

The logo for revvity, featuring the word "revvity" in a lowercase, white, sans-serif font on a black background. The background of the entire page is a vibrant, abstract image of overlapping, translucent spheres in shades of yellow, orange, and green, resembling a molecular or cellular structure.

revvity

SERVICE MANUAL

# Bead Ruptor Elite™

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## Table of Contents

Tool Requirements .....	3
RP1 Lid Replacement.....	4
RP2 Fingerplate Removal .....	5
RP3 Carousel Removal.....	6
RP4 Neck Gasket Removal.....	6
RP5 Spider Removal .....	7
RP6 Housing Removal .....	8
RP7a Blue VFD Removal.....	9
RP7b Black VFD Removal.....	10
RP8 Power Supply Removal.....	11
RP9 User Interface Removal.....	12
RP10 Fuse Replacement .....	13
RP11 Lid Gasket Replacement .....	13
RP12 Fan Installation.....	14
Troubleshooting Guide.....	15
Troubleshooting Guide Pictures.....	16
Verification Procedures .....	18
Calibration Procedures.....	19
Spare Parts List.....	23
Error Message Guide .....	23

## Tool Requirements

Example	Description
McMaster 5163A11	1/4" Combination Wrench
McMaster 5543A25	5/16" Socket
McMaster 5299A29	Long Nose Pliers
McMaster 8522A11	Wire Cutters
McMaster 5682A44	#2 Phillips (6" shaft)
McMaster 5682A41	3/32" Flat Screwdriver (3" shaft)
McMaster 6286A19	9/64" Allen Ball Driver
McMaster 6286A16	3 mm Allen Ball Driver
McMaster 6286A13	3/32" Allen Ball Driver
McMaster 91458A113	242 Loctite Blue
McMaster 70215K71	Small Zip Ties
Extech 461830/461831 115/220 Volt	Stroboscope (must be calibrated)
Fluke 930-931	Tachometer (must be calibrated)
Any	Multimeter
FLIR TG54	IR Thermometer (must be calibrated)
Any	HyPot Tester (AC)

## RP1 Lid Replacement

Required RP: None

Required Tools: 3 mm Allen Wrench

1. Using 3 mm Allen Wrench, remove (2) screws from each hinge
2. Reverse process to install. No Loctite necessary. Perform VP1 & VP2.

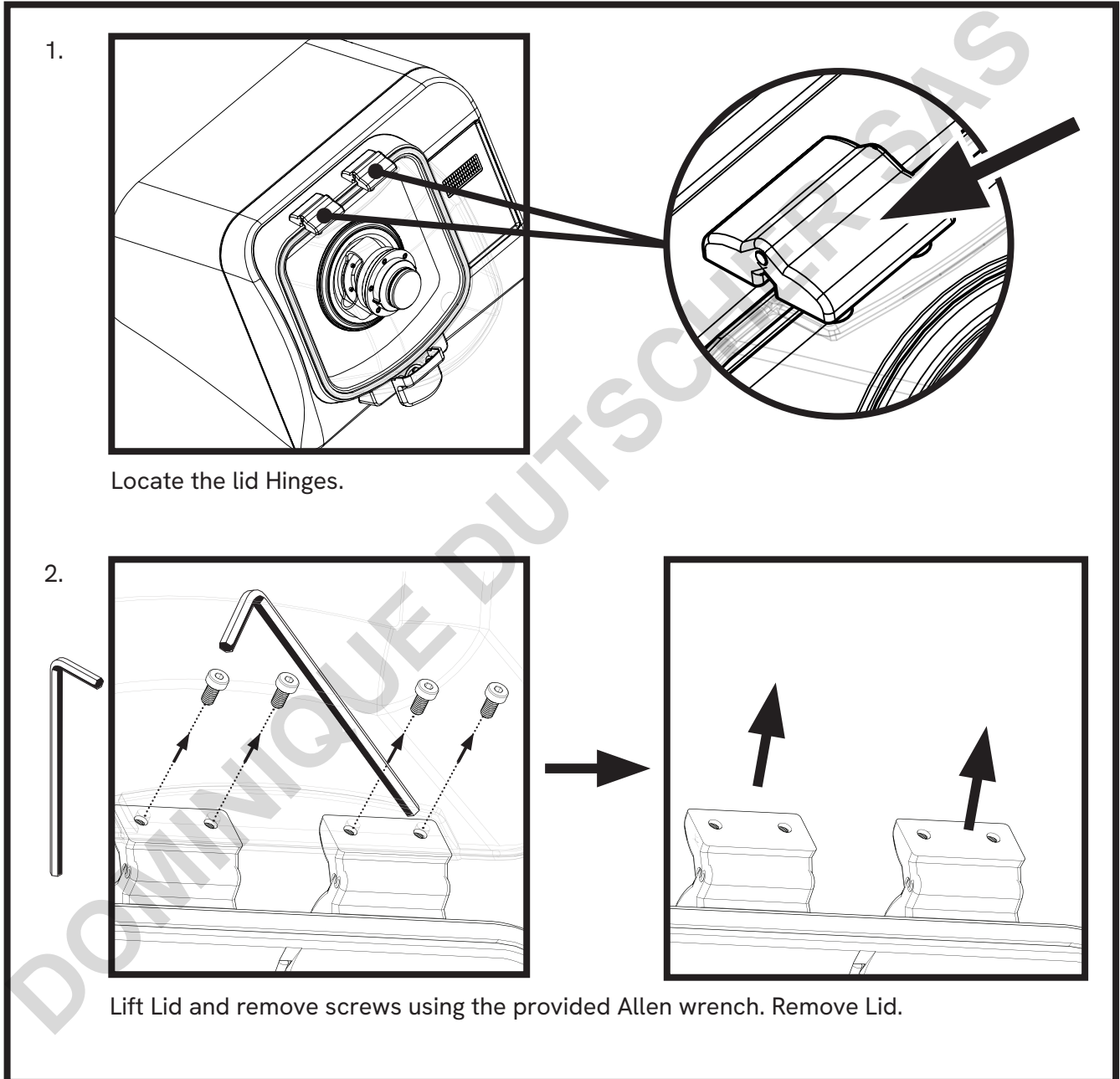


Figure 1

## RP2 Fingerplate Removal

Required RP: None

Required Tools: None

1. To remove the fingerplate, turn knob counterclockwise and lift fingerplate from carousel.
2. Lift carriage plate off carousel to access the carousel (Figure 2).
3. Reverse the process to install. No Loctite necessary.
4. Perform VP1 & VP2.

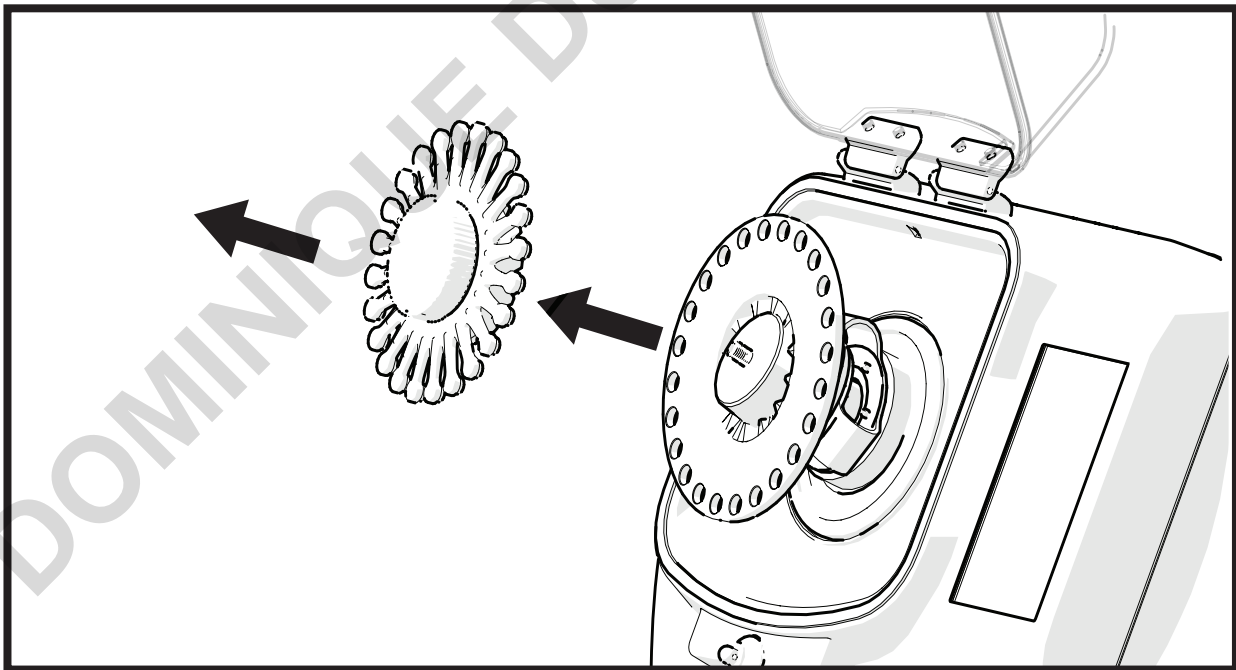
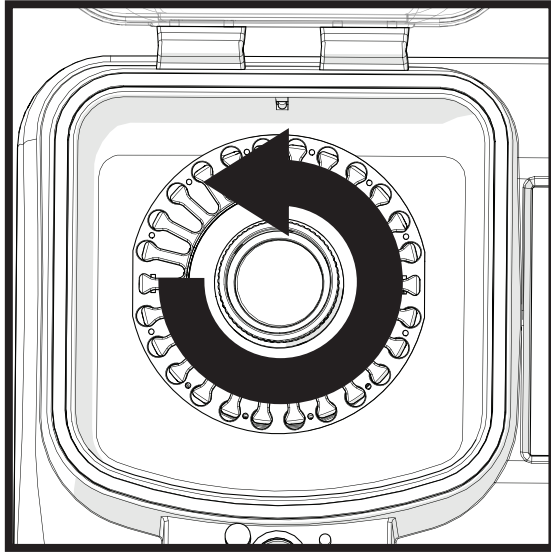


Figure 2

## RP3 Carousel Removal

Required RP: 2

Required Tools: 9/64" Allen Ball Driver, Loctite 242

1. Perform RP2.
2. Using 9/64" Allen Ball Driver remove the (6) 8-32 screws that hold the carousel (Figure 3).
3. Pull carousel off the bearing.
4. Reverse process to install (use tightening sequence below). Use Loctite 242 on all fasteners.
5. Perform VP1 & VP2

Note: If re-installation onto bearing is difficult, make sure you are holding the carousel at the same angle as the bearing and it should easily slide on.

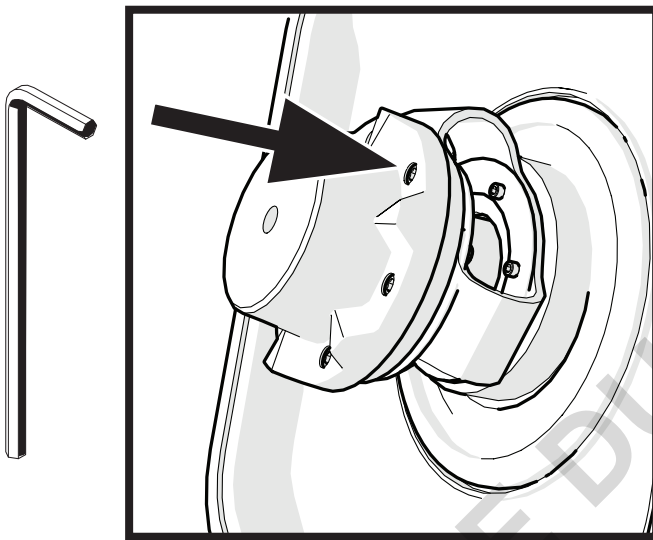
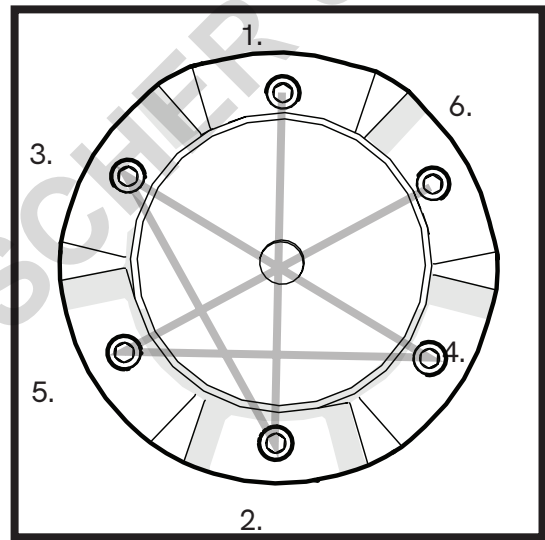


Figure 3



Tightening Sequence

## RP4 Neck Gasket Removal

Required RP: None

Required Tools: None

1. Remove the neck gasket (Figure 4). Gently stretch the neck gasket to bring it over the carousel.

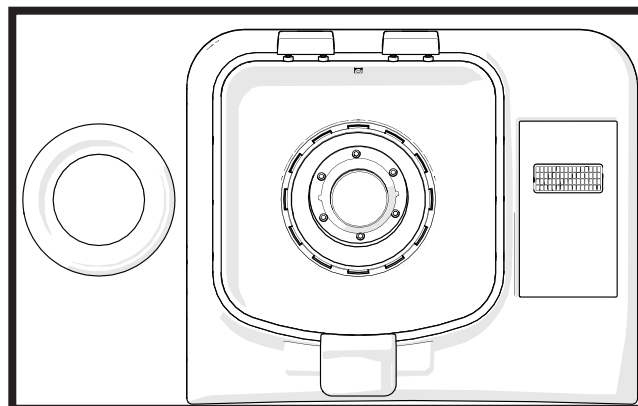


Figure 4

## RP5 Spider Removal

Required RP: 2 & 3

Required Tools: 1/4" Combination Wrench, 3/32" Allen, Loctite 242

1. Perform RP1 and RP2
2. Remove (6) 4-40 nuts with 1/4" combination wrench (Figure 5) from back of lock ring.
3. Remove (6) 4-40 socket head cap screws using 3/32" allen ball driver from spider Gasket retaining ring (Figure 6).
4. Spider gasket is split at the bottom and should now come off the unit.
5. Reverse process to install. Use Loctite 242 on screws but not nuts.
6. Perform RP1 & RP2

Note: When reinstalling screws, tighten only until snug. You are compressing rubber as you tighten, so it will not reach a hard stop until permanent damage is already done.

Note: When reinstalling 4-40 nuts, tighten until flush with face of the nut.

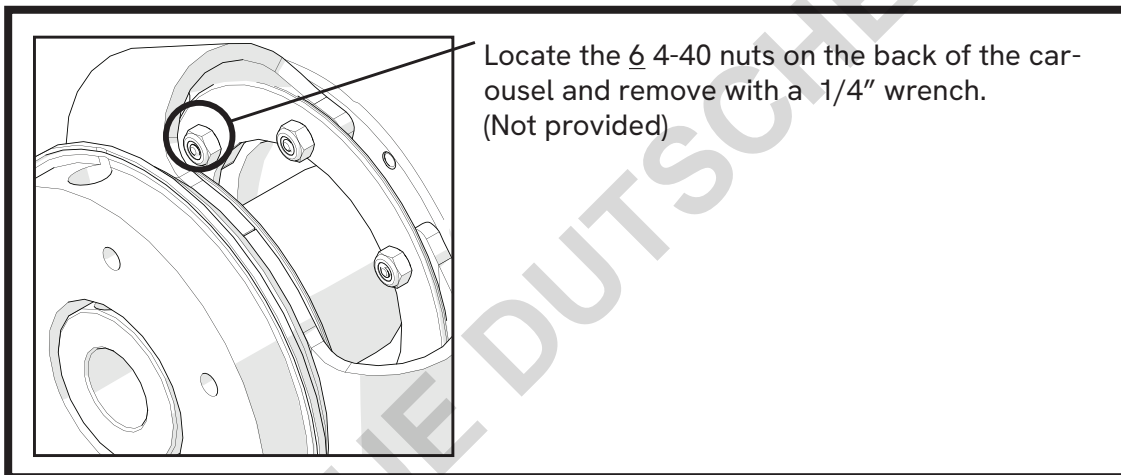


Figure 5

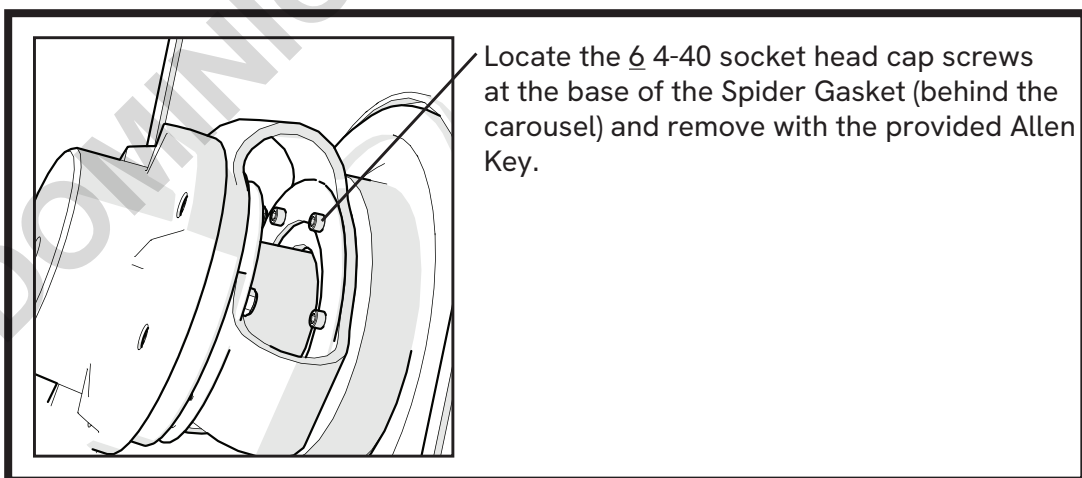


Figure 6

## RP6 Housing Removal

Required RP: 2 & 4

Required Tools: #2 Phillips Screwdriver

1. Perform RP2 & RP4
2. Remove (6) screws on underside of housing on each side (Figure 7), slide unit to edge of the work surface to make access possible.

Warning: Do not place unit on back or sides to access these screws.

3. Remove (3) screws on back of housing with #2 Phillips (Figure 8).

Note: This covers lid latch solenoid replacement, door solenoids, door sensor and temp sensor.

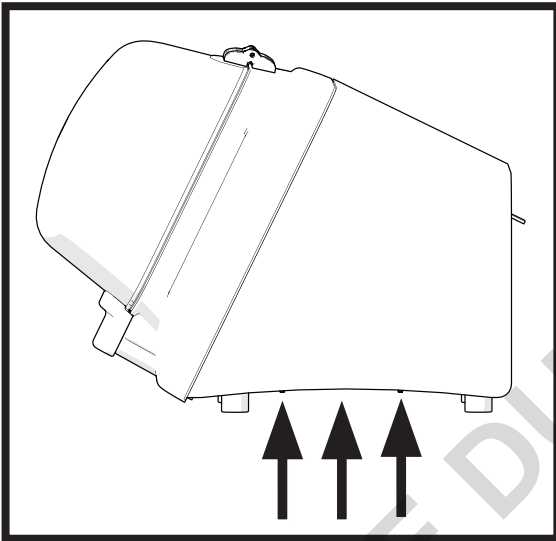


Figure 7

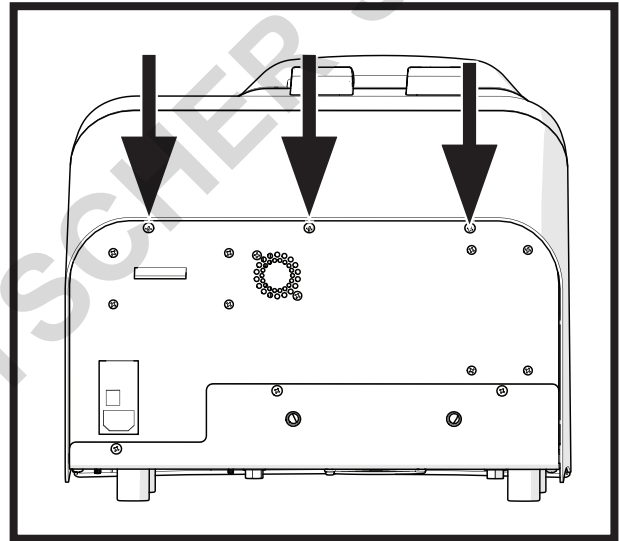


Figure 8

4. Tip housing forward to access cables, being careful that carousel clears housing opening (Figure 9).
5. Disconnect cables shown (Figure 10).

Note: These connectors have a tab on the side that must be pressed and held while disconnecting.

6. Reverse process to install. Be sure to seat the edge of the neck gasket onto both the housing and the spider gasket support ring.

7. Perform VP1, VP2, CP2 & CP3

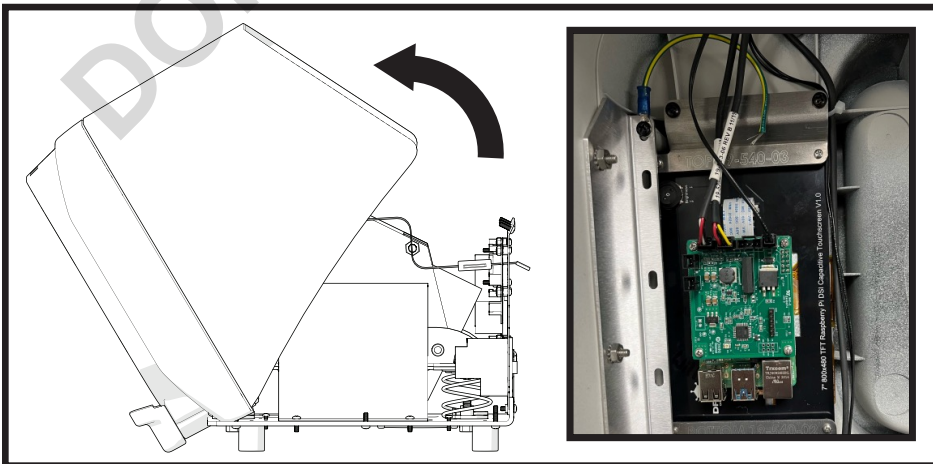


Figure 9

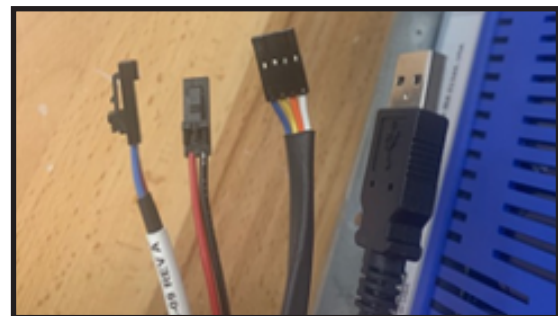


Figure 10

## RP7a Blue VFD Removal

Required RP: 2, 4, & 6

Required Tools: #2 Phillips Screwdriver, 3/32" Flat Screwdriver, Needle Nose Pliers

1. Perform RP2, RP4 and RP6. If you have a Blue VFD continue to next step. If you have a Black VFD continue to step 2 on next page.
2. Remove (2) screws from each side of VFD base (Figure 11)
3. Remove hook and loop strap (Figure 11)
4. Using 3/32" flat screwdriver remove (3) motor wires (Figure 12)
5. Remove (4) VFD control wires (Figure 13)
6. Remove (3) power wires and (1) ground wire (Figure 14)

Note: Connections above have been protected by potting compound during the initial assembly process, pressing the screw driver into compound should clear it and allow the removal of the set screw.

7. Reverse process to install. No Loctite necessary. Use needle nose pliers to manipulate wires as necessary.
8. This concludes the Blue VFD installation. Perform VP1, VP2, & CP2

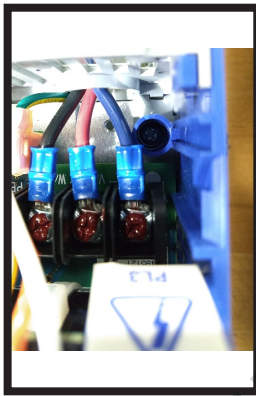


Figure 12



Figure 13



Figure 14



Figure 11

## RP7b Black VFD Removal

2. Remove (2) screws from each side of VFD base (Figure 15)
3. Using 3/32" flat screwdriver remove (3) motor wires (Figure 16)
4. Remove (4) VFD control wires (Figure 17)
5. Remove (3) power wires and (1) ground wire (Figure 18 and 19)
6. Reverse process to install. No Loctite necessary. Use needle nose pliers to manipulate wires as necessary.
7. This concludes the Black VFD installation. Perform VP1, VP2, & CP2

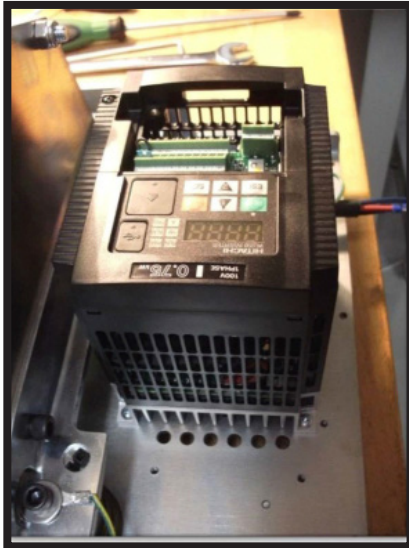


Figure 15

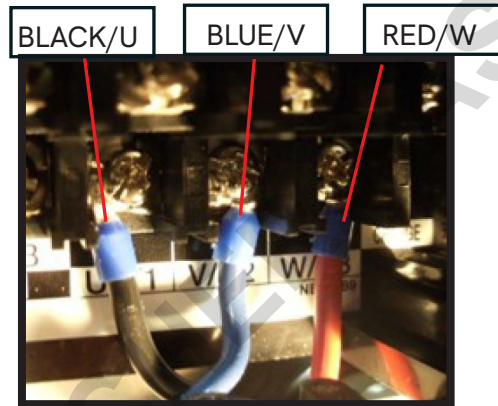


Figure 16



Figure 17

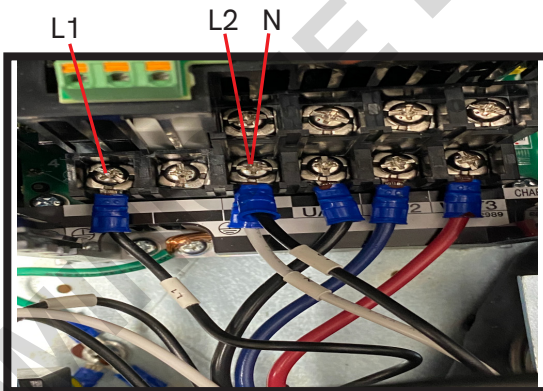


Figure 18

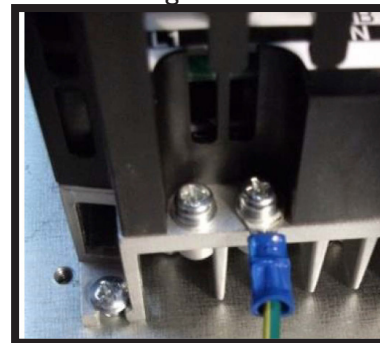


Figure 19

## RP8 Power Supply Removal

Required RP: 2, 4, & 6

Required Tools: 5/16" Socket

1. Perform RP2, RP4 and RP6
2. Disconnect both white plugs and the red connector (Figure 20).
3. Using 5/16" socket remove the nuts at each corner.

WARNING: Use Caution to not lose the studs.

4. Reverse process to install. No Loctite necessary. Be sure to replace ground wire in top right corner.

WARNING: Metal standoff and lock washer go on top right corner (of Figure 20) above the ground connection. Correct stack of these items is critical (Figure 21).

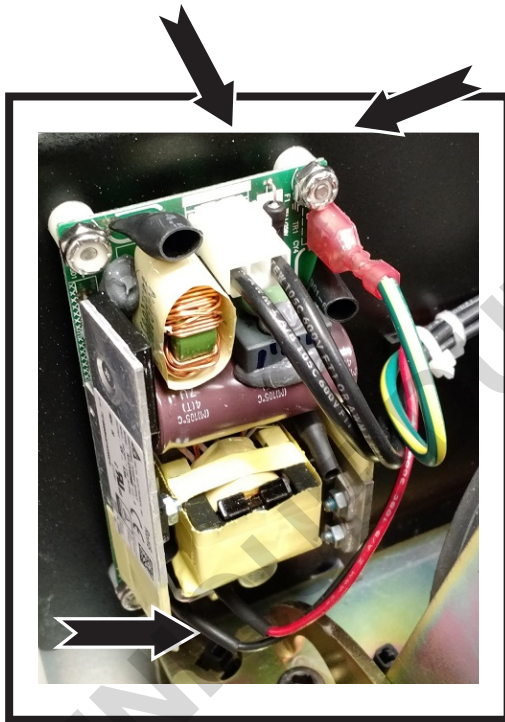


Figure 20



Figure 21

5. Check manufacturer part number on label on side of power supply (Figure 22, Figure 23, Figure 24).
6. Using table below, wire harness to power supply according to diagram A,B, or C.

Note: Wiring of new power supplies varies depending on manufacturer part number. Manufacturer PN can be found on the unit (Figure 22, Figure 23, Figure 24).

WARNING: If power supply is not wired correctly, the UI board will be damaged.



Figure 22



Figure 23

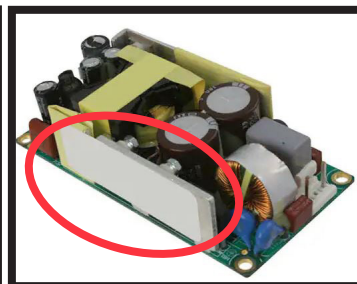
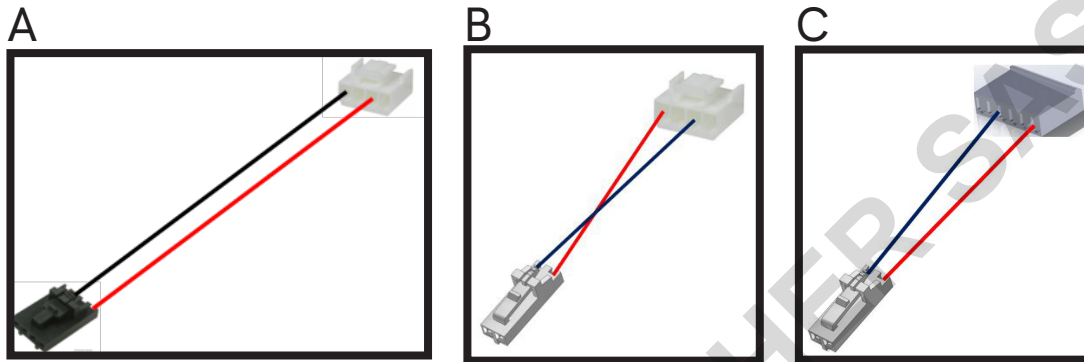


Figure 24

Part Number	Manufacturer PN	Wire Harness Orientation	Number of Pins
19-413-2	MDS-065APS12 BA	A	4
19-413-3	RPS-120-12	B	4
19-413-5	MTB080012A	C	6

### 7. Wiring Diagrams:-



8. Reverse process to install. No Loctite necessary. Be sure to replace ground wire to right corner.  
 9. Perform VP1, & VP2

### RP9 User Interface Removal

Required RP: 2, 4, & 6

Required Tools: #2 Phillips Screwdriver, 5/16" Socket

1. Perform RP2, RP4, and RP6
2. Using #2 Phillips Screwdriver, disconnect (1) ground wire connection (Figure 25).
3. Using #2 Phillips Screwdriver, remove 4 screws securing the touchscreen assembly (Figure 26).
4. Reverse process to install. No Loctite necessary.
5. Perform VP1, VP2, CP2, and CP3

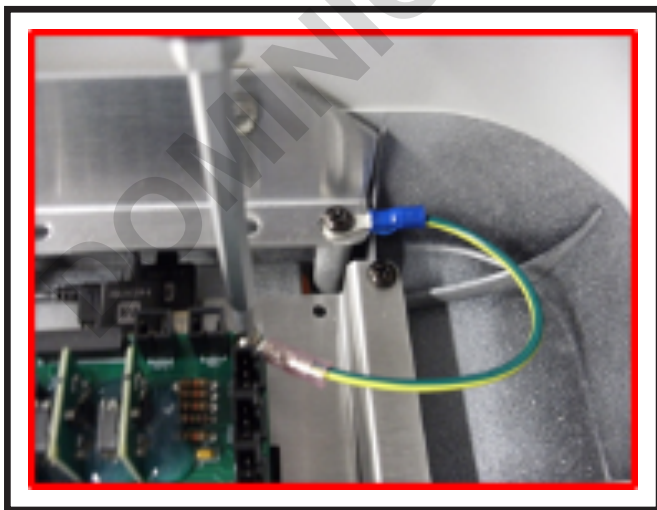


Figure 25

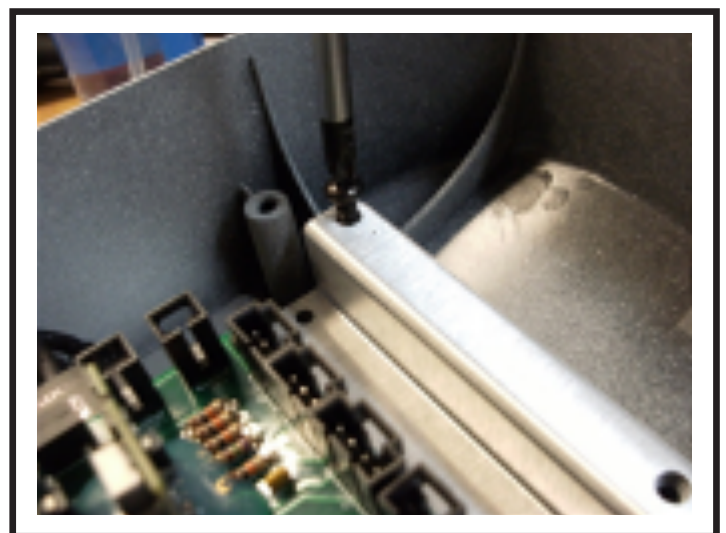


Figure 26

## RP10 Fuse Replacement

Required RP: N/A

Required Tools: Flat Screwdriver

1. Use flat screwdriver to loosen fuse block on in-line filter box (Figure 27).
2. Use flat screw driver to slide out fuse block.
3. Check both fuses and replace if they look damaged (Figure 28).
4. Installation is the reverse of these steps. Take care to keep the fuses in place during insertion.
5. Perform VP1, & VP2



Figure 27



Figure 28

## RP11 Lid Gasket Replacement

Required RP: N/A

Required Tools: Flat Screwdriver, Rubbing Alcohol, Goo Gone, Sponge

1. Remove the old gasket. A small screw driver may be necessary to get under the seal and the adhesive strip left on the housing. Be very careful not to scratch the housing.
2. Use Goo Gone and a small cloth or sponge and scrub the adhesive from the seal area.
3. Wipe down area with rubbing alcohol so the new seal will adhere well.
4. Remove paper cover from new gasket and start by applying the entire top of the seal at once. Work your way down each side and then across the bottom meeting in the middle.

Note: Be sure not to stretch the gasket while applying, as this will cause an excess and there will be a bubble (Figure 29).

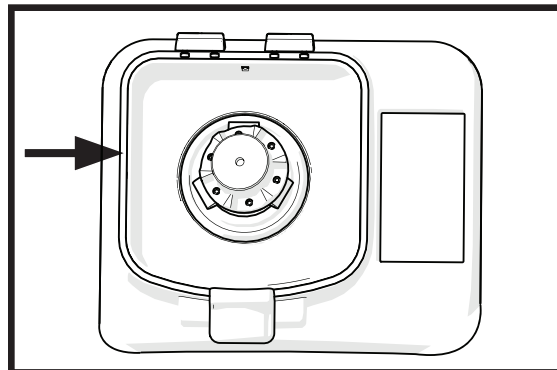


Figure 29

## RP12 Fan Installation

Required RP Sequence: 2, 4 & 6

Required Tools: Screw Driver, 5/16 socket driver, cable tie

1. Perform RP2, RP4 and RP6.
2. Install the fan (Figure 30) with the sticker facing the back plate and wires facing down using 2 bolts (Figure 31) and lock nuts. Orientation is critical.
3. Tighten bolts with screwdriver and 5/16 socket driver.
4. Plug fan into the user interface as shown (Figure 32).
5. Secure wire with a cable tie (Figure 33).
6. Perform VP1 & VP2



Figure 30

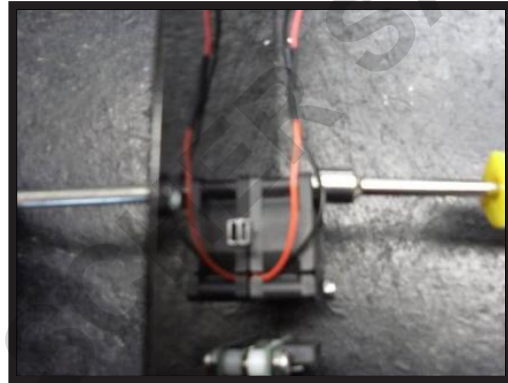


Figure 31

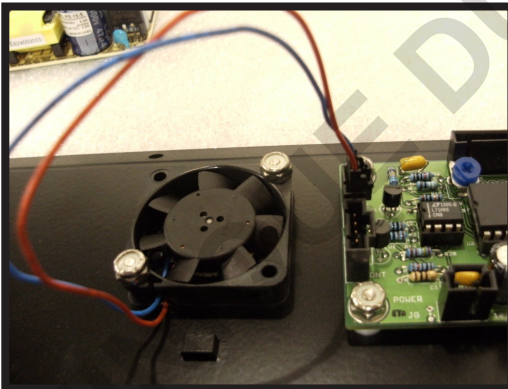


Figure 32

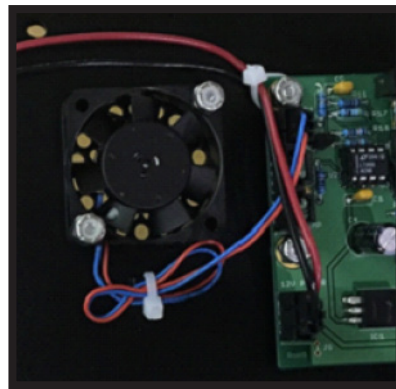


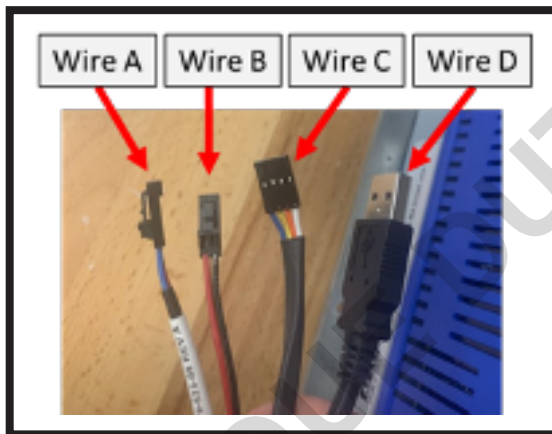
Figure 33

## Troubleshooting Guide

Problem	Possible Cause	Action(s)
The fan does not work	No Power	<ol style="list-style-type: none"> <li>1. Check main voltage.</li> <li>2. Check that the voltage of the unit matches that being delivered by the main power supply.</li> <li>3. Make sure the unit is plugged in properly.</li> <li>4. Check and replace fuses if blown (RP10).</li> </ol>
	Faulty Fan	<ol style="list-style-type: none"> <li>1. Turn off the unit.</li> <li>2. Unplug fan connector (TSG Pic #1).</li> <li>3. Power on unit, check for DC voltage at fan connector (TSG Pic #1).</li> <li>4. If no voltage, replace User Interface (RP9). If 5V DC present, replace fan (RP12).</li> </ol>
No display on the screen	No Power	<ol style="list-style-type: none"> <li>1. Check main voltage.</li> <li>2. Check that the voltage of the unit matches that being delivered by the main power supply.</li> <li>3. Make sure the unit is plugged in properly.</li> <li>4. Check and replace fuses if blown (RP10).</li> </ol>
	Faulty display screen	<ol style="list-style-type: none"> <li>1. Turn off the unit.</li> <li>2. Remove housing (RP6).</li> <li>3. Power on unit. Check wire B in TSG Pic #2 for 12V output.</li> <li>4. If no 12V is found replace power supply (RP8).</li> <li>5. If 12V is found replace User Interface (RP9).</li> </ol>
One or several tubes are not sealed tightly	The cap is not properly sealed or the tube is faulty.	If a dangerous or potentially dangerous sample is contained in the tube, apply the proper decontamination procedure.
Unit power on with a loud "BANG"	Motor control device damaged due to incorrect voltage selection.	Replace VFD (RP7).
Unit powers on but motor does not turn.	Incorrect voltage selected.	<ol style="list-style-type: none"> <li>1. Power off unit and select appropriate voltage by flipping the fuse to the correct voltage (RP10).</li> <li>2. Power on the unit.</li> <li>3. If problem persists, replace VFD (RP7).</li> </ol>
Rattling noise from within processing area	Tube(s) loose due to damage	Replace damaged tubes.
	Tube holder assembly damaged	<ol style="list-style-type: none"> <li>1. Power off unit.</li> <li>2. Open unit and replace fingerplate.</li> </ol>
	Carousel internal components damaged	<ol style="list-style-type: none"> <li>1. Power off unit.</li> <li>2. Open unit and replace carousel (RP3).</li> </ol>

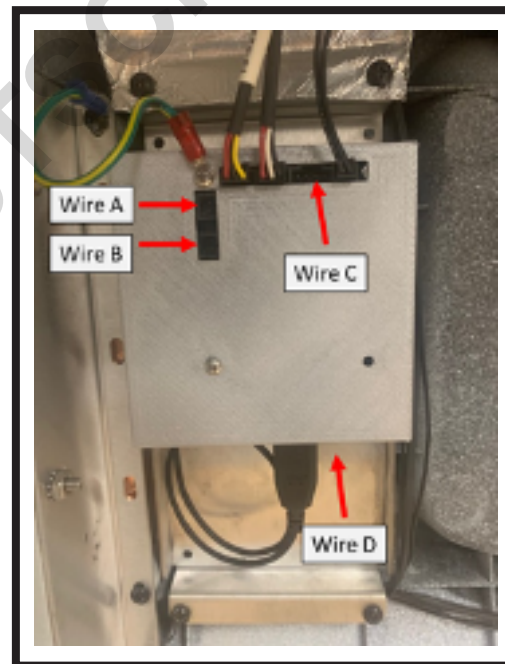
Problem	Possible Cause	Action(s)
Rattling noise or excessive vibration from inside the unit.	Frame fasteners loosened.	1. Power off unit. 2. Open unit (RP6) and tighten all fasteners on motor and frame
	Frame damaged.	1. Power off unit. 2. Open unit (RP6) and inspect frame for damage. 3. If damage is present, replace damaged components.
	Shipping screws still in place	1. Power off unit 2. Remove shipping screws on the back of the unit.
Screen does not react to input	Damaged screen	1. Power off unit 2. Replace User Interface (RP9).

### Troubleshooting Guide Pictures



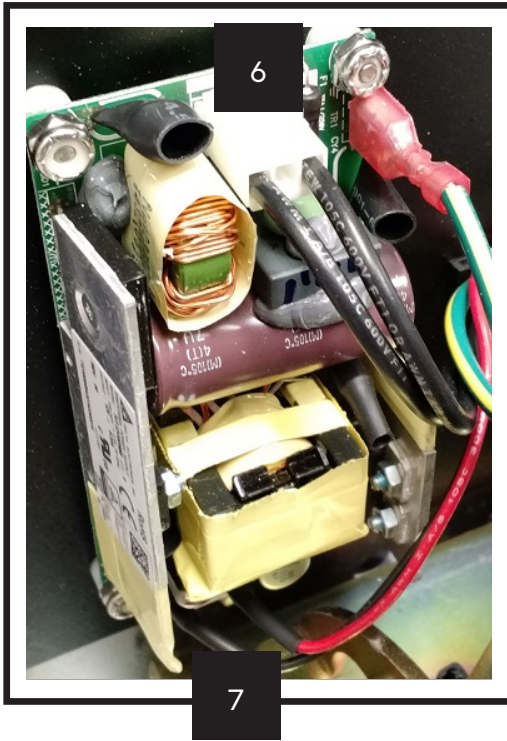
TSG Pic. 2

**⚠ WARNING:** Do Not swap wires A & B. Damage to the electronics will occur.



TSG Pic. 1

A	Fan
B	12V DC IN
C	VFD
D	USB



TSG Pic. 3

6	115V/220V supply
7	12V DC OUT

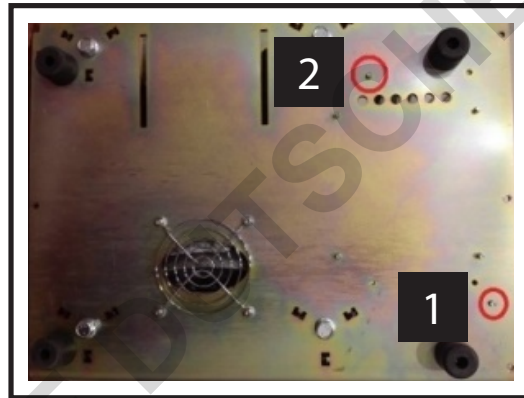
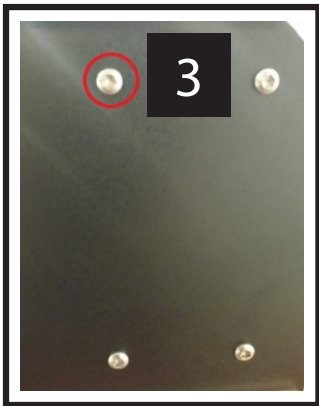
! Note: On connector 6, there should only be mains AC voltage (100V, 115V, or 230V). If connector 6 has correct voltage connector 7 should have 12V DC.

## Verification Procedures

### VP1 Electrical Safety Test

1. Perform Ground continuity checks from the PEM Ground to the following (this can be done with a simple multimeter)
  - A. Ground between VFD and PEM (Location 1)
  - B. Ground between VFD and Motor (Location 2)
  - C. Power Supply Ground (Location 3)
2. Perform HyPot Checks with the red lead to the line and the black lead to the following locations. Settings to be 1.45KV, 10 Seconds 12mA limit
  - A. PEM Ground (Location 1)
  - B. PE ground (Location 2)

Note: The screw for 1 and 2 can be accessed from the bottom of the unit while sitting close to the edge of the table. The top of this picture is the front of the unit.



**Note:** This is the right-hand side of the back panel when viewing the unit from behind.

### VP2 Function Test

For most repairs a simple function test will suffice:

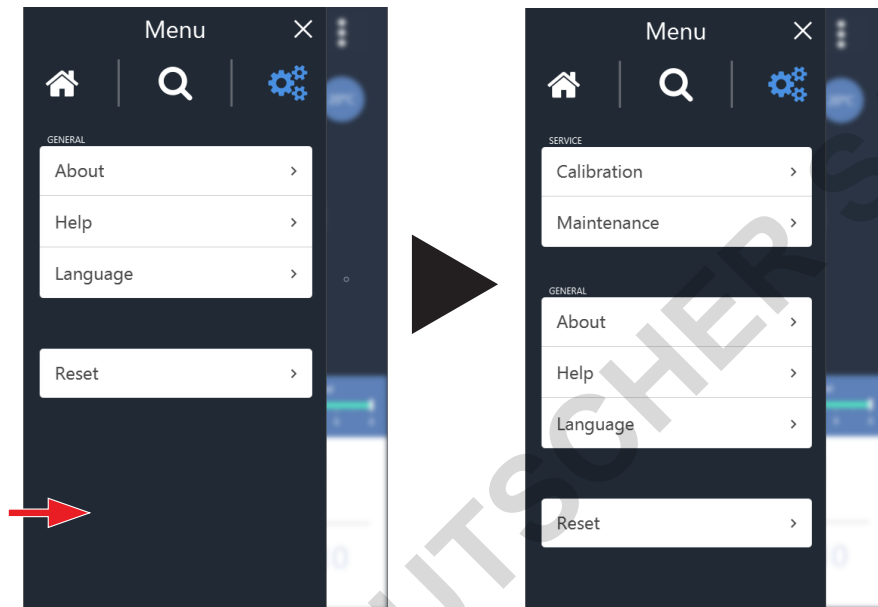
1. RUN should make the unit start running
2. STOP should stop the run
3. Changing speed should change the motor speed.
4. Temperature sensor should respond to input (finger on sensor).
5. Door should be locked when running.

## Calibration Procedures

### CP1 UI Splash Screen Calibration

Use of the calibration procedure below is only necessary if you have removed or worked on the User Interface or VFD. In that case, also use the speed calibration process on the next page.

1. In the settings menu press and hold in the blank space as highlighted below and hold for 5 seconds or until the calibration menu appears.



### CP2 Speed Calibration

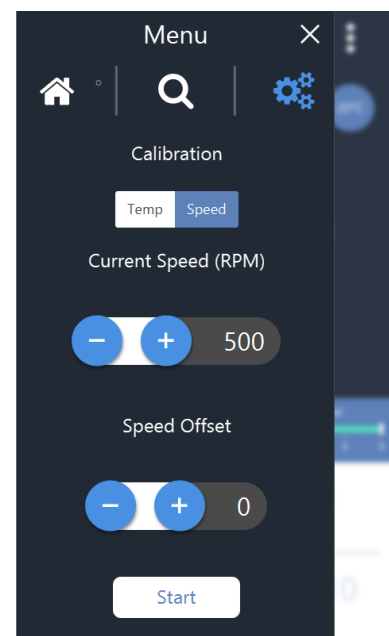
Required Tools: Stroboscope or Tachometer

1. Ensure the Stroboscope or Tachometer is calibrated.
2. Remove all sample tubes from tube holders or completely remove the carriage plate.
3. Turn unit on.
4. To adjust speed, select the speed icon in the calibration page and set the current speed to the desired speed to be calibrated (eg. 500RPM, 2000RPM, or 3700RPM).

Note: Stay clear of hub and all moving parts. The lid latch and door safety are disabled in the calibration menu.

5. Select Start.
6. Use the Speed Offset so that the hub speed matches the current speed set at all 3 speeds noted above in step 4.

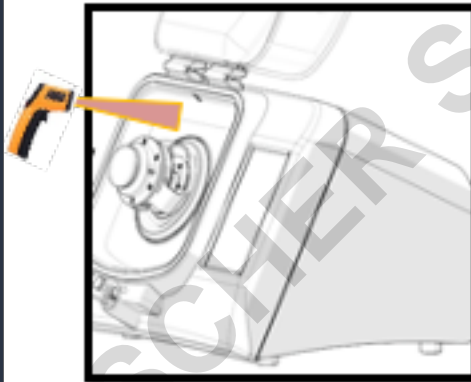
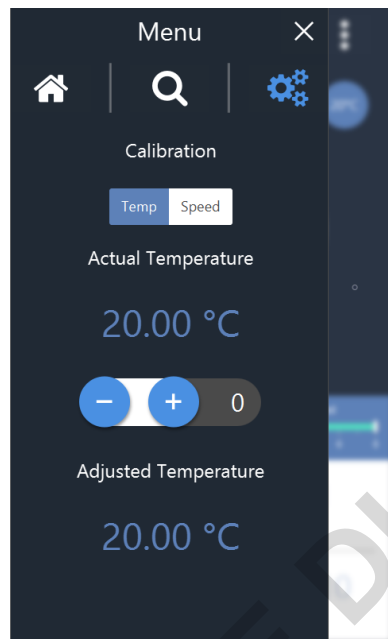
Note: If the unit was off more than 100RPM do the following steps. If your unit is within spec and it is calibrated, CP2 is complete.



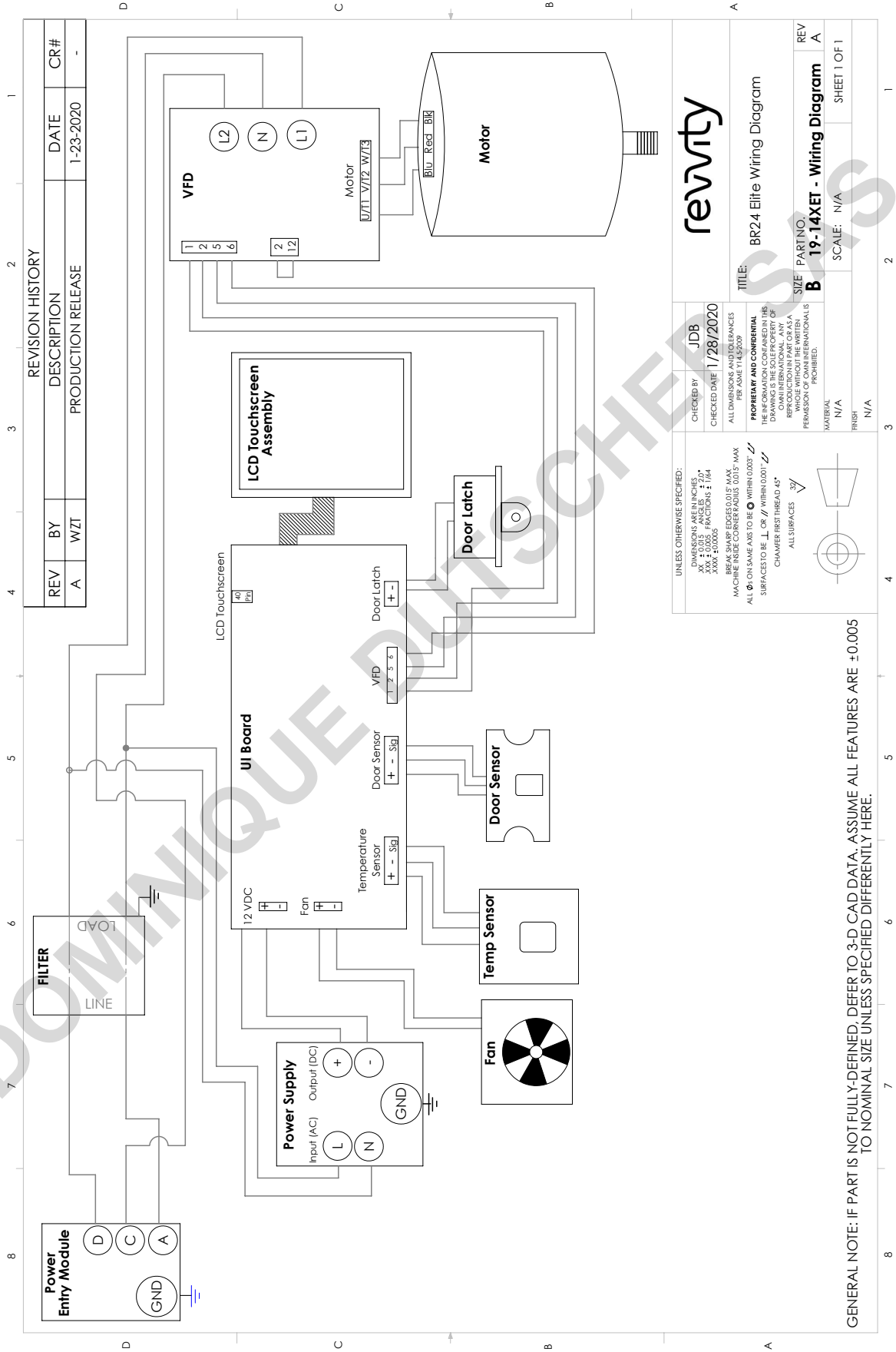
## CP3 Temperature Calibration

Required Tools: IR thermometer

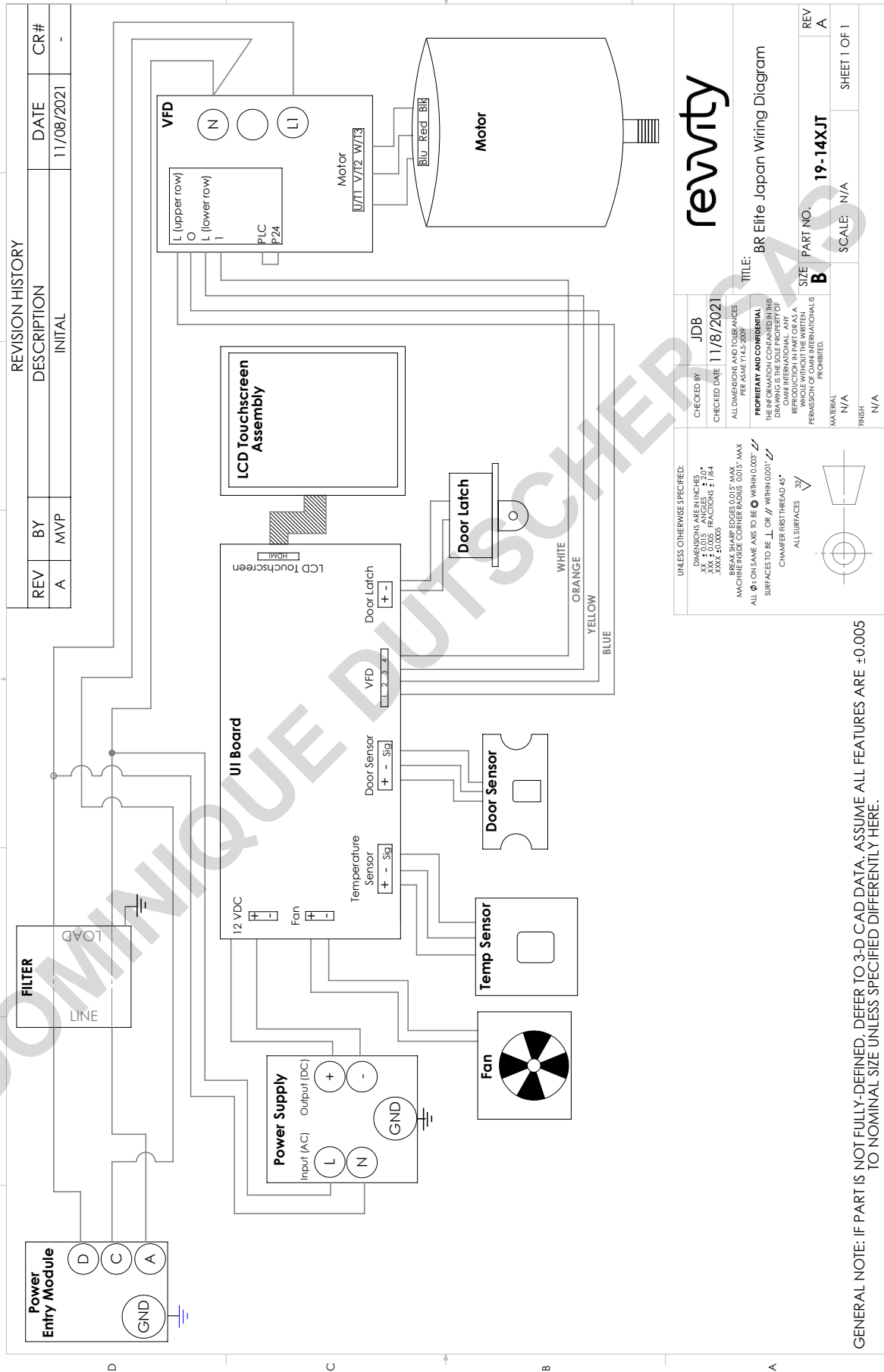
1. Ensure IR thermometer is calibrated.
2. Select the temperature tab
3. Open the lid and take a reading from a non-reflective section of the housing above the hub with the IR thermometer from 15-20 cm away from the housing.
4. Adjust the temperature so that the screen reflects the same temperature  $\pm 2^{\circ}\text{C}$  as the calibrated IR thermometer.



# Wiring Diagram



GENERAL NOTE: IF PART IS NOT FULLY-DEFINED, DEFER TO 3-D CAD DATA. ASSUME ALL FEATURES ARE ±0.005 TO NOMINAL SIZE UNLESS SPECIFIED DIFFERENTLY HERE.



## Spare Parts List

Item Code	Description
S-19-371-02	Hub Replacement Kit
S-19-523	Lid, Complete
S-19-536	Touchscreen Replacement Kit
S-19-407	Fan Replacement Kit
S-19-413	Power Supply Replacement Kit
S-19-212	Lid Seal Replacement Kit
S-19-247	Neck Gasket Replacement Kit
S-19-2053E	Housing Replacement Kit
S-19-302	Spider Gasket Replacement Kit
S-00-193	Fuse Replacement Kit
S-00-141-2	VFD Replacement Kit (Blue)
S-19-042-04	Pelican Shipping Kit
S-00-141FJ	100V VFD Replacement Kit (Black)

## Error Message Guide

Problem	Possible Cause	Action(s)
Close Lid	The lid is not latched properly.	<ol style="list-style-type: none"> <li>1. Check that nothing prevents the lid from closing.</li> <li>2. Press lid and ensure the handle is locked properly.</li> </ol>
	Detection system is faulty	<ol style="list-style-type: none"> <li>1. Turn off the unit.</li> <li>2. Replace Housing (RP6).</li> </ol>



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Revvity, Inc.  
940 Winter Street  
Waltham, MA 02451  
USA  
[www.revvity.com](http://www.revvity.com)

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