REL-1915-230
ELECTRIC HIGH PRESSURE
SINGLE/DOUBLE ACTING
HYDRAULIC PUMP

The REL-1915 Portable Electric High Pressure Hydraulic Power Pump. This intermittent duty two stage pumping system features a high pressure piston style pump, complimented by a low pressure pump for rapid tool advance. The 5/8 HP universal electric motor will operate from any 230V AC power supply.

WARNING
All information found in this guide must be read and understood before use or testing of this tool.
Failure to read and understand these warnings and safe handling instructions could result in severe personal injury and or death.
TABLE OF CONTENTS

Registration .................................. 2
Tool Quick Reference ....................... 3
General Safety Issues ....................... 4-6

SPECIFICATIONS
General ........................................ 7
Pre-Operation .................................. 7
Hydraulic Fluids .............................. 7
Connections and Hoses ..................... 8
Operation (Single Acting) ................. 9
Operation (Double Acting) .............. 10

MAINTENANCE
General ........................................ 11
Troubleshooting ............................. 12
Before Disassembly ......................... 13

Reservoir Clean & Fill ...................... 13
Major Components (Fig. 1 & 2) .......... 14-15
External Assembly (Fig. 3) .............. 16
Motor Assembly (Figure 4) ............... 17
Pump Block Assy (Figure 5) .............. 18-19
Drive Gear Assy (Figure 6) .............. 20
REL-DIR-VALVE .............................. 21
Valve Assembly (Figure 7) ............... 22-23
Maintenance Record ....................... 23
Phone, Fax & Address ..................... 24

REGISTRATION

UPON RECEIPT OF THIS TOOL, COMPLETE THE REGISTRATION BELOW.

COMPANY ________________________________________________________________

ADDRESS ________________________________________________________________

__________________________________________________________________________

PHONE ______________________ FAX ________________________________

SERIAL NUMBER __________________________________________________________

DATE OF PURCHASE _______________________________________________________

DEALER NAME ____________________________________________________________

This symbol indicates items of extreme importance. Safety of user and others may be in jeopardy if these instructions are not read and understood.
REL-1915
ELECTRIC HIGH PRESSURE
SINGLE/DOUBLE ACTING
HYDRAULIC PUMP

The REL-1915 portable Electric High Pressure Hydraulic Power Pump. This intermittent duty two stage pumping system features a high pressure piston style pump, complimented by a low pressure pump for rapid tool advance. The 5/8 HP universal electric motor will operate from any 230V AC power supply.

FEATURES:
- 5/8 HP electric motor
- Two stage pumping system
- 10,000 PSI high pressure pump
- Designed for use with single or double-acting remote tools
- High-pressure relief valve
- Factory filled oil reservoir
- Hand control with 8’ cord
- Carrying handle
- Optional carrying case

Electric Motor
5/8 HP, 0.47kw, 3,000 RPM
230V AC 5.5 Full Load AMPS

Electrical Control
Body mount toggle switch and removable remote hand control with 8 foot twist lock cord.

Oil Delivery Per Minute
160 cubic inches at 100 PSI
30 cubic inches at 10,000 PSI

Oil Reservoir
3 quarts (.75 gallon)

Consult your RELIABLE representative for more information about our complete line of hydraulic tools.
BEFORE USING THIS TOOL, READ THE WARNINGS and the recommended practices described in this manual. Failure by the operator to read and fully understand these warnings will leave this person unqualified to use and operate this tool. Property damage, severe personal injury, and/or death could result by not following these warnings.

These warnings will appear in appropriate locations when they are pertinent to the particular subject being shown. Read each one carefully and follow them strictly.

**Eye Protection**

**WARNING**

Always wear eye protection to avoid injury from flying debris or hydraulic oil leaks. Failure to do so can result in serious personal injury.

**Hard Hat**

**WARNING**

Always wear a hard hat to avoid injury from falling debris. Failure to do so can result in serious personal injury.

**Hearing Protection**

**WARNING**

Always wear hearing protection, to avoid hearing loss due to long term exposure to high noise levels.

**Dust Mask**

**WARNING**

Always wear a Mask. Failure to observe this warning may result in serious health issues and/or breathing difficulty.

**Foot Protection**

**WARNING**

Always wear foot protection. Failure to do so can result in serious personal injury.

**Operation/Safety**

**WARNING**

For your own safety, ensure that you fully comply with all safe operation guidelines required by your employer.

Methods may vary with the working guidelines established by each utility or contractor.
Safe Operation & Care

**WARNING**

**USE THIS TOOL FOR ITS INTENDED PURPOSE ONLY**
Any other use can result in injury or property damage.

**INSPECT TOOL BEFORE USE.** Replace any worn, damaged or missing parts. A damaged or improperly assembled tool may malfunction, injuring operator and/or nearby personnel.

**INSPECT HYDRAULIC HOSES AND COUPLINGS** before each use. Repair or replace if any cracking, leakage, wear or damage is found. Worn or damaged hoses may fail resulting in personal injury or property damage.

**CLEAR WORK AREA** of all bystanders and unnecessary personnel before operating this tool.

**KEEP ALL PARTS OF THE BODY AWAY FROM MOVING PARTS.**
Failure to observe this warning could result in serious injury.

---

**WARNING**

**Safety**

**DO NOT** attempt to make any changes to any of the component parts or accessories when connected to the power source.

**DO NOT** adjust, inspect, or clean tool while the tool is connected to the power source. The tool could accidentally start up and cause serious injury.

**DO NOT** lock the tool in the On Position. In an emergency, serious damage or injury could occur during the time required to stop the tool.

---

**WARNING**

**Oil Injection Injury**

Hydraulic oil or fluid under the skin is a serious injury. Oil under pressure can penetrate the skin and may cause dismemberment or loss of life. Seek medical assistance immediately if such an injury should occur.

Always wear safety gloves, eye protection and all required safety equipment when operating or handling this tool.

**DO NOT** use fingers or hands to attempt to locate a leak.

**DO NOT** handle hoses or couplers while system is pressurized.

**NEVER** open or service the system before depressurizing.
Burn Hazard

**Do Not** connect or disconnect tool, hoses or fittings while power source is running or while hydraulic fluid is hot. Hot hydraulic fluid may cause serious burns.

Failure to observe this warning could result in serious injury.

---

Electrical Shock Hazard

Use only certified non-conductive hoses and fittings. Always wear and use the necessary clothing, equipment and safety practices to protect against electrical shock.

Failure to observe this warning may result in serious personal injury or death.

---

Safe Handling

**HYDRAULIC FLUID MAY CAUSE SKIN IRRITATION.** Prevent hydraulic fluid from making contact with skin.

**IN THE EVENT OF SKIN CONTACT** immediately wash thoroughly.

Failure to observe this warning could result in injury.

---

General Safety

Ensure that all fellow employees and bystanders are clear and protected from possible injury caused by this tool or the operations being performed. Persons in close proximity could be injured and property damaged if the tool were to malfunction.

This tool should always be used within the limits and purposes stated by the product manufacturer. Abuse or usage beyond the manufacturers’ intended purposes could cause damage to the tool and severe injury to the operator.

---

**NOTICE**

*If you have any questions* regarding the information found in this manual please contact **RELIABLE EQUIPMENT** before continuing.

Phone: 215-357-3500  **Toll Free: 800-966-3530**  Fax: 215-357-9193
TOOL SPECIFICATIONS

Height.................................................................................................................. 15 in.
Depth...................................................................................................................... 8 in.
Width...................................................................................................................... 8 in.
Weight.................................................................................................................. 35.72 lbs.
Electric Motor .................................................................................................. 230V AC
........................................................................................................................... 5/8 hp
Pump System ..................................................................................................... Two Stage Piston Style
Tool Operation ................................................................................................. Single or Double Acting
Operating Pressure .......................................................................................... 10,000 psi
Relief Setting (factory pre-set) ........................................................................ 10,000 psi
Oil Reservoir ..................................................................................................... 3 quarts
Oil Delivery Per Minute ................................................................................... 160 cubic inches at 100 psi
......................................................................................................................... 30 cubic inches at 10,000 psi

PRE-OPERATION OF TOOL

**WARNING**

**DO NOT** connect hoses or fittings to pump before completing all of the instructions in this section.

Ensure power source is **OFF**, and hydraulic flow is turned **OFF**.

Failure to comply with this warning can result in severe injury or death.

Before attempting to run or use the REL-1915 pump, check all connections, including hoses, and couplings. (See WARNINGS on page 8)

Wear all safety items required and make sure that the working area is clear of obstructions and non-essential personnel.

HYDRAULIC FLUIDS

All hydraulic fluids that meet these listed specifications or the listed HTMA specifications may be used for this tool.

**S. U. S.**

@ 100° F (38° C) ................................................................................................. 140 TO 225
@ 210° F (99° C) ................................................................................................. 40 minimum
FLASH POINT ......................................................................................... 340° F min. (170° C min.)
POUR POINT ....................................................................................... -30° F min. (-34° C min.)
HOSES AND FITTINGS

There exists the potential for shock in using anything other than certified non-conductive hoses and hydraulic oil with dielectric properties, when using system components near energized electrical lines. Failure to recognize these conditions could cause electrocution.

Hoses and fittings used with this tool must comply with S.A.E. J1273 which covers recommended practice for selection, installation, and maintenance of hose and hose assemblies. The correct hoses and fittings are available from your supplier. WARNING: Failure to comply with these warnings could result in severe bodily injury.

UNIT/HOSE CONNECTIONS

ALWAYS DISCONNECT pump/power source and move toggle switch to OFF before connecting or disconnecting any components.

ALWAYS DEPRESSURIZE hydraulic system, before slowly disconnecting this unit or any of the systems components.

ALWAYS TIGHTEN couplings completely. Loose or improperly tightened couplings will not allow fluid to pass through the hose creating a blockage in the supply or return line.

ALWAYS INSPECT HOSES AND CONNECTORS before connection to tool. Replace or repair if any leakage is evident. Leakage is a sign of deterioration in component parts. Worn or leaking parts must be repaired or replaced, or tool damage or severe injury could result.

HOSE INSTALLATION

ALWAYS ENSURE CONNECTORS ARE CLEAN

SINGLE ACTING - Connect the hose to the pressure port on the power source, then connect to the port on the tool.

DOUBLE ACTING - Care must be taken to assure the correct connection of the hoses to the pressure and return (tank) ports. Connect the return hose to the return (tank) port on the power source, then to the return port on the tool.

Connect the pressure hose to the pressure port on the tool, then to the “P” pressure port on the power source.

Operation with hydraulic flow reversed can cause malfunction. Failure to fully comply can result in severe injury or death.
SINGLE ACTING PUMP OPERATION

There are a number of safety items that need to be addressed when using the tool. Seek out the supervisor for basic instruction in handling the tool. Some basic problems are easily overcome by knowing the rules of operation.

Inspect, set-up and connect the tool as described on the previous pages.
Refer to photos and diagrams on the following pages as needed.
Connect to 230V electric power source.
Plug remote hand control switch (included) into pump.

**NOTE:** REMOTE HAND CONTROL IS AVAILABLE FOR SINGLE ACTING OPERATION ONLY.

| ! | TURNING ON TOGGLE SWITCH MAY PREMATURELY BEGIN TOOL OPERATION. |
| ! | REMOTE HAND CONTROL SWITCH WILL OPERATE PUMP WITHOUT TURNING ON MANUAL TOGGLE SWITCH LOCATED ON MOTOR HOUSING. |
| ! | TOGGLE SWITCH MAY BE USED IN PLACE OF PENDANT SWITCH FOR SINGLE ACTING OPERATION. **NOTE:** A 4-WAY VALVE MAY ALSO BE USED FOR ADDED CONTROL. |

Open vent.
Set up desired operation (ie. crimp, cut, or spearing).
Activate pump using remote hand control by depressing intermittent switch.

**NOTE:** For operator safety, control remains active only while switch is depressed.

When relief valve popping occurs desired pressure has been achieved.
Release button and allow tool to retract.

**NOTE:** Holding switch **ON** after relief valve has popped will cause unnecessary wear on relief valve and pump assembly.

| ! | WARNING: **DO NOT** change dies, disconnect tools, hoses, or fittings while pump is running, hot, or under pressure. **Serious injury or burns may result.** |

DISCONNECTING HOSES

Turn pump **OFF** and disconnect from power source.
Disconnect the pressure hose from the pressure “P” port on the pump, then disconnect the hose from the pressure port on the tool.
Disconnect the return hose from the return “T” port on the tool, then disconnect the hose from the return (tank) port on the pump.
Install dust caps on all connectors to prevent dirt and contaminants from entering the hydraulic system.

Refer to photos and diagrams on the following pages as needed.
DOUBLE ACTING PUMP OPERATION

There are a number of safety items that need to be addressed when using the tool. Seek out the supervisor for basic instruction in handling the tool. Some basic problems are easily overcome by knowing the rules of operation.

Inspect, set-up and connect the tool as described on the previous pages.

Refer to photos and diagrams on the following pages as needed.

Connect to 230V electric power source.

**NOTE:** REMOTE HAND CONTROL IS AVAILABLE FOR SINGLE ACTING OPERATION ONLY.

Remote switch is not necessary for double acting operation. Tool is controlled by an in-line control valve.

Open vent

Set up desired operation (ie. crimp, cut, or spearing).

Turn pump on at toggle switch.

For tool operation, use an in-line 4-way control valve (ie. PVA-0022 or PVA-1122) to advance and retract tool ram.

When relief valve popping (audible) occurs desired pressure has been achieved.

Retract tool using 4-way valve.

**NOTE:** Holding valve **ON** after relief valve has popped will cause unnecessary wear on relief, valve and pump assembly.

**WARNING:** DO NOT change dies, disconnect tools, hoses, or fittings while pump is running, hot, or under pressure. **Serious injury or burns may result.**

DISCONNECTING HOSES

Turn pump **OFF** and disconnect from power source.

Disconnect the pressure hose from the pressure “P” port on the pump, then disconnect the hose from the pressure port on the tool.

Disconnect the return hose from the return “T” port on the tool, then disconnect the hose from the return (tank) port on the pump.

Install dust caps on all connectors to prevent dirt and contaminants from entering the hydraulic system.

Refer to photos and diagrams on the following pages as needed.
SCHEDULED MAINTENANCE

The life, reliability, and safety of the tool is dependent on proper maintenance.

DAILY MAINTENANCE

Clean all surfaces including, hand control, fittings, hoses and housing.
Inspect tool for wear and damage. Worn or damaged parts can cause malfunction.
Inspect for cracked hoses and leaking fittings.
Check fluid level of the power source reservoir frequently.
Remove Vent to add hydraulic fluid as needed. Replace vent immediately. (see page 12)

All the above items must be replaced with new parts if signs of wear are evident.

FLUID CONTAMINATION: Cover the ends of fittings with a dust cap when disconnected. This will help keep the fluid from contamination. (See Reservoir Clean & Fill on pg 15)

MONTHLY MAINTENANCE: Inspect per Appendix A, SAE Standard J1273, 5/86 for hose or fitting damage such as wear, cracks or leakage; replace the necessary parts.

IMPORTANT: The greatest cause of hydraulic pump failure is dirt. Prevent the introduction of foreign matter into the unit via hydraulic fluid, dirty connections or accumulation of sediment.

NOTE: Keep Label Set clean and legible. Replace decals when necessary. Part #RL22400

BEFORE USING THIS PRODUCT
READ THE SAFETY WARNINGS
and recommended practices described in the manual. Failure by the operator to read and fully understand the warnings will leave this person unqualified to use and operate the tool.

Failure to observe all warnings and instructions could result in property damage, severe personal injury, and/or death.

CAUTION
Operation and safety methods may vary in accordance with the guidelines established by each utility. For your safety, ensure you fully comply with all safe operation guidelines established by your respective power utility.

DANGER
Explosion Hazard
Do NOT operate in areas where explosive vapors or flammable materials exist. Death or serious injury will result. Check NEC and local codes before installing.

DANGER
The user should be properly trained in the correct procedures required for work on or around electrical lines.

OPEN VENT VALVE BEFORE OPERATING. CLOSE AFTER USE.

MOTOR SPEC. PLATE (METAL)
(see pg 12) Order part #1915-DP

<table>
<thead>
<tr>
<th>HP</th>
<th>VOLTS</th>
<th>FL AMPS</th>
<th>PH</th>
<th>CYCLES</th>
<th>RPM FL</th>
<th>INSULATION CLASS</th>
<th>ROTATION</th>
<th>COMMUTATOR END</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8</td>
<td>230</td>
<td>5.5</td>
<td>1</td>
<td>60</td>
<td>3000</td>
<td>B</td>
<td>CCW</td>
<td>1915-DP</td>
</tr>
</tbody>
</table>

11
TROUBLESHOOTING

Determine the source (i.e. tool or hydraulic system) of the problem before trouble shooting.

Will not run
- Improper power source
  - Verify power source meets specifications 230V AC

Motor runs but pump will not operate
- Low hydraulic fluid
  - Check fluid level
- Incorrect viscosity
  - Use recommended fluid
- Pump damaged
  - Repair by authorized technician
- Hoses incorrectly connected
  - Switch hoses (see hose connection in this manual)
- Dirt in pump
  - Disassemble, clean and repair

Pump runs slow
- Power supply not functioning correctly
  - Reset to operator manual specs.
- Fluid not warmed to correct temp
  - Allow a warm-up period
- Fluid viscosity too high
  - See recommended viscosity
- Air in hydraulic system
  - Check hoses for breaks, leaks, or loose connections
- Hydraulic fluid level low
  - Fill to level. Check for leaks
- Worn or damaged components
  - Replace worn or damaged components

Pump operation is erratic
- Hydraulic fluid not warm
  - Allow oil to warm up
- Dirt or contaminants in tool
  - Clean and reassemble
- Air in system
  - Check hoses for breaks, leaks, or loose connections

Pump runs continuously
- Tool locked in “ON” position
  - Release toggle switch

Pump runs hot
- Low fluid level
  - Fill pump reservoir to correct level
- Fluid viscosity incorrect
  - Use recommended fluid
- Fluid dirty
  - Drain tank, flush, and replace fluid
- Worn or damaged O-rings or gaskets
  - Replace worn or damaged components

Pump leaks hydraulic fluid
- Worn or damaged seals
  - Disassemble and replace worn or damaged seals
- Components loose
  - Tighten component hardware

Pump lacks power
- Control valve leaking
  - Worn part or seal rings

NOTICE

If you have any questions regarding the information found in this manual please contact RELIABLE EQUIPMENT before continuing.
Phone: 215-357-3500  Toll Free: 800-966-3530  Fax: 215-357-9193
READ BEFORE DISASSEMBLY

Safety

**WARNING**

DO NOT attempt to make any changes to any of the component parts or accessories when connected to the power source.

DO NOT adjust, inspect, or clean tool while the tool is connected to the power source. The tool could accidentally start up and cause serious injury.

**WARNING**

Before disassembly, disconnect hoses as described in this manual. Any residual pressure within the unit can and will spray at high velocity, injuring the person doing the disassembly. Hot or pressurized hydraulic fluid will cause serious injury or death.

Complete disassembly is not recommended. Return the unit to an authorized dealer for total disassembly and/or repair.

All maintenance or disassembly should take place on a flat, clean work surface covered with towels or wipers so as to have a clean space for the disassembled parts.

Inspect each part during disassembly for wear, scratches, and cuts. Discard the worn or damaged parts and replace with new factory authorized parts.

O-rings are sensitive to sharp edges. Inspect closely for cuts or damage. A small cut will cause a leak. When assembling or disassembling O-rings, use hydraulic fluid as a lubricant to help disassembly or installation.

---

**RESERVOIR CLEAN AND FILL**

**ALWAYS disconnect** pump/power source and move toggle switch to **OFF** before connecting or disconnecting system components.

**ALWAYS DEPRESSURIZE** hydraulic system before slowly disconnecting this unit or any of the system’s components.

Disconnect pump from any hoses or tools.

Remove the screws holding the motor housing and pump assembly to reservoir.

Carefully lift assembly out of reservoir, taking care not to damage gasket.

Dump out old oil from reservoir, clean out **ALL** sludge and sediment. **DO NOT RUN DRY**

Clean inlet screen of dirt and debris.

Fill with **CLEAN HYDRAULIC FLUID** as specified.

Reference hydraulic fluid sight glass for appropriate level, as shown on page 12.

Check gasket for damage, replace if necessary. Re-assemble completely.

Test thoroughly prior to field use.
<table>
<thead>
<tr>
<th>REF.</th>
<th>PART</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R22003</td>
<td>1</td>
<td>MOTOR HOUSING</td>
</tr>
<tr>
<td>2</td>
<td>R22075</td>
<td>1</td>
<td>SIGHT GLASS</td>
</tr>
<tr>
<td>3</td>
<td>R22087</td>
<td>1</td>
<td>MANIFOLD BLOCK</td>
</tr>
<tr>
<td>4</td>
<td>R22070</td>
<td>1</td>
<td>TOGGLE SWITCH</td>
</tr>
<tr>
<td>5</td>
<td>R22103</td>
<td>1</td>
<td>VENT</td>
</tr>
<tr>
<td>6</td>
<td>R22006</td>
<td>1</td>
<td>RESERVOIR</td>
</tr>
<tr>
<td>7</td>
<td>1915-PS</td>
<td>1</td>
<td>REMOTE HAND CONTROL SWITCH (ABOVE)</td>
</tr>
<tr>
<td>8</td>
<td>70355K34</td>
<td>1</td>
<td>ELECTRIC CORD SET (Specify 230V)</td>
</tr>
</tbody>
</table>

FIGURE 2

- ON
- 7 REMOTE SWITCH
- REMOTE SWITCH PORT
- 8 115V AC ELECTRIC CORD SET
<table>
<thead>
<tr>
<th>REF.</th>
<th>PART</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R22058</td>
<td>8</td>
<td>BUTTON HEAD SET SCREW, 10-32X1/2</td>
</tr>
<tr>
<td>2</td>
<td>R22071</td>
<td>1</td>
<td>REMOTE SWITCH PORT</td>
</tr>
<tr>
<td>3</td>
<td>R22005</td>
<td>4</td>
<td>GEAR CASE COVER</td>
</tr>
<tr>
<td>4</td>
<td>R22096</td>
<td>1</td>
<td>SOCKET HEAD CAP SCREW, 1/4-20X1</td>
</tr>
<tr>
<td>5</td>
<td>R22078</td>
<td>4</td>
<td>HEX NUT</td>
</tr>
<tr>
<td>6</td>
<td>R22079</td>
<td>4</td>
<td>LOCK WASHER</td>
</tr>
<tr>
<td>7</td>
<td>R22076</td>
<td>2</td>
<td>STUD, BELL HOUSING</td>
</tr>
<tr>
<td>REF.</td>
<td>PART</td>
<td>QTY.</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>R22050</td>
<td>1</td>
<td>HANDLE</td>
</tr>
<tr>
<td>2</td>
<td>R22065</td>
<td>1</td>
<td>BELL COVER</td>
</tr>
<tr>
<td>3</td>
<td>R22004</td>
<td>1</td>
<td>END BELL</td>
</tr>
<tr>
<td>4</td>
<td>R22062</td>
<td>2</td>
<td>BRUSH HOLDER</td>
</tr>
<tr>
<td>5</td>
<td>R22073</td>
<td>2</td>
<td>CAP, BRUSH HOLDER</td>
</tr>
<tr>
<td>6</td>
<td>R22068</td>
<td>2</td>
<td>BRUSH ASSY</td>
</tr>
<tr>
<td>7</td>
<td>R22078</td>
<td>4</td>
<td>10-32 HEX NUT &amp; # 10 LOCKWASHER</td>
</tr>
<tr>
<td>8</td>
<td>R22085</td>
<td>2</td>
<td>PLASTIC TUBING</td>
</tr>
<tr>
<td>9</td>
<td>2071-095</td>
<td>1</td>
<td>FIELD ASSY</td>
</tr>
<tr>
<td>10</td>
<td>1071-095</td>
<td>1</td>
<td>ARMATURE ASSY</td>
</tr>
<tr>
<td>11</td>
<td>R22077</td>
<td>2</td>
<td>10-32 X 3 3/4 STUD</td>
</tr>
<tr>
<td>12</td>
<td>R22046</td>
<td>1</td>
<td>FINGER WASHER</td>
</tr>
<tr>
<td>13</td>
<td>R22071</td>
<td>1</td>
<td>RECEPTACLE</td>
</tr>
<tr>
<td>14</td>
<td>R22005</td>
<td>1</td>
<td>COVER</td>
</tr>
<tr>
<td>15</td>
<td>R22099</td>
<td>2</td>
<td>SCREW, 6-32 X 1/2 FHCS</td>
</tr>
</tbody>
</table>
FIGURE 5
PUMP BLOCK
ASSEMBLY

REFER TO
FIGURE 6
(Balloon 11)
<table>
<thead>
<tr>
<th>REF.</th>
<th>PART</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
<th>(FIGURE 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R22017</td>
<td>1</td>
<td>SPACER, BEARING</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>R22016</td>
<td>1</td>
<td>DRIVE SHAFT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>R22024</td>
<td>1</td>
<td>3/16 ROLL PIN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>R22030</td>
<td>1</td>
<td>1/8 X 3/4 DOWEL</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>R22018</td>
<td>1</td>
<td>BEARING, DRIVE SHAFT</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>R22019</td>
<td>1</td>
<td>LG. THRUST WASHER</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>R22020</td>
<td>2</td>
<td>CAM SPACER</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>12737</td>
<td>1</td>
<td>CAM BEARING ASSY</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>R22023</td>
<td>1</td>
<td>CAM</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>R22019</td>
<td>1</td>
<td>THRUST WASHER</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>R22041</td>
<td>1</td>
<td>RETAINING RING</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>R22009</td>
<td>1</td>
<td>INTENSIFIER BLOCK</td>
<td></td>
</tr>
<tr>
<td>15*</td>
<td>R22047</td>
<td>1</td>
<td>O-RING</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>R22026</td>
<td>1</td>
<td>PIN, BALL STOP</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>R22051</td>
<td>1</td>
<td>SPRING</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>R22054</td>
<td>2</td>
<td>1/4 DIA. BALL</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>R22061</td>
<td>2</td>
<td>VALVE PLUNGER</td>
<td></td>
</tr>
<tr>
<td>20*</td>
<td>R22052</td>
<td>1</td>
<td>O-RING,</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>R22056</td>
<td>2</td>
<td>SPRINGS, LP PISTON</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>R22048</td>
<td>1</td>
<td>LP RELIEF PISTON</td>
<td></td>
</tr>
<tr>
<td>23*</td>
<td>R22063</td>
<td>1</td>
<td>O-RING</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>R22060</td>
<td>1</td>
<td>LP SPRING</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>R22057</td>
<td>1</td>
<td>LP VALVE CAP</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>R22053</td>
<td>1</td>
<td>LP VALVE BODY</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>R22099</td>
<td>4</td>
<td>6-32 X 1/2 FHSS</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>R22079</td>
<td>1</td>
<td>1/16 NPT PLUG</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>R22036</td>
<td>1</td>
<td>BUSHING, HP</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>R22037</td>
<td>1</td>
<td>PISTON, HP</td>
<td></td>
</tr>
<tr>
<td>31*</td>
<td>R22049</td>
<td>1</td>
<td>O-RING</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>R22038</td>
<td>1</td>
<td>PRESSURE CAP</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>R22060</td>
<td>1</td>
<td>LP SPRING</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>R22040</td>
<td>1</td>
<td>LP VALVE CAP</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>R22035</td>
<td>1</td>
<td>SLEEVE &amp; PLUG</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>R22069</td>
<td>1</td>
<td>3/16 DIA. BALL</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>R22055</td>
<td>2</td>
<td>PRESSURE RELIEF SPRING</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>R22028</td>
<td>1</td>
<td>NEEDLE BEARING</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>R22066</td>
<td>1</td>
<td>5/16 COVER PLATE</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>R22098</td>
<td>3</td>
<td>8-32 X 5/8 SHCS</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>R22081</td>
<td>1</td>
<td>COPPER WASHER</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>12780</td>
<td>1</td>
<td>HP RELIEF VALVE</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>R22046</td>
<td>1</td>
<td>SPACER BLOCK</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>R22029</td>
<td>1</td>
<td>OUTLET PLATE</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>R22032</td>
<td>4</td>
<td>VANE</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>R22031</td>
<td>1</td>
<td>ROTOR</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>R22033</td>
<td>1</td>
<td>CENTER PLATE</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>R22034</td>
<td>1</td>
<td>INTAKE PLATE</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>R22088</td>
<td>1</td>
<td>FILTER PLATE</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>R22089</td>
<td>1</td>
<td>SCREEN</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>R22093</td>
<td>1</td>
<td>RETAINING RING</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>R22095</td>
<td>1</td>
<td>LOCATING FERRULE</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>R22094</td>
<td>4</td>
<td>8-32 X 2 1/4 SHCS</td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>R22100</td>
<td>1</td>
<td>SEAL KIT INCL. ITEMS INDICATED (see also #3 next page)</td>
<td></td>
</tr>
</tbody>
</table>
# FIGURE 6

**GEAR CASE COVER ASSEMBLY**

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R22074</td>
<td>1</td>
<td>COUNTER SHAFT</td>
</tr>
<tr>
<td>2</td>
<td>R22027</td>
<td>1</td>
<td>KEY</td>
</tr>
<tr>
<td>3*</td>
<td>R22010</td>
<td>1</td>
<td>SEAL SLEEVE (included in seal kit)</td>
</tr>
<tr>
<td>4</td>
<td>R22012</td>
<td>1</td>
<td>LOWER SHAFT BEARING</td>
</tr>
<tr>
<td>5</td>
<td>9060-739</td>
<td>1</td>
<td>HELICAL GEAR</td>
</tr>
<tr>
<td>6</td>
<td>R22014</td>
<td>1</td>
<td>3/16 SQ X 1/2 LG KEY</td>
</tr>
<tr>
<td>7</td>
<td>R22011</td>
<td>1</td>
<td>UPPER SHAFT BEARING</td>
</tr>
<tr>
<td>8</td>
<td>R22046</td>
<td>1</td>
<td>FINGER WASHER</td>
</tr>
<tr>
<td>9</td>
<td>R22005</td>
<td>1</td>
<td>COVER</td>
</tr>
<tr>
<td>10</td>
<td>R22102</td>
<td>2</td>
<td>5/16 SOCKET HEAD CAP SCREW</td>
</tr>
<tr>
<td>11</td>
<td>R22045</td>
<td>1</td>
<td>PRESSURE PIPE, OUTLET</td>
</tr>
</tbody>
</table>
REL-DIR-VALVE - BI-DIRECTIONAL VALVE

Converts your 10,000 PSI power source for multiple tool connections

The REL-DIR-VALVE will save time, and reduce the need for continuous tool change-outs in repetitive or multiple tool operations. With this multi-tool converter all you do is turn the handle to switch the active tool.

For use on RELIABLE’S line of high pressure Pumps and Intensifiers.

* Fittings may vary to meet customer requirements.
FIGURE 7
REL-DIR-VALVE
MULTIPLE TOOL
SELECTOR VALVE

* Fittings may vary to meet customer requirements.
<table>
<thead>
<tr>
<th>REF.</th>
<th>PART</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
<th>(FIGURE 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R22501</td>
<td>1</td>
<td>VALVE BODY</td>
<td>FIGURE 7</td>
</tr>
<tr>
<td>2</td>
<td>R22502</td>
<td>1</td>
<td>SPOOL</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>R22503</td>
<td>1</td>
<td>TOP PLATE</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>R22504</td>
<td>1</td>
<td>CAP</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>R22505</td>
<td>1</td>
<td>HANDLE</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>R22506</td>
<td>1</td>
<td>SPRING PIN</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>R22507</td>
<td>1</td>
<td>HARD BALL</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>R22508</td>
<td>1</td>
<td>COMPRESSION SPRING</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>R22509</td>
<td>4</td>
<td>FLAT HEAD SOCKET SCREW</td>
<td></td>
</tr>
<tr>
<td>10*</td>
<td>R22510</td>
<td>4</td>
<td>TOP SEAL, O’RING</td>
<td></td>
</tr>
<tr>
<td>11*</td>
<td>R22511</td>
<td>1</td>
<td>LOWER SEAL, O’RING</td>
<td></td>
</tr>
<tr>
<td>12*</td>
<td>R22512</td>
<td>1</td>
<td>BACKUP RING</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>R22513</td>
<td>1</td>
<td>1/16 NPT PLUG</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>R22514</td>
<td>1</td>
<td>OUTLET NIPPLE, 1/4 NPT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K2251</td>
<td>1</td>
<td>SEAL KIT</td>
<td></td>
</tr>
</tbody>
</table>

* ITEMS INCLUDED IN SEAL KIT

**MAINTENANCE RECORDS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Parts or Service Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If you have any questions regarding the information found in this manual please contact RELIABLE EQUIPMENT at the address, phone or fax numbers shown below.