UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS
SERIES 123A, 4123A, 323A, 4323A

Section	1301
Page	1301.1
Issue	B

TABLE OF CONTENTS

RELATED PRODUCTS

Steel Externals, Jacketed Pumps: Catalog Section 1302

Steel Externals, Mag Drive Pumps: Catalog Section 1303

Cast Iron, Non-Jacketed Pumps: Catalog Section 1401

Stainless Steel, Non-Jacketed Pumps: Catalog Section 1701

SERIES DESCRIPTION

The Universal Product Line has the broadest range of sealing options of all pumps built by Viking. The stuffing box on all sizes accepts packing, numerous component single mechanical seals, or a wide variety of cartridge seals.

The Universal Product Line is Viking Pump's most versatile line of internal gear pumps due to the availability of many design and material options.

HL4123A

OPERATING RANGE:

SERIES	NOMINAL FLOW		MAXIMUM PRESSURE		TEMPERATURE RANGE		VISCOSITY RANGE	
	GPM	m^3h	PSI	Bar	°F	°C	SSU	cSt
123A	15 - 500	3 - 114	200	14	−20 to +800	−25 to +425	28 to 2,000,000	1 to 440,000
4123A	15 - 500	3 - 114	200	14	−20 to +800	−25 to +425	28 to 2,000,000	1 to 440,000
323A	600 - 1,600	136 - 364	200	14	−20 to +800	−25 to +425	28 to 2,000,000	1 to 440,000
4323A	600 - 1,600	136 - 364	200	14	−20 to +800	−25 to +425	28 to 2,000,000	1 to 440,000

UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS

SERIES 123A, 4123A, 323A, 4323A

FEATURES & BENEFITS

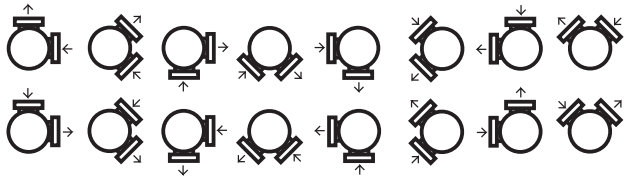
- Positive Displacement Internal Gear pumping principle handles a broad range of viscosities with constant flow rate
- Axial rotor thrust is controlled by double row ball bearing or tapered roller bearings; bushings provided a secondary point of radial shaft support
- Rotatable bearing housing provides easy rotor end clearance adjustment to compensate for viscosity or wear
- Numerous material options are available for bushings, idler pins, shafts, rotors, idlers and elastomers
- Gear and pump geometry has been optimized based on more than 100 years of experience
- Footed steel bracket provides rigid mounting to help maintain alignment, which extends seal and bearing life
- Can use direct drive, gear reducer or gearmotor drive, or belt-drive
- Pressure relief valve standard on non-jacketed pumps; less valve / plain head option available
- Series designed with an enlarged bearing housing; used in conjunction with a spacer coupling permits easy cartridge seal installation and removal in place without removing the head and rotor/shaft.
- Seal options include packing, single component seals, cartridge lip seals and cartridge single and double mechanical seals; various seal flush plans are available
- Steel externals for petroleum refineries, petrochemical plants and similar customers who require higher temperature and higher working pressures than cast iron pumps can provide

3 Year Limited Warranty

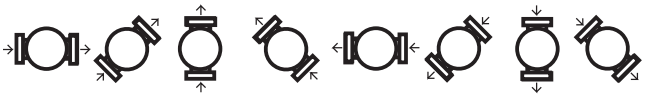
Viking Universal Product Line pumps carry a three year limited warranty. See catalog section 000 for details.

PORT LOCATION OPTIONS

90° port options:

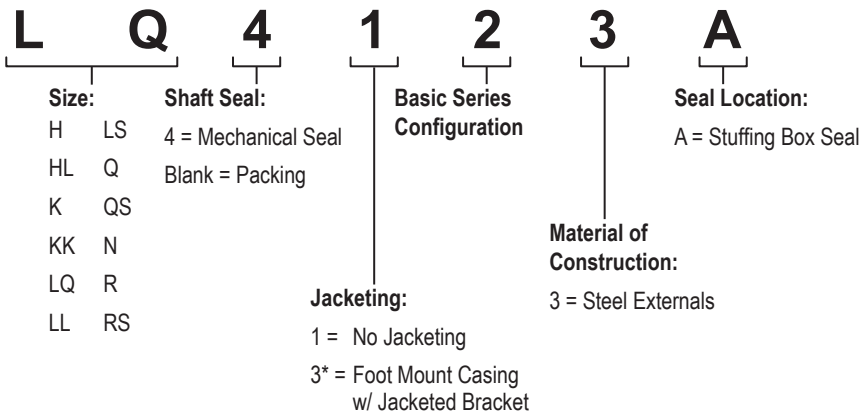


Opposite port options:



NOTE: See page 1301.7 for a complete list of casing options by size.

MODEL NUMBER KEY



* Note: Only the N through RS sizes are foot mount casing with jacketed bracket.

STANDARD MATERIALS OF CONSTRUCTION

Component	Standard Material	
Casing	Steel, ASTM A216, Class WCB	
Head	Steel, ASTM A216, Class WCB	
Bracket	Steel, ASTM A216, Class WCB	
Idler	**Standard**	① Cast Iron, ASTM A148, Class 35B
	Steel Fitted	①② Cast Iron, ASTM A148, Class 35B
Rotor	**Standard**	③ Cast Iron, ASTM A148, Class 35B
	Steel Fitted	④ Steel, ASTM A148, Grade 80-40
Shaft	⑤ Steel, ASTM A108, Grade 1045	
Idler Pin	Hardened Steel, ASTM A108, Grade 1045	
Idler Bushing	**(4123A, 4323A)**	Carbon Graphite
	(123A, 323A)	Bronze, ASTM B584 (B505), Alloy C93700
Bracket Bushing	**(4123A, 4323A)**	Carbon Graphite
	(123A, 323A)	Bronze, ASTM B584 (B505), Alloy C93700
Pressure Relief Valve	⑥ Steel, ASTM A216, Class WCB	
Standard Packing (123A, 323A)	Braided PTFE	
Standard Mechanical Seal (4123A, 4323A)	Carbon vs. Silicon Carbide Faces, FKM Elastomers	

① H and HL sizes have a powdered metal idler: Powdered Metal MPIF 35, FC-0208-50 (G) , Powdered Metal MPIF 35, FC-0208-45 (H, HL)

② Q and QS sizes have a hardened steel idler when pump is steel fitted: ASTM A148 Grade 80-40.

③ KK, LS, QS, N and RS sizes have ductile iron rotor: ASTM A536 Grade 60-40-18.

④ Material specification for HL steel rotor is AISI 8620, LS steel rotor is ASTM A148 80-50.

⑤ LQ, LL and LS sizes are high strength steel ASTM A434 Type 4140 Grade BC or equivalent.

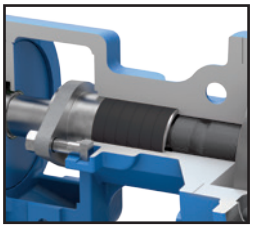
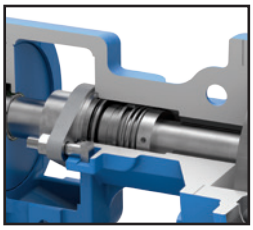
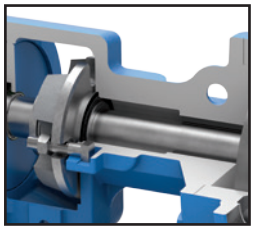
⑥ LQ, LL and LS relief valve bodies are stainless steel.

UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS

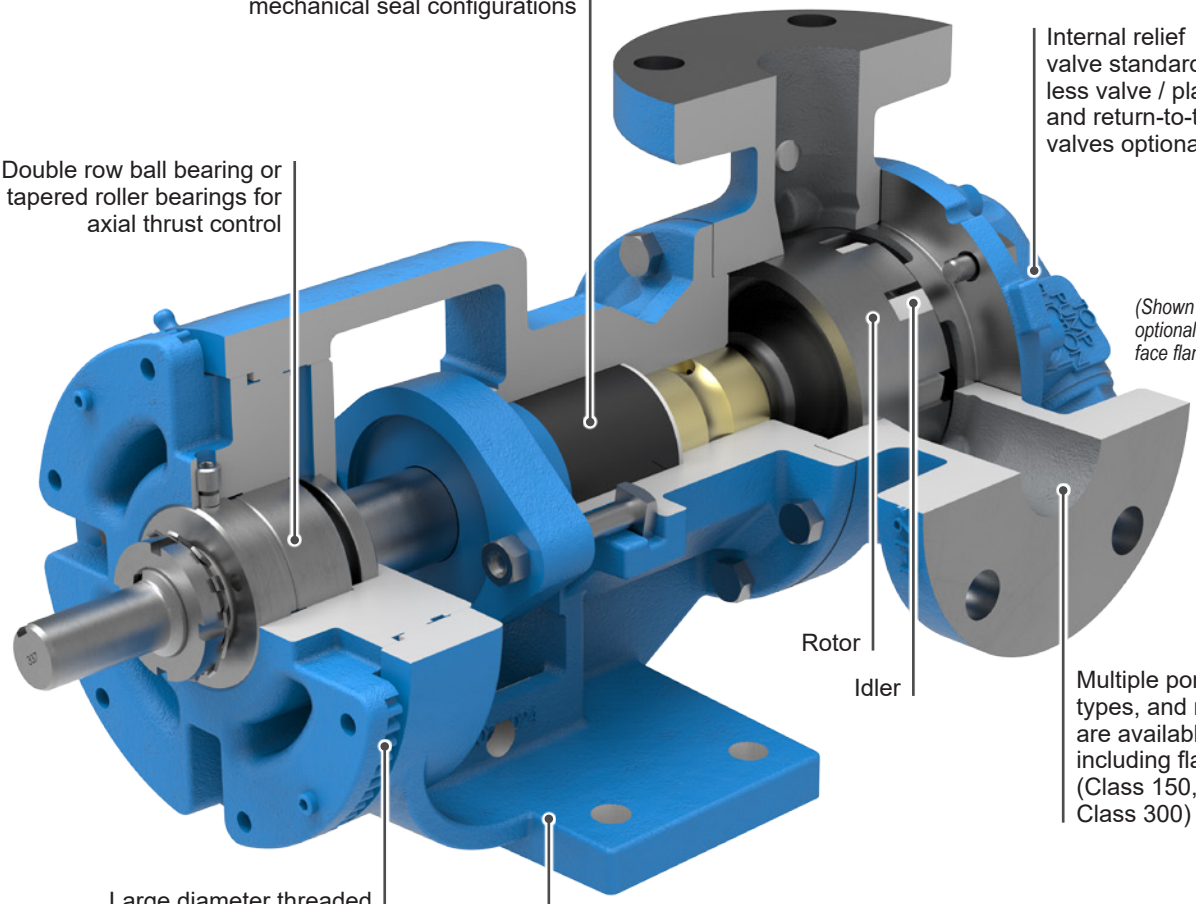
SERIES 123A, 4123A, 323A, 4323A

CUTAWAY VIEW & PUMP FEATURES

Packing | **Component Seal** | **Cartridge Seal**

Seal chamber accepts packing and a variety of component and cartridge style mechanical and lip seals, in both single and double mechanical seal configurations



* All except RS size

SPECIAL MATERIALS & OPTIONS SELECTION GUIDELINES

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

- Steel fitted construction recommended above the following viscosities, according to pump size:

Viscosity	Pump Size											
	H	HL	K	KK	LQ	LL	LS	Q	QS	N	R	RS
SSU	25,000	7,500	25,000	75,000	25,000	2,500	75,000	7,500	75,000	75,000	25,000	75,000
cSt	5,500	1,700	5,500	17,000	5,500	550	17,000	1,700	17,000	17,000	5,500	17,000

- Extra clearances, depending on viscosity. See ES-2 for recommendations.
- Special Sealing:
  FKM or Buna N Type 1 component seals good up to 15,000 SSU (3,300 cSt).
  PTFE Type 9 seals good up to 25,000 SSU (5,500 cSt).
  Packed gland good up to 2,000,000 SSU (440,000 cSt).
  Cartridge triple lip seals available to 2,000,000 SSU (440,000 cSt).
- 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 viscosities over 250,000 SSU (55,000 cSt), contact factory for additional pump construction and operation recommendations.

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

- Carbon graphite bushings.
- Pump should be operated at slower than normal speeds, which may require a larger pump.

For high temperatures – Above 225°F (105°C)

- High temperature elastomers – FKM up to 350°F (175°C); Buna up to 225°F (105°C); PTFE up to 450°F (230°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.
- For temperatures above 450°F (230°C), special materials and sealing requirements may be needed. Contact factory for recommendations.
- Pump should be operated at slower than normal speeds, which may require a larger pump.

For abrasive or dirty liquids

- If possible, filter or strain out the abrasives present.
- Wear resistant bushings - hardened cast iron, tungsten carbide or Colmonoy coated.
- Abrasive-resistant idler pin - tungsten carbide or Colmonoy plus TC filler coated pins.
- Hardened or hard-coated shaft.
- Abrasive-resistant seals.
- For high concentrations of abrasives or particle sizes greater than 250 microns (0.010 in), contact factory for recommendations.
- Pump should be operated at slower than normal speeds, which may require a larger pump.
- Consult factory for specific recommendations.

UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS
SERIES 123A, 4123A, 323A, 4323A

SPECIFICATIONS

Model Number	③ Standard Port Size	Nominal Pump Rating (100 SSU & below)			④ Maximum Hydrostatic Pressure		① Maximum Discharge Pressure for 100 SSU liquid at rated speed		② Maximum Recommended Temperature for Standard Pump		Approx. Shipping Weight with Valve	
	Inches	GPM	m^3/h	RPM	PSIG	BAR	PSIG	BAR	°F	°C	Lbs.	Kg.
H123A	1 ½	15	3	1750	400	28	200	14	450	230	43	20
H4123A	1 ½	15	3	1750	400	28	200	14	350	175	43	20
HL123A	1 ½	30	7	1750	400	28	200	14	450	230	45	20
HL4123A	1 ½	30	7	1750	400	28	200	14	350	175	45	20
K123A	2	80	18	780	400	28	200	14	450	230	120	54
K4123A	2	80	18	780	400	28	200	14	350	175	120	54
KK123A	2	100	23	780	400	28	200	14	450	230	125	57
KK4123A	2	100	23	780	400	28	200	14	350	175	125	57
LQ123A	2 ½	135	31	640	400	28	200	14	450	230	185	64
LQ4123A	2 ½	135	31	640	400	28	200	14	350	175	185	64
LL123A	3	140	32	520	400	28	200	14	450	230	195	89
LL4123A	3	140	32	520	400	28	200	14	350	175	195	89
LS123A	3	200	45	640	400	28	200	14	450	230	200	91
LS4123A	3	200	45	640	400	28	200	14	350	175	200	91
Q123A	4	300	68	520	250	17	200	14	450	230	450	204
Q4123A	4	300	68	520	250	17	200	14	350	175	450	204
QS123A	6	500	114	520	250	17	200	14	450	230	550	250
QS4123A	6	500	114	520	250	17	200	14	350	175	550	250
N323A	6	600	136	350	250	17	200	14	450	230	810	367
N4323A	6	600	136	350	250	17	200	14	350	175	810	367
R323A	8	1,100	250	280	250	17	200	14	450	230	1,435	651
R4323A	8	1,100	250	280	250	17	200	14	350	175	1,435	651
RS323A	10	1,600	364	280	250	17	125	9	450	230	2,500	1,140
RS4323A	10	1,600	364	280	250	17	125	9	350	175	2,500	1,140

① For maximum recommended discharge pressures at different viscosities, see performance curves, which can be electronically generated with the Viking Pump Curve Generator, located on www.vikingpump.com. If suction pressure exceeds 50 PSIG, consult factory. Higher pressures possible with factory approval based on application details.

② Extra clearances are required above 225°F / 105°C. Higher temperatures can be handled with special construction, consult factory.

③ Ports are suitable for Class 150 ANSI steel or stainless steel companion flanges or flanged fittings.

④ Maximum hydrostatic pressure for standard pump construction. Rating is dependent on seal, gaskets and ports.

OPTIONAL CASINGS

Size	Standard Casings		Optional Casings						
	Ports (Inches)	Rotatable Data							
H	1.5" ①Ⓡ	Fully Rotatable	1.5" ②Ⓡ	2" ①Ⓡ	2" ②Ⓡ				
HL	1.5" ①Ⓡ	Fully Rotatable	1.5" ②Ⓡ	2" ①Ⓡ	2" ②Ⓡ				
K	2" ①Ⓡ	Ports cannot face down	2" ②Ⓡ	2.5" ①Ⓡ	2.5" ②Ⓡ	3" ①Ⓡ	3" ②Ⓡ	4" ①Ⓡ	4" ②Ⓡ
KK	2" ①Ⓡ	Ports cannot face down	2" ②Ⓡ	2.5" ①Ⓡ	2.5" ②Ⓡ	3" ①Ⓡ	3" ②Ⓡ	4" ①Ⓡ	4" ②Ⓡ
LQ	2.5" ①Ⓡ	Ports cannot face down	2.5" ②Ⓡ	3" ②Ⓡ	4" ①Ⓡ	4" ②Ⓡ	6" ①Ⓡ		
LL	3" ①Ⓡ	Ports cannot face down	3" ②Ⓡ	4" ①Ⓡ	4" ②Ⓡ				
LS	3" ①Ⓡ	Fully Rotatable	3" ②Ⓡ	4" ①Ⓡ	4" ②Ⓡ				
Q	4" ①Ⓡ	Fully Rotatable	4" ②Ⓡ	5" ①Ⓡ	5" ②Ⓡ	6" ①Ⓡ*	6" ②Ⓡ*	6" ①◎	6" ②◎
QS	6" ①◎	Rotatable with special casing	6" ①Ⓡ	6" ②◎					
N	6" ①◎	Not Rotatable							
R	8" ①◎	Not Rotatable							
RS	10" ①◎	Not Rotatable							

① Ports suitable for Class 150 ANSI steel or stainless steel companion flanges or flanged fittings.

② Ports suitable for Class 300 ANSI steel or stainless steel companion flanges or flanged fittings.

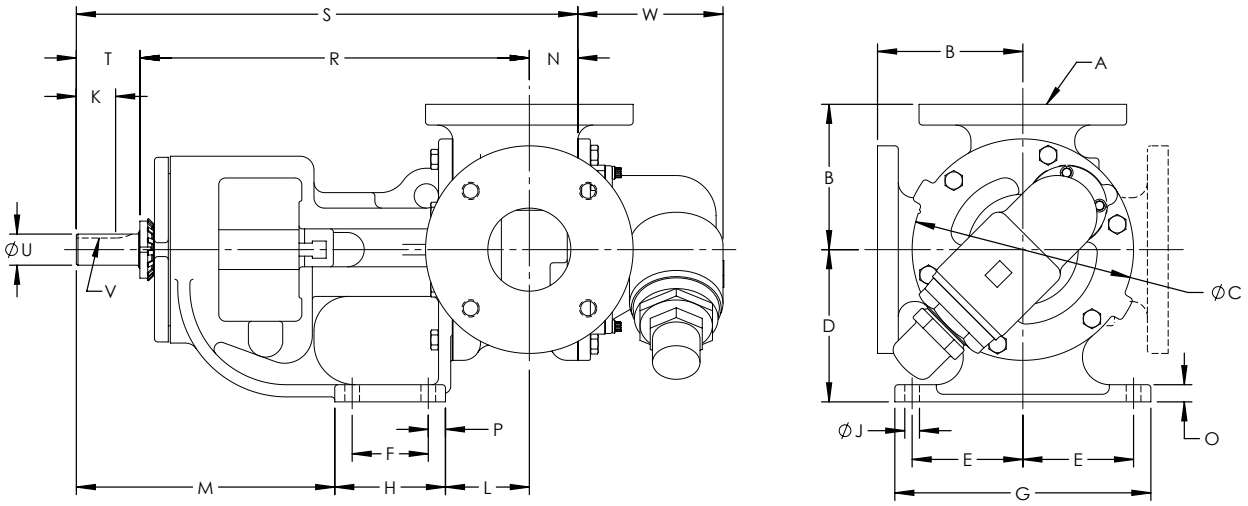
◎ Opposite Ports

Ⓡ 90° port arranged for Right Hand inlet (viewed from shaft end)

* Core smaller than port size

UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS
SERIES 123A, 4123A, 323A, 4323A

DIMENSIONS – H THROUGH Q SIZES



These dimensions are average and not for construction purposes. Certified prints on request.

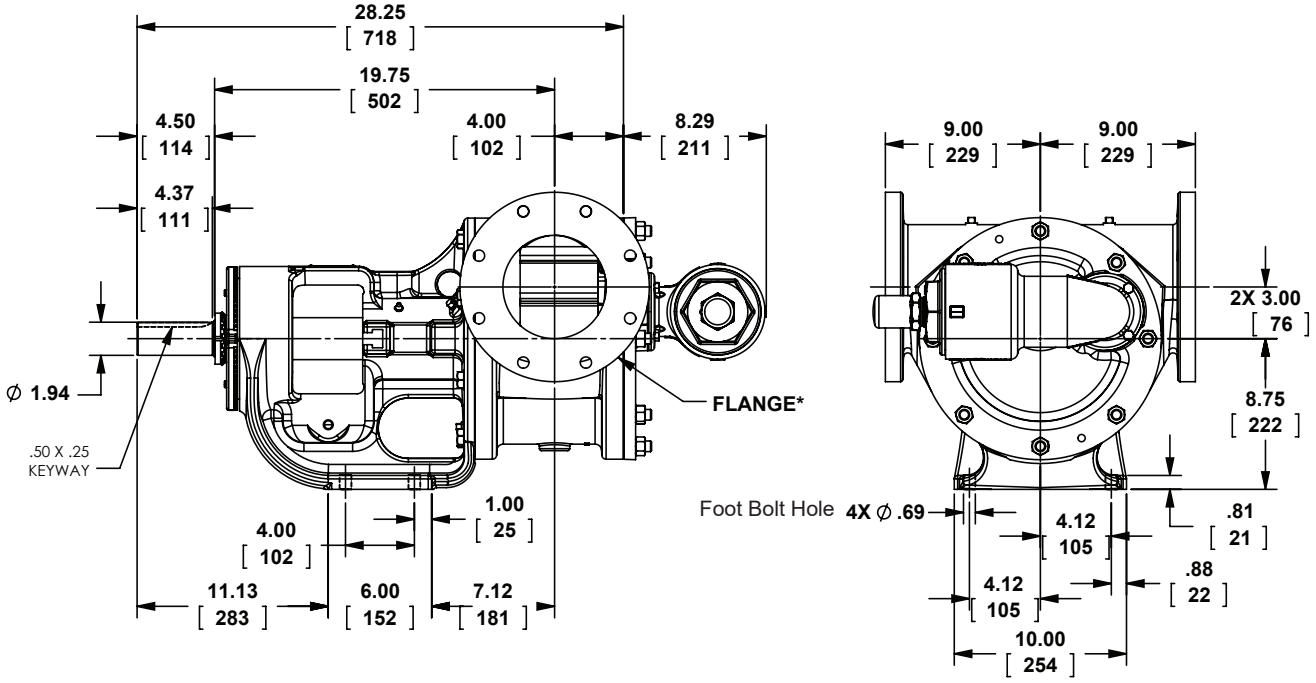
Model Number		① A (in)		B	C	D	E	F	G	H	J	K	L	M
Packed	Mechanical Seal													
H123A HL123A	H4123A HL4123A	1.5	in	4.00	4.75	3.50	2.75	2.25	6.75	3.50	0.47	0.99	3.38	5.19
			mm	102	121	89	70	57	171	89	12	25	86	132
K123A KK123A	K4123A KK4123A	2	in	5.25	8.00	5.50	4.00	2.75	9.25	4.00	0.53	1.42	3.00	9.38
			mm	133	203	140	102	70	235	102	14	36	76	238
LQ123A	LQ4123A	2.5	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	1.42	3.38	9.12
			mm	183	260	178	111	102	254	137	14	36	86	232
LL123A	LL4123A	3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	1.42	3.38	9.12
			mm	183	260	178	111	102	254	137	14	36	86	232
LS123A	LS4123A	3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	2.55	4.75	9.12
			mm	183	260	178	111	102	254	137	14	65	121	232
Q123A	Q4123A	4	in	8.25	14.00	8.75	4.12	4.00	10.00	6.00	0.69	3.58	6.62	11.12
			mm	210	356	222	105	102	254	152	18	91	168	282

Model Number			N	O	P	R	S	T	U (in)	V (in)	W
Packed	Mechanical Seal										
H123A HL123A	H4123A HL4123A	in	1.19	0.56	0.62	10.44	13.25	1.62	0.75	.19 x .09	2.85
		mm	30	14	16	265	337	41			72
K123A KK123A	K4123A KK4123A	in	1.75	0.62	0.62	14.12	18.12	2.25	1.12	.25 x .12	5.25
		mm	44	16	16	359	460	57			133
LQ123A	LQ4123A	in	1.75	0.62	0.62	15.62	19.62	2.25	1.12	.25 x .12	5.43
		mm	44	16	16	397	498	57			138
LL123A	LL4123A	in	2.25	0.62	0.62	15.62	20.12	2.25	1.12	.25 x .12	5.43
		mm	57	16	16	397	511	57			138
LS123A	LS4123A	in	2.44	0.62	0.62	15.75	21.69	3.50	1.44	.38 x .19	5.43
		mm	62	16	16	400	551	89			138
Q123A	Q4123A	in	3.00	0.75	1.00	19.25	26.75	4.50	1.94	.50 x .25	8.25
		mm	76	19	25	489	679	114			210

① Ports are suitable for Class 150 ANSI steel or stainless steel companion flanges or flanged fittings.

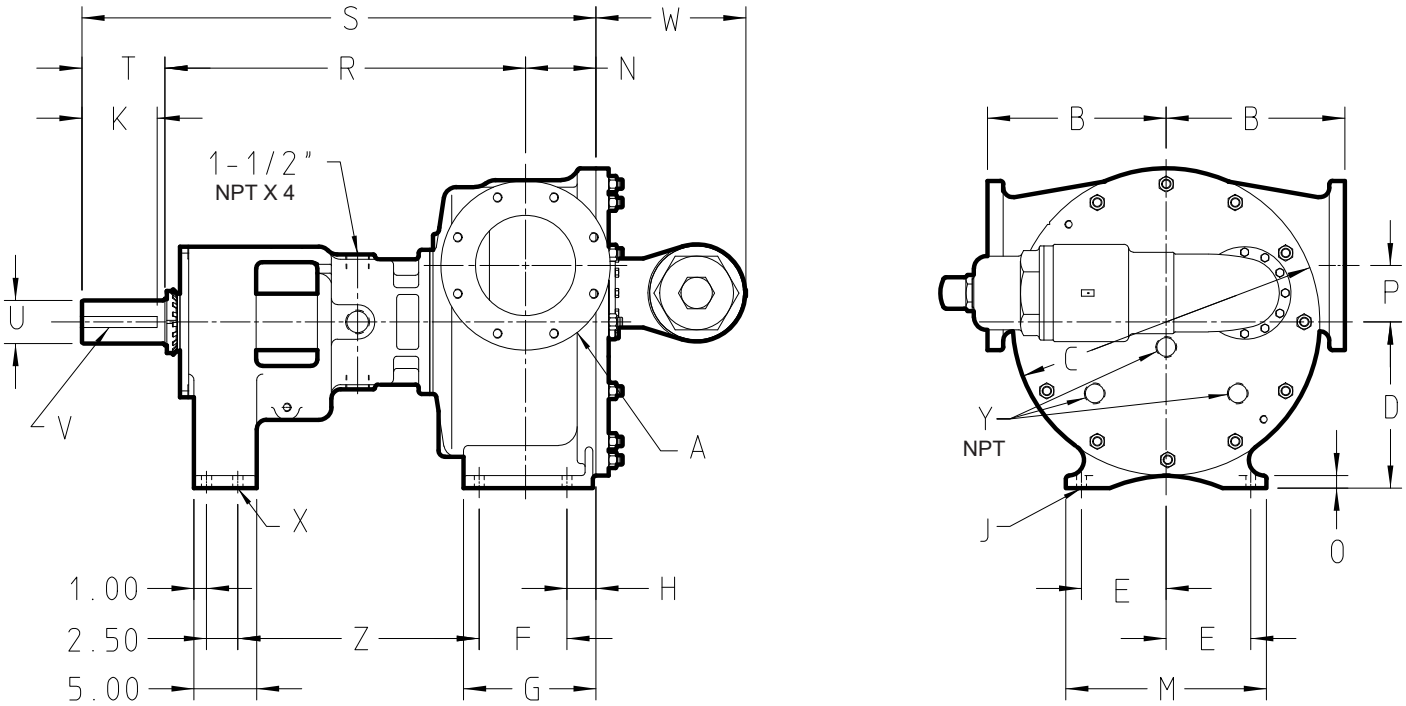
DIMENSIONS – QS SIZE

Dimensions shown in inches with millimeter equivalent shown in parentheses



* 123A/4123A ports suitable for use with Class 150 ANSI steel or stainless steel companion flanges or flanged fittings. They are studded, not through-bolt.

DIMENSIONS – N & R SIZES – JACKETED BRACKET (323A, 4323A)

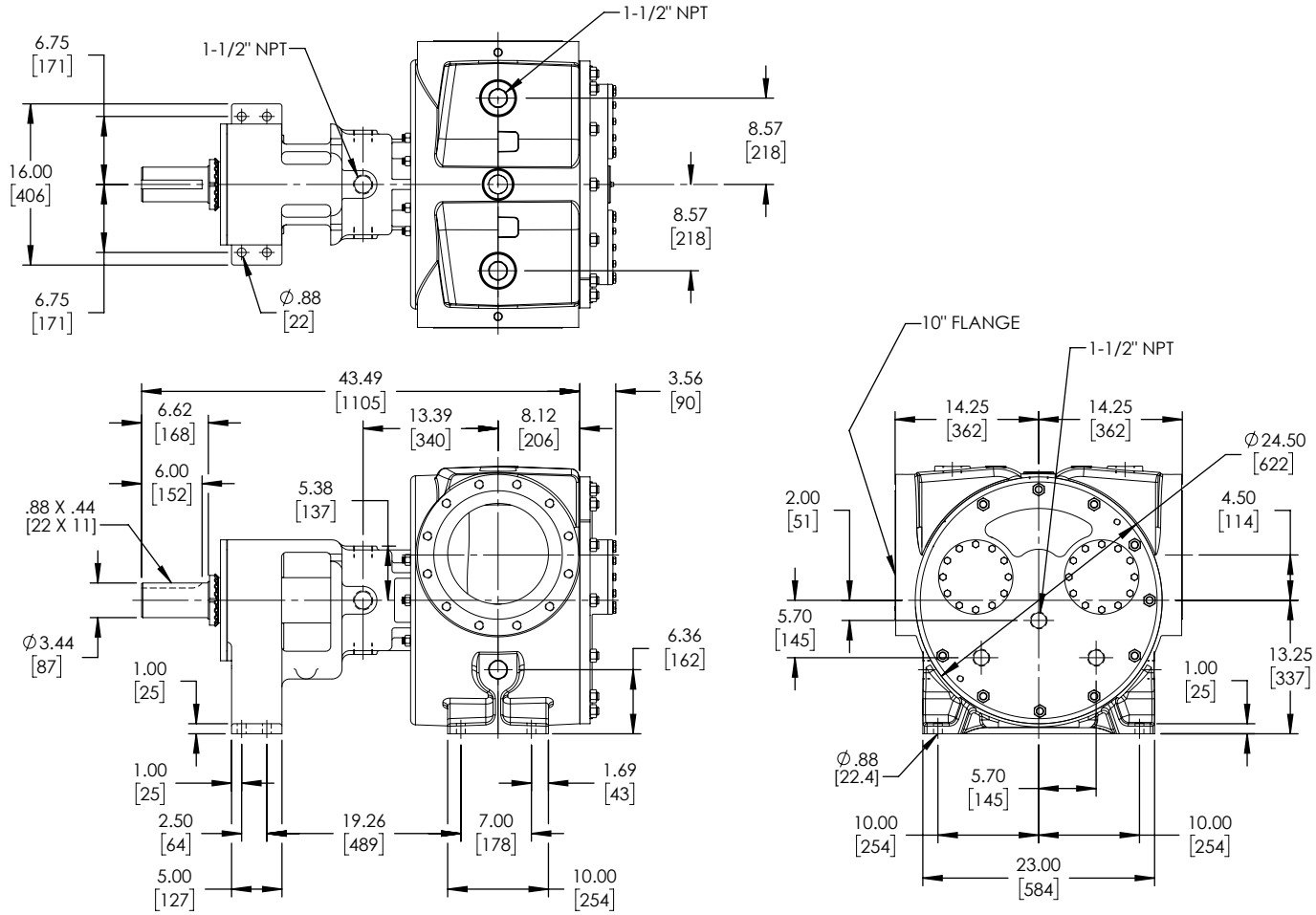


Model Number		A (in)		B	C	D	E	F	G	H	J	K	M	N	O	P	R	S	T	U (in)	V (in)	W	X	Y (in)	Z
Packed	Stuffing Box Seal																								
N323A	N4323A	①	in	9.75	17.25	9.50	5.00	6.25	8.69	1.62	0.69	4.50	12.00	4.50	1.00	3.00	26.00	36.50	6.00	2.44	.62 x.31	8.63	0.69	—	18.94
		6	mm	248	438	241	127	159	221	41	18	114	305	114	25	76	660	927	152			219	18	—	481
R323A	R4323A	①	in	14.25	24.50	13.25	6.75	7.00	10.56	2.31	0.78	6.00	16.00	5.62	1.00	4.50	28.75	41.00	6.62	3.44	.88 x.44	12.00	0.69	1.25	19.25
		8	mm	362	622	337	171	178	268	59	20	152	406	143	25	114	730	1041	168			305	18		489

① Ports are suitable for use with Class 150 ANSI steel or stainless steel companion flanges or flanged fittings.

NOTE: The N size is standard with a jacketed bracket and non-jacketed head and non-jacketed relief valve, while the "R" size is standard with a jacketed bracket, a jacketed head, and a non-jacketed relief valve. "RS" contact factory for jacketing options.

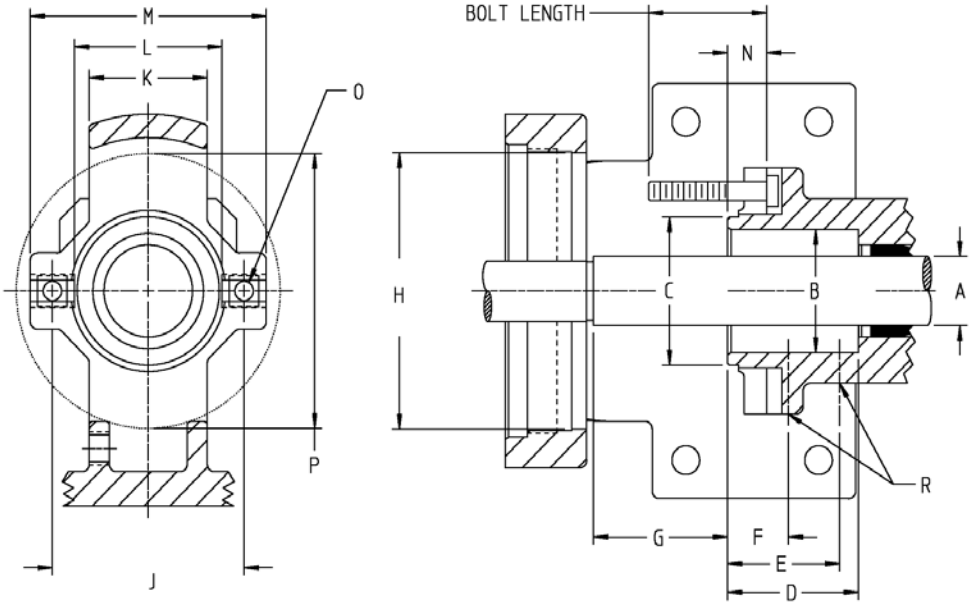
DIMENSIONS – RS SIZE – JACKETED BRACKET (323A, 4323A)



NOTE: RS size pumps are only available with a jacketed casing, as shown.

UNIVERSAL PRODUCT LINE:
STEEL EXTERNALS — NON-JACKETED PUMPS
SERIES 123A, 4123A, 323A, 4323A

DIMENSIONS – STUFFING BOX SEAL CHAMBER



Pump Size		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R
H & HL	In	1.12	2.00	2.41	2.22	1.90	1.03	2.27	4.50	3.00 to 3.50	2.00	2.50	4.00	0.66	5/16	4.47	1/8
	mm		51	61	56	48	26	58	114	76 to 89	51	64	102	17		114	3
K & KK	In	1.44	①2.31	3.00	3.13	2.25	1.25	3.00	5.25	3.50 to 4.50	2.50	3.00	5.00	0.38	7/16	5.25	1/4
	mm		①58.7	76	80	57	32	76	133	89 to 114	64	76	127	10		133	6
LQ, & LL	In	1.44	①2.31	3.00	3.13	2.25	1.25	4.00	5.25	3.50 to 4.50	2.50	3.00	5.00	0.44	7/16	5.25	1/4
	mm		①58.7	76	80	57	32	102	133	89 to 114	64	76	127	11		133	6
LS	In	1.62	2.38	2.80	2.70	2.25	1.16	3.52	5.25	3.25 to 4.50	3.00	2.80	5.00	0.46	7/16	5.25	1/4
	mm		60	71	69	57	30	89	133	83 to 114	76	71	127	12		133	6
Q & QS	In	2.44	3.42	4.50	4.00	2.50	1.53	4.10	6.75	5.50 to 6.25	3.20	4.50	7.20	0.56	5/8	6.75	1/4
	mm		87	114	102	64	39	104	171	140 to 159	81	114	183	14		171	6
N	In	3.44	4.69	—	5.56	1.65	—	4.91	8.81	6.75	—	—	—	—	②3/4	9.00	1/4
	mm		119	—	141	42	—	125	224	171	—	—	—	—		229	6
R & RS	In	4.50	5.75	—	5.56	1.53	—	4.79	9.81	7.75	—	—	—	—	②3/4	9.81	1/4
	mm		146	—	141	39	—	122	249	197	—	—	—	—		249	6

① Bracket is counter bored to a diameter of 2.687 inches (68 mm), 0.12 inches (3 mm) deep from stuffing box face.

② Studs are used in place of cap screws.

NPSH REQUIRED

Printed performance curves are not available.

Performance curves can be electronically generated with the Viking Pump Curve Generator on vikingpump.com.

NPSHR data is not available on the pump selector.

NPSH (Net Positive Suction Head): The $NPSH_R$ (Net Positive Suction Head Required by the pump) is given in the table below and applies for viscosities through 750 SSU. $NPSH_A$ (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 VISCOSITIES UP TO 750 SSU – See $NPSH_R$ table below.

$NPSH_R$ for high viscosities can be estimated using the following method:

1. Calculate line loss for a 1 foot long pipe of a diameter matching the pump inlet port size. Use your flow rate and max viscosity.

2. Convert this value into Feet of Liquid (S.G. 1.0)

3. Add this value to the $NPSH_R$ value in the chart below.

$NPSH_R$ – FEET OF LIQUID (Specific Gravity 1.0), Viscosities up to 750 SSU

PUMP SIZE	PUMPS SPEED, RPM														
	100	125	155	190	230	280	350	420	520	640	780	950	1150	1450	1750
H, HL	—	—	—	—	1.7	1.8	1.9	2.1	2.4	2.8	3.4	4.5	6.2	9.5	13.5
K, KK	—	1.7	1.8	1.9	2.1	2.3	2.8	3.3	4.4	6.3	9.1	—	—	—	—
LQ	1.6	1.8	2.0	2.2	2.5	3.0	3.8	5.0	7.3	10.8	—	—	—	—	—
LL	1.6	1.8	2.0	2.2	2.5	3.0	3.8	5.0	7.3	—	—	—	—	—	—
LS	1.6	1.8	2.0	2.2	2.5	3.0	3.8	5.0	7.3	10.8	—	—	—	—	—
Q, QS	1.9	2.1	2.3	2.7	3.3	4.2	6.1	8.4	12.7	—	—	—	—	—	—
N	2.1	2.3	3.5	4.5	6.3	9.5	15.0	—	—	—	—	—	—	—	—
R	6.1	7.1	8.3	10.1	12.1	15.2	—	—	—	—	—	—	—	—	—
RS	7.0	8.5	10.4	13.1	17.2	22.4	—	—	—	—	—	—	—	—	—