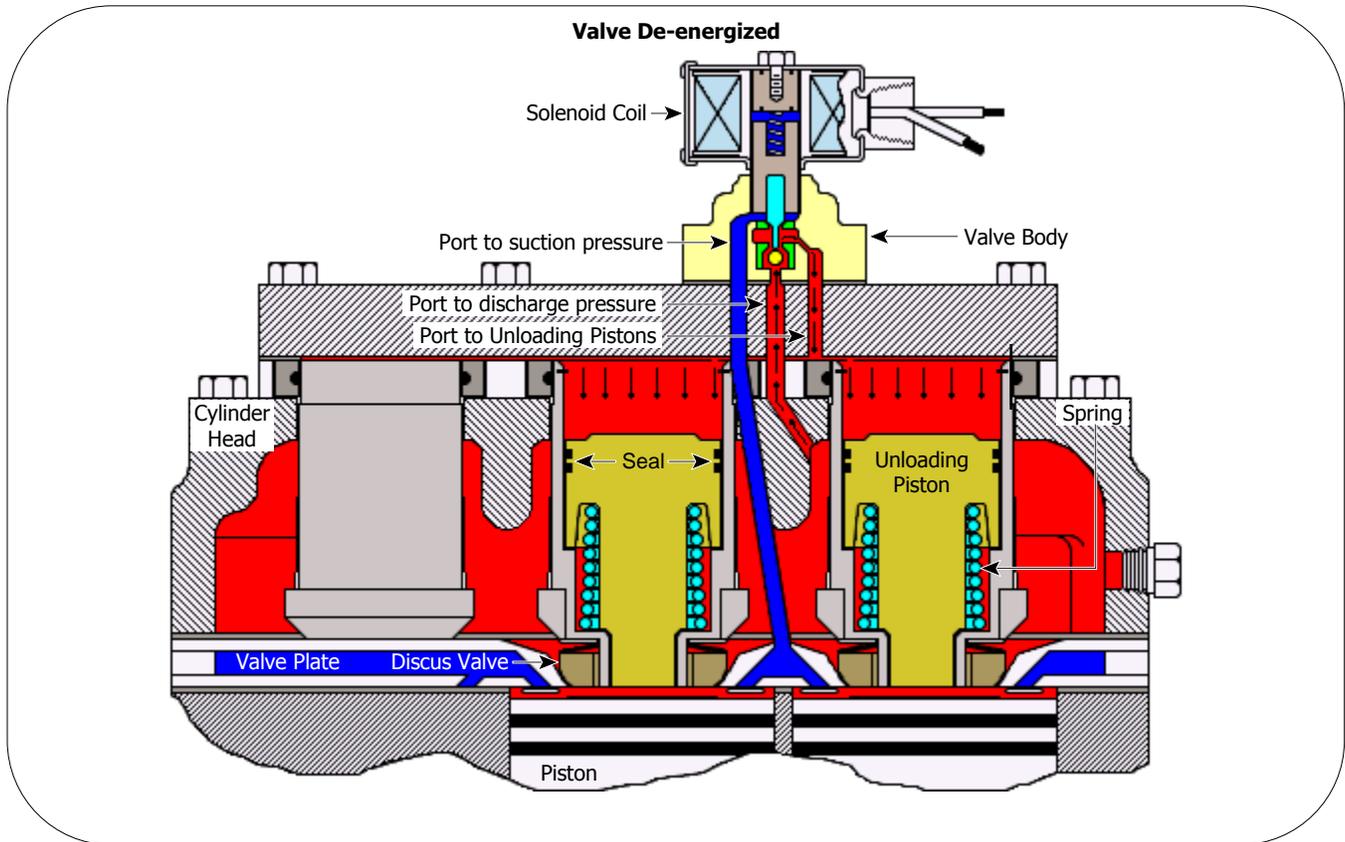


Copeland
Moduload® for 3D compressors



LOADED OPERATION

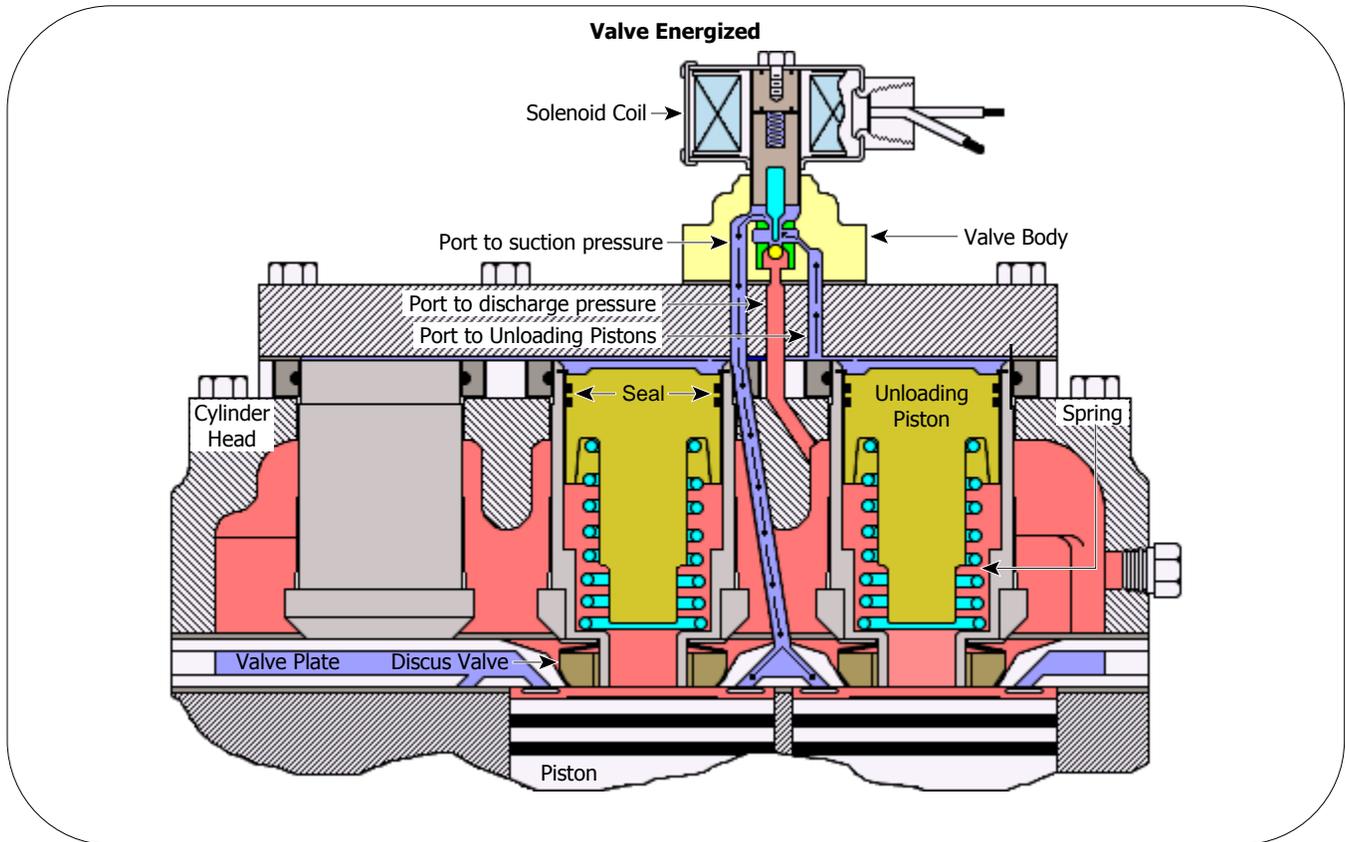
3D compressors unload by allowing compressed gas to fill a storage chamber above each cylinder and re-expand back into the cylinder during the suction stroke. As the gas reexpands, both the volumetric efficiency and compressor capacity are reduced. The energy consumed during compression is almost completely recovered during re-expansion, resulting in high efficiency in the unloaded mode.

A piston, cylinder, and spring mechanism is used which are solenoid actuated. All cylinders are unloaded equally, thus providing well balanced operation at all times.

The unloading hardware consists of a spring and plunger assembly for each cylinder housed in a chamber mounted on top of the valve plate.

In the fully loaded operating mode (with the solenoid valve de-energized), the solenoid needle valve is seated in the upper port, and the top of the unloading piston is exposed to discharge pressure through the discharge pressure port. The high pressure discharge gas on top of the unloader piston forces it to remain seated in the Discus valve.

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UNLOADED OPERATION

When unloaded operation is required, the solenoid valve is energized. The needle valve seats in the lower port, and the unloading piston chamber (above the unloading piston) is exposed to suction pressure through the suction port. With suction pressure on top of the piston, the spring force underneath the piston is sufficient to move the piston to the top of the chamber. In this position, the unloader piston opens a passage in the center of the Discus valve through which high pressure gas enters the expansion chamber during the compression stroke. During the suction stroke, the gas contained in the unloading chamber re-expands through the passage into the cylinder thus reducing capacity.