FEATURES

SUPERIOR DESIGN
- Triplex plunger design gives smoother fluid flow.
- Wetted seal design keeps high pressure seals completely lubricated and cooled.
- Inlet and discharge valve and seat assemblies interchange for easier maintenance.
- Lubricated low pressure seal provides double protection against external leakage.
- Oil bath crankcase assures proper lubrication.
- Plunger design results in extra quiet operation.
- The close tolerance concentricity of the ceramic plunger maximizes seal life.

QUALITY MATERIALS
- All stainless steel valves are heat treated and seats are roller burnished for a positive seal and extended valve life.
- Aluminum Bronze manifold is strong and corrosion resistant.
- Polished surface of solid ceramic plungers results in extended seal life.
- Extra hard finish of ceramic plunger is durable and abrasion resistant.
- Die cast aluminum crankcase provides lightweight strength and precision tolerance control.
- Forged, nitrided chrome-moly crankshaft gives unmatched strength and surface hardness.
- Oversized crankshaft bearings mean longer bearing life.

EASY MAINTENANCE
- Wet end is easily serviced without entering crankcase, requiring less time and effort.
- Valve assemblies are accessible without disturbing piping, for quick service.
- Preset packings mean no packing gland adjustment is necessary, reducing maintenance costs.

WORLD LEADER IN TRIPLEX HIGH PRESSURE PUMPS

Plunger Pump Model 654

SPECIFICATIONS

<table>
<thead>
<tr>
<th>U.S. Measure</th>
<th>Metric Measure</th>
</tr>
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<tbody>
<tr>
<td>Volume</td>
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</tr>
<tr>
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</tr>
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</tr>
<tr>
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<td>790 RPM</td>
</tr>
<tr>
<td>Bore</td>
<td>0.709&quot;</td>
</tr>
<tr>
<td>Stroke</td>
<td>1.180&quot;</td>
</tr>
<tr>
<td>Crankcase Capacity</td>
<td>42 oz.</td>
</tr>
<tr>
<td>Maximum Fluid Temperature</td>
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</tr>
<tr>
<td>Inlet Ports (2)</td>
<td>3/4” NPT</td>
</tr>
<tr>
<td>Discharge Ports (2)</td>
<td>1/2” NPT</td>
</tr>
<tr>
<td>Pulley Mounting</td>
<td>Either side</td>
</tr>
<tr>
<td>Shaft Diameter</td>
<td>1.180&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>44 lbs.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>15.83&quot; x 12.99&quot; x 6.46&quot;</td>
</tr>
</tbody>
</table>

HORSEPOWER REQUIREMENTS

<table>
<thead>
<tr>
<th>Flow</th>
<th>PRESSURE</th>
<th>MOTOR PULLEY SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI</td>
<td>PSI</td>
<td>PSI</td>
</tr>
<tr>
<td>2000</td>
<td>3000</td>
<td>4000</td>
</tr>
<tr>
<td>GPM</td>
<td>BAR</td>
<td>BAR</td>
</tr>
<tr>
<td>140</td>
<td>210</td>
<td>280</td>
</tr>
<tr>
<td>4.5</td>
<td>6.2</td>
<td>9.3</td>
</tr>
<tr>
<td>4.0</td>
<td>5.3</td>
<td>8.3</td>
</tr>
<tr>
<td>3.5</td>
<td>4.8</td>
<td>7.2</td>
</tr>
</tbody>
</table>

DETERMINING THE PUMP R.P.M. = Rated G.P.M. = Desired G.P.M. = Desired R.P.M.

DETERMINING THE REQUIRED H.P. = GPM x PSI = Electric Brake

DETERMINING MOTOR PULLEY SIZE = Pump R.P.M. = Motor R.P.M.

Note: Consult engine manufacturer when using gas or diesel engine.
Completely interchangeable stainless steel inlet and discharge valves for easy service.

Polished, solid ceramic plungers for resistance to corrosion and abrasion which means a longer service life.

Main bearings are oversized for pump life.

Stainless steel plunger rod for strength.

100% wetted seal design lubricated and cooled by pumped fluid on both sides for extended seal life.

Pre-set seals require no adjustment.

Matched oversized connecting rods are of Znamak, a material noted for strength and bearing quality.

Diecast aluminum crankcase means high strength, light weight and excellent tolerance control.

Valve seals are roller burnished and valves are heat treated for positive seating and long life.

Stainless steel slinger keeps pumped fluid out of crankcase.

Crankshaft is nitrided chrome-moly forged. Cat Pumps is the only pump manufacturer in the world utilizing this quality.

654S-284 5M
### Parts List

**Item** | **Part No.** | **Description** | **QTY.**
--- | --- | --- | ---
2 | 43488 | Crankcase | 1
3 | 14050 | Stud Bolt (M10 x 45) | 4
4 | 14177 | O-ring, Cap (Buna-N) | 1
5 | 43211 | Oil Filler Cap | 1
7 | 43492 | O-ring, Crankcase Cover (Buna-N) | 1
8 | 43491 | Crankcase Cover | 1
9 | 44426 | Flat Flex. Gasket (Buna-N) | 1
10 | 43987 | Bubble Oil Gauge | 1
11 | 23170 | O-ring, Drain Plug (Buna-N) | 1
12 | 25625 | Drain Plug | 1
14 | 92520 | Sems Comb. Head Screw (M6 x 20) | 4
16 | 43494 | Crankshaft - Dual End | 1
17 | 39600 | Bearing, Tapered Roller | 2
18 | 43495 | Oil Seal | 2
19 | 11340 | O-ring, Bearing Case | 2
20 | 43520 | Split Adj. Shim, Bearing Case | 2-4
21 | 43496 | Bearing Case | 2
22 | 92519 | Sems Comb. Head Screw (6 x 16) | 8
24 | 43497 | Connecting Rod | 3
25 | 43501 | Plunger Rod | 3
26 | 43507 | Plunger Pin | 3
27 | 43504 | Washer | 3
28 | 43500 | Oil Seal (Buna-N) | 3
29 | 43509 | Seal Retainer | 3
30 | 43506 | Barrier Slinger | 3
31 | 43585 | Wick | 3
32 | 43584 | Collar | 3
33 | 43232 | Ceramic Plugner | 3
34 | 43645 | Copper Gasket, Plunger | 3
35 | 43235 | Back Up Ring (Teflon) | 3
36 | 17399 | O-ring (Buna-N) | 3
38 | 14160 | O-ring (Viton) | 3
39 | 104360 | Plunger Retainer - W/Stud-S.S. | 3
40 | 44664 | Oil Pan W/Screws | 1
41 | 43971 | Manifold Head - Aluminum Bronze | 1
42 | 101791 | Retaining Seal, (Buna N) | 3
43 | 43586 | Lo-Pressure Seal (Buna N) | 3
43* | 43512 | Seal Case | 3
44 | 14762 | O-ring, (Buna-N) | 3
45 | 11732 | O-ring (Viton) | 3

**Item** | **Part No.** | **Description** | **QTY.**
--- | --- | --- | ---
45* | 43319 | V-Packing (Buna-N Compound) | 6
46* | 43589 | V-Packing (Buna-N Compound) | 6
47* | 43590 | Male Adapter | 3
48 | 43518 | Adapter | 3
49 | 43519 | Back-up Ring (Teflon) | 3
50 | 13964 | O-ring (Buna-N) | 3
51 | 14333 | O-ring (Viton) | 3
52 | 43248 | Back Up Ring (Teflon) | 6
53 | 43249 | O-ring Valve Seat (Buna-N) | 6
54 | 44383 | O-ring Valve Seat (Viton) | 6
55 | 43722 | Valve Seat | 6
56 | 43721 | Valve | 6
57 | 43751 | Valve Spring | 5
58 | 43564 | Retainer (Nylon) (43836 S.S.) | 5
59 | 17619 | O-ring (Buna-N) | 5
60 | 11691 | O-ring (Viton) | 5
61 | 43851 | Valve Plug - Chromed | 5
62 | 43850 | Valve Plug - Unchromed | 5
63 | 20326 | Plug - 3/4" - Chrome | 1
64 | 12503 | Split Lock Washer (M10) | 4
65 | 81048 | Hex Nut (M10) | 4
66 | 30764 | Shaft Protector W/2 Screws | 1
67 | 30264 | Direct Mounting | 1
68 | 14050 | Stud | 4
69 | 12490 | Washer | 4
70 | 12503 | Split Lock Washer | 4
71 | 81048 | Hex Nut | 5
72 | 30661 | Mounting Kit (Includes Rails Pulley, Hub, Key, S.P.) | 1
73 | 30613 | Rail Assembly | 1
74 | 30635 | Rail | 1
75 | 30903 | Hex Cap Screws | 2
76 | 30921 | Split Lock Washer | 2
77 | 30912 | Hex Nut | 2
78 | 30059 | Hub (M30) W/Screw (M8 Keyway) | 1
79 | 30063 | Key (M8) | 1
80 | 30206 | 9.75" Pulley | 1
81 | 30820 | Valve Kit (PVPF) | 2
82 | 30919 | Seal Kit | 1
83 | 43523 | Seal Case Removal Tool | 1
84 | 30696 | Valve Seat Removal Tool | 1

*These parts are exclusive to 654. Remaining parts are interchangeable with Model 650.
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<tr>
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INLET CONDITION CHECK-LIST

Inadequate inlet conditions can cause serious malfunctions in the best designed pump. Surprisingly, the simplest of things can cause the most severe problems. Some of these conditions can go unnoticed to the unfamiliar or untrained eye. To help eliminate some of these costly headaches, we have put together a check list of probable cause areas which should be evaluated before operation of any system. Remember, no two systems are alike, so there can be no ONE best way to set up a system. All factors must be carefully considered.

INLET SUPPLY should be adequate to accommodate the maximum flow being delivered by the pump.

- Avoid closed loop systems, especially at higher temperatures and larger volumes. By-pass should be returned to a holding tank.
- Low vapor pressure fluids, such as solvents, require a booster pump for adequate inlet supply.
- Higher viscosity fluids require a positive NPSH for adequate inlet supply.
- Where vapor pressure fluids tend to vaporize and require a positive NPSH for adequate supply.
- Higher temperature fluids should be returned to a holding tank to eliminate air bubbles and turbulence; install diffusers on all return lines to the tank.

INLET LINE SIZE should be adequate to avoid starving the pump.

- The line should generally be 1-1/2 to 2 times the specified pump inlet port size.
- The line MUST be a FLEXIBLE hose, NOT a rigid pipe, and reinforced on SUCTION systems to avoid collapsing.
- The smaller the inlet plumbing the less the potential for problems. Keep the length to a minimum, the number of elbows and joints to a minimum (ideally no elbows) and the inlet accessories to a minimum.
- Use pipe sealant to assure air tight, positive sealing pipe joints.

BY-PASS TO INLET Care should be exercised when deciding the method of by-pass. It is recommended that the by-pass be directed to a baffled reservoir tank with at least one baffle between the by-pass line and the inlet line to the pump. Although not recommended, by-pass fluid may be returned to the inlet line of the pump if the system is properly designed to protect your pump. When using this method a PRESSURE REDUCING VALVE should be installed on the inlet line to avoid excessive pressure to the inlet of the pump. (REDUCING VALVE SHOULD BE INSTALLED BETWEEN THE BY-PASS CONNECTION AND THE INLET TO THE PUMP) It is also recommended that a TEMPERATURE SENDING VALVE be used to monitor the temperature build-up in the by-pass loop to avoid premature seal failure.

- A low-pressure, flexible cloth braid (not metal braid) hose should be used from the by-pass connection to the inlet of the pump.
- It is recommended to use a minimum 24" by-pass hose.

INLET PRESSURE should fall within the specifications of the pump. These conditions vary slightly from the plunger to the piston pumps.

- Higher temperatures require pressurized inlet.
- Optimum pump performance is achieved with a flooded or pressurized inlet. However, negative feedback is under ideal conditions.

INLET ACCESSORIES are designed to protect against overpressurization, monitor inlet flow, control contamination, control temperature and provide ease of servicing.

- All accessories should be sized to avoid restricting the inlet flow.
- A pressure gauge is recommended to monitor the inlet pressure and should be mounted AS CLOSE TO THE PUMP INLET as possible.
- All accessories should be compatible with the solution being pumped to avoid malfunction.

See High Pressure Guide for more information on pump protection and maintenance.

654-O-387-25 5M