

Vilter®



***The World's Best Compressors™
For Gas Compression***

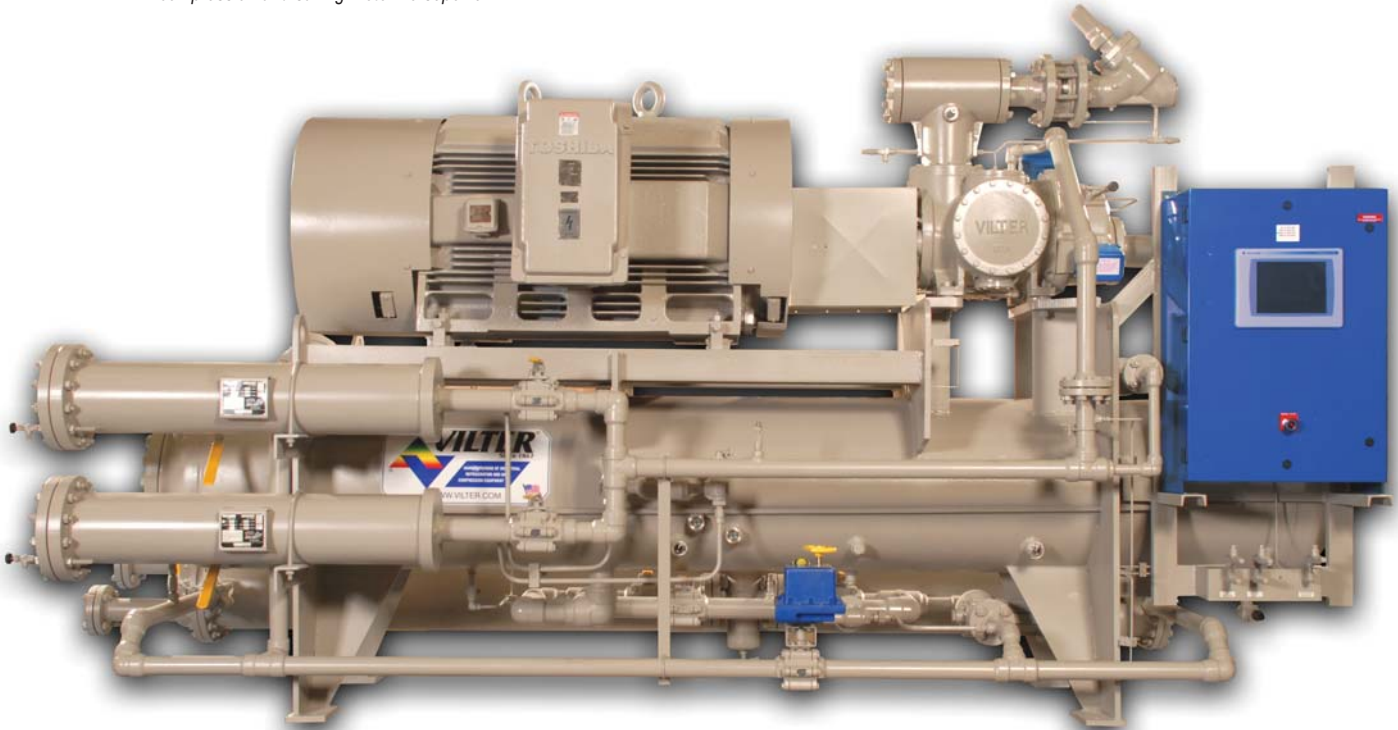


**VSG
Compressor**

***For natural gas
and process gas
applications***

Parallex™ Slide System - It's the key to part load efficiencies far superior to twin screw compressors. Capacity and volume slides move independently of each other based on load, eliminating over or under compression and saving motor horsepower.

Allen-Bradley Programmable Controller - The CompactLogix programmable controller with an A-B PanelView 1000 graphic display provides high performance in a small footprint for stand alone operation or for integrated system control.



Large Capacity Oil Filter - Filters lubricating oil before injection into the compressor. Internal cartridge filter removes all particles larger than 25 microns. Filter inlet and outlet are equipped with transducers for monitoring pressure drop, and shut-off valves for servicing.

Oil Cooling Options —

- Water Cooled
- Air Cooled

Applications

- Gas Liquification
- Vapor Recovery
- Flare Gas Recovery
- Coal Bed Methane Recovery
- Field and Fuel Gas Boosting
- Wellhead Recovery
- Enhanced Oil Recovery
- Landfill Gas Recovery
- LNG Boil Off
- Gas Gathering
- BIO - Gas
- Digester
- CO₂
- Nitrogen
- Hydrogen
- Refrigerant

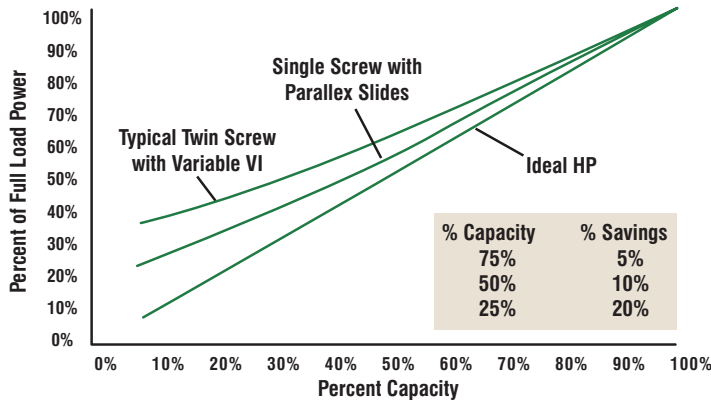
Compressor-Features The Vilter Advantages

- Displacements from 310 to 2,048 CFM
- Variable capacity control 10-100%
- Variable volume ratios 1.2 – 7.0
- Compression ratios 2 – 20
- Electronic actuators are weatherproof and conform to Class 1, Group C&D, Division 2 Classification
- Balanced main rotor with no axial or radial loads
- Parallex™ Slide System for maximum operating efficiency
- Low Bearing Loads no Hydrodynamic- bearings
- High suction pressure capability is standard
- Clockwise rotation models available
- Low noise levels
- Low maintenance costs

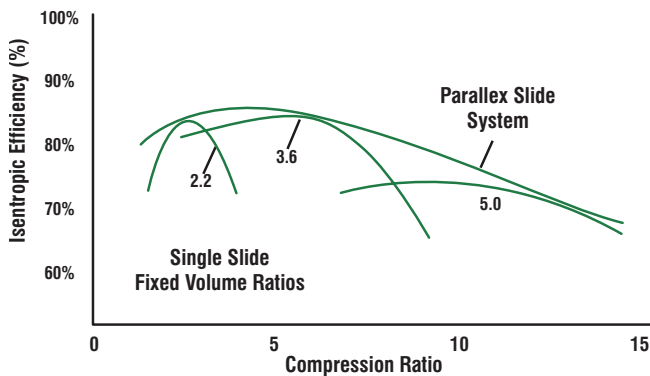


The World's Best Compressors™ For Gas Compression

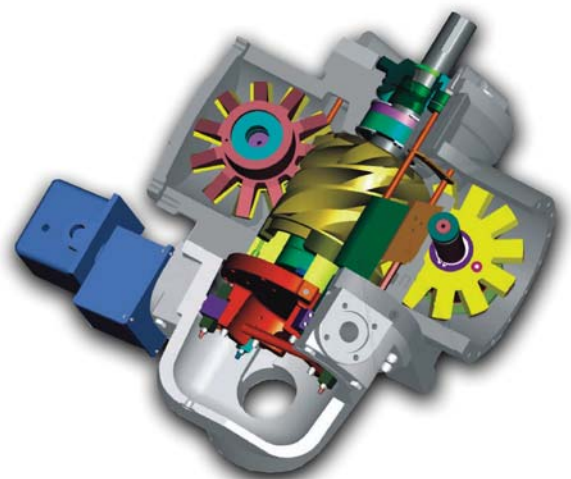
Part Load Energy Consumption – Single Screw vs. Twin Screw



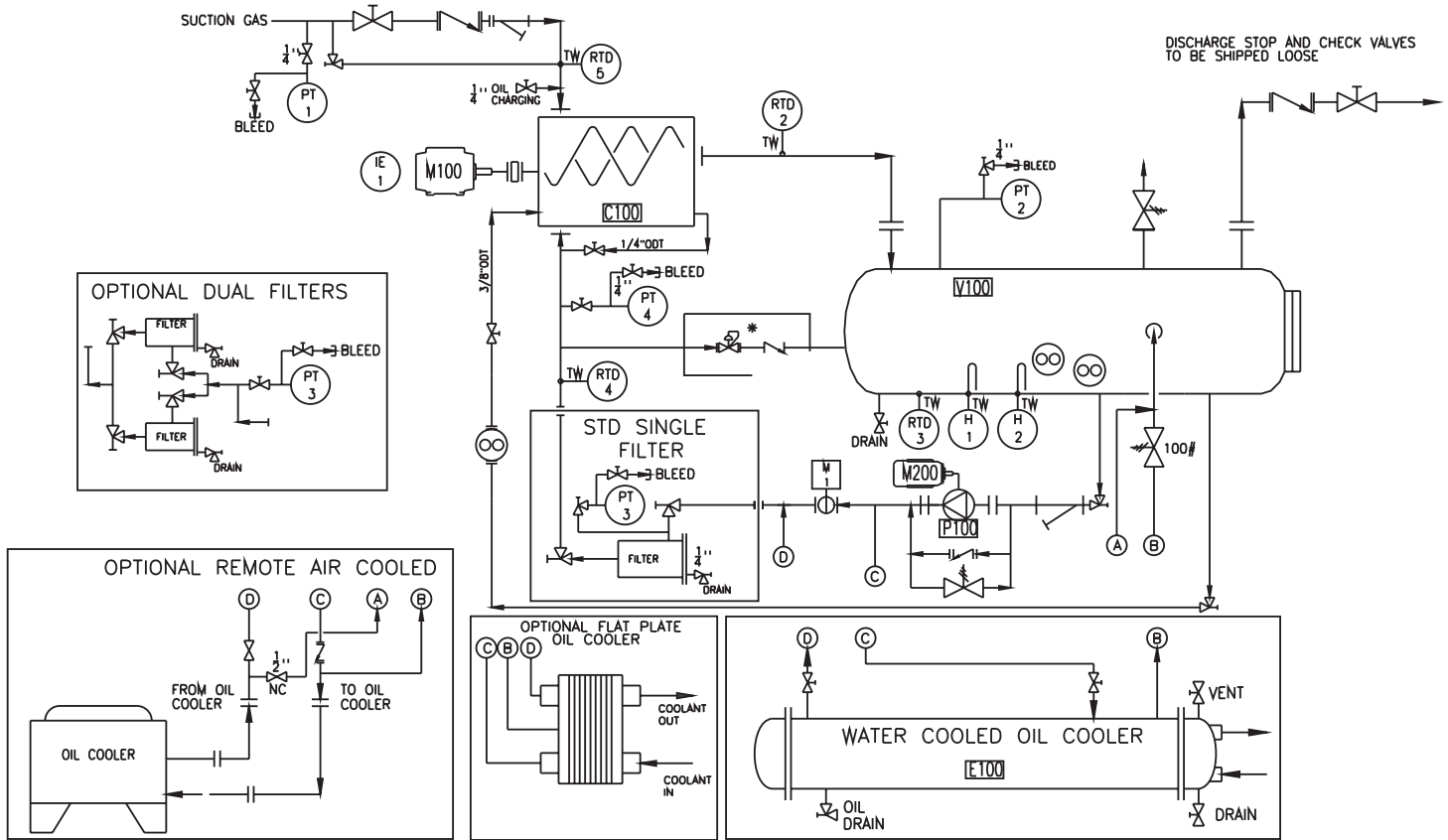
Isentropic Efficiency Comparison Between Variable and Fixed Volume



Vilter's VSG single screw gas compressors deliver longer life, higher reliability and better energy efficiency than twin screw compressors and have fewer moving parts than reciprocating compressors. The key to the single screw compressor's reliability is in its balanced design. At the core of the positive displacement rotary compressor is a single main rotor intermeshed with two opposing gaterotors. The balanced design results in ultra-low bearing loads with significantly decreased vibration and sound levels. The key to the single screw compressor's high energy efficiency is Vilter's exclusive Parallelex™ slide system allowing the compressor to run at optimum efficiency through its full range of capacity. Providing the highest reliability and unsurpassed energy efficiency...The World's Best Compressors are available only from Vilter!



Unit Features



Flow Diagram (Figure 1)

Standard Construction:

- Main bearings – Roller and ball type angular contact thrust.
- Gaterotor bearings – Roller and ball type angular contact thrust.
- Hand wheels or optical slide valve motor for capacity and volume control. Suitable for Class 1, Group C+D, Div. II.
- Variable Vi - Independent volume control and capacity control for improving efficiencies.
- Separate pre-lube oil pump with TEFC drive motor.
- Lube oil piping is carbon steel, using socket weld or butt weld connections. Threaded connections are kept to a minimum.
- ASME designed oil separator with coalescing oil filter.
- CompactLogix programmable controller with an A-B PanelView 1000 graphic display
- Separate stop and check valves for both suction and discharge lines.

Process Gas Circuit:

- Suction Gas Stop and Check Valve.
- Suction Line Strainer – The strainer is stainless steel mesh construction and suited to Process Gas applications.
- Process Gas/Oil Separator – The separator is capable of removing the oil from the discharge gas stream and is an ASME-coded vessel which uses five stages of separation to achieve an oil loss of below 4 PPM.
- Discharge Oil Separator Relief Valve.

Injection Oil Circuit:

- Oil Pre-lube Pump with TEFC motor.
- Oil Cooler/Temperature Control Valve – An oil cooler, either air or water cooled, must be used to remove the heat of compression from the oil stream. A two way temperature control valve is used to maintain precise oil injection temperature to the compressor VIA PID loop control in PLC.
- Oil Filtration – Filtration down to 25 microns nominal. Optional dual filters are recommended to allow replacement of one cartridge while the compressor continues running with the other cartridge in service.
- Oil Heater – Oil heaters are supplied to maintain oil temperature of at least 90°F when the compressor is not running.

Available Options:

- Stainless steel lube oil circuit.
- Suction bypass connection for fuel gas booster application.
- Dual oil pumps.
- Dual oil filters.
- Water cooled or air cooled oil coolers.
- High & Low ambient temperature options.

Note – Because the oil system on the VSG compressor utilizes discharge gas pressure as the means to move the injection oil through the system, it must be remembered that all components of the oil system are exposed to full discharge pressure and must be pressure rated accordingly.

Alarm and Shutdown Annunciation/Indication

The control system for the VSG compressor must protect the machine from running outside of normal operating conditions. This is accomplished by providing operators with alarms when operating parameters have reached an abnormal condition, and by automatically stopping the compressor before these conditions can cause a unit failure.

Safety Setpoints:

- Low Gas Suction Temperature
- High Gas Discharge Temperature
- Low Oil Separator Start Temperature
- Low Oil Separator Run Temperature

- Low Oil Injection Temperature
- High Oil Injection Temperature
- Low Suction Pressure
- High Discharge Pressure
- Prelube Oil Pressure
- Low Oil Pressure
- High Starting Oil Filter Differential Pressure
- High Running Oil Filter Differential Pressure
- High Motor Amperage Limit

In most cases, the safety setpoints described will have settings which are dictated by process requirements, and not necessarily mechanical constraints of the compressor. Process pressures and temperatures may vary considerably depending on the application of the compressor. The VSG compressor is designed to operate in a broad range of applications. Minimum and maximum values for each safety setpoint are provided, while precise settings for the safety setpoints must be derived for each installation.

Instrumentation

Pressure

There are four pressure transducers to read system pressures as listed below (Figure 1).

PT1 Suction pressure transducer

(-15.0 - 400 PSIG) measures the gas suction pressure into the compressor housing.

PT2 Discharge pressure transducer

(-15.0 - 400 PSIG) measures the discharge pressure of the process gas in the separator.

PT3 Oil Filter Inlet pressure transducer

(-15.0 - 400 PSIG) measures the oil pressure as it enters the oil filter canisters.

PT4 Oil Manifold pressure transducer

(-15.0 - 400 PSIG) measures the oil pressure downstream of the oil filter as the oil is injected into the compressor.

Additional pressure transducers may be required and installed by the customer for pressure readings at customer specified points such as process gas discharge pressure from the package boundary, cooling water pressure to and/or from the oil cooler, etc.

Temperature

There are four temperature readings for processor control, as listed below (Figure 1).

RTD1 Suction temperature RTD measures the temperature of the incoming suction gas.

RTD2 Discharge temperature RTD measures the temperature of the gas/oil mixture as it is discharged from the compressor housing.

RTD3 Oil Separator temperature RTD measures the temperature of the oil in the separator sump.

RTD4 Oil Injection temperature RTD measures the temperature of the oil as it is injected into the compressor.

Additional RTD's may be required and installed by the customer for temperature readings at customer specified points such as discharge gas temperature from the package boundary, cooling water temperature to and/or from the oil cooler, gas aftercooler temperature, etc.

Additional Instrumentation

- Motor current transformer
- Optical actuators for capacity and volume slide indication

Other Options:

- Remote start/stop input
- Remote alarm/trip output



Application Guidelines

To ensure the successful operation of the VSG compressor, the guidelines described below should be followed.

Proper lubrication is critical to the operation of the VSG compressor. The compressor relies on the injected oil to absorb and remove the heat of compression, to seal the compression chambers formed in the flutes of the screw, and to lubricate all moving parts. For this reason, it is imperative that the oil chosen be of correct viscosity, and that sufficient oil flow be provided at all times, using an auxiliary oil pump when necessary. The oil chosen must be compatible with the process gas, to prevent absorption of the gas into the oil, which would dilute the oil and reduce the viscosity. Also oil filtration to 25 micron nominal particle size is required to ensure that only clean oil is injected into the compressor. For assistance in choosing the correct oil for the application and in sizing an auxiliary oil pump, consult a Vilter representative.

Injection oil temperature must be closely controlled for optimum performance. Oil temperature must be maintained a minimum of 15 - 20°F above the gas mixture dewpoint at anytime to prevent condensation or liquid knockout from occurring within the compressor.

Gas composition plays a role in the performance of the VSG compressor as well. While the VSG is capable of handling a wide variety of gases, if H₂S is present in the process gas in any concentration, special oil additives are required to protect the compressor from corrosion. Levels below 100 PPM of H₂S allow the standard warranty to apply.

Typical gases handled: Natural Gas, Landfill Gas, Carbon Dioxide, Propane, Helium, Propylene and Ammonia. Other gases will need to be reviewed for compatibility and operational performance by Vilter.

Compressor Capacity and Design Limitations Standard Compressor Models

Description	VSG 301	VSG 361	VSG 401	VSG 501	VSG 601	VSG 701	VSG 751	VSG 901	VSG 1051	VSG 1201	VSG 1551	VSG 1851	VSG 2101
Rotor Diameter (mm)	205	205	205	240	240	240	280	280	310	310	350	350	350
Gaterotor Diameter (mm)	195	205	216	225	240	252	268	280	298	310	331	350	368
Theoretical Displacement CFM at 3550 RPM	305	353	405	502	608	691	802	906	1101	1229	1526	1790	2118
Max. H.P. 3600 RPM* Max. Allowable Torque	300 H.P. 444 ft. lbs.			650 H.P. 962 ft. lbs.			725 H.P. 1280 ft. lbs.		865 H.P. 1280 ft. lbs.		1000 H.P. 1479 ft. lbs.		
Rotor Speed (RPM)	1200-4800						1200-4000		1200-3800		1200-3600		
Direction of Rotation	CCW Facing Drive End			CW Facing Drive End			CCW Facing Drive End						
Drive Type	Direct Drive, Electric Motor, Gas Engine												
Built-in Volume Ratio	From 1.2 to 7.0 (Continuously Variable Automatic, or Manual Control)												
Capacity Range	From 10% to 100% (Continuously Variable Automatic, or Manual Control Available)												
Standard Oil Separator Design (PSIG)**	400						350						
Bare Comp. MAWP** (PSIG)	515						485				450		
Max. Pressure Differential (PSIG)***	325												
Min. Inlet Temp (°F)	-50°F												
Max. Inlet Temp (°F)	180°F												
Max. Disch. Temp (°F)	210° (Contact Vilter for increased temperature limits)												
Max. Oil Temp (°F)	190° (Contact Vilter for increased temperature limits)												

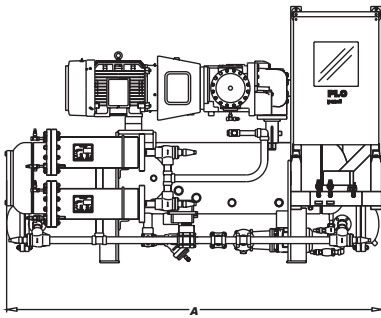
*Higher limits are available. Consult Vilter Manufacturing LLC.

**Higher discharge pressures are achievable. Consult Vilter Manufacturing LLC. for approval.

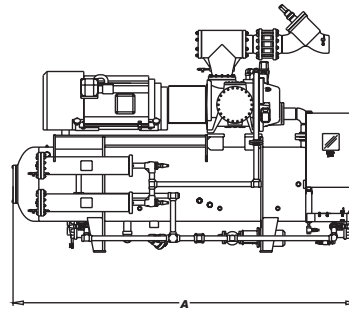
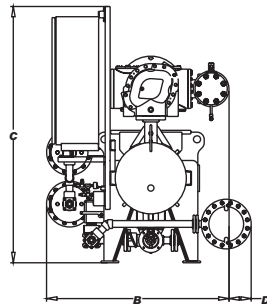
***Higher differential pressures can be achieved. Consult Vilter Manufacturing LLC. for approval.

Note: MAWP (Maximum Allowable Working Pressure). The relief valve setting must be below the MAWP. The relief valve is usually set 10% lower than the MAWP.

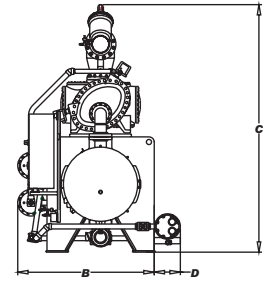
VSG Unit Dimensions & Specifications



Models VSG 301-701



Models VSG 751- 2101



Models VSG 301-701, above, are shown with a standard C-Flange motor mount, single oil filter and standard water-cooled oil cooler which is noted by the D dimension on the drawing. Models VSG 751-2101 drawings illustrate the optional dual oil filter and the optional remote mounted oil cooler which can be air cooled.

It is important to note that all VSG models can be fitted with single or dual oil filters, water-cooled oil cooler or remote mounted oil cooler.

VSG Unit Dimensions

Filter Model	Standard Connection Sizes		Unit Dimensions (Approximate)				Approx. Shipping Weight (lbs.)
	Suction*	Discharge*	A Length	B Width	C Height	D Optional Oil Cooler	
VSG-301	3"	3"	8'-10"	4'-2"	6'	7-3/4"	3600
VSG-361	3"	3"	8'-10"	4'-2"	6'	7-3/4"	4150
VSG-401	4"	3"	8'-10"	4'-2"	6'	7-3/4"	4150
VSG-501	4"	3"	8'-9"	3'-8"	7'-6"	10-3/4"	5500
VSG-601	4"	4"	9'-10"	4'-0"	7'-10"	10-3/4"	6000
VSG-701	4"	4"	9'-10"	4'-0"	7'-10"	10-3/4"	6000
VSG-751	6"	4"	12'-0"	3'-7"	8'-0"	16"	5300
VSG-901	6"	4"	12'-0"	3'-7"	8'-0"	16"	5350
VSG-1051	6"	6"	13'-2"	4'-1"	8'-8"	16"	6600
VSG-1201	6"	6"	13'-2"	4'-1"	8'-10"	16"	6800
VSG-1551	8"	6"	14'-0"	5'-8"	10'	17"	9200
VSG-1851	8"	6"	14'-0"	5'-8"	10'	17"	9300
VSG-2101	10"	6"	14'-0"	5'-8"	10'	17"	9500

* Dimensions shown are approximate and should not be used for construction.

Vilter®



Vilter Manufacturing LLC

**5555 South Packard Ave.
Cudahy, WI 53110-8904
www.vilter.com**

**Telephone: (414) 744-0111
Fax: (414) 744-3483**

E-mail: custserv.@vilter.com

**District Sales Offices &
Distributors Worldwide**