

UNIVAC®

**SERIES
250 UPENDER**

INSTRUCTION MANUAL

SERIAL NUMBER 18-81651

**ASME B30.20 BTH-1
DESIGN CATEGORY: B
SERVICE CLASS: 2**

January 2018



PREFACE

Your new UNIVAC® Series Lifter will only support loads up to its rated capacity when loaded correctly. The UNIVAC® is a vacuum lifter complying with ASME B30.20 BTH-1 Design Category B and Service Class 2, which is for specific tasks withstanding forces based on the unit's rated capacity. The installation, operation, and maintenance instructions in this manual are typical of the UNIVAC®. Please note that your UNIVAC® may differ from the pictorial examples in this manual. Use the following guidelines in this manual for your protection, and for optimal operation of your equipment. The safety precaution lists in the manual are not necessarily all-inclusive. The owner/user is responsible for understanding and acting according to ASME, ANSI, OSHA, NFPA 70, and any other regulations required for your location, city, and state. In addition, refer to the Manufacturer's instruction manuals for more detailed product and safety information on other attachments or components used with your lifting equipment.

Check your UNIVAC lifter upon arrival. REPORT ANY DAMAGE IMMEDIATELY TO THE CARRIER'S AGENT.

For shipping constraints, your unit may arrive disassembled. If necessary, reassemble and check your unit for loose clamps, vacuums hoses, nuts and bolts.

DO NOT store your Lifter resting on the vacuum pads for any length of time. This method of storage destroys the vacuum pad seal rings.

Use your serial number (below) when contacting The Caldwell Group, Inc. to accelerate the response time in addressing requests for your UNIVAC®.

THE CALDWELL GROUP	
ROCKFORD, ILLINOIS	
RATED CAP.	440 LBS.
MODEL NO.	VL-0358
SERIAL NO.	18-81651
WEIGHT	See Unit ID Tag LBS.
CC29	

VACUUM PAD RATED CAPACITY: 155 LBS EACH

REQUIRED POWER: 115V-1-60HZ



All qualified persons responsible for installation, operation, and maintenance shall read and understand all the contents of this manual to avoid serious injury, death, or property damage. Keep this manual.



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DANGER: indicates an imminently hazardous situation, which, if not avoided, *will* result in death or serious injury and property damage.



WARNING: indicates a potentially hazardous situation, which, if not avoided, *could* result in death or serious injury and property damage.



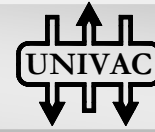
CAUTION: indicates a potential hazardous situation which, if not avoided, *may* result in minor or moderate injury or property damage



The safety alert symbol indicates a potential personal injury hazard: it is not used for messages related to property damage only.



UNIVAC®
THE CALDWELL GROUP



SAFETY

GENERAL

The fundamental objective of the following safety suggestions are to protect authorized, qualified persons responsible for installation, start-up, operations, maintenance, or servicing of the UNIVAC® Series Lifter from injury, serious injury, or death. It is the responsibility of the owner/user to provide all proper devices, tools, and methods that are necessary to effectively protect each employee from recognized hazards, during installation, start-up, operation, maintenance, or servicing. The safety precautions stated in this manual are not all-inclusive. The owner/user is responsible for understanding and acting in accordance with—ASME, ANSI, OSHA, and NFPA70 Regulations—and any other applicable local, city, and or state ordinances.

TRAINING

Authorized, qualified individuals, and personnel need comprehensive training in the use of protective equipment, safeguards, and safe operation of this manipulating lifting system. Permit only authorized, qualified persons to operate and maintain your UNIVAC®.

PERSONAL PROTECTION

Personal protective equipment is required whenever there are hazards that can do bodily harm through absorption, inhalation, or physical contact. The construction requirements of all personal protective equipment must be concurrent to the work performed.



SAFETY, GENERAL CARE AND USE



INSTALLATION

Below-the-hook lifters shall be assembled and installed according to the instructions in this manual, unless other specific arrangements have been approved in writing by The Caldwell Group. When lifter/auxiliary power supply is required, user inspection shall ensure that the power source coincides with the requirements of the lifter. If electrical connections are made, the power supply shall be connected to the line side of the crane disconnect or to an independent circuit as specified in the operation instructions of this manual.

Check for correct rotation of power units, lubrication of moving parts, and filling of reservoirs, all according to the manual instructions.

OPERATOR TRAINING

Lifters shall be operated in accordance to operation instructions in this manual, and by qualified persons who have received instructions described in the "Operation" section of these guidelines. Training shall also include instruction regarding:

- Details of the lifting cycle.
- Understand the application of the lifter to the load, including adjustments to the lifter, if any, to adapt it to various sizes and types of loads.
- Instruction in any special operations or precautions that may be required.
- Recognition of proper load configuration. For example, preferred operation requires an orderly pattern of stacking.
- Before assuming responsibility for using the lifter, an operator shall demonstrate full understanding of the lifting procedure to the instructor. The instructor should record notes of the operator's demonstrated ability.

INSPECTION

The lifter shall be visually inspected by or under the direction of an appointed person on a daily or weekly schedule, depending on the nature of the lifter and the severity of the service.

Details to look for include but are not limited to:

- Structural deformation.
- Cracks in the structural frame, welds, hoist hook attachment points, mechanically operating parts, any attached slings, clevises, and hooks.
- Malfunctions during operation of a mechanically operating lifter.
- Loose covers, fasteners, and stops.
- Faulty operation of automatic hold and release mechanisms.
- Wear of hoist hooking points, load-supporting clevises, pins, slings, linkages, and mechanical parts.
- Missing identification and product safety labels.

MAINTENANCE AND REPAIRS

- A qualified person, based on recommendations made in this manual, should establish a preventive maintenance program for each lifter.
- A qualified person shall have responsibility for repairs. A qualified person should accurately maintain dated records and details of repairs and parts replacement.
- Replacement parts shall be at least equivalent to the original specifications.



SAFETY, CARE AND USE



OPERATING PRACITCES

DO'S

- The operator shall receive, read, and understand the operation instructions in this manual.
- The operator shall carefully watch the lifter, ensuring proper performance during the lifting cycle.
- The operator shall be familiar with the standard crane directing hand signals.
- The operator shall respond to hand signals from only an appointed person; however, stop signals from anyone shall be obeyed.
- The operator shall notify a designated person when he considers a load unsafe.
- The operator shall inspect the lifter before use. A qualified person shall examine any identified defect to determine if it is a hazard.

OPERATING PRACITCES

DON'T'S

- The operator shall not operate a malfunctioning lifter or one with an "Out of Service" tag attached.
- The operator shall not use the lifter for any purpose(s) other than those designated by The Caldwell Group's operating instructions.
- The operator shall not use a lifter when the nameplate (capacity, weight, etc) or product safety labels are missing.
- No one shall make alterations or modifications to lifters without first consulting The Caldwell Group.
- No one shall obscure or paint over The Caldwell Group nameplate (capacity, weight, etc.) or product safety labels.
- The load shall not be lifted higher than necessary or left suspended unattended, with or without a load.
- The lifter shall not lift an unbalanced or unsafe load.

HANDLING THE LOAD

- The lifter shall not be loaded in excess of its rated load.
- The combined weight of the lifter and load shall not exceed the rated capacity of the crane or hoist.
- The lifter shall be applied to the load in accordance with The Caldwell Group's recommended operation procedure.
- The lifter's sling(s) shall not be twisted or knotted
- The lifter shall not touch obstructions during load movement.
- The lifter shall not be loaded with loose material that might fall during movement.
- The operator or other personnel shall not place themselves or any part of their bodies beneath suspended loads.
- The load or lifter shall not drag or slide on the floor or any other surface.
- Do not use the lifter to lift loads beyond its intended function.
- If suspended loads are moved manually, they shall be pushed, not pulled.
- A preliminary lift of a few inches shall be made to establish that the load is stable.
- During lifting and transporting a load, slowly start, move, and stop the lifter.

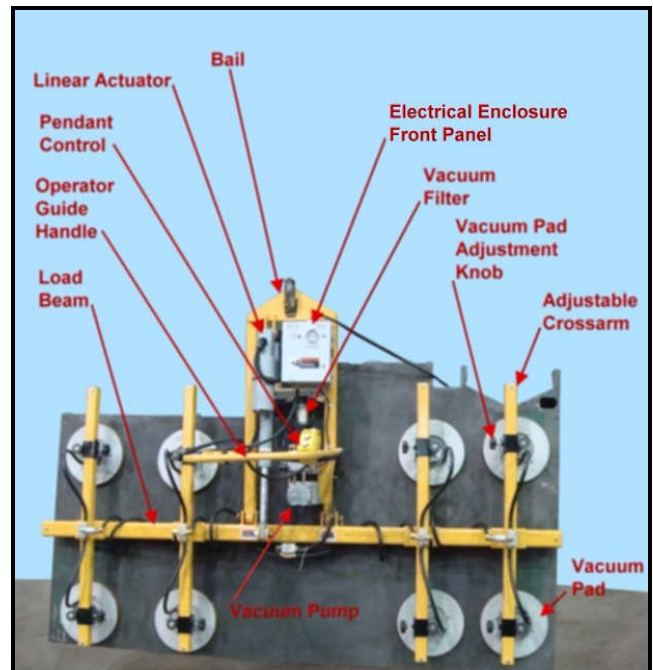


OPERATOR QUALIFICATIONS

Only trained operators, who have demonstrated their ability, shall operate below-the-hook vacuum lifters. Operator qualifications are as follows:

OPERATOR QUALIFICATIONS

- Perform routine pre-operation inspection of the below-the-hook vacuum lifting unit.
- Know the purpose, function of all indicators, lights, gauges, etc. located on the vacuum lifting unit.
- Know how to adjust or attach components, accommodating various sizes and types of loads:
 - vacuum pads
 - crossbeams
 - load beam
 - slide valves
- Know how and where to attach the lifter to the load:
 - gravity
 - placement of lifter on the load's center of gravity
 - special vacuum pad adjustments
 - adjustments needed load conditions:
 - thickness
 - bending
 - flatness
 - load size and weight
 - lifter's size and weight
 - lifter's rated capacity
 - hoist's rated capacity
- Never exceed the lifter's or hoist's rated capacity.'
- Know and demonstrate the proper engagement and usage of all attachments, adapters, or equipment modifications for special application requirements.
- Know how to store the unit correctly, preventing damage.
- Maintain accurate, required records.





OPERATING PRINCIPLES

The UNIVAC Series Lifter attaches to the surface of the load with a partial vacuum (negative pressure) from the vacuum pads. The atmospheric pressure on the outside of the pad and material holds the load with predictable certainty to the pad. The vacuum circuit controls the vacuum.

The **red** vacuum slide valve has two positions, Vacuum OFF and Vacuum ON. The **red** vacuum slide valve is open when in the Vacuum ON position. When the slide valve is open, the vacuum pump pulls air out of the vacuum pads. The check valve prevents air from reentering the pads should the vacuum pump stop because of a power failure.

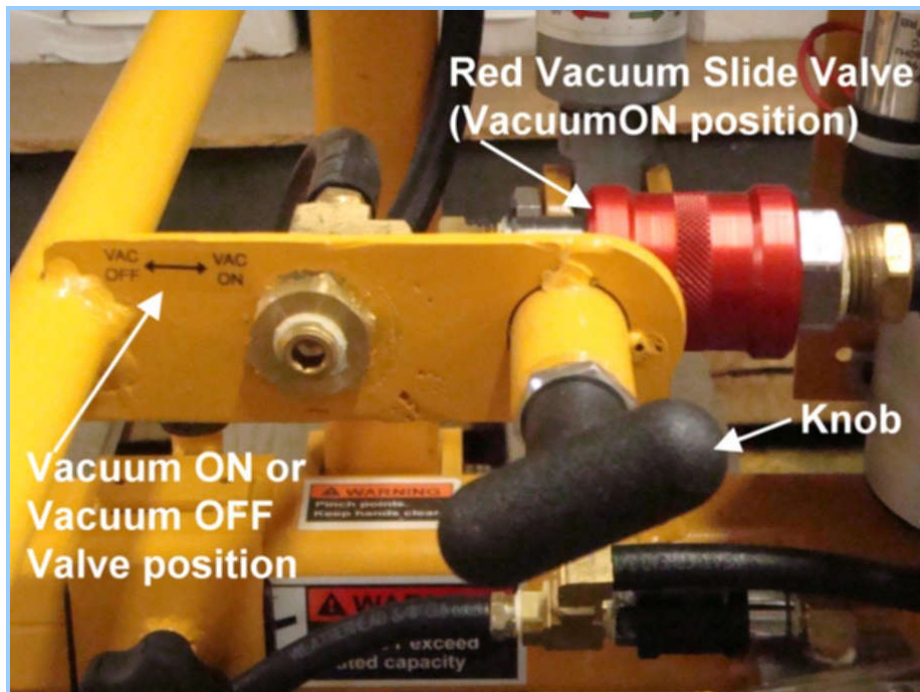
Simultaneously, the air evacuates from the pads and vacuum reserve tank. If the power is interrupted, the reserve tank maintains vacuum in the pads for a period of several minutes until power is restored or the load is safely lowered.

Slide the **red** vacuum slide valve to Vacuum OFF to release the vacuum pads from the load. The negative pressure in the pads equalizes, releasing the vacuum and facilitating vacuum pad removal from the load.

Before lifting a load, completely slide the **red** vacuum slide valve to the Vacuum ON position. Failure to complete this procedure can result in a vacuum leak, which would allow the load to fall. Once the **red** vacuum slide valve is in the Vacuum ON position the operator must wait for the vacuum to increase and stabilize on the vacuum gauge dial (located on the front panel of the electrical enclosure). The dial indicator must point to a minimum of 20 inches of mercury (Hg) on the vacuum gauge in order to lift the load. Typical vacuum readings should be between 23 to 25 inches of mercury (Hg).



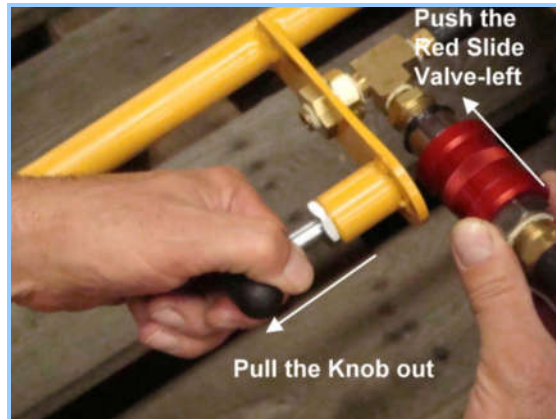
Warning – **Never** move the vacuum slide valve to the Vacuum OFF position when a load is suspended from the lifter. The load will drop, and could serious injury or death.



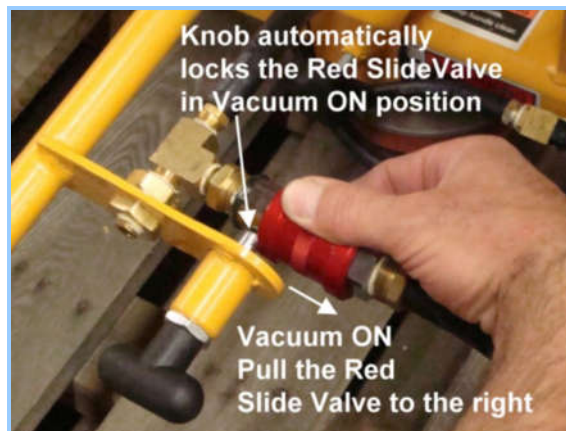


RED VACUUM SLIDE VALVE

Vacuum OFF position



Vacuum ON position





OPERATING INSTRUCTIONS

WARNING: DO NOT attempt to lift a load when the vacuum level is at zero through 19 inches of mercury.

Load loss could cause serious injury or death.

1. Be sure power supply is the same as shown on Lifter. Any power cords used shall be of the grounding type to insure operator safety, and shall be of heavy enough gauge to carry the amperes drawn by the Lifter without introducing excessive voltage drop.

Electrical Enclosure-Top Panel



2. If the vacuum unit is extremely cold, bring it to room temperature before starting.
3. Turn the unit ON by pushing the toggle switch up (located on front panel of the electrical enclosure). If the vacuum pump motor fails to start, push the toggle switch down, turning the unit OFF. Read the troubleshooting section of this manual.

Electrical Enclosure-Front Panel

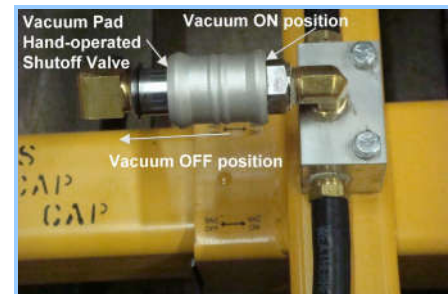


4. Position the pads to support the load evenly; then, slowly lower the unit onto the load, centering the lifter on the load.

5. If your unit is equipped with hand-operated shutoff valves at each crossarm, be certain to open enough of them to provide safe lifting capacity for the weight of the load.

NOTE: If all the valves are closed, no vacuum will flow to the lifting pads on the unit.

Vacuum Pad Hand-operated Shutoff Valve



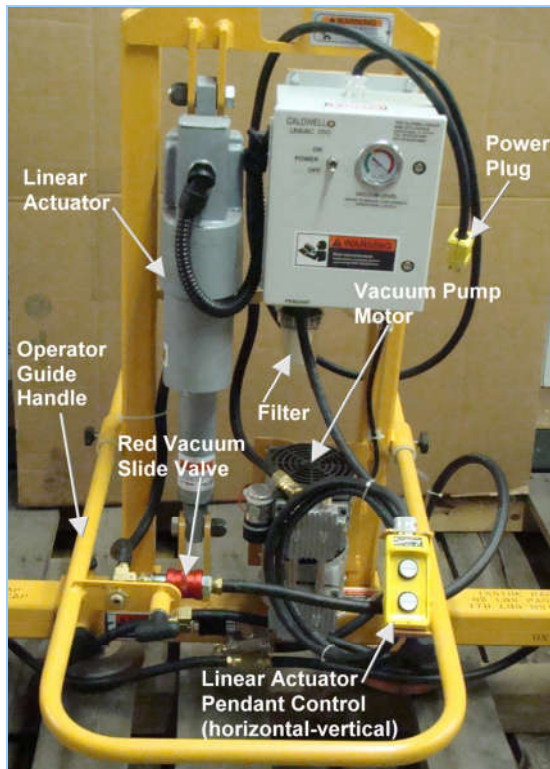
6. Once all of the vacuum pads are positioned on the load, slide the **red** vacuum slide valve to the Vacuum ON position and wait for the vacuum in the pads to increase and stabilize. Verify that adequate vacuum is indicated on the vacuum gauge dial before lifting the load. A minimum of 20 inches of mercury (Hg) must be seen on the vacuum gauge for a safe lift.
7. The dial indicator on vacuum gauge dial on the front cover will point to the vacuum level in inches of mercury (Hg). The gauge reading will begin to rise. When the gauge reaches more than 20 inches of mercury (Hg) and stabilizes, lift and move the load. The gauge reading should continue to increase to 23 inches of mercury or more to provide a safe lift.
8. Transport the load to the new location and slowly lower the load. Once the load is sitting on a stable surface, slide the **red** vacuum slide valve to the Vacuum OFF position, which releases the vacuum pads from the load. Wait for the dial indicator to point to zero inches of mercury before removing the pads from the load.
9. Once the dial indicator points to zero, slowly raise the lifter until all pads clear the load, and reposition the lifter for the next load.



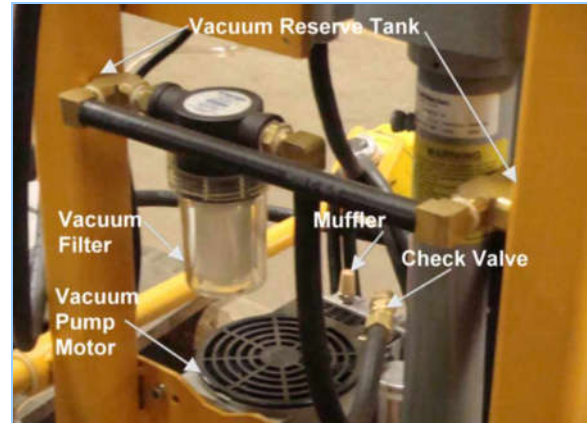
EQUIPMENT DESCRIPTION

ELECTRICAL ENCLOSURE

The electrical enclosure supplies and controls the vacuum to the vacuum pads. The Electrical Enclosure houses the Power ON-OFF toggle switch, vacuum gauge dial, circuit breaker, power plug, and the toggle switch. The **red** vacuum slide valve is between the Vacuum Pump Motor and the operator guide handle, controlling vacuum supply to the vacuum pads, ON or OFF.



The vacuum reserve system is a safety feature, which prevents sudden loss of vacuum in the event of a power or equipment failure.

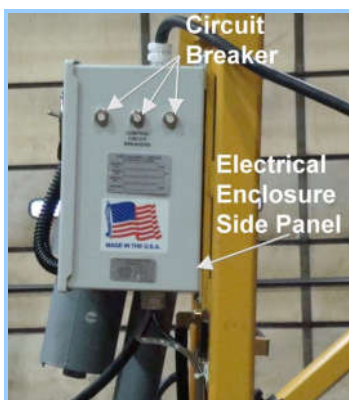


The main power toggle switch and vacuum gauge dial are mounted on the Electrical Enclosure front panel.

Before servicing, DISCONNECT ALL POWER FROM THE UNIT AND WAIT SEVERAL MINUTES.

The vacuum pump has a capacitor to aid in starting the vacuum pump. This capacitor must be fully **discharged** before doing any service work on the vacuum unit.

If the electrical enclosure is disassembled, caution should be used when laying the control panels aside, ensuring none of the panel-mounted components are damaged.





EQUIPMENT DESCRIPTION

VACUUM LIFTING PADS

WARNING

Always tighten the vacuum pad adjustment knob to the crossbeam.

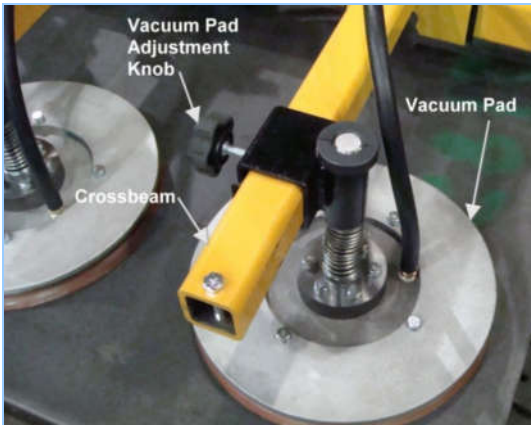
Always tighten the crossbeam knob to the load beam.

Load loss could cause serious injury or death.

When more than one pad is used, pads are connected to an array of crossarms, and the crossarms are connected to the load beam.

In multiple pad configurations, vacuum lines and manifolds connect all the pads to the unit. Hand-operated shut off valves are used when it is necessary to disconnect certain pads from the vacuum circuit. These valves must be adjusted as described in STEP 5, page 10, under Operating Instructions.

When using a multi-pad arrangement, pads should be equally spaced on the load, insuring each pad will carry its share of the load weight. **THIS IS AN ABSOLUTE MUST WHEN USING PADS AT FULL WORKING LOAD LIMIT.**

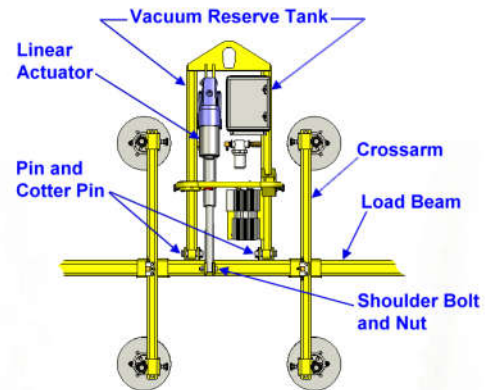


Adjust vacuum pads along the crossarm length by loosening the vacuum pad adjustment knob, which is located on each crossarm. Hold the pad while sliding the vacuum pads to the desired position. Tighten the vacuum pad adjustment knob, securing the vacuum pads to the crossarm.

Always check the vacuum pads by moving them back and forth, ensuring the vacuum pad adjustment knob is tight. Failure to tighten the vacuum pad adjustment knob can result in movement of the vacuum pad, causing an unstable load, which can cause serious injury or death.

LOAD BEAM

The load beam is fabricated from structural tubing and is connected to the UNIVAC Series Lifter by two pins, each with a cotter pin. One pin with cotter pin is fastened at the base of each vacuum reserve tank. One shoulder bolt with a nut is fastened to the base of the linear actuator. The bolt and two pins allow for fast assembly or disassembly of the UNIVAC. **BE SURE THE NUT AND BOLT ARE TIGHT AND THE TWO PINS WITH COTTER PINS ARE IN PLACE BEFORE LIFTING THE LOAD.**



Adjust crossarms along the load beam length by loosening the crossbeam adjustment knobs, which are located on the center of each crossarm. Hold the crossarm while sliding the crossarm to the desired position. Tighten the crossbeam adjustment knob, securing the crossarm assembly to the load beam.

Always check the crossarms by moving them back and forth, ensuring the crossbeam adjustment knob is tight. Failure to tighten the crossbeam adjustment knob can result in movement of the crossarms, causing an unstable load, which can cause serious injury or death.

CROSSARMS

Crossarms are constructed from structural steel members and are fabricated in varying lengths to fit the application requirements.

Crossarms may or may not be equipped with a vacuum manifold. A manifold is supplied when there are more than three pads per crossarm, or when crossarms are over six feet long, or both.

Adjust crossarms along the load beam length by loosening the crossbeam adjustment knobs, which are located on the center of each crossarm. Hold the crossarm while sliding the crossarm to the desired position. Tighten the crossbeam adjustment knob, securing the crossarm assembly to the load beam.

Always check the crossarms by moving them back and forth, ensuring the crossbeam adjustment knob is tight. Failure to tighten the crossbeam adjustment knob can result in movement of the crossarms, causing an unstable load, which can cause serious injury or death.



COMPONENT DESCRIPTION

The following paragraphs provide information on the components and sub-assemblies that make up your UNIVAC 250 Series Unit. Instructions for performing adjustments and repairs are included.

WARNING

WARNING: When servicing a lifting unit, all power to the motor must be de-energized and disconnected. All rotating components must be at a standstill.

MAIN VACUUM SYSTEM

- **VACUUM PUMP**—The vacuum pump in your UNIVAC Series Lifter is an oil-less piston vacuum pump.

NEVER LUBRICATE AN OIL-LESS VACUUM PUMP.

DANGER

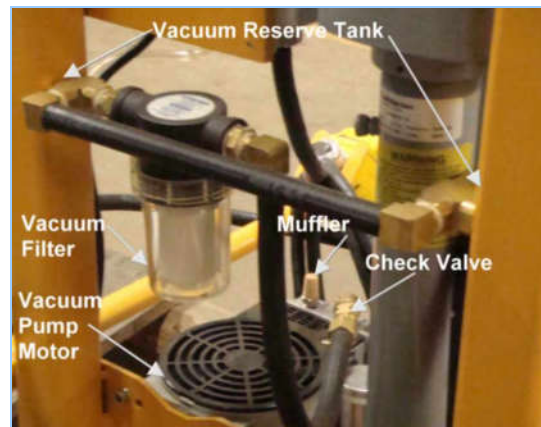
DANGER: Prevent explosive hazard, DO NOT pump combustible liquids, or vapors with this pump.

- **FILTER AND MUFFLER**—The vacuum filter is located next to the linear actuator and underneath the electrical enclosure. The vacuum filter prevents dirt and foreign matter from entering the vacuum pump and valves. The exhaust muffler is located on the vacuum pump and allows the vacuum pump to exhaust and reduces the noise of the vacuum pump exhaust. It is very important to keep both the filter and the muffler in good condition, ensuring maximum system efficiency and long pump life. Refer to periodic maintenance section of this manual for maintenance of these components. Disposable filter element pays for itself with lower maintenance and downtime.

- **MANUALLY OPERATED SHUT-OFF VALVES**—Hand-operated valves, located on each crossarm, are a vacuum pad control feature, adjusting to load size and type. Simply, slide the valve to vacuum OFF, shutting off vacuum to unneeded pads.

This feature provides an escape for the slight vacuum formed in the pad when the lifter is lowered onto the load and, thereby, prevents the unused pads from sticking to the load, during the release cycle.

Operation is performed by simply sliding the slide valve right for Vacuum ON, or left for Vacuum OFF.





COMPONENT DESCRIPTION

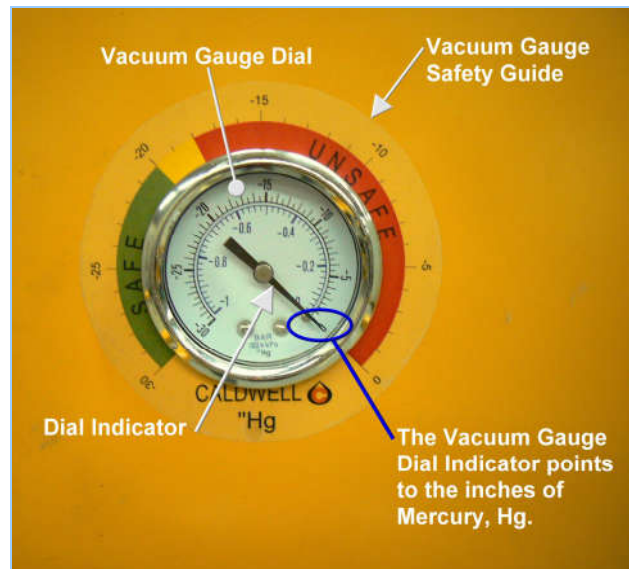
MAIN VACUUM SYSTEM

- VACUUM RESERVE SYSTEM
 - a. RESERVE TANK—A vacuum reserve system insures vacuum is available to the Vacuum pads for a period of time after a power or pump failure.
 - b. CHECK VALVE—The check valve in the UNIVAC Series Lifter is connected between the vacuum reserve tank and the vacuum pump motor. The check valve prevents air from entering the vacuum circuit in the case of a power or pump failure.
- CONTROL AND MONITORING SYSTEM
 - a. TOGGLE SWITCH—The toggle switch on the Electrical Enclosure front panel controls the main power, ON and OFF.
 - b. VACUUM GAUGE DIAL—A vacuum gauge dial indicates the vacuum level. The vacuum gauge dial serves as a diagnostic instrument, during unit testing and maintenance, thereby, providing a vacuum level checking method. We recommend periodic inspection of the vacuum gauge dial with an accurate test gauge. Replace the vacuum gauge dial if the reading is off by more than plus one inch of mercury, + 1" Hg when the system is idle.
 - c. (OPTIONAL) VACUUM LOSS ALARM—This optional device will audibly sound when low vacuum levels are detected. A replaceable 9-volt battery powers this unit. The audible alarm has an adjustable volume control. When the **Red** test button is depressed, the alarm will sound, indicating that the Vacuum Loss Alarm is functioning properly.

- d. **RED** VACUUM SLIDE VALVE—The valve is **red** in color and located between the operator guide handle and vacuum pump motor P. The valve transfers vacuum to the vacuum pads when moved to Vacuum ON, and releases the vacuum from the vacuum pad when moved to Vacuum OFF. When attaching the lifter to the load, the **red** vacuum slide valve must be completely in the Vacuum ON position. To release the load, the **red** vacuum slide valve must be completely in the Vacuum OFF position.



Warning – **Never** move the vacuum slide valve to the Vacuum OFF position when a load is suspended from the lifter. Load loss could cause serious injury, death, or property damage.

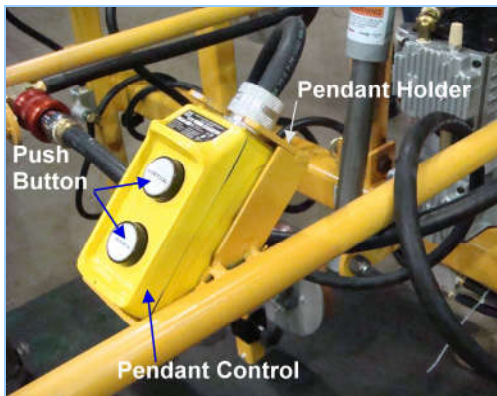




COMPONENT DESCRIPTION

PENDANT CONTROL

- **PENDANT CONTROL**—The pendant control has two push buttons, horizontal and vertical, which trigger the linear actuator, rotating the load beam a maximum 90 degrees. Press and hold the button, either horizontal or vertical, until the linear actuator automatically stops. Otherwise, to control the angle between zero and 90 degrees, quickly press, hold, and release the button, horizontal or vertical, which stops linear actuator; the load beam angle of rotation is achieved at the point of release.





PERIODIC MAINTENANCE

Performing these few simple maintenance steps will prolong the life of your UNIVAC Series Lifter, insuring operating safety. We recommend following the schedule below:

- DAILY
 - a. Perform filter and muffler check.
 - b. Perform proof load test.
- WEEKLY
 - a. Check seal rings, hoses, and fittings.
 - b. Check for loose bolts, nuts, and structural damage.
 - c. Test vacuum gauge dial reading.
 - d. Lubricate pad slide valves with one drop of light oil on each side of slide valves and shift valve several times.
- QUARTERLY
 - a. DO NOT LUBRICATE THE MOTOR OR PUMP ASSEMBLY.
 - b. Check vacuum gauge for accuracy using an accurate test gauge assembly.
- PERFORMING PROOF LOAD TEST

The proof load test should be conducted daily to verify that the UNIVAC Series Lifter safety features are operating properly. In effect, the test simulates an electrical power failure so that the performance of the vacuum reserve system can be checked.

 - a. Position your UNIVAC Series Lifter over a sheet of nonporous material such as steel or aluminum.
 - b. Adjust the crossarms and the vacuum pads properly supporting the load.
 - c. Lower the unit onto the material so that all pads make contact. If the pads are equipped with shutoff valves, they should all be set to the Vacuum ON position.
 - d. Push the toggle switch up to the ON position.
 - e. Slide the **red** Vacuum Slide Valve to the Vacuum ON position.
 - f. Wait until the vacuum gauge reaches a minimum of 20 inches of Mercury (Hg) and stabilizes, indicating the load is safe to lift.

Note: The typical vacuum gauge reading should stabilize at 23" to 25" Hg. with this unit.

- g. Lift the vacuum unit and the load so that the load is between 1 and 2 inches above its rest position.
 - h. Simulate a power failure by pushing the toggle switch to the OFF position.
Observe the vacuum gauge dial indicator. If the reading drops more than 1" Hg. in two minutes, the system should be checked for leaks. Refer to the troubleshooting section of this manual for guidance in locating leaks.
- PERFORM FILTER AND MUFFLER CHECK

The filter and muffler check should be performed daily to verify that these units are not contaminated more than recommended for efficient operation. A clogged filter or muffler will impede the flow of air into the pump. The condition of these units can be checked by starting the vacuum pump with no material attached to the pads and all hand-valves open to the vacuum system:

 - a. FILTER

The filter has a clear sight glass with a replaceable filter element. A filter with excessive dirt and discoloration requires replacement.

To replace the filter element, first, disconnect all power to the unit and wait several minutes. Next, unscrew the clear sight glass and remove. After removing the sight glass, the o-ring becomes visible. Inspect the o-ring. If the O-ring is damaged, replace with a new o-ring.

When replacing the sight glass, make sure the o-ring does not get kinked or pinched. Otherwise, the o-ring will fail to seal properly, causing a vacuum leak. Once the filter is replaced, test for vacuum leaks by powering up the vacuum unit, verifying the lifter reaches proper vacuum levels; and can maintain the vacuum levels, even with the vacuum pump shut off.
 - b. MUFFLER

The Muffler is located on the Vacuum Pump. The Muffler threads into the Vacuum Pump. Replace a clogged or extremely dirty muffler with a new muffler.



TRACE LEAKAGE

Troubleshooting is always easier if one has a good understanding of how the equipment is intended to operate. The operating principles located in this manual should be reviewed before repairing and servicing this unit.

- **TESTING FOR LEAKS:**

Should the unit fail the proof load test, there is a leak somewhere in the vacuum system.

A process of elimination can most readily determine the location of the leak. Check the UNIVAC first, if it tests good, other sections of the vacuum system are connected one at a time until the leaky section is found. Close off the vacuum to each crossarm. Perform a power-off vacuum test in the same manner as outlined for the proof load test; start the pump, switch the vacuum on and allow the gauge reading to increase to 23" Hg. or higher. Then stop the pump and observe the gauge. If the reading drops more than 1" Hg. in two minutes, the leak is located in UNIVAC. If not, the leak is in the vacuum pad piping or in the vacuum pad.

If the leakage is external of the UNIVAC, open the cross arm valves one at a time and repeat the power-off vacuum test. Opening the cross arm valves one at a time will isolate the crossarm that has the leak. If leakage is still indicated, the leak is in the piping to the pads or to the pads themselves. Continue the process of elimination until the location of the leak is pinpointed.

The following components should be checked as possible sources of vacuum leaks:

- a. Seal Rings – check for cracks, cuts or other damages.
 - b. Vacuum Pads – check for cracks and loose bolts.
 - c. Vacuum Hoses – check for breaks, cuts, pinch marks, and loose fittings.
 - d. Vacuum Filter – check for looseness and damaged o-ring.
- **THREAD CONNECTIONS:**
 - a. All thread connections should be drawn up tight using pipe dope. Care should be taken to prevent pipe dope and other foreign material from entering the vacuum system.



TROUBLE SHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSES</u>	<u>REMEDY</u>
Vacuum pump will not run	No power to unit Defective pump/motor unit Defective ON-Off main power toggle switch Loose or damaged wiring Unit at extremely low temperature	Check power source Check, to repair or replace as required Check , replace as required Meter check, repair or replace as required Bring unit to room temperature before starting
Vacuum pump runs hot	Low incoming voltage High ambient temperature	Check and correct as required Shield unit
No or low vacuum reading on vacuum gauge	Improper vacuum pad seal Clogged filter or muffler Damaged pad or seal ring Loose or damaged hoses or fittings Defective gauge Defective gauge line Defective pump Porous or perforated material; rough, dirty, and /or foreign particles on surface	Check, replace as required Check , replace as required Check , replace as required Check , repair or replace as required Check , replace as required Check, clean or replace as required Check, to return for repair or replace as required Check by using unit on clean, non-porous material such as steel or aluminum



TROUBLE SHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSES</u>	<u>REMEDY</u>
Unit remains in "Vacuum On" cycle	Red vacuum slide valve is in the "Vacuum On" position Defective vacuum On-Off valve	Slide the red vacuum slide valve to "Vacuum Off" position Check, replace as required
Unit remains in "Vacuum Off" cycle	Red vacuum slide valve is in the "Vacuum Off" position Loose or damaged wiring Defective vacuum On-Off valve	Slide the red vacuum slide valve to "Vacuum On" position Check, repair or replace as required Check, replace as required
Delayed Vacuum attach	Clogged filter or muffler Improper vacuum pad seal Damaged vacuum pads or seal rings Worn vacuum pump Porous and/or perforated material Clogged, loose or damaged hoses and/or fittings	Check, clean or replace as required Check, replace as required Check for cracks, loose or broken bolts, cut or torn seal rings, excessive seal ring wear, deformed seals, replace as required Replace the vacuum pump Test on non-porous material, for example, steel or aluminum Check, to clean, repair or replace as required



TROUBLE SHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSES</u>	<u>REMEDY</u>
Excessive vacuum loss during "Proof Load Test"		Refer to section on "Tracing Leakage", Page 18
Noisy vacuum pump	Clogged filter-muffler	Clean or replace the filter-muffler
No vacuum at pads	Shut-Off valve is in the closed position Vacuum line to pad clogged or kinked Vacuum line quick coupler loose Loose material on surface of load that is plugging the pad port Defective pad shut-off valve	Change the Shut-Off valve to the open position to provide safe lifting capacity for the intended load Check, to clean or replace as required Check, re-connect or replace as required Remove loose material at pad port Check, repair or replace as required
Unit will not lift load	Load over rated capacity of unit Material peeling from outer pads Individual pad(s) pulls loose under load Material surface not flat Small pads mixed with large pads Sheets of material stuck together	DO NOT load over unit's rated capacity Check pads for proper spacing and adjust as required Check, adjust pad elevation even with other pads Use compensating pad mountings for uneven surfaces Check , correct Separate sheets before attempting to lift the load



KEY FACTORS

MARKINGS	Load Capacity & Empty Weight shall be clearly marked on every Lifter
WEIGHT OF LOAD	Must be within capacity of lifter
WEIGHT OF LIFTER & LOAD	Must be within capacity of Hoist & Crane
WEIGHT OF DISTRIBUTION OF LOAD	Must not overload any one part of the lifter
HEADROOM	Headroom must be sufficient for loaded lifter and the purpose of the lift
DAMAGE RISK TO LOAD	Protect fragile loads from damage throughout lift cycle
DAMAGE RISK TO LIFTER	Protect lifter from abuse by the loads being lifted
VERSATILITY	Because lifters are versatile be sure correct lifter is used
STORAGE	Lifter shall be stored and protected in designated location when not in use
INSPECTION	Lifter must be inspected at frequent regular intervals
CERTIFICATION	Lifter must be approved for use after each inspection
SERVICE RECORD	Permanent inspection and maintenance records should be kept on all lifters
RESPONSIBILITY	The lifter operator should exercise full responsibility for safe lifting operation at all times
HOUSEKEEPING	Good housekeeping promotes safety in ALL operations
SPECIAL CONSIDERATIONS	Consult manufacturer in hazardous or unusual environment conditions such as:
	TEMPERATURE CORROSION
	MOISTURE ABRASION
	ALTITUDE



SPARE PARTS

ITEM#	DESCRIPTION	PART NUMBER
1	5 Amp Circuit Breaker	101301
2	7 Amp Circuit Breaker	101306
3	10 Amp Circuit Breaker	101302
4	Vacuum Gauge	101711
5	Toggle Switch	101370
6	Exhaust Vent	101488
7	Check Valve, 3/8 NPT x 3/8 NPT	101294
8	Control Slide Valve (Red) ½ FNPT	101712
9	Vacuum Pump	101732
10	Vacuum Filter (Housing & Filter)	101714
11	Replacement Filter Element	101713
12	Pad Slide Valve	101472
13	Ball Bolt Mount ½" Dia x 10" Lg	B-1006-1-4
14	Seal Ring VSN-8SO-30	C-1001-5

**MODIFICATIONS TO YOUR LIFTING EQUIPMENT WITHOUT PRIOR WRITTEN APPROVAL FROM
THE CALDWELL GROUP, INC. VOIDS YOUR WARRANTY.
REFER TO ASME B30.20 REGARDING LIABILITY OF REPAIRED OR MODIFIED LIFTERS.**



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