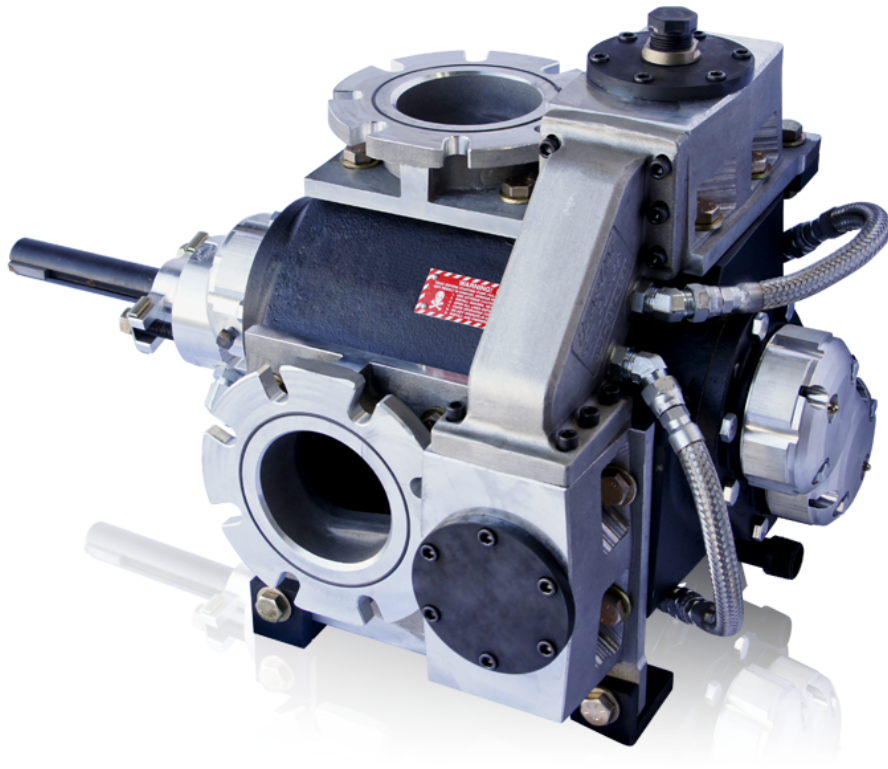




960

PUMP SERVICE MANUAL



INSTALLATION | OPERATION | MAINTENANCE

BearCat 960 external gear positive displacement pump

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960 PUMP SERVICE MANUAL

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Product status

The BearCat 960 Series is a legacy pump and has been replaced by the 900 Series for new equipment builds. This manual continues to support 960 pumps already in service. For new applications or replacement pumps, contact BearCat Pumps to select the appropriate 900 Series model and confirm any required installation changes.

Using this manual

Pump configuration and system requirements vary by application. Contact BearCat Pumps when the installed configuration is uncertain.

READ BEFORE INSTALLATION OR OPERATION

Safety

Read this manual completely before installing, operating or servicing the pump. Only qualified personnel should install, operate and maintain the pump and associated equipment.

BURN AND SPLASH HAZARD - PPE REQUIRED

Before starting or operating the pump, wear long sleeves, gloves and a face shield appropriate for the pumped material and temperature.

- Inspect the pump and system before start-up. Confirm cleanliness, integrity and correct valve position.
- Bring heat-traced or jacketed pumps to working temperature before start-up when required to prevent product solidification.
- Verify that suitable pressure protection is installed and correctly set for the application.
- All electrical work must be completed by qualified personnel in accordance with equipment manufacturers' procedures and applicable codes.
- Keep all guards securely installed during operation. Never remove a guard while the pump is running.
- When venting a flooded-suction pump, do not completely remove plugs or fully open a vent. Liquid may discharge under pressure.
- Check the pump for specific safety labels. Replace any label that is missing or unreadable.

Safety Blankets

Any pump that is heated or pumping hot liquid should be operated with Safety Blankets properly installed. Keep the blankets in place during operation and replace missing or damaged blankets before use.

Before service

- Stop and isolate the drive system.
- Close the suction and discharge valves.
- Relieve pressure and allow the pump and material to reach a safe working temperature.
- Confirm that the pump cannot restart before removing guards or components.

BEARCAT 960

Overview

The BearCat 960AR is an external gear, positive displacement pump designed specifically for rubberized and polymer-modified asphalts. The pump is available with heating blocks, a relief valve, and several shaft configurations to suit the application.

Typical applications

- Primary pump on an asphalt-rubber distributor
- Plant supply through a Micro Motion Coriolis mass flow meter
- Transfer from a mix blender
- Tank or transport unloading

R model bearing design

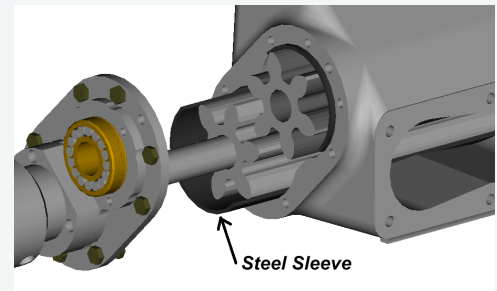
The R model uses heavy-duty AR bearings. In abrasive or high-viscosity materials, these bearings improve service life and make maintenance more predictable.

Complete rebuild program

The 960 is completely rebuildable. A factory-rebuilt pump is bored and sleeved, then fitted with new gears, shafts, bearings, end plates, seals and hardware. The core-exchange program is structured to minimize downtime; in most cases, the rebuilt pump is delivered before the existing pump is removed from service. Contact BearCat Pumps for availability.



960 pump - representative configuration



Steel sleeve installed during factory rebuild



Heavy-duty AR bearing

SYSTEM AND DRIVE

Installation

Shaft alignment

Belt drive: Align the pulleys and set proper belt tension. Keep belts and pulleys clean and free of oil and debris.

Direct drive: Accurately align the coupled shafts. Misalignment can cause rapid seal wear and reduced pump life.

System piping

Position the pump as close as practical to the source. Suction piping must be no smaller than the pump inlet and should avoid sharp bends, abrupt section changes and unnecessary restrictions. Account for pressure losses through valves, strainers, flexible lines and fittings.

Some systems use a low-level drop to retain a small amount of liquid at the pump after the lines are evacuated. This retained liquid can improve priming at the next start-up.

Piping strain

Before final tightening, loosen the suction and discharge flange bolts. If the flanges spring apart, twist or move excessively out of parallel, correct the piping alignment. Do not use the pump flanges to pull piping into position. The pump is not a pipe-alignment tool.

The piping system may expand and contract substantially with temperature. The final installation must allow for this movement without loading the pump.

Re-tighten at operating temperature

After the pump reaches operating temperature, inspect and re-tighten flange bolts as required. Green gaskets may soften as they heat, allowing joints to loosen and leak.

PRESSURE PROTECTION

Relief Valve

BearCat pumps are positive displacement pumps and must have suitable pressure protection. An internal relief valve may be mounted on the back of the pump. As discharge-to-inlet differential pressure rises, the poppet begins to open and bypasses liquid to the inlet side.

RELIEF VALVE IS NOT A PRESSURE REGULATOR

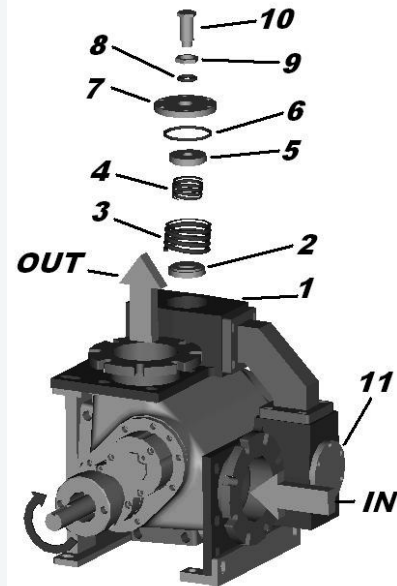
The listed setting is where the valve begins to open - not a guaranteed maximum pressure. Pressure rises as bypass flow increases and depends on pump speed, material and relief-path capacity. Never rely on the relief valve to make closed-discharge operation safe.

Setting and verification

- If the pump has no internal relief valve, install a suitable external relief device in the system.
- Where the duty was known, the internal relief valve was factory adjusted during performance testing.
- Confirm operation under actual application conditions. Pump speed, material viscosity and return-path restriction affect relieving pressure.

Inspection or removal

- 1 Stop the pump, isolate the system, relieve pressure and verify a safe working temperature.
- 2 Measure from the back of the adjuster cap to the end of the adjuster bolt. Record the distance.
- 3 Release spring compression by loosening the adjuster lock nut and bolt.
- 4 Remove the bolts securing the adjuster cap. Remove items 2 through 6; clean and inspect.
- 5 Reassemble in reverse order and return the adjuster bolt to the recorded distance. Verify the relief setting before service.



1 RV housing	6 Cap O-ring
2 Inner poppet	7 Adjuster cap
3 Inner spring	8 Bolt O-ring
4 Outer spring	9 Lock nut
5 Outer poppet	10 Adjuster bolt

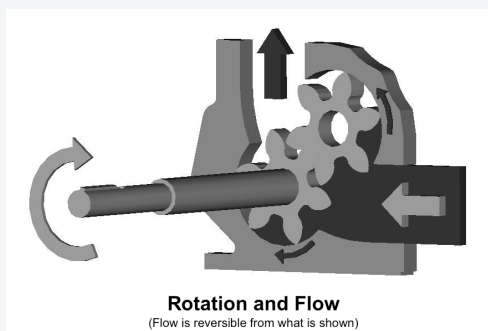
Representative internal relief valve

INITIAL OPERATION

Start-up

Before starting: Verify guards, Safety Blankets, pressure protection and system valves are correctly installed and positioned. Wear long sleeves, gloves and a face shield appropriate for the pumped material and temperature.

- 1 With the drive isolated, confirm that the pump turns freely by hand. Reinstall all guards before applying power.
- 2 If heating is required, turn on the heat supply and allow the pump temperature to stabilize.
- 3 For flooded suction, gradually open the required system valves and check for leakage.
- 4 For suction lift, prime the pump by adding as much compatible liquid as practical through the strainer housing or adjacent suction piping.
- 5 Briefly start and stop the drive to confirm rotation. Correct rotation is shown by the diagram on the pump cover plate.
- 6 Start the pump at minimum speed. Check for leaks, smooth rotation and normal system operation, then cautiously increase to the required operating speed.



Rotation and flow - flow is reversible from the direction shown

INSPECTION AND LUBRICATION

Routine Maintenance

Bearing grease - AR series

For maximum service life, grease AR-model bearings at the end of each operating day, immediately after shutdown while the pump is still hot. Cold asphalt rubber is extremely hard on the bearings and castle-nut assembly. Use an NLGI No. 2 lithium-complex, extreme-pressure, high-temperature bearing grease. Do not mix incompatible grease types. Greasing helps displace or dilute asphalt rubber before the next start-up.

Grease is cheaper than bearings. This remains one of maintenance's less controversial findings.

Keep guards in place and avoid contact with hot surfaces while greasing. Follow the equipment owner's shutdown procedure and use appropriate protective clothing.

Shaft seal

Seal life varies with pressure, operating procedures, material and service conditions. Replace the seal if leakage exceeds one drop per minute or any amount considered unacceptable for the application. Confirm that the correct seal kit is available before beginning work.

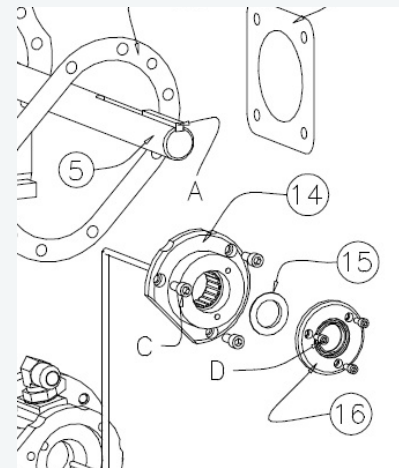
CHECK	WHAT TO LOOK FOR	ACTION
During operation	Leaks, unusual noise, vibration or cavitation	Stop and investigate abnormal conditions
After shutdown - AR models	Bearing lubrication	Grease while the pump remains hot
Shaft seal	Leakage above one drop per minute or unacceptable leakage	Schedule seal replacement
Safety Blankets and guards	Missing, loose or damaged components	Correct before operation

SHAFT SEAL PROCEDURE

Seal Replacement

Before removing guards or components: Stop and isolate the drive, close the suction and discharge valves, relieve system pressure, and verify that the pump and material are at a safe working temperature.

- 1 Turn the pump off completely and prevent unintended restart.
- 2 Confirm that the pump is isolated from the system by closing the suction and discharge valves.
- 3 Remove the guard, coupling, bearing or companion flange located behind the dust-seal mount bracket (item 16). Remove the bracket and carefully pry out the old shaft seal (item 15).
- 4 Clean asphalt and debris from the shaft and seal bore. Remove sharp burrs from the keyway and shaft. Inspect for a groove worn into the shaft; an excessively deep groove requires shaft replacement.
- 5 Mask the keyway with clear plastic tape. Lubricate the taped keyway and seal surface with grease. Carefully slide the new shaft seal over the shaft and into the seal bore. Install the new dust-seal mount bracket.
- 6 Reinstall bearings, couplings, companion flanges and all guards. Verify alignment before returning the pump to service.



Shaft seal components

Items 14, 15 and 16

START WITH EVIDENCE

Troubleshooting

START WITH THE VACUUM GAUGE

Compare inlet vacuum with the machine's normal reading. A sudden change can reveal colder or more viscous material, a restricted suction line or a dirty screen. The change often matters more than one isolated number.

Use the same sequence every time

- 1 **Confirm the symptom.** Identify no flow, reduced flow, abnormal noise or leakage, and note when it began.
- 2 **Record the evidence.** Capture pump speed, material temperature, inlet vacuum and discharge pressure before changing anything.
- 3 **Check the flow path.** Verify rotation, valve position, prime, heat and the condition of the suction port, screen and piping.
- 4 **Change one condition at a time.** Run only long enough to observe the result, then record what changed.

Changing five things at once produces one result and no answer.

No flow or failure to prime

CHECK	WHAT TO CONFIRM	ACTION
Rotation	The shaft is turning in the correct direction.	Correct drive rotation before further testing.
Prime	The pump and suction path contain compatible liquid.	Prime through the screen box or adjacent suction piping. If equipped with a screen box, add 3 gallons of compatible liquid.
Air leakage	Suction joints, plugs and vents are not drawing air.	Seal the leak and place vents and plugs in their operating position.
Flow path	Required valves are open; the suction port, screen and filter are clear.	Open the correct valves and clean any restriction.
Suction supply	Liquid level, suction lift and piping loss are within the pump's capability.	Correct the supply or piping condition before increasing speed.
Vacuum	Compare with normal. Above 20 inHg strongly indicates a suction restriction.	Find the restriction, verify material temperature and reduce speed if necessary.
Discharge	The discharge line is safely vented and is not holding trapped pressure.	Vent the line using the machine's approved procedure.

WHAT THE PUMP IS TELLING YOU

Operating Symptoms

SYMPTOM	LIKELY MEANING	OPERATOR ACTION
Low growl on a new or unprimed pump	Hardened gears are meshing, or the pump is still turning empty.	Establish liquid prime, then judge the sound again under normal flow.
Loud clacking	Cavitation caused by restricted inlet flow or colder, more viscous material.	Check inlet vacuum, material temperature, valves and the screen. Reduce speed until the clacking stops.
Noise rises with inlet vacuum	The suction path is becoming restricted or material viscosity has increased.	Compare with the normal vacuum reading. Restore heat or clear the restriction.
Abnormal noise continues after prime	Possible internal wear, debris or drive-system misalignment.	Stop and investigate pump internals, material cleanliness and drive alignment.
Shaft seal leakage exceeds one drop per minute	The seal is worn or the service conditions are shortening its life.	Schedule seal replacement, then isolate and depressurize before service.

STOP AND SECURE THE EQUIPMENT

Stop troubleshooting if there is a hot-product leak, unexpected motion, a missing guard, rapidly rising pressure, visible drive damage or abnormal noise that continues after speed is reduced. Follow the machine owner's shutdown and lockout procedure before inspection.

Before calling it weird

CAPTURE	RECORD
Pump identity	Model and configuration; serial number when available.
Fault behavior	What changed, what still works and when the condition began.
Readings	Pump speed, material temperature, inlet vacuum and discharge pressure.
Evidence	Clear photos of the pump, drive, nearby piping and the area of concern.
Recent work	Changes to the pump, drive, heat, valves or piping.

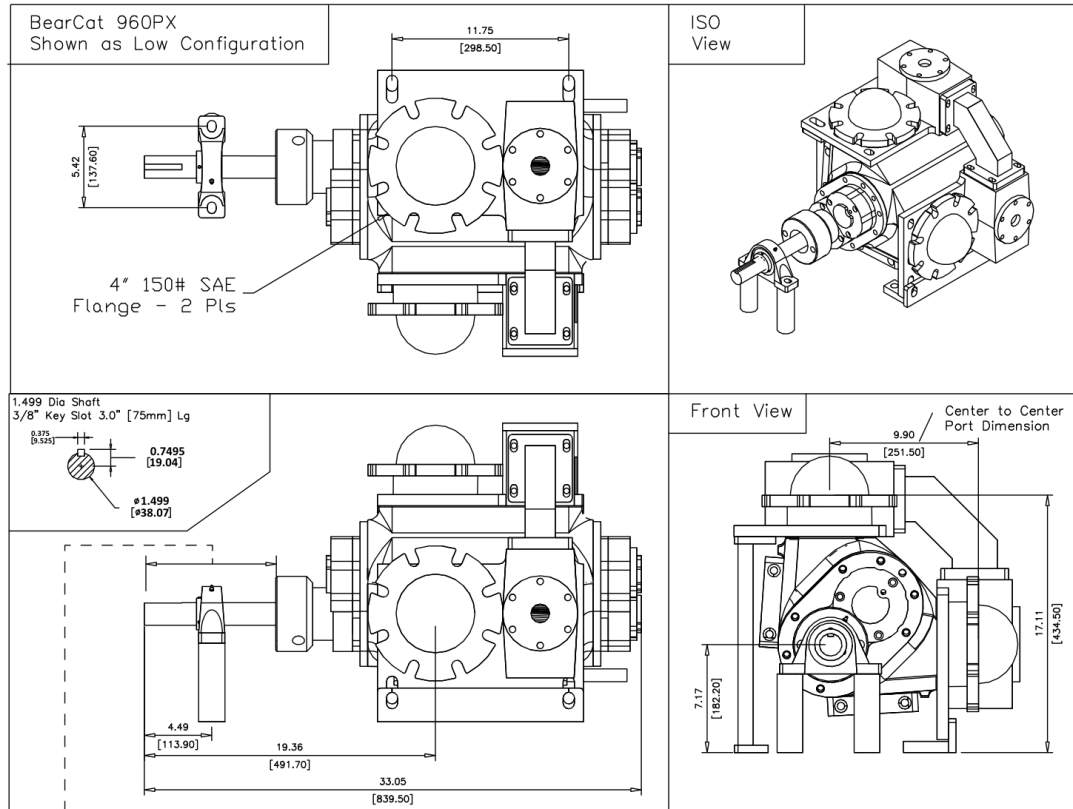
One clear photo and four useful readings beat a detailed description of how bad it sounds.

Revision history

REV	DATE	CHANGE
A	2026.09.03	Initial modernized 960 service manual.
B	2026.09.03	Rebuilt troubleshooting around evidence, operating symptoms and service records.

960PX - LOW CONFIGURATION SHOWN

Pump Dimensions



Heated Packing Box

D Shaft ("Stub Shaft"): 0" (Flush-Do Not Use)

C Shaft ("Cut Shaft"): 4.75"

X Shaft: 6.50"

L Shaft: 8.75"

Shaft extension

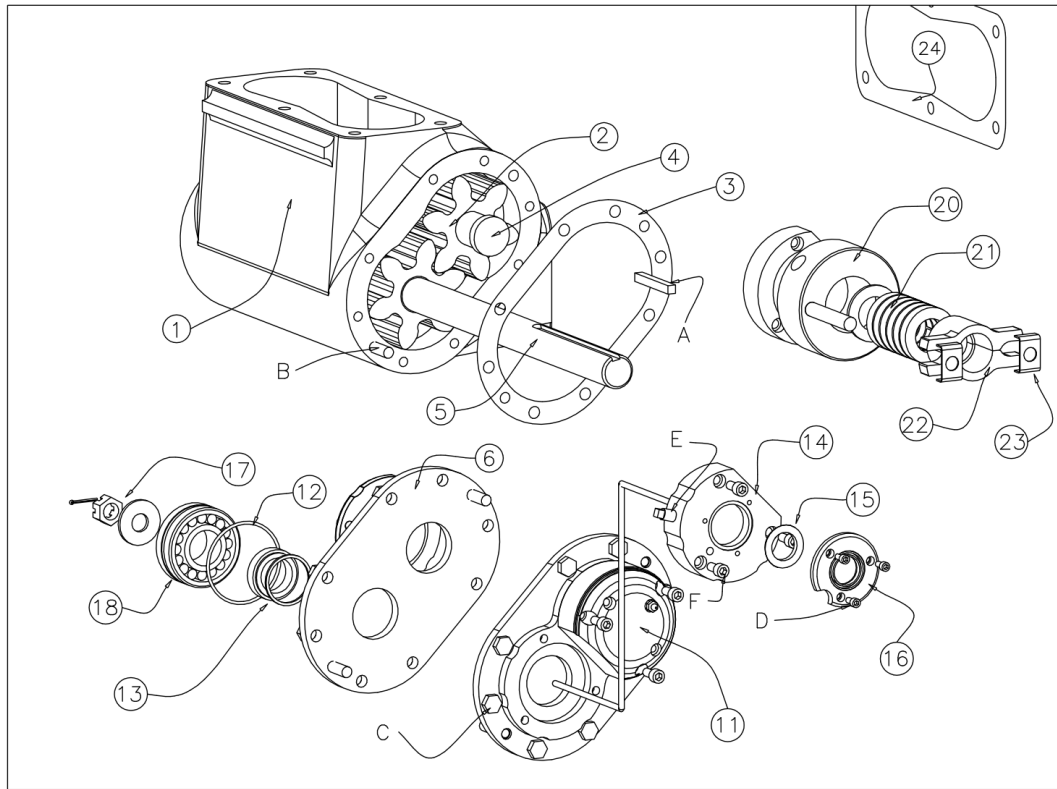
D - Stub shaft	0.00" - flush; do not use
C - Cut shaft	4.75"
X shaft	6.50"
L shaft	8.75"

Port size

The 5" pump port uses the equivalent bolt circle of a 4" ANSI 150 lb pipe flange and can be bolted directly to that flange using standard-size gaskets and fittings. For high-performance applications, contact BearCat Pumps for specifications and weld-on flanges for 5" line connections.

EXPLODED VIEW

Parts - 960 Pump



To order, specify the pump model number (example: 960PX) followed by the item number.

- (1) Housing
- (2) Gear set
- (3) End plate gasket
- (4) Idler shaft
- (5) Drive shaft
- (6) End plate
- (12) Cap O-ring
- (13) Piston bracket and ring
- (14) Seal housing
- (15) Shaft seal
- (16) Dust seal / mount bracket
- (17) Castle nut / bearing washer / pin
- (18) Bearing
- (24) Port gasket

Packed seal assembly

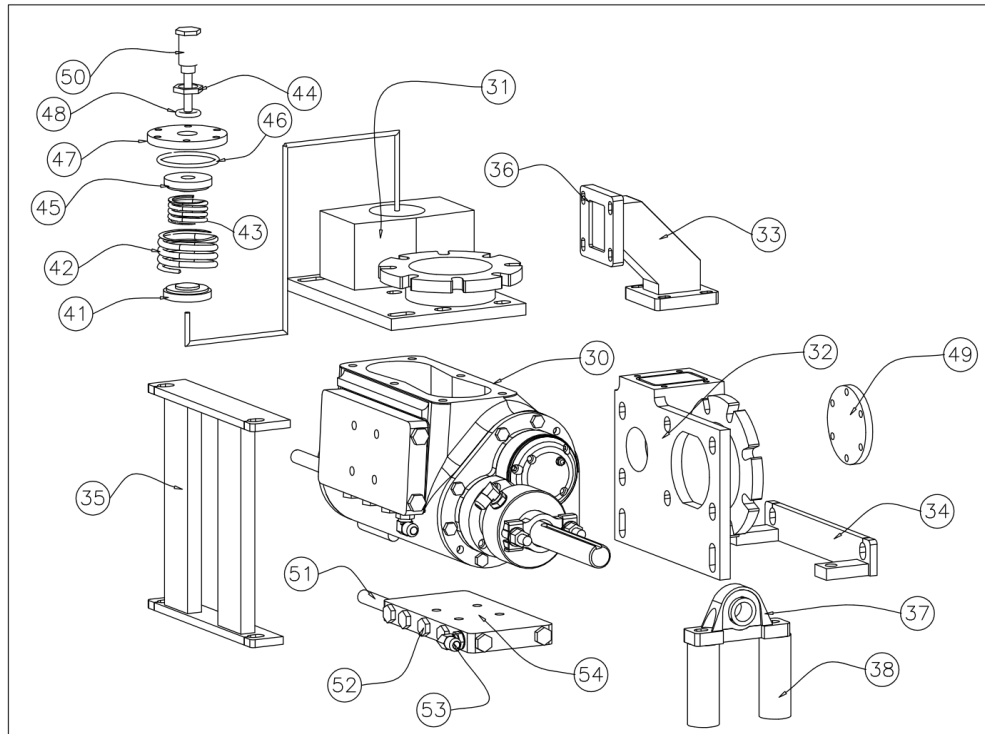
- (20) Packed housing
- (21) Packing washer / 7-ring set
- (22) Gland - 2 piece
- (23) Clips / studs / nuts / washers

Hardware

- (A) 3/8 key stock, 2" long
- (B) 1/2 dowel pin, 1-1/4" long
- (C) 1/2-13 x 1-1/2 hex head
- (D) 1/4-20 x 3/8 socket head
- (E) 3/8-16 x 1 square-head set screw
- (F) 3/8-16 x 1-1/2 socket head

960 PUMP PARTS

Full Mount Assembly



To order, specify the model configuration (example: 960PX-RS) followed by the item number.

- | | |
|---------------------------|---------------------------------|
| (30) 960 pump | (43) Inner spring |
| (31) Top plate | (44) Lock nut |
| (32) Side plate | (45) Outer poppet |
| (33) RV elbow | (46) Cap O-ring |
| (34) Foot bracket | (47) RV adjuster plate |
| (35) Support bracket | (48) RV adjuster bolt O-ring |
| (37) Pillow block bearing | (49) Return cover |
| (38) Bearing support | |
| (41) Main poppet | Heat cell |
| (42) Outer spring | (51) 1/2 FPT to #10 MB straight |
| | (52) #10 MB plug |
| | (53) #10 MB to #10 MJ 90 |
| | (54) Aluminum heat cell |

Hardware

- (A) 3/8 key stock, 2" long
 (B) 1/2 dowel pin, 1-1/4" long
 (C) 1/2-13 x 1-1/2 hex head
 (D) 1/4-20 x 3/8 socket head
 (E) 3/8-16 x 1 square-head set screw
 (F) 3/8-16 x 1-1/2 socket head