The Vilter Single Screw compressor is a rotary, positive displacement compressor which incorporates a main screw and two gaterotors. Compression of the gas is accomplished by the engagement of the two gaterotors with the helical grooves in the main screw. The drive shaft imparts rotary motion to the main screw which in turn drives the intermeshed gaterotors.

The compressor is comprised of three fundamental components which rotate and complete the work of the compression process. This typically includes a cylindrical main screw with six helical grooves and two planar gaterotors, each with 11 teeth. The rotational axes of the gaterotors are parallel to each other and mutually perpendicular to the axes of the main screw.

The standard Vilter Single Screw Compressor (as shown in this end view drawing) consists of two rotating gaterotor assemblies and a main screw assembly. All bearings are pressure fed with oil.

This side view cross-sectional drawing of a Vilter oil flooded Single Screw illustrates the suction and the discharge ports as well as the various seals and driveshaft.
Vilter’s VSS line of single screw compressors delivers higher performance than twin screw compressors and have fewer moving parts than reciprocating compressors. The key to Vilter’s single screw compressor reliability is its balanced design. This inherent design advantage allows Vilter to offer the 5/15, a five-year warranty on internal components and a fifteen-year warranty on bearings, the industry’s longest. The balanced design results in ultra-low bearing loads with significantly decreased vibration and sound levels. The addition of Vilter’s exclusive Parallex slide system allows the compressor to run at optimum efficiency.

**Tradition & Technology**
Together. Working For You.

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**Vission™ micro-controller**—2000 winner of start magazine’s third annual Technology & Business Award competition. It has been developed in Windows CE utilizing Think and Do™ software for user-friendly operation, ease of custom programming and maximum flexibility. It features dual processing power providing unmatched reliability. Standard languages in the controller are English, Spanish and French, as well as English or SI units of measure.

**Oil Cooling Options**—
- V-Plus®
- Thermosyphon
- Water Cooled
- Liquid Injection

**Large Capacity Oil Filter**—Filters lubricating oil before injection into the compressor. Internal cartridge filter removes all particles larger than 12 microns. Filter inlet and outlet are equipped with transducers for monitoring pressure drop, and shut-off valves for servicing. Available with dual oil filters.
### VSS Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>CPM</th>
<th>Tons</th>
<th>BHP</th>
<th>Tons</th>
<th>BHP</th>
<th>Suction (b)</th>
<th>Discharge (b)</th>
<th>A (b)</th>
<th>B (b)</th>
<th>C (b)</th>
<th>D (c)</th>
<th>E (c)</th>
<th>F (c)</th>
<th>Weight (lbs)</th>
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<tr>
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</tbody>
</table>

(a) Tons and CFM based on 20°F and 95°F; 10°F liquid subcooling, saturated suction. Ratings for other refrigerants are available - Consult home office.

(b) Dimensions shown are approximate and for ammonia high stage units. Other refrigerants and booster units may have different dimensions.

(c) Maximum addition (including safety valve) to width of compressor package.

(d) Without motor; with liquid injection oil cooling. Units with external cooler will weigh approximately 500 pound more.

"E" models above are Econ-o-Mizer® models.
The theory of the single screw compressor begins with an understanding of the machine's components and how they function in concert to create a fluid flow. The single screw compressor is composed of a single rotor, or screw, that rotates in a housing to create a compression process. As the screw rotates, the engagement of the gate rotor continues, compressing the gas and forcing it into the discharge port in the housing. Since the screw has two gaterotors, the compression process begins. As the screw rotates, the maximum area of the gate rotor is exposed to the gas pressure. This inherent design feature allows the gas to be compressed between the grooves, which are aligned with the discharge port, and the pressure in the housing is built up. The compression process is then completed as the gas flows into the discharge port and is expelled from the compressor.

Process Diagrams

**Suction**

- The suction process begins with the screw being positioned in the suction position.
- As the screw rotates, the suction ports are aligned with the suction ports in the casing.
- The gas is drawn into the suction ports and flows through the grooves of the screw.
- The gas is then compressed as the screw rotates and the suction ports are closed.

**Compression**

- As the screw continues to rotate, the gas is compressed between the grooves of the screw.
- The compression process continues until the gas reaches the discharge pressure.
- The gas is then expelled from the compressor through the discharge port.

**Discharge**

- The discharged gas exits the compressor and is expelled into the environment.
- The process cycle repeats as the screw rotates and the suction process begins again.

The efficiency of the single screw compressor is dependent on the design of the screw and the housing. The screw design includes a series of grooves that are aligned with the suction and discharge ports. The grooves are designed to maximize the compression efficiency while minimizing the clearance losses. The housing design includes a series of ports that are aligned with the suction and discharge ports. The ports are designed to minimize the friction losses and maximize the gas flow.

**Sealing During Compression**

- Sealing is provided by the compression of the gas in the groove and the resultant pressure differences.
- The compression process creates pressure differences between the gas in the groove and the gas in the casing.
- These pressure differences create a sealing effect that prevents the gas from leaking out of the compressor.

**Design**

- The design of the single screw compressor includes a series of grooves that are aligned with the suction and discharge ports.
- The grooves are designed to maximize the compression efficiency while minimizing the clearance losses.
- The housing design includes a series of ports that are aligned with the suction and discharge ports.
- The ports are designed to minimize the friction losses and maximize the gas flow.

**Capacity Control**

- The capacity of the single screw compressor is controlled by the position of the capacity slide and the volume slide.
- The capacity slide is set to allow a specific amount of gas to be discharged from the compressor.
- The volume slide is set to allow a specific amount of gas to be suctioned into the compressor.

**Volume Ratio**

- The volume ratio of the single screw compressor is determined by the position of the capacity slide and the volume slide.
- The volume ratio is the ratio of the volume of gas suctioned into the compressor to the volume of gas discharged from the compressor.

**Conclusion**

- The single screw compressor is designed to operate efficiently over a wide range of conditions.
- The design features include a series of grooves that are aligned with the suction and discharge ports.
- The housing design includes a series of ports that are aligned with the suction and discharge ports.
- The design is optimized to minimize friction losses and maximize the gas flow.

**Volute Ratio**

- The volute ratio of the single screw compressor is determined by the position of the capacity slide and the volume slide.
- The volute ratio is the ratio of the pressure at the suction port to the pressure at the discharge port.
- The volute ratio is controlled by the position of the capacity slide and the volume slide.

**Capacity & Volume Ratio Controls**

- The capacity and volume ratio controls are used to set the amount of gas suctioned into the compressor and the amount of gas discharged from the compressor.
- The controls are set to allow a specific amount of gas to be suctioned and discharged.
- The controls are set to allow a specific amount of gas to be suctioned and discharged.

**Slide Design**

- The slide design of the single screw compressor includes a series of grooves that are aligned with the suction and discharge ports.
- The grooves are designed to maximize the compression efficiency while minimizing the clearance losses.
- The housing design includes a series of ports that are aligned with the suction and discharge ports.
- The ports are designed to minimize the friction losses and maximize the gas flow.

**Carbon Face Seals**

- Carbon face seals are used to seal the clearance between the screw and the housing.
- The carbon face seals are made from a material that is resistant to high temperatures and pressures.
- The carbon face seals are designed to minimize the friction losses and maximize the gas flow.

**Labyrinth Seals**

- Labyrinth seals are used to seal the clearance between the screw and the housing.
- The labyrinth seals are made from a material that is resistant to high temperatures and pressures.
- The labyrinth seals are designed to minimize the friction losses and maximize the gas flow.

**Winding Back Seals**

- Winding back seals are used to seal the clearance between the screw and the housing.
- The winding back seals are made from a material that is resistant to high temperatures and pressures.
- The winding back seals are designed to minimize the friction losses and maximize the gas flow.

**Centrifugal Force**

- Centrifugal force is used to create an axial load on the screw.
- The screw is positioned in the suction position and the centrifugal force is applied.
- The centrifugal force is used to create an axial load on the screw.

**Optimum Load Conditions**

- The optimum load conditions are determined by the position of the capacity slide and the volume slide.
- The optimum load conditions are determined by the position of the capacity slide and the volume slide.
- The optimum load conditions are determined by the position of the capacity slide and the volume slide.

**Optimum Efficiency**

- The optimum efficiency is determined by the position of the capacity slide and the volume slide.
- The optimum efficiency is determined by the position of the capacity slide and the volume slide.
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