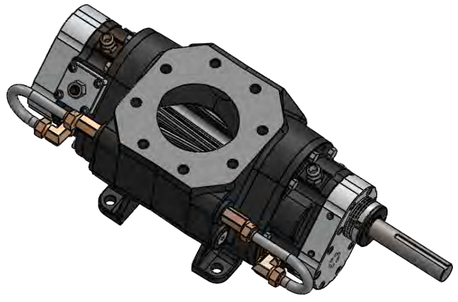
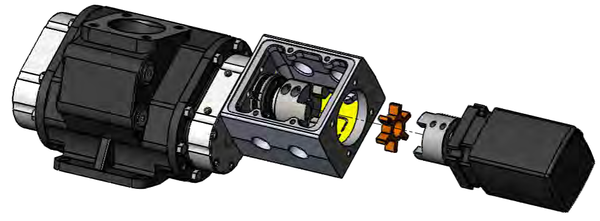


BearCat Pumps

300,450,600 and 900

Pump and Gear Meter Manual



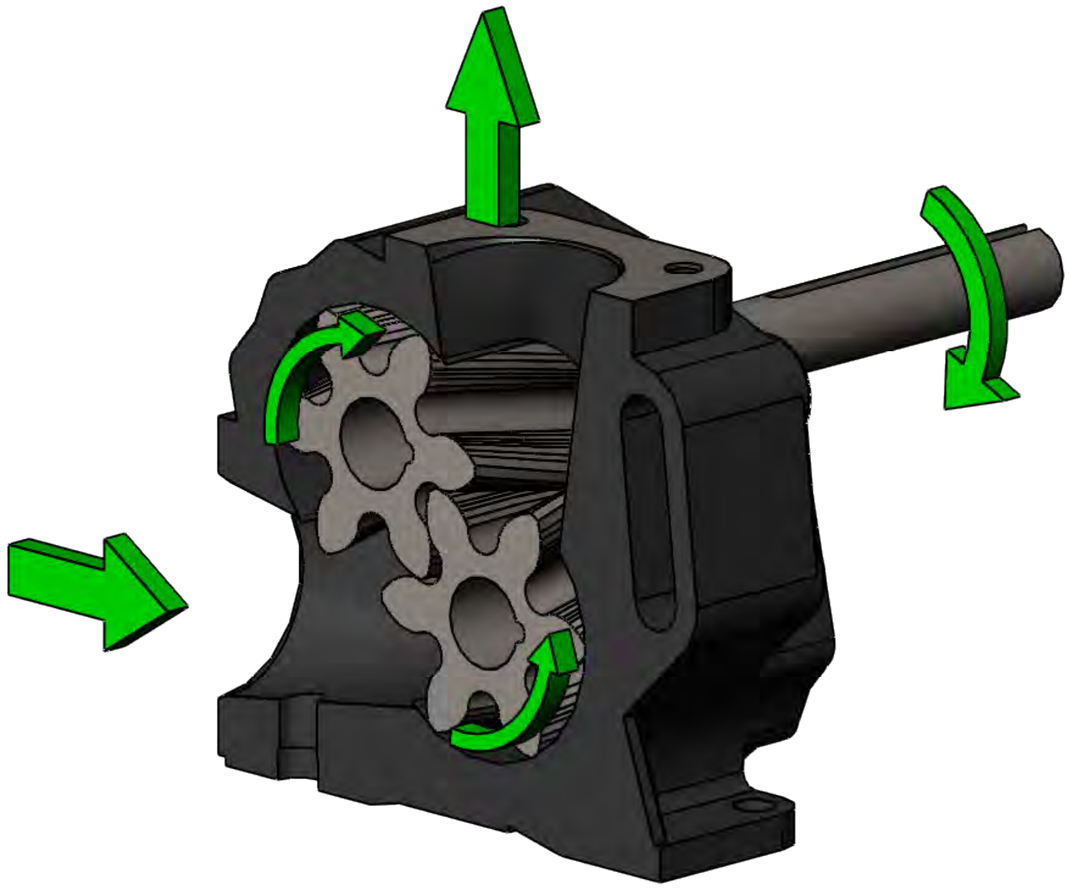
Index

(Click links for quick access)

General Safety Precautions

- This manual should be read entirely prior to the commencement of installation and operation.
- Only qualified personnel should install, operate and maintain this pump and associated equipment.
- Check pump for specific safety warnings/labels.
- Prior to start-up, ensure complete cleanliness and integrity of the system in which the pump is installed.
- In most cases the relief valve is factory set during performance test. In cases where the type of duty is not known (such as distributors or stock orders) or where the components containing the relief valve come from pre-tested stock batches, it is not possible to factory set the relief valve. In this case it is the installer's responsibility to set the relief valve in accordance with the specific application.
- Pumps with heat tracing or jacketing necessary to prevent solidification of the product should be brought up to working temperature prior to start-up.
- All electrical work must be done in accordance with the manufacturers recommended procedures by qualified personnel.
- Ensure all guards are securely in place before operating the equipment. Do not remove guards at any time during operation.
- For pumps operating under 'flooded' suction, when venting the pump through a plug or valve, care should be taken not to completely remove vent plugs or completely open any vent as this could result in liquid being discharged from the openings under pressure.
- Prior to start-up, ensure that the system valves and associated equipment are correctly set.
- Wear appropriate safety atire including long sleeves, face shield, and gloves, whenever starting or operating the pump.

Start-up Procedure



Rotation and Flow

Start-Up Procedure

1. Pump should turn freely by hand. Ensure all guards are in place.
2. Heat if necessary.
3. Gradually open valves, and check for signs of leakage before starting pump.
4. If possible, add some of the liquid directly to the pump. This helps lubricate and prime during the first start-up.
5. Check the rotation by flicking starter 'ON' then 'OFF'. (Correct rotation shown in diagram)
6. Start pump slowly - check for leaks - gradually increase speed.

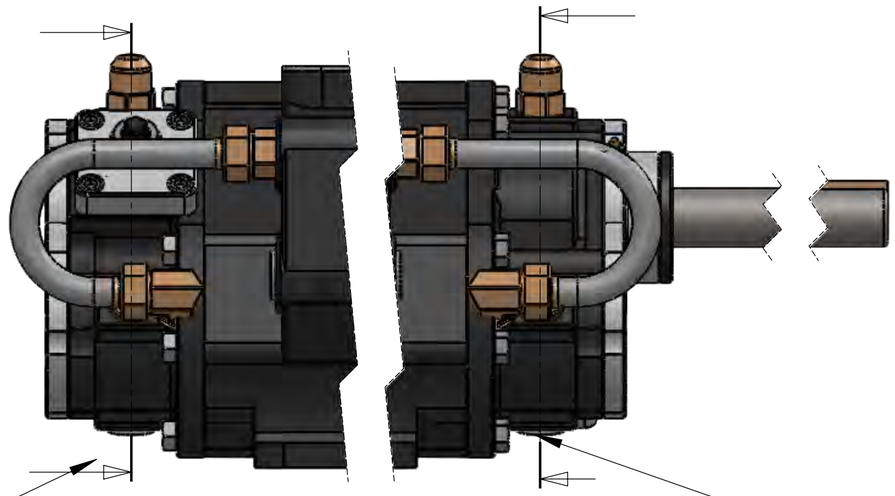
Re-Torque Bolts

Thermal expansion can loosen bolt connections. It is advised that all bolt connections get checked and re-tightened after initial heat-up, and during routine maintenance.

Relief Valve

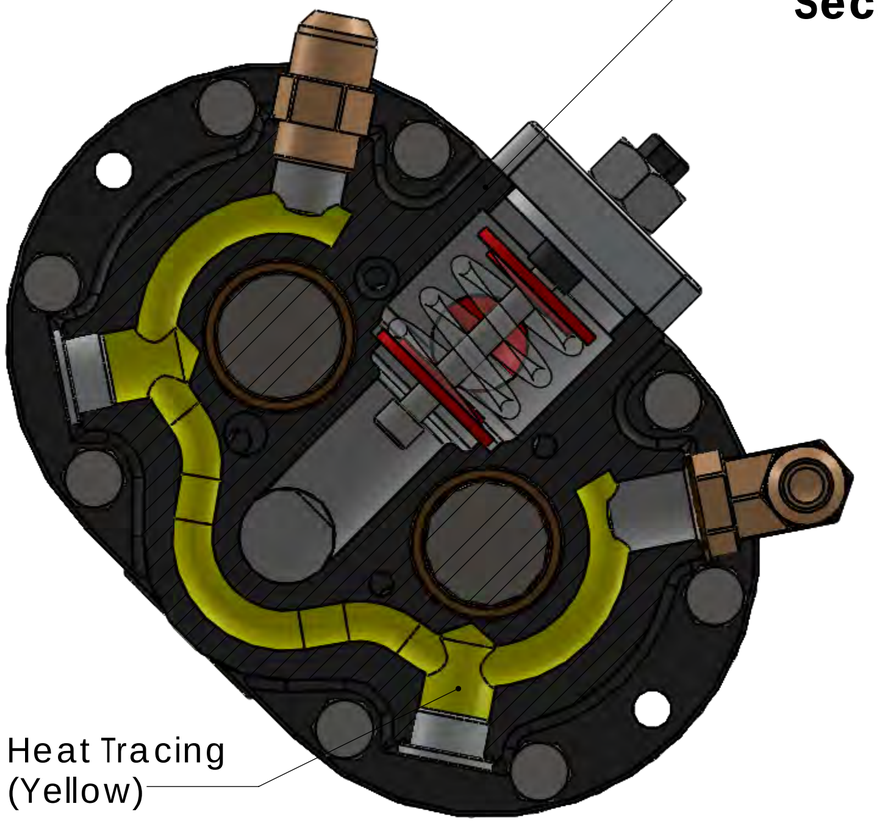
Relief Valve Operation:

Each endplate can relieve pressure in one flow direction only. As such, if the valves are set in opposite directions, each can be adjusted to independent pressures. It is possible to pressure relieve at 80 PSI in one direction, while 30 PSI in reverse.

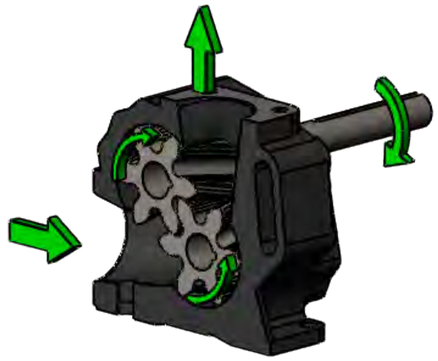


Front Valve Section

Rear Valve Section



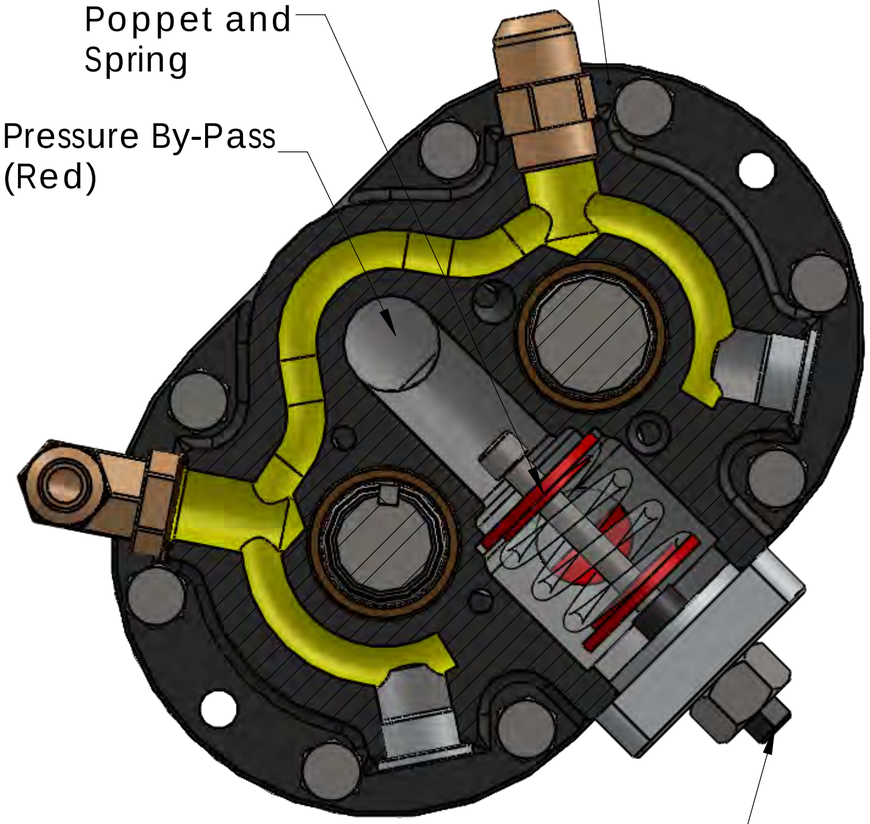
Heat Tracing (Yellow)



If the pump is turning as shown view above, the Front valve is controlling pressure. The rear valve can not open in this condition, as the fluid pressure is pushing against it.

Relief Valve Poppet and Spring

Pressure By-Pass (Red)



Adjuster Bolt

- Flush (80 PSI @ 100GPM)
- Backing off the bolt, each full thread exposed subtracts approximately 5PSI

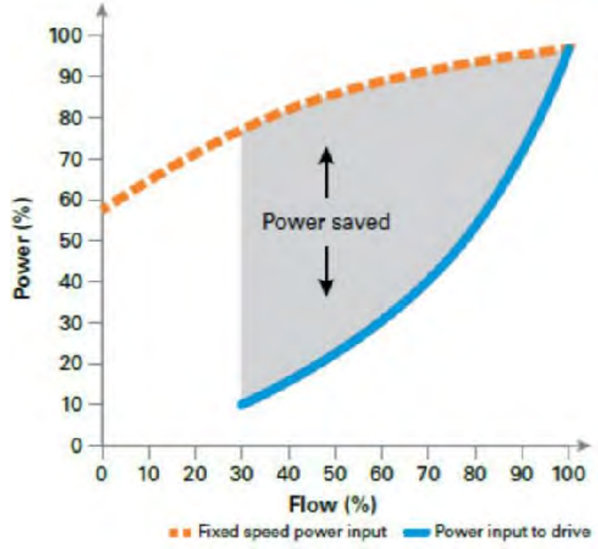
Flow Speed Control

Flow Speed Control:

Pump speed control, either in the form of a Variable Frequency Drive (VFD) or hydraulic control valve is a valuable feature. Many factors can contribute to a situation where pump speed would need to be decreased for cautionary reason, or increased for efficiency gains. These controls have other built in features such as motor protection and pressure control. They also provide valuable information when trouble shooting. Without control, one is left with limited options when problems occur. This can lead to damage, shortened life, or compromised safety.

Energy Savings from a VFD

The graph to the right shows the energy comparison of *Fixed Speed** with a VFD. Initially, fixed speed would certainly be the least expensive. However, energy savings should be considered during the cost analysis. At some point this alone would cover the cost.



*Fixed Speed; Not everyone will choose some type of speed control. As a cautionary measure, we advise all fixed drive systems start at a reduced speed. This should be as much as 50% below the pumps maximum. At initial start-up, this slower speed is more forgiving When conditions are not as expected. Once the issues are corrected, the motor pulley can be replaced with a larger pulley to increase speed as conditions allow.

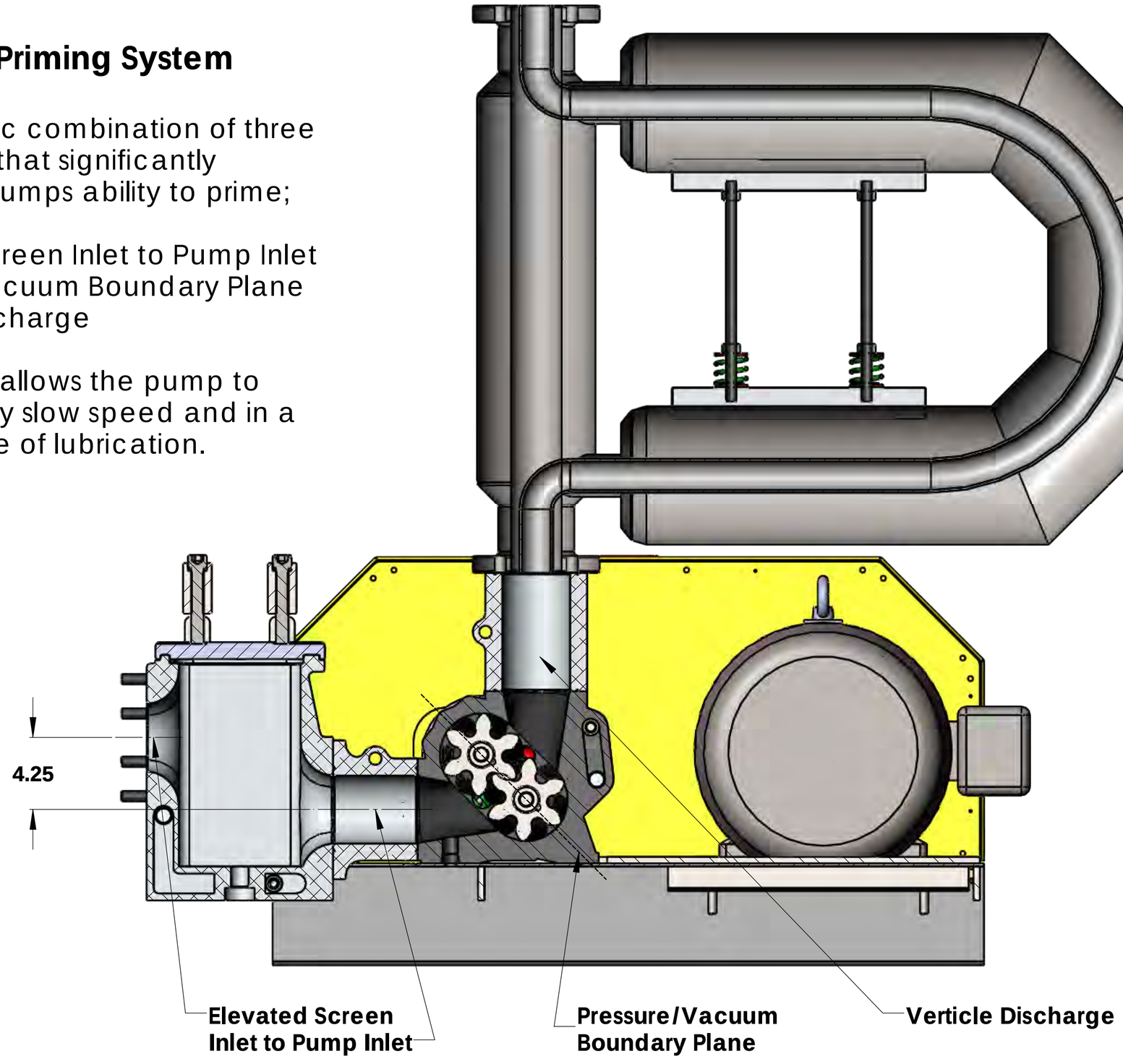
Liquid Lock Priming Diagram

Liquid Lock Priming System

This is a specific combination of three key elements that significantly improve the pumps ability to prime;

1. Elevated Screen Inlet to Pump Inlet
2. Pressure/Vacuum Boundary Plane
3. Verticle Discharge

This condition allows the pump to prime at a very slow speed and in a continual state of lubrication.



Building a Model Number

600 R C X - R H - A A - P B - . 0 4 5

Displacement
- 300 = 0.30 Gal/Rev
- 450 = 0.45 Gal/Rev
- 600 = 0.60 Gal/Rev
- 900 = 0.90 Gal/Rev

Pump or Meter Style
- C = Bushed, No RV
- B = Bushed, RV, Non Heated
- V = Bushed, RV, Heated
- T = Bushed, Heated Meter

- K = Bearing, RV, No Heat
- N = Bearing, No RV
- W = Bearing, No RV, No Heat
- S = Sealed Bearing, RV, No Heat
- R = Bearing, RV, Heated
- U = Bearing, Heated Meter

Shaft Seal
- M = Modified Seal (Single - Obsolete)
- N = Cooling Spacer - Narrow (Double)
- C = Cooling Spacer - Wide (Double)
- B = Bearing Spacer (Double)
- P = Packed Seal (Obsolete)
- H = Packed Seal (Heated)
- J = Packed Seal (Non-Heated)

Drive Shaft Type
- X = Extended
- C = Cut to Custom Length
- H = Hydraulic Mount Shaft
- S = Short

Configuration
- RH = Right High (standard)
- RL = Right Low
- LH = Left High
- LL = Left Low

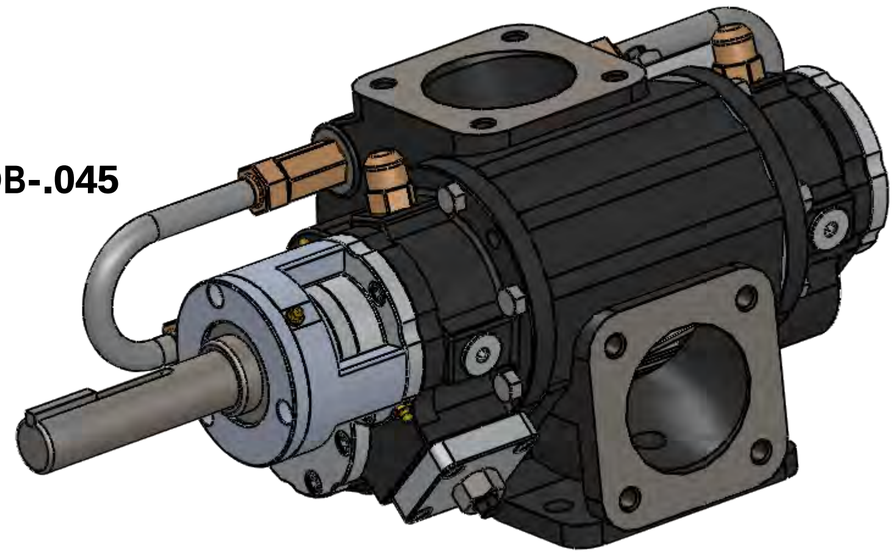
Combined Gasket Clearance
- .030 = 2 x 0.15” End Plate Gaskets
- .045 = 1 x 0.15” + 1 x 0.3” End Plate Gaskets
- .060 = 2 x 0.30” End Plate Gaskets

Option Items
- OB = Outboard Bearing
- PB = Pillow Block
- EH = Electric Heat Cavities
- EA = Encoder Guard and Coupler
- Multiple options can be stacked
  ex. -OB-EH

Side Outlet Relief
- 4 = Fixed: 40psi @100gpm (standard on bushing pumps)
- 8 = Fixed: 80psi @100gpm
- A = Adjustable (standard on bearing pumps)
- B = Blocked

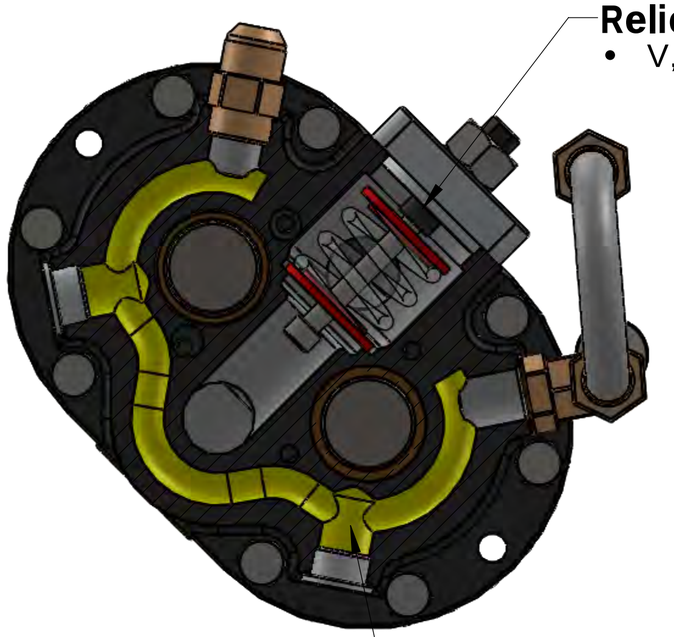
Top Outlet Relief
- 4 = Fixed: 40psi @100gpm
- 8 = Fixed: 80psi @100gpm (standard on bushing pumps)
- A = Adjustable (standard on bearing pumps)
- B = Blocked

Example shown:
450VNX-RH-AA-OB-.045



End Plate Style

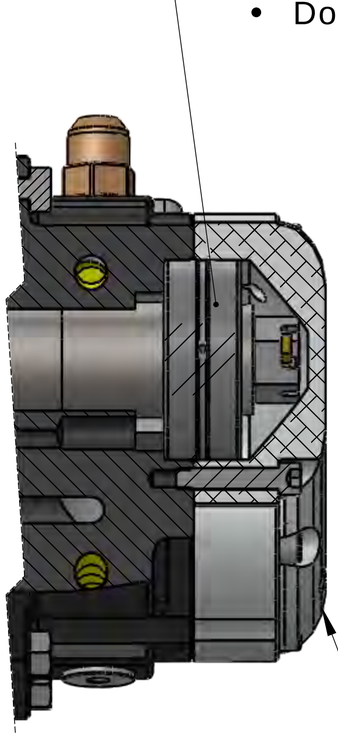
Style	Relief	Heat	Bearing	Bushing	Viton	Buna-N	Grease
C				X	X		
B	X			X		X	
V	X	X		X	X		
T		X		X	X		
N			X		X		X
W			X			X	X
R	X	X	X		X		X
S	x		x			x	x
U		X	X		X		X



Relief Valve
- V, B, S and R

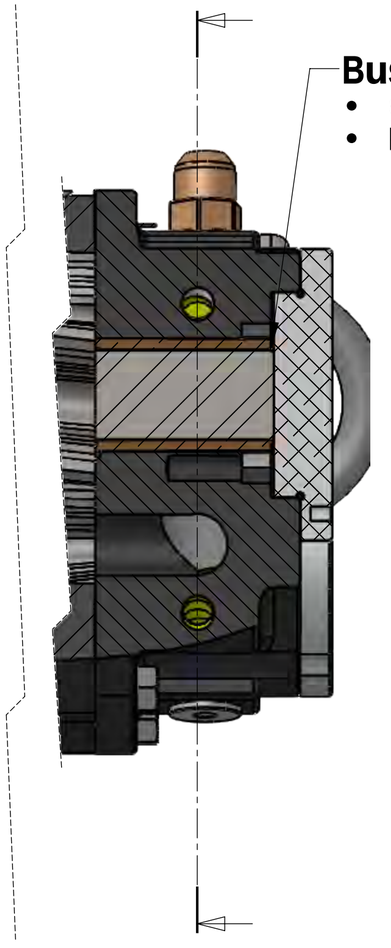
Heat Tracing
- V, T, R and U
- Passage shown in yellow
- Fittings included

Bearing Style
- N, W, S, R and U
- Domed End Cap



Grease Fittings
- N, W, S, R and U
- Domed End Cap
- Grease Fittings

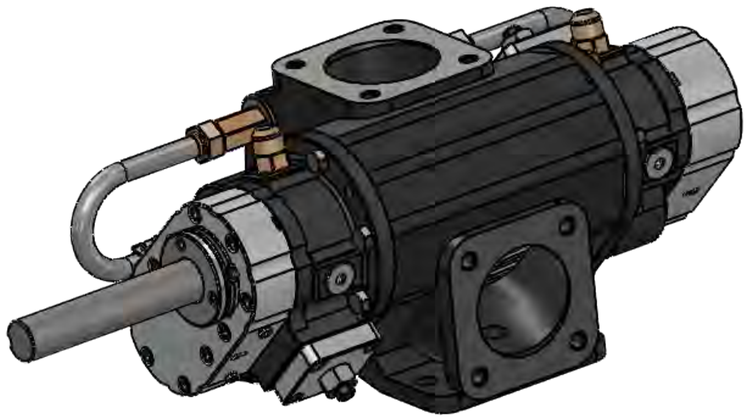
Bushing Style
- C, V, B, and T
- Flat End Cap



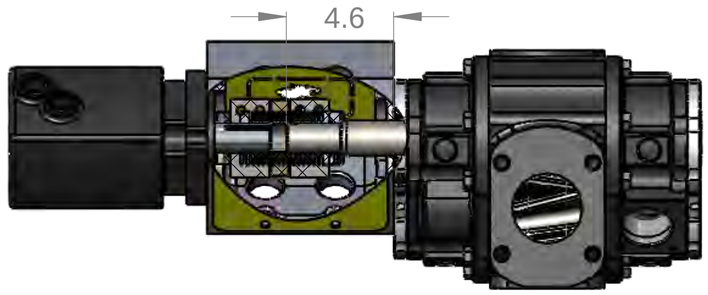
Material	Style	Seal Type	Notes
Rubberized Asphalt	R U	C P	Use oversized displacement
Modified Asphalt	V T R U	M N C P	
Emulsified Asphalt	C V T	M N C	
Crude Oil	B W S	M D	
Condensate	S	B	Use oversized displacement
Dust Control	W S	B	
Abrasive	N W S R U	C B	Use oversized displacement
Corrosive	W S	B	
Hot	V T R U	C	

Shaft Type

X: Extended Shaft



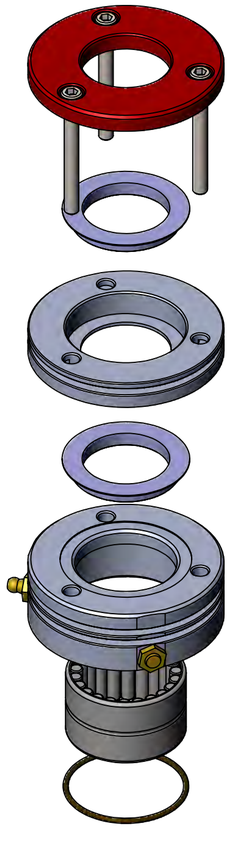
H: Hydraulic Shaft



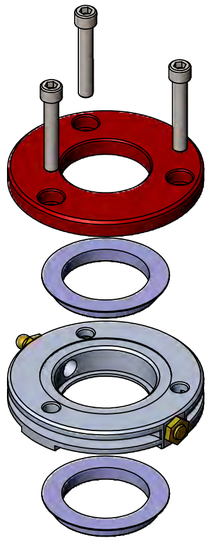
Set distance from mount face. Used for Hydraulic motors and Gear Meters.

Seal Type

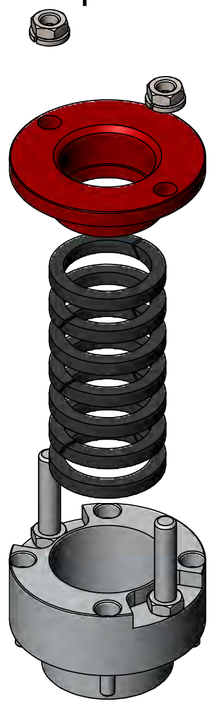
N: Cooling Double
(bushing pumps)



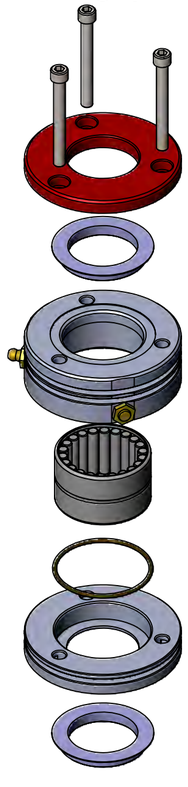
C: Cooling Double
(bearing pumps)



J: Packing
(1/4” packing)

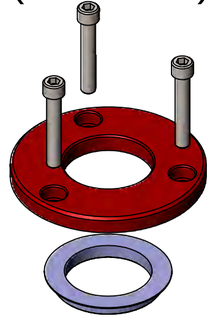


B: Bearing Double
(bushing pumps)

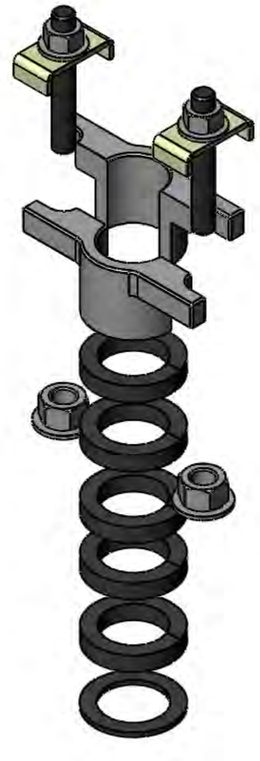


OBSOLETE SEALS

M: Single Lip Seal
(obsolete)



P: Packing
(3/8”, obsolete)

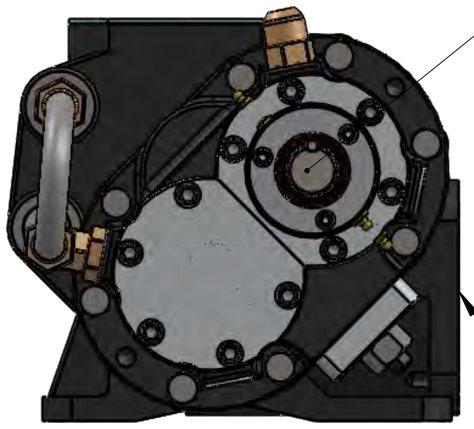


Configuration

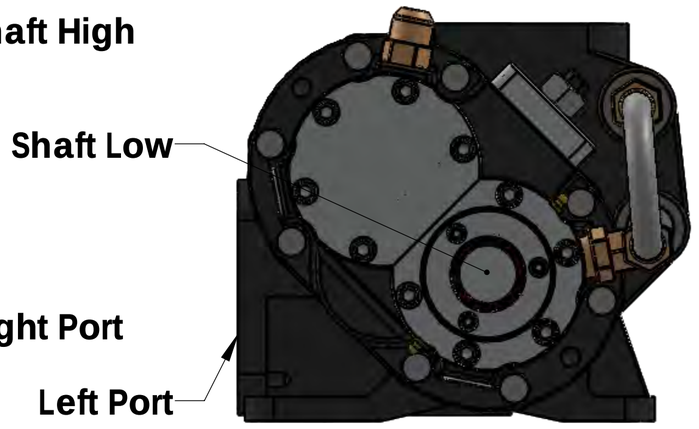
Configuration Examples

The configuration is determined by side port postion and drive shaft location. Looking down the drive shaft, is the side port on the left or right. Is the drive shaft in the high or low position. See examples to left.

RH Example
Right High

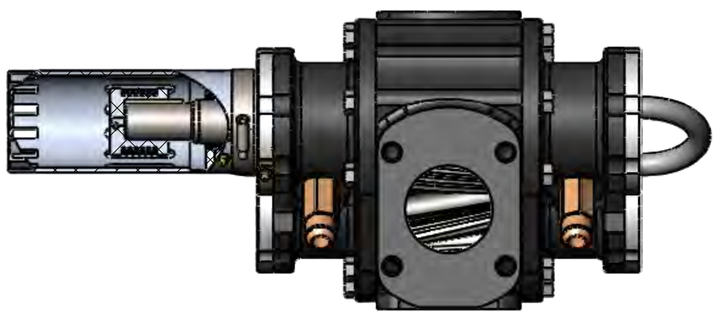


LL Example
Left Low



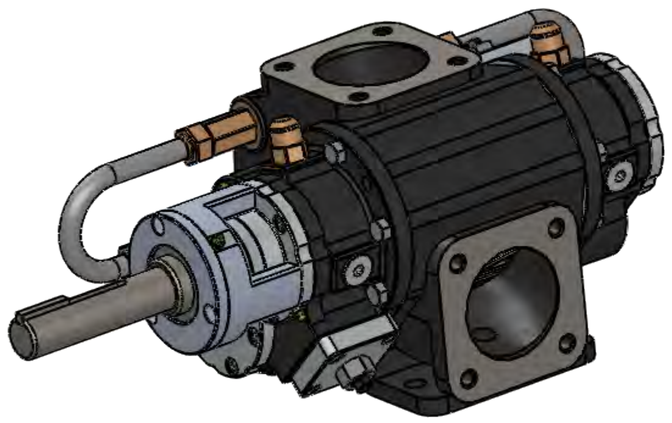
Option Items

EA: Encoder Mount

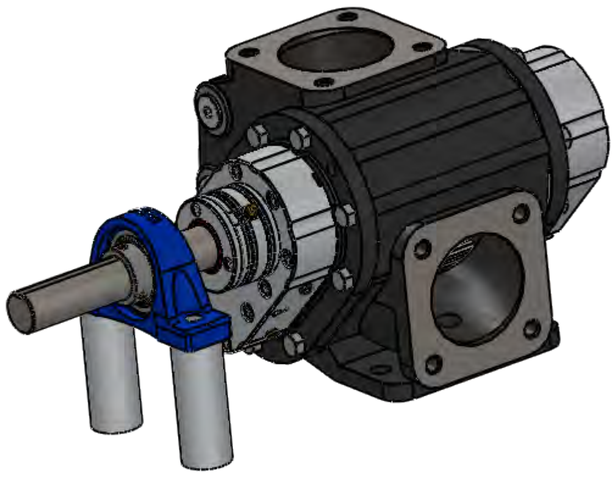


Encoder coupler and guard
(encoder not included)

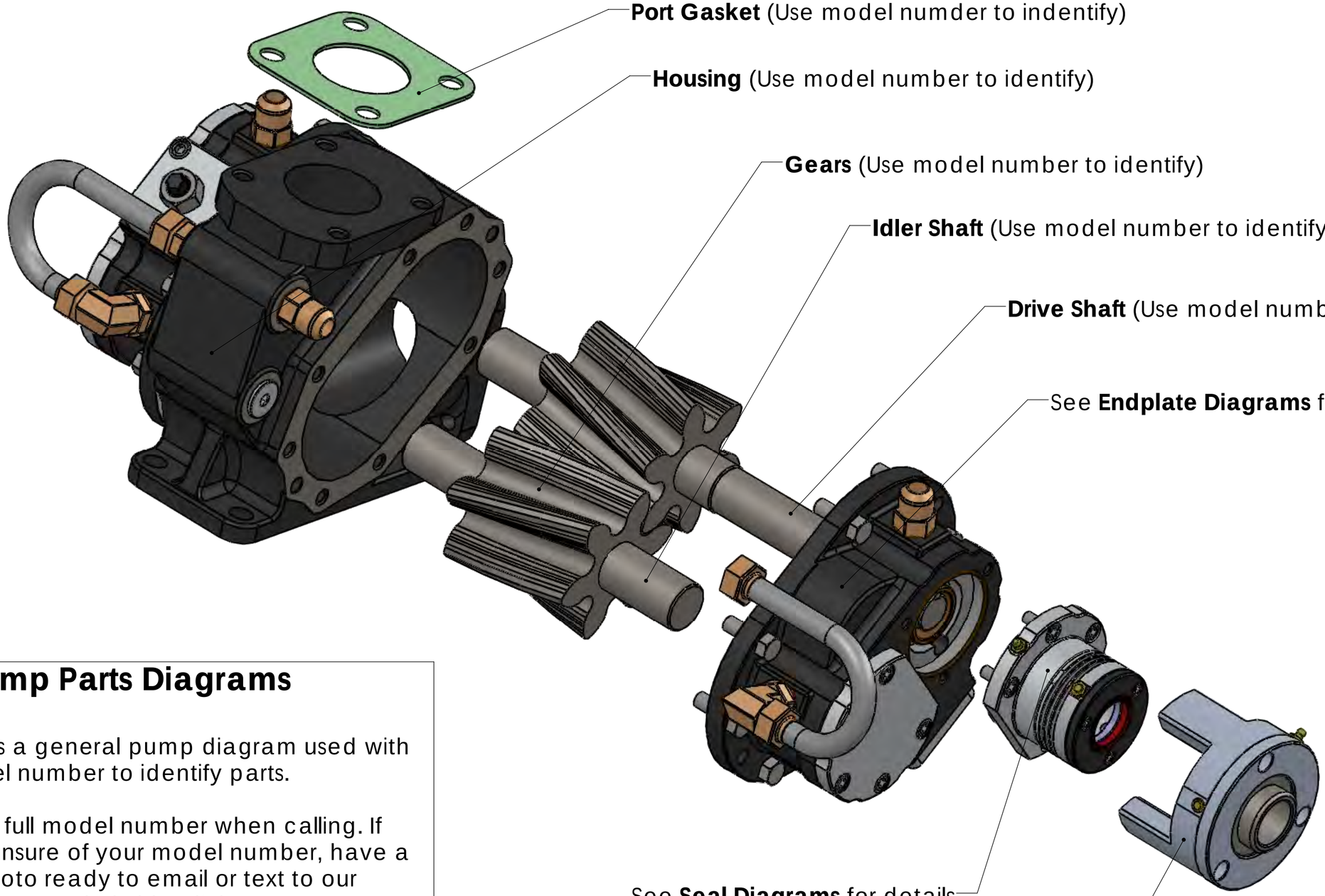
OB: Outboard Bearing



PB: Pillow Block Bearing



Base Component Diagram



Pump Parts Diagrams

This shows a general pump diagram used with the model number to identify parts.

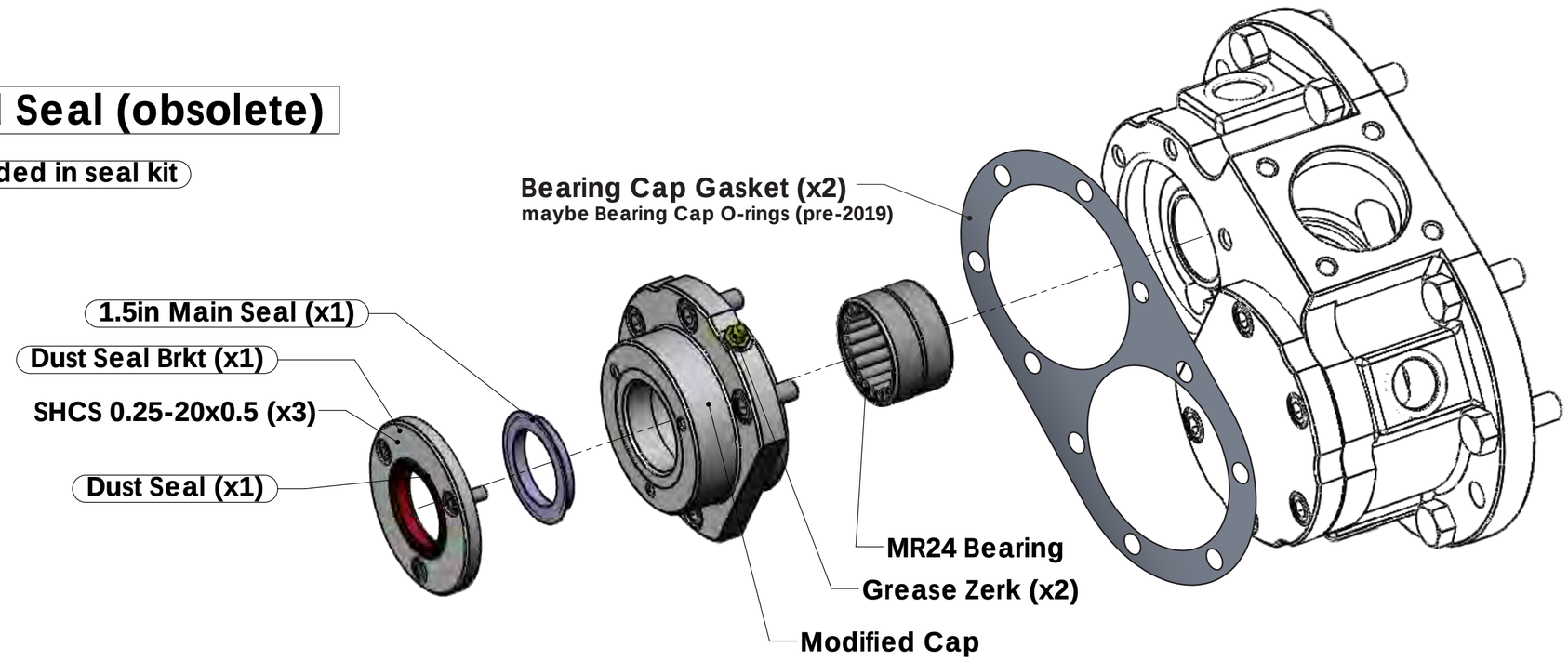
Have the full model number when calling. If you are unsure of your model number, have a digital photo ready to email or text to our technician to assist in identifying your pump.

Example Model Number: 450VMX-RH

Seal Diagrams (1 of 3)

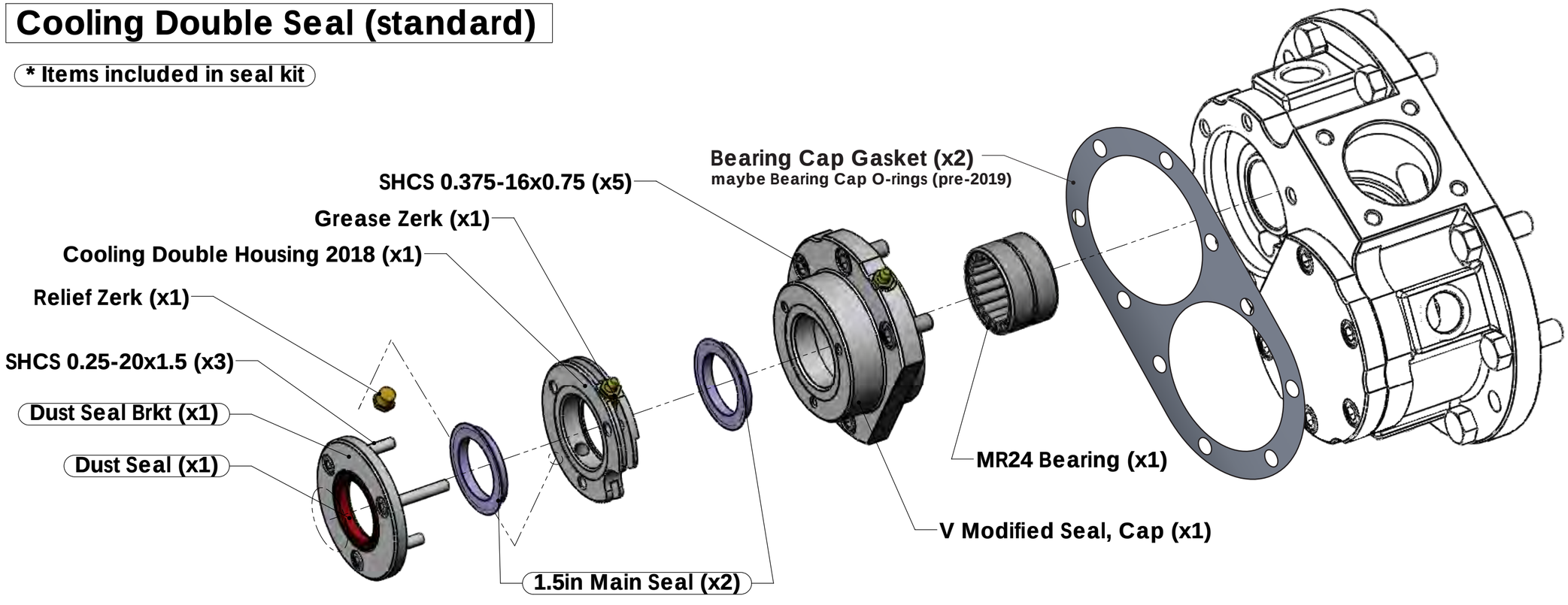
Modified Seal (obsolete)

* Items included in seal kit



Cooling Double Seal (standard)

* Items included in seal kit

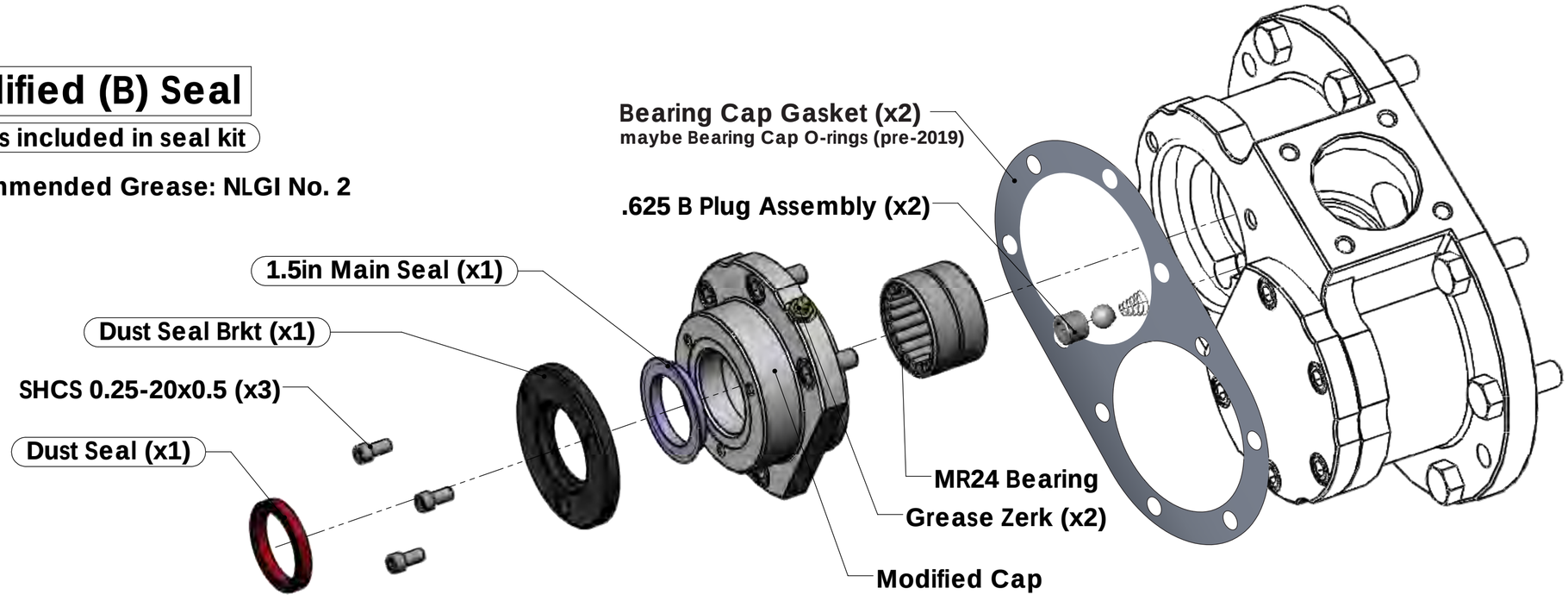


Seal Diagrams (2 of 3)

Modified (B) Seal

* Items included in seal kit

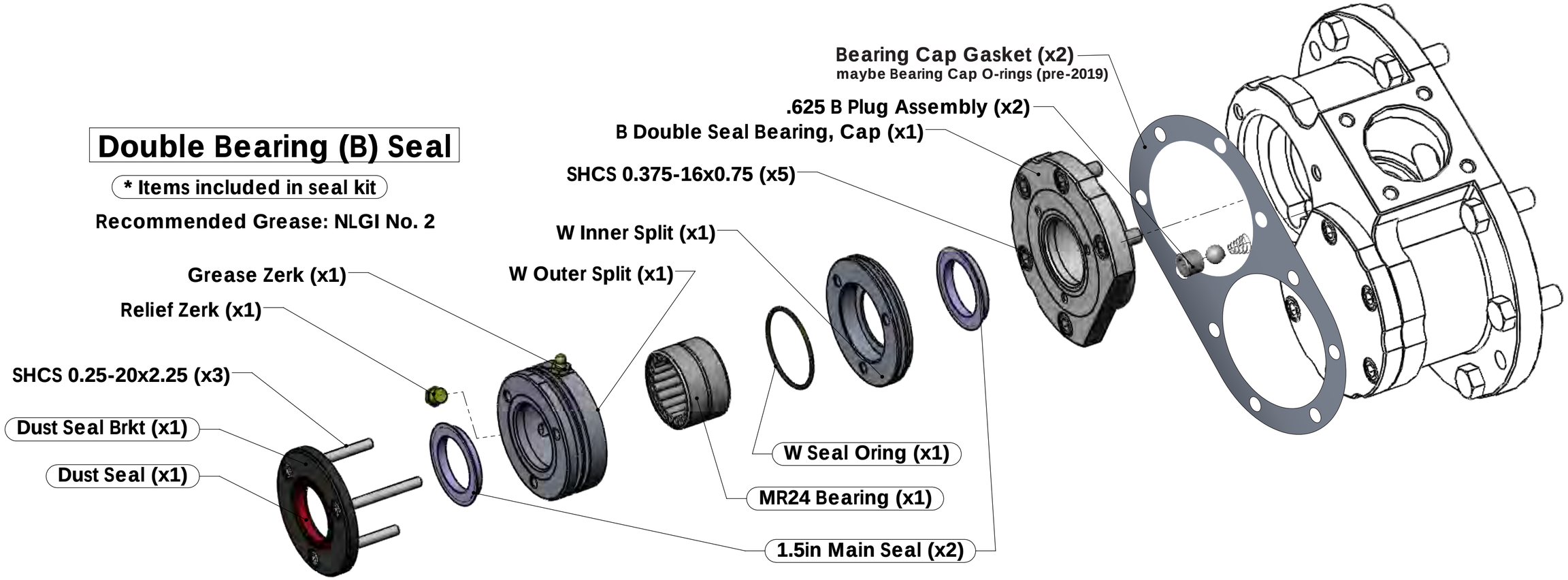
Recommended Grease: NLGI No. 2



Double Bearing (B) Seal

* Items included in seal kit

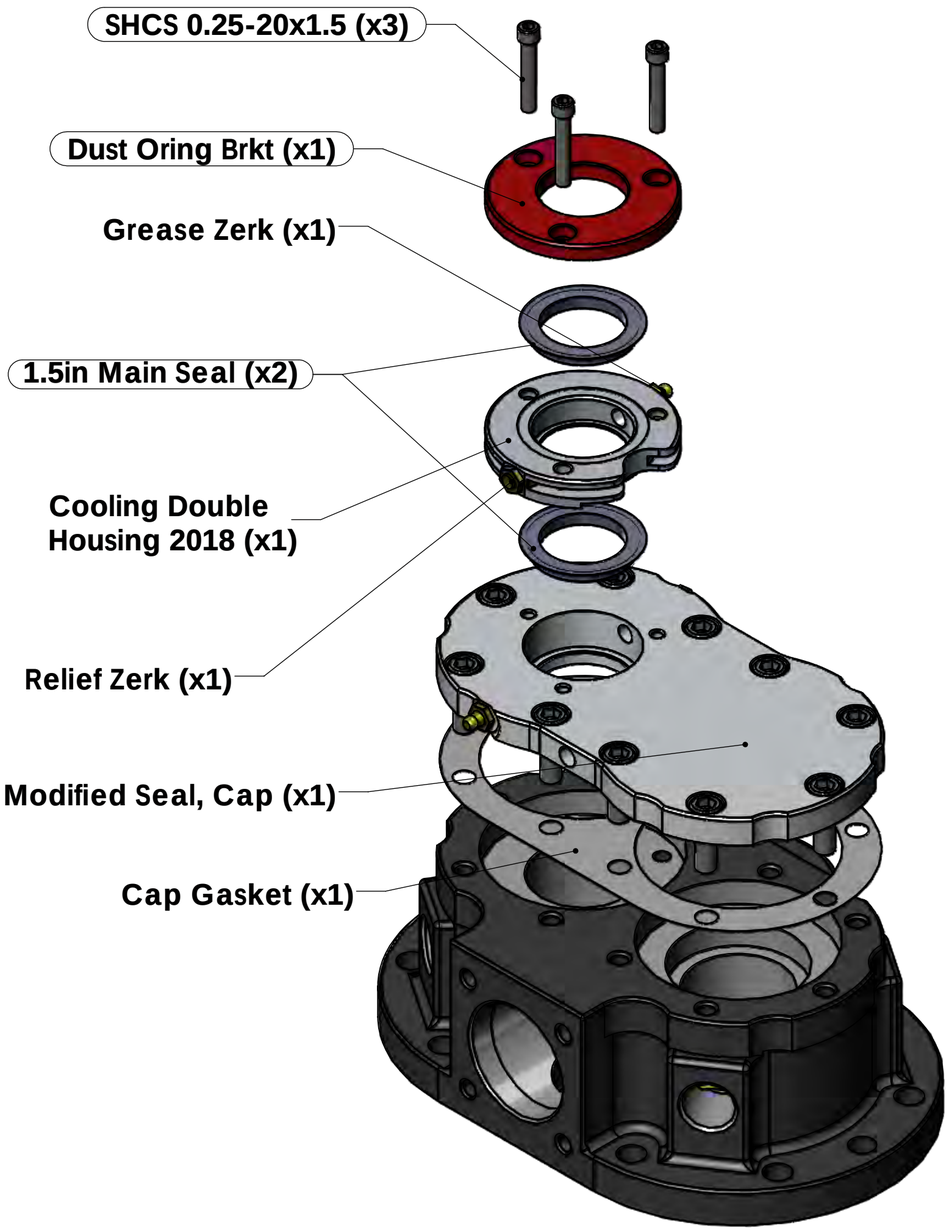
Recommended Grease: NLGI No. 2



Seal Diagrams (3 of 3)

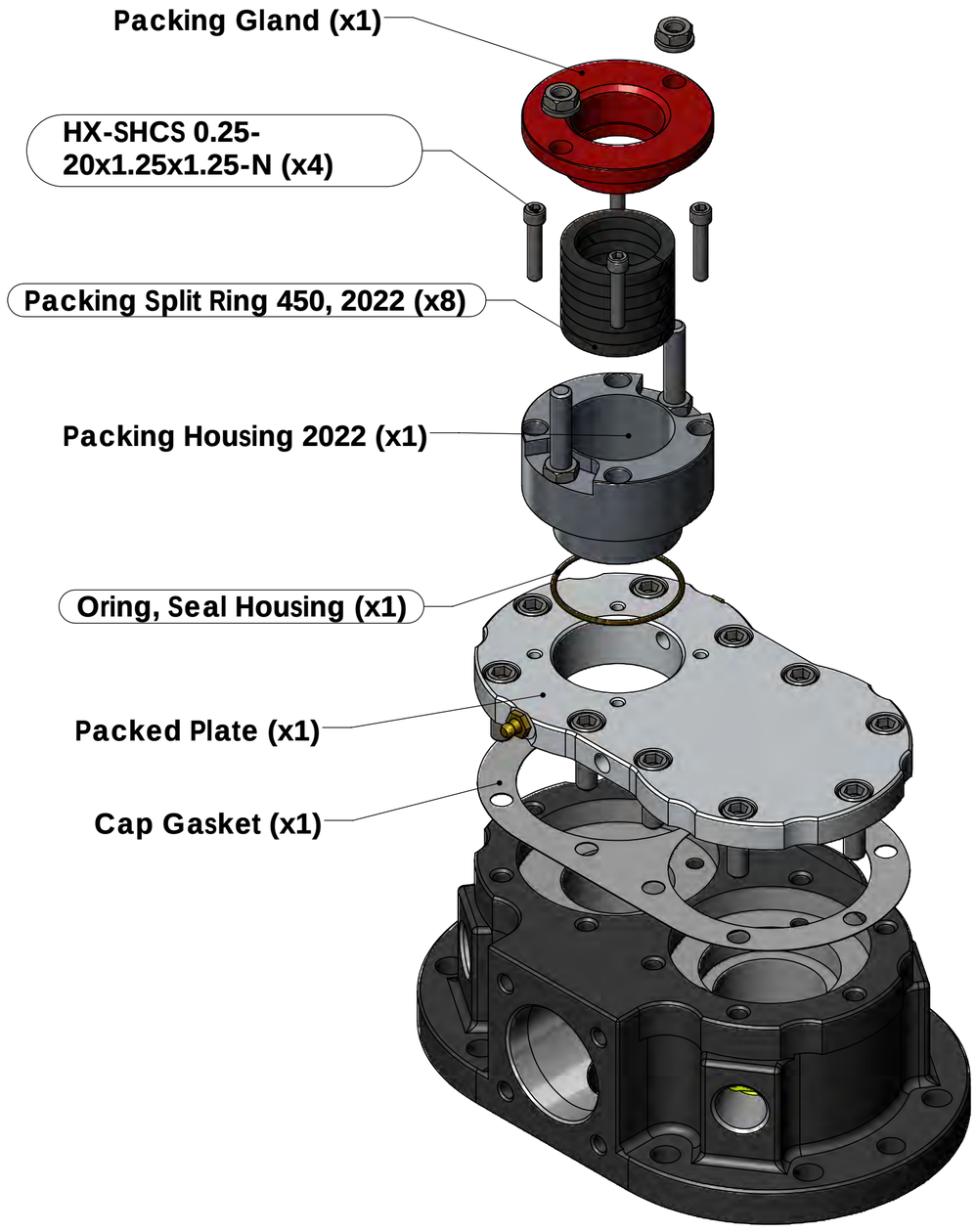
Cooling Double 2020

* Items included in seal kit



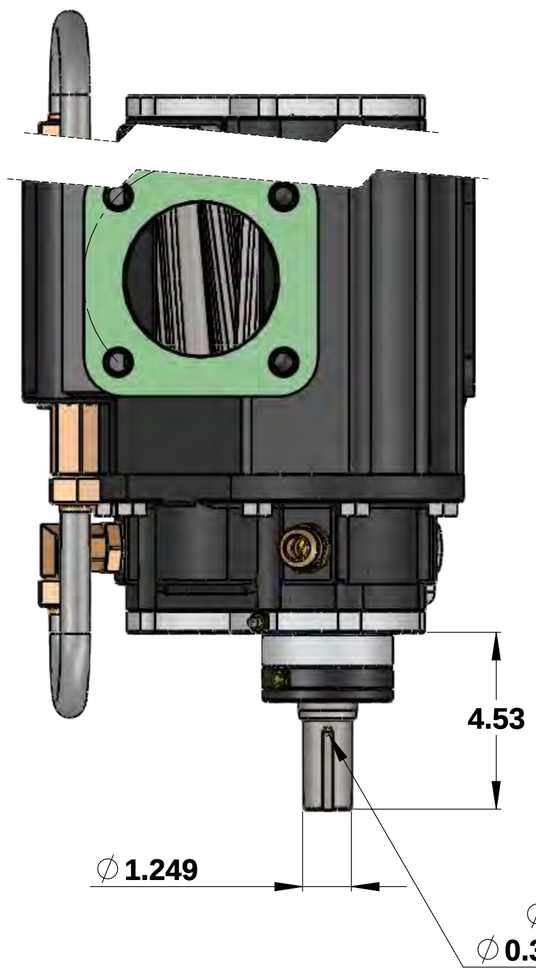
Packed Seal 2022

* Items included in seal kit



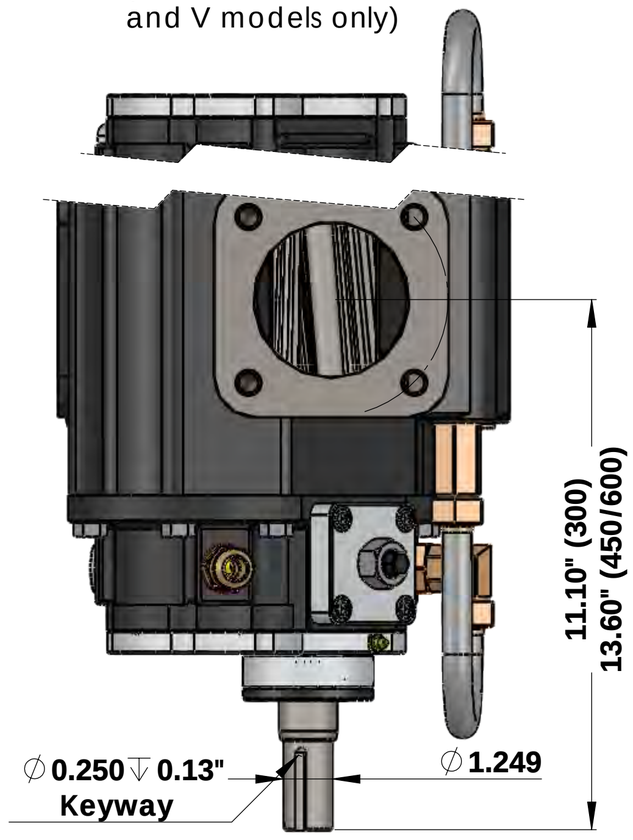
Shaft Style Diagrams

H - Hydraulic Shaft

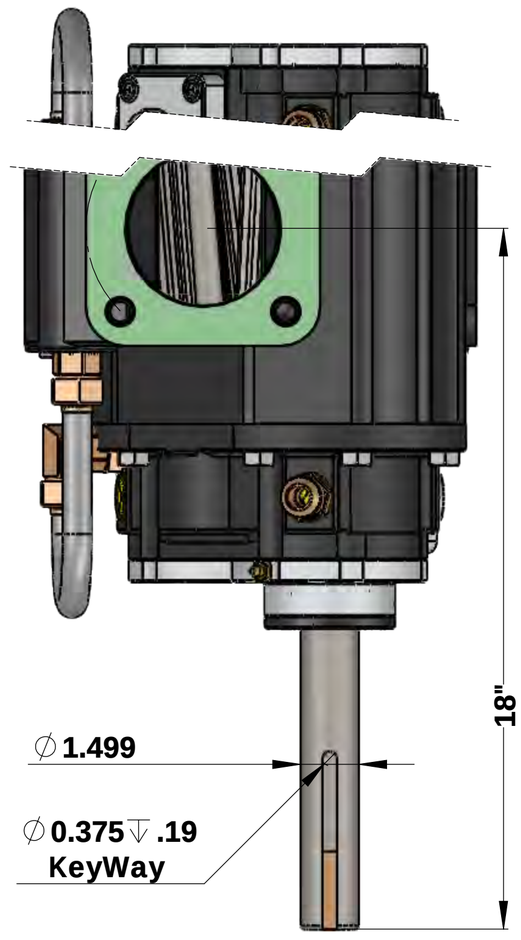


S - Short Shaft

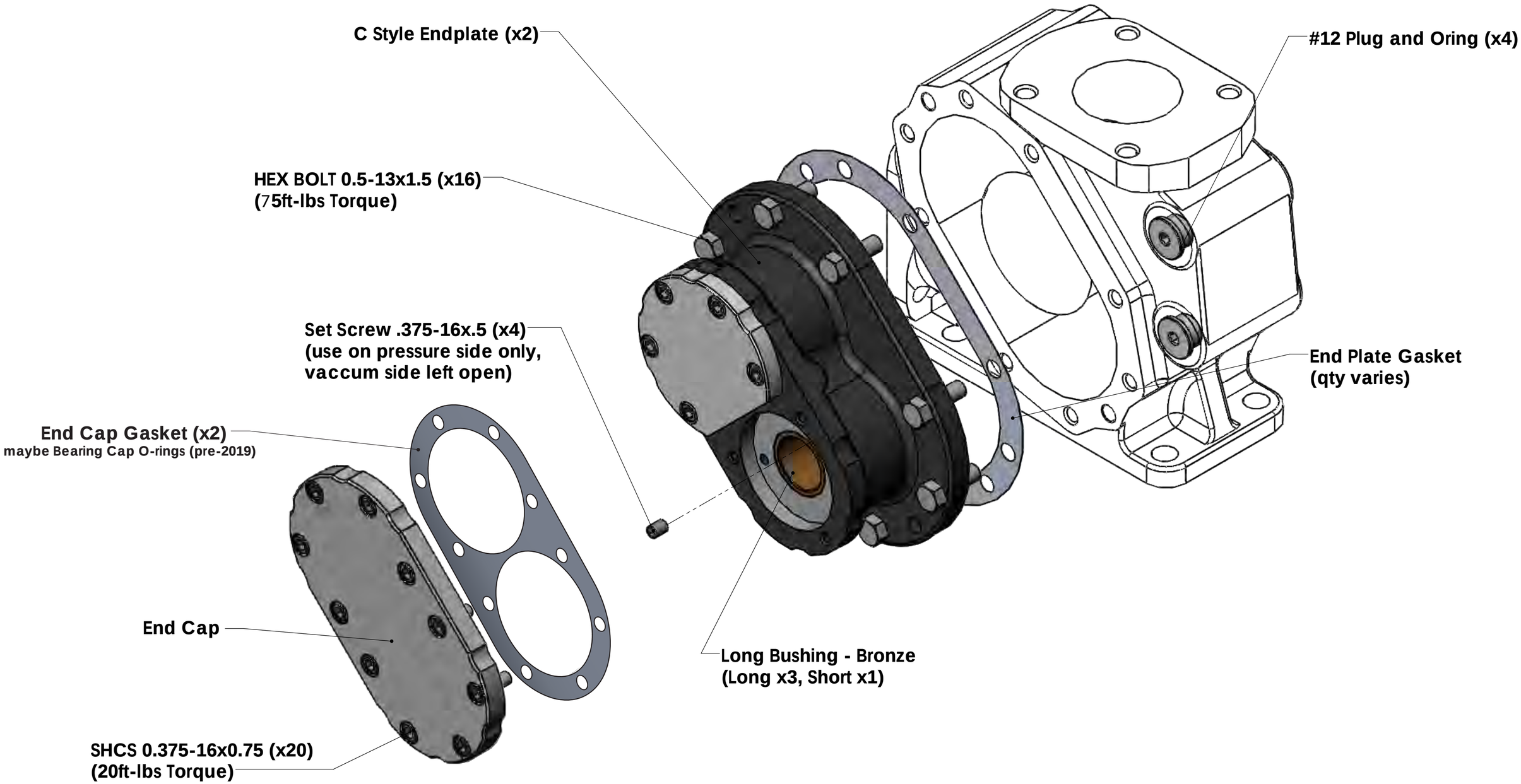
(Available in B,C,
and V models only)



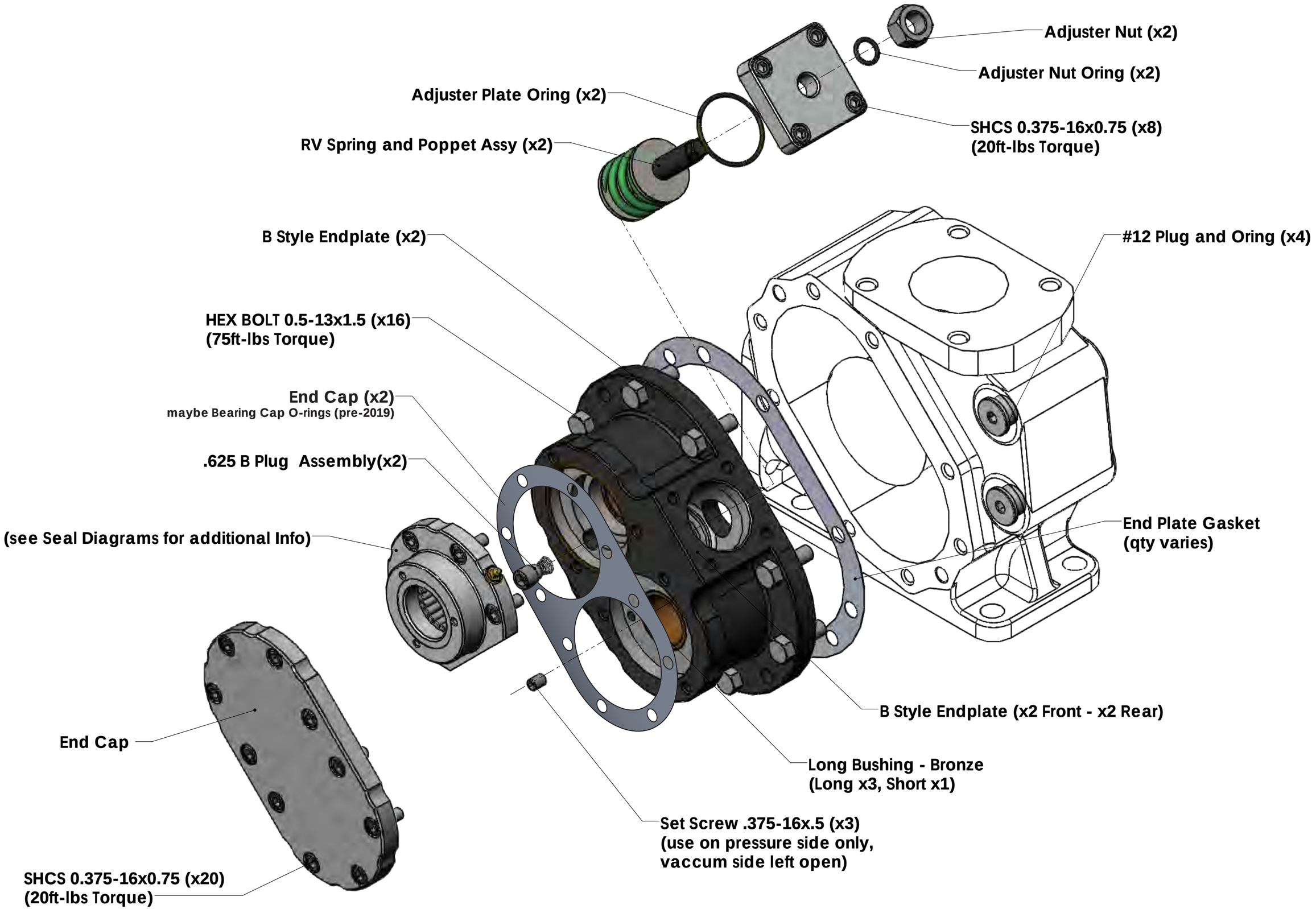
X - Extended Shaft



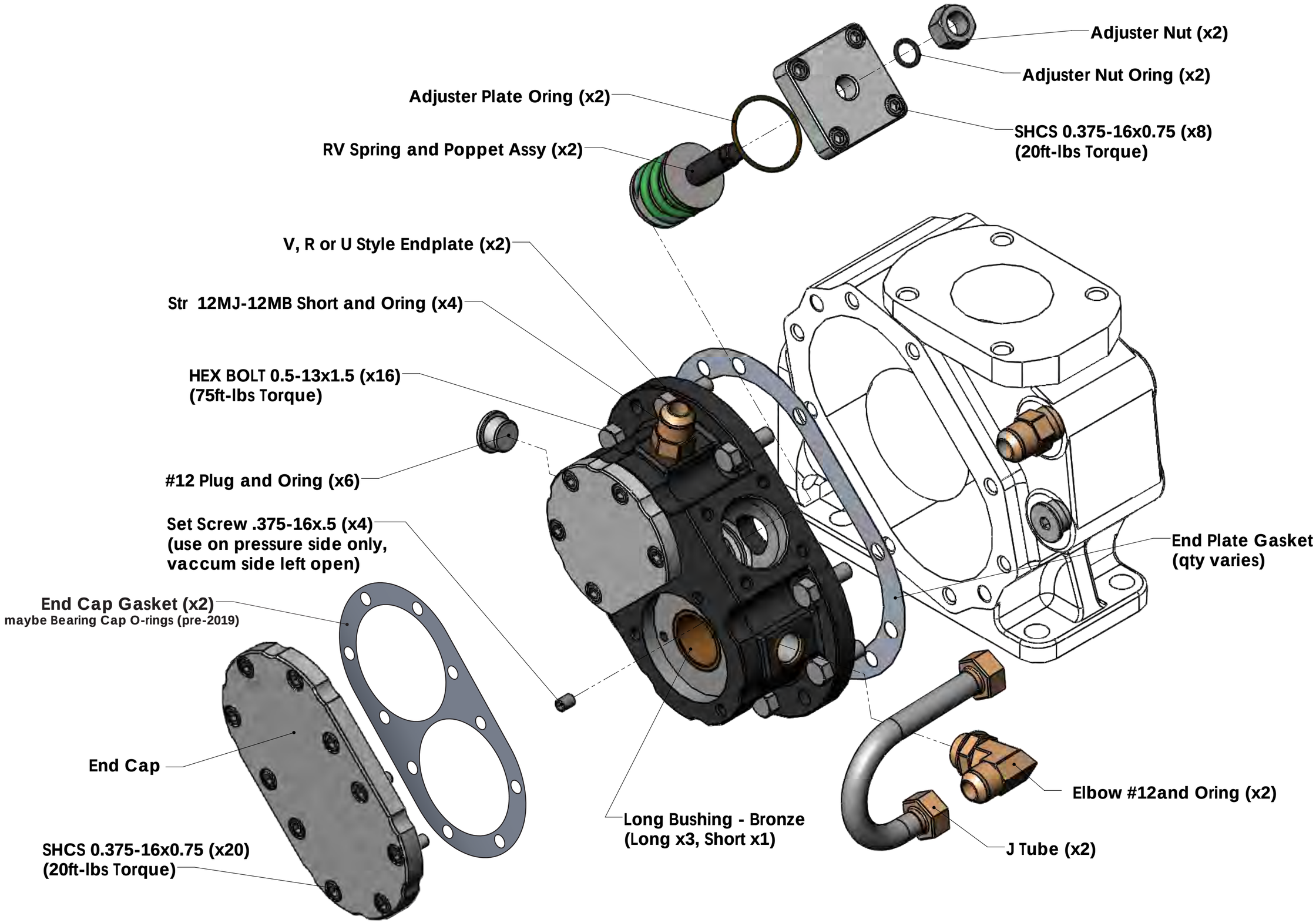
C Style Diagram



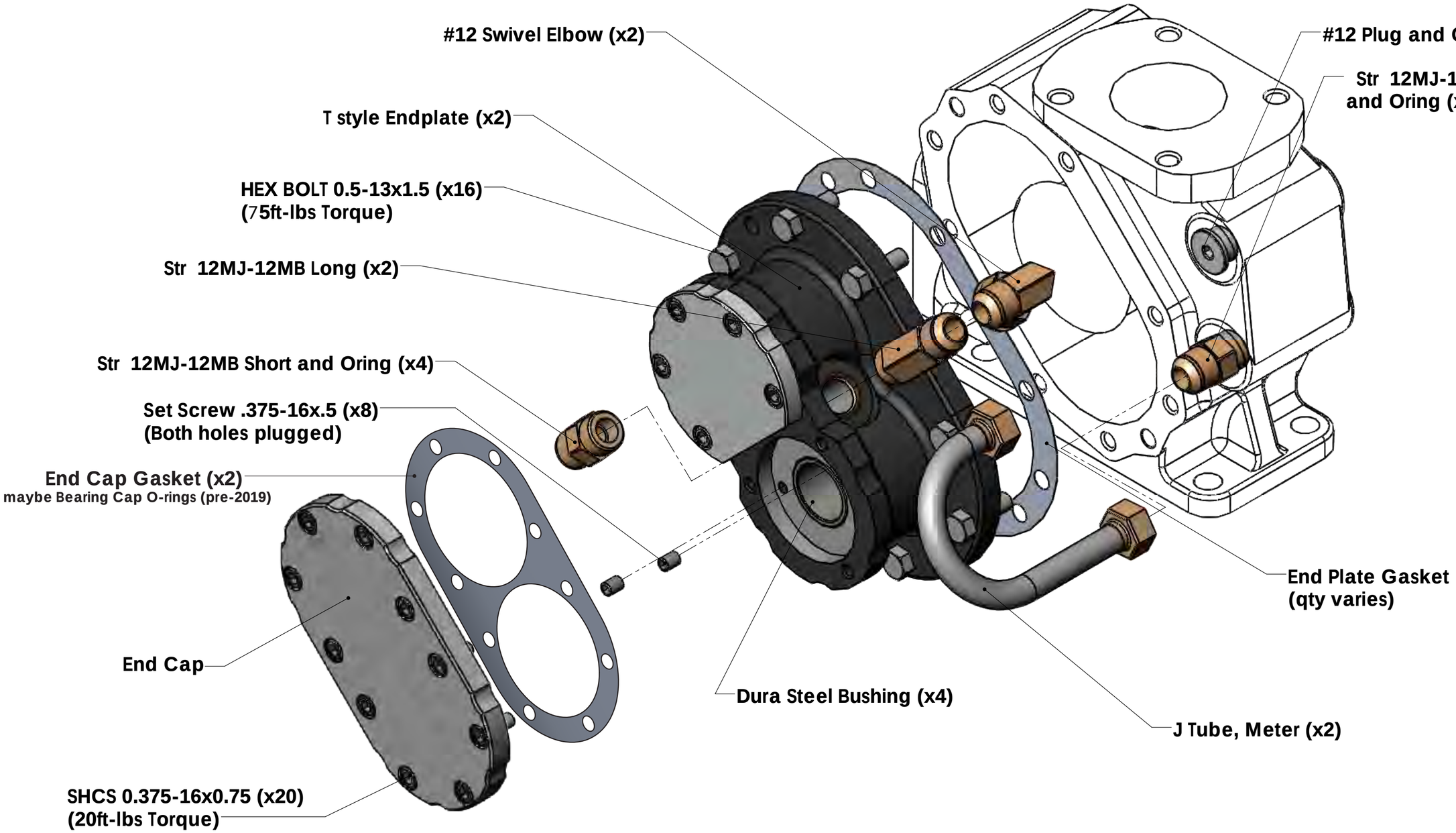
B Style Diagram



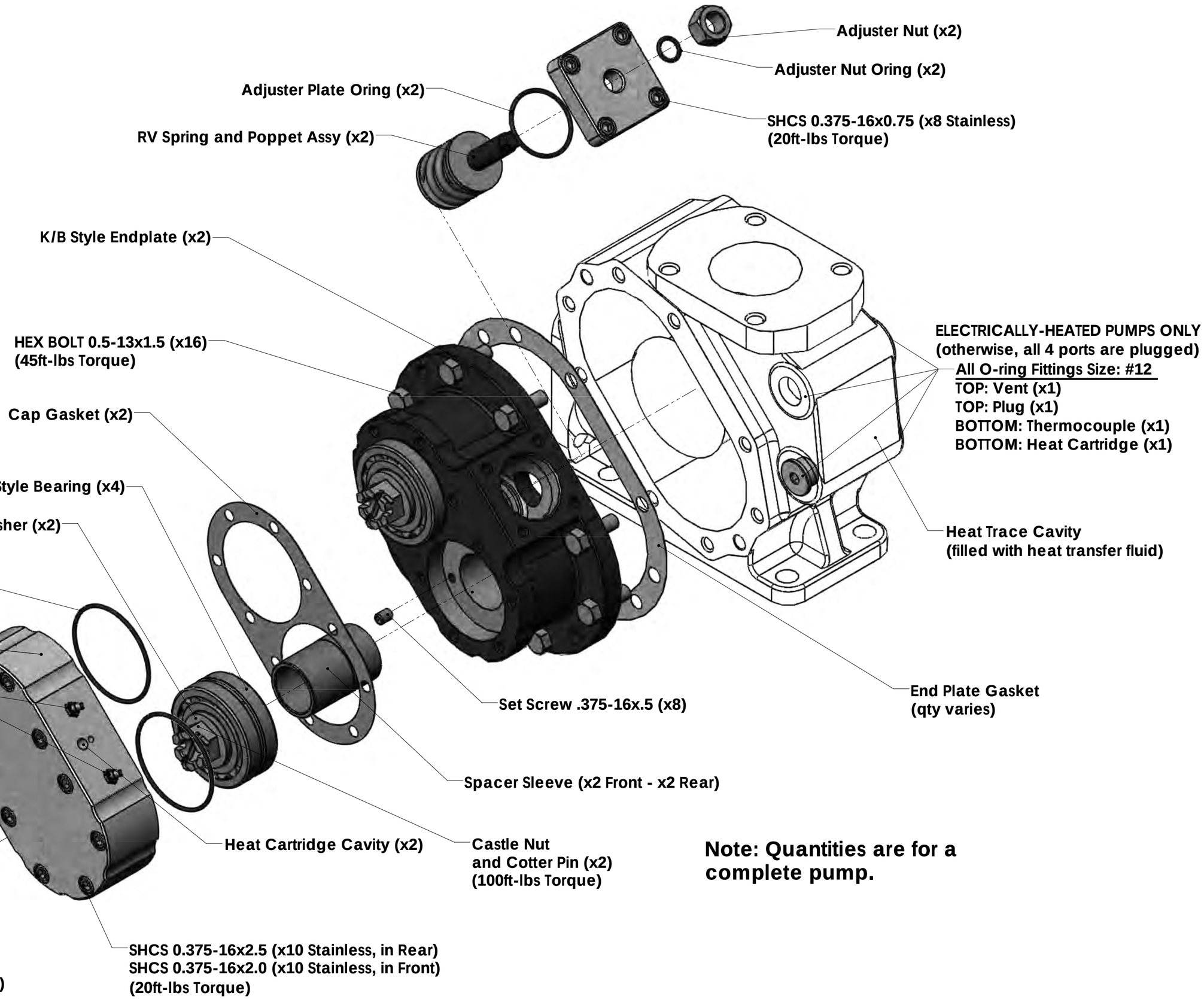
V Style Diagram



T Style Diagram

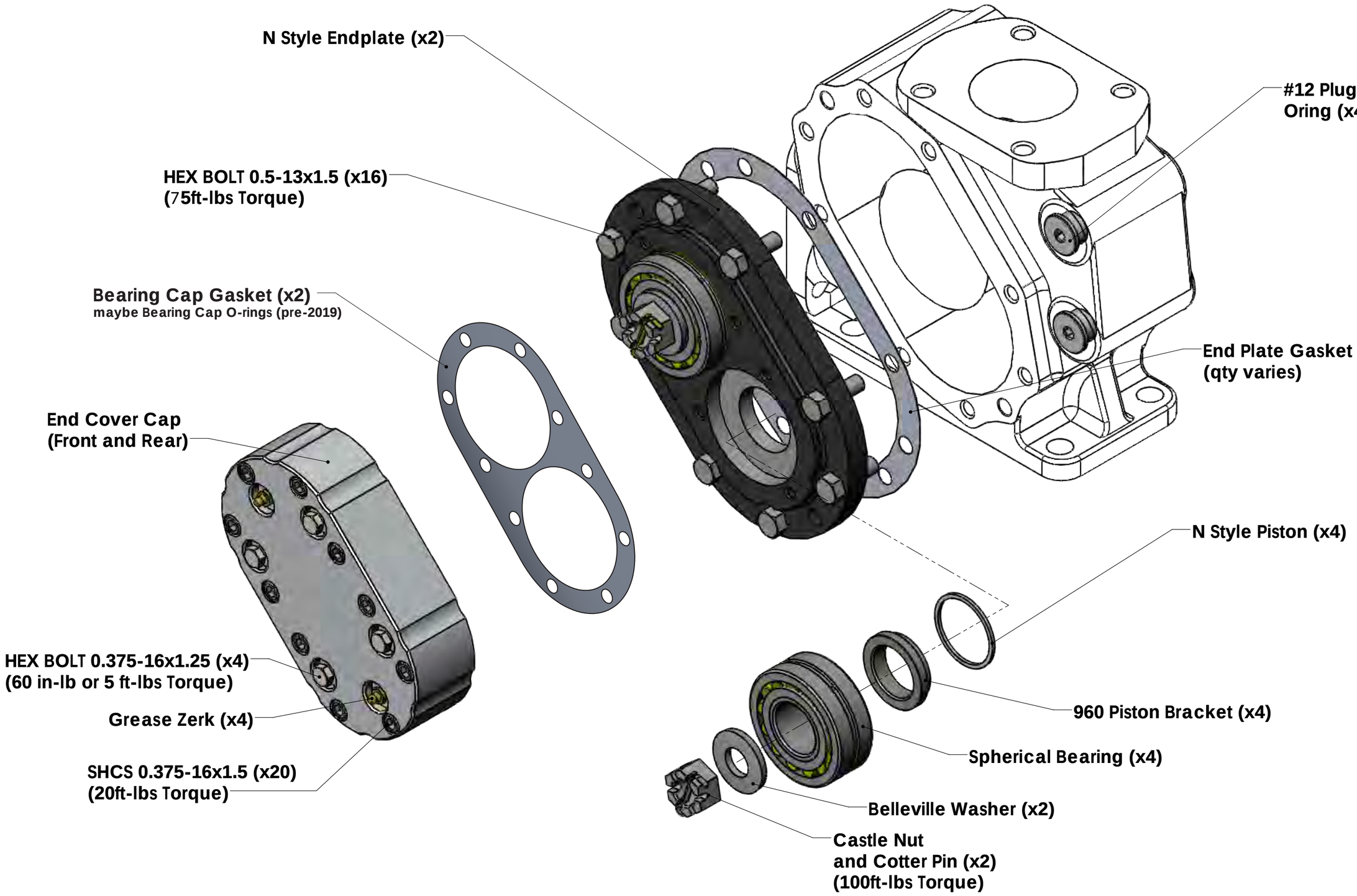


K Style Diagram

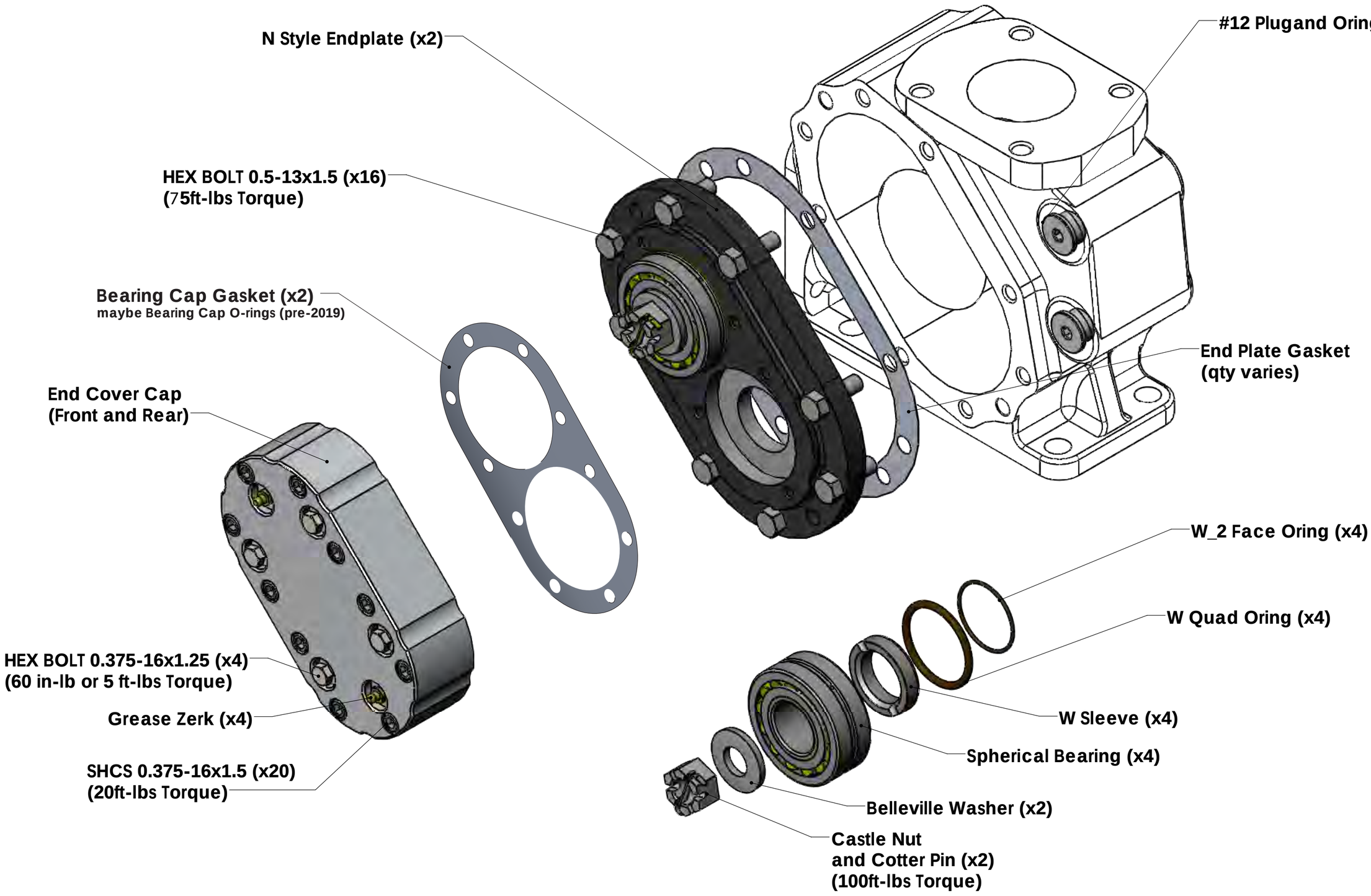


Note: Quantities are for a complete pump.

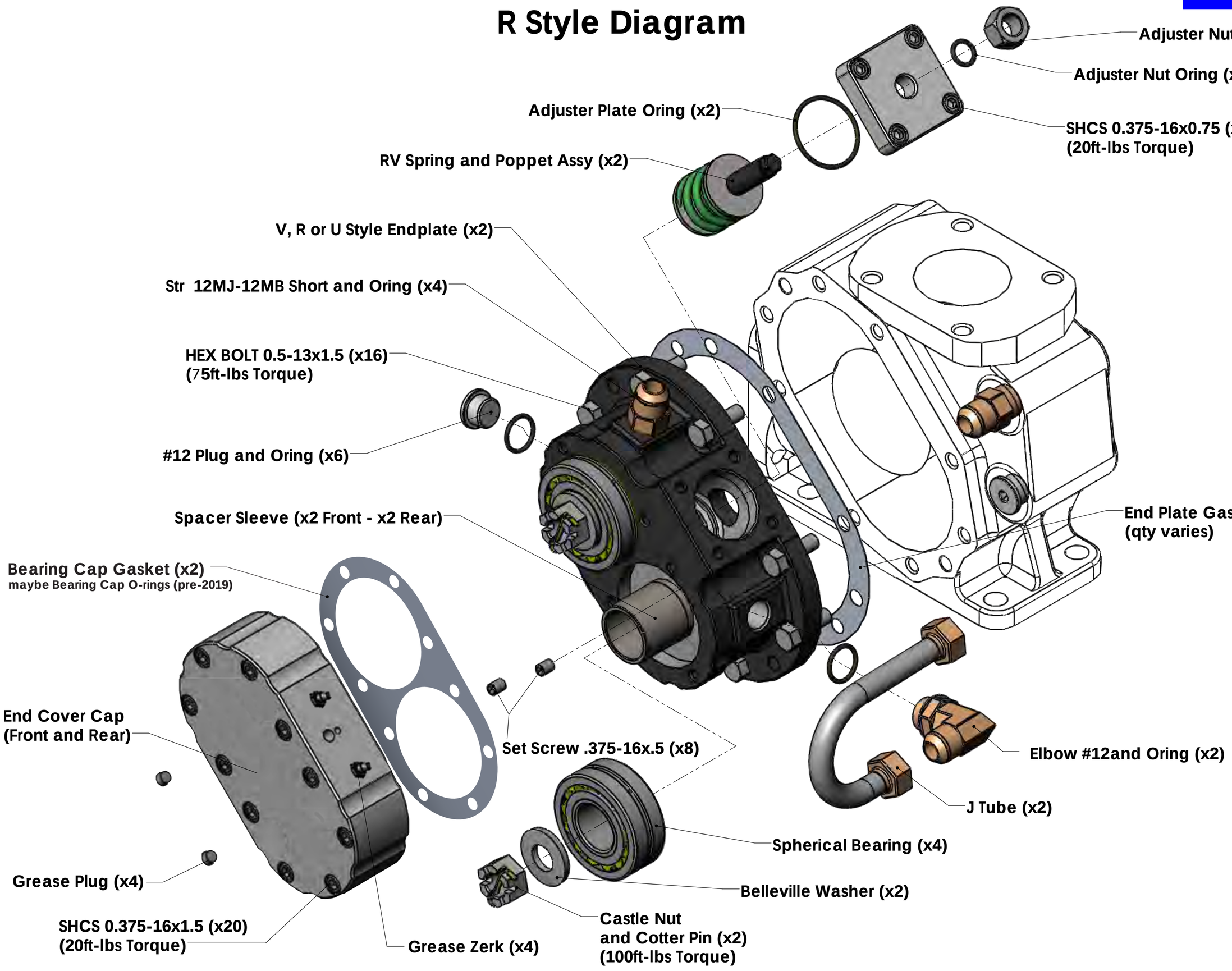
N Style Diagram



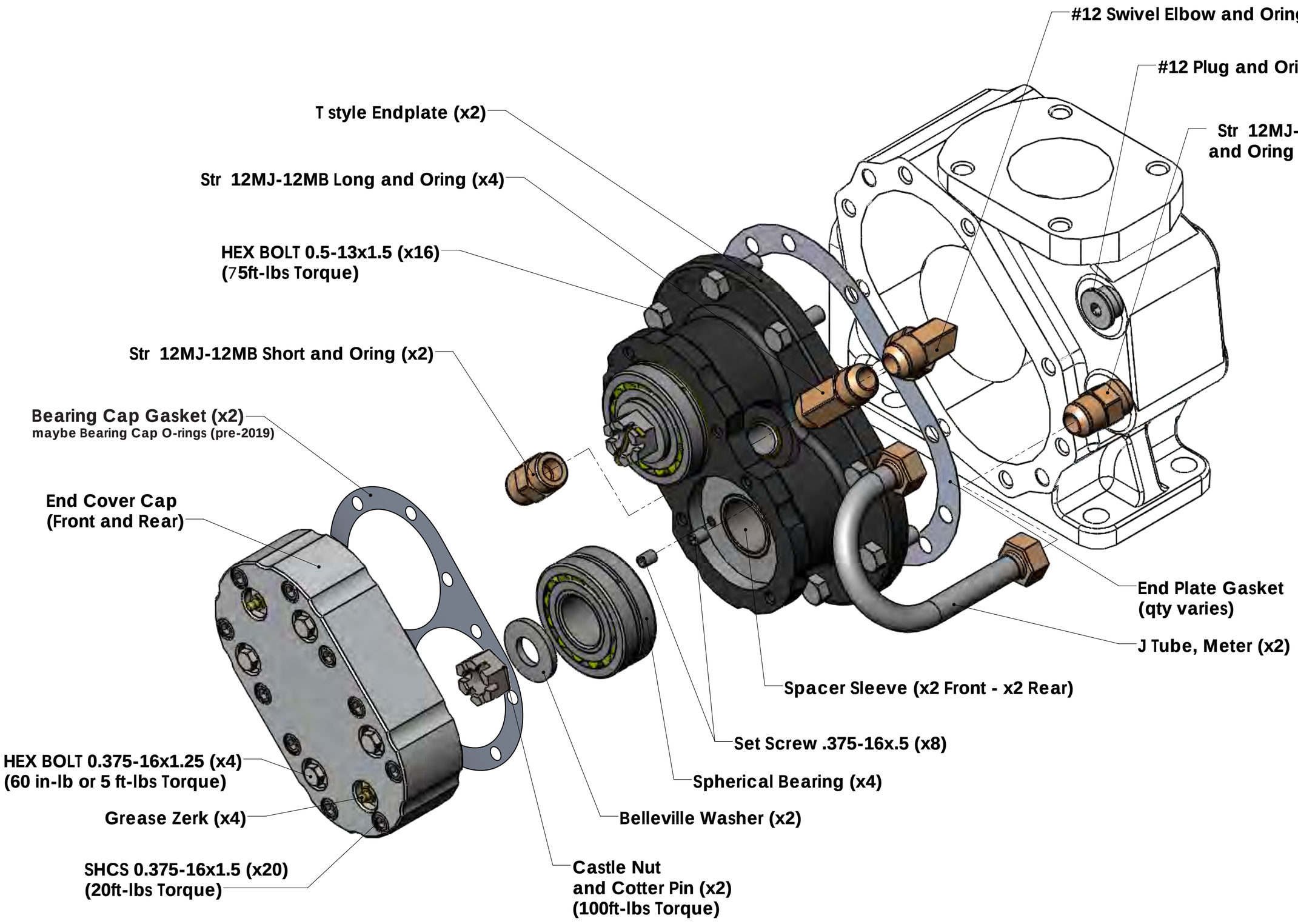
W Style Diagram



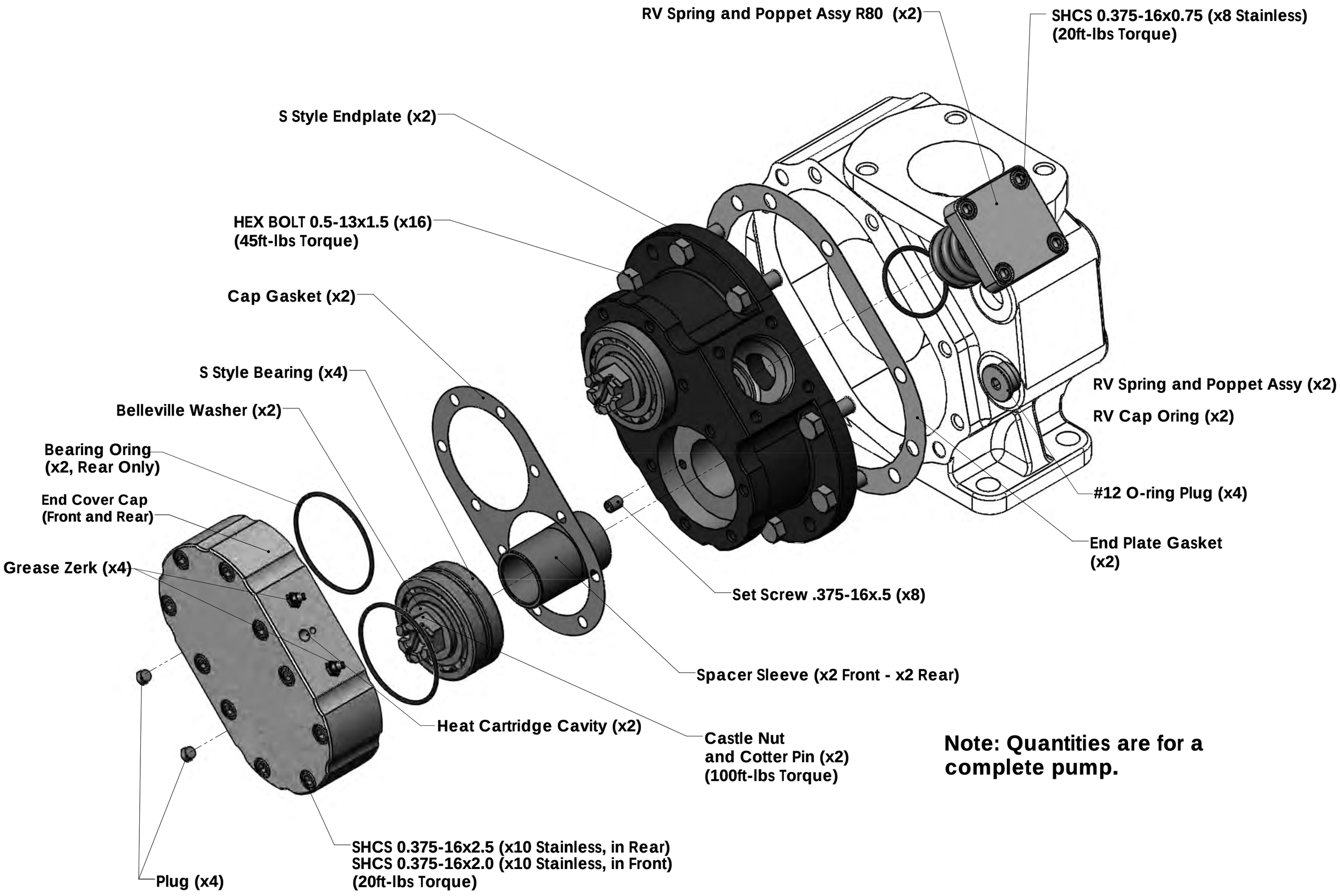
R Style Diagram



U Style Diagram

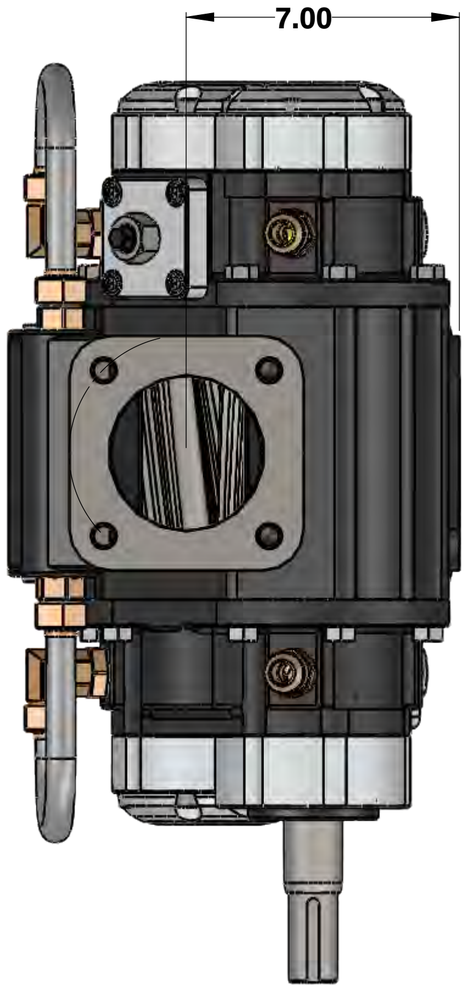


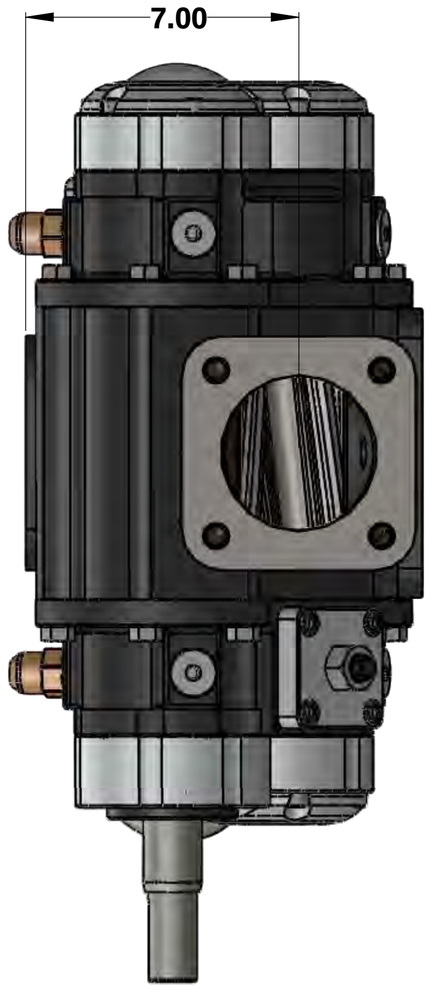
S Style Diagram

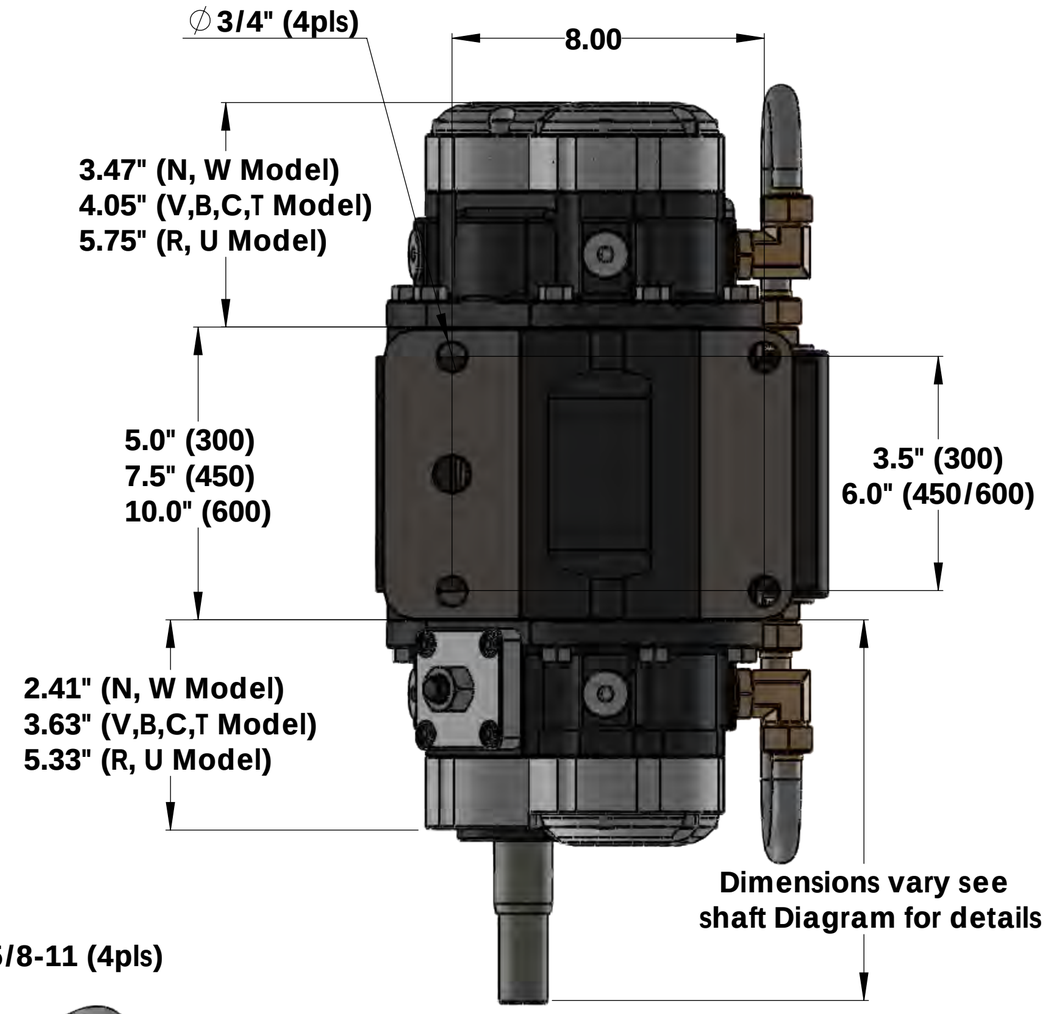


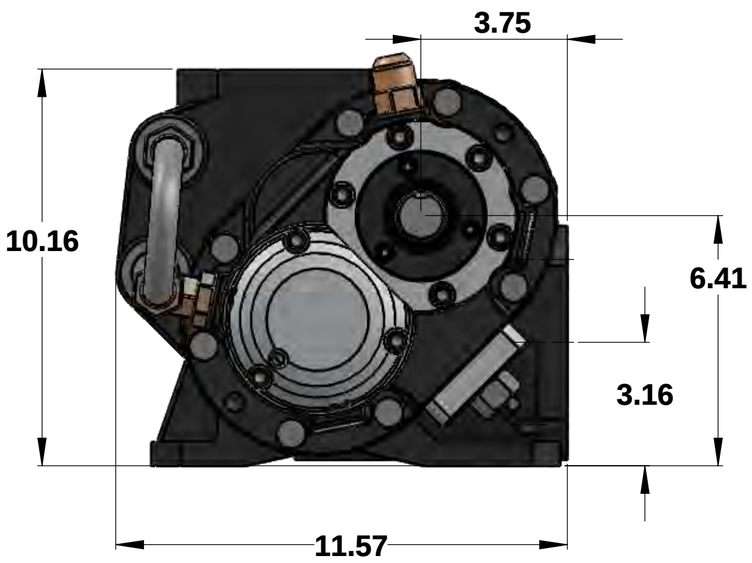
Note: Quantities are for a complete pump.

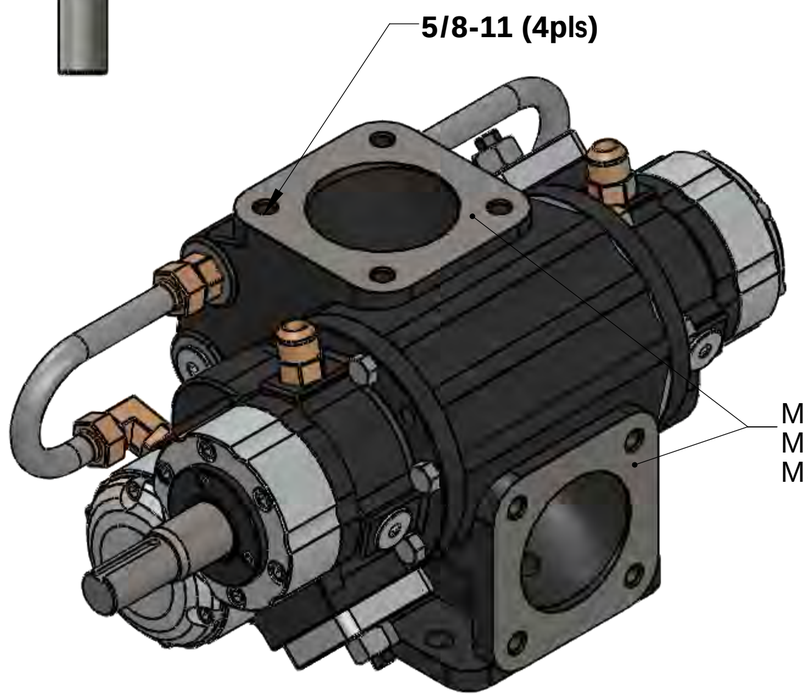
Basic Dimensions





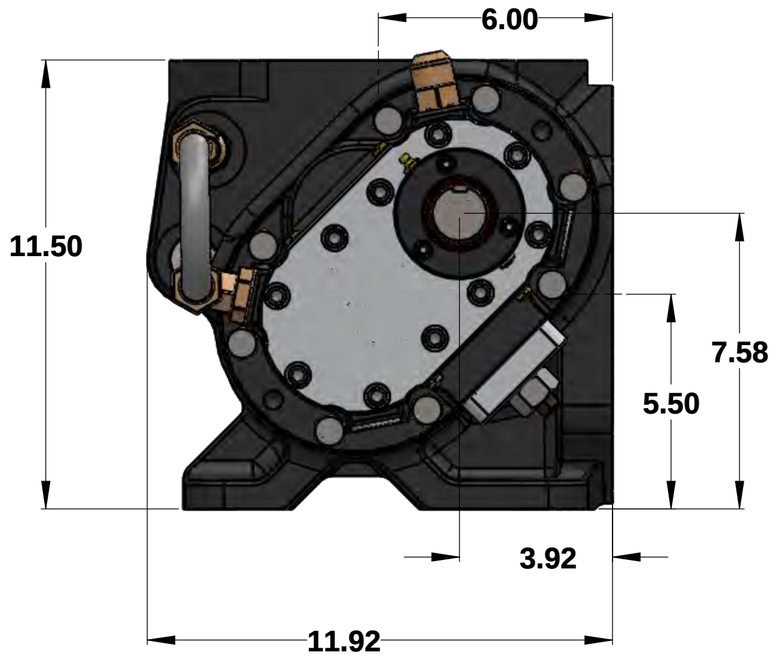


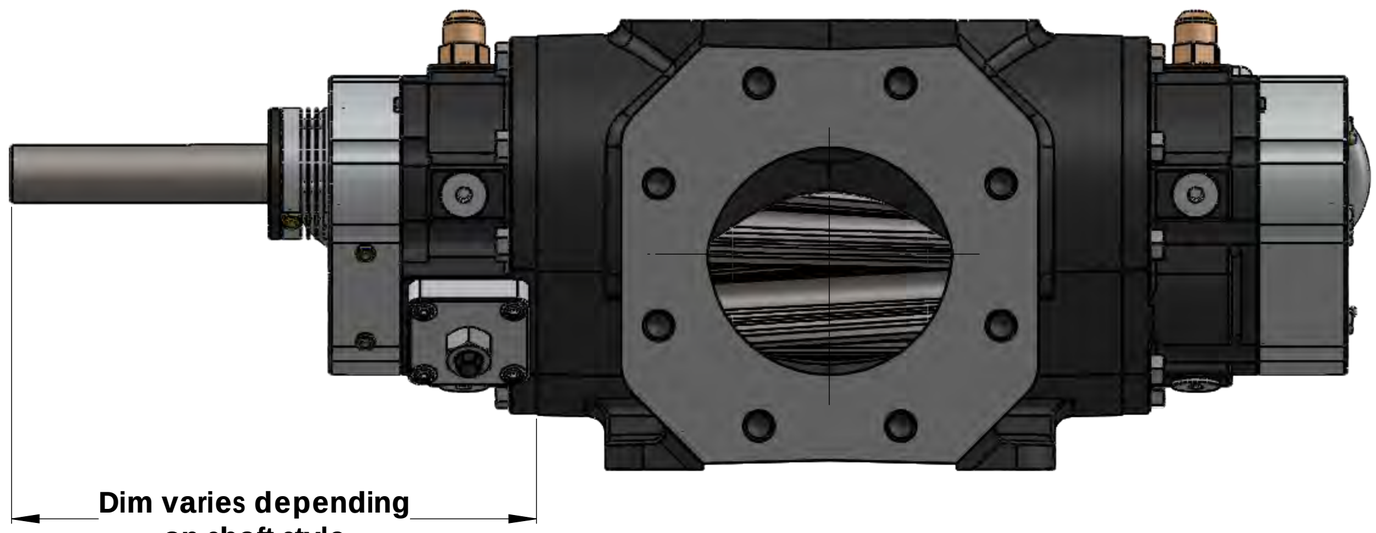


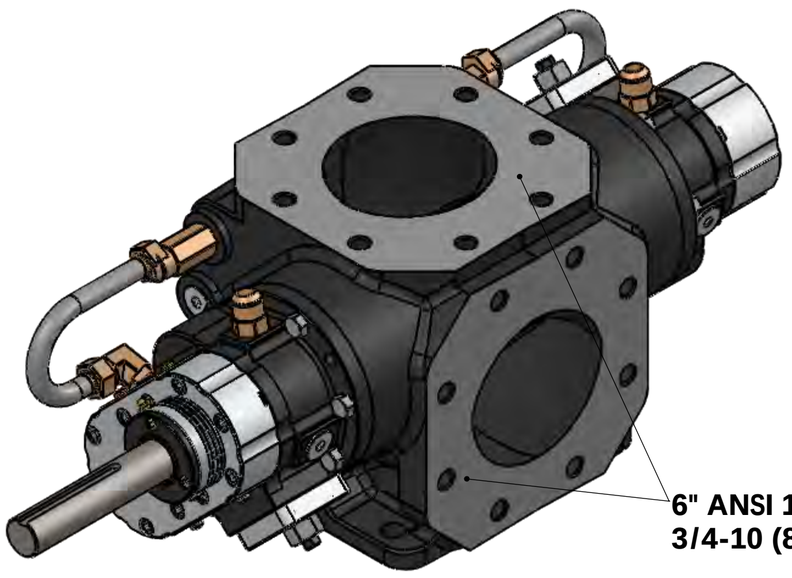


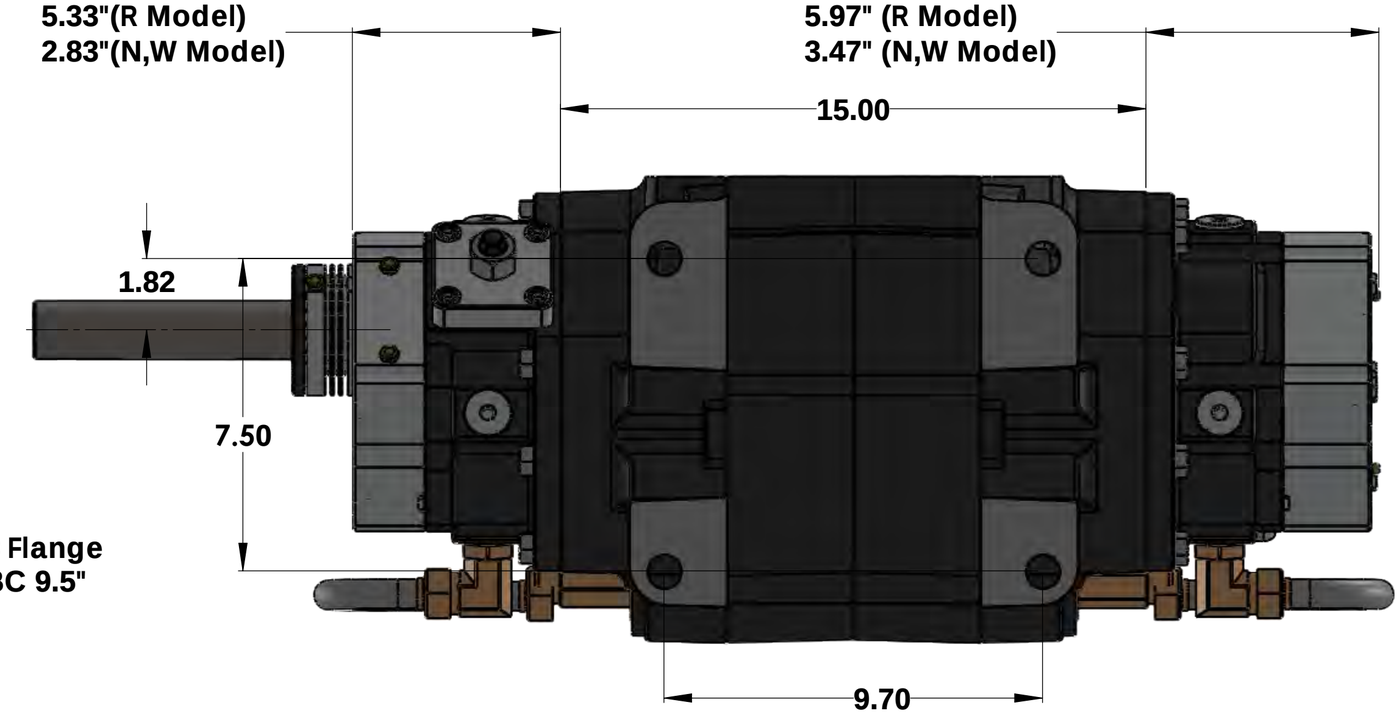
Model 300 - **2.5" ANSI** 150# Flange bolt circle
Model 450 - **3" ANSI** 150# Flange bolt circle
Model 600 - **3" ANSI** 150# Flange bolt circle

900 Basic Dimensions









Shaft Dimensions

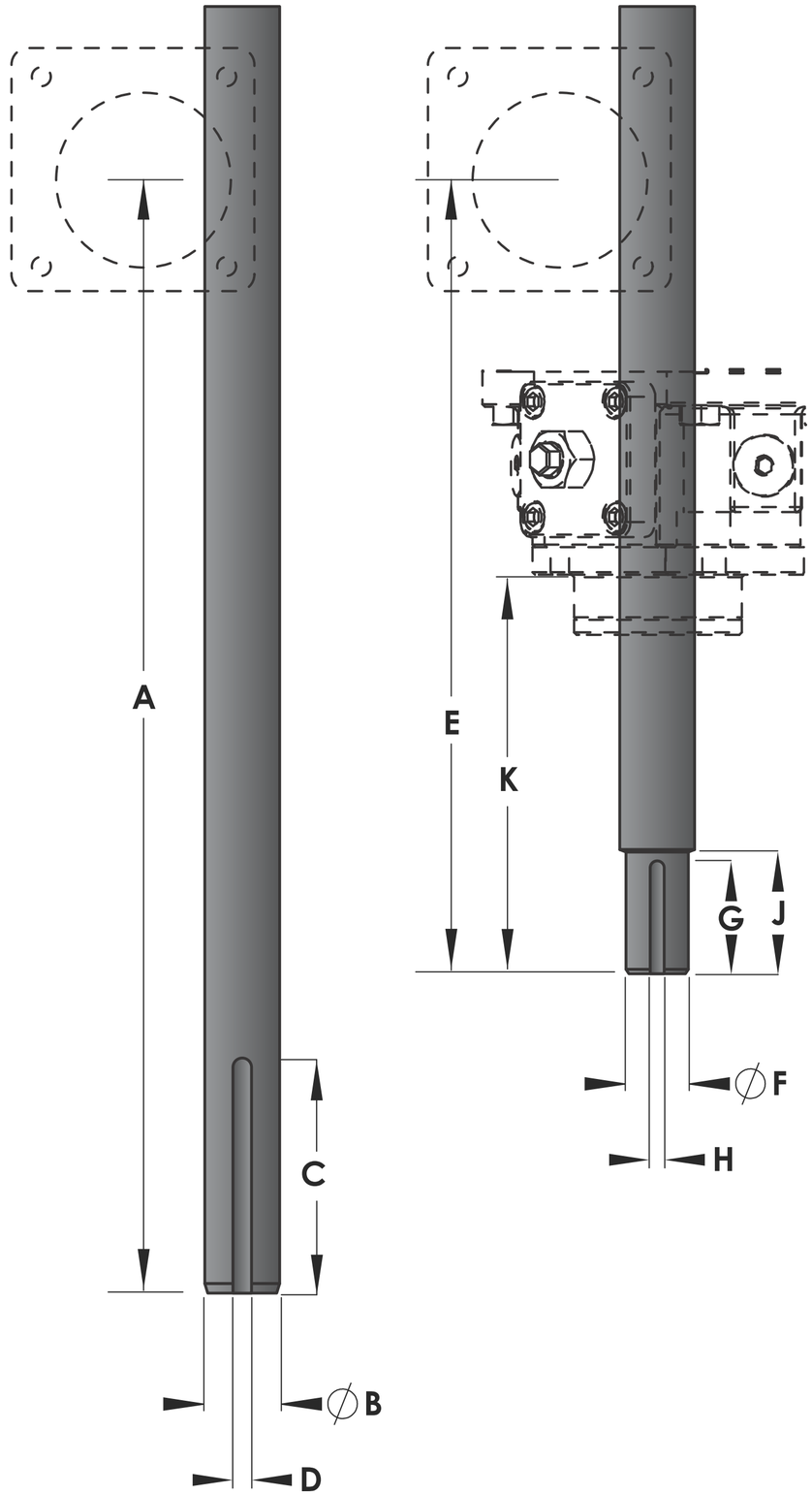
Bearing Pump Series (R, U, S, K, N)

Model	Shaft Type	Dimensions										
		A	B	C	D	E	F	G	H	J	K	SEALS
300	H					12.36	1.25	2	0.313	2.25	4.5	N,C
300	X	15.25	1.5	6.5	0.375							J,N,C
450	H					13.58	1.25	2	0.313	2.25	4.5	N,C
450	C	17.25	1.5	4.75	0.375							J,N,C
450	X	19	1.5	6.5	0.375							J,N,C
600	H					14.86	1.25	2	0.313	2.25	4.5	N,C
600	D	13.6	1.5	1.75	0.375							N
600	C	18.5	1.5	4.75	0.375							J,N,C
600	X	19.75	1.5	6.5	0.375							J,N,C
600	L	22	1.5	8.75	0.375							J,N,C
900	H					17.36	1.25	2	0.313	2.25	4.5	N,C
900	X	21.75	1.5	6.5	0.375							J,N,C

Bushing Pump Series (V, B, T, C)

OBSOLETE PUMPS
THIS LIST IS FOR REFERENCE ONLY

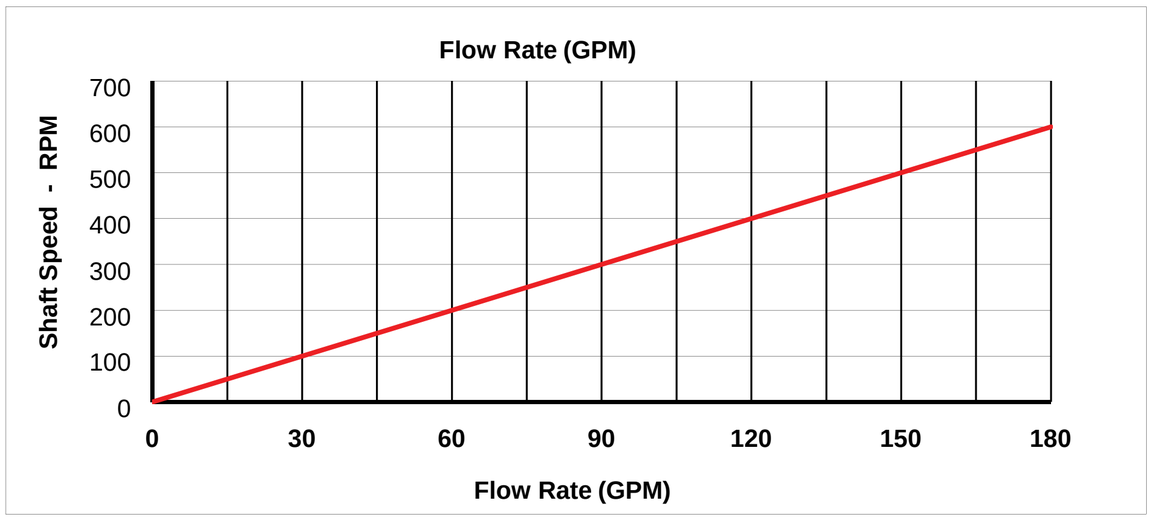
Model	Shaft Type	Dimensions										
		A	B	C	D	E	F	G	H	J	K	SEALS
300	H					9.43	1.25	2	0.313	2.25	4.5	J,N,C
300	S					12.25	1.25	2	0.25	2.25		J,N,C
300	X	15.25	1.5	5.25	0.375							J,N,C
450	H					11.93	1.25	2	0.313	2.25	4.5	J,N,C
450	S					13.6	1.25	2	0.25	2.25		J,N,C
450	X	18	1.5	6.25	0.375							J,N,C
600	H					13.18	1.25	2	0.25	2.25	4.5	J,N,C
600	S					13.6	1.25	2	0.25	2.25		J,N,C
600	X	18	1.5	6.25	0.375							J,N,C

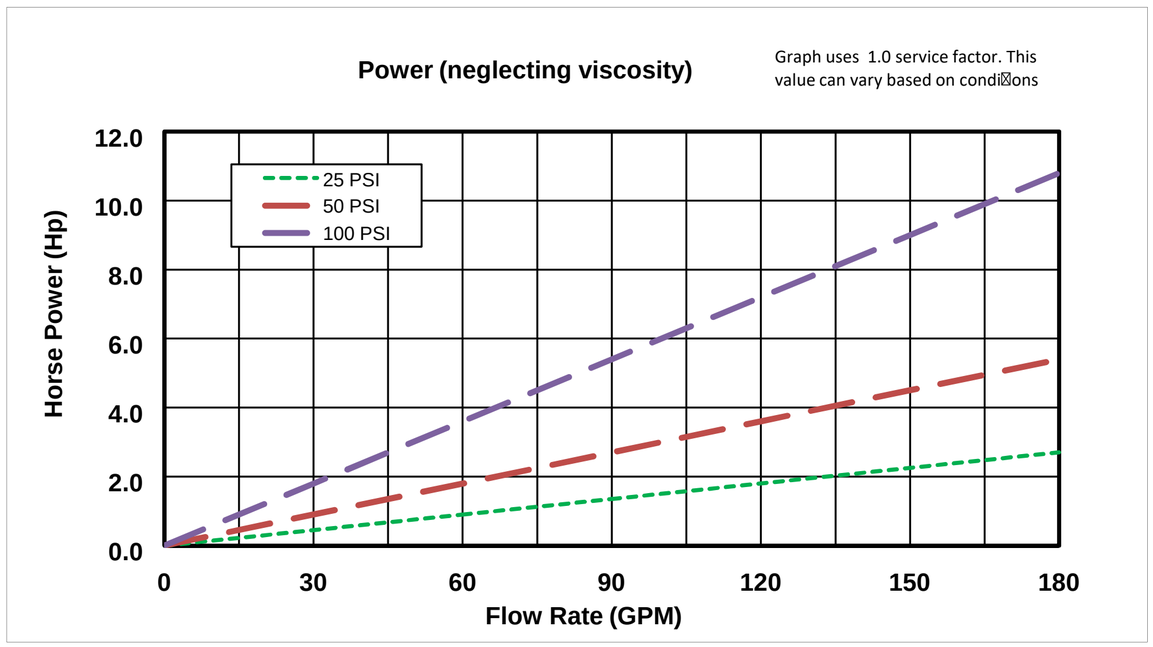


Performance Curves

300

Pump Disp	**300**
Max RPM	600
Max GPM	180
Port Size	2.5in ANSI 150# Flange



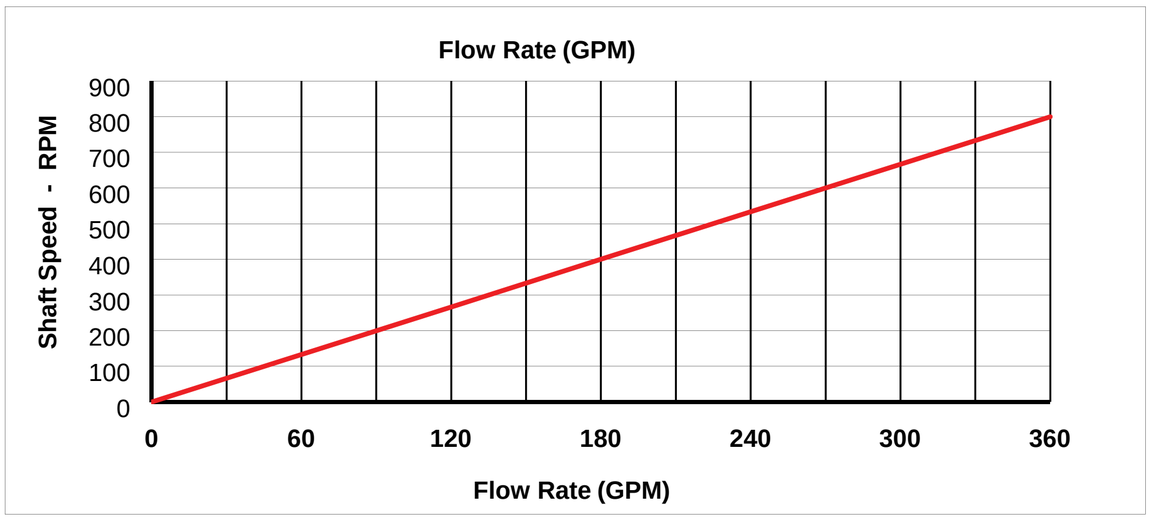


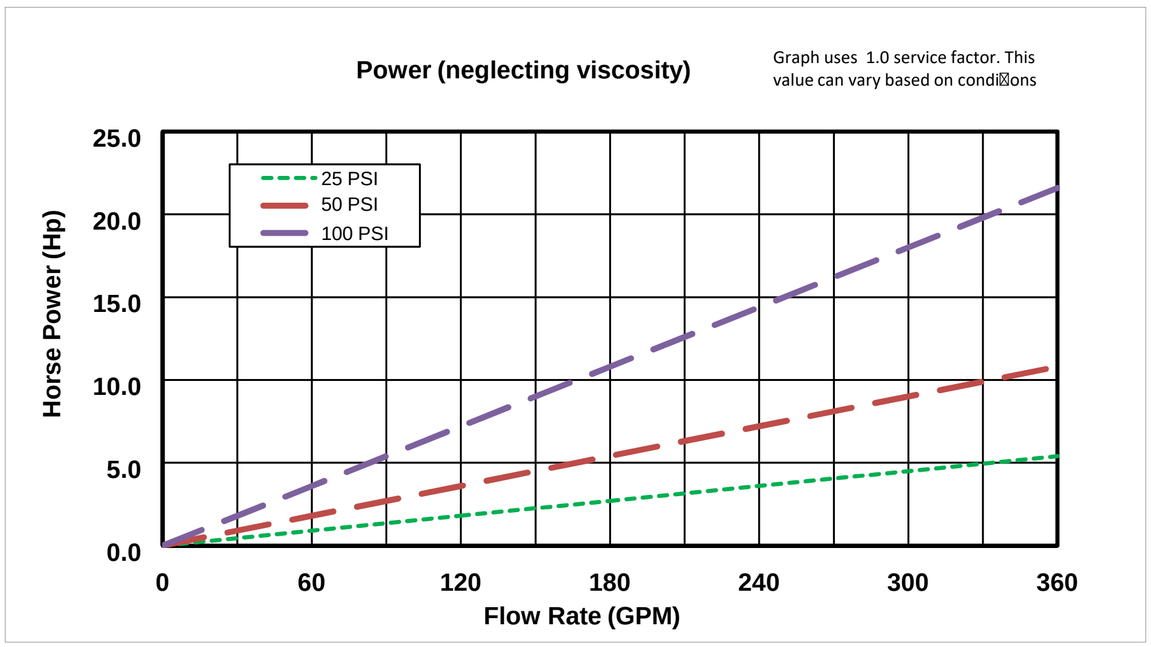
450

Pump Disp	**450**
Max RPM	800
Max GPM	360
Port Size	4in Pump Flange*

*Bolt circle on flange is ANSI 3in 150#

*Port adapters available for 4in ANSI 150#, 8-bolt





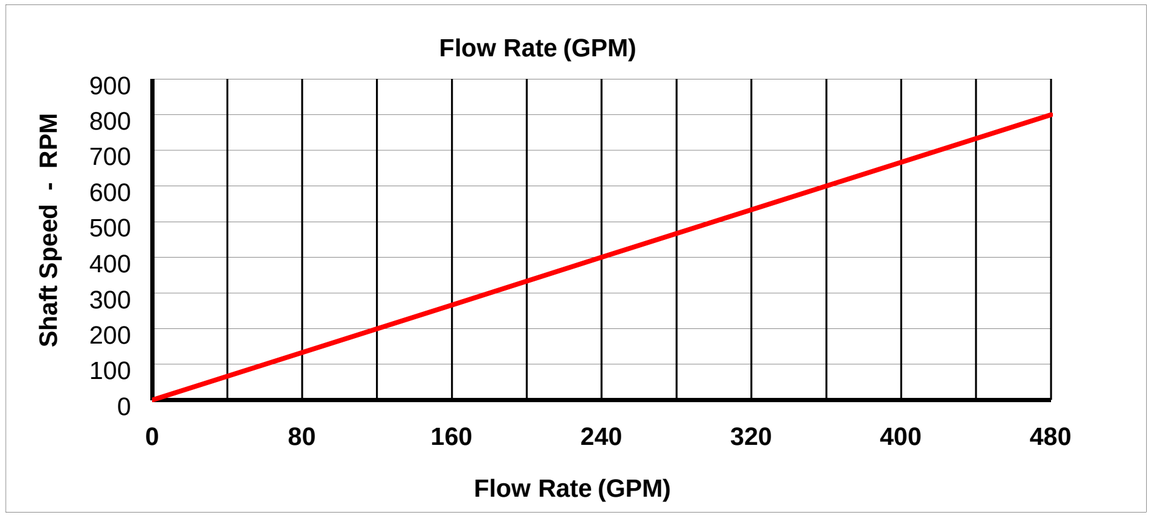
Performance Curves

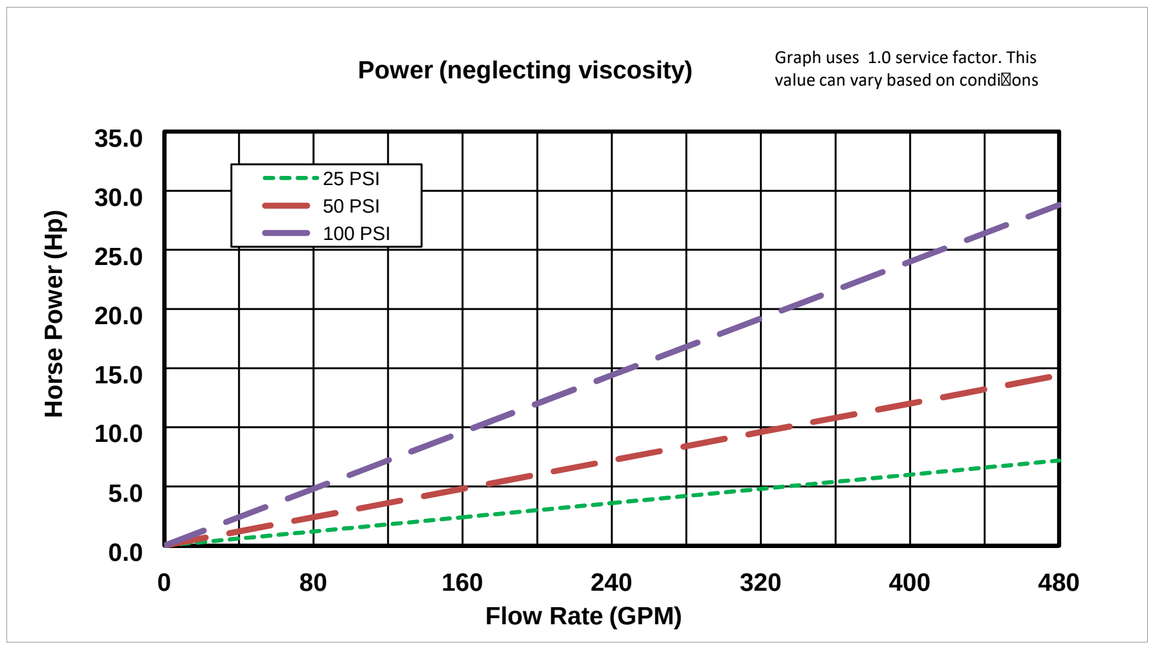
600

Pump Disp	**600**
Max RPM	800
Max GPM	480
Port Size	4in Pump Flange*

*Bolt circle on flange is ANSI 3in 150#

*Port adapters available for 4in ANSI 150#, 8-bolt

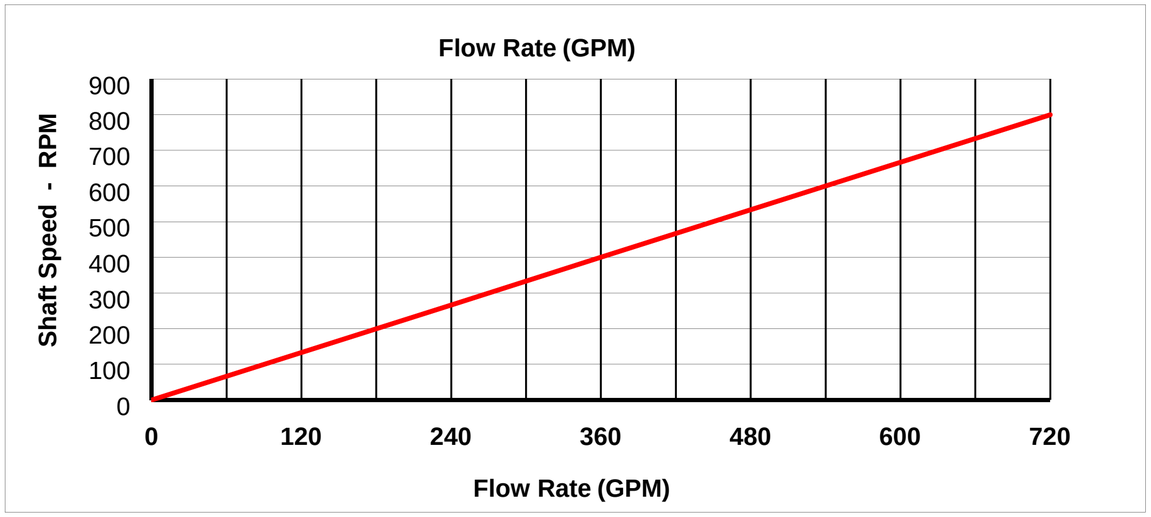


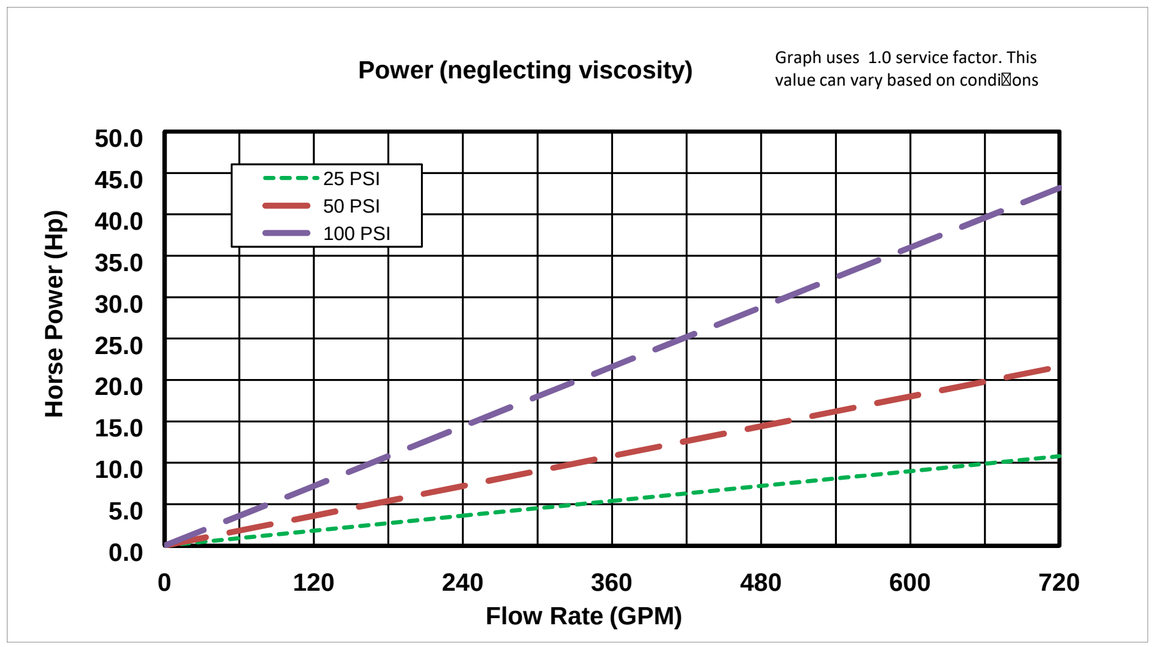


900

Pump Disp	**900**
Max RPM	800
Max GPM	720
Port Size	6" Pump Flange*

*Bolt circle on flange is ANSI 6in 150#

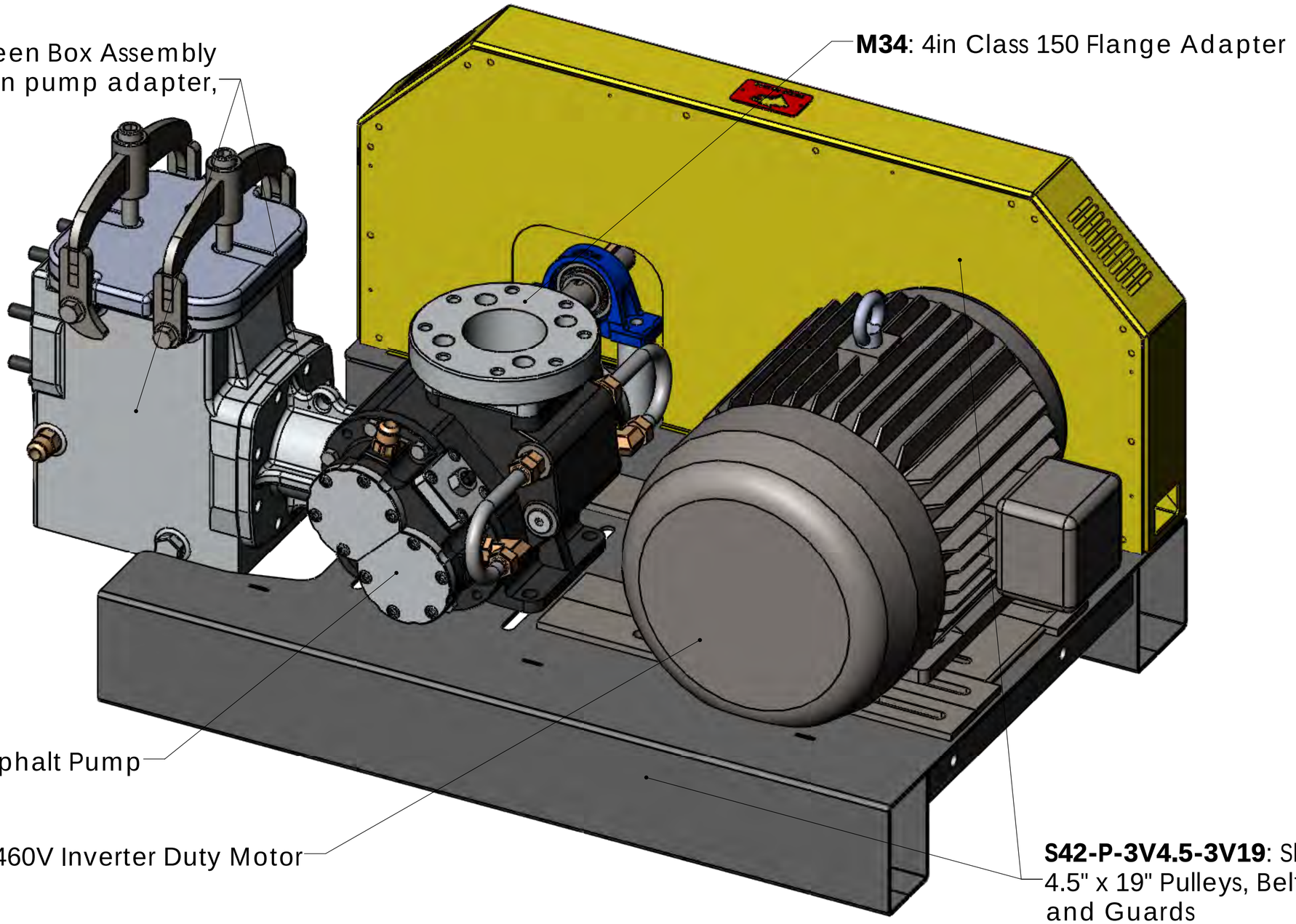




4in Asphalt Unloading Skid

4in Asphalt Unloading Skid with Screen Box

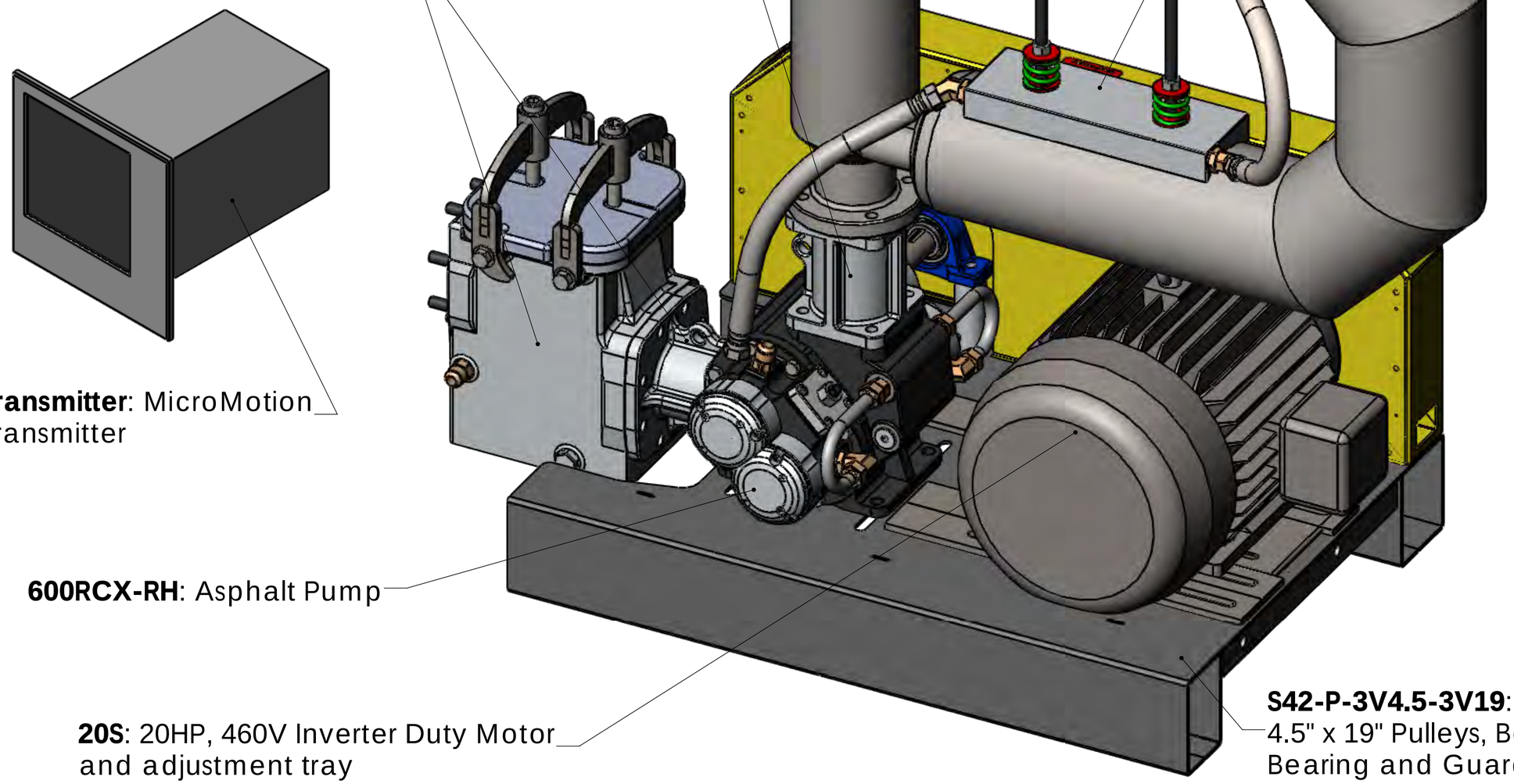
Below is an example of a skid for unloading apshalt tankers. Model numbers for ordering shown in **bold text**.



3in Micro Motion Metering Skid

3in Micro Motion Meter Skid

Below is an example of a Metering Skid for Rubberized Asphalt. Model numbers for ordering shown in **bold text**.



CMF300M: MicroMotion CMF300M, with extended core processor (4-wire)

CMF300-H: Heat Block kit for 300 Series Micro Motion

C3030: 3in Pump to Meter Port Adapter

SC4-C-43-30: Screen Box Assembly, with coarse screen pump adapter and jumper hose

3500 Transmitter: MicroMotion 3500 Transmitter

600RCX-RH: Asphalt Pump

20S: 20HP, 460V Inverter Duty Motor and adjustment tray

S42-P-3V4.5-3V19: Skid, with 4.5" x 19" Pulleys, Belts, Bearing and Guards

4in Gear Metering Assembly

4in Gear Metering Assembly

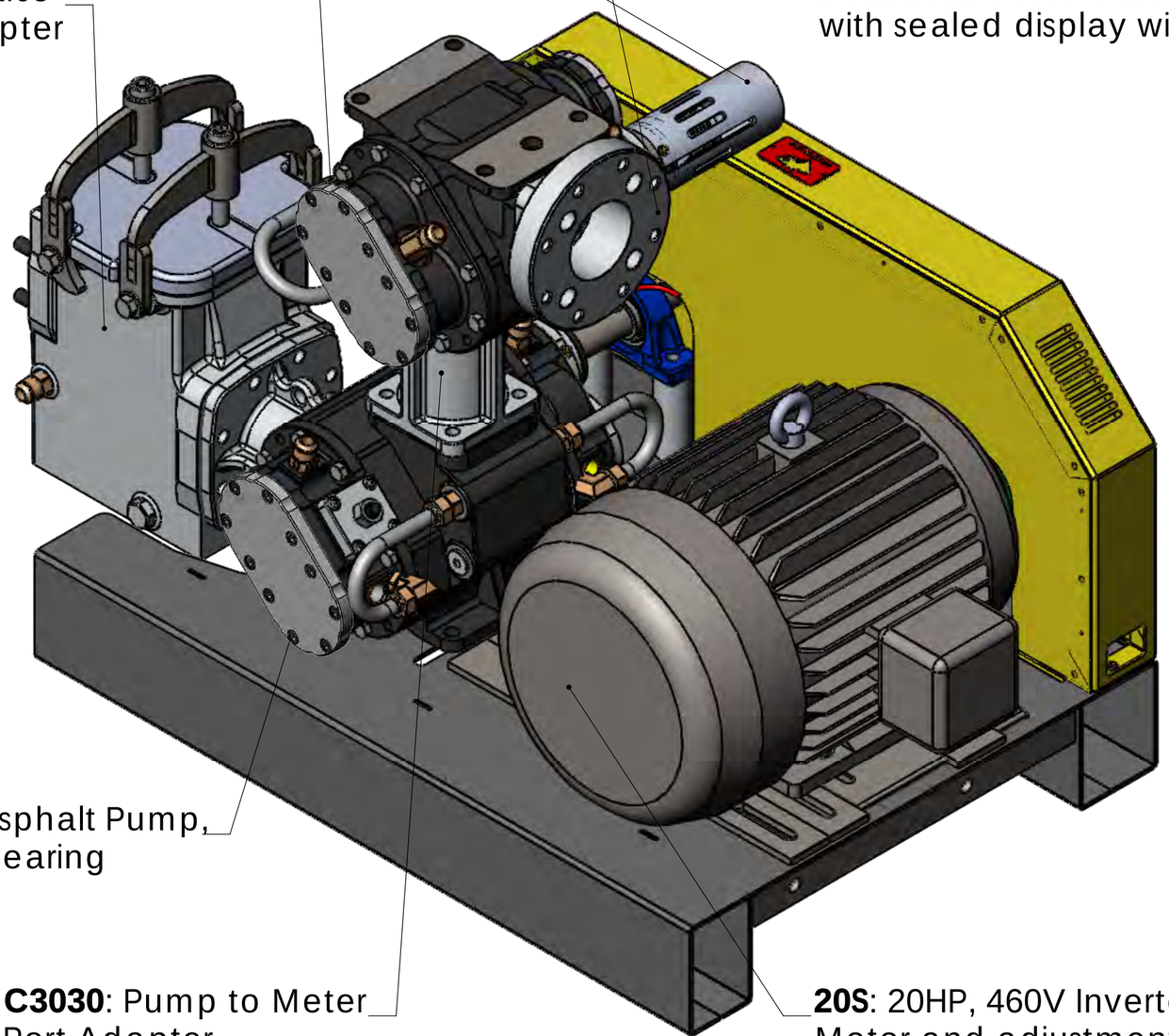
Below is an example of a 4in Gear Meter System for Asphalt. Model numbers for ordering shown in **bold text**.

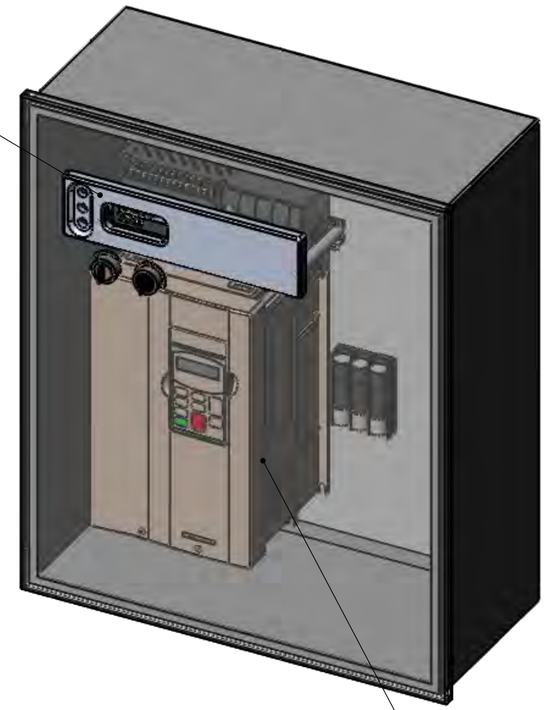
450TNH-RH-EA: Asphalt Gear Meter, with Encoder Coupler and Guard option

M34: 4in Class 150 Flange Adapter

SC4-C-43-30: Screen Box Assembly, with coarse screen, pump adapter and jumper hose

BCM-PNL: Control Monitor PLC, with sealed display window





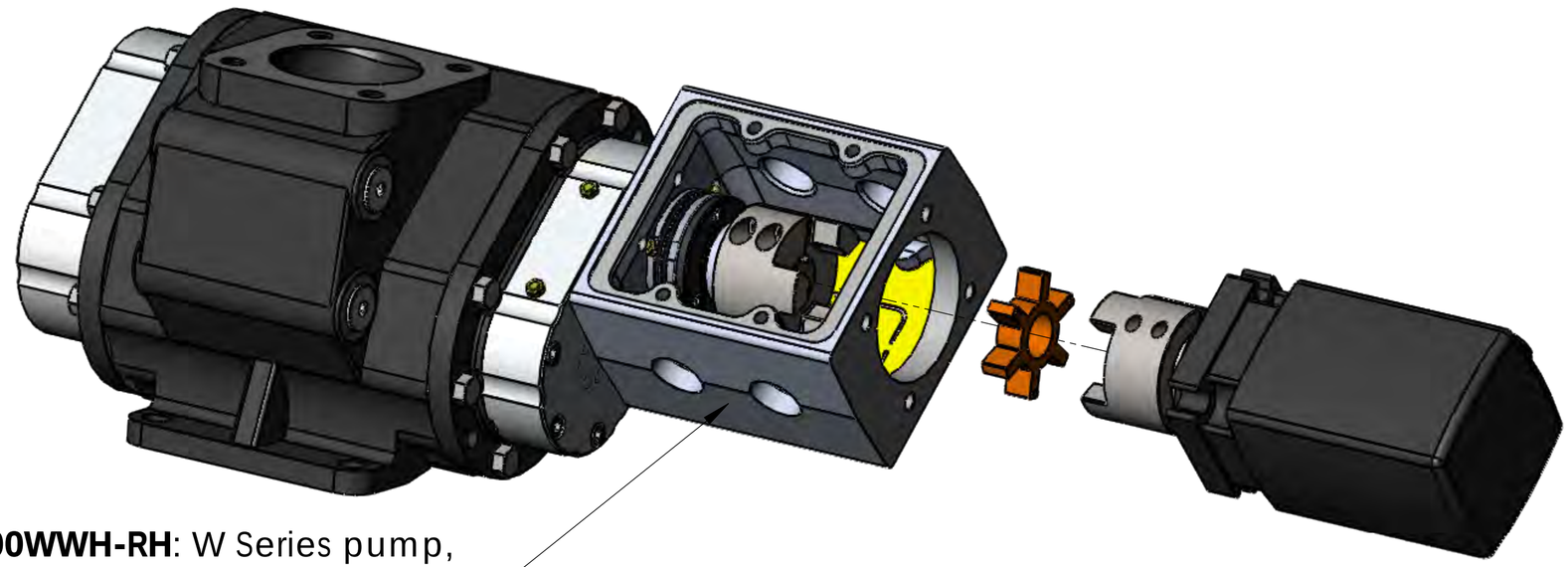
BCP204: 20HP, 460V VFD and Panel includes; NEMA 12,13, ANSI 61, Hinged Door Enclosure, External Controls and fuse block.

600VCX-RH-AA-PB: Asphalt Pump, with Pillowblock Bearing

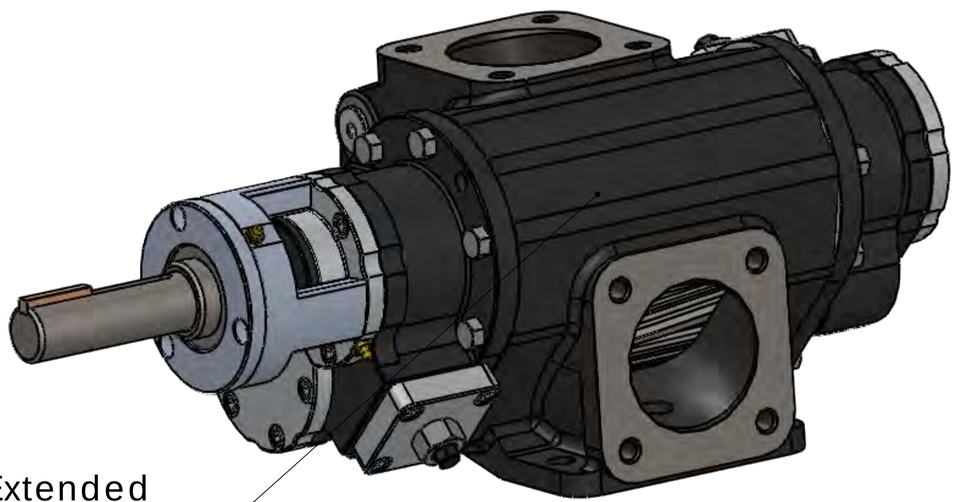
C3030: Pump to Meter Port Adapter

20S: 20HP, 460V Inverter Duty Motor and adjustment tray

Truck Pumps



600WWH-RH: W Series pump, with Hydraulic Motor and Split Clamp Coupler.



600BMX-RH-OB: B Series pump Extended Shaft and Outboard Bearing. Good choice for crude hauler truck, with PTO drive.