

KEEP FOR FUTURE REFERENCE



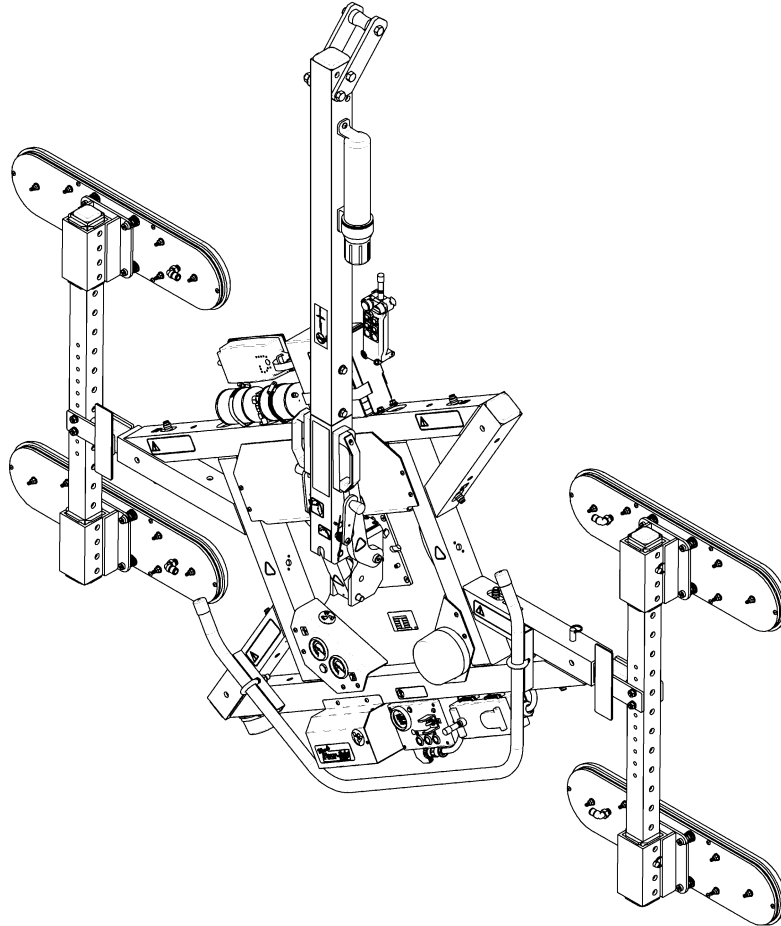
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INSTRUCTIONS

International Version

MODEL NUMBERS: MRTALPR4FS625DC,
MRTALPR4FS10TDC

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



**LOW-PROFILE MANUAL ROTATOR / TILTER 600
DC-VOLTAGE, WITH DUAL VACUUM SYSTEM
& PAD FRAME T-ARM ASSEMBLIES
(AVAILABLE WITH REMOTE CONTROL SYSTEM)**



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



DESIGNED FOR THE MATERIALS HANDLING PROFESSIONAL



[View Quick Start Guide.](#)

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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)

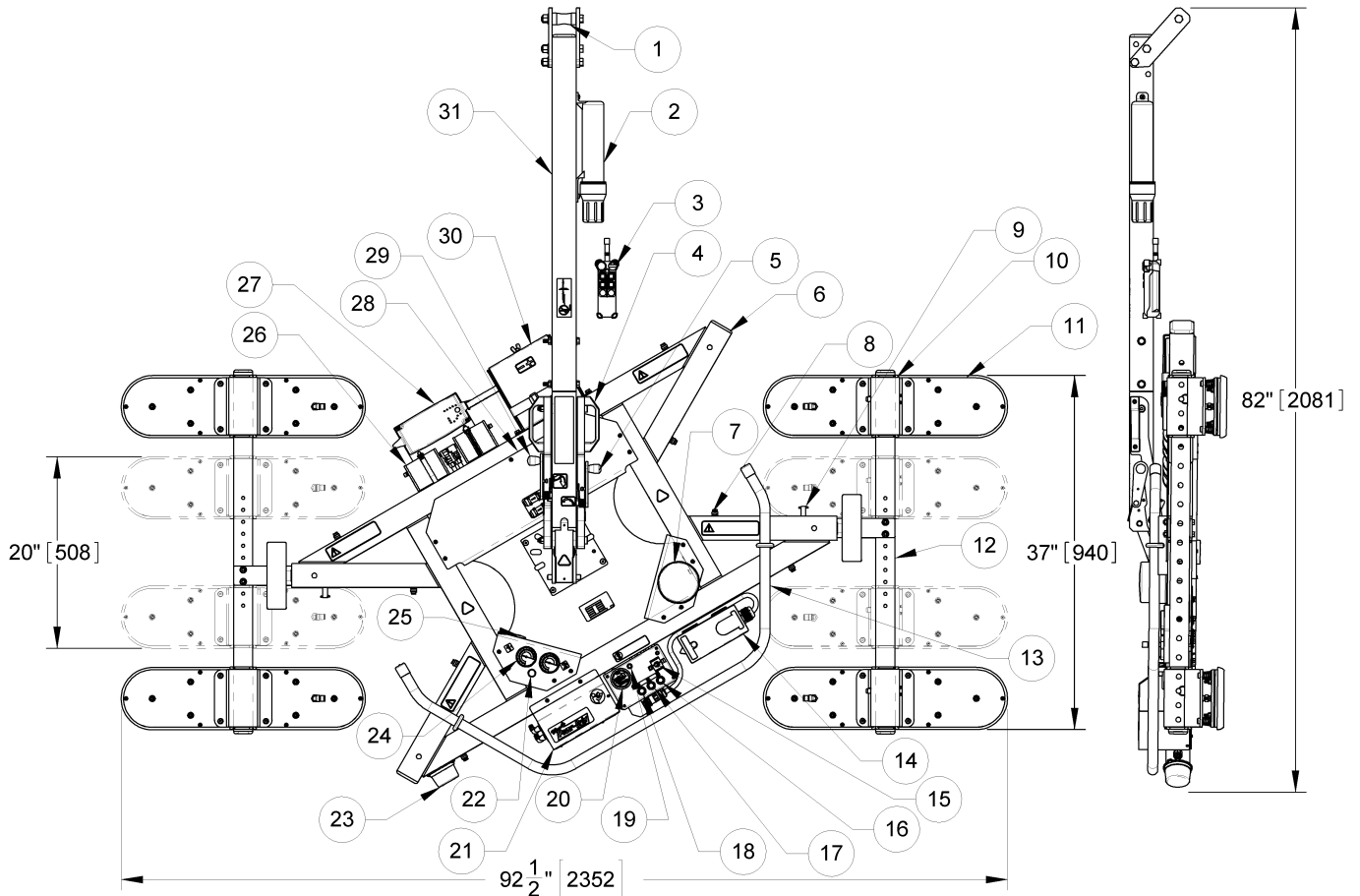
Always remember that modifications to the lifter may compromise its safety. Wood's Powr-Grip cannot be responsible for the safety of a lifter that has been modified by the customer. For consultation, contact Wood's Powr-Grip (see LIMITED WARRANTY).

Never disengage both the rotation latch and the tilt latch at the same time.

If the lifter is equipped with a Remote Control System, **never** operate the lifter remotely unless there is clear communication about intended actions (eg, releasing load) with all personnel near the lift. In addition, the operator must visually verify the status of the lifter and load prior to remote operations.

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 MRTALPR4FS625DC shown with Remote Control System option.

- | | | |
|---------------------------------|------------------------------|---|
| 1 LIFT SPOOL | 11 VACUUM PAD | 22 VACUUM LIFT LIGHT |
| 2 INSTRUCTION CANISTER | 12 PAD FRAME T-ARM ASSEMBLY | 23 RED STROBE LIGHT |
| 3 RADIO TRANSMITTER (optional) | 13 CONTROL HANDLE | 24 VACUUM GAUGES |
| 4 CONTROL HANDLE | 14 RADIO RECEIVER (optional) | 25 LOW VACUUM WARNING BUZZER |
| 5 ROTATION RELEASE LEVER | 15 POWER SWITCH | 26 VACUUM RESERVE TANK |
| 6 PAD FRAME | 16 RELEASE BUTTON | 27 BATTERY CHARGER |
| 7 AMBER STROBE LIGHT (optional) | 17 APPLY BUTTON | 28 Cover for AIR FILTERS
and VACUUM SWITCHES |
| 8 QUICK CONNECTOR | 18 ENABLE BUTTON | 29 TILT RELEASE LEVER |
| 9 COTTERLESS HITCH PIN | 19 BATTERY TEST BUTTON | 30 BATTERY |
| 10 SLIDING PAD MOUNT | 20 BATTERY GAUGE | 31 LIFT BAR |
| | 21 Cover for VACUUM PUMP | |

- 1 EMERGENCY TRANSMITTER DISCONNECT
- 2 TRANSMISSION INDICATOR LIGHT
- 3 RELEASE BUTTON
- 4 TRANSMITTER POWER/ENABLE BUTTON
- 5 APPLY BUTTON

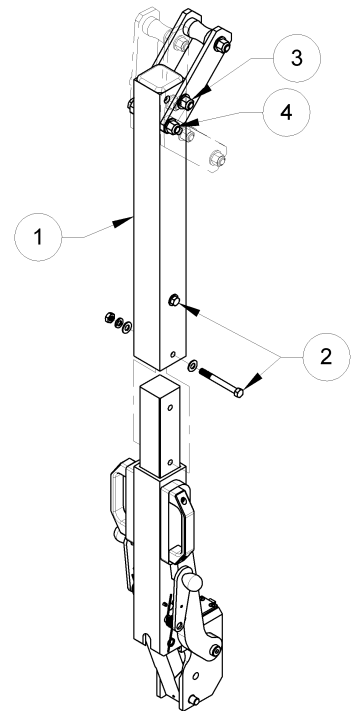


OPTIONAL RADIO TRANSMITTER

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) If necessary, assemble the lifter's lift bar as follows: One segment of the lift bar can be removed, to reduce overall lifter dimensions for shipping. If so, orient the removable segment (1) as shown in the illustration, and slide it over the other segment until the bolt holes align. Reinstall the bolts and all associated hardware (2); then tighten both bolts securely.
- 3) Position the lifter's lift spool as follows: The adjustable lift spool assembly provides 3 different lift points (see illustration), in order to optimize the lifter's hang angle and/or its overall height for the intended use.³ To change the lift spool position, remove the retaining bolt (3) and, if necessary, loosen the pivot bolt (4). Next pivot the lift spool assembly until the bolt holes align for the desired spool position. Then reinstall the retaining bolt and all associated hardware. Tighten both bolts securely.
- 4) 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 tilt latch (see OPERATION: TO TILT THE LOAD) and raise the lift bar to a vertical orientation. Then attach the hoisting equipment hook to the lift spool.

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

³ When the Pad frame T-arm assemblies are installed on the pad frame (see illustration in OPERATING FEATURES), placing the lift spool in the lowest position would create interference when the pad frame is rotated. To avoid this problem, place the lift spool in one of the other two positions or remove the T-arm assemblies (see TO INSTALL/REMOVE T-ARM ASSEMBLIES to follow).

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 spool.

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

Use the hoisting equipment to raise the lifter out of the shipping container. Be careful to avoid damaging any vacuum pads.

- 5) If necessary, install the pad frame T-arm assemblies as directed in the following section. Remove the pad covers (when applicable) and save them for use whenever the lifter is stored.
- 6) Connect the electrical connectors uniting the battery to the battery charger and the vacuum generating system. Now the lifter is operational.
- 7) Perform Operational and Load Tests for the lifter as directed in MAINTENANCE: TESTING SCHEDULE. If the lifter is equipped with a Remote Control System, also perform the REMOTE CONTROL SYSTEM TEST (see MAINTENANCE).

TO INSTALL/REMOVE T-ARM ASSEMBLIES

- 1) Remove the cotterless hitch pin from the extension arm of one pad frame T-arm assembly.
- 2) Insert the end of the extension arm as far as possible into its socket on the lifter's main pad frame as shown in the preceding illustration, so that the holes align for the cotterless hitch pin.

Note: Be sure to install each extension arm in the correct socket (see illustration), in order for the red strobe light to be visible.

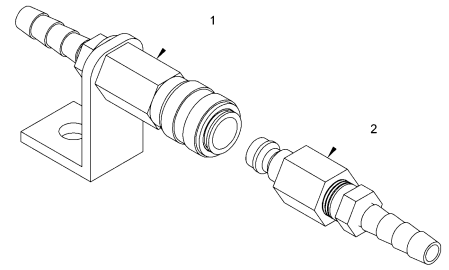
- 3) Secure the extension arm in the pad frame by pushing the cotterless hitch pin through the holes until the retaining ball emerges on the far side of the pad frame socket.
- 4) Connect the 2 vacuum hoses on each T-arm assembly to the nearest available connection points on the main pad frame, as directed in the following section.

Note: The lifter's 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.

- 5) Repeat steps #1-4 to install the second T-arm assembly, as shown in the preceding illustration.
- 6) To remove T-arm assemblies, reverse this procedure. Store removed T-arm assemblies in a clean, dry location to protect them from environmental exposure. Set the vacuum pads facing upward, because prolonged pressure against the rubber seals may cause them to become distorted.

To Connect/Disconnect Vacuum Hoses

The vacuum hose for each vacuum pad is connected to or disconnected from the lifter's vacuum system by means of a quick connector. To connect the vacuum hose, push the male and female ends of the connector together until they lock. To disconnect the vacuum hose, move the release ring on the female end until the connector separates.



WARNING: *Make sure vacuum hoses are coiled or routed to avoid damage during rotation or tilt.*

QUICK CONNECTOR

- 1 FEMALE END
- 2 MALE END

Make sure all vacuum hoses are secure and routed to avoid being punctured, pinched, kinked, entangled, abraded or otherwise damaged while the lifter is in operation.

Note: Whenever a vacuum hose is disconnected from the vacuum system, the corresponding vacuum pad does not contribute to the load capacity, whether or not the pad is mounted on the pad frame.

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.⁴ 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.

- In order to maintain load stability in the upright position, the maximum allowable thickness of loads is 1½" [3.8 cm] at the maximum weight (see SPECIFICATIONS: Load Capacity).⁵ This allowance assumes that the load is centered correctly on the lifter's pad frame (see OPERATION: TO APPLY THE PADS TO A LOAD: Positioning the Lifter on the Load) and that no other forces, such as wind pressure, are at work on the load. Either of these circumstances could reduce the allowable load thickness.

⁴ 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.

⁵ This allowance does **not** account for the use of Pad Spacers (option CM3PE2). **WARNING: Pad Spacers can reduce load stability in the upright position and, in some cases, the allowable thickness of loads.**

Conversely, allowable thickness increases as load weight decreases. In addition, an operator may be able to manually counteract the tendency of unstable loads to tilt out of the upright position, provided that the operator maintains control of the load at all times (see OPERATION: TO LIFT AND MOVE THE LOAD: About the Tilt Linkage and TO TILT THE LOAD). 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.

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.
- If the lifter is equipped with a Remote Control System, the work environment must be suitable for using it, as verified by the REMOTE CONTROL SYSTEM TEST (see MAINTENANCE).

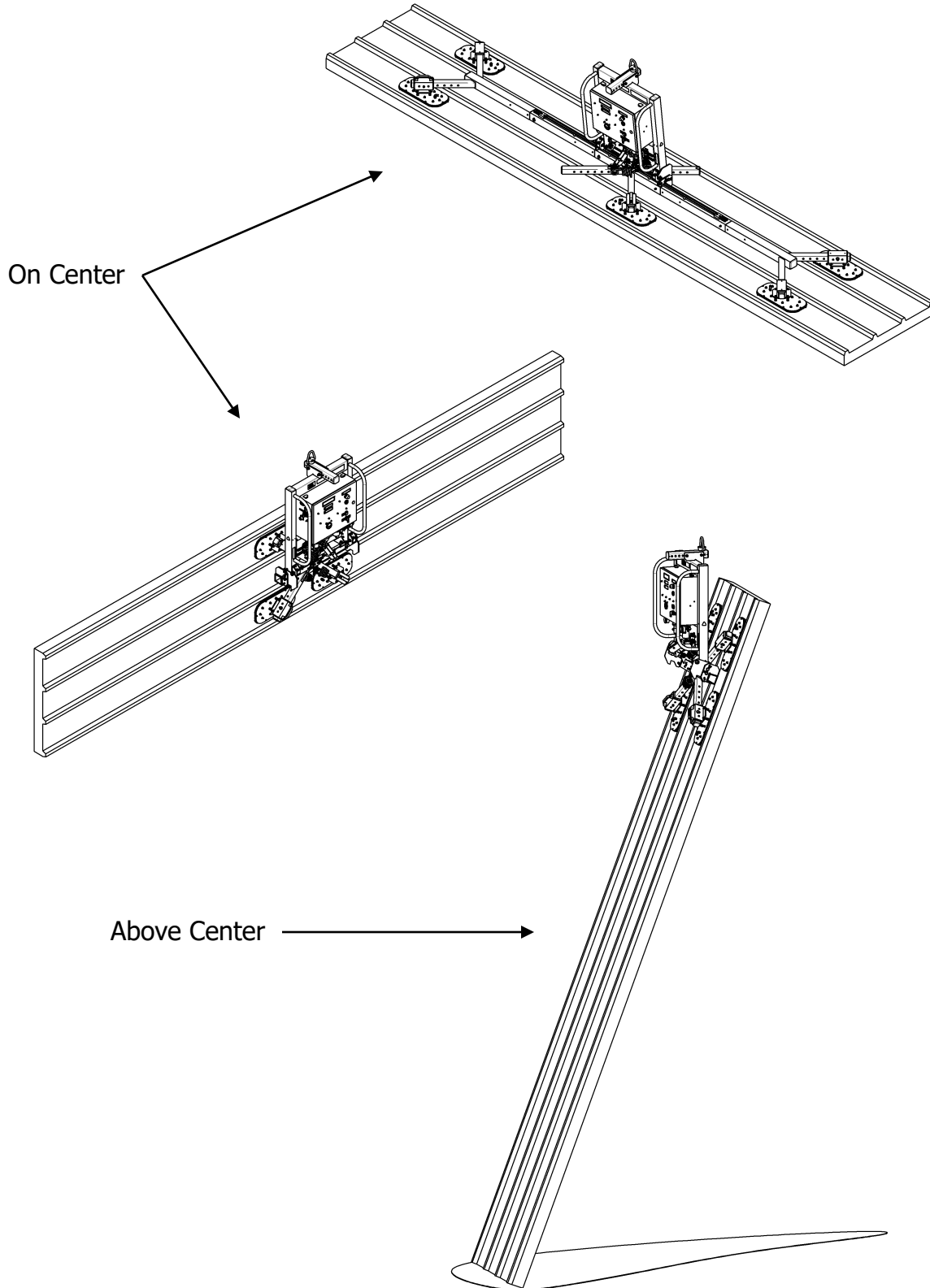
DISPOSAL OF THE LIFTER

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.

TYPICAL APPLICATIONS

Though the lifter is designed with the flexibility to be used in many different ways, these illustrations represent some typical applications.



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.

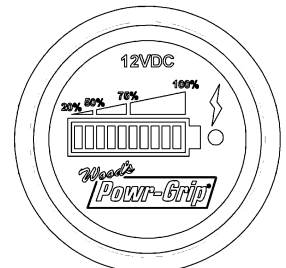
⚠ WARNING: Always wear appropriate personal protective equipment.

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).



⚠ WARNING: Make sure alarm is clearly audible over ambient noise at operator position.

The volume of the alarm may be adjusted by rotating the shutter of the low vacuum warning buzzer. Make sure the alarm is loud enough to be heard over any other noise that may be present while the lifter is in use. In addition, the alarm must be clearly audible at the maximum distance the operator may be from the lifter, as well as through any barriers or obstructions between the operator and the lifter. In order to be considered clearly audible, **the alarm volume must exceed ambient noise by at least 15 dBA at the operator position.**⁶

Since the Maximum Alarm Volume is 103 dBA, ambient noise must not exceed 88 dBA under any circumstances. Furthermore, if ambient noise measures 88 dBA, the alarm volume must be set to maximum and the operator must remain within 2 ft [60 cm] of the warning buzzer, in order for it to be effective.

⁶ Consult CE Standard EN 457 for alternative ways to determine whether the alarm is clearly audible to operators.

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

Two air filters help protect the vacuum generating system from contaminants. However, the lifter is not intended for use on wet load surfaces because the filters would not prevent liquid from entering the vacuum system. The operator must examine each filter regularly and remove any liquid or other contaminants found inside (see MAINTENANCE: AIR FILTER MAINTENANCE). To access the air filters, remove the cover indicated in OPERATING FEATURES.

Preparing to Use the Optional Remote Control System

If the lifter is equipped with a Remote Control System, the operator can engage the lifter's apply and release functions at distances up to 250 ft [76 m], provided there is a direct and clear view of the lifter and its status indicators from the operator location (see MAINTENANCE: REMOTE CONTROL SYSTEM TEST). When lifting a load from a remote location, the operator must monitor the lifter at all times to make sure that it is functioning as intended.⁷ In addition, the operator must exercise special care to ensure that the load is landed and supported correctly before releasing the load (see TO RELEASE THE PADS FROM THE LOAD to follow).

The radio transmitter is also equipped with an emergency transmitter disconnect that prevents the transmitter from sending any transmission. This button should not need to be used, but may have to be reset if accidentally engaged. To reset, twist the button clockwise while allowing it to spring outward to its normal position.

⁷ The Remote Control System is designed with safeguards to prevent multiple lifters from responding until a clear transmission is received. Nevertheless, radio controlled lifters should be tested to ensure that each transmitter controls only one lifter. The buttons located on the lifter function regardless of any radio transmissions in the vicinity.

To ADJUST THE PAD FRAME

Be sure to adjust the position of vacuum pads and/or cross members of the pad frame T-arm assemblies, so as to optimize load support and minimize load overhang for the intended use. Pads must be arranged symmetrically, to keep the lifter balanced. Note: Use only 2 pads on each T-arm assembly.


- 1) Remove the cotterless hitch pin from one sliding / movable pad mount.
- 2) Reposition the pad mount at the desired position along the cross member of the pad frame T-arm assembly, and align the holes for the cotterless hitch pin in the pad mount with the corresponding holes in the cross member.
- 3) Secure the pad mount by pushing the cotterless hitch pin through the holes until the retaining ball emerges on the far side of the pad mount.
- 4) Make sure that the vacuum hose serving the pad is not pinched, kinked, cut or abraded and that it will not interfere with lifter operations.
- 5) Repeat steps #1-4 to position other pad mounts as needed. Always position pads so as to create a symmetrical arrangement of the pad frame, and make sure that all vacuum lines are functioning correctly.

Note: Depending on the position of pad mounts, the pad frame may extend beyond the edges of smaller loads. When moving such loads, be careful to avoid any obstacles to the pad frame, as well as to the load.

In addition to the sliding / movable pad mounts, T-arm assemblies offer a second means of adjusting the position of vacuum pads: The bolts connecting the cross member to the extension arm on each T-arm assembly may be removed, allowing you to reposition the cross member. This allows you to align the pads precisely on the 2 T-arm assemblies, for example, in order to attach the lifter on cladding panel profiles with high contours and/or narrow spacing between contours. Be sure to tighten the bolts securely each time after you reposition a cross member on its extension arm.

TO APPLY THE PADS TO A LOAD

Powering up the Lifter

Place the lifter's power switch in the "on" () position.⁸ The adjacent, blue power light remains illuminated while the lifter is powered up. 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).

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

If the lifter is equipped with a Remote Control System, press the transmitter power button () and hold it briefly to activate the radio transmitter.⁹

Note: If the transmitter is activated, the transmission indicator light flashes green when any button on the transmitter is pressed and held; if the transmitter is not activated, the indicator light flashes red (see BEFORE USING THE LIFTER: Preparing to Use the Optional Remote Control System preceding).

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).

To lift loads in the *flat* orientation (see INTENDED USE: TYPICAL APPLICATIONS), center the pad frame to within 2" [5 cm] of the load center (hereafter, "on center"), since off-center loading can cause the load to hang at an angle or to tilt unexpectedly (see TO TILT THE LOAD to follow), and it may also damage the lifter.¹⁰

To lift loads in the *upright* orientation (see INTENDED USE: TYPICAL APPLICATIONS), center the pad frame from left to right on the load and determine which will be the top edge of the load while lifting. Then position the vacuum pads near that edge (hereafter, "above center"). This position will maximize stability while lifting the load.

If the lifter is positioned above center on a load encountered in the flat orientation, the load automatically tilts to the upright position when lifted (see TO TILT THE LOAD: Tilting Loads Positioned Above Center to follow).

Note: The tilt latch will lock in the vertical position.

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.

⁸ When the operator powers up the lifter, either the stand-by function or the apply function is automatically activated, depending on which was used last.

⁹ The radio transmitter turns off automatically, after a period of inactivity. The operator can also operate the lifter without using the radio transmitter, if desired.


¹⁰ 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.



WARNING: *Lift point must be adjusted so as to prevent interference between adjustable lift point tube and load.*

Note: If the load would extend higher than the lift point when lifted or tilted upright, the lift point must be adjusted to prevent interference between the adjustable lift point tube and the load (see ASSEMBLY: TO SET UP THE LIFTER). Failure to do so could damage the lifter or load, and may result in an unexpected load release.

Sealing the Pads against the Load

Firm pressure at the center of the lifter helps the vacuum pads begin to seal against the load. Press the apply button () on the lifter or the optional radio transmitter to make sure the apply function is activated. This energizes the vacuum pump, causing air to be drawn at the pads immediately. In addition, the low vacuum warning buzzer sounds an alarm and the red strobe light flashes, to warn the operator and other personnel when vacuum is insufficient for lifting the maximum load weight (see TO LIFT AND MOVE THE LOAD: Interpreting the Warning Buzzer and Lights to follow). The lifter must remain in the apply mode throughout the entire lift.



WARNING: *Keep apply function activated 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 2 vacuum gauges, which indicate the current vacuum level in each circuit of the lifter's vacuum system. 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. Both gauge needles 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 either 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 both vacuum gauges, except when used at high elevations (see SPECIFICATIONS: Operating Elevation). If not, make sure the vacuum switches are adjusted correctly (see MAINTENANCE: VACUUM SWITCH ADJUSTMENT). If either 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 both vacuum gauges, due to leakage in the seal between the vacuum pads and the load surface.¹¹ In the case of contamination, thoroughly clean the contact surfaces of the load and the vacuum pads (see MAINTENANCE: VACUUM PAD

¹¹ Contaminated loads can also cause the vacuum pump to run frequently or continuously. Since excessive pumping quickly reduces battery energy, the operator should clean the load when possible, to minimize pumping.

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 pump stops running, place the lifter's power switch in the "off" () position.
- 4) Raise the load a minimal distance, to assure that it is supported by the lifter.
- 5) Monitor both vacuum gauges 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.¹²

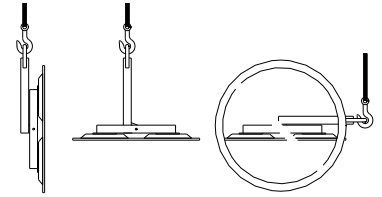
¹² Certain load materials are too rough or porous to allow the lifter to form a seal which can be maintained for 5 minutes without power. However, in geographical locations where CE Standards do not apply, it may be possible to use the lifter to lift such loads. Contact Wood's Powr-Grip for more information.

TO LIFT AND MOVE THE LOAD

Positioning the Lift Bar

 **WARNING:** *Lift bar must be oriented vertically to lift load.*

Never lift the load from a flat position with the lift bar latched parallel to the load. Always disengage the tilt latch (see TO TILT THE LOAD to follow) and raise the lift bar to a vertical orientation before attempting to lift.



Interpreting the Warning Buzzer and Lights

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 low vacuum warning buzzer and the red strobe light turn *off* automatically, whereas the green vacuum lift light turns *on* automatically, to signal that the lifter is ready to lift the maximum load weight. As vacuum continues to increase, the vacuum pump also turns off, to conserve battery energy.

 **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.

Monitoring Vacuum Indicators

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

 **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 pump turns on and off automatically, as required to maintain sufficient vacuum for lifting the maximum load weight. Under normal conditions, such intermittent cycling of the pump is no cause for alarm.

However, if vacuum decreases significantly, the lift light turns *off* and the low vacuum warning buzzer turns *on*, to signal the reduction in vacuum to the operator. If this occurs while you are lifting a load, make sure both vacuum gauges show 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 pump runs 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.

Monitoring the Low Vacuum Warning Buzzer

Using the low vacuum warning buzzer requires minimal interaction from the operator. The warning buzzer sounds an alarm until the lifter attains sufficient vacuum to lift the maximum load weight (see SPECIFICATIONS: Load Capacity). After the lifter has attained this vacuum level, the alarm stops sounding, to indicate that the lifter is ready to lift the load.

 **WARNING: Never attempt to lift load while alarm is sounding.**

Do not attempt to lift the load while the alarm is sounding; such an attempt could result in a load release and possible injury to the operator.

If the vacuum system experiences leakage while the lifter is attached to the load, the vacuum pump turns on automatically, as required to maintain sufficient vacuum. The alarm also sounds while the pump is running, to signal the reduction in vacuum to the operator. If the alarm sounds while you are lifting a load, make sure the vacuum gauge shows a vacuum level of 16" Hg [-54 kPa] or higher. If not, immediately 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 alarm is sounding.**

Discontinue lifter use until the cause of the vacuum loss can be determined. Using the lifter on contaminated, rough or porous surfaces may result in a vacuum loss, due to leakage between the vacuum pads and the load. Since the alarm may sound in such circumstances, consult the section TO APPLY THE PADS TO A LOAD: Vacuum Level on Other Surfaces to determine whether the lifter can be used to lift the load. If the vacuum loss is due to any other cause, 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 the control handles or other appropriate means to keep the lifter and load in the desired orientation while they are suspended from the crane.

If the lifter is positioned *above center* on a load encountered in the flat orientation, the load automatically tilts to the upright position when lifted (see TO TILT THE LOAD: Tilting Loads Positioned Above Center to follow).

Note: the tilt latch automatically engages when the pad frame returns to the upright position.

In Case of Power Failure

The lifter is equipped with 2 vacuum reserve tanks, designed to maintain vacuum temporarily in case of a power failure (ie, in battery).

 **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.

TO ROTATE THE LOAD EDGEWISE

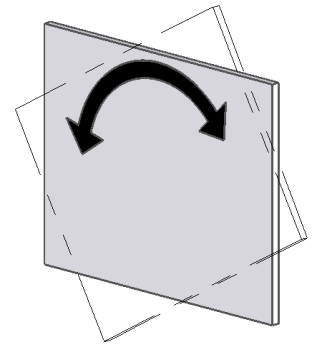
⚠ WARNING: *Never disengage both the rotation latch and the tilt latch at the same time.*

This lifter is not designed for rotation and tilt functions to be used at the same time. Disengaging the rotation and tilt latches simultaneously could cause uncontrolled and unpredictable load movement, potentially resulting in load damage or injury to the operator.

Make sure the pad frame is latched in the vertical position of the tilt range (see TO TILT THE LOAD to follow), as shown in the OPERATING FEATURES illustration, because the rotation function does not work in any other position.

⚠ 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. Make sure there is sufficient clearance for the load to rotate without contacting the operator or any nearby objects. Maintain a firm grip on the control handle (located on pad frame), to keep the load under control at all times. Pull 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 30° of rotation, simply let go of the rotation release lever 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 TILT THE LOAD

⚠ WARNING: *Always keep hands and fingers away from bars of tilt linkage.*

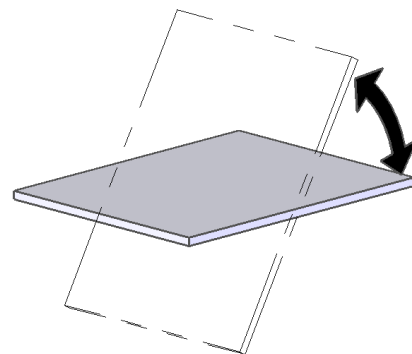
⚠ WARNING: *Never disengage both the rotation latch and the tilt latch at the same time.*

This lifter is not designed for rotation and tilt functions to be used at the same time. Disengaging the rotation and tilt latches simultaneously could cause uncontrolled and unpredictable load movement, potentially resulting in load damage or injury.

Remember that the load requires more vertical space when tilted to the upright position, as well as more horizontal space when tilted to the flat position. Make sure there is sufficient clearance for the load to tilt without contacting the operator or any nearby objects. If the lifter is equipped with the optional tilt lock, also make sure it is either disengaged or deactivated (see

OPERATION: TO LIFT AND MOVE THE LOAD: About the Optional Tilt Lock). Then lift upward or press downward on the lower control handles to tilt the load as desired. Since the tilt linkage is





designed to automatically maintain the load in either the upright or the flat position, the load force on the control handles changes direction during the tilt. If load size permits, maintain control with the handles throughout the tilt. For loads with overhang, it may be necessary to release the control handles as the load approaches the flat position. If so, keep the load under control using hand cups or other appropriate means.



Note: The pad frame automatically latches in place when it returns to the vertical position.

TO RELEASE THE PADS FROM THE LOAD

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

The lifter is designed to prevent an accidental load release, which could result from unintentionally interrupting the apply mode: When the load is at rest and fully supported, press and hold the enable button () and the release button () on the lifter, to force air into the vacuum pads, quickly breaking the vacuum seal. Alternatively, if the lifter is equipped with a Remote Control System, press and hold the enable button () and the release button () on the radio transmitter. Continue to hold both buttons until the vacuum pads disengage completely from the load.

If the lifter is equipped with a Remote Control System, an amber strobe light flashes as long as the operator is pressing the enable or release buttons. This serves to show the operator when signals are being transmitted successfully from a remote location and also to warn other personnel that the operator is suspending the apply function.

⚠ WARNING: *If vacuum pads do not disengage completely, do not attempt to move the lifter or load.*

The operator must never attempt to move the lifter or load until the vacuum pads are completely disengaged, as this could cause an unexpected load release and potential injury to the operator

or others. If the vacuum pads do not disengage completely on the first attempt, repeat the release process. If the load cannot be successfully released for any reason, reapply the vacuum pads to the load as previously directed (see TO APPLY THE PADS TO A LOAD preceding) prior to moving the lifter or load.

After the load is successfully released, the lifter will automatically activate the stand-by mode to conserve the battery energy until the lifter is ready to lift another load. Once the stand-by mode is activated, only the blue power light remains illuminated.

Prior to lifting another load, perform the Every-Lift Inspection as directed in MAINTENANCE: INSPECTION SCHEDULE.

AFTER USING THE LIFTER

Make sure the power switch on the lifter is in the "off" (☐) position. The adjacent power light shuts off when the operator powers down the lifter.

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

To remove the lifter from the hoisting equipment, place stable supports under the pad frame. Use the hoisting equipment to gently lower the lifter until the supports are holding its entire weight and the vacuum pads are not contacting anything. Make sure the lifter is stable; then detach the hoisting equipment hook from the lift spool.

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 (when applicable) to keep the vacuum pads clean. 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 minimize 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.

Note: One or more wiring diagrams are provided in the final section of this *INSTRUCTIONS* manual for reference when servicing the lifter or trouble-shooting a deficiency.

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 filters 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 the lifter is equipped with a Remote Control System, perform the REMOTE CONTROL SYSTEM TEST to follow.

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.¹³ 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.¹⁴
- 2) Apply the vacuum pads to the load as previously directed.
- 3) After the vacuum pump stops running, place the lifter's 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. Since the low vacuum warning buzzer is controlled by a vacuum switch, consult the VACUUM SWITCH ADJUSTMENT discussion for inspection, testing and adjustment procedures.

¹³ ASME Standard B30.20 requires the lifter to be tested to 125% of its Load Capacity.

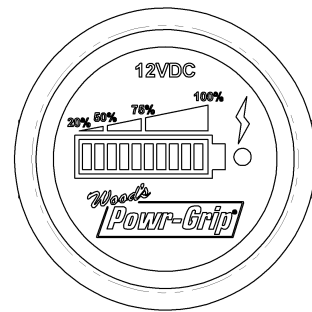
¹⁴ Flat Lifters are exempt from this requirement.

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.

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).¹⁵ 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.

While the lifter's power switch is in the "on" position (), the battery gauge automatically monitors battery energy (provided that the lifter is not in stand-by mode). 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.

While the lifter's power switch is in the "off" position () (or the lifter is in stand-by mode), the battery energy can be checked manually using the battery test button. 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.

¹⁵ 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.

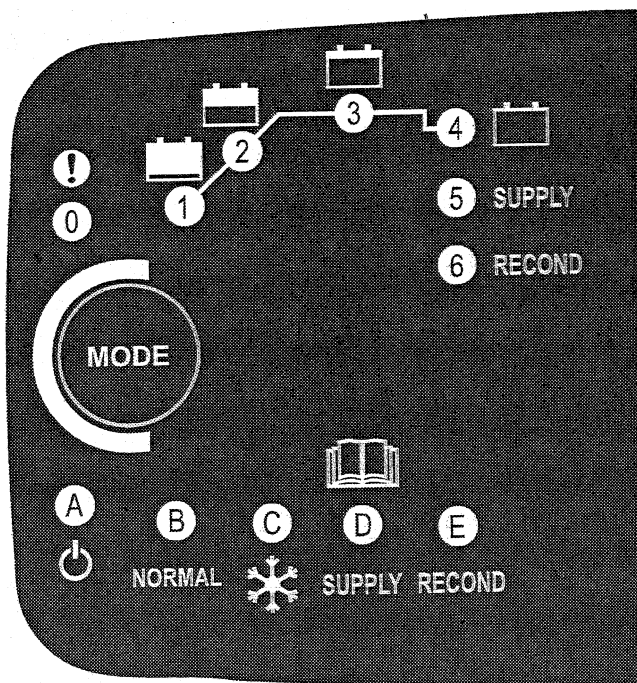
Identify the input voltage marked on the charger and plug it in to an appropriate power source.¹⁶ The power source must be equipped with a ground fault circuit interrupter, in order to reduce the risk of electrical shocks.

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

Using a Large Charger

If the lifter is equipped with a large (7 amp) battery charger, press the "MODE" button to select "NORMAL" mode.¹⁷ 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.¹⁸ When the battery is fully charged, the charger switches to a maintenance mode and charging level light #4 (green) turns on. When you perform a BATTERY TEST, 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.¹⁹ However,



¹⁶ Any external power supply must conform to all applicable local codes.

¹⁷ **CAUTION:** Always use "NORMAL" mode to charge the battery, unless directed to do otherwise. "SUPPLY" mode circumvents some safety features, which could result in property damage and possible injury.

¹⁸ 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.

¹⁹ When the charger is used in "NORMAL" mode, it automatically senses the energy level of the battery and reduces 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.

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).

Using a Small Charger

If the lifter is equipped with a small (0.6-1 amp) battery charger, a battery usually takes no more than 16 hours to charge completely, after which the charger shuts off automatically. When you perform a BATTERY TEST, the blue light on the battery gauge also turns on, to indicate that the battery is fully charged. Following long-term use, a battery gradually loses capacity. Replace it whenever the operating time between recharging is no longer satisfactory.

BATTERY CHARGER TEST

Perform this test only when the battery is *not* fully charged (see BATTERY TEST preceding). While the lifter's power switch is in the "off" position (⊖) and the battery charger is *disconnected* from any AC power source, use the battery test button to take an energy reading on the battery gauge. Then plug the charger in to an appropriate AC power source and allow a few moments for the battery gauge to show an accurate energy reading. If the charger is functioning correctly, the energy reading should be higher when the charger is plugged in.

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:²⁰ Pad damage can reduce the lifting capacity of the lifter. 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.²¹ Wipe all residue from the pad face, and allow the pad to dry completely before using the lifter.

²⁰ If the lifter is equipped with VPFS10T pads, the sealing edge is the replaceable sealing ring. When it is damaged, install a new sealing ring insert. In such cases, see TO REPLACE SEALING RING INSERT IN VPFS10T VACUUM PAD to follow.

²¹ If these cleaning methods are not successful, contact Wood's Powr-Grip or an authorized dealer for assistance.

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).²² When the pumping cycle is completed, the vacuum level should register above 16" Hg [-54 kPa] on each of the vacuum gauges (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 lifter's power switch in the "off" position (⊖), to interrupt the energy flow from the battery.
- 4) Monitor the vacuum gauges: *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.

REMOTE CONTROL SYSTEM TEST

If the lifter is equipped with a Remote Control System, perform this test in the environment where the lifter is normally employed. Use the radio transmitter to activate each of the remote functions.²³ Vary the location and distance of the transmitter in relation to the lifter, to ensure that transmissions are effective in a variety of circumstances. This may require assistance from someone near the lifter, to verify that functions are being performed as intended.

If the Remote Control System does not function correctly, review the following potential causes of malfunction and correct them as directed:

- The battery for the radio transmitter may be worn out. Replace any expended battery (see REPLACEMENT PARTS LIST).
- Metal or other electrically conductive surfaces may be causing interference between the radio transmitter and radio receiver. Although the transmission signals often can bounce around interfering surfaces, the signals do not travel through conductive walls. Reposition the transmitter as necessary to transmit signals effectively.

If the preceding directions do not resolve a performance problem, repeat the test under different conditions, to determine whether there is transmission interference in the work environment or the Remote Control System is not functioning as intended. Correct any deficiency before resuming normal use of the Remote Control System. If necessary, contact Wood's Powr-Grip or an authorized dealer for assistance.

²² 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.

²³ Use a test material with appropriate surface characteristics (see INTENDED USE: LOAD CHARACTERISTICS) to test the apply and release functions.

To REPLACE SEALING RING IN VPFS10T VACUUM PAD

- 1) Remove the old sealing ring insert: Hold the vacuum pad firmly and pull the ring insert out from the mounting groove. Discard any damaged ring insert.
- 2) Install a new sealing ring insert (see REPLACEMENT PARTS LIST): Make sure the entire vacuum pad is clean, including the mounting groove (see VACUUM PAD MAINTENANCE: Cleaning preceding). Push the ring insert into the mounting groove so that the insert's base (flat side) fits flush against the bottom of the groove. Begin by placing the inside edge of the ring insert against the inside edge of the mounting groove. Then push gently and firmly on the outside edge of the ring insert until it seats completely into the mounting groove. A pad ring installation tool is available to facilitate this process (see REPLACEMENT PARTS LIST). Work your way around the entire ring insert, repeating this process until the entire ring is seated in the mounting groove.
- 3) Make sure that the sealing ring is secure and fully inserted into the mounting groove around the entire perimeter of the vacuum pad.

Note: If the ring insert ever comes partially or entirely out of the mounting groove, inspect the ring insert for damage and reinstall an undamaged ring insert according to preceding directions.

AIR FILTER MAINTENANCE

(for in-line filters)

Filter Function and Conditions Requiring Service

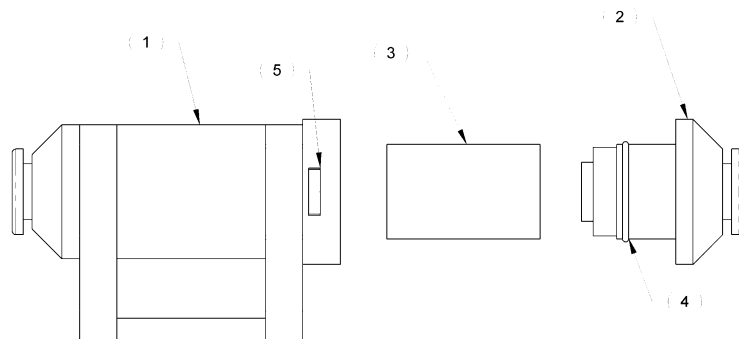
This air filter prevents solid particles from contaminating components in the vacuum system.

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

Open each filter regularly to determine whether liquid or other contaminants are trapped inside. Remove any liquid or contaminants found. Clean or replace the filter element if it has an overall dirty appearance, or if there is a noticeable increase in the time required to attain full vacuum (see REPLACEMENT PARTS LIST).

Filter Service Procedures

- 1) Hold the filter case (1) and turn the removable end (2) counter-clockwise approximately 45° until it stops moving.
- 2) Pull the end outward from the case and remove the filter element (3). Use an air hose or other suitable means to remove any liquid or other contaminants found inside the case. Also make sure the seal (4) is not damaged.
- 3) Determine whether the filter element needs to be replaced (see Conditions Requiring Service above).
- 4) Depending on the outcome of step 3, install a new element or reinstall the old element, as shown in the illustration.
- 5) Align the 2 projections on the removable end with the grooves in the case, and insert the end into the case. Push in and turn the end clockwise approximately 45° until it stops moving. Make sure that the projections are completely visible through the windows (5) in the case.
- 6) Test the vacuum system, to make sure the air filter does not leak (see VACUUM TEST preceding).



VACUUM PUMP MAINTENANCE – DYNAFLO DV1034204

⚠ 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, gaskets/flap valves or (when preferable) the entire head assemblies²⁴ (see REPLACEMENT PARTS LIST), as necessary to obtain acceptable pump performance. Perform the following maintenance on both heads of the pump.

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

Replacing a Diaphragm

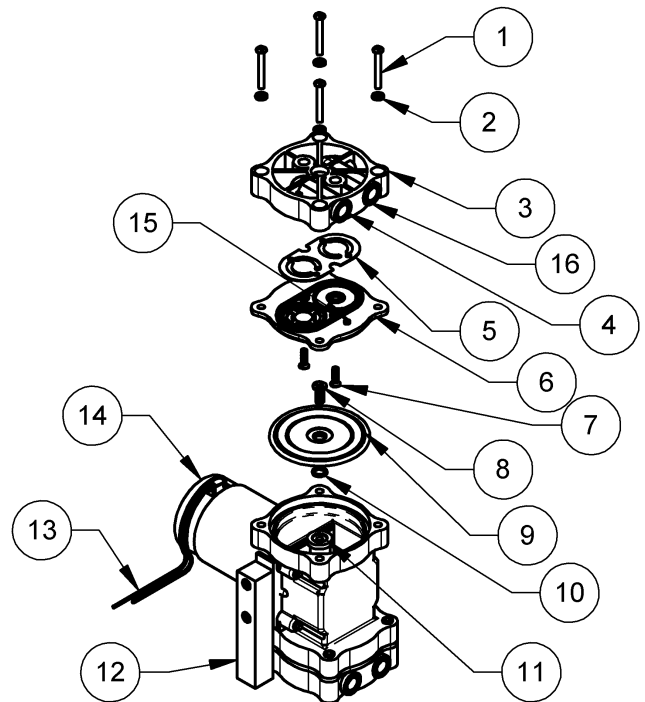
- 1) Remove the four head screws (1) and lock washers (2), and remove the head assembly (3–7).
- 2) Remove the diaphragm retaining screw (8), diaphragm (9) and rubber O-ring (10).
Note: Be sure to save the flat washer located between the O-ring and the connecting rod (11). Also take note of the diaphragm 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 a 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 a 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 (VACUUM)	8 DIAPHRAGM RETAINING SCREW	12 MOUNTING FOOT	16 EXHAUST PORT (PRESSURE)

²⁴ **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.

VACUUM SWITCH ADJUSTMENT

Vacuum Switch Function

Two vacuum switches control various functions of the vacuum lifter (see OPERATING FEATURES for location of vacuum switches). While the lifter is powered up, each vacuum switch senses the vacuum level in one of the two vacuum circuits of the vacuum system. If either circuit loses significant vacuum while the lifter is in the apply mode, the system responds automatically. Each vacuum switch controls two functions: Settings n_1 and n_2 control the vacuum pump(s) and the battery gauge. Settings n_3 and n_4 control a vacuum lift light and low vacuum warning buzzer, light and/or strobe light.

Both vacuum switches should have the same settings to ensure the two circuits are functioning together. Although the vacuum switches are set at the factory and should not require adjustment, the following section lists the factory settings, in case adjustment is necessary.

Adjustment Procedure

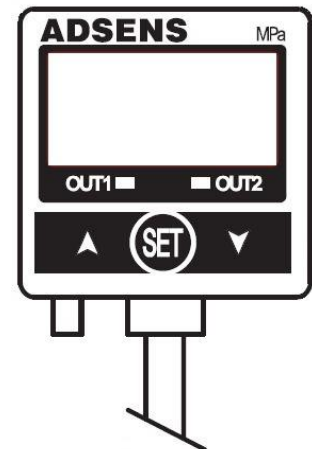
⚠ WARNING: *Lifting capacity decreases whenever vacuum switch is adjusted to maintain lower vacuum level.*

- 1) To unlock the vacuum switch settings, press and hold the "SET" button for at least five seconds. Note that a different menu may appear if the button is released too soon.²⁵ Use the arrow keys to access the unlocked mode ("UnL") and press the "SET" button again.
- 2) Press and release the "SET" button to access the different settings (n_1, n_2, n_3, n_4). Use the arrow keys to adjust each setting and then press the "SET" button to continue to the next setting. The following values should appear on the digital display:

- n_1 = -458. This setting turns off power to the vacuum pump(s) when the vacuum system reaches the maximum vacuum level. Setting n_1 must always be set above n_2.

Note: Lowering this value allows the pump(s) to shut off at higher elevations, but it also requires the pump(s) to run more frequently.

- n_2 = -432. After a vacuum switch has turned off the vacuum pump(s) (see n_1) and the vacuum system begins to lose vacuum, setting n_2 turns on power again to the vacuum pump(s). The vacuum pump(s) should turn on before the needle on either vacuum gauge moves from the green range to the red range. Setting n_2 must always be set above n_4.



²⁵ The vacuum switch has additional settings that should **not** be adjusted. These settings are accessed if the "SET" button is held for 3 seconds. For reference, the correct settings are provided below.

- Setting 1 should display "nnH"
- Setting 2 should display "1nC"
- Setting 3 should display "2nC"
- Setting 4 should display "192"
- Setting 5 should display "nAn"

- n_3 = -430. This setting turns off the low vacuum warning buzzer, light and/or strobe light and turns on the vacuum lift light, indicating that the lifter has already reached the minimum vacuum level (see n_4). Setting n_3 must always be set above n_4.
- n_4 = -428. After the vacuum switch has turned off the vacuum pump(s) (see n_1) and the vacuum system has lost significant vacuum, setting n_4 turns on the low vacuum warning buzzer, light and/or strobe light and turns off the vacuum lift light. This signals a loss of adequate vacuum to the lifter operator.

Note: Setting n_4 corresponds with the minimum vacuum level for lifting loads. ***This setting must not be lowered without first consulting Wood's Powr-Grip, because it may reduce the maximum lifting capacity.***

- 3) Each vacuum switch must be locked after all adjustments have been made. Use the arrow keys to access the locked mode ("LoC") and press the "SET" button again.
- 4) Repeat steps 1-4 for the other vacuum switch, to ensure the settings are the same.

REPLACEMENT PARTS LIST

Stock No.	Description	Qty.
97465HV	Pad Frame T-Arm Assembly w/VPFS10T Vacuum Pads (optional)	2
97465	Pad Frame T-Arm Assembly w/VPFS625 Vacuum Pads (optional)	2
97464	Pad Frame Extension Kit for Roof Panels (optional)	1
97463	Pad Frame Rocker Arms Set for Roof Panels (optional)	1
93221	Vacuum Pump - Diaphragm Type - 2.5-SCFM [71 liters/minute] - 12 V DC (Dynaflor)	1
66197BM	Dynaflor Pump Gasket & Flap Valves	2
66197AM	Dynaflor Pump Diaphragm Kit	2
66197AA	Dynaflor Pump Dual-Head Assembly	2
65442CA	Vacuum Hose - 1/4" [6.3 mm] OD - Red (approx. 120" [305 cm] in length)	1
65442AM	Vacuum Hose - 1/4" [6.3 mm] ID x 48" [122 cm] Length - Coiled - Green	2
65441	Vacuum Hose - 1/4" [6.3 mm] ID x 48" [122 cm] Length - Coiled - Red	2
65439AM	Vacuum Hose - 5/32" [4.0 mm] OD - Red (approx. 25" [64 cm] in length)	1
65439	Vacuum Hose - 5/32" [4.0 mm] OD - Blue (approx. 25" [64 cm] in length)	1
65429	Vacuum Hose - 1/4" [6.3 mm] OD - Blue (approx. 200" [508 cm] in length)	1
65211	Check Valve - 1/8 NPT	2
65011	Pad Spring - Tapered Type (for VPFS625 pads)	16
65010	Pad Spring - Coil Type (for VPFS10T pads)	4
64834	LED Indicator - 12 V DC - Green (aka, vacuum lift light)	1
64832	LED Indicator - 12 V DC - Blue - Small (aka, power light)	1
64752	Audio Alarm - 5-15 V DC - Panel Mount	1
64713AM	Battery Charger - 7 Amp - 240 V AC - Australian Type	1
64712AM	Battery Charger - 7 Amp - 100 / 120 V AC	1
64711AM	Battery Charger - 7 Amp - 240 V AC	1
64682	Battery - 1.5 V DC - AA Alkaline (for optional radio transmitter)	4
64665	Battery - 12 V DC - 18 Amp-Hours	1
64590	Battery Gauge	1
64460	Circuit Breaker - 15 A	1
64453CT	Circuit Board - Populated	1
64272	Strobe Light - 12 V DC - Amber (optional)	1
64273	Strobe Light - 12 V DC - Red	1
64238AA	Vacuum Switch - Digital	2
64233	Power Switch	1
64213	Push-Button Switch - Chrome (for apply, enable, and release buttons)	3
64199	Push-Button Switch - Red (for battery test button)	1
57340	Battery Connector - Twin Lead (for 18 amp-hour battery)	1
57389	Remote Control System Retrofit Kit (optional)	1
54107	Movable Pad Mount - 2-1/2" [63.5 mm] Tubing Size	4
53122	Pad Fitting - Elbow - 5/32" [4.0 mm] ID (for VPFS10T pads)	4
49726	Vacuum Pad Insert - Model VIFS625 / 6" x 25" [15 cm x 64 cm] (for VPFS625 pads)	4
49724TT	Sealing Ring Insert - Model VIFS10T2 - Closed Cell Foam (for VPFS10T pads)	4
49724LT	Sealing Ring Insert - Model VIFS10T1 - Low-Marking Rubber (for VPFS10T pads)	4
49672T	Vacuum Pad - Model VPFS10T / 10" [25 cm] Diameter - w/Replaceable Sealing Ring	4
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	3
49122	End Plug - 2" x 2" x 1/4" [50.8 mm x 50.8 mm x 6.4 mm] Tubing Size	4
29353	Pad Cover (for VPFS10T pads)	4
20050	Pad Ring Installation Tool	1
16131	Element for Air Filter	2
16057	Quick Connector - 1/8 FNPS - Male End	4
16056	Quick Connector - 1/8 FNPS - Female End	8

Stock No.	Description	Qty.
15920	Vacuum Gauge - 1/8 NPT - CBM Type - w/Panel Mount Bracket	2
15792AM	Rotation or Tilt Release Lever Knob	2
15632	Pad Filter Screen - Small (for VPFS10T pads)	4
15630	Pad Filter Screen - Large (for VPFS625 pads)	4
15310AM	Pad Fitting - Push-In Swivel Elbow - 1/4 Male-NPT to 3/8" OD Hose Size (for VPFS625 pads)	4
13530	Cotterless Hitch Pin - 1/2" x 3 1/2" [13 mm x 89 mm]	6
11726AM	Clamp Collar - 2.157-18 Thread - 1-Piece	1
10906PM	Shoulder Bolt - Socket Head - 3/8" x 1" x 5/16-18 Thread (for mounting VPFS625 pads)	16
10900	Shoulder Bolt - Socket Head - 5/16" x 1/2" x 1/4-20 Thread (for mounting VPFS10T pads)	24

***SERVICE ONLY WITH IDENTICAL REPLACEMENT PARTS,
AVAILABLE AT WPG.COM OR THROUGH AN AUTHORIZED WPG DEALER***

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.

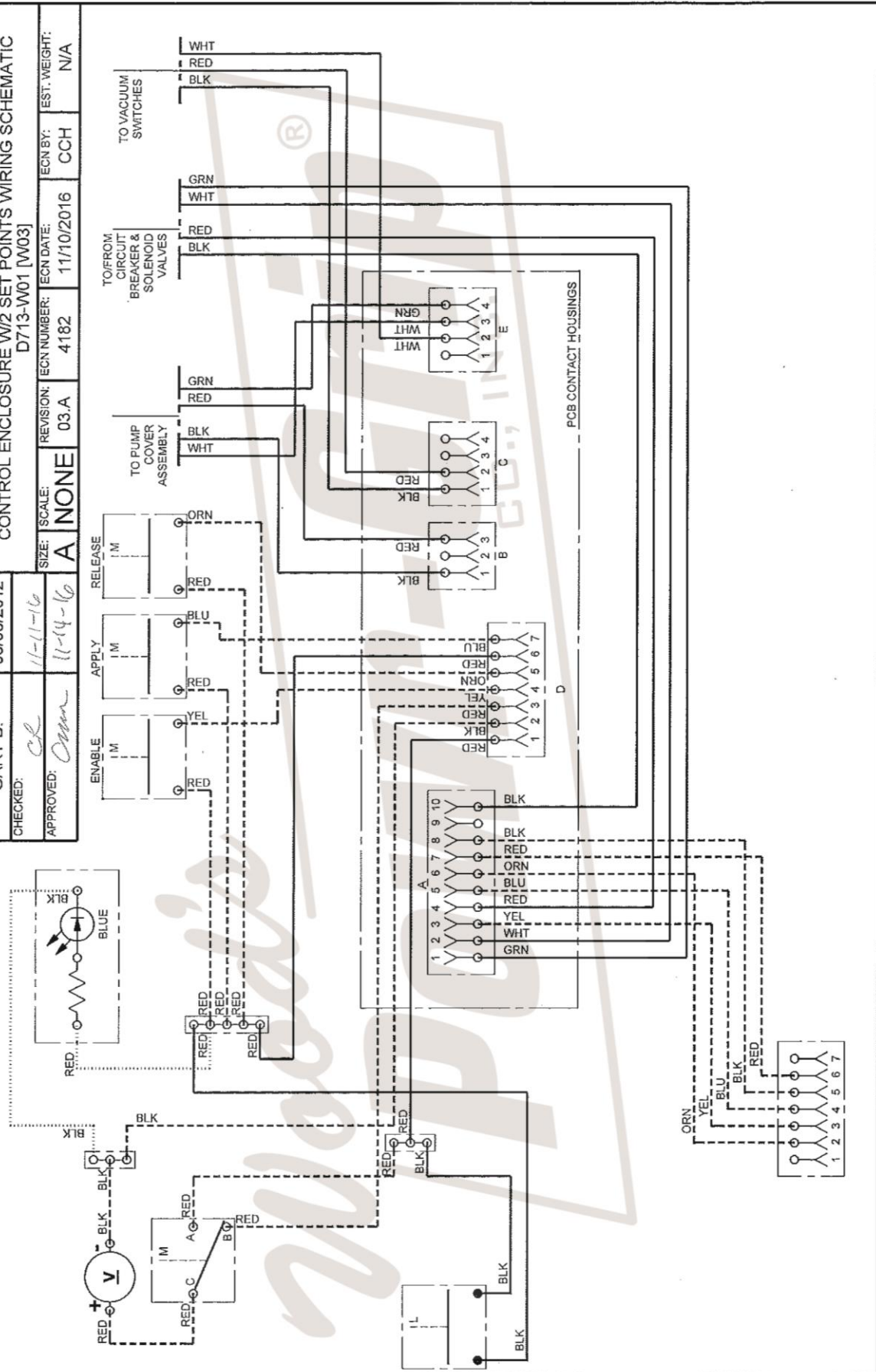
Wood's Powr-Grip Co., Inc.
908 West Main St. / P.O. Box 368
Laurel, MT USA 59044

phone 800-548-7341

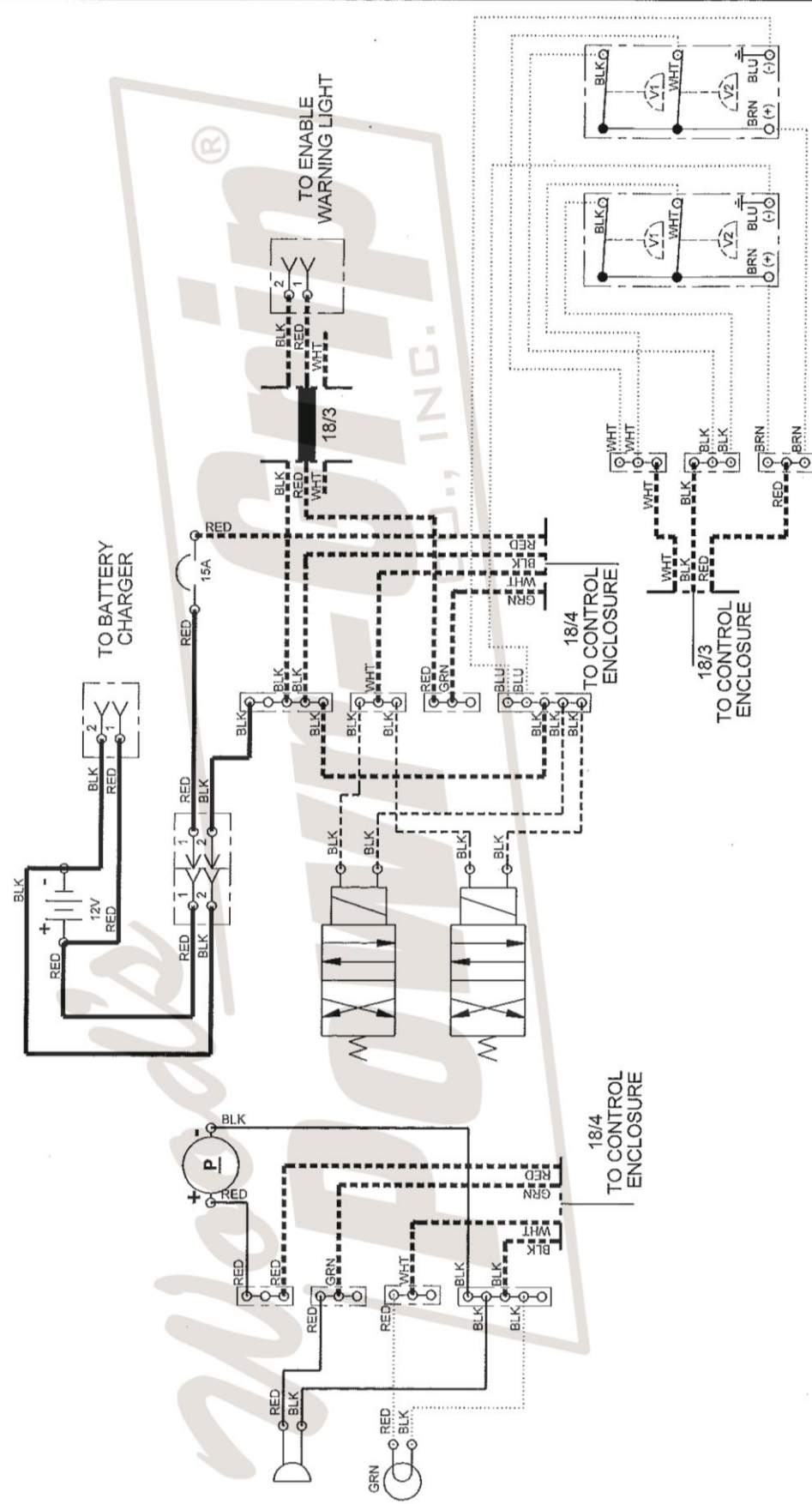
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fax 406-628-83

WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.		TYPE: STANDARD		FILE DIRECTORY: 713-713-W01 [W03]	
LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.		THIS DRAWING IS THE PROPERTY OF WOOD'S POWR-GRIP CO., INC. IT IS LOANED WITH THE UNDERSTANDING THAT NEITHER IT NOR ANY INFORMATION CONTAINED THEREIN WILL BE COPIED, PUBLISHED OR TRANSMITTED TO OTHERS WITHOUT EXPRESS WRITTEN PERMISSION.		WOOD'S POWR-GRIP CO., INC. LAUREL, MONTANA U.S.A.	
.24AWG. .20AWG. .18AWG. N/A N/A N/A		DC2 VACUUM CONTROL SYSTEM		CONTROL ENCLOSURE W/2 SET POINTS WIRING SCHEMATIC	
PRODUCT MANAGER: GARY B.		DATE: 06/06/2012		N/A	
CHECKED: <i>cl</i>		REVISION: 03.A		ECN BY: CCH	
APPROVED: <i>oem</i>		SCALE: A NONE		ECN DATE: 11/10/2016	
DATE: 11-11-16		SIZE: 03.A		EST. WEIGHT: N/A	
DATE: 11-14-16		REVISION: 03.A		ECN NUMBER: 4182	



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1100LB LOW-PROFILE MANUAL-ROTATOR/QUADRA-FILTER CROSS-ARM PAD FRAME CROSS-ARM WIRING SCHEMATIC D775B-W01 [C-W01]	
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PRODUCT MANAGER: JOSH E.	CHECKED: <i>cl</i>
APPROVED: <i>cmr</i>	DATE: 10-10-16
APPROVED: <i>cmr</i>	DATE: 10-10-16
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EST. WEIGHT: N/A	ECN BY: JAC



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1100LB LOW-PROFILE MANUAL-ROTATOR/QUADRA-FILTER CROSS-ARM PAD FRAME PANEL MASTER WIRING SCHEMATIC D775B-W01 [C-W03]	
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LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.	
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18AWG --- N/A	16AWG --- N/A
PRODUCT MANAGER: JOSH E.	DATE: 11/05/2015
CHECKED: <i>OR</i>	10-10-16
APPROVED: <i>mm</i>	10-10-16

