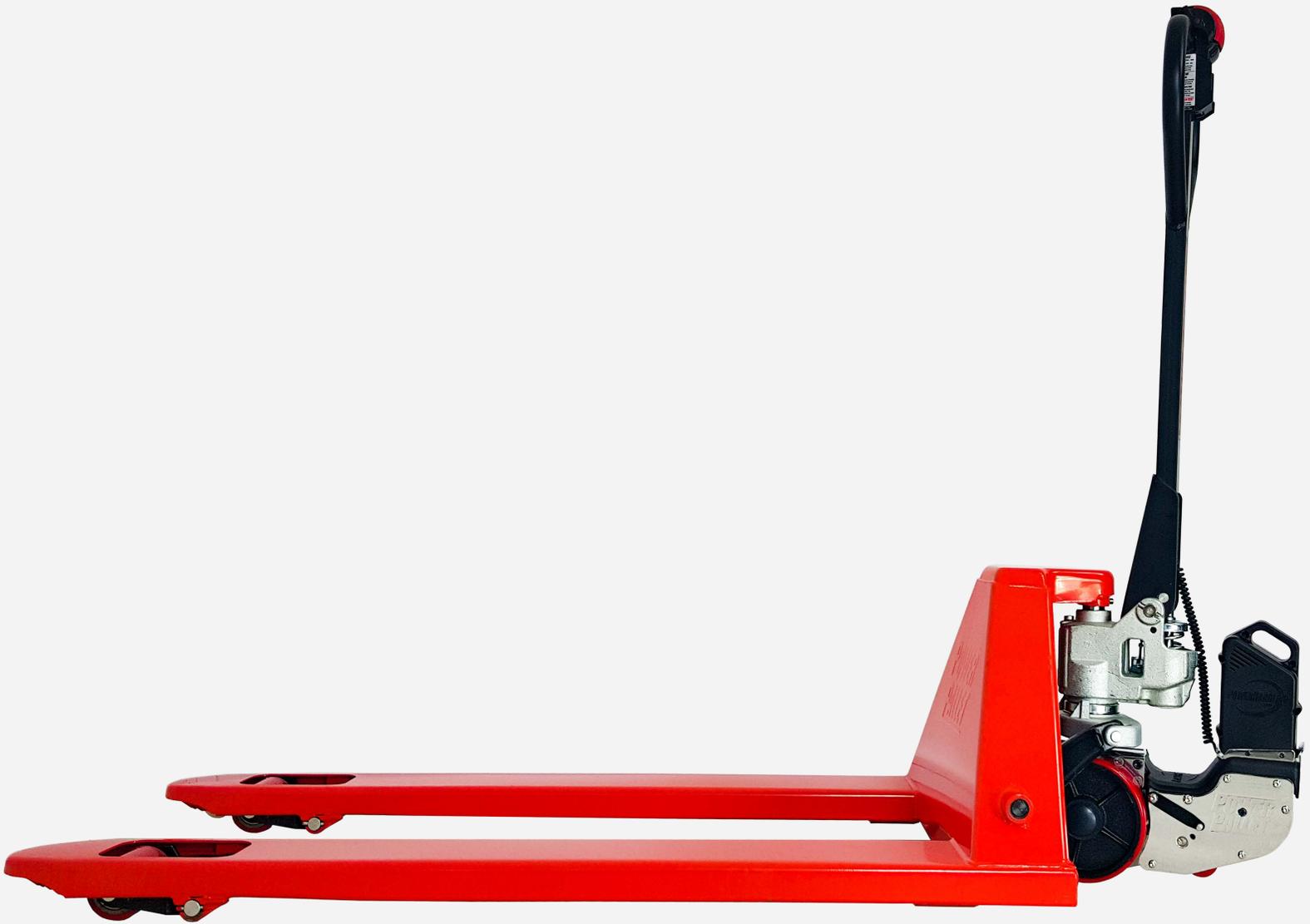




SMARTER. SMALLER. STRONGER.



PowerHandling, Inc.

# PowerPallet User Manual

Published: May 2021



DO NOT INSTALL, OPERATE OR SERVICE THIS PRODUCT UNLESS YOU HAVE READ AND FULLY UNDERSTAND THE ENTIRE CONTENTS OF THIS MANUAL. FAILURE TO DO SO MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY OR DEATH.

### **FCC Notice**

This device complies with part 15 of the FCC Rules. Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **Training Information**

According to Federal law (OSHA §1910.178, Rev. 1999), only properly trained operators are permitted to operate a powered industrial truck.

You must be trained and certified by your employer that you are qualified to operate this powered industrial truck.

Do not operate this machine without being fully qualified by your employer to do so.

## Precautions

Improper operation of the equipment may result in operator injury, or load, and/or property damage. The following precautions must be adhered to at all times:

Any person operating the machine must be trained and authorized to do so.
All warnings and instructions must be carefully read and understood before operating the device.
Do not operate in hazardous areas/environment.
Inspect the unit before use. Do not operate if anything seems out of place.
Do not operate the machine without the pallet-jack wheels mounted and secured properly on the wheel shaft.
Approved footwear must be worn while operating the device.
Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever a clear sight of travel is absent or compromised.
Start, stop, travel, steer and brake smoothly. Slow down for turns and on uneven or slippery conditions that could cause the truck to slide or overturn.
Leave sufficient room for braking depending on load being carried and speed of travel. Check braking distance of the machine before operating it for work.
Do not load the pallet-jack beyond its rated load capacity.
Do not carry loads that the operator cannot handle manually. The PowerPallet is only meant to provide a power-assist, and does not increase the load carrying capacity.
Make sure load is centered and located as far back as possible against the chassis.
Do not carry people or try to ride on the machine.
Do not operate the machine under the influence of alcohol or drugs.
Regular daily inspection of the device, including drive wheel condition and brake performance, must be performed by a qualified person. Any abnormal condition should be noted and the machine removed from use.
Follow all safety procedures required by the workplace, city, state and country where the machine will be used.

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## Description

### Introduction

This document describes the PowerPallet, a unique bolt-on machine that converts a manual pallet-jack into a powerful, fast, yet ultra-compact motorized pallet-jack. The standard safety features, assembly instructions, terms and definitions, operation, maintenance, service and troubleshooting pertaining to the machine are detailed in this manual.

The PowerPallet provides power-assist by attaching on to many major name-brand manual pallet-jacks. Due to the compact design of the PowerPallet, it retains the maneuverability of the manual pallet-jack that it is being bolted on to.

### General Use and Application

The PowerPallet is meant for light duty applications, and intermittent use.

Some of the many applications may include use in:

- Back of truck
- Retail store
- Manufacturing plants
- Dock assist

### PowerPallet Specifications

Weight (not including Battery)	27 lbs.
Max. load capacity (on flat concrete)	3500 lbs. or rated capacity of pallet-jack, whichever is less
Max. speed (unloaded, on flat concrete)	93.3m/min (3.48mph)
Drive motor	Brushless DC electric motor
Slope rating (concrete)	Not rated for slopes.

### Battery Specifications

Composition	Li-Ion (Rechargeable)	NiMH (Rechargeable)
Power	5Ah, 51.8V (Li-Ion)	5Ah, 46V (NiMH)
Type (ID)	Type E	Type E
Weight	4lbs. (Li-Ion)	9 lbs. (NiMH)



Do not attempt to operate the machine with any other battery or power source other than the PowerPallet battery.

## Standard Safety Features

### Braking by Handle Position

In Warehouse mode, the PowerPallet applies full braking when the handle moves into the upright position. There is an optional setting to apply full braking when the PowerPallet handle moves into the horizontal position.

In the Truck mode, there is an optional setting to apply full brakes when the PowerPallet handle moves into the horizontal position.

*Note: In the Manual mode, braking by handle position is disabled.*

### Belly-Button

Pressing or bumping against the Belly-Button while the truck is stationary or moving backward stops current operation, and drives the truck away a few feet from the operator as long as the Belly-Button is depressed. This feature reduces the possibility of the operator getting pinned by the steering handle.

### Parking Brake

The PowerPallet has a safety parking brake on the left side of the unit that can be easily engaged to lock the PowerPallet motor from driving. This prevents any undesired rolling of the machine.

### USB Flash Drive Key (Optional Feature)

The PowerPallet can be programmed to require a USB flash drive as a key before operating the machine. This feature adds a level of security to client use. This can be achieved by a simple firmware update.

## Installation

### List of Parts



Figure 1: Parts (Out of the box)

1. PowerPallet Base unit with User Controller
2. User Controller mounting bracket
3. Pallet mount kit (pallet-jack specific)
4. Spacer rod
5. Fasteners
6. Allen-wrench tool for screw-jack adjustment
7. Pallet-jack handle sleeves
8. Battery charger & power cable
9. Battery

## Tools Required

1. M3 and M5 Allen-wrenches
2. Phillips #1 screwdriver
3. Snap-ring pliers
4. Allen-wrench tool for screw-jack adjustment
5. Flat-head screwdriver



Figure 2: Tools Required for Installation

## Assembly

- 1) Set the rear end of the pallet-jack such that the wheels are off the ground. Place some weights (>20kg) on the front forks, to prevent it from tipping over during installation.



- 2) Remove end caps of both wheels using a flat-head screwdriver.



- 3) Remove the snap-rings using the snap-ring pliers, and slide the wheels out. (Note: Some pallet-jack models use nuts to hold the wheels on. Use appropriate tools if that is true for the pallet-jack that the PowerPallet is being installed on.)



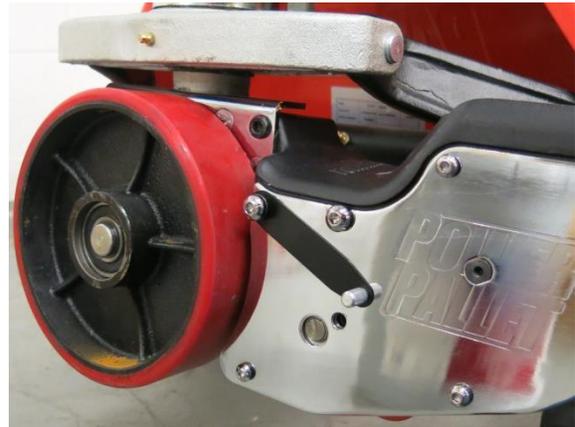
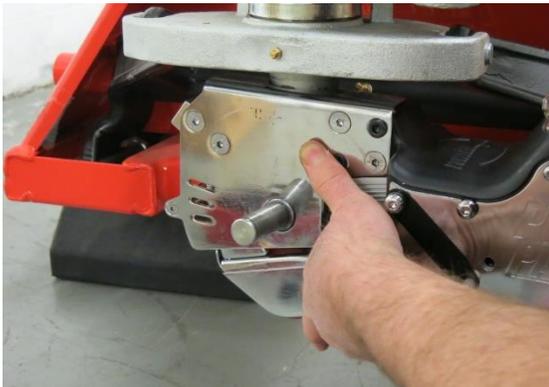
- 4) If the pallet mount kit came with spacer rings for the pallet-jack, slide them onto both sides of the axle.



- 5) Place one mounting plate on one side of the PowerPallet and secure it with the M8 flat-head screws provided. Secure one end of the cylindrical spacer rod to the mounting plate with M5 flat-head screw.



- 6) Gently lift and slide this assembly on to the corresponding shaft of the pallet-jack (The assembly can be held in place by mounting on one of the pallet-jack wheels behind it).



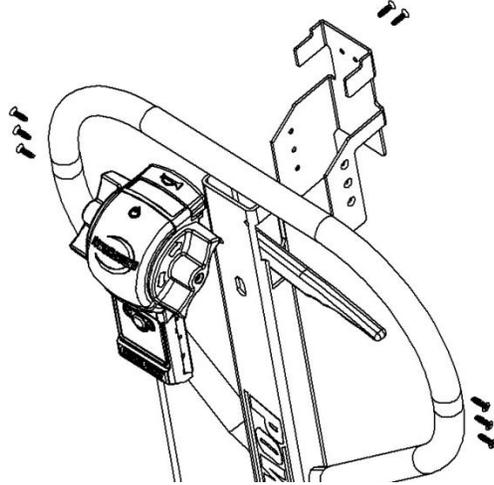
- 7)
- a) Slide the other mounting plate on to the opposite side and secure it to the PowerPallet with the M8 flat-head screws.
  - b) Secure the other end of the cylindrical spacer rod between the 2 mounting plates with the M5 flat-head screw.
  - c) Readjust the screws on both sides (if necessary) to securely mount the PowerPallet symmetrically about the wheel mounting shaft.



- 8) Slide the pallet-jack wheels back on to the shafts, secure them with the snap-rings using the snap-ring pliers, and reattach the wheel end caps.
- 9) Make sure the screw-jack assembly is secured by the fasteners with the drive-spring properly mounted.



- 
- 10) Install the User Controller on the handle of the pallet-jack using the User Controller mounting plate with the aid of the Philips screwdriver and the 8 plastite screws. Make sure the backs of the mounting plate and the User Controller are laid completely flat against the handle of the pallet-jack and the cable is properly placed in the slot provided for it.



- 11) Wrap the cable sleeve around the stem of the handle and the coiled cable, and close the zipper. Place allen-wrench tool to adjust the screw-jack in the slot provided on the cable sleeve.



## Screw-Jack Adjustment

The machine comes with an adjustable screw-jack that allows the operator to set the height of the drive-wheel with respect to the wheels of the pallet-jack. The operator can alter this height by using the allen-wrench tool provided to adjust the compression in the drive-spring, thus being able to achieve sufficient traction and optimal stability for any operable load.

At the correct setting the 7" diameter pallet jack steer wheels will be approximately  $\frac{1}{4}$ " off the ground with no load on the pallet jack. The adjustment screw may need to be adjusted periodically as the drive roller wears out to keep the PowerPallet at the proper setting.

If the screw is turned clock-wise all the way, the drive-wheel is at its maximum height setting. It might not make contact with the ground.

If the screw is turned counter clock-wise all the way, the drive-wheel is at its minimum height setting, thus achieving maximum traction with the ground in contact.

The factory setting is 2 clock-wise rotations from the minimum height setting.

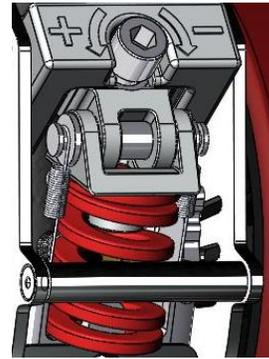


Figure 3: Screw-Jack Height Adjustment

## Curb-Wheel Height Adjustment

To adjust the curb-wheel height, remove the bottom plate using the M3 wrench to unscrew the fasteners (See Figure 4). Once the plate is removed, the curb-wheel can be set in 2 positions:

1. *Lower to the ground:* The flat side of the axle is positioned facing the ground and away from the machine.
2. *Higher from the ground:* The flat side of the axle is positioned facing the machine and away from the ground.

Once the desired height is set, place the bottom plate back and secure it with the M5 flat-head screws.

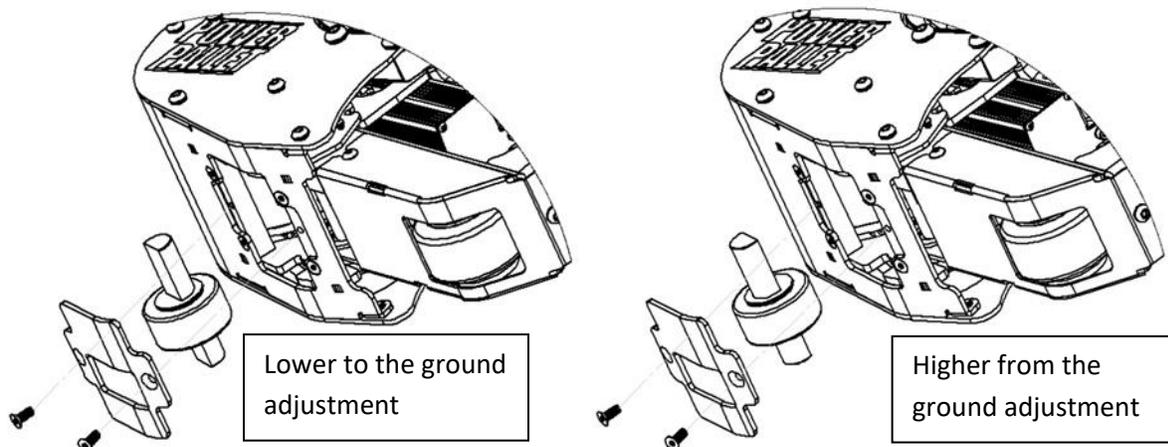


Figure 4: Curb-Wheel Height Adjustment

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## Operation

### Terms & Definitions

#### Forward Travel

If the truck is moving away from the operator when the operator is standing directly behind the handle of the pallet-jack and away from the forks, it is said to be traveling forward.

#### Backward Travel

If the truck is moving towards the operator when the operator is standing directly behind the handle of the pallet-jack and away from the forks, it is said to be traveling backward.

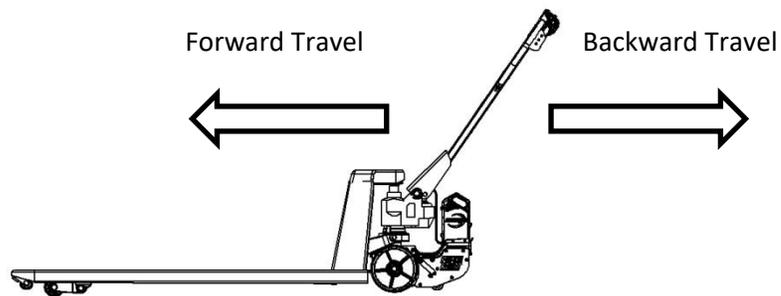


Figure 5: Forward and Backward Travel

#### Base Unit

The base unit consists of the chassis enclosing the motor, drive system and the controller board. It also has a horn for warning and feedback.

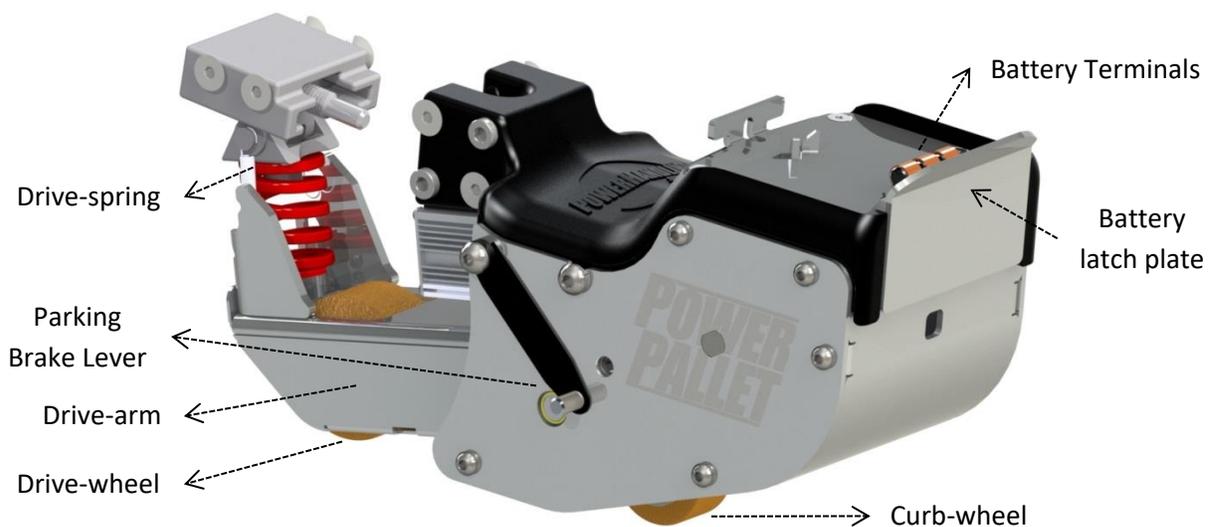


Figure 6: PowerPallet Base Unit

## User Controller

The User Controller allows the user to control and operate the PowerPallet.

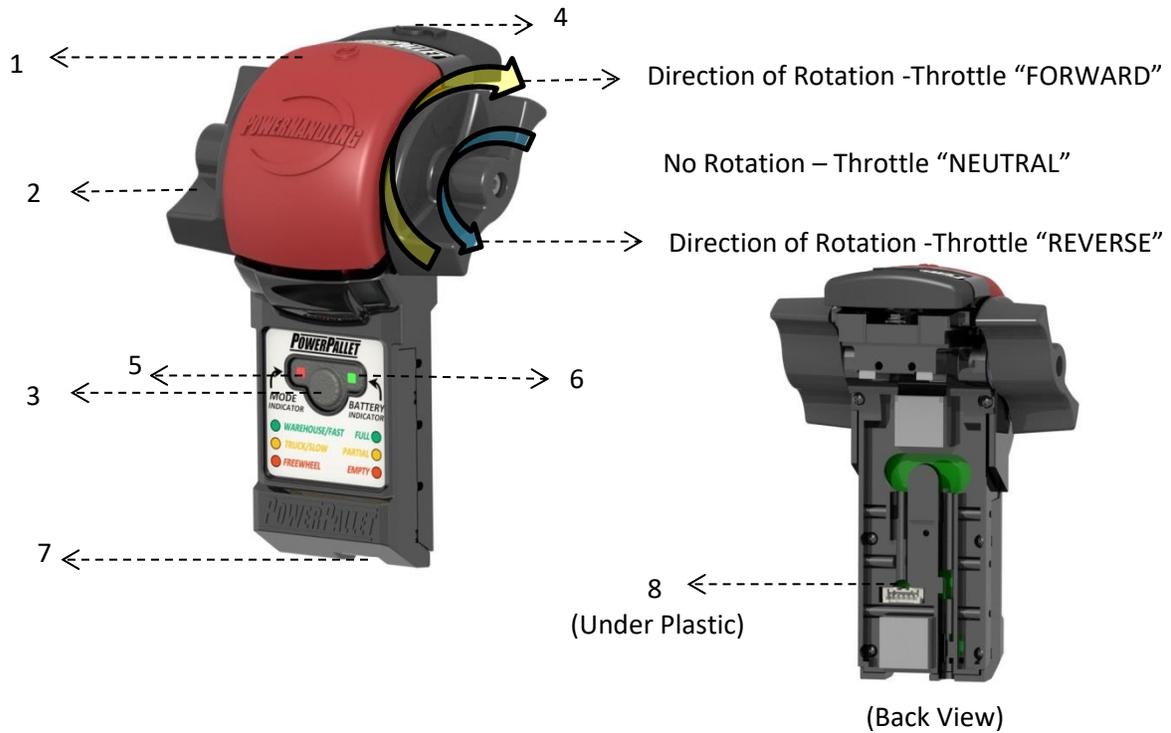


Figure 7: Parts of the User Controller

No.	Part	Use/Description
1	Belly-Button	<ul style="list-style-type: none"> <li>- Power up machine</li> <li>- Activate Belly-Stop</li> <li>- Initiate firmware upgrade of the machine</li> </ul>
2	Throttle	<ul style="list-style-type: none"> <li>- Drive the motor</li> <li>- Controlled descent on slope/hill</li> </ul>
3	Mode-Button	<ul style="list-style-type: none"> <li>- Switch mode of operation</li> <li>- Exit Belly-Stop</li> <li>- Power down machine when pressed along with Horn-Button</li> </ul>
4	Horn-Button	<ul style="list-style-type: none"> <li>- Beep Horn</li> <li>- Power down machine when pressed along with Mode-Button</li> </ul>
5	Left LED	<ul style="list-style-type: none"> <li>- Indicates mode of operation</li> </ul>
6	Right LED	<ul style="list-style-type: none"> <li>- Indicates battery level</li> <li>- Indicates high motor temperature &amp; if motor is overheated</li> </ul>
7	USB Port	<ul style="list-style-type: none"> <li>- Update firmware using a USB flash drive</li> <li>- USB Flash Drive Key (optional feature)</li> </ul>
8	GREEN Power LED	<ul style="list-style-type: none"> <li>- Indicates User Controller is powered</li> </ul>

## Li-Ion Battery Charging

The Li-Ion battery charger includes an external charger block that plugs into the battery cradle. To charge the battery simply plug the power cord into the charger block, plug the charger block into the charger base, plug the power cord into a mains circuit and set the battery on the charger base.

**The LED indicator light that shows the battery charge status is located on this external battery charger block.**

**There are no indicator lights on the Li-Ion charger base.**

Green LED indicates:

- Charger power connected or battery is fully charged.

Red LED indicates:

- Battery is charging.



## NiMH Battery Charging

The NiMH battery charger includes an integral control board in the charger base with LED indicator lights on the charger front panel that indicates the battery charge status.

Green LED indicates:

- Charger power connected or battery fully charged.

Red LED indicates:

- Battery charging.

Flashing Green LED indicates:

- Battery cells over temp (cool battery before recharging) or thermistor circuit error.

## Device Operation

This section will detail the following:

- Battery Installation and Removal
- Power Up/Power Down
- Operating Modes
- Battery and Motor Temperature Indication
- Belly-Stop Braking
- Transition between Use States
- Parking Brake
- Manual Jack Operation

## Battery Installation



**Step 1:** Align and insert centrally located steel tabs on the front of the battery into the slots on the battery base-plate.



**Step 2:** Make sure the tabs on the back plate securely capture the battery from the back.

Figure 8: Installing the Battery

## Battery Removal



**Step 1:** Pull battery latch plate backward.



**Step 2:** Tilt battery forward and slide it out from the slots on the battery base-plate

Figure 9: Removing the Battery

## Power Up & Power Down

State	Action	Description
Power Up	Press Belly-Button with the battery installed	<ul style="list-style-type: none"> <li>- Horn beeps once indicating the machine is awake</li> <li>- Left LED indicates Warehouse Mode (default mode of operation), and the Right LED indicates the battery level</li> </ul>
Power Down	<p>Any of these actions will power down the machine:</p> <ul style="list-style-type: none"> <li>• Press Mode-Button + Horn-Button together with the machine completely stopped</li> <li>• Leaving the machine idle for the timeout period</li> <li>• Removing the PowerPallet battery from the base unit</li> </ul>	<ul style="list-style-type: none"> <li>- Idle timeout period is 100 seconds when the USB Flash Drive Key feature is not used</li> <li>- Idle timeout period is 15 seconds when the USB Flash Drive Key feature is used</li> </ul>

## Operating Modes

The 3 modes of operation for the PowerPallet are described in table below. The Left LED indicates the current mode of operation.

Mode of Operation		Left LED	Driving	Braking
Warehouse/Fast	Press Mode-Button to change mode	GREEN	Tilt handle to speed control position, and then slowly rotate the throttle in the direction you wish the drive-wheel to rotate	<ul style="list-style-type: none"> <li>- Full braking applied when handle is upright. Optional brake when handle is horizontal</li> <li>- Braking is ON when the throttle is in neutral position</li> <li>- Variable braking<sup>1</sup> effective when throttle is rotated in the opposite direction of drive-wheel rotation</li> </ul>
Truck/Slow (1/4 <sup>th</sup> speed of Warehouse Mode)		YELLOW	With handle upright or tilted within the speed control positional limits, slowly rotate the throttle in the direction you wish the drive-wheel to rotate	<ul style="list-style-type: none"> <li>- Optional brake when handle is horizontal</li> <li>- Braking is ON when the throttle is in neutral position</li> <li>- Variable braking<sup>1</sup> effective when throttle is rotated in the opposite direction of drive-wheel rotation</li> </ul>
Freewheel/Manual		RED	<ul style="list-style-type: none"> <li>- Drive disabled</li> <li>- Allows operator to manually operate the pallet-jack</li> </ul>	<ul style="list-style-type: none"> <li>- Braking is OFF when throttle is in neutral position</li> <li>- Variable braking effective when throttle is rotated forward/backward</li> </ul>

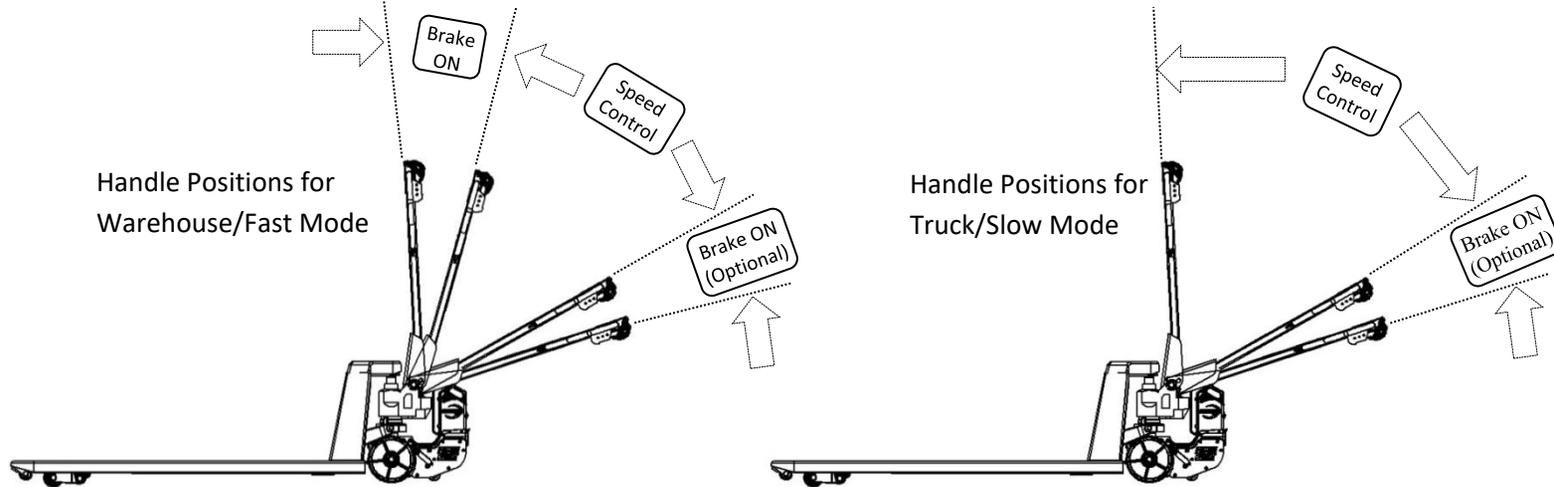


Figure 10: Handle Positions for Warehouse & Truck Modes

<sup>1</sup> Variable braking force is proportional to the relative degree of throttle rotation away from the neutral position.

## Battery & Motor Temperature Indication

The Right LED indicates battery level and motor temperature information.

Right LED	Indication	Description
Solid GREEN	Good battery	- > 70% battery remaining
Solid YELLOW	OK battery	- 40% - 70% battery remaining
Solid RED	Low battery	- 10% - 40% battery remaining
Flashing RED	Extremely low battery	- < 10% battery remaining - Replace or recharge battery immediately - Drive disabled
Flashing YELLOW	High motor temp.	- Machine performance limited to preserve motor
Flashing YELLOW (Horn beeps when driven)	Motor overheated	- Machine performance severely limited to preserve motor - Move truck to a safe area, and allow motor to cool-down

## Belly-Stop

Pressing or bumping against the Belly-Button while the truck is stationary or moving backward stops current operation, and drives the truck away a few feet from the operator as long as the Belly-Button is depressed.

If the truck is moving forward when the Belly-Button is pressed, current operation is stopped, and full braking is applied.

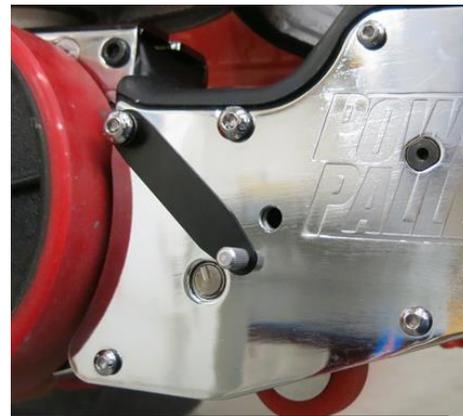
Belly-Stop Indication	Exit Belly-Stop
Left & Right LEDs flash RED with simultaneous horn beeping	Release Belly-Button, ensure throttle is in the neutral position and that the motor is stopped, and then press the Mode-Button

## Parking Brake

The parking brake is on the left side of the PowerPallet base unit. Figure 11 shows the 2 positions for the parking brake lever. When the parking brake is engaged, the PowerPallet motor is locked from spinning. Use the parking brake to avoid unwanted travel of the machine or whenever the machine is idle.



Parking Brake - Disengaged



Parking Brake - Engaged

Figure 11: Parking Brake: Engage & Disengage Positions

## Errors and Warnings

The PowerPallet indicates any errors or warnings using the Left and Right LEDs, and the horn. The table below lists the various indications and their corresponding descriptions.

Warning Indication	Warning	Description	Recommended Action
Left LED flashes GREEN in Warehouse Mode or YELLOW in Truck Mode	Attempting to override safety feature	Throttle input detected with steering handle upright or horizontal	See <a href="#">Handle Positions for Warehouse &amp; Truck Modes</a>
	Motor stalled for longer than 2 seconds	Insufficient throttle input	Increase throttle rotation
		Insufficient torque to move load	Reduce load on the pallet-jack
		Parking brake engaged	Disengage parking brake before attempting to drive
		Battery too low to move load	Replace battery with fully charged battery
Both LEDs flashing RED with no horn beeping	Belly-Stop active, Mode-Button pressed but throttle not in neutral position	Machine would continue to act as if Belly-Stop is active	To resume operation, return throttle to neutral position
Horn beeps continuously	Communication loss	Communication lost between the controller and throttle	Remove battery, wait for 15 seconds, and reconnect battery
Both LEDs flashing YELLOW on powering up	No USB Key (optional feature)	Machine will not operate without USB flash drive key installed	Power down, insert USB flash drive key, and power up machine
Both LEDs blink RED and YELLOW alternatively	No Application Firmware	Machine will not function without valid software	Update the device with the latest software (See <a href="#">Firmware Update</a> section)
Both LEDs blink RED and GREEN alternatively	Update Bootloader		
Horn beeps continuously	Downhill rolling	Machine rolling with no input from the throttle	<ul style="list-style-type: none"> <li>- If safe to do so, bring unit to a stop, lowering the load</li> <li>- Ensure if within operating parameter, if not, take machine out of service to get it fixed</li> </ul>

## Maintenance

The PowerPallet has been designed and built to be virtually maintenance free. The following instructions are recommended for achieving the best performance and increasing the life of the machine and battery.

### Machine Maintenance

1. Measure the diameter of the drive-wheel with urethane. Make sure the outer diameter of the urethane is greater than 55mm.
2. Check urethane thickness on the curb-wheel.
1. Lube the drive chain as needed for smooth operation. **If the machine is used in wet/humid environments, lube the chain more frequently to keep it lubricated and to prevent rust from forming.**  
*Recommended Lubricant: Dry Teflon Chain Lube, example: Du Pont Teflon Chain-Saver*
2. Check coiled throttle cable for any signs of wear or damage.



Perform any kind of maintenance with the battery removed from the machine.

### Rechargeable Battery Care

Rechargeable batteries require routine care. Read and follow the guidelines in this document to safely use PowerHandling rechargeable batteries and achieve the maximum battery life span.

#### Overview

Do not leave batteries unused for extended periods of time, either in the product or in storage. When a battery has been unused for 6 months check the charge status and charge or dispose of the battery as appropriate. The typical estimated life of a Lithium-Ion battery is about two to three years or 400 to 600 charge cycles, whichever occurs first. The typical estimated life of a NiMH battery is about one to two years or 300 to 400 charge cycles, whichever occurs first. One charge cycle is a period of use from fully charged, to fully discharged, and fully recharged again. All rechargeable batteries have a limited life and will gradually lose their capacity to hold a charge. This loss of capacity (aging) is irreversible. As the battery loses capacity, the length of time it will power the product (run time) decreases. Rechargeable batteries continue to slowly discharge (self-discharge) when not in use or while in storage. Routinely check the battery's charge status.

#### Battery Maintenance

Observe and note the run time that a new fully-charged battery provides for powering your product. Use this new battery run time as a basis to compare run times for older batteries. The run time of your battery will vary depending on the product's configuration and your specific application. Routinely check the battery's charge status. Carefully monitor batteries that are approaching the end of their estimated life.

Consider replacing the battery with a new one if you note either of the following conditions:

- The battery run time drops below about 80% of the original run time.

- The battery charge time increases significantly.

If a battery is stored or otherwise unused for an extended period, be sure to follow the storage instructions in this document.

### Storage (Li-Ion)

- Charge or discharge the battery to approximately 40%-50% of capacity before storage.
- Charge the battery to approximately 40%-50% of capacity at least once every six months.
- Remove the battery and store it separately from the product.
- Ideal battery storage temperature is between 5 °C and 20 °C (41 °F and 68 °F).

### Storage (NiMH)

- Charge battery before placing in storage. Recharge approx. every 3 months.
- Remove the battery and store it separately from the product.
- Ideal battery storage temperature is between 5 °C and 20 °C (41 °F and 68 °F).
- 2-3 charge/discharge cycles may be necessary to restore full capacity to the battery pack after prolonged storage.

NOTE. Batteries self-discharge during storage. Higher temperatures (above 20 °C or 68 °F) will reduce the battery storage life.

### Handling Precautions

- Do not disassemble, crush, or puncture a battery.
- Do not short the external contacts on a battery.
- Do not dispose of a battery in fire or water.
- Do not expose a battery to temperatures above 60 °C (140 °F).
- Avoid exposing the battery to excessive shock or vibration.
- Do not use a damaged battery.
- If a battery pack has leaking fluids, do not touch any fluids. Dispose of a leaking battery pack (see Disposal and Recycling in this document).
- In case of eye contact with fluid, do not rub eyes. Immediately flush eyes thoroughly with water for at least 15 minutes and seek medical attention.
- Remove the battery and store it separately from the product.

### Disposal and Recycling

- Rechargeable batteries are subject to disposal and recycling regulations that vary by country and region. Always check and follow your applicable regulations before disposing of any battery. Contact Rechargeable Battery Recycling Corporation ([www.rbrc.org](http://www.rbrc.org)) for U.S.A. and Canada, or your local battery recycling organization.
- Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles.
- Place only discharged batteries in a battery collection container. Use electrical tape or other approved covering over the battery connection points to prevent short circuits.

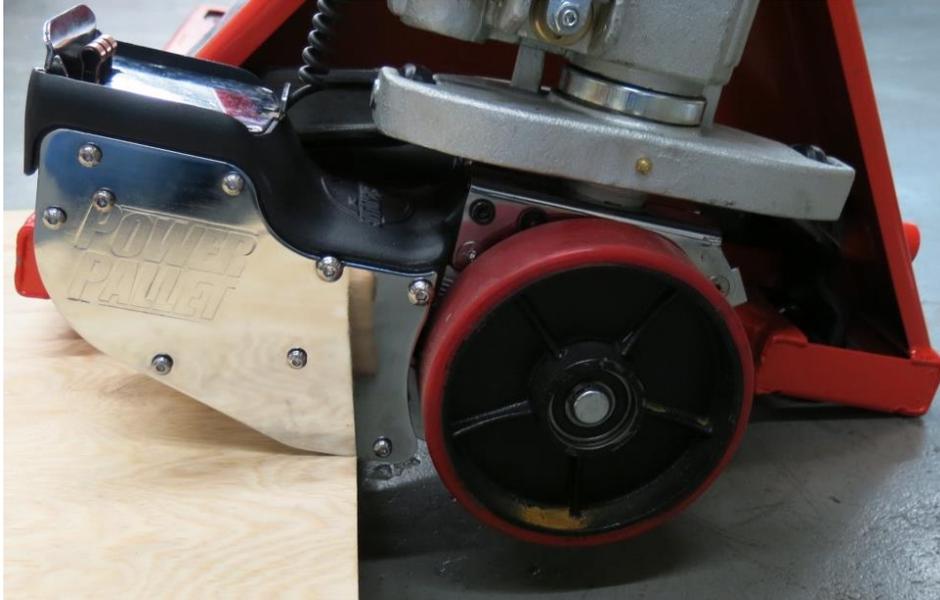
## Service

### Manual Jack Operation

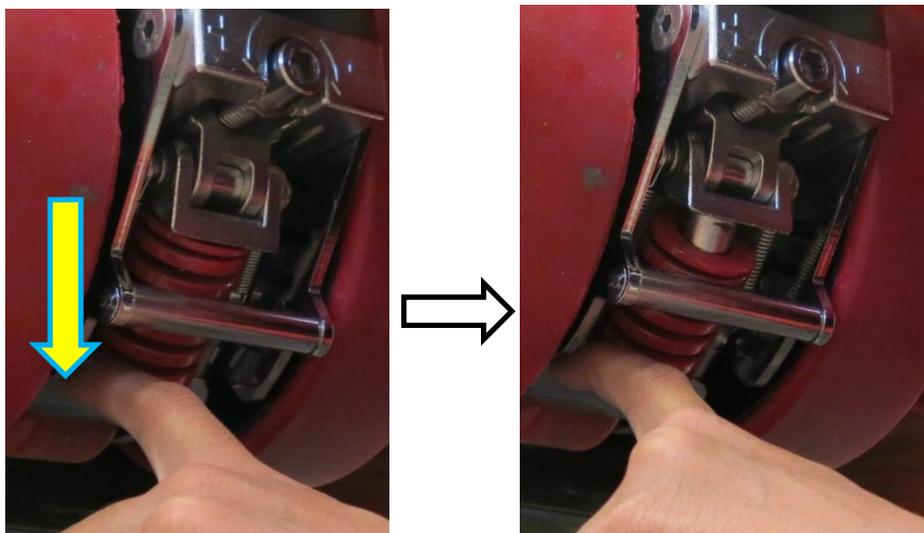
The pallet-jack can be easily switched to manual jack operation by simply removing the drive-spring on the screw-jack assembly.

### Drive-Spring Removal

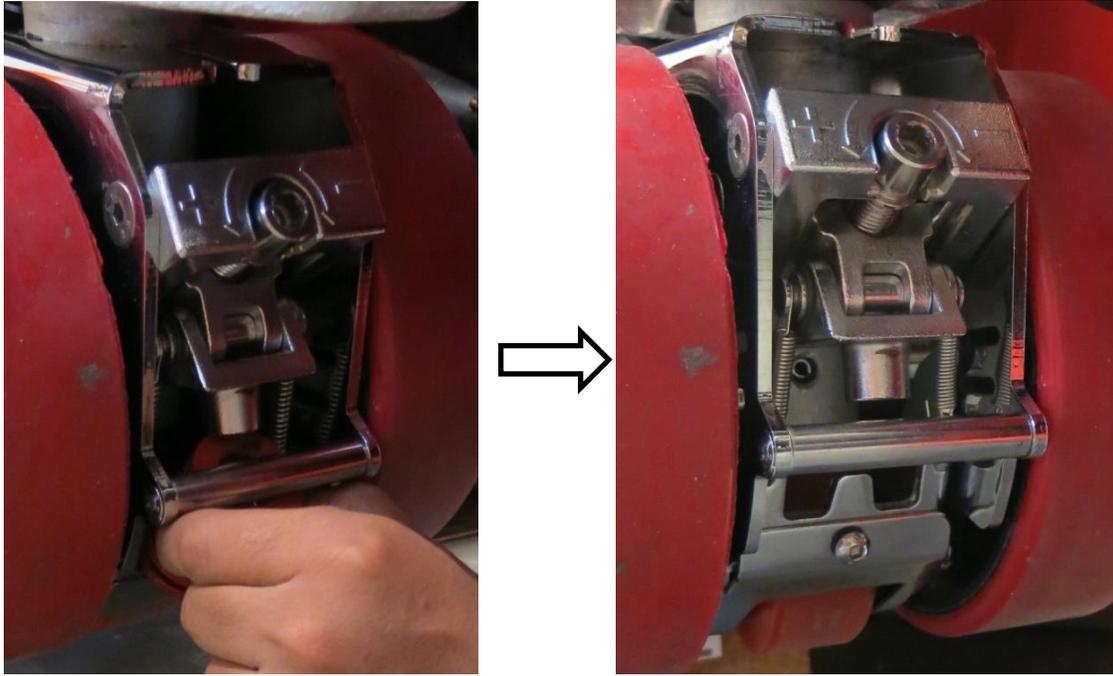
**STEP 1:** Mount one side of the pallet-jack and the base unit of the PowerPallet over a pallet. Make sure the drive-arm is not resting on the pallet, and the drive-wheel is off the ground.



**STEP 2:** Cut and remove the plastic cable-tie holding the spring in place and push down on the PowerPallet drive-arm until it has lowered far enough to clear the drive-spring from the tab holding it on place.



**STEP 3:** Pull the drive-spring out



### Drive-Spring Installation

To use the PowerPallet again, replace the drive-spring on the screw-jack assembly following the steps for removing the drive-spring in reverse order and reinstall a new plastic cable-tie.



Make sure the battery is not installed when installing/removing the drive-spring.

### Replacement Parts

Contact [Sales & Support](#) for replacement parts and procedure for replacement.

### USB Flash Drive Key (Optional Feature)

The PowerPallet can be programmed to be operated only when a USB flash drive key is detected on startup. Contact [Sales & Support](#) if you wish to use this feature.

## Firmware Update

The software on the device can be upgraded or reinstalled using a USB flash drive. The update file with the name "**PHPPRRR.BIN**" can be received by contacting [Sales & Support](#). Copy the update file on a 8GB or smaller USB 2.0 flash drive (formatted to a FAT32 file system), and follow the [Firmware & Settings Update Process](#).

## Acceleration, Brake and Handle Braking Settings Update

The motor acceleration and braking can be changed to achieve the best performance in various environments. The horizontal handle brake angle can also be set based on user preference. This is achieved by modifying a text file on a USB flash drive. The text file with the name "**pp\_key.txt**" can be received by contacting [Sales & Support](#). The text file will have instructions on how to alter these settings. Copy the text file on a 8GB or smaller USB 2.0 flash drive (formatted to a FAT32 file system), and follow the [Firmware & Settings Update Process](#).

*Note: If the USB Flash Drive Key feature is used, the Firmware & Settings Update Process can be skipped. Just change the text file "pp\_key.txt" on the flash drive to the desired settings and power up the PowerPallet with the flash drive plugged in.*

## Firmware & Settings Update Process

1. Make sure the PowerPallet is powered down.
2. Insert the USB flash drive containing the file ("**PHPPRRR.BIN**" for Firmware Update, "**pp\_key.txt**" for Acceleration and Brake Settings Update) into the USB programming port on the PowerPallet User Controller.
3. Press and hold down the Belly-Button for longer than 3 seconds until the Left and Right LEDs light up YELLOW. Release the Belly-Button once the LEDs light up YELLOW.
4. The Left and Right LEDs will fade from bright YELLOW to dim YELLOW indicating the update process.
5. If the upgrade is successful, the LEDs will blink GREEN 3 times, and the machine will power down. Power up the machine to begin operation with the updated firmware.
6. If the upgrade was unsuccessful, the LEDs will blink RED 3 times, and the machine will power down.

*Note: If update process fails, the machine will operate with the existing firmware and settings.*

## Troubleshooting

If the PowerPallet does not perform as expected, see table below to troubleshoot the problem.

Problem	Diagnosis	Possible Solution
For any problem, first check <a href="#">Errors and Warnings</a>	Does problem match any of the warnings?	Follow corresponding recommended action
Motor turns but does not drive the pallet-jack	Is the drive-wheel off the ground?	<a href="#">Adjust the screw-jack</a> to lower the drive-wheel
	Is the drive-wheel slipping on the ground while the pallet-jack wheels are in contact with the ground?	
	Is the drive-spring improperly mounted or missing?	<a href="#">Install drive-spring</a> correctly
Problem not listed or not fixed	Check <a href="#">Maintenance &amp; Service</a> sections	-
	Make a note of the problem, environment and the situation leading up to its occurrence	Remove battery, wait for 15 seconds, and reconnect battery
	Problem persists after restarting	Contact <a href="#">Sales &amp; Support</a>

## Warranty & Guarantee (Machines & Parts / Materials & Labor)

### Overview & Conditions:

PowerHandling Incorporated hereby warrants and guarantees all of its material handling machines and parts will be free from defects in materials and workmanship.

This Warranty is conditional upon:

- The unit being used in a normal and responsible manner and for the purpose for which it was intended - consistent with the application details provided to PowerHandling.
- The unit is being used in accordance with PowerHandling's recommended operation and maintenance instructions as outlined in the documentation provided with the machine.
- The unit having all replacement parts provided by PowerHandling. The use of non-original PowerHandling replacement parts voids all warranties.
- All afore-mentioned parts being correctly installed, either by PowerHandling, an authorized reseller or by the customer (per the instructions or directions provided by PowerHandling).

### Warranty Periods

- RVB Series is warranted for a period of twenty four (24) months from the date the user receives the unit(s) from PowerHandling.
- PowerPallet, PowerCart H-Series, PowerCart L-Series, PowerMover G-Series, RGB-Series, A-Series are warranted for a period of twelve (12) months from the date the user receives the unit(s) from PowerHandling.
- NiMH battery packs are warranted for a period of three (3) months from purchase. If battery life is less than 12 months, please review your application and charging procedures with PowerHandling to ensure they are consistent with maximizing their service life.
- Lithium Battery Packs are warranted for a period of twelve (12) months from purchase. If battery life is less than 24 months, please review your application and charging procedures with PowerHandling to ensure they are consistent with maximizing their service life.

Any and all defects either due to improper use, negligent maintenance, or as a result of normal wear and tear are not covered by this guarantee. Hence the following are excluded:

#### Exceptions - Use/Misuse Related:

- Air motor damage due to air that is not clean (unfiltered) or not dry (no inline water trap fitted).
- Brushed electric motor damage caused by over-use (too high a duty cycle for the PowerRoll).
- Brushed electric motor damage caused by non-timely brush replacement and/or improper or incomplete brush maintenance.

#### Exceptions - Long Term Consumables:

- Vanes / vane kits (for air machines) and brushes / brush kits (for battery machines).
- Brushed electric motors are a long-term consumable and will typically need to be replaced after 5-10 brush replacements, depending on the condition of the commutator bars.
- Battery packs are long-term consumables and will need to be replaced periodically. Life depends on many factors including cycling rate, charging practices, and operating/storage temperatures. Misuse or failing to follow best practices can reduce battery life.
- Muffler materials, connectors and other miscellaneous hardware (for air machines).

### Terms & Conditions

All parts supplied under warranty will be provided at no charge to the customer FOB, Post Falls, ID, once the failed parts have been received back at PowerHandling. If the warranty parts are provided in advance of the failed items being returned, they will be invoiced as a normal parts sale and then a credit note will be applied when the failed parts are received by PowerHandling. If the warranted parts are available from another PowerHandling location closer to the customer, the parts may be supplied from that location if available.

In the event of a claim being made under the terms of this Warranty which requires the unit to be returned to PowerHandling, the customer must first obtain a Return Material Authorization (RMA) from their sales contact. All freight and related duties and other costs are to customer's account. All parts and labor costs incurred for the repair and / or replacement of warranted parts will be provided at no charge to the customer.

PowerHandling and its distributors, agents, and resellers assume no other responsibility beyond the scope of this Warranty. The repair or replacement of the said unit constitutes the limit of PowerHandling's liability to the customer and PowerHandling specifically disclaims and excludes rescission as a remedy, or the payment of compensatory or consequential damages, attorney's fees or costs of litigation.

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