MODEL 15
OPERATING INSTRUCTIONS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FLOW</th>
<th>PRESSURE</th>
<th>SHAFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.011</td>
<td>2.2 GPM</td>
<td>1000 PSI</td>
<td>Hollow w/keyway</td>
</tr>
<tr>
<td>15.010</td>
<td>2.2 GPM</td>
<td>1000 PSI</td>
<td>Hollow w/keyway</td>
</tr>
</tbody>
</table>

CAUTION: CAT PUMPS are positive displacement pumps. Therefore, a properly designed pressure relief mechanism MUST be installed in the discharge piping. Failure to install such a relief mechanism could result in personal injury or damage to the pump or system. Cat Pumps Corporation does not assume any liability or responsibility for the operation of a customer's high pressure system.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet Pressure</td>
<td>Flooded to 60 PSI</td>
</tr>
<tr>
<td>R.P.M.</td>
<td>1800 RPM</td>
</tr>
<tr>
<td>Bore</td>
<td>0.75&quot;</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.370&quot;</td>
</tr>
<tr>
<td>Max. Temperature</td>
<td>160°F</td>
</tr>
<tr>
<td>Inlet Port</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>Discharge Port</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>Weight (carton of 4)</td>
<td>48 lbs.</td>
</tr>
</tbody>
</table>

LUBRICATION

The Model 15 comes pregreased from the factory with a Lithium base, high temperature NLGI No. 2 grease. Thereafter, grease every 100 hours of operation, at least two shots of grease or until appearance of grease on bearing face.

HORSEPOWER REQUIREMENTS

<table>
<thead>
<tr>
<th>Pressure (PSI)</th>
<th>Horsepower</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>0.96</td>
</tr>
<tr>
<td>800</td>
<td>1.28</td>
</tr>
<tr>
<td>1000</td>
<td>1.5</td>
</tr>
</tbody>
</table>

WARRANTY

WARRANTY: CAT PUMPS CORPORATION (hereafter called the Corporation) warrants that the goods sold hereunder will be free from defects in material and workmanship for 90 days from the date of original shipment to the buyer. It is expressly agreed that the Corporation's liability hereunder shall in no event exceed the purchase price paid for any defective goods, and the Corporation's sole obligation, and the buyer's exclusive remedy, shall be limited, at the Corporation's election, to the Corporation's repairing, replacing, or refunding the purchase price paid for the defective goods. In no event shall the Corporation be liable for any damages, including but not limited to loss of use and loss of profits, caused by any defects in the goods sold hereunder, whether such damages occur or are discovered before or after repair or replacement. Moreover, all warranty claims are subject to inspection at CAT Pumps facilities in Minneapolis, Minnesota. If goods returned for inspection have been disassembled or otherwise tampered with, all warranty commitments by the Corporation shall be null and void.

No agent, employees, or representative of CAT PUMPS has any authority to bind the Corporation to any affirmation, representation, or warranty concerning the goods sold hereunder, and unless an affirmation, representation, or warranty made by an agent, employee, or representative is specifically included in writing within these Conditions of Purchase, it shall not be enforceable by the buyer. In addition, IT IS EXPRESSLY AGREED THAT THE WARRANTY CONTAINED HEREIN SHALL BE THE EXCLUSIVE AND ONLY WARRANTY TO PASS WITH THE GOODS SOLD HEREUNDER AND SAID WARRANTY SHALL BE IN LIEU OF ALL WARRANTIES OF MERCHANTABILITY AND FITNESS.

TYPICAL INSTALLATION

Note: Fluid may be returned to reservoir, drain, or pump. Inlet for 3 minutes maximum only.

CAUTION: If pump is not bolted down, support accumulator and other accessories on a separate panel.

DIMENSIONAL DRAWING

Hollow Shaft Models

5-1/16

Oil Plug

1/4-14 NPT, Both Ports

2-3/4

11/32 Dia (Two Holes)

4-1/4

1-7/32

5/8

5-9/16

3-1/2

2-3/8

Flexible Pressure Hose, 3/8 inch ID, 800 PSI working pressure

Flexible Suction Hose, 1/2" I.D. minimum, preferably 5/8" I.D.

Vacuum Gauge

Gauge Shut-off Valve

Pressure Gauge 0-1000 PSI

Relief Valve

Outlet

Electric Motor 1800 RPM Max.
Before Installation
1. Leave plastic port plugs in place until ready to connect lines.
2. Carefully review the Typical Installation Drawing for recommended hookup and specifications of other components in the system.
3. For hollow shaft models make sure the motor has a 5/8" straight shaft.
4. If pump will not be bolted down, use a torque arm to keep it from rotating. Free end of torque arm must bear against a rigid surface.
5. Support accumulator and other heavy accessories on a separate panel to avoid damaging motor bearings.
6. Suction strainer should be 40 mesh.
7. Be certain the nozzle is properly sized for the system to meet the requirements.
8. If vacuum and pressure gauges are not used provide a fitting so they can be installed for troubleshooting.
9. Mount an accumulator in the discharge line close to the pump to dampen pulsations in the systems.
10. A relief valve, regulating valve or unloader valve must be in the discharge line of the system to relieve excessive pressure should clogging occur.
11. By-pass flow can be returned.
   To the Reservoir: This should be done only when a single liquid is pumped. If detergents are added by means of an injector, for example, this would contaminate the reservoir.
   To the Floor Drain: This is used when the valve functions only as a safety device to relieve the outlet line should clogging occur.
   To the Pump Inlet: This procedure is not recommended and should be limited to a maximum THREE MINUTE CONTINUOUS BY-PASS. Returning to the inlet permits using a gun without contaminating the reservoir or wasting liquid. The liquid recirculates when the gun is closed and this small amount of liquid will increase in temperature.

Operation
1. Before operating check to see if there is any leakage at the High Pressure Seals.
2. Before starting, open all valves in the piping system. Then start pump. If the pump does not prime, remove the nozzle until the pump delivers full outlet flow. Filling inlet line before starting will avoid any priming problems.
3. Pump requires a flooded inlet liquid level must not fall below top of inlet.
4. Do not operate pumps with a liquid temperature above 160°.
5. Limit pressure to 500 PSI measured at the pump and limit operating speed to 1800 RPM.

Maintenance
1. Clean strainer often enough to prevent starving pump inlet. Restricted inlet flow will result in cavitation damage to pump.
2. Regrease cam follower bearing every 100 hours of operation. Apply a small amount of grease on outer race of cam follower bearing.
3. After operation with chemicals, thoroughly rinse pump with clear water.

PUMP ASSEMBLY
A. Servicing the Valves
1. Remove the cover (2) by unscrewing the four screws (1).
2. Remove both cylinder heads (24) and cylinder head o-rings (23) from both sides of the pump by unscrewing the four capscrews (25).
3. NOTE: Two valve assemblies are on each side of the pump: an inlet valve (bottom) and an outlet valve (top). ALTHOUGH THE PARTS ARE THE SAME IN EACH, THE ORDER IS REVERSED.
4. The valve seat (12) of the OUTLET ASSEMBLY can be lifted out with a screwdriver or a puller tool. The o-ring (13), valve (11), spring (10) and retainer (9) should be removed next.
5. For the INLET ASSEMBLY lift out the spring retainer (9), spring (18) and valve (11). If the valve seat (12) is tight, apply a few drops of penetrating oil around edge of seat. Let oil soak a few minutes. Then using a screwdriver or puller tool. Remove valve seat (12) from opposite side of pump. Tap gently, moving rod or screwdriver from side to side of seat to force valve seat out. Remove o-ring (13) from valve seat (12).

B. Servicing the Piston Cup
1. Unscrew retaining screw (22) and remove using a blade screwdriver that fits screw slot.
2. Push out sleeve (16); containing high pressure seal (18), back-up ring (6), retaining ring (14), plunger bearing (15), o-ring (17), high pressure seal (18) and seal retainer (19). If sleeve is tight, apply a few drops of penetrating oil around edge of sleeve. Let soak a few minutes, then tap out using a wood dowel and hammer against inner edge of sleeve. Remove o-ring (17) from sleeve (16). Carefully remove plunger (10) from sleeve assembly. Inspect plungers for wear, cracks or chips. Replace if necessary.
3. Repeat same procedure for opposite side of pump.
4. Then left out connecting rod (5).
5. With snap ring pliers, remove retaining ring (32).
6. Push drive assembly (31) from pump. This can be done with an arbor press.
7. Use an arbor press and yoke support to remove outer main bearing (29) from shaft. Remove both snap rings (28) and press inner bearing (27) from shaft.
8. Cam follower bearing (26) and shaft (29) assembly should now be examined for wear and replaced if necessary.
NOTE: The numbers in parentheses ( ) used throughout this text refer to items in the exploded view of the pump and in the parts list.
EXPLoded VIEW
March 1989

PLUNGER MODEL 15

PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>937724</td>
<td>Phillips Head Screw (8-32&quot; x 1/4&quot;)</td>
<td>4</td>
<td>23</td>
<td>937741</td>
<td>Plunger Retaining Screw</td>
<td>2</td>
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<tr>
<td>2</td>
<td>937712</td>
<td>Cover, Grease Fitting</td>
<td>1</td>
<td>23</td>
<td>936615</td>
<td>O-Ring, Cylinder Head (Buna-N)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>937702</td>
<td>Grease Fitting</td>
<td>1</td>
<td>24</td>
<td>937710</td>
<td>Cylinder Head</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>937701</td>
<td>Grease Extension</td>
<td>1</td>
<td>25</td>
<td>937711</td>
<td>Hex Head Screw, 3/8&quot; uncx</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>937743</td>
<td>Connecting Rod</td>
<td>1</td>
<td>26</td>
<td>937682</td>
<td>Cam Follower</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>937719</td>
<td>Back-up Ring, Hi-Pressure Seal</td>
<td>2</td>
<td>27</td>
<td>920217</td>
<td>Bearing</td>
<td>2</td>
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<tr>
<td>7</td>
<td>923250</td>
<td>Body</td>
<td>1</td>
<td>28</td>
<td>920219</td>
<td>Snap Ring</td>
<td>2</td>
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<tr>
<td>8</td>
<td>926606</td>
<td>* Valve Spring Retainer</td>
<td>4</td>
<td>29</td>
<td>937740</td>
<td>Drive Shaft 2.2 GPM Hollow w/keyway</td>
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<tr>
<td>9</td>
<td>920969</td>
<td>* Valve Spring</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>919450</td>
<td>* Valve Seat</td>
<td>4</td>
<td>30</td>
<td>937731</td>
<td>Set Screw (1/4-20 x 1/4)</td>
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<tr>
<td>11</td>
<td>931350.019</td>
<td>O-Ring, Valve Seat (Buna-N)</td>
<td>4</td>
<td>31</td>
<td>937713</td>
<td>Drive Assembly</td>
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<tr>
<td>12</td>
<td>937707</td>
<td>Retaining Ring</td>
<td>4</td>
<td>32</td>
<td>918249</td>
<td>Retaining Ring</td>
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<tr>
<td>13</td>
<td>937703</td>
<td>Adapter Sleeve</td>
<td>2</td>
<td>33</td>
<td>919972.004</td>
<td>Mounting Bracket</td>
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<tr>
<td>14</td>
<td>937704</td>
<td>Plunger Bearing</td>
<td>2</td>
<td>34</td>
<td>926794</td>
<td>Hex Nut &amp; Bolt Assembly</td>
<td>1</td>
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<tr>
<td>15</td>
<td>937705</td>
<td>* O-Ring, Adapter (Buna-N)</td>
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<td>937715</td>
<td>Sleeve Assembly ( included in Kit)</td>
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<tr>
<td>16</td>
<td>937706</td>
<td>* Hi-Pressure Seal (Buna-N)</td>
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<td>36</td>
<td>937714</td>
<td>Valve Assembly ( included in Kit)</td>
<td>1</td>
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<tr>
<td>17</td>
<td>937707</td>
<td>* Seal Retainer</td>
<td>2</td>
<td>37</td>
<td>937737</td>
<td>Valve Puller Tool</td>
<td>1</td>
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<tr>
<td>18</td>
<td>937742</td>
<td>* Solid Ceramic Plunger</td>
<td>2</td>
<td>38</td>
<td>937723</td>
<td>Chemical Injector Head</td>
<td>1</td>
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<tr>
<td>19</td>
<td>931350.002</td>
<td>O-Ring, Retaining Screw</td>
<td>2</td>
<td>39</td>
<td>937716</td>
<td>Plunger Assembly ( included in Assembly)</td>
<td>1</td>
</tr>
</tbody>
</table>

*These items must be replaced as a set when servicing production models prior to 2/89.
LIQUID INJECTOR
Model 937723

OPERATION
The chemical injector adjustment knob comes set at the minimum injection position with adjustment knob turned completely into the injector body and the reference number “0” toward the hose barb. Start the pump and begin adjusting the injector to the desired flow. Turning the adjustment knob counter-clockwise increases flow, while clockwise decreases flow. **Two complete turns** through the reference numbers will bring you to the maximum injection position. **CAUTION**: Do not exceed two and one half turns of the adjustment knob as the injector will malfunction and begin sucking air. Flow may be stopped by turning the adjustment knob clockwise into the body until it seats lightly. Do not over tighten as the adjustment needle will be damaged.

DISASSEMBLY
1. Unthread retaining collar several turns to loosen from injector head.
2. Next pull injector body from injector head and remove both collar and body from the head.
3. The ball and spring will be loose in valve retainer.
4. Next, unthread needle valve from body and examine o-ring and valve for wear.
5. Examine all parts for wear and replace with new valve kit.

NOTE: Valve kit includes special valve seat and restrictor which are installed in pump. Examine both and replace if worn. Remember to install restrictor first, then valve seat.

937722 VALVE KIT including:
- Valve seat — pump
- O-ring
- Restrictor — 2 G.P.M.
- Restrictor — 3 G.P.M.
930991 Adjusting Knob

ASSEMBLY
1. Lubricate o-rings for ease of installation and install on needle valve and valve seat end of body.
2. Replace needle valve and thread completely into body.
3. Install spring then ball into retainer.
4. Press body into retainer. Be certain it is completely seated.
5. Thread collar onto retainer and tighten completely onto head.

TROUBLE SHOOTING
1. No detergent flow
   - A. Connection not tight.
   - B. Inlet pressure too high.
   - C. Foreign particles lodged between the check valve and valve seat (Flow will be reversed from pump to detergent tank on pressure stroke.)

2. Air in detergent line
   - A. End of supply line not submerged in detergent reservoir.
   - B. Too many restrictions in detergent line.
   - C. Loose hose barb.