ADVANCE LIFTS

Installation, Operation and Maintenance Manual for the Following Equipment:

All HD Series Lifts

☐ This manual contains specific information for your equipment, see options on P 2-1.

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

Model Number_____ Serial Number_____

Installation location: _____

_____

_____

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

Distributor Information: _____

_____

_____

_____

Advance Lifts, Inc.
701 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.**

Congratulations, the equipment that you have purchased is of the highest quality available. 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 the 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 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 your distributor. That number identifies your specific lift and will allow your distributors 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: Engineering Dept.

Thank you for purchasing our product.

SECTION 3. RESPONSIBILITIES OF OWNERS & USERS

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

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

Repairs: Authorized personnel in conformance with the manufacturer's instructions shall make all repairs.

Operators: Only trained and authorized personnel shall be permitted to operate the lift. They must understand to be alert to safety hazards during all operations.

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

1. Read and understood the manufacturer's operating instructions and safety rules, or been trained by a qualified person.

2. Inspected the lift for proper operation and condition. Any suspect item shall be carefully examined and a determination made by a qualified person as to whether it constitutes a safety hazard. All unsafe items shall be corrected before further use of the lift.

During Operations: The lift shall be used only in accordance with its intended use and within the manufacturer's limitation and safety rules:

1. Do not overload the lift.

2. Insure that all safety devices are operational and in place.

3. Be certain that all loads are centered on the lift.

4. Insure that all personnel near operating lifts understand to stand back from operating lifts so that no body parts can be pinched by the mechanism or platform and any items that may fall off the lift will not strike them.

Modifications Or Alterations: Modifications or alteration of industrial scissors lifts shall be made in conformance with all applicable provisions of scissors lift manufacturer's proposed ANSI standards and shall be at least as safe as the equipment was before modification. These changes shall also satisfy recommendations of the original equipment manufacturer for the particular application of the lift.

SECTION 4. INSTALLATION INSTRUCTIONS

Floor mounted units with base frames:

1. Move the lift to the usage area; insuring the floor is clean and level. If slings are used, encircle the entire lift, not just the platform.

2. If floor is not level, shim each corner of the base frame to level the unit. **Caution!** Before securing the unit to the floor, shim or grout the entire base frame assembly. The base frame must be completely supported.

> **CAUTION!**
> **Continuous baseframe support is essential for proper installation.**

3. Using the pushbutton control or footswitch, push the “up” button in short jogs to see if the lift will rise. If the unit does not rise, check the motor rotation. On 3 phase systems, 2 of the 3 power leads may have to be switched so the pump will turn in the proper direction. **Caution!** Operating a hydraulic pump in reverse, even for brief periods, can cause permanent pump damage.

4. Raise the lift halfway several times then fully lower it, holding the down control an extra 10 seconds each time the lift is lowered to bleed air from the unit. HD units should be filled within 2” of the top of the reservoir with the unit in the fully lowered position. Lag the unit in place using ½” x 5”, “Rawl-Studs” or wedge anchors in the holes provided.

5. Due to the rigors of shipping it may be necessary to snug up some hydraulic fittings. Hose fittings, in particular, are most susceptible.

6. Clean up any debris or spilled fluid as they may later be misinterpreted as mechanical trouble or a cylinder leak. Remove maintenance bars and lower the unit.

7. Instruct user(s) in the proper operation of the lift, safety precautions, and equipment capacity. Supply maintenance personnel with this service manual.

Pit mounted units:

1. Check all pit dimensions for accuracy.
2. Attach a temporary electrical line through the pit conduit to the lift. Check for correct motor rotation; (see paragraph #3 in “floor mounted installation”).
3. Using slings, encircle the entire lift, not just the platform and lower the lift into the pit, centering it for 1” minimum clearance on all sides to the pit wall.
4. Raise the lift with the pushbutton or footswitch and remove the slings. Run the unit up and down several times. Level and center the lift by shimming and grouting the entire base frame. (**Continuous base frame support is essential for proper installation**). Lag the unit in place using ½” x 5”, “Rawl-Studs” or wedge anchors in the holes provided.
5. With the lift fully elevated shutoff the main power, then complete the permanent electrical wiring.
6. Follow the instructions outlined in paragraphs 4, 5 and 6 under “Floor mounted installation”. To complete the installation.

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 safety devices provided and be careful not to surprise anyone in the area with the movement of the lift.

Pre-operational checks:

1. Check all electrical wiring and connections to be sure that they are completed properly and are operational.
2. Check for obstructions or debris that may interfere with the safe operations of the lift.
3. Be sure that all personnel in the area are a safe distance away from the lift and aware that you are about to operate it.
4. If there are any optional safety devices such as bellows or electric toe guards, check them for proper operation.

Test operating the equipment:

1. Station yourself so that you will always see the equipment when it is in operation. Never operate the equipment blind!
2. Raise the equipment and note that the control is a constant pressure, “dead-man” type. When you release the up or down switch the unit should stop moving immediately and maintain its elevation. If it does not, contact your maintenance personnel.
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 my take several cycles to smooth out the operation. If the operation is not smooth after several cycles, contact your maintenance personnel. Any evidence of binding or scraping in the operation should cause you to 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 our customer service department at 1-800-843-3625.

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 the capacity.
3. **WARNING!** 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 unit if you cannot see it and the personnel around it.

Daily operation (continued):

4. On the first use of the lift each day, the operator should check to see that the lift is functioning properly and smoothly. All safety devices should be in place and operating correctly.

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.

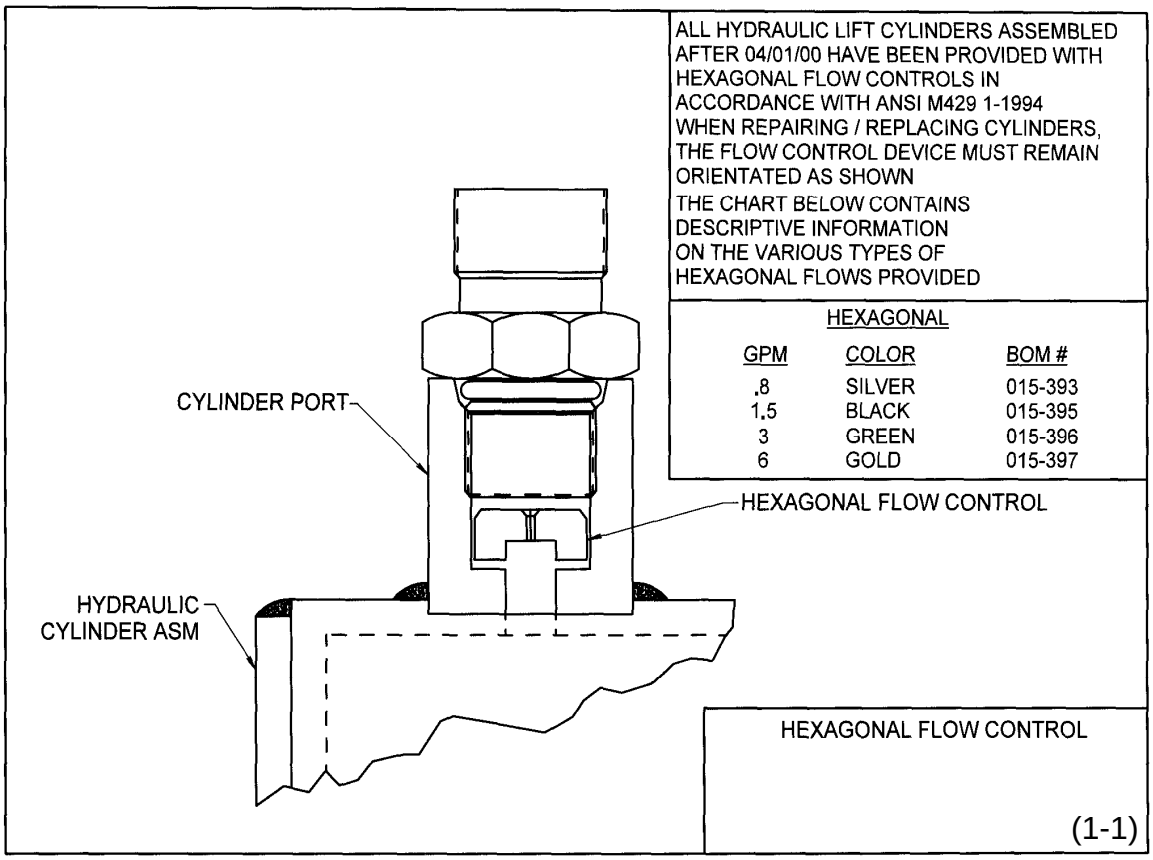
Warning! Loads should be centered before raising or lowering the lift as this will help insure even wear on all moving parts.

General Information Notes:

1. A special additive has been added to the hydraulic fluid to facilitate the initial break-in period for the tight tolerance, high quality, hydraulic cylinders. If the original fluid is changed, contact the factory for purchasing replacement fluid.

2. The following changes in cylinder construction and flow control design were effected on April 1st, 2000. (Illustration 1-1). Proper orientation of the flow control device is critical to the performance of the lift.

3. All units manufactured after April 1st, 2000 contain JIC and O-Ring Boss fittings, units manufactured before this date had NPT fittings. **Caution!** These fittings are not interchangeable, know the difference.



SECTION 6. MAINTENANCE INSTRUCTIONS

1. Always remember that this is machinery with large moving parts that can seriously hurt you.

2. Read and understand this manual before attempting any service work.

3. **WARNING!** Always use the safety bars or safety leg when you are going to work on the unit in the elevated position or must reach under the platform. (See photo on page 6-4 for proper positioning and engagement of the safety bars).

4. When using the safety bars, adhere to the following rules:
   A. The unit must be unloaded.
   B. Be sure the safety bars are properly engaged.
   C. Hold the down pedal or pushbutton an extra 10 seconds when lowering onto the safety bars to be sure that all the weight of the lift is on the bars.
   D. Disconnect and tag the electricity to the unit to prevent accidental movement of the lift by other personnel.
   E. Spend as little time as possible under the lift.

5. Use only replacement parts recommended by the manufacturer.

6. Do not let the equipment stay in disrepair; fix small problems before they become big problems. A unit in disrepair can become a severe hazard if left unattended.

7. Inspect the equipment on a regular schedule, preferably monthly.

8. Never work on the hydraulics or electrical systems unless the unit is fully lowered or properly sitting on the safety support or wheel block.

9. Never apply a load to the equipment until the base frame is continuously supported.

10. **WARNING!** Never expect to hold the leg assemblies open by simply lifting one end of a platform.
    A. The roller end of most lifts is not “gibbed” or captured in any way, so lifting on the roller end will simply tilt 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 an unpredictable manner and could cause personal injury.
    C. The only safe way to hold a lift’s legs open is to use the factory designed safety support. If a safety maintenance bar is

Routine Maintenance: (All lifts)
Weekly: Once a week or after repetitive operation, the unit should be raise to its full height. This will get rid of cylinder oil seepage buildup and lubricate the upper cylinder barrel.
Monthly:
1. Check the hydraulic fluid level as specified in Section 4, Paragraph 4.

WARNING! Be sure a maintenance safety leg or safety bars are properly engaged before performing maintenance checks 2 through 6 or reaching beneath a raised lift. (See instructions 3, 4 and 10 above)

2. Clean all debris from the vicinity of floor or pit mounted units in order to avoid interference with the lift mechanism or rollers.
3. Check for presence and proper seating of all snap rings and clips on all axles, cylinder, and rollers.
4. Check rollers, pins and bushings for any signs of wear such as flat spots, missing fasteners, or dislodged bearing material.
5. Check the hydraulic fittings for cracks or leaks and clean up any weepage on or beneath the cylinder.
6. Check hoses and electrical lines for abrasions or other abuse and check for snug connections.
7. Operate the unit and check for any abnormal noise or vibrations.
8. Check all safety devices on the unit such as the condition of the pleated bellows or smooth operation of the electric toe guards.

Seasonal or Semiannual Maintenance: Change hydraulic fluid for ambient temperature change if appropriate or if there is any evidence of accumulated condensation creating water contamination. See page P 5-2, paragraph number 1, under the heading “General Information Notes” and P 4-1, paragraph number 4 for more information on changing fluid.

Recommended Lift Blocking Procedures

WARNING!

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

DANGER!

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

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

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

1. Any load must be removed from the lift prior to engaging the maintenance device(s). These devices are designed to support an unloaded lift only. Failure to remove the load from the lift prior to blocking could cause the failure of the maintenance device(s) and allow the lift to fall unexpectedly. This can result in personal injury or death, or permanent damage to the maintenance device(s) and/or the lift.
2. Raise the lift to its fully raised position. If you do not, the maintenance device(s) may not be able to be placed properly in its/their designed blocking position.
3. Remove the maintenance device(s) from its/their storage location and place it/them into the engaged position as shown in Figure 1-1 (*Note: further information may be useful here to provide additional instructions as to the location and method of storage and engaged positions*).
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.

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

WARNING!

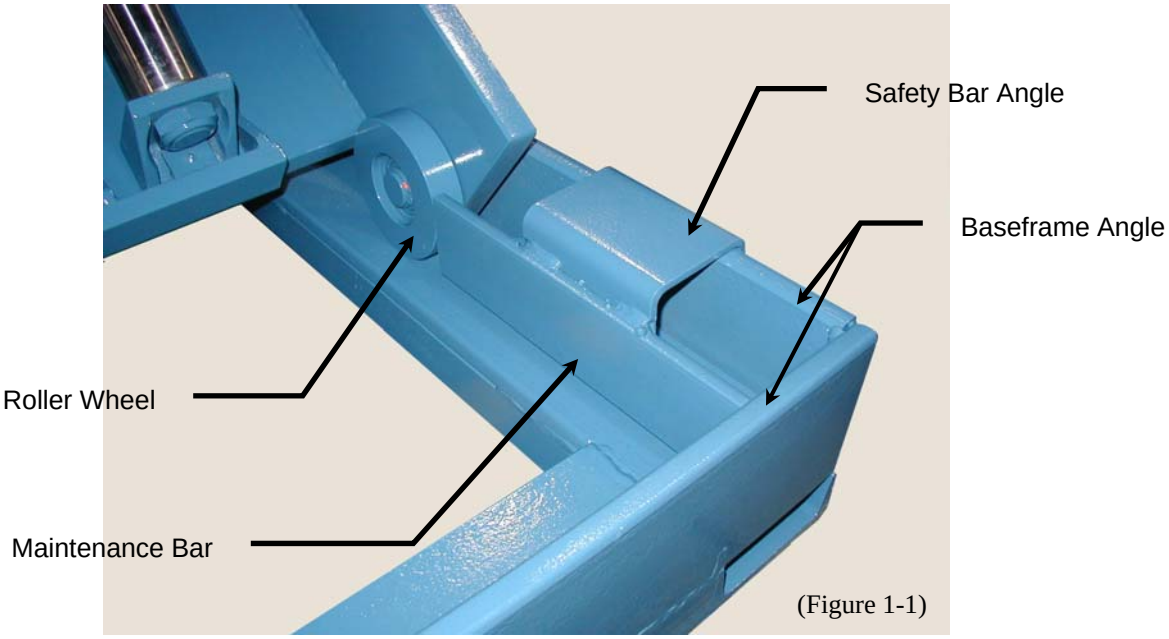
Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids (or air) during maintenance and/or repair of the lift and result in severe injury or death.

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

DANGER HIGH VOLTAGE!

Disconnect and/or lock out the electrical supply to the power unit prior to any installation or maintenance being performed.

1. Maintenance bars should be stored near the lift in a convenient location.
2. Raise the lift to full travel, and place the safety bar in front of each roller wheel on the scissors leg. Make sure the safety bar angle captures the base frame angle (see photo 1-1).
3. Once **ALL** safety bars are in place, slowly lower the lift until the roller wheel is engaged with the safety bars and the safety bars rest against the end of the base frame. Visually inspect both safety bars to insure they are secure.
4. To disengage the safety bars raise the lift to move the roller wheels off the safety bars and make sure lift operates correctly. If assistance is required in removal of the safety bar, lightly tap with a hammer to break it loose.



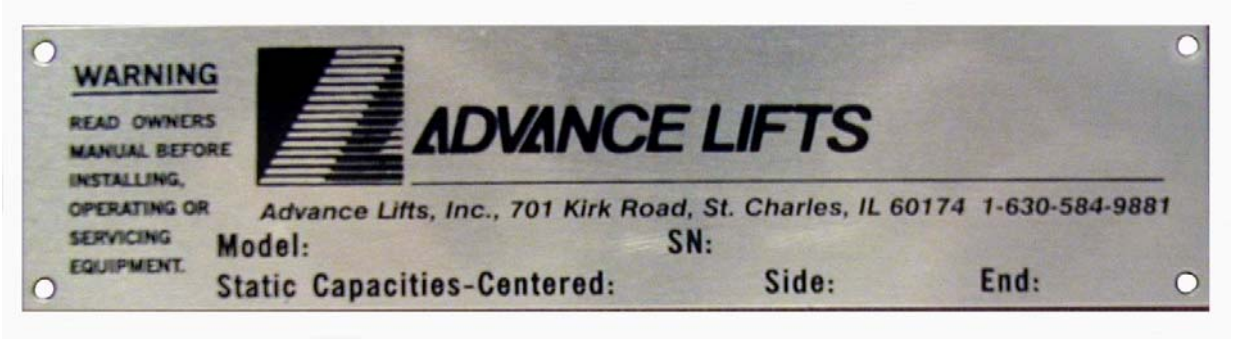
Maintenance Bar in Use

WARNING LABEL LOCATIONS & SPECIFICATIONS

The warning and informational labels normally attached to HD lifts, they are shown full size below and their proper mounting locations are shown on page 7-2. Descriptions of the labels are as follows:

Label 1: This is simply a promotional label identifying the unit as Advance Lifts unit.

Label 2: This is the formal nameplate and it should never be removed from the unit. The serial number on this nameplate is critical in identifying the specific unit for correct parts and service information. This plate also informs all readers of the proper capacity limits of the unit.

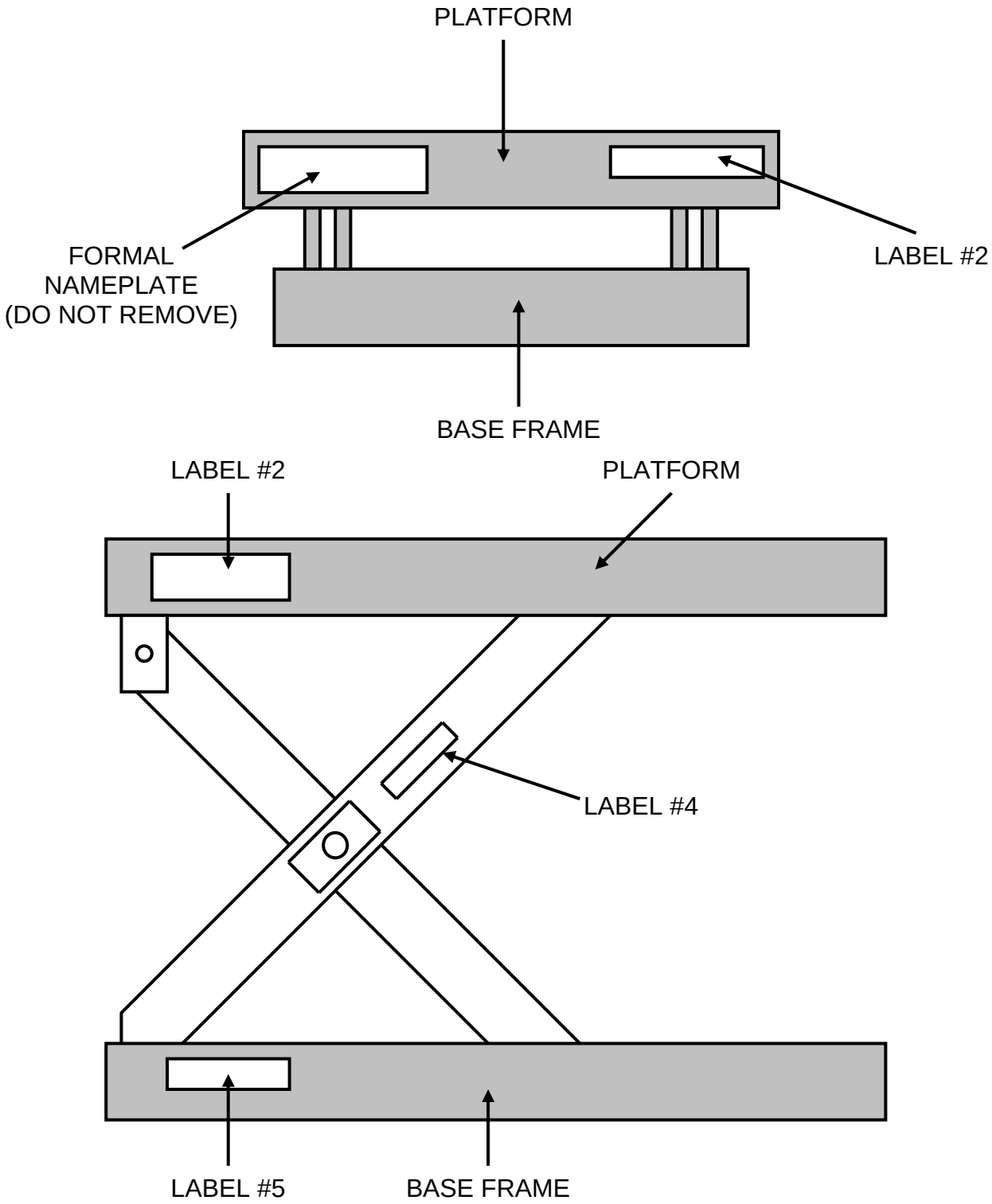


Label 3: This is an important “Danger” label that warns users of the three greatest hazards.

Label 4: This is a “Warning” label to not ride on the unit.

Label 5: This is a “Danger” label reinforcing the need to use maintenance safety legs.

WARNING LABEL LOCATIONS



SECTION 8. HYDRAULIC DETAILS

1. **Weepage and Leakage:**
   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 considered normal maintenance. 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, which 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 in Section 8, page 8-7.
   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 any part of the lift, cover exposed rods with plastic or soluble grease, which can be removed after painting to insure that no paint sticks to the rods and damages packing's or seals.

2. **General precautions:**
   A. **Caution:** Be sure that all pressure is relieved from the hydraulic system before disassembling any components. Continue to hold the "down" control for several seconds after fully lowering the unit on its safety 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, which may fall into oil dry, or dirt. If you suspect contamination, flush the system and components.

3. **Hydraulic fittings, sealant and torque's:**
   A. Advance Lifts may be equipped with either NPT fittings (tapered), or SAE fittings (with O-ring seals), or JIC fittings (37-1/2˚ tapered). 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 tightened 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 37-1/2˚ SAE fitting being mixed with 30˚ NPT fittings or either one being mixed with SAE 45˚ 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 Locktite, again don't over apply. Never use sealant or tapes on JIC, O-Ring Boss or swivel fittings.
   E. Be extremely careful not to over-tighten ORB fittings, thread the fitting finger tight and then tighten the nut on the fitting.
   F. Never reuse old Teflon tape. Once a connection has been opened, remove all tape and apply fresh tape.

OIL RECOMMENDATIONS AND SEAL COMPATIBILITY

Fluids:

1. As of 1/1/03 the current standard hydraulic fluid is Castrol Dual Range HV46 hydraulic fluid. This is the fluid normally supplied by the factory and is suitable for a temperature range of –10 to +100 degrees Fahrenheit. When replacing or adding fluid to an Advance Lift, use only ISO 46 hydraulic fluid that is manufactured with a group II base oil. ISO 46 hydraulic fluid can be identified by its purple color.

2. From 3/25/85 until 12/31/02, Dexron II and Dexron Ill automatic transmission fluids were supplied; they can be identified by pink coloring

3. Older units may be filled with 5W30 motor oil that is suitable for the same temperature range and was supplied by the factory prior to 3/25/85. Be sure not to mix fluids. If you wish to switch from one fluid to another, drain the reservoir and system, then refill with the new fluid.

4. Do not use any other fluid unless it has been approved by the Advance lifts engineering department. Brake fluids and other hydraulic fluids may damage the system's seals or hoses. If it is required to switch from one fluid to another, drain the reservoir and system completely, and then refill with the factory approved new fluid.

5. Biodegradable and fire retardant fluids are available. Contact the factory for specifications. It may be necessary to change some seals and/or hoses for total system compatibility, depending upon the specific model lift and the requested fluid.

Options:

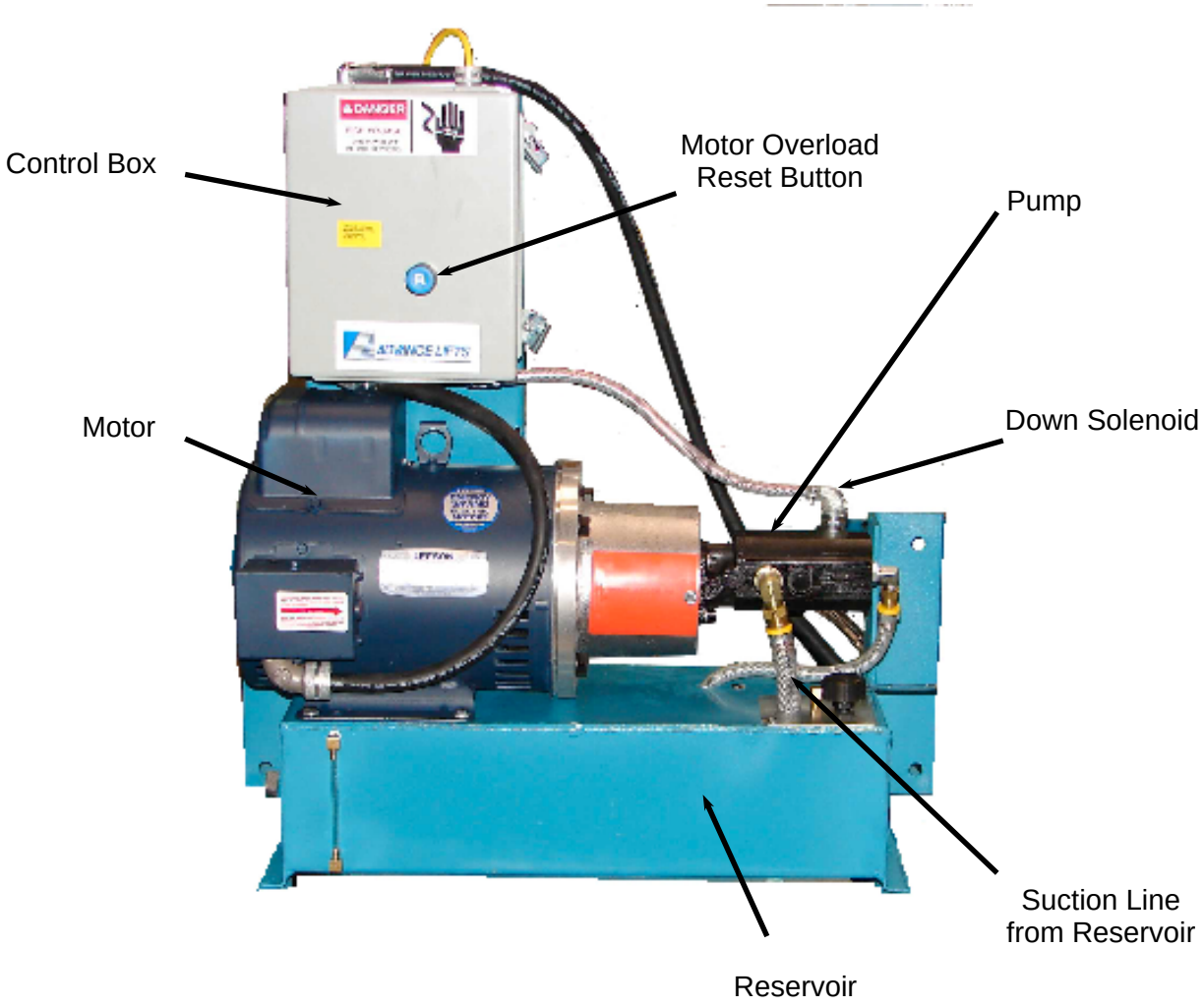
For extremely warm temperature ranges of +120 to +140 degrees Fahrenheit, you may switch to 10W30 motor oil. If ambient temperatures are expected above 140 degrees, consult the factory.

For extremely cold temperature ranges Advance Lifts recommends the use of a fluid heater, contact your distributor for more information and specifications.

Seals:

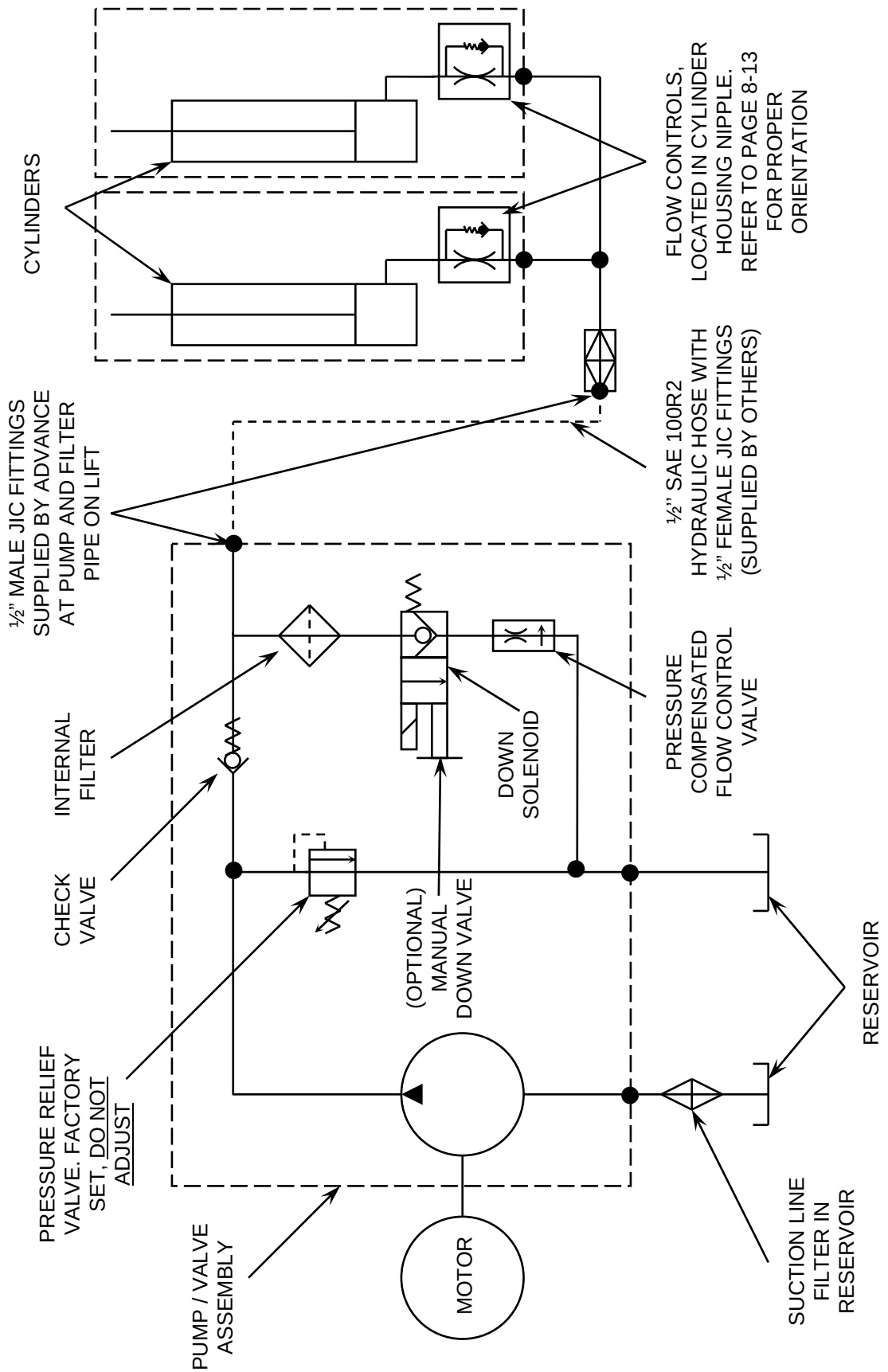
Generally, the seals in the unit are Buna-N-Nitrile and polyurethane. The hoses are either PVC for suction lines or braided wire for pressure lines. Always call the factory about special fluids rather than make assumptions on your own.

Standard Heavy-Duty units are supplied with external power units. Your power unit may vary in appearance with the addition or subtraction of features. Use this photo to identify major components.



See Page P 8-4 for Hydraulic Diagram and Pages 9-3, 9-4 & 9-5 for Electrical Diagrams

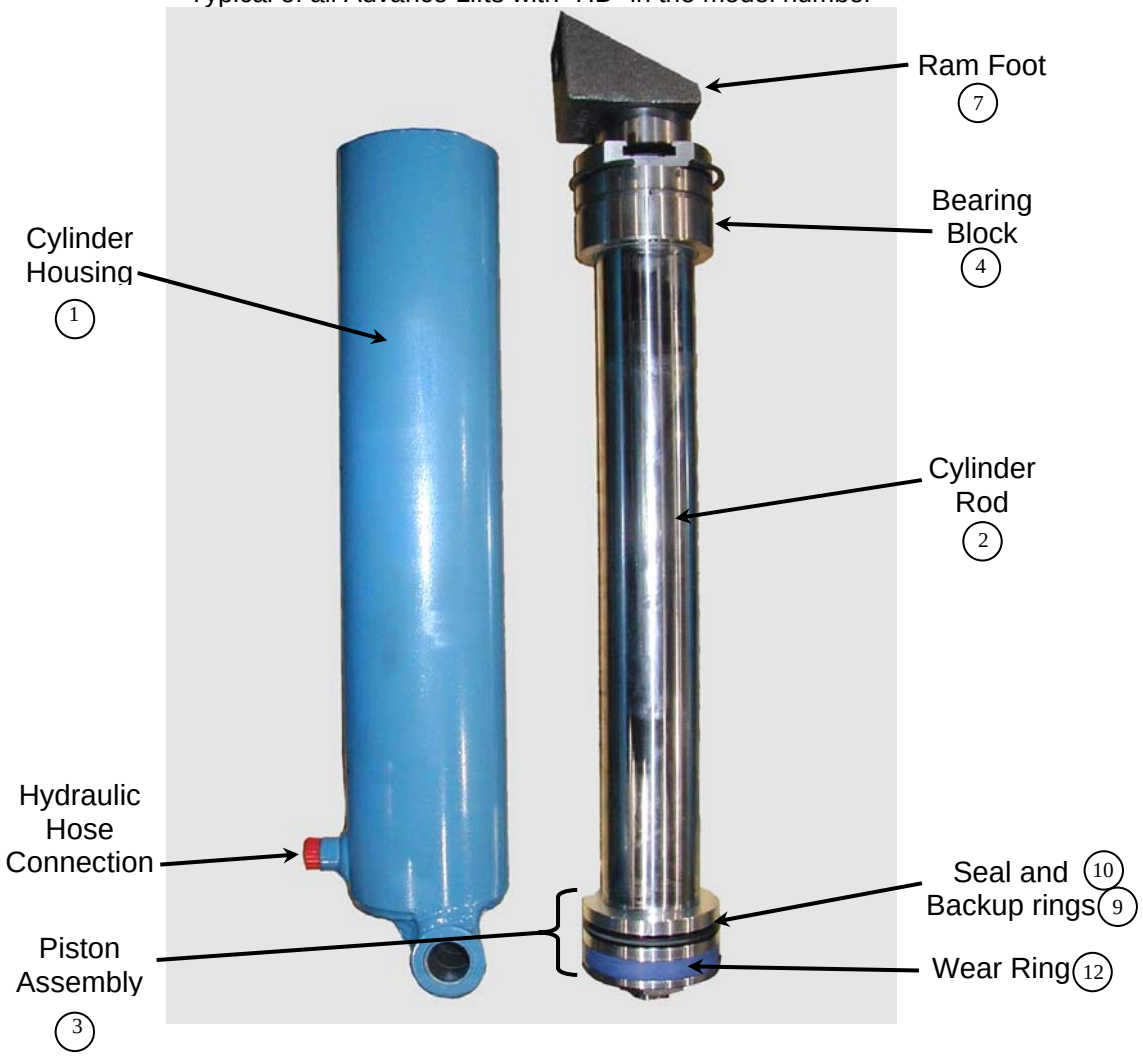
HYDRAULIC DIAGRAM FOR UNITS WITH INTERNALLY VALVED PUMPS



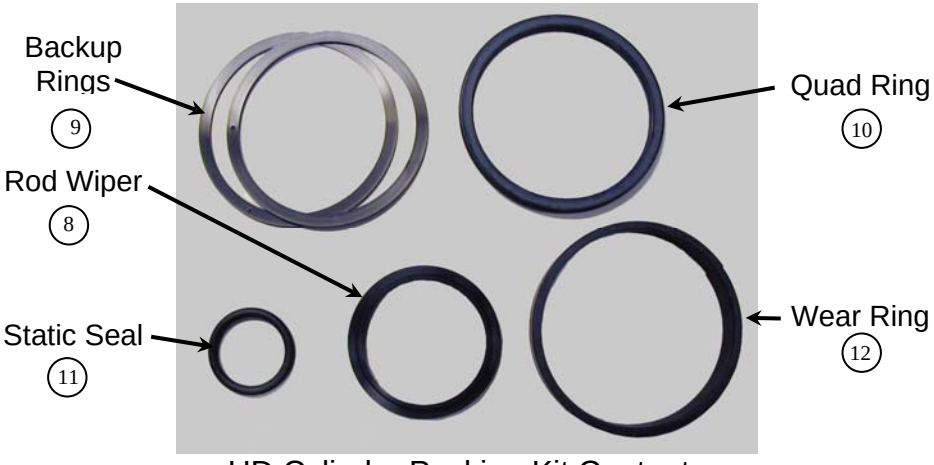
HYDRAULIC DIAGRAM FOR HD SERIES LIFTS
NUMBER OF CYLINDER CAN CHANGE DUE TO CAPACITY

HD CYLINDER
(Piston Type)

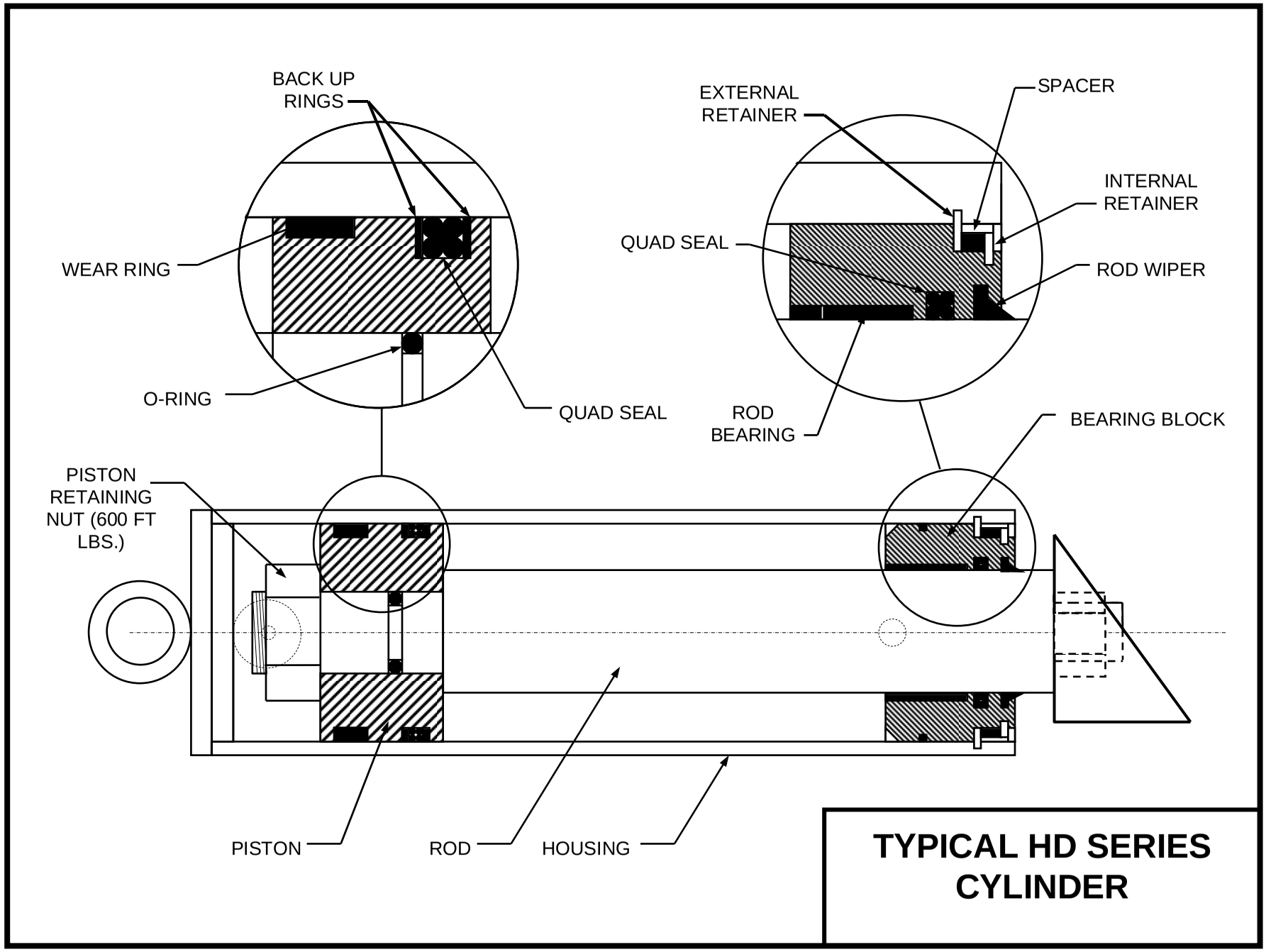
Typical of all Advance Lifts with “HD” in the model number



SEAL KIT



HD Cylinder Packing Kit Contents



TYPICAL HD SERIES CYLINDER

REPAIR PROCEDURES FOR HD CYLINDERS

Tools & Supplied required:

"Lubriplate" and hydraulic fluid matching the existing fluid in the system for topping off the reservoir when finished. (**Standard fluid is Rykon ISO 46 hydraulic oil**)
A five- (5) gallon bucket to collect fluid from the cylinders.
Wrenches to disconnect hydraulic fittings.
Emery cloth.
Clean lint free cloths and hose caps.
Clean work surface (butcher paper on top of most surfaces works well), with a means of holding the cylinder in a fixed position for disassembly and re-assembly.
Safety legs supplied with each Advance unit.
(1) Snap ring tool (Waldes Truarc external type #S-660 or Industrial pliers #P-104.)
Cylinders hone (Craftsman glaze breaker #9K4633 or equivalent.)

Cylinder Removal:

1. Raise the empty lift and settle it securely on its safety bars.
2. Once settled securely, depress the down control an additional 20 seconds to relieve any pressure from the hydraulic system. Remove the power connection to the power unit and mark with a warning label or lock the connection out to prevent unintended reconnection. (Check your company lockout and tag Standard Operating Procedures.)
3. Disconnect the hydraulic hose from the cylinder and cap the hose to prevent contamination.
4. Remove the ram foot retainers.
5. Remove the cylinder from the lift by freeing the upper pin first and swinging the cylinder into an easily supported position.
6. 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.

HD Series Cylinder Disassembly:

1. Secure the cylinder assembly in a vise using a pin through the cylinder clevis. Do not secure the cylinder housing in a vise or damage to the housing will occur.
2. Compress the retaining ring with retaining ring pliers.
3. Push the cylinder rod back into the cylinder, and then pull forward quickly to remove the entire front bearing and piston assembly.
4. At this point, when the packing set is pulled out past the groove in the front of the cylinder, it will be cut by the groove and small shavings of the packing kit will be left behind. Clean out any shavings from the front groove after disassembly.
5. Using a screwdriver, lift and remove the two backup washers and the piston seal packing set. Caution: Do not nick or scratch the metal surfaces. Clean groove if necessary.
6. Lubricate the new rings and seal, gently stretch them over the piston, and place them in the seal grooves.

HD CYLINDER REBUILD PROCEDURES (CONTINUED)

7. Inspect the entire surface of the cylinder housing and its assemblies for scratches or burrs. Carefully remove or clean any contaminates from the components before re-assembly.
8. If surface rust or scratching is evident on the inside of the cylinder housing, use an automatic cylinder hone to refinish the housing. Again, carefully remove the resulting contaminants before re-assembly.
9. Remove the static seal and the rod wiper. Remove the lock nut and slide the piston off the rod. Remove the static seal.
10. Slide the front bearing assembly off the rod, then carefully remove the flexible rod wiper, using a screwdriver to bend the seal inward to collapse and remove it. Inspect the groove for damage and debris and clean the assembly.
11. Lubricate and insert a new rod wiper, sliding it into its groove.
12. Inspect groove, then lubricate and slide a new static seal into place. Slide piston back in place on the rod and tighten the lock nut.
13. Liberally lubricate the outside of the new packing kit and the groove in the cylinder wall, align the piston carefully and then slide the entire assembly back into the cylinder.
14. Compress the retaining ring and slide the front bearing assembly into place. Release retaining ring and check to insure that it is entirely captured in the cylinder wall groove.
15. Replace cylinder(s) in lift, clean any foreign matter from the male and female hose connections and assemble hoses.
16. Clean up any spilled oil, as this may be misinterpreted, at some later date, as a leak.

Re-installation of HD Cylinders:

1. Remount the cylinder in the lift and reattach the hose with special care to avoid contamination.
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 control an extra 20 seconds each time to help bleed air from the hydraulic system. This will eliminate any “Spongy” operation. Check the oil level.
4. The lift is now ready to go back into service.

SECTION 9. ELECTRICAL DETAILS

General Electrical Information:

The motor supplied as standard is a 208/230/460v 3-phase motor, with connection diagrams on the outside of the motor for low voltage (208/230V) or high voltage (460V). 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.

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

To reverse the direction of rotation of 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, 3-Phase (230V to 460V):

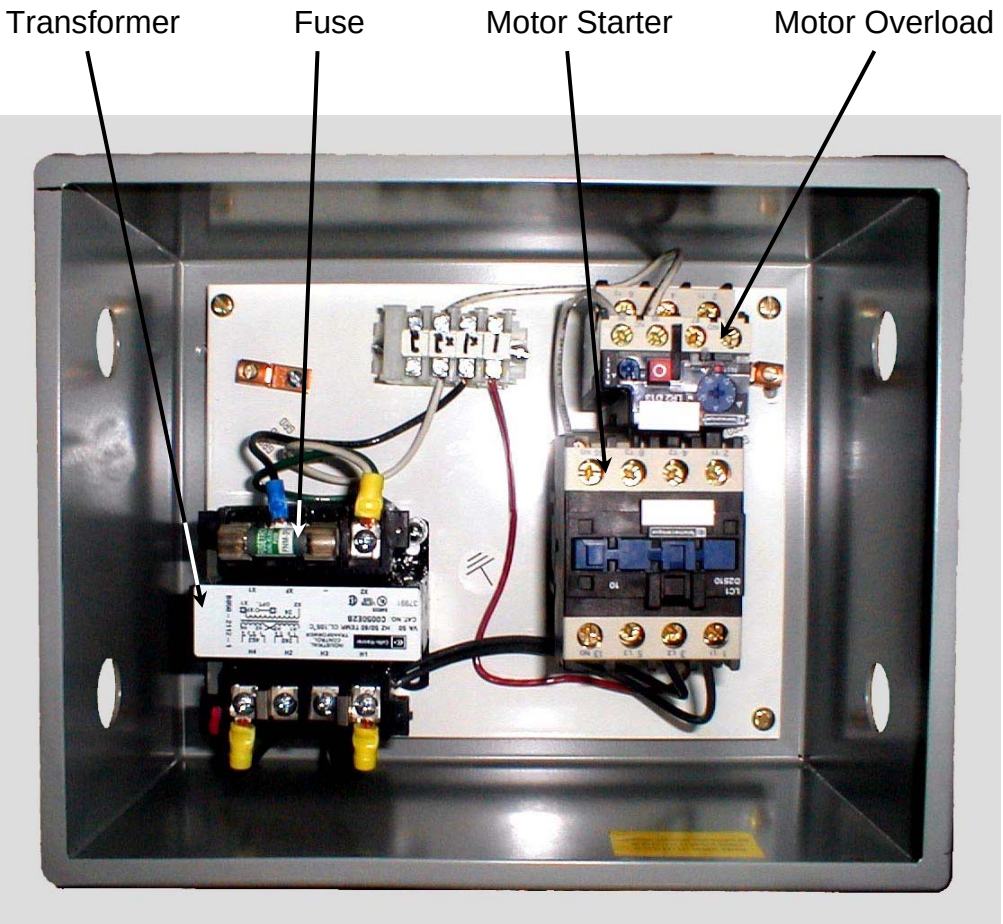
A. Change transformer primary connections to 460V.
B. Change overload protection to proper value as per currents in motor tables. Order new overload; adjust new overload to motor full load current setting. Insure the overload is set to “manual” reset, not “automatic” to inure the equipment cannot re-start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

Field Changes in Voltage, 3-Phase (460V to 230V):

A. Change transformer primary connections to 230V.
B. Change overload protection to proper value as per currents in motor table. 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.

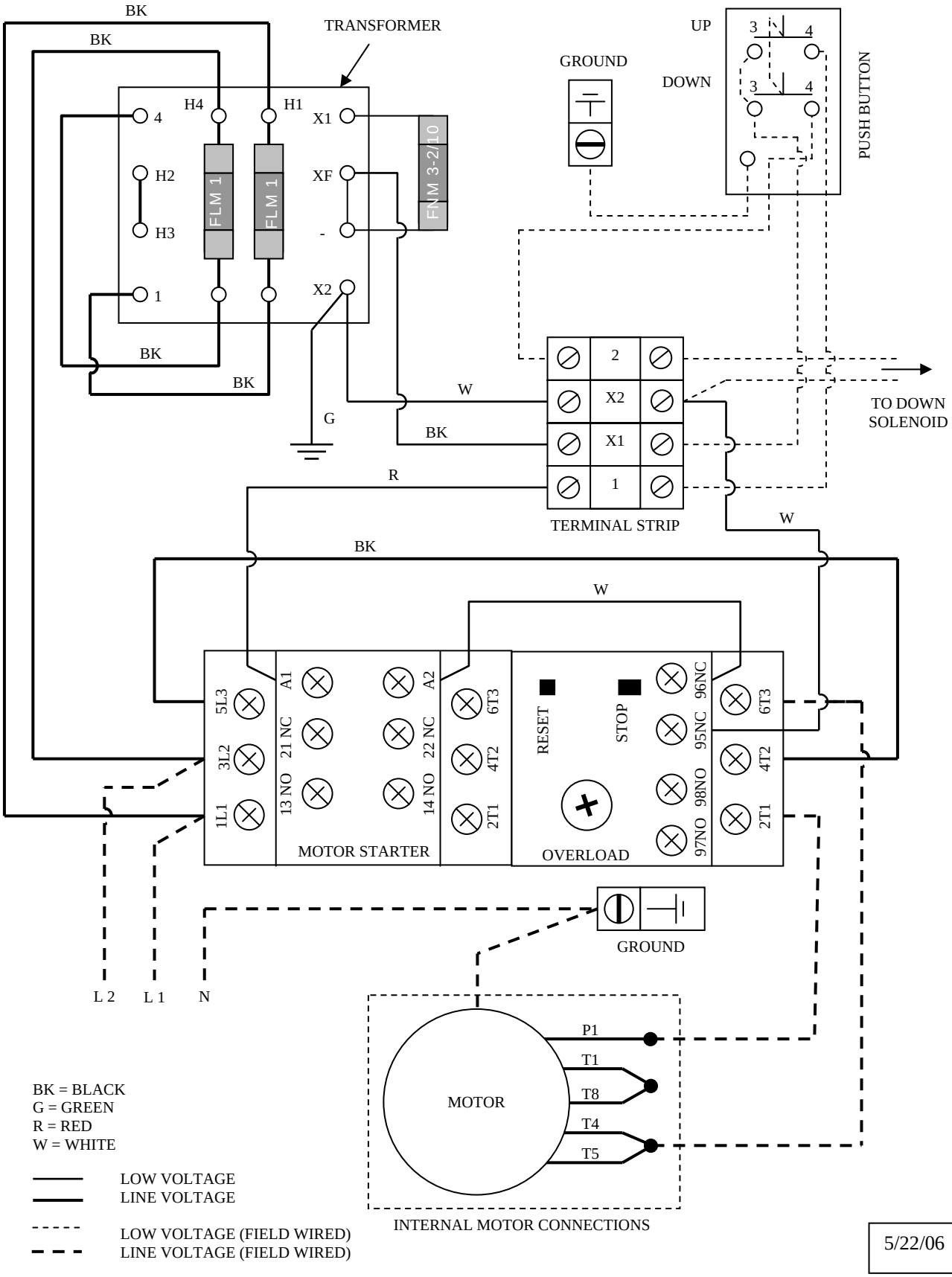
IMPORTANT: When changing voltages, insure motor rotation is correct.

TYPICAL ELECTRICAL CONTROLLER

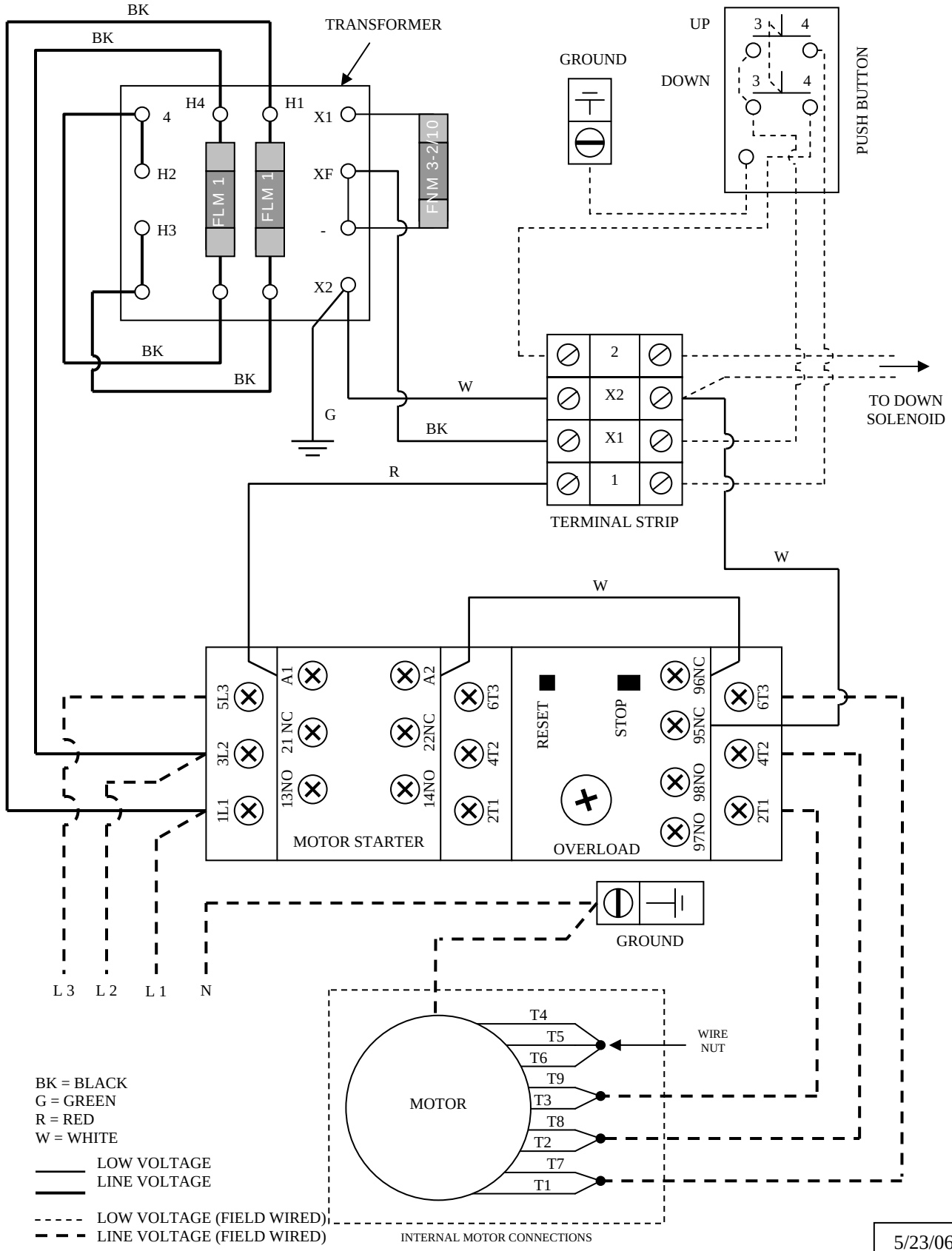


Typical HD Control Box

ADVANCE LIFTS WIRING DIAGRAM
FOR 230 VOLT SINGLE PHASE 5 HP

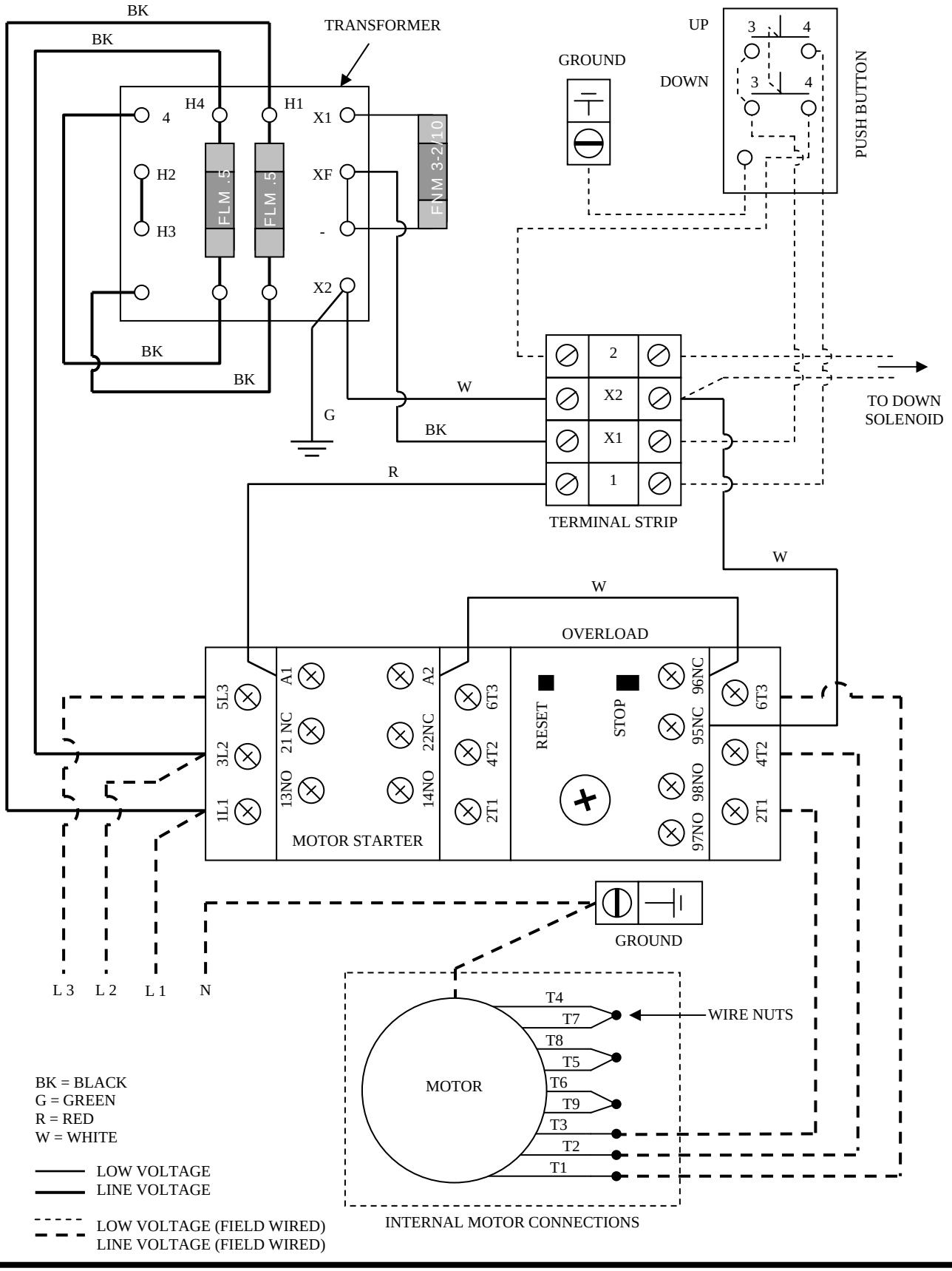


ADVANCE LIFTS WIRING DIAGRAM
230 VOLT THREE PHASE 5



5/23/06

ADVANCE LIFTS WIRING DIAGRAM
460 VOLT THREE PHASE 5



SECTION 10. TROUBLESHOOTING HINTS

Warning: Only qualified service personnel should undertake service work on hydraulic lifts. The service person should be able to read and understand wiring and hydraulic diagrams, know how to safely troubleshoot live electrical circuits and be familiar with this manual and all safety devices on the lift. Contact your distributor if you need assistance in troubleshooting your equipment.

Warning: No work should be performed beneath a raised lift platform unless the safety leg is installed in accordance with Section 6 of this manual

Symptom	Probable Cause	Corrective Action
Equipment does not raise.	Load is too heavy	Reduce weight to rated load
	Motor rotation is reversed	On three phase units, have an electrician reverse any two power leads on the power plug to reverse rotation. (Note: that the hydraulic pump can not be run backwards for more than a few seconds without suffering severe damage).
	Motor may be single-phasing	Check wiring and overloads to determine that all three phase lines are present at the motor.
	Low voltage at motor terminals	Check voltage at motor terminals while unit is under full load. If current is below requirements in Section 9 of this manual, correct the wire size or run length.
	Pinched hydraulic line	Check to see that no lines are pinched. Correct as necessary.
	Low oil level in reservoir	Check oil level and correct as necessary. If oil is low, check for leaks also.
	Clogged reservoir breather	Check that air can pass freely through filter and correct as necessary.
	Clogged suction line	Observe the clear suction line to be sure that it remains full of oil with no air bubbles at anytime. If there are any bubbles, check for a loose fitting, cracked ports or a clogged suction filter.

Symptom	Probable Cause	Corrective Action
Equipment does not raise (continued)	Down solenoid wired Incorrectly to energize with up circuit	Hold screwdriver on down solenoid and press “up” switch. If you feel magnetism correct the lift wiring.
	Down solenoid stuck open	Remove the down solenoid and check for free movement of the plunger.
	Pump failure	Place gage on pump and if it does not produce 3200 psi., replace pump.
Equipment raises too slowly	Load is too heavy	Reduce weight to rated
	Pinched hydraulic line	Check to see that no lines are pinched. Correct as necessary.
	Dirt in down solenoid	Clean the down so that it may fully close.
	Wrong oil for ambient temperature	See oil recommendations in Section 8 of the manual.
	Dirt in reservoir breather	Clean air breather.
	Low voltage at motor	Check voltage at motor terminals while unit is under full load. If current is below requirements in section 9 of this manual, correct the wire size or run length.

Symptom	Probable Cause	Corrective Action
Equipment raises too slowly (continued)	Clogged suction line.	Observe the clear suction line to be sure it remains full of oil with no air bubbles at anytime. If there are any bubbles, check for loose fittings, cracked ports or clogged suction filter.
Motor heats or labors excessively.	Low voltage at motor terminals.	Check voltage at motor terminals while unit is under full load. If current is below requirements in Section 9 of this manual, correct the wire size or run length.,
	Wrong oil for ambient temperature.	See oil recommendations in Section 8 of manual.
	Load is too heavy.	Reduce load to rated load.
Operation is spongy.	Air in cylinders.	Bleed the cylinders to remove air trapped in them. If this reoccurs, check for air bubbles in the suction line and air leaks.
Equipment lowers too slowly.	Pinched hydraulic line.	Check to see that no lines are pinches. correct if necessary.
	Dirt in flow control valve.	Remove and clean flow control valve.
Equipment lowers too fast.	Dirt in check valve.	Remove and clean check valve.
	Dirt in flow control valve.	Remove and clean flow control valve.

Symptom	Probable Cause	Corrective Action
Lift raises, then Lowers.	Dirt in check valve.	Remove and clean check valve.
	Down solenoid wired Incorrectly.	Hold screwdriver on down solenoid and if you feel magnetism correct the lift wiring.
	Leaking cylinder packings.	Repack cylinders.
Lift raises, but will not lower.	Faulty solenoid valve	Replace valve.
	Down solenoid incorrectly wired.	Rewire per diagram in Section 9 of this manual.
	Faulty solenoid coil.	Replace coil.
	Obstruction in baseframe.	Raise lift to clear obstruction then remove.
Oil spraying out of reservoir.	Clogged air breather.	A dirty breather filter may build up positive pressure which will spray oil. Clean air breather.
Lift will not raise and motor will not run.	Control voltage fuse blown.	Replace fuse.
	Motor starter overload	Reset motor starter.
	Wrong voltage to unit.	Check wiring in controller and on motor to confirm wiring is compatible with available power.,
	Transformer connections loose.	Check and tighten terminal screws on transformer.
	Transformer defective.	Replace transformer.
	Pushbutton defective	Replace pushbutton

SECTION 11. ADVANCE LIFTS INC. WARRANTY

For a period of one year 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 or 250,000 cycles (whichever occurs first) 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.

SECTION 12. PARTS LIST

GENERAL DESCRIPTION	DETAIL DESCRIPTION	PART #
MECHANICAL:		
WHEEL WITH PRESSED BEARING	HD-XXXX,WHEEL ASM,5,1.125	009-375
WHEEL WITH ROLLER BEARING	HD-XXXX,WHEEL ASM,5,1.125 (022-100)	021-964
WHEEL SNAP RING 1-1/4"	RR,ROTO-CLIP,SHR-125	001-876
BASE AND PLATFORM PIN (1-1/4" X 2-7/16")	PIN,1.25,2.438,GRVD ENDS	A-0437
BASE AND PLATFORM PIN SNAP RING 1-1/4"	RR,ROTO-CLIP,SHR-125	001-061
COMPLETE CYLINDER:		
Lifts manufactured before 4/1/00 require an elbow part # 010-219 when replacing a complete cylinder assembly.		
Before 01/01/02		
HD-0824,1024,1224, COMPLETE CYLINDER	HD-XX24,CYL ASM,3.5B,2.5R,6.063S	D-3263S1
HD-0836,1036,1236, COMPLETE CYLINDER	HD-XX36,CYL ASM,3.5B,2.5R,9.5S	D-3241S1
HD-0848,1048,1248, COMPLETE CYLINDER	HD-XX48,CYL ASM,3.5B,2.5R,12.25S	D-3252S1
HD-0860,1060,1260, COMPLETE CYLINDER	HD-XX60,CYL ASM,3.5B,2.5R,16.813S	D-3228
After 01/01/02		
HD-0824,1024,1224, COMPLETE CYLINDER	HD-XX24,CYL ASM,3.5B,2.5R,6.063S	D-12094
HD-0836,1036,1236, COMPLETE CYLINDER	HD-XX36,CYL ASM,3.5B,2.5R,9.5S	D-12092
HD-0848,1048,1248, COMPLETE CYLINDER	HD-XX48,CYL ASM,3.5B,2.5R,12.25S	D-12090
HD-0860,1060,1260, COMPLETE CYLINDER	HD-XX60,CYL ASM,3.5B,2.5R,16.813S	D-12078
CYLINDER PARTS:		
CYLINDER PACKING KIT (ALL)	HD-XXXX,CYL PKG KIT,3.5B,2.5R	004-205
CYLINDER PIN SNAP RING 1"	RR,ROTOCLIP,SHR-98-1IN	001-876
CYLINDER RAM PIN (1" X 19-1/8")	PIN,1,19.188,GRVD ENDS	A-0430
FLOW CONTROL CARTRIDGE (3.0 GPM) PRE 4/00	HV,VONBERG,FIXED 3.0,1303-1-3.0	001-304
GREEN HEXAGONAL FLOW CONTROL AFTER 4/00	HV,HEX FLOW CONTROL,3.0GPM,GREEN	015-396
ELBOW ADAPTER FITTING (ORB X NPT)	HF,90 ELBOW,04MNPT-06MORBA	010-219
MOTOR:		
115/230 VOLT, 1 PHASE	MR,2,17,1,120274-00	000-319
208/230/460/480 VOLT, 3 PHASE	MR,5,17,3,CM3218TADL	003-373
PUMP:		
HYDRAULIC PUMP, 1 PHASE UNITS	HP,1,2,17,AZ-1204	010-549
HYDRAULIC PUMP, 3 PHASE UNITS	HP,1,2.8,17	000-357
HYDRAULIC: (COMMON TO ALL HD MODELS)		
COMPLETE MANIFOLD ASSEMBLY	2000K,5000,FLOW VALVE I	003-457
CHECK VALVE	HV,DELTA,CHECK VALVE,85002355	001-262
24V DOWN SOLENOID VALVE AND COIL ASM	HV,DELTA,DOWN SOLENOID W/24V COIL	001-259
24V DOWN SOLENOID COIL ONLY	HV,DELTA,24V COIL, 36910038	001-260
DOWN SOLENOID VALVE 24V/115V	HV,DELTA,DOWN SOLENOID,85002355	001-279
115V DOWN SOLENOID COIL ONLY	HV,DELTA,115V COIL,39670035	001-261
RELIEF VALVE	HV,DELTA,RELIEF VALVE,86002129	001-263
PRESSURE LINE FILTER	HV,FILTERTEK,FILTER,36150	001-319
FLOW CONTROL VALVE	HV,VONBERG,FIXED 3.5,2410-1-3.5	001-293
COMPLETE CONTROLLER: (SELECT BY VOLTAGE AND PHASE)		
115 VOLT, 1 PHASE	CT,1045,TELE,2/1,115,24,10X8X6	004-399
230 VOLT, 1 PHASE	CT,HD,TELE,2/1,230,24,50,10X4X4,Z	009-295
230 VOLT, 3 PHASE	CT,P,TELE,2/3,230,24,10X4X4	004-083
460 VOLT, 3 PHASE	CT,P,TELE,2/3,460,24,10X4X4	004-718

SECTION 12. PARTS LIST

GENERAL DESCRIPTION	DETAIL DESCRIPTION	PART #
TRANSFORMER:		
115-230V,24V, 1 PHASE	CT,XFMR,115/230/24,50VA	029-921
240-480V,24V, 3 PHASE	CT,XFMR,240/480/24,50VA	029-919
CONTACTOR, MOTOR STARTER: (SELECT BY VOLTAGE, PHASE AND MANUFACTURE DATE)		
115-230V, 1 PHASE CONTACTOR (BEFORE 6/02)	CT,TELE,CONTACTOR,LC1D2510B6	000-413
115-230V, 1 PHASE CONTACTOR (AFTER 6/02)	CT,TESYS,CONTACTOR,LC1D25B7	000-692
208,230,460V,3 PHASE CONTACTOR (BEFORE 6/02)	CT,TELE,CONTACTOR,LC1D0910B6	000-430
208,230,460V,3 PHASE CONTACTOR (AFTER 6/02)	CT,TESYS,CONTACTOR,LC1D09B7	000-690
OVERLOAD: (SELECT BY VOLTAGE, PHASE AND MANUFACTURE DATE)		
115 VOLT, 1 PHASE (BEFORE 6/02)	CT,TELE,OVERLOAD,17-25,LR2D1322	000-419
115 VOLT, 1 PHASE (AFTER 6/02)	CT,TESYS,OVERLOAD,17-25,LRD22	000-700
230 VOLT, 1 PHASE (BEFORE 6/02)	CT,TELE,OVERLOAD,9-13,LR2D1316	000-763
230 VOLT, 1 PHASE (AFTER 6/02)	CT,TESYS,OVERLOAD,9-13,LRD16	000-698
230 VOLT, 3 PHASE (BEFORE 6/02)	CT,TELE,OVERLOAD,7-10,LR2D1314	000-421
230 VOLT, 3 PHASE (AFTER 6/02)	CT,TESYS,OVERLOAD,7-10,LRD14	000-697
460 VOLT, 3 PHASE (BEFORE 6/02)	CT,TELE,OVERLOAD,4-6,LR2D1310	000-416
460 VOLT, 3 PHASE (AFTER 6/02)	CT,TESYS,OVERLOAD,4-6,LRD10	000-695
OPTIONS:		
BLUE SPRAY PAINT, 16 oz	PS,RABBE,BLUE AERO,16OZ,38-398	015-173
YELLOW SPRAY PAINT, 16 oz	PS,RABBE,YELLOW AERO,16OZ,54-438	015-174
POWER UNIT DECAL KIT	DOK,PU DECAL KIT	003-868
COMPLETE DECAL KIT	P,HD,TSL,DETAIL DECAL KIT	004-138
OWNERS MANUAL	HD-XXXX,OWNERS MANUAL	004-258
PLUG 115V, 1 PHASE	ES,LEVITON,PLUG,125V,30A,1PH,2611	000-998
PLUG 230V, 1 PHASE	ES,LEVITON,PLUG,250V,20A,1PH,2321	000-996
PLUG 230V, 3 PHASE	ES,LEVITON,PLUG,250V,20A,3PH,2421	001-671
PLUG 460V, 3 PHASE	ES,LEVITON,PLUG,480V,30A,3PH,2731	000-994
PUSH BUTTON SWITCH	ME,PENDANT PUSH BUTTON,NEMA 4	000-802
FOOT SWITCH 115-230V 1 PHASE	P,FT SWITCH W/PWR CORD 115,1PH	004-913
FOOT SWITCH 230V, 3 PHASE	P,FT SWITCH W/PWR CORD 230,3PH	004-122
FOOT SWITCH 460V, 3 PHASE	P,FT SWITCH W/PWR CORD 460,3PH	004-909
REPLACEMENT NAME/SERIAL NUMBER TAG	SS,NAMEPLATE,ASSY,1-1/2X6-1/4 APT	001-598

Material Safety Data Sheet

1. Chemical product and company identification

Product name	CASTROL DUAL RANGE HV 46 HYDRAULIC FLUID
MSDS #	460278
Historic MSDS #:	None.
Code	460278
Product use	Hydraulic fluid For specific application advice see appropriate Technical Data Sheet or consult our company representative.
Supplier	BP Lubricants USA Inc. 9300 Pulaski Highway Baltimore, Maryland 21220-2495
EMERGENCY HEALTH INFORMATION:	1 (800) 447-8735 Outside the US: +1 703-527-3887 (CHEMTREC)
EMERGENCY SPILL INFORMATION:	1 (800) 424-9300 CHEMTREC (USA)
OTHER PRODUCT INFORMATION	1 (866) 4 BP - MSDS (866-427-6737 Toll Free - North America) email: bpcares@bp.com

2. Composition/information on ingredients

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

3. Hazards identification

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

Ingestion	Causes gastrointestinal irritation and diarrhea.
Medical conditions aggravated by over-exposure	None identified.

See toxicological information (section 11)

4. First aid measures

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

5. Fire-fighting measures

Flammability of the product	May be combustible at high temperature.
Flash point	232 °C (Open cup) Cleveland.
Products of combustion	These products are carbon oxides (CO, CO_2).
Unusual fire/explosion hazards	This material is not explosive as defined by established regulatory criteria.
Fire-fighting media and instructions	In case of fire, use water fog, foam, dry chemicals, or carbon dioxide. Do not use water jet.
Protective clothing (fire)	Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

6. Accidental release measures

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

7. Handling and storage

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

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Occupational exposure limits
Distillates (petroleum), hydrotreated, heavy paraffinic (Highly refined mineral oil)	**ACGIH (United States).** STEL: 10 mg/m^3 15 minute(s). Form: Oil mist, mineral TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral **OSHA (United States).** TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral
Lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity (Highly refined mineral oil)	**ACGIH (United States).** STEL: 10 mg/m^3 15 minute(s). Form: Oil mist, mineral TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral **OSHA (United States).** TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral
White mineral oil, petroleum (Highly refined mineral oil)	**ACGIH (United States).** STEL: 10 mg/m^3 15 minute(s). Form: Oil mist, mineral TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral **OSHA (United States).** TWA: 5 mg/m^3 8 hour(s). Form: Oil mist, mineral
Proprietary performance additives.	None assigned.

Control Measures Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits.

Hygiene measures Wash hands after handling compounds and before eating, smoking, using lavatory, and at the end of day. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the work-station location.

Personal protection

Eyes Avoid contact with eyes. Chemical splash goggles.

Skin and body Avoid prolonged or repeated contact with skin. Wear protective clothing if prolonged or repeated contact is likely.

Respiratory None required; however, use of adequate ventilation is good industrial practice. If heated and ventilation is inadequate, use a NIOSH certified respirator with an organic vapor cartridge and P95 particulate filter.

Hands Wear protective gloves if prolonged or repeated contact is likely.

Consult your supervisor or S.O.P. for special handling directions

Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state Liquid.

Color Purple.

Pour Point -45 °C

Specific gravity 0.8697

Solubility Insoluble in cold water.

Viscosity Kinematic: 46.5 mm^2/s (46.5 cSt) at 40°C
Kinematic: 7.9 mm^2/s (7.9 cSt) at 100°C
SUS: 216 SUS at 37.7°C

Viscosity Index 141

10. Stability and reactivity

Stability and reactivity	The product is stable.
Conditions to avoid	Keep away from heat, sparks and flame. Keep away from sources of ignition.
Incompatibility with various substances	Reactive with oxidizing agents.
Hazardous decomposition products	Products of combustion: carbon oxides (CO, CO_2).
Hazardous polymerization	Will not occur.

11. Toxicological information

Acute toxicity

Toxicity testing not conducted.

At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of its low volatility. May be harmful by inhalation if exposure to vapor, mists or fumes resulting from thermal decomposition products occurs.

Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhea.

Chronic toxicity

Carcinogenic effects	No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH or the International Agency for Research on Cancer (IARC). No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).
Mutagenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a mutagen.
Reproductive effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a reproductive toxin.
Teratogenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as teratogenic or embryotoxic.

12. Ecological information

Ecotoxicity — No testing has been performed by the manufacturer.

13. Disposal considerations

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

Consult your local or regional authorities.

14. Transport information

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

15. Regulatory information

U.S. Federal regulations

US INVENTORY (TSCA): In compliance.

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

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

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

SARA 313

Form R - Reporting requirements

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

Supplier notification

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

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

State regulations

No products were found.

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

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

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

Inventories

AUSTRALIAN INVENTORY (AICS): Not determined.

CANADA INVENTORY (DSL): In compliance.

CHINA INVENTORY (IECS): Not determined.

EC INVENTORY (EINECS/ELINCS): Not determined.

JAPAN INVENTORY (ENCS): Not determined.

KOREA INVENTORY (ECL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

16. Other information

Label requirements

CAUTION!

MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.

HMIS® Rating :

Health	**1**
Flammability	**1**
Physical Hazard	**0**
Personal protection	**X**

National Fire Protection Association (U.S.A.)

History

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Notice to reader

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