Heavy-Duty, Foot-Mounted Sealless Internal Gear Pumps

Model H8124A

Model K8124A

The Universal Mag Drive is the ideal sealing technology within Viking's Universal Seal Series of pumps. It is dimensionally interchangeable with Viking bracket styled heavy duty and Universal Seal pumps, allowing an easy upgrade from packed or mechanical seals to sealless technology. The Universal Mag Drive's hermetic, static sealed canister provides the highest level of liquid containment available by eliminating traditional dynamic shaft seals. It also eliminates housekeeping issues and downtime due to seal failure. This product is designed to handle a broad range of applications requiring continuous duty at pressures up to 200 PSI (14 Bar).

Nominal Flow Rates:

Pump Size	Cast Iron, Ductile Iron & Steel Externals Series		Stainless Steel Series	
	GPM	m^3/h	GPM	m^3/h
H	**15**	3.4	**15**	3.4
HL	**30**	6.8	**30**	6.8
K	**80**	18	**80**	18
KK	**100**	23	**100**	23
L/LQ	**135**	31	**135**	31
LL	**170**	39	**170**	39
LS	**200**	45	**200**	45
Q	**300**	68	**300**	68
QS	**500**	114	**500**	114

Operating Range①:

Cast Iron Series 8124A		
Nominal Flow	GPM	15-500
	m^3/h	3.4-114
Pressure Range	PSI	To 200 PSI
	Bar	To 14 Bar
Temp. Range ②	°F	–60°F to +500°F
	°C	–51°C to +260°C
Viscosity Range	SSU	28 SSU to 250,000 SSU
	cSt	0.1 cSt to 55,000 cSt

Steel Externals Series 8123A		
Nominal Flow	GPM	15-500
	m^3/h	3.4-114
Pressure Range	PSI	To 200 PSI
	Bar	To 14 Bar
Temp. Range ②	°F	–20°F to +500°F
	°C	–29°C to +260°C
Viscosity Range	SSU	28 SSU to 250,000 SSU
	cSt	0.1 cSt to 55,000 cSt

Stainless Steel Series 8127A		
Nominal Flow	GPM	15-500
	m^3/h	3.4-114
Pressure Range	PSI	To 150 PSI
	Bar	To 10 Bar
Temp. Range ②	°F	–120°F to +500°F
	°C	–84°C to +260°C
Viscosity Range	SSU	28 SSU to 250,000 SSU
	cSt	0.1 cSt to 55,000 cSt

① Refer to Specification Tables 635.7 for individual model information.
② Samarium cobalt magnets required for temperatures over 225° F (107°C)

VIKING UMD INTERNAL GEAR PUMPS

UNIVERSAL MAG DRIVE

SERIES 8124A (Cast Iron), 8123A (Steel Externals), 8127A (Stainless Steel)

Series Description

The Universal Mag Drive provides the product durability and the flexibility of options customers expect from the Viking heavy duty pumps with the added benefit of providing a direct drop-in replacement that has a dimensionally interchangeable footprint with the Viking bracket styled heavy duty and Universal Seal counterpart. This magnetically driven pump series eliminates the need for complex shaft seals traditionally associated with hazardous, hard-to-seal, or expensive liquids. These pumps are ideal for applications like caustics, isocyanates, adhesives, solvents and mercaptans.

This Series features 9 different sizes with flows to 500 GPM (114 m^3/h), with three materials of construction options. They may be applied to both thin and thick liquids, and operate in either direction. They are also capable of operating under suction lift conditions.

The Universal Mag Drive series continues the tradition of most robust series of internal gear pumps built by Viking Pump. A summary of the major design features and available options appears to the right.

3 Year Limited Warranty

Viking Universal Seal series pumps carry a three year limited warranty. See catalog section 000 for details.

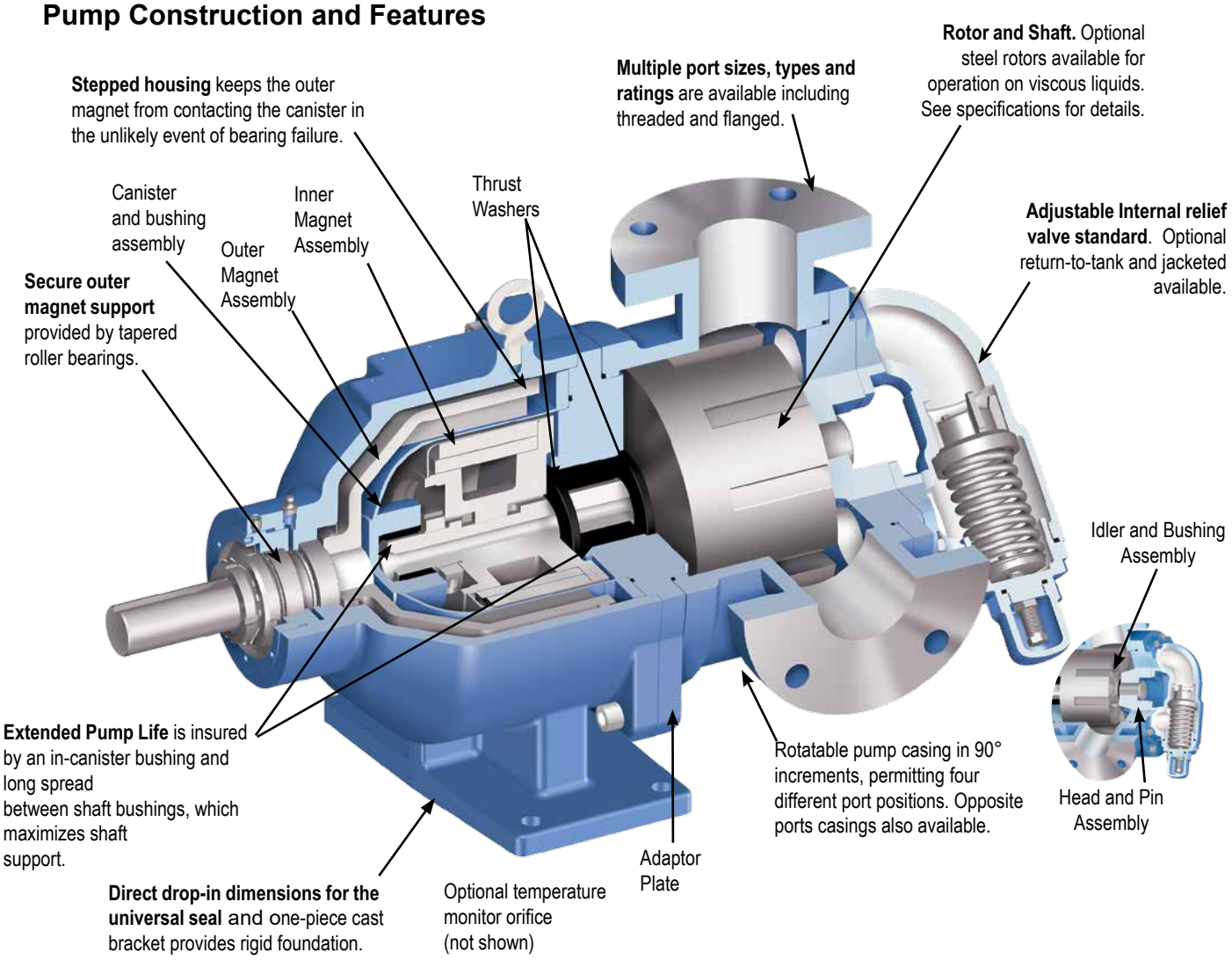
Major Design Features & Options

- Positive displacement, internal gear pumping principle.
- Gear and pump geometry has been optimized based on more than 100 years of experience. These pumps are designed to provide exceptional reliability and freedom from down time and maintenance.
- Drop in foot print allows direct replacement of a Viking Universal Seal pump without re-piping.
- Foot-mounted design.
- Comes in three materials of construction: Cast Iron, Steel and Stainless Steel Externals.
- Available with 90° ports, which can be rotated in 90° degree increments, or with 180° ports (Check individual sizes).
- Ports are threaded or flanged. Jacketed casing available in steel and stainless steel.
- Pumps come with an adjustable internal pressure relief valve on standard design. Jacketed pressure relief valves are available in steel and stainless.
- The pump operates in either direction, allowing one pump to be used for both loading and unloading. There is a slight reduction in capacity at viscosities less than 100 SSU with counter-clockwise rotation.
- Adjustable end clearance for fluid viscosity or temperature by use of head shims.
- Static O-rings at key points assures liquid containment.
- ATEX Conformity. Pumps conforming to ATEX hazard prevention requirements are available
- Short-term Run-dry Capability. Unlike many mag-drive pumps, the Viking Universal Mag Drive series may be run dry for short periods, such as for clear lines when unloading, or in the case of accidental empty tank situations.

Revolvable Pump Casings Standard on H through LS Sizes

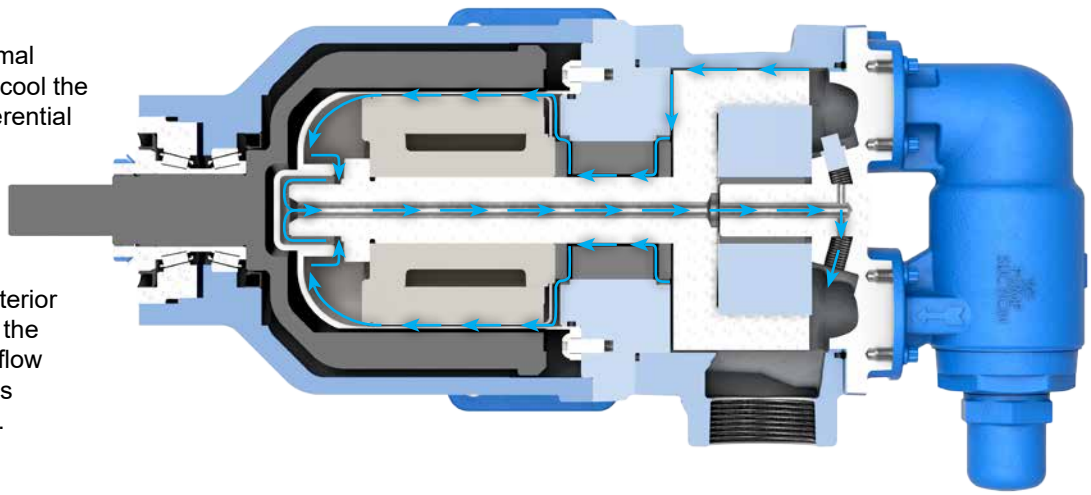
All Universal Mag Drive pumps are equipped with pump casings that can be positioned to meet common piping configurations. H through Q sizes have standard 90° ports which can be turned to any of four positions. The QS size has standard 180° ports with an option of 90° ports allowing you to achieve any of four positions, like the other sizes. Optional opposite ports are available on other sizes and materials. Direction of flow is reversible so any given port can be used as suction or discharge. The relief valve must “point “ to the suction port in all cases.

Pump Construction and Features



H through LS hollow shaft circulation illustrated below. Q & QS circulation is reversed - not illustrated (idler pin open to discharge port).

Positive Cooling Flow (indicated by small arrows) minimizes potential for thermal product degradation and to cool the magnet area. Pressure differential from the discharge side causes a cooling flow between the pump shaft and bushing, and the canister and magnet through the shaft interior and hollow idler pin back to the pump suction. This cooling flow is reversed when the pump's direction of flow is reversed.



Model Number Key

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7	Field 8	Field 9
L	S	8	1	2	4	A-	325	R

Size:
H
HL
K
KK
L
LQ
LL
LS
Q
QS

Shaft Sealing:
8 = Sealless

Jacketing:
1 = Non-Jacketed Bracket

Material of Construction:
3 = Steel Externals
4 = Cast Iron
7 = Stainless Steel

Series Edition:
A = Original Design

Torque Specifications:
H-HL = 40 Ft-lb
K-KK = 90 Ft-lb
K-KK = 180 Ft-lb
L-LS = 325 Ft-lb
Q-QS = 425 Ft-lb
Q-QS = 900 Ft-lb

Drive Configurations:
__ = Pump Only
D = Direct Drive
R = Reducer Drive
P = Purchased Reducer

Model numbers for the Universal Mag Drive series, begin with the displacement, followed by the pump series. The last number of the series indicates the material of construction for the external components. This is followed by the coupling and drive unit designations.

Neodymium iron boron magnets are the standard. For application temperatures over 225°F (107°C), Samarium Cobalt magnets are available in all sizes.

Materials of Construction - All Series

Component		Cast Iron Series 8124A	Steel Externals Series 8123A	Stainless Steel Series 8127A
Casing		Cast Iron ASTM A48, Class 35B	Steel ASTM A216, Grade WCB	Stainless Steel ASTM A 743, Grade CF8M
Head		Cast Iron ASTM A48, Class 35B	Steel ASTM A216, Grade WCB	Stainless Steel ASTM A 743, Grade CF8M Case Hardened
Bracket		Cast Iron ASTM A48, Class 35B	Cast Iron ASTM A48, Class 35B	Cast Iron ASTM A48, Class 35B
Idler	Standard	② Cast Iron ASTM A48 Class 35B	② Cast Iron ASTM A48 Class 35B	Stainless Steel ASTM A 743, Grade CF8M Case Hardened
	Optional Material	Consult Factory	Consult Factory	Non-Galling Stainless and PPS Composite
Rotor	Standard	① Cast Iron ASTM A48, Class 35B	① Cast Iron ASTM A48, Class 35B	Stainless Steel ASTM A 743, Grade CF8M Case Hardened
	Optional Material	Steel ASTM A148, Grade 80-50	Steel ASTM A148, Grade 80-50	NA
Rotor Shaft		Hardened Steel ASTM A108, Grade 1045	Hardened Steel ASTM A108, Grade 1045	Hard Coated Stainless Steel ASTM A276 Type 316 Hard Coated
Idler Pin		Hardened Steel ASTM A108, Grade 1045	Hardened Steel ASTM A108, Grade 1045	Hard Coated Stainless Steel ASTM A276 Type 316 Hard Coated
Idler Bushing	Standard	Carbon Graphite	Carbon Graphite	Carbon Graphite
	Optional Material	Hardened Cast Iron, Silicon Carbide	Hardened Cast Iron, Silicon Carbide	Silicon Carbide
Internal Pressure Relief Valve		Cast Iron ASTM A48, Class 35B	Steel ⑤ ASTM A216, Grade WCB	Stainless Steel ASTM A 743, Grade CF8M
Canister		316L Stainless Steel	316L Stainless Steel	316L Stainless Steel
Canister Bushing	Standard	Carbon Graphite	Carbon Graphite	Carbon Graphite
	Optional Material	Hardened Cast Iron, Siliconized Graphite	Hardened Cast Iron, Siliconized Graphite	Siliconized Graphite
Thrust Washers	Standard	④ Hardened Cast Iron	④ Hardened Cast Iron	④ Silicon Carbide
	Optional Material	Silicon Carbide	Silicon Carbide	NA
Coupling Magnets	Standard	Neodymium Iron Boron	Neodymium Iron Boron	Neodymium Iron Boron
	Optional Material	Samarium Cobalt	Samarium Cobalt	Samarium Cobalt
O-rings	Standard	Viton®	Viton®	PTFE (Derivative) Encapsulated
	Optional Material	PTFE (Derivative) Encapsulated, Kalrez®	PTFE (Derivative) Encapsulated, Kalrez®	Viton®, Kalrez®
Adaptor Plate		Cast Iron ASTM A48, Class 35B	Steel ASTM A216, Grade WCB	Stainless Steel ASTM A743, Grade CF8M
Adaptor Bushing	Standard	Carbon Graphite	Carbon Graphite	Carbon Graphite
	Optional Material	Hardened Cast Iron, Silicon Carbide	Hardened Cast Iron, Silicon Carbide	Silicon Carbide

① KK, LS and QS sizes have ductile iron rotor, ASTM A536 Grade 60-40-18.
② H and HL sizes have powdered metal idler, MPIF Std 35 FC-0208-50.
③ Steel fitted Q and QS sizes have steel idlers.
④ Q and QS contains two sets of thrust washers, one set is carbon graphite as standard.
⑤ LQ-LS relief valve bodies are stainless steel.

VIKING UMD INTERNAL GEAR PUMPS

UNIVERSAL MAG DRIVE

SERIES 8124A (Cast Iron), 8123A (Steel Externals), 8127A (Stainless Steel)

Specifications

Model Number	⑥ Standard Port Size	⑦ Capacity at Maximum Rated Speed			Max. Hydrostatic Pressure		① Max. Discharge Pressure		② Max. Recommended Temp. for Standard Pump				Steel Fitted Recommended Above	Approx. Shipping Weight with Valve
									Standard Construction		High Temperature Construction			
	Inches (mm)	GPM	m^3/h	RPM	PSIG	BAR	PSIG	BAR	°F	°C	°F	°C	SSU	Pounds
H8124A	③1.5 (40)	15	3.4	1750	400	28	200	14	225	107	500	260	25,000	60
H8123A	⑤1.5 (40)													70
H8127A	⑤1.5 (40)						150	10					N/A	70
HL8124A	③1.5 (40)	30	6.8	1750	400	28	200	14	225	107	500	260	7,500	60
HL8123A	⑤1.5 (40)													70
HL8127A	⑤1.5 (40)						150	14					N/A	70
K8124A	③2 (50)	80	18	780	400	28	200	14	225	107	500	260	25,000	195
K8123A	⑤2 (50)													205
K8127A	⑤2 (50)						150	10					N/A	205
KK8124A	③2 (50)	100	23	780	400	28	200	14	225	107	500	260	75,000	195
KK8123A	⑤2 (50)													205
KK8127A	⑤2 (50)						150	10					N/A	205
L8124A	③2 (50)	135	30	640	400	28	200	14	225	107	500	260	25,000	280
LQ8124A	④2.5 (65)	135	30	640	400	28	200	14	225	107	500	260	25,000	290
LQ8123A	⑤2.5 (65)													295
LQ8127A	⑤2.5 (65)						150	10					N/A	295
LL8124A	④3 (75)	170	39	640	400	28	200	14	225	107	500	260	2,500	305
LL8123A	⑤3 (75)													315
LL8127A	⑤3 (75)						150	10					N/A	315
LS8124A	④3 (75)	200	45	640	400	28	200	14	225	107	500	260	75,000	340
LS8123A	⑤3 (75)													350
LS8127A	⑤3 (75)						125	9					N/A	350
Q8124A	4 (100)	300	68	520	400	28	200	14	225	107	500	260	7,500	705
Q8123A	4 (100)													730
Q8127A	4 (100)						125	9					N/A	730
QS8124A	6 (150)	500	114	520	400	28	200	14	225	107	500	260	75,000	775
QS8123A	6 (150)													805
QS8127A	6 (150)						125	9					N/A	805

① For maximum recommended discharge pressures see performance curves, which can be electronically generated with the Viking Pump Selector Program, located on www.vikingpump.com.

② Extra clearances are required above 225ºF. Higher temperatures can be handled with special construction, consult factory.

③ Ports are tapped for standard (NPT) pipe. Other options are available, consult factory.

④ Ports are suitable for use with ANSI Class 125 cast iron companion flanges or flanged fittings. Other options are available, consult factory.

⑤ Ports are suitable for ANSI Class 150 steel or stainless steel companion flanges or flanged fittings. Other options are available, consult factory.

⑥ See p.635.9 for other port type and size options.

⑦ Nominal capacity on medium viscosity liquids with clockwise rotation. There is a slight reduction in capacity at viscosities less than 100 SSU with counter-clockwise rotation.

Special Materials and Options Selection Guidelines

For High Viscosities - Above 2,500 SSU (550 cSt)

- Steel fitted construction recommended on Cast Iron and Steel Externals pumps above the following viscosities, according to pump size:

Viscosity										
	H	HL	K	KK	L	LQ	LL	LS	Q	QS
SSU	25,000	7,500	25,000	25,000	25,000	25,000	2,500	75,000	7,500	75,000
cSt	5,500	1,650	5,500	5,500	5,500	5,500	550	16,500	1,650	16,500

- Extra clearances required, depending on viscosity.
- Larger ports may be required depending on suction conditions.
- Pump should be operated at slower than normal speeds, which may require a larger pump.

For low viscosities or non-lubricating liquids – Below 100 SSU (20 cSt)

- Carbon graphite bushings.
- Cast iron idler for iron or steel pumps, or PPS or 770 stainless alloy idler for stainless steel pumps.
- Silicon carbide thrust washers

For high temperatures – Above 225°F (107°C)

- Samarium cobalt magnets required. Maximum temperature is 500°F (260°C), contact factory for special material requirements for temperatures above 400°F (204°C)
- High temperature elastomers – Viton® up to 350°F (177°C); PTFE up to 400°F (204°C); or Kalrez® up to 550°F (288°C);
- High temperature relief valve above 350°F (177°C).
- High temperature bushings recommended depending on temperature, size and specific material. See ESB-3 for recommendations.
- Additional operating clearances may be required depending on temperature, size and specific material. See ES-2 for recommendations.

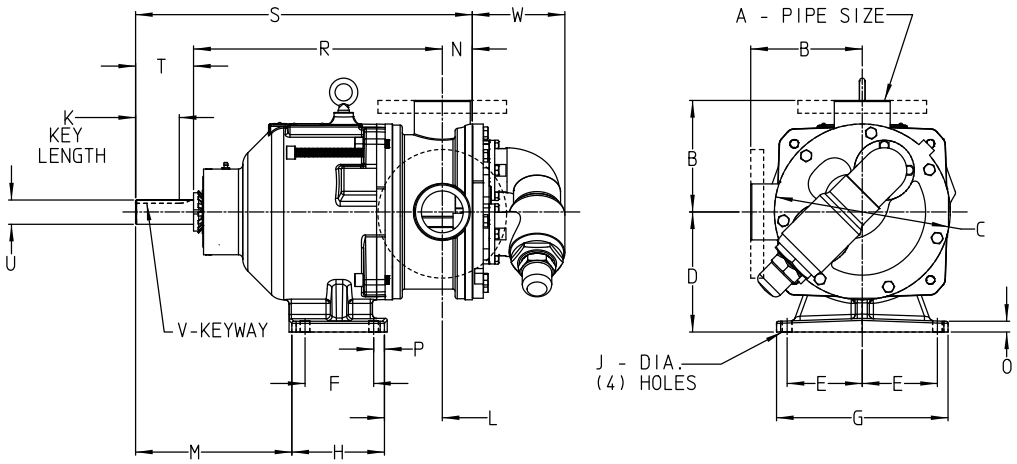
PPS - Reinforced polyphenylene sulfide.

VIKING UMD INTERNAL GEAR PUMPS

UNIVERSAL MAG DRIVE

SERIES 8124A (Cast Iron), 8123A (Steel Externals), 8127A (Stainless Steel)

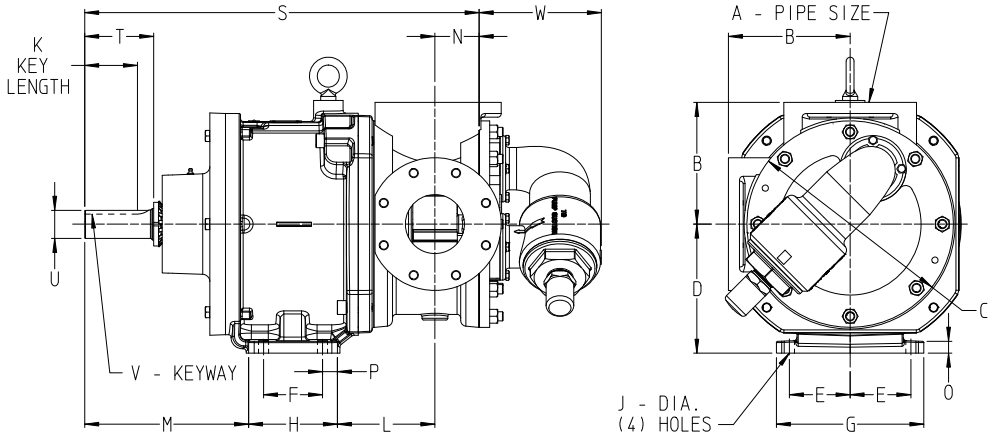
Dimensions - H through LS Sizes – All Materials of Construction



Model Number	A (in)		B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U④	V	W
H8124A HL8124A	① 1.5	in	3.00	4.75	3.50	2.75	2.25	6.75	3.50	.47	0.99	3.38	5.19	1.19	0.56	0.63	10.45	13.26	1.62	0.75	.19 x .09	2.90
		mm	76.2	120.6	88.9	69.8	57.1	171.4	88.9	11.9	25.1	85.8	131.8	30.2	14.2	15.7	265.5	336.8	41.1	19.0		73.7
H8123A HL8123A HL8127A H8127A	③ 1.5	in	4.00	4.75	3.50	2.75	2.25	6.75	3.50	.47	0.99	3.38	5.19	1.19	0.56	0.63	10.45	13.26	1.62	0.75	.19 x. 09	2.90
		mm	102	120.6	88.9	69.8	57.1	171.4	88.9	11.9	25.1	85.8	131.8	30.2	14.2	15.7	265.5	336.8	41.1	19.0		73.7
K8124A KK8124A	① 2	in	5.12	8.00	5.50	4.00	2.75	9.25	3.95	.56	1.42	3.03	9.39	1.75	.62	.60	14.12	18.12	2.25	1.125	.25 x .12	5.25
		mm	130	203	140	102	70	235	100	14	36.1	77	239	44	16	15	359	460	57	28		133
K8123A K8127A KK8123A KK8127A	③ 2	in	5.25	8.00	5.50	4.00	2.75	9.25	3.95	.56	1.42	3.03	9.39	1.75	.62	.60	14.12	18.12	2.25	1.125	.25 x .12	5.25
		mm	133	203	140	102	70	235	100	14	36.1	77	239	44	16	15	359	460	57	28		133
L8124A	① 2	in	6.50	10.25	7.00	4.38	4.00	10.00	5.40	.56	2.55	3.37	9.11	1.75	.62	.63	14.50	19.63	3.38	1.438	.38 x .19	5.40
		mm	165	260	178	112	102	254	137	14	65	86	231	44	16	16	369	499	86	36		137
LQ8124A LQ8123A LQ8127A	②③ 2.5	in	7.19	10.25	7.00	4.38	4.00	10.00	5.40	.56	2.55	3.37	9.11	1.75	.62	.63	14.50	19.63	3.38	1.438	.38 x .19	5.40
		mm	183	260	178	112	102	254	137	14	65	86	231	44	16	16	369	499	86	36		137
LL8124A LL8123A LL8127A	②③ 3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.40	.56	2.55	3.37	9.11	2.25	.62	.63	14.50	20.13	3.38	1.438	.38 x .19	5.40
		mm	183	260	178	112	102	254	137	14	65	86	231	57	16	16	369	511	86	36		137
LS8124A LS8123A LS8127A	②③ 3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.40	.56	2.55	4.74	9.11	2.44	.62	.63	15.87	21.69	3.38	1.438	.38 x .19	5.40
		mm	183	260	178	112	102	254	137	14	65	120	231	62	16	16	403	551	86	36		137

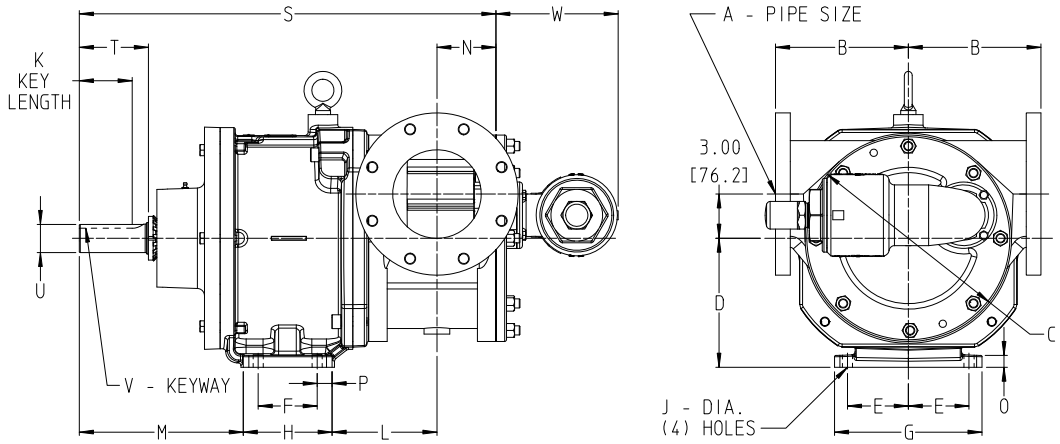
① Series 8124A ports are tapped for standard (NPT) pipe.
② Series 8124A, sizes LQ, LL and LS ports are suitable for use with 125# ANSI cast iron flanges or flanged fittings.
③ Series 8123A and 8127A ports are suitable for 150# ANSI steel or stainless steel companion flanges or flanged fittings.
④ When replacing on existing units, sizes L, LL and LQ may require a different size coupling half.

Dimensions - Q Size – All Materials of Construction



Model Number	A (in)		B	C	D	E	F	G	H	J	K	L	M	N	O	P	S	T	U④	V	W
Q8124A Q8123A Q8127A	②③ 4	in	8.25	14.00	8.75	4.12	4.00	10.00	6.00	0.69	3.58	6.62	11.13	3.00	0.80	1.00	26.75	4.68	1.94	.50 x .25	8.29
		mm	210	356	222	105	102	254	152	18	91	168	283	76	20	25	679	119	49		211

Dimensions - QS Size – All Materials of Construction



Model Number	A (in)		B	C	D	E	F	G	H	J	K	L	M	N	O	P	S	T	U④	V	W
QS8124A QS8123A QS8127A	②③ 6	in	9.00	14.00	8.75	4.12	4.00	10.00	6.00	0.69	3.58	7.12	11.13	4.00	0.80	1.00	28.25	4.68	1.94	.50 x .25	8.29
		mm	229	356	222	105	102	254	152	18	91	181	283	102	20	25	718	119	49		211

① Series 8124A ports are tapped for standard (NPT) pipe.
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③ Series 8123A and 8127A ports are suitable for 150# ANSI steel or stainless steel companion flanges or flanged fittings.
④ When replacing on existing units, sizes L, LL and LQ may require a different size coupling half.

Selecting the Correct Viking Mag Drive® Coupling

1. Find pump HP and speed from the performance curves, which can be electronically generated with the Viking Pump Selector Program, located on www.vikingpump.com/pumpselector.
2. Calculate the application torque (T), using this formula:

$$T\ (FT\text{-}LB) = \frac{HP}{SPEED} \times 5252$$

3. Select the temperature correction factor (TCF) from Table 1 or Table 2.

STANDARD NEODYMIUM MAGNETS (For Application Temperatures Below 225°F.)							
Application Temp. (°F)	**AMB**	**100**	**125**	**150**	**175**	**200**	**225**
TCF	1.0	.94	.88	.82	.76	.70	.64

Table 1: Temperature Correction Factors

OPTIONAL SAMARIUM COBALT MAGNETS (For Application Temperatures Above 225°F.)					
Application Temp. (°F)	**175**	**200**	**300**	**400**	**500**
TCF	.74	.73	.69	.63	.59

Table 2: Temperature Correction Factors

4. Divide calculated application torque by TCF to get adjusted application torque.
5. Select coupling with rating equal to or greater than "adjusted application torque" from Table 3.

MAGNETIC COUPLING TORQUE RATING TABLE	
Pump Size	**Torque (FT-LBS)**
H & HL	40
K & KK	90
	180
L, LQ, LL, LS	325
Q & QS	425
	900

Table 3

EXAMPLE

1. An HL8124A is required to pump 30 GPM of 20 cSt liquid at 1750 RPM, 50 PSI differential pressure

   Temperature is 150°F.

   From the pump selector, required HP is 2.8.
2. Calculate torque (T).

$$TORQUE\ (T) = \frac{2.8}{1750} \times (5252)$$

$$= 8.40\ FT\ LB$$

3. From the temperature correction factor table, the correction factor (TCF) = .82.
4. Calculate adjusted application torque.

$$ADJUSTED\ APPLICATION\ TORQUE = \frac{8.40}{.82}$$

$$= 10.25\ FT\text{-}LB$$

5. Select coupling.

THE NEODYMIUM 40 FT-LB COUPLING IS THE PROPER SELECTION

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.