

INTENDED FOR USE BY PROFESSIONAL MACHINE OPERATORS

OPERATING INSTRUCTIONS



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 **READ AND UNDERSTAND BEFORE
OPERATING THIS MACHINE**



POWER-LIFT 1600

Model number: PL1600-416L

Original Instructions © Wood's Powr-Grip Co., Inc.

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SPECIFICATIONS

Model Number	PL1600-416L
Product Description	A battery powered, self-propelled machine that supports loads using vacuum and manipulates loads using powered boom and tilt motions, along with manual rotation and yaw motions, for use in glazing and similar materials handling tasks.
Vacuum Pads	Four 16" (41 cm) nominal diameter, lipped, standard rubber ¹ (Model VPFS16L)
Pad Spread²	(to outer edges)
Large Rectangular	50" x 74" (127 cm x 188 cm)
Small Rectangular	36" x 49½" (91 cm x 126 cm)
Linear	17¼" x 83" (44 cm x 211 cm)
 Maximum Load Capacity³	1,600 lbs (725 kg) Caution: <i>Lifting capacity of the machine is reduced by various factors, especially boom position—see “PERMISSIBLE LOAD CHART”.</i>
Per-Pad Capacity	400 lbs (181 kg)
 Machine Weight	2,520 lbs (1,143 kg)
Power Source	24 volts DC (two 12V batteries)
Battery Capacity	100 amp-hours
Boom Movements	
Maximum Extension	40¾" (104 cm) vertically; 47½" (120 cm) horizontally (see “TO EXTEND OR RETRACT THE BOOM”)
Maximum Lifting Height	159" (404 cm) with vertical load (see “TO RAISE OR LOWER THE BOOM”) 173½" (441 cm) with horizontal load (see “TO EXTEND OR RETRACT THE BOOM”)
 Rotation Capability	Manual, 360°, with 12 stops (every 30°)
 Tilt Capability	Powered, maximum of 180° when combined with boom movement (see “PERMISSIBLE LOAD CHART” and “TO TILT THE LOAD”)
Side Shift Capability	Powered, 8" (20 cm) (4" [10 cm] to right or left of center)
Yaw Capability	Manual, 90° to the right side and 40° to the left side
 Remote Control System	FCC, CE and IC compliant
Product Options	Available with Forklift Pockets. See separate instructions about other options.
 Operating Elevation	Up to 6,000' (1,828 m)
 Operating Temperatures	32° — 104° F (0° — 40° C)

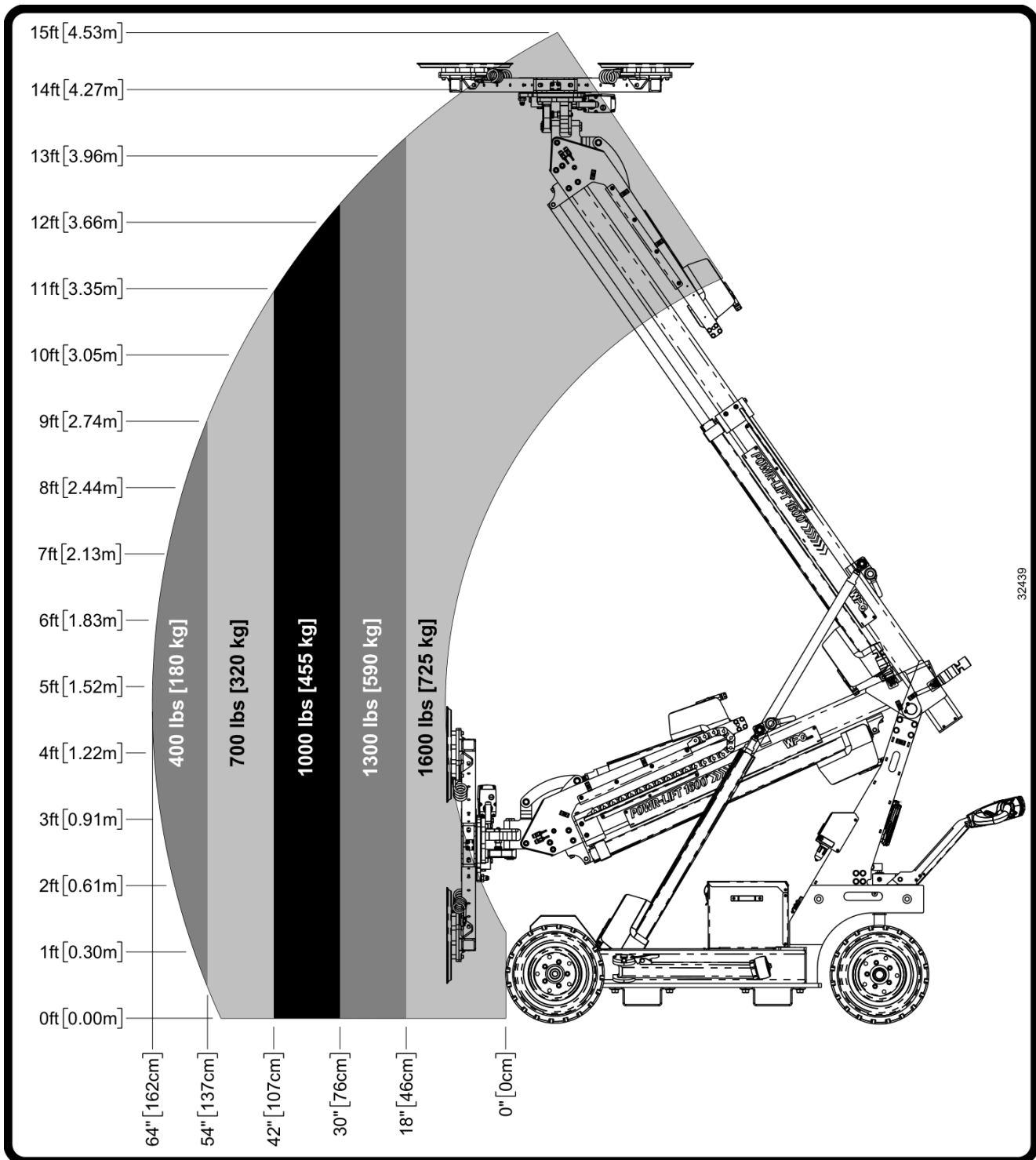
1..... Available with [other rubber compounds](#) for special purposes.

2..... Other dimensions may be obtained in rectangular configurations by sliding the movable pad mounts to a different position (see “[TO CHANGE THE PAD FRAME CONFIGURATION](#)”).

3..... Pad compound, load rigidity, strength, surface conditions, overhang, angle, center of gravity and temperature affect capacity. A “qualified person” should evaluate the effective lifting capacity for each use (see definition under “[RATED LOAD TEST](#)”).

SPECIFICATIONS

PERMISSIBLE LOAD CHART



Using the machine other than indicated in the Permissible Load Chart (eg, overloading) could result in unexpected load release, machine tipping and/or personal injury.

 **Never use machine contrary to Load Chart.**

SPECIFICATIONS

If the machine detects instability while in use, the red warning light turns on and the warning buzzer sounds continuously. If this happens:

- 1) Keep everyone away from the machine and any attached load until the instability is resolved.



Stay clear of machine and load while indicators warn of instability.



- 2) If it is possible to act safely, use boom and load movement to reduce the center of gravity of the machine and the load (see [“TO RAISE OR LOWER THE BOOM”](#), [“TO EXTEND OR RETRACT THE BOOM”](#), [“TO ROTATE THE LOAD”](#) and [“TO TILT THE LOAD”](#)). Then drive the machine to a more stable location (see [“TO DRIVE THE MACHINE”](#)).

SAFETY



Wear personal protective equipment that is appropriate for the load material. Follow trade association guidelines.



Do not remove or obscure safety labels.



Do not make any modifications to the machine. Modifying the machine will void the "LIMITED WARRANTY".



Use the machine only in an approved "OPERATING ENVIRONMENT" (see "INTENDED USE").



Make sure to consider all possible effects of "INDIRECT LOADING" on lifting capacity (see "INTENDED USE").



Do not use a machine that is damaged, malfunctioning, or missing parts.



Do not use a machine if the sealing edge of any vacuum pad is cut or otherwise damaged.



Do not use a machine to lift cracked or broken glass.



Do not exceed the Maximum Load Capacity or lift loads the machine is not designed for (see "INTENDED USE").



Do not use a machine if the Maximum Load Capacity or any safety label appears to be missing or obscured.



Make sure the contact surfaces of loads and vacuum pads are clean before attaching pads (see "MAINTENANCE").



Position vacuum pads correctly on loads before lifting (see "OPERATION").



Do not lift a load if any vacuum indicator shows inadequate vacuum.



Keep unauthorized personnel away from the machine, to avoid injury in case of an unintended load release.



Do not touch the vacuum release controls during a lift.



Do not allow anyone to step or stand on the machine.



Do not allow anyone to ride on the machine.



Do not allow anyone to sit or ride on the load.



Do not lift a load higher than necessary or leave suspended loads unattended.



Do not allow anyone under a suspended load.



Before servicing a machine, place the power control in the inactive position and disconnect the power source.

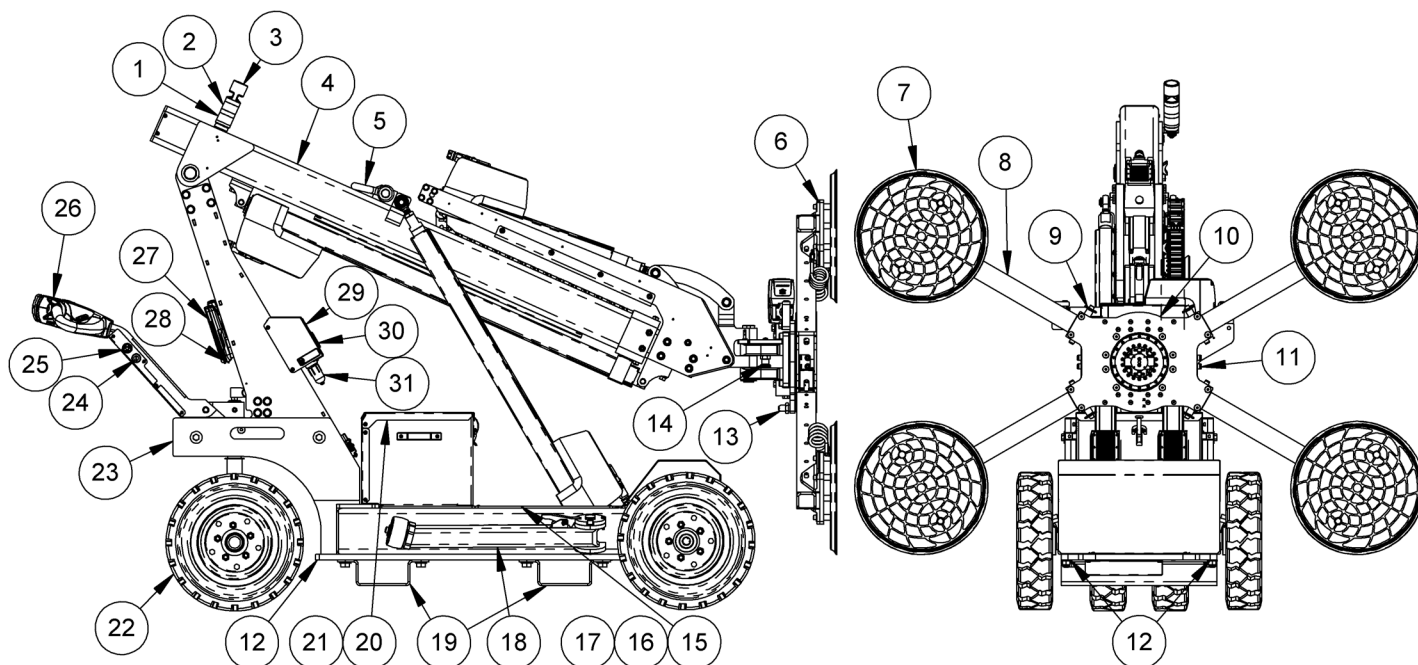


Do not use pressure washers or other sprayers on the machine.

OPERATING FEATURES

Features shown here are underlined on their first appearance in each section following.

MACHINE FEATURES

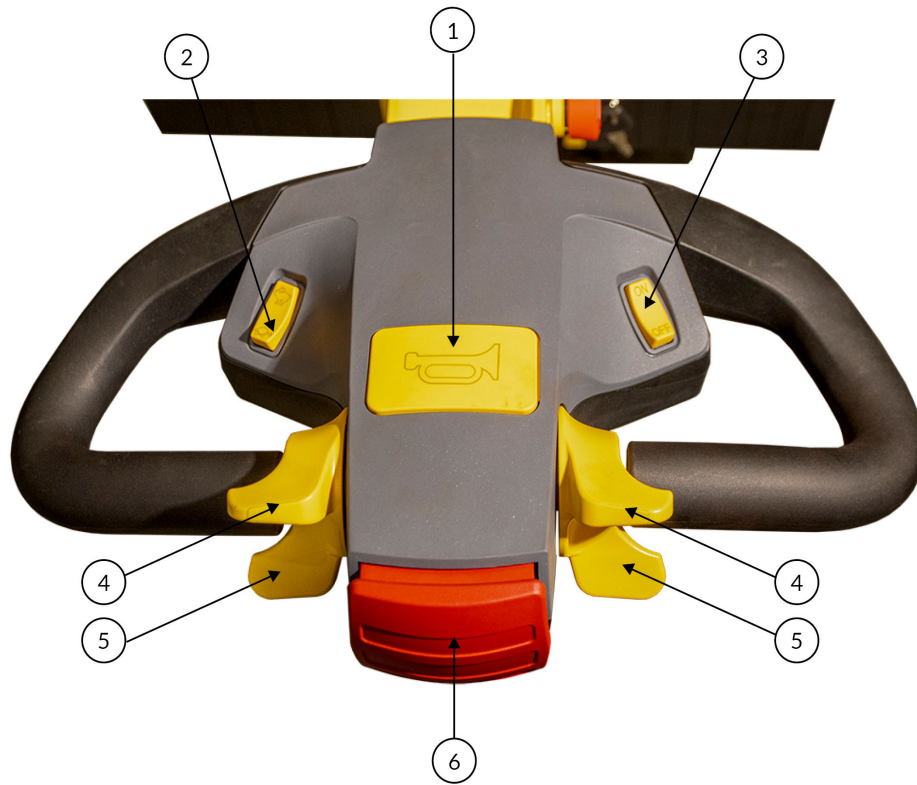


- | | | |
|-----------------------------|------------------------------|------------------------------|
| 1 VACUUM LIFT LIGHT (green) | 11 QUICK CONNECTOR | 22 TIRE |
| 2 WARNING LIGHT (red) | 12 TIE-DOWN POINTS | 23 COUNTERWEIGHTS |
| 3 WARNING BUZZER | 13 ROTATION LATCH | 24 POWER KEY |
| 4 BOOM | 14 YAW LATCH | 25 EMERGENCY STOP |
| 5 LIFT SHACKLE | 15 VACUUM PUMPS* | 26 CONTROL HANDLE |
| 6 MOVABLE PAD MOUNT | 16 RADIO RECEIVER* | 27 RADIO TRANSMITTER |
| 7 VACUUM PAD | 17 9V BATTERY* | 28 TRANSMITTER CHARGING DOCK |
| 8 EXTENSION ARM | 18 STABILIZER LEG | 29 BATTERY GAUGE |
| 9 COTTERLESS HITCH PIN | 19 FORKLIFT POCKETS (option) | 30 VACUUM GAUGES |
| 10 PAD FRAME | 20 12V BATTERIES* | 31 AIR FILTERS |
| | 21 BATTERY CHARGERS* | * inside enclosure |

Note: A model PL1600-416L is shown. Although some of the following photos do not show this specific machine, they all illustrate how this kind of machine functions.

OPERATING FEATURES

CONTROL HANDLE FEATURES



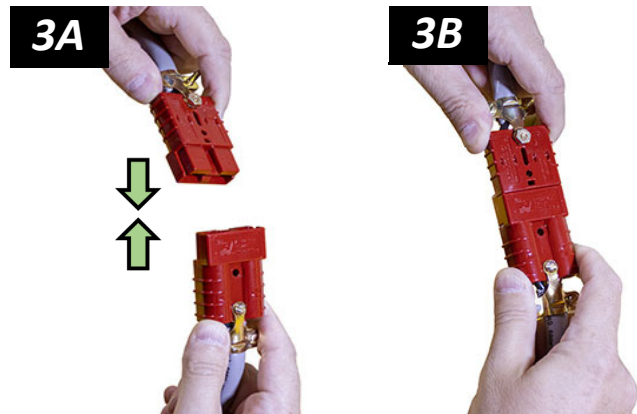
- 1 HORN
- 2 DRIVE SPEED SWITCH
- 3 DRIVE POWER SWITCH
- 4 "FORWARD" DRIVE PADDLES
- 5 "REVERSE" DRIVE PADDLES
- 6 BUMP STOP

SETUP

- 1) Remove all restraining devices and shipping materials, and save them with the shipping pallet for future use.
- 2) Remove the machine from the pallet as directed in [“TO MOVE THE MACHINE”](#). You may also drive the machine off the pallet as directed in [“TO DRIVE THE MACHINE”](#), *provided you employ a ramp* that is capable of supporting the machine and providing adequate clearance to avoid high-centering.

- 3) Connect the electrical connectors located inside the enclosure with the 12V batteries (figs. 3A-B).

Install the 9V battery for the warning buzzer as directed in [“TO REPLACE THE 9V BATTERY”](#).



- 4) Assemble the pad frame for optimal load support (see [“TO CHANGE THE PAD FRAME CONFIGURATION”](#)). Then remove the pad covers and save them for future use (fig. 4A).



- 5) Perform tests as required under [“TESTING”](#).

SETUP

TO CHANGE THE PAD FRAME CONFIGURATION

Various pad frame configurations enable the machine to match different load dimensions. The illustrations below show 3 commonly used configurations. Although the maximum and minimum rectangular dimensions are shown, other configurations are also possible.

Caution: Position the vacuum pads for the 2 circuits of the dual vacuum system (marked “1” and “2”) as shown in the illustrations.

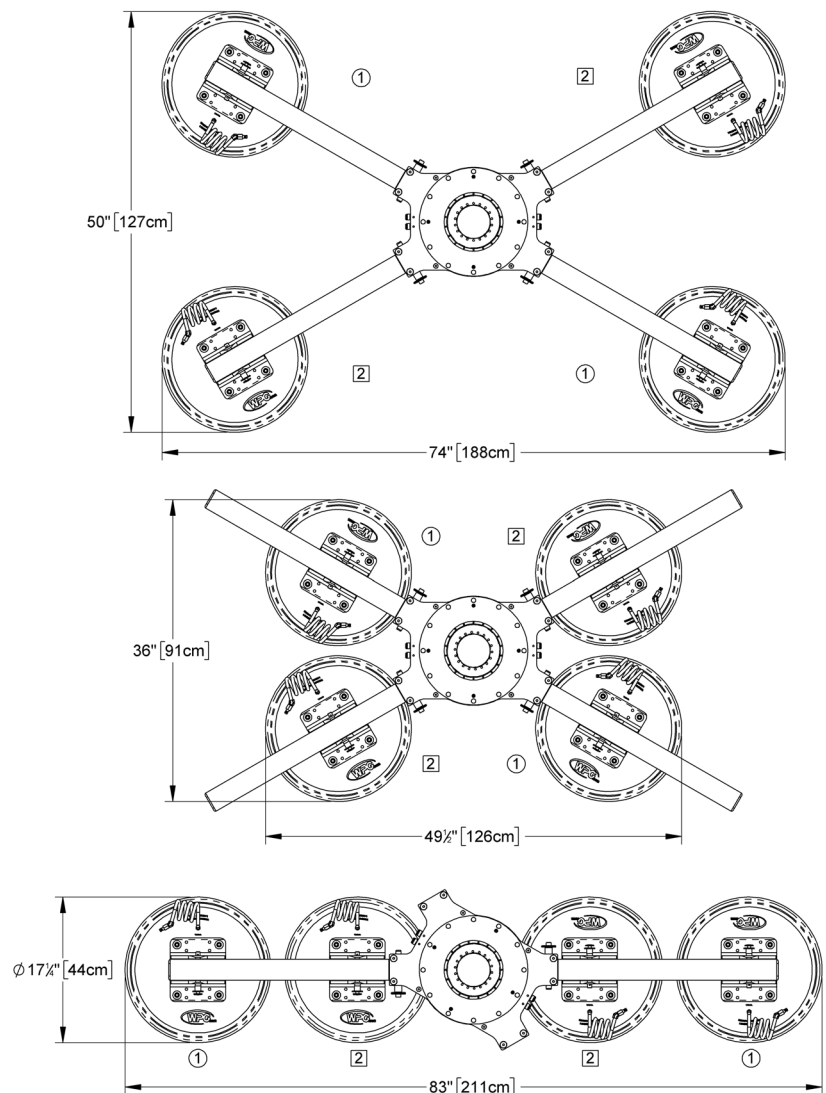
- 1) Choose a configuration that maximizes support across the load surface and minimizes load overhang (see “[LOAD CHARACTERISTICS](#)”).
- 2) Install or remove the extension arms and reposition the movable pad mounts as needed.



Make sure vacuum pads are arranged symmetrically, to keep load balanced.



Securely position vacuum hoses to avoid damage during machine operation.



Repositioning/Removing Movable Pad Mounts

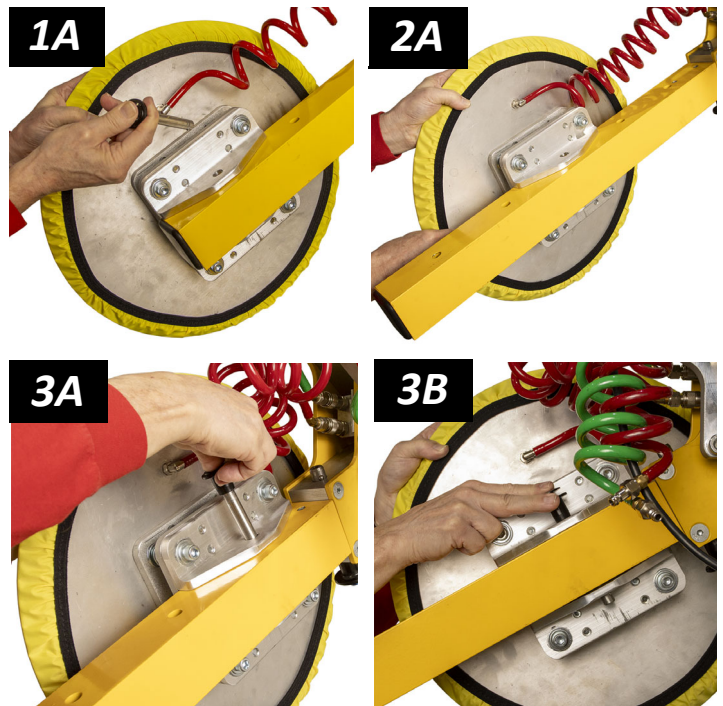
- 1) Remove the cotterless hitch pin that secures a movable pad mount to the pad frame (fig. 1A).
- 2) Move the pad mount to the position on the extension arm necessary to assembly the desired pad frame configuration (fig. 2A).

Note: Depending on the configuration selected, you may need to remove the mount from the extension arm and install it on another arm.



Removing or disconnecting any vacuum pad reduces lifting capacity.

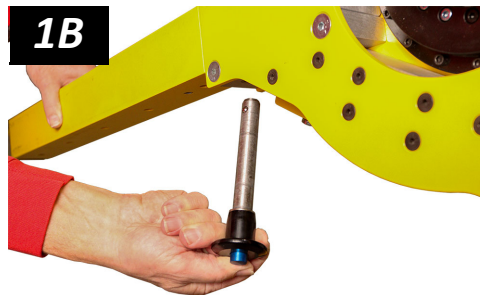
In such cases, disconnect the corresponding vacuum hose and reconnect it, when necessary (see [“Connecting/Disconnecting Vacuum Hoses”](#)).



- 3) Align the pin holes and insert the hitch pin, to secure the mount (figs. 3A-3B).
- 4) Repeat steps 1-3 as needed to assemble the configuration selected.

Removing/Installing Extension Arms

- 1) After you have removed the movable pad mounts as previously described, remove the cotterless hitch pin that secures the extension arm to the pad frame (fig. 1B).



- 2) Remove the extension arm from the pad frame (fig. 2B). Reinsert the cotterless hitch pin in the arm for safekeeping.



Note: Repeat or reverse steps 1-2 as needed to set up or tear down the machine.

Note: Store removed components in a clean, dry location.

SETUP

Connecting/Disconnecting Vacuum Hoses

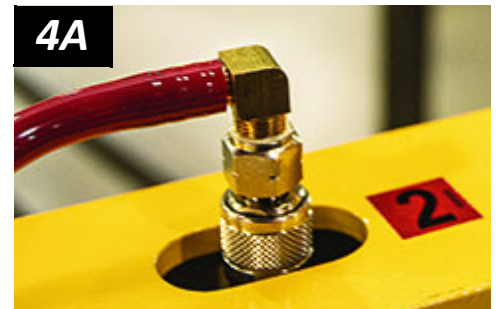


To *connect* a vacuum hose, push the male and female ends of the quick connector together until they lock (fig. 1A).

To *disconnect* a vacuum hose, move the release ring on the female end until the quick connector separates (fig. 2A).

! *Make sure quick connectors seal completely and all vacuum hoses function correctly (see “Vacuum Test”).*

Make sure all hoses are connected correctly: Green hose to circuit 1 (fig. 3A) and red hose to circuit 2 (fig. 4A).



The 2 vacuum gauges are labeled to indicate the related circuits (fig. 5A).

Note: The gauge face colors do not correspond with the circuit colors.



TO MOVE THE MACHINE

After the machine has been removed from the shipping pallet, you may drive the machine to the work location, when appropriate (see [“TO DRIVE THE MACHINE”](#)), or you can use one of the following methods to move it, when it is more suitable for the location:

Using the Lift Shackle to Move the Machine

Caution: Any use of hoisting equipment must comply with all relevant statutory or regulatory standards in your region. The operator must read, understand and follow the equipment’s operating instructions.

A crane or other appropriate hoisting equipment may be used to move an unloaded machine for short distances, either horizontally or vertically, using the lift shackle provided (fig. 1A):



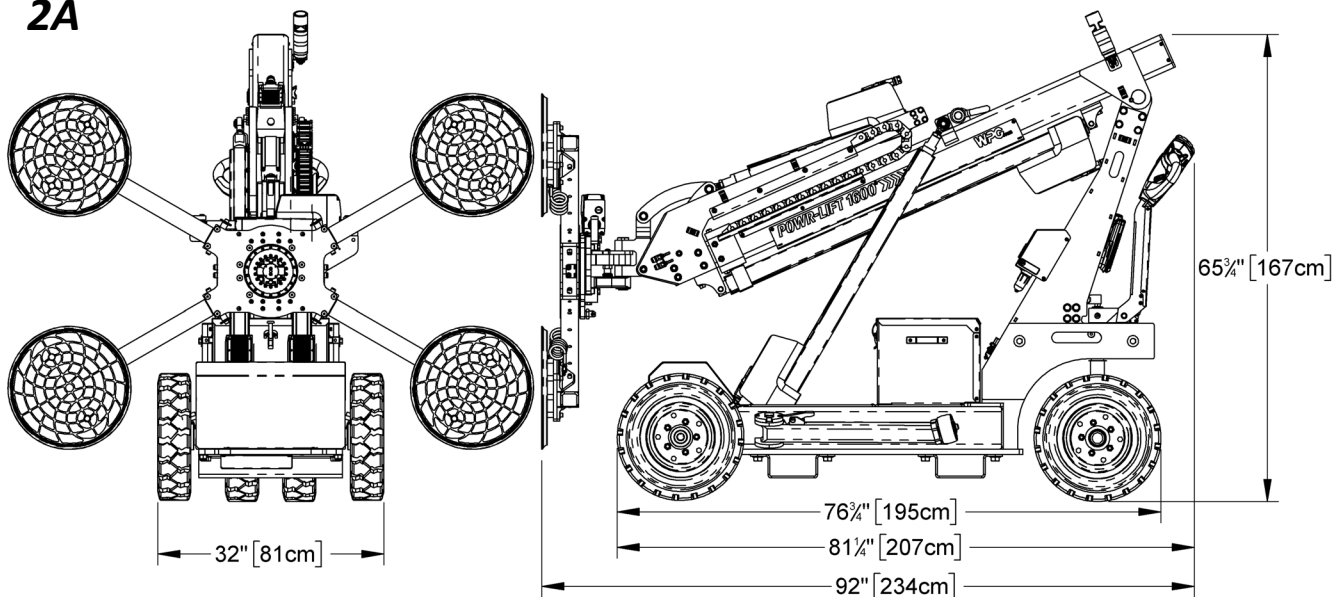
Use only lift shackle as lift point (fig. 1A).

- 1) Select hoisting equipment rated for the Machine Weight (see [“SPECIFICATIONS”](#)) and otherwise suited to the task at hand.



- 2) Adjust the machine to it’s most compact configuration (fig. 2A)

2A



SETUP

- 3) Attach the hoisting hook to the lift shackle (fig. 3A).

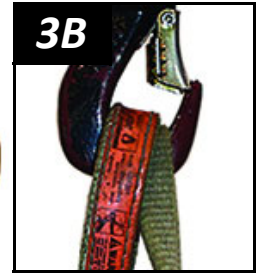


Make sure hook has restraining latch (see arrow in fig. 3A).

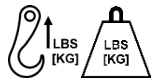
Note: Use rigging as needed (fig. 3B).



Only use rigging rated for Machine Weight.



- 4) While you are hoisting the machine, use control lines or other appropriate means to keep the machine under control and prevent contact with anything dangerous or damaging.
- 5) Carefully move and position the machine on a stable surface with sufficient weight-bearing capacity for machine use (see Maximum Load Capacity and Machine Weight in “SPECIFICATIONS”).
- 6) Park the machine as directed in “Parking the Machine”.



Using Optional Forklift Pockets to Move the Machine

Caution: Any forklift use must comply with all relevant statutory or regulatory standards in your region. The operator must read, understand and follow the forklift’s operating instructions.

If a machine is equipped with optional forklift pockets (fig. 1A), a forklift may be used to move the unloaded machine for short distances:

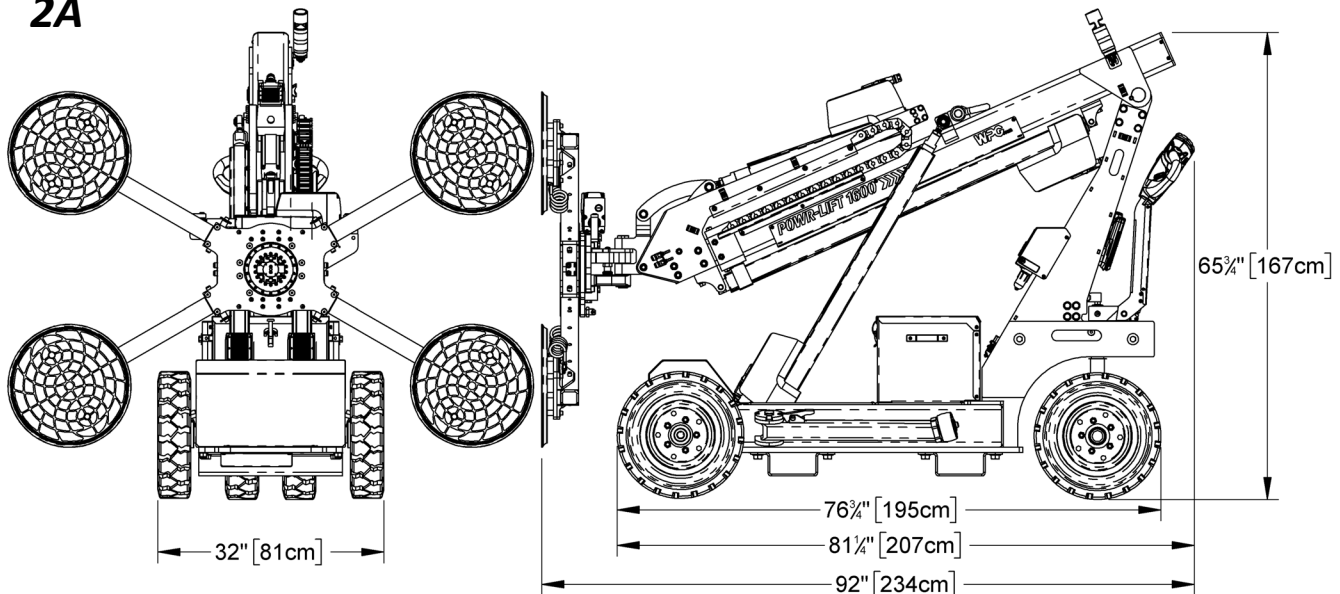
- 1) Select a forklift with adequate load capacity and other capabilities necessary to handle the machine as intended (see Machine Weight in “SPECIFICATIONS”). Be sure to account for the machine’s center of gravity and any grade, side hill or obstacle that may be encountered during transport, as well as any other relevant factors.



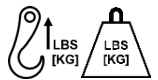
SETUP

- 2) Adjust the machine to it's most compact configuration (fig. 2A).

2A



- 3) Insert the forks into the pockets and secure the machine using safety straps or chains, as directed by the forklift manufacturer and/or relevant standards.
- 4) Carefully move and position the machine on a stable surface with sufficient weight-bearing capacity for machine use (see Maximum Load Capacity and Machine Weight in "SPECIFICATIONS").
- 5) Park the machine as directed in "Parking the Machine".



About Using Tie-Downs



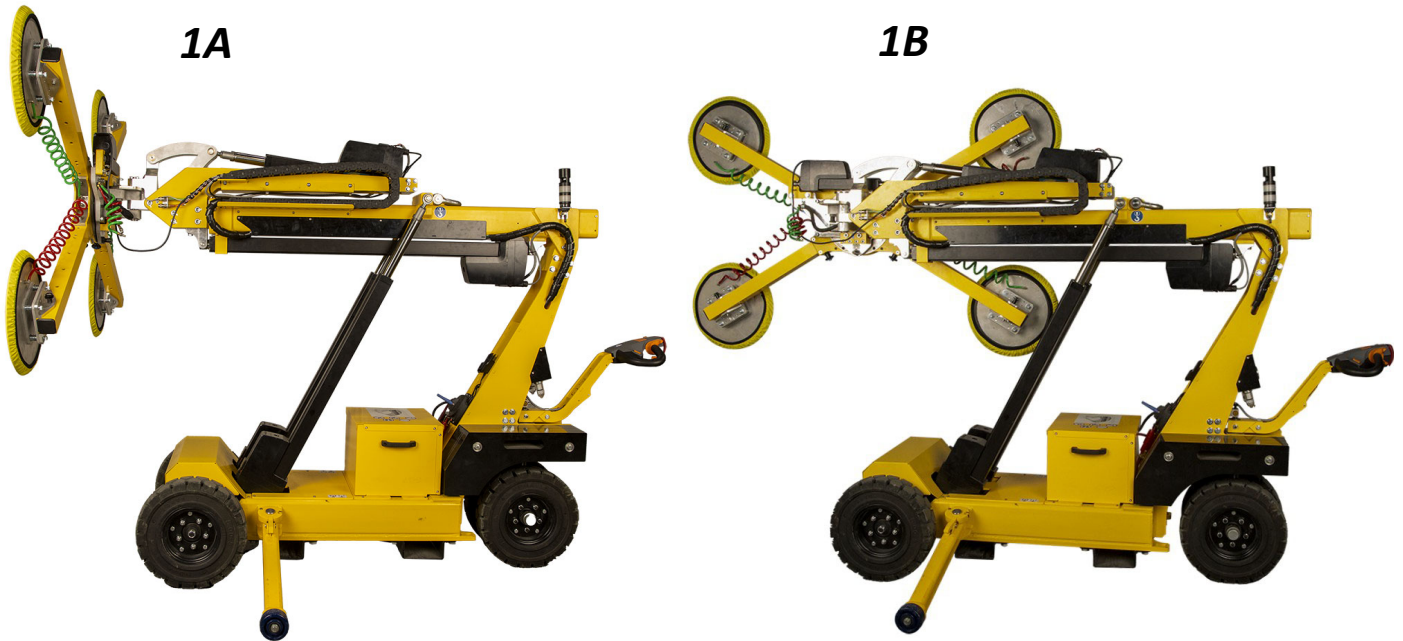
The machine is equipped with tie-down points at front (fig. 1A) and rear (fig. 1B) for use in securing the machine for transportation on a pallet, trailer or other appropriate weight-bearing device. Follow directions from elsewhere in this section about moving and positioning the machine on the surface.



Use only tie-down points to secure machine (figs. 1A & 1B).

TO USE THE YAW FUNCTION

Yaw movement enables you to pivot the pad frame up to 90° in relation to the boom (figs. 1A-1B), in order to drive the machine through doorways or other narrow openings.

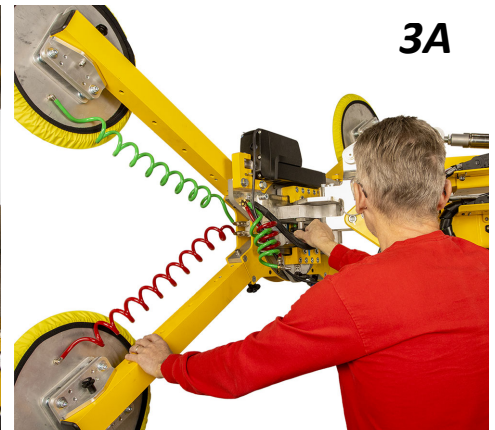
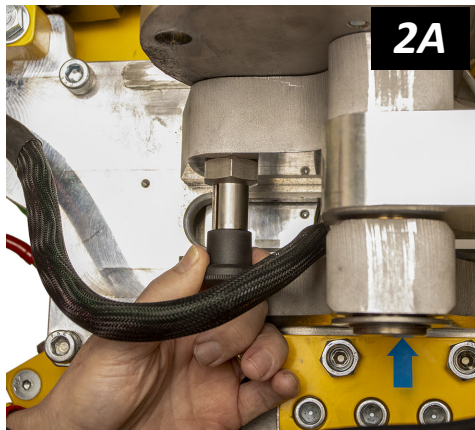


1) Grasp the pad frame securely.

2) Pull the knob to disengage the yaw latch (fig. 2A).

Note: To lock out the latch, also turn the knob 1/4 turn.

3) Hold the latch in the disengaged position and pivot the pad frame 90° (or to the desired angle) (fig. 3A).



4) Release the latch and guide the pad frame to the nearest stop.

Note: Whenever yaw is not required, keep the yaw latch engaged, to prevent load damage or personal injury.

LOAD CHARACTERISTICS

Make sure the machine is intended to handle each load according to these requirements:



Do NOT handle explosives, radioactive substances or other hazardous materials.

- The load weight must not exceed the Maximum Load Capacity.
- The load must be a single piece of relatively nonporous material with a flat and relatively smooth contact surface.¹ To determine whether the load is too porous or rough, perform the “[Vacuum Pads/Load Compatibility Test](#)”.
- The load’s contact surface must be able to obtain a friction coefficient of 1 with the machine’s vacuum pads (see “[Pad-to-Load Friction Coefficient](#)”). Otherwise, the capacity should be derated appropriately.
- The load’s surface temperature must not exceed 150° F (66° C).²
- The load’s *minimum* length and width are determined by the current Pad Spread (see “[SPECIFICATIONS](#)”).
- The load’s *maximum* length and width are determined by its allowable overhang.³
- 2" (5 cm) is the allowable thickness at Maximum Load Capacity.⁴



Note: Standard vacuum pads can stain or deform load surfaces with light colors or soft coatings. Test such surfaces for damaging effects before using the machine on them.⁵

WIND LOADS AND OTHER INDIRECT LOADING

Make sure to account for wind loads, dynamic loading or other indirect loading that can negatively affect lifting capacity and machine/load stability:



Indirect loading can reduce lifting capacity and machine stability.

1..... A “single piece” of material includes curtainwall assemblies, unitized glazing systems and similar construction units.

2..... Vacuum pads made from a heat-resistant rubber compound can enable you to lift loads with higher surface temperatures. Contact WPG or an authorized dealer for more information.

3..... The allowable overhang is the amount of load material that can extend sideways beyond vacuum pads without breaking or otherwise being damaged. This depends on the load material, its thickness, and the angle of handling (if any). Since every material has different physical properties, the allowable overhang must be evaluated separately for each load type. Contact WPG or an authorized dealer for more information.

4..... However, the allowable thickness increases as load weight decreases. Contact WPG for more information.

5..... Alternative rubber compounds are available for these purposes. Contact WPG or an authorized dealer for more information.

INTENDED USE

- Wind loads: Wind pressure on the surface of load materials, whether from sustained winds or maximum wind gusts, can greatly reduce the stability of the machine and load. Consult chart 1A to determine the allowable Lift Height and Allowable Wind Speed for your Load Surface Area in square feet (ie, width x height). Any attempt to use the machine in contrary conditions could result in unexpected load release, machine tipping and/or personal injury.



Never use machine in conditions contrary to wind speed chart.

1A

		Load Surface Area (ft ²)									
		20	40	60	80	100	120	140	160	180	200
Lift Height (ft)	14	24	17	14	12	11	10	9	9	8	8
	12	25	18	15	13	12	11	10	9	9	8
	10	25	20	16	14	13	12	11	10	10	9
	8	25	23	18	16	14	13	12	11	11	10
	6	25	25	21	18	16	15	14	13	12	12
	4	25	25	25	23	20	18	17	16	15	14
	2	25	25	25	25	25	25	24	23	21	20
		Allowable Wind Speed (mph)									

- Weight amplification that results when a loaded machine abruptly starts/stops moving, changes direction or bounces up and down (eg, when crossing rough terrain).
- Other external forces that effectively increase the weight of a machine's attached load.

If the machine detects instability while in use, the red warning light turns on and the warning buzzer sounds continuously. If this happens:

- 1) Keep everyone away from the machine and the any attached load until the instability is resolved.



Stay clear of machine and load while indicators warn of instability.



- 2) If it is possible to act safely, use boom and load movement to reduce the center of gravity of the machine and the load (see ["TO RAISE OR LOWER THE BOOM"](#), ["TO EXTEND OR RETRACT THE BOOM"](#), ["TO ROTATE THE LOAD"](#) and ["TO TILT THE LOAD"](#)). Then drive the machine to a more stable location (see ["TO DRIVE THE MACHINE"](#)).

INTENDED USE

OPERATING ENVIRONMENT

Make sure the machine is suitable for each work environment, given the following restrictions:

- This machine is not intended for any environment that is dangerous to the operator or damaging to the machine. Avoid environments containing explosives, caustic chemicals and other dangerous substances.

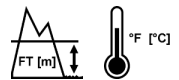


Never use machine in dangerous environments.



Metal particles and similar environmental contaminants could result in vacuum pump failure.

- The work environment is limited by the Operating Elevation and Operating Temperatures.^{1,2}
- The machine is not designed to be watertight. Do not use it in rain or other unsuitable conditions.
- See “[WIND LOADS AND OTHER INDIRECT LOADING](#)” about Allowable Wind Speed.



Moisture can reduce lifting capacity.

DISPOSAL OF THE MACHINE

After the Service Life of the machine has ended (see “[SPECIFICATIONS](#)”), dispose of it in compliance with all local codes and applicable regulatory standards.

Note: Special disposal regulations may apply to the 12V batteries.

1..... Although machine use may be possible at higher elevation, lifting capacity is reduced whenever the machine is unable to attain vacuum in the green range on the vacuum gauges. See “[About High-Elevation Mode](#)”.

2..... Special provisions may allow the machine to operate outside the specified temperature range. Contact WPG for more information.

BEFORE USING THE MACHINE

Determine whether the machine is capable of each intended task (see “SPECIFICATIONS” and “INTENDED USE”). Then complete the following preparations:

Taking Safety Precautions

- Be trained in all industry and regulatory standards for machine operation in your region.
- Follow trade association guidelines about precautions needed for each load material.



Read all directions and safety rules before using machine.



Always wear appropriate personal protective equipment.

Performing Inspections and Tests

- Follow the “INSPECTION SCHEDULE” and “TESTING”.
- Service the 2 air filters whenever a bowl contains liquid or other contaminants, or an element appears dirty (see “AIR FILTER MAINTENANCE” in *SERVICE MANUAL*).
- Make sure the warning buzzer is clearly audible at the maximum distance between the operator and the machine, despite any barriers or obstacles.^{1,2}



Examine air filters regularly and service when needed.



Make sure warning buzzer can be heard over noise at operator position.



1..... Maximum buzzer volume is 95 dBA at 39" (1 m). If CE or UKCA Standards apply, consult EN 7731 to make sure the warning buzzer is compliant.

2..... The “Vacuum Test” provides a convenient opportunity to check this.

Checking the 12-Volt Batteries



Always check 12V batteries' energy before using machine.

While the machine is powered up, a battery gauge displays the existing energy level (fig. 1A).¹ Press the button () to change the display between voltage and percentage of remaining battery capacity.

- If battery energy is in the red range, discontinue machine use and charge the batteries (see [“TO RECHARGE 12-VOLT BATTERIES”](#)).
- While battery energy is $\leq 24.5V$, the warning light flashes (fig. 1B) and the machine is unable to attach to a load. After the batteries are adequately charged, the machine automatically resumes normal functioning.



1A



1B

¹..... If the battery charger is connected to an AC power source, the reading on the battery gauge will not be accurate.

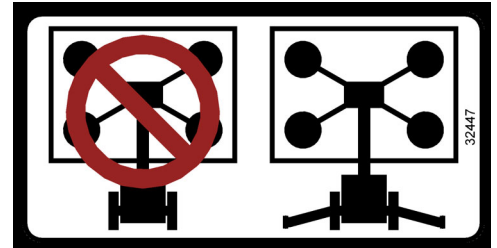
Using the Stabilizer Legs

Both stabilizer legs must be used to help prevent the machine from tipping over whenever any one, or any combination, of the following circumstances applies:



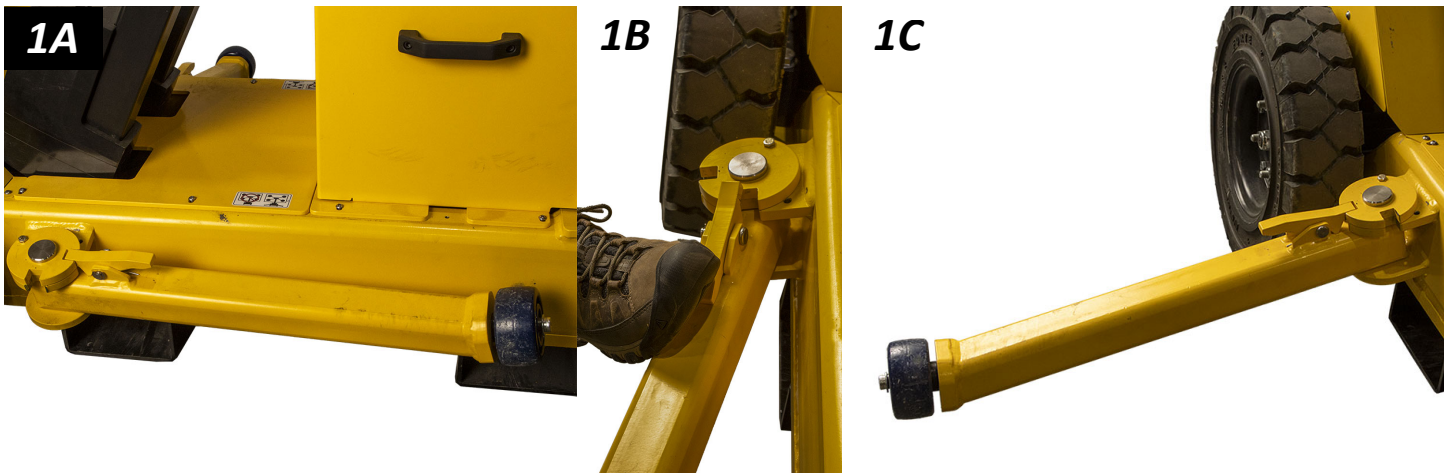
Use stabilizer legs whenever there is risk of machine tipping.

- The machine is loaded (see “[TO ATTACH THE PADS TO A LOAD](#)”).
- The machine is on a side hill (see “[TO DRIVE THE MACHINE](#)”).
- The machine is driven over uneven ground (see “[TO DRIVE THE MACHINE](#)”).



To *extend* a stabilizer leg, press on the latch lever (fig. 1B), move the leg from the retracted position (fig. 1A) to the extended position (fig. 1C), and make sure that it latches in place.

To *retract* a stabilizer leg, press on the latch lever (fig. 1B), move the leg from the extended position (fig. 1C) to the retracted position (fig. 1A), and make sure that it latches in place.



OPERATION

Preparing to Use the Remote Control System

 The radio transmitter (fig. 1A) and radio receiver enable you to activate the machine's “attach” and “release” functions, as well as powered boom and load movements, at distances up to 250' (76 m), provided you have a clear and direct view of the machine and its status indicators.

Note: The radio connection indicator light is illuminated whenever the transmitter and receiver are wirelessly linked. To prevent any radio transmission, press the emergency disconnect button.¹

To operate a machine remotely, follow these safety rules:

- Visually verify the status of the machine and load prior to lifting.



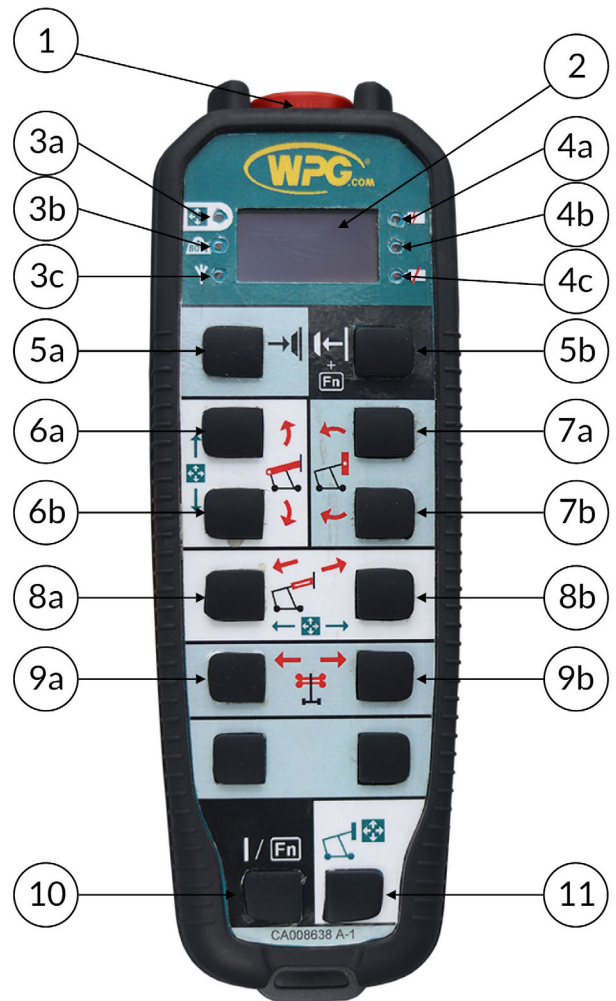
Make sure nearby personnel are aware of intended remote actions.

- Monitor the machine at all times to make sure it is functioning as intended.
- Be sure the load is stable and supported correctly before releasing it.

Button and indicator light functions are explained in the relevant sections following.

Buttons for boom and load movements (6a-9b) are dual-speed type: Press gently for slow or firmly for fast movement.

1A



- 1 EMERGENCY DISCONNECT
- 2 DISPLAY
- 3 INDICATOR LIGHTS:
 - 3a PLANAR MODE
 - 3b HIGH-ELEVATION MODE
 - 3c RADIO CONNECTION

- 4 INDICATOR LIGHTS:
 - 4a CHARGING BATTERIES
 - 4b N/A
 - 4c CHARGING NEEDED
- 5a ATTACH PADS
- 5b RELEASE PADS
- 6a RAISE BOOM
- 6b LOWER BOOM

- 7a TILT LOAD UP
- 7b TILT LOAD DOWN
- 8a RETRACT BOOM
- 8b EXTEND BOOM
- 9a SHIFT LOAD LEFT
- 9b SHIFT LOAD RIGHT
- 10 POWER/FUNCTION
- 11 PLANAR MODE

1..... To reset the emergency disconnect button, twist the button clockwise and allow it to spring outward to its original position.

TO POWER UP THE MACHINE

Insert the power key into the support arm for the control handle (fig. 1A) and turn it clockwise to power up the machine. This supplies power to all powered motions, the drive function and vacuum generating system.

Also make sure the emergency stop (fig. 1A) is disengaged (turn it clockwise).

Note: The emergency stop can be used to disable all powered motions and the drive function. However, it does not prevent the vacuum generating system from continuing to function.

 Press the power button (|) on the radio transmitter to activate it (fig. 1B).¹



1..... The radio transmitter turns off automatically after a period of inactivity.

OPERATION

TO ATTACH THE PADS TO A LOAD

Make sure the contact surfaces of the load and vacuum pads are clean (see “[Pad Cleaning](#)”).



Positioning the Pad Frame on the Load

1) Center the pad frame on the load (fig. 1A).¹



2) Make sure all vacuum pads will fit on the load and will be loaded evenly (fig. 2A).



Consult the Per-Pad Load Capacity.



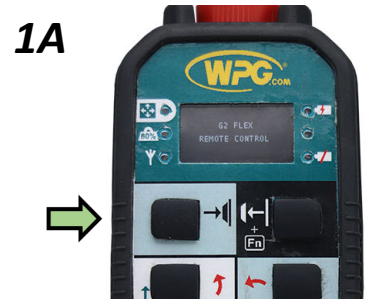
3) Adjust the pad frame to match the angle of the load (see “[TO TILT THE LOAD](#)”). Then gently but firmly move the vacuum pads into contact with the load surface (see “[TO DRIVE THE MACHINE](#)”, “[TO RAISE OR LOWER THE BOOM](#)” and “[TO EXTEND OR RETRACT THE BOOM](#)”).

1..... The machine is designed to handle the maximum load weight when the load’s center of gravity is positioned within 4" (10 cm) of the machine’s rotation axis.

OPERATION

Sealing the Pads on the Load

Press the “attach pads” button (→) on the radio transmitter (fig. 1A).
The vacuum pumps will run until the vacuum pads seal completely.¹



When vacuum is sufficient to lift the Maximum Load Capacity, the vacuum lift light turns *on* automatically (fig. 1B) and the vacuum pumps turn *off* temporarily, to conserve energy in the 12V batteries.



Never lift load unless lift light is illuminated, because premature lifting could result in load release and personal injury.

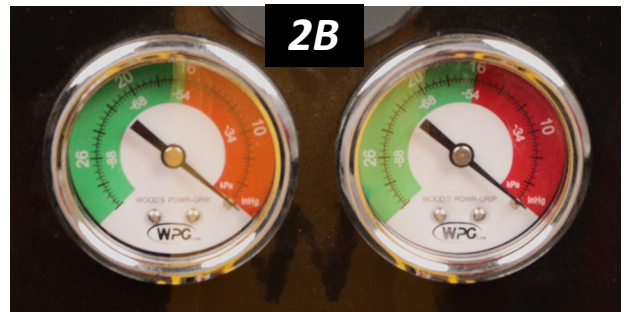
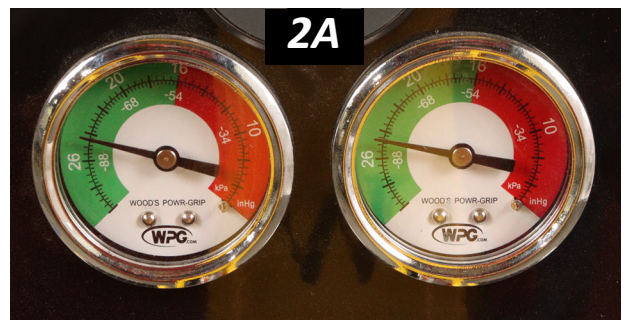
Note: If the warning buzzer beeps during attachment, this means the 9V battery needs to be replaced.

Reading the Vacuum Gauges

The 2 vacuum gauges of the dual vacuum system show the current vacuum level in positive inches of Hg and negative kPa:

- **Green range** (≥ 16 " Hg [≤ -54 kPa]): Vacuum level is sufficient to lift the maximum load weight (fig. 2A).
- **Red range** (< 16 " Hg [> -54 kPa]): Vacuum level is **not** sufficient to lift the maximum load weight (fig. 2B).²

Once the pads have sealed, the machine should be able to maintain sufficient vacuum for lifting, except when used above the recommended Operating Elevation. If it does not, perform the “Vacuum Test”.



1..... Although a vacuum pad may become distorted during shipping or storage, this condition should correct itself with continued use.

2..... The gauge face colors do not correspond with the circuit colors.

About High-Elevation Mode

If you need to use the machine above the recommended Operating Elevation, you can try to access high-elevation mode by holding the “attach pads” button (→) on the radio transmitter for 5 seconds. If the machine is able to obtain 80% of attaching vacuum (12.8" Hg [-43 kPa]), it will then function in high-elevation mode, signaled by a flashing vacuum lift light. This enables you to lift 80% of the rated lifting capacity in any given application.¹

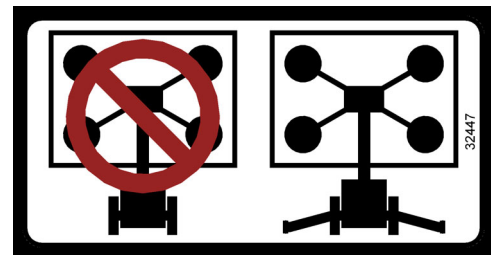


Do not exceed 80% of rated lifting capacity while machine is functioning in high-elevation mode.

To Lift and Move the Load

After the machine has attained the optimal vacuum level, use boom movement, load movement and/or drive capabilities to handle the load as needed for the intended task (see relevant sections).

Caution: Before the load is in movement, make sure the stabilizer legs are deployed (see “Using the Stabilizer Legs”), and minimize the load height and center of gravity as much as possible. In addition, if the yaw function is used while the machine is loaded, use on side hills is not permitted.



Monitoring Vacuum Indicators

Monitor the vacuum lift light and both vacuum gauges throughout the operation of the machine.

While a load is attached to the vacuum pads, the vacuum pumps turn on and off to overcome any leakage. However, **if the vacuum pump is unable to overcome leakage**, the warning buzzer sounds continuously and the lift light turns off. If this happens:

1) Keep everyone away from an attached load until it can be safely lowered to a stable support.

2) Stop using the machine until the cause of the vacuum loss can be identified: Conduct the “Pad Inspection”.

3) Correct any faults before resuming normal operation of the machine.

1..... If the machine is subsequently able to generate full vacuum, it will automatically return to normal mode and the lift light will turn on continuously.



Make sure all vacuum indicators remain completely visible.



Stay clear of any attached load while indicators warn of insufficient vacuum.

TO DRIVE THE MACHINE

Taking Safety Precautions

To drive the machine, follow these safety rules:

- Do not stand or walk on the downhill end of the machine while it is moving.
- Do not allow anyone else to stand or walk on the downhill end of the machine while it is moving.
- Position yourself on the uphill end of the machine while driving, whether moving downhill or uphill (ie, back the machine uphill).
- Place the drive speed switch in the slow position (turtle/tortoise) while driving downhill.
- Abide by all slope restrictions covered in [“Understanding Slope Restrictions”](#).



OPERATION

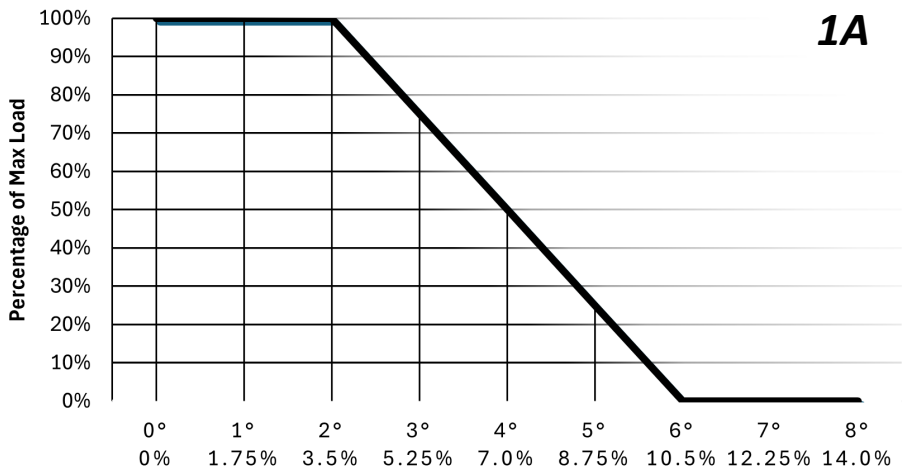
Understanding Slope Restrictions

Using the machine on a slope, whether longitudinal, lateral or diagonal to the machine (α in fig. 1B), can significantly reduce the effective load capacity:

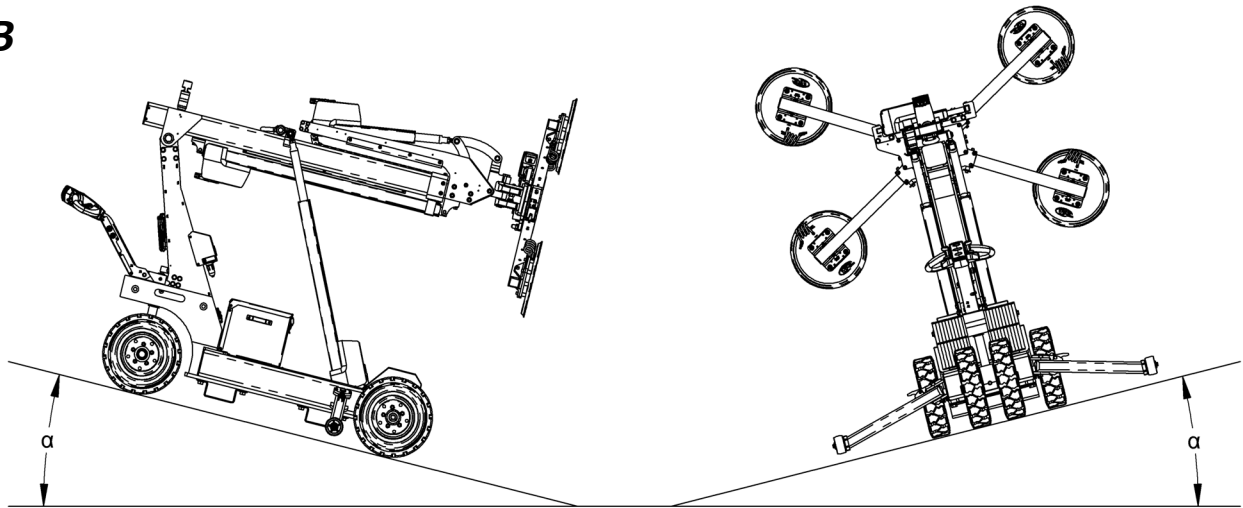


Always consult slope chart to determine allowable slopes and load weights.

Consult chart 1A to determine the machine's reduced load capacity on any slope greater than 2° / 3.5% (ie, Percentage of Max Load x Maximum Load Capacity in "SPECIFICATIONS"). Do not attempt to support **any** load on a slope of 6° / 10.5% or greater.



1B



If the machine detects instability while in use, the red warning light turns on and the warning buzzer sounds continuously. If this happens:

- 1) Keep everyone away from the machine and any attached load until the instability is resolved.



Stay clear of machine and load while indicators warn of instability.



- 2) If it is possible to act safely, use boom and load movement to reduce the center of gravity of the machine and the load (see "TO RAISE OR LOWER THE BOOM", "TO EXTEND OR RETRACT THE

OPERATION

BOOM", **"TO ROTATE THE LOAD"** and **"TO TILT THE LOAD"**). Then drive the machine to a more stable location (see **"TO DRIVE THE MACHINE"**).

Using the Control Handle

Use the control handle to propel the machine forward or backward, as well as to steer the machine in the desired direction:



Use stabilizer legs whenever there is risk of machine tipping (see **"Using the Stabilizer Legs"**).

- 1) Place the drive power switch in the "ON" position to enable propulsion (fig. 1A).
- 2) Then select speed of movement by placing the drive speed switch in the slow position (turtle/tortoise) or the fast position (rabbit/hare) (fig. 2A).
- 3) Press one or both of the "forward" drive paddles to propel the machine forward (fig. 3A). Press one or both of the "reverse" drive paddles to propel the machine backward (fig. 3B).



Note: If the red bump stop (figs. 3A and 3B) comes into contact with the operator or any other object, the machine will stop reversing. If you continue to hold one or both paddles, the machine will begin to move forward.

- 4) Steer the machine to the destination and position it as needed for the intended use. Then park the machine as directed in **"Parking the Machine"**.

Parking the Machine

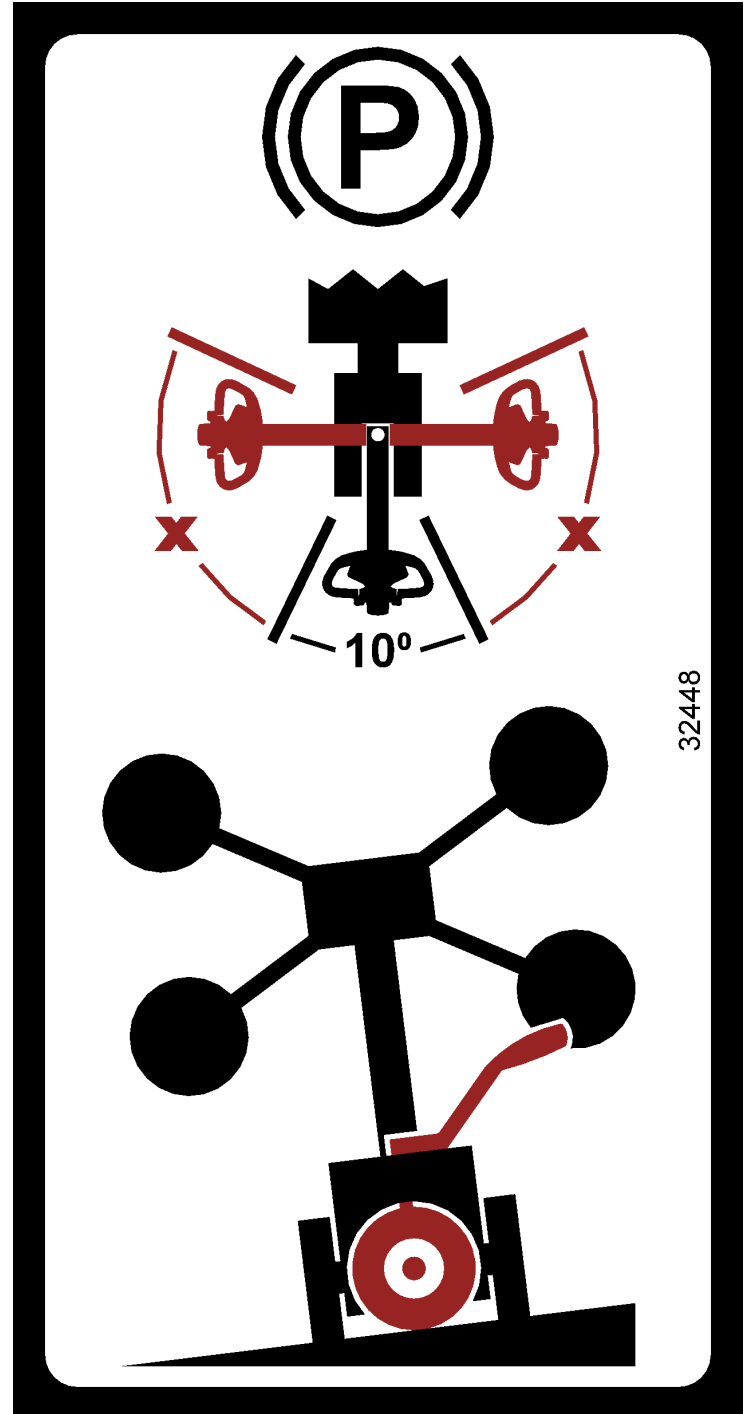
- 1) Use the control handle to align the steering tires with the machine as indicated at right: The tires and handle must be aligned parallel to the machine's long dimension, with no more than 10° variation. This is particularly important if the machine is resting on a side slope, since tires aligned perpendicularly to the machine can roll, causing the machine and load to change position unexpectedly.



Always park machine as directed in instructions.

- 2) Place the drive power switch in the "OFF" position to disable propulsion.

Note: Other powered motions remain enabled while the machine is powered up (see "To POWER UP THE MACHINE").



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OPERATION

TO RAISE OR LOWER THE BOOM



Make sure any load is positioned correctly on pad frame (as previously directed).

Caution: Unbalanced loads can interfere with the machine's boom capability, and they can also damage the machine.

- 1) Make sure the machine and any attached load has enough clearance to move without contacting anyone or anything.

2A

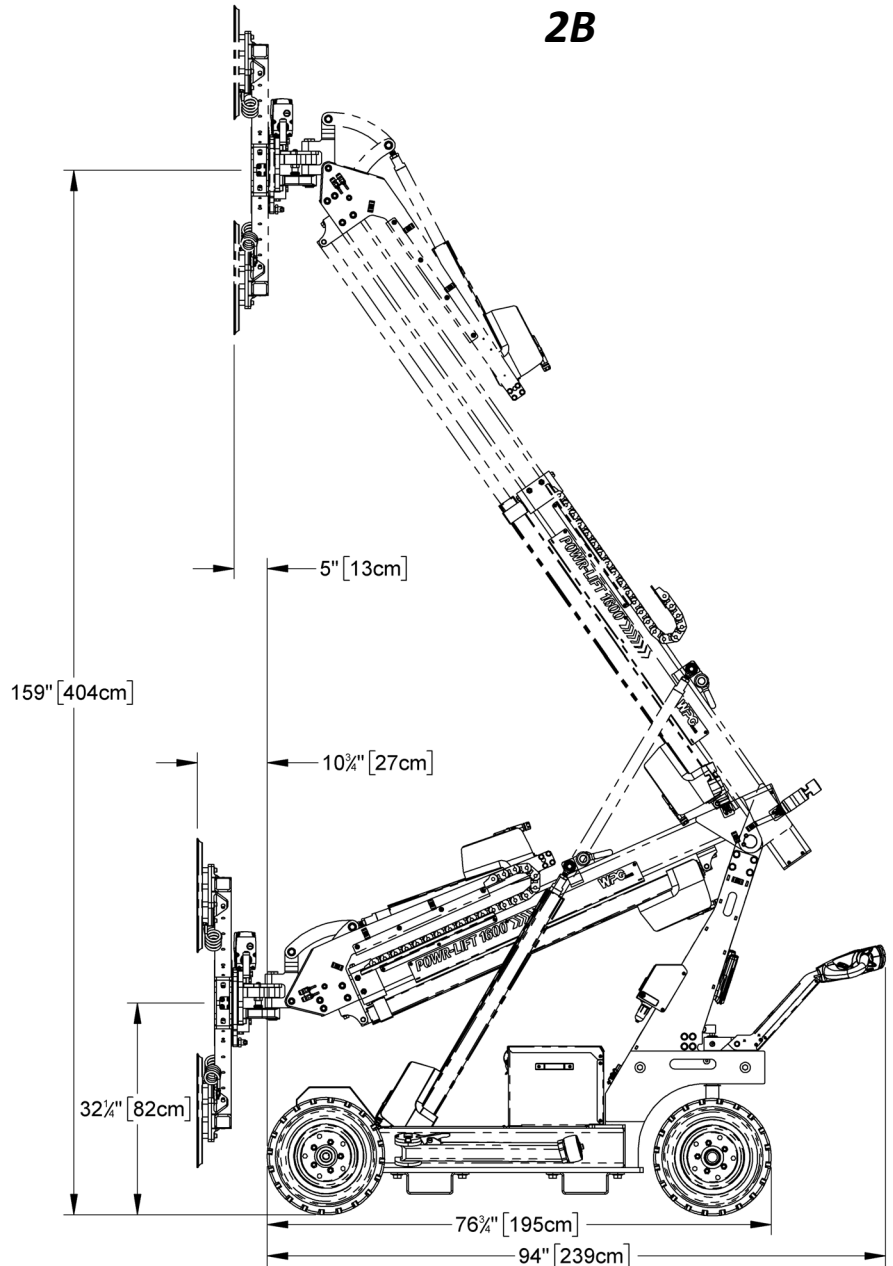


- 2) Use the radio transmitter to adjust boom height as desired (fig. 2A):

- Press the "raise boom" button (*upper arrow* in fig. 2A) to move the boom upward (fig. 2B).
- Press the "lower boom" button (*lower arrow* in fig. 2A) to move the boom downward (fig. 2B).

- 3) To stop boom motion in the desired position, simply let go of the button.

2B



OPERATION

TO EXTEND OR RETRACT THE BOOM



Make sure any load is positioned correctly on pad frame (as previously directed).

Caution: Unbalanced loads can interfere with the machine's boom capability, and they can also damage the machine.

- 1) Make sure the machine and any attached load has enough clearance to move without contacting anyone or anything.

2A

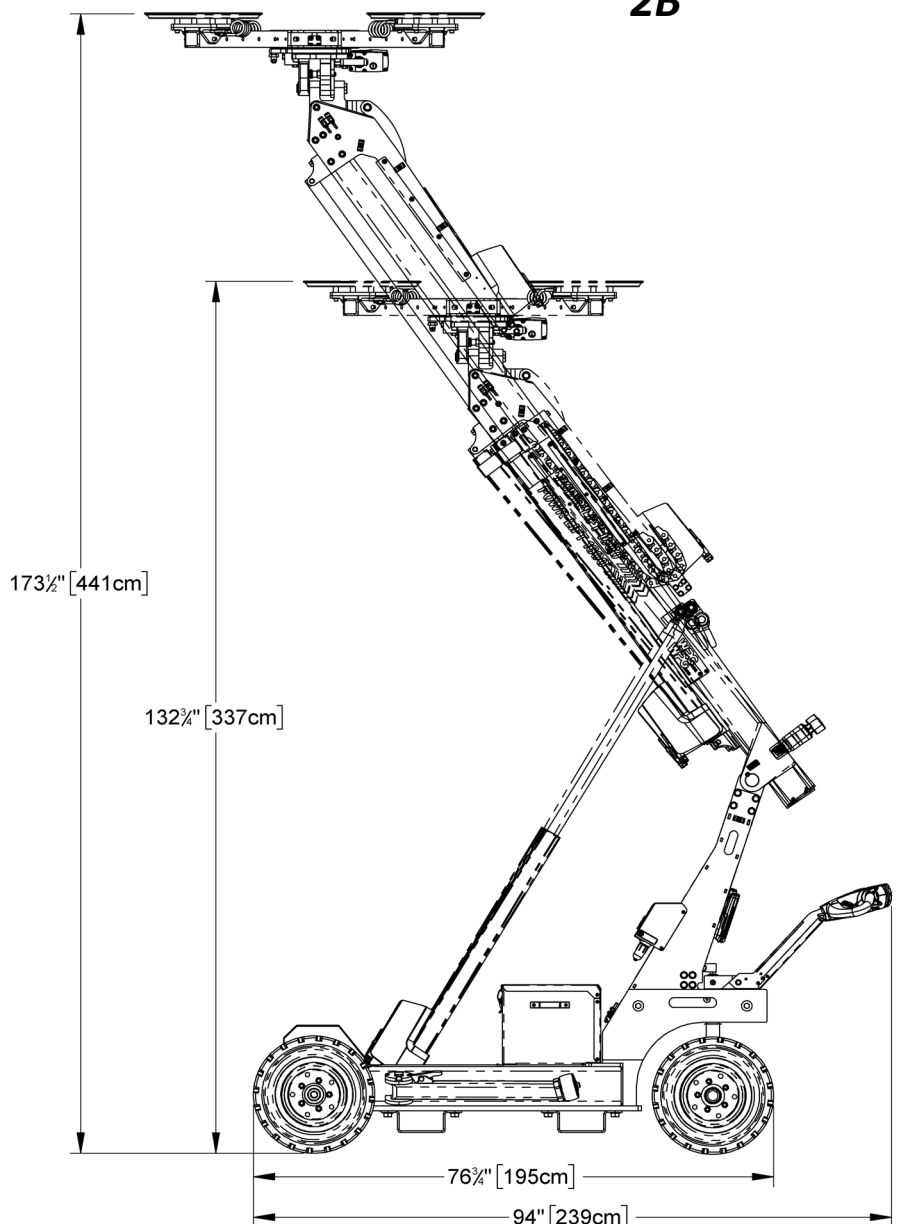


- 2) Use the remote transmitter to adjust boom length as desired (fig. 2A):

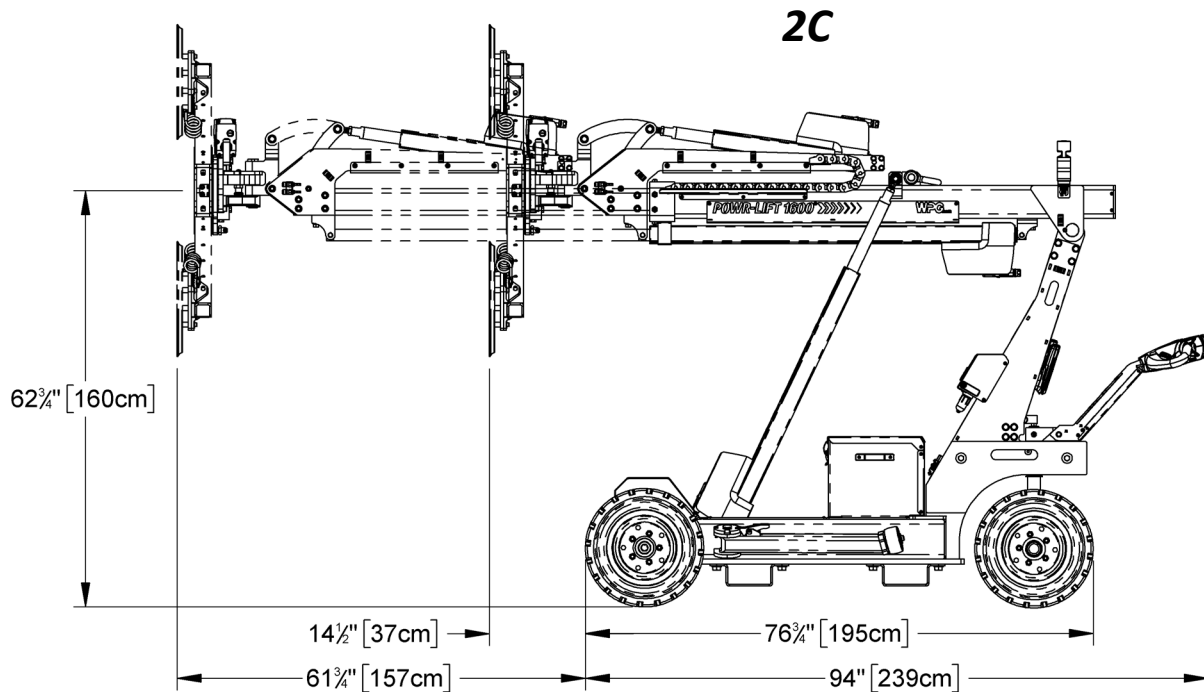
- Press the “extend boom” button (arrow *at right* in fig. 2A) to lengthen the boom (figs. 2B & 2C).
- Press the “retract boom” button (arrow *at left* in fig. 2A) to shorten the boom (figs. 2B & 2C).

- 3) To stop boom motion in the desired position, simply let go of the button.

2B



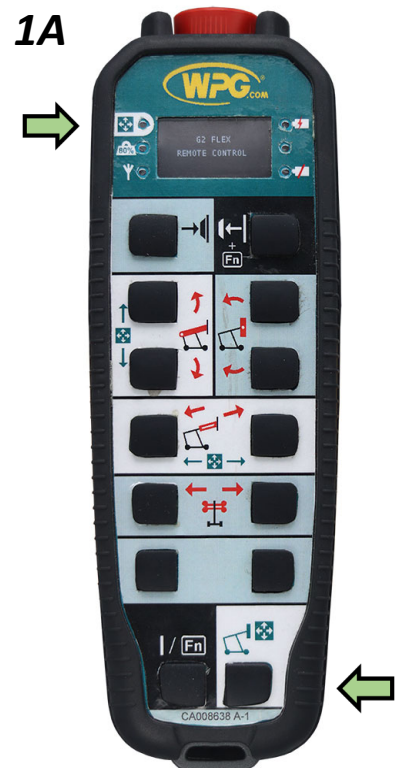
OPERATION



TO USE PLANAR MODE

Planar mode enables a machine operator to maintain the load's orientation in its current plane, regardless of how the boom is moved:

- 1) Hold the "planar mode" button (*lower arrow in fig. 1A*) on the radio transmitter for 3 seconds or until the "planar mode indicator light" (*upper arrow in fig. 1A*) turns on.
- 2) Follow directions in the preceding sections to move the boom as desired.
- 3) To discontinue planar mode, hold the "planar mode" button again for 3 seconds.



TO ROTATE THE LOAD



Make sure load is positioned correctly on pad frame (as previously directed).

- 1) Make sure the load has enough clearance to rotate without contacting anyone or anything.
- 2) Grasp the pad frame securely or use another appropriate means to keep the load under control at all times.



Unbalanced loads may rotate unexpectedly when rotation latch is disengaged.

- 3) Move the lever of the rotation latch from the engaged position (fig. 3A) to the disengaged position (fig. 3B).



3A



3B

- 4) Rotate the load to the desired position (fig. 4A).
- 5) To stop load motion, move the rotation latch lever to the engaged position and guide the load to the nearest rotation stop.

Note: Whenever rotation is not required, keep the rotation latch engaged, to prevent load damage or personal injury.



4A

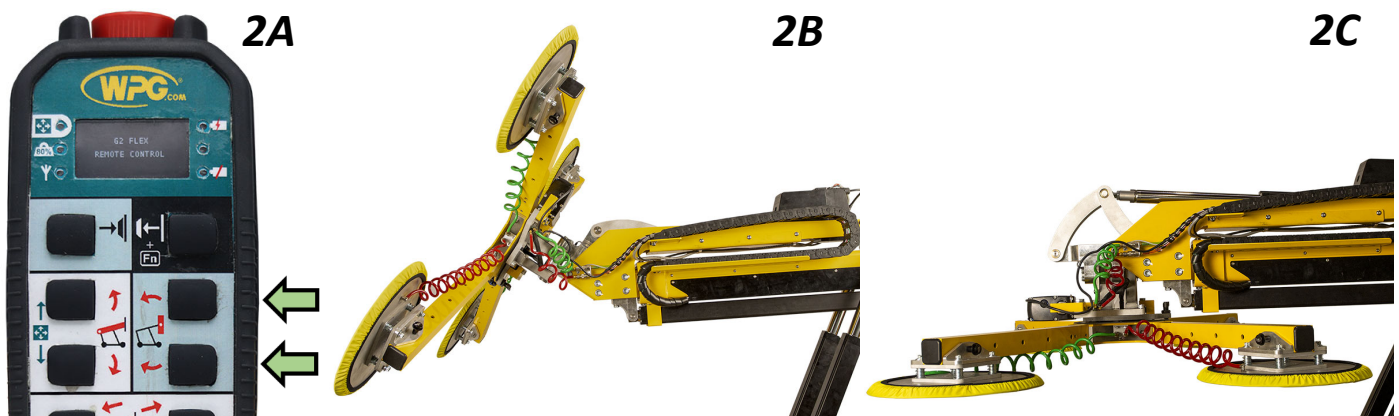
TO TILT THE LOAD



Make sure load is positioned correctly on pad frame (as previously directed).

Caution: Unbalanced loads can interfere with the machine's tilt capability, and they can also damage the machine.

- 1) Make sure the load has enough clearance to tilt without contacting anyone or anything.
- 2) Use the radio transmitter to tilt the load as desired (fig. 2A):



- Press the “tilt load up” button (*upper arrow in fig. 2A*) to tilt the load toward an upward facing position (fig. 2B).
 - Press the “tilt load down” button (*lower arrow in fig. 2A*) to tilt the load toward a downward facing position (fig. 2C).
- 3) To stop load motion in the desired position, simply let go of the tilt button.

Note: See “[LOAD CHARACTERISTICS](#)” about allowable load overhang.

OPERATION

TO SHIFT THE LOAD LEFT OR RIGHT



Make sure load is positioned correctly on pad frame (as previously directed).

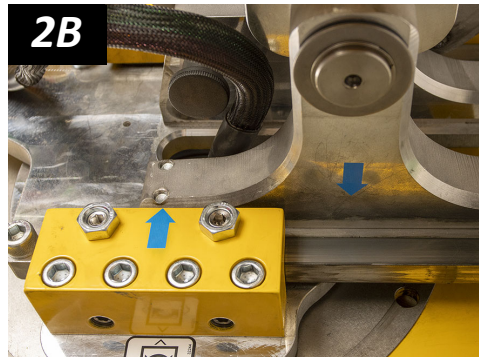
Caution: Unbalanced loads can interfere with the machine's shifting capability, and they can also damage the machine.

- 1) Make sure the load has enough clearance to shift without contacting anyone or anything.
- 2) Use the radio transmitter to shift the load as desired (fig. 2A):

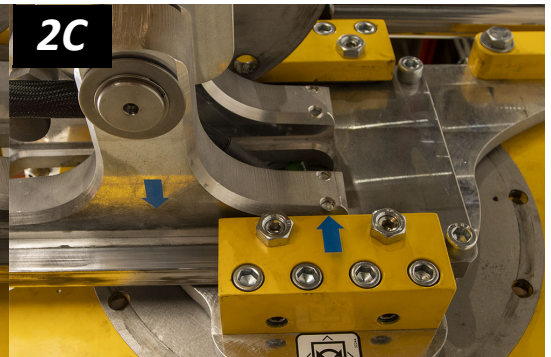
2A



2B



2C



- Press the “shift load left” button (arrow *at left* in fig. 2A) to move the load laterally to the left of the machine (fig. 2B).
 - Press the “shift load right” button (arrow *at right* in fig. 2A) to move the load laterally to the right of the machine (fig. 2C).
 - Using the blue arrows as a guide (figs. 2B-2C), press either button as needed to align the load on center.
- 3) To stop load motion in the desired position, simply let go of the button.

OPERATION

TO RELEASE THE PADS FROM THE LOAD



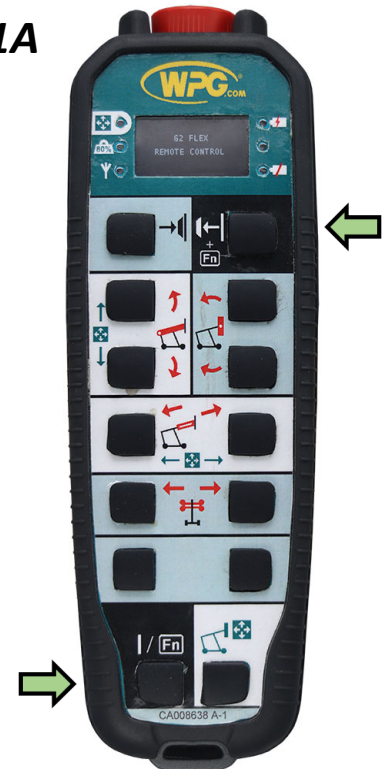
Make sure load is stable and fully supported before releasing vacuum pads.

- 1) Hold the “function” button (Fn) and the “release pads” button (⇐|) on the radio transmitter (fig. 1A) until the vacuum pads release the load completely. Otherwise, the machine will automatically try to reattach to the load.¹



Do not move machine until pads release load completely, because such movement could result in load damage or personal injury.

1A



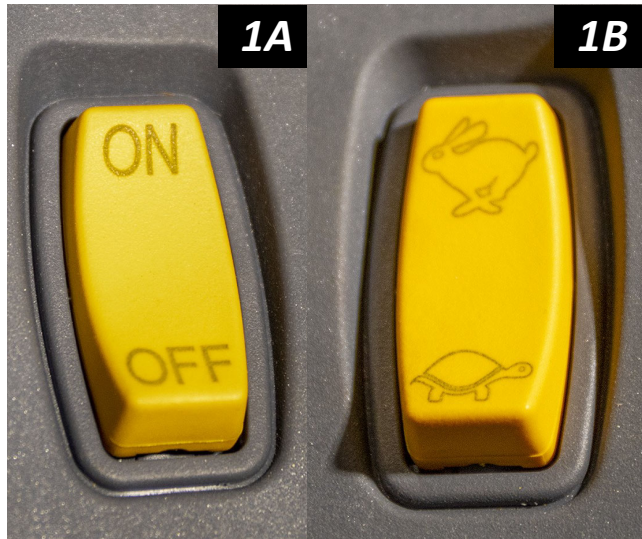
- 2) Before you lift another load, perform the Every-Lift Inspection (see “[INSPECTION SCHEDULE](#)”).

1..... A “Timed Release” function can be used to help separate the vacuum pads from the load: While you continue to hold the “release” button, release the “function” button and then press it again. This prolongs the release mode for another 10 seconds.

OPERATION

AFTER USING THE MACHINE

- 1) Place the drive power switch in the “OFF” position (fig. 1A) and the drive speed switch in the turtle/tortoise position (fig. 1B). Then raise the control handle (fig. 1C).



- 2) Turn the power key counter-clockwise to power down the machine (fig. 2A), and remove the key. Then press the emergency stop, to engage it.



- 3) Charge the 12V batteries after each workday as needed (see “[To RECHARGE 12-VOLT BATTERIES](#)”).¹

- 4) Place the radio transmitter in the transmitter charging dock (fig. 4A).

Note: The transmitter will automatically charge in the dock while the machine is powered up and for two hours after it has been powered down.



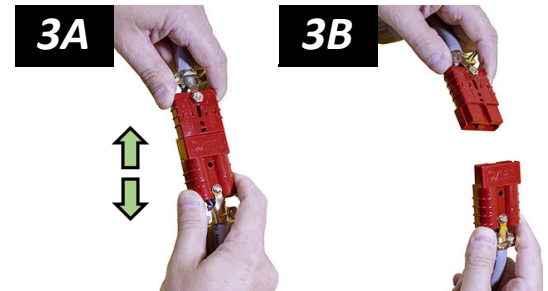
1..... To maximize battery life, charge them promptly after each use.

Storing the Machine

- 1) Use the pad covers supplied to keep the vacuum pads clean (fig. 1B).



- 2) Charge the 12V batteries completely and repeat every 6 months (see [“To RECHARGE 12-VOLT BATTERIES”](#)).
- 3) Disconnect the electrical connectors (figs. 3A-B) to prevent battery discharge.



- 4) Store the machine in a clean, dry location.
Store the batteries between -4° F and 122° F (-20° — 50° C).

Transporting the Machine

Secure the machine on the original shipping pallet with the original shipping restraints and materials or equivalent. Reverse the steps in [“SETUP”](#).

INSPECTIONS AND TESTS

INSPECTION SCHEDULE

Perform inspections according to the following frequency schedule. If any fault is found, correct it and perform the next most frequent inspection before using the machine.

Note: If a machine is used less than 1 day in a 2-week period, perform the Periodic Inspection before using it.

Action	Every Lift	Frequent ¹ (Every 20-40 hrs.)	Periodic ² (Every 250-400 hrs.)
Examine <u>vacuum pads</u> for contaminants or damage (see “Pad Inspection”).	✓	✓	✓
Examine load surface for contaminants or debris.	✓	✓	✓
Examine controls and indicators for damage.	✓	✓	✓
Examine machine’s structure for damage.		✓	✓
Examine vacuum system for damage (including <u>vacuum pads</u> , fittings and hoses).		✓	✓
Examine <u>air filters</u> for conditions requiring service (see “AIR FILTER MAINTENANCE” in <i>SERVICE MANUAL</i>).		✓	✓
Perform “Vacuum Test” .		✓	✓
Check for unusual vibrations or noises while operating machine.		✓	✓
 Perform “Remote Control System Test” .		✓	✓
Examine entire machine for evidence of: • looseness, excessive wear or excessive corrosion • deformation, cracks, dents to structural or functional components • cuts in vacuum pads or hoses • any other hazardous conditions			✓
Inspect entire electrical system for damage, wear or contamination that could be hazardous, in compliance with all local codes and regulatory standards. Caution: Use appropriate cleaning methods for each electrical part, as specified by codes and standards. <i>Improper cleaning can damage parts.</i>			✓

1..... The Frequent Inspection is also required whenever the machine has been out of service for 1 month or more.

2..... The Periodic Inspection is also required whenever the machine has been out of service for 1 year or more. Keep a written record of all Periodic Inspections. If necessary, return the machine to WPG or an authorized dealer for repair (see [“REGISTRATION AND LIMITED WARRANTY”](#)).

TESTING

Perform the following test to determine whether or not a load surface is too porous or rough:

Vacuum Pads/Load Compatibility Test¹

- 1) Make sure the vacuum generating system is functioning correctly (see “[Vacuum Test](#)”).
- 2) Thoroughly clean the load surface and the vacuum pads (see “[Pad Cleaning](#)”).²
- 3) Place the load in the vertical position on a stable support.
- 4) Attach the vacuum pads to the load as previously directed.
- 5) Raise the load a minimal distance, to make sure it is supported by the machine.
- 6) After the vacuum pump stops running, power down the machine as previously directed.



Take precautions in case load should fall during test.

Note: During this time, the warning buzzer sounds continuously.

- 7) Watch each vacuum gauge: **Starting from a vacuum level of 16" Hg (-54 kPa), the machine must maintain a vacuum level greater than 12" Hg (less than -41 kPa) for 5 minutes.** Contact WPG for more information.
- 8) Power up the machine and lower the load *after* 5 minutes or *before* the vacuum level diminishes to 12" Hg (increases to -41 kPa).

1..... The “[Pad-to-Load Friction Coefficient](#)” can affect the outcome of this test.

2..... Contaminated loads can also cause the vacuum pumps to run frequently or continuously. Since excessive pumping quickly reduces battery energy, clean the load whenever possible.

INSPECTIONS AND TESTS

Perform the following tests before placing the machine in service *initially* and *following any repair*, when directed in the “*INSPECTION SCHEDULE*”, or *whenever necessary*:

Operational Tests

Test all features and functions of the machine (see “*OPERATING FEATURES*” and “*OPERATION*”).

Vacuum Test

- 1) Clean the face of each vacuum pad (see “*Pad Cleaning*”).
- 2) Use a test load with weight equal to the Maximum Load Capacity, a clean, smooth, nonporous surface and other appropriate “*LOAD CHARACTERISTICS*”. 
- 3) Attach the vacuum pads to the test load as previously directed. After the vacuum pumps stop running, the vacuum level should appear in the green range on both of the vacuum gauges.
- 4) Raise the load a minimal distance. Then power down the machine as previously directed.¹

 **Take precautions in case load should fall during test.**
- 5) Watch the vacuum gauges: *The vacuum level should not decrease by more than 4" Hg (increase by more than 14 kPa) in 5 minutes.*
- 6) Power up the machine and lower the load after 5 minutes or whenever a machine fails the test, and release the load as previously directed.

 **Never use machine that has failed test.**
- 7) Qualified service personnel must correct any fault in the vacuum system before the machine can be returned to service.

 **This service must be performed by qualified service personnel.**

1..... During this time, the warning buzzer sounds continuously.

INSPECTIONS AND TESTS

Rated Load Test¹

The following steps must be performed or supervised by a qualified person:²

- 1) Use a test load that weighs 125% ($\pm 5\%$) of the Maximum Load Capacity and has the appropriate “LOAD CHARACTERISTICS”. 
- 2) Attach the vacuum pads to the load as previously directed.
- 3) Position the load to produce the greatest stress on the machine consistent with “INTENDED USE”.
- 4) Raise the load a minimal distance and leave it suspended for 2 minutes.
- 5) Once the test is completed, lower and release the load as previously directed.
- 6) Inspect the machine for any stress damage, and repair or replace components as necessary to successfully pass the test.
- 7) Prepare a written report of the test and keep it on file.



Take precautions in case load should fall during test.



Never use machine that has failed test.

Remote Control System Test

 Test the Remote Control System where the machine is normally used. Use the radio transmitter to activate each of the remote functions.³ Vary the transmitter's direction and distance from the machine, to make sure transmissions are effective.⁴

If the Remote Control System is not functioning correctly, ...

- the batteries for the radio transmitter may need to be replaced, or;
- metal or other electrically conductive surfaces may be causing radio interference. Reposition the transmitter to transmit signals effectively.

If the problem persists, vary the test conditions, to determine whether there is transmission interference in the work environment or the Remote Control System is not functioning. Correct any fault before using the Remote Control System.

1..... An equivalent simulation may also be used. Contact WPG for more information.

2..... A “qualified person” has successfully demonstrated the ability to solve problems relating to the subject matter and work, either by possessing a recognized degree in an applicable field or a certificate of professional standing, or by possessing extensive knowledge, training and experience.

3..... Use a test material with appropriate “Load Characteristics” to test the “attach” and “release” functions.

4..... This may require assistance from someone near the machine, to verify functions are working as intended.

VACUUM PAD MAINTENANCE

Pad-to-Load Friction Coefficient

The friction coefficient represents the vacuum pads' ability to resist load slippage. The Maximum Load Capacity assumes a friction coefficient of 1, as can be expected when using clean, new, standard rubber vacuum pads to handle clean, dry, regular glass. ***If the machine is used under any other conditions, a qualified person must first determine the effective lifting capacity.***¹



Long-term exposure to heat, chemicals or UV light can damage vacuum pads. Replace pads every 2 years or more often when necessary.

Pad Inspection

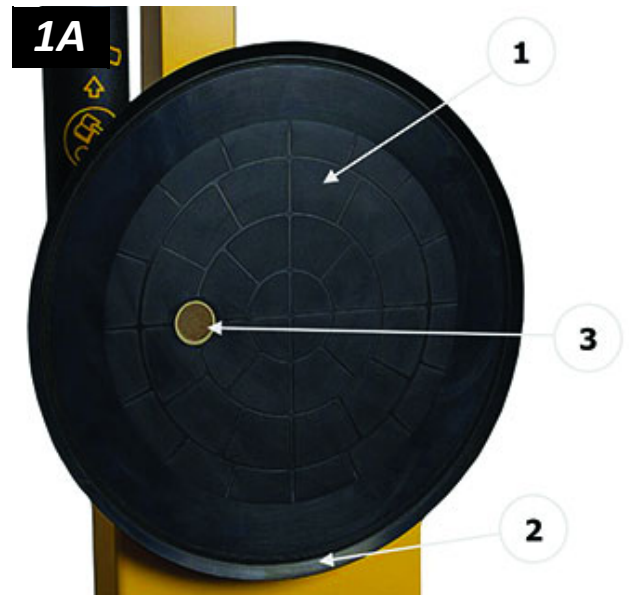
Inspect each vacuum pad (fig. 1A) according to the “[INSPECTION SCHEDULE](#)” and correct the following faults before using the machine, when applicable):

- Contaminants on the face (item 1 in fig. 1A) or sealing edges (item 2 in fig. 1A).
- Filter screen (item 3 in fig. 1A) missing from face.



Replace any pad that has damaged sealing edges.

- Nicks, cuts, deformation or abrasions in sealing edges.
- Wear, stiffness or glaze.



1..... A “qualified person” has successfully demonstrated the ability to solve problems relating to the subject matter and work, either by possessing a recognized degree in an applicable field or a certificate of professional standing, or by possessing extensive knowledge, training and experience.

Pad Cleaning

- 1) Regularly clean the face of each vacuum pad (fig. 1A), using soapy water or other mild cleansers to remove oil, dust and other contaminants.



Never use harsh chemicals on vacuum pad.

Solvents, petroleum-based products (including kerosene, gasoline and diesel fuel) or other harsh chemicals can damage vacuum pads.



Never use rubber conditioners on vacuum pad.

Many rubber conditioners can leave a hazardous film on vacuum pads.

- 2) Prevent liquid from entering the vacuum system through the suction hole on the pad face.
- 3) Wipe each pad face clean, using a clean sponge or lint-free cloth to apply the cleanser.¹
- 4) Allow each pad to dry completely before using the machine.

1A



¹..... A brush with bristles *that do not harm rubber* can help remove contaminants clinging to sealing edges. If these cleaning methods are not successful, contact WPG or an authorized dealer for assistance.

TO RECHARGE 12-VOLT BATTERIES

Charge the 12V batteries whenever the battery gauge shows reduced energy.¹ **Caution:** Make sure the machine is powered down.

Plug the battery charger in to a 100-240V AC, 50-60 Hz, 7A (maximum) power source.²

Normally, the batteries should take no more than 8 hours to charge completely.³

Red and green lights indicate the status of each charger (figs. 1A-B), as follows:

- Continuous green: Battery is fully charged (fig. 1A).
- Flashing green: Charger is in standby mode. Power down the machine and disconnect the batteries (see “[Storing the Machine](#)”) before charging.
- Continuous red: Charging is in process (fig. 1B).
- Flashing red: Charger has a fault or is in protection mode (ie, is protecting the charger from damage). See the *SERVICE MANUAL* for more information.



Make sure power source has ground fault circuit interrupter.

1A



1B



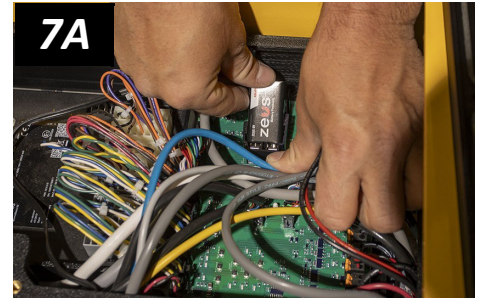
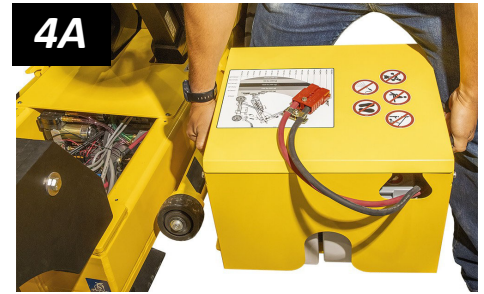
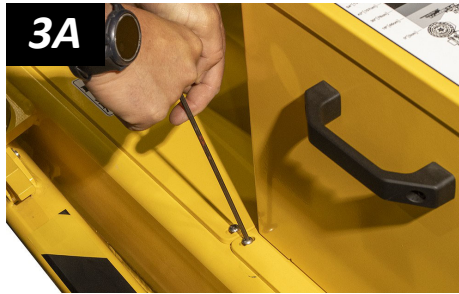
1..... To maximize the batteries' lifespan, charge them promptly after each use.

2..... Any external power supply must conform to all applicable local codes. The machine is not intended for use while the charger is connected to AC power.

3..... The charger automatically reduces the charging rate when the batteries are fully charged.

MAINTENANCE

TO REPLACE THE 9V BATTERY

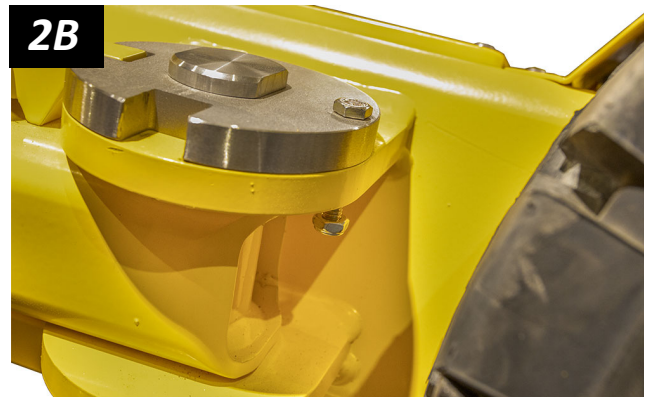


- 1) Power down the machine (see [“AFTER USING THE MACHINE”](#)).
- 2) Disconnect the electrical connectors (fig. 2A)
- 3) Remove the screws retaining the enclosure that contains the 12V batteries (fig. 3A).
- 4) Remove the battery enclosure, providing access to the inner enclosure (figs. 4A-5A).
- 5) Remove the screws retaining the lid of the inner enclosure (fig. 5A).
- 6) Remove the lid of the enclosure, to provide access to the 9V battery (fig. 6A).
- 7) Remove the 9V battery from its holder (fig. 7A).
- 8) Install a new battery according to the polarity markings.
- 9) Reverse steps 2-6.
- 10) Power up the machine again, to test the new battery (see [“Performing Inspections and Tests”](#)).

TO REPLACE SHEAR PINS IN STABILIZER LEGS

The stabilizer legs are equipped with shear pins (**#10712CM** in “REPLACEMENT PARTS”). If a stabilizer leg is accidentally driven into an unyielding obstacle with sufficient force, the shear pin is designed to break, in order to prevent more serious damage to the machine. In such cases, replace the shear pin as follows:

- 1) Remove any remaining part of the old shear pin, using appropriate tools.
- 2) Insert a new shear pin and retaining nut (figs. 2A-B).
- 3) Tighten the shear pin securely (fig. 3A).



REPLACEMENT PARTS

Stock No.	Description	Qty.
93026	Quick Connector – 1/8 FNPT – Female End – Double with Straight Barbs	3
93022	Quick Connector – 1/8 FNPT – Male End – Single with 45° Barb	6
67353	Light Tower with Buzzer (aka, vacuum lift light, warning light and warning buzzer)	1
66197AM	Pump Diaphragm Kit	2
66197AA	Pump Dual-Head Assembly	2
66136AV	Vacuum Pump – Diaphragm Type – 2.5 SCFM – 24 V DC	2
65442AM	Vacuum Hose – 0.245" ID x 3/8" OD x 48" Length – Coiled – Green	2
65441	Vacuum Hose – 0.245" ID x 3/8" OD x 48" Length – Coiled – Red	2
65440TR	Vacuum Hose – 0.245" ID x 3/8" OD – Transparent Red	**
65437TG	Vacuum Hose – 0.245" ID x 3/8" OD – Transparent Green	**
65255PM	Solenoid Valve – 4-Way – 24 V DC	2
65211	Check Valve – 1/8 NPT	2
65096	Gas Spring (for control handle)	1
64979	Actuator – 24 V DC – 8" (200 mm) Stroke (to side shift pad frame)	1
64978	Actuator – 24 V DC – 16" (400 mm) Stroke (to tilt pad frame)	1
64977	Actuator – 24 V DC – 47" (1200 mm) Stroke (to extend/retract boom)	1
64976	Actuator – 24 V DC – 35" (900 mm) Stroke (to raise/lower boom)	2
64696CH	Battery Charger – 100-240 V AC – 20 Amp	2
64696	Battery – 12 V DC – 100 Amp-Hours	2
49380T	Vacuum Pad – 16" (40 cm) Diameter – Lipped	4
49150	End Plug – 2-1/2" x 2-1/2" x 1/4" Tubing Size	4
29356	Pad Cover	4
16137	Element Kit for Air Filter – 2 oz Bowl Size	2
15630	Pad Filter Screen – Large	4
15130BS	Pad Fitting – Swivel Elbow – 1/8 Male BSPP x 1/4" Barb	4
13540	Cotterless Hitch Pin – Push-Button – 5/8" x 3-1/2" (for extension arms)	4
13532	Cotterless Hitch Pin – Push-Button – 1/2" x 3-3/8" (for pad mounts)	4
10712CM	Bolt – Hex Head – 1/4-20 Thread x 1-1/2" – Grade 8 (aka, shear bolt for stabilizer legs)	2

* — Length as required; sold by the inch (approx 2.5 cm).

** — For use with barbed fittings only. Do not use with "push-in"-style fittings. Maximum pressure rating: 90 psi @ 75° F (172 kPa @ 24° C). Length as required; sold by the inch (approx 2.5 cm).

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

REGISTRATION AND LIMITED WARRANTY

TO REGISTER THIS WPG PRODUCT

Go to the [PRODUCT REGISTRATION](#) page at [wpg.com](#) and complete the form. Registration keeps you advised of important updates and notifications, and simplifies inquiries to WPG regarding your product. Registration is **not** required to activate your Limited Warranty (see next section).

ABOUT THE LIMITED WARRANTY

Note: Read the [WARRANTY RETURN FORM](#) at [wpg.com](#) for important details about the Limited Warranty.

Wood's Powr-Grip® (WPG) products are warranted to be free from defects in manufacturing and materials for 1 year from the date of purchase.

If a problem develops during the warranty period, follow the instructions below to obtain warranty service. If inspection shows that the product has a defect, WPG will repair or replace the product without charge.



Obtaining Warranty Service or Repair Service

For customers in the U.S. and Canada: Go to the [EXCHANGE PROGRAM, REPAIRS & WARRANTY](#) page at [wpg.com](#) and click the applicable link. Alternatively, you may contact the WPG Technical Service Department (see contact information below).

For customers in all other localities: Contact the WPG Technical Service Department (see contact information below) or your dealer for assistance.

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