DAIKIN

# Installation and Maintenance Manual

# IM 1137-4

Group: **Chiller**
Part Number: **IM1137-4**
Date: **June 2018**
**Supersedes: July 2017**

# Templifier®
# Heat Recovery Water Heaters

## Model TGZ, B Vintage
## 600 to 3100 MBH
## HFC-134a Refrigerant
## 60/50 Hz

**Manufactured in an ISO 9001 & ISO 14001 certified facility**

# Pre-Start Checklist – Scroll Compressor Chillers

*Must be completed, signed, and provided to Daikin Applied at least 2 weeks prior to requested start date.*

| | |
|---|---|
| **Job Name** | |
| **Installation Location** | |
| **Customer Order Number** | |
| **Model Number(s)** | |
| **G.O. Number(s)** | |

| **Chilled Water** | **Yes** | **No** | **N/A** | **Initials** |
|---|---|---|---|---|
| Piping Complete | | | | |
| Water strainer installed on evaporator entering chilled water piping **per IM** | | | | |
| Water System filled, flushed and vented | | | | |
| Pumps installed and operational (rotation checked, strainers cleaned) | | | | |
| Controls operational (3-way valves, face/bypass dampers, bypass valves, etc.) | | | | |
| Water system operated and tested; flow meets unit design requirements | | | | |
| Flow switch installed and wired | | | | |
| Vent installed on evaporator | | | | |
| Glycol at design % | | | | |
| **Electrical** | **Yes** | **No** | **N/A** | **Initials** |
| Building controls operational | | | | |
| *Power leads connected to power block or optional disconnect | | | | |
| Power leads have been checked for proper phasing and voltage | | | | |
| All interlock wiring complete and compliant with Daikin specifications | | | | |
| Power applied at least 12 hours before startup | | | | |
| Oil heaters energized at least 12 hours before startup | | | | |
| Chiller components (EXV Sensors Transducers) installed and wired properly. | | | | |
| *Wiring complies with National Electrical Code and local codes (See Notes) | | | | |
| Remote EXV wired with shielded cable | | | | |
| **Miscellaneous** | **Yes** | **No** | **N/A** | **Initials** |
| Unit control switches all off | | | | |
| **Remote Evaporator / Condenser Piping** factory reviewed | | | | |
| All refrigerant components/piping leak tested, evacuated and charged | | | | |
| Thermometers, wells, gauges, control, etc., installed | | | | |
| Minimum system load of 80% capacity available for testing/adjusting controls | | | | |
| **Document Attached:** Technical Breakdown from Selection Software | | | | |
| **Document Attached:** Final Order Acknowledgement | | | | |
| **Document Attached:** Remote piping approval | | | | |

**Notes:** The most common problems delaying start-up and affecting unit reliability are:

1. Field installed compressor motor power supply leads too small. Questions: Contact the local Daikin sales representative*. State size, number and type of conductors and conduits installed:
   a. From Power supply to chiller _____

* Refer to NFPA 70-2017, Article 440.35

2. Remote Evaporator piping incomplete or incorrect. Provide approved piping diagrams.
3. Items on this list incorrectly acknowledged resulting in delayed start and possible extra expenses incurred by return trips.

Cut Here

## Contractor Representative

Signed: _____

Name: _____

Company: _____

Date: _____

Phone/Email: _____

## Daikin Applied Sales Representative

Signed: _____

Name: _____

Company: _____

Date: _____

Phone/Email: _____

This manual provides installation, operation, and maintenance information for the Daikin TGZ Templifier® Heat Recovery Scroll Water Heater with the MicroTech® II controller. Complete operating and maintenance information is in OMM 1136.

**NOTE:** Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equpuipment.

**⚠ 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® II control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

**⚠ 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.

**⚠ CAUTION**

When moving refrigerant to/from the chiller from an auxiliary tank, a grounding strap must be used. An electrical charge builds when halo-carbon refrigerant travels in a rubber hose. A grounding strap must be used between the auxiliary refrigerant tank and the chiller's end sheet (earth ground), which will safely take the charge to the ground. Damage to sensitive electronic components could occur if this procedure is not followed.

## HAZARD IDENTIFICATION INFORMATION

**⚠ DANGER**

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

**⚠ WARNING**

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

**⚠ CAUTION**

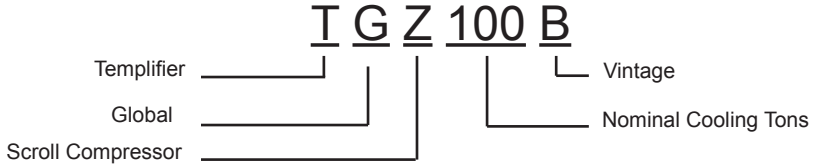
Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

# General Description

Daikin TGZ water heaters are scroll compressor refrigeration units that recover heat from warm fluid streams in the evaporator and deliver hot water, at a useful temperature, from the condenser to a heating load. They are designed for indoor installations only and are completely assembled, wired, charged and tested. Each unit consists of four or six (depending on unit size) scroll compressors, evaporator (brazed-plate on models 040 through 120 and shell-and-tube evaporators on models 150 to 190), shell-and-tube condenser/heater, and complete refrigerant piping.

There are two refrigerant circuits, each with manual liquid line shutoff valves, charging valves, filter-driers, liquid line solenoid valves, sight glass/moisture indicators, and expansion valves. The electrical control center includes a MicroTech II® control system and other components necessary for dependable automatic operation.

NOMENCLATURE



# Inspection

When the equipment is received, all items should be carefully checked against the bill of lading to provide a complete shipment. All units must be carefully inspected for damage upon arrival. All shipping damage must be reported to the carrier and a claim must be filed with the carrier. The unit serial number plate should be checked before unloading the unit to be sure that it agrees with the power supply available. Physical damage to unit after acceptance is not the responsibility of Daikin Applied.

**NOTE:** Unit shipping and operating weights are given in the Physical Data Tables beginning on page 25

# Handling

Every model TGZ water heater is shipped with a full refrigerant charge that is isolated in the condenser by the manual condenser liquid valve and the compressor discharge service valve.

If the unit has been damaged, allowing the refrigerant to escape, there can be danger of suffocation in the equipment area since the refrigerant will displace the air. Be sure to review Environmental Protection Agency (EPA) requirements if damage has occurred. Avoid exposing an open flame to the refrigerant.

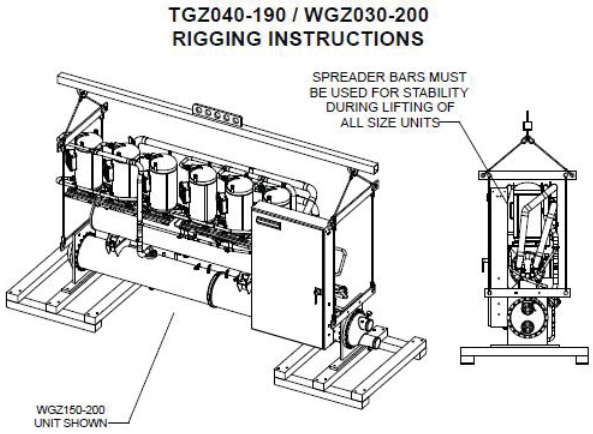
The skid option is strongly recommended for ease of handling and to help prevent damage during installation.

**⚠ WARNING**

Avoid contact with sharp edges. Personal injury can result.

Improper riggin, lifting, or moving of a unit can result in property damage, severe personal injury or death. Follow rigging and moving instructions carefully. Do not stand beneath the unit while it is lifted or being istalled.

***Figure 1: Lifting the Unit***




It is recommended that all moving and handling be performed with skids under the unit when possible and that the skids not be removed until the unit is in the final location. When moving the unit, dollies or simple rollers can be used under the skids.

Never put the weight of the unit against the control box.

When moving, only apply pressure to the base on the skids, and not to the piping or shells. Avoid dropping the unit at the end of the roll.

If the unit must be hoisted, it is necessary to lift the unit by attaching cables or chains at the lifting holes located on the disposable lifting bars. Spreader bars must be used to protect the control cabinet and other areas of the unit. See Figure 1.

Do not attach slings to piping or equipment. Move unit in the upright horizontal position at all times. Set unit down gently when lowering from the trucks or rollers. See Table 12 on page 24 for total and point weights.

# Location

The unit is designed for indoor application and must have equipment room temperature for operating and standby conditions between 40°F to 122°F (4.4°C to 50°C).

Because of the electronic control devices, the units should not be exposed to the weather. A plastic cover over the control box is supplied as temporary protection during shipment. A reasonably level and sufficiently strong floor is required for the unit. If necessary, additional structural members should be provided to transfer the weight of the unit to the nearest beams.

**NOTE:** Unit shipping and operating weights are available in the weights section starting in Table 12 on page 24

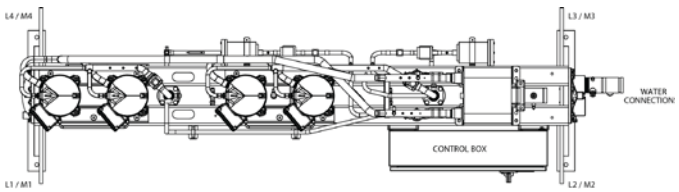
## *Placing the Unit*

The small amount of vibration normally encountered with the water chiller makes this unit particularly desirable for basement or ground floor installations where the unit can be mounted directly to the floor. The floor construction should be such that the unit will not affect the building structure nor will it transmit noise and vibration into the structure.

## *Vibration Isolators*

It is recommended that isolators be used on all upper level installations or in areas where vibration transmission is a consideration.

***Figure 2: Isolator Locations***




**NOTE:** Representative model for isolator location numbering only; ordered unit configuration may be different than shown.

Once the unit has been located, set the unit in place and level with a spirit level. When spring-type isolators are required, install springs running under the main unit supports.

The unit should be set initially on shims or blocks at the listed spring free height. When all piping, wiring, flushing, charging, etc., is completed, the springs are adjusted upward to loosen the blocks or shims that are then removed. Refer to Table 12 on page 24 for correct lifting and mounting locations.

Installation of spring isolators requires flexible piping connections and at least three feet of flexible electrical conduit to avoid straining the piping and transmitting vibration and noise.

A rubber anti-skid pad should be used under isolators if hold-down bolts are not used.

***Table 1: Vibration Mounting Location and Kit Number***

| TGZ MODEL | R-I-S MOUNTING LOCATION | | | | | SPRING-FLEX MOUNTING LOCATION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | M1 (LEFT-FRONT) | M2 (RIGHT-FRONT) | M3 (RIGHT-REAR) | M4 (LEFT-REAR) | KIT PART NUMBER | M1 (LEFT-FRONT) | M2 (RIGHT-FRONT) | M3 (RIGHT-REAR) | M4 (LEFT-REAR) | KIT PART NUMBER |
| 040B | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | 332325701 | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | 332320701 |
| 050B | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | 332325701 | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | 332320701 |
| 060B | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | RP-3 Gray-WR | 332325701 | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | CP1E-ID-900 Dk. Green | 332320701 |
| 080B | RP-4 Brown-WR | RP-4 Brown-WR | RP-4 Brown-WR | RP-4 Brown-WR | 332325702 | CP2E-ID-1350 Dk. Purple | CP2E-ID-1350 Dk. Purple | CP2E-ID-1350 Dk. Purple | CP2E-ID-1350 Dk. Purple | 332320702 |
| 100B | RP-4 Brown-WR | RP-4 Brown-WR | RP-4 Brown-WR | RP-4 Brown-WR | 332325702 | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | 332320703 |
| 110B | RP-4 Red-WR | RP-4 Red-WR | RP-4 Red-WR | RP-4 Red-WR | 332325703 | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | 332320703 |
| 120B | RP-4 Red-WR | RP-4 Red-WR | RP-4 Red-WR | RP-4 Red-WR | 332325703 | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | CP2E-ID-1800 Dk. Green | 332703703 |
| 150B | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | 332325704 | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | 332320704 |
| 170B | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | 332325704 | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | 332320704 |
| 190B | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | RP-4 Lime-WR | 332325704 | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | CP2E-ID-2400 Gray | 332320704 |

**NOTE:** Refer to Figure 2 on page 6 for locating isolators.

**NOTE:** For spring-flex mountings, CP2E have two springs per isolator housing, CP1E have one spring per housing.

***Figure 3: Spring Flex Mounting (CP-1) Isolator Dimensions***

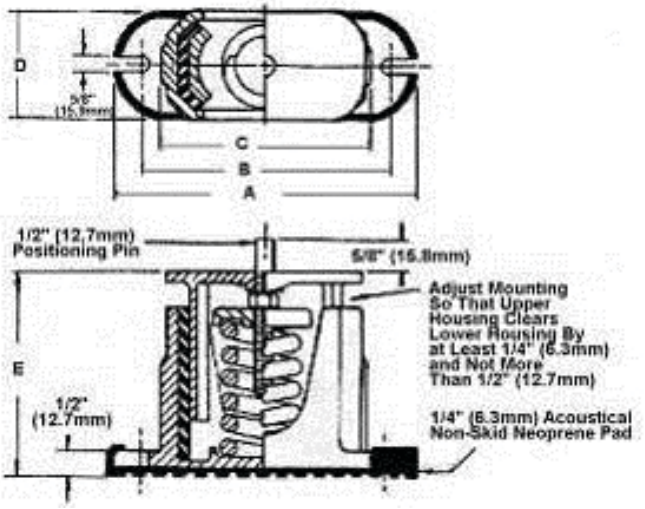



***Figure 4: Spring Flex Mounting (CP-2) Isolator Dimensions***

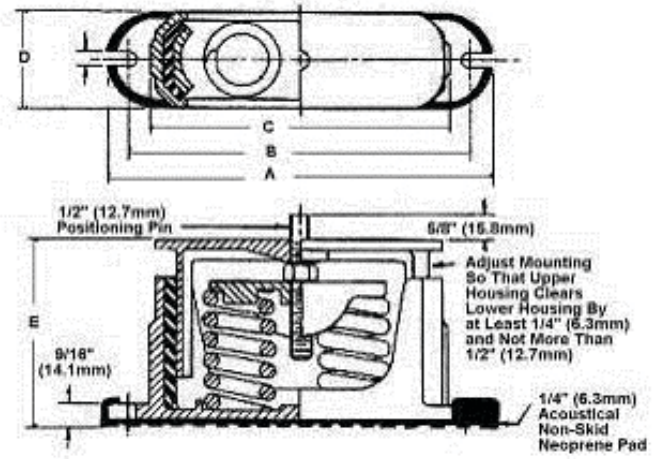



***Figure 5: Rubber-in-Shear Mounting (RP-3) Isolator Dimensions***

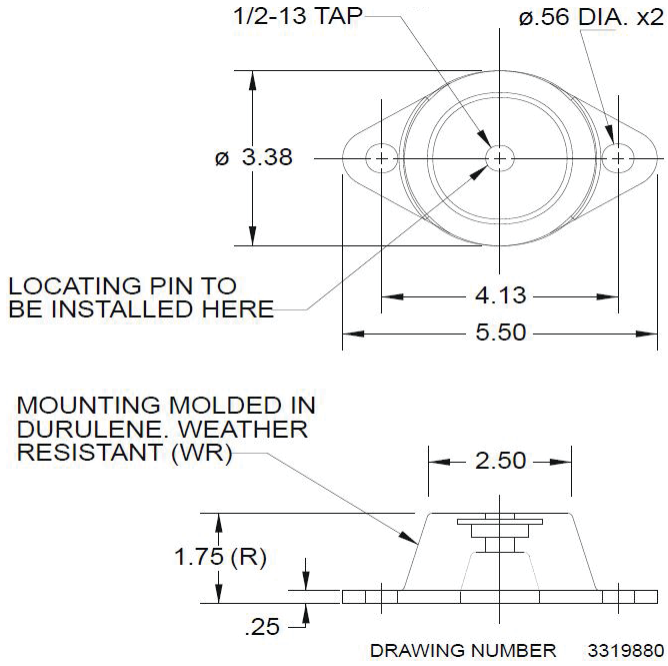
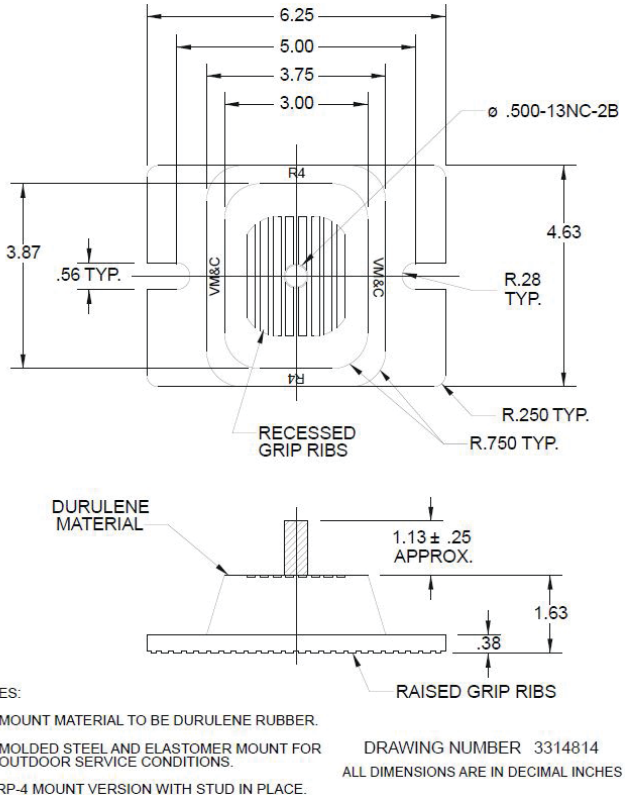



***Figure 6: Rubber-in-Sheer Mounting (RP-4) Isolater Dimensions***



# Chilled Water Piping

**⚠ CAUTION**

To prevent damage to the evaporator and potential chiller failure, a supply strainer is required in the inlet water piping which connects to this evaporator. This strainer must be installed prior to operation of the chilled liquid pumps.

**NOTE:** Since the Templifier evaporator and/or condenser may have to be valved off for cleaning or repair, it may be desirable to pipe a bypass around them so that system source and hot water flow is not interrupted.

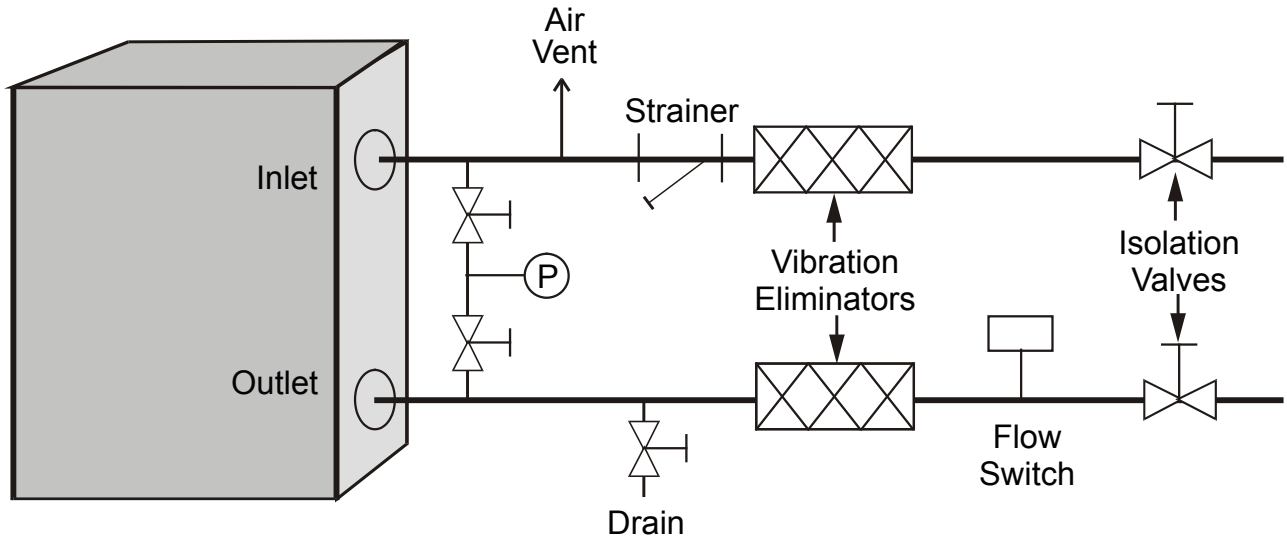
Field installed water piping to the chiller **must** include:

- 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).
- TGZ models require a strainer with perforations no larger than 0.062" (1.6 mm) diameter. See the Inlet Strainer Guidelines on Table 2 on page 11 for more information.
- A water flow switch must be installed in the horizontal piping of the supply (evaporator outlet) water line to avoid evaporator freeze-up under low or no flow conditions. The flow switch may be ordered as a factory-installed option, a field-installed kit, or may be supplied and installed in the field.
- Piping for units with brazed-plate evaporators must have a drain and vent connection provided in the bottom of the lower connection pipe and to the top of the upper connection pipe, respectively. See Figure 7. These evaporators do not have drain or vent connections due to their construction.
- Purge air from the water system before unit start-up to provide adequate flow through the evaporator.
- Adequate piping support, independent from the unit, to eliminate weight and strain on the fittings and connections.

It is **recommended** that the field installed water piping to the chiller include:

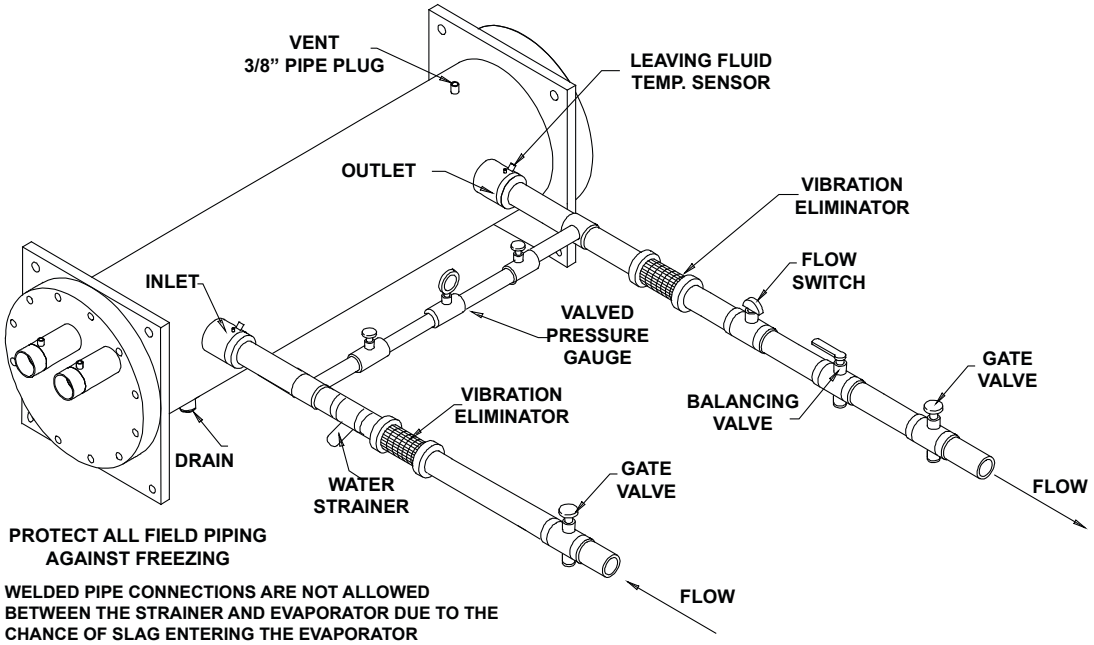
- Thermometers at the inlet and outlet connections of the evaporator.
- Water pressure gauge connection taps and gauges at the inlet and outlet connections of the evaporator for measuring water pressure drop.
- Shutoff valves are necessary to isolate the unit from the piping during unit servicing.
- Minimum bends and changes in elevation to minimize pressure drop.
- An expansion tank and regulating valve to maintain adequate water pressure. Tank becomes required for closed loop systems based on water volume and temperature ranges.
- Vibration eliminators in both the supply and return water lines to reduce transmissions to the building.
- Flush the system water piping thoroughly before making connections to the unit evaporator.
- Piping insulation, including a vapor barrier, helps prevent condensation and reduces heat loss.
- Regular water analysis and chemical water treatment for the evaporator loop is recommended immediately at equipment start-up.

***Figure 7: Typical Piping for Brazed-Plate Evaporator***




**WELDED PIPE CONNECTIONS ARE NOT ALLOWED BETWEEN THE STRAINER AND EVAPORATOR DUE TO THE CHANCE OF SLAG ENTERING THE EVAPORATOR**

*Figure 8: Typical Piping for Shell and Tube Evaporator*




### *Groove Coupling / Flow Switch Warning*

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. PVC piping should not be used.

On units utilizing shell-and-tube evaporator vessels and factory-mounted flow switches and flange connections (groove-to-flange adaptors or weld-on flanges), relocating the flow switch is required to allow for possible future replacement. The flange will interfere with unscrewing the switch. The following procedure is recommended before installing a flange to avoid interference:

1.Remove the flow switch and plug the switch opening in the nozzle.

2.Install the groove-to-flange adaptor or weld on flange.

3.Relocate the flow switch in the water piping outside the flange close enough to it that the wire leads will reach and the switch can still be unscrewed.

## Source Water Piping

The system water piping must be flushed thoroughly prior to making connections to the unit evaporator. Lay out the water piping so the source water circulating pump discharges into the evaporator inlet.

**⚠ CAUTION**

A cleanable strainer must be placed in the water lines at the water inlet to the evaporator to remove debris and impurities before they reach the evaporator. Failure to do so will cause damage to the equipment. Please refer to Table 2 on page 11 for model-specific diameter sizes.

**⚠ CAUTION**

Templifier Models TGZ 040 - TGZ 120 must have clean source water from a closed and treated loop going to the brazed-plate evaporator. For open water loop applications, an intermediate heat exchanger between the source water and evaporator is required. Failure to provide a clean, closed water loop can cause equipment failure and possible revocation of the unit warranty.

Templifier evaporator water can come from various sources and care must be exercised to avoid sources that can cause corrosion, fouling, or accumulation of debris in the heat exchanger. Borderline cases will require a careful and rigorously performed maintenance schedule.

## Inlet Strainer Guidelines

An inlet water strainer must be installed in the chilled water piping before the evaporator inlet. Two paths are available to meet this requirement:

1. A field-installed kit shipped loose with the unit that consists of:

- Y-type area strainer with 304 stainless steel perforated basket, groove pipe connections and strainer cap. Refer to Table 2
- Extension pipe with two Schrader fittings that can be used for a pressure gauge and thermal dispersion flow switch. The pipe provides sufficient clearance from the evaporator for strainer basket removal.
- ½-inch blowdown valve
- Two grooved clamps

The strainer is sized per Table 2. Connection sizes are given in Dimensions beginning on Figure 17 on page 19.

2. A field-supplied strainer that meets specification and installation requirements of this manual on www.DaikinApplied.com.

***Table 2: Evaporator Characteristics***

| Unit Size | 040B-120B | 150B-190B |
|---|---|---|
| Evaporator | Brazed Plate | Shell-and tube |
| Materials | Stainless Steel, Copper | Carbon Steel, Copper |
| Max Perf. Size | No larger than 0.062" dia. | No larger than 0.125" dia. |
| Cleaning | Chemical | Chemical |

Inlet and outlet connections are clearly marked on the unit and also appear on the dimension drawings, beginning with Figure 17 on page 19. Drain connections should be provided at all low points in the system to permit complete drainage. Air vents should be located at the high points in the system to purge out air. A vent connection, located on top of the evaporator vessel, permits the purging of air out of the evaporator. Air purged from the water system prior to unit start-up provides adequate flow through the vessel and prevents safety cutouts on the freeze protection. System pressure should be maintained by using a properly sized expansion tank.

Pressure gauges should be installed in the inlet and outlet water lines to the evaporator. Pressure drop through the evaporator should be measured to calculate proper gpm (L/s) as specified in the Pressure Drop tables starting with Figure 14 on page 16.

Source water piping may have to be insulated (depending on its temperature) to reduce heat loss and prevent condensation if cold water is used. If cooling tower water is used, insulation may not be necessary. Complete unit and system leak tests should be performed prior to insulating the water piping. Insulation with a vapor barrier is recommended. If the vessel is insulated, the vent and drain connections must extend beyond the proposed insulation thickness for accessibility. If the unit operates year-round, or if the system is not drained for the winter, the chilled water piping exposed to outdoor ambient should be protected against freezing by wrapping the lines with a heater cable.

## Source/Hot Water Thermostat

The source water temperature sensor is factory installed in the leaving water connection on the evaporator. The controlling hot water sensor is in the leaving condenser connection. A sensor is also located in the entering water connection in order to measure the condenser Delta-T. Care should be taken not to damage the sensor cable or lead wires when working around the unit. It is also advisable to check the lead wire before running the unit to be sure that it is firmly anchored and not rubbing on the frame or any other component.

If the sensor is ever removed from the well for servicing, care must be taken as not to wipe off the heat conducting compound supplied in the well.

The units can be switched from heating to cooling. In the cooling mode they are controlled by a thermistor in the leaving evaporator connection, in the heating mode by the leaving condenser thermistor.

## Flow Switch

A water flow switch must be mounted in the evaporator and condenser leaving water lines to prove adequate water flow to the vessels before the unit can start. This will safeguard against slugging the compressors on startup. It also serves to shut down the unit in the event that water flow is interrupted to guard against evaporator freeze-up.

A flow switch is available from Daikin Applied (part # 01750330). It is a "paddle" type switch and adaptable to any pipe size from 1" (25mm) to 6" (152mm) nominal. Certain minimum flow rates are required to close the switch and are listed in Table 3. Installation should be as shown on Figure 9. See Figure 28 on page 31 for terminal locations. The normally open contacts of the flow switch should be wired between these two terminals. There is also a set of normally closed contacts on the switch that could be used for an indicator light or an alarm to indicate when a "no flow" condition exists.

**NOTE:** Install per the vendor instructions and calibrate to a safe setting based on the application design flow.

1. The flow arrow must be pointed in the correct direction.

2. Provide a straight length of pipe before and after the flow switch of at least five times the pipe diameter.

3. Trim flow switch paddle if needed to fit the pipe diameter. Make sure paddle does not hang up in pipe.

**⚠ CAUTION**

Make sure the arrow on the side of the switch is pointed in the direction of flow. Install per manufacturer's instructions. Incorrect installation will cause improper operation and possible evaporator damage.

***Table 3: Flow Switch Minimum Flow Rates***

| Nominal Pipe Size Inches (mm) | Minium Req'd Flow to Active Switch - GPM (l/s) |
|---|---|
| 2 (50.8) | 18.8 (1.2) |
| 2 1/2 (63.5) | 24.3 (1.5) |
| 3 (76.2) | 30.0 (1.9) |
| 4 (101.6) | 39.7 (2.5) |
| 5 (127.0) | 58.7 (3.7) |
| 6 (152.4) | 79.2 (5.0) |

*Figure 9: Flow Switch*

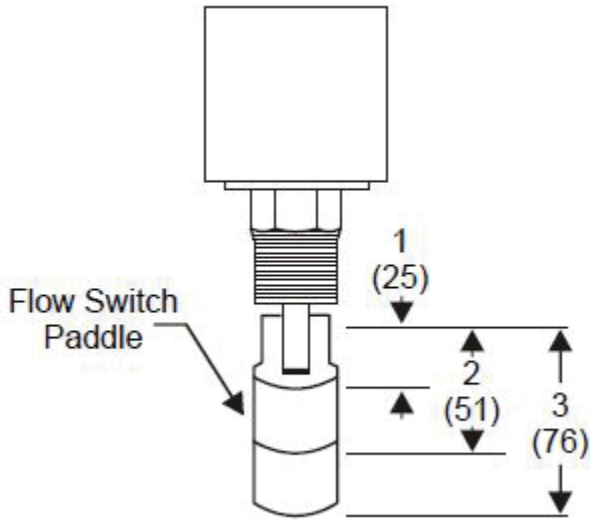
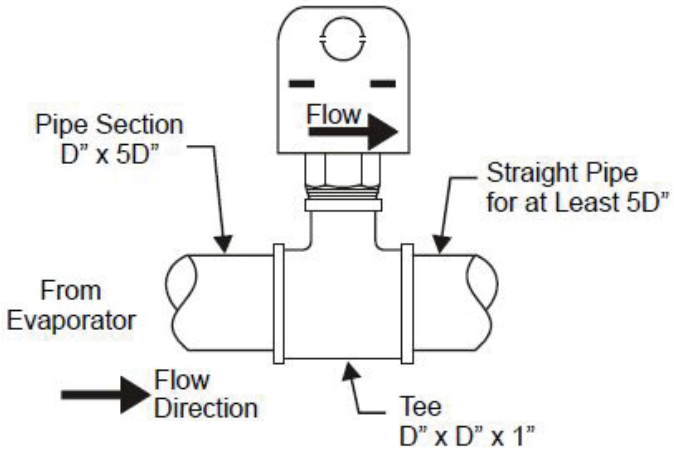



*Figure 10: Flow Switch (view from end of cooler)*




## Glycol Solutions

The use of glycol in Templifier systems is rare, but if used, the system glycol capacity, glycol solution flow rate in gpm (Lps), pressure drop through the cooler, and system pressure drop can be calculated using the following formulas and table.

1. Capacity — Capacity is reduced from that with plain water. To find the reduced value multiply the unit's water system capacity by the capacity correction factor C, as shown in Table 4 and Table 5, to find the unit's capacity in the glycol system.

2. GPM —To determine evaporator gpm (or ΔT) knowing ΔT (or gpm) and capacity:

$$Glycol\ GPM = \frac{24\ x\ Glycol\ Capacity}{\Delta T}\ x\ G\ FromTables$$

3. Pressure Drop — To determine glycol pressure drop through the cooler, enter the proper water pressure drop curve, beginning on page 16, at the water flow. Multiply the water pressure drop found there by P to obtain corrected glycol pressure drop.

4. To determine glycol system kW, multiply the water system kW by factor K. Test coolant with a clean, accurate glycol solution hydrometer to determine the freezing point. Obtain percent glycol from the freezing point table below.

Daikin Applied encourages a minimum glycol concentration of 25% be provided on all glycol applications. Glycol concentrations below 25% have too little inhibitor content for long-term corrosion protection of ferrous metals.

**NOTE:** The effect of glycol in the condenser is negligible and there is no capacity derate. There is a significant increase in pressure drop.

*Table 4: Ethylene Glycol*

| | Freezing Point | | | | | P (Pressure Drop) |
|---|---|---|---|---|---|---|
| % Glycol | °F | °C | C (Capacity) | K (Power) | G (Flow) | |
| 20 | 18 | -8 | 0.982 | 0.992 | 1.04 | 1.129 |
| 30 | 7 | -14 | 0.972 | 0.986 | 1.074 | 1.181 |
| 40 | -7 | -22 | 0.961 | 0.976 | 1.121 | 1.263 |
| 50 | -28 | -33 | 0.946 | 0.966 | 1.178 | 1.308 |

*Table 5: Propylene Glycol*

| | Freezing Point | | | | | P (Pressure Drop) |
|---|---|---|---|---|---|---|
| % Glycol | °F | °C | C (Capacity) | K (Power) | G (Flow) | |
| 20 | 19 | -7 | 0.975 | 0.985 | 1.028 | 1.147 |
| 30 | 9 | -13 | 0.962 | 0.978 | 1.05 | 1.248 |
| 40 | -5 | -21 | 0.946 | 0.971 | 1.078 | 1.366 |
| 50 | -27 | -33 | 0.929 | 0.965 | 1.116 | 1.481 |

*Table 6: Burst Protection*

| Percent Volume Glycol Concentration Required | | |
|---|---|---|
| Temp F (C) | For Burst Protection | |
| | Ethylene Glycol | Propylene Glycol |
| 20 (6.7) | 11 | 12 |
| 10 (-12.2) | 17 | 20 |
| 0 (-17.8) | 22 | 24 |
| -10 (-23.3) | 26 | 28 |
| -20 (-28.9) | 30 | 30 |
| -30 (-34.4) | 30 | 33 |
| -40 (-40.0) | 30 | 35 |
| -50 (-45.6) | 30 | 35 |
| -60 (-51.1) | 30 | 35 |

**⚠ CAUTION**

Do not use automotive grade antifreeze. Industrial grade glycols must be used. Automotive antifreeze contains inhibitors which will cause plating on the copper within the unit evaporator. The type and handling of glycol used must be consistent with local codes.

## Condenser Water Piping

Arrange the condenser water so the water enters the bottom connection of the condenser. The condenser water will discharge the condenser from the top connection. Failing to arrange the condenser water as stated above will negatively affect the capacity and efficiency. Note that the condensers are shipped as either two-pass (10 to 15-degree F Delta-T) or four-pass (15 to 40-degree F Delta-T). For 2-pass, the connections are on the vertical centerline of the condenser. For 4-pass, they are off to one side.

Pressure gauges should be installed in the inlet and outlet water lines to the condenser. Pressure drop through the condenser should be measured to determine gpm (L/s) from pressure drop curves starting on page 16. Vibration eliminators are recommended in both the supply and return water lines.

Templifier hot water systems usually have a supplementary heater located after (downstream) of the Templifier condenser to either boost the hot water temperature or to function as a standby heater.

Care should be exercised to avoid overly warm water coming back to the Templifier from the system and causing a relief valve discharge. This is true whether the unit is running or off. Maximum temperature is 160°F.

Some jurisdictions require double heat exchange walls between refrigerant and potable water. Potable water run directly through a condenser has only one heat exchange wall (the condenser tube), and certain jurisdictions may require an intermediate heat exchanger.

# Refrigerant Relief Valve Piping

Relief valves are located in the following location and require piping per code, usually to the outside of the building. All valve connections are 5/8-inch flare. There is:

- One relief valve in the suction piping of each of two circuits
- One relief valve on the shell of each of two condenser circuits
- One additional valve in the discharge piping of circuits with 30 HP compressors

***Table 7: Relief Valve Piping***

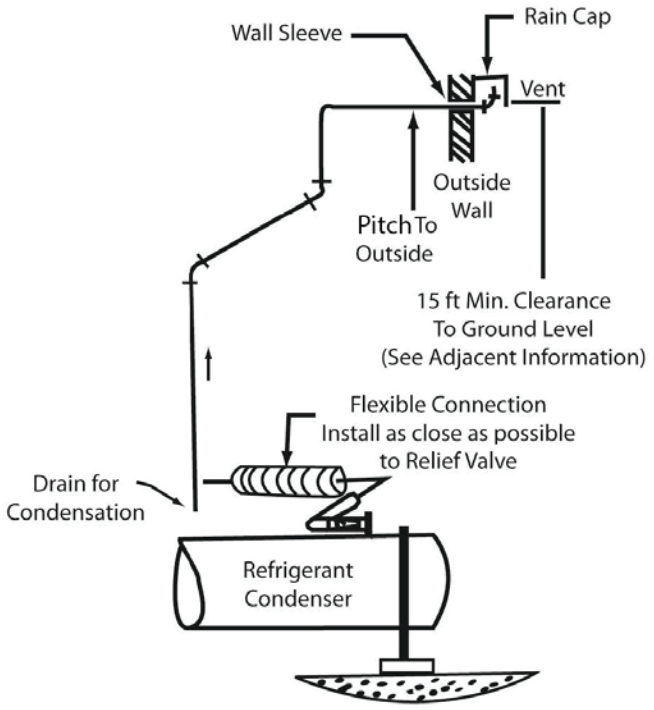
| TGZ Model Size | Suction Line Total | Cond. Shell Total | 30 HP Disch. Line Total | Total per Unit |
|---|---|---|---|---|
| 040B, 050B, 060B, 080B, 100B, 150B | 2 | 2 | 0 | 4 |
| 110B, 170B | 2 | 2 | 1 | 5 |
| 120B, 190B | 2 | 2 | 2 | 6 |

The current ANSI/ASHRAE Standard 15 specifies that pressure relief valves on vessels containing Group 1 refrigerant (R-134a) “shall discharge to the atmosphere at a location not less than 15 feet (4.6 meters) above the adjoining ground level and not less than 20 feet (6.1 meters) from any window, ventilation opening or exit in any building.” The piping must be provided with a rain cap at the outside terminating point and a drain at the low point on the vent piping to prevent water buildup on the atmospheric side of the relief valve. In addition, a flexible pipe section should be installed in the line to eliminate any piping stress on the relief valve(s).

The size of the discharge pipe from the pressure relief valve shall not be less than the size of the pressure relief outlet. When two or more vessels are piped together, the common header and piping to the atmosphere shall not be less than the sum of the area of the relief valve outlets connected to the header. Fittings should be provided to permit vent piping to be easily disconnected for inspection or replacement of the relief valve.

**NOTE:** Provide adequate fittings in piping to permit repair or replacement of relief valve.

*Figure 11: Relief Valve Piping*




## Heating and Cooling Units

Templifiers can be arranged and controlled to act as either a water chiller or a water heater. These systems vary considerably in the specifics of the piping arrangement. Care must be exercised when changeover occurs to avoid mixing water streams that could possibly contaminate a water system. For example, a unit can have chilled water in the evaporator and tower water in the condenser when in the cooling mode. Changeover to heating could put tower water through the evaporator and hot water (possibly potable water) through the condenser. This could introduce tower water into the chilled water system and into the hot water system and should be avoided.

## Water Pressure Drop

The vessel flow rates must fall between the minimum and maximum values shown on the appropriate evaporator and condenser curves beginning on page 16. Flow rates below the minimum values shown will result in laminar flow that will reduce efficiency, cause erratic operation of the expansion valve, and could cause low temperature cutoffs. On the other hand, flow rates exceeding the maximum values shown can cause erosion on the evaporator water tubes.

Measure the water pressure drop through the vessels at field installed pressure taps. It is important not to include valves or strainers in these readings.

The condenser flow rate will determine whether 2-pass or 4-pass condensers are used, according toTable 8

*Table 8: Condenser Flow Rate*

| Condenser Δ-T | Passes | Flow Rate |
|---|---|---|
| 10 - 15° F | 2-Pass | High |
| 15 - 40° F | 4-Pass | Low |

*Figure 12: Piping Schematic, Models TGZ 040 – 120*

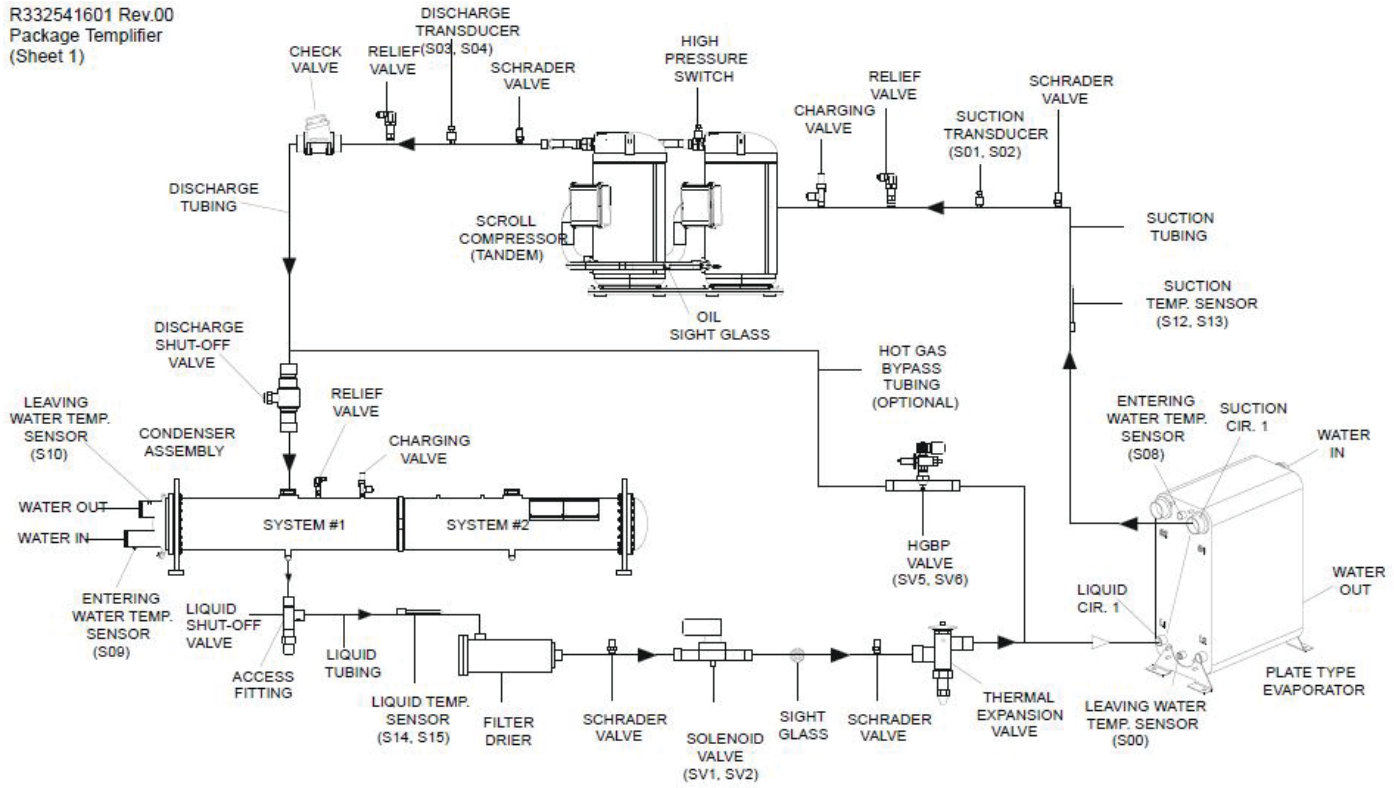



*Figure 13: Piping Schematic, Models TGZ 150 – 190*

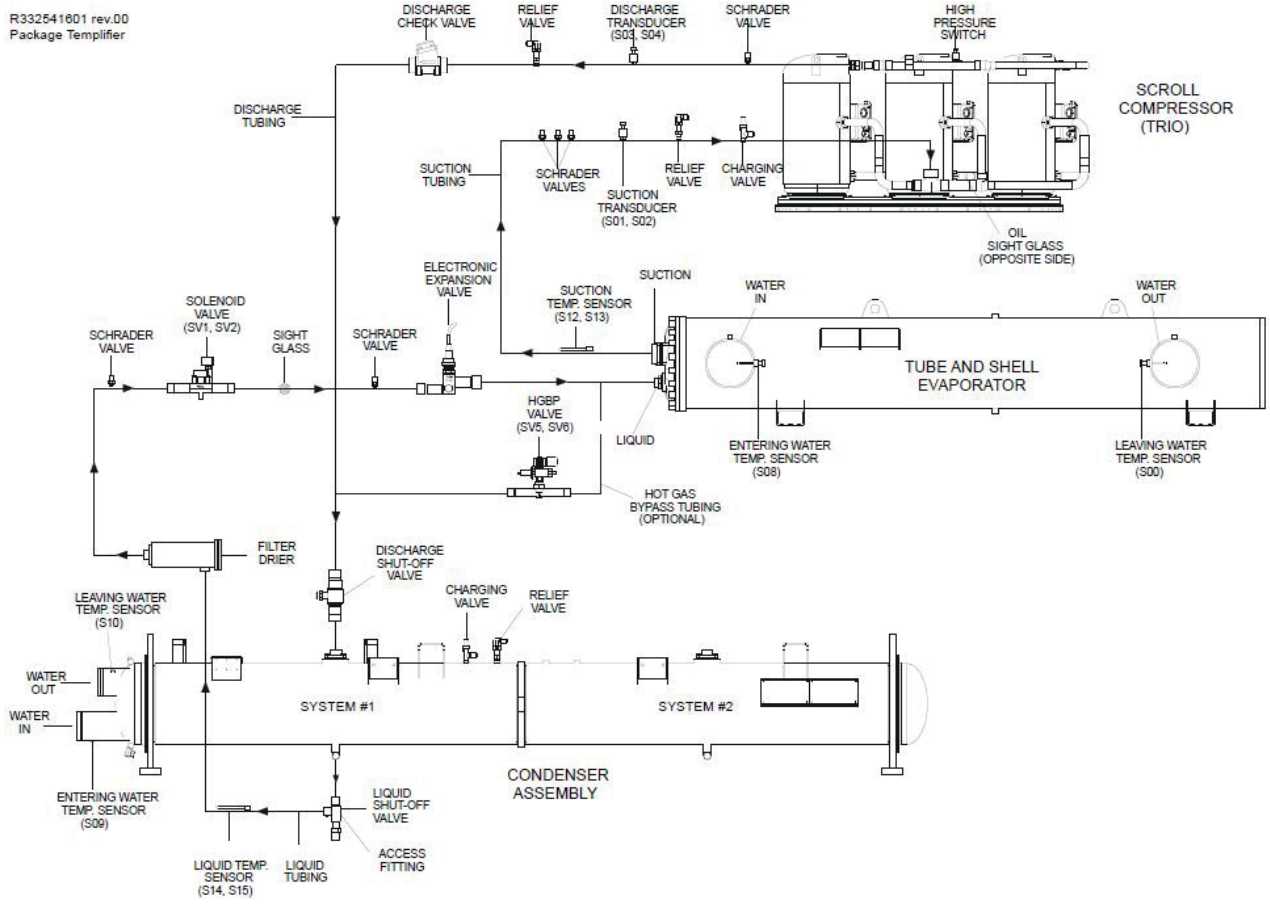


*Figure 14: Evaporator Pressure Drop*

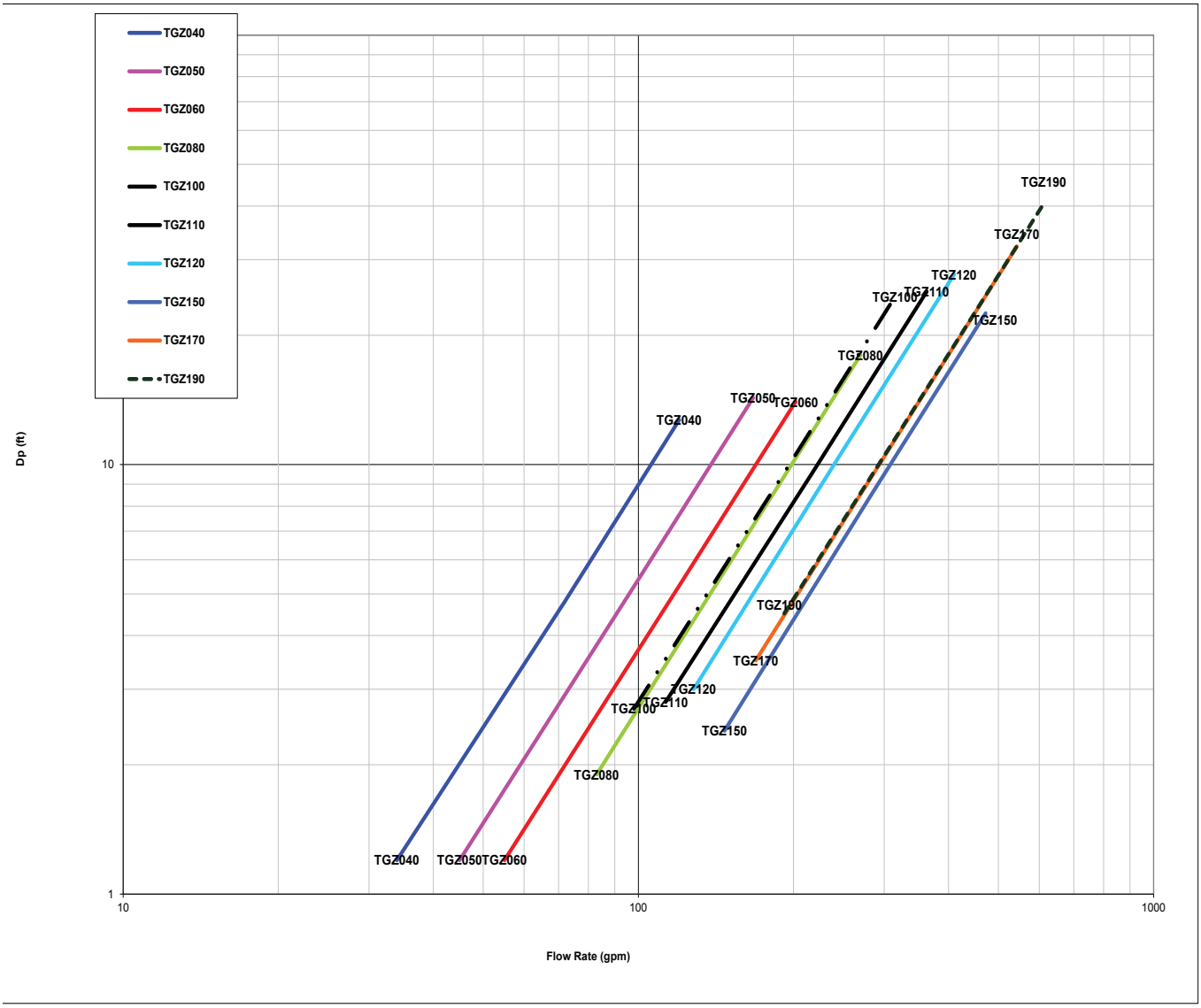



*Table 9: Evaporator Pressure Drop*

| TGZ Unit | Evap | Minimum Flow Rate | | | | Nominal Flow Rate | | | | Maximum Flow Rate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | |
| | | gpm | DP ft. | lps | DP kpa | gpm | DP ft. | lps | DP kpa | gpm | DP ft. | lps | DP kpa |
| 40 | AC500DQ-62H | 34 | 1.2 | 2.1 | 3.4 | 72 | 4.8 | 4.5 | 14.4 | 120 | 12.7 | 7.6 | 37.9 |
| 50 | AC500DQ-82H | 45 | 1.2 | 2.8 | 3.5 | 100 | 5.4 | 6.3 | 16.1 | 167 | 14.3 | 10.5 | 42.8 |
| 60 | AC500DQ-102H | 55 | 1.2 | 3.5 | 3.5 | 121 | 5.3 | 7.6 | 15.8 | 202 | 14.0 | 12.7 | 42.0 |
| 80 | AC500DQ-122H | 83 | 1.9 | 5.2 | 5.7 | 162 | 6.8 | 10.2 | 20.3 | 270 | 18.0 | 17.0 | 53.7 |
| 100 | AC500DQ-142H | 98 | 2.7 | 6.2 | 8.0 | 189 | 9.3 | 11.9 | 27.8 | 315 | 24.6 | 19.9 | 73.4 |
| 110 | AC500DQ-162H | 113 | 2.8 | 7.1 | 8.2 | 218 | 9.6 | 13.8 | 28.7 | 363 | 25.3 | 22.9 | 75.6 |
| 120 | AC500DQ-182H | 128 | 3.0 | 8.1 | 9.1 | 246 | 10.5 | 15.5 | 31.4 | 410 | 27.7 | 25.9 | 82.9 |
| 150 | EV34191111/9 | 147 | 2.4 | 9.3 | 7.3 | 283 | 8.5 | 17.9 | 25.4 | 472 | 22.5 | 29.8 | 67.2 |
| 170 | EV34191212/7 | 169 | 3.5 | 10.7 | 10.5 | 326 | 12.2 | 20.6 | 36.5 | 543 | 32.2 | 34.3 | 96.2 |
| 190 | EV34191212/7 | 192 | 4.5 | 12.1 | 13.4 | 369 | 15.5 | 23.3 | 46.3 | 615 | 40.9 | 38.8 | 122.3 |

*Figure 15: Standard Four-pass Condenser Pressure Drop*

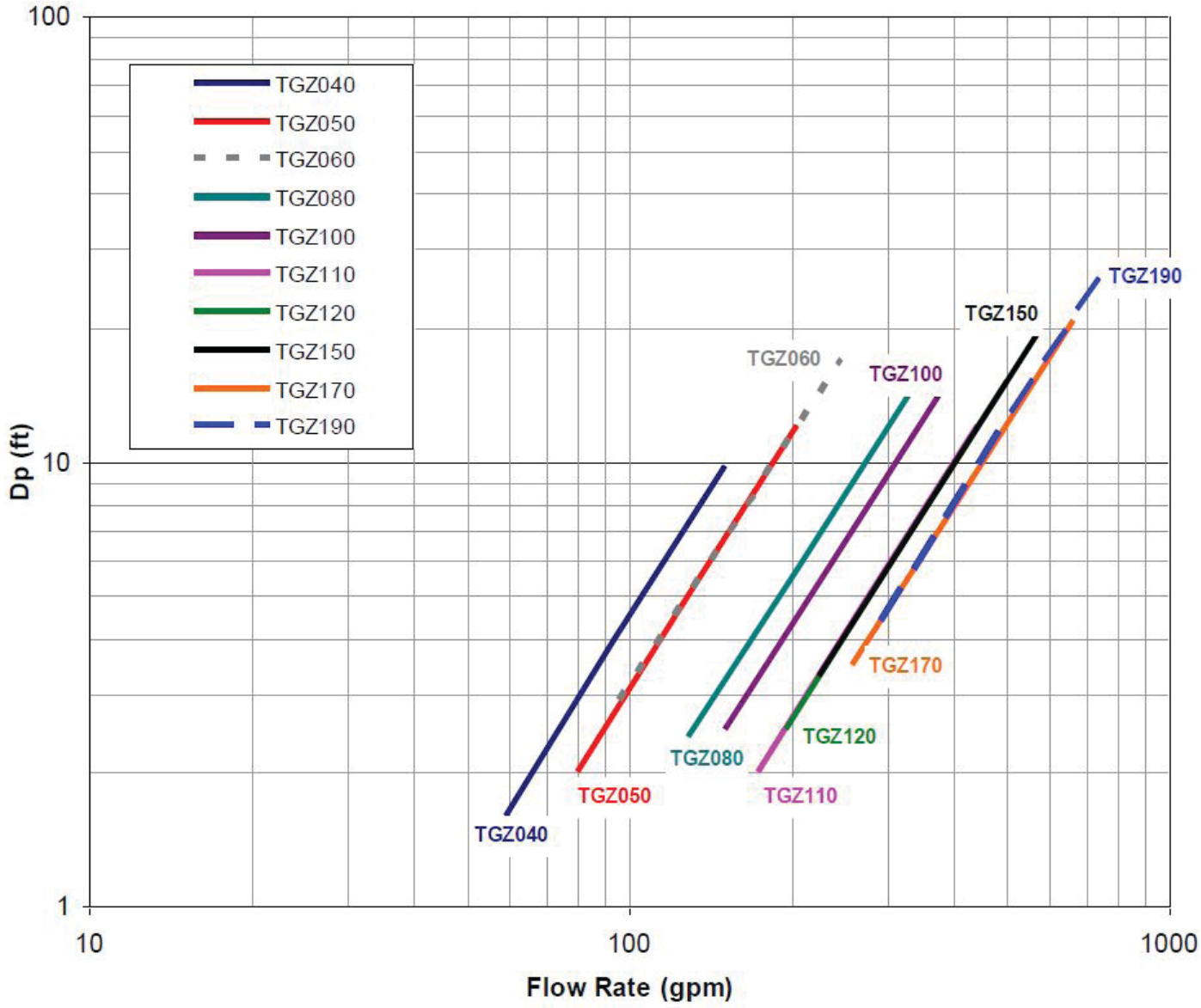



*Table 10: Standard Four-pass Condenser Pressure Drop*

| UNIT MODEL | COND. MODEL | Minimum Flow Rate | | | | Nominal Flow Rate | | | | Maximum Flow Rate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | |
| | | GPM | DP ft | lps | DP kpa | GPM | DP ft | lps | DP kpa | GPM | DP ft | lps | DP kpa |
| TGZ040 | C1010-62 | 23 | 1.93 | 1.45 | 5.77 | 47 | 7.5 | 3.0 | 22.4 | 63 | 13.1 | 4.0 | 39.1 |
| TGZ050 | C1010-62 | 32 | 2.44 | 2.02 | 7.29 | 64 | 9.1 | 4.0 | 27.2 | 86 | 16.0 | 5.4 | 47.7 |
| TGZ060 | C1010-76 | 38 | 3.40 | 2.40 | 10.16 | 77 | 13.0 | 4.9 | 38.9 | 103 | 22.6 | 6.5 | 67.5 |
| TGZ080 | C1410-112 | 51 | 2.84 | 3.22 | 8.49 | 103 | 10.8 | 6.5 | 32.3 | 138 | 18.8 | 8.7 | 56.3 |
| TGZ100 | C1410-128 | 60 | 3.00 | 3.79 | 8.97 | 120 | 11.2 | 7.6 | 33.5 | 160 | 19.3 | 10.1 | 57.8 |
| TGZ110 | C1610-164 | 69 | 2.44 | 4.35 | 7.29 | 138 | 9.1 | 8.7 | 27.2 | 184 | 15.7 | 11.6 | 47.0 |
| TGZ120 | C1610-164 | 78 | 3.08 | 4.92 | 9.21 | 156 | 11.5 | 9.8 | 34.4 | 208 | 19.9 | 13.1 | 59.4 |
| TGZ150 | C1612-164 | 90 | 4.85 | 5.68 | 14.50 | 180 | 18.1 | 11.4 | 54.1 | 240 | 31.3 | 15.1 | 93.4 |
| TGZ170 | C1612-184 | 103 | 4.89 | 6.50 | 14.60 | 207 | 18.4 | 13.1 | 55.0 | 276 | 31.8 | 17.4 | 95.0 |
| TGZ190 | C1612-184 | 117 | 6.24 | 7.38 | 18.66 | 234 | 23.3 | 14.8 | 69.6 | 312 | 40.2 | 19.7 | 120.3 |

*Figure 16: Optional Two-pass Condenser*

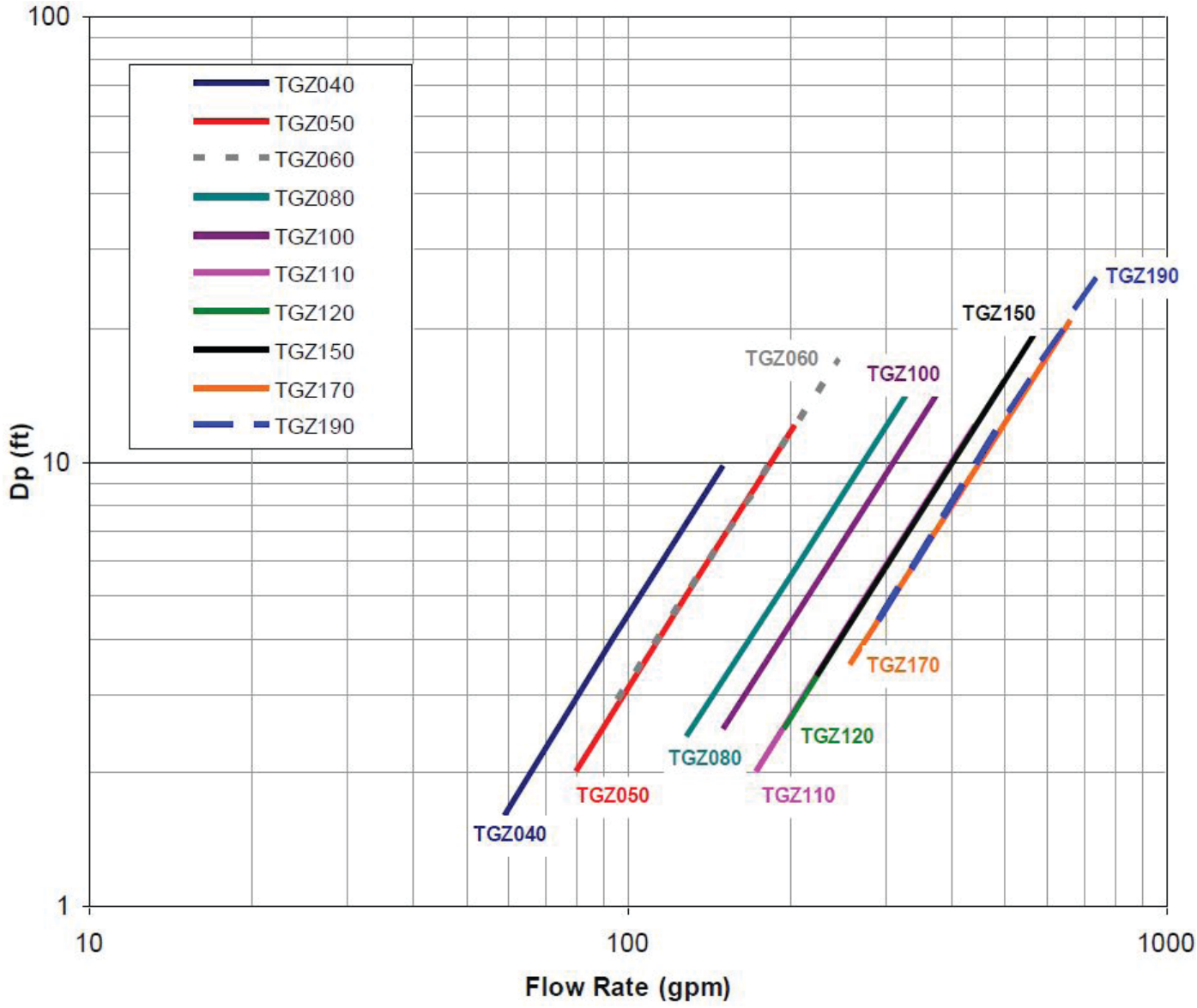
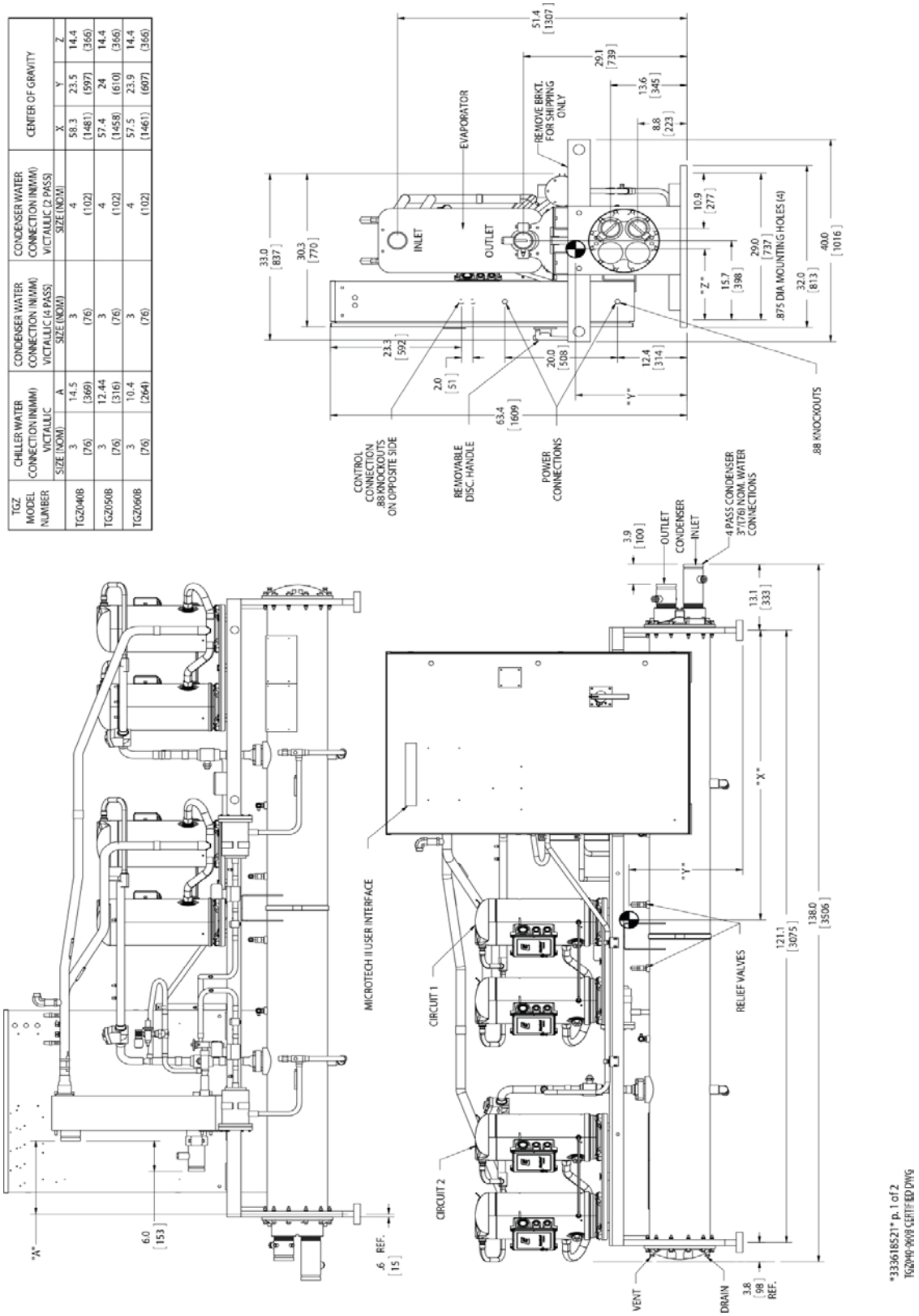



*Table 11: Optional Two-pass Condenser*

| TGZ UNIT MODEL | COND. MODEL | Minimum Flow Rate | | | | Nominal Flow Rate | | | | Maximum Flow Rate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | | Inch-Pound | | S.I. | |
| | | GPM | DP ft | lps | DP kpa | GPM | DP ft | lps | DP kpa | GPM | DP ft | lps | DP kpa |
| TGZ040 | C1010-62 | 59 | 1.6 | 3.7 | 4.9 | 94 | 4.0 | 5.9 | 12.0 | 150 | 9.8 | 9.5 | 29.3 |
| TGZ050 | C1010-62 | 80 | 2.0 | 5.0 | 6.0 | 128 | 4.9 | 8.1 | 14.6 | 205 | 12.0 | 12.9 | 35.8 |
| TGZ060 | C1010-76 | 96 | 2.9 | 6.1 | 8.5 | 154 | 7.0 | 9.7 | 20.9 | 246 | 17.0 | 15.5 | 51.0 |
| TGZ080 | C1410-112 | 129 | 2.4 | 8.1 | 7.1 | 206 | 5.8 | 13.0 | 17.3 | 330 | 14.2 | 20.8 | 42.3 |
| TGZ100 | C1410-128 | 150 | 2.5 | 9.5 | 7.3 | 240 | 6.0 | 15.1 | 17.9 | 384 | 14.7 | 24.2 | 43.8 |
| TGZ110 | C1610-164 | 173 | 2.0 | 10.9 | 6.0 | 276 | 4.9 | 17.4 | 14.6 | 442 | 12.0 | 27.9 | 35.8 |
| TGZ120 | C1610-164 | 195 | 2.5 | 12.3 | 7.6 | 312 | 6.2 | 19.7 | 18.5 | 499 | 15.1 | 31.5 | 45.3 |
| TGZ150 | C1612-164 | 225 | 3.3 | 14.2 | 9.9 | 360 | 8.1 | 22.7 | 24.2 | 576 | 19.8 | 36.3 | 59.1 |
| TGZ170 | C1612-184 | 259 | 3.5 | 16.3 | 10.4 | 414 | 8.5 | 26.1 | 25.4 | 662 | 20.8 | 41.8 | 62.1 |
| TGZ190 | C1612-184 | 293 | 4.4 | 18.5 | 13.2 | 468 | 10.8 | 29.5 | 32.3 | 749 | 26.4 | 47.2 | 78.8 |

***Figure 17: Dimensions, TGZ040B – TGZ060B, Standard 4-pass Condenser***

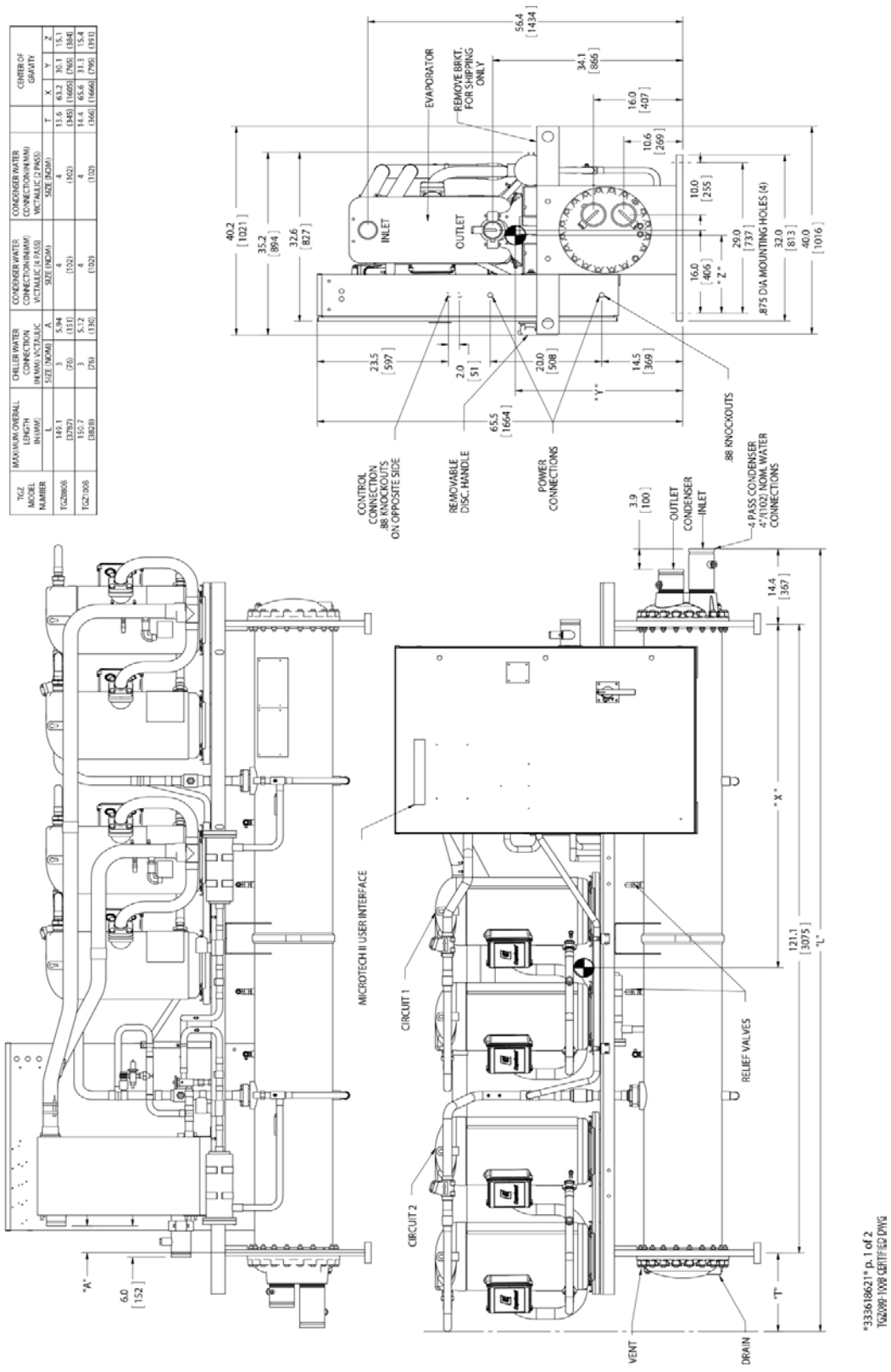
| TGZ MODEL NUMBER | CHILLER WATER CONNECTION IN(MM) VICTAULIC | | CONDENSER WATER CONNECTION IN(MM) VICTAULIC (4 PASS) | CONDENSER WATER CONNECTION IN(MM) VICTAULIC (2 PASS) | CENTER OF GRAVITY | | |
|---|---|---|---|---|---|---|---|
| | SIZE (NOM) | A | SIZE (NOM) | SIZE (NOM) | X | Y | Z |
| TGZ040B | 3 (76) | 14.5 (369) | 3 (76) | 4 (102) | 58.3 (1481) | 23.5 (597) | 14.4 (366) |
| TGZ050B | 3 (76) | 12.44 (316) | 3 (76) | 4 (102) | 57.4 (1458) | 24 (610) | 14.4 (366) |
| TGZ060B | 3 (76) | 10.4 (264) | 3 (76) | 4 (102) | 57.5 (1461) | 23.9 (607) | 14.4 (366) |




**NOTE:** See “Weights” on Table 12 on page 24 for lifting and corner weights. Left-hand condenser connections are an available option.

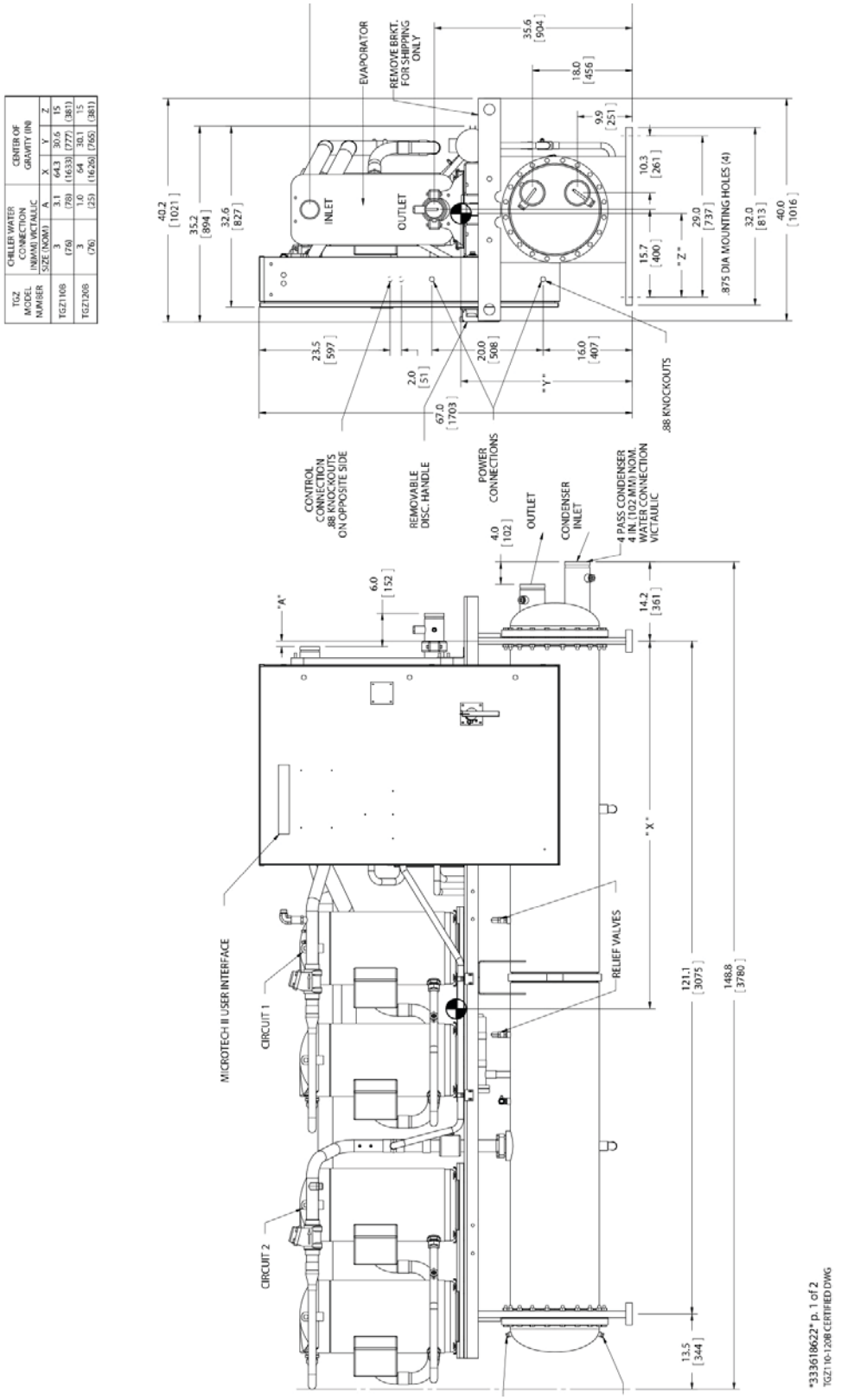
*Figure 18: Dimensions, TGZ080B – TGZ100B, Standard 4-Pass Condenser*

| TGZ MODEL NUMBER | MAXIMUM OVERALL LENGTH IN (MM) | CHILLER WATER CONNECTION (IN/MM) VICTAULIC | CONDENSER WATER CONNECTION (IN/MM) VICTAULIC (4 PASS) | CONDENSER WATER CONNECTION (IN/MM) VICTAULIC (2 PASS) | CENTER OF GRAVITY | | |
|---|---|---|---|---|---|---|---|
| | | SIZE (NOM) | SIZE (NOM) | SIZE (NOM) | | X | Y | Z |
| TGZ0808 | 149.1 (3792) | 3 (76) | 4 (102) | 4 (102) | 13.6 (345) | 63.3 (1605) | 30.1 (765) | 15.1 (384) |
| TGZ1008 | 150.2 (3828) | 3 (76) | 5 1/2 (130) | 4 (102) | 14.4 (366) | 65.6 (1666) | 31.3 (795) | 15.4 (391) |




**NOTE:** See “Weights” on Table 12 on page 24 for lifting and corner weights. Left-hand condenser connections are an available option.

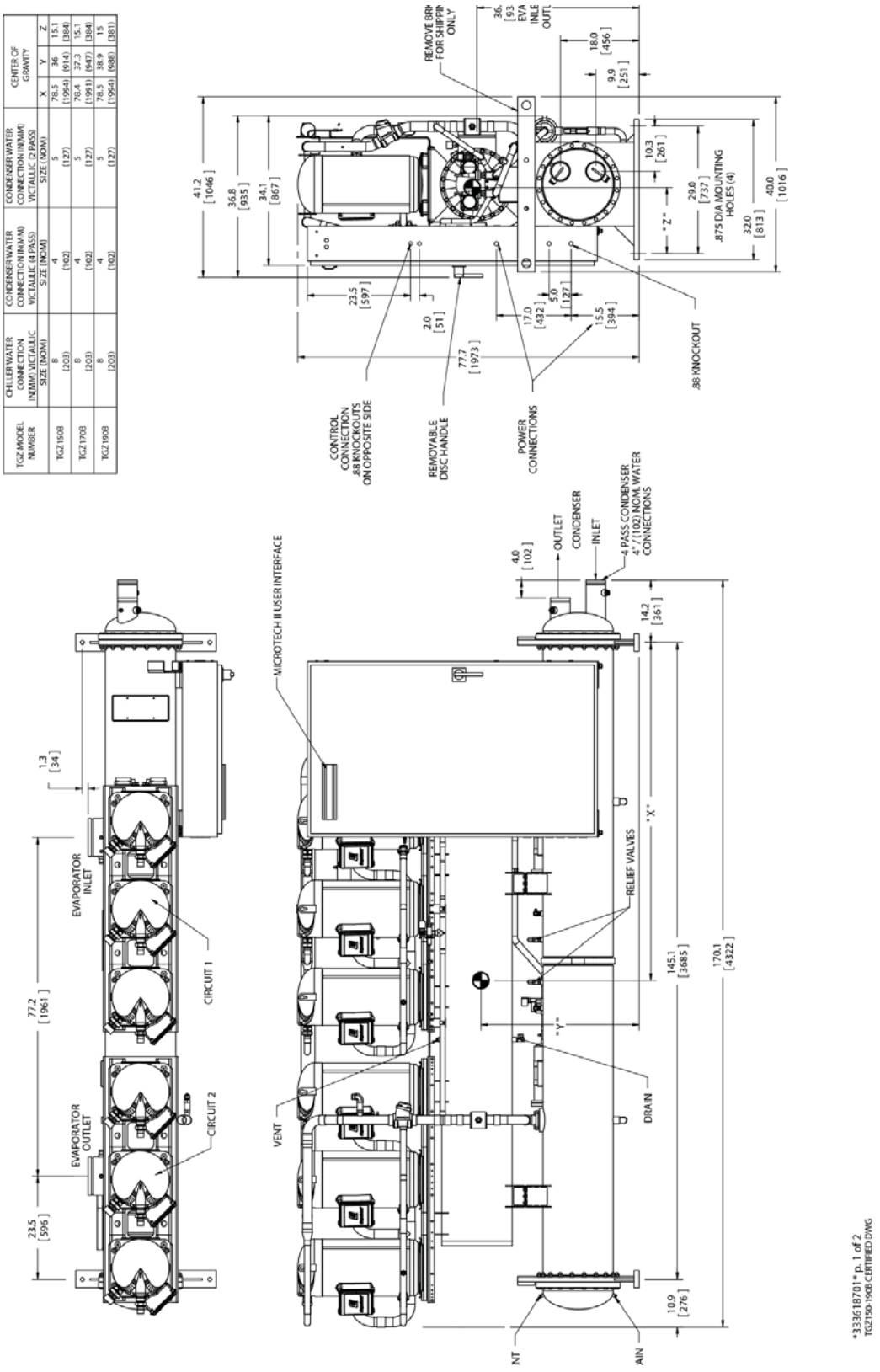
*Figure 19: Dimensions, TGZ110B – TGZ120B, Standard 4-Pass Condenser*




**NOTE:** See “Weights” on Table 12 on page 24 for lifting and corner weights. Left-hand condenser connections are an available option.

*Figure 20: Dimensions, TGZ150B –TGZ190B, Standard 4-Pass Condenser*

| TGZ MODEL NUMBER | CHILLER WATER CONNECTION IN/MM: VICTAULIC SIZE (NOM) | CONDENSER WATER CONNECTION IN/MM) VICTAULIC (4 PASS) SIZE (NOM) | CONDENSER WATER CONNECTION IN/MM) VICTAULIC (2 PASS) SIZE (NOM) | CENTER OF GRAVITY X | Y | Z |
|---|---|---|---|---|---|---|
| TGZ150B | 8 (203) | 4 (102) | 5 (127) | 78.5 (1994) | 36 (914) | 15.1 (384) |
| TGZ170B | 8 (203) | 4 (102) | 5 (127) | 78.4 (1991) | 37.3 (947) | 15.1 (384) |
| TGZ190B | 8 (203) | 4 (102) | 5 (127) | 78.5 (1994) | 38.9 (988) | 15 (381) |




**NOTE:** See “Weights” on Table 12 on page 24 for lifting and corner weights. Left-hand condenser connections are an available option.

**NOTE:** For optional left-hand connections, reverse the images below.

***Figure 21: Dimensions, TGZ040B – TGZ060B, Optional 2-Pass condenser***

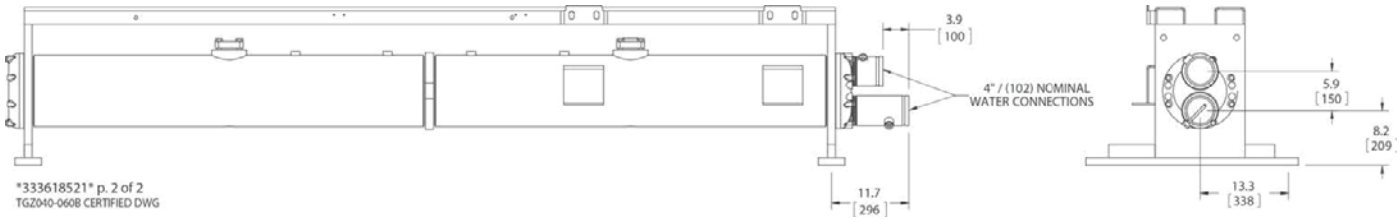



***Figure 22: Dimensions, TGZ080B –TGZ100B, Optional 2-Pass Condenser***

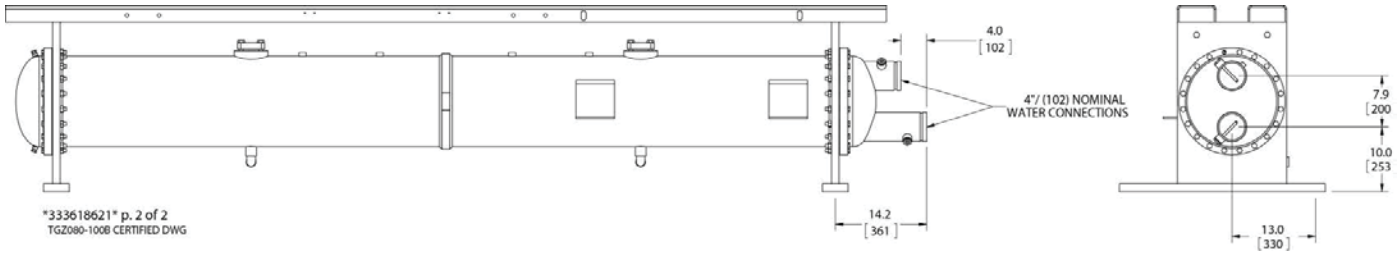



***Figure 23: Dimensions, TGZ110B – TGZ120B, Optional 2-Pass Condenser***

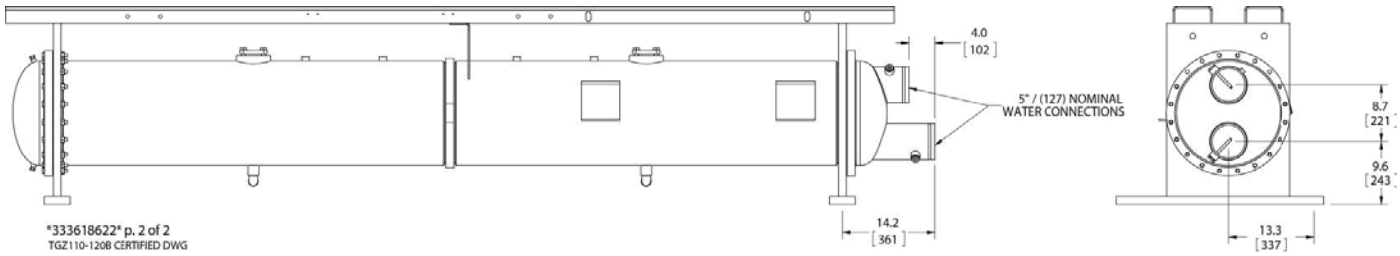
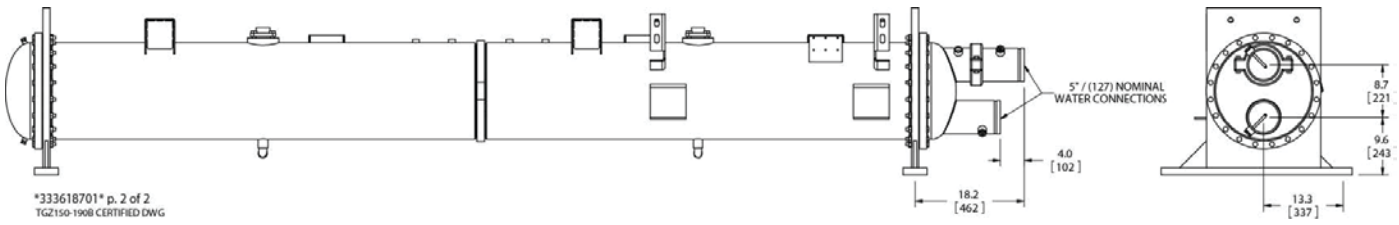



***Figure 24: Dimensions, TGZ150B – TGZ190B, Optional 2-Pass Condenser***




**NOTE:** Tube sheet-to-tube sheet dimensions are the same for a 4-pass condenser.

# Weights

**NOTE:** Refer to Figure 25 for lifting and mounting point's physical location.

***Table 12: TGZ Lifting, Mounting, and Total Weights, Inch-Lbs Units***

| MODEL | LIFTING WEIGHT FOR EACH POINT (LBS) | | | | MOUNTING LOADS FOR EACH POINT (LBS) | | | | SHIPPING WEIGHT (LBS) | OPERATING WEIGHT (LBS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 | L2 | L3 | L4 | M1 | M2 | M3 | M4 | | |
| TGZ040B | 592 | 638 | 625 | 580 | 633 | 682 | 668 | 620 | 2434 | 2604 |
| TGZ050B | 590 | 653 | 641 | 580 | 633 | 701 | 688 | 622 | 2464 | 2644 |
| TGZ060B | 597 | 660 | 650 | 588 | 646 | 714 | 703 | 636 | 2496 | 2699 |
| TGZ080B | 1034 | 947 | 1021 | 1115 | 1111 | 1017 | 1097 | 1198 | 4116 | 4422 |
| TGZ100B | 1126 | 952 | 1072 | 1268 | 1211 | 1023 | 1152 | 1363 | 4418 | 4749 |
| TGZ110B | 1271 | 1123 | 1207 | 1366 | 1375 | 1215 | 1305 | 1478 | 4967 | 5373 |
| TGZ120B | 1257 | 1122 | 1195 | 1339 | 1361 | 1214 | 1294 | 1450 | 4913 | 5319 |
| TGZ150B | 1823 | 1546 | 1675 | 1975 | 2046 | 1735 | 1880 | 2216 | 7019 | 7877 |
| TGZ170B | 1846 | 1570 | 1694 | 1991 | 2077 | 1767 | 1906 | 2241 | 7101 | 7991 |
| TGZ190B | 1848 | 1566 | 1682 | 1986 | 2081 | 1763 | 1894 | 2235 | 7082 | 7972 |

***Table 13: TGZ Lifting, Mounting, and Total Weights, SI Units***

| MODEL | LIFTING WEIGHT FOR EACH POINT (KG) | | | | MOUNTING LOADS FOR EACH POINT (KG) | | | | SHIPPING WEIGHT (KG) | OPERATING WEIGHT (KG) |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 | L2 | L3 | L4 | M1 | M2 | M3 | M4 | | |
| TGZ040B | 269 | 289 | 283 | 263 | 287 | 309 | 303 | 281 | 1104 | 1181 |
| TGZ050B | 268 | 296 | 291 | 263 | 287 | 318 | 312 | 282 | 1118 | 1199 |
| TGZ060B | 271 | 299 | 295 | 267 | 293 | 324 | 319 | 288 | 1132 | 1224 |
| TGZ080B | 469 | 430 | 463 | 506 | 504 | 461 | 498 | 543 | 1867 | 2006 |
| TGZ100B | 511 | 432 | 486 | 575 | 549 | 464 | 523 | 618 | 2004 | 2154 |
| TGZ110B | 577 | 509 | 547 | 620 | 624 | 551 | 592 | 670 | 2253 | 2437 |
| TGZ120B | 570 | 509 | 542 | 607 | 617 | 551 | 587 | 658 | 2229 | 2413 |
| TGZ150B | 827 | 701 | 760 | 896 | 928 | 787 | 853 | 1005 | 3184 | 3573 |
| TGZ170B | 837 | 712 | 768 | 903 | 942 | 802 | 865 | 1017 | 3221 | 3625 |
| TGZ190B | 838 | 710 | 763 | 901 | 944 | 800 | 859 | 1014 | 3212 | 3616 |

***Figure 25: Lifting and Mounting Points Location***

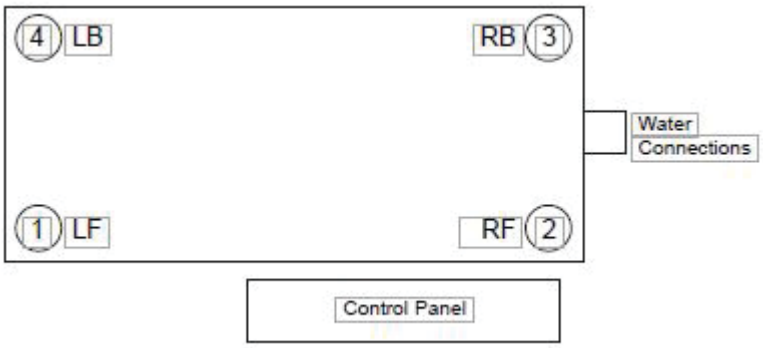


*Table 14: TGZ 040B – 060B*

| TGZ Unit Model | TGZ040B | | TGZ050B | | TGZ060B | |
|---|---|---|---|---|---|---|
| No. Of Circuits | 2 | | 2 | | 2 | |
| **COMPRESSORS (4)** | | | | | | |
| Nominal Horsepower | 10 | 10 | 13 | 13 | 15 | 15 |
| Number per Circuit | 2 | 2 | 2 | 2 | 2 | 2 |
| Unloading Steps, % | 25 / 50 / 75 100 | | 25 / 50 / 75 100 | | 25 / 50 / 75 100 | |
| Oil Charge, per compr. Oz (l) | 110 (3.3) | | 110 (3.3) | | 110 (3.3) | |
| **CONDENSER** | | | | | | |
| Number | 1 | | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | | 2 | |
| Diameter, in. (mm) | 10.75 (273) | | 10.75 (273) | | 10.75 (273) | |
| Tube Length, in (mm) | 122 (3099) | | 122 (3099) | | 122 (3099) | |
| Design W.P.,psig (kPa): | | | | | | |
| Refrigerant Side | 500 (3447) | | 500 (3447) | | 500 (3447) | |
| Water Side | 232 (1599) | | 232 (1599) | | 232 (1599) | |
| Relief Valve Setting, psig (kPa) | 500 (3447) | | 500 (3447) | | 500 (3447) | |
| No. Of Water Passes - Standard | 4 | | 4 | | 4 | |
| No. Of Water Passes - Optional | 2 | | 2 | | 2 | |
| Water Volume, gallons (l) | 13.6 (51.5) | | 13.6 (51.5) | | 16.3 (61.8) | |
| Pump-Down Refrig Capacity lb. (kg) (3) | 121.7(55.2) | 121.7(55.2) | 121.7(55.2) | 121.7(55.2) | 107.3(48.7) | 107.3(48.7) |
| Connections: | | | | | | |
| Water In & Out, in., (mm) (4 Pass) | 3 (76) | | 3 (76) | | 3 (76) | |
| Water In & Out, in., (mm) (2 Pass) | 4 (102) | | 4 (102) | | 4 (102) | |
| Relief Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | | 5/8 (15.9) | |
| Purge Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | | 5/8 (15.9) | |
| Vent & Drain, in (mm) FPT | 1/2 (12.7) | | 1/2 (12.7) | | 1/2 (12.7) | |
| Liquid Subcooling | Integral | | Integral | | Integral | |
| **EVAPORATOR** | | | | | | |
| Number | 1 | | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | | 2 | |
| Water Volume, gallons (1) | 3.7 (14.0) | | 5.0 (18.9) | | 5.0 (18.9) | |
| Refrigerant Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | | 450 (3102) | |
| Relief Valve Setting, psig (kPa) | 450 (3102) | | 450 (3102) | | 450 (3102) | |
| Water Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | | 450 (3102) | |
| Water Connections: | | | | | | |
| In & Out, in. (mm) victaulic | 3 (76) | | 3 (76) | | 3 (76) | |
| Drain & Vent | Field Supplied | | Field Supplied | | Field Supplied | |
| **UNIT DIMENSIONS** | | | | | | |
| Length, in. (mm) | 138 (3506) | | 138 (3506) | | 138 (3506) | |
| Width, in. (mm) | 33 (838) | | 33 (838) | | 33 (838) | |
| Height, in. (mm) | 63.2 (1605) | | 63.2 (1605) | | 63.2 (1605) | |
| **UNIT WEIGHTS** | | | | | | |
| Operating WT., lb., (kg) | 2604 (1181) | | 2644 (1199) | | 2699 (1224) | |
| Shipping WT., lb. (kg) | 2434 (1104) | | 2464 (1117) | | 2496 (1132) | |
| R-134a Ref. Charge, lb. (kg) | 45 (20.4) | 45 (20.4) | 45 (20.4) | 45 (20.4) | 50 (22.7) | 50 (22.7) |

*Table 15: TGZ080B – 100B*

| TGZ Unit Model | TGZ080B | | TGZ100B | |
|---|---|---|---|---|
| No. Of Circuits | 2 | | 2 | |
| **COMPRESSORS (2)** | | | | |
| Nominal Horsepower | 20 | 20 | 25 | 25 |
| Number per Circuit | 2 | 2 | 2 | 2 |
| Unloading Steps, % | 25 / 50 / 75 100 | | 25 / 50 / 75 100 | |
| Oil Charge, per compr. Oz (l) | 158 (4.7) | | 200 (5.9) | |
| **CONDENSER** | | | | |
| Number | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | |
| Diameter, in. (mm) | 14 (356) | | 14 (356) | |
| Tube Length, in (mm) | 122 (3099) | | 122 (3099) | |
| Design W.P.,psig (kPa): | | | | |
| Refrigerant Side | 500 (3447) | | 500 (3447) | |
| Water Side | 232 (1599) | | 232 (1599) | |
| Relief Valve Setting, psig (kPa) | 500 (3447) | | 500 (3447) | |
| No. Of Water Passes - Standard | 4 | | 4 | |
| No. Of Water Passes - Optional | 2 | | 2 | |
| Water Volume, gallons (1) | 27.5 (104) | | 27.5 (104) | |
| Pump-Down Refrig Capacity lb. (kg) (3) | 186 (84.2) | | 186 (84.2) | |
| Connections: | | | | |
| Water In & Out, in., (mm) (4 Pass) | 4 (102) | | 4 (102) | |
| Water In & Out, in., (mm) (2 Pass) | 4 (102) | | 4 (102) | |
| Relief Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | |
| Purge Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | |
| Vent & Drain, in (mm) FPT | 1/2 (12.7) | | 1/2 (12.7) | |
| Liquid Subcooling | Intergral | | Intergral | |
| **EVAPORATOR** | | | | |
| Number | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | |
| Water Volume, gallons (1) | 8.7 (32.9) | | 8.7 (32.9) | |
| Refrigerant Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | |
| Relief Valve Setting, psig (kPa) | 450 (3102) | | 450 (3102) | |
| Water Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | |
| Water Connections: | | | | |
| In & Out, in. (mm) victaulic | 3 (76) | | 3 (76) | |
| Drain & Vent | Field Supplied | | Field Supplied | |
| **UNIT DIMENSIONS** | | | | |
| Length, in. (mm) | 149 (3785) | | 151 (3836) | |
| Width, in. (mm) | 32.5 (826) | | 32.5 (826) | |
| Height, in. (mm) | 65.5 (1664) | | 65.5 (1664) | |
| **UNIT WEIGHTS** | | | | |
| Operating WT., lb., (kg) | 4422 (2005) | | 4749 (2154) | |
| Shipping WT., lb. (kg) | 4116 (1867) | | 4418 (2004) | |
| R-134a Ref. Charge, lb. (kg) | 85 (38.6) | 85 (38.6) | 90 (40.8) | 90 (40.8) |

*Table 16: TGZ 110B – 120B*

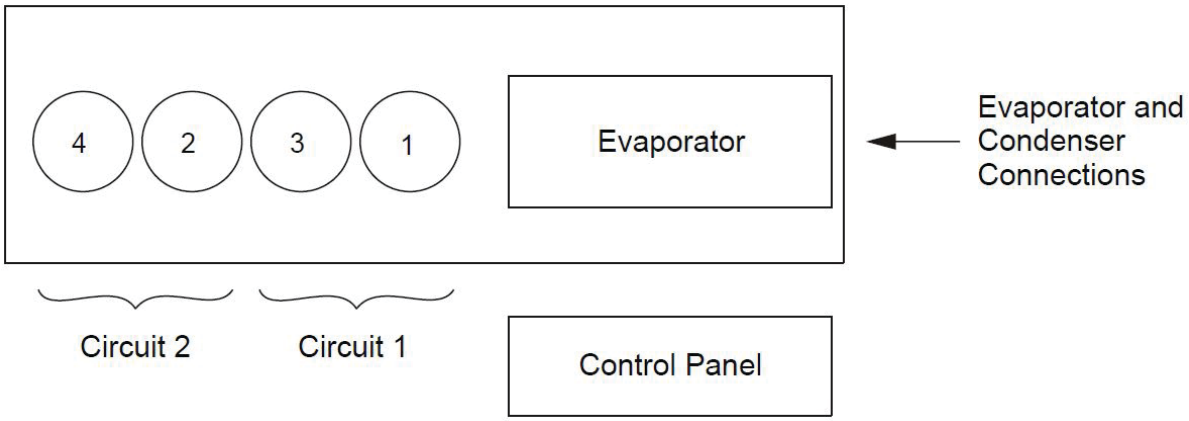
| TGZ Unit Model | TGZ110B | | TGZ120B | |
|---|---|---|---|---|
| No. Of Circuits | 2 | | 2 | |
| **COMPRESSORS (2)** | | | | |
| Nominal Horsepower | 25 | 30 | 30 | 30 |
| Number per Circuit | 2 | 2 | 2 | 2 |
| Staging, 4 Stages, Circuit #1 in Lead | 23/50/73/100 | | 25 / 50 / 75 100 | |
| Staging, 4 Stages, Circuit #2 in Lead | 27/50/77/100 | | 25 / 50 / 75 100 | |
| Oil Charge, per compr. Oz (l) | 200 (5.9) | 213 (6.3) | 213 (6.3) | |
| **CONDENSER** | | | | |
| Number | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | |
| Diameter, in. (mm) | 16.0 (406.4) | | 16.0 (406.4) | |
| Tube Length, in (mm) | 120 (3048) | | 120 (3048) | |
| Design W.P.,psig (kPa): | | | | |
| Refrigerant Side | 500 (3447) | | 500 (3447) | |
| Water Side | 232 (1599) | | 232 (1599) | |
| Relief Valve Setting, psig (kPa) | 500 (3447) | | 500 (3447) | |
| No. Of Water Passes - Standard | 4 | | 4 | |
| No. Of Water Passes - Optional | 2 | | 2 | |
| Water Volume, gallons (l) | 35.4 (134) | | 35.4 (134) | |
| Pump-Down Refrig Capacity lb. (kg) (3) | 252 (114) | | 252 (114) | |
| Connections: | | | | |
| Water In & Out, in., (mm) (4 Pass) | 4 (102) | | 4 (102) | |
| Water In & Out, in., (mm) (2 Pass) | 5 (127) | | 5 (127) | |
| Relief Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | |
| Purge Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | |
| Vent & Drain, in (mm) FPT | 1/2 (12.7) | | 1/2 (12.7) | |
| Liquid Subcooling | Integral | | Integral | |
| **EVAPORATOR** | | | | |
| Number | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | |
| Water Volume, gallons (1) | 9.7 (36.7) | | 9.7 (36.7) | |
| Refrigerant Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | |
| Relief Valve Setting, psig (kPa) | 450 (3102) | | 450 (3102) | |
| Water Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | |
| Water Connections: | | | | |
| In & Out, in. (mm) victaulic | 3 (76) | | 3 (76) | |
| Drain & Vent | Field Supplied | | Field Supplied | |
| **UNIT DIMENSIONS** | | | | |
| Length, in. (mm) | 149 (3784) | | 149 (3784) | |
| Width, in. (mm) | 34.5 (876) | | 34.5 (876) | |
| Height, in. (mm) | 67 (1702) | | 67 (1702) | |
| **UNIT WEIGHTS** | | | | |
| Operating WT., lb., (kg) | 5373 (2437) | | 5319 (2412) | |
| Shipping WT., lb. (kg) | 4967 (2253) | | 4913 (2228) | |
| R-134a Ref. Charge, lb. (kg) | 110 (49.9) | 110 (49.9) | 110 (49.9) | 110 (49.9) |

*Table 17: TGZ 150B – 190B*

| TGZ Unit Model | TGZ150B | | TGZ170B | | TGZ190B | |
|---|---|---|---|---|---|---|
| No. Of Circuits | 2 | | 2 | | 2 | |
| **COMPRESSORS (2)** | | | | | | |
| Nominal Horsepower | 25 | 25 | 25 | 30 | 30 | 30 |
| Number per Circuit | 3 | 3 | 3 | 3 | 3 | 3 |
| Staging, 6 Stages, Circuit #1 in Lead | 17 / 33 / 50 / 67 / 83 /100 | | 15 / 33 / 48 / 67 / 81 / 100 | | 17 / 33 / 50 / 67 / 83 /100 | |
| Staging, 6 Stages, Circuit #2 in Lead | 17 / 33 / 50 / 67 / 83 /100 | | 19 / 34 / 52 / 67 / 85 / 100 | | 17 / 33 / 50 / 67 / 83 /100 | |
| Oil Charge, per compr. Oz (l) | 200 (5.9) | | 200 (5.9) | 213 (6.3) | 213 (6.3) | |
| **CONDENSER** | | | | | | |
| Number | 1 | | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | | 2 | |
| Diameter, in. (mm) | 16 (406.4) | | 16 (406.4) | | 16 (406.4) | |
| Tube Length, in (mm) | 144 (3658) | | 144 (3658) | | 144 (3658) | |
| Design W.P.,psig (kPa): | | | | | | |
| Refrigerant Side | 500 (3447) | | 500 (3447) | | 500 (3447) | |
| Water Side | 232 (1599) | | 232 (1599) | | 232 (1599) | |
| Relief Valve Setting, psig (kPa) | 500 (3447) | | 500 (3447) | | 500 (3447) | |
| No. Of Water Passes - Standard | 4 | | 4 | | 4 | |
| No. Of Water Passes - Optional | 2 | | 2 | | 2 | |
| Water Volume, gallons (l) | 42.5 (160.9) | | 47.1 (178.4) | | 47.1 (178.4) | |
| Pump-Down Refrig Capacity lb. (kg) (3) | 302 (137) | | 277 (126) | | 277 (126) | |
| Connections: | | | | | | |
| Water In & Out, in., (mm) (4 Pass) | 4 (102) | | 4 (102) | | 4 (102) | |
| Water In & Out, in., (mm) (2 Pass) | 5 (127) | | 5 (127) | | 5 (127) | |
| Relief Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | | 5/8 (15.9) | |
| Purge Valve, Flare in., (mm) | 5/8 (15.9) | | 5/8 (15.9) | | 5/8 (15.9) | |
| Vent & Drain, in (mm) FPT | 1/2 (12.7) | | 1/2 (12.7) | | 1/2 (12.7) | |
| Liquid Subcooling | Integral | | Integral | | Integral | |
| **EVAPORATOR** | | | | | | |
| Number | 1 | | 1 | | 1 | |
| No. Refrigerant Circuits | 2 | | 2 | | 2 | |
| Water Volume, gallons (1) | 57.6 (218) | | 56.9 (215.4) | | 56.9 (215.4) | |
| Refrigerant Side D.W.P., psig, (kPa) | 450 (3102) | | 450 (3102) | | 450 (3102) | |
| Water Side D.W.P., psig, (kPa) | 150 (1034) | | 150 (1034) | | 150 (1034) | |
| Relief Valve Setting, psig (kPa) | 450 (3102) | | 450 (3102) | | 450 (3102) | |
| Water Connections: | | | | | | |
| In & Out, in. (mm) victaulic | 8 (203) | | 8 (203) | | 8 (203) | |
| Drain & Vent | 1/2 (12.7) | | 1/2 (12.7) | | 1/2 (12.7) | |
| **UNIT DIMENSIONS** | | | | | | |
| Length, in. (mm) | 170 (4318) | | 170 (4318) | | 170 (4318) | |
| Width, in. (mm) | 34 (864) | | 34 (864) | | 34 (864) | |
| Height, in. (mm) | 78 (1981) | | 78 (1981) | | 78 (1981) | |
| **UNIT WEIGHTS** | | | | | | |
| Operating WT., lb., (kg) | 7877 (3572) | | 7991 (3624) | | 7972 (3616) | |
| Shipping WT., lb. (kg) | 7019 (3183) | | 7101 (3220) | | 7082 (3212) | |
| R-134a Ref. Charge, lb. (kg) | 140 (63.5) | 140 (63.5) | 150 (68) | 150 (68) | 150 (68) | 150 (68) |

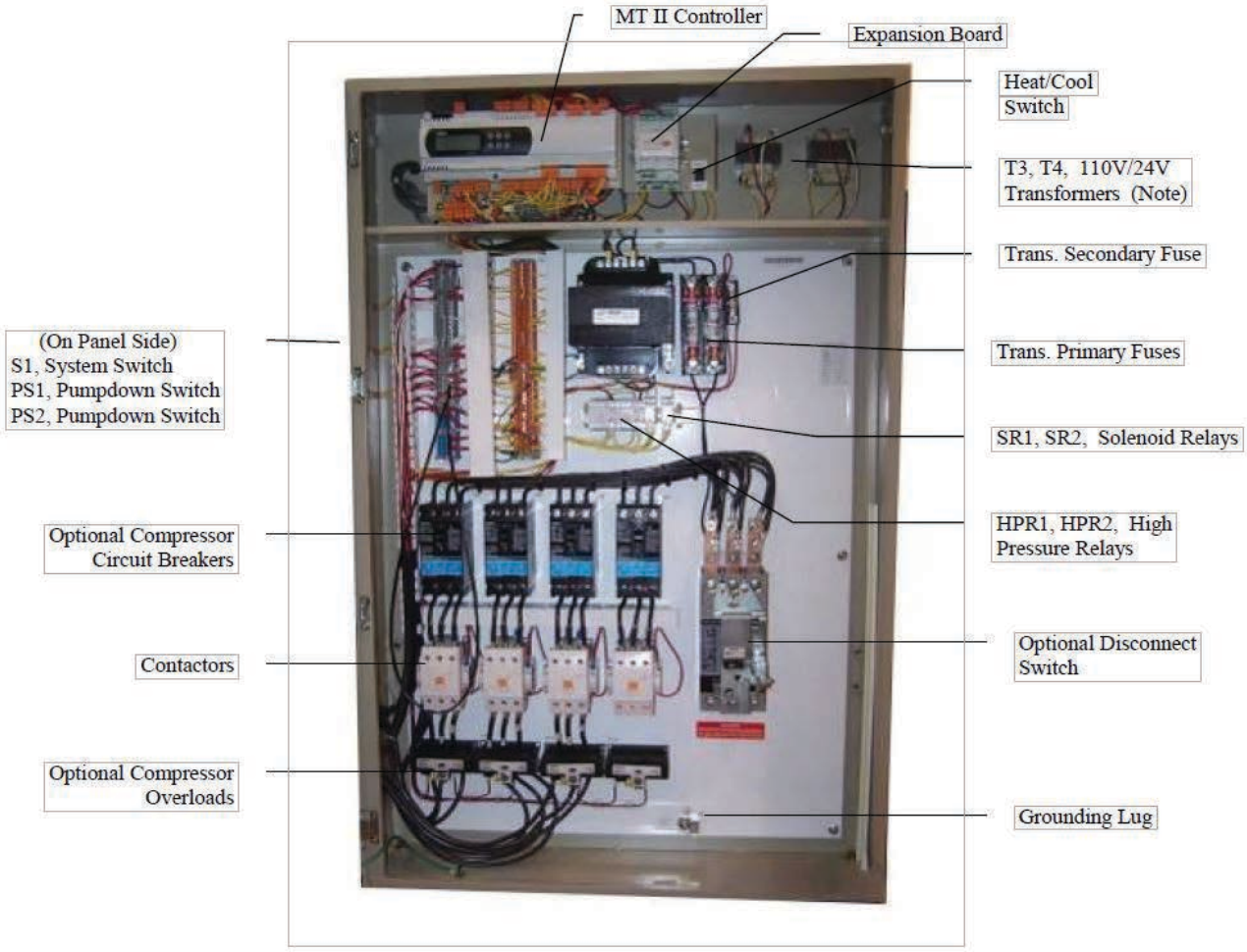
**Unit Components**

***Figure 26: Compressor Locations***




**NOTE:** Models TGZ150 to TGZ190 add a #5 compressor to circuit #1 and a #6 compressor to circuit #2 and substitute an underslung shell-and-tube evaporator for the brazed-plate evaporator.

***Figure 27: Electric Panel Components***




**NOTE:** Models TGZ 150 – 190 have additional T5 for electronic expansion valves.

### Electrical Notes

#### *Field Wiring*

The TGZ units are supplied as standard with compressor contactors and power terminal block, designed for multi-point power supply to the unit, no compressor circuit breakers. Available options are:

1. Single-point connection to power block with compressor circuit breakers

2. Single-point connection to disconnect switch with compressor circuit breakers

3. High short circuit current rating with single-point disconnect switch (excluding 575V units)

4. Multi-point connection to disconnect switch, no compressor circuit breakers

5. The supplemental overloads option is used to reduce the required electrical service size and wire sizing for units under 140°F leaving condenser water temperature.

A factory-installed control circuit transformer is standard. Optionally, a field-installed control power source can be wired to the unit.

Wiring and conduit selections must comply with the National Electrical Code and/or local requirements.

An open fuse indicates a short, ground, or overload. Before replacing a fuse or restarting a compressor, the root cause must be identified and corrected. Tables in the Electrical Data section (starting with Table 20 on page 32) give specific information on recommended wire sizes.

Unit power inlet wiring must enter the control box through the right side. A 7/8-inch pilot knockout is provided. Refer to the unit dimension drawings beginning with Figure 17 on page 19 for the location of power (and control) connections.

**⚠ CAUTION**

To avoid equipment damage, use only copper conductors in main terminal block.

#### *Notes for "Electrical Data Single Point" Power*

1. If a separate 115V power supply is used for the control circuit, then the wire sizing is 10 amps for all unit sizes.

2. Recommended power lead wire sizes for 3 conductors per conduit are based on 100% conductor ampacity in accordance with NEC. Voltage drop has not been included. Therefore, it is recommended that power leads be kept short. All terminal block connections must be made with copper wire.

3. The recommended power lead wire sizes are based on an ambient temperature of 86°F (30°C). Ampacity correction factors must be applied for other ambient temperatures. Refer to the NEC Handbook.

4. Must be electrically grounded according to national and local electrical codes.

#### *Voltage Limitations*

1. Within +/- 10% of nameplate rating

2. Voltage unbalance not to exceed 2% with a resultant current unbalance of 6 to 10 times the voltage unbalance per NEMA MG-1 Standard. This is an important restriction that must be adhered to.

#### *Notes for "Field Wiring Data"*

1. Requires a single disconnect to supply electrical power to the unit. This power supply must either be fused or use a circuit breaker.

2. All field wiring to unit power block or optional non-fused disconnect switch must be copper.

3. All field wire size values given in table apply to 75°C rated wire per NEC.

### Panel Ratings

#### *Units without Supplemental Overloads*

***Table 18: Standard Panel Short Circuit Current Ratings***

| | | TGZ-B Model Size | | |
|---|---|---|---|---|
| Voltage | Hz | 40 | 050-100 | 110-190 |
| 208-230 | 60 | 5 | 5 | 10 |
| 380 | 60 | 5 | 5 | 5 |
| 400 | 50 | 5 | 5 | 5 |
| 460 | 60 | 5 | 5 | 5 |
| 575 | 60 | 5 | 5 | 5 |

***Table 19: Optional Panel Ratings (kA)***

| Voltage | Hz | Options, Single-Point Power Connection Only |
|---|---|---|
| 208-230 | 60 | 100 |
| 380 | 60 | 65 |
| 400 | 50 | 65 |
| 460 | 60 | 65 |
| 575 | 60 | Not Available |

**NOTE:** High Short Circuit Current Rating (HSCCR) provides all panel components rated per above table and is so labeled.

**Circuit Breakers**

The circuit breaker used in the High Short Circuit panel option may have a higher trip rating than the unit Maximum Overload Protection (MOP) value shown on the unit nameplate. The circuit breaker is installed as a service disconnect switch and does not function as branch circuit protection, mainly that the protection device must be installed at the point of origin of the power wiring. The breaker (disconnect switch) is oversized to avoid nuisance trips at high ambient temperature conditions.

**Field Wiring Diagram**

***Figure 28: Field Wiring Diagram***

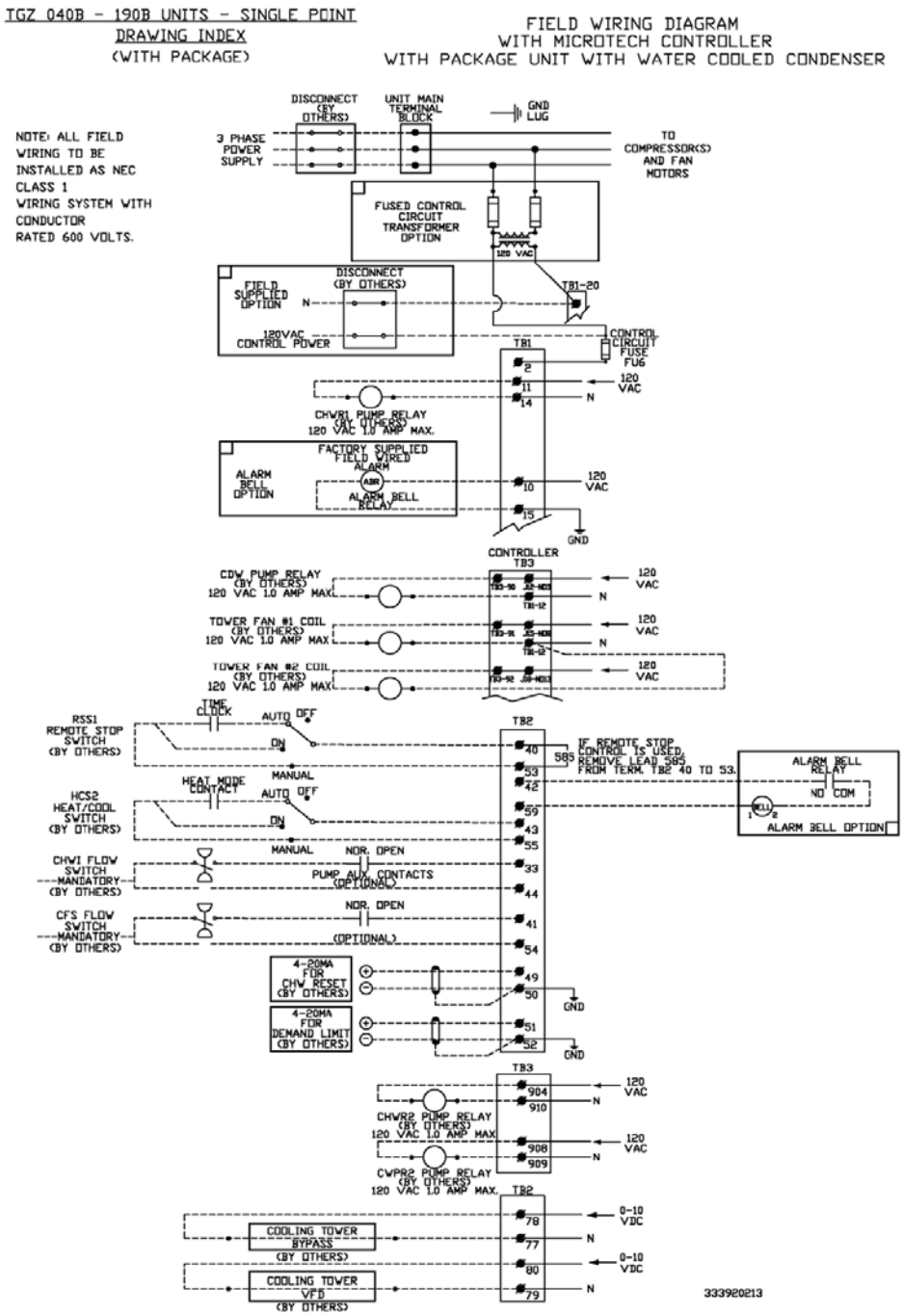


***Table 20: RLA-LRA***

| Model | Voltage | | Compressors RLA with Overload | | | | | | Compressors RLA without Overload | | | | | | Compressors LRA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | #1 | #3 | #5 | #2 | #4 | #6 | #1 | #3 | #5 | #2 | #4 | #6 | #1 | #3 | #5 | #2 | #4 | #6 |
| 040B | 208 | 60 | 30.8 | 30.8 | -- | 30.8 | 30.8 | -- | 35.3 | 35.3 | -- | 35.3 | 35.3 | -- | 239 | 239 | -- | 239 | 239 | -- |
| | 230 | 60 | 28.0 | 28.0 | -- | 28.0 | 28.0 | -- | 35.3 | 35.3 | -- | 35.3 | 35.3 | -- | 239 | 239 | -- | 239 | 239 | -- |
| | 380 | 60 | 16.8 | 16.8 | -- | 16.8 | 16.8 | -- | 21.2 | 21.2 | -- | 21.2 | 21.2 | -- | 145 | 145 | -- | 145 | 145 | -- |
| | 460/400 | 60/50 | 14.0 | 14.0 | -- | 14.0 | 14.0 | -- | 17.9 | 17.9 | -- | 17.9 | 17.9 | -- | 125 / 118 | 125 / 118 | -- | 125 / 118 | 125 / 118 | -- |
| | 575 | 60 | 11.2 | 11.2 | -- | 11.2 | 11.2 | -- | 11.5 | 11.5 | -- | 11.5 | 11.5 | -- | 80 | 80 | -- | 80 | 80 | -- |
| 050B | 208 | 60 | 42.0 | 42.0 | -- | 42.0 | 42.0 | -- | 48.1 | 48.1 | -- | 48.1 | 48.1 | -- | 300 | 300 | -- | 300 | 300 | -- |
| | 230 | 60 | 38.4 | 38.4 | -- | 38.4 | 38.4 | -- | 48.1 | 48.1 | -- | 48.1 | 48.1 | -- | 300 | 300 | -- | 300 | 300 | -- |
| | 380 | 60 | 23.2 | 23.2 | -- | 23.2 | 23.2 | -- | 25.6 | 25.6 | -- | 25.6 | 25.6 | -- | 139 | 139 | -- | 139 | 139 | -- |
| | 460/400 | 60/50 | 19.2 | 19.2 | -- | 19.2 | 19.2 | -- | 21.8 | 21.8 | -- | 21.8 | 21.8 | -- | 150 / 140 | 150 / 140 | -- | 150 / 140 | 150 / 140 | -- |
| | 575 | 60 | 15.2 | 15.2 | -- | 15.2 | 15.2 | -- | 18.6 | 18.6 | -- | 18.6 | 18.6 | -- | 109 | 109 | -- | 109 | 109 | -- |
| 060B | 208 | 60 | 52.0 | 52.0 | -- | 52.0 | 52.0 | -- | 52.6 | 52.6 | -- | 52.6 | 52.6 | -- | 340 | 340 | -- | 340 | 340 | -- |
| | 230 | 60 | 48.8 | 48.8 | -- | 48.8 | 48.8 | -- | 52.6 | 52.6 | -- | 52.6 | 52.6 | -- | 340 | 340 | -- | 340 | 340 | -- |
| | 380 | 60 | 29.6 | 29.6 | -- | 29.6 | 29.6 | -- | 32.1 | 32.1 | -- | 32.1 | 32.1 | -- | 196 | 196 | -- | 196 | 196 | -- |
| | 460/400 | 60/50 | 24.4 | 24.4 | -- | 24.4 | 24.4 | -- | 25.6 | 25.6 | -- | 25.6 | 25.6 | -- | 173 | 173 | -- | 173 | 173 | -- |
| | 575 | 60 | 19.6 | 19.6 | -- | 19.6 | 19.6 | -- | 21.2 | 21.2 | -- | 21.2 | 21.2 | -- | 132 | 132 | -- | 132 | 132 | -- |
| 080B | 208 | 60 | 58.0 | 58.0 | -- | 58.0 | 58.0 | -- | 73.1 | 73.1 | -- | 73.1 | 73.1 | -- | 505 | 505 | -- | 505 | 505 | -- |
| | 230 | 60 | 52.8 | 52.8 | -- | 52.8 | 52.8 | -- | 73.1 | 73.1 | -- | 73.1 | 73.1 | -- | 505 | 505 | -- | 505 | 505 | -- |
| | 380 | 60 | 31.6 | 31.6 | -- | 31.6 | 31.6 | -- | 37.8 | 37.8 | -- | 37.8 | 37.8 | -- | 280 | 280 | -- | 280 | 280 | -- |
| | 460/400 | 60/50 | 26.4 | 26.4 | -- | 26.4 | 26.4 | -- | 30.1 | 30.1 | -- | 30.1 | 30.1 | -- | 225 | 225 | -- | 225 | 225 | -- |
| | 575 | 60 | 21.2 | 21.2 | -- | 21.2 | 21.2 | -- | 24.4 | 24.4 | -- | 24.4 | 24.4 | -- | 180 | 180 | -- | 180 | 180 | -- |
| 100B | 208 | 60 | 69.2 | 69.2 | -- | 69.2 | 69.2 | -- | 73.1 | 73.1 | -- | 73.1 | 73.1 | -- | 500 | 500 | -- | 500 | 500 | -- |
| | 230 | 60 | 62.4 | 62.4 | -- | 62.4 | 62.4 | -- | 73.1 | 73.1 | -- | 73.1 | 73.1 | -- | 500 | 500 | -- | 500 | 500 | -- |
| | 380 | 60 | 37.6 | 37.6 | -- | 37.6 | 37.6 | -- | 44.9 | 44.9 | -- | 44.9 | 44.9 | -- | 305 | 305 | -- | 305 | 305 | -- |
| | 460/400 | 60/50 | 31.2 | 31.2 | -- | 31.2 | 31.2 | -- | 35.3 | 35.3 | -- | 35.3 | 35.3 | -- | 250 | 250 | -- | 250 | 250 | -- |
| | 575 | 60 | 25.2 | 25.2 | -- | 25.2 | 25.2 | -- | 28.2 | 28.2 | -- | 28.2 | 28.2 | -- | 198 | 198 | -- | 198 | 198 | -- |
| 110B | 208 | 60 | 69.2 | 69.2 | -- | 88.8 | 88.8 | -- | 73.1 | 73.1 | -- | 93.6 | 93.6 | -- | 500 | 500 | -- | 599 | 599 | -- |
| | 230 | 60 | 62.4 | 62.4 | -- | 80.0 | 80.0 | -- | 73.1 | 73.1 | -- | 93.6 | 93.6 | -- | 500 | 500 | -- | 599 | 599 | -- |
| | 380 | 60 | 37.6 | 37.6 | -- | 48.0 | 48.0 | -- | 44.9 | 44.9 | -- | 53.2 | 53.2 | -- | 305 | 305 | -- | 358 | 358 | -- |
| | 460/400 | 60/50 | 31.2 | 31.2 | -- | 40.0 | 40.0 | -- | 35.3 | 35.3 | -- | 45.5 | 45.5 | -- | 250 | 250 | -- | 310 | 310 | -- |
| | 575 | 60 | 25.2 | 25.2 | -- | 32.0 | 32.0 | -- | 28.2 | 28.2 | -- | 36.5 | 36.5 | -- | 198 | 198 | -- | 239 | 239 | -- |
| 120B | 208 | 60 | 88.8 | 88.8 | -- | 88.8 | 88.8 | -- | 93.6 | 93.6 | -- | 93.6 | 93.6 | -- | 599 | 599 | -- | 599 | 599 | -- |
| | 230 | 60 | 80.0 | 80.0 | -- | 80.0 | 80.0 | -- | 93.6 | 93.6 | -- | 93.6 | 93.6 | -- | 599 | 599 | -- | 599 | 599 | -- |
| | 380 | 60 | 48.0 | 48.0 | -- | 48.0 | 48.0 | -- | 53.2 | 53.2 | -- | 53.2 | 53.2 | -- | 358 | 358 | -- | 358 | 358 | -- |
| | 460/400 | 60/50 | 40.0 | 40.0 | -- | 40.0 | 40.0 | -- | 45.5 | 45.5 | -- | 45.5 | 45.5 | -- | 310 | 310 | -- | 310 | 310 | -- |
| | 575 | 60 | 32.0 | 32.0 | -- | 32.0 | 32.0 | -- | 36.5 | 36.5 | -- | 36.5 | 36.5 | -- | 239 | 239 | -- | 239 | 239 | -- |
| 150B | 208 | 60 | 69.2 | 69.2 | 69.2 | 69.2 | 69.2 | 69.2 | 73.1 | 73.1 | 73.1 | 73.1 | 73.1 | 73.1 | 500 | 500 | 500 | 500 | 500 | 500 |
| | 230 | 60 | 62.4 | 62.4 | 62.4 | 62.4 | 62.4 | 62.4 | 73.1 | 73.1 | 73.1 | 73.1 | 73.1 | 73.1 | 500 | 500 | 500 | 500 | 500 | 500 |
| | 380 | 60 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 44.9 | 44.9 | 44.9 | 44.9 | 44.9 | 44.9 | 305 | 305 | 305 | 305 | 305 | 305 |
| | 460/400 | 60/50 | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 | 35.3 | 35.3 | 35.3 | 35.3 | 35.3 | 35.3 | 250 | 250 | 250 | 250 | 250 | 250 |
| | 575 | 60 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 28.2 | 28.2 | 28.2 | 28.2 | 28.2 | 28.2 | 198 | 198 | 198 | 198 | 198 | 198 |
| 170B | 208 | 60 | 69.2 | 69.2 | 69.2 | 88.8 | 88.8 | 88.8 | 73.1 | 73.1 | 73.1 | 93.6 | 93.6 | 93.6 | 500 | 500 | 500 | 599 | 599 | 599 |
| | 230 | 60 | 62.4 | 62.4 | 62.4 | 80.0 | 80.0 | 80.0 | 73.1 | 73.1 | 73.1 | 93.6 | 93.6 | 93.6 | 500 | 500 | 500 | 599 | 599 | 599 |
| | 380 | 60 | 37.6 | 37.6 | 37.6 | 48.0 | 48.0 | 48.0 | 44.9 | 44.9 | 44.9 | 53.2 | 53.2 | 53.2 | 305 | 305 | 305 | 358 | 358 | 358 |
| | 460/400 | 60/50 | 31.2 | 31.2 | 31.2 | 40.0 | 40.0 | 40.0 | 35.3 | 35.3 | 35.3 | 45.5 | 45.5 | 45.5 | 250 | 250 | 250 | 310 | 310 | 310 |
| | 575 | 60 | 25.2 | 25.2 | 25.2 | 32.0 | 32.0 | 32.0 | 28.2 | 28.2 | 28.2 | 36.5 | 36.5 | 36.5 | 198 | 198 | 198 | 239 | 239 | 239 |
| 190B | 208 | 60 | 88.8 | 88.8 | 88.8 | 88.8 | 88.8 | 88.8 | 93.6 | 93.6 | 93.6 | 93.6 | 93.6 | 93.6 | 599 | 599 | 599 | 599 | 599 | 599 |
| | 230 | 60 | 80.0 | 80.0 | 80.0 | 80.0 | 80.0 | 80.0 | 93.6 | 93.6 | 93.6 | 93.6 | 93.6 | 93.6 | 599 | 599 | 599 | 599 | 599 | 599 |
| | 380 | 60 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 53.2 | 53.2 | 53.2 | 53.2 | 53.2 | 53.2 | 358 | 358 | 358 | 358 | 358 | 358 |
| | 460/400 | 60/50 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 45.5 | 45.5 | 45.5 | 45.5 | 45.5 | 45.5 | 310 | 310 | 310 | 310 | 310 | 310 |
| | 575 | 60 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | 36.5 | 36.5 | 36.5 | 36.5 | 36.5 | 36.5 | 239 | 239 | 239 | 239 | 239 | 239 |

**NOTE:** 1. External overloads only available on Templifier units with 140°F maximum condenser leaving water temperature.
2. Unit wire sizing amps are equal to 125% of the largest compressor-motor RLA plus 100% of RLA of all other loads in the circuit including control transformer.
3. Single point power supply requires a single fused disconnect to supply electrical power to the unit.
4. Compressor RLA values are for wire sizing purposes only and do not reflect normal operating current draw.

***Table 21: Single Point with External Overloads***

| Model | Voltage | | MCA | Field Wire | | Max. | Power Block [2] | | Disconnect Switch [2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | | Qty | Wire GA | FS | Size | Lug Range | Size | Lug Range |
| 040B | 208 | 60 | 131 | 3 | 1/0 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 230 | 60 | 119 | 3 | 1 AWG | 125 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 380 | 60 | 72 | 3 | 4 AWG | 80 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 60 | 3 | 6 AWG | 70 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| | 575 | 60 | 48 | 3 | 8 AWG | 50 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 050B | 208 | 60 | 179 | 3 | 3/0 AWG | 200 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 164 | 3 | 2/0 AWG | 200 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 380 | 60 | 99 | 3 | 3 AWG | 110 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 82 | 3 | 4 AWG | 100 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| | 575 | 60 | 65 | 3 | 6 AWG | 80 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 060B | 208 | 60 | 221 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 208 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 126 | 3 | 1 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 104 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 575 | 60 | 84 | 3 | 4 AWG | 100 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 080B | 208 | 60 | 247 | 3 | 250 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 225 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 135 | 3 | 1/0 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 113 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 575 | 60 | 91 | 3 | 3 AWG | 110 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 100B | 208 | 60 | 295 | 3 | 350 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 266 | 3 | 300 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 160 | 3 | 2/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 133 | 3 | 1/0 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 108 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| 110B | 208 | 60 | 339 | 6 | 4/0 AWG | 400 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 305 | 3 | 350 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 184 | 3 | 3/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 153 | 3 | 2/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 123 | 3 | 1 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 120B | 208 | 60 | 378 | 6 | 250 MCM | 450 | 380A | (1) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 340 | 6 | 4/0 AWG | 400 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 204 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 170 | 3 | 2/0 AWG | 200 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 575 | 60 | 136 | 3 | 1/0 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 150B | 208 | 60 | 433 | 6 | 4/0 AWG | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 390 | 6 | 250 MCM | 450 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 235 | 3 | 250 MCM | 250 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 195 | 3 | 3/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 575 | 60 | 158 | 3 | 2/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 170B | 208 | 60 | 497 | 6 | 250 MCM | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 448 | 6 | 4/0 AWG | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 269 | 3 | 300 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 224 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 575 | 60 | 180 | 3 | 3/0 AWG | 200 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| 190B | 208 | 60 | 555 | 6 | 300 MCM | 600 | 760A | (2) 500 - #4 | 800A | (3) 500 - 3/0 |
| | 230 | 60 | 500 | 6 | 250 MCM | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 300 | 3 | 350 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 250 | 3 | 250 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 575 | 60 | 200 | 3 | 4/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |

**NOTE:** 1. Unit wire sizing amps are equal to 125% of the largest compressor-motor RLA plus 100% of the other compressor RLA's.
2. Multiple point power supply requires a separate fused disconnect for each circuit to supply electrical power to the unit.
3. External compressor overload option is only available for units with 140°F maximum leaving condenser water temperature.
4. Wire sizes shown above are for standard ambient temperature and short runs of wire.

***Table 22: Single Point without External Overloads***

| Model | Voltage | | MCA | Field Wire | | Max. | Power Block [2] | | Disconnect Switch [2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | | Qty | Wire GA | FS | Size | Lug Range | Size | Lug Range |
| 040B | 208 | 60 | 150 | 3 | 1/0 AWG | 175 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 150 | 3 | 1/0 AWG | 175 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 91 | 3 | 3 AWG | 110 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 77 | 3 | 4 AWG | 90 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| | 575 | 60 | 49 | 3 | 8 AWG | 60 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 050B | 208 | 60 | 205 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 205 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 109 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 93 | 3 | 3 AWG | 110 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 575 | 60 | 80 | 3 | 4 AWG | 90 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 060B | 208 | 60 | 224 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 224 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 137 | 3 | 1/0 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 109 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| | 575 | 60 | 91 | 3 | 3 AWG | 110 | 175A | (1) 2/0 - #14 | 100A [1] | (1) 1/0 - #10 |
| 080B | 208 | 60 | 311 | 3 | 400 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 311 | 3 | 400 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 161 | 3 | 2/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 128 | 3 | 1 AWG | 150 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 104 | 3 | 2 AWG | 125 | 175A | (1) 2/0 - #14 | 125A [1] | (1) 3/0 - #3 |
| 100B | 208 | 60 | 311 | 3 | 400 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 311 | 3 | 400 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 191 | 3 | 3/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 150 | 3 | 1/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 120 | 3 | 1 AWG | 125 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 110B | 208 | 60 | 357 | 6 | 4/0 AWG | 450 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 357 | 6 | 4/0 AWG | 450 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 210 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 173 | 3 | 2/0 AWG | 200 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 575 | 60 | 139 | 3 | 1/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 120B | 208 | 60 | 398 | 6 | 250 MCM | 450 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 398 | 6 | 250 MCM | 450 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 227 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 194 | 3 | 3/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 575 | 60 | 156 | 3 | 2/0 AWG | 175 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 150B | 208 | 60 | 457 | 6 | 4/0 AWG | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 457 | 6 | 4/0 AWG | 500 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 281 | 3 | 300 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 221 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 575 | 60 | 177 | 3 | 3/0 AWG | 200 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| 170B | 208 | 60 | 524 | 6 | 300 MCM | 600 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 230 | 60 | 524 | 6 | 300 MCM | 600 | 760A | (2) 500 - #4 | 600A | (2) 500 - 3/0 |
| | 380 | 60 | 308 | 3 | 350 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 254 | 3 | 250 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 575 | 60 | 204 | 3 | 4/0 AWG | 225 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| 190B | 208 | 60 | 585 | 6 | 350 MCM | 600 | 760A | (2) 500 - #4 | 800A | (3) 500 - 3/0 |
| | 230 | 60 | 585 | 6 | 350 MCM | 600 | 760A | (2) 500 - #4 | 800A | (3) 500 - 3/0 |
| | 380 | 60 | 333 | 3 | 400 MCM | 350 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 460/400 | 60/50 | 285 | 3 | 300 MCM | 300 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 575 | 60 | 229 | 3 | 4/0 AWG | 250 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |

**NOTE:** 1. Unit wire sizing amps are equal to 125% of the largest compressor-motor RLA plus 100% of the other compressor RLA's.
2. Single point power supply requires a single fused disconnect to supply electrical power to the unit.
3. External compressor overload option is only available for units with 140°F maximum leaving condenser water temperature.
4. Wire Sizes shown above are for standard ambient temperature and short runs of wire.

***Table 23: Multi-Point with External Overloads***

| Model | Voltage | | **Cir #1** | Field Wire | | Max. | **Cir #2** | Field Wire | | Max. |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | MCA | Qty | Wire GA | FS | MCA | Qty | Wire GA | FS |
| 040B | 208 | 60 | 69 | 3 | 4 AWG | 100 | 69 | 3 | 4 AWG | 100 |
| | 230 | 60 | 63 | 3 | 6 AWG | 90 | 63 | 3 | 6 AWG | 90 |
| | 380 | 60 | 38 | 3 | 8 AWG | 50 | 38 | 3 | 8 AWG | 50 |
| | 460/400 | 60/50 | 32 | 3 | 10 AWG | 45 | 32 | 3 | 10 AWG | 45 |
| | 575 | 60 | 25 | 3 | 10 AWG | 35 | 25 | 3 | 10 AWG | 35 |
| 050B | 208 | 60 | 95 | 3 | 3 AWG | 125 | 95 | 3 | 3 AWG | 125 |
| | 230 | 60 | 86 | 3 | 3 AWG | 125 | 86 | 3 | 3 AWG | 125 |
| | 380 | 60 | 52 | 3 | 6 AWG | 70 | 52 | 3 | 6 AWG | 70 |
| | 460/400 | 60/50 | 43 | 3 | 8 AWG | 60 | 43 | 3 | 8 AWG | 60 |
| | 575 | 60 | 34 | 3 | 10 AWG | 45 | 34 | 3 | 10 AWG | 50 |
| 060B | 208 | 60 | 117 | 3 | 1 AWG | 150 | 117 | 3 | 1 AWG | 150 |
| | 230 | 60 | 110 | 3 | 2 AWG | 150 | 110 | 3 | 2 AWG | 150 |
| | 380 | 60 | 67 | 3 | 4 AWG | 90 | 67 | 3 | 4 AWG | 90 |
| | 460/400 | 60/50 | 55 | 3 | 6 AWG | 80 | 55 | 3 | 6 AWG | 80 |
| | 575 | 60 | 44 | 3 | 8 AWG | 60 | 44 | 3 | 8 AWG | 60 |
| 080B | 208 | 60 | 131 | 3 | 1/0 AWG | 175 | 131 | 3 | 1/0 AWG | 175 |
| | 230 | 60 | 119 | 3 | 1 AWG | 150 | 119 | 3 | 1 AWG | 150 |
| | 380 | 60 | 71 | 3 | 4 AWG | 100 | 71 | 3 | 4 AWG | 100 |
| | 460/400 | 60/50 | 59 | 3 | 6 AWG | 80 | 59 | 3 | 6 AWG | 80 |
| | 575 | 60 | 48 | 3 | 8 AWG | 60 | 48 | 3 | 8 AWG | 60 |
| 100B | 208 | 60 | 156 | 3 | 2/0 AWG | 225 | 156 | 3 | 2/0 AWG | 225 |
| | 230 | 60 | 140 | 3 | 1/0 AWG | 200 | 140 | 3 | 1/0 AWG | 200 |
| | 380 | 60 | 85 | 3 | 4 AWG | 110 | 85 | 3 | 4 AWG | 110 |
| | 460/400 | 60/50 | 70 | 3 | 4 AWG | 100 | 70 | 3 | 4 AWG | 100 |
| | 575 | 60 | 57 | 3 | 6 AWG | 80 | 57 | 3 | 6 AWG | 80 |
| 110B | 208 | 60 | 156 | 3 | 2/0 AWG | 225 | 200 | 3 | 3/0 AWG | 250 |
| | 230 | 60 | 140 | 3 | 1/0 AWG | 200 | 180 | 3 | 3/0 AWG | 250 |
| | 380 | 60 | 85 | 3 | 4 AWG | 110 | 108 | 3 | 2 AWG | 150 |
| | 460/400 | 60/50 | 70 | 3 | 4 AWG | 100 | 90 | 3 | 3 AWG | 125 |
| | 575 | 60 | 57 | 3 | 6 AWG | 80 | 72 | 3 | 4 AWG | 100 |
| 120B | 208 | 60 | 200 | 3 | 3/0 AWG | 250 | 200 | 3 | 3/0 AWG | 250 |
| | 230 | 60 | 180 | 3 | 3/0 AWG | 250 | 180 | 3 | 3/0 AWG | 250 |
| | 380 | 60 | 108 | 3 | 2 AWG | 150 | 108 | 3 | 2 AWG | 150 |
| | 460/400 | 60/50 | 90 | 3 | 3 AWG | 125 | 90 | 3 | 3 AWG | 125 |
| | 575 | 60 | 72 | 3 | 4 AWG | 100 | 72 | 3 | 4 AWG | 100 |
| 150B | 208 | 60 | 225 | 3 | 4/0 AWG | 250 | 225 | 3 | 4/0 AWG | 250 |
| | 230 | 60 | 203 | 3 | 4/0 AWG | 250 | 203 | 3 | 4/0 AWG | 250 |
| | 380 | 60 | 122 | 3 | 1 AWG | 150 | 122 | 3 | 1 AWG | 150 |
| | 460/400 | 60/50 | 101 | 3 | 2 AWG | 125 | 101 | 3 | 2 AWG | 125 |
| | 575 | 60 | 82 | 3 | 4 AWG | 100 | 82 | 3 | 4 AWG | 100 |
| 170B | 208 | 60 | 225 | 3 | 4/0 AWG | 250 | 289 | 3 | 350 MCM | 350 |
| | 230 | 60 | 203 | 3 | 4/0 AWG | 250 | 260 | 3 | 300 MCM | 300 |
| | 380 | 60 | 122 | 3 | 1 AWG | 150 | 156 | 3 | 2/0 AWG | 200 |
| | 460/400 | 60/50 | 101 | 3 | 2 AWG | 125 | 130 | 3 | 1 AWG | 150 |
| | 575 | 60 | 82 | 3 | 4 AWG | 100 | 104 | 3 | 2 AWG | 125 |
| 190B | 208 | 60 | 289 | 3 | 350 MCM | 350 | 289 | 3 | 350 MCM | 350 |
| | 230 | 60 | 260 | 3 | 300 MCM | 300 | 260 | 3 | 300 MCM | 300 |
| | 380 | 60 | 156 | 3 | 2/0 AWG | 200 | 156 | 3 | 2/0 AWG | 200 |
| | 460/400 | 60/50 | 130 | 3 | 1 AWG | 150 | 130 | 3 | 1 AWG | 150 |
| | 575 | 60 | 104 | 3 | 2 AWG | 125 | 104 | 3 | 2 AWG | 125 |

**NOTE:** “Maximum Fuse Sizes” are selected at approximately 225% of the largest compressor RLA plus 100% of other compressor RLA values.

***Table 24: Multi-Point with External Overloads***

| Model | Voltage | | **Cir #1** Power Block [2] | | **Cir #1** Disconnect Sw [2] | | **Cir #2** Power Block [2] | | **Cir #2** Disconnect Sw [2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | Size | Lug Range | Size | Lug Range | Size | Lug Range | Size | Lug Range |
| 040B | 208 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | N/A | -- | N/A | -- | N/A | -- | N/A | -- |
| 050B | 208 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 060B | 208 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 080B | 208 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 100B | 208 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 110B | 208 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 120B | 208 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 150B | 208 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 170B | 208 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| 190B | 208 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |

**NOTE:** 1. On HSCCR Unit = 250A {(1) 350 - #6}
2. Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however the lug range must be the same.
3. “Size” is the maximum amperage rating for the terminals or the main electrical device. “Connection” is the range of wire sizes that the terminals on the electrical device will accept.

***Table 25: Multi-Point without External Overloads***

| Model | Voltage | | **Cir #1** | Field Wire | | Max. | **Cir #2** | Field Wire | | Max. |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Size | Hz | MCA | Qty | Wire GA | FS | MCA | Qty | Wire GA | FS |
| 040B | 208 | 60 | 79 | 3 | 4 AWG | 110 | 79 | 3 | 4 AWG | 110 |
| | 230 | 60 | 79 | 3 | 4 AWG | 110 | 79 | 3 | 4 AWG | 110 |
| | 380 | 60 | 48 | 3 | 8 AWG | 60 | 48 | 3 | 8 AWG | 60 |
| | 460/400 | 60/50 | 40 | 3 | 8 AWG | 50 | 40 | 3 | 8 AWG | 50 |
| | 575 | 60 | 26 | 3 | 10 AWG | 35 | 26 | 3 | 10 AWG | 35 |
| 050B | 208 | 60 | 108 | 3 | 2 AWG | 150 | 108 | 3 | 2 AWG | 150 |
| | 230 | 60 | 108 | 3 | 2 AWG | 150 | 108 | 3 | 2 AWG | 150 |
| | 380 | 60 | 58 | 3 | 6 AWG | 80 | 58 | 3 | 6 AWG | 80 |
| | 460/400 | 60/50 | 49 | 3 | 8 AWG | 70 | 49 | 3 | 8 AWG | 70 |
| | 575 | 60 | 42 | 3 | 8 AWG | 60 | 42 | 3 | 8 AWG | 60 |
| 060B | 208 | 60 | 118 | 3 | 1 AWG | 150 | 118 | 3 | 1 AWG | 150 |
| | 230 | 60 | 118 | 3 | 1 AWG | 150 | 118 | 3 | 1 AWG | 150 |
| | 380 | 60 | 72 | 3 | 4 AWG | 100 | 72 | 3 | 4 AWG | 100 |
| | 460/400 | 60/50 | 58 | 3 | 6 AWG | 80 | 58 | 3 | 6 AWG | 80 |
| | 575 | 60 | 48 | 3 | 8 AWG | 60 | 48 | 3 | 8 AWG | 60 |
| 080B | 208 | 60 | 164 | 3 | 2/0 AWG | 225 | 164 | 3 | 2/0 AWG | 225 |
| | 230 | 60 | 164 | 3 | 2/0 AWG | 225 | 164 | 3 | 2/0 AWG | 225 |
| | 380 | 60 | 85 | 3 | 4 AWG | 110 | 85 | 3 | 4 AWG | 110 |
| | 460/400 | 60/50 | 68 | 3 | 4 AWG | 90 | 68 | 3 | 4 AWG | 90 |
| | 575 | 60 | 55 | 3 | 6 AWG | 70 | 55 | 3 | 6 AWG | 80 |
| 100B | 208 | 60 | 164 | 3 | 2/0 AWG | 225 | 164 | 3 | 2/0 AWG | 225 |
| | 230 | 60 | 164 | 3 | 2/0 AWG | 225 | 164 | 3 | 2/0 AWG | 225 |
| | 380 | 60 | 101 | 3 | 2 AWG | 125 | 101 | 3 | 2 AWG | 125 |
| | 460/400 | 60/50 | 79 | 3 | 4 AWG | 110 | 79 | 3 | 4 AWG | 110 |
| | 575 | 60 | 63 | 3 | 6 AWG | 90 | 63 | 3 | 6 AWG | 90 |
| 110B | 208 | 60 | 164 | 3 | 2/0 AWG | 225 | 211 | 3 | 4/0 AWG | 300 |
| | 230 | 60 | 164 | 3 | 2/0 AWG | 225 | 211 | 3 | 4/0 AWG | 300 |
| | 380 | 60 | 101 | 3 | 2 AWG | 125 | 120 | 3 | 1 AWG | 150 |
| | 460/400 | 60/50 | 79 | 3 | 4 AWG | 110 | 102 | 3 | 2 AWG | 125 |
| | 575 | 60 | 63 | 3 | 6 AWG | 90 | 82 | 3 | 4 AWG | 110 |
| 120B | 208 | 60 | 211 | 3 | 4/0 AWG | 300 | 211 | 3 | 4/0 AWG | 300 |
| | 230 | 60 | 211 | 3 | 4/0 AWG | 300 | 211 | 3 | 4/0 AWG | 300 |
| | 380 | 60 | 120 | 3 | 1 AWG | 150 | 120 | 3 | 1 AWG | 150 |
| | 460/400 | 60/50 | 102 | 3 | 2 AWG | 125 | 102 | 3 | 2 AWG | 125 |
| | 575 | 60 | 82 | 3 | 4 AWG | 110 | 82 | 3 | 4 AWG | 110 |
| 150B | 208 | 60 | 238 | 3 | 250 MCM | 300 | 238 | 3 | 250 MCM | 300 |
| | 230 | 60 | 238 | 3 | 250 MCM | 300 | 238 | 3 | 250 MCM | 300 |
| | 380 | 60 | 146 | 3 | 1/0 AWG | 175 | 146 | 3 | 1/0 AWG | 175 |
| | 460/400 | 60/50 | 115 | 3 | 2 AWG | 150 | 115 | 3 | 2 AWG | 150 |
| | 575 | 60 | 92 | 3 | 3 AWG | 110 | 92 | 3 | 3 AWG | 110 |
| 170B | 208 | 60 | 238 | 3 | 250 MCM | 300 | 304 | 3 | 350 MCM | 350 |
| | 230 | 60 | 238 | 3 | 250 MCM | 300 | 304 | 3 | 350 MCM | 350 |
| | 380 | 60 | 146 | 3 | 1/0 AWG | 175 | 173 | 3 | 2/0 AWG | 225 |
| | 460/400 | 60/50 | 115 | 3 | 2 AWG | 150 | 148 | 3 | 1/0 AWG | 175 |
| | 575 | 60 | 92 | 3 | 3 AWG | 110 | 119 | 3 | 1 AWG | 150 |
| 190B | 208 | 60 | 304 | 3 | 350 MCM | 350 | 304 | 3 | 350 MCM | 350 |
| | 230 | 60 | 304 | 3 | 350 MCM | 350 | 304 | 3 | 350 MCM | 350 |
| | 380 | 60 | 173 | 3 | 2/0 AWG | 225 | 173 | 3 | 2/0 AWG | 225 |
| | 460/400 | 60/50 | 148 | 3 | 1/0 AWG | 175 | 148 | 3 | 1/0 AWG | 175 |
| | 575 | 60 | 119 | 3 | 1 AWG | 150 | 119 | 3 | 1 AWG | 150 |

**NOTE:** 1. On HSCCR Unit = 250A {(1) 350 - #6}
2. Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however the lug range must be the same.
3. “Size” is the maximum amperage rating for the terminals or the main electrical device. “Connection” is the range of wire sizes that the terminals on the electrical device will accept.

***Table 26: Multi-Point without External Overloads***

| Model Size | Voltage Size | Hz | **Cir #1** Power Block [2] | | **Cir #1** Disconnect Sw [2] | | **Cir #2** Power Block [2] | | **Cir #2** Disconnect Sw [2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Size | Lug Range | Size | Lug Range | Size | Lug Range | Size | Lug Range |
| 040B | 208 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 050B | 208 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 060B | 208 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 080B | 208 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 100B | 208 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 230 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 110B | 208 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 120B | 208 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 230 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 150B | 208 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 |
| 170B | 208 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 125A | (1) 3/0 - #3 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 100A | (1) 1/0 - #10 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| 190B | 208 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 230 | 60 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 | 380A | (1) 500 - #4 | 400A | (2) 500 - 3/0 |
| | 380 | 60 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 | 380A | (1) 500 - #4 | 250A | (1) 350 - #6 |
| | 460/400 | 60/50 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |
| | 575 | 60 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 | 175A | (1) 2/0 - #14 | 250A | (1) 350 - #6 |

**NOTE:** 1. On HSCCR Unit = 250A {(1) 350 - #6}
2. Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however the lug range must be the same.
3. “Size” is the maximum amperage rating for the terminals or the main electrical device. “Connection” is the range of wire sizes that the terminals on the electrical device will accept.

# Start-Up and Shutdown

**NOTE:** Daikin Applied service personnel or factory authorized service agency must perform initial startup in order to activate warranty. Return the "Scroll Compressor Equipment Warranty Form" within 10 working days to Daikin Applied as instructed on the form to obtain full warranty benefits.

## Pre Start-Up

1. Perform visual inspection of all components.

2. With main disconnect open, check all electrical connections in control panel and starter to be sure they are tight and provide good electrical contact. Use only copper wire to connection points.

3. Check and inspect all water piping. Make sure flow direction is correct and piping is made to correct connection on evaporator and condenser.

4. Open all water flow valves to the condenser and evaporator.

5. Flush the cooling tower (if there is one used) and system piping to be sure the system is clean. Start source water pump and manually start hot water pump. Check all piping for leaks. Vent the air from the evaporator and condenser water circuit as well as from the entire water system. The cooler circuit should contain clean, non-corrosive water.

6. Check to see that the water temperature sensor is installed in the correct water line.

7. Making sure control stop switch S1 is open (off) and pumpdown switch(es) PS1 and PS2 are on "manual pumpdown," throw the main power and control disconnect switches to "on." This will energize the crankcase heaters. Wait a minimum of 12 hours before starting up unit.

8. Check compressor oil level. Prior to start-up, the oil level should cover at least one-third of the sightglass.

9. Check pressure drop across evaporator and condenser, and see that water flow is correct per the design flow rates and data starting on page 16

10. Check the actual line voltage to the unit to make sure it is the same as called for on the compressor nameplate within + 10% and that phase voltage unbalance does not exceed 2%. Verify that adequate power supply and capacity is available to handle load.

11. Check that the panel-mounted Heat/Cool switch is in the correct position

12. Make sure all wiring and fuses are of the proper size. Also make sure all interlock wiring is completed per Daikin Applied diagrams. Use only copper wire.

13. Verify that all mechanical and electrical inspections by code authorities have been completed.

14. Make sure all auxiliary load and control equipment is operative and that adequate cooling heat is available for initial start-up.

## Start-Up

1. Open the compressor suction and discharge shutoff valves until backseated. Always replace valve seal caps.

2. Open the manual liquid line shutoff valve and leak test the unit.

3. Check to see that the unit circuit breakers are in the "off" position.

4. Check to see that the pumpdown switches PS1 and PS2 are in the "manual pumpdown" position and the control system switch S1 is in the "off" position.

5. Place the main power and control circuit disconnects to the "on" position.

6. Verify crankcase heaters have operated for at least 12 hours prior to start-up. Crankcase should be warm.

7. Adjust the setpoint on the MicroTech II controller to the desired hot water temperature.

8. Start the auxiliary equipment for the installation by turning on the time clock, ambient thermostat and/or remote on/off switch and chilled water pump.

9. Check resets of all equipment protection controls.

10. Switch the unit circuit breakers to "On".

11. Place pumpdown switches PS1 and PS2 to "auto" for restart and normal operation.

12. Start the system by pushing the system switch S1 to "On".

13. After running the unit for a short time, check the oil level in each compressor crankcase and check for flashing in the refrigerant sightglass.

14. After system performance has stabilized, complete the "Compressorized Equipment Warranty Form" (Form No. 206036A) to obtain full warranty benefits. This form is shipped with the unit. After completion return to your sales representative from Daikin Applied.

15. Verify all control settings appropriate to the application.

## Start-up after Extended Shutdown

1. Inspect all equipment to see that it is in satisfactory operating condition.

2. Open the compressor suction and discharge valves until backseated. Always replace valve seal caps.

3. Open the manual liquid line shutoff valves.

4. Check circuit breakers. They must be in the "off" position.

5. Check to see that the pumpdown switch(es) PS1 and PS2 are in the "manual shutdown" position and the control system switch S1 is in the "off" position.

6. Throw the main power and control circuit disconnects to the "on" position.

7. Allow the crankcase heaters to operate for at least 12 hours prior to start-up.

8. Start the source water flow and purge the water piping as well as the evaporator in the unit.

9. Start the auxiliary equipment for the installation by turning on the time clock, ambient thermostat and/or remote on/off switch.

10. Adjust the setpoint on the MicroTech II controller to the desired hot water temperature.

11. Check resets of all equipment protection controls.

12. Switch the unit circuit breakers to “on.”

13. Start the system by pushing the system switch S1 to “on.”

**⚠ WARNING**

Most relays and terminals in the control center are powered when S1 is closed and the control circuit disconnect is on. Therefore, do not close S1 until ready for start-up or serious equipment damage can occur.

14. Place pumpdown switch(es) PS1 and PS2 to the “auto pumpdown” position for restart and normal operation.

15. After running the unit for a short time, check the oil level in each compressor crankcase and for flashing in the refrigerant sightglass (see Maintenance section).

**⚠ WARNING**

This unit contains POE lubricants that must be handled carefully and the proper protective equipment (gloves, eye protection, etc.) must be used when handling POE lubricant. POE must not come into contact with any surface or material that might be harmed by POE, including certain polymers (e.g. PVC/CPVC and polycarbonate piping).

Daikin Applied recommends against the use of PVC and CPVC piping for chilled water systems. In the event the pipe is exposed to POE oil used in the refrigerant system, the pipe can be chemically damaged and pipe failure can occur. Also, do not use oil or refrigerant additives in the system.

## General

The liquid line sightglass/moisture indicator on all circuits must be checked to be sure the glass is full and clear and the moisture indicator indicates a dry condition. If the indicator shows that a wet condition exists or if bubbles show in the glass, even with a full refrigerant charge, the filter-drier element should be changed if acid test or oil analysis indicated acid conditions.

Water supplies in some areas can tend to foul the TGZ heat exchangers to the point where cleaning is necessary. The fouled vessel will be indicated by an abnormally high condensing pressure or low evaporating pressures and can result in nuisance trip-outs. To clean the vessels, a chemical descaling solution should be used according to the manufacturer’s directions.

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 checking the sensor tip for buildup and cleaning the tip using a soft cloth. Stubborn build up (e.g., lime) can be removed using a common vinegar cleaning agent.

**⚠ WARNING**

Warranty is voided if wiring is not in accordance with specifications. A blown fuse or tripped protector indicates a short ground or overload. Before replacing fuse or restarting compressor, the trouble must be found and corrected. It is important to have a qualified control panel electrician service this panel. Unqualified tampering with the controls can cause serious damage to equipment and void the warranty.

Prior to attempting any service on the control center, study the wiring diagram furnished with the unit so that you understand the operation of the unit.

**⚠ DANGER**

The panel is always energized even if the system switch is off. If it is necessary to de-energize the complete panel, including crankcase heaters, pull the main unit disconnect. Failure to do so may result in serious personal injury or death.

If motor or compressor damage is suspected, do not restart until qualified service personnel have checked the unit.

## Electrical Terminals

**⚠ DANGER**

To avoid injury from electric shock hazard, turn off all power before continuing with the following service.

All power electrical terminals should be checked for tightness every six months, as they tend to loosen in service due to normal heating and cooling of the wire.

***Figure 29: TGZ Operating Envelope***

| Evap LWT Temp: | Condenser Leaving Water Temperature, F | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 |
| 80 | n/a | n/a | n/a | n/a | OK | | | | | OK |
| 70 | n/a | n/a | n/a | OK | | | | | | OK |
| 60 | n/a | n/a | OK | | | | | | | OK |
| 50 | n/a | OK | | | | | | | | OK |
| 45 | n/a | | | | | | | | | OK |
| 40 | OK | | | | | | | | | OK |
| 35 | OK | | | | | | | | OK | n/a |
| 30 | OK | | | | | | | OK | n/a | n/a |
| 25 | OK | | | | | | OK | n/a | n/a | n/a |
| 20 | OK | | | | | OK | n/a | n/a | n/a | n/a |

*Table 27: TGZ Temperature Limits*

| Cooling Cycle | Min. Temp | Max Temp | Note: |
|---|---|---|---|
| Evaporator Leaving Water Temp. | 40° F | 60° F | In Cooling Cycle controlling Evap LWT - The Maximum Setpoint temp is 60°F |
| Condenser Leaving Water Temp | 70° F | 160° F | With Evap LWT above 50°F, the Cond LWT must be 30°F above Evap. LWT |
| Evaporator Water Delta-T | 6° F | 16° F | |
| With Glycol in Evap - Evap LWT | 15° F | 60° F | With Evap LWT below 40°F, the Cond EWT must not exceed 120°F above the Evap LWT. |
| | | | |
| **Heating Cycle** | | | |
| Evaporator Leaving Water Temp | 40° F | 85° F | With Evap LWT above 70°F, the Cond LWT must be 30°F above Evap LWT |
| Condenser Leaving Water Temp | 110° F | 160° F | |
| Evaporator Water Delta-T | 6° F | 16° F | |
| Condenser Water Delta - T | | | |
| with 2 Pass Condenser Water Flow | 10° F | 15° F | Cond Water Temp Delta-T should be 10°F minimum for good condenser liquid subcooling |
| with 4 Pass Condenser Water Flow | 15° F | 40° F | |

*Table 28: TGZ Flow Limits*

| Unit Nominal Tons | 40 | 50 | 60 | 80 | 100 | 110 | 120 | 150 | 170 | 190 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Evaporator GPM Range** | | | | | | | | | | |
| 10 F Water Temp Delta-T, 65ELWT/130CLWT | 72 | 100 | 121 | 162 | 189 | 218 | 246 | 283 | 326 | 369 |
| 16-6 Water Temp Delta-T, 65ELWT/130LWT | 45 - 120 | 62 - 167 | 75 - 202 | 101 - 270 | 118 - 315 | 136 - 363 | 154 - 410 | 177 - 472 | 204 - 543 | 231 - 615 |
| 10 Water Temp Delta-T, Full Unit Range | 34 - 120 | 45 - 167 | 55 - 202 | 83 - 270 | 98 - 315 | 113 - 363 | 128 - 410 | 147 - 472 | 169 - 543 | 192 - 615 |
| | | | | | | | | | | |
| **Condenser GPM Range - 4 Pass Cond** | | | | | | | | | | |
| 20 F Water Temp Delta-T, 65ELWT/130CLWT | 47 | 64 | 77 | 103 | 120 | 138 | 156 | 180 | 207 | 234 |
| 40-15 F Water Temp Delta-T, 65ELWT/130CLWT | 23 - 63 | 32 - 86 | 38 - 103 | 51 - 138 | 60 - 160 | 69 - 184 | 78 - 208 | 90 - 240 | 103 - 276 | 117 - 312 |
| | | | | | | | | | | |
| **Condenser GPM Range - 2 Pass Cond** | | | | | | | | | | |
| 10 F Water Temp Delta-T, 65ELWT/130CLWT | 94 | 128 | 154 | 206 | 240 | 276 | 312 | 360 | 414 | 468 |
| 15 F Water Temp Delta-T, 65ELWT/130CLWT | 63 | 85 | 103 | 137 | 160 | 184 | 208 | 240 | 276 | 312 |

**NOTE:** ELWT=Evaporator Leaving Water Temperature, CLWT=Condenser Water Leaving Temperature.

## Compressor POE Oil

The oil level should be watched carefully upon initial start-up and for sometime thereafter. Compressor oil must be one of the following: Copeland brand Ultra 22 CC, Copeland brand Ultra 32 CC, Copeland brand Ultra 32-3MAF, Mobil EAL Artic 22 CC, or Uniqema RL32-3MAF.

This is synthetic polyolester oil with anti-wear additives and is highly hygroscopic. Care must be taken to minimize exposure of the oil to air when charging oil into the system. Oil can be added to the compressor through the oil fill hole on the compressor. To add oil, pump in the necessary oil.

## Sightglass and Moisture Indicator

A clear glass of liquid indicates that there may be an adequate refrigerant charge in the system to provide proper feed through the expansion valve. Bubbling refrigerant in the sightglass indicates that the system is short of refrigerant charge. Refrigerant gas flashing in the sightglass could also indicate an excessive pressure drop in the line, possibly due to a clogged filter-drier or a restriction elsewhere in the system. An element inside the sightglass indicates what moisture condition corresponds to a given element color. If the sightglass does not indicate a dry condition after about 12 hours of operation, the oil should be tested for acid and the filter-driers changed if necessary.

*Table 29: Troubleshooting Chart*

| PROBLEM | POSSIBLE CAUSES | POSSIBLE CORRECTIVE STEPS |
|---|---|---|
| Compressor Will Not Run | 1. Main switch, circuit breakers open.<br>2. Fuse blown.<br>3. Thermal overloads tripped or fuses blown.<br>4. Defective contactor or coil.<br>5. System shut down by equipment protection devices.<br>6. No heating required.<br>7. Liquid line solenoid will not open.<br>8. Motor electrical trouble.<br>9. Loose wiring. | 1. Close switch<br>2. Check electrical circuits and motor winding for shorts or grounds. Investigate for possible overloading. Replace fuse or reset breakers after fault is corrected.<br>3. Overloads are auto reset. Check unit closely when unit comes back on lines.<br>4. Repair or replace.<br>5. Determine type and cause of shutdown and correct it before resetting safety switch.<br>6. None. Wait until unit calls for heating.<br>7. Repair or replace coil.<br>8. Check motor for opens, short circuit, or burnout.<br>9. Check all wire junctions. Tighten all screws. |
| Compressor Noisy or Vibrating | 1. Improper piping support on suction or liquid line.<br>2. Worn compressor.<br>3. Low lift.<br>4. Compressor improperly phased and running backwards | 1. Relocate, add or remove hangers.<br>2. Replace.<br>3. Avoid inverted starts and control discharge pressure.<br>4. Correct phasing. |
| High Discharge Pressure | 1. Condenser water insufficient or temperature too high.<br>2. Fouled condenser tubes<br>3. Noncondensables in system.<br>4. System overcharge with refrigerant.<br>5. Discharge shutoff valve partially closed. | 1. Investigate ways to increase hot water supply or lower the temperature of the hot water. Check operation of the supplementary heater.<br>2. Clean.<br>3. Purge the noncondensables.<br>4. Remove excess refrigerant.<br>5. Open valve. |
| Low Discharge Pressure | 1. Suction shutoff valve partially closed.<br>2. Insufficient refrigerant in system.<br>3. Low suction pressure.<br>4. Compressor floodback.<br>5. Condenser too large. | 1. Open valve.<br>2. Check for leaks. Repair and add charge.<br>3. See corrective steps for low Suction pressure below.<br>4. Check suction superheat.<br>5. Check condenser operation against rating. |
| High Suction Pressure | 1. Excessive load.<br>2. Expansion valve overfeeding. | 1. Reduce load or add additional equipment.<br>2. Check remote bulb. Regulate superheat. |
| Low Suction Pressure | 1. Lack of refrigerant.<br>2. Evaporator dirty.<br>3. Clogged liquid line filter-drier.<br>4. Clogged suction line or compressor suction gas strainers.<br>5. Expansion valve malfunctioning.<br>6. Gasket failure in evaporator head ring.<br>7. Condensing temperature too low.<br>8. Insufficient water flow. | 1. Check for leaks. Repair and add charge.<br>2. Clean chemically.<br>3. Replace cartridge(s).<br>4. Clean strainers.<br>5. Check and reset for proper superheat. Replace if necessary.<br>6. Check ΔP across evaporator.<br>7. Check means for regulating condensing temperature.<br>8. Adjust flow. |
| Compressor Loading/Unloading Intervals Too Short | 1. Erratic water sensor.<br>2. Insufficient water flow.<br>3. System load swings.<br>4. Unit operation with no load. | 1. Replace<br>2. Adjust flow.<br>3. Correct load control.<br>4. Review BAS controls. |
| Motor Overload Relays or Circuit Breakers Open | 1. Low voltage during high load conditions.<br>2. Defective or grounded wiring in motor or power circuits.<br>3. Loose power wiring or burnt compressor contacts.<br>4. High condensing temperature.<br>5. Power line fault causing unbalanced voltage.<br>6. High ambient temperature around the overload relay. | 1. Check supply voltage for excessive line drop.<br>2. Replace compressor motor.<br>3. Check all connections and tighten. Replace contactor.<br>4. See corrective steps for high discharge pressure.<br>5. Check Supply voltage. Notify power company. Do not start until fault is corrected.<br>6. Provide ventilation to reduce heat. |
| Compr. Thermal Switch Open | 1. Operating beyond design conditions.<br>2. Supply voltage range or imbalance<br>3. High ssh. | 1. Add facilities so that conditions are within allowable limits.<br>2. Correct power.<br>3. Verify charge & expansion valve operation. |
| Freeze Protection Opens | 1. Thermostat set too low.<br>2. Low water flow.<br>3. Low suction pressure.<br>4. Rapid Load Swings. | 1. Reset to 42°F (6°C) or above.<br>2. Adjust flow.<br>3. See "Low Suction Pressure."<br>4. Verify Chiller and BAS controls. |

*Table 30: Maintenance Schedule*

| | Monthly | Quarterly | Semi-Annually | Annually | As Required By Performance |
|---|---|---|---|---|---|
| **I. Compressor** | | | | | |
| A. Performance Evaluation (Log & Analysis) * | O | | | | |
| B. Motor | | | | | |
| • Meg. Windings | | | X | | |
| • Ampere Balance (within 10%) | | X | | | |
| • Terminal Check (tight connections, porcelain clean) | | | | X | |
| • Motor Cooling (check temperature) | | X | | | |
| C. Lubrication System | | | | | |
| • Oil Level | O | | | X | |
| • Oil Appearance (clear color, quantity) | O | | | | |
| • Oil change if indicated by oil analysis | | | | | X |
| **II. Controls** | | | | | |
| A. Operating Controls | | | | | |
| • Check Settings and Operation | | | X | | |
| B. Protective Controls | | | | | |
| • Test Operation of: | | | | | |
| Alarm Relay | | X | | | |
| Pump Interlocks | | X | | | |
| High and Low Pressure Cutouts | | X | | | |
| **III. Condenser** | | | | | |
| B. Test Water Quality | | X | | | |
| C. Clean Condenser Tubes (or as required) | | | | X | |
| D. Eddycurrent Test - Tube Wall Thickness | | | | | X |
| E. Seasonal Protection | | | | | X |
| **IV. Evaporator** | | | | | |
| B. Test Water Quality | | X | | | |
| C. Clean Evaporator Tubes or plates ( as required) | | | | | X |
| D. Seasonal Protection | | | | | X |
| **V. Expansion Valves** | | | | | |
| A. Performance Evaluation (Superheat Control) | | X | | | |
| **VI. Compressor - Chiller Unit** | | | | | |
| A. Performance Evaluation | O | | | | |
| B. Leak Test: | | | | | |
| • Compressor Fittings and Terminal | | X | | | |
| • Piping Fittings | | X | | | |
| • Vessel Relief Valves | | X | | | |
| C. Vibration Isolation Test | | X | | | |
| D. General Appearance: | | | | | |
| • Paint | | | | X | |
| • Insulation | | | | X | |
| **VII. Starter(s)** | | | | | |
| A. Examine Contactors (hardware and operation) | | X | | | |
| B. Verify Overload Setting and Trip | | X | | | |
| C. Test Electrical Connections | | X | | | |
| **VIII. Optional Controls** | | | | | |
| A. Hot Gas Bypass (verify operation) | | X | | | |

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Now that you have made an investment in modern, efficient Daikin Applied equipment, its care should be a high priority. For training information on all Daikin Applied HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

***Warranty***

All Daikin Applied equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

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To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

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