



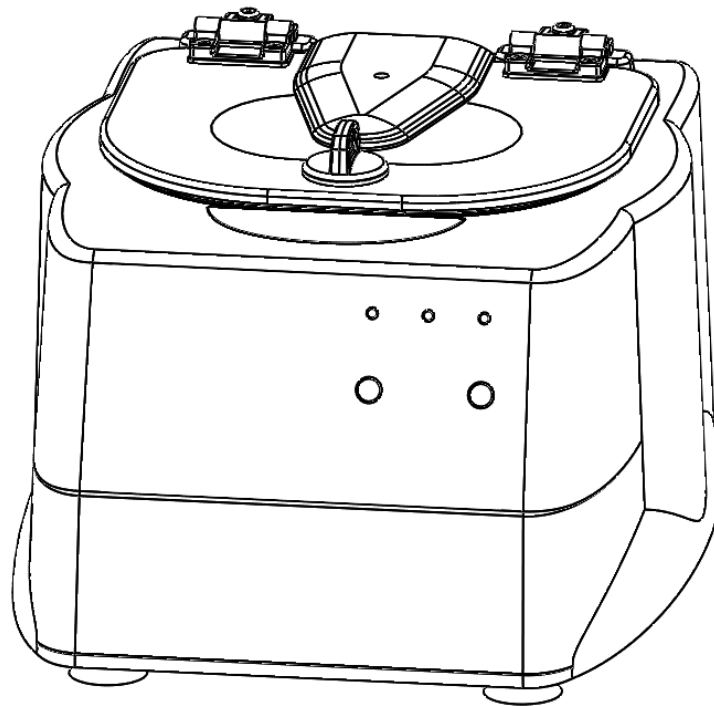
Drucker Diagnostics

Innovative Solutions for a Healthier World

Service Manual

HORIZON 6, 6 FA

HORIZON 6 Flex, 6 Flex FA



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1. PREFACE

- 1.1. The purpose of this manual is to provide the service technician with information for troubleshooting, testing, and repair of laboratory centrifuge model HORIZON 6, 6 FA, 6 Flex and 6 Flex FA. Only qualified technically trained personnel should attempt any of the servicing described in this document. Failure to follow the procedures in this document may result in personal injury or instrument damage. Drucker Diagnostics will not be held liable for any injury or damage because of improper servicing.
- 1.2. Information contained within this manual is subject to change without notice.

2. GENERAL DESCRIPTION OF MAJOR COMPONENTS

- 2.1. Motor: Permanent Split Capacitor AC Motor
- 2.2. Control Board: The control board is the microcontroller-based control center of the centrifuge. All control signals are generated in the control board.
- 2.3. Lid Locking Tray Assembly: The lid tray assembly contains a solenoid and limit switch that are used to determine the state of the lid (Open or Closed) and to keep the lid locked during centrifugation cycles.
- 2.4. Rotor: The centrifuge rotor is the main component that spins in the centrifuge. The rotor is loaded with tube holders, and the samples are placed into the tube holders for processing.

3. WARRANTY INFORMATION

- 3.1. Drucker Diagnostics warrants its centrifuges to be free from defects in workmanship and parts for two years.

4. SPECIFICATIONS

	Horizontal rotor	Fixed-angle rotor
Maximum Speed	3800 RPM	3900 RPM
Maximum RCF	2000 xg	1850 xg
Maximum Capacity	6 Tubes (17 x 100mm)	6 Tubes (17 x 125mm)
Dimensions (in)	9.0 (H) x 12.0 (W) x 14 (L)	
Environmental Operating Range	16-32 deg C	
Typical Noise Level (At Maximum Speed)	< 64 dB A	
Electrical Ratings	115VAC (+/- 10V)	

5. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The lid does not open.	No power	<ul style="list-style-type: none"> • Check line cord • Check circuit breaker on underside of centrifuge. • Check wall outlet
	Lid knob is not completely closed	Rotate the lid knob fully clockwise before pressing the 'OPEN' button
	Lid lock is active (Unlock timed out)	Press the 'OPEN' button to de-activate the lid lock
	Lid tray is unplugged from control board or defective	Check wiring
	Control board is damaged	Replace Control board
		To gain access to the rotor - Remove the 'OPEN/CLOSE' sticker and slide the lid latch lever toward the front of the centrifuge. This will unlock the lid.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Excessive vibration	Rotor improperly loaded	Load equally filled tubes symmetrically in the rotor. All carriers and/or tube holders must be present in the rotor.
	Debris lodged within the rotor or tube carriers	Carefully inspect all rotor pockets, tube holders and crevasses for debris, and clean thoroughly.
	Centrifuge housing is loose	Tighten or replace screws
	Missing/damaged feet	Replace feet
	Motor failure	Replace motor
	Rotor damaged	Replace rotor

PROBLEM	POSSIBLE CAUSE	SOLUTION
Rotor does not spin	No Power	<ul style="list-style-type: none"> • Check line cord • Check circuit breakers on underside of centrifuge. • Check wall outlet
	Lid not properly latched	Press down firmly on lid and rotate lid knob clockwise until the 'LATCHED' light illuminates.
	Internal connection failure	Check wiring
	Control board failure	Replace control board
	Motor Failure	Replace motor

PROBLEM	POSSIBLE CAUSE	SOLUTION
Clicking noise during braking	Rotor is loose	Tighten rotor nut

PROBLEM	POSSIBLE CAUSE	SOLUTION
Whistling noise while running	Debris in air intake / exhaust ports	Remove power before clearing debris.
	Damaged gasket	Requires service

PROBLEM	POSSIBLE CAUSE	SOLUTION
Cycle ends prematurely: Centrifuge reports the error in a repeating BUZZ / BEEP sequence		
ROTOR BALANCE ERROR: 4 error buzzes + 2 repeating beeps All LEDs blinking in unison with beeps	Rotor improperly loaded	Correct the imbalance
OVERCURRENT ERROR: 4 error buzzes + 3 repeating beeps	Control board, motor, or wiring fault	Check wiring
MOTOR SPEED ERROR: 4 error buzzes + 4 repeating beeps	Rotor motion not detected	<ul style="list-style-type: none"> • Check sensor in lid locking tray assembly • Check reflective tape on rotor
	Abnormal rotor acceleration detected	Check for missing tube holders
	Motor fails to reach the set speed	<ul style="list-style-type: none"> • Check for missing tube holders • Check the lid and guard bowl gaskets. Voids in the rotor chamber gaskets change the airflow, resulting in increased stress on the motor drive

6. SERVICE INSTRUCTIONS

6.1. Cleaning

- The cabinet, rotor and accessories can be cleaned using soap and water, isopropyl alcohol, or a 10% (5500 PPM) bleach solution
- Apply cleaning solutions with a towel or cloth. Do not submerge the centrifuge in water or other cleaning solutions as this will cause damage and void the warranty.
- Under no circumstances should any of the following be used: TBQ Germicidal Products, Fully/Partially Halogenated Hydrocarbons, Ketones or Esters.
- Use of any chemicals not prescribed by the manufacturer may cause damage to the rotor and tube carriers and shall not be used.

6.2. Removing the Rotor

- Use a 1/2" nut driver to loosen the center rotor screw (turn counter-clockwise).
- Lift the rotor straight up and out of the rotor chamber.
- To install the rotor, reverse steps A and B above.
- Take care to align the hub spines with the rotor hub.
- Tighten the rotor nut by hand with a 1/2" nut driver until snug. A good rule of thumb is one full thread showing above the nut is a good indicator of proper installation.

6.3. Maintaining the Rotor

- Keep the rotor clean, any corrosive materials must not be allowed contact with the rotor and should be cleaned immediately.
- The rotor should be checked periodically for signs of wear.
- Remove the rotor from service if any of the following are found: cracks, deep scratches, corrosion or discoloring.

6.4. **Rotor Nut**

- If the rotor Nut needs to be tightened, use a ½” nut driver and tighten it by hand until snug.
- Rule of thumb: One full thread showing above the nut is a good indicator of proper installation.

6.5. **Speed Calibration**

- Check the centrifuge speed periodically, every two years is recommended.
- Important: When verifying rotor speed, make certain that all carriers are installed in the rotor.
- No calibration adjustment of speed can be made, only a verification of rotor speed.

6.6. **Removing the Cabinet (Upper Housing)**

- There are nine screws that fasten the centrifuge cabinet to the base.
- Begin by unplugging the centrifuge and waiting 10 minutes for internal voltages to dissipate.
- Use a #2 Phillips screwdriver to remove the cabinet screws (six on the bottom, three in the rear)
- The centrifuge control panel is attached to the base internally with cable harnesses. Be careful not to stress the cables when removing the cabinet.
- Lift the cabinet straight up and off the base, setting it down on its front side.
- Gently remove the combination power supply / motor harness from the control board.

6.7. **Replacing the Lid Lock Assembly**

- The lid lock assembly is accessible once the cabinet has been removed.
- Gently remove the lid lock wire harness' from the control board.
- The lid lock assembly is held in place with four screws.
- Two #8-16 screws on the inside and two #8-32 screws on the outside (covered by the open/close label).
- Remove the Open/Close label to access the two screws underneath.
- To install, line up the holes on the lid tray assembly to the screw holes on the cabinet and install the four screws.
- Complete the installation by plugging the wire harness into the control board header 'J2'.

6.8. Replacing the Control Board

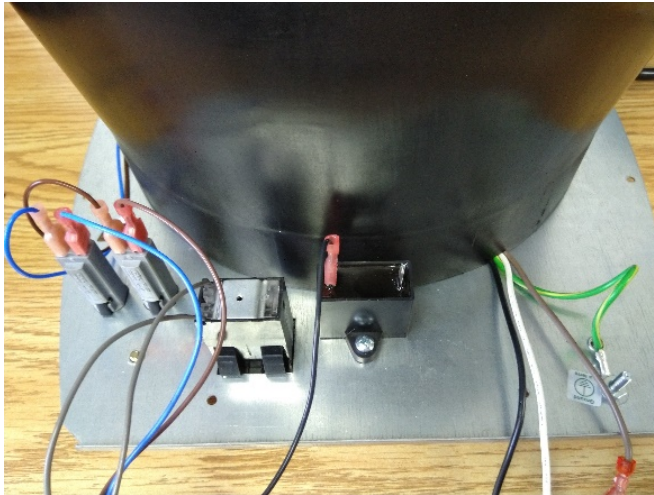
- The control board is accessible once the cabinet has been removed. Make certain that all wire harnesses have been disconnected.
- The control board has capacitors that will remain charged for a period after the centrifuge is unplugged. Make certain to use standard precautions for handling potentially charged capacitors when working with the control board.
- The control board is held in place with six screws. Use a #2 Philips driver to remove the screws. The board is now free to remove.
- To install the control board, make certain that the six posts line up with the holes in the control board and use a # 2 driver to install the screws.

6.9. Removing the motor

- Remove the cabinet assembly as previously described.
- Flip the base assembly up-side down and remove the three screws that are securing the exhaust cover and set aside.
- Remove the six screws that hold the guard bowl
- Lift the base assembly off the guard bowl and set it aside
- Disconnect the motor wire connectors.
- Remove the ground connection with a nut driver.
- Flip the guard bowl.
- The motor is held in place with four #8 Nylok nuts. Remove them with an 11/32" nut driver.
- Slide the motor out of the guard bowl's motor well.

6.10. Replacing the motor

- Flip the guard bowl upside down and locate the notch on the bottom.
- Install the motor into the guard bowl with the wires reaching in the same direction as the notch.
- Holding the motor in place, flip the bowl on its side and drive 4 #8 Nylok nuts onto the motor studs with an 11/32" nut driver.
- Turn the guard bowl assembly upside down and position the bowl so the notch is in an 8 o'clock position.
- Place the base assembly onto the guard bowl – make sure the orientation of the motor wires is the same as the image below.

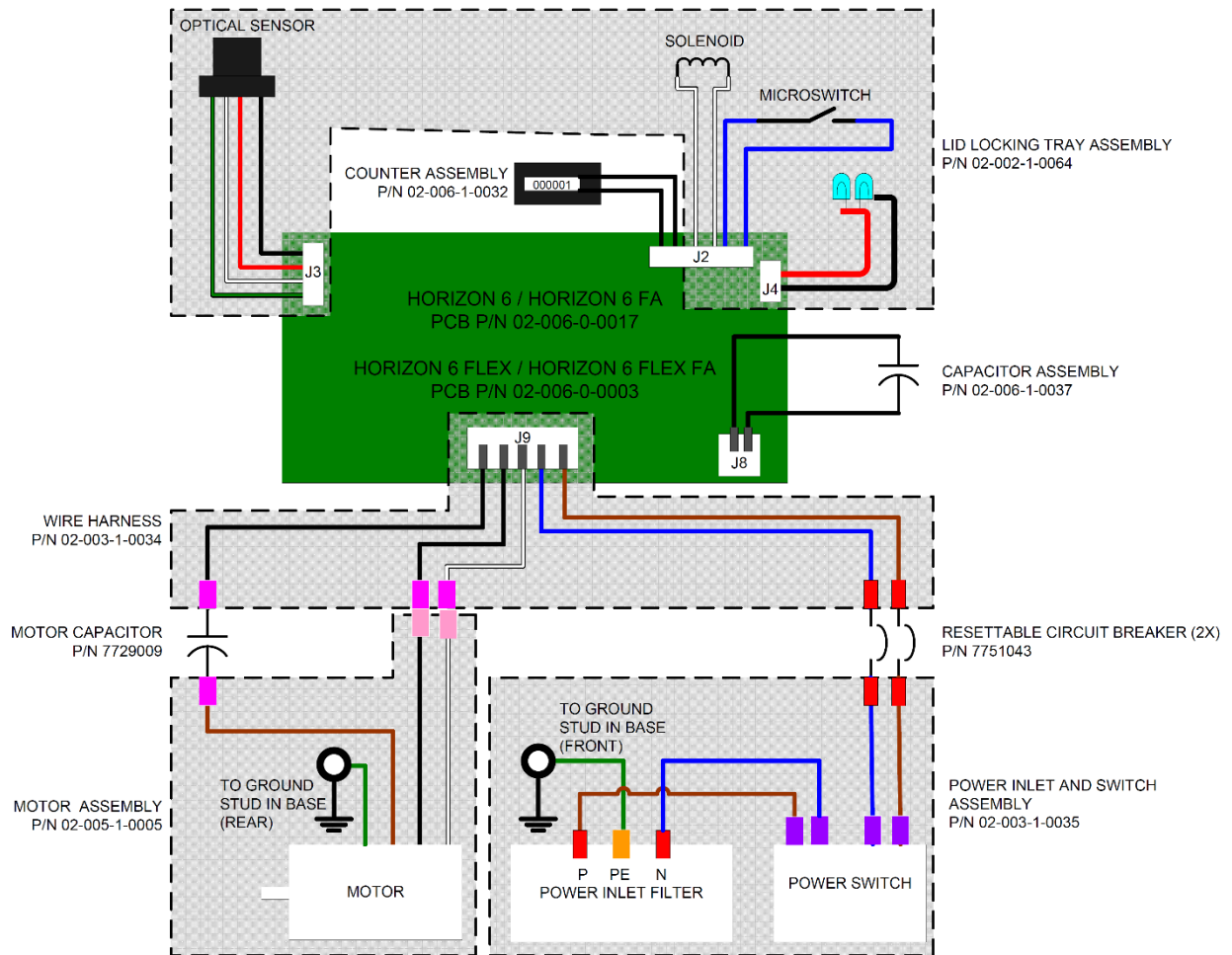


- Make certain that the motor wires are in the notch, and that no wires are pinched between the guard bowl and base.
- Fasten the guard bowl to the base with the six screws, connect the brown wire to the capacitor, ground to the ground stud and the remaining wires black-to-black, white-to-white.

6.11. Power Connections and Final Assembly

- Make certain that the lower assembly is unplugged from the mains supply.
- Connect all wiring harnesses to the control board as shown in the wiring diagram in section 8.
- Carefully place the cabinet onto the base taking care not to pinch any wires between the two.
- Complete the assembly by replacing the six screws in the bottom and three in the rear.

7. WIRING DIAGRAM



8. SPARE PARTS LIST

