

UNILIFT™

PALLET TRANSPORTER & POSITIONER

Bishamon®



SERVICE MANUAL

For Serial Numbers 1110804 to Current

Model UNI-20

Patents

United States	8,376,089
China	ZL200780049482.8
Korea	10-1244363

Other Patents Pending



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GETTING STARTED

PLEASE READ THIS MANUAL CAREFULLY BEFORE USING THE UniLift™ Pallet Transporter and Positioner. The safety of all persons installing, using or servicing the UniLift™ is of utmost importance to Bishamon. The UniLift™ is capable of lifting heavy loads and is capable of causing SEVERE PERSONAL INJURY if used improperly or certain safety precautions are not taken. When properly used and maintained, the UniLift™ will provide many years of safe, trouble free service. If you have any questions about any of the instructions in this manual or about the use of this product, PLEASE contact your DEALER or Bishamon Industries Corporation.

UniLift™ is a trademark of Bishamon Industries Corporation. Throughout this service manual the UniLift™ may be referred to as the “Unit”, the “Lift” or the “Lifter”.

INSPECTION

IMMEDIATELY upon receipt of the palletized UniLift, visually inspect the unit for damage. Any damage to the unit MUST BE NOTED on the DELIVERY RECEIPT and photographed, if possible. Next, remove all packing and strapping material and thoroughly inspect the UniLift for any concealed damage that was not readily apparent during the preliminary inspection. Refer to the “Unpacking the UniLift” section of this manual for instruction on how to remove the unit from the pallet. Any concealed damage found that was not noted on the delivery receipt should be IMMEDIATELY reported in writing TO THE DELIVERING CARRIER.

OPERATOR SAFETY

Operator Training

Only trained and authorized personnel shall be permitted to operate a UniLift. User responsibilities, including “General Safety Practices” and “Operating Safety Rules and Practices”, are defined in ANSI/ITDF B56.10-2006 “Safety Standard for Manually Propelled High Lift Industrial Trucks”. It is the responsibility of the Owner/User to ensure compliance with this standard. Bishamon does not offer operator training. Operator training programs may be offered by your local Bishamon dealer or available online.

SAFETY DEFINITIONS

Bishamon uses the following system to identify the degree of risk associated with hazards and unsafe practices.

DANGER - Immediate hazard which will result in SEVERE PERSONAL INJURY or DEATH.

WARNING - Hazard or unsafe practice which could result in SEVERE PERSONAL INJURY or DEATH and PROPERTY DAMAGE.

CAUTION - Hazard or unsafe practice which could result in MINOR PERSONAL INJURY and PROPERTY DAMAGE.

DANGER

1. **READ THIS MANUAL COMPLETELY BEFORE USING THE UNILIFT. THOROUGHLY UNDERSTAND AND FOLLOW ALL SAFETY INSTRUCTIONS. DO NOT** operate the UniLift unless you have been trained and authorized to do so. All operators must understand and be familiar with the operation and function of all controls and indicators.
2. A falling load can cause **SEVERE PERSONAL INJURY** or **DEATH. NEVER** go under the loaded or unloaded forks. All maintenance should be performed with the unloaded forks in the fully lowered position or securely blocked in a raised position.
3. A falling load or tip-over can cause **SEVERE PERSONAL INJURY** or **DEATH. DO NOT** travel with the load elevated. **ALWAYS** travel with the outriggers retracted and the forks in the lowest position possible. **ALWAYS** ensure others are well clear of the UniLift when loads are raised or lowered. **DO NOT** use the UniLift on a slope, unlevel or unstable surface.
4. **NEVER** sit or stand on the forks. **NEVER** allow others to sit, stand or ride on the forks. Sudden movement could cause loss of balance resulting in **SEVERE PERSONAL INJURY** or **DEATH.**
5. Use extreme care when handling or working around batteries. Improper handling can cause **SEVERE PERSONAL INJURY** or **DEATH. ALWAYS** use eye protection and protective clothing when handling batteries. Batteries contain acid which can cause severe burns and injury. **NEVER** expose a battery to extreme heat, open flames or sparks. Battery vapors are explosive.
6. The UniLift is a NFPA truck type E. **DO NOT** use the lift in an area where potentially explosive dusts, gases or vapors may be present. Failure to comply may result in an explosion and cause **SEVERE PERSONAL INJURY** or **DEATH.**

WARNING

1. The UniLift is designed for use with stable, uniformly distributed, palletized loads on a solid, level and dry floor. **DO NOT** use the lifter for any purpose other than its intended use. Improper use could result in **SEVERE PERSONAL INJURY** and **PROPERTY DAMAGE. DO NOT** overload the UniLift. **NEVER** exceed the designated capacity and load center ratings. **ALWAYS** ensure the forks completely engage the pallet and are centered in the pallet. **DO NOT** concentrate the load at one point on the pallet. **ALWAYS** uniformly distribute each layer of load over the pallet surface. **DO NOT** use the UniLift with an unstable, unbalanced or loosely stacked load. Unbalanced loads may become unstable and fall. **DO NOT** allow the casters or load wheels to drop from one level to another. A small drop (1/8 inches or more) will cause a severe impact load which may result in structural damage or loss of load.
2. **CRUSHING HAZARD. ALWAYS** keep hands and feet clear of the load and all moving components. **CRUSHING HAZARDS**, as shown in Figure 1, are created as the forks move up or down. **SEVERE PERSONAL INJURY** could result.
3. **PINCH POINT HAZARD. ALWAYS** keep feet, hands and fingers away from all moving components. **PINCH POINT HAZARDS**, as shown

in Figure 1, are created as the forks move up or down. **SEVERE PERSONAL INJURY** could result.

ALWAYS keep hands and fingers away the mast and fork carriage.

ALWAYS keep feet clear of the rolling wheels and casters.

4. Use care when transporting a palletized load. Improper load handling could cause **SEVERE PERSONAL INJURY**.
PULL or **PUSH SLOWLY** and avoid sharp turns or rapid maneuvering when handling elevated loads. When equipped with rollers and whenever possible, avoid pushing a loaded UniLift with the outriggers extended. Rapid maneuvering and turns could damage the outriggers.
ALWAYS travel with the forks in the lowest position possible.
KEEP WATCHING the condition of the load. If the load shifts or becomes unstable, **STOP** immediately and restack the load.
ALWAYS be prepared to lower the load in the event the UniLift becomes uncontrollable.
DO NOT use the UniLift on a wet or slippery surface. Doing so could result in a fall or **SEVERE PERSONAL INJURY**.
TAKE CARE not to run over objects on the floor. Even a small object can cause the UniLift to stop abruptly.
MOVE SLOWLY and use care when turning or maneuvering in tight areas.
5. **NEVER** leave the loaded lifter unattended unless the forks are fully lowered, the brake is applied and the battery disconnect switch is turned to **OFF**.
6. **DO NOT** change the hydraulic pump's relief valve setting. The relief valve is installed to protect the operator and the UniLift. Changing the relief valve setting may cause the forks to suddenly fall. **SEVERE PERSONAL INJURY** and **PROPERTY DAMAGE** could result.
7. **ALL** lift servicing must be performed by qualified personnel only. Unauthorized modifications to the UniLift, its hydraulic power unit or its control system may compromise the performance and safety of the system resulting in **SEVERE PERSONAL INJURY** and **PROPERTY DAMAGE**.
UNDER NO CIRCUMSTANCES should you attempt any repair or service that is not covered in this manual.
DO NOT attempt to remove the constant force spring. The constant force spring is heavily preloaded and will recoil violently if released.
ALWAYS remove the load and **DEPRESS THE DOWN BUTTON** for several seconds to release the hydraulic pressure before servicing the lift. The release of hydraulic fluid under high pressure can be dangerous.
ALWAYS disconnect the battery before servicing the electrical system. Not doing so could result in a **SEVERE ELECTRICAL SHOCK**.
8. **ALWAYS** ensure all safety warning labels are in place and legible. If not, remove the UniLift from service and replace the required labels. Refer to Figure 2 for label descriptions and locations.

CAUTION

- 1 **DO NOT** continue to operate the pump if a squealing noise is heard coming from the pump. The pressure relief valve is operating. Continued use of the pump with the relief valve operating will cause permanent damage the pump. **REDUCE** the load to prevent the relief valve from operating.

CRUSH AND PINCH POINT HAZARDS



Figure 1 Hazard Locations

SAFETY WARNING LABEL LOCATIONS



Figure 2 Safety Warning Label Locations

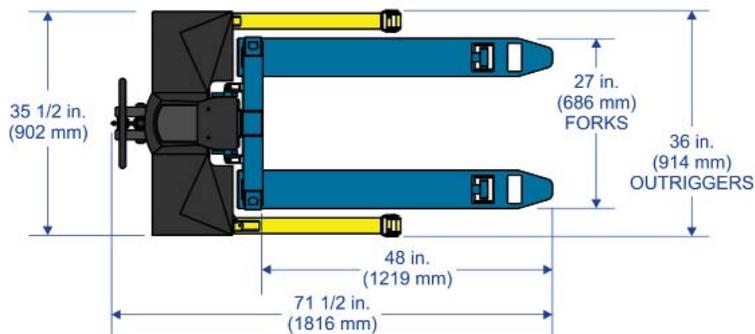
RESPONSIBILITIES OF OWNERS/USERS

It is the responsibility of the Owners/Users to:

- Ensure only trained and authorized personnel are permitted to operate the UniLift and that all operators understand the operating instructions, safety rules and hazards associated with this lift.
- Ensure the UniLift is inspected and maintained in proper working order in accordance with the operation/maintenance instructions provided in this manual.
- Ensure any UniLift not in safe operating condition is removed from service and repaired to Bishamon's standards. Unsafe conditions include, but are not limited to: excessive leakage, missing pins or fasteners, bent or cracked structural members, cut or frayed hydraulic lines and damaged or malfunctioning controls or safety devices.
- Ensure all repairs are made by qualified personnel in conformance with the instructions provided by Bishamon Industries Corporation.
- Ensure the UniLift is used in accordance with the guidelines provided in this manual.
- Ensure modifications or alterations of any UniLift are made only with the written permission of Bishamon Industries Corporation.

For additional information regarding Owner/User responsibilities, please refer to ANSI/ITDF B56.10-2006 "Safety Standard for Manually Propelled High Lift Industrial Trucks". If you have additional questions, please contact your local Bishamon Dealer or contact Bishamon Industries Corporation.

SPECIFICATIONS



SPECIFICATIONS:	
UNI-20	
• Pallet Jack Capacity:	2000 lbs (907 kg)
• Stacker Capacity:	2000 lbs (907 kg) @ 20" (508 mm) Load Center 1700 lbs (771 kg) @ 24" (610 mm) Load Center
• Fork Raised Height:	
• Pallet Jack Mode:	9.4 in. (238 mm)
• Stacker Mode:	35.25 in. (895 mm) @ 1700 lbs capacity*
• Pallet Jack Wheel Base:	59.3 in. (1506 mm)
• Stacker Wheel Base:	43.0 in. (1092 mm)
• Steering Wheels:	8.0 in. (203 mm) Diameter Polyurethane
• Load Wheels:	3.0 in. (76 mm) Diameter Polyurethane
• Power:	24 VDC
• Battery:	(2) 12 VDC, Group U1, 33 amp-hr
• Charger:	24 VDC - 5 amp automatic
• Lifting:	2:1 ratio / chain, hydraulic actuation
• Outrigger Actuation:	Electro-mechanical actuation with linkage
• User Controls:	Push button "Raise and Lower" Key switch / battery disconnect switch Outrigger position LEDs Battery charger and battery status LEDs
• System Control:	24 VDC PCB with outrigger switches, proximity and transition limit switch
• Load Wheel Actuation:	Cam driven lever arm system
• Sound Pressure Level:	<70 dB(a)
• Operating Environment:	Indoors
• Lighting Requirement:	Good General Lighting
• Operating Environment Temperature:	+40F - +150F

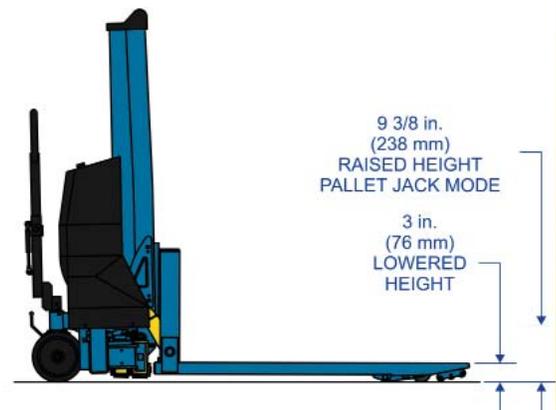
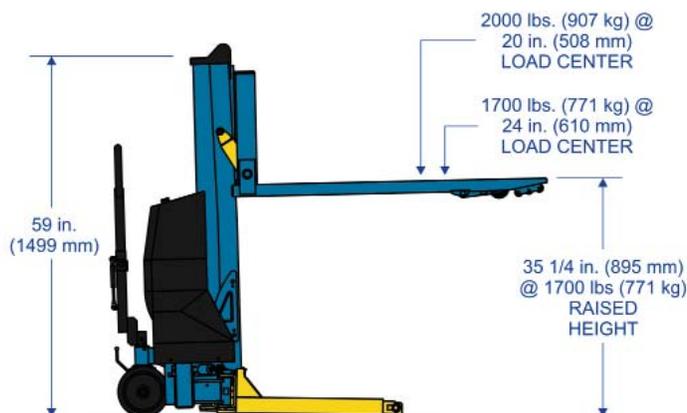


Figure 3 Specification Description

FUNCTIONAL DESCRIPTION

The UniLift is a dual purpose pallet positioner and transporter designed to improve palletizing productivity and worker safety. The UniLift allows palletized loads to be transported like a pallet jack then lifted like a stacker. It rolls, steers and maneuvers like a typical pallet jack allowing easy transport and precise positioning. From the maximum pallet jack height, the UniLift will quickly transform into a high lift stacker. Release and depress the UP button again and each of the UniLift's deployable outriggers will rotate into position to provide high lift load support. Unlike a straddle stacker, the outriggers do not straddle the load allowing access from three sides. The palletized load can now be raised to a convenient working height.



Figure 4 Functional Drawing

UNPACKING THE UNILIFT

The UniLift is shipped on an oversized pallet and only requires removal from the pallet and charging before it is ready for use. Although removal from the pallet is a simple process, certain precautions must be taken to ensure product damage does not occur.

Tools Required

- Banding or strap cutters
- Knife or single sided razor blade
- 5/32 inch Hex Key or Allen Wrench (*overhead hoist instructions only*)
- 5/8-11 Eyebolt (*overhead hoist instructions only*)

Equipment Required

- Forklift or overhead hoist

Forklift Unpacking Instructions

1. Using a forklift or similar equipment, move the palletized UniLift to a convenient location with suitable work area. The area should be clean and have good general lighting.
2. Next, using the strap cutter, remove the bands securing the UniLift to the pallet. Remove all packing material and place it off to the side.
3. The UniLift is stabilized on the pallet with one (1) shipping block (24 inches long) under the frame of the UniLift (this block is not secured with nails or screws). In addition there is one (1) block in front of the forks secured to the pallet and one (1) block in back of the steering wheels secured to the pallet.
4. Next, spread the forklift forks 27 inches apart. Approach the UniLift from behind and place the tips of the forklift forks underneath the frame with each of the forklift tips at either end of the UniLift frame. From here, raise the UniLift just high enough to remove the shipping block that is underneath the frame (this block is not secured to the pallet with nails or screws). Remove the shipping block then lower the UniLift back down on to the pallet.
5. As shown in Figure 5, insert one forklift fork under the center of the base frame **behind** the retracted outriggers and the other fork under the UniLift's forks. Use care when inserting the forks and ensure the fork under the base is not contacting the retracted outriggers.
6. Carefully lift the UniLift off the pallet and set it on the floor.

Overhead Hoist Unpacking Instructions

1. Using a pallet truck or similar equipment, move the palletized UniLift to a convenient location with suitable work area. The area should be clean and have good general lighting.
2. Next, using the strap cutter, remove the bands securing the UniLift to the pallet. Remove all packing material and place it off to the side.
3. Using a 5/32 inch hex key wrench, remove the two (2) button head cap screws that secure the top cover to the mast. Place the mast top cover off to the side.
4. Thread the 5/8-11 eyebolt into the access hole on the top of the mast. Ensure there is a minimum of 1 inch of thread engagement.
5. Next, attach a lifting sling or chain to the eyebolt and carefully lift the UniLift off the pallet. Slide the pallet to the side and gently lower the UniLift to the floor.
6. Reposition the mast cap on top of the mast and reinstall the two (2) screws.



Figure 5 Forklift Lift Points

PREPARATION FOR USE

Before you begin, locate and identify the components detailed in Figure 6. These components will be referred to throughout the “Installation” and “Operating” procedures. Make sure you understand the function of each component before proceeding.

Items Required

1. AC extension cord

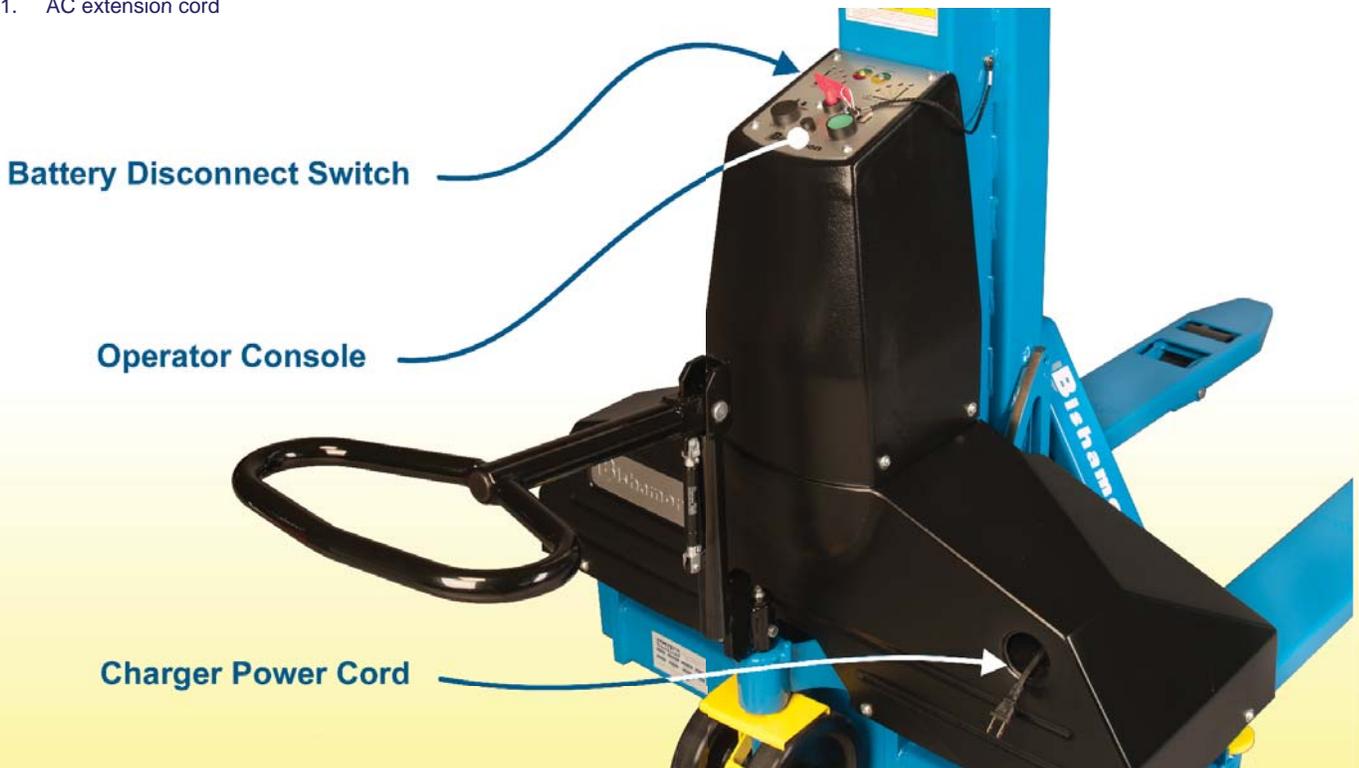


Figure 6 Installation Components

Charger Power Cord - All UniLifts are supplied with a recessed charger power cord. To access the cord, grab the male end of the cord and gently fold the power cord out of the recess. The cord will extend 2 to 3 inches to allow a 120 VAC extension cord to be attached. After charging, disconnect the extension cord and fold the plug back into the recess.

Battery Disconnect Switch - All UniLifts are supplied with a battery disconnect switch. Turning the key to the OFF position disconnects battery power from the UniLift. The key is attached to a lanyard and which is secured to the side of the mast.

Operator Console – The UniLift’s operator console includes a key / battery disconnect switch, UP and DOWN controls, outrigger position LEDs, battery charger and battery status LEDs.

UP Button – Depress and hold the UP button to run the power unit and raise the forks. From a fully lowered position, the forks will rise to the



Figure 7 Operator Console

maximum pallet jack height and stop. To transition to STACKER MODE and continue to raise the forks, release the UP button then depress and hold the UP button again. There will be a 6 second delay while the outriggers rotate to their extended positions. When the outriggers are completely extended, the power unit will run again and the forks will continue to rise. Raise the forks to the desired height and release the UP button. To avoid damaging the outriggers, ALWAYS ensure the outriggers are either in the fully retracted or the fully extended position. **NEVER leave an outrigger partially extended while moving the UniLift.**

DOWN Button – Depress and hold the DOWN button to lower the forks. When lowering from a raised height above 10 inches (254 mm) the forks will stop automatically and each outrigger will rotate to its retracted position (6 second delay). Continue to hold the DOWN button to lower the forks to the desired height. ALWAYS ensure the outriggers are either in the fully retracted or the fully extended position. **NEVER leave an outrigger partially extended while moving the UniLift.**

Key / Battery Disconnect Switch – Turning the key to the OFF position disconnects all battery power from the UniLift. Turn the key to the ON position to enable the UniLift's control system.

Outrigger Position LEDs – The position of each deployable outrigger is indicated by 5 LEDs (2 green and 3 red LEDs). A green LED indicates the outrigger is in either the fully retracted or the fully extended position. The red LEDs indicate an outrigger is moving between positions, is stopped in between positions or has struck an obstruction. The various outrigger positions with the associated LED indications are illustrated below in Figures 8 – 19.

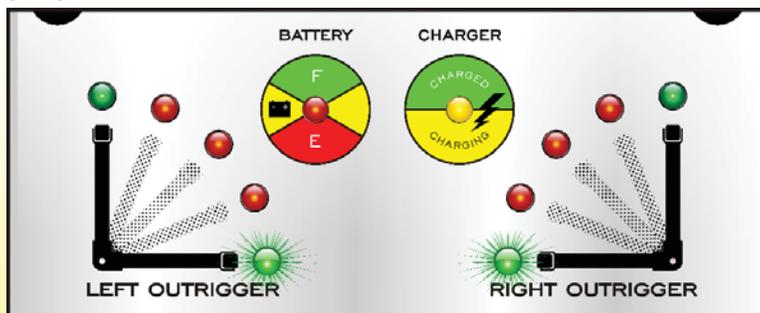


Figure 8 Outriggers Fully Retracted LED Indicators

Outriggers Fully Retracted – The two lower green LEDs will be illuminated when both outriggers are fully retracted. The UniLift is in PALLET JACK mode and is capable of lifting, lowering and transporting a palletized load as a pallet jack.

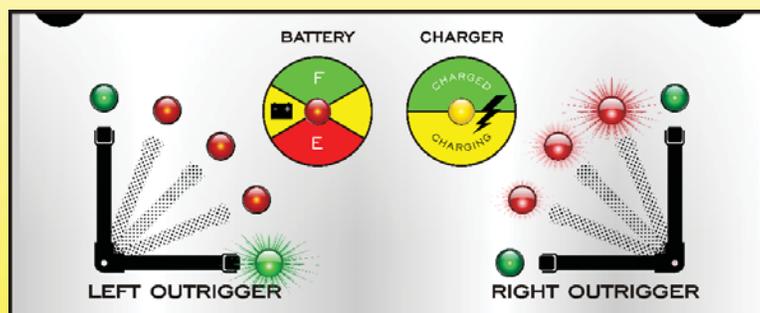


Figure 9 Right Outrigger Extending LED Indicators

Right Outrigger Extending – As the UniLift transitions from a pallet jack to a stacker, the right outrigger will begin to extend and three red LEDs will scroll outward indicating the right outrigger's direction of movement. While depressing the UP button, the right outrigger will rotate from the fully retracted position to the fully extended position in approximately three seconds. During this time the LEDs will continue to scroll outward.

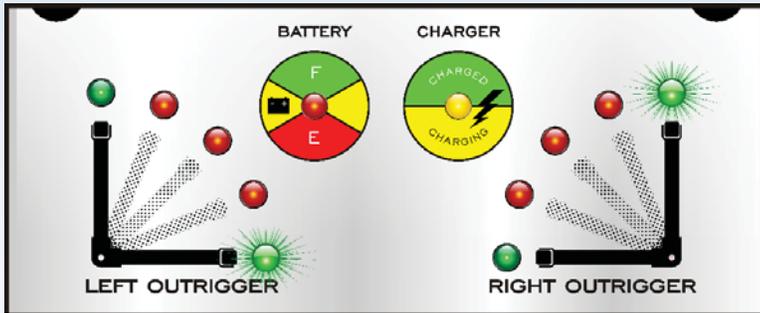


Figure 10 Right Outrigger Extended LED Indicators

Right Outrigger Extended – When the right outrigger reaches its fully deployed position, the upper right green LED will illuminate. At this time, the left outrigger is in the fully retracted position, as indicated by the green LED.

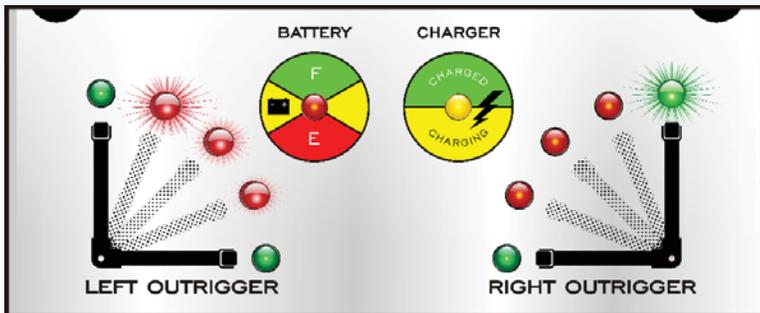


Figure 11 Left Outrigger Extending LED Indicators

Left Outrigger Extending – Immediately following the right outrigger extension, the left outrigger will begin to extend and the left three red LEDs will scroll outward indicating the left outrigger's direction of movement. Continue to depress the UP button.

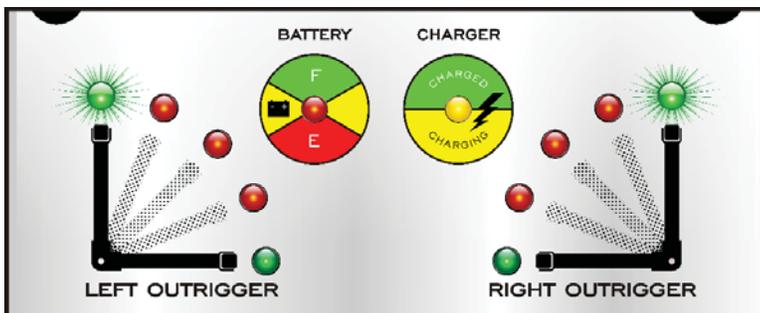


Figure 12 Outriggers Fully Extended LED Indicators

Outriggers Fully Extended – The two upper green LEDs will be illuminated when both outriggers are fully extended. The UniLift is now in STACKER mode and is capable of lifting and positioning a palletized load. The outriggers contact the floor and the forks begin to raise with the UP button depressed.

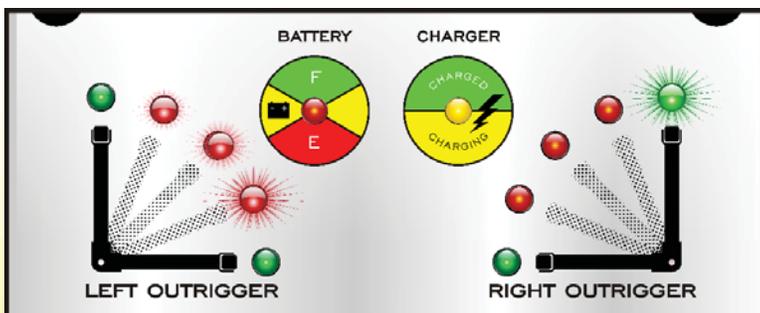


Figure 13 Left Outrigger Retracting LED Indicators

Left Outrigger Retracting – As the UniLift transitions from a stacker to a pallet jack, the forks will automatically stop lowering, the left outrigger will begin to retract and the left three red LEDs will scroll inward indicating the left outrigger's direction of movement. Continue to depress the DOWN button.

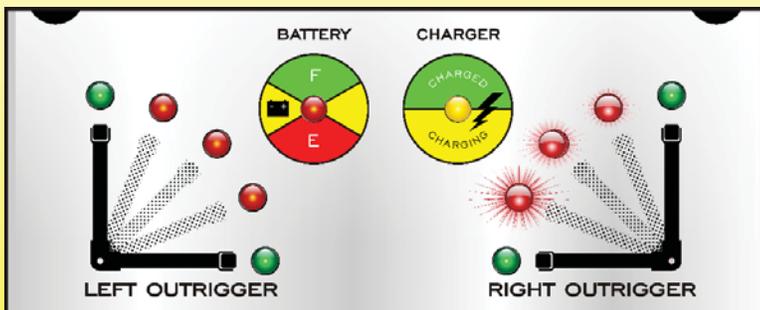


Figure 14 Right Outrigger Retracting LED Indicators

Right Outrigger Retracting – Immediately following the left outrigger retraction, the right three red outrigger will begin to retract and the right LEDs will scroll inward indicating the right outrigger's direction of movement. Continue to depress the DOWN button to ensure both outriggers are fully retracted.

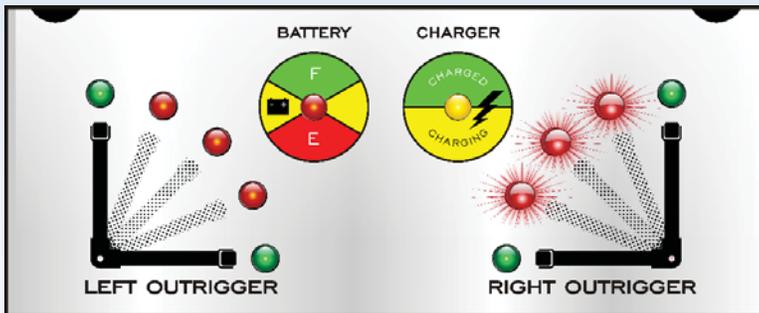


Figure 15 Right Outrigger Stopped Mid-Travel LED Indicators

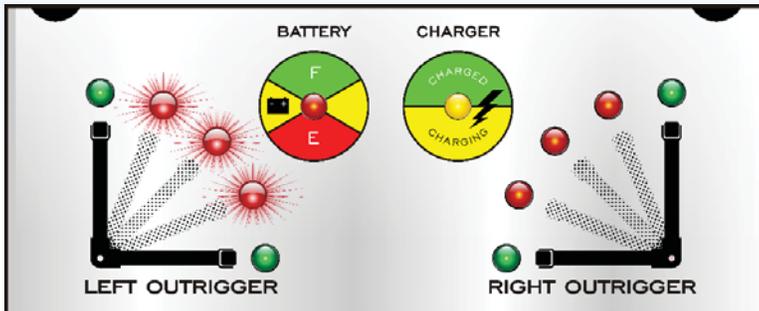


Figure 16 Left Outrigger Stopped Mid-Travel LED Indicators

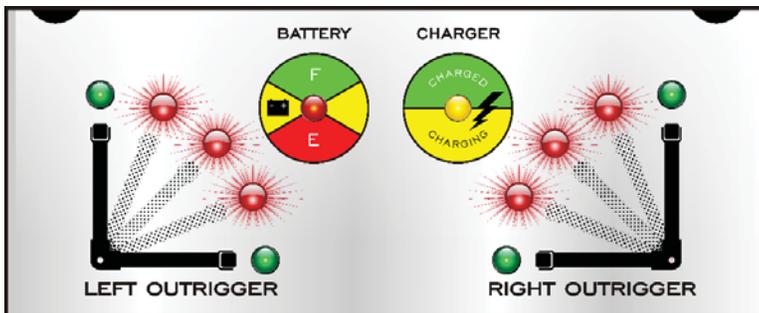


Figure 17 Outrigger Obstruction LED Indicators

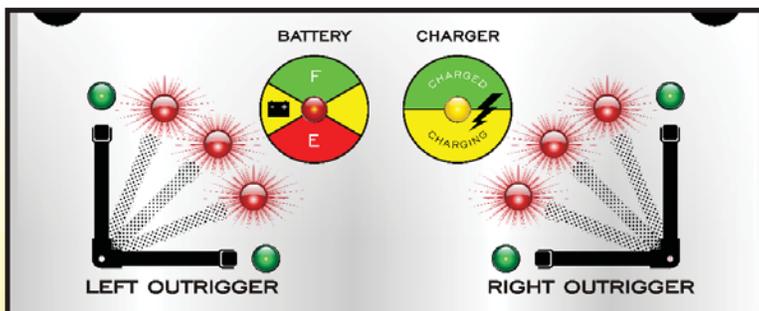


Figure 18 Service Mode LED Indicators

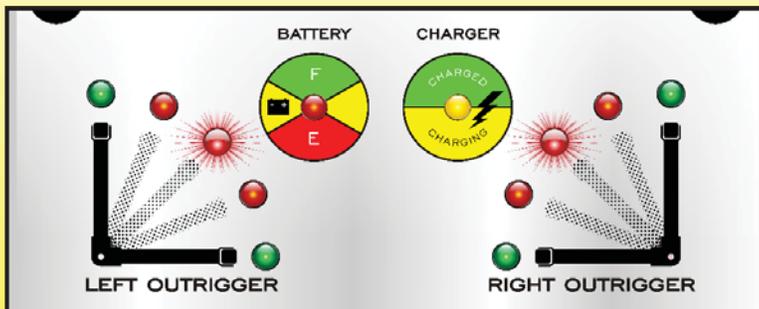


Figure 19 Battery Lockout Mode LED Indicators

Right Outrigger Stopped Mid-Travel – If the operator releases the UP or DOWN button with the right outrigger in-between it's fully retracted or fully deployed positions, the right 3 red LEDs will stop scrolling and flash in a repeating sequence of 2 red LEDs then 1 LED and an audible warning will sound. Continue to depress the UP or DOWN button to ensure the right outrigger is either fully retracted or fully extended.

Left Outrigger Stopped Mid-Travel – If the operator releases the UP or DOWN button with the left outrigger in between it's fully retracted or fully deployed positions, the left 3 red LEDs will stop scrolling and flash in a repeating sequence of 2 red LEDs then 1 LED and an audible warning will sound. Continue to depress the UP or DOWN button to ensure the left outrigger is either fully retracted or fully extended.

Outrigger Obstruction – If either outrigger encounters a pallet or floor obstruction which stops the outrigger's movement, all 3 LEDs associated with the outrigger that has been obstructed (right or left) will flash at the same time and an audible warning will sound. The LEDs will continue to flash until the operator reverses the outrigger's direction. CAREFULLY remove the obstruction or reposition the UniLift to allow the outriggers to rotate as required. For additional information refer to the "OPERATING INSTRUCTIONS – Stacker Mode / Pallet Obstruction" section of this manual.

Service Mode/ LED indication – The UniLift operates using a series of switching and coordinating movements. The UniLift control system is programmed to enter Service Mode in the event the UniLift's program sequence has been compromised. In the event the UniLift enters Service Mode, all six (6) red LEDs inside the arc of the right and left banks will illuminated continuously as shown in Figure 18. The UniLift will not operate in Service Mode. Remove the UniLift from service and have a qualified technician troubleshoot and perform service. Contact Bishamon Industries for assistance in troubleshooting and service.

Control System/Battery Life Lockout – The UniLift control system has lockouts to prevent battery damage in the event that the batteries are very weak and an operator continues to use the UniLift to raise load. After the "Battery" LED on the console glows red for 30 minutes the control system will enter the first of two lockouts. The first lockout will disable the UP button so that the UniLift can only be lowered and not raised. This is so the operator can set the load down and go charge the UniLift. If the UniLift continues to be used and another 30 minutes goes by, the UniLift controls will become completely locked out; the batteries are now completely dead. This second lockout will glow the middle LED in the center of the LED arc on the left and right side of the console (two places) at

the same time as shown in figure 19. Before using the UniLift for the first time, plug an extension cord into the charger's power cord and allow the batteries to completely charge. The "Charging" LED will glow green when the batteries are fully charged. The UniLift is now ready for use. Before using the UniLift, make sure you are familiar with the SAFETY INSTRUCTIONS, the OPERATING INSTRUCTIONS and are TRAINED. Only trained and authorized personnel shall be permitted to operate a UniLift.

Battery Charger LED – The LED labeled "Charger" illuminates in two colors. The "Charger" LED will glow yellow when the batteries are charging and then will glow green when the batteries are fully charged. Always ensure the BATTERY DISCONNECT SWITCH is turned to the OFF position while charging the batteries.

Battery Status LED – The left LED labeled "Battery" illuminates in three colors and indicates the battery status based on battery voltage. Glowing green indicates the batteries have a full charge, glowing yellow indicates the batteries require charging but the UniLift can still be used, glowing red indicates the batteries are very weak and require IMMEDIATE charging.

UniLift Control System/Battery Life Lockout – The UniLift control system has lockouts to prevent battery damage in the event that the batteries are very weak and an operator continues to use the UniLift to raise load. After the "Battery" LED on the console glows red for 30 minutes the control system will enter the first of two lockouts. The first lockout will disable the UP button so that the UniLift can only be lowered and not raised. This is so the operator can set the load down and go charge the UniLift. If the UniLift continues to be used and another 30 minutes goes by, the UniLift controls will be completely locked out. The batteries are now completely dead. This second lockout will glow the middle LED in the center of the LED arc on the left and right side of the console (two places) at the same time as shown in figure 18.

Before using the UniLift for the first time, plug an extension cord into the charger's power cord and allow the batteries to completely charge. The "Charging" LED will glow green when the batteries are fully charged. The UniLift is now ready for use. Before using the UniLift, make sure you are familiar with the SAFETY INSTRUCTIONS, the OPERATING INSTRUCTIONS and are TRAINED. Only trained and authorized personnel shall be permitted to operate a UniLift.

UniLift in Service Mode/ LED indication – The UniLift operates using a series of switching and coordinating movements. The UniLift control system is programmed to enter Service Mode in the event the UniLift's program sequence has been compromised. In the event the UniLift enters Service Mode all six (6) red LEDs inside the arc of the right and left banks will illuminated continuously as shown in Figure 19. The UniLift will not operate in Service Mode. Remove the UniLift from service and have a qualified technician troubleshoot and perform service. Contact Bishamon Industries for assistance in troubleshoot and service.

OPERATING INSTRUCTIONS

General Instructions

The UniLift is designed for use with GMA style (48" long x 40" wide) pallets. Dimensions for a standard GMA pallet are identified below in Figure 20. As shown below, the total depth of a GMA pallet is approximately 5 inches (127 mm). For the UniLift to operate properly, the pallet height should not exceed 5 1/2 inches (140 mm). In many cases, extremely tall pallets, pallets with very thick bottom boards or pallets with damaged bottom boards will prevent the outriggers from extending properly. The UniLift must be capable of lifting the bottom of the pallet to a minimum height of 4 inches (102 mm) off the floor (the minimum height for the UniLift's outriggers to rotate to their extended positions).

In addition to GMA style pallets, the UniLift is capable of lifting most skids, including postal skids.

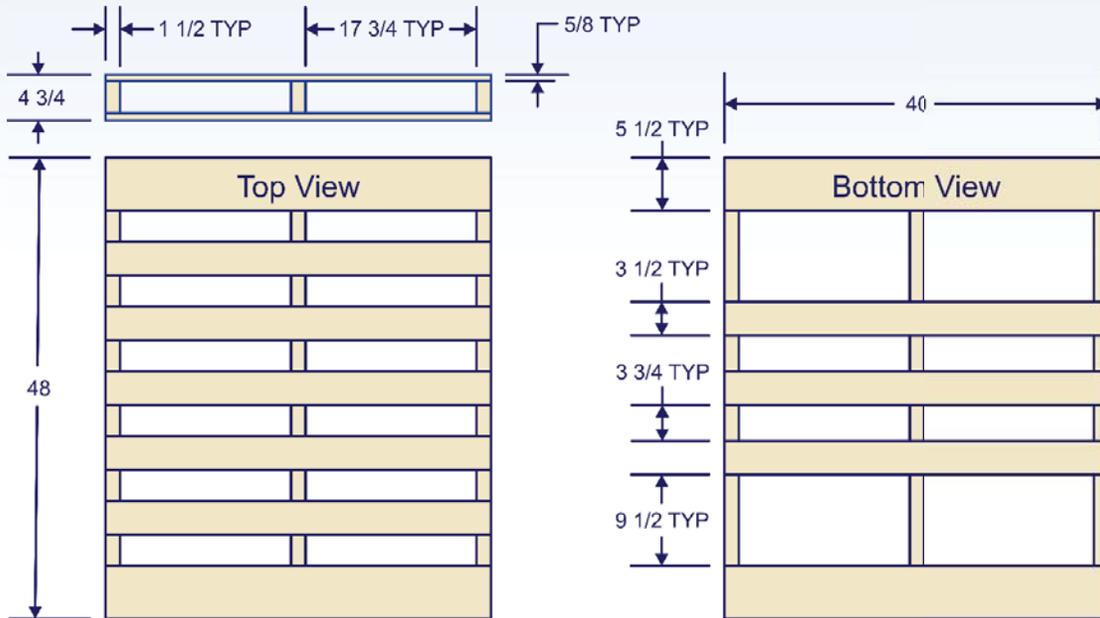


Figure 20 GMA Pallet Dimensions

1. Turn the BATTERY DISCONNECT SWITCH to the "ON" position.
2. Check the status of the outrigger position LEDs. Both outriggers should be in the fully retracted positions. If not, depress the DOWN button to fully retract both outriggers.

Brake Operation

The UniLift is equipped with a parking brake designed to hold the lift in a desired position on a level surface. The UniLift's brake operation is illustrated in Figure 21.

1. To apply the brake, rotate the brake lever to the lower position by depressing the brake pedal with your foot. The brake pedal will remain in the depressed position until released.
2. To release the brake, position your foot under the pedal and nudge the lever upward. The brake lever will rotate to the upper position releasing the brake.

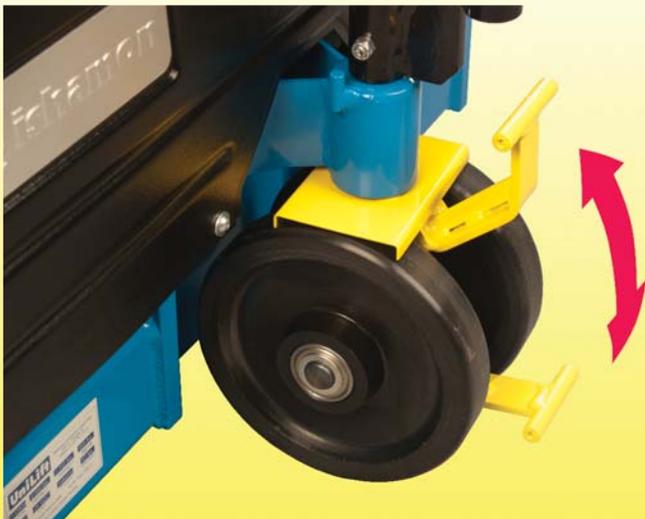


Figure 21 Brake Operation

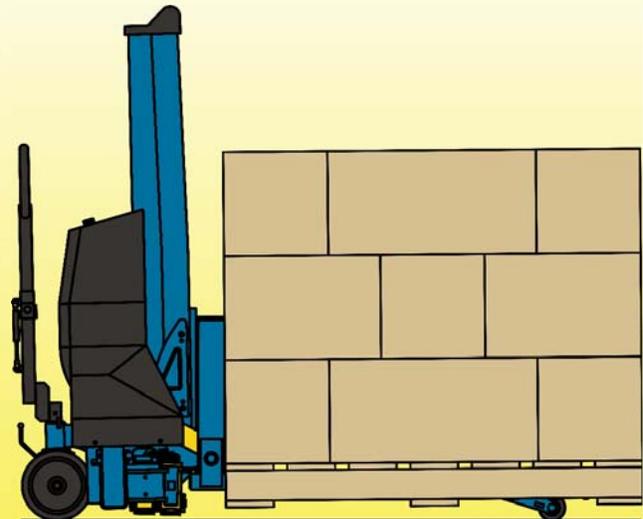


Figure 22 Pallet Jack Mode

Pallet Jack Mode Operation

The UniLift is capable of operating like a pallet jack and will easily transport palletized loads on a smooth level surface.

1. Depress the DOWN button to ensure the forks are fully lowered.
2. Check the position of the brake. If required, rotate the brake pedal to the release position.
3. Insert the forks into a loaded pallet. Ensure the forks are centered in the pallet and fully engage the pallet. The pallet should be in good condition with the load uniformly distributed on the top surface. ALWAYS visually check the condition of the load before attempting to raise and move it.
4. Depress the UP button to raise forks and elevate the palletized load. Release the UP button when the bottom of the pallet clears the floor. If a squealing sound is heard coming from the UniLift, immediately release the UP button. The pressure relief valve is operating due to an overload. Reduce the load to 2000 lbs or less before attempting to lift it.

⚠ DANGER

ALWAYS travel with the outriggers retracted and the forks in the lowest position possible.

5. Carefully transport the palletized load to the desired location. Pull or push the UniLift slowly and avoid sharp turns or rapid maneuvering.
6. Whenever possible, pull the loaded UniLift to the desired location. To pull the UniLift, first lower the pull handle to a comfortable position and grip the handle loop with both hands. Next, ensure you have a sure footing and then carefully pull on the handle to start the UniLift in motion. Once the UniLift is in motion, release one hand, turn and face the desired direction while pulling with the other hand.
7. Always look ahead and walk slowly while pulling the UniLift. Take care when maneuvering around corners and in tight areas. Always watch for others when traveling in narrow aisles or approaching intersections.
8. If pushing a load is required, place both hands on the handle and push slowly. Use care and avoid sudden steering movements.
9. Always keep an eye on the condition of the load. If the load shifts or becomes unstable, stop immediately and restack the load.
10. When the palletized load is at the desired location, depress the DOWN button to lower the forks.
11. With sure footing, carefully pull the UniLift rearward to remove the forks from the pallet.

⚠ WARNING

NEVER leave the loaded lifter unattended unless the forks are fully lowered, the brake is applied and the key switch is turned to **OFF**.

Stacker Mode/Work Positioner Operation

The UniLift allows palletized loads to be transported like a pallet jack then lifted like stacker. This unique transformation occurs when the deployable outriggers rotate to their fully extended positions providing load support while the UniLift continues to lift the load.

1. Always ensure others are well clear of the UniLift.
2. Depress and hold the UP button to raise the forks. The forks will rise to full extension in approximately 3 seconds and stop.
3. To transition to stacker mode, release the UP button then depress and hold the UP button again. The right outrigger will extend to the fully open position in approximately 3 seconds. As previously described, the right outrigger LEDs scroll in the direction of the outrigger movement. When the outrigger reaches full extension, the green right outrigger extended LED will illuminate. Extension of the left outrigger will start automatically. Observe the left outrigger LED display, the red LEDs scroll outward. If either outrigger strikes an obstruction and fails to extend fully, the 3 LEDs associated with the outrigger that has been obstructed (right or left) will flash and an audible warning will sound (see stacker operation with pallet obstruction).
4. After both outriggers reach full extension, the forks will continue to rise. Continue to depress the UP button to raise the load to the desired height. When the desired height is reached, release the UP button.
5. Turn the ON-OFF switch to the OFF position and apply the parking brake.
6. Load or unload the pallet as required. Always uniformly distribute the load on the pallet surface and never exceed the capacity or load center ratings.
7. Always use extreme care when working around a loaded pallet in the raised position. Never put hands or feet under the pallet or inside the outriggers at any time.

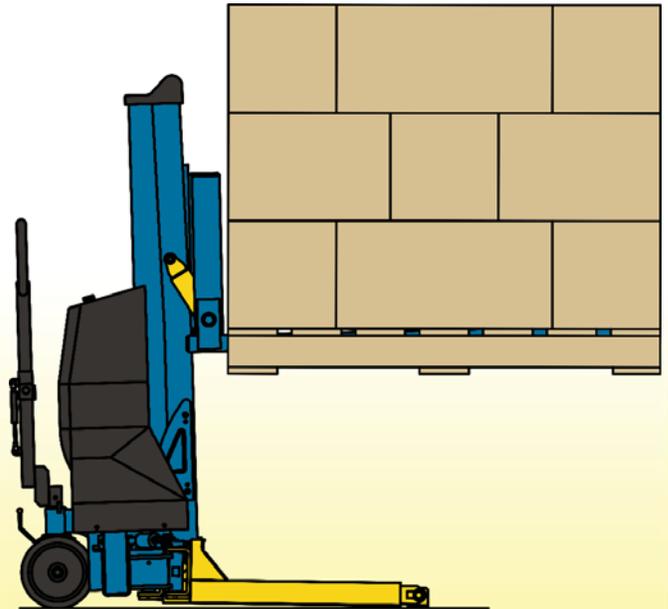


Figure 23 Stacker Mode

⚠ WARNING

DO NOT overload the UniLift. **NEVER** exceed the designated capacity and load center ratings.
CRUSHING HAZARD - ALWAYS keep hands and feet clear of the load and all moving components.

8. If repositioning the pallet height is required, walk to the rear of the unit and turn the BATTERY DISCONNECT SWITCH to ON. Then raise or lower the pallet to the desired height. Turn the BATTERY DISCONNECT SWITCH to OFF, then continue loading or unloading as required.
9. When the loading or unloading process is complete, walk to the rear of the UniLift and turn the BATTERY DISCONNECT SWITCH to ON. Depress and hold the DOWN button to lower forks. The forks will lower to the transition point and the outriggers will automatically retract to the stored position. Outrigger progress is displayed on the LED console. If either outrigger encounters an obstruction or fails to fully retract, the red LEDs will flash (see stacker operation with pallet obstruction).
10. Release the DOWN button when the forks reach the desired height or are completely lowered.

DANGER

DO NOT travel with the load elevated. **ALWAYS** travel with the outriggers retracted and the forks in the lowest position possible.

Stacker Mode/Positioning a Pallet (elevated surface 30 1/2" high or less)

1. Follow the "Pallet Jack Mode Operation" instruction and position the palletized load directly in front of the elevated surface. The UniLift should be positioned such that the pallet can be pushed into the desired position without turning the steering handle. Apply the parking brake.
2. Depress and hold the UP button to raise the forks. The forks will rise to full extension and stop. Release the UP button then depress and hold the UP button again. After both outriggers reach full extension, the forks will continue to rise. Continue to depress the UP button to raise the load to the desired height above the elevated surface or platform. If possible, the bottom of the pallet should be 1" – 2" above the elevated surface. When the desired height is reached, release the UP button.

CAUTION

DO NOT continue to operate the pump if a squealing noise is heard coming from the pump. The pressure relief valve is operating. Continued use of the pump with the relief valve operating will cause permanent damage the pump. The forks are at their maximum raised height.

3. Check to ensure there is sufficient clearance for the outriggers and that there is no obstruction in front of the unit.
4. Release the brake then slowly and carefully push the raised pallet over the elevated surface. Push straight and watch the condition of the outriggers at all times.

If an outrigger strikes an obstruction or deflects from the extended position, STOP immediately and reverse direction. If possible, lower the forks to pallet jack height and fully retract the outriggers. Completely lower the load, turn the BATTERY DISCONNECT SWITCH to the OFF position and remove the UniLift from service. Contact a supervisor or maintenance personnel to inspect the UniLift for damage.

5. When the palletized load is properly positioned, depress the DOWN button to lower the load onto the elevated surface. Continue to lower the forks until they completely disengage the pallet and release the DOWN button. Carefully pull the UniLift rearward to remove the forks from the pallet.
6. When the forks are well clear of the pallet and elevated surface, depress and hold the DOWN button to lower forks to the fully lowered position.
7. With the UniLift operating as a pallet jack, move the lift to the desired location.

Stacker Mode/Pallet Obstruction

As previously mentioned, the UniLift is designed for use with GMA style (48" long x 40" wide) pallets. In many cases, extremely tall pallets, pallets with very thick bottom boards or pallets with damaged bottom boards will prevent the outriggers from extending properly. The UniLift must be capable of lifting the bottom of the pallet to a minimum height of 4 inches (102 mm) off the floor (the minimum height for the UniLift's outriggers to rotate to their extended positions).

Outriggers fail to extend while raising a pallet

1. If either outrigger fails to extend while raising a pallet, the 3 red LEDs associated with the outrigger will flash and an audible warning will sound indicating the outrigger has contacted an obstruction.
2. Release the UP button and carefully look under the pallet to determine the nature of the obstruction.
3. If the pallet is in good condition but is too deep, then lower the pallet and remove the UniLift from the pallet. Temporarily place a thin board on the top of each fork. The board should be approximately 6" wide and extend the full length of the fork. Carefully reinsert the UniLift forks into the pallet. Before raising the load, ensure the boards are properly positioned on the forks.
4. Raise the pallet as normal. The boards (spacers) may elevate the pallet and create the required space for the outriggers to extend normally.
5. Otherwise, if an obstruction is present and can be removed without placing a hand or foot under the pallet, remove the obstruction and continue to operate the UniLift as normal.
6. If these procedures fail, the UniLift is not capable of lifting this pallet. Another lifting device must be used.

Outriggers fail to retract while lowering a pallet

1. If either outrigger fails to retract while lowering a pallet, the 3 red LEDs associated with the outrigger will flash and an audible warning will sound indicating the outrigger has contacted an obstruction.
2. Release the DOWN button and carefully look under the pallet to determine the nature of the obstruction.
3. Next, press the UP button and raise the pallet to a convenient height and carefully remove the obstruction. Never place a hand or foot

under the loaded pallet.

4. If the obstruction can not be removed, lower the forks to the lowest possible position and carefully travel to a location with an elevated platform capable of supporting the loaded pallet. An ideal surface would be 18 – 24 inches (457 – 610 mm) in height and have clearance for the outriggers at the floor. Lower the damaged pallet onto the surface and remove the UniLift. Another lifting device must be used.

ROUTINE MAINTENANCE

The UniLift is designed to provide years of service and requires little maintenance. However, a routine inspection and maintenance program will prevent costly replacement of parts and/or downtime. All service should be performed by a qualified service person who has an understanding of load positioning equipment and electrical/hydraulic diagrams. This person should be thoroughly familiar with the operation and use of this type of equipment.

⚠ DANGER

A falling load can cause **SEVERE PERSONAL INJURY** or **DEATH**. **NEVER** go under the loaded or unloaded forks. All maintenance should be performed with the forks in the fully lowered position or securely blocked in a raised position.

Use extreme care when handling or working around batteries. Improper handling can cause **SEVERE PERSONAL INJURY** or **DEATH**.

ALWAYS use eye protection and protective clothing when handling batteries. Batteries contain acid which can cause severe burns and injury.

NEVER expose a battery to extreme heat, open flames or sparks. Battery vapors are explosive.

⚠ WARNING

ALL lift servicing must be performed by qualified personnel only. Unauthorized modifications to the UniLift, its hydraulic power unit or its control system may compromise the performance and safety of the system resulting in **SEVERE PERSONAL INJURY** and **PROPERTY DAMAGE**.

UNDER NO CIRCUMSTANCES should you attempt any repair or service that is not covered in this manual.

DO NOT attempt to remove the constant force spring. The constant force spring is heavily preloaded and will recoil violently if released.

ALWAYS remove the load and **DEPRESS THE DOWN BUTTON** for several seconds to release the hydraulic pressure before servicing the lift. The release of hydraulic fluid under high pressure can be dangerous.

ALWAYS disconnect the battery before servicing the electrical system. Not doing so could result in a **SEVERE ELECTRICAL SHOCK**.

Blocking the Forks in a Raised Position

Blocking the unloaded forks in an elevated position may be required for certain periodic inspections or maintenance operations. There are many acceptable methods to block or secure the unloaded fork carriage in an elevated position. Identified below are several methods:

- Bishamon carriage support (recommended method)
- Fork lift
- Overhead hoist or structure with sling
- Portable scissor lift
- Heavy duty work platform approximately 32 inches high
- Structural member securely positioned in the mast

Always use extreme care when blocking the unloaded forks in an elevated position. If an acceptable method is not available, Bishamon offers an optional carriage support plate that will secure the elevated fork carriage to the top of the mast. Install the plate as follows:

1. Completely raise the forks, remove the mast cap cover and mast guard.
2. Position the carriage support plate over the roll pins of the carriage.
3. Replace the center button-head cap screw and tighten securely.
4. Carefully lower the fork carriage until the carriage support plate rests on top of the mast. Install the hex bolt supplied with the bracket into the center hole on top of the mast and tighten securely.
5. Finally, turn the BATTERY DISCONNECT SWITCH to the OFF position. The fork carriage is now secured in an elevated position.

Removing the Upper Console and Lower Battery Cover

Tools required:

- 3/16 and 5/32 Hex L-Key (Allen) wrench or equivalent
 - Two 1/2 inch sockets or wrenches
1. First, move the UniLift to an area with good lighting and a suitable work area. Completely lower the forks and turn the BATTERY DISCONNECT SWITCH to the OFF position. Next, using the 3/16 Hex L-Key (Allen) wrench, remove the cap screw that secures the

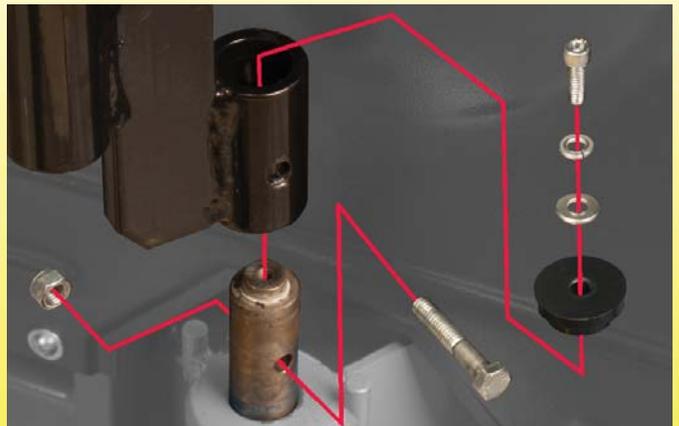


Figure 24 Handle Assembly Removal

pivot axle mount. Then using the two 1/2 inch sockets or wrenches, remove the bolt and nut that secure the handle assembly to the brake pivot shaft. As shown in Figure 24, pull the handle assembly straight up off the brake pivot shaft and set it off to the side.

- Using the Allen wrench, remove the four (4) screws attaching the console plate to the upper console cover. Next, remove the four (4) screws that attach the upper console cover to the lower battery cover.
- As illustrated in Figure 25, slide the console plate together with the upper console cover top end straight back about one (1) inch and carefully separate the upper console cover from the console plate. Set the upper console cover off to the side.
- Temporarily replace and snug the front two (2) screws to secure the console plate to the mast.



Figure 25 Upper Console Cover Removal

- To remove the lower battery cover, remove the eight (8) screws that attach the lower battery cover to the frame.
- As shown in figure 26, remove the lower battery cover by working it upwards and rotating the left side of the cover back such that the electric cord can be disconnected from the battery charger. Disconnect the battery charger cord from the battery charger, finish removing the cover and set it off to the side. Inspection and/or maintenance can now be performed on the UniLift.
- To reinstall the covers, install the lower battery cover first, then the upper console cover.



Figure 26 Lower Battery Cover Removal

Disconnecting the Batteries

- Lower the forks completely and turn the BATTERY DISCONNECT SWITCH to the OFF position.
- Follow the instruction above to remove the lower battery cover. As shown in Figure 27, locate the main power fuse attached to the right battery. Unplug the fuse to disconnect all battery power to the system.
- When servicing is complete, plug the power fuse into the fuse holder and reinstall the lower battery cover.

Disconnecting the Mast Cover

- Raise the forks completely and turn the BATTERY DISCONNECT SWITCH to the OFF position.
- Using a 3/16 inch hex key wrench, remove the two (2) button head cap screws that secure the top cover to the mast. Place the mast top cover off to the side.
- As shown in Figure 28, remove the button head cap screw and the clamp plate. Set the screws and plate off to the side.

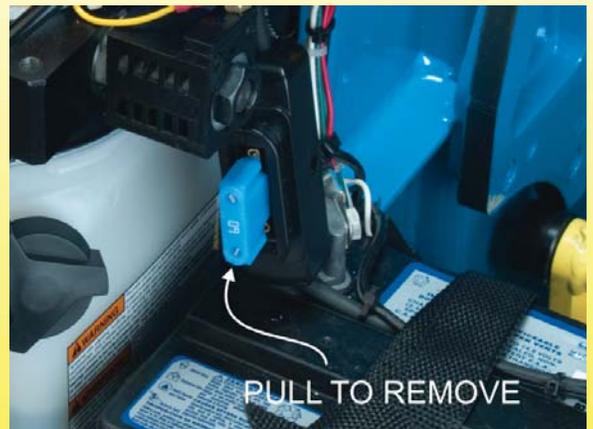


Figure 27 Main Power Fuse

4. Grasp the mast cover on each side and slide the cover off the roll pins. Next guide the cover upward allowing the cover to retract. Similar to a window shade, the mast cover will retract completely. When released, the roller may spin for several turns releasing the spring tension. Before removing mast cover completely, note there are washers on either side of the mast cover. Remove cover with washers and set aside.
5. When reinstalling the mast cover it will be necessary to re-tension the roller spring. To do so, install the mast cover with the washers in place on top of the mast. Rotate the mast cover 5 complete rotations in the direction and as illustrated in figure 29. Then pull cover downward and reposition the holes over the pins on the fork carriage. Replace the clamp plate and screw.
6. Finally, reposition the mast cap on top of the mast and reinstall the two screws. Raise and lower the forks several times to ensure the mast cover functions correctly. If not, check the spring tension (step 5) and ensure the bottom of the yellow mast guard is secured squarely.



Figure 28 Mast Cover Clamp



Figure 29 Roller Installation

Daily Visual Inspection

Bishamon recommends that every UniLift be visually inspected daily before use. Detailed below is a suggested daily inspection checklist for normal operating conditions and environments. Extreme or unusual operating conditions may require a more extensive inspection and maintenance program. If you have any questions regarding the inspection or maintenance of any UniLift, do not hesitate to contact your local Bishamon dealer or Bishamon Industries Corp. If any of the following conditions exist, REMOVE the UniLift from service and contact a qualified service person.

Inspect the following items with the forks lowered.

1. Visually check the general condition of the UniLift. Inspect for loose, worn, damaged or broken components.
2. Visually inspect the frame, mast, outriggers and fork carriage for broken or cracked welds.
3. Check the condition of the warning labels. The warning labels are for the safety of the operator. If the labels are worn, missing or unreadable, REPLACE them before placing the UniLift back in service.

Inspect the following items with the forks fully raised.

1. Visually inspect the carriage wheels and rollers (18 total) for flat spots, wear or damage.
2. Visually inspect the cylinder area for hydraulic fluid leakage.
3. As shown in Figure 30, manually operate both linkage lever arms and check for smooth movement and complete load wheel retraction. To check their operation, first ensure the forks are fully raised and the BATTERY DISCONNECT SWITCH is turned to OFF. Carefully gasp each lever arm and rotate it rearward until it stops. Release each arm and watch for smooth movement and complete load wheel retraction. There should be a definite audible knock when the load wheel fully retracts and strikes the travel stop in the fork. If the load wheels fail to retract completely or any binding is present, the lift MUST be repaired before continued use or damage to the battery cover may result.



Figure 30 Linkage Lever Arms

Daily Inspection Chart

Inspection Item	Forks	Notes
Loose, worn, missing, damaged or broken components	Lowered	General inspection
Broken or cracked welds	Lowered	Inspect frame and forks
Warning decals and labels	Lowered	Inspect condition
Wheel and load rollers	Raised	18 wheels total
Hydraulic cylinder	Raised	Inspect for fluid leakage
Linkage lever arm system	Raised	Complete load wheel retraction

Chart 1 Daily Inspection Items

Weekly Inspection and Operation Checks

Bishamon recommends that several items be inspected on a weekly basis. In addition to the daily inspection, the following items should be inspected every week. If any of the following conditions exist, REMOVE the UniLift from service and contact a qualified service person.

Inspect or check the following items with the forks lowered.

1. Raise and lower the forks completely. During operation, listen for any unusual noises that may indicate binding or worn components. The operation should be smooth and quiet.
2. Operate the parking brake to ensure smooth operation. With the brake pedal depressed, push or pull on the UniLift to ensure proper wheel engagement.
3. Visually inspect the mast channels, cylinder and lifting chain. Lower the forks completely and turn the BATTERY DISCONNECT SWITCH to the OFF position. As demonstrated in Figure 31, gently pull the mast cover to the side and inspect the cylinder area. The channels should be smooth, free of filings and lightly coated with lubricant. The cylinder area should be free of leaks and excess hydraulic fluid. Visually inspect the chain and chain wheel bracket. All fasteners and retaining rings should be in place. The chain should be free of excessive wear. If excessive wear is apparent, remove the UniLift from service and alert a supervisor or maintenance personnel. For additional "Removal From Service Criteria" refer to OSHA 1910.184 and ASME B30.9.
4. Following the inspection, release the mast cover and allow it to retract. If the cover has wrinkles, gently pull the cover downward on both sides at the same time and allow it to retract. The cover should now be straight and wrinkle free.



Figure 31 Mast Inspection

Weekly Inspection/Operation Check Chart

Inspection Item / Operation Check	Forks	Notes
Operation check - raise and lower forks	*	Check for smooth quiet operation
Brake operation	Lowered	Check operation
Mast channels	Lowered	Smooth, free of filings and lightly lubricated
Cylinder area	Lowered	Free of leaks and excess fluid
Chain wheel bracket	Lowered	Fasteners and retaining rings in place

Chart 2 Weekly Inspection Items

Detailed Inspection and Maintenance (After 30 days of use - Every 6 months thereafter)

Bishamon recommends that every UniLift be inspected and maintained on a regular basis. Identified below is a suggested detailed inspection and maintenance checklist for normal operating conditions and environments. Extreme or unusual operating conditions may require a more extensive inspection and maintenance program. If you have any questions regarding the inspection or maintenance of any UniLift, do not hesitate to contact your local Bishamon dealer or Bishamon Industries Corp. The following inspection and maintenance items must be performed by a qualified service person.

WARNING

ALL lift servicing must be performed by qualified personnel only. Unauthorized modifications to the UniLift, its hydraulic power unit or its control system may compromise the performance and safety of the system resulting in **SEVERE PERSONAL INJURY** and **PROPERTY DAMAGE**.

UNDER NO CIRCUMSTANCES should you attempt any repair or service that is not covered in this manual.

DO NOT attempt to remove the constant force spring. The constant force spring is heavily preloaded and will recoil violently if released.

ALWAYS remove the load and **DEPRESS THE DOWN BUTTON** for several seconds to release the hydraulic pressure before servicing the lift. The release of hydraulic fluid under high pressure can be dangerous.

ALWAYS disconnect the battery before servicing the electrical system. Not doing so could result in a **SEVERE ELECTRICAL SHOCK**.

The UniLift's upper console cover, lower battery cover and mast cover must be removed to perform many of the detailed inspection and maintenance items. To remove the upper and lower covers, follow the instructions in the previous section titled "Removing the Console and Battery Covers". To remove the mast cover, follow the instructions in the previous section titled "Disconnecting the Mast Cover". After completing the monthly inspection and maintenance, reinstall the covers. Use care not to damage the covers.

1. Lubricate the parking brake guide tube and cam mechanism with Slick 50 One Lube or equivalent. Lubricate the locations identified in Figure 32. Check for smooth operation and proper wheel engagement.
2. 2. Inspect all the pivots points in the outrigger pivots and linkage pivots. To do so, raise the forks to the maximum pallet jack height and



Figure 32 Brake Lubrication Points



Figure 33 Outrigger Inspection Points

extend both outriggers. At the moment the left outrigger completely extends and both green Outrigger Extended LEDs are illuminated, release the UP button. Both outriggers should be slightly off the floor. Turn the BATTERY DISCONNECT SWITCH to the OFF position. Thoroughly inspect the outrigger pivots and linkage pivots identified in Figure 30. Ensure all pins and retaining rings are in place and secure.

Check each outrigger linkage to ensure it is fully extended and over center. Grasp the end of the outrigger and attempt to move the outrigger in and out. The outrigger should be tight against the stop bolt with little to no movement. As illustrated in Figure 31, the linkage

should be locked and approximately 1/32 inch over-center. Check both outriggers. If either outrigger linkage required adjustment, consult the factory for detailed adjustment instructions. DO NOT attempt to adjust the outrigger linkage assembly without a thorough understanding of the adjustment procedure.

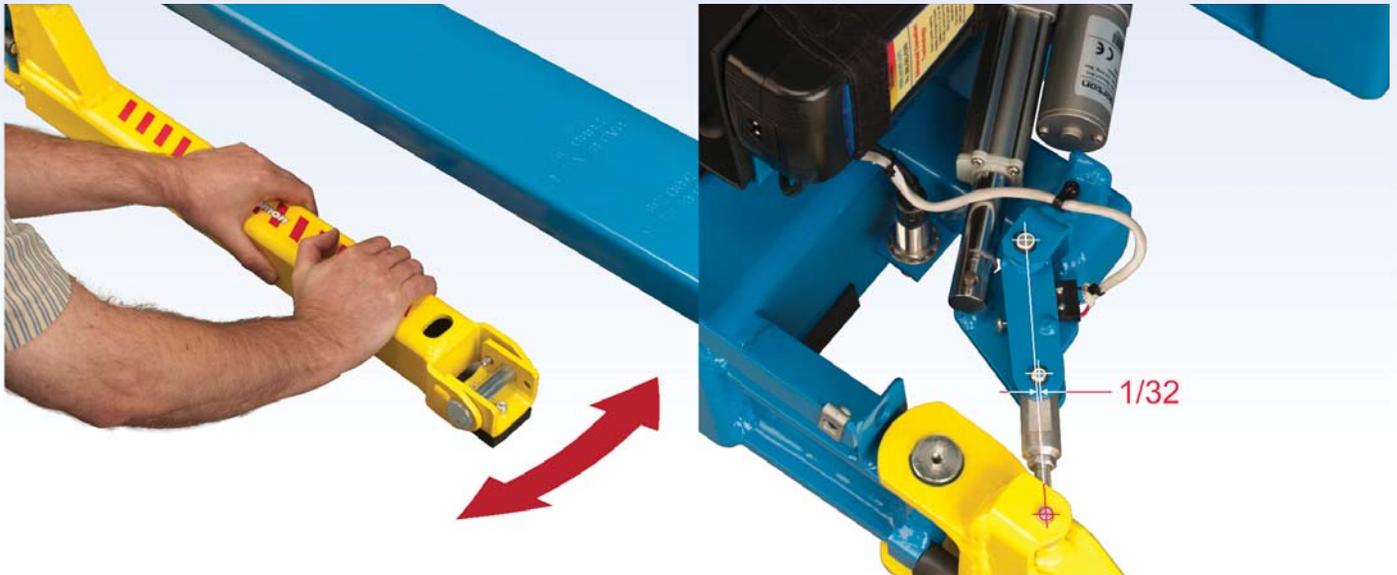


Figure 34 Outrigger Linkage

3. With the mast cover removed, forks lowered and the BATTERY DISCONNECT SWITCH turned to the OFF position, thoroughly inspect the upper cylinder area, chain wheel bracket, chain and transition switch. Never depress the transition switch unless the BATTERY DISCONNECT SWITCH is in the OFF position. Check the following:

- Mast Channels..... Smooth and lightly lubricated
- Chain Wheel Bracket..... All retaining rings in place
- Chain / Chain Wheel..... No excessive wear
- Transition Switch..... Good condition and bracket secure
- Upper Cylinder Area..... Return line in place – no fluid leakage

Raise the forks to their maximum height and turn the BATTERY DISCONNECT SWITCH to the OFF position. Take care not to place your hands or feet under the fork carriage unless it is securely blocked in the raised position. Check the following:

- Lower cylinder..... Hydraulic line and fittings secure – no leakage
- Constant Force Spring..... Clean and free of debris; no cracks

WARNING

DO NOT attempt to remove the constant force spring. The constant force spring is heavily preloaded and will recoil violently if released.

If the spring area contains debris, remove the debris with compressed air. Use caution, the sides of the spring may be sharp. Never push or pull on the spring. If spring removal is required, contact your dealer or Bishamon for removal instructions.

Bishamon recommends replacing the constant force spring every two (2) years or five thousand (5000) cycles.

Lower the forks and turn the BATTERY DISCONNECT SWITCH to the OFF position.

4. Inspect the batteries and battery terminals. Ensure the terminals are clean and tight. Next, check the battery straps to ensure they are tight and the batteries are not free to move.
5. Check the level and appearance of the hydraulic oil. The oil level is visible through the reservoir. With the forks completely lowered, the oil level should be 1 to 2 inches below the filler. Add hydraulic oil if required. Next, check the hydraulic oil for contamination. Using a dip stick, remove a small amount of oil from the reservoir. The oil should appear light in color and be free of contamination. If the color has darkened or if it feels gritty, the oil should be changed immediately. Refer to the following section for instructions on changing the hydraulic oil.
6. Grease the lever arm cam followers. To do so, raise the forks so that the yellow lever arms are at a convenient height. Using a grease gun with a general purpose EP grease, lubricate both cam followers. Pump the gun slowly until grease protrudes from around the roller.
7. Replace the lower battery cover, the upper console cover and the mast cover and the handle.
8. Rotate the handle completely through its steering arc. It should move freely without binding. Pull the handle to its fully lowered position. When released, the gas spring should be capable of returning the handle to its upright position. If required, replace the handle gas spring.

Detailed Inspection and Maintenance

Inspection or Maintenance Item	Forks	Notes
Lubricate parking brake	Lowered	Lubricate with "Slick 50 One Lube" or equivalent
Outtrigger pivots and linkage components	Raised*	Ensure all pins and retaining rings are in place and secure
Outtrigger linkage	Raised*	Ensure linkage over-centers and locks
Mast channels	Lowered	Smooth, free of filings and lightly lubricated
Chain wheel / chain wheel bracket	Lowered	All pins and retaining rings in place
Chain	Lowered	No excessive wear
Transition switch and switch bracket	Lowered	Good condition and bracket secure
Upper cylinder area	Lowered	Return line in place - no fluid leakage
Lower cylinder area	Raised	Hydraulic line and fittings secure - no leakage
Constant force spring	Raised	Clean and free of debris; no cracks
Battery terminals	Lowered	Clean and tight
Hydraulic Oil	Lowered	Oil level and appearance
Handle gas spring	Lowered	Handle returns properly
Lever arm cam followers	Raised	Grease cam followers

* See Figure 33

Chart 3 Detailed Inspection and Maintenance

Detailed Maintenance (Every 2 years or 5000 lift cycles)

Bishamon recommends that several items be replaced every two (2) years or every five thousand (5000) lift cycles. Replacement of these components will ensure the UniLift continues to operate in a safe, reliable manner. Instructions for the following maintenance items are outside the scope of the manual. However, detailed instructions are available from your local Bishamon dealer or Bishamon Industries Corporation. The following maintenance operations must be performed by a qualified service person.

Hydraulic Oil

Bishamon recommends the hydraulic oil be replaced every twentyfour (24) months of service or more often if conditions warrant. The frequency of oil changes will depend upon the general working conditions, severity of use and the overall cleanliness and care given to the UniLift. Unless otherwise specified, all UniLifts are supplied with Golden West Lubricants Uni-Lube 10 hydraulic oil.

Fluid Type	Manufacturer	Fluid Temperature Range °F
Uni-Lube 10	Golden West Lubricants	+30 - +150
DTE LIGHT	MOBIL	+40 - +150
DTE 21	MOBIL	0 - +150
SAE 10	PENNZOIL, MOBIL, ETC	0 - +150
SAE 10W30	PENNZOIL, MOBIL, ETC	+20 - +170
SAE 20	PENNZOIL, MOBIL, ETC	+30 - +170

Chart 4 Recommended Hydraulic Fluids

Constant Force Spring

Bishamon recommends replacing the constant force spring every two (2) year or five thousand (5000) cycles. Removal of the fork carriage assembly is required. While not complicated, this should not be attempted without a thorough understanding of the fork carriage removal and installation procedures. Contact your local Bishamon dealer or Bishamon Industries Corporation for additional instructions.

Mast Rollers

Bishamon recommends inspecting and lubricating the mast roller needle bearings every two (2) years or five thousand (5000) cycles. Thoroughly clean the mast roller needle bearings, bearing races and thrust washers with an industrial solvent. Lubricate each needle bearing with a general purpose EP grease.

2 Year (5000 Cycle) Maintenance Items

Maintenace Item	Forks	Notes
Change hydraulic oil	Lowered	Recommended oil - Mobil DTE 21
Constant force spring replacement	Removed	
Mast rollers	Removed	Inspect and lubricate needle roller bearings

Chart 5 2 Year/5000 Cycle Maintenance Items

Cylinder Seal Replacement

In the event the pump or cylinder seals are leaking, detailed instructions and replacement part kits are available. Contact your local dealer or Bishamon Industries Corporation to obtain service kits and instructions for these items.

Electrical and Hydraulic Schematic

Electrical and hydraulic schematics are available upon request. Contact your local dealer or Bishamon Industries Corporation to obtain the required schematics.

Troubleshooting

Problem	Cause	Solution
Forks will not raise (Pump will not run)	No electrical power	Charge batteries Check fuses Check wiring and connections
Forks will not raise (pump running)	Load too heavy - relief valve operating Hydraulic oil level low Raise solenoid valve will not close Lower solenoid valve held open	Reduce load Add oil to hydraulic reservoir Clean/repair/replace valve Clean/repair/replace valve
Forks will not remain elevated	Lower solenoid valve held open Check valve held open	Clean/repair/replace valve Clean/repair/replace valve
Forks will not lower	Fork carriage obstruction Lower solenoid valve malfunction Faulty switch or wiring Broken constant force spring Obstruction in flow limiting valve Non standard or damaged pallet	Remove obstruction Clean/repair/replace valve Replace switch and/or check wiring Replace spring Clean/repair/replace valve Replace pallet
Outriggers will not deploy	Outrigger obstruction Faulty outrigger actuator Non standard or damaged pallet	Remove obstruction Replace actuator Replace pallet
Outriggers will not retract	Outrigger obstruction Faulty outrigger actuator Defective batteries	Remove obstruction Replace actuator Replace batteries
Batteries will not charge	Blown charger fuse Loose or corroded connection	Replace fuse Check/repair connections

Chart 6 Troubleshooting

REPLACEMENT PARTS

Bishamon has carefully selected the components used in the manufacture of the UniLift. In the event replacement parts are required, ALWAYS use genuine UniLift components provided by Bishamon. These parts can be obtained from your local Bishamon dealer or by contacting Bishamon Industries Corporation

For detailed exploded views and parts lists contact your local Bishamon dealer, Bishamon Industries Corporation or visit www.bishamon.com.