

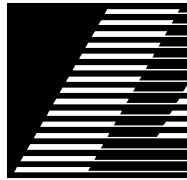
# **ADVANCE LIFTS**

*Dock Lift Owners Manual*



**CAUTION!**

**THIS MANUAL IS AN IMPORTANT DOCUMENT  
IT SHOULD BE KEPT WITH THE MACHINE OR  
LOCATED WHERE READILY AVAILABLE TO  
OPERATORS AND MAINTENANCE PERSONNEL  
FOR REFERENCE PURPOSES.**



# **ADVANCE LIFTS**

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## INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR THE FOLLOWING DOCK LIFT MODEL NUMBERS

Throughout this manual, units are referred to by series. Each series has special installation, maintenance and safety requirements.

2000 Series Lifts (**2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2400, 2500**)

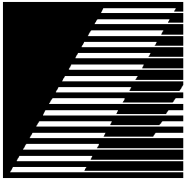
2000K Series Lifts (**2010K, 2500K**)

3000 Series Lifts (**3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3300, 3310, 3320, 3330, 3340, 3350, 3360, 3370, 3380**)

4000 Series Lifts (**4100, 4120, 4130, 4140, 4150, 4160, 4170, 4180, 4200, 4210, 4220, 4230, 4240, 4250, 4260, 4270, 4280, 4300, 4310, 4320, 4330, 4340, 4350, 4360, 4370, 4380, 4400, 4410, 4420, 4430, 4440, 4450, 4460, 4470, 4480**)

T-Series Lifts (**T2-50608, T2-60608, T2-60609, T2-60610, T2-60708, T2-60709, T2-60710, T2-60808, T2-60809, T2-60810, T3-50608, T3-60608, T3-60609, T3-60610, T3-60708, T3-60709, T3-60710, T3-60808, T3-60809, T3-60810**)

OTHER \_\_\_\_\_



# ADVANCE LIFTS

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## Dock Lift Installation, Operation, and Maintenance Manual

In any correspondence with your distributor or the factory you will need the following information:

Model Number \_\_\_\_\_ Serial Number \_\_\_\_\_

Installation location: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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### CAUTION!

At Initial Installation, determine proper motor/pump rotation by starting the motor in very short intervals to prevent permanent pump damage. Running the pump backwards will damage it. See the Installation Instructions, Section 4, for proper procedure.

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Distributor Information: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Advance Lifts, Inc.**  
**701 S. Kirk Road**  
**St. Charles, IL 60174-3428**  
**Toll Free 1-800-843-3625**  
**Sales Fax 1-630-584-9405**  
**Parts and Service Fax 1-630-584-6837**  
**E-mail: [Parts@advancelifts.com](mailto:Parts@advancelifts.com)**

\*Advance Lifts, Inc. furnishes one manual with each unit. Additional manuals are available at \$25.00 each.

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## INTRODUCTION

Congratulations, the equipment that you have purchased is of the highest quality. Your Advance Lift will provide you with many years of trouble free service in return for the minimal maintenance described in this manual.

Please be sure that no individual is allowed to operate the lift until they have been fully familiarized with operating instructions in this manual. Also insure that at least one person at the lift site is familiar with the maintenance section of this manual and is assigned responsibility for doing the maintenance on a regular basis.

Please note that the lift has a metal nameplate attached to it that contains information such as the model number, capacities, and the serial number. Do not remove the nameplate. Be sure that no operator ever exceeds the capacities shown on the nameplate or they may cause damage to the lift or injure personnel. Also, be sure to have the serial number of the lift handy if you have to call the factory. That serial number identifies your specific lift and will allow factory personnel to give you the most thorough and timely assistance possible.

This manual is under constant review and we would appreciate any constructive suggestions that may enhance its usefulness. Please send your suggestions to Advance Lifts, Inc Attn: Service Manager

Thank you for purchasing our product.

\*Mandatory reading before attempting installation.

## SECTION 3: RESPONSIBILITIES OF OWNERS & USERS

**Inspection and Maintenance:** The lift shall be inspected and maintained in proper working order in accordance with this manual and safe operating practice.

**Removal from Service:** Any lift not in safe operating condition shall be removed from service until it is repaired to the original manufacturer's standards.

**Repairs:** Only authorized personnel shall make repairs. All repairs shall be in conformance with the manufacturer's instructions.

**Operators:** Only trained and authorized personnel shall be permitted to operate the lift. Operators must be alert to the safety hazards of lift operation.

**Before Operation:** Before using the lift, the operator shall have:

1. Read and/or have had explained and understood, the manufacture's operating instructions and safety rules.
2. Inspected the lift for proper operation and condition. Any suspect item shall be carefully examined and a determination made by a qualified person as to whether it constitutes a hazard. All items not in conformance with the manufacturer's specification shall be corrected before further use of the lift.

**During Operation:** The lift shall be used in accordance with its intended use and within the manufacturer's limitations and safety rules.

**Safety rules:**

1. Do not overload lift.
2. Insure that all safety devices are operational and in place.
3. Insure that all personnel near an operating lift understand to stand so that no body parts can be pinched by the mechanism or platform and any items that may fall off the lift will not strike them.

**Modifications or Alterations:** Modifications or alternations of industrial scissors lifts shall be made only with written permission of the original manufacturer, Advance Lifts. These changes shall be in conformance with all applicable provisions of this standard and shall be as safe as the equipment was before modification. These changes shall also satisfy all safety recommendations of the original equipment manufacturer of the particular application of the lift.

## SECTION 4: INSTALLATION INSTRUCTIONS

Series 2000, 2000K, T-Series, 3000, 4000

### Equipment and Supplies Required:

1. Equipment to maneuver the Advance Lift into position. Nylon slings are preferred, but padded alloy chains through the guardrail socket holes will also work as rigging.
2. The appropriate gallons of oil and a funnel, for exact quantity see page P 8-3. Note that the 2010K, 2500K & T-Series units only require 5 gallons. Series 3000 units require 10 gallons and series 4000 units require 15 gallons.
3. A ½", extra heavy, double wire braid hose (SAE 100R2A) or extra heavy seamless piping from the power unit to the equipment with ½" JIC female fittings on the ends. Advance supplies a ½" JIC male flare connector on the outlet of the power unit and the end of the filter pipe on the lift. 4000 series lifts require two hoses because of their special piping needs. If hose or piping length will exceed 35 feet, consult the pressure chart to insure proper sizing. **Caution!** Be sure all hydraulic fittings are rated for hydraulic systems that may peak out at 4000 PSI. Hardware store items can burst at 150 PSI. Only buy from reputable hydraulic outlets.
4. Material for shimming and grouting, and anchor bolts. We recommend "Rawl-Stud Wedge Anchors", "Wej-It" or equivalent bolts in the 5/8" x 6" size. The 3000 and 4000 series will require the 1" x 9" size. The studs must be embedded at least 4 ½" into the concrete.
5. Electrical fused disconnect (if required), refer to local electrical codes.
6. Wire and electrical fittings for the branch circuit, pushbutton station, down solenoid, motor and any accessories. See branch and control circuit section of this manual.
7. Standard hand tools for electrical work and hydraulic maintenance.
8. A heavy pry bar for shifting the equipment and a drill for installing the lag down studs.
9. Maintenance device; This is supplied by Advance Lifts on all units. Check the maintenance section of this manual for proper usage of each style of maintenance leg.
10. Pit mounted units will require timbers to temporarily support the unit over the pit.

## SECTION 4: (CONTINUED) INSTALLATION INSTRUCTIONS

### Installation Procedure:

1. Read the Installation, Operating, and Maintenance instructions completely before attempting installation. You may also find it helpful to read the remaining sections of the manual for a better understanding of how the equipment works.
2. If you are installing a pit mounted unit, check the pit dimensions against the pit drawing for conformity (length, width, and depth including bridge recesses) and be sure to check the diagonal of the pit for square. Also be sure whatever surface the base frame will sit on is flat and level or is shimmed to achieve that end. (See p 4-6 for a typical pit drawing).
3. Locate the power unit, check to insure that there is no water contamination in the reservoir. Fill the reservoir through the breather hole with the appropriate hydraulic fluid (see fluid recommendation section of this manual). Ideally, you should mount the reservoir on a wall approximately 6 ½' above the ground. This prevents people from standing on or placing objects on the power unit. It will free up floor space and because the reservoir is higher than the lift, it will allow any air in the system to naturally rise to the highest point and purge itself from the system.
4. Run the hydraulic and clear / blue breather lines from the power unit to the lift and flush the hydraulic lines with clean fluid before connecting them. If the lines must be pushed through chases or enclosures, be sure to cap the lines to prevent contaminants from entering the hose. The breather line must not be pinched or restricted during installation. Cleanliness is the single most important factor in the maintenance of any hydraulic system. **CAUTION!** Contamination will destroy cylinders, valves, and pumps!
5. Following the electrical diagrams in the electrical section of this manual, make the electrical connection to the motor and controls for the unit. **Be sure that you have correct motor rotation!** Continued operation of a hydraulic pump in reverse rotation will destroy it! You can detect the rotation by making short motor jogs and watching the clear suction line from the reservoir to the pump. If the rotation is correct, the fluid will leap up the line into the pump. If the rotation is reversed, there will be no fluid in the suction line. You may change the rotation of a 3-phase motor by simply exchanging the positions of any two of the three power wire connections. With single-phase motors, rotation is set at the factory. Remember to have the discharge end of the hosing secure and discharging into a container or someone may take an oil bath.

Note: Some installers try to arrange all of the above work to be completed before they ever bring a lift to the job site. This allows them to use the crane that is used to offload and position the lift for as short a time as possible.

## SECTION 4: (CONTINUED) INSTALLATION INSTRUCTIONS

### Installation Instructions:

6. Figure out the proper orientation of the lift. (Surface mounted units may simply be put into place). Note: All dock lifts are built so that loads are transferred over the hinged (clevis) end of the platform when elevated to truck height and this is the end to which the hinged bridge is usually welded. Occasionally, the bridges are side mounted. Surface mounted units are equipped with approach ramps for transitioning on and off the unit from the ground level. The ramps are usually much larger than the bridge and located on the roller end of the platform and should never ever be used as a bridge to the truck!
7. For pit mounted units, place timbers diagonally across the corners of the pit and with shipping restraints still in place, but shipping blocks removed, place the lift on the timbers. Then you may make temporary hose connections being careful not to over-tighten and crack the hydraulic fittings. Finally, you may remove the timber supports and lower the lift into the pit.
9. You may now break the shipping restraints (banding). Use the lift's power unit to open the lift a few feet and use your crane to raise the clevis end (hinged bridge end) of the lift by hooking the bevel toe guard or use a plate grab attached to the hinged bridge. This will allow you to remove your chains or slings and the banding material from beneath the unit's base frame. The tipping may not be necessary if you hooked your lift chains through the guardrail sockets of the platform and the shipping bands slide out from under the lift. **DANGER! Do no allow anyone to get under the unit!**
10. Carefully lower the unit insuring that the platform edges clear the sides of the pit. The heavy pry bar may be used to reposition the unit with even clearance from all pit walls. Note the lowered height in relation to the surrounding pit edges for later shimming adjustments. **Caution!** The lift shall be installed so that no part of the lift platform is more than ¼" above or below the surrounding surface.
11. Once the lift is properly positioned, (whether it is pit mounted or surface mounted), you may begin the lag down procedure. T-Series models have special lag down instructions located on page P 4-5.
12. Raise the unit and position the maintenance leg or bar as shown in the maintenance section of this manual (pages 6-3 through 6-6). Lower the unit onto the maintenance leg and press the down button for an extra 10 seconds to relieve all hydraulic pressure. Drill the lag down holes and set the lag bolts. Check the unit for side to side level and then shim or grout the base frame for continuous support. The shimming should enhance the match between the platform and the surrounding surfaces when fully lowered, but not at the expense of side to side levelness. A slight slope from clevis end to roller end is not a problem, but side to side slope will cause premature wear on all the moving parts of the lift. Tighten the lag bolts.

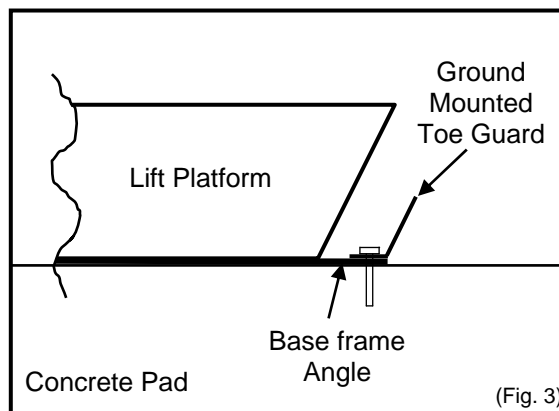
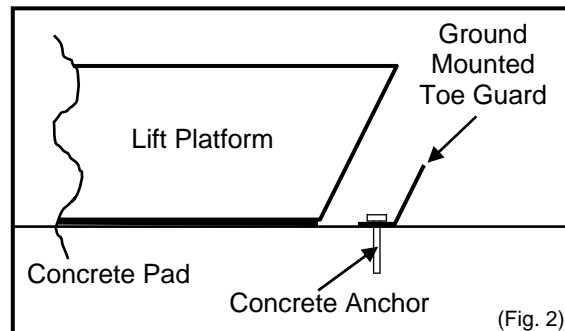
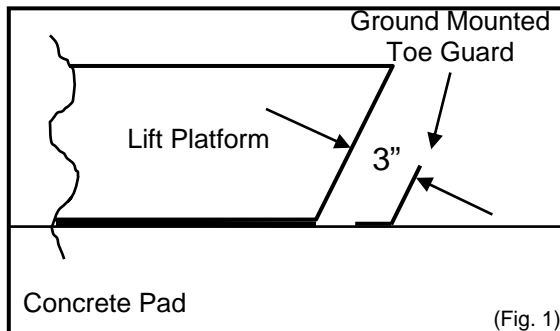


## SECTION 4: (CONTINUED) INSTALLATION INSTRUCTIONS

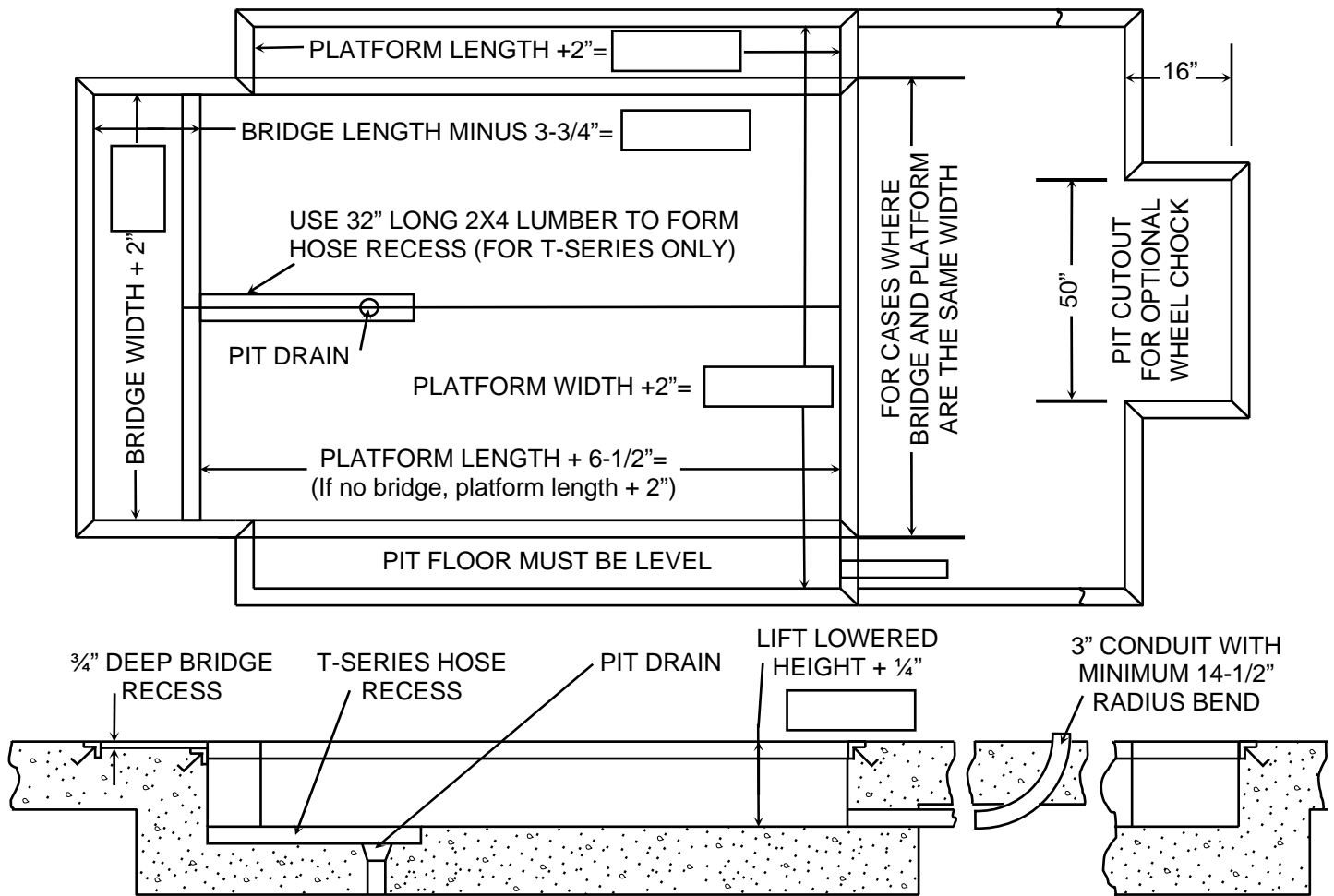
13. If a temporary hydraulic connection was made to lower the unit into the pit, now is the time to switch to your permanent hydraulic connection. Note: on T-Series models the hose must run under the base frame, see page P 4-5 for pit details. Also, if there are any electrical options such as limit switches or electrical toe guards, now is the time to do that wiring.
14. Check that there are no tools or debris in the pit or beneath the unit, raise the unit and remove the maintenance leg, then fully lower the unit. On pit mounted units, check that the bridges are flush with their curb angles and that they do not pivot when loads roll over them, shim any movement accordingly.
15. Operate the equipment through several cycles, holding the down button an extra 20 seconds after the lift is fully lowered to bleed air from the cylinders. Check the reservoir fluid level with the unit fully lowered and top off the fluid to 1" from the top of the reservoir on 5-gallon reservoirs and 2.5" from the top of 10-gallon reservoirs.
16. Adjust accessories such as limit switches and if the unit has electric toe guards or roller shades, fasten the hose in the pit so that it does not move and interfere with proper operation.
17. Raise the unit one final time, install the maintenance leg, and thoroughly clean the entire area. Be sure all fluid spills are cleaned up so that they are not later misinterpreted as new fluid leaks. Check all hydraulic fittings for leaks.
18. Meet with the facility manager or maintenance foreman and turn over this maintenance manual with the reminder that no one should be allowed to operate the unit unless they are familiar with the operating instructions. Show them the maintenance leg and any other maintenance devices. Point out the metal nametag on the unit with the serial number and capacity ratings. Make it clear that some specific person in their organization must be charged with responsibility for the maintenance of the unit and if they have no further questions, lower the unit and consider your job complete.

SECTION 4.1: Special instructions for T - Series Only  
Ground Mounted Toe Guards (GMTG)

1. T-Series lifts not installed in pits require additional toe guard protection not outlined in the previous instructions. The toe guards are placed around the perimeter of the unit and are used to keep personnel a safe distance from the platform as the unit raises and lowers. All personnel shall stay to the outside of the toe guards when the lift is in operation.
2. Place the toe guards 3" from the lift platform's beveled toe guards as illustrated in figure 1 below. Insure all four corners line up and lag the guards to the concrete through the holes provided using 3/8" concrete anchors as shown in figure 2.
3. Units with 8' platforms require eight (8) concrete anchors and ten (10) anchors are needed for units over 8' in length.
4. One of the guards has 3/4" drilled mounting holes in it as opposed to the normal 1/2" mounting holes. This guard mounts to the base frame "lag-down angle" as illustrated in figure 3.



# ADVANCE LIFTS PIT DIAGRAM (K's, T's, 2000, 3000, & 4000 SERIES)



\*When mounting a "T-Series" lift on a pad it is necessary to supply a cutout in the concrete to allow passage of the hose under the base frame. T-Series lifts have no clearance between the platform and ground, any hose run through or over the base frame will be damaged when the platform is lowered.

### Installation Bill of Material\*

1. One (1) Advance Lift Model Number \_\_\_\_\_.
2. 3" x 3" x 1/4" curb angle as required.
3. One (1) 3" conduit from power unit location to pit for hydraulic hose.
4. One (1) electric disconnect switch for 5 HP or 7.5 HP motor.
5. 5 gallons of Chevron Rykon ISO 46 hydraulic fluid for T's & K's, 10 gallons for 2000 & 3000 series and 15 gallons for series 4000 units.
6. One (1) 1/2" SAE 100R2 hydraulic hose from the power unit location to the lift base with 1/2" female JIC threads on both ends. (4000 series lifts require two (2) hoses).
7. Concrete anchor bolts and material for shimming and/or grouting.

\*Seller furnishes Advance dock lift only unless otherwise agreed to in writing

### Notes:

- A. Reinforce concrete to suit local soil conditions.
- B. All pit work and materials shown are the responsibility of the owner or his agent (by pit contractor)
- C. Installer to run 1/2" diameter hose(s) through the 3" conduit from the power unit to the lift base.
- D. Dimension tolerances are plus 1/4", minus 0" (+1/4" - 0).
- E. 180° steel hinge bridges require a bridge recess length equal to bridge length minus 2-3/4".
- F. 180° aluminum hinge bridges require a bridge recess length equal to bridge length minus 3-3/4" and a pit length equal to platform length plus 7-1/2".
- G. Consult factory for bridges longer than 30". (18" on 4000 series).

## SECTION 5: OPERATING INSTRUCTIONS

Hydraulic scissors lifts have an excellent safety record overall, but as with all moving equipment they can be dangerous. Operators must use common sense and take responsibility for the safety of everyone near the lift. They must use the devices provided and be careful not to surprise anyone in the area with the movement of the lift.

The most common accidents that occur are people walking off the end of the lift and people tripping over the hinged bridge or knocking the bridge over onto someone's foot. These are prevented by simply using guardrails and safety chains, and by being aware of the bridge position and size. **Be alert!**

### **Pre-operational checks:**

1. Check all electrical wiring and connections to be sure that they are completed properly and are operational.
2. Check for the proper operating condition of all safety devices such as guardrails, safety chains, and optional equipment such as electric toe guards, warning bells, or automatic chocks.
3. Check for obstructions or debris that may interfere with the safe operation of the lift. **Caution!** Obstructions and debris in the pit can cause the lift to remain partially raised above the surrounding surface causing a trip hazard.
4. Be sure that all personnel in the area are a safe distance away from the lift and aware that you are about to move it.
5. Know the capacity of the lift to be sure not to overload it.

### **Test operate the equipment:**

1. Station yourself so that you always see the equipment and surrounding area when it is in operation. Never operate the equipment in the blind.
2. Raise the equipment and note that the pushbutton is a constant pressure, "dead-man" type. When you release the up or down button, the unit should stop moving immediately and maintain its elevation. If it does not, notify your maintenance personnel immediately.
3. Cycle the equipment several times to be sure that it is operating smoothly with no jerking or sudden movement. On initial start up there may be some air in the lines or the cylinders may be dry due to storage so it may take several cycles to smooth out the operation. If the operation is not smooth after several cycles, contact your maintenance personnel. If there is any evidence of binding or scraping in the operation you should immediately stop using the lift.
4. Check all safety devices for proper operation.
5. If you elect to test load the equipment be sure that you do not exceed the capacities shown on the nameplate. Overloading may cause structural stresses that may not show up for some time, but will diminish the life and capacity of the unit. If you have any questions about testing the unit, call the engineering department at the factory at 1-800-843-3625.

## COMPATIBLE LOADING EQUIPMENT GUIDE:

Each Advance lift is designed with a weight capacity and platform design for specific types of loading equipment. Using the wrong type of loading equipment on a given series of lifts will invite unintentional overloading. For safe operation, follow these guidelines and be careful to never exceed the nameplate.

UNIT	TYPE OF LOADING EQUIPMENT
2000 SERIES, T & K SERIES	All of the above and small powered pallet jacks.
3000 SERIES	All of the above & straddle stackers, small stand-up & sit-down rider fork trucks.
4000 SERIES	All of the above & medium fork trucks.

Calculate the weight of the heaviest types of loads you expect to handle to be sure that they are within the rated capacity. Beware of surprisingly heavy materials such as liquids, grains, powder, and paper; all of which can weigh much more than you suspect because of their density.

A little effort to determine the true weight of your heaviest loads before you start to use your equipment can save damage to your equipment and possible injury to your personnel. If you discover that some loads will exceed the capacity of the unit, make arrangements to have the loads split. All operating personnel should be warned about heavy loads, warning signs should be placed in the dock lift area as a reminder.

### **Daily operation:**

1. All personnel should be required to read the entire operating instruction section of this manual prior to operating the lift.
2. Operators must know the capacity of the unit and be aware of any loads that may exceed capacity.
3. Operators must be alert to all personnel in the vicinity of the lift and avoid any surprises to these personnel in regard to movement of or the position of the lift at any time. Never operate the unit if you can not see it and the personnel around it.
4. On the first use of the lift each day, each operator should check to see that the lift is operating properly and smoothly. All safety devices should be in place and operating properly and the hinged bridge should be swung through its full arc of movement. The bridge stops should prevent the bridge from drooping more than 45 degrees below the horizontal in the forward position and the bridge should swing back 20 degrees beyond vertical toward the platform in the upright position. Any problems should be immediately reported to the maintenance personnel.

## Daily Operation (Continued)

5. If the unit has a traveling electrical cord, the operator must insure that it is kept away from the lift as it rises and lowers.
6. When raising or lowering the lift, the load should be centered on the platform (that is, the load should be evenly distributed and its center of gravity should be at the center of the platform).
7. If a unit is equipped with both a hinged bridge and a hinged ramp, be sure that the operators know the difference and never use the ramp for load transfer in the raised position. The ramps are usually much longer than the bridges which means they can work as a long lever creating severe eccentric loads and they are often positioned on the weakest side of the lift for load movement in the fully lowered position only. **Use ramps in the fully lowered position only!**
8. Do not allow bridges or ramps to “free fall” from near vertical positions to the position against their hinge stops. This type of abuse will definitely cause damage to the stops, hinges, and platform edges, eventually rendering the unit unsafe. Lower ramps by hand and lower bridges to the down stop position with the restraining chains.

### Efficient lift usage:

The following procedures will help you maximize the efficient use of your lift in your loading and unloading operations.

1. First it should be noted that there is a long restraining chain on each lift that is designed to run from the hinged bridge to the guardrail post farthest away from the bridge. The purpose of this chain is to allow an operator to pull the hinged bridge back from anywhere on the platform with minimal movement, once the bridge is raised to the near vertical position by the truck bed as the lift is lowered.
2. This means that the hinged bridge only has to be manually lifted once in a loading or unloading sequence. It should be raised to the vertical standing position before the lift is raised to truck height. Once the top of the bridge is just above the truck bed height, the bridge can be pushed against the truck and allowed to cam into truck. Then when you lower the unit, the bridge is allowed to cam up on the truck bed to the near vertical position and then pulled back to a safe resting position with the chain. There is a second snap on the chain that allows you to lock the bridge in the raised position whenever the load or guardrails prevents the bridge from swinging back at least 20° beyond vertical. (See illustration at end of section.)
3. If your unit is equipped with an approach ramp, do not raise the ramp on each cycle. In fact, the ramp is to be raised only when the lift is being moved to a new location. Many of the ramps are designed with built in wheel chocks which help prevent a wheeled vehicle from rolling off the platform and only work properly when the ramp is lowered.

## How To Use Superdoks Efficiently

Palletized Loads One (1) man removes pallet from truck places it in storage area and returns for next pallet until truck is offloaded

Non Palletized Loads One (1) man in truck stacks material on pallet or 4 wheeled cart Second (2nd) man removes pallet or cart from truck places it in storage area and returns for next load until truck is unloaded

### Objective

"TO FREE UP THE TRUCK AS QUICKLY AS POSSIBLE"

### Placing Bridge in Truck

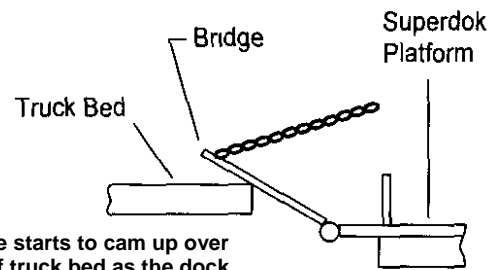
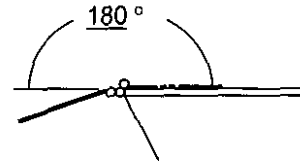
With bridge folded back toward platform raise the dock lift until the top the bridge is just above the opening of the truck, push the bridge against the truck with your foot while controlling the fall with the safety chains. As the dock lift is raised, the bridge will cam over onto the truck bed and lay flat for loading and unloading.

### Removing Bridge from Truck and Securing

Begin to lower the dock lift until the bridge starts to cam up over the end of the truck bed. With foot, chain, or hand, flip bridge back toward platform. Once bridge is folded back toward platform attach safety hook (A) to secure the bridge in place and continue lowering the unit.

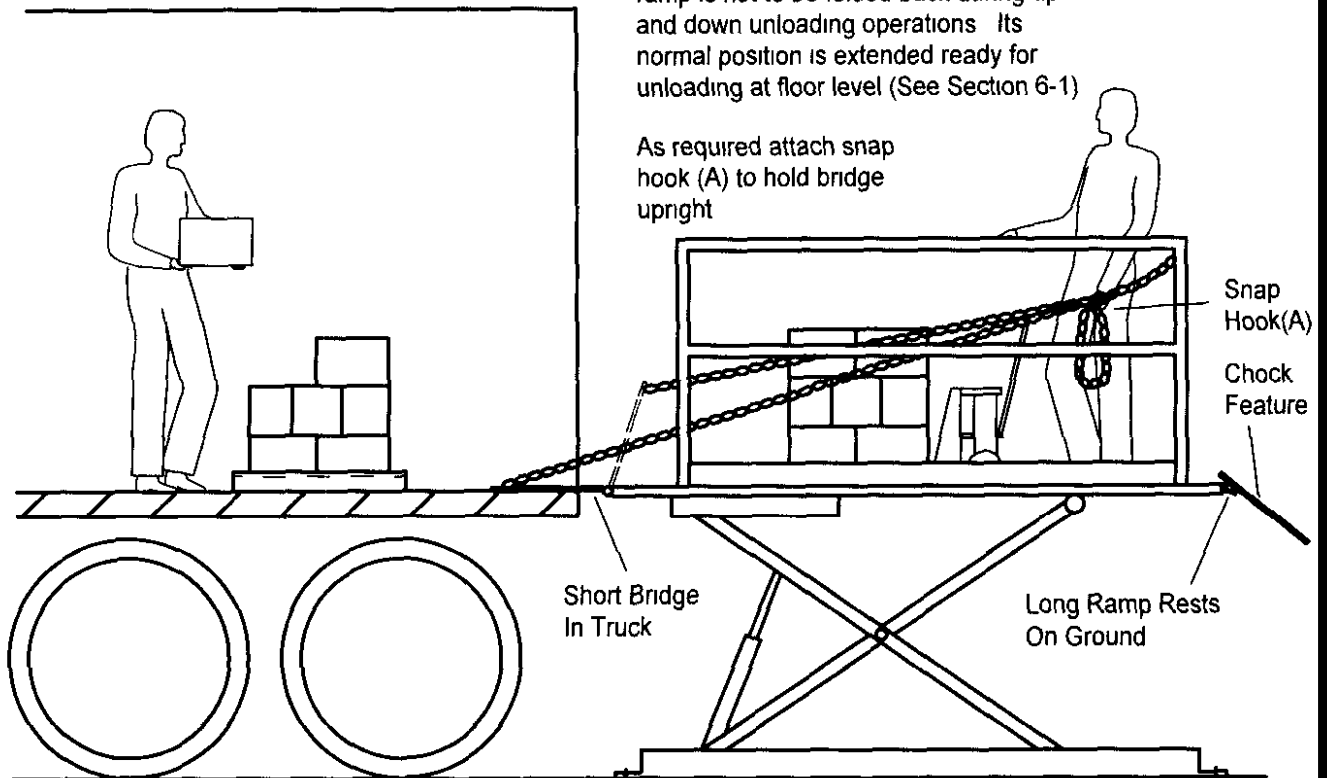
### CAUTION

With 180 Degree movement bridges exercise care in steps 5 & 7 as bridge will continue to pivot back flat on the platform



If a unit has a chock ramp the chock ramp is not to be folded back during up and down unloading operations Its normal position is extended ready for unloading at floor level (See Section 6-1)

As required attach snap hook (A) to hold bridge upright



**DANGER! Do not remove bridge stops or allow bridge to hang vertically.**

## SECTION 6: MAINTENANCE INSTRUCTIONS

The routine maintenance of this equipment is minor and consists of periodic checks.

**Weekly:** Once a week, or after repetitive operation, the lift should be raised to its full height. This will get rid of cylinder oil seepage build-up and lubricate the upper cylinder barrel.

**Monthly:** Check that the hydraulic fluid level in the reservoir is 1" to 2" from the top of the tank, depending on model, with the unit fully lowered. It is strongly urged that a maintenance log be maintained with the dates of monthly inspections, the name of the inspector and results of the inspection.

### **CAUTION:**

Be sure the maintenance device is properly engaged before performing maintenance checks 2 through 6 or reaching beneath a raised lift. **(Read all of section 6 for proper maintenance safety leg procedures).**

1. Clean all debris from the pit or the vicinity of floor mounted units in order to avoid interference with the lift mechanism or rollers.
2. Check for presence and proper seating of all snap rings and clips on all axles, cylinders, and rollers.
3. Check rollers, pins and bushings for any signs of wear such as flat spots, missing fasteners, or dislodged bearing material.
4. Check the hydraulic fittings for cracks or leaks and clean up any seepage on or beneath the cylinders.
5. Check hoses and electrical lines for abrasions or other abuse and check for snug connections.
6. Operate the unit and check for any abnormal noise or vibrations.
7. Check all safety devices on the unit such as guardrails, safety chains, etc. including any options such as electric toe guards or chocks, for proper operation.
8. Check the hinged bridge to insure that its stops are not damaged, allowing it to droop more than 45 degrees below horizontal, check the hinge spools for cracks and or broken welds, be sure the bridge leans back over the platform at least 20 degrees beyond vertical.

### **Seasonal or semiannual maintenance:**

Change hydraulic fluid for ambient temperature changes if appropriate. Check the fluid reservoir to see if there is any evidence of accumulated condensation creating water contamination. The fluid will appear "milky" and light pink in color. Water accumulation will damage the hydraulic pump.



## SECTION 6: (CONTINUED)

### Maintenance Cautions:

1. Always remember that this is a piece of machinery with large moving parts that can seriously hurt you.
2. Read this manual in its entirety before attempting service work.
3. Always use the maintenance device if you are going to work on the unit in the elevated position or reach under the platform. (See the illustrations at the end of this section for proper positioning and engagement of the maintenance supports.)
4. It may be necessary to bypass travel limit switches in order to properly position the maintenance support.
5. When using the maintenance support observe the following rules:
  - A. There shall be no load on the platform
  - B. The maintenance support shall be properly engaged.
  - C. Hold the down button an extra 10 seconds when lowering onto the maintenance support to be sure that all the weight of the lift is on the support.
  - D. Use shoring or blocking as a backup to the maintenance support.
  - E. Disconnect and tag the electricity to the unit to prevent accidental movement of the lift by other personnel.
  - F. Spend as little time as possible under the lift.
6. Use only replacement parts recommended by the manufacturer.
7. Do not let the equipment stay in disrepair; fix little problems while they are little problems or some of them may get severe very quickly.
8. Inspect the equipment on a regular schedule, preferably monthly.
9. Never work on the hydraulics or electrical systems unless the unit is fully lowered or properly sitting on a maintenance support.
10. Never apply a load to the equipment unless the base is continuously supported and non-portable units are securely lagged to the ground.
11. Never expect to hold leg assemblies open by simply lifting one end of a platform.
  - A. The roller end of most lifts are not gibbed or captured in any way, so lifting on the roller end simply tilts the platform.
  - B. Even if you raise the clevis end of the platform, if the base frame is not firmly lagged to the ground or held down by some other means, the legs will come up with the platform in a spongy and unpredictable manner and could cause serious injury.
  - C. The only safe way to hold a lift's legs open other than the factory designed maintenance support is to block between the clevis end of the platform and the base frame.

## Section 6: (Continued)

### Recommended Lift Blocking Procedures



#### **WARNING!**

**Only authorized personnel should perform inspection or maintenance and service procedures. Unauthorized personnel attempting these procedures do so at the risk of severe injury or death.**



#### **DANGER!**

**Failure to properly adhere to lift blocking procedures is to risk the sudden and uncontrolled descent of the lift during maintenance or inspection. A falling lift can cause severe injury or death.**

This procedure describes the only factory-approved method of working under a lift. Follow these instructions EVERY time you plan to reach or crawl beneath the lift to perform service or maintenance – no matter how momentary that might be.

If the factory-provided maintenance device is damaged or missing, stop immediately and consult the factory for assistance. The manufacturer is not liable for your failure to use the approved maintenance device(s) and procedures that have been provided.

1. Any load must be removed from the lift prior to engaging the maintenance device(s). These devices are designed to support an unloaded lift only. Failure to remove the load from the lift prior to blocking could cause the failure of the maintenance device(s) and allow the lift to fall unexpectedly. This can result in personal injury or death, or permanent damage to the maintenance device(s) and/or the lift.
2. Raise the lift to its fully raised position. If you do not, the maintenance device(s) may not be able to be placed properly in its/their designed blocking position.
3. Remove the maintenance device(s) from its/their storage location and place it/them into the engaged position as shown in Figures 1-5. Read and understand the specific instructions for your equipment before proceeding.
4. Lower the lift until it makes complete contact with the maintenance device(s). Re-check to ensure that all provided devices are fully and securely engaged. If the device(s) is/are not fully engaged the lift could fall unexpectedly, resulting in permanent damage to the device(s) or the lift.

## Recommended Lift Blocking Procedures (continued)



### **DANGER!**

**If for any reason you are unable to lower the lift completely onto the maintenance device(s), stop immediately and consult the factory. Failure to properly use the factory approved maintenance device(s) could result in severe injury or death.**

5. Once the maintenance device(s) is/are properly and securely engaged, continue to press the down button, valve or switch for an additional 5-10 seconds to relieve all pressure in the operating system.



### **WARNING!**

**Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids (or air) during maintenance and/or repair of the lift and result in severe injury or death.**

6. Follow OSHA electrical lock-out/tag-out procedures. Disconnect and tag all electrical and/or other power sources to prevent an unplanned or unexpected actuation of the lift.
7. Once inspection or work is complete, reverse the performance of the steps above to raise the lift off the maintenance device(s) and place the device(s) back into its/their designated storage position(s).



### **DANGER!**

**HIGH VOLTAGE! – Disconnect and/or lock out the electrical supply to the power unit prior to any installation or maintenance being performed.**

**CAUTION!** Read the entire lift blocking procedure and all warnings before attempting to use the maintenance bar.

**ALL MODELS**

Never use the maintenance device when the platform has a load. Remove the load first, then brace for service or maintenance. Check that the maintenance bar is well seated and remains so during heavy wrenching or maintenance operations.

**FOR SERIES 2000K**

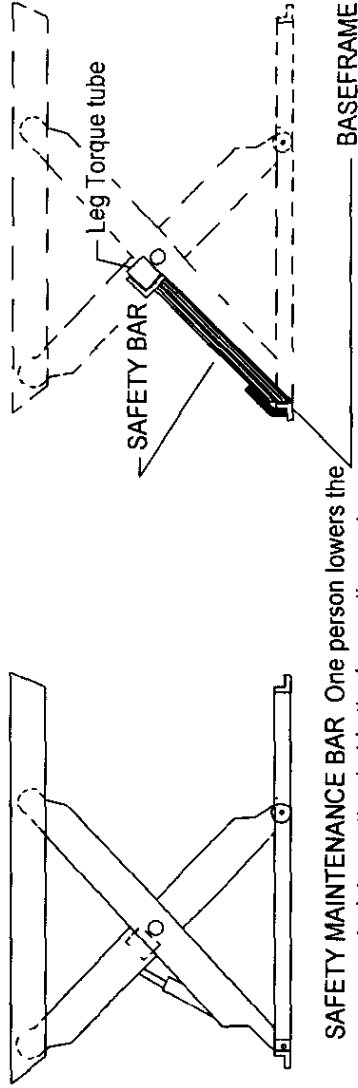
Place the maintenance bar near the center of the torque tube and against the base frame; be certain the bar is captured on the base frame angle, and then lower the equipment until it is totally supported by the bar. (Fig. 1)

**FOR SERIES 2000**

Place the maintenance bar near the center of the torque tubes and then lower the equipment until it is totally supported by the bar. (Fig. 2)

**ALL MODELS**

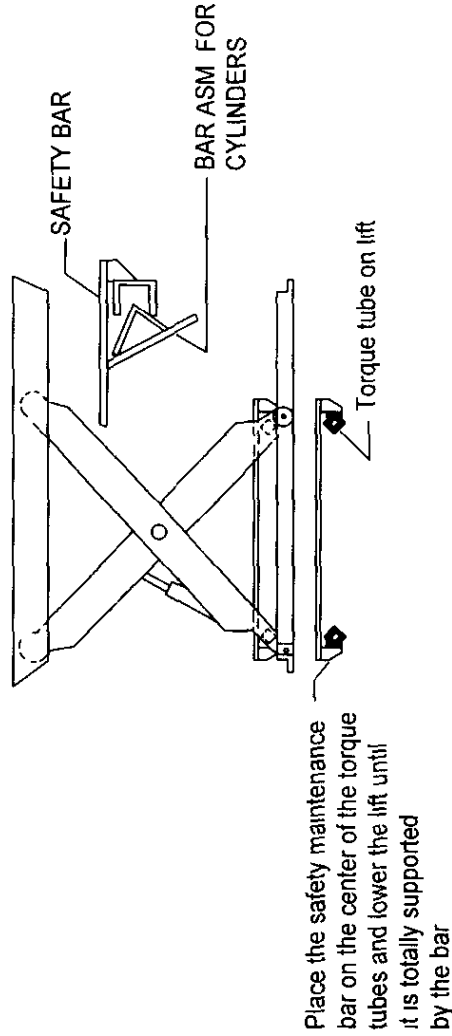
Every unit of the above models is supplied with a maintenance device. It is the only factory-approved method of blocking the lift open. If the bar is missing contact your distributor for replacement.



**SAFETY MAINTENANCE BAR** One person lowers the equipment while another holds the bar on the center of the torque tube and on the baseframe. Lower the equipment until it is totally supported by the bar

**SERIES 2000K**

**Fig. 1**



Place the safety maintenance bar on the center of the torque tubes and lower the lift until it is totally supported by the bar

**SERIES 2000**

**Fig. 2**

**Safety Maintenance Bar-  
Series 2000,2000K**

**CAUTION!** Read the entire lift blocking procedure and all warnings before attempting to use the maintenance bar.

#### SERIES 3000

Place the maintenance bar or leg near the center of the torque tube and on base frame, then lower the equipment until it is totally supported by the bar or leg. (Fig. 3)

#### SERIES 4000

Place the maintenance bar or leg near the center of the torque tubes, then lower the equipment until totally supported by the bar or leg. (Fig. 4)

#### T-SERIES LIFTS

Place the maintenance bar into lower pocket on base frame. Hold bar vertical and fully lower the equipment until the platform is resting on the leg. (Fig. 5)

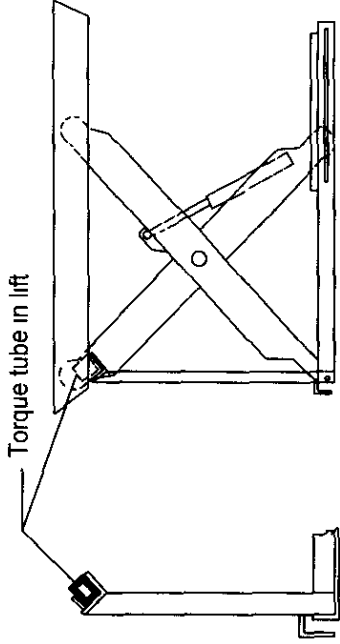
#### ALL MODELS

Never use the maintenance device when the platform has a load. Remove the load first, then brace for service or maintenance. Check that the maintenance bar is well seated and remains so during heavy wrenching or maintenance operations.

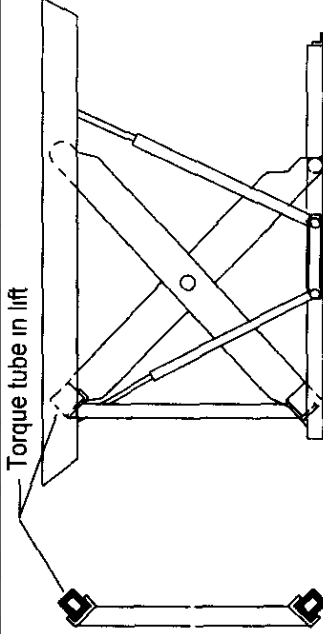
#### ALL MODELS

Every unit of the above models is supplied with a maintenance device. It is the only factory-approved method of blocking the lift open. If the bar is missing contact your distributor for replacement.

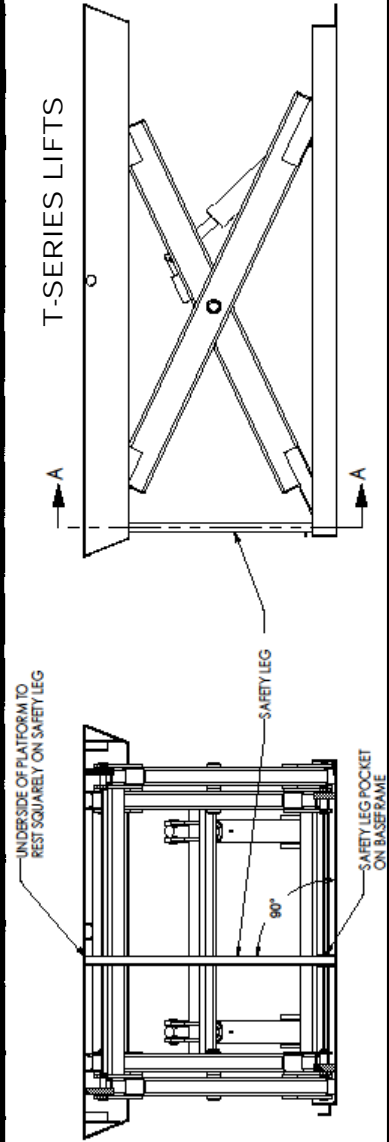
**MAINTENANCE DEVICE FOR:  
3000 SERIES, 4000 SERIES AND T-SERIES**



**SAFETY MAINTENANCE BAR** One person lowers the equipment while another holds the bar on the center of the torque tube and on the baseframe. Lower the equipment until it is totally supported by the bar. **SERIES 3000 LIFT**



**SAFETY MAINTENANCE BAR** One person lowers the equipment while another holds the bar on the center of the torque tubes. Lower the equipment until it is totally supported by the bar. **SERIES 4000 LIFT**

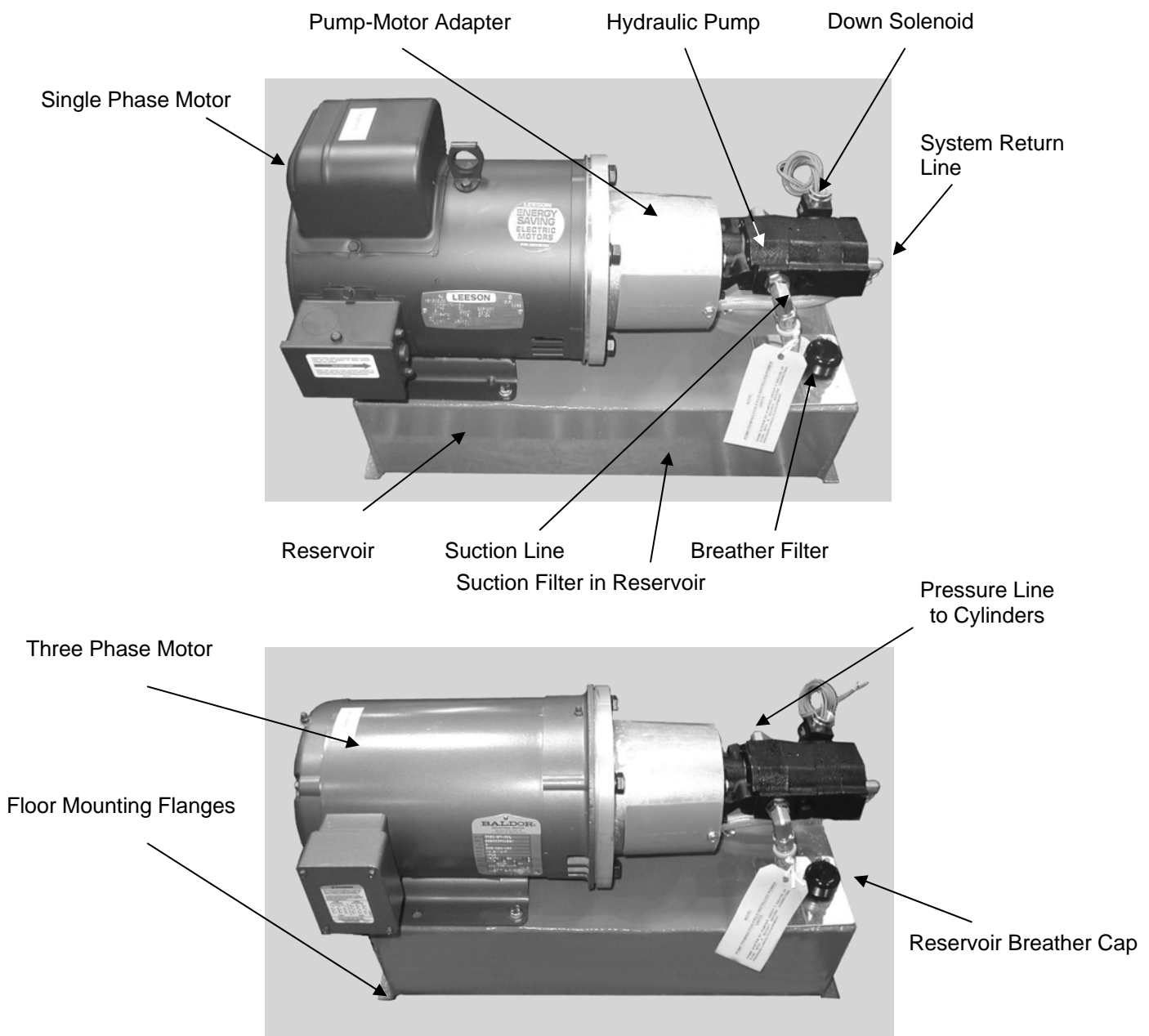


**T-SERIES LIFTS**

## SECTION 7: POWER UNIT ASSEMBLIES

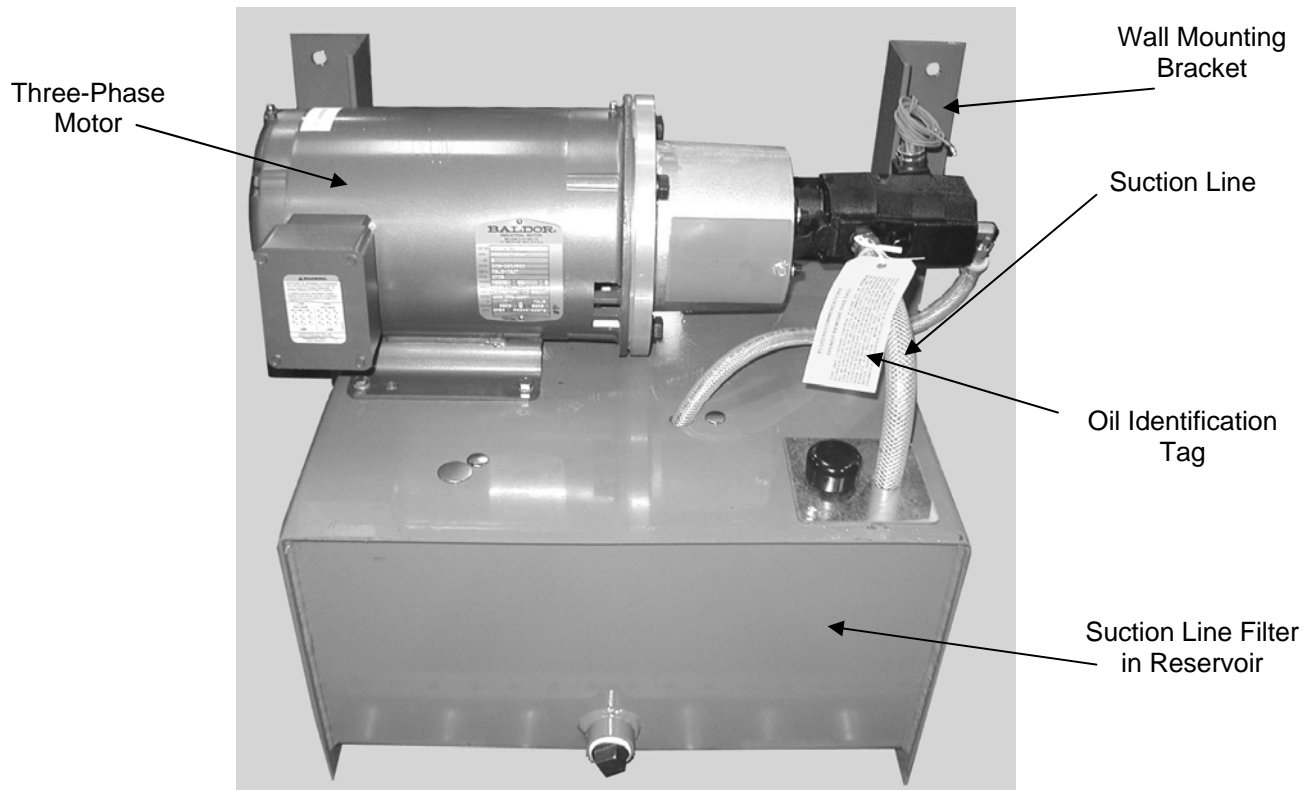
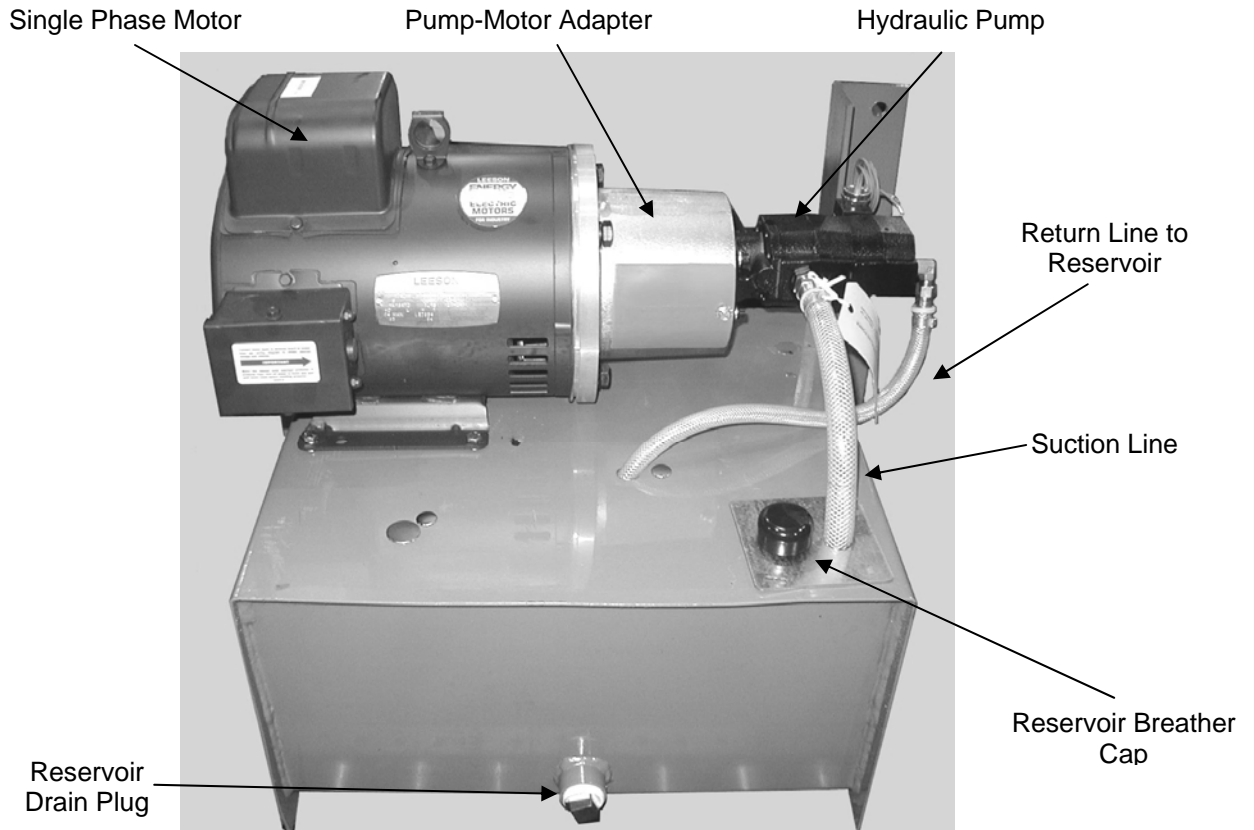
This section contains drawings and photos of completed power units to aid service personnel in identifying each component. Please be careful to match the correct voltage and horsepower as well as model number, when you are trying to identify the power unit for your lift. Advance Lifts uses several different brand name motors and pumps, so the ones shown in the pictures may not be the same exact brands as on your unit. More information about individual components may be available in the hydraulic or electrical sections of this manual. Also note that these illustrations may show options that were not included on your particular unit and the components used may be changed at any time without notice.

### Models 2000K & T-Series



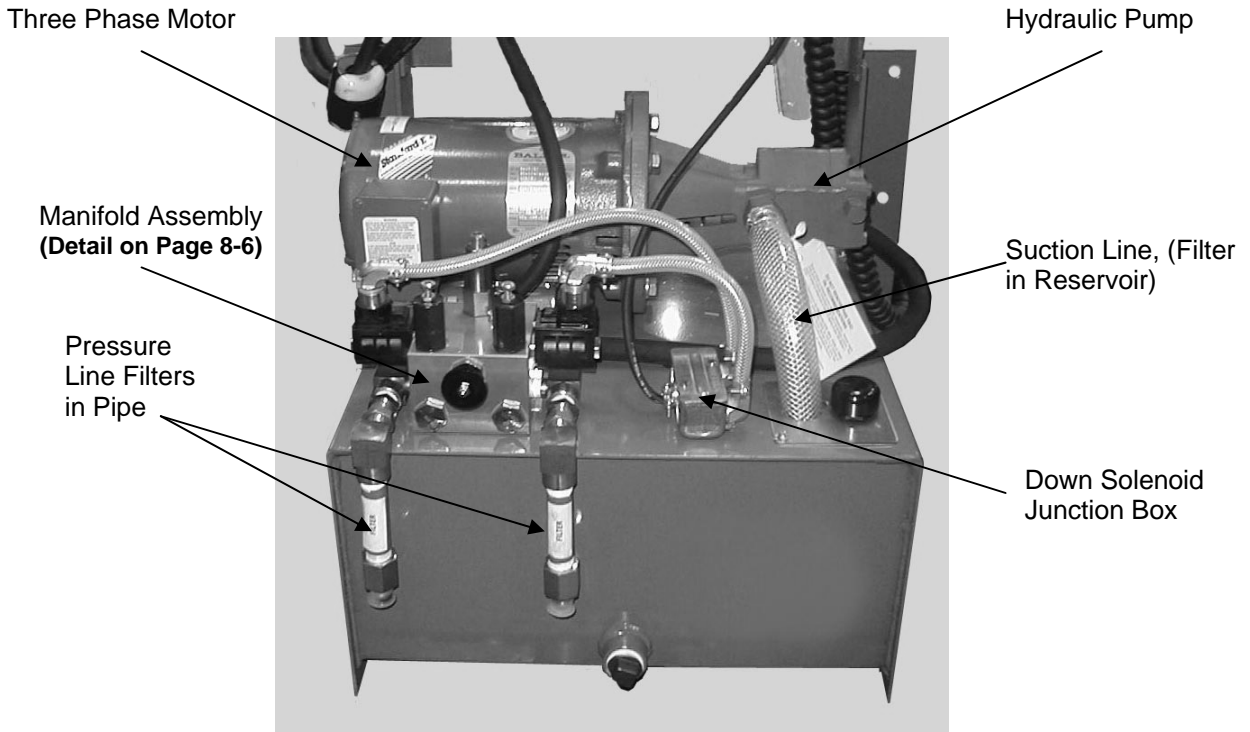
See Page 8-4 for Hydraulic Diagram and Pages 9-3 thru 9-5 for Electrical Diagram

## Series 2000 and 3000 Power Units

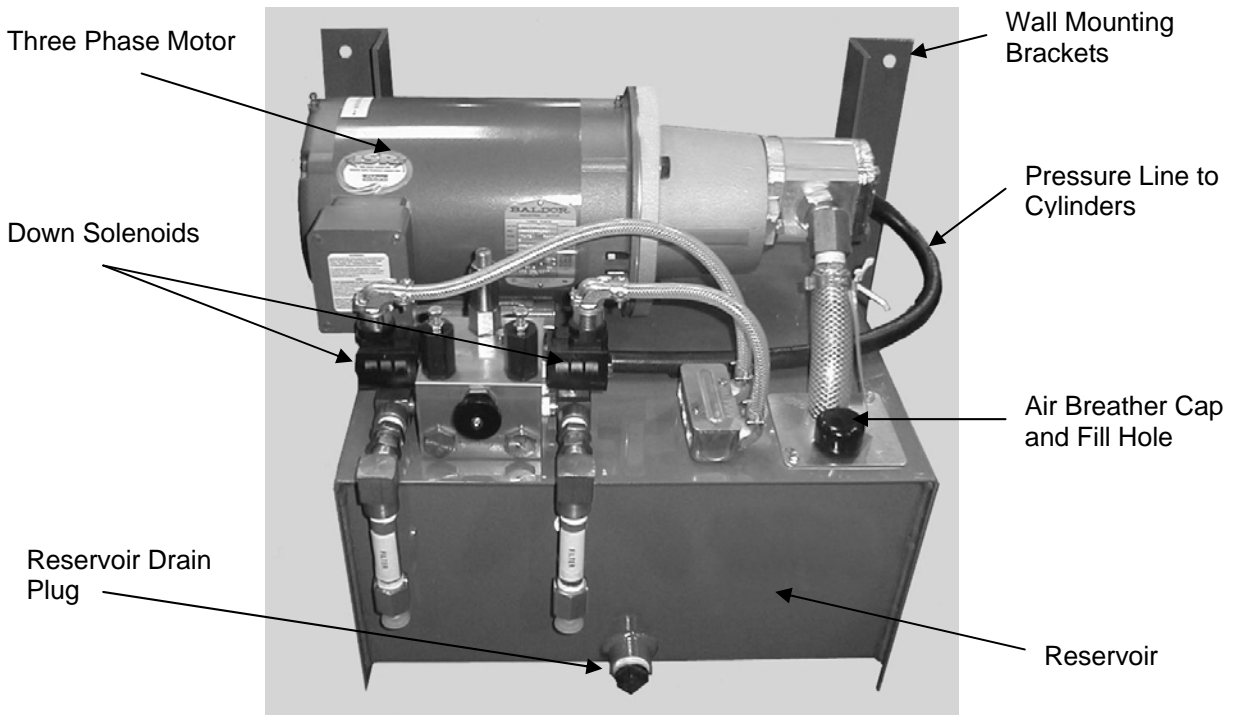


See Page 8-4 for Hydraulic Diagram and Pages 9-3 thru 9-5 for Electrical Diagram

Series 4000



Series 4100 Power Unit



See Page 8-5 for Hydraulic Diagram and Pages 9-4 & 9-5 for Electrical Diagrams



## SECTION 8: HYDRAULIC DETAILS

### 1. General Hydraulic Information:

- A. All hydraulic cylinders will require the replacement of packing's and seals after a period of time, depending on usage and environmental conditions. It is normal maintenance just like changing oil in an automotive engine. However, maintenance personnel should recognize the difference between leakage and weepage:
- B. Weepage is the normal accumulation of fluid that passes the seals in the course of operations, as the hydraulic fluid properly performs its lubrication function on cylinder walls and piston rods. It may be occasionally observed squirting from cylinder breathers, but should stop squirting after several cycles of full stroke when the small accumulation is cleared.
- C. Leakage is the fluid that leaks past worn or cut packing's and seals. It too may be observed squirting but does not stop after several cycles and the lift will probably not hold position under load.
- D. See repacking under cylinder repair procedures.
- E. Always be careful when working around cylinders, not to nick the extended rod or dent the cylinder casing, as this may cause damage to cylinder seals or packing's.
- F. If you elect to repaint or retouch part of the lift, cover exposed rods with plastic or soluble grease that can be removed after painting to insure that no paint sticks to the rods and damages packing's or seals.

### 2. General precautions:

- A. Be sure that all pressure is relieved from the hydraulic system before disassembling any components. Continue to hold the down button for several seconds after fully lowering the unit on its maintenance support or the ground, before opening a line or component.
- B. Always be careful to avoid contamination entering the system. Be especially careful with the ends of hoses that may fall into oil dry or dirt. If you suspect contamination, flush the system and components.

### 3. Hydraulic fitting sealant and torque:

- A. Advance lifts may be equipped with either NPT fittings (tapered) or SAE fittings (with "O" ring seals, depending on age, know the difference!
- B. Be careful when tightening NPT fittings not to over tighten and crack them. Swivel fittings are especially vulnerable and should only be snug enough to stop leaking.
- C. If leakage persists after tightening the fittings fairly hard, inspect fittings for burrs on the mating edges or the possibility of a 37 degree SAE fitting being mixed with the standard 30 degree NPT fittings, or either one being mixed with SAE 45 degree fittings.
- D. When using Teflon tape on NPT fittings, be sure the tape is started 1-1/2 threads back from the leading edge and only use 2 wraps to be sure that tape does not break off and contaminate the system. You may substitute pipe sealant with Teflon paste from Pro Lock or Loctite, but again don't over apply. Never use sealant or tapes on swivel fittings or SAE o-ring fittings.
- E. Never reuse old Teflon tape. Once a connection has been opened, remove all old tape and apply fresh tape.

## Oil Recommendations & Seal Compatibility

### Fluids:

1. As of 1/1/03 the current standard hydraulic fluid an ISO 46, (group II base) hydraulic fluid. This is the fluid normally supplied by the factory and is suitable for a temperature range of -10 to +100 degrees Fahrenheit. When replacing or adding fluid to an Advance Lift, use only ISO 46 hydraulic fluid that is manufactured with a group II base oil. ISO 46 hydraulic fluid can be identified by its purple color.
2. **Caution!** Do not use any fluid that has not been approved by the Advance Lifts engineering department. Brake fluids and other hydraulic fluids may attack the system's seals or hoses.
3. A biodegradable or fire resistant fluid is also available, however you must contact the factory for its name, because it is also necessary to change some seals and/or hoses for total system compatibility, depending upon the specific model lift that you have.

### Seals:

Generally, the seals in the unit are Buna-N-Nitrile and polyurethane. The hoses are composed of either PVC for suction lines or braided wire. Always call the factory about special fluids rather than make assumptions on your own.

### Options:

1. For extremely cold applications we recommend an oil immersion heater which simply fits in the drain coupling on most units, replacing the drain plug, these are available in appropriate sizes from the factory. NOTE: A separate 120V, 20 Amp circuit is required for all oil immersion heaters.
2. For extremely warm temperature ranges over +100 degrees Fahrenheit consult the factory.

## Pressure Chart for Hoses & Pipes

Hose	SAE	Working PSI	Bursting PSI
¼"	100-R2A	5000	20000
⅜"	100-R2A	4000	16000
½"	100-R2A	3500	14000
¾"	100-12	4000	16000

Seamless Pipe	Working PSI	Bursting PSI
½" Schedule 80	4100	21000
¾" Schedule 80	3500	17600
1" Schedule 80	3500	15900

Caution: Never use any hose or piping that does not meet or exceed the ratings listed above.

### Line Size Calculations

Formula:  $P = \frac{V \times Q}{18,300 \times D \times D \times D}$

Where: P=PSI loss per foot  
 Q=GPM flow  
 V=SUS viscosity @  
 Operating temp.  
 D=Inside dia. Of pipe  
 in inches

Example: For a standard Series 2000 lift with a flow rate of approximately 3GPM, we recommend ½" SAE 100R2A hose up to 35 feet and ¾" pipe or hose for distances slightly beyond that. This keeps the line pressure loss at 40 PSI and allows for efficient lowering speeds.

For each T or 90-degree elbow add 3 feet to length.

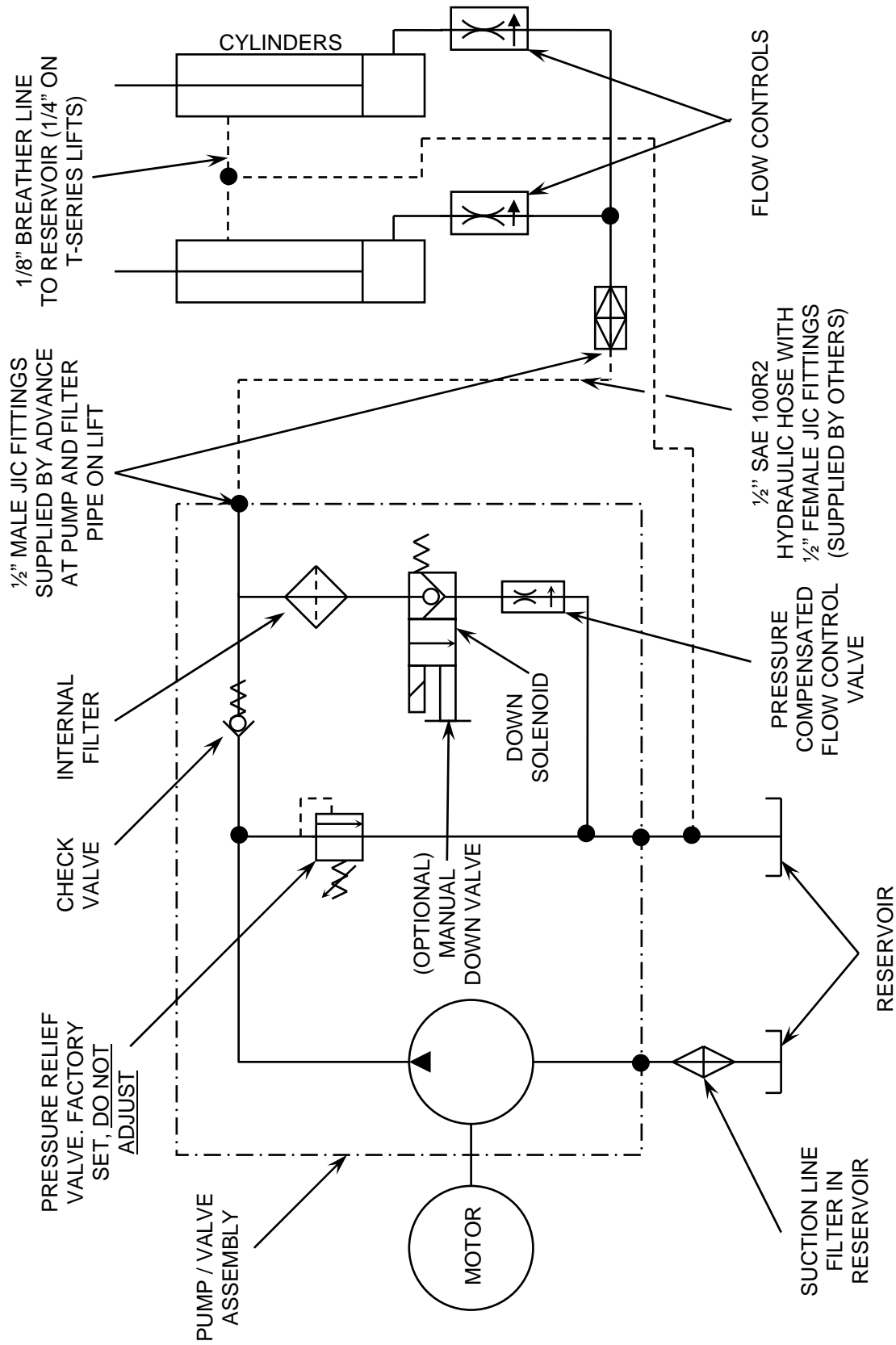
For each 45-degree elbow add 1 foot to length.

Target the pressure to below 50 PSI. The empty lift going down will see any excess piping losses as restrictions and increase the time it takes the lift to lower.

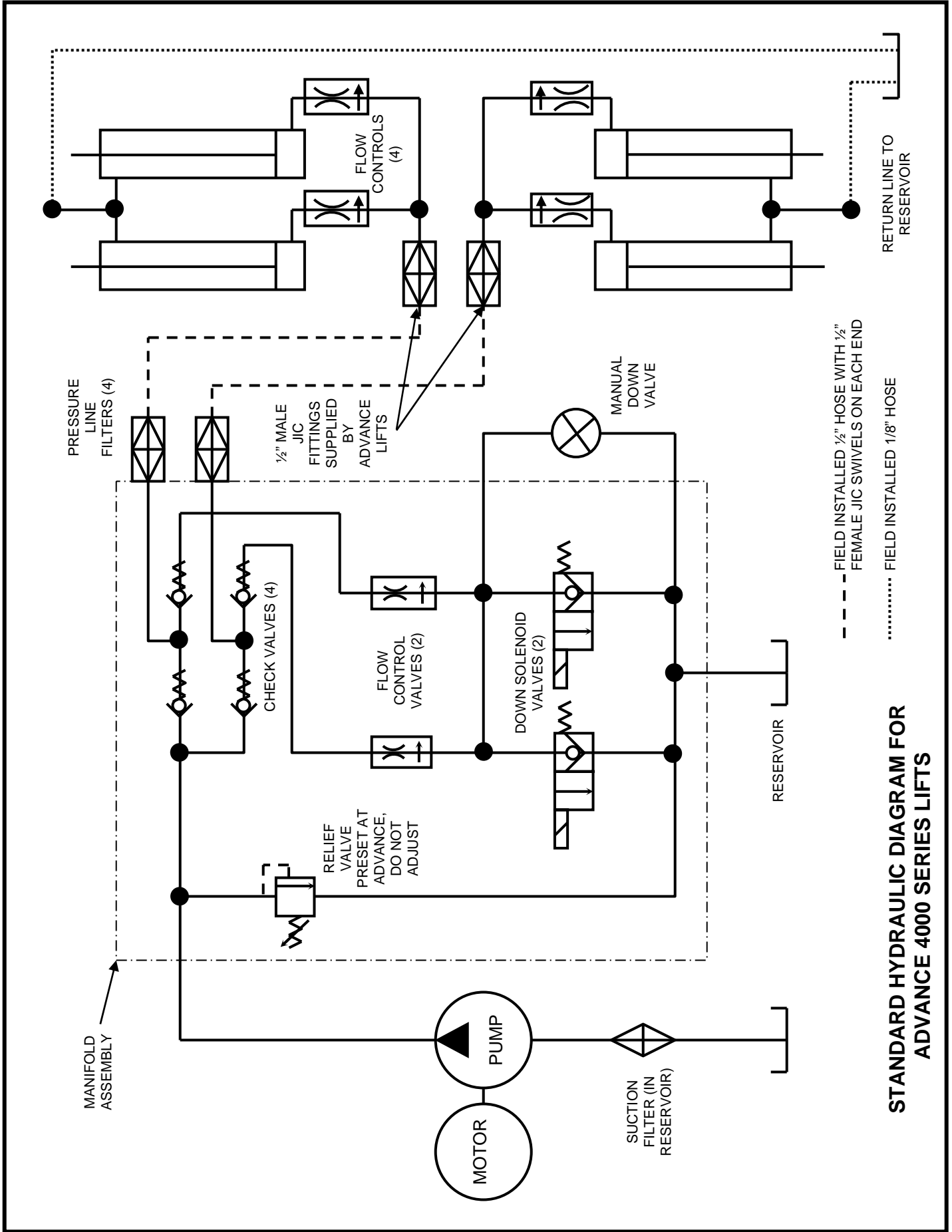
### Standard Oil Capacities of Listed Equipment

Series 2000	10 Gallons
Series 2000K, T	5 Gallons
Series 3000	10 Gallons
Series 4000	10 or 15 Gallons

# HYDRAULIC DIAGRAM FOR UNITS WITH INTERNALLY VALVED PUMPS

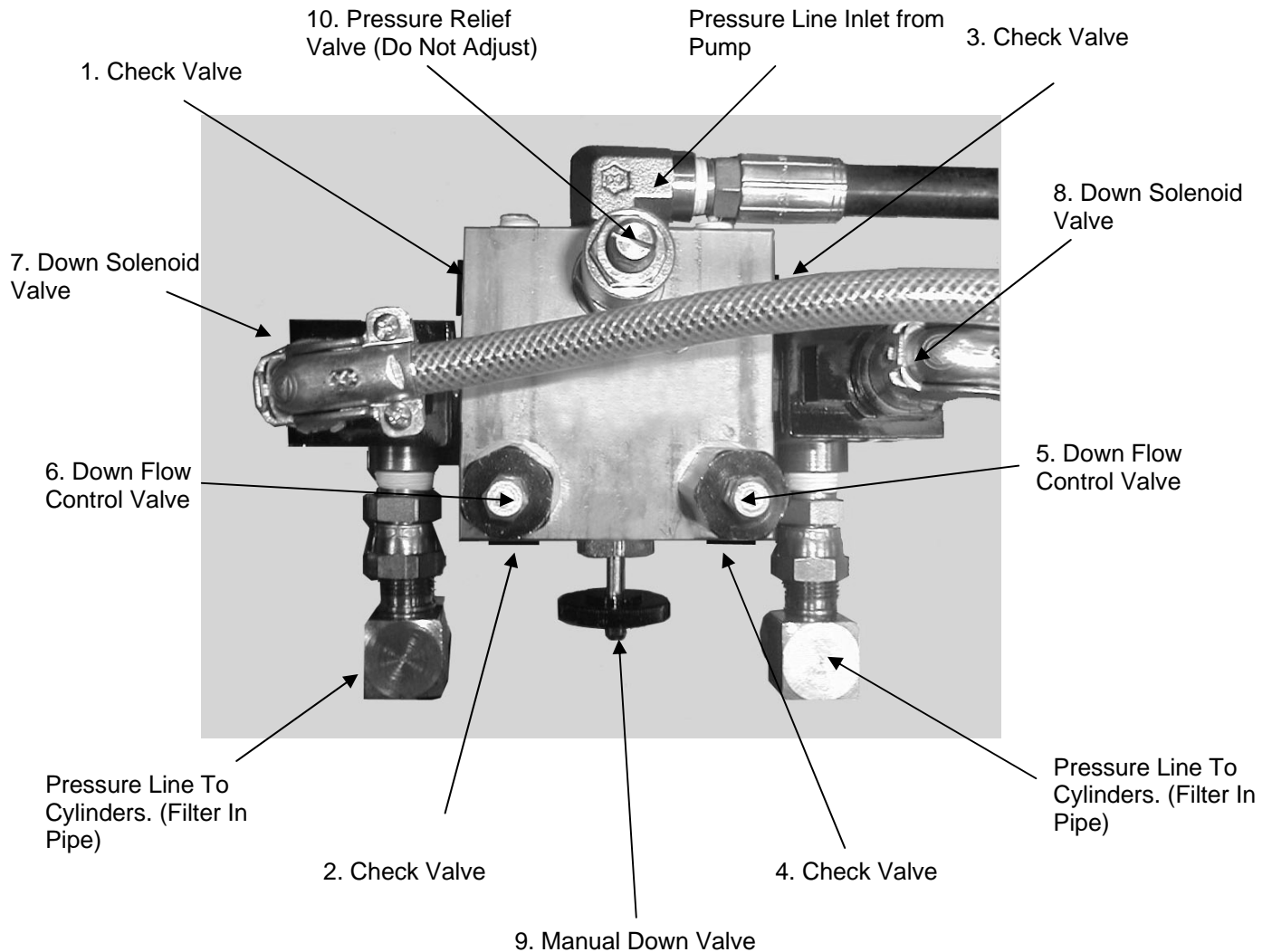


HYDRAULIC DIAGRAM FOR THE FOLLOWING MODELS  
T-SERIES, 2000-SERIES, 2000K-SERIES, 3000-SERIES



**STANDARD HYDRAULIC DIAGRAM FOR  
ADVANCE 4000 SERIES LIFTS**

Series 4000  
Standard Valve Manifold



**Reference Page 8-10 for Valve Cartridge Details**

**NOTE: Valve numbers coincide with those shown in the hydraulic diagram on Page 8-5**

**Part Number Reference**

Description	Part Number
1-4. Check Valves	001-262
5,6. Down Flow Control Valves	001-303
7,8. Down Solenoid Valves	001-293
9. Manual Down Valve	001-277
10. Pressure Relief Valve	001-263

## Repair Procedures for 3", 3-1/4, 3-1/2", & 4" Cylinders

Cylinders for models 2000, 2000K, T-Series, 3000, 4000

### Tools & Supplies Required:

- (2) Small screwdrivers to remove retaining rings and rod wipers.
- (1) snap ring tool (Waldes Truarc external type #S-660 or Industrial pliers #P-104.)
- A (5) gallon bucket to collect fluid from the cylinders.
- Wrenches to disconnect hydraulic fittings.
- Cylinder hone (Craftsman glaze breaker #9K4633 or equivalent).
- Emery cloth
- Clean lint free cloths and hose caps.
- Clean work surface (butcher paper on top of most surfaces works well), with a means of holding cylinder end fixed position for disassembly and assembly.
- "Lubriplate Grease" and hydraulic fluid matching the existing fluid in the system for topping off when finished.
- Maintenance leg supplied with each Advance unit.

### Cylinder Removal:

1. Raise the empty lift and settle it securely on its maintenance leg.
2. Once settled securely, depress the down button an additional 20 seconds to relieve any pressure from the cylinders. Remove the power connection to the power unit and mark with a warning label or lock the connection out to prevent unintended reconnection.
3. Disconnect the hydraulic hoses from the cylinders, on units made between April 1<sup>st</sup> 2000 and January 1<sup>st</sup> 2011 remove the internal "Hexagonal" flow control from the cylinder fitting nipple and cap the hose ends to prevent contamination, refer to page P 8-12 for proper orientation.
4. Remove the cylinder from the lift by freeing the upper pin first and swinging the cylinder into an easily supported position then remove the lower pin.
5. Place the hose connection end of the cylinder in a 5-gallon bucket and force the cylinder closed to drain the hydraulic fluid from the cylinder. Do not reuse the fluid unless you are sure it is contamination free by careful straining.
6. Note that if you are going to repack one cylinder on a lift, it is usually a good idea to do all cylinders at the same time. Packing's generally wear at the same rate and if you only repack one cylinder, you may have to pull the lift out of service soon thereafter to do the others.

### Cylinder Disassembly:

1. Secure the cylinder with a rod through the clevis or cross tube, do not use a vise, which will crush or otherwise damage the housing.
2. Using snap ring pliers (or screwdrivers with spiral type retaining rings); remove the retaining rings in front of the cylinder bearings. Some cylinders also have spacer rings, which are easily removed if the bearing is pushed back into the housing slightly, and these units will have a second retaining ring to remove.

### **Cylinder Disassembly: (Continued)**

3. Carefully remove any debris from the retaining grooves, and then pull out the entire rod, bearing, & piston assembly. Note that the groove in the cylinder housing has a sharp edge on the front side and a beveled back edge. The sharp edge is necessary for proper snap ring retention and will probably cut the packing when it is pulled out, but the beveled back edge will allow the new packing to slide in uncut.
4. Remove the hex nut or snap ring adjacent to the piston, then slide the piston and bearing off of the rod. If the hex nut is assembled with Loctite, a small amount of heat may help break the nut loose. Be sure that all components are placed on clean surfaces to avoid contamination.

### **Repacking and Inspection:**

1. Carefully inspect the entire housing with a flashlight, looking for any evidence of rust, scratches, or surface blemishes. Small blemishes may be removed with fine emery cloth and larger faults will require the use of the hone listed above. Be sure to thoroughly clean the housing when you are done to avoid contamination.
2. Do not become the victim of a false economy by using only part of a repacking kit. Since you have invested in disassembling the cylinder, use all new packing parts and seals of the reused old parts may fail in the near future causing a repeat of the whole exercise.
3. Remove the rod wiper on the bearing by using a screwdriver to bend the seal inward to collapse and remove it. Inspect the groove and remove any debris.
4. Lubricate and insert a new wiper with your fingers, sliding it into its groove. Depending upon temperature, the rod wiper may slide in much easier if it is warmed in hot water, then dried, lubricated, and inserted. The bearing may now be slid back onto the rod.
5. Begin repacking the piston by using a screwdriver to carefully remove the old backup rings and seal from the groove. Newer cylinders are also equipped with a wear ring that should be removed at this time. Be careful to leave the grooves nick free and clean.
6. Lubricate the new backup rings, seal and wear ring and gently stretch them into place. Note that the seal fits between the rings.
7. Inspect the static seal groove on the cylinder rod, then lubricate the groove and slide a new static seal in place. Slide the piston back into position noting that the flat side, not the chamfered side, should rest against the retaining ring or nut. Reinstall the retaining ring or nut using Loctite if the fastener is a plain nut.

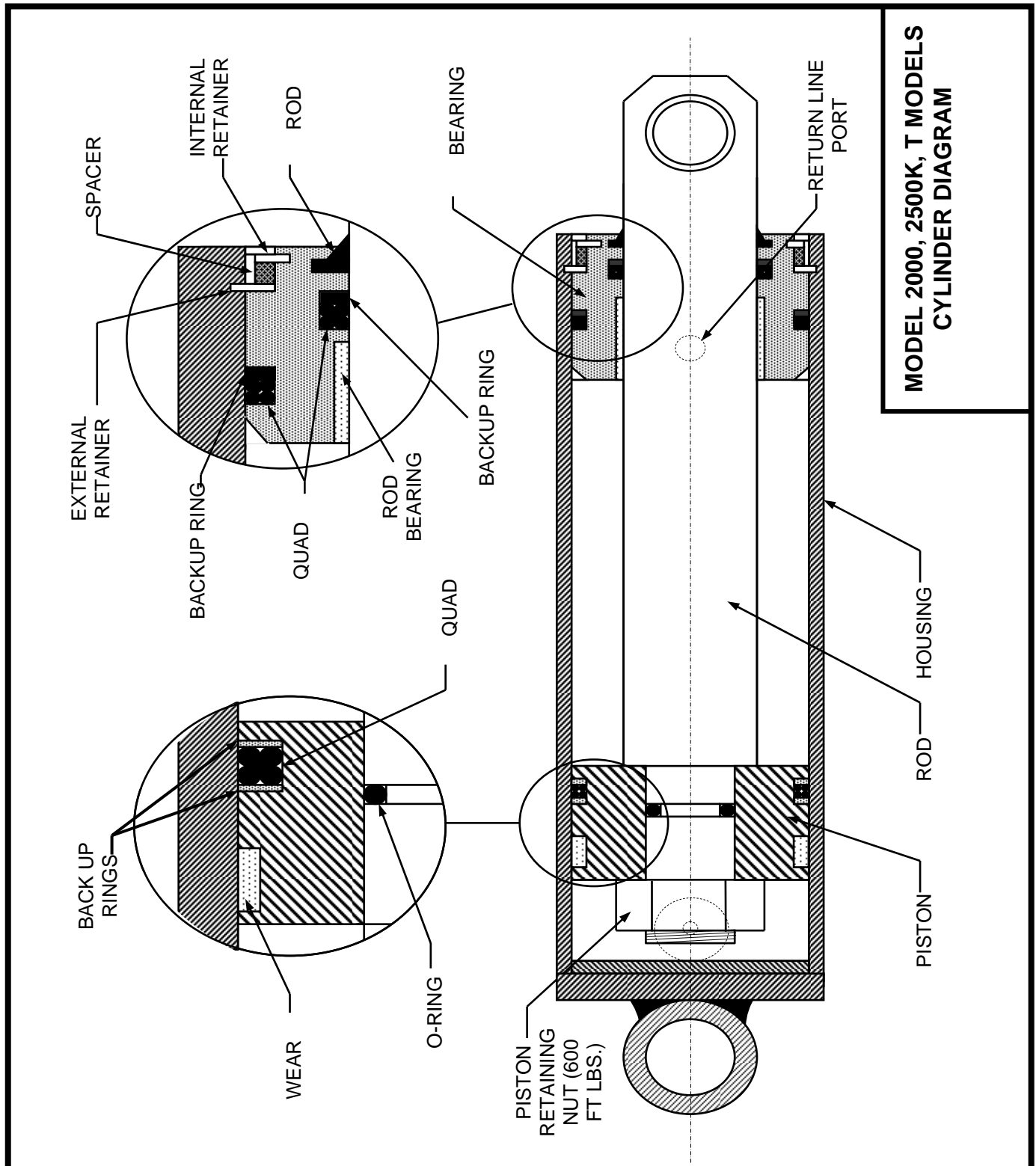
### **Assembly:**

1. Liberally lubricate the outside of the new packing kit and the groove in the cylinder housing, align the piston carefully and slide the entire assembly back into the housing.
2. With 3-1/2" & 4" cylinders you may simply compress the retaining ring and slide the bearing into position and release the ring into its groove. With 3" cylinders you must slide the bearing beyond its normal position to install the inner retaining ring, insert the spacer washer, then install the outer ring. In all cases be sure that the retaining rings are fully seated in their grooves or the cylinders will come apart when fully extended, causing an accident.

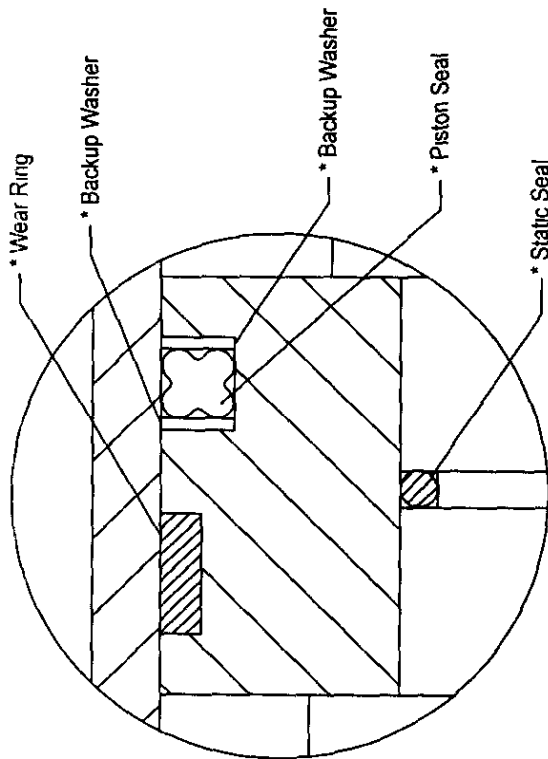


## Reinstallation:

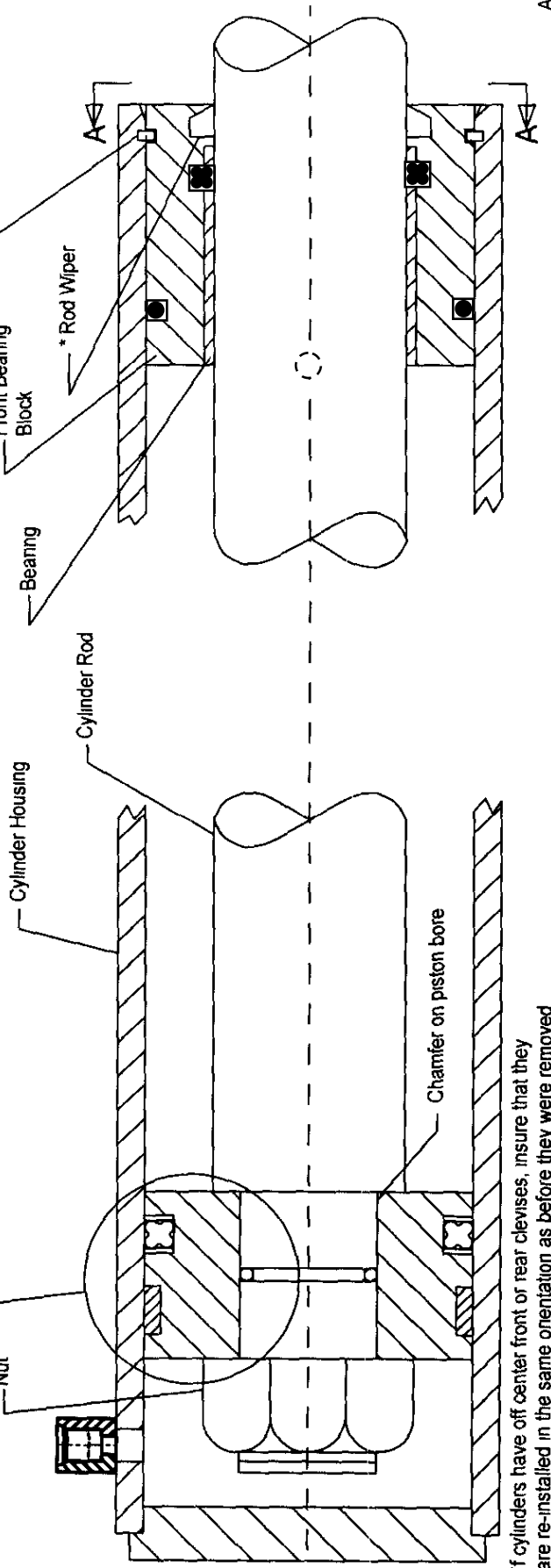
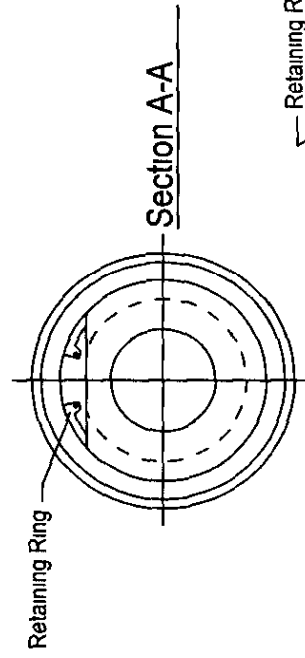
1. Remount the cylinders in the lift.
2. Clean up any spilled oil to insure that it is not later misinterpreted as a new oil leak.
3. Connect the electrical power and cycle the lift several times, holding the down button an extra 20 seconds each time to help bleed air from the hydraulic system. This will eliminate any "Spongy" operation. Check the oil level and top off ½" from the top of the reservoir with the same type fluid originally used.
4. The lift is now ready to go back into service.



**SERIES 3000, 4000, T SERIES UNITS WITH  
6000 LBS. CAPACITY AND ALL T MODELS**



\* - Included in packing kit - When ordered



If cylinders have off center front or rear clevises, insure that they are re-installed in the same orientation as before they were removed

## Section 9: Electrical Information

The motor supplied as standard is 208/230/460V 3-phase motor, with connection diagrams on the outside of the motor for low voltage, 230V or high voltage, 460V. This motor connection is also rated for 208V. As any standard motor is rated for +/-10% of voltage variation, this motor will operate properly, within ratings, at 208, 220, 230, 240, 440, 460, and 480V, 3-phase supply. There are other motor configurations including single phase 115V & 230V. If you are unsure of the correct voltage or phase, contact the factory before applying line voltage.

If the standard motor is intended for 208V line usage, some caution is advised. If your motor is a 230V motor, and your 208V line voltage drops to 207 Volts (a drop of only ½%), the motor will be operating at -10% in a marginal region. Wiring runs and actual 208 voltages become very important. If your line voltage varies (due to loads elsewhere in the system, etc.) you may have an advantage by ordering as an option a specific 208V +/-10% motor.

To reverse the direction of rotation on a 3-phase motor, reverse any two of the three power leads to the motor. On single-phase motors, see wiring diagram on motor.

### **Field Changes in Voltage:**

Advance Lifts' standard electrical supplied is 230V, 3-phase unless otherwise specified. Any field change in supply voltage would entail the following changes.

#### **230V to 460V**

- A. Change transformer primary connections to 460V.
- B. Change overload protection to proper value as per currents in motor tables. Order new overload; adjust new overload to motor full load current setting. Insure the overload is set to "manual" reset, not "automatic" to insure the equipment cannot re-start automatically.
- C. Change motor connections for high 460V.
- D. Change plug and receptacle for power, if required.

#### **460V to 230V**

- A. Change transformer primary connections to 230V.
- B. Change overload protection to proper value as per currents in motor tables. Order new overload; adjust new overload to motor full load current setting. Insure the overload is set to "manual" reset, not "automatic" to insure the equipment cannot re-start automatically.
- C. Change motor connections for low 230V.
- D. Change plug and receptacle for power, if required.

**IMPORTANT: When changing voltages, insure motor rotation is correct.**

## Motor Controllers (Typical)

### Specifications:

Motor Starter with adjustable thermal overload.

50VA transformer with 24 VAC secondary fused at 4 amps (Standard)

100VA transformer with 115 VAC secondary fused at 1.6 amps (Optional)

Reset is manual or automatic (manual is standard, automatic is not to be used)

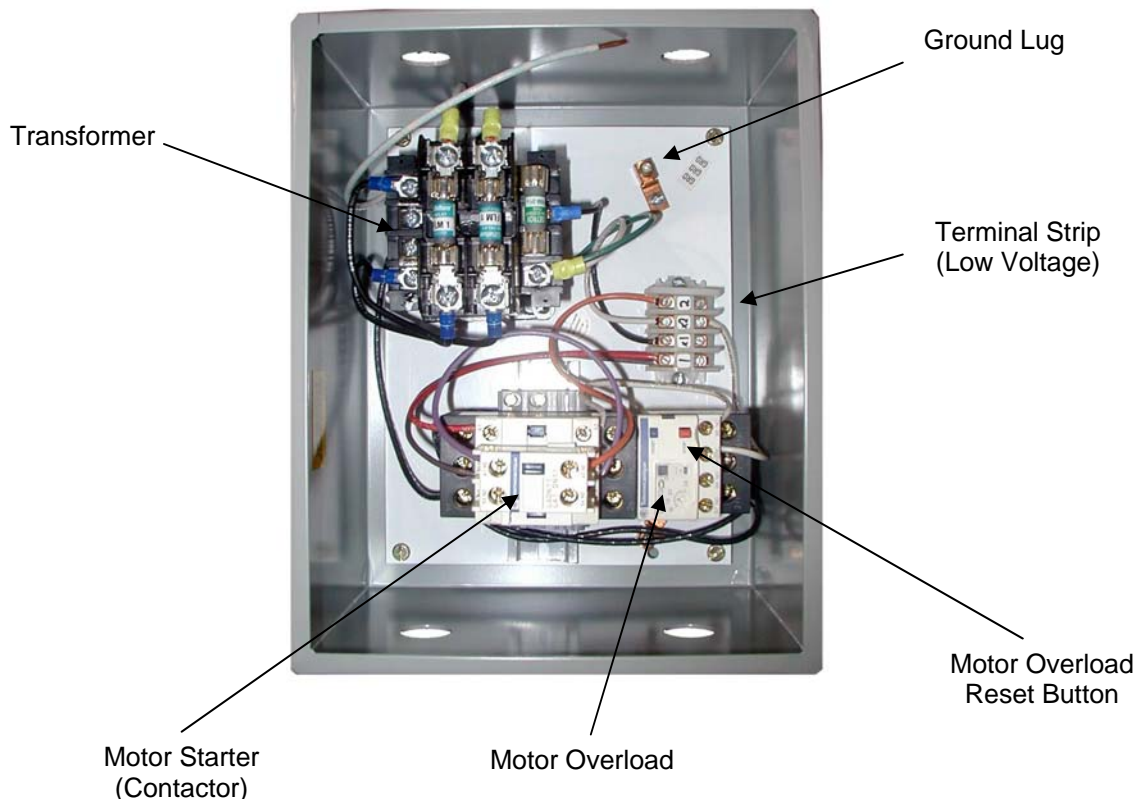
Enclosure is NEMA 12 JIC supplied with (4) conduit openings (motor, down solenoid, power and push button station)

Completely wired with terminal strips for final secondary voltage control connections  
All components UL, CSA

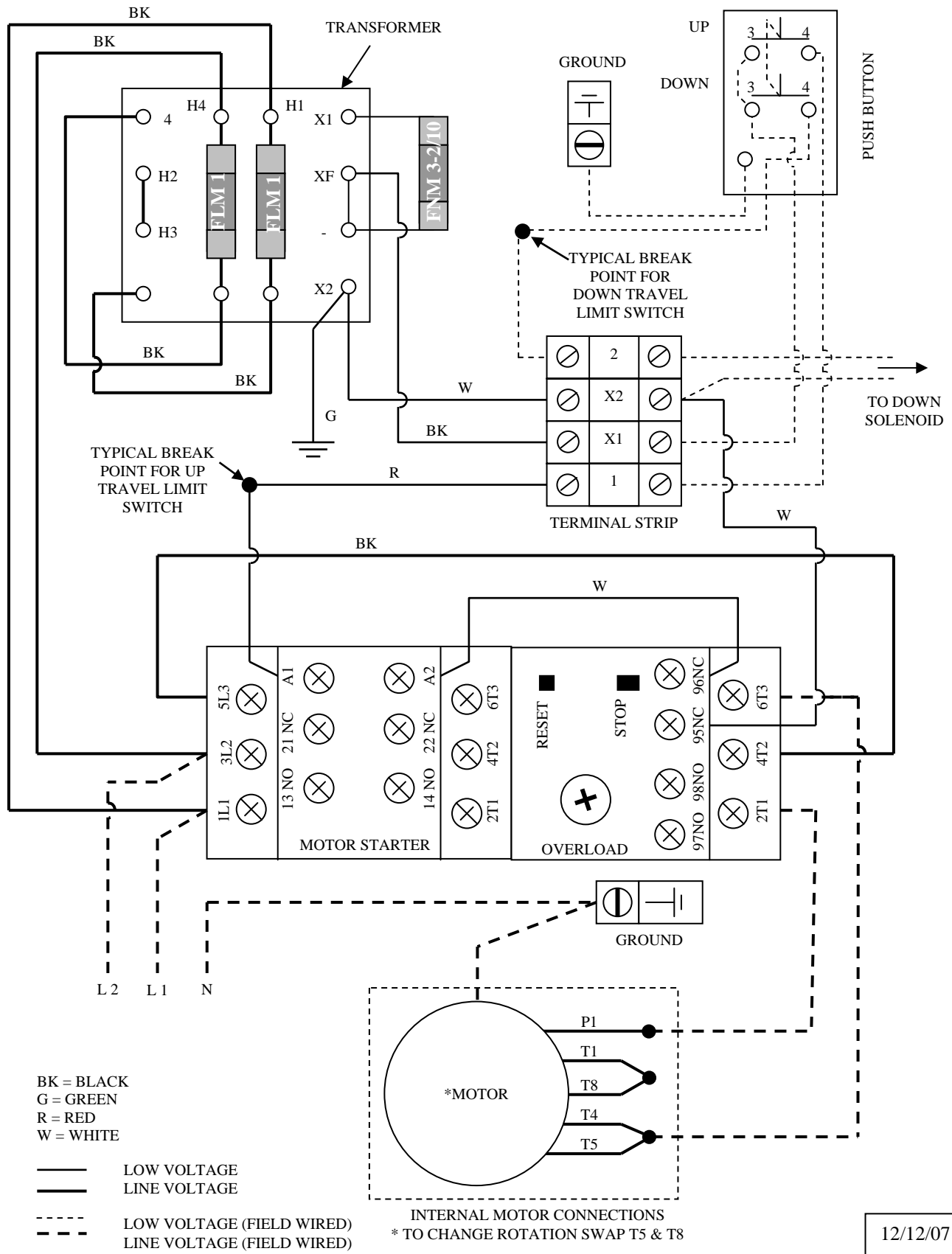
Overall dimensions: (approximate)

Metal Enclosures: 9"w x 12"h x 8"d

**Typical motor controller** – appearance may vary.

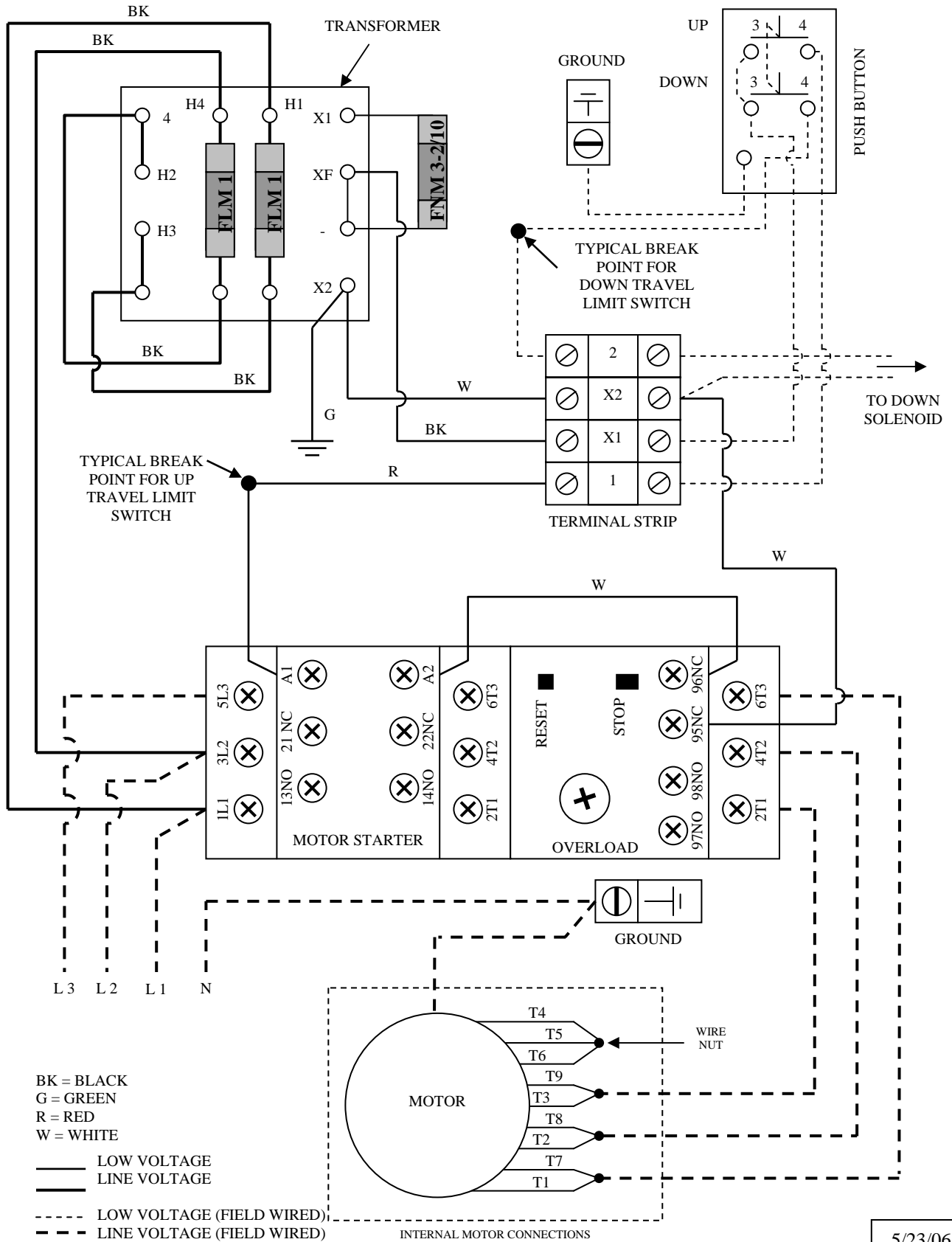


# ADVANCE LIFTS WIRING DIAGRAM FOR 230 VOLT SINGLE PHASE 5 HP



# ADVANCE LIFTS WIRING DIAGRAM

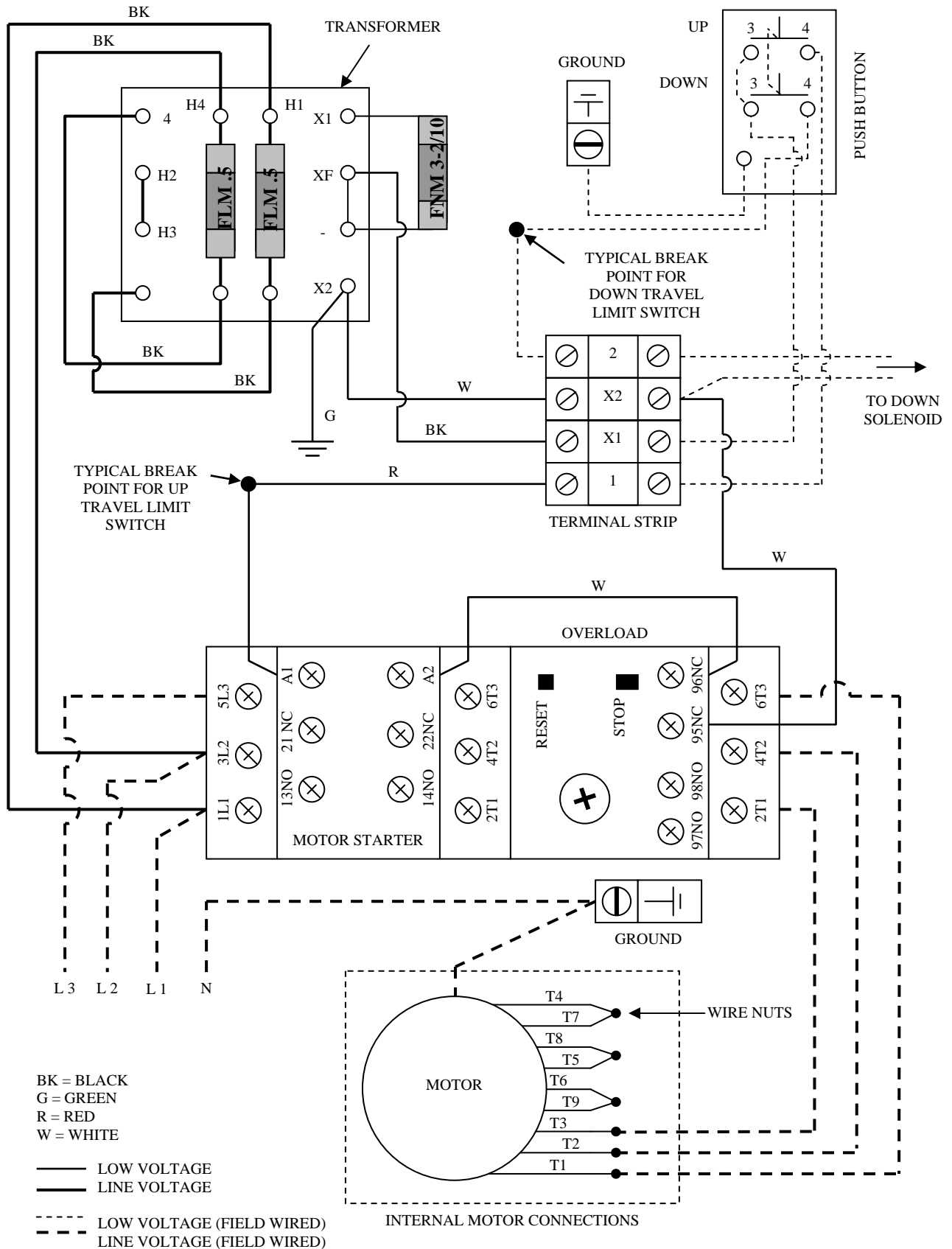
## 230 VOLT THREE PHASE 5 & 7.5HP



5/23/06

# ADVANCE LIFTS WIRING DIAGRAM

## 460 VOLT THREE PHASE 5 & 7.5HP

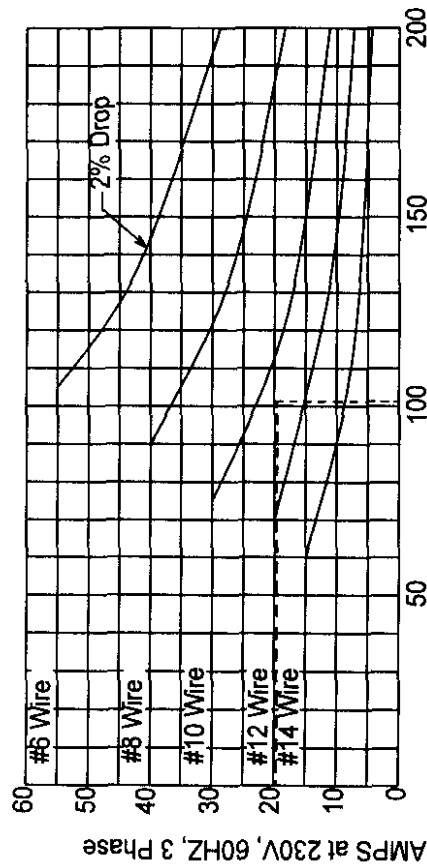


# Branch Circuit Wire Sizes For 230V & 460V, 3 Phase, 60HZ.\*

(Calculated for 2% maximum allowable line voltage drop with copper conductors Table is a guideline, not intended to supersede the National Electrical or local codes )

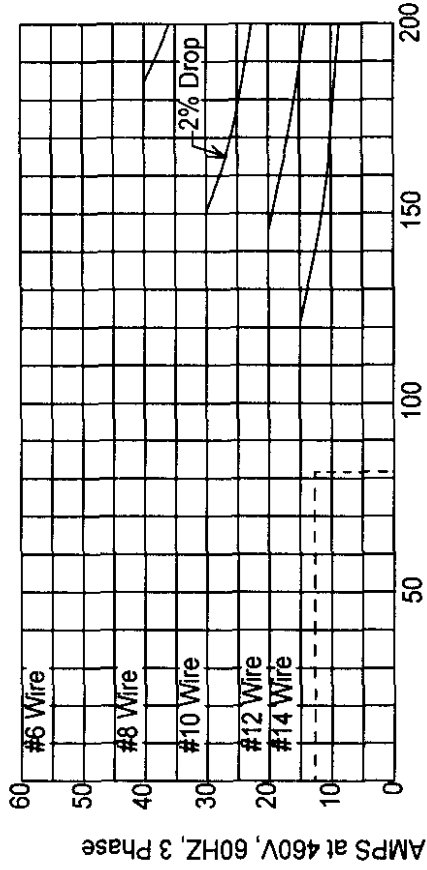
Directions Locate Current on vertical axis, locate wire length on horizontal axis Use wire size above point of intersection

\*Note See table listing minimum wire sizes and fusing on motor data page



Length of Wire in Feet

Example 5HP, 230V, 3 phase, 19 6A motor, length of wire run is 102 FT Wire size above point of intersection is #10 (#12 wire would have more than 2% drop )



Length of Wire in Feet

Example 7.5HP, 460V, 3 phase, 12 6A motor, length of wire run is 82 FT Wire size above point of intersection is #14

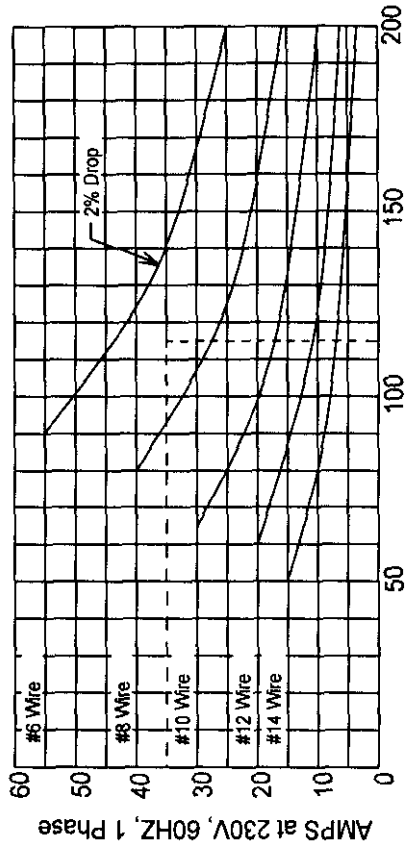
Long wiring runs with undersized wire will cause voltage drops Voltage measurements should therefore be made at the motor terminals, so that the true voltage supplied to the motor is determined Measure the voltage when the motor is fully loaded (load on lifting equipment and lift leaving the fully lowered position) Measurements with the motor idling (no load) is at low current, and voltage drops will not be apparent under those circumstances Consult the table in this manual for guidelines on wire run sizes Note importance of 208V wire runs as noted in Motor Data



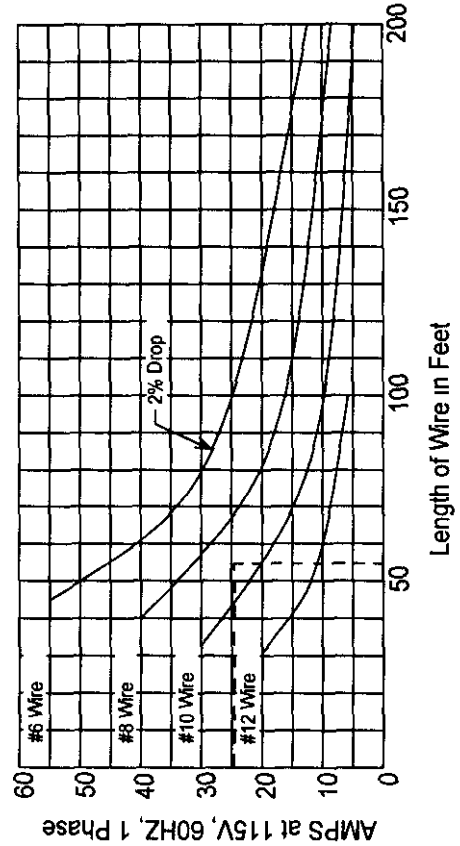
## Branch Circuit Wire Sizes For 230V & 115V, 1 PHASE, 60HZ

(Calculated for 2% maximum allowable line voltage drop with copper conductors. Table is a guideline, not intended to supersede the National Electrical or local codes.)

Directions: Locate Current on vertical axis, locate wire length on horizontal axis. Use wire size above point of intersection.

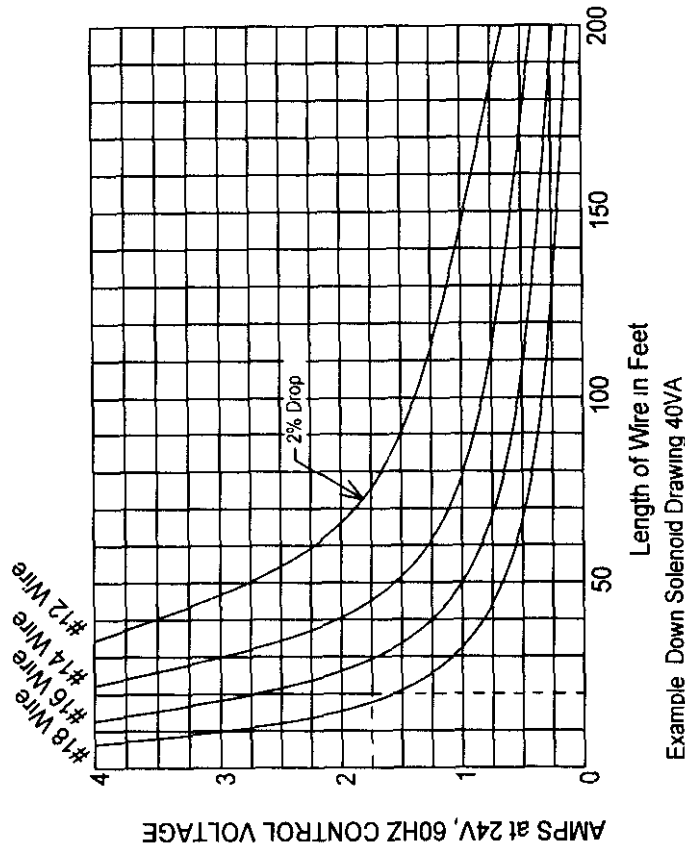


Example 5HP, 230V, 1 phase, 35A motor, length of wire run is 115FT. Wire size above point of intersection is #6



Example 1 5HP, 115V, 1 phase, 24A motor, length of wire run is 55FT. Wire size above point of intersection is #8

## CONTROL CIRCUIT WIRE SIZE FOR 24V, 1 PHASE, 60HZ



$$I = \frac{W}{E} = \frac{40VA}{24A} = 1.7A$$

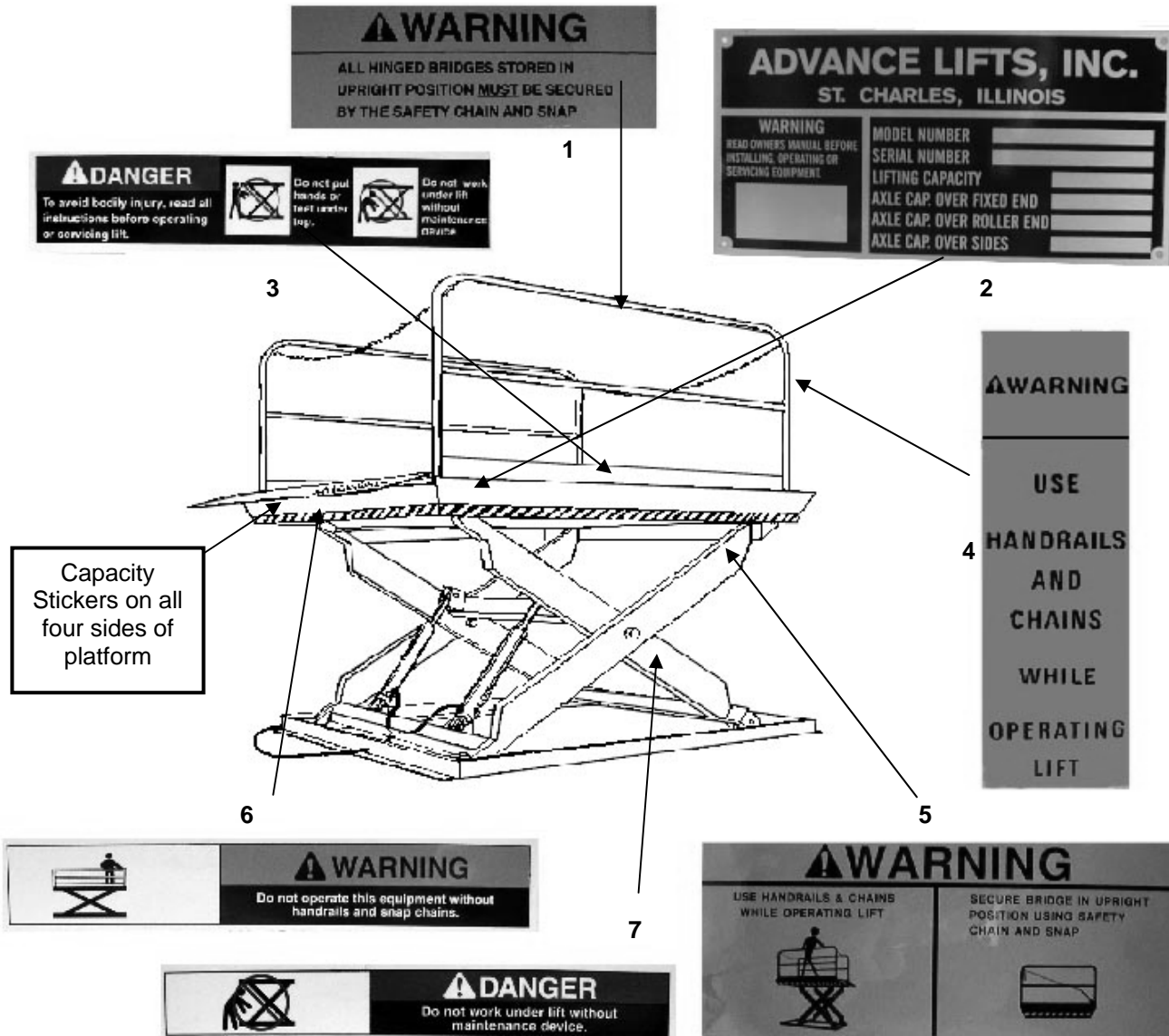
Length of coil cord is 20FT. Wire size above point of intersection is #16

Advance Lifts uses #16-4 wire size when 20FT coil cord is ordered for push button station control

\*Graph calculated for 4 wire copper cord, types S, SO, SJ, SJO



## SECTION 10: IDENTIFICATION AND LABEL PLACEMENT



### TYPICAL PLACEMENT

(EACH DECAL KIT IS SUPPLIED WITH LOCATION INSTRUCTIONS)

No.	Qty.	Location
1.	(2)	Centers of handrail, both sides
2.	(1)	Cylinder end, right side of platform
3.	(4)	Centered on each side of platform
4.	(4)	Upper vertical section of handrail
5.	(2)	Outer leg
6.	(1 per bridge)	Under bridge
7.	(2)	Torque tubes each end

### DECAL KITS BY MODEL/SERIES

SERIES 2000 (P-004-059) SERIES 2000K (P-003-993)

T SERIES (P-023-350) SERIES 3000 (P-004-261) SERIES 4000 (P-004-375)

## SECTION 11: TROUBLESHOOTING

### A. Equipment does not rise; pump is running: (see also Section M)

1. The motor rotation may be reversed. See the installation procedure on how to jog the motor to check for proper rotation. If the lift has been installed for some time and the motor is 3-phase, it is possible that the plant wiring “upstream” has been changed during plant maintenance or alteration, and the motor is now running reversed. A hydraulic pump can only run reversed for a short time (possibly 10 to 20 seconds) without causing permanent pump damage.
2. Motor may be single phasing. Check wiring and overloads to be certain that each three-phase line is present at the motor.
3. Voltage at motor terminals may be too low to run the pump at existing load. Check voltage directly at motor terminals while pump is running under load. (Reading source voltage with the pump idling will not give accurate results). Inadequate or incorrect wiring can starve the motor of voltage and current and will show up at the motor terminals when the motor is drawing the higher current that is required while motor is loaded.
4. Check for a hydraulic hose leak or pinching, and correct as necessary.
5. Check under the pump coupling to insure the key way has not slipped off the pump shaft.
6. Check for oil shortage in the reservoir and correct by filling the reservoir. Refer to “Fluid Recommendations” in this manual for the correct fluid for your ambient temperature.
7. The suction filter in the reservoir or the pressure line filters in the pipe outlet of the power unit or the breather cap on the reservoir may be clogged. Clean as required.
8. Check if the load is exceeding equipment ratings causing the relief valve to bypass the fluid back to the reservoir. Never change the relief valve setting, these are 100% tested, adjusted, and locked at the factory. Any change in the relief valve setting could cause your equipment either not to lift its capacity, or cause dangerous forces in the equipment, and void your warranty.
9. Check that the suction line fittings are not loose, causing the pump to pull in air instead of fluid. Check for a hairline crack on the suction port of the pump. The clear suction line should stay full of oil at all times, clear, and no air. Check that the natural curve of the suction hose in the reservoir doesn't cause the filter to rise out of the fluid. Re-install the suction line without rotating it and the tension of the hose will free the suction hose to lie against the reservoir wall and the filter to lay flat near the reservoir bottom. If you have the short round “pancake” type of filter with the filter screen on the bottom of the filter, insure that it does not rest against the bottom of the reservoir, as this will restrict the flow to the pump.

## SECTION 11: TROUBLESHOOTING (Continued)

10. The down solenoid may be energized due to incorrect wiring, or mechanically stuck open, bypassing fluid.
  - A. Check the wiring. Hold a non-magnetized screwdriver to the top of the down solenoid coil and press the up button. If you can feel magnetism, the wiring is faulty.
  - B. Lightly tap the down solenoid to seat it properly. Do not bang it hard, as internal stem parts may be permanently damaged. The solenoid coil can be removed, and the down valve removed for cleaning as explained in the hydraulic "Component Information" section.
  - C. Disconnect the pressure line from the valve manifold to the equipment. Place a pressure gauge at the valve output, using high-pressure reducers. Press the up button in a short jog and read the pressure. Press the down button to relieve the pressure. If the system will not put out the pressure indicated on the hydraulic diagram, the trouble is either the valves or pump. If a load is not available, then the maximum hydraulic system pressure can be checked on a gauge by raising the unit to its full height momentarily against its physical stops. Proceed to step 11 to determine which place the trouble exists.
11. The hydraulic pump may be inoperative. Disconnect a hydraulic line at the power unit, use a large bucket (5-gallon) and run the pump a short time. If no flow appears either the pump or pump motor coupling inside motor mounting flange is defective, or pump rotation is reversed. Connect a pressure gauge to the outlet of the pump, through a high-pressure tee and bleeder valve with hose to a bucket. Slowly turn the bleeder valve and see if it produces specified pressure. Do not close the valve all the way as the pressure buildup of a good pump could cause the pump to explode. If the pump does not put out the required pressure, then the problem is in other areas, such as a down solenoid valve leaking fluid back to the reservoir, allowing pressure not to be built up in the system. If the pump will not put out the required pressure, replace the pump.
12. Repeated continuous type operation of the equipment may cause thinning of oil due to heat buildup. Feel the side of the reservoir to check the temperature of the oil. The equipment is intended for dock type operation, not elevator type operation that would make the equipment cost several times as much. The thin oil can cause the equipment not to rise, and in time, ruin the hydraulic pump. This type of operation could void the warranty considerations.

### **B. Equipment raises too slowly:**

1. Small amounts of foreign material could stick in the down solenoid, bypassing some of the fluid. Lower equipment and clean the down solenoid valve.
2. Foreign material clogging the suction filter, breather cap, pressure line filter, or a hose that is pinched. See A-4, 5, 6, 7 and 9.
3. Low motor voltage. See A-3.
4. Load exceeding equipment ratings. See A-8.
5. Oil may be too thick (ambient temperature) for proper operation. Refer to "Fluid Recommendations".

## SECTION 11: TROUBLESHOOTING (Continued)

6. Equipment in which the cylinders are field installed may have incorrect alignment of cylinders, causing binding. Measure and ascertain that the cylinders are in the correct alignment with the equipment and with each other. Binding cylinders will often cause a “shuddering” vibration when the equipment is operating.
7. Oil may be too thin for ambient temperatures. See A-12

### **C. Motor labors or heats excessively:**

1. Voltage may be too low. See A-3.
2. Wiring may be incorrect. Check that one leg of the motor lines is not open or grounded.
3. Pump may be overheating from oil starvation that develops high internal heat, heating both the motor and the pump, eventually causing pump failure. See A-1 through A-9.
4. Oil may be too thick for ambient temperature. See “Fluid Recommendations”. Binding cylinders. See B-6.
5. Pump may be overheating due to insufficient lubrication caused by oil being too thin. See A-12.

### **D. Operation is “spongy”:**

1. Bleed the cylinders to release trapped air by lowering the equipment to the fully down position and hold the down button depressed for an additional 20 seconds. Raise lift and repeat this procedure several times. Check that the oil completely fills the clear suction hose at all times. If the level falls back to the reservoir oil level, check suction lines and fittings for an air leak.
2. Check for oil starvation. See A, 1-9.
3. Do not confuse “spongy” operation with small surges caused by foreign material on equipment wheel roller plates.

### **E. Equipment lowers too slowly:**

1. Pressure filter in pipe outlet of power unit may require cleaning. See “Component Information” for proper procedure.
2. Check for pinched hose, tubing, or obstruction in piping lines.
3. Check “Fluid Recommendations” for your ambient temperature type. Oil may be too thick. See also H-6.
4. Foreign material in flow control valve. With equipment fully lowered, remove and flush out any foreign material. Do not change flow control setting, as equipment could be damaged by high speeds. See “Component Information” for proper way to remove, clean, and install the flow control valve.
5. Equipment having two down solenoid valves and/or flow control valves may have one valve inoperative.
6. Binding cylinders. See B-6.

## SECTION 11: TROUBLESHOOTING (Continued)

### F. Equipment lowers too fast:

**CAUTION! This can develop into a dangerous condition, the equipment reaching destructive speed. Find and correct this condition before allowing use of this equipment.**

1. Check for leaking hoses, particularly cracked fittings or other damage caused by equipment motion near the equipment and power unit, over-tightening of fittings until they develop hairline cracks. Check underground conduits for evidence of fluid leaks.
2. Inspect the check valve. The combination of the flow rates of the down flow control valve and a check valve stuck open due to foreign material, could increase the lowering speed. See G-2.
3. If the equipment lowers initially at a normal rate, then speeds up as the equipment lowers, check the flow control valve(s). Foreign material could stick, not allowing the pressure compensated function of the control to operate normally. See "Component Information" for the method of removal and replacement.
4. Oil may be too thin. See A-12.

### G. Lift raises then lowers back down:

1. Down valves may be incorrectly wired or stuck open due to dirt in the system. See A-10, a. & b.
2. Check valve may be stuck open due to dirt in the system. See "Component Information" for removal, cleaning and installation. If pump and motor turns backward while the lift is lowering back down, the check valve is certainly inoperative.
3. Cylinder packing may be leaking. Check for oil leakage, see "General Hydraulic Information" and section on "Cylinder Repair Procedures".
4. Check for leaking hoses, fittings, or evidence of oil in underground conduit runs.

### H. Equipment has raised but will not lower, or lowers partly:

1. Check both main and transformer secondary fuses.
2. Incorrect down solenoid wiring.
3. Stuck down solenoid valve. See A-10b, however do not remove the down solenoid body, as the equipment will come down with nothing to hold it in place.
4. Faulty down solenoid coil. Coil can be removed safely for replacement. As in step 3, do not remove valve body.
5. Down limit switch (if used) or electric toe guards (if used) inoperative or incorrectly wired. If you have electric toe guards, check that the hydraulic hose is secured to the bottom of the pit so it cannot accidentally trip the electric toe guard.
6. Maintenance device or other object blocking down travel. Do not pry out any object blocking down travel, because the hydraulic pressure has already been removed when the down button was pressed, and the equipment will fall at a dangerous speed. Raise the equipment slightly using the up button, remove object, then press the down button.

## SECTION 11: TROUBLESHOOTING (Continued)

7. Improper oil for ambient temperatures. Oil may be too thick, causing improper operation of velocity fuses (if used). See "Component Information" on velocity fuses. Warm the cylinders by wrapping heat tape (of the type used for water pipes) around the cylinder. Later, after operation is normal, change to proper oil as per "Fluid Recommendations".
8. Binding Cylinders. See B-6

### **I. Equipment raises slightly, then equipment stops and motor stalls:**

Check the suction line filter. Filter may be clogged, allowing slight movement until grime seals off filter. Check the suction filter for buildup of "varnish". If necessary, remove the suction filter, hold the suction hose down into the oil, and try normal up operation of equipment. If operation returns to normal either clean or replace the suction line filter. See the "Component Information" section for procedure and proper placement of the suction hose.

### **J. Oil leaking or spraying out of the reservoir:**

1. Reservoir may be mounted on its side. The motor should sit on top of the reservoir, the mounting bracket positioned vertical for lagging the power unit to the wall.
2. Clogged air breather allowing reservoir to build up positive pressure, then spraying oil. Try unit operation with air breather removed and clean or replace the air breather if this corrects the condition.

### **K. Equipment will not raise, motor will not run:**

1. Control fuse has blown.
2. Motor starter overload has tripped. Depress reset button on controller.
3. Line fuse blown, single phasing motor or motor starter overload tripping. See #2 above.
4. Initial installation: Line voltage 230V and transformer wired for 460V. This will give 12V-control voltage instead of 24V, and motor starter will not operate. Check to make sure motor was not wired for 460V before trying operation. The same situation applies to 115V control voltage. Use a good AC voltmeter to check for proper control voltage.
5. Check transformer for loose screw terminals at the various connection points including jumpers and under the fuse clips.
6. Check push button station for proper operation and its wiring to the controller.

### **L. Down solenoid or Magnetic Starter Coil burns out routinely:**

1. Transformer may be wired wrong. As an example, a 460V line with the transformer and primary wired for 230V will give the control voltage of 48V instead of 24V. (Same doubling voltage applies to 115V control transformers.) This will burnout coils ranging from immediately to several month intervals, depending on the stamina of the coil. Correct the condition. P 10-5
2. The transformer may be defective. Check control voltage with a good AC voltmeter.



## SECTION 11: TROUBLESHOOTING (Continued)

3. Although very rare, high voltage spikes may be coming in on the power lines at random, burning out coils. This cannot be detected with a power company recorder, A "Varistor" can be purchased and easily installed on control systems to protect the coils. More severe cases on both 115V or 24V control systems may need a special "High Insulation Transformer" in place of the standard control transformer.

### **M. Equipment does not lift rated load, or raises load about 1" then stops:**

1. Check troubleshooting section (A), 2 through 11. Check if platform roller wheels roll freely with no binding as lift raises and lowers.
2. Lift may be overloaded. If a lift is listed as capable of fork truck loading, bear in mind that most "sit-down" rider fork trucks weigh at least 5,000 to 7,500 pound empty.
3. Platform may be shifted or damaged from transit or unintentional abuse.
  - A. Check if the inside edge of the bevel toe guard is rubbing against the base frame in the fully lowered position. Look for scratch marks on the base frame. Bend back bevel toe guards as required and see "b" below.
  - B. Check if the platform roller wheels are running straight on their platform members as the lift raises and lowers and legs or wheels are not rubbing on nearby platform members. Consult Advance Lifts on how to straighten out a platform.
  - C. Check that the platform roller wheels are actually rolling as unit rises.
4. There may actually be no problem. Many shipping tickets contain estimated weights much lower than the actual weight. The lift may be seeing a load based on shipping tickets, well above lift capacity. In this case the lift would not generally raise the 1" and stop, generally it will not lift at all from the full lowered position.

### **N. Breather lines do not stay connected.**

1. Be certain that the lines are not pinched.
2. Check that there is no debris in the lines.
3. Once a line has been removed from the fitting, the hose must be cut back before reinstallation.
4. If lines are completely filled with oil, drain oil out and test cylinders for seal failures.
5. Remove breather lines from both cylinders and raise the unit fully to clear out oil "weepage" from cylinder housing. Once all the oil has been removed, reconnect the breather lines as described in #4. Raise the unit to full height again, breather lines will stay on if there are no obstruction or debris in the hose. Instruct the owner to raise the unit fully once a week to keep the buildup in the cylinder housing to a minimum.

## SECTION 12: ADVANCE LIFTS INC. PARTS AND LABOR WARRANTY

For a period of two years from date of shipment from the Company's plant, the Company agrees to replace or repair, free of charge, any defective parts, material or workmanship on new equipment. This shall include electrical and hydraulic components.

For a period of ten years from date of shipment from Company's plant, the Company agrees to replace or repair any defective structure.

Company authorization must be obtained prior to the commencement of any work. The Company reserves the right of choice between effecting repairs in the field or paying all freight charges and effecting the repairs at the Company's plant. The Company further reserves the right of final determination in all warranty considerations. Evidence of overloading, abuse, or field modification of units without Company approval shall void this warranty. No contingent liabilities will be accepted.

Damage incurred in transport is the responsibility of the carrier and is not covered by this warranty. Any damage detected upon receipt of equipment should be immediately reported to the carrier. If you need assistance filing your claim, please contact Advance Lifts.

## SECTION 13: OPTION INFORMATION

### Limit Switches:

2000, 3000 & 4000 Series: Limit switches are mounted to the base frame and activate off a factory welded bracket on the scissors legs. To adjust: Raise unit to desired height, loosen the arm set screw and rotate limit switch activator arm until it comes into contact with the activation plate. Cycle the lift to check for correct height. If too high, lower the lift an equal distance of the over-travel and reset limit switch. If too low, raise the lift an equal distance above desired height and reset the switch. Repeat this process until desired height is achieved.

T-Series: Limit switches are mounted to a U-channel along the side of the base frame. The contact arm is activated by the wheel clevis straps welded to the side of the scissors leg. The limit switch contact arm cannot be set above a parallel plane of the base frame. Depending on the levelness of the installation, it may be necessary to bend the contact arm slightly to make consistent contact with the clevis straps. To adjust the limit switch, raise the unit to desired height. Preset the contact arm facing the clevis straps on a downward angle and tighten the set screw. Slide the whole limit switch assembly toward the clevis and listen for the limit switch to activate. Tighten set screws and operate the lift to check for desired height. Make slight forward and back adjustments to fine tune the set point.

## SERIES 2000 PARTS LIST

GENERAL DESCRIPTION	PART #	GENERAL DESCRIPTION	PART #
<b>MECHANICAL:</b>		<b>COMPLETE POWER UNIT:</b>	
WHEEL ASSEMBLY	P-005-244	230 VOLT, 1 PH, 24VA, WITH PUSHBUTTON	P-004-896
WHEEL BASE & PLATFORM PIN (1-1/4" x 3-3/4")	P-A-0216	230 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-003-562
WHEEL, BASE AND PLATFORM PIN SNAP RING	P-001-061	460 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-004-895
MAIN AXLE PIN (1-3/4" x 6-7/8")	P-A-0227		
MAIN AXLE PIN SNAP RING 1-3/4"	P-001-063	<b>CONTROL BOX. COMPLETE:</b>	
UPPER WHEEL PIN ASM (TATTLE-TALE)	P-015-484	230 VOLT, 1 PHASE	P-004-790
UPPER WHEEL PIN PLUG (TATTLE-TALE)	P-A-4258	230 VOLT, 3 PHASE	P-003-966
STEEL HANDRAIL WITH SAFETY CHAIN	P-004-433	460 VOLT, 3 PHASE	P-004-783
SAFETY CABLE, (64-3/4")	P-004-386		
STEEL BRIDGE (12" X 72")	P-003-572	<b>TRANSFORMER: (SELECT BY VOLTAGE AND PHASE)</b>	
		100VA transformers used on lifts with warning light or bell.	
<b>CYLINDER: CURRENT STANDARD (5/88 TO DATE)</b>		230V, 24V, 1 PHASE	P-001-845
Lifts manufactured before 4/1/00 require an elbow part		240-460V, 24V, 3 PHASE	P-001-844
# P-010-219 when replacing a complete cylinder assembly.		230V,24V,1 PHASE, WITH BELL OR LIGHT	P-000-746
COMPLETE CYLINDER	P-D-0024	240-460V,24V,3 PHASE WITH BELL OR LIGHT	P-000-399
CYLINDER PACKING KIT	P-003-514		
CYLINDER HOUSING	P-004-053	<b>CONTACTOR, MOTOR STARTER:</b>	
CYLINDER ROD ASSEMBLY	P-004-054	230V, 1 PHASE, CONTACTOR	P-000-414
CYLINDER BEARING ASSEMBLY	P-003-923	230V, 3 PHASE, CONTACTOR	P-000-413
CYLINDER PISTON ASSEMBLY	P-A-1409	460V, 3 PHASE, CONTACTOR	P-000-413
CYLINDER PIN UPPER	P-A-1951		
CYLINDER PIN LOWER	P-A-0209	<b>OVERLOAD:</b>	
CYLINDER PIN SNAP RING 1"	P-001-876	230V, 1 PHASE, OVERLOAD	P-000-420
FLOW CONTROL CARTRIDGE (BEFORE 4/00)	P-001-302	230V, 3 PHASE, OVERLOAD	P-000-418
GREEN HEXAGONAL FLOW CONTROL (AFTER 4/00)	P-015-396	460V, 3 PHASE, OVERLOAD	P-000-417
<b>CYLINDER: (PRE 5/88)</b>		<b>MOTOR: (SELECT BY VOLTAGE AND PHASE)</b>	
COMPLETE CYLINDER	P-005-755	208/230V 1 PHASE	P-001-327
CYLINDER ROD ASSEMBLY	P-005-756	208/230/460/480V 3 PHASE	P-003-373
UPPER CYLINDER PIN, (OLD STYLE)	P-A-0226		
LOWER CYLINDER PIN, (OLD STYLE)	P-A-0209	<b>OPTION:</b>	
<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>		BELL AND TIMER KIT, 24V	P-005-823
HYDRAULIC PUMP	P-000-357	BELL AND TIMER KIT, 110V	P-005-825
FLOW VALVE	P-004-334	STROBE WARNING LIGHT, 24V	P-000-805
CHECK VALVE	P-001-262	STROBE WARNING LIGHT, 110V	P-001-422
24V DOWN SOLENOID VALVE AND COIL ASM	P-001-259	FLUID HEATER	P-001-347
24V DOWN SOLENOID COIL (ONLY)	P-001-260	BLUE SPRAY PAINT, 16 oz	P-015-173
24V/115V DOWN SOLENOID VALVE (ONLY)	P-001-279	YELLOW SPRAY PAINT, 16 oz	P-015-174
115V DOWN SOLENOID AND COIL ASM	P-001-296	POWER UNIT DECAL KIT	P-003-868
115V DOWN SOLENOID COIL (ONLY)	P-001-297	COMPLETE DECAL KIT FOR 2000K	P-003-993
FLOW CONTROL VALVE (3.5 GPM)	P-001-293	LIMIT SWITCH ASSEMBLY	P-003-898
RELIEF VALVE	P-001-263	INSTALLATION KIT, 20' HOSE AND 10 GAL FLUUII	P-006-400
BREATHER CAP FOR RESERVOIR	P-001-890	OWNERS MANUAL	P-003-566
		REPLACEMENT NAME/SERIAL NUMBER TAG	P-001-448

**TO ORDER PARTS CALL 800-843-3625  
OR E-MAIL PARTS@ADVANCELIFTS.COM**

## T SERIES PARTS LIST

GENERAL DESCRIPTION	PART #	GENERAL DESCRIPTION	PART #
<b>MECHANICAL:</b>		<b>COMPLETE POWER UNIT:</b>	
ROLLER WHEEL	P-023-153	230 VOLT, 1 PH, 24VA, WITH PUSHBUTTON	P-004-771
WHEEL, BASE, PLATFORM PIN (1.25 X 3.75)	P-A-0216	230 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-003-563
WHEEL, BASE, PLATFORM PIN SNAP RING	P-001-061	460 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-004-770
MAIN AXLE PIN (1-3/4" x 6-7/8")	P-A-0227		
MAIN AXLE PIN SNAP RING 1-3/4"	P-001-063	<b>TRANSFORMER: (SELECT BY VOLTAGE AND PHASE)</b>	
STEEL HANDRAIL WITH SAFETY CHAIN	P-004-433	100VA transformers on lifts with a warning light or bell.	
SAFETY CABLE, (64-3/4")	P-004-386	230V, 24V, 50VA, 1 PHASE	P-001-845
STEEL BRIDGE (12" X 72")	P-003-572	240-460V, 24V, 50VA, 3 PHASE	P-001-844
		230V,24V, 100VA, 1 PHASE	P-000-746
		240-460V,24V, 100VA, 3 PHASE	P-000-399
<b>CYLINDER: T-50608 ONLY</b>		<b>CONTROL BOX. COMPLETE:</b>	
COMPLETE CYLINDER	P-D-12312	230 VOLT, 1 PHASE	P-004-790
CYLINDER PACKING KIT	P-023-614	230 VOLT, 3 PHASE	P-003-966
CYLINDER HOUSING	P-B-1404	460 VOLT, 3 PHASE	P-004-783
CYLINDER ROD ASSEMBLY	P-023-168		
CYLINDER BEARING ASSEMBLY	P-023-173	<b>CONTACTOR, MOTOR STARTER:</b>	
CYLINDER PISTON	P-A-9910	230V, 1PH, CONTACTOR	P-000-414
CYLINDER PIN UPPER	P-A-0219	230V, 3PH, CONTACTOR	P-000-413
CYLINDER PIN LOWER	P-001-538	460V, 3PH, CONTACTOR	P-000-413
CYLINDER PIN SNAP RING 1.25"	P-001-063		
FLOW CONTROL	P-015-396		
<b>CYLINDER: ALL EXCEPT T-50608</b>		<b>OVERLOAD:</b>	
COMPLETE CYLINDER	P-D-12311	230V, 1PH, OVERLOAD	P-000-420
CYLINDER PACKING KIT	P-004-635	230V, 3PH, OVERLOAD	P-000-418
CYLINDER HOUSING	P-B-1403	460V, 3PH, OVERLOAD	P-000-417
CYLINDER ROD ASSEMBLY	P-023-168		
CYLINDER BEARING ASSEMBLY	P-023-170	<b>MOTOR: (SELECT BY VOLTAGE AND PHASE)</b>	
CYLINDER PISTON	P-A-1551	208/230V 1 PHASE	P-001-327
CYLINDER PIN UPPER	P-A-0219	208/230/460/480V 3 PHASE	P-003-373
CYLINDER PIN LOWER	P-A-9899		
CYLINDER PIN SNAP RING 1.25"	P-001-061	<b>OPTION:</b>	
FLOW CONTROL	P-015-396	BELL AND TIMER KIT, 24V	P-005-823
		BELL AND TIMER KIT, 110V	P-005-825
		STROBE WARNING LIGHT, 24V	P-000-805
		STROBE WARNING LIGHT, 110V	P-001-422
		FLUID HEATER	P-001-347
		BLUE SPRAY PAINT, 16 oz	P-015-173
		YELLOW SPRAY PAINT, 16 oz	P-015-174
		POWER UNIT DECAL KIT	P-003-868
		COMPLETE DECAL KIT FOR T2000	P-023-582
		LIMIT SWITCH ASSEMBLY	P-003-898
		INSTALLATION KIT, 20' HOSE AND 5 GAL FLUID	P-006-399
		REPLACEMENT NAME/SERIAL NUMBER TAG	P-001-448
<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>			
HYDRAULIC PUMP	P-000-357		
FLOW VALVE	P-003-457		
CHECK VALVE	P-001-262		
24V DOWN SOLENOID VALVE AND COIL ASM	P-001-259		
24V DOWN SOLENOID COIL (ONLY)	P-001-260		
24V/115V DOWN SOLENOID VALVE (ONLY)	P-001-279		
115V DOWN SOLENOID AND COIL ASM	P-001-296		
115V DOWN SOLENOID COIL (ONLY)	P-001-297		
FLOW CONTROL VALVE (3.5 GPM)	P-001-293		
RELIEF VALVE	P-001-263		
BREATHER CAP FOR RESERVOIR	P-001-890		

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**OR E-MAIL [PARTS@ADVANCELIFTS.COM](mailto:PARTS@ADVANCELIFTS.COM)**

## SERIES 2000K PARTS LIST

GENERAL DESCRIPTION	PART #	GENERAL DESCRIPTION	PART #
<b>MECHANICAL:</b>		<b>TRANSFORMER: (SELECT BY VOLTAGE AND PHASE)</b>	
WHEEL ASSEMBLY	P-005-244	100VA transformers used on lifts with warning light or bell.	
WHEEL BASE & PLATFORM PIN (1-1/4" x 3-3/4")	P-A-0216	230V, 24V, 1 PH	P-001-845
WHEEL, BASE AND PLATFORM PIN SNAP RING	P-001-061	240-460V, 24V, 3 PHASE	P-001-844
MAIN AXLE PIN (1-3/4" x 6-7/8")	P-A-0227	230V,24V,1PH, WITH BELL OR LIGHT	P-000-746
MAIN AXLE PIN SNAP RING 1-3/4"	P-001-063	240-460V,24V,3PH WITH BELL OR LIGHT	P-000-399
STEEL HANDRAIL WITH SAFETY CHAIN	P-004-433	<b>CONTACTOR, MOTOR STARTER:</b>	
SAFETY CABLE, (64-3/4")	P-004-386	230V, 1PH, CONTACTOR	P-000-693
STEEL BRIDGE (12" X 72")	P-003-572	230V, 3PH, CONTACTOR	P-000-692
<b>CYLINDER: CURRENT STANDARD (5/88 TO DATE)</b>		460V, 3PH, CONTACTOR	P-000-692
<b>OVERLOAD:</b>			
Lifts manufactured before 4/1/00 require an elbow part		230V, 1PH, OVERLOAD	P-000-701
# P-010-219 when replacing a complete cylinder assembly.		230V, 3PH, OVERLOAD	P-000-699
COMPLETE CYLINDER	P-D-1185	460V, 3PH, OVERLOAD	P-000-696
CYLINDER PACKING KIT	P-003-514	<b>MOTOR: (SELECT BY VOLTAGE AND PHASE)</b>	
CYLINDER HOUSING	P-003-856	208/230V 1 PHASE	P-001-327
CYLINDER ROD ASSEMBLY	P-005-731	208/230/460/480V 3 PHASE	P-003-373
CYLINDER BEARING ASSEMBLY	P-003-923	<b>OPTION:</b>	
CYLINDER PISTON ASSEMBLY	P-A-1409	BELL AND WARNING LIGHT COMBO.	P-005-823
CYLINDER PIN UPPER	P-A-1951	BELL AND LIGHT PROTECTIVE CAGE	P-005-825
CYLINDER PIN LOWER	P-A-0209	FLUID HEATER	P-001-347
CYLINDER PIN SNAP RING 1"	P-001-876	BLUE SPRAY PAINT, 16 oz	P-015-173
FLOW CONTROL CARTRIDGE (BEFORE 4/00)	P-001-302	YELLOW SPRAY PAINT, 16 oz	P-015-174
GREEN HEXAGONAL FLOW CONTROL (AFTER 4/00)	P-015-396	POWER UNIT DECAL KIT	P-003-868
<b>CYLINDER: (PRE 5/88)</b>		COMPLETE DECAL KIT FOR 2000K	P-003-993
COMPLETE CYLINDER	P-005-651	LIMIT SWITCH ASSEMBLY	P-003-898
CYLINDER ROD ASSEMBLY	P-003-919	INSTALLATION KIT, 20' HOSE AND 5 GAL FLUID	P-006-399
UPPER CYLINDER PIN, (OLD STYLE)	P-A-0226	REPLACEMENT NAME/SERIAL NUMBER TAG	P-001-448
LOWER CYLINDER PIN, (OLD STYLE)	P-A-0209	<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>	
<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>		HYDRAULIC PUMP	P-026-106
24V DOWN SOLENOID COIL (ONLY)	P-015-301	24V DOWN SOLENOID COIL (ONLY)	P-015-301
24V/115V DOWN SOLENOID VALVE (ONLY)	P-003-106	24V/115V DOWN SOLENOID VALVE (ONLY)	P-003-106
BREATHER CAP FOR RESERVOIR	P-001-890	<b>COMPLETE POWER UNIT: (SELECT BY VOLTAGE AND PHASE)</b>	
<b>COMPLETE POWER UNIT: (SELECT BY VOLTAGE AND PHASE)</b>		230 VOLT, 1 PH, 24VA, WITH PUSHBUTTON	P-004-771
230 VOLT, 1 PH, 24VA, WITH PUSHBUTTON	P-004-771	230 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-003-563
230 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-003-563	460 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-004-770
460 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-004-770	<b>CONTROL BOX. COMPLETE: (SELECT BY VOLTAGE AND PHASE)</b>	
<b>CONTROL BOX. COMPLETE: (SELECT BY VOLTAGE AND PHASE)</b>		230 VOLT, 1 PHASE	P-004-790
230 VOLT, 1 PHASE	P-004-790	230 VOLT, 3 PHASE	P-003-966
230 VOLT, 3 PHASE	P-003-966	460 VOLT, 3 PHASE	P-004-783
460 VOLT, 3 PHASE	P-004-783		

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## SERIES 3000 PARTS LIST

GENERAL DESCRIPTION	PART #	GENERAL DESCRIPTION	PART #
<b>MECHANICAL:</b>		<b>TRANSFORMER: (SELECT BY VOLTAGE AND PHASE)</b>	
WHEEL ASSEMBLY	P-005-244	100VA transformers used on lifts with warning light or bell.	
UPPER WHEEL PIN (1-1/4" X 3-3/4")	P-A-0216	230V, 24V, 1 PH	P-001-845
LOWER WHEEL PIN (1-1/4" X 5-3/4")	P-A-0390	240-460V, 24V, 3 PHASE	P-001-844
WHEEL PIN SNAP RING 1-1/4"	P-001-061	230V,24V,1PH, WITH BELL OR LIGHT	P-000-746
MAIN AXLE PIN (2" x 7")	P-A-0379	240-460V,24V,3PH WITH BELL OR LIGHT	P-000-399
MAIN AXLE PIN SNAP RING 2"	P-001-057	<b>CONTACTOR, MOTOR STARTER:</b>	
BASE AND PLATFORM PIN (1-1/2" X 3-3/4")	P-A-0216	230V, 1PH, CONTACTOR	P-000-414
STEEL HANDRAIL WITH SAFETY CHAIN	P-004-433	230V, 3PH, CONTACTOR	P-000-413
SAFETY CABLE, (64-3/4")	P-004-386	460V, 3PH, CONTACTOR	P-000-413
STEEL BRIDGE (12" X 72")	P-B-0190	<b>OVERLOAD:</b>	
<b>CYLINDER:</b>		230V, 1PH, OVERLOAD	P-000-420
Lifts manufactured before 4/1/00 require an elbow part		230V, 3PH, OVERLOAD	P-000-418
# P-015-683 when replacing a complete cylinder assembly.		460V, 3PH, OVERLOAD	P-000-417
3200 COMPLETE CYLINDER	P-D-1434	<b>MOTOR: (SELECT BY VOLTAGE AND PHASE)</b>	
3200 CYLINDER PACKING KIT	P-003-515	208/230V 1 PHASE	P-001-327
3200 CYLINDER HOUSING	P-004-267	208/230/460/480V 3 PHASE	P-003-373
3200 CYLINDER ROD ASSEMBLY	P-004-268	<b>OPTION:</b>	
3200 CYLINDER BEARING ASSEMBLY	P-003-874	BELL AND TIMER KIT, 24V	P-005-823
3200 CYLINDER PISTON ASSEMBLY	P-A-1551	BELL AND TIMER KIT, 110V	P-005-825
3300 COMPLETE CYLINDER	P-D-1435	STROBE WARNING LIGHT, 24V	P-000-805
3300 CYLINDER PACKING KIT	P-003-516	STROBE WARNING LIGHT, 110V	P-001-422
3300 CYLINDER HOUSING	P-004-280	FLUID HEATER	P-001-347
3300 CYLINDER ROD ASSEMBLY	P-004-282	BLUE SPRAY PAINT, 16 oz	P-015-173
3300 CYLINDER BEARING ASSEMBLY	P-004-284	YELLOW SPRAY PAINT, 16 oz	P-015-174
3300 CYLINDER PISTON ASSEMBLY	P-A-1552	POWER UNIT DECAL KIT	P-003-868
CYLINDER PIN (1" X 5-5/16")	P-A-0226	COMPLETE DECAL KIT FOR 3000	P-004-261
CYLINDER PIN (1" X 7-5/16")	P-A-0416	INSTALLATION KIT, 20' HOSE AND 10 GAL FLUID	P-006-400
CYLINDER PIN SNAP RING 1"	P-001-876	OWNERS MANUAL	P-003-566
FLOW CONTROL CARTRIDGE (BEFORE 4/00)	P-001-302	PLUG 230V, 3 PHASE	P-001-671
GREEN HEXAGONAL FLOW CONTROL (AFTER 4/00)	P-015-396	PLUG 460V, 3 PHASE	P-000-994
<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>		PLUG 230V, 1 PHASE	P-002-049
HYDRAULIC PUMP	P-000-357	PUSH BUTTON SWITCH	P-000-802
FLOW VALVE	P-004-334	REPLACEMENT NAME/SERIAL NUMBER TAG	P-001-448
CHECK VALVE	P-001-262		
24V DOWN SOLENOID VALVE AND COIL ASM	P-001-259		
24V DOWN SOLENOID COIL (ONLY)	P-001-260		
24V/115V DOWN SOLENOID VALVE (ONLY)	P-001-279		
115V DOWN SOLENOID AND COIL ASM	P-001-296		
115V DOWN SOLENOID COIL (ONLY)	P-001-297		
FLOW CONTROL VALVE (3.5 GPM)	P-001-293		
RELIEF VALVE	P-001-263		
BREATHING CAP FOR RESERVOIR	P-001-890		
<b>COMPLETE POWER UNIT:</b>			
230 VOLT, 1 PH, 24VA, WITH PUSHBUTTON	P-004-896		
230 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-003-562		
460 VOLT, 3 PH, 24VA, WITH PUSHBUTTON	P-004-895		
<b>CONTROL BOX. COMPLETE:</b>			
230 VOLT, 1 PHASE	P-004-790		
230 VOLT, 3 PHASE	P-003-966		
460 VOLT, 3 PHASE	P-004-783		

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## SERIES 4000 PARTS LIST

GENERAL DESCRIPTION	PART #	GENERAL DESCRIPTION	PART #
<b>MECHANICAL:</b>		<b>COMPLETE POWER UNIT WITH PUSHBUTTON:</b>	
4100,4200,4300,4400 INNER WHEEL	P-A-0499	4100,4200,4300,4400, 230 VOLT, 3 PH, 24VA	P-004-391
4100,4200,4300,4400 OUTER WHEEL	P-A-0500	4100,4200,4300,4400, 460 VOLT, 3 PH, 24VA	P-005-485
4100,4200,4300,4400 WHEEL PIN (1-3/4"X6-7/8")	P-A-0227	4100, 230 VOLT, 3 PH, 24VA (AFTER 1/00)	P-006-983
4100,4200,4300,4400 WHEEL PIN SNAP RING	P-001-063	4100, 460 VOLT, 3 PH, 24VA (AFTER 1/00)	P-010-684
4100,4200,4300,4400 MAIN AXLE PIN (2" x 9")	P-A-0370		
4100,4200,4300,4400 MAIN AXLE PIN SNAP RING	P-001-057	<b>CONTROL BOX. COMPLETE:</b>	
4100,4200,4300,4400 BASE AND PLATFORM PIN	P-A-0376	4100,4200,4300,4400, 230 VOLT, 3 PHASE	P-005-489
STEEL HANDRAIL ASSEMBLY	P-004-446	4100,4200,4300,4400, 460 VOLT, 3 PHASE	P-005-494
SAFETY CABLE, (64-3/4")	P-004-386	4100, 230V, 3 PHASE (AFTER 1/00)	P-006-308
STEEL BRIDGE (12" X 72")	P-B-0191	4100, 460V, 3 PHASE (AFTER 1/00)	P-007-202
<b>MECHANICAL: 4100 AFTER 1/1/2000</b>		<b>TRANSFORMER:</b>	
4100 INNER WHEEL (AFTER 1/00)	P-A-8206	240-460V,24V,3PH	P-000-399
4100 OUTER WHEEL (AFTER 1/00)	P-A-8205		
4100 PLATFORM WHEEL PIN (AFTER 1/00)	P-A-8203	<b>CONTACTOR, MOTOR STARTER:</b>	
4100 BASE FRAME WHEEL PIN (AFTER 1/00)	P-A-8202	208,230,460,480V, 3PH, CONTACTOR	P-000-413
4100 BASE AND PLATFORM PIN (AFTER 1/00)	P-A-8201		
<b>CYLINDER: MODELS 4100, 4200, 4300, 4400</b>		<b>OVERLOAD:</b>	
Lifts manufactured before 4/1/00 require an elbow part # P-015-683 when replacing a complete cylinder assembly.		230V, 3PH, OVERLOAD	P-000-419
COMPLETE CYLINDER	P-D-0498	460V, 3PH, OVERLOAD	P-000-763
CYLINDER PACKING KIT	P-004-365	230V, 3PH, OVERLOAD 4100 (AFTER 1/00)	P-000-418
CYLINDER HOUSING	P-004-361	460V, 3PH, OVERLOAD 4100 (AFTER 1/00)	P-000-417
CYLINDER ROD ASSEMBLY	P-004-363		
CYLINDER BEARING ASSEMBLY	P-004-364	<b>MOTOR:</b>	
CYLINDER PISTON ASSEMBLY	P-A-1551	208,230,460,480V 3 PHASE	P-001-344
UPPER CYLINDER PIN (1" X 4-1/2")	P-A-0410	208,230,460,480V 3 PHASE, 4100 (AFTER 1/00)	P-003-373
LOWER CYLINDER PIN (1-1/4" X 3-3/4")	P-A-0216		
CYLINDER PIN SNAP RING 1"	P-001-876	<b>OPTIONS:</b>	
CYLINDER PIN SNAP RING 1-1/4"	P-001-061	BELL AND TIMER KIT, 24V	P-005-823
		BELL AND TIMER KIT, 110V	P-005-825
		STROBE WARNING LIGHT, 24V	P-000-805
		STROBE WARNING LIGHT, 110V	P-001-422
		FLUID HEATER	P-001-347
		BLUE SPRAY PAINT, 16 oz	P-015-173
		YELLOW SPRAY PAINT, 16 oz	P-015-174
		POWER UNIT DECAL KIT	P-003-868
		COMPLETE DECAL KIT FOR 4000	P-004-375
		INSTALLATION KIT, 20' HOSE AND 15 GAL FLUID	P-006-401
		OWNERS MANUAL	P-003-566
		PLUG 230V, 3 PHASE	P-001-671
		PLUG 460V, 3 PHASE	P-000-994
		PUSH BUTTON SWITCH	P-000-802
		PRESSURE LINE FILTER	P-001-319
		REPLACEMENT NAME/SERIAL NUMBER TAG	P-001-448
<b>HYDRAULIC: (COMMON TO ALL POWER UNITS)</b>			
HYDRAULIC PUMP	P-000-358		
HYDRAULIC PUMP 4100 (AFTER 1/00)	P-007-114		
FLOW VALVE	P-003-458		
CHECK VALVE	P-001-262		
24V DOWN SOLENOID VALVE AND COIL ASM	P-001-259		
24V DOWN SOLENOID COIL (ONLY)	P-001-260		
24V/115V DOWN SOLENOID VALVE (ONLY)	P-001-279		
115V DOWN SOLENOID AND COIL ASM	P-001-296		
115V DOWN SOLENOID COIL (ONLY)	P-001-297		

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# Material Safety Data Sheet



## 1. Chemical product and company identification

**Product name** CASTROL DUAL RANGE HV 46 HYDRAULIC FLUID  
**MSDS #** 460278  
**Historic MSDS #:** None.  
**Code** 460278  
**Product use** Hydraulic fluid  
For specific application advice see appropriate Technical Data Sheet or consult our company representative.  
**Supplier** BP Lubricants USA Inc.  
9300 Pulaski Highway  
Baltimore, Maryland 21220-2495  
**EMERGENCY HEALTH INFORMATION:** 1 (800) 447-8735  
**EMERGENCY SPILL INFORMATION:** 1 (800) 424-9300 CHEMTREC (USA)  
**OTHER PRODUCT INFORMATION:** 1 (866) 4 BP - MSDS (866-427-6737 Toll Free - North America) email: bpcare@bp.com

## 2. Composition/information on ingredients

Ingredient name	CAS #	% by weight
Distillates (petroleum), hydrotreated, heavy paraffinic (Highly refined mineral oil)	64742-54-7	85 - 90
Lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity (Highly refined mineral oil)	72623-85-9	5 - 15
White mineral oil, petroleum (highly refined mineral oil)	8042-47-5	1 - 5
Proprietary performance additives.	proprietary	5 - 10

## 3. Hazards identification

**Physical state** Liquid.  
**Color** Purple.  
**Emergency overview** CAUTION!  
MAY CAUSE EYE IRRITATION.  
MAY CAUSE SKIN IRRITATION.  
**Routes of entry** Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis.  
**Potential health effects** Skin contact. Eye contact. Inhalation. Ingestion.  
**Eyes** May cause eye irritation.  
**Skin** Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. High pressure skin injections are serious medical emergencies. Injury will not appear serious at first, within a few hours, tissue will become swollen, discolored and extremely painful.  
**Inhalation** Mist : May cause respiratory tract irritation.

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Ingestion  
Medical conditions aggravated by over-exposure  
See toxicological information (section 11)

Causes gastrointestinal irritation and diarrhea.  
None identified.

## 4. First aid measures

**Eye contact** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.  
**Skin contact** Immediately wash exposed skin with soap and water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops. Accidental high pressure injection through the skin requires immediate medical attention.  
**Inhalation** If inhaled, remove to fresh air. Get medical attention if symptoms appear.  
**Ingestion** Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately.

## 5. Fire-fighting measures

**Flammability of the product** May be combustible at high temperature.  
**Flash point** 232 °C (Open cup) Cleveland.  
**Products of combustion** These products are carbon oxides (CO, CO<sub>2</sub>).  
**Unusual fire/explosion hazards** This material is not explosive as defined by established regulatory criteria.  
**Fire-fighting media and instructions** In case of fire, use water fog, foam, dry chemicals, or carbon dioxide. Do not use water jet.  
**Protective clothing (fire)** Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

## 6. Accidental release measures

**Personal precautions** Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable fighting procedures (See Section: "Fire-fighting measures").  
**Environmental precautions and clean-up methods** If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.  
**Personal protection in case of a large spill** Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

## 7. Handling and storage

**Handling** Avoid contact with eyes. Avoid contact with skin and clothing. Wash thoroughly after handling.  
**Storage** Keep container tightly closed. Keep container in a cool, well-ventilated area. Empty containers may contain harmful, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse or dispose of containers unless adequate precautions are taken against these hazards.

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## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	<b>Occupational exposure limits</b>
<b>Ingredient name</b>	<b>ACGIH (United States).</b>
Distillates (petroleum), hydrotreated, heavy paraffinic (Highly refined mineral oil)	STEL: 10 mg/m <sup>3</sup> , 15 minute(s), Form: Oil mist, mineral TWA: 5 mg/m <sup>3</sup> , 8 hour(s), Form: Oil mist, mineral
	<b>OSHA (United States).</b>
Lubricating oils (petroleum), C20-50 hydrotreated neutral oil-based, high viscosity (Highly refined mineral oil)	TWA: 5 mg/m <sup>3</sup> , 8 hour(s), Form: Oil mist, mineral STEL: 10 mg/m <sup>3</sup> , 15 minute(s), Form: Oil mist, mineral TWA: 5 mg/m <sup>3</sup> , 8 hour(s), Form: Oil mist, mineral
	<b>OSHA (United States).</b>
White mineral oil, petroleum (Highly refined mineral oil)	TWA: 5 mg/m <sup>3</sup> , 8 hour(s), Form: Oil mist, mineral STEL: 10 mg/m <sup>3</sup> , 15 minute(s), Form: Oil mist, mineral TWA: 5 mg/m <sup>3</sup> , 8 hour(s), Form: Oil mist, mineral
	<b>OSHA (United States).</b>
Proprietary performance additives.	None assigned.
<b>Control Measures</b>	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits.
<b>Hygiene measures</b>	Wash hands after handling compounds and before eating, smoking, using lavatory, and at the end of day. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the work-station location.
<b>Personal protection</b>	
Eyes	Avoid contact with eyes. Chemical splash goggles.
Skin and body	Avoid prolonged or repeated contact with skin. Wear protective clothing if prolonged or repeated contact is likely.
Respiratory	None required; however, use of adequate ventilation is good industrial practice. If heated and ventilation is inadequate, use a NIOSH certified respirator with an organic vapor cartridge and P95 particulate filter.
Hands	Wear protective gloves if prolonged or repeated contact is likely.
	Consult your supervisor or S.O.P. for special handling directions
	Consult local authorities for acceptable exposure limits.

## 9. Physical and chemical properties

<b>Physical state</b>	Liquid.
<b>Color</b>	Purple.
<b>Pour Point</b>	-45 °C
<b>Specific gravity</b>	0.8697
<b>Solubility</b>	Insoluble in cold water.
<b>Viscosity</b>	Kinematic: 46.5 mm <sup>2</sup> /s (46.5 cSt) at 40 °C Kinematic: 7.9 mm <sup>2</sup> /s (7.9 cSt) at 100 °C SUS: 216 SUS at 37.7 °C
<b>Viscosity Index</b>	141

## 10. Stability and reactivity

<b>Stability and reactivity</b>	The product is stable.
<b>Conditions to avoid</b>	Keep away from heat, sparks and flame. Keep away from sources of ignition.
<b>Incompatibility with various substances</b>	Reactive with oxidizing agents.
<b>Hazardous decomposition products</b>	Products of combustion: carbon oxides (CO, CO <sub>2</sub> ).
<b>Hazardous polymerization</b>	Will not occur.

## 11. Toxicological information

<b>Acute toxicity</b>	Toxicity testing not conducted.
<b>Chronic toxicity</b>	At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of its low volatility. May be harmful by inhalation if exposure to vapor, mists or fumes resulting from thermal decomposition products occurs. Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhea.
<b>Carcinogenic effects</b>	No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH or the International Agency for Research on Cancer (IARC). No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).
<b>Mutagenic effects</b>	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a mutagen.
<b>Reproductive effects</b>	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a reproductive toxin.
<b>Teratogenic effects</b>	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as teratogenic or embryotoxic.

## 12. Ecological information

<b>Ecotoxicity</b>	No testing has been performed by the manufacturer.
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## 13. Disposal considerations

<b>Waste information</b>	Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities.
	Consult your local or regional authorities.

## 14. Transport information

Not classified as hazardous for transport (DOT, TDG, IMO/IMDG, IATA/ICAO)

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## 15. Regulatory information

U.S. Federal regulations

US INVENTORY (TSCA): In compliance.

TSCA 12(b) one-time export notification.: naphthalene, naphthalene, mequinol

This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: CASTROL DUAL RANGE HV 46 HYDRAULIC FLUID: Immediate (Acute) Health Hazard

SARA 313

Form R - Reporting requirements

Supplier notification

This product does not contain any hazardous ingredients at or above regulated thresholds.

This product does not contain any hazardous ingredients at or above regulated thresholds.

CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4): naphthalene: 100 lbs. (45.36 kg); Cumene: 5000 lbs. (2268 kg); Benzene: 10 lbs. (4.536 kg); Toluene: 1000 lbs. (453.6 kg); Xylene: 100 lbs. (45.36 kg); naphthalene: 100 lbs. (45.36 kg); phosphorothioic acid, O,O - di-C1-14- alkyl esters zinc salts ; phenol: 1000 lbs. (453.6 kg); Ethyl acrylate: 1000 lbs. (453.6 kg); Lead: 10 lbs. (4.536 kg); Arsenic: 1 lbs. (0.4536 kg); Cadmium: 10 lbs. (4.536 kg);

No products were found.

**WARNING:** This product contains a chemical known to the State of California to cause cancer, naphthalene; naphthalene; Ethyl acrylate; Arsenic

**WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Lead; Cadmium; Benzene

AUSTRALIAN INVENTORY (AICS): Not determined.

CANADA INVENTORY (DSL): In compliance.

CHINA INVENTORY (IECS): Not determined.

EC INVENTORY (EINECS/ELINCS): Not determined.

JAPAN INVENTORY (ENCS): Not determined.

KOREA INVENTORY (ECL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

## 16. Other information

Label requirements

CAUTION!

MAY CAUSE EYE IRRITATION.  
MAY CAUSE SKIN IRRITATION.

**HMIS® Rating :**  
Health **1** National Fire Protection Association (U.S.A.)  
Flammability **1**  
Physical Hazard **0**  
Personal protection **X**



History

Date of issue 07/07/2005.

Date of previous issue 07/02/2005.

Prepared by Product Stewardship

Notice to reader

**NOTICE :** This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.

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