

## High/Low By-Pass Valves

*Prevent Premature Release  
of Refrigerant Thru Catastrophic  
Relief Valves*

tech  
tips



The High/Low By-Pass valve was designed to handle momentary instances of over pressure (not a fire). It by-passes excess pressure to the low side of the system thus preventing the catastrophic relief valve from discharging refrigerant into the atmosphere. If the over pressure increases then the catastrophic relief valve will be activated.

The High/Low By-Pass valve is an indirectly spring loaded diaphragm type of valve. System pressure acts on the diaphragm causing the piston to lift from the valve seat. The external side of the diaphragm is exposed to atmospheric pressure. Consequently, the valve setting is not appreciably affected by back

pressure. The valve will start to function at a fixed pressure not at a pressure differential. Because the valve starts to function at a fixed pressure, it is particularly suitable for high side to low side applications in a refrigeration system.

The valve has relatively low flow rates. This is due to the minimum diaphragm travel. High flow rates were not the primary design criteria of this device. The valve's primary function is to by-pass only enough gas so as to reduce the effects of the high pressure spiked. High flow rates would adversely affect system performance.

Care should be taken when using this valve. Continued by-passing of refrigerant for extended periods of time can lead to loss of system capacity, excessively high temperatures at the compressor and possible compressor failure.

Because of this we would recommend that some type of sensor be put in the discharge line from the valve to monitor if the valve was relieving from the high side to the low side.

When ordering By-Pass valves, you must specify pressure setting. Range 150 to 450 PSI Standard settings are:

- 195 PSI** (For 235 PSI, Relief Valve)
- 250 PSI** (For 300 PSI, Relief Valve)
- 290 PSI** (For 350 PSI, Relief Valve)
- 330 PSI** (For 400 PSI, Relief Valve)
- 350 PSI** (For 425 PSI, Relief Valve)
- 375 PSI** (For 450 PSI, Relief Valve)

Figure 1:

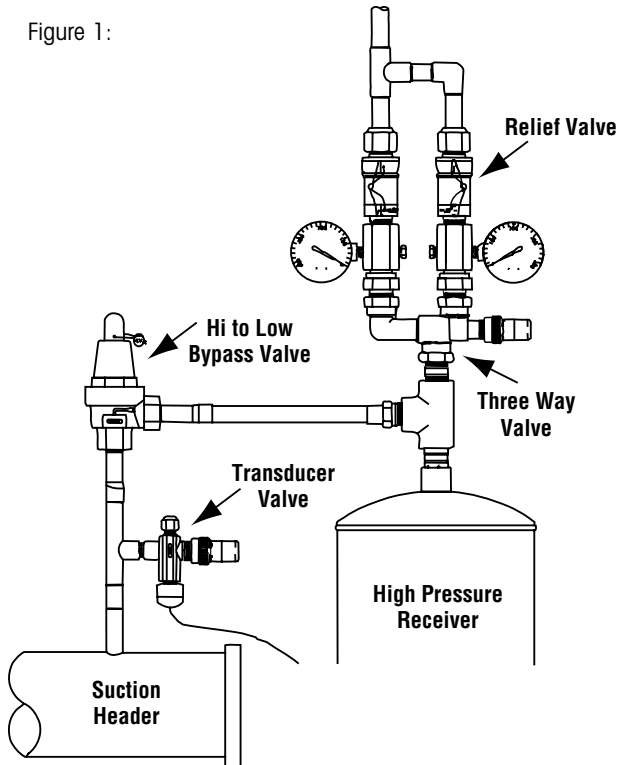


Figure 1 shows a typical By-Pass, relief system for a high pressure receiver. This system consists of the High/Low By-Pass valve and a dual relief valve assembly, complete with "Sentry" Rupture Disc Assemblies, all mounted on a 3-way valve. The drawing shows a High/Low By-Pass Valve in operation.

**At what pressure should these devices be set?**

A typical installation with a pressure vessel having a maximum working pressure of 400 PSI might be:

- Relief Valves:** Set at the design 400 PSI working pressure of the vessel or 25% higher than the maximum working pressure of the system.
- Rupture Disc Assemblies:** Set at relief valve setting. 400 PSI
- High/Low Side Valve:** Set at approximately 80-85% of the relief valve setting. 330 PSI

See Relief Valve Parameters table below for code parameters for a 400 PSI relief valve.

**Please Note** the added protection a High/Low By-Pass valve provides if system pressure nears the potential relief valve "Seep" Point.

Relief Valve Parameters

		PSI
+10%	-----RV Full Open	440
+3%	-----	412
R.V. Setting Tolerance	Relief Valve (RV) Setting	400
-3%	-----	388
-10%	-----Potential R.V. "Seep" Point	360
	Max. System Oper. Pressure	320

Relief valve parameters as a percent of R.V. set pressure