450XL™ Compressor

For Industrial Refrigeration

Vilter™

The World's Best Compressors™
For Industrial Refrigeration

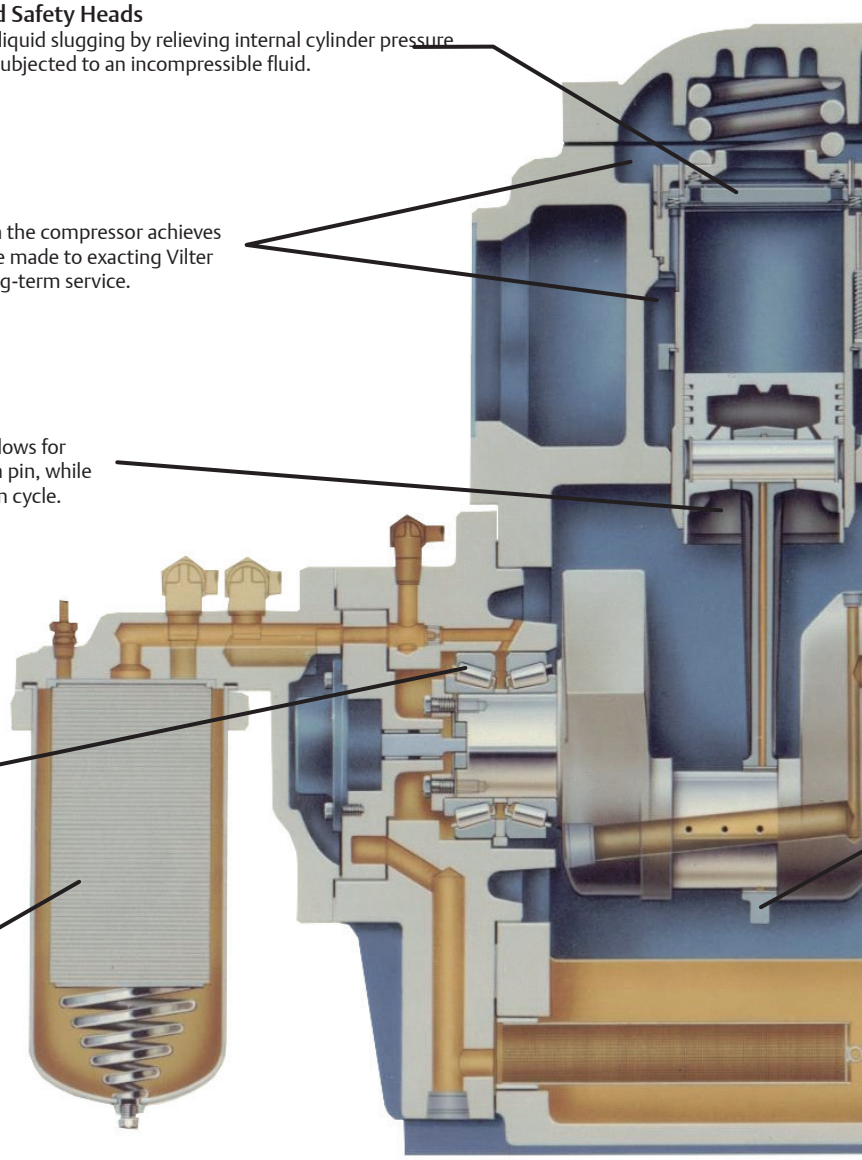
EMERSON™
Climate Technologies

450XL™ Cross Section

Spring Loaded Safety Heads
Protect against liquid slugging by relieving internal cylinder pressure if cylinders are subjected to an incompressible fluid.

Suction and Discharge Porting
Maximum suction and discharge porting through the compressor achieves minimum pressure drop with valve plates that are made to exacting Vilter material and manufacturing requirements for long-term service.

Piston and Connecting Rod
The unique design of the piston and connecting rod assembly allows for movement only between the connecting rod bushing and piston pin, while providing positive lubrication throughout the entire compression cycle.



Double Tapered Roller Bearings
Energy-efficient roller bearings enable the compressor to be used for high suction pressure applications as well as high belt-drive horsepower requirements.

Tri-Micro™ Oil Filter
Removes 95% of contaminants as small as 3 microns in size. Allows full flow of oil at all times, resulting in reduced wear on compressor components. Combines extreme filtering capacity with the convenience of a throw-away recharge element. Filter is enclosed in a seamless drawn carbon steel shell with cast iron cover, and is equipped with a means for determining pressure drop across the filter.

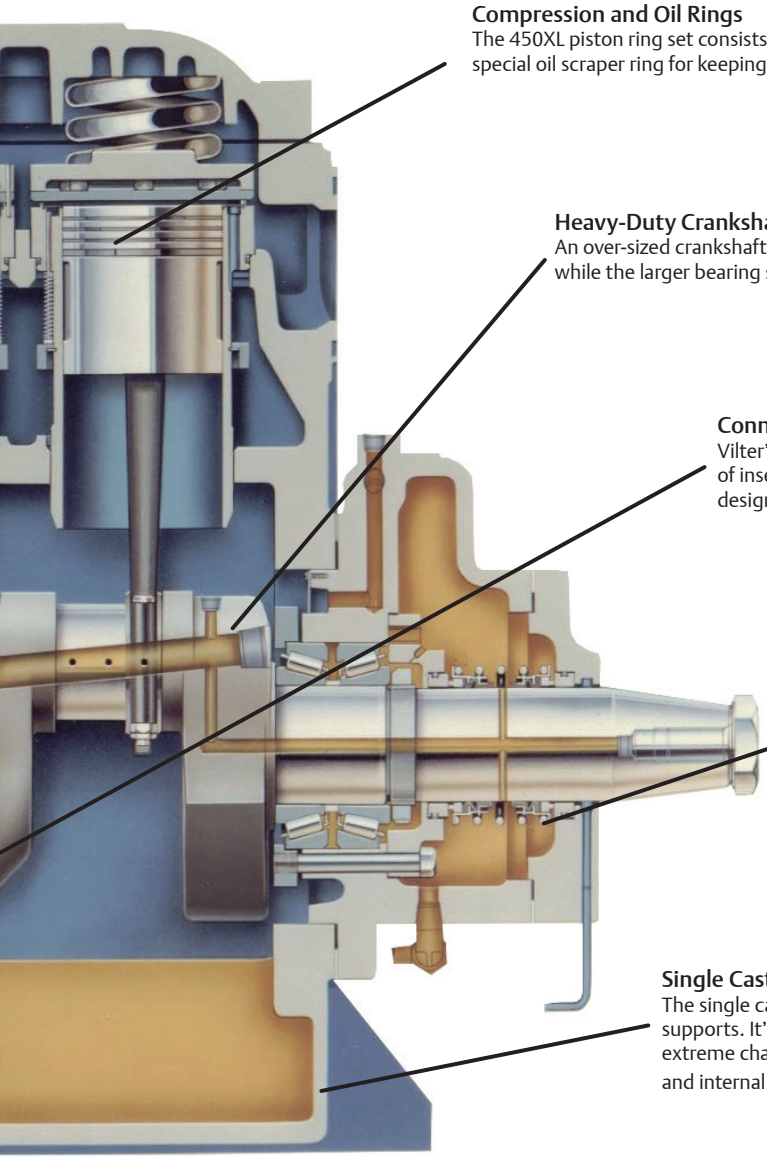
The versatile Vilter 450XL compressor is now even better!

While retaining all of the features that are exclusive to Vilter compressors, we've made several design improvements:

- Piston
- Connecting rod and bearing insert
- Crankshaft
- Safety head
- Capacity reduction system

Even though we've made these specific changes, we've retained all of the exclusive Vilter features, including provisions for fast and easy servicing with components that are easy to access.

The 450XL compressor can operate with ammonia, halocarbon and even some hydrocarbon refrigerants. It works in extreme applications with up to a 250# pressure differential. It can be belt-driven up to 300 bhp or direct driven all the way up to 375 bhp. And it can run at high compression ratios all the way up to 12:1 with certain halocarbon refrigerants.



Compression and Oil Rings
The 450XL piston ring set consists of three compression rings and a single, special oil scraper ring for keeping oil consumption to an absolute minimum.

Heavy-Duty Crankshaft*
An over-sized crankshaft pin diameter provides years of rugged, dependable duty, while the larger bearing surface allows for higher pressure differential capabilities.

Connecting Rod Bearings*
Vilter's unique oil circuit drilling arrangement ensures proper hydrodynamic lubrication of insert bearings throughout the entire compression process. Rod bearings are specially designed to supply lubrication to the piston pin bushing at all times.

Double Bellows Shaft Seal
The 450XL shaft seal, designed to specific Vilter specifications, is manufactured from materials strictly used for industrial refrigeration applications. Seal unit assembly consists of two opposed seals – one sealing from the atmosphere and the other from the crankcase. Mating seal surfaces are lubricated and cooled by circulated oil.

Single Casting Frame
The single casting frame incorporates suction and discharge manifolds plus bearing supports. It's cast to exacting tolerances from a high grade of cast iron to withstand extreme changes in heat and pressure. The castings are notably free from porosity and internal strains, and display excellent wearing qualities.

*Patented Design

Even with all these built-in features, you'll still find the 450XL compressor to be extremely cost-efficient. It has a whopping 50-cfm/cylinder displacement while running at 1200 RPM. And the high isentropic efficiency means its bhp/ton is second to none when compared to other compression systems on the market today.

The 450XL compressor can be installed almost anywhere, even on an upper floor if necessary, since vibration is kept to a minimum. Noise level is low too, due to the use of quick-acting, precise ring plate suction and discharge valves.

Far-Reaching Applications

The 450XL compressor is so versatile it can handle almost any refrigeration system condition. Up to 350 psig maximum discharge, and up to 150 psig maximum suction with a maximum 250 psig pressure differential. At different compression ratios, too, from 8:1 for ammonia to 12:1 for R-22. In V-belt configurations all the way up to 300 bhp, or direct drive setups up to 375 bhp. And it's usable for both 50 cycle and 60 cycle applications up to 1200 RPM.

The graph **(Figure 2)** on the next page depicts the broad range of suitable applications.

Nominal High-Stage Capacities

With its 4-1/2" x 4-1/2" bore and stroke, the 450XL compressor provides up to 30% more capacity than similar size compressor units, all while maintaining a favorable bhp/ton ratio.

Nominal high-stage ratings are shown in **Figure 1** below.

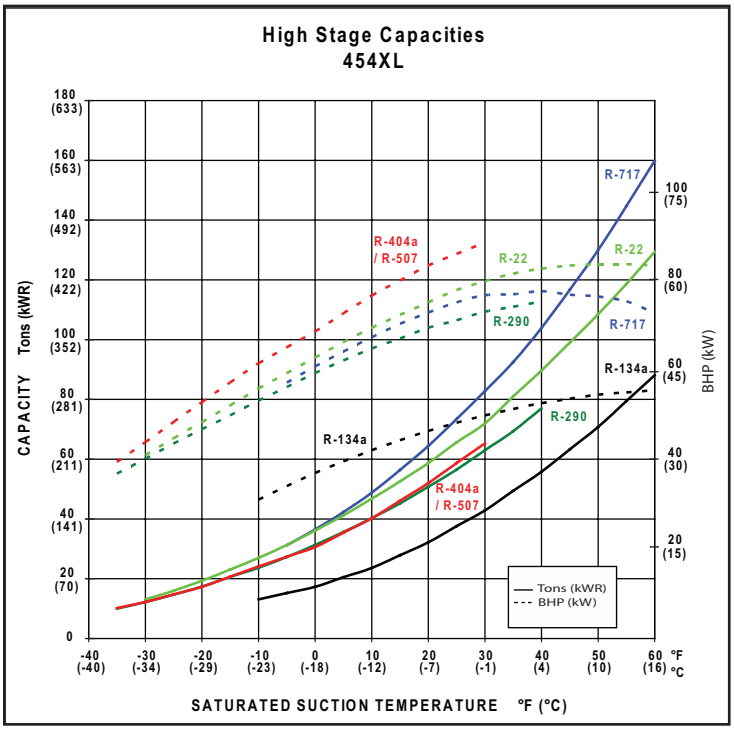
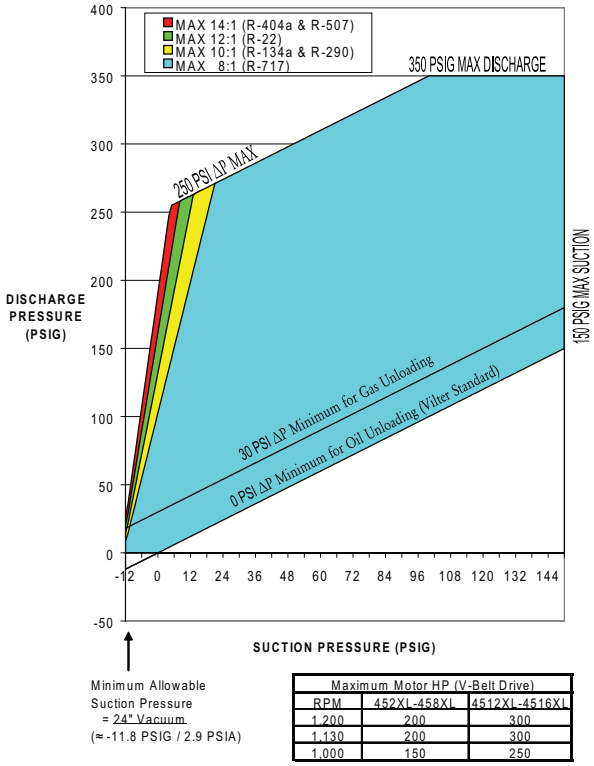


Figure 1 High-Stage Capacities



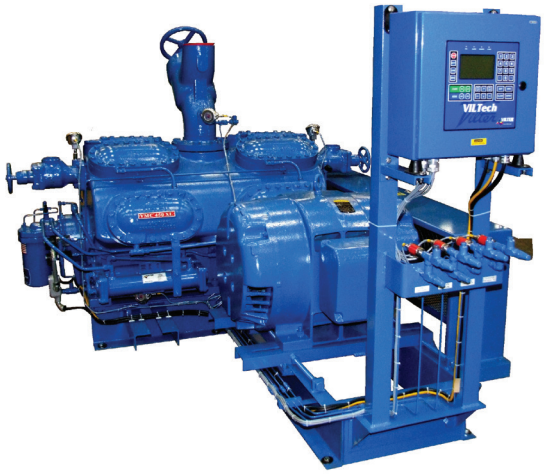
Maximum Motor HP (V-Belt Drive)		
RPM	452XL-458XL	4512XL-4516XL
1,200	200	300
1,130	200	300
1,000	150	250

Figure 2 Broad Applications

The following conditions were used in establishing these ratings:

- 1200 RPM
- Saturated suction.
- No subcooling.
- No belt losses.
- All ratings are based on 95°F condensing temperature.
- Ratings are based on a 4-cylinder 450XL (454XL). For tonnage and approximate bhp figures of other 450XL models, use a direct proportion to the number of cylinders of the 454XL. For example, use a 3.0 factor for determining the 12-cylinder 450XL tons and approximate bhp figures.

Complete detailed ratings for all 450XL high-stage models, plus ratings for 450XL booster compressors, special high suction pressure compressors, and even integral two-stage compressors,are available for all major refrigerants either from the Vilter homeoffice, your Vilter District Sales office, or from an Authorized Vilter Distributor.



4516XL Belt Drive Recip Pak with VILTech Micro-Controller

Time-Honored Features

Vilter's attention to detail shows wherever you look.

Over a century of experience in refrigeration compressor design goes into each and every part that comprises the 450XL compressor.

We've designed our component parts to work together, not just fit together. That's why Vilter guarantees that all Genuine Vilter Parts will match your Vilter compressor dimensionally, metallurgically and thermally for optimum compressor performance.

With Genuine Vilter Parts, you can be assured of getting the engineering design and special construction features that only Vilter can offer. Consider some of the special manufacturing steps that Vilter parts go through:

- Select surfaces are shot-peened for added strength
- Mating faces are lapped for greater compressor efficiency
- Many parts are ultrasonically inspected for maximum reliability
- The steels used are of special alloys for durable performance
- Exacting tolerances are measured in light bands rather than in thousandths of inches

The Vilter Full Two-Year Warranty

The 450XL compressor is fully warranted against defects of materials and workmanship under normal use and service, for a period of two years from date of shipment regardless of startup date. For example, if startup occurs one month from shipping date, the customer will have a full twenty-three (23) months of warranty coverage after startup.

Genuine Vilter Parts

When you need parts for your 450XL compressor – whether for repair work or scheduled maintenance – make sure you specify Genuine Vilter Parts.

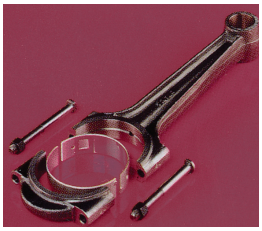
Look for the Genuine Vilter Part mark that is either etched or stamped directly on all major Vilter parts. It's your assurance of Vilter warranty protection. In some cases, where a replacement part does not lend itself to stamping or etching, a blue tag will identify the part as a Genuine Vilter Part. Vilter replacement parts (except those too big to box) are shipped in boxes that have the Genuine Vilter Part mark right on the box itself.

Don't be misled by look-alike, no-name imitations of Vilter compressor parts that carry vague warranties. Cheap parts can become an expensive mistake. Make sure you insist on using only Genuine Vilter Parts, and that you contact an Authorized Vilter Distributor (or Vilter direct) for all your 450XL compressor parts requirements

Piston, Pin and Ring Assembly

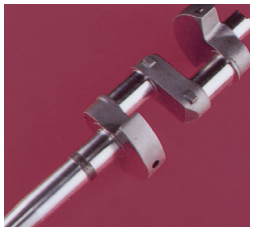
- A shrink-fit wrist pin is used to increase bearing load capacity.
- Hardened steel wrist pins are ground and polished to size.
- Three cast iron compression rings and one oil ring provide a positive seal while wiping oil back to the crankcase.

Connecting Rod, Bearing and Bushing



- Replaceable insert bearing improves lubrication and load carrying capacity.
- Forged connecting rods back the precision-made, steel-backed Babbitt insert bearing.
- Grooved wrist pin bushings are fed with pressurized lubricating oil.

Ductile Iron Crankshaft

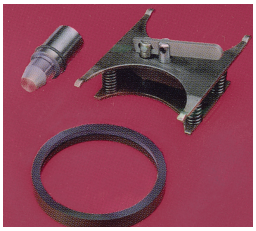


- Designed with a bigger crankpin diameter for greater load bearing and bearing surface.
- All crankshafts are statically and dynamically balanced for reduced vibration.
- Precision drilled crankshaft ensures proper lubrication through the compression cycle.
- The 6, 8, 12, and 16-cylinder crankshafts are shot-peened for greater strength.

Spring Loaded Safety Heads

- Spring loaded safety heads provide protection against liquid slugging.
- The suction and discharge porting improve compressor efficiency.

Capacity Reduction System



- A piston operated unloading mechanism lifts the suction valve plate to unload the cylinders for reduced capacity or unloaded starts.
- Simplified unloading piston allows easy removal for seal servicing.

General Specifications

The complete line of 450XL compressors is comprised of six models ranging from a nominal 25-ton 2-cylinder machine all the way to the high end of the scale – a nominal 200-ton 16-cylinder model. In-between are the 4, 6, 8 and 12-cylinder mid-size units. All 450XL compressors run at a maximum of 1200 RPM, and all are provided with built-in capacity reduction steps for economical operation at reduced loads. V-belt and direct-connected motor operation are also available throughout the entire range of 450XL models.

We've tried to make every inch count in designing the 450XL to fit into even the tightest space requirements. The 450XL is a machine that provides 50 cfm/cylinder, giving you maximum capacity in a minimum amount of space.

There's sure to be a 450XL model that's a perfect match to your refrigeration application.

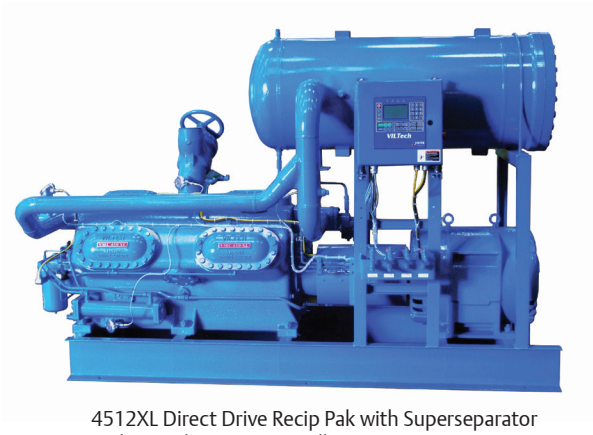
Engineering Specifications

The compressor shall have double shaft seal; double tapered, roller main shaft bearings;

Tri-Micro® oil filter and oil strainer that removes 95% of contaminants as small as 3 microns in size; dynamically and statically balanced heavy duty crankshaft of ductile iron, also shot-peened on 6, 8, 12 and 16-cylinder models; spring safety heads; die-forged, steel connecting rods with replaceable bearing halves; aluminum type heat treated pistons with three compression rings and one oil ring; piston operated suction valve lifters to unload the compressor for starting and to provide capacity control. The piston and connecting rods shall be assembled with a shrink-fit wrist pin for higher load carrying capabilities and superior wearing qualities.

The compressor(s) shall be equipped with the additional following standard equipment: crankcase oil thermometer and heater; oil filter pressure gauge with manual 3-way valve; oil failure switch; high and low pressure cutout; capacity control switches and unloader solenoid valves for _____ steps of capacity reduction; water or refrigerant cooled oil cooler; suction, discharge, and oil pressure gauges complete with Stedy-Mounts® and shut-off valves; ___ (water or refrigerant) cooled cylinder covers.

Compressor(s) shall come complete with structural steel base, and be driven by a ___ HP, _____ RPM, _____ volt, _____ phase _____ cycle motor with direct coupling and coupling guard, or V-belt drive with flywheel, belts and motor sheave for _____ RPM. Compressor(s) shall have a capacity of not less than ____ tons when operating at _____ °F (psig) suction temperature (pressure) and _____ psig (°F) condensing pressure (temperature). Compressors are to be manufactured by Vilter Manufacturing LLC, Cudahy, Wisconsin, or equal as approved.



4512XL Direct Drive Recip Pak with Superseparator and VILTech Micro-Controller

General Dimensions

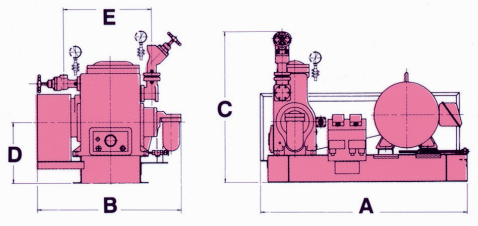
ITEM		452XL	454XL	456XL	458XL	4512XL	4516XL
Number of Cylinders		2	4	6	8	12	16
Maximum RPM		1200	1200	1200	1200	1200	1200
Bore & Stroke - In. (mm)		4½x4½ (114x114)	4½x4½ (114x114)	4½x4½ (114x114)	4½x4½ (114x114)	4½x4½ (114x114)	4½x4½ (114x114)
CFM @ Maximum RPM (m^3/hr)		99.4(169)	199(338	298(507)	398(676)	597(1014)	796(1352)
Tons(Kcal/hr x 10^3) Refrigeration @ 95°F Condensing	R-717 (10°F)	24(73)	49(148)	73(221)	97(293)	146(442)	195(590)
	R-22 (20°F)	29(88)	59(178)	88(26)	117(354)	176(532)	235(711)
	R-290 (0°F)	16(48)	31(94)	47(142)	62(187)	94(284)	125(378)
Suction Connection - Inches (mm)		2½(64)	3(76)	4(102)	4(102)	5(127)	6(152)
Discharge Connection - Inches (mm)		2(51)	2½(64)	3(76)	3(76)	Two 3(76)	Two 3(76)
Unit Weight Less Motor - Lbs. (Kg.)		1900(862)	2700(1225)	3100(1406)	3400(1542)	5300(2404)	5800(2630)
Oil Charge - Gallons (Liters)		5(19)	7(27)	7(27)	7(27)	14(53)	14(53)
Standard Steps of Unloading (%)		0	50	33/66	24/50	33/66	25/50
Option 1 Steps of Unloading (%)		50	25/50/75	-	25/50/75	-	25/50/75
Option 2 Steps of Unloading (%)		100	50/100	33/66/100	25/50/75/100	33/66/100	25/50/75/100
Maximum Discharge Temp. - °F (°C)		300(149)	300(149)	300(149)	300(149)	300(149)	300(149)
Crankcase Oil Temp. Range - °F (°C)		110-130 (43-54)	110-130 (43-54)	110-130 (43-54)	110-130 (43-54)	110-130 (43-54)	110-130 (43-54)

2 & 4 Cylinder Units

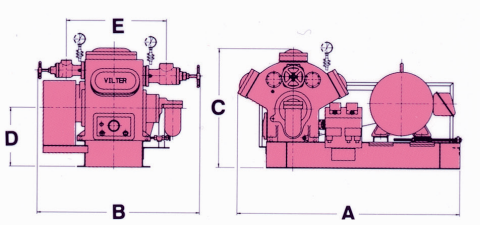
6 & 8 Cylinder Units

12 & 16 Cylinder Units

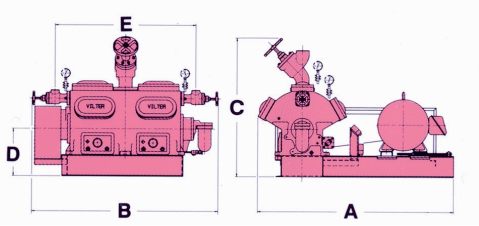
V-Belt Drive Ammonia



Cyls.	A	B	C	D	E
2	69"(1753)	52"(1321)	37"(940)	20"(508)	31-1/2"(800)
4	74"(1880)	52"(1321)	37"(940)	20"(508)	31-1/2"(800)

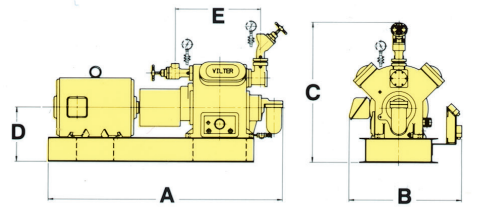


Cyls.	A	B	C	D	E
6	76"(1930)	59"(1498)	40-3/8"(1026)	20"(508)	34-1/8"(867)
8	76"(1930)	58"(1473)	39"(991)	20"(508)	34-3/4"(883)

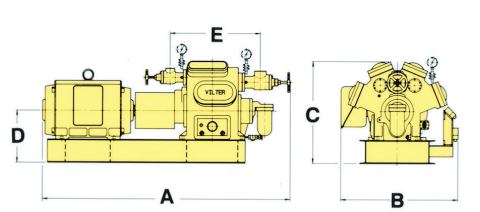


Cyls.	A	B	C	D	E
12	83"(2108)	79-1/4"(2013)	58-1/2"(1486)	20"(508)	59-5/8"(1514)
16	83"(2108)	79-1/4"(2013)	62-1/4"(1581)	20"(508)	59-5/8"(1514)

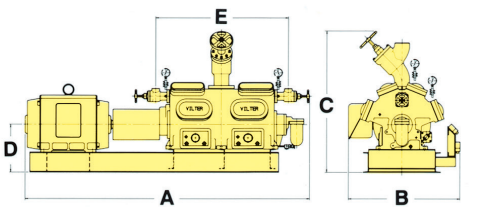
Direct Drive Ammonia



Cyls.	A	B	C	D	E
2	78-3/4"(2000)	41"(1041)	49-9/16"(1259)	20"(508)	29-1/8"(740)
4	86-3/4"(2203)	41-12"(1054)	51-9/16"(1310)	20"(508)	31-9/16"(802)

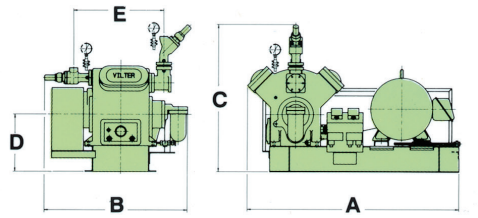


Cyls.	A	B	C	D	E
6	92-3/4"(2356)	42-1/4"(1073)	40-3/8"(1026)	20"(508)	34-1/8"(867)
8	95-1/4"(2419)	44-7/8"(1140)	39"(991)	20"(508)	34-3/4"(883)

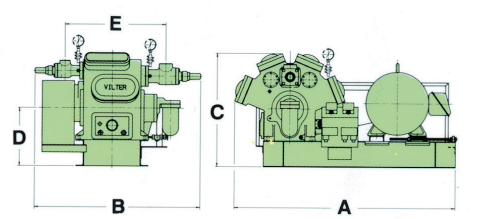


Cyls.	A	B	C	D	E
12	128-1/4"(3258)	50-3/8"(1280)	60"(1524)	21-1/2"(546)	59-5/8"(1514)
16	128-1/4"(3258)	50-3/8"(1280)	63-5/8"(1616)	21-1/2"(546)	59-5/8"(1514)

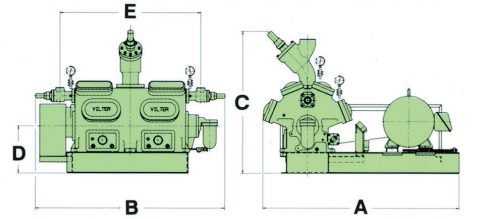
V-Belt Drive Halocarbon



Cyls.	A	B	C	D	E
2	69"(1753)	48-7/8"(1241)	49-7/16"(1256)	20"(508)	29-1/8"(740)
4	74"(1880)	50-1/32"(1271)	51-7/16"(1310)	20"(508)	31-9/16"(802)

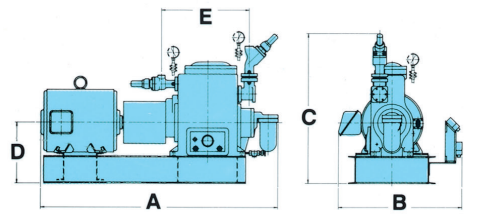


Cyls.	A	B	C	D	E
6	76"(1930)	56-1/2"(1435)	40-3/8"(1026)	20"(508)	34-1/8"(867)
8	76"(1930)	57"(1448)	39"(991)	20"(508)	34-3/4"(883)

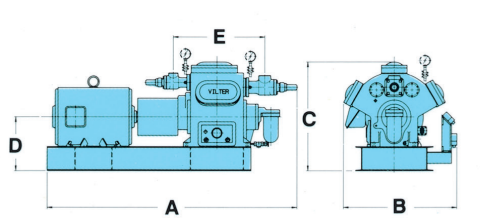


Cyls.	A	B	C	D	E
12	83"(2108)	80-1/4"(2038)	57"(1448)	20"(508)	59-5/8"(1514)
16	83"(2108)	80-1/4"(2038)	60-1/8"(1527)	20"(508)	59-5/8"(1514)

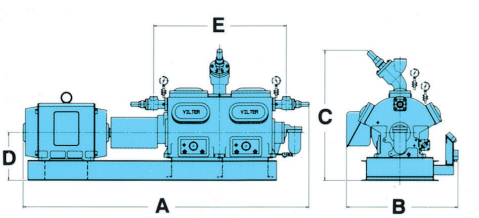
Direct Drive Halocarbon



Cyls.	A	B	C	D	E
2	78-3/4"(2000)	41"(1041)	49-7/16"(1256)	20"(508)	29-1/8"(740)
4	86-3/4"(2203)	41-12"(1054)	51-7/16"(1310)	20"(508)	31-9/16"(802)



Cyls.	A	B	C	D	E
6	93"(2369)	42-1/4"(1073)	40-3/8"(1026)	20"(508)	34-1/8"(867)
8	95-3/4"(2432)	44-7/8"(1140)	39"(991)	20"(508)	34-3/4"(883)



Cyls.	A	B	C	D	E
12	128-3/4"(3270)	50-3/8"(1280)	58-1/2"(1486)	21-1/2"(546)	59-5/8"(1514)
16	128-3/4"(3270)	50-3/8"(1280)	61-5/8"(1565)	21-1/2"(546)	59-5/8"(1514)

General Dimensions – The dimensions shown above are approximate, and should not be used for construction. Vilter issues certified prints for construction purposes. These dimensions are provided in inches, and are followed in parenthesis by millimeters – in. (mm) Space needed to remove flywheel – 7" (178mm).
Space needed to remove crankshaft, from wall to centerline of compressor – 42" (1067mm) for 2-8 cylinder models, and 84" (2134mm) for 12-16 cylinder models.