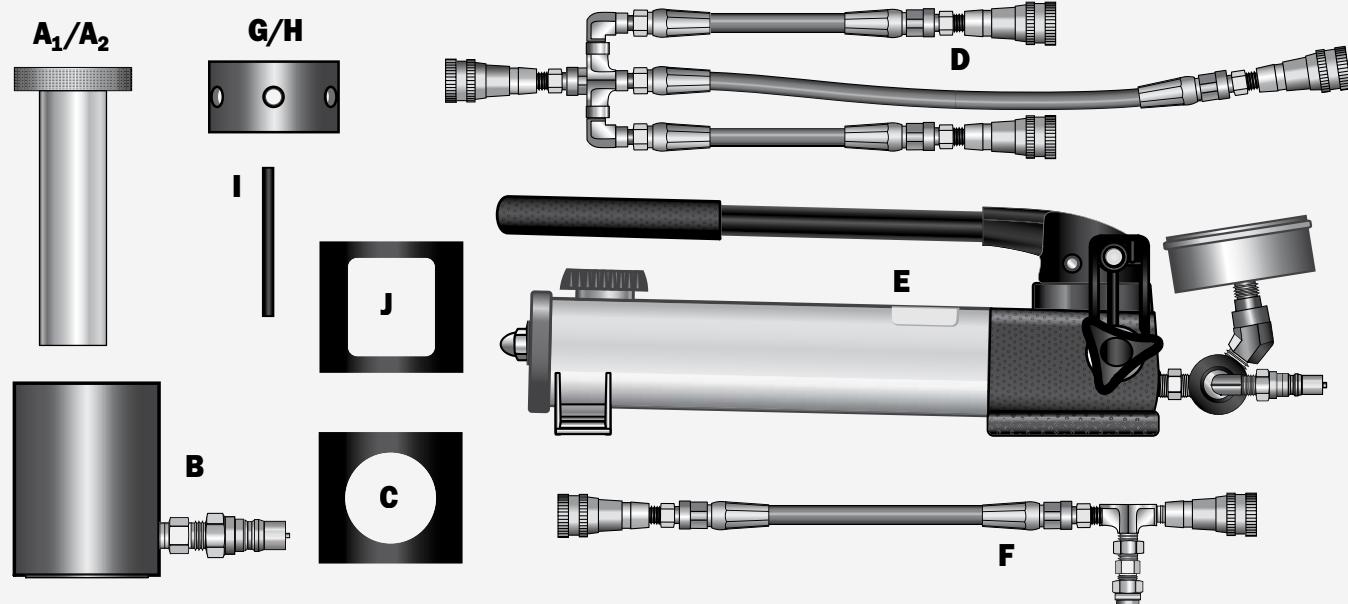


STANDARD KIT/COMPONENTS FOR INSTALLATIONS WITH SHACKLE RODS OF 3/4 IN/M20 OR LESS\*



**A<sub>1</sub>\*** Threaded Insert 3/4-10 : (6) 11283  
**A<sub>2</sub>\*** Threaded Insert M20 : (6) 11284  
**B.** Hydraulic Cylinder : (6) 11282  
**C.** Short Stand : (6) 11704  
**D.** Triple Hose : (2) 11710  
**E.\*\*** Pump Assembly : (1) 11733

**F.** Single Hose : (2) 11705  
**G.** Adjustment Nut Collar 3/4-10: (1) 11273  
**H.** Adjustment Nut Collar M20 : (1) 11713  
**I.** Nut Collar Key: (1) 11269  
**J.** Adjustment Nut Stand:(1) 11265

\* Choice of either A1 or A2 inserts as part of Standard Kit. M16 and M12 Threaded Inserts are available upon request.

\*\* Note: RLE uses AW32 hydraulic oil.

PRIOR TO EQUALIZATION WE RECOMMEND A CLOSE EXAMINATION OF THE DRIVE SHEAVE

Brugg RLE is adaptable to a variety of hitchplate configurations.

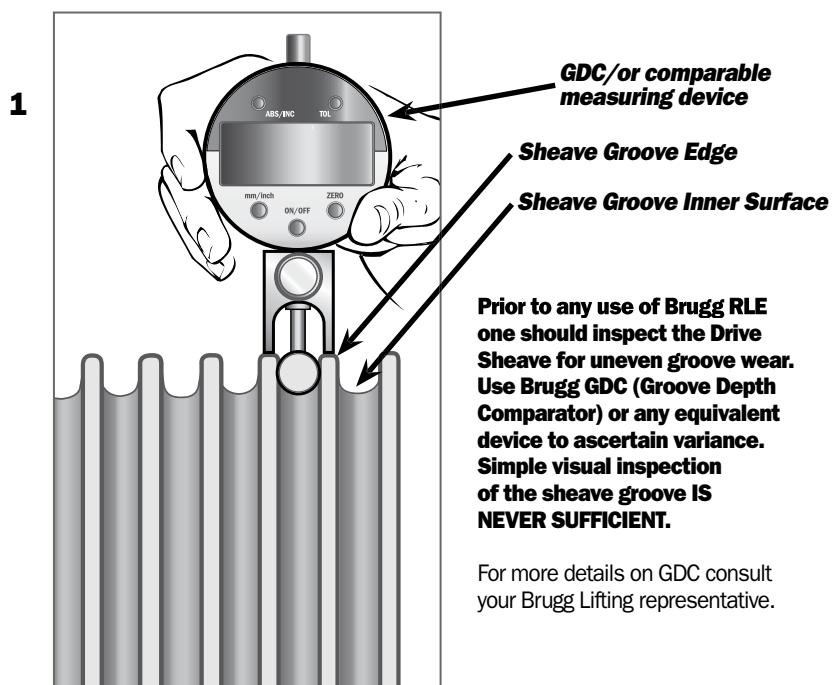
**RLE/Large:** for 7/8 -1 1/2 in., M24-M38 shackles

**RLE/Intermediate:** shackles up to 7/8 in. and M24

**RLE/Standard:** for 3/4 in. and M20 shackles

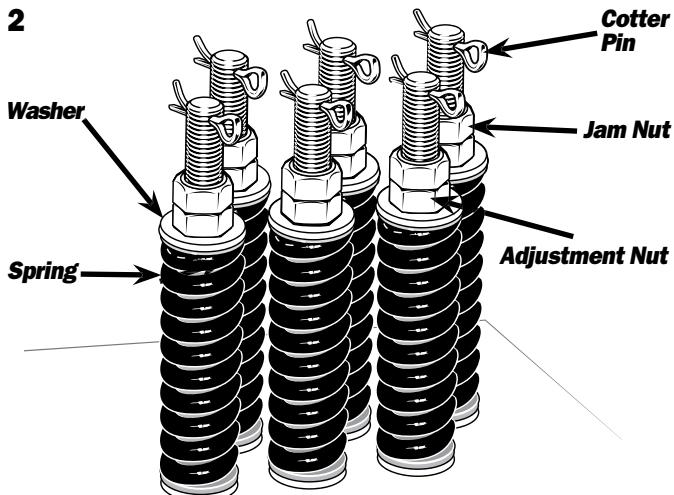
Adapters are available for M12, M16, M20, M24 shackles (additional sizes available special order). In addition, RLE offers further options permitting it to equalize rope tensions in even more challenging environments. For further details on Brugg RLE contact your Brugg Lifting sales representative.

**Procedures shown detail technique for 2:1 and 1:1 (should structural design allow easy component access) roped installations. Remember to follow all safety regulations and manufacturer service requirements.**

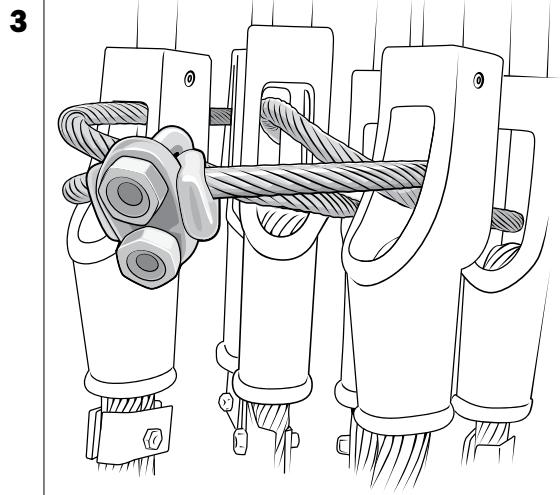


For more details on GDC consult your Brugg Lifting representative.

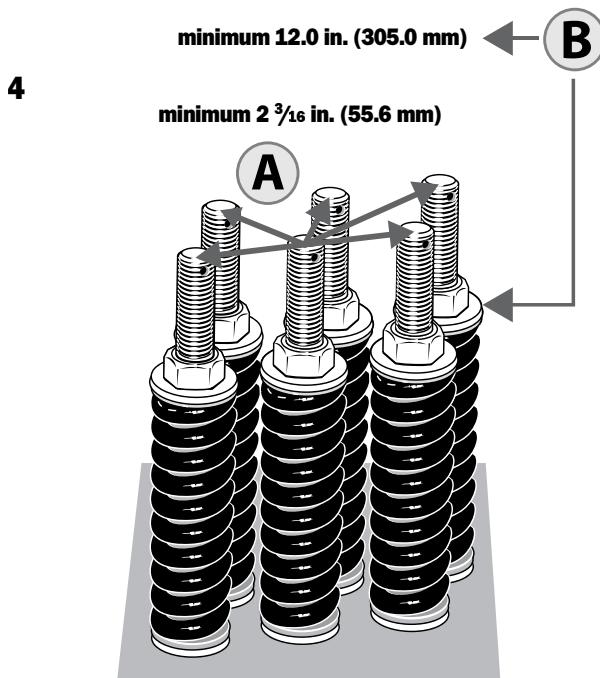
2:1 INSTALLATIONS WITH SHACKLE RODS OF 3/4 IN/M20 OR LESS



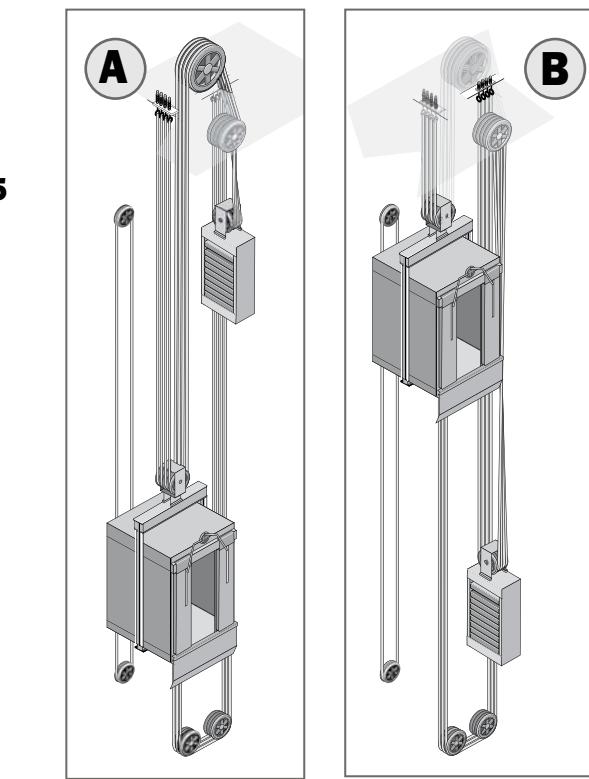
Inspect and verify that the Jam and Adjustment Nuts are situated on top of the Washer/Spring assembly. Each Shackle should have its own Cotter Pin securely inserted. **NOTE: Washers on top of springs must be of sufficient diameter to support RLE Stands. If too small call your Brugg representative for a solution.**



Prior to usage of RLE ensure that a Spinout Cable is properly affixed.

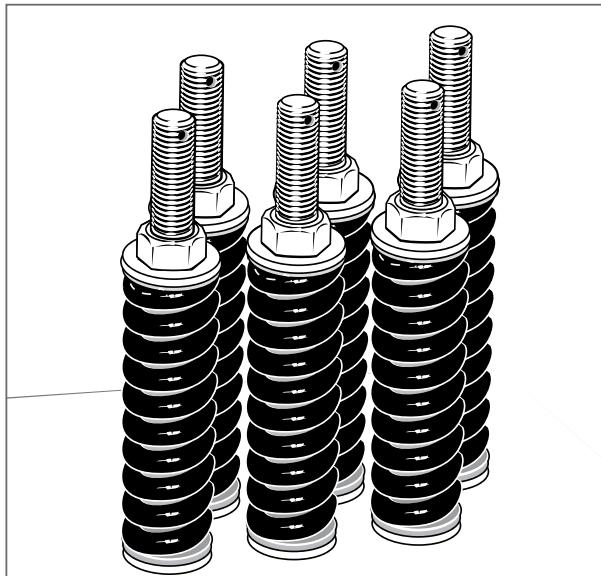


This device works best on installations offering hitchplate arrangements with a minimum center-to-center spacing (**A**) of **2 3/16 in. (55.6 mm)** between rope shackle rods and a minimum clearance (**B**) of **12 in. (305.0 mm)** between shackle washer and the closest obstruction overhead.



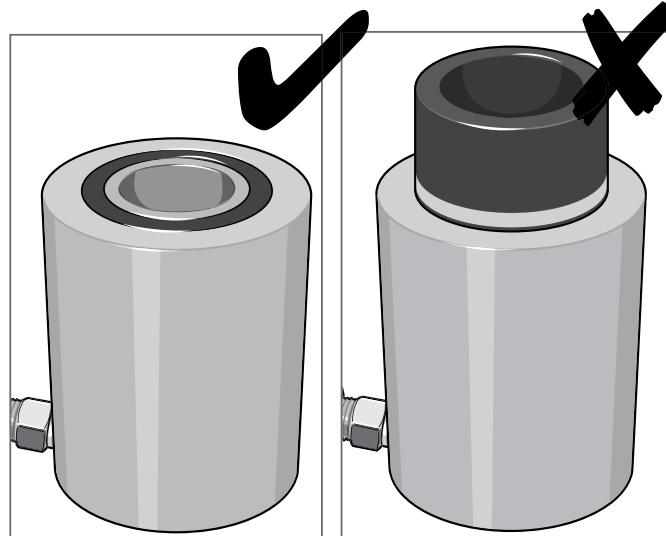
Park the car at the bottom of the hoistway if working with the Car Side Shackles (**A**). If working from the Counterweight Side, then park the car at the top landing (**B**). In most cases, the car will be positioned at the bottom of the hoistway.

6



After parking the car securely remove **only the cotter pin and jam nut on each threaded rod/spring assembly.**

7



**A. Proceed to Step 8**

**B. Fluid remains.  
Go to Step 10**

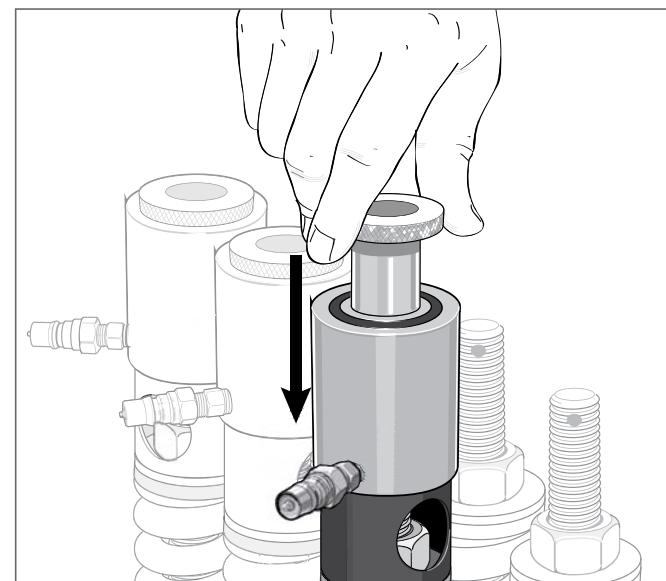
Review the Cylinders. If the Piston area (the black protruding ring within the Cylinder) remains above the top surface of a Cylinder then fluid or air remains from previous use. **Do not attempt to force the Piston level with the Cylinder. Instead proceed to step 10. If the piston is positioned correctly then go to step 8.**

8



Place a Short Stand on top of each Wedge Socket Spring and install Hydraulic Cylinders as shown. The cylinder base offers an inset shoulder to insure a good fit on the metal stand.

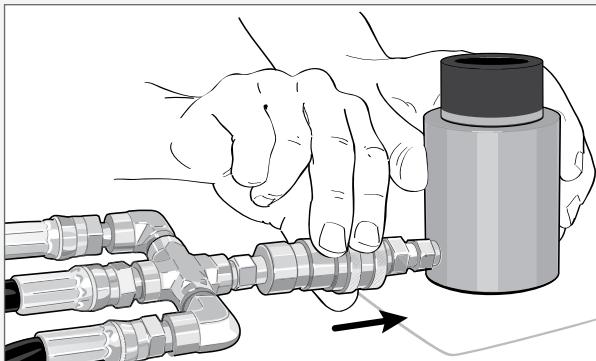
9



Thread the appropriate Insert (3/4-10 or M20) through each Cylinder onto the Shackle Rod. **Each insert should screw down even with the top of its Cylinder. If this is not the case proceed to Step 10 (see insert 7B as example). Only after all Inserts are even with the top of the Cylinders (see insert 7A) may you proceed to Step 11 (titled: Attaching RLE Components For Six Cylinder Usage).**

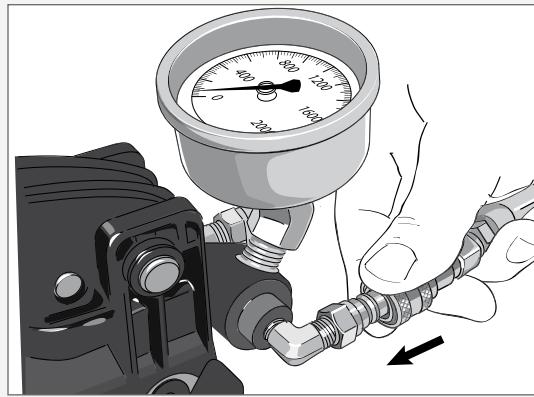
## Removing Fluid from Cylinders for proper Adjustment Insert positioning

**10**



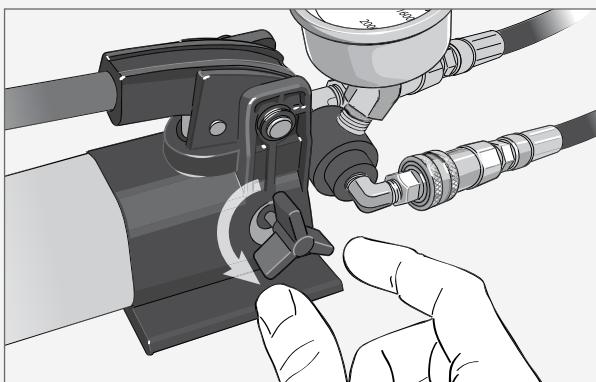
Attach the Main Socket of the Triple Hose to the Cylinder with the raised Piston. **If an Insert is in place withdraw it and place aside. Fluid removal cannot be accomplished if an Insert is in position.**

**10a**



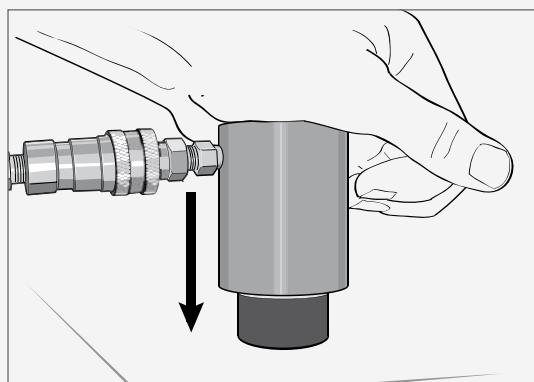
Attach the loose end of a long Triple Hose to the Pump Assembly. **Press carefully to connect.**

**10b**



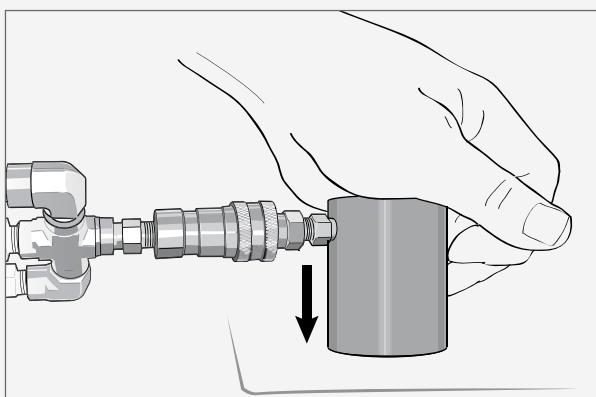
After the hose has been connected to the Pump turn the star-shaped Handle counterclockwise (to open) and allow hydraulic fluid to exit Cylinders.

**10c**



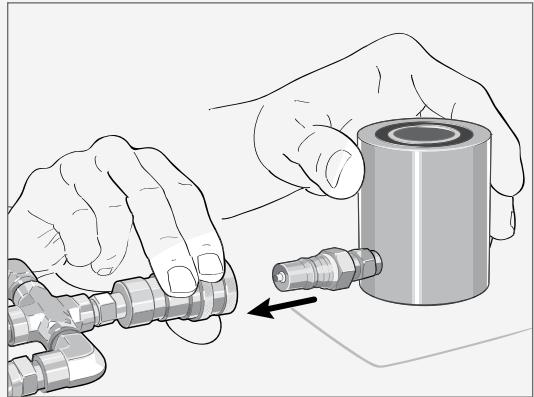
Position the Cylinder upside down. **Press the Cylinder firmly against a level work surface to force residual fluid back into the Pump Assembly reservoir.**

**10d**



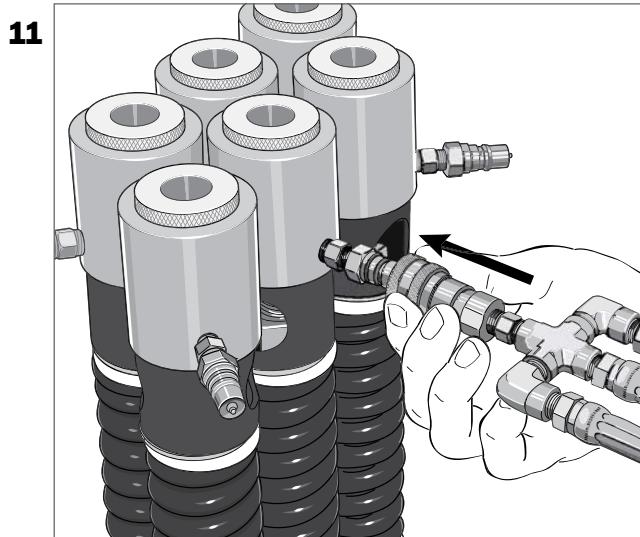
When the Piston is level with the Cylinder top you are finished. Repeat as needed for other Cylinders.

**10e**

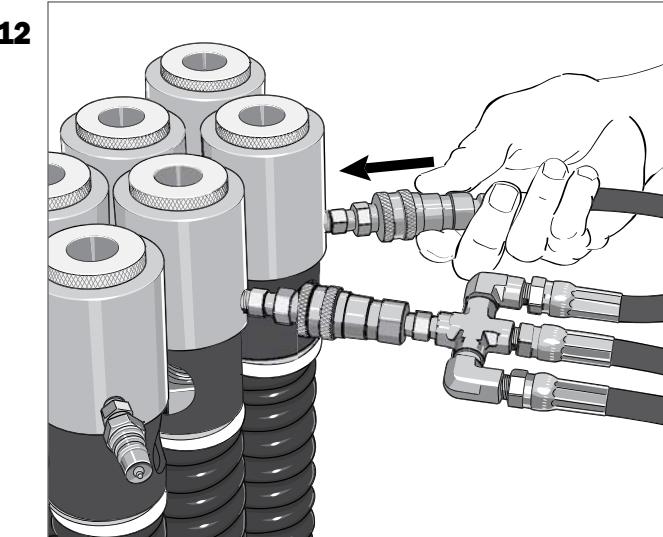


To proceed with equalization disconnect the Triple Hose from the Cylinder and return to Step 8.

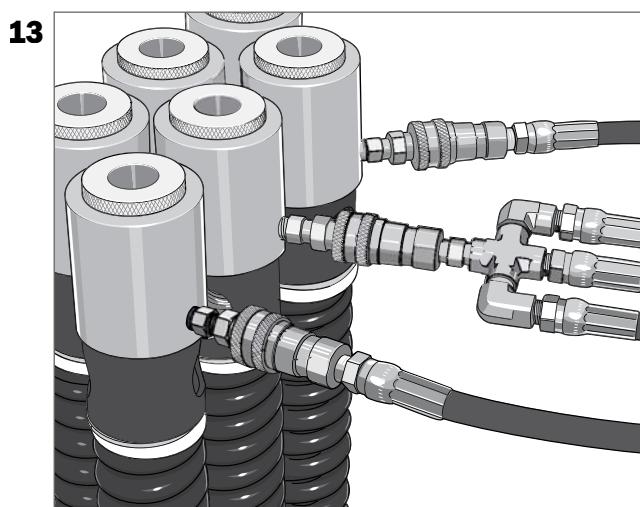
## Attaching RLE Components For Six Cylinder Usage. (Continuation from Step 9)



Take the Triple Hose from the RLE kit and insert the central coupling socket plug into a cylinder port. **Press carefully to connect.**

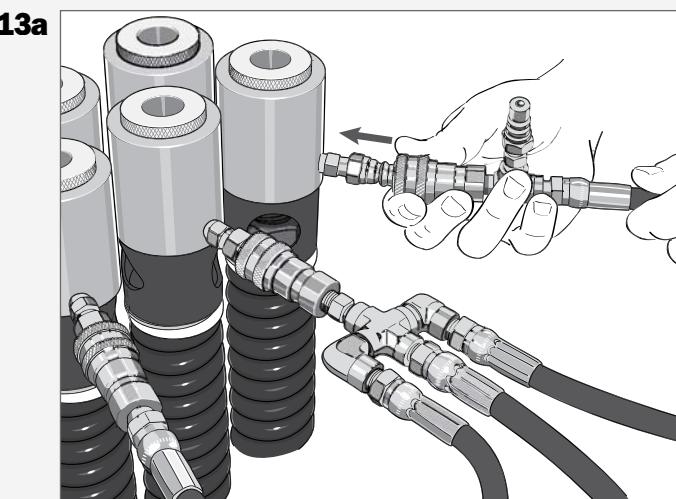


Attach a secondary hose coupling plug to an adjoining cylinder. The hose is made to accommodate a minimum  $\frac{3}{4}$  in. (19.0 mm) radius bend. **Press carefully to connect.**



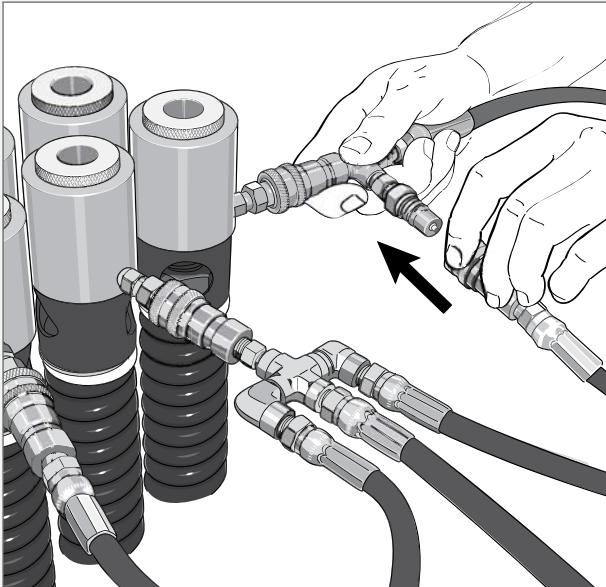
Attach the remaining hose coupling to another cylinder port. To complete the coupling process use the second Triple Hose assembly and repeat Steps 11 through 13 for the remaining cylinders. When finished advance to step 14. **NOTE: To equalize a 7 or 8 rope installation follow Steps 13 a through 13c (See: Using More Than Six Cylinders).**

## Using More Than Six Cylinders.



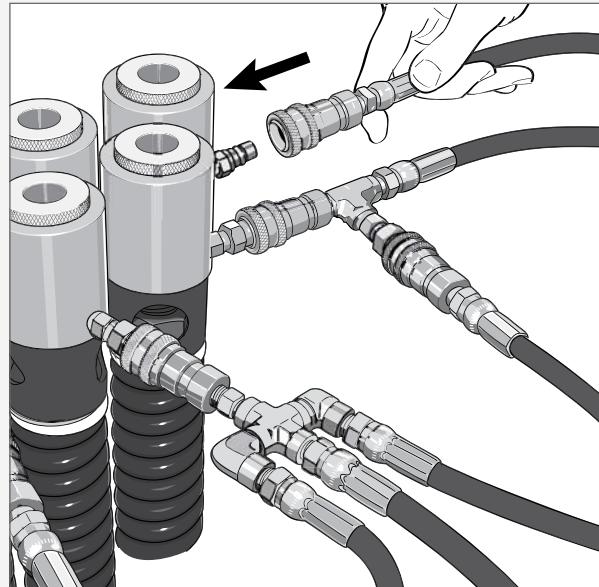
The Standard RLE Kit contains 6 cylinders. To configure a Triple Hose assembly so that one may use additional cylinders you must attach a short Add-On Extension Hose to complete the pressure circuit. **First, couple the main plug of the Add-On Hose (using the coupling nearest to the smaller Tee-Joint outlet) to the Cylinder intake that is adjacent to an already attached large Triple Hose assembly.**

**13 b**



Attach the loose member of a Triple Hose Assembly to the Tee-Joint connector of the Add-On Hose. The hose is designed to handle a minimum  $\frac{3}{4}$  in (19.0 mm) bend. **Remember to apply even, easy pressure to connect.**

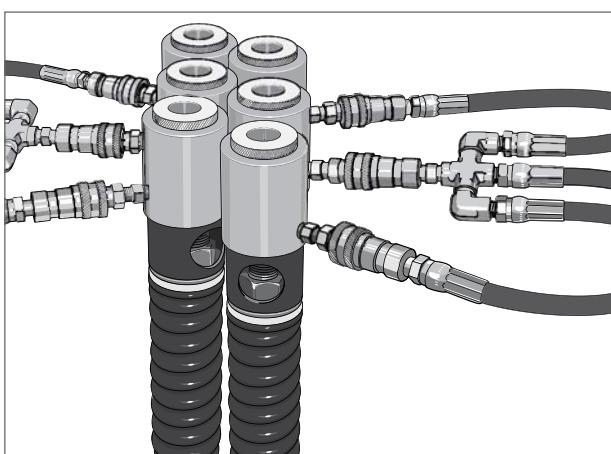
**13c**



Couple the remaining end of the Add-On Hose to an open Cylinder port. The Triple Hose Assembly is now configured to handle four cylinders. To equalize eight cylinders repeat Steps 13 a through 13 c using the Triple Hose and Add-On Hose. **After the desired number of Cylinders are installed proceed to Step 15.**

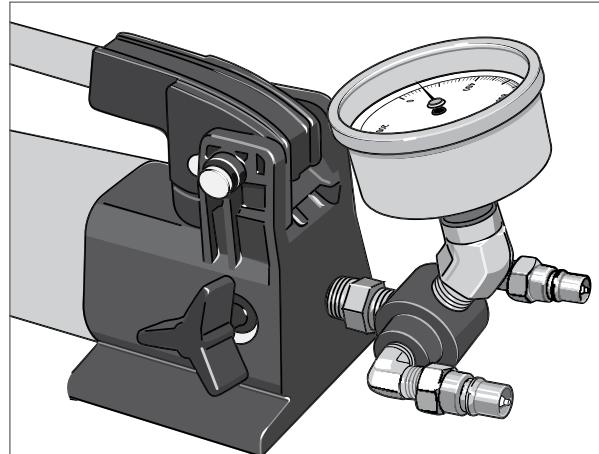
## Attaching RLE Components For Six Cylinder Usage. (Continuation from Step 13)

**14**



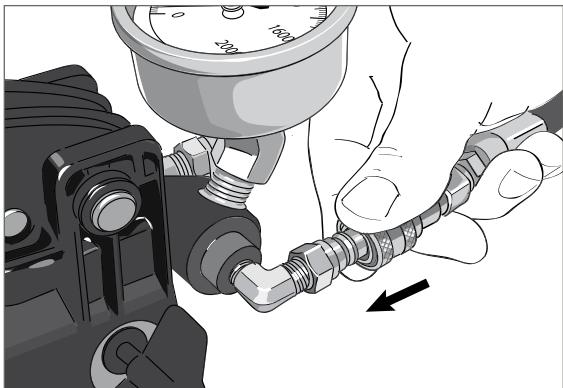
**A completed six Cylinder arrangement is detailed above.**  
(To equalize more than six ropes review Steps 13 a through 13c). Do not stretch or kink Triple Hose lines.

**15**



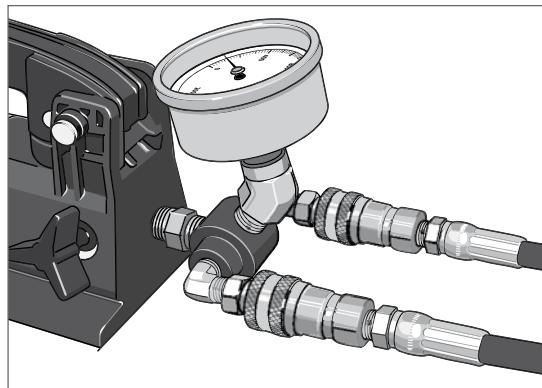
**Place Pump Unit on a level area that allows ample work space and convenient access to both Triple Hoses.**

**16**



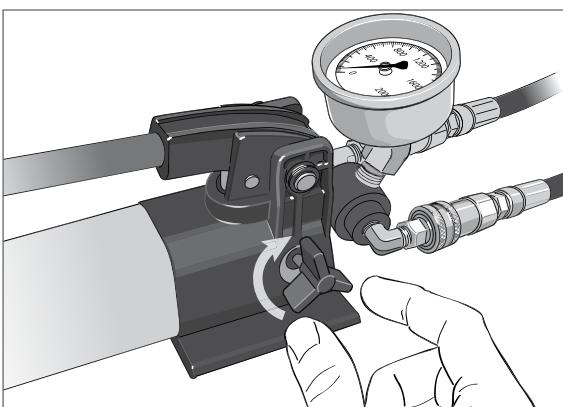
Attach one end of a long Triple Hose to the Pump Assembly. **Press carefully to connect.**

**17**



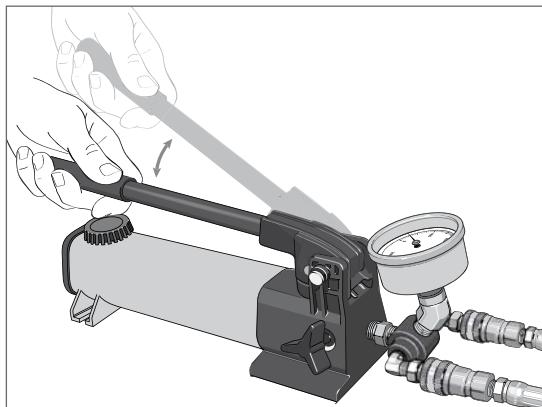
Connect the remaining Triple Hose coupling. **Only light pressure is required to assemble all RLE components.**

**18**



**After all hoses have been connected to the Pump Assembly, turn the star-shaped Handle clockwise (to close) to allow pressurization of the Cylinders.**

**19**

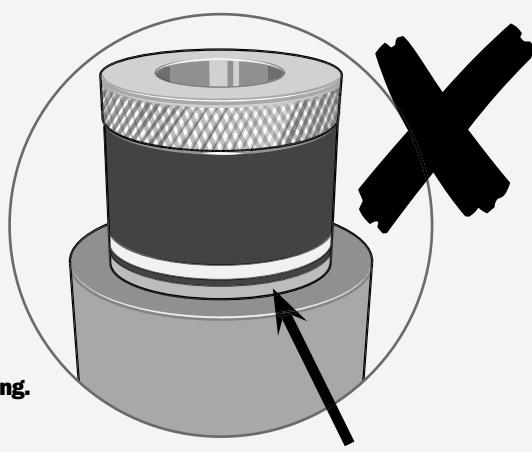


Pump steadily until all Adjustment Nuts have been lifted above their springs. All loads are successfully transferred from the hitch plate to the Cylinders when all Nuts have been lifted off their springs. Proceed to Step 21. **NOTE: Stop and review Step 20 should any Piston reveal a red line during pumping.**

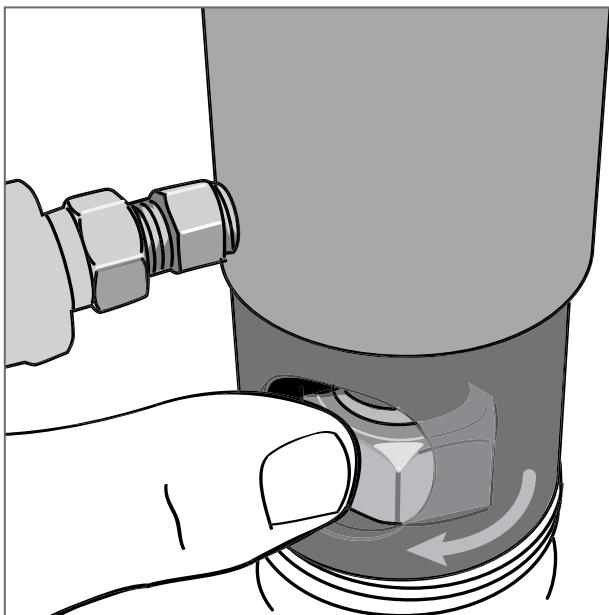
## **20 Yellow Means Caution! Red Line Means Stop! Reset the System Now!**

The appearance of a yellow line on a piston during pumping means it is nearing maximum stroke (a red line signifies Maximum Stroke has been reached). Should one or more pistons attain yellow or red line status, and one or more pistons have not moved from their springs, equalization has NOT achieved. Cease pumping immediately and reset the system.

**TO RESET RLE:** Run all Adjustment Nuts down against the springs and then release pump pressure by turning the star-shaped valve **COUNTERCLOCKWISE** (review Step 21). Screw down each Threaded Insert so it is again level with the top of its own Cylinder. Once all Inserts are properly positioned, pressurize RLE by turning the star-shaped valve **CLOCKWISE** (Step 18) and continue pumping. In some installations rope tensions may be so out of range that it may be necessary to repeat this procedure more than once to achieve equalization.

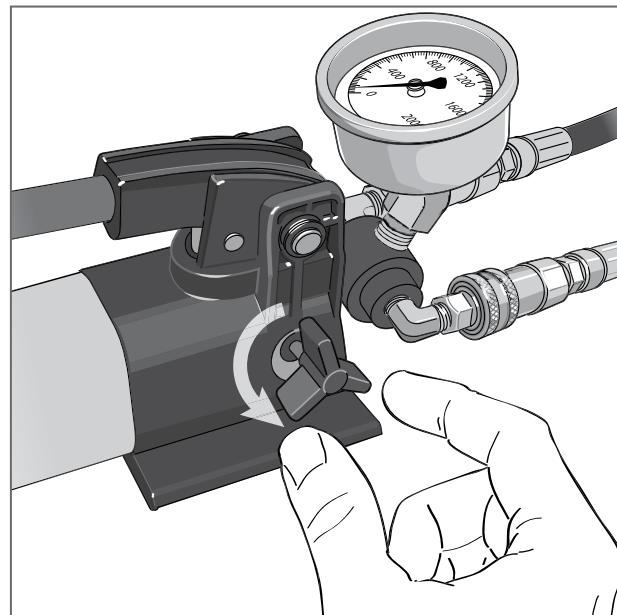


**21**



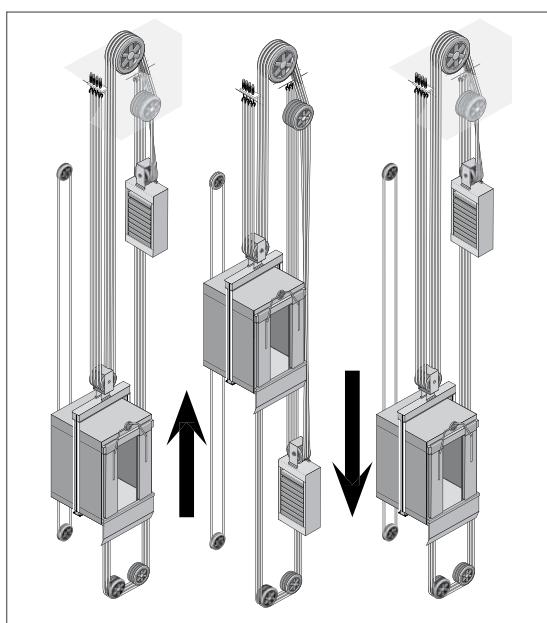
Run the Shackle Rod Adjustment Nuts down against the top of the Springs **using finger pressure only and proceed to step 22**. Should the presence of rust or a worn thread on the nut make this difficult RLE provides a Nut Collar for your use. For details review "Utilizing the Nut Collar".

**22**



Turn the valve handle counterclockwise (OPEN) to depressurize the pump and return hydraulic fluids back to the pump reservoir.

**23**



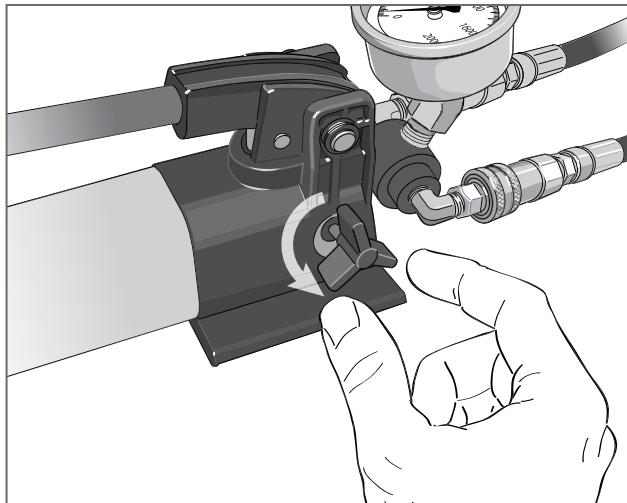
Prior to final Brugg RLE disassembly reset the system (see Step 20) and pump until all Shackle Nuts have been raised approximately 1/2 in. (12 mm) above the shackle washer. Move the car up in inspection mode approximately 10 feet and then return it back again to its original starting position. If all nuts remain lifted above springs after the car has returned to its original position then equalization has been maintained.

Note: This will remove the possibility that friction around the sheaves could inhibit true load equalization. It will also eliminate the possibility that "stiction" (the amount of force initially necessary to move a piston in a hydraulic system) could affect results.

Once again run the adjustment nuts down against the springs. Turn the valve handle counterclockwise (OPEN) to depressurize the pump and return hydraulic fluids back to the pump reservoir. To disassemble Brugg RLE follow the previous listed steps in reverse order and store each part in turn to avoid potential contamination with debris and dirt. Avoid kinking or puncturing device hoses. Avoid rough handling of the glass Pressure Gauge and the Hydraulic Cylinders as these key components can be damaged.

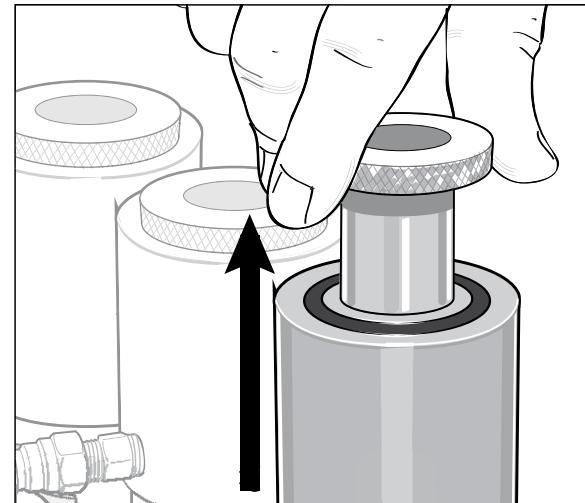
## Utilizing The Nut Collar. (Continuation from Step 21)

**1**



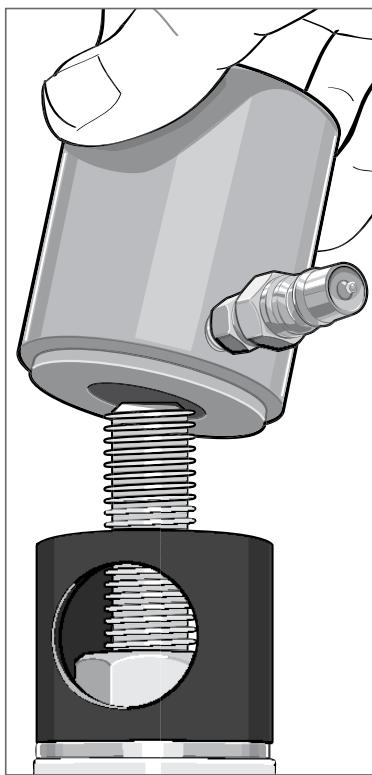
Turn the valve handle counterclockwise (OPEN) to depressurize the pump and return hydraulic fluids back to the pump reservoir.

**2**



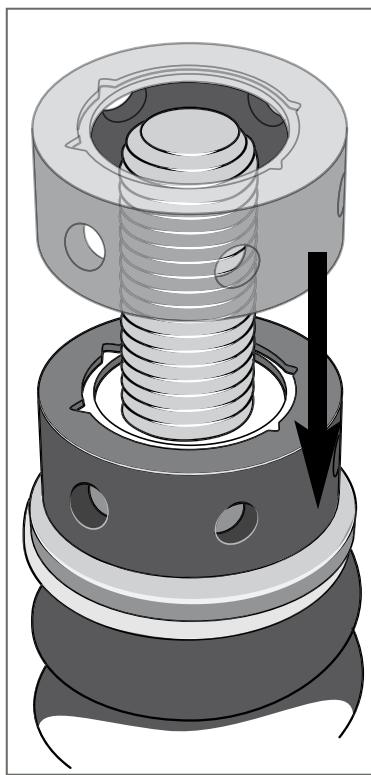
Make sure that all Inserts are flush with the top of their cylinders. Unthread the insert from the cylinder on the shackle rod featuring the impeded Adjustment Nut and place aside.

**3**



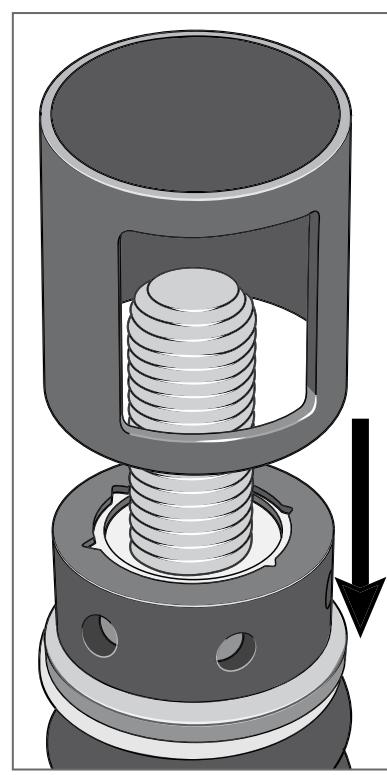
Lift the Cylinder from the shackle causing the problem and remove the Short Stand.

**4**

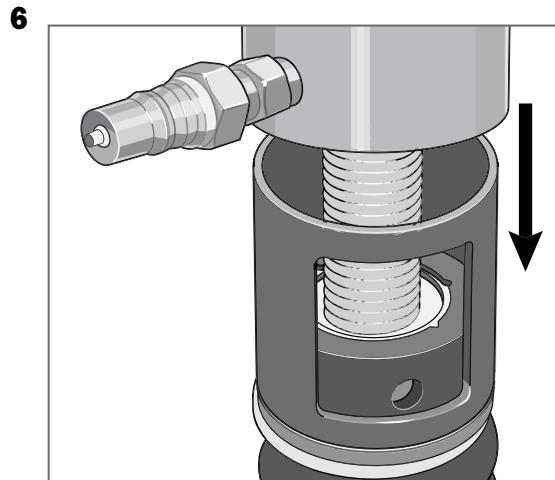


Remove a Nut Collar from the RLE Kit and place directly on the Wedge Socket Spring as shown.

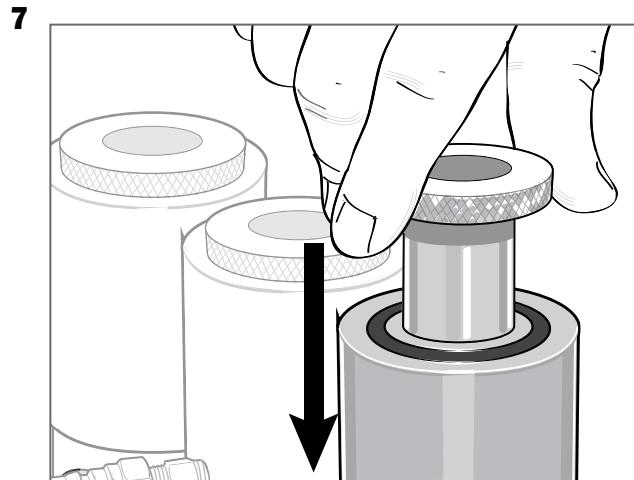
**5**



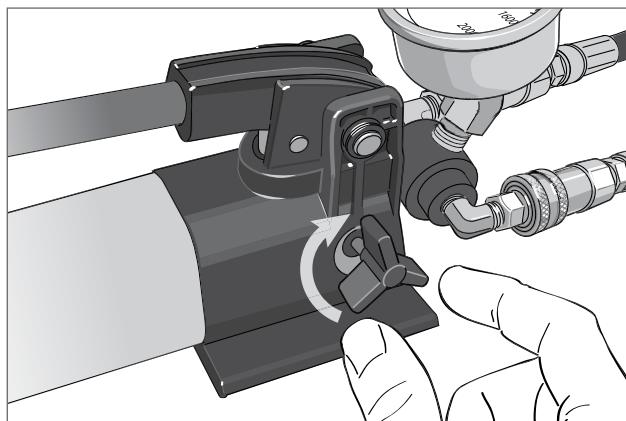
Place an Adjustment Stand (featuring rectangular entry port) and align to permit easy access to the Adjustment Key ports.



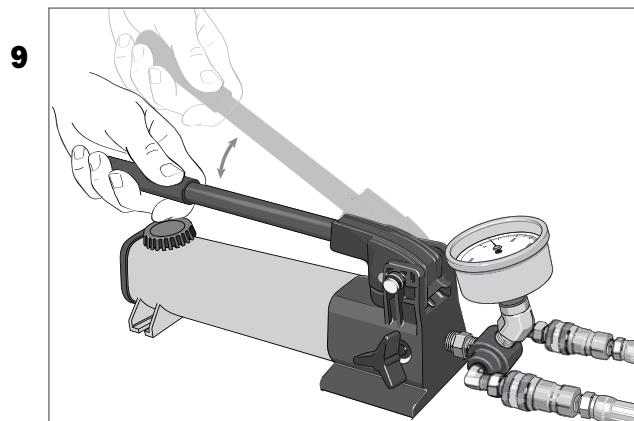
Mount the Cylinder onto the Adjustment Nut Stand.



Thread the insert back onto the Shackle Rod.

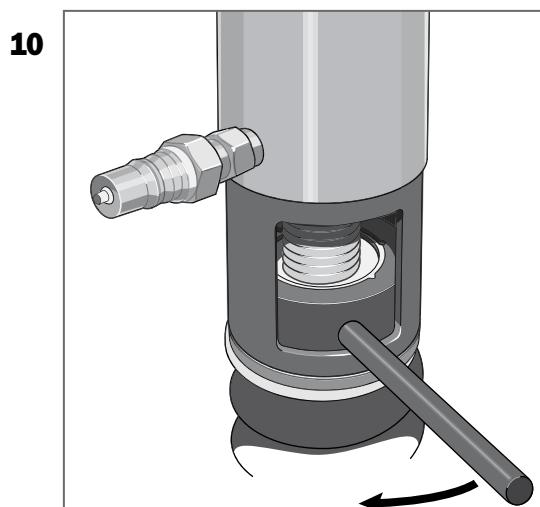


**Once hoses have been connected to the Pump, turn the star-shaped Handle clockwise (to close) to allow pressurization of the Cylinders.**



Pump until all Adjustment Nuts have been lifted above their springs. All loads are successfully transferred from the hitch plate to the Cylinders when all Nuts have been lifted off their springs.

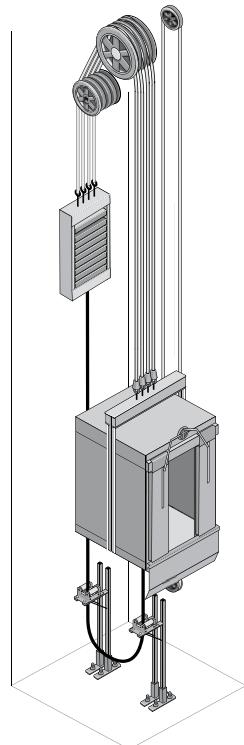
**NOTE: Stop and review Step 20 should any Piston reveal a red line during pumping.**



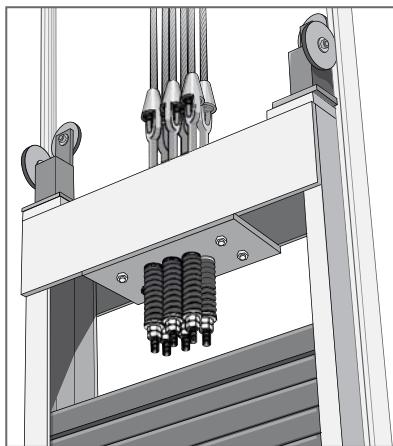
**Once all Nuts have been lifted off their springs, place the provided Adjustment Key into the Nut Collar opening and run the Shackle Rod Adjustment Nut back against the top of the springs using the Adjustment Collar Key. Then run the remaining Adjustment Nuts down with your fingers. Return to Step 23 to finish the process.**

## Using RLE In A 1:1 Installation (should installation design and clearance permit)

**1**



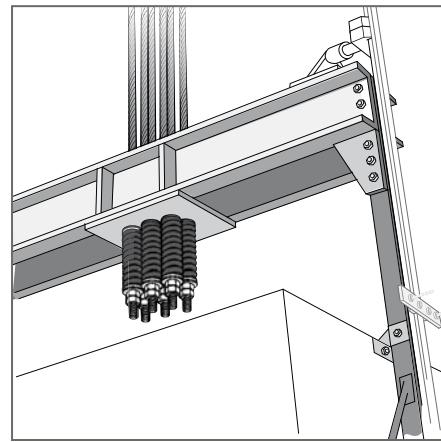
**A.(favored car position for 1:1 usage)**



**B. Counterweight shackles**

Follow all safety precautions when accessing the crosshead area on top of the car, or the shackles positioned in the counterweight frame at the rope hitch plate.

In a 1:1 installation we recommend that RLE be used **with the car parked at the bottom landing (see A)**. Optionally RLE may be used with the car parked midway in the hoistway to permit access to the counterweight side shackles. However this way may require the user to take the additional step of moving the car with the RLE still attached to the counterweight. Great care must be taken to avoid any damage to the RLE unit and in securing worker safety. To use RLE in a 1:1 installation simply repeat the steps detailed in a 2:1 installation.



**C. Crosshead shackles**

### PROCEDURAL NOTE

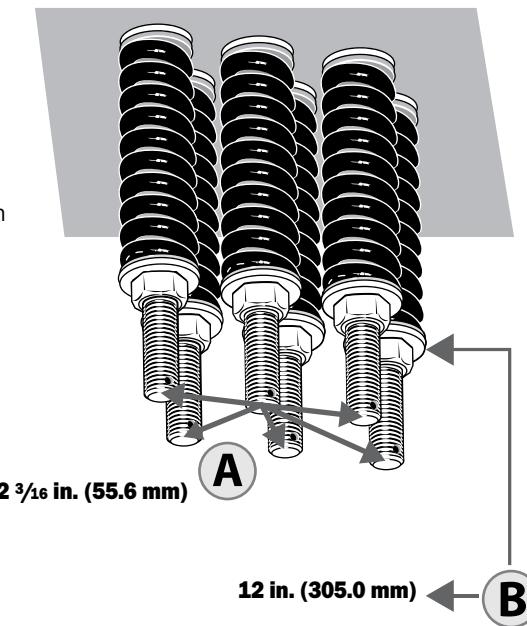
The critical differences between 2:1 and 1:1 procedures are:

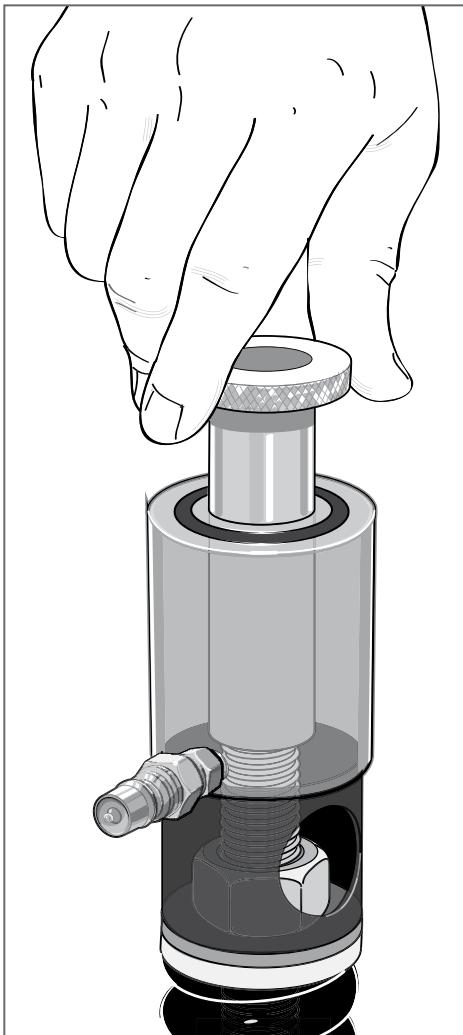
- the natural change in vertical orientation of all RLE components from 2:1 to a 1:1 installation design
- the mechanic installs the RLE cylinders on the **shackles extending beneath the counterweight rope hitch plate (see B)** or onto the **crosshead shackles above the car (see C)**, instead of using the hitch plate in the machine room as with 2:1.

**2**

**In order to successfully use Brugg RLE to equalize ropes in a 1:1 installation it is crucial that one have a sufficient center-to-center spacing of  $2\frac{3}{16}$  in. (55.6 mm) between rope shackle rods and a minimum clearance of 12.0 in. (305.0 mm) between shackle washer and the closest obstruction below.**

One should be able to position the pressure pump within convenient access of the shackle rods so as to not stretch or twist pressure hoses.





## User Notes:

- The pump is preset to its maximum operating pressure. Any attempt to alter settings, or substituting another pump for device use, voids product warranty and will create a safety hazard.
- The RLE pump fill cap has a vent function. During usage the reservoir must be vented to avoid a vacuum being created within the reservoir, as this will hinder pump operation. Be sure that the fill/vent cap is closed prior to placing the pump back into the RLE case.
- Periodically check oil levels but never drain the pump completely. Only refill the reservoir with AW32 Hydraulic oil.
- Store all components in the RLE Case until needed and replace after use.
- Never disconnect Pressure Couplings under pressure.

• Do not use tools to adjust Thread Adapters, loosen fittings or work on the Cylinders. RLE is not designed to be user serviceable. Any action by parties other than a designated Brugg representative to adjust, augment or otherwise alter the physical integrity of the RLE device from its initial manufacture voids warranty and can create a safety hazard.

• Use only the appropriate Thread Adapter for the required shackle rod. It is improper to thread an M20 onto a 3/4 in. Shackle. To handle Shackles with diameters larger than 3/4 in. or M20, or installations where Shackles are spaced tightly together, (e.g., closer than 55.6 mm or 2 3/16 in.) ask your Brugg representative for details on the RLE Option Plus or RLE Limited Space Kit.

## RLE Maintenance:

RLE requires little maintenance other than wiping occasionally with a clean cloth. Never clean RLE with solvents or expose components to water. Check fluid levels periodically. Should the RLE reservoir run low on hydraulic fluid refill only with AW32 hydraulic oil.

Avoid rough handling and do not use tools to tighten or adjust Adapters or Thread Couplings.

## Troubleshooting:

### Problem

**Hose Couplings will not connect or disconnect.**

### Cause

1. Pressure on system.

### Solution

1. Ensure system is at zero pressure prior to connecting or disconnecting all Hoses (*Turn Pump Valve counterclockwise to depressurize system*).

**Threaded Inserts will not connect.**

1. Insert threads damaged.

1. Call Brugg for replacement.

2. Shackle Rod threads damaged or fouled.

2. Ensure Shackle Rod threads are clean, not fouled or damaged. Rethread Shackle Rod again.

3. Wrong sized threaded insert,  
e.g. 3/4 —10 on M20 Shackle Rod.

3. Check Shackle Rod thread size and replace with correct insert.

## Troubleshooting:

| <b>Problem</b>  | <b>Cause</b>   | <b>Solution</b>  |
|---|--|--|
| <b>Fluid pools beneath Hose.</b><br><small>(Note: A small amount of coupling leakage is normal)</small>   | 1. Hose damaged/punctured.   | 1. Contact Brugg for a Replacement Hose should you suspect serious leakage. (Proper size/ pressure rating is important).   |
| <b>Pump Unit leaks fluid.</b>   | 1. Pump reservoir has been overfilled.<br><br>2. Fill/Vent Plug has been loosened.<br><br>3. Pump Seals are leaking.   | 1. Only refill or top off reservoir after all fluid has been returned from all Cylinders.<br><br>2. Tighten fill/vent plug prior to storage/transport.<br><br>3. Call Brugg for repair or replacement.   |
| <b>Pumping action reaches yellow or red mark on cylinder piston.</b>  | 1. Cylinder near, <b>or at maximum stroke (red).</b>   | 1. Run Adjustment Nuts back down against the Shackle Springs, release pressure, and thread all Threaded Inserts down so that they are again even with the top of the cylinders (See Step 20).  |
| <b>Repeated pumping results in at least one Adjustment Insert consistently not moving or inserts showing yellow (caution) or red levels (maximum stroke).</b> | 1. Rope still loose.<br><br>2. Spinout rope too tight.<br><br>3. RLE device action movement is being impeded with.<br><br>4. Hose Coupling is not fully connected to cylinder. | 1. Continue procedure.<br><br>2. Obstruction impedes movement of shackles.<br><br>3. Examine installation area to ensure that shackles are not hanging up on any floor penetration, or machine beams, and all shackles are free to lift individually.<br><br>4. Depressurize system and recouple Hose to Cylinder. |

## RLE Product Warranty

### Warranty Conditions:

- a. **Brugg RLE (Rope Load Equalizer) is warranted to be free from defects in material and workmanship for one year commencing on the date the invoice is submitted by Brugg Lifting to the customer by mail.**
- b. **The manufacturer's sole and exclusive obligations and liabilities under this warranty are and shall be limited to issuance of credit for, or repair or replacement of this device which proves to be other than as warranted, and Brugg shall have sole discretion as to which of these remedies it shall provide. Brugg shall not reimburse or make any allowance to buyer for any labor charges incurred by buyer for replacement, adjustment, or repair any goods or parts thereof or for any other work unless Brugg authorizes such charges in advance in writing.**
- c. **If this device's warranty has not expired and it is claimed to be defective in material or workmanship, Brugg shall, in its sole discretion, issue shipping instructions for return of the device to Brugg. The buyer shall prepay all transportation charges for such return. Any claim for breach of Brugg RLE's warranty shall conclusively be deemed to be waived within ten (10) days after the date on which the claimed defect is discovered.**
- d. **The Brugg RLE warranty shall be null and void if the original buyer transfers ownership of the warranted goods, unless Brugg is notified in writing of the transfer and of the name and address of the new owner within fifteen (15) days after the date on which transfer is made.**
- e. **Brugg RLE warranty shall not apply if the device has been subjected to any misuses, neglect or accidental damage or which contain defects that are in any way attributable to improper repairs or alterations made or performed by any person or entity not under the control of Brugg.**

## RLE Product Warranty

- f. The warranties set forth herein are Brugg's sole and exclusive warranty for or relating to this device. Brugg neither makes nor assumes any warranty of merchantability, any warranty of fitness for any particular purpose, a warranty that the goods shall be delivered free of the rightful claim of any third person by way of infringement or the like, or any other warranty of any kind, express, implied, or statutory.
- g. Brugg neither assumes nor authorizes any person or entity to assume for it any other liability or obligation in connection with the sale or use of this product, and there are not oral agreements or warranties collateral to, or affecting the sale of the goods.
- h. Brugg RLE's warranty, obligations and liabilities and buyers remedies set forth herein are limited to their precise terms. Brugg shall not be liable of any damages of any kind, including without limitation, special, incidental, or consequential damages, for, resulting from, or in connection with any breach of warranty. The obligations and liabilities of seller and the remedies of buyer's set forth herein shall be the buyers sole and exclusive remedies for, resulting from, or in connection with the breach of the warranty of the RLE device.

### Definition of Limitations:

The Brugg RLE is a hoist rope tension equalization tool rated for normal industrial use when following prescribed operational procedures. Brugg assumes no responsibility for damages to surrounding machineries through the use of Brugg RLE, or from improper use or inaccurate operator utilization. Brugg RLE should only be utilized by trained professionals and is only one part of a maintenance procedure and in no way eliminates the necessity of examining surrounding components, lubrication, or other understood industry rope wear factors.

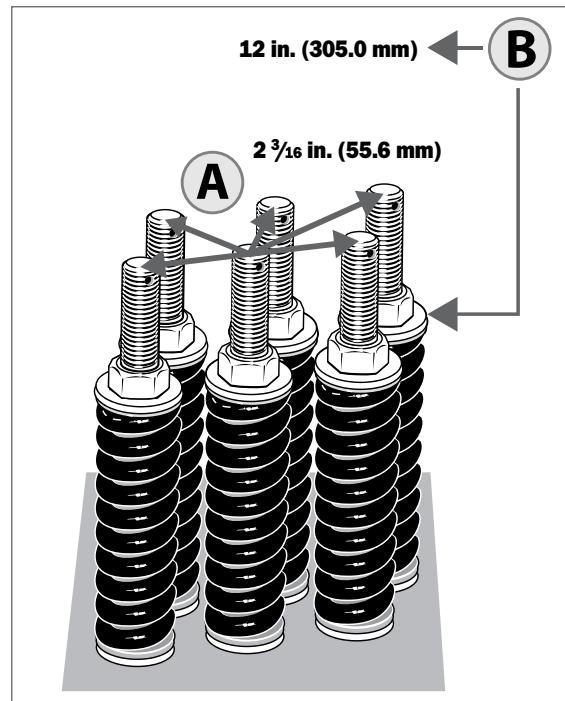
## Important Note

### Minimum Spatial Requirements:

To use Brugg RLE successfully in a **2:1 system (Drawing 1)** one must have sufficient center-to-center spacing of **2 3/16 in. (55.6 mm)** between rope shackle rods, and a minimum overhead clearance of **12.0 in. (305.0 mm)** between shackle washer and the nearest obstruction above.

Such spacing is commonly found in 2:1 systems and is occasionally provided for in 1:1 systems. However, should system demands require special adjustments in RLE components in order for it to better fit your system's design, please call your Brugg representative.

### RLE Minimum Clearance Requirements



**2:1 Installation**

**Brugg Lifting** · Rome, GA USA  
+1 706 235 6315 · [www.bruggrope.com](http://www.bruggrope.com)

**Brugg Lifting** · Birr, CH  
+41 56 464 42 42 · [www.brugglifting.com](http://www.brugglifting.com)

**Brugg Lifting** · Dubai UAE  
+9714 887 6991 · [www.brugglifting.com](http://www.brugglifting.com)

**Brugg Lifting** · P.R. China  
+86 512 6299 0779 · [www.brugglifting.com](http://www.brugglifting.com)