

# UNIVERSAL PRODUCT LINE: STEEL EXTERNALS — JACKETED PUMPS

SERIES 4223AX, 4323AX (Full Compliance with API 676 Standards)

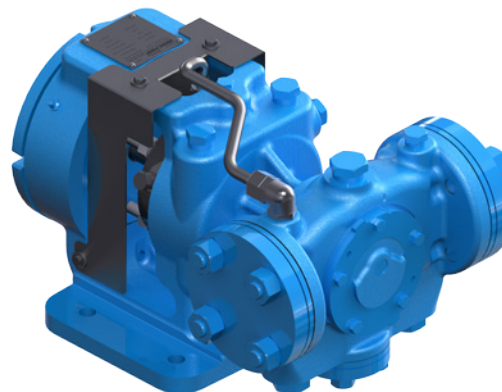
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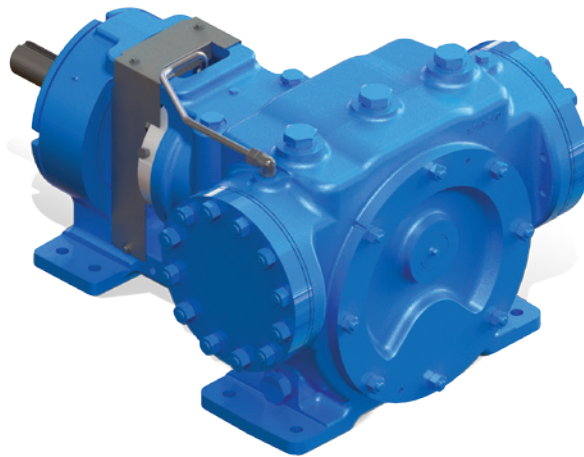
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## SERIES DESCRIPTION

4223AX & 4323AX Series foot-mounted internal gear pumps are designed and manufactured to comply fully with the current version of American Petroleum Institute's design standard for positive displacement pumps, API 676. Applications include oil and gas and petrochemical industries where exceptional reliability is required.



HL4323AX



N4323AX

## RELATED PRODUCTS

Steel Externals, Jacketed Pumps (API 682 Seal):  
Catalog Section 1304

Stainless Steel, Jacketed Pumps (API 676 Compliant):  
Catalog Section 1705

## OPERATING RANGE

SERIES	NOMINAL FLOW		MAXIMUM PRESSURE		TEMPERATURE RANGE		VISCOSITY RANGE	
	GPM	m <sup>3</sup> h	PSI	Bar	°F	°C	SSU	cSt
4223AX	15 - 1,100	3.4 - 250	200	14	-20 to +550	-30 to +290	28 to 35,000	1 to 7,500
4323AX	15 - 1,100	3.4 - 250	200	14	-20 to +550	-30 to +290	28 to 35,000	1 to 7,500

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## UNIVERSAL PRODUCT LINE: STEEL EXTERNALS — JACKETED PUMPS SERIES 4223AX, 4323AX (Full Compliance with API 676 Standards)

### FEATURES REQUIRED BY API 676, STANDARD IN 4223AX & 4323AX SERIES PUMPS

- API 682 Seal. Viking's seal chamber will accept almost any customer-specified brands and types of API 682-compliant Category 1, 2 or 3 cartridge mechanical seals, and can provide API seal plans to meet application requirements. Standard seal is a category 2 single mechanical seal. Carbon vs. silicon carbide with API Plan 13.
- 3mm corrosion allowance above Maximum Allowable Working Pressure (MAWP). The XPD 676 has an additional 3mm corrosion allowance built into all pressure containing components over and above our standard steel Universal Seal series pumps.
- 25,000 hour L-10 life on tapered roller bearings. Standard on all sizes at maximum speed and pressure.
- Steel castings to be normalized and tempered. Standard.
- High Strength Bolting. XPD 676 features high strength fasteners stamped with manufacturer's symbol and material codes, studs on some sizes. Threaded holes are drilled and tapped to minimum 1.5X stud diameter with minimum metal around the bottom of threaded holes at least 0.5X stud diameter plus 3mm corrosion allowance, per the specification.
- Casing drain and seal chamber vent. XPD 676 has cast-in casing drain with ANSI Class 300 RF flange and seal chamber vent to completely drain the casing before maintenance.
- Mounting surfaces flat and parallel. The mounting feet of XPD 676 pumps are machined to 6.3µm Ra, with flatness tolerance of 25µm. The upper surface is machined parallel to the foot, and where the pump has both bracket and casing feet (N & R sizes), the feet are machined flat and parallel, in the same plane within 150 µm/m (0.002 in./ft) of distance between the mounting surfaces after the pump is assembled.
- Rectangular keyways. Viking cuts rectangular keyways with required fillets and includes the key with each pump. Tapered shaft extension on shafts larger than 2.5". Viking tapers the shaft extension on the "R" size for easy removal of the coupling half.
- Non-Destructive Evaluation of castings and post-weld evaluation of any necessary weld repairs using mag particle (MT) testing
- Certified hydrostatic testing to 1.5X MACP
- Certified performance testing in accordance with Section 3.6 of the Hydraulic Institute pump standards, at the specified viscosity (from 28 to 25,000 SSU), with data including speed, discharge pressure, suction pressure, power, and capacity.

- Packaging for long term storage, including corrosion inhibitor applied to exposed metal parts and metal port covers to protect internals from corrosion and contaminants.
- Documentation to include, at a minimum:
  - Certified dimensional outline drawing
  - Allowable flange loadings
  - Cross-sectional drawing and bill of material
  - Mechanical seal drawing & bill of material
  - Performance curve
  - Certified hydrostatic test data
  - Material certifications (traceability)
  - Weld procedure specification (WPS)
  - Weld maps
  - Non-destructive testing procedures
  - Performance test procedures
  - Performance test data
  - Data sheets applicable to proposals, purchase & as-built
  - Installation manual
  - Operation & Maintenance manual
  - Spare parts recommendations & price list
  - List of drawings & submittals
  - Shipping list
- There are many more requirements of the API 676 specification, and Viking has designed this pump to comply with all of them, as standard.

### FEATURES & BENEFITS

Besides the features required by the API 676 standard, Viking offers many additional features and benefits that our customers commonly request, including:

- Jacketing to melt ambient-temperature solids like bitumen before startup. The XPD 676 features jacketed bracket and casing as standard, with option for jacketed head.
- Opposite ports with reversible direction of flow are standard, for easy in-line piping and the ability to transfer product in either direction or strip a line of product.
- O-Ring seals on head and casing joints instead of gaskets for maximum sealing effectiveness.
- Optional labyrinth seals on bearing housing for longest bearing life by minimizing contamination (lip seals standard).
- Grease lubrication standard, enabling re-greasing of pump during operation, without the need for shutdown.
- End clearance is easily adjusted to compensate for wear over time or for higher temperatures or viscosities, by simply rotating the threaded bearing housing.



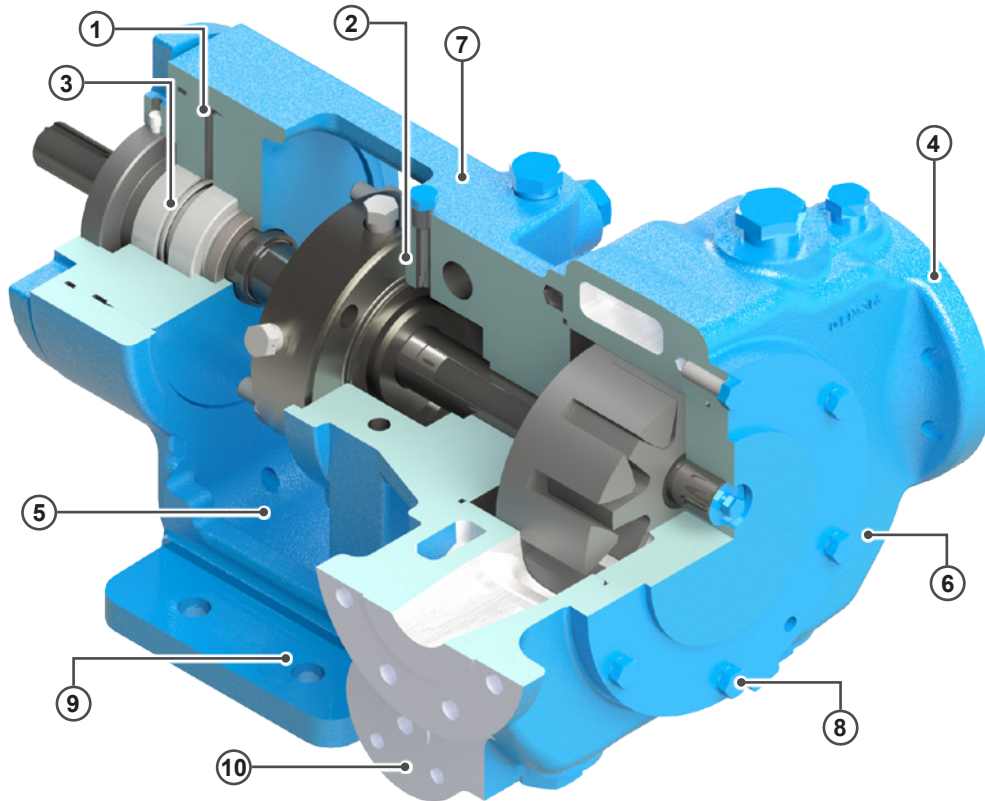
Viking XPD 676 pumps carry a five year limited warranty.

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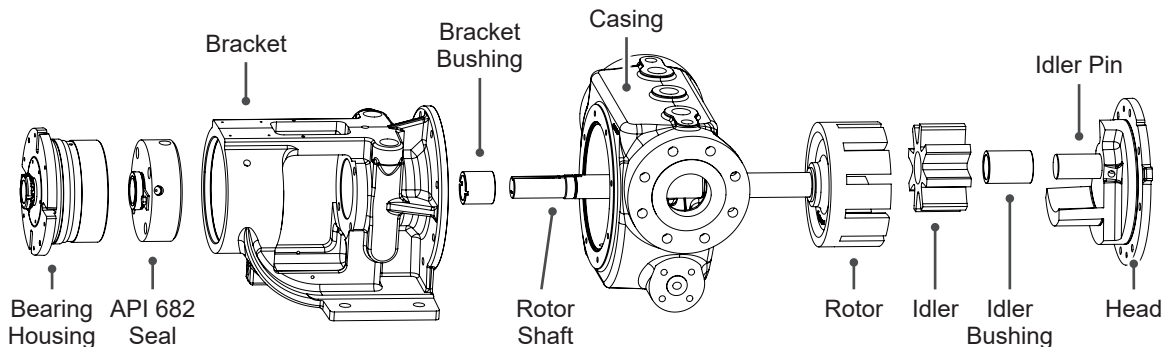
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**CUTAWAY VIEW & PUMP FEATURES**



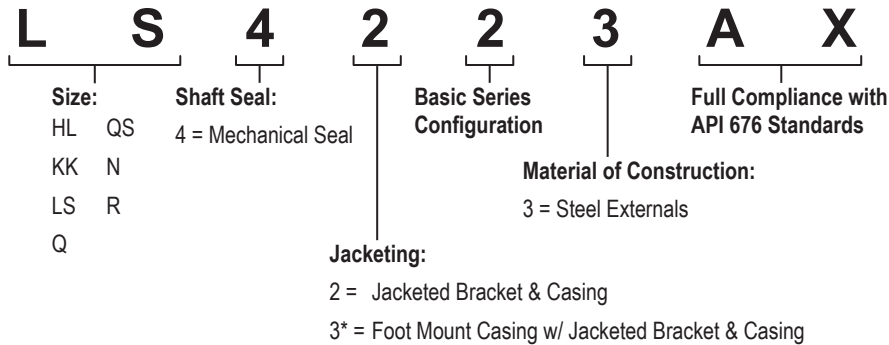
1. Large diameter threaded bearing housing allows easy removal of cartridge seals.
2. Seal chamber accepts most brands of cartridge seals conforming to API 682. API Seal Plan 13 provided as standard. Other plans available.
3. Tapered roller thrust bearings provide minimum 25,000 hour L-10 life at maximum flow, pressure and viscosity.
4. ANSI Class 300 raised face flanges standard.
5. One-piece cast bracket provides rigid foundation to maximize seal and bearing life.
6. Non-jacketed head standard. Optional head jacket available.
7. Seal chamber venting port for start-up and draining pump prior to maintenance.
8. High strength fasteners have material grade and manufacturer’s identification symbols applied.
9. Mounting surfaces flat and parallel for superior alignment.
10. Casing drain cast-in with ANSI Class 300 raised face flange to completely drain casing before maintenance.



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**MODEL NUMBER KEY**



\* Only the N & R sizes are foot mount with jacketed bracket (3).

**SPECIFICATIONS**

Model Number	③ Standard Port Size	Nominal Pump Rating (100 SSU & below)			④ Maximum Hydrostatic Pressure		① Maximum Discharge Pressure		② Maximum Recommended Temperature for Standard Pump		Steel Fitted Recommended Above		Approximate Shipping Weight	
	Inches	GPM	m <sup>3</sup> /h	RPM	PSIG	BAR	PSIG	BAR	°F	°C	SSU	cSt	Lbs.	Kg.
HL4223AX	1 ½	30	6.8	1750	450	31	200	14	350	180	7,500	1,700	170	77
KK4223AX	2	100	23	780	450	31	200	14	350	180	25,000	5,500	215	98
LS4223AX	3	200	45	640	450	31	200	14	350	180	75,000	17,000	360	163
Q4223AX	4	300	68	520	450	31	200	14	350	180	7,500	1,700	640	290
QS4223AX	6	500	113	520	450	31	200	14	350	180	75,000	17,000	700	318
N4323AX	6	600	136	350	450	31	200	14	350	180	75,000	17,000	1015	460
R4323AX	8	1100	248	280	450	31	200	14	350	180	25,000	5,500	2050	930

**NOTE:** HL-N size pumps are standard with a jacketed bracket and plain head.  
R size pumps are standard with a jacketed bracket, jacketed casing and jacketed head.

- 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](http://www.vikingpump.com). If suction pressure exceeds 50 PSIG, consult factory. Higher pressures possible with factory approval based on application details.
- ② Higher temperatures can be handled with special construction and/or extra clearances, consult factory. Temperature based on FKM seal as standard. Lower temperature limits may be required when using other seal elastomers.
- ③ Ports are suitable for Class 300 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.

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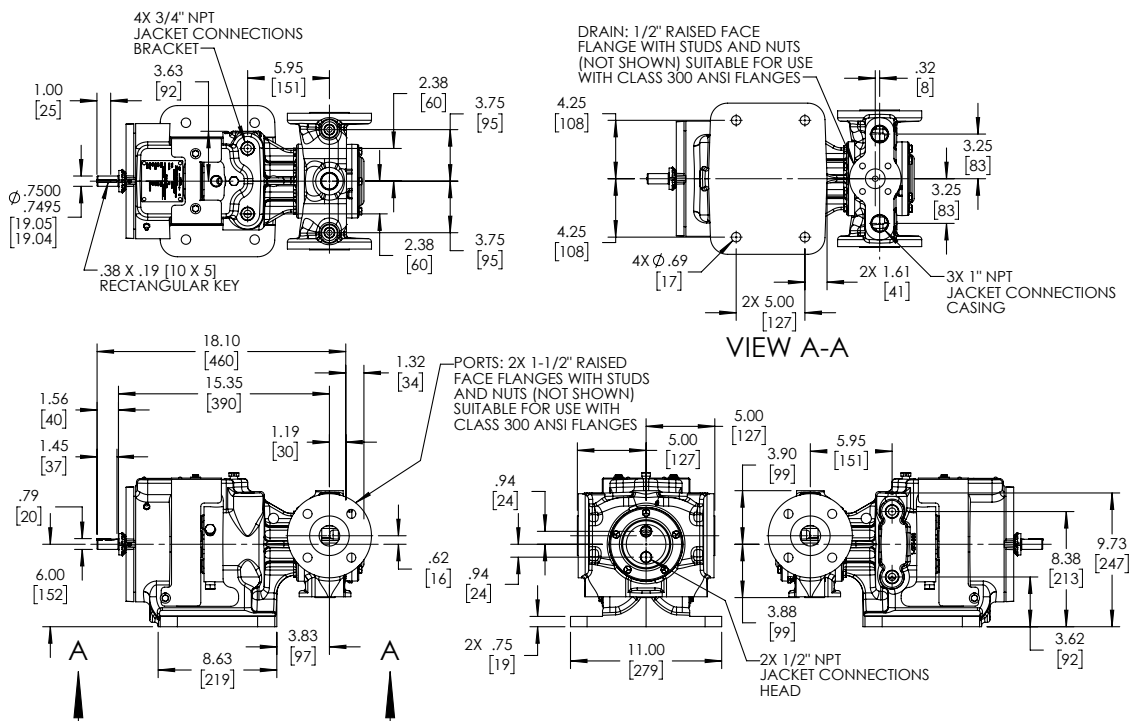
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## MATERIALS OF CONSTRUCTION

Component		Standard Material
Casing		⑤ Steel, ASTM A216, Class WCC
Head		⑤ Steel, ASTM A216, Class WCC
Optional Head Jacket Plate		Steel, ASTM A216, Class WCC
Bracket		⑤ Steel, ASTM A216, Class WCC
Idler		②③ Cast Iron, ASTM A48, Class 35B
Rotor	Standard	① Cast Iron, ASTM A48, Class 35B
	Steel Fitted	④ Steel, ASTM A148, Grade 80-40
Rotor Shaft		⑤ Steel, ASTM A108, Grade 1045
Idler Pin		Hardened Steel, ASTM A108, Grade 1045
Idler Bushing		Carbon Graphite
Bracket Bushing		Carbon Graphite
Standard Mechanical Seal		SS Gland, Carbon / Silicon Carbide / FKM Elastomers

- ① KK, LS, QS, N and RS sizes have ductile iron rotor, ASTM A536 Grade 60-40-18.
- ② Steel fitted Q and QS sizes have steel idler.
- ③ H and HL sizes have powdered metal idler, MPIF Std 35 FC-0208-50.
- ④ Material specification for HL steel rotor is AISI 8620, LS steel rotor is ASTM A148 80-50.
- ⑤ Traceability standard.

## DIMENSIONS – HL4223AX



Note: All dimensional drawings are shown with optional jacketed head.  
These dimensions are average and not for construction purposes. Certified prints on request.

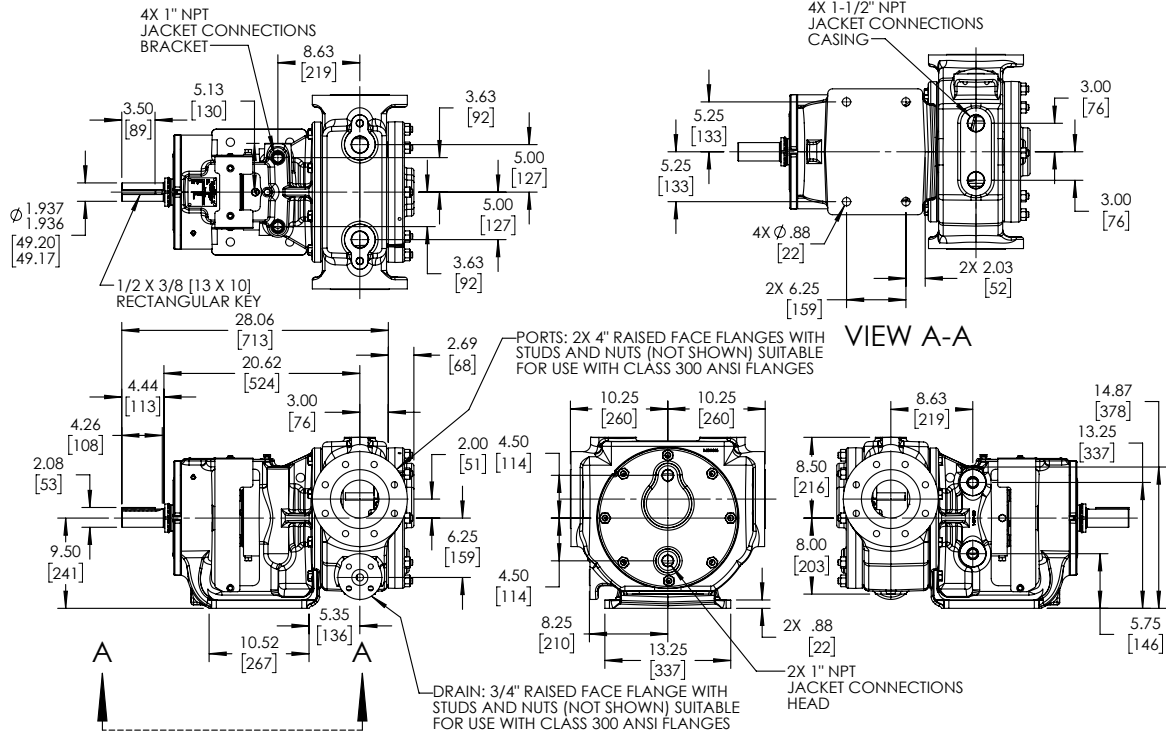


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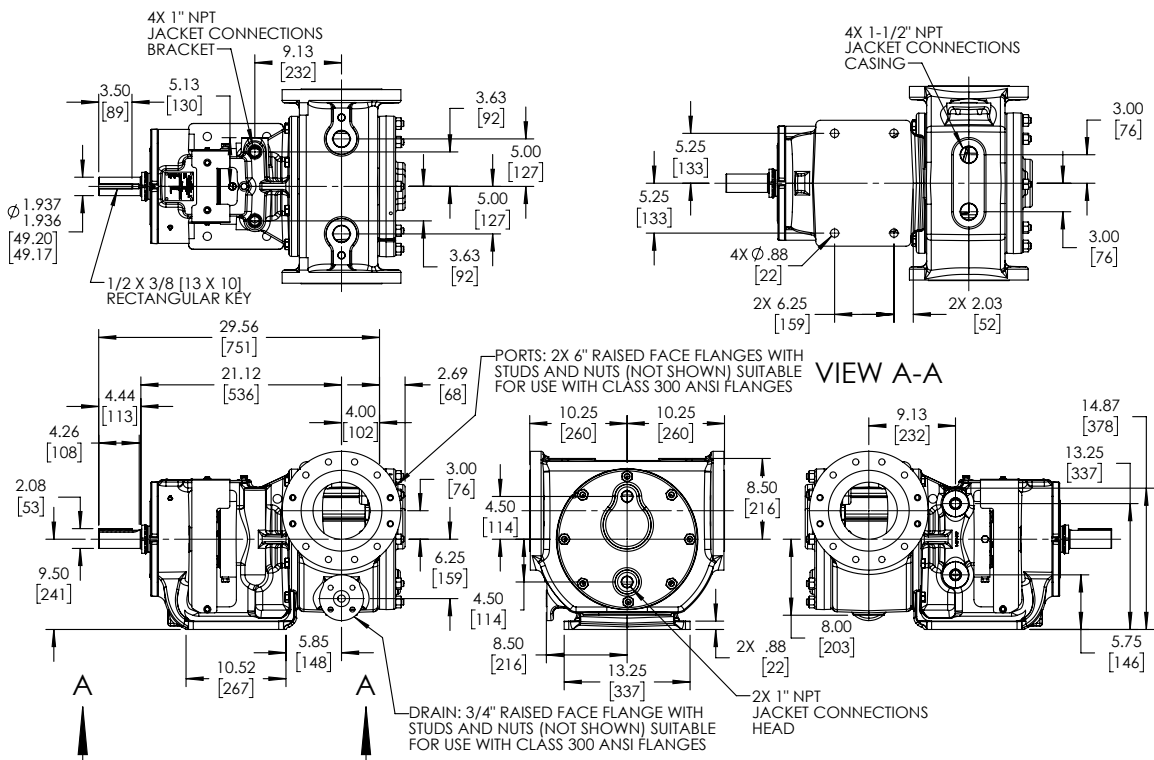
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## DIMENSIONS — Q4223AX



## DIMENSIONS — QS4223AX



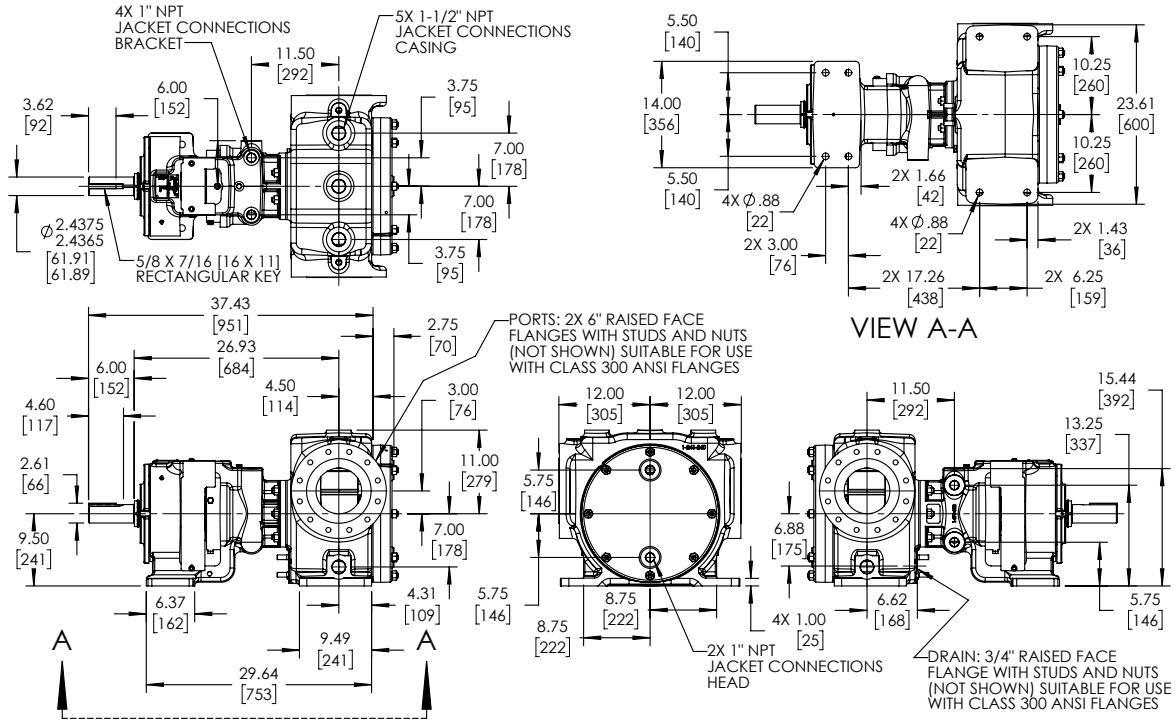
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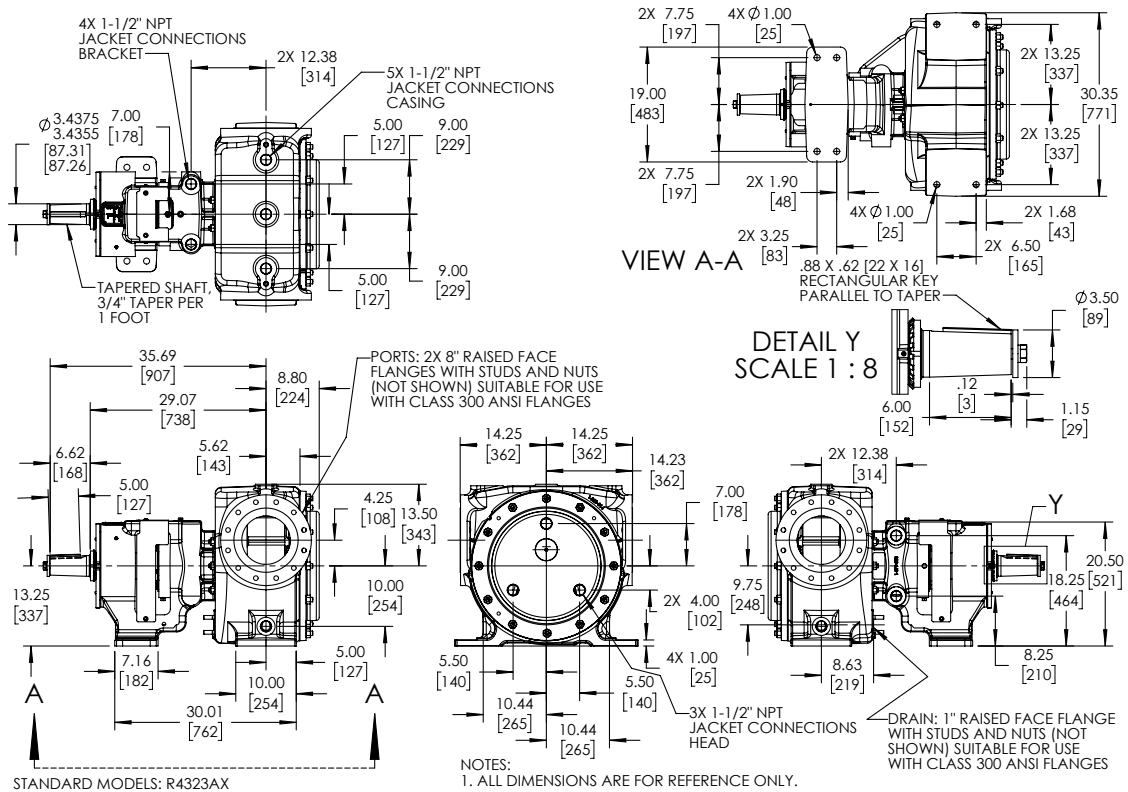
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## DIMENSIONS — N4323AX



## DIMENSIONS — R4323AX



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**NPSH REQUIRED**

Printed performance curves are not available.

Performance curves can be electronically generated with the Viking Pump Curve Generator on [vikingpump.com](http://vikingpump.com).

NPSHR data is not available on the curve generator.

**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
HL	—	—	—	—	1.7	1.8	1.9	2.1	2.4	2.8	3.4	4.5	6.2	9.5	13.5
KK	—	1.7	1.8	1.9	2.1	2.3	2.8	3.3	4.4	6.3	9.1	—	—	—	—
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	—	—	—	—	—	—	—	—	—

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