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Form No. 102669

|                             |        |        |
|-----------------------------|--------|--------|
| Operating Instructions for: |        |        |
|                             |        | 100159 |
| 100064                      | 100149 | 100166 |
| 100065                      | 100153 | 100167 |
| 100066                      | 100156 | 100171 |
| 100139                      | 100157 | 100172 |
| 100148                      | 100158 | 100173 |

**SINGLE-ACTING, SPRING RETURN**  
**THREADED BODY HYDRAULIC CYLINDERS**  
**Max. Operating Pressure: 5,000 PSI**

### INTRODUCTION

These instructions are written to help you, the user, more effectively use and maintain your single-acting Hytec cylinders. These cylinders are recommended for a variety of workholding applications.

### SYSTEM EVALUATION

Your cylinder, hose, couplings, pump and all other system components must have a maximum pressure rating greater than or equal to the system operating pressure. An improperly matched system can cause system components to fail and possibly cause serious injury. If you are in doubt, consult your distributor, nearest authorized hydraulic service center, or Hytec factory or field representative.

## SAFETY PRECAUTIONS



### WARNING

#### Hydraulic Hoses and Fluid Transmission Lines

- All WARNING statements must be carefully observed to help prevent personal injury.
- Avoid straight line tubing connections in short runs. Straight line runs do not provide for expansion and contraction due to temperature and pressure changes.
- Eliminate stress in the tube lines. Long tubing runs should be supported by brackets or clips. Tubes through bulkheads should have bulkhead fittings. This makes easy removal possible and helps support the tubing.
- Before operating the cylinder, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off pump and shift the control valve to release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact. Do not allow the hose to 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 and possibly result in personal injury.
- Do not use a hose or tubing to move attached equipment. Stress can damage the hose and possibly cause personal injury.
- Hose material and seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects, some coolants and some paints. Consult the manufacturer before painting a hose. Hose deterioration due to corrosive materials can result in personal injury.

Sheet No. 1 of 2

Issue Date: Rev. 12-10-93

### Safety Precautions Cont'd - Cylinder

- The user must be familiar with the correct operation, maintenance, and use of the cylinder(s). Lack of knowledge in any of these areas can lead to personal injury.
- Do not exceed rated capacities of the cylinders. Excess pressure can result in personal injury.
- Inspect each cylinder periodically to prevent unsafe conditions from developing.
- Never use extreme heat to disassemble a hydraulic cylinder. Metal fatigue can lead to unsafe conditions.

## HYDRAULIC CONNECTIONS

Hydraulic lines and fittings can act as restrictors in the system. The restricting of the oil flow causes back pressure that slows the cylinder's return. Return speed also varies because of the application, condition of the cylinder and the temperature and viscosity of the oil. All lines, fittings and other system components must be sized to minimize restriction.

## BLEEDING THE SYSTEM

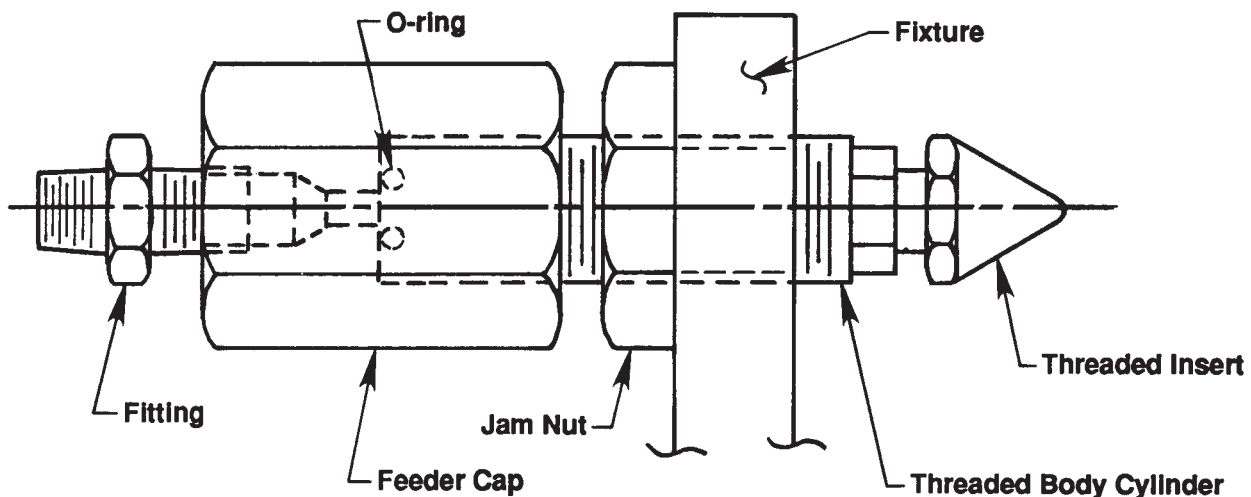
After all connections are made, the hydraulic system should be bled. Shut off the pump, and loosen a fitting as far from the pump as possible. Jog the pump briefly until fluid spurts from the loose connection. Continue this operation until a continuous clear flow of hydraulic fluid is seen. Shut off the pump, and tighten the loosened fitting. Fill the pump reservoir to the correct level again.

**OR**

First, determine that the pump's reservoir is properly vented. (Refer to operating instructions for your pump if you have any doubts about its need to be vented.) With no load on the system and the pump higher than the rest of the system, cycle the system several times to remove any air that is trapped in the system.

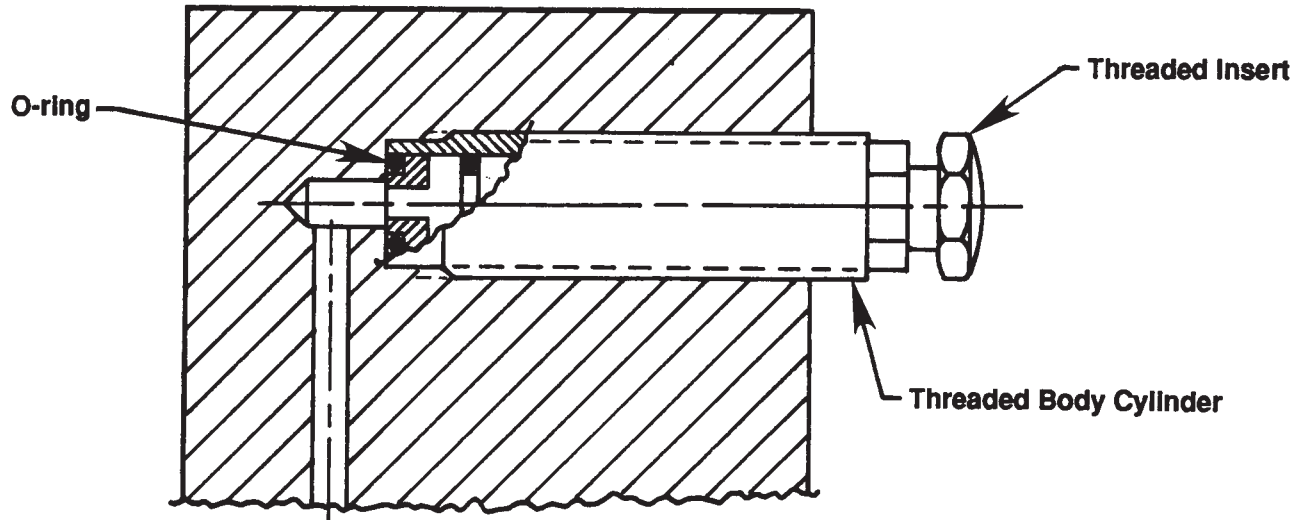
## SET UP

### STANDARD MOUNTING WITH FEEDER CAP



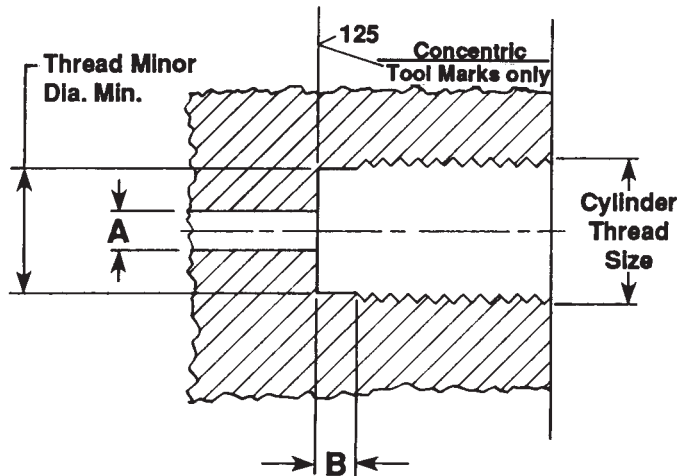
An o-ring (supplied) is always used to seal the cylinder base to the feeder cap. **IMPORTANT: Do not attempt to use any form of thread sealant or teflon tape to seal the cylinder to its pressure source.** When used with a feeder cap (optional), the cylinder can be mounted in a threaded hole and locked in position with a single jam nut (optional) on either side of the mounting hole. The feeder cap itself can also be used as a jam nut as long as the cylinder is torqued into the feeder cap first, and then assembled into the fixture. Longer cylinders can be mounted in a bore with a jam nut on both sides to hold the cylinder in position.

**MANIFOLD MOUNTING**



An o-ring (supplied) is always used to seal the cylinder base to the manifold. **IMPORTANT: Do not attempt to use any form of thread sealant or teflon tape to seal the cylinder to its pressure source.** When manifold mounted, the cylinder is simply torqued into the manifold. A jam nut can be added but is not necessary.

**RECOMMENDED MANIFOLD MOUNTING DETAIL**



| Cyl. Thread Size | A Max. | B Max. |
|------------------|--------|--------|
| 1/2              | .156   | .156   |
| 5/8              | .250   | .156   |
| 3/4              | .312   | .187   |
| 1"               | .437   | .187   |

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

- Manifold mounting requires that the user provide pressurized hydraulic passageways within the fixture. These should be designed only by persons qualified to insure system safety. Improperly designed manifolds can burst under hydraulic pressure, causing serious personal injury.
- These cylinders are designed for 5,000 PSI maximum operating pressure. Do not exceed this pressure!

**THREADED INSERTS**

**IMPORTANT:** Always use a Hytec threaded insert with the cylinders. This will provide a hardened wear surface at the workpiece and prevent damage to the piston.

The threaded insert can be locked into the piston using a jam nut (not supplied), a low strength thread locking compound or by hydraulically extending the piston to its maximum stroke with pressure maintained. The resulting friction will keep the piston from turning as the insert is torqued.

## TROUBLE-SHOOTING GUIDE

**IMPORTANT:**

● The following trouble-shooting and repair procedures should only be performed by qualified personnel familiar with this equipment. Use the proper equipment when trouble-shooting!

| PROBLEM   | CAUSE  | SOLUTION  |
|---|--|---|
| <b>Erratic Action</b>   | <ol style="list-style-type: none"> <li>1. Air in system</li> <li>2. Viscosity of oil too high</li> <li>3. Internal leakage in cylinder</li> <br/> <li>4. Cylinder sticking or binding</li> </ol>   | <ol style="list-style-type: none"> <li>1. Bleed air and check for leaks</li> <li>2. Change to lower viscosity oil</li> <li>3. Replace worn packings<br/>Check for excessive contamination or wear</li> <li>4. Check for dirt, gummy deposits or leaks as above<br/>Check for misalignment, worn parts or defective packing</li> </ol> |
| <b>Cylinder does not advance</b>                                | <ol style="list-style-type: none"> <li>1. Low or no oil in pump reservoir</li> <li>2. Air-locked pump</li> <li>3. Loose couplers</li> <br/> <li>4. Plugged hydraulic line</li> <li>5. Pump not operating</li> <br/> <li>6. Load is above the capacity of the system</li> </ol>                                     | <ol style="list-style-type: none"> <li>1. Fill with oil and bleed the system</li> <li>2. Bleed the system</li> <li>3. Tighten couplers &amp; bleed the system</li> <li>4. Flush and clean system</li> <li>5. Check pump operating instructions</li> <li>6. Use the correct equipment</li> </ol>                                       |
| <b>Cylinder extends only partially</b>                          | <ol style="list-style-type: none"> <li>1. Pump reservoir is low on oil</li> <li>2. Cylinder piston rod binding</li> </ol>  | <ol style="list-style-type: none"> <li>1. Fill and bleed the system</li> <li>2. Check for dirt, gummy deposits or leaks as above<br/>Check for misalignment, worn parts or defective packing</li> </ol>   |
| <b>Cylinder advances slower than normal</b>                     | <ol style="list-style-type: none"> <li>1. Loose connection</li> <li>2. Leaky connection</li> <br/> <li>3. Restricted hydraulic line or fitting</li> <li>4. Pump not working correctly</li> <br/> <li>5. Leaky seals</li> </ol>   | <ol style="list-style-type: none"> <li>1. Tighten and bleed the system</li> <li>2. Clean and seal connection with a non-hardening pipe thread compound or teflon tape</li> <li>3. Clean or replace if damaged</li> <li>4. Check pump operating instructions</li> <li>5. Replace seals</li> </ol>                                      |
| <b>Cylinder advances but does not maintain pressure</b>         | <ol style="list-style-type: none"> <li>1. Leaky connection</li> <br/> <li>2. Cylinder seals leaking</li> <li>3. Pump valve malfunctioning</li> </ol>   | <ol style="list-style-type: none"> <li>1. Clean and seal connection with a non-hardening pipe thread compound or teflon tape</li> <li>2. Replace seals</li> <li>3. Check pump operating instructions</li> </ol>   |
| <b>Cylinder leaks oil</b>                                       | <ol style="list-style-type: none"> <li>1. Worn or damaged seals</li> <li>2. Loose connections</li> </ol>   | <ol style="list-style-type: none"> <li>1. Replace seals</li> <li>2. Tighten fittings</li> </ol>   |
| <b>Cylinder will not retract or retracts slower than normal</b> | <ol style="list-style-type: none"> <li>1. Pump release valve closed</li> <li>2. Couplers not fastened</li> <li>3. Blocked hydraulic lines</li> <li>4. Weak or broken retraction springs</li> <li>5. Cylinder damaged internally</li> <li>6. Pump reservoir too full</li> <li>7. Excessive back pressure</li> </ol> | <ol style="list-style-type: none"> <li>1. Open pump release valve</li> <li>2. Fasten couplers</li> <li>3. Clean and flush</li> <li>4. Send to service center for repair</li> <li>5. Send to service center for repair</li> <li>6. Drain oil to correct level</li> <li>7. Use larger/shorter return lines</li> </ol>                   |