



Virtual Engineer: Sporlan Division

Crankcase Pressure Regulator

Contents

Crankcase Pressure Regulators.....	1
Mechanical Crankcase Pressure Regulator	1
Electric Crankcase Pressure Regulator	2
Valve Sizing in Virtual Engineer.....	2
Inputting Sizing Information.....	2
Getting Results and Comparing Choices	3
Configuring a Part and Saving Results	4

Crankcase Pressure Regulators

Sporlan Crankcase Pressure Regulating Valves are designed to prevent overloading of the compressor motor by limiting the crankcase pressure during and after a defrost cycle or after a normal shutdown period. When properly installed in the suction line, these valves automatically throttle the vapor flow from the evaporator until the compressor can handle the load.

Mechanical Crankcase Pressure Regulator

Crankcase pressure regulating valves (sometimes called suction pressure regulating valves) are sensitive only to their outlet pressure (compressor crankcase or suction pressure). To indicate this trait, the designation for our crankcase pressure regulating valves describes the operation: Close on **R**ise of **O**utlet pressure or CRO.

Sporlan manufactures three adjustable models: the CRO-4, CRO(T)-6 and CRO(T)-10. All models are available in various adjustment ranges. The CRO(T)-6 and CRO(T)-10 valves are built with an anti-chatter device which is designed to minimize the damaging effect of compressor pulsations on the valve's bellows. The CRO-4 does not require this device because the pulsations are dampened before reaching the underside of the diaphragm. The CRO-4 on the other hand has balanced piston design which cancels out both inlet and outlet pressure from acting on the piston.

Refer to [Bulletin 90-10](#) for more information on Sporlan Crankcase Pressure Regulator valves.

Electric Crankcase Pressure Regulator

The Sporlan CDS family represents a line of electronically controlled step motor valves, designed to contribute minimal pressure drop to the system. By providing synchronized signals to the step motor, discrete angular movements are translated through a Digital Linear Actuator (DLA) into precise linear positioning of the valve piston. The balanced pistons and ports are uniquely characterized, providing superb flow resolution and performance across a range of applications and operating conditions.

Sporlan CDS valves are available in two styles—the CDS-2, CDS-4 and CDS-7 provide 2500 steps of resolution, while the larger CDS-9, CDS-16 and CDS-17 provide 6386 steps of resolution. Capable of tremendous versatility, CDS valves can be used to replace a variety of mechanical and solenoid valves throughout typical refrigeration and air conditioning systems, where low pressure drop and precise refrigerant flow control are desired. And because the valves are powered by an external controller, no pilot lines or high to low side bleeds are required.

Refer to [Bulletin 100-40](#) for more information on Sporlan CDS valves.

Valve Sizing in Virtual Engineer

Inputting Sizing Information

Refrigerant is the type of refrigerant the system is operating with, by ASHRAE R-number designation.

Evaporator Temperature is the saturated temperature at evaporator or suction pressure. Virtual Engineer will allow Liquid Temperature to be less than the Evaporator Temperature.

CPR Valve Setting is the maximum compressor saturated suction temperature setpoint for the valve.

Suction Vapor Temperature is the temperature of the suction vapor entering the compressor. Virtual Engineer will not allow Suction Vapor Temperature to be less than Evaporator Temperature.

Liquid Temperature value is the liquid refrigerant temperature at the inlet of the expansion valve.

Compressor Capacity is the total cooling capacity of the compressor the crankcase pressure regulating valve is protecting. Virtual Engineer assumes one CPR per compressor.

Enter the required information into the left pane of the sizing tool. As information is entered, Virtual Engineer will filter products meeting that criteria in the right pane. When you have entered the required information, valid products will be available to compare in the right pane, including CRO and CDS valves. All valid products are included to compare by default. You may uncheck any product you don't wish to compare.

Getting Results and Comparing Choices

Click the "Compare" button at the top of the right pane to be taken to the Compare Table. The Compare Table will display the results of the selection, and the values input. The best selection within each compared product will be highlighted. The Compare Table will also show other selections within the compared products.

Click the "Select Columns" button at the upper left corner of the Compare Table to select what values you would like to appear in the Compare Table. Below is a quick explanation of the columns that can be selected for the Crankcase Pressure Regulator tool:

- **Valve Type:** The family that the valve belongs to
- **Nominal Valve Capacity:** The rated capacity of the valve per ANSI/AHRI Standards
- **Required Pressure Drop:** Reduction of pressure required to deliver specified capacity
- **Percent Rated Capacity:** How much of the valve's capacity is being used
- **Adjustment Range:** The pressure adjustment range of the mechanical valve
- **Number of Steps:** Total number of steps at full stroke of the electric valve
- **Maximum Rated Pressure:** The maximum working pressure of the valve in ambient conditions
- **Warnings:** Any warnings associated with the selection, such as a high or low loading condition, will display here.

After selecting columns, you can click and drag the column header to change the order of the columns. You can also click the ▼ in the column headers to further narrow or sort your results.

Click the "Group by Series" button at the top of the Compare Table to group the results by the valve family they belong to. Click the button again to ungroup.

Click the “Close” button below the Compare Table or the X in the upper right corner of the screen to close the Compare Table and return to the input screen.

Configuring a Part and Saving Results

In the second column of the Compare Table, there are two buttons that can appear: “Configure” or “Select.”

Click the “Configure” button next to the desired series to be taken to its eConfigurator. The eConfigurator can be used to configure a part according to your unique system. The eConfigurator will give an item number that can be used to purchase your part. Click the “Save” button to save your configuration and return to Virtual Engineer’s dashboard. The configured part will appear in your system.

If a “Select” button appears next to the desired series, then there is no eConfigurator currently available for that product, and the series will be selected without any configuration.

Click the “Export” button at the upper right corner of the Compare Table to save your results as an Excel spreadsheet.

Click the blue page icon in the “RPT” column of the Compare Table to generate a summary report of your inputs and choices. If the part was configured using an eConfigurator, the item number will also appear in the summary report. This report can be downloaded as a PDF and printed as needed.