

**MOVOTEC<sup>®</sup>**  
**Crank Driven “Bolt-On”**  
**Lift System Manual**

by  
**SUSPA<sup>®</sup>**



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Suspa<sup>®</sup> Incorporated

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## **2.0 Introduction**

Thank you for purchasing the Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System.

For over twenty years, Movotec<sup>®</sup> systems have been used on industrial workbenches, small machine bases, physical therapy equipment, massage tables, office furniture, biological and chemical vented hoods, autopsy and necropsy tables, sewing machine bases, home healthcare beds, packaging equipment, custom yachts, and many other applications.

## **3.0 Safety Instructions**

**READ THE INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO INSTALL, OPERATE, OR SERVICE THIS PRODUCT. FOLLOW THESE SAFETY INSTRUCTIONS AT ALL TIMES.**

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This manual contains safety, installation, operation, maintenance, and user service instructions for the Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System. Suspa<sup>®</sup> Incorporated is not responsible for any alteration, misuse, misapplication, or abuse of this product resulting in property damage, personal injury or death.

** WARNING FAILURE TO FOLLOW THE INSTRUCTIONS IN THIS MANUAL COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

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If you have any questions about the use of this product, the safety practices outlined in this manual or would like a digital copy of this manual, please contact us (see **Section 15** for contact information).

**VERIFY SYSTEM SELECTION.** Before the installing or operating the system, please review the application to confirm that the correct Movotec<sup>®</sup> Lift System has been selected. Pay particular attention to the load capacity and adjustment range ratings listed on the blue product label.

**HANDLE COMPONENTS WITH CARE.** Do not handle system by the hydraulic tubing. Keep hydraulic tubing far from heat, sharp edges, and moisture. If hydraulic tubing is damaged, discontinue use and have the tubing replaced immediately. Do not ever attempt to repair a damaged hydraulic tubing line.

**VISUALLY INSPECT COMPONENTS.** Before installing and operating the system, inspect all components for any damage that may have occurred during shipping and installation. Do not attempt to disassemble system or system components for any reason. If a defective component is found, contact Suspa<sup>®</sup> Incorporated for repair or replacement.

**USE OF TRAINED AND QUALIFIED PERSONNEL** System installation, operation, and repair should only be done by persons having sufficient knowledge of the lift system and the contents of this manual. In addition, they must have an understanding of all warnings and precautionary measures noted in these safety instructions.

**AVOID HAZARDOUS ENVIRONMENT.** Do not operate the system outside. Do not expose the system to damp or wet conditions. Avoid any chemical or corrosive environments. Do not operate the system in the presence of flammable solvents, propellants, and/or explosive materials (i.e. gas, vapor, dust, etc.) Avoid temperatures outside of the system rated operating temperature range 41° to 113°F (5° to 45°C). Do not subject lift system components to vibration and/or impact load conditions.

**INSTALLATION SAFEGUARDS.** Do not use the system for any purpose other than its intended function. Before operating system, make sure that the workstation has a minimum clearance of 2 in. (51mm) from any other object or structure to prevent pinching or crushing hazards. Do not allow wall, cabinet, electrical lines, hydraulic or pneumatic lines, or any other fixed structures to obstruct the movement of the workstation during operation.

**KEEP CHILDREN AWAY.** It is not recommended that children operate this lift device. If this device is used by or near children, close supervision is absolutely necessary.

**USE OF ACCESSORIES.** Use only spare parts and accessories authorized or supplied by Suspa® Incorporated. Do not replace or replenish lift system hydraulic fluid unless the fluid is supplied by Suspa® Incorporated.

**MAINTENANCE SAFEGUARDS.** Prior to performing any maintenance or service on the device, remove the load from all lift cylinders. The workstation or structure that the lift system is attached to should be stabilized to prevent personal injury or property damage during maintenance or service procedures.

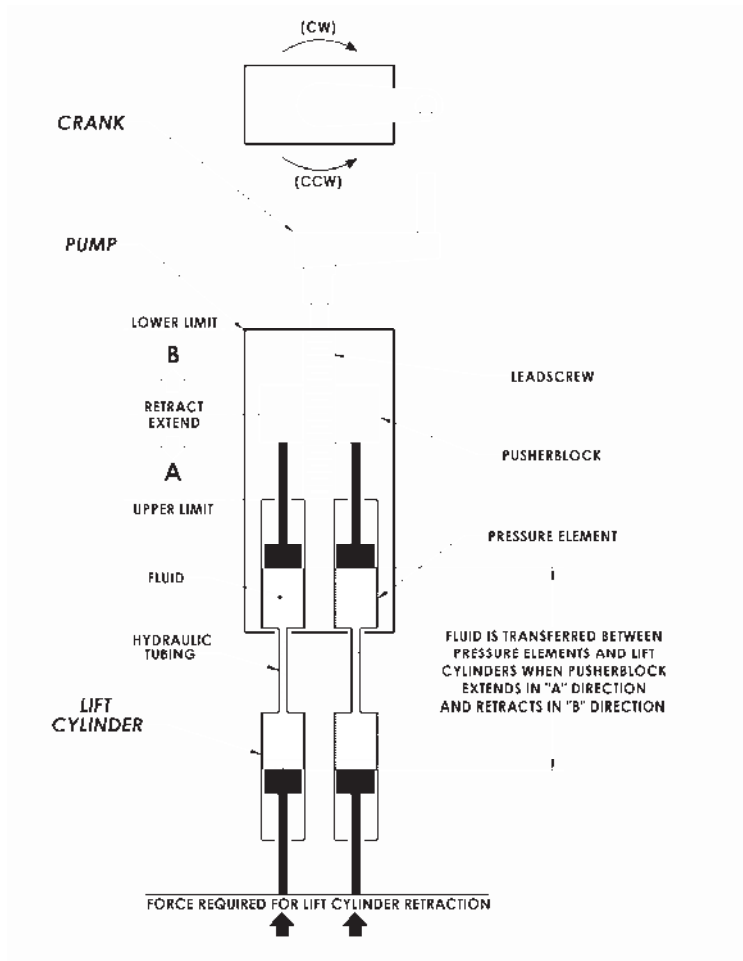
**RETRACT SYSTEM BEFORE MOVING.** To reduce the risk of property damage and personal injury, always retract the lift system fully before moving the equipment.

**UNPLUG BEFORE CLEANING.** Retract the lift system before cleaning components. Clean system components with a mild soap and water-damped cloth. Do not use corrosive cleaning agents or high pressure wash systems to clean lift system components. Make sure system is clean and dry before operating the system.

**SAVE THIS MANUAL FOR FUTURE REFERENCE.**

## 4.0 How it Works

Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift Systems are comprised of three major component subsystems; the crank, the pump, and the lift cylinders. This section will explain how each subsystem works together to make the lift system extend and retract.



**Movotec<sup>®</sup> Crank Driven Schematic**

### 4.1 Extension Cycle

The crank is mechanically coupled to the pump leadscrew shaft. When the crank is rotated in a clockwise (CW) direction, the leadscrew shaft rotates in the same (CW) direction. As the crank continues to rotate in a (CW) direction, the threaded pusherblock moves up the leadscrew in the direction of arrow “A”. This action drives fluid from the pressure elements, through the hydraulic tubing, and into the lift cylinders causing them to extend. As the cylinder load increases, the force required to rotate the crank increases. Generally speaking, the crank force required to extend the system will always be greater than the crank force required to retract the system. It is also important to note that when

the pump has reached its upper limit, the user will feel increased resistance at the crank handle.

#### **4.2 Retraction Cycle:** (Refer to **Movotec<sup>®</sup> Crank Driven Schematic** on page 6)

The crank is mechanically coupled to the pump leadscrew shaft. When the crank is rotated in a counter-clockwise (**CCW**) direction, the leadscrew shaft rotates in the same (**CCW**) direction. As the crank continues to rotate in a (**CCW**) direction, the threaded pusherblock moves down the leadscrew in the direction of arrow “**B**”. As long as there is sufficient load on the lift cylinder piston rods, the fluid in the lift cylinders flows back through the hydraulic tubing and into the pressure elements. It is important to note that the user will feel increased resistance at the crank handle when the pump has reached its lower limit.

### **5.0 Unpacking Instructions**

The system comes packaged in a cardboard carton. To unpack the system:

- Check the carton label to confirm that you have received the correct system; open the carton and remove packaging material.
- Carefully remove the system from the carton, and verify all components are present (reference chart below), and that the correct lift system was received.

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Do not handle the lift cylinders and motorized pump by the hydraulic tubing. Incorrect handling of hydraulic tubing could weaken the tubing material and system tubing connections.



**WARNING**

**DAMAGE TO TUBING OR TUBING CONNECTIONS  
COULD CAUSE FLUID LOSS AND UNCONTROLLED  
DESCENT OF THE WORK-SURFACE.**

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- Verify that all of the listed components are present; carton should contain:



System Component	Quantity
<b>(A) Crank Driven Pump</b>	1
<b>(B) Lift Cylinders</b>	4
<b>(C) Drill Templates</b>	4
<b>(D) Cable Ties</b>	8
<b>(E) Mounting Clips</b>	8

- If the lift system is damaged or any component is missing, please contact Suspa<sup>®</sup> Incorporated to resolve the issue.
- Dispose of the all packaging materials in an ecologically sound manner; if uncertainty exists with regards to disposal / recycling details, please contact Suspa<sup>®</sup> Incorporated.

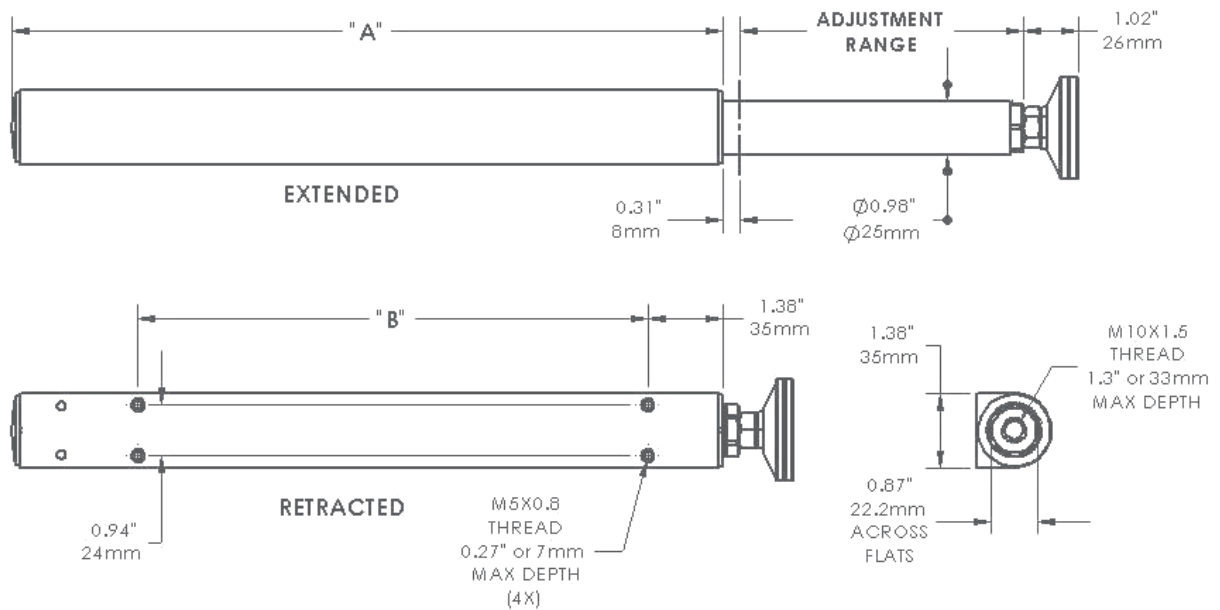
## 6.0 Lift System Specifications

The "A", "B", "X", and "Y" dimensions shown in the table and drawings below vary depending on the system lift capacity and the adjustment range of the selected system.

Lift System Part Number	Adjustment Range (in/mm)	System Lift Capacity (lb/kg)	CB "Bolt-On" Cylinder		Crank Driven Pump	
			"A" (in/mm)	"B" (in/mm)	"X" (in/mm)	"Y" (in/mm)
MLS-00001	6.1 / 155	750 / 340	10.2 / 258.5	6.49 / 165	11.50 / 292	10.87 / 276
MLS-00002	7.7 / 195	750 / 340	13.1 / 333.5	9.45 / 240	13.86 / 352	13.23 / 336
MLS-00003	11.8 / 300	750 / 340	18.3 / 463.5	13.39 / 340	18.58 / 472	17.95 / 456
MLS-00004	15.7 / 400	750 / 340	22.0 / 558.5	13.39 / 340	23.39 / 594	22.76 / 578
MLS-00005	5.9 / 150	1000 / 454	10.2 / 258.5	6.49 / 165	13.86 / 352	13.23 / 336
MLS-00006	9.1 / 230	1000 / 454	18.3 / 463.5	13.39 / 340	16.22 / 412	15.59 / 396
MLS-00007	12.0 / 305	1000 / 454	18.3 / 463.5	13.39 / 340	23.39 / 594	22.76 / 578
MLS-00008	15.7 / 400	1000 / 454	22.0 / 558.5	13.39 / 340	28.43 / 722	27.80 / 706

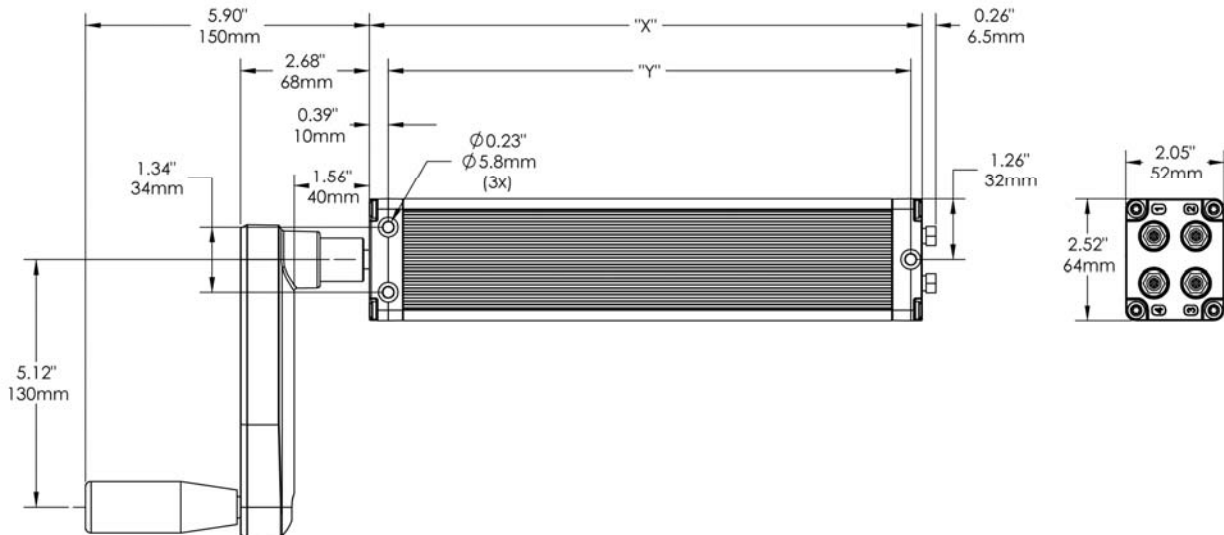
### 6.1 Lift Cylinder Specifications

CB4xx cylinders are rated for a maximum load of 250lb (113.4kg) each.





**6.2 Crank Driven Pump Specifications** (Refer to Chart on Page X for “X” and “Y” dimensions)



**6.3 Regulatory Information**

**RoHS Directive (2002/95/EC)**

Suspa<sup>®</sup> Incorporated has examined all of the materials and processes utilized in the production of Movotec<sup>®</sup> lift systems and has determined that this product is in compliance with the European Union RoHS Directive 2002/95/EC.

## **7.0 Installation Instructions**

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**FOLLOW ALL SAFETY INSTRUCTIONS CONTAINED IN SECTION 3.0 OF THIS MANUAL BEFORE INSTALLING THIS PRODUCT. FAILURE TO FOLLOW THE INSTRUCTIONS IN THIS MANUAL COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

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### **7.1 System Component Placement**

Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System components are physically linked together with hydraulic tubing. Therefore, it is very important to make sure that the system components are located on the workstation so that each component can be installed safely without damaging the hydraulic tubing. It is also important to make sure that the crank has enough clearance to rotate freely beyond the work surface.

**7.1.1 Crank Driven Pump Placement** - The crank driven pump can be installed in any orientation, however it is recommended to mount the unit horizontally. The pump should be installed so that there is enough hydraulic tubing to reach each lift cylinder and enough clearance for the minimum hydraulic tubing bend radius of 2 in. (51mm) to be maintained. The crank should be located near the edge of the work-surface. Suspa<sup>®</sup> Incorporated offers other cranks and crank hardware options which can be purchased on our website at <http://movotec.com> .

**7.1.2 Lift Cylinder Placement** – The lift cylinders should be located on the workstation so that the load on the system is balanced. Lift cylinders must also be oriented vertically and parallel to one another to prevent cylinder binding during extension and retraction cycles. Suspa<sup>®</sup> Incorporated offers an assortment of brackets to reduce the number of holes to be drilled for lift cylinder mounting and to facilitate system installation. These cylinder mounting brackets can be purchased on our website at <http://movotec.com> .

**7.1.3 Hydraulic Tubing Placement** – Hydraulic tubing must be kept away from sharp edges and moving parts. Contact with moisture and heat must also be avoided. Hydraulic tubing should be fixed to the workstation or structure using the cable ties and mounting clips provided. Additional cable ties and mounting clips can be purchased on our website at <http://movotec.com> .

## **7.2 Crank Driven Pump Installation**

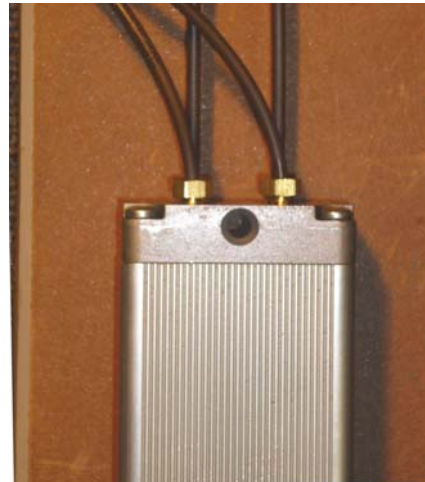
- If possible, orient workstation as shown for ease of component placement and installation.



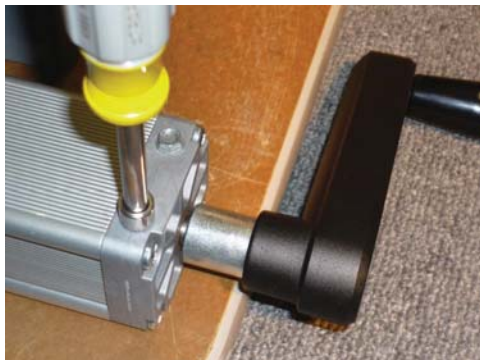
- Place crank driven pump in the desired location, making sure sufficient clearance exists for the crank to rotate freely beyond the work-surface.



- Mark and prepare three holes in the locations provided in the pump front and rear mounting plates.



- Mount the crank driven pump to the work-surface. Please note that mounting screws are not provided with system.



- Check mounting screws to ensure that the unit is tightly secured.

### **7.3 Lift Cylinder Installation**

- Unwrap lift cylinders and drilling templates from bubble wrapping. Dispose of bubble wrapping material in an ecologically sound manner.



- Thoroughly clean all workstation leg surfaces to ensure the cylinder drilling templates will adhere. Apply the drilling templates parallel to the workstation leg surfaces, making sure that the templates are oriented correctly.

- Please note that the drilling templates are shown upside down due to the orientation of the workstation.



## NOTICE

Lift cylinder mounting hole locations vary depending upon the lift cylinder model number. The lift cylinder model number can be found on the product label. “Bolt-On” lift cylinder model numbers begin with “CB” (i.e. CB431).

Lift cylinder mounting instructions can also be found printed on the drilling templates provided with the system.

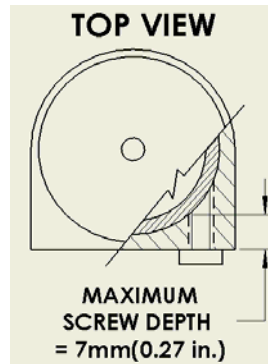
- Drill (4) - 6mm holes in the appropriate locations indicated on each drill templates.



- Select cylinder mounting screws with a property class of 8.8 or greater.

**NOTICE**

To avoid lift cylinder damage, the screw depth must not exceed 7mm (0.27 in.) into the lift cylinder housing as shown below.



- Install each cylinder to the workstation frame using (4) - M5 screws of the appropriate length. Suspa<sup>®</sup> Incorporated recommends a lift cylinder mounting screw thread engagement of 0.196-.0275in. (5-7mm).
- Ensure that there is enough flexible hydraulic tubing to reach each workstation leg without putting any tension on the tubing and while maintaining the minimum flexible tubing bend radius of 2in. (51mm). Each system is shipped with hydraulic tubing cut-to-length and assembled to the unit, (2) lengths at 8.2 ft. (2.5m), and (2) lengths at 10.2 ft. (3.1m).



- Check the lift cylinder mounting screws to ensure that they are tightly secured to the workstation. Take special care not to over tighten lift cylinder mounting screws. Suspa<sup>®</sup> Incorporated recommends a lift cylinder mounting screw tightening torque of 4.0-4.5 N-m (35-40 lb-in).

## **7.4 Hydraulic Tubing Management**

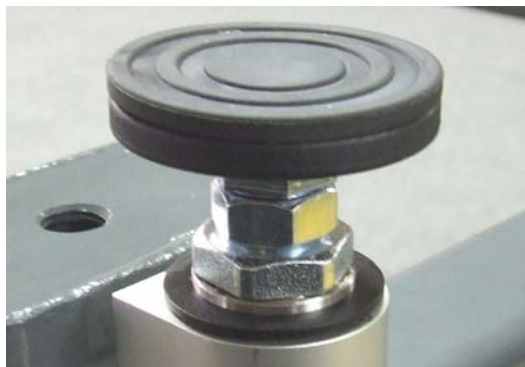
- Coil up excess hydraulic flexible tubing into approximately 6 in. (150mm) diameter coil(s) and attach to the workstation using the mounting clips and/or cable ties. Take special care not to damage flexible tubing during this operation.



- While it is recommended to coil up excess tubing when hydraulic tubing lengths are too long, the lines can be shortened. Contact Suspa<sup>®</sup> Incorporated for detailed Movotec<sup>®</sup> Tube Shortening Instructions.
- If hydraulic tubing lengths are too short, it is only possible to make the tubing lengths longer by replacing the line, using a Movotec<sup>®</sup> Refill Kit. Contact Suspa<sup>®</sup> Incorporated for a more information and instructions.
- Check flexible tubing to ensure it is secured to the workstation and that no damage has been sustained during this operation.

## **7.5 Workstation Leveling**

- Thread glide into all lift cylinders until the glide threads are fully engaged as shown. This step will provide a good starting point for leveling the workstation.



- Re-orient the workstation so that the glides are in contact with the floor as shown.

**NOTICE**

To prevent damage from occurring to the system, take special care not to drop the workstation onto the lift cylinders

- Place a level on the top of the work-surface. Unthread glide(s) from the lift cylinder(s) as needed to achieve a level work-surface. Once the workstation is level, tighten the lock nut on all four glides to ensure the workstation will remain level during use.





## **8.0 Operation Instructions**

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### **⚠ WARNING**

**FOLLOW ALL SAFETY INSTRUCTIONS CONTAINED IN SECTION 3.0 OF THIS MANUAL BEFORE OPERATING THIS PRODUCT. FAILURE TO FOLLOW THE INSTRUCTIONS IN THIS MANUAL COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

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Movotec<sup>®</sup> systems can lift relatively large loads, lasting for many years, as long as they are installed and used correctly. The Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System is not intended for continuous cycling or for applications requiring precision height adjustment.

### **NOTICE**

The Movotec<sup>®</sup> lift system is single-acting and will require a minimum load of 35 lb (15.9 kg) per cylinder for even lift system retraction.

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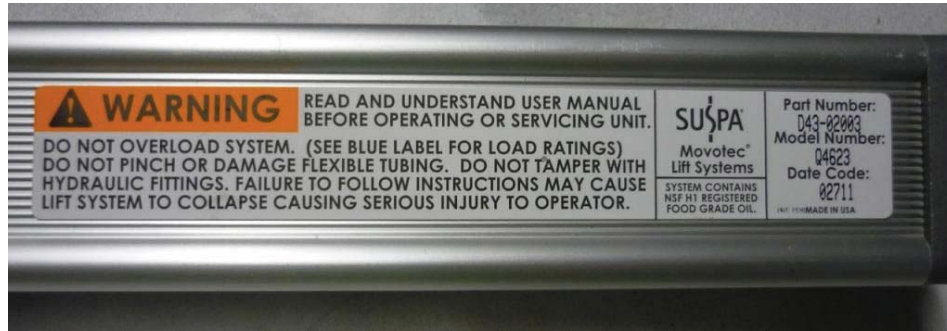
### **8.1 Before Loading the Workstation**

- Check all hydraulic connections.
- Check for damage to flexible hydraulic tubing that may have occurred while unpacking or installing the system.
- Check all system components to ensure that they are tightly secured to the workstation.
- Confirm that a minimum load of 35 lb (15.9 kg) per cylinder is present for even lift system retraction.
- Confirm the maximum system load is not being exceeded. The maximum system load is the total load including the workstation being lifted and anything on top of the work-surface.

**WARNING**

If the lift system does not operate as explained in Section 4.0 of this manual, remove the load from the system immediately and contact Suspa<sup>®</sup> Incorporated technical support.

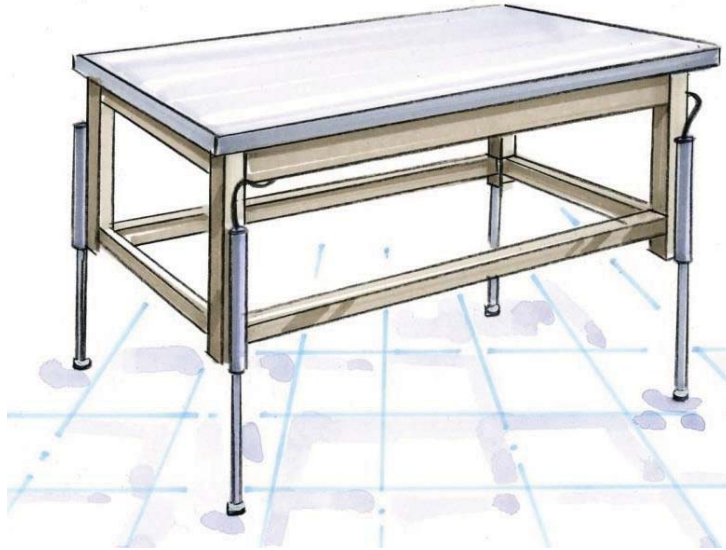
If technical support is needed, or any questions exist before operation, system information can be found using the product labels located on the side of the pump (reference photographs below).

**NOTICE**

Do not dismantle the system unless authorized by Suspa<sup>®</sup> Incorporated. Attempting to repair the system or system components without authorization from Suspa<sup>®</sup> Incorporated voids the warranty.

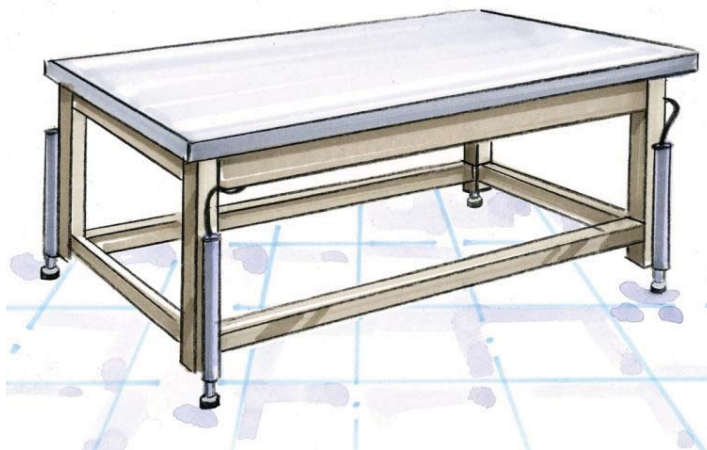
## **8.2 System Extension Cycle**

Rotate crank in the clockwise (**CW**) direction. Continue rotating the crank in the (**CW**) direction until the workstation has reached the desired height or the upper limit is reached.



## **8.3 System Retraction Cycle**

Rotate crank in the counter-clockwise (**CCW**) direction. Continue rotating the crank in the (**CCW**) direction until the workstation has reached the desired height or the lower limit is reached.



#### **8.4 Stowing the Crank**

When not in use, the folding handle can easily be stowed inside the crank body.

Pull crank grip outward until crank mechanism begins to fold.



## **9.0 Troubleshooting**

Many system problems can be attributed to system load conditions or incorrect mounting hardware usage. In most cases, problems can be solved by reviewing the following possible system problems, possible causes, and implementing the recommended solutions.

**Problem:** Crank turns but does not extend or retract system.

<b>Possible Causes</b>	<b>Recommended Solutions</b>
Crank not fully engaged	Ensure crank handle is fully installed on to pump shaft.
Broken Pusher Block	Contact Suspa <sup>®</sup> Incorporated for replacement pump.

**Problem:** Crank is difficult to turn.

<b>Possible Causes</b>	<b>Recommended Solutions</b>
Upper or Lower Limit Reached	Stop rotating crank.
Workstation movement is obstructed by fixed object(s)	Provide clearance between workstation and obstruction.
System Load is High or Load Rating is exceeded	Verify system load does not exceed rating and remove weight as needed.

**Problem:** Uneven lift cylinder retraction.

<b>Possible Causes</b>	<b>Recommended Solutions</b>
Insufficient Lift Cylinder Load	Add load to system. Contact Suspa <sup>®</sup> Incorporated for tube shortening instructions.
Cylinder Mounting Screws Too Long	Reduce cylinder mounting screw length.
Flexible Tubing Lengths Too Long	Contact Suspa <sup>®</sup> Incorporated for tube shortening instructions.

## **10.0 Inspection and Maintenance**

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**FOLLOW ALL SAFETY INSTRUCTIONS CONTAINED IN SECTION 3.0 OF THIS MANUAL BEFORE PERFORMING INSPECTION AND MAINTENANCE PROCEDURES ON THIS PRODUCT. FAILURE TO FOLLOW THE INSTRUCTIONS IN THIS MANUAL COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

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The Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System should be inspected regularly to detect any condition which has or may lead to excessive component wear or premature failure. Special attention should be given to the following possible causes of system failure.

### **10.1 Changing Load Conditions**

Overload conditions should be promptly corrected to prevent premature wear of mechanical components. This will also prevent overheating and premature failure of electrical components.

### **10.2 Contamination**

Although surgical cleanliness is not required, ordinary cleaning practices will pay off in increased service life of the lift system. Dust and dirt can restrict ventilation for electrical components and cause wear in moving components such as shafts and bearings. An attempt should be made to keep the system components reasonably clean throughout their useable service life.

### **10.3 Hydraulic Tubing Damage**

Check the hydraulic tubing for visible signs of aging and wear. Replacement of damaged hydraulic tubing will prevent future breakdowns and possible injury to personnel.

## **11.0 Warranty**

Suspa<sup>®</sup> Incorporated warrants that if the Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System has been properly installed and not subject to abuse or misuse and proves to be defective (as defined below) within the Applicable Warranty Period after the date of manufacture of the item by Suspa<sup>®</sup> Incorporated or, if applicable, by Suspa<sup>®</sup> Incorporated’s supplier and if the Buyer returns the item to Seller within that period, F.O.B. Suspa<sup>®</sup> Incorporated’s plant in Grand Rapids, Michigan, then Suspa<sup>®</sup> Incorporated shall, at Suspa<sup>®</sup> Incorporated’s option, either repair or replace the defective item, at Suspa<sup>®</sup> Incorporated’s expense. If Suspa<sup>®</sup> Incorporated fails to repair or replace a defective item within a reasonable time, then Suspa<sup>®</sup> Incorporated shall be liable to the Buyer for the lesser of (1) the reasonable costs of repair or replacement by a third party or (2) that part of the purchase price of the defective goods that the Buyer shall have paid, but the Buyer shall not obtain repair or replacement by a third party without giving Suspa<sup>®</sup> Incorporated at least fifteen (15) days prior written notice, during which time Suspa<sup>®</sup> Incorporated may repair or replace the defective item. An item shall be considered “defective” if Suspa<sup>®</sup> Incorporated finds that it is defective in materials or workmanship and if the defect materially impairs the value of the goods to the Buyer, except that if the Buyer shall have approved drawings of, or specifications for, or production samples of the goods, then the goods shall not be defective to the extent that they conform to the drawings, specifications, or samples. This paragraph sets forth the Buyer’s sole and exclusive remedies for any defect in the goods. The Applicable Warranty Period for the Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System is two years.

**EXCEPT AS STATED IN THE PREVIOUS PARAGRAPH, SUSPA<sup>®</sup> INCORPORATED DOES NOT MAKE ANY WARRANTY AS TO THE GOODS AND, IN PARTICULAR, DOES NOT MAKE ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND THE BUYER IS SOLELY RESPONSIBLE FOR DETERMINING THE PROPER APPLICATION AND USE OF THE GOODS.** Suspa<sup>®</sup> Incorporated shall not have any tort liability to the Buyer with respect to any of the goods and shall not be liable for consequential or incidental damages that arise from any product defect, delay, nondelivery, or other breach. The Buyer shall not have any right of rejection or of revocation of acceptance of Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift System products.

If you have any questions regarding the warranty or believe that you have received a defective component, please contact Suspa<sup>®</sup> Incorporated.

## **12.0 Replacement Parts**

Contact Suspa<sup>®</sup> Incorporated if the system has sustained any damage during shipping or installation. Suspa<sup>®</sup> Incorporated can help determine whether the system can be serviced with replacement parts or if the entire system should be replaced. Before contacting Suspa<sup>®</sup> Incorporated, please have the system part number, system model number, and date code ready, which can be found on the blue product label affixed to the side of the pump (as shown below):



## **13.0 Optional Accessories**

Suspa<sup>®</sup> Incorporated offers many optional accessories for customizing Movotec<sup>®</sup> Crank Driven “Bolt-On” Lift Systems which include:

- Lift cylinder mounting brackets
- Special folding cranks
- Hydraulic tube shortening instructions
- System refill kits

Please contact Suspa<sup>®</sup> Incorporated or view our website for more detailed information.

## **14.0 Disposal**

Dispose of the lift system components in an ecologically sound manner, separating plastic, mechanical components, and hydraulic fluid. Fluid disposal instructions for Movotec<sup>®</sup> NT15 hydraulic fluid can be found on our Material Safety Data Sheet (MSDS) document which is available upon request.

## **15.0 Contact Information**

SUSPA Incorporated  
 3970 Roger B. Chaffee Drive SE  
 Grand Rapids, MI 49548-3497  
 Phone: (616) 241-4200  
 Fax: (616) 241-4347  
[www.suspa.com](http://www.suspa.com)

