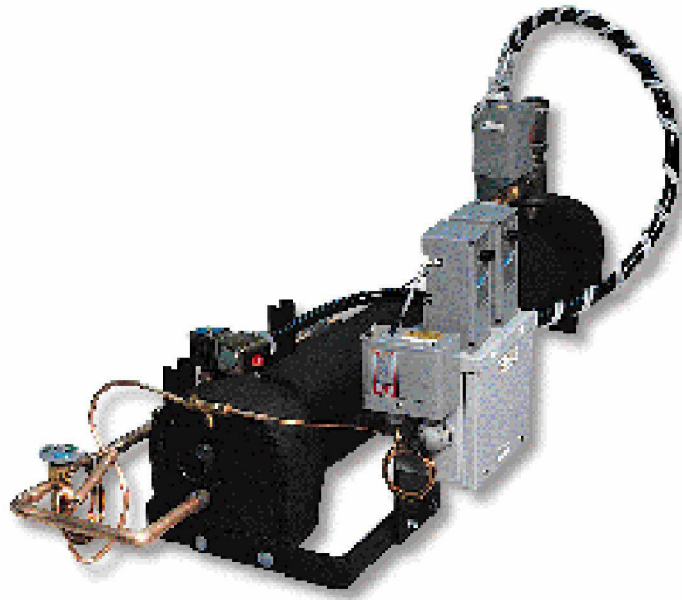


CB ChillerBuilder Kit

Installation and Service Manuals



| Chiller Builder Kit | Nom Tons | Circuits | Evaporator | TX Kit |
|---------------------|----------|----------|------------|-------------|
| CBKIT2-1 | 2 | 1 | TX2-1 | TXKIT1 |
| CBKIT3-1 | 3 | 1 | TX3-1 | TXKIT2 |
| CBKIT5-1 | 5 | 1 | TX5-1 | TXKIT2 |
| CBKIT6-1 | 6 | 1 | TX6-1 | TXKIT3 |
| CBKIT7.5-1 | 7-1/2 | 1 | TX7-1/2-1 | TXKIT3 |
| CBKIT10-1 | 10 | 1 | TX10-1 | TXKIT3 |
| CBKIT12-1 | 12 | 1 | TX12-1 | TXKIT3 |
| CBKIT15-1 | 15 | 1 | TX15-1 | TXKIT4 |
| CBKIT20-1 | 20 | 1 | TX20-1 | TXKIT4 |
| CBKIT25-1 | 25 | 1 | TX25-1 | TXKIT4 |
| CBKIT10-2 | 10 | 2 | TX10-2 | DTXKIT10-12 |
| CBKIT12-2 | 12 | 2 | TX12-2 | DTXKIT10-12 |
| CBKIT15-2 | 15 | 2 | TX15-2 | DTXKIT15-20 |
| CBKIT20-2 | 20 | 2 | TX20-2 | DTXKIT15-20 |
| CBKIT25-2 | 25 | 2 | TX25-2 | DTXKIT15-20 |
| CBKIT30-2 | 30 | 2 | TXB30-2 | DTXKIT30 |
| CBKIT40-2 | 40 | 2 | TXB40-2 | DTXKIT40 |
| CBKIT60-2 | 60 | 2 | TXB60-2 | DTXKIT60 |
| CBKIT15-3 | 15 | 3 | TX15-3 | TXKIT15-3 |
| CBKIT20-4 | 20 | 4 | TX20-4 | TXKIT20-4 |



Standard
Refrigeration Company

DTXKIT15-25

DUAL CIRCUIT CHILLER BUILDER

INSTALLATION & OPERATING MANUAL

Unpacking and Inspection

The components of your Chiller Builder kit left the factory in perfect condition. Carefully inspect the chiller crate and the carton that contains the assembly components for damage. Carefully remove all crating and packing materials. These may be needed for re-shipment if you find hidden damage.

Shipping Damage

1. For freight, express or truck delivery, notify your local transportation company agent if there is any damage. According to the contract terms and conditions of the carrier, the responsibility of the shipper ends at the time and place of shipment. The carrier then assumes full responsibility for the shipment.
2. If there is damage, hold the goods with the container and packing for inspection by the examining agent. **Do not return any goods prior to the inspection and authorization of the transportation agent.**

3. File a claim against the transportation company. Substantiate the claim by referring to the agent's report. Document your claim with a certified copy of your wholesaler's invoice.
4. Advise your wholesaler of your wish for replacement.

Shortage

Check the packing list. If an item is missing, re-inspect the container and packing material to see if smaller items were missed during unpacking. Notify your wholesaler immediately of any shortage. (See bill of materials).

Incorrect Shipment

If the shipment is not what you ordered, contact your wholesaler immediately. Include the order number and item number. Hold the incorrect items until shipping instructions are received.

Assembling the Chiller Builder

Please note: The two-stage temperature control is mounted in the cover of the control box. The temperature control probe is wired to the control and will be mounted in a well as part of the kit's assembly.

The freezestat is located on control board #1. The temperature probe for this control connects to the board. The freezestat sensor will be strapped to the leaving water line with plastic wire ties as part of the kit's assembly. Refer to control box drawing on pages 10 & 11.

1. Carefully unpack and inspect all components and verify the components with the component list.
2. Begin assembly by orienting the liquid line bracket and the control box bracket as shown in the assembly drawing on page 8 (items 14 & 15). As you face the evaporator's refrigerant connection end, the liquid line bracket (item 14, the longer one) is on the left and the control box bracket (item 15, the shorter one) is on the right. The liquid line bracket should go on the outside of the TX evaporator mounting foot and the control box mounting bracket on the inside. Secure the brackets to the evaporator foot with the two 1/2-13 x 1-1/2" bolts and nuts provided.
3. Mount the two unistrut brackets (item 19) to the liquid line frame, with the flanges facing out, using 1/4"-20 x 1/2" bolts. See the assembly drawing.
4. Attach the control box mounting plate (item 17) to the control box (item 16) with four 1/4"-20 X 1/2" machine screws. Use two 1/4" flat washers on each screw between the control box and the mounting plate to space the box away from the plate. Mount this assembly to the control box mounting bracket with two 1/4-20 x 1/2" bolts.
5. Check the assembly drawings on pages 8 & 9 to determine the proper tubing lengths and fittings for the liquid lines. Clean and flux all fitting joints.
6. Assemble the liquid lines as per the assembly drawing, making sure the final assembly is square and level. Wrap the expansion valve with a wet rag before soldering any of the fittings. Use 50% silver solder for all copper-to-steel joints, being sure to use proper fluxing methods. Solder the remaining joints with a quality 15% silver brazing alloy.
7. Temporarily install the 1/4" x close nipples into the 1/4" FPT fittings on the evaporator's suction lines. Install the 1/4" couplings onto the nipples and the 1/4" flare x 1/4" flare x 1/4" MPT tees into the couplings. (The nipple and coupling space the tee away from suction line to make room for insulation). **DO NOT DOPE ANY THREADS AT THIS TIME, AS THE SUCTION LINES WILL NEED TO BE SOLDERED FIRST.** Fit and shape the 1/4" tubing equalizing lines between the expansion valves and the tees. Connect the equalizer line of each expansion valve to the 1/4" tee in the suction line above the liquid connection the expansion valve is piped to. Don't fully tighten the flare connections to the tees. Solder the equalizing lines to the expansion valves' equalizing connections, taking care to keep the valves cool with wet rags. Disconnect the equalizing lines from the 1/4"

- tees and remove the tee assemblies from the suction lines.
8. Check the water fitting assembly drawing on page 9 to determine the proper fittings for the evaporator you are using. You may have extra fittings as each Chiller Builder model covers more than one evaporator model.
 9. Determine whether the leaving water temperature or the return water temperature will control the chiller. The flow switch/temperature probe assembly will be mounted in the evaporator's leaving water fitting if the chiller is to be controlled by the leaving water temperature or in the return fitting if it is to be controlled by the return water temperature.
 10. Assemble and install the flow switch/temperature probe assembly in the selected water connection. Install the temperature probe in the assembly's 1/2" FPT fitting. The temperature control is the control mounted in the control box cover. Refer to the separate temperature control instruction sheet for control operation details.
 11. Determine and cut the proper flow switch paddle length. Refer to the separate flow switch instruction sheet. Attach the paddle to the flow switch.
 12. Install the flow switch in the assembly's 1" fitting. Be sure the switch's flow direction arrow is pointed in the proper direction.
 13. Cut and install two lengths of SO wiring cable between the solenoid valves and the "LLS" terminals on the control boards' terminal strip. Use the blue wire nuts to connect the SO cord to the solenoid coils. Be sure board #1 is wired to solenoid 1 (bottom solenoid) and board #2 is wired to solenoid 2 (top solenoid).
 14. Cut and install SO wiring cable between the flow switch and the "FS" terminals on control board #1 terminal strip. Wire the flow switch to the common and "closes on flow increase" terminals (red and yellow terminals 1 & 3).

Installing the Chiller Builder

1. Pipe the supply and return water lines to the evaporator.
2. Secure the freezestat temperature probe (from board #1) to the water outlet line using the two long plastic wire ties. The freezestat probe comes off of control board #1.
3. Pipe the liquid line from condensing unit #1 to the ChillR-BuildR's lower liquid line assembly (it's solenoid should be wired to board #1).
4. Pipe the suction line from condensing unit #1 to the TX evaporator's left suction connection. Silver solder the evaporator joint.
5. Pipe the liquid line from condensing unit #2 to the ChillR-BuildR's upper liquid line assembly (its solenoid should be wired to control board #2).
6. Pipe the suction line from condensing unit #2 to the TX evaporator's right suction connection. Silver solder the evaporator joint.
7. Dope and re-install the 1/4" tee assemblies in the 1/4" FPT fittings on the evaporator suction line connections. Re-connect the

Installation (cont.)

- expansion valve equalizing lines to the tee.
8. Strap the expansion valve bulbs to their respective suction lines. The bulbs should be in the 4 o'clock or the 8 o'clock position on the suction line. Refer to the separate expansion valve instruction sheet.
 9. Connect the cap tube from the low pressure switch #1 (on the left side of the control box) to the ¼" tee on the left side of the evaporator head (circuit one).
 10. Connect the cap tube from the low pressure switch #2 (on the right side of the control box) to the ¼" tee on the right side of the evaporator head (circuit two).
 11. If auxiliary compressor proof contacts are going to be used, wire the contact from the compressor #1 motor contactor to PROOF terminals on board #1 (left board) and the contact from the compressor #2 motor contactor to PROOF terminals on board #2 (right board), taking care to remove the terminal jumpers first. Either a normally open or a normally closed contact can be used. (See board jumper settings to configure board for a N.O. or N.C. auxiliary contact).
 12. If the control circuit is non pump-down, use COMP from terminals on the boards to control their respective condensing unit.
 13. Connect a 120 volts power circuit **to the N-in and L1-in terminals on board #1 only, paying attention to polarity.**
 14. Refer to the **Check Out Procedure** located elsewhere in this manual and check the unit's operation.
 15. Evacuate and charge the systems. Test all piping for water or refrigerant leaks. Set the temperature control's setpoint and differential for both stages, freezestat setpoint and differential, and the freeze protection low pressure switches to complete the installation.
 16. Insulate the water lines, suction lines and the lines between the expansion valves and the TX evaporator.
-

Chiller Builder Operation

The control circuit is designed for use with or without a pump-down cycle. If the condensing unit is equipped with a receiver large enough for use with a pump-down cycle, do not wire the board's COMP terminals to the condensing units. The compressors' low pressure controls will control and cycle the compressors. A time delay feature overrides the low pressure freeze protection controls during start up to allow the system time to build sufficient suction pressure to keep the low pressure control on line.

If the condensing unit has no receiver or a pump-down cycle is not being used, wire the COMP terminals to control the condensing unit (see page 12 for field wiring details).

Operating Overview

The temperature control controls the chiller's liquid line solenoid valves and the condensing units' contactors (in non pump-down condensing units) in response to chilled water temperature. The temperature control can control from either the leaving or the return chilled water temperature, depending on application or preference. The liquid line solenoids will close and the condensing units will stop (pump down and stop on pump-down applications) when the temperature control is satisfied or the OFF-ON switch is OFF. A fault condition will stop the unit.

The flow switch monitors chilled water flow and will not permit the compressor to operate if the flow is interrupted for more than 3 seconds. The flow switch is wired to board #1 but also controls board #2 through the communications cable. A low pressure switch on each refrigeration circuit and the freezestat sensor (wired to the first board only) provide freeze protection. The control circuit comes factory set so that a freeze-up fault, due to either low suction pressure or low leaving chilled water tempera-

ture, or a flow fault, will require manual reset to restart the unit after the fault is corrected.

(This can be changed to automatic reset by jumping the AUTO pins on the boards – see CONTROL BOARD JUMPER SETTINGS below.) The control circuit is reset by pressing the red reset button for approximately 1 second. In non-pump-down applications, set the time delays to 0, as they are generally not used in these situations. In pump-down systems, set the delay to 1 minute or as required to allow the system to build operating pressure at startup.

Operation

If the control switch is on, the temperature control calls for cooling, the Freeze Protection Low Pressure Switches and Freezestat (FZ) sense satisfactory conditions, the solenoids will open and the condensing unit will start. On systems using a pump-down cycle, the compressor will start once the suction pressure rises to the cut-in point of the compressor's low pressure control. The unit will continue to operate for 30 seconds (plus any time delay on the Freeze Low Pressure Bypass time delay) while it waits for the compressor run proof confirmation. If the run proof confirmation is not received in this time, the liquid solenoid will close and the unit will stop. The unit will re-start if the run proof comes on at any time as long as the control switch is on, there are no other faults and the temperature control calls for cooling.

The unit will stop and the solenoids will close if a flow fault occurs. There is a 3 second delay on the flow switch fault to prevent nuisance trips.

The unit will stop and the unit's solenoid will close if the Freeze Protection Low Pressure Switch senses a below freezing suction pressure.

Operation (cont.)

The indicator lights on the control boards will indicate any control fault. If the boards are set for automatic reset, the lights will be on to indicate any existing fault condition and will blink if a fault condition has existed but does not exist now. Pressing the red reset button for approximately 1 second resets the lights.

Control Functions

TEMPERATURE CONTROL

The temperature control directly controls the liquid line solenoids and the condensing units (non pump-down operation) in response to the chilled water temperature. If the temperature control is calling and the control switch is on, the liquid line solenoid will be open and the condensing unit will operate.

| <u>Temperature control stage</u> | <u>Controls</u> |
|----------------------------------|--|
| 1 | Condensing unit #1 and liquid line solenoid #1 |
| 2 | Condensing unit #2 and liquid line solenoid #2 |

If the temperature control stage 2 is satisfied, compressor #2 liquid line solenoid valve will close and condensing unit #2 will be off. If the temperature control stage 1 is satisfied, compressor #1 liquid line solenoid valve will close and condensing unit #1 will be off.

CONTROL SWITCHES

The Chiller Builder control off-on switches are located on the top of the control box. The control switches act the same as a satisfied temperature control. If a switch is on, the liquid line solenoid will be open and the condensing unit will operate whenever the temperature control calls for cooling. If a switch is off, the liquid line solenoid valve will be closed and the condensing unit will be off.

FREEZE PROTECTION LOW PRESSURE SWITCH

The freeze protection low pressure switch senses suction pressure and will stop the unit and close the liquid solenoid valve if the suction pressure falls below the chilled liquid freeze point. Set the freeze protection low pressure switch at a pressure corresponding to the freeze point of the liquid being chilled (58 PSI in the case of water and R22). The switch can be overridden for up to 5 minutes during startup to allow the system to achieve operating pressure.

COMPRESSOR RUN PROOF

The compressor run proof is an auxiliary contact from the compressor contactor or a current relay sensing compressor current to verify that the compressor is operating when required. At startup, the compressor has 30 seconds plus the delay time on the Freeze Low Pressure Bypass Timer to start before the control circuit looks at the run proof contacts. Either normally open or normally closed run proof contacts can be used by setting the CF jumper on the control board (jumpered means the contacts are normally closed).

FLOW SWITCH

The flow switch closes the liquid line solenoids and stops the condensing units if there is no water flow. There is a 3 second delay once the flow switch opens before a fault condition is triggered to prevent nuisance trips.

Off Cycle

During an off cycle (whenever the temperature control is satisfied or the unit control switches are off), the liquid line solenoid valves are closed and the condensing units will be off.

Checking Out the Chiller Builder

After the unit has been installed, you can use the following procedure to check out the control circuit. You should perform the check-out before charging the system so that the operation of the low pressure controls can be verified.

First, remove power from the compressor contactors so you won't start the compressors during the check-out procedure. Turn the control switches "OFF". Set the FREEZE LOW PRESSURE BY-PASS time delay (on the control board) to 30 seconds. Turn off the circulating pump. Re-power the control circuit.

1. Verify that the cap tube from FREEZE PROTECTION LOW PRESSURE SWITCH #1 is connected to circuit #1, the LLS terminals on control board #1 are wired to the liquid solenoid in circuit #1 and (on none pump-down systems) the COMP terminals control condensing unit #1. Verify the same for circuit #2.
2. Set the temperature control setpoint down to 0° so that all four stages call for cooling.
3. Turn control switch #1 "ON". The liquid line solenoid should come "ON". If the control board's COMP terminals are controlling the compressor (on systems not using a pump-down cycle), the compressor contactor should also come on. If they don't, check the wiring.
4. The unit will experience a flow failure after approximately 5 seconds. The fault will be

identified by an indicating light on the control board. If no fault occurs, check the flow switch installation and wiring.

5. Press the RESET button to reset the control board and turn the control switch off.
6. Turn the circulating pump on.
7. Turn the control switch "ON". Again, the liquid line solenoid should come "ON" and, if the control board's COMP terminals are controlling the compressor (on systems not using a pump-down cycle), the compressor contactor should also come on.

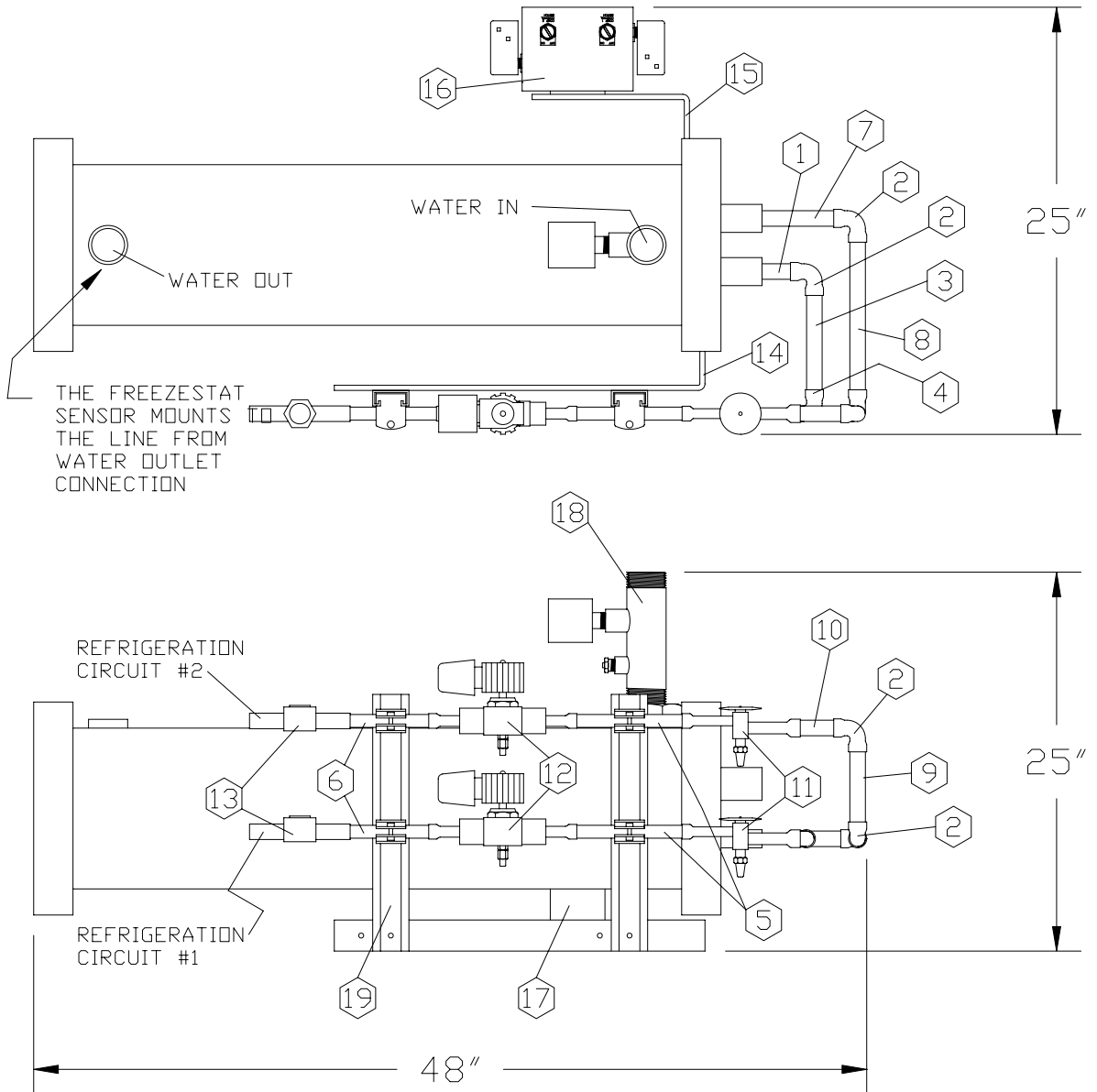
The unit should experience a LOW PRESSURE FAULT after approximately 30 seconds and the solenoid and compressor contactor should go off. If they don't, check the flow switch installation and wiring.

Press the RESET button to reset the control board and turn the control switch off.

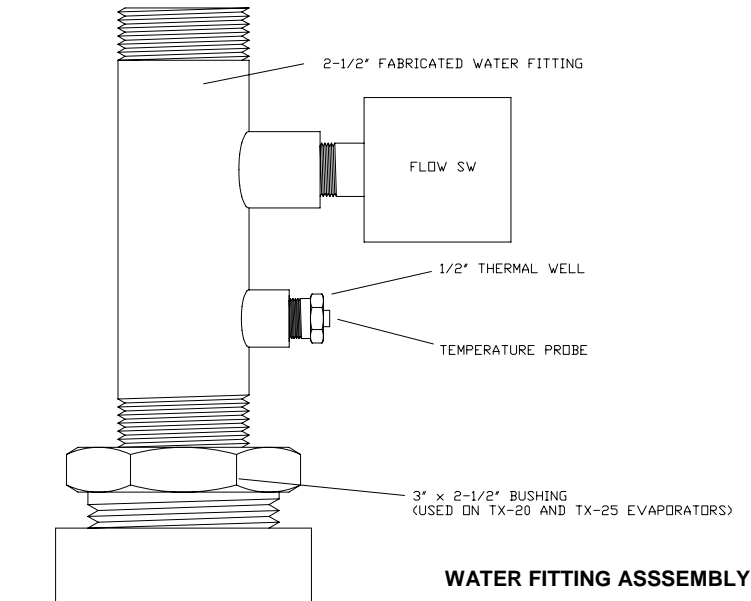
8. Repeat steps 3 through 7 for circuit #2.
9. Reset the temperature control and the control board bypass timers to their original setpoints.

The control circuit is operating correctly if it behaves as described above. Remove the control power and remove the jumpers from the flow switch and low pressure controls. Set the temperature and pressure controls. The unit is ready to be charged.

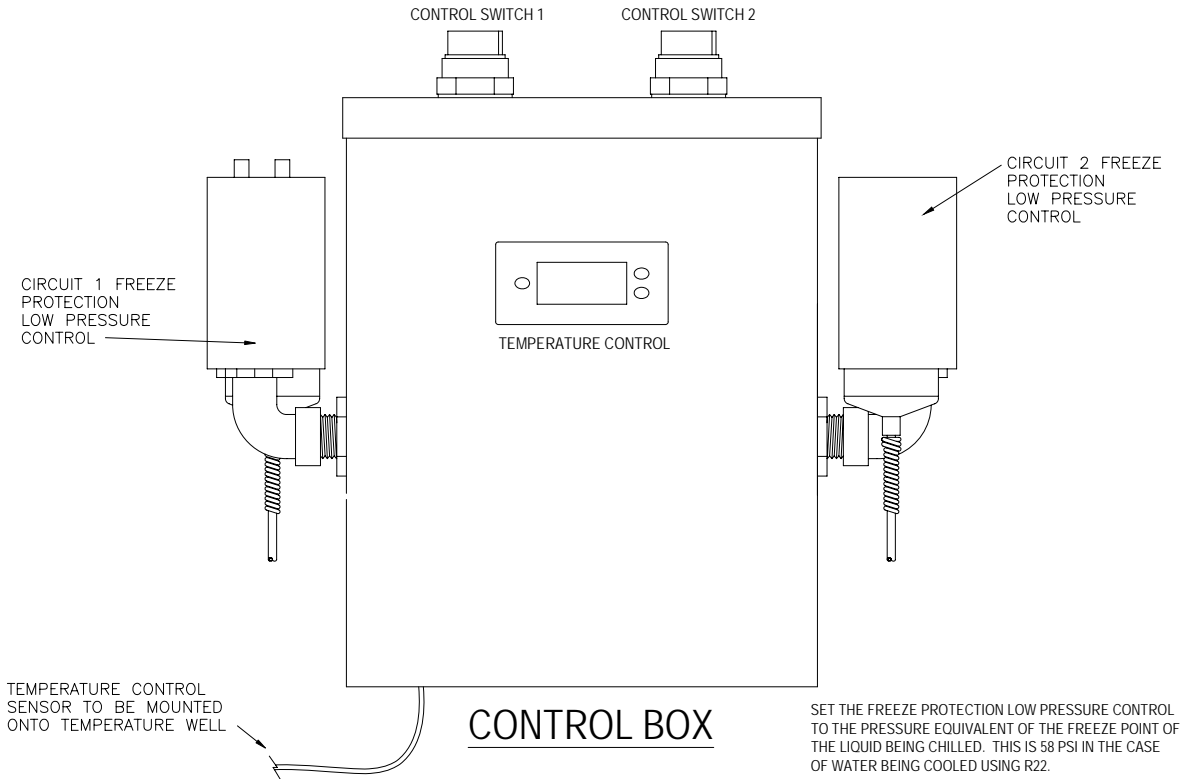
DTXKIT15-25 Assembly Drawing



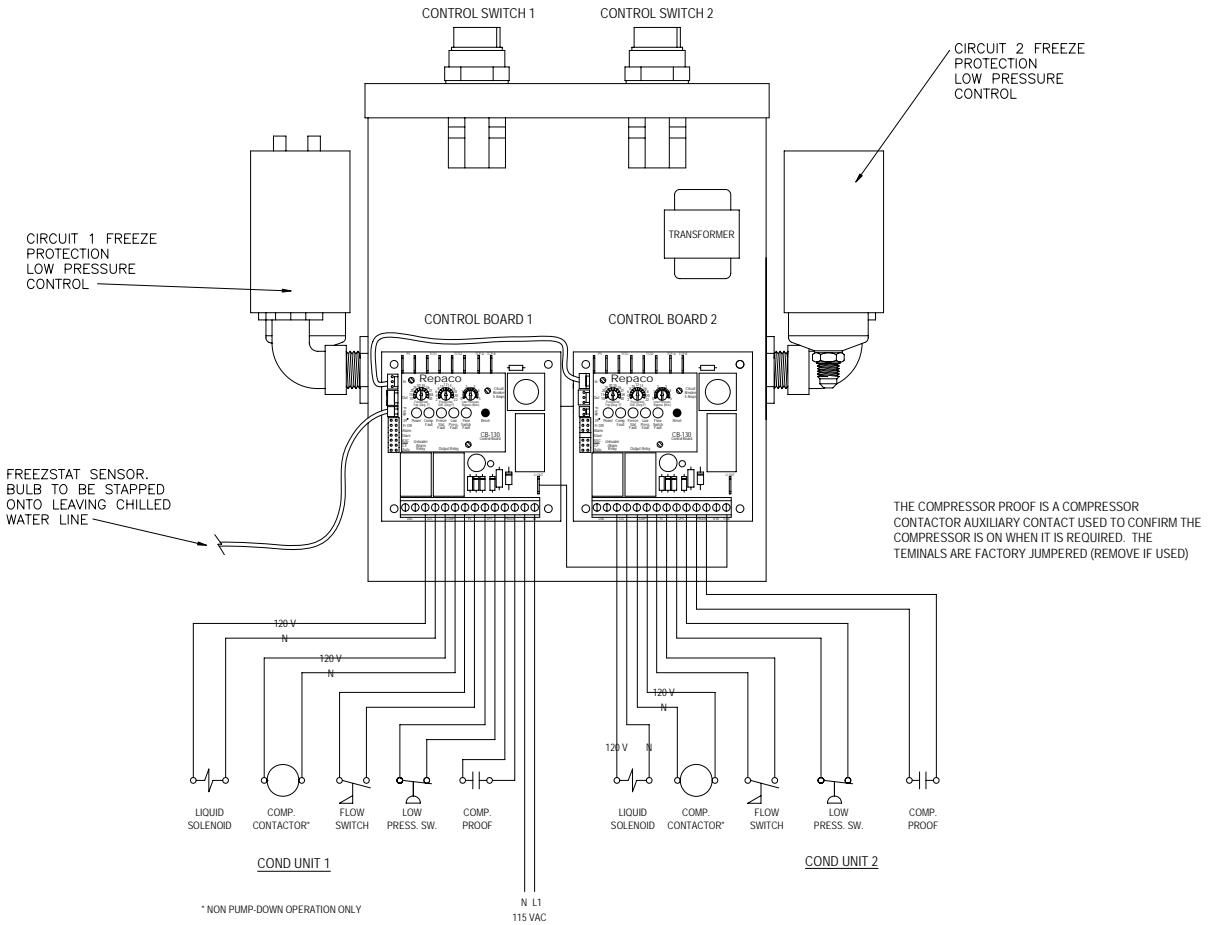
| DTXKIT15-25 DUAL Chiller-Builder PARTS LIST | |
|---|---------------------------------|
| PART NUMBER | DESCRIPTION |
| TX-15-2, 20-2, 25-2 | |
| 1 | 7/8" x 2" COPPER TUBING |
| 2 | 7/8" ELBOW (4) |
| 3 | 7/8" x 4" COPPER TUBING |
| 4 | 7/8" STREET ELBOW |
| 5 | 5/8" x 5-3/4" COPPER TUBING (2) |
| 6 | 5/8" x 5" COPPER TUBING (2) |
| 7 | 7/8" x 4-1/2" COPPER TUBING |
| 8 | 7/8" x 6-1/2" COPPER TUBING |
| 9 | 7/8" x 5" COPPER TUBING |
| 10 | 7/8" x 3-1/2" COPPER TUBING |
| 11 | EXPANSION VALVE (2) |
| 12 | SOLENOID VALVE (2) |
| 13 | SIGHT GLASS (2) |
| 14 | LIQUID LINE BRACKET |
| 15 | CONTROL BOX BRACKET |
| 16 | CONTROL BOX |
| 17 | CONTROL BOX MOUNTING PLATE |
| 18 | WATER FITTING ASSEMBLY |
| 19 | UNISTRUT BRACKET (2) |



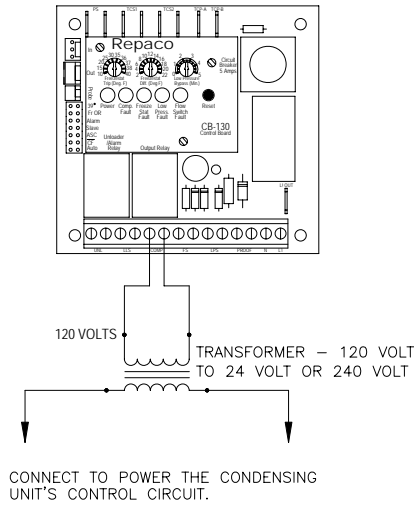
Control Box



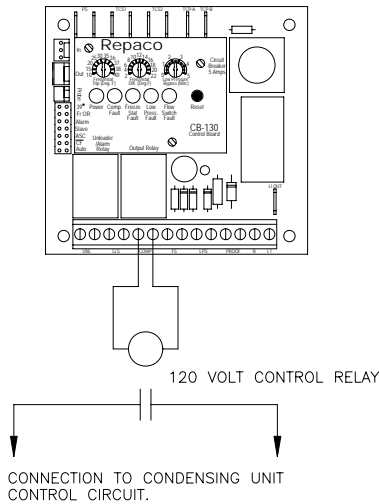
Control Box Field Wiring



Alternate Condensing Unit Wiring Methods



CONDENSING UNIT IS CONTROLLED BY 24 VOLT OR 240 VOLT CONTROL POWER.

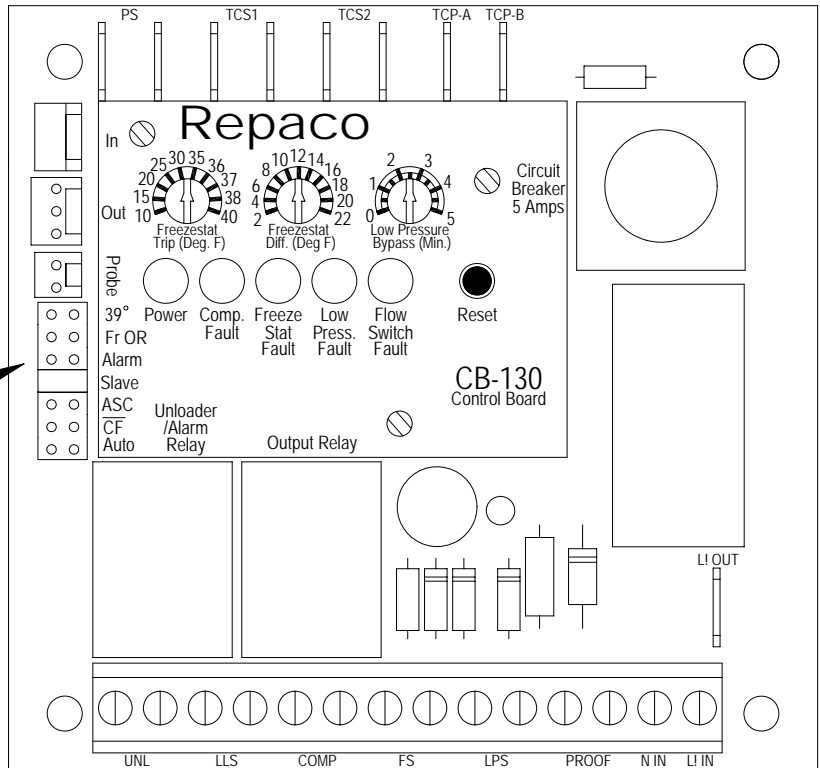


CONDENSING UNIT IS CONTROLLED BY A CONTROL CONTACT.

Control Board Jumper Settings

| | | | |
|------|--|------|--|
| 39° | Factory jumped. Do not change. | | overridden by pressing the reset button). If not jumped, unit will start immediately. |
| FrOR | Not jumped. Do not change. | | |
| Alrm | Factory jumped. Allows the UN terminals to acts as an alarm signal (outputs 120 volts if a fault occurs). Do not change. | CF | Not jumped if compressor proof contact is normally open. Jumped if compressor proof contact is normally closed. |
| Slav | Factory set according to duty. Do not change. | Auto | Not jumped = Faults automatically reset when corrected. Jumped = Faults require a manual reset by pressing the red RESET button for approximately 1 second. |
| ASC | Jump to activate 5 minute anti-recycle feature. Once unit off, it will not restart for 5 minutes (can be | | |

JUMPERS



Pressure Switch Settings

Chiller-Builder kits are shipped with the following controls settings factory pre-set. The installer should verify these settings before operating the system.

Temperature freezestat:
(Freezestat bulb is located on the leaving chilled water line):

39°F

Pressure control
freezestat (R22):

Cut-in: 75 PSIG (37°F)
Differential: 16 PSI
Cut-out: 59 PSI (33°F)
(Cut-in minus
Differential)

NOTE: These pressure settings are valid for R22 only. Contact the factory for pressure freezestat settings for other refrigerants.

Limits of Operation

Chiller-Builder kits are designed to chill water in the air conditioning temperature range:

Inlet water temperature: 54°F

Leaving chilled
water temperature: 44°F

Suction temperature
(using R22):

35°F (61.5 PSIG)

Contact the factory for a Chiller-Builder selection for applications using chilled fluids other than water, for operating conditions outside this temperature range or for refrigerants other than R22.

DTXKIT15-25 Chiller Builder Component List

| Qty | Description | Size | Part No. |
|---|-------------------------------------|--|----------------|
| BRACKETS AND MOUNTING HARDWARE | | | |
| 1 | Liquid line "L" bracket | | |
| 1 | Control box "L" bracket | | |
| 1 | Control box mounting plate | | |
| 2 | Unistrut liquid line bracket | 13" | |
| 4 | Unistrut clamp | 5/8" | |
| 2 | Hex head bolt and nut | 1/2"-13 x 1-1/2" | |
| 4 | Bolt | 1/4"-20 x 1/2" | |
| 4 | Slotted washer head machine screw | 1/4"-20 x 1/2" | |
| 8 | Flat washer | 1/4" | |
| ELECTRICAL COMPONENTS AND HARDWARE | | | |
| 1 | Control box | Dual circuit, electronic control board | |
| 1 | Temperature probe well | 1/2" | WEL11A-601R |
| 15' | SO control wiring cord | | |
| 3 | SO cord connectors | (2 for solenoids, 1 for flow switch) | |
| 2 | Temperature control sensor | (Wired to control box) | |
| 4 | Blue wire nut | | |
| 2 | Freezestat bulb mounting cable ties | 10" | |
| 2 | Wiring fork connectors | 16-14 | |
| 1 | Temperature control literature | | |
| 1 | Pressure control literature | | |
| LIQUID LINE PIPING COMPONENTS | | | |
| 2 | Expansion valve | 5/8" x 7/8" | EBSVE-11-CP100 |
| 2 | Solenoid valve | 5/8" | ME10S250-120 |
| 2 | Sight glass | 5/8" | SA15S |
| 10 | Pieces, liquid line tubing | 5/8", 7/8" x Various lengths - see Liquid Line Drawing for details | |
| 4 | Copper elbow | 7/8" | |
| 1 | Copper street elbow | 7/8" | |
| 2 | Copper equalizing line | 1/4" X 16" | |
| 2 | Flare nut | 1/4" | |
| 2 | Brass tee | 1/4" FL x 1/4" FL x 1/4" MPT | |
| 2 | Close nipple | 1/4" | |
| 2 | Threaded coupling | 1/4" | |
| WATER LINE COMPONENTS | | | |
| 1 | Flow switch | 1" | F61KB-11 |
| 1 | Fabricated water fitting | 2-1/2" | |
| 1 | Threaded reducing bushing | 3" x 2-1/2" | |