PowerMate®

L1/L2 Series Model Repair Manual

PowerMate®/LP International Inc.
P.O. Box 696, 151 Savannah Oaks Drive
Brantford, ON, CA N3T5P9
Tel: (519) 759-3292 Fax: (519) 759-3298 Toll: 1-800-697-6283
Website: www.PowerMate.info Email: info@powermate.info

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Section A: Trouble Shooting

Switches

Both Switches Inoperative

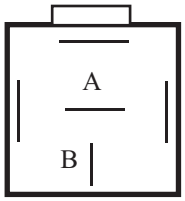
A. Check and replace fuse if necessary with 30A automotive fuse.
B. Test battery and or batteries.
C. Wiggle and visual test of wiring for loose, pinched or broken wires.
D. Motor brushes

One Switch Inoperative

E. Bypass Switch: Cross the two terminals on the bottom of the suspect switch with a wrench or screwdriver. If the machine works, switch is faulty. See Switch/Charge Plug replacement. Continue troubleshooting relay and solenoids if the machine is still inoperative.

Relay and Solenoids

A. Bypass Relay: **Special Note: When performing this test, do not push both push button switches at the same time.



Remove two wires (refer to diagram) and join together. Push the suspect switch. If the switch works, the relay is faulty. See Relay Replacement. Continue troubleshooting if the machine is still inoperative.

B. Bypass Solenoid: **Special Note: This is a test that will require two people.**
This test also requires one 6-8" length of 10G wire. The solenoid(s) to be tested will be determined by the type of machine and the suspect switch (open or close), refer to appropriate diagram.

iii.	L-Series Open switch (wheels up/load down)	2 solenoids bottom of the pack
iv.	L-Series Close Switch (wheels down/load up)	2 solenoids top of the pack

1. Depress and hold down the suspect switch.
2. Take the 10G wire and make contact on the large posts of one of the two solenoids. If the machine operates, the solenoid is faulty. See Solenoid Replacement. If the machine is still inoperative repeat steps on the next solenoid.

***NOTE:** Though slight, there is a possibility of both solenoids inoperative, check both.*

Machine Will Not Lift a Load

Drive Screw Spinning

A. Ballnut locknut is too loose. To tighten see Ballnut Locknut Adjustment.
B. If the above does not solve the problem, the ballnut will have to be replaced. See Ballnut Replacement.

Drive Screw NOT Spinning

C. If the motor is spinning but not the drive screw:
   1. L-Series : Check brake assembly kit and replace if damaged. See Brake Assembly Replacement. Also, if the brake assembly is damaged check and ensure the drive screw is still connected to the motor.
   2. Check roll pin in the coupling. Replace if sheared or misshapen.
   3. Check coupling and replace if stripped.
   4. Check motor spline and replace if stripped.

D. If the motor is not spinning, check the battery and replace if necessary.

Section A: Trouble Shooting Continued

Machine is Fully Open and Will Not Close

A. If the drive screw just spins, the ballnut locknut is too loose. See Ballnut Locknut Adjustment.

B. If the drive screw does not spin, the ballnut locknut is too tight. See Ballnut Locknut Adjustment.

Urethane Bumper is Squashed

A. Ballnut locknut is too tight. See Ballnut Locknut Adjustment.

B. Check the spring washer in the override bearing kit for flatness. If the spring washer has flattened, see Override Bearing Assembly Replacement.

Machine Operates Intermittently

A. If the machine is used quite extensively and or is older, the problem will more that likely be motor brushes. See Motor Brush Replacement.

B. If machine is new, wiggle check and visually inspect for loose pinched or broken wiring, also, see Relay and Solenoids.

Load Drifts Down

A. Check Brake Assembly Kit for sheared or misshapen roll pin and or damaged spring. Replace Brake Assembly Kit if necessary. See Brake Assembly Replacement.

Machine Makes a Grinding Noise When Opening & Closing

A. On a M-Series the inner frame is probably bent. The proper measurement on the inner frame will be 14” from the outside of the frame. If a minimum 16” C or Bessey clamp is available, repair can be completed by the customer. The bend is usually at or around the battery box. Open the machine enough to attach the clamp to where the battery box is welded. Close the clamp to 13.5”. The frame will spring back to around 14”. If clamp is not available, return to L P for repair.

Brake Cap Gets Hot During Normal Use

A. Check Brake Assembly Kit for sheared or misshapen roll pin and or damaged spring. Replace Brake Assembly Kit if necessary. See Brake Assembly Replacement.

Wheel Brakes Flip Over During Normal Use

A. Check and replace green urethane stop if necessary.

B. Coupling on brake shoe needs adjustment. Bend coupling slightly towards the wheel axle. See diagram for details.

Charging System

A. Machine will not accept a charge.

1. Check fuse and replace with 30A automotive fuse if necessary.
2. Wiggle and visual test of wiring for loose, pinched or broken wires.
3. Check wiring inside of charger plug. Refer to the back of the charger for positive and negative wire colors. The positive wire will go the large prong and the negative to the center.
4. Check the battery(s). If Amps are too low, battery will not charge. See Installation of Sealed Batteries Diagram.

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Section B: Switch/Charge Plug Replacement L-1

PROCEDURE:

NOTE: *Remove the fuse prior to any maintenance on this equipment.*

1. Remove the two Handle Housing Covers by removing the four screws.

TOGGLE SWITCH

2. Remove the Nut retaining the Toggle Switch, and dis-engage the Toggle Switch from the Handle Housing Cover. If the Toggle Switch replacement is required, remove the two switch wires and replace the Toggle Switch at this time.

PUSH BUTTON SWITCH

3. Unscrew the Rubber Covers and remove the Push Button Switches out of the side of the Handle Housing. Install new Push Button Switches, swapping one wire at a time to maintain proper order.

NOTE: *Do not remove any wires unless the switch is to be replaced*.

CHARGE PLUG

4. If the Charge Plug requires replacement, remove the two 6-32NC nuts and screws and pull out the charge plug with wires.
5. Transfer wires from the charge plug to the replacement charge plug maintaining wire placement. Re-install the plug into the Handle Housing, insert the two 6-32NC Screws and secure with the two N-32NC Nuts.
6. Insert the push button Switches into the Handle Housing and secure with the Rubber Covers.

7. Insert the Toggle Switch into the handle Housing Cover and turn with the Switch Nut.
8. Attach the Handle Housing Covers securing with the 10-24NC Screws.
9. Re-install the fuse and test.

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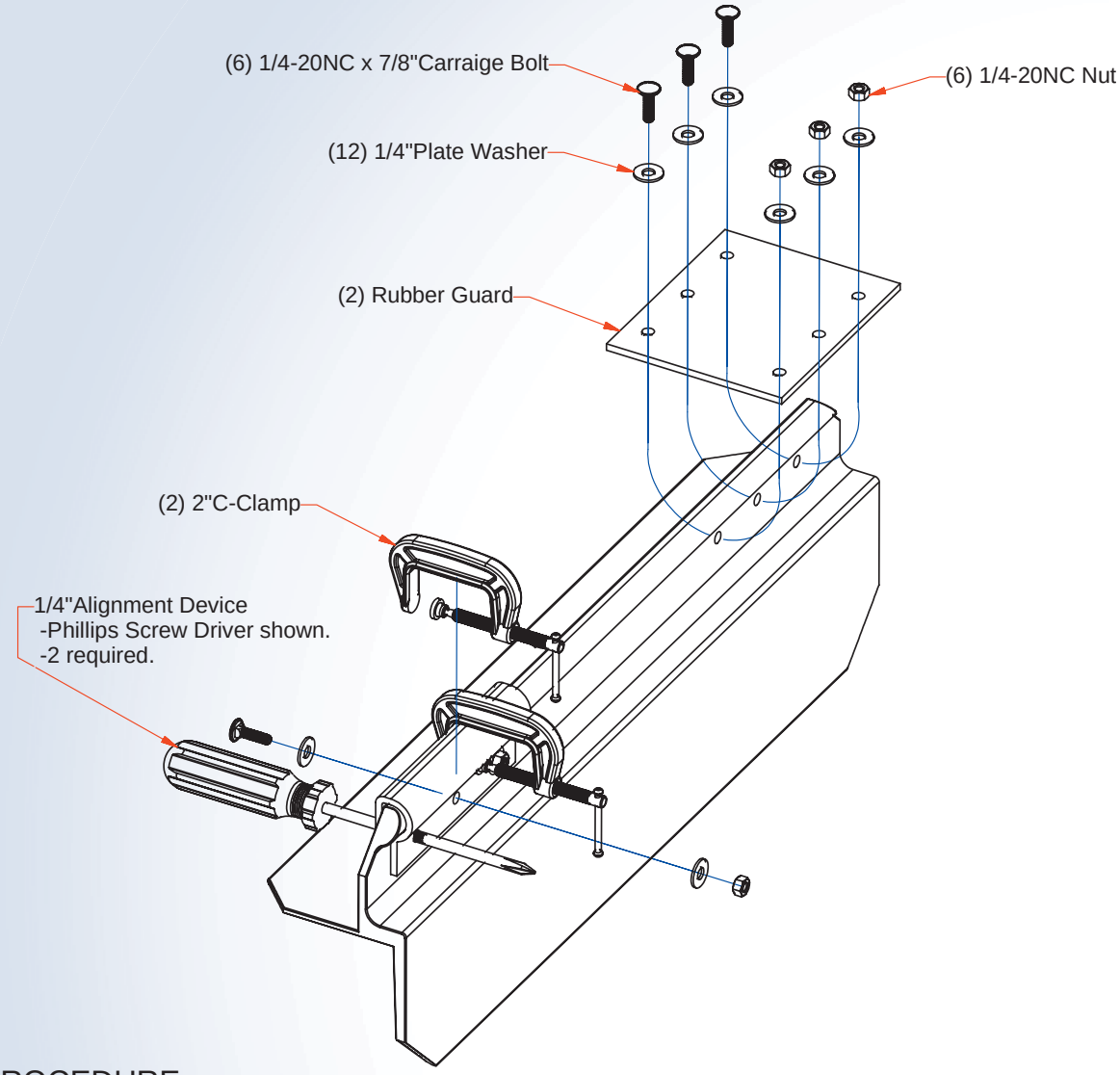
Section C: Bottom Guard Replacement



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 GUARD REPLACEMENT

Replacement Kit No. 410060

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Section D: Strap Replacement

PROCEDURE:

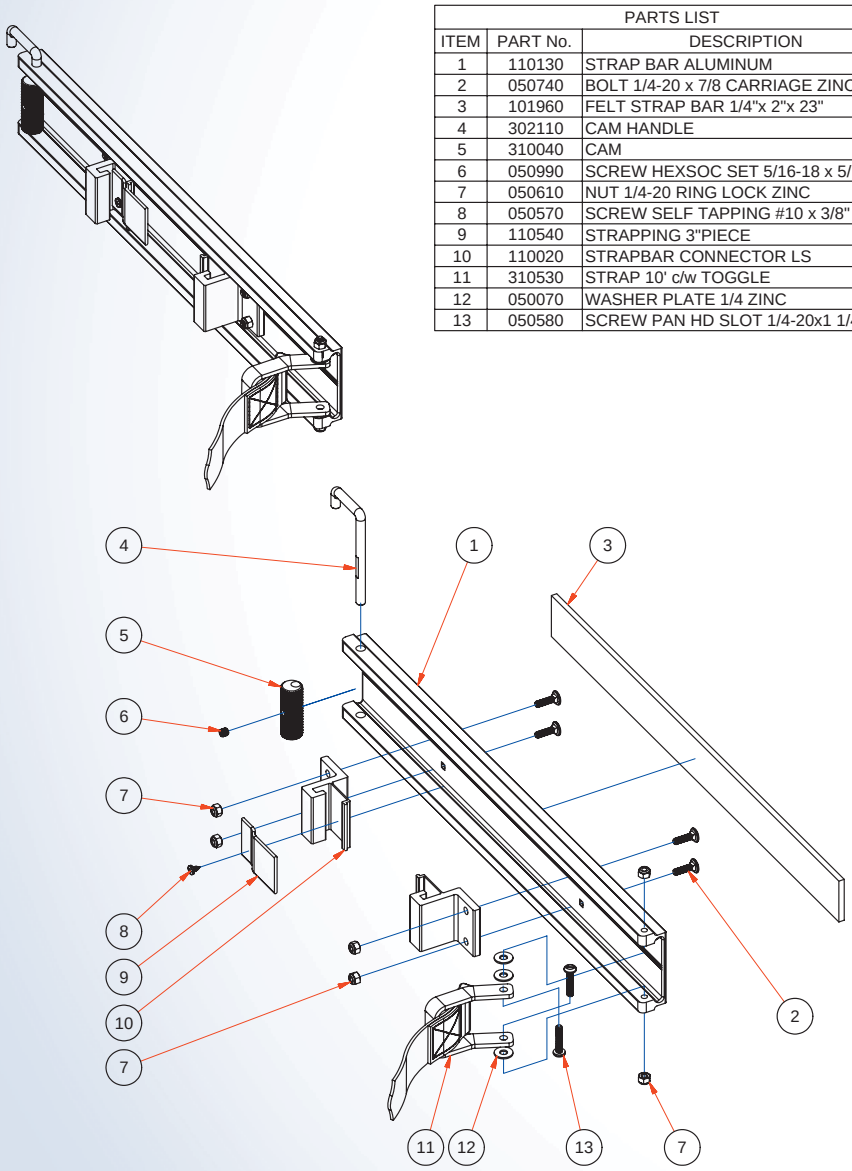
1. Remove the two Screw Pan HD Slot (Item 13), 3 Washer Plates (Item 12), 2 Nuts 1/4-20 Ring Lock (Item 7), Strap & Toggle (Item 11) with slot screwdriver and 7/16” wrench. Discard.
2. Position new Strap & Toggle with three Washer Plates (Item 12) positioned inside of the Strap-bar, two on the inside top, one on the inside bottom. Insert the two Screw Pan HD Slot (Item 13) and affix with two Nuts 1/4-20 Ring Lock (Item 7). Snug, but do not over tighten.

Offset Cam Adjustment

PROCEDURE:

1. Move Cam Handle (Item 4) parallel to the Strap Bar (Item 1).
2. Raise the Cam Handle (Item 4) and move the Cam (Item 5) and Screw Hexsoc Set 5/16” (Item 6) 90° to the Cam Handle.
3. Tighten with 5/32” allen key.

PARTS LIST		
ITEM	PART No.	DESCRIPTION
1	110130	STRAP BAR ALUMINUM
2	050740	BOLT 1/4-20 x 7/8 CARRIAGE ZINC
3	101960	FELT STRAP BAR 1/4"x 2"x 23"
4	302110	CAM HANDLE
5	310040	CAM
6	050990	SCREW HEXSOC SET 5/16-18 x 5/16
7	050610	NUT 1/4-20 RING LOCK ZINC
8	050570	SCREW SELF TAPPING #10 x 3/8"
9	110540	STRAPPING 3"PIECE
10	110020	STRAPBAR CONNECTOR LS
11	310530	STRAP 10' c/w TOGGLE
12	050070	WASHER PLATE 1/4 ZINC
13	050580	SCREW PAN HD SLOT 1/4-20x1 1/4



STRAP BAR ASSEMBLY
PN 410020S

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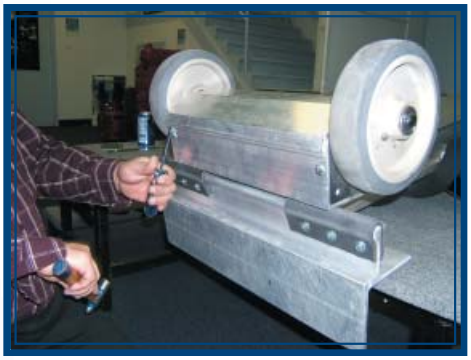
Section E: Solenoid Replacement

PROCEDURE:

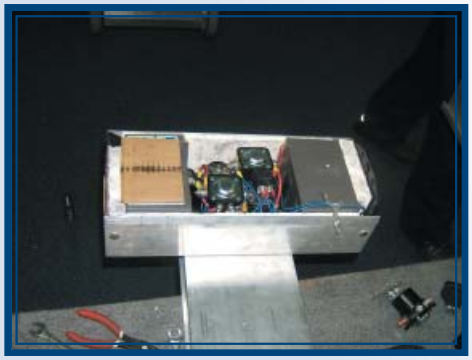
1. Place the machine on a suitable work bench with the machine resting on its face (toeplate down). Remove the fuse. *(See Pic E - A)*
2. Remove the Battery Box Cover using a large flat screw driver and hammer. *(See Pic E - B)*
3. Remove the wheels and axle. *(See Pic E - C)*
4. See Bypass Solenoid in the trouble-shooting guide to determine inoperative solenoid(s).
5. Remove styrofoam packing and both batteries. *(See Pic E - D)*
6. Remove the two bolts holding the suspect solenoid to the solenoid bracket. Remove wires from the suspect solenoid, label if necessary. Discard suspect solenoid. *(See Pic E - E)*
7. Re-wire the new solenoid, referring to the wiring diagram if necessary.
8. Install the new solenoid to the solenoid bracket (two bolts). *(See Pic E - F)*
9. Install 3/8” styrofoam to top and bottom of the Battery Box.
10. Install Battery Packs.
11. Install 1” styrofoam packing between Batteries and Battery Box ends.
12. Connect positive (red wires) to the large post of the bottom left side solenoid. Install the negative (black wires) to the large post of the upper right side solenoid.
13. Replace axle, wheels and Battery Box Cover.

Pic E - A: Remove the Fuse

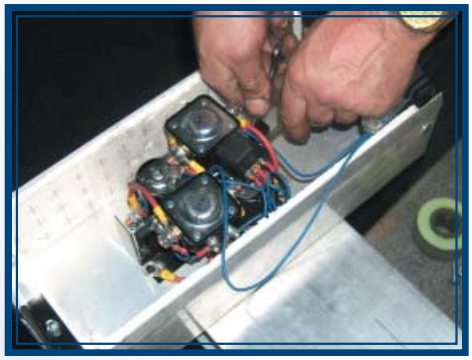


Pic E - B: Remove Battery Box

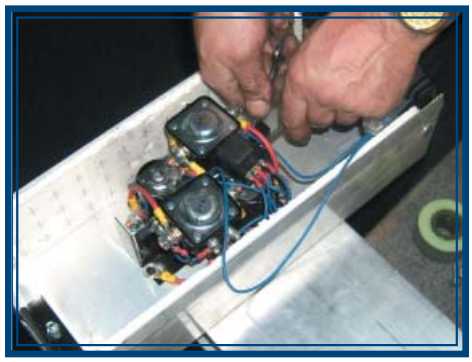
Pic E - C: Remove the Wheels and axle.



Pic E - D: Remove Styrofoam Packing and Both Batteries



Pic E - E: Remove Bolts



Pic E - F: Install New Solenoid

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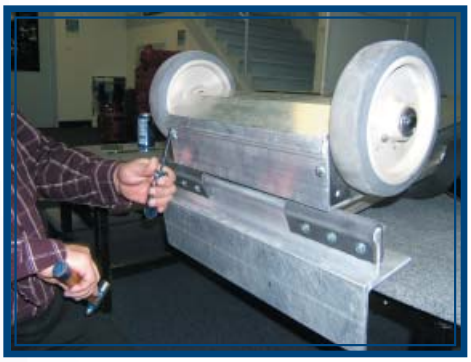
Section F: Relay Replacement

PROCEDURE:

1. Place the machine on a suitable work bench with the machine resting on its face (toeplate down). Remove the fuse. *(See Pic F - A)*
2. Remove the Battery Box Cover using a large flat screw driver and hammer. *(See Pic F - B)*
3. Remove the wheels and axle. *(See Pic F - C)*
4. At left side center of the solenoid pack is a nut and bolt securing the relay to the solenoid pack. Loosen only and remove relay. *(See Pic F - D)*
5. Important: With the new relay in hand, remove one wire at a time from the suspect relay and connect to the matching tang on the new relay. Discard old relay. *(See Pic F - E)*
6. Install the new relay, tighten nut and bolt to secure.
7. Replace axle, wheels and Battery Box Cover.
8. Re-insert fuse and test. 14. Re-insert fuse and test.

Pic F - A: Remove the Fuse



Pic F - B: Remove Battery Box

Pic F - C: Remove the Wheels and axle.

Pic F - D: Loosen only and remove relay

Pic F - E: Discard Old Relay

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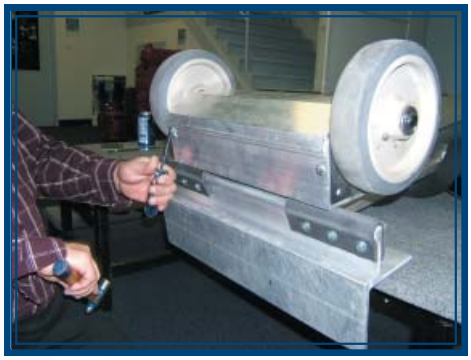
Section G: Fuse Assembly Replacement

PROCEDURE:

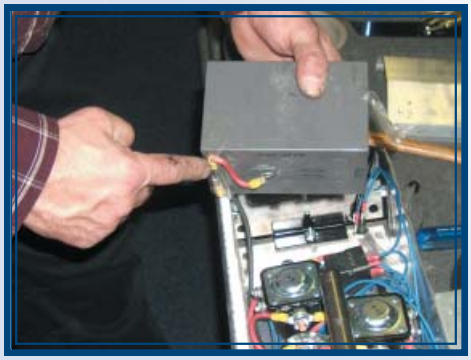
1. Place the machine on a suitable work bench with the machine resting on its face (toeplate down). Remove the fuse. *(See Pic G - A)*
2. Remove the Battery Box Cover using a large flat screw driver and hammer. *(See Pic G - B)*
3. Remove the wheels and axle. *(See Pic G - C)*
4. Remove the positive (red wire) off the large post of the bottom left side solenoid. Remove the negative (black wire) off the large post of the upper right side solenoid.
5. Remove styrofoam packing surrounding left side battery. Remove the battery for easy access to the fuse assembly. *(See Pic G - D)*
6. Disconnect and mark the two wires to ensure proper re-installation of the fuse assembly. *(See Pic G - E)*
7. Unscrew the placement washer and remove the old fuse assembly.
8. Remove fuse from the new assembly and install into position. Re-install placement washer hand tight. *(See Pic G - F)*
9. Re-attach marked wires to the fuse assembly. Re-install battery. Install styrofoam packing between Battery and Battery Box End.
10. Install the positive (red wire) to the large post of the bottom left side solenoid. Install the negative (black wire) to the large post of the upper right side solenoid.
11. Replace axle, wheels and Battery Box Cover.
12. Re-insert fuse and test.

Pic G - A: Remove the Fuse

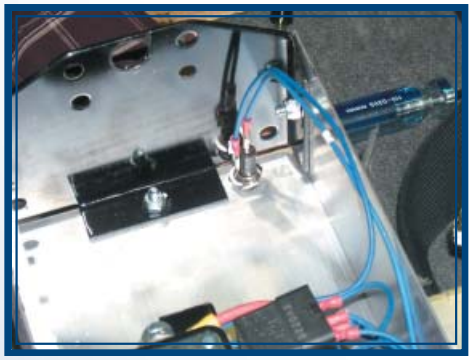


Pic G - B: Remove Battery Box

Pic G - C: Remove the Wheels and axle.



Pic G - D: Remove Styrofoam Packing and Both Batteries



Pic G - E: Disconnect and mark the two wires.

Pic G - F: Re-attach marked wires to fuse assembly

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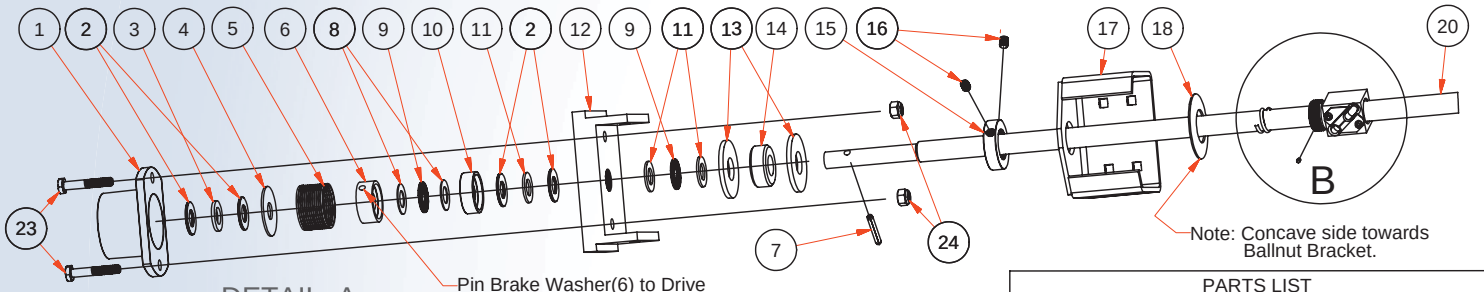
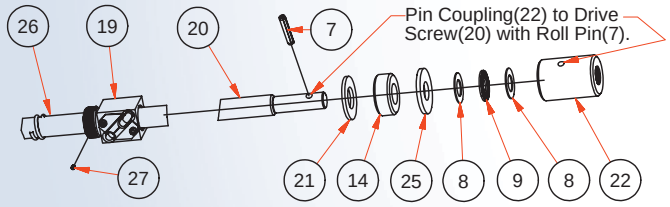
Section H: Override Bearing Assembly

PROCEDURE:

NOTE: *Read all instructions carefully before attempting to make repairs to any part of the drive screw assembly. Refer to the Screw Assembly Drawing.*

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).
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.





PARTS LIST		
ITEM	PART No.	DESCRIPTION
1	110450	BRAKE CAP L-SERIES
2	050840	WASHER THRUST BRONZE .060
3	050140	WASHER THRUST STEEL 1/2".090
4	150940	WASHER RETAINER
5	050800	BRAKE SPRING
6	050820	WASHER TOP BRAKE DRIVE
7	051680	ROLL PIN 3/16"
8	050810	WASHER THRUST STEEL 1/2"x .030
9	050120	BEARING THRUST STEEL
10	050850	WASHER BOTTOM BRAKE DRIVE
11	050920	WASHER THRUST STEEL 1/2"x .060
12	310070	BEARING RETAINER ASSEMBLY
13	050040	PLATE WASHER 5/8"
14	100700	URETHANE BUMPER
15	052090	BALLNUT LOCKNUT 5/8"SCREW
16	050550	SET SCREW 1/4-20NC x 5/16
17	310250	BALLNUT BRACKET
18	050830	WASHER DISC SPRING 5/8"
19	050170	BALLNUT 5/8"
20	102040	DRIVE SCREW 5/8"
21	051850	WASHER 5/8"
22	300840	COUPLING
23	050640	BOLT 1/4-20NC x 1 1/2"
24	050610	LOCK NUT 1/4-20NC
25	055640	PLATE WASHER 1/2"
26	050171	LOAD LOCKING SPRING
27	102045	LOAD LOCK PIN

SCREW ASSEMBLY L-1, LE-1
P/N 310010

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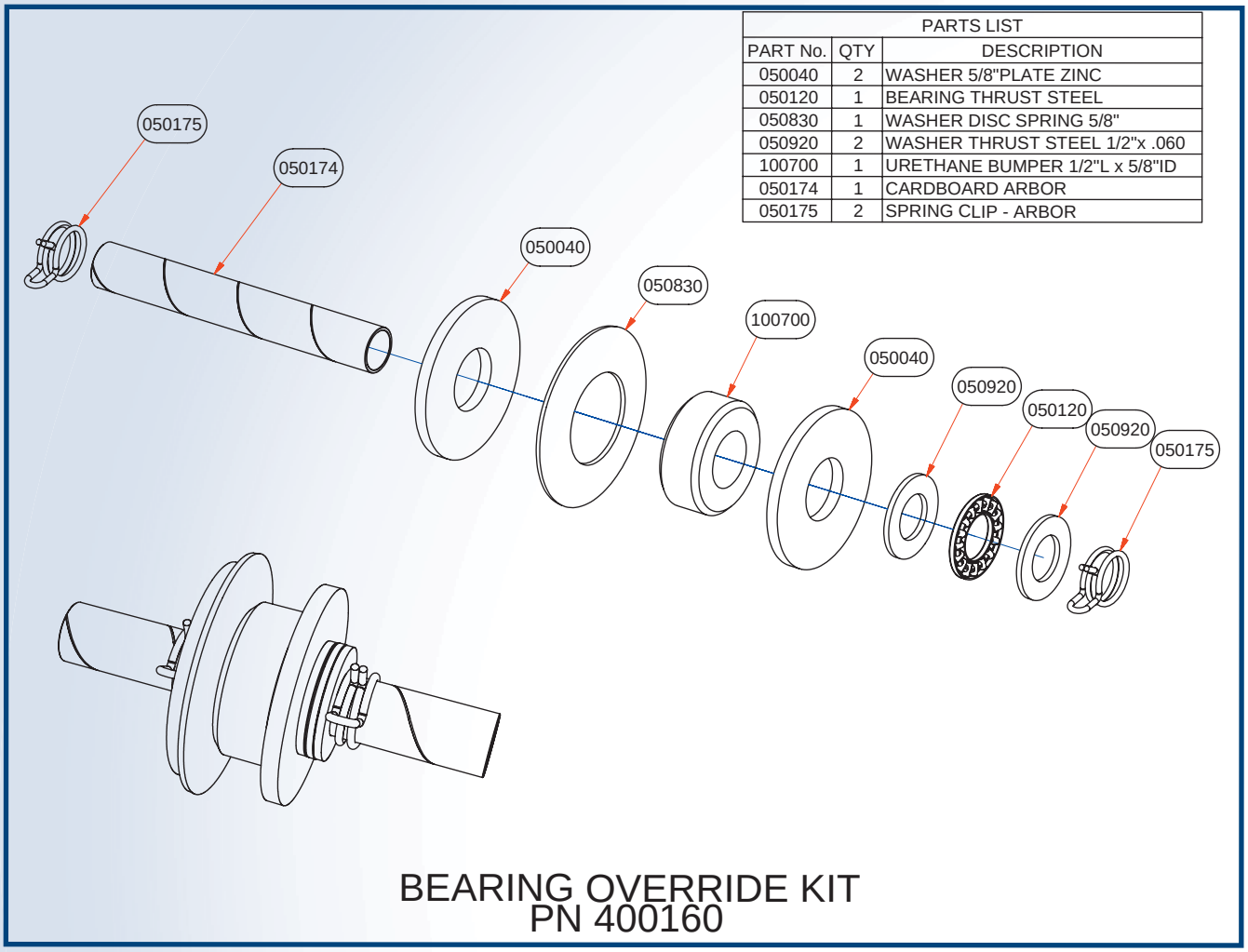
Section H: Override Bearing Replacement - (con't)

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

Section I: Motor Brush Replacement

PROCEDURE:

1. Place the PowerMate on a suitable work bench with the machine resting on it's wheels and rear handles (toeplate up). Activate the unit until it is extended approximately half-way. Remove the fuse. *(See Pic I - A on pg 13)*
2. Remove four nuts retaining the toeplate to the Outer Frame. *(See Pic I - B on pg 13)* Remove the two bolts and nuts fastening the Bearing Retainer *(See Pic I - C on pg13)* and the Inner Frame. *(See Pic I - D on pg13)* The Outer Frame can now be slid off the Inner Frame in the direction of the handles.
3. Apply duct tape to the top of the motor to stop the motor from pulling apart. *(See Pic I - E on pg 13)*
4. Undo the bolts at the bottom of the motor. *(See Pic I - F on pg 13)*
5. Gently grasp the top and middle of the motor and gently wiggle the motor from the bottom that is attached to the PowerMate and pull off. *(See Pic I - G on pg 14)*
6. Loosen up the bolt on the casing that is still attached to the frame and remove the nut and washers. *(See Pic I - H on pg 14)*
7. Remove the motor brush by pushing the bolt end into the hole off the base.
8. Place the new motor brush into the casing. Hold the black spacer tight into the hole and while keeping constant pressure on the black spacer re-install the washers, wire and nut back on to the bolt on the motor brush. *(See Pic I - I on pg 14)*

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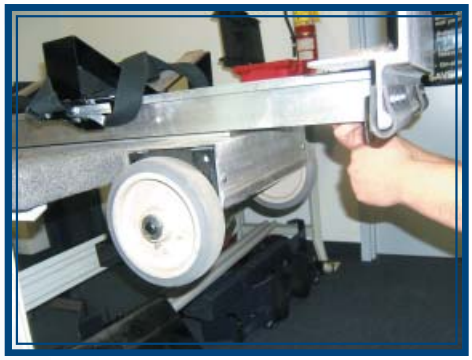
Section I: Motor Brush Replacement (con't)

PROCEDURE (con't):

9. Check the motor spline and ensure there are still three washers on the spline. These washers are very thin, it is best to put them between your thumb and index finger, separate and count them. *(See Pic I - J on pg 14)*
10. To put together the motor body, put it on a slight angle and join together. Tricky. *(See Pic I - K on pg 14)*
11. Tighten the bolts at the bottom of the motor. *(See Pic I - L on pg 14)*
12. Take a hack saw and cut off excess bolt even with the nut on the motor brush. *(See Pic I - M on pg 14)*
13. Turn the stairclimber drive screw so the ballnut is positioned approximately halfway along the drive screw . Slide the outer frame over the inner frame from the handle end. *(See Pic I - N on pg 14)*
14. Grip the drive screw and rotate to engage the coupling with the spline on the stairclimber motor. The bearing retainer can now be fastened to the inner frame with ¼" bolts and nuts. *(See Pic I - O on pg 14)*
15. Re-assemble the toeplate to the outer frame with four ¼" carriage bolts and nuts.
16. Re-install the fuse and operate.
17. Adjust ballnut locknut properly. Tighten ballnut locknut hand tight only, then tighten the set screws. See Ballnut Locknut Adjustment for details.
18. Test the machine for smooth operation.
19. NOTE: Ballnut must spin in the ballnut bracket when machine is operated to its limit in either direction. Re-adjust the ballnut locknut if necessary.
20. Test the machine for proper brake action. This test should be performed with a minimum load of 300lbs (140Kg). Braking of the load should be heard to start immediately upon release of the switch.
21. Reach for a cold drink, you deserve it.

Pic I - A: Remove the Fuse

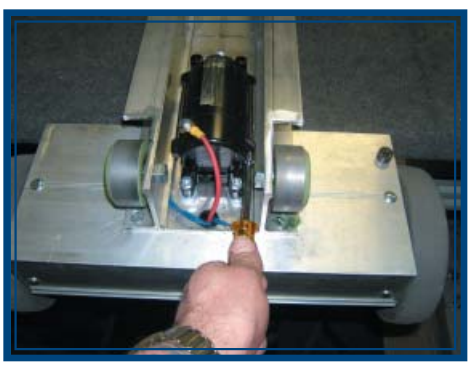


Pic I - B: Remove four nuts retaining the toeplate to outer frame

Pic I - C: Remove teh two bolts and nuts fastening the bearing retainer

Pic I - D: Slide off the outer frame from the inner frame

Pic I - E: Apply duct tape to top of motor.



Pic I - F: Undo bolts at the bottom of motor.

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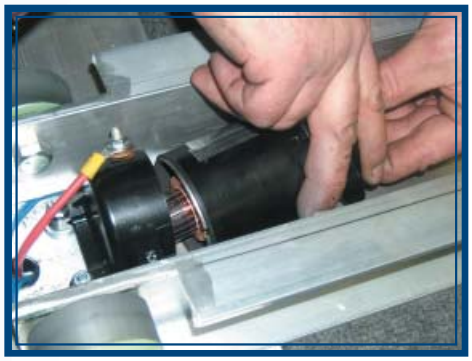
Section I: Motor Brush Replacement (con't)

Pic I - G: Gently grasp top and middle of motor

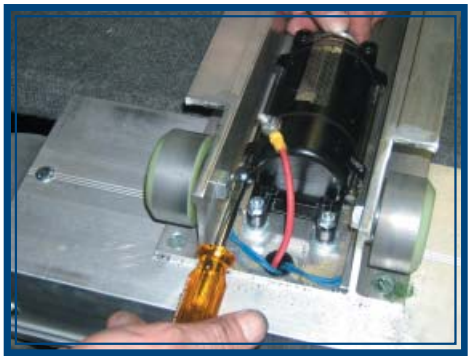
Pic I - H: Loosen up the bolt on the casing that is still attached to the frame.

Pic I - I: Place the new motor brush into the casing

Pic I - J: Check the motor spline and ensure there are still three washers on the spline



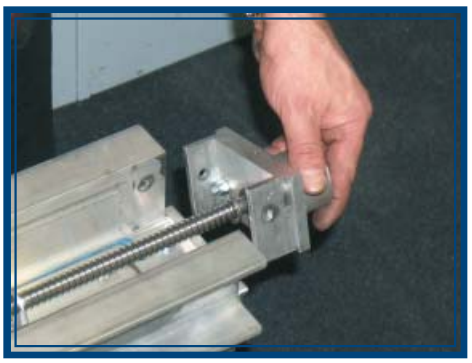
Pic I - K: Put motor body on a slight angle and join together.



Pic I - L: Tighten the bolts at the bottom of the motor

Pic I - M: Take a hack saw and cut off excess bolt even with the nut on the motor brush

Pic I - N: Turn stairclimber drive screw so the ballnut is positioned halfway along the drive screw.



Pic I - O: Grip the drive screw and rotate to engage the coupling with the spline on the stairclimber motor.

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Section J: Drive Screw Assembly Replacement

PROCEDURE:

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

Refer to the Screw Assembly Drawing on page 11.

1. Place machine on a suitable work bench with the machine resting on it's wheels and rear handles (toeplate up). Activate the unit until it is extended approximately half-way. Remove the fuse.
2. Remove four nuts retaining the toeplate to the outer frame. Remove the two bolts and nuts fastening the bearing retainer(item 12) and inner frame. The outer frame can now be slid off the inner frame in the direction of the handles.
3. Remove the brake assembly as outlined in the Brake Assembly Replacement procedure steps 1 through 3.
4. Remove the override bearing assembly as outlined in the Override Bearing Assembly Replacement procedure step
5. 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 have loosened and the locknut removed. Remove the ballnut bracket(17) and the spring disc washer(18) from the screw.
6. 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.
7. As per the screw assembly drawing, replace the override bearing components (Bearing Override Kit P/N 400160) in reverse order as follows: 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).
8. As per the screw assembly drawing, replace the brake assembly components (Brake Assembly Kit P/N 400150) in reverse order as follows: 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(17).
9. Install brake cap(1) and insert the ¼" bolts(22) and fasten with the nuts(23).
10. Turn the stairclimber drive screw (20) so the ballnut (19) is positioned approximately halfway along the drive screw (20). Slide the outer frame over the inner frame from the handle end.
11. Grip the drive screw (20) and rotate to engage the coupling (22) with the spline on the stairclimber motor. The bearing retainer can now be fastened to the inner frame with ¼" bolts (23) and nuts (24).
12. Re-assemble the toeplate to the outer frame with four ¼" carriage bolts and nuts.
13. Re-install the fuse and operate.
14. Adjust ballnut locknut properly. Tighten ballnut locknut (15) hand tight only, then tighten the set screws (16). See Ballnut Locknut Adjustment for details.
15. Test the machine for smooth operation.
16. NOTE: Ballnut must spin in the ballnut bracket when machine is operated to its limit in either direction. Re-adjust the ballnut locknut (15) if necessary.
17. Test the machine for proper brake action. This test should be performed with a minimum load of 300lbs (140Kg). Braking of the load should be heard to start immediately upon release of the switch.

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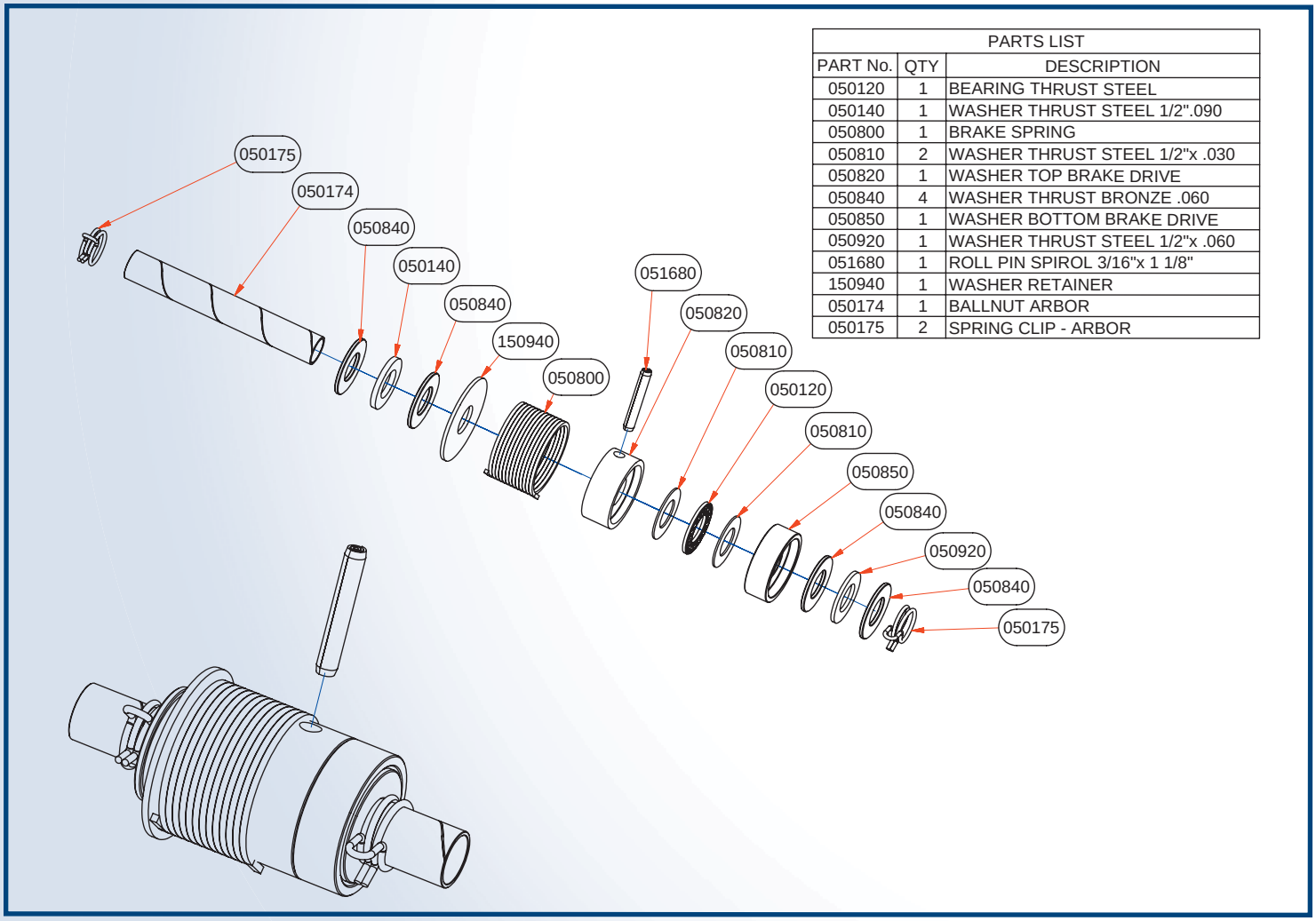
Section K: Brake Assembly Replacement

PROCEDURE:

NOTE: *Read all instructions carefully before attempting to make repairs to any part of the drive screw assembly.*

Refer to the Screw Assembly Drawing on page 11.

1. With reference to the Screw Assembly drawing, remove the two ¼" 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).
4. As per the screw assembly drawing, replace the brake assembly components (Brake Assembly Kit P/N 400150) in reverse order as follows: (see drawing below)
   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(17).
5. Install brake cap(1) and insert the ¼" bolts(22) and fasten with the nuts(23).



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

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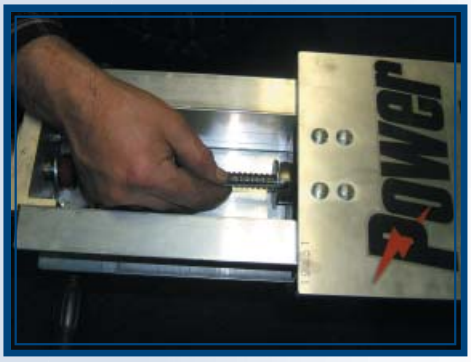
Section L: Ballnut Locknut Adjustment

PROCEDURE:

1. Place the PowerMate on a suitable work bench with the machine resting on it's wheels and rear handles (toeplate up). Activate the unit until it is extended approximately half-way. Remove the fuse.
2. Loosen the two Set Screws 5/16" (Item 16) on the Ballnut Locknut (Item 15). *(See Pic L - A)* (refer to screw assembly drawing on pg 11)
3. With a screwdriver against one of the three flat sides of the Ballnut (Item 19), hand tighten the Ballnut Locknut (item 15). Tighten the two Set Screws 5/16" (Item 16). *(See Pic L - B)*
4. Re-install Fuse and test. *(See Pic L - C)*

Note: *Ballnut must spin in the ballnut bracket when machine is operated to its limit in either direction. Re-adjust the ballnut locknut (Item 15) 1/4 turn if necessary.*



Pic L - A: Loosen the two set screws

Pic L - B: Hand tighten the Ballnut Locknut

Pic L - C: Re-install Fuse and test

Section M: Ballnut Bracket Replacement

PROCEDURE:

1. Place the PowerMate on a suitable work bench with the machine resting on it's wheels and rear handles (toeplate up). Activate the unit until it is extended approximately half-way. Remove the fuse. *(See Pic M - A on pg 17)*
2. Remove four nuts retaining the toeplate to the Outer Frame. *(See Pic M - B on pg 17)* Remove the two bolts and nuts fastening the Bearing Retainer and the Inner Frame. *(See Pic M - C on pg 17)* The Outer Frame can now be slid off the Inner Frame in the direction of the handles.

Pic M - A: Remove Fuse

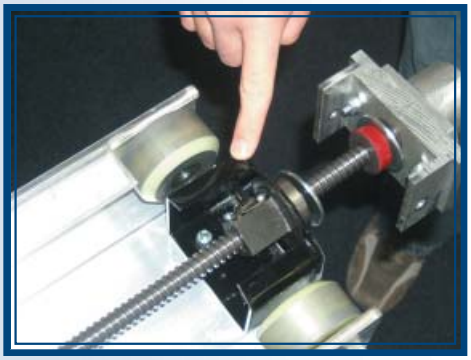
Pic M - B: Remove four nuts retaining the toeplate to the outer frame.

Pic M - C: Remove the tow bolts and nuts fastening the bearing retainer.

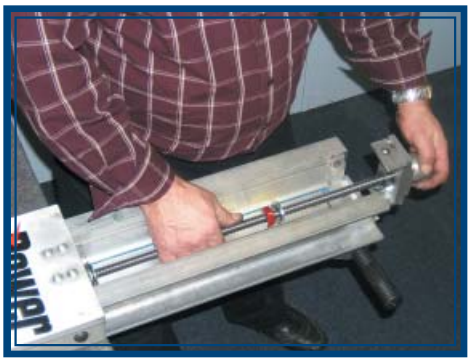
Section M: Ballnut Bracket Replacement (con't)

PROCEDURE:

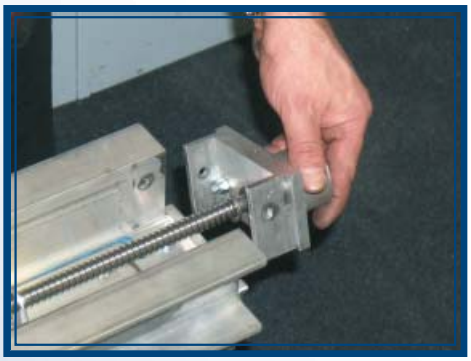
3. Turn the Outer Frame over to expose the Ballnut Bracket. *(See Pic: M - D on pg 18)* Remove the four nuts on the Ballnut Bracket and separate from the Outer Frame.
4. Remove the Brake Assembly and Override Bearing Assembly. See section: Procedure for Repairing the L Series Drive Screw Assembly - Brake Assembly Replacement and Override Assembly for detailed instruction.
5. Remove old Ballnut Bracket and replace.
6. Re-install the Brake Assembly and Override Bearing Assembly. See Brake Assembly Replacement and Override Assembly replacement for detailed instruction.
7. Re-attach the Drive Screw Assembly to the Outer Frame with four nuts and bolts that were set aside in step 3.
8. Turn the stairclimber drive screw so the ballnut is positioned approximately halfway along the drive screw. Slide the outer frame over the inner frame from the handle end. *(See Pic M - E on pg 18)*
9. Grip the drive screw and rotate to engage the coupling with the spline on the stairclimber motor. The bearing retainer can now be fastened to the inner frame with ¼" bolts and nuts. *(See Pic M - F on pg 18)*
10. Re-assemble the toeplate to the outer frame with four ¼" carriage bolts and nuts.
11. Re-install the fuse and operate.
12. Adjust ballnut locknut properly. Tighten ballnut locknut hand tight only, then tighten the set screws. See Ballnut Lock nut Adjustment for details.
13. Test the machine for smooth operation.
14. NOTE: Ballnut must spin in the ballnut bracket when machine is operated to its limit in either direction. Re-adjust the ballnut locknut if necessary.
15. Test the machine for proper brake action. This test should be performed with a minimum load of 300lbs (140Kg).



Pic M - D: Remove the four nuts on Ballnut Bracket



Pic M - E: Slide outer frame over the inner frame.



Pic M - F: Fasten bearing retainer to inner frame.

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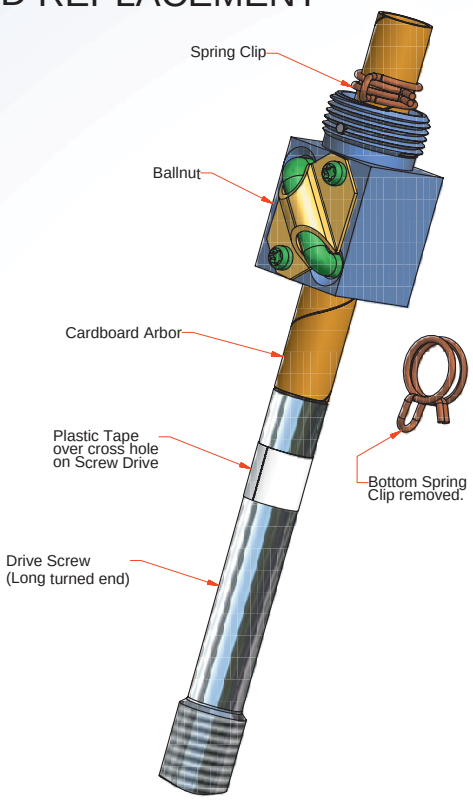
BALLNUT REMOVAL AND REPLACEMENT

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(19) 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. Attach spring clips to both ends of the arbor to retain the ballnut.
6. To install a ballnut, the reverse happens. Remove the spring clip from the cardboard arbor on the square end of the ballnut. Be sure the arbor does not disengage the arbor 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 keed 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.



INSTALLATION OF SEALED BATTERIES IN POWERMATE L-SERIES

1. Remove **Fuse**.
2. Remove **Battery Box Cover** using a large **flat screw driver** and hammer.
3. Remove **wheels and axle**.
4. Install **3/8"Styrofoam Packing** to top and **bottom** of **Battery Box**.
5. Install **Battery Packs** 316050/1 as shown below.
6. Install **1"Styrofoam Packing between Batteries** and Battery Box ends.
7. Connect **Red Positive Wires** to the Solenoid post as shown below.
8. Connect **Black Negative** Wires to Solenoid post as indicated below.
9. Replace **axle, wheels**, and Battery Box Cover.
10. Re-install **Fuse**.