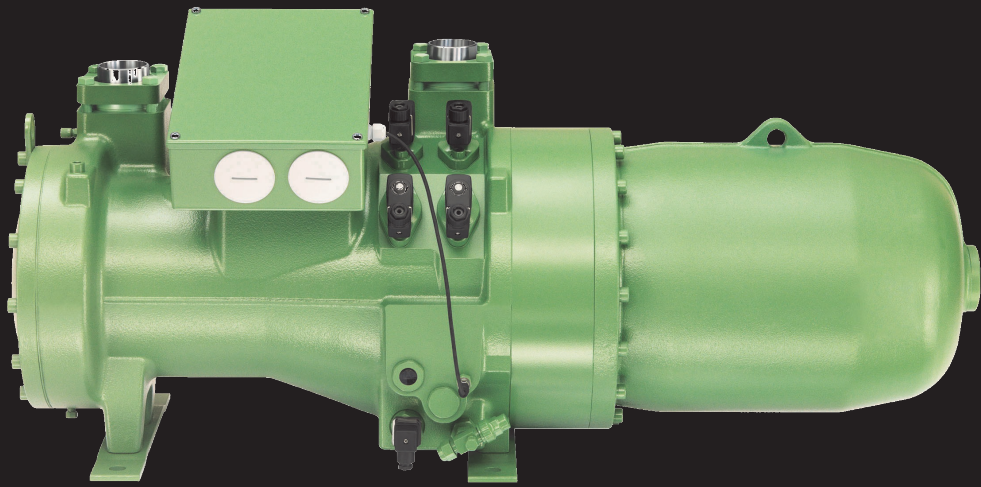




BITZER LIQUID INJECTION GUIDELINES

For CSH Series Screw Compressors



TB-0016



BITZER Liquid Injection Guidelines for CSH Compressors

Liquid Injection

Additional cooling may be required during reduced capacity operation, high condensing and / or low evaporating temperatures. Direct liquid injection at the ECO port for the CSH1 or via a Fixed Port for the CSH3 is a relatively simple method of achieving additional cooling of BITZER CSH and CSH-Y screw compressors.

Integral Nozzle for Liquid Injection

For CSH and CSH-Y model compressors manufactured after August 2003, the integrated liquid injection nozzle provides an alternative to the thermostatic expansion valve. This nozzle is tuned for optimum injection flow in relation to the demand.

The liquid injection nozzle and adaptor are mounted as a unit directly into the ECO port for the CSH1 and via a separate fixed port for the CSH3 (see figure 1 and 2).

Retrofitting

For systems utilizing the Sporlan Y1037 or other device, the new style liquid injection nozzles can be installed on-site. To do so, remove the standard adaptor and existing thermostatic expansion valve and replace with new liquid injection nozzle and the liquid injection temperature controller.

Liquid Injection

When liquid injection oil cooling is used, a liquid line solenoid valve is required. This solenoid valve will be energized by the Liquid Injection Temperature Controller (see figure 2). The solenoid valve must be selected to provide sufficient capacity for the maximum cooling load of the compressor.

Contact BITZER Application Engineering for assistance with the load calculation.

The control circuit power to the liquid injection temperature controller must be wired through a normally open (N.O.) auxiliary relay on the compressor contactor. This will insure that liquid will

only be injected into the compressor while it is operating.

The liquid injection temperature controller should be wired as follows:

The power or hot lead from the N.O. auxiliary relay should be wired to the center terminal on the controller. The neutral lead should be wired to the far left terminal.

The liquid injection solenoid should be wired as follows:

Power or hot lead should be wired from the far right terminal on the controller to the liquid supply solenoid. Neutral lead should be wired to the far left terminal of the liquid injection controller (see figure 3).

The thermostat sensor has a supplied length of 10 feet. This sensor must be mounted on the discharge line approximately 8 to 12 inches from the discharge service valve.

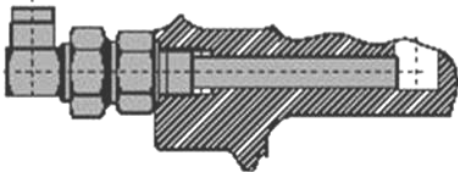
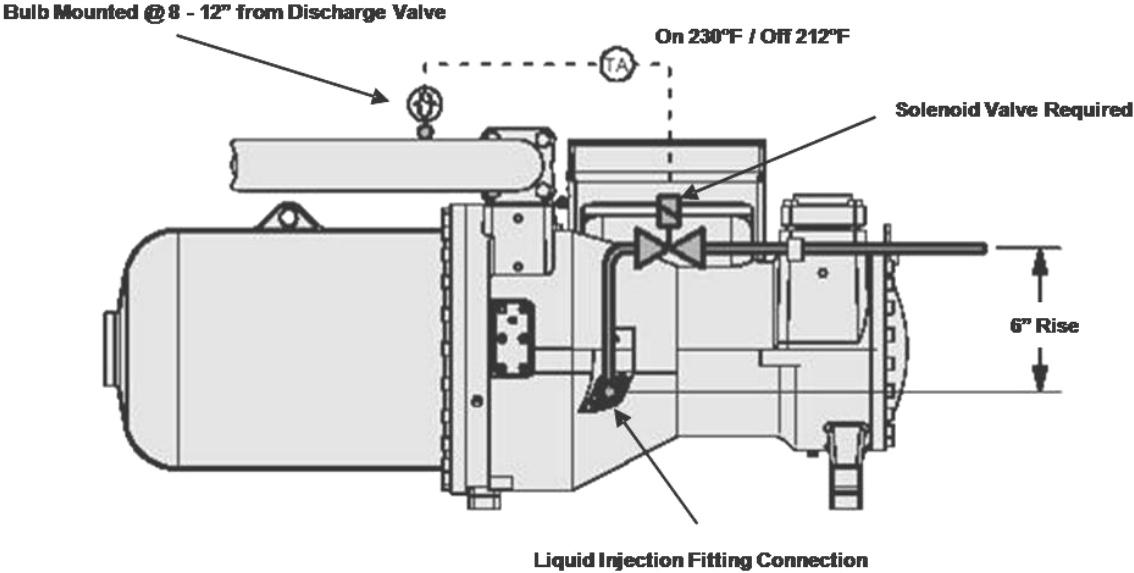
To install the thermostat sensor:

- Clean the discharge piping surface where the bulb is to be located.
- Apply heat transfer paste to the contact surface.
- Attach the sensor firmly with adequate pipe and/or hose clamps.
- Insulate the sensor.

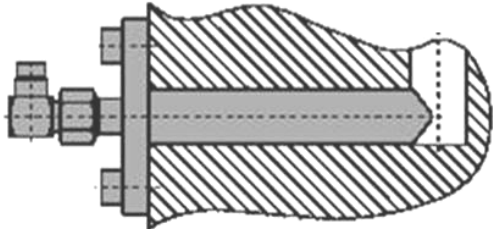
The liquid supply piping to the compressor must include a vertical riser of a minimum of 6" from the injection port on the compressor to avoid oil migration and damage of components through hydraulic peaks during starting.

The liquid supply piping must be installed to supply a constant supply of liquid refrigerant. A sight glass mounted between the solenoid valve and injection port on the compressor is recommended. A rotolock valve is recommended at the compressor for service.

Liquid Injection Nozzle and Fitting – ECO Port (Figure 1)
For CSH1 Series Compressors

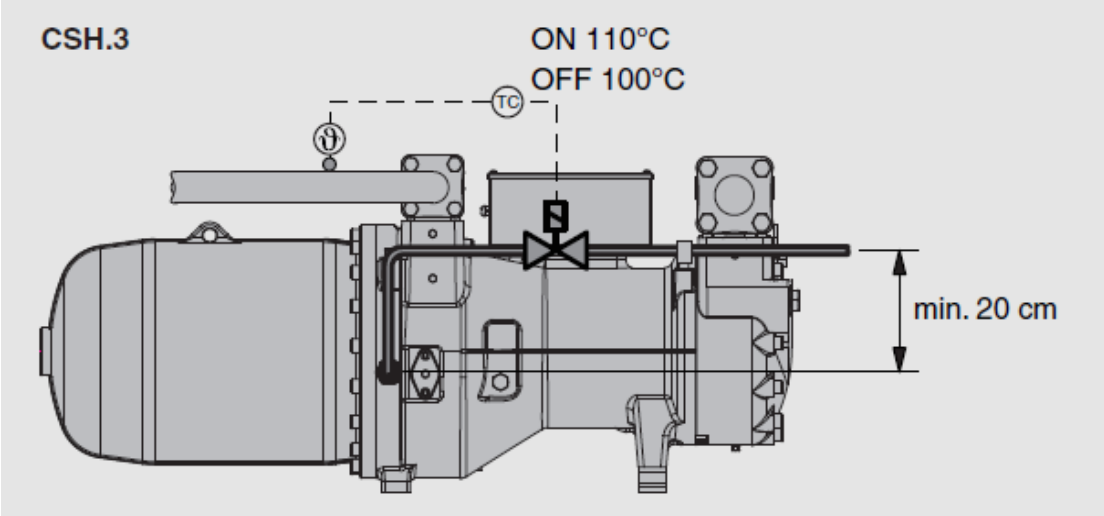


CSH-Y 35,40,50,60,70
CSH 50,60,70,80,90



CSH-Y 80,90,110,125,140,160,180,210,240
CSH 110,125,140,180,210,240,280,300

Liquid Injection Nozzle and Fitting – ECO Port (Figure 2)
For CSH3 Series Compressors



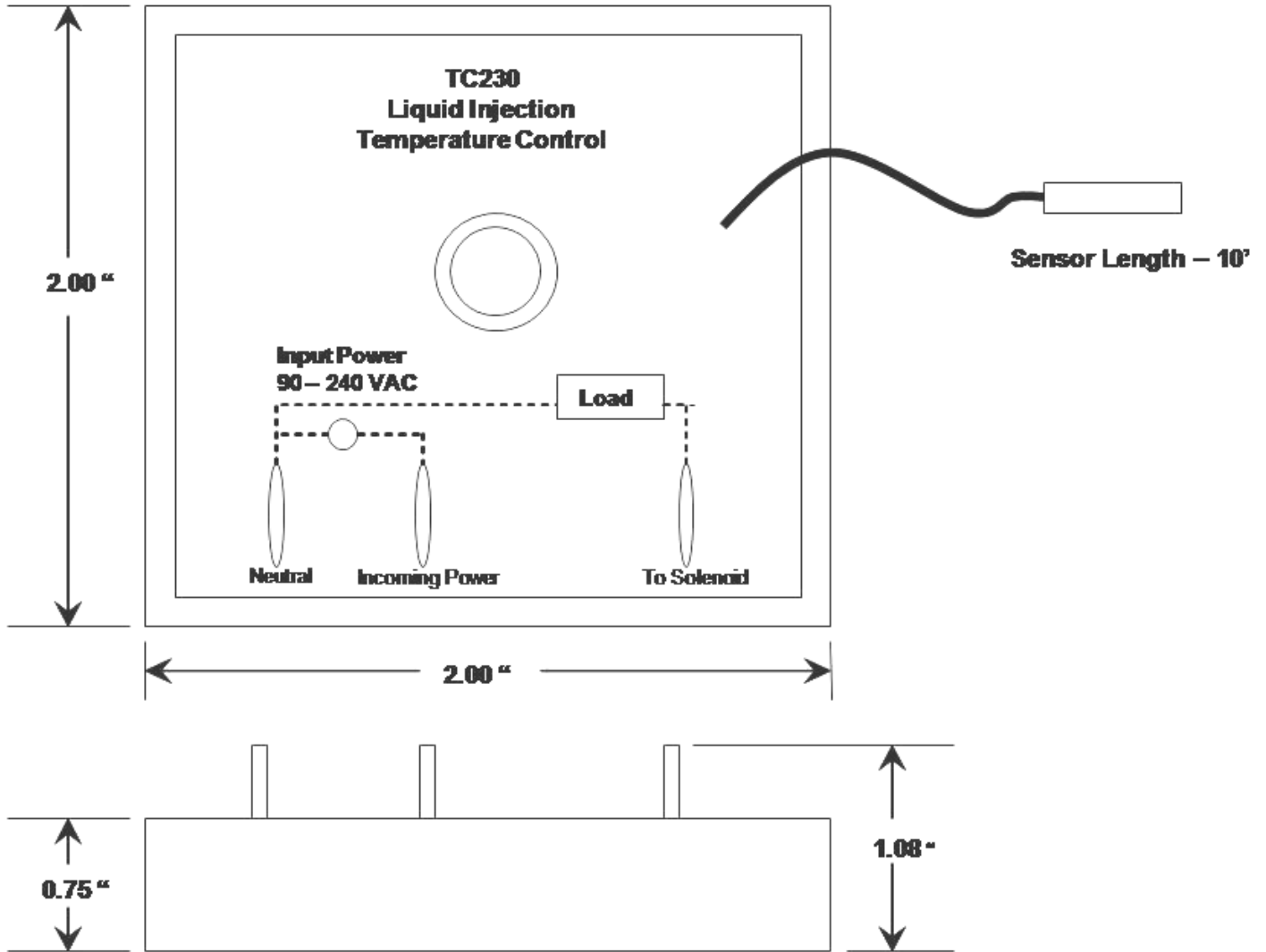
Port for Liquid Injection



Shut-off valve for Liquid Injection

**New Liquid Injection Port with
Fixed Integrated Injection Nozzle**

Liquid Injection Temperature Controller (Figure 3)



BITZER Component Part Numbers

For CSH1 Series Compressors

Compressor	Liquid Injection Controller	Liquid Injection Nozzle
CSH-Y 50,60,70 CSH 70,80,90	085-0164-17	361332-05
CSH-Y 35,40 CSH 50,60	085-0164-17	361332-06
CSH-Y 80,90,110,125,140 CSH 110,125,140	085-0164-17	361332-04
CSH-Y 160,180,210,240 CSH 180,210,240,280,300	085-0164-17	361332-07

For CSH3 Series Compressors

Compressor	Liquid Injection Controller	Liquid Injection Nozzle
CSH3-65	085-0164-17	361332-10
CSH3-75	085-0164-17	361332-10
CSH3-85	085-0164-17	361332-10
CSH3-95	085-0164-17	361332-10


Liquid Injection Controller Specifications

Input Voltage: 90-265 VAC
Frequency: 50 to 60 Hz
Output Rating: 1 Amp @ 240 VAC
Sensor Length: 10'
Turn On Temp: 230°F
Turn Off Temp: 210°F
Mounting Style: Surface
Terminations: .25" Quick Connects



Notes





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