VIKING® INDUSTRIAL LOBE PUMPS
RL SERIES

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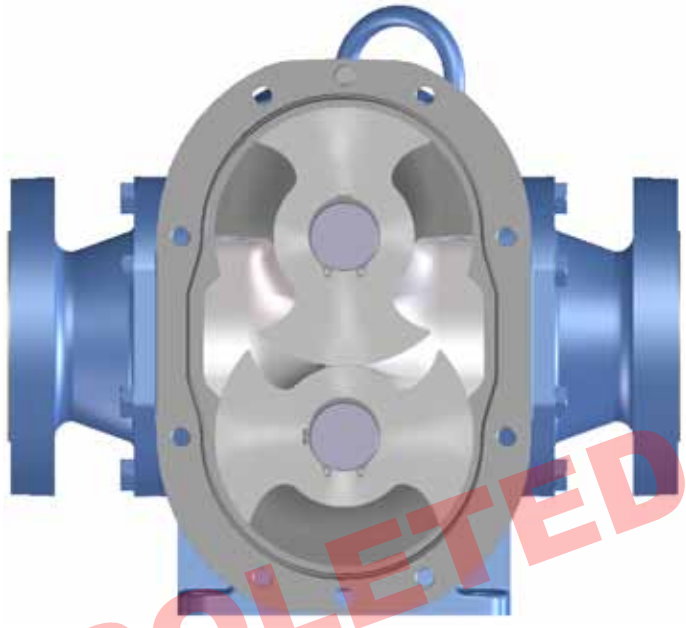
Performance

Size	Nominal Capacity		Pressure			
			Standard 2-Bushing Design		High Pressure 4-Bushing Design	
	GPM	M^3/hr	**PSI**	BAR	**PSI**	BAR
RL016	**105**	23.8	**250***	17	**400***	27
RL025	**160**	36.3	**175**	12	**400***	27
RL150	**820**	186	**N/A**	N/A	**400**	27

* Packed Pumps are limited to 200 PSI (14 bar)

Temperature Range		Viscosity Range**	
ºF	ºC	**SSU**	cSt
-40 to 400*	-40 to 205*	**31 to 2,000,000**	1 to 440,000

* Special sealing or materials may be required.
** Optional low viscosity construction (reduced clearances) may be required below 750 SSU



RL40167 with front cover removed

Nomenclature

RL 4 0167

Series
Industrial Lobe

Seals
4 = mechanical seals
Blank = packing (N/A on size 150)

Size (nominal displacement)
016 = 16 gals/100 revs
025 = 25 gals/100 revs
150 = 150 gals/100 revs

Material
7 = Stainless Steel

Product Description

The RL Series timed rotary lobe pumps with bi-wing lobes have been designed exclusively for industrial applications. They combine these four key benefits:

- Maintain product integrity, especially for shear-sensitive fluids, suspensions or dispersions.
- Provide a variety of sealing options, allowing end users to purchase seals from their vendor of choice.
- Provide higher pressure capabilities than traditional rotary lobe pumps.
- Provide ease of maintenance, including cleaning and lobe clearance adjustment. Simple timing design requires no shimming.

The RL Series efficiently handles a broad range of fluids, from water-like to highly viscous, while minimizing fluid shear and pulsation. The unique, patented design emphasizes flexibility in sealing, porting and lobe clearance adjustment to optimize the pump for each application. Lobe timing has been simplified for ease of operation and maintenance. An extremely robust design has been employed to prevent shaft deflection and ensure an exceptionally long service life, even on difficult applications.

The RL Series come standard with 2 bushings behind the lobes. The high pressure design has bushing support on both sides of the lobes. This is standard on size 150, and optional on the smaller sizes. The model number does not differentiate between the standard or high pressure designs. To get a high pressure pump on the smaller sizes, use the standard model number (e.g. RL40257) and order the high pressure option.

VIKING® INDUSTRIAL LOBE PUMPS
RL SERIES

Major Design Features

Shaft sealing options include cartridge-style single and double mechanical seals and cartridge-style triple lip seals on all sizes. Packing and component-style single mechanical seals are also available on the RL016 and 025 pumps. These pumps were designed to offer maximum flexibility, using standard size, off-the-shelf seals from major manufacturers. Features include:

- Double tapered roller bearings in a patented threaded, adjustable housing, which allows lobe clearance adjustments without shimming and without complete pump disassembly.
- Porting flexibility, to match the correct port size to the customer's piping, is provided through an enlarged suction area with bolt-on ports on the RL016 and 025, (3" & 4") and three port size options (6", 8" & 10") on the RL150.
- Bi-wing lobes offer maximum surface sealing area for high efficiency. The large voids gently handle fluids that are shear-sensitive or have entrained solids.
- Enlarged loading cavities on three sides of the lobes minimize fluid pulsation and improve suction characteristics on highly viscous fluids.
- Optional low viscosity construction with reduced clearances is available on the RL016 and RL025 for thin liquid applications. This minimizes slip to provide highest volumetric efficiency and maximum discharge pressure, even on water-like fluids.
- Reversible direction of flow. The pump can be run in either direction. Some modifications may be required. Consult the factory for details.
- The extra-large helical timing gears reduce noise, provide high load-carrying capabilities, and offer long life. Timing gear adjustment is simply done by matching two marks on each gear, and locking tang washers in place.
- Temporary run-dry capability. Because the timed lobes are non-contacting, the pump may be run dry for short periods, if a seal flush/quench and lubricating fluid film on the bushings is present.

RL40167 Industrial Lobe Pump


RL40167 (shaft guards removed)

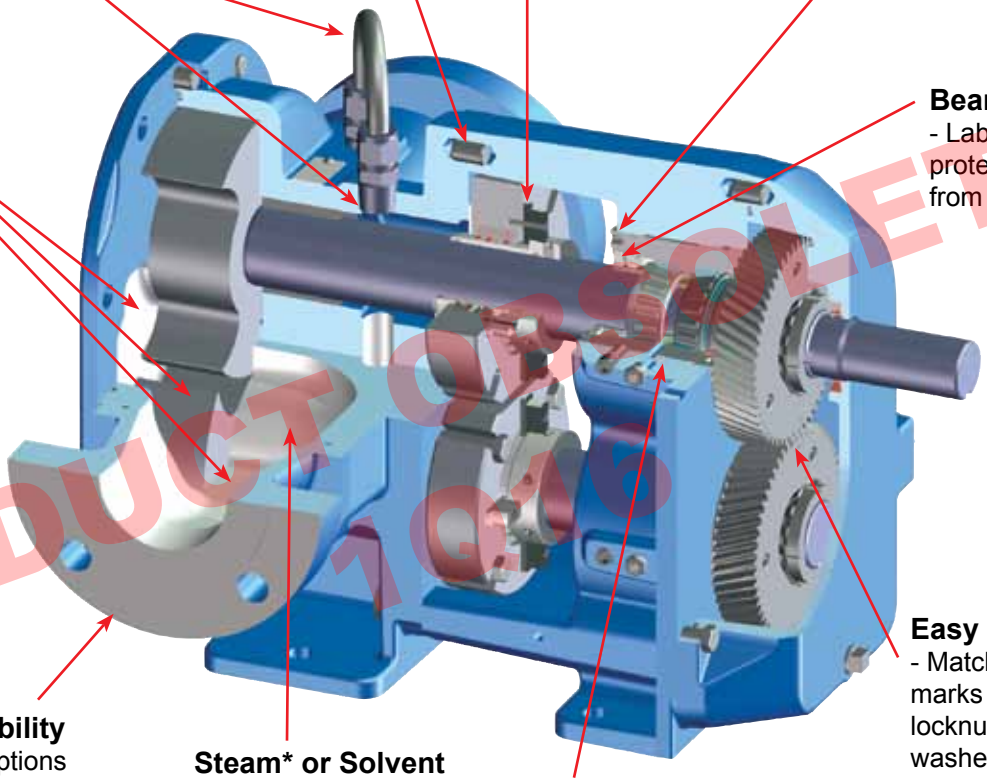
Feature Overview

Extended Seal Life
- Enlarged suckback tube vents air from both seal chambers to prevent dry seal faces. Shaft support on both sides of seal prevents deflection and seal wear.

Ease of Reassembly
- Dowel pins ensure true alignment upon reassembly, to prevent lobe contact and extend seal life.

Sealing Flexibility
- Accepts cartridge mechanical seals from most manufacturers (or packing or component mechanical seals on the RL016 and 025).

Simple Lobe Clearance Adjustment
- Just rotate the adjustable bearing housing and lock with a set screw. No shimming!



Bearing Isolation
- Labyrinth seals protect thrust bearings from contamination.

Enlarged Loading Cavities
- Three-side access improves suction side filling and reduces discharge side trapping pressure pulsations.

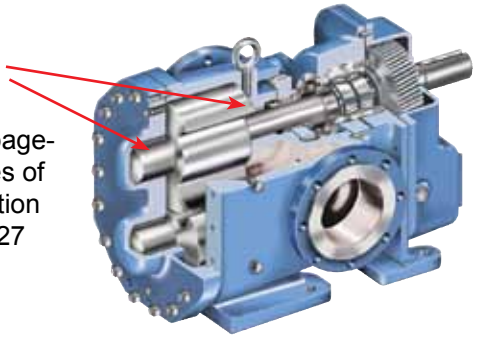
Easy Timing
- Match the timing gear marks and secure the locknut with the tang washer. No shimming!

Porting Flexibility
- Bolt-on port options on smaller sizes, plus 3 port size options on the RL150, ensure correctly sized ports are available to match the application.

Steam* or Solvent Cleanable
- Designed for applications where frequent cleaning is required.

Thrust Control
- Regreasable, double-row tapered roller bearings handle radial and axial thrust (RL016, RL025).

High Pressure
- Optional high pressure design (standard on RL150) uses pumpage-lubricated bushings on both sides of the lobes to prevent shaft deflection and allow pressures to 400 psi (27 bar).



Lobe Retention
- Lobes on standard RL016 and RL025 pumps are secured by means of snap rings, allowing replacement of lobes. Lobes on high pressure models, including RL150s, are press fit onto shafts.

*Steam temperature is limited to 275 °F (135 C)

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VIKING® INDUSTRIAL LOBE PUMPS
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Specifications

Model Numbers		Port Size*		Nominal Capacity (at max. speed, w/162 cSt fluid)		Max. Speed	Max. Discharge Pressure				Max. Hydrostatic Pressure		Max. Temperature		Shipping Weight (High Pressure Design)	
							Standard 2-Bushing Design		High Pressure 4-Bushing Design							
Packed	Mechanical Seal	Std.	Optional													
		(in.)	(in.)	GPM	M^3/hr	RPM	PSI	Bar	PSI	Bar	PSI	Bar	°F	°C	Lbs	Kg
RL0167	RL40167	3"①	3"③	105	23.8	640	250	17	400	27	600	40	400	204	281 (305)	128 (139)
			4"①③													
RL0257	RL40257	3"①	3"③	160	36.3	640	175	12	400	27	600	40	400	204	297 (321)	135 (146)
			4"①③													
N/A	RL41507	6"②	8"②④	820	186	600	N/A	N/A	400	27	600	40	400	204	1160	530
			10"②④													

* Raised face flanges are standard. Pumps may be ordered with one port (usually suction) larger than the other port, using any of the optional port sizes.
① Ports are suitable for use with 150# ANSI steel or stainless steel companion flanges or flanged fittings
② Ports are lap joint flanges suitable for use with 150# ANSI steel or stainless steel companion flanges or flanged fittings
③ Ports are suitable for use with 300# ANSI steel or stainless steel companion flanges or flanged fittings
④ Ports are lap joint flanges suitable for use with 300# ANSI steel or stainless steel companion flanges or flanged fittings

Construction

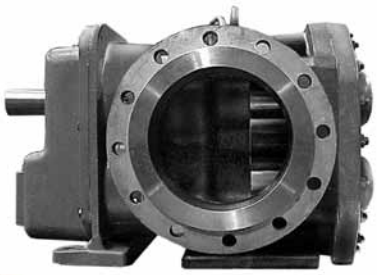
Component	Standard		Options	
	RL016-025	RL150	RL016-025	RL150
Casing & Head	316 Stainless Steel			
Lobes	Stainless Steel ASTM 743 Grade CF8M Surfaced Hardened			
Shafts	Stainless Steel ASTM A564 Type 630 Surfaced Hardened			
Bushings	PEEK® (Poly Ether Ether Ketone)		Contact Factory	
O-Rings	Viton®		Kalrez®	
Bracket	Cast Iron			
Gear Case Cover	Aluminum			
Shaft Guards	Stainless Steel	Painted Steel		

PEEK® is a trademark of Victrex PLC.
Viton® and Kalrez® are registered trademarks of DuPont Dow Elastomers.

Shaft Sealing

Size	Seal Options				
	Cartridge Single Mechanical Seal	Cartridge Double Mechanical Seal	Cartridge Triple Lip Seal	Component Single Mechanical Seal	Packed Gland
RL016	S	O	O	O	O
RL025	S	O	O	O	O
RL150	O	O	S	N/A	N/A
S = Standard; O = Optional; N/A = Not Available					

RL41507 with optional 10" ports



RL40257 with High Pressure Option

Special Materials and Options Selection Guidelines

High Viscosities - Above 3,300 cSt

- Sealing Considerations for viscosity (based on application requirements and experience)
  PPC 1101V Cartridge single seal good up to 3,300 cSt.
  Cartridge triple lip seals good up to 400,000 cSt.
  Contact factory for seal recommendations for viscosities over (3,300 cSt) when cartridge lipseal is not acceptable.
- Larger ports may be required depending on suction conditions.
- Pump may need to be operated at slower than normal speeds, which may require a larger pump.
- Additional clearances required per ES2 (Engineering Standard 2).

For Low Viscosities Or Non-Lubricating Liquids – Below 180 cSt

- Reduced clearance lobes

For High Temperatures – Above 212°F to 400°F (100°C to 204°C)

- High temperature elastomers
  Viton® up to 350°F (177°C); or Kalrez® is rated to 500°F (260°C).
- Standard PEEK® bushings rated to 250°F (120°C). Consult factory above 250°F (120°C).
- Contact factory for clearance specifications.

For Abrasive Or Dirty Liquids

- Wear resistant bushings - Contact factory.
- Hardened or hard-coated shafting.
- Abrasive-resistant seal.
- Pump should be operated at slower than normal speeds, which may require a larger pump.

Mechanical Seal Options

RL40167 & RL40257 (1.875" Shaft)

Seal Style	Seal Vendor	Seal Type	Materials Of Construction
Cartridge Single Rubber Bellows	* PPC Mech. Seals	1101V	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and single coiled spring
		1101V	Viton elastomers, Silicon Carbide vs Silicon Carbide seal faces, 316 S.S. metal parts and single coiled spring
Cartridge Triple Lip Seal	Fluidtec	P/S-II	Viton elastomers, Gylon sealing elements, PTFE spacers, 316 S.S. metal parts
Cartridge Single Pusher	Flow-serve	ISC1PX	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5610	
	Flow-serve	ISC1PX	Viton elastomers, Silicon Carbide vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5610	
Cartridge Single Metal Bellows	Flow-serve	ISC1BX	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows
	John Crane	5615Q	
	Flow-serve	ISC1BX	Viton elastomers, Silicon Carbide vs Silicon Carbide seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows
	John Crane	5615Q	
Cartridge Double Pusher	Flow-serve	ISC2PP	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5620	
	Flow-serve	ISC2PP	Viton elastomers, Silicon Carbide vs Silicon Carbide inboard seal faces, Carbon vs Silicon Carbide outboard seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5620	
Cartridge Double Metal Bellows	Flow-serve	ISC2BB	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. gland, sleeve & metal parts and Alloy 20 or Hastelloy C bellows
	John Crane	5625	
	Flow-serve	ISC2BB	Viton elastomers, Silicon Carbide vs Silicon Carbide inboard seal faces, Carbon vs Silicon Carbide outboard seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows
	John Crane	5625	

* Standard seal on RL40167 and RL40257

RL41507 (3" Shaft)

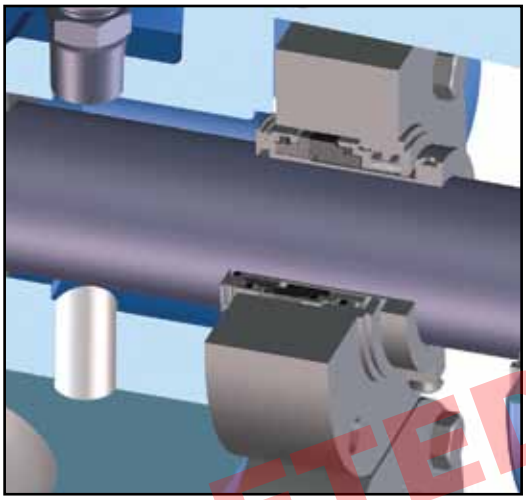
Seal Style	Seal Vendor	Seal Type	Materials Of Construction
Cartridge Triple Lip Seal	** Fluid-tec	P/S-II	Viton elastomers, Gylon sealing elements, PTFE spacers, 316 S.S. metal parts
Cartridge Single	Flowserve	84	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5610	
	Chesterton	180	
	PPC Mech. Seals	P-3F	
	Flowserve	85	Viton elastomers, Silicon Carbide vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	John Crane	5610	
	Chesterton	180	
	PPC Mech. Seals	P-3F	
Cartridge Single Metal Bellows	John Crane	5615	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows
			Viton elastomers, Silicon Carbide vs Silicon Carbide seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows
Cartridge Double	John Crane	5620	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. metal parts and Hastelloy C springs
	Chesterton	280	
	John Crane	5620	Viton elastomers, Silicon Carbide vs Silicon Carbide inboard seal faces, Carbon vs Silicon Carbide outboard seal faces, 316 S.S. metal parts and Hastelloy C springs
	Chesterton	280	
Cartridge Double Metal Bellows	John Crane	5625	Viton elastomers, Carbon vs Silicon Carbide seal faces, 316 S.S. gland, sleeve & metal parts and Alloy 20 or Hastelloy C bellows
			Viton elastomers, Silicon Carbide vs Silicon Carbide inboard seal faces, Carbon vs Silicon Carbide outboard seal faces, 316 S.S. metal parts and Alloy 20 or Hastelloy C bellows

** Standard seal on RL41507

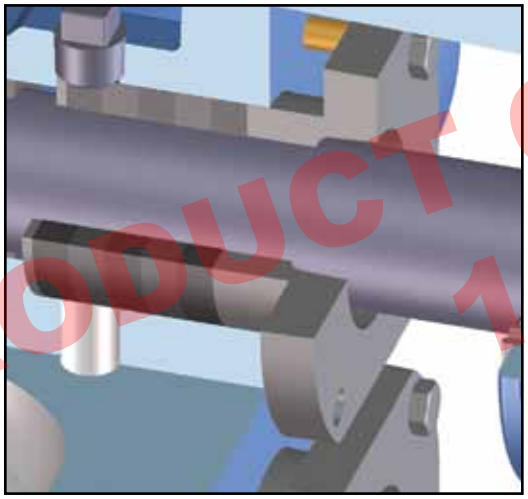
Shaft Sealing Options

These drawings of the RL016 and RL025 stuffing box illustrate the various shaft sealing options on those sizes, which come standard with cartridge-style single mechanical seals. Packed glands and component mechanical seals are not available on the RL41507, which has cartridge triple lip seals standard. Actual seal construction varies by manufacturer.

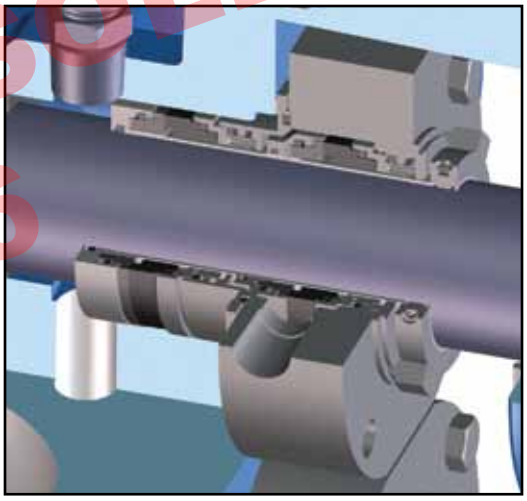
The suckback tube provided vents the seal chamber to the inlet port. This keeps the chamber at the lowest system pressure to insure proper seal function. When reversing the rotation on the pump, the seal chamber will experience an increase in pressure, which may affect seal performance. Refer to seal manufacture's specifications or contact the factory for recommended pressure limits.



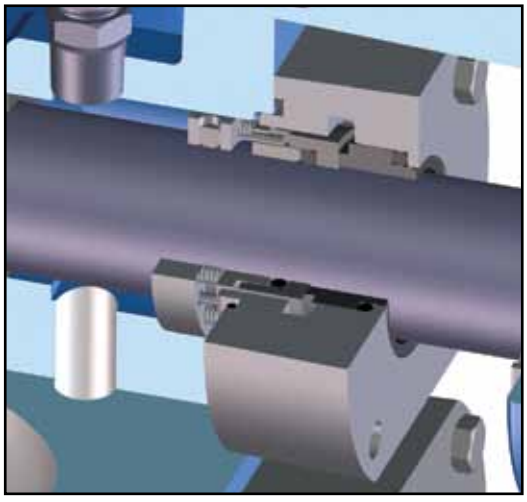
Cartridge Single Mechanical Seal



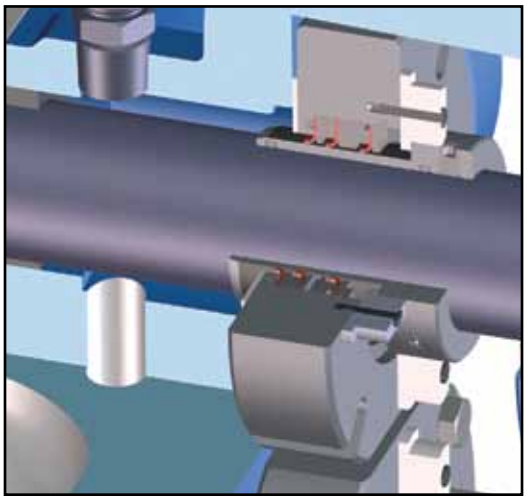
Packed Gland (limited to 200 psi/14 bar)



Cartridge Double Mechanical Seal

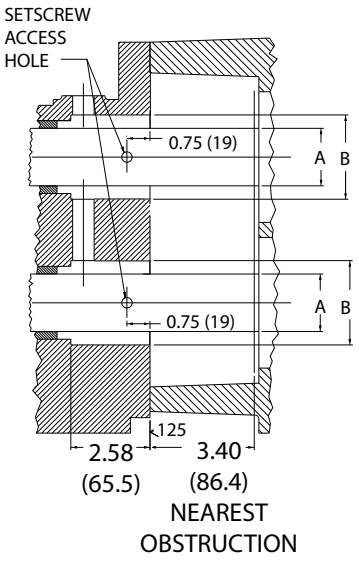


Component Single Mechanical Seal



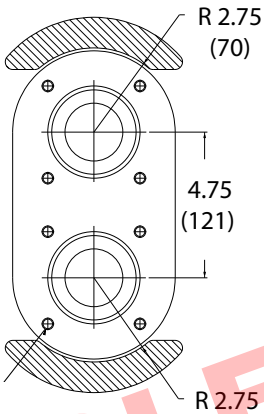
Cartridge Triple Lip Seal

Seal Chamber Dimensions



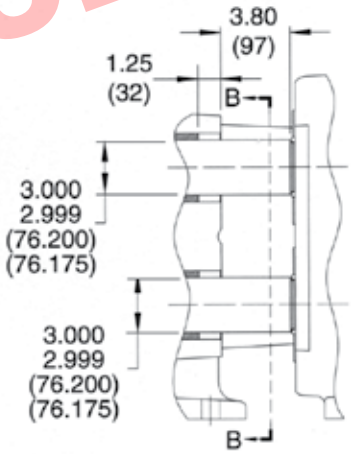
A = SHAFT DIA.
1.875 (47.6)

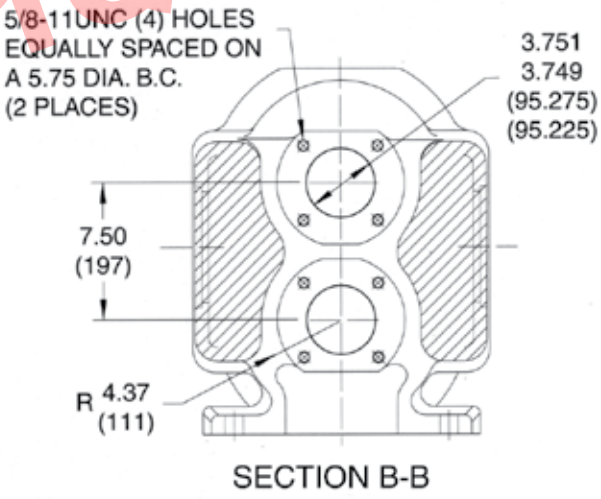
B = PACKING BORE
2.75 DIA. (70)



3/8-16UNC (4) HOLES
EQUALLY SPACED ON A
4.250 DIA. B.C.
(2 PLACES)

RL016 - RL025

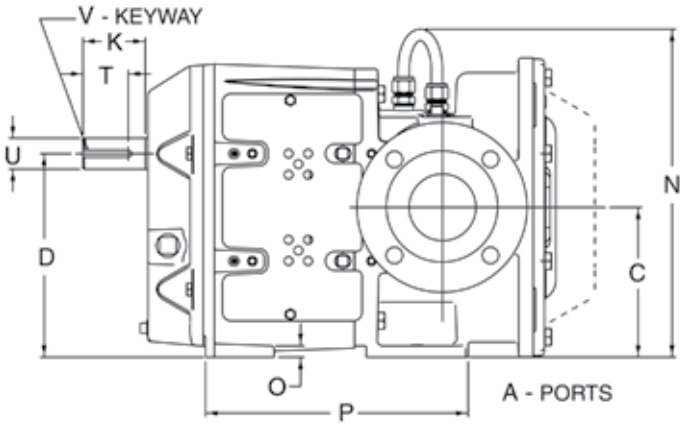


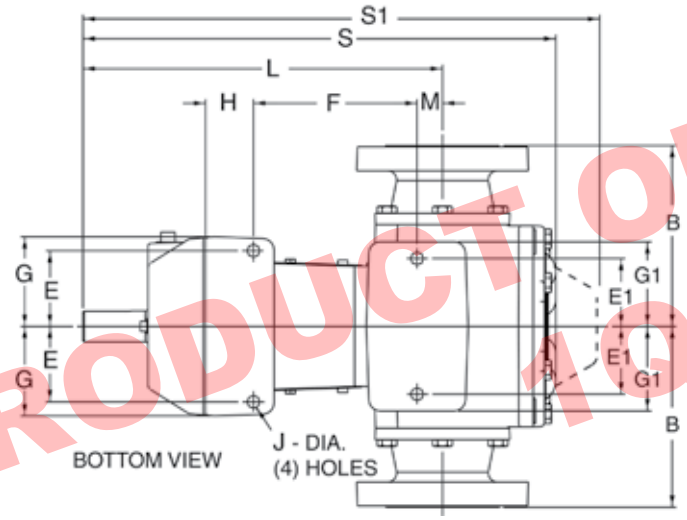


SECTION B-B

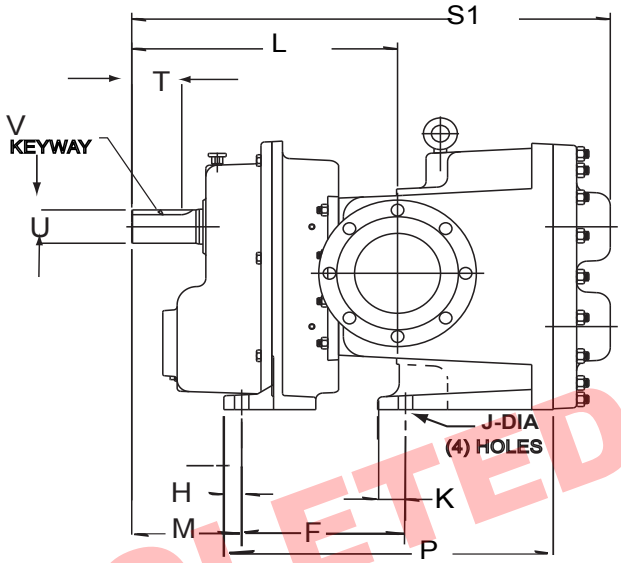
RL150

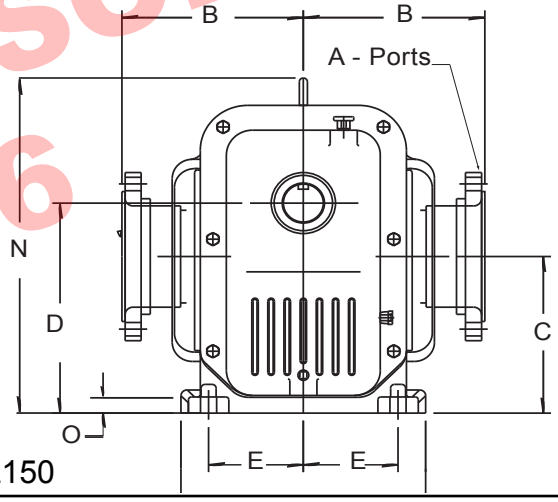
Dimensions





RL016 - RL025





RL150

Size	Std	A①	B④⑤	C	D	E	E1	F	G	G1	H	J	K	L	M
RL016	in	3.00	8.00	6.63	9.00	3.34	3.00	7.22	3.96	3.74	2.11	0.56	2.75	15.86	1.12
	mm	76	203	168	229	85	76	183	101	95	54	14	70	403	28
RL025	in	3.00	8.00	6.63	9.00	3.34	3.00	7.22	3.96	3.74	2.11	0.56	2.75	15.86	1.12
	mm	76	203	168	229	85	76	183	101	95	54	14	70	403	28
RL150	in	6	11.25	10.25	13.75	5.88	N/A	11.34	15.17	N/A	1.35	1	1.95	18.56	7.78
	mm	152	286	260	349	149	N/A	288	385	N/A	34	25	50	471	198

Size	Std	N	O	P	S②	S1③	T	U	V
RL016	in	14.50	0.50	11.58	19.96	21.90	2.00	1.37	0.31
	mm	368	13	294	507	556	51	35	8
RL025	in	14.50	0.50	11.58	20.86	22.80	2.00	1.37	0.31
	mm	368	13	294	530	51	51	35	8
RL150	in	21.93	1.06	23.00	N/A	33.41	3.5	2.5	0.62
	mm	557	27	584	N/A	849	89	63	15.88

NOTES
① Raised Face Flanges are standard on 016 and 025 Models. Lap Joint flanges are standard on 150 model. Ports are suitable for use with 150# and 300# ANSI stainless steel companion flanges or flanged fittings.
② Dimension for the standard pump (2-bushing).
③ Dimension for the high pressure pump (4-bushing).
④ All port options for 016 and 025 models will have the same port to port "B" dimension.
⑤ Optional 10" port on RL150 will have "B" dimension of 12.25 in (311.15 mm).

VIKING® INDUSTRIAL LOBE PUMPS
RL SERIES

Performance Curve Notes

Printed performance curves are not available.

Performance curves can be electronically generated with the Viking Pump Selector Program. This program can be located on www.vikingpump.com for the general public.

For authorized distributors, this program can be found listed under the "Products" tab at www.idexconnect.com. Security passwords are required to access IDEXconnect.

INLET CONDITIONS
The performance curves show "Based on 10 In.-Hg.", or "Based on 0 In-Hg." which is the standard test condition. This is not the maximum suction capability of the pump.

NPSH (Net Positive Suction Head)
The $NPSH_R$ (Net Positive Suction Head Required by the pump) is shown on each curve. $NPSH_A$ (Net Positive Suction Head – Available in the system) must be greater than the $NPSH_R$. For a complete explanation of NPSH, see Application Data Sheet AD-19.

FOR RL41507 $NPSH_R$ DATA CONSULT FACTORY

MECHANICAL EFFICIENCY:
The Mechanical Efficiency (expressed in percent) can be calculated using the following formula:

$$\text{Mechanical Efficiency} = \frac{(\text{Differential Pressure, PSI})(\text{Capacity, GPM})(100)}{(\text{Horsepower, BHP})(1715)}$$

METRIC CONVERSION: The following table has been compiled for conversion to metric values.

VACUUM		PRESSURE		CAPACITY	
In.-Hg (inches of mercury)	kPa* (Kilopascals)	PSI ($lb./in^2$)	kPa* (Kilopascals)	GPM (US gal/minute)	M^3/H (Cubic Meters / Hour)
1	3.4	1	6.9	100	22.7
5	17	25	172	200	45.4
10	34	50	345	300	68.1
15	51	100	690	400	90.8
20	68	150	1034	500	113.5
25	85	200	1379	600	136
		250	1724	700	159
		400	2758	800	181

* 100 kPa = 1 bar