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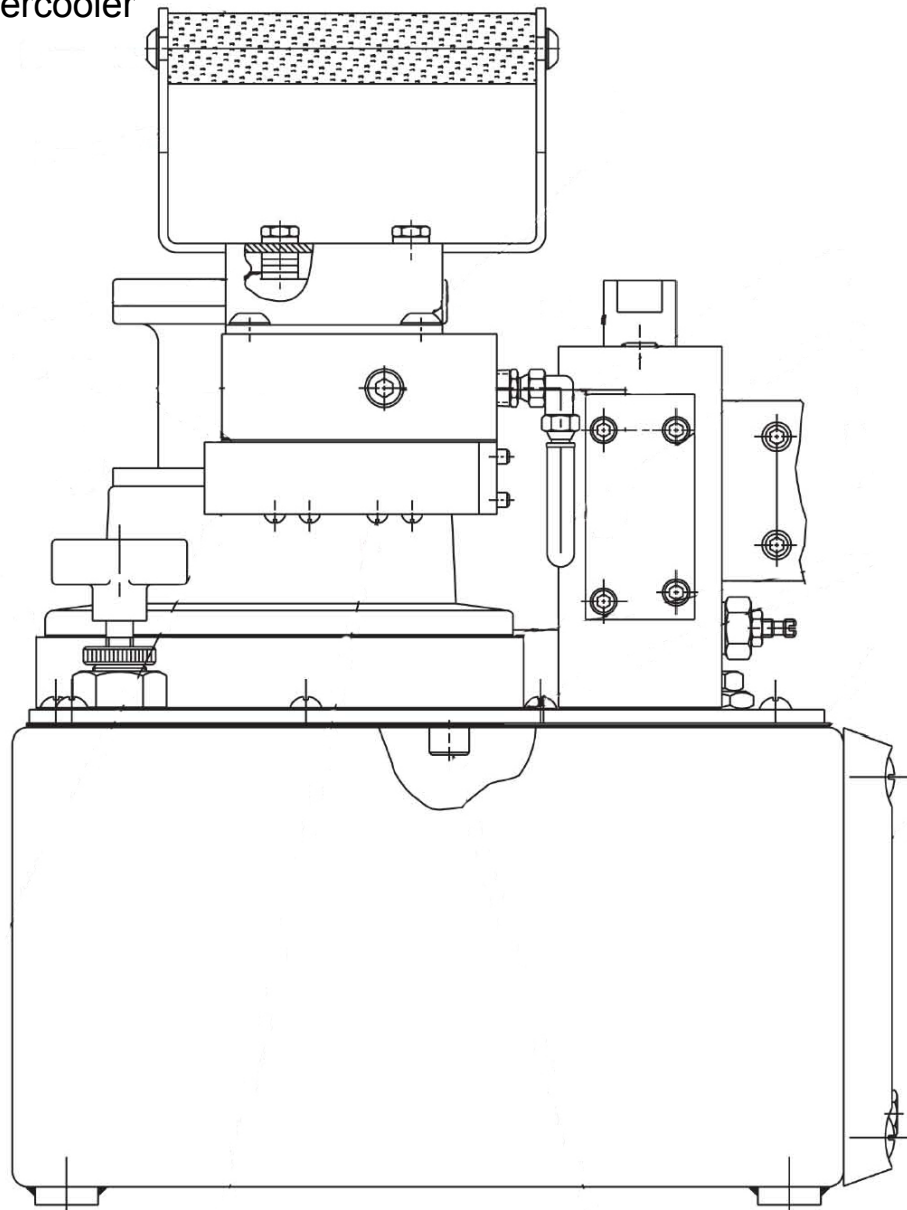
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# Torque Wrench Air Pump AP1000P

Operating & Maintenance Instructions For 3 hp, Air Power Pump  
With Built In Intercooler



Version 1  
Feb. 2008

## WARNING

**IMPORTANT SAFETY INFORMATION ENCLOSED.  
READ THIS MANUAL BEFORE OPERATION.  
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO  
THE HANDS OF THE OPERATOR.  
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

The use of other than genuine TorcUP replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.

Repairs should be made only by authorized personnel. Consult your nearest TorcUP Authorized Service Center. Refer all communications to the nearest TorcUP Office or Distributor.

## WARNING

For Technical Support and Information Contact:  
TorcUP, Inc.  
1025 Conroy Place, Easton, PA 18040  
Toll Free: (888) TORCUP-1 Fax: (610) 250-2700  
E-mail: [info@torcup.com](mailto:info@torcup.com)

## FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY

- Keep hands, loose clothing and long hair away from the reaction arm and working area during operation. Do not attempt to support the tool with your hands during operation.
- This tool will exert a strong reaction force. Use proper mechanical support and correct reaction arm positioning to control these forces. Do not position the reaction arm so that it tilts the tool off the axis of the bolt and never use the swivel inlets as a reaction stop.

Avoid sharp bends and kinks that will cause severe back-up pressure in hoses and lead to premature hose failure.

- Use accessories recommended by TorcUP.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- Use only sockets and accessories that correctly fit the bolt or nut and function without tilting the tool off the axis of the bolt.

Always wear eye protection when operating or performing maintenance on this tool.



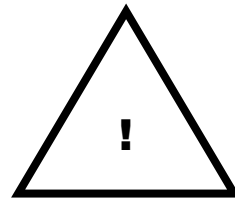
Always wear ear protection when operating this tool.



Keep body stance balanced and firm. Do not overreach when operating this tool.



Operate at 10,000 psig (681 bar) maximum pressure.



Do not use damaged, frayed or deteriorated hydraulic hoses and fittings.



Always turn off the pump and disconnect the power before installing, removing, or adjusting any accessory on this tool, or before performing any maintenance on this tool.



Do not carry the tool by the hose.



The Torque Reaction Arm must be positioned against a positive stop. Do not use the Arm as a dead handle. Take all precautions to make certain the operator's hand cannot be pinched between the Arm and a solid object.



## NOTICE

**SAVE THESE INSTRUCTIONS. DO NOT DESTROY.**

## **OPERATING INSTRUCTIONS AT A GLANCE**

### **Before Operating Pump:**

1. Check that your Air supply is clean of dirt and water.
2. Use only torque wrench, hoses and equipment & accessories rated at 10,000 PSI.
3. Make sure all hose and fitting connections are tight and secure. Hoses cannot be kinked or twisted.
4. Oil level should be 1" to 2" from the reservoir plate.
5. Loosen lock nut and back out relief valve to prevent unintended pressure build-up.
6. Never operate the pump with the directional control valve in advance or retract at 10,000 PSI without wrench movement for more than 1 minute. Leaving the valve in the advance or retract position without the wrench moving will overheat the oil.

### **After Completing the Job:**

1. Before disconnecting hoses, fittings, etc., be sure the wrench is retracted and unloaded, then unplug the power cord.
2. Store the pump in a clean, dry area.

### **Periodic Maintenance:**

1. Completely change the hydraulic oil and clean the oil filter screen and magnet [located in the reservoir] twice a year. [Use TorcUP approved oil only, 2 gallon]. Change the oil more frequently when used in extremely dusty areas or when the oil has been overheated. Using oil other than TorcUP approved oil voids the pump warranty

## OPERATING INSTRUCTIONS FOR: AP1000P

**Max. Capacity: 10,000PSI**

### NOTE:

- Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment. Visually inspect all components for shipping damage. If any damage is found, notify carrier immediately.
- Remove pump from shipping container – but do not remove any plugs or valves until the unit is ready to be fully assembled to prevent dirt or foreign matter from contaminating system.
- Read carefully follow these instructions. Most problems with new equipment are caused by improper operation or installation.
- Do not change motors without consulting the pump manufacturer's Technical Services Department.

**SAFETY PRECAUTIONS    WARNING:** To help prevent injury.

### HYDRAULIC HOSE

- Before operating the pump, all hose connections must be tightened with the proper tools. Do not over tighten. Connections should only be tightened securely and leak-free. Over tightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Never disconnect or connect any hydraulic hoses or fitting without first unloading the wrench. Double check the gauge to ensure pressure has been released. When making connections with quick disconnect couplings, make sure the couplings are fully engaged. Threaded connections such as fittings, gauges, etc. must be securely tightened and leak free.
- Always shut off the electric motor before breaking any connections in the systems.
- Loose or improperly threaded fittings can be potentially dangerous if pressurized, however, severe over tightening can cause premature thread failure. Fittings need to be tightened secure and leak free.
- Never hold and stand directly in line with any hydraulic connections while pressurizing.
- Never grab, touch or in any way come in contact with a hydraulic pressure leak. Escaping oil can penetrate the skin and serious injury can result.
- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause series injury.
- Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact. Do not let the hose kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for wear, because any of these conditions can damage the hose.
- Do not use the hose to move attached equipment. Stress can damage the hose, causing injury.
- Inspect each hose for wear before each use.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials can result in injury.

### PUMP

- Do not exceed the PSI hydraulic pressure rating noted on the pump nameplate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities can result in equipment failure and/or personal injury.
- The pump's maximum working pressure is 10,000 PSI (700kg/cm). Make sure that all hydraulic equipment such as wrench, hoses, etc. used with this pump is rated at 10,000 PSI operating pressure.
- Before replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill can cause injury due to excess reservoir pressure created when the cylinders are retracted.

### TORQUE WRENCHES

- Do not exceed the rated capacities of the torque wrenches. Excess pressure can result in injury.

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## OPERATING INSTRUCTIONS FOR: AP1000P

### POWER SUPPLY (Air Driven Motor)

- Disconnect air supply when pump is not in use or when breaking any connection in the hydraulic system.
- An air shut-off valve or quick connect is installed in the air line to the pump unit. Close the shut-off valve before connecting the air line to the pump.

### INSTRUCTIONS BEFORE USE

**Hydraulic Connections:** Check hydraulic oil level to prevent possible pump burnout. Open the red plastic plug located on the reservoir plate. Oil level should be approximately 1" from top of reservoir plate – with cylinders retracted and motor off. Add TorcUP approved oil as necessary. Do not mix different grades of oil. Loosen lock nut and back out (turn counter-clockwise) relief valve to prevent unintended pressure buildup. Make sure all desired gauge, hose and quick coupler connections are tight and secure before operating. The pump's pressure ports are located just below the control valve.

**Hose Connections:** Couple hoses to pump outlet manifold. "A" port is for advancing and "B" port is for retracting the piston on the torque wrench. Pump is supplied with the specified coupling halves already connected to the pump ports to prevent incorrect coupling of hoses to wrench. Couple hoses to torque wrench. When using TorcUP pump and torque wrench combination, Series HPH hoses and couplers are designed so that the pump advance port can only be connected to the wrench advance port, and the pump retract port can only be connected to the wrench retract port.

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## 1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: RYKON® OIL MV

MANUFACTURER/SUPPLIER:

Amoco Oil Company  
200 East Randolph Drive  
Chicago, IL 60601

EMERGENCY HEALTH INFORMATION:

1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

OTHER PRODUCT SAFETY INFORMATION:

(312) 856-3907

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## 2.0 COMPOSITION/INFORMATION ON INGREDIENTS

| COMPONENT                                   | CAS#       | RANGE % BY WEIGHT |
|---|------------|-------------------|
| Solvent refined heavy paraffinic distillate | 64741-88-4 | 80-100            |

(See section 8.0 "Exposure Controls/Personal Protection" for exposure guidelines)

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## 3.0 HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** This product has been evaluated and does not require any hazard warning on the label under OSHA criteria.

### POTENTIAL HEALTH EFFECTS:

**EYE CONTACT:** No significant health hazards identified.

**SKIN CONTACT:** Prolonged or repeated contact may produce some skin irritation. High-pressure equipment can inject this product through the skin and cause severe damage.

**INHALATION:** No significant health hazards identified.

**INGESTION:** No significant health hazards identified.

**HMIS CODE:** (Health:0) (Flammability:1) (Reactivity:0)

**NFPA CODE:** (Health:0) (Flammability:1) (Reactivity:0)

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## 4.0 FIRST AID MEASURES

**EYE:** Flush eyes with plenty of water.

**SKIN:** Wash exposed skin with soap and water. Get medical attention if irritation develops. Get immediate medical attention following injection injuries.

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Get medical attention.

**INGESTION:**

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## 5.0 FIRE FIGHTING MEASURES

**FLASHPOINT:** 383°F (195°C) (Cleveland open cup)

**UEL:** Not Determined

**LEL:** Not Determined

**AUTOIGNITION TEMPERATURE:** Not Determined

**FLAMMABILITY CLASSIFICATION:** Not Flammable.

**EXTINGUISHING MEDIA:** Agents approved for Class B hazards (e.g. dry chemical, carbon dioxide, foam, steam) or water fog.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** None Identified.

**FIRE-FIGHTING EQUIPMENT:** Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

**HAZARDOUS COMBUSTION PRODUCTS:** Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

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## 6.0 ACCIDENTAL RELEASE MEASURES

Prevent spreading by diking, ditching, or absorbing on inert materials. Keep out of sewers and waterways.

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## 7.0 HANDLING AND STORAGE

**HANDLING:** No Special Requirements

**STORAGE:** No Special Requirements

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## 8.0 EXPOSURE CONTROLS/PERSONAL PROTECTION

**EYE:** None required, however, use of eye protection is good industrial practice.

**SKIN:** Wear protective gloves if prolonged or repeated contact is expected.

**INHALATION:** None required, however, use of adequate ventilation is good industrial practice

**ENGINEERING CONTROLS:** Control airborne concentrations below the exposure guidelines

### EXPOSURE GUIDELINES:

| COMPONENT                                   | CAS#       | EXPOSURE LIMITS   |
|---|------------|---|
| Solvent refined heavy paraffinic distillate | 64741-88-4 | OSHA PEL: 5mg/m <sup>3</sup> (oil mist) (1989) (1971)<br>ACGIH TLV-TWA: 5 mg/m <sup>3</sup> (oil mist)<br>ACGIH TLV-STEL: 10 mg/m <sup>3</sup> (oil mist) |

## 9.0 CHEMICAL AND PHYSICAL PROPERTIES

|                                     |                          |
|-------------------------------------|--------------------------|
| <b>APPEARANCE AND ODOR:</b>         | Oily liquid. Pale yellow |
| <b>pH:</b>                          | Not Determined           |
| <b>VAPOR PRESSURE:</b>              | Not Determined           |
| <b>VAPOR DENSITY:</b>               | Not Determined           |
| <b>BOILING POINT:</b>               | Not Determined           |
| <b>MELTING POINT:</b>               | Not Determined           |
| <b>SOLUBILITY IN WATER:</b>         | Negligible, below 0.1%   |
| <b>SPECIFIC GRAVITY (WATER = 1)</b> | 0.87                     |
| <b>VISCOSITY:</b>                   | 32.4 – 39.66cSt at 40°C  |
| <b>POUR POINT:</b>                  | -40oF (-40oC) (maximum)  |
| <b>VISCOSITY INDEX:</b>             | 95 Minimum               |

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## 10.0 STABILITY AND REACTIVITY

**STABILITY:** Stable

**CONDITIONS TO AVOID:** None identified

**MATERIALS TO AVOID:** Avoid chlorine, fluorine, and other strong oxidizers

**HAZARDOUS DECOMPOSITION:** None identified

**HAZARDOUS POLYMERIZATION:** Will not occur.

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## 11.0 TOXICOLOGICAL INFORMATION

### ACUTE TOXICITY DATA:

**EYE IRRITATION:** Testing not conducted. See other toxicity data.

**SKIN IRRITATION:** Testing not conducted. See other toxicity data

**DERMAL LD50:** Testing not conducted. See other toxicity data

**ORAL LD50:** Testing not conducted. See other toxicity data

**INHALATION LC50:** Testing not conducted. See other toxicity data

### OTHER TOXICITY DATA:

Specific toxicity test have not been conducted on this product. Our hazard evaluation is based on information from similar products, the ingredients, technical literature, and/or professional experience.

No component of this product present at levels greater than 0.1% is identified as a carcinogen by the US National Toxicology Program, the US Occupational Safety and Health Act, or the International Agency on Research on Cancer (IARC).

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## 12.0 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product.



### 13.0 DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations. Enclosed – controlled incineration is recommended unless directed otherwise by applicable ordinances. This material may be amenable to recycling.

Since the emptied containers retain product residue, follow label warnings even after container is emptied.

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### 14.0 TRANSPORTATION INFORMATION

#### US DEPT OF TRANSPORTATION

**Shipping Name:** Not Regulated

#### INTERNATIONAL INFORMATION

##### Sea (IMO/IMDG)

**Shipping Name:** Not Determined

##### Air (ICA/IATA)

**Shipping Name:** Not Determined

##### European Road/Rail (ADR/RID)

**Shipping Name:** Not Determined

##### Canadian Transportation of Dangerous Goods

**Shipping Name:** Not Determined

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### 15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102A/103 HAZARDOUS SUBSTANCES (40 CFR PART 302.4): This product is not reportable under 40 CFR Part 302.4

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR PART 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR PART 370): This product is not regulated under SARA Title III Section 311/312

SARA TITLE III SECTION 313 (40 CFR PART 372): This product is not regulated under Section 313 of SARA and 40 CFR Part 372

US INVENTORY (TSCA): Listed on inventory

This product contains n-methyl pyrrolidone (CAS 872-50-4) which is currently undergoing review and testing under TSCA Section 4. Notification to the US EPA Office of Toxic Substances is required prior to export of this material from the United States.

OSHA HAZARD COMMUNICATION STANDARD: Contains a component listed by OSHA. Contains a component listed by ACGIH

EC INVENTORY (EINECS/ELINCS): Not Determined

JAPAN INVENTORY (MITI): Not Determined

AUSTRALIA INVENTORY (AICS): Not Determined

KOREA INVENTORY (DSL): Not Determined

CANADA INVENTORY (DSL): Not Determined

PHILIPPINE INVENTORY (PICCS): Not Determined

FOOD CONTACT STATUS:

USDA: H2 Status. This product is acceptable to the USDA for use as a lubricant in official meat and poultry establishments provided there is no possibility of the lubricant or lubricated part contacting edible products.

## 16.0 OTHER INFORMATION

Prepared by

Environmental Health and Safety Department

Issued: September 20, 1993

This Material Safety Data Sheet conforms to the requirements of ANSI z400.1

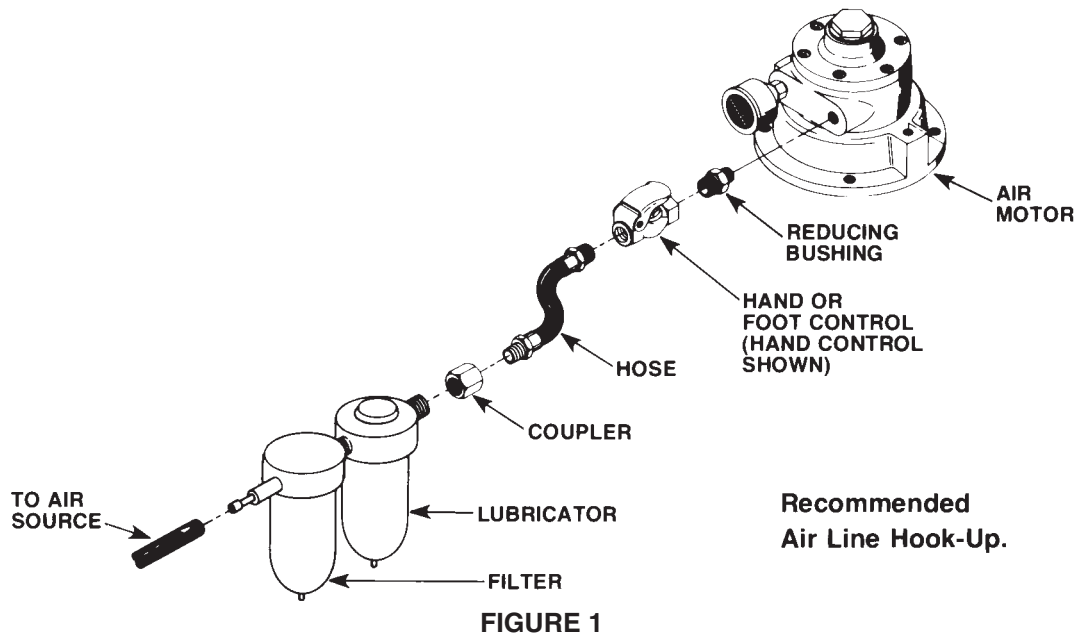
This material safety data sheet and the information it contains are offered to you in good faith as accurate. We have reviewed any information contained in this data sheet, which we received from sources outside our company. We believe the information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

# HYDRAULIC PUMP SET-UP PROCEDURE

## Motor Hook-up and Operation

**Air Motor:** Remove the thread protectors from the air inlet, and install the air supply fittings (not supplied) as shown in Figure 1. Air supply must be minimum 50 CFM and 80 PSI, with 100 PSI maximum.

**IMPORTANT:** Seal all external pipe connections with a high-quality, nonhardening thread sealant. Teflon tape can be used to seal hydraulic connections if only one layer of tape is used. Apply the tape carefully, two threads back, to prevent it from being pinched by the coupler and broken off inside the system. Any loose pieces of tape could travel through the system and obstruct the flow of oil or cause jamming of precision-fit parts.



## SET-UP AND OPERATION

### Filling The Reservoir

**NOTE:** The pump has been shipped without oil in the reservoir. High-grade hydraulic oil has been shipped with the pump in a separate container. If additional oil is required, use a high-grade, approved hydraulic oil.

1. Clean the area around the filler cap to remove all dust and grit. Any dirt or dust in the oil can damage the polished surfaces and precision-fit components of the pump.
2. Retract all cylinders to the return position.
3. Remove the filler cap, and insert a clean funnel and filter. Fill with hydraulic oil to 1/2" from the top of the filler hole. Replace filler cap with the breather-hole in the filler cap open.
4. Cycle the pump (with cylinders attached) several times. Retract the cylinders, and check the oil level in the pump reservoir again.

### Hydraulic Connections

1. Clean all the areas around the oil ports of the pump and cylinder.
2. Inspect all threads and fittings for signs of wear or damage, and replace as needed.
3. Clean all hose ends, couplers or union ends.
4. Remove the thread protectors from the hydraulic oil outlets. Connect the hose assembly to the hydraulic oil outlet, and couple the hose to the cylinder. Although a high-grade, non-hardening thread sealant is preferred, teflon tape may be used to seal hydraulic connections if only one layer of tape is used. Apply carefully to prevent the tape from being pinched by the coupler and broken off inside the pipe end. Any loose pieces of tape could travel through the system and obstruct the flow of oil.

## SET-UP AND OPERATION (CONTINUED)

### Priming The Pump

When operating the pump for the first time:

1. Valve and hose connections must be tight, and the reservoir must be filled to the proper oil level. Start the motor.
2. Jog the pump several times to build pressure. If the pump doesn't build pressure, it may not be primed. Disconnect a hose from the system and route it back to the pump reservoir. Run the pump until a steady flow of oil is observed free of suspended air bubbles. Reconnect the hose to the system.
3. Run cylinder out to its full travel several times to eliminate air from the system. For more complete instructions, refer to the section titled "Bleeding Air From The System."
4. The pump is ready to be put into regular operation.

**IMPORTANT:** After eliminating trapped air from a large work-holding system, retract the cylinders and refill the pump reservoir to 1/2" from the top of the filler hole.

### Adjusting The Pressure Regulating Valve

**NOTE:** For easy adjustment of the pressure regulating valve, always adjust the pressure by *increasing* to the desired pressure setting.

1. Loosen the wing nut on the pressure regulating valve, and turn the knob out a few turns in a counterclockwise direction. This will *decrease* the setting to a lower than desired pressure.
2. The pump must be completely connected. Press and hold the Run button on the hand switch.
3. Slowly turn the pressure regulator knob in a clockwise direction. This gradually *increases* the pressure setting. When the desired pressure is reached, lock the knob in position by tightening the wing nut.

## PREVENTIVE MAINTENANCE



**WARNING:** To help prevent personal injury,

- Disconnect the pump from the power supply before performing maintenance or repair procedures.
- Repairs and maintenance are to be performed in a dust-free area by a qualified technician.

### Bleeding Air From The System

Air can accumulate in the hydraulic system if the reservoir oil level is too low. This air causes the cylinder to respond in an unstable or slow manner. To remove the air:

1. The hydraulic cylinder(s) must be positioned on their side(s) with the couplers located upward.
2. Remove any load from the cylinder(s), and cycle the hydraulic system through several cycles (fully extend and retract the cylinders).

**IMPORTANT:** Some of the single-acting spring return cylinders have a cavity in the rod that forms an air pocket. This type of cylinder must be positioned upside down when the hydraulic system is bled.

### Hydraulic Fluid Level

1. Check the oil level in the reservoir after each 10 hours of use. Proper oil level is 1/2" from the top of the fill hole when all cylinders are retracted.
2. Drain, flush, and refill the reservoir with an approved, high-grade hydraulic oil after approximately every 300 hours of use. The frequency of oil changes will depend upon the general working conditions, severity of use, and overall cleanliness and care given the pump.

### Lubrication (Air Driven Motor Only)

If the pump is operated on a continuous duty cycle or a maximum speeds for extended periods, an automatic air line oiler should be installed in the air inlet line as close to the pumping unit as possible. Set the unit to feed 1-3 drops of oil per minute (one drop for every 50-75 CFM of air) into the system, or refer to the pump manufacturer's instructions. Use SAE No. 10 oil.

### Maintenance Cleaning

1. Keep the pump's outer surface as free from dirt as possible.
2. Seal all unused couplers with thread protectors.
3. Keep all hose connections free of dirt and grime.
4. The breather-hole in the filler cap must be clean and unobstructed at all times.
5. Equipment connected to the pump must be kept clean.
6. Use only an approved, high-grade hydraulic oil in this pump. Change as recommended (every 300 hours).

### Draining And Flushing The Reservoir

**IMPORTANT:** Clean the pump exterior before the pump interior is removed from the reservoir.

1. Remove the ten screws fastening the motor and pump assembly to the reservoir. **IMPORTANT: Do not damage the gasket or pump the filter or pressure regulating valves when lifting the pump and motor off the reservoir.**
2. Clean the inside of the reservoir and fill with a suitable flushing oil. Rinse the filter clean.
3. Place the pump and motor assembly back onto the reservoir, and secure with two machine screws assembled on opposite corners of the housing.

**IMPORTANT:** The hydraulic flow control valve must be in the neutral position for the following step. Because this pump is equipped with a valve that has only an advance or retract position, place the valve in the advance position, and connect a hose to the advance port on the valve. Place the other end of the hose into the oil filler plug hole.

4. Run the pump for several minutes. Then disconnect the motor and pump assembly, and drain and clean the inside of the reservoir.
5. Fill the reservoir with an approved, high-grade hydraulic oil.  
Place the pump and motor assembly (with gasket) on the reservoir, and thread the ten screws. Tighten securely and evenly.

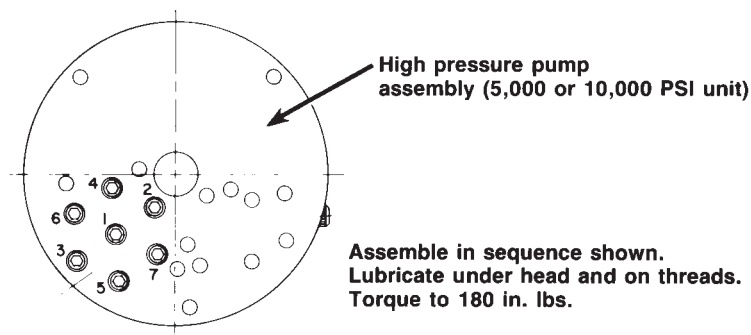
## PREVENTIVE MAINTENANCE (CONTINUED)

### Adding Oil To The Reservoir

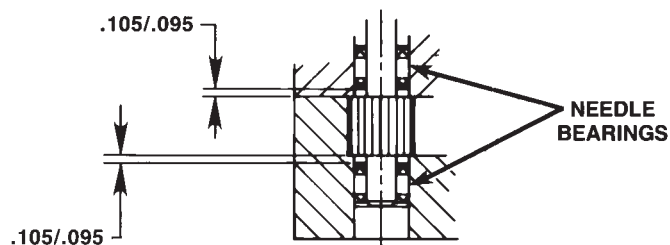
1. Cylinder(s) must be fully retracted and the power supply disconnected when adding oil to the reservoir.
2. Clean the entire area around the filler plug before removing the filler plug.
3. Use a clean funnel with filter when adding oil.
4. Use an approved, high-grade hydraulic oil (215 SSU @ 100° F) only.

## REASSEMBLY SPECIFICATIONS

### HIGH PRESSURE PUMP ASSEMBLY BOLT TIGHTENING SEQUENCE



### NEEDLE BEARING INSTALLATION SPECIFICATIONS



When replacing the needle bearings on the drive gear of the basic pump, the dimensions shown must be as specified.

## TROUBLESHOOTING GUIDE



### WARNING

- To help prevent personal injury, any repair work or troubleshooting must be done by qualified personnel familiar with this equipment.
- Use the proper gauges and equipment when troubleshooting.

#### NOTE:

- It is often best to check for leaks by using a hand pump and applying pressure to the suspect area without the motor running. Watch for leaking oil and follow it back to its source.
- Plug the outlet ports of the pump when checking for leakage to determine if the leakage is in the pump or in the cylinder or tool.
- Refer to the Parts List #101990 included with your particular pump when using this troubleshooting guide.

| PROBLEM   | CAUSE   | SOLUTION  |
|---|---|---|
| Pump is not delivering oil or delivers only enough oil to advance cylinder(s) partially or erratically (continued). | 1. Oil level too low.   | 1. Fill reservoir to 1/2" from top of filler hole with all cylinders retracted.   |
|   | 2. Loose-fitting coupler to cylinder.   | 2. Check quick-disconnect couplings to cylinders. Inspect couplers to ensure that they are completely coupled. Occasionally couplers have to be replaced because the ball check does not stay open due to wear. |
|   | 3. Air in system.   | 3. Bleed the system.  |
|   | 4. Air leak in suction line.  | 4. Check and tighten suction line.  |
|   | 5. Dirt in pump or filter plugged.  | 5. Pump filter should be cleaned and, if necessary, pump should be dismantled and all parts inspected and cleaned.  |
|   | 6. Oil is bypassing through the double-acting cylinder.                               | 6. By removing the cylinder and capping the hoses, the pump and valve can be checked. Observe if pump holds pressure.   |
|   | 7. Cold oil or oil too heavy (Hydraulic oil is of a higher viscosity than necessary). | 7. Change to a lighter oil.   |
|   | 8. Relief valve or low pressure unloading valve out of adjustment.                    | 8. Adjust as needed.  |
|   | 9. Reservoir capacity is too small for the size of the cylinder(s) used.              | 9. Use smaller cylinder(s) or larger reservoir.   |
|   | 10. Defective directional valve.  | 10. Inspect all parts carefully and replace if necessary.   |
|   | 11. Sheared drive shaft key(s)  | 11. Replace.  |
|   | 12. Motor rotating in wrong direction.  | 12. Air motor: Air line connected into wrong port.  |
|   | 13. Vacuum in reservoir.  | 13. Check for plugged vent in filler plug.  |
|   | 14. Low pressure pump worn.   | 14. Remove end cap from low pressure gear pump. Clean pump, and replace worn gears, shifting spool, body or end cap.  |

| PROBLEM   | CAUSE   | SOLUTION   |
|---|---|--|
| <b>Pump builds pressure but cannot maintain pressure.</b> | <ol style="list-style-type: none"> <li>1. Check to see if there are any external leaks. If no oil leakage is visible, the problem is internal. If using a double-acting cylinder, remove it from the system to ensure that the leak is not in the cylinder.</li> <li>2. To test for a leaking control valve, lift the pump from the reservoir but keep the filter in the oil. Remove the drain line to see if the oil is leaking from the valve. If the valve is not leaking, the internal check valve could be leaking. Refer to the note concerning checking for oil leaks at the beginning of this troubleshooting Guide.</li> <li>3. Leaking pressure switch seal.</li> </ol> | <ol style="list-style-type: none"> <li>1. Seal leaking pipe fittings with pipe sealant.</li> <li>2. Clean, reseal or replace flow control valve parts. If the internal check valve(s) are leaking, the pump must be dismantled and the seat areas repaired, poppets replaced, etc.</li> <li>3. Repair or replace seal.</li> </ol>  |
| <b>Pump will not build full pressure.</b>                 | <ol style="list-style-type: none"> <li>1. Faulty pressure gauge.</li> <li>2. Check for external leakage.</li> <li>3. Check the external pressure regulator. Check the relief valve setting.</li> <li>4. Look for internal leakage in double-acting cylinders.</li> <li>5. Check for leaks in the flow control valve.</li> <li>6. Inspect the pump for internal leakage. Check high pressure pump inlet or outlet ball checks.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Calibrate gauge.</li> <li>2. Seal faulty pipe fitting with pipe sealant.</li> <li>3. Lift the pump from the reservoir, but keep the filter immersed in oil. Note the pressure reading when the relief valve begins to open. If functioning normally, it should start to leak off at relief valve pressure.</li> <li>4. Remove the cylinder from the pump. If the pump builds full pressure, the cylinder is defective.</li> <li>5. Clean and reseal or replace parts.</li> <li>6. Same procedure as above, but look for leaks around the entire inner mechanism. If there are no visible leaks, the high pressure pump subassembly may be leaking. Remove all parts. Check the valve head assembly body for any damage to the seat area. Clean and reseal if necessary. Inspect for damage and replace if necessary, then reassemble.</li> </ol> |



| PROBLEM   | CAUSE  | SOLUTION   |
|---|--|--|
| <b>Pump will not build full pressure.<br/>(Continued)</b> | <ul style="list-style-type: none"><li>7. Sheared key(s).</li><li>8. Inadequate air pressure</li><li>9. Shifting spool seat and/or shifting spool poppet (located under high pressure pump assembly) worn.</li><li>10. Shifting spool o-ring (located within shifting spool bore) worn or broken.</li></ul>                           | <ul style="list-style-type: none"><li>7. Replace.</li><li>8. Increase air pressure.</li><li>9. Clean and reseal or replace.</li><li>10. With an o-ring pick, remove o-ring and backup washer through low pressure pump assembly end. Replace.</li></ul>  |
| <b>Cylinder(s) will not retract.</b>                      | <ul style="list-style-type: none"><li>1. Check the system pressure; if the pressure is zero, the control valve is releasing pressure and the problem may be in the cylinder(s), mechanical linkage connected to cylinder(s), or quick-disconnect couplings.</li><li>2. Defective valve.</li><li>3. Inadequate air pressure</li></ul> | <ul style="list-style-type: none"><li>1. Check the cylinders for broken return springs, and check couplers to ensure that they are completely coupled. Occasionally couplers have to be replaced because one check does not stay open in the coupled position.</li><li>2. Check valve operation and inspect parts. Replace if necessary.</li><li>3. Increase air pressure.</li></ul> |
| <b>Pump delivers excess oil pressure.</b>                 | <ul style="list-style-type: none"><li>1. Faulty pressure gauge.</li><li>2. Relief valve not properly set.</li></ul>  | <ul style="list-style-type: none"><li>1. Calibrate gauge.</li><li>2. Adjust the relief valve.</li></ul>  |

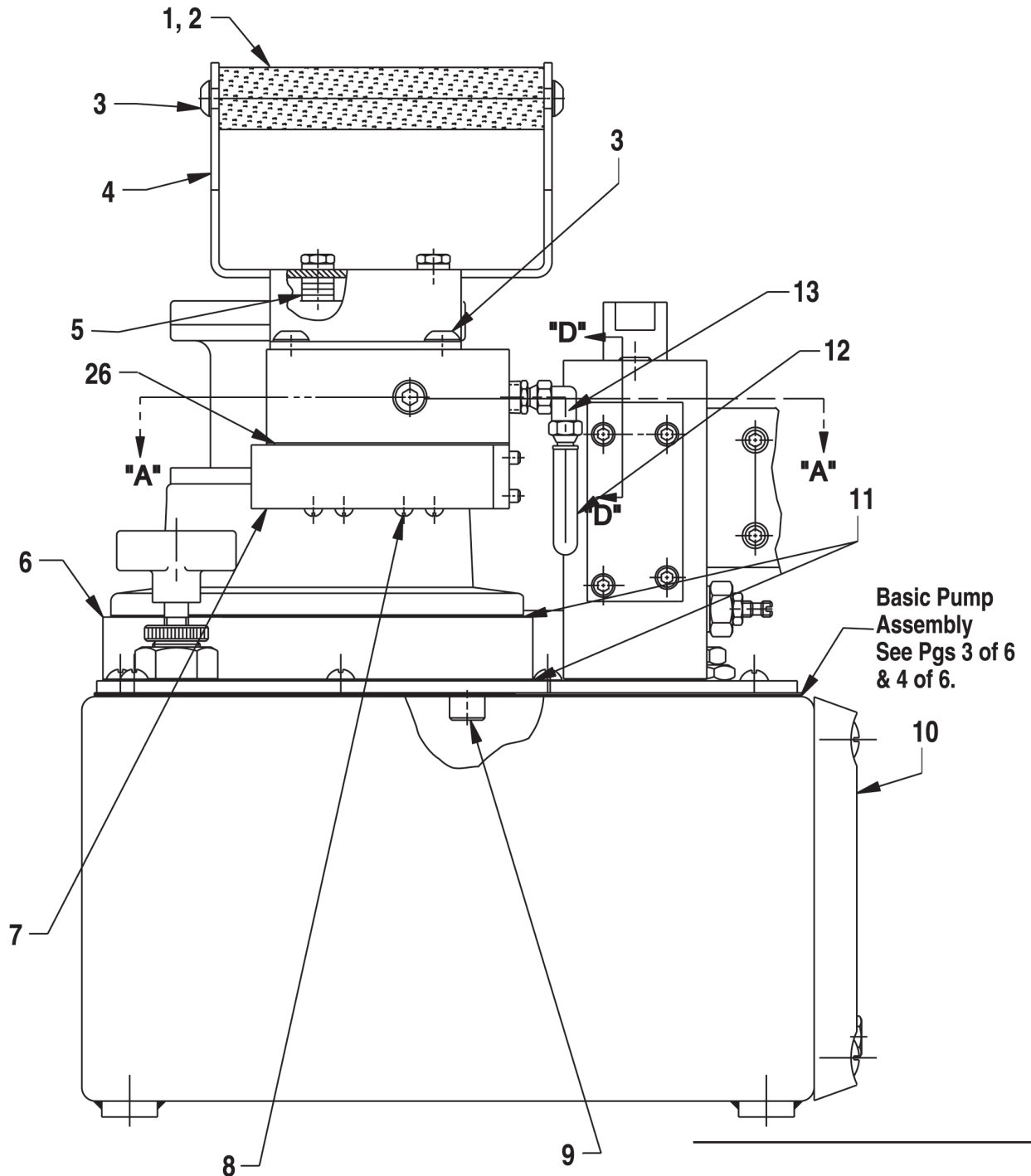


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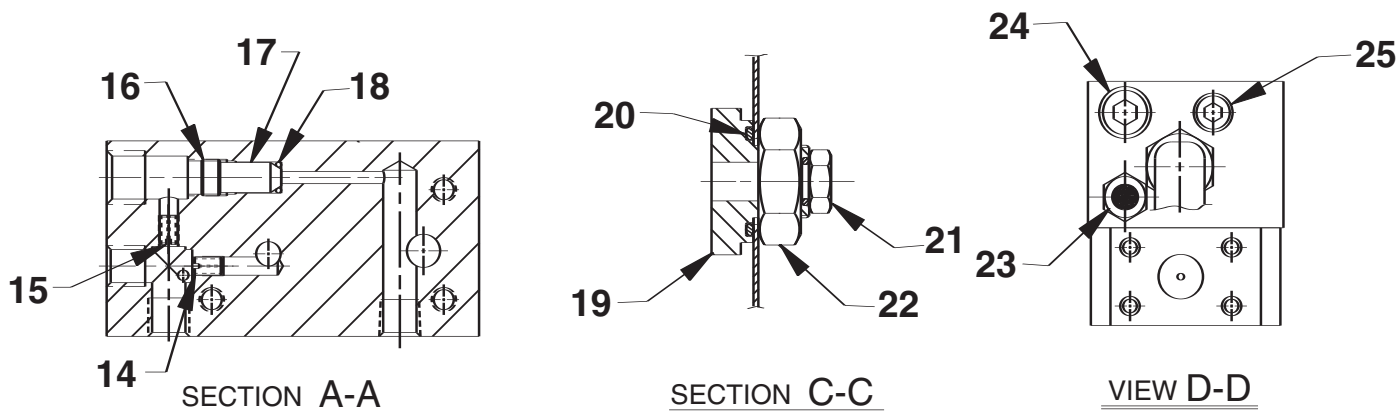
Parts List for:

**AP1000-P**

## AIR/HYDRAULIC PUMP GENERAL SECTION



## Parts List

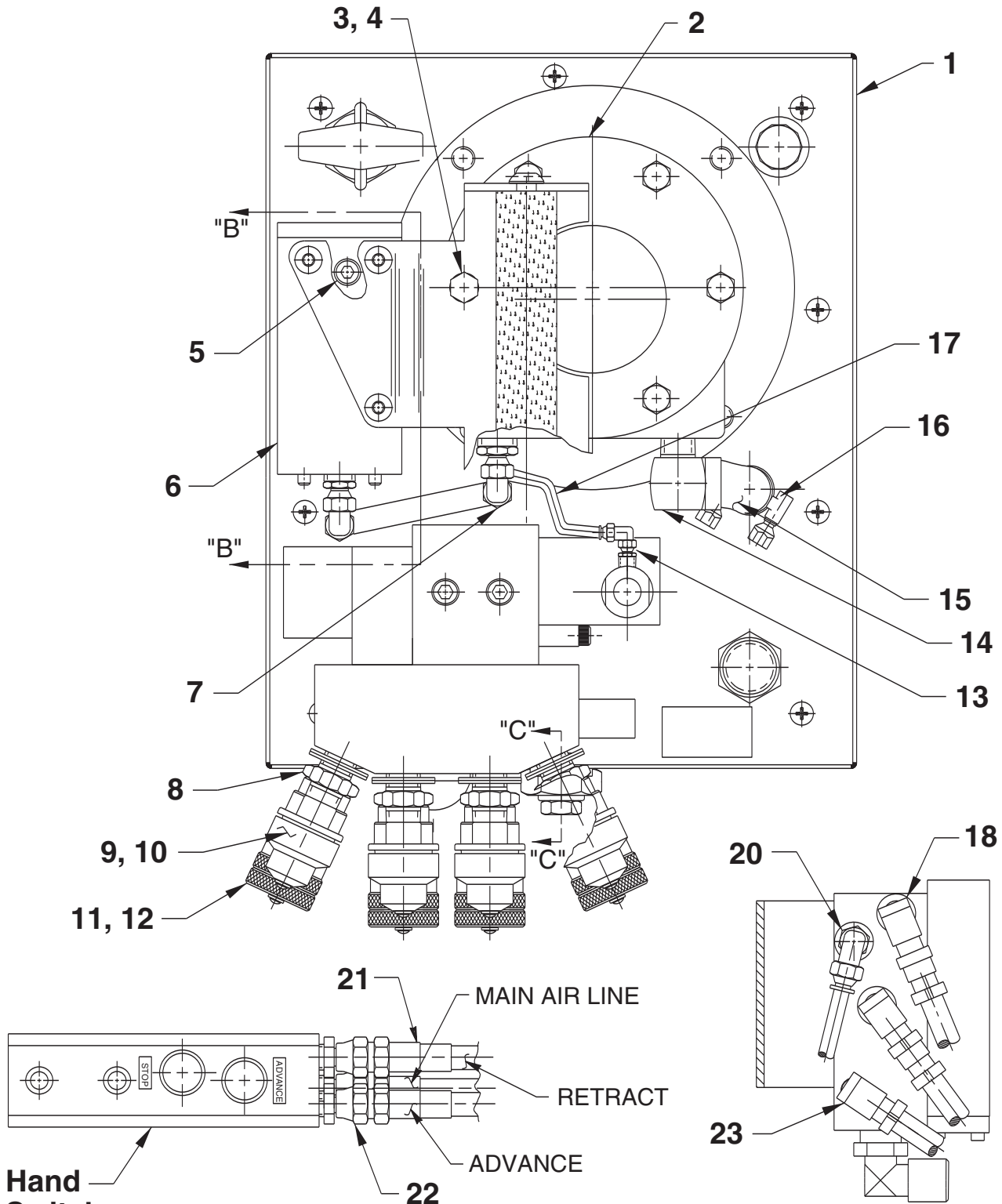


| Item No. | Part No. | No. Req'd | Description  |
|----------|----------|-----------|--|
| 1        | 252154   | 1         | Handle   |
| 2        | 251600   | 1         | Handle Grip  |
| 3        | 251437   | 5         | Hex Soc. Screw   |
| 4        | 58807GY8 | 1         | Handle Bracket   |
| 5        | 12719    | 2         | Plain Washer (For 1/4 Bolt)  |
| 6        | 421259   | 1         | Motor Base   |
| 7        | 351276   | 1         | 4-Way Air Pilot Valve  |
| 8        | 252175   | 4         | Slotted Screw (Torque to 50 in. lbs., 4 places)  |
| 9        | 11531    | 4         | Hex Soc. Screw<br>(Torque to 250 in. lbs., 4 places; 3/8-16 UNC X 2" Lg.)                      |
| 10       | 350431   | 1         | Temp Gauge   |
| 11       | *351277  | 2         | Gasket   |
| 12       | *252226  | .75 ft    | Nylon Tubing   |
| 13       | *252176  | 1         | 90° Elbow Fitting  |
| 14       | †214990  | 1         | Restrictor Screw   |
| 15       | †252173  | 1         | Orifice Screw (Note: Do not apply Loctite to threads.)   |
| 16       | †17240   | 1         | Hollow Locking Screw (3/8-24 UNF X 3/16 Lg. Apply Loctite<br>#242 or Equiv.. and finger tight) |
| 17       | †253531  | 1         | Check Valve (3000 PSI)   |
| 18       | †10265   | 1         | O-ring (5/16 X 3/16 X 1/16)  |
| 19       | 351000   | 1         | Drain  |
| 20       | 14725    | 1         | O-ring (1-1/8" X 15/16 X 3/32)   |
| 21       | 17147    | 1         | Plug Fitting (1/4 Tube)  |
| 22       | 10396    | 1         | Hex Jam Nut (3/4-16 UNF)   |
| 23       | 251599   | 1         | Filler/Breather Cap  |
| 24       | 10479    | 1         | Plug Fitting (1/4 NPTF)  |
| 25       | 10427    | 1         | Plug Fitting (1/8 NPTF)  |
| 26       | 252580   | 1         | Gasket   |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

Part numbers marked with a dagger (†) are contained in Repair Kit No. 252391.

# **FINAL ASSEMBLY** (TOP VIEW)



**Hand Switch Assembly**  
See back sheet 6 of 6

**SECTION B-B**

## Parts List

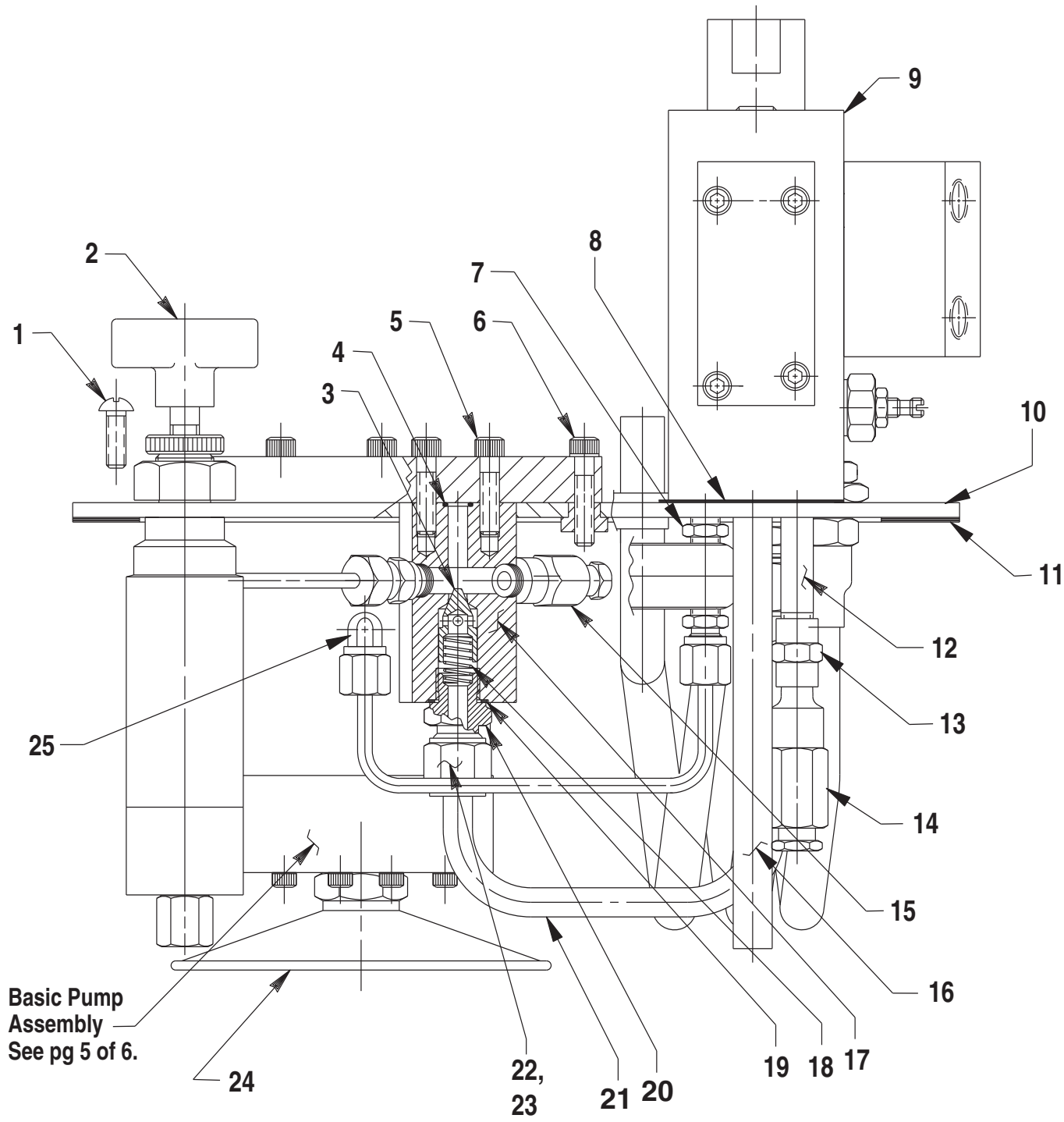
| Item No. | Part No.         | No. Req'd | Description                         |
|----------|------------------|-----------|-------------------------------------|
| 1        | <b>65599BK2</b>  | 1         | Reservoir                           |
| 2        | <b>421304GY8</b> | 1         | Air Motor (4 Hp.)                   |
| 3        | <b>10018</b>     | 2         | Cap Screw (1/4-28 UNF X 1-1/4" Lg.) |
| 4        | <b>12719</b>     | 8         | Plain Washer (For 1/4 Bolt)         |
| 5        | <b>15499</b>     | 1         | Plug Fitting (1/8" PTF)             |
| 6        | <b>†58780</b>    | 1         | Manifold Body                       |
| 7        | <b>*252177</b>   | 1         | 90° Elbow Fitting                   |
| 8        | <b>10672</b>     | 4         | Straight Fitting (1/4 NPTF)         |
| 9        | <b>251798</b>    | 4         | Quick Plug Coupler                  |
| 10       | <b>252069</b>    | 4         | Dust Cap                            |
| 11       | <b>251797</b>    | 4         | Quick Coupler                       |
| 12       | <b>252068</b>    | 4         | Dust Cap                            |
| 13       | <b>*250463</b>   | 1         | 90° Elbow Fitting                   |
| 14       | <b>212897</b>    | 1         | 90° Elbow Fitting                   |
| 15       | <b>212898</b>    | .33 ft    | Pressure Hose                       |
| 16       | <b>12367</b>     | 2         | Hose Clamp                          |
| 17       | <b>*15883</b>    | .6 ft     | Tubing                              |
| 18       | <b>14440</b>     | 2         | 90° Elbow Fitting                   |
| 20       | <b>250463</b>    | 1         | 90° Elbow Fitting                   |
| 21       | <b>•421610</b>   | 1         | Three Strand 15' Hose               |
| 22       | <b>•208218</b>   | 3         | Straight Fitting (1/8 NPTF)         |
| 23       | <b>14680</b>     | 1         | 90° Elbow Fitting                   |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

Part numbers marked with a dagger (†) are contained in Repair Kit No. 252391.

Part numbers marked with a bullet (•) are contained in Repair Kit No. 090227-2.

**BASIC PUMP ASSEMBLY W/ACCESSORIES**



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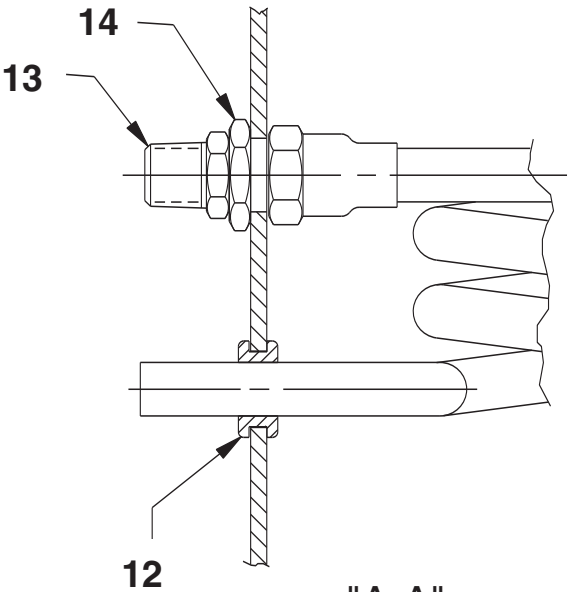
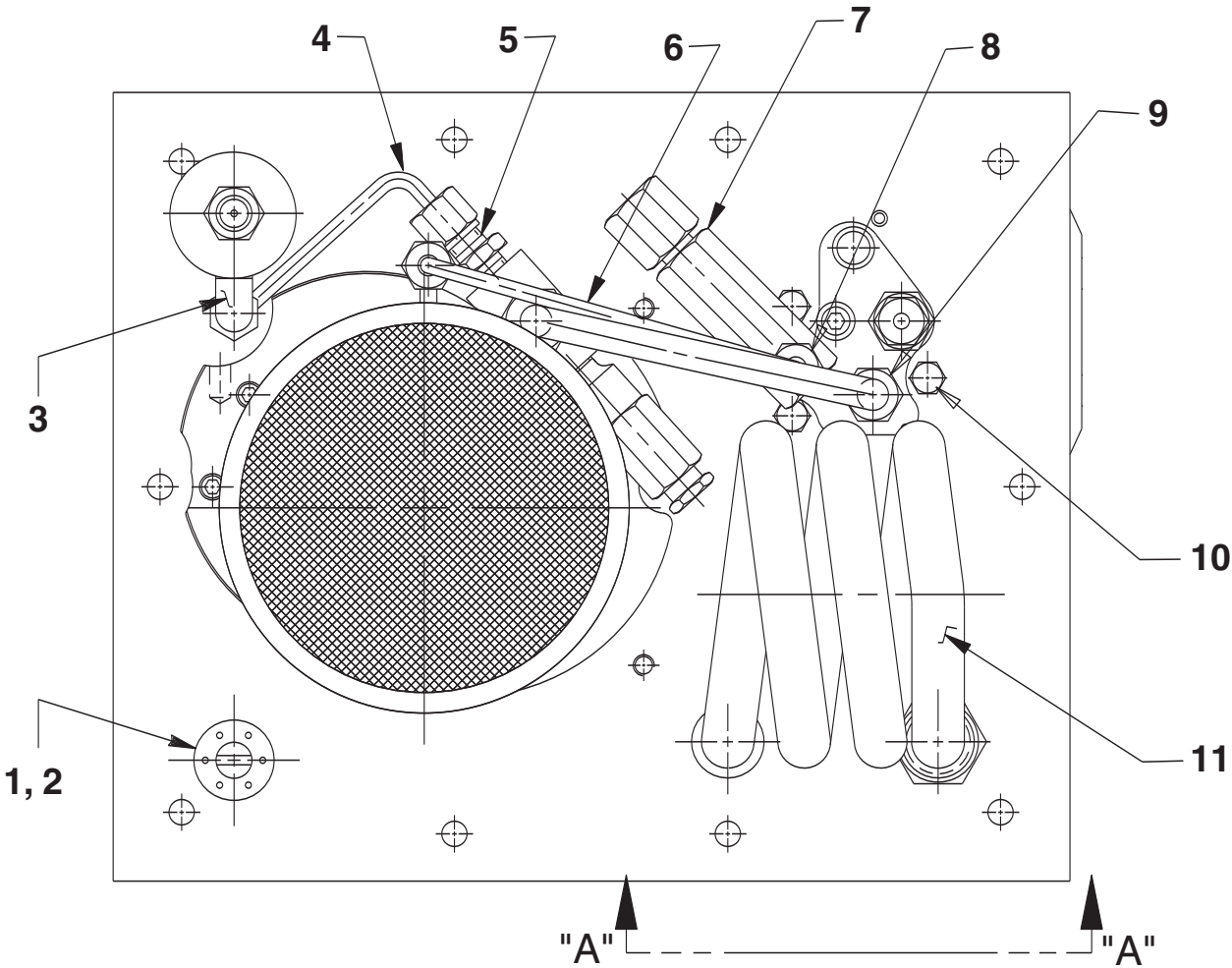
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## Parts List

| Item No. | Part No.  | No. Req'd | Description  |
|----------|-----------|-----------|--|
| 1        | 10177     | 10        | Phillips Screw (1/4-20 UNC X 3/4 Lg.)                            |
| 2        | 252284    | 1         | Pressure Regulator Assembly (See Form No. 107277)                |
| 3        | 20771     | 1         | Poppet   |
| 4        | 10266     | 1         | O-ring (3/8 X 1/4 X 1/16)  |
| 5        | 10015     | 2         | Hex Soc. Screw (1/4-28 UNF X 1" Lg.; Torque to 130/180 in. lbs.) |
| 6        | 10016     | 2         | Hex Soc. Screw (1/4-20 UNC X 1" Lg.)                             |
| 7        | 11421     | 1         | Straight Fitting   |
| 8        | 351095    | 1         | Gasket   |
| 9        | 421248    | 1         | Valve Assembly (See Form No. 105549)                             |
| 10       | 65186GY8  | 1         | Cover Plate  |
| 11       | *40164    | 1         | Cover Plate Gasket   |
| 12       | 15456     | 1         | Straight Fitting   |
| 13       | 18841     | 1         | Straight Fitting   |
| 14       | *21278-15 | 1         | Relief Valve (Set at 1,500/1,700 PSI)                            |
| 15       | *21278    | 1         | Relief Valve (Set at 10,100/10,700 PSI)                          |
| 16       | 200609    | 1         | Drain Tube   |
| 17       | 20776     | 1         | Valve Body   |
| 18       | 10425     | 1         | Spring (3/8 O.D. X 3/4 Lg.)                                      |
| 19       | 10261     | 1         | Special Washer (3/4 X 19/32 X 1/32)                              |
| 20       | 20770     | 1         | Connector Fitting (Torque to 40/50 ft. lbs.)                     |
| 21       | 252117    | 1         | Oil Line   |
| 22       | 10430     | 1         | Tube Sleeve  |
| 23       | 10431     | 1         | Nut Fitting (3/8 Tube)   |
| 24       | *21345    | 1         | Filter Screen (Includes o-rings)                                 |
| 25       | 11278     | 1         | 90° Elbow Fitting  |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

**BASIC PUMP ASSEMBLY**  
(BOTTOM VIEW)



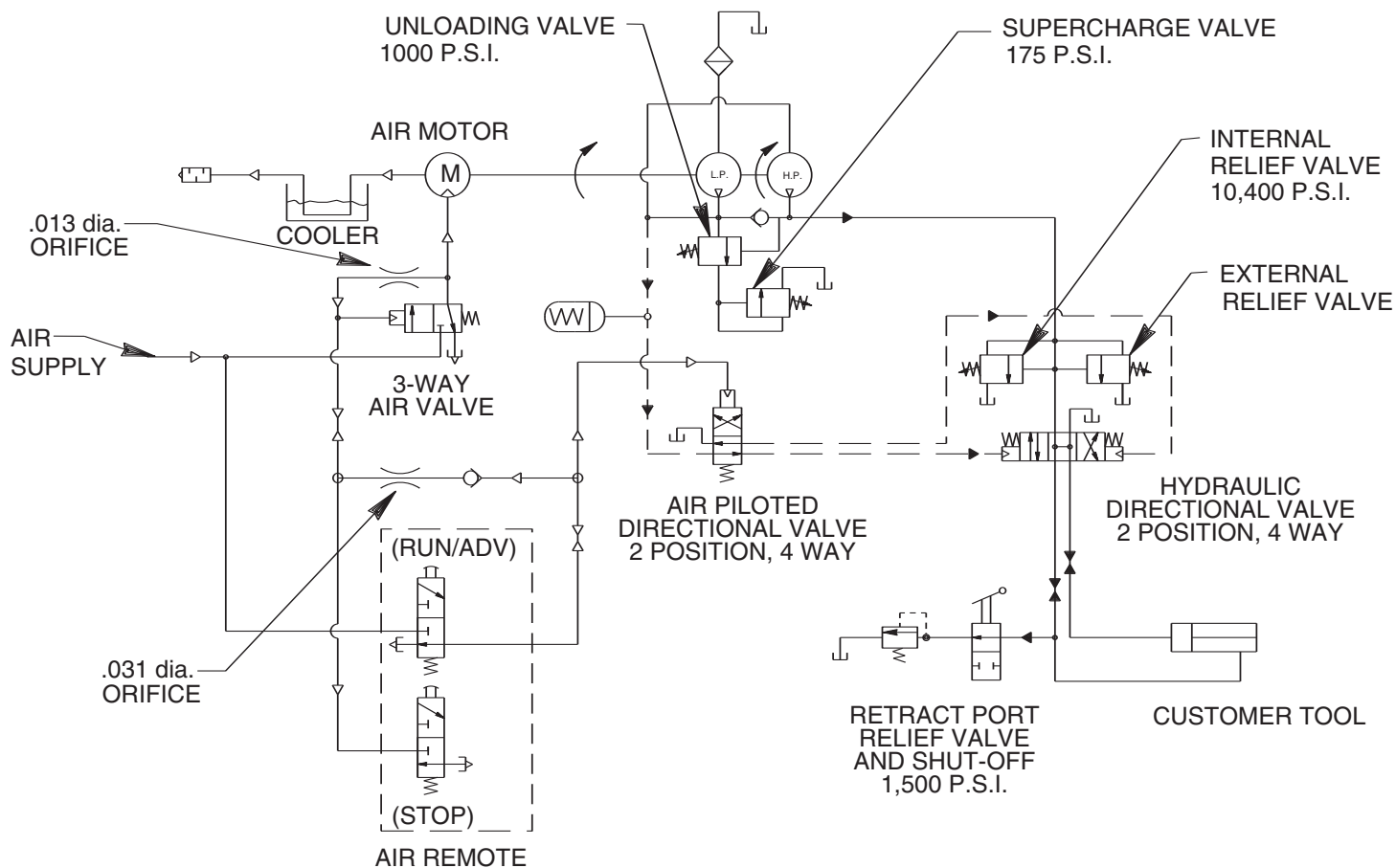
VIEW "A-A"



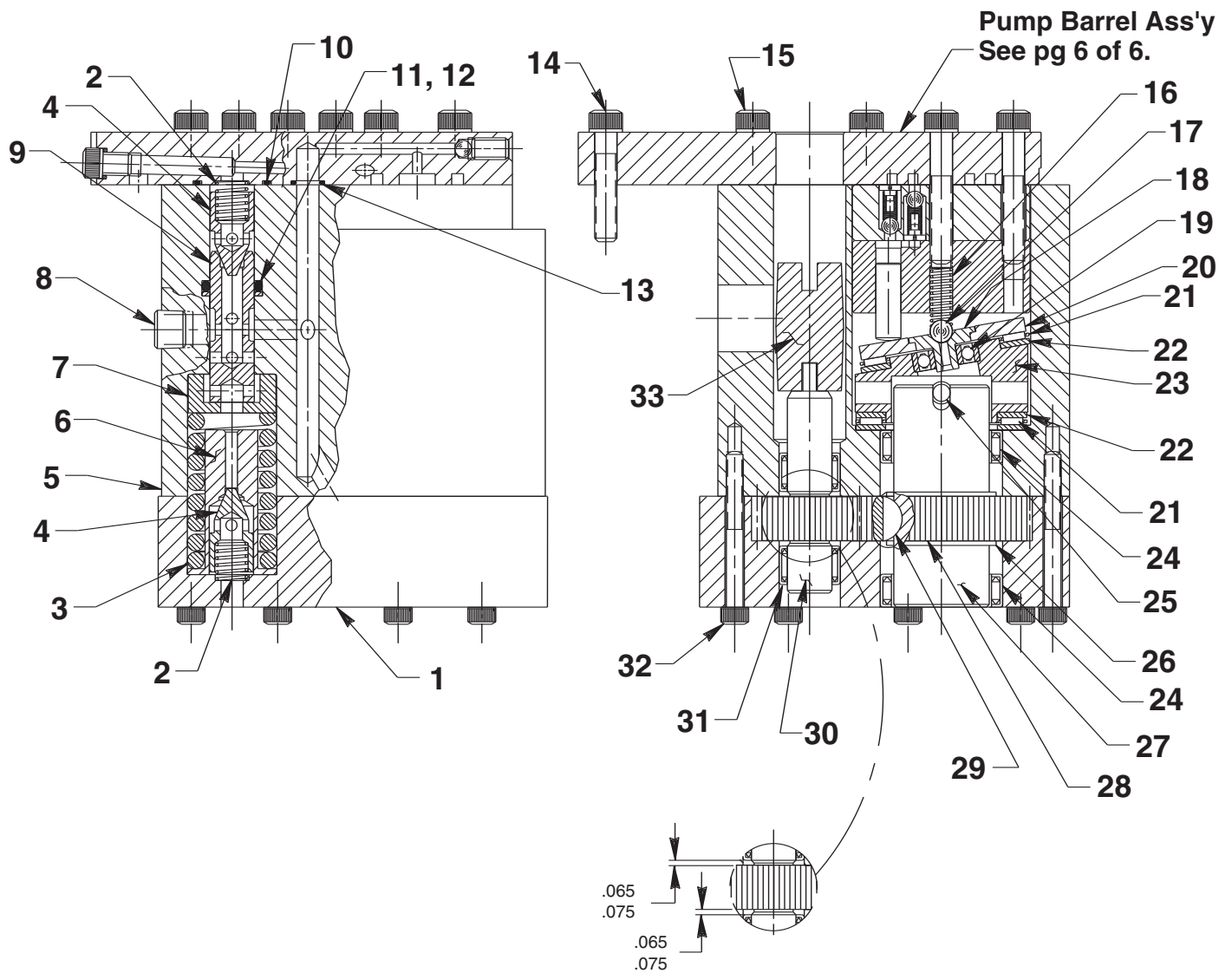
## Parts List

| Item No. | Part No. | No. Req'd | Description                              |
|----------|----------|-----------|--|
| 1        | 20937    | 1         | Vent Cap                                 |
| 2        | 200415   | 1         | O-ring (13/16 X 5/8 X 3/32)              |
| 3        | 16177    | 1         | 90° Elbow Fitting                        |
| 4        | 201570   | 1         | Pressure Regulator Tube                  |
| 5        | 14844    | 1         | Straight Fitting                         |
| 6        | 252118   | 1         | Oil Line                                 |
| 7        | 21943    | 1         | Accumulator                              |
| 8        | 11173    | 1         | Straight Fitting                         |
| 9        | 10661    | 1         | Straight Fitting                         |
| 10       | 12825    | 3         | Hex Hd. Cap Screw (1/4-20 UNC X 5/8 Lg.) |
| 11       | 46626    | 1         | Heat Exchanger Coil                      |
| 12       | 212896   | 1         | Rubber Grommet                           |
| 13       | 251795   | 1         | Straight Fitting                         |
| 14       | 251796   | 1         | Hex Jam Nut (1/2 N.P.S.M.)               |

## HYDRAULIC SCHEMATIC



## PUMP ASSEMBLY

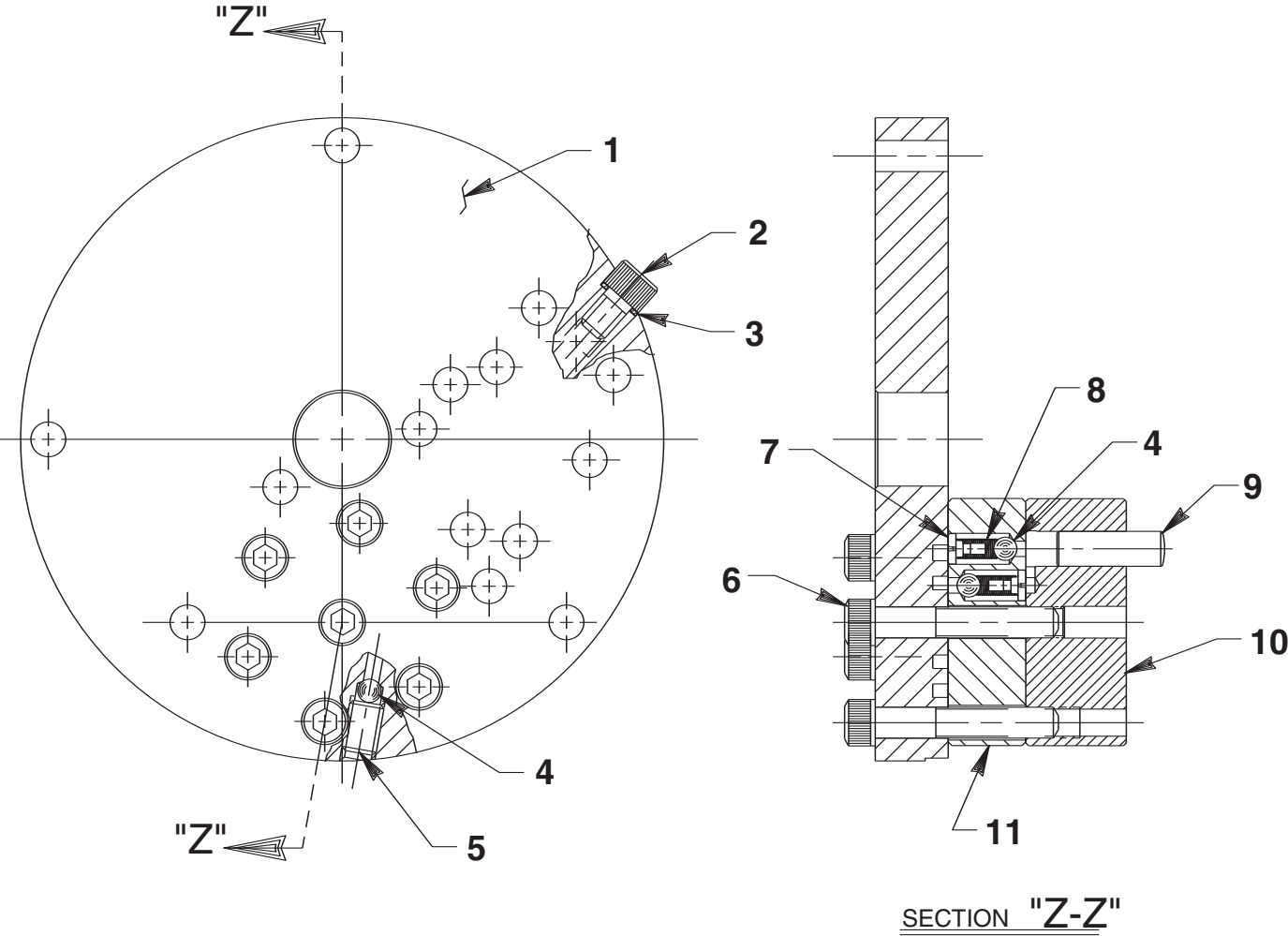


## Parts List

| Item No. | Part No. | No. Req'd | Description   |
|----------|----------|-----------|---|
| 1        | 30533    | 1         | End Plate   |
| 2        | 10425    | 2         | Spring (3/8 O.D. X 3/4 Lg.)   |
| 3        | 10426    | 1         | Spring (1" O.D. X 1-13/16" Lg.)   |
| 4        | 20771    | 2         | Poppet  |
| 5        | 40120    | 1         | Pump Body   |
| 6        | 23256    | 1         | Spring Guide  |
| 7        | 23255    | 1         | Spring Guide  |
| 8        | 10427    | 1         | Plug Fitting  |
| 9        | 20849    | 1         | Spool   |
| 10       | 10303    | 1         | O-ring (7/8 X 3/4 X 1/16)   |
| 11       | 10271    | 1         | O-ring (11/16 X 1/2 X 3/32)   |
| 12       | 12389    | 1         | Backup Washer (11/16 x 1/2 X 1/16)                                      |
| 13       | 10266    | 1         | O-ring (3/8 X 1/4 X 1/16)   |
| 14       | 10016    | 1         | Hex Soc. Screw (1/4-20 UNC X 1" Lg.)                                    |
| 15       | 10020    | 9         | Hex Soc. Screw (1/4-20 UNC X 1-1/4" Lg.;<br>Torque to 170/180 in. lbs.) |
| 16       | 10361    | 1         | Spring (1/4 O.D. X 1" Lg.)  |
| 17       | 10375    | 1         | Steel Ball (1/4" dia.)  |
| 18       | 23547    | 1         | Top Bearing Plate   |
| 19       | 11814    | 1         | Ball Bearing  |
| 20       | 23548    | 1         | Top Plate   |
| 21       | 11228    | 2         | Needle Bearing  |
| 22       | 11813    | 3         | Bearing Race  |
| 23       | 23549    | 1         | Angle Plate   |
| 24       | 11064    | 2         | Needle Bearing  |
| 25       | 11955    | 1         | Slotted Spring Pin  |
| 26       | 11261    | 2         | External Retaining Ring   |
| 27       | 23556    | 1         | Shaft   |
| 28       | 23557    | 1         | Drive Gear  |
| 29       | 11821    | 1         | Woodruff Key  |
| 30       | 21272    | 1         | Drive Gear  |
| 31       | 11199    | 2         | Needle Bearing  |
| 32       | 10001    | 12        | Hex Soc. Screw (#10-32 UNF X 1-3/4" Lg.;<br>Torque to 50/60 in. lbs.)   |
| 33       | *252108  | 1         | Coupling  |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

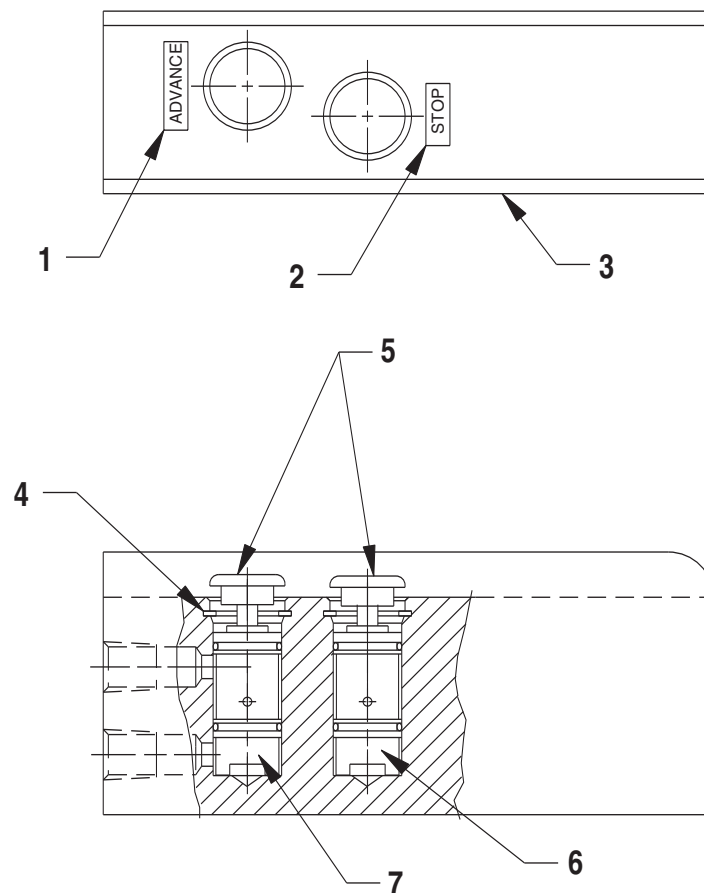
#33113 PUMP BARREL ASSEMBLY



| Item No. | Part No. | No. Req'd | Description   |
|----------|----------|-----------|---|
| 1        | *50411   | 1         | Top Plate   |
| 2        | 10002    | 1         | Soc. Hd. Cap Screw (1/4-20 UNC X 3/8" Lg.; Torque to 140/160 in. lbs.)  |
| 3        | 10442    | 1         | Special Washer  |
| 4        | *12223   | 7         | Ball (3/16" Dia.)   |
| 5        | 10519    | 1         | Hex Set Screw (1/4-20 UNC X 3/8 Lg.; Torque to 65/70 in. lbs.)          |
| 6        | *10023   | 7         | Soc. Hd. Cap Screw (1/4-28 UNF X 1-1/2" Lg.; Torque to 170/180 in. lbs) |
| 7        | *24549   | 6         | Ball Guide  |
| 8        | *10445   | 6         | Spring (5/32 O.D. X 3/4 Lg.)  |
| 9        | *21628   | 3         | Piston  |
| 10       | *41062   | 1         | Pump Barrel   |
| 11       | *40630   | 1         | Valve Head  |

Consult factory when replacing items marked with an asterisk (\*).

## HAND SWITCH ASSEMBLY NO. 421257



| Item No. | Part No. | No. Req'd | Description                  |
|----------|----------|-----------|------------------------------|
| 1        | 29663    | 1         | Decal (Advance)              |
| 2        | 203769   | 1         | Decal (Stop)                 |
| 3        | 421256   | 1         | Valve Body                   |
| 4        | 11033    | 2         | Internal Retaining Ring      |
| 5        | *206105  | 2         | Push Button                  |
| 6        | *252121  | 1         | 3-Way Poppet Valve Cartridge |
| 7        | *206104  | 1         | 3-Way Closed Valve Cartridge |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

**Note: Complete Hand Switch Assembly No. 421257 is contained in Repair Kit No. 090227-2.**

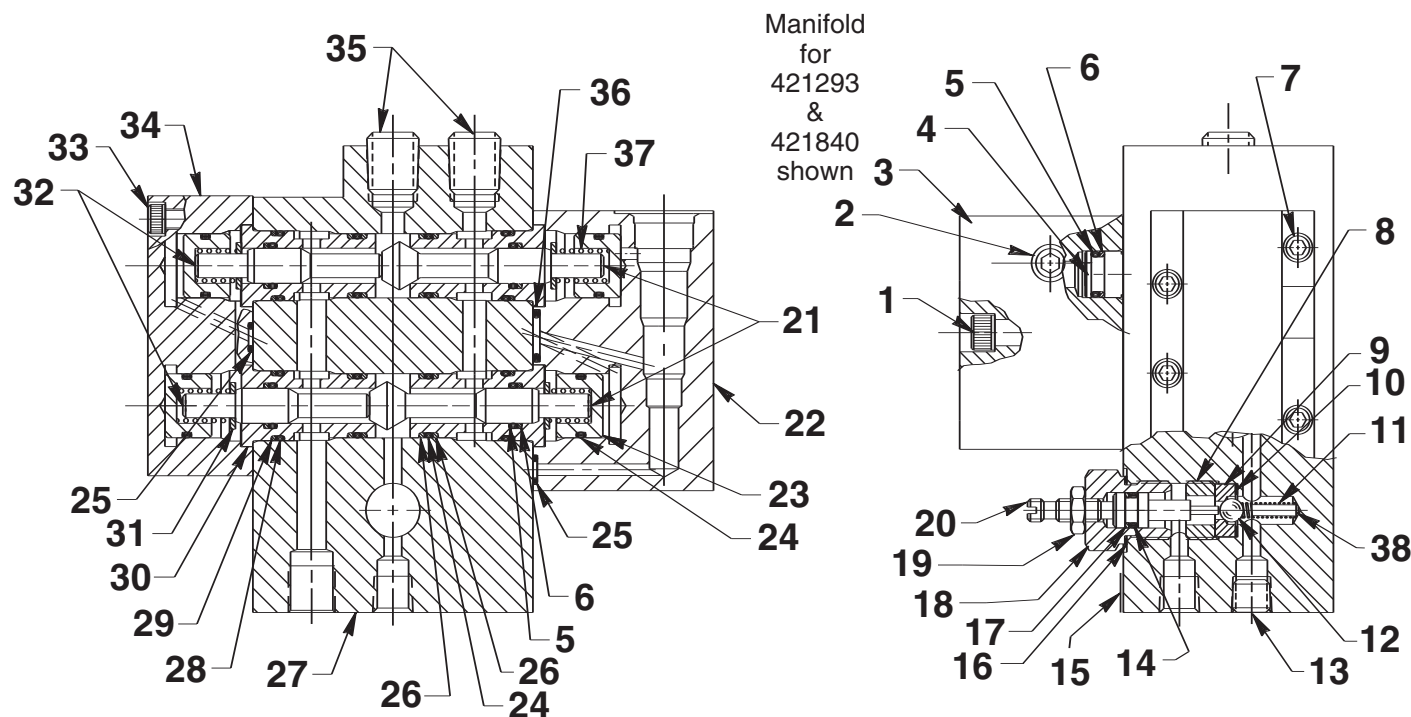


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 sales@torcup.com \* www.torcup.com

## Parts List for:

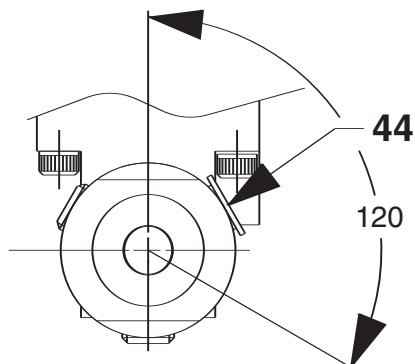
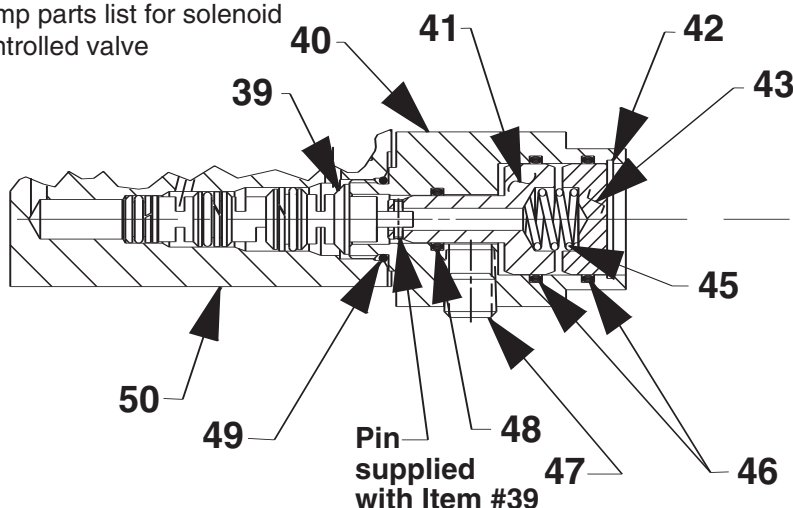
**AP1000P**

# 4-WAY, OPEN CENTER, SOLENOID/PNEUMATIC CONTROLLED, PILOT OPERATED DIRECTIONAL VALVE ASSEMBLY



## FOR 421248 & 421840 (Pneumatic Controlled Valves)

Note: See electric hydraulic pump parts list for solenoid controlled valve



**NOTE: ASSEMBLE PLASTIC PLUG INTO PORT ORIENTED WITHIN 120° ANGLE SHOWN.**

## Parts List

| Item No. | Part No. | No. Req'd | Description   |
|----------|----------|-----------|---|
| 1        | 10854    | 2         | Cap Screw (1/4-20UNC X 1-3/4 Lg.; Torque to 150/180 in. lbs.)         |
| 2        | 14972    | 1         | Pipe Plug (1/4 NPTF; For 421293)                                      |
|          | 10427    | 2         | Pressure Plug (1/8 NPTF; For 421292)                                  |
| 3        | 351319   | 1         | Manifold (For 421293)   |
|          | 351319CL | 1         | Manifold (For 421293CL, 421840)                                       |
|          | 421856   | 1         | Manifold (For 421860)   |
|          | 421856CL | 1         | Manifold (For 3000113CL, 3000167CL, 421248)                           |
| 4        | 21094    | 2         | Bushing   |
| 5        | *10268   | 8         | O-ring (1/2 X 3/8 X 1/16)   |
| 6        | *11863   | 8         | Backup Washer (1/2 X 3/8 X 1/16)                                      |
| 7        | 14426    | 4         | Cap Screw (#10-24 UNC X 1" Lg.; Torque to 50/70 in. lbs.)             |
| 8        | 212735   | 1         | Hollow Lock Screw (5/8-18 UNF x 5/16 Lg.; Torque to 180/200 in. lbs.) |
| 9        | 351200   | 1         | Replaceable Seat  |
| 10       | 12042    | 1         | Copper Washer (9/16 X 3/8 X 1/32)                                     |
| 11       | 10361    | 1         | Compression Spring (1/4 O.D. X 1" Lg.)                                |
| 12       | 10375    | 1         | Steel Ball (1/4 Dia.)   |
| 13       | 251279   | 1         | Drive Plug (1/8 PTF)  |
| 14       | 10266    | 1         | O-ring (3/8 X 1/4 X 1/16)   |
| 15       | 252164   | 1         | Decal   |
| 16       | 252099   | 1         | Copper Washer   |
| 17       | 12184    | 1         | Backup Washer (3/8 X 1/4 X .048)                                      |
| 18       | 252053   | 1         | Valve Cap   |
| 19       | 10383    | 1         | Jam Nut (1/4-20 UNC)  |
| 20       | 351257   | 1         | Bushing   |
| 21       | *200542  | 2         | Poppet Half   |
| 22       | 64648    | 1         | Right End Cap (FOR 421293GY8, 421860)                                 |
|          | 64648CL  | 1         | Right End Cap (FOR 3000113CL, 421293CL, 3000167CL, 421248, 421840)    |
| 23       | 22070    | 4         | Piston  |
| 24       | *11284   | 8         | O-ring (11/16 X 9/16 X 1/16)  |
| 25       | *10265   | 6         | O-ring (5/16 X 3/16 X 1/16)   |
| 26       | *12391   | 8         | Backup Washer (11/16 X 9/16 X .048)                                   |
| 27       | 65095    | 1         | Valve Body (FOR 421293GY8, 421860)                                    |
|          | 65095CL  | 1         | Valve Body (FOR 3000113CL, 421293CL, 3000167CL, 421248, 421840)       |
| 28       | *10302   | 4         | O-ring (3/4 X 5/8 X 1/16)   |
| 29       | *12392   | 4         | Backup Washer (3/4 X 5/8 X 1/16)                                      |
| 30       | *22068   | 4         | Bushing   |
| 31       | 209541   | 4         | Washer  |
| 32       | 200541   | 2         | Poppet Half   |
| 33       | 11151    | 4         | Cap Screw (10-24 UNC X 1-1/4 Lg.; Torque to 50/70 in. lbs.)           |
| 34       | 420902   | 1         | Left End Cap (FOR 421293GY8, 421860)                                  |
|          | 420902CL | 1         | Left End Cap (FOR 3000113CL, 421293CL, 3000167CL, 421248, 421840)     |
| 35       | 10479    | 2         | Pipe Plug (1/4 NPTF)  |
| 36       | *10269   | 1         | O-ring (9/16 X 3/8 X 3/32)  |
| 37       | 10362    | 4         | Compression Spring (3/8 O.D. X 3/4 Lg.)                               |
| 38       | 12955    | 1         | Dowel Pin (.19 x .50)   |
| 39       | †351232  | 1         | Spool Valve (Includes pin; For electric operated [solenoid] valves)   |
|          | 252192   | 1         | Spool Valve (Includes pin; For pneumatic operated valves)             |
| 40       | †421249  | 1         | Valve Body (Torque to 144 in. lbs. max.)                              |

Parts List

| Item No. | Part No.  | No. Req'd | Description  |
|----------|-----------|-----------|--|
| 41       | †351231   | 1         | Spool  |
| 42       | †16686    | 1         | Retaining Ring (Internal .88 x .042)                   |
| 43       | †252105   | 1         | Piston   |
| 44       | 15697     | 1         | Plastic Cap  |
| 45       | †11195    | 1         | Spring (.49 OD x .75 x .05 ws)                         |
| 46       | †10304    | 2         | O-ring (1.00 x .87 Nitrile)                            |
| 47       | †251279   | 2         | Plug Fitting (1/8 NPTF)                                |
| 48       | †10268    | 1         | O-ring (.50 x .37 Nitrile)                             |
| 49       | †10301    | 1         | O-ring (.62 x .50 Nitrile)                             |
| 50       | 421293CL  | 1         | Solenoid Valve Assembly (Includes Items #1 through 38) |
|          | 3000167CL | 1         | Solenoid Valve Assembly (Includes Items #1 through 38) |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 351005-KIT.  
Part numbers marked with a dagger (†) are contained in Repair Kit No. 351586.



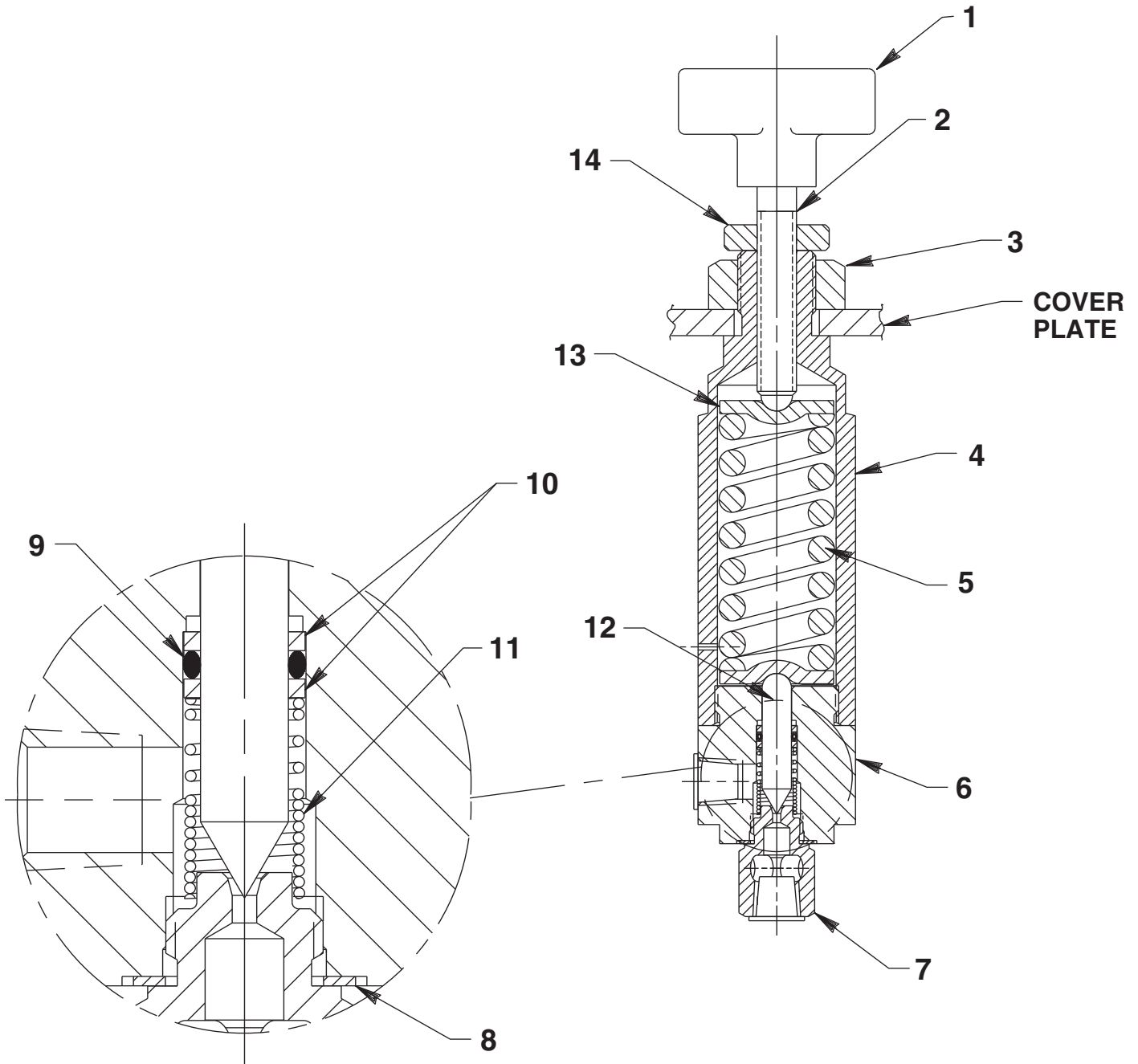


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Parts List for:

**AP1000P**

## PRESSURE REGULATOR ASSEMBLY



## Parts List

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| Item No. | Part No. | No. Req'd | Description   |
|----------|----------|-----------|---|
| 1        | 215693   | 1         | Knob (Note: Assemble to stem [Item #2] with Loctite #242 or equiv.)               |
| 2        | 215721   | 1         | Adjustment Stem   |
| 3        | 10396    | 1         | Jam Nut (3/4-16 UNF)  |
| 4        | 309077   | 1         | Regulator Housing   |
| 5        | 215429   | 1         | Compression Spring (1.100 O.D. X 2-1/2 Lg.)                                       |
| 6        | 420891   | 1         | Regulator Body  |
| 7        | †*350944 | 1         | Seat Fitting (Torque to 440/460 in. lbs.)   |
| 8        | †*14874  | 1         | Washer (.700 X 1/2 X 1/32)  |
| 9        | †*10266  | 1         | O-ring (3/8 X 1/4 X 1/16)   |
| 10       | †*215430 | 2         | Backup Washer   |
| 11       | *215431  | 1         | Spring (Note:Assemble closed coils of spring form towards seat fitting [Item #7]) |
| 12       | †*309079 | 1         | Poppet  |
| 13       | 215428   | 2         | Spring Retainer (Grease pocket before assembling [both ends])                     |
| 14       | 215683   | 1         | Regulator Locking Nut   |

Part numbers marked with an asterisk (\*) are contained in Repair Kit No. 090210.

Part numbers marked with a dagger (†) are contained in Repair Kit No. 9633-KIT.