

KEEP FOR FUTURE REFERENCE



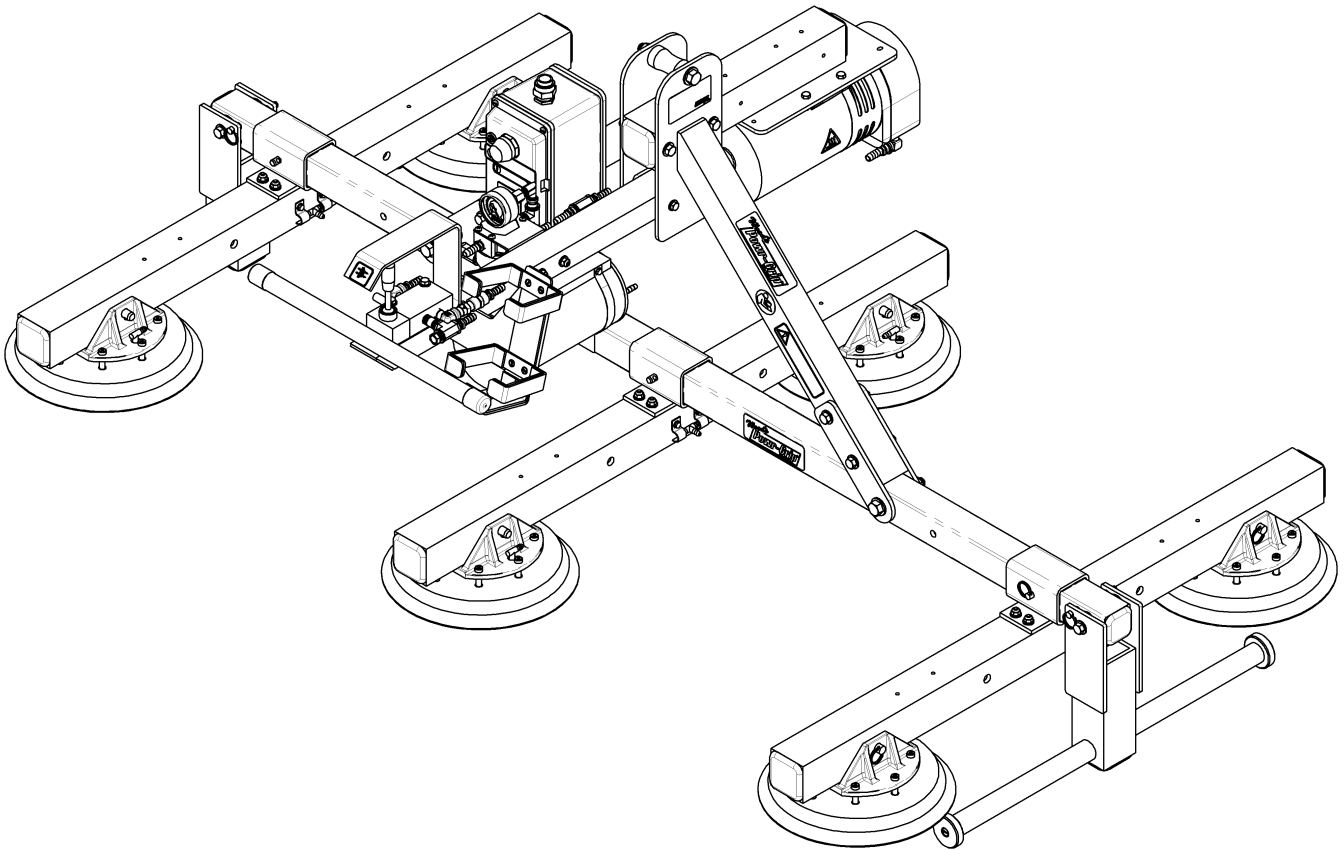
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INSTRUCTIONS

International Version

MODEL NUMBERS: FLEXR4HV11AC,
FLEXR6HV11AC

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



**FLEXR SERIES FLAT LIFTER
WITH SLIDING ARMS
AC-VOLTAGE**



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



DESIGNED FOR THE MATERIALS HANDLING PROFESSIONAL

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SPECIFICATIONS

Description:	Designed for use with a crane or other hoisting equipment, the FLEXR-HV11AC lifters employ vacuum to hold a load for lifting in the flat orientation.	
Model Number:	FLEXR4HV11AC (w/4 Vacuum Pads)	FLEXR6HV11AC (w/6 Vacuum Pads)
Load Capacity:	(rated at 16" Hg [-54 kPa] on clean, smooth, nonporous flat surfaces ¹)	
Per-Pad:	300 lbs [136 kg]	300 lbs [136 kg]
Maximum:	1200 lbs [545 kg]	1500 lbs [680 kg]
Lifter Weight:	140 lbs [64 kg]	165 lbs [75 kg]
Power Source:	See serial number plate for specific AC voltage, frequency and amperage.	
Vacuum Pads: ²	10" [25 cm] nominal diameter, lipped (Model HV11), standard rubber, spring-mounted (¾" [20 mm] travel), with #60 filter screen	
Pad Spread:	(to outer edges)	
Maximum:	41" x 70¼" [1041 x 1784 mm]	
Minimum:	23" x 54¼" [584 x 1378 mm]	
Vacuum Pump:	Rotary vane type, 4 SCFM [113 liters/minute] nominal airflow <i>or</i> Diaphragm type, 3 SCFM [85 liters/minute] nominal airflow <i>or</i> Wobble Piston, 4 SCFM [113 liters/minute] nominal airflow	
Vacuum Reserve Tank:	Vacuum reservoir helps prevent immediate vacuum loss in case of power failure.	
Vacuum Gauge:	Dial gauge indicates current vacuum level in positive inches of Hg and negative kPa.	
Vacuum Lift Light:	Green light is energized whenever vacuum level is sufficient for lifting maximum load weight (higher than 16" Hg [-54 kPa]).	
Options:	See separate instructions about optional features.	
Operating Elevation:	Maximum = 10,000 feet [3048 meters]	
Operating Temperatures:	32° to 100° F [0° to 38° C]	
Service Life:	This lifter is designed to have a service life of at least 20,000 lifting cycles, when used and maintained as intended. Vacuum pads, filter elements and other wear-out items are excluded; see MAINTENANCE and REPLACEMENT PARTS LIST for more information. For the DISPOSAL OF THE LIFTER after its service life, see INTENDED USE.	

ASME Standard BTH-1: Design Category "B", Service Class "0" (see www.wpg.com for more information)

.....
!!-CE-!! Note: This symbol appears in the *INSTRUCTIONS* manual only when requirements of a CE Standard are *different* from requirements of other standards that also apply to this vacuum lifter. CE requirements are mandatory in geographical areas where CE Standards apply, but may be optional in other locations.
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¹ Load Capacity is based on a friction coefficient of 1; see MAINTENANCE: VACUUM PAD MAINTENANCE: Friction Coefficient for additional information.

² Options include oil-resistant rubber pads for use on oily surfaces (see REPLACEMENT PARTS LIST).

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.

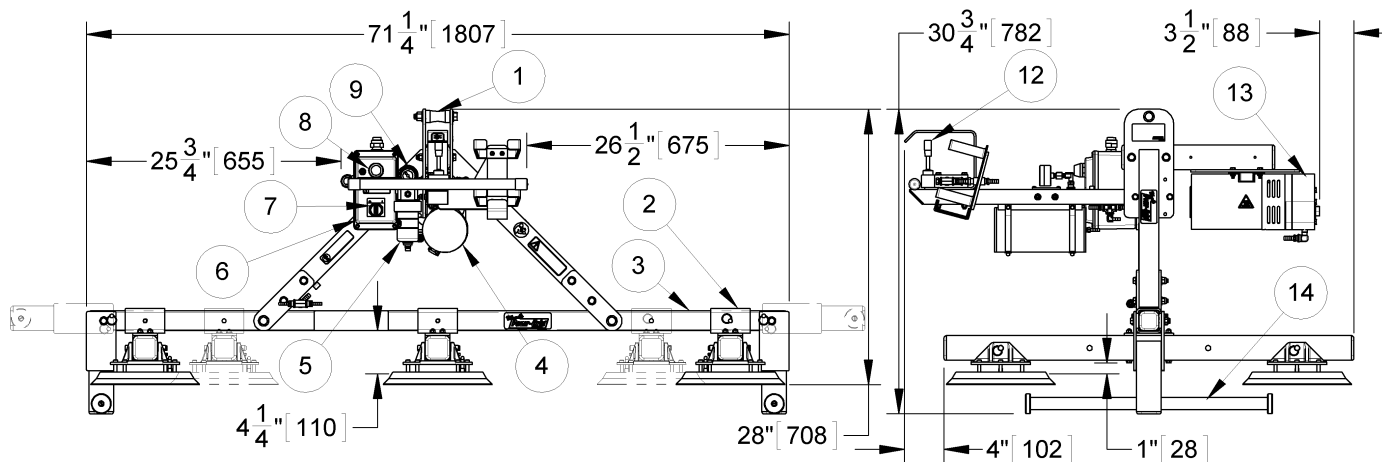
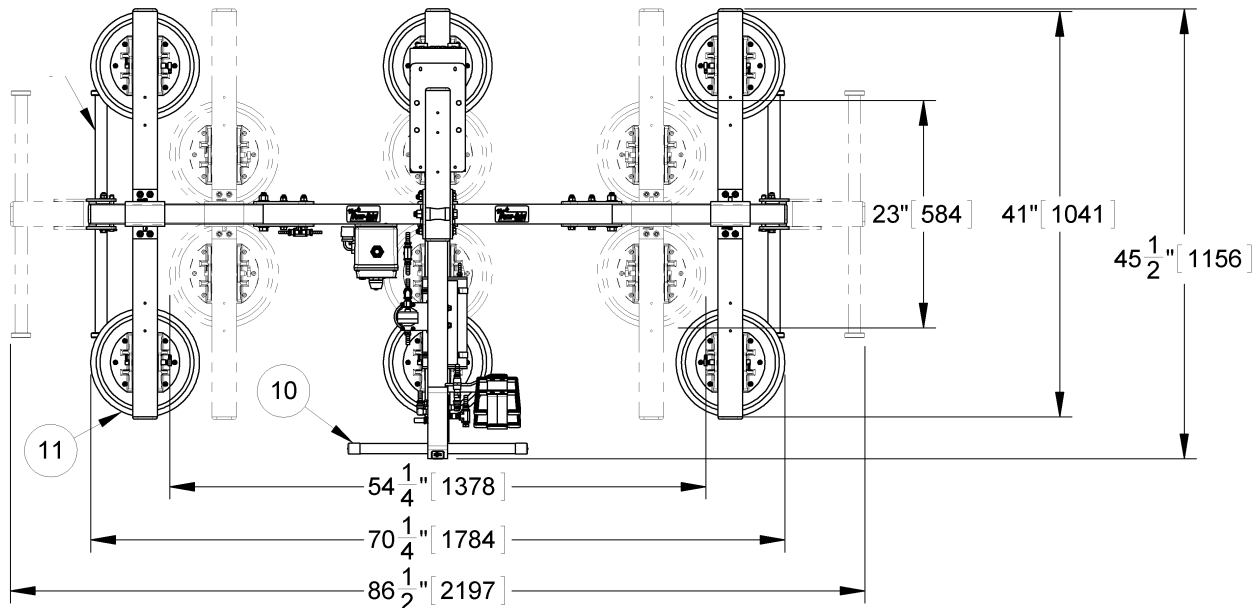
Always place the power control in the inactive position and, when possible, disconnect the power source before opening any enclosure on the lifter. (Only applicable to powered lifters)

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).

Always employ a ground fault circuit interrupter when connecting the power cable to the power source.

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 FLEXR6HV11AC shown.

- | | | |
|-----------------------|--------------------------------|--------------------------------------|
| 1 LIFT SPOOL | 6 Enclosure with VACUUM SWITCH | 11 VACUUM PAD with MOVABLE PAD MOUNT |
| 2 SLIDING PAD ARM | 7 POWER SWITCH | 12 VACUUM CONTROL VALVE |
| 3 PAD FRAME | 8 VACUUM LIFT LIGHT | 13 VACUUM PUMP |
| 4 VACUUM RESERVE TANK | 9 VACUUM GAUGE | 14 PARKING STAND/CONTROL HANDLE |
| 5 AIR FILTER | 10 CONTROL HANDLE | |

ASSEMBLY


- 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).

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

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

- 3) Move the control handles at the ends of the pad frame to the position desired for managing the load, as follows: Remove the cotterless hitch pin from one handle pivot, and pivot the handle into the desired position. When the holes for the cotterless hitch pin are aligned, push the pin through the holes until the retaining ball emerges on the far side of the pivot. Repeat this procedure for the second handle.
- 4) Connect the power cable from the lifter to the power source as follows: Wire the female connector provided to an appropriate current-protected power source (see serial number plate for power requirements).

 **WARNING: Wiring must be done by qualified personnel, taking all appropriate safety precautions.**

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.**

Make certain the power cable is routed so that it does not become tangled while operating the lifter or hoisting equipment. Then push the power cable's male connector into the female connector and twist to secure them together. Now the lifter is operational.

- 5) Perform Operational and Load Tests for the lifter as directed in MAINTENANCE: TESTING SCHEDULE.

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).
- 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.

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: 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.

-
- **!!-CE-!!** If the lifter is employed in a construction area, CE Standard EN 13155 requires the use of a secondary positive holding device, such as a sling system, designed to support the load in case of a vacuum system failure.

 **WARNING: Where CE Standards apply, secondary positive holding device is required for lifting loads in construction zones.**

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.

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

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).

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

The lifter is equipped with one or more air filters to help protect the vacuum system from contaminants.⁴ 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).

⁴ In order for the operator to use the lifter on wet load surfaces, it must be equipped with 2 or more filters that are connected *in series*. However, see MAINTENANCE: VACUUM PAD MAINTENANCE: Friction Coefficient before using the lifter on wet load surfaces.

TO CHANGE THE CONFIGURATION OF VACUUM PADS

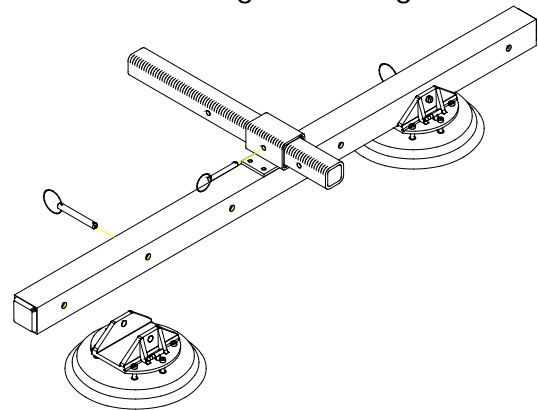
The lifter can accommodate various load dimensions, depending on the position of the sliding pad arms and movable pad mounts on the pad frame (see illustration in OPERATING FEATURES). Move the pad arms and pad mounts inward or outward on the pad frame as needed to provide adequate support across the load surface. The vacuum pads must be arranged symmetrically, to keep the lifter balanced.

⚠ WARNING: *Make sure all vacuum hoses are coiled or routed so they do not become entangled, kinked or punctured.*

To position a pad arm, remove the cotterless hitch pin from the arm's sliding mount. While making sure the vacuum hose does not get pinched, slide the arm to the desired position and align the holes for the pin. Push the pin through the holes until the retaining ball emerges on the far side of the arm mount. On the opposite end of the pad frame, position the second sliding pad arm at an equal distance from the center of the lifter.

To position each set of vacuum pads on a pad arm, remove the cotterless hitch pins from the pad mounts, move the pads inward or outward equal distances on the pad arm, and secure them with the cotterless hitch pins.

Before applying the vacuum pads to a load, make sure that all vacuum hoses are properly connected and will not interfere with lifter operation.



TO APPLY THE PADS TO A LOAD

Powering up the Lifter

Make sure the lever on the vacuum control valve is in the "release" (☰) position: Pull outward on the lever's knob, move the lever all the way *downward* and release it.

CAUTION: *Never place valve lever in center position; this can result in pump damage.*


Place the power switch in the ON position (☑), to engage the vacuum pump. The lifter is designed for the vacuum pump to run continuously.

⚠ WARNING: *Never turn power off while operating lifter; keep pump running throughout lift.*

The power switch must remain in the ON position while operating the lifter. Placing the power switch in the OFF position (☐) during lifter operation could result in the release of the load and possible injury to the operator (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 harm the pads or prevent them from sealing against the load (see MAINTENANCE: VACUUM PAD MAINTENANCE).⁵


 **WARNING:** *To avoid accidental load release, always center lifter's pad frame on load.*

Center the lifter's pad frame to within 2" [5 cm] of the load center, since off-center loading could result in a load release and possible injury to the operator, and it may also damage the lifter.⁶ 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 lower the lifter onto the load until all pads are touching the contact surface.

Sealing the Pads against the Load

Move the lever on the vacuum control valve to the "apply" ( position: Pull outward on the lever's knob, move the lever all the way *upward* and release it. This position opens the lifter's vacuum lines to the airflow created by the vacuum pump, causing air to be drawn immediately at the vacuum pads.⁷ Apply the lifter to the load until all pads seal against it.

 **WARNING:** *Keep valve lever in "APPLY" position throughout lift.*

The valve lever must remain in the "apply" ( position throughout the entire lift. Any interruption of the vacuum flow during lifter operation could result in the release of the load and possible injury to the operator.

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 Gauge

The vacuum gauge indicates the current vacuum level in 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. 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], press on any pad that has not yet sealed.

⁵ Since oil damages the rubber in standard pads, the load surface must be free of oil unless the lifter is equipped with optional oil-resistant pads, which may be used on oily surfaces (see REPLACEMENT PARTS LIST).

⁶ 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.

⁷ To minimize the time it takes for the lifter to attach and obtain full vacuum, do not place the valve lever in the "APPLY" position until the vacuum pads are contacting the load.

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 the vacuum gauge, except when used at high elevations (see SPECIFICATIONS: Operating Elevation). If not, 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 the vacuum gauge, due to leakage in the seal between the vacuum pads and the load surface. 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) When the vacuum level registers above 16" Hg [-54 kPa] on the vacuum gauge (see TO LIFT AND MOVE THE LOAD: Load Capacity and the Lift Light to follow), 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 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.⁸

TO LIFT AND MOVE THE LOAD

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 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 and the lever on the vacuum control valve is in the "apply" (⇌) position (see TO RELEASE THE PADS FROM THE LOAD: About Stand-By Mode to follow); such an attempt could result in a load release and possible injury to the operator.

⁸ 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 vacuum gauge 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.

The lifter's vacuum pump runs continuously to maintain sufficient vacuum for lifting the maximum load weight. If the vacuum system experiences leakage while the lifter is attached to the load, the lift light turns off automatically, to signal the reduction in vacuum to the operator.

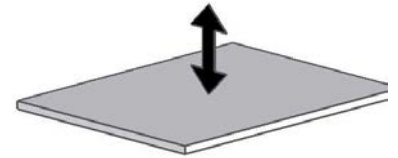
If the lift light turns off while you are lifting a load, make sure the vacuum gauge shows a vacuum level of 16" Hg [-54 kPa] or higher. If not, move away and stay clear of the load until it can be lowered to the ground or a stable support.

⚠ 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 lift light does not turn on when 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 the control handles to keep the lifter and load in the desired orientation while they are suspended from the crane.



Note: Depending on the arrangement of sliding pad arms and movable 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 Case of Power Failure

The lifter is equipped with a vacuum reserve tank, designed to maintain vacuum temporarily in case of a power failure.

⚠ 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 RELEASE THE PADS FROM THE LOAD

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

When the load is at rest and fully supported, move the lever on the vacuum control valve to the "release" (☞) position: Pull outward on the lever's knob, move the lever all the way *downward* and then release it. This forces air into the vacuum pads, quickly breaking the vacuum seal. After the pads have disengaged completely from the load, move the lifter away. Leave the valve lever in the release position until ready to attach to the next load.

AFTER USING THE LIFTER

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.*

The control handles can be used as parking stands when an unloaded lifter is not suspended from a crane: Secure the handles in position, pointing straight down from the pad frame (see ASSEMBLY). Use the hoisting equipment to gently lower the lifter until the parking stands support its entire weight; 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 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 down on the parking stands as described in the preceding section.  
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MAINTENANCE

 **WARNING:** *Make sure power source is disconnected before servicing lifter.*

Note: One or more wiring/hose routing diagrams may be 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).

If any 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.
- If the lifter runs on AC electrical power, 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.⁹ 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.¹⁰
- 2) Apply the vacuum pads to the load as previously directed.
- 3) When the vacuum level registers above 16" Hg [-54 kPa] on the vacuum gauge, turn off or disconnect the power source (as appropriate).
- 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.

⁹ ASME Standard B30.20 requires the lifter to be tested to 125% of its Load Capacity.

¹⁰ 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.

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 of the lifter. Replace any damaged pad immediately (see REPLACEMENT PARTS LIST).¹¹


 **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).

¹¹ If the lifter is equipped with VPFS10T or VPFS625 pads, the sealing edge is the replaceable sealing ring. When it is damaged, see TO REPLACE SEALING RING INSERT IN VACUUM PAD to follow.

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.¹² 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).¹³
- 3) When the vacuum level registers above 16" Hg [-54 kPa] on the vacuum gauge, turn off or disconnect the power source (as appropriate) and leave the pads attached to the surface.
- 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.

¹² If these cleaning methods are not successful, contact Wood's Powr-Grip or an authorized dealer for assistance.

¹³ 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.

AIR FILTER MAINTENANCE — LARGE

(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.

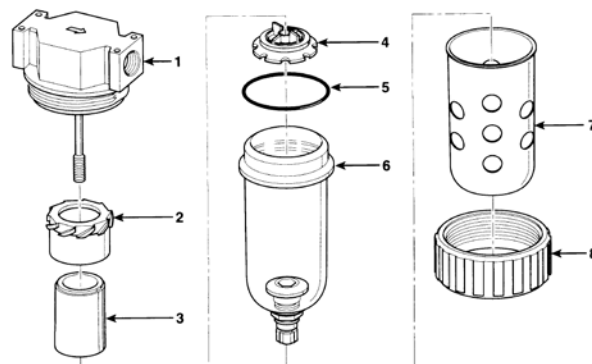
6) Install the deflector and a new filter element; then screw the baffle back on (tighten gently, finger tight) to hold the element in place.

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.

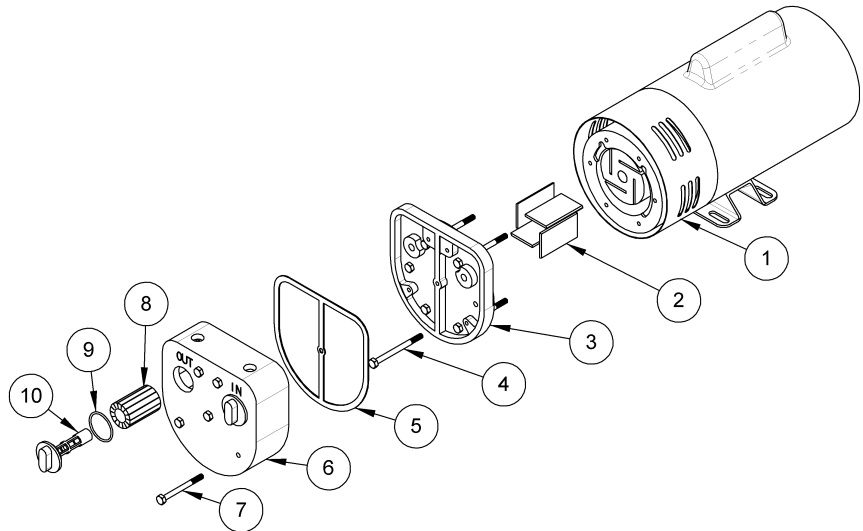
VACUUM PUMP MAINTENANCE – GAST 0523-101Q-SG588DX

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

Disassembly/Reassembly Procedure

(includes replacing the air filters, vanes and gasket—see REPLACEMENT PARTS LIST)

- 1) Remove the end caps (10), O-rings (9) and air filters (8) from the sound chamber (6) of the vacuum pump.
- 2) Remove the five bolts (7) and remove the sound chamber (6).
Note: If any liquid is discovered in the sound chamber, thoroughly dry all interior surfaces of the pump prior to reassembly.
- 3) Remove the six bolts (4) from the endplate (3), and separate the endplate from the rotor housing. The shroud (1) surrounding the rotor housing will loosen as well.
- 4) Note the orientation of the bevel on the vanes (2) for step 5. Then remove the vanes by sliding them out the end of the rotor. If needed, rotate the rotor by hand to position the vanes for easier access.
- 5) Make sure that the rotor and housing are clean and free of debris. Orient the new vanes (2) like the old ones by matching the bevel. Then insert the new vanes by sliding them into the empty slots in the rotor.
- 6) Reinstall the endplate (3) and secure it with the six bolts (4) previously removed.
- 7) Remove the gasket (5), and make sure that the contact surfaces between the endplate and sound chamber are clean. Install a new gasket and reinstall the sound chamber (6). Then secure the sound chamber with the five bolts (7) previously removed.
- 8) Replace the air filters (8). Then reinstall the O-rings (9) and end caps (10).



1 SHROUD

2 VANES (4x)

3 ENDPLATE

4 BOLTS FOR ENDPLATE (6x)

5 GASKET

6 SOUND CHAMBER

7 BOLTS FOR SOUND CHAMBER (5x)

8 AIR FILTER (2x)

9 O-RING (2x)

10 END CAP (2x)

VACUUM PUMP MAINTENANCE – GAST DAA-V505-GB/D

⚠ 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 worn parts as necessary to obtain acceptable pump performance (see REPLACEMENT PARTS LIST). Perform the following procedures on both heads of the pump.

Replacing a Diaphragm

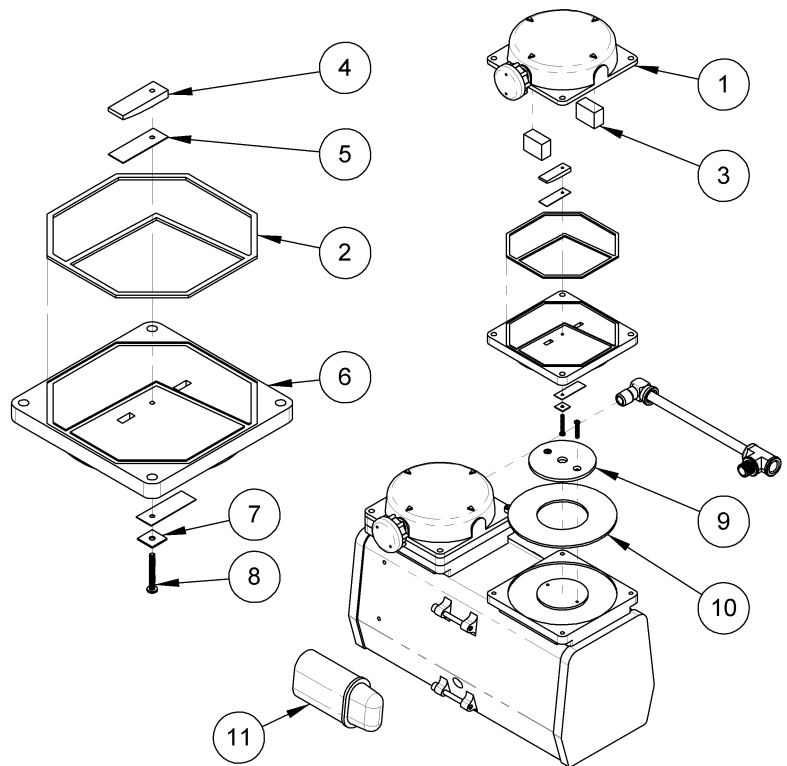
- 1) Loosen screws as necessary to remove the head (1) and the valve plate (6).¹⁴
- 2) Loosen screws as necessary to remove the diaphragm retainer plate (9).
- 3) Replace the diaphragm (10), installing the new one in the same orientation as the old one. Then reverse steps 1 and 2 for reassembly.

Replacing a Head Gasket and a Set of Filter Elements

- 1) Loosen screws as necessary to remove the head (1) and turn it upside-down.
- 2) Replace the filter elements (3) and the head gasket (2). Then reverse step 1 for reassembly.

Replacing a Set of Leaf Valves

- 1) Loosen screws as necessary to remove the head (1) and the valve plate (6).¹⁴
- 2) Lift the head off the valve plate, and turn the valve plate upside-down.
- 3) Loosen the valve screw (8) and remove the leaf valves (5), valve retainer (7) and valve limiter (4).
- 4) Replace these parts and reassemble the valve plate assembly (6) as shown in the illustration. Then reverse steps 1-3 for reassembly.



1 HEAD	4 VALVE LIMITER	7 VALVE RETAINER	10 DIAPHRAGM
2 HEAD GASKET	5 LEAF VALVE	8 VALVE SCREW	11 CAPACITOR
3 FILTER ELEMENT	6 VALVE PLATE	9 RETAINER PLATE	

¹⁴ Whenever you remove the valve plate assembly, be careful to save any shims located between the valve plate and the pump body and reinstall them during reassembly.

VACUUM PUMP MAINTENANCE – GAST N70

⚠ 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 worn parts as necessary to obtain acceptable pump performance (see REPLACEMENT PARTS LIST).

A) Disassembling the Head Assembly

- 1) Note or mark the orientation of the pump heads (2) and valve plate (3) for reassembly.
- 2) Remove the eight head screws (1), and then remove the two heads (2) and valve plate (3).
- 3) Remove the four head O-rings (8) and the two cylinder O-rings (9) from the valve plate (3). The O-rings will be replaced later.

B) Replacing the Head-Side Leaf Valves

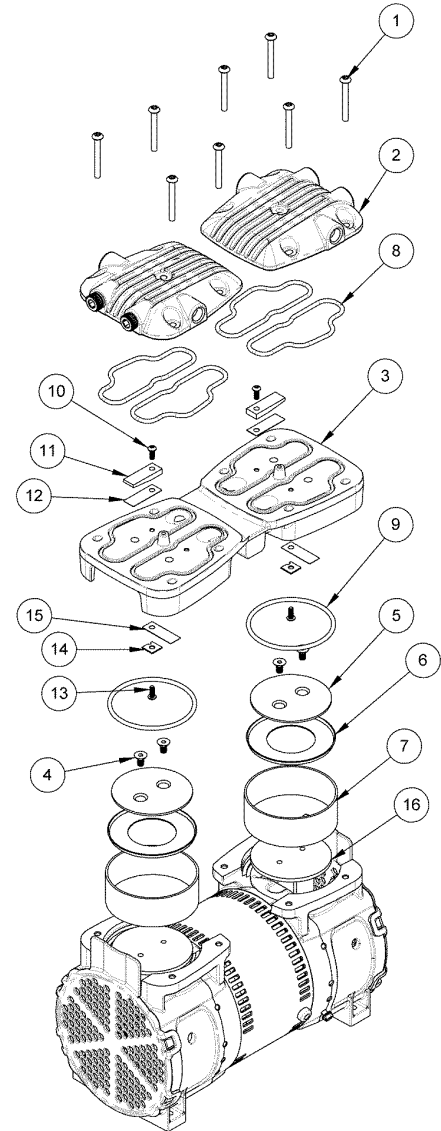
- 1) Note the orientation of the valve limiters (11) for reassembly.
- 2) Remove the two long valve screws (10) from the head side of the valve plate (3), and then remove the two valve limiters (11) and (exhaust) leaf valves (12).
- 3) Install new leaf valves (12) and reinstall the valve limiters (11) and long valve screws (10).

C) Replacing the Cylinder-Side Leaf Valves

- 1) Note the orientation of the valve retainer plates (14) for reassembly.
- 2) Remove the two short valve screws (13) from the cylinder side of the valve plate (3) and then remove the two retainer plates (14) and (intake) leaf valves (15).
- 3) Install new leaf valves (15) and reinstall the retainer plates (14) and short valve screws (13).

D) Disassembling the Cylinder Assembly

- 1) Note the orientation of the cylinders (7) and cups (6) for reassembly.
- 2) Remove the four retainer screws (4) from the two retainer plates (5). Remove the cylinders (7), leaving the retainer plates and cups (6) inside.
- 3) Invert the cylinders (7) and push the retainer plates (5) out through the top. The cylinders and cups (6) will be replaced next.



E) Replacing the Cylinders and Cups

- 1) Push one push rod (16) all the way down, and then position a new cylinder (7) over the push rod.
- 2) Place a retainer plate (5) into a new cup (6) and insert these parts together into the top of the cylinder (7). Then push both parts down until the retainer plate contacts the push rod (16).
- 3) Install two new retainer screws (4) to secure the retainer plate (5) to the push rod (16). Tighten the screws securely.
- 4) Press down on the cylinder (7) just installed to hold it in place, and then push the other push rod (16) all the way down.
- 5) Repeat steps 1–5 to install the second cylinder, cup and retainer plate.

F) Replacing O-Rings and Reassembling the Head Assembly

- 1) Install two new cylinder O-rings (9) into the valve plate (3), and position the valve plate on the top of the cylinders (7).
- 2) Install four new head O-rings (8) into the valve plate (3), and position the two heads (2) on top of the valve plate.
- 3) Make sure that the valve plate (3) and heads (2) are oriented in their original positions, and secure the heads to the pump using the eight head screws (1).

Reference Number	Availability	Quantity	Description
1	*	8	Head Screws (T25 Torx)
2	*	2	Head
3	*	1	Valve Plate
4	△	4	Retainer Screw (T20 Torx)
5	*	2	Retainer Plate
6	△	2	Cup
7	△	2	Cylinder
8	△	4	Head O-ring
9	△	2	Cylinder O-ring
10	*	2	Long Valve Screw (T15 Torx)
11	*	2	Valve Limiter
12	△	2	Leaf Valve (Exhaust)
13	*	2	Short Valve Screw (T15 Torx)
14	*	2	Retainer Plate
15	△	2	Leaf Valve (Intake)

* Special Order – Non-Stocked Item

△ Included in service kit #66178

VACUUM SWITCH ADJUSTMENT

Vacuum Switch Function

A vacuum switch controls the vacuum lift light for an AC lifter (see OPERATING FEATURES for location of vacuum switch). After the lifter attains a vacuum level sufficient for lifting the maximum load weight (hereafter, "minimum lifting level"), the vacuum switch automatically turns on the lift light. When vacuum decreases to a level that is lower than the minimum lifting level (as when releasing a load), the vacuum switch automatically turns off the lift light again, until the minimum lifting level is regained.

Conditions Requiring Readjustment

At the factory, the vacuum switch is set to 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 lift light functions in relation to the vacuum level registered on the vacuum gauge, as follows:

- If 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 lift light would turn on at vacuum levels that are not sufficient to lift the maximum load weight.
- If the lift light *does not turn on after* vacuum increases to a level much *higher* than the minimum lifting level, the light bulb may be burned out. If this condition persists after the bulb has been replaced, the vacuum switch may need to be adjusted to turn on the lift light at a lower vacuum level. 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 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 turn off the lift light at a higher vacuum level**.¹⁵ Otherwise, the lift light would remain on at vacuum levels that are not sufficient to lift the maximum load weight.

Adjustment Procedure

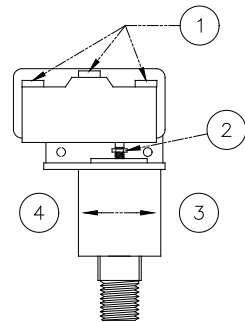
- 1) Using a 1/4" open-end wrench (as provided), turn the adjustment screw about 1/6th turn at a time (approximately one flat of the screw head).

To make the vacuum lift light turn *on* at a *lower* vacuum level, turn the screw *clockwise* (when viewing vacuum switch from end with electrical connectors).

To make the lift light turn *off* at 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.

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



- 1 ELECTRICAL CONNECTORS
- 2 ADJUSTMENT SCREW
- 3 LIGHT OFF AT HIGHER VACUUM
- 4 LIGHT ON AT LOWER VACUUM

¹⁵ In order to observe lifter functions while vacuum is decreasing, it may be necessary to create a controlled leak in the vacuum system (e.g., by breaking the seal between one or more vacuum pads and the test surface).

REPLACEMENT PARTS LIST

Stock No.	Description	Qty.
66201	Pump Diaphragm (for diaphragm pumps)	1
66200	Pump Service Kit (for diaphragm pumps)	1
66175AM	Pump Gasket (for rotary vane pump)	1
66175	Pump Vanes/Filters Kit (for rotary vane pump)	1
66150	Vacuum Pump - Diaphragm Type - 3-SCFM [85 liters/minute] - 120 V AC	1
66149	Vacuum Pump - Diaphragm Type - 3-SCFM [85 liters/minute] - 240 V AC	1
66127	Vacuum Pump - Rotary Vane Type - 4-SCFM [113 liters/minute] - 100/120/240 V AC	1
66125	Vacuum Pump - Wobble Piston - 4-SCFM [113 liters/minute] - 100/120/240 V AC	1
65443	Vacuum Hose - 3/8" [9.5 mm] ID (approx. 84" [214 cm] in length)	1
65441	Vacuum Hose - 1/4" [6.3 mm] ID x 48" [122 cm] Length - Coiled - Red	*
65440	Vacuum Hose - 1/4" [6.3 mm] ID - Red (approx. 60" [153 cm] in length)	1
65438	Vacuum Hose - 1/8" [3.2 mm] ID (approx. 6" [16 cm] in length)	1
65277	Vacuum Control Valve with Lever	1
65234	Solenoid Valve - 240 V AC - 6 W (for 240 V AC diaphragm pump)	1
65226	Solenoid Valve - 120 V AC - 6 W (for 120 V AC diaphragm pump)	1
65212	Check Valve - 1/4 NPT	1
65211AM	Check Valve - 1/8 NPT	1
65014	Pad Spring - Wave Type	*
64284	Bulb - 6.3 V - Bayonet (for vacuum lift light)	1
64262	Green Lens (for vacuum lift light)	1
64236	Vacuum Switch - 1/4 NPT	1
64191	Contact Block (for power switch)	1
59028	Movable Pad Mount - 2-1/2" [63.5 mm] Tubing Size	*
53132	Pad Fitting - Tee - 5/32" [4.0 mm] ID	*
53124	Pad Fitting - Elbow - 5/32" [4.0 mm] ID - Long Stem	*
49606T	Vacuum Pad - Model HV11 / 10" [25 cm] Dia. - Lipped - Oil-Resistant (option)	*
49605T	Vacuum Pad - Model HV11 / 10" [25 cm] Dia. - Lipped (standard)	*
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	*
29353	Pad Cover	*
29306AM	End Cap - 1" [25.4 mm] ID Tubing Size	2
20270	1/4" [6.4 mm] Open-End Wrench (for adjusting vacuum switch)	1
16132	Filter Element Kit (for 4.4 oz [130 ml] bowl size air filter)	*
15910	Vacuum Gauge - 1/8 NPT - CBM Type	1
15630	Pad Filter Screen - Large	*
13532	Cotterless Hitch Pin - 1/2" x 4" [13 mm x 102 mm]	*
13522	Cotterless Hitch Pin - 3/8" x 3-1/2" [10 mm x 89 mm]	2
13520	Cotterless Hitch Pin - 3/8" x 3" [10 mm x 76 mm]	4
10904	Shoulder Bolt - Socket Head - 5/16" X 1" X 1/4-20 Thread (for mounting pads)	*

* Quantity varies, depending on lifter model or options selected.

**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.

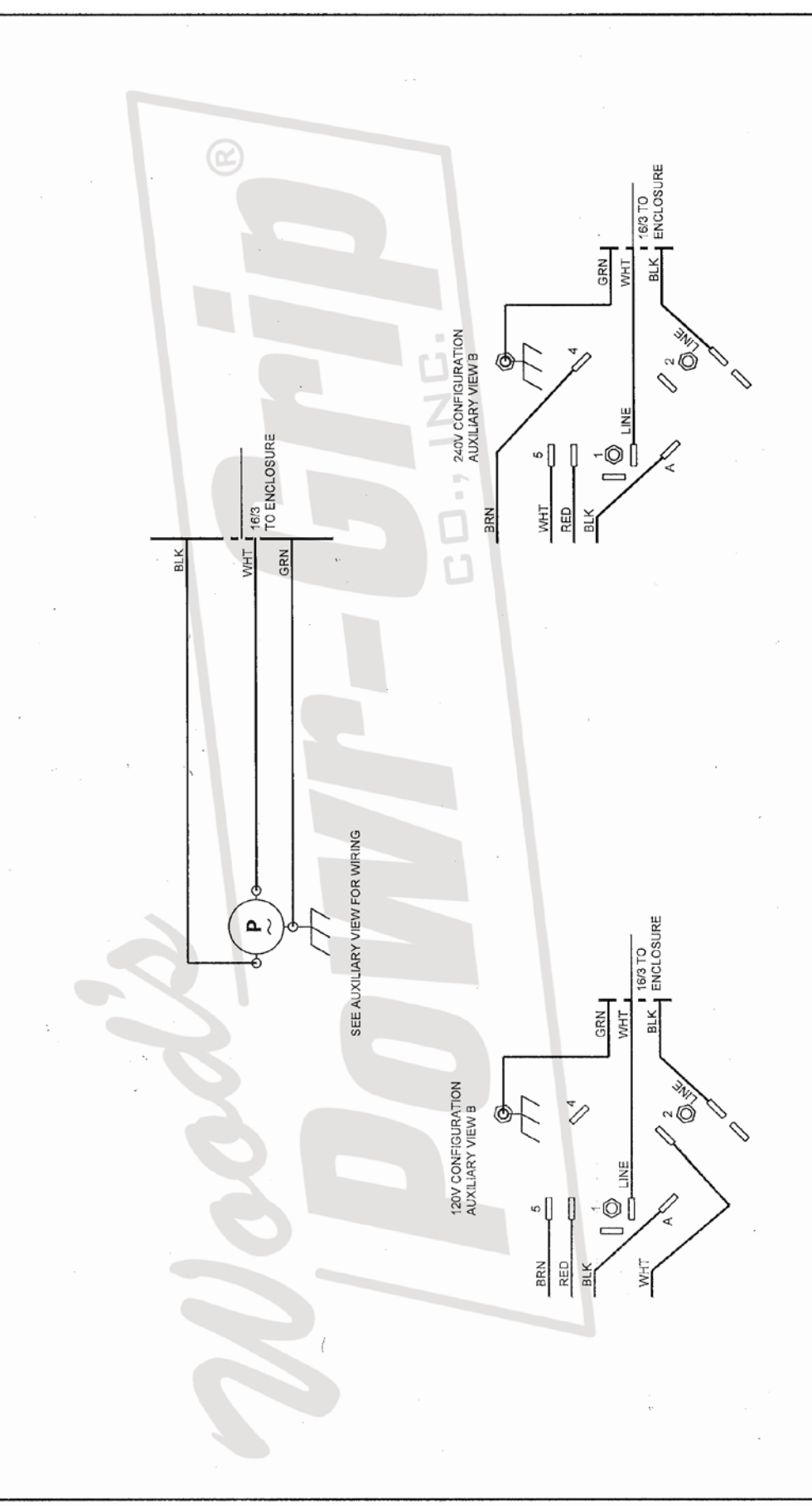
Wood's Powr-Grip Co., Inc.
908 West Main St. / P.O. Box 368
Laurel, MT USA 59044

phone 800-548-7341

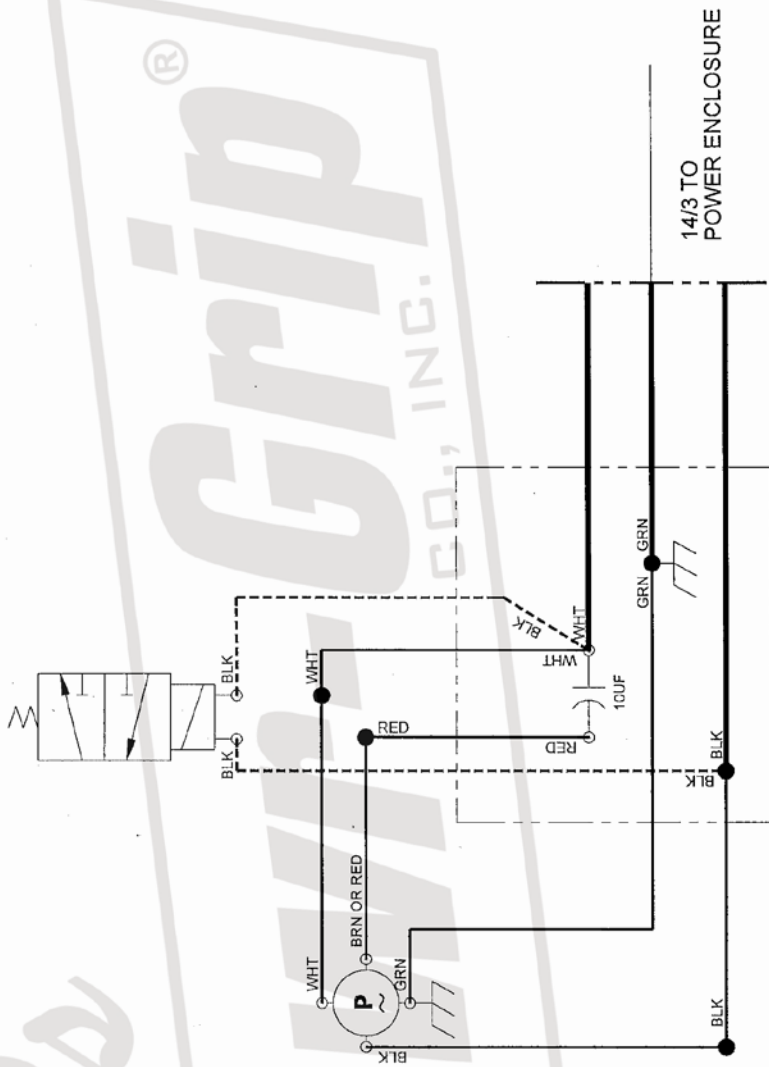
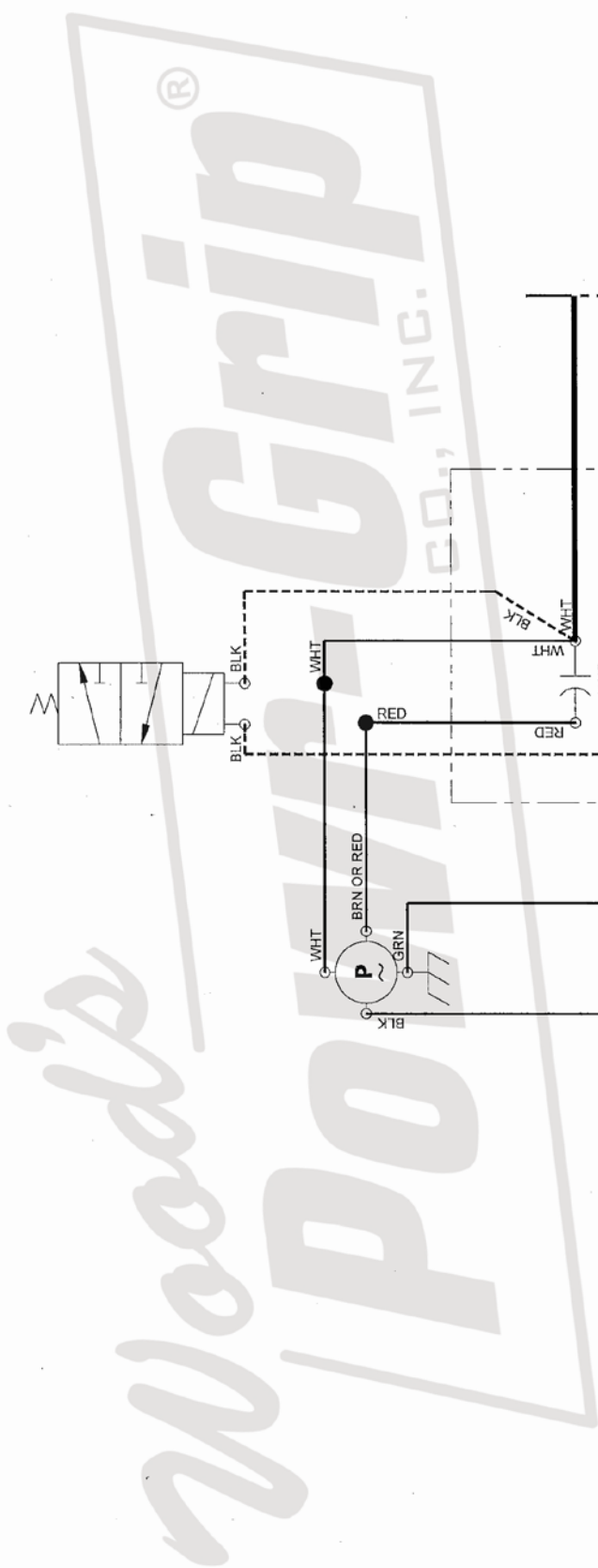
phone 406-628-8231

fax 406-628-8354

WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW. LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE. --- N/A --- --- 16AWG --- --- N/A --- --- N/A ---		TYPE: STANDARD DIRECTORY: 700-W01 [W01]
DRAWN: L. RENNER CHECKED: <i>CR</i> APPROVED: <i>CM</i>	DATE: 03/03/2005 <i>04-02-12</i> <i>4-2-12</i>	THIS DRAWING IS THE PROPERTY OF WOOD'S POWR-GRIP CO., INC. LAUREL, MONTANA U.S.A. 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.
STANDARD PARTS N/A 120/240VAC GAST 4 SCFM VACUUM PUMP WIRING SCHEMATIC D700-W01 [W01]		
SIZE: A SCALE: NONE REV: 1 ECN NUMBER: 2762	DATE: 12/09/2011	BY: LER



WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW. LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE. ---.20AWG ---.16AWG ---.14AWG ---.12AWG ---.10AWG ---.08AWG ---.06AWG ---.05AWG ---.04AWG ---.03AWG ---.02AWG ---.015AWG ---.012AWG ---.010AWG ---.008AWG ---.006AWG ---.005AWG ---.004AWG ---.003AWG ---.002AWG ---.001AWG		WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW. LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE. ---.20AWG ---.16AWG ---.14AWG ---.12AWG ---.10AWG ---.08AWG ---.06AWG ---.05AWG ---.04AWG ---.03AWG ---.02AWG ---.015AWG ---.012AWG ---.010AWG ---.008AWG ---.006AWG ---.005AWG ---.004AWG ---.003AWG ---.002AWG ---.001AWG	
DRAWN: L. RENNER		DATE: 05/30/2006	
CHECKED: <i>CR</i>		DATE: 04-02-12	
APPROVED: <i>Cam</i>		DATE: 4-2-12	
TYPE: STANDARD		FILE [SHEET]: 700-W02 [W02]	
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STANDARD PARTS N/A			
120/240VAC GAST 3 SCFM VACUUM PUMP WIRING SCHEMATIC D700-W02 [W02]			
SIZE: A	SCALE: NONE	REV: 2	ECN NUMBER: 2762
DATE: 12/09/2011	BY: LER		

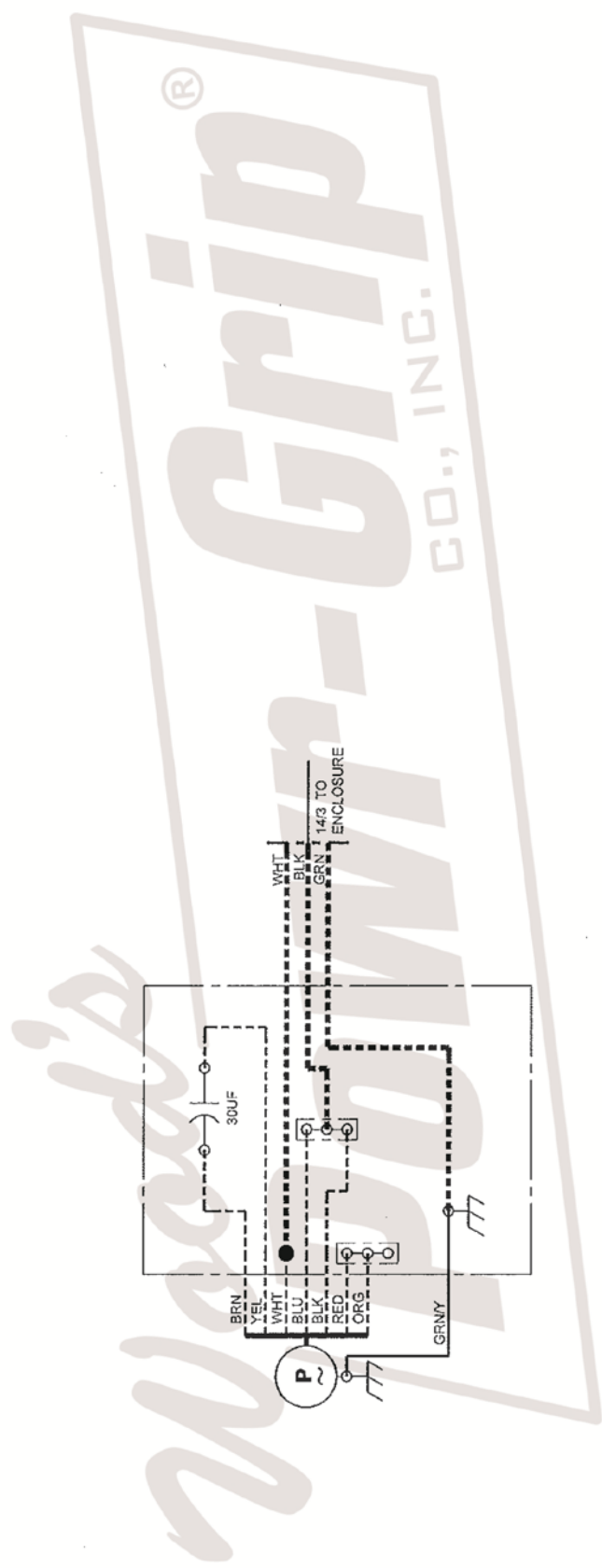


700
 TYPE: STANDARD FILE DIRECTORY: 700-W04 [W04]
 FILE (SHEET):
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WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.
 LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.
 --- 18 AWG ---
 --- 14 AWG ---
 --- N/A AWG ---
 PRODUCT MANAGER: GARY B.
 DATE: 02/05/2016
 CHECKED: *cl*
 APPROVED: *Ommer* 03-16-16
 3-16-16

STANDARD PARTS
 N/A
 120VAC 4SCFM WOBBLE PISTON VAC PMP WIRING SCHEMATIC
 D700-W04 [W04]

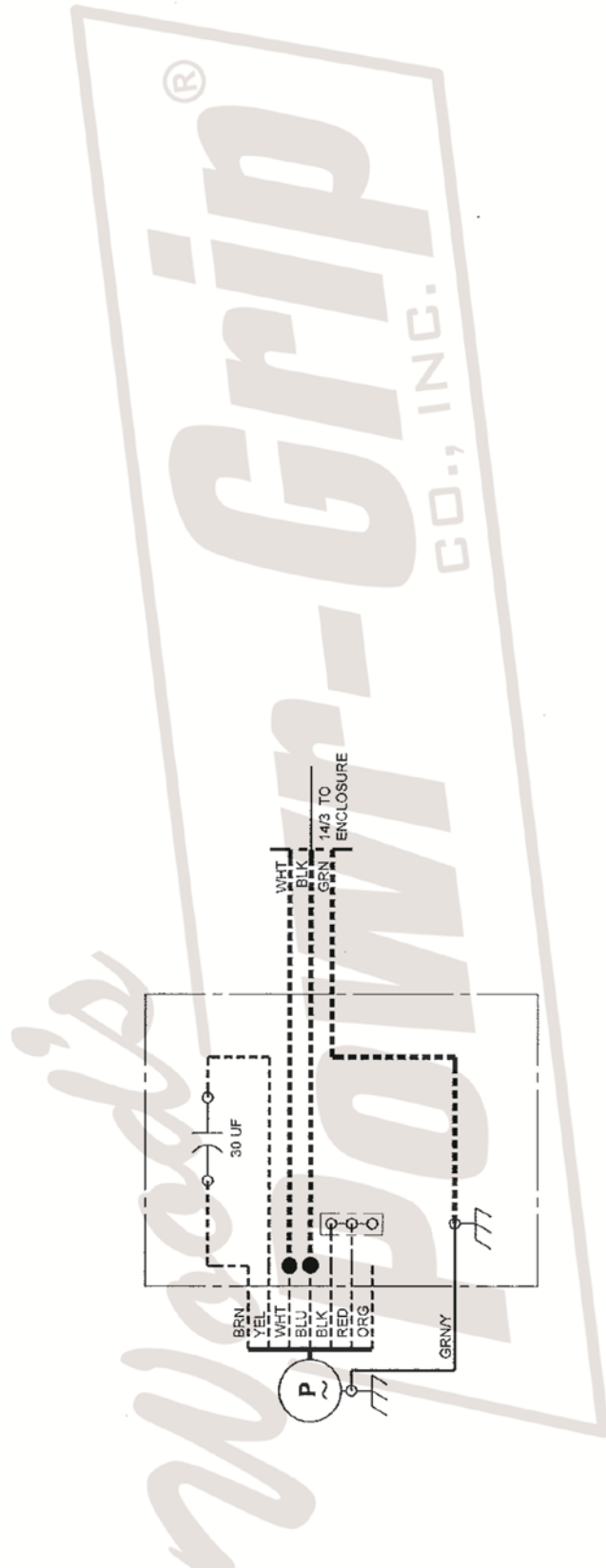
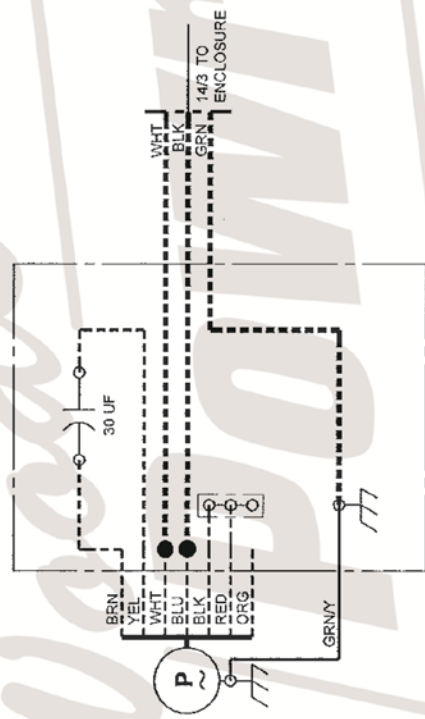
SIZE: A NONE REVISION: 01.A ECN NUMBER: 3948 ECN BY: CCH EST. WEIGHT: N/A
 SCALE: NONE REVISION: 01.A ECN NUMBER: 3948 ECN BY: CCH EST. WEIGHT: N/A



TYPE: STANDARD	FILE DIRECTORY: 700	FILE SHEET: 700-W04 [W05]
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STANDARD PARTS N/A		
240VAC 4SCFM WOBBLE PISTON VAC PMP WIRING SCHEMATIC D700-W04 [W05]		
SIZE: A	SCALE: NONE	REVISION: 01.A
ECN NUMBER: 3948	ECN DATE: 02/05/2016	ECN BY: CCH
		EST. WEIGHT: N/A

WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.
 LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.
 --- 18 AWG ---
 - - - 14 AWG - - -
 - - - - - N/A AWG - - - - -

PRODUCT MANAGER: GARY B.	DATE: 02/05/2016
CHECKED: <i>CR</i>	<i>02-29-16</i>
APPROVED: <i>Crn</i>	<i>3-15-16</i>



WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW. LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE. --- 20AWG --- --- 16AWG --- --- 14AWG ---		DIRECTORY: STANDARD FILE (SHEET): 708A-W01 [A-W01]
DRAWN: L. RENNER CHECKED: CR APPROVED: <i>Chen</i>		THIS DRAWING IS THE PROPERTY OF WOOD'S POWR-GRIP CO., INC. LAUREL, MONTANA U.S.A. 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.
DATE: 01/18/2007 DATE: 03-27-12 DATE: 3-27-12		3 SCFM AC VACCUUM PACKAGE GREEN LIGHT POWER ENCLOSURE AC POWER ENCLOSURE WIRING DIAGRAM D708A-W01 [A-W01]
SCALE: A NONE	REV: 2 ECN NUMBER: 2848	DATE: 03/22/2012 BY: RAS

- NOTES:
- 1) SEE PUMP WIRING DIAGRAM FOR SPECIFIC WIRE GAUGE.
 - 2) 8AMP FOR 100/120VAC SYSTEMS, AND 5AMP FOR 240VAC SYSTEMS.
 - 3) POWER CONNECTORS SHOWN FROM WIRE CONNECTION END.

