

Operating, Maintenance, and Instruction Manual



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Pre-Installation

1. Choose a location that is easily accessible for pump servicing. Ensure adequate electrical service is available.
2. Locate the pump for direct piping. Special attention should be given to the suction piping which should be as large, or larger, than the pump intake port. **For efficient operation, it is essential the suction side of a gear pump not be restricted.** Avoid tees, elbows, valves, and other flow devices within 12 pipe diameters of the pipe inlet. Provide adequate support for the piping. The pump should not be used to support piping.
3. Pumps are shipped with the suction port marked - IN; the discharge port marked -OUT. On 1-9 GPM pumps, the suction port on pumps with relief valves is the port nearest to the relief valve adjusting screw. This is opposite on 10-240 GPM pumps.
4. Pumps will operate in either direction. However, the relief valve will only function in one direction. Relief valve components are symmetrical and can be installed to operate with either clockwise or counter-clockwise shaft rotation.
5. Have an electrician connect the motor using sound practice. Provide adequate overload protection. **Note: When checking the direction of rotation, the pump must be full of liquid. Pumps fitted with mechanical seals must not run dry, not even momentarily.** Determine the direction of rotation by watching the motor fan.
6. The motor selected meets the requirements of the specified operating conditions. Changed conditions, for example, higher viscosity, higher specific gravity, or lower head losses, can overload the motor. When changing operating conditions, or whenever there is any doubt, please contact your local distributor with the full details.

Installation

1. Provide a solid foundation free from excessive vibration.
2. Shim to prevent distortion of the pump mount base. Securely anchor the pump and motor to the foundation.
3. All pipe connections on the suction side of the pump must be air tight. An air leak on the suction side of the pump will result in the loss of prime.
4. Provide priming tee on the discharge line of the pump.
5. If the media pumped contains solids, a suction strainer is recommended to exclude solid particles from the pump. Contact Haight Pump for a recommendation.
6. Support the piping independent of the pump. Excessive strain on the pump casing can interfere with gear alignment.
7. When the piping is complete, loosen the bracket set screws and allow the pump to align with the piping. Tighten the bracket set screws and re-check the shaft alignment. Make sure there is no metal to metal contact of the coupling halves. Do not over tighten the pipe/pump connections, as damage can result.
8. A vacuum gauge can be installed in the pipe plug on the relief valve nearest the adjustment screw (1-9 GPM). A pressure gauge can be installed in the opposite pipe plug (1-9 GPM). 10-80 GPM relief valves are designed to incorporate a vacuum gauge only.
9. Check the shaft rotation to ensure it is correct. Normal rotation is clockwise as viewed from the shaft side of the pump.

Precautionary Notes

1. Prior to performing any service on the pump or motor:
 - (a) Disconnect and lockout the power source to the motor (refer to OSHA 1910.147.)
 - (b) Shut off any liquid heating source.
 - (c) If the unit operates at elevated temperatures, allow it to cool to room temperature before performing any service.
2. Drain the pump and piping of excess liquid. **Caution: Handle and dispose of liquids in accordance to the manufacturers Material Safety Data Sheets.**

Disassembly for Inspection Purposes Only

1. Remove the bolts from the drive plate.
2. Carefully separate the drive cover and housing. Rotate the pump shaft by hand. It should turn freely. If resistance is present, check for built up residue.
3. Use a soft marker to mark the rotor/pinion location. Remove the rotor from the housing.
4. Inspect the housing, shaft/pinion, rotor, and drive plate for signs of wear or damage. Excessive wear will decrease pump performance.
5. Inspect the O-rings, gaskets, and bearings for chipping, splitting, or missing sections.
6. Inspection of the pump seal requires complete removal of the pump from the motor and bracket.

Complete Disassembly for Repair or Replacement

1. Complete precautionary steps 1 and 2.
2. Loosen the support bracket screws that secure the pump to the bracket.
 - (a) Size 1-9 GPM pumps: 3 set screws
 - (b) Size 10-80 GPM pumps: 4 cap screws
 - (c) Size 120-240 GPM pumps: 8 cap screws
3. Remove the coupling and shaft key. Inspect the shaft end for burrs or other damage.
4. Rotate the pump shaft by hand. It should rotate freely. Cheater bar needed for large flow pumps (44-240 GPM).
5. Remove the bolts from the drive plate.
6. Carefully separate the drive cover and housing.
7. Use a soft marker to mark the rotor/pinion location. Remove the rotor from the housing.
8. Remove the shaft/pinion assembly from the housing.
9. Carefully pry the cover off the housing.
10. Inspect, repair, or replace all damaged parts.

Note: If significant damage is evident to the major pump components, it is best to replace the pump. If possible, determine the cause of the damage and correct the identified problem.

Reassembly

1. Pump reassembly is the reverse of disassembly. However, care should be exercised in three areas:
 - (a) It is good practice to replace elastomer sealing devices and gaskets every time the pump is reassembled. This is mandatory for Teflon o-rings and lip seals. Gently stretch the o-rings before placing them in the o-ring groove.
 - (b) Place the rotor into position with your mark facing out.
 - (c) Use a cross bolt tightening pattern to re-assemble the housing and covers. Periodically turn the pump shaft. Check for unusual noise. Improper tightening will cause the pump to bind.
2. The pump will function best if primed first. Return the pump to service and check for leaking and loose connections. Air leaks on the suction side of the pump will reduce pump performance.

Relief Valve Components

1. See precautionary notes.
2. To change the relief valve for reverse rotation:
 - (a) Loosen the locknut on the adjusting screw while holding the adjusting screw stationary.
 - (b) Remove the bonnet and bonnet washer.
 - (c) Remove the adjusting screw, spring, and poppet.
 - (d) Remove the cap and cap washer.
3. Reassemble in reverse order. Remember the spring and adjusting screw must be on the suction side of the pump for the relief valve to operate.
4. Unbolt relieve valve from pump (4 bolts) and reverse assembly. Note: venting needs to be reversed also.

Special Seal Components

1. Standard 1-240 U/UR pumps use a lip seal as the main shaft seal. These seals are available in Buna-N, Viton, Neoprene, Silicon, Kalrez, PTFE materials.
2. Packed pumps use 4 or 5 element V-cup Teflon shaft seals. Shaft seals are also available in Graphite rope, Graphfoil, and virgin Teflon. A gland is included to provide tension for the packing.
3. Type 21, Type 2, Type 2B, and Type 9 mechanical seals are available. Contact Haight Pumps for special drawings for pumps with mechanical seals.

Maintenance Parts or Factory Repair

1. When ordering parts, for pumps from 1998 and earlier, locate the pump serial number stamped on the machined face of the cover or body of the pump housing. For pumps from 1999 and later, the serial number tag is located on the pump body.
2. Haight Pump maintains a repair service shop that will rebuild, test, and return pumps promptly.
3. Remove pipes, coupling, and mounting bracket before returning the pump to the factory.
4. Contact Haight Pumps for a Return Good Authorization number before sending the pump to the factory. Material Safety Data Sheets are required on all returns.

General Information

The following is general information about Haight rotary gear pumps. Due to the variety of options and configurations available, it is not possible to provide detailed information in this manual. Detailed drawings and bill of materials will be provided upon request.

Never operate a pump with the discharge line closed or plugged. Severe damage to the pump and/or system will result.

Haight Pumps does not accept responsibility or liability for damage or injury resulting from improper application and/or operation of the pump and/or system.

Direction of Rotation Haight pumps are designed to operate in either direction by simply changing the shaft rotation. Pumps supplied with relief valves are the exception to this rule. Failure to reverse the relief valve components will render the relief valve inoperable. The procedure for reversing the flow direction in the relief valve is covered in the *Assembly and Disassembly* instructions.

Pump Alignment Bedplate mounted pumps and motor combinations are aligned and tested at the factory. Vibration during shipment and/or poor bedplate mounting conditions can cause premature failure or unacceptable noise and vibration.

Simple alignment checks can be performed by placing a straight edge on the top and side of the coupling. Improper alignment is indicated by a separation between the coupling and straight edge. Adjust the motor and pump location until any separation disappears in both planes.

Bedplate Mounting Install nuts on the foundation bolts to provide location adjustment. Loosely place the bedplate on the foundation bolts. Adjust the bedplate height and location to meet the inlet and outlet piping. Ensure the bedplate is level and true. Fasten in place with lock washers or lock nuts. Check coupling alignment.

Piping Improper suction piping is the leading cause of poor pump performance, including cavitation, noisy operation, inadequate performance, and premature pump failure. Particular care should be taken to avoid long, restricted pipe runs, the use of elbows, tees, valves, or other flow devices within twelve (12) pipe diameters of the pump inlet. Inlet piping should be at least equal to the pump inlet size.

The discharge piping arrangement is somewhat less critical than the inlet side, however, good engineering practice, as defined by the *Hydraulic Institute*, should be followed.

Pumps are not designed to be used as piping system support devices. Piping systems should have adequate, independent hangers to provide support. Again, the Hydraulic Institute offers guidelines for proper pipe support design.

Seals Haight Pump offers three standard type seals, each with specific operating characteristics.

Lip seals: Available in Buna-N, Viton, Teflon, Silicone, Neoprene, and Kalrez seals. Lip seals are inexpensive, but have certain limitations, which include:

- Expected operating life of 2,000 - 3,000 hours
- Should not be used with system pressures over 50 PSI
- Should not be used in vacuum applications over 3" HG

General Information: Seals (continued)

Packing gland Available in Graphfoil, or Teflon, and other materials upon request. Packing glands are useful at high temperatures and pressures, resist shock and vibration, and can be adjusted to accommodate wear. However, packing glands must weep to function properly and require adjustment during the start-up operation.

During start-up, or after repacking, run the pump to pressurize the stuffing box. Steady weepage should occur in less than ten (10) minutes. If steady weepage has not begun within ten (10) minutes, stop the pump and allow it to cool. Overheating the gland will damage the packing gland and shaft. Do not loosen the gland adjustment screws. Repeat this process until steady weepage is established.

Adjust the packing gland screws 1/6th of a turn in a cross bolt tightening pattern. Allow to run ten (10) minutes. Continue this process until the weepage rate is approximately one (1) drop per minute. Periodic inspection and adjustment will be required. Do not over tighten the packing gland as damage to the gland and shaft will result.

Bearings and Rotor/Pinion Shaft

DU & Carbon Graphite Bearings Recommended for applications over 100 PSI and for thin fluids.

Teflon Rotor Do not use Teflon rotors in applications exceeding 100 PSI, and 200 F. The pump is provided with open tolerances. Increased slip will reduce efficiency with fluids below 200 SSU.

Delrin Rotor Do not use above 80 PSI and 120 F. Delrin rotors provide better abrasion resistance than Teflon rotors. The pump is provided with open tolerances. Increased slip will reduce efficiency with fluids below 200 SSU.

Note: For applications above 75 PSI, vent both shaft bearings to the suction side of pump.

Spares and Repairs

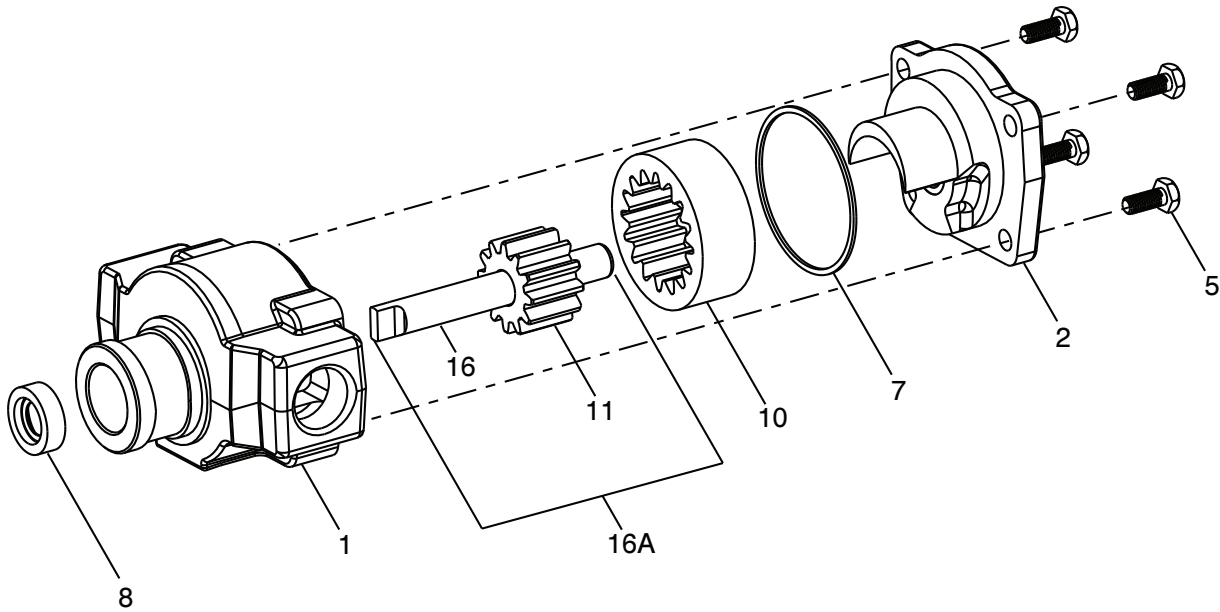
Haight Pumps operates a repair service for all pumps for which records exist. To ensure the correct parts are supplied, the pump serial number is required. The serial number is stamped into the metal of the pump body or cover, in a prominent position on the top area of the pump.

We advise customers whose pumps are custom fabricated to have spare pumps or parts on hand. Custom fabricated pumps and parts generally have long delivery times for replacement.

Troubleshooting

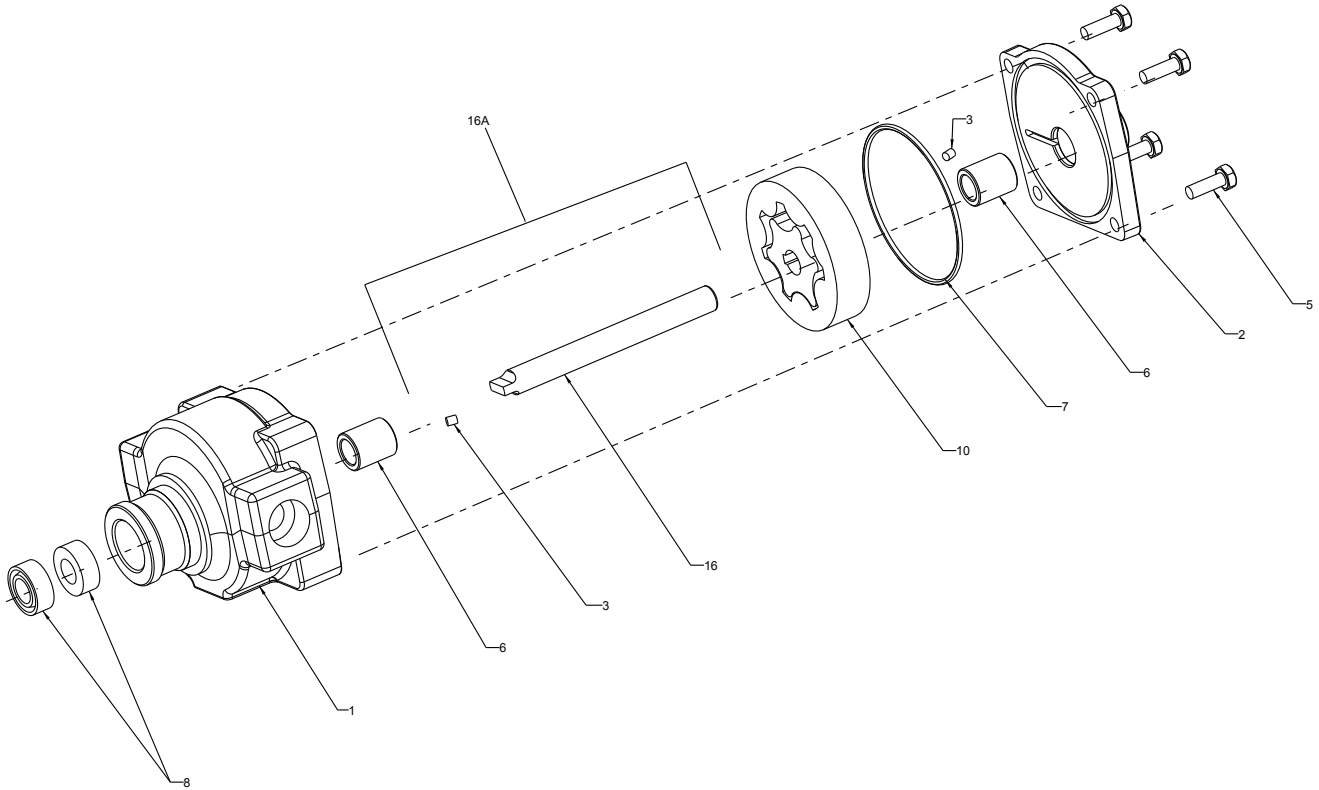
<u>Problem</u>	<u>Probable Cause</u>
<i>No liquid delivered</i>	<ul style="list-style-type: none">•Pump not primed•Suction lift too high; check with a gauge at the pump suction•Wrong direction of rotation•Pump not rotating (failure of drive from prime mover)
<i>Not enough liquid delivered</i>	<ul style="list-style-type: none">•Air leaks in suction line or through stuffing box•Speed too low•Suction lift too high, or not enough suction head (for hot liquids)•Foot valve too small or obstructed•Foot valve or end of suction pipe not immersed deeply enough•Piping improperly installed, permitting air or gas to pocket in pump•Mechanical defects:<ul style="list-style-type: none">•Pump damaged•Pump badly worn•Packing defective•Relief valve not sealing or jammed by foreign matter
<i>Pump works for awhile, then loses suction</i>	<ul style="list-style-type: none">•Leaky suction lines•Suction lift too high•Air or gases in liquid•Plugged lines or filter
<i>Pump takes too much power</i>	<ul style="list-style-type: none">•Speed too high•Liquid heavier or more viscous than design condition•Suction or discharge line obstructed•Mechanical defects:<ul style="list-style-type: none">•Shaft bent•Rotating element binds•Stuffing boxes too tight•Misalignment due to improper connection of pipe lines or driver•Poor piping conditions•Check pressure is being measured at the pump and not some distance away from the pump, thus ignoring pressure losses in piping, valves, etc.
<i>Noisy pump</i>	<ul style="list-style-type: none">•Speed too high•Suction lift or viscosity too high (piping diameter too small)•Wrong direction of rotation (recesses in the pump covers to prevent hydraulic noise operate only in one direction)•Badly supported pipe or bedplates causing resonant vibration•Relief valve chattering•Pressure too low; an increase in pressure can prevent gear noise in low pressure applications•Cavitation due to inlet or outlet conditions
<i>Gland leakage</i>	<ul style="list-style-type: none">•Packing hard and shaft scored•Pressure on pump too high or pressure relief passage blocked•Shaft run out excessive•When re-packing a gland, all the old packing must be removed; it is not good enough to just add extra rings as the original packing becomes compressed

HAIGHT® 3E and 5E Hot Oil Replacement Parts



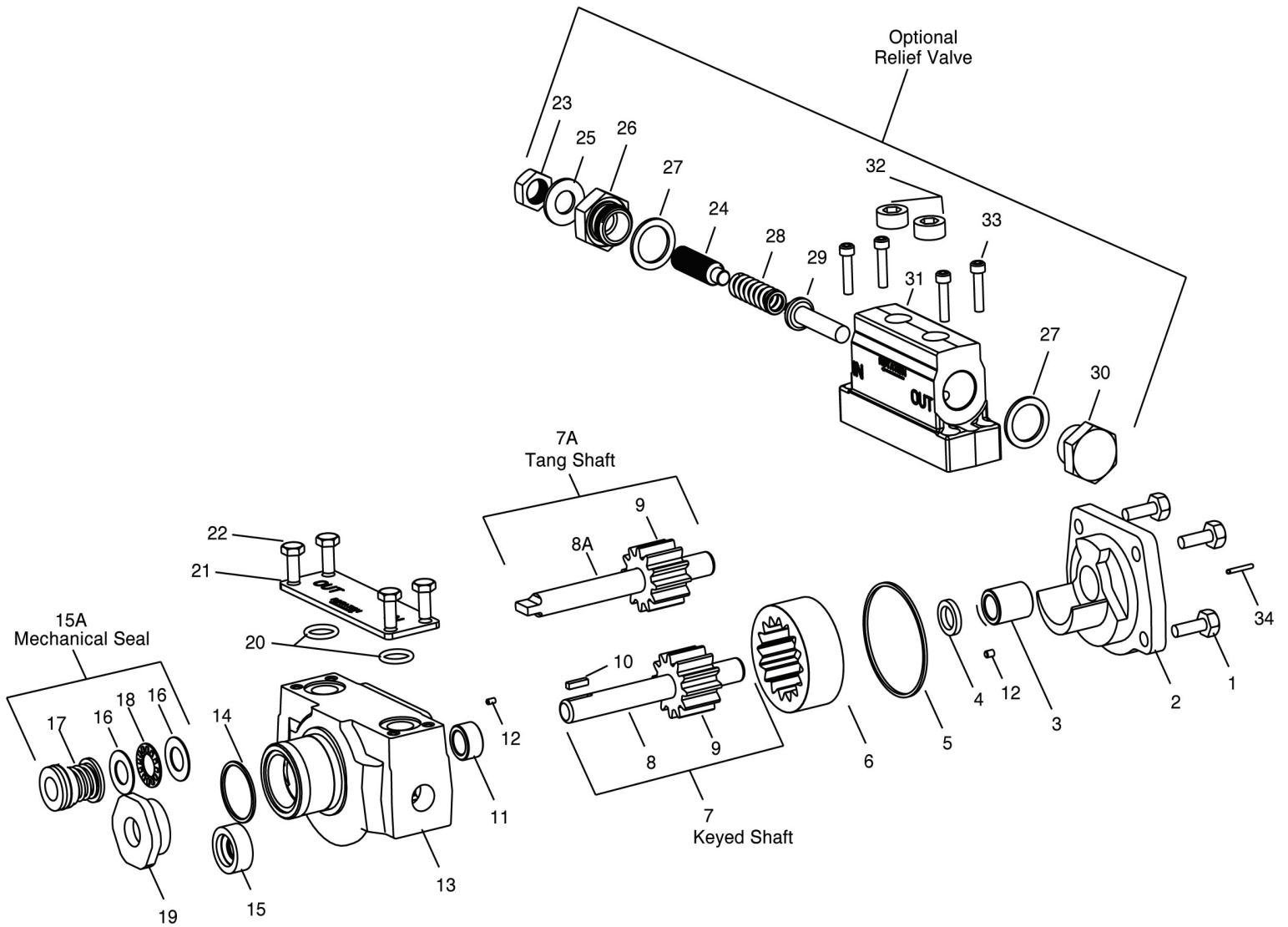
Item No	Description	Style	Part Number	Qty
1	E Style Casing	3E & 5E	ED53F5	1
2	3E Cover	3E	ED330F	1
	5E Cover	5E	ED530F	1
5	Cover Bolts	3E & 5E	E90HC.6	4
7	Cover O-Ring	3E & 5E	E28V1	1
8	Lip Seal	3E & 5E	E18V	1
10	Rotor	3E	D326F1	1
10	Rotor	5E	D526F1	1
11	Pinion	3E & 5E	N/A	1
16	Shaft - Tang	3E & 5E	N/A	1
16A	Tang Shaft-Pinion Assy	3E	ED3C13BC	1
16A	Tang Shaft-Pinion Assy	5E	RED5C13BC	1
17	Keyed Shaft	3E & 5E	N/A	1
17A	Keyed Shaft-Pinion Assy (Not Shown)	3E	DU3C13PK	1
17A	Keyed Shaft-Pinion Assy (Not Shown)	5E	DU5C13PK	1

HAIGHT® 6G & 8G Hot Oil Gerotor Pump Replacement Parts
****Obsolete pump since 2004 - some parts no longer available****



Item No	Description	Style	Part Number	Qty
1	G Style Casing	6G	EG63F7D	1
		8G	EG83F7A	1
2	6G Cover	6G & 8G	EG830F	1
3	Vent Set Screw	6G & 8G	E49G	2
5	Cover Bolts	6G & 8G	E90HC.6	4
6	Bearing	6G & 8G	E11F	2
7	Cover O-Ring	6G & 8G	SE2151V76	1
8	Lip Seal	6G & 8G	E18V	2
10	Gerotor Set	6G	HJ169A	1
		8G	HJ89A	1
16	Shaft-Tang	6G	F18C50	1
		8G	ED524BC	1
16A	Shaft/Spacer/Key Assy	6G	DU6C13BC	1
16A	Tang Shaft-Pinion Assy	8G	DU8C13BC	1

1U through 5U HAIGHT® Pumps with or without Relief Valve



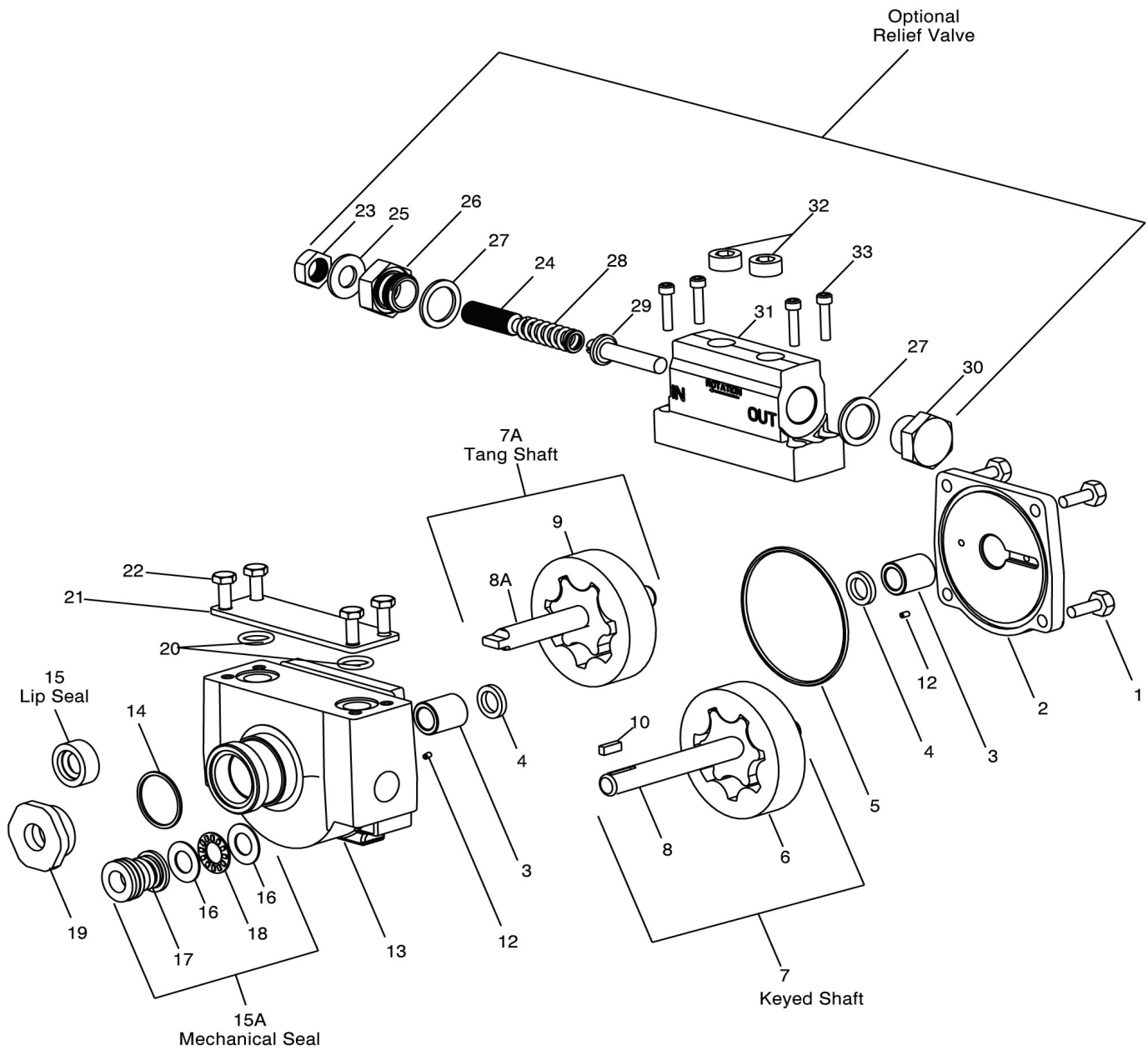
1U - 5U STANDARD PUMP REPLACEMENT PARTS

Item#	Description	Part No	Qty		Item#	Description	Part No	Qty
1	Screw-Cover	E90HC.6	4		11	Shaft Bearing		1
2	Cover					Iron	E11F2	
	1U Standard	ED130A	1			Bronze	E11B2	
	Hatrided	ED130AH				Carbon Graphite	E11G2	
	X-Hard	ED130AXH				Du-Iron Sleeve	E11UFA2	
	3U Standard	ED330A	1		12	Set Screw, Vent	E49F	1
	Hatrided	ED330AH			13	Case 1/2" ports	ED56A5	1
	X-Hard	ED330AXH				Hatrided	ED56AH5	
	5U Standard	ED530A	1			X-Hard	ED56AXH5	
	Hatrided	ED530AH				Case 3/4" ports	ED56A7	1
	X-Hard	ED530AXH				Hatrided	ED56AH7	
						X-Hard	ED56AXH7	
3	Shaft Bearing		1		14	O-ring Gland		1
	Iron	E11F				Buna	E24SE	
	Bronze	E11B				Viton®	E24SV	
	Carbon Graphite	E11G				Neoprene	E24SN	
	DU-Iron Sleeve	E11UFA				Teflon	E24ST	
4	Wiper Seal		1			Silicone	E24SZ	
	Buna	E21E				Kalrez®	E24SK	
	Viton®	E21V			15	Lip Seal		
	Neoprene	E21N			15A	Mechanical T-21 Seal		
5	O-Ring Cover		1		16	Washer	E25C3	2
	Buna	E28E			17	Mechanical Seal		
	Viton®	E28V1			18	Thrust Bearing	E11TB2	1
	Neoprene	E28N			19	Gland	E22SS3F4	1
	Teflon	E28T			20	O-ring For Cover/Relief Valve		2
	Silicone	E28Z				Buna	SE2018N90	
	Kalrez®	E28K				Neoprene	SE2018C90	
6	Rotor					Kalrez®	SE2018K75	
	1U Standard	D126F1				Teflon	SE2018J60	
	Hatrided	D126H				Silicone	SE2018S90	
	X-Hard	D126XH				Viton®	SE2018V90	
	Teflon	D126T1			21	Cover Plate	ED530CP	1
	Delrin	D126D1			22	Screw-Cover Plate	E90HC.5	4
	Open Clearance	D126NF			23	Locking Nut	E64C	1
	Ni-Resist	D126N1			24	Adjustment Screw	E55C	1
	3U Standard	D326F1			25	Sealing Washer Std.	E68C	1
	Hatrided	D326H				Buna	E25N1	
	X-Hard	D326XH				Neoprene	E25C2	
	Teflon	D326T1				Viton®	E25V1	
	Delrin	D326D1			26	Bonnet	E57C	
	Open Clearance	D326NF			27	O-ring, Relief Valve		1
	Ni-Resist	D326N1				Buna	SE2020N70	
	5U Standard	D526F1				Neoprene	SE2020C70	
	Hatrided	D526H				Viton®	SE2020V76	
	X-Hard	D526XH				Teflon	Consult Factory	
	Teflon	D526T1				Silicone	Consult Factory	
	Delrin	D526D1				Kalrez®	Consult Factory	
	Open Clearance	D526NF			28	Spring		
	Ni-Resist	D526N1				40 - 180 PSI	E52S	1
7	Shaft & Pinion Assembly					100 - 250 PSI	E52H	
	1U	DU1C13PK	1		29	Poppet	E51C	1
	3U	DU3C13PK	1		30	Cap	E50C	1
	5U	DU5C13PK	1		31	Relief Valve Body	ED55A	1
7A	Tanged Shaft & Pinion Assy				32	Pipe Plug	ZA285	2
	1U	DU1C13BC	1		33	Screw, Valve Body	E90SC.8	4
	3U	DU3C13BC	1					
	5U	DU5C13BC	1					
7B	Outboard Bearing Shaft & Pinion Assy (Not shown)							
	1U	DU1C13LPK	1					
	3U	DU3C13LPK	1					
	5U	DU5C13LPK	1					
8	Shaft Keyed	(Not sold separately)						
8A	Shaft-Tang	(Not sold separately)						
9	Pinion-Steel	(Not sold separately)						
10	Key 1/8 sq. x 1/2" Long	E13C50	1					



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HAIGHT® 6U & 8U Gerotor Pumps with or without Relief Valve
****Obsolete pump since 2004 - some parts no longer available****



6U - 8U GEROTOR PUMP REPLACEMENT PARTS

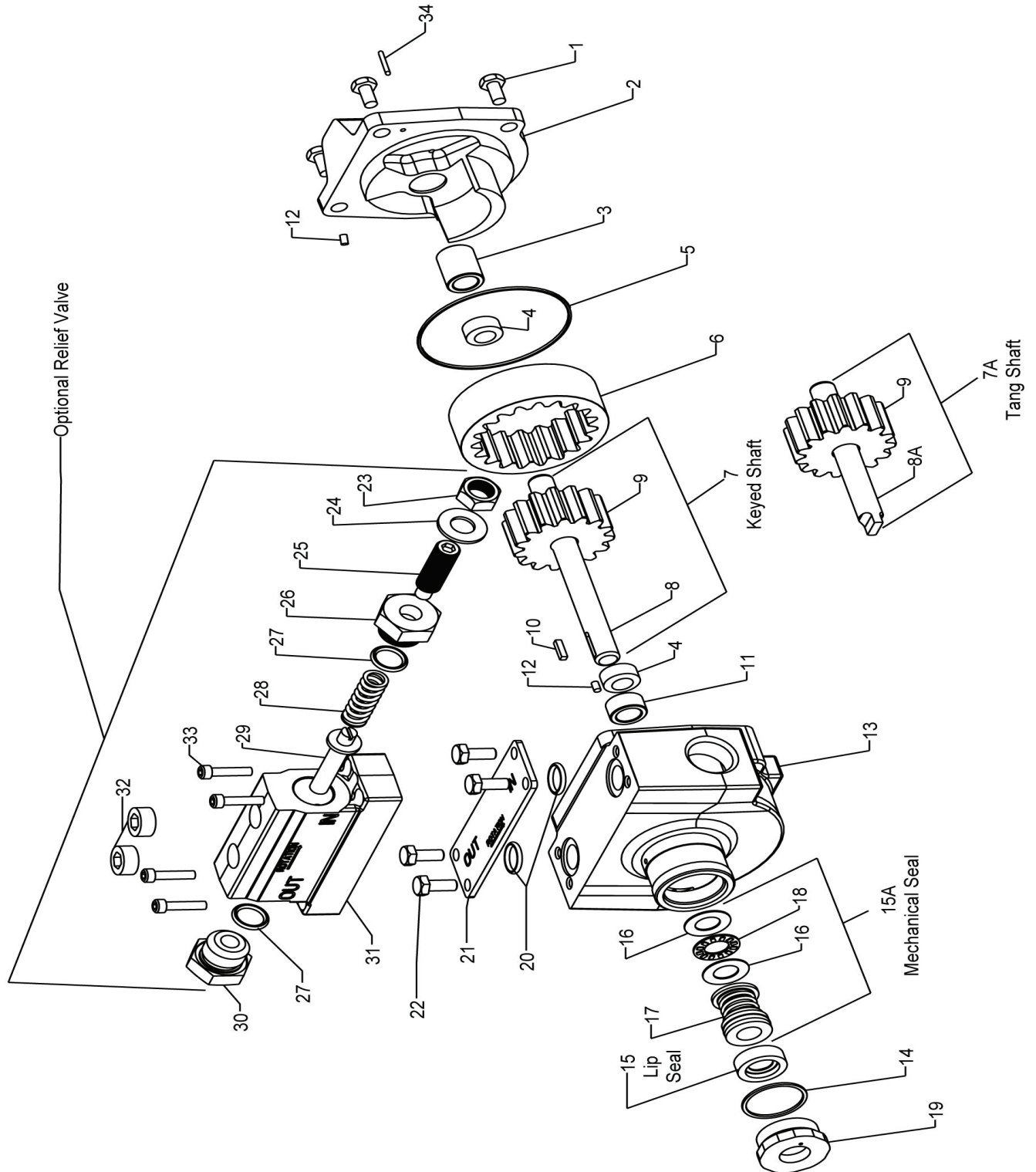
****Obsolete pump since 2004 - some parts no longer available****

Item#	Description	Part No	Qty	Item#	Description	Part No	Qty
1	Screw-cover	E90HC.6	4	21	Cover Plate	ED530CP	1
2	Cover	EG830A	1	22	Screw, Cover Plate	E90HC.5	4
3	Shaft bearing		2	23	Locking Nut	E64C	1
	Iron	E11F		24	Adjustment Screw	E55C	1
	Bronze	E11B		25	Sealing Washer		1
	Carbon Graphite	E11G			Buna	E25N1	
	DU-Iron Sleeve	E11UFA			Neoprene	E25C2	
4	Wiper Seal		1		Viton®	E25V1	
	Buna	E21E			Sealing Gasket	E68C	1
	Viton®	E21V		26	Bonnet	E57C	1
	Neoprene	E21N		27	O-ring, Relief Valve		2
5	O-Ring Cover		1		Buna	SE2020N70	
	Buna	SE2151N70			Neoprene	SE2020C70	
	Viton®	SE2151V76			Viton®	SE2020V76	
	Neoprene	SE2151C70		28	Spring		
	Teflon	SE2151J60			40 - 180 PSI	E52S	1
	Kalrez®	SE2151K75			100 - 250 PSI	E52H	
	Silicone	SE2151S70		29	Poppet	E51C	1
6	Gerotor Set		1	30	Cap	E50C	1
	6U Pump			31	Relief Valve Body	ED55A	1
	Keyed Shaft	HJ169A		32	Pipe Plug	ZA285	2
	8U Pump			33	Screw, Valve Body	E90SC.8	4
	Keyed Shaft	HJ89A					
7 & 7A	Shaft & Gear Set Assembly		1				
	6U Pump						
	Standard	DU6C13PK					
	Outboard Bearing	DU6C13LPK					
	Tang	DU6C13BC					
	8U Pump						
	Standard	DU8C13PK					
	Outboard Bearing	DU8C13LPK					
	Tang	DU8C13BC					
8	Shaft-Keyed	(Not sold separately)					
8A	Shaft-Tang	(Not sold separately)					
10	Key	E13C50	1				
12	Set Screw, Vent	E49G	1				
13	Case 3/4" ports		1				
	6U Pump	EG66A7					
	8U Pump	EG86A7					
14	O-ring Gland		1				
	Buna	E24SE					
	Viton®	E24SV					
	Neoprene	E24SN					
	Teflon	E24ST					
	Silicone	E24SZ					
	Kalrez®	E24SK					
15	Lip Seal						
15A	Mechanical Seal Package						
16	Washer	E25C3	1				
17	Mechanical Seal						
18	Thrust Bearing	E11TB2	1				
19	Gland	E22SS3F4	1				
20	O-Ring,Cover Plate or RV Body		2				
	Buna	SE2018N90					
	Neoprene	SE2018C90					
	Kalrez®	SE2018K75					
	Teflon	SE2018J60					
	Silicone	SE2018S90					
	Viton®	SE2018V90					



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**6EU through 9EU HAIGHT® Pumps with or without Relief Valve
 After February 1, 2008**

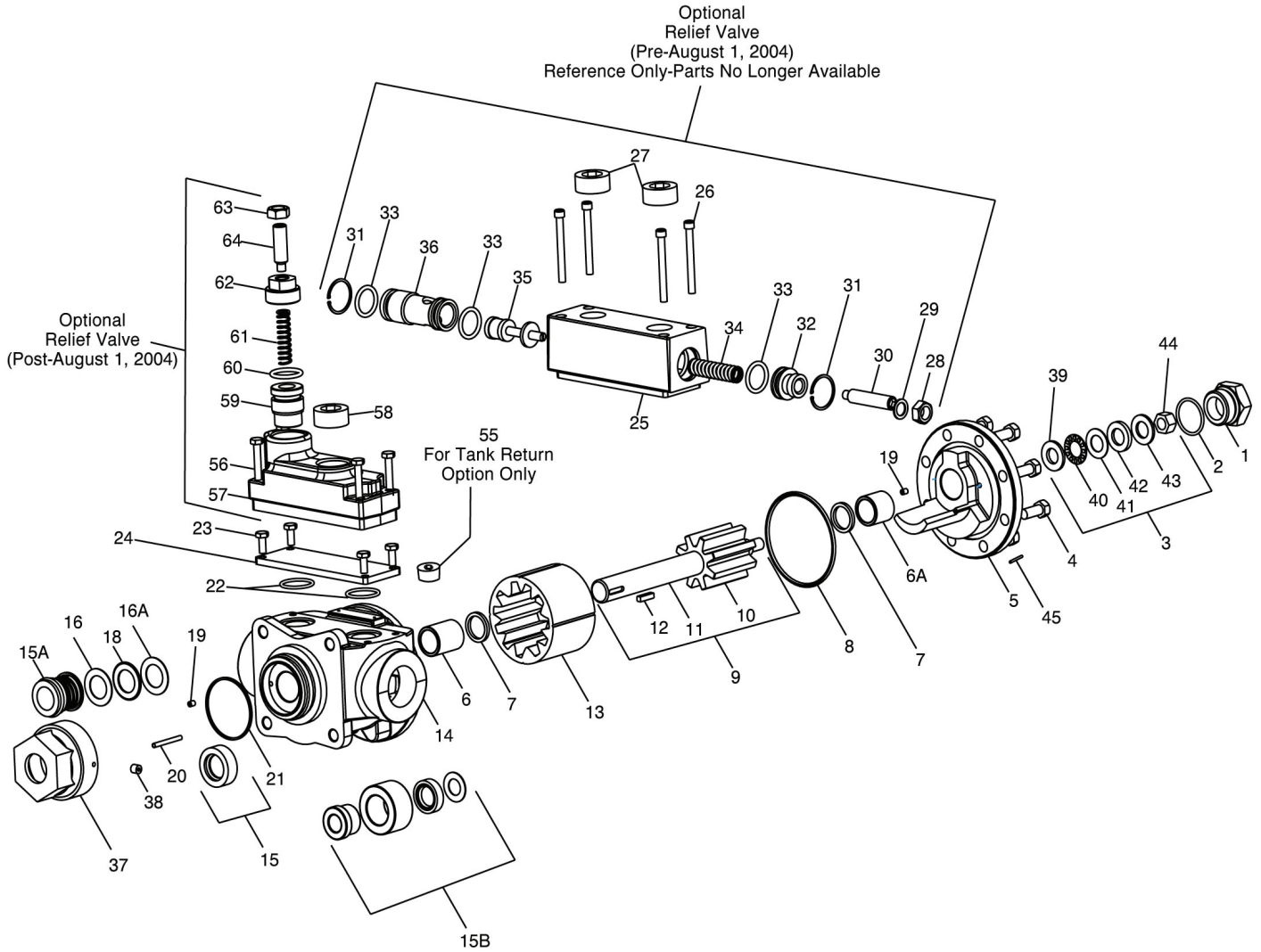


6EU - 9EU STANDARD PUMP REPLACEMENT PARTS
After February 1, 2008

Item#	Description	Part No	Qty	Item#	Description	Part No	Qty
1	Screw-Cover	E90HC.6	4	7A	Tanged Shaft & Pinion Assy		1
2	Cover		1	6EU	ED6C13BCU		
	6EU Standard	ED630A		7EU	ED7C13BCU		
	Hatrided	ED630AH		8EU	ED8C13BCU		
	X-Hard	ED630AXH		9EU	ED9C13BCU		
	7EU Standard	ED730A	1	7B	Outboard Bearing Shaft & Pinion Assy		1 (Not shown)
	Hatrided	ED730AH		6EU	ED6C13LPK		1
	X-Hard	ED730AXH		7EU	ED7C13LPK		1
	8EU Standard	ED830A	1	8EU	ED8C13LPK		1
	Hatrided	ED830AH		9EU	ED9C13LPK		1
	X-Hard	ED830AXH		8	Shaft Keyed	(Not sold separately)	
	9EU Standard	ED930A	1	8A	Shaft-Tang	(Not sold separately)	
	Hatrided	ED930AH		9	Pinion-Steel	(Not sold separately)	
	X-Hard	ED930AXH		10	Key 1/8 sq. x 1/2" Long	E13C50	1
3	Shaft Bearing		1	11	Shaft Bearing		1
	Iron	E11F			Iron	E11F2	
	Bronze	E11B			Bronze	E11B2	
	Carbon Graphite	E11G			Carbon Graphite	E11G2	
	DU-Iron Sleeve	E11UFA			Du-Iron Sleeve	E11UFA2	
4	Wiper Seal		1	12	Set Screw, Vent	E49F	1
	Buna	E21E		13	Case 1/2" Ports	ED86A5	1
	Viton®	E21V			Hatrided	ED86AH5	
	Neoprene	E21N			X-Hard	ED86AXH5	
5	O-Ring Cover		1		Case 3/4" Ports	ED86A7	1
	Buna	SE2041N70			Hatrided	ED86AH7	
	Viton®	SE2041V76			X-Hard	ED86AXH7	
	Neoprene	SE2041C70		14	O-ring Gland		1
	Teflon	SE2041J70			Buna	E24SE	
	Silicone	SE2041S70			Viton®	E24SV	
6	Rotor		1		Neoprene	E24SN	
	6EU Standard	ED626F1			Teflon	E24ST	
	Hatrided	ED626H			Silicone	E24SZ	
	X-Hard	ED626XH			Kalrez®	E24SK	
	Teflon	ED626T1		15	Lip Seal		
	Delrin	ED626D1		15A	Mechanical T-21 Seal		
	Open Clearance	ED626NF		16	Washer	E25C3	2
	Ni-Resist	ED626N1		17	Mechanical Seal		
	7EU Standard	ED726F1		18	Thrust Bearing	E11TB2	1
	Hatrided	ED726H		19	Gland	E22SS3F4	1
	X-Hard	ED726XH		20	O-ring for Cover/Relief Valve		2
	Teflon	ED726T1			Buna	SE2018N90	
	Delrin	ED726D1			Neoprene	SE2018C90	
	Open Clearance	ED726NF			Kalrez®	SE2018K75	
	Ni-Resist	ED726N1			Teflon	SE2018J60	
	8EU Standard	ED826F1			Silicone	SE2018S90	
	Hatrided	ED826H			Viton®	SE2018V90	
	X-Hard	ED826XH		21	Cover Plate	ED530CP	1
	Teflon	ED826T1		22	Screw-Cover Plate	E90HC.5	4
	Delrin	ED826D1		23	Locking Nut	E64C	1
	Open Clearance	ED826NF		24	Adjustment Screw	E55C	1
	Ni-Resist	ED826N1		25	Sealing Washer Std.	E68C	1
	9EU Standard	ED926F1			Buna	E25N1	
	Hatrided	ED926H			Neoprene	E25C2	
	X-Hard	ED926XH			Viton®	E25V1	
	Teflon	ED926T1		26	Bonnet	E57C	
	Delrin	ED926D1		27	O-ring, Relief Valve		1
	Open Clearance	ED926NF			Buna	SE2020N70	
	Ni-Resist	ED926N1			Neoprene	SE2020C70	
	7EU Standard	ED926F1			Viton®	SE2020V76	
	Hatrided	ED926H			Tefon	Consult Factory	
	X-Hard	ED926XH			Silicone	Consult Factory	
	Teflon	ED926T1			Kalrez®	Consult Factory	
	Delrin	ED926D1		28	Spring		
	Open Clearance	ED926NF			40 - 180 PSI	E52S	1
	Ni-Resist	ED926N1			100 - 250 PSI	E52H	
7	Shaft & Pinion Assembly		1	29	Poppet	E51C	1
	6EU	EU6C13PK	1	30	Cap	E50C	1
	7EU	EU7C13PK	1	31	Relief Valve Body	ED55A	1
	8EU	EU8C13PK	1	32	Pipe Plug	ZA285	2
	9EU	EU9C13PK	1	33	Screw, Valve Body	E90SC.8	4

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10U through 40U HAIGHT® Pumps with or without Relief Valve



Item#	Description	Part No.	Qty.	Item#	Description	Part No.	Qty..
1	Screw on Plug	SAE16	1	6&6A	Bearing		2
2	O-Ring		1		Iron	F11F	
	Buna	SE3916N70			Bronze	F11B	
	Viton®	SE3916V76			Graphite	F11G	
	Neoprene	SE3916C70			DU	F11UFA	
	Kalrez®	SE3916K75		7	Wiper Seal		2
	Teflon	SE3916J60			Buna	F21E	
	Silicone	SE3916S70			Neoprene	F21N	
3	Thrust Washer Kit	RRKT001	1		Viton®	F21V	
4	Screw	PC262	8	8	O-Ring-Cover		1
5	Cover		1		Buna	F28E	
	10U	D1030A11			Viton®	F28V	
	Hatrided	D1030AH11			Neoprene	F28N	
	X-Hard	D1030AXH11			Kalrez®	F28K	
	15U	D1530A11			Teflon	F28T	
	Hatrided	D1530AH11			Silicone	F28Z	
	X-Hard	D1530AXH11					
	20U	D2030A11					
	Hatrided	D2030AH11					
	X-Hard	D2030AXH11					

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10U - 20U STANDARD PUMP REPLACEMENT PARTS

Item#	Description	Part No.	Qty.		Item#	Description	Part No	Qty
9	Shaft & Pinion Assy-Std.				21	O-Ring, Gland		1
	10U Standard	DU10C13MC3	1			Buna	SE2137N70	
	OBB Shaft	DU10C13MC4				Viton®	SE2137V76	
	Hatrided Pinion	DU10C13MH3				Neoprene	SE2137C70	
	Hatrided/OBB Shaft	DU10C13MH4				Silicone	SE2137S70	
	X-Hard	DU10C13MX3				Kalrez®	SE2137K75	
	X-Hard/OBB Shaft	DU10C13MX4				Teflon	SE2137J60	
	Open Clearance	DU10C13MO3			22	O-Ring, Cover Plate, Valve Body		2
	Open Clearance/OBB	DU10C13MO4				Buna	SE2122N90	
	15U Standard	DU15C13MC3	1			Viton®	SE2122V90	
	OBB Shaft	DU15C13MC4				Neoprene	SE2122C90	
	Hatrided Pinion	DU15C13MH3				Teflon	SE2122J60	
	Hatrided/OBB Shaft	DU15C13MH4				Silicone	SE2122S90	
	X-Hard	DU15C13MX3				Kalrez®	SE2122K75	
	X-Hard/OBB Shaft	DU15C13MX4			23	Screw, Cover Plate	E90HC.6	4
	Open Clearance	DU15C13MO3			24	Cover Plate	D1030CP	1
	Open Clearance/OBB	DU15C13MO4			25	Valve Body	FD55A	1
	20U Standard	DU20C13MC3	1		26	Screw, Valve Body	E90SC2.5	4
	OBB Shaft	DU20C13MC4			27	Pipe Plug	F65C	2
	Hatrided Pinion	DU20C13MH3			28	Lock Nut	E64C	1
	Hatrided/OBB Shaft	DU20C13MH4			29	Washer		1
	X-Hard	DU20C13MX3				Steel	E68C	
	X-Hard/OBB Shat	DU20C13MX4				Teflon	E68T	
	Open Clearance	DU20C13MO3				Optional HP/Vacuum Thread Sealing Gasket		1
	Open Clearance/OBB	DU20C13MO4				Buna	E25N1	
10	Pinion	(Not sold separately. Must order Item #9)				Neoprene	E25C2	
11	Shaft	(Not sold separately. Must order Item #9)				Viton®	E25V1	
12	Drive Key 3/16 Sq x 3/4" L	F18C75	1			Silicone	E25S1	
13	Rotor		1		30	Adjustment screw	F55C	1
	10U Standard	D1026F1			31	Retaining ring	F59C	2
	Hatrided	D1026H			32	Bonnet	F57C	1
	X-Hard	D1026XH			33	O-ring, Valve-Buna	F56E	3
	Delrin	D1026D1				Neoprene	F56N	
	Teflon	D1026T1				Viton®	F56V	
	Open Clearance	D1026NF				Teflon	F56T	
	Ni-Resist	D1026N1				Silicone	F56Z	
	15U Standard	D1526F1			34	Spring-Std	H52S	1
	Hatrided	D1526H				Heavy duty	H52C	
	X-Hard	D1526XH				Light duty	H52D	
	Delrin	D1526D1			35	Poppet	F51C	1
	Teflon	D1526T1			36	Cage	H50C	1
	Open Clearance	D1526NF			38	Set Screw, Gland	E49D	1
	Ni-Resist	D1526N1			39	Washer	F25C2	1
	20U Standard	D2026F1			40	Thrust Bearing	F11TB2	1
	Hatrided	D2026H			41	Washer	F25C3	1
	X-Hard	D2026XH			42	Spherical Washer	F25C5	1
	Delrin	D2026D1			43	Spherical Washer	F25C4	1
	Teflon	D2026T1			44	Nut	ZA532A	1
	Open Clearance	D2026NF			45	Pin	F41C	1
	Ni-Resist	D2026N1			55	Pipe Plug 3/4" NPT	DP20S	1
14	Case		1		56	Screw	E90HC1.2	4
	1" ports	D203A11K			57	Valve Body	FD55SA	1
	1-1/4" Ports	D203A11L			58	Pipe Plug	F65C	1
	1-1/2" Ports	D203A11M			59	Piston	RVP05	1
	Case - Hatrided				60	O-Ring		1
	1" ports	D203AH11K				Buna	F92B	1
	1-1/4" Ports	D203AH11L				Neoprene	F92N	1
	1-1/2" Ports	D203AH11M				Viton	F92V	1
	Case - X-Hard					Silicone	F92Z	1
	1" ports	D203AXH11K			61	Spring		
	1-1/4" Ports	D203AXH11L				20-40 PSI	H52L	1
	1-1/2" Ports	D203AXH11M				50-80 PSI	H52M	1
						90-130 PSI	H52N	1
						170-220 PSI	H52P	1
15	Lip Seal				62	Bonnet	F56A	1
15A	Mechanical Seal				63	Nut	E64JN	1
15B	Packing Seal				64	Adjustment Screw	F55C	1
16	Washer	F25C3	1					
16A	Washer	F25C2	1					
17	Gland	F22SS2A	1					
18	Thrust Bearing	F11TB2	1					
19	Set Screw, Vent	E49E	1					
20	Pin	F43C1	1					



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24U - 40U STANDARD PUMP REPLACEMENT PARTS

Item#	Description	Part No	Qty	Item#	Description	Part No	Qty
1	Screw on Plug	SAE16	1		Open Clearance	DU30C13MO7	
2	O-Ring		1		Open Clearance/OBB	DU30C13MO8	
	Buna	SE3916N70		40U Standard		DU40C13MC7	1
	Viton®	SE3916V76		OBB Shaft		DU40C13MC8	
	Neoprene	SE3916C70		Hatrided Pinion		DU40C13MH7	
	Kalrez®	SE3916K75		Hatrided/OBB Shaft		DU40C13MH8	
	Teflon	SE3916J60		X-Hard		DU40C13MX7	
	Silicone	SE3916S70		X-Hard/OBB Shaft		DU40C13MX8	
3	Thrust Washer Kit	RRKT001	1		Open Clearance	DU40C13MO7	
4	Screw	KR364	8		Open Clearance/OBB	DU40C13MO8	
5	Cover		1	10	Pinion (Not sold separately. Must order Item #9)		
	24U	D2230A11		11	Shaft (Not sold separately. Must order Item #9)		
	Hatrided	D2230AH11		12	Drive Key 3/16 Sqx3/4" L	F18C75	1
	X-Hard	D2230AXH11		13	Rotor		
	30U	D3030A11		24U Standard		D2226F1	1
	Hatrided	D3030AH11		Hatrided		D2226H	
	X-Hard	D3030AXH11		X-Hard		D2226XH	
	40U	D4030A11		Delrin		D2226D1	
	Hatrided	D4030AH11		Teflon		D2226T1	
	X-Hard	D4030AXH11		Open Clearance		D2226NF	
6 & 6A	Bearing 24U & 30U		2	Ni-Resist		D2226N1	
	Iron	H11F		30U Standard		D3026F1	1
	Bronze	H11B		Hatrided		D3026H	
	Graphite	H11G		X-Hard		D3026XH	
	DU	H11UFA		Delrin		D3026D1	
6A	Bearing 40U			Teflon		D3026T1	
	Iron	H11F10	1	Open Clearance		D3026NF	
	Bronze	H11B10	1	Ni-Resist		D3026N1	
	Graphite	H11G10	1	40U Standard		D4026F1	1
6	Bearing 40U			Hatrided		D4026H	
	Iron	H11F	1	X-Hard		D4026XH	
	Bronze	H11B	1	Delrin		D4026D1	
	Graphite	H11G	1	Teflon		D4026T1	
	DU	H11UFA	2	Open Clearance		D4026NF	
7	Wiper Seal		2	Ni-Resist		D4026N1	
	Buna	H21E		14	Case		1
	Neoprene	H21N		1-1/4" Ports		D403A11L	
	Viton®	H21V		1-1/2" Ports		D403A11M	
8	O-Ring-Cover		1	Case - Hatrided			1
	Buna	H28E		1-1/4" Ports		D403AH11L	
	Viton®	H28V		1-1/2" Ports		D403AH11M	
	Neoprene	H28N		Case - X-Hard			1
	Kalrez®	H28K		1-1/4" Ports		D403AXH11L	
	Teflon	H28T		1-1/2" Ports		D403AXH11M	
	Silicone	H28Z		15	Lip Seal		
9	Shaft & Pinion Assy-Std.			15A	Mechanical Seal		
	24U Standard	DU22C13MC7	1	15B	Gland	H22SS2A	
	OBB Shaft	DU22C13MC8		16	Washer	H25C2	1
	Hatrided Pinion	DU22C13MH7		16A	Washer	H25C2	1
	Hatrided/OBB Shaft	DU22C13MH8		17	Shaft Seal (See Seal Kits)		
	X-Hard	DU22C13MX7		18	Thrust Bearing	F11TB2	1
	X-Hard/OBB Shaft	DU22C13MX8		19	Set Screw, Vent	E49E	1
	Open Clearance	DU22C13MO7		20	Pin	F43C1	1
	Open Clearance/OBB	DU22C13MO8		21	O-Ring, Gland		1
	30U Standard	DU30C13MC7	1	Buna		SE2137N70	
	OBB Shaft	DU30C13MC8		Viton®		SE2137V76	
	Hatrided Pinion	DU30C13MH7		Neoprene		SE2137C70	
	Hatrided/OBB Shaft	DU30C13MH8					
	X-Hard	DU30C13MX7					
	X-Hard/OBB Shaft	DU30C13MX8					

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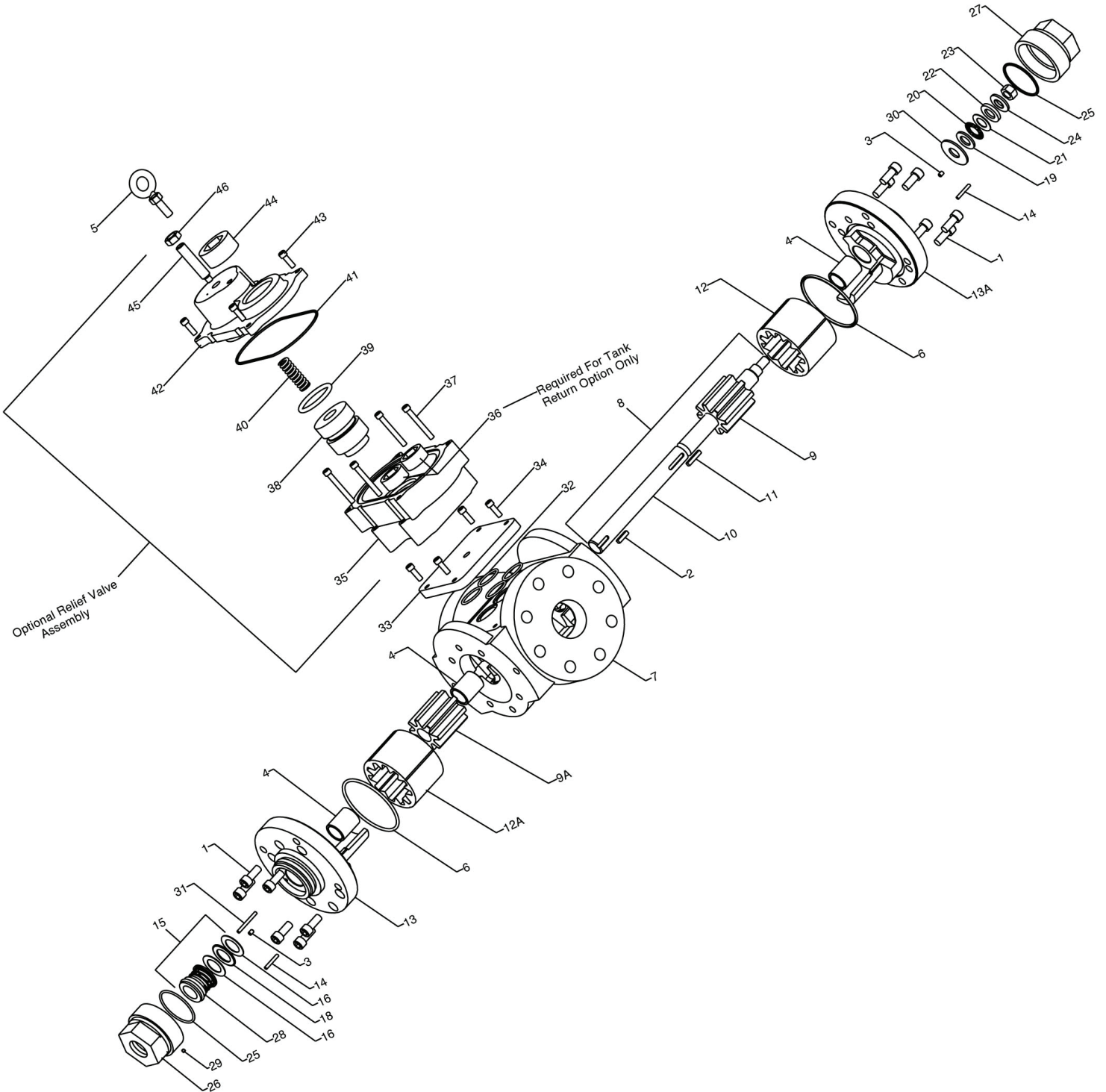
24U - 40U STANDARD PUMP REPLACEMENT PARTS

Item#	Description	Part No.	Qty
	Silicone	SE2137S70	
	Kalrez®	SE2137K75	
	Teflon	SE2137J60	
22	O-Ring, Cover Plate, Valve Body		2
	Buna	SE2122N90	
	Viton®	SE2122V90	
	Neoprene	SE2122C90	
	Teflon	SE2122J60	
	Silicone	SE2122S90	
	Kalrez®	SE2122K75	
23	Screw, Cover Plate	E90HC.6	4
24	Cover Plate D.I.	D1030CP	1
25	Valve Body	FD55A	1
26	Screw, Valve Body	E90SC2.5	4
27	Pipe Plug	F65C	2
28	Lock Nut	E64C	1
29	Washer		1
	Steel	E68C	
	Teflon	E68T	
	Optional HP/Vacuum Thread Sealing Gasket		1
	Buna	E25N1	
	Neoprene	E25C2	
	Viton®	E25V1	
	Silicone	E25S1	
30	Adjustment Screw	F55C	1
31	Retaining Ring	F59C	2
32	Bonnet	F57C	1
33	O-ring, Valve-Buna	F56E	3
	Neoprene	F56N	
	Viton®	F56V	
	Teflon	F56T	
	Silicone	F56Z	
34	Spring-Std	H52S	1
	Heavy Duty	H52C	
	Light Duty	H52D	
35	Poppet	F51C	1
36	Cage	H50C	1
38	Set Screw, Gland	E49D	1
39	Washer	F25C2	1
40	Thrust Bearing	F11TB2	1
41	Washer	F25C3	1
42	Spherical Washer	F25C5	1
43	Spherical Washer	F25C4	1
44	Nut	ZA532A	1
45	Pin	F41C	1
55	Pipe Plug 3/4" NPT	DP20S	1
56	Screw	E90HC1.2	4
57	Valve Body	FD55SA	1
58	Pipe Plug	F65C	1
59	Piston	RVP05	1
60	O-Ring		1
	Buna	F92B	1
	Neoprene	F92N	1
	Viton	F92V	1
	Silicone	F92Z	1
61	Spring		
	20-40 PSI	H52L	1
	50-80 PSI	H52M	1
	90-130 PSI	H52N	1
	170-220 PSI	H52P	1
62	Bonnet	F56A	1
63	Nut	E64JN	1
64	Adjustment Screw	F55C	1



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HAIGHT® 44 through 80 GPM Double Pump



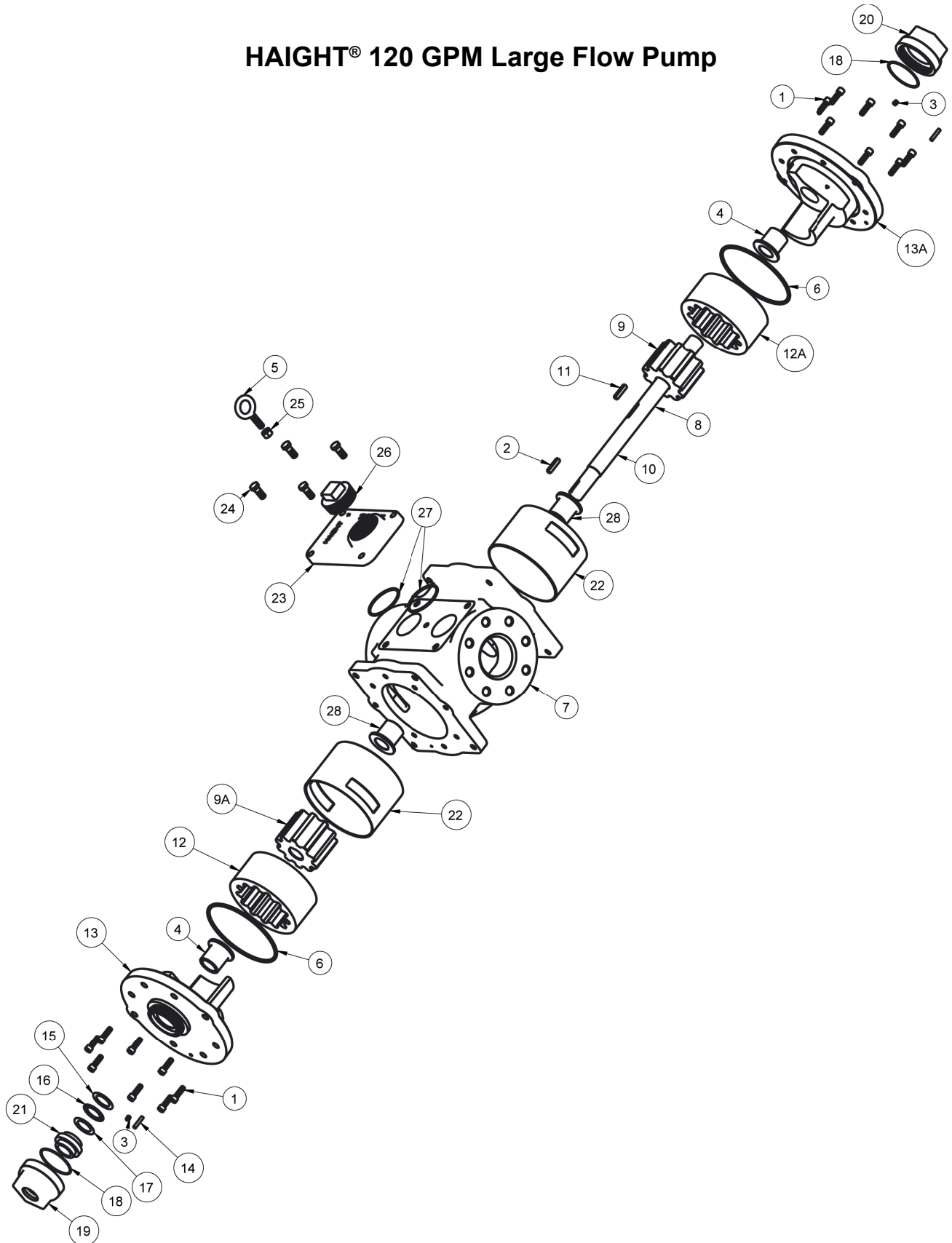
44 - 80 GPM DOUBLE PUMP REPLACEMENT PARTS

Item#	Description	Part No	Qty	Item#	Description	Part No	Qty
1	Screw .375 x .875 UNC HSCS	H90SC.8	12	25	O-ring-Gland		2
2	Drive Key .188 x .75	F18C75	1		Buna	SE2137N70	
3	Set Screw 10-32x1/4 SH CP	E49E	2		Viton®	SE2137V76	
4	Shaft Bearing .877 x 1.5 x 1.128		3		Neoprene	SE2137C70	
	Iron	H11F			Kalrez®	SE2137K75	
	Bronze	H11B			Silicone	SE2137S70	
	Carbon Graphite	H11G			Teflon	SE2137J60	
5	Eyebolt	EYB1	1	26	Gland Cap-Shaft	H22SS2A	1
6	O-ring		2	27	Gland Cap	F22SM2A	1
	Neoprene	H28N		28	Mechanical Shaft Seal		
	Buna N	H28E		29	Set Screw 10-32x1/4 SH CP	E49D	1
	Viton®	H28V		30	Washer .656x1.66x.094	F25C7	1
	Kalrez®	H28K		31	Roll Pin	F43C1	1
	Teflon	H28T		32	O-ring		4
	Silicone	H28Z			Buna	SE2122N90	
7	Casing	D403A4	1		Viton®	SE2122V90	
8	Shaft & Pinion Assembly		1		Neoprene	SE2122C90	
	44 GPM	RSK001			Kalrez®	SE2122K75	
	54 GPM	RSK002			Teflon	SE2122J60	
	60 GPM	RSK003			Silicone	SE2122S90	
	70 GPM	RSK004		33	Cover Plate	D8030CP	1
	80 GPM	RSK005		34	Screw, Cover Plate	E90SC.9	4
9	Standard Pinion	(Not sold separately. See Item #8)		35	Valve Body	RVB03	1
9A	Keyed Pinion	(Not sold separately. See Item #8)		36	Pipe Plug	F65C	2
10	Shaft	(Not sold separately. See Item #8)		37	Screw, Valve Body	E90SC2.0	4
11	Key, Pinion - .188x 1.0	F18C100	1	38	Valve Piston	RVP04	1
12	Rotor		1	39	O-ring, Valve Piston		1
	44 GPM	D2226F1			Buna	SE2327N70	
	54 GPM	D2226F1			Viton®	SE2327V76	
	60 GPM	D3026F1			Neoprene	SE2327C70	
	70 GPM	D4026F1			Silicone	SE2327S70	
	80 GPM	D4026F1			Kalrez®	SE2327K75	
12A	Mating Rotor		1	40	Spring		1
	44 GPM	D2226F1			40 - 80 PSI	H52E	
	54 GPM	D3026F1			80 - 130 PSI	H52F	
	60 GPM	D3026F1			130 - 220 PSI	H52G	
	70 GPM	D3026F1		41	O-ring, Valve Cover		1
	80 GPM	D4026F1			Buna	SE2160N70	
13	Drive Plate		1		Viton	SE2160V76	
	44 GPM	D2230A8			Neoprene	SE2160C70	
	54 GPM	D3030A8			Silicone	SE2160S70	
	60 GPM	D3030A8			Kalrez®	SE2160K75	
	70 GPM	D3030A8		42	Valve Cover	RVC30	1
	80 GPM	D4030A8		43	Screw, Valve Cover	E90SC1.0	4
13A	Cover		1	44	Pipe Plug	H65C	1
	44 GPM	D2230A8		45	Adjustment Screw	F55C	1
	54 GPM	D2230A8		46	Lock Nut	E64C	1
	60 GPM	D3030A8					
	70 GPM	D4030A8					
	80 GPM	D4030A8					
14	Roll Pin .156x1.13	F41C1	2				
15	Seal Kit						
16	Washer .625x1.12x.094	H25C2	2				
18	Thrust Bearing (Keyed end) (.875)	H11TB2	1				
19	Washer (1.12 x .63 x .09 hard steel)	F25C2	1				
20	Thrust Washer (.625)	F11TB2	1				
21	Washer (1.12 x .63 x .03 hard steel)	F25C3	1				
22	Washer	F25C5	1				
23	Locking Nut	ZA532A	1				
24	Washer	F25C4	1				



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HAIGHT® 120 GPM Large Flow Pump



120 GPM LARGE FLOW PUMP REPLACEMENT PARTS

Item#	Description	Part No	Qty
1	Screw	H90SC1.2	16
2	Drive Key, 5/16 Sq X 1.50 Lg	J31C15A	1
3	Set Screw, Vent	J49E	2
4	Bearing	J11GF	2
5	Eyebolt	EYB5	1
6	O-ring, Cover	SE2366N70	2
7	Case	D2403A	1
8	Shaft & Pinion Assembly	D60C13D1	1
9	Standard Pinion	(Not sold separately. See Item #8)	
9A	Keyed Pinion	(Not sold separately. See Item #8)	
10	Shaft	(Not sold separately. See Item #8)	
11	Key, 5/16 Sq X 1.150 Lg	J31C15A	1
12	Rotor	D6026F	1
12A	Rotor	D6026F	1
13	Cover	D6030A	1
13A	Cover	D6030A	1
14	Pin	F41C5	2
15	Washer	J25C2	1
16	Thrust Bearing	J11TB2	1
17	Washer	J25C2	1
18	O-ring,Gland	SE2151N70	2
19	Gland	J22SS2A	1
20	Gland	J22SS2AS	1
21	Shaft Seal	J18AMS	1
22	Sleeve	240CPSLV	2
23	Top Cover	D24030CP	1
24	Top Cover Screws	KL84	4
25	Eye Bolt Nut	PC433W	1
26	Pipe Plug	UK50	1
27	O-ring, Top Cover	F28E	2
28	Bearing	J11CGF	2