CYLINDER HANDLING & INSTALLATION

Proper Handling

Cylinders should always be handled in the closed and secured position to prevent damage to chromed surfaces. ***NEVER step or stand on the chromed surfaces of the cylinder.***

It is always good practice to lift a cylinder into place using a nylon sling. ***DO NOT use a chain***, which can easily scar or scratch polished and chromed surfaces leading to premature failure. Also, the cylinder body and the sleeves can easily be damaged with chain hoists.

NEVER use the pin eye or clevis for lifting. Any damage to the bearing surface will alter the pin fitting. Lifting eyes are provided on inverted cylinders and it is crucial to keep inverted cylinders banded through completed installation.

ALWAYS have the ports plugged when handling and storing telescopic cylinders. When removing a cylinder from service, a fully retracted TS model Airoflex cylinder may hold up to 3 gallons of oil depending on model. A fully retracted Hyco cylinder may hold 12+ gallons of oil depending on model.

Installation

- Do not drop, hammer, or damage cylinders when installing.
- While setting cylinder(s) rotate so that the oil inlet is farthest away from dumper pivot end. Failure to do so may cause cylinder and/or plumbing to collide with base bearing bolts during operation.
- Cylinders should be extended 1”-2” with the dumper fully at rest on the foundation. Failure to leave stroke remaining will cause the platform to rest on the cylinders. Damage may result as trucks back on and off the platform.
- When removing the port plug on a new cylinder, some oil may remain from testing.
- Install threaded fixed orifice or inline check valve with orifice hole provided for each cylinder, in cylinder inlet or outlet before attaching hose. When supplied with check valves, ensure free flow into the cylinder and restricted flow out. For more detail refer to the manifold installation drawing.
- On inverted cylinders, remove the shipping strap prior to operating.
- It is very important that the cylinder foundations are of equal height and level so that cylinders extend evenly. If the platform shifts to one side when first rising, shim the cylinder on the side that the platform has shifted. Place shims between the base bearing and the sole plate. If one cylinder is running ahead of the other, shim the cylinder that changes stages first while extending.
- Once the dumper is fully aligned and commissioned, the cylinder base bearings are to be braced fore and aft to prevent future movement of the bearings.
- Lubricate cylinder bearings with a good grade of general-purpose grease.
- If the dumper/cylinder(s) is not to be installed immediately upon receipt, store them in accordance with the Cylinder Storage document in this manual

PROPER STORAGE OF HYDRAULIC CYLINDERS

Proper Storage

Cylinders should be kept in an environment that is protected from excessive moisture and temperature extremes. Storage areas that allow exposure to rain, snow and extreme cold must be avoided. Airoflex recommends that the cylinder be stored in an indoor climate-controlled space.

Airoflex or other OEM hydraulic cylinders should be stored fully closed/retracted and secured in a vertical position with the plunger end down. Once in a vertical position, be certain the cylinder is fully secure to keep it upright. Storing the cylinder in this manner will keep the oil on the packing material thus protecting them from drying out.

If horizontal storage cannot be avoided, then fill the cylinder with hydraulic oil, bleed all air and position the cylinder with the base end slightly raised. Raising the base end of the cylinder will keep oil on the packing materials. When storing horizontally, the cylinder should be rotated to a new position at least every two months to prevent drying, distortion and deterioration of the packing material. Storing cylinders horizontally can damage the packing, Airoflex is not responsible for any damaged packing due to horizontal or improper storage of hydraulic cylinders.

Environmental Storage Considerations

- Daytime heat will bake the oil out of packing material which causes leaks and rapid wear when the cylinder is placed in service
- Cool nights cause water condensation and corrosion damage to wear surfaces.

If the cylinder will be stored over several months, cover each polished tube section with grease to prevent rusting. Periodic inspections are important to verify that the cylinder is in the closed position, and to protect against rust and leaking oil.

SET-UP PROCEDURE – 45 TON PORTABLE

- This set-up procedure is only valid for Airoflex 45-ton portable models (P45U-4563-xxxx)

- Portable Tipper Set-up: Reverse procedure for disassembly and transport. For intra-facility transport, skip steps 6 and 14.

<u>See installation drawings for in depth procedure and details.</u>

Installation drawings: 100688, 200358, 200360, 200485, 200513

1. Select proper dump site:
    a. Level to within 1/8" per foot or (0.6 degrees)
    b. Clearance for dump pile and material handling equipment
    c. No overhead lines or structures
    d. Minimum of 3,000 PSF soiling bearing capacity
2. Unpin short transport strut from rear outrigger wing, rotate wings perpendicular to the dumper and pin in place with provided long support strut 'DOS'.
3. Locate 52 sq. ft (26 each side) of dunnage and provide outrigger pads 'DOP' directly under jacks.
4. Extend jack 'DOC' so the rear of the tipper subframe 'DSF' is level and approximately 2" above grade.
5. Relieve air pressure from tipper air suspension bags
6. Install lift cylinders and cylinder walkways 'DCW'. Refer to drawing number 200359 for supplemental installation instructions.
7. Remove transport locking pins (clevis pins) connecting the pivot pad 'DPP' to the subframe 'DSF' and lower the pivot pad jacks, allowing the pivot pad to freely pivot.
8. Unpin subframe 'DSF' from main frame 'DPF' and slowly lower onto ground using jacks/winches (supplied by others)
9. Once pivot pad 'DPP' is on the ground, snug all four pivot pad jacks so that the subframe 'DSF' is fully supported by the jacks and center pin.
10. Adjust all four jacks so the subframe 'DSF' is level and parallel to the main pivots. See drawing number 200360 for full leveling instructions.
11. Position the HPU approximately 4 feet from the manifold inlet and couple quick disconnect fitting. See drawing number 100688 for connection details.
12. Power on the HPU and allow it to idle for a minimum of five minutes. Ensure the cylinder auto-bleeders are venting air.
13. Bump the lift cylinders to take the load off the semi-tractor and remove the tractor.
14. Install retainer hoop 'RH2'.
15. Join halves of the ramp 'PRR/PRL'
16. Level and position the ramp at the end of the tipper frame 'DPF'
17. Alignment of the ramp to the tipper frame is critical. Misalignment will drastically reduce bearing life.
18. Attach the ramp brace 'RFB'.

Follow all local laws and regulations when transporting any Airoflex Portable Unit. See drawings: 200359 and 200361 for transportation details.

START-UP AND OPERATION

INITIAL START-UP PROCEDURES

1. Check the direction of pump rotation. An arrow on top of pump body indicates the direction of rotation.
2. Check oil level. Oil should be at the high mark on the gage or the dip stick. Prime the pump(s). Pour oil through the connection between the large check valve(s) located above the pump(s).
3. Start pump motor(s). Allow the power unit to idle for 10 – 15 minutes. Bump the controls for each circuit to check for proper response/operation.
4. Start by bleeding the small line circuits (wheel-locks, backstop, pit door, etc., if equipped) by opening the tube fitting near the cylinder. Ensure backstops and pit doors are fully operational prior to lifting the main platform.
5. Bleed air from the main cylinders using the bleed/test ports on the top sleeve of each cylinder. To activate the bleed port, remove the cap then screw the bleed hose onto the port to open the valve. Actuate the cylinder control and bleed air until out-flowing oil is free of air bubbles. Repeat the bleeding procedure two or three times a day for the first several days until all air is trapped in the system escapes.
6. On the first full lift of the platform, raise the dumper a couple feet at a time. At each interval, check for clearances to buildings, equipment, etc. Also watch all hose and flexible conduit connections between the dumper and foundation for snags or tightness. Ensure there is adequate bow in the hose and conduit to accommodate the full motion of the dumper.
7. Operate each system circuit several times, checking for leaks on the power unit and field lines. Also, check the alignment of the dumper and all operational components.
8. Make sure the interlocking safety limit switches, if equipped, are operating properly. The platform should not be able to be raised until the Wheel-lock is fully extended, or the drive-thru backstop has reached a minimum or set height determined by the customer. Ensure the maximum tilt limit switch cuts power three or four inches before the cylinders reach their maximum extended stroke or maximum design tilt angle.
9. To set system operating pressure: On main dumper circuit, open the petcock valve (if equipped) to the gage on the relief valve; raise the cylinders until they are fully extended. Keep up button depressed and regulate pressure by turning the handle on the relief valve. On small circuits such as those for the wheel-lock or backstop, set at 500 psi. Set the pit door circuits at 1000 psi. Raise the pressure only if more is needed to lift your loads and never operate at a higher pressure than is needed. Note: when running the dumper empty, the pressure will likely not surpass 800-1000 psi on the main cylinders.
10. After the first 50hrs of operation, replace oil filters.

OPERATING INSTRUCTIONS

Refer to the project specific electrical schematic for a dumper operation sequence. If the controls are provided by others, the electrical schematic is for reference purposes only.

- Start pump motor(s) and allow the unit to idle a few minutes. In cold weather, below 10° F, idle 20 – 30 minutes.
- Ensure the platform is all the way down before going on and off the platform. For drive-thru gate type backstops, ensure they are open. For wheel-lock(s) or pop-up backstop, ensure they are down.
- Make sure that there is always an authorized operator at the controls. Do not allow untrained or unauthorized personnel to operate the dumper.
- Position trucks as close as possible to the center of the platform. On trailer tippers, ensure the tractor is pulled off and clear of the platform
- Activate the wheel-lock or the backstop (if powered) and back gently against it. Make sure both rear wheels are firmly against the wheel-lock or the trailer frame/bumper is firmly against the backstop.
- Set the brakes and put the truck in gear or in park.
- Make sure that the area behind the dumper is clear. Ensure no personnel are near or on the platform. Ensure no one is in the tractor or trailer.
- Operate the controls to raise the pit door and/or dumper.
- Do not operate the dumper in high wind conditions (50mph or above). The stated wind speed is based on the dumpers structural design. Site safety protocol and regulations should dictate maximum operable wind speed (not to exceed 50 mph). Do not let ice, snow, product etc. buildup on or under the dumper deck.

**** Airoflex Equipment is not responsible for any changes or alterations without our written authorization. Any machinery, equipment or accessories which have been subjected to misuse, neglect or accident, or have been tampered with, improperly maintained, or altered by any party (other than Seller) are excluded from any warranty as set forth in the purchase contract.***

HYDRAULIC POWER UNIT INSTALLATION

Standard Hydraulic Power Unit:

- The HPU should be stored indoors in a climate-controlled area until installation. ***
- It is recommended that the hydraulic power unit is placed in a ventilated shelter. Leave two-foot minimum space all around the unit to access servicing. Allow more space for inserting or removing in-tank immersion heaters, if equipped. ***
- Locate the power unit as close to the dumper as practical and in a position to avoid as many piping bends.
- Anchor the power unit to the floor according to foot mounting holes provided.
- Route plumbing so access is maintained to service all filters, access covers, gauges, etc.
- **For Airoflex Model Cylinders Only**: Fill the tank with hydraulic oil of the proper viscosity ISO 32-46 for your area. A petroleum-based fluid is recommended and must be compatible with the nitrile, viton and polyurethane seals in our cylinders. Synthetic, Biodegradable or Fire-Resistant fluids may cause premature seal failure.
- **For HYCO Model Cylinders Only**: Use mineral base oil intended for hydraulic service. Acceptable mineral base oils will have 150 SSU viscosity at 100 degrees Fahrenheit. SAE 10 or SAE 20 grade oil is acceptable.
- If commissioning does not commence directly after installation, the HPU should be prepped for storage and protected the weather/elements. Check for condensation in the reservoir before filling with oil, clean if necessary. ***
- Secondary heating or cooling equipment may be needed beyond what is provided due to the cycles per hour, piping layout, environmental temperature, seasonal variation, and type of shelter.

*** *Airoflex will not be responsible for any issues with the Hydraulic Power Unit resulting from improper storage or installation.*

HPU Features:

Most Airoflex hydraulic power units have the following features, refer to the project specific hydraulic schematic and component datasheets for details of the power unit and options provided.

Filtration – The HPU will have a breather filter for the tank. Most units utilize return filters on the unloading circuit of the pumps, the fluid is filtered as the unit idles. See hydraulic schematic for replacement part #s.

Reservoir Access – The reservoir includes access covers to allow cleaning inside the tank when drained.

Level & Temperature Gauges – Most units feature both a visual sight glass and electrical indicators with warning lights in the control panel (if supplied by Airoflex).

Manual/Emergency Lower Valve – Should power be interrupted to the power unit while platform is raised, a manual valve can be used to open the main dumper lowering valve to bring the platform down.

Dumper Lowering Speed Adjustment – Some HPUs are provided with throttling valves to control the retracting speed of the cylinders. To slow the lowering speed further, a stroke adjuster on the main dumper lowering valve can be adjusted to limit the opening of the valve. Turning the adjustment in will reduce the flow rate through the valve, turn the adjustment out will increase flow rate speeding descent.

Manual Overrides – Most solenoid-controlled valves can be manually actuated. These should only be used for initial commissioning or troubleshooting purposes.

Note: *In manual modes, all interlocking and electrical controls are bypassed, including the maximum tilt switch.* ***DO NOT*** *lift the tipper more than 63 degrees or its maximum design tilt angle.*

AIROFLEX SAFETY REQUIREMENTS

The following safety procedures are necessary for the proper operation of your unit, maximum equipment life, and the safety of your personnel.

GOOD OPERATORS ARE ESSENTIAL TO SMOOTH OPERATION

- Make sure that only an authorized operator is at the controls when the dumper is in use.
- Do not bounce the platform.
- Do not allow personnel to be in the truck or vehicle on the platform or behind the dumper when dumping.
- Locate the control panel so that the dumping operation can be fully observed. The operator should watch the load for even flow to avoid sudden shifts of weight.
- The entire platform should be visible from the control panel or install ON/OFF control on a long cord for remote operation.

HIGH PRESSURE HYDRAULIC OIL LEAKS

- Secure all plumbing to prevent vibration fatigue that can cause oil leaks.
- Use high pressure steel or stainless-steel piping when any piping needs to be replaced. Pipe and joints must withstand 2000 PSI operating pressure.
- Never test for small oil leaks with bare hands. High pressure oil is dangerous. It can penetrate the skin and cause serious injury.

MAINTAIN A SECURE, WELL BALANCED LOAD ON PLATFORM

- Raise truck only high enough as needed to dump load.
- A backstop that supports the trailer frame is required for high tilt (over 45 degrees) dumpers.
- Bleed air from hydraulic system to prevent surges and excessive strain on dumper parts or sudden load shifts.
- Center truck on platform with rear wheels on proper wheel stops or truck frame against fully raised backstop.
- Leave the truck in gear or park and lock the brakes on all wheels. Shut off the engine.
- Before raising the platform, release the trailer's rear door locking levers. Open the doors cautiously to prevent injury from suddenly released material.
- Check to see that cylinders are both lifting equally as the dumper raises. If the cylinders are not lifting even, check hydraulic system and bearing alignment and correct immediately.
- For portable models, ensure that the outrigger and wheels are on sturdy ground and properly cribbed if necessary, to prevent unwanted movement to due to settlement.
- Never stop abruptly when raising or lowering the platform so that it could cause the load to jog or shift and create an unstable condition.
- Establish a procedure for checking on vehicle condition. Certain truck designs having sliding tandems and axle lifts must be in good working order or they can be a hazard when unloading. Trailers having axle assemblies with pivot supports above and ahead of the axle and/or air suspension should be chained for additional safety.

PERIODIC MAINTENANCE LEADS TO REDUCED SAFETY HAZARDS

- Prior to any maintenance, lock out / tag out dumper system(s) to prevent injury.
- Follow all maintenance procedures recommended by Airoflex in their maintenance instructions such as oil replacement, filter replacement, hydraulic system inspection, coupling and bearing alignment and general inspection of nuts and bolts for tightness.
- Set up a frequent inspection schedule to check weldments on the frame, wear and cracks in the bearings, pivot shaft, hoses, piping, and other wear points. If repair or replacement is needed, do so immediately.
- Always allow at least a few minutes of warm-up time on the power units. (In cold weather, warm up 20 – 30min.)
- Check maximum tilt limit switch operation periodically to see that power is cut off to the cylinders three or four inches before the cylinders reach their maximum extended stroke or maximum design tilt angle.
- Never make alterations or modifications to Airoflex equipment without written approval from Airoflex.
- Keep the power unit, hydraulic lines, platform, and dumper pit clean and free from dirt and debris to prevent undue wear and rust. Maintain a good coat of Airoflex recommended paint on painted surfaces to prevent rust which could weaken dumper.
- Dumpers equipped with wheel chocks and adjustable backstops have electrical interlocks to prevent platform from being raised until chocks or backstops are fully extended. The limit switches must be checked frequently for proper operation.

The information provided here is by no means comprehensive or exhaustive. Additional safety, operational and/or maintenance practices may be needed beyond those contained in this Manual. Every truck dumper is unique regarding environment, installation, and operation. It is important that you incorporate this equipment into your facility's programs and practices.

MAINTENANCE INSTRUCTIONS

Regular maintenance is essential to keeping your truck dumper running smoothly. Provide training for those who will operate the equipment. If trucks drivers will be operating the dumper, be sure they have a way to report issues when they arise. Set up a frequent inspection schedule to check welds on the frame, bolts, wear and cracks in the bearings, pivot shaft, hoses, piping, and other wear points. If repair or replacement is needed, do so immediately.

- NEVER jog or bounce the dumper, backstop and/or pit door.
- When servicing/replacing bearings, use new bolts. Inspect all bolts once each year and replace any bolts that are cracked or badly rusted. Check for loose deck plates, rub rails, handrails, etc.
- Lubricate bearings weekly with a good grade of general-purpose grease. Always keep the dumper and cylinder bearings clean. Refer to the project drawings for locations of grease ports.
- Clean debris, dirt, and build-up off the top and underside of the dumper frame. Monitor corrosion and repaint as needed.
- Do not let ice, snow, product, etc. to buildup upon the foundation under the dumper deck. Structural damage to frame and/or foundation may result.
- Routinely monitor the dumper alignment with the foundation. A dumper that has suddenly or dramatically shifted in/upon the foundation or lifting out of level is a common sign of mechanical and/or structural problems. Inspect immediately.
- If pivot bearings shifted, the platform may be aligned by loosening and adjusting the rear pivot bearings. If one cylinder is running ahead of the other, shim the cylinder that reaches a stage change first on extension.
- Upon major electrical or hydraulic repairs/changes, recomplete the start-up process to ensure all equipment operates as intended.
- Check the system operating pressure often. Operate between 1000 and 1500 psi but never set pressure higher than needed to lift your loads.
- To avoid gage breakage on dial pressure gages, keep the petcock valve (if equipped) to the gage closed, except to set or check pressure.
- Bleed the air from the system through the vent plug or test point on the main cylinders initially and on a regular schedule. To bleed small line circuits, open the line next to the cylinder or hydraulic motor until the hydraulic oil is free of air bubbles.
- IMPORTANT – Clean the tank and replace the hydraulic oil once a year. Keep the outside of the power unit clean and accessible for servicing.
- Regularly check the oil level in the HPU, hoses and piping. Look for spongy or leaky conditions. Replace suspect hoses before they break.
- Use a good grade of hydraulic oil with the proper viscosity for your climate. Petroleum base fluids are recommended, oil must be compatible with Nitrile, Viton, and Polyurethane seals. See the HPU Installation page for details.
- Replace return filter cartridges at the first 50 hours of operation, then at least four times a year or every 500 hours of operation.
- Clean or replace the tank air breather filter with air every three months or once a month under extremely dusty conditions. Replace filter at least once a year.
- If an Airoflex telescoping cylinder begins to leak excessively, tighten the brass packing gland with spanner wrenches provided. Tighten nut with cylinder retracted and all pressure removed. NOTE: It will be easier to adjust when cylinders are cold. Do not over tighten. Call Airoflex if leaking continues.
- If a Hyco brand telescoping cylinder begins to leak excessively, call Airoflex to setup cylinder service.
- Check cylinder surfaces often for scoring. Keep surfaces and joints clean to prevent foreign matter from scoring cylinder.
- Check regularly to see that the wheel-lock(s) or backstop extends fully.
- Check that all limit switches are working properly.
- Lubricate bearings weekly with a good grade of general-purpose grease. Always keep the dumper and cylinder bearings clean. Grease point include, but are not limited to:
    - Pivot and cylinder pins
    - Dumper and hopper bearings
    - Gearboxes
    - Hinges