RagorGage xT

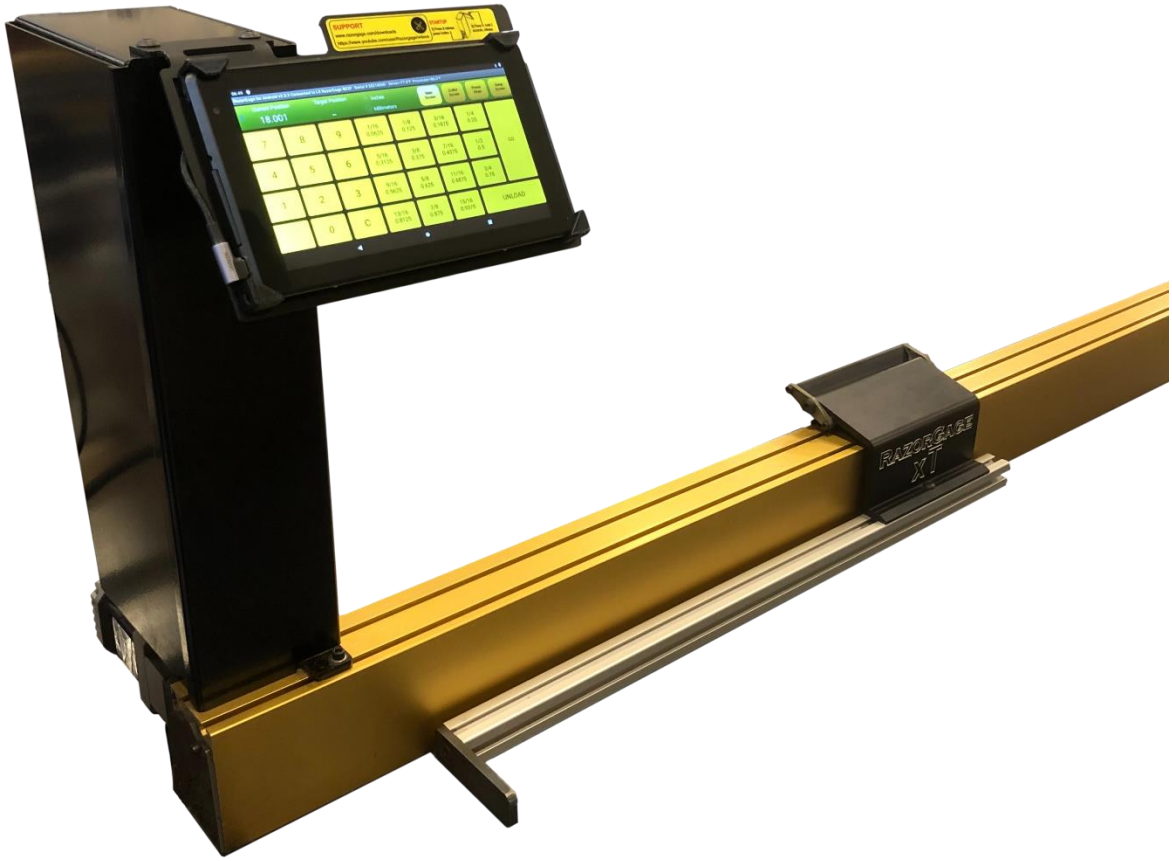


Table of Contents

General Safety Rules for Woodworking Machinery

WARNING

The operator must thoroughly read and understand this manual before operating the saw or starting any servicing. All safety and warning instructions should be followed. This manual must be available to all operators.

1. For your own safety, read the operation manual carefully. Know your machine. Learn its applications and limitations, and any hazards specific to this machine. All personnel should be trained in the operational procedures and received safety instruction before operating this equipment. If you have not received proper training in the use of this machine, DO NOT OPERATE THIS MACHINE, damage to the equipment or injury to the operator is possible.

2. This machine should not be operated without all of the guards in place and safety devices in operation. Removal of any guards or disabling any of the safety devices may result in damage to the equipment or injury to the operator. If any of the guards or safety devices are missing, damaged or not working properly, DO NOT OPERATE THIS MACHINE, notify your supervisor immediately.

3. If the operator has any safety concerns or questions regarding the operation of this equipment, DO NOT OPERATE THIS MACHINE, the machine should be locked out and your supervisor notified immediately.

4. All Lock Out/Tag Out procedures must be followed before servicing or adjusting this equipment. If you have not received proper training in the Lock Out/Tag Out procedures for this machine, DO NOT OPERATE THIS MACHINE, damage to the equipment or injury to the operator is possible.

5. In case of any equipment malfunction or jam the machine should be powered off and locked out before clearing any materials from the operational areas of this machine. Once cleared the reset procedures need to be followed when powering up the equipment. At no time should any of the machine control systems including electrical, hydraulic or pneumatic circuits be manually overridden.

6. Check machine for damaged parts. Before continued machine use any damaged guard or part must be carefully checked for proper operation of its intended function. Check all moving parts for proper alignment, check for binding of moving parts, breakage of parts, proper secure mounting, and any other condition that may affect machine operation. Guards or other parts that are damaged must be properly repaired or replaced.

7. Machine must be properly grounded.

8. Maintain and clean machine at recommend intervals. Intervals may need to be adjusted due to work load or material type to keep machine in top condition. Follow instructions for lubrication, setup, and changing accessories

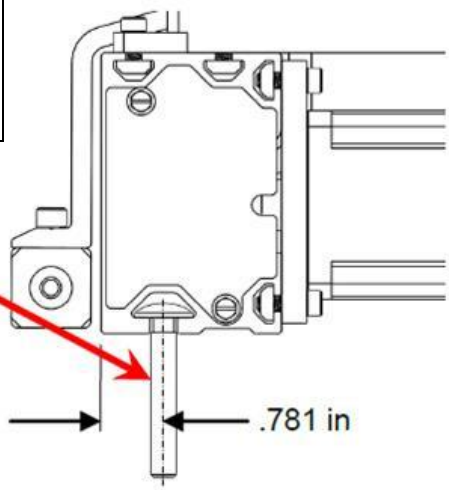
9. Disconnect machine from power source before, changing accessories, or any servicing activity.
10. Avoid accidental starting. Make sure switch is in the off position before connecting to power.
11. Remove any tools or loose objects from work surface of machine. Make sure any tools used for adjustment or maintenance are removed from machine before machine is restarted. Make a habit of scanning for tools and scraps every time the machine is started.
12. Keep work area clean. Cluttered work areas and workbenches increase the likelihood of an accident.
13. Do not use in dangerous environments. Do not use machine in damp or wet locations, or expose them to rain. Keep work area well illuminated.
14. Keep children away. All visitors should be kept at a safe distance from work area.
15. Make workshop childproof, with padlocks, master switches, or by removing starter keys.
16. Do not force the machine. It will function better and safer at its designed rate.
17. Use the right tools. Do not force the machine or attachments to do a job for which they were not designed. Contact the manufacturer or distributor if there is any question about the machine's suitability for a particular job.
18. Use only recommended accessories. Consult the operation manual for recommended accessories.
19. Wear proper apparel. Avoid loose clothing, gloves, neckties, rings bracelets, or jewelry which could be tangled in moving parts. Keep long hair contained to prevent entanglement. Non-slip footwear is recommended.
20. Always wear safety glasses.
21. Secure the work piece.
22. Keep proper footing and balance at all times.
23. Do not use machine while under the influence of drugs, alcohol, or any medication.
24. Always wear a face mask or dust mask if operation creates excessive dust or chips. Always operate machine in a well-ventilated area and provide proper dust removal.
25. Never leave machine running unattended. Turn power off. Do not leave machine until it comes to a complete stop.

Installation

Mounting RazorGage xT to the Table

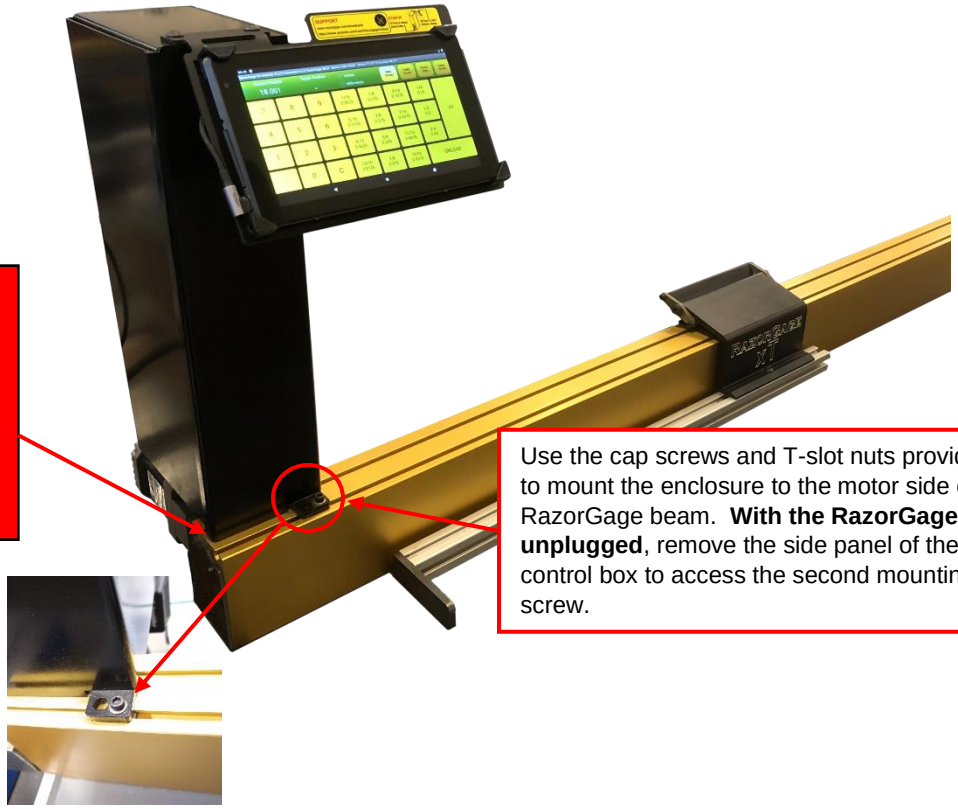
Position the beam on your table with the motor end next to the saw. Align the beam with the saw fence and mark the front edge of the fence on your table. Remove the beam and strike a line 0.781" back from your marks. Drill 11/32 holes along the line to mount the beam. Three holes should be enough.

The beam is held to the table with 5/16 carriage bolts as shown.



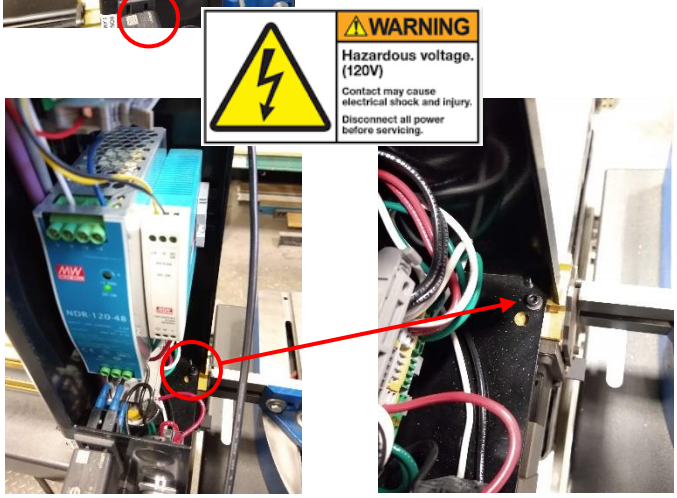
Mounting Electrical Enclosure

The xT Enclosure MUST be flush with the edge when mounted to the RazorGage extrusion. Otherwise the carriage could hit the enclosure during homing.



Use the cap screws and T-slot nuts provided to mount the enclosure to the motor side of the RazorGage beam. **With the RazorGage unplugged**, remove the side panel of the control box to access the second mounting screw.

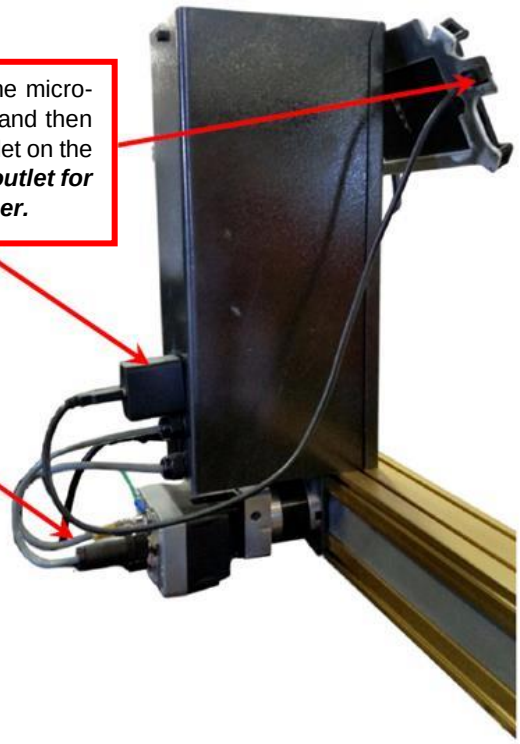
With a 7/64” Allen wrench remove the two screws holding on the side panel. Once side panel has been removed. Locate the second mounting screw in the bottom of the enclosure and use the t-nut and cap screw provided to finish mounting the enclosure.



Electrical Connections

Plug the tablet power cable into the micro-USB slot on the side of the tablet and then the other end into the 110 VAC outlet on the back of the box. ***Do not use this outlet for anything other than tablet charger.***

Thread the two motor cables onto the mating connectors on the back on the motor.

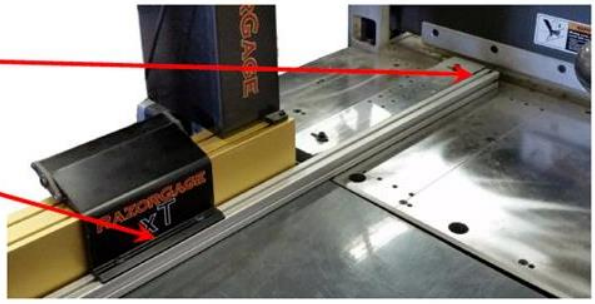


Setup

Once your RazorGage is securely mounted to your table and electrical connect have been made, the first-time calibration process can begin. First the stop extension is adjusted. The RazorGage will then be powered up. Next the home offset will be set. And finally, the scale factor will be calibrated. Follow instructions below to complete setup of the RazorGage. **The RazorGage xT Bluetooth connect will be paired and scale factor calibrated upon arrival.**

1. *Adjust the Stop Extension*

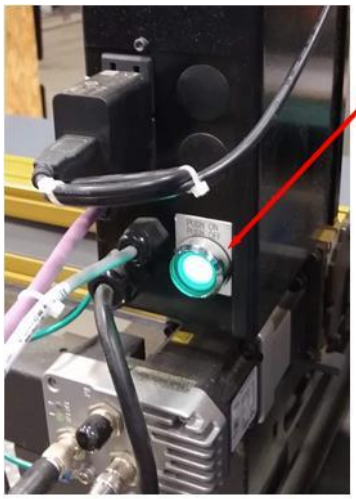
With the positioner at the home position, slide the stop extension to a point about an inch from the saw blade cutting plane and tighten the locking screw.



To adjust the stop extension, loosen the mounting screws on the stop extension and slide it away from the saw so that it won't hit your saw when you home the machine. With the power off, push the moving carriage toward the motor end of the RazorGage until the carriage hits the internal hard stop. Now extend the stop extension toward the saw blade until it is as close as you want it to be. The stop extension should be adjusted so that the distance from the cut to the stop face is less than the shortest part you want to be able to cut. Tighten the stop extension screws.

2. *Power up the RazorGage.*

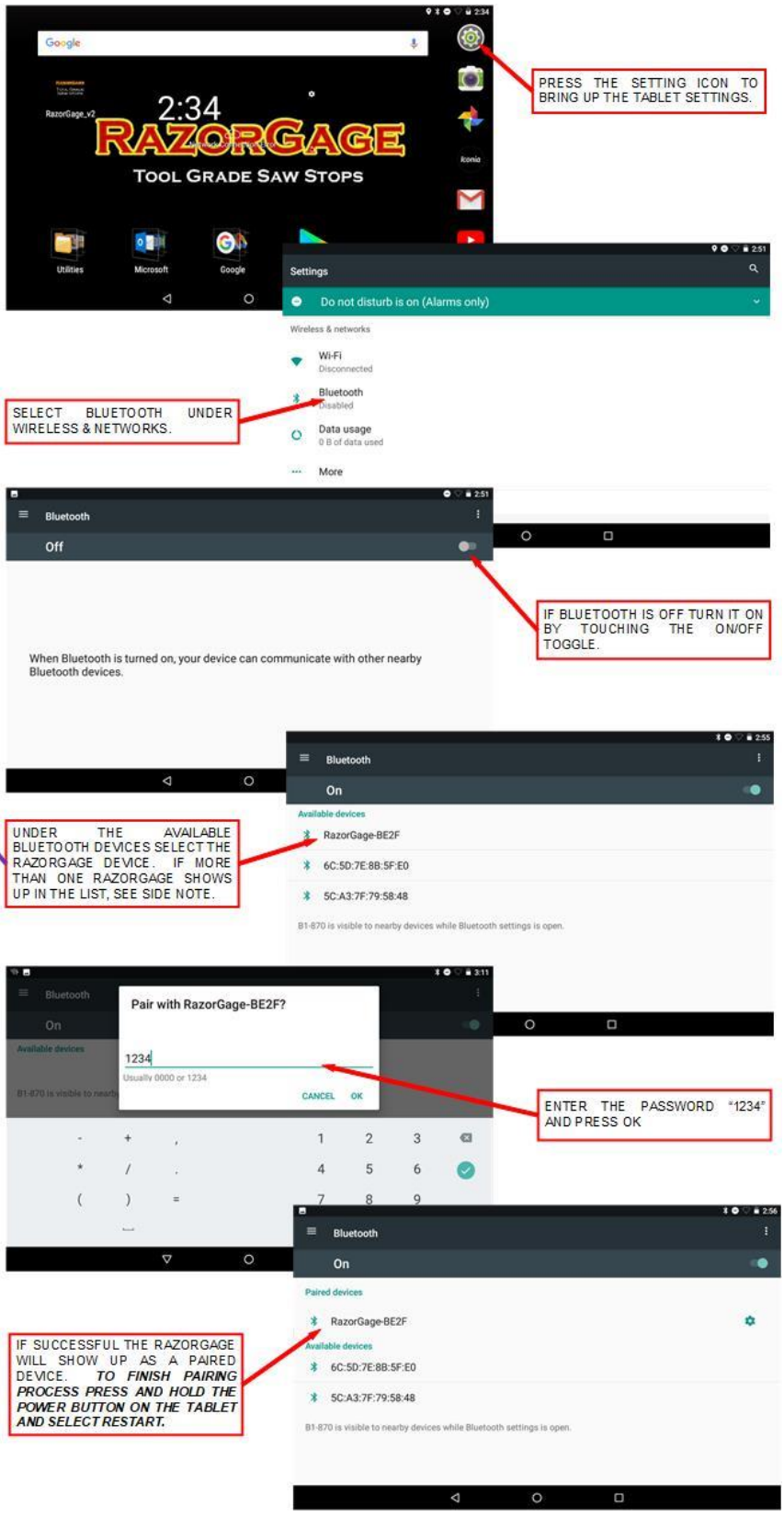
It is very important to note that there are TWO things to power on the RazorGage and the Tablet.



AT THE BACK OF THE CONTROL BOX, PRESS THE GREEN PUSH ON / PUSH OFF PUSHBUTTON. WHEN POWERED UP THE BUTTON WILL ILLUMINATE.

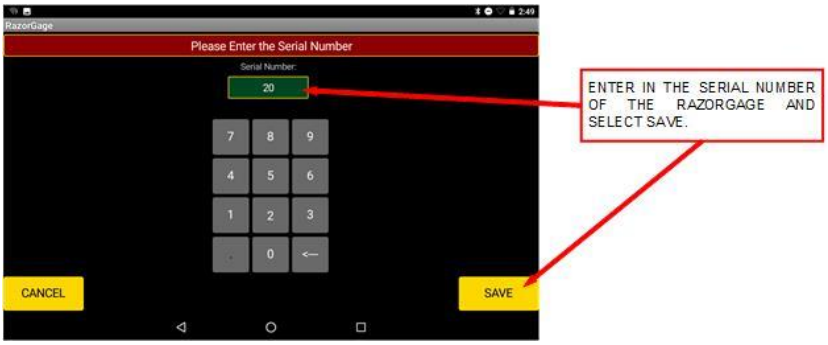
PRESS THE POWER BUTTON AT THE TOP LEFT CORNER OF THE ANDROID TABLET TO TURN ON POWER.

3. *Pair the Bluetooth Connection.* **RazorGage xT is shipped with Bluetooth already paired.*

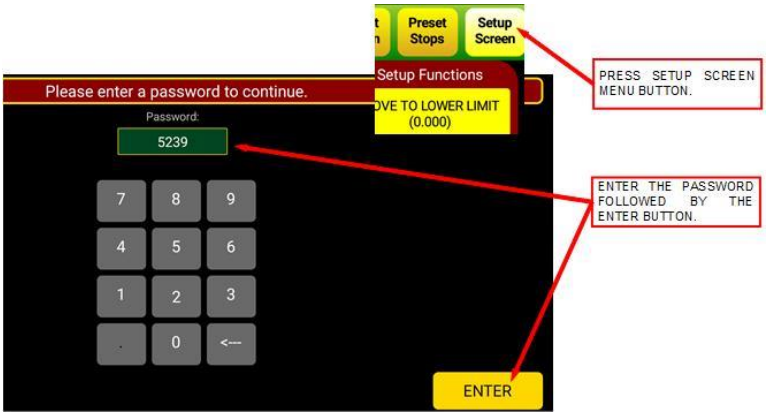


4. *Open the RazorGage xT App.*

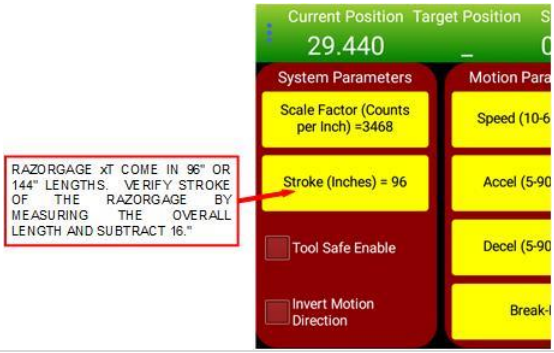
5. *Enter the Serial Number of the RazorGage.*



6. *Open Setup Screen*



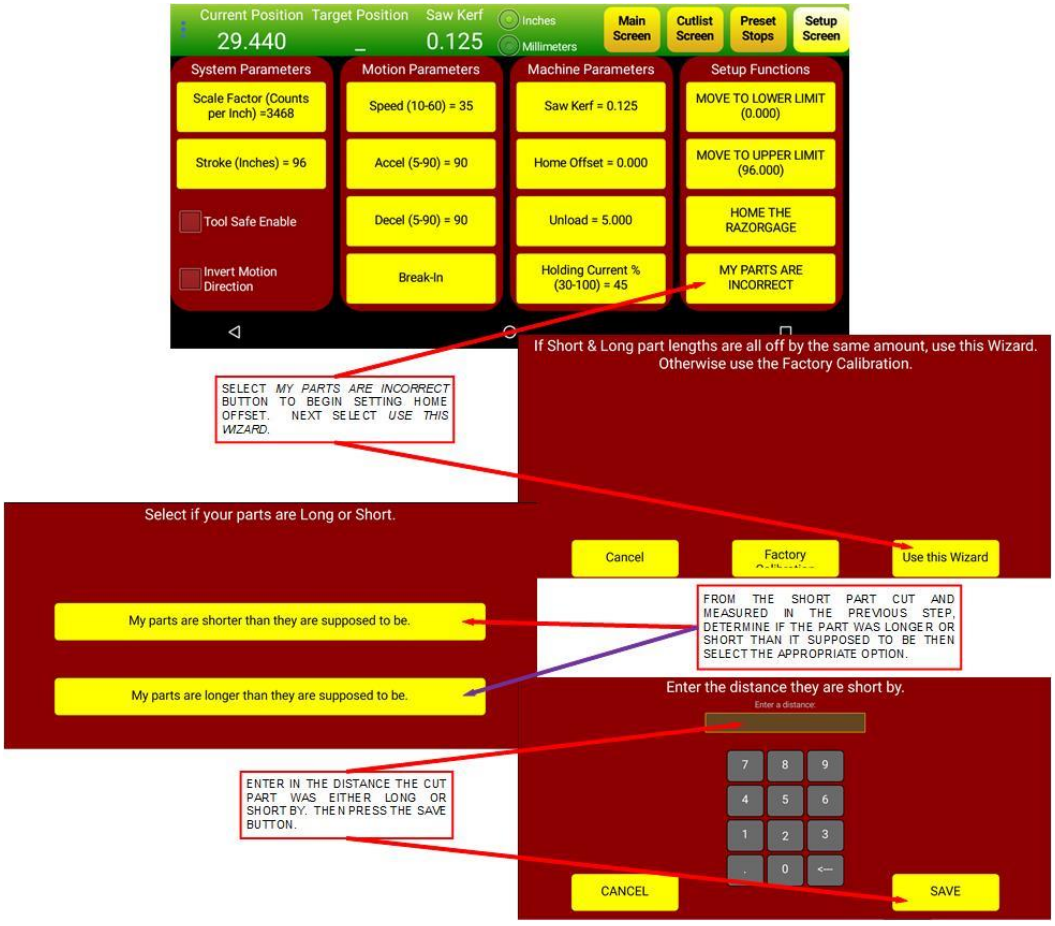
7. *Check the Stoke*



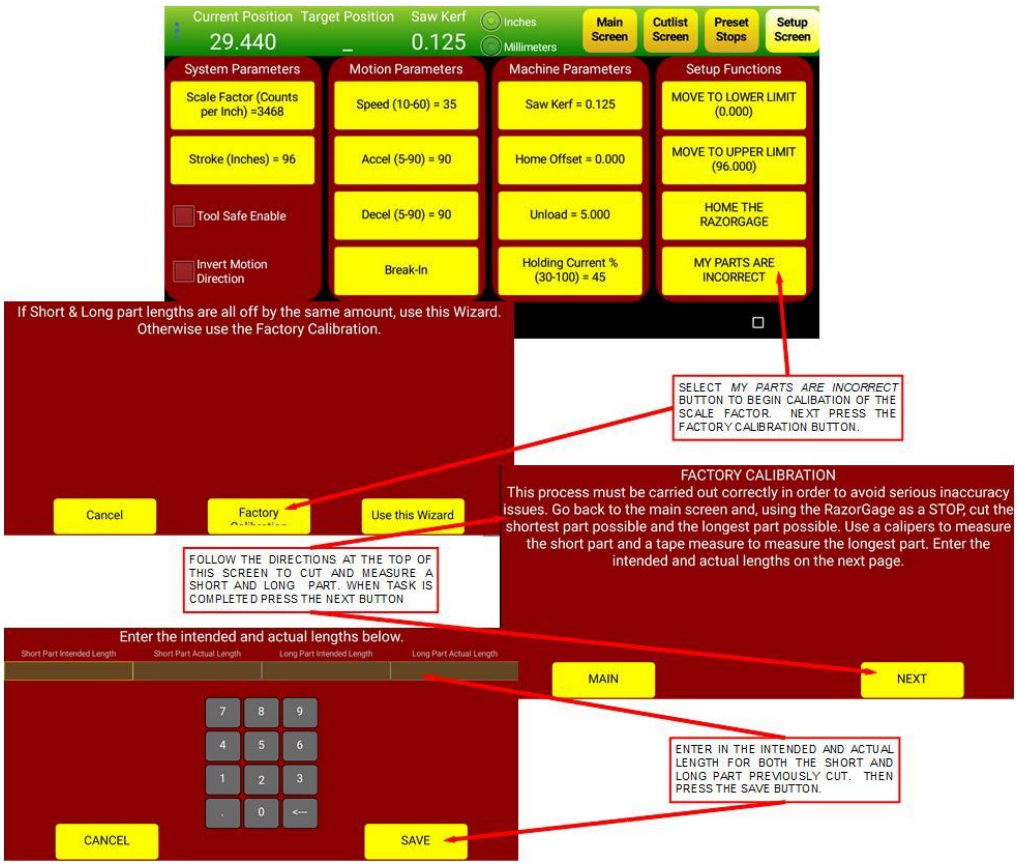
8. Cut a Short Piece of Material & Measure with Calipers.

From the Main Screen, move the RazorGage into position and cut a short piece of stock material. Measure the length of the piece with calipers. Take note of both the intended length and the actual length of the part cut.

9. Set Home Offset



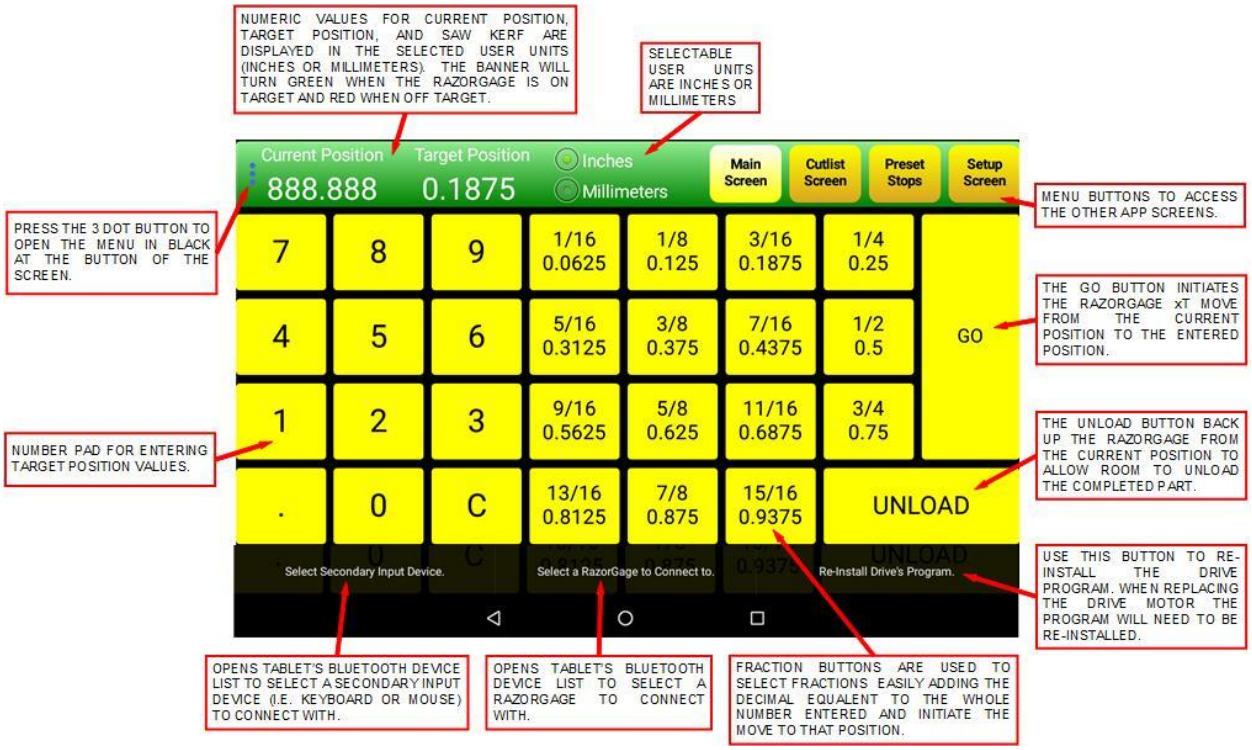
10. Calibrate Scale Factor. **RazorGage xT is shipped calibrated.*



General Operation

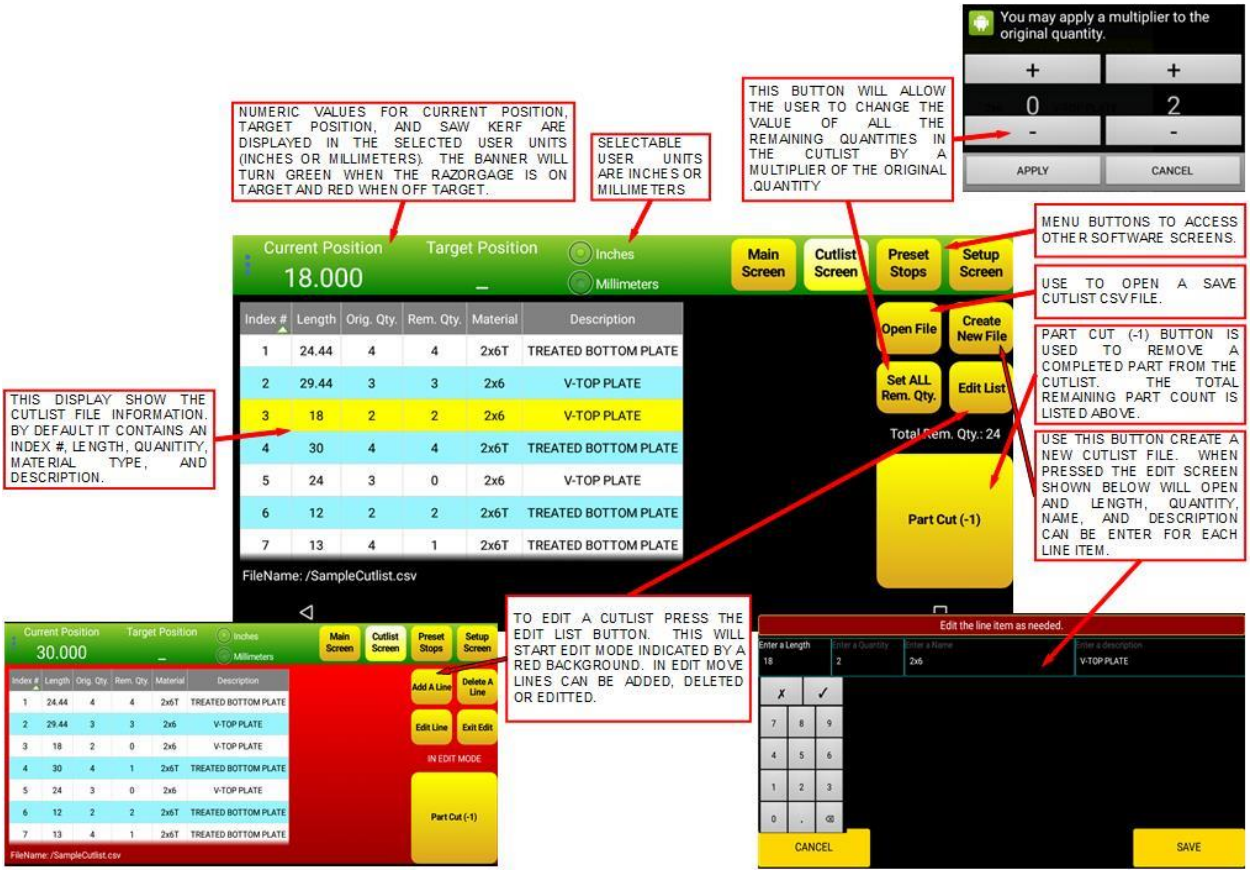
Main Screen

The Main Screen is used for moving the RazorGage by manually entering part lengths. On the Main Screen a target position can be entered by punching in the whole number and decimal followed by the enter key. Alternatively, when using fractions punching in the whole number followed by pressing the FRACTIONS button followed by the desired fraction will move the RazorGage to the selected position. The UNLOAD button will back the RazorGage up allowing room to remove completed part. Pressing this button, a second time will return to the previously entered position.



Cutlist Screen

The Cutlist Screen is used when predetermined list of part sizes controls the positioning of the RazorGage. Cutlists files can be created or downloaded to your Android tablet with the Cutlist Screen. Press the OPEN FILE button to find the cutlist CSV file you wish to open. Cutlist files from a network drive or cloud storage will need to be save to the download folder on the tablet to be used. Once you selected a file to open the cutlist will be displayed on the screen. The cutlist file can be edited by selecting a line item and pressing EDIT LIST. Editing options of adding a line, deleting a line, or editing a line are available. A cutlist file can be created in the RazorGage software by selecting CREATE NEW FILE. Quantity can be edited individually through the edit menu or all together by selecting SET ALL REM. QTY which will allow you to change all quantities at once. Select a line item by touching it and highlighting it yellow. When a line is selected the RazorGage will move into position for that part length. As a part is cut pressing the PART CUT (-1) button will track the complete part by removing one from the quantity of the selected cutlist item. When the current line item quantity reaches zero the next item in the list will be automatically selected and the RazorGage will move to that position. The cutlist doesn't need to be completed in order and at any time a different line item can be selected to work from.

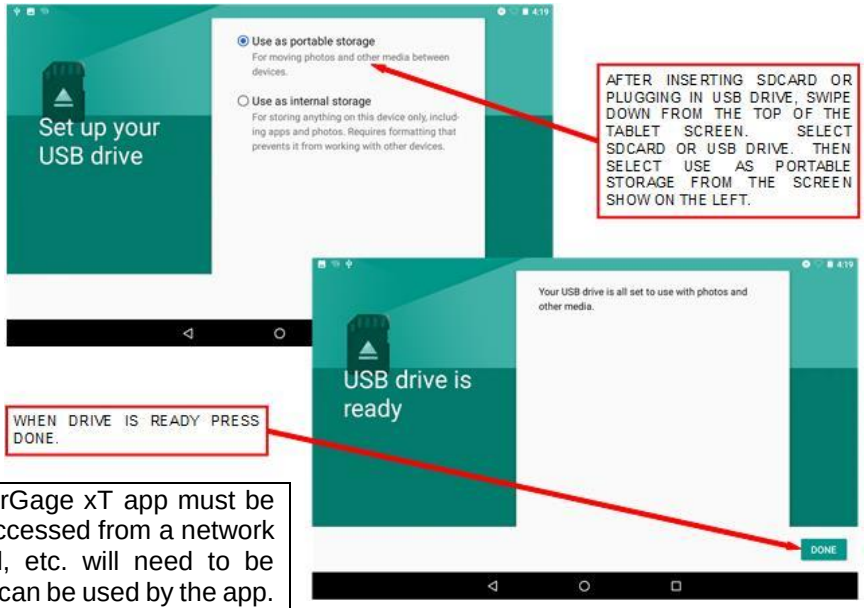


Cutlist Screen

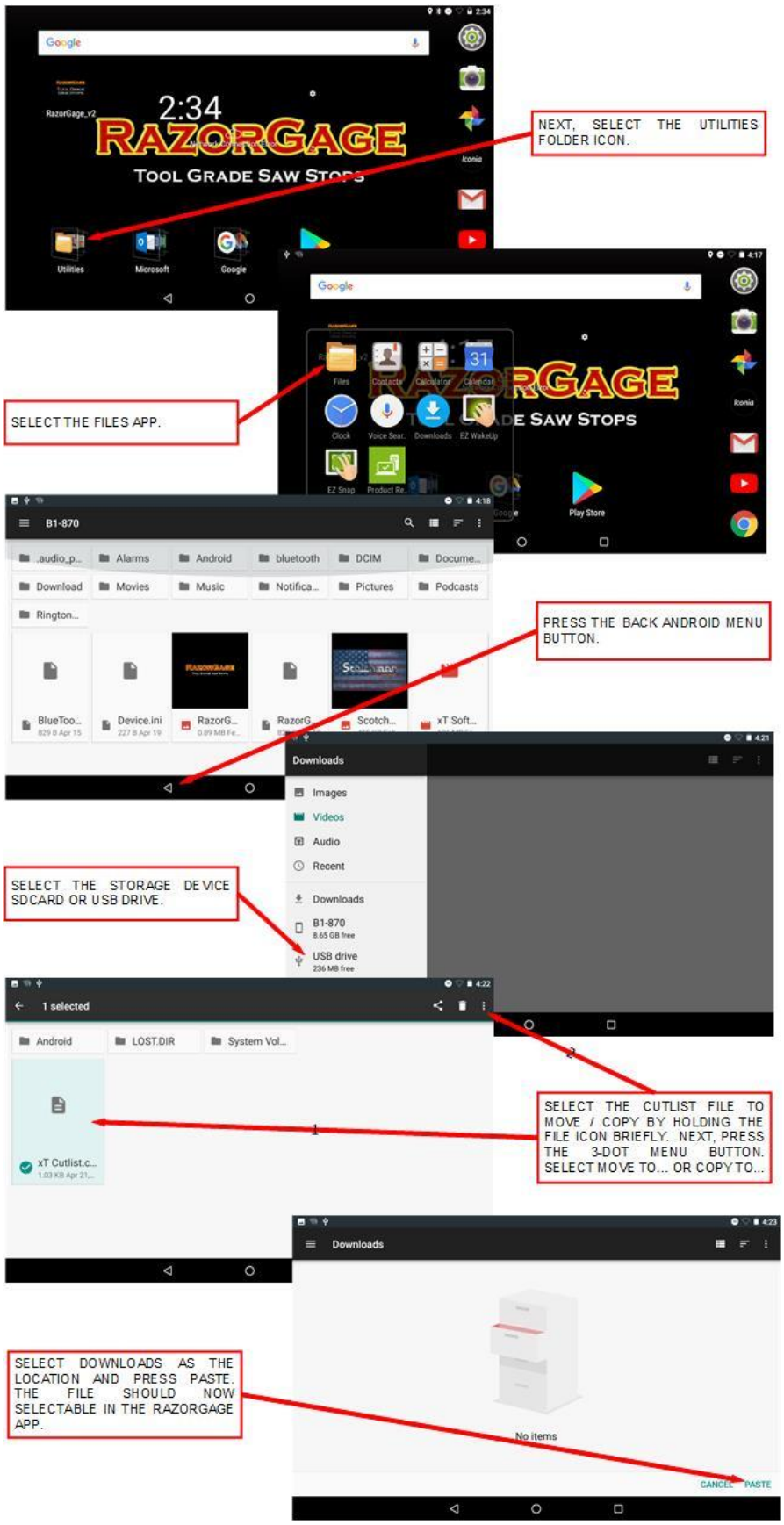
This column must be populated with row number. They do not need to be in sequential order but you must not duplicate row numbers.	Length is in decimal inches or millimeters. Do not use feet or fractions in this column. The RazorGage software will not convert the values in the cutlist to other units. If the software is in inch mode, the numbers in this column will represent inches. If the software is put into metric mode, the values will represent millimeters.	This column contains the quantity of parts needed. If this list represents a single assembly, the xT software gives you the option to multiply the Original Qty values to create multiple assemblies.	Initially populate this column with same values as the Orig. Qty. column. The values in this column get decremented as parts are cut. The xT software allows you to multiply the values in the Original Qty column by a number so that you can make parts required for multiple assemblies. That multiplied value gets put in this column.	Remaining columns can be any kind of information you need. Cutlists created on the machine itself using the RazorGage software will contain inforamtion as shown below so if you intend to use cutlists created on the machine and cutlists created remotely you may want to use these two columns as shown below.		<<<DELETE THIS ENTIRE ROW ONCE YOU UNDERSTAND THE INSTRUCTIONS. The RazorGage xT software automatically creates column headings from the first row of the cutlist. If you don't delete Row 1 of this spreadsheet, the cutlist won't load properly on the machine. The RazorGage xT software will accept more than 5 columns. The first four columns must contain the information shown in this template. Remaining columns can contain any kind of information desired. If there are so many columns that they won't fit on the Android screen, the operator will have to swipe or scroll to see them. When you're done creating the cutlist, save it as a .csv file and email that file to your RazorGage xT's Gmail address. You must create a Gmail account for your machine and install the Gmail app on your RazorGage xT in order to do this. Consult the Google website for instructions regarding setting up a Gmail account and installing the Gmail App on the RazorGage xT Android tablet. Remember to delete this row once you understand the instructions.
INDEX#	LENGTH	ORIG. QTY	REM. QTY.	MATERIAL	PART DESCRIPTION	
1	3.000	2	2	OAK	RAIL	
2	3.001	3	3	OAK	STILE	
3	3.002	4	4	OAK	RAIL	
4	3.003	5	5	OAK	STILE	
5	3.004	6	6	OAK	RAIL	
6	3.005	7	7	OAK	STILE	
7	3.006	8	8	OAK	RAIL	
8	3.007	9	9	OAK	STILE	
9	3.008	10	10	OAK	RAIL	
10	3.009	11	11	ALUM	SASH	
11	3.01	12	12	ALUM	SILL	
12	3.011	13	13	ALUM	SASH	
13	3.012	14	14	ALUM	SILL	
14	3.013	15	15	ALUM	SASH	
15	3.014	16	16	ALUM	SILL	
16	3.015	17	17	ALUM	SASH	
17	3.016	18	18	ALUM	SILL	
18	3.017	19	19	ALUM	SASH	

Creating a Cutlist in a Spreadsheet

Downloading a Cutlist File

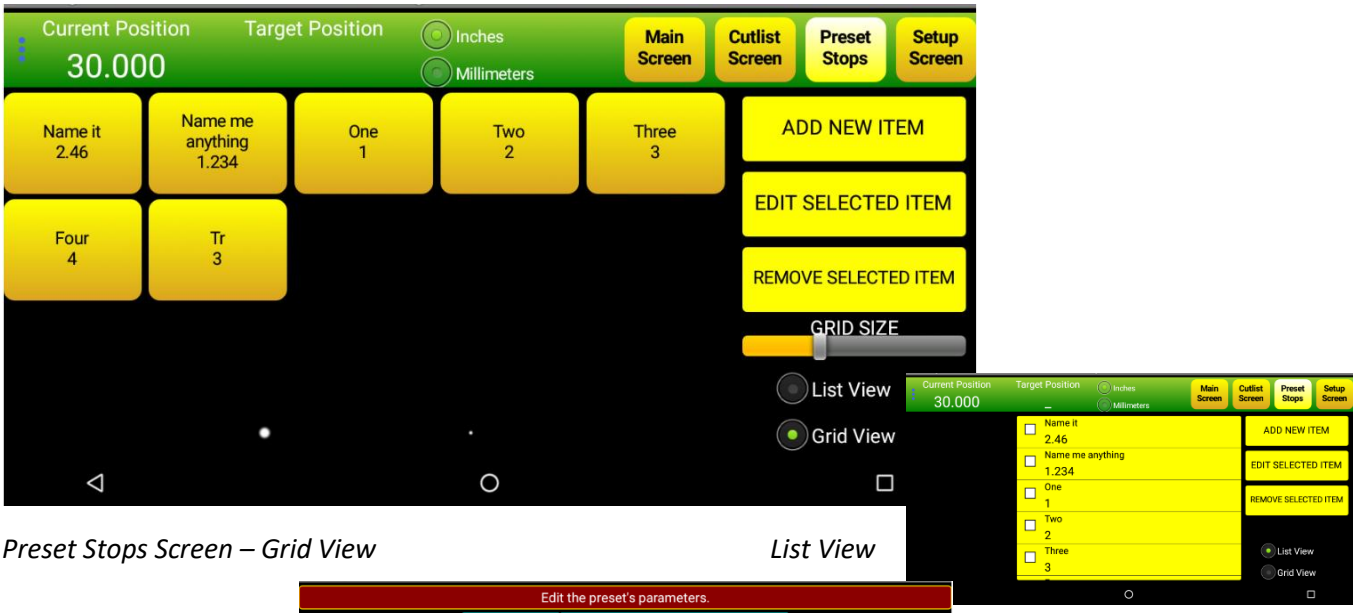


Cutlists created outside of the RazorGage xT app must be saved in .CSV format. Cutlist files accessed from a network drive, cloud storage, email, sdcard, etc. will need to be downloaded to the tablet before they can be used by the app. Once the file has been downloaded onto the device make sure it is located in the Downloads folder of the Android tablet. The following instructions show how to move a cutlist file from a SDCard or USB drive to the downloads folder.

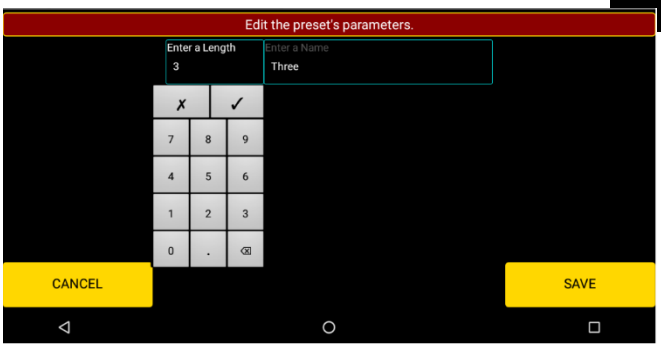

NEXT, SELECT THE UTILITIES FOLDER ICON.
SELECT THE FILES APP.
PRESS THE BACK ANDROID MENU BUTTON.
SELECT THE STORAGE DEVICE SDCARD OR USB DRIVE.
SELECT THE CUTLIST FILE TO MOVE / COPY BY HOLDING THE FILE ICON BRIEFLY. NEXT, PRESS THE 3-DOT MENU BUTTON. SELECT MOVE TO... OR COPY TO...
SELECT DOWNLOADS AS THE LOCATION AND PRESS PASTE. THE FILE SHOULD NOW SELECTABLE IN THE RAZORGAGE APP.

Presets Screen

The Presets Screen is for an application where the RazorGage position is controlled by custom selectable buttons. With the Presets Screen customizable buttons or list items can store various part lengths referenced by a label. A preset button can be setup by pressing the ADD NEW ITEM button. A window will popup where a length and label can be entered. When editing an existing button, the same Edit Presets Parameter window will open to make changes. Press the SAVE button to finish the setup. Once a button is setup simply press the customized button or list item and the RazorGage will move to that position.



Preset Stops Screen – Grid View *List View*



Edit Preset Parameters Screen

Machine Adjustments

WARNING

The operator must remove from and lock out all power sources to positioner before servicing.

Belt Tension Adjustment

The belt tension is set at the factory but may need to be adjusted after changing hands (direction) of the RazorGage or if the motor gearbox is replaced. Follow the directions below to complete this adjustment.

1) Loosen the idler slide screws.

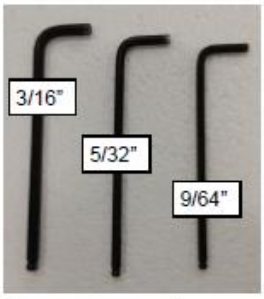
2) Tension belt using the idler tensioning screw. Feel the belt as you go until the belt has a snug feel. If you overtighten the belt, the motor will stall when it tries to move the carriage. If that happens the belt is too tight. Loosen the belt a little at a time until the motor will drive the carriage at least12 inches per second. If you want to go faster, loosen the belt. If you want tighter accuracy, tighten the belt and reduce the speed.

3) Tighten idler slide screws.

4) Once you're done and the RazorGage xT makes moves without stalling, go through the calibration process. If you're unsure about how to calibrate, watch the RazorGage xT Software video on the RazorGage YouTube Channel or click SETTINGS, and then click the button labeled "MY PARTS ARE WRONG" and then click FACTORY CALIBRATION.

Change the Hand of the RazorGage xT

The RazorGage xT is able to be setup for either right or left-hand operation. Use the instructions below to make the adjustment. No software settings will need to be changed for this procedure.

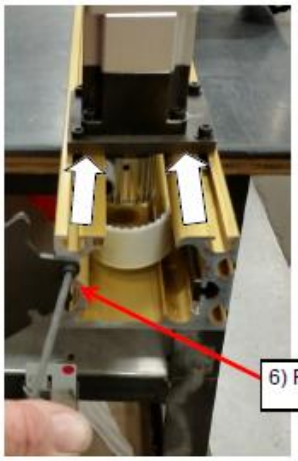


1) Gather tools.

2) Roll beam face down.

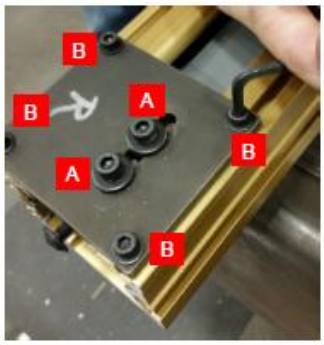
3) Tuck about 12" of seal under belt on motor end.

4) Loosen drive assembly mtg. screws.



5) Slide drive assembly in about 6".

6) Remove both end plates.



7) Loosen idler slide screws (A) and idler assembly mounting screws (B)

8) Using belt slack gained by sliding drive assembly inboard, slide idler out & remove.

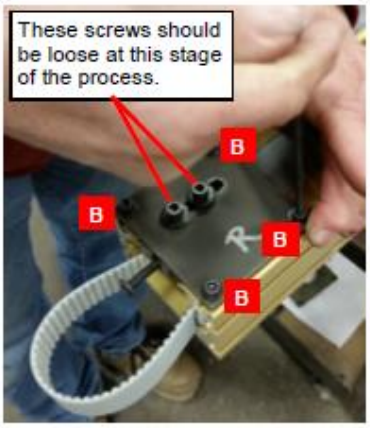
9) Move brass threaded plug and tensioning screw to opposite side of idler block.

10) With idler removed, drive assembly will slide out.

11) On the end drive assy.is moving to, pull belt loop out and slide the drive assembly into the T-Slots.

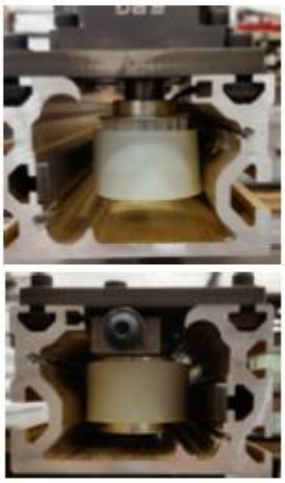
11) As before, tuck about 12" of seal under the belt on the new motor end.

12) Slide the drive assembly in-board about 6".



13) Using the belt slack gained by sliding the drive assembly inboard, slide the idler assembly into the t-slots and tighten mounting screws (B).

14) Position drive assembly flush with end and tighten mounting screws TIGHT!



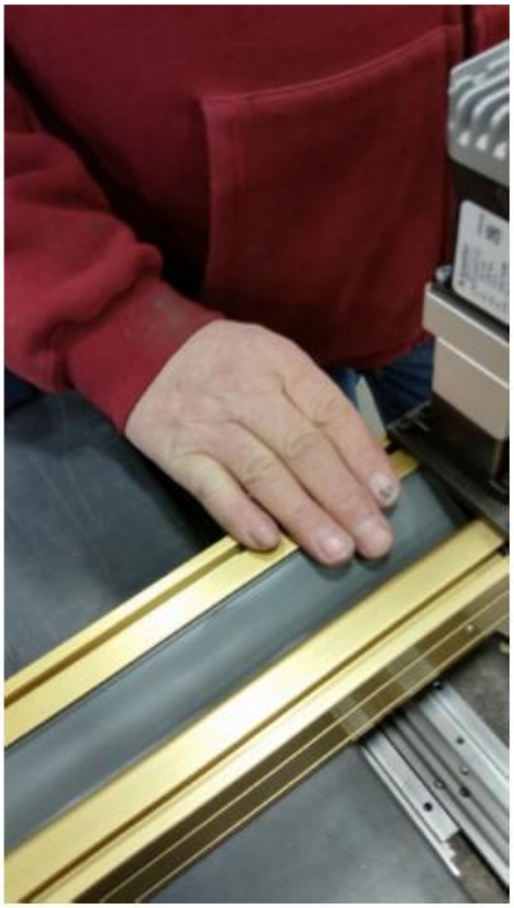
15) Ensure belt is inside the pulley flanges on both ends.

16) Install end caps on both ends.

17) Insert the idler tensioning screw.

19) Tension belt using the idler tensioning screw. Feel the belt as you go until the belt has a snug feel. If you overtighten the belt, the motor will stall when it tries to move the carriage. If that happens the belt is too tight. After performing step 20 & 21and after hooking up the cables to the motor, run the positioner to see if it stalls. Loosen the belt a little at a time until the motor will drive the carriage at least 2 inches per second. If you want to go faster, loosen the belt. If you want tighter accuracy, tighten the belt and reduce the speed.

20) Tighten idler slide screws.

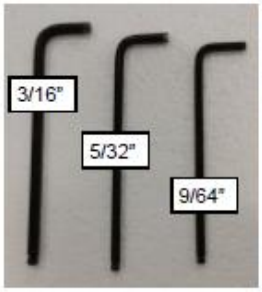


21) Tug the seal out from under the belt and tuck it just inside the extrusion lip as shown.

22) Once you're done and the RazorGage xT is running again, go through the calibration process. If you're unsure about how to calibrate, watch the RazorGage xT Software video on the RazorGage YouTube Channel or click SETTINGS, and then click the button labeled "MY PARTS ARE WRONG" and then click FACTORY CALIBRATION.

Shortening Stroke of the RazorGage xT

The stroke of the RazorGage xT can be shortened to a custom length. Use the instructions below to make the adjustment. The stroke setting and scale factor calibration will need to adjusted after this process is completed.



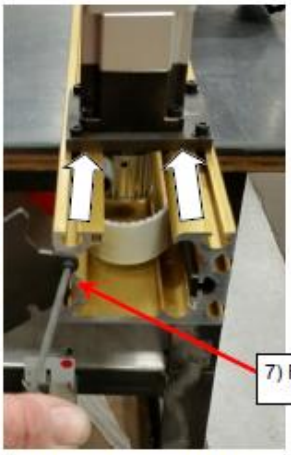
1) Gather tools.

2) Roll beam face down.

3) Tuck about 12" of seal under belt on motor end.

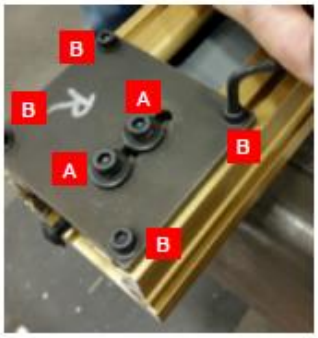
4) Mark the idler and drive assemblies so you know how they go back on.

5) Loosen drive assembly mtg. screws.



6) Slide drive assembly in about 6".

7) Remove both end plates.



8) Loosen idler slide screws (A) and idler assembly mounting screws (B)

9) Using belt slack gained by sliding drive assembly inboard, slide idler out & remove.

10) Be careful not to lose the brass barrel nut. It will drop out if the tensioning screw is removed.

11) With idler removed, drive assembly and carriage will slide out. Remove drive assembly, belt, and carriage as one unit.

12) Now that everything is out of the extrusion you can cut down the lengths:

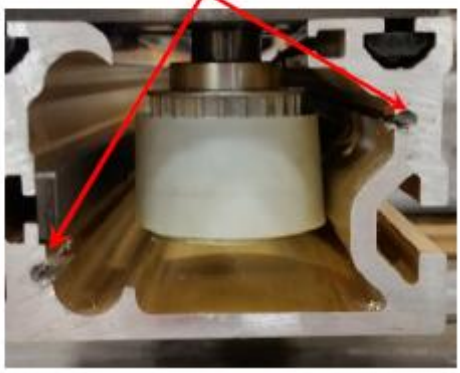
Extrusion - 101-7/8"

Belt: 201-3/4"

Vinyl Seal: 97-1/8"

It would be best to cut the extrusion on the motor end since the end plate on that end doesn't perform any real function so if the cut isn't perfectly square it won't hurt anything. When you cut the end off you'll use your mark you made earler so you will want to make another mark inside the drop so you will still know how to orient the motor when you put it on. After you saw the end you may want to de-bur the cut a little so the outside edges aren't sharp.

13) Once you've cut the extrusion, take an 8-32 tap, put it in your cordless drill, set the torque down a little, put a little Tap-All or other tapping fluid on the tap, and tap the two holes in the end of the extrusion.



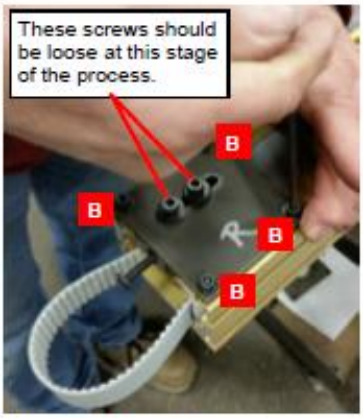
14) To remove the belt from the carriage, loosen the two belt clamp screws.

15) After you've cut all the components, re-attach the belt to the carriage and slide the seal back into place. Then slide the carriage in from the end opposite the one you sawed (just to avoid having to push the carriage through any burrs.

16) On the drive end, pull belt loop out and slide the drive assembly into the T-Slots.

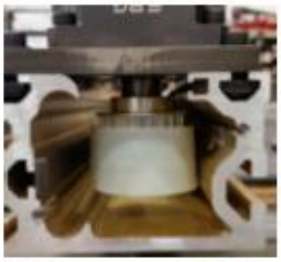
17) As before, tuck about 12" of seal under the belt on the new motor end.

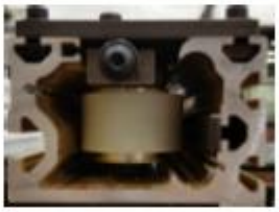
18) Slide the drive assembly in-board about 6".



19) Using the belt slack gained by sliding the drive assembly inboard, slide the idler assembly into the t-slots and tighten mounting screws (B).

20) Position drive assembly flush with end and tighten mounting screws TIGHT!





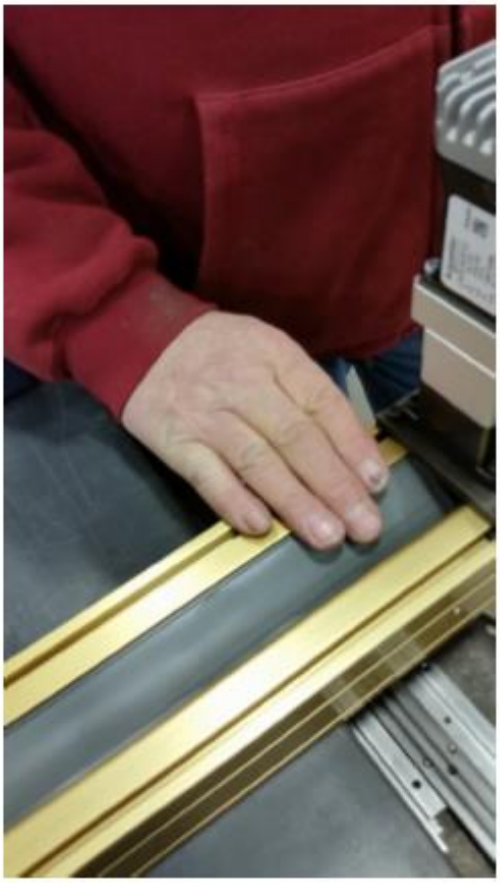
21) Ensure belt is inside the pulley flanges on both ends.

22) Install end caps on both ends.

23) Insert the idler tensioning screw.

19) Tension belt using the idler tensioning screw. Feel the belt as you go until the belt has a snug feel. If you overtighten the belt, the motor will stall when it tries to move the carriage. If that happens the belt is too tight. After performing step 20 & 21and after hooking up the cables to the motor, run the positioner to see if it stalls. Loosen the belt a little at a time until the motor will drive the carriage at least 2 inches per second. If you want to go faster, loosen the belt. If you want tighter accuracy, tighten the belt and reduce the speed.

20) Tighten idler slide screws.



21) Tug the seal out from under the belt and tuck it just inside the extrusion lip as shown.

22) Once you're done and the RazorGage xT is running again, go through the calibration process. If you're unsure about how to calibrate, watch the RazorGage xT Software video on the RazorGage YouTube Channel or click SETTINGS, and then click the button labeled "MY PARTS ARE WRONG" and then click FACTORY CALIBRATION.

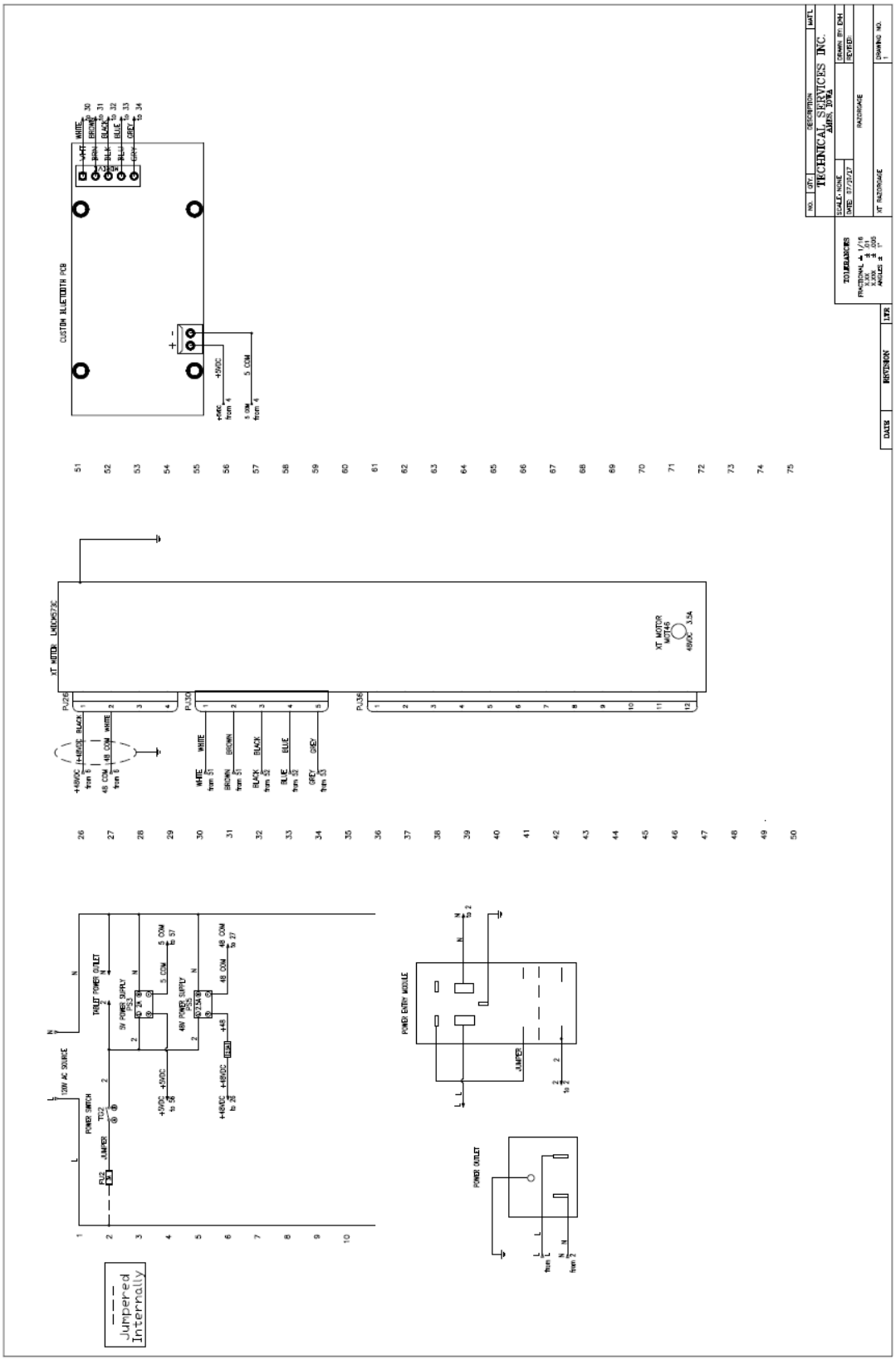
Replacement Parts List

ITEM	RGX#	DESC
1	RGX01805	ANDROID TABLET
2	RGX00797	TABLET CHARGING CABLE
3	RGX01845	MDRIVE STEPPER MOTOR
4	RGX02031	MDRIVE POWER CABLE
5	RGX02126	MDRIVE COMMUNICATION CABLE
6	RGX01825	BLUETOOTH COMM BOARD
7	RGX01844	GEARBOX
8	RGX01824	48VDC POWER SUPPLY, 2.5A, 120-240V INPUT
9	RGX01826	5VDC POWER SUPPLY, 2A, 120-240V INPUT
10	RGX01658	POWER ON PUSHBUTTON
11	RGX00571	DRIVE BELT

A full list of field replaceable parts can be accessed at our web site:

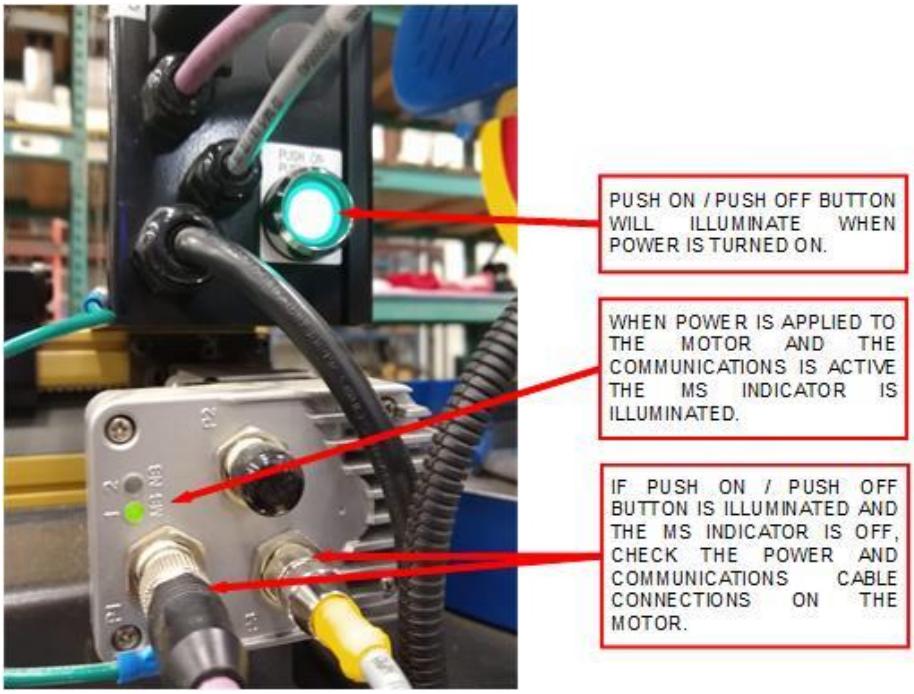
https://razorgage.com/product-line/replacement-parts/

Troubleshooting - Electrical Schematics



Troubleshooting Guide

	Description	Possible Causes	Corrective Action
1	RAZORGAGE APP STUCK ON "*PLEASE WAIT CONNECTING TO RAZORGAGE"* SCREEN.	• RazorGage enclosure power is off.	• Check PUSH ON / PUSH OFF button on RazorGage enclosure is illuminated if not press the button to turn control power on. If the button still doesn't illuminate, check the 3Amp fuse FU2 inside the enclosure and replace if necessary.
		• Lost Bluetooth connection.	• In the Android tablet settings select Bluetooth and check to see if the RazorGage is showing up as a paired device. If not follow the instructions in the Setup section step #3 to pair the device again.
		• Motor power connection is loose.	• If PUSH ON / PUSH OFF button is illuminated and the MS indicator on the motor is off, check the power cable connection on the motor and wire termination in the enclosure.
		• Motor communications connection is loose.	• If PUSH ON / PUSH OFF button is illuminated and the MS indicator on the motor is off, check the communications cable connection on the motor and wire termination in the enclosure.
		• Failed motor.	• If you have exhausted all the above actions, the motor has likely failed and needs to be replaced.
3	RAZORGAGE STALLS DURING MOVE.	• The RazorGage speed is set too high.	• Go to the SETUP SCREEN and check the Motion Parameter Speed. Set the speed to 14 or less.
		• The RazorGage accel and/or decel is set too high.	• Go to the SETUP SCREEN and check the Motion Parameters Accel & Decel. Set each to 20 or less.
		• The RazorGage drive belt is tensioned too tightly.	• Check the drive belt tension and loosen the belt tension if it is too tight. Check RazorGage scale factor anytime belt tensioning is adjusted by cutting a short and long part and measuring them for accuracy. Recalibrate the scale factor if necessary. See section Setup step #7.
		• Stroke is not properly set.	• If stall is occurring at the high limit of the RazorGage and an audible bang is heard, it is likely that the RazorGage is running into the internal hard stop. On the Setup Screen check the Stroke parameter. The standard RazorGage xT lengths are 96" or 144". If RazorGage length has been modified the stroke can be found by measuring the overall length of the extrusion and minus 16".
		• Scale factor is not calibrated correctly.	• If stall is occurring at the high limit of the RazorGage and an audible bang is heard, it is likely that the RazorGage is running into the internal hard stop. Recalibrate the scale factor. See section Setup step #7.
3	CUTLIST FILE IS NOT FOUND.	• The cutlist file is in the wrong format.	• When making cutlist files make sure to save them in .CSV format. The RazorGage app will not recognize other formats such as the default Excel format .XLSX for example.
		• The cutlist file is not downloaded.	• To be used by the RazorGage app cutlist file needs to be downloaded locally to the tablet.
		• The cutlist file is not located in correct folder.	• If cutlist file was downloaded onto tablet and still isn't found, check to see if the file is in the Downloads folder and not some other location on the tablet.



Power and Communications Indicators.

If you have more questions about RazorGage products visit our Downloads page and our You Tube channel. Both are accessible from the RazorGage home page, www.razorgage.com. If you would like to discuss an application, feel free to call us at (515) 232-3188.