Installation and Maintenance Manual	IM 1131
Water-Cooled Scroll Compressor Chiller	Group: **Chillers**
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WGZ030DW - WGZ200DW, Packaged Water-Cooled Chillers
WGZ030DA - WGZ200DA, Condenserless Chillers
30 - 200 Tons (105 - 700 kW)
50/60 Hz
R-410A

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Hazard Identification

⚠ 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.

AHRI CERTIFIED™ www.ahridirectory.org Water-Cooled Chillers AHRI Standard 550/590

Modbus BACnet International ETL LISTED ETL LISTED LONMARK 3.4

**AHRI Certification and ETL Listing apply to 60Hz models only*

Manufactured in an **ISO Certified facility**

Note: Cover photograph is an WGZ060-D. This manual covers WGZ-D vintage water-cooled scroll chillers. For WGZ-C vintage models, see IMM WGZC, available at www.daikinmcquay.com.

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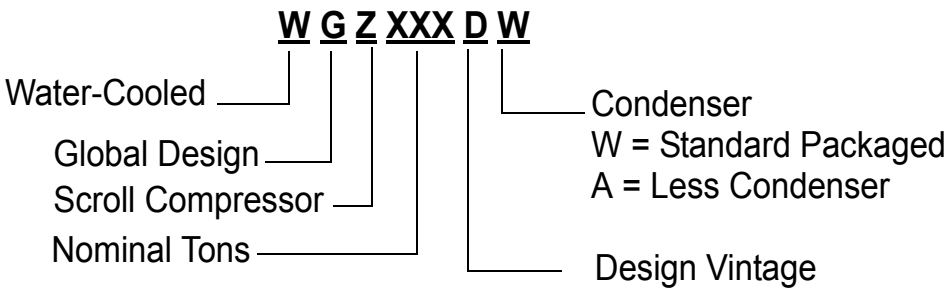
Chiller Nomenclature



General Description

Daikin McQuay WGZ water chillers are designed for indoor installations and are available with water-cooled condensers (Model WGZ-DW), or arranged for use with remote, air-cooled or evaporative condensers (Model WGZ-DA). Each water-cooled unit is completely assembled and factory wired before evacuation, charging and testing. They consist of hermetic scroll compressors, brazed-plate evaporators on Models WGZ 030 to 130 or shell-and-tube on Models WGZ 150 to 200, water-cooled condenser on Model WGZ-DW, and complete refrigerant piping.

Units manufactured for use with remote condensers (Models WGZ-DA) have all refrigerant specialties factory-mounted and connection points for refrigerant discharge and liquid lines.

Liquid line components that are included are manual liquid line shutoff valves, charging valves, filter-driers, liquid line solenoid valves, sight glass/moisture indicators, and expansion valves. Other features include compressor crankcase heaters, and a MicroTech II microprocessor controller.

The electrical control center includes all equipment protection and operating controls necessary for dependable automatic operation. Optional unit-mounted disconnect switche(s) may not be present, inwhich case a field-supplied and installed, fused disconnect switch is required.

Inspection

When the equipment is received, all items should be carefully checked against the bill of lading to be sure of 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 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 McQuay International.

Note: Unit lifting weights and Corner operating weightsare given in the weight tables beginning on page 26.

Refrigerant Charge

Every model WGZ-DW water chiller with water-cooled condensers is shipped with a full refrigerant charge. For shipment, the charge is contained in the condenser and is isolated by the condenser liquid shutoff valve and the compressor discharge valve common to a pair of compressors.

⚠ CAUTION

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

A holding charge of nitrogen/helium is supplied in remote condenser models, WGZ-DA and must be removed prior to charging with refrigerant. The operating charge must be field supplied and charged.

Installation

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 equipment.

⚠ CAUTION

Avoid contact with sharp edges. Personal injury can result

Location

WGZ chillers are intended only for installation in an indoor or weather protected area consistent with the NEMA 1 rating on the chiller, controls, and electrical panels. Equipment room temperature for operating and standby conditions is 40°F to 122°F (4.4°C to 50°C).

Because of the electrical 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 water chiller. If necessary, additional structural members should be provided to transfer the weight of the unit to the nearest beams.

Space Requirements for Connections and Servicing

The chilled water and condenser water (on units with a water-cooled condenser) piping enters and leaves the unit from the right side when looking at the control panel. Left-hand condenser connections are an option. A clearance of at least 3 feet (1219 mm), or more if codes require, should be provided beyond this piping and on all other sides and ends of the unit for general servicing or for changing the compressors, if it ever becomes necessary. Allow a minimum of 4-foot clearance in front of the control panel or as required by the NEC or local codes.

On units equipped with a water-cooled condenser (Type WGZ-DW) clearance should also be provided for cleaning or removal of condenser tubes on one end of the unit. The clearance for cleaning depends on the type of apparatus used, but can be as much as the length of the condenser (10 feet, 3050 mm). Tube replacement requires the length of the condenser (as much as 12 feet) plus three feet of workspace. This space can often be provided through a doorway or other opening.

Moving the Unit

Refer to Lifting/Mounting weights beginning on page 26.

The packaged unit skid option is strongly recommended for ease of handling and to help prevent damage if a crane is not available for rigging at site. Properly designed field supplied skids or dollies are acceptable. Do not push unit along a floor without them. The condenserless models (AGZ-DA) are manufactured with a base suitable for moving with rollers.

All moving and handling of packaged units (Figure 1) must be performed with skids or dollies under the unit and they should not be removed until the unit is in the final location. Never put the weight of the unit against the control box.

In moving, always apply pressure to the base on the skids only and not to the piping or other components. A long bar will help move the unit. Avoid dropping the unit at the end of the roll.

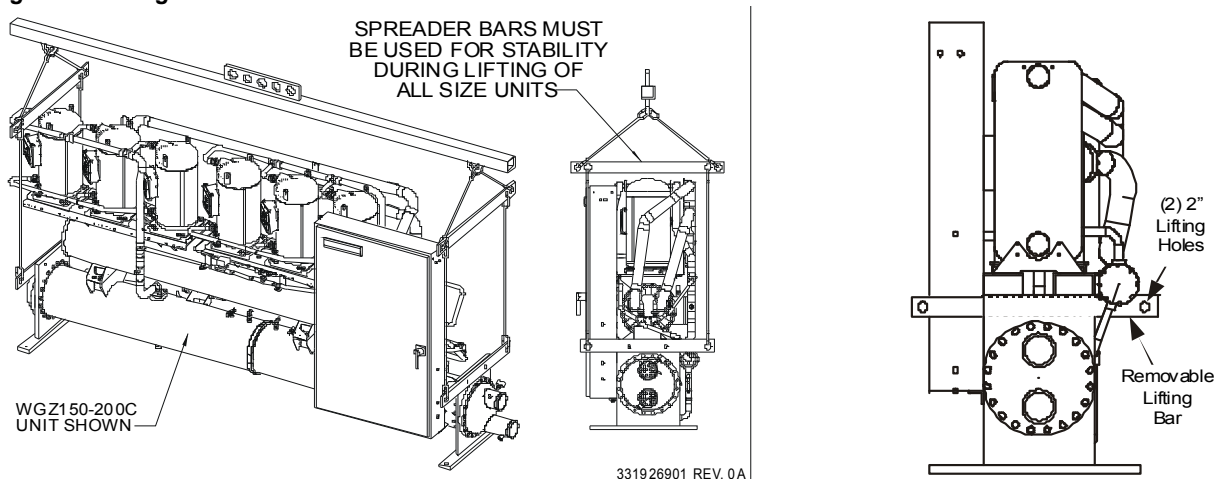
If the unit must be hoisted, lift the unit from the removable lifting arms factory-bolted to each end of the unit adjacent to the tube sheet by attaching cables or chains to the end of the arms. A spreader bar must be used to protect the piping, control panel and other areas of the chiller (Figure 1). The lifting arms should be removed and discarded after use.

Do not attach slings to piping or equipment. Do not attempt to lift the unit by lifting points mounted on the compressors. They are for lifting only the compressor should one need to be removed from the unit. Move unit in the upright horizontal position at all times. Set unit down gently when lowering from the truck or rollers.

Placing the Unit

The small amount of vibration normally encountered 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, or transmit noise and vibration into the structure.

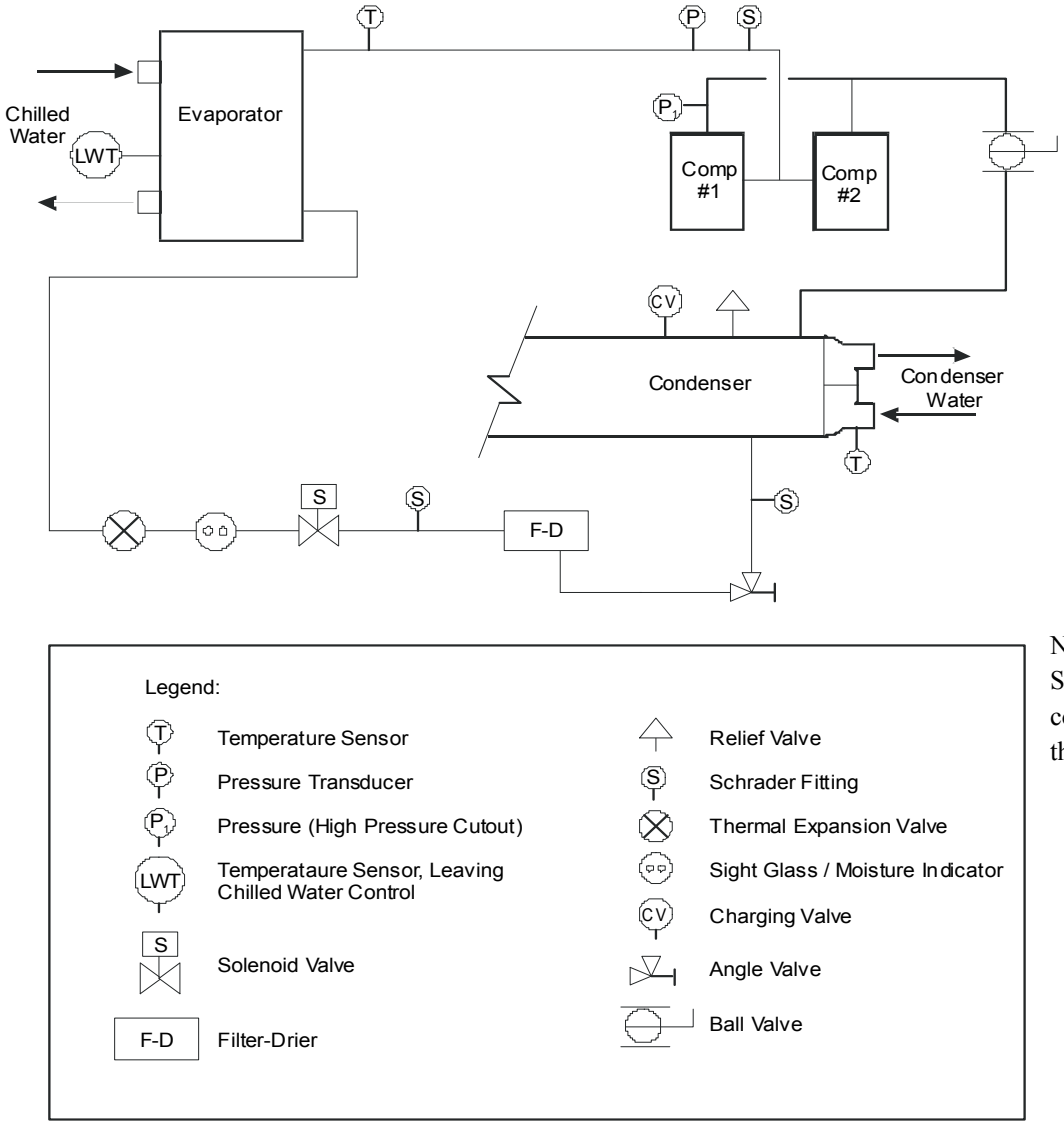
Figure 1: Lifting the Unit



Unit Configuration

WGZ 030DW to 130DW have two refrigerant circuits, two tandem scroll compressors (total of four), a single two-circuited brazed plate evaporator, a single two-circuited water-cooled condenser, interconnecting refrigerant piping and a control panel with associated sensors and transducers. Models WGZ 150DW to 200DW have two trio-compressors (total of 6) and a shell-and-tube evaporator.

Figure 2: Schematic Piping Diagram (One of Two Circuits for Brazed Plate Evaporators)



NOTE:
Standard condenser connections are on the control panel end.

Install Vessel Drain Plugs at Start-up

Condensers are drained of water in the factory and are shipped with the condenser drain plugs in the heads removed and stored in a bag in the control panel. Be sure to replace plugs prior to filling the vessel with fluid.

General Piping Guidelines

Due to the variety of piping practices, it is advisable to follow the recommendations of local authorities for code compliance. They can supply the installer with the proper building and safety codes required for a safe and proper installation.

The piping should be designed with a minimum number of bends and changes in elevation to keep system cost down and performance up. Other piping design considerations include:

1. All piping should be installed and supported to prevent the chiller connections from bearing any strain or weight of the system piping.
2. Vibration eliminators to reduce vibration and noise transmission to the building.
3. Shutoff valves to isolate the unit from the piping system during unit servicing.
4. Do not use PVC or CPVC piping for any water lines.

5 Manual or automatic air vent valves at the high points of the system. Drains should be placed at the lowest points in the system.

6 On units with factory-mounted flow switches and where flange connections (Victaulic-to-flange adaptors or weld-on flanges) are to be used, relocating the flow switch is required to allow for possible future replacement since the flange will interfere with unscrewing the switch. The following is recommended, before installing a flange, to avoid interference 1) Remove the flow switch before and plug the switch opening in the nozzle. 2) Install the Victaulic-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.

7 Some means of maintaining adequate system water pressure (e.g., expansion tank or regulating valve).

8 Temperature and pressure indicators located within 3 feet (0.9 meters) of the inlet and outlet of the vessels to aid in unit servicing.

9 This product is equipped with a copper-brazed 304 series stainless steel evaporator plate or a shell and tube evaporator with carbon steel shell and copper tubes. The water or other fluid used in these evaporators must be clean and non-corrosive to the materials used in the evaporator. The use of non-compatible fluids can void the equipment warranty. If the compatibility of the fluid with the evaporator is in question, a professional water quality consultant should administer the proper testing and evaluate compatibility

10 A strainer or some means of removing foreign matter from the water before it enters the pump is recommended. It should be placed far enough upstream to prevent cavitation at the pump inlet (consult pump manufacturer for recommendations). The use of a strainer will prolong pump life and thus maintain system performance.

Important Note: A cleanable 40-mesh strainer must also be placed in the water line just prior to the inlet of the evaporator on Models WGZ 030 to 130. A 20-mesh is satisfactory on Models WGZ 150 to 200. This will aid in preventing foreign material from entering and decreasing the performance of the evaporator.

11 If the unit is used as a replacement chiller on a previously existing piping system, the system should be thoroughly flushed prior to unit installation. Regular water analysis and chemical water treatment on the evaporator and condenser is recommended immediately upon equipment start-up.

12 In the event glycol is added to the water system, as an afterthought for freeze protection, recognize that the refrigerant suction pressure will be lower, cooling performance less, and water side pressure drop will be higher. If the percentage of glycol is large, or if propylene glycol is used instead of ethylene glycol, the added pressure drop and loss of performance could be substantial. Reset the freezestat and low leaving water alarm temperatures. The freezestat is factory set to default at 36°F (2.2°C). Reset the freezestat setting to approximately 4° to 5°F (2.3° to 2.8°C) below the leaving chilled water setpoint temperature. See the section titled "Glycol Solutions" for additional information concerning the use of glycol.

13 A preliminary leak check of the water piping should be made before filling the system.

Note: A water flow switch or pressure differential switch must be mounted in the evaporator outlet water line to signal that there is water flow before unit will start.

Figure 3: Typical Evaporator Field Water Piping (WGZ030 - WGZ130)

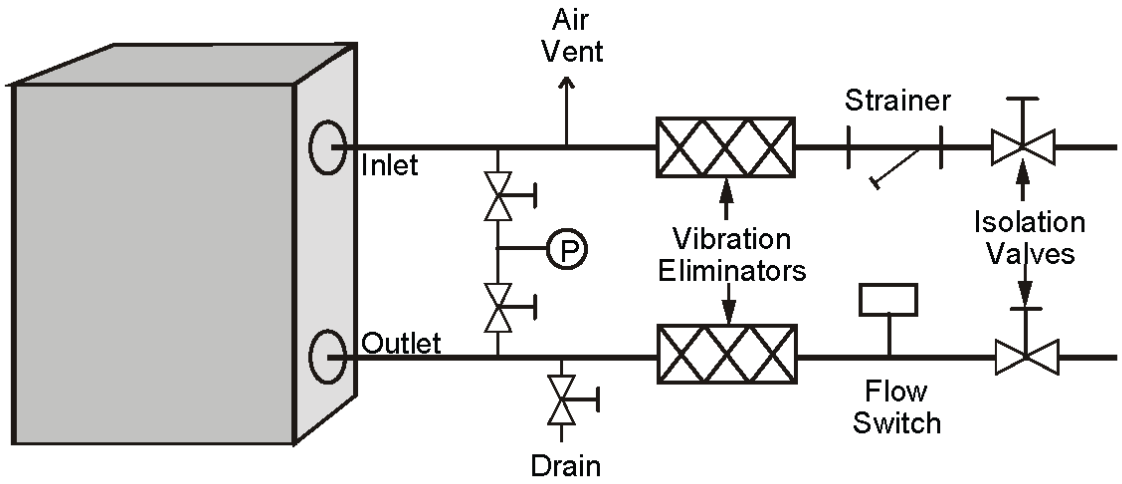
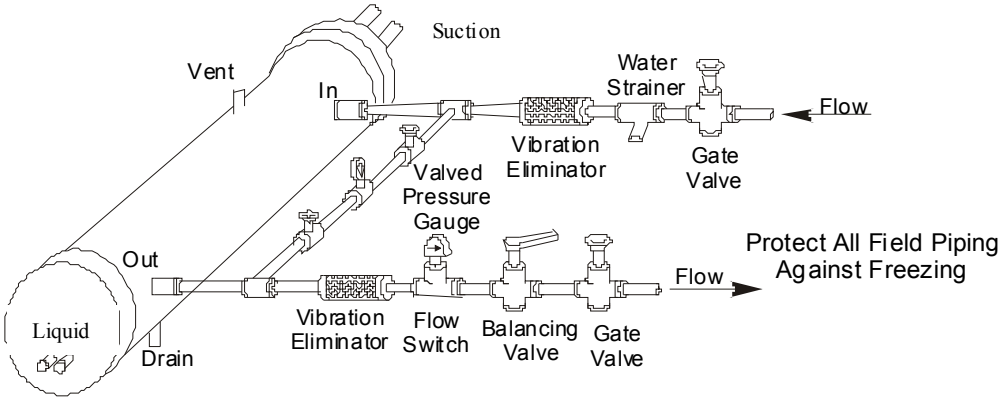


Figure 4: Typical Evaporator Field Water Piping (WGZ150 - WGZ200)



System Water Volume

It is important to have adequate water volume in the system to provide an opportunity for the chiller to sense a load change, adjust to the change, and then stabilize. The system water volume is the total amount of water in the evaporator, air handling equipment, and associated piping. As the expected load change becomes more rapid, a greater water volume is needed. If the water volume is too low, operational problems can occur including rapid compressor cycling, rapid loading and unloading of compressors, erratic refrigerant flow in the chiller, improper motor cooling, shortened equipment life and other undesirable occurrences.

For normal comfort cooling applications where the cooling load changes relatively slowly, a minimum system volume of two to three minutes times the flow rate (GPM) is recommended. For example, if the design chiller flow rate is 120 gpm, we recommend a system volume of 240 to 360 gallons.

For process applications where the cooling load can change rapidly, additional system water volume is needed. A process example would be the quenching of hot metal objects. The load would be very stable until the hot metal is dipped into the water tank. Then, the load would increase drastically.

Since there are many other factors that can influence performance, systems can successfully operate below these suggestions. But as the water volume decreases below these guidelines, the possibility of system instability increases.

Variable Chilled Water Flow

Reducing chilled water flow in proportion to load can reduce total system power consumption. Certain restrictions apply to the amount and rate of flow change. The rate of flow change should be a maximum of 10 percent of the change, per minute. Do not reduce flow lower than the part load minimum flows listed on page 14 or page 15.

Chilled Water Piping

The system water piping must be flushed thoroughly prior to making connections to the unit evaporator. It is required that a 40-mesh strainer be installed in the return water line before the inlet to the chiller. Lay out the water piping so the chilled water circulating pump discharges into the evaporator inlet.

The return water line must be piped to the evaporator inlet connection and the supply water line must be piped to the evaporator outlet connection. If the evaporator water is piped in the reverse direction, a substantial decrease in capacity and efficiency of the unit will be experienced.

A flow switch must be installed in the horizontal piping of the supply (evaporator outlet) water line to prove water flow before starting the unit.

Drain connections should be provided at all low points in the system to permit complete drainage of the system. Air vents should be located at the high points in the system to purge air out of the system. The evaporators are not equipped with vent or drain connections and provision must be made in the entering and leaving chilled water piping for venting and draining.

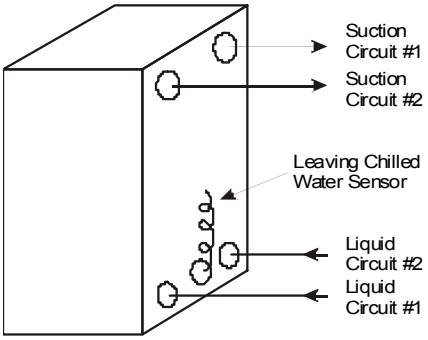
Pressure gauges should be installed in the inlet and outlet water lines to the evaporator. Pressure drop through the evaporator should be measured to determine water flow from the flow/pressure drop curves beginning on page 14. Vibration eliminators are recommended in both the supply and return water lines.

Chilled water piping should be insulated to reduce heat loss and prevent condensation. Complete unit and system leak tests should be performed prior to insulating the water piping. Insulation with a vapor barrier would be the recommended type of insulation. If the vessel is insulated, the vent and drain connections must extend beyond the proposed insulation thickness for accessibility.

Chillers not run in the winter should have their water systems thoroughly drained if subject to sub-freezing temperatures. If the chiller operates year-round, or if the system is not drained for the winter, the chilled water piping exposed to sub-freezing ambient temperatures should be protected against freezing by wrapping the lines with a heater cable. In addition, an adequate percentage of glycol should be added to the system to further protect the system during low ambient temperature periods. It should be noted that water piping that has been left drained is

subject to more corrosion than if filled with water. Use of a Vapor Corrosion Inhibitor (VCI) or some other protection should be considered.

Figure 5: Thermostat Well Location, WGZ 030 - 130



The chilled water sensor is factory installed in the leaving water connection on the evaporator. 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 to not wipe off the heat-conducting compound supplied in the well.

⚠ CAUTION

The thermostat bulb should not be exposed to water temperatures above 125°F (51.7°C) as this will damage it.

Flow Switch

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

If the optional factory flow switch is not supplied, a flow switch is available from Daikin McQuay under part number 01750330. It is a "paddle" type switch and adaptable to any pipe size from 1 in. (25 mm) to 6 in. (152 mm) nominal. Certain flow rates are required to open the switch and are listed in Table 1. Wire from switch terminals Y and R to panel terminals 33 and 43 (chilled water) and 41 and 53 (condenser water). 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.

1. Apply pipe sealing compound to only the threads of the switch and screw unit into 1 in. (25 mm) reducing tee. The flow arrow must be pointed in the correct direction.
2. Piping should provide a straight length before and after the flow switch of at least five times the pipe diameter without any valves, elbows, or other flow restricting elements.

⚠ CAUTION

Make sure the arrow on the side of the switch is pointed in the direction of flow. The flow switch is designed to handle the control voltage and should be connected according to the wiring diagram.

Table 1: Paddle-Type Flow Switch Flow Rates

Pipe Size NOTES (x)		inch	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
		mm	32 (2)	38 (2)	51	63 (3)	76	102 (4)	127 (4)	153 (4)	204 (5)
Min. Adjst.	Flow	gpm	5.8	7.5	13.7	18.0	27.5	65.0	125.0	190.0	205.0
		Lpm	1.3	1.7	3.1	4.1	6.2	14.8	28.4	43.2	46.6
	No Flow	gpm	3.7	5.0	9.5	12.5	19.0	50.0	101.0	158.0	170.0
		Lpm	0.8	1.1	2.2	2.8	4.3	11.4	22.9	35.9	38.6
Max. Adjst.	Flow	gpm	13.3	19.2	29.0	34.5	53.0	128.0	245.0	375.0	415.0
		Lpm	3.0	4.4	6.6	7.8	12.0	29.1	55.6	85.2	94.3*5455*
	No Flow	gpm	12.5	18.0	27.0	32.0	50.0	122.0	235.0	360.0	400.0
		Lpm	2.8	4.1	6.1	7.3	11.4	27.7	53.4	81.8	90.8

Note (1): A segmented 3-inch paddle (1, 2, and 3 inches) is furnished mounted, plus a 6-inch paddle loose.
Note (2): Flow rates for a 2-inch paddle trimmed to fit the pipe.
Note (3): Flow rates for a 3-inch paddle trimmed to fit the pipe.
Note (4): Flow rates for a 3-inch paddle.
Note (5): Flow rates for a 6-inch paddle.

Glycol Solutions

⚠ CAUTION

Do not use automotive antifreeze. Industrial glycols must be used. Automotive antifreeze contains inhibitors that causes plating on copper tubes. The type and handling of glycol used must be consistent with local codes.

WGZ units are designed to operate with a leaving chilled fluid temperature from 15°F (-9.4°C) to 60°F (16°C). Leaving chilled fluid temperatures below 40°F (4.6°C) result in suction temperatures at or below the freezing point of water and a glycol anti-freeze solution is required. The use of glycol in the evaporator will reduce the performance of the unit. The reduction in performance depends upon the glycol concentration and temperature. This should be taken into consideration during initial system design. Glycol in the condenser will have a negligible effect on performance because glycol at these higher temperatures will perform with characteristics similar to water.

Daikin McQuay recommends a minimum concentration of 25% be provided on all glycol applications. Glycol concentrations below 25% are too diluted for long-term corrosion protection of ferrous metals and corrosion inhibitors need to be recalculated and possibly added to the system.

Chiller capacity, flow rate, evaporator pressure drop, and power input for glycol solutions can be calculated using the following formulas and reference to Table 2 for ethylene glycol and Table 3 for propylene glycol. Test coolant with a clean, accurate, glycol solution hydrometer (similar to that found in service stations) to determine the freezing point.

Note: Ethylene and propylene glycol ratings are outside the scope of AHRI Standard 550/590-2003 certification program.

Capacity is reduced compared to that with plain water. To find the reduced value, multiply the chiller's capacity when using water by the capacity correction factor C to find the chiller's capacity when using glycol.

Flow -To determine evaporator gpm (or T) knowing T (or gpm) and capacity:

$$Glycol\ GPM = \frac{24\ x\ Glycol\ Capacity}{\Delta T}\ x\ Flow\ Correction\ G\ From\ Tables$$

For Metric Applications -- Determine evaporator lps (or T) knowing T (or lps) and kW:

$$Glycol\ Lps = \frac{kW}{4.18\ x\ \Delta T}\ x\ Flow\ Correction\ G\ from\ Tables$$

Pressure Drop - To determine glycol pressure drop through the cooler, enter the water pressure drop graph on page 14 at the actual glycol flow. Multiply the water pressure drop found there by P to obtain corrected glycol pressure drop.

Power -To determine glycol system kW, multiply the water system kW by factor K.

Table 2: Ethylene Glycol Correction Factors

%E.G.	Freeze Point		Capacity	Power	Flow	PD
	° F	° C	"C"	"K"	"G"	"P"
10%	25.0	-3.9	0.997	0.999	1.030	1.113
20%	18.0	-7.8	0.993	0.997	1.060	1.226
30%	7.0	-14.0	0.987	0.995	1.092	1.369
40%	-7.0	-22.0	0.980	0.992	1.132	1.557
50%	-28.0		0.973	0.991	1.182	1.791

Table 3: Propylene Glycol Correction Factors

%P.G.	Freeze Point		Capacity	Power	Flow	PD
	° F	° C	"C"	"K"	"G"	"P"
10%	25.0	-3.9	0.994	0.998	1.016	1.106
20%	19.0	-7.2	0.987	0.995	1.032	1.211
30%	9.0	-13.0	0.978	0.992	1.057	1.380
40%	-5.0	-21.0	0.964	0.987	1.092	1.703
50%	-27.0	-32.8	0.952	0.983	1.140	2.250

Condenser Water Piping

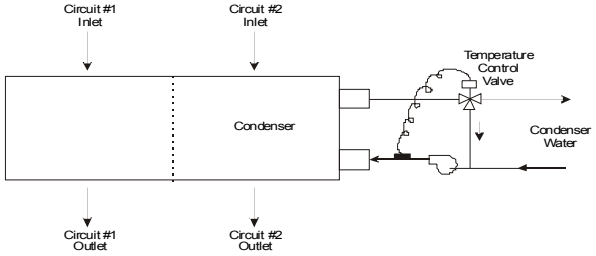
Arrange the condenser water so the water enters the bottom connection of the condenser. The condenser water will discharge from the top connection. Failing to arrange the condenser water as stated above will negatively affect the capacity and efficiency.

Install pressure gauges in the inlet and outlet water lines to the condenser. Pressure drop through the condenser should be measured to determine flow on the pressure drop/flow curves beginning on page 14. Vibration eliminators are recommended in both the supply and return water lines. Install a 20-mesh strainer in the inlet piping to the condenser.

Water-cooled condensers can be piped for use with cooling towers, well water, or heat recovery applications. Cooling tower applications must be made with consideration of freeze protection and scaling problems. Contact the cooling tower manufacturer for equipment characteristics and limitations for the specific application. Head pressure control must be provided if the entering condenser water can fall below 60°F. The WGZ condenser has two refrigerant circuits with a common condenser water circuit. This arrangement makes head pressure control with discharge pressure actuated control valves difficult.

If the tower water temperature cannot be maintained at a 60°F minimum, or when pond, lake, or well water that can fall below 60°F (15°C) is used as the condensing medium, special discharge pressure control must be used. A water recirculating system with recirculating pump as shown in Figure 6 is recommended. This system also has the advantage of maintaining tube velocity to help prevent tube fouling. The pump must cycle with the chiller.

Figure 6: Recirculating Discharge Water System



Refrigerant Piping

Refrigerant piping, to and from the unit, should be sized and installed according to the latest ASHRAE Handbook. It is important that the unit piping be properly supported with sound and vibration isolation between tubing and hanger, and that the discharge lines be looped at the condenser and trapped at the compressor to prevent refrigerant and oil from draining into the compressors. Looping the discharge line also provides greater line flexibility.

NOTE: Do not install any refrigerant piping underground.

The discharge gas valves, liquid line solenoids, filter-driers, moisture indicators, and expansion valves are all factory mounted as standard equipment with the water chiller.

For remote condenser application (WGZ-DA) such as air-cooled or evaporative condenser, the chillers are shipped with a nitrogen/helium holding charge. The unit is evacuated in the factory to 500 microns before charging with the nitrogen.

The liquid line has a shutoff valve upstream from the liquid line solenoid valve and a copper tube cap to be brazed on this line after test to seal this line for shipment.

The discharge line has a ball valve installed between the compressor and the discharge stub tube with a copper tube cap brazed on the line after test to seal it for shipment.

The discharge gas valves, liquid line solenoids, filter-driers, moisture indicators, and expansion valves are all factory-mounted as standard equipment with the water chiller.

⚠ DANGER

Do not apply heat, such as a brazing torch, to a sealed unit, vessel, or component. Internal gases can increase the internal pressure and cause a life-threatening explosion. Open the system when heating. The short line between a valve and brazed end cap can be drilled to vent it. Note that the valve may leak and the entire unit charge may be open to the cap.

It is important that the unit be kept tightly closed until the remote condenser is installed, piped to the unit and the high side evacuated.

When the field piping has been leak tested, evacuated, and is ready to charge, the unit valves can be opened and the system is ready to pressure test, evacuate and charge the entire system together at one time.

After the equipment is properly installed, leak tested, and evacuated, it can be charged with R-410A, and run at design load conditions. Add charge until the liquid line sight glass is clear, with no bubbles flowing to the expansion valve. Total operating charge will depend on the air-cooled condenser used and volume of the refrigerant piping.

NOTE: On WGZ-DA units (units with remote condensers), the installer is required to record the refrigerant charge by stamping the total charge and the charge per circuit on the serial plate in the appropriate blocks provided for this purpose.

Discharge lines must be designed to handle oil properly and to protect the compressor from damage that can result from condensing liquid refrigerant in the line during shutdown. Total friction loss for discharge lines of 3 to 6 psi (20.7 to 41.4 kPa) is considered good design. Careful consideration must be given for sizing each section of piping to insure that gas velocities are sufficient at all operating conditions to carry oil. If the velocity in a vertical discharge riser is too low, considerable oil can collect in the riser and the horizontal header, causing the compressor to lose its oil and result in damage due to lack of lubrication. When the compressor load is increased, the oil that had collected during reduced loads can be carried as a slug through the system and back to the compressor, where a sudden increase of oil concentration can cause liquid slugging and damage to the compressor.

Any horizontal run of discharge piping should be pitched away from the compressor approximately 1/8 inch (6.4 mm) per foot (meter) or more. This is necessary to move, by gravity, any oil lying in the header. Oil pockets must be avoided because oil needed in the compressor would collect at such points and the compressor crankcase can become starved.

It is recommended that any discharge lines coming into a horizontal discharge header rise above the centerline of the discharge header. This is necessary to prevent any oil or condensed liquid from draining to the compressor heads when the compressor is not running.

In designing liquid lines, it is important that the liquid reach the expansion valve without flash gas since this gas will reduce the capacity of the valve. Because "flashing" can be caused by a pressure drop in the liquid line, the pressure losses due to friction and changes in static head should be kept to a minimum.

A check valve must be installed in the liquid line in all applications where the ambient temperature can drop below the equipment room temperature. This prevents liquid migration to the condenser, helps maintain a supply of refrigerant in the liquid line for initial start-up, and keeps liquid line pressure high enough on "off" cycle to keep the expansion valve closed.

On systems as described above, a relief valve or relief-type check valve, must be used in the liquid line as shown in piping systems (shown in and Its purpose is to relieve dangerous hydraulic pressures that could be created as cool liquid refrigerant trapped in the line between the check valve and the expansion or shutoff valve warms up. Install a relief device in the hot gas piping at the condenser coil as shown in Figure 7 and Figure 8. Install a discharge check valve in the discharge line, in a horizontal run, close to the condenser.

Recommended Line Sizing for Field Piping

Final design should be based on ASHRAE design standards.

Table 4: Equivalent Feet for Fittings

Fitting Type	7/8"	1 1/8"	1 3/8"	1 5/8"	2 1/8"	2 5/8"	3 1/8"
Elbows							
90º Standard	2.0	2.6	3.3	4.0	5.0	6.0	7.5
90º Long Radius	1.4	1.7	2.3	2.6	3.3	4.1	5.0
90º Street	3.2	4.1	5.6	6.3	8.2	10.0	12.0
45º Standard	0.9	1.3	1.7	2.1	2.6	3.2	4.0
45º Street	1.5	2.1	3.0	3.4	4.5	5.2	6.4
180º Bend	3.2	4.1	5.6	6.3	8.2	10.0	12.0
Tees							
Full Size	1.4	1.7	2.3	2.6	3.3	4.1	5.0
Reducing	2.0	2.6	3.3	4.0	5.0	6.0	7.5
Valves							
Globe Valve, Open	22.0	29.0	38.0	43.0	55.0	69.0	84.0
Gate Valve, Open	0.9	1.0	1.5	1.8	2.3	2.8	3.2
Angle Valve, Open	9.0	12.0	15.0	18.0	24.0	29.0	35.0

Table 5: Maximum Line Size for Oil Carry Up a Discharge Riser, R-410A

Unit Size	WGZ030	WGZ035	WGZ040	WGZ045	WGZ050	WGZ055	WGZ060	WGZ070	WGZ080	WGZ090
Line Size (in.)	1 5/8	1 5/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	2 5/8	2 5/8

Unit Size	WGZ100	WGZ115	WGZ130	WGZ150	WGZ170	WGZ200
Line Size (in.)	2 5/8	3 1/8	3 1/8	2 5/8	3 1/8	3 1/8

Table 6: Recommended Liquid Line Size, R-410A

Unit Model	Conn. Size at Unit	Recommended Liquid Line Size (in.)				
		Up to 50 Equiv. Ft	Up to 75 Equiv. Ft	Up to 100 Equiv. Ft	Up to 125 Equiv. Ft	Up to 150 Equiv. Ft
WGZ030	7/8"	7/8 "	7/8 "	7/8 "	7/8 "	7/8 "
WGZ035	7/8"	7/8 "	7/8 "	7/8 "	7/8 "	1 1/8 "
WGZ040	7/8"	7/8 "	7/8 "	7/8 "	1 1/8 "	1 1/8 "
WGZ045	7/8"	7/8 "	7/8 "	7/8 "	1 1/8 "	1 1/8 "
WGZ050	7/8"	7/8 "	7/8 "	7/8 "	1 1/8 "	1 1/8 "
WGZ055	7/8"	7/8 "	7/8 "	1 1/8"	1 1/8 "	1 1/8 "
WGZ060	7/8"	7/8 "	7/8 "	1 1/8 "	1 1/8 "	1 1/8 "
WGZ070	1 1/8"	1 1/8"	1 1/8 "	1 1/8 "	1 1/8 "	1 1/8"
WGZ080	1 1/8"	1 1/8 "	1 1/8 "	1 1/8"	1 1/8"	1 1/8"
WGZ090	1 1/8"	1 1/8 "	1 1/8 "	1 1/8"	1 1/8"	1 1/8"
WGZ100	1 1/8"	1 1/8 "	1 1/8 "	1 1/8"	1 1/8"	1 1/8"
WGZ115	1 1/8"	1 1/8 "	1 1/8 "	1 1/8"	1 3/8"	1 3/8"
WGZ130	1 1/8"	1 1/8 "	1 3/8"	1 1/8"	1 3/8"	1 3/8"
WGZ150	1 3/8"	1 3/8"	1 1/8 "	1 3/8"	1 3/8"	1 3/8"
WGZ170	1 3/8"	1 3/8"	1 1/8 "	1 3/8"	1 3/8"	1 3/8"
WGZ-200	1 3/8"	1 3/8"	1 1/8 "	1 3/8"	1 3/8"	1 3/8"

Table 7: Recommended Horizontal or Downflow Discharge Line Size, R-410A

Unit Model	Conn. Size at Unit	Recommended Discharge Line Sizes				
		Up to 50 Equiv. Ft	Up to 75 Equiv. Ft	Up to 100 Equiv. Ft	Up to 125 Equiv. Ft	Up to 150 Equiv. Ft
WGZ030	1 3/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"
WGZ035	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
WGZ040	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
WGZ045	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
WGZ050	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
WGZ055	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
WGZ060	1 3/8"	1 3/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
WGZ070	1 3/8"	1 3/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
WGZ080	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
WGZ090	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
WGZ100	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
WGZ115	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"
WGZ130	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"
WGZ150	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"
WGZ170	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"
WGZ200	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 1/8"	2 5/8"

Typical Arrangements

Figure 7 illustrates a typical piping arrangement involving a remote air-cooled condenser located at a higher elevation than the compressor and receiver. This arrangement is commonly encountered when the air-cooled condenser is on a roof and the compressor and receiver are on grade level or in a basement equipment room.

Figure 8 illustrates another very common application where the air-cooled condenser is located on essentially the same level as the compressor and receiver. The discharge line piping in this case is not too critical. The principal problem encountered with this arrangement is that there is frequently insufficient vertical distance to allow free drainage of liquid refrigerant from the condenser coil to the receiver.

Notice, in both illustrations, that the hot gas discharge line is looped at the bottom and top of the vertical run. This is done to prevent oil and condensed refrigerant from flowing back into the compressor and causing damage. The highest point in the discharge line should always be above the highest point in the condenser coil. It is advisable to include a purging vent at this point to extract non-condensables from the system.

The receiver is used when it is desired to have refrigerant storage capacity in addition to the pumpdown capability of the condenser.

Figure 7: Condenser Above Compressor and Optional Receiver Installation

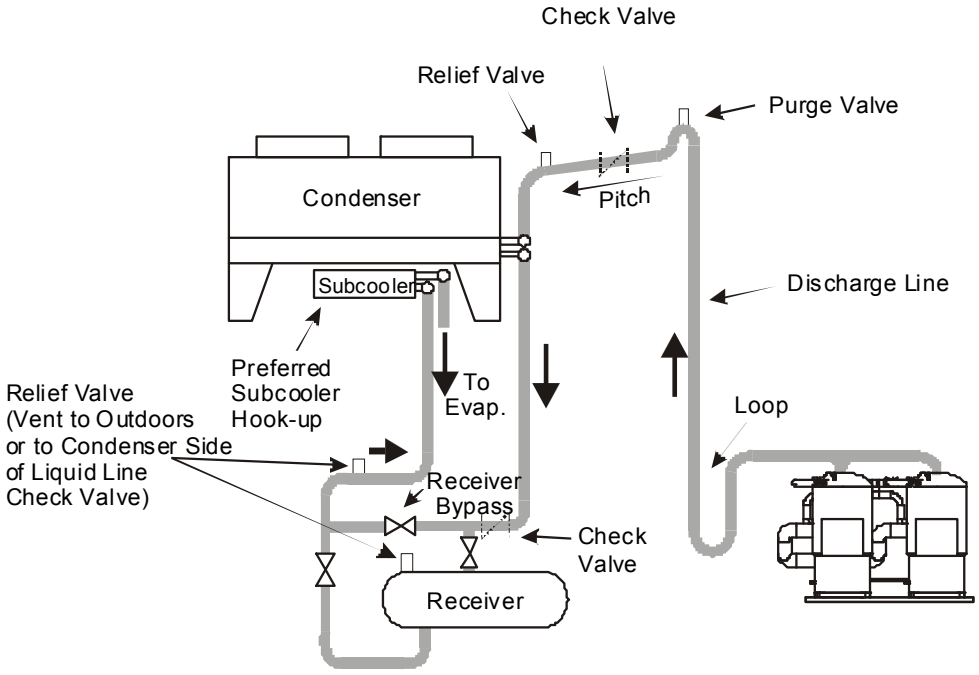
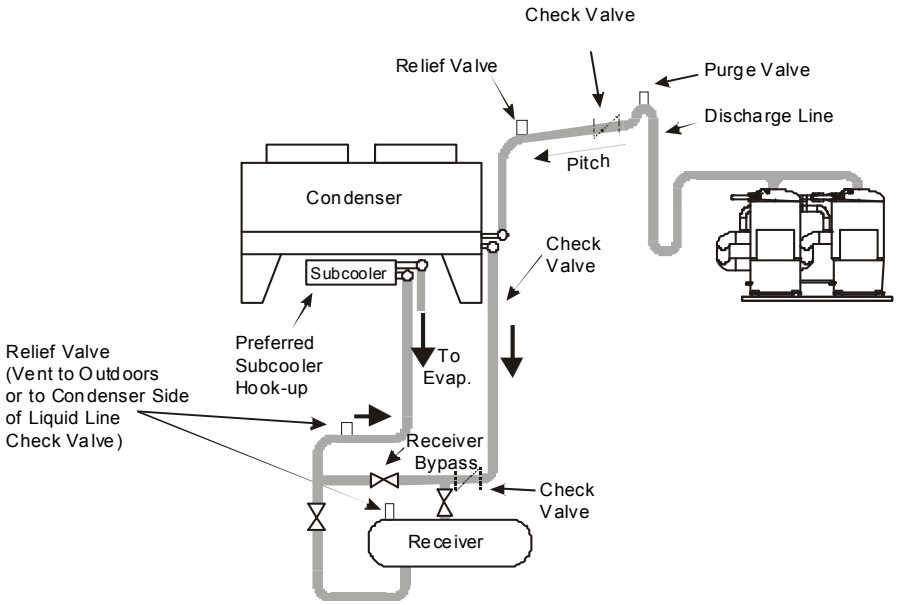


Figure 8: Condenser and Compressor on Same Level, Optional Receiver Installation
Note: The receiver is bypassed during normal operation.



Receiver notes:

1. The arrangement shown is required if the system refrigerant charge exceeds the condenser coil pumpdown capacity.
2. This arrangement is used for head pressure control by adding a back-flooding valve.
3. When a receiver is not required, the refrigerant piping from the condenser outlet to the subcooler inlet is omitted. Flow is from the subcooling coil directly to the evaporator.

Factory-Mounted Condenser

Units with the standard water-cooled, factory-mounted condenser are provided with complete refrigerant piping and full operating refrigerant charge at the factory.

There is a remote possibility on water-cooled units utilizing low temperature pond or river water as a condensing medium, and if the water valves leak, that the condenser and liquid line refrigerant temperature could drop below the equipment room temperature on the "off" cycle. This problem only arises during periods when cold water continues to circulate through the condenser and the unit remains off due to satisfied cooling load.

If this condition occurs cycle the condenser pump off with the unit or check the liquid line solenoid valve for proper operation.

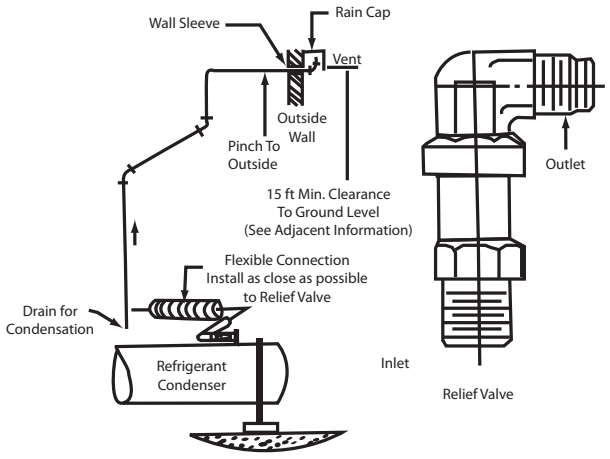
Relief Valve Piping

The ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems, specifies that pressure relief valves on vessels containing Group 1 refrigerant (R-410A) "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 with a drain at the low point on the vent piping to prevent water buildup on the atmospheric side of the relief valve. Also, 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 should 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 should not be less than the sum of the area of each of the lines connected to the header.

NOTE: Fittings should be provided to permit vent piping to be easily disconnected for inspection or replacement of the relief valve.

Figure 9: Relief Valve Piping



The relief valve setting is 450 psi (3100 kPa) for water cooled and 600 psi (4175 kPa) for air-cooled applications.

Pressure Drop Data

Figure 10: WGZ-D Condenser Pressure Drop Curves

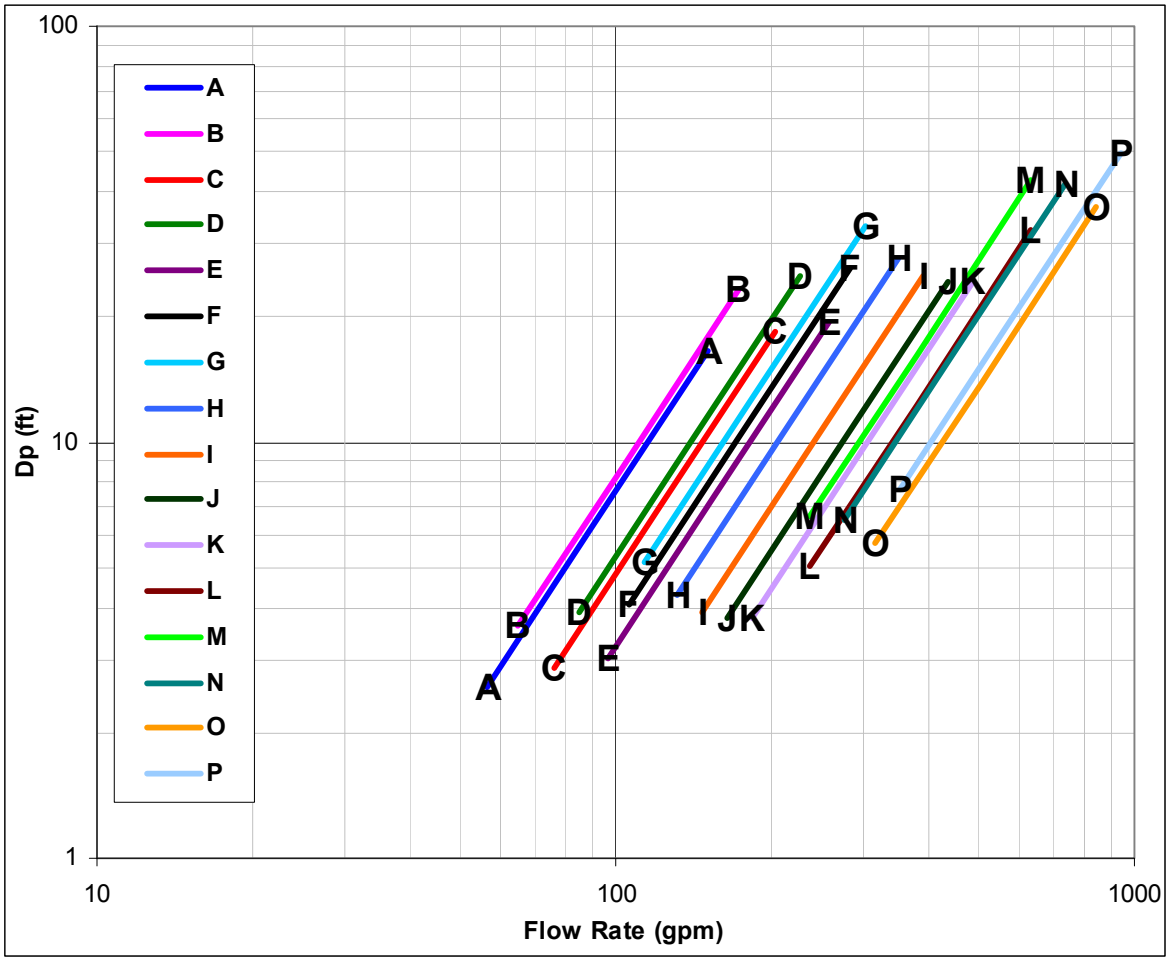


Table 8: WGZ-D CondenserPressure Drop Data

Model	Curve Ref	Minimum Flow & Pr. Drop				Nominal Flow & Pr. Drop				Maximum Flow & Pr. Drop			
		Inch-Pound		S.I.		Inch-Pound		S.I.		Inch-Pound		S.I.	
		GPM	Ft	L/S	kPa	GPM	Ft	L/S	kPa	GPM	Ft	L/S	kPa
WGZ030D	A	56.3	2.6	3.5	7.7	90.0	6.3	5.6	18.8	150.0	16.6	9.4	49.7
WGZ035D	B	64.9	3.6	4.1	10.8	103.8	8.8	6.5	26.3	173.0	23.2	10.8	69.4
WGZ040D	C	76.3	2.9	4.8	8.6	122.1	7.0	7.6	20.9	203.5	18.5	12.7	55.2
WGZ045D	D	85.3	3.9	5.3	11.6	136.5	9.5	8.5	28.4	227.5	25.1	14.2	74.9
WGZ050D	E	96.4	3.0	6.0	9.1	154.2	7.4	9.6	22.1	257.0	19.5	16.1	58.4
WGZ055D	F	105.8	4.1	6.6	12.1	169.2	9.9	10.6	29.6	282.0	26.1	17.6	78.1
WGZ060D	G	113.4	5.2	7.1	15.4	181.5	12.6	11.3	37.7	302.5	33.3	18.9	99.4
WGZ070D	H	131.6	4.3	8.2	12.8	210.6	10.5	13.2	31.4	351.0	27.7	21.9	82.8
WGZ080D	I	146.8	3.9	9.2	11.6	234.9	9.5	14.7	28.4	391.5	25.1	24.5	74.9
WGZ090D	J	163.3	3.8	10.2	11.3	261.3	9.2	16.3	27.5	435.5	24.3	27.2	72.6
WGZ100D	K	183.4	3.8	11.5	11.3	293.4	9.2	18.3	27.5	489.0	24.3	30.6	72.6
WGZ115D	L	237.6	5.0	14.8	15.1	380.1	12.3	23.8	36.8	633.5	32.5	39.6	97.0
WGZ130D	M	237.6	6.6	14.8	19.8	380.1	16.2	23.8	48.4	633.5	42.8	39.6	127.8
WGZ150D	N	277.9	6.5	17.4	19.3	444.6	15.8	27.8	47.2	741.0	41.7	46.3	124.7
WGZ170D	O	317.4	5.7	19.8	17.1	507.9	14.0	31.7	41.8	846.5	37.0	52.9	110.5
WGZ200D	P	352.7	7.7	22.0	23.0	564.3	18.8	35.3	56.2	940.5	49.6	58.8	148.3

Figure 11: WGZ-D Evaporator Pressure Drop Curves

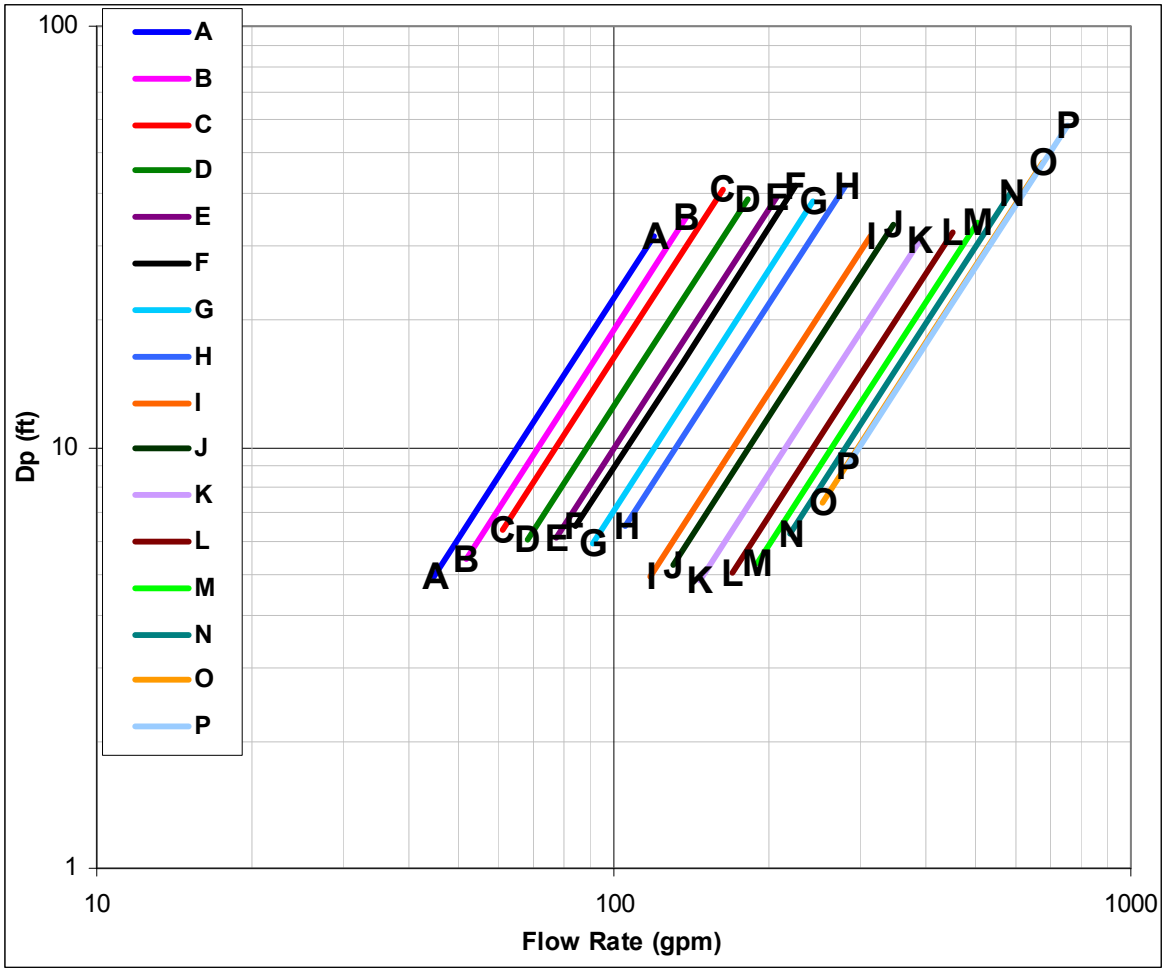


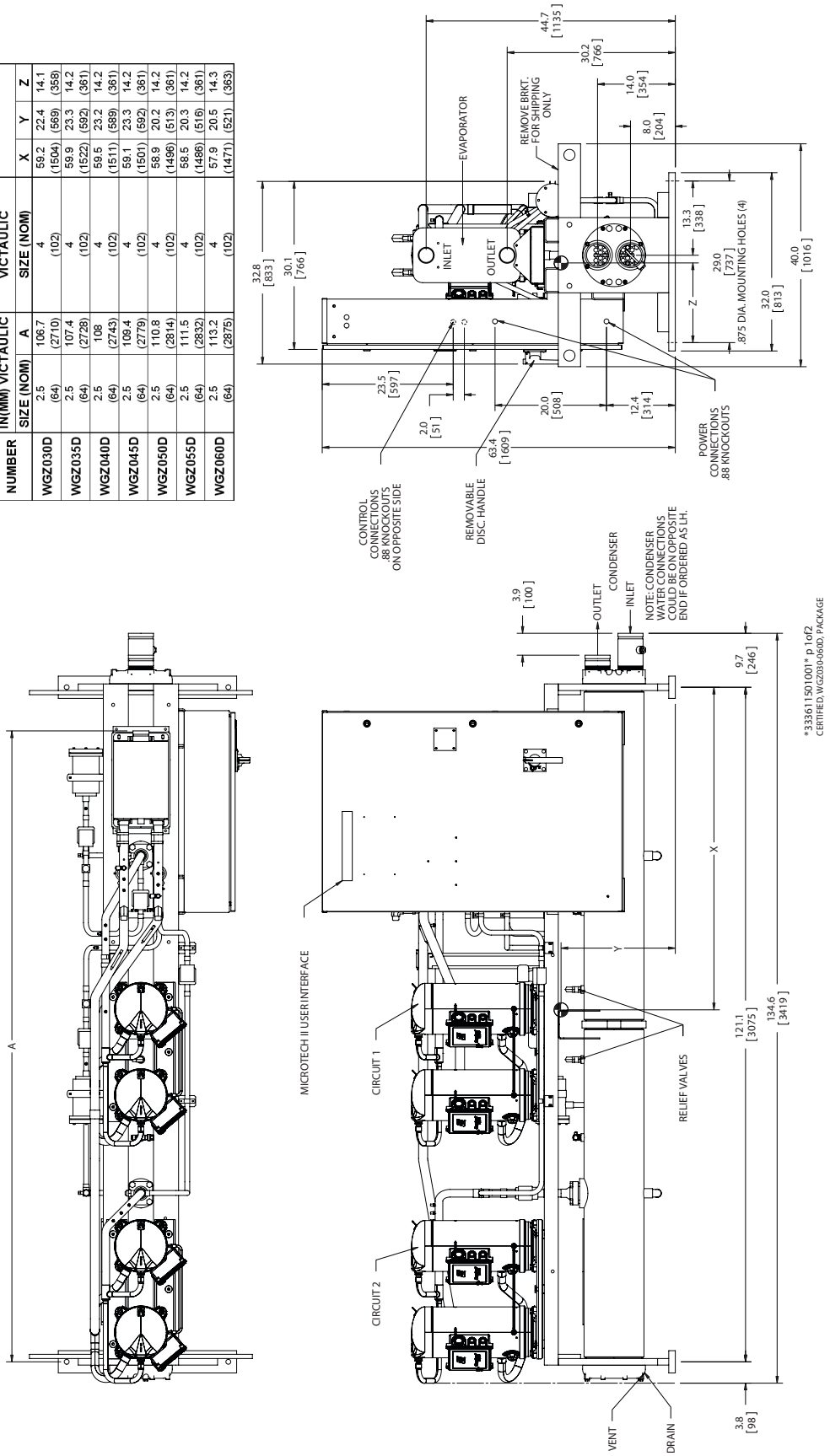
Table 9: WGZ-D Evaporator Pressure Drop Data

Model	Curve Ref	Minimum Flow & Pr. Drop				Nominal Flow & Pr. Drop				Maximum Flow & Pr. Drop			
		Inch-Pound		S.I.		Inch-Pound		S.I.		Inch-Pound		S.I.	
		GPM	Ft	L/S	kPa	GPM	Ft	L/S	kPa	GPM	Ft	L/S	kPa
WGZ030D	A	45.0	4.9	2.8	14.7	72.0	12.0	4.5	35.9	120.0	31.7	7.5	94.7
WGZ035D	B	51.9	5.4	3.2	16.3	83.0	13.3	5.2	39.8	138.3	35.1	8.6	104.9
WGZ040D	C	61.1	6.3	3.8	19.0	97.7	15.5	6.1	46.3	162.8	40.9	10.2	122.3
WGZ045D	D	68.3	6.0	4.3	18.0	109.2	14.7	6.8	43.9	182.0	38.8	11.4	116.0
WGZ050D	E	77.1	6.1	4.8	18.2	123.4	14.9	7.7	44.5	205.7	39.3	12.9	117.6
WGZ055D	F	84.6	6.5	5.3	19.3	135.4	15.8	8.5	47.2	225.7	41.7	14.1	124.7
WGZ060D	G	90.8	5.9	5.7	17.7	145.2	14.5	9.1	43.3	242.0	38.3	15.1	114.4
WGZ070D	H	105.3	6.5	6.6	19.3	168.5	15.8	10.5	47.2	280.8	41.7	17.6	124.7
WGZ080D	I	117.4	4.9	7.3	14.7	187.9	12.0	11.7	35.9	313.2	31.7	19.6	94.7
WGZ090D	J	130.6	5.2	8.2	15.7	209.0	12.8	13.1	38.3	348.3	33.8	21.8	101.0
WGZ100D	K	146.7	4.8	9.2	14.4	234.7	11.8	14.7	35.3	391.2	31.1	24.4	93.1
WGZ115D	L	169.4	5.0	10.6	15.1	271.0	12.3	16.9	36.8	451.7	32.5	28.2	97.0
WGZ130D	M	190.1	5.3	11.9	15.9	304.1	13.0	19.0	38.9	506.8	34.3	31.7	102.6
WGZ150D	N	222.3	6.2	13.9	18.6	355.7	15.2	22.2	45.4	592.8	40.1	37.1	119.9
WGZ170D	O	253.9	7.4	15.9	22.0	406.3	18.0	25.4	53.8	677.2	47.5	42.3	142.0
WGZ200D	P	282.1	9.0	17.6	26.9	451.4	22.0	28.2	65.8	752.3	58.1	47.0	173.6

Pressure Drop Data

Figure 12: WGZ030DW - 060DW (Packaged)

WGZ MODEL NUMBER	CHILLER WATER CONNECTION IN(MM) VICTAULIC		CONDENSER WATER CONNECTION IN(MM) VICTAULIC	CENTER OF GRAVITY		
	SIZE (NOM)	A	SIZE (NOM)	X	Y	Z
WGZ030D	2.5 (64)	106.7 (2710)	4 (102)	59.2 (1504)	22.4 (569)	14.1 (358)
WGZ035D	2.5 (64)	107.4 (2728)	4 (102)	59.9 (1522)	23.3 (592)	14.2 (361)
WGZ040D	2.5 (64)	108 (2743)	4 (102)	59.5 (1511)	23.2 (589)	14.2 (361)
WGZ045D	2.5 (64)	109.4 (2779)	4 (102)	59.1 (1501)	23.3 (592)	14.2 (361)
WGZ050D	2.5 (64)	110.8 (2814)	4 (102)	58.9 (1496)	20.2 (513)	14.2 (361)
WGZ055D	2.5 (64)	111.5 (2832)	4 (102)	58.5 (1486)	20.3 (516)	14.2 (361)
WGZ060D	2.5 (64)	113.2 (2875)	4 (102)	57.9 (1471)	20.5 (521)	14.3 (363)



Dimensions - Packaged

Figure 13: WGZ070DW (Packaged)

MODEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIPPING WEIGHT LBS (KG)	OPERATING WEIGHT LBS (KG)
	L1	L2	L3	L4	M1	M2	M3	M4		
WGZ070D	877 (398)	843 (382)	900 (408)	935 (424)	912 (414)	877 (398)	935 (424)	973 (441)	3555 (1613)	3696 (1676)

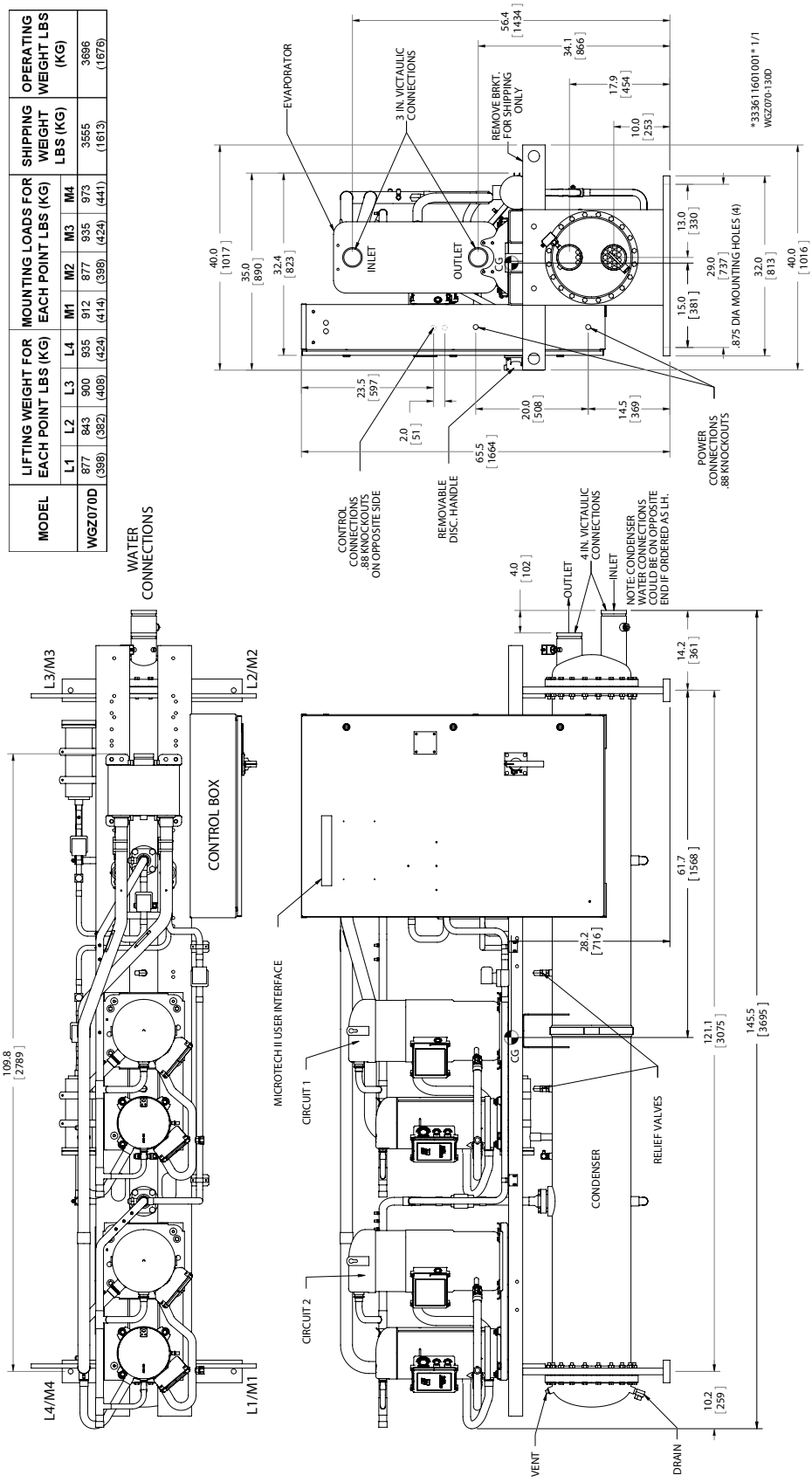
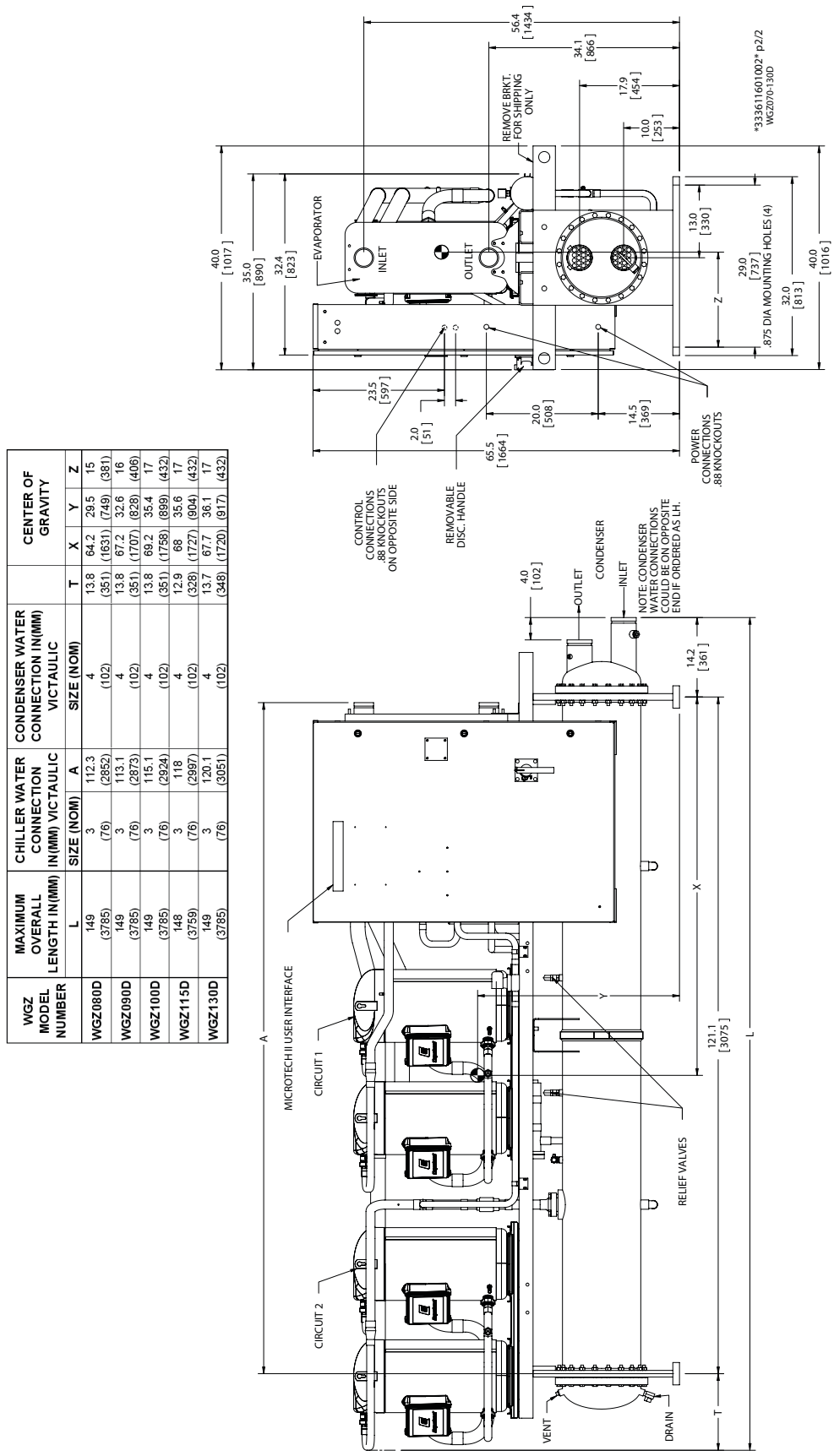


Figure 14: WGZ080DW - 130DW (Packaged)



WGZ MODEL NUMBER	MAXIMUM OVERALL LENGTH IN(MM)	CHILLER WATER CONNECTION IN(MM) VICTAULIC		CONDENSER WATER CONNECTION IN(MM) VICTAULIC		CENTER OF GRAVITY		
	L	SIZE (NOM)	A	SIZE (NOM)	T	X	Y	Z
WGZ080D	149 (3785)	3 (76)	112.3 (2852)	4 (102)	13.8 (351)	64.2 (1631)	29.5 (749)	15 (381)
WGZ090D	149 (3785)	3 (76)	113.1 (2873)	4 (102)	13.8 (351)	67.2 (1707)	32.6 (828)	16 (406)
WGZ100D	149 (3785)	3 (76)	115.1 (2924)	4 (102)	13.8 (351)	69.2 (1758)	35.4 (899)	17 (432)
WGZ115D	148 (3759)	3 (76)	118 (2997)	4 (102)	12.9 (328)	68 (1727)	35.6 (904)	17 (432)
WGZ130D	149 (3785)	3 (76)	120.1 (3051)	4 (102)	13.7 (348)	67.7 (1720)	36.1 (917)	17 (432)

Dimensions - Packaged

Figure 15: WGZ150DW - 200DW (Packaged)

WGZ MODEL NUMBER	MAXIMUM OVERALL HEIGHT IN(MM)	CHILLER WATER CONNECTION IN(MM) VICTAULIC	CONDENSER WATER CONNECTION IN(MM) VICTAULIC	CENTER OF GRAVITY		
	H	SIZE (NOM)	SIZE (NOM)	T	X	Y	Z
WGZ150D	76.9 (1953)	8 (203)	5 (127)	11 (279)	75 (1905)	37.8 (960)	14.8 (376)
WGZ170D	76.9 (1953)	8 (203)	5 (127)	10.9 (276)	77.7 (1974)	37.7 (958)	14.9 (379)
WGZ200D	77.7 (1973)	8 (203)	5 (127)	10.9 (276)	77.9 (1979)	38.3 (973)	15 (3811)

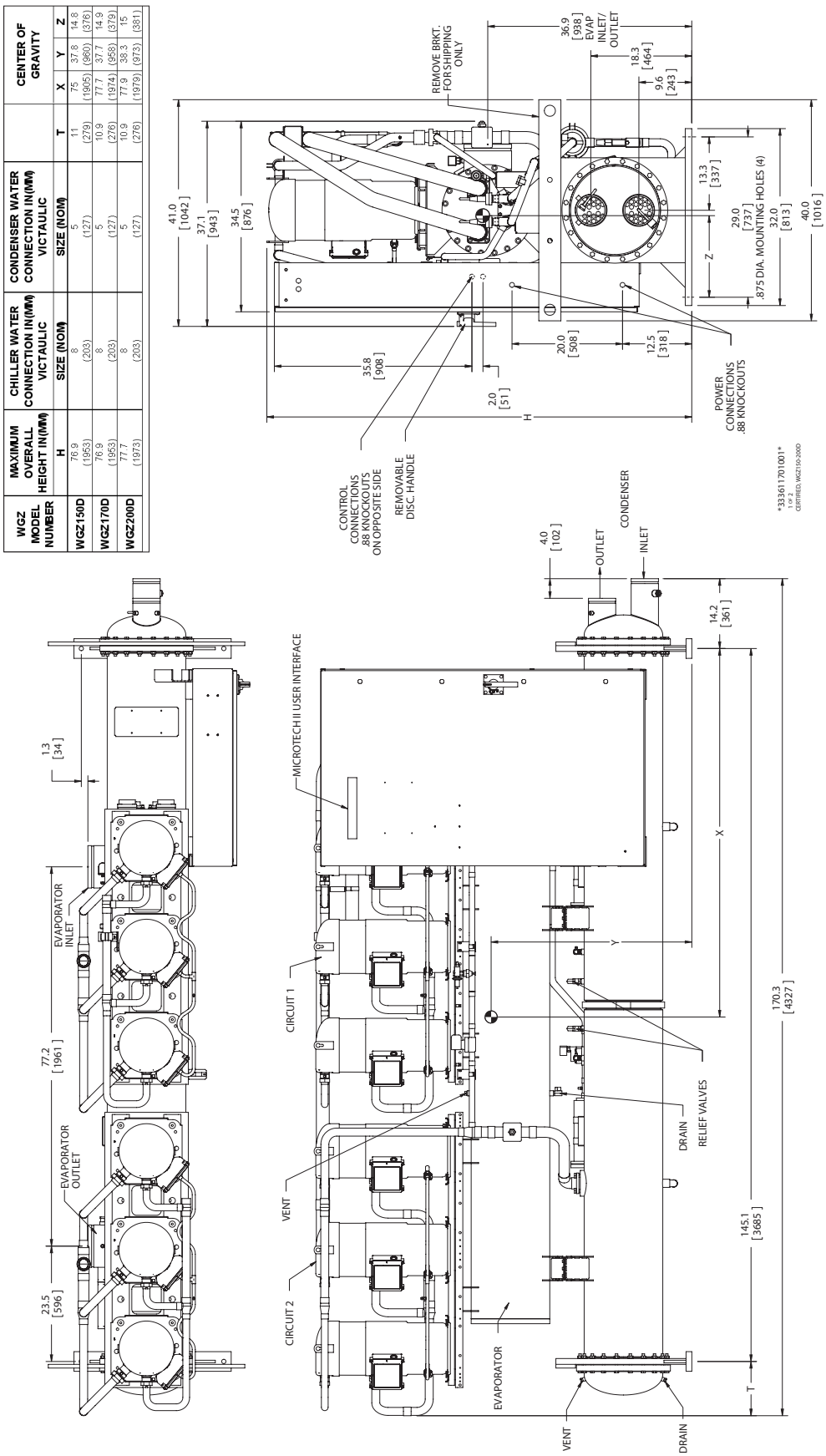
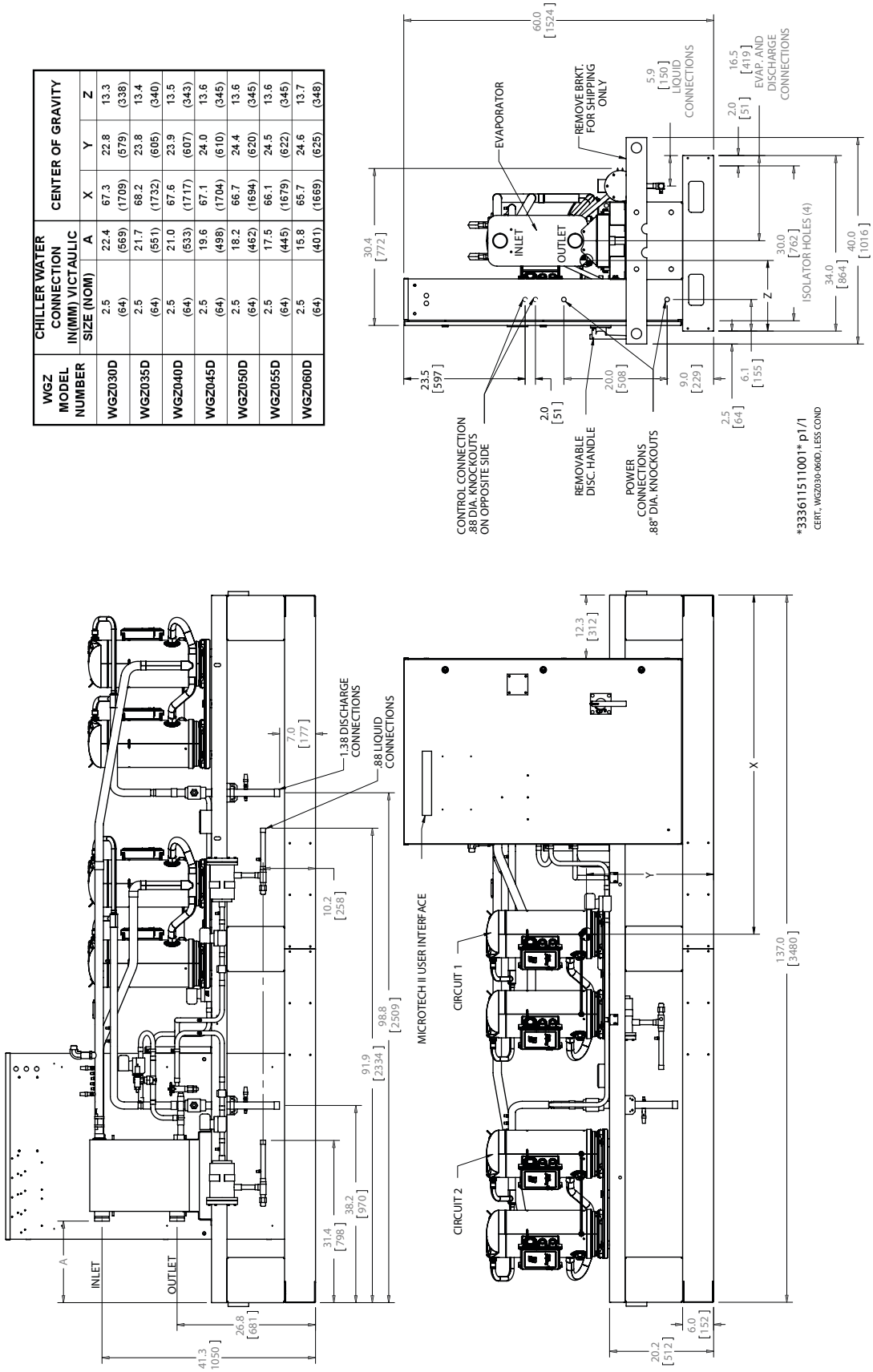


Figure 16: WGZ030DA - 060DA (Condenserless)

WGZ MODEL NUMBER	CHILLER WATER CONNECTION IN(MM) VICTAULIC SIZE (NOM)	A	CENTER OF GRAVITY X	Y	Z
WGZ030D	2.5 (64)	22.4 (569)	67.3 (1709)	22.8 (579)	13.3 (338)
WGZ035D	2.5 (64)	21.7 (551)	68.2 (1732)	23.8 (605)	13.4 (340)
WGZ040D	2.5 (64)	21.0 (533)	67.6 (1717)	23.9 (607)	13.5 (343)
WGZ045D	2.5 (64)	19.6 (498)	67.1 (1704)	24.0 (610)	13.6 (345)
WGZ050D	2.5 (64)	18.2 (462)	66.7 (1694)	24.4 (620)	13.6 (345)
WGZ055D	2.5 (64)	17.5 (445)	66.1 (1679)	24.5 (622)	13.6 (345)
WGZ060D	2.5 (64)	15.8 (401)	65.7 (1669)	24.6 (625)	13.7 (348)



Dimensions - Condenserless

Figure 17: WGZ070DA (Condenserless)

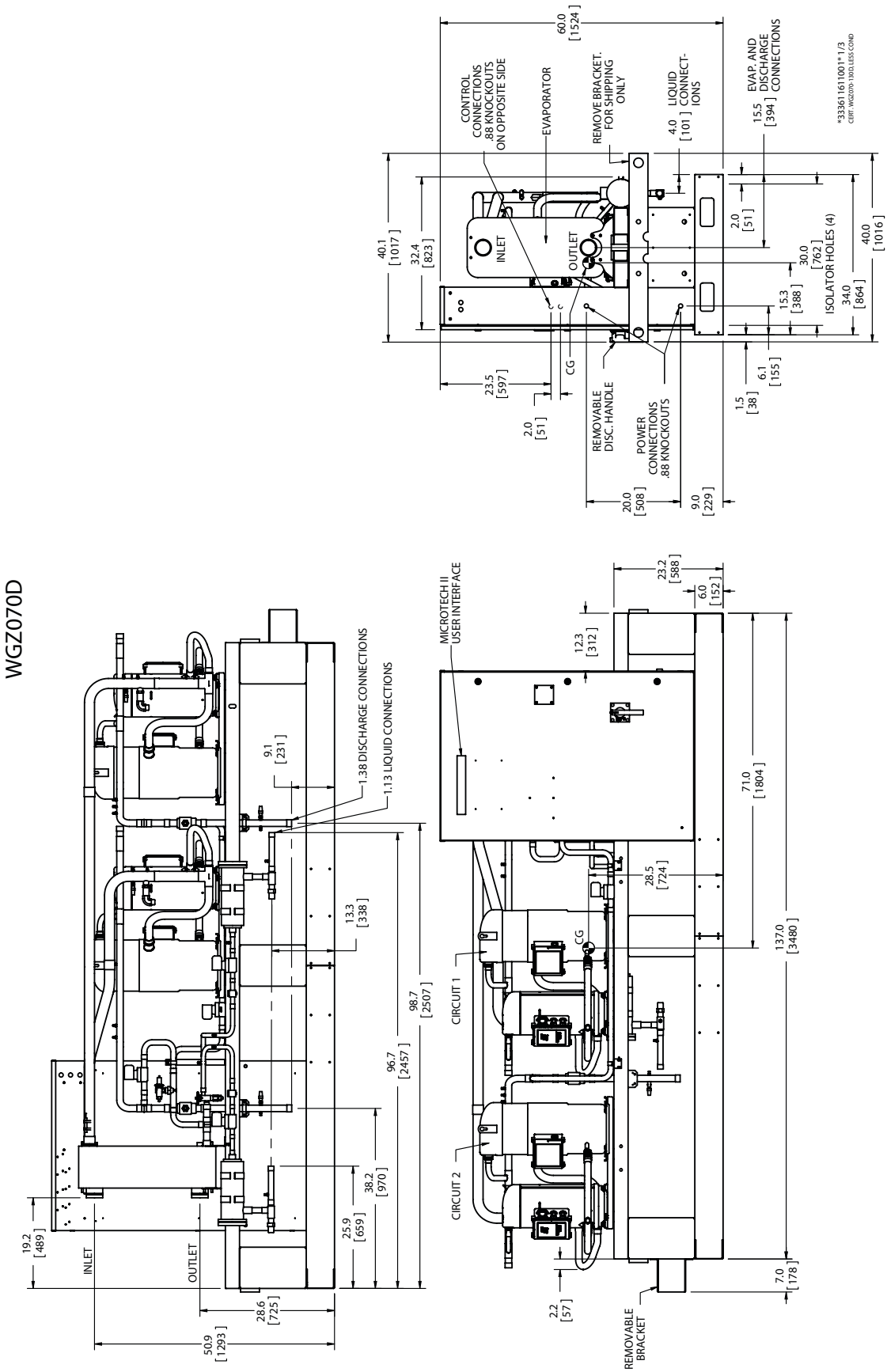
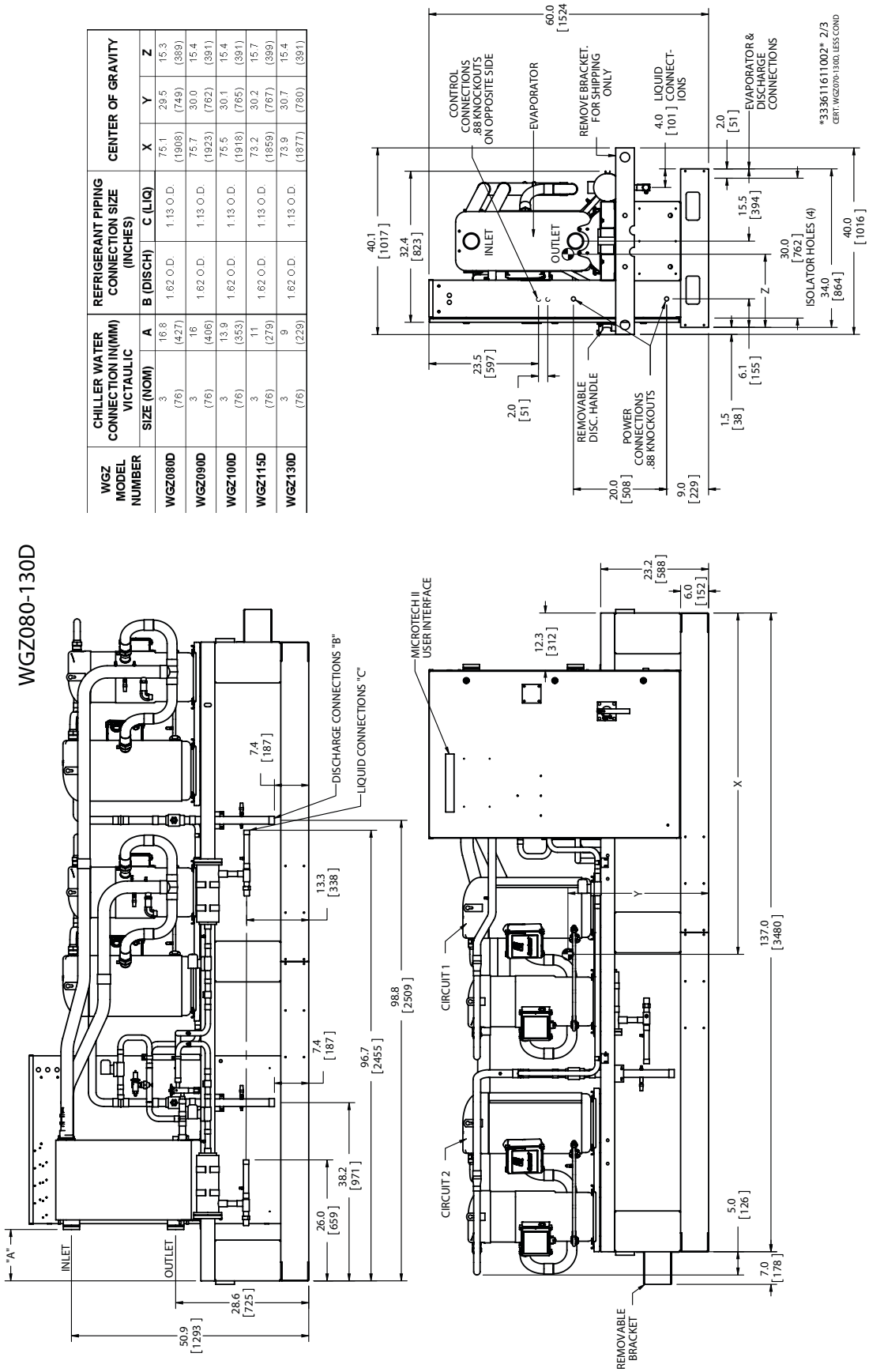


Figure 18: WGZ080DA - 130DA (Condenserless)

WGZ MODEL NUMBER	CHILLER WATER CONNECTION IN(MM) VICTAULIC		REFRIGERANT PIPING CONNECTION SIZE (INCHES)		CENTER OF GRAVITY		
	SIZE (NOM)	A	B (DISCH)	C (LIQ)	X	Y	Z
WGZ080D	3 (76)	16.8 (427)	1.62 O.D.	1.13 O.D.	75.1 (1908)	29.5 (749)	15.3 (389)
WGZ090D	3 (76)	16 (406)	1.62 O.D.	1.13 O.D.	75.7 (1923)	30.0 (762)	15.4 (391)
WGZ100D	3 (76)	13.9 (353)	1.62 O.D.	1.13 O.D.	75.5 (1918)	30.1 (765)	15.4 (391)
WGZ115D	3 (76)	11 (279)	1.62 O.D.	1.13 O.D.	73.2 (1859)	30.2 (767)	15.7 (399)
WGZ130D	3 (76)	9 (229)	1.62 O.D.	1.13 O.D.	73.9 (1877)	30.7 (780)	15.4 (391)



Dimensions - Condenserless

Figure 19: WGZ150DA - 200DA (Condenserless) (see next page for more dimensions)

WGZ MODEL NUMBER	CHILLER WATER CONNECTION IN(MM) VICTAULIC SIZE (NOM)	CENTER OF GRAVITY		
		X	Y	Z
WGZ150D	8 (203)	75.4 (1915)	42.6 (1082)	15.9 (404)
WGZ170D	8 (203)	77.3 (1963)	43.2 (1097)	15.9 (404)
WGZ200D	8 (203)	77.9 (1979)	43.7 (1110)	15.7 (399)

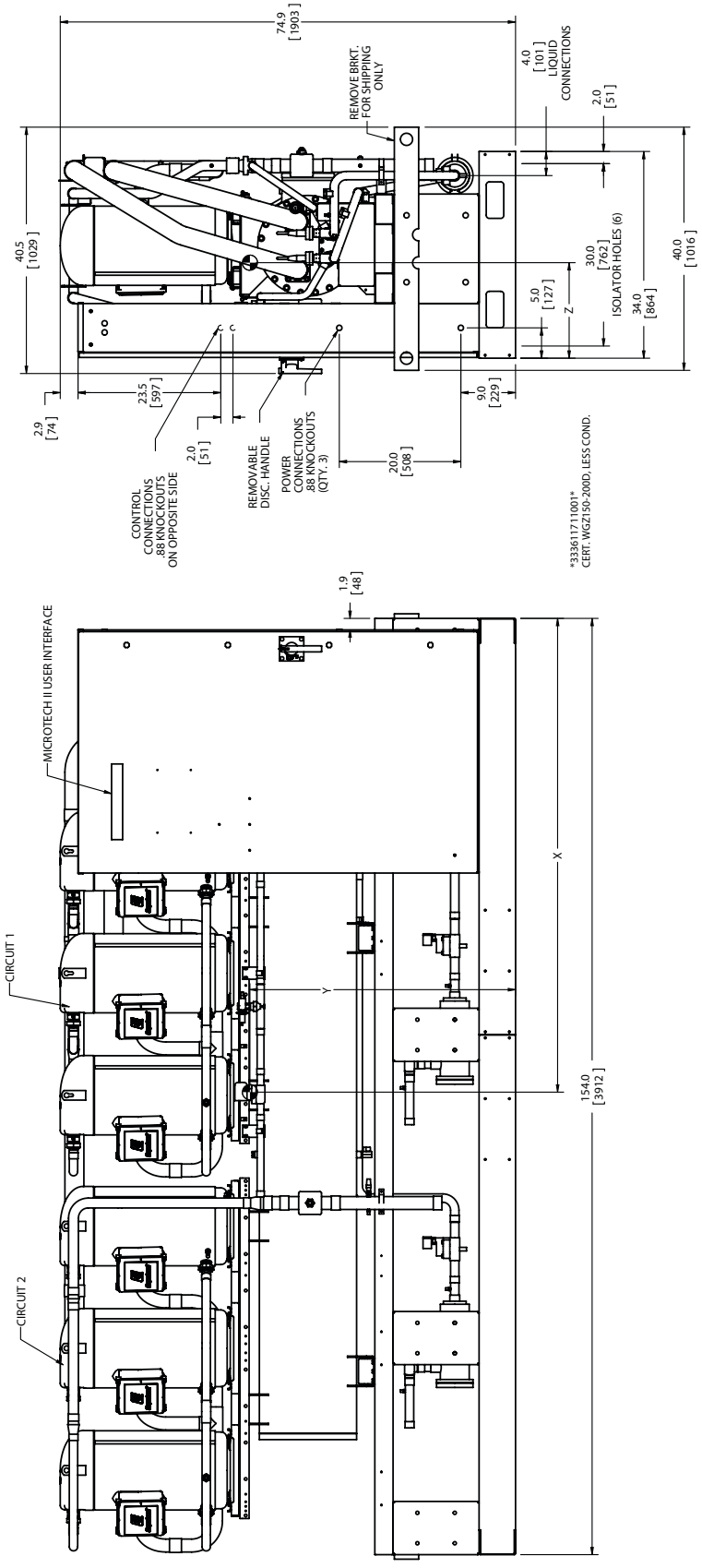
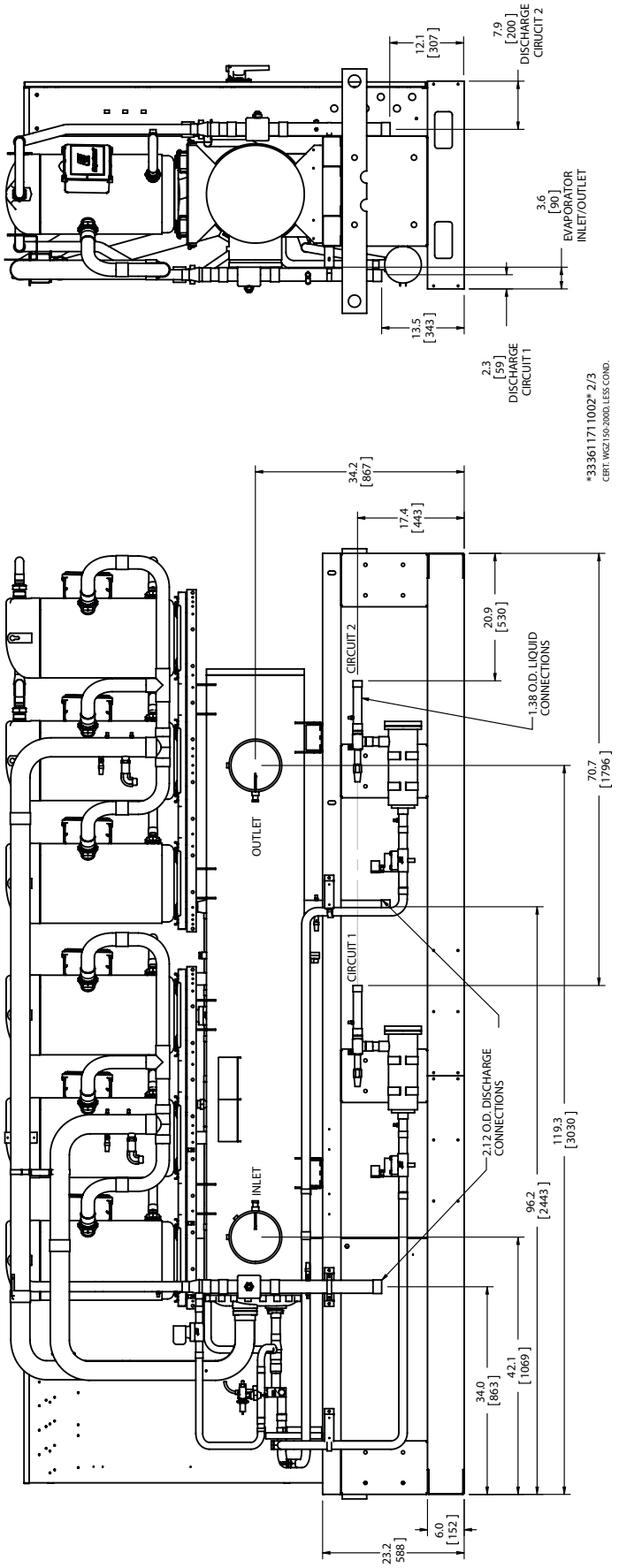


Figure 20: WGZ150DA - 200DA (Condenserless) (continued)



Lifting and Mounting Weights

Figure 21: Lifting Locations, WGZ030-060D Packaged

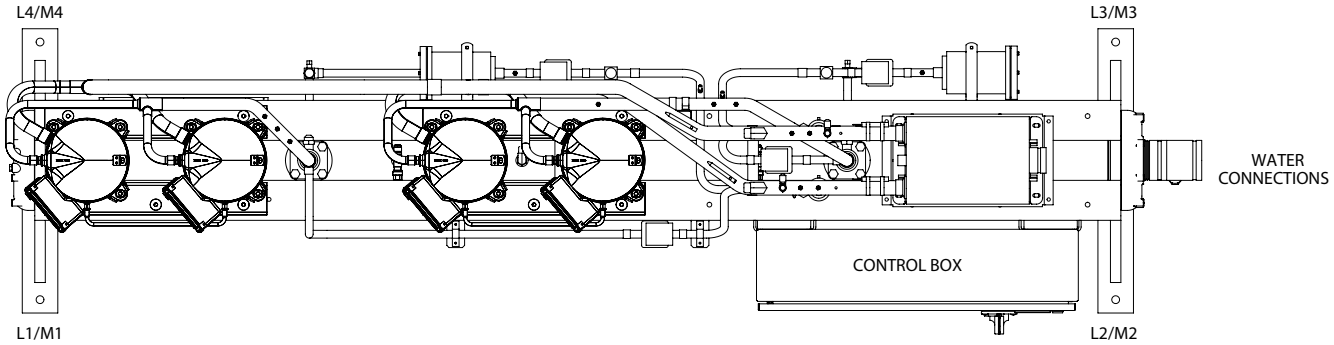


Table 10: Lifting Weights, WGZ030-060D Packaged

MODEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	LBS (KG)	LBS (KG)
WGZ030DW	605 (274)	632 (287)	598 (271)	572 (259)	624 (283)	652 (296)	617 (280)	590 (268)	2408 (1092)	2484 (11127)
WGZ035DW	629 (285)	644 (292)	614 (279)	601 (273)	649 (294)	664 (301)	633 (287)	619 (281)	2488 (1129)	2564 (1163)
WGZ040DW	634 (288)	656 (298)	627 (284)	606 (275)	657 (298)	680 (308)	650 (295)	628 (285)	2523 (1144)	2615 (1186)
WGZ045DW	634 (288)	664 (301)	635 (288)	606 (275)	657 (298)	688 (312)	658 (299)	628 (285)	2539 (1152)	2631 (1193)
WGZ050DW	646 (293)	683 (310)	656 (298)	621 (282)	674 (306)	713 (323)	685 (311)	648 (294)	2606 (1182)	2719 (1233)
WGZ055DW	644 (292)	690 (313)	664 (301)	620 (281)	672 (305)	720 (327)	693 (314)	647 (293)	2618 (1188)	2731 (1239)
WGZ060DW	646 (293)	706 (320)	682 (309)	624 (283)	674 (306)	736 (334)	711 (323)	651 (295)	2658 (1206)	2771 (1257)

Figure 22: Lifting Locations, WGZ070-130D Packaged

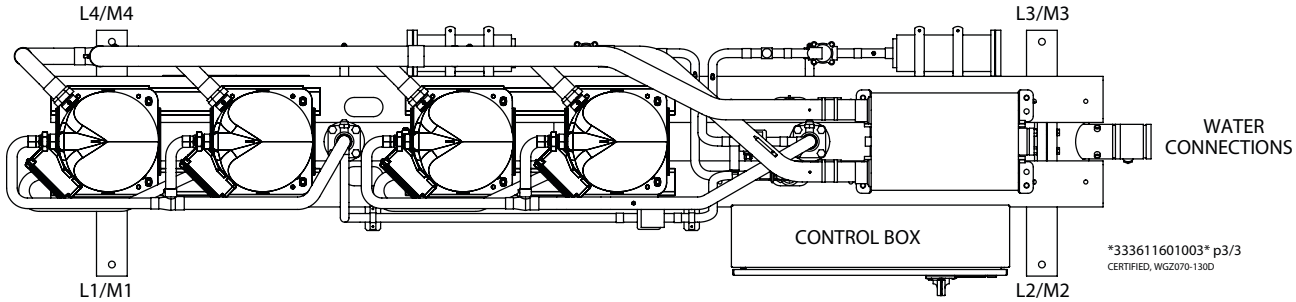


Table 11: Lifting Weights, WGZ070-130D Packaged

MODWEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	LBS (KG)	LBS (KG)
WGZ070DW	877 (398)	843 (382)	900 (408)	935 (424)	912 (414)	877 (398)	935 (424)	973 (441)	3555 (1613)	3696 (1676)
WGZ080DW	1016 (461)	900 (408)	965 (438)	1090 (494)	1056 (479)	935 (424)	1003 (455)	1133 (514)	3971 (1801)	4128 (1872)
WGZ090DW	1026 (465)	824 (374)	1020 (463)	1270 (576)	1071 (486)	860 (390)	1064 (483)	1325 (601)	4140 (1878)	4320 (1960)
WGZ100DW	1018 (462)	763 (346)	1084 (492)	1446 (656)	1066 (484)	799 (362)	1135 (515)	1515 (687)	4311 (1955)	4515 (2048)
WGZ115DW	984 (446)	769 (349)	1087 (493)	1390 (630)	1032 (468)	806 (366)	1139 (517)	1457 (661)	4230 (1919)	4434 (2011)
WGZ130DW	1046 (475)	824 (374)	1173 (532)	1490 (676)	1093 (496)	861 (391)	1226 (556)	1557 (706)	4533 (2056)	4737 (2149)

Figure 23: Lifting Locations, WGZ150-200D Packaged

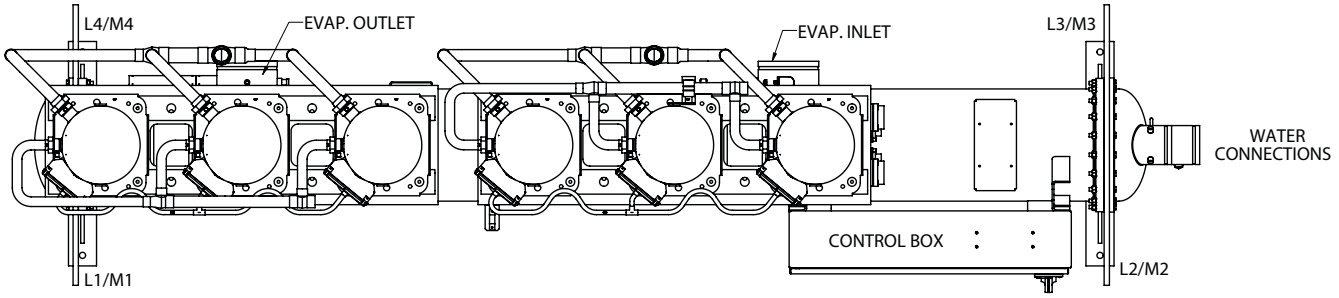


Table 12: Lifting Weights, WGZ150-200D Packaged

MODWEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	LBS (KG)	LBS (KG)
WGZ150DW	1490 (676)	1393 (632)	1444 (655)	1545 (701)	1691 (767)	1581 (717)	1638 (743)	1752 (795)	5873 (2664)	6662 (3022)
WGZ170DW	1661 (753)	1439 (653)	1521 (690)	1756 (797)	1880 (853)	1628 (738)	1720 (780)	1986 (901)	6377 (2893)	7214 (3272)
WGZ200DW	1729 (784)	1492 (677)	1599 (725)	1852 (840)	1946 (883)	1679 (762)	1799 (816)	2085 (946)	6672 (3026)	7509 (3406)

Figure 24: Lifting Locations, WGZ030-060D Condenserless

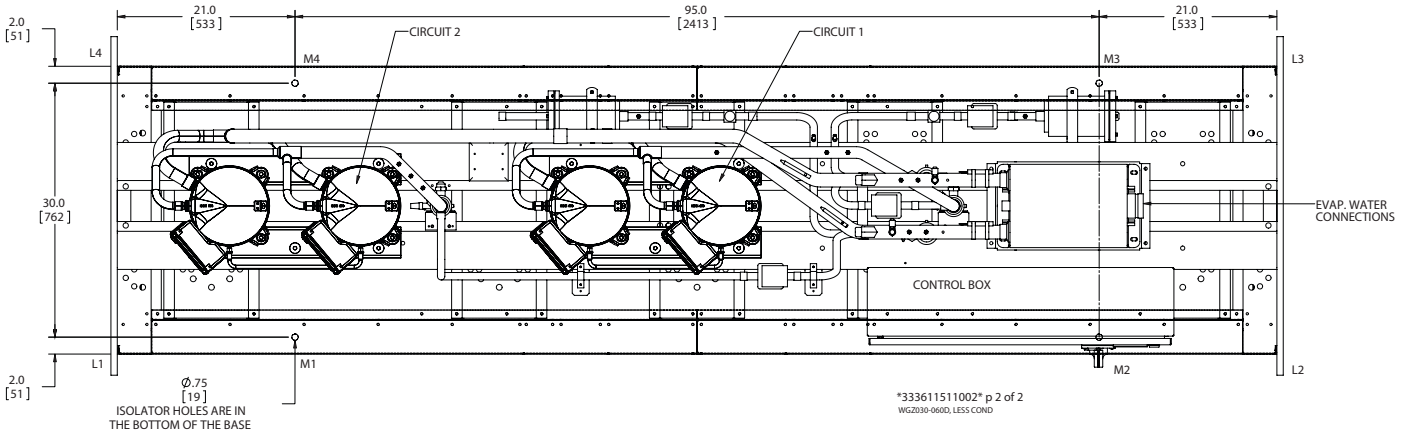


Table 13: Lifting Weights, WGZ030-060D Condenserless

MODEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	LBS (KG)	LBS (KG)
WGZ030DA	415 (188)	430 (195)	373 (169)	360 (163)	476 (216)	501 (227)	322 (146)	306 (139)	1578 (716)	1604 (728)
WGZ035DA	440 (200)	444 (201)	391 (177)	387 (176)	508 (230)	515 (234)	336 (152)	331 (150)	1662 (754)	1690 (767)
WGZ040DA	435 (197)	446 (202)	399 (181)	389 (176)	502 (228)	521 (236)	345 (156)	332 (151)	1669 (757)	1699 (771)
WGZ045DA	435 (197)	454 (206)	406 (184)	389 (176)	501 (227)	533 (242)	353 (160)	332 (151)	1685 (764)	1719 (780)
WGZ050DA	437 (198)	460 (209)	413 (187)	392 (178)	503 (228)	542 (246)	361 (164)	335 (152)	1702 (772)	1740 (789)
WGZ055DA	435 (197)	467 (212)	420 (191)	392 (178)	500 (227)	553 (251)	369 (167)	333 (151)	1714 (778)	1755 (796)
WGZ060DA	438 (199)	475 (216)	431 (196)	397 (180)	503 (228)	565 (256)	380 (172)	338 (153)	1741 (790)	1786 (810)

Lifting and Mounting Weights

Figure 25: Lifting Locations, WGZ070-130D Condenserless

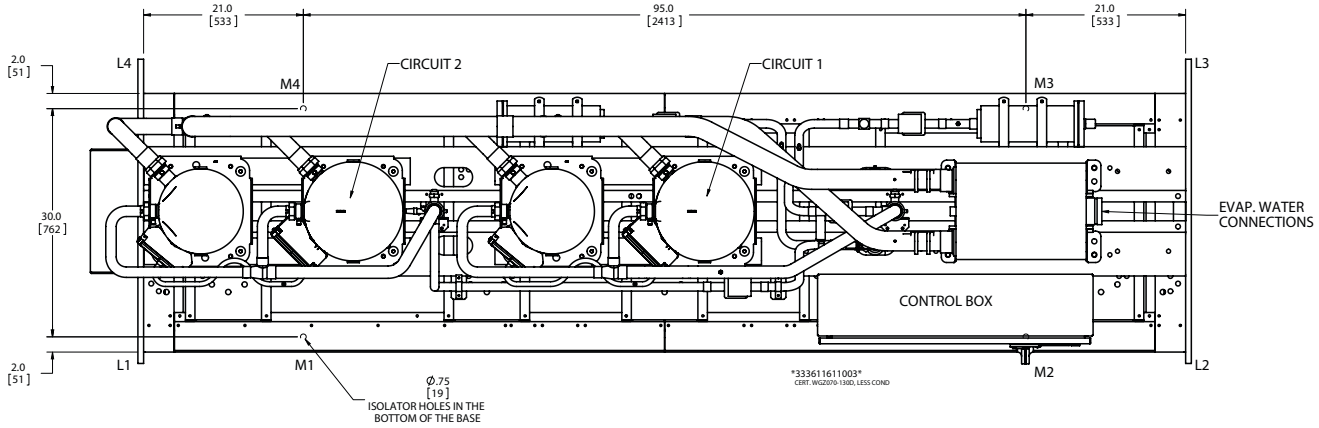


Table 14: Lifting Weights, WGZ070-130D Condenserless

MODEL	LIFTING WEIGHT FOR EACH POINT LBS (KG)				MOUNTING LOADS FOR EACH POINT LBS (KG)				SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	LBS (KG)	LBS (KG)
WGZ070DA	431 (196)	503 (228)	552 (250)	472 (214)	565 (256)	700 (318)	571 (259)	461 (209)	1958 (888)	2296 (1041)
WGZ080DA	600 (272)	631 (286)	691 (313)	657 (298)	705 (320)	755 (343)	615 (279)	575 (261)	2579 (1170)	2649 (1202)
WGZ090DA	630 (286)	651 (295)	722 (328)	699 (317)	743 (337)	778 (353)	643 (292)	614 (279)	2701 (1225)	2778 (1260)
WGZ100DA	658 (299)	684 (310)	764 (347)	735 (333)	777 (352)	820 (372)	681 (309)	646 (293)	2841 (1289)	2923 (1326)
WGZ115DA	617 (280)	681 (309)	784 (356)	710 (322)	722 (328)	828 (376)	709 (322)	619 (281)	2792 (1266)	2878 (1305)
WGZ130DA	705 (320)	764 (347)	845 (383)	780 (354)	828 (376)	925 (420)	761 (345)	682 (309)	3094 (1403)	3196 (1450)

Figure 26: Lifting Locations, WGZ150-200D Condenserless

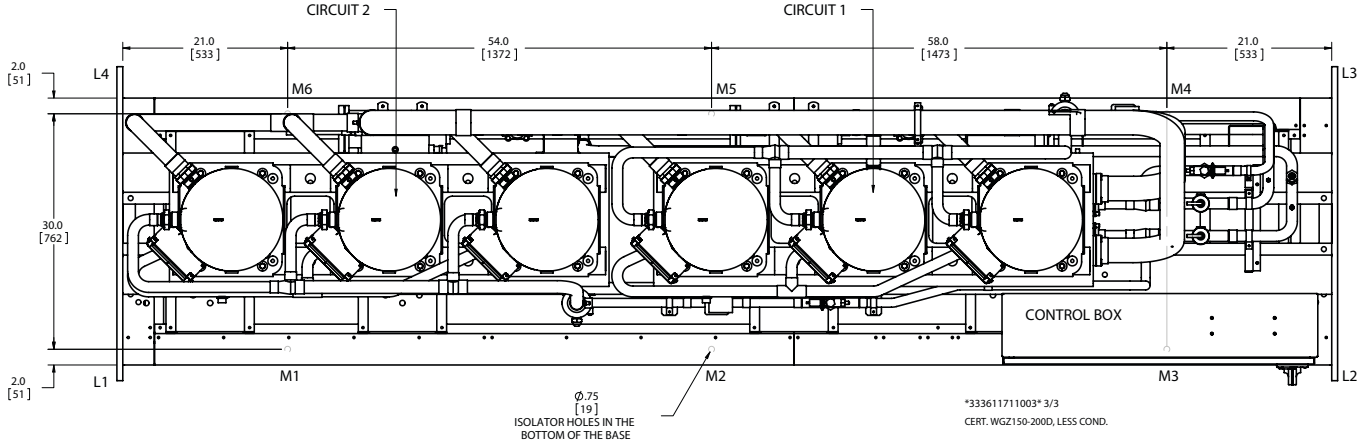
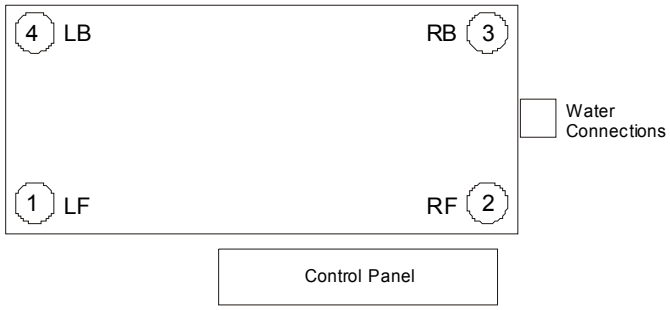


Table 15: Lifting Weights, WGZ150-200D Condenserless

MODEL	LIFTING WEIGHT FOR EACH POINT (LBS)				MOUNTING LOADS FOR EACH POINT LBS (KG)						SHIP WT	OPER. WT
	L1	L2	L3	L4	M1	M2	M3	M4	M5	M6	LBS (KG)	LBS (KG)
WGZ150DA	912 (414)	952 (432)	1127 (511)	1080 (490)	671 (304)	713 (323)	758 (344)	860 (390)	809 (367)	761 (345)	4071 (1847)	4571 (2073)
WGZ170DA	1003 (455)	994 (451)	1170 (531)	1180 (535)	747 (339)	754 (342)	760 (345)	868 (394)	860 (390)	853 (387)	4347 (1972)	4841 (2196)
WGZ200DA	1090 (494)	1065 (483)	1228 (557)	1257 (570)	796 (361)	791 (359)	785 (356)	914 (415)	921 (418)	927 (421)	4640 (2105)	5134 (2329)

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

Figure 27: Isolator Locations



Transfer the unit as indicated under "Moving the Unit." In all cases, 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.

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

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

Refer to unit dimension drawing for mounting locations.

Table 16: Isolator Kit Part Numbers

WGZ-DW Packaged Chiller Isolator Kit Part Numbers

Model Number	030-060	070-080	90	100-130	150-200
Spring-Flex	332320501	332320502	332320503	332320504	332320505
R-I-S	332325501	332325502	332325502	332325503	332325503

WGZ-DA Remote Condenser Isolator Kit Part Numbers

Model Number	030-060	070-080	090-115	130	150-200
Spring-Flex	332320506	332320507	332320508	332320509	332320510
R-I-S	332325504	332325501	332325501	332325501	332325505

Table 17: Vibration Isolator Mounting Locations (Packaged Chillers)

Unit	Spring-Flex Mountings				R-I-S Mountings			
Size	M1	M2	M3	M4	M1	M2	M3	M4
WGZ030DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ035DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ040DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ045DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ050DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ055DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ060DW	ID-900 Green	ID-900 Green	ID-900 Green	ID-900 Green	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray
WGZ070DW	ID-1350 Purple	ID-1350 Purple	ID-1350 Purple	ID-1350 Purple	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown
WGZ080DW	ID-1350 Purple	ID-1350 Purple	ID-1350 Purple	ID-1350 Purple	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown
WGZ090DW	ID-1800 Green	ID-1800 Green	ID-1800 Green	ID-1800 Green	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown
WGZ100DW	ID-1800 Green	ID-1800 Green	ID-1800 Green	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red

Table 18: Vibration Isolator Mounting Locations (Packaged Chillers), continued

Unit Size	Spring-Flex Mountings				R-I-S Mountings			
	M1	M2	M3	M4	M1	M2	M3	M4
WGZ115DW	ID-1800 Green	ID-1800 Green	ID-1800 Green	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red
WGZ130DW	ID-1800 Green	ID-1800 Green	ID-1800 Green	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red
WGZ150DW	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red
WGZ170DW	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red
WGZ200DW	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	ID-2400 Gray	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red	RP-4 Brick Red

Table 19: Vibration Isolator Mounting Locations (Condenserless Chillers)

Unit Size	Spring-Flex Mountings						R-I-S Mountings					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
WGZ030DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ035DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ040DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ045DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ050DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ055DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ060DA	ID-900 Green	ID-900 Green	ID-510 Black	ID-510 Black	N/A	N/A	RP-3 Lime	RP-3 Lime	RP-3 Lime	RP-3 Lime	N/A	N/A
WGZ070DA	ID-900 Green	ID-900 Green	ID-675 Purple	ID-900 Green	N/A	N/A	RP3 Gray	RP3 Gray	RP3 Gray	RP3 Gray	N/A	N/A
WGZ080DA	ID-900 Green	ID-900 Green	ID-675 Purple	ID-900 Green	N/A	N/A	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray	N/A	N/A
WGZ090DA	ID-1020 Black	ID-1020 Black	ID-680 Red	ID-1020 Black	N/A	N/A	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray	N/A	N/A
WGZ100DA	ID-1020 Black	ID-1020 Black	ID-680 Red	ID-1020 Black	N/A	N/A	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray	N/A	N/A
WGZ115DA	ID-1020 Black	ID-1020 Black	ID-680 Red	ID-1020 Black	N/A	N/A	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray	N/A	N/A
WGZ130DA	ID-1020 Black	ID-1020 Black	ID-680 Red	ID-1020 Black	N/A	N/A	RP-3 Gray	RP-3 Gray	RP-3 Gray	RP-3 Gray	N/A	N/A
WGZ150DA	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown
WGZ170DA	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown
WGZ200DA	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	ID-1020 Black	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown	RP-4 Brown

Table 20: Physical Data - WGZ030D - WGZ055D

WGZ UNIT SIZE	030		035		040		045		050		055	
Unit capacity @ AHRI tons, (kW) (Note 1)	30.0 (105.5)		34.6 (121.7)		40.7 (143.1)		45.5 (160.0)		51.4 (180.7)		56.4 (198.3)	
No. Circuits	2		2		2		2		2		2	
COMPRESSORS												
Nominal Tons	7.5	7.5	9	9	10	10	12	12	13	13	13	15
Number Per Circuit	2	2	2	2	2	2	2	2	2	2	2	2
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT												
Staging, Circuit #1 in Lead	25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		23 / 50 / 73 / 100	
Staging, Circuit #2 in Lead	25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		27 / 50 / 77 / 100	
Oil Charge per Compressor- oz. (l)	85 (2.5)		110 (3.3)		110 (3.3)		110 (3.3)		110 (3.3)		110 (3.3)	
CONDENSER												
Number	1		1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2		2	
Diameter- in. (mm)	10 (254)		10 (254)		10 (254)		10 (254)		10 (254)		10 (254)	
Tube Length- in. (mm)	120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)	
Design Working Pressure PSIG, (kPa):												
Refrigerant Side	500 (3447)		500 (3447)		500 (3447)		500 (3447)		500 (3447)		500 (3447)	
Water Side	232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)	
Pump-Out Capacity- lb. (kg) (Note 2)	245.8 (111.7)		245.8 (111.7)		228.2 (103.7)		228.2 (103.7)		205.4 (93.4)		205.4 (93.4)	
Victaulic Conn.In & Out- in. (mm)	4 (102)		4 (102)		4 (102)		4 (102)		4 (102)		4 (102)	
Relief Valve, Flare- In. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Purge Valve, Flare- In. (mm)	1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)	
Vent & Drain- in. (mm) NPT	1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)	
Liquid Subcooling	Integral		Integral		Integral		Integral		Integral		Integral	
EVAPORATOR, BRAZED-PLATE												
Number	1		1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2		2	
Water Volume- gal (l)	1.6 (6.1)		1.8 (6.8)		2.0 (7.6)		2.3 (8.7)		2.6 (9.8)		2.8 (10.6)	
Design Working Pressure- PSIG, (kPa):												
Refrigerant Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Water Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Victaulic Conn. In & Out- in. (mm)	2.5 (65)		2.5 (65)		2.5 (65)		2.5 (65)		2.5 (65)		2.5 (65)	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Vent & Drain	Field		Field		Field		Field		Field		Field	
UNIT DIMENSIONS												
Length- in. (mm)	136.0 (3455)		136.0 (3455)		136.0 (3455)		136.0 (3455)		136.0 (3455)		136.0 (3455)	
Width- in. (mm)	32.8 (832)		32.8 (832)		32.8 (832)		32.8 (832)		32.8 (832)		32.8 (832)	
Height- in. (mm)	63.4 (1609)		63.4 (1609)		63.4 (1609)		63.4 (1609)		63.4 (1609)		63.4 (1609)	
UNIT WEIGHTS												
Operating Weight- lb. (kg)	2484 (1127)		2564 (1163)		2615 (1186)		2631 (1193)		2719 (1233)		2731 (1239)	
Shipping Weight- lb. (kg)	2408 (1092)		2488 (1129)		2523 (1144)		2539 (1152)		2606 (1182)		2618 (1188)	
Cir #1 R410A Oper Charge- lb. (kg)	43 (19.5)		43 (19.5)		43 (19.5)		47 (21.4)		47 (21.4)		50 (22.7)	
Cir #2 R410A Oper Charge- lb. (kg)	43 (19.5)		43 (19.5)		43 (19.5)		47 (21.4)		47 (21.4)		50 (22.7)	

Note 1: Capacity certified in accordance with AHRI Standard 550/590.

Note 2: 90% Full R-410A at 90°F (32**°C)**

Physical Data - Packaged Units

Table 21: Physical Data - WGZ060D - WGZ100D

WGZ UNIT SIZE	60		70		80		90		100	
Unit capacity @ AHRI tons, (kW) (Note 1)	60.5 (212.7)		70.2 (246.8)		78.3 (275.3)		87.1 (306.3)		97.8 (343.9)	
No. Circuits	2		2		2		2		2	
COMPRESSORS										
Nominal Tons	15	15	15/20	15/20	20	20	20/26	20/26	26	26
Number per Circuit4	2	2	2	2	2	2	2	2	2	2
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT										
Staging, 4 Stages, Circuit #1 in Lead	25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100	
Staging, 4 Stages, Circuit #2 in Lead	25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100	
Oil Charge, per compressor oz. (l)	110 (3.3)		110 (3.3) 145 (4.3)	110 (3.3) 145 (4.3)	145 (4.3)		145 (4.3)	145 (4.3)	145 (4.3)	
CONDENSER										
Number	1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2	
Diameter, in. (mm)	10 (254)		14 (356)		14 (356)		14 (356)		14 (356)	
Tube Length, in. (mm)	120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)	
Design Working Pressure, psig (kPa):										
Refrigerant Side	500 (3447)		500 (3447)		500 (3447)		500 (3447)		500 (3447)	
Water Side	232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)	
Pump-Out Capacity- lb. (kg) (Note 2)	205.4 (93.4)		415.1 (188.7)		397.5 (180.7)		371.1 (168.7)		344.7 (156.7)	
Conn. In & Out, in., (mm) Victaulic	4 (102)		4 (102)		4 (102)		4 (102)		4 (102)	
Relief Valve, Flare in., (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Purge Valve, Flare in. (mm)	1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)	
Vent & Drain, in. (mm) NPT	1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)	
Liquid Subcooling	Integral		Integral		Integral		Integral		Integral	
EVAPORATOR, BRAZED-PLATE										
Number	1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2	
Water Volume- gal (l)	3.2 (12.0)		5.6 (21.2)		6.3 (23.8)		6.8 (25.7)		8.0 (30.2)	
Design Working Pressure- PSIG, (kPa):										
Refrigerant Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Water Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Victaulic Conn. In & Out- in. (mm)	2.5 (65)		3 (76)		3 (76)		3 (76)		3 (76)	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Vent & Drain	Field		Field		Field		Field		Field	
UNIT DIMENSIONS										
Length- in. (mm)	136.0 (3455)		145.5 (3695)		149.6 (3799)		149.4 (3795)		149.4 (3795)	
Width- in. (mm)	32.8 (832)		35.0 (889)		35.0 (889)		35.0 (889)		35.0 (889)	
Height- in. (mm)	63.4 (1609)		65.5 (1664)		65.5 (1664)		65.5 (1664)		65.5 (1664)	
UNIT WEIGHTS										
Operating Weight- lb. (kg)	2771 (1257)		3696 (1676)		4128 (1872)		4320 (1960)		4515 (2048)	
Shipping Weight- lb. (kg)	2658 (1206)		3555 (1613)		3971 (1801)		4140 (1878)		4311 (1955)	
Cir #1 R410A Oper Charge- lb. (kg)	50 (22.7)		74 (33.6)		80 (36.4)		80 (36.4)		90 (40.9)	

Note 1: Capacity certified in accordance with AHRI Standard 550/590.

Note 2: 90% Full R-410A at 90°F (32**°C)**

Table 22: Physical Data - WGZ115D - WGZ200D

WGZ UNIT SIZE	115		130		150		170		200	
Unit capacity @ AHRI tons, (kW) (Note 1)	112.9 (397.0)		126.7 (445.5)		148.2 (521.1)		169.3 (595.3)		188.1 (661.4)	
No. Circuits	2		2		2		2		2	
COMPRESSORS										
Nominal Tons	26/30	26/30	30	30	26	26	26	30	30	30
Number Per Circuit	2	2	2	2	3	3	3	3	3	3
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT										
Staging, 4 Stages, Circuit #1 in Lead	22 / 50 / 72 / 100		25 / 50 / 75 / 100		17/33/50/67/83/100		15/33/48/67/81/100		17/33/50/67/83/100	
Staging, 4 Stages, Circuit #2 in Lead	22 / 50 / 72 / 100		25 / 50 / 75 / 100		17 / 33 / 50 / 67		19/33/52/67/86/100		17/33/50/67/83/100	
Oil Charge, per compressor oz. (l)	145 (4.3) 213 (6.3)	145 (4.3) 213 (6.3)	213 (6.3)		145 (4.3)		145 (4.3)	213 (6.3)	213 (6.3)	
CONDENSER										
Number	1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2	
Diameter, in. (mm)	14 (356)		14 (356)		16 (406.4)		16 (406.4)		16 (406.4)	
Tube Length, in. (mm)	120 (3048)		120 (3048)		144 (3658)		144 (3658)		144 (3658)	
Design Working Pressure., psig (kPa):										
Refrigerant Side	500 (3447)		500 (3447)		500 (3447)		500 (3447)		500 (3447)	
Water Side	232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)	
Pump-Out Capacity- lb. (kg) (Note 2)	344.7 (156.7)		344.7 (156.7)		572.3 (260.1)		508.9 (231.3)		508.9 (231.3)	
Water Conn In & Out, in., (mm) (4)	4 (102)		4 (102)		5 (127)		5 (127)		5 (127)	
Relief Valve, Flare in., (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Purge Valve, Flare in. (mm)	1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)	
Vent & Drain, in. (mm) NPT	1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)		1/4 (6.4)	
Liquid Subcooling	Integral		Integral		Integral		Integral		Integral	
EVAPORATOR, BRAZED-PLATE					**SHELL-AND-TUBE**					
Number	1		1		1		1		1	
No. Refrigerant Circuits	2		2		2		2		2	
Water Volume- gal (l)	9.6 (36.3)		10.8 (40.9)		57.6 (218.0)		56.9 (215.4)		56.9 (215.4)	
Design Working Pressure- PSIG, (kPa):										
Refrigerant Side	653 (4500)		653 (4500)		450 (3102)		450 (3102)		450 (3102)	
Water Side	653 (4500)		653 (4500)		150 (1034)		150 (1034)		150 (1034)	
Victaulic Conn. In & Out- in. (mm)	3 (76)		3 (76)		8 (203)		8 (203)		8 (203)	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)							
Vent & Drain	Field		Field		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)	
UNIT DIMENSIONS										
Length- in. (mm)	149.4 (3795)		149.4 (3795)		170.3 (4326)		170.3 (4326)		170.3 (4326)	
Width- in. (mm)	35.0 (889)		35.0 (889)		37.1 (927)		37.1 (927)		37.1 (927)	
Height- in. (mm)	65.5 (1664)		65.5 (1664)		76.9 (1953)		76.9 (1953)		77.7(1974)	
UNIT WEIGHTS										
Operating Weight- lb. (kg)	4434 (2011)		4737 (2149)		6662 (3022)		7214 (3272)		7509 (3406)	
Shipping Weight- lb. (kg)	4230 (1919)		4533 (2056)		5873 (2664)		6377 (2893)		6672 (3026)	
Cir #1 R410A Oper Charge- lb. (kg)	100 (45.5)		100 (45.5)		150 (68.2)		150 (68.2)		150 (68.2)	
Cir #2 R410A Oper Charge- lb. (kg)	100 (45.5)		100 (45.5)		150 (68.2)		150 (68.2)		150 (68.2)	

Note 1: Capacity certified in accordance with AHRI Standard 550/590.

Note 2: 90% Full R-410A at 90°F (32**°C)**

Physical Data - Units Less Condenser

Table 23: Physical Data - WGZ030D - AGZ055D

WGZ UNIT SIZE	30		35		40		45		50		55	
Tons (kW) (at 44°F LWT/125°F SDT)	26.9 (94.6)		31.2 (109.7)		36.2 (127.3)		40.3 (141.7)		46.3 (162.8)		50.6 (177.9)	
No. Circuits	2		2		2		2		2		2	
COMPRESSORS												
Nominal Tons	7.5	7.5	9	9	10	10	12	12	13	13	13	15
Number per Circuit	2	2	2	2	2	2	2	2	2	2	2	2
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT												
Staging, Circuit #1 in Lead	25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		23 / 50 / 73 / 100	
Staging, Circuit #2 in Lead	25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		25 / 50 / 75 / 100		27 / 50 / 77 / 100	
Oil Charge per Compressor- oz. (l)	85 (2.5)		110 (3.3)		110 (3.3)		110 (3.3)		110 (3.3)		110 (3.3)	
EVAPORATOR, BRAZED PLATE												
No. Refrigerant Circuits	2		2		2		2		2		2	
Water Volume- gal (l)	1.6 (6.1)		1.8 (6.8)		2.0 (7.6)		2.3 (8.7)		2.6 (9.8)		2.8 (10.6)	
Design Working Pressure- PSIG, (kPa):												
Refrigerant Side	653 (4500)		653 (4500)		653 (4500))		653 (4500)		653 (4500)		653 (4500)	
Water Side	653 (4500)		653 (4500)		653 (4500))		653 (4500)		653 (4500)		653 (4500)	
Victaulic Conn. In & Out- in. (mm)	**2.5 (65)**		**2.5 (65)**		**2.5 (65)**		**2.5 (65)**		**2.5 (65)**		**2.5 (65)**	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Vent & Drain	Field		Field		Field		Field		Field		Field	
UNIT DIMENSIONS												
Length- in. (mm)	137.0 (3480)		137.0 (3480)		137.0 (3480)		137.0 (3480)		137.0 (3480)		137.0 (3480)	
Width- in. (mm)	34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)	
Height- in. (mm)	60.0 (1524)		60.0 (1524)		60.0 (1524)		60.0 (1524)		60.0 (1524)		60.0 (1524)	
UNIT WEIGHTS												
Operating Weight- lb. (kg)	1604 (728)		1690 (767)		1699 (771)		1719 (780)		1740 (789)		1755 (796)	
Shipping Weight- lb. (kg)	1578 (716)		1662 (754)		1669 (757)		1685 (764)		1702 (772)		1714 (778)	

Note 1: Nominal capacity based on base unit capacity without derate for refrigerant piping. See Refrigerant Piping section on page 10.
Note 2: Condenser and field piping not included.

Table 24: Physical Data - WGZ060D - AGZ100D

WGZ UNIT SIZE	60		70		80		90		100	
Tons (kW) (at 44°F LWT/125°F SDT)	55.0 (193.4)		62.5 (219.8)		70.7 (248.6)		79.3 (278.8)		88.7 (311.9)	
No. Circuits	2		2		2		2		2	
COMPRESSORS										
Nominal Tons	15	15	15/20	15/20	20	20	20/26	20/26	26	26
Number per Circuit	2	2	2	2	2	2	2	2	2	2
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT										
Staging, Circuit #1 in Lead	25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100	
Staging, Circuit #2 in Lead	25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100		22 / 50 / 72 / 100		25 / 50 / 75 / 100	
Oil Charge per Compressor- oz. (l)	110 (3.3)		110 (3.3) / 145 (4.3)	110 (3.3) / 145 (4.3)	145 (4.3)		145 (4.3)	145 (4.3)	145 (4.3)	
EVAPORATOR, BRAZED PLATE										
No. Refrigerant Circuits	2		2		2		2		2	
Water Volume- gal (l)	3.2 (12.0)		5.6 (21.2)		6.3 (23.8)		6.8 (25.7)		8.0 (30.2)	
Design Working Pressure- PSIG, (kPa):										
Refrigerant Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Water Side	653 (4500)		653 (4500)		653 (4500)		653 (4500)		653 (4500)	
Victaulic Conn. In & Out- in. (mm)	**2.5 (63)**		**3 (76)**		**3 (76)**		**3 (76)**		**3 (76)**	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Vent & Drain	Field		Field		Field		Field		Field	
UNIT DIMENSIONS										
Length- in. (mm)	137.0 (3480)		144.0 (3658)		144.0 (3658)		144.0 (3658)		144.0 (3658)	
Width- in. (mm)	34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)	
Height- in. (mm)	60.0 (1524)		60.0 (1524)		60.0 (1524)		60.0 (1524)		60.0 (1524)	
UNIT WEIGHTS										
Operating Weight- lb. (kg)	1786 (810)		2296 (1041)		2649 (1202)		2778 (1260)		2923 (1326)	
Shipping Weight- lb. (kg)	1741 (790)		2228 (1010)		2579 (1170)		2701 (1225)		2841 (1289)	

Note 1: Nominal capacity based on base unit capacity without derate for refrigerant piping. See Refrigerant Piping section on page 10.
Note 2: Condenser and field piping not included.

Table 25: Physical Data - WGZ115D - AGZ200D

WGZ UNIT SIZE	115		130		150		170		200	
Tons (kW) (at 44°F LWT/125°F SDT)	101.9 (358.3)		115.1 (404.7)		133.1 (468.0)		153.7 (540.4)		174.3 (612.8)	
No. Circuits	2		2		2		2		2	
COMPRESSORS										
Nominal Tons	26/30	26/30	30	30	26	26	26	30	30	30
Number per Circuit	2	2	2	2	3	3	3	3	3	3
CAPACITY REDUCTION STEPS - PERCENT OF COMPRESSOR DISPLACEMENT										
Staging, Circuit #1 in Lead	22 / 50 / 72 / 100		25 / 50 / 75 / 100		17 / 33 / 50 / 67 / 83		15 / 33 / 48 / 67 / 81		17 / 33 / 50 / 67 / 83	
Staging, Circuit #2 in Lead	22 / 50 / 72 / 100		25 / 50 / 75 / 100		17 / 33 / 50 / 67 / 83		19 / 33 / 52 / 67 / 86		17 / 33 / 50 / 67 / 83	
Oil Charge per Compressor- oz. (l)	145 (4.3) 213 (6.3)	145 (4.3) 213 (6.3)	213 (6.3)		145 (4.3)		145 (4.3)	213 (6.3)	213 (6.3)	
EVAPORATOR, BRAZED PLATE										
No. Refrigerant Circuits	2		2		2		2		2	
Water Volume- gal (l)	8.5 (32.1)		10.5 (39.7)		57.6 (218.0)		56.9 (215.4)		56.9 (215.4)	
Design Working Pressure- PSIG, (kPa):										
Refrigerant Side	653 (4500)		653 (4500)		450 (3102)		450 (3102)		450 (3102)	
Water Side	653 (4500)		653 (4500)		150 (1034)		150 (1034)		150 (1034)	
Victaulic Conn. In & Out- in. (mm)	**3 (76)**		**3 (76)**		**8 (203)**		**8 (203)**		**8 (203)**	
Relief Valve, Flare- in. (mm)	5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)		5/8 (15.9)	
Vent & Drain	Field		Field		1/2 (12.7)		1/2 (12.7)		1/2 (12.7)	
UNIT DIMENSIONS										
Length- in. (mm)	144.0 (3658)		144.0 (3658)		154.0 (3912)		154.0 (3912)		154.0 (3912)	
Width- in. (mm)	34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)		34.0 (864)	
Height- in. (mm)	60.0 (1524)		60.0 (1524)		75.0 (1905)		75.0 (1905)		75.0 (1905)	
UNIT WEIGHTS										
Operating Weight- lb. (kg)	2878 (1305)		3196 (1450)		4571 (2073)		4841 (2196)		5134 (2334)	
Shipping Weight- lb. (kg)	2792 (1266)		3094 (1403)		4071 (1847)		4347 (1972)		4640 (2105)	

Note 1: Nominal capacity based on base unit capacity without derate for refrigerant piping. See Refrigerant Piping section on page 10.
Note 2: Condenser and field piping not included.

Start-Up and Shutdown

Complete operating instructions are contained in the current version of Operating & Maintenance Manual OM 1130 found on www,daikinmcquay.com .

Pre Start-up

1. The chilled-water system should be flushed and cleaned. Proper water treatment is required to prevent corrosion and organic growth.
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. Although connections are tightened at the factory, they can loosen enough in shipment to cause a malfunction.
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 and system piping to be sure the system is clean. Start evaporator pump and manually start condenser pump and cooling tower. 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, treated, non-corrosive water.
6. Check to see that the evaporator water thermostat sensor is securely installed.
7. Making sure control stop switch S1 is open (off) and pumpdown switches PS1 and PS2 are on "manual pumpdown," place the main power and control disconnect switches to "on." This will energize the crankcase heaters. Wait a minimum of 12 hours before starting the unit.
8. Check compressor oil level. Prior to start-up, the oil level should cover at least one-third of the oil sight glass located in the equalizing line between the compressors or on the compressor.
9. Check water pressure drop across evaporator and condenser, and see that water flow is correct (beginning on page 17) per the design flow rates.
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 3%. Verify that adequate power supply and capacity is available to handle load.
11. Make sure all wiring and fuses are of the proper size. Also make sure that all interlock wiring is completed per Daikin McQuay diagrams.
12. Verify that all mechanical and electrical inspections by code authorities have been completed.
13. Make sure all auxiliary load and control equipment is operative and that an adequate cooling load is available for initial start-up.

Start-up

1. Open the compressor discharge shutoff valves until backseated. Always replace valve seal caps.
2. Open the two manual liquid line shutoff valves.
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. Put 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 to the touch.
7. Check that the MicroTech II controller is set to the desired chilled water temperature.
8. Start the system auxiliary equipment for the installation by turning on the time clock, ambient thermostat and/or remote on/off switch and water pumps.
9. Check resets of all equipment protection controls.
10. Switch on the unit circuit breakers.
11. Set pumpdown switches PS1 and PS2 to "auto" for restart and normal operation.
12. Start the system by setting the system switch S1 to on.
13. After running the unit for a short time, check the oil level in each compressor crankcase, rotation of condenser fans (if any), and check for flashing in the refrigerant sight glass.
14. After system performance has stabilized, it is necessary that the "Compressorized Equipment Warranty Form" (Form No. 206036A) be completed to establish commencement of the warranty period. Be sure to list the pressure drop across both vessels. This form is shipped with the unit and after completion should be returned to the McQuay Service through your sales representative.

Weekend or Temporary Shutdown

Move pumpdown switches PS1 and PS2 to the "manual pumpdown" position. After the compressors have pumped down, turn off the chilled water pump. Note: With the unit in this condition, it will not restart until these switches are turned back on. The unit has one-time pumpdown. It is important that the compressors pump down before the water flow to the unit is interrupted to avoid freeze-up in the evaporator.

Leave S1 on and power to the unit so that the crankcase heaters will remain energized.

Start-up after Temporary Shutdown

1. Start the water pumps.
2. With the control system switch S1 in the "on" position, move the pumpdown switches PS1 and PS2 to the "auto pumpdown" position.
3. Observe the unit operation for a short time, noting unusual sounds or possible cycling of compressors.
4. Check compressor crankcase heaters.

Extended Shutdown

1. Close the manual liquid line shutoff valves.
2. After the compressors have pumped down, turn off the water pumps.
3. Turn off all power to the unit.
4. Move the control service switch S1 to the "off" position.
5. Close the discharge shutoff valves on the compressor(s) and the liquid outlet valves at the condenser.
6. Tag all opened disconnect switches to warn against start-up before opening the compressor suction and discharge valves.
7. Drain all water from the unit evaporator, condenser, and chilled water piping if the unit is to be shut down during the winter and exposed to below freezing temperatures. Do not leave the vessels or piping open to the atmosphere over the shutdown period.

Start-up after Extended Shutdown

1. Inspect all equipment to see that it is in satisfactory operating condition.
2. Remove all debris that has collected on the surface of the condenser coils (remote condenser models) or check the cooling tower, if present.
3. Open the compressor discharge valves until backseated. Always replace valve seal caps.
4. Open the manual liquid line shutoff valves.
5. Check circuit breakers. They must be in the "off" position.
6. Check to see that the pumpdown switches PS1 and PS2 are in the "manual shutdown" position and the control system switch S1 is in the "off" position.
7. Put the main power and control circuit disconnects to the "on" position.
8. Allow the crankcase heaters to operate for at least 12 hours prior to start-up.
9. Start the chilled water pump and purge the water piping as well as the evaporator in the unit.
10. Start the system auxiliary equipment for the installation by turning on the time clock, ambient thermostat and/or remote on/off switch.
11. Check that the MicroTech II controller is set to the desired chilled water temperature.
12. Check resets of all equipment protection controls.
13. Switch the unit circuit breakers to "on."
14. Start the system by setting the system switch S1 to "on."

⚠ CAUTION

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.

15. Set pumpdown switches PS1 and PS2 to the "auto pumpdown" position for restart and normal operation.
16. After running the unit for a short time, check the oil level in the compressor oil sight glass or in the compressor's equalizing lines for flashing indicating possible refrigerant in the oil (see System Maintenance section beginning on page 38).

System Maintenance

To provide smooth operation at peak capacity and to avoid damage to package components, a program of periodic inspections should be set up and followed. The following items are intended as a guide to be used during inspection and must be combined with sound refrigeration and electrical practices to provide trouble-free performance.

The liquid line sight glass/moisture indicator on all circuits must be checked to be sure that the glass is full and clear and that 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 must be changed.

Water supplies in some areas can tend to foul the water-cooled condenser to the point where cleaning is necessary. The fouled condenser will be indicated by an abnormally high condenser approach temperature (saturated discharge temperature minus leaving condenser water temperature) and can result in nuisance trip-outs. To clean the condenser, mechanical cleaning or a chemical descaling solution should be used according to the manufacturer's directions.

Systems with remote air-cooled condensers require periodic cleaning of the finned surface of the condenser coil.

Cleaning can be accomplished by using a cold water spray, brushing, vacuuming, or high-pressure air. No tools should be used that could damage the coil tubes or fins.

The compressor oil level must be checked periodically to be sure that the level is at the center of the oil sightglass located in the compressor's equalizing line or on the compressor itself. Low oil level can cause inadequate lubrication and if oil must be added, use oils referred to in the following Compressor Lubrication section.

A pressure tap has been provided on the liquid line downstream of the filter-drier and solenoid valve but before the expansion valve. An accurate subcooled liquid pressure and temperature can be taken here. The pressure read here could also provide an indication of excessive pressure drop through the filter-drier and solenoid valve due to a clogging filter-drier. Note: A normal pressure drop through the solenoid valve is approximately 3 psig (20.7 kPa) at full load conditions.

⚠ CAUTION

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

⚠ DANGER

The panel is always energized to ground even when the system switch is off. To de-energize the complete panel including crankcase heaters, pull the main unit disconnect.
Failure to do so can result in severe personal injury or death.

Electrical Terminals

⚠ WARNING

To avoid injury from electric shock hazard, turn off all power and perform lockout and tag-out of source before continuing with the following service. Note that the unit might be powered from multiple sources.

All power electrical terminals should be re-tightened every six months, as they tend to loosen due to normal heating and cooling of the wire.

Compressor Lubrication

The oil level should be watched carefully upon initial start-up and regularly thereafter.

All tandem and triple compressors on WGZ units come equipped with oil equalization lines connecting the crankcase of each set of compressors in each refrigerant circuit. This allows the oil to move from one compressor crankcase to the other during normal operation, and balance between the two when the compressors are off. The oil sight glass is located in the equalization line on one circuit of the WGZ 070 and both circuits of WGZ 080 through WGZ 100. All other models have the oil sight glass in the compressor body. In either case, the oil level should be 1/4 to 1/3 of the glass.

The units are factory-charged with lubricant and one of the following lubricants must be used if lubricant is to be added to the system:

- Copeland Ultra 22 CC
- Mobil EAL Arctic 22 CC
- ICI EMKARATE RL RL 32CF

Since POEs are very hygroscopic, they will quickly absorb moisture if exposed to air. Pump the lubricant into the unit through a closed transfer system. Avoid overcharging the unit.

Oil can be added to the Copeland compressor through the oil fill hole in the crankcase. Special equipment is required to add oil and the work should be done by qualified refrigeration technicians with the proper training and equipment.

⚠ WARNING

POE lubricants 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).

Sightglass and Moisture Indicator

The refrigerant sight glasses should be observed periodically. A monthly observation should be adequate. A clear glass of liquid indicates that there is adequate refrigerant charge in the system to provide proper feed through the expansion valve. The sight glass should be clear when:

- Ambient temperature is above 75°F (23°C)
- Both compressors on a circuit are running
- All fans on a circuit are running

Bubbling refrigerant in the sight glass may occur at other conditions and may indicate that the system is short of refrigerant charge. Refrigerant gas flashing in the sight glass 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 sight glass indicates what moisture condition corresponds to a given element color. If the sight glass does not indicate a dry condition after about 12 hours of operation, the unit should be pumped down and the filter-driers changed.

If the system is suspected of being short of refrigerant, a qualified service technician with EPA certification should be contacted to thoroughly check out the unit and add refrigerant if necessary.

Crankcase Heaters

The compressors are equipped with crankcase heaters. The function of the heater is to keep the temperature in the crankcase high enough to prevent refrigerant from migrating to the crankcase and condensing in the oil during off-cycle. When a system is to be started up initially, the power to the heaters should be turned on for at least 12 hours before the compressors are started. The crankcase should be up to about 80°F (26.7°C) before the system is started up, to minimize lubrication problems or liquid slugging of compressor on start-up.

If the crankcase is cool (below 80°F) (26.7°C) and the oil level in the sight glass is full to top, allow more time for oil to warm before starting the compressor.

The crankcase heaters are on whenever power is supplied to the unit and the compressor is not running.

Optional Controls

Phase/Voltage Monitor (Optional)

The phase/voltage monitor is a device that provides protection against three-phase electrical motor loss due to power failure conditions, phase loss, and phase reversal. Whenever any of these conditions occur, an input relay is deactivated, disconnecting power to the thermostatic control circuit. The compressor does a rapid shutdown pump down.

The input relay remains deactivated until power line conditions return to an acceptable level. Trip and reset delays have been provided to prevent nuisance tripping due to rapid power fluctuations.

When three-phase power has been applied, the input relay should close and the "run light" should come on. If the relay does not close, perform the following tests.

1. Check the voltages between L1-L2, L1-L3, and L2-L3. These voltages should be approximately equal and within +10% of the rated three-phase line-to-line voltage.
2. If these voltages are extremely low or widely unbalanced, check the power system to determine the cause of the problem.
3. If the voltages are good, turn off the power and interchange any two of the supply power leads at the disconnect switch. This may be necessary, as the phase/voltage monitor is sensitive to phase reversal. Turn on the power. The relay should now close after the appropriate delay.

Factory settings are as follows:

- Voltage Setting: set at nameplate voltage.
- Trip Delay Time: 2 seconds
- Restart Delay Time: 60 seconds

Hot Gas Bypass (Optional)

This option allows passage of discharge gas to the evaporator, permitting operation at lower loads than available with compressor unloading. It also keeps the velocity of refrigerant gas high enough for proper oil return at light load conditions.

The pressure regulating valve is a Sporlan® SHGBE-8 and factory set to begin opening at 69 psig and can be changed by changing the pressure setting. The adjustment range is 0 to 100 psig. To raise the pressure setting, remove the cap on the bulb and turn the adjustment screw clockwise. To lower the setting, turn the screw counterclockwise. Do not force the adjustment beyond the range it is designed for, as this will damage the adjustment assembly. The regulating valve opening point can be determined by slowly reducing the system load while observing the suction pressure. When the bypass valve starts to open, the refrigerant line on the evaporator side of the valve will begin to feel warm to the touch.

⚠ CAUTION

The hot gas line can become hot enough to cause personal injury in a very short time. Avoid contact when it is operating or during cool-down period.

Maintenance Schedule

Table 26: Periodic 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 alarms		X			
III. Condenser					
B. Test water quality		X			
C. Clean condenser tubes (or as required)				X	
D. Eddycurrent test -					X
E. Seasonal protection					X
IV. Evaporator					
B. Test water quality		X			
C. Clean evaporator tubes or plates (or as required)					X
D. Eddycurrent test - (or as required)					X
E. 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			

System Service

⚠ DANGER

Service on this equipment is to be performed only by qualified refrigeration personnel. Causes for repeated tripping of equipment protection controls must be investigated and corrected. Disconnect all power before doing any service inside the unit or serious personal injury or death can occur.

NOTE: Anyone servicing this equipment must comply with the requirements set forth by the EPA concerning refrigerant reclamation and venting.

Filter-Driers

To change the filter-drier, pump the unit down (with the compressor running) by closing the manual liquid line shutoff valve(s). The unit will start pumping down until it reaches the low-pressure cutoff setting of 58 psi.

Close the discharge valve. Remove the refrigerant in the liquid line with a recovery unit to EPA required pressure. Remove and replace the filter-drier(s). Evacuate the lines through the liquid line manual shutoff valve(s) to remove noncondensables that may have entered during filter replacement. A leak check is recommended before returning the unit to operation.

Liquid Line Solenoid Valve

The liquid line solenoid valve(s), which are responsible for automatic pumpdown during normal unit operation, do not normally require any maintenance. However, in the event of failure they can require replacement of the solenoid coil or of the entire valve assembly.

The solenoid coil can be removed from the valve body without opening the refrigerant piping by moving pumpdown switch PS1 or PS2 to the "manual" position.

The coil can then be removed from the valve body by simply removing a nut or snap-ring located at the top of the coil. The coil can then be slipped off its mounting stud for replacement. Be sure to replace the coil on its mounting stud before returning the pumpdown switch to the "auto pumpdown" position.

To replace the entire solenoid valve, follow the steps for changing a filter-drier.

Thermostatic Expansion Valve

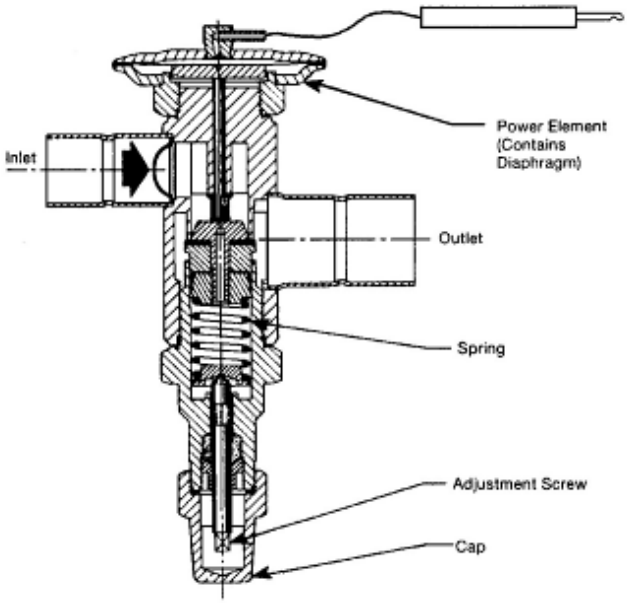
The expansion valve is responsible for allowing the proper amount of refrigerant to enter the evaporator regardless of cooling load. It does this by maintaining a constant superheat. (Superheat is the difference between refrigerant temperature as it leaves the evaporator and the saturation temperature corresponding to the evaporator pressure). All WGZ chillers are factory set for between 8°F and 12°F (4.4°C to 6.7°C) superheat at full load.

To increase the superheat setting of the valve, remove the cap at the bottom of the valve to expose the adjustment screw. Turn the screw clockwise (when viewed from the adjustment screw end) to increase the superheat and counterclockwise to reduce superheat. Allow time for system rebalance after each superheat adjustment.

The expansion valve, like the solenoid valve, should not normally require replacement, but if it does, the unit must be pumped down by following the steps involved when changing a filter-drier.

If the problem can be traced to the power element only, it can be unscrewed from the valve body without removing the valve, but only after pumping the unit down.

Figure 28: Thermostatic Expansion Valve



⚠ CAUTION

Adjustment of expansion valve should only be performed by a qualified service technician. Failure to do so can result in improper unit operation.

Note: Superheat will vary with compressor unloading, but should be approximately as follows: between 8°F and 12°F (4.4°C and 6.7°C) at full load; between 6°F and 10°F at part load.

Water-cooled Condenser

The condenser is of the shell-and-tube type with water flowing through the tubes and refrigerant in the shell. Integral subcoolers are incorporated on all units. All condensers are equipped with 450 psig (2790 kPa) relief valves. Normal tube cleaning procedures can be followed.

Evaporator

The evaporators are sealed, brazed-stainless steel plate unit. or DX shell-and-tube. Normally no service work is required on the evaporator.

Troubleshooting Chart

Table 27: Troubleshooting Chart

PROBLEM	POSSIBLE CAUSES	POSSIBLE CORRECTIVE STEPS
Compressor Will Not Run	Main switch, circuit breakers open.	Close switch
	Fuse blown.	Check electrical circuits and motor winding for shorts or grounds. Investigate for possible overloading. Replace fuse or reset breakers after fault is corrected.
	Thermal overloads tripped or fuses blown.	Overloads are auto reset. Check unit closely when unit comes back on line.
	Defective contactor or coil.	Repair or replace.
	System shut down by equipment protection devices.	Determine type and cause of shutdown and correct it before resetting protection switch.
	No cooling required.	None. Wait until unit calls for cooling.
	Liquid line solenoid will not open.	Repair or replace coil.
	Motor electrical trouble.	Check motor for opens, short circuit, or burnout.
	Loose wiring.	Check all wire junctions. Tighten all terminal screws.
Compressor Noisy or Vibrating	Flooding of refrigerant into crankcase.	Check superheat setting of expansion valve.
	Improper piping support on suction or liquid line.	Relocate, add or remove hangers.
	Worn compressor.	Replace.
High Discharge Pressure	Condenser water insufficient or temperature too high.	Readjust temperature control or water regulating valve. Investigate ways to increase water supply.
	Fouled condenser tubes (water-cooled condenser). Clogged spray nozzles (evaporative condenser). Dirty tube and fin surface (air cooled condenser).	Clean.
	Noncondensables in system.	EPA purge the noncondensables.
	System overcharge with refrigerant.	Remove excess refrigerant.
	Discharge shutoff valve partially closed.	Open valve.
	Condenser undersized (air-cooled).	Check condenser rating tables against the operation.
	High ambient conditions.	Check condenser rating tables against the operation.
Low Discharge Pressure	Faulty condenser temp. regulation.	Check condenser control operation.
	Insufficient refrigerant in system.	Check for leaks. Repair and add charge.
	Low suction pressure.	See corrective steps for low suction pressure below.
	Condenser too large.	Check condenser rating table against the operation.
	Low ambient conditions.	Check condenser rating tables against the operation.
High Suction Pressure	Excessive load.	Reduce load or add additional equipment.
	Expansion valve overfeeding.	Check remote bulb. Regulate superheat.
Low Suction Pressure	Lack of refrigerant.	Check for leaks. Repair and add charge.
	Evaporator dirty.	Clean chemically.
	Clogged liquid line filter-drier.	Replace cartridge(s).
	Clogged suction line or compressor suction gas strainers.	Clean strainers.
	Expansion valve malfunctioning.	Check and reset for proper superheat. Replace if necessary.
	Condensing temperature too low.	Check means for regulating condensing temperature.
	Compressor will not unload.	See corrective steps for failure of compressor to unload.
	Insufficient water flow.	Adjust flow.
Little or No Oil Pressure	Clogged suction oil strainer.	Clean.
	Excessive liquid in crankcase.	Check crankcase heater. Reset expansion valve for higher superheat. Check liquid line solenoid valve operation.
	Low oil level.	Add oil.
	Flooding of refrigerant into crankcase.	Adjust thermal expansion valve.
Compressor Loses Oil	Lack of refrigerant.	Check for leaks and repair. Add refrigerant.
	Velocity in risers too low (A-C only).	Check riser sizes.
	Oil trapped in line.	Check pitch of lines and refrigerant velocities.
Motor Overload Relays or Circuit Breakers Open	Low voltage during high load conditions.	Check supply voltage for excessive line drop.
	Defective or grounded wiring in motor or power circuits.	Replace compressor-motor.
	Loose power wiring.	Check all connections and tighten.
	High condensing temperature.	See corrective steps for high discharge pressure.
	Power line fault causing unbalanced voltage.	Check Supply voltage. Notify power company. Do not start until fault is corrected.
	High ambient temperature around the overload relay	Provide ventilation to reduce heat.
Compressor Thermal Switch Open	Operating beyond design conditions.	Add facilities so that conditions are within allowable limits.
	Discharge valve partially shut.	Open valve.
Freeze Protection Opens	Thermostat set too low.	Reset to 42°F (6°C) or above.
	Low water flow.	Adjust flow.
	Low suction pressure.	See “Low Suction Pressure.”

Electrical Notes

Notes for "Electrical Data Single Point" Power:

1. If a separate 115V power supply is used for the control circuit, then the wire sizing amps 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. It is recommended that power leads be kept short. All terminal block connections must be made with copper (type THW) 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 National Electrical Code Handbook.
4. Must be electrically grounded according to national and local electrical codes.

Voltage Limitations:

1. Within 10 percent 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, 1998 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 an HACR type 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.

Supplemental Overloads Option

The supplemental overloads option is used to reduce the required electrical service size and wire sizing (cost) to the water cooled version of WGZ chillers. The overloads reduce the electrical requirements for the chiller because water-cooled duty requires less power than air-cooled duty. The overload option is only available for WGZ-DW models with water-cooled condensers (not WGZ-DA models with air-cooled condensers) and having single point electrical power connections. Refer to the electrical data on pages 33, 37, and 38 for the reduced electrical requirements.

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, meaning that the protection device must be installed external to the unit per prevailing electric codes. The breaker (disconnect switch) is oversized to avoid nuisance trips at high ambient temperature conditions.

Electrical Data

Panel Short Circuit Current Ratings

Units without Supplemental Overloads

Standard Panel Short Circuit Current Rating

Voltage	Hz	WGZ-D Model Size		
		WGZ 030-040	WGZ 045-090	WGZ 100-200
208-230	60	5kA	5kA	5kA
380	60	5kA	5kA	5kA
400	50	5kA	5kA	5kA
460	60	5kA	5kA	5kA
575	60	5kA	5kA	5kA

Optional High Short Circuit Current Rating Panel

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

Units with Supplemental Overloads

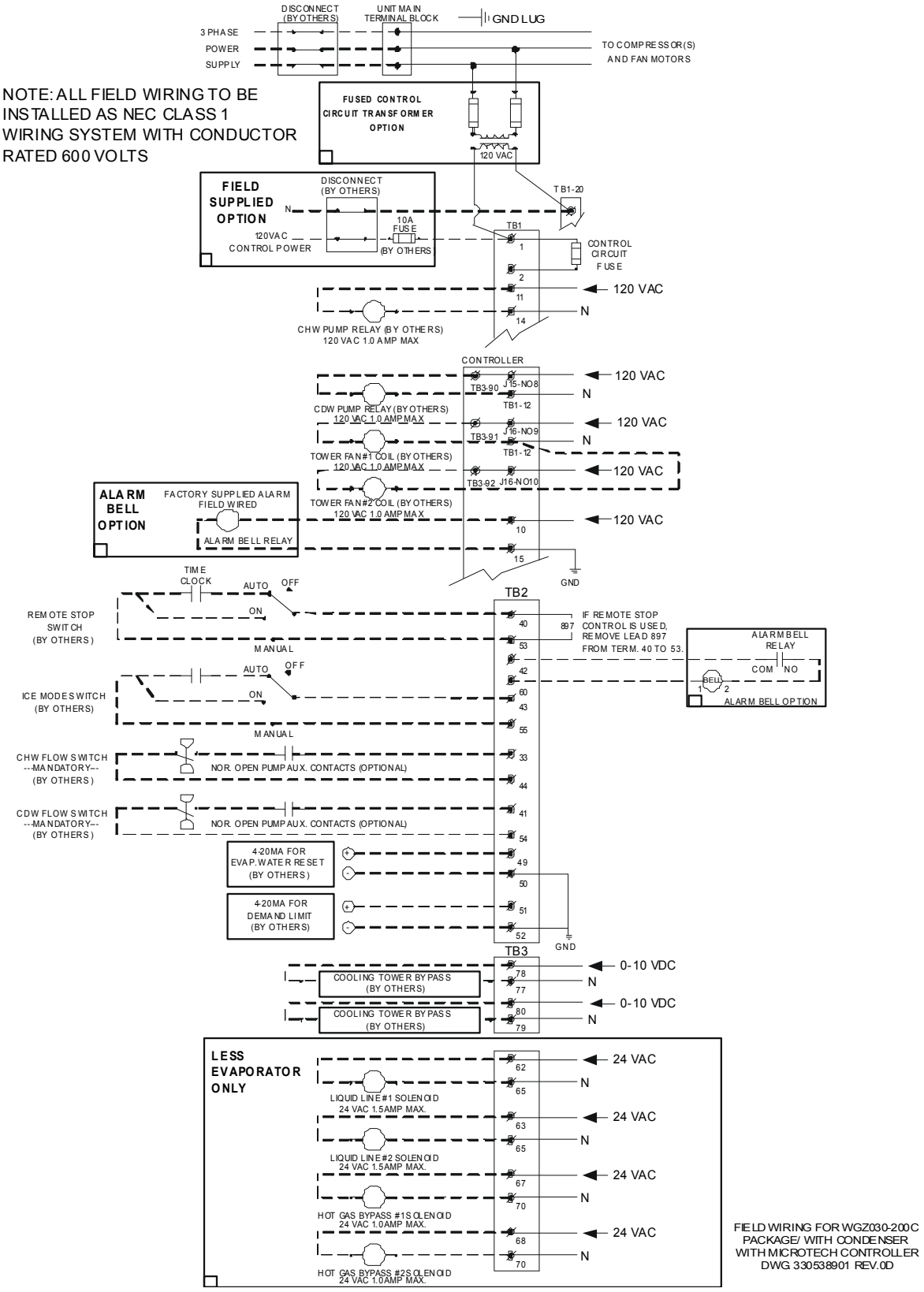
Standard Panel

Voltage	Hz	WGZ-D Model Size		
		WGZ 030-040	WGZ 045-090	WGZ 100-200
208-230	60	5kA	5kA	5kA
380	60	5kA	5kA	5kA
400	50	5kA	5kA	5kA
460	60	5kA	5kA	5kA
575	60	5kA	5kA	5kA

Optional High Short Circuit Current Rating Panel

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

Field Wiring Diagram (Packaged Units)



FIELD WIRING FOR WGZ030-200C PACKAGE/ WITH CONDENSER WITH MICROTECH CONTROLLER DWG 330538901 REV.0D

Figure 29: Field Wiring Diagram (Units less condenser)

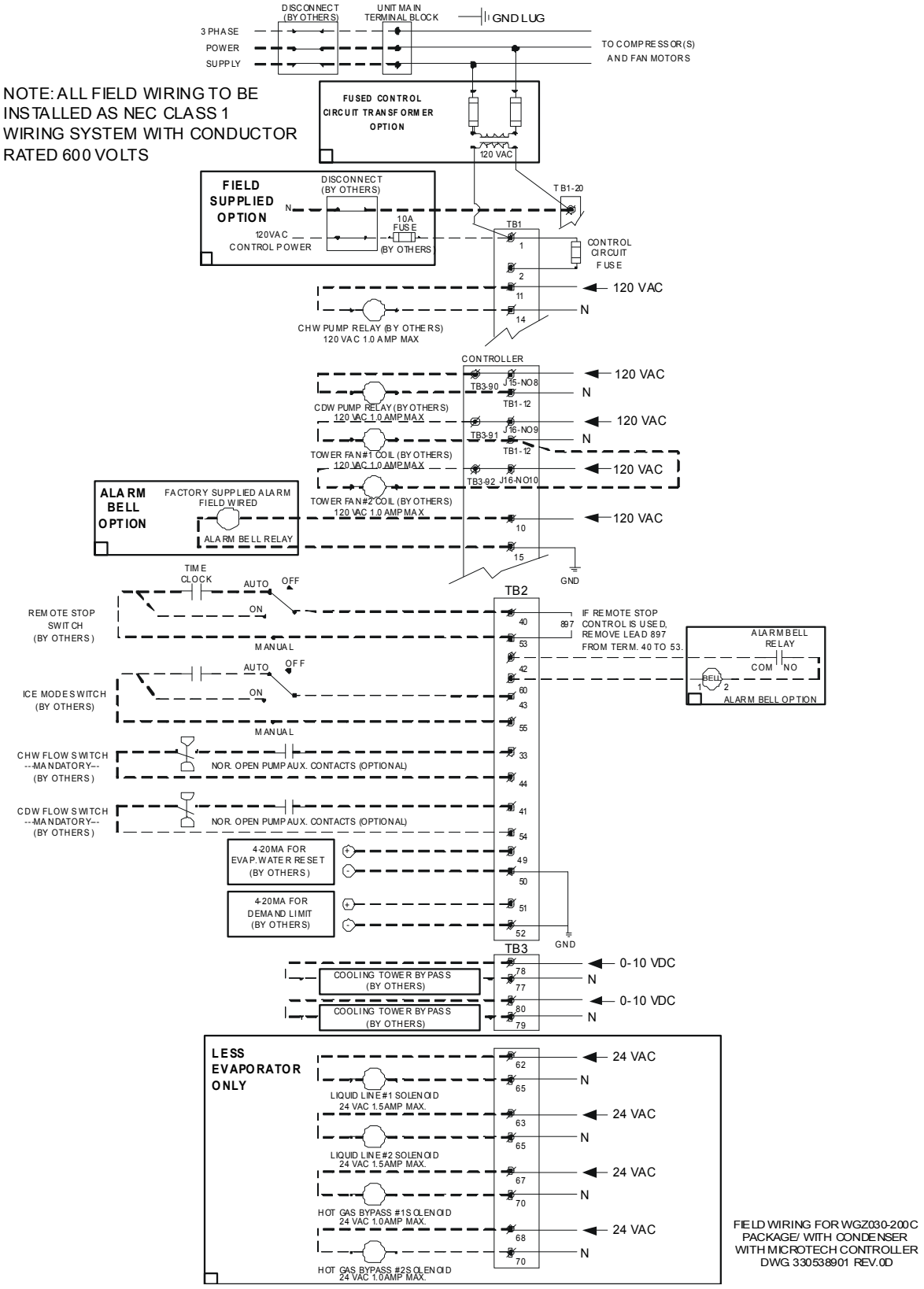


Table 28: Compressor Amp Draw (with and without optional external overloads)

WGZ Unit Size	Volts	Rated Load Amps Per Compressor						Rated Load Amps Per Compressor						Locked Rotor Amps					
		Unit w/o Optional External Overloads						Unit with Optional External Overloads						Across-The-Line Starting					
		Circuit 1			Circuit 2			Circuit 1			Circuit 2			Circuit 1			Circuit 2		
		#1	#3	#5	#2	#4	#6	#1	#3	#5	#2	#4	#6	#1	#3	#5	#2	#4	#6
030D	208V	29.5	29.5	--	29.5	29.5	--	22.4	22.4	--	22.4	22.4	--	195	195	--	195	195	--
	230V	29.5	29.5	--	29.5	29.5	--	20	20	--	20	20	--	195	195	--	195	195	--
	380V	16.7	16.7	--	16.7	16.7	--	13.6	13.6	--	13.6	13.6	--	123	123	--	123	123	--
	400-460V	14.7	14.7	--	14.7	14.7	--	12	12	--	12	12	--	95/95	95/95	--	95/95	95/95	--
	575V	12.2	12.2	--	12.2	12.2	--	N/A	N/A	--	N/A	N/A	--	80	80	--	80	80	--
035D	208V	30.1	30.1	--	30.1	30.1	--	25	25	--	25	25	--	225	225	--	225	225	--
	230V	30.1	30.1	--	30.1	30.1	--	23.2	23.2	--	23.2	23.2	--	225	225	--	225	225	--
	380V	19.2	19.2	--	19.2	19.2	--	13.8	13.8	--	13.8	13.8	--	140	140	--	140	140	--
	400-460V	16.7	16.7	--	16.7	16.7	--	12	12	--	12	12	--	114/111	114/111	--	114/111	114/111	--
	575V	12.2	12.2	--	12.2	12.2	--	N/A	N/A	--	N/A	N/A	--	80	80	--	80	80	--
040D	208V	33.3	33.3	--	33.3	33.3	--	28.6	28.6	--	28.6	28.6	--	239	239	--	239	239	--
	230V	33.3	33.3	--	33.3	33.3	--	25.6	25.6	--	25.6	25.6	--	239	239	--	239	239	--
	380V	23.7	23.7	--	23.7	23.7	--	16.9	16.9	--	16.9	16.9	--	145	145	--	145	145	--
	400-460V	17.9	17.9	--	17.9	17.9	--	12.8	12.8	--	12.8	12.8	--	125/118	125/118	--	125/118	125/118	--
	575V	12.8	12.8	--	12.8	12.8	--	N/A	N/A	--	N/A	N/A	--	80	80	--	80	80	--
045D	208V	48.1	48.1	--	48.1	48.1	--	30.5	30.5	--	30.5	30.5	--	245	245	--	245	245	--
	230V	48.1	48.1	--	48.1	48.1	--	28	28	--	28	28	--	245	245	--	245	245	--
	380V	23.7	23.7	--	23.7	23.7	--	18.3	18.3	--	18.3	18.3	--	145	145	--	145	145	--
	400-460V	18.6	18.6	--	18.6	18.6	--	14.4	14.4	--	14.4	14.4	--	125/118	125/118	--	125/118	125/118	--
	575V	14.7	14.7	--	14.7	14.7	--	12	12	--	12	12	--	100	100	--	100	100	--
050D	208V	51.3	51.3	--	51.3	51.3	--	36	36	--	36	36	--	300	300	--	300	300	--
	230V	51.3	51.3	--	51.3	51.3	--	32.8	32.8	--	32.8	32.8	--	300	300	--	300	300	--
	380V	26.9	26.9	--	26.9	26.9	--	19.6	19.6	--	19.6	19.6	--	139	139	--	139	139	--
	400-460V	23.1	23.1	--	23.1	23.1	--	16.8	16.8	--	16.8	16.8	--	150/140	150/140	--	150/140	150/140	--
	575V	19.9	19.9	--	19.9	19.9	--	13.6	13.6	--	13.6	13.6	--	109	109	--	109	109	--
055D	208V	51.3	51.3	--	55.8	55.8	--	36	36	--	44	44	--	300	300	--	340	340	--
	230V	51.3	51.3	--	55.8	55.8	--	32.8	32.8	--	40	40	--	300	300	--	340	340	--
	380V	26.9	26.9	--	34	34	--	19.6	19.6	--	25.3	25.3	--	139	139	--	196	196	--
	400-460V	23.1	23.1	--	26.9	26.9	--	16.8	16.8	--	20	20	--	150/140	150/140	--	173/173	173/173	--
	575V	19.9	19.9	--	23.7	23.7	--	13.6	13.6	--	16	16	--	109	109	--	132	132	--
060D	208V	55.8	55.8	--	55.8	55.8	--	44	44	--	44	44	--	340	340	--	340	340	--
	230V	55.8	55.8	--	55.8	55.8	--	40	40	--	40	40	--	340	340	--	340	340	--
	380V	34	34	--	34	34	--	25.3	25.3	--	25.3	25.3	--	196	196	--	196	196	--
	400-460V	26.9	26.9	--	26.9	26.9	--	20	20	--	20	20	--	173/173	173/173	--	173/173	173/173	--
	575V	23.7	23.7	--	23.7	23.7	--	16	16	--	16	16	--	132	132	--	132	132	--
070D	208V	73.9	55.8	--	73.9	55.8	--	54.4	44	--	54.4	44	--	505	340	--	505	340	--
	230V	73.9	55.8	--	73.9	55.8	--	49.6	40	--	49.6	40	--	505	340	--	505	340	--
	380V	38.2	34	--	38.2	34	--	31.2	25.3	--	31.2	25.3	--	290	196	--	290	196	--
	400-460V	31.4	26.9	--	31.4	26.9	--	24.8	20	--	24.8	20	--	225/220	173/173	--	225/220	173/173	--
	575V	24.6	23.7	--	24.6	23.7	--	20	16	--	20	16	--	180	132	--	180	132	--

Electrical Data

Table 29: Compressor Amp Draw (with and without optional external overloads)

WGZ Unit Size	Volts	Rated Load Amps Per Compressor						Rated Load Amps Per Compressor						Locked Rotor Amps					
		Unit w/o Optional External Overloads						Unit with Optional External Overloads						Across-The-Line Starting					
		Circuit 1			Circuit 2			Circuit 1			Circuit 2			Circuit 1			Circuit 2		
		#1	#3	#5	#2	#4	#6	#1	#3	#5	#2	#4	#6	#1	#3	#5	#2	#4	#6
080D	208V	73.9	73.9	--	73.9	73.9	--	54.4	54.4	--	54.4	54.4	--	505	505	--	505	505	--
	230V	73.9	73.9	--	73.9	73.9	--	49.6	49.6	--	49.6	49.6	--	505	505	--	505	505	--
	380V	38.2	38.2	--	38.2	38.2	--	31.2	31.2	--	31.2	31.2	--	290	290	--	290	290	--
	400-460V	31.4	31.4	--	31.4	31.4	--	24.8	24.8	--	24.8	24.8	--	225/220	225/220	--	225/220	225/220	--
	575V	24.6	24.6	--	24.6	24.6	--	20	20	--	20	20	--	180	180	--	180	180	--
090D	208V	85.3	73.9	--	85.3	73.9	--	64.8	54.4	--	64.8	54.4	--	605	505	--	605	505	--
	230V	85.3	73.9	--	85.3	73.9	--	58.4	49.6	--	58.4	49.6	--	605	505	--	605	505	--
	380V	51.9	38.2	--	51.9	38.2	--	36.7	31.2	--	36.7	31.2	--	353	290	--	353	290	--
	400-460V	38.8	31.4	--	38.8	31.4	--	29.6	24.8	--	29.6	24.8	--	320/315	225/220	--	320/315	225/220	--
	575V	32.1	24.6	--	32.1	24.6	--	23.2	20	--	23.2	20	--	218	180	--	218	180	--
100D	208V	85.3	85.3	--	85.3	85.3	--	64.8	64.8	--	64.8	64.8	--	605	605	--	605	605	--
	230V	85.3	85.3	--	85.3	85.3	--	58.4	58.4	--	58.4	58.4	--	605	605	--	605	605	--
	380V	51.9	51.9	--	51.9	51.9	--	36.7	36.7	--	36.7	36.7	--	353	353	--	353	353	--
	400-460V	38.8	38.8	--	38.8	38.8	--	29.6	29.6	--	29.6	29.6	--	320/315	320/315	--	320/315	320/315	--
	575V	32.1	32.1	--	32.1	32.1	--	23.2	23.2	--	23.2	23.2	--	218	218	--	218	218	--
115D	208V	109.6	85.3	--	109.6	85.3	--	83.2	64.8	--	83.2	64.8	--	599	605	--	599	605	--
	230V	109.6	85.3	--	109.6	85.3	--	75.2	58.4	--	75.2	58.4	--	599	605	--	599	605	--
	380V	69.2	51.9	--	69.2	51.9	--	47.7	36.7	--	47.7	36.7	--	358	353	--	358	353	--
	400-460V	54.5	38.8	--	54.5	38.8	--	37.6	29.6	--	37.6	29.6	--	310/310	320/315	--	310/310	320/315	--
	575V	49.4	32.1	--	49.4	32.1	--	30.4	23.2	--	30.4	23.2	--	239	218	--	239	218	--
130D	208V	109.6	109.6	--	109.6	109.6	--	83.2	83.2	--	83.2	83.2	--	599	599	--	599	599	--
	230V	109.6	109.6	--	109.6	109.6	--	75.2	75.2	--	75.2	75.2	--	599	599	--	599	599	--
	380V	69.2	69.2	--	69.2	69.2	--	47.7	47.7	--	47.7	47.7	--	358	358	--	358	358	--
	400-460V	54.5	54.5	--	54.5	54.5	--	37.6	37.6	--	37.6	37.6	--	310/310	310/310	--	310/310	310/310	--
	575V	49.4	49.4	--	49.4	49.4	--	30.4	30.4	--	30.4	30.4	--	239	239	--	239	239	--
150D	208V	85.3	85.3	85.3	85.3	85.3	85.3	64.8	64.8	64.8	64.8	64.8	64.8	605	605	605	605	605	605
	230V	85.3	85.3	85.3	85.3	85.3	85.3	58.4	58.4	58.4	58.4	58.4	58.4	605	605	605	605	605	605
	380V	51.9	51.9	51.9	51.9	51.9	51.9	36.7	36.7	36.7	36.7	36.7	36.7	353	353	353	353	353	353
	400-460V	38.8	38.8	38.8	38.8	38.8	38.8	29.6	29.6	29.6	29.6	29.6	29.6	320/315	320/315	320/315	320/315	320/315	320/315
	575V	32.1	32.1	32.1	32.1	32.1	32.1	23.2	23.2	23.2	23.2	23.2	23.2	218	218	218	218	218	218
170D	208V	85.3	85.3	85.3	109.6	109.6	109.6	64.8	64.8	64.8	83.2	83.2	83.2	605	605	605	599	599	599
	230V	85.3	85.3	85.3	109.6	109.6	109.6	58.4	58.4	58.4	75.2	75.2	75.2	605	605	605	599	599	599
	380V	51.9	51.9	51.9	69.2	69.2	69.2	36.7	36.7	36.7	47.7	47.7	47.7	353	353	353	358	358	358
	400-460V	38.8	38.8	38.8	54.5	54.5	54.5	29.6	29.6	29.6	37.6	37.6	37.6	320/315	320/315	320/315	310/310	310/310	310/310
	575V	32.1	32.1	32.1	49.4	49.4	49.4	23.2	23.2	23.2	30.4	30.4	30.4	218	218	218	239	239	239
200D	208V	109.6	109.6	109.6	109.6	109.6	109.6	83.2	83.2	83.2	83.2	83.2	83.2	599	599	599	599	599	599
	230V	109.6	109.6	109.6	109.6	109.6	109.6	75.2	75.2	75.2	75.2	75.2	75.2	599	599	599	599	599	599
	380V	69.2	69.2	69.2	69.2	69.2	69.2	47.7	47.7	47.7	47.7	47.7	47.7	358	358	358	358	358	358
	400-460V	54.5	54.5	54.5	54.5	54.5	54.5	37.6	37.6	37.6	37.6	37.6	37.6	310/310	310/310	310/310	310/310	310/310	310/310
	575V	49.4	49.4	49.4	49.4	49.4	49.4	30.4	30.4	30.4	30.4	30.4	30.4	239	239	239	239	239	239

Table 30: Wire Sizing Amps - Single Point without optional External Overloads

Model Size	Voltage	MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size	
030D	208V	126	3	1 AWG	1	1.25	150
	230V	126	3	1 AWG	1	1.25	150
	380V	71	3	4 AWG	1	1.00	80
	400-460V	63	3	6 AWG	1	0.75	70
	575V	52	3	6 AWG	1	0.75	60
035D	208V	128	3	1 AWG	1	1.25	150
	230V	128	3	1 AWG	1	1.25	150
	380V	82	3	4 AWG	1	1.00	100
	400-460V	71	3	4 AWG	1	1.00	80
	575V	52	3	6 AWG	1	0.75	60
040D	208V	142	3	1/0 AWG	1	1.50	175
	230V	142	3	1/0 AWG	1	1.50	175
	380V	101	3	2 AWG	1	1.25	110
	400-460V	77	3	4 AWG	1	1.00	90
	575V	55	3	6 AWG	1	0.75	60
045D	208V	205	3	4/0 AWG	1	2.00	250
	230V	205	3	4/0 AWG	1	2.00	250
	380V	101	3	2 AWG	1	1.25	110
	400-460V	80	3	4 AWG	1	1.00	90
	575V	63	3	6 AWG	1	0.75	70
050D	208V	218	3	4/0 AWG	1	2.00	250
	230V	218	3	4/0 AWG	1	2.00	250
	380V	115	3	2 AWG	1	1.25	125
	400-460V	99	3	3 AWG	1	1.00	110
	575V	85	3	4 AWG	1	1.00	100
055D	208V	229	3	4/0 AWG	1	2.00	250
	230V	229	3	4/0 AWG	1	2.00	250
	380V	131	3	1/0 AWG	1	1.50	150
	400-460V	107	3	2 AWG	1	1.25	125
	575V	94	3	3 AWG	1	1.00	110
060D	208V	238	3	250 MCM	1	2.00	250
	230V	238	3	250 MCM	1	2.00	250
	380V	145	3	1/0 AWG	1	1.50	175
	400-460V	115	3	2 AWG	1	1.25	125
	575V	101	3	2 AWG	1	1.25	110
070D	208V	274	3	300 MCM	1	2.50	300
	230V	274	3	300 MCM	1	2.50	300
	380V	153	3	2/0 AWG	1	1.50	175
	400-460V	124	3	1 AWG	1	1.25	150
	575V	103	3	2 AWG	1	1.25	125

Model Size	Voltage	MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size	
080D	208V	315	3	400 MCM	1	2.50	350
	230V	315	3	400 MCM	1	2.50	350
	380V	163	3	2/0 AWG	1	1.50	200
	400-460V	134	3	1/0 AWG	1	1.50	150
	575V	105	3	2 AWG	1	1.25	125
090D	208V	337	6	4/0 AWG	1	3.00	400
	230V	337	6	4/0 AWG	1	3.00	400
	380V	190	3	3/0 AWG	1	2.00	225
	400-460V	149	3	1/0 AWG	1	1.50	175
	575V	120	3	1 AWG	1	1.25	125
100D	208V	363	6	4/0 AWG	1	3.00	400
	230V	363	6	4/0 AWG	1	3.00	400
	380V	221	3	4/0 AWG	1	2.00	250
	400-460V	165	3	2/0 AWG	1	1.50	200
	575V	137	3	1/0 AWG	1	1.50	150
115D	208V	412	6	4/0 AWG	2	2.00	450
	230V	412	6	4/0 AWG	2	2.00	450
	380V	256	3	300 MCM	1	2.50	300
	400-460V	197	3	3/0 AWG	1	2.00	225
	575V	171	3	2/0 AWG	1	1.50	200
130D	208V	466	6	250 MCM	2	2.00	500
	230V	466	6	250 MCM	2	2.00	500
	380V	295	3	350 MCM	1	2.50	350
	400-460V	232	3	250 MCM	1	2.00	250
	575V	210	3	4/0 AWG	1	2.00	250
150D	208V	534	6	300 MCM	2	2.50	600
	230V	534	6	300 MCM	2	2.50	600
	380V	325	3	400 MCM	1	2.50	350
	400-460V	243	3	250 MCM	1	2.00	250
	575V	201	3	4/0 AWG	1	2.00	225
170D	208V	613	6	350 MCM	2	2.50	700
	230V	613	6	350 MCM	2	2.50	700
	380V	381	6	250 MCM	1	3.00	400
	400-460V	294	3	350 MCM	1	2.50	300
	575V	257	3	300 MCM	1	2.50	300
200D	208V	685	12	250 MCM	2	3.00	700
	230V	685	12	250 MCM	2	3.00	700
	380V	433	6	4/0 AWG	2	2.00	500
	400-460V	341	6	4/0 AWG	1	3.00	350
	575V	309	3	350 MCM	1	2.50	350

Electrical Data

Table 31: Wire Sizing Amps - Single Point with optional External Overloads

Model Size	Voltage	MCA	Field Wire		Field Hub.		Max Fuse
			Qty	Wire GA	Qty	Size	
030D	208V	96	3	3 AWG	1	1.00	110
	230V	85	3	3 AWG	1	1.00	100
	380V	58	3	6 AWG	1	0.75	70
	400-460V	51	3	6 AWG	1	0.75	60
	575V	N/A	--	--	--	--	--
035D	208V	107	3	2 AWG	1	1.25	125
	230V	99	3	3 AWG	1	1.00	110
	380V	59	3	6 AWG	1	0.75	70
	400-460V	51	3	6 AWG	1	0.75	60
	575V	N/A	--	--	--	--	--
040D	208V	122	3	1 AWG	1	1.25	150
	230V	109	3	2 AWG	1	1.25	125
	380V	72	3	4 AWG	1	1.00	80
	400-460V	55	3	6 AWG	1	0.75	60
	575V	N/A	--	--	--	--	--
045D	208V	130	3	1 AWG	1	1.25	150
	230V	119	3	1 AWG	1	1.25	125
	380V	78	3	4 AWG	1	1.00	90
	400-460V	62	3	6 AWG	1	0.75	70
	575V	51	3	6 AWG	1	0.75	60
050D	208V	153	3	2/0 AWG	1	1.50	175
	230V	140	3	1/0 AWG	1	1.50	150
	380V	84	3	4 AWG	1	1.00	100
	400-460V	72	3	4 AWG	1	1.00	80
	575V	58	3	6 AWG	1	0.75	70
055D	208V	171	3	2/0 AWG	1	1.50	200
	230V	156	3	2/0 AWG	1	1.50	175
	380V	97	3	3 AWG	1	1.00	110
	400-460V	79	3	4 AWG	1	1.00	90
	575V	64	3	6 AWG	1	0.75	70
060D	208V	187	3	3/0 AWG	1	2.00	225
	230V	170	3	2/0 AWG	1	1.50	200
	380V	108	3	2 AWG	1	1.25	125
	400-460V	85	3	3 AWG	1	1.00	100
	575V	68	3	4 AWG	1	1.00	80
070D	208V	208	3	4/0 AWG	1	2.00	250
	230V	190	3	3/0 AWG	1	2.00	225
	380V	120	3	1 AWG	1	1.25	125
	400-460V	95	3	3 AWG	1	1.00	110
	575V	76	3	4 AWG	1	1.00	90
080D	208V	232	3	250 MCM	1	2.00	250
	230V	211	3	4/0 AWG	1	2.00	250
	380V	133	3	1/0 AWG	1	1.50	150
	400-460V	106	3	2 AWG	1	1.25	125
	575V	85	3	3 AWG	1	1.00	100
090D	208V	252	3	250 MCM	1	2.00	300
	230V	229	3	4/0 AWG	1	2.00	250
	380V	144	3	1/0 AWG	1	1.50	175
	400-460V	115	3	1 AWG	1	1.25	125
	575V	92	3	3 AWG	1	1.00	110
100D	208V	276	3	300 MCM	1	2.50	300
	230V	249	3	250 MCM	1	2.00	300
	380V	156	3	2/0 AWG	1	1.50	175
	400-460V	126	3	1 AWG	1	1.25	150
	575V	99	3	3 AWG	1	1.00	110
115D	208V	313	3	400 MCM	1	2.50	350
	230V	282	3	300 MCM	1	2.50	300
	380V	178	3	3/0 AWG	1	2.00	200
	400-460V	142	3	1/0 AWG	1	1.50	150
	575V	113	3	2 AWG	1	1.25	125
130D	208V	354	6	4/0 AWG	1	3.00	400
	230V	320	3	400 MCM	1	2.50	350
	380V	203	3	4/0 AWG	1	2.00	250
	400-460V	160	3	2/0 AWG	1	1.50	175
	575V	130	3	1 AWG	1	1.25	150
150D	208V	405	6	250 MCM	1	3.00	450
	230V	365	6	4/0 AWG	1	3.00	400
	380V	230	3	4/0 AWG	1	2.00	250
	400-460V	185	3	3/0 AWG	1	2.00	200
	575V	145	3	1/0 AWG	1	1.50	150
170D	208V	465	6	250 MCM	2	2.00	500
	230V	420	6	4/0 AWG	2	2.00	450
	380V	266	3	300 MCM	1	2.50	300
	400-460V	211	3	4/0 AWG	1	2.00	225
	575V	169	3	2/0 AWG	1	1.50	175
200D	208V	520	6	300 MCM	2	2.50	600
	230V	470	6	250 MCM	2	2.00	500
	380V	299	3	350 MCM	1	2.50	300
	400-460V	235	3	250 MCM	1	2.00	250
	575V	190	3	3/0 AWG	1	2.00	200

Table 32: Wire Sizing Amps - Multi-Point without optional External Overloads

Model Size	Voltage	Cir. 1 MCA	Field Wire		Field Hub.		Max Fuse Size	Cir. 2 MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size			Qty	Wire GA	Qty	Size	
030D	208V	66	3	4 AWG	1	1.00	90	66	3	4 AWG	1	1.00	90
	230V	66	3	4 AWG	1	1.00	90	66	3	4 AWG	1	1.00	90
	380V	38	3	8 AWG	1	0.50	50	38	3	8 AWG	1	0.50	50
	400-460V	33	3	10 AWG	1	0.50	45	33	3	10 AWG	1	0.50	45
	575V	27	3	10 AWG	1	0.50	35	27	3	10 AWG	1	0.50	35
035D	208V	68	3	4 AWG	1	1.00	90	68	3	4 AWG	1	1.00	90
	230V	68	3	4 AWG	1	1.00	90	68	3	4 AWG	1	1.00	90
	380V	43	3	8 AWG	1	0.50	60	43	3	8 AWG	1	0.50	60
	400-460V	38	3	8 AWG	1	0.50	50	38	3	8 AWG	1	0.50	50
	575V	27	3	10 AWG	1	0.50	35	27	3	10 AWG	1	0.50	35
040D	208V	75	3	4 AWG	1	1.00	100	75	3	4 AWG	1	1.00	100
	230V	75	3	4 AWG	1	1.00	100	75	3	4 AWG	1	1.00	100
	380V	53	3	6 AWG	1	0.75	70	53	3	6 AWG	1	0.75	70
	400-460V	40	3	8 AWG	1	0.50	50	40	3	8 AWG	1	0.50	50
	575V	29	3	10 AWG	1	0.50	40	29	3	10 AWG	1	0.50	40
045D	208V	108	3	2 AWG	1	1.25	150	108	3	2 AWG	1	1.25	150
	230V	108	3	2 AWG	1	1.25	150	108	3	2 AWG	1	1.25	150
	380V	53	3	6 AWG	1	0.75	70	53	3	6 AWG	1	0.75	70
	400-460V	42	3	8 AWG	1	0.50	60	42	3	8 AWG	1	0.50	60
	575V	33	3	10 AWG	1	0.50	45	33	3	10 AWG	1	0.50	45
050D	208V	115	3	2 AWG	1	1.25	150	115	3	2 AWG	1	1.25	150
	230V	115	3	2 AWG	1	1.25	150	115	3	2 AWG	1	1.25	150
	380V	61	3	6 AWG	1	0.75	80	61	3	6 AWG	1	0.75	80
	400-460V	52	3	6 AWG	1	0.75	70	52	3	6 AWG	1	0.75	70
	575V	45	3	8 AWG	1	0.50	60	45	3	8 AWG	1	0.50	60
055D	208V	115	3	2 AWG	1	1.25	150	126	3	1 AWG	1	1.25	175
	230V	115	3	2 AWG	1	1.25	150	126	3	1 AWG	1	1.25	175
	380V	61	3	6 AWG	1	0.75	80	77	3	4 AWG	1	1.00	110
	400-460V	52	3	6 AWG	1	0.75	70	61	3	6 AWG	1	0.75	80
	575V	45	3	8 AWG	1	0.50	60	53	3	6 AWG	1	0.75	70
060D	208V	126	3	1 AWG	1	1.25	175	126	3	1 AWG	1	1.25	175
	230V	126	3	1 AWG	1	1.25	175	126	3	1 AWG	1	1.25	175
	380V	77	3	4 AWG	1	1.00	110	77	3	4 AWG	1	1.00	110
	400-460V	61	3	6 AWG	1	0.75	80	61	3	6 AWG	1	0.75	80
	575V	53	3	6 AWG	1	0.75	70	53	3	6 AWG	1	0.75	70
070D	208V	144	3	1/0 AWG	1	1.50	175	144	3	1/0 AWG	1	1.50	175
	230V	144	3	1/0 AWG	1	1.50	175	144	3	1/0 AWG	1	1.50	175
	380V	81	3	4 AWG	1	1.00	110	81	3	4 AWG	1	1.00	110
	400-460V	65	3	6 AWG	1	0.75	90	65	3	6 AWG	1	0.75	90
	575V	54	3	6 AWG	1	0.75	70	54	3	6 AWG	1	0.75	70
080D	208V	166	3	2/0 AWG	1	1.50	225	166	3	2/0 AWG	1	1.50	225
	230V	166	3	2/0 AWG	1	1.50	225	166	3	2/0 AWG	1	1.50	225
	380V	86	3	3 AWG	1	1.00	110	86	3	3 AWG	1	1.00	110
	400-460V	71	3	4 AWG	1	1.00	100	71	3	4 AWG	1	1.00	100
	575V	55	3	6 AWG	1	0.75	80	55	3	6 AWG	1	0.75	80
090D	208V	178	3	3/0 AWG	1	2.00	250	178	3	3/0 AWG	1	2.00	250
	230V	178	3	3/0 AWG	1	2.00	250	178	3	3/0 AWG	1	2.00	250
	380V	100	3	3 AWG	1	1.00	125	100	3	3 AWG	1	1.00	125
	400-460V	78	3	4 AWG	1	1.00	100	78	3	4 AWG	1	1.00	100
	575V	63	3	6 AWG	1	0.75	80	63	3	6 AWG	1	0.75	80

Table 33: Wire Sizing Amps - Multi-Point without optional External Overloads (continued)

Model Size	Voltage	Cir. 1 MCA	Field Wire		Field Hub.		Max Fuse Size	Cir. 2 MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size			Qty	Wire GA	Qty	Size	
100D	208V	192	3	3/0 AWG	1	2.00	250	192	3	3/0 AWG	1	2.00	250
	230V	192	3	3/0 AWG	1	2.00	250	192	3	3/0 AWG	1	2.00	250
	380V	117	3	1 AWG	1	1.25	150	117	3	1 AWG	1	1.25	150
	400-460V	87	3	3 AWG	1	1.00	125	87	3	3 AWG	1	1.00	125
	575V	72	3	4 AWG	1	1.00	100	72	3	4 AWG	1	1.00	100
115D	208V	216	3	4/0 AWG	1	2.00	300	216	3	4/0 AWG	1	2.00	300
	230V	216	3	4/0 AWG	1	2.00	300	216	3	4/0 AWG	1	2.00	300
	380V	134	3	1/0 AWG	1	1.50	175	134	3	1/0 AWG	1	1.50	175
	400-460V	103	3	2 AWG	1	1.25	125	103	3	2 AWG	1	1.25	125
	575V	90	3	3 AWG	1	1.00	110	90	3	3 AWG	1	1.00	110
130D	208V	247	3	250 MCM	1	2.00	350	247	3	250 MCM	1	2.00	350
	230V	247	3	250 MCM	1	2.00	350	247	3	250 MCM	1	2.00	350
	380V	156	3	2/0 AWG	1	1.50	225	156	3	2/0 AWG	1	1.50	225
	400-460V	123	3	1 AWG	1	1.25	175	123	3	1 AWG	1	1.25	175
	575V	111	3	2 AWG	1	1.25	150	111	3	2 AWG	1	1.25	150
150D	208V	277	3	300 MCM	1	2.50	350	277	3	300 MCM	1	2.50	350
	230V	277	3	300 MCM	1	2.50	350	277	3	300 MCM	1	2.50	350
	380V	169	3	2/0 AWG	1	1.50	200	169	3	2/0 AWG	1	1.50	200
	400-460V	126	3	1 AWG	1	1.25	150	126	3	1 AWG	1	1.25	150
	575V	104	3	2 AWG	1	1.25	125	104	3	2 AWG	1	1.25	125
170D	208V	277	3	300 MCM	1	2.50	350	356	6	4/0 AWG	1	3.00	450
	230V	277	3	300 MCM	1	2.50	350	356	6	4/0 AWG	1	3.00	450
	380V	169	3	2/0 AWG	1	1.50	200	225	3	4/0 AWG	1	2.00	250
	400-460V	126	3	1 AWG	1	1.25	150	177	3	3/0 AWG	1	2.00	225
	575V	104	3	2 AWG	1	1.25	125	161	3	2/0 AWG	1	1.50	200
200D	208V	356	6	4/0 AWG	1	3.00	450	356	6	4/0 AWG	1	3.00	450
	230V	356	6	4/0 AWG	1	3.00	450	356	6	4/0 AWG	1	3.00	450
	380V	225	3	4/0 AWG	1	2.00	250	225	3	4/0 AWG	1	2.00	250
	400-460V	177	3	3/0 AWG	1	2.00	225	177	3	3/0 AWG	1	2.00	225
	575V	161	3	2/0 AWG	1	1.50	200	161	3	2/0 AWG	1	1.50	200

Table 34: Wire Sizing Amps - Multi-Point with optional External Overloads

Model Size	Voltage	Cir. 1 MCA	Field Wire		Field Hub.		Max Fuse Size	Cir. 2 MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size			Qty	Wire GA	Qty	Size	
030D	208V	50	3	8 AWG	1	0.50	70	50	3	8 AWG	1	0.50	70
	230V	45	3	8 AWG	1	0.50	60	45	3	8 AWG	1	0.50	60
	380V	31	3	10 AWG	1	0.50	40	31	3	10 AWG	1	0.50	40
	400-460V	27	3	10 AWG	1	0.50	35	27	3	10 AWG	1	0.50	35
	575V	N/A	--	--	--	--	--	N/A	--	--	--	--	--
035D	208V	56	3	6 AWG	1	0.75	80	56	3	6 AWG	1	0.75	80
	230V	52	3	6 AWG	1	0.75	70	52	3	6 AWG	1	0.75	70
	380V	31	3	10 AWG	1	0.50	45	31	3	10 AWG	1	0.50	45
	400-460V	27	3	10 AWG	1	0.50	35	27	3	10 AWG	1	0.50	35
	575V	N/A	--	--	--	--	--	N/A	--	--	--	--	--
040D	208V	64	3	6 AWG	1	0.75	90	64	3	6 AWG	1	0.75	90
	230V	58	3	6 AWG	1	0.75	80	58	3	6 AWG	1	0.75	80
	380V	38	3	8 AWG	1	0.50	50	38	3	8 AWG	1	0.50	50
	400-460V	29	3	10 AWG	1	0.50	40	29	3	10 AWG	1	0.50	40
	575V	N/A	--	--	--	--	--	N/A	--	--	--	--	--
045D	208V	69	3	4 AWG	1	1.00	90	69	3	4 AWG	1	1.00	90
	230V	63	3	6 AWG	1	0.75	90	63	3	6 AWG	1	0.75	90
	380V	41	3	8 AWG	1	0.50	50	41	3	8 AWG	1	0.50	50
	400-460V	32	3	10 AWG	1	0.50	45	32	3	10 AWG	1	0.50	45
	575V	27	3	10 AWG	1	0.50	35	27	3	10 AWG	1	0.50	35
050D	208V	81	3	4 AWG	1	1.00	110	81	3	4 AWG	1	1.00	110
	230V	74	3	4 AWG	1	1.00	100	74	3	4 AWG	1	1.00	100
	380V	44	3	8 AWG	1	0.50	60	44	3	8 AWG	1	0.50	60
	400-460V	38	3	8 AWG	1	0.50	50	38	3	8 AWG	1	0.50	50
	575V	31	3	10 AWG	1	0.50	40	31	3	10 AWG	1	0.50	40
055D	208V	81	3	4 AWG	1	1.00	110	99	3	3 AWG	1	1.00	125
	230V	74	3	4 AWG	1	1.00	100	90	3	3 AWG	1	1.00	125
	380V	44	3	8 AWG	1	0.50	60	57	3	6 AWG	1	0.75	80
	400-460V	38	3	8 AWG	1	0.50	50	45	3	8 AWG	1	0.50	60
	575V	31	3	10 AWG	1	0.50	40	36	3	8 AWG	1	0.50	50
060D	208V	99	3	3 AWG	1	1.00	125	99	3	3 AWG	1	1.00	125
	230V	90	3	3 AWG	1	1.00	125	90	3	3 AWG	1	1.00	125
	380V	57	3	6 AWG	1	0.75	80	57	3	6 AWG	1	0.75	80
	400-460V	45	3	8 AWG	1	0.50	60	45	3	8 AWG	1	0.50	60
	575V	36	3	8 AWG	1	0.50	50	36	3	8 AWG	1	0.50	50
070D	208V	109	3	2 AWG	1	1.25	150	109	3	2 AWG	1	1.25	150
	230V	100	3	3 AWG	1	1.00	125	100	3	3 AWG	1	1.00	125
	380V	63	3	6 AWG	1	0.75	80	63	3	6 AWG	1	0.75	80
	400-460V	50	3	8 AWG	1	0.50	70	50	3	8 AWG	1	0.50	70
	575V	40	3	8 AWG	1	0.50	50	40	3	8 AWG	1	0.50	50
080D	208V	122	3	1 AWG	1	1.25	175	122	3	1 AWG	1	1.25	175
	230V	112	3	2 AWG	1	1.25	150	112	3	2 AWG	1	1.25	150
	380V	70	3	4 AWG	1	1.00	100	70	3	4 AWG	1	1.00	100
	400-460V	56	3	6 AWG	1	0.75	80	56	3	6 AWG	1	0.75	80
	575V	45	3	8 AWG	1	0.50	60	45	3	8 AWG	1	0.50	60
090D	208V	133	3	1/0 AWG	1	1.50	175	133	3	1/0 AWG	1	1.50	175
	230V	120	3	1 AWG	1	1.25	150	120	3	1 AWG	1	1.25	150
	380V	76	3	4 AWG	1	1.00	100	76	3	4 AWG	1	1.00	100
	400-460V	61	3	6 AWG	1	0.75	80	61	3	6 AWG	1	0.75	80
	575V	48	3	8 AWG	1	0.50	60	48	3	8 AWG	1	0.50	60

Table 35: Wire Sizing Amps - Multi-Point with optional External Overloads (continued)

Model Size	Voltage	Cir. 1 MCA	Field Wire		Field Hub.		Max Fuse Size	Cir. 2 MCA	Field Wire		Field Hub.		Max Fuse Size
			Qty	Wire GA	Qty	Size			Qty	Wire GA	Qty	Size	
100D	208V	146	3	1/0 AWG	1	1.50	200	146	3	1/0 AWG	1	1.50	200
	230V	131	3	1/0 AWG	1	1.50	175	131	3	1/0 AWG	1	1.50	175
	380V	83	3	4 AWG	1	1.00	110	83	3	4 AWG	1	1.00	110
	400-460V	67	3	4 AWG	1	1.00	90	67	3	4 AWG	1	1.00	90
	575V	52	3	6 AWG	1	0.75	70	52	3	6 AWG	1	0.75	70
115D	208V	164	3	2/0 AWG	1	1.50	225	164	3	2/0 AWG	1	1.50	225
	230V	148	3	1/0 AWG	1	1.50	200	148	3	1/0 AWG	1	1.50	200
	380V	94	3	3 AWG	1	1.00	125	94	3	3 AWG	1	1.00	125
	400-460V	75	3	4 AWG	1	1.00	100	75	3	4 AWG	1	1.00	100
	575V	59	3	6 AWG	1	0.75	80	59	3	6 AWG	1	0.75	80
130D	208V	187	3	3/0 AWG	1	2.00	250	187	3	3/0 AWG	1	2.00	250
	230V	169	3	2/0 AWG	1	1.50	225	169	3	2/0 AWG	1	1.50	225
	380V	107	3	2 AWG	1	1.25	150	107	3	2 AWG	1	1.25	150
	400-460V	85	3	4 AWG	1	1.00	110	85	3	4 AWG	1	1.00	110
	575V	68	3	4 AWG	1	1.00	90	68	3	4 AWG	1	1.00	90
150D	208V	211	3	4/0 AWG	1	2.00	250	211	3	4/0 AWG	1	2.00	250
	230V	190	3	3/0 AWG	1	2.00	225	190	3	3/0 AWG	1	2.00	225
	380V	119	3	1 AWG	1	1.25	150	119	3	1 AWG	1	1.25	150
	400-460V	96	3	3 AWG	1	1.00	125	96	3	3 AWG	1	1.00	125
	575V	75	3	4 AWG	1	1.00	90	75	3	4 AWG	1	1.00	90
170D	208V	211	3	4/0 AWG	1	2.00	250	270	3	300 MCM	1	2.50	350
	230V	190	3	3/0 AWG	1	2.00	225	244	3	250 MCM	1	2.00	300
	380V	119	3	1 AWG	1	1.25	150	155	3	2/0 AWG	1	1.50	200
	400-460V	96	3	3 AWG	1	1.00	125	122	3	1 AWG	1	1.25	150
	575V	75	3	4 AWG	1	1.00	90	99	3	3 AWG	1	1.00	125
200D	208V	270	3	300 MCM	1	2.50	350	270	3	300 MCM	1	2.50	350
	230V	244	3	250 MCM	1	2.00	300	244	3	250 MCM	1	2.00	300
	380V	155	3	2/0 AWG	1	1.50	200	155	3	2/0 AWG	1	1.50	200
	400-460V	122	3	1 AWG	1	1.25	150	122	3	1 AWG	1	1.25	150
	575V	99	3	3 AWG	1	1.00	125	99	3	3 AWG	1	1.00	125

Table 36: Connection Sizing - Single Point without optional External Overloads

Model Size	Voltage Size	Power Block [2]		Disconnect Switch [2]	
		Size	Lug Range	Size	Lug Range
030D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
035D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
040D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
045D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
050D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
055D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
060D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
070D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
080D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
090D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
100D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
115D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	250A	(1) 350 - #6
	575V	380A	(1) 500 - #4	250A	(1) 350 - #6
130D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	575V	380A	(1) 500 - #4	250A	(1) 350 - #6
150D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	575V	380A	(1) 500 - #4	250A	(1) 350 - #6
170D	208V	760A	(2) 500 - #4	800A	(3) 500 - 3/0
	230V	760A	(2) 500 - #4	800A	(3) 500 - 3/0
	380V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	575V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
200D	208V	760A	(2) 500 - #4	800A	(4) 500 - 250
	230V	760A	(2) 500 - #4	800A	(4) 500 - 250
	380V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	575V	380A	(1) 500 - #4	400A	(2) 500 - 3/0

Note [1]: On HSCCR Unit = 250A {(1) 350 - #6}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Table 37: Connection Sizing - Single Point with optional External Overloads

Model Size	Voltage Size	Power Block [2]		Disconnect Switch [2]	
		Size	Lug Range	Size	Lug Range
030D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--
035D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--
040D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--
045D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
050D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
055D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
060D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
070D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
080D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
090D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
100D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
115D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
130D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
150D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	250A	(1) 350 - #6
170D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	250A	(1) 350 - #6
	575V	380A	(1) 500 - #4	250A	(1) 350 - #6
200D	208V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	230V	760A	(2) 500 - #4	600A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	400-460V	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	575V	380A	(1) 500 - #4	250A	(1) 350 - #6

Note [1]: On HSCCR Unit = 250A {(1) 350 - #6}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Table 38: Connection Sizing - Multi-Point without optional External Overloads

Model Size	Voltage Size	**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
030D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
035D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
040D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
045D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
050D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
055D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
060D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
070D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10

Note [1]: On HSCCR Unit = 400A {(1) 600 - #1}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Table 39: Connection Sizing - Multi-Point without optional External Overloads (continued)

Model Size	Voltage Size	**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
080D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
090D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
100D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
115D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
130D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
150D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
170D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	250A	(1) 350 - #6
200D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	400-460V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6

Note [1]: On HSCCR Unit = 400A {(1) 600 - #1}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Table 40: Connection Sizing - Multi-Point with optional External Overloads

Model Size	Voltage Size	**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
030D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--	N/A	--	N/A	--
035D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--	N/A	--	N/A	--
040D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	N/A	--	N/A	--	N/A	--	N/A	--
045D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
050D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
055D	208V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
060D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
070D	208V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10

Note [1]: On HSCCR Unit = 400A {(1) 600 - #1}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Table 41: Connection Sizing - Multi-Point with optional External Overloads (continued)

Model Size	Voltage Size	**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
080D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
090D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
100D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
115D	208V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	230V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
130D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	400-460V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
150D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	250A	(1) 350 - #6
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10
170D	208V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	250A	(1) 350 - #6	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	100A [1]	(1) 1/0 - #10	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3
200D	208V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	230V	380A	(1) 500 - #4	400A	(2) 500 - 3/0	380A	(1) 500 - #4	400A	(2) 500 - 3/0
	380V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	400-460V	175A	(1) 2/0 - #14	250A	(1) 350 - #6	175A	(1) 2/0 - #14	250A	(1) 350 - #6
	575V	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3	175A	(1) 2/0 - #14	125A [1]	(1) 3/0 - #3

Note [1]: On HSCCR Unit = 400A {(1) 600 - #1}
Note [2]: Power Block and Disconnect Switch sizes are the minimum. Larger sizes may be used, however lug range must be same.

Field Wiring, Power

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

- Single-point connection to power block with compressor circuit breakers
- Single-point connection to disconnect switch with compressor circuit breakers
- High short circuit current rating with single-point disconnect switch (Not available on 575V units)
- Multi-point connection to disconnect switch, no compressor circuit breakers

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 trouble must be found and corrected. Tables in the Electrical Data section (page 39) 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 control panel picture Figure 30, page 62 for general location of power inlet.)

NOTE: Use only copper supply conductors. Terminations are sized for copper only.

Field Wiring, Control

A factory-mounted control transformer supplies the correct control circuit voltage.

The transformer power leads are connected to the power block PB1 or disconnect switch DS1.

Interlock Wiring, Condenser Pump Starter or Air Cooled Condenser Fan Starter

Provisions are made for interlocking a condenser pump starter, tower fans, a tower bypass valve, or up to eight air-cooled condenser fan contactors to be controlled by the MicroTech II unit controller. Condenser fan operation can also be controlled by pressure switches supplied with the condenser. Coil voltage must be 115 volts with a maximum of 20 VA.

An evaporator and condenser (water-cooled units only) flow switch is necessary on all units. It is also advisable to wire a chilled water pump interlock in series with the flow switch for additional freeze protection.

Control wiring must enter the control box through a 7/8-inch knockout provided on the panel upper left side.

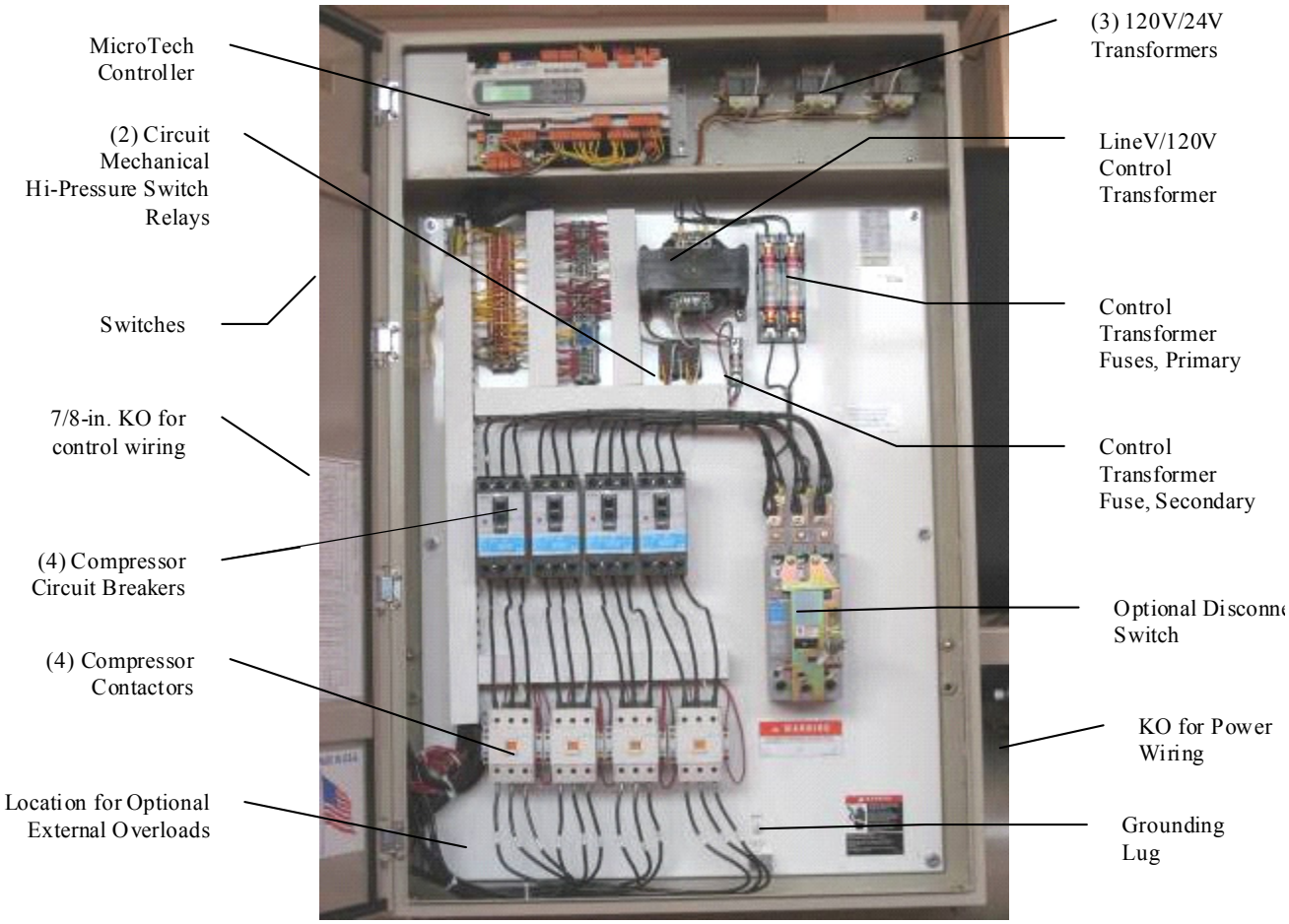
Ambient Air Sensor

Units with a remote air-cooled condenser will have an outdoor air sensor furnished with the unit, inside the control panel and wired to the correct terminals. It must be installed outdoors in a location that will give the true outdoor temperature that the condenser coils will see. Splicing of the sensor lead may be required. The sensor must be installed for the unit to operate.

Optional Remote Interface Panel

The box containing the optional remote interface panel will have installation instructions, IOM- MT II Remote, in it.

Figure 30: Control Panel Layout



Job Name: _____ **McQuay G.O. No.:** _____

Installation Address: _____

City/State/Zip: _____

Purchasing Contractor: _____

City/State/Zip: _____

Unit Model No. _____ **Serial No.:** _____

Compressor #1 Serial No.: _____ **Compressor #2 Serial No.:** _____

Compressor #3 Serial No.: _____ **Compressor #4 Serial No.:** _____

Compressor #5 Serial No.: _____ **Compressor #6 Serial No.:** _____

I. PRE START-UP PROCEDURE - refer to attached documentation.

II. PRE START-UP CHECKLIST	**YES**	**NO**
A. Is any shipping damage visible?	☐	☐
B. Is unit installed level?	☐	☐
C. Is unit positioned to provide adequate free area for service and operation?	☐	☐
D. Are fans properly aligned and turn freely?	☐	☐
E. Has thermostat bulb been properly installed in the well?	☐	☐
F. Does electrical service correspond to unit nameplate?	☐	☐
Volts ___ Hertz _____ Phase _____		
G. Has unit been adequately grounded?	☐	☐
H. Has an adequate fused disconnect and fuses been installed?	☐	☐
Fuse Amp Rating _____		
I. Are all electrical power connections tight?	☐	☐
J. Have compressor crankcase heaters been operating for 24 hours prior to start-up?	☐	☐
K. Are setscrews on all pulleys, bearings and fans tight?	☐	☐
L. Are all service and liquid line valves open?	☐	☐
M. Have all shipping hold down plates been removed?	☐	☐
N. Does all field wiring conform to unit electrical diagram?	☐	☐
O. Has a flow switch been installed per the IM bulletin?	☐	☐
P. Does chiller and condenser water piping conform to the IM Bulletin?	☐	☐
Q. Is wind impingement against the air cooled condenser a consideration?	☐	☐

R. Description of unit location with respect to building structures; i.e., buildings, fences, walls, overhangs, other?

Description: _____

_____

_____

III. REFRIGERATION SYSTEM

		YES	NO
A.	Has all field piping been leak tested at 100 psig (690 kPa)?	☐	☐
B.	Has system been properly evacuated and charged?	☐	☐
C.	Refrigerant R-_____ Circuit 1 _____ lbs. (kg) Circuit 2 _____ lbs. (kg)		
D.	Does piping to unit appear to be adequately sized and installed according to the IM bulletin?	☐	☐
E.	Is a liquid line filter-drier installed in each circuit?	☐	☐
F.	Is level of oil in sightglass visible but not more than 1/2 glass with compressors running?	☐	☐
G.	Is a liquid line solenoid installed in each circuit?	☐	☐
H.	Is expansion valve bulb properly installed and insulated?	☐	☐

IV. DESIGN CONTROLS (From submittal)

A. CHILLER
Water Pressure Drop: _____ psig (kPa) _____ Ft. (kPa) _____ gpm (lps)
Water Temperatures: Entering _____ °F (°C) Leaving _____ °F (°C)

B. CONDENSOR
Water Pressure Drop: _____ psig (kPa) _____ Ft. (kPa) _____ gpm (lps)
Water Temperatures: Entering _____ °F (°C) Leaving _____ °F (°C)

V. START-UP (Readings Must Be Taken At Full Load)

		YES	NO
A.	Does unit start and perform per sequence of operation as stated in the IM bulletin?	☐	☐
B.	Do condenser fans rotate in the proper direction?	☐	☐

MICROTECH STATUS CHECK (Each Reading Must be Verified With Field Provided Instruments Of Known Accuracy)

		MicroTech	Verification
C.	Water Temperatures: Leaving Evaporator	°F (°C)	°F (°C)
	Entering Evaporator	_____°F (°C)	_____°F (°C)
	Entering Condenser	_____°F (°C)	_____°F (°C)
	Leaving Condenser	_____°F (°C)	_____°F (°C)
D.	Circuit #1 Refrigerant Pressures:		
	Evaporator _____ psig (kPa) _____ °F (°C)		_____psig
	Minimum Condenser Pressure _____ psig (kPa)		
	Maximum Condenser Pressure _____ psig (kPa)		
E.	Circuit #2 Refrigerant Pressures:		
	Evaporator _____ psig (kPa) _____ °F (°C)		_____psig
	Minimum Condenser Pressure _____ psig (kPa)		
	Maximum Condenser Pressure _____ psig (kPa)		
F.	Circuit #1 Refrigerant Temperatures:		
	Saturated Evaporator Temperature	_____°F (°C)	_____°F (°C)
	Suction Line Temperature	_____°F (°C)	_____°F (°C)
	Suction Superheat	_____°F (°C)	_____°F (°C)
	Saturated Condenser Temperature	°F (°C)	°F (°C)
	Condenser Approach	°F (°C)	°F (°C)
	Liquid Line Temperature	_____°F (°C)	_____°F (°C)
	Subcooling	_____°F (°C)	_____°F (°C)
G.	Circuit #2 Refrigerant Temperatures:		
	Saturated Evaporator Temperature	_____°F (°C)	_____°F (°C)
	Suction Line Temperature	_____°F (°C)	_____°F (°C)
	Suction Superheat	_____°F (°C)	_____°F (°C)
	Saturated Condenser Temperature	_____°F (°C)	°F (°C)
	Condenser Approach	_____°F (°C)	°F (°C)
	Liquid Line Temperature	_____°F (°C)	°F (°C)
	Subcooling	_____°F (°C)	_____°F (°C)
H.	Outdoor Air Temperature	_____°F (°C)	_____°F (°C)

I. Does the system contain glycol? ☐ ☐
Percentage by weight _____ or by volume _____
J. If the chilled water system includes glycol, have the freezestats been adjusted lower to meet actual job requirements? ☐ ☐
Note: See installation bulletin for low temperature or ice bank applications.

K. Waterside Pressure Drop:

Chiller: _____psig (kPa) ____Ft. (kPa) _____gpm (lps)

Condenser:_____psig (kPa) ____Ft. (kPa) _____gpm (lps)

L. System Oil Pressure:

Compressor #1 _____ psig (kPa) Compressor #3 _____ psig (kPa) Compressor #5 _____ psig (kPa)

Compressor #2 _____ psig (kPa) Compressor #4 _____ psig (kPa) Compressor #6 _____ psig (kPa)

M. Unit Voltage Across Each Phase: V V V

N. Unit Current Per Phase: amps amps amps

O. Compressor Current Per Phase:

Compressor #1:	Amps	Amps	Amps
Compressor #2:	Amps	Amps	Amps
Compressor #3:	_____ Amps	_____ Amps	_____ Amps
Compressor#4:	_____Amps	_____ Amps	_____ Amps
Compressor #5:	_____ Amps	_____ Amps	_____ Amps
Compressor #6:	_____ Amps	_____ Amps	_____ Amps

VI. CONTROL CHECK AND SETPOINT VERIFICATION / STANDARD UNIT SETPOINT

MICROTECH SETPOINTS	MICROTECH	STANDARD
A. Leaving Evaporator	_____°F (°C)	_____ °F (°C)
B. Reset Leaving	_____°F (°C)	_____°F (°C)
C. Reset Signal	_____ma	
D. Reset Option	_____	
E. Maximum Chilled Water Reset	_____°F (°C)	_____°F (°C)
F. Return Setpoint	_____°F (°C)	
G. Maximum Pulldown	_____°F (°C)	
H. Control Band	°F (°C)	°F (°C)
I. Interstage Delay	_____ sec.	_____ sec.
J. Start-to-Start Delay	_____ min.	
K. Stop-to-Stop Delay	_____min.	
L. Minimum Lift Pressure	____psig (kPa)	
M. Deadband	____psig (kPa)	
N. Stage Up Error	____psig (kPa)	
O. Stage Down Error	____psig (kPa)	

ALARM SETPOINTS MUST BE VERIFIED WITH INSTRUMENTS OF KNOWN ACCURACY

P. Low Pressure Cut-In	____ psig (kPa)	____ psig (kPa)
Q. Low Pressure Cut-Out	____ psig (kPa)	____ psig (kPa)
R. Refrigerant Freezestat	____ psig (kPa)	____ psig (kPa)
S. Chilled Water Freezestat	____ psig (kPa)	____ psig (kPa)
T. Freezestat Time Delay	_____sec.	_____sec.
U. High Pressure Cut-Out	____ psig (kPa)	____ psig (kPa)

V. Unit Type = _____
W. Number of Compressors = _____
X. Number of Stages = _____
Y. Number of Fan Stages = _____
Z. IDENT = _____

Warranty Registration Form (Scroll)

VII. FOR HEAT RECOVERY CHILLERS ONLY (Must Be Taken At Full Load)

A. Place unit in heat recovery mode.
B. Waterside Pressure Drop: _____ psig (kPa) _____ Ft. (kPa) _____ gpm (lps)
C. Waterside Temperatures: _____ Inlet _____ Outlet
D. Head Pressure: Circuit #1 _____ psig (kPa) Circuit #2 _____ psig (kPa)
E. Suction Pressure: Circuit #1 _____ psig (kPa) Circuit #2 _____ psig (kPa)
F. Compressor Current Per Phase:
Compressor #1 _____ AMPS _____ AMPS _____ AMPS
Compressor #2 _____ AMPS _____ AMPS _____ AMPS
Compressor #3 _____ AMPS _____ AMPS _____ AMPS
Compressor #4 _____ AMPS _____ AMPS _____ AMPS

VIII. GENERAL

A. Are all control lines secure to prevent excess vibration and wear? ..... ☐ ☐
B. Are all gauges shut off, valve caps and packings tight after startup? ..... ☐ ☐

Performed By: Title:

Company Name: _____

Address: _____

City/ State/ Zip Code: _____

Telephone Number: _____ Modem Number: _____

Signature: _____ Date: _____

Contractor's Signature: _____

RETURN COMPLETED FORM TO: McQUAY INTERNATIONAL, WARRANTY DEPARTMENT, PO BOX 2510, STAUNTON, VA 24402

Daikin McQuay Training and Development

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

Warranty

All Daikin McQuay equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin McQuay Representative for warranty details. Refer to Form 933-43285Y. To find your local Daikin McQuay Representative, go to www.daikinmcquay.com.

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