

BEARCAT ***PUMPS***

PUMP AND METER SERIES

300 / 450 / 600 / 900 **Pump and Meter Manual**

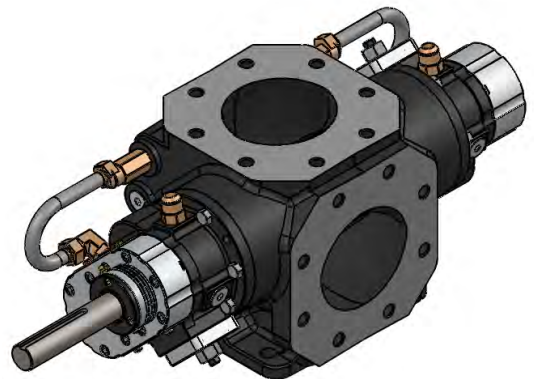
Installation, operation and maintenance | Bearing series

TECHNICAL MANUAL

Rev E | 2026.09.20

Document BCP-300-900-PM

Bearing-only edition



BearCat Pumps

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CONTENTS

Index

Click any blue section title. Drawing pages are landscape for readable part labels.

1	Application and bearing styles	3
2	Safety boundary	4
3.1	Installation and liquid-lock priming	5
3.2	Start, operate and shut down	6
3.3	Relief valves and pressure protection	7
4	Maintenance and service preparation	8
5.1	Read the model number	9
5.2	Shaft, seal and configuration codes	10
6	Performance reference	11
7.1	Cooling double seal - 2020 assembly	12
7.2	Packed seal - 2022 assembly	13
8.1	K style end plate	14
8.2	N style end plate	15
8.3	R style end plate	16
8.4	U style gear-meter end plate	17
8.5	S style end plate	18
9.1	300 / 450 / 600 basic dimensions	19
9.2	900 basic dimensions	20
9.3	Bearing-series shaft dimensions	21
10.1	Micro Motion metering skid	22
10.2	Pump and gear metering system	23
11	Service evidence and revision record	24

USE THE CORRECT MANUAL

This edition covers bearing designs. Service information for C, B, V, T and W styles is in the Legacy Pump and Meter Manual.

Application and bearing styles

This manual covers 300, 450, 600 and 900 Series bearing pumps and metering systems using either a U style bearing gear meter or a Micro Motion meter. Match the complete model number and installed equipment before using a drawing or ordering parts.

BEARING-ONLY PRODUCT FAMILY

BearCat has standardized this pump family on bearings after extensive operating experience. The retained styles below use bearings to support the gear shafts.

Styles covered by this edition

Style	Construction / duty	Integral relief	Heat arrangement
K	Bearing pump	Yes	Unheated base; electric-heat option shown on drawing
N	Bearing pump	No	Unheated base
R	Bearing pump	Yes	Heat-traced
U	Bearing gear meter	No	Heat-traced
S	Sealed-bearing pump	Yes	Unheated base

The style describes the base construction. Options, seal materials and allowable service must match the actual build. A cavity or fitting in a drawing does not by itself establish an installed heating system.

Legacy equipment

Styles **C, B, V, T and W** are obsolete and are excluded from this edition. All bushed pump designs are excluded. Use the Legacy Pump and Meter Manual for those units; this revision does not change their parts or service requirements.

CODE POSITION MATTERS

A pump-style letter is only one part of the model number. For example, C can still identify a seal or shaft, and B can identify a blocked relief passage. See pages 9-10.

Safety boundary

Only trained personnel should install, operate or service this equipment. Follow the equipment owner's procedures and the requirements for the material being handled.

BEFORE INSPECTION OR SERVICE

Stop the process, isolate and lock out all drive and heating energy, relieve trapped pressure, control hot product and verify zero hazardous energy. A stop button, HMI or VFD is not an energy-isolation device.

Protect people and the installation

- **Hot product:** Any pump that is heated or pumping hot liquid should be operated with Safety Blankets properly installed. Keep the protection maintained and use the required face, hand and body protection.
- **Pressure:** Provide suitable pressure protection for the pump, piping and accessories. Confirm the discharge and relief paths before starting; a positive-displacement pump must not run against a blocked outlet.
- **Moving parts:** Fit all coupling, belt and shaft guards before operation. Keep hands, clothing and tools clear of the drive.
- **Opening the system:** Do not loosen a plug, hose, cover or fastener to check whether pressure is present. Isolate, depressurize and drain by the established procedure first.
- **Electrical and heating work:** Use qualified personnel and the component manufacturer's instructions. Heat only equipment built for that service.
- **Lifting and support:** Use lifting equipment suited to the complete assembly. Support the pump and piping so the ports do not carry unsupported pipe loads.

STOP FOR AN UNSAFE CONDITION

Stop if there is uncontrolled leakage, loss of flow, abnormal noise or vibration, a drive trip, or pressure outside the approved operating range. Find the cause before restarting.

Installation and liquid-lock priming

1 Prepare the system

Confirm the pump, seals, drive and heating arrangement suit the product. Clean the suction piping and screen box; remove installation debris.

2 Support, align and connect

Secure the assembly, support the piping and verify drive alignment. Keep the suction path open and airtight. Provide accessible pressure and vacuum readings.

3 Establish a safe flow path

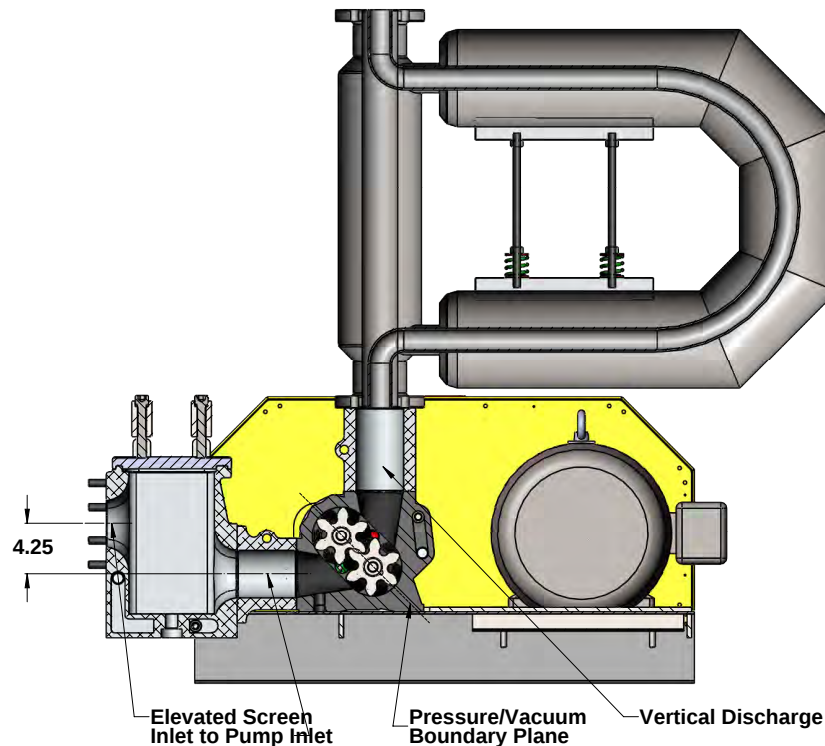
Check valve positions, discharge routing and pressure protection. Confirm that any relief return path is available in the intended direction.

4 Prepare to prime slowly

Where practical, add compatible pumped liquid to wet the pump before first startup. Bring heat-traced equipment to the required operating temperature before turning it.

Liquid-lock arrangement

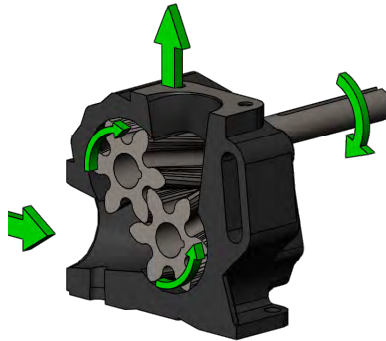
The illustrated arrangement combines an elevated screen inlet, the pressure/vacuum boundary and an upward discharge route. Retained liquid supports priming at low speed and helps keep the pumping elements wetted.



Example liquid-lock arrangement. The 4.25-in dimension belongs to the assembly shown; use the installation drawing for the actual piping geometry.

Start, operate and shut down

Begin at low speed. Increasing speed does not correct an empty pump or a restricted suction line.



Rotation and flow example. Verify the installed direction before operating.

- 1 Check free movement with energy isolated**
With the pump safe and depressurized, confirm it turns freely by hand. Restore every guard before energizing.
- 2 Verify heat, valves and liquid supply**
Open the required valves gradually and check for leakage. Confirm the product can flow and the pressure-protection path is available.
- 3 Check rotation with a brief controlled jog**
Keep guards in place and people clear. Compare the observed rotation and flow path with the installed arrangement.
- 4 Start slowly and confirm delivery**
Watch discharge pressure, suction vacuum, drive load and leaks. If flow does not establish, stop and investigate.
- 5 Increase speed only as conditions allow**
Stay within the pump and complete-system limits. Watch the readings as the rate changes; record normal values in the service log.

Normal shutdown and reversal

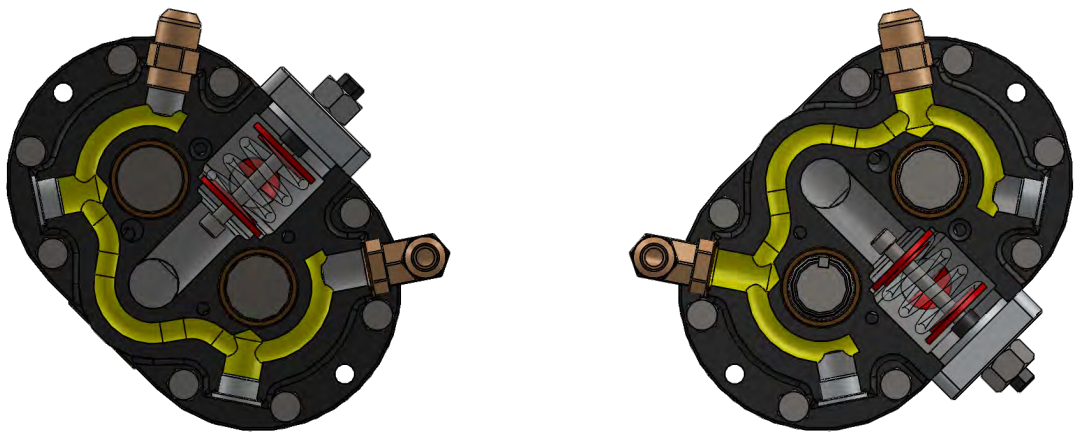
Reduce speed and stop the drive before changing the flow direction. Verify valves, destination and pressure protection for reverse operation before restarting slowly. For shutdown, stop before closing a valve that would block a running pump; secure the system under the site procedure.

Relief valves and pressure protection

PRESSURE PROTECTION IS REQUIRED

Provide protection sized for the actual flow, speed, viscosity and piping arrangement. An internal relief valve is a bypass device, not a pressure regulator or a substitute for a properly designed relief system.

Each end-plate relief valve works in one flow direction. Reversing flow changes which valve can bypass. K, R and S configurations include relief provisions; N pumps and U gear meters require pressure protection elsewhere in the system.



Cutaway feature	Meaning
Red passage	Internal pressure-bypass path
Yellow passage	Heating passage, separate from the product bypass
Opposite end plates	The active bypass depends on flow direction; verify protection in both directions when reversal is used.

What a relief setting means

Opening pressure is where a valve begins to bypass; pressure can rise as more flow is forced through it. A stated test value such as **80 psi at 100 GPM** describes that test condition. It does not establish the same pressure at every flow or guarantee a maximum system pressure.

Do not set pressure by bolt position or counted turns alone. Adjustment and testing require an approved procedure, appropriate gauges and a safe discharge path. Confirm the setting for the actual duty; do not assume every pump was factory set for the installation.

Maintenance and service preparation

Inspect from recorded evidence. Keep a log of leakage, temperature, suction vacuum, discharge pressure, speed and drive load so a change in condition is visible.

When / condition	Check and action
Before operation	Check the liquid supply, screen condition, valve positions, guards, Safety Blankets where required, visible leaks and secure mounting.
Initial heat-up / routine inspection	Thermal cycling can loosen connections. After safe shutdown and isolation, inspect and check fasteners using the values for the installed design.
Lubrication	Identify each lubrication point and the installed bearing/seal assembly. Use the specified grease, amount and interval for that build; confirm the lubricant, amount and interval for the product and operating temperature with BearCat.
Leakage, noise or load change	Record the conditions, stop when necessary and inspect the cause. Do not compensate for a developing fault by increasing speed or tightening unrelated parts.
Before opening the pump	Isolate all energy, cool as needed, depressurize and drain safely. Record the model, orientation and gasket arrangement before disassembly.

Grease the correct assembly

Identify the bearing-cap zerks and the separate seal-spacer zerk where fitted. Greasing the seal spacer does not grease the bearing caps. Match the lubricant to the pumped material and operating temperature; use the amount and interval specified for the installed build.

Use a hand-operated grease gun and avoid forcing grease against a seal. **Grease is useful. Hydraulic pressure delivered through a grease gun is not.**

Trace a leak before choosing parts

Record whether the leak is product or grease, and whether it begins at the shaft seal, cap joint or fitting. Note whether it started after greasing, heat-up, reversal or recent service. The cooling double seal and packing assembly have different service parts; identify the fitted assembly on pages 12-13.

N, R and U bearing caps: match the cap gasket or pre-2019 cap O-rings to the installed build.

Fastener torque: use the chart on the matching K, N, R, U or S drawing (pages 14-18). Each chart identifies the fastener location, thread/length and torque for that drawing.

Read the model number

Read the code by position. The same letter can mean different things in the style, seal, shaft, relief or option fields.

ILLUSTRATIVE MODEL CODE

600 R C X - RH - AA - PB - .045

Example bearing-pump build. Read the full code and match it to the installed equipment before selecting parts.

Field	Example	Meaning
Displacement	600	0.60 gal/rev nominal displacement
Pump / meter style	R	Bearing pump with relief and heat tracing
Shaft seal	C	Wide cooling double-seal arrangement
Drive shaft	X	Extended shaft
Configuration	RH	Right side port, high shaft; viewed looking down the drive shaft toward the pump
Top / side outlet relief	AA	Adjustable top-outlet and side-outlet relief designations
Option	PB	Pillow block bearing
Combined gasket clearance	.045	Recorded assembly-clearance code; preserve the build specification

Relief and option codes

Relief: A = adjustable; B = blocked; 4 = fixed 40 psi at 100 GPM; 8 = fixed 80 psi at 100 GPM. These codes identify the build and its stated test condition; see page 7 before interpreting pressure behavior.

Options: OB = outboard bearing; PB = pillow block; EH = electric-heat cavities; EA = encoder guard and coupler, with encoder supplied separately. Multiple option codes can be combined.

Combined-clearance codes include .030, .045 and .060. Use the verified assembly record for the actual gasket stack and clearance; the code alone is not a field-adjustment instruction.

Shaft, seal and configuration codes

Shaft code	Identification
X	Extended shaft
H	Hydraulic-mount shaft
C	Custom-cut shaft; use the specified finished dimensions
D / L	Additional bearing-series shaft codes listed in the dimension table on page 21; order by the complete build identification.

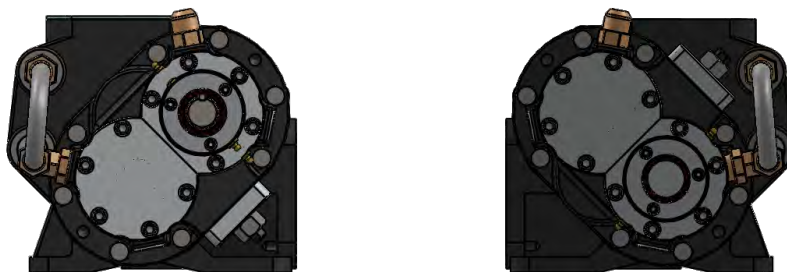
Seal codes identify a separate assembly

Seal code	Seal arrangement
C	Wide cooling spacer, double seal; current retained assembly on page 12
N	Narrow cooling spacer, double seal
B	Bearing spacer, double seal
H / J	Packed seal: heated / non-heated designation; retained packing assembly on page 13

These are identification definitions, not a seal-interchangeability chart. Match the installed seal to the complete model and serial record with BearCat before choosing a replacement.

View from the drive-shaft end

RH = right port / high shaft; **RL** = right port / low shaft;
LH = left port / high shaft; **LL** = left port / low shaft.

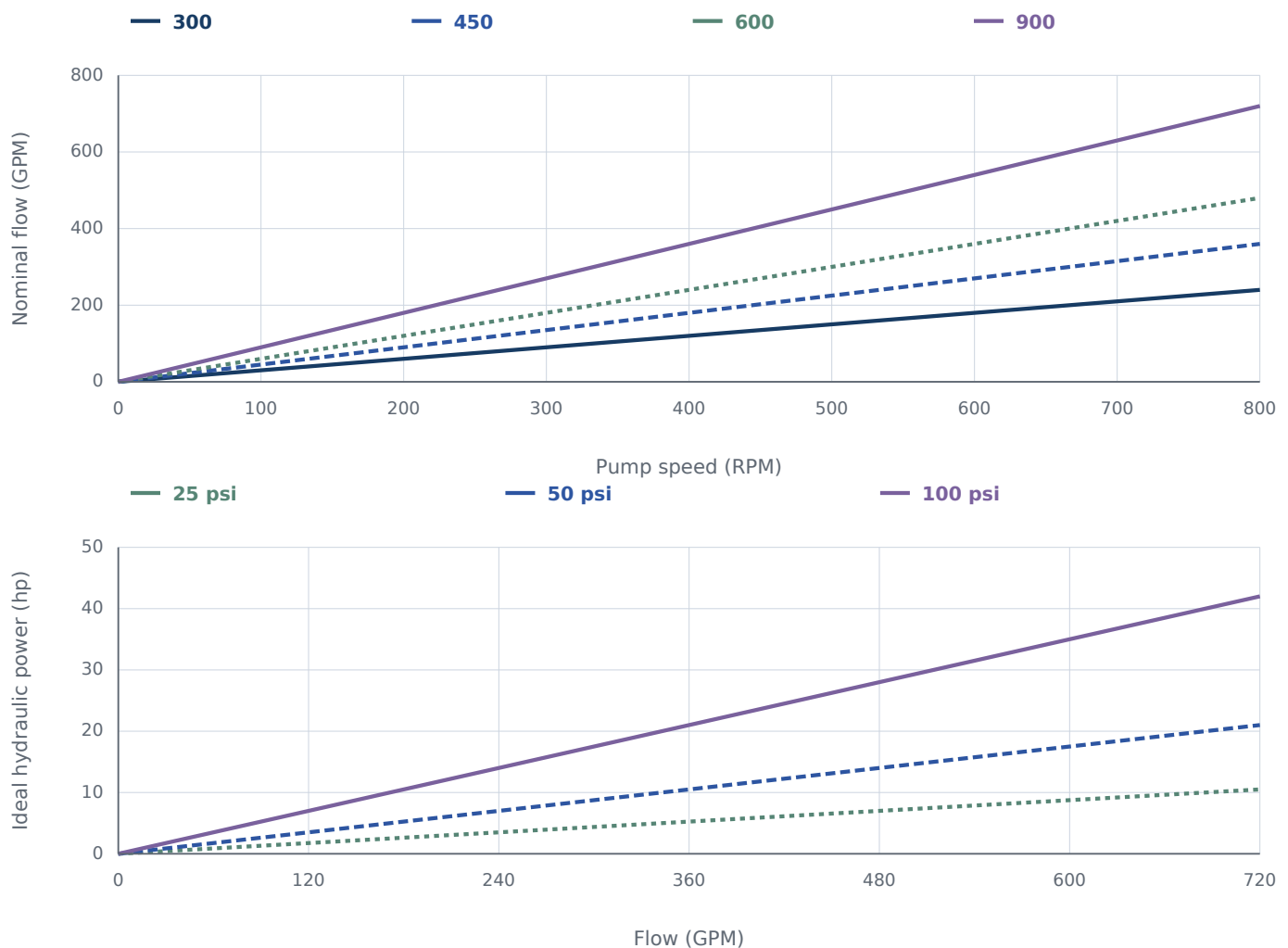


Left image: RH. Right image: LL. These define the viewing convention.

Performance reference

Series	Nominal gal/rev	Maximum RPM	Nominal GPM at max RPM
300	0.30	800	240
450	0.45	800	360
600	0.60	800	480
900	0.90	800	720

Reference flows assume nominal displacement. Actual delivery and usable speed depend on the product, temperature, inlet conditions, pressure, drive and installed equipment.



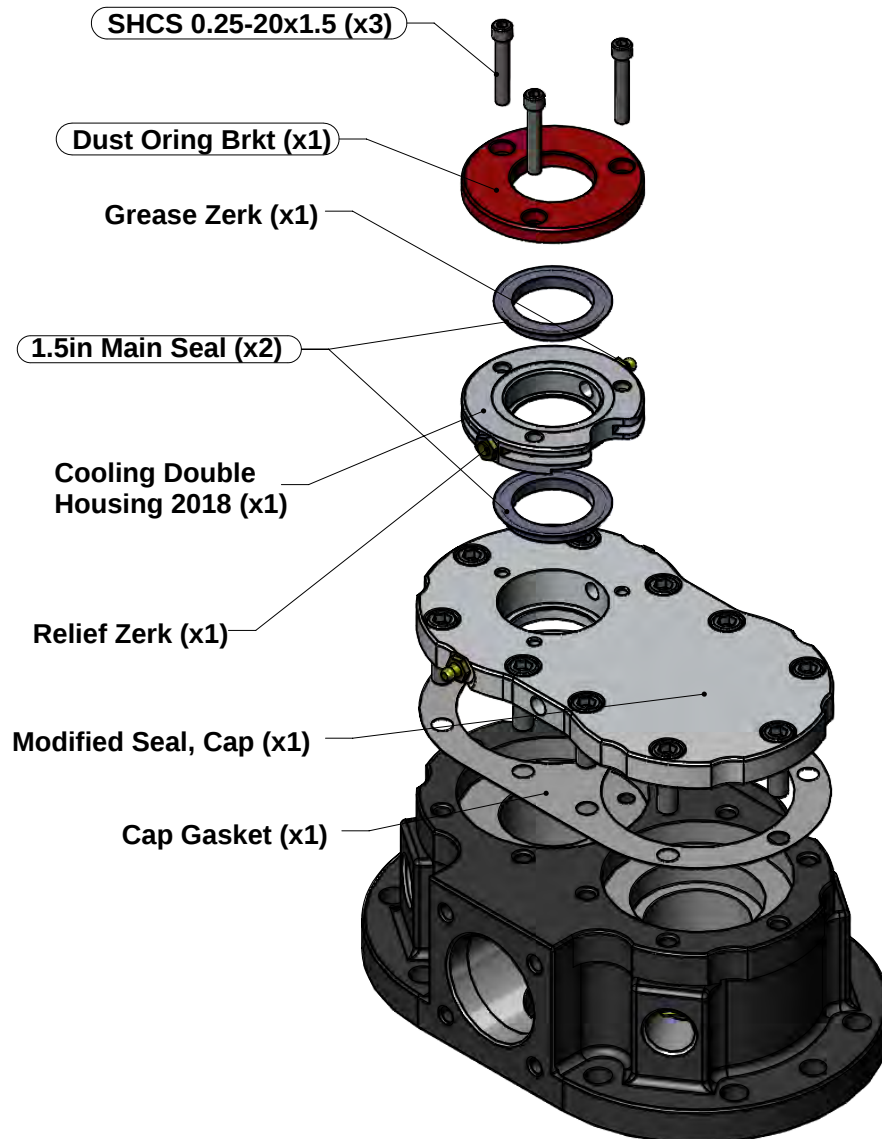
Nominal flow = gal/rev x RPM.

Ideal hydraulic hp = GPM x differential psi / 1714. The power curves neglect viscosity and use a 1.0 service factor. They are a reference, not a motor-sizing calculation; mechanical and viscous losses increase required shaft power.

A VFD or suitable hydraulic speed control allows a slow start and rate adjustment as conditions change. Set initial and maximum speed for the actual duty; a catalog maximum is not a startup target.

Cooling double seal - 2020 assembly

This cooling double-seal assembly uses two main seals and a separate cooling housing. Match the hardware and cap arrangement to the installed pump.



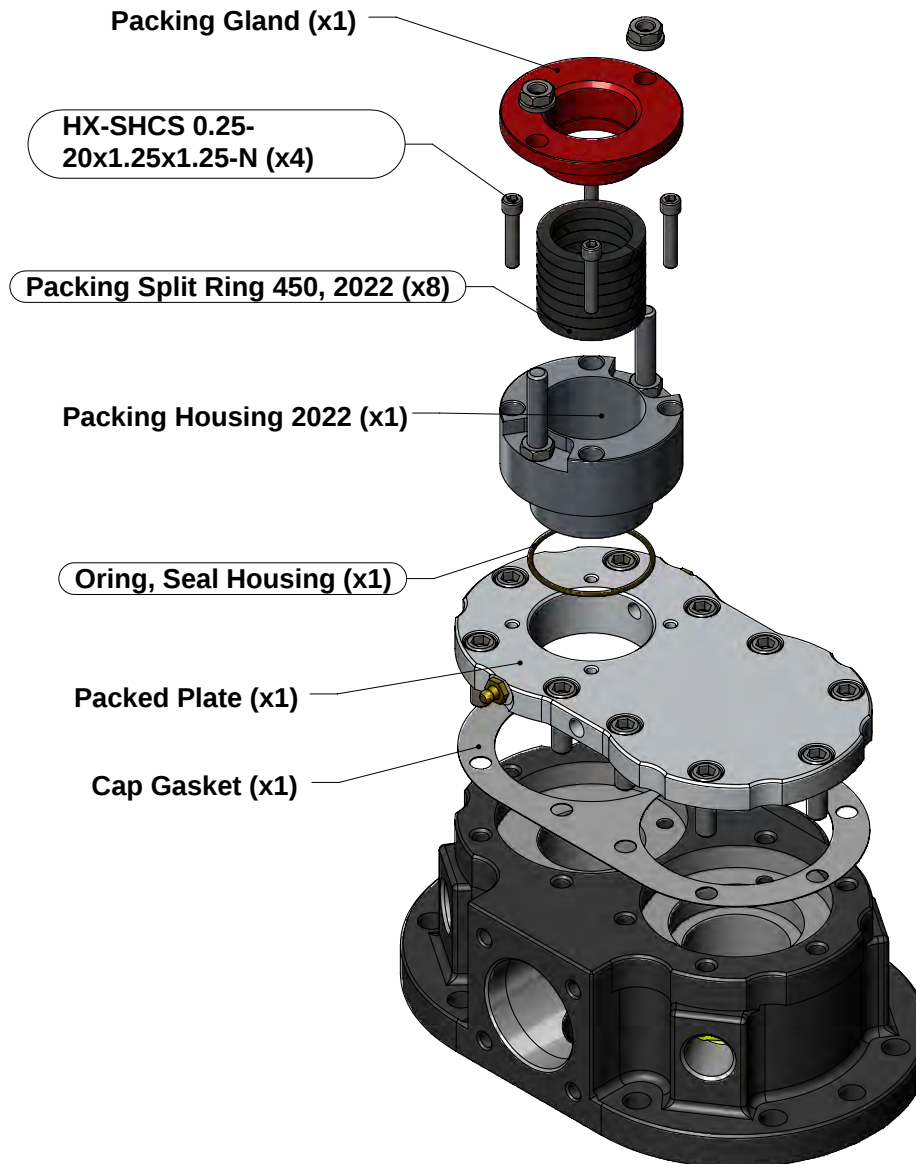
Outlined callouts identify seal-kit items. Match the cap, gasket and seal arrangement to the installed assembly before ordering.

SERVICE BOUNDARY

Isolate the drive and heating energy, cool as required, depressurize and drain before opening the seal assembly.

Packed seal - 2022 assembly

The gland, packing set, housing and plate form a separate shaft-seal assembly. Packing seals the shaft; bearings support it.



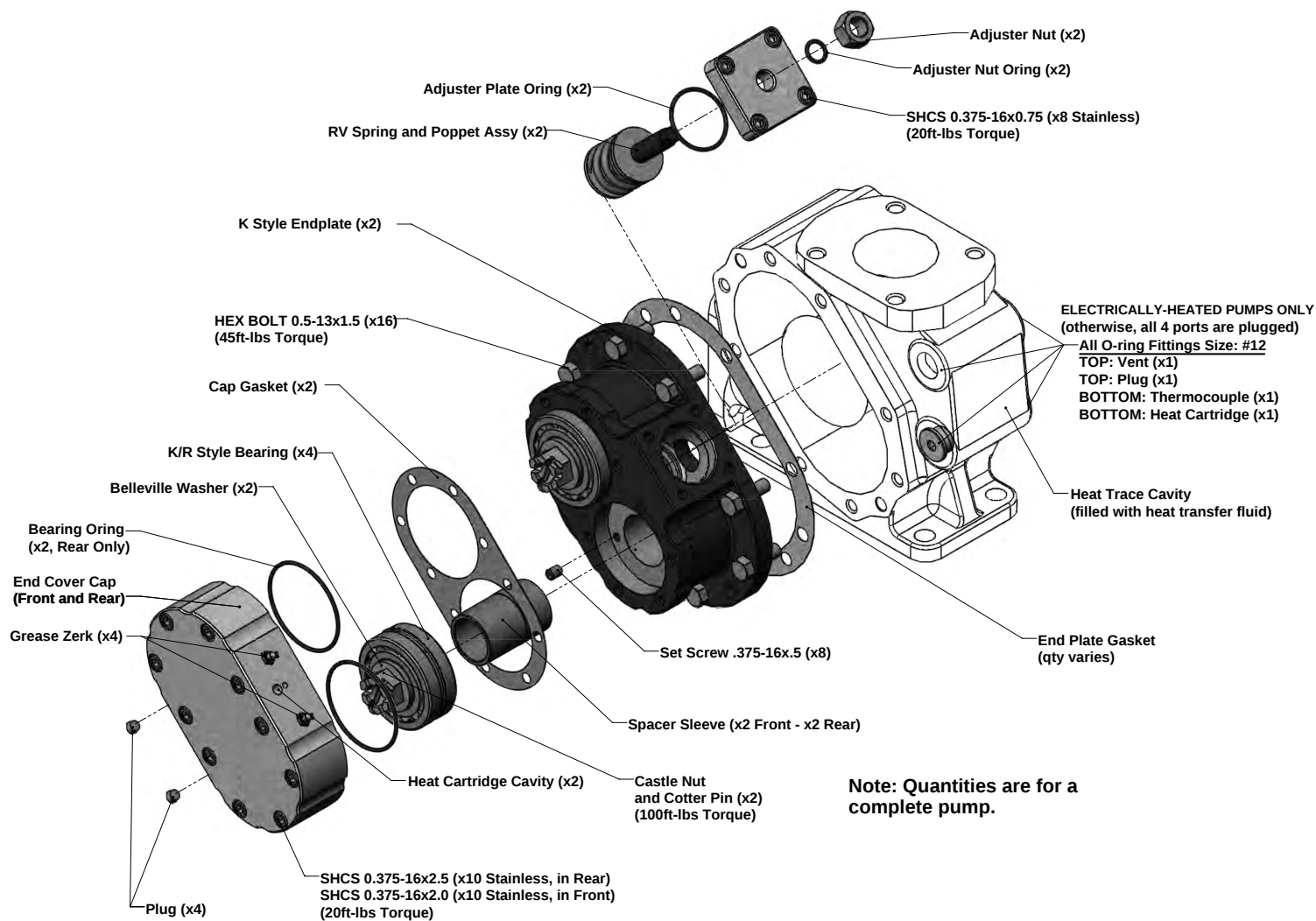
Outlined callouts identify seal-kit items. Match the packing size, split-ring set, gland hardware and component sequence to the actual build.

SERVICE BOUNDARY

Isolate the drive and heating energy, cool as required, depressurize and drain before opening the seal assembly.

K style end plate

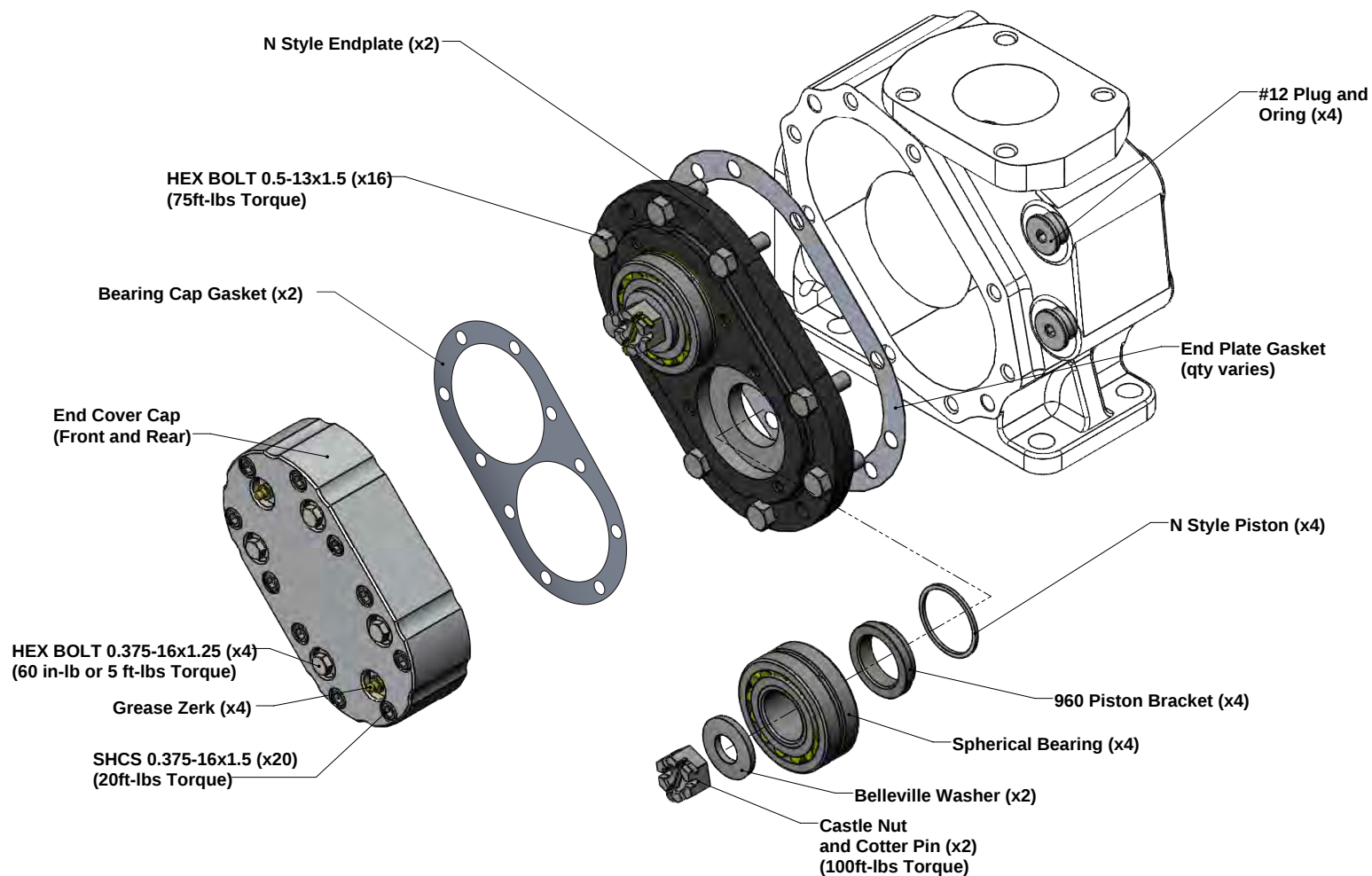
Bearing pump with relief. Optional electric-heating details apply only where fitted.



1/2-13 x 1.5 (end plate)	45 ft-lb
3/8-16 x 2.0 front / 2.5 rear	20 ft-lb
3/8-16 x 0.75 (relief cap)	20 ft-lb
Castle nut	100 ft-lb

N style end plate

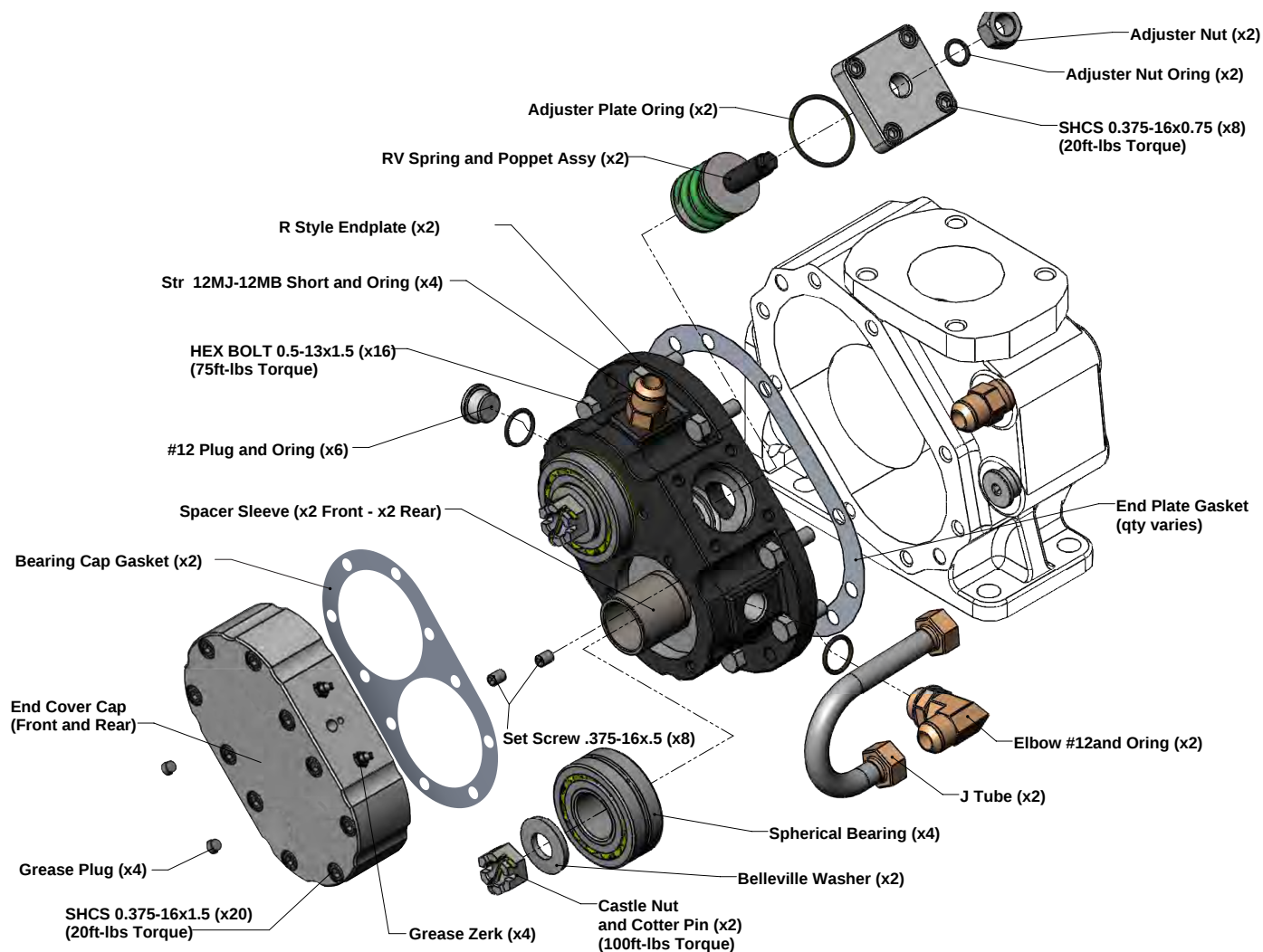
Bearing pump without an integral relief valve. Provide external pressure protection.



1/2-13 x 1.5 (end plate)	75 ft-lb
3/8-16 x 1.5 (end cover)	20 ft-lb
3/8-16 x 1.25 (bracket)	60 in-lb
Castle nut	100 ft-lb

R style end plate

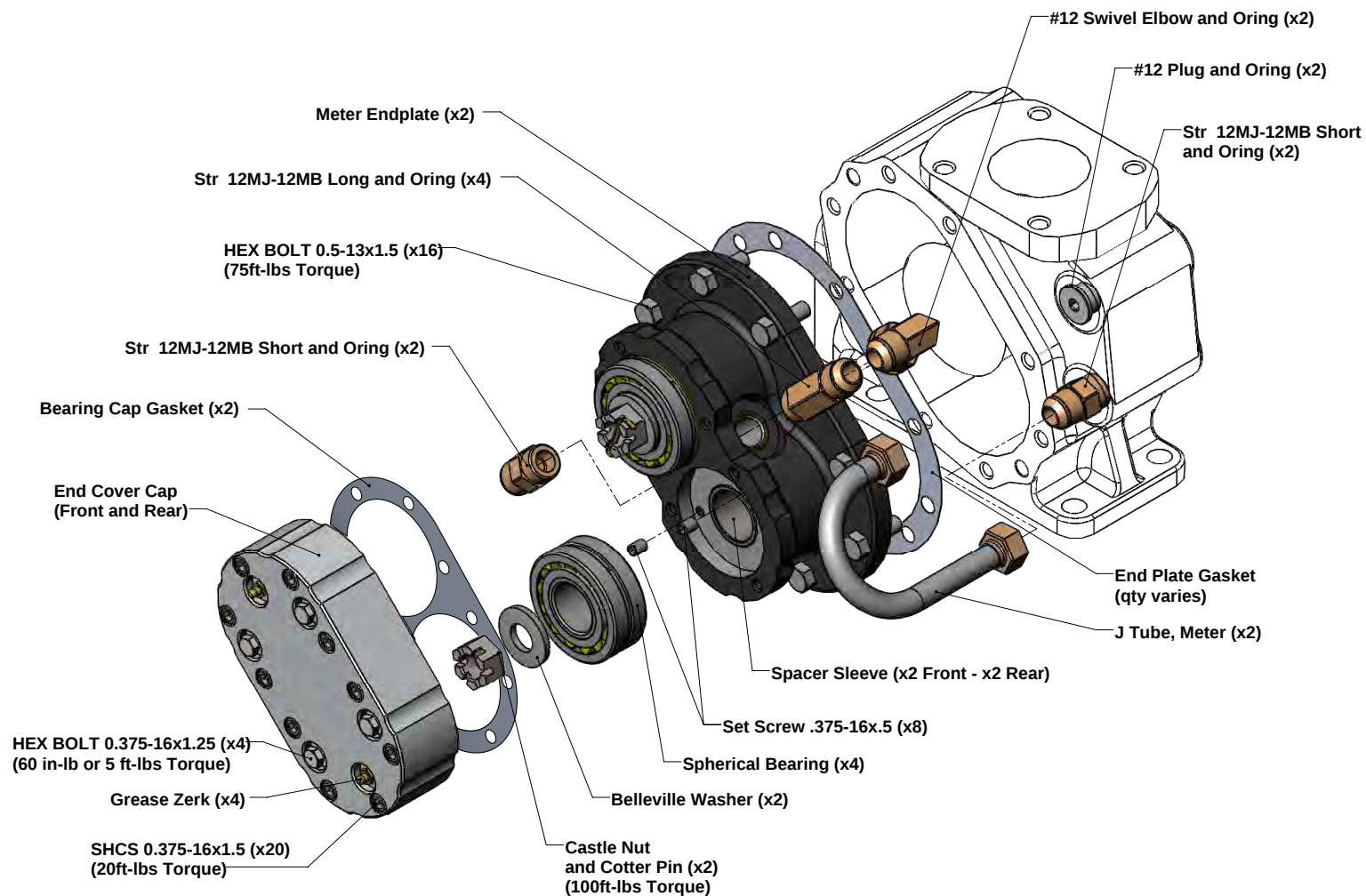
Bearing pump with heat tracing and direction-dependent internal relief.



1/2-13 x 1.5 (end plate)	75 ft-lb
3/8-16 x 1.5 (end cover)	20 ft-lb
3/8-16 x 0.75 (relief cap)	20 ft-lb
Castle nut	100 ft-lb

U style gear-meter end plate

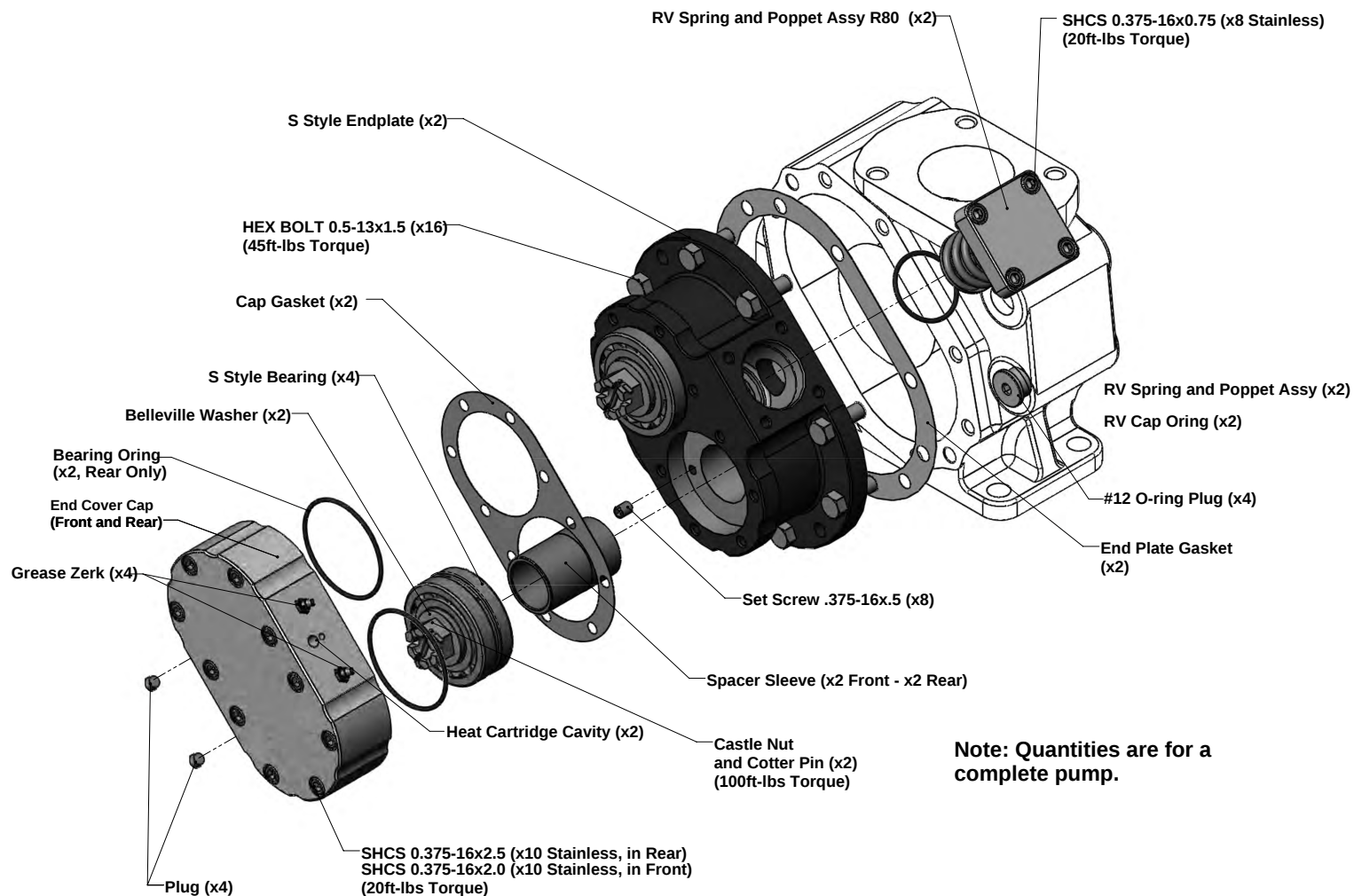
Bearing gear meter with heat tracing. System pressure protection is provided separately.



1/2-13 x 1.5 (end plate)	75 ft-lb
3/8-16 x 1.5 (end cover)	20 ft-lb
3/8-16 x 1.25 (bracket)	60 in-lb
Castle nut	100 ft-lb

S style end plate

Sealed-bearing pump with relief. Match the installed relief assembly to the build record.



Note: Quantities are for a complete pump.

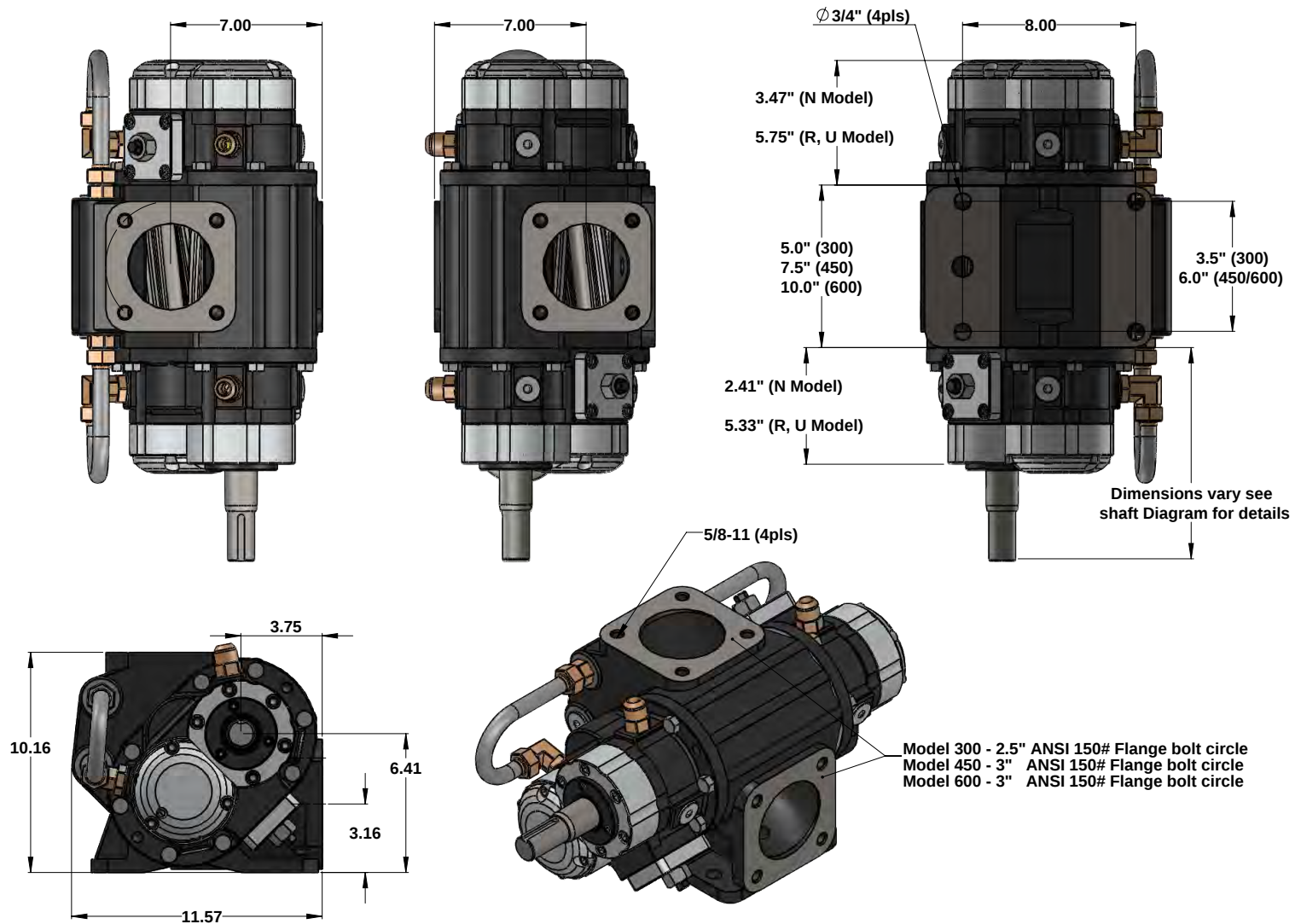
1/2-13 x 1.5 (end plate)	45 ft-lb
3/8-16 x 2.0 front / 2.5 rear	20 ft-lb
3/8-16 x 0.75 (relief cap)	20 ft-lb
Castle nut	100 ft-lb

9.1

300 / 450 / 600 basic dimensions

[RETURN TO INDEX](#)

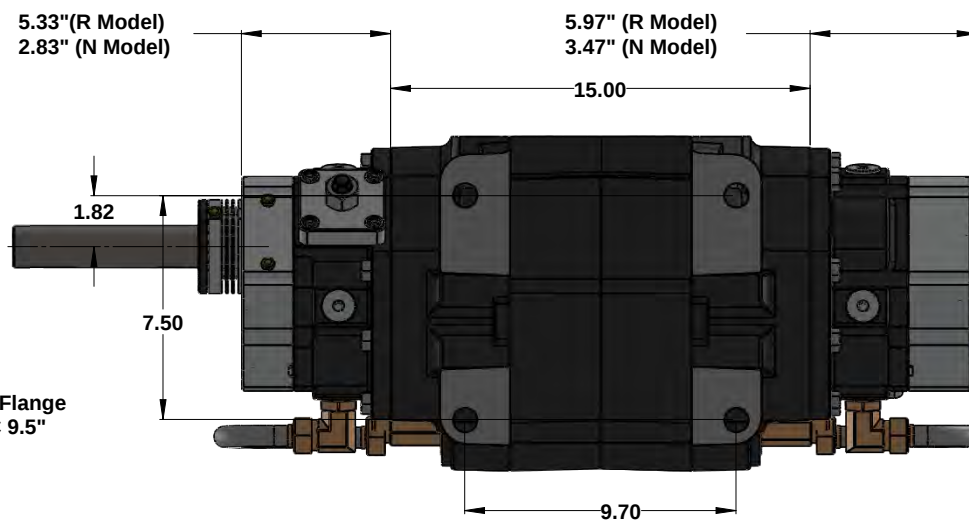
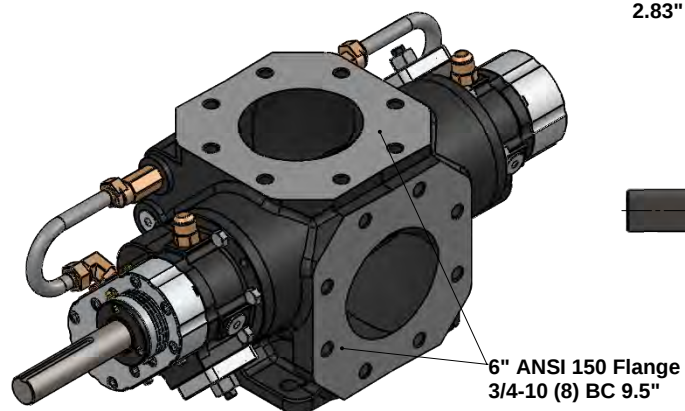
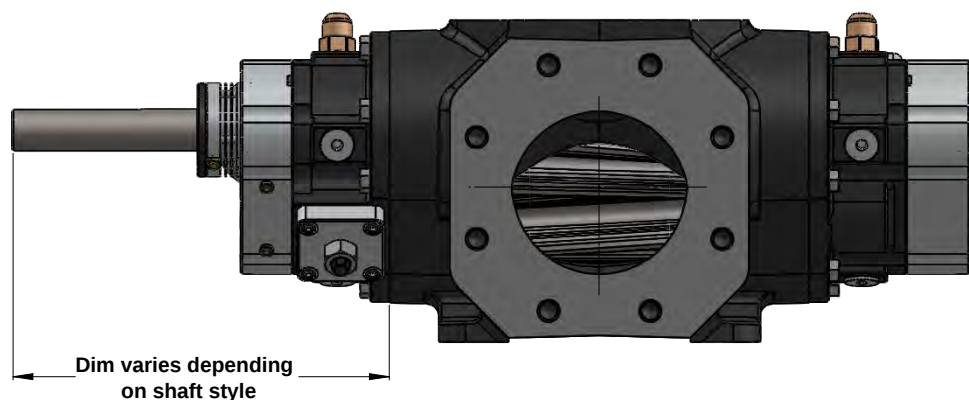
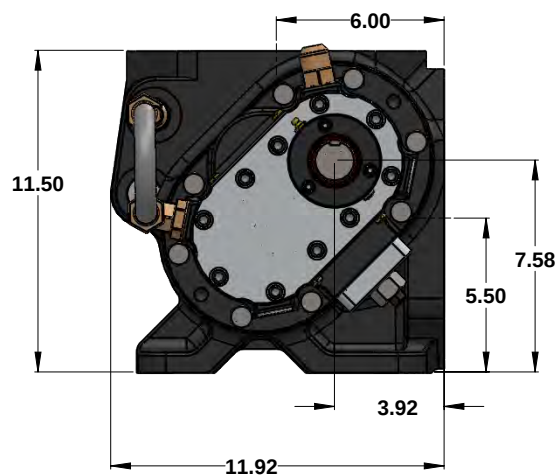
Dimensions in inches. Style-dependent values shown for N, R and U only; obtain the build drawing for K/S or an unlisted option.



450/600: 4-in pump flange on a 3-in Class 150 bolt circle. Adapters are available for a 4-in Class 150, 8-bolt connection.

900 basic dimensions

Dimensions in inches. Style-dependent values shown for N and R; confirm the specific assembly before fabrication.



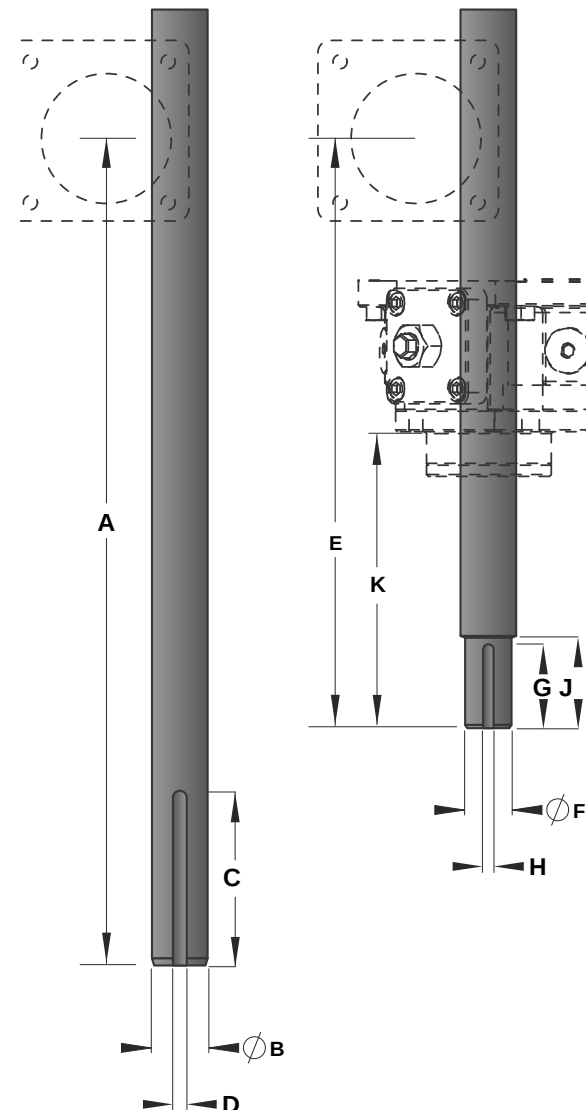
Bearing-series shaft dimensions

Dimensions in inches for the bearing series. A-D describe the straight shaft; E-K describe the hydraulic shaft.

Series	Shaft	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	D	13.6	1.5	1.75	0.375	-	-	-	-	-	-
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	-	-	-	-	-	-

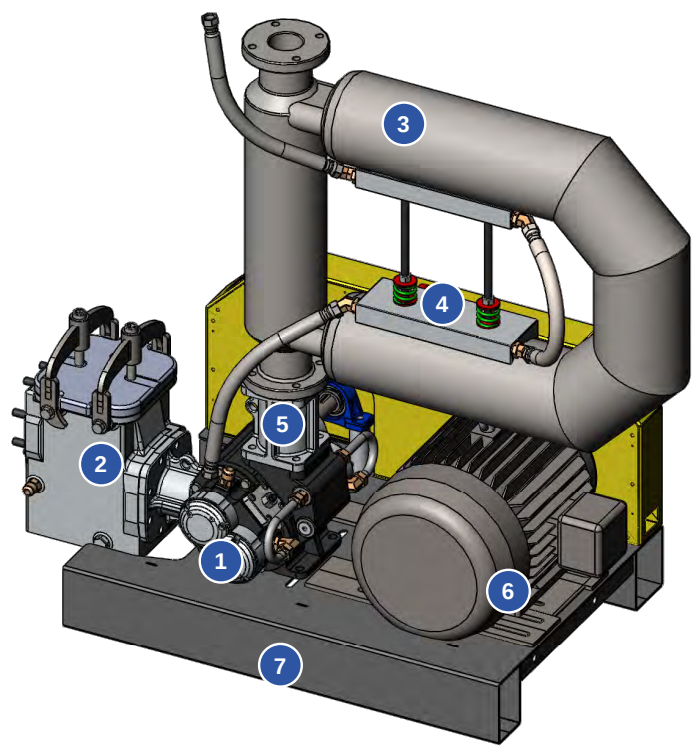
A dash indicates a dimension not applicable to that shaft in the source table. Shaft codes are independent of pump-style codes; C here is a shaft designation.

Verify seal fit and finished projection against the complete model/build record before machining or ordering a replacement shaft.



Micro Motion metering skid

Example bearing-pump metering skid for rubberized asphalt, using a 600RCX-RH pump and a Micro Motion CMF300M meter. This is an assembly example, not a specification for every installation.

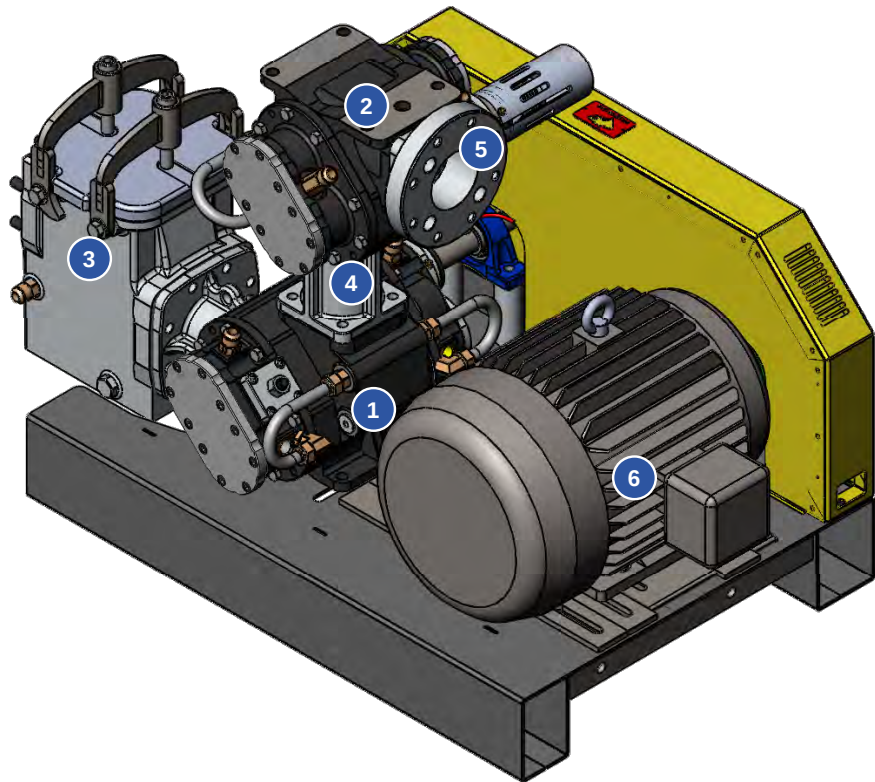


#	Component / identifier	Purpose
1	600RCX-RH	Bearing pump with cooling double seal and extended shaft
2	SC4-C-43-30	Screen box, coarse screen, pump adapter and jumper hose
3	CMF300M	Micro Motion meter with extended core processor
4	CMF300-H	Heat-block kit for the CMF300 assembly
5	C3030	3-in pump-to-meter port adapter
6	20S	20 hp, 460 V inverter-duty motor and adjustment tray
7	S42-P-3V4.5-3V19	Skid, 4.5-in / 19-in pulleys, belts, bearing and guards

Specify the meter/control interface and heating arrangement for the actual installation. Confirm component selection with BearCat before ordering. Apply the hot-product protection on page 4.

Pump and gear metering system

4-in asphalt metering system with a 600 Series R style bearing pump and a 450 Series U style bearing gear meter. The gear meter uses bearings to support its shafts, with an encoder coupling and guard for the metering interface.



#	Component / identifier	Purpose
1	600 Series R style	Bearing asphalt pump; pillow block support shown
2	450 Series U style	Bearing gear meter with encoder coupling and guard
3	SC4-C-43-30	Screen box, coarse screen, pump adapter and jumper hose
4	C3030	Pump-to-meter port adapter
5	M34	4-in Class 150 flange adapter
6	20S	20 hp, 460 V inverter-duty motor and adjustment tray

Drive package: BCP204 - 20 hp, 460 V VFD and panel with external controls and fuse block (not illustrated).

Typical system arrangement. Confirm the complete pump, bearing gear-meter and current control configuration before ordering. Apply the hot-product protection on page 4.

Service evidence and revision record

SEND PHOTOS BEFORE CALLING

Send wide, well-lit, high-resolution photographs of the complete installation from several angles. Include the pump, drive, piping, valve positions, controls and the surrounding area. Close-ups can supplement these views. BearCat can zoom in, but cannot zoom out.

Include these details

Record	What BearCat needs
Equipment identity	Complete model number, serial number, pump or gear-meter duty, and installed options
Operating conditions	Product and temperature; speed; measured flow; suction vacuum; discharge pressure; drive load
Symptom	What changed, when it happens, what still works, and whether it follows heat-up, speed, direction or product
Controls / meter	Exact fault message; indicator states; meter identity; HMI and PLC revisions when applicable
Recent work	Parts replaced, piping or valve changes, lubrication, maintenance and configuration changes

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Use the complete model number to identify the housing, gears, idler shaft, drive shaft, port gasket, end plates and seal assembly when ordering parts.

Revision record

Revision / date	Change
Rev A 2026.09.15	New bearing-only edition in the T7 format; obsolete style material removed and Micro Motion example rebuilt.
Rev B 2026.09.15	Renamed Pump and Meter Manual; restored the bearing pump and gear-meter system.
Rev C 2026.09.15	Added drawing torque charts and the grease note; removed the legacy control panel.
Rev D 2026.09.15	300 Series: 800 RPM / 240 nominal GPM. Simplified torque tables. Removed troubleshooting.
Rev E 2026.09.20	Added the selected assembled-pump cover image without labels or leaders.

Document: BCP-300-900-PM

Basis: original pump drawings; 300 Series speed updated by Kevin Hill, 2026.09.15.

Grease note: 600SC Rev E. Visual master: T7 Rev H.