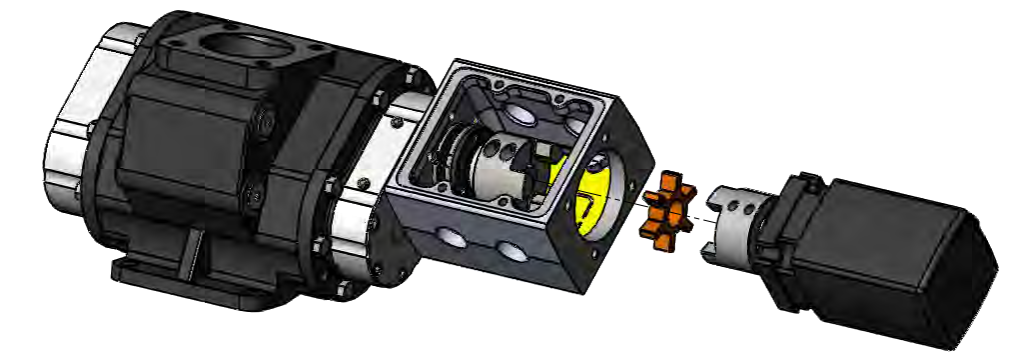


BearCat Pumps

300,450,600 and 900 Pump and Gear Meter Manual



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Example Systems & Misc:

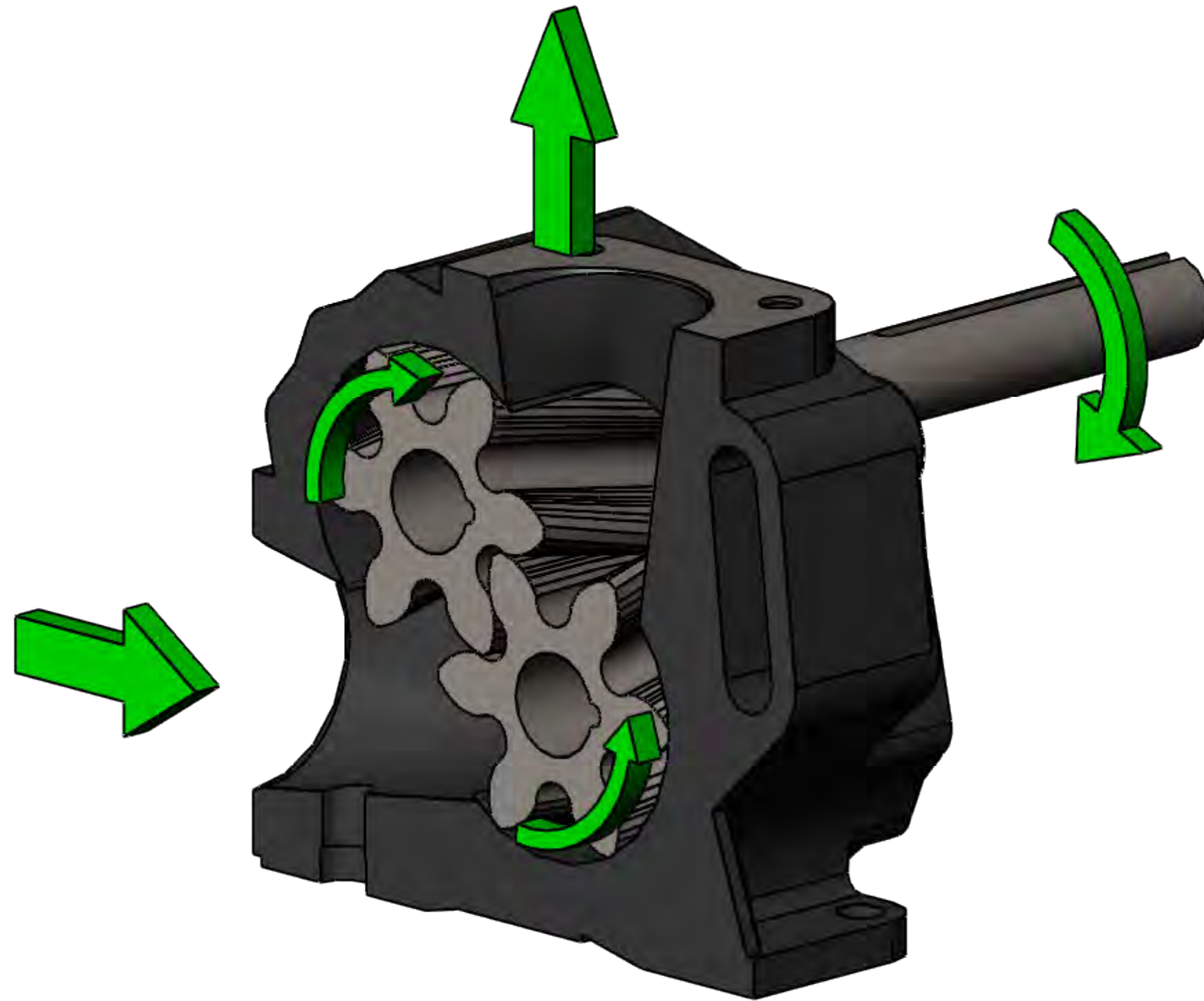
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General Safety Precautions

- 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 attire 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.

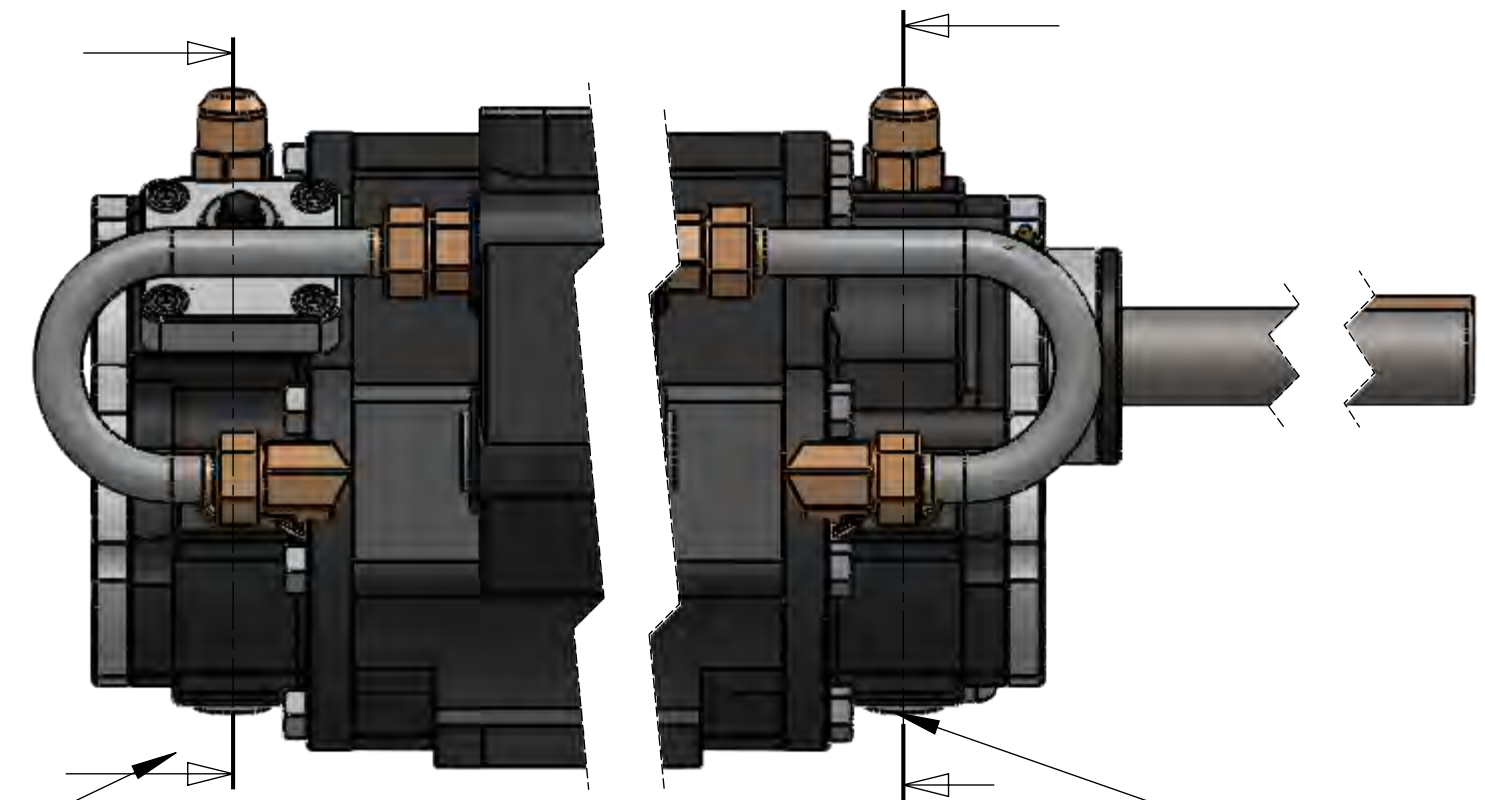
Re-Torque Bolts

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.

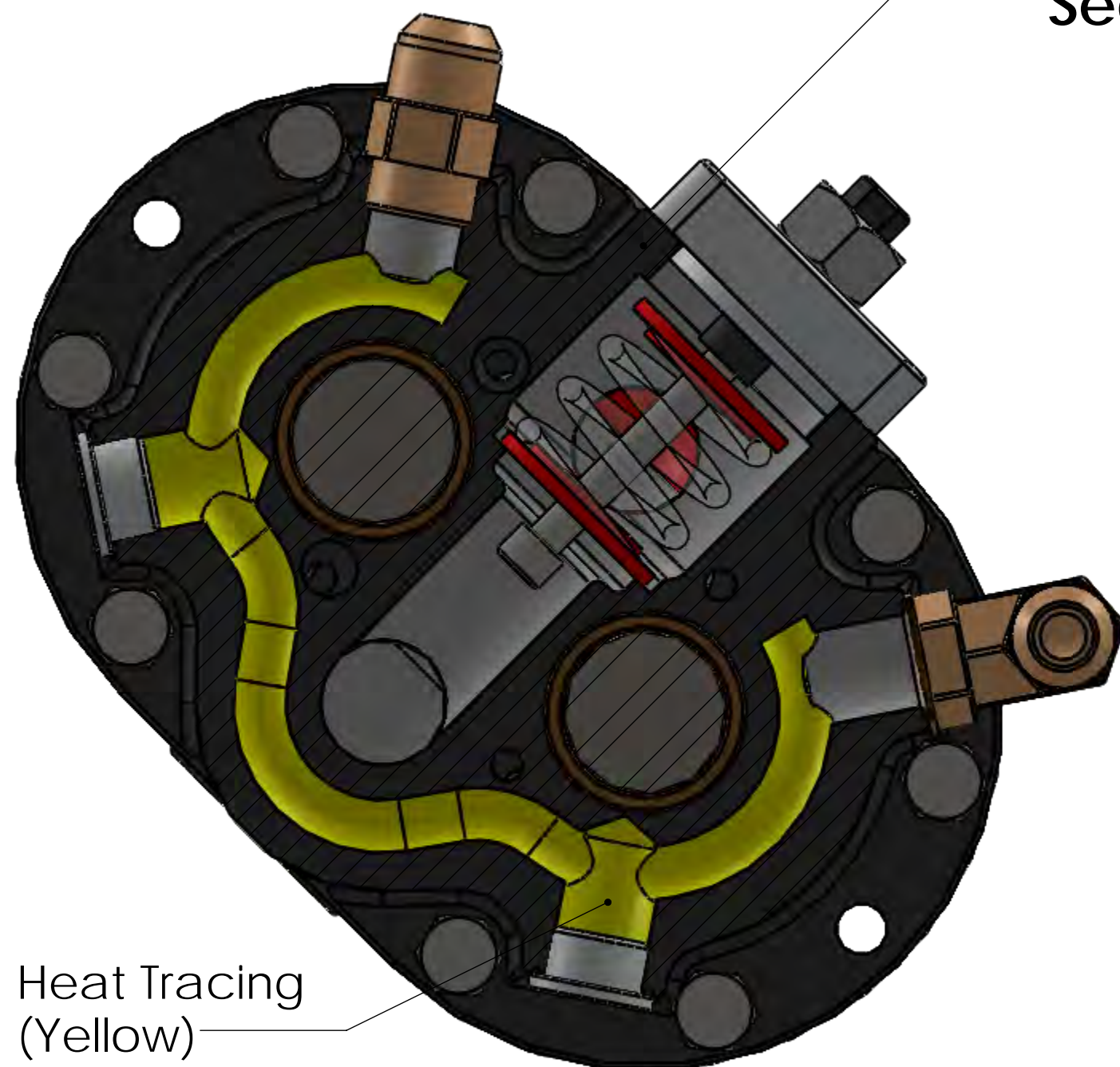


Rear Valve Section

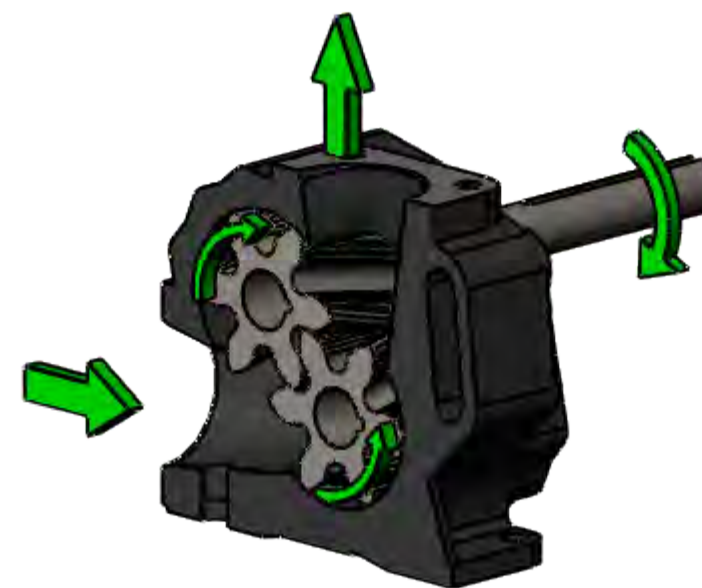
Front Valve Section

Relief Valve Poppet and Spring

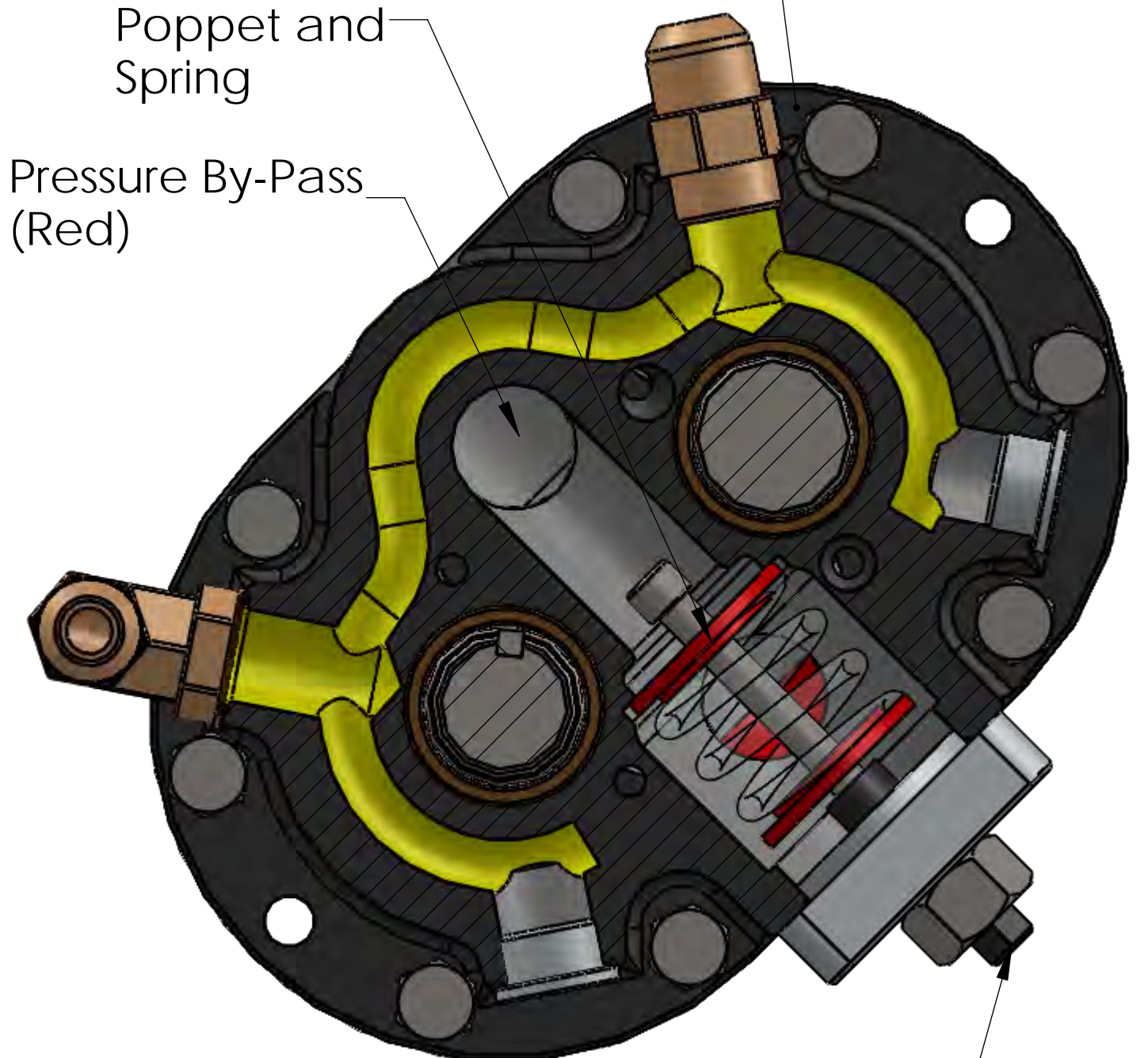
Pressure By-Pass (Red)



Heat Tracing (Yellow)



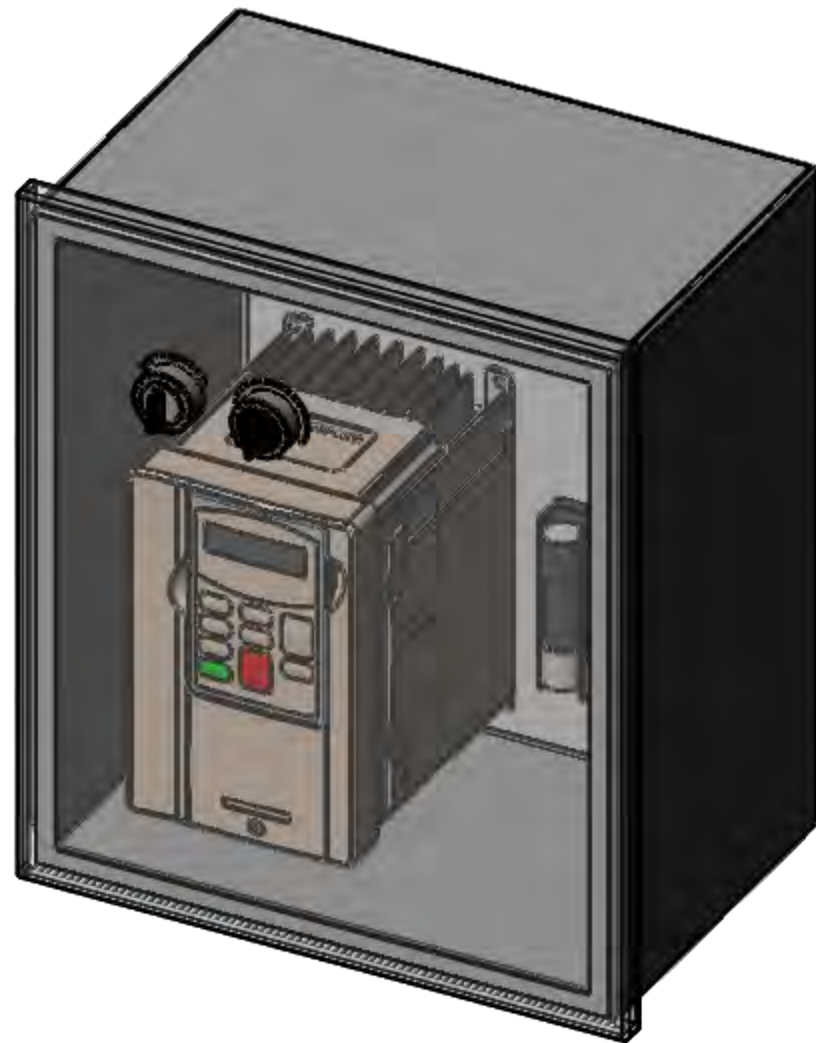
If the pump is turning as shown view above, the Front valve is controlling pressure. The rear valve can not open in this condition, as the fluid pressure is pushing against it.



Adjuster Bolt

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

Flow Speed Control

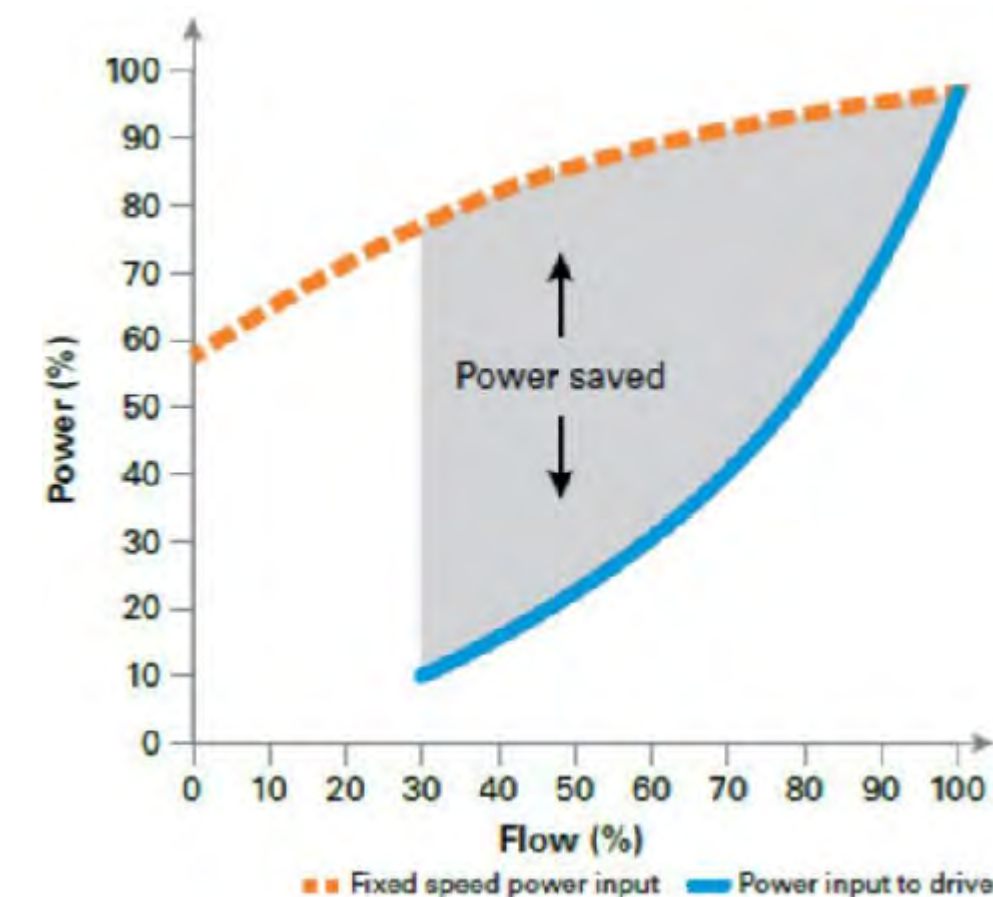


Flow Speed Control:

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.

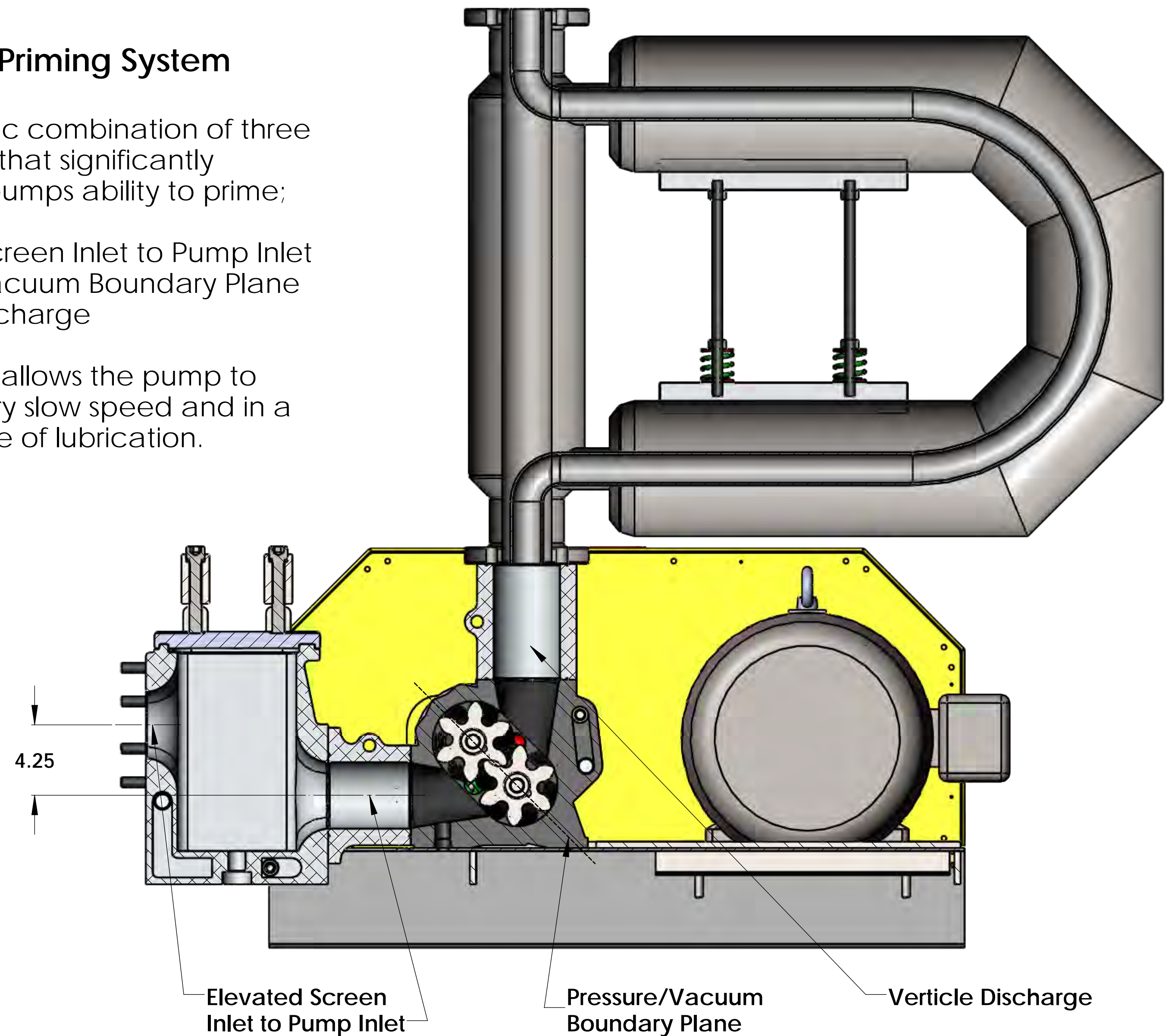
Liquid Lock Priming Diagram

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

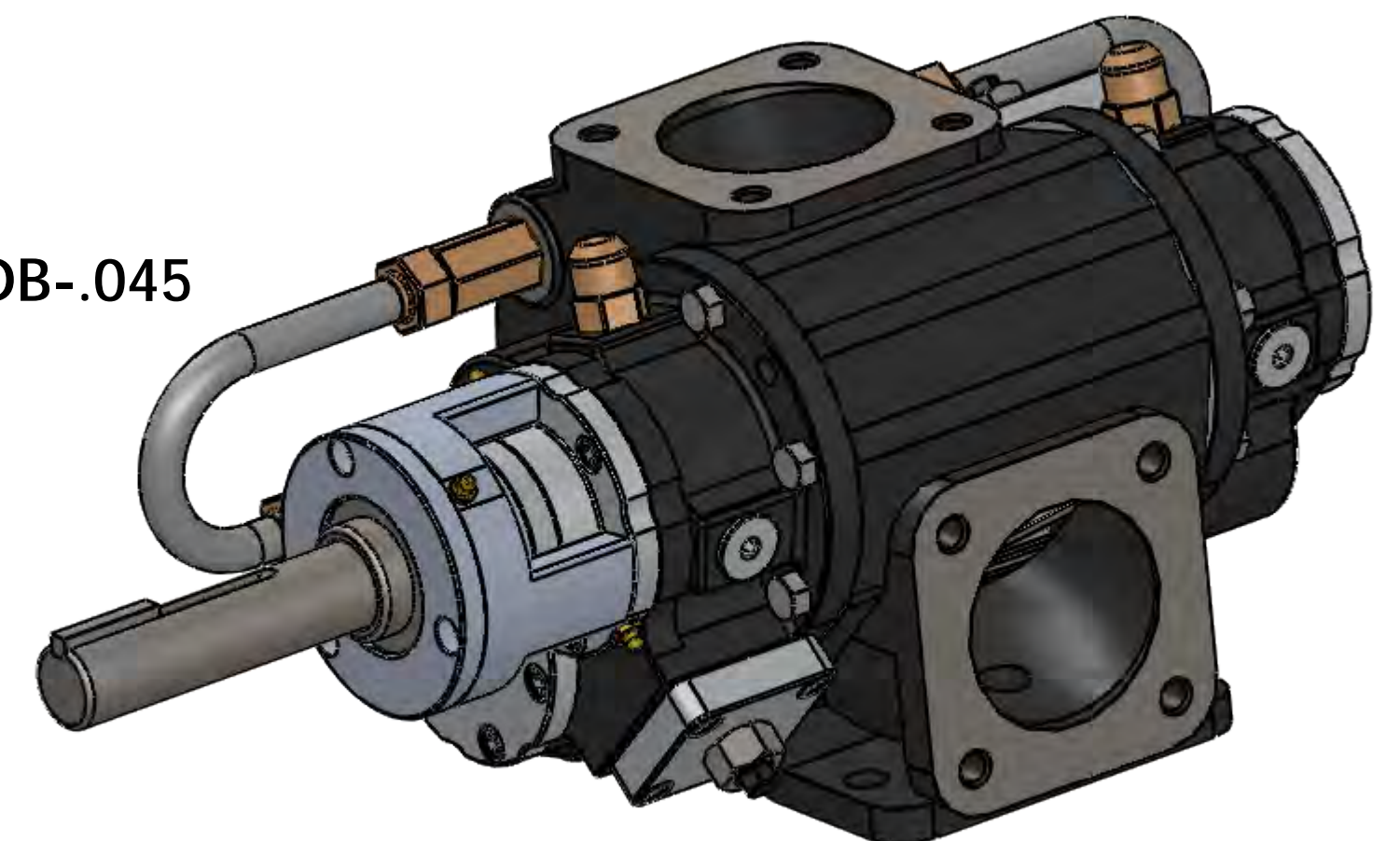
Side Outlet Relief

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

Top Outlet Relief

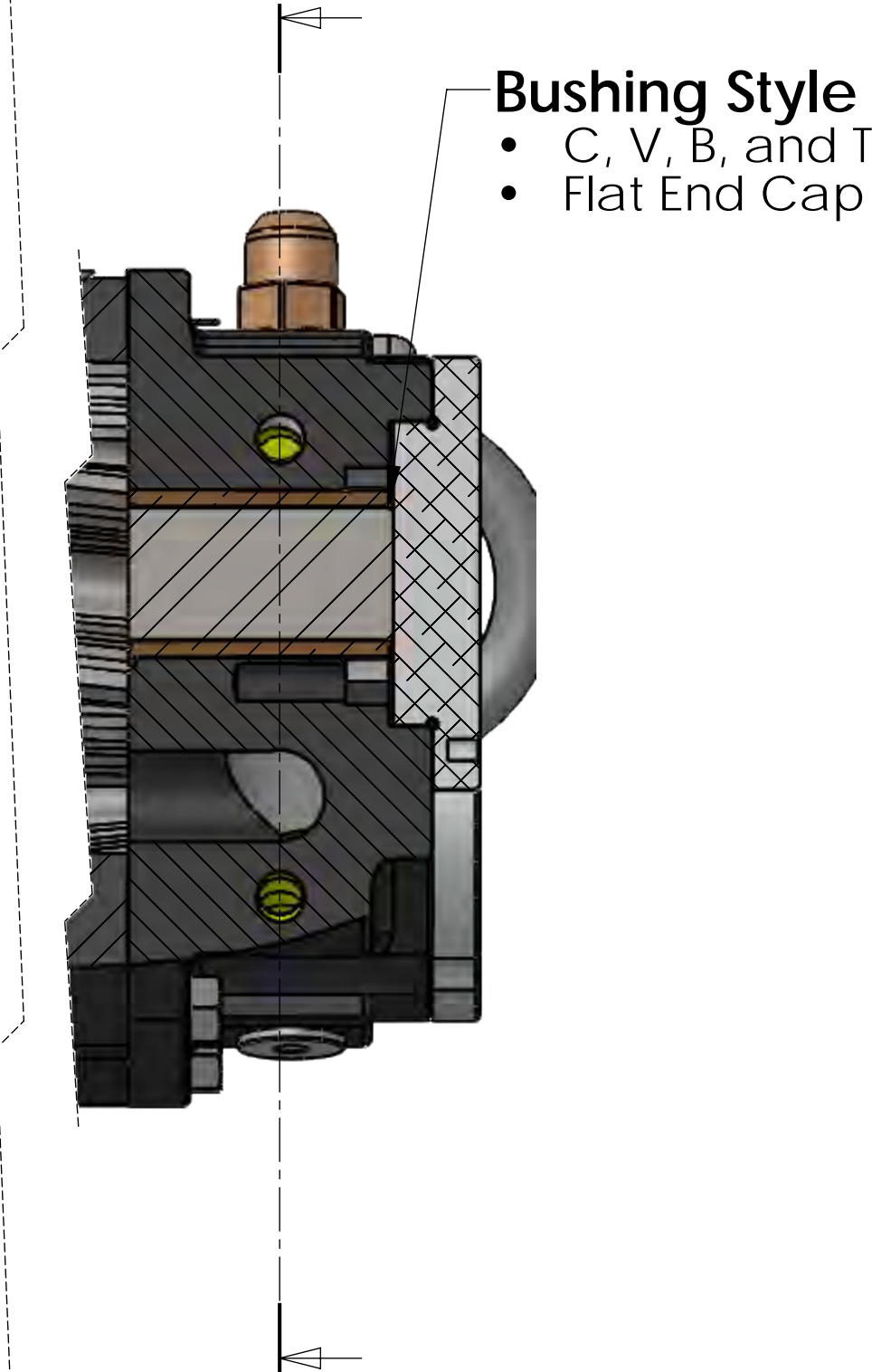
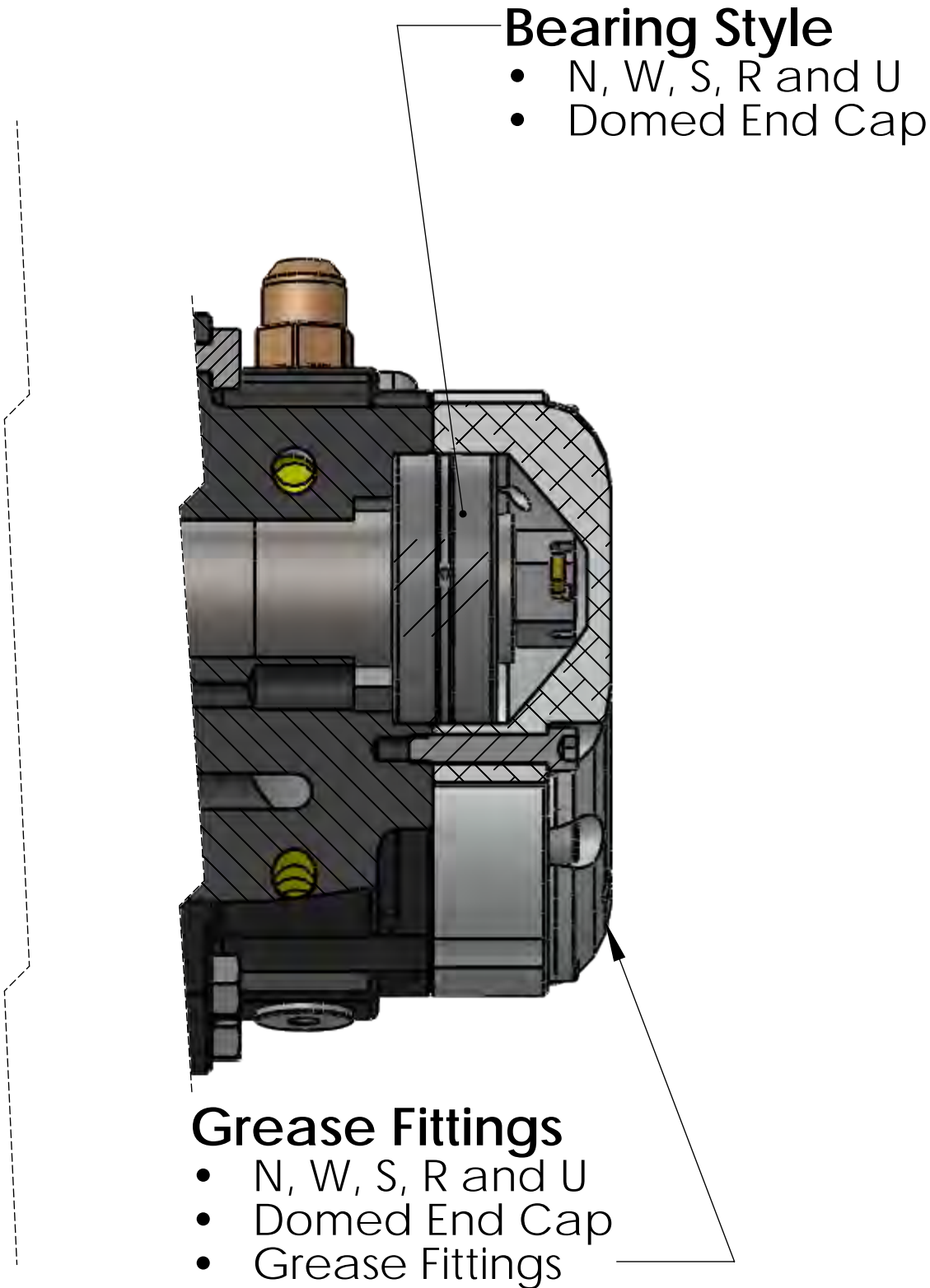
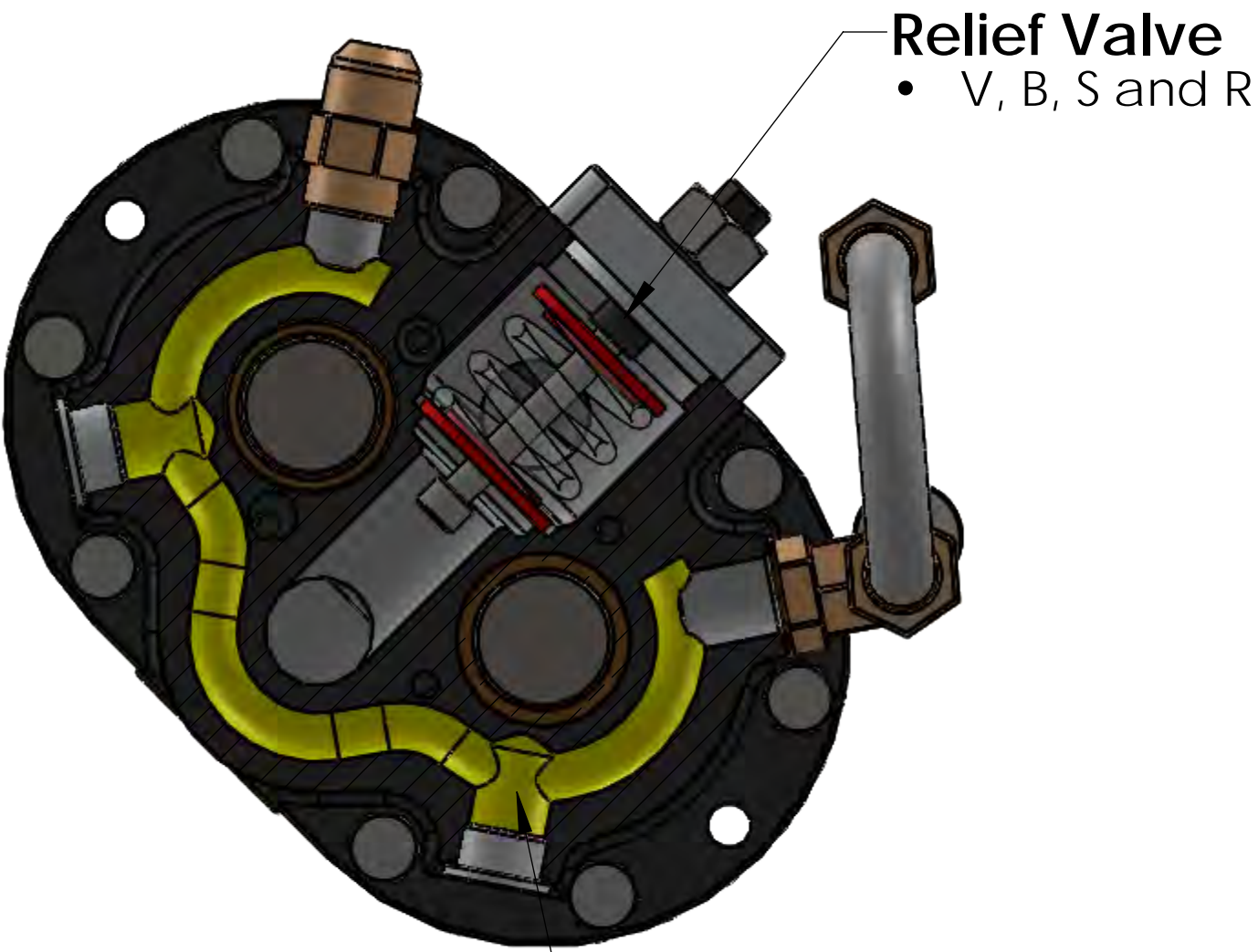
- 4 = Fixed: 40psi @100gpm
- 8 = Fixed: 80psi @100gpm (standard on bushing pumps)
- A = Adjustable (standard on bearing pumps)
- B = Blocked

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



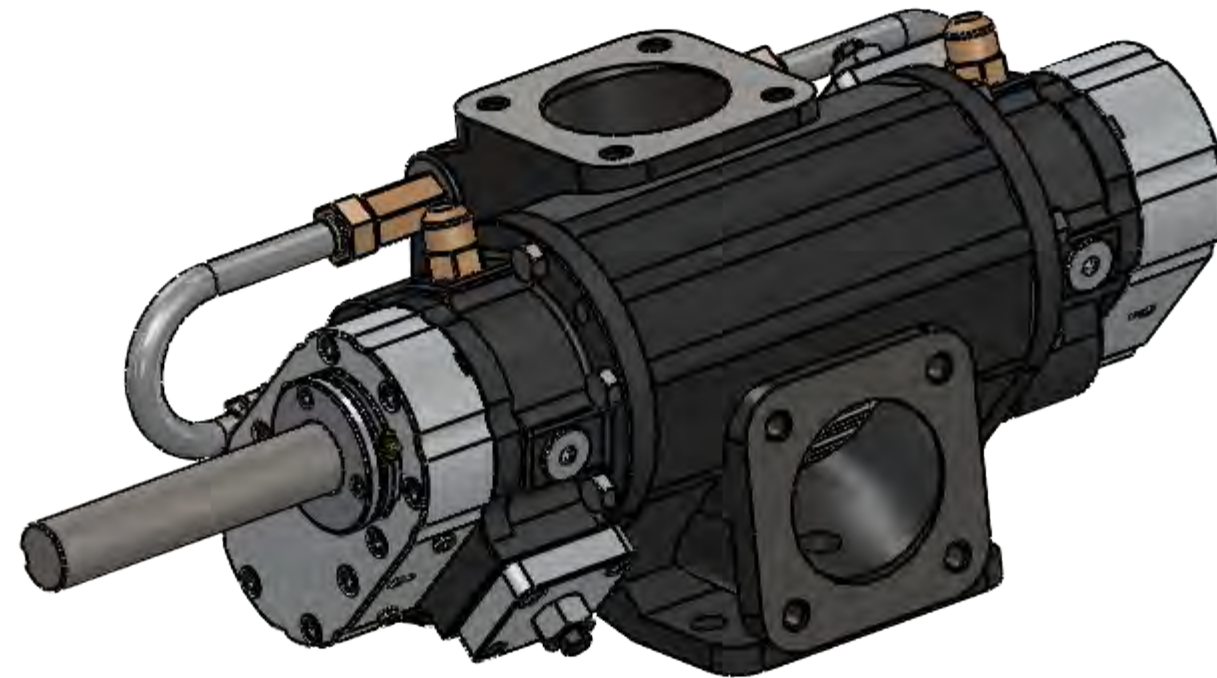
Heat Tracing

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

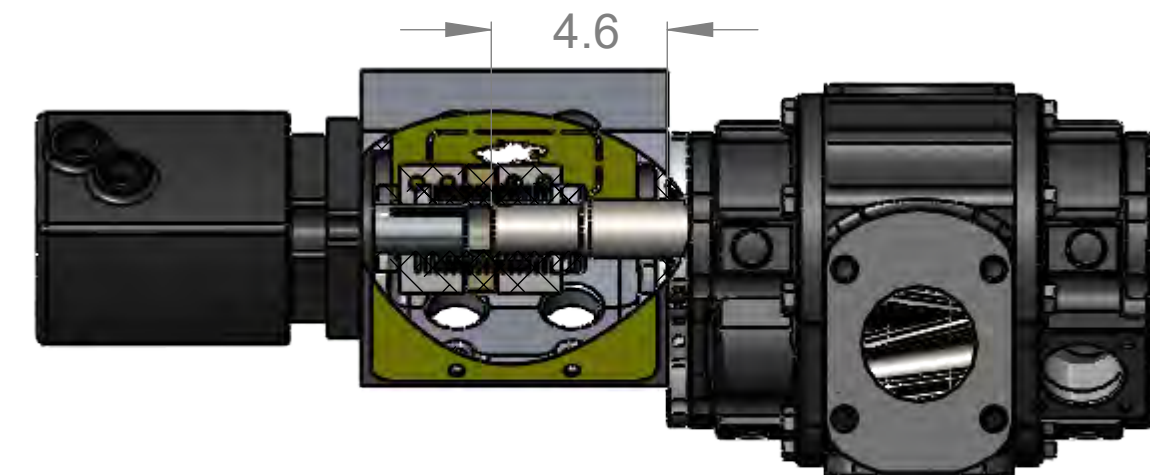
Material	Style	Seal Type	Notes
Rubberized Asphalt	R U	C P	Use oversized displacement
Modified Asphalt	V T R U	M N C P	
Emulsified Asphalt	C V T	M N C	
Crude Oil	B W S	M D	
Condensate	S	B	Use oversized displacement
Dust Control	W S	B	
Abrasive	N W S R U	C B	Use oversized displacement
Corrosive	W S	B	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

Shaft Type

X: Extended Shaft



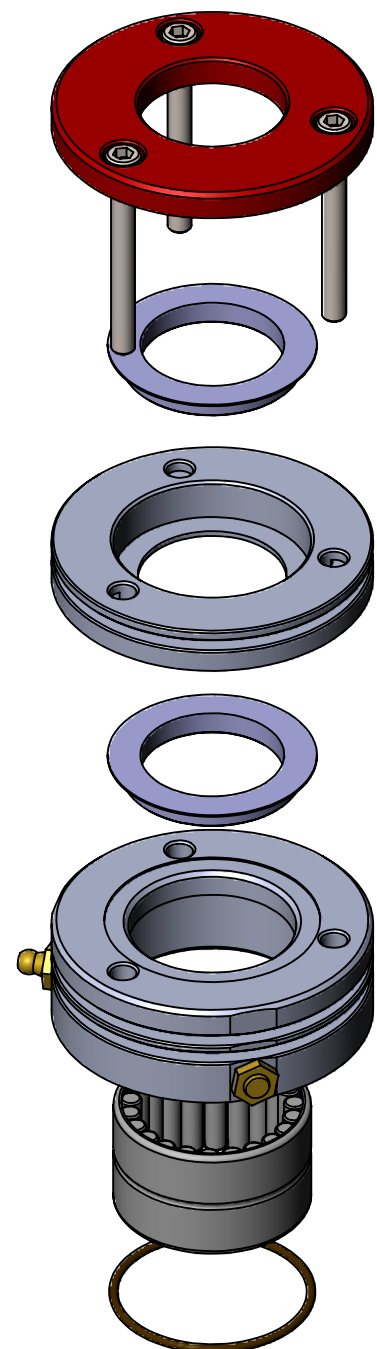
H: Hydraulic Shaft



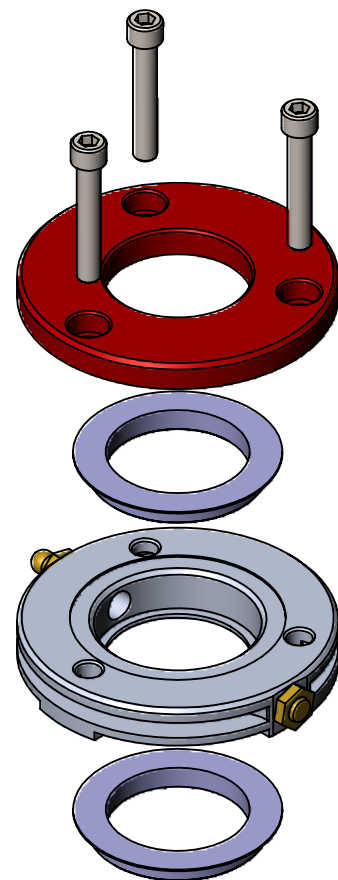
Set distance from mount face. Used for Hydraulic motors and Gear Meters.

Seal Type

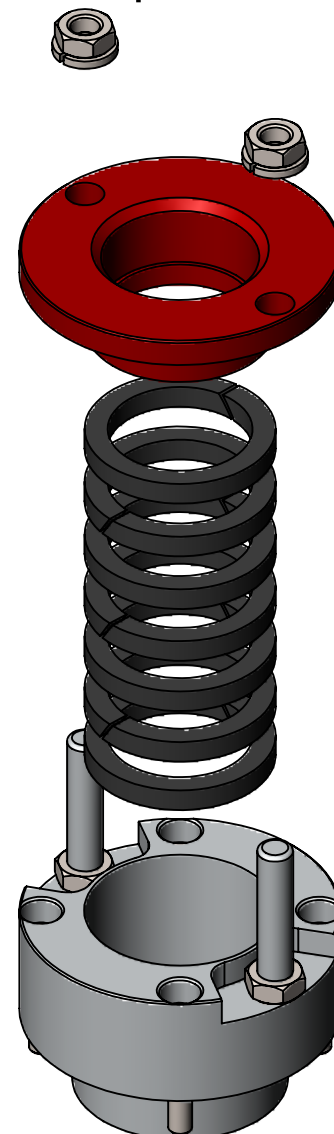
N: Cooling Double
(bushing pumps)



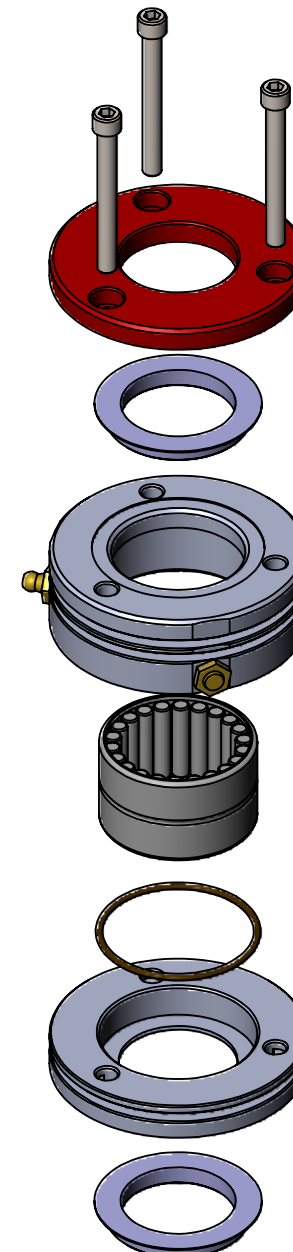
C: Cooling Double
(bearing pumps)



J: Packing
(1/4" packing)

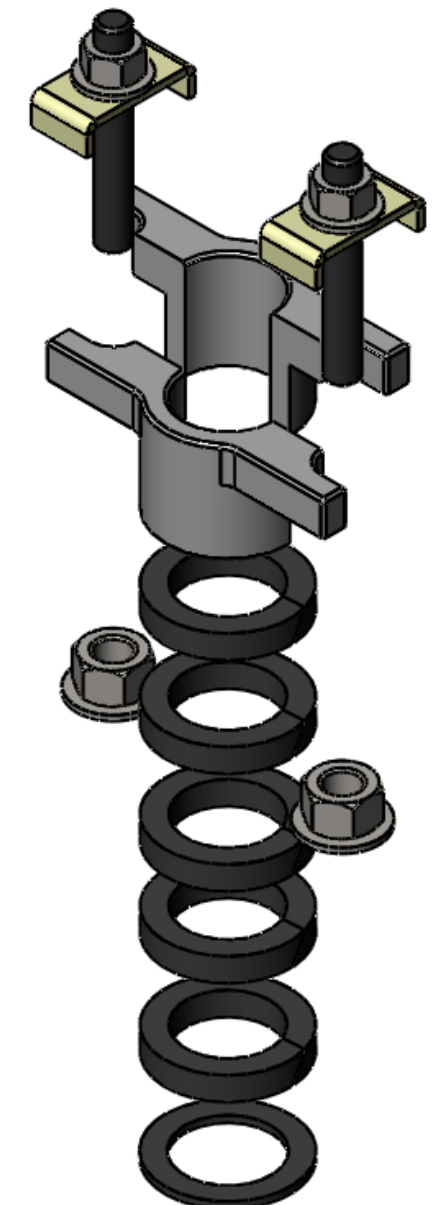


B: Bearing Double
(bushing pumps)

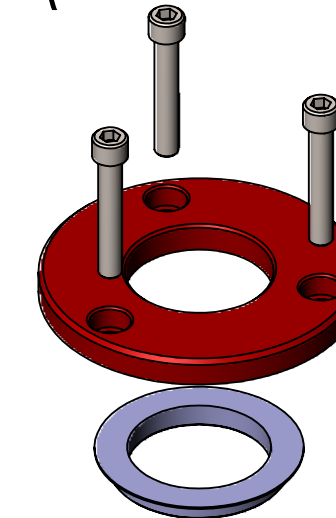


OBSOLETE SEALS

P: Packing
(3/8", obsolete)



M: Single Lip Seal
(obsolete)



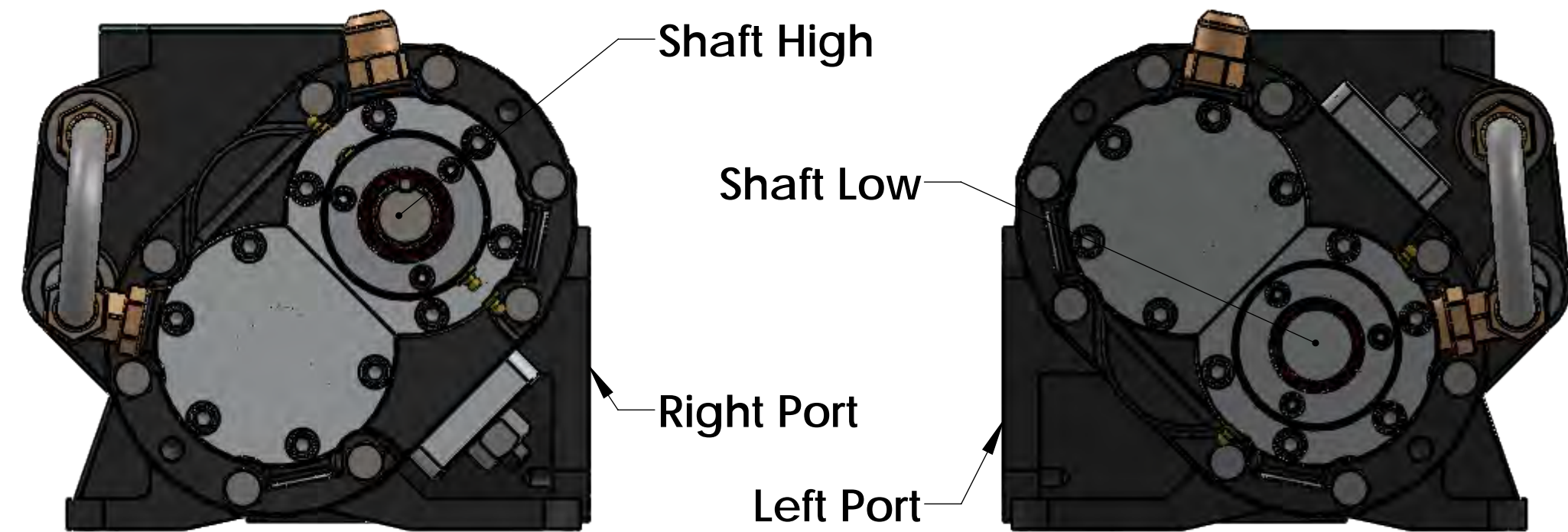
Configuration

Configuration Examples

The configuration is determined by side port position 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.

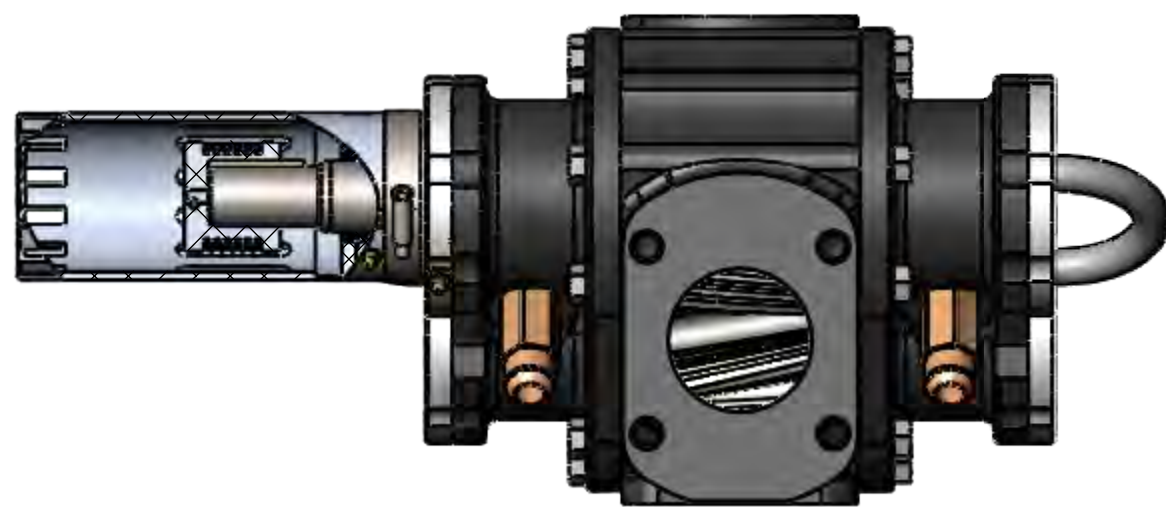
RH Example
Right High

LL Example
Left Low



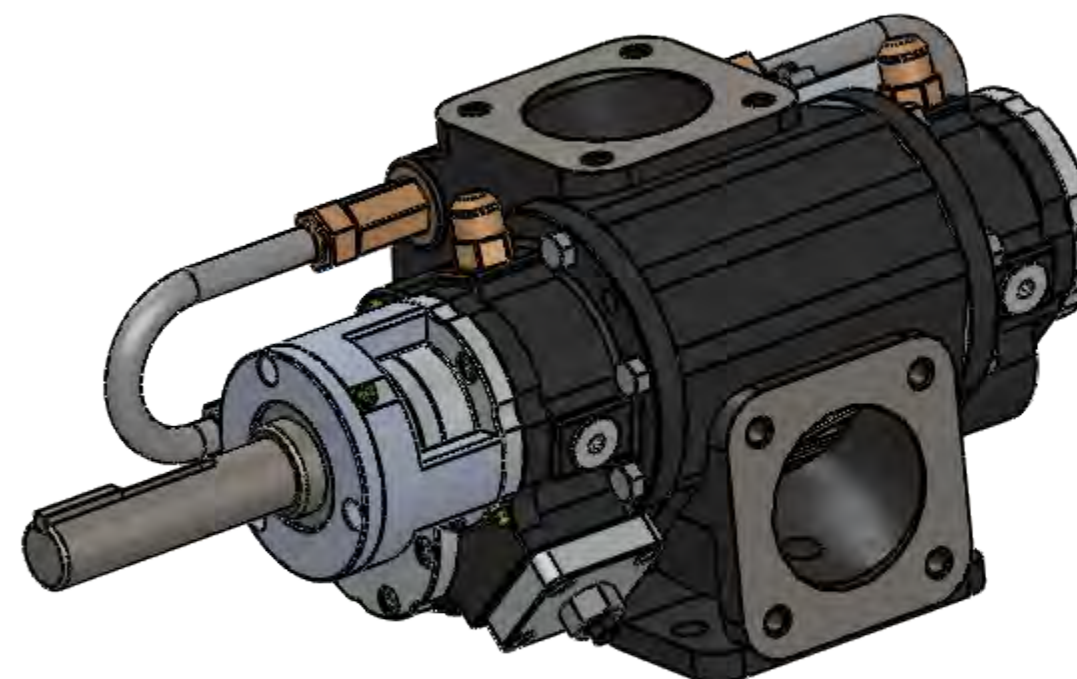
Option Items

EA: Encoder Mount

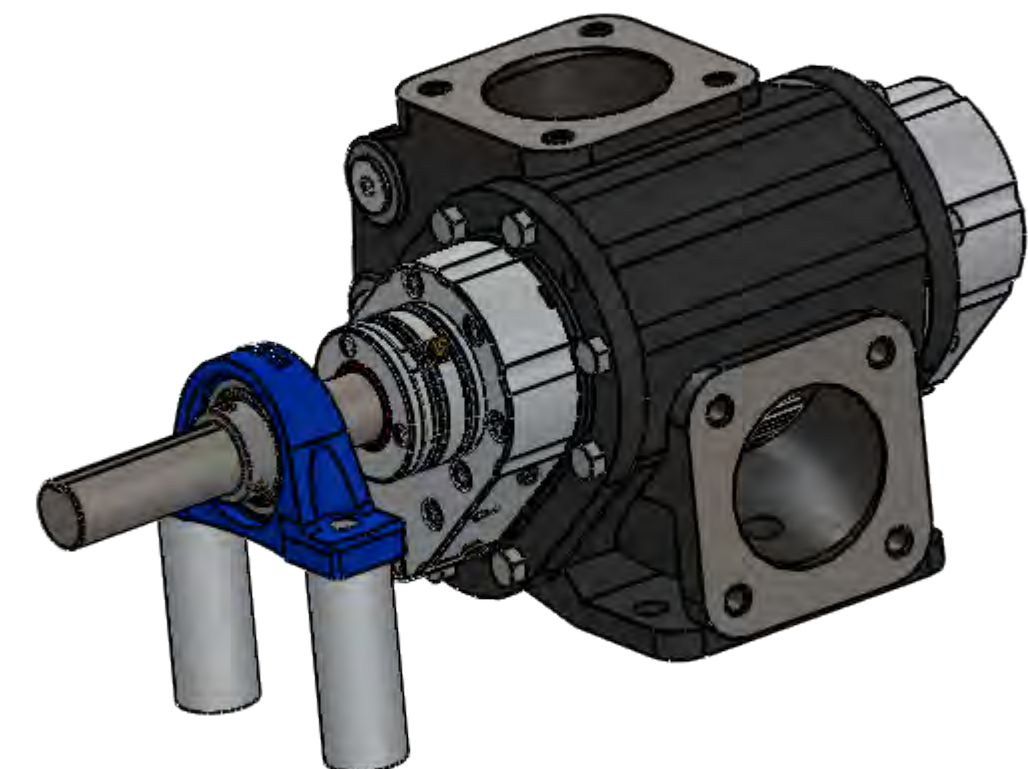


Encoder coupler and guard
(encoder not included)

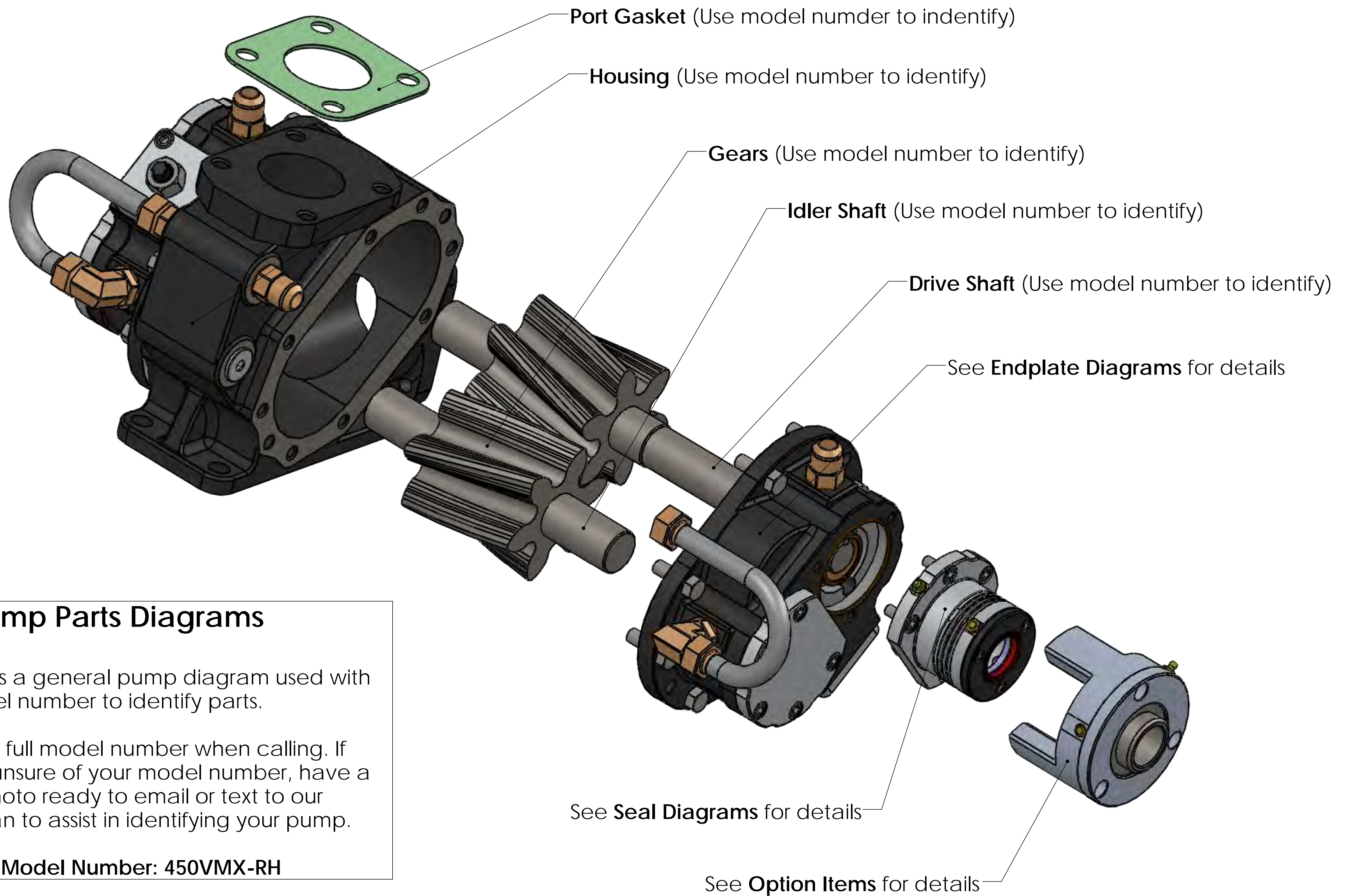
OB: Outboard Bearing



PB: Pillow Block Bearing



Base Component Diagram



Pump Parts Diagrams

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

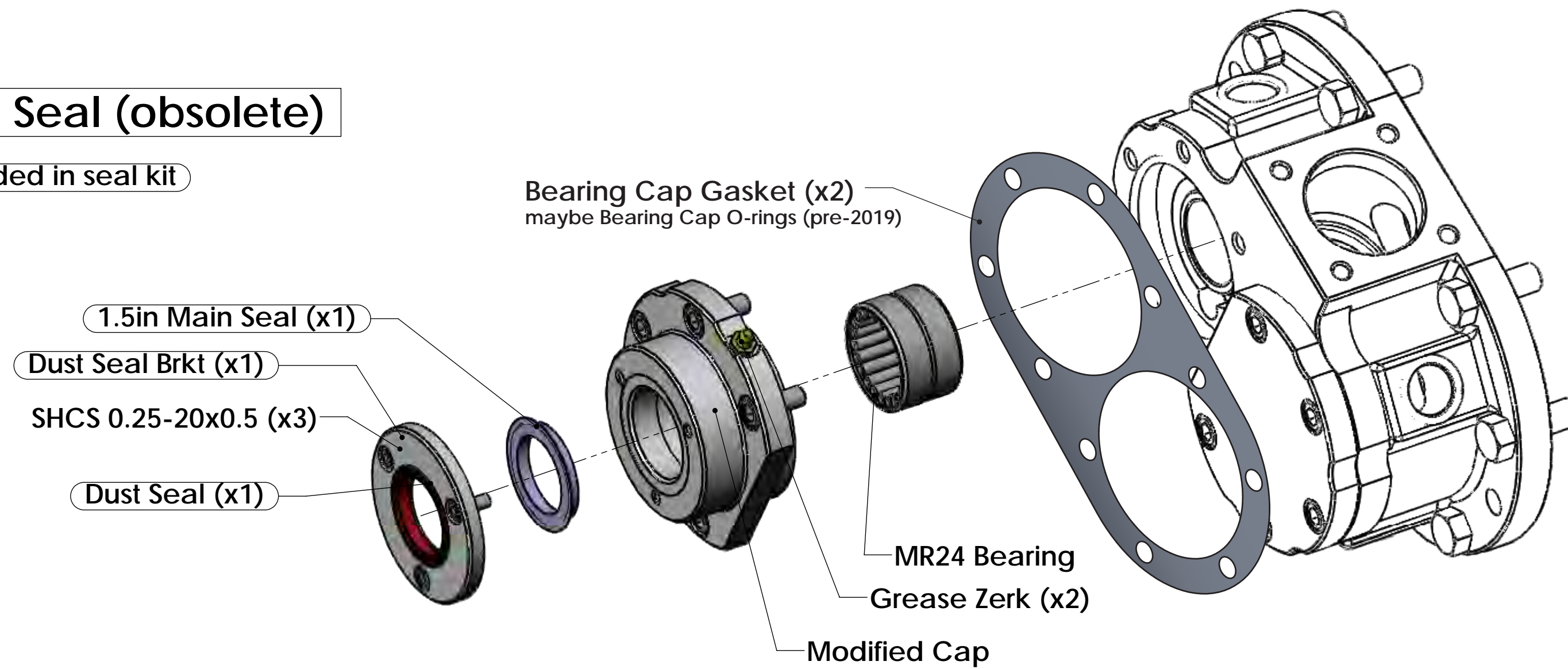
Have the full model number when calling. If you are unsure of your model number, have a digital photo ready to email or text to our technician to assist in identifying your pump.

Example Model Number: 450VMX-RH

Seal Diagrams (1 of 3)

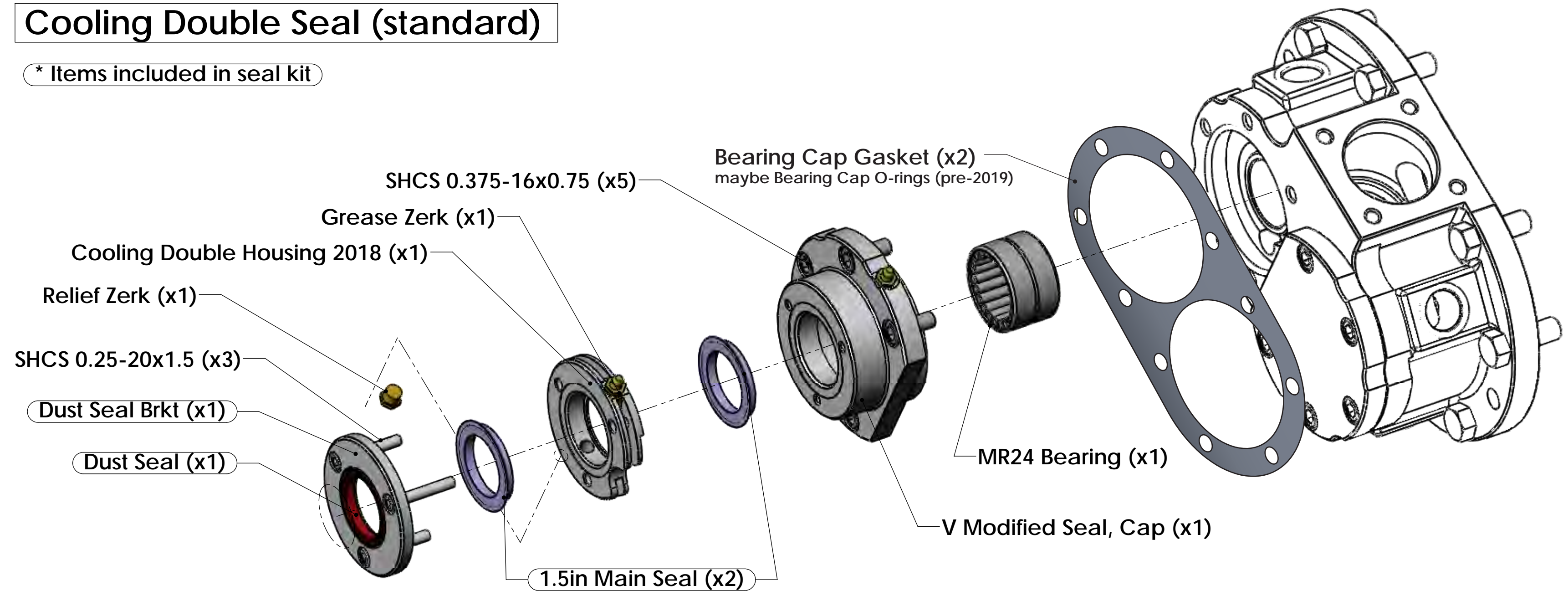
Modified Seal (obsolete)

* Items included in seal kit



Cooling Double Seal (standard)

* Items included in seal kit

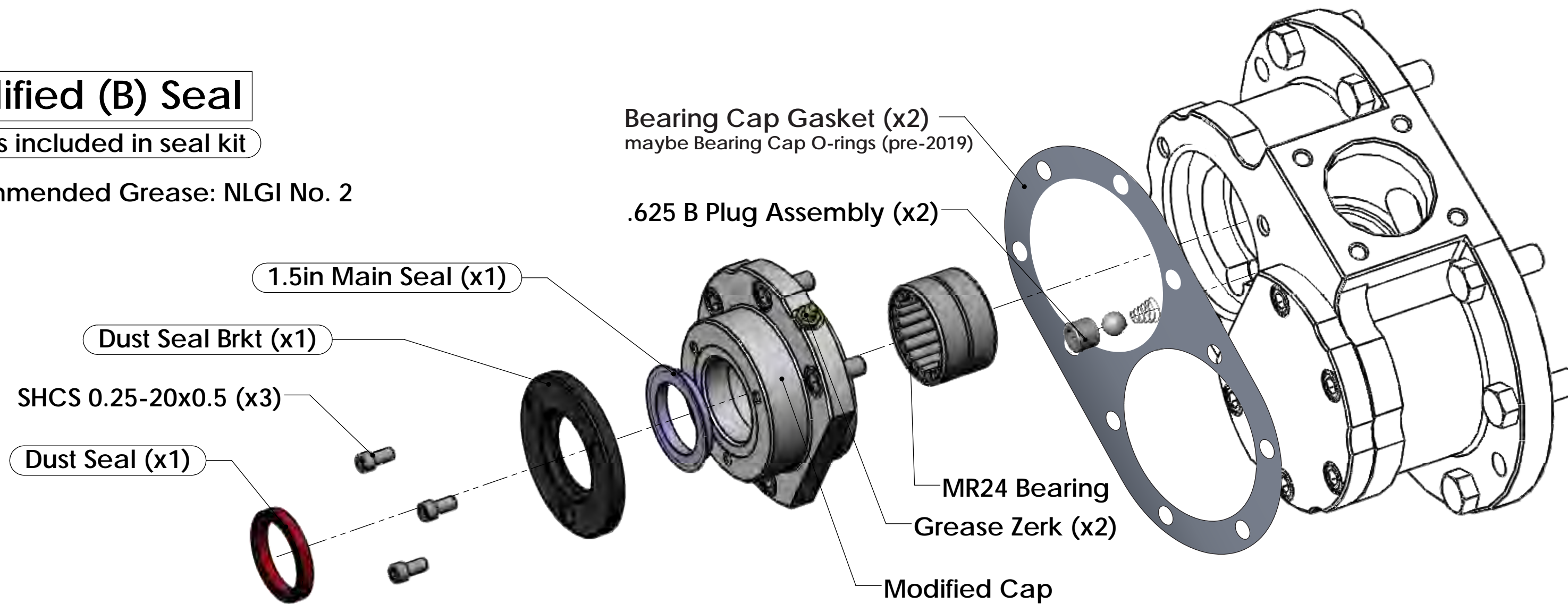


Seal Diagrams (2 of 3)

Modified (B) Seal

* Items included in seal kit

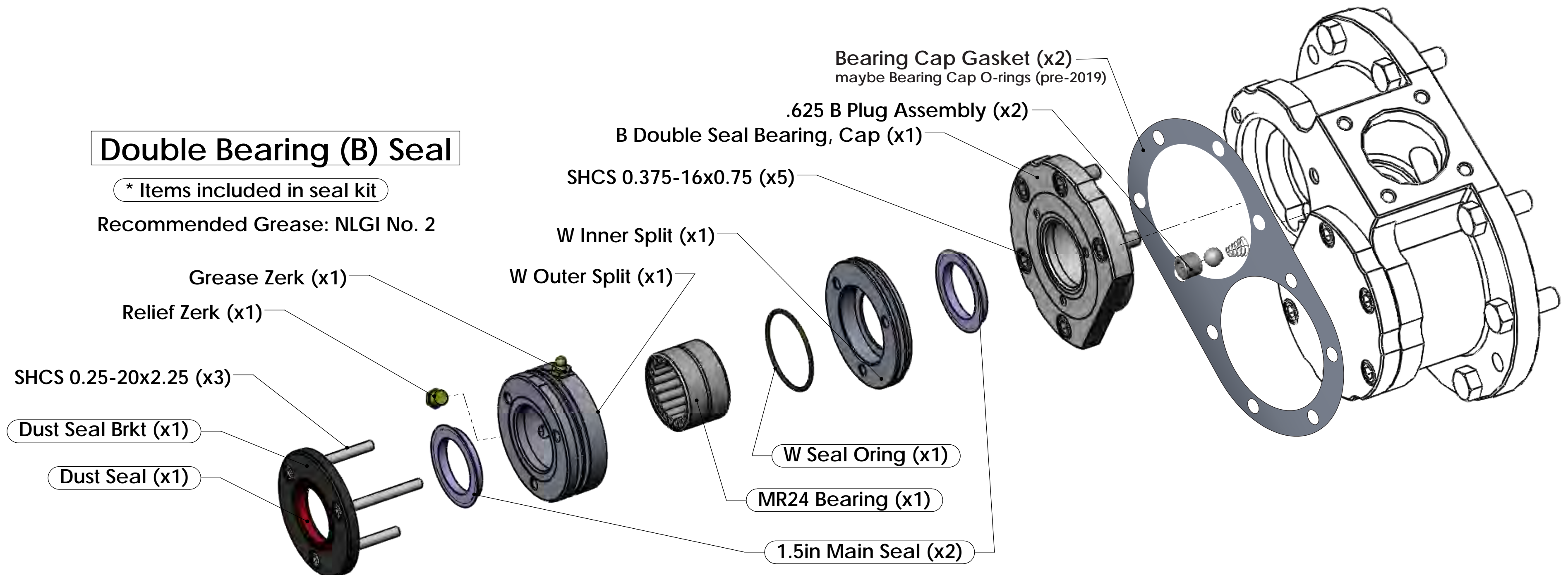
Recommended Grease: NLGI No. 2



Double Bearing (B) Seal

* Items included in seal kit

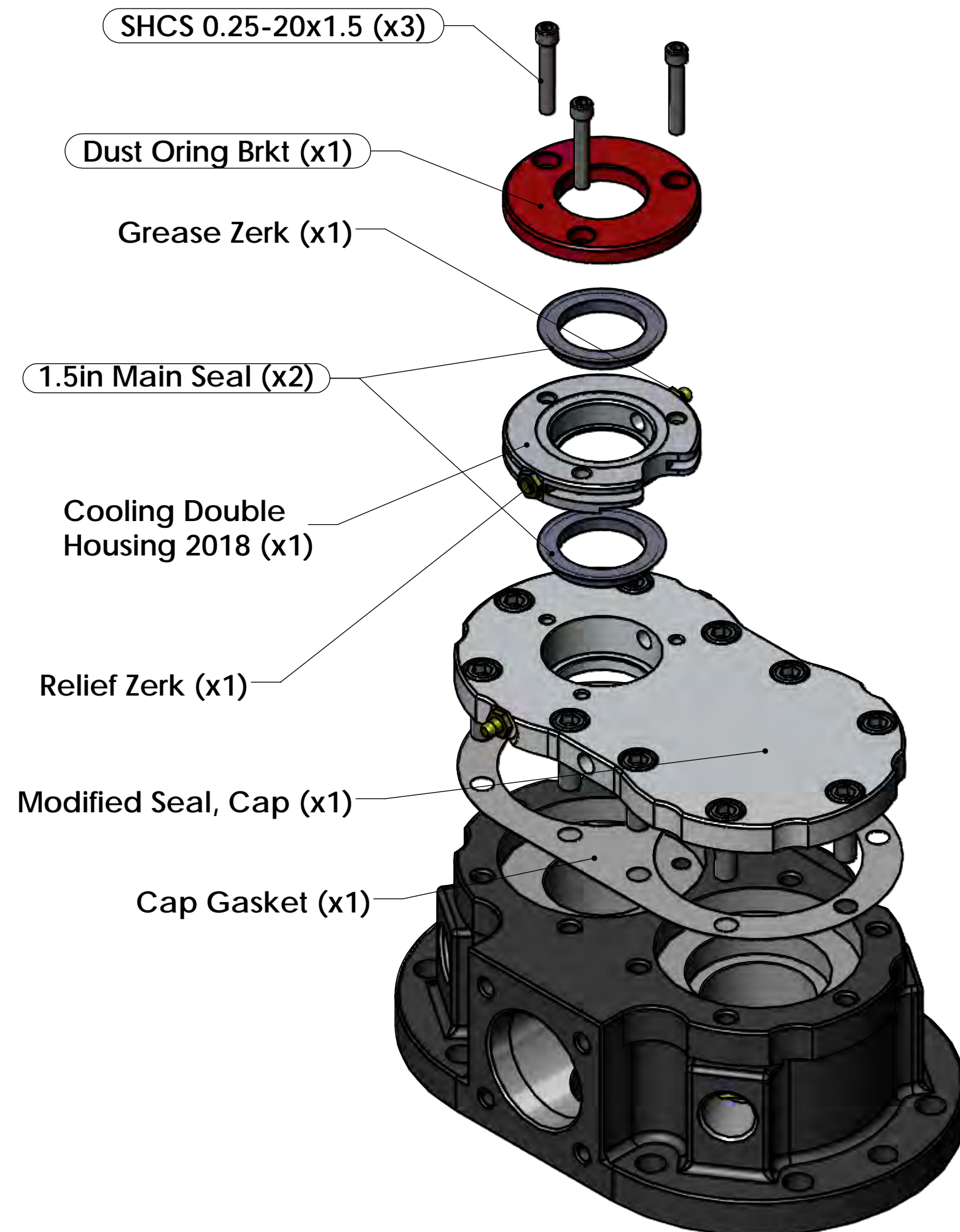
Recommended Grease: NLGI No. 2



Seal Diagrams (3 of 3)

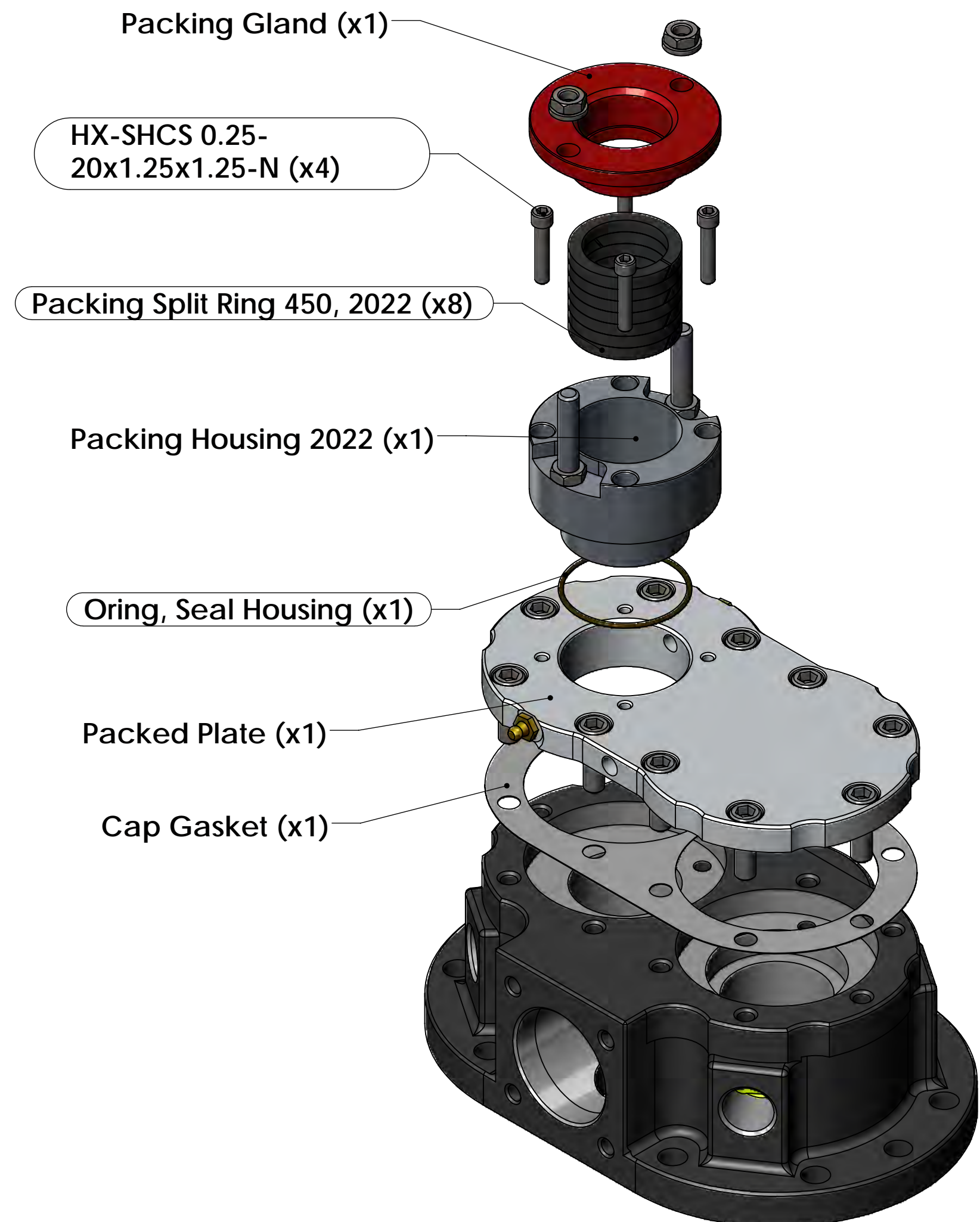
Cooling Double 2020

* Items included in seal kit



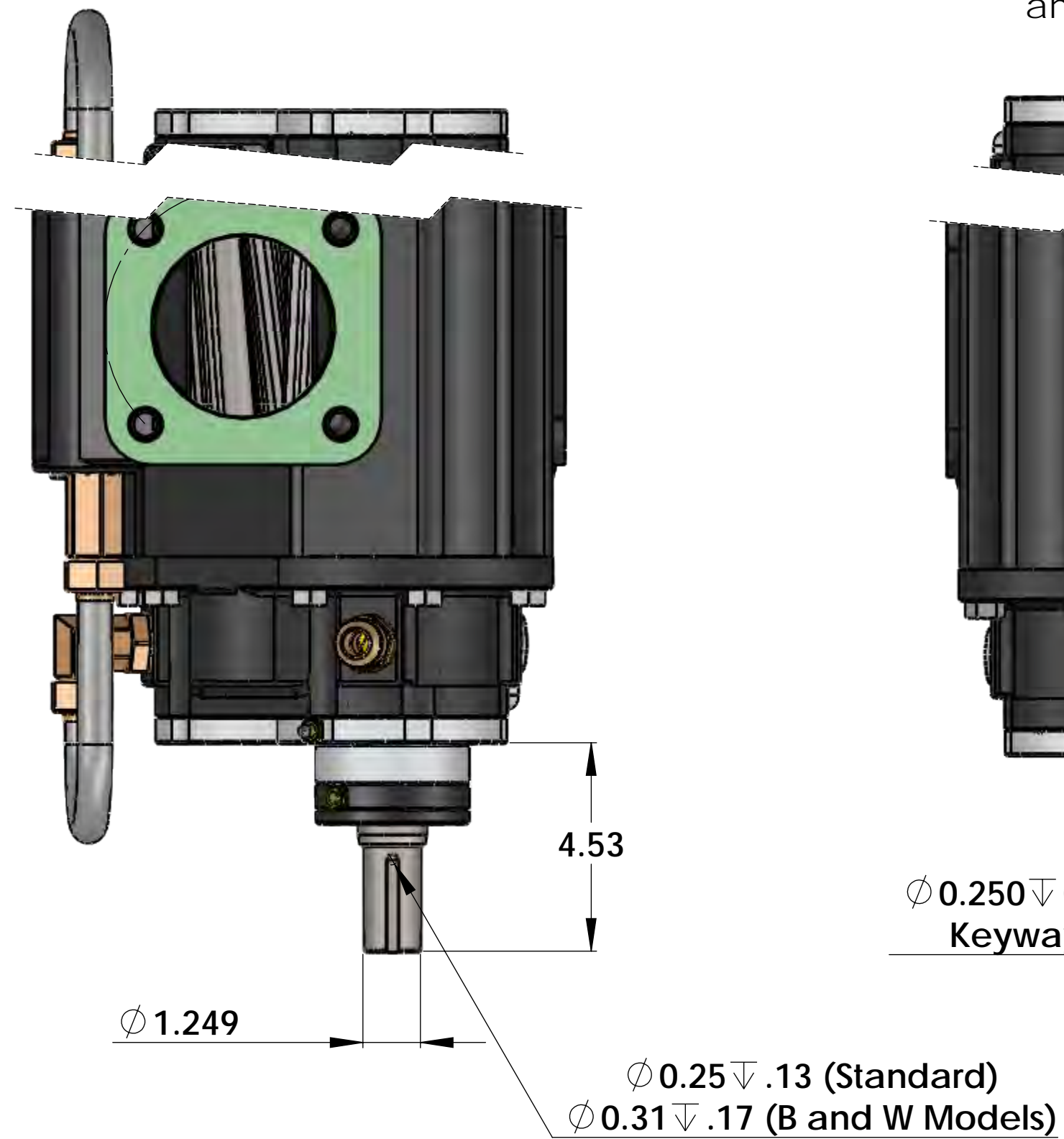
Packed Seal 2022

* Items included in seal kit



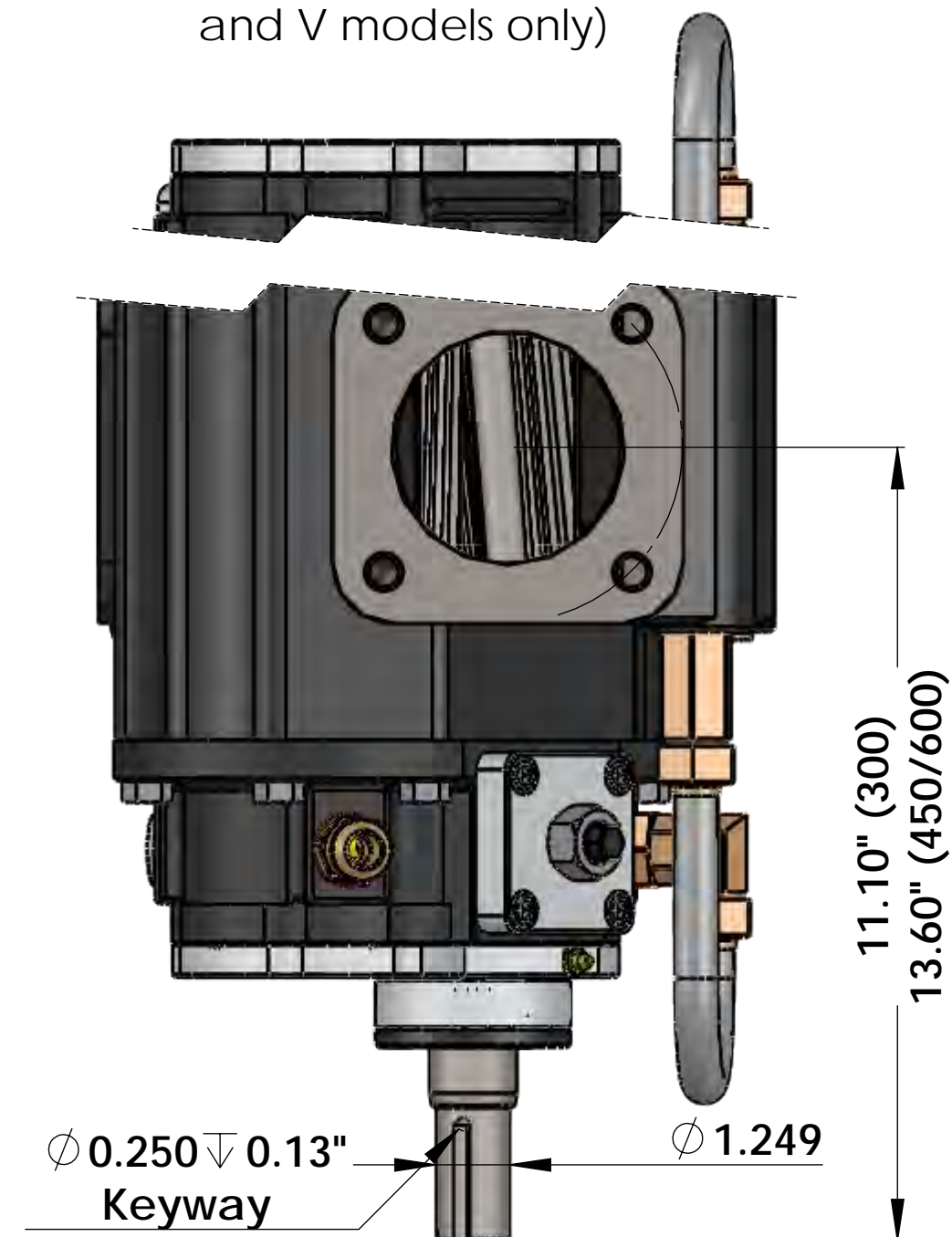
Shaft Style Diagrams

H - Hydraulic Shaft

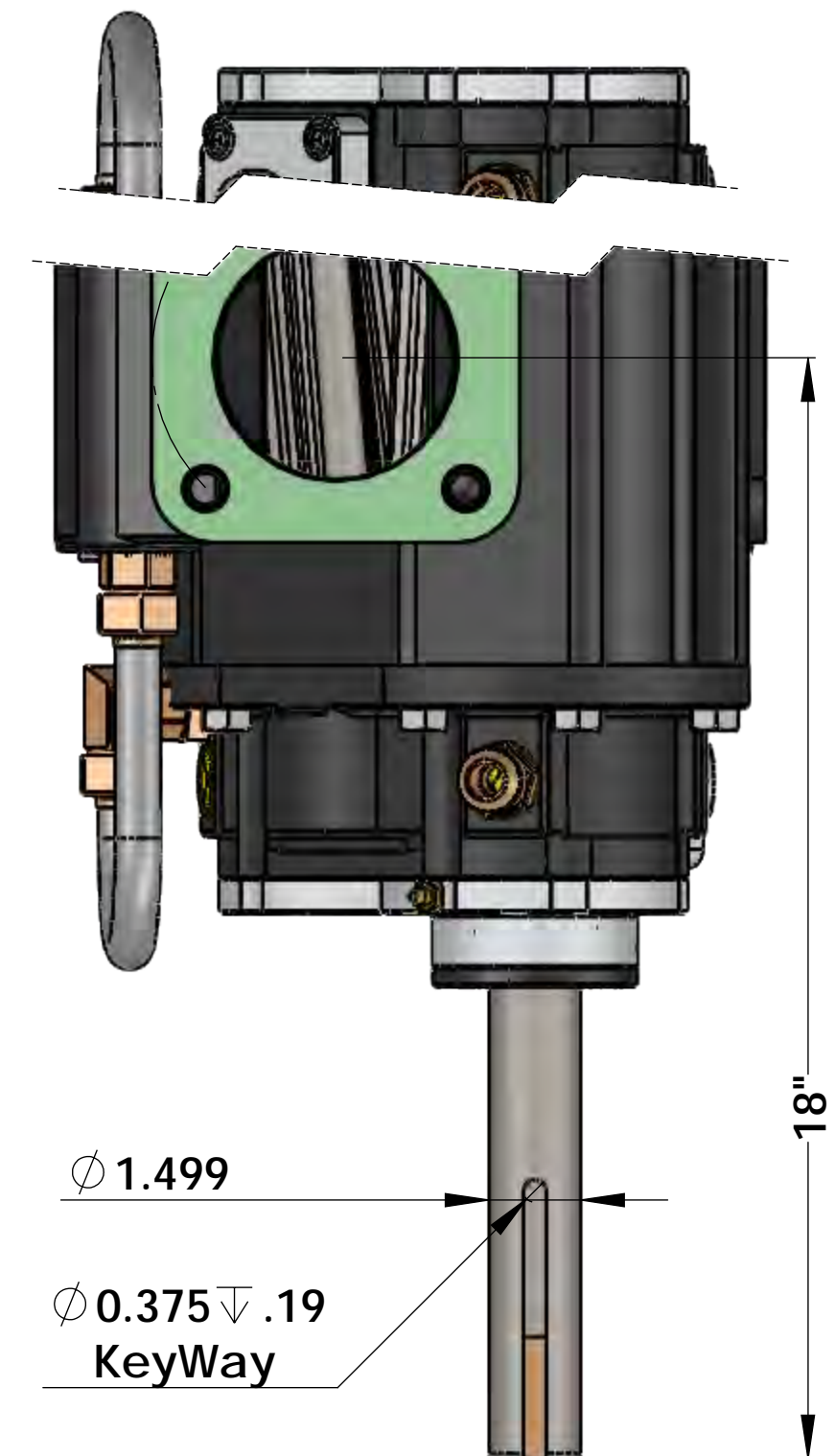


S - Short Shaft

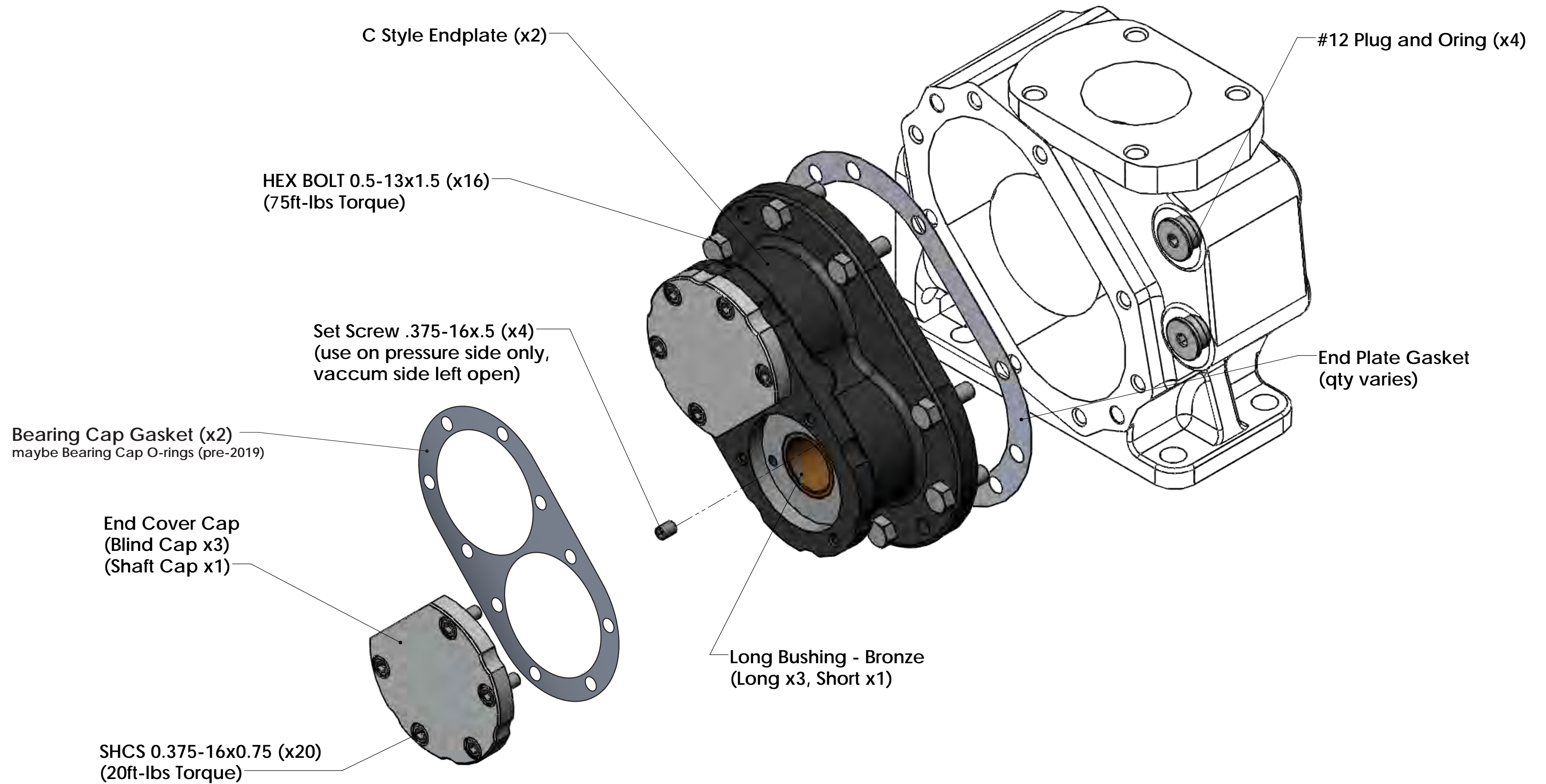
(Available in B,C,
and V models only)



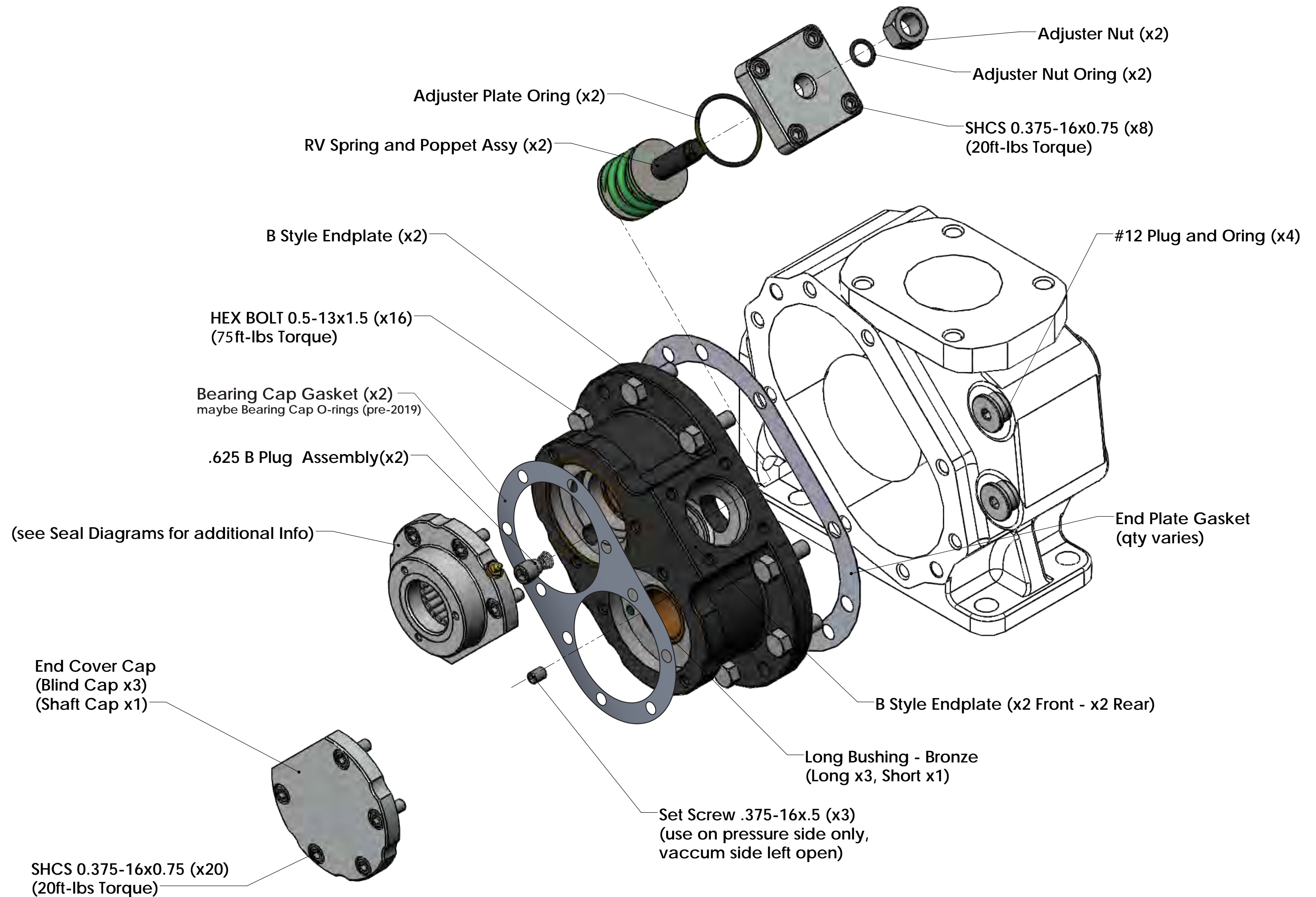
X - Extended Shaft



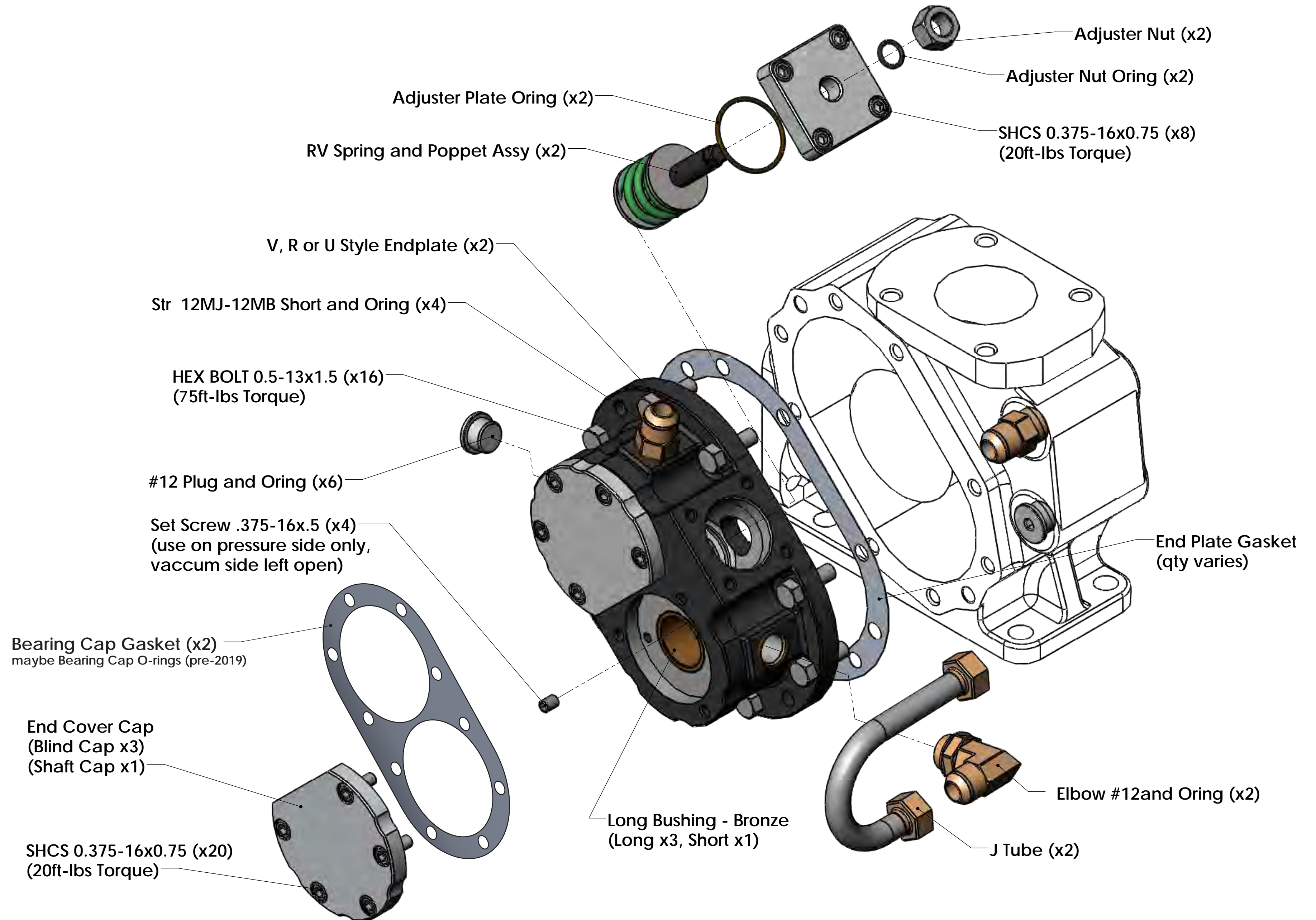
C Style Diagram



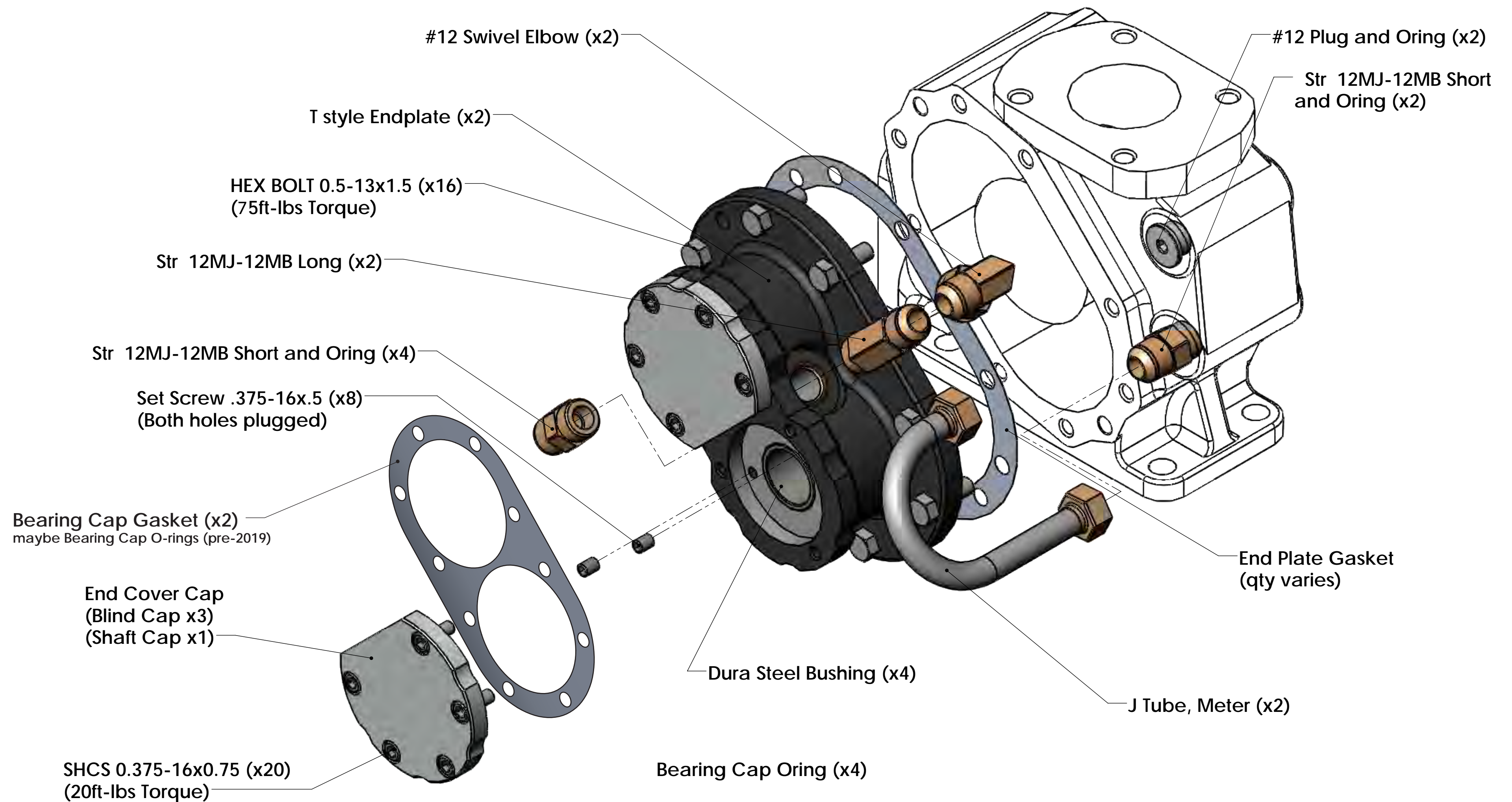
B Style Diagram



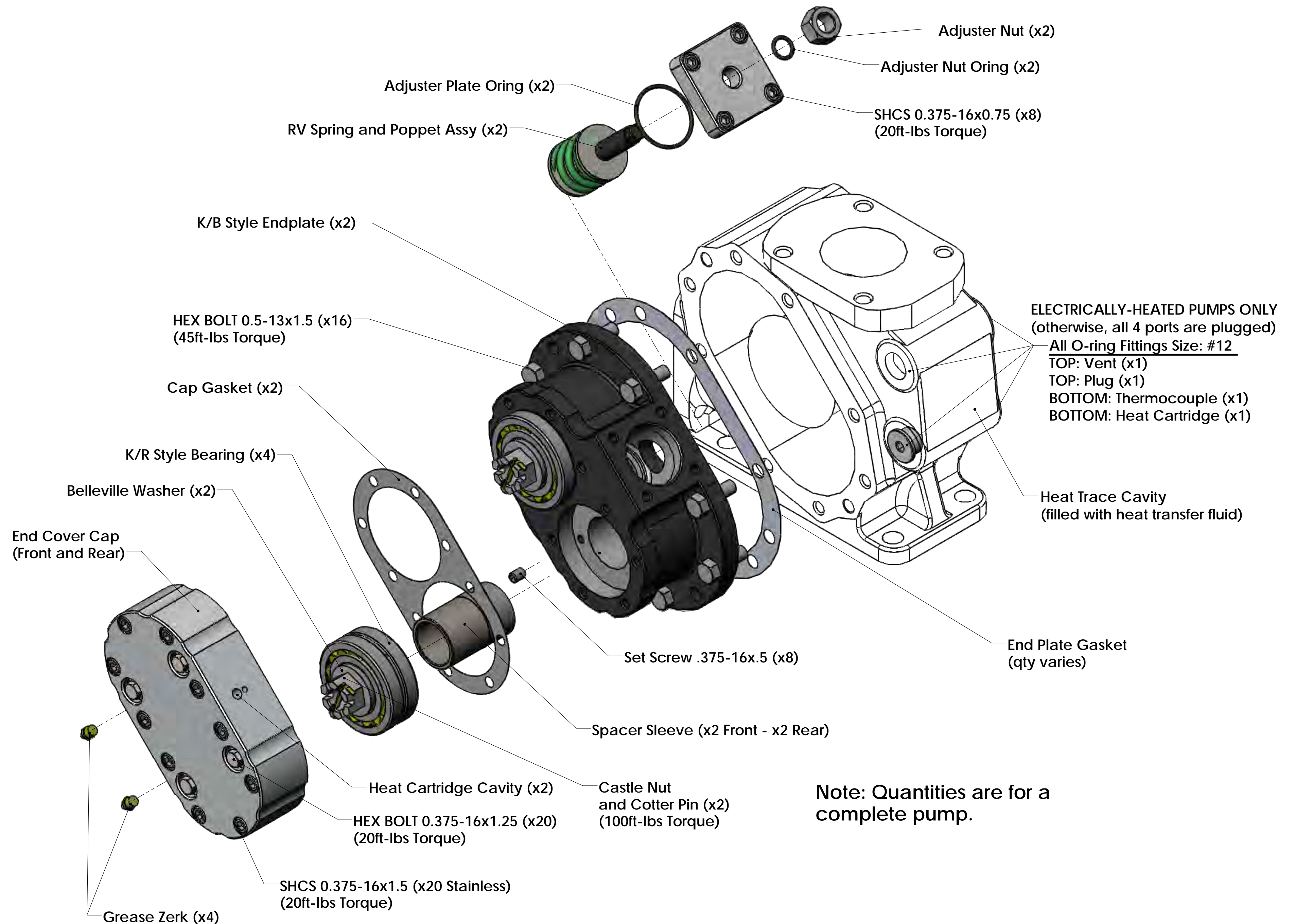
V Style Diagram



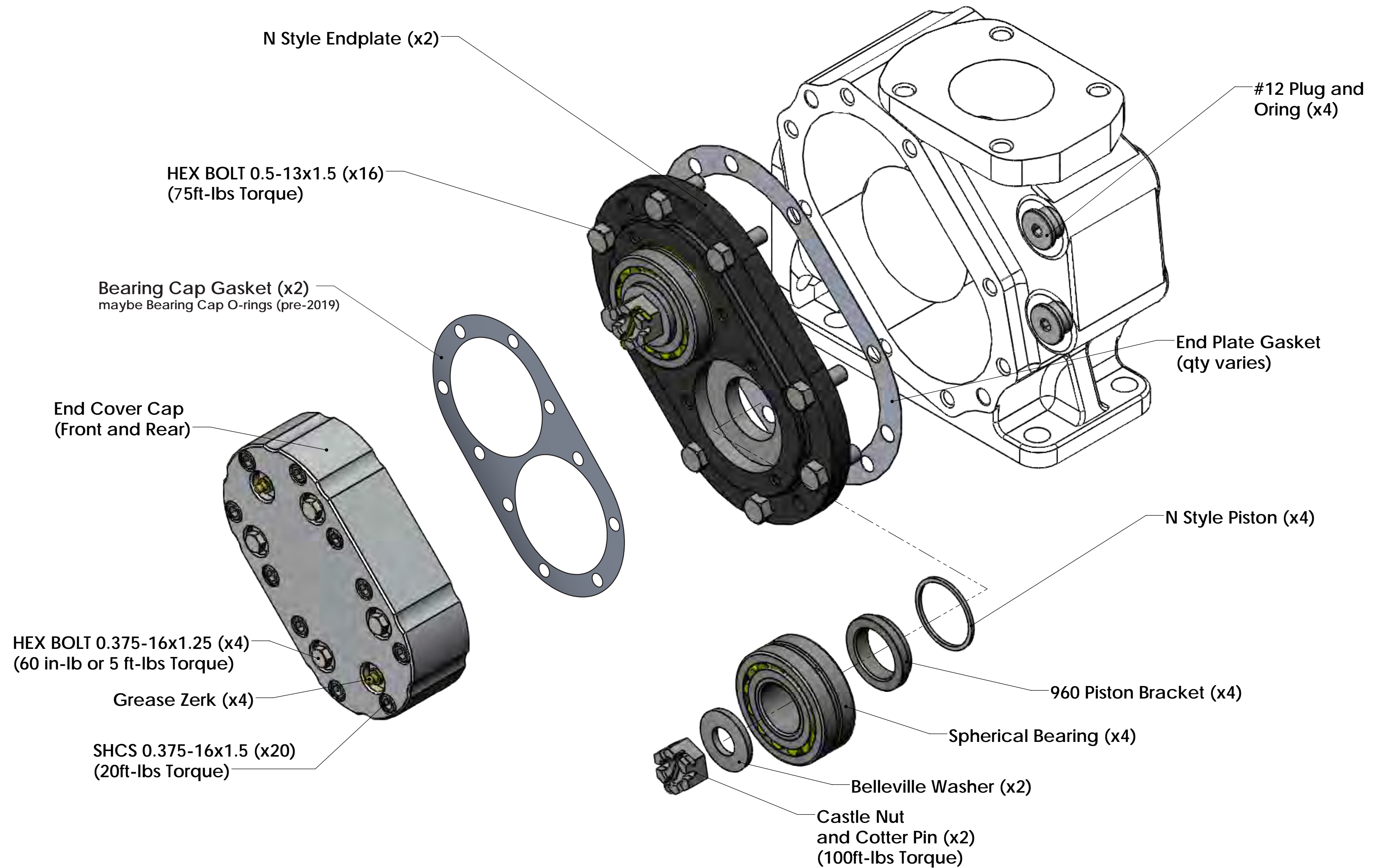
T Style Diagram



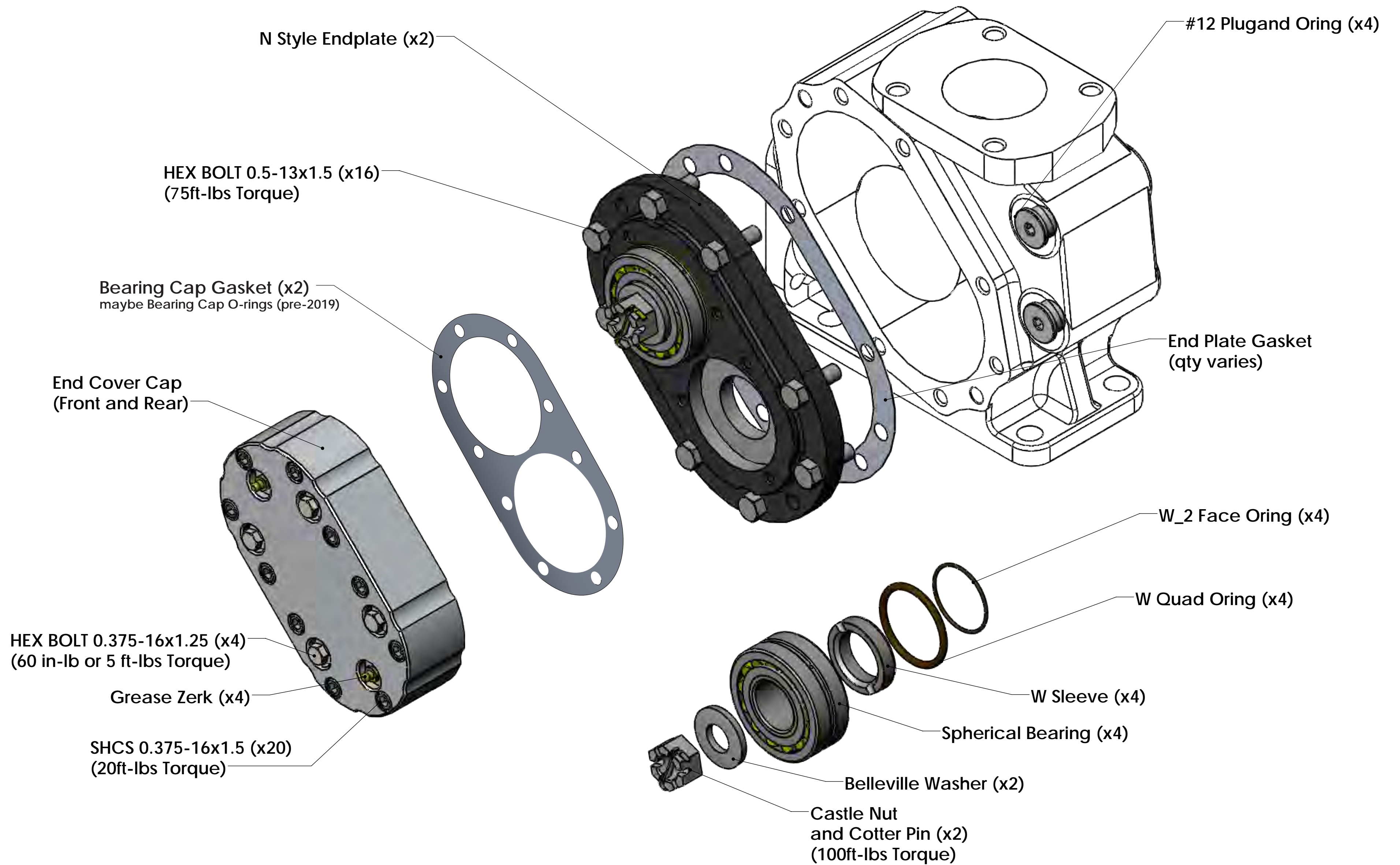
K Style Diagram



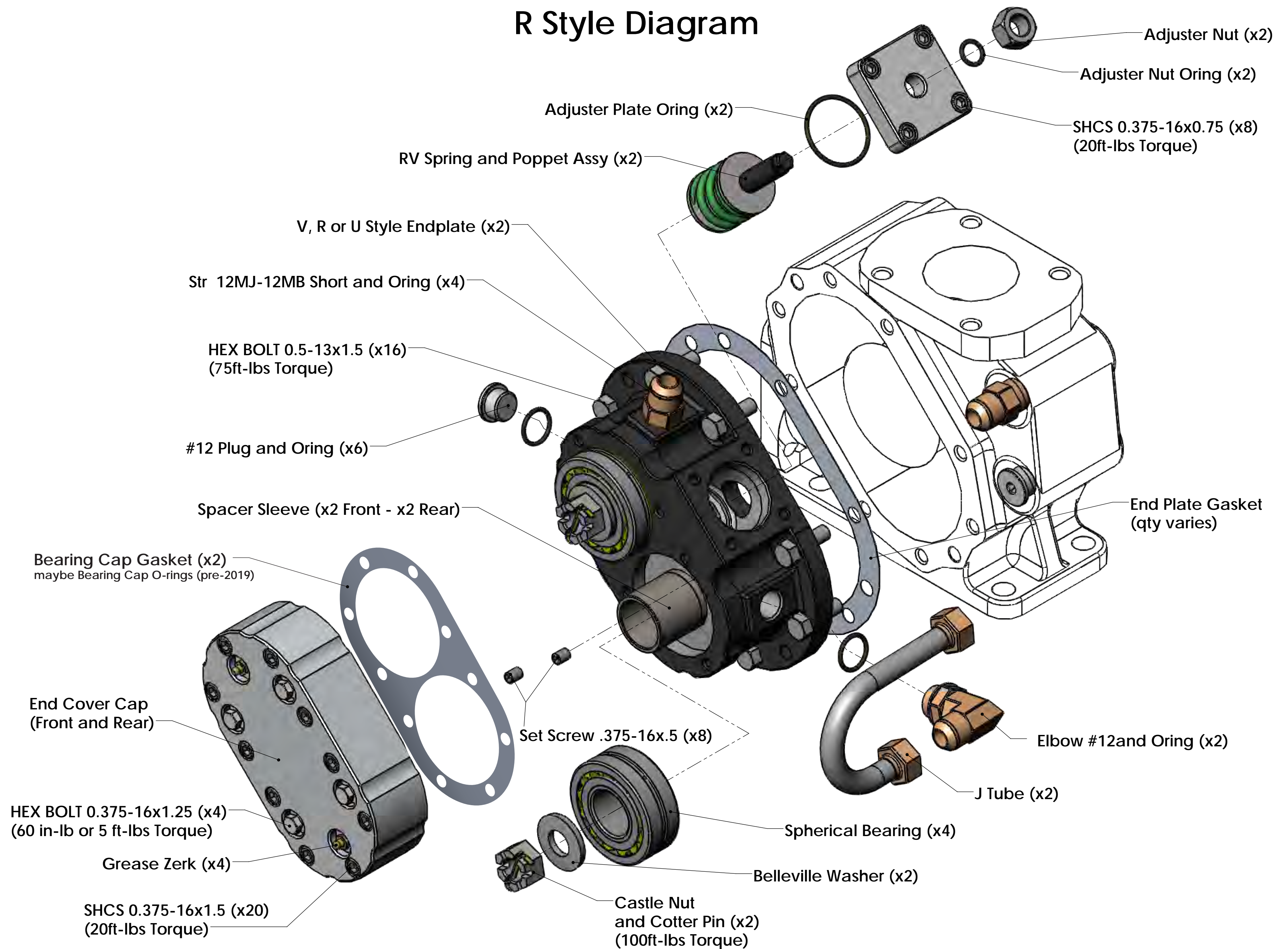
N Style Diagram



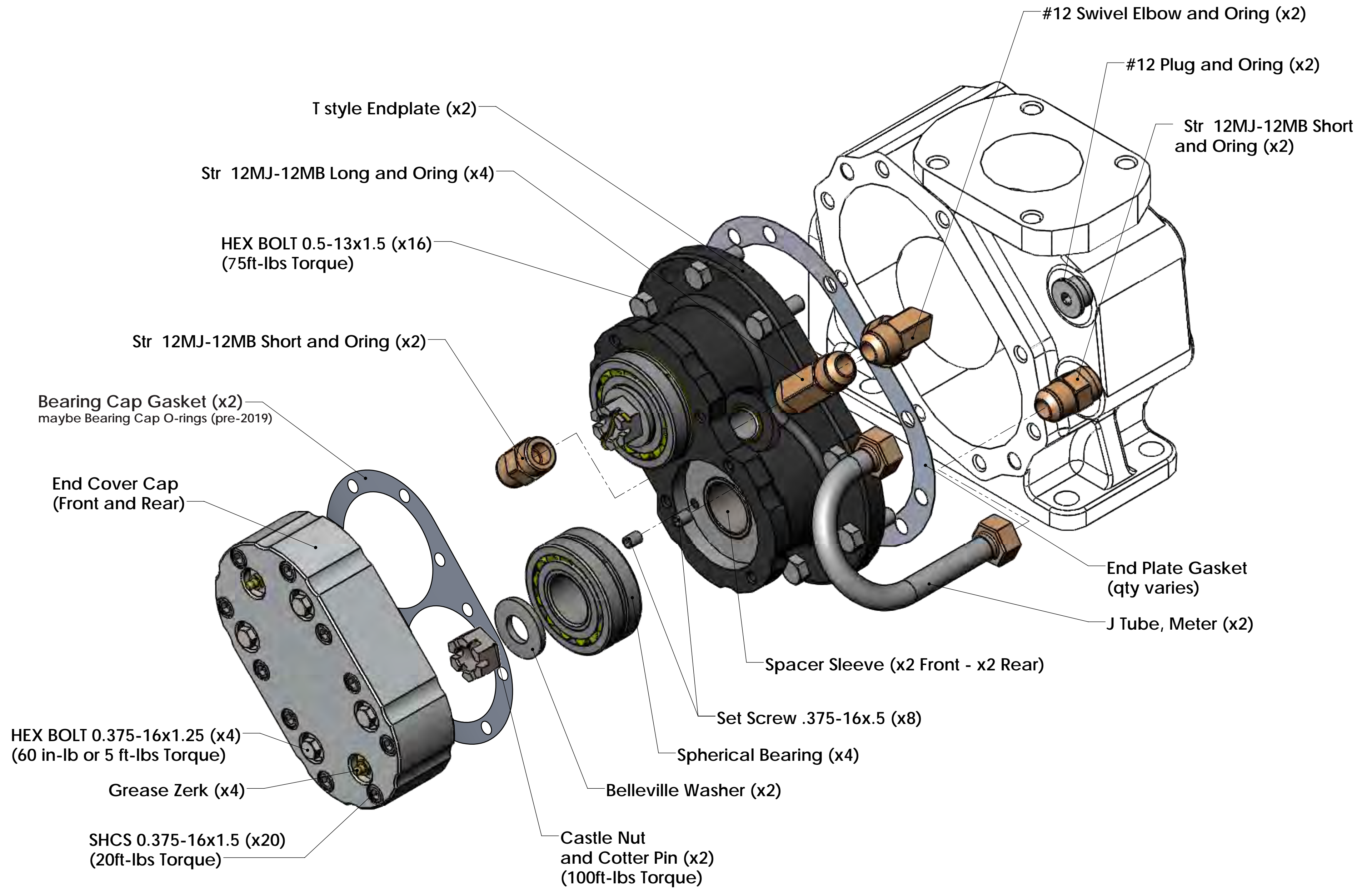
W Style Diagram



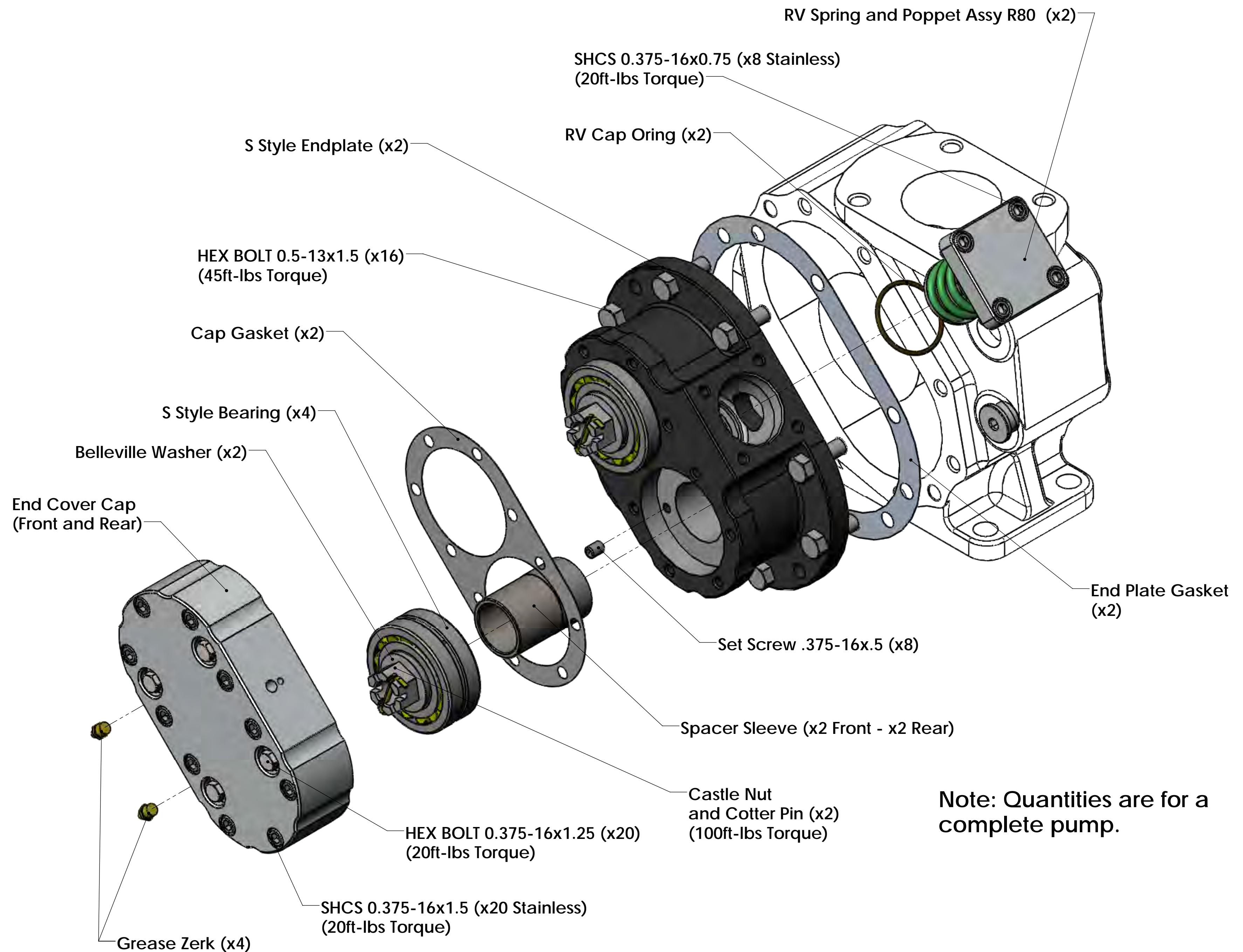
R Style Diagram



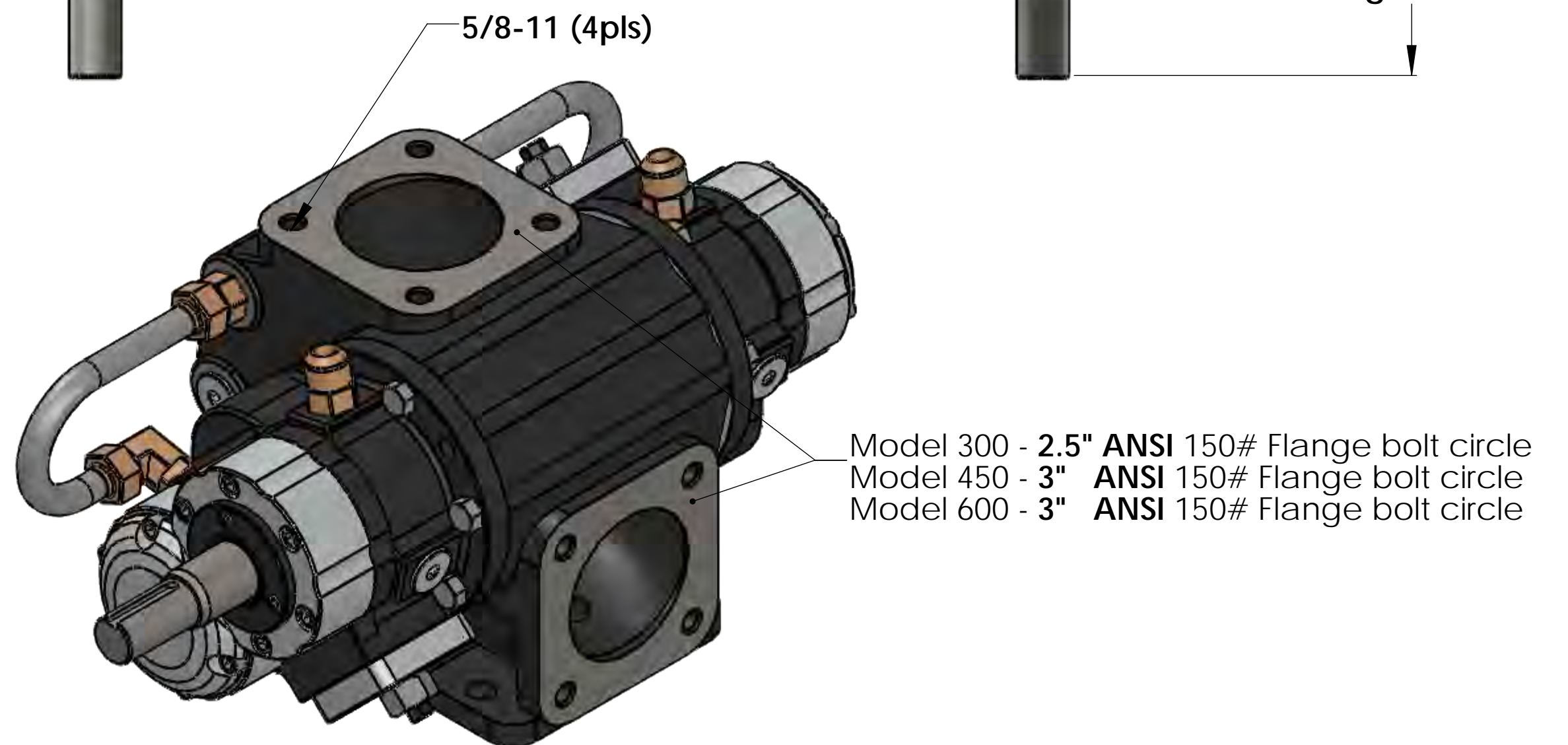
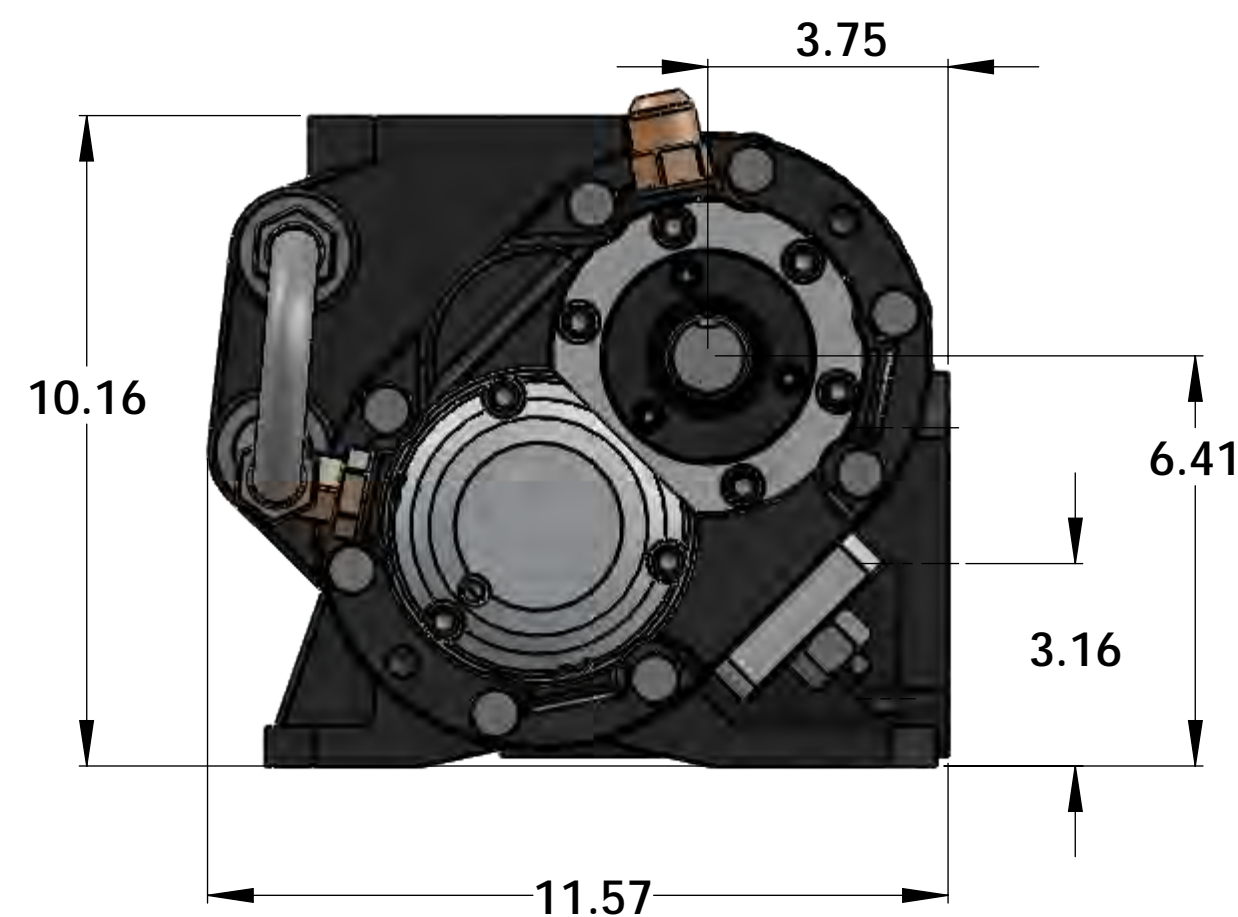
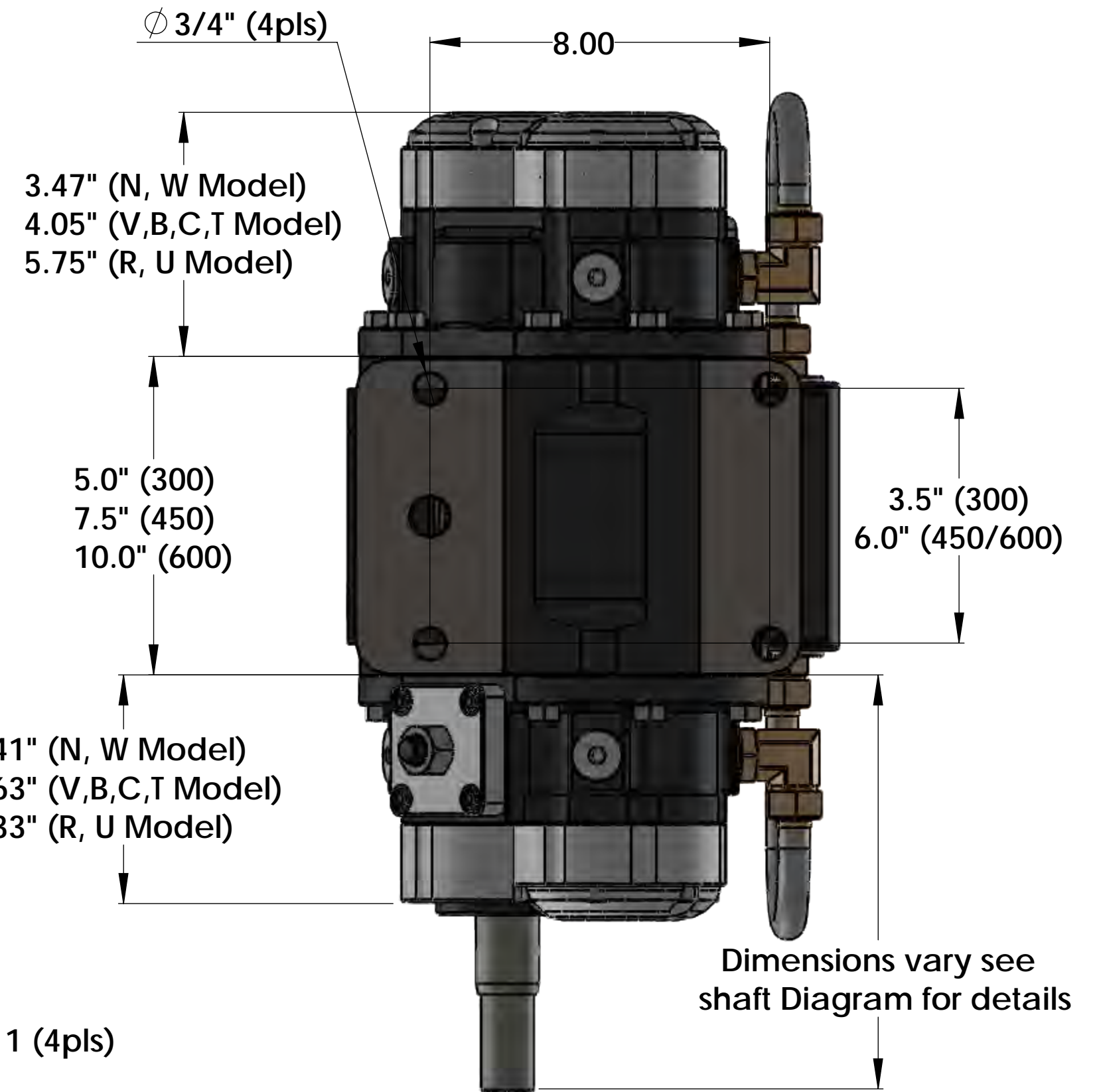
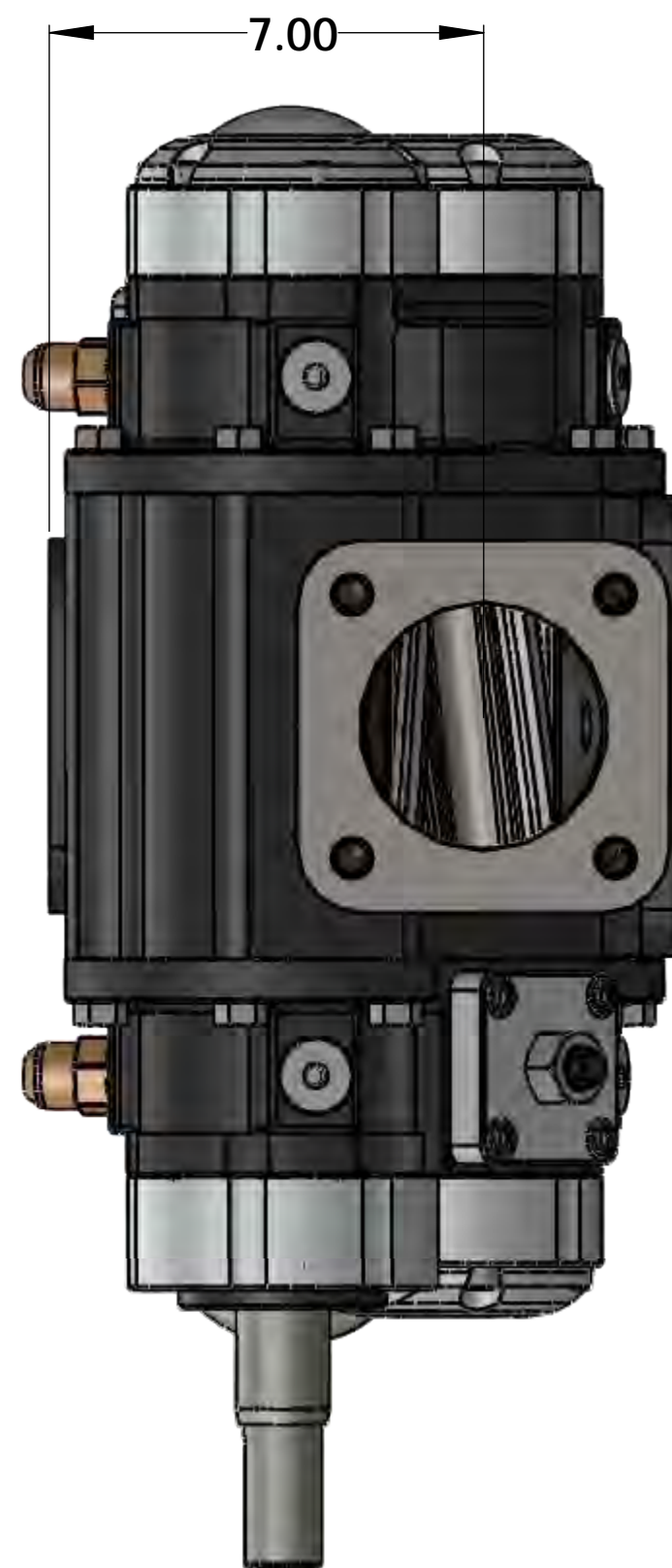
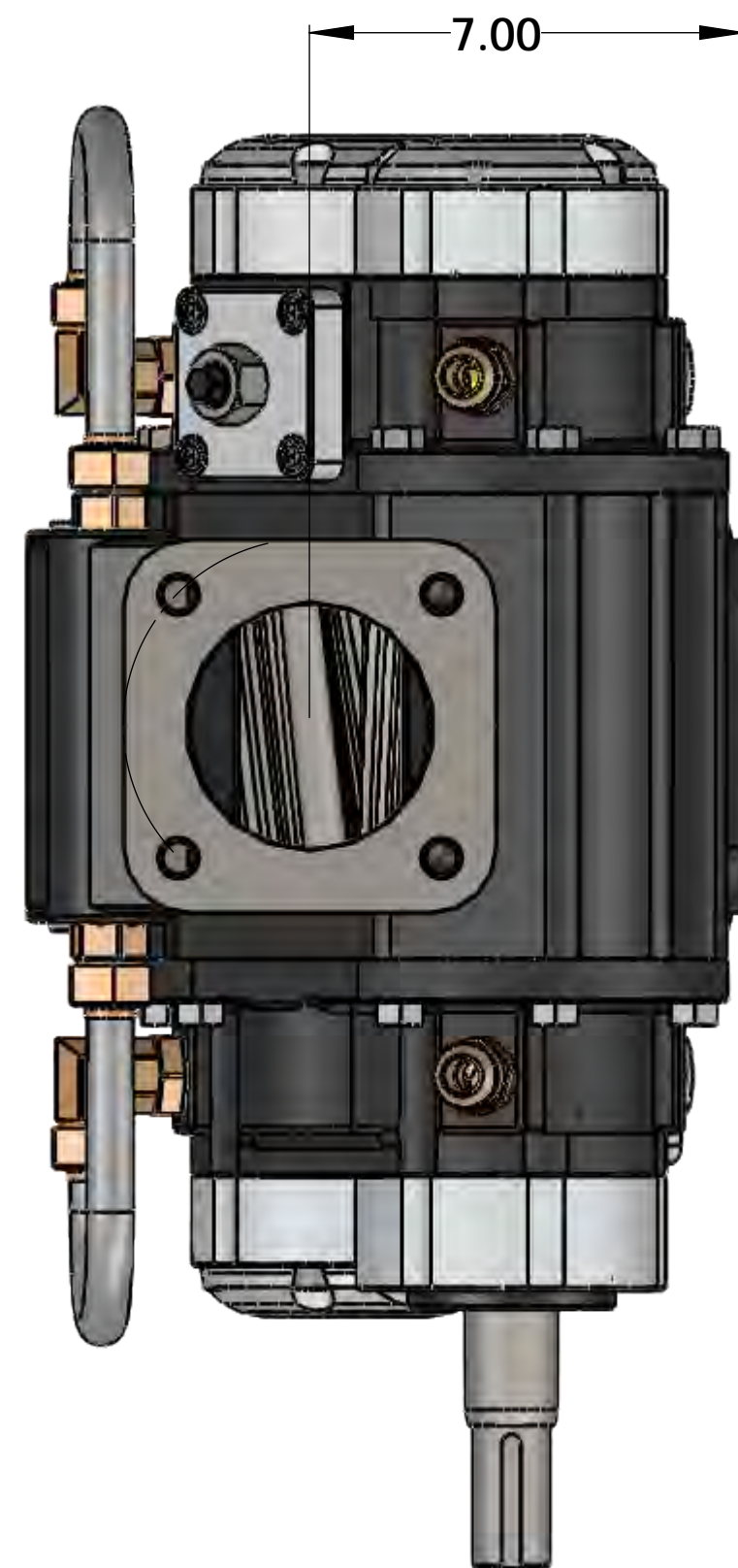
U Style Diagram



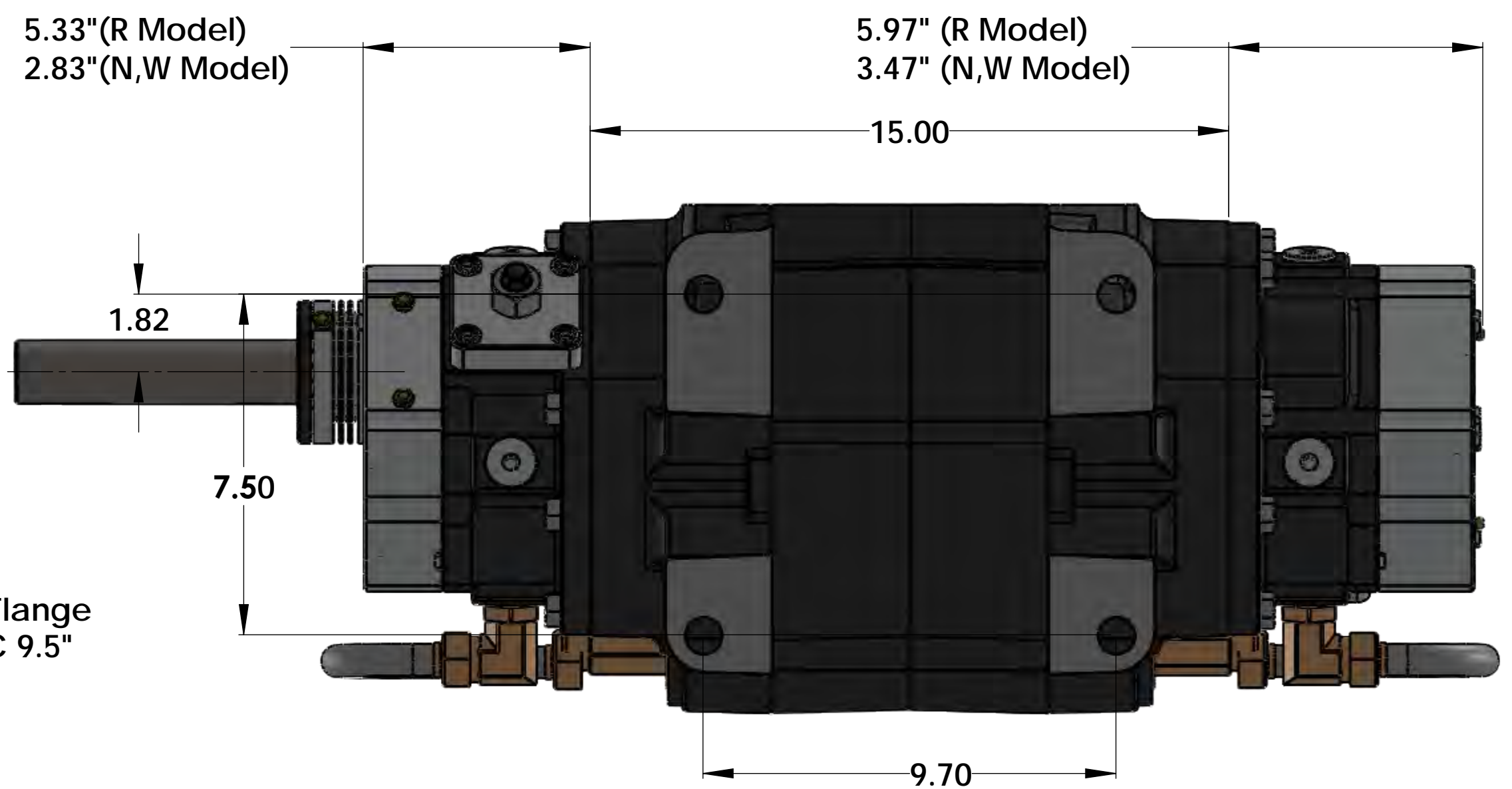
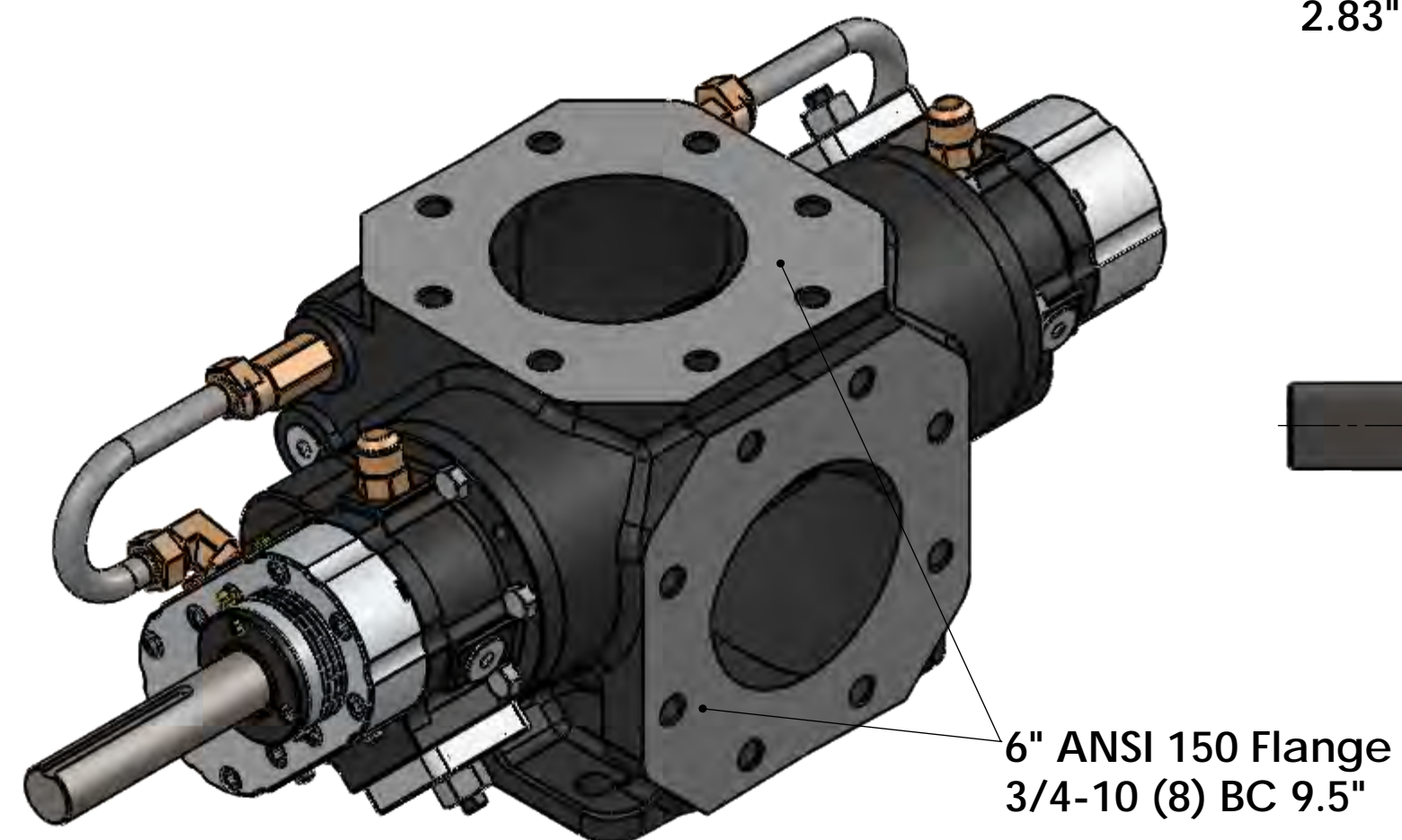
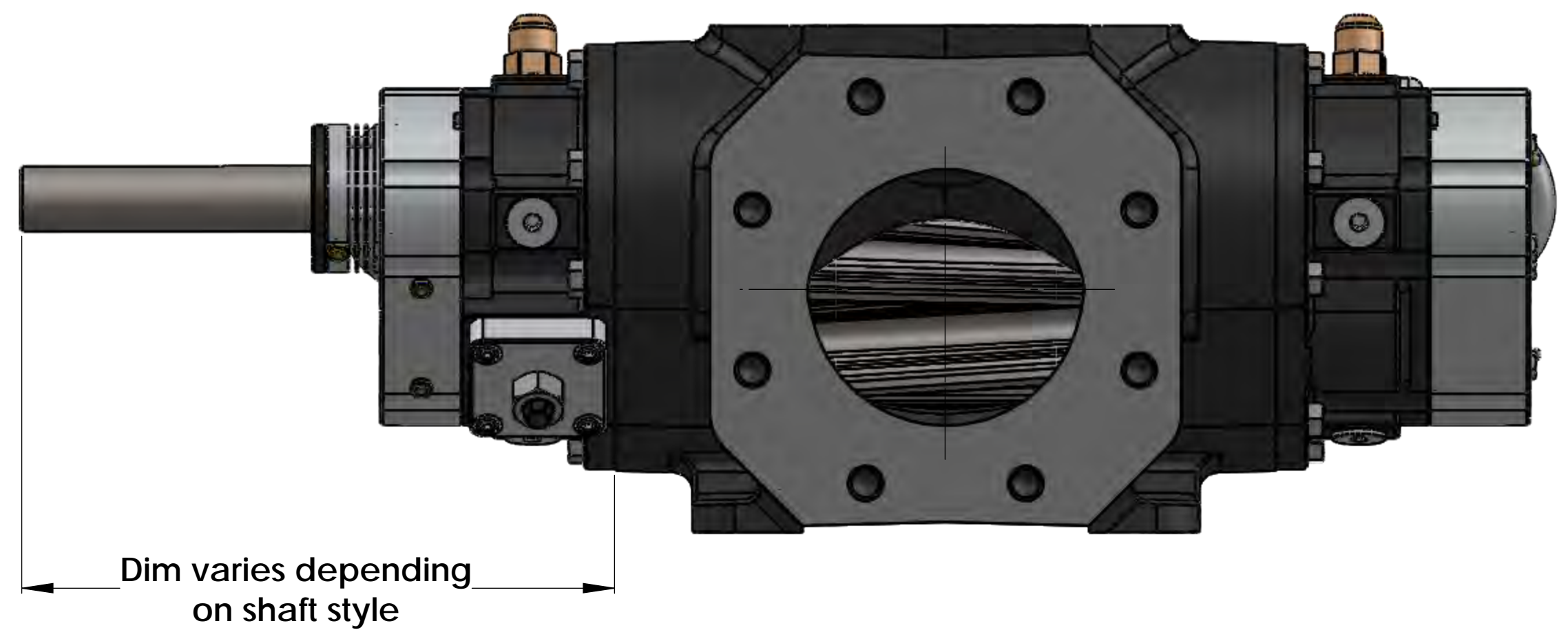
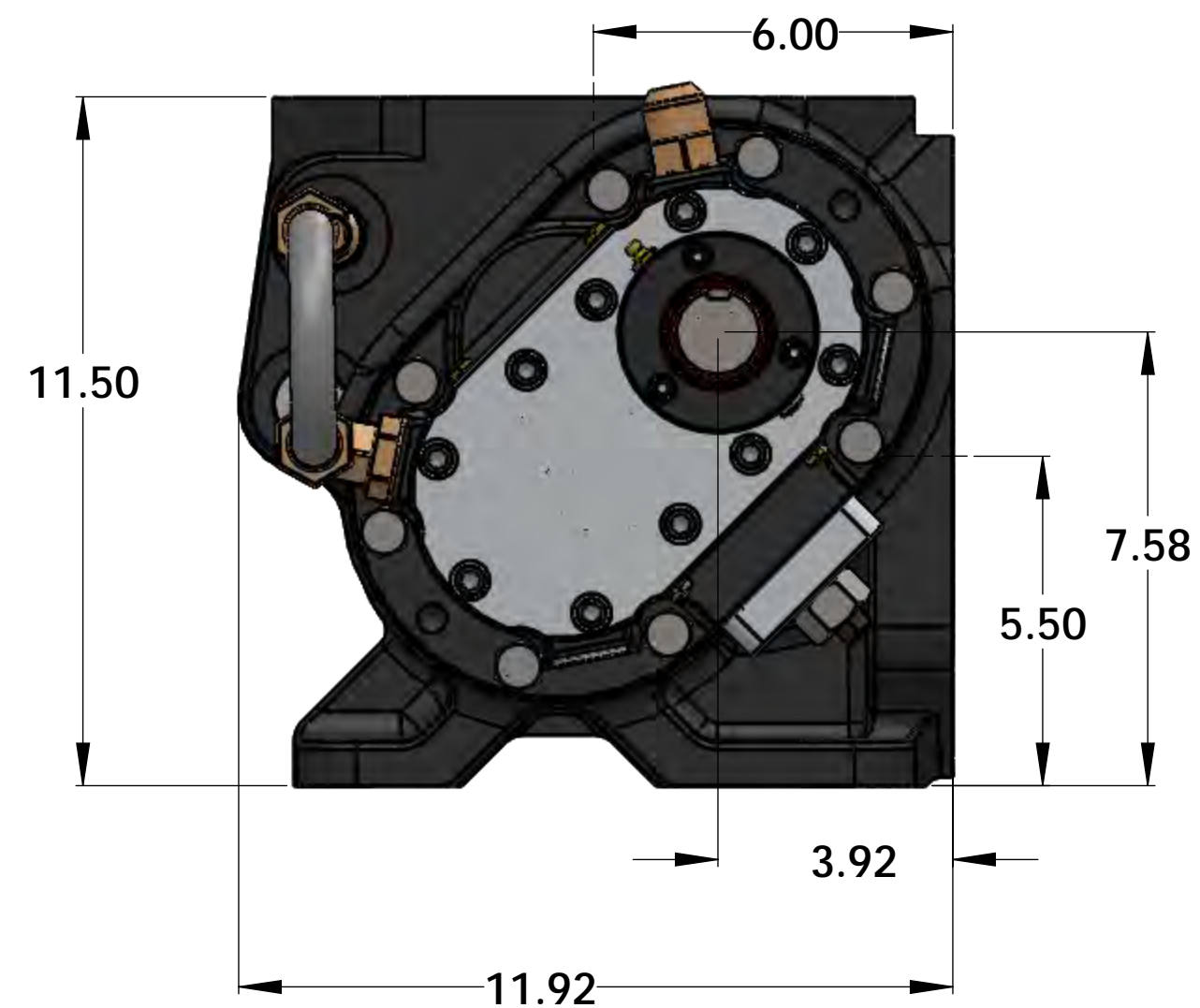
S Style Diagram



Basic Dimensions



900 Basic Dimensions



Shaft Dimensions

Shaft Styles and Dimensions

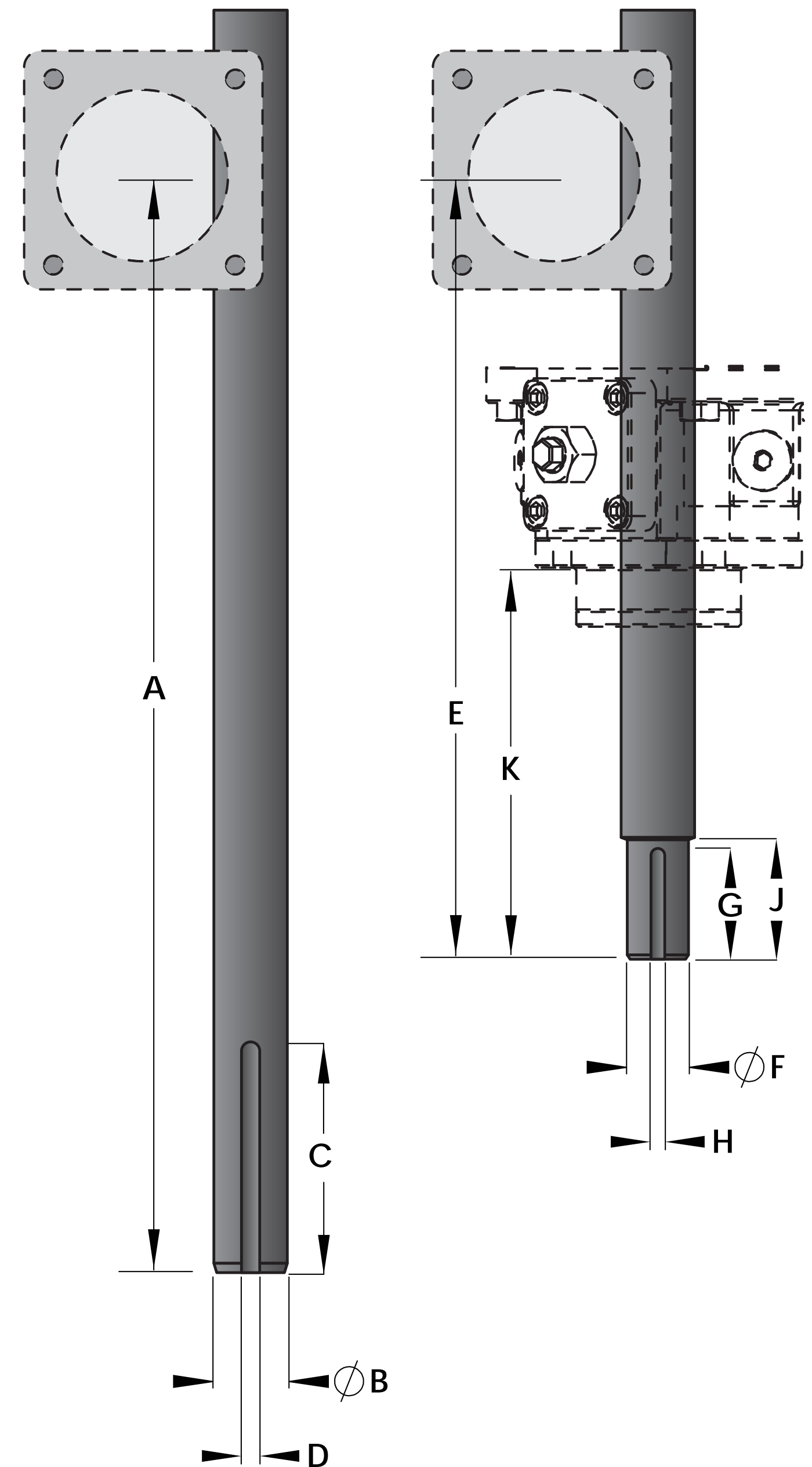
Bearing Pump Series (R, U, S, K)

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

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

Model	Shaft Type	Dimensions										
		A	B	C	D	E	F	G	H	J	K	
300	H					9.43	1.25	2	0.313	2.25	4.5	*
300	S					11.1	1.25	2	0.25	2.25		
300	X	15.25	1.5	5.25	0.375							
450	H					11.93	1.25	2	0.313	2.25	4.5	*
450	S					13.6	1.25	2	0.25	2.25		
450	X	18	1.5	6.25	0.375							
600	H					13.18	1.25	2	0.25	2.25	4.5	*
600	S					13.6	1.25	2	0.25	2.25		*
600	X	18	1.5	6.25	0.375							

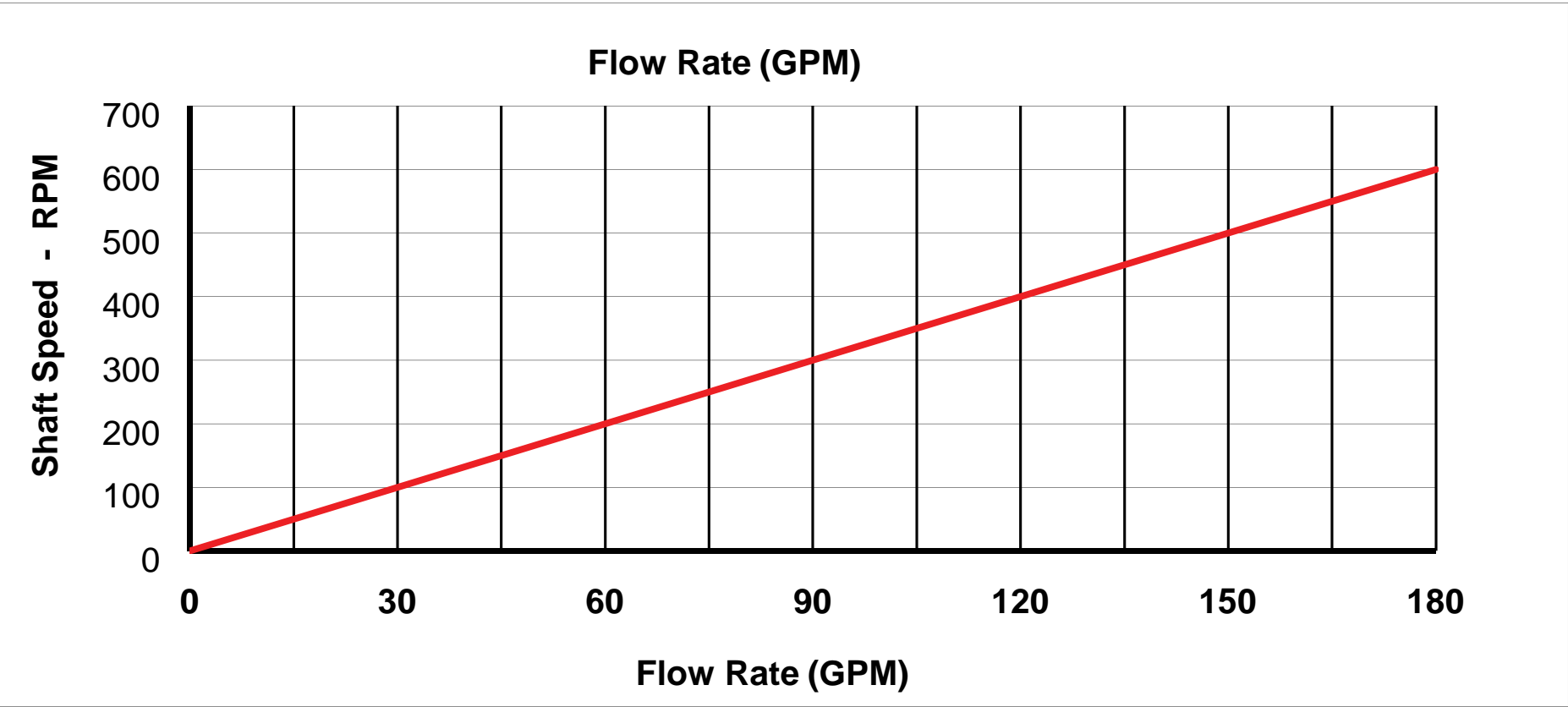
* DENOTES THAT THIS SHAFT CAN NOT BE USED WITH A P-STYLE PACKING BOX



Performance Curves

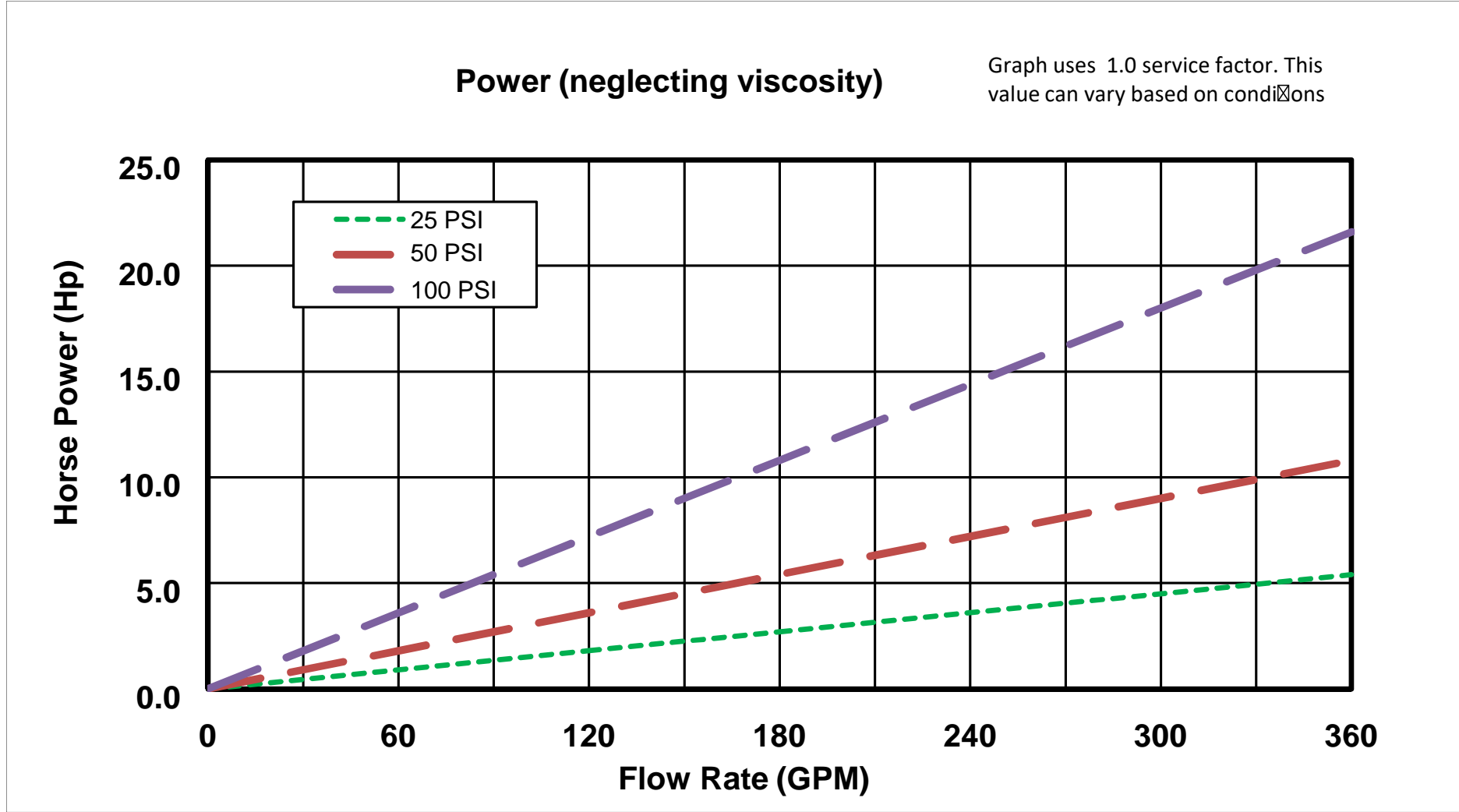
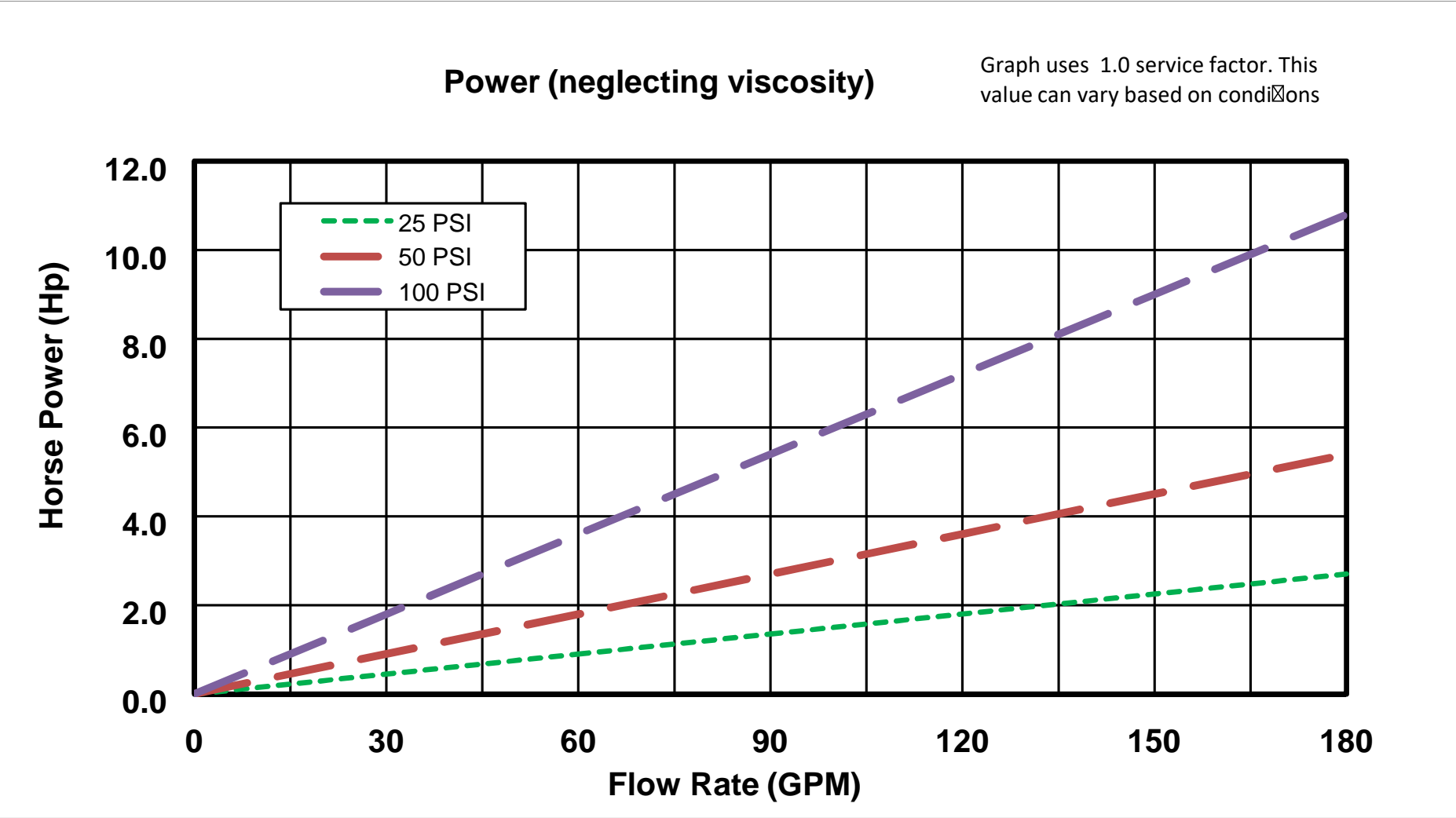
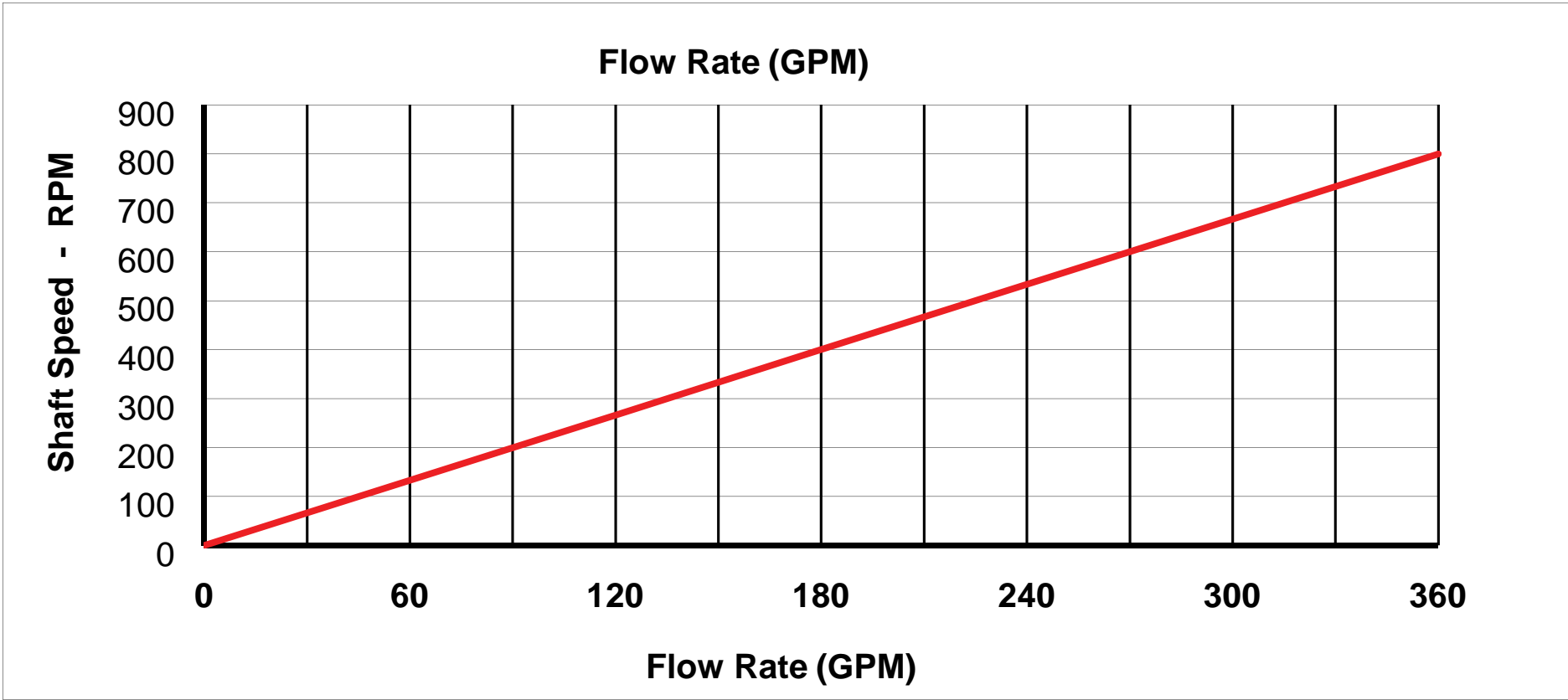
300

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



450

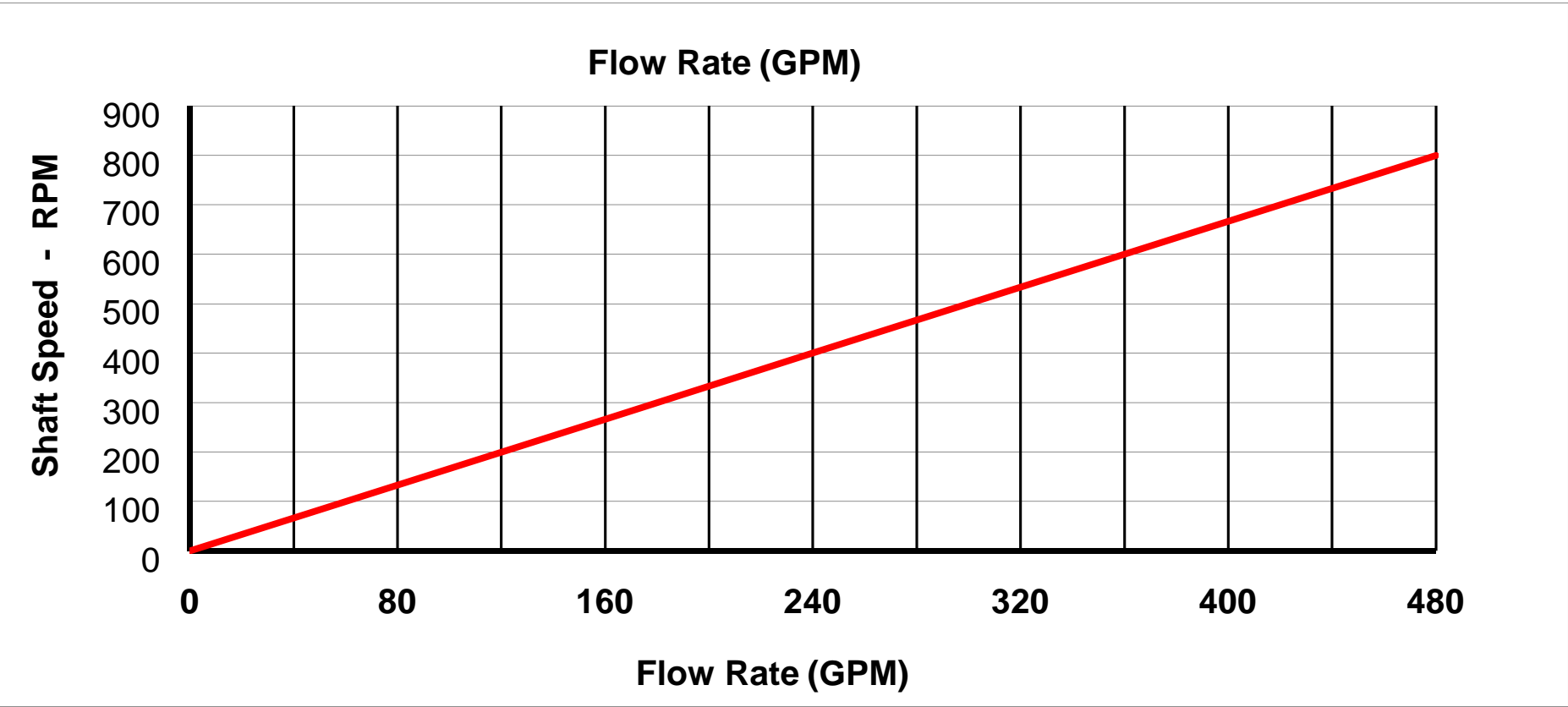
Pump Disp 450
Max RPM 800
Max GPM 360
Port Size 4in Pump Flange*
*Bolt circle on flange is ANSI 3in 150#
*Port adapters available for 4in ANSI 150#, 8-bolt



Performance Curves

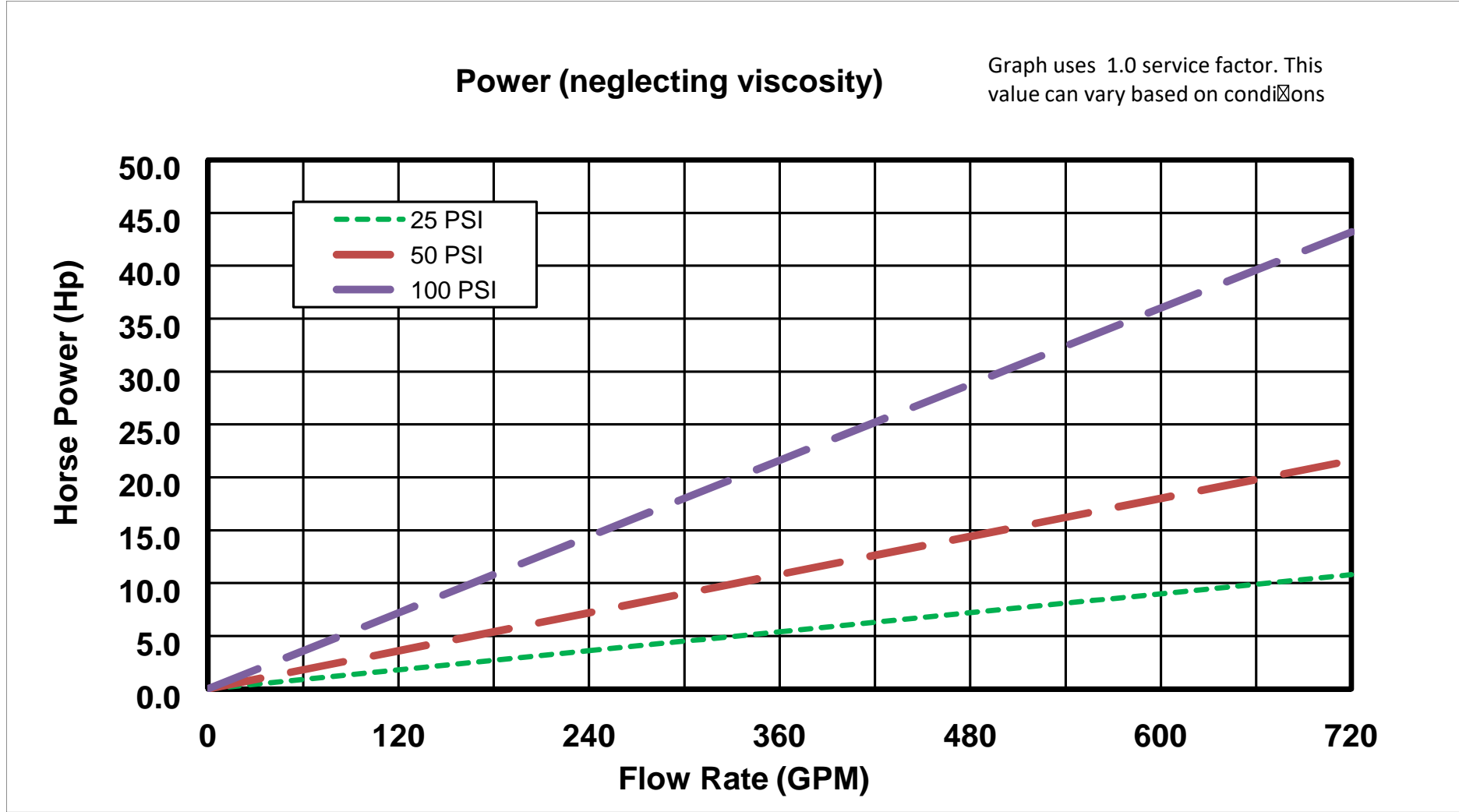
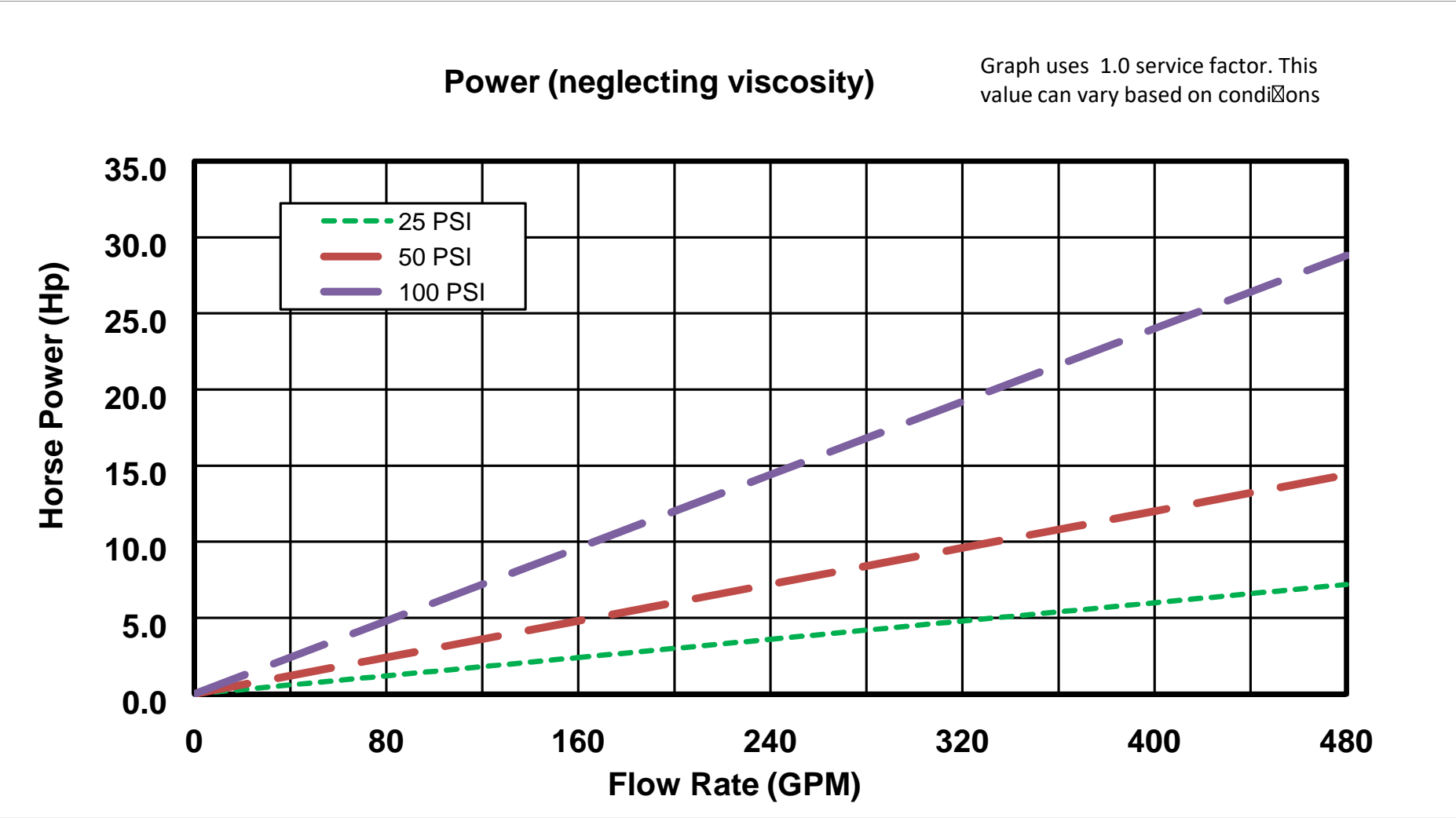
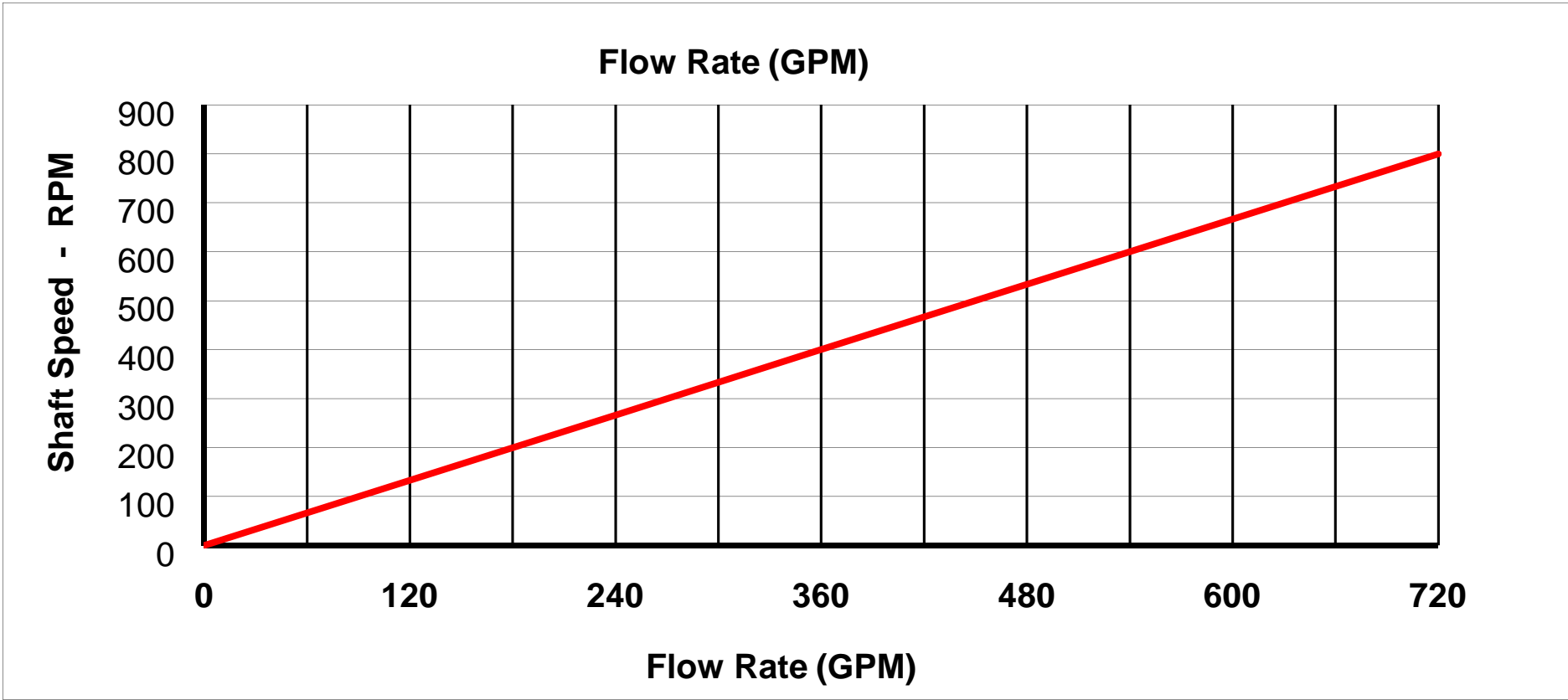
600

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 asphalt tankers. Model numbers for ordering shown in **bold text**.

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

M34: 4in Class 150 Flange Adapter

600VCX-RH: Asphalt Pump

15S: 15HP, 460V Inverter Duty Motor

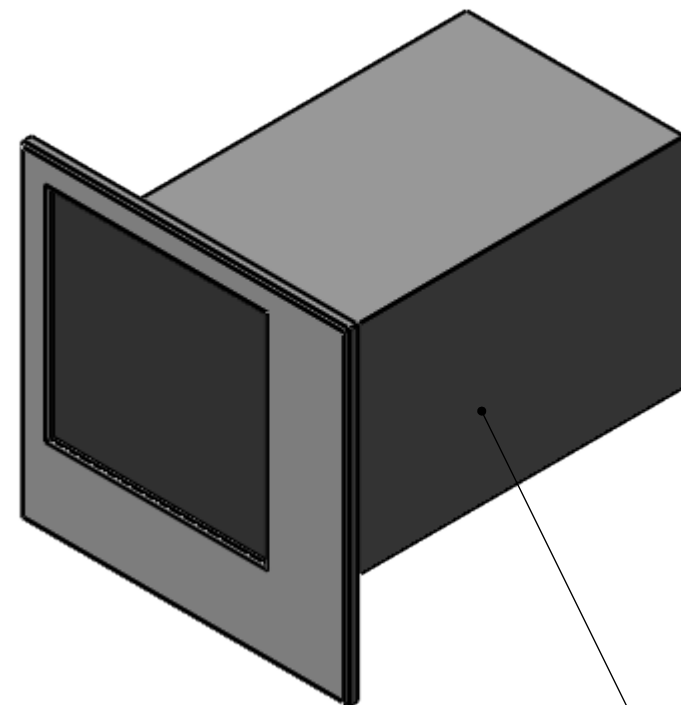
S42-P-3V4.5-3V19: Skid with 4.5" x 19" Pulleys, Belts, Bearing and Guards

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**.

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



3500 Transmitter: MicroMotion 3500 Transmitter

C3030: 3in Pump to Meter Port Adapter

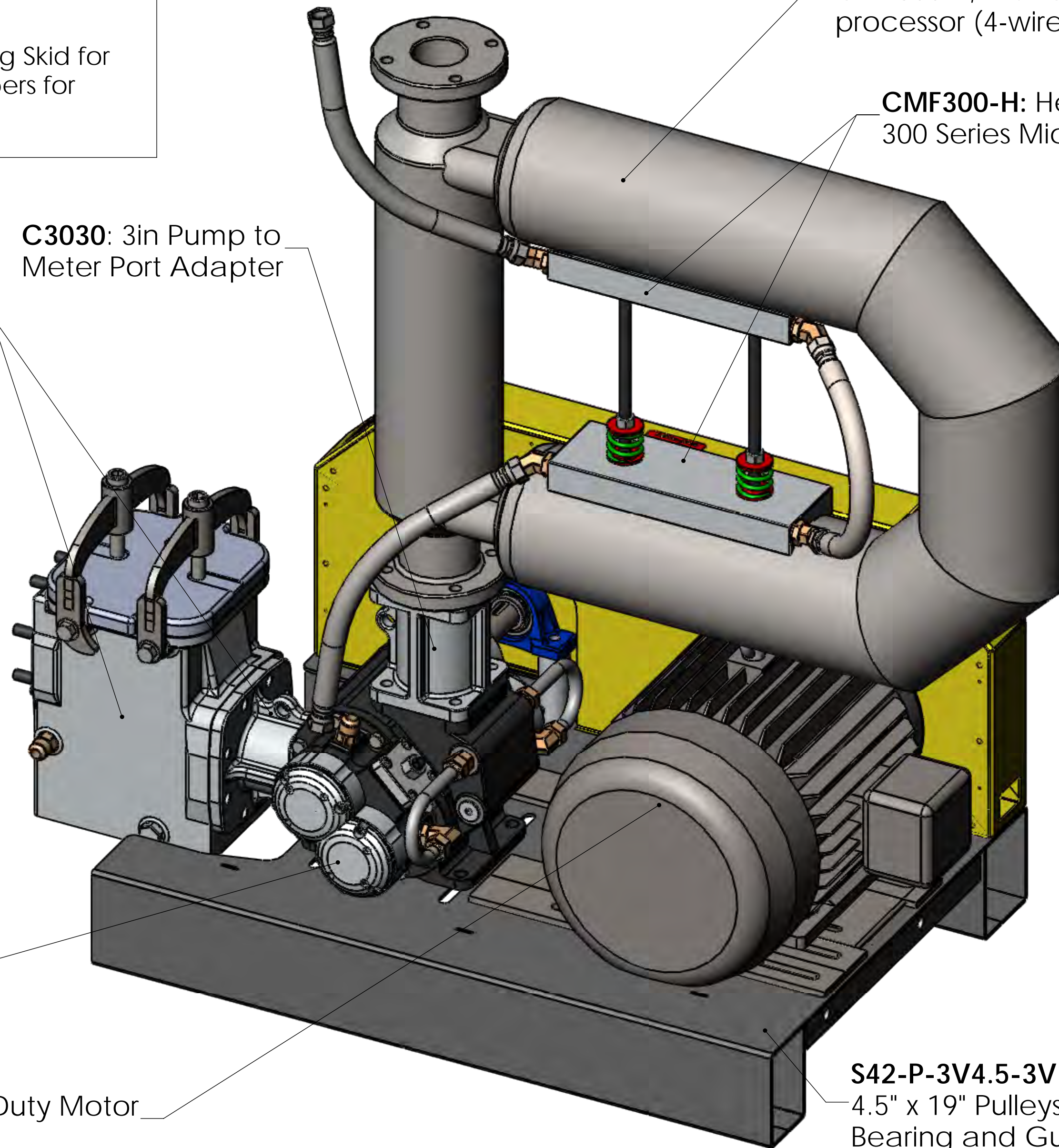
CMF300M: MicroMotion CMF300M, with extended core processor (4-wire)

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

600RCX-RH: Asphalt Pump

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

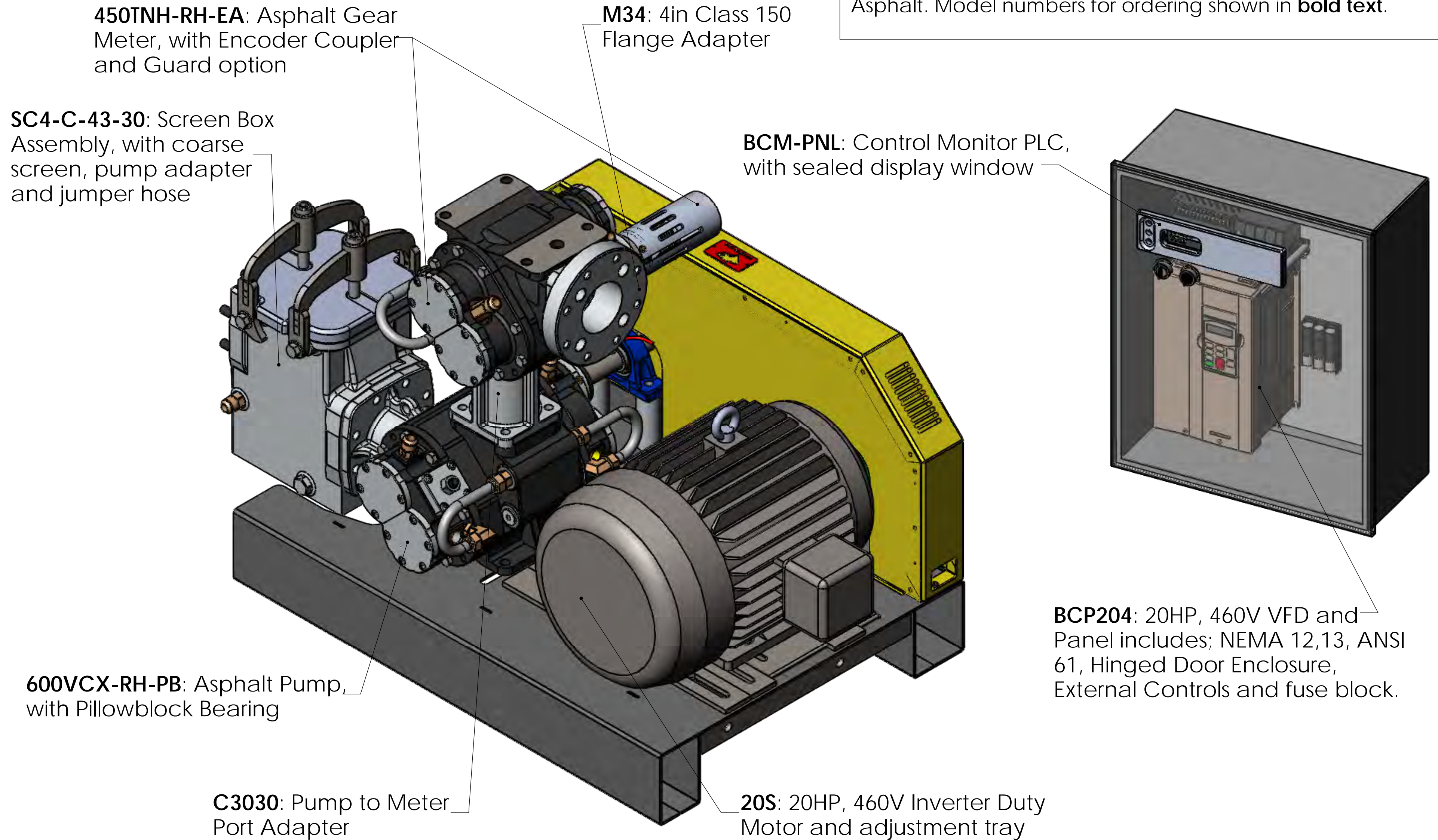
S42-P-3V4.5-3V19: Skid, with 4.5" x 19" Pulleys, Belts, Bearing and Guards



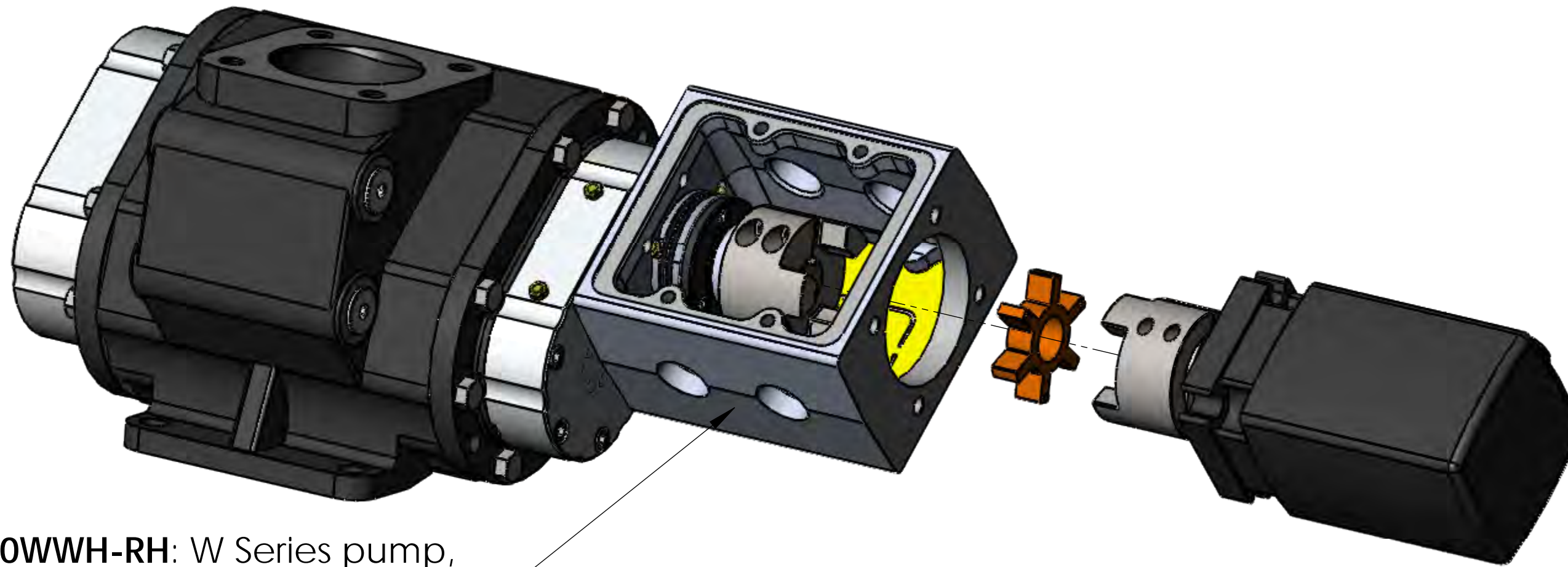
4in Gear Metering Assembly

4in Gear Metering Assembly

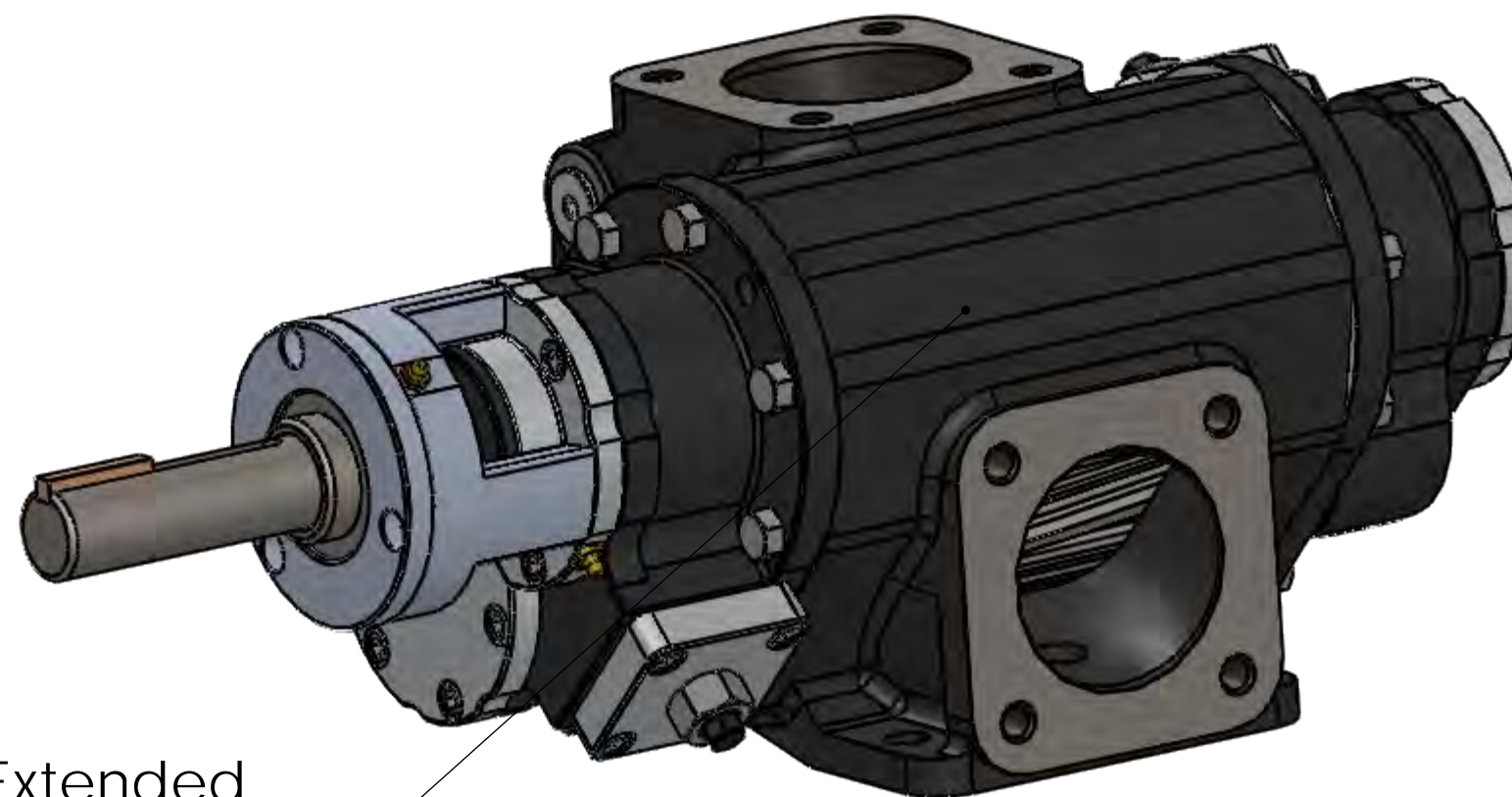
Below is an example of a 4in Gear Meter System for Asphalt. Model numbers for ordering shown in **bold text**.



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.