PSL WARRANTY

WARRANTY

PSL will repair or replace any portion of the equipment which proves to be defective within a period of 3 months from the date of shipment upon the return of the same to PSL at Purchaser's expense when such defects are due to defective materials supplied by PSL or defective workmanship of its employees, provided that the equipment shall have been properly installed, maintained, and utilized during the period covered by this warranty, and provided further that this warranty shall extend only to the Purchaser and no other party by any means, and provided, finally, that PSL shall in no event be responsible for the cost of field labor, calibrations or other charges incurred by the Purchaser. At all times, PSL shall have and possess the sole right and option to determine whether to repair or replace defective equipment. Machinery parts, accessories and components manufactured by others are warranted only to the extent of the original manufacturer’s warranty.

EXCLUSION OF OTHER WARRANTIES:

EXCEPT FOR THE ABOVE EXPRESS WARRANTY, THERE ARE NO WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, WHICH EXTEND BEYOND THE DESCRIPTION OF THE EQUIPMENT ON THE FACE HEREOF, NO WARRANTIES OR REPRESENTATIONS AT ANY TIME MADE BY ANY SALES REPRESENTATIVE OF PSL SHALL BE EFFECTIVE TO VARY OR EXPAND THE FOREGOING EXPRESS WARRANTY OR ANY OTHER TERMS HEREOF.

Precision Sure Lock
704-B West Simonds
Seagoville, Texas 75159 USA
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WARRANTY CLAIMS

Proper presentation of warranty claims will expedite the claim handling. The procedure is simple and outlined as follows:

(a) notify PRESTRESS SUPPLY, INC. of any malfunction or failure of PSL Equipment.
(b) order genuine PSL replacement or repair parts. Use of others will limit or void warranty consideration.
(c) always give model and serial number of equipment.
(d) return damaged or malfunctioning parts to PSL for warranty consideration.
(e) warranty claims must be completed, signed by owner, and returned freight prepaid to the factory within a period of 30 days.

PARTS ORDERING

Repair or replacement parts for your PSL equipment should be ordered from PRESTRESS SUPPLY, INC. Standard hardware items are noted by an * after the part number and may be locally available.

When ordering repair or replacement parts, always refer to model and serial number of your PSL equipment. Serial numbers must be given to ensure proper parts will be shipped.

Most every part order is an emergency to some degree. When ordering parts for your PSI HERCULES JACK, use the manual drawings to locate the required part or parts. Select proper reference number from drawing and match it with reference number on parts list. This will give you proper part numbers to order and assures you of receiving the part with the least possible delay.

Always check part number and description carefully. A few minutes verifying part identification will save you many hours of unprofitable "down time."
ASSEMBLY INSTRUCTIONS

(1) Read operating instruction manual.

(2) Bolt ram together, recommended torque load is 85 ft/lbs.

(3) Connect the pull and return hoses to the ram. Be careful that no dirt or grit gets into the system.

(4) Connect motor starter to ample grounded electric circuit. Be sure the motor, starter coil, and starter heaters are connected for the proper voltage. Be sure to check rotation.

(5) Check oil level in tank.

(6) Extend and retract the ram several times holding the valve open 3 to 4 seconds after the ram stops to expel the air.

(7) Hang the ram by a suitable suspension. Be sure the ram is in alignment with the cable.

GENERAL INSTRUCTIONS

(1) Do not allow anyone to operate the machine until they have studied and understand the instructions. The operator should practice operating the pressure regulators without any cable in the machine. This can be done by pulling the ram all the way back. The full pressure can be exerted with no harm to the equipment. The operator should practice moving the ram, and setting the regulators until a feel is developed for operating the machine before attempting to tension cable.

(2) The gauges are subjected to a great deal of vibration and shock during shipment. For this reason, the machine must be calibrated (following instructions in gauge section) after it is received and assembled.

(3) Do not change any of the regulator settings without following an approved procedure. However, there is no danger of damage to the tensioning machine itself no matter what combination of valve positions is selected.

(4) The tensioning machine has a range of 1,500 lbs. to 52,000 lbs. line pull.

(5) Be sure the reservoir is full of oil before the unit is operated.

(6) Be sure that the power supply cables are in good condition and that the machine is grounded.

(7) Be sure to check hoses for damage or wear, replace if necessary.
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<thead>
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<td>4</td>
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<td>61160</td>
<td>Initial Gauge</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
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</table>
**CONTROLS**

Direction Control Valve

The left hand valve on the dash controls the direction the ram moves. Pull on the handle pulls the cable; push returns the ram. The ram will not return unless the Initial-Final-EaseOff handle is in the Final position.

Initial-Final-EaseOff Valve

The right hand valve selects Initial and Final for tensioning or EaseOff to release the pressure in the cylinder slowly, allowing the chuck to seat gradually. Internally in the hydraulics, a cartridge valve must be pressurized open to perform the EaseOff function. It is normal for the machine to sound like it is building pressure even though it does not show on the gauge. Actually the Final Gauge reading will drop during EaseOff. The Initial reading will drop during Return.

Initial Pressure Regulator

Controls the maximum pressure when the Initial-Final-EaseOff handle is in the Initial position.

Final Pressure Regulator

Controls the maximum pressure when Initial-Final-EaseOff handle is in Final position. Note: Final pressure regulator must be set to a higher pressure than Initial pressure regulator.

0 - 7,000 lbs. Gauge (Initial)

Used to measure the tension during Initial tensioning. This gauge has a relief valve which protects the gauge from overload.

0 - 60,000 lbs. Gauge (Final)

Used to measure tension during Final tensioning. Indicates the tension on the ram when the Direction Control Valve is in the pull position.
CONTROL OF JACKING FORCE

All flow and regulation of the oil is controlled by the:

- Main Control Valve
- Main Valve Body
- Gauge Valve Block
- Gauge Snubbers

Cartridge Valves located in these housings manage the flow according to which lever the operator pushes or pulls. Adjustable Gauge Snubbers protect the gauges from sudden shock and pulsations. Gauges should move smoothly and rapidly enough to reflect the desired tension by the time the cable stops moving but should not be jerky or bounce. (See Setting Gauge Snubbers).

The cartridge system was designed so if a problem develops, a Cartridge Valve can be easily removed and replaced by field personnel. **Cleanliness is of the utmost importance** when servicing this unit, as most of the valves have small orifices which could be blocked. Caution should also be exercised when replacing hoses and lines to make sure they are free of hose particles or dirt.

Pressure bypass valves referred to as: Initial Pressure Regulator and Final Pressure Regulator, allow the tension to be controlled so the ram will stop when a preset tension is reached. The accuracy of setting of automatic regulators should be verified by running to the desired cutoff load whenever there is reason to suspect improper results, and at a minimum, at the beginning of the operation each day.

SETTING PRESSURE REGULATORS

The left-hand regulator controls the Initial tension pressure.

The right-hand regulator controls the Final tension pressure. The Final tension regulator is always in the circuit, therefore, it must be set to a higher pressure than the Initial regulator.

Before placing ram on cable:

1. Set selector to Final.
2. Pull Direction Control Valve and bottom ram.
3. Slowly turn the Final regulator clockwise until gauge reads desired Final tension.
4. Ease pressure off with EaseOff handle and return ram an inch or so.
(5) Release tension, then pull again to see if the tension repeats. If it does not, reset and recheck.

(6) Select Initial.

Note: An Initial tension of 3000 Lbs. is recommended for best accuracy.

(7) Slowly turn the Initial regulator clockwise until the Initial gauge reads the specified pressure.

(8) Release tension, then pull again to see if the tension repeats. If it does not, reset and recheck.

**JOGGING DIRECTION CONTROL VALVE**

The system is designed to temporarily 'Hold' the highest pressure reached. Once the Ram has stopped moving, jogging the Direction Control Valve causes pressure surges to the system. Although it may not be enough to actually move the cable more, it will most likely increase the gauge reading, resulting in inaccurate tension indications. **DO NOT JOG DIRECTION CONTROL VALVE!**

Calibrating with short cables can cause similar effects as jogging, because pressure is reached instantly when no elongation of the strand has to occur. This is why it is recommended to calibrate on a bed with a longer cable.

**TENSIONING CABLE**

The Prestressed Concrete Institute recommends:

After strands have been positioned, an initial tension in the range of 5% to 25% (3000 lbs. recommended) of the Final force should be applied.

Reference marks should then be established from which elongation can be measured. Final tensioning forces can be measured. Elongation can be accurately measured from these reference marks. Elongation measurement shall take into account all operational losses and compensations in the tensioning system.
Initial Tension:

(1) Set Initial and Final Regulators to proper tensions as outlined in Setting Pressure Regulators.

(2) Set selector to Initial.

(3) Pull Direction Control Valve until gauge reads the preset initial tension and stops. DO NOT JOG! Mark Chuck Box to measure elongation.

Final Tension

(1) Set selector to Final.

(2) Hold Direction Control Valve until gauge reaches the preset Final tension and stops. Release the handle. DO NOT JOG! Check the elongation. Loads indicated by the gauges should control the tensioning, with elongation checked on every strand.

CAUTION: THE OPERATOR SHOULD NOTE THE TENSION AND ELONGATION TO SEE THAT NEITHER ARE EXCEEDED DURING TENSIONING.

Returning Ram

(1) Ease-Off the pressure.

(2) Push the Direction Control Valve until the ram fully returns.
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<td>Valve to Valve Body 1 Final</td>
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* Common Hardware items, should be available from local sources.
** Give stroke length, when ordering parts.
If Cylinder is Load Cell equipped, LC should be added to part number.
Gauge Manifold

Main Manifold

(16)
## Manifold Valving

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<td>(CXCD-XAN) Check Valve</td>
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GAUGE PRESSURE RELATIONSHIP

PSI Hercules Jacks are composed of two separate systems; inter-related, but separate. They are:

1. The Gauge System
2. Pressure Control System

1. The gauges measure how much oil pressure is introduced into the jack circuit, nothing else.

2. The pressure control system governs oil pressure put into the Jack circuit. The regulators on the panel tell the system what pressure to hold. There are several factors that can cause the regulators to drift off. The most common is change in oil temperature.

Lack of repeatability or drift should not be confused with gauge inaccuracy! They are NOT related.

EXAMPLE: An auto with cruise control: The speedometer gauges how fast the car is going. The cruise control governs car speed. If the cruise control drifts off speed or doesn’t repeat, the speedometer is not what is inaccurate!

The gauges used in PSI Hercules Jacks are of the highest quality available; each is hand assembled and has passed a calibration and visual inspection by the manufacturer. They are a very simple device with little chance of failure. They are normally damaged by pulsations beating them apart or overpressurization damage. Because the gauge system is pulsation dampened and overpressurization protected, the chance that a calibration problem is in the gauge is RARE; usually the error is elsewhere.

CALIBRATION PROCEDURES

Gauges, Cylinders, and Power Units must be calibrated as a SYSTEM in the SAME MANNER they are used in Tensioning operations. The calibration should be performed through and just beyond the expected range of tensioning, with actual and indicated gauge pressures established at various load points.

Calibrations should be performed by an approved testing laboratory, calibration service or under the supervision of a registered professional engineer, and a certified calibration curve should be maintained for each tensioning system. Pressure readings can be used directly if the calibration determines a reading is within the proper tolerance. Service conditions will determine the frequency of Calibrations. However, calibration shall be performed at any time a tensioning system indicates erratic results, and in any case, at intervals not greater than 12 months.
CHANGING GAUGES

1. Remove hydraulic line from gauge snubber.
2. Remove the three gauge mounting bolts and lift gauge out of panel.
3. Remove snubber from gauge. Use a wrench on flats provided on gauge inlet.
4. Apply thread sealant to pressure connection on gauge taking care not to allow sealant to block gauge port. Install snubber, again using wrench on flats provided. Do not overtighten snubber and split snubber housing.
5. Place new gauge on panel and reinstall bolts.
6. Bottom the ram and set pressure to 1,500 to 2,000 lbs. Place a small pan or rag under the snubber to catch lost oil. Loosen the line nut slightly until oil flows out smoothly and then retighten.
7. New gauges must be calibrated. (See Gauge Calibration).

SETTING GAUGE SNUBBERS

The gauges are protected from rapid pressure changes and pulsations by Gauge Snubbers. If the snubbers are improperly set, the gauges can be damaged or wear quickly. If the gauge pointer moves too slowly, the cable tension may be reached, causing the ram to stop moving, but the Pointer may not be to the proper reading yet. This can give a false indication the Jack is not performing consistent. Also, if the snubbers are set too tight, the gauges may not zero.

Calibrations performed with a short piece of strand may not allow oil to flow through properly set snubbers to the gauges fast enough, because pressure is instant on the strand but has to flow to the gauge. If the snubbers are set too loose, pressure "SLAP" (because no elongation has to occur) will cause 'high' readings, and the 'Hold' circuitry will not allow the pointer to come back.

The gauge pointer should move quickly as pressure is increased, but should not slam if pressure is suddenly applied. To adjust, loosen lock nut, turn clockwise to increase amount of snubbing or counterclockwise to decrease snubbing. Retighten lock nut.
MAINTENANCE OF STRAINER AND OIL FILTER

The pump is protected from foreign particles by a strainer located over the outlet, inside the tank. The oil is then filtered between the pump and Direction Control Valve. The oil filter MUST be changed quarterly. The oil should be changed and the strainer serviced annually. Under extreme conditions the unit will require servicing more often. If the pump becomes excessively noisy or performance falls off, the strainer may need cleaning or the Filter Cartridge should be replaced.

CLEANING THE STRAINER

1. Drain oil by removing tank line from pump.
2. Remove tank inspection plate.
3. Remove strainer and wash in kerosene or mineral spirits. Blow clean and reinstall all parts.
4. Fill tank with clean oil.

HYDRAULIC OIL

Use any high quality petroleum base hydraulic oil, light turbine oil, dextron, or A.T.F. Note: Under no circumstances should a heavy oil be used.

REPAIRING HYDRAULIC LEAKS IN FITTING JOINTS

O-ring joints should be repaired by replacing the O-ring and re-assembling.

Taper joints should be repaired by the following method:

1. Unscrew joint.
2. Clean joint with safety solvent.
3. Prime with Loctite Primer Grade T.
4. Allow to dry.
5. Coat joint with Loctite Pipe Sealant with Teflon #59231.
6. Assemble joint.

NOTE: DO NOT use Teflon Tape Sealant on pipe joints. Teflon Tape reduces friction, allowing joints to be tightened too far and causing permanent damage. Joints will also quickly vibrate loose and leak.
RAM AND CHUCK BOX INSPECTION

The following inspection should be performed monthly.

1. Turn ram upside down and wash out the stantion and chuck box. Then lubricate with light oil. Visually inspect the ram and fittings for cracks or breaks, either is cause for immediate replacement.

2. Check the chuck box and stantion wear plate. If not flat and smooth, replace them. If you are using the nose reducer, inspect it for deformation and replace if necessary.

3. Check cylinder rod for any abnormal marks or scrapes that could be the signs of a warped or damaged cylinder rod.

REBUILDING CYLINDER

1. Remove hoses from cylinder and plug.

2. Wash cylinder to completely remove all dirt.

3. Cover work bench with clean paper.

4. Remove jacking stantion.

5. Remove cap bolts. Place 3 bolts in tapped holes and evenly pull head.

6. Pull rod and piston from cylinder tube. Use the head as a slide hammer, bumping the chuck box gently while pulling on the chuck box.

7. Inspect cylinder bore and cylinder rod. Both MUST be smooth and free of deep scratches, gouges, and dents.

8. Grip chuck box in a vise. Put a wrench on the piston nut and unscrew whichever one loosens first. (Piston nut or chuck box from rod). Slide the head off the cylinder rod.

   NOTE: If both piston nut and chuck box need to be removed, as to change a rod, screw two nuts onto threads, lock together and unscrew other end. If chuck box resists, warm the threaded area evenly to 300°F using an oxygen acetylene torch.


10. Remove piston seal and replace. Be careful not to gouge piston. If piston nut did not come off, do not worry. With O-ring it does not wear.
11. Slide head back on rod.

**NOTE:** If chuck box unscrewed, the following assembly procedure MUST be followed:

A. Completely clean oil from rod threads and chuck box threads with lacquer thinner, then Loctite Grade N Primer.
B. Coat threads with Loctite 601.
C. Assemble and tighten to 600 Ft. lbs.

12. Reassemble with one threaded hole in cylinder head down. Tighten all bolts to 85 Ft. lbs.

13. Jack must be calibrated after cylinder rebuilding. (See Gauge Calibration.)
1. Ram stops moving, but pressure gauge continues to rise slowly, then stops.
   a) Gauges react too slow. (See Setting Gauge Snubbers.)

2. Initial or Final gauge reads required pressure and repeats, but cables are not correct pressure.
   a) Gauges need to be calibrated. (See Calibrating Gauges.)

3. Initial tension insufficient.
   a) Final tension regulator set lower than Initial regulator.  
      (See Initial-Final Regulators.)

4. Insufficient pressure on either regulator.
   a) (See Initial-Final Regulators.)

5. Initial or Final regulator will not accurately repeat.
   a) Incorrect snubber setting. (See Setting Gauge Snubbers.)
   b) Worn or damaged regulators. (See Initial-Final Regulators.)

6. Initial or Final regulator has no control over high pressure.
   a) Clogged seat in regulator. (See Initial-Final Regulators.)

7. If no return pressure.
   a) Impending cylinder seal failure causing minor leakage.
   b) There is an internal failure in the valve body.

8. Ram returns slowly.
   a) Clean debris from jacking station.
   b) There is an internal failure in the valve body.

9. After moving jack, nothing works.
   a) Motor is running the wrong way.

10. Jack is over heating.
    a) Check hydraulic fluid level.
    b) Check filter cartridge and intank strainer.
    c) Check hydraulic pump for pressure loss and/or metal fragments.