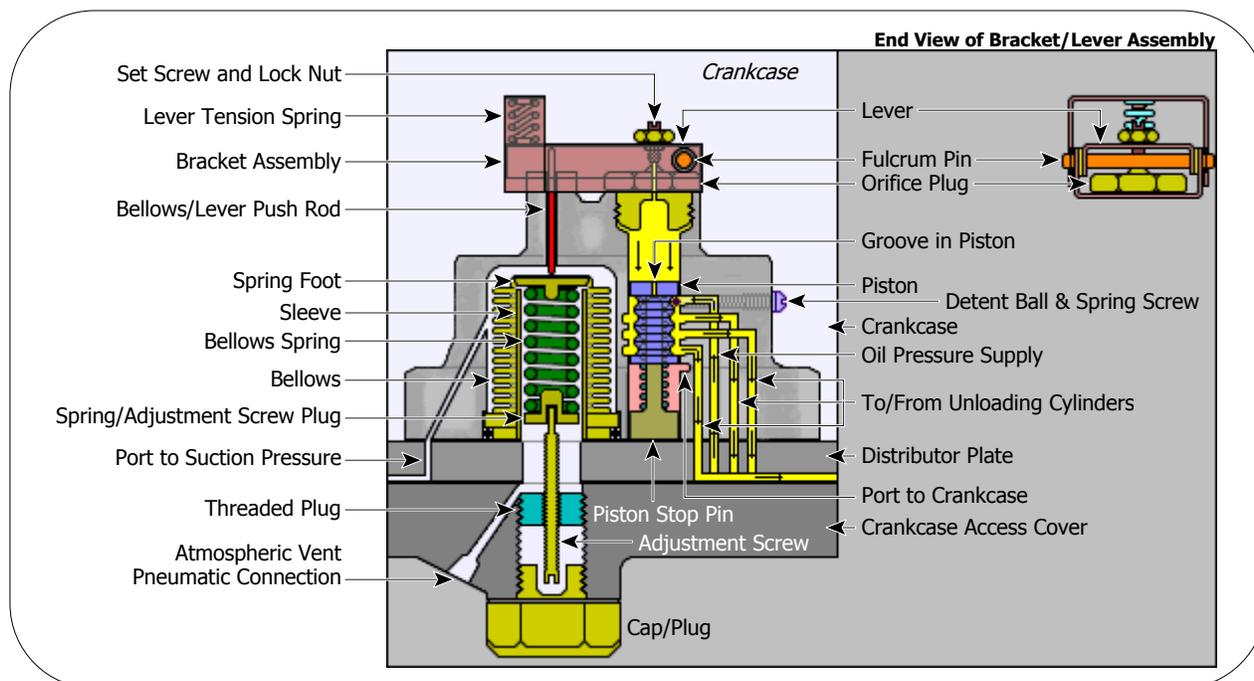


Trane
Model E and F Compressors
Unloading Characteristics
Suction Actuator Mechanism

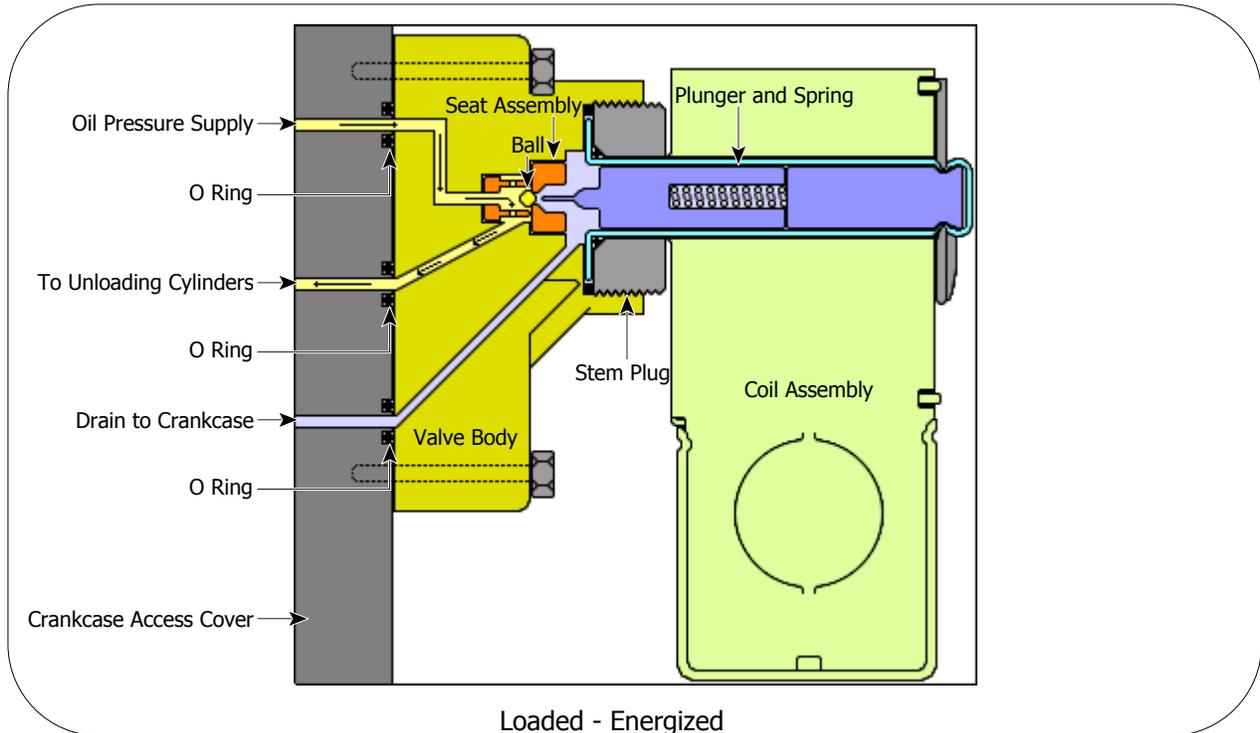


The Suction Actuator consists of a bellows/spring assembly and combination hydraulic relay assembly. The adjustment screw is turned to achieve a specific suction pressure. With the bellows/spring assembly putting pressure on the bellows/lever push rod the lever assembly is moved upward which moves the set screw and lock nut assembly off of the orifice plug port. Oil pressure built up beneath the orifice plug is relieved to the crankcase allowing the piston to move upwards due to the spring pressure beneath it. As the piston moves upwards oil pressure is cut off from the ports leading to the unloading cylinders in stages. There are three detent balls and springs located 120 degrees around the piston and held in place by screws. These detent balls and springs help the spool piston to move in stages rather than all at once. Once the ports leading to the unloading cylinders are cut off from oil pressure they are open to a drain port beneath the piston and the oil pressure built up in the unloaders is relieved to the crankcase via this drain port and the cylinders unload.

A port in the Suction Actuator housing allows suction pressure to be imposed on the bellows assembly. When the suction pressure is high enough it pushes the bellows/spring assembly towards the crankcase access cover which allows the push rod and lever assembly to move down closing off the port in the orifice plug. This allows oil pressure to build up on top of the piston moving it down against its spring. Ports leading to the unloading cylinders are then opened, in stages, to oil pressure which causes the cylinders to load up. Oil that is beneath the piston is relieved to the crankcase via a drain port below as the piston moves down.

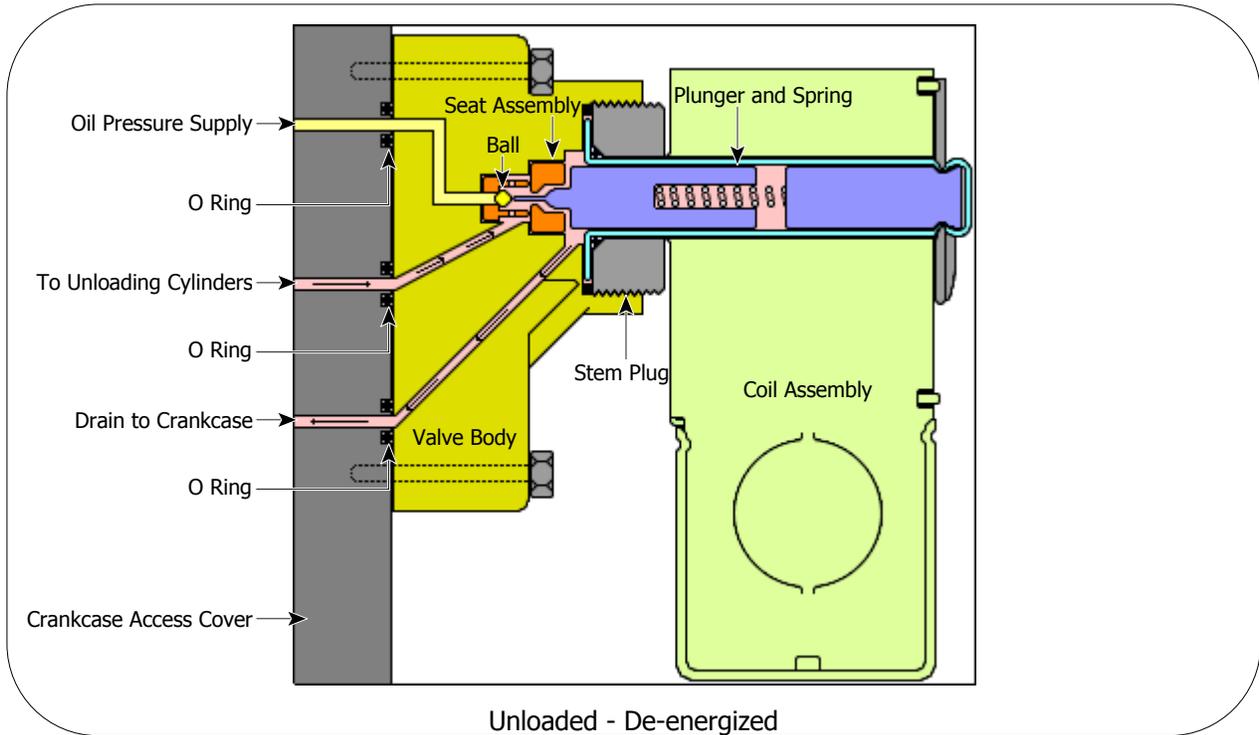
Oil pressure is controlled at the orifice plug and lever set screw to control loading of the cylinders, in stages, to maintain a close range in suction pressure so that loading and unloading of the cylinders is automatic once the adjustment screw is set at the desired pressure.

Trane
Model E and F Compressors
Unloading Characteristics
Solenoid Unloading



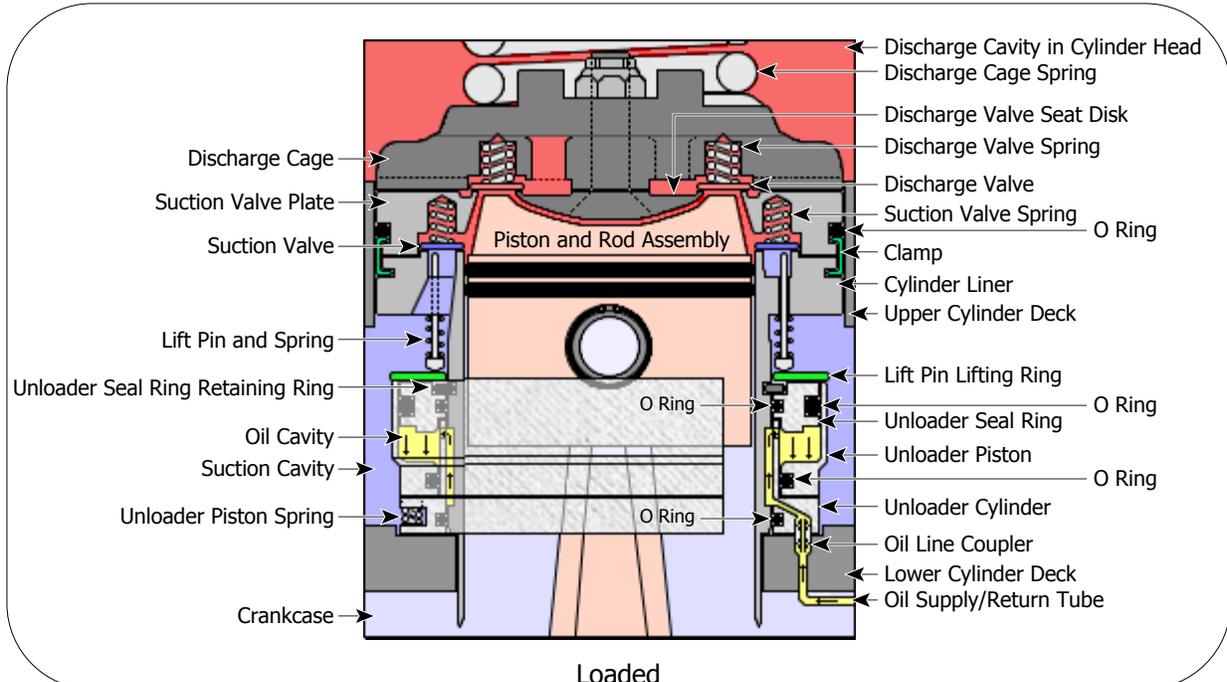
When the solenoid valve is energized the plunger is pulled towards the coil compressing its spring. Oil pressure is then allowed to force the valve ball onto the port, in the valve seat assembly, which closes off access to the crankcase. Oil pressure is then allowed to flow to the unloaders through the valve seat assembly. This loads the cylinders.

Trane
Model E and F Compressors
Unloading Characteristics
Solenoid Unloading



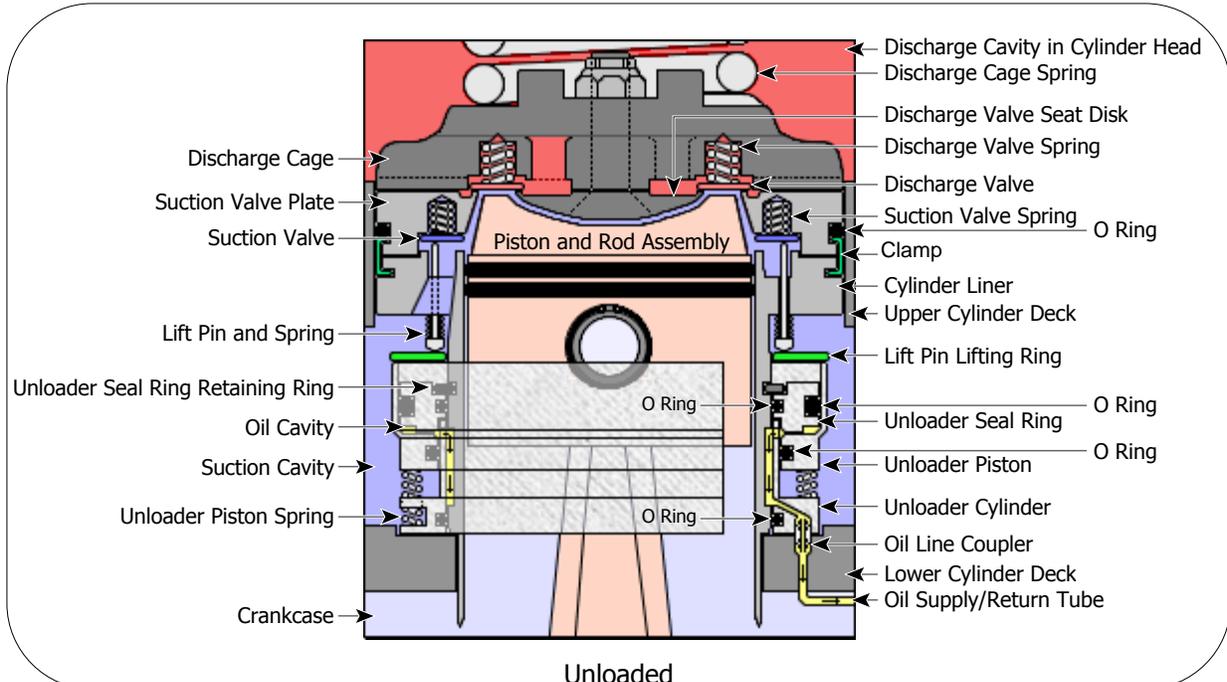
When the solenoid valve is de-energized the plunger spring forces the plunger towards the valve body. The plunger contacts the valve ball and forces it against the port supplying oil pressure and closes it off. Oil pressure built up in the unloaders is allowed to drain to the crankcase through a port in the seat assembly and valve body. This unloads the cylinders.

Trane
Model E and F Compressors
Unloading Characteristics
Unloading Cylinder



With oil pressure applied to the unloader mechanism, via the oil supply/return tube, oil is forced into the unloader cylinder and around the cylinder liner. Drilled ports in the unloader cylinder allow oil pressure to the unloader piston and unloader seal ring. The oil pressure forces the unloader piston down against the unloader piston springs. This, in turn, allows the lift pin springs to force the lift pins and lift pin ring down so that the lift pins are below the suction valve seats ground onto the cylinder liner. The suction valve springs force the suction valve against its seats on the cylinder liner. As the piston travels downward the difference in pressure in the cylinder created by the void allows the suction gas, in the suction cavity, to force the suction valve open against its springs. Suction gas enters the cylinder until the piston downward travel has stopped and the pressure in the cylinder becomes equal to the suction pressure. The suction valve closes due to the suction valve springs. As the piston travels upwards the pressure in the cylinder becomes greater than the pressure in the discharge cavity in the head. The discharge valve then opens against the discharge valve springs. The high pressure gas is then forced from the cylinder through ports in the discharge cage assembly into the discharge cavity in the head. When the piston stops traveling upwards and the pressure in the cylinder becomes equal to the pressure in the discharge cavity of the head, the discharge valve closes against its seats ground in the suction valve plate and discharge valve seat disk. The discharge springs keep the discharge valve closed tightly while the piston travels downward for another intake cycle.

Trane
Model E and F Compressors
Unloading Characteristics
Unloading Cylinder



When oil pressure is allowed to drain from the unloader mechanism, via the oil supply/return tube, the unloader piston springs force the unloader piston upwards. Since the unloader piston contacts the lift pin ring the lift pins are also moved upwards and the lift pin springs are compressed. The lift pins contact the suction valve and move it upwards off of its seats to the fully open position compressing the suction valve springs. With the suction valve held in the fully open position suction gas can enter and exit the cylinder as the piston travels up and down. Since the suction valve does not close, in this state, no compression takes place and the discharge valve never opens thus effectively unloading the cylinder.