



a division of GLBH Group Manufacturing Ltd.

Operating Manual Mod-U-Lift Systems

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Certificate that the Manual has been read

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PLEASE SIGN *AFTER* THE MANUAL HAS BEEN READ.

The MOD-U-LIFT SYSTEM and its ancillary tool line is a result of years of research into the needs of industries which must Push, Pull, Press and Lift in the course of maintaining machinery.

Safety, Durability and User-Friendly Ergonomics are the basis of the design philosophy underlying the MOD-U-LIFT SYSTEM.

The components and materials used in the manufacture of this equipment are of the highest quality. However, the components of this system are machines, and machines must be operated and maintained properly to serve their purpose safely and reliably.

***This manual contains important information regarding the operation and maintenance of this equipment. The key material is found on pages: 1 through 10.

*The information contained on each of these pages is important, however, the information in **bold letters**, underlined, or otherwise highlighted has to do with Safe Operation and Maintenance of the equipment. Failure to understand it and to follow its direction could lead to serious personal injury, or death.*

Each individual operating this equipment should read the pages noted above and sign a copy of the following certificate.

Please Print

Name of Company: _____

Name of Employee: _____

I certify that I have read the pages noted above and understand their contents. I will operate the equipment in a safe and responsible manner.

Signed: _____

Do not operate, perform maintenance or repairs on this product until the relevant information contained within this document has been read, understood, and the individual taking such action has been deemed competent and approved for operating and/or performing service to the equipment.

Please contact Hydra-Tech International if you have questions or suggestions which could enhance the safe operation of this equipment.

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MOD-U-LIFT Systems TM

A New Approach to Lifting and Maintenance Equipment

Mod-U-Lift Systems are comprised of a lifting module and a power module. Through offering a complete system that can be separated into these two components lifting procedures can be done more safely and conveniently!

Mod-U-Lift Systems are offered in a variety of configurations to meet your specific needs.

Lift Modules come in a range of lifting capacities as well as stroke length. 60, 90-, 100-, 120- and 175-ton capacities are offered and stroke lengths range between 13" (33cm) and 24" (61cm). Extensions can also be used to increase effective stroke lengths and provide higher degrees of safety for high lifts. Some products are even offered with alloy aluminum components to manage weight and provide better maneuverability!

Power Modules are offered with either air or electric motors and both produce minimal noise. The multi-position handles are designed to provide superb balance and maneuverability. With the use of the Level Scoot Bracket, using the Power Module to move your Lift Module is made even easier, providing two heights for level lifting when clearances are low and a third position that tilts the whole system with exceptional balance.

For specific information on the varieties and features of the Mod-U-Lift Systems and what can best meet your needs please contact Hydra-Tech International:

#110, 5842 – 86th Avenue SE, Calgary, Alberta, Canada T2C 4L7

Telephone (403) – 720 – 7740 Fax (403) – 720 – 7758

Website: www.hydra-tech.net

Email: sales@hydra-tech.net

Safety Precautions and General Instructions

1. Dirt Kills Hydraulics!! The MOD-U-LIFT system allows you to separate the Power Module and Lift Module. The hydraulic quick couplers are a point at which dirt can enter the system. Always clean couplers carefully prior to re-connecting.
2. Check the hydraulic oil level daily. The oil should fill at least 2/3 of the level gauge found on the side of the reservoir with the Lifting Ram(s) fully retracted.



3. Oil that is milky has water in it and must be changed.
4. Change hydraulic oil twice a year. Use good grade hydraulic oil only. For extreme cold operating conditions, Arctic grade oil may be used. (See recommendations on page 17)



An optional oil heater is available for cold weather operation.

5. Keep all MOD-U-LIFT System components clean. If high-pressure washers or compressed air are used, there is a risk of forcing dirt into piston wipers, oil tank breathers etc.
6. MOD-U-LIFT Systems jacking cylinders are plumbed with a female coupler in the bottom (advance) port, and a male coupler in the top (retract) port. The Pump Modules are plumbed to match. Extension hoses have a male coupler on one end, and a female on the other. This arrangement eliminates the possibility of crossed hoses.

For storage, auxiliary hoses should be coiled, and the male coupler connected to the female coupler. This reduces the chance for contaminants to enter the hose.

7. The handle should be in the middle or lowered positions for optimum balance and maneuverability when moving the Mod-U-Lift jack.
8. a) Lift the system only by the main handle with the handle in the vertical position.
b) Carry or transport the Lifting Modules by the swing up handles mounted on the base.
c) If present, use the handle on the top of the pump motor only to remove the pump from the tank.



the

9. Never tamper with pressure relief valve

fitted in the top of the cylinder. Trapped pressure could result and possibly burst the cylinder.

Important Load Raising and Lowering Instructions

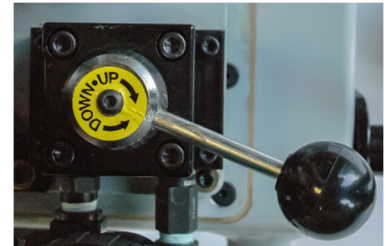
1. **Do not lift loads that are not on a firm level surface.**
2. **Do not side load jacks.** The top surface of the Lifting Module saddle must be parallel to the jacking pad of the load to be lifted. If this is impossible, use a Swivel Saddle to compensate for up to 5° of side load.
3. Use a sturdy level base for jacking.
4. **When required use an anti-skid shim** between the jack saddle and the jacking pad.
5. **Never handle hydraulic hoses under pressure!** Modern Jacking equipment operates



at 10,000 PSI. Pinholes in hoses can cause hydraulic fluid to be injected into the skin or muscle. **You could lose an eye, hand, or arm!**



6. Release pressure from hoses by shutting off the Power Module and swinging the control valve handle to the advance and retract positions. This allows trapped fluid to be returned to the tank.
7. When connecting quick couplers, begin by making sure they are clean and always be sure they are fully connected. When properly connected, there should be no gap between the rotating sleeve on the female coupler and the shoulder on the male coupler.



CORRECT



WRONG



*****NEVER** handle pressurized hose or fittings with your bare hands!***

SCHEDULED MAINTENANCE HELPS PREVENT UNSCHEDULED BREAKDOWNS.

Important Load Raising and Lowering Instructions (continued)

8. THE LOAD HOLDING VALVE MUST BE TESTED PRIOR TO EACH LIFT

In the unlikely event of a valve malfunction, the load could drop at an uncontrolled rate.

TEST PROCEDURE

- a. Raise the ram far enough to contact the load and lift it 2-3" (5-7.6cm) to take the weight of the load.
 - b. Turn off the motor.
 - c. Swing the valve to the retract position. After several minutes, check to ensure that there is no creeping down, confirming the load holding valve is functioning properly.
 - d. If the valve does not hold, have the unit serviced.
9. **Any time a hydraulic oil leak is detected, remove the unit from service and have it repaired and tested if necessary, at an authorized facility.**

Note: Please contact Hydra-Tech International for current information regarding authorized facilities.

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Raising a Load

**When lifting loads, stay as far back as possible. Never expose yourself to a live load.
Mechanically support all loads after they are lifted.**

1. Position the MOD-U-LIFT Jack under the jacking pad of the load to be lifted. The jacking pad should be parallel to the top of the saddle. If it is not possible to position the saddle parallel to the jacking pad, a swivel saddle may be used to compensate for up to 5°.
2. If the jacking pad is in a difficult place to reach with the complete MOD-U-LIFT unit, first position it and then separate the Lifting Module from the Power Module, see note, (It may be easier to position the Lift Module with the use of a Lift Module Cart). Then place the Power Module in the most convenient and safe position and connect the Modules with high pressure (10,000 PSI) hoses. Hoses up to 100 feet (30.5m) in length can be used.

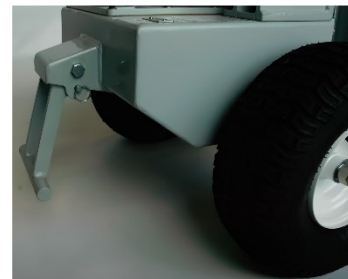


NOTE: THE REAR SUPPORT LEG MUST BE LOWERED AND LOCKED INTO PLACE, AND THE HOSES DISCONNECTED PRIOR TO SEPARATING THE TWO MODULES.

Raised:



Lowered:



Disconnect the two Modules by:

- a) **Clamp System:** Pulling the knurled knob on the clamping lever rearward and rotating 90° to lock out. Swing the clamping lever up while holding the main Power Module handle securely.
 - b) **Level Scoot System:** See attached illustrations included in this manual.
3. Clean contact surfaces, including the top of the lifting rod, locking rings, extensions and the saddle.

4. If required, insert a shim between the saddle of the Lifting Module, and the jacking pad of the equipment to be lifted to prevent slipping.

NOTE: It is the owner and operator's responsibility to ensure that any material used as a shim is able to withstand the forces it may be exposed to and does not present any potential hazards.

5. Move the valve control lever to the advance (raise) position.
6. Push the thumb toggle switch on the remote-control pendant to ON (electric models), or open the air valve on air operated models.
7. Advance the plunger until it contacts the jacking point. Check to make sure it is correctly and safely positioned.
8. CHECK THE OPERATION OF THE LOAD HOLDING VALVE...See page 3.
9. Advance the plunger to lift the load, inserting the locking rings *as you go*. **Locking rings should only be installed when the jack is not moving and the load is deemed stable.** Begin *with the tallest rings*. Ensure that the rings are concave side up. (Note the up arrow decal on the rings) **LOCKING RING SEATING SURFACES MUST BE KEPT CLEAN TO MAXIMIZE CONTACT AREA FOR SAFETY AND TO AVOID DAMAGING THE RINGS. (See pages 7 and 8 for more information on Locking Rings)**
10. When you have reached the maximum required lift height, insert the final locking ring as required. Keep your fingers clear of the contacting faces! Ensure that the locking rings are stacked with their open sides aligned. This configuration provides the highest column strength from the Locking Ring stack.

If the equipment to be lifted has a narrow jacking pad you will want to position the ram saddle to give maximum contact. The Locking Rings must face the same direction to give maximum load bearing capacity. If this exposes the ram plunger to welding or grinding sparks, an optional Spark Blanket should be used.

If your jacking pad is large enough, you can face the open side of the ring stack away from the area where you will be welding, grinding, etc. This helps protect the plunger from sparks and grit.

11. a) With the Power Module shut off, swing the control valve lever to retract (lower).
 - b) Jog the motor to retract the plunger **until the saddle is resting solidly on the top locking ring.** Do not retract the plunger more than 1/4" (0.63cm) past where the saddle contacts the locking ring. The saddle locks the locking rings together creating a mechanical column capable of safely supporting 2 times the rated capacity of the jack. Locking rings **do not** replace certified stands. Locking rings provide a mechanical column to support the load while a certified stand is positioned.
12. Release the pressure in the hoses by shutting off the motor and swinging the control valve from the advance position to the retract position.
13. If required, you may now remove the Power Module from the Lifting Module. Do this by lowering and locking the rear support leg, uncoupling the quick couplers, and separating the Power Module from the Lifting Module.

NOTE: The rear support leg must be lowered and locked into place, and the hoses disconnected prior to separating the two Modules.

<p>NEVER USE HYDRAULICS TO SUPPORT A LOAD!! <u>ALWAYS USE CERTIFIED STANDS.</u></p>
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*****See pages 7 & 8 for important information on Locking Rings**

LOCKING RINGS and load support devices

Hydraulic Jacks are a simple and reliable method of lifting loads. They are never to be used to sustain loads. Certified safety stands may be used to support a load.

The intended function of the locking ring is to provide a mechanical support to allow the safer placement of appropriate load supporting equipment, such as a stand, and remove the risk associated with having a load on a column of hydraulic fluid.

NEVER WORK NEAR A LOAD THAT IS NOT PROPERLY SUPPORTED!

Correct installation of Locking Rings

1. Prior to performing the lift, ensure that the mating surfaces of the cylinder top, base ring and locking rings are free of dirt.
2. Incrementally place locking rings as the ram lifts the load, placing taller rings first and shorter rings last. **Install the rings when the jack is stopped and the load is deemed stable – stay well back while the jack is lifting.**
3. Face the open side of the rings away from the work area to shield the cylinder rod from sparks and debris, keeping the open side of all rings in alignment with each other.
4. Retract the cylinder rod no more than 1/4" (0.63cm) after the load is at the correct height and the last ring has been placed, to ensure the load is being supported by the rings, and not the hydraulic cylinder.

Incorrect:



Correct:



NEVER USE HYDRAULICS TO SUPPORT A LOAD!!
ALWAYS USE CERTIFIED STANDS.

LOCKING RINGS and load support devices (continued)

With regard to Locking Rings, HYDRA-TECH International Corporation states the following:

The HYDRA-TECH Lift Module / Locking Ring column will support a load at least 2 times the rated capacity of the Lift Module when all of the following requirements are met:

- a) **The Lift Module is positioned on a flat, horizontal surface** with at minimum, sufficient load bearing capacity to support 2 times the rated capacity of the Lift Module without settling or subsiding, and is;
- b) **Fitted with Locking Rings correctly positioned** and on which the mating surfaces are free from debris and the cylinder rod is lowered 1/4" (0.63cm) from supporting the load, and is;
- c) **Loaded in a manner which does not exert a side load or bending moment** on the Cylinder / Locking Ring column, and is;
- d) **Not subjected to external, lateral forces** such as side winds against the supported load, impact from other machines, etc.;

No other claim expressed or implied of any kind, including suitability for any particular application or use is made by HYDRA-TECH, or may be made on behalf of HYDRA-TECH by it's agents or representatives.

<p>NEVER USE HYDRAULICS TO SUPPORT A LOAD!! <u>ALWAYS USE CERTIFIED STANDS.</u></p>
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Optional Extensions **PLEASE READ CAREFULLY!**

Cylinder Rod Extensions are available in various heights, and are rated for the maximum lifting capacity of the jack only under the following circumstances:

1. THERE IS NO SIDE LOADING. The optional Swivel Saddle will compensate for up to 5° of side load and is mandatory with 12" (30cm) and 20" (50.8cm) total extension configurations.



2. THE MAXIMUM EXTENSION OF UP TO 20" (50.8cm) CONSISTING OF 1 BASE EXTENSION AND 1 ALUMINUM EXTENSION ADAPTER, I.E. NOT SEVERAL EXTENSIONS STACKED.

NOTE: ONLY ONE EXTENSION, IN COMBINATION WITH A SINGLE BASE, SHOULD EVER BE USED AT A TIME. DO NOT STACK EXTENSIONS!

Less than the above circumstances will reduce the capacity of the extensions.
Combinations of negative circumstances such as those outlined below will cause exponential reductions in capacity.

Examples:

Side Loading

A wind blowing against the side of a machine being lifted such as a boxcar, or the use of an unstable or non-parallel jacking base will cause side loading. Side loading greatly reduces the capacity of the extension.

Extension Length

An 8" (20.3cm) extension stack is less resistant to side loading than a 4" (10cm) extension.

IMPORTANT

Every lift must be set up with maximum safety in mind. The lifting saddle should be positioned to start as close to the jacking pad as possible. The MOD-U-LIFT System allows the operator to separate the Lift Module and place it's much lighter weight on a base, to enable the operator to complete the lift using as little ram stroke, or using the shortest extension possible.

This is the safest approach and should be used if there is any doubt about the total load to be lifted, or the possibility of side loading the ram or extensions.

Lowering a Load

Before Beginning

1. If there is any possibility that someone may have added oil to the reservoir, check to make certain that the tank will have sufficient capacity to accept the oil from the cylinder. This will mean the gauge will have to show approximately 2/3 full. If there is any doubt, open the breather-filler plug on the tank, and monitor the oil level as the ram retracts; to be sure there is room in the tank.
2. To re-attach the Power Module to the Lift Module

- a. Clamp System

Roll the Power Module to the Lift Module and rotate the Power Module to the rear so that the lower portion of the Power Module mating plate will fit in the lip at the bottom of the Lift Module mating plate. Rotate the Power Module forward and lower the clamping lever to clamp the two plates together. Rotate the spring-loaded pin 90 degrees and insure that it snaps into place to secure the clamping lever. Re-connect the quick couplers making certain they are completely seated. (see page 2, #7.) Retract and pin the support leg.

- b. Level Scoot

See illustrations included in this manual.

To Lower the Load

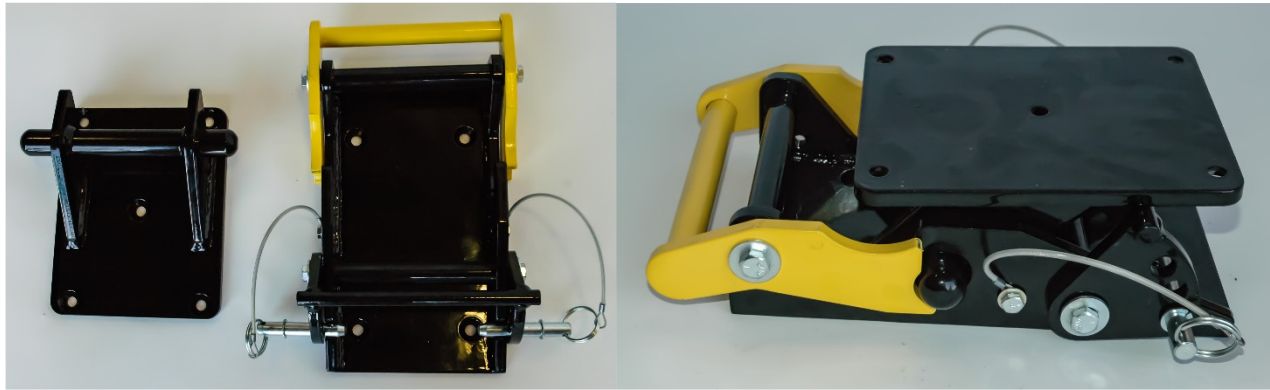
3. Place the control valve lever in the advance (raise) position. With the remote control, extend the ram sufficiently to remove the Locking Rings. The Locking Rings should be stacked on the handle bracket beginning with the shorter rings at the bottom, and moving to the taller rings at the top.
4. Rotate the control valve to the retract (lower) position. Start the Pump to retract the ram.
5. Important: When the ram is fully retracted, stop the motor and rotate the control valve to advance. Jog the motor to advance the ram slightly (approximately 1/8"(0.3cm)). This eliminates pressure buildup in the ram during storage.
6. Swing the control valve lever to the retract position and to the advance position to bleed all the pressure from the lines. This will ensure that there will be no pressure locked in the topside of the ram or the hoses.

TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
Jerky action	-Air in system -Internal Leakage in cylinder -Low oil level in reservoir	**Cycle cylinder fully up and down. -Have Lift Module serviced. -Bring oil to proper level.
Pump operates but will not move piston / raise load	-Low oil level in reservoir. -Filter screen is plugged. -Relief valve(s) are set wrong. -Control valve needs service.	-Check oil level in reservoir. Add oil and bleed the system. -Clean screen and reservoir. -Have unit serviced. -Service control valve.
Piston extends but will not retract	-Retract Couplers not seated. -Pump not developing enough pressure to operate the load holding valve.	-Remove pressure from lines, disconnect, clean and reconnect couplers, confirming seal (page 2 #7)
Noisy Pump	-Low oil level in reservoir -Air in system - Worn pump	-Bring oil to proper level. -Check pump intake tubing and seals for places where air might enter. - Cycle cylinder fully up and down -Have serviced by a qualified technician
Ram extends part way and stops.	-Low oil in reservoir. -Couplers not seated. -Cylinder is damaged.	-Bring oil to proper level. -Remove pressure from lines, disconnect, clean and reconnect couplers, confirming seal (page 2 #7). -Have Lift Module serviced.
Cylinder or fittings leak oil.	-Seals worn/damaged fittings loose.	-Have serviced by a qualified technician.
Oil vents from cylinder port relief valve when raising ram.	-Couplers not seated or defective. -Faulty Relief Valve	-If screw style, tighten coupler so female collar is up against shoulder of male coupler -Replace if defective. -Have unit serviced.
Cylinder advances more slowly than normal.	-Oil to thick or dirty. -Restricted hose or fitting. -Needle valve on optional manifold closed. -Pump worn. -Cylinder worn. -Quick coupler not fully tightened.	-Change to clean oil of SAE weight suitable for temperature. Page 2. -Isolate and replace. -See page 9 & 10. -Have Pump Module serviced. -Have Lift Module serviced. -Retighten couplers.

SCHEDULED MAINTENANCE HELPS PREVENT UNSCHEDULED BREAKDOWNS.

Level Scoot Bracket



Pivot Rod Position Pins

Latch Arm Reaction Arm

The level scoot bracket is a mounting mechanism that is designed to securely lock the Mod-U-Lift Power Module to the Lift Module and disconnect the two quickly and with ease.

Positions:

The level scoot bracket is designed to be configured in three different positions. This allows for easier maneuvering of the lift unit in the workspace. This is done with the reaction arm and position pins. Refer to illustration 1 (right) for position designations.

Position 1, the lift unit will be moved in a straight tilt.

Position 2 offers ½" (1.27cm) of level clearance over the ground.

Position 3 offers 1" (2.54cm) of level clearance over the ground.



Illustration 1

Attaching:

1. Insert the two pins into the reaction arm, in the desired position for best maneuverability. Ensure that the pins are attached to the bracket with a cable to prevent them from being lost.
2. Maneuver the power module so that the pivot rod on the power modules bracket pushes the latch arm back and moves into the groove. Refer to illustration 2
3. Inspect to confirm the latch arm has returned to the vertical position, locking the pivot arm in place. Refer to Illustration 3 for an example of a properly secured level scoot bracket.
4. The mount can be additionally secured with a safety bolt (**HEX BOLT Ø3/8" NC x 1 1/2" LG**) screwed in place after handle returned to vertical position. Refer to Illustration 4



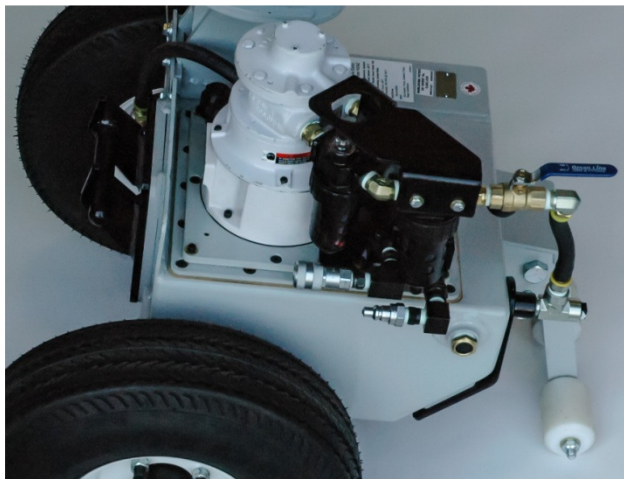
Illustration 3

Illustration 4



Detaching:

1. **LOWER AND SECURE THE POWER MODULES FOOT!** Refer to the illustration 4 (below).
2. Disconnect the hydraulic hoses between the lift module and the power module.
3. Remove the two pins from the reaction arm, allowing it to swing freely. Ensure that the pins are attached to the bracket with a cable to prevent them from being lost.
4. Apply light pressure to the power module handle in the direction of the lift until pressure is removed from the latch arm. Then turn the latch arm in the direction of the power module and lower the power module onto the support foot.
5. The power module can now be maneuvered away from the lift.



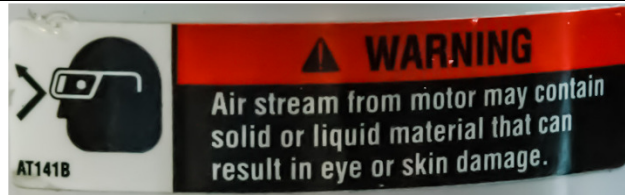
PM 120-175



PM 60-100

Illustration 4.1

Air Powered Safety Precautions & General Instructions



Air Supply Requirements: Minimum 50 CFM (1.4 M³/min) & 80 PSI (5.5 bar) with 100 PSI (7 bar) maximum.

1. Inspect all air hoses for signs of wearing or damage.
2. Securely fasten the air hose to the air inlet bracket, with the valve in the closed position.
3. Put the directional control valve into the neutral position, in between Up and Down.
4. On the filter lubricator assembly, check to see if there is an adequate amount of lubricating fluid and that the filter is clean and intact.
5. Set the drip rate on the lubricator as follows:
 - a) Slowly open the air valve, allowing the flow of air through the motor.
 - b) Visually inspect the rate at which lubricating fluid is fed into the system and rotate the rate control valve till the lubricator drips once in approximately ten seconds.

Rate Control _____

Drip Point _____

Lubricating Fluid Container _____



See Page 18 for Recommended Fluids

Electrically Powered Safety Precautions & General Instructions

Electrical Supply: 115 volts, 1.5 HP, 8 Amps (North American)
230 volts 1.5 HP, 8 amps (European)



- 1 . Do not tamper with electrical components.
- 2 . Do not open motor control box while the Jack is plugged in!

3. When cleaning the equipment take care to keep electrical components dry.

4. Check the brush indicator light prior to use, if the light is off the brushes are still functioning properly.

5. Visually inspect the attached power cord for damages prior to plugging in the Jack.

6. Ensure you are using an adequate power cord, refer to the table below.



7. If using a portable welder, ensure that the lifting equipment is unplugged prior to use. This prevents grounding through the motor on the jack.

Current At Full Load (Amps)	Cord Size AWG (mm ²) 3.2 Volt Drop			
	Length of Cord			
	0-25 feet (0-8 m)	25-50 feet (8-15 m)	50-100 feet (15-30 m)	100-150 feet (30-45 m)
6	18 (.82)	16 (1.33)	14 (2.09)	12 (3.32)
8	18 (.82)	16 (1.33)	12 (3.32)	10 (5.37)
10	18 (.82)	14 (2.09)	12 (3.32)	10 (5.37)
12	16 (1.33)	14 (2.09)	10 (5.37)	8 (8.37)
14	16 (1.33)	12 (3.32)	10 (5.37)	8 (8.37)
16	16 (1.33)	12 (3.32)	10 (5.37)	8 (8.37)
18	14 (2.09)	12 (3.32)	8 (8.37)	8 (8.37)
20	14 (2.09)	12 (3.32)	8 (8.37)	6 (13.30)
22	14 (2.09)	10 (5.37)	8 (8.37)	6 (13.30)
24	14 (2.09)	10 (5.37)	8 (8.37)	6 (13.30)
26	12 (3.32)	10 (5.37)	8 (8.37)	6 (13.30)
28	12 (3.32)	10 (5.37)	6 (13.30)	4 (21.29)
30	12 (3.32)	10 (5.37)	6 (13.30)	4 (21.29)

Preventative Maintenance

Daily Checklist:

1. Fully stroke the lifting plunger.
2. Visually inspect for bent or damaged components, hoses or fittings, and hydraulic leaks etc.
3. Tighten loose bolts and fittings as required.

REMOVE FROM SERVICE IF DAMAGE, CRACKS, BENT COMPONENTS OR
HYDRAULIC LEAKS ARE FOUND.

General Level 1 Maintenance:

Recommended every 12 months depending on usage.

1. Clean unit
2. Inspect for leaks
3. Check for any loose bolts & tighten as required
4. Check for any cracks on the equipment
5. Replace damaged or missing safety decals
6. Inspect hoses for damage
7. Check for any loose fittings and tighten as required
8. Check condition of air connection quick coupler or electrical cord

PREVENTATIVE MAINTENANCE IS A REQUIREMENT FOR EQUIPMENT AND
MACHINERY.

LIFTING DEVICES CAPABLE OF LIFTING OVER 2,000 KG (4,409LBS) ARE
REQUIRED TO HAVE TO LOAD RATING ON THE EQUIPMENT

Storing:

To reduce potential wear and keep the Mod-U-Lift System in best form it is recommended that the equipment be stored in a dry, covered location, where it is protected from the elements and potential environmental hazards. When the Mod-U-Lift System is being stored it should be in the fully retracted (lowered) position and any pressure within the hydraulic hoses should be removed by moving the traversing direction valve left and right.

Repair:

Any repairs should be done by Hydra-Tech International or an approved service centre.

Recommended Hydraulic Fluids & Lubricating Fluids

(For ambient temperatures from -20°F / -29°C to 12QOF)

Power Team AW46
Exxon Unavis Extra
Texaco Rando HDAZ

Notes:

Alternate fluids may be used if they have the following characteristics:

- Pour point -45°F / -43°C, viscosity 150 SUS@ 1000f
- Viscosity 45 SUS @ 210°F / 99°C
- Viscosity index 150, and anti-corrosion, anti-foam, anti-oxidant, anti-rust, anti-wear and demulsifier additives

For air powered units the recommended lubricating fluid for the air motor is:

F442 Turbine Oil

STANDARD WARRANTY

1. **WARRANTY POLICY.** Subject to those terms and conditions contained herein, Seller warrants that all Seller products conform in all material respects to the description identified in the quotation, proposal or offer made by Seller to Buyer for the sale of its products (collectively, "**Quotation**") and will be free from defects in material and workmanship for two (2) years from the date of shipment to Buyer (except for spare parts which Seller warrants for one (1) year from the date of shipment to Buyer). Products manufactured by manufacturers other than Seller and/or its affiliates ("**Other Manufacturer's Products**") supplied by Seller to Buyer are not warranted by Seller. Other Manufacturer's Products may be warranted separately by their respective manufacturers and Seller shall, to the extent possible, assign to Buyer whatever rights Seller may obtain under any such warranties.

THE FOREGOING REPRESENTS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY SELLER TO BUYER AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW (INCLUDING BY STATUTE) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

2. **WARRANTY REMEDIES.** Buyer's sole and exclusive remedy for Seller's breach of the foregoing warranties during the warranty period shall be, at Seller's sole discretion, the repair and/or replacement of any defective products (or component parts thereof) pursuant to the terms of and conditioned upon Buyer's compliance with the procedure identified in Section 5 hereof.
3. **LIMITATION OF DAMAGES. SELLER SHALL HAVE NO LIABILITY TO BUYER OR ANY END USER OF PRODUCTS OR SERVICES WITH RESPECT TO THE SALE OF PRODUCTS OR PROVISION OF SERVICES UNDER THE QUOTATION FOR LOST PROFITS OR FOR SPECIAL, CONSEQUENTIAL, EXEMPLARY, OR INCIDENTAL DAMAGES OF ANY KIND WHETHER ARISING IN CONTRACT, TORT, PRODUCT LIABILITY, STRICT LIABILITY OR OTHERWISE, EVEN IF SELLER WAS ADVISED OF THE POSSIBILITY OF SUCH LOST PROFITS OR DAMAGES. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY DAMAGES WHATSOEVER IN EXCESS OF THE TOTAL PRICE PAID BY BUYER FOR PRODUCTS AND/OR SERVICES REFERENCED IN THE QUOTATION.**
4. **INAPPLICABILITY OF, AND VOIDING OF THE WARRANTY.** This Standard Warranty does not cover defects in Seller products which are not defects in material and workmanship and may be attributed to other causes including but not limited to failure to operate and/or maintain Seller products in accordance with the applicable Seller installation and/or operator's manuals, owner's manuals, maintenance manuals, manufacturer's recommendations, and any other manuals, guidelines or recommendations of Seller concerning the maintenance and operation of Seller products that may be communicated to Buyer from time to time, side-pulling of load, shock loading, excessive jogging, eccentric loading, overloading, accidental occurrence, improper repair, improper handling or storage of products, chemical exposure and/or abnormal operating conditions not identified to and expressly and specifically accepted by Seller in writing prior to Seller's issuance of a Quotation, or any other cause that in Seller's sole discretion is not attributable to defects in material and workmanship. Failure of products to meet published performance specifications due to abnormal operating conditions beyond Seller's knowledge or control shall not be considered defects in either workmanship and/or material.

Modification of Seller products and/or incorporation of Other Manufacturer's Products into Seller products by individuals and/or organizations other than Seller shall void this Standard Warranty.

Buyer's failure to pay in full when due for the products and services provided for in a Quotation shall void this Standard Warranty.

5. **WARRANTY PROCEDURE.** To obtain warranty remedies pursuant to this Standard Warranty, Buyer must strictly adhere to the following procedure. Buyer's failure to comply with the terms of this procedure shall void this Standard Warranty.

- (a) Buyer shall, within seventy-two (72) hours of any claimed non-conformance or defect in Seller products, notify Seller's Warranty Administrator in writing of the alleged non-conformance or defect.
- (b) Seller shall, within a reasonable time, advise Buyer of its intention to initially accept or deny the warranty claim pursuant to the terms of this Standard Warranty. If Seller elects to initially accept the warranty claim, it shall advise Buyer of its intention to replace, repair, or otherwise further inspect the allegedly nonconforming or defective products (or component parts thereof) ("**Initial Acceptance**").
 - (i) **Replacement of allegedly nonconforming or defective products.** Should Seller provide Initial Acceptance of Buyer's warranty claim and elect to replace the allegedly nonconforming or defective products (or component parts thereof), or should Seller elect to provide Initial Acceptance of Buyer's warranty claim through notification to Buyer that Seller elects to inspect the allegedly nonconforming or defective products (or component parts thereof) and then subsequently elect to replace the allegedly nonconforming or defective products (or component parts thereof), Seller shall within a reasonable time, ship new, comparable, replacement products to Buyer F.C.A. Seller's plant, warehouse or dock, as defined by Incoterms 2010, via the lowest cost method available.
 - (ii) **Repair of allegedly nonconforming or defective products.** Should Seller provide Initial Acceptance of Buyer's warranty claim and elect to repair and/or permit the repair of the allegedly nonconforming or defective products (or component parts thereof) by approved third parties, or should Seller elect to provide Initial Acceptance of Buyer's warranty claim through notification to Buyer that Seller elects to inspect the allegedly nonconforming or defective products (or component parts thereof) and then subsequently elects to repair the allegedly nonconforming or defective products, Seller shall, unless otherwise agreed in writing by the Warranty Administrator, pay only those direct labor costs incurred to effectuate the repair and the cost of Seller replacement products consumed during said repair provided that the costs for all products and/or services are approved in advance in writing by Seller's Warranty Administrator.
 - (iii) **Inspection of allegedly nonconforming or defective products.** Should Seller provide Initial Acceptance of Buyer's warranty claim through notification to Buyer that Seller elects to inspect the allegedly nonconforming or defective products (or component parts thereof) and then subsequently determine that the alleged nonconformity or defect is not covered under this Standard Warranty, Seller shall bill Buyer, and Buyer shall pay Seller any and all costs associated

(iv) with the performance of inspection of allegedly nonconforming or defective products.

6. **WAIVER. BUYER HEREBY WAIVES ANY CLAIM THAT THE EXCLUSIONS OR LIMITATIONS IDENTIFIED HEREIN DEPRIVE IT OF AN ADEQUATE REMEDY. BUYER SHALL BE ENTITLED TO NO OTHER REMEDY OTHER THAN THOSE IDENTIFIED IN SECTION 2 HEREOF WITH RESPECT TO THE PROVISION OF PRODUCTS AND/OR SERVICES BY SELLER REGARDLESS OF THE FORM OF CLAIM OR CAUSE OF ACTION, WHETHER BASED IN CONTRACT, TORT INCLUDING NEGLIGENCE, STRICT LIABILITY OR OTHERWISE.**