



Installation Instructions

SAFETY CONSIDERATIONS

Absorption liquid chillers provide safe and reliable service when operated within design specifications. When operating this equipment, use good judgment and safety precautions to avoid damage to equipment and property or injury to personnel.

Be sure you understand and follow the procedures and safety precautions contained in the chiller instructions as well as those listed in this guide.

⚠ DANGER

DO NOT USE OXYGEN or air to purge lines, leak test, or pressurize a chiller. Use nitrogen.

NEVER EXCEED specified test pressures. For the 16JB chiller, the maximum pressure is 8 psig (83 kPa).

WEAR goggles and suitable protective clothing when handling lithium bromide, octyl alcohol, inhibitor, lithium hydroxide, and hydrobromic acid. IMMEDIATELY wash any spills from the skin with soap and water. IMMEDIATELY FLUSH EYES with water and consult a physician.

⚠ WARNING

DO NOT USE eyebolts or eyebolt holes to rig chiller sections or the entire assembly.

DO NOT work on high-voltage equipment unless you are a qualified electrician.

DO NOT WORK ON electrical components, including control panels or switches, until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors or solid-state components.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are deenergized before resuming work.

NEVER DISCONNECT safety devices or bypass electric interlocks while operating the chiller. Also, never operate the chiller when any safety devices are not adjusted and functioning normally.

DO NOT syphon lithium bromide or any other chemical by mouth.

BE SURE all hydrogen has been exhausted before cutting into purge chambers. Hydrogen mixed with air can explode when ignited.

WHEN FLAMECUTTING OR WELDING on an absorption chiller, some noxious fumes may be produced. Ventilate the area thoroughly to avoid breathing concentrated fumes.

DO NOT perform any welding or flamecutting to a chiller while it is under a vacuum or pressurized condition.

NEVER APPLY an open flame or live steam to a refrigerant cylinder. Dangerous overpressure can result. When necessary to heat a cylinder, use only warm (110 F [43 C]) water.

DO NOT REUSE disposable (nonreturnable) cylinders or attempt to refill them. It is DANGEROUS AND ILLEGAL. When cylinder is emptied, evacuate remaining gas pressure, loosen the collar, and unscrew and discard the valve stem. DO NOT INCINERATE.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., while the chiller is under pressure or while chiller is running.

⚠ CAUTION

DO NOT climb over a chiller. Use platform, catwalk, or staging. Follow safe practices when using ladders.

DO NOT STEP ON chiller piping. It might break or bend and cause personal injury.

USE MECHANICAL EQUIPMENT (crane, hoist, etc.) to lift or move inspection covers or other heavy components. Even if components are light, use such equipment when there is a risk of slipping or losing your balance.

VALVE OFF AND TAG steam, water, or brine lines before opening them.

DO NOT LOOSEN waterbox cover bolts until the water box has been completely drained.

DO NOT VENT OR DRAIN waterboxes containing industrial brines, liquid, gases, or semisolids without permission from your process control group.

BE AWARE that certain automatic start arrangements can engage starters. Open the disconnects ahead of the starters in addition to shutting off the chiller or pump.

USE only repaired or replacement parts that meet the code requirements of the original equipment.

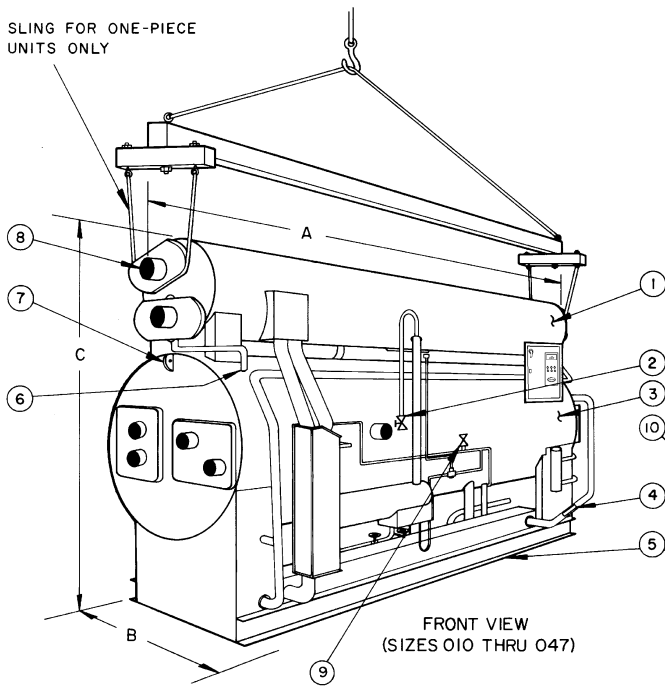
DO NOT ALLOW UNAUTHORIZED PERSONS to tamper with chiller safeties or to make major repairs.

PERIODICALLY INSPECT all valves, fittings, piping, and relief devices for corrosion, rust, leaks, or damage.

PROVIDE A DRAIN connection in the vent line near each pressure relief device to prevent a build-up of condensate or rain water.

IMMEDIATELY wipe or flush the floor if lithium bromide or octyl alcohol is spilled on it.

ONE-PIECE UNIT

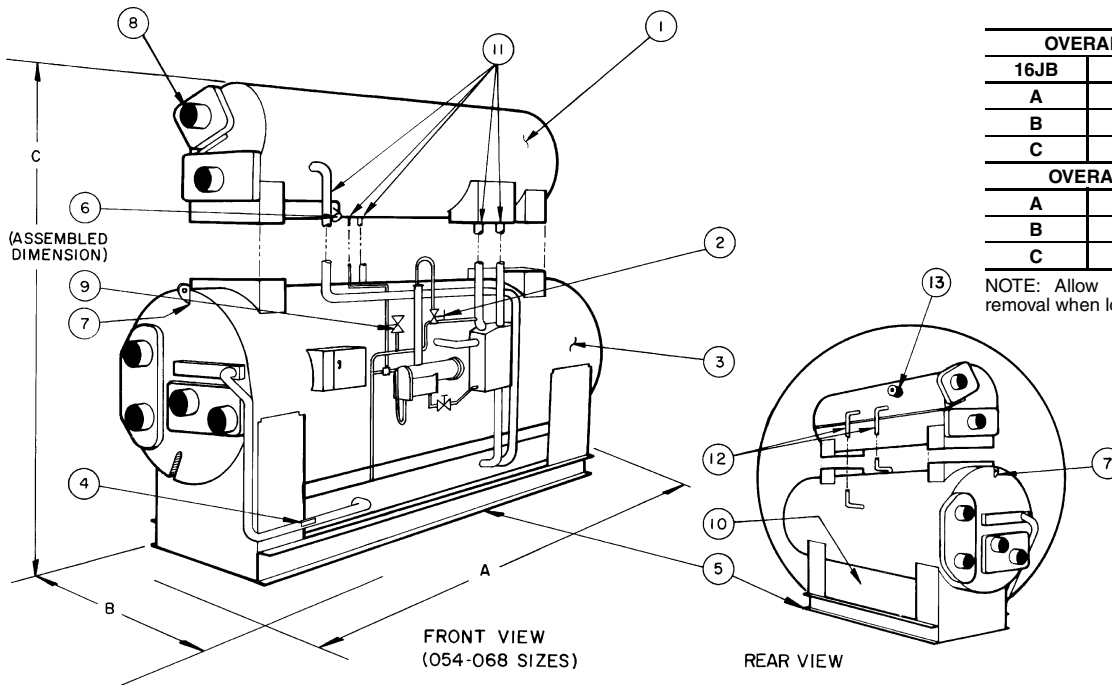


OVERALL DIMENSIONS (ft-in.)					
16JB	010,012,014	018,021	024,028	032,036	041,047
A	16-10 ⁷ / ₈	16-11 ³ / ₄	17-0 ¹ / ₈	16-11 ⁷ / ₈	17-2 ¹ / ₄
B	3- 8 ⁵ / ₈	4- 5 ¹ / ₈	5-1 ¹ / ₈	6- 3 ¹ / ₄	7-5
C	7- 3 ¹ / ₂	7- 9 ⁷ / ₈	8-9 ¹ / ₂	10- 1 ¹ / ₄	11-6 ¹ / ₈

OVERALL DIMENSIONS (mm)				
A	B	C		
5153	1133.5	2222.5		
5175.2	1349.4	2384.4		
5184.8	1558.9	2679.7		
5178.4	1911.4	3092.4		
5238.7	2260.6	3381.4		

NOTE: Allow 14'-4" (4368.8 mm) for tube removal when locating machine (either end).

TWO-PIECE UNIT



OVERALL DIMENSIONS (ft-in.)		
16JB	054,057	061,068
A	21-11 ¹ / ₄	21-8 ¹ / ₈
B	6- 4 ³ / ₄	7-4 ¹ / ₄
C	11-10	13-2 ¹ / ₄

OVERALL DIMENSIONS (mm)		
A	B	C
6686.5	1949.4	3606.8
6607.2	2241.5	4019.5

NOTE: Allow 19'-3" (5867.4 mm) for tube removal when locating machine (either end).

LEGEND

- | | | |
|----------------------------------|--|---|
| 1 — Generator-Condenser Assembly | 7 — Lift Lugs (both ends) | 11 — Weld Connections-front view (054-068 units only) |
| 2 — Purge Exhaust Valve | 8 — Condenser Water Box | 12 — Weld Connections-rear view (054-068 units only) |
| 3 — Absorber-Evaporator Assembly | 9 — Auxiliary Evacuation Valve | 13 — Rupture Disc Assembly (hot water machines only) |
| 4 — Thermostat Wells | 10 — Refrigerant Low-Temp Cutout Well (on refrigerant pump sump) | |
| 5 — Optional Shipping Skids | | |
| 6 — Condensate Drain | | |

Fig. 1 — Rigging and Dimensions Diagram

INTRODUCTION

General — The 16JB machine is factory assembled, wired and leak tested. Installation (not by Carrier) consists primarily of establishing water and electrical services to the machine. Rigging, installation, field wiring and field piping are the responsibility of the contractor and/or customer. Carrier has no installation responsibilities for the equipment. The scope of Carrier's duties at time of start-up are listed in Introduction portion of the 16JB Start-Up, Operation and Maintenance Instructions.

Job Data — Necessary information consists of: Machine location drawings, piping drawings, field wiring diagrams and rigging guide.

RECEIVING AND INSTALLATION

Step 1 — Check Equipment

IDENTIFY MACHINE — The machine model number and serial number are stamped on machine identification plate. Check this information against shipping papers and job data.

INSPECT SHIPMENT — *The machine is at a deep vacuum when shipped. Do not open any valves until the vacuum has been noted. Refer to Shipping Vacuum Check.*

Inspect for shipping damage while machine is still on shipping conveyance. If machine appears to be damaged or has been torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit.

Check all items against shipping list. Immediately notify the nearest Carrier Air Conditioning office if any item is missing.

To prevent loss or damage, leave all parts in original packages until installation.

CHECK SHIPPING VACUUM — To check for leaks that have occurred during shipment:

- Connect an absolute pressure gage to places listed in Table 1.
- Record the absolute pressure of each assembly. If vessel pressure is greater than 0.28 in. (7mm) of mercury, the machine has acquired a leak in shipping, and must be leak tested. Refer to the Machine Leak Test procedure for instructions.

Table 1 — Absolute Pressure Gage Test Connections

UNIT 16JB	GAGE CONNECTION
010-047	At auxiliary evacuation valve (item 9, Fig.1)
054-068	Generator-Condenser: At condenser-purge suction line (Fig. 2)
	Absorber-Evaporator: At auxiliary evacuation valve (item 9, Fig. 1)

STORAGE PROTECTION — If the machine is not going to be installed immediately, it is very important to use a drop cloth or plastic covering to protect the machine from construction dirt and moisture before installation. *Also, do not remove protective shipping cover on control panel until ready to use.*

Step 2 — Rigging and Installation

PREPARING 2-PIECE UNIT — Two-piece units must be prepared for installation before they can be rigged.

- Break vacuum with nitrogen by attaching a regulated source to the auxiliary evacuation valve on the absorber-evaporator shell.

- Break vacuum with a dry nitrogen on the generator-condenser shell by introducing a regulated source to the shipping valve.
- Protect machine insulation with a leather or wet canvas cover when welding or cutting.
- Remove all piping end plates as shown in Fig. 2.
- Remove the weld elbow and shipping valve on the condenser-purge suction line.

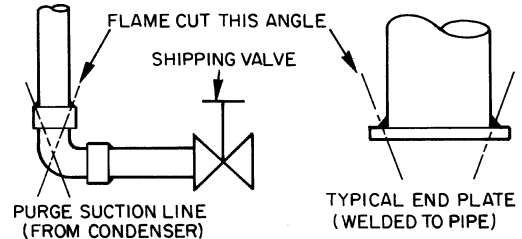


Fig. 2 — Weld Breaking Instructions

⚠ CAUTION

To avoid contaminates and debris getting into chiller, do not leave machine open any longer than necessary.

⚠ CAUTION

Be careful not to remove any stock from pipe ends. Do not get slag inside machine while flame cutting.

RIG MACHINE PROPERLY — Refer to rigging instructions in plastic envelope attached to machine. Rigging instructions vary for one-piece units and 2-piece units.

⚠ WARNING

Lifting machine from points other than those specified may result in serious damage and personal injury. Rigging equipment and procedure must be adequate for machine weight. Refer to Table 2 for machine weights.

Table 2 — Rigging Weights

UNIT 16JB	WEIGHT (lb)		WEIGHT (kg)	
	1-Piece Units			
010	9,000		4,082	
012	9,100		4,128	
014	9,100		4,128	
018	11,500		5,216	
021	12,300		5,579	
024	14,600		6,622	
028	14,800		6,713	
032	18,500		8,391	
036	18,900		8,573	
041	23,000		10,433	
047	23,500		10,659	
	2-Piece Units			
	Absorber	Generator	Absorber	Generator
041	18,000	5,500	8,165	2,495
047	18,500	5,500	8,392	2,495
054	21,500	7,000	9,752	3,175
057	22,000	7,000	9,979	3,175
061	26,500	7,000	12,020	3,175
068	28,000	7,400	12,701	3,357

Rigging One-Piece Units — One-piece units consist of all units from 010-036 and, when specified, units 041-047. Lift with cable slings under condenser water boxes. Refer to Fig. 1.

Rigging 2-Piece Units — Two-piece units consist of all units from 054-068 and, when specified, units 041-047. Refer to the following procedure for rigging.

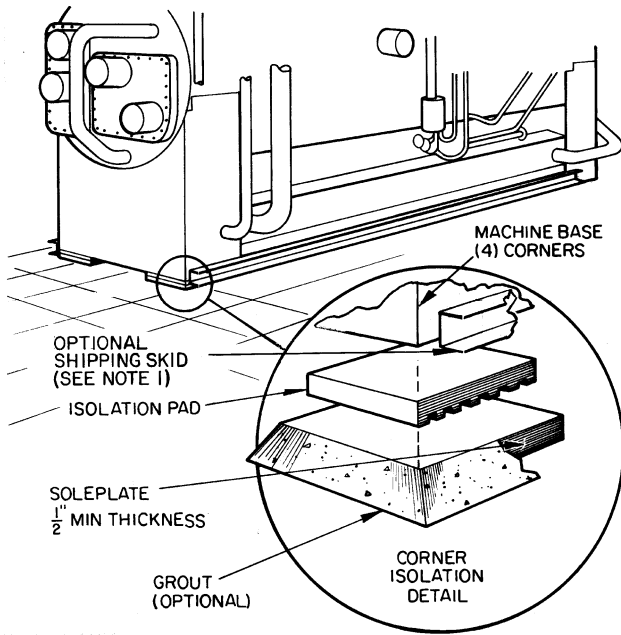
1. Absorber-evaporator assembly — Lift the absorber-evaporator assembly from lift lugs at each end of machine. Refer to Fig. 1.
2. Generator-condenser assembly
 - a. Lift with cable slings placed under condenser water boxes. Refer to Fig. 1.
 - b. Place generator-condenser assembly on top of absorber-evaporator assembly.
 - c. Align the match marks stamped on one leg of each generator-condenser and absorber-evaporator assemblies.
 - d. Make sure stamped serial numbers accompanying the match marks correspond on both assemblies.

POSITION AND LEVEL THE EQUIPMENT — Isolation pads are not necessary for most installations. However, for cases where isolation pads are required, refer to Fig. 3 and Table 3 for installation data.

It is not necessary to level the generator-condenser assembly as both assemblies are designed to be level when the absorber-evaporator assembly has been leveled.

The 16JB machine must be level within 1/4 in. per 20 ft, both lengthwise and diagonally. To level the machine, proceed as follows:

1. Fill 50-ft length of clear flexible tubing completely with water.
2. Use water gage and leveling reference points stamped on absorber-evaporator shell to level machine. Leveling marks on evaporator shell are covered by small removable one-in. squares of insulation.
3. Level machine with shims until requirements are met. If isolation assembly is used, shim under the soleplate.



NOTES:

1. If optional shipping rails are on unit, be sure only the machine base is on the isolation pad at each corner.
2. Shim under soleplate if necessary to level machine.

Fig. 3 — Typical Isolation Assembly

ASSEMBLE 2-PIECE UNIT — Assemble 2-piece unit (see procedure below). Then leak test and evacuate machine as described in Machine Leak Test and Machine Evacuation procedures.

1. Bolt leg assemblies.
2. Weld the piping connections and make sure weld connections are vacuum tight.

⚠ WARNING

If chiller is assembled before it is rigged, do not lift machine under condenser water boxes to avoid damage to machine. Machine should be lifted using lift lugs located at each end of the machine.

Table 3 — Isolation Pad and Soleplate Specifications

UNIT 16JB	NO. (EACH) OF PADS AND SOLEPLATES	DIMENSIONS (in.)		DIMENSIONS (mm)	
		Pad	Soleplate	Pad	Soleplate
010 012 014	4	9 x 6.4	10 x 7.5	228 x 162	254 x 191
018 021	4	9 x 10.4	10 x 11.5	228 x 263	254 x 292
024 028	4	9 x 12.4	10 x 13.5	228 x 315	254 x 343
032 036	4	9 x 14.4	10 x 15.5	228 x 365	254 x 394
041 047	4	9 x 18.4	10 x 19.5	228 x 465	254 x 495
054 057	4	12 x 18.4	13 x 19.5	305 x 465	331 x 495
061 068	4	14 x 18.4	15 x 19.5	356 x 465	381 x 495

NOTE: Higher isolation efficiencies may be obtained with double-layer pads. Double-layer pads, factory-fused together, are available from various manufacturers. If 2 single-layer pads are used, a metal divider equal to pad dimensions should be inserted between layers.

MACHINE LEAK TEST — All field-weld joints on the chiller must be leak tested prior to starting the machine. Leak test as follows:

1. Close all pump service valves, auxiliary evacuation valve (Fig. 4) and purge exhaust valve (Fig. 5).
2. Refer to Table 4 for amount of refrigerant and nitrogen required for leak testing.
3. If machine is under vacuum, bring to atmospheric pressure with dry nitrogen.
4. Pressurize to 8 psig with Refrigerant 22. Charge through auxiliary evacuation valve (item 9, Fig. 1).
5. Increase the machine pressure to 20 psig with dry nitrogen.

⚠ WARNING

Exceeding 20 psi will cause severe damage to chiller.

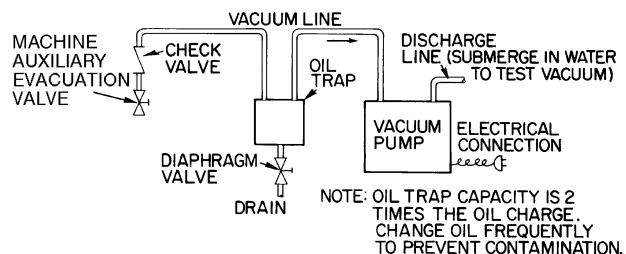


Fig. 4 — Auxiliary Evacuation Device

- Leak test all field weld joints with electronic leak detectors or equivalent. *If machine has acquired a leak in shipment or rigging, all joints must be leak tested.*
- After leak testing has been completed and leaks have been corrected, release the machine pressure.

Table 4 — Quantity of Refrigerant and Nitrogen Required for Leak Testing

UNIT 16JB	REFRIGERANT 22 (No. of Cylinders)		NITROGEN (No. of Cylinders)
	25 lb	12 lb	300 cu ft vol
	11.3 kg	5.4 kg	8.5 cu meters
010 012 014	1	0	1.0
018 021	1	1	1.0
024 028	2	1	2.5
032 036	2	1	2.5
041 047	4	0	3.5
054 057	4	0	3.5
061 068	5	0	4.5

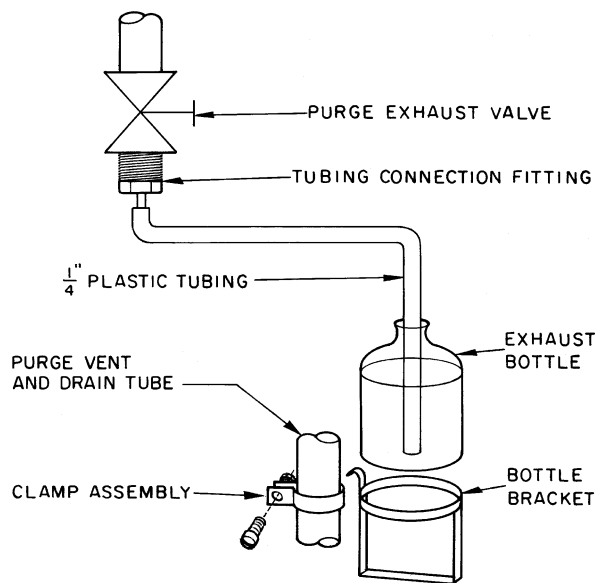


Fig. 5 — Purge Exhaust Assembly

MACHINE EVACUATION — Removal of non-condensables from the machine is required after machine has been opened. To evacuate the machine, proceed as follows:

- Connect auxiliary evacuation device (Fig. 4) to auxiliary evacuation valve. Be sure that the line is as short as possible and that line size is not smaller than connection to auxiliary device. A check valve must be used on the suction lines to keep vacuum pump oil out of the chiller. Be sure that all connections are vacuum tight.
- Close refrigerant pump service valve(s), solution service valve, auxiliary evacuation valve, and purge exhaust valve.
- Start auxiliary evacuation device. Open auxiliary evacuation valve. Reduce machine pressure to one in. of mercury absolute or lower. Check pressure with absolute pressure gage at refrigerant pump service valve.

- Close auxiliary evacuation valve and shut off auxiliary evacuation device.
- Note and record absolute pressure gage reading.
- Coat all machine field-weld joints with weld sealant.

Step 3 — Connect Piping — Install piping using job data, piping drawings and procedure outlined below. A typical piping installation is shown in Fig. 6.

CAUTION

Factory-supplied insulation is not flammable but can be damaged by welding sparks and open flame. Protect insulation with a wet canvas cover.

- Make sure connections to water box covers allow removal of covers for maintenance. Install a flange or Victaulic grooved coupling in the piping between the absorber outlet and condenser outlet.
- Install pipe hangers where needed. Make sure no weight or stress is placed on water box nozzles or flanges.
- Install water box vent and drain piping in accordance with individual job data. Vent and drain piping shown in Fig. 6 is typical only and may not conform to your arrangement. Air vents should be at all high points in piping to eliminate water hammer.
- Install water box drain plugs (shipped with unit).
- Water flow direction must be as specified in job flow diagrams or water flow markings on water boxes.
- Install 5 thermometer wells and thermometers (not supplied by Carrier). Thermometer wells should extend into the pipe a minimum of $\frac{1}{3}$ pipe diameter.

Area	Suggested Range
Entering chilled water	0° to 100 F
Leaving chilled water	0° to 100 F
Entering absorber water	30 to 120 F
Entering condenser water	30 to 120 F
Leaving condenser water	30 to 180 F

Step 4 — Install Steam or Hot Water Piping

STEAM MACHINE

- Locate the steam control valve, a minimum of 3 ft from the generator nozzle and install a pressure gage between steam control valve and machine.
- Install the steam trap, as close to the machine as possible and at least 3 ft below the generator outlet. Piping from the trap must be located as low as possible to prevent condensate from backing up into the generator at part load. When the condensate system is closed, an air vent of some type must be part of the system. If a condensate receiver is used, the vent should be part of the tank.

HOT WATER MACHINE

- Install thermometer wells and connection for pressure gages. For thorough mixing and temperature stabilization, wells in leaving water pipe should be placed 6 to 10 pipe diameters from water box and should extend inside the pipe at least 2 in. (50 mm).
- Vent rupture discs to the outside of the building for safety. The 16JB hot water chillers are factory equipped with a rupture disc assembly on the generator-condenser assembly (see Fig. 1).
 - Add a flexible connection and adequate support to pipe, as required, to eliminate any piping stress on rupture disc. Provide fittings so vent piping can be disconnected periodically for inspection of disc. Provide pipe plug on outlet side of relief device for leak testing.

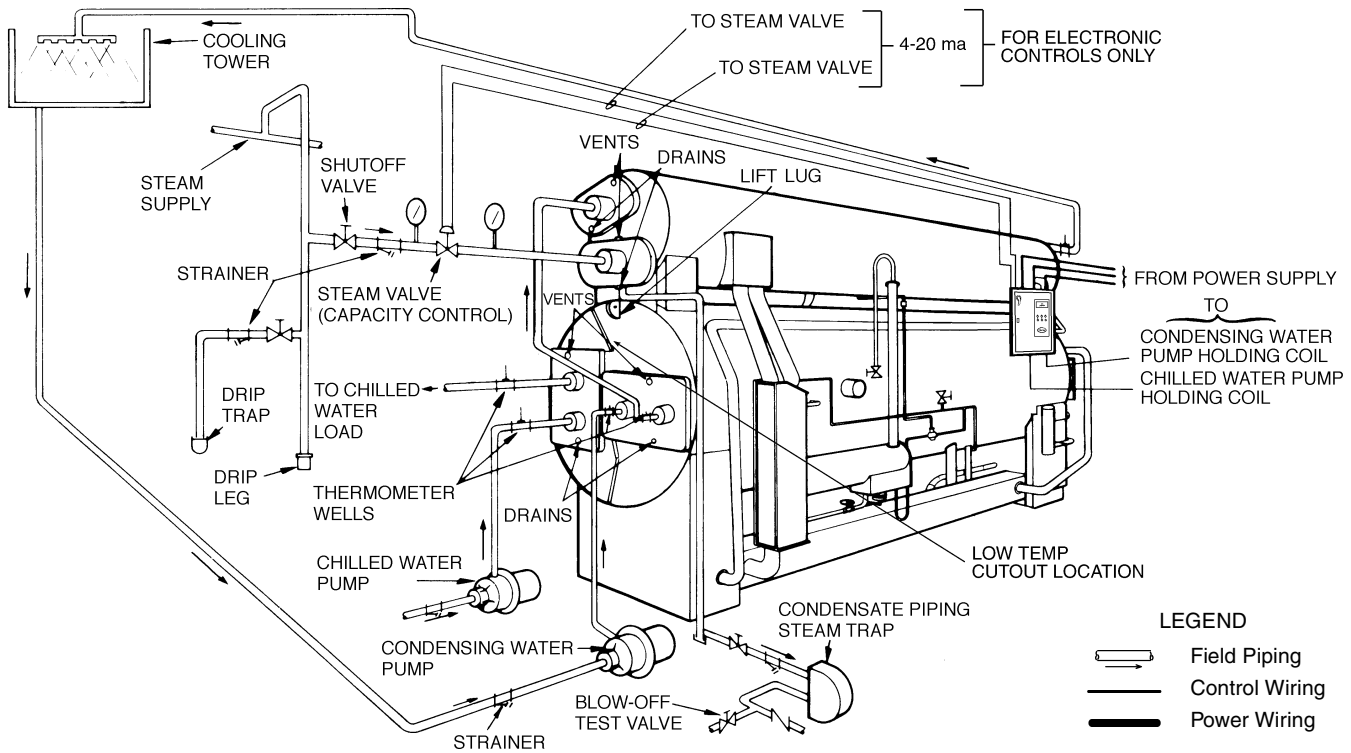


Fig. 6 — Typical Piping and Wiring

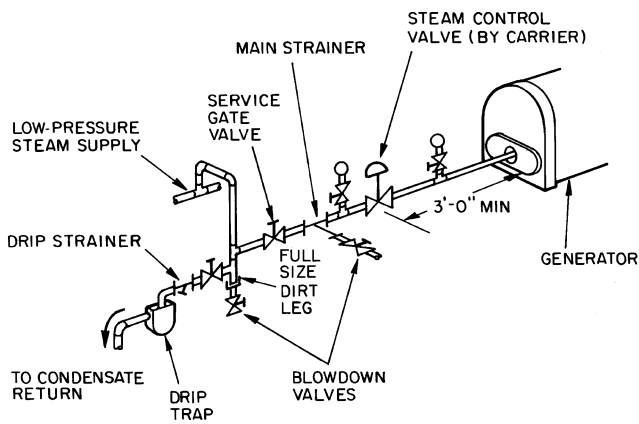


Fig. 7 — Low-Pressure (2 to 15 psig) Steam Supply Piping

- b. Cover outdoor vent with a rain cap to prevent excessive moisture from entering the vent line.
- c. Place a condensate drain at the low point in the piping to prevent any water build-up on the atmospheric side of the disc assembly.

Step 5 — Apply Field Insulation (If Required) —

Apply insulation as indicated in job data. If shipping vacuum test indicates significant loss of machine vacuum, do not apply insulation. Protect insulation from weld heat damage and weld splatter during installation.

Recommended Areas for Insulation:

1. Steam or hot water condensate lines

2. Entering and leaving chilled water lines
3. Chilled water boxes (install drain plugs before insulating)
4. Generator shell (if heat is objectionable)
5. Refrigerant pump and piping

Step 6 — Make Electrical or Pneumatic Connections — Field wiring must be installed in accordance with job wiring diagrams and all applicable electrical codes.

CHECK AVAILABLE POWER SUPPLY AND SAFETY INTERLOCKS — Check available power supply and safety interlocks to be sure they match the machine equipment. Job voltage, amperage and values are circled in red on the panel wiring diagram.

CHECK HEATERS AND FUSES — Check heaters and fuses against a sizing table located on the wiring diagram inside the control panel door. Check the motor nameplate for full load ampere rating. Do not install heater or fuses until safety controls have been checked out at initial start-up.

CHECK MACHINES WITH PNEUMATIC CAPACITY CONTROLS — Make sure they have a continuous supply of clean, dry, 18 psig air with volume of at least 0.3 cfm.

INSTALL CAPACITY CONTROL VALVE(S) — The valve can be either electronic or pneumatic.

Electronic Control Valve — Install wiring to control valve(s) as shown on wiring diagram located inside control panel door.

Pneumatic Control Valve — Install 1/4-in. plastic tubing from control panel to control valve(s) as shown on diagrams located inside control panel door.

Chillers with PIC Controls

CAPACITY CONTROL VALVE(S) — Refer to the job control diagram instructions for specific connections and Fig. 8. The chilled water temperature sensor and its wiring to the control panel are installed in the factory. Install wiring for the valve positioning control between the valve operator and the wiring terminals in the control panel. Wire the 4 to 20 mA signal for the valve operator to terminal strip 1 (TB-1), terminals 415 (+) and 416 (-). The 4 to 20 mA signal is internally powered.

Electronically Controlled Actuator — Also install wiring for valve operator power between the valve operator and wiring terminals in the control panel.

Pneumatically Controlled Actuator — Also install 1/4-in. (6 mm) plastic tubing between the valve operator and the pneumatic supply air.

EXTERNAL WIRING — Install external wiring to chiller control panel according to job wiring diagrams and data. Check available power supply and safety interlocks to be sure they match the chiller equipment requirements, including:

- three-phase power supply for controls and chiller hermetic pumps
- start and run interlocks for chilled water and cooling water pumps and for cooling tower fan(s)
- remote chiller start/stop contacts, if used
- remote operating status and fault indication, if used
- any CCN wiring as indicated on the job wiring diagrams.

SENSOR ELEMENTS — For all sensor elements not already installed on the chiller, uncoil the capillary tubing for the thermostats and place the sensing element in the

adjacent temperature wells. Add heat conductive oil or compound to the wells after checking and calibrating the following controls at start-up:

- high-stage generator/high-temperature limit switch
- low chilled water temperature limit switch
- water pressure differential switch (normally installed in the field). Since there is no bulb, the pressure is tapped to the water piping.

INSTALL LOW-TEMPERATURE CUTOUT — A low-temperature control is mounted on the end of the unit.

1. Uncoil capillary tubing and place the sensing element in the adjacent temperature wells. Use tape or grommet to protect capillary where it goes through any supports.
2. Secure sensing element in well. Apply heat-conductive compound to sensing element after control has been calibrated at initial start-up.

Step 7 — Initial Solution and Refrigerant Charging — Lithium bromide solution and refrigerant (water) will be placed in the machine at initial start-up. *Do not charge solution into the machine until the unit is ready for operation.*

⚠ WARNING

Do not start any pump motors until the machine has been charged with solution and refrigerant. The hermetic pumps can be seriously damaged by dry operations.

Refer to 16JB 010-068 Start, Operation, and Maintenance Instructions for charging procedures.

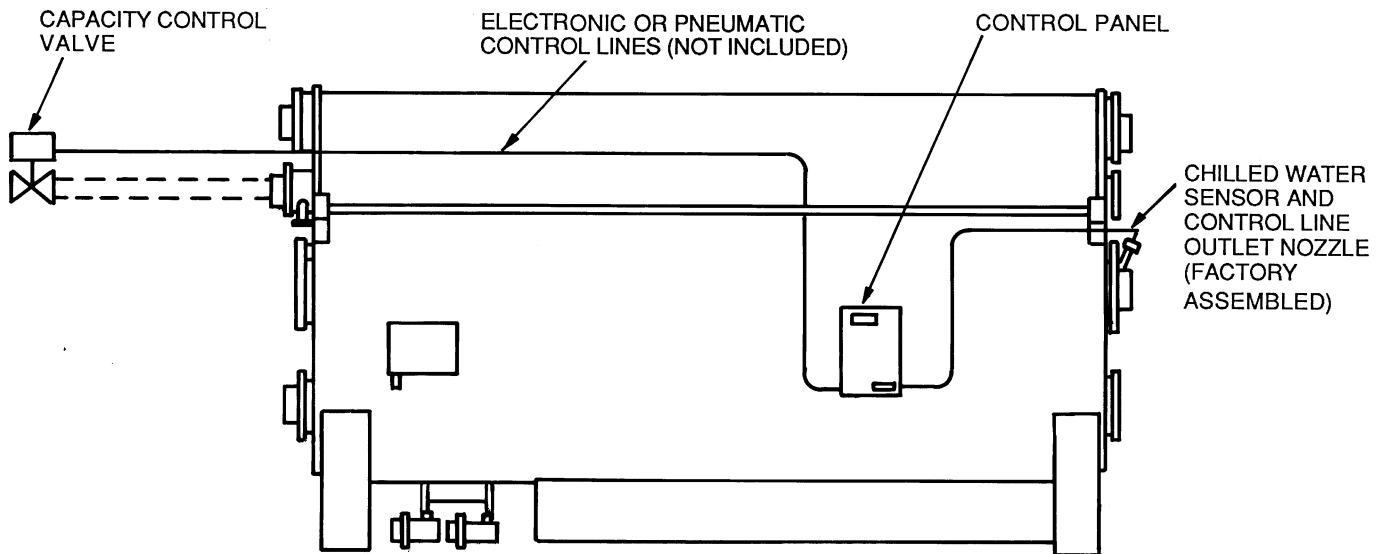


Fig. 8 — Capacity Controls

