AERO BOOM®

HIGH FORCE HYDRAULIC
TOOLS & SOLUTIONS

POST TENSIONING JACK

OPERATION MANUAL

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HYDRAULIC POST-TENSIONING JACKS

All cylinders are marked with maximum pressure setting

A5DA1 SERIES

NOTE: For a detailed parts list or to locate a Aeroboom Authorized Hydraulic Service Center, contact your nearest Aeroboom facility. A list of all Aeroboom facilities is located at the end of this document.

DEFINITIONS

Authorized - appointed by a duly constituted administrative or regulatory authority.
Authorized Service Center - independent service facility designated by the manufacturer to repair and test products.
Cylinders, Rams, and Jacks - used to apply force in a linear motion through the use of hydraulic fluid under pressure confined in a pressure vessel (body) with moveable pressure vessel (piston).
Designated - selected by the employer or employer's representative as being qualified to perform specific duties.
Extension - a device to increase the cylinder's, ram's or jack's retracted length.
Load - the total weight or force to be overcome by the cylinder, ram or jack.
Qualified - a person who, by possession of a recognized degree, certificate, professional standing or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter or work, or who is filled or suited for a given purpose or function. Competent.
Operator - a person qualified to operate or use a device or machine.
Rated Capacity - the maximum load for which the cylinder, ram, or jack is designed and built.
Service, Normal - cylinders, rams or jacks used under controlled or known consistent loads at less than 85% of rated capacity except for isolated instances.
Service, Severe - cylinders, rams or jacks used under conditions not rated as normal service.
Travel - linear extending or retracting movement of the cylinder, ram or jack.

SAFETY EXPLANATIONS

Two safety symbols are used to identify any action or lack of action that can cause personal injury. Your reading and understanding of these safety symbols is very important.

DANGER - Danger is used only when your action or lack of action will cause serious human injury or death.

WARNING - Warning is used to describe any action or lack of action where a serious injury can occur.

IMPORTANT - Important is used when action or lack of action can cause equipment failure, either immediate or over a long period of time.

WARNING: It is the operator's responsibility to read and understand the following safety statements,

- **Only qualified operators should install, operate, adjust, maintain, clean, repair, or transport this machinery.**
- **These jacks are designed for general use in normal environments. These components are not specifically designed for lifting and moving people, agri-food machinery, certain types of mobile machinery or special work environments such as: explosive, flammable or corrosive. Only the user can decide the suitability of this machinery in these conditions or extreme environments. Aeroboom will supply information necessary to help make these decisions.**

SAFETY PRECAUTIONS

⚠ DANGER

- **ALWAYS USE AND FOLLOW THE LATEST REVISION OF THE POST-TENSIONING INSTITUTE FIELD PROCEDURES MANUAL FOR BONDED SINGLE STRAND TENDONS (AVAILABLE FROM AEROBOOM WHEN USING THESE POST-TENSIONING JACKS.**
- **A double-acting jack must have both hoses and all couplers securely connected to both ports. If one of the two ports is restricted or becomes disconnected, pressure will build and the jack, hose or coupler can burst, possibly causing serious injury or death.**
- **When extending double-acting jacks, the retract port must not be restricted. A restricted retract port will prevent pressure from being released and the jack can burst, possibly causing serious injury or death.**
- **When extending a jack under load, always insure that the coupler(s) or port thread(s) has (have) not been damaged or do(es) not come in contact with any rigid obstruction. If this condition does occur, the coupler's attaching threads may become stripped or pulled from the jack resulting in the instantaneous release of high pressure hydraulic fluid, flying objects, and loss of the load. All of these possible results could cause serious injury or death.**
- **Securely position the jack and wedges before tensioning the strand.**
- **Avoid off-center loads which could damage the jack and/or cause loss of the load, possibly causing serious injury or death.**
- **Control the load at all times.**
- **Properly rated adapters must be installed and used correctly for each application.**

⚠ WARNING

- **All WARNING statements must be carefully observed to help prevent personal injury.**

Hydraulic Hoses and Fluid Transmission Lines

- **Before operating the pump, 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 the pump and 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, crush, cut, or bend so tightly that the fluid 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 the hose to move attached equipment. Stress can damage the hose and possibly cause personal injury.**
- **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. Hose deterioration due to corrosive materials can result in personal injury. Consult the manufacturer before painting a hose. Never paint a coupler.**

SAFETY PRECAUTIONS (CONTINUED)

Post-tensioning Jacks

- **ALWAYS USE AND FOLLOW THE LATEST REVISION OF THE POST-TENSIONING INSTITUTE FIELD PROCEDURES MANUAL FOR BONDED SINGLE STRAND TENDONS (AVAILABLE FROM AEROBOOM WHEN USING THESE POST-TENSIONING JACKS.**
- The user must be a qualified operator familiar with the correct operation, maintenance, and use of the jack(s). Lack of knowledge in any of these areas can lead to personal injury.
- Read and understand all safety and warning decals and instructions.
- The stressing jack operator and anyone within sight of the stressing jack must wear protective eyewear that meets the requirements of OSHA, ANSI Z87.1, or applicable EU standards.
- It is the owner/operator's responsibility to use appropriate guarding to contain any pieces that might break or fly apart when applying force. For added protection, always wrap the workpiece in a protective blanket before applying force. Contact your nearest Aeroboom facility (see listing at the end of this document) for more information about protective blankets.
- Use only approved accessories and approved hydraulic fluid. Hoses, seals and all components used in a system must be compatible with the hydraulic fluid used.
- **DO NOT EXCEED THE RATED CAPACITIES OF THE JACKS OR THE TENDONS BEING STRESSED. EXCESS PRESSURE CAN RESULT IN PERSONAL INJURY.**
- Inspect each jack and coupler before each shift or usage to prevent unsafe conditions from developing.
- Do not use jacks if they are damaged, altered or in poor condition.
- Do not use jacks with bent or damaged couplers or damaged port threads.
- Use caution when loading and unloading the jacks.
- Workpieces must be well supported and aligned so that cylinder/ram force is straight, and parts being stressed cannot slip out or break.
- Keep hands out of the work area during operation.
- Avoid pinch points or crush points that can be created by the load or parts of the jack.
- All personnel must be clear of the tendon before and during stressing. If a tendon or strand fails it may cause injury if forcefully ejected from the stressing jack, or if the free end strikes someone. The tendon or strand stores energy during the stressing (stretching) process. Also, the jack will fall.
- Use your leg muscles and keep back straight when lifting jacks into position.
- Never use extreme heat to disassemble a hydraulic cylinder or jack. Metal fatigue and/or seal damage will result and can lead to unsafe operating conditions.
- The guide cannot cover every hazard or situation so always do the job with SAFETY FIRST.

IMPORTANT:

- Keep the jack clean at all times.
- While at a job site, when the cylinder is not in use, keep the piston rod fully retracted.
- Use an approved, high-grade pipe thread sealant to seal all hydraulic connections. PTFE tape can be used if only one layer of tape is used and it is applied carefully (two threads back) 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 fluid or cause jamming of precision-fit parts.
- Always use protective covers on disconnected quick couplers. Be certain that the hoses are connected properly, and not reversed on double-acting jacks.

SYSTEM EVALUATION

Your jack, hose(s), couplings and pump all must be rated for the same maximum operating pressure, correctly connected and compatible with the hydraulic fluid used. An improperly matched system can cause the system to fail and possibly cause serious injury. If you are in doubt, consult your nearest Aeroboom facility. Do not exceed the recommended capacity of the tendon. **IMPORTANT: Consult the latest revision of the Post-Tensioning Institute Field Procedures Manual For Unbonded Single Strand Tendons.**

SET-UP

BLEEDING THE SYSTEM

After all connections are made, the hydraulic system must be bled of any trapped air. Refer to the diagrams below.

With no load on the system and the pump vented and positioned higher than the cylinder or jack, cycle the system several times. If you are in doubt about venting your pump, read the operating instructions for your pump. Check the reservoir for possible low fluid level and fill to proper level with approved, compatible hydraulic fluid as necessary.

System with a single-acting cylinder

System with a double-acting cylinder

IMPORTANT: Some spring return cylinders or jacks have a cavity in the rod which forms an air pocket. This type of cylinder or jack should be bled when positioned upside down or lying on its side with the port facing upward.

INSPECTION

Consult the latest revision of the Post-Tensioning Institute Field Procedures Manual For Unbonded Single Strand Tendons.

Before each use, visually inspect for the following items:

1. Cracked or damaged jack
2. Excessive wear, bending, damage, or insufficient thread engagement
3. Leaking hydraulic fluid
4. Scored or damaged piston rod
5. Loose bolts
6. Damaged or improperly assembled accessory equipment, wedges, etc.
7. Modified, welded, or altered equipment
8. Bent or damaged couplers or port threads

Preventive Maintenance (yearly or sooner, if the cylinder or jack condition suggests damage) - Visual examination by the operator or other designated personnel with a dated and signed equipment record.

OPERATION

1. Improper care and use of stressing equipment may result in property damage, and/or personal injury. Only trained, qualified personnel should be allowed in the immediate vicinity of equipment during use. Personnel doing the stressing and inspectors should remain clear of the tendon being stressed at all times. Never permit anyone to stand in the immediate vicinity of the jack and the pump while stressing.

2. Open the jack gripper by pulling back on the gripper handle or cable.

3. Position the jack on the strand to be stressed and push forward until the jack nose bears on the anchor. Never attempt to adjust the position of the jack, either by striking or pushing after any load has been applied. Remove the jack and reposition if necessary.

4. Push the jack grippers forward to engage the strand and check to ensure that:
   a. Jack grippers are parallel to avoid damage to themselves or the strand.
   b. Strand is in proper position within jack grippers.

5. Place the pump 4-way valve in stressing position.

6. Operate the pump by use of the pendant switch. (Use of the pendant switch allows the operator to stand to the side of the pump, out of harms way, should the tendon or jack grippers fail.)

   WARNING: Do not exceed the recommended pressure/force for the size of strand being stressed. Consult strand manufacturer and Post-tensioning Institute Field Procedures Manual.

7. On pumps equipped with a sequence valve or automatic seating valve:
   a. Start pump motor and run until proper pressure is indicated on pressure gauge.
   b. Switch 4-way valve to retract position.
   c. Pressure will remain on the pressure side of the jack, but gauge pressure will drop to zero and start to rebuild pressure.
   d. When preset pressure is achieved (depending on the equipment used), the seating plunger will be fully pressurized, a popping noise will be heard, and the jack will start to retract.
   e. When the jack is fully retracted, stop the pump and switch the 4-way valve to stressing position. The seating plunger should fully retract. It is important to stop the pump and switch the valve quickly to avoid excessive pressure build-up in the jack after is has completely returned. This excessive pressure build-up can cause premature failure of the jack seals, hoses and fittings.

f. Slide the jack forward to release the jack grippers and remove the jack from the tendon.

Note: For jacks without power seating wedge setters, after proper gauge pressure is achieved, by switching the valve to the retract position, the jack will begin to retract.

OPERATION (CONTINUED)

WARNING:

Don'ts of Stressing

1. DON'T stress any tendons which contain concrete slurry inside the anchor cavity. Concrete in the anchor cavity will prevent proper seating of the wedges. It is safer and less expensive to clean out concrete slurry than to have to detension, repair or replace tendons, or repair the jack.
2. DON'T use the jack when you can see that it does not seat properly on the face of the anchor.
3. DON'T overstress tendons in order to achieve proper elongation.
4. DON'T allow obstructions in the path of the jack extensions.
5. DON'T use extension cords longer than 100 ft. (30m) or less than 3 wire, 12 gauge.
6. DON'T continue stressing if you suspect that something is not working properly.
7. DON'T detension with loose plates, spacing shims or piggy packing.
8. DON'T stand in the immediate vicinity of the jack or tendon, or between the jack and the pump during stressing or detensioning.
9. DON'T permit other workmen in the immediate area of the jack or pump during stressing operations.
10. DON'T hammer or beat on the jack or jack cylinders.
11. DON'T do anything if you are not sure; ask someone who knows.

All of the information listed is meant to be a general guide line for operation of post tension stressing equipment. The Post Tensioning Institute publishes a "Field Procedures Manual For Unbonded Single Strand Tendons" which can be obtained by calling 1-800-541-1418 and asking for #107348.

JACK MAINTENANCE

- **Always use clean, approved hydraulic fluid and change as needed.**
- **Any exposed threads (male or female) must be cleaned and lubricated regularly, and protected from damage.**
- **If a cylinder or jack has been exposed to rain, snow, sand, grit-laden air, or any corrosive environment it must be cleaned, lubricated, and protected immediately after exposure.**

PERIODIC CLEANING

A routine should be established to keep the hydraulic system as free from dirt as possible. All unused couplers must be sealed with dust covers. All hose connections must be free of dirt and grime. Any equipment attached to the jack must be kept clean. Use only Aeroboom hydraulic fluid and change as recommended or sooner if the fluid becomes contaminated (never exceed 300 hours).

STORAGE

Single-acting Jacks

Single-acting jacks should be stored in a vertical position with the rod end down in a ***dry***, well-protected area where they will not be exposed to corrosive vapors, dust or other harmful elements.

When a single-acting jack has not been used for a period of three (3) months it should be connected to a pump and be fully extended at less than 1,000 PSI and then retracted. This cycle will lubricate the cylinder walls thereby reducing the potential for rust formation on the cylinder walls.

Double-acting Jacks

Double-acting jacks should be stored in a vertical position with the rod end down in a ***dry***, well-protected area where they will not be exposed to corrosive vapors, dust or other harmful elements. If a double-acting jack has been stored for a year or more, it must be thoroughly inspected before it is used.

TROUBLE-SHOOTING GUIDE

IMPORTANT:

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

NOTE:

- **All the following statements may not apply to your particular model of jack. Use the guide as a general reference for trouble-shooting.**

PROBLEM	CAUSE	SOLUTION
Erratic action	1. Air in system or pump cavitation	1. Add fluid, bleed air and check for leaks
	2. Internal leakage in double-acting jack or external leakage in single-acting jacks	2. Replace worn packings. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	3. Jack sticking or binding	3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.
Jack does not move	1. Loose couplers	1. Tighten couplers
	2. Faulty coupler	2. Verify that female coupler is not locked up (ball wedged into seat). Replace both female and male couplers.
	3. Improper valve position	3. Close release valve or shift to new position
	4. Low or no hydraulic fluid in pump reservoir	4. Fill and bleed the system
	5. Air-locked pump	5. Prime pump per pump operating instructions
	6. Pump not operating	6. Check pump's operating instructions
	7. Load is above the capacity of the system	7. Use the correct equipment
	8. Fluid leaks out of rod end relief valve (double-acting jack only)	8. Make sure all couplers are fully coupled. Contact your nearest Authorized Hydraulic Service Center.
Jack extends only partially	1. Pump reservoir is low on hydraulic fluid	1. Fill and bleed the system
	2. Load is above the capacity of the system	2. Use the correct equipment
	3. Cylinder piston rod binding	3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.
Jack moves slower than normal	1. Loose connection or coupler	1. Tighten
	2. Restricted hydraulic line or fitting	2. Clean and replace if damaged
	3. Pump not working correctly	3. Check pump operating instructions
	4. Cylinder seals leaking	4. Replace worn seals. Check for excessive contamination or wear

TROUBLE-SHOOTING GUIDE (CONTINUED)

PROBLEM	CAUSE	SOLUTION
Jack moves but does not maintain pressure	1. Leaky connection	1. Clean, reseal with thread sealant and tighten connection
	2. Cylinder seals leaking	2. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	3. Pump or valve malfunctioning	3. Check pump or valve operating instructions
Jack leaks hydraulic fluid	1. Worn or damaged seals	1. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	2. Loose connections	2. Clean, reseal with thread sealant and tighten connection
	3. Rod end relief valve has activated (double-acting jack only)	3. Make sure all couplers are fully coupled. a. *If relief valve is still leaking,* do not attempt to service this component. Contact your nearest Authorized Hydraulic Service Center.
Jack will not retract or retracts slower than normal	1. Pump release valve closed	1. Open pump release valve
	2. Loose couplers	2. Tighten couplers
	3. Blocked hydraulic lines	3. Clean and flush
	4. Weak or broken retraction springs	4. Send to service center for repair
	5. Jack damaged internally	5. Send to service center for repair
	6. Pump reservoir too full	6. Drain hydraulic fluid to correct level

AERO BOOM®

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LIFETIME WARRANTY

Aeroboom warrants all of its products to be free from defects in material and workmanship for the life of the product. This warranty applies to original purchaser and is not transferable. Damaged components, including broken welds, dented or crushed cylinder walls, bent pistons, or couplers are the result of misuse, and are not covered under this warranty. Items such as seals, o-ring and spring wearing out shall not constitute a defect and shall not be considered for warranty credit. We believe that the Aeroboom products you purchase will meet or exceed your performance requirements. However, in the unlikely event that an Aeroboom product fails due to material or workmanship defect please contact Aeroboom, to have it resolved.

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