

KEEP FOR FUTURE REFERENCE



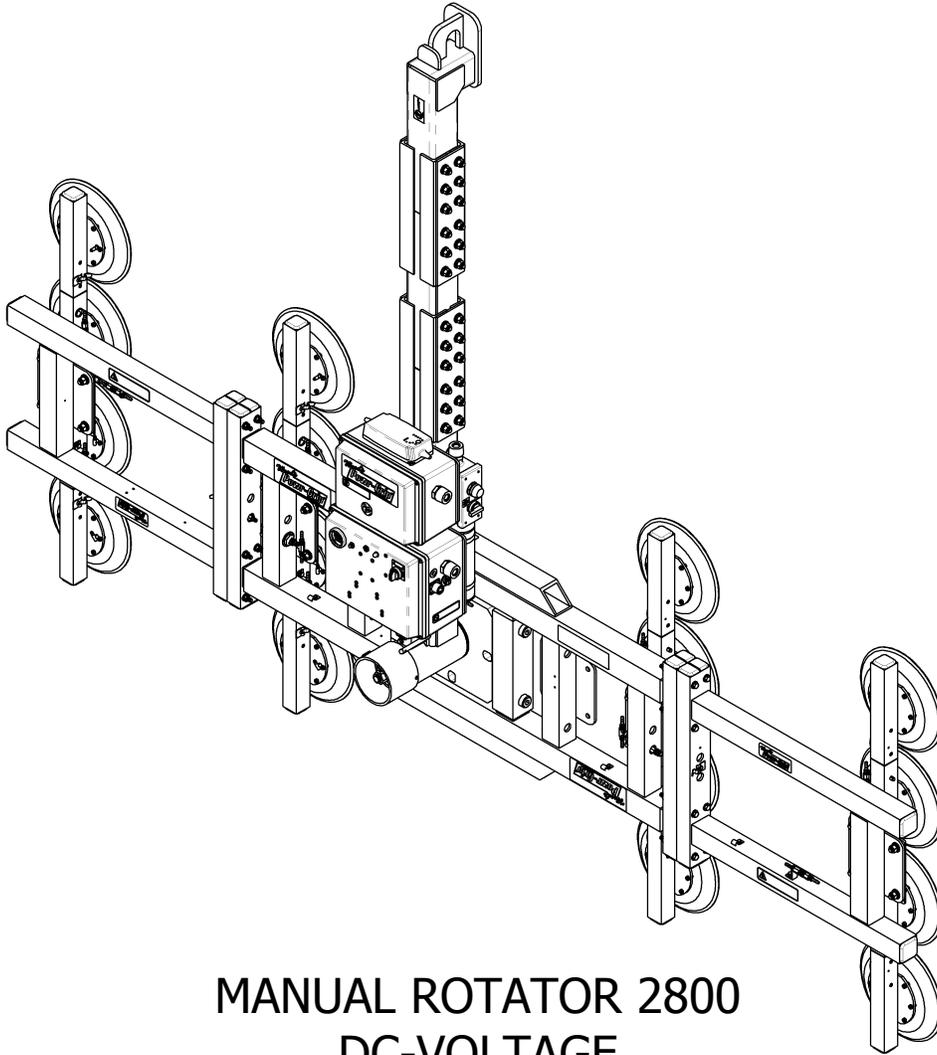
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INSTRUCTIONS

International Version

MODEL NUMBER: MR1611LDCCO

SERIAL NUMBER: _____
(please see serial label and record number here)



**MANUAL ROTATOR 2800
DC-VOLTAGE
WITH DUAL VACUUM SYSTEM OPTION**



***READ ALL INSTRUCTIONS AND WARNINGS
BEFORE OPERATING THIS LIFTER***



DESIGNED FOR THE MATERIALS HANDLING PROFESSIONAL

WARNINGS



Powr-Grip is pleased to offer the most reliable vacuum lifters available. Despite the high degree of security provided by this product, certain precautions must be observed to protect the operator and others.



Always wear personal protective equipment that is appropriate for the material being handled. Follow trade association guidelines.

Always operate the lifter under conditions approved for its design (see INTENDED USE: OPERATING ENVIRONMENT).

Never operate a lifter that is damaged, malfunctioning, or missing parts.

Never operate a lifter if the sealing edge of any vacuum pad is cut or otherwise damaged.

Never remove or obscure warning labels.

Never operate a lifter if the Load Capacity or any warning appears to be missing or obscured.

Always make certain the contact surfaces of the load and all vacuum pads are clean prior to applying the pads (see MAINTENANCE: VACUUM PAD MAINTENANCE).

Never exceed the Load Capacity or attempt to lift loads the lifter is not designed for (see INTENDED USE: LOAD CHARACTERISTICS).

Never attempt to lift cracked or broken glass with this lifter.

Always position the vacuum pads correctly on the load prior to lifting (see OPERATION: TO APPLY THE PADS TO A LOAD).

Never lift a load when any vacuum indicator shows inadequate vacuum.

Never touch the vacuum release controls during a lift. This may result in loss of vacuum and release of the load.

Never allow people to ride on the lifter or the load being lifted.

Never lift a load higher than necessary or leave suspended loads unattended.

Never lift a load over people.

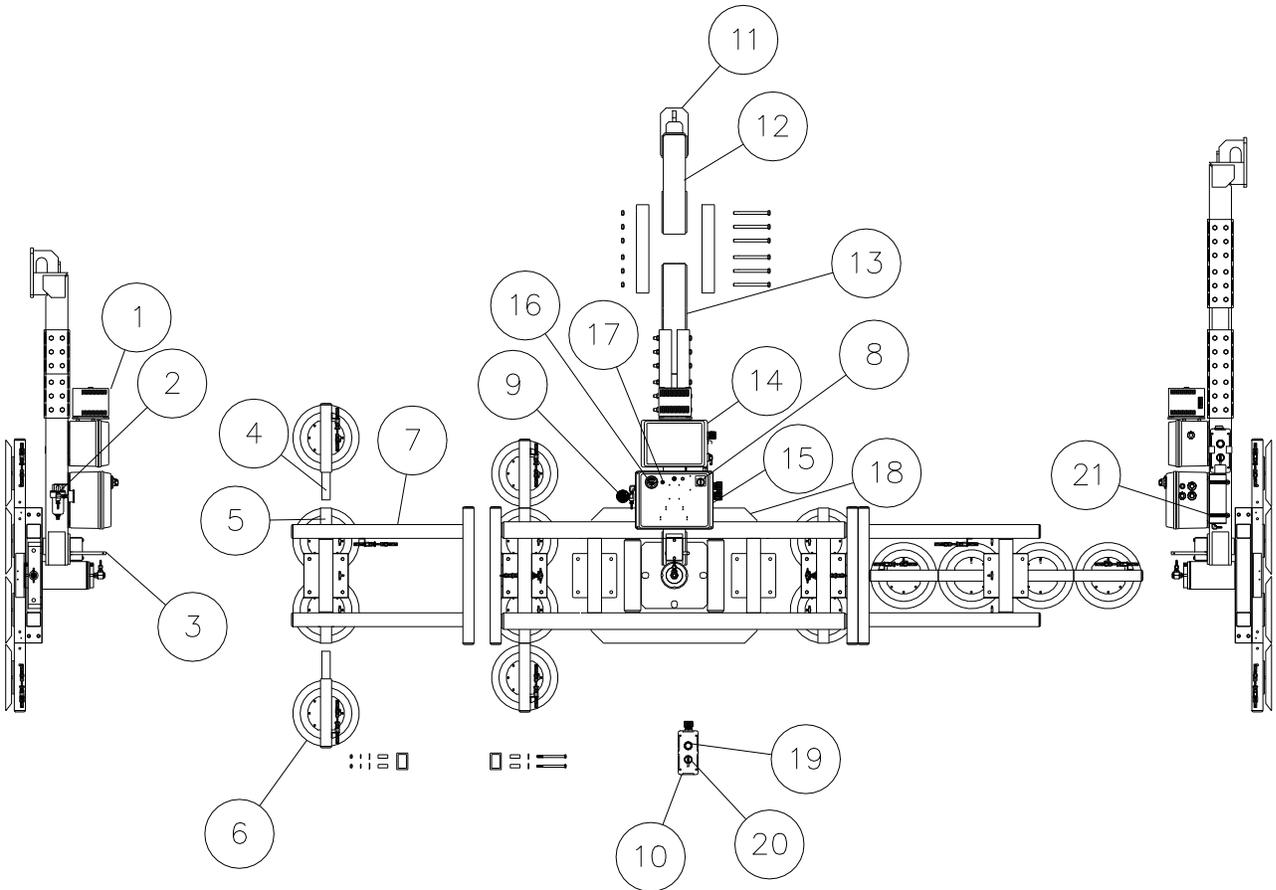
Always keep other personnel far enough away from the lifter to avoid injury in the event of an unexpected load release.

Always place the power control in the inactive position and, when possible, disconnect the power source before opening any enclosure on the lifter. (Only applicable to powered lifters)

Always remember that modifications to the lifter may compromise its safety. Wood's Powr-Grip cannot be responsible for the safety of a lifter that has been modified by the customer. For consultation, contact Wood's Powr-Grip (see LIMITED WARRANTY).

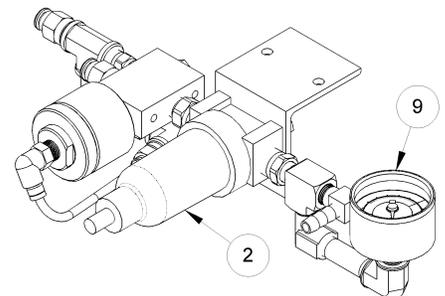
OPERATING FEATURES

Note: Components featured in the following instructions for assembling, operating or maintaining the vacuum lifter are underlined> on their first appearance in each section.



Standard MR1611LDC shown.

- | | | |
|----------------------------------|----------------------------|----------------------------------------------------|
| 1 BATTERY CHARGER | 8 POWER SWITCH | 15 Enclosure with VACUUM PUMP(S) and VACUUM SWITCH |
| 2 AIR FILTERS | 9 VACUUM GAUGE | 16 BATTERY GAUGE |
| 3 ROTATION RELEASE LEVER | 10 MOVABLE CONTROL PENDANT | 17 BATTERY TEST BUTTON |
| 4 REMOVABLE PAD ARM | 11 LIFT BAIL | 18 CENTER SECTION of PAD FRAME |
| 5 ROTATING PAD ARM | 12 LIFT BAR | 19 VACUUM LIFT LIGHT/ VACUUM CONTROL PUSH BUTTON |
| 6 VACUUM PAD | 13 LIFT BAR EXTENSION | 20 APPLY/RELEASE SWITCH |
| 7 REMOVABLE SECTION of PAD FRAME | 14 BATTERY ENCLOSURE | 21 VACUUM RESERVE TANK |



Dual Vacuum System Valve Assembly

ASSEMBLY

TO SET UP THE LIFTER

- 1) Open the shipping container and remove all materials for restraining or protecting the vacuum lifter. Save the container for use whenever the lifter is transported.
- 2) Suspend the lifter from a crane as follows: Select hoisting equipment (crane and hoist, when applicable) rated to carry the maximum load weight plus the lifter weight (see SPECIFICATIONS: Maximum Load Capacity and Lifter Weight).

Note: Any application of the lifter must conform to all statutory or regulatory standards that relate to the hoisting equipment when used in its geographical location (eg, relevant OSHA standards in the USA).

Disengage the lifter's rotation latch (see OPERATION: TO ROTATE THE LOAD EDGEWISE) and raise the lift bar to a vertical orientation, until the rotation latch re-engages.

Note: When you are planning to use the removable sections of the pad frame, install the lift bar extension before proceeding further (see TO CHANGE THE PAD FRAME CONFIGURATION to follow).

 **WARNING: Hoisting equipment hook must be fitted with restraining latch to prevent lift bail from slipping off under any circumstances.**

Note: Some hoisting equipment hooks could interfere with an upright load that extends beyond the lifter's pad frame. If the load would contact the hook during lifter operation, the operator must prevent this by attaching a sling (or other rigging that does not interfere with the load) between the hook and the lift bail.

 **WARNING: Any sling used must be rated to carry maximum load weight plus lifter weight.**

Attach the hoisting equipment hook to the lift bail, and use the hoisting equipment to raise the lifter out of the shipping crate. Be careful to avoid damaging any vacuum pads. Remove the pad covers and save them for use whenever the lifter is stored.

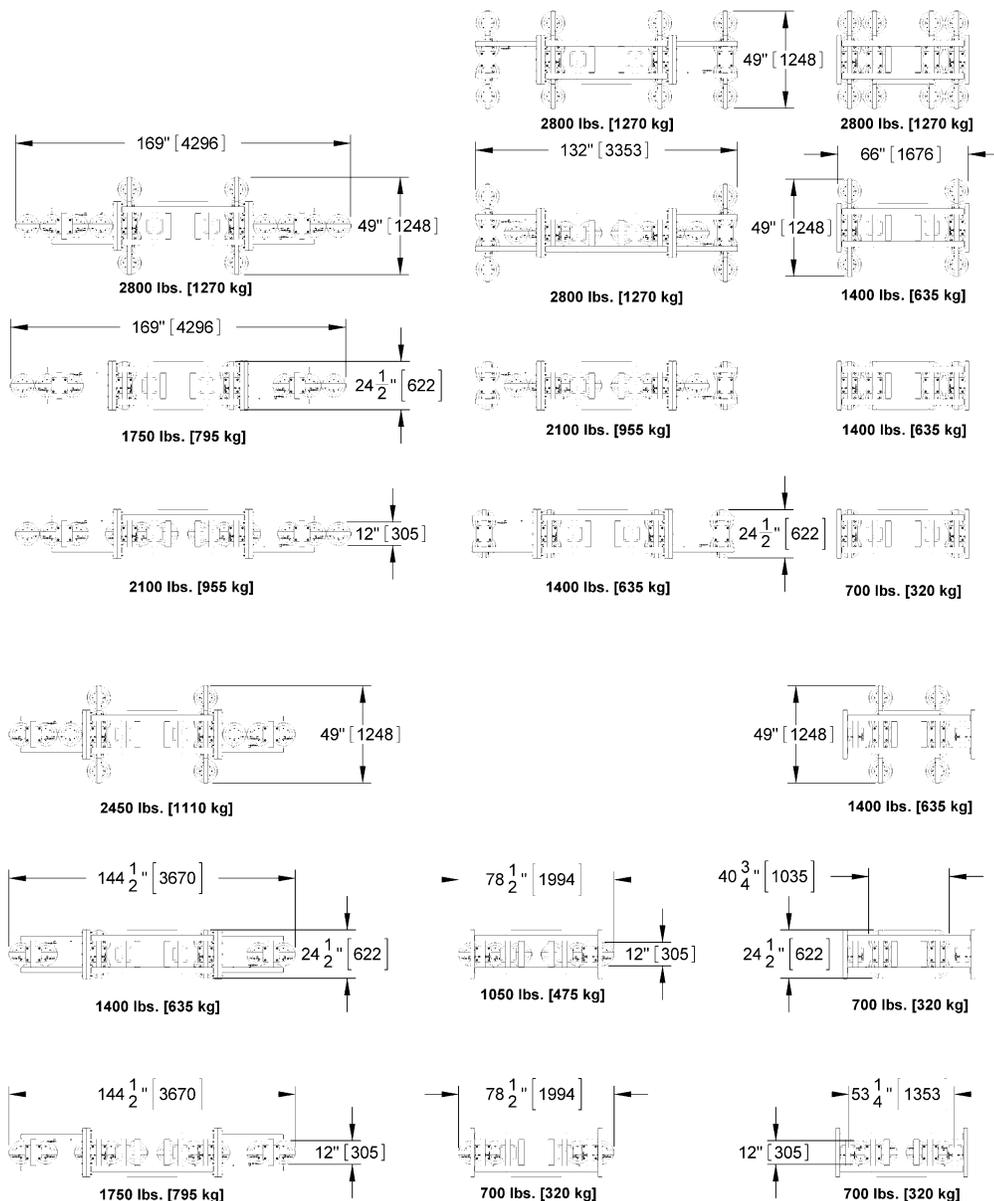
- 3) Assemble the pad frame in the configuration that will provide optimal support of the load while lifting (see TO CHANGE THE PAD FRAME CONFIGURATIONS to follow). Now the lifter is operational.
- 4) Connect the electrical connectors uniting the battery to the battery charger and the vacuum generating system. Now the lifter is operational.
- 5) Perform Operational and Load Tests for the lifter as directed in MAINTENANCE: TESTING SCHEDULE.

To Change the Pad Frame Configuration

This lifter offers a variety of pad frame configurations to accommodate different load dimensions and weights (see illustrations). Configurations are created by installing or removing the pad frame's outer, removable sections and removable pad arms, and/or by rotating the pad frame's rotating pad arms. Some configurations also require the lift bar extension to be installed (see To Install the Lift Bar Extension to follow).

Note: The dual vacuum system is equipped with 2 air-line circuits, which are identified by color-coded vacuum hoses. In order to ensure maximum effectiveness of the dual vacuum system, the vacuum pads must be connected in an equal and alternating distribution to the 2 circuits.

Always arrange the vacuum pads in a symmetrical configuration, in both horizontal and vertical dimensions. After changing the pad frame configuration, make sure all vacuum hoses are secure and routed to avoid being pinched, snagged, abraded or otherwise damaged while the lifter is in operation. Also be sure to verify that all pads are connected and functioning correctly.



Pad Spread and Load Capacity

To Install (and Remove) the Lift Bar Extension

The lift bar extension must be used whenever the pad frame's removable sections are attached. Otherwise, the extended pad frame would strike the lift bail during rotation. The lift bar extension can be removed whenever the removable sections are not attached to the pad frame.

- 1) Support the lifter so that hoisting equipment is not required to hold it upright. Make sure the lifter is supported securely before removing the hoisting equipment hook from the lift bail.
- 2) Remove the 12 bolts from the lift bar joint and remove the joint couplers.
- 3) Install the lift bar extension between the upper and lower sections of the lift bar.
- 4) Install joint couplers at the joints on either end of the lift bar extension.
- 5) Install and securely tighten the 12 bolts for each of the 2 lift bar joints.
- 6) To remove the lift bar extension, reverse this procedure.

To Install (and Remove) the Optional Short Lift Bar

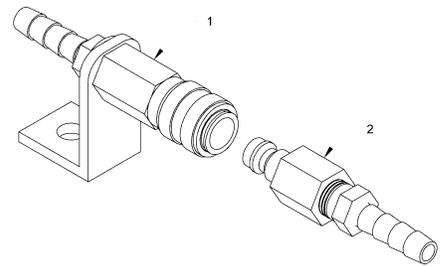
If applicable, install the Short Lift Bar directly to the lifter, as described in the preceding section. However, do *not* use the lift bar extension or joint couplers; instead, bolt the Short Lift Bar securely onto the lower section of the standard lift bar, using the hardware provided.

⚠ WARNING: Maximum Load Capacity equals 1800 lbs [815 kg] when Short Lift Bar is installed.

To remove the Short Lift Bar, reverse this procedure.

To Install (and Remove) the Removable Sections of the Pad Frame

- 1) Align one removable section with the center section of the pad frame.
- 2) Align the bolt holes on each side of the joint where the removable section attaches to the center section. Insert the 8 bolts for 1 removable section through the bolt holes and tighten the bolts securely. Make sure the bolt spacers located inside the pad frame's tubes remain in place.
- 3) Remove the male end of the quick connector from the spring clip on the pad frame's removable section. Thread the vacuum hose through the opening for this purpose at the pad frame joint. Push the male and female ends of the quick connectors together until they lock.
- 4) Repeat steps 1-3 to install the other removable section of the pad frame.
- 5) To remove the pad frame's removable sections, reverse this procedure. Move the release ring on the female end of the quick connector away from the male end to separate the ends.

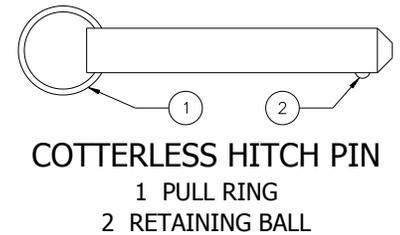


QUICK CONNECTOR

- 1) FEMALE END
- 2) MALE END

To Install (and Remove) Removable Pad Arms

- 1) Insert the end of a removable pad arm in one socket on the pad frame, so that the holes align for the cotterless hitch pin.
- 2) Secure the removable pad arm in the pad frame by pushing a cotterless hitch pin through the holes until the retaining ball emerges on the far side of the pad frame socket.
- 3) Remove the end of the quick connector from the spring clip on the pad arm. Push the male and female ends of the quick connector together until they lock. To ensure maximum effectiveness of the dual vacuum system, make sure that the vacuum pads are connected in an equal and alternating distribution to the 2 circuits of the vacuum system.
- 4) Repeat steps 1-3 to install each pad arm required for the pad frame configuration desired.
- 5) To remove the removable pad arms, reverse this procedure. Move the release ring on the female end of the quick connector away from the male end to separate the ends. Store removed pad arms in a clean, dry location to protect them from environmental exposure.



To Rotate Rotating Pad Arms

- 1) Remove the 4 bolts that secure each rotating pad arm on the pad frame.
- 2) Rotate the arm 90° and reinstall the bolts.
Note: Routing for the vacuum hoses allows the arm to be rotated in one direction only. Do not attempt to rotate the arm in the opposite direction, because this can result in crimping or pinching of vacuum hose.
- 3) Repeat steps 1-2 to rotate each pad arm as required for the pad frame configuration desired.

INTENDED USE

LOAD CHARACTERISTICS

 **WARNING: This lifter is NOT intended for lifting hazardous materials, such as explosives or radioactive substances.**

The operator must verify that the lifter is intended to handle each load, in accordance with the following requirements:

- The load must not exceed the maximum allowable weight specified under Load Capacity (see SPECIFICATIONS).
- The load must be a single piece of nonporous or semiporous material with a flat and relatively smooth contact surface.³ To determine whether the load is too porous or rough, perform the test under Vacuum Level on Other Surfaces (see OPERATION: TO APPLY THE PADS TO A LOAD).
- The load's contact surface must be suitable for obtaining a friction coefficient of 1 with the lifter's vacuum pads (see MAINTENANCE: VACUUM PAD MAINTENANCE: Friction Coefficient), as verified by a friction test. If necessary, contact Wood's Powr-Grip for help in conducting a friction test.
- In order to avoid damaging the vacuum pads, the load's surface temperature must not exceed the allowable Operating Temperatures (see SPECIFICATIONS). However, if such an application cannot be avoided, Wood's Powr-Grip does offer a heat-resistant rubber compound and other solutions which may enable you to lift loads with higher surface temperatures. Contact Wood's Powr-Grip or an authorized dealer for more information.
- While the *minimum* length and width of the load are determined by the Pad Spread (see SPECIFICATIONS), the *maximum* length and width are determined by the allowable overhang, or the amount of load material that can extend sideways beyond the vacuum pads without breaking or otherwise being damaged.

The allowable overhang depends on the kind of load material being lifted, the thickness of the material, and the angle at which it is handled (if any). Since materials such as glass, stone or sheet metal each have different physical properties, the allowable overhang must be evaluated separately for each type of load. If necessary, contact Wood's Powr-Grip or an authorized dealer for help in determining the recommended overhang in a specific situation.

- 1" [2.5 cm] is the maximum allowable thickness of loads at the maximum weight (see SPECIFICATIONS: Load Capacity). However, allowable thickness increases as load weight decreases. If necessary, contact Wood's Powr-Grip for help in determining the maximum thickness permitted when handling any specific load.

Note: Vacuum pads can stain or deform load surfaces with light colors or soft coatings. The operator should test such surfaces for detrimental effects before using the lifter on them.

³ Lifters that feature concave vacuum pads can also attach to some kinds of curved loads. Since curvature affects the lifting capacity, contact Wood's Powr-Grip for help in determining the Load Capacity for a particular curved load.

OPERATING ENVIRONMENT

The operator must determine whether the lifter is intended to be used in each work environment, in accordance with the following restrictions:

 **WARNING: Never use lifter in dangerous environments.**

- This lifter is not intended for use in any environment that is inherently dangerous to the operator or likely to compromise the lifter's ability to function. Environments containing explosives, caustic chemicals and other dangerous substances must be avoided when using the lifter.
- The lifter's work environment is limited by the Operating Elevation and Operating Temperatures indicated in SPECIFICATIONS.
- The lifter's work environment must be free of metal particles or any other contaminants that could damage lifter components through airborne contact or any other means of transmission in the environment. If such contaminants cause a vacuum pump failure, they could result in a load release and possible injury to the operator or others nearby.

 **WARNING: Environmental contaminants could result in vacuum pump failure.**

- Using the lifter in wet environments may require the operator to take special precautions:
Moisture on contact surfaces of the load or vacuum pads diminishes the lifter's slip resistance, thereby reducing the lifting capacity (see MAINTENANCE: VACUUM PAD MAINTENANCE: Friction Coefficient).

 **WARNING: Moisture reduces slip resistance of vacuum pads.**

Although the lifter's exterior surfaces can tolerate some exposure to water vapor, they are not designed to be water-tight. Submerging the lifter or using it in rain may damage lifter components; these and similar conditions must be avoided.

DISPOSAL OF THE LIFTER

After the vacuum lifter has reached the end of its service life, you must dispose of the lifter in compliance with all local codes and regulatory standards that are relevant for the geographical region.

Note: This lifter is equipped with a battery, which may be subject to special disposal regulations.

OPERATION

BEFORE USING THE LIFTER

The operator must determine whether the lifter is capable of performing each intended task, in accordance with the SPECIFICATIONS and INTENDED USE sections of this *INSTRUCTIONS* manual. In addition, all of the following preparations must be completed prior to lifting any load.

Taking Safety Precautions

The operator must be trained in all relevant industry and regulatory standards for the operation of the vacuum lifter in its geographical location (eg, ASME B30.20 in the USA).

The operator must read and understand this *INSTRUCTIONS* manual, including all **WARNINGS**, before using the lifter. If necessary, contact Wood's Powr-Grip or an authorized dealer for assistance.

⚠ WARNING: Always wear appropriate personal protective equipment.

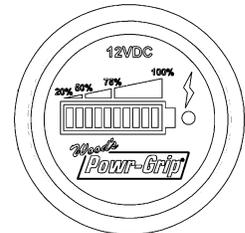
The operator must wear any personal protective equipment and take any other precautions required to handle the load safely. Consult appropriate trade association guidelines to determine what precautions are necessary for each type of load material.

Performing Inspections and Tests

⚠ WARNING: Always check battery energy before using lifter.

(See MAINTENANCE: BATTERY TEST)

Perform all inspections and tests required by the INSPECTION and TESTING SCHEDULES (see MAINTENANCE). In addition, if the lifter has been in storage, always conduct a VACUUM TEST before placing it in service (see MAINTENANCE).



The lifter is equipped with 3 air filters to help protect the vacuum generating system from contaminants. In order for a filter to function, the operator must empty the filter bowl before enough liquid accumulates to contact any portion of the filter element (see MAINTENANCE: AIR FILTER MAINTENANCE).

⚠ WARNING: Examine each air filter regularly, and empty when necessary.

There are 2 small air filters located on the lifter's pad frame. If either of these filters is not maintained properly, it could become obstructed, causing vacuum to build up in the line leading to the large vacuum gauge and the vacuum lift light. Since the vacuum level at these vacuum indicators would be higher than what actually exists elsewhere in the vacuum system, the lifter could seem to be ready to lift the load, even though the lifter has not attained a vacuum level sufficient for lifting the maximum load weight (see TO APPLY THE PADS TO A LOAD: Reading the Vacuum Gauges and TO LIFT AND MOVE THE LOAD: Load Capacity and the Lift Light to follow). In order to avoid this dangerous situation, each of the air filters must be maintained as directed in the MAINTENANCE section.

Confirming the Pad Frame Configuration

 **WARNING: Load Capacity of lifter varies, depending on pad frame configuration.**

Make sure the pad frame has been assembled in the configuration that will provide optimal support of the load while lifting (see ASSEMBLY: TO CHANGE THE PAD FRAME CONFIGURATION). The pad frame configuration selected must be appropriate both for the weight and for the dimensions of the load to be lifted.

To Apply the Pads to a Load

Powering up the Lifter

Place the lifter's power switch in the ON () position.⁴ The blue power light remains illuminated while the lifter is powered up.

 **WARNING: Never turn power off while lifting.**

Keep the power switch in the ON position while lifting a load. Any power interruption during a lift could result in the release of a load and possible injury to the operator or others (see TO LIFT AND MOVE THE LOAD: In Case of Power Failure to follow).

Positioning the Lifter on the Load

Make certain that the contact surfaces of the load and all vacuum pads are free of any contaminants that could prevent the pads from sealing against the load (see MAINTENANCE: VACUUM PAD MAINTENANCE).

The lifter must be attached only to vertically oriented loads. Center the pad frame to within 2" [5 cm] of the load center, since off-center loading can cause the load to rotate unexpectedly, and it may also damage the lifter.⁵ Make sure that all vacuum pads will fit entirely on the load's contact surface (see SPECIFICATIONS: Pad Spread) and that they will be loaded evenly while lifting (see SPECIFICATIONS: Per-Pad Load Capacity). Then apply the lifter to the load so that all pads are touching the contact surface.

Sealing the Pads against the Load

The apply/release switch is located on the movable control pendant. The movable control pendant allows the vacuum controls to be moved away from the lifter, so that the operator can control airflow at a distance equal to the length of the pendant cord.

 **WARNING: Do not disconnect control pendant during lifter operation.**

⁴ If a vacuum pump or any other powered component fails to function while the lifter's power switch is in the ON position, examine each circuit breaker (adjacent to power switch) to determine whether it has interrupted the electrical circuit to the component. Although the operator can reset the circuit breaker, the power interruption may indicate an electrical problem that requires attention. Correct any deficiency before resuming normal operation of the lifter (see wiring diagram provided).

⁵ The lifter is designed to handle the maximum load weight (see SPECIFICATIONS: Maximum Load Capacity) when the load's center of gravity is positioned within 2" [5 cm] of the pad frame's center point. Occasional loading deviations are permissible, provided that the operator can maintain control of the load at all times and that the load weight is low enough to avoid damaging the lifter.

The movable control pendant is not intended to be disconnected during lifter operation. Disconnecting the control pendant is likely to result in a load release and injury to the operator or others nearby.

Turn the apply/release switch on the movable control pendant to the "APPLY" position (clockwise). This energizes the vacuum pumps, causing vacuum to be drawn immediately at the vacuum pads. Press the lifter onto the load until all the pads seal against it. The apply/release switch must remain in the "APPLY" position throughout the entire lift.

 **WARNING: Keep apply/release switch in "APPLY" position throughout lift.**

Note: If a vacuum pad has been lying against a hard object (as during shipping), it may be slightly distorted. Although initially it may be difficult to apply the pad to a load, this condition should correct itself with continued use.

Reading the Vacuum Gauges

The lifter is equipped with 3 vacuum gauges: 2 *small* vacuum gauges are located on the pad frame, to indicate the current vacuum level in each circuit of the lifter's vacuum system. A third, *large* vacuum gauge is located on the lift bar. So long as the air filters on the pad frame are maintained properly (see BEFORE USING THE LIFTER: Performing Inspections and Tests preceding), the large vacuum gauge indicates the lower of the vacuum levels existing in the 2 circuits.

Each vacuum gauge registers vacuum in the same way: The *green* range indicates vacuum levels sufficient for lifting the maximum load weight, whereas the *red* range indicates vacuum levels that are **not** sufficient for lifting the maximum load weight. The gauge needle should show a sudden surge in vacuum as the vacuum pads seal against the load. If it takes more than 5 seconds for the vacuum level to reach 5" Hg [-17 kPa] on a vacuum gauge, press on any pad that has not yet sealed.

Vacuum Level on Optimal Surfaces

When the lifter is attached to clean, smooth, nonporous load surfaces, it should be able to maintain a vacuum level in the green range on all 3 vacuum gauges, except when used at high elevations (see SPECIFICATIONS: Operating Elevation). If not, make sure the vacuum switch is adjusted correctly (see MAINTENANCE: VACUUM SWITCH ADJUSTMENT). If the vacuum switch cannot be adjusted to maintain a vacuum of 16" Hg [-54 kPa], perform the VACUUM TEST (see MAINTENANCE) to determine whether there is a deficiency in the vacuum generating system.

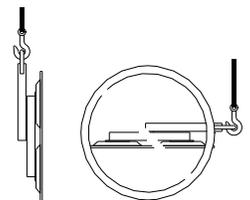
Vacuum Level on Other Surfaces

When the lifter is attached to contaminated, rough or porous load surfaces, it may not be able to maintain a vacuum level in the green range on all 3 vacuum gauges, due to leakage in the seal between the vacuum pads and the load surface.⁶ In the case of contamination, thoroughly clean the contact surfaces of the load and the vacuum pads (see MAINTENANCE: VACUUM PAD MAINTENANCE: Cleaning), and reapply the lifter to the load. If the load has rough or porous surfaces, ***the operator must conduct a test to determine whether the lifter is designed to lift the load***, as follows:

- 1) Make sure the lifter's vacuum generating system is functioning correctly (see MAINTENANCE: VACUUM TEST).
- 2) Apply the vacuum pads to the load as previously directed.
- 3) After the vacuum pumps stop running, place the power switch in the OFF (⊖) position.
- 4) Raise the load a minimal distance, to assure that it is supported by the lifter.
- 5) Monitor the large vacuum gauge while the load is suspended for 5 minutes: ***The lifter must maintain a minimum vacuum level of 10" Hg [-34 kPa] during this time.*** If not, the load does not possess the characteristics required for using this lifter.⁷

TO LIFT AND MOVE THE LOAD

 ***WARNING: Never attempt to lift load when lifter is in horizontal orientation.***



Load Capacity and the Lift Light

A lifter's Load Capacity is rated at a vacuum level of 16" Hg [-54 kPa] (see SPECIFICATIONS). After the lifter has attained this level, the vacuum pumps turn off automatically, to conserve battery energy. At the same time, the green vacuum lift light turns on, to indicate that the lifter is ready to lift the maximum load weight.

 ***WARNING: Never attempt to lift load unless green lift light is illuminated.***

Do not attempt to lift the load unless the lift light is illuminated; such an attempt could result in a load release and possible injury to the operator.

⁶ Contaminated loads can also cause the vacuum pumps to run frequently or continuously. Since excessive pumping quickly reduces battery energy, the operator should clean the load when possible, to minimize pumping.

⁷ Certain load materials are too rough or porous to allow the lifter to form a seal which can be maintained for 5 minutes without power. However, in geographical locations where CE Standards do not apply, it may be possible to use the lifter to lift such loads. Contact Wood's Powr-Grip for more information.

Monitoring Vacuum Indicators

The vacuum lift light and the large vacuum gauge must remain completely visible to the operator, so that they can be monitored throughout the entire lift.⁸

 **WARNING: Vacuum indicators must be visible to operator throughout entire lift.**

If the vacuum system experiences leakage while the lifter is attached to the load, the vacuum pumps turn *on* automatically, as required to maintain sufficient vacuum for lifting the maximum load weight. The lift light turns *off* while the pumps are running, to signal the reduction in vacuum to the operator.

If the pumps turn on and the lift light turns off while you are lifting a load, make sure the large vacuum gauge shows a vacuum level of 16" Hg [-54 kPa] or higher. If not, move away and stay clear of the load until it can be lowered to the ground or a stable support.

 **WARNING: Stay clear of any suspended load while vacuum level is lower than 16" Hg [-54 kPa].**

Discontinue lifter use until the cause of the vacuum loss can be determined. If the pumps run at intervals of ten minutes or less while the lifter is attached to clean, smooth, nonporous materials, the leakage is likely to be in the vacuum system. In this event, perform the VACUUM TEST (see MAINTENANCE) and inspect the vacuum pads for damage (see MAINTENANCE: VACUUM PAD MAINTENANCE: Inspection). If the vacuum loss cannot be remedied immediately, perform inspection and maintenance as needed to identify and correct any deficiency before resuming normal operation of the lifter.

Controlling the Lifter and Load

When vacuum indicators show that the lifter is ready, use the hoisting equipment to raise the lifter and load as needed to clear any obstacles in their path. Use any appropriate means to keep the lifter and load in the desired orientation while they are suspended from the crane. Once sufficient clearance is established, the load can be rotated as desired (see TO ROTATE THE LOAD EDGEWISE to follow).

In Case of Power Failure

The lifter is equipped with 3 vacuum reserve tanks, designed to maintain vacuum temporarily in case of a failure at the lifter's power source.

 **WARNING: Stay clear of any suspended load in the event of a power failure.**

Although the lifter is designed to support the load for at least 5 minutes without power, this depends on many factors, including the condition of the load and the lifter's vacuum system (see INTENDED USE: LOAD CHARACTERISTICS and MAINTENANCE: VACUUM PAD MAINTENANCE, VACUUM TEST). If a power failure occurs, keep all personnel clear of the suspended load until it can safely be placed on the ground or a stable support. Correct any deficiency before resuming normal operation of the lifter.

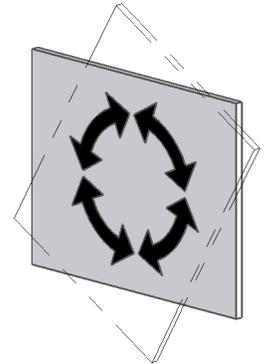
⁸ In addition, the small vacuum gauges mounted on the pad frame can be used to monitor the status of each circuit of the vacuum system (see TO APPLY THE PADS TO A LOAD: Reading the Vacuum Gauges preceding).

TO ROTATE THE LOAD EDGEWISE

⚠ WARNING: *Make sure load is positioned correctly on lifter (see To APPLY); unbalanced loads may rotate unexpectedly when latch is disengaged.*

Remember that the load is longer in its diagonal dimensions than in its side dimensions; raise the load high enough to clear any obstacles when rotating. Keep the load under control at all times, using hand cups or other appropriate means. Disengaging the pad frame's rotation latch allows the load to rotate. Pull the cable that hangs from the rotation release lever to disengage the rotation latch, and rotate the load to the desired position.

To stop the load's motion automatically at each quarter turn, simply let go of the cable immediately after initiating the rotation, so that the rotation latch engages at the next stop. Whenever rotation is not required, keep the rotation latch engaged, to prevent accidental damage to the load and possible injury to the operator.



TO RELEASE THE PADS FROM THE LOAD

⚠ WARNING: *Load must be fully supported before releasing vacuum pads.*

Make sure the load is at rest and fully supported. As a safety precaution, two actions must be performed to release the pads from the load: The vacuum lift light also functions as a push-button switch. Press and hold this vacuum control push button throughout the release operation. At the same time, turn the apply/release switch to the "RELEASE" position (counter-clockwise) to force air into the vacuum pads, quickly breaking the vacuum seal. Continue to hold the apply/release switch and the push-button switch until the pads disengage completely from the load.⁹

When the apply/release switch is no longer held in the "RELEASE" position, it automatically returns to the neutral position. Do not turn the apply/release switch to the "APPLY" position until the pads are contacting the next load to be lifted. This conserves battery energy and reduces the time required to apply the pads to the load, by preventing the primary vacuum reserve tank from losing its vacuum.

⁹ If the pads do not release fully or they release too slowly, make sure the release mechanism is functioning correctly (see MAINTENANCE: VACUUM TEST: Release Function Test).

AFTER USING THE LIFTER

Leave the apply/release switch in the neutral position and place the power switch in the OFF position ().

CAUTION: Do not set the lifter against any surfaces which could soil or damage the vacuum pads.

Built-in parking feet can be used to support an unloaded lifter when not suspended from a crane: Make sure the pad frame is oriented vertically with the parking feet at the bottom. Use the hoisting equipment to gently lower the lifter until the parking feet support its entire weight. Make sure the lifter leans securely against an appropriate support; then detach the hoisting equipment hook from the lift bail.

If the lifter is transported to another location, use the original shipping container and secure the lifter so as to protect the vacuum pads and all other components from damage while in transit.

Storing the Lifter

Use the covers supplied to keep the vacuum pads clean.

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**!!-CE-!!** In accordance with CE Standard EN 13155, the lifter is designed to rest on relatively horizontal surfaces without tipping over. To store the lifter in this way, set the lifter with the pads facing downward on a clean, smooth, flat surface and place a support under the lift bail. Since the lifter's intended use does not include tilting, be careful to protect the vacuum pads and support the lifter while tilting it to the horizontal position.  
~~~~~

Charge the battery completely when placing it in storage and at six-month intervals thereafter (see MAINTENANCE: BATTERY RECHARGE). After charging the battery, disconnect the electrical connectors uniting the battery to the battery charger and to the vacuum generating system, in order to prevent power drainage. Preferred temperatures for storing the battery are 32° to 70° Fahrenheit [0° to 21° Celsius]. Higher temperatures require the battery to be charged more frequently. Storage at temperatures above 100° Fahrenheit [38° Celsius] should be avoided.

MAINTENANCE



WARNING: Always make sure battery is disconnected before servicing lifter.

INSPECTION SCHEDULE

Perform inspections routinely, according to the following frequency schedule:

Every-Lift Inspection

- Examine the vacuum pads and load surface for contamination or debris (see VACUUM PAD MAINTENANCE to follow).
- Examine the vacuum pads, controls and indicators for visual damage (see VACUUM PAD MAINTENANCE to follow).
- Test the battery for adequate charge (see BATTERY TEST to follow).

If a battery's charge appears to be inadequate, charge and retest the battery (see BATTERY RECHARGE to follow). If any other deficiency is detected during the inspection, correct it before using the lifter and perform the Frequent Inspection to follow.

Frequent Inspection

(following every 20-40 hours' use; or whenever lifter is out of service for 1 month or more)

- Examine the lifter's structure for visual damage.
- Examine the vacuum system (including vacuum pads, fittings and hoses) for visual damage.
- Examine the air filter for conditions requiring service (see AIR FILTER MAINTENANCE to follow).
- Perform the VACUUM TEST to follow.
- Check for unusual vibrations or noises while operating the lifter.

If any deficiency is detected during the inspection, correct it before using the lifter and perform the Periodic Inspection to follow.

Periodic Inspection

(following every 250-500 hours' use; or whenever lifter is out of service for 1 year or more)

- Examine the entire lifter for external evidence of looseness, excessive wear, deformation, cracks, excessive corrosion, dents to structural or functional components, cuts, or any deficiency which might constitute a hazard.
- Inspect all parts of the electrical system for damage, wear or contamination that could constitute a hazard, in compliance with all local codes and regulatory standards that are relevant for the geographical region.

CAUTION: Be sure to use appropriate cleaning methods for each type of electrical component, as specified by codes and standards. Improper cleaning can damage components.

- Keep a written record of all Periodic Inspections.

If any deficiency is detected during the inspection, correct it before using the lifter. If necessary, return the lifter to Wood's Powr-Grip or an authorized dealer for repair (see LIMITED WARRANTY).

Infrequent Use

If a lifter is used less than 1 day in a 2-week period, perform the Periodic Inspection *each time before using the lifter*.

TESTING SCHEDULE

Perform these tests when placing the lifter in service *initially* and *each time following a repair or modification*. Correct any deficiency and retest before using the lifter.

Operational Tests

- Perform the VACUUM TEST to follow.
- Test all features and functions of the lifter (see OPERATING FEATURES, OPERATION and MAINTENANCE).

Load Test

Prove that the lifter can lift 100% of its Maximum Load Capacity (see SPECIFICATIONS), using an actual load or an equivalent simulation.¹⁰ Employ the following method to test with an actual load:

- 1) Place a test load with appropriate LOAD CHARACTERISTICS (see INTENDED USE) on a stable support. Make sure the load is oriented in the upright position.¹¹
- 2) Apply the vacuum pads to the load as previously directed.
- 3) After the vacuum pump stops running, place the power switch in the OFF () position.
- 4) Raise the load a minimal distance, to assure that it is supported by the lifter.
- 5) Hold the load for 5 minutes. The load must not slip or fall during this time period. If it does, conduct a VACUUM TEST and inspect each vacuum pad as indicated under VACUUM PAD MAINTENANCE: Inspection (see sections to follow). Correct any deficiency that is found and retest the lifter.

Note: See MAINTENANCE topics to follow for additional directions about inspecting and testing specific lifter components.

MAINTENANCE SCHEDULE

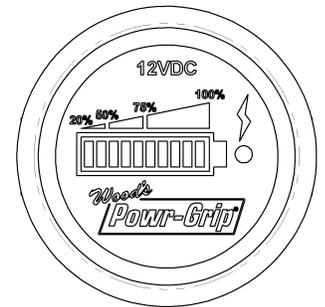
Unless specified elsewhere in this *INSTRUCTIONS* manual, the lifter does not require maintenance on a routine basis. Instead, maintenance must be performed whenever a deficiency is indicated by routine inspections or tests. Any maintenance warranted must be performed before resuming normal operation of the lifter.

¹⁰ ASME Standard B30.20 requires the lifter to be tested to 125% of its Load Capacity.

¹¹ Flat Lifters are exempt from this requirement.

BATTERY TEST

The lifter is equipped with a battery gauge to help the operator evaluate whether the battery has adequate energy for lifting. Factors such as the condition of the battery, the time required to execute a lift, and the porosity of the load combine to determine how much battery energy is needed. ***It is the operator's responsibility to evaluate these conditions and to make sure the battery has sufficient energy to complete a lift safely.*** Check the battery energy before every lift and also at the end of each day's use, to decide whether a charge is needed (see BATTERY RECHARGE to follow).¹² Never use the lifter when battery energy registers lower than 50% (that is, when only red lights are illuminated), regardless of the estimated energy requirement.



⚠ WARNING: Never use lifter if battery energy is lower than 50% of capacity.

When the power switch is in the ON () position and the apply/release switch is in the neutral (center) position, the operator must press the battery test button for a few moments to make the energy level register on the battery gauge. This enables the operator to check the battery energy while the lifter is powered up but *not* attached to a load.

When the power switch is in the ON () position and the apply/release switch is in the "APPLY" (right) position, the battery gauge automatically monitors the energy level of the battery. This enables the operator to check the battery energy while the lifter is powered up and attached to a load. However, the battery gauge shuts off temporarily while the vacuum pump is running, to prevent an inaccurate reading. When the pumping cycle is completed, the battery gauge requires a few moments to stabilize before it displays an accurate energy reading again.

Note: If the lifter has not been used since the battery was charged, the battery gauge may falsely indicate an energy level that is higher than actual, due to a "surface charge" on the battery. After the pump runs for approximately one minute, the surface charge dissipates, allowing the operator to take an accurate energy reading.

¹² The battery charger must be disconnected from its AC power source in order to test the battery energy; otherwise, the energy reading on the battery gauge would not be accurate.

BATTERY RECHARGE

CAUTION: Charge battery only while lifter's power switch is in the OFF (☐) position.

Operating the lifter when the battery charger is connected to an AC power source could result in permanent damage to the charger.

Only use a battery charger supplied by or approved by Wood's Powr-Grip; other chargers may reduce battery life. Charge the battery as soon as possible after any extended use of the lifter, or whenever the battery gauge indicates diminished energy (see BATTERY TEST preceding).

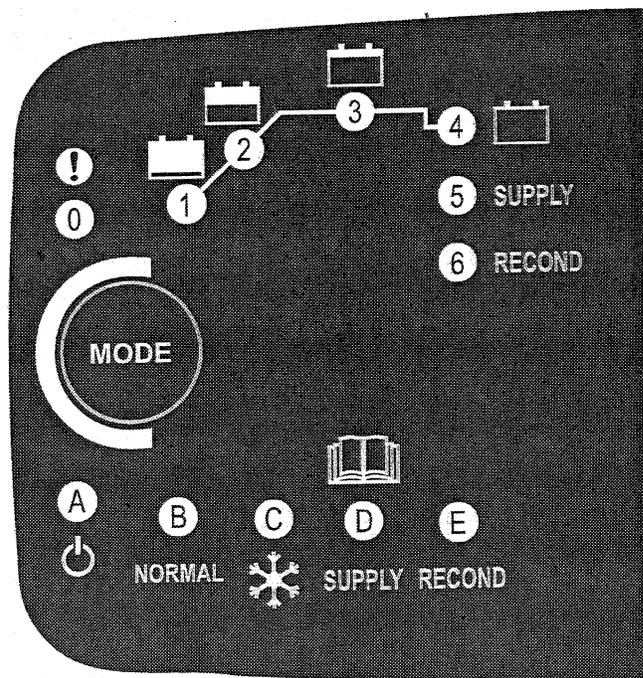
Temperatures higher than 70° Fahrenheit [21° Celsius] require the battery to be charged more frequently.

Identify the input voltage marked on the charger and plug it in to an appropriate power source.¹³ The power source must be equipped with a ground fault circuit interrupter, in order to reduce the risk of electrical shocks.

⚠ WARNING: Power source must be equipped with ground fault circuit interrupter.

Press the "MODE" button to select "NORMAL" mode. After the mode has been selected, the charger should begin to charge the battery automatically. Lights #1-4 in the illustration indicate the level of charging that has been attained.¹⁴ When the battery is fully charged, the charger switches to a maintenance mode and charging level light #4 (green) turns on. The blue light on the battery gauge also turns on, to indicate that the battery is fully charged. Be sure to unplug the charger and check the battery energy again before operating the lifter (see BATTERY TEST preceding).

When the lifter and its charger are used as directed, the battery should take no more than 8 hours to charge completely.¹⁵ However, following long-term use, a battery gradually loses the capacity to hold a charge. After reaching charging level #3, the charger analyzes the battery voltage, to determine whether or not the battery is holding a charge. If the battery does not hold a charge adequately, the charger's red error light (!) turns on, indicating that the battery needs to be replaced (see REPLACEMENT PARTS LIST).



¹³ Any external power supply must conform to all applicable local codes.

¹⁴ If none of the charging level lights turns on, the battery connection or the battery itself may be faulty. If the red error light (!) turns on immediately, the battery leads may be reversed or the charger terminals may be short-circuited; once the problem has been corrected, the charger should function normally. The red error light can indicate other problems, depending on the mode selected and level of charging; if necessary, contact Wood's Powr-Grip for assistance.

¹⁵ The charger is designed to automatically sense the energy level of the battery and reduce the charging rate when the battery is fully charged. Accordingly, the charger does not need to be unplugged until the lifter is going to be used again.

VACUUM PAD MAINTENANCE

Friction Coefficient

The friction coefficient represents the lifter's ability to resist load slippage when the load is oriented in any position except horizontal. If the contact surfaces of either the load or the vacuum pads are not clean, dry and in good condition, slippage is more likely to occur.

The Load Capacity of most Powr-Grip lifters is based on a friction coefficient of 1 (only Flat Lifters are exempt from this requirement). However, a vacuum pad's ability to maintain this friction coefficient is reduced by factors such as contamination, wear, age and exposure to sunlight, as well as the condition of the load's contact surface (see INTENDED USE: LOAD CHARACTERISTICS). Pads that have surface contamination must be thoroughly cleaned (see Cleaning discussion to follow). Over time, the rubber in a pad may experience hardening or leaching of chemicals, resulting in stiffness or surface glaze. Pads that exhibit wear, stiffness or glaze must be replaced. In addition, all pads should be replaced on a regular basis, preferably after no more than 2 years, to ensure that the friction coefficient is not compromised. If necessary, contact your dealer or Wood's Powr-Grip for more information.

Inspection

Inspect each vacuum pad for the following deficiencies routinely, as directed in the preceding INSPECTION and TESTING SCHEDULES. Correct any deficiency before using the lifter.

- Contaminates on the pad face or sealing edges: Soil build-up can prevent pads from sealing adequately or reduce the friction coefficient (see discussion preceding). Follow the directions to clean pads as necessary (see discussion to follow).
- Filter screen missing from pad face: This screen helps prevent debris from plugging the vacuum hose and the air filter. Replace any missing screen immediately (see REPLACEMENT PARTS LIST).
- Nicks, cuts or abrasions in sealing edges: Pad damage can reduce the lifting capacity. Replace any damaged pad immediately (see REPLACEMENT PARTS LIST).

 **WARNING: Replace vacuum pad if sealing edge has any nicks, cuts or abrasions.**

- Wear, stiffness or glaze: See Friction Coefficient preceding. Replace any pad that exhibits wear, stiffness or glaze (see REPLACEMENT PARTS LIST).

Cleaning

Regularly clean the face of each vacuum pad to remove oil, dust and any other contaminants. Acceptable cleaning agents include soapy water and other mild cleansers. Do *not* use solvents, petroleum-based products (including kerosene, gasoline and diesel fuel) or any harsh chemicals for cleaning. Do *not* use unauthorized rubber cleaners or conditioners, such as those intended for cleaning tires or vinyl surfaces, because those products can leave a hazardous film on vacuum pads which significantly reduces their lifting capacity (see Friction Coefficient preceding). The use of any unauthorized cleaning agent is prohibited because it could damage the pad and/or create a hazard to the operator or others.

 **WARNING: Never use solvents, gasoline or other harsh chemicals to clean vacuum pad.**

 **WARNING: Never use unauthorized rubber cleaners or conditioners to clean vacuum pad.**

To prevent liquid from contaminating the vacuum system during cleaning, cover the suction hole in the recess for the filter screen or make sure the pad faces downward. Use a clean sponge or lint-free cloth to apply an authorized cleanser and wipe the pad face clean. A toothbrush (or similar brush with bristles *that do not harm rubber*) may be used to remove contaminants clinging to sealing edges.¹⁶ Wipe all residue from the pad face, and allow the pad to dry completely before using the lifter.

VACUUM TEST

Test the vacuum system for leakage routinely, as directed in the preceding INSPECTION and TESTING SCHEDULES.

- 1) Clean the face of each vacuum pad as previously directed (see VACUUM PAD MAINTENANCE: Cleaning).
- 2) Apply the lifter to a clean, smooth, nonporous surface. The surface should be flat or possess no more curvature than the lifter is designed for (if any).¹⁷ When the pumping cycle is completed, the vacuum level should register above 16" Hg [-54 kPa] on the vacuum gauge (if not, see VACUUM SWITCH ADJUSTMENT to follow).
- 3) After the vacuum pump stops running, leave the pads attached to the surface and place the power switch in the OFF (○) position, to interrupt the energy flow from the battery.
- 4) Monitor the vacuum gauge: *The vacuum level should not decrease by more than 4" Hg [-14 kPa] in 10 minutes.*

 **WARNING: If lifter fails vacuum test, discontinue use immediately.**

Correct any deficiency in the vacuum system before using the lifter. Contact Wood's Powr-Grip or an authorized dealer for assistance.

¹⁶ If these cleaning methods are not successful, contact Wood's Powr-Grip or an authorized dealer for assistance.

¹⁷ Any test material used must be fully and independently supported, and capable of bearing the lifter's weight. Do not use the lifter to lift the test material during the vacuum test.

Dual Vacuum Circuit Test

Two vacuum system circuits allow the lifter to maintain the vacuum level in one circuit even if an unexpected vacuum loss occurs in the other one. Verify the function of the circuits each time the preceding VACUUM TEST is performed and whenever a deficiency is suspected, as follows:

- 1) Clean the vacuum pads and apply the lifter to the test material as directed in the preceding VACUUM TEST.
- 2) After the vacuum pumps stop running, monitor the small vacuum gauges (located on the pad frame) as a leak is introduced in one circuit. To introduce a leak, pull up on the edge of one vacuum pad until the vacuum circuit begins to leak. The corresponding vacuum gauge should indicate a loss of vacuum in that circuit.
- 3) As the vacuum level decreases in one circuit, continue to monitor the vacuum gauge for the other circuit, to make sure that it maintains its original vacuum level.
- 4) Repeat steps 1-3 to verify the function of the second circuit of the vacuum system. Be sure to introduce the leak at a vacuum pad belonging to the second circuit.

Correct any deficiency in the vacuum system before using the lifter. Contact Wood's Powr-Grip or an authorized dealer for assistance.

Release Function Test

The Dual Vacuum System employs an adjustable relief valve, in order to actuate the pressurized release function. This relief valve has been set at the factory and normally does not need to be adjusted. However, the release function should be tested each time the preceding VACUUM TEST is performed, to make sure that the release mechanism is working correctly. Release the test material as previously directed (see OPERATION: TO RELEASE THE PADS FROM THE LOAD) and monitor the release mechanism for the following symptoms:

- The vacuum pads release for only one circuit of the vacuum system (ie, only 1 of the 2 small vacuum gauges shows a decrease in vacuum).
- The vacuum pads release very slowly (ie, requiring more than 2 seconds per each pad in use).
- The lifter does not release at all (ie, both small vacuum gauges show full vacuum).

If any of these conditions is observed during release, the release mechanism is not functioning correctly. Correct any deficiency before using the lifter. Contact Wood's Powr-Grip or an authorized dealer for assistance.

AIR FILTER MAINTENANCE

(for 4.4 oz [130 ml] bowl size filters)

Filter Function and Conditions Requiring Service

An air filter prevents solid particles and liquid from contaminating components in the vacuum system.

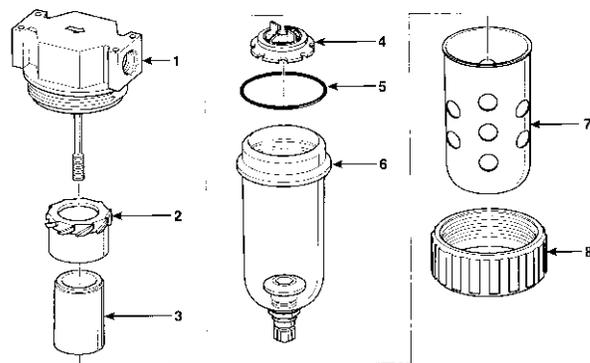
CAUTION: *Examine air filter regularly and empty when necessary.*

Liquid must not contact any portion of the filter element; remove trapped liquid regularly. Replace the element if it has an overall dirty appearance, or if there is a noticeable increase in the time required to attain full vacuum. (Refer to REPLACEMENT PARTS LIST for filter element kit.)

Filter Service Procedures

- 1) Unscrew the threaded collar (8) from the body (1). Support the body while twisting the collar, to protect the vacuum line fittings from being damaged. Then remove the bowl guard (7) and the bowl (6).
- 2) Determine whether the filter element (3) needs to be replaced (see Conditions Requiring Service preceding). *If so*, proceed to step 3.

If not, remove any liquid or contaminants from the bowl; clean the old bowl seal (5) with mild soap and water; and skip to step 7.



- 3) Unscrew the baffle (4), and remove the element and deflector (2).
- 4) Discard the element and the bowl seal (5).
- 5) Clean all internal parts and the bowl, using mild soap and water only. Do *not* use any other cleaners.
- 6) Install the deflector and a new filter element; then screw the baffle back on (tighten gently, finger tight) to hold the element in place.
- 7) Lubricate the new or cleaned bowl seal, using a mineral base oil or grease (such as the lubricant furnished in the filter element kit). Do *not* use synthetic oils, such as esters, or silicones.
- 8) Place the bowl seal around the rim of the bowl. Then install the bowl on the body, taking care to avoid contaminating the filter element with lubricant.
- 9) Install the bowl guard and the collar, tightening it only hand-tight (28-32 in-lbs [316-362 N-cm] torque).
- 10) Test the vacuum system to be certain the air filter does not leak (see VACUUM TEST preceding, if applicable).

⚠ WARNING: When the air filter is being used on a *vacuum* system, rather than with pressure, using the twist drain to remove liquid from the bowl is *not* recommended. **Never** disturb the twist drain, as contaminants could lodge in the drain seal and cause a vacuum leak.

AIR FILTER MAINTENANCE

(for 1 oz [30 ml] bowl size filters)

Filter Function and Conditions Requiring Service

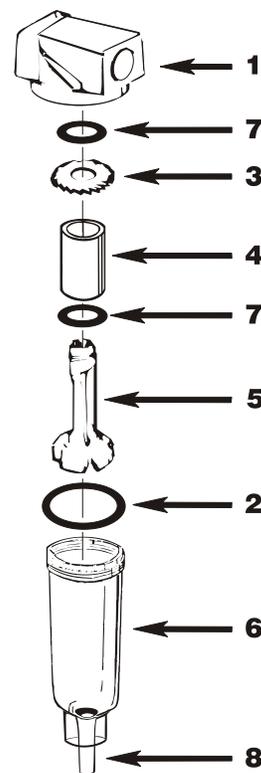
An air filter prevents solid particles and liquid from contaminating components in the vacuum system.

CAUTION: *Examine air filter regularly and empty when necessary.*

Liquid must not contact any portion of the filter element; remove trapped liquid regularly. Replace the element if it has an overall dirty appearance, or if there is a noticeable increase in the time required to attain full vacuum. (Refer to REPLACEMENT PARTS LIST for filter element kit.)

Filter Service Procedures

- 1) Unscrew the bowl (6) from the body (1). Support the body while twisting the bowl, to protect the vacuum line fittings from being damaged.
- 2) Determine whether the filter element (4) needs to be replaced (see Conditions Requiring Service preceding). *If so*, proceed to step 3. *If not*, remove any liquid or contaminants from the bowl; clean the old bowl seal (2) with mild soap and water; and skip to step 7.
- 3) Unscrew the element holder (5) and remove all internal parts.
- 4) Set aside the element, element gaskets (7) and bowl seal for disposal later.
- 5) Clean all other internal parts and the bowl, using mild soap and water only. *Do not* use any other cleansing agents.
- 6) Place the new element gaskets and element, along with the old deflector (3), on the element holder, and screw the assembly back into the filter body (tighten gently, finger tight).
- 7) Lubricate the new or cleaned bowl seal (2)¹⁸, using a mineral base oil or grease (such as the lubricant furnished in the filter element kit). *Do not* use synthetic oils, such as esters, and *do not* use silicones.
- 8) Place the bowl seal around the rim of the bowl. Then screw the bowl back into the body, taking care to avoid contaminating the filter element with lubricant. Hand-tighten only.
- 9) Test the vacuum system to be certain the air filter does not leak (see VACUUM TEST preceding, if applicable).



⚠ WARNING: When the air filter is being used on a *vacuum* system, rather than with pressure, using the twist drain (8) to remove liquid from the bowl is **not** recommended. **Never** disturb the twist drain, as contaminants could lodge in the drain seal and cause a vacuum leak.

¹⁸ The filter element kit may contain two sizes of bowl seals (O-ring type gaskets). If so, use the smaller bowl seal; or if in doubt, compare the old bowl seal to determine the appropriate size.

VACUUM PUMP MAINTENANCE

(for Thomas pump no. 2907CDC22/12)

⚠ WARNING: Before proceeding with any maintenance, disconnect power source.

If the vacuum pump takes too long to attain full vacuum, it may require maintenance. Replace the diaphragms, valve flappers or head gaskets as necessary to obtain acceptable pump performance (see REPLACEMENT PARTS LIST). Perform the following procedures on both heads of the pump.

Replacing a Diaphragm (1)

- 1) Remove the six head screws (14) and remove the head (13).
- 2) Remove the four diaphragm hold-down screws (3) and the diaphragm hold-down plate (2).
- 3) Replace the diaphragm (1) and reverse the above procedure for reassembly.

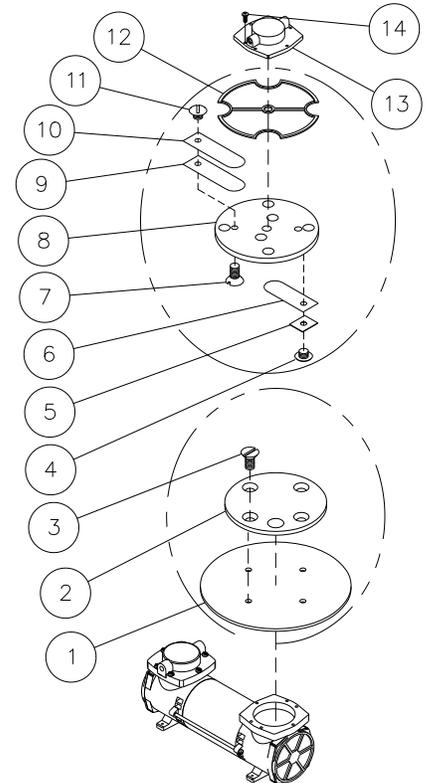
Replacing an Intake Valve Flapper (6)

- 1) Remove the six head screws (14) and remove the head (13).
- 2) Remove the intake valve flapper screw (4) and the intake valve keeper (5).
- 3) Replace the intake valve flapper (6) and reverse the above procedure for reassembly.

Replacing a Set of Exhaust Valve Flappers (9 & 10) and a Head Gasket (12)

- 1) Remove the six head screws (14) and remove the head (13).
- 2) Turn the head upside-down and remove the five valve plate screws (7).
- 3) Lift out the valve plate (8) to access the exhaust valve flappers (9 & 10) and head gasket (12).¹⁹
- 4) Remove the exhaust valve flapper screw (11) and replace the exhaust valve flappers.
- 5) Replace the head gasket and reverse the above procedure for reassembly.

1 DIAPHRAGM	5 INTAKE VALVE KEEPER	10 EXHAUST VALVE FLAPPER (METAL)
2 DIAPHRAGM HOLD-DOWN PLATE	6 INTAKE VALVE FLAPPER (METAL)	11 EXHAUST VALVE FLAPPER SCREW
3 DIAPHRAGM HOLD-DOWN SCREWS	7 VALVE PLATE SCREWS	12 HEAD GASKET
4 INTAKE VALVE FLAPPER SCREW	8 VALVE PLATE	13 HEAD
	9 EXHAUST VALVE FLAPPER (PLASTIC)	14 HEAD SCREWS



¹⁹ **CAUTION:** Depending on the product, the vacuum system may require the valve plate (8) to be rotated to an orientation different from the one shown. When removing the valve plate, always take note of its orientation in the pump head (13), and install the valve plate the same way during reassembly. In all cases, the valve plate must be oriented so that its intake hole is matched with the head port that connects to the check valve.

VACUUM PUMP MAINTENANCE

(for Dynaflo pump no. DV1032102)

⚠ WARNING: Before proceeding with any maintenance, disconnect power source.

If the vacuum pump takes too long to attain full vacuum, it may require maintenance. Replace the diaphragm, gasket/flap valves or (when preferable) the entire head assembly²⁰ (see REPLACEMENT PARTS LIST), as necessary to obtain acceptable pump performance.

CAUTION: Do not over-tighten the head screws, because this may damage the threads in the pump body.

Replacing the Diaphragm

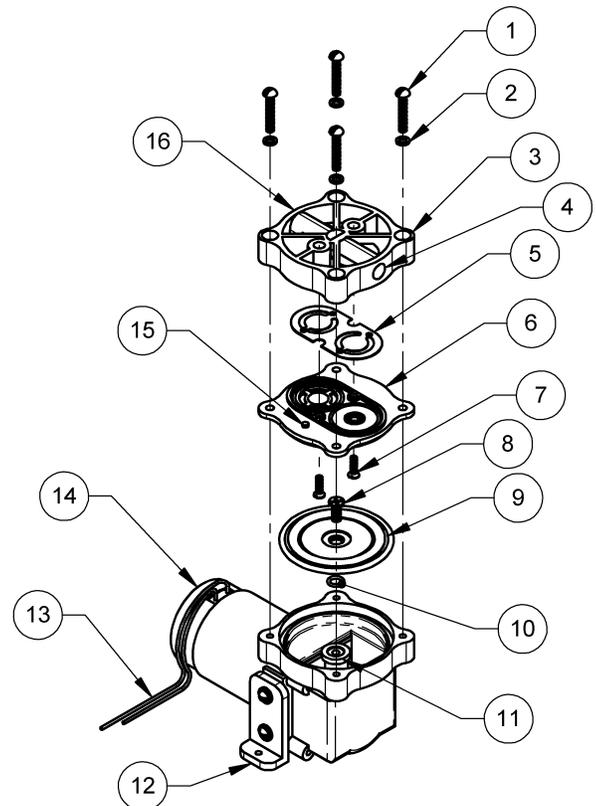
- 1) Remove the four head screws (1) and lock washers (2), and remove the head assembly (3–7).
- 2) Remove the diaphragm retaining screw (8), diaphragm (9) and rubber O-ring (10).
Note: Be sure to save the flat washer located between the O-ring and the connecting rod (11). Also take note of the diaphragm orientation for reassembly.
- 3) Replace the diaphragm, rubber O-ring and diaphragm retaining screw. Reinstall the flat washer in its original position.
- 4) Reverse the steps above for reassembly, as shown in the illustration.

Replacing the Gasket/Flap Valves

- 1) Remove the four head screws (1) and lock washers (2), and remove the head assembly (3–7).
- 2) Invert the head and remove the two valve plate screws (7). Remove the valve plate (6) to access the gasket/flap valves.
- 3) Replace the gasket/flap valves (5) and reverse the steps above for reassembly, as shown in the illustration. Use the alignment pin (15) to ensure proper fit between the head and valve plate.

Replacing the Head Assembly

- 1) Remove the four head screws (1), lock washers (2) and head assembly (3–7).
- 2) Replace the head assembly, and reverse the steps above for reassembly, as shown in the illustration.



1 HEAD SCREW	5 GASKET/FLAP VALVES	9 DIAPHRAGM	13 WIRES
2 LOCK WASHER	6 VALVE PLATE	10 RUBBER O-RING	14 MOTOR
3 HEAD	7 VALVE PLATE SCREW	11 CONNECTING ROD	15 ALIGNMENT PIN
4 INTAKE PORT	8 DIAPHRAGM RETAINING SCREW	12 MOUNTING FOOT	16 EXHAUST PORT

²⁰ **CAUTION:** Depending on the product, the head assembly (3–7) may be rotated to an orientation different from the one shown. When removing the head assembly, always take note of its orientation and install it the same way during reassembly. Make sure that the intake and exhaust ports remain in their original positions.

VACUUM SWITCH ADJUSTMENT

Vacuum Switch Function

A vacuum switch controls the vacuum pump and the vacuum lift light for a DC lifter (see OPERATING FEATURES for location of vacuum switch). When the lifter's power switch is in the ON position (), turning the apply/release switch to the "APPLY" position activates the vacuum pump, which evacuates the vacuum pads. After the lifter attains a vacuum level sufficient for lifting the maximum load weight (hereafter, "minimum lifting level"), the vacuum switch automatically turns off the pump and turns on the lift light.²¹ In order to maintain sufficient vacuum, the vacuum switch automatically turns on the pump and turns off the lift light again before vacuum decreases to a level that is lower than the minimum lifting level.

Conditions Requiring Readjustment

At the factory, the vacuum switch is set to maintain the minimum vacuum level specified for Load Capacity (see SPECIFICATIONS). However, shipping vibrations or shocks, normal wear, or other conditions may adversely affect this adjustment. Periodically verify the switch adjustment by comparing how the vacuum pump and the vacuum lift light function in relation to the vacuum level registered on the vacuum gauge, as follows:

- If the pump *turns off* and the lift light *turns on before* vacuum attains the minimum lifting level, it is likely that the air filter's element is dirty. **Any filter element that obstructs airflow must be replaced** (refer to AIR FILTER MAINTENANCE preceding). Otherwise, the pump would turn off at vacuum levels that are not sufficient to lift the maximum load weight.
- If the pump *turns off* but the lift light *does not turn on after* vacuum attains the minimum lifting level, the light bulb may be burned out. The bulb should be replaced when necessary. Otherwise, the operator might wait unnecessarily for the lift light to turn on, after the lifter has already attained sufficient vacuum to lift the maximum load weight.
- If the pump *does not turn off* and the lift light *does not turn on after* vacuum increases to a level much *higher* than the minimum lifting level, the vacuum switch may be adjusted to maintain a lower vacuum level. Otherwise, the pump would continue to run unnecessarily after the lifter has attained sufficient vacuum to lift the maximum load weight.
- If the pump *does not turn on* and the lift light *does not turn off before* vacuum decreases to a level *lower* than the minimum lifting level, the vacuum switch **must be adjusted to maintain a higher vacuum level**.²² Otherwise, the lifter would not maintain sufficient vacuum to lift the maximum load weight.

²¹ When using the lifter at high elevations, reduced atmospheric pressure may prevent the vacuum generating system from attaining the vacuum level set at the factory. This causes the pump to run continuously. If the ability to lift the maximum load weight is not required, the operator can adjust the vacuum switch to maintain a lower vacuum level, allowing the pump to cycle normally. However, be advised that **lifting capacity decreases proportionally with decreasing vacuum**, based on the vacuum level specified for the Load Capacity (see SPECIFICATIONS). For example, if a lifter's Load Capacity is rated at 16" Hg [-54 kPa], lifting capacity decreases by 6.25% for each inch of Hg subtracted from (or for each 3.4 kPa added to) the vacuum level. **Always maintain a minimum vacuum level of 10" Hg [-34 kPa]**, regardless of the vacuum level specified for the original Load Capacity. In addition, lifter markings should be adjusted to reflect the revised Load Capacity and the vacuum gauge should be marked to indicate the revised minimum lifting level.

²² In order to observe lifter functions while vacuum is decreasing, it may be necessary to create a controlled leak in the vacuum system (eg, by breaking the seal between one or more vacuum pads and the test surface).

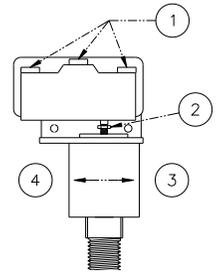
Adjustment Procedure

 **WARNING:** *Load capacity decreases whenever vacuum switch is adjusted to maintain lower vacuum level.*

- 1) Using a 1/4" open-end wrench (as provided), turn the adjustment screw about 1/6th turn at a time (approximately one flat of the screw head).

To maintain a *lower* vacuum level, turn the screw *clockwise* (when viewing vacuum switch from end with electrical connectors).

To maintain a *higher* vacuum level, turn the screw *counter-clockwise* (when viewing vacuum switch from end with electrical connectors).



- 2) Recheck the vacuum switch setting following each 1/6th turn of the adjustment screw. In order to test the adjustment accurately, release the vacuum pads completely before reapplying them to a test surface.

1 ELECTRICAL CONNECTORS
2 ADJUSTMENT SCREW
3 TO MAINTAIN HIGHER VACUUM
4 TO MAINTAIN LOWER VACUUM

When the vacuum switch is adjusted correctly, the vacuum pump turns off only *after* vacuum increases to a level higher than the minimum lifting level; and the pump turns on again *before* vacuum decreases to a level lower than the minimum lifting level.

REPLACEMENT PARTS LIST

Stock No.	Description	Qty.
93220	Vacuum Pump - Diaphragm Type - 1-SCFM [28 liters/minute] - 12 V DC (Dynaflor)	2
66197BM	Dynaflor Pump Gasket & Flap Valves	2
66197AM	Dynaflor Pump Diaphragm Kit	2
66197	Dynaflor Pump Head Assembly	2
66191	Thomas Pump Gasket	2
66189	Thomas Pump Valve Flapper - Plastic (for exhaust port)	2
66186	Thomas Pump Valve Flapper - Metal (for intake & exhaust ports)	4
66183	Thomas Pump Diaphragm	2
66135	Vacuum Pump - Diaphragm Type - 3-SCFM [85 liters/minute] - 12 V DC (Thomas)	1
65443	Vacuum Hose - 3/8" [9.5 mm] ID (approx. 6" [15 cm] in length)	1
65438	Vacuum Hose - 1/8" [3.2 mm] ID (approx. 6" [15 cm] in length)	1
65440	Vacuum Hose - 1/4" [6.3 mm] ID - Red (approx. 280" [711 cm] in length)	1
65437	Vacuum Hose - 1/4" [6.3 mm] ID - Green (approx. 280" [711 cm] in length)	1
65429	Vacuum Hose - 0.16" [4.1 mm] ID (approx. 72" [183 cm] in length)	1
65263	Air-Piloted Valve	2
65244	Solenoid Valve - 12 V DC - 5 W	1
65240	Solenoid Valve - 12 V DC - 11 W	2
65212BB	Check Valve - 1/4 NPT - 3-15 psi	1
65211AM	Check Valve - 1/8 NPT - 0.15 psi	1
65211	Check Valve - 1/8 NPT - 0.5 psi	2
65010	Pad Spring - Coil Type	16
64709AM	Battery Charger - 120 V AC	1
64708AM	Battery Charger - 100 / 240 V AC	1
64667	Battery - 12 V DC - 26 Amp-Hours	1
64590	Battery Gauge	1
64495	Fuse (for 120 V battery charger)	1
64464	Circuit Breaker - 30 A	1
64288	Bulb - 14 V - Flanged (for power indicator light)	1
64283	Bulb - 13 V - Bayonet (for vacuum lift light)	1
64262	Green Lens (for vacuum lift light)	1
64236	Vacuum Switch - 1/4 NPT	1
64200	Push-Button Switch (for battery test button)	1
64191	Contact Block (for power switch)	1
58168	Guard for Rotating Union	1
53132	Hose Fitting - Tee - 5/32" [4.0 mm] ID	6
53126	Pad Fitting - Tee - 3/64" [1.2 mm] ID	8
53120	Pad Fitting - Elbow - 3/64" [1.2 mm] ID	8
49646T	Vacuum Pad - Model G3370 / 11" [28 cm] Diameter - Lipped	16
49150	End Plug - 2 1/2" x 2 1/2" x 1/4" [63.5 mm x 63.5 mm x 6.4 mm] Tubing Size	4
49122	End Plug - 2" x 2" x 1/4" [50.8 mm x 50.8 mm x 6.4 mm] Tubing Size	24
29353	Pad Cover	16
28675	Wood's Powr-Grip® Vacuum Cup Cleaner	1
20270	1/4" [6.4 mm] Open-End Wrench (for adjusting vacuum switch)	1

Stock No.	Description	Qty.
16134	Filter Element Kit (for 1 oz [30 ml] bowl size air filter)	2
16132	Filter Element Kit (for 4.4 oz [130 ml] bowl size air filter)	1
16055	Quick Connector - 1/8 FNPT - Female End	16
16054	Quick Connector - 1/8 FNPT - Male End	16
15911	Vacuum Gauge - 1 1/2" [3.8 cm] Dia. - 1/8 NPT - CBM Type (aka " <i>small</i> vacuum gauge")	2
15910	Vacuum Gauge - 2" [5.1 cm] Dia. - 1/8 NPT - CBM Type (aka " <i>large</i> vacuum gauge")	1
15650	360° Rotating Union - 1/4 NPT	1
15630	Pad Filter Screen - Large	16
15333	Hose Fitting - Tee - 1/4" [6.4 mm] OD - Push-In	1
13516	Cotterless Hitch Pin - 3/8" x 4" [10 mm x 64 mm]	8
11124	Hex Nut - 1/2-13 Thread - 85 ksi [586 MPa] (for lift bar & rotating pad arms)	40
11120	Hex Nut - 3/8-16 Thread - 85 ksi [586 MPa] (for removable sections of pad frame)	16
10900	Shoulder Bolt - Socket Head - 5/16" x 1/2" x 1/4-20 Thread (for mounting pads)	96
10863	Bolt - Hex Head - 1/2-13 Thread x 6 1/2" - Grade 5 (for lift bar)	24
10834	Bolt - Hex Head - 1/2-13 Thread x 1 1/2" - Grade 5 (for rotating pad arms)	16
10822	Bolt - Hex Head - 3/8-16 Thread x 5" - Grade 5 (for removable sections of pad frame)	16

***SERVICE ONLY WITH IDENTICAL REPLACEMENT PARTS
SUPPLIED BY OR APPROVED BY WOOD'S POWR-GRIP CO., INC.***

LIMITED WARRANTY

Powr-Grip products are carefully constructed, thoroughly inspected at various stages of production, and individually tested. They are warranted to be free from defects in workmanship and materials for a period of one year from the date of purchase.

If a problem develops during the warranty period, follow the instructions hereafter to obtain warranty service. If inspection shows that the problem is due to defective workmanship or materials, Powr-Grip will repair the product without charge.

WARRANTY DOES NOT APPLY WHEN:

Modifications have been made to the product after leaving the factory.

Rubber portions have been cut or scratched during use.

Repairs are required due to abnormal wear and tear.

The product has been damaged, misused, or neglected.

If a problem is not covered under warranty, Powr-Grip will notify the customer of costs prior to repair. If the customer agrees to pay all repair costs and to receive the repaired product on a C.O.D. basis, Powr-Grip then will proceed with repairs.

TO OBTAIN REPAIRS OR WARRANTY SERVICE

For purchases in *North America*:

Contact the Technical Service Department at Wood's Powr-Grip Co.. When factory service is required, ship the complete product--prepaid--along with your name, address and phone number to the street address hereafter.

For purchases in *all other localities*:

Contact your dealer or the Technical Service Department at Wood's Powr-Grip Co. for assistance.

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