



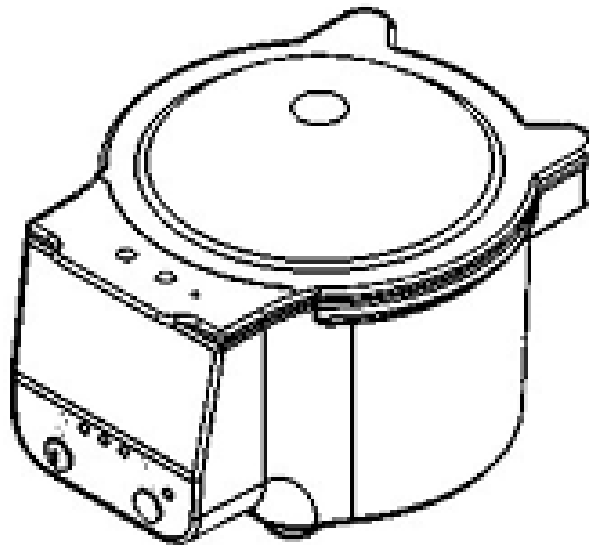
200 Shadylane Drive
Philipsburg, PA 16866

Phone: (814) 342-6205
Fax: (814) 342-4510
www.druckerdiagnostics.com

Service Manual

Model Dash Micro Centrifuge

Model Dash Apex 4 Centrifuge



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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 Dash Micro and Dash Apex 4. 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 as a result 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: Brushless DC Motor
- 2.2 Printed Circuit Board: The PCB is the microcontroller based control center of the centrifuge. All control signals are generated in the PCB.
- 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 samples 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

| | Dash Micro | Dash Apex 4 |
|--|------------------------------|------------------------------|
| Maximum Speed | 8300 RPM | 8500 RPM |
| Maximum RCF | 4236 xg | 4440xg |
| Maximum Capacity | 4 Tubes (6mL) | 4 Tubes (6mL) |
| Dimensions (in) | 6.87 (H) x 7.0 (W) x 7.0 (L) | 6.87 (H) x 7.0 (W) x 7.0 (L) |
| Ambient Temperature | 5 – 40 deg C | 5 – 40 deg C |
| Typical Noise Level (At Maximum Speed) | < 59 dB A | < 59 dB A |
| Incoming to Power Supply | | |
| Supply Voltage | 100 – 240 (+/- 10%) | 100 – 240 (+/- 10%) |
| Supply Frequency | 50 – 60 Hz | 50 – 60 Hz |
| Current Consumption | 1.3 – 0.6A | 1.3 – 0.6A |
| Incoming to Centrifuge | | |
| Voltage | 24VDC | 24VDC |
| Current Consumption | 3.75A | 3.75A |

5 TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|------------------------|---|---|
| The lid does not open. | No Power | Check line cord. |
| | No Power | Check external power supply. |
| | No Power | Check wall outlet. |
| | Lid tray is unplugged from PCB or defective | Requires service. |
| | PCB is damaged | Requires service. |
| | | To gain access to the rotor – Insert the provided tool through the hole located on the side of the centrifuge front panel. Press in through this hole and into the cabinet to engage the emergency unlock. Once the emergency unlock is engaged, the lid will pop open. |

| 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, whether loaded, or empty. |
| | Debris lodged within the rotor or tube carriers | Carefully inspect all rotor pockets, tube holders and crevasses for debris. |
| | Centrifuge housing is loose | Requires service. |
| | Missing/damaged feet | Requires service. |
| | Motor failure | Requires service. |
| | Rotor windshield damage | Requires service. |
| | Rotor damaged | Replacement required. |

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---------------------|-----------------------------|---|
| Rotor does not spin | No Power | Check line cord. |
| | No Power | Check external power supply. |
| | No Power | Check wall outlet. |
| | Lid not properly latched | Press lightly on the front edge of the lid. An audible “click” will indicate the lid is fully closed. |
| | Internal connection failure | Requires service. |
| | PCB failure | Requires service. |
| | Motor Failure | Requires service. |

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|-------------------------------|----------------|----------------------|
| Clicking noise during braking | Rotor is loose | Tighten rotor screw. |

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|-------------------------------|--------------------------------------|--------------------------------------|
| Whistling noise while running | Debris in air intake / exhaust ports | Remove power before clearing debris. |
| | Gasket failure | Requires service. |
| | Gasket failure | Requires service. |

6 SERVICE INSTRUCTIONS

6.1 Cleaning

- a) Use appropriate Personal Protective Equipment (PPE)
- b) The cabinet, rotor top and accessories shall be thoroughly cleaned using soap and water, isopropyl alcohol, or a mild bleach solution.
- c) Apply cleaning solutions with a dampened towel or cloth ONLY. Do not spray or pour cleaning solution directly onto or into the centrifuge. Do not saturate or submerge the centrifuge in water or other cleaning solutions as this will cause damage, create a safety risk; and void the warranty.
- d) Under no circumstances should any of the following be used: Fully/Partially Halogenated Hydrocarbons, Ketones and Esters.
- e) Use of any chemicals not prescribed by the manufacturer may cause damage to the rotor and tube carriers / holders and shall not be used.

6.2 Maintaining the Rotor

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

6.3 Rotor Screws

- a) If the rotor screw needs to be tightened, use a # Screwdriver bit and tighten to 2.0 Nm.

6.4 Speed Calibration

- a) Check the centrifuge speed periodically, at least every two years is recommended.
- b) No calibration adjustment of speed can be made, only a verification of rotor speed.

6.5 Removing the Front Panel Assembly

- a) There are four screws that fasten the centrifuge front panel to the cabinet.
- b) Begin by unplugging the centrifuge and waiting 10 minutes for internal voltages to dissipate.
- c) Use a #2 screwdriver to remove the cabinet screws.
- d) Gently remove the Front Panel Assembly from the Cabinet.
- e) To reinstall the Front Panel Assembly, push the front panel assembly onto the cabinet. The top edge of the front panel will sit on ledge on outside of cabinet.
- f) Secure the front panel to the cabinet using four screws.

6.6 Replacing the User Interface Board

- a) The Interface Board is accessible once the cabinet front panel assembly is removed.
- b) The Interface Board is held in place with four screws.
- c) Use a #2 Phillips screwdriver to remove the four screws on the inside of the Front Panel Assembly.
- d) Gently remove the interface cable from the Interface Board .
- e) To install the User Interface Board, reverse steps above.

6.7 Replacing the Lid Tray Assembly

- f) The lid tray assembly is accessible once the cabinet front panel assembly, rotor and guardbowl are removed.
- g) Gently remove the lid tray wire harness from the PCB and pull the wires through the hole located at the bottom of the cabinet.
- h) The lid tray assembly is held in place with two screws.
- i) Use a #2 Phillips screwdriver to remove the two lid tray screws on the inside of the cabinet
- j) To install the lid tray, reverse steps E through C above
- k) Complete the installation by gently plugging the lid tray wire harness into the PCB.

6.8 Replacing the Main PCBA

- a) The PCB is accessible once the Rotor and Guard Bowl have been removed.
- b) The PCB 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 PCB.
- c) The PCB is held in place with four screws.
- d) Use a #1 screwdriver to remove the PCB screws.

- e) To install the PCB, align the PCB with the mounting standoffs in the cabinet.
- f) Use a #1 screwdriver to install the PCB screws.
- g) Important: over tightening the PCB screws can cause malfunction by stripping the screw threads away from the plastic mounting boss.
- h) Ensure to connect the Power Jack Harness, User Interface Board, and Lid Latch Assembly Harness to the main PCBA Board

6.9 Replacing the Rotor

- a) The rotor is held in place with three rotor screws.
- a) Use a # Screwdriver bit to loosen the three (3) rotor screw.
- b) Lift the rotor core straight up and off the motor shaft.
- c) To install the rotor core reverse steps A and B above.
- d) Tighten the rotor screw with a # screwdriver bit to 2.0 Nm.

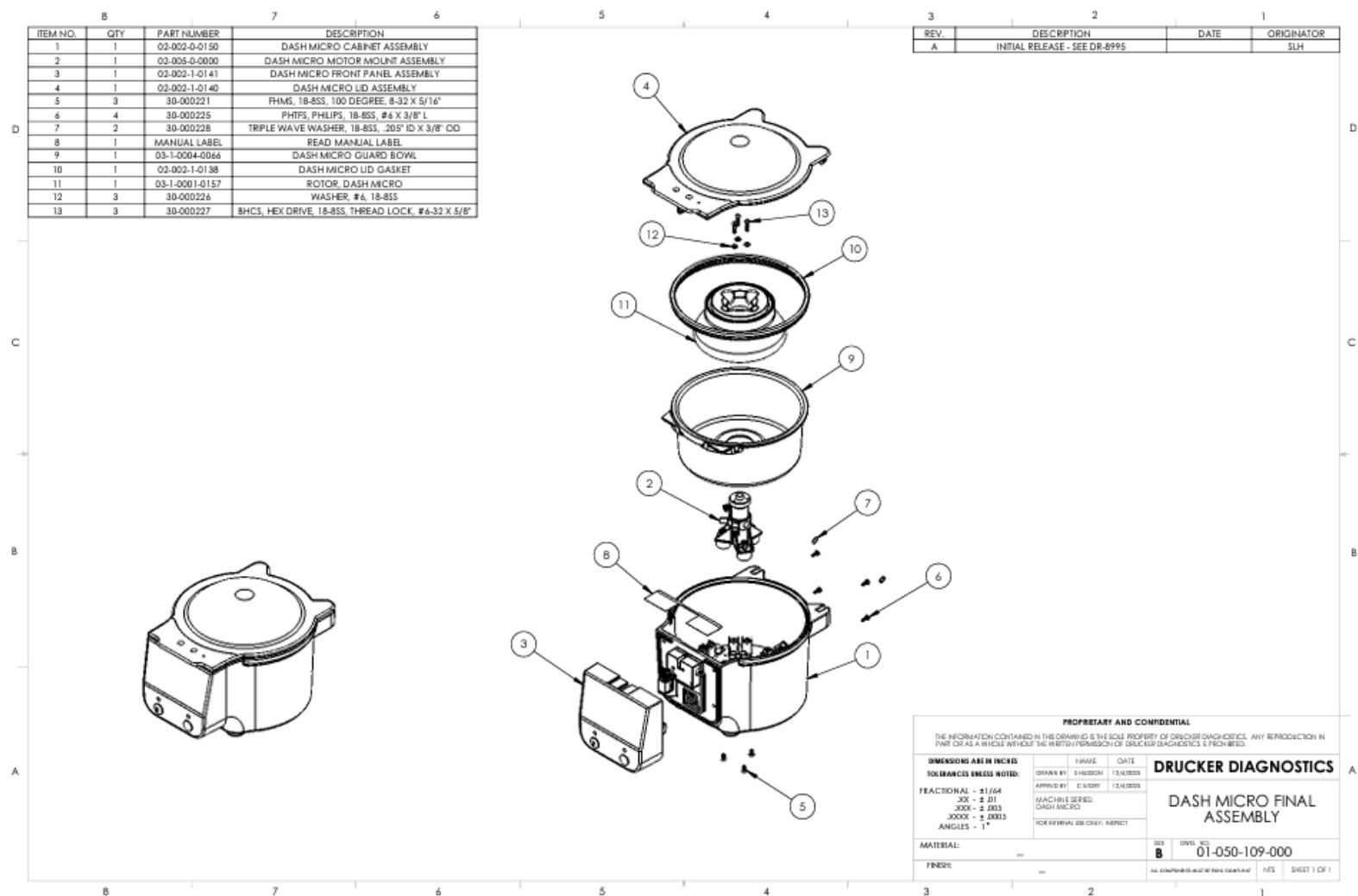
6.10 Replacing the Motor Assembly

- h) The Motor is accessible once the Rotor and Guard Bowl have been removed.
- a) Remove the motor connector wires (rainbow) from the Main PCBA.
- b) On the underside of the cabinet remove the 3 screws to remove the Motor Mount Assembly
- c) To Install the new motor mount, Orient the motor mount assembly in cabinet with the seam of the motor mount facing the front of the unit.
- d) While holding the motor mount in place, secure assembly to cabinet from underside, using 3 screw.
- e) Connect motor connector (rainbow) to main PCBA.
- f) **IMPORTANT: Ensure excess rainbow ribbon wire is pushed under main PCBA.**

7 ASSEMBLY DRAWINGS – Dash Micro Centrifuge

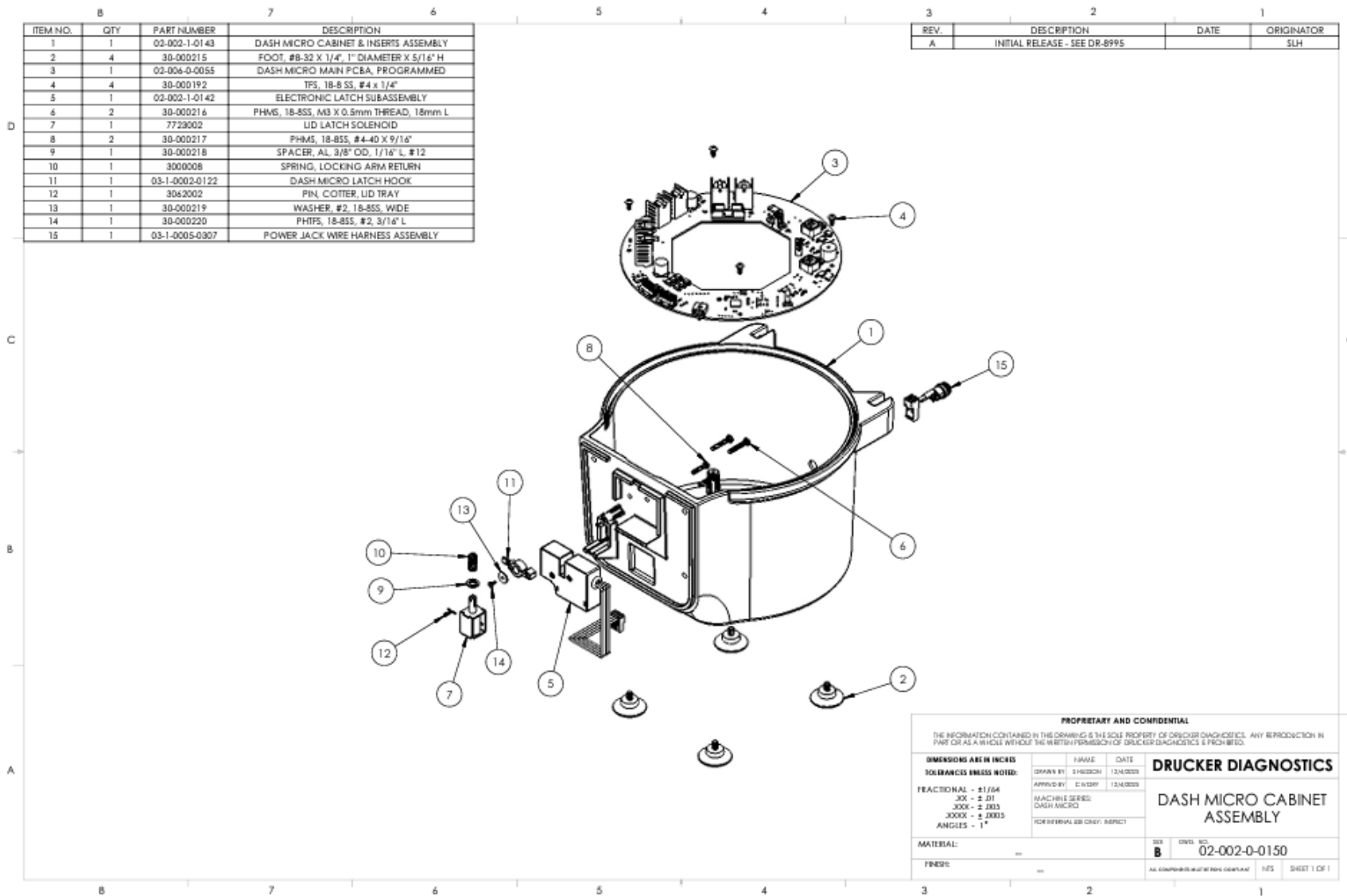
7.1 FINAL CENTRIFUGE ASSEMBLY

7.1.1 Reference drawing 01-050-109-000



7.2 CABINET ASSEMBLY

7.2.1 Reference drawing 02-002-0-0150



7.3 Motor Mount Assembly

7.3.1 Reference drawing 02-005-0-0000

| ITEM NO. | QTY | PART NUMBER | DESCRIPTION |
|----------|-----|----------------|---|
| 1 | 1 | 03-1-0004-0067 | DASH MICRO MOTOR MOUNT |
| 2 | 3 | 30-000223 | VIBRATION DAMPING MOUNT W/ STUD & INSERT, #8-32 |
| 3 | 3 | 3022001 | NUT, HEX, 8-32 |
| 4 | 3 | 3022003 | 8/32 NYLOCK NUT |
| 5 | 1 | 02-005-1-0018 | DASH MICRO MOTOR & ADAPTER ASSEMBLY |
| 6 | 1 | 30-000224 | SPRING BAND CLAMP FOR 1-1/16" OD HOSE |

| REV. | DESCRIPTION | DATE | ORIGINATOR |
|------|-------------------------------|------|------------|
| A | INITIAL RELEASE - SEE DR-8995 | | SLH |

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| | | |
|---------------------------------|--------------------------------|-----------|
| DIMENSIONS ARE IN INCHES | NAME | DATE |
| TOLERANCES UNLESS NOTED: | DRAWN BY: S. HERRON | 1/10/2005 |
| FRACTIONAL - ± 1/64 | APPROVED BY: C. HERRON | 1/10/2005 |
| XXX - ± .01 | MACHINE SERIES: | |
| XXXX - ± .003 | DASH MICRO | |
| ANGLES - 1° | FOR INTERNAL USE ONLY - IMPACT | |

DRUCKER DIAGNOSTICS

DASH MICRO MOTOR MOUNT ASSEMBLY

MATERIAL: SS
FINISH: SS

REV: **B** DWG. NO.: **02-005-0-0000**

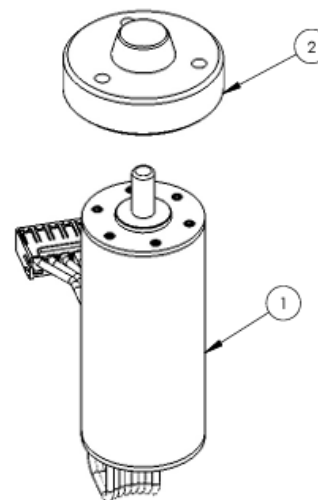
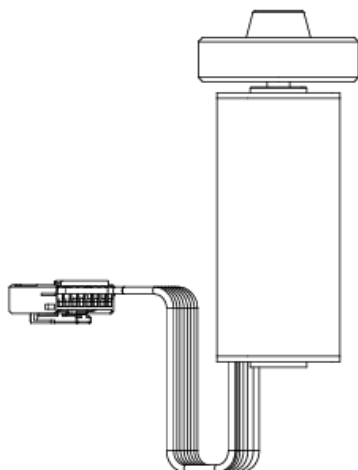
ALL DIMENSIONS UNLESS OTHERWISE NOTED

7.4 MOTOR ASSEMBLY

7.4.1 Reference drawing 02-005-1-0018

| ITEM NO. | QTY | PART NUMBER | DESCRIPTION |
|----------|-----|----------------|---------------------------------------|
| 1 | 1 | 02-005-1-0019 | DASH MICRO MOTOR & CONNECTOR ASSEMBLY |
| 2 | 1 | 03-1-0001-0161 | DASH MICRO ROTOR ADAPTER |

| REV. | DESCRIPTION | DATE | ORIGINATOR |
|------|-------------------------------|------|------------|
| A | INITIAL RELEASE - SEE DR-8995 | | SLH |



NOTES:

1. PRESS ROTOR ADAPTER (2) ONTO SHAFT OF MOTOR (1) UNTIL FULLY INSERTED

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DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS NOTED:

FRACTIONS - $\pm 1/64$
 .XX - $\pm .01$
 .XXX - $\pm .005$
 .XXXX - $\pm .0005$
 ANGLES - $\pm 1^\circ$

| | NAME | DATE |
|--------------------------------|----------|------------|
| DRAWN | S HUDSON | 11/28/2023 |
| APPRVD | C IVORY | 11/28/2023 |
| MACHINE SERIES: DASH MICRO | | |
| FOR INTERNAL USE ONLY: INSPECT | | |

DRUCKER DIAGNOSTICS

DASH MICRO MOTOR & ADAPTER ASSEMBLY

MATERIAL:

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SEE DWG. NO. **A** 02-005-1-0018

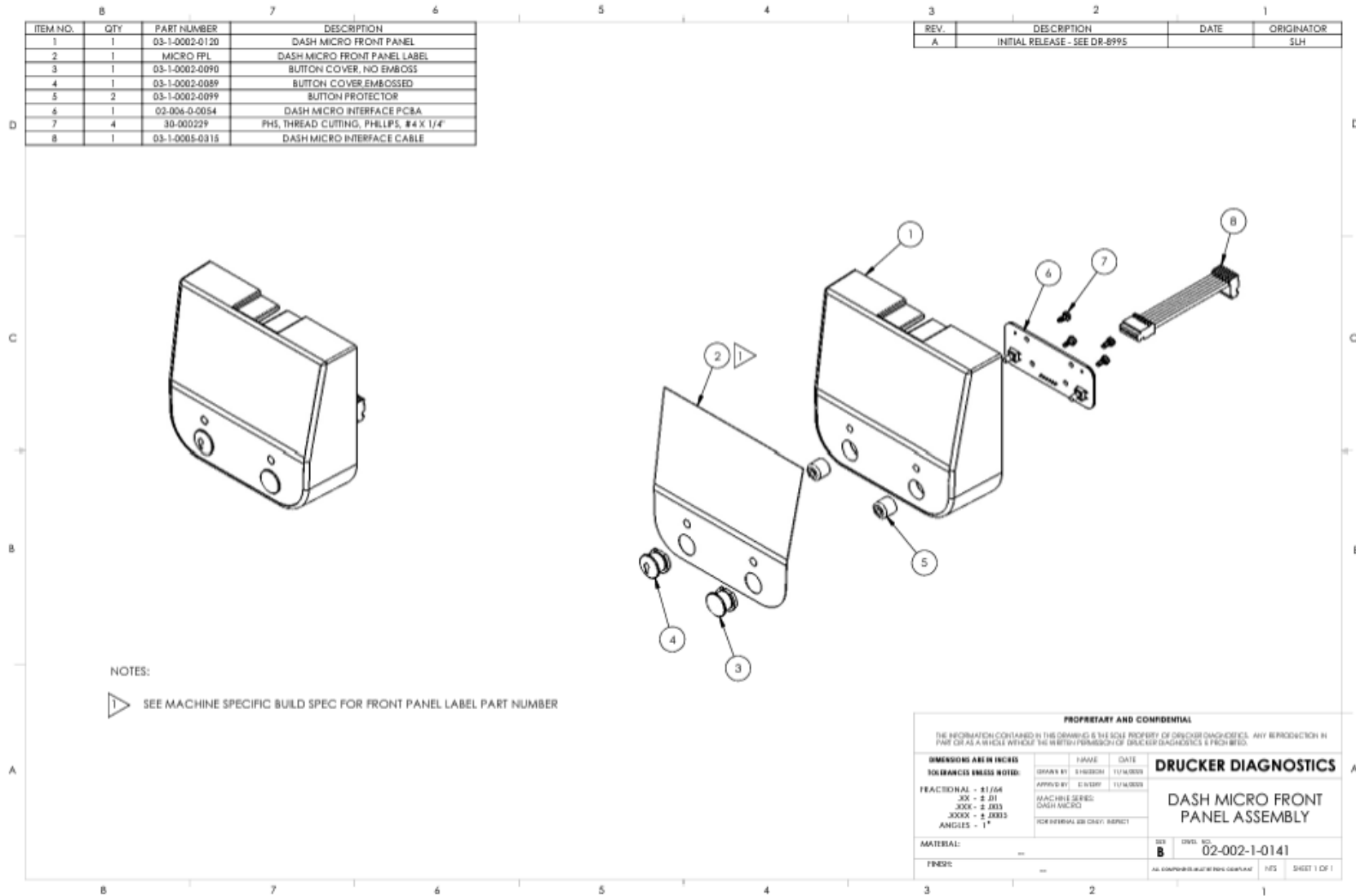
FINISH:

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ALL COMPONENTS MUST BE ROHS COMPLIANT NTS SHEET 1 OF 1

7.5 Front Panel Assembly

7.5.1 Reference drawing 02-002-1-0141



8 ASSEMBLY DRAWINGS – Dash Apex 4 Centrifuge

8.1 FINAL CENTRIFUGE ASSEMBLY

8.1.1 Reference drawing 01-053-109-000

| ITEM NO. | QTY | PART NUMBER | DESCRIPTION |
|----------|-----|----------------|--|
| 1 | 1 | 02-002-0-0154 | DASH MICRO CABINET ASSEMBLY |
| 2 | 1 | 02-005-0-0000 | DASH MICRO MOTOR MOUNT ASSEMBLY |
| 3 | 1 | 02-002-1-0148 | DASH APEX 4 FRONT PANEL ASSEMBLY |
| 4 | 1 | 02-002-1-0140 | DASH MICRO LID ASSEMBLY |
| 5 | 3 | 30-000221 | FHMS, 18-8SS, 100 DEGREE, 8-32 X 3/8" |
| 6 | 4 | 30-000225 | PHIFS, PHILIPS, 18-8SS, #6 X 3/8" L |
| 7 | 2 | 30-000228 | TRIPLE WAVE WASHER, 18-8SS, .205" ID X 3/8" OD |
| 8 | 1 | 03-1-0008-0038 | DASH MICRO LID CLIP, LEFT |
| 9 | 1 | 03-1-0008-0039 | DASH MICRO LID CLIP, RIGHT |
| 10 | 1 | | MANUAL LABEL |
| 11 | 1 | 03-1-0004-0066 | DASH MICRO GUARD BOWL |
| 12 | 1 | 02-002-1-0138 | DASH MICRO LID GASKET |
| 13 | 1 | 03-1-0001-0169 | DASH MICRO/APEX 4 ROTOR |
| 14 | 3 | 30-000226 | WASHER, #6, 18-8SS |
| 15 | 3 | 30-000227 | BHCS, HEX DRIVE, 18-8SS, THREAD LOCK, #6-32 X 5/8" |
| 16 | 1 | 0000-099-172 | LOCTITE 242 |

| REV. | DESCRIPTION | DATE | ORIGINATOR |
|------|-------------------------------|-----------|------------|
| A | INITIAL RELEASE - SEE DR-9350 | 8/11/2024 | SLH |

NOTES:

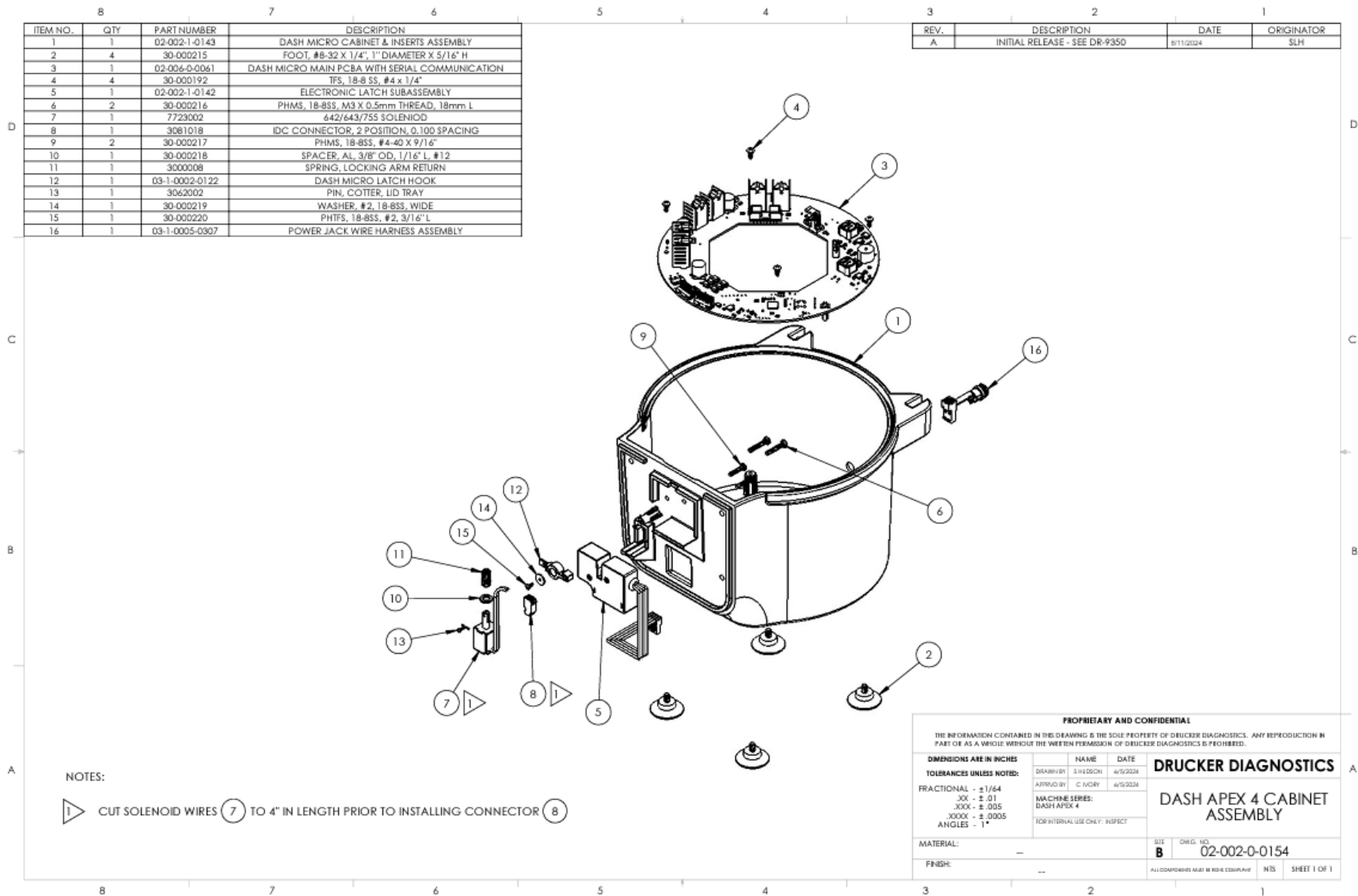
1. APPLY LOCTITE (16) TO SCREWS (5) PRIOR TO INSTALLATION

2. ASSEMBLE PER MP451

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| DIMENSIONS ARE IN INCHES TOLERANCES UNLESS NOTED: FRACTIONAL - ± 1/64 XX - ± .01 XXX - ± .005 XXXX - ± .0005 ANGLES - 1° | DRAWN BY | NAME | DATE |
| | APPROVED BY | C. MCGRY | AW/2024 |
| MATERIAL: -- | | SITE DRG. NO. B 01-053-109-000 | |
| FINISH: -- | | ALL COMPONENTS MUST BE MARKED AS SHOWN IN THIS SHEET 1 OF 1 | |

8.2 CABINET ASSEMBLY

8.2.1 Reference drawing 02-002-0-0154



8.3 Motor Mount Assembly

8.3.1 Reference drawing 02-005-0-0000

| ITEM NO. | QTY | PART NUMBER | DESCRIPTION |
|----------|-----|----------------|---|
| 1 | 1 | 03-1-0004-0067 | DASH MICRO MOTOR MOUNT |
| 2 | 3 | 30-000223 | VIBRATION DAMPING MOUNT W/ STUD & INSERT, #8-32 |
| 3 | 3 | 3022001 | NUT, HEX, 8-32 |
| 4 | 3 | 3022003 | 8/32 NYLOCK NUT |
| 5 | 1 | 02-005-1-0018 | DASH MICRO MOTOR & ADAPTER ASSEMBLY |
| 6 | 1 | 30-000224 | SPRING BAND CLAMP FOR 1-1/16" OD HOSE |

| REV. | DESCRIPTION | DATE | ORIGINATOR |
|------|-------------------------------|------|------------|
| A | INITIAL RELEASE - SEE DR-8995 | | SLH |

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| DIMENSIONS ARE IN INCHES | DATE | |
| TOLERANCES UNLESS NOTED: | DRAWN BY | 1/10/0000 |
| FRACTIONAL - ± 1/64 | APPROVED BY | 1/10/0000 |
| XXX - ± .01 | | |
| XXXX - ± .003 | | |
| XXXXX - ± .0005 | | |
| ANGLES - 1° | | |

DRUCKER DIAGNOSTICS

DASH MICRO MOTOR MOUNT ASSEMBLY

MATERIAL: **B** DIVS. NO. **02-005-0-0000**

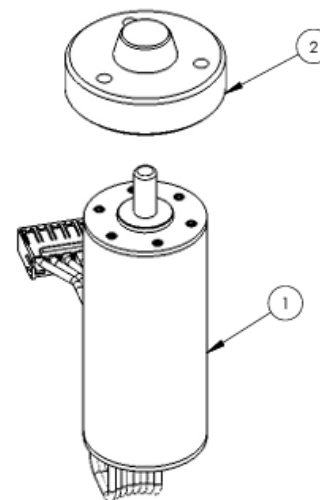
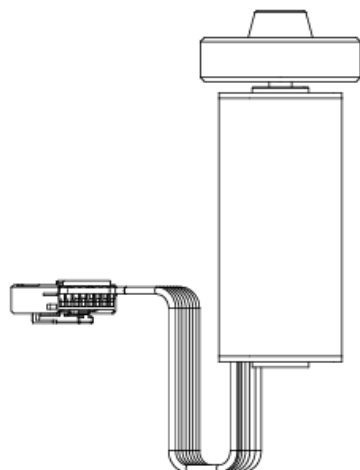
FIGS: **B** ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED SHEET 1 OF 1

8.4 MOTOR ASSEMBLY

8.4.1 Reference drawing 02-005-1-0018

| ITEM NO. | QTY | PART NUMBER | DESCRIPTION |
|----------|-----|----------------|---------------------------------------|
| 1 | 1 | 02-005-1-0019 | DASH MICRO MOTOR & CONNECTOR ASSEMBLY |
| 2 | 1 | 03-1-0001-0161 | DASH MICRO ROTOR ADAPTER |

| REV. | DESCRIPTION | DATE | ORIGINATOR |
|------|-------------------------------|------|------------|
| A | INITIAL RELEASE - SEE DR-8995 | | SLH |



NOTES:

1. PRESS ROTOR ADAPTER (2) ONTO SHAFT OF MOTOR (1) UNTIL FULLY INSERTED

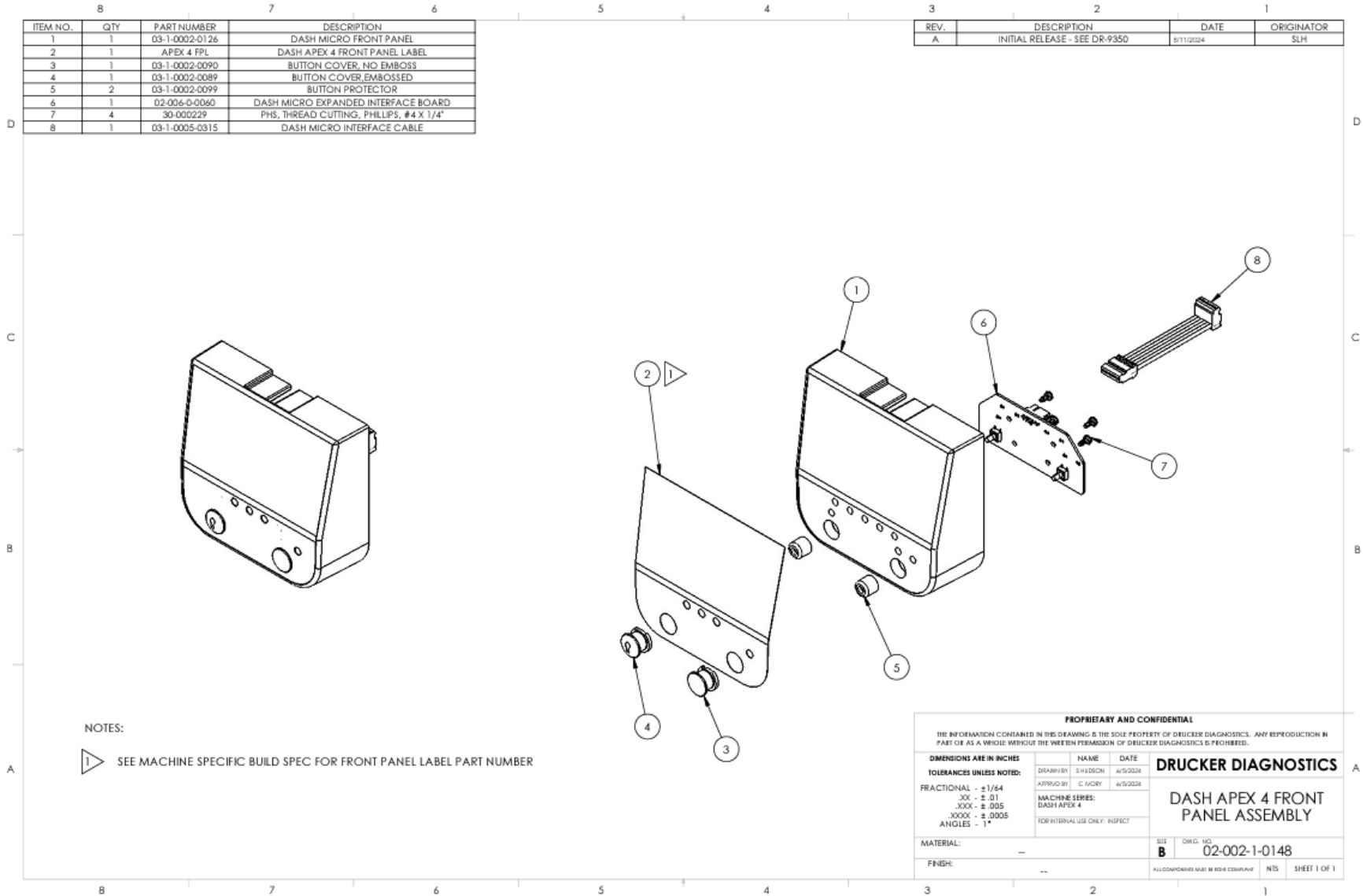
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| DIMENSIONS ARE IN INCHES | | NAME | DATE | DRUCKER DIAGNOSTICS |
|---------------------------------|--|---------------------------------------|---------------------|--|
| TOLERANCES UNLESS NOTED: | | DRAWN | S HUDSON 11/28/2023 | |
| FRACTIONS - $\pm 1/64$ | | APPRVD | C IVORY 11/28/2023 | |
| .XX - $\pm .01$ | | MACHINE SERIES: DASH MICRO | | |
| .XXX - $\pm .005$ | | FOR INTERNAL USE ONLY: INSPECT | | DASH MICRO MOTOR & ADAPTER ASSEMBLY |
| .XXXX - $\pm .0005$ | | SEE DWG. NO. 02-005-1-0018 | | |
| ANGLES - $\pm 1^\circ$ | | A | | |
| MATERIAL: --- | | ALL COMPONENTS MUST BE ROHS COMPLIANT | | NTS SHEET 1 OF 1 |
| FINISH: --- | | | | |

8.5 Front Panel Assembly

8.5.1 Reference drawing 02-002-1-0148



9 REVISION HISTORY

| Revision # | Date | DR | Details of Change |
|------------|-----------|------|-------------------|
| A | 8/13/2024 | 9475 | Original Issue |
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