



## Virtual Engineer: Sporlan Division

### MTW and CDS Discharge Pressure Regulator

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#### Discharge Pressure Regulators

The Modulating Three Way (MTW) valve is typically located in the discharge line. It modulates compressor discharge flow to control heat reclaim, reheat, or dehumidification applications. The CDS (two way) pressure regulating valve can also be used in this application.

#### Modulating Three Way Valves

The MTW valve allows control of refrigerant flow through two outlet ports. Two valve pistons are attached to a connecting rod and to the stepper motor. As the MTW valve modulates one port opens and the other port closes. The movement of the valve pistons relative to the two ports is inversely proportional.

Refer to [Bulletin 100-40-3](#) for more information on Sporlan MTW valves.

## CDS Discharge Pressure Regulators

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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

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### Inputting Sizing Information

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**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.

**Condensing Temperature** is the saturated temperature at discharge or condensing pressure. It is checked against the Liquid Temperature. Virtual Engineer will not allow Condensing Temperature to be less than Liquid Temperature.

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

**System Capacity** is the total cooling capacity of the system.

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 MTW 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

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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, based on a % loading criteria of 1%-100%. Virtual engineer assumes isentropic compression plus 50°F, with 25°F superheated vapor entering the compressor.

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 Discharge MTW tool:

- **Valve Type:** The family that the valve belongs to
- **Nominal Capacity:** The rated capacity of the valve per ANSI/AHRI Standards
- **Required Pressure Drop:** Reduction of pressure required to deliver specified capacity
- **Maximum Rated Pressure:** The maximum working pressure of the valve in ambient conditions
- **Number of Steps:** Total number of steps at full stroke
- **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

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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.