PowerMate®
StairClimbing HandTrucks

# OPERATING MANUAL



## ALUMINUM L-SERIES




L-1




L-2

S02-051.01

T20-010.09

For Serial Numbers 36000 and higher.

PN 011900 Rev. E1
PN 310570 Rev. E1
Eng. 08/ 14/ 14

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# WARNING

**Failure to obey the Instructions and Safety rules in this manual could result in death or serious injury.**

**Read the Operating Manual completely.**
**Only competent, trained operators may use this equipment.**
**Training is essential to understanding all the features and capabilities of your PowerMate, and ensure good safe work practices.**

Training courses are available through
L P INTERNATIONAL INC., please call
1-800-697-6283



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# ***PowerMate*® MODEL L-SERIES**

The ***PowerMate*®** L-Series Models are motorized electric hand trucks used for the safe movement of heavy and awkward loads. It can move loads up and down stairs, on and off of vehicles or loading docks and across flat surfaces.

The design takes advantage of the principle of leverage. All of the lifting of the load is performed by the equipment.

The ***PowerMate*®** L-Series units are designed specifically to move loads with various center of gravity locations. Refer to the Load Recommendation Chart for capacities.

## DELIVERY AND WARRANTY REGISTRATION

When your ***PowerMate*®** Motorized Stairclimber is delivered, unpack and inspect the unit for damage or shortage of parts. If required, make note of any deficiencies on the Delivery Acceptance Form. Registering your unit for the Warranty can be done online at www.powermate.info. Click on Service, fill in the required fields under Warranty and click Send Now.

**Standard Equipment**

One Strapbar
Battery Charger

**Optional Equipment**

Wheel Brakes
Step Extension
Cylinder Attachment
Hot Water Tank Attachment
Extended Depth or Width Toe Plate
Refer to the accessory page for details.

**⚠ WARNING** The use of this equipment with any options other than those specified in this manual may create a hazard.

**Manufactured By:**

L P INTERNATIONAL INC.
P.O. Box 696, 151 Savannah Oaks Drive
Brantford, Ontario, Canada N3T 5P9
TEL: (519) 759-3292 FAX: (519) 759-3298
**1-800-697-6283**



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# OPERATOR TRAINING

The ***PowerMate®*** L-Series Model has been tested and inspected by both the manufacturer and the distributor to ensure the quality of manufacture and operation. The equipment is delivered by the distributor, fully assembled and ready for use.

The ***PowerMate®*** L-Series Model is unique in its operation and is used to move heavy and awkward loads. For these reasons, classroom and hands-on training in safe and efficient operating procedures for all operators is absolutely necessary.

During the training, the operator should

## LEARN HOW TO DO THE FOLLOWING:

**General** Use the Load Recommendation Instructions
Follow the General Safety Rules

**Strapbars** Adjust the location of the strapbars.
Adjust, tighten and release the straps.
Stow loose strapping when not in use.

**Flat Surface** Raise the wheels to incline the load back.
Reposition the load in balance over the wheels.
Move over obstacles on the floor.
Bring the load back to an upright position.

**Stairclimbing** Position the wheels and heelplate on a stair.
Climb up and down stairs.
Rest safely in a balanced position on stairs.
Pivot on tight landings.

**Lifting** Load and unload onto vehicles or loading docks.
Load and unload small vans.

**Two Operators** Work as a team with another operator.

# HAZARD GRAPHICAL SYMBOLS

The ***PowerMate*®** products use graphical symbols, safety colours, and signal words throughout the Operators Manual and on the units themselves. Operators using the ***PowerMate*®** must familiarize themselves with these symbols.



**Safety Alert Symbol:** This symbol indicates a potential personal injury hazard. Safety information following this symbol must be followed to avoid possible injury or death.




**DANGER:** Indicates an *imminently* hazardous situation which, if not avoided, will result in death or serious injury.




**WARNING:** Indicates a *potentially* hazardous situation which, if not avoided, could result in death or serious injury.




**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.




**NOTICE:** The signal word to address practices not related to personal injury.

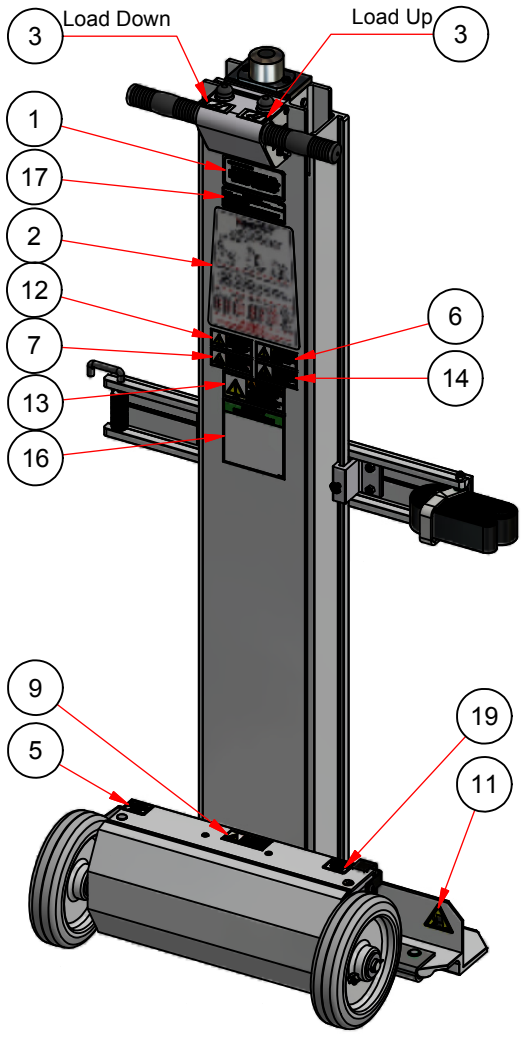
## SAFETY LABEL MAINTENANCE

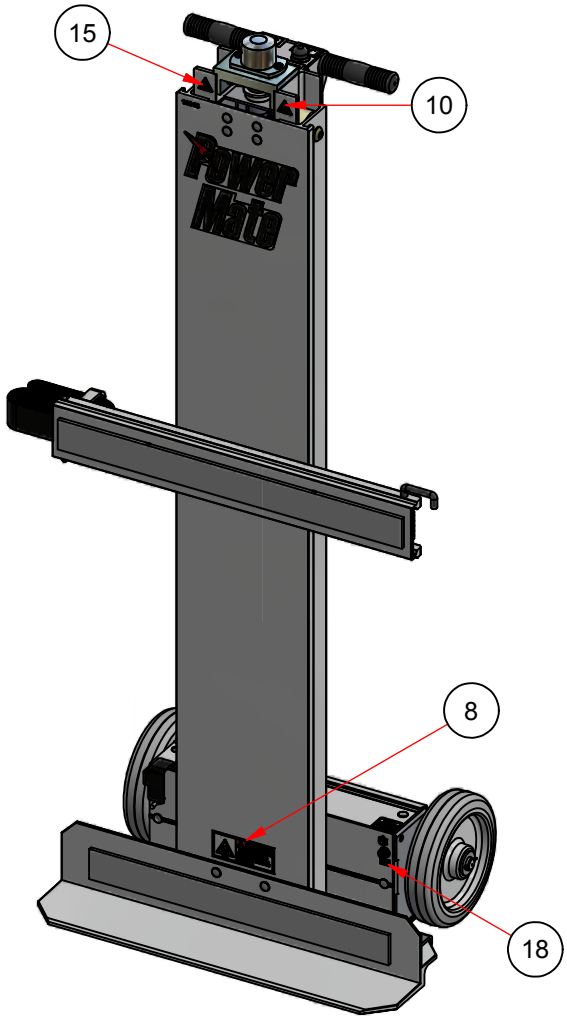
Safety of the operator and surrounding environment must be considered at all times. To that end, safety labelling on the ***PowerMate*®** must be maintained to provide legible safety information. Clean the labels with soap and water. Do not use solvent-based cleaners because they may damage the labels. Replace damaged or missing labels. Replacement labels may be purchased from L P International Inc. Customer Service Phone number 1-800-697-Mate.

# MANDATORY SAFETY LABEL PLACEMENT
## Standard L-1/L-2 *PowerMate®* Units

NOTE: Model L-1 shown.

| PARTS LIST | | | |
|---|---|---|---|
| ITEM | QTY | PART No. | DESCRIPTION |
| 1 | 1 | 055840C | DECAL LS DISTRIBUTED BY LP |
| 2 | 1 | 055870/80 | DECAL LS MAINTENANCE L-1/L-2 |
| 3 | 1 | 055830A | DECAL LS LOAD DOWN/UP |
| 4 | 1 | 055850A | DECAL LS ON/OFF |
| 5 | 1 | 055820C | DECAL LS CHARGER PLUG |
| 6 | 1 | 057010A | CAUTION DECAL - AUTHORIZED PERSONNEL |
| 7 | 1 | 057040A | DANGER DECAL - EXPLOSIVE ENVIRONMENT |
| 8 | 1 | 057020A | DANGER DECAL - CRUSH HAZARD FOOT |
| 9 | 1 | 057030A | DANGER DECAL - ELECTRICAL SHOCK |
| 10 | 1 | 057100A | WARNING DECAL - ROTATING SHAFT PICTOGRAM |
| 11 | 2 | 057140A | WARNING DECAL - CRUSH HAZARD FOOT PICTOGRAM |
| 12 | 1 | 057050A | WARNING DECAL - KEEP OFF |
| 13 | 1 | 057090A | WARNING DECAL - PINCH POINT HAZARD |
| 14 | 1 | 057120A | WARNING DECAL- ROTATING SHAFT/HAIR Small |
| 15 | 1 | 057130A | WARNING DECAL - ROTATING SHAFT/HAIR PICTOGRAM |
| 16 | 1 | 057190A | DECAL - SAFETY INSTRUCTION LS |
| 17 | 1 | 057160A | DECAL - FAULT ALERTS |
| 18 | 1 | 057170A | DECAL - FUSE 10 AMPS |
| 19 | 1 | 057150A | DECAL - CIRCUIT BREAKER PRESS OFF |



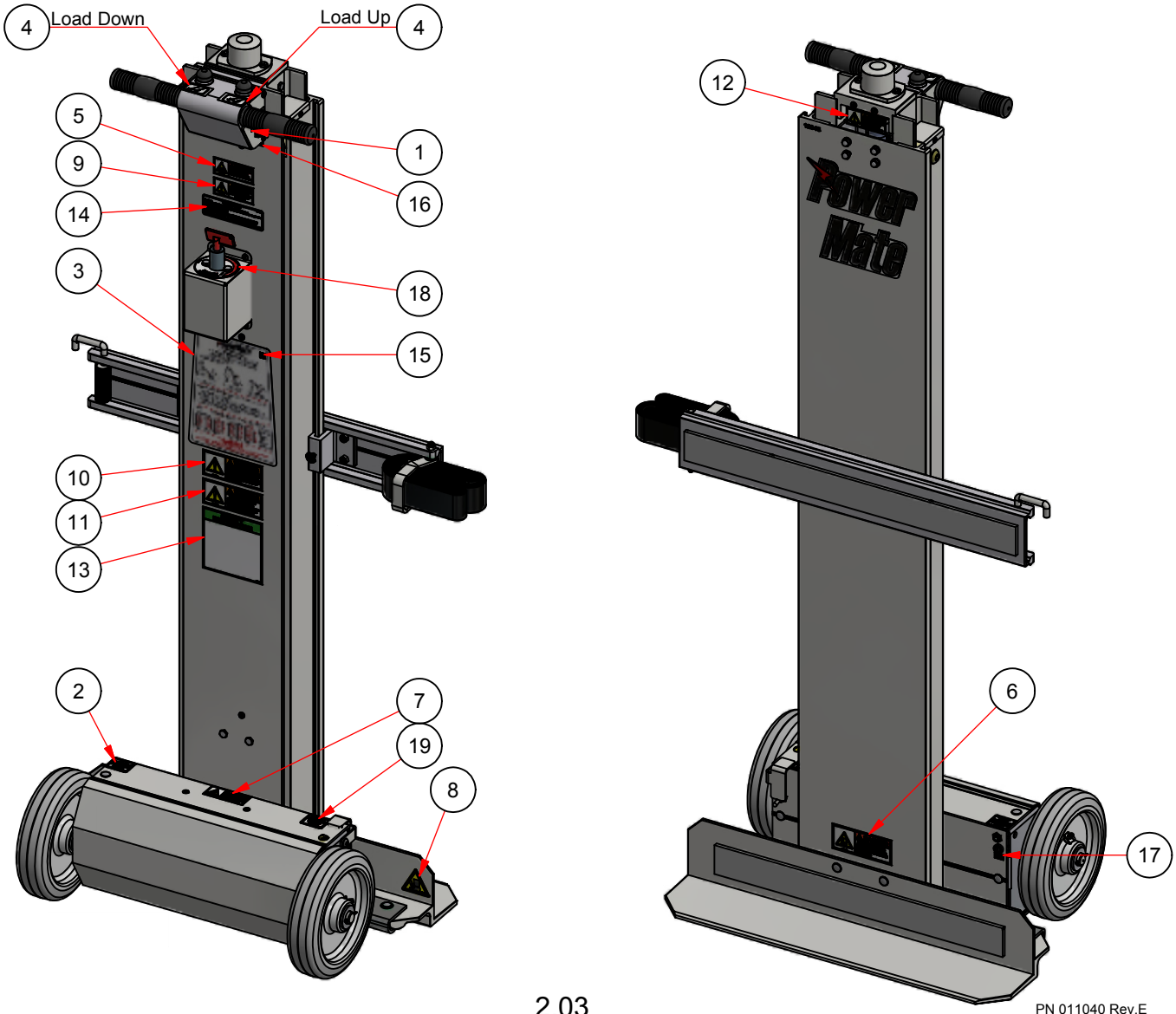



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# MANDATORY SAFETY DECAL PLACEMENT For L-1/L-2 *PowerMate®* Units With Battery Switch

NOTE: Model L-1 shown.

| PARTS LIST | | | |
|---|---|---|---|
| ITEM | QTY | PART No. | DESCRIPTION |
| 1 | 1 | 055850A | DECAL LS ON/OFF |
| 2 | 1 | 055820C | DECAL LS CHARGER PLUG |
| 3 | 1 | 055870/80 | DECAL LS MAINTENANCE L-1/L-2 |
| 4 | 1 | 055830A | DECAL LS LOAD DOWN/UP |
| 5 | 1 | 057040A | DANGER DECAL - EXPLOSIVE ENVIRONMENT |
| 6 | 1 | 057020A | DANGER DECAL - CRUSH HAZARD FOOT |
| 7 | 1 | 057030A | DANGER DECAL - ELECTRICAL SHOCK |
| 8 | 2 | 057140A | WARNING DECAL - CRUSH HAZARD FOOT PICTO |
| 9 | 1 | 057050A | WARNING DECAL - KEEP OFF |
| 10 | 1 | 057060A | WARNING DECAL - MOVING PARTS Large |
| 11 | 1 | 057090A | WARNING DECAL - PINCH POINT HAZARD |
| 12 | 1 | 057070A | WARNING DECAL - SCREW GUARD |
| 13 | 1 | 057190A | DECAL - SAFETY INSTRUCTION LS |
| 14 | 1 | 057160A | DECAL - FAULT ALERTS |
| 15 | 1 | 055860A | DECAL - CE MARK APPROVAL |
| 16 | 1 | 057210A | DECAL - DATE OF MANUFACTURE |
| 17 | 1 | 057170A | DECAL - FUSE 10 AMPS |
| 18 | 1 | 057180A | DECAL - ROTARY SWITCH |
| 19 | 1 | 057150A | DECAL - CIRCUIT BREAKER PRESS OFF |






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# SAFETY PRECAUTIONS

## READ THE MANUAL (Mandatory)



**Read** all safety and operating instructions before anyone operates your PowerMate® Unit. Use the PowerMate® unit only as described in this manual.

**Retain** all safety and operating instructions for future reference. Ensure they are readily available.

**Heed** all warnings in the safety and operating instructions.

**Follow** all installation, operation, service, and safety instructions.

**Operator** must have received approved training on the PowerMate® unit to be used. Training shall include theory, practice, and testing.

**Never** allow unqualified or un-authorized personnel to operate the equipment.

**Operator** must be familiar with normal operating practices and procedures. Whenever there is and doubt as to safety, the operator should stop the operation and not proceed until safe conditions are restored.

**Operator** is responsible for maintaining proficiency on PowerMate® equipment. Familiarity with instructions, safety procedures, maintenance practices, controls, operation, loading, are required at all times.



**WARNING**: Only trained personnel shall operate PowerMate® equipment. Failure to comply may result in possible severe injury to the operator and/or others, and damage and/or loss of property.

**Wear** safety shoes. Keep hair, loose clothing, fingers and all parts of the body away from pinch points and moving/rotating parts. Use equipment handles and controls for manoeuvring and operation.

**Operator** must have good hearing and vision (with or without correction) and must have good depth perception.

**Operator** must not be afflicted with any health condition(s) that might cause loss of control or ability.

**Do not** operate the equipment when using alcohol or taking medication that will affect your physical performance or judgement.

**Do not** eat or drink during the operation of PowerMate® equipment.

**S**tay alert when operating PowerMate® equipment.

**No horseplay** or practical jokes when operating the equipment.

**Do not** lift people and never ride on the PowerMate® Unit.

**Do not** abuse the equipment. Use PowerMate® equipment only for their intended use.



## SAFETY INSPECTION

**WARNING: Do not use** PowerMate® equipment if it is damaged. Check for corrosion. Failure to do so may result in catastrophic failure, which may lead to injury, damage or loss of property, and loss of life.

**Inspect** the PowerMate® unit (see maintenance section) prior to using to ensure the operation can be safely completed. Insure all components of the unit are secure and functioning.

**Do not use** accessories or attachments not recommended by the manufacturer, as this may increase risk of damage and cause hazards.

**Use** only PowerMate® accessories best suited for the application ie: Strapbar Attachment for box type loads, Cylinder attachment for cylindrical loads, etc.

**Insure** that the PowerMate® unit is charged and ready for the operation.



## ENVIRONMENT SAFETY

**CAUTION**: Barriers, warning signs, designated walkways or other safeguards must be provided where pedestrians are exposed to the risk of collision.

**Plan** your work. Make a plan of action from picking up the load to the point where the load is delivered. Check for doorway size, pathway surfaces, ceiling heights, tight corners, stair step size and integrity, turn radius considerations, etc.. Always use the recommended number of operators for a load.

**Check** the work site. Inspect the area to be traversed with the PowerMate® unit. Avoid debris, rough surfaces, pot holes, bumps, steep grades, etc. Avoid spills of any kind, slippery surfaces, soft ground, and standing water. Observe any condition that may cause loss of control of the PowerMate® unit leading to injury and/or property damage.

**Ensure** planned route for PowerMate® operation is clear of obstacles and uninvolved personnel. When visibility is obstructed use spotter person for direction instruction and/or clear path of obstacles and un-involved personnel.

**Do Not Place** the PowerMate® Unit on an unstable surface. Supporting surface must be capable of carrying the loaded PowerMate® Unit with Operator(s). Check the condition of stairs and the edges of loading docks and vehicle beds. When moving on or off a vehicle, be prepared for movement in the vehicle suspension system.

**Do not use** PowerMate® equipment in an enclosed space where oxygen, flammable, explosive or toxic vapours are present and/or are given off by oil base paint, paint thinner, some mothproofing substances, or in an area where flammable dust is present.



## LOADING SAFETY

**CAUTION: Never** lift a load that is over the rated capacity of the PowerMate® unit. Estimate the weight and center of gravity position of the load and refer to the unit Load Capacity Chart to ensure the load is within the loading envelope. The capacity may be limited by the weight and strength of the operator(s). Do not operate with a load that is beyond the operator's physical ability.

**Do not** attempt to increase the load capacity of the equipment by the use of chains, rope, or other means of securing the equipment to the bed or bodies of vehicles, handrails, wall brackets, etc..

**Operators** shall determine the balance of unfamiliar loads prior moving the load. Work performed in a balanced condition is done easier and safer. New operators should gain practice experience with lighter loads of approximately 250 lbs. with a medium center of gravity before progressing to heavier loads. Do not raise or lower the load too far past the balance point. Jog the equipment control switches so as not to transfer the load weight too quickly. Training is mandatory!

**Ensure** the load is not damaged, properly packaged, no loose items such as tools used in packaging the load and sharp items (such as nails) projecting from the load.

**Protect** the PowerMate® strapping material from sharp edges to prevent strap failure. Always inspect straps prior to use. Insure the strapping latching mechanism is fully engaged.

**Verify** load secureness at the beginning of use, and prior to climbing or descending with the load. Check for any loose items or load shifting.

**Never** unstrap a load with the PowerMate® unit in an open (extended) condition. The unit will fall over backwards if the wheels are not in contact with a stable surface when the unit is unloaded.

**Do not** load the PowerMate® unit with a load center of gravity that is outside the side to side limits of the unit wheels.



## SAFETY IN MOTION

**CAUTION: When** transiting a surface, avoid high speed turns that may cause the load and PowerMate® unit to tip. Remember that the load must be secure to the PowerMate® unit to ensure the load cannot shift.

**When** transiting the unit without a load, ensure the load strapping devices are secure, not dangling, to prevent a trip hazard and prevent entanglement in the PowerMate® moving parts.

**Always** keep your attention in the direction you are moving, monitoring clearances above, below, and each side of the PowerMate® and load. When visibility is obstructed use spotter person for directional instruction and/or clear path of obstacles and un-involved personnel.



## SAFETY IN MOTION continued

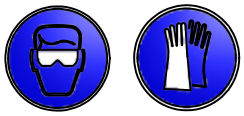
**Stay alert.** Should something break, loosen, or malfunction, on your machine, stop work and seek qualified assistance to correct the condition. When going down a ramp or incline, always walk ahead of the machine and use the open/close controls to engage the rubber guard (foot) with the ground to act as a brake. Do not allow the loaded PowerMate® to attain an un-controllable speed. When moving a PowerMate® unit down a stair without a load, always push the wheels off the step before lowering the wheels to the next step.

**Do not** compress the top urethane bumper when the machine is under load.

## BATTERY SAFETY



Lead-acid batteries contain hydrogen-oxygen gases that can be explosive and sulphuric acid that can cause severe burns. To help avoid risk of danger and injury, observe these precautions when handling or working with a lead-acid battery.



**Wear** ANSI approved safety glasses or goggles and a face shield. **Wear** proper clothing to protect hands, and body. Wear appropriate rubber gloves and apron.



**Never** lean over a battery when testing or charging. Cigarettes, flames or sparks, could cause a battery to explode. Keep all ignition sources away from battery. **Do not** strike the sides of a battery with any spark producing item. Make sure work area is well-ventilated.

**Never** touch both battery terminals with bare hands at the same time. **Remove** rings, watches and dangling jewelry when working with batteries. The metal in the jewelry can cause a shock and burns if contacted with the battery terminals.

**Only** use insulated/non-conducting tools when making connections on a battery. Never lay tools or other parts on top of a battery.



Because the batteries used in L P International products are of the sealed type, the battery should be replaced if there is evidence of spillage. If there is spilled sulphuric acid present, neutralize with baking soda. **Never** remove vent caps on a sealed battery. In the event of an accident, flush with water and call a physician immediately. If venting gas is significantly inhaled, seek immediate medical attention.

**Never** store batteries with explosives, flammable materials, chemicals, or food.

**Protect** batteries from crushing, punctures and shorting.

**Do not** charge or use booster cables or adjust battery connections without proper instructions and training.

**Keep** batteries out of reach of children.

**Do not** accumulate used batteries. Dispose used batteries in accordance with local environmental laws.

# CHARGING SAFETY INSTRUCTIONS

## Battery Charger



Before using the battery charger, read all instructions and cautionary markings on the battery charger, battery, and product using the battery.

DANGER: Electrical equipment may be hazardous if misused. Operation of this product, and the device it is used on, must always be done with complete knowledge of the product instructions and safety information. Failure to do so may cause serious injury.



DANGER: RISK OF ELECTRICAL SHOCK, BURNS, OR FIRE -The battery charger must be used as supplied. Do not use charger units if the input or output cord is cut or frayed, or damaged in any way. Never replace, splice, or repair cables or connectors supplied with the charger. Do not use the charger if case is damaged in any way. Do not open the charger case for any reason. There are no user serviceable parts. Always be sure that the charger is disconnected from the power source and battery being charged before handling.

NOTICE Your AC cord came equipped with a three-wire grounding plug (a plug that has a third grounding pin). This plug will only fit only a grounded AC outlet. If you are unable to insert the plug into an outlet because the outlet is not grounded contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug. Pay particular attention to convenience of receptacles.

If an extension cord is necessary, use a cord with a current rating at least equal to that of the charger. Cords rated for less amperage than the charger may overheat. Ensure the pins of the extension cord plug are the same number, size, shape, as those on the charger. Ensure the extension cord is wired properly and in good condition.



**CAUTION:** Position the charger and charger cords so that it is not tripped over, pulled, or placed in contact with heated surfaces. Route charger cords so that they are not likely to be walked on or pinched by items placed upon or against them. Protect the charger from dampness or wet weather, such as rain, snow, and so on. Keep charger away from sources of liquids, such as drinks, washbasins, bathtubs, shower stalls, solvents, flowing water, and so on. Do not allow the charger, or any of its cords and connectors lie in standing water such as a puddle.

**CAUTION**: Charge only properly maintained and rechargeable lead acid batteries of the same voltage rating that is printed on the charger. Other battery types or voltages, damaged batteries, or improperly maintained batteries may burst or emit dangerous gases.

**CAUTION**: Only use the supplied charger on PowerMate® products. The charger units supplied by L P International are internally protected against battery polarity reversal and overload. This limits potential damage to the charger. However, the charger does not protect against shorting or overload of external wiring or of the battery being charged. Integrity of the PowerMate® unit wiring should be monitored during routine inspections.

## CHARGING SAFETY INSTRUCTIONS continued

**CAUTION**: Do not operate the PowerMate® unit while connected to the charger.

**Do not** overload wall outlets or extension cords, as this can result in a risk of fire or electrical shock.

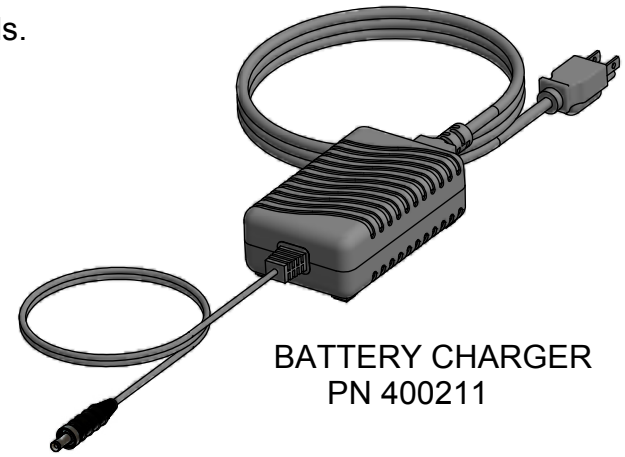
**Do not** operate charger if it has received a sharp blow, been dropped, or otherwise damaged in anyway.

To reduce risk of electrical shock, unplug the charger from the outlet before attempting maintenance or cleaning.

Disconnect the power plug by pulling the plug, not the cord.

**Do not** handle the plug with wet hands.

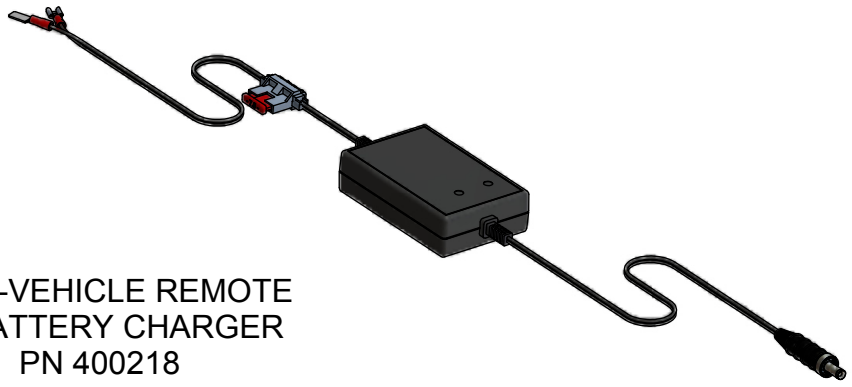
Unplug the charger when not in use.



BATTERY CHARGER
PN 400211

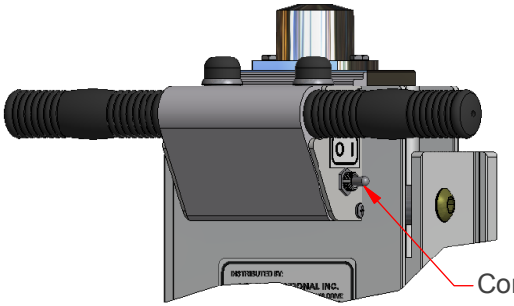
### 12V IN-VEHICLE CHARGER

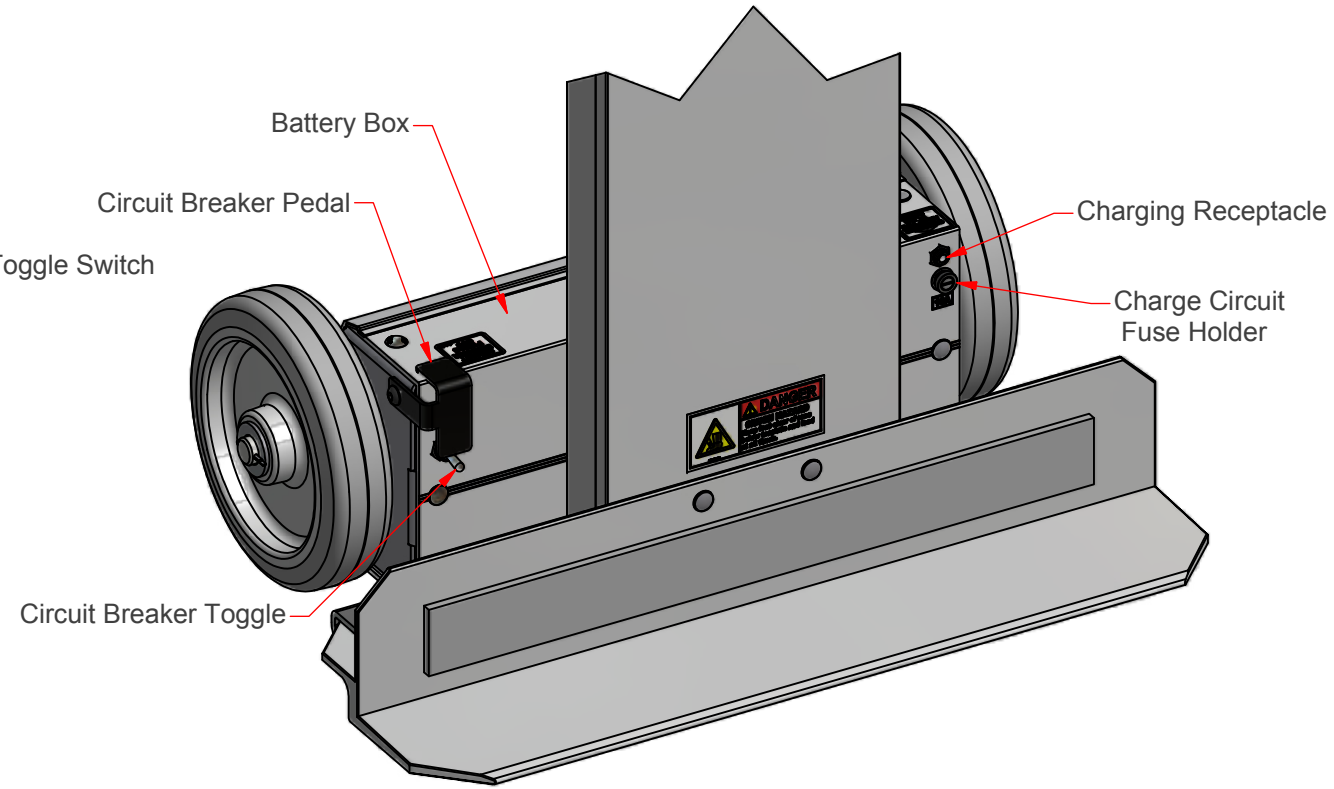
**WARNING:** The In-vehicle charger cannot protect against vehicle damage caused by faults in the wiring from the vehicle battery to the charger or faults in any other portion of the vehicle wiring harness. The user must ensure that the wiring to the charger adheres to the same vehicle wiring standards and safety precautions required for all vehicle wiring.

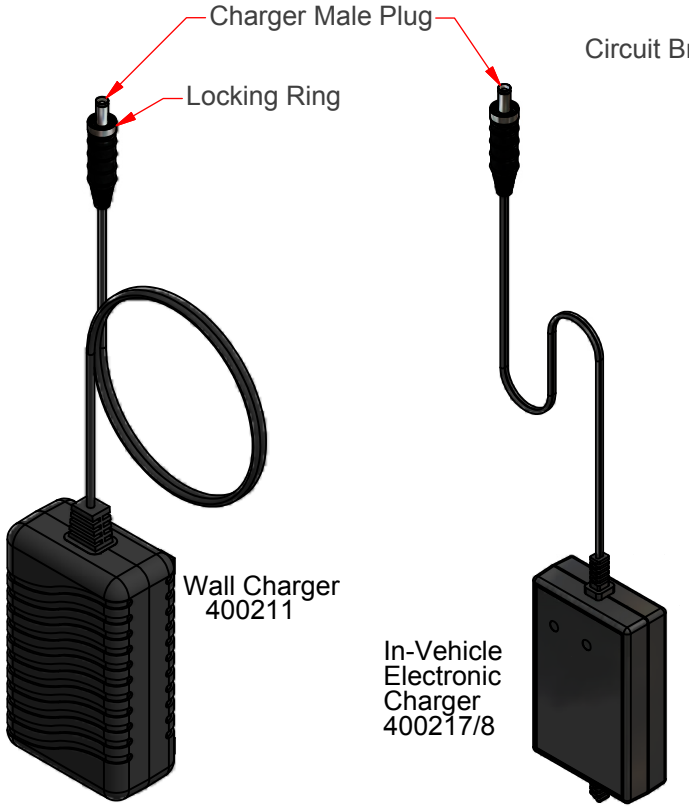


IN-VEHICLE REMOTE
BATTERY CHARGER
PN 400218

# L-SERIES POWERMATE CHARGING INSTRUCTION




**INSTRUCTION:**

1. Provide electrical power to the Battery Charger being used.
2. De-activate the PowerMate by depressing the Circuit Breaker Pedal located on top of the Battery Box, moving the Circuit Breaker Toggle to the down (off) position. Move the Control Toggle Switch to the "O"(Off) position.
3. Insert the Charger Male Plug into the Charging Receptacle located in the Battery Box. The Plug may be secured in place with the intergral threaded locking ring. The charge cycle is fully automatic.The Wall Charger and the In-vehicle Electronic Charger will indicate the charge status by LED indicators. Refer to the specific Charger documentation.
4. To discontinue the charge cycle, dis-engage the Charger Male Plug from the Charging Receptacle.
5. The PowerMate® can be re-activated for use by moving the Circuit Breaker Toggle to the on (up) position, and moving the Control Toggle Switch to the "I"(On) position.

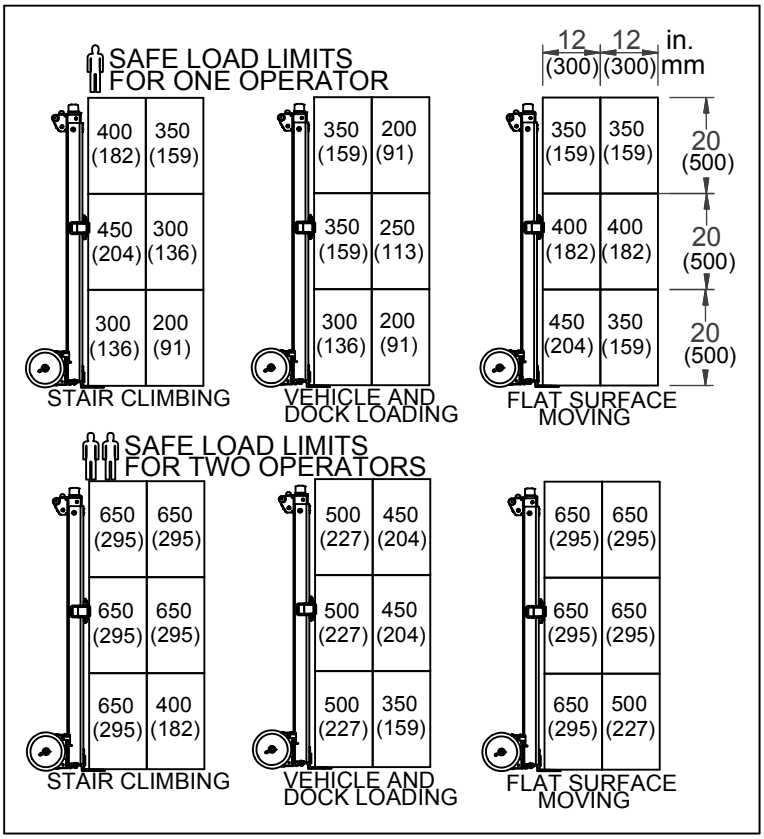
NOTE: The PowerMate® can remain on the Battery Charger at all times, ensuring a fully charged unit when called upon. In any case, the Circuit Breaker Toggle should always be in the off (down) position when the PowerMate® is not in use.



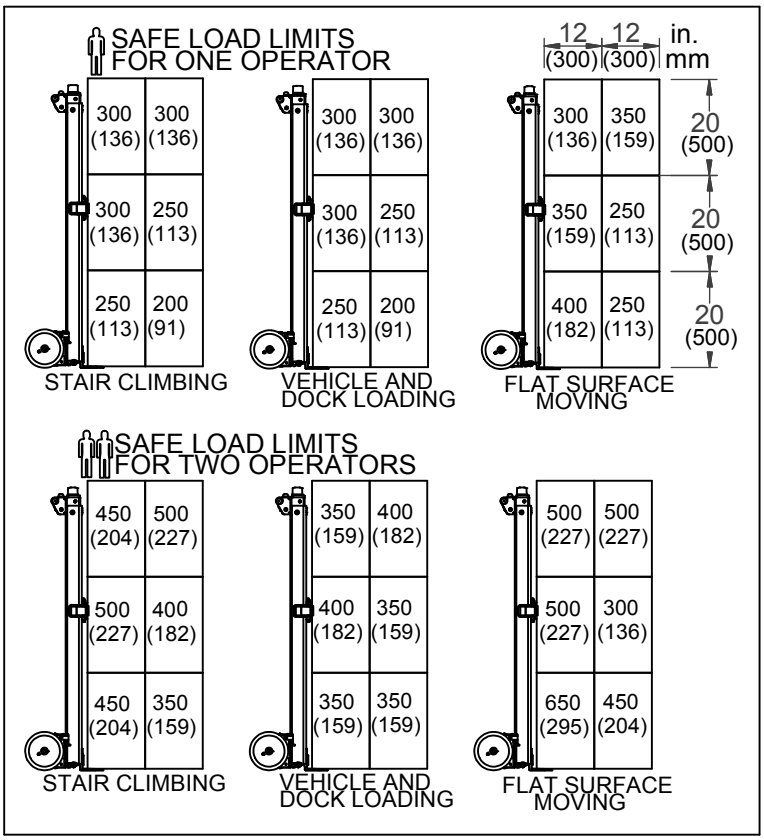
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# L-1 *POWERMATE*® LOADING INSTRUCTIONS

## L-1




## L-2




After establishing the weight of your load and its center of gravity, refer to the load drawings to determine:

**1**.That the capacity of the *PowerMates*® adequate for the intended application.

**2**.Whether one or two operators are required.

SAFE LOADING RECOMMENDATIONS ARE IN LBS. (KGS.).

NOTE: LOAD RATINGS ARE CALCULATED FOR TRAINED, PROFICIENT, EXPERIENCED OPERATORS AND SHOULD BE USED AS A GENERAL GUIDE ONLY.



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# ***POWERMATE*® OPERATION**

A



B



C



D



## Loading on a Vehicle

1. Position the *PowerMate*® as shown in "A" close to the tailgate or rear of the vehicle allowing room for the wheels of the *PowerMate*® to clear the vehicle upon raising.

2. Push the "LOAD DOWN" button to raise the wheels until they rest on the vehicle bed as shown in "B".

3. Push the "LOAD UP" button and raise the toeplate/load to the vehicle floor as shown in "C".

4. When the load is in the retracted position, as shown in "D", the *PowerMate*® can be positioned anywhere on the vehicle bed.

## Unloading from a Vehicle

1. Locate the *PowerMate*® as shown in "D" with the wheels just far enough away from the end of the tailgate/vehicle bed to allow the L-1 outer frame to clear as it is lowered as shown in "C".

2. Push the "LOAD DOWN" button to lower the *PowerMate*® toeplate and load to the ground as shown in "B".

3. Push the "LOAD UP" button to lower the wheels to the ground, whereupon the *PowerMate*® can be manoeuvred as required.



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# ***POWERMATE®*** **OPERATION**

## CLIMBING UP A STAIR

A



1. Manoeuver the *PowerMate®* backwards to the first step as shown in "A", just near enough to allow the wheels to clear the edge of the step treads when raised.

2. Tip the *PowerMate®* back on the heel of the toeplate, as shown in "B". Depress the "LOAD DOWN" button to raise the wheels to rest on the second step.

3. Tip the *PowerMate®* back on its wheels and depress the "LOAD UP" button, raising the toeplate and load to rest on the first step, as shown in figure "C".

B



4. Tip the *PowerMate®* forward on the toeplate so the wheels will clear the step tread and activate the "LOAD DOWN" button to raise the wheels to the next step.

5. Tip the *PowerMate®* back on its wheels and depress the "LOAD UP" button, raising the toeplate and load to rest on the next step, as shown in figure "C".

Repeat the above steps 4 and 5, until the top of the stairs are reached. Note: The *PowerMate®* can be "parked" on the stairs in a balance position spanning two steps, at any interval as shown in "D".

C



## DESCENDING A STAIR

1. Position the *PowerMate®* at the top of the stairs with the load and toeplate overhanging and clear of the steps. Activate the "LOAD DOWN" button to lower the load to rest on the second step down.

2. Tip the *PowerMate®* forward on the toeplate and activate the "LOAD UP" button to lower the wheels down to the first step down.

3. Tip the *PowerMate®* back on the wheels, lifting the load and toeplate to clear the next step tread. Depress the "LOAD DOWN" button until the toeplate contacts the next step down.

D



Repeat the above steps 2 and 3, until the bottom of the stairs are reached. Note: The *PowerMate®* can be "parked" on the stairs in a balance position spanning two steps, at any interval as shown in "D".



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## STORAGE PROCEDURE

If the equipment is not to be used for an extended period of time (over 3 months) then the following storage procedure should be completed by a knowledgeable service person.

1. Remove the drive screw guard (if installed). Extend the main frames fully. Clean and lubricate the drive screw with light machine oil. Replace the drive screw guard.

2. Disable the equipment by placing the safety toggle switch in the “Off” (O) position.

3. Store the equipment in a dry/dust-free location.

4. Check every 3 months that the battery is fully charged.

5. Before returning the equipment to service, it should be examined by a trained and competent service person.

## BATTERY CARE

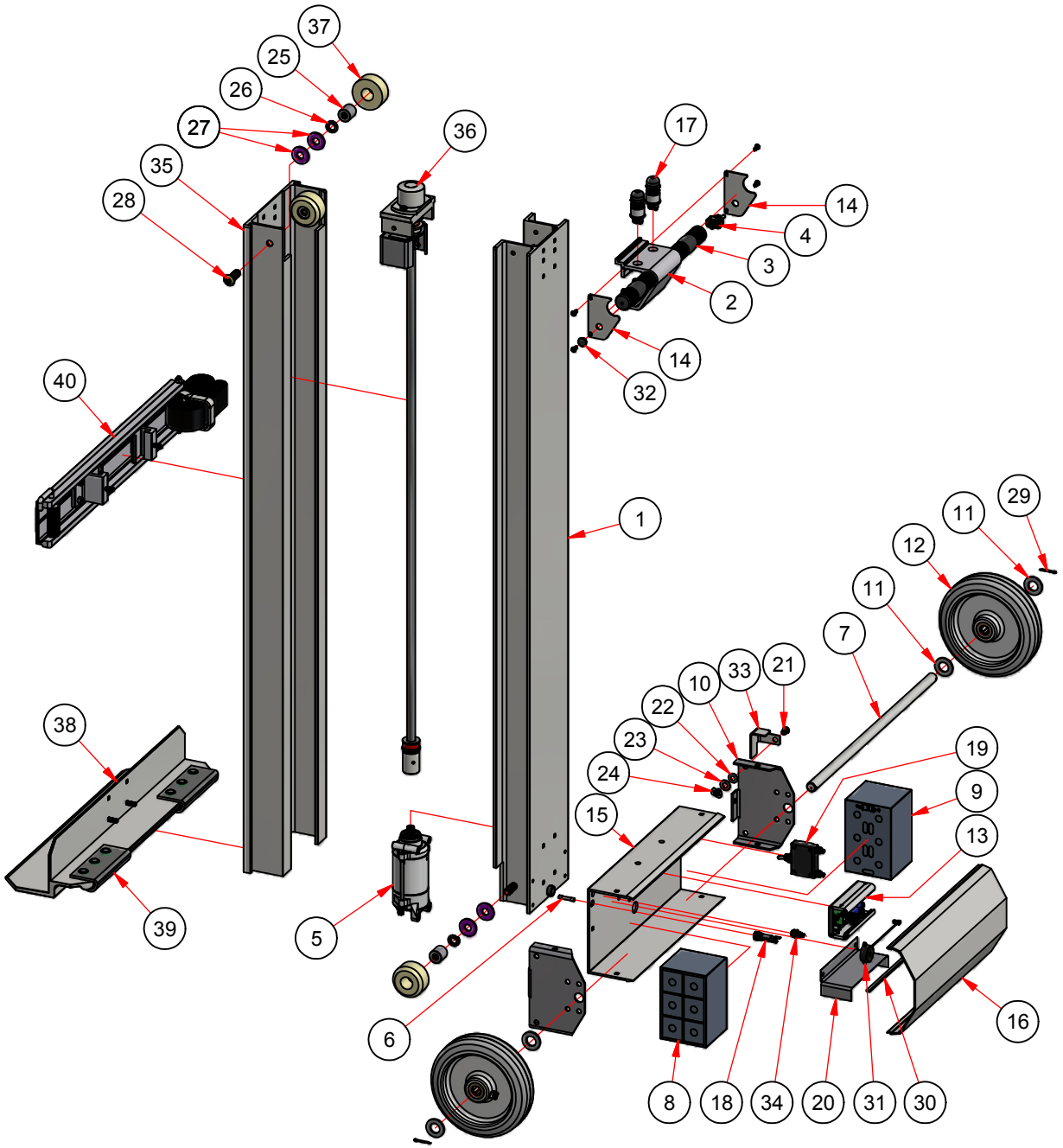
The 12 volt DC battery system is maintenance free and sealed. The gelled electrolyte inside the battery requires no maintenance whatsoever throughout its life. *DO NOT ATTEMPT TO OPEN THESE BATTERIES.*

The best battery life and equipment performance will be attained by keeping the battery fully charged.

The equipment has a small female battery charging receptacle located on the front face of the battery box. This receptacle is connected directly to the battery.

The battery charger output wire has a mating male plug.

Insertion of the male plug into the female receptacle connects the battery charger to the battery. Once connected the battery charger automatically commences charging. The charger stops when the battery is fully charged.

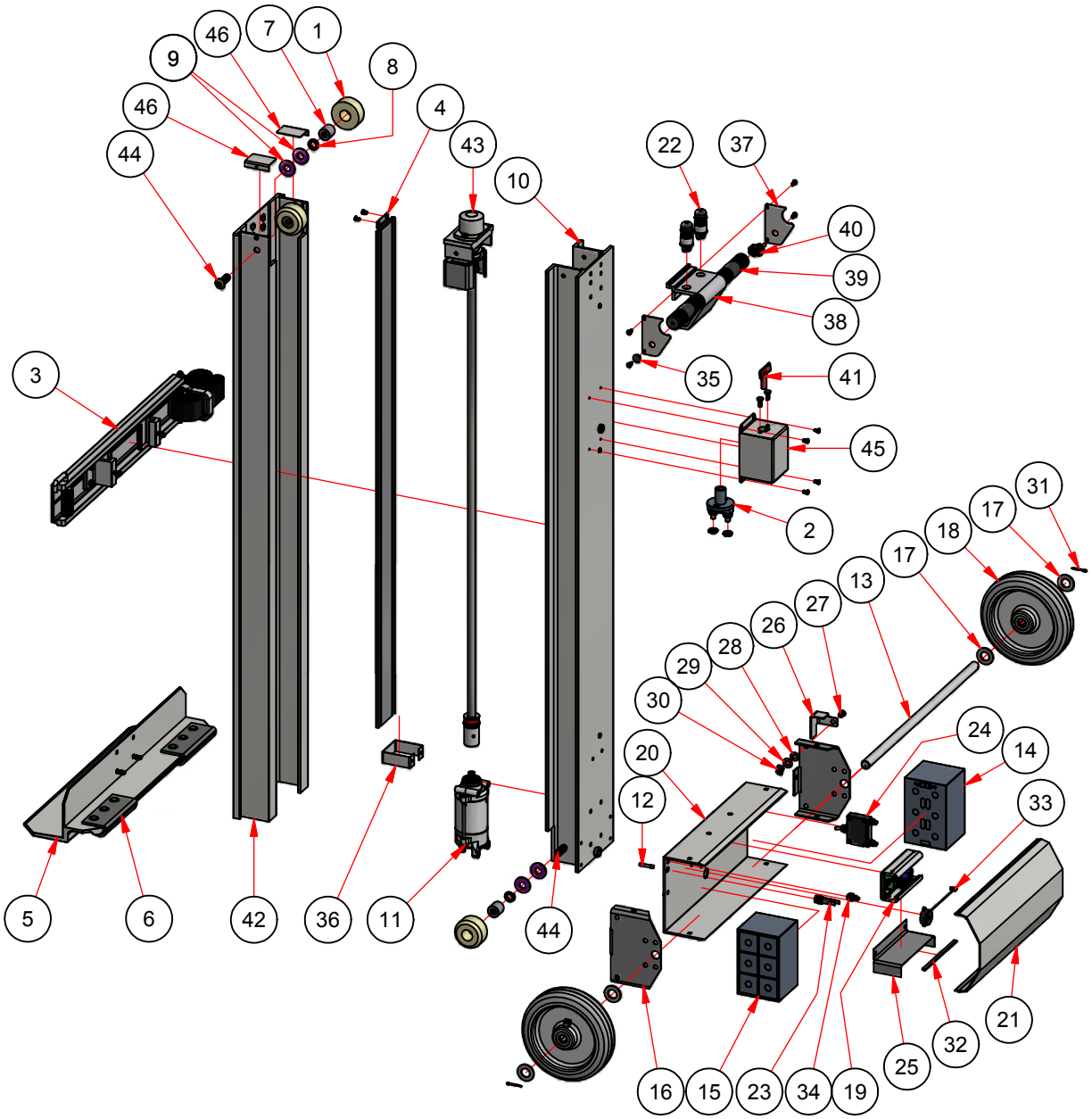



| PARTS LIST | | |
|---|---|---|
| ITEM | PART No. | DESCRIPTION |
| 1 | 110110E<br>110010G | INNER FRAME L-1<br>INNER FRAME L-2 |
| 2 | 110050D | HANDLE HOUSING LS |
| 3 | 055310 | HANDLE GRIP LS |
| 4 | 051360 | SWITCH TOGGLE SPST |
| 5 | 050860D | ELECTRIC MOTOR |
| 6 | 051705 | FUSE 10 AMP AGC |
| 7 | 310311 | 3/4"WHEEL AXLE PF |
| 8 | 316053 | BATTERY PACK SUB ASSEMBLY LS LH |
| 9 | 316054 | BATTERY PACK SUB ASSEMBLY LS RH |
| 10 | 330610C | AXLE SUPPORT BRACKET LE PF |
| 11 | 050060 | WASHER 3/4 SAE |
| 12 | 055232 | 8" RUBBER WHEEL 3/4" LS |
| 13 | 052810 | SOLID STATE CONTROLLER |
| 14 | 110055E | HANDLE HOUSING COVER |
| 15 | 110170G | BATTERY BOX ALUMINUM L-1 |
| 16 | 110160 | BATTERY BOX COVER |
| 17 | 050210 | SWITCH PUSH BUTTON 2 TERMINAL |
| 18 | 052690C | FUSE HOLDER HOLE MOUNT |
| 19 | 051366A | CIRCUIT BREAKER TOGGLE |
| 20 | 310430 | BATTERY SPACING BRACKET PF |
| 21 | 050774 | BOLT 5/16-18 x 1/2 BUTTON HEAD CAP |
| 22 | 050051 | WASHER DISC SPRING 3/8" |
| 23 | 050050 | WASHER 3/8 SAE ZINC |
| 24 | 050625 | NUT 5/16-18NC T |
| 25 | 055251 | ROLLER AXLE LS |
| 26 | 050780 | WASHER 1/2"LOCK |
| 27 | 055640 | WASHER 1/2"PLATE 1 3/8"LS |
| 28 | 050720 | BOLT 1/2-13NC 1 1/2"HH GR5 ZINC |
| 29 | 050110 | COTTER PIN 1/8 x 1 ZINC |
| 30 | 110431 | EXTRUDED RUBBER CHANNEL LS |
| 31 | 052692 | BUZZER ASSEMBLY |
| 32 | 052200 | PLUG NYLON BLACK 1/2"HOLE |
| 33 | 310366 | STOP PEDAL PF |
| 34 | 310393A | CHARGE PLUG ASSEMBLY LS |
| 35 | 110100D<br>110000F | OUTER FRAME L-1<br>OUTER FRAME L-2 |
| 36 | 310010C<br>310020C | SCREW ASSEMBLY L-1<br>SCREW ASSEMBLY L-2 |
| 37 | 055250 | ROLLER WHEEL L SERIES |
| 38 | 310520B | TOEPLATE ASSEMBLY L-1, L-2 |
| 39 | 410060 | BOTTOM RUBBER GUARD |
| 40 | 410020S | ALUMINUM STRAPBAR ASSEMBLY |

# MODEL L-1/L-2 REPLACEMENT COMPONENT LIST

4.01

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Sheet 1 of 2

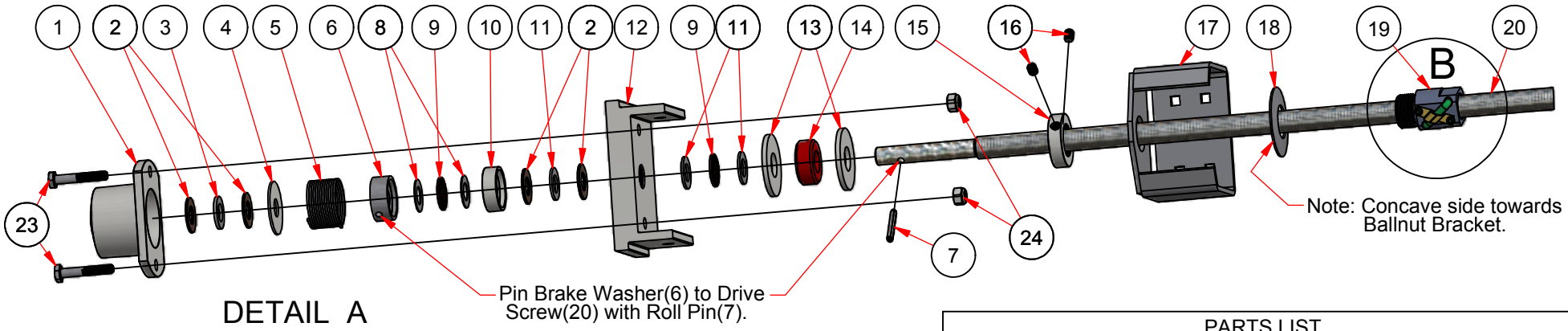



| PARTS LIST | | |
|---|---|---|
| ITEM | PART No. | DESCRIPTION |
| 1 | 055250 | ROLLER WHEEL L SERIES |
| 2 | 051362 | SWITCH BATTERY DISCONNECT |
| 3 | 410020S | ALUMINUM STRAPBAR ASSEMBLY |
| 4 | 310275 | SCREW GUARD L-1 PF |
| 5 | 110140 | TOE PLATE L1/L2 |
| 6 | 410060 | BOTTOM RUBBER GUARD |
| 7 | 055251 | ROLLER AXLE LS |
| 8 | 050780 | WASHER 1/2"LOCK |
| 9 | 055640 | WASHER 1/2"PLATE 1 3/8"LS |
| 10 | 110110E EC<br>110010G EC | INNER FRAME L-1 EC<br>INNER FRAME L-2 EC |
| 11 | 050860D | ELECTRIC MOTOR |
| 12 | 051705 | FUSE 10 AMP AGC |
| 13 | 310311 | 3/4"WHEEL AXLE PF |
| 14 | 316054 | BATTERY PACK SUB ASSEMBLY LS RH |
| 15 | 316053 | BATTERY PACK SUB ASSEMBLY LS LH |
| 16 | 330610C | AXLE SUPPORT BRACKET LE PF |
| 17 | 050060 | WASHER 3/4 SAE |
| 18 | 055232 | 8" RUBBER WHEEL 3/4" LS |
| 19 | 052810 | SOLID STATE CONTROLLER |
| 20 | 110170G | BATTERY BOX ALUMINUM L-1 |
| 21 | 110160 | BATTERY BOX COVER |
| 22 | 050210 | SWITCH PUSH BUTTON 2 TERMINAL |
| 23 | 052690C | FUSE HOLDER HOLE MOUNT |
| 24 | 051366A | CIRCUIT BREAKER TOGGLE |
| 25 | 310430 | BATTERY SPACING BRACKET PF |
| 26 | 310366 | STOP PEDAL PF |
| 27 | 050774 | BOLT 5/16-18 x 1/2 BUTTON HEAD CAP |
| 28 | 050051 | WASHER DISC SPRING 3/8" |
| 29 | 050050 | WASHER 3/8 SAE ZINC |
| 30 | 050625 | NUT 5/16-18NC T |
| 31 | 050110 | COTTER PIN 1/8 x 1 ZINC |
| 32 | 110431 | EXTRUDED RUBBER CHANNEL LS |
| 33 | 301522 | BUZZER ASSEMBLY |
| 34 | 310393A | CHARGE PLUG ASSEMBLY LS |
| 35 | 052200 | PLUG NYLON BLACK 1/2"HOLE |
| 36 | 310280 | SCREW GUARD BRACKET LS PF |
| 37 | 110055E | HANDLE HOUSING COVER |
| 38 | 110050D | HANDLE HOUSING LS |
| 39 | 055310 | HANDLE GRIP LS |
| 40 | 051360 | SWITCH TOGGLE SPST |
| 41 | 051362 | SWITCH KEY |
| 42 | 110100D<br>110000F | OUTER FRAME L-1<br>OUTER FRAME L-2 |
| 43 | 310010C<br>310020C | SCREW ASSEMBLY L-1<br>SCREW ASSEMBLY L-2 |
| 44 | 055300 | BOLT HXSOC BUTTON 1/2 x 1 1/2 LS |
| 45 | 310270 | SWITCH BOX LS PF |
| 46 | 310285 | ROLLER GUARD LS PF |

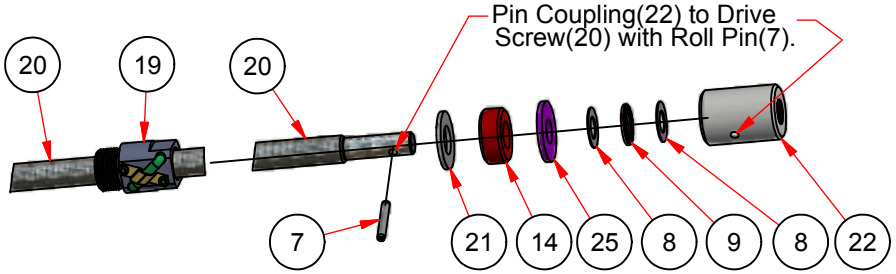
# MODEL L-1/L-2 with BATTERY SWITCH
# REPLACEMENT COMPONENT LIST

4.02

PN 011500 Rev.E
Eng. 04/ 16/ 14
Sheet 2 of 2

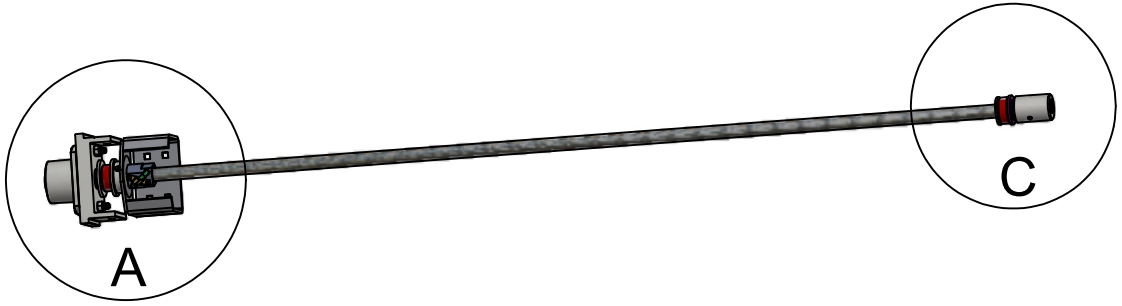



DETAIL A




DETAIL B

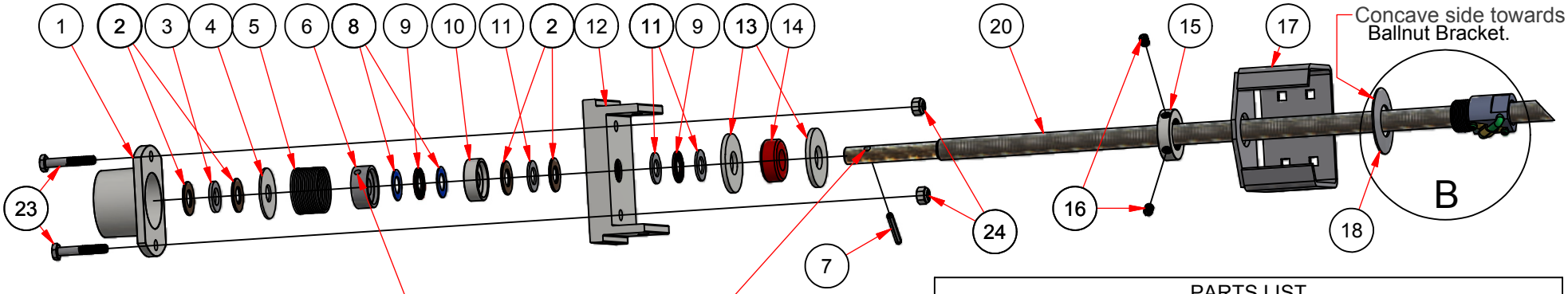
DETAIL C



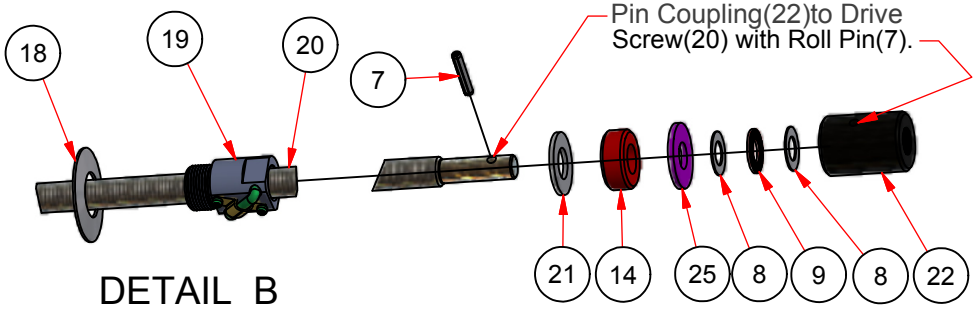

| PARTS LIST | | | |
|---|---|---|---|
| ITEM | QTY | PART No. | DESCRIPTION |
| 1 | 1 | 110450 | BRAKE CAP L-SERIES |
| 2 | 4 | 050840 | WASHER THRUST BRONZE .060 |
| 3 | 1 | 050140 | WASHER THRUST STEEL 1/2".090 |
| 4 | 1 | 150940 | WASHER RETAINER |
| 5 | 1 | 050800 | BRAKE SPRING |
| 6 | 1 | 050820 | WASHER TOP BRAKE DRIVE |
| 7 | 2 | 051680 | ROLL PIN SPIROL 3/16"x 1 1/8" |
| 8 | 4 | 050810 | WASHER THRUST STEEL 1/2"x .030 |
| 9 | 3 | 050120 | BEARING THRUST STEEL |
| 10 | 1 | 050850 | WASHER BOTTOM BRAKE DRIVE |
| 11 | 3 | 050920 | WASHER THRUST STEEL 1/2"x .060 |
| 12 | 1 | 310070 | BEARING RETAINER ASSEMBLY LS |
| 13 | 2 | 050040 | WASHER 5/8"PLATE ZINC |
| 14 | 2 | 100700 | URETHANE BUMPER 1/2"L x 5/8"ID |
| 15 | 1 | 052090 | BALLNUT LOCKNUT 5/8"DRIVE SCREW |
| 16 | 2 | 050550 | SET SCREW 1/4-20NC x 5/16 |
| 17 | 1 | 310250A | BALLNUT BRACKET ALUMINUM |
| 18 | 1 | 050830B | WASHER DISC SPRING 5/8" |
| 19 | 1 | 050170C | BALLNUT 5/8"(NOOK) |
| 20 | 1 | 102040C | DRIVE SCREW 5/8 x 47.937" |
| 21 | 1 | 051850 | WASHER 5/8 SAE ZINC |
| 22 | 1 | 300840 | COUPLING PAINT FINAL |
| 23 | 2 | 050640 | BOLT 1/4-20NC x 1 1/2"HH GR5 ZINC |
| 24 | 2 | 050610 | NUT 1/4-20 RING LOCK ZINC |
| 25 | 1 | 055640 | WASHER 1/2"PLATE 1 3/8"LS |

## SCREW ASSEMBLY L-1, LE-1
## PN310010

4.03




DETAIL A




DETAIL B

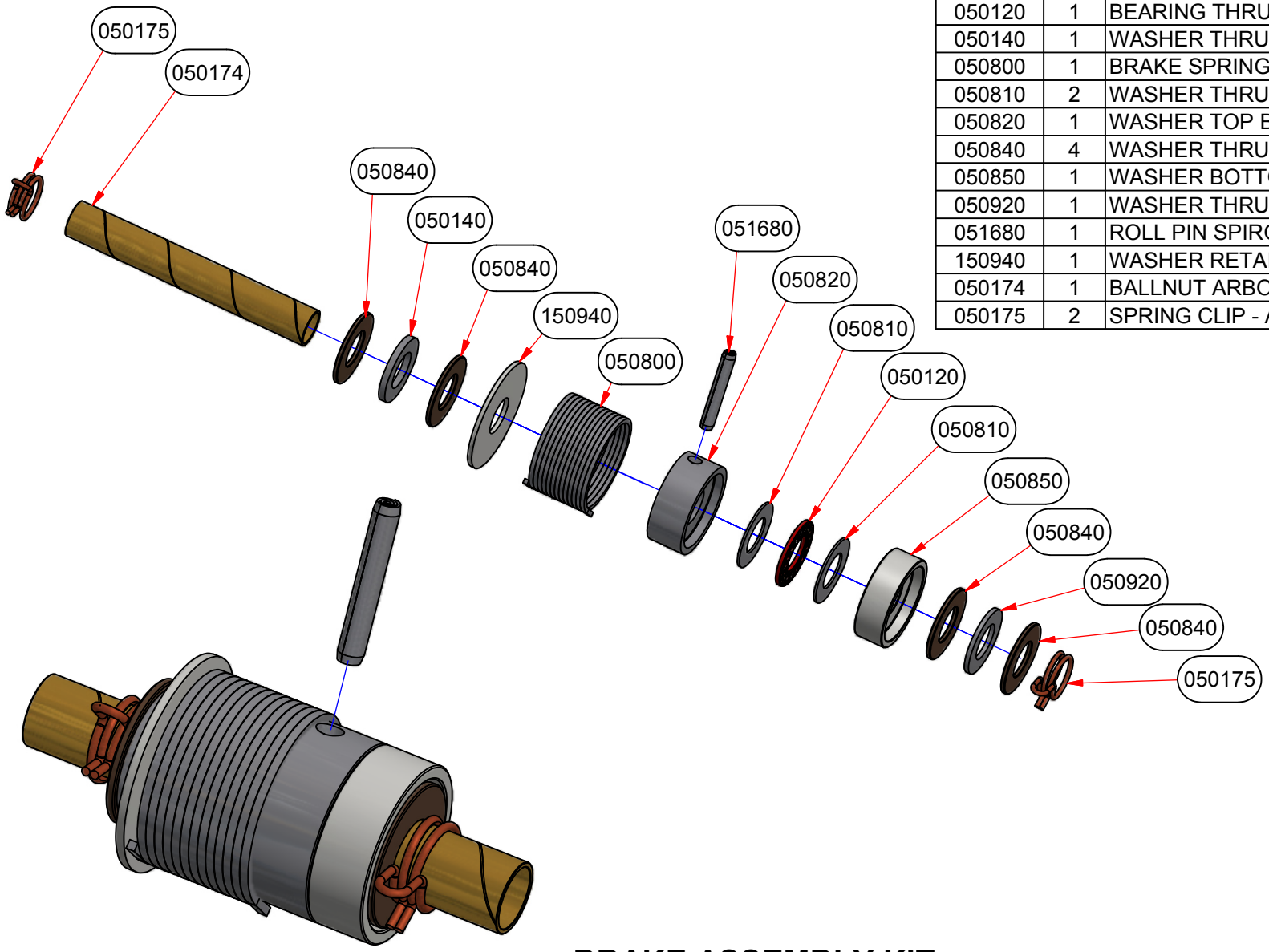
DETAIL C




| PARTS LIST | | | |
|---|---|---|---|
| ITEM | QTY | PART No. | DESCRIPTION |
| 1 | 1 | 110450 | BRAKE CAP L-SERIES |
| 2 | 4 | 050840 | WASHER THRUST BRONZE .060 |
| 3 | 1 | 050140 | WASHER THRUST STEEL 1/2".090 |
| 4 | 1 | 150940 | WASHER RETAINER |
| 5 | 1 | 050800 | BRAKE SPRING |
| 6 | 1 | 050820 | WASHER TOP BRAKE DRIVE |
| 7 | 2 | 051680 | ROLL PIN SPIROL 3/16"x 1 1/8" |
| 8 | 4 | 050810 | WASHER THRUST STEEL 1/2"x .030 |
| 9 | 3 | 050120 | BEARING THRUST STEEL |
| 10 | 1 | 050850 | WASHER BOTTOM BRAKE DRIVE |
| 11 | 3 | 050920 | WASHER THRUST STEEL 1/2"x .060 |
| 12 | 1 | 310070 | BEARING RETAINER ASSEMBLY LS |
| 13 | 2 | 050040 | WASHER 5/8"PLATE ZINC |
| 14 | 2 | 100700 | URETHANE BUMPER 1/2"L x 5/8"ID |
| 15 | 1 | 052090 | BALLNUT LOCKNUT 5/8"DRIVE SCREW |
| 16 | 2 | 050550 | SET SCREW 1/4-20NC x 5/16 |
| 17 | 1 | 310250A | BALLNUT BRACKET ALUMINUM |
| 18 | 1 | 050830B | WASHER DISC SPRING 5/8" |
| 19 | 1 | 050170C | BALLNUT 5/8"(NOOK) |
| 20 | 1 | 110220B | DRIVE SCREW 5/8 x 41.437" |
| 21 | 1 | 051850 | WASHER 5/8 SAE ZINC |
| 22 | 1 | 300840 | COUPLING PAINT FINAL |
| 23 | 2 | 050640 | BOLT 1/4-20NC x 1 1/2"HH GR5 ZINC |
| 24 | 2 | 050610 | NUT 1/4-20 RING LOCK ZINC |
| 25 | 1 | 055640 | WASHER 1/2"PLATE 1 3/8"LS |

## SCREW ASSEMBLY L-2, LE-2(34/32)
## PN310020
4.04

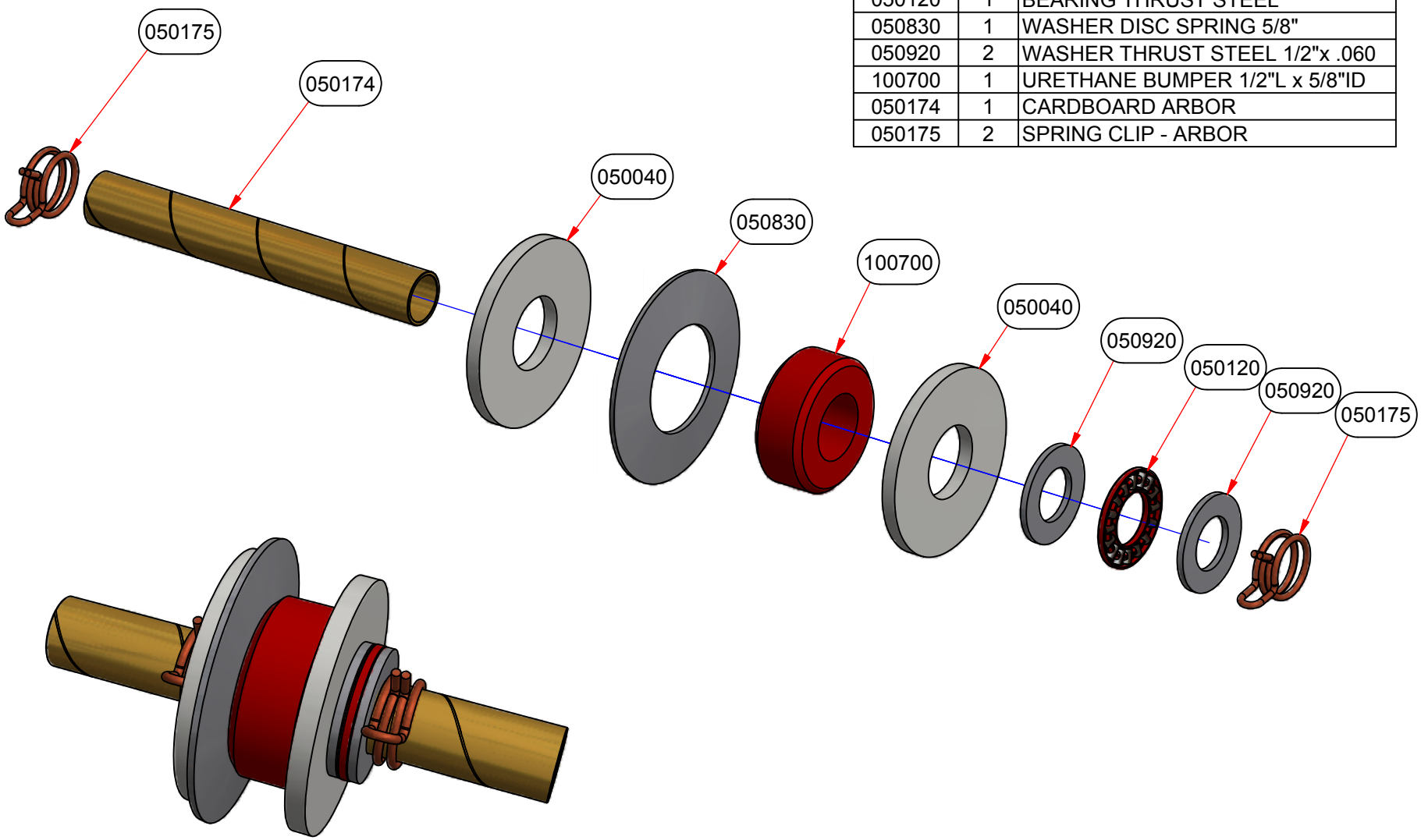
| PARTS LIST | | |
|---|---|---|
| PART No. | QTY | DESCRIPTION |
| 050120 | 1 | BEARING THRUST STEEL |
| 050140 | 1 | WASHER THRUST STEEL 1/2".090 |
| 050800 | 1 | BRAKE SPRING |
| 050810 | 2 | WASHER THRUST STEEL 1/2"x .030 |
| 050820 | 1 | WASHER TOP BRAKE DRIVE |
| 050840 | 4 | WASHER THRUST BRONZE .060 |
| 050850 | 1 | WASHER BOTTOM BRAKE DRIVE |
| 050920 | 1 | WASHER THRUST STEEL 1/2"x .060 |
| 051680 | 1 | ROLL PIN SPIROL 3/16"x 1 1/8" |
| 150940 | 1 | WASHER RETAINER |
| 050174 | 1 | BALLNUT ARBOR |
| 050175 | 2 | SPRING CLIP - ARBOR |




# BRAKE ASSEMBLY KIT
# PN 400150

4.05

| PARTS LIST | | |
|---|---|---|
| PART No. | QTY | DESCRIPTION |
| 050040 | 2 | WASHER 5/8"PLATE ZINC |
| 050120 | 1 | BEARING THRUST STEEL |
| 050830 | 1 | WASHER DISC SPRING 5/8" |
| 050920 | 2 | WASHER THRUST STEEL 1/2"x .060 |
| 100700 | 1 | URETHANE BUMPER 1/2"L x 5/8"ID |
| 050174 | 1 | CARDBOARD ARBOR |
| 050175 | 2 | SPRING CLIP - ARBOR |




# BEARING OVERRIDE KIT
# PN 400160

4.06

# MAINTENANCE AFTER EVERY YEAR OF OPERATION

This equipment is designed for use as a heavy duty lifting device. To ensure operator safety and continuing trouble free operation, have the equipment thoroughly checked by a trained and competent service person at least once a year. This maintenance should be performed using the following procedure.

1. Place a load of at least 300 pounds (140 kilograms) on the equipment. Cycle the equipment up and down several times in order to evaluate its current condition. This load test will help reveal the condition of the drive and brake systems, the frame structures and the electrical components. Improper conditions may be exhibited by excessive vibration, unusual noise or slow operation.

2. Check the inner and outer frame assemblies for bending, flattening, twisting, looseness or worn surfaces of the frame members. Check the frame roller tracks for cracks and worn surfaces.

3. Check the rollers for free rotation. Lubricate the roller axles with light machine oil.

4. Check that the two main frame wheels and main frame axle are in good condition. Lubricate the two main frame wheels with multi-purpose grease.

5. Check that the strapbar mounting hardware is secure. Check that the load binding straps are not cut or frayed and that the strap locking handles are secure.

6. Remove the drive screw as outlined under “Drive Screw Removal and Installation”. Clean the drive screw and ballnut. Do not remove the ballnut from the drive screw.

7. Check for a close running fit between the drive screw and the ballnut. There should be no wobble or excessive clearance and the ballnut should run smoothly and freely. There is a small tube on the side of the ballnut for the re-circulation of the ball bearings. Check that the 2 tube halves are fastened tightly together. Check that the area of the outside threads at the top of the ballnut is in good condition. If any of these checks reveal a problem, replace the ballnut as outlined in the manual.

8. If during the test of the equipment in step #1, there was excessive vibration, check the drive screw for straightness. Replace the drive screw as outlined in the manual if the drive screw is at all bent.

9. Check that the ballnut locknut, drive coupling, top and bottom red urethane bumpers and brake cap are all in good condition.

10. Replace all of the components for the brake assembly and the override bearing as outlined elsewhere in this manual.

11. Check that the electric motor armature, brushes and bearings are in good condition.

## MAINTENANCE AFTER EVERY YEAR OF OPERATION continued

12. Reassemble the drivescrew assembly and electric motor in the equipment as outlined elsewhere in this manual.

13. Replace the 2 rubber grips on the heelplate of the outer frame.

14. Remove the control handle assembly and replace the two pushbuttons.

15. Check that all electrical wire connections are secure.

16. Check that the battery and battery charger are in good condition and that the battery is fully charged.

17. Repeat the equipment load test from step #1. Cycle the equipment up and down several times in order to evaluate its condition.

**WARNING** - All repairs, electrical or mechanical, should be carried out only by a trained and competent service person. Use only approved repair parts; any others may create a hazard.



# Procedure for Repairing the L-Series Drive Screw Assembly

*NOTE: Read all instructions carefully before attempting to make repairs to any part of the drive screw assembly. Refer to the Screw Assembly Drawing. For this procedure, it will be necessary to remove any accessories like an extended toeplate, screw guard, strapbars, etc.*

## Procedure to Disassemble Machine

1. Place machine on a suitable work bench with the machine resting on its wheels and rear handles (toeplate up). Activate the unit until it is extended approximately halfway. Disconnect the power supply by way of the circuit breaker.

2. Remove four nuts retaining the toeplate to the outer frame. Remove the two bolts and nuts fastening the bearing retainer (12) and inner frame. The outer frame can now be slid off the inner frame in the direction of the handles.

## Brake Assembly Replacement

1. With reference to the Screw Assembly drawing for the particular model, remove the two 1/4"bolts(23) and nuts(24). Proceed to remove the brake cap(1), two bronze thrust washers(2), steel washer(3), washer retainer(4) and brake spring(5).

2. Drive out the 3/16" roll pin(7) taking care not to bend the screw shaft. Place a suitable support underneath the brake drive top washer(6) for this operation.

3. Remove the brake drive top washer(6), two steel thrust washers(8), thrust washer(9), brake drive bottom washer(10), two bronze thrust washers(2), and the steel thrust washers(11).

NOTE: At this point, if it is intended to replace the Bearing Override or Ballnut, complete those procedures first before continuing with the brake re-assembly.

4. As per the screw assembly drawing, replace the brake assembly components (Brake Assembly Kit P/N 400150) in reverse order as follows:
   Items: 2-11-2-10-8-9-8-6-7-5-4-2-3-2
   During assembly, place a few drops of light machine oil on the thrust bearing(9) only. Remember to support the brake drive top washer(6) when installing the 3/16" roll pin(7).

5. Install brake cap(1) and insert the 1/4"bolts(23) and fasten with the nuts(24). Go to procedure for re-assembly of machine.

## Override Bearing Assembly

1. Remove the brake assembly as outlined in the Brake Assembly procedure.

2. Continue the disassembly by removing the two steel thrust washers(11), steel thrust bearing(9), two plate washers(13), and the urethane bumper(14).

   NOTE: At this point, if it is intended to replace the Ballnut or removing the Drive Screw for service/replacement, complete those procedures first before continuing with the override bearing replacement.

3. As per the screw assembly drawing, replace the override bearing components (Bearing Override Kit P/N 400160) in reverse order as follows:
   Items: 13-14-13-11-9-11-12
   Apply a few drops of light machine oil to thrust bearing(9) and the roller bearing in the bearing retainer(12).

4. Replace the brake assembly components as per the Brake Assembly instruction step 4.

## Drive Screw Removal & Installation

1. Remove the brake assembly as outlined in the Brake Assembly procedure.

2. Remove the override bearing assembly as outlined in the Override Bearing Assembly procedure.

3. Apply a band of tape around the drive screw(20) at each end of the ballnut(19). This will prevent the ballnut from disengaging the drive screw until the appropriate time. The set screws(16) in the ballnut locknut(15) may be loosened and the locknut removed. Remove the drive screw(20) through the ballnut bracket(17) and remove the spring disc washer(18) from the drive screw.

   NOTE: At this point, if it is intended to remove the ballnut (19) for replacement, complete the Ballnut Replacement procedure first, before re-installing the drive screw.

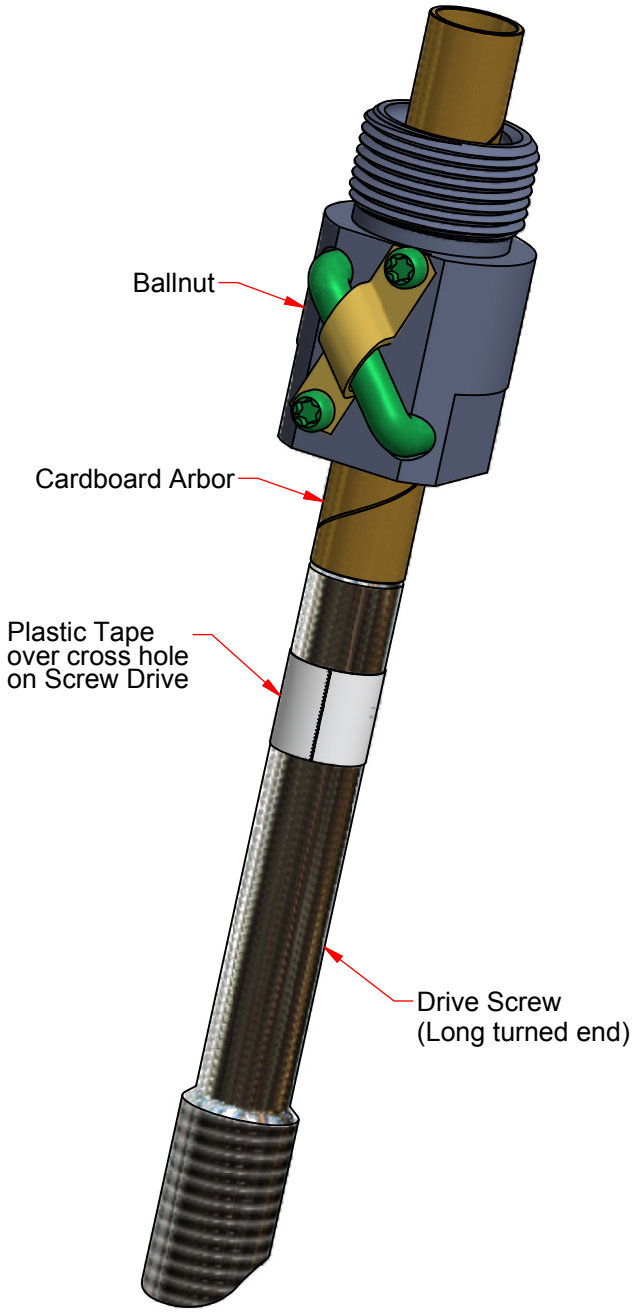
4. To re-install the drive screw(20), place the spring disc washer(18) over the ballnut thread, insuring the concave side of the washer is oriented away from the square body of the ballnut. Insert the drive screw(20) through the ballnut bracket (17) as per the assembly drawing. Thread the ballnut locknut(15) onto the ballnut(19) but do not tighten. Remove the tape either side of the ballnut, if applied.

5. Continue the re-assembly process by returning to step 3 of the Override Bearing Procedure.

# BALLNUT REMOVAL AND REPLACEMENT

**PROCEDURE:**

1. To begin, the screw assembly must be removed from the unit. Follow the procedure for Drive Screw removal and replacement.
2. Remove the tape from the drive screw that is keeping the ballnut in position, if installed.
3. Apply one layer of thin plastic tape banding around the long turned end of the screw over the cross hole. This is the end that the ballnut will be removed.
4. Stand the drive screw vertically with the long turned end up. Thread the ballnut up the screw until it is completely disengaged from the thread. The tape over the cross hole prevents the balls in the ballnut from falling out into the cross hole.
5. Place a cardboard arbor firmly against the end of the screw, insuring that it is centered and square, and slide the ballnut up onto the cardboard arbor. Loop a tie-wrap through the Cardboard Arbor and around the ballnut and secure tight.
6. To install a ballnut, the reverse happens. Remove the tie-wrap from the cardboard arbor with a side cutter. Be sure the arbor does not disengage from the ballnut or all the balls in the ballnut will fall out.
7. Place the end of the arbor firmly, centered and square, onto the long turned end of the drive screw. Slide the ballnut off the arbor onto the screw, over the tape and engage the drive screw thread. Allow the ballnut to spin down the screw to approximately halfway along its length. Band tape around the screw at both ends of the ballnut to keep the ballnut in position.
8. Remove the plastic tape from the cross hole.
9. Return to the instruction for the installation of the Drive Screw, step 4.






PN 011580 Rev. E
Eng. 04/ 17/ 14

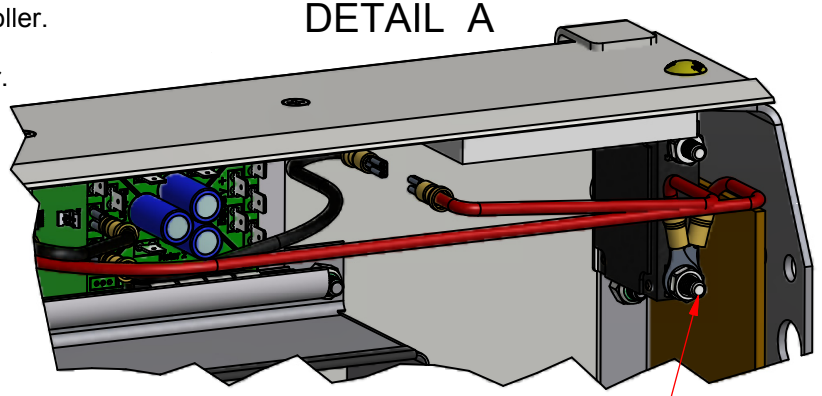
## INSTRUCTION:

1. Remove Fuse. Move Circuit Breaker Toggle Switch to the down "disconnect" position.
2. Remove Battery Box Cover using a large flat screwdriver and hammer.
3. Remove wheels and axle.
4. Dis-connect the Battery negative (black) wire connections from the circuit board of the Controller.

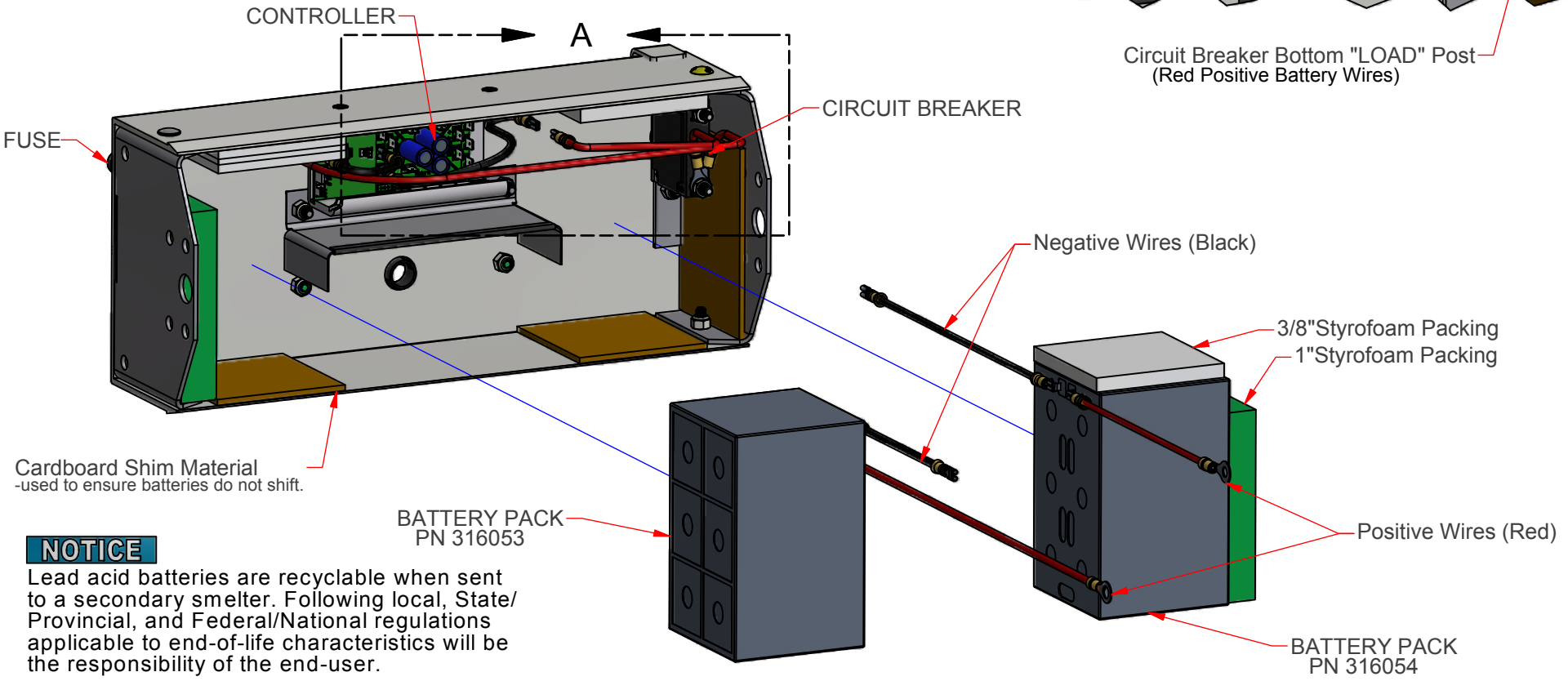
**⚠ CAUTION** Care must be taken to not allow the Battery wire connectors to short circuit to frame.

5. Dis-connect the Battery positive wire connections from the bottom post of the Circuit Breaker.
6. Remove the Battery Packs. It may be necessary to re-install the styrofoam packing.
7. Install 3/8"Styrofoam Packing to the inside top of the Battery Box.
8. Install replacement Battery Packs 316053 and 316054 as shown below.
9. Install 1"Styrofoam Packing between Batteries and Battery Box ends.
10. Connect Red Positive Wires to the Circuit Breaker bottom "LOAD" post.
11. Connect Black Negative Wires to the Controller Negative tangs on the circuit board.
12. Replace axle, wheels, and Battery Box Cover.
13. Re-install Fuse, place the Circuit Breaker Switch in the up "connect" position, and test unit.

DETAIL A



Circuit Breaker Bottom "LOAD" Post
(Red Positive Battery Wires)



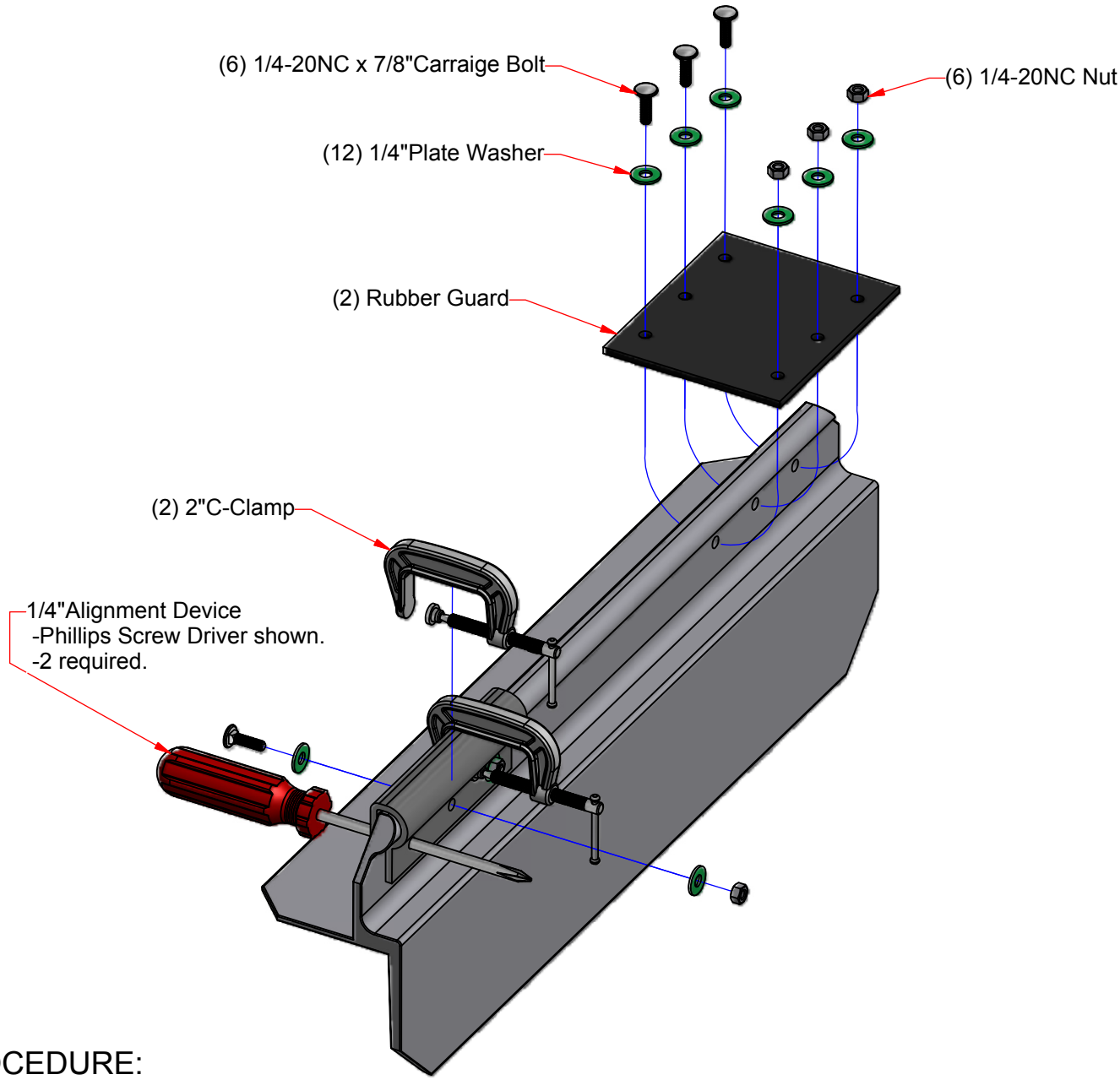

**NOTICE**

Lead acid batteries are recyclable when sent to a secondary smelter. Following local, State/ Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

# INSTALLATION OF SEALED BATTERIES IN POWERMATE L-SERIES

## REPLACEMENT BATTERY PACK No. 410053

5.05




## PROCEDURE:

Tools required: Two 1/4"drifts, screwdrivers(phillips), or pry type tools.
-used to pull and align holes in rubber to holes in toeplate.
- 7/16"socket wrench.
- Two 2" C-clamps.

1. Extend PowerMate unit approximately 15" and rest the unit face down(wheels up) on a suitable work surface. The floor may also be used. Note: The view above is shown as the toeplate only for clarity.
2. Remove the 1/4"Nuts with the 7/16"wrench and dis-assemble the old Rubber Guard.
3. Use the screw driver type tools to align the holes of the new Rubber Guard and the Toeplate.
4. Apply the two 2"C-Clamps either side of the center hole leaving room to apply a Washer.
5. Insert a Carriage Bolt and Washer through the center hole as shown, and place a Washer on the exposed thread. Applying thumb pressure to the head of the Bolt, start the 1/4"Nut onto the thread. Remove the C-Clamps and tighten the 1/4"Nut with the 7/16"wrench.
6. Re-install the C-Clamps adjacent to another hole, remove the alignment device, and repeat the Bolt installation step 5.

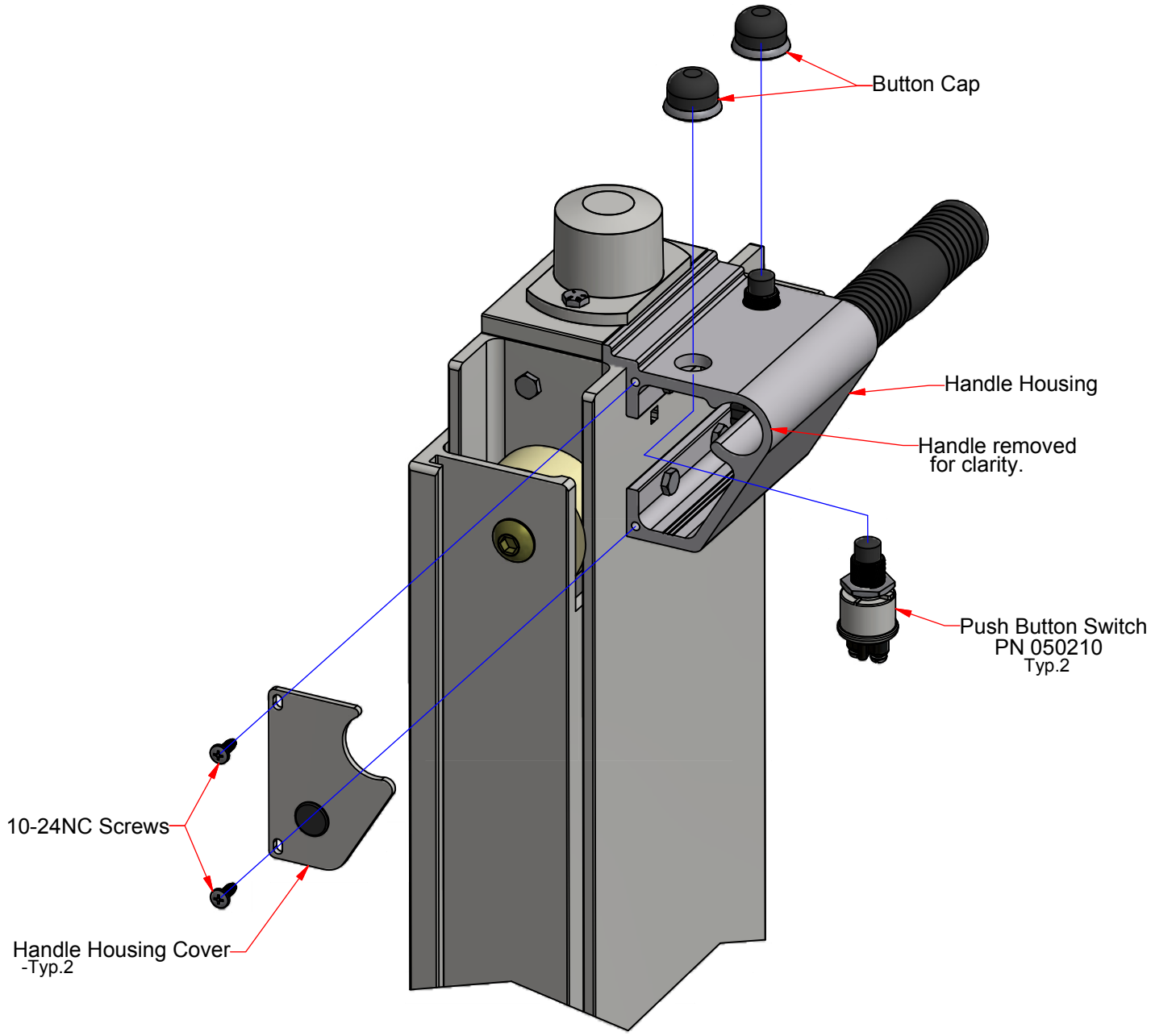
# BOTTOM RUBBER GUARD REPLACEMENT

Replacement Kit No. 410060



PN 011620 Rev.E
Eng. 04/ 25/ 14

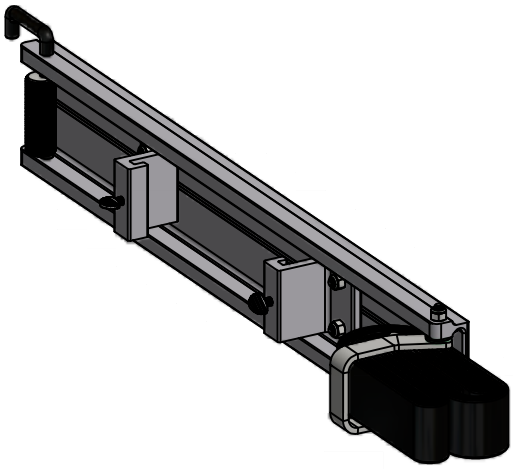
# PUSH BUTTON REPLACEMENT L-SERIES



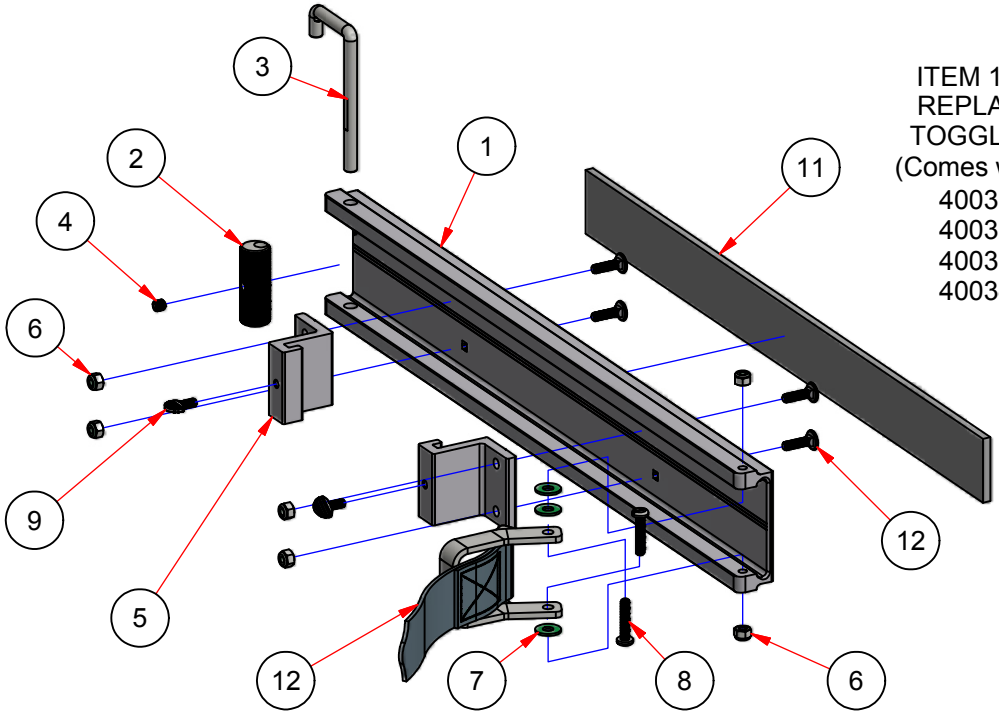

## PROCEDURE:

Tools required: Phillips screwdriver, water pump pliers, 1/4"slot screw driver.

1. Remove Handle Housing Covers(2) by removing the 10-24NC Screws(2 each).
2. Remove the Button Caps using water pump pliers.
3. Pull the Push Button Switches down and out of the Handle Housing.
4. Remove the screws retaining the wiring to the Push Button Switches using the 1/4"screwdriver.
5. Re-attach the wiring to the replacement Push Button Switches.
6. Re-insert the Push Button Switches into the Handle Housing.
7. Screw on the Button Caps and tighten with the water pump pliers.
8. Install the Handle Housing Covers with the 10-24NC Screw.

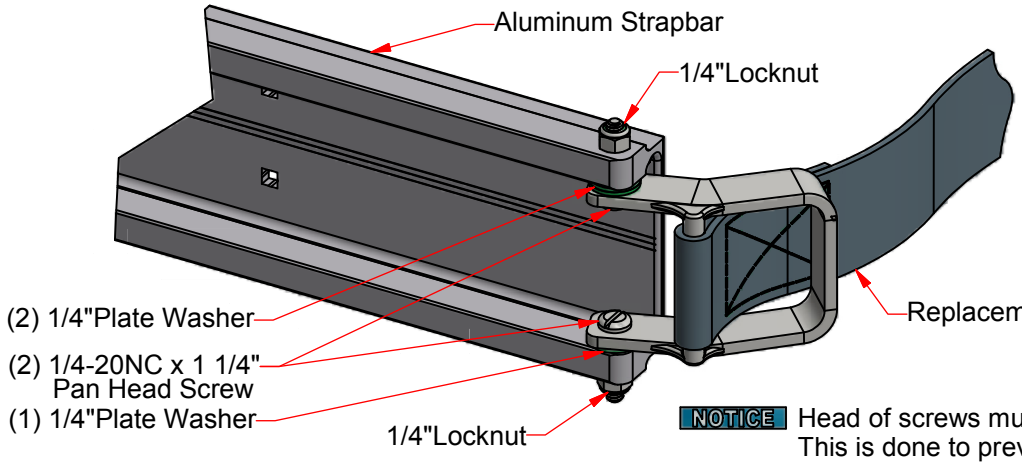


| PARTS LIST | | | |
|---|---|---|---|
| ITEM | QTY | PART No. | DESCRIPTION |
| 1 | 1 | 310130 | STRAP BAR ALUMINUM L-1 L-2 |
| 2 | 1 | 310040 | CAM FINAL PAINT |
| 3 | 1 | 302110 | CAM HANDLE FINAL PAINT |
| 4 | 1 | 050990 | SCREW HEXSOC SET 5/16-18 x 5/16 |
| 5 | 2 | 110020D | STRAPBAR CONNECTOR LS |
| 6 | 6 | 050610 | NUT 1/4-20 RING LOCK ZINC |
| 7 | 3 | 050070 | WASHER PLATE 1/4 ZINC |
| 8 | 2 | 050580 | SCREW PAN HD SLOT 1/4-20x1 1/4 |
| 9 | 2 | 050583 | SCREW 1/4-20NC THUMB |
| 10 | 1 | 101960 | FELT STRAP BAR 1/4"x 2"x 23" |
| 11 | 4 | 050740 | BOLT 1/4-20 x 7/8 CARRIAGE ZINC |




ITEM 12:
REPLACEMENT STRAP/
TOGGLE KITS AVAILABLE
(Comes with fastener hardware):
400310 - 10 ft. Strap
400320 - 12 ft. Strap
400300 - 14 ft. Strap
400340 - 16 ft. Strap

## STRAPBAR ASSEMBLY L-SERIES

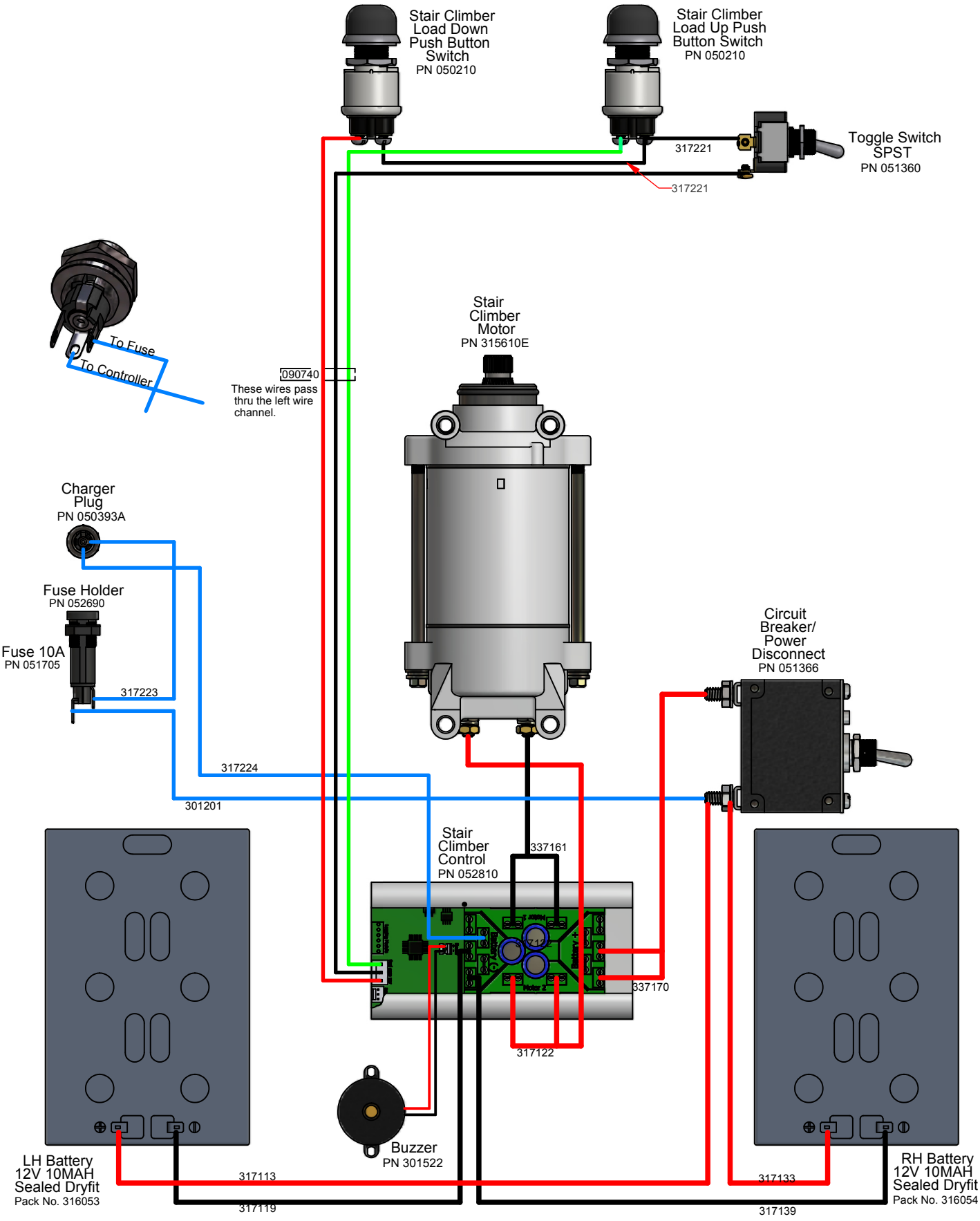



NOTICE Head of screws must be oriented inwards.
This is done to prevent chaffing on strap.

## REPLACEMENT STRAP INSTALLATION

TOOLS REQUIRED: 7/16"Wrench, 5/16"Flat Screw Driver.

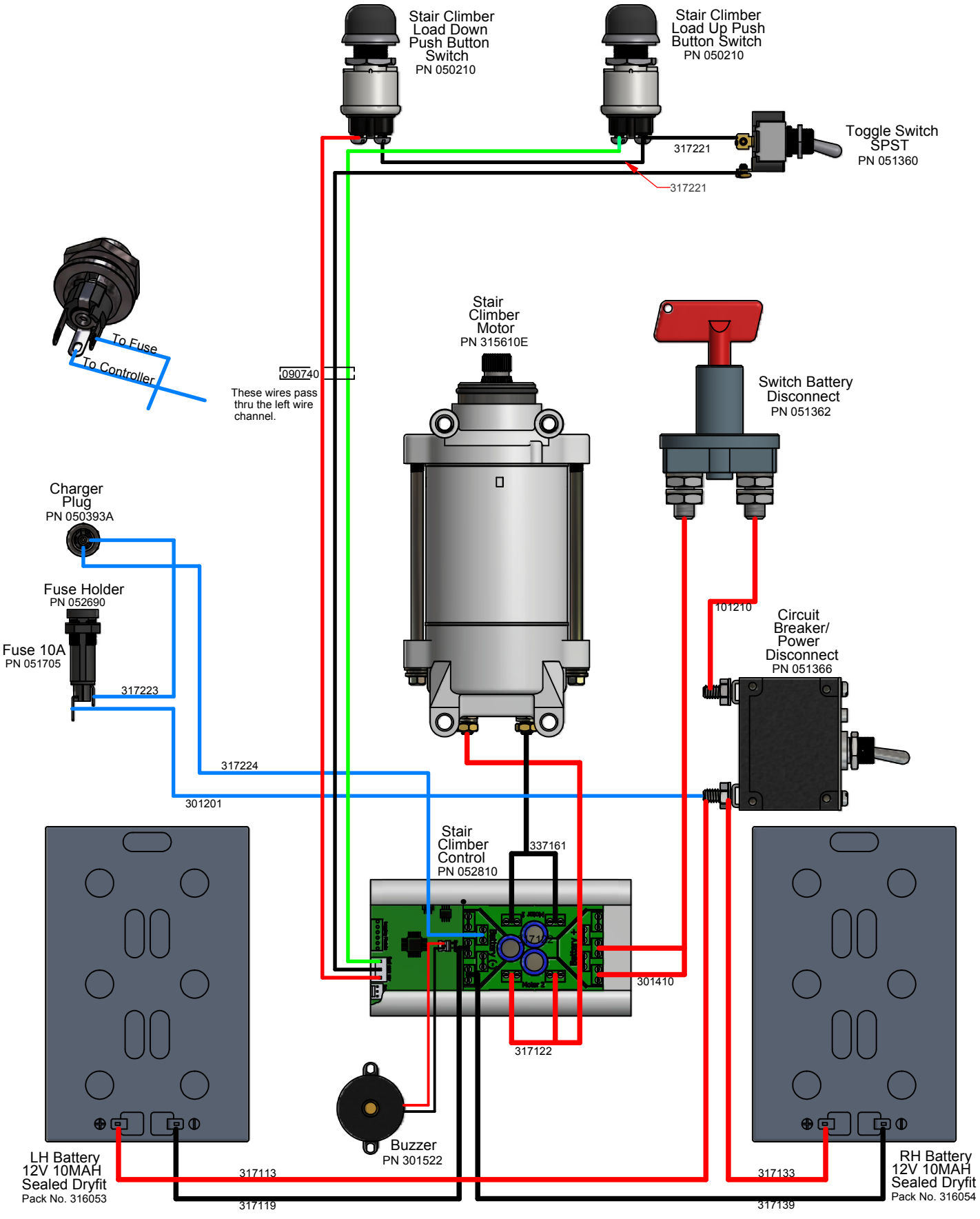
# *POWERMATE*® L-SERIES WIRING DIAGRAM






PN 011690 Rev.E
Eng. 04/ 17/ 14
Sheet 1 of 2

# *POWERMATE*® L-SERIES WIRING DIAGRAM with Battery Switch






PN 011690 Rev.E
Eng. 04/ 17/ 14
Sheet 2 of 2

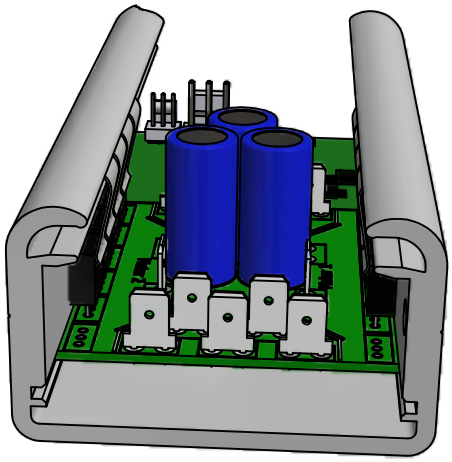
# L-SERIES SPECIFICATIONS ANSI/CSA

| Model | L-1 | L-2 |
|---|---|---|
| Weight | 100.5 lbs. | 96 lbs. |
| Height | 59" | 51" |
| Width | 24" | |
| Strapbar Width | 24 1/4" | |
| Length | 16 1/4" | |
| Ballscrew | 5/8" | |
| Stroke Length | 40" | 34" |
| Extension Speed | 5" per sec. (no load) | |
| Load Capacity | | |
| Stair Climbing | 650 lbs. | 500 lbs. |
| Dock/Vehicle Loading | 500 lbs. | 400 lbs. |
| Flat Surface Moving | 650 lbs. | 650 lbs. |

# L-SERIES SPECIFICATIONS CE

| Model | L-1 | L-2 |
|---|---|---|
| Weight | 45.5 kgs. | 43.5 kgs. |
| Height | 1.5m | 1.29m |
| Width | .61m | |
| Strapbar Width | .62m | |
| Length | .41m | |
| Ballscrew | 15.88mm | |
| Stroke Length | 1.02m | .86m |
| Extension Speed | 127mm per sec. (no load) | |
| Load Capacity | | |
| Stair Climbing | 295 kgs. | 227 kgs. |
| Dock/Vehicle Loading | 227 kgs. | 182 kgs. |
| Flat Surface Moving | 295 kgs. | 295 kgs. |

NOTE: Weights are approximate due to manufacturing tolerances. Data given for L-Series PowerMates equipped with standard equipment.



# STAIR CLIMBER SOLIDSTATE CONTROLLER

The Stair Climber Solid State Controller is a fully solid state Pulse Width Modulated (PWM) controller. Its advanced microprocessor based control implements a state-of the-art power MOSFET motor drive. Advanced features provide improved functionality, smoother operation, reduced mechanical stress, and protects against abuse and system faults.

## ADVANTAGES

- Reduced peak current reduces power loss in batteries, motor, and cabling.
- Reduced peak current reduces battery stress, increased service life.
- Reduced peak torque reduces mechanical stress, increasing service life of the gear train and motor.
- Smooth operation "feel" by controlled acceleration and deceleration (motor voltage ramp-up and ramp-down) eliminating jerkiness.
- Automatically slows speed with heavy loads, improving control and safety.
- Overload protection shuts off if lift load is too heavy.
- Protects batteries by limiting minimum loaded voltage to 8.5 volts.
- Internal protections for many types of internal and external faults.
- Protects controller by inhibiting operation if battery voltage is to high.
- Detects battery+ or battery- short to frame and inhibits motor operation.
- Limits continuous operation to <30 seconds. Control wiring fault protection.
- Alerts to low or excess control heating (from over-use).
- Alerts to overload or excess continuous run time (control fault).
- Alerts to battery+ or battery- short to frame.
- Alerts to internal controller faults.
- Low standby power of less than 20mA.

## SPECIFICATIONS

| | |
|---|---|
| Operating Voltage Range: | 8.5V - 14.4V |
| Maximum Voltage: | 16.0V (non-operating) |
| Over-voltage shut-off | 15.5V |
| Motor Current Limit: | 100 Amps (+10%, -5%) |
| Output Time Rating (@100 Amps): | 1.5Min. Minimum (ambient & initial temp<25ºC) |
| Continuous Current (Ambient<25ºC) | 65 Amps (75 Amps in Le-Series Unit) |
| Maximum Run without stop: | 25 to 30 Seconds (sofware limited) |
| Input control current, Max.(@ 13V) | 0.3 mA |
| Standby Current (@12.6V) | < 18mA |
| Buzzer or LED output: | 5 Volts, maximum 15mA |
| Standby Time (25% charge remains) | 40 days (start with 20 AH battery, fully charged) |
| Operating Temperature Range: | -25ºC to 50ºC |
| Storage Temperature Range: | -40ºC to 85ºC |
| Environmental: | Solid State Controller Unit is100% RoHS compliant. |

## FAULT ALERTS

Faults are indicated by a buzzer producing a series of beeps to indictate various faults as follows:

One Beep - Overload condition (too much weight on Unit) - **Reduce Load**
- Maximum run time (25-30sec.) exceeded - **Release and re-apply switch**

Two Beeps - Low Battery - **Recharge Battery**

Three Beeps- Battery+ or Battery- shorted to frame. **HALT USE AND RETURN FOR REPAIR**
-System Fault - **FAULTY UNIT -HALT USE AND RETURN FOR REPAIR**

Four Beeps - Overheating due to excessive use (many minutes) - **Allow five minutes to cool**



PN 011710 Rev.E
Component 052810
Eng. 04/ 25/ 14

# POWERMATE® BATTERY SPECIFICATIONS

**dryfit from Sonnenschein.**

dryfit-the name that has a synonym for a future-oriented battery generation

dryfit technology was invented by Sonnenschein.

Solid advantages point-by-point:

| | |
|---|---|
| • Maintenance-free and sealed | Needs no maintenance whatsoever throughout its life. Each cell is sealed by a valve preventing penetration by air-borne oxygen. Over-pressure in the cells [e.g. through over-charging] unseats the valve so letting out the excess independent pressure; the valve then closes again. For installations of dryfit batteries in rooms, containers and cabinets the standards VDE 0510 Part 2 are complied with. |
| • Independence of position | Sonnenschein dryfit batteries of series A200 can be used in any orientation including upside down. In stationery installation, care should be taken to ensure that valves point upwards and are not covered. |
| • Deep discharge resistant | dryfit batteries survive deep-discharging without suffering damage. Even when discharged and remaining connected to a load for 4 weeks, they recover 80% of their capacity after 48 hours charging. 100% is reached after a few cycles. |
| • Extremely low self-discharging | Less than 0.1% of the rated capacity per day at +20°C ambient temperature means no re-charging even after up to 2 years storage. |
| • Cyclic capability | Special measure relating to electrolyte production give A200 version of dryfit batteries good cyclic capability. At 100% discharge [up to discharge cut-off voltage of 1.75 Volts/cell] more than 200 cycles can be obtained. Considerably more cycles are possible with partial discharges. |
| • Long-life | Under continuous charge operation the life is 4-5 years, end of life being defined as when 60% of the rated capacity is reached [as per DIN 43534]. |
| • Wide temperature range | From -30°C to + 50°C [can also be briefly exceeded]. For operation under extreme temperature conditions, please observe works recommendations. |
| • High load capacity, all-round use | Robust grid and connector design gives good high-current load properties. Excellently suited for operation under extreme conditions due to high resistance to vibration. The larger types [from 20Ah] are suitable for starting internal combustion motors. |
| • Simple charging method | Just one charging voltage for cyclic and continuous charging modes. No current limiter needed as charging current is regulated by the battery. Constant charging voltage at +20°C room temperature is 2.3 Volts/cell. |
| • VdS approval: | At present 8 types are approved by the VdS [federation of German specialist insurers]. |
| • No hazardous goods | Due to immobilized gel electrolyte dryfit batteries A200 are not classified as hazardous goods. |

**Tested and found to be good!**

Sonnenschein dryfit batteries comply with the following international standards:

**dryfit A 200**

DIN 43534 "Maintenance-free" sealed rechargeable batteries with gelled electrolyte.

DIN 43539 Part 5 Tests "Maintenance-free" sealed rechargeable batteries with gelled electrolyte.

VdS approvals:
Currently 8 types approved by VdS [federation of German insurers].

DIN 57510/VDE 0510 Rechargeable batteries and battery systems, stationary batteries.

NATO - Selected types tested and approved according to guidelines for military supply standards.

DIN EN 50014/VDE 0179/0171 Part 1/5.78 General specifications.

DIN 57833/VDE 0833 Part 1 Danger warning equipment for fire, assault/robbery and burglary.

UL recognition File MH 12547.

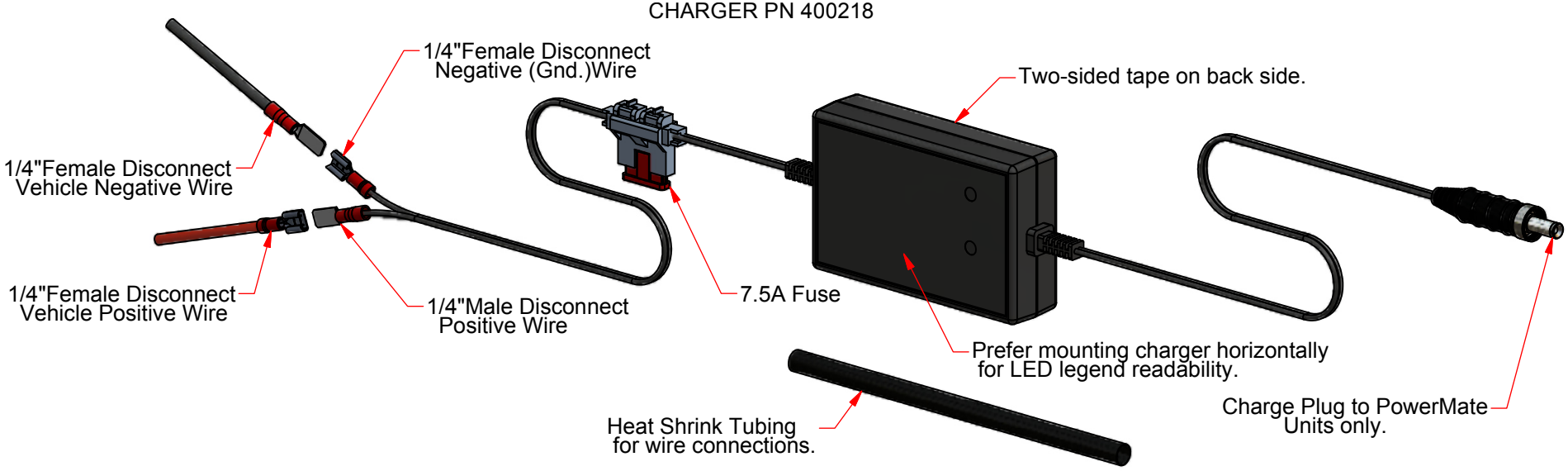
***PowerMate®*** units are fitted with Sonnenschein Batteries. Customers using ***PowerMate®*** get a full days' use from a fully charged battery. When ***PowerMate®*** is not in use, recharge the battery.



PN 011700 Rev.E
Eng. 04/ 25/ 14

# BATTERY CHARGER REMOTE INSTALLATION INSTRUCTION

CHARGER PN 400218




**Locating the Charger:**

Determine the position in the vehicle the PowerMate Unit will be using as it's charging station. The Battery Charger should be mounted in a position that will allow visibility of the charger and give easy access for the charger output wire (6 feet) and charge plug to the PowerMate Unit. The charger is equipped with adhesive backing for mounting to any flat surface.

NOTE:The mounting location should be free from moisture, dirt, and other contaminants. The charger should be mounted where the air is free to move around it. It should never be located in a box, compartment, or covered by any object. Doing so may result in excess heating and reduced performance. Do not expose the charger to any type of water spray. Do not immerse in water or any liquid. Should the charger become wet inside it should be disconnected immediately and returned to the manufacturer for refurbishment. Mount where the charger and its cables will not be physically damaged.

**Input Wiring:**

The installation will require a negative ground contact, and a positive wire coming from the vehicle battery. It is the installers responsibility to ensure the wire is of proper size capable of carrying at least 7 Amps continuous. In order to ensure maximum performance of the charger, the following wire sizes are recommended:

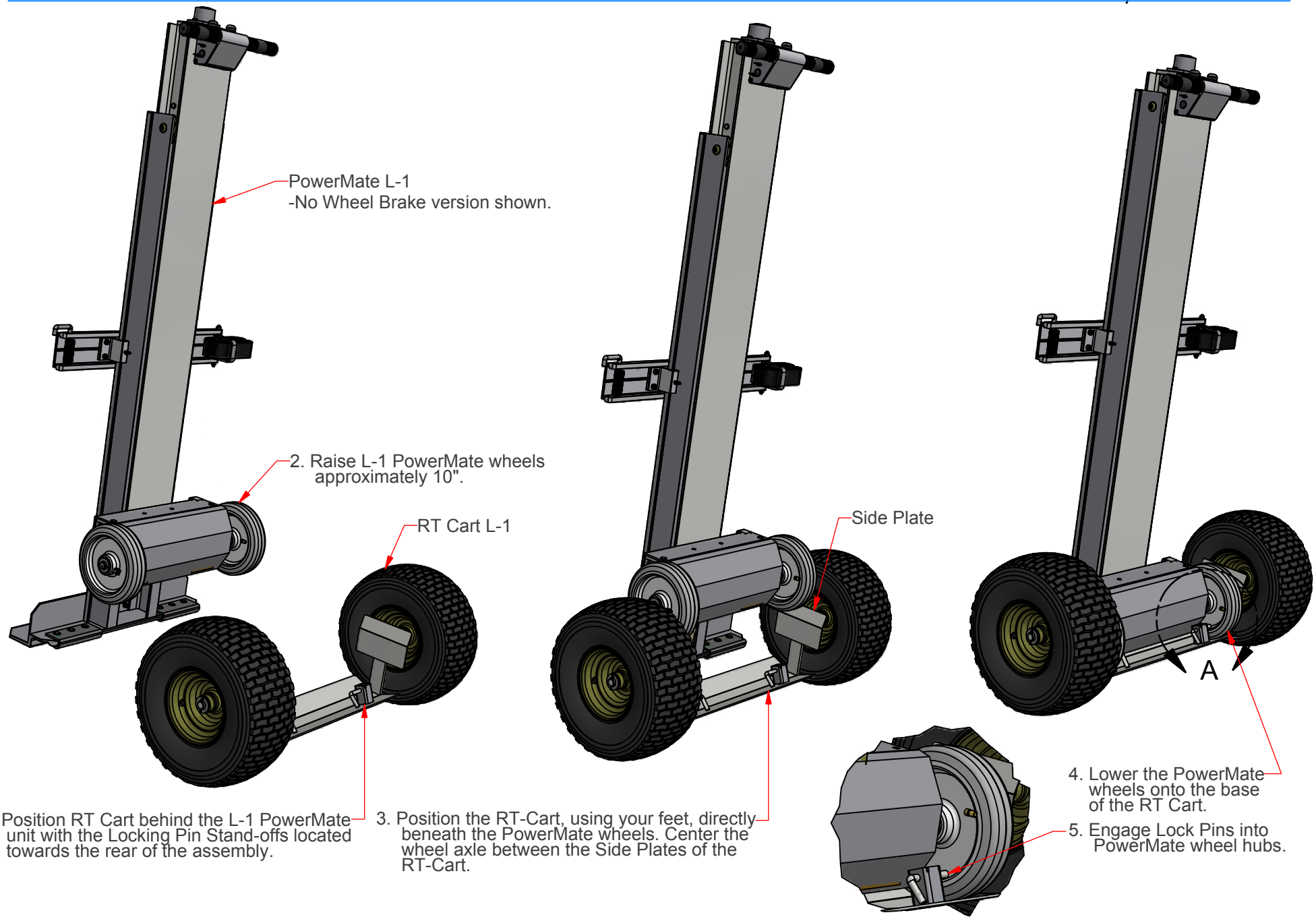
| EXTENSION LENGTH | MINIMUM WIRE GAUGE |
|---|---|
| Up to 10 feet | 12 AWG |
| 11 feet to 20 feet | 10 AWG |
| 21 feet to 30 feet | 8 AWG |
| Over 30 feet | Not recommended |

Attach a 1/4"Male Terminal Disconnect to the negative (Gnd.) wire and a 1/4"Female Terminal Disconnect to the positive wire. Slip on a piece of Heat Shrink Tubing (provided) over the lead in connections and connect the lead in wires to the mating charger input wires. Slide the Heat Shrink Tubing over the connections and shrink. Secure all wires to prevent damage. Wire loom material may be used. It is the installer's responsibility to ensure the wiring to the vehicle battery and negative ground point are properly protected and secure.

NOTE: Refer to the Battery Charger Manufacturers documents provided for safety and operating instructions. Take into consideration that this charger has been modified for remote location mounting.



PN 011720 Rev.E
Assy. No. 400218
Eng. 04/ 17/ 14




# RT CART L-1 ATTACHMENT INSTRUCTION

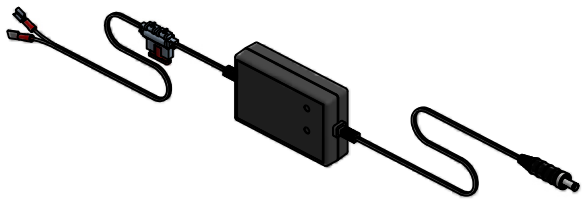


PN 011730 Rev.E
Assembly 414300
Eng. 04/ 17/ 14

# *PowerMate®* ACCESSORIES/SPARE PARTS FOR ALUMINUM MODELS

## 400217 IN-VEHICLE CHARGER

The MobileCharge 12E charges your PowerMate from the vehicle 12V system. When the vehicle if off, it will continue to charge for 2.5 hrs, protecting the vehicle battery. The 3-stage charging profile extends battery life and is independent of vehicle system voltage.



*Battery Charger Remote Kit shown. In-Vehicle Charger comes with accessory port plug.*

## 400218 BATTERY CHARGER REMOTE KIT

Our hard-wired MobileCharge 12E smart charging system keeps yout PowerMate charged as it remains in the back of your vehicle. It will never draw draw the vehicle battery down below 70% capacity so your vehicle will always will have enough power to start the engine.

## 414300 ROUGH TERRAIN CART L-1/P-2

(For PowerMates without Wheel Brakes)

Perfect for moving heavy loads across gravel, grass, mud, snow, delivering to new construction sites and row housing.



| | | |
|---|---|---|
| Depth | 16 inch | 40.64 cm |
| Width | 38 1/4 inch | 97.16 cm |
| Height | 16 inch | 40.64 cm |
| Weight | 37lb. | 16.8 kg |

## 414305 ROUGH TERRAIN CART L-1/P-2

(For PowerMates with Wheel Brakes)

Perfect for moving heavy loads across gravel, grass, mud, snow, delivering to new construction sites and row housing.



| | | |
|---|---|---|
| Depth | 16 inch | 40.64 cm |
| Width | 38 1/4 inch | 97.16 cm |
| Height | 16 inch | 40.64 cm |
| Weight | 37lb. | 16.8 kg |

## 404210 STEP EXTENSION



Comes with Mat Assembly and can be placed at the top or bottom of a staircase to create more room and a better turning surface for maneuvering your PowerMate with it's load. Allows you to complete 17% more moves.

Step Extension = 20"x 28" Mat Assembly = 22"x 44"

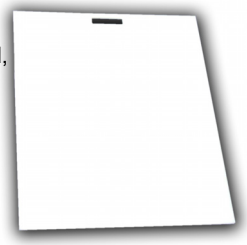
## 414100 L-1 WHEEL BRAKES



| | | |
|---|---|---|
| Depth | 3 1/4 inch | 8.26 cm |
| Width | 5 1/4 inch | 13.35 cm |
| Height | 6 1/2 inch | 16.51 cm |
| Weight | 12 1/2 lb. | 5.67 kg |

## 304200 PIVOT PAD/MAT ASSEMBLY

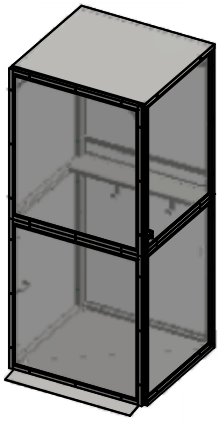
Available in two sizes, the Pivot Pad is made of durable material which allows you to turn the PowerMate, with it's load, on a dime. Move your loads effortlessly around tight corners while protecting your customer's property.



Pivot Pad = 24" wide x 30"l ong x 1/4" thick
Mat Assembly = 28" wide x 44" long x 1/4" thick

## 406400 DOCKING STATION

The Docking Station is a secure storage locker for storing and charging a PowerMate. Hanging devices are provided for accessories.



L P INTERNATIONAL INC.
P.O. Box 696, 151 Savannah Oaks Dr.,
Brantford, ON N3T 5P9
TEL: (519)759-3292 FAX: (519) 759-3298
1-800-697-6283
www.powermate.info



PN 011920 Rev.E1
Eng. 08/ 14/ 14

# ***PowerMate*® ACCESSORIES/SPARE PARTS FOR ALUMINUM MODELS**

## 410040 HOT WATER TANK ATTACHMENT

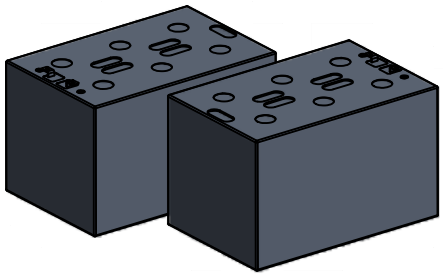


| | | |
|---|---|---|
| Depth | 6" | 15.2 cm |
| Width | 18 1/4" | 46.35 cm |
| Height | 4 1/2" | 10.79 cm |

| | | |
|---|---|---|
| Depth | 12 3/4" | 32.38 cm |
| Width | 18 1/4" | 46.35 cm |
| Height | 4 1/2" | 10.79 cm |

1. Top piece fits over Strapbar.
2. Bottom piece fits over toeplate.

## 410053 SEALED BATTERY PACK 12V 20Ah



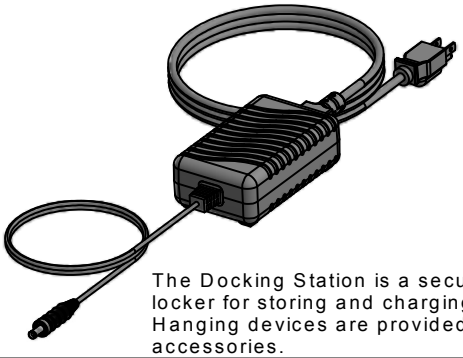
For L-1 Units Ser. No. 30550 and higher.

## 410190 EXTENDED TOEPLATE DEPTH



| | | |
|---|---|---|
| Depth | 13" | 33.02 cm |
| Width | 22" | 55.88 cm |
| Height | 4 3/4" | 12.06 cm |

## 400211 BATTERY CHARGER



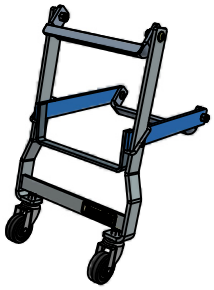
The Docking Station is a secure storage locker for storing and charging a PowerMate Hanging devices are provided for accessories.

## 410020S EXTRA STRAPBAR

| | | |
|---|---|---|
| 400310 | 10' Strap | 3.05m |
| 400320 | 12' Strap | 3.65m |
| 400300 | 14' Strap | 4.24m |
| 400340 | 16' Strap | 4.87m |



## 414810 DOLLY ATTACHMENT KIT



## 410061 CYLINDER ATTACHMENT



| | | |
|---|---|---|
| Depth | 6" | 15.24 cm |
| Width | 18" | 45.72 cm |
| Height | 4" | 10.16 cm |

## 410801 PREVENTATIVE MAINTENANCE KIT

Consisting of:

| QTY | PART No. | DESCRIPTION |
|---|---|---|
| 1 | 410060 | BOTTOM RUBBER GUARD ASSEMBLY |
| 2 | 050210 | SWITCH PUSH BUTTON 2 TERMINAL |
| 1 | 400310 | STRAP 10' c/w HARDWARE |
| 1 | 400150 | BRAKE ASSEMBLY KIT |
| 1 | 400160 | BEARING OVERRIDE KIT |

L P INTERNATIONAL INC.
P.O. Box 696, 151 Savannah Oaks Dr.,
Brantford, ON N3T 5P9
TEL: (519)759-3292 FAX: (519) 759-3298
1-800-697-6283
www.powermate.info



PN 011930 Rev.E1
Eng. 08/ 14/ 14

# Warranty

Every ***PowerMate***® Safety Moving System supplied by L P INTERNATIONAL INC. including accessories, with the exception of batteries, straps and shear pins is guaranteed against faulty workmanship and defective materials for a period of one year from date of purchase, when given normal use and maintenance in accordance with operation manual.

The above warranty will apply only to the original purchaser.

L P INTERNATIONAL INC. do not hold themselves responsible for any damage caused by atmospheric or chemical influences nor defects due to unskilled operation, lack of maintenance and use of unprescribed lubricants. Neither do they accept responsibility for normal wear and tear and consequences therefrom. Warranty Service is available through your local authorized dealer or distributor. Warranty is void if serviced by unauthorized persons.

Machine Model _____ Serial No. _____

Manufactured By:
**L P INTERNATIONAL INC.**

MAILING ADDRESS

P.O. BOX 696, 151 SAVANNAH OAKS DR.
BRANTFORD, ONTARIO, CANADA
N3T 5P9

USA MAILING ADDRESS:
P.O. BOX 1132
LEWISTON, N.Y., 14092-8132

PHONE: (519) 759-3292
1-800-697-6283
FAX: (519) 759-3298

# DECLARATION OF CONFORMITY

**ORIGINAL LANGUAGE VERSION**

Date:

Manufacturer: L P INTERNATIONAL INC.
Box 696, 151 Savannah Oaks Dr
Brantford ON CA N3T 5P9

declares that the apparatus:

***PowerMate*® Model Serial №**

➪ conforms to the protection requirements of Council directive:

**2006/42/EC (Machinery Directive)**
**2004/108/EC (Electromagnetic Compatibility Directive)**

on the approximation of the laws of the Member States relating to machinery directive and electromagnetic compatibility.

➪ STANDARDS including Annex 1 of 2006/42/EC and 4 (Lifting)

**NAME** **L. Jeavons**

**TITLE** **General Manager**

**SIGNATURE**

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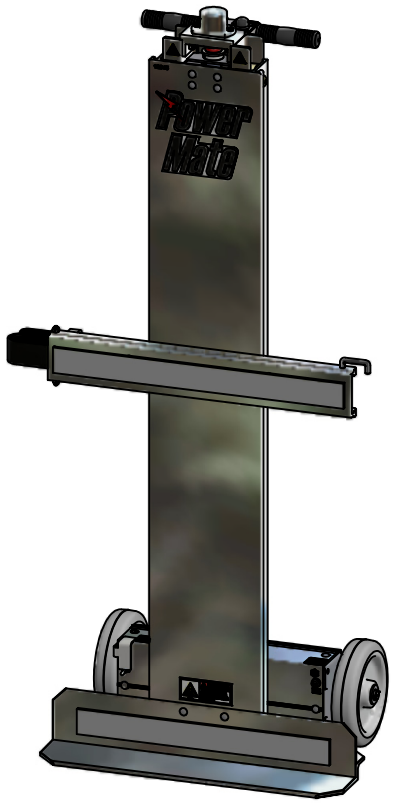
# DAILY MAINTENANCE SCHEDULE

NOTE: If attempting any service repair work disconnect the battery by depressing the toggle on the circuit breaker.

- Inspect unit frame for structural damage.
- Inspect wheels and tires. Grease the wheels if required. Ensure the cotter pins are in place.
- Inspect all bolts and fasteners are in place and secure.
- Inspect the load straps for damage. Nicks or tears are not acceptable.
- Inspect the push button switches for condition and operation. Make sure the wiring is secure.
- Test the circuit breaker for operation. Cycle the unit testing for operation, direction and smoothness.
- Observe the roller operation in the outer frame rails. Oil rollers as required. Inspect the drive screw and ballnut for damage, bending (wobble during operation), and lubrication.
- Ensure the operating manual is readily available for reference.
- Keep the battery fully charged.

**FOR PARTS AND SERVICE CONTACT:**

**1-800-697-*Mate***






PN 011820 Rev.E
Eng. 04/ 25/ 14