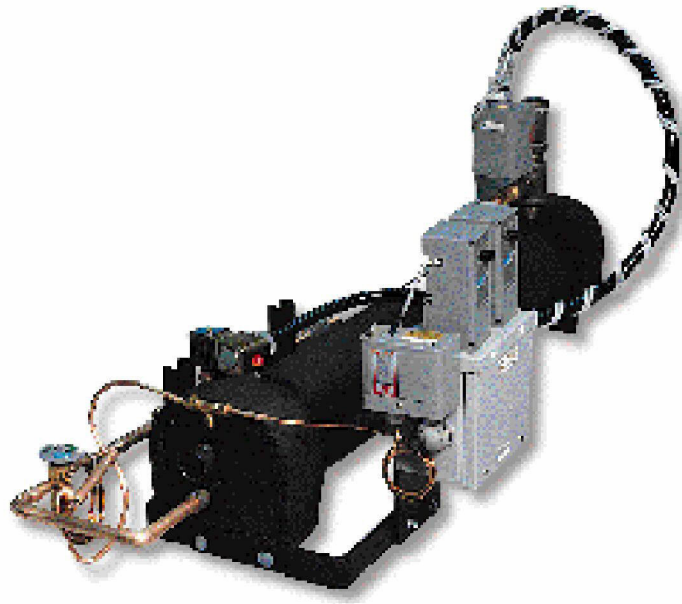


CB ChillerBuilder Kit

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

TXKIT-3

SINGLE 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 temperature control is mounted on top 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 the control board. 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 page 12.

Pre-Assembly

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 drawings on pages 4-11. As you face the evaporator's refrigerant connection end, the liquid line bracket (the longer one) is on the left and the control box bracket (the shorter one) is on the right. The liquid line bracket should go on the outside of the TX evaporator mounting foot; the control box mounting bracket on the inside. Secure the brackets to the evaporator foot with the two $\frac{1}{2}$ "-13 x 1- $\frac{1}{2}$ " bolts and nuts provided.
3. Mount the two liquid line unistrut brackets to the liquid line frame, with the flanges facing out, using $\frac{1}{4}$ " x $\frac{1}{2}$ " bolts. See the assembly drawings on pages 4-11, noting which bracket holes are used.

Assembly

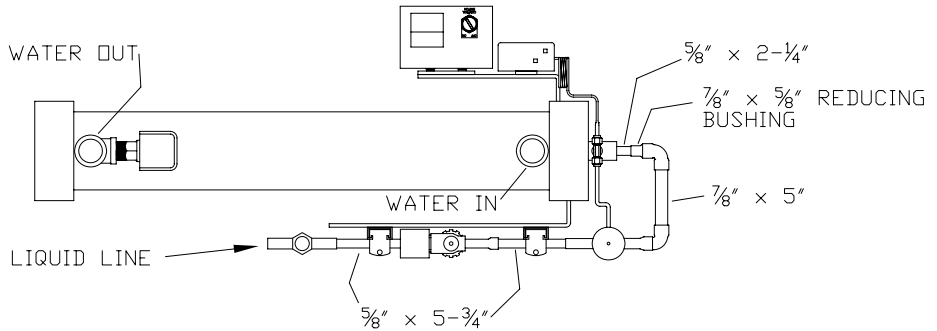
1. Attach the control box mounting plate to the control box with two $\frac{1}{4}$ "-20 X $\frac{1}{2}$ " machine screws. Mount this assembly to the control box bracket with two $\frac{1}{4}$ "-20 x $\frac{1}{2}$ " bolts.
2. Attach the low pressure switch to the pressure switch mount plate with two 10-24 x $\frac{1}{2}$ " machine screws. Mount this assembly to the control box bracket with two $\frac{1}{4}$ "-20 x $\frac{1}{2}$ " bolts.
3. Cut and install SO wiring cable between the low pressure switch and the "LPS" terminals on the control board terminal strip. Use two fork connectors to wire to the low pressure control terminals. Install a SO Cord (Romex) connector on the low pressure switch electrical knockout to secure the SO cable.
4. Assemble the liquid line as shown in the assembly drawings on pages 4-11, making sure the final assembly is square and level. Clean and flux all fitting joints. Wrap the expansion valve and solenoid with wet

Assembly (cont.)

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.

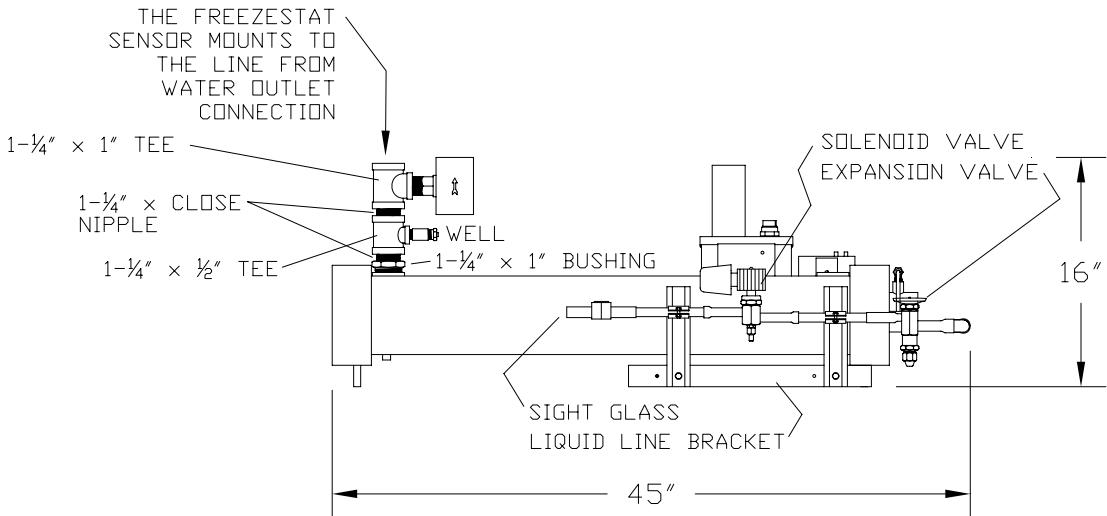
5. Temporarily install the ¼" flare x ¼" flare x ¼" MPT tee into the ¼" FPT fitting on the evaporator's suction line. **DO NOT DOPE ANY THREADS AT THIS TIME, AS THE SUCTION LINE WILL NEED TO BE SOLDERED FIRST.** Fit and shape the ¼" tubing equalizing line between the expansion valve and the tee. Connect the expansion valve equalizer line to the ¼" tee. Don't fully tighten the flare connections on the tee. Solder the equalizing line to the expansion valve equalizing connection, taking care to keep the expansion valve cool with wet rags. Disconnect the equalizing line from the ¼" tee and remove the tee from the suction line.
 6. Check the assembly drawings on pages 4-11 to determine the proper fittings for the water fitting assembly for the evaporator you are using. You may have extra fittings as this Chiller Builder model covers more than one evaporator model.
 7. 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.
 8. Assemble and install the flow switch/temperature probe assembly in the selected water connection. Determine and cut the proper flow switch paddle length. Refer to the separate flow switch instruction sheet. Attach the paddle to the flow switch. Install the flow switch in the assembly's 1" fitting. Be sure the switch's flow direction arrow is pointed in the proper direction.
 9. Install the temperature probe in the assembly's ½" FPT fitting. The temperature control is the control mounted on top of the control box. Refer to the separate temperature control instruction sheet for control operation details.
 10. Cut and install a length of SO wiring cable between the solenoid valve and the "LLS" terminals on the control board's terminal strip. Use the blue wire nuts to connect the SO cord to the solenoid coil.
 11. Cut and install SO wiring cable between the flow switch and the "FS" terminals on the control board terminal strip. Wire the flow switch to the common and "closes on flow increase" terminals (red and yellow terminals 1 & 3).
-

TXKIT-3 With TX-6 Evaporator Assembly Drawing

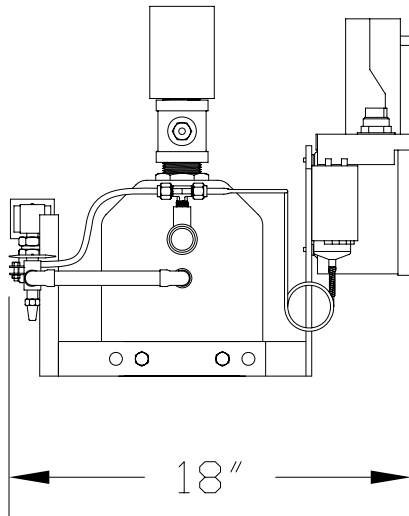
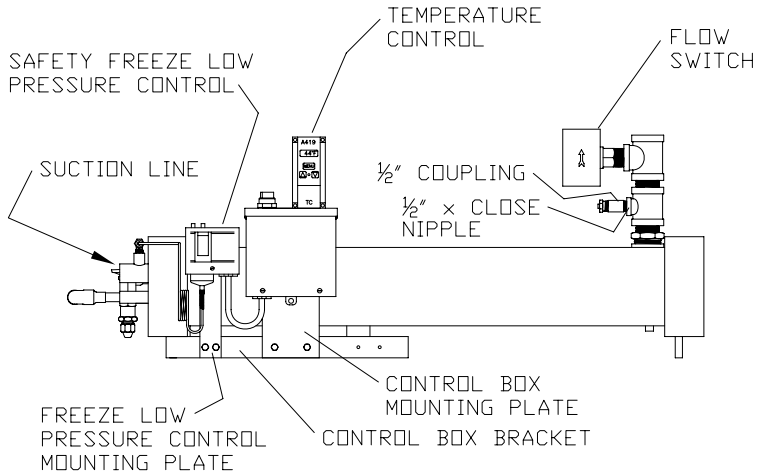


Note:

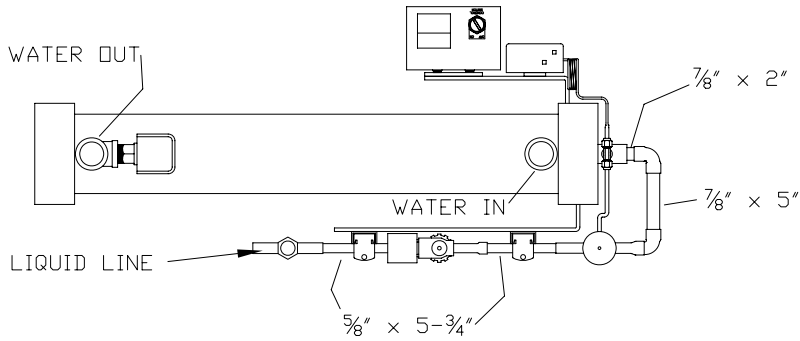
The temperature control can control from either leaving or return water temperature. Mount the water fitting and the temperature control bulb in the line used for control.



TXKIT-3 With TX-6 Evaporator Assembly Drawing

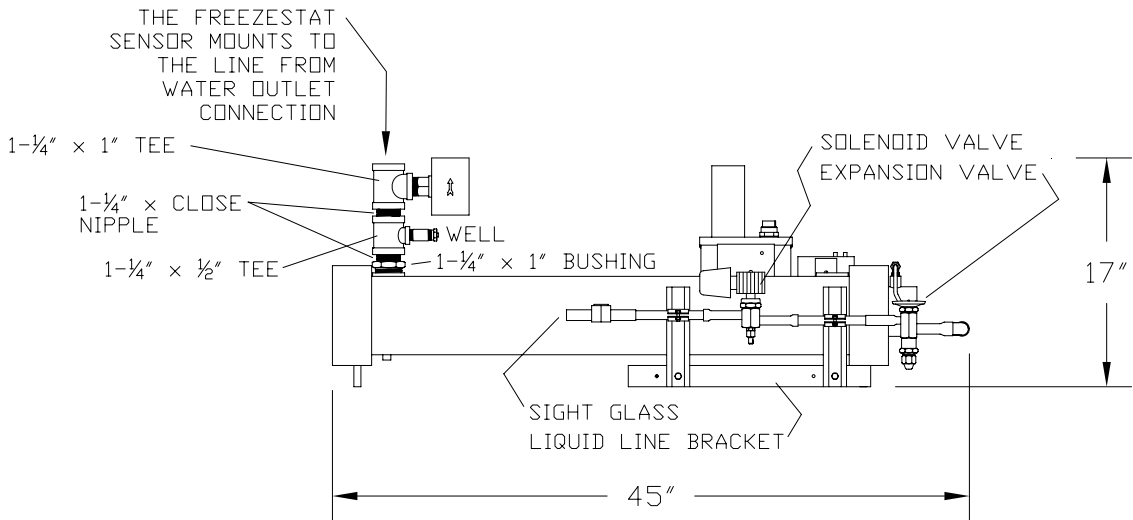


TXKIT-3 With TX-7-1/2 Evaporator Assembly Drawing

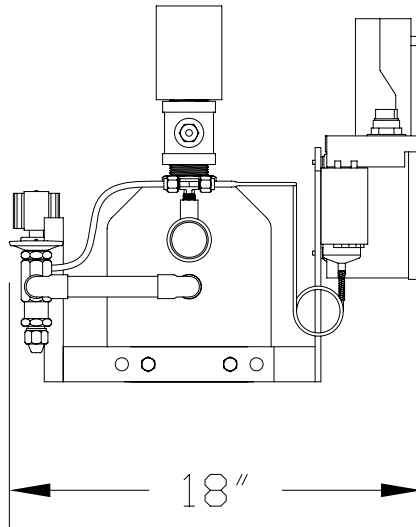
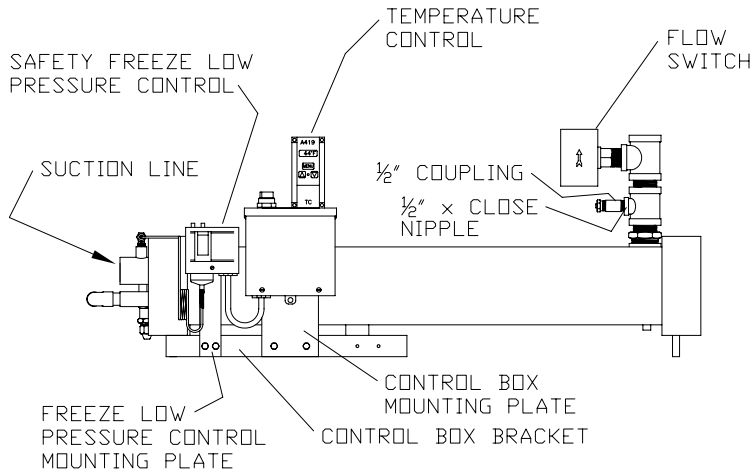


Note:

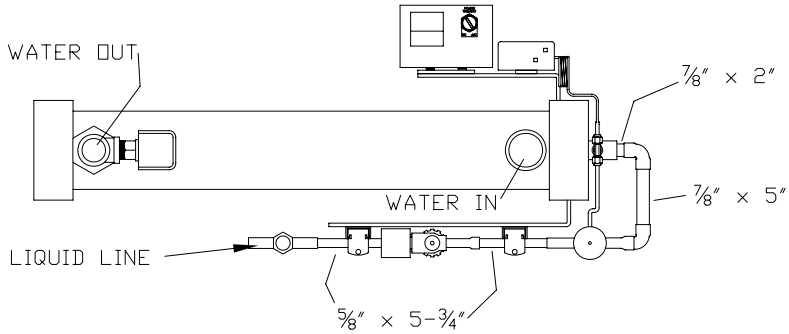
The temperature control can control from either leaving or return water temperature. Mount the water fitting and the temperature control bulb in the line used for control.



TXKIT-3 With TX-7-1/2 Evaporator Assembly Drawing

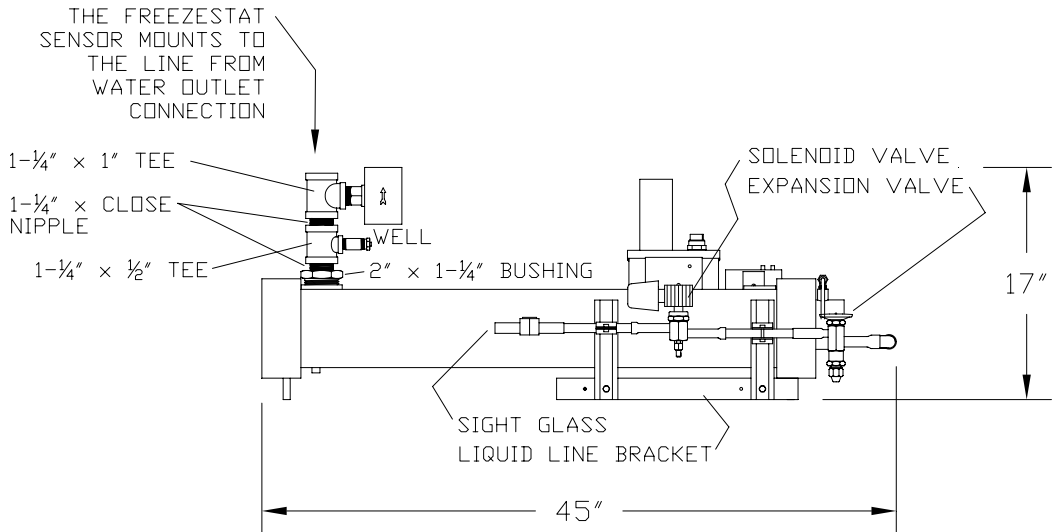


TXKIT-3 With TX-10 Evaporator Assembly Drawing

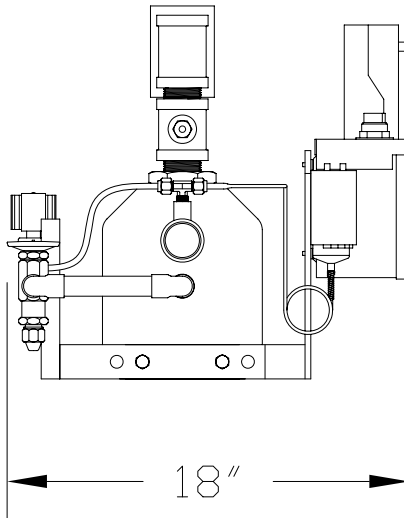
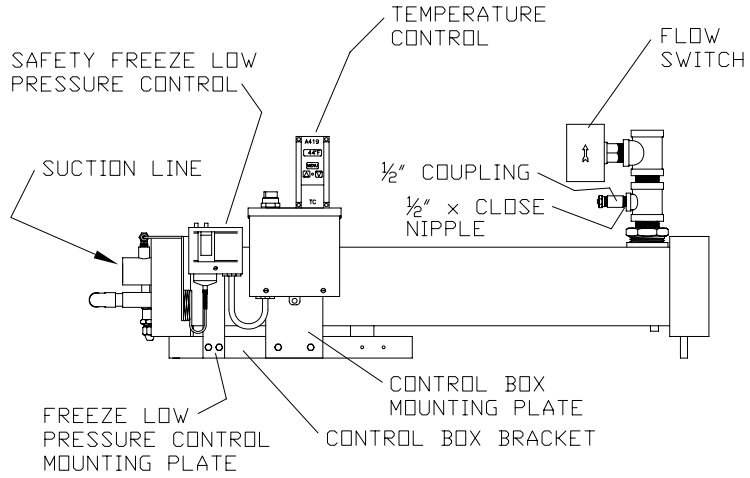


Note:

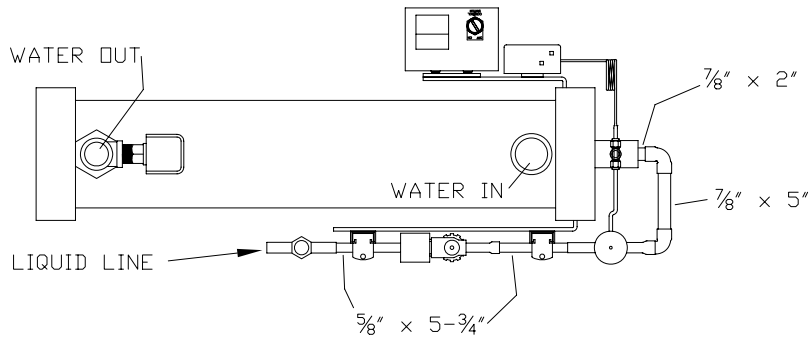
The temperature control can control from either leaving or return water temperature. Mount the water fitting and the temperature control bulb in the line used for control.



TXKIT-3 With TX-10 Evaporator Assembly Drawing

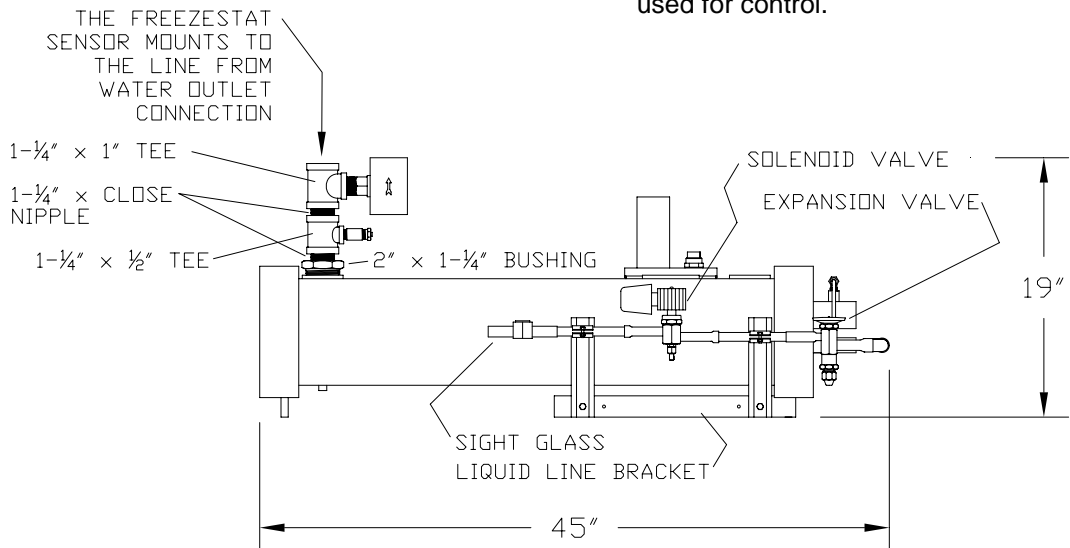


TXKIT-3 With TX-12 Evaporator Assembly Drawing

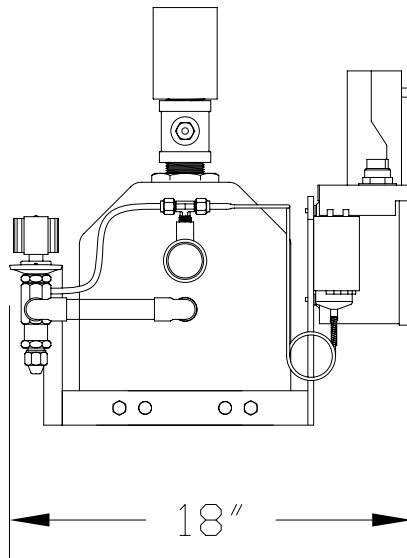
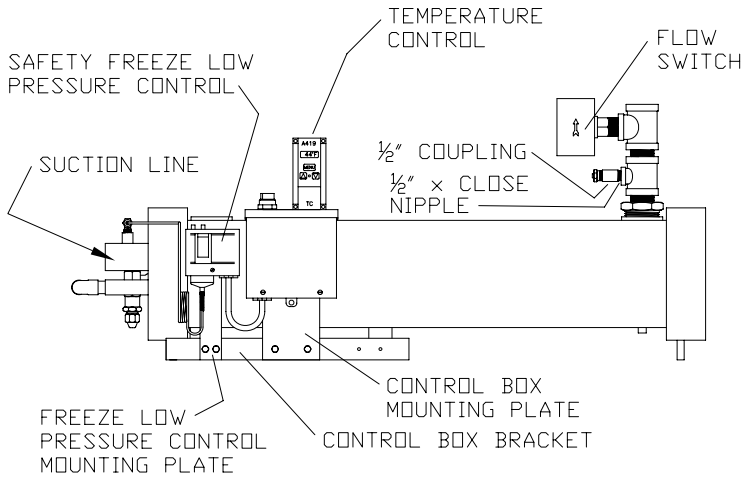


Note:

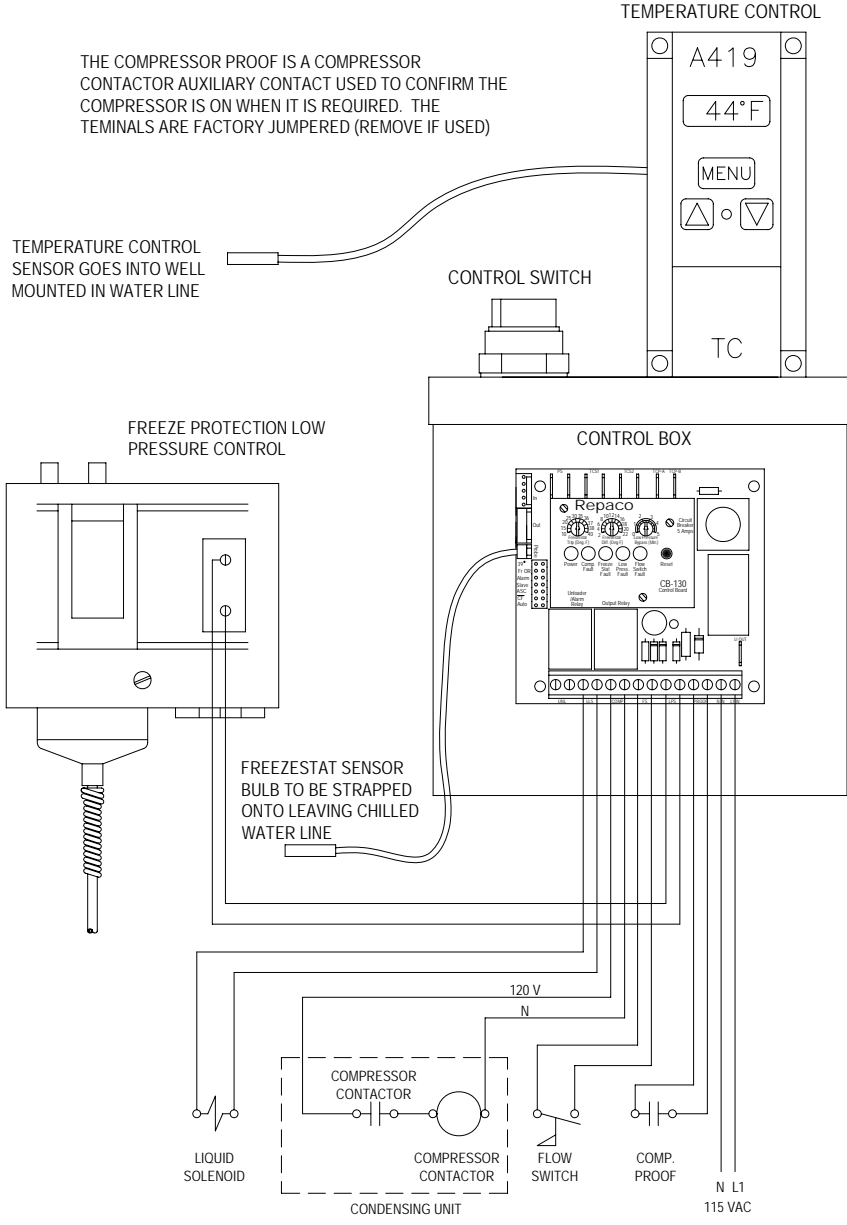
The temperature control can control from either leaving or return water temperature. Mount the water fitting and the temperature control bulb in the line used for control.



TXKIT-3 With TX-12 Evaporator Assembly Drawing

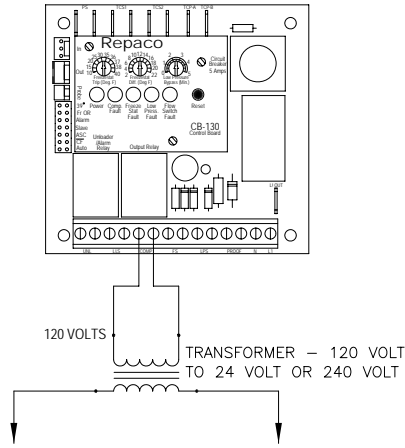


Control Box Field Wiring



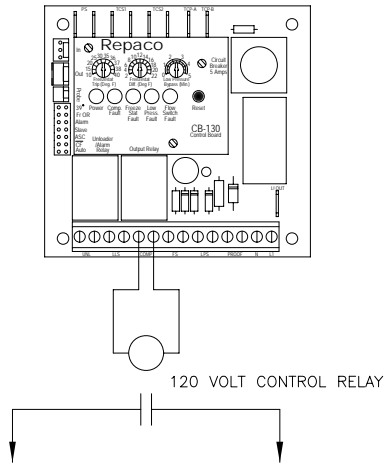
NON PUMP-DOWN OPERATION FIELD WIRING

Alternate Condensing Unit Wiring Methods



CONNECT TO POWER THE CONDENSING UNIT'S CONTROL CIRCUIT.

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



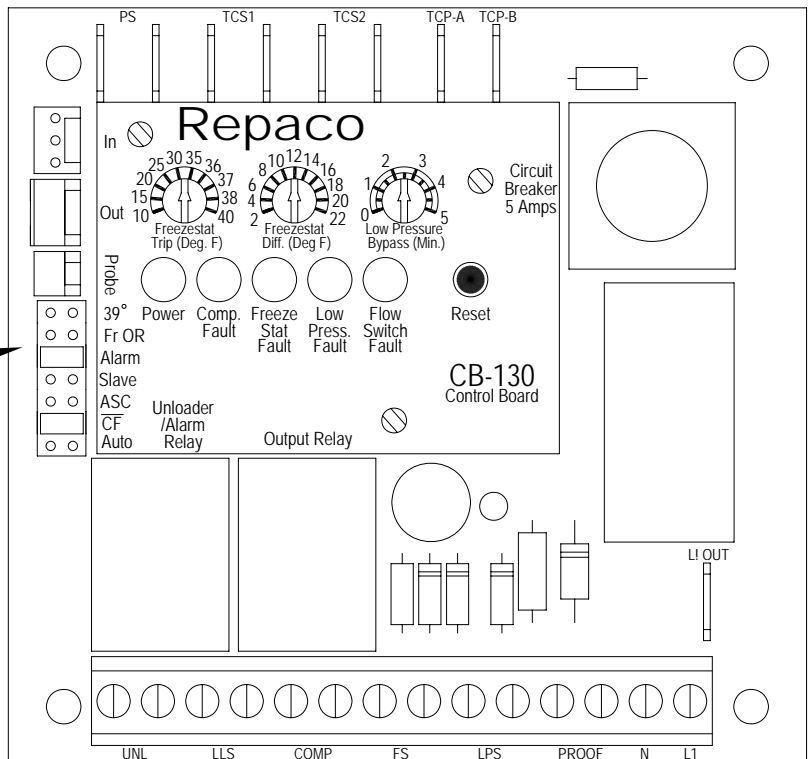
CONNECTION TO CONDENSING UNIT CONTROL CIRCUIT.

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	Not jumped. 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 control 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.

Installing the Chiller Builder

1. Pipe the supply and return water lines to the evaporator.
 2. Secure the freezestat temperature probe to the water outlet line using the two long plastic wire ties. The freezestat probe comes off of the control board.
 3. Pipe the liquid line from the condensing unit to the ChillR-BuildR's liquid line assembly.
 4. Pipe the suction line from the condensing unit to the TX evaporator suction connection. Silver solder the evaporator joint.
 5. Dope and re-install the ¼" tee in the ¼" FPT fitting on the evaporator suction line connection. Re-connect the expansion valve equalizing line to the tee.
 6. Strap the expansion valve bulb to the suction line. The bulb 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.
 7. Connect the cap tube from the low pressure switch to the ¼" tee.
 8. If auxiliary compressor proof contacts are used, wire the proof contact from the "PROOF" terminals on the control board, taking care to remove the terminal jumper 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).
 9. If the control circuit is non pump-down, use COMP terminals on the board to control the condensing unit. The "COMP" terminals output 120 volts when the compressor is required. See the alternate wiring methods on page 13. The compressor controls must be included in the circuit.

If the system uses a pump-down cycle, the condensing unit low pressure control will control the compressor, so the COMP terminals do no need to be wired to the condensing unit.
 10. Connect a 120 volts power circuit to the **N-in and L1-in terminals on the board, paying attention to polarity.**
 11. Refer to the **Check Out Procedure** located elsewhere in this manual and check the unit's operation.
 12. Test all piping for water or refrigerant leaks. Evacuate and charge the system. Set the temperature control's setpoint and differential, freezestat setpoint and differential, and the freeze protection low pressure switch.
 13. Insulate the water lines, suction line and the line between the expansion valve and the TX evaporator to complete the installation.
-

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 compressor's low pressure control will control and cycle the compressor. A time delay feature overrides the low pressure freeze protection control 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 wiring diagram on page 9).

Operating Overview

The temperature control controls the chiller's liquid line solenoid valve and the condensing unit's contactor (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 solenoid will close and the condensing unit 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 4 seconds. A low pressure switch and the freezestat sensor 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 temperature, 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 board – see CONTROL BOARD JUMPER SETTINGS on page 10.) 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 it is 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 sense satisfactory conditions, the solenoid 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 solenoid will close if a flow fault occurs. There is a 4 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. *(continued on next page)*

Operation (cont.)

The indicator lights on the control board will indicate any control fault. If the board is 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 solenoid and the condensing unit (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.

CONTROL SWITCH

The Chiller Builder control off-on switch is located on the top of the control box. The control switch 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 suc-

tion 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 4 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 switch is off), the liquid line solenoid valve is closed and the condensing unit 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 control can be verified.

First, remove power from the compressor contactor so you won't start the compressor during the check-out procedure. Turn the control switch "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. Set the temperature control setpoint down to 0° so that the temperature control calls for cooling.
2. Turn the control switch "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.
3. The unit will experience a flow failure after approximately 4 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.

4. Press the RESET button to reset the control board and turn the control switch off.
5. Turn the circulating pump on.
6. 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.

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. Set the temperature and pressure controls. The unit is ready to be charged.

TXKIT-3 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		
1	Low pressure control mounting plate		
2	Unistrut liquid line bracket		
2	Unistrut clamp	5/8"	
2	Hex head bolt and nut	1/2"-13 x 1-1/2"	
2	Slotted washer head machine screw	1/4"-20 x 1/2"	
6	Hex bolts	1/4"-20 x 1/2"	
2	Machine screw	10-32 x 1/2"	
ELECTRICAL COMPONENTS AND HARDWARE			
1	Control box	Single circuit	
1	Low pressure freeze protection control	P70AB-12D	
1	Temperature probe well	1/2"	WEL11A-601R
10'	16-2 SO cord		
3	SO cord connector	1/2"	
2	Temperature probe	(wired to controls)	
2	Blue wire nut		
2	Freezestat bulb cable ties	10"	
4	14-16 fork connector		
1	Temperature control literature		
1	Pressure control literature		
LIQUID LINE PIPING COMPONENTS			
1	Expansion valve	5/8" x 7/8"	EBSVE-11-CP100
1	Solenoid valve	5/8"	ME10S250-120
1	Sight glass	5/8"	SA15S
5	Pieces, liquid line tubing	5/8", 7/8" x Various lengths - see Liquid Line Drawing for details	
1	Copper elbow	7/8"	
1	Copper street elbow	7/8"	
1	Copper reducing bushing	7/8" X 5/8"	
1	Copper equalizing line	1/4" X 16"	
1	Flare nut	1/4"	
1	Brass tee	1/4" FL x 1/4" FL x 1/4" MPT	
WATER LINE COMPONENTS			
1	Flow switch	1"	F61KB-11
1	Threaded tee	1-1/4" x 1-1/4" x 1"	
1	Threaded tee	1-1/4" x 1-1/4" x 1/2"	
1	Threaded reducing bushing	2" x 1-1/4"	
1	Threaded reducing bushing	1-1/2" x 1-1/4"	
1	Coupling	1/2"	
2	Close nipple	1-1/4"	
1	Close nipple	1"	
1	Close nipple	1/2"	