ADVANCE LIFTS

Dock Lift Owner's Manual

NOTICE

This manual is an important document. Keep it with the machine or located where readily available to operators and maintenance personnel for reference purposes.

ADVANCE LIFTS

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

Throughout this manual, units are refered 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)**

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, 3400, 3410, 3420, 3430, 3440, 3450, 3460, 3470, 3480, 3500, 3510, 3520, 3530, 3540, 3550, 3560, 3570, 3580, 3600, 3610, 3620, 3630, 3640, 3650, 3660, 3670, 3680)**

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, T2-55609, T2-55610, T2-55708, T2-55709, T2-50710, T2-50808, T2-50809, T2-50810, T3-50608, T3-60608, T3-60609, T3-60610, T3-60708, T3-60709, T3-60710, T3-60808, T3-60809, T3-60810)**

OTHER_____

ADVANCE LIFTS

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: _____

_____

_____

NOTICE

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.

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

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

SECTION 2: INDEX & INTRODUCTION

*Mandatory reading before attempting installation.

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.

SECTION 3: RESPONSIBILITIES OF OWNERS & USERS

Basic Principles: Owners/users shall apply sound principles of safety**,** training, inspection, maintenance, and expected operating environment.
It shall be the responsibility of the owner/user to advise the manufacturer where deflection may be critical to the application.

Manuals: Owners/users shall keep and maintain a copy of the operating and maintenance manual(s) and ensure its availability to operating and maintenance personnel.

Inspection and Maintenance: It shall be the responsibility of the users to inspect and maintain the industrial scissors lift as required to ensure proper operation. The frequency of inspection and maintenance shall be based upon the manufacturer's recommendations and be compatible with operating conditions and the severity of the operating environment.
Industrial scissors lifts that are not in proper operating condition shall be immediately removed from service until repaired. Maintenance and repairs shall be made by a qualified person and the repairs shall be in conformance with the manufacturer's recommendations.

Maintenance Safety Precautions: Before adjustments and repairs are started on an industrial scissors lift, the following precautions shall be taken as applicable:

1. Remove the load from the platform.
2. Lower platform to the full down position, if possible or secure by maintenance device and/or blocking as described by the manufacturer to prevent unintended platform movement.
3. Relieve system pressure from all circuits before loosening or removing any components.
4. All controls in the "off' position and all operating features secured from inadvertent motion by brakes, blocks, or other means.
5. Disconnect power and follow established owner/user lockout/tag out policies.
6. Follow precautions and directions as specified by the manufacturer.

Replacement Parts: When parts or components are replaced, they shall be replaced with parts or components approved by the original manufacturer of the industrial scissors lift.

Maintenance Training: The owner/user shall ensure only qualified personnel inspect and maintain the industrial scissors lift in accordance with the sections: Inspection and Maintenance, Replacement Parts and Operator Training and the manufacturer's recommendations as described in the maintenance manual.

Operator Training: An owner/user, who directs or authorizes an individual to operate an industrial scissors lift, shall ensure that the individual has been:

1. Trained in accordance with the manufacturer's operating manual.
2. Made aware of the responsibilities of operators as outlined under the Operators Section of this manual.
3. Retrained, if necessary, based on the owners/user's observation and evaluation of the operator.

Modifications: Modifications and additions shall not be performed without the manufacturer's prior written approval. Where such authorization is granted, capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

Responsibility of Operators

Basic Principles: Operators shall apply sound principles of safety and good judgment in the application and operation of the scissors lift, with consideration given to its intended use and expected operating environment. Since the operator is in direct control of the industrial scissors lift, conformance with good safety practices is the responsibility of the operator. The operator shall make decisions on the consideration for the fact that his or her own safety as well as the safety of other personnel on or near the scissors lift is dependent on those decisions.

General Training: Only personnel who have received general instructions regarding the inspection, application and operation of industrial scissors lifts, including recognition and avoidance of hazards associated with their operation, shall operate an industrial scissors lift. Such topics covered shall include, but not necessarily be limited to, the following issues and requirements:

1. A pre-start inspection
2. Responsibilities associated with problems or malfunctions affecting the operation of the industrial scissors lift
3. Factors affecting stability
4. The purpose of placards and decals
5. Workplace inspection
6. Safety rules and regulations
7. Authorization to operate
8. Operator warnings and instructions
9. Actual operation of the industrial scissors lift. Under the direction of a qualified person, the trainee shall operate the industrial scissors lift for a sufficient period of time to demonstrate proficiency in actual operation of the industrial scissors lift.

Prestart Inspection: Before use each day or at the beginning of each shift, the industrial scissors lift shall be given a visual inspection and functional test including but not limited to the following:

1. Operating and emergency controls
2. Safety devices
3. Air or hydraulic system leaks
4. Electrical cables and wiring harness
5. Loose or missing parts
6. Wheels and casters
7. Nameplates, precautionary and instructional markings and/or labeling
8. Guardrail system
9. Items specified by the manufacturer

Problem or Malfunctions: Any problems or malfunctions that affect the safety of operations shall be repaired prior to the use of the industrial scissors lift.

Before Operations: The operator shall:

1. Read and understand the manufacturer’s operating instruction(s) and user’s safety rules or have them explained
2. Understand all labels, warnings, and instructions displayed on the industrial scissors lift or have them explained

Responsibility of Operators

Workplace Inspections: Before the industrial scissors lift is used and during use, the operator shall check the area in which the industrial scissors lift is to be used for possible hazards such as, but not limited to:

1. Bumps, floor obstructions and uneven surfaces
2. Overhead obstructions and electrical hazards
3. Presence of unauthorized persons
4. Other possible unsafe conditions as noted in the operating manual.

Operator Warnings and Instructions: The operator shall ensure the operation of the industrial scissors lift is in compliance with the following:

1. **Slope**. The industrial scissors lift shall only be operated on flat and level surfaces.
2. **Guardrail system**. Guardrails shall be installed and positioned, and access gates or openings shall be secured per the manufacturer's instructions.
3. **Distribution of load**. The load and its distribution on the platform and any platform extension(s) shall be in accordance with the manufacturer's rated capacity for that specific configuration.
4. **Maintaining overhead clearance**. The operator shall ensure that adequate clearance is maintained from overhead obstructions and energized electrical conductors and parts.
5. **Point of Operation.** The operator shall not place any part of their body under the platform.
6. **Personnel footing**. Personnel shall maintain firm footing on dock lifts and work access lifts while working thereon. Climbing by occupants on the guardrail system is prohibited. The use of planks, ladders, or any other devices on the platform for achieving additional height is prohibited.
7. **Precaution for moving equipment**. When other moving equipment or vehicles are present, special precautions shall be taken to comply with the safety standards established for the workplace.
8. **Reporting problems or malfunctions**. The operator shall immediately report to a supervisor any problem(s) or malfunction(s) that become evident during operation. The operator shall ensure all problems and malfunctions that affect the safety of operations are repaired prior to continued use.
9. **Capacity limitation**. Rated capacity shall not be exceeded when loads are transferred to the platform at any level.
10. **Work area**. The operator shall ensure the area surrounding the industrial scissors lift is clear of personnel and equipment before lowering the platform.
11. **Battery charging**. Batteries shall be charged in strict accordance with the lift manufacturer's instructions.
12. **Securing the industrial scissors lift.** The operator shall comply with the means and procedures provided to protect against use by an unauthorized person(s).
13. **Altering safety devices**. Safety devices shall not be altered or disabled.
14. **Modifications**. Modifications or alterations of an industrial scissors lift or the fabrication and attaching of frameworks or the mounting of attachments for holding tools or materials onto the platform or the guardrail system shall only be accomplished with prior written permission of the manufacturer.
15. **Assistance to the operator**. If an operator encounters any suspected malfunction or any hazard or potentially unsafe condition relating to capacity, intended use or safe operation the operator shall cease operation of the industrial scissors lift and request further instruction from the owner/user.
16. **Problems or malfunctions**. Any problem(s) or malfunction(s) that affect the safety of operations shall be repaired prior to the use of the industrial scissors lift.

SECTION 4: INSTALLATION INSTRUCTIONS

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

Equipment and Supplies Required:

Mechanical:

Equipment to maneuver the lift into position
Nylon Slings or Chains
Support Timbers
Plate Grab/Clamp
Heavy Pry Bar
Standard Hand Tools
Shims
Anchor Bolts
Grouting Material
Fish Tape and Rope

Electrical:

Electrical Disconnect
Standard Hand Tools
Wire (see Section 9 for Branch and Control Circuit requirements)
Electrical Fittings

Equipment and Supplies Notes:

The appropriate amount and type of Hydraulic Fluid is included with the lift.

A standard length and quantity of the appropriate hose is supplied with the lift.

Anchor Specifications: Series 2000, 2500K & T-Series Units Use 5/8” X 6”. Series 3000 & 4000 use 1” X 9”.

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.

NOTICE

Standard Remote Power Units are not weatherproof. If power unit is to be installed outdoors, a factory approved cover must be used.

4. Run the hydraulic and 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 contaminates 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.

NOTICE

T-Series models require the hose to be routed under the base frame. Routing the hose in any other manner will result in hose damage. See page P 4-5 for pit details.

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. (continued on next page)

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.

⚠ DANGER

Do not allow anyone to get under the unit during installation. Serious injury or death could occur.

8. You may now break the shipping restraints (banding). Use the lifts 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, figure 1. 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.

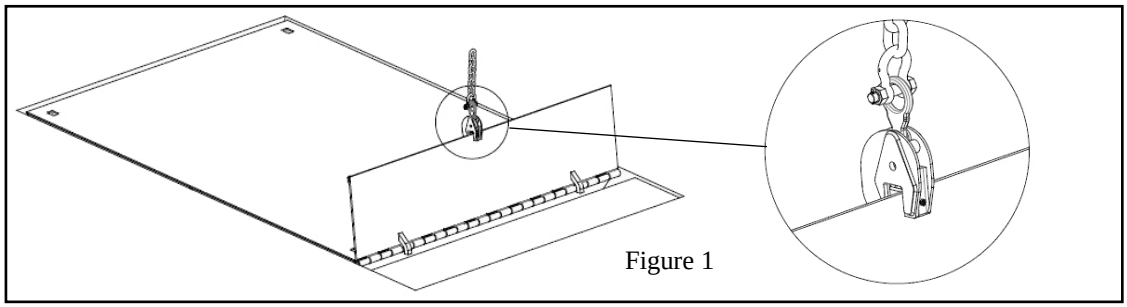


Figure 1

9. 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. **!** The lift shall be installed so that no part of the lift platform is more than ¼" above or below the surrounding surface.

10. Once the lift is properly positioned, (whether it is pit mounted or surface mounted), you may begin the lag down procedure. Surface mounted 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 6-7). 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.

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.

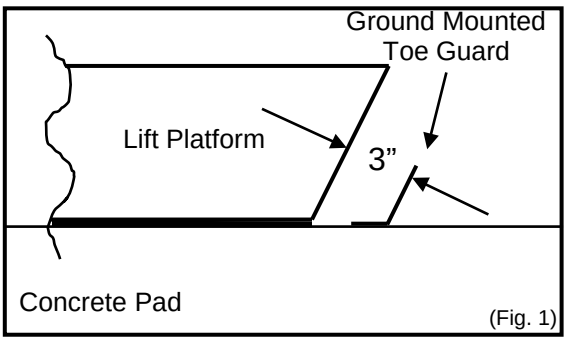
SECTION 4.1: Special instructions for T - Series Only
Ground Mounted Toe Guards (GMTG)

1. T-Series lifts <u>not</u> 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.

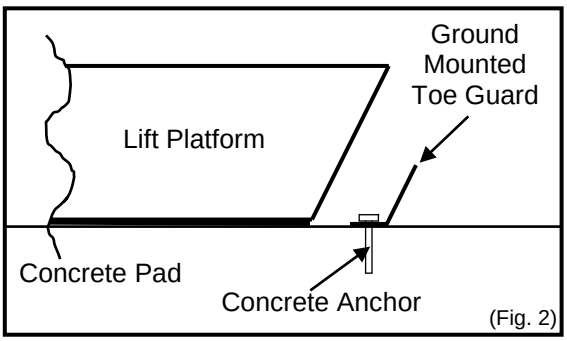
2. Place the toe guards 3” from the lift platform’s beveled toe guards as illustrated in figure 1 below. Insure all four corners line up and lag the guards to the concrete through the holes provided using 3/8” concrete anchors as shown in figure 2.

3. Units with 8’ platforms require eight (8) concrete anchors and ten (10) anchors are needed for units over 8’ in length.

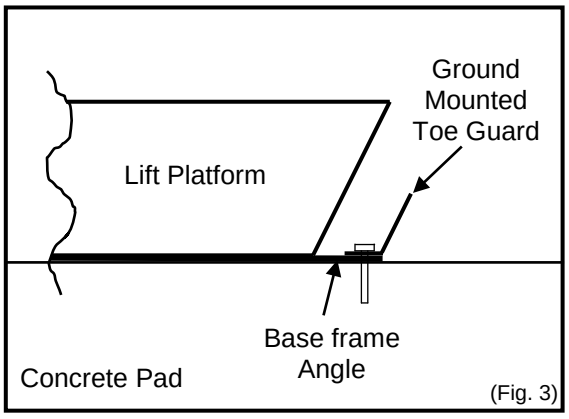
4. One of the guards has ¾” drilled mounting holes in it as opposed to the normal ½” mounting holes. This guard mounts to the base frame “lag-down angle” as illustrated in figure 3.



(Fig. 1)

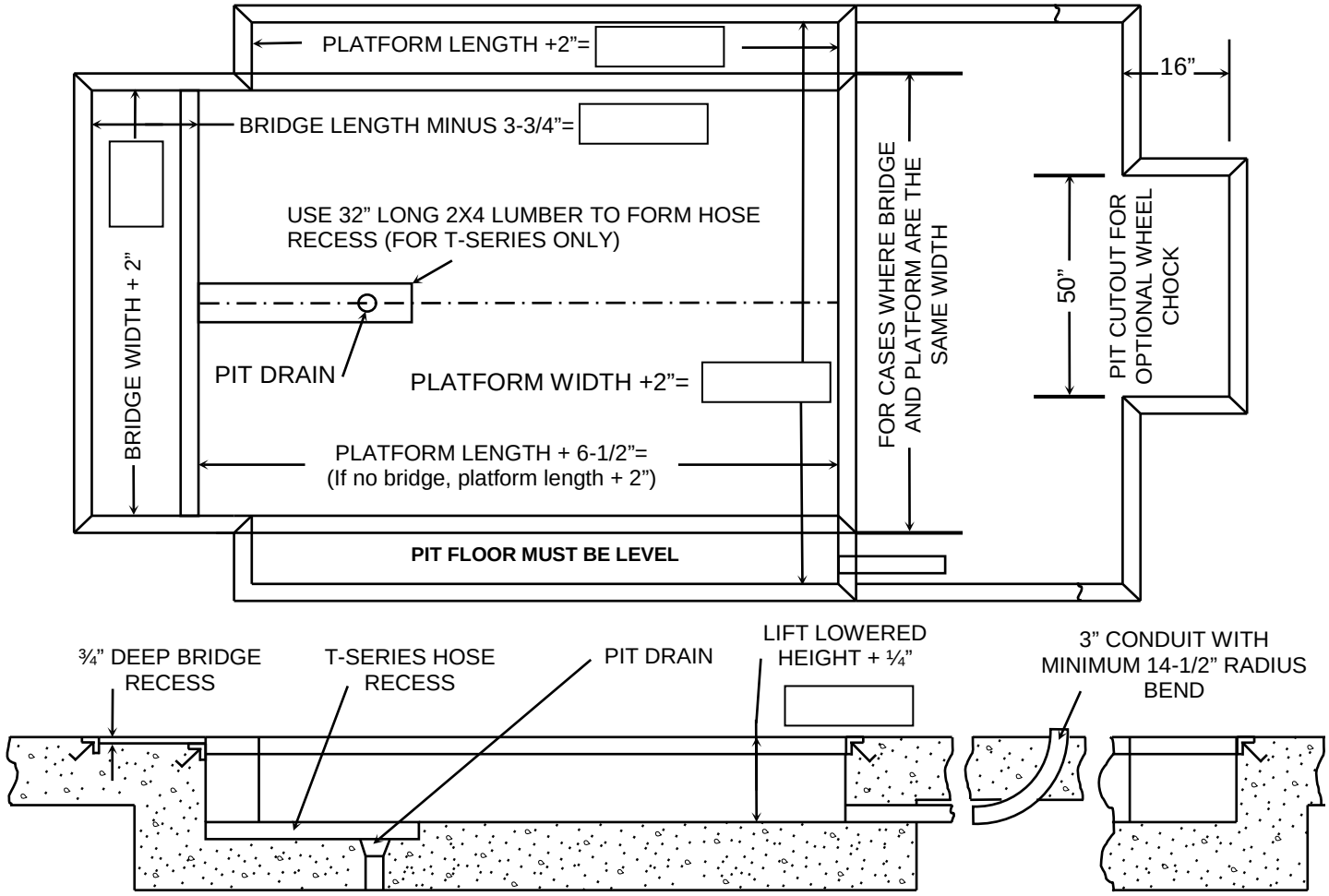


(Fig. 2)



(Fig. 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 ¼" 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) ½" SAE 100R2 hydraulic hose from the power unit location to the lift base with ½" 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 ½" diameter hose(s) through the 3" conduit from the power unit to the lift base.
D. Dimension tolerances are plus ¼", minus 0" (+1/4" – 0).
E. 180º steel hinge bridges require a bridge recess length equal to bridge length minus 2-3/4".
F. 180º 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.
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.

⚠CAUTION

Obstructions and debris in the pit can cause the lift to remain partially raised above the surrounding surface causing a trip hazard.

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
All of the above and small powered pallet jacks.	2000 SERIES, T & K SERIES
All of the above & straddle stackers, small stand-up & sit-down rider fork trucks.	3200 & 3300 SERIES
All of the above & medium fork trucks.	3400, 3500, 3600 & 4000 SERIES

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 cannot 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 raises 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 20º 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.

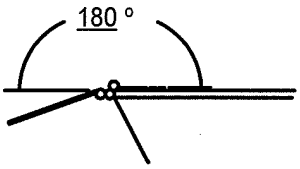
How To Use Dock Lifts Efficiently

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 cars, second man removes pallet or cart from truck places it in storage area and returns for nest load until truck is unloaded.

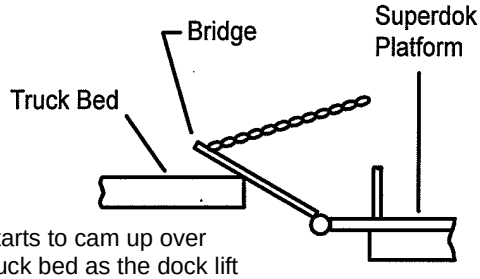
Objective: Free up the truck as quickly as possible.

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



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.



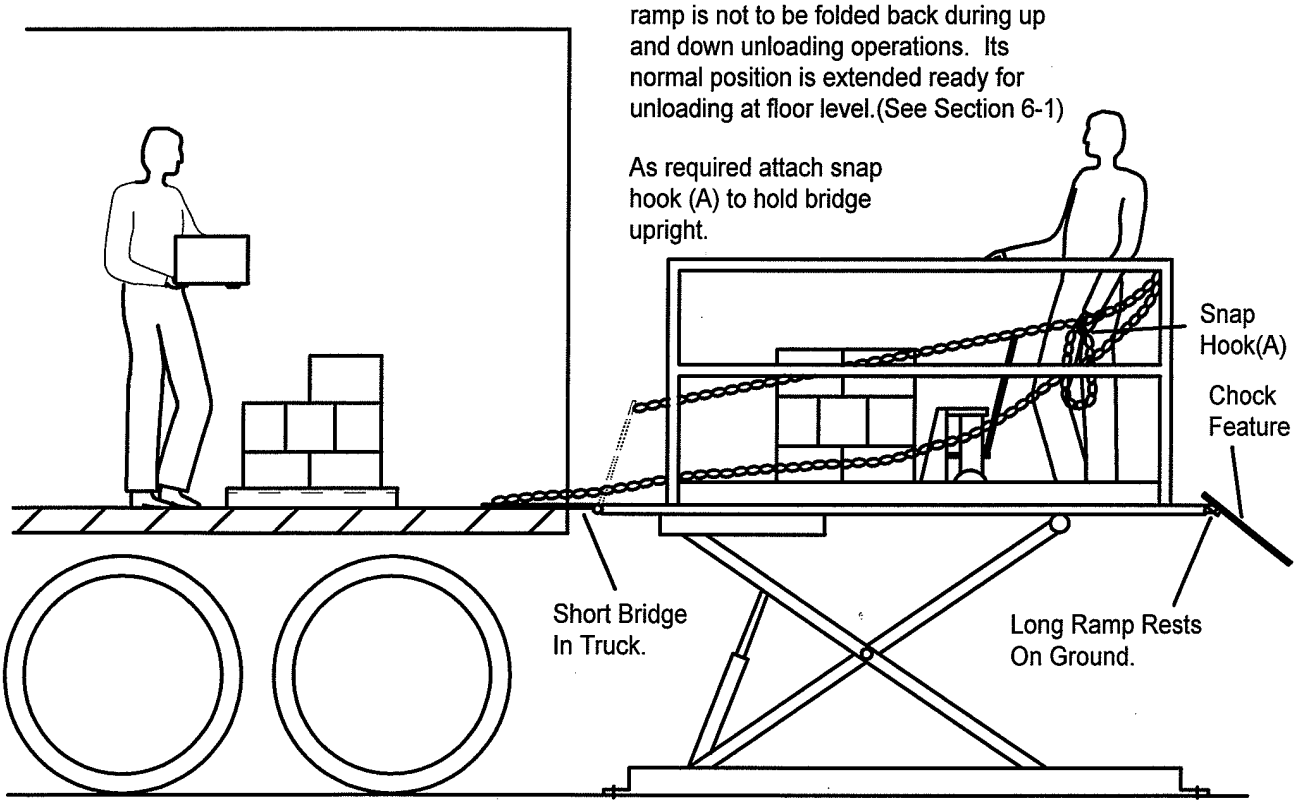
Bridge starts to cam up over end of truck bed as the dock lift raises or lowers.

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 Snap Hook (A) to secure the bridge in place and continue lowering the unit.

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.
- Shear Hazard

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 operator shall run the lift to 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.

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.

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 of 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 device.
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. If the maintenance device is unusable or missing, contact the factory (800-843-3625) for other methods of blocking the lift up.

Recommended Lift Blocking Procedures

⚠ DANGER

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 on pages P 6-5, P 6-6 & P 6-7. Read and understand the specific instructions for your model 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.

⚠ 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.

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.

⚠ DANGER

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.

5. 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.

6. 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.

⚠WARNING

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

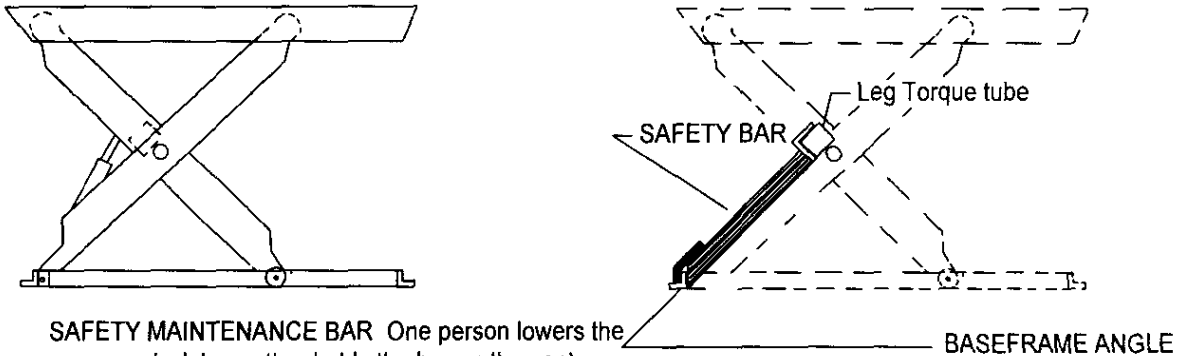
Place the maintenance bar near the center of the torque tube and against the base frame; be certain the bar is captured on the base frame angle, and then lower the equipment until it is totally supported by the bar. (Fig. 1)

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

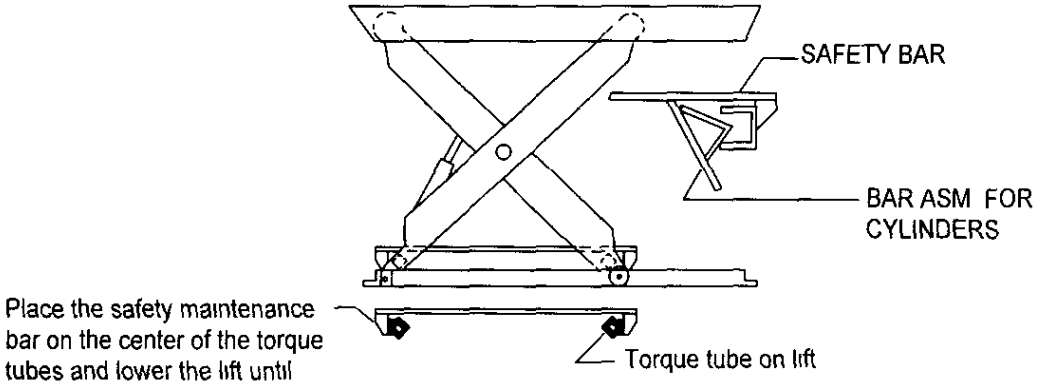
Every unit, of the above models, is supplied with a maintenance device. It is the only factory-approved method of blocking the lift open. If the bar is missing contact your distributor for replacement.



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

⚠WARNING

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

4100 SERIES

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 4200, 4300, 4400

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 VERSION #1

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)

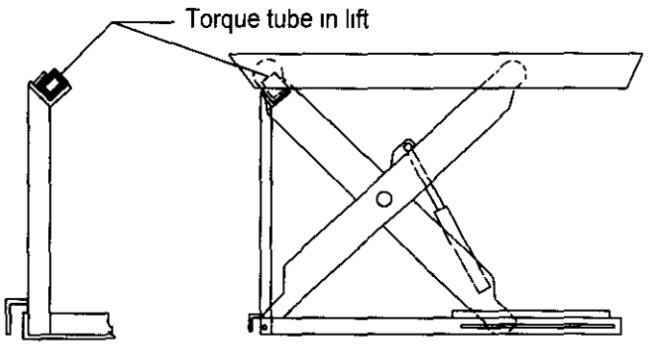
ALL MODELS

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.

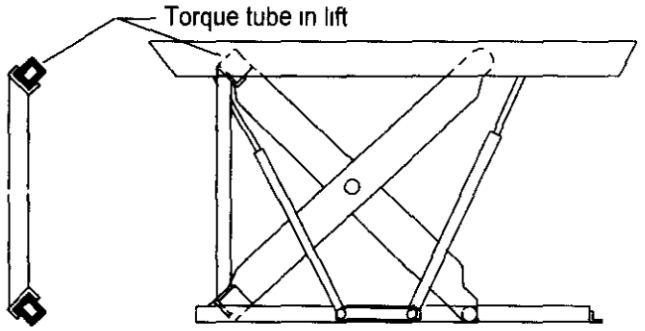
MAINTENANCE DEVICE FOR: 4000 SERIES AND SOME T-SERIES LIFTS



SAFETY MAINTENANCE BAR One person lowers 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

4100 SERIES MODELS

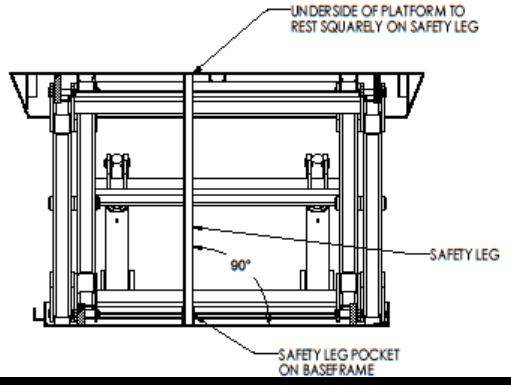
Fig. 3

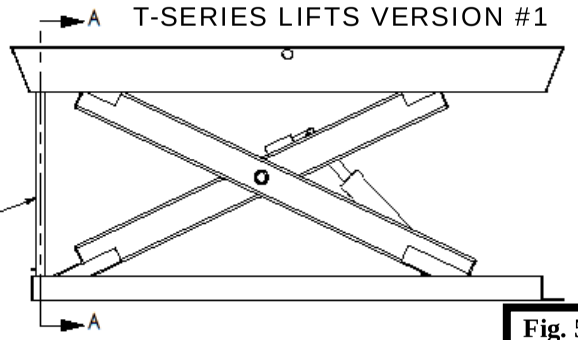


SAFETY MAINTENANCE BAR One person lowers the equipment while another holds the bar on the center of the torque tubes Lower the equipment until it is totally supported by the bar

4000 SERIES EXCEPT 4100 MODELS

Fig. 4





T-SERIES LIFTS VERSION #1

Fig. 5

SERIES 3000 UNITS Raise the lift high enough to allow the rotation of **BOTH** Maintenance Devices into place as shown in Figure 6 then lower the lift on to the devices. Once the roller wheels have made contact with the devices, continue holding the "Down" button for 15 seconds to relieve hydraulic pressure. Remove any load from the platform before deploying the maintenance device. Store the device as shown in figure 7.

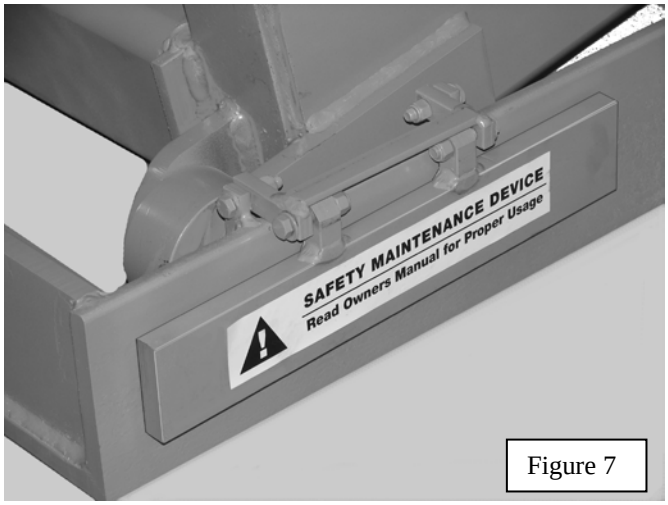


Figure 7

Maintenance Device in the stored position.

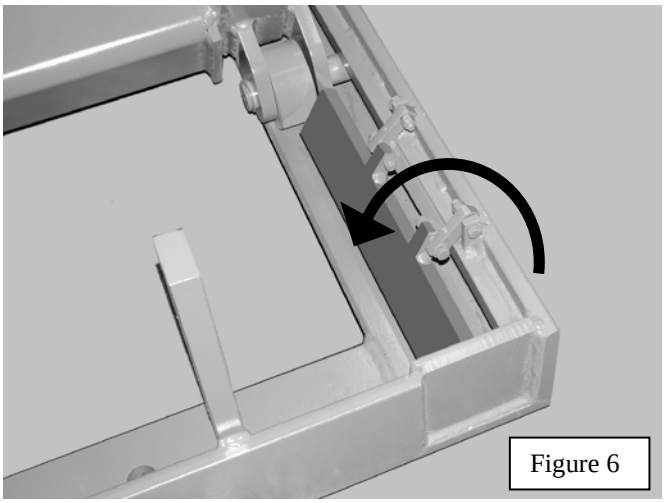


Figure 6

Maintenance Device in use.

⚠WARNING Read the entire lift blocking procedure and all warnings before attempting to use the Maintenance Device.

T-Series Version # 2: Raise the lift high enough to insert the maintenance device into the hole on the lower torque tube as shown in Figure 8. While one person holds the device in place, a second person slowly lowers the lift. As the lift lowers, align the device with the hole in the upper torque tube. Remove any loads from the platform before using the maintenance device. Store as shown in figure 9.

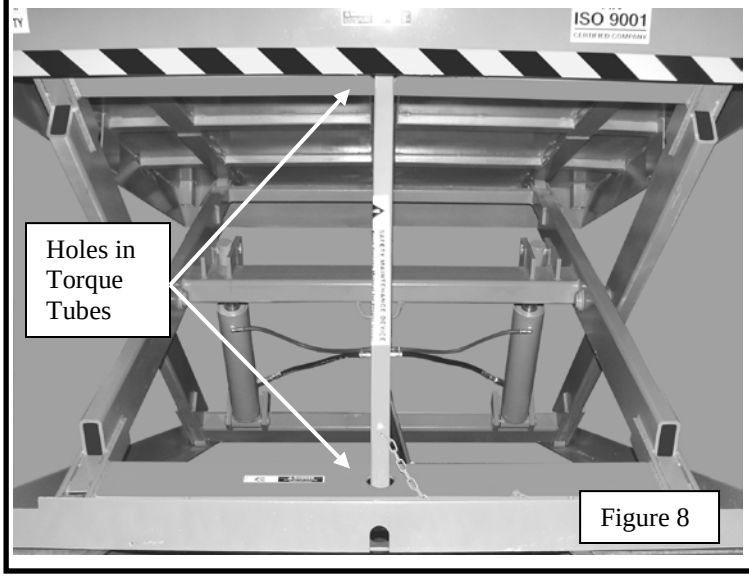


Figure 8

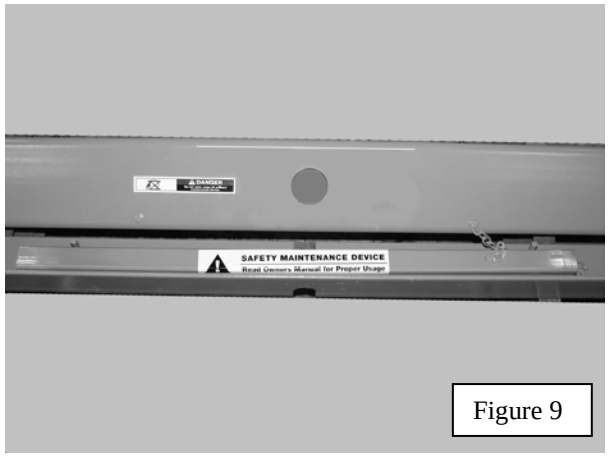


Figure 9

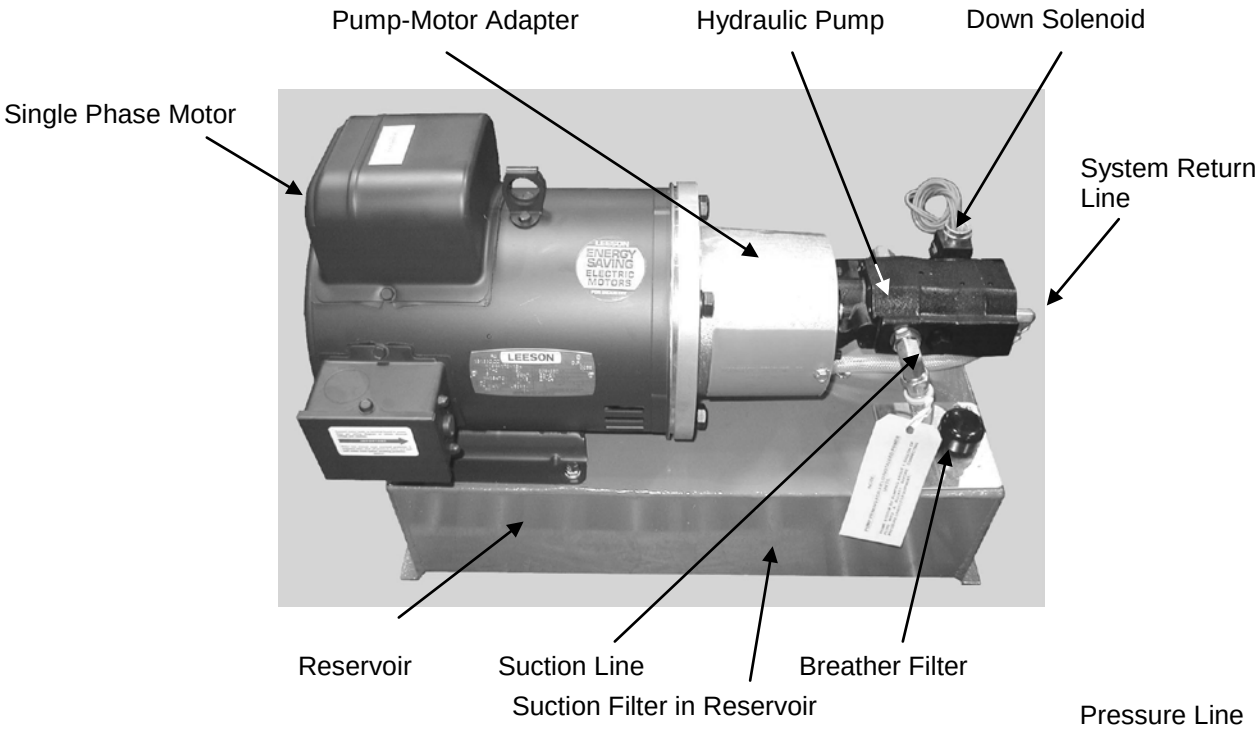
Store the Maintenance Device in the space provided in the base frame.

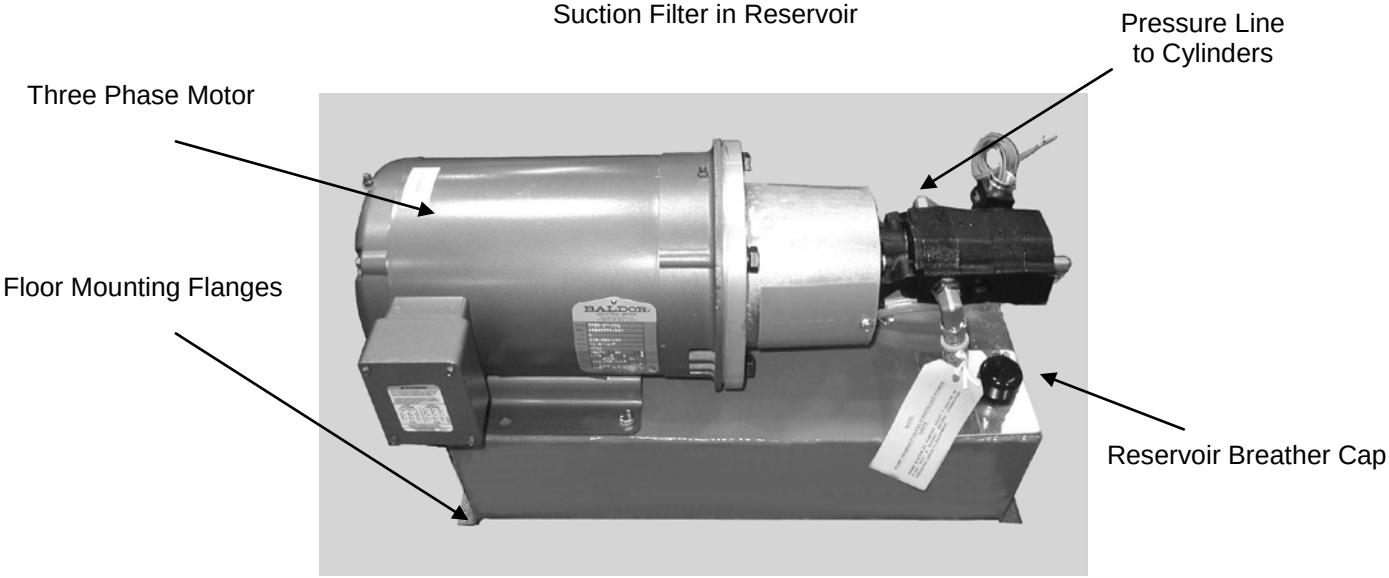
If you have any questions about the use or placement of maintenance devices, call the factory at 800-843-3625.

SECTION 7: POWER UNIT ASSEMBLIES

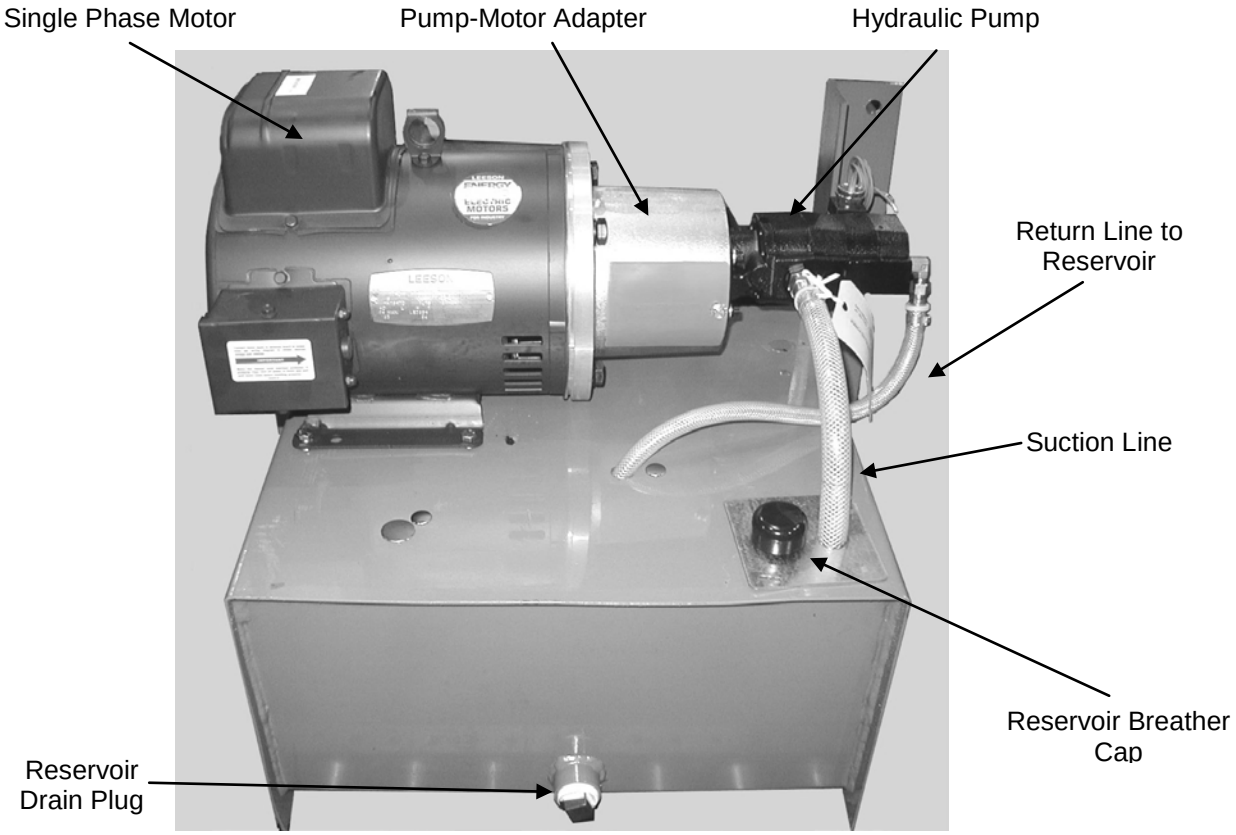
This section contains drawings and photos of completed power units to aid service personnel in identifying each component. Please be careful to match the correct voltage and horsepower as well as model number, when you are trying to identify the power unit for your lift. Advance Lifts uses several different 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.

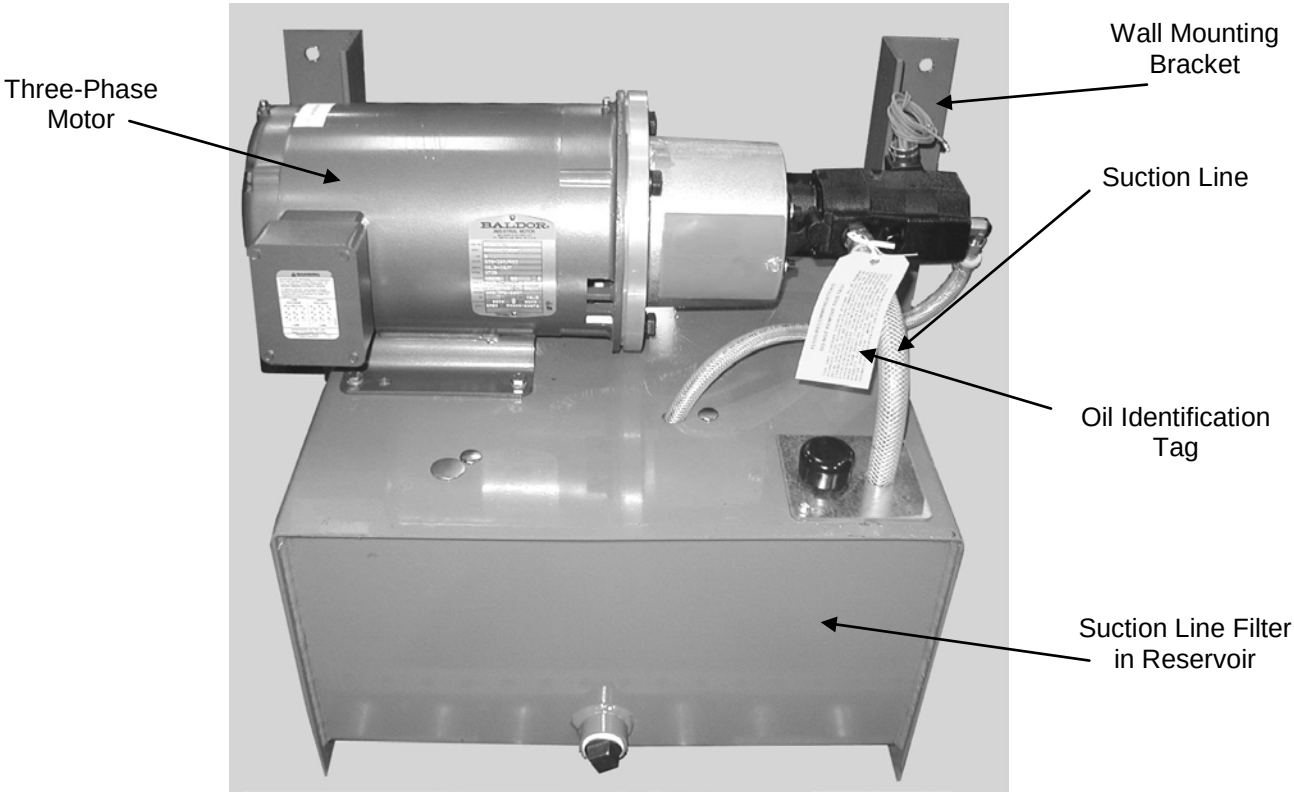
Models 2000K & T-Series



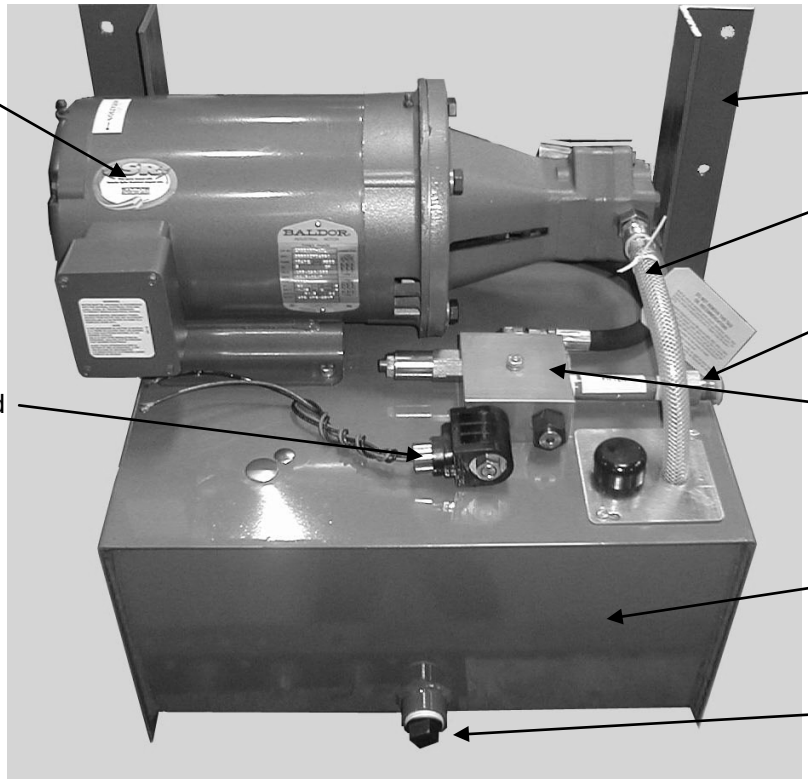


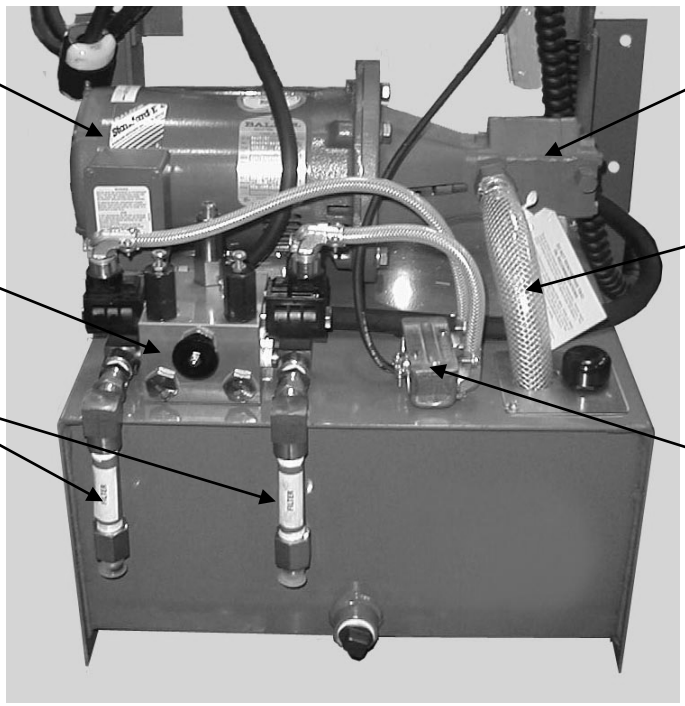
See Page 8-4 for Hydraulic Diagram and Pages 9-3 thru 9-5 for Electrical Diagram



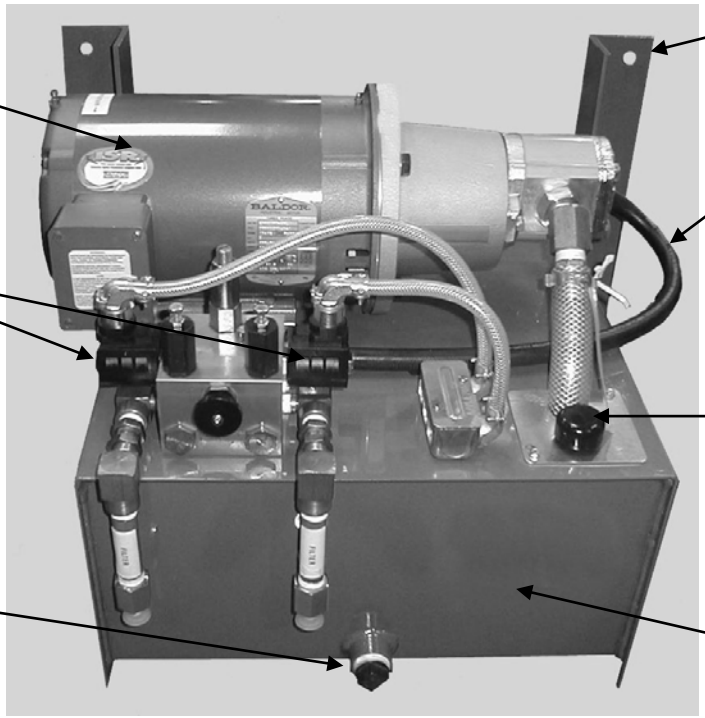


See Page 8-4 for Hydraulic Diagram and Pages 9-3 thru 9-5 for Electrical Diagram


Motor
Wall Mounting Bracket
Suction Line
Pressure Line Filter in Pipe
Down Solenoid
Valve Manifold Block
(Detail on Page 8-7)
Suction Line Filter in Reservoir
Reservoir Drain Plug



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 NPT fittings (tapered), JIC fittings (flare) or SAE fittings (with "O" ring seals, depending on options, 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.

Fluids:

1. 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. Advance Lifts ISO 46 hydraulic fluid can be identified by its purple color, when purchase elsewhere the fluid will be clear.

2. 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
3/8"	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

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.

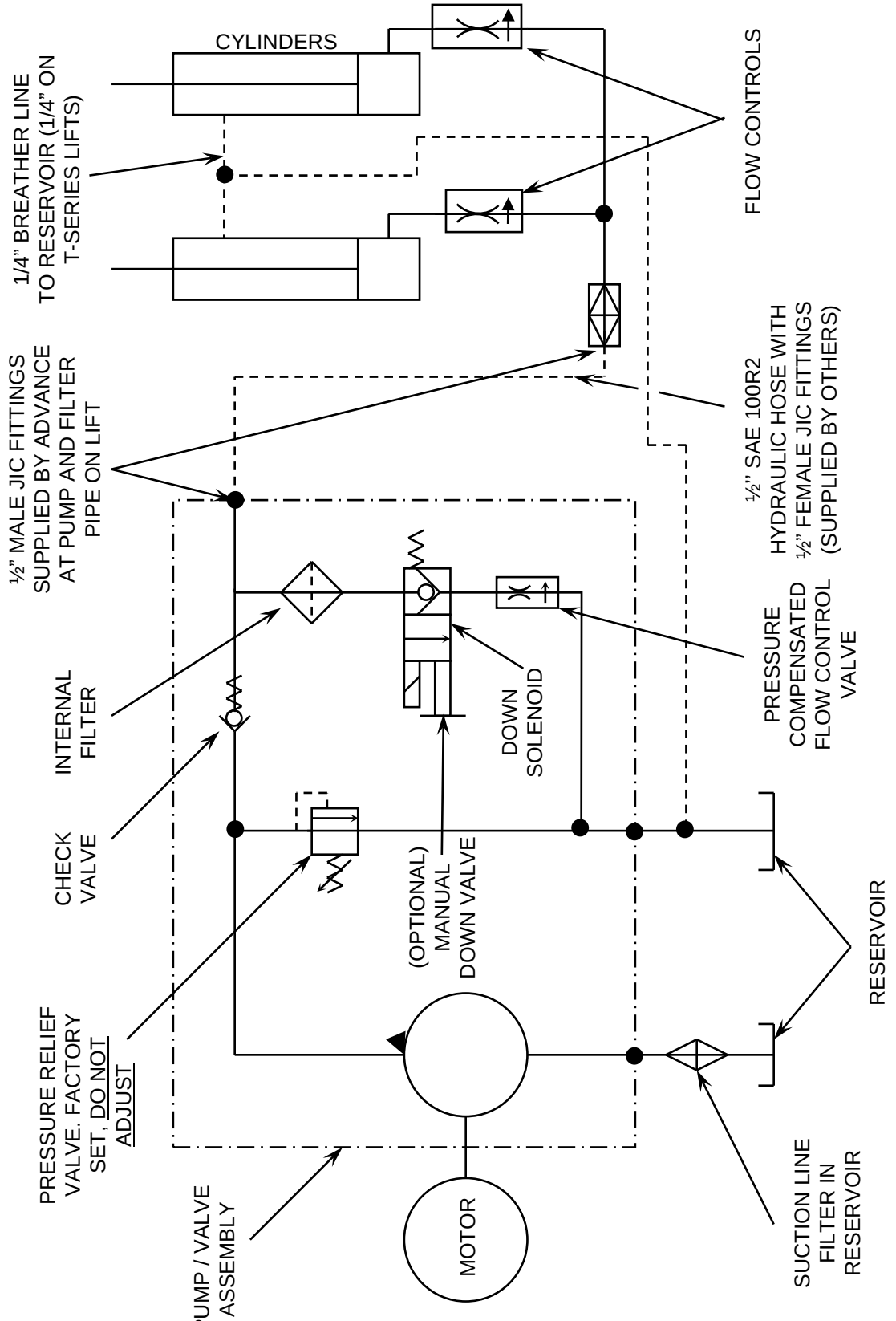
⚠CAUTION

Never use any hose or piping that does not meet or exceed the ratings listed above or hydraulic system could fail.

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

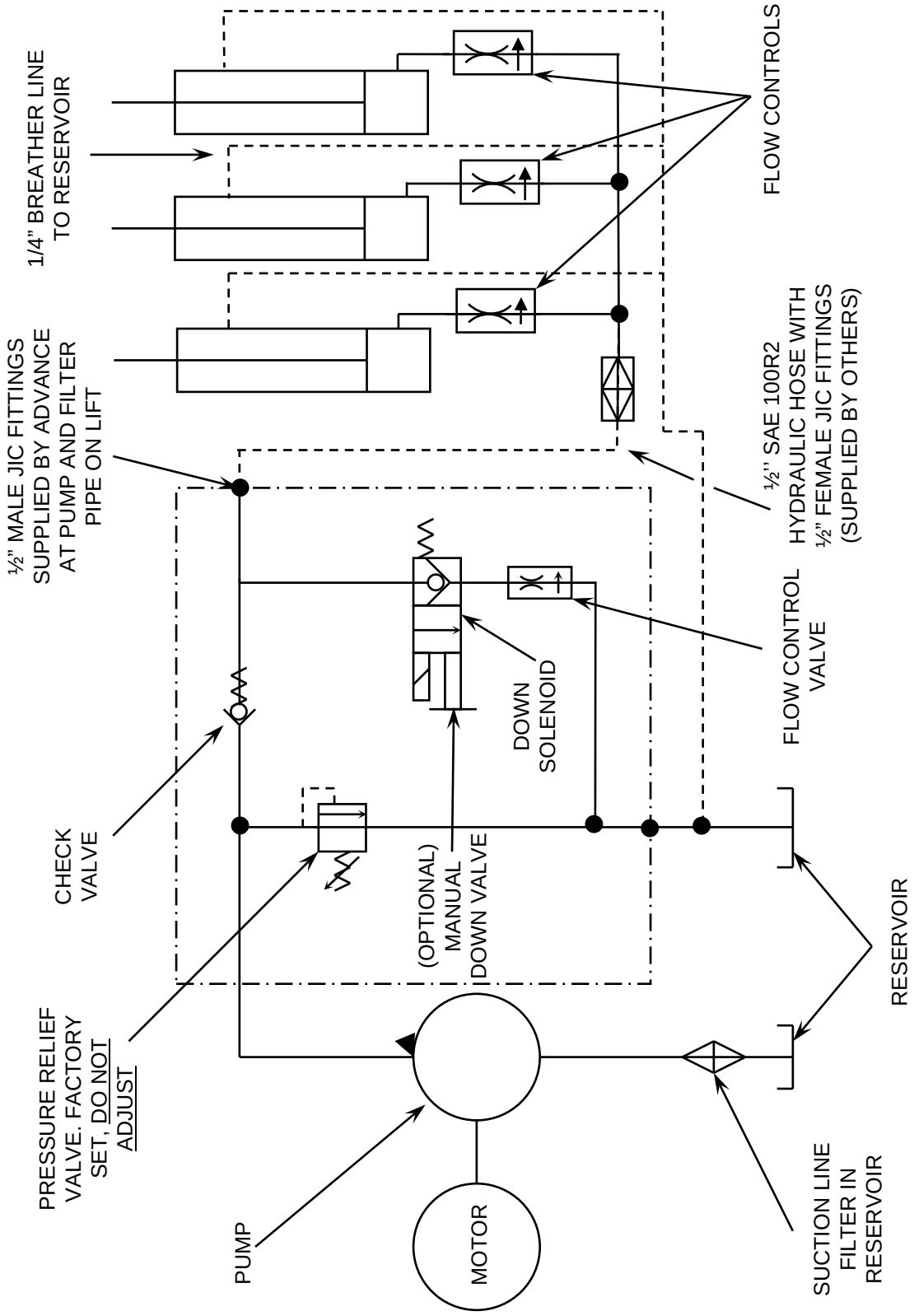
HYDRAULIC DIAGRAM FOR UNITS INTERNAL VALVE PUMPS



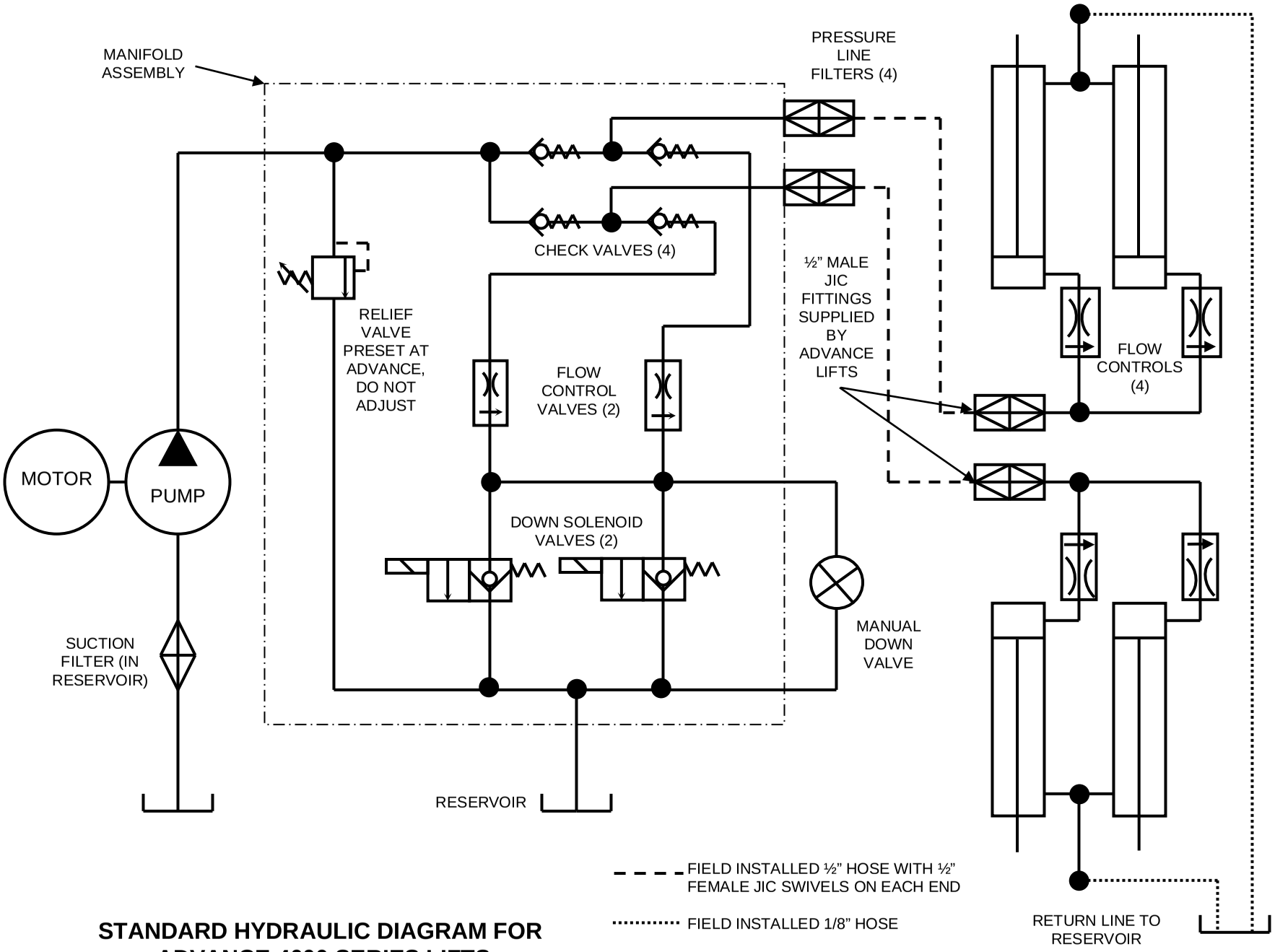
HYDRAULIC DIAGRAM FOR THE FOLLOWING MODELS

T-SERIES, 2000-SERIES, 2000K-SERIES, 3200, 3300 & 3400-SERIES

HYDRAULIC DIAGRAM FOR 3500 & 3600 SERIES UNITS

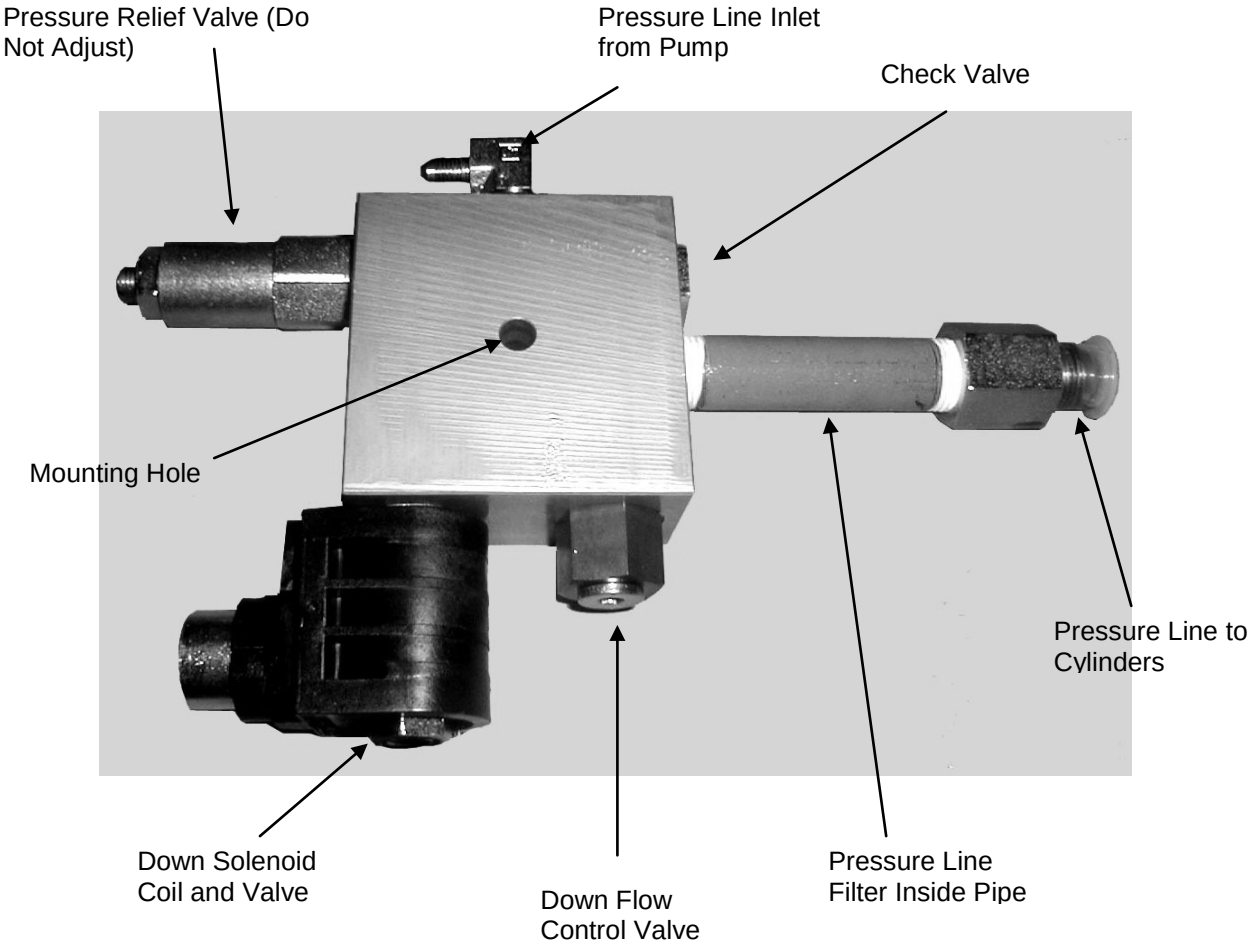


HYDRAULIC DIAGRAM FOR THE FOLLOWING MODELS
3500 & 3600 SERIES LIFTS



STANDARD HYDRAULIC DIAGRAM FOR ADVANCE 4000 SERIES LIFTS

Series 3500 & 3600
Standard Valve Manifold

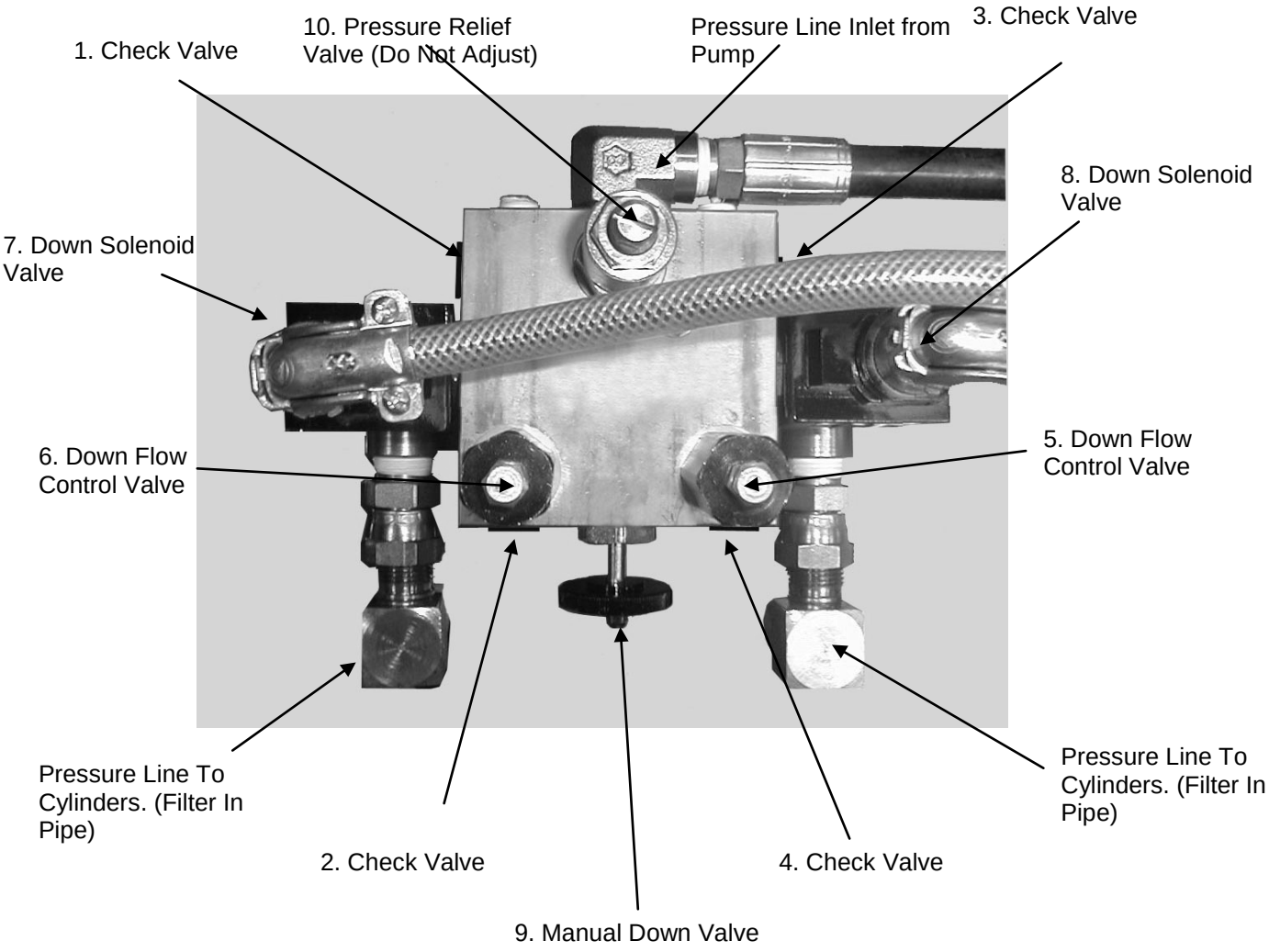


Note: picture for reference only.

Part Number Reference

Description	Part Number
Check Valve	001-262
Down Flow Control Valve	001-303
Down Solenoid Valve	001-293
Pressure Relief Valve	001-263

Series 4000
Standard Valve Manifold



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

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

Cylinder Removal:

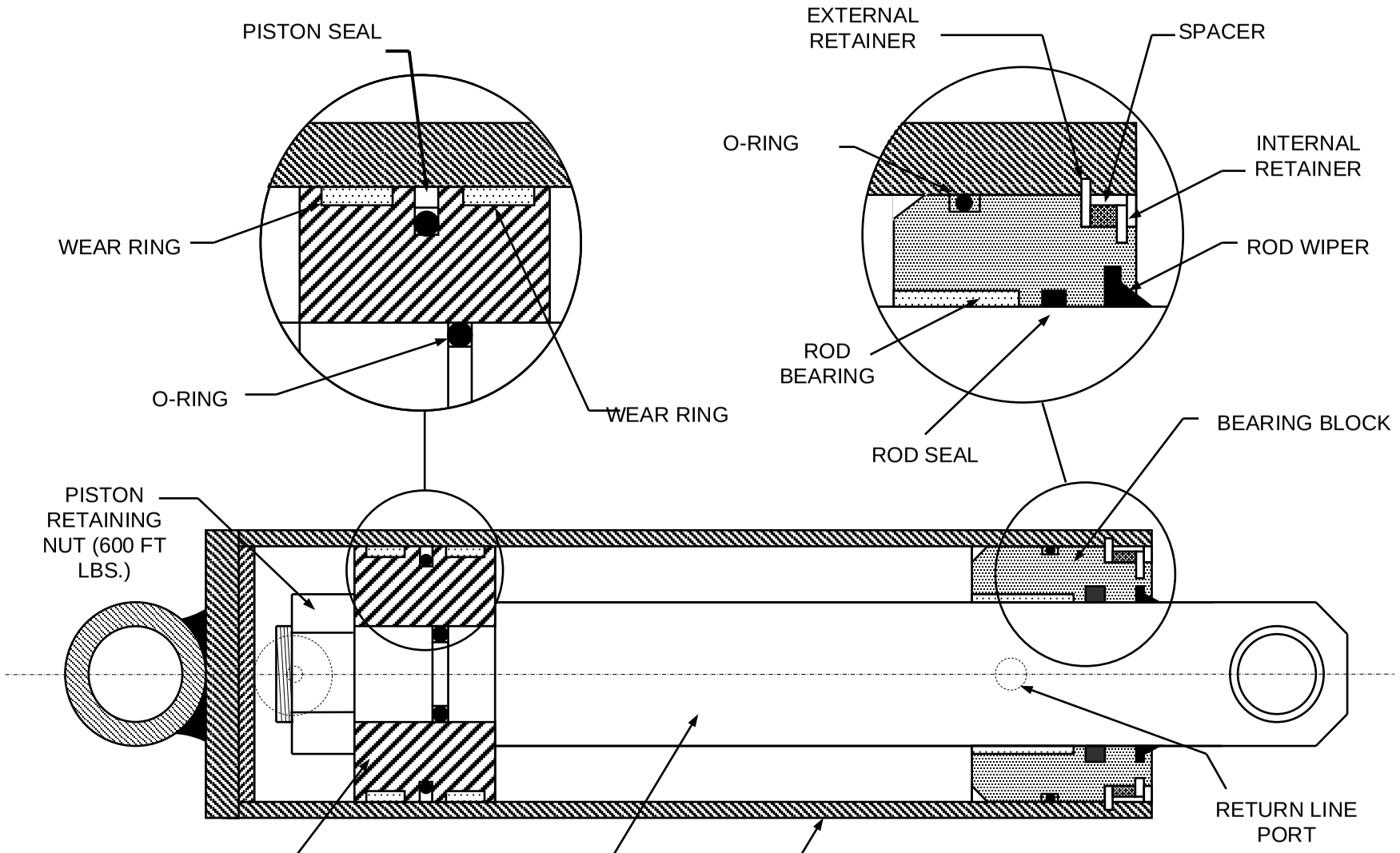
1. Raise the empty lift and settle it securely on its maintenance leg.
2. Once settled securely, depress the down button an additional 20 seconds to relieve any pressure from the cylinders. Remove the power connection to the power unit and mark with a warning label or lock the connection out to prevent unintended reconnection.
3. 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.
4. 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.
5. 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.

Reinstallation:

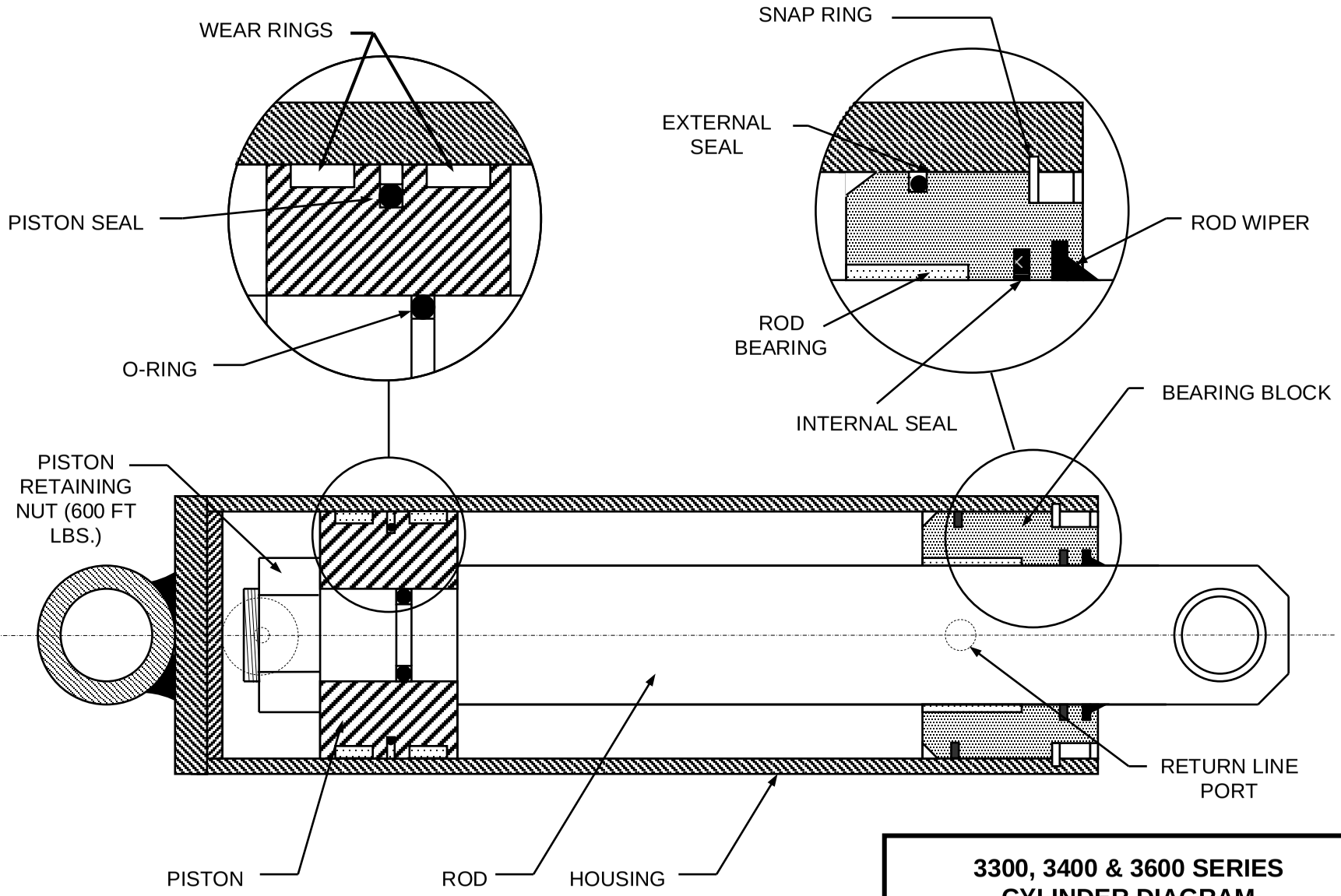
1. Remount the cylinders in the lift.
2. Clean up any spilled oil to insure that it is not later misinterpreted as a new oil leak.
3. Connect the electrical power and cycle the lift several times, holding the down button an extra 20 seconds each time to help bleed air from the hydraulic system. This 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.

Cylinder Repair:

All Advance Lifts cylinders use a high grade two piece design comprised of a standard size O-ring with a glass-filled PTFE cap. These seals are not replaceable in the field without specialized tools. Advance recommends that you consult with a professional who has the necessary tools to install the seals.



MODEL 2000, 2500K, T2 & T3–SERIES, 3200 SERIES, 3500 SERIES & 4000 SERIES CYLINDER DIAGRAM



3300, 3400 & 3600 SERIES CYLINDER DIAGRAM

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

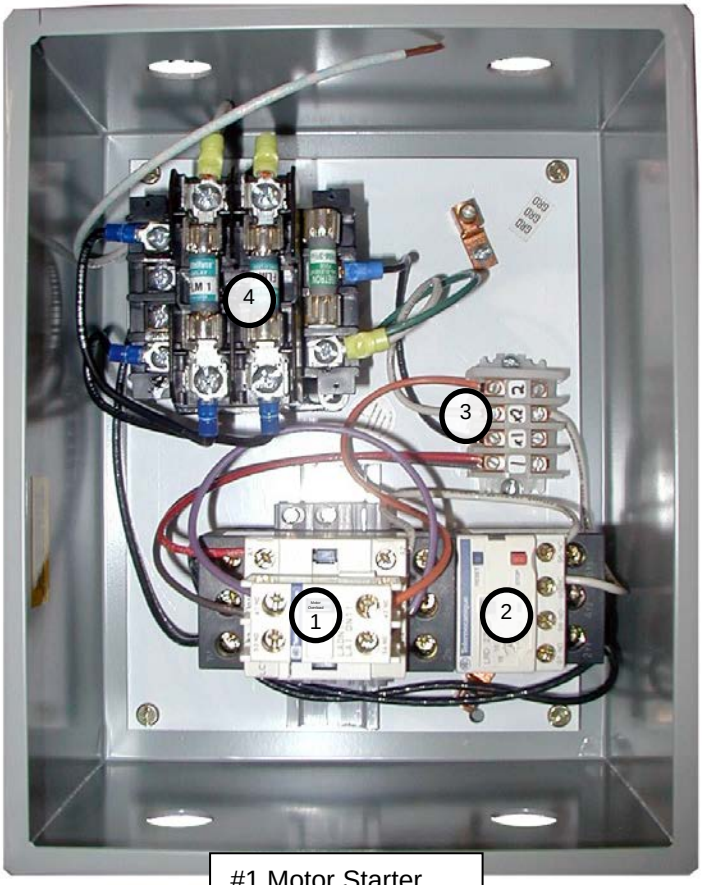
A. Change transformer primary connections to 230V.
B. Change overload protection to proper value as per currents in motor tables. Order new overload; adjust new overload to motor full load current setting. Insure the overload is set to "manual" reset, not "automatic" to insure the equipment cannot re-start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

Specifications:

Motor Starter with adjustable thermal overload.
50VA transformer with 24 VAC secondary fused at 3.2 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, line voltage and push button station)
Completely wired with terminal strips for final secondary voltage control connections
All components UL, CSA
Overall dimensions: Metal Enclosures: 9”w x 12”h x 8”d (approximate)

Typical motor controller – appearance may vary.

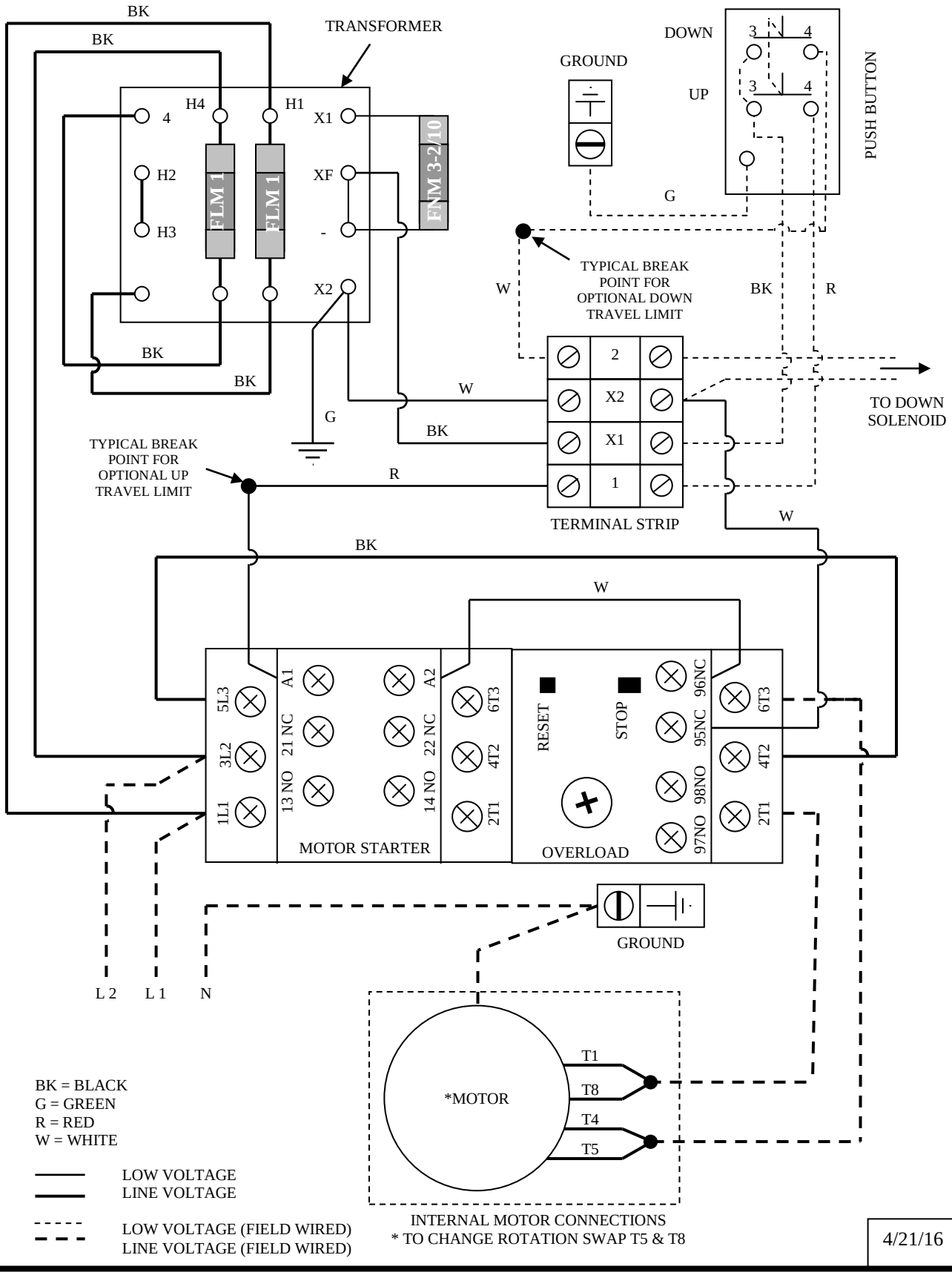


#1 Motor Starter
#2 Motor Overload
#3 Terminal Strip
#4 Transformer

Decal on front of control box

ADVANCE LIFTS WIRING DIAGRAM

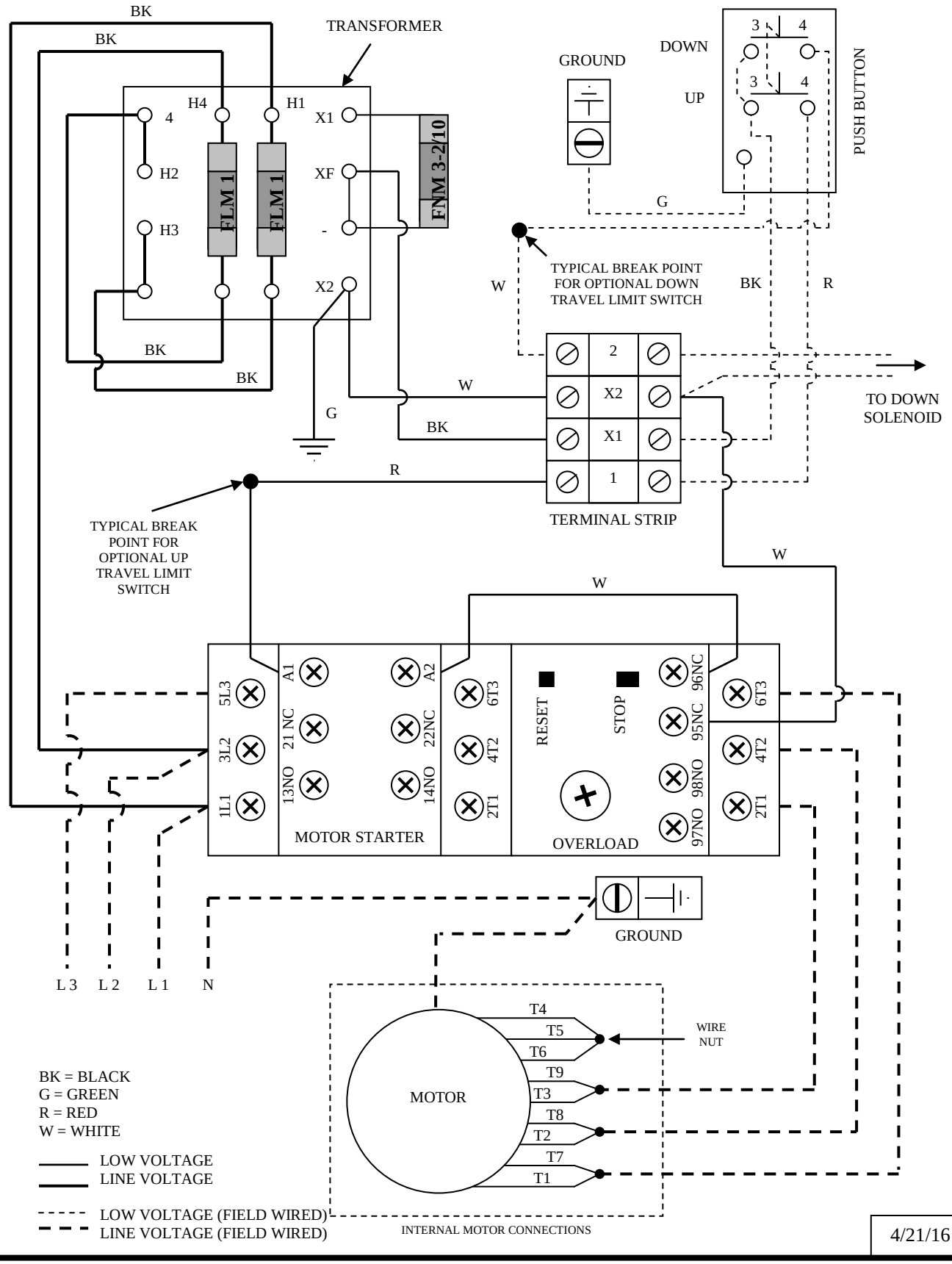
FOR 230 VOLT SINGLE PHASE 5 HP



4/21/16

ADVANCE LIFTS WIRING DIAGRAM

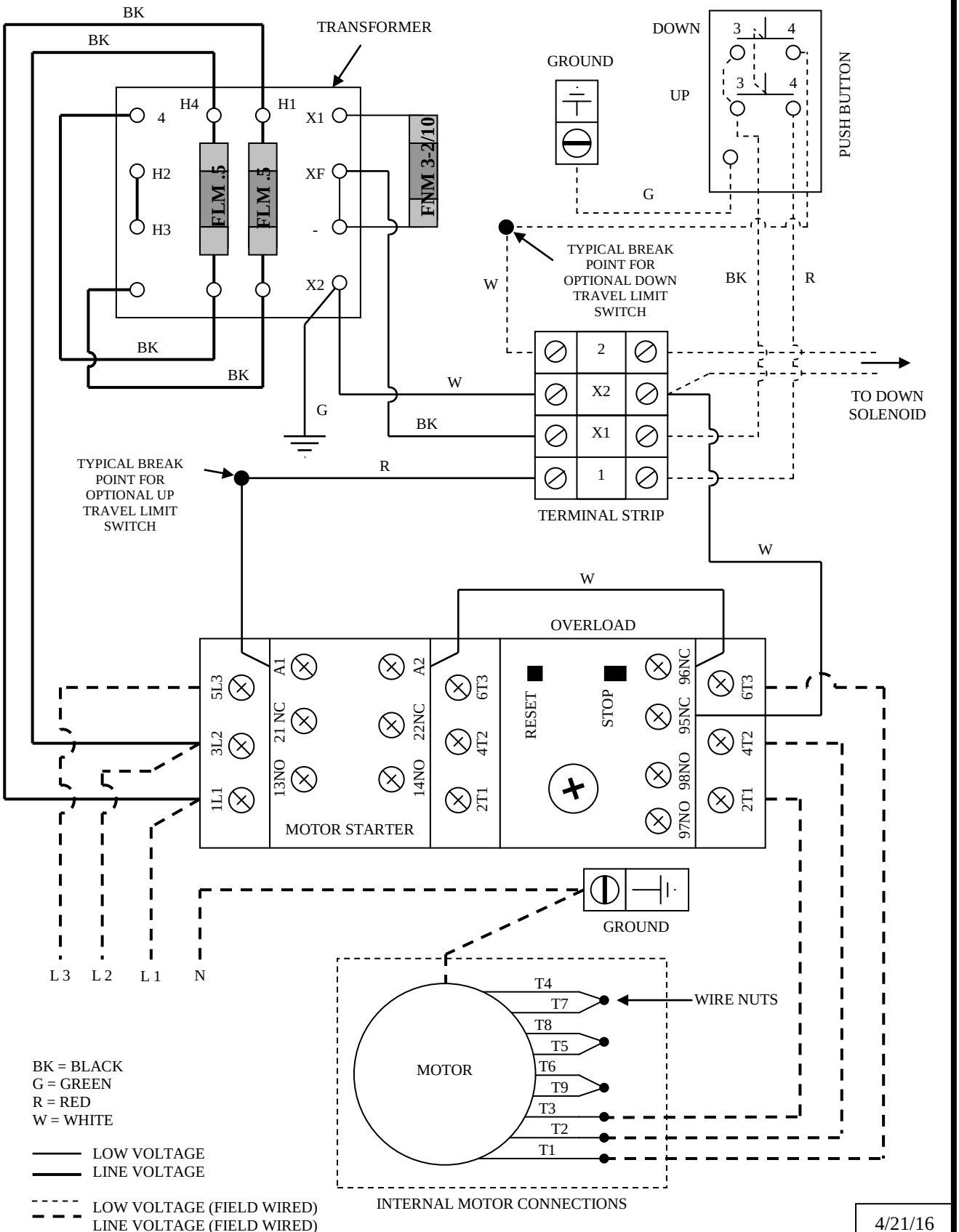
230 VOLT THREE PHASE 5 & 7.5HP



4/21/16

ADVANCE LIFTS WIRING DIAGRAM

460 VOLT THREE PHASE 5 & 7.5HP

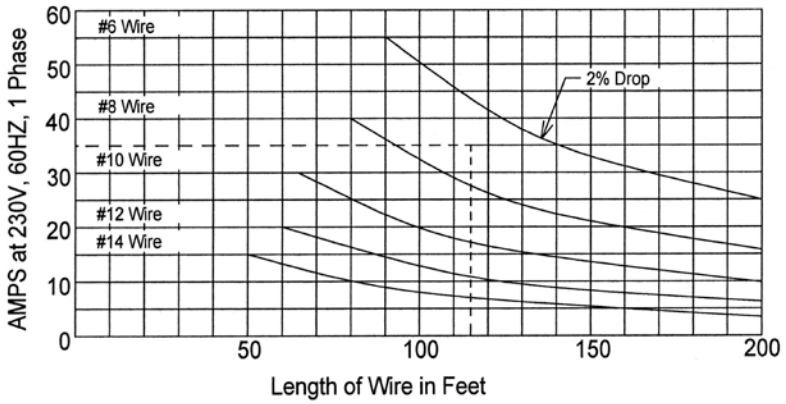


4/21/16

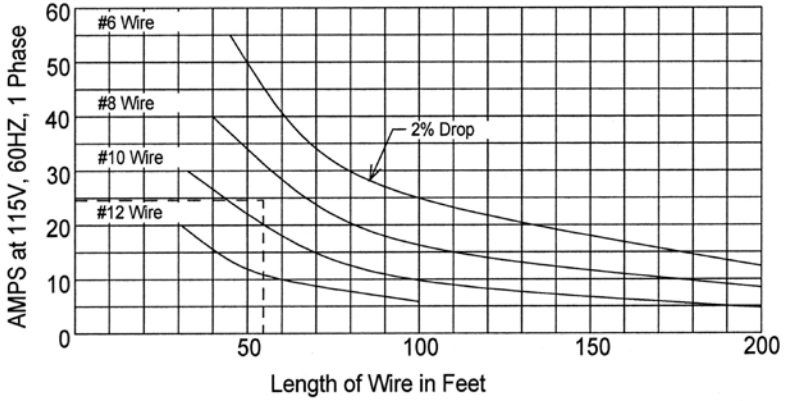
Branch Circuit Wire Sizes For 230V & 115V, 1 PHASE, 60HZ

(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.

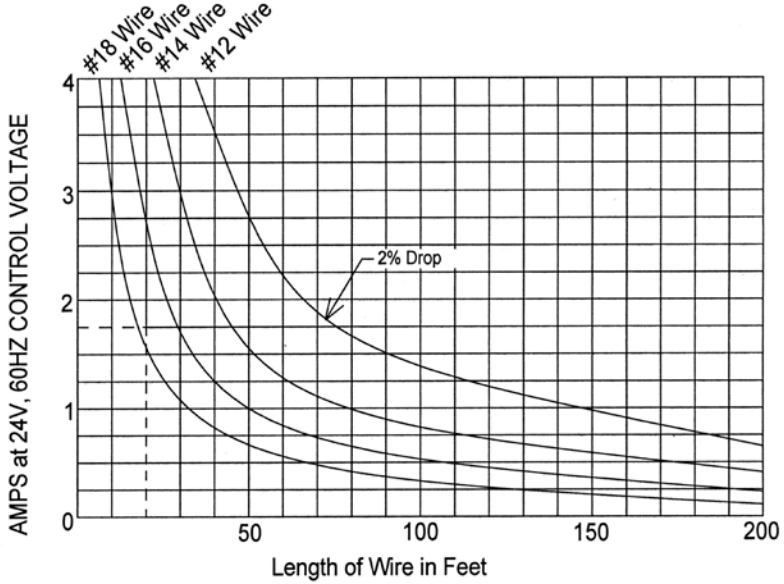


Example: 5HP, 230V, 1 phase, 35A motor, length of wire run is 115FT. Wire size above point of intersection is #6.



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



Example: Down Solenoid Drawing 40VA.

$$\left(I = \frac{W}{E}\right) \quad \frac{40VA}{24A} = 1.7A$$

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.

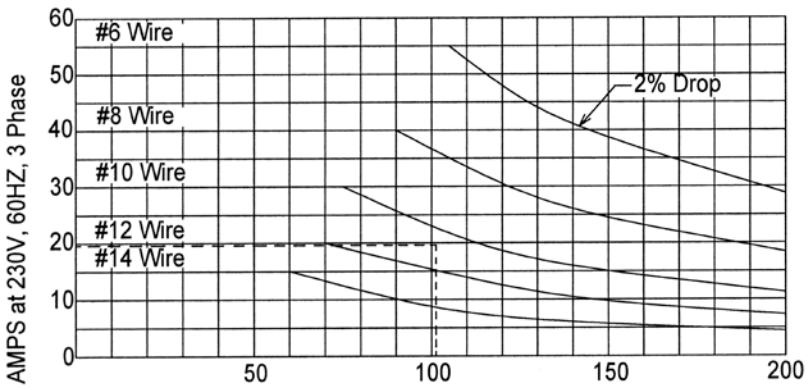
*Graph calculated for 4 wire copper cord, types S, SO, SJ, SJO.

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

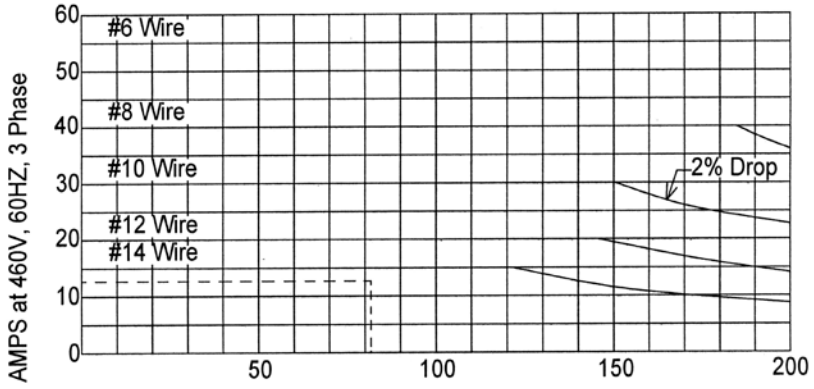
(Calculated for 2% maximum allowable line voltage drop with copper conductors. Table is a guideline, not intended to supersede the National Electrical or local codes.)

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.



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.)



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.

TYPICAL MOTOR INFORMATION

SERIES	HORSEPOWER	RPM'S
2000	5	1725
2000K	5	1725
T-SERIES	5	1725
3200	5	1725
3300	5	1725
3400	5	1725
3500	7.5	3450
3600	7.5	3450
4100	5	1725
4200	7.5	3450
4300	7.5	3450
4400	7.5	3450

230V 3Ø

HORSEPOWER	APPROX. FULL LOAD AMPS	MIN COPPER WIRE SIZE	CIRCUIT BREAKER AMPS	TIME DELAY FUSE
1	3.6	14	15	5.6
1-1/2	5.2	14	15	8
2	6.8	14	15	10
3	9.6	14	20	15
5	15.2	12	30	25
7-1/2	22	10	45	30
10	28	8	60	40

460V 3Ø

HORSEPOWER	APPROX. FULL LOAD AMPS	MIN COPPER WIRE SIZE	CIRCUIT BREAKER AMPS	TIME DELAY FUSE
1	1.8	14	15	2.8
1-1/2	2.6	14	15	4
2	3.4	14	15	5.6
3	4.8	14	15	8
5	7.6	14	15	12
7-1/2	11	14	20	17.5
10	14	12	25	20

115V 1Ø

HORSEPOWER	APPROX. FULL LOAD AMPS	MIN COPPER WIRE SIZE	CIRCUIT BREAKER AMPS	TIME DELAY FUSE
1/2	9.8	14	20	15
3/4	13.8	12	25	20
1	16	12	30	25
1-1/2	20	10	40	30
2	24	10	50	30
3	34	8	70	50
5	56	-	-	-

230V 1Ø

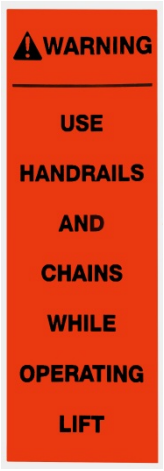
HORSEPOWER	APPROX. FULL LOAD AMPS	MIN COPPER WIRE SIZE	CIRCUIT BREAKER AMPS	TIME DELAY FUSE
1/2	4.9	14	15	8
3/4	6.9	14	15	10
1	8	14	15	12
1-1/2	10	14	20	15
2	12	14	25	17.5
3	17	10	35	25
5	28	8	60	40

NOTE: These tables are intended as a guideline, not to supersede national or local electrical codes.

Label #1 placed on long sides of the platform.

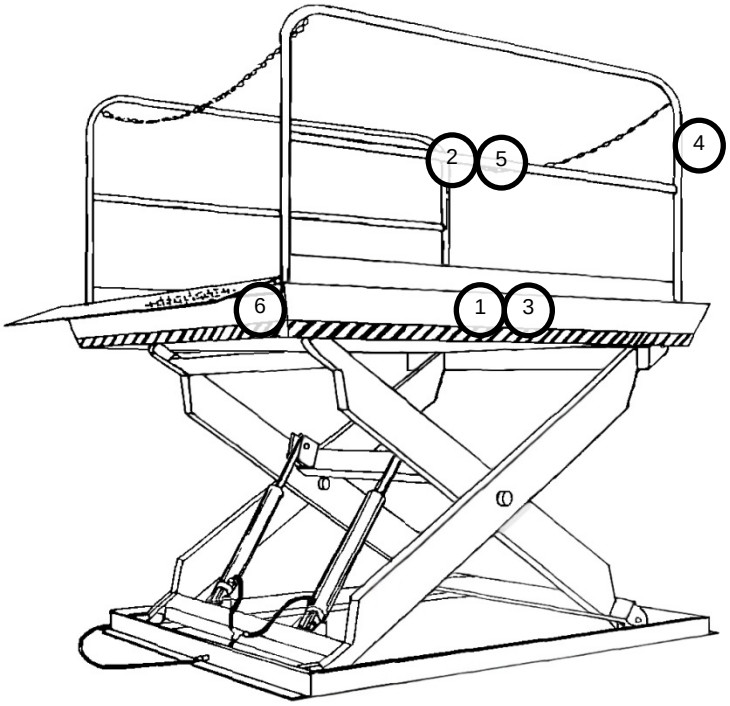
Label #2 placed centered on mid-rail

Label #3 placed on long sides of the platform.

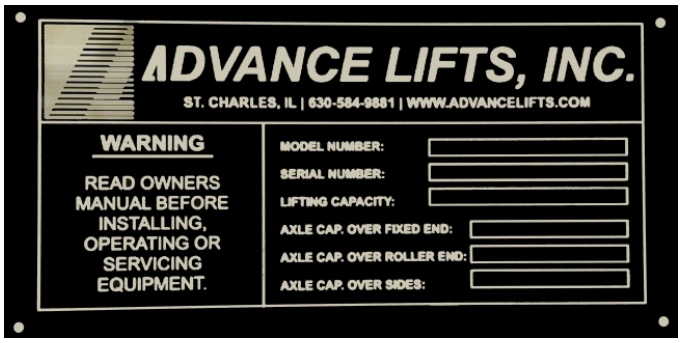


Label #4 placed on all guardrail uprights.

CAPACITY LABELS, placed on all sides of the platform.



Label #5 placed center on mid-rail.



#6 Advance Lifts identification and data plate. Data plate typically located under the transfer bridge.

SECTION 11: TROUBLESHOOTING

A. Equipment does not rise; motor 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.

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 the 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".

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.

E. Equipment lowers too fast:

⚠CAUTION
Equipment that lowers too quickly can develop into a dangerous condition, if the equipment is reaching destructive speed. Find and correct this condition before allowing use of the 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.

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.

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 make slight adjustments to the contact arm to make consistent contact with the clevis straps possible. 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.

SECTION 14. PARTS LISTS

2000 SERIES LIFTS

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
MECHANICAL:			**COMPLETE POWER UNIT:**	
WHEEL ASSEMBLY	005-244		230V, 1PH, 24V, WITH PUSHBUTTON	004-896
WHEEL, BASE, PLATFORM PIN	A-0216		230V, 3PH, 24V, WITH PUSHBUTTON	003-562
WHEEL, BASE, PLATFORM PIN CLIP	001-061		460V, 3PH, 24V, WITH PUSHBUTTON	004-895
MAIN AXLE PIN	A-0227			
AXLE PIN CLIP	001-063		**CONTROL BOX, COMPLETE:**	
GUARDRAIL	043-605		230V, 1 PHASE	004-790
STEEL BRIDGE 12X72	003-572		230V, 3 PHASE	003-966
			460V, 3 PHASE	004-783
CYLINDER:				
COMPLETE CYLINDER	D-0024		**TRANSFORMER:**	
CYLINDER SEAL KIT	003-514		230V, 1 PHASE	029-921
UPPER CYLINDER PIN	A-1951		230V & 460V, 3 PHASE	029-919
LOWER CYLINDER PIN	A-0209			
FLOW CONTROL	001-304		**MOTOR STARTER:**	
			230V, 1 PHASE	000-693
HYDRAULIC:			230V & 460V, 3 PHASE	000-692
PUMP	026-106			
SOLENOID COIL	015-301		**MOTOR OVERLOAD:**	
SOLENOID VALVE	003-106		230V, 1 PHASE	000-701
RESERVOIR BREATHER CAP	001-890		230V, 3 PHASE	000-699
			460V, 3 PHASE	000-696
MISC.				
PUSHBUTTON	000-802		**MOTOR:**	
FLUID HEATER	001-347		230V, 1 PHASE	001-327
BLUE TOUCH UP PAINT	028-672		230V – 460V, 3 PHASE	044-091
YELLOW TOUCH UP PAINT	028-673			
DECAL SET	004-059			
LIMIT SWITCH ASSEMBLY	003-898			
OWNERS MANUAL	003-566			
COIL CORD	000-788			
HANDRAIL TUBE CAPS	043-603			
SERIAL NUMBER TAG	001-488			

2500K SERIES LIFTS

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
MECHANICAL:			**COMPLETE POWER UNIT:**	
WHEEL ASSEMBLY	005-244		230V, 1PH, 24V, WITH PUSHBUTTON	004-771
WHEEL, BASE, PLATFORM PIN	A-0216		230V, 3PH, 24V, WITH PUSHBUTTON	003-563
WHEEL, BASE, PLATFORM PIN CLIP	001-061		460V, 3PH, 24V, WITH PUSHBUTTON	004-770
MAIN AXLE PIN	A-0227			
AXLE PIN CLIP	001-063		**CONTROL BOX, COMPLETE:**	
GUARDRAIL	043-605		230V, 1 PHASE	004-790
STEEL BRIDGE 12X72	003-572		230V, 3 PHASE	003-966
			460V, 3 PHASE	004-783
CYLINDER:				
COMPLETE CYLINDER	D-1185		**TRANSFORMER:**	
CYLINDER SEAL KIT	003-514		230V, 1 PHASE	029-921
UPPER CYLINDER PIN	A-1951		230V & 460V, 3 PHASE	029-919
LOWER CYLINDER PIN	A-0209			
FLOW CONTROL	043-610		**MOTOR STARTER:**	
			230V, 1 PHASE	000-693
HYDRAULIC:			230V & 460V, 3 PHASE	000-692
PUMP	026-106			
SOLENOID COIL	015-301		**MOTOR OVERLOAD:**	
SOLENOID VALVE	003-106		230V, 1 PHASE	000-701
RESERVOIR BREATHER CAP	001-890		230V, 3 PHASE	000-699
			460V, 3 PHASE	000-696
MISC.				
PUSHBUTTON	000-802		**MOTOR:**	
FLUID HEATER	001-347		230V, 1 PHASE	001-327
BLUE TOUCH UP PAINT	028-672		230V – 460V, 3 PHASE	044-091
YELLOW TOUCH UP PAINT	028-673			
DECAL SET	003-993			
LIMIT SWITCH ASSEMBLY	003-898			
OWNERS MANUAL	003-566			
COIL CORD	000-788			
HANDRAIL TUBE CAPS	043-603			
SERIAL NUMBER TAG	001-488			

T-SERIES LIFTS

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
MECHANICAL:			**COMPLETE POWER UNIT:**	
WHEEL ASSEMBLY	023-153		230V, 1PH, 24V, WITH PUSHBUTTON	004-771
WHEEL, BASE, PLATFORM PIN	A-0216		230V, 3PH, 24V, WITH PUSHBUTTON	003-563
WHEEL, BASE, PLATFORM PIN CLIP	001-061		460V, 3PH, 24V, WITH PUSHBUTTON	004-770
MAIN AXLE PIN	A-0227			
AXLE PIN CLIP	001-063		**CONTROL BOX, COMPLETE:**	
GUARDRAIL	043-605		230V, 1 PHASE	004-790
STEEL BRIDGE 12X72	003-572		230V, 3 PHASE	003-966
			460V, 3 PHASE	004-783
CYLINDER:				
COMPLETE CYLINDER	D-12311		**TRANSFORMER:**	
T2 CYLINDER SEAL KIT	028-886		230V, 1 PHASE	029-921
T3 CYLINDER SEAL KIT	033-560		230V & 460V, 3 PHASE	029-919
UPPER CYLINDER PIN	A-0219			
LOWER CYLINDER PIN	A-9899		**MOTOR STARTER:**	
CYLINDER PIN CLIP	001-061		230V, 1 PHASE	000-693
FLOW CONTROL	043-610		230V & 460V, 3 PHASE	000-692
HYDRAULIC:			**MOTOR OVERLOAD:**	
PUMP	026-106		230V, 1 PHASE	000-701
SOLENOID COIL	015-301		230V, 3 PHASE	000-699
SOLENOID VALVE	003-106		460V, 3 PHASE	000-696
RESERVOIR BREATHER CAP	001-890			
			MOTOR:	
MISC.			230V, 1 PHASE	001-327
PUSHBUTTON	000-802		230V – 460V, 3 PHASE	044-091
FLUID HEATER	001-347			
BLUE TOUCH UP PAINT	028-672			
YELLOW TOUCH UP PAINT	028-673			
DECAL SET	023-582			
LIMIT SWITCH ASSEMBLY	003-898			
OWNERS MANUAL	003-566			
COIL CORD	000-788			
HANDRAIL TUBE CAPS	043-603			
SERIAL NUMBER TAG	001-488			

3000 SERIES LIFTS

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
MECHANICAL:			**CYLINDER:**	
3200 & 3300 SERIES MODELS			**3200 SERIES MODELS**	
WHEEL	005-244		COMPLETE CYLINDER	D-21009
UPPER WHEEL PIN	A-19472		CYLINDER SEAL KIT	053-501
LOWER WHEEL PIN	A-19471		UPPER CYLINDER PIN	A-8434
WHEEL PIN CLIP	001-061		LOWER CYLINDER PIN	A-11569
PLATFORM/BASE FRAME PIN	A-0216		CYLINDER PIN CLIP	001-061
PLATFORM/BASE PIN CLIP	001-061		CYLINDER FLOW CONTROL	043-610
MAIN AXLE PIN	A-19460		**3300 SERIES MODELS**	
MAIN AXLE PIN CLIP	002-072		COMPLETE CYLINDER	D-21010
3400 SERIES MODELS			CYLINDER SEAL KIT	053-500
WHEEL	046-342		UPPER CYLINDER PIN	A-8434
UPPER WHEEL PIN	A-19492		LOWER CYLINDER PIN	A-11569
LOWER WHEEL PIN	A-18878		CYLINDER PIN CLIPS	001-061
WHEEL PIN CLIP	001-062		CYLINDER FLOW CONTROL	043-610
PLATFORM/BASE FRAME PIN	A-0145		**3400 SERIES MODELS**	
PLATFORM/BASE FRAME PIN CLIP	001-062		COMPLETE CYLINDER	D-20950
MAIN AXLE PIN	A-18877		CYLINDER SEAL KIT	053-500
MAIN AXLE PIN CLIP	001-055		UPPER CYLINDER PIN	A-18969
3500 SERIES MODELS			LOWER CYLINDER PIN	A-14825
WHEEL	053-498		CYLINDER PIN CLIPS	001-062
UPPER WHEEL PIN	A-19734		CYLINDER FLOW CONTROL	034-610
LOWER WHEEL PIN	A-19733		**3500 SERIES MODELS**	
WHEEL PIN CLIP	001-062		COMPLETE CYLINDER	D-21303
PLATFORM/BASE FRAME PIN	A-19745		CYLINDER SEAL KIT	053-502
PLATFORM/BASE PIN CLIP	001-062		UPPER CYLINDER PIN	A-5847
MAIN AXLE PIN	A-18877		LOWER CYLINDER PIN	A-11569
MAIN AXLE PIN CLIP	001-055		CYLINDER PIN CLIPS	001-061
3600 SERIES MODELS			CYLINDER FLOW CONTROL	043-610
WHEEL	053-499		**3600 SERIES MODELS**	
UPPER WHEEL PIN	A-19794		COMPLETE CYLINDER	D-21304
LOWER WHEEL PIN	A-19793		CYLINDER SEAL KIT	053-500
WHEEL PIN CLIP	001-063		UPPER CYLINDER PIN	A-18969
PLATFORM/BASE FRAME PIN	A-19798		LOWER CYLINDER PIN	A-19802
PLATFORM/BASE FRAME PIN CLIP	001-063		LOWER MIDDLE CYLINDER PIN	A-14825
MAIN AXLE PIN	A-18877		CYLINDER PIN CLIPS	001-062
MAIN AXLE PIN CLIP	001-055		CYLINDER FLOW CONTROL	043-610

3000 SERIES LIFTS (CONTINUED)

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
HYDRAULIC:				
3200, 3300, 3400 SERIES MODELS				
HYDRAULIC PUMP	026-106			
DOWN SOLENOID VALVE	003-106			
DOWN SOLENOID COIL	015-301			
3500, 3600 SERIES MODELS				
HYDRAULIC PUMP	052-855			
MANIFOLD ASSEMBLY	022-717			
DOWN SOLENOID VALVE	001-279			
DOWN SOLENOID COIL	001-260			
CHECK VALVE	001-262			
FLOW VALVE	001-293			
RELIEF VALVE	001-263			
RESERVOIR BREATHER CAP	001-890			
TRANSFORMER:				
230V 1-PHASE	029-921			
230V/460V 3-PHASE	029-919			
MOTOR STARTER:				
230V 1-PHASE	000-693			
230V/460V 3-PHASE	000-692			
MOTOR OVERLOAD:				
230V 1-PHASE	000-701			
230V 3-PHASE	000-699			
460V 3-PHASE	000-696			
MOTOR:				
230V 1-PHASE (ALL MODELS)	001-327			
230/460V 3-PHASE (3200, 3300, 3400)	044-091			
230/460V 3- PHASE (3500, 3600)	044-247			
MISC:				
FLUID HEATER	001-347			
BLUE TOUCH UP PAINT	028-672			
YELLOW TOUCH UP PAINT	028-673			
DECAL KIT	004-261			
PUSHBUTTON	000-802			
20’ COILED CORD	000-788			
REPLACEMENT SERIAL # TAG	001-448			

4000 SERIES LIFTS

GENERAL DESCRIPTION	PART #		GENERAL DESCRIPTION	PART #
MECHANICAL:			**TRANSFORMER:**	
4100 SERIES MODELS			230V/460V, 24V, 3-PHASE	029-920
INNER WHEEL	006-946			
OUTER WHEEL	006-945		**MOTOR STARTER:**	
UPPER WHEEL PIN	A-8203		230V/460V 3-PHASE	000-692
LOWER WHEEL PIN	A-8202			
WHEEL PIN RETAINING CLIP	001-063		**MOTOR OVERLOAD:**	
PLATFORM/BASE FRAME PIN	A-0376		3200, 3300, 3400, 230V, 3-PHASE OVERLOAD	000-699
PLATFORM/BASE FRAME PIN RETAINING CLIP	001-063		3200, 3300, 3400, 460V, 3-PHASE OVERLOAD	000-696
MAIN AXLE PIN	A-0370		3500, 3600, 230V, 3-PHASE OVERLOAD	000-700
MAIN AXLE PIN RETAINING CLIP	001-057		3500, 3600, 460V, 3-PHASE OVERLOAD	000-698
4200, 4300, 4400 SERIES MODELS			**MOTOR:**	
INNER WHEEL	016-865		3200, 3300, 3400, 230V/460V, 3-PHASE	044-091
OUTER WHEEL	009-376		3500, 3600, 230V/460V, 3-PHASE	044-247
WHEEL PIN	A-0227			
WHEEL PIN RETAINING CLIP	001-063		**MISC:**	
PLATFORM/BASE FRAME PIN	A-0376		FLUID HEATER	001-347
PLATFORM/BASE FRAME PIN RETAINING CLIP	001-063		DECAL KIT	004-375
MAIN AXLE PIN	A-0370		OWNERS MANUAL	003-566
MAIN AXLE PIN RETAINING CLIP	001-057		PUSHBUTTON	000-802
			COIL CORD	000-788
CYLINDER:			SERIAL TAG	001-448
4100 SERIES MODELS				
CYLINDER ASSEMBLY	D-10162			
CYLINDER SEAL KIT	004-365			
UPPER CYLINDER PIN	A-0410			
UPPER CYLINDER PIN RETAINING CLIP	001-876			
LOWER CYLINDER PIN	A-0216			
LOWER CYLINDER PIN RETAINING CLIP	001-061			
4200, 4300, 4400 SERIES MODELS				
CYLINDER ASSEMBLY	D-0498			
CYLINDER SEAL KIT	004-365			
UPPER CYLINDER PIN	A-0410			
UPPER CYLINDER PIN RETAINING CLIP	001-876			
LOWER CYLINDER PIN	A-0216			
LOWER CYLINDER PIN RETAINING CLIP	001-061			
HYDRAULIC:				
4100 HYDRAULIC PUMP	007-114			
4200, 4300, 4400 HYDRAULIC PUMP	000-358			
FLOW VALVE ASSEMBLY	003-458			
CHECK VALVE	001-262			
SOLENOID VALVE	001-279			
SOLENOID COIL	001-260			
FLOW CONTROL VALVE	001-292			
RELIEF VALVE	001-263			
MANUAL DOWN VALVE	001-227			
RESERVOIR BREATHER CAP	001-890			

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200), Health Canada HPR (SOR/2015-17), and Mexico NOM-018-STPS-2015

SECTION 1: Identification

Product Identifier **Powerflow™ NZ HE Hydraulic Oil**

Other means of identification Phillips 66 Powerflow™ NZ HE Hydraulic Oil 32
Phillips 66 Powerflow™ NZ HE Hydraulic Oil 46
Phillips 66 Powerflow™ NZ HE Hydraulic Oil 68

Code **831315**

Relevant identified uses Hydraulic Fluid

Uses advised against All others

24 Hour Emergency Phone Number CHEMTREC: 1-800-424-9300
CHEMTREC México 01-800-681-9531

Manufacturer/Supplier
Phillips 66 Lubricants
P.O. Box 4428
Houston, TX 77210

SDS Information
URL: www.phillips66.com/SDS
Phone: 800-762-0942
Email: SDS@P66.com

Customer Service
U.S.: 800-368-7128 or International: 1-832-765-2500

Technical Information
1-877-445-9198

SECTION 2: Hazard identification

Classified Hazards

No classified hazards

Hazards Not Otherwise Classified (HNOC)

PHNOC: None known

HHNOC: None known

Label elements

No classified hazards

SECTION 3: Composition/information on ingredients

Chemical Name	CASRN	Concentration
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	<95

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician)

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Prolonged or repeated contact may dry skin and cause irritation. Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

SECTION 5: Firefighting measures

NFPA 704: National Fire Protection Association

Health: 0 **Flammability:** 1 **Instability:** 0

0 = minimal hazard
1 = slight hazard
2 = moderate hazard
3 = severe hazard
4 = extreme hazard

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers,

storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Keep container(s) tightly closed and properly labeled. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Chemical Name	ACGIH	OSHA	Mexico	Phillips 66
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	---	---	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Biological occupational exposure limits
Note: This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

Skin/Hand Protection: The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance: Amber, Transparent
Physical Form: Liquid
Odor: Petroleum
Odor Threshold: No data
pH: Not applicable
Vapor Density (air=1): >1
Upper Explosive Limits (vol % in air): No data
Lower Explosive Limits (vol % in air): No data
Evaporation Rate (nBuAc=1): No data
Particle Size: Not applicable
Percent Volatile: No data
Flammability (solid, gas): Not applicable
Solubility in Water: Negligible

Flash Point: > 389.3 °F / > 198.5 °C
Test Method: Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Initial Boiling Point/Range: No data
Vapor Pressure: <1 mm Hg
Partition Coefficient (n-octanol/water) (Kow): No data
Melting/Freezing Point: No data
Auto-ignition Temperature: No data
Decomposition Temperature: No data
Specific Gravity (water=1): 0.860 - 0.873 @ 60°F (15.6°C)
Bulk Density: 7.16 - 7.27 lbs/gal
Viscosity: 6.5 - 11.5 cSt @ 100°C; 28.8 - 74.8 cSt @ 40°C
Pour Point: < -54.4 °F / < -48 °C

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of hazardous reactions: Hazardous reactions not anticipated.

Conditions to avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous decomposition products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

Information on Toxicological Effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not expected to be an aspiration hazard

Skin Corrosion/Irritation: Not expected to be irritating. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Not expected to be irritating.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): Not expected to cause organ effects from single exposure.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Distillates, petroleum, hydrotreated heavy paraffinic

Carcinogenicity: This oil has been highly refined by a variety of processes to reduce aromatics and improve performance characteristics. It meets the IP-346 criteria of less than 3 percent PAH's and is not considered a carcinogen by the International Agency for Research on Cancer.

SECTION 12: Ecological information

GHS Classification:
No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

U.S. Department of Transportation (DOT)
UN Number: Not regulated
UN proper shipping name: None
Transport hazard class(es): None
Packing Group: None
Environmental Hazards: This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant
Special precautions for user: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds)
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA - Section 313 and 40 CFR 372
This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds)
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65
WARNING. This product can expose you to chemicals including 1-Naphthylamine (CASRN 134-32-7) which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

International Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA.
All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other information

Issue Date:	Previous Issue Date:	SDS Number	Status:
02-Feb-2018	02-May-2017	831315	FINAL

Revised Sections or Basis for Revision:
Format change

Legend (pursuant to NOM-018-STPS-2015):
The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
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