



Technical Document

Granite 1300 Series

Upgrading to a 2-HP (110v or 220v)
Brushless DC Motor

Applicable to Granite 1300 Classic Series Machines



Parts List

The following items were shipped with your brushless DC motor upgrade kit. Please refer to the above image to identify the item numbers. Use this list to ensure all your parts have been included.

Note: The items marked "A" or "B" refer to the type of motor upgrade you purchased. Your kit will come with either the 110 motor or the 220 motor.

Item	Quantity	Description	Part Number	received
1	1	Motor Mount	GMX02023	<input type="checkbox"/>
2	1	Motor Pulley	GMX02027	<input type="checkbox"/>
3	1	Motor End Bracket	GMX02026	<input type="checkbox"/>
4	1	Bracket	GMX02044	<input type="checkbox"/>
5A	1	Brushless DC Motor (110v)	GMX02029-110-1	<input type="checkbox"/>
5B	1	Brushless DC Motor (220v)	GMX02029-220-2	<input type="checkbox"/>
6A	1	Control Cabinet & Motor Drive	GMX02046 (110v)	<input type="checkbox"/>

		Assembly		
6B	1	Control Cabinet & Motor Drive Assembly	GMX02046 (220v)	<input type="checkbox"/>
7	1	Potentiometer	GMX02048	<input type="checkbox"/>
8	1	Reset Button	GMX02049	<input type="checkbox"/>
9	1	Potentiometer Knob	GMX02047	<input type="checkbox"/>
10	4	M5 x 45 Pan Head Screw	S18054	<input type="checkbox"/>
11	4	M5 Nut	S18065	<input type="checkbox"/>
12	4	M5 Washer	S18005	<input type="checkbox"/>
13	4	M5 Lock Washer	S18075	<input type="checkbox"/>
14	1	Speed Placard	GMX04045	<input type="checkbox"/>
15	1	Belt Position Placard	GMX04044	<input type="checkbox"/>
16	1	Reset Placard	GMX04045	<input type="checkbox"/>
17	1	V-Belt A-920	GMX03020	<input type="checkbox"/>
18	1	Protective Shield	G04029	<input type="checkbox"/>
		Items Not Pictured		
	4	M8 x 40 Cap head Screws	S12845	<input type="checkbox"/>
	4	M8 Flat Washer	S18140	<input type="checkbox"/>
	4	M8 Lock Washer	S18135	<input type="checkbox"/>
	4	M8 Nut	S18125	<input type="checkbox"/>
	2	M6 x 25 Cap Head Screw	S12011	<input type="checkbox"/>

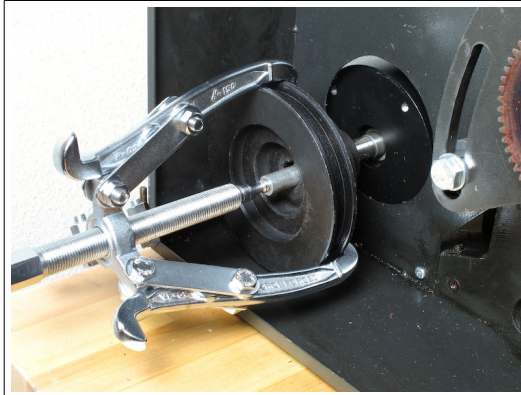
If something is missing or damaged please call Smithy Co immediately for a replacement part.

Tools Required

The following tools will aid you in your upgrade installation.

Quantity	Description
1	Phillips Head Screwdriver #2
1	Medium Common Screwdriver
1	Electric/air Hand Drill
1 ea	Drill Bits: 1/8, 3/16, 1/4, 3/8
1	3-Jaw Allen Wrench Set
1	Metric Allen Wrench Set
1	Metric Socket Set (3/8 size)
1	Generic Pliers

Installation Procedure



Step 1- Remove Motor Pulley

A. Remove the pulley box door

B. Remove the drive belts

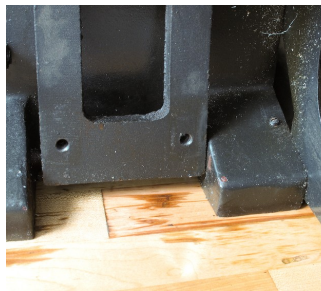
C. Loosen the setscrew on the motor pulley and use a 3-jaw puller to ease the pulley off the motor shaft. Transfer the new pulley provided in the kit.



Step 2-Remove Motor

A. Remove the cover on the motor's electrical junction box. Disconnect the wires from the motor to the machine.

B. Remove the 4-motor mounting bolts and pull the motor free.



Step 3-Remove the Motor Mount

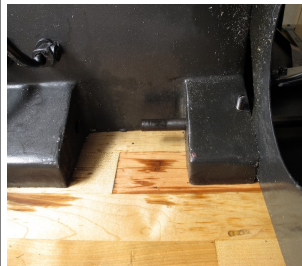
A. Remove the hex-head bolt holding the L-shaped bracket from the motor tensioner to the motor mount. *The bolt's head is on the inboard side. You will need this bolt for the new motor mount.*

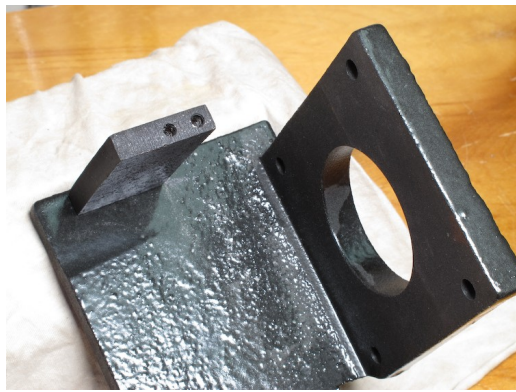
B. Loosen the setscrew in the machine casting at the right side of the motor mount pivot pin.



C. Insert an M5 x 8 bolt into the end of the pivot pin from the pulley box end, and pull the pin nearly out of the casting into the pulley box with pliers.

D. Once the bracket is free, remove the motor mount from the L-shaped bracket. Save the cap-head screws for the new motor mount.





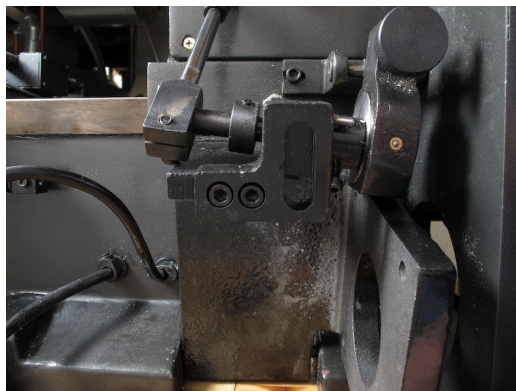
Step 4-Assemble the New Motor Mount

A. Mount the largest portion of the motor mount to the top bracket and the L-shaped bracket.

B. The bracket (GMX02044) will attach to the motor mount with the 2-M6 x 25 cap-head screws. The two spaced holes should be facing away from the motor mount (as pictured) and toward the large hole of the bracket.

C. The L-shaped bracket (GMX02026) attaches to the end of the rectangular bracket (GMX02044) using 2 cap-head screws (refer to step 3.E).

D. Secure the cap-head screws into the two small holes of the bracket.



Step 5-Install The Motor Mount

A. Install the motor mount onto the machine by setting the motor mount into place and pressing or tapping the pivot pin back into position.

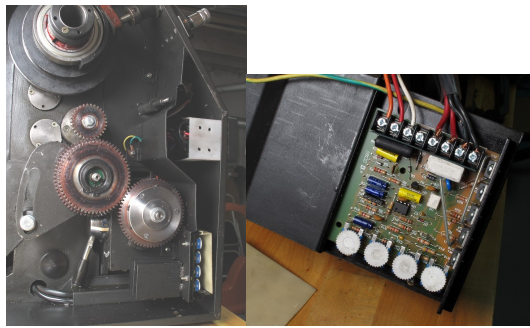
B. Tighten the setscrews using a long shank (about 6") screwdriver to lock the pivot pin in place.

C. Loosen the setscrews and the socket-head cap screws on the two collars on the sides of (G02010) tensioner block.

D. Install the hex-head bolt saved from step 3.A from the backside of the end bracket into the tensioner block and tighten it.

E. Adjust the tensioner system for full travel and ensure no binding by sliding the bushing/collars just snug to the tensioner block and tightening setscrews as well as setting the stop screw against the stop pin (G02009) when the mount is fully tensioned.

F. If needed, loosen the handle setscrew (G02004) and slide the handle slightly toward the tailstock to ensure it clears the motor mount assembly when the handle is in the upright position.

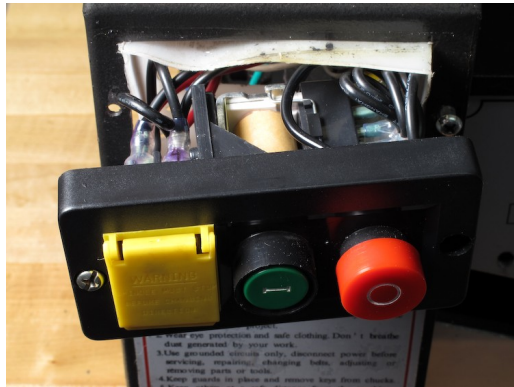


Step 6-Remove Control Board

A. Remove the three screws that attach the sheet metal controller guard to the machine.

B. Pull the controller/guard assembly out of the pulley box and remove the wires from the controller.

C. Carefully remove the controller from the sheet metal guard.



Step 7-Remove Switch Assembly

A. Remove the two setscrews that attach to the switch assembly to the pulley box and pull the assembly out of the machine. Save the screws.

B. Remove all wires from the 6 terminals of the reversing switch.

C. Disconnect the power feed wires—you will reuse these wires to connect to the new switch assembly.

D. Carefully remove the old switch assembly from the machine.



Step 8-Remove the Old Potentiometer

A. Loosen the setscrew on the side of the speed potentiometer knob and pull the knob off.

B. Remove the hex-nut that attaches to the potentiometer to the pulley box and pull the entire potentiometer out of the machine.

Step 9-Remove Speed Placard

A. Tap the three small rivets from inside of the pulley box to loosen them.

B. Use pliers to pull out the rivets, save them.

C. Use a putty knife to carefully lift the old speed placard from the pulley box. Note: Keep the old placard flat during removal for use in marking the new placard holes.

Step 10-Prepare for New Potentiometer and Install the New Speed Placard

A. Compare the old potentiometer with the new one. The anti-rotation “leg” on the new one is closer to the shaft. A new hole should be drilled in the pulley box to accept the shorter leg of the new potentiometer.

B. Locate this new hole at the 9 o'clock position to the potentiometer hole. Centerpunch 1/8” from the edge of the potentiometer hole. Use a 1/8” bit and drill through the outside. Deburr the hole on both sides.

C. Test fit the new potentiometer into the hole.

D. Use the old speed placard to mark locations and drill the new holes with a 3/32” bit.

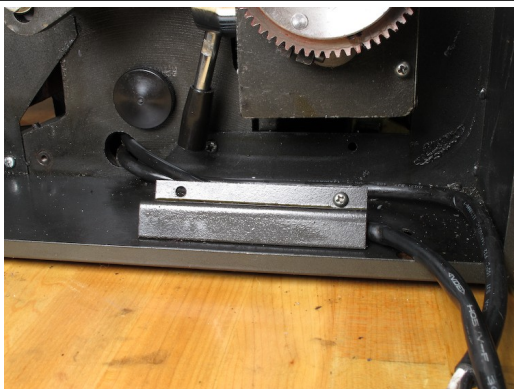
E. Centerpunch marked locations and drill the new holes in the placard using a 3/32” bit.

F. Remove any burrs created with a file or abrasive cloth.

G. Remove white glue backing from the new placard. Line up the rivet holes and the new drilled holes with small nails or pins. Press the placard to the pulley box.

H. Lightly tap the rivets back into place.

I. Remove the clear film on the face of the placard.



Step 11-Remove Old Wiring

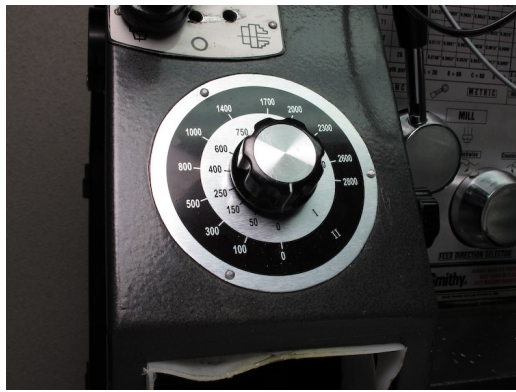
A. Remove the wire cover at the inside bottom of the pulley box.

B. Loosen the setscrew on the wire lock collar from the original motor to reverse switch wire.

C. Unscrew the wire lock collar from the machine casting.

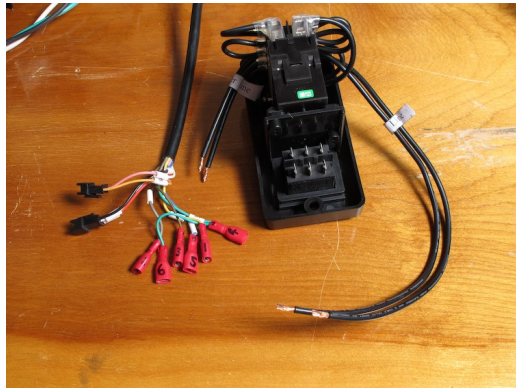
D. Pull a length of string through the bed casting with the wire which originally connected the reverse switch and the motor (two conductor wire).

	<p>E. Pull the wire from the back of the machine. The string should enter the casting from the pulley box end.</p> <p>F. Save the wire lock collar if you wish to reuse it.</p> <p>H. Leave the wall plug wire (three conductor) in place.</p>
	<p><u>Step 12-Remove Idler Pulley Assembly</u></p> <p>A. The large idler pulley will no longer be used with the new motor. Remove the entire pulley and arm assembly.</p> <p>B. Remove the large bolt holding the idler arm and the change gears in position.</p> <p>C. Pivot the change gear bracket out of the way and remove the idler assembly and spacer.</p> <p>D. Remove the spacer from the idler assembly and reinstall the spacer and bolt the machine.</p> <p>E. Move the change gears back into position and tighten the bolt to hold everything in position.</p>
	<p><u>Step 13-Install Reset Button</u></p> <p>A. Measure and centerpunch location halfway between switch assembly opening and front safety placard and about midway front to back on the pulley box.</p> <p>B. Drill 25/64” hole through. Deburr the hole.</p> <p>C. Disconnect the reset button from the new wiring bundle.</p> <p>D. Remove the threaded nut from the backside.</p> <p>E. Install the new reset button from the outside. Red washer on outside of the pulley box. Tighten threaded plastic nut on inside of the pulley box.</p> <p>F. Affix the reset button placard below or next to the newly installed button.</p>



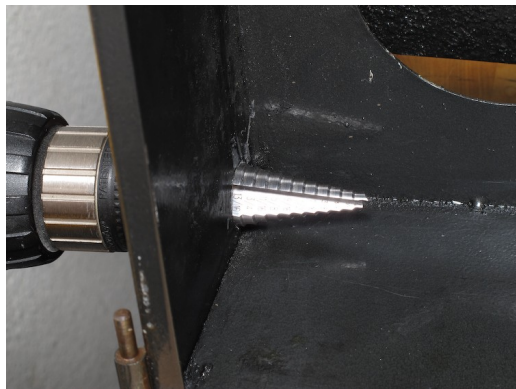
Step 14-Install New Potentiometer

- A. Disconnect the potentiometer from the wiring bundle.
- B. remove the hex-head nut and washer.
- C. Install from inside, engage the anti-rotation leg into the drilled hole, and tighten the washer and hex-head bolt from the outside.
- D. Rotate the potentiometer shaft all the way counter-clockwise and install the new knob with the indicator mark pointed to “0”.
- E. Tighten the setscrew on the knob.



Step 15-Disconnect the Switch Assembly from the Motor and Controller.

- A. Before disconnecting the wires, record their positions for easier reconnection later. Disconnect the 6 wire connections from the motor controller to the switch assembly.



Step 16-Drill hole for controller to wire entry to pulley box.

- A. From the outside back of the pulley box, mark the location 1/2” from bottom and 7/8” from the rear of the pulley box.
- B. Centerpunch the location.
- C. Finish the hole by drilling to 13/16” with either a hole saw or a taper style drill bit (shown in photograph). Deburr the hole.

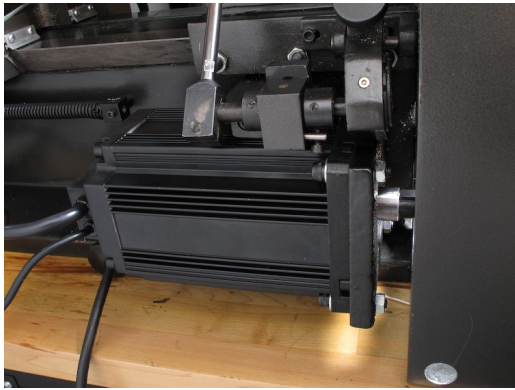


Step 17-Work power wire through machine bed.

- A. To avoid significant difficulty feeding the 3-conductor power wire through the machine bed-set the motor and controller on a flat surface to feed the wires prior to mounting the motor.
- B. Slip the wire collar saved from step 11 over the power-feed wire.
- C. Use the string saved from step 11 to pull the

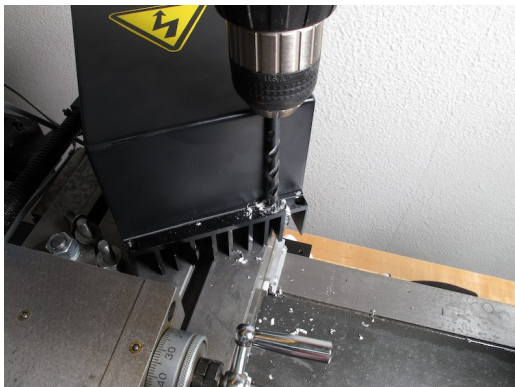
wire through the machine bed and into the pulley box.

D. Screw the locking wire collar back into the machine casting but leave the setscrew loose.



Step 18-Mount Motor

A. Using the 4 M8 caphead screws, flat washers, split washers, and nuts provided in the kit-mount the motor to the new motor mount. The split washers and nuts go on the pulley side of the box. The wires will be at the back of the motor and should point outward from the machine when installed.



Step 19-Mount controller.

A. Keep the controller away from machine debris and lubrication during this procedure.

B. Use the M5 caphead screws, nuts, and washers provided in the kit for installation.

C. ***This part is unclear because person who wrote this step is talking about drilling extra holes for a “shallow” pulley box.





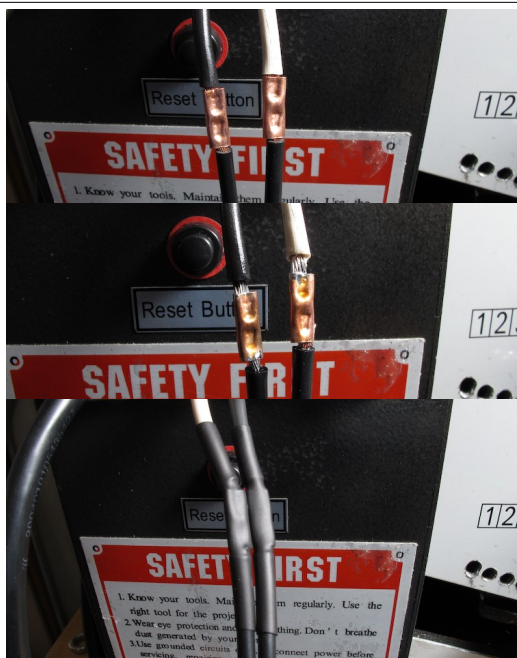
Step 20-Rough wiring location

A. Remove the inboard plastic nut from the wire lock collar on the controller wire bundle (6 reverse switch reset connectors and potentiometer wiring). Slide the wire off.

B. Insert the wire bundle through the 13/16" hole that was drilled in step 16.

C. Slip the plastic nut over the wire ends and tighten it to lock to wire collar in place.

D. Position the three wire bundles at the bottom of the pulley box and tighten the wire cover in place.



Step 21-Final wire connecting

A. Note wires labeled "power line" and "motor line".

B. Use the wire diagram provided in the kit to connect the black and white wires.

C. Bring the three sets of wires out of the pulley box through the plastic switch surround and through the opening for the switch.

D. Connect the six wires to the controller.

E. Strip about 1/4" of insulation from each wire.

F. Slice a piece of shrink tubing provided on each of the four white and black wires. Slide them all the way to the end.

G. Make electrical connections with the copper butt joint crimp connectors provided. Optional: The belt and suspenders method-add solder to the joint after crimping and let cool.

H. Slide the shrink tubing over the connections and heat shrink. Wrap with electrical tape for protection.

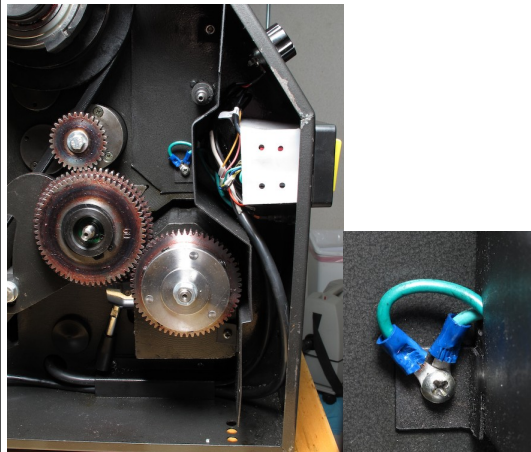
I. The Ground (green) wires from the power and motor controller should be connected together and to the machine casting as before. Use the middle splash guard screw.



Step 22-Install Switch

A. Push the switch assembly into place inside the plastic switch surround.

B. Fasten the switch to the pulley box with the original screws.

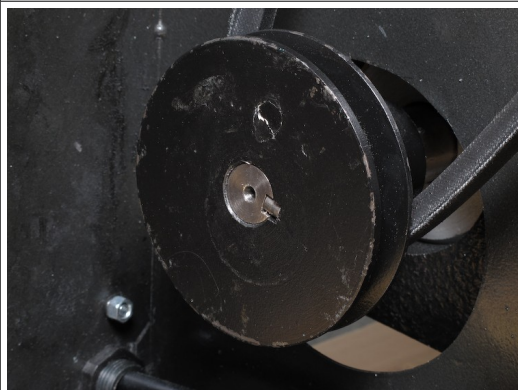


Step 23-Install splash/wire guard

A. Ensure all wires are out of the way and install the three screws to locate the splash guard. The middle screw is used to mount to the old ground wires from step 21.

B. Pull the extra length of the motor controller wires down and through the wire cover.

C. Finish tightening the wire cover at the bottom of the pulley box, the setscrew in the locking wire collar behind the motor, and the locking collar on the wire entering behind the pulley box.



Step 24-Install pulley, drive belt, and pulley box door

A. Remove the plastic shaft protector and install the new pulley on the motor shaft by tapping it in place against the shaft's shoulder.

B. Tighten the pulley's setscrew.

C. Install the new belt (it is slightly shorter than the old belt).

D. If the belt appears to be too close to the gear boss, adjust the motor mount position on the pivot pin toward the pulley box using the tension block collars.

E. Align the pulley box door pins and press down.

F. Degrease inside of the pulley box door and attach the white belt position sticker provided in the kit.



Step 25-Test Run

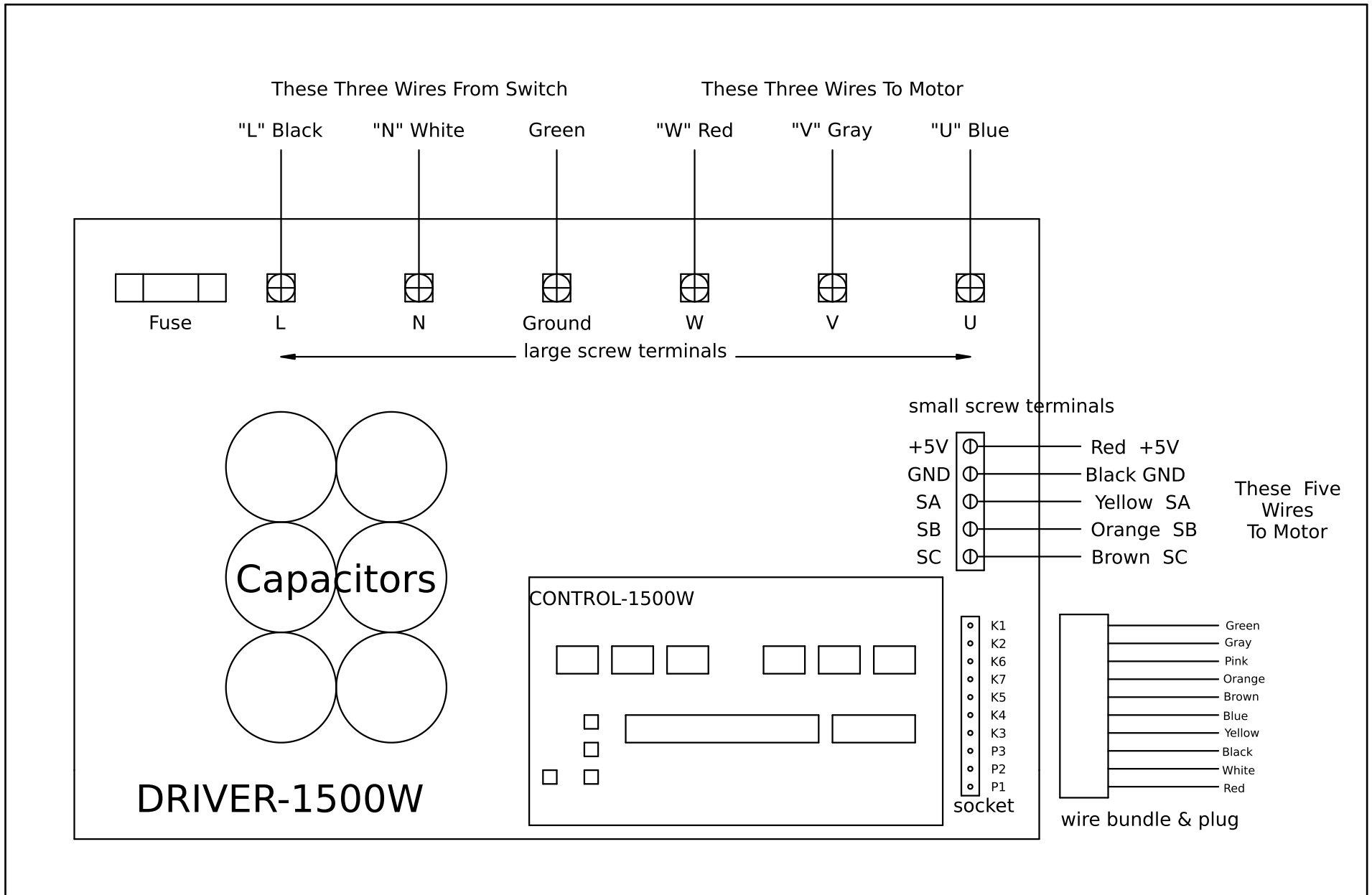
A. Plug in your machine and push the start button.

B. Turn the speed potentiometer clockwise to increase the speed and then turn it back to a slower speed. The motor RPM should follow the setting selected on the potentiometer.

C. Press the stop button.

D. Toggle the reverse switch the opposite position.

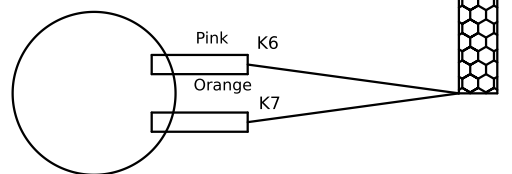
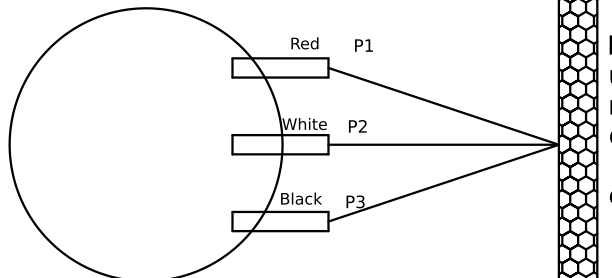
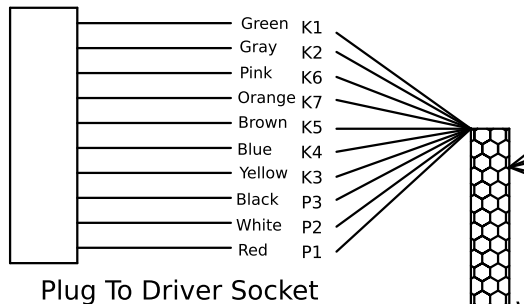
E. Repeat A, B, C. Motor should reverse directions.



GRANITE MAX-110 CONTROL WIRING	1500W DRIVER & CONTROL	DRAWN: DEW	Revision	Page 1 of 2
		APPROVED: DEW	B	
SMITHY INDUSTRIES	110-VOLT	DATE: 2009-09-17	01/10/14	

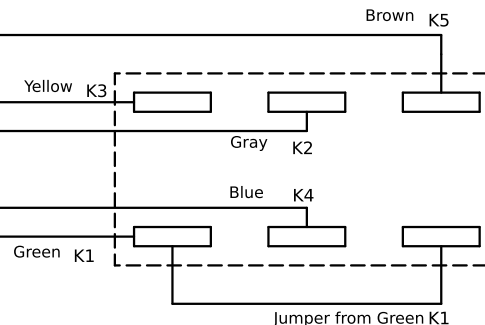
Driver Socket

- K1
- K2
- K6
- K7
- K5
- K4
- K3
- P3
- P2
- P1

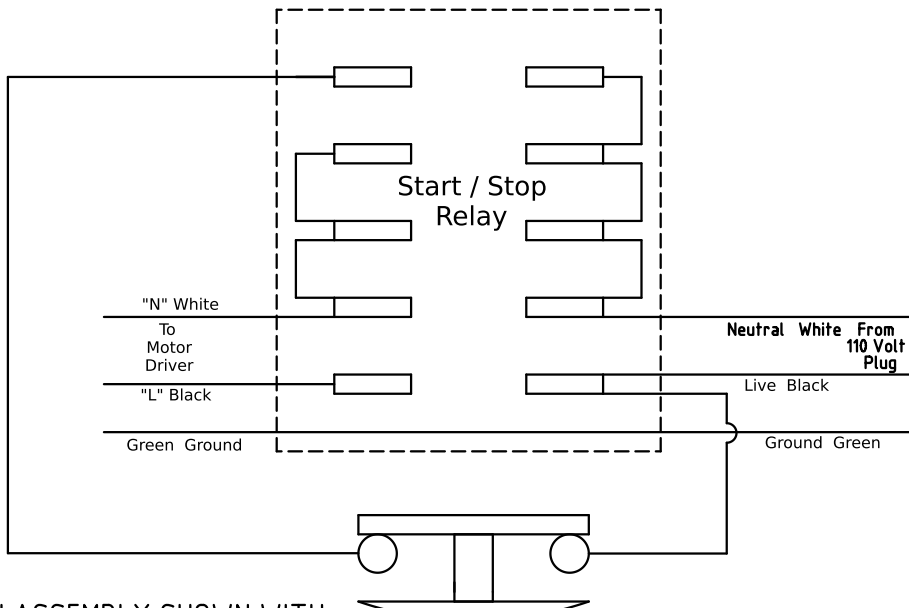


Wire Bundle

Reversing Switch



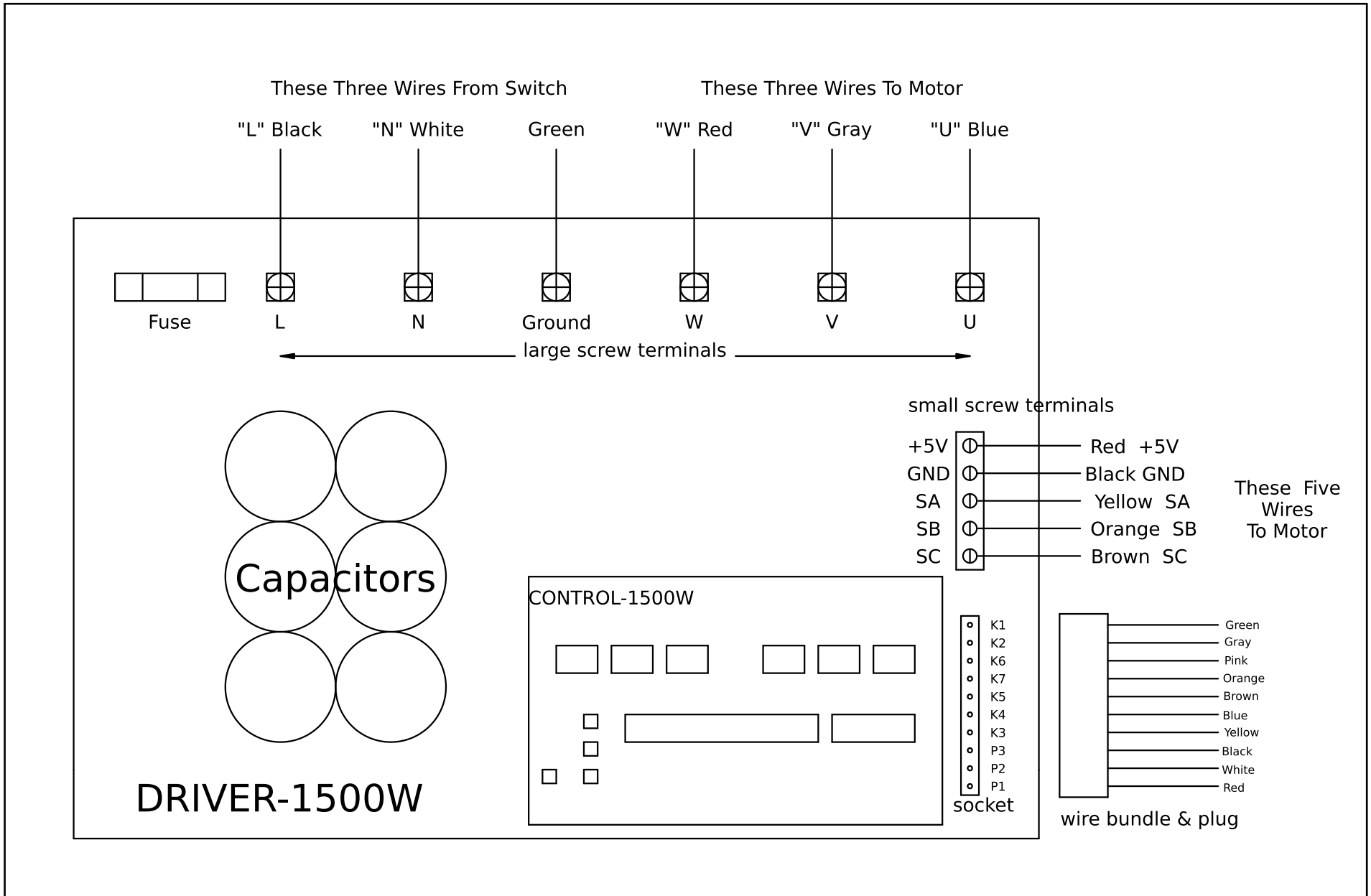
Start / Stop Relay



SWITCH ASSEMBLY SHOWN WITH
BUTTONS FACING DOWNWARD

Emergency Stop Button
Located Under Relay

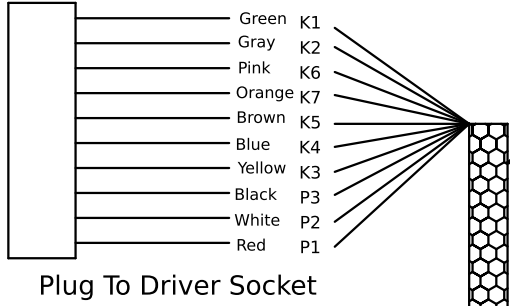
<p>GRANITE MAX-110 CONTROL WIRING</p> <p>SMITHY INDUSTRIES</p>	<p>ELECTRO MAGNETIC SWITCH</p> <p>110-VOLT</p>	DRAWN: DEW	Revision	<p>Page</p> <p>2 of 2</p>
		APPROVED: DEW	B	
		DATE: 2009-09-17	01/10/14	



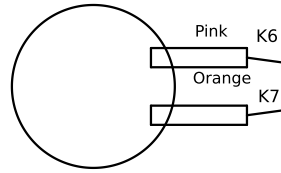
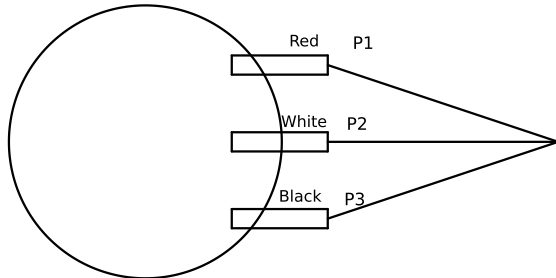
GRANITE IMAX-220 CONTROL WIRING SMITHY INDUSTRIES	1500W DRIVER & CONTROL 220-VOLT	DRAWN: DEW	Revision	Page 1 of 2
		APPROVED: DEW	A	
		DATE: 2009-09-17	01/10/14	

Driver Socket

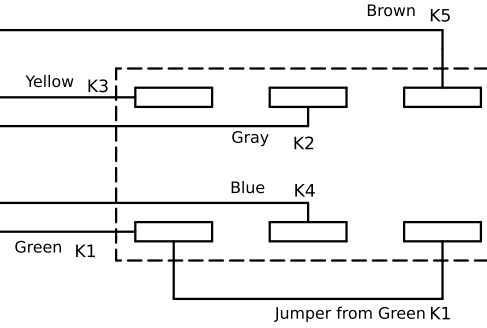
- K1
- K2
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- K4
- K3
- P3
- P2
- P1



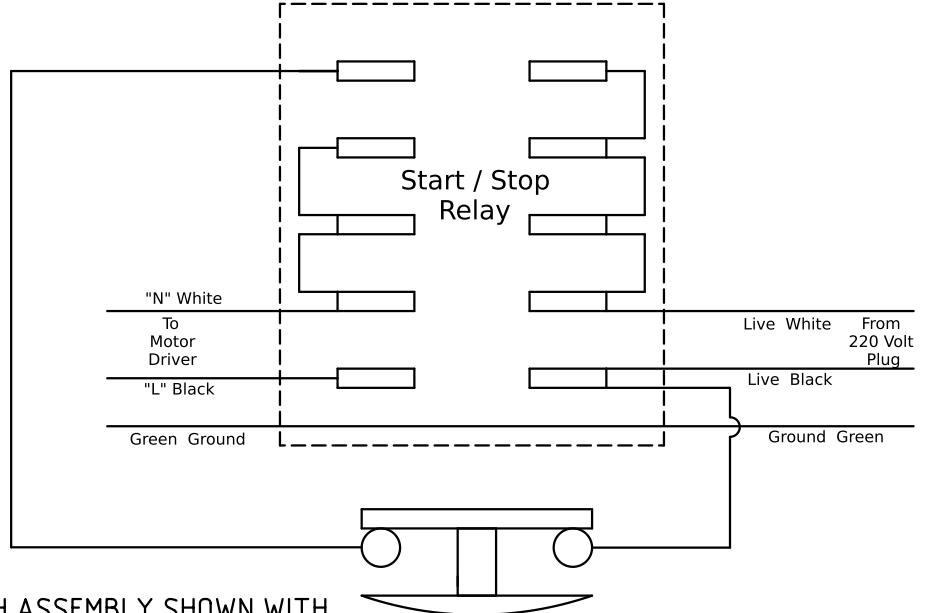
Wire Bundle



Reversing Switch



Start / Stop Relay



SWITCH ASSEMBLY SHOWN WITH BUTTONS FACING DOWNWARD

<p>GRANITE IMAX-220 CONTROL WIRING</p> <p>SMITHY INDUSTRIES</p>	<p>ELECTRO MAGNETIC SWITCH</p> <p>220-VOLT</p>	DRAWN: DEW	Revision	<p>Page</p> <p>2 of 2</p>
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