UNIVERSAL PRODUCT LINE:
STAINLESS STEEL — JACKETED PUMPS

227C Series™, 1227C Series™, 4227C Series™, 327A Series™, 1327A Series™, 4327A Series™

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SERIES DESCRIPTION

227C Series™, 4227C Series™, 1227C Series™

The Universal Product Line has the broadest range of sealing options of all pumps built by Viking Pump®. The U-Plus™ bracket design accepts numerous component seals for use in the stuffing box or behind the rotor, packing, cartridge seals and Viking Pump's own O-Pro® seals. These products come standard with a jacketed head and bracket.

This is Viking Pump's most versatile line of internal gear pumps with many design and material options. These series are available with the ProPort™ casing and a wide variety of flange types and sizes as well as both 90 degree and opposite port arrangements* enabling flexibility when connecting pumps to piping.

327A™ Series, 4327A Series™, 1327A Series™

Viking's largest product series in the Universal Product Line offer high capacity and a variety of sealing arrangements including component or cartridge mechanical seals, packing and O-Pro® seals. These products come standard with a jacketed bracket and optional jacketed head.



KK1227C



LL227C

*90 degree port arrangements available in sizes H-Q

RELATED PRODUCTS

Stainless Steel, Non-Jacketed Pumps: Catalog Section 2701

Cast Iron, Jacketed Pumps: Catalog Section 1402

Steel Externals, Jacketed Pumps: Catalog Section 2302

OPERATING RANGE

SERIES	NOMINAL FLOW		MAXIMUM PRESSURE		TEMPERATURE RANGE		VISCOSITY RANGE	
	GPM	m^3h	PSI	Bar	°F	°C	SSU	cSt
227C Series™	10 - 320	2.3 - 73	175	12	−120 to +500	−85 to +260	28 to 2,000,000	0.1 to 440,000
1227C Series™	6 - 320	1.4 - 73	175	12	0 to +350	−15 to +175	28 to 2,000,000	0.1 to 440,000
4227C Series™	10 - 320	2.3 - 73	175	12	−120 to +500	−85 to +260	28 to 2,000,000	0.1 to 440,000
327A Series™	600 - 1,600	136 - 364	200	14	−120 to +500	−85 to +260	28 to 2,000,000	0.1 to 440,000
1327A Series™	475 - 1,280	108 - 290	200	14	0 to +350	−15 to +175	28 to 2,000,000	0.1 to 440,000
4327A Series™	600 - 1,600	136 - 364	200	14	−120 to +500	−85 to +260	28 to 2,000,000	0.1 to 440,000

UNIVERSAL PRODUCT LINE:
STAINLESS STEEL — JACKETED PUMPS

227C Series™, 1227C Series™, 4227C Series™, 327A Series™, 1327A Series™, 4327A Series™

FEATURES & BENEFITS

- Positive Displacement Internal Gear pumping principle handles a broad range of viscosities with constant flow rate
- **ProPort™ Casing (227C Series™, 1227C Series™ & 4227C Series™):**
  - » Adaptable port design offers a variety of ports sizes and types, enabling flexibility when connecting pumps to piping
  - » Casing drain allows the pump to be drained without removing the head
  - » Optional O-ring joint seals for high pressure or difficult to seal applications
  - » Internal circulation promotes flow behind the rotor
- **U-Plus™ Bracket (227C Series™, 1227C Series™ & 4227C Series™):**
  - » Seal options include packing, O-Pro® Guard Seal, single component seals, cartridge lip seals and cartridge single and double mechanical seals. Various seal flush plans are available
  - » Stainless steel window guards offer protection from rotating parts
- Footed one-piece stainless steel bracket provides rigid mounting to help maintain alignment, which extends seal and bearing life
- Series designed with an enlarged bearing housing; used in conjunction with a spacer coupling permits easy cartridge seal or O-Pro® Guard seal installation and removal in place without removing the head and rotor/shaft
- Stainless steel construction for reliable handling of corrosive liquids
- Axial rotor thrust is controlled by double row ball bearing or tapered roller bearings; bushings provide 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
- Can be used with direct drive, gear reducer or gearmotor drive, or belt-drive

3 YEAR LIMITED WARRANTY

Viking Universal Product Line pumps carry a three year limited warranty. See catalog section 1000 for details.

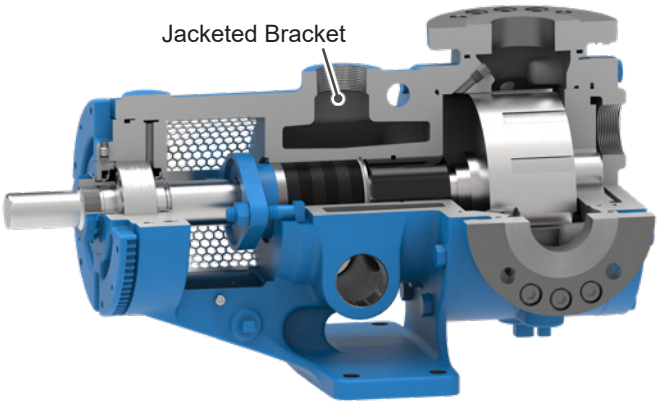
JACKETING

Jacketed pumps provide a cavity, or jacket, on the external wall of the pump through which steam or heat transfer liquid can be passed to control the temperature of the fluid in the pump. The heat transfer medium flows in a closed loop back to the boiler or heater. Applications include “melting” ambient temperature solids like asphalt which solidify in the pump when it cools, and maintaining precise temperature control in processes like manufacturing polymers and epoxy resins.

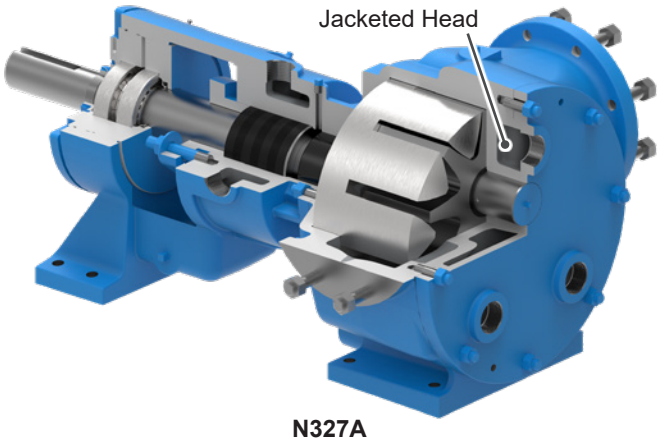
Standard-Jacketed Pumps

Standard-Jacketed pumps include 227C Series™, 4227C™ Series™ & 1227C™ Series™. They feature jacketing on the head and bracket only, and are typically used for melting ambient temperature solids.

327A Series™, 4327A Series™ & 1327A Series™ pumps are standard with jacketed bracket and optional jacketed head.



KK227C
Jacketed Pump Cutaway



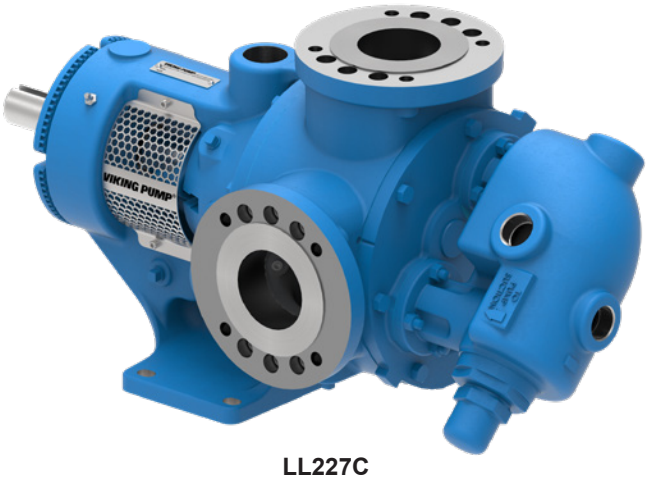
N327A
Jacketed Pump Cutaway

RELIEF VALVE CONFIGURATIONS

Jacketed pumps are provided with a jacketed head, no relief valve as standard. Integral pressure relief valves are available in jacketed (L-N sizes) and non-jacketed (H-N sizes) configurations with a non-jacketed head.

The N size 327A Series™, 1327A Series™ & 4327A Series™ pumps are standard with a jacketed bracket, non-jacketed head and non-jacketed relief valve. A jacketed head, or a jacketed relief valve with non-jacketed valve-type head, is available as an option.

The R size 327A Series™, 1327A Series™ & 4327A Series™ pumps are standard with a jacketed bracket, a jacketed head and a non-jacketed relief valve. RS models have a jacketed bracket, casing and head with no relief valve.

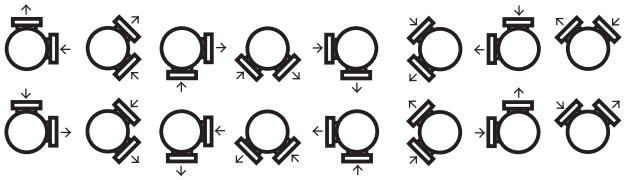


LL227C
Jacketed Relief Valve

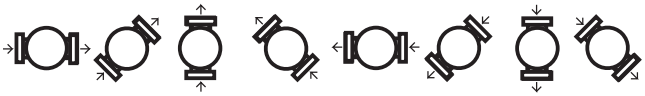
PORT LOCATION OPTIONS

227C Series™, 4227C Series™, 1227C Series™

90° port options:



Opposite port options:



NOTE: See page 2702.8 for a complete list of port options for ProPort™ casing by size.

H-Q sizes are standard with 90 degree ports, optional opposite port casings are available.

QS size is standard with opposite ports.



KK1227C
90° Ports

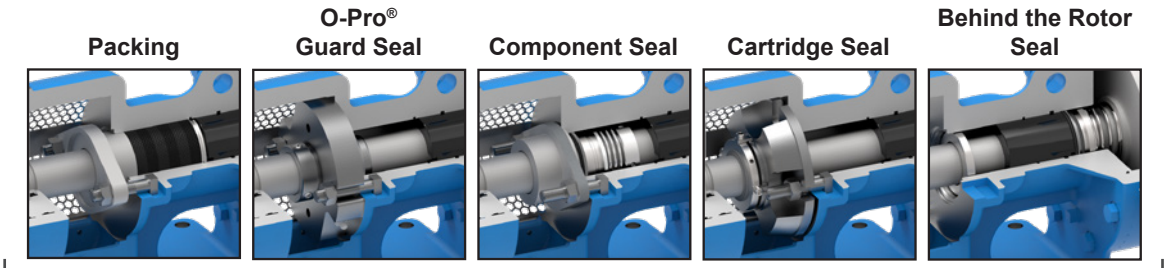


HL227C
Opposite Ports

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CUTAWAY VIEW & PUMP FEATURES



U-Plus™ bracket seal chamber accepts a variety of seal types

Jacketing for steam, hot oil, or water circulation to maintain a constant temperature

Internal circulation promotes flow behind the rotor

Double row ball bearing or tapered roller bearings for axial thrust control

Stainless steel window guards offer protection against moving parts

Casing Drain

ProPort™ casing offers an adaptable port design with a variety of port sizes and types

Idler

Rotor

Large diameter threaded bearing housing allows easy seal removal

One-piece cast bracket with seal between bearings provides rigid foundation to maximize seal and bearing life

MODEL NUMBER KEY

L S 4 2 2 7 C

Size:

H	LS
HL	Q
K	QS
KK	N
L	R
LL	RS

Shaft Seal:
Blank = Packing
1 = O-Pro® Seal
4 = Mechanical Seal

Jacketing:
2 = Jacketed
3* = Foot Mount Casing w/ Jacketed Bracket

Basic Series Configuration

Material of Construction:
7 = Stainless Steel

Bracket Type:
A = Universal Bracket for Stuffing Box Seals
C = U-Plus™ Bracket for Stuffing Box or Behind the Rotor Seals

* Only the N through RS sizes are foot mount with jacketed bracket (3).

STANDARD MATERIALS OF CONSTRUCTION

Component	Standard Material
Casing	Stainless Steel, ASTM A743, Class CF8M
Ports	Stainless Steel, ASTM A743, Class CF8M
Head	Stainless Steel, ASTM A743, Class CF8M, Case Hardened
Head Plate	Cast Iron, ASTM A48, Class 35B
Bracket	Stainless Steel, ASTM A743, Class CF8M
Idler	Stainless Steel, ASTM A743, Class CF8M, Case Hardened
Rotor	Stainless Steel, ASTM A743, Class CF8M, Case Hardened
Shaft	① Stainless Steel, ASTM A276, Type XM-19 or 316 Condition B
Idler Pin	Hard Coated Stainless Steel, ASTM A276, Type 316, Colmonoy #6 Coated
Idler Bushing	Carbon Graphite
Bracket Bushing	Carbon Graphite
Pressure Relief Valve	Stainless Steel, ASTM A743, Grade CF8M
Standard Packing (227C, 327A)	Braided PTFE
O-Pro® Guard Gland & Sleeve (1227C Series™, 1327A Series™)	Stainless Steel, ASTM A743, Class CF8M, Sanitary FKM Elastomers
Standard Mechanical Seal (4227C, 4327A)	Carbon vs. Silicon Carbide Faces, FKM Elastomers

① N, R and RS shafts are Colmonoy #6 coated.

SPECIAL MATERIALS & OPTIONS SELECTION GUIDELINES

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

- Extra clearances, depending on viscosity. See ES-2 for recommendations.
- Special Sealing:
  PTFE Type 9 seals to 25,000 SSU (5,500 cSt).
  Packed gland to 2,000,000 SSU (440,000 cSt).
  O-Pro® seals to 2,000,000 SSU (440,000 cSt).
  Behind the rotor abrasive liquid seals to 250,000 SSU (55,000 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.
- Internal circulation holes in the ProPort™ casing can be used to promote flow behind the rotor.
- 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)

- 770 stainless steel or PPS idler to prevent galling.
- 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 – PTFE up to 450°F (230°C); FKM up to 350°F (175°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.
- Abrasive-resistant idler pin.
- Hard-coated shaft.
- Behind the rotor 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.

SPECIFICATIONS

Model Number	③ Standard Port Size	Nominal Pump Rating (100 SSU & below)			Max. Hydrostatic Pressure		① Maximum Discharge Pressure		Max. Recommended Temperature for Standard Pump		Approx. Shipping Weight with Valve	
	Inches	GPM	m^3/h	RPM	PSIG	BAR	PSIG	BAR	°F	°C	Lbs.	Kg.
H227C	1 ½	10	2.3	1150	400	28	150	10	375	190	51	23
H1227C	1 ½	6	1.4	760	400	28	150	10	350	175	52	24
H4227C	1 ½	10	2.3	1150	400	28	150	10	375	190	51	23
HL227C	1 ½	20	4.5	1150	400	28	150	10	375	190	51	23
HL1227C	1 ½	13	3	760	400	28	150	10	350	175	52	23
HL4227C	1 ½	20	4.5	1150	400	28	150	10	375	190	51	23
K227C	2	50	11	520	400	28	150	10	350	175	147	67
K1227C	2	50	11	520	400	28	150	10	350	175	150	68
K4227C	2	50	11	520	400	28	150	10	350	175	147	67
KK227C	2	65	15	520	400	28	150	10	350	175	147	67
KK1227C	2	65	15	520	400	28	150	10	350	175	149	68
KK4227C	2	65	15	520	400	28	150	10	350	175	146	66
L227C	2 ½	100	23	520	400	28	150	10	350	175	232	105
L1227C	2 ½	100	23	520	400	28	150	10	350	175	235	107
L4227C	2 ½	100	23	520	400	28	150	10	350	175	232	105
LL227C	3	135	31	520	400	28	150	10	350	175	248	112
LL1227C	3	135	31	520	400	28	150	10	350	175	251	114
LL4227C	3	135	31	520	400	28	150	10	350	175	248	112
LS227C	3	160	36	520	400	28	125	9	345	170	267	121
LS1227C	3	160	36	520	400	28	125	9	350	175	270	123
LS4227C	3	160	36	520	400	28	125	9	345	170	267	121
Q227C	4	200	45	350	250	17	175	12	270	130	557	253
Q1227C	4	200	45	350	250	17	175	12	350	175	560	254
Q4227C	4	200	45	350	250	17	175	12	270	130	556	252
QS227C	6	320	73	350	250	17	175	12	270	130	638	289
QS1227C	6	320	73	350	250	17	175	12	350	175	642	291
QS4227C	6	320	73	350	250	17	175	12	270	130	638	289
N327A	6	600	136	350	250	17	200	14	250	120	1,005	455
N1327A	6	475	108	280	250	17	200	14	225	105	1,005	455
N4327A	6	600	136	350	250	17	200	14	250	120	998	453
R327A	8	1,100	250	280	250	17	175	12	225	105	1,905	864
R1327A	8	880	200	225	250	17	175	12	225	105	1,910	866
R4327A	8	1,100	250	280	250	17	175	12	225	105	1,910	866
RS327A	10	1,600	364	280	250	17	125	9	225	105	2,500	1,140
RS1327A	10	1,280	290	225	250	17	125	9	225	105	2,465	1,118
RS4327A	10	1,600	364	280	250	17	125	9	225	105	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 steel or stainless steel companion flanges or flanged fittings. H & HL sizes standard with NPT ports.

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PORT OPTIONS FOR PROPORT™ CASING

Port Options	Pump Sizes								
	H	HL	K	KK	L	LL	LS	Q	QS
1.5" NPT	S	S							
2" NPT			✓	✓	S ✓				
1.5" Class 150 ①	✓ ®	✓ ®							
1.5" Class 300 ②	✓ ®	✓ ®							
2" Class 150 ①	✓	✓	S ®	S ®					
2" Class 300 ②	✓	✓	✓ ®	✓ ®					
2.5" Class 150 ①					S ®				
2.5" Class 300 ②					✓ ®				
3" Class 150 ①			✓	✓	✓ ®	S ®	S ®		
3" Class 300 ②			✓	✓	✓	✓ ®	✓ ®		
4" Class 150 ①			✓ ®	✓ ®	✓	✓	✓	S ®	
4" Class 300 ②					✓	✓	✓	✓ ®	
6" Class 150 ①									S ®
6" Class 300 ②									✓ ®
DIN 32 PN16 *	✓ ®	✓ ®							
DIN 40 PN16 *	✓	✓							
DIN 50 PN16 *	✓	✓	✓ ®	✓ ®					
DIN 65 PN16 *			✓	✓	✓	✓ ®			
DIN 80 PN16 *			✓	✓	✓	✓ ®	✓ ®		
DIN 100 PN16 *					✓	✓	✓		
DIN 150 PN16 *								✓	✓ ®

✓ = Available Port Option

S = Standard Porting

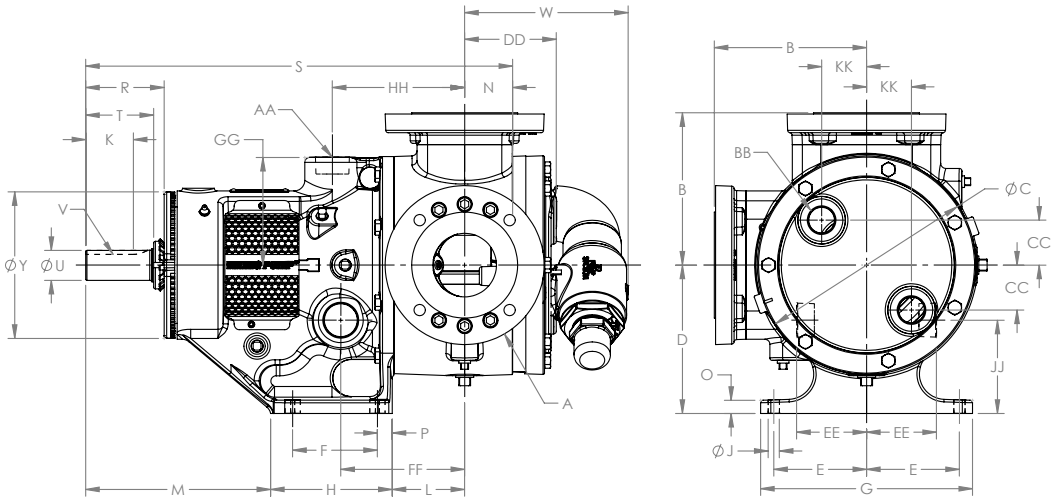
® = Flanges Designed with a Raised Face

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

② = Ports are suitable for use with Class 300 steel or stainless steel companion flanges or flanged fittings

* Ports are sutable for use with DIN PN16 steel or stainless steel companion flanges or flanged fittings

DIMENSIONS – H THROUGH Q SIZES



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

Model Number			①						②③									②③	
Packed	O-Pro® Seal	Mech. Seal	A (in)		B	C	D	E	F	G	H	J	K	L	M	N	O	P	R
H227C	H1227C	H4227C	1.5	in	3.50	4.75	3.50	2.75	2.25	6.75	3.50	0.47	0.99	3.38	5.19	1.19	0.56	0.62	2.20
HL227C	HL1227C	HL4227C	NPT	mm	89	121	89	70	57	171	89	12	25	86	132	30	14	16	56
K227C	K1227C	K4227C	2	in	5.25	8.00	5.50	4.00	2.75	9.25	4.00	0.53	1.42	3.00	9.38	1.75	0.62	0.62	2.84
KK227C	KK1227C	KK4227C		mm	133	203	140	102	70	235	102	13	36	76	238	44	16	16	72
L227C	L1227C	L4227C	2.5	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	2.25	3.58	8.89	1.75	0.62	0.62	3.70
				mm	183	260	178	111	102	254	137	13	57	91	226	44	16	16	94
LL227C	LL1227C	LL4227C	3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	2.25	3.58	8.89	2.25	0.62	0.62	3.70
				mm	183	260	178	111	102	254	137	13	57	91	226	57	16	16	94
LS227C	LS1227C	LS4227C	3	in	7.19	10.25	7.00	4.38	4.00	10.00	5.38	0.53	2.55	4.75	9.12	2.44	0.62	0.62	3.90
				mm	183	260	178	111	102	254	137	13	65	121	232	62	16	16	99
Q227C	Q1227C	Q4227C	4	in	8.25	14.00	8.75	4.12	4.00	10.00	6.00	0.69	3.58	6.62	11.12	3.00	0.75	1.00	5.20
				mm	210	356	222	105	102	254	152	18	91	168	282	76	19	25	132

Model Number												④							④
Packed	O-Pro® Seal	Mech. Seal		S	T	U (in)	V (in)	W	Y	AA (in)	BB (in)	CC	DD	EE	FF	GG	HH	JJ	KK
H227C	H1227C	H4227C	in	13.25	1.62	0.75	.19 x .09	4.04	5.75	0.75	0.50	0.84	2.41	1.83	4.04	2.39	4.04	1.76	0.43
HL227C	HL1227C	HL4227C	mm	337	41			103	146	19	13	21	61	46	103	61	103	45	11
K227C	K1227C	K4227C	in	18.13	2.25	1.12	.25 x .12	7.00	6.75	1.25	1.25	1.75	3.25	2.75	5.78	4.01	5.78	3.38	0.00
KK227C	KK1227C	KK4227C	mm	461	57			178	171	32	32	44	83	70	147	102	147	86	0
L227C	L1227C	L4227C	in	19.63	3.13	1.44	.38 x .19	7.18	7.00	1.25	1.00	3.00	3.81	3.30	5.85	5.12	6.25	4.40	0.00
			mm	499	80			182	178	32	25	76	97	84	149	130	159	112	0
LL227C	LL1227C	LL4227C	in	20.12	3.13	1.44	.38 x .19	7.68	7.00	1.25	1.00	3.00	4.31	3.30	5.85	5.12	6.25	4.40	0.00
			mm	511	80			195	178	32	25	76	109	84	149	130	159	112	0
LS227C	LS1227C	LS4227C	in	21.69	3.50	1.44	.38 x .19	7.72	7.00	1.25	1.00	3.00	4.50	3.30	7.00	5.12	7.40	4.40	0.00
			mm	551	89			196	178	32	25	76	114	84	178	130	188	112	0
Q227C	Q1227C	Q4227C	in	26.75	4.50	1.94	.50 x .25	11.25	8.38	1.50	1.00	3.75	5.06	4.50	6.62	7.00	7.62	5.50	3.75
			mm	679	114			286	213	38	25	95	129	114	168	178	194	140	95

① Unless otherwise noted, ports are suitable for class 150 ANSI stainless steel companion flanges or flanged fittings.

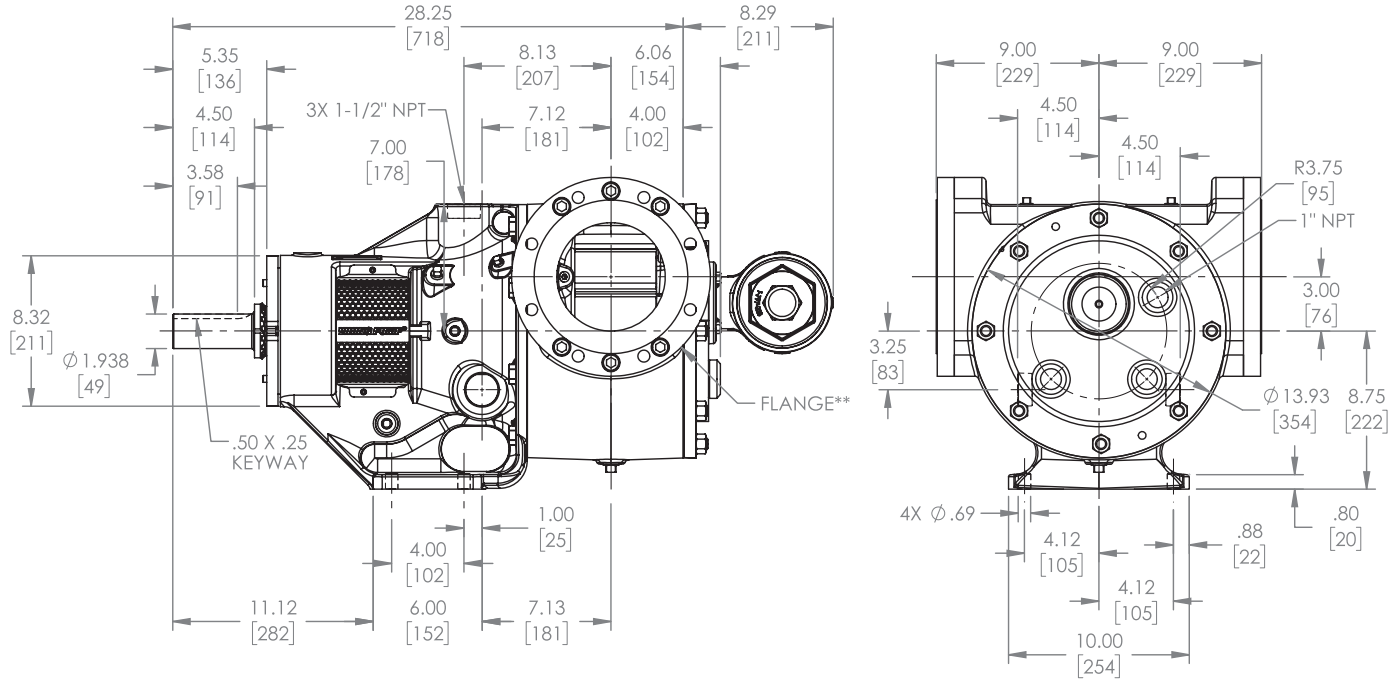
② H/HL bracket foot has slotted foot mounting holes. Dimension F = 1.65-2.38 [42-60] and dimension P = 0.52-0.65 [13-16].

③ L/LL/LS bracket foot has slotted foot mounting holes. Dimension F = 3.81-4.19 [81-106] and dimension P = 0.45-0.64 [12-16].

④ Q/QS jacketed heads have 3 connection points on a 3.75 radius.
Two are at the 3 and 6 o'clock positions, and the third is .97 to the right of the vertical centerline and 3.62 above the horizontal centerline.

DIMENSIONS – QS SIZE

Dimensions shown in inches with millimeter equivalent shown in parentheses

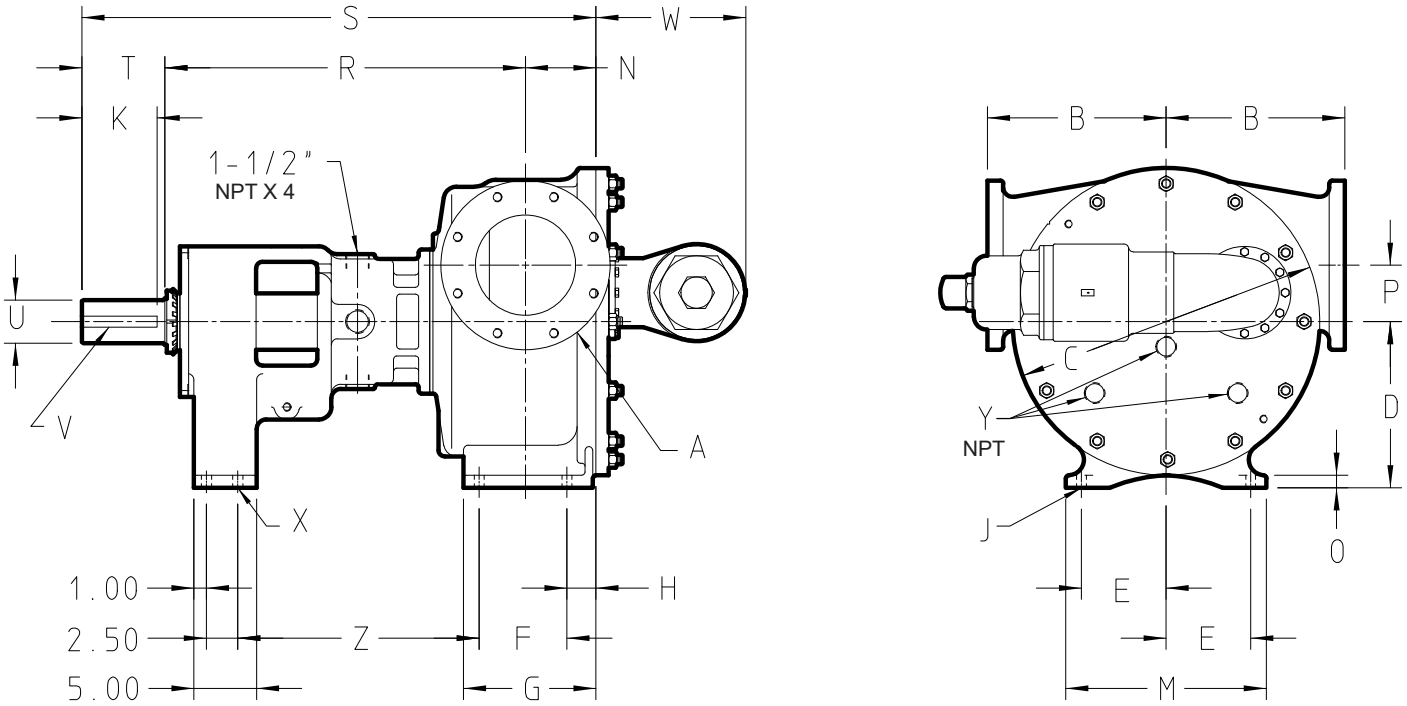


Model Number		
Packed	O-Pro® Seal	Mechanical Seal
QS227C	QS1227C	QS4227C

* Ports for steam or hot oil jacketing are inch standard NPT threads.

227C/1227C/4227C ports suitable for use with Class 150 ANSI steel or stainless steel companion flanges or flanged fittings.

DIMENSIONS – N & R SIZES – JACKETED BRACKET (327A SERIES™, 1327A SERIES™, 4327A SERIES™)



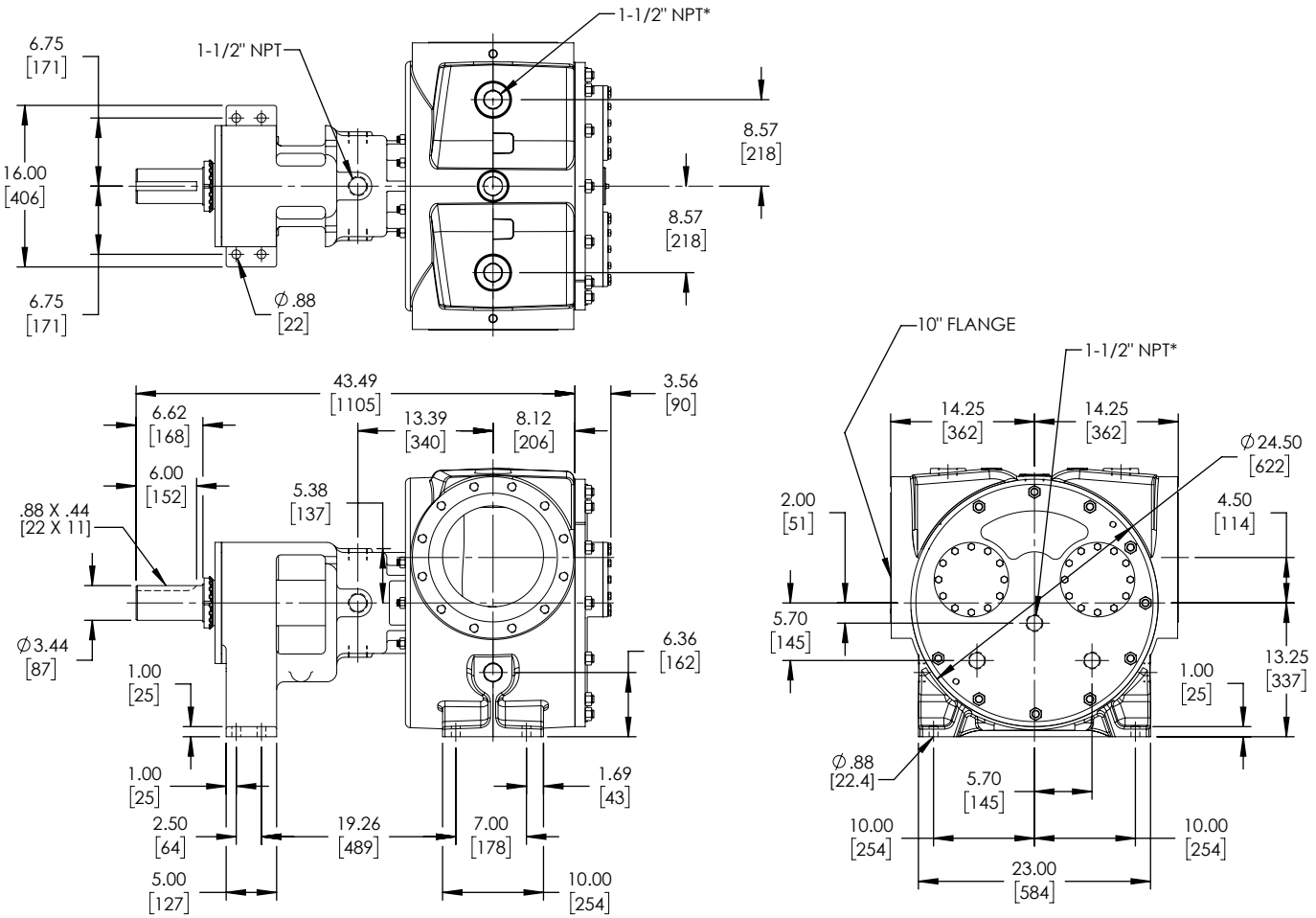
Model Number			A (in)		B	C	D	E	F	G	H	J	K	M	N
Packed	O-Pro® Seal	Stuffing Box Seal													
N327A	N1327A	N4327A	① 6	in	9.75	17.25	9.50	5.00	6.25	8.69	1.62	0.69	4.50	12.00	4.50
				mm	248	438	241	127	159	221	41	18	114	305	114
R327A	R1327A	R4327A	① 8	in	14.25	24.50	13.25	6.75	7.00	10.56	2.31	0.78	6.00	16.00	5.62
				mm	362	622	337	171	178	268	59	20	152	406	143

Model Number				O	P	R	S	T	U (in)	V (in)	W	X	Y	Z
Packed	O-Pro® Seal	Stuffing Box Seal												
N327A	N1327A	N4327A	in	1.00	3.00	26.00	36.50	6.00	2.44	.62 x.31	8.63	0.69	—	18.94
			mm	25	76	660	927	152			219	18	—	481
R327A	R1327A	R4327A	in	1.00	4.50	28.75	41.00	6.62	3.44	.88 x.44	12.00	0.69	1.25	19.25
			mm	25	114	730	1041	168			305	18	1.25	489

① Ports are suitable for use with Class 150 ANSI 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.

DIMENSIONS – RS SIZE – JACKETED BRACKET (327A SERIES™, 1327A SERIES™, 4327A SERIES™)



* Ports for steam or hot oil jacketing are inch standard NPT threads.

NOTE: RS size pumps are only available with a jacketed casing, as shown. RS pumps standard with raised face flanged ports.

NPSH REQUIRED

Printed performance curves are not available.

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

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	—	—	—	—
L	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	—	—	—	—	—	—	—	—	—