

# "How Do I Choose a Cartridge?"

Griswold Controls offers seven different PSID ranges for our cartridges, because with precision comes accuracy. Our cartridges stay within their 5% tolerance over their precise flow range.

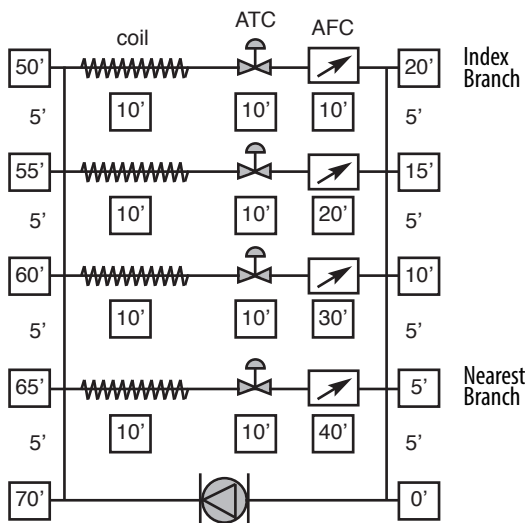
To select which PSID range is right for your Terminal Unit application, follow these guidelines:



- 1. Available Line Pressure:** Total pressure for the line must be known (If unavailable proceed directly to Step 4b). For a multiple branch system, consider each branch separately, and use the pressure differential across the entire branch. You need to ensure that the correct PSID range is selected for the branch nearest the pump and for the branch farthest from the pump (index circuit). If both of these circuits call for the same PSID range, all the circuits in-between will use that same PSID range.
- 2. Component Pressure Drop:** Calculate all of the pressure drops across the branch – for example, coils, long pipe-lines and any other components and fittings that cause constant amounts of pressure drop. Some components have a best and worst case pressure spec, as in the case of a strainer whose pressure drop may vary depending on the cleanliness of the strainer, or a throttling valve. If you have the total pressure for the branch and the components are Griswold Controls Coil Piping Packages (CPP) components, Griswold can calculate pressure for those components. If pressure information for a coil is unknown, estimate three to five PSID.
- 3. Calculation:** Ensure that all pressure calculations are converted to PSI (1 PSID = 2.307 feet of head). Subtract the total pressure drop (Step 2) from the total system or branch pressure (Step 1) to arrive at the total pressure available for the cartridge. For example if the available pressure from step 1 is 40 PSID and the total component pressure drops in step 2 are 33 PSID then the available excess PSID is 40-33=7 PSID.

**4. PSID Range:** That number (or numbers in best/worst systems) is the pressure that determines the required PSID range for your cartridge. If there are two acceptable PSID ranges, pick the lower range because there are always small pressure drops (for fittings, etc) that we neglect and that may be discovered after the system is functioning. Also, it is recommended that you pick a range which situates your PSID roughly in the middle of the range. From the example in Step 3 a cartridge should be selected that starts to control the flow below seven PSID. Our standard 1-14, 2-32 and 4-57 cartridges will work for this application.<sup>1</sup>

**4b. No Information?** If no information is available, 2–32 PSID is proven to match most HVAC applications.



Example – Multiple Branch, Constant Speed System

General Rule for PSID ranges: for a system with up to 75' Pump Head, you will generally need a 2–32 PSID cartridge. More than 75', some branches may require 4–57 PSID. The 8–128 PSID range is not usually used for HVAC.

In the example at left, the total component pressure drop across the first branch is 60' (or about 22 PSID). The farthest (or index) branch has a drop of 30' (or about 13 PSID). The values shown for the components in the example are nominal.

<sup>1</sup> While valve will control the flow through the high end of PSID range, there is a limit to the maximum PSID across the cartridge before cavitation occurs. A conservative guide is: Maximum Allowable Pressure Drop = 0.5 (Inlet Pressure - Water Vapor Pressure). Cavitation is an effect that occurs when the fluid vaporizes as it goes through a port opening. As the fluid exits the port the vapor bubbles collapse back into a liquid state. The vapor bubbles imploding cause noise and vibration in the valve and can eventually destroy valves. This phenomenon is amplified when entrained air is in the system. If cavitation is a concern, then selecting a stiffer spring like 4-57 or 8-128 can help reduce risk.