Revision: 1.0
Date: August 10, 2026

PBFT Installation & Service Guide

Model: PBFT VS USB1100

Required Software:

FORCEWare™ Version 5.9.0 or Later
(compatible with both 32-bit and 64-bit systems)

Prepared by: GPD Global® Documentation Department

This equipment complies with applicable EU directives. See Declaration of Conformity.

611 Hollingsworth Street
Grand Junction, CO, USA 81505
tel: +1.970.245-0408 • fax +1.970.245-9674
request@gpd-global.com • www.gpd-global.com

Table of Contents

Preface

This guide provides installation, service, maintenance, and troubleshooting information for the GPD Global Peel Back Force Tester (PBFT).

It is intended for qualified service and maintenance personnel.

Key points about this edition:

- This is the first version (V1) of the PBFT Installation & Service Guide.
- The content focuses exclusively on hardware installation, maintenance, and service procedures.
- All procedures have been verified against the current PBFT hardware configuration.
- Software-related instructions are covered in the separate FORCEWare Software User Guide.

Safety Information

IMPORTANT For your personal protection, read all instructions before operating this machine.

Warnings

This equipment does not include spare fuses. Fuses at the IEC power inlet are operator replaceable. Fuses located within terminal block fuse holders require access to internal components and should be replaced only by qualified service personnel. Replace fuses only with the same type and rating specified by the manufacturer. Incorrect fuse selection may result in fire, equipment damage, or injury.

The system weighs approximately 66 lb (30 kg). Two persons or a suitable lifting aid are required to lift the system. Failure to follow these instructions may result in personal injury and damage to the system or other equipment.

This equipment must be used as described in these instructions. Use for any other purpose may result in equipment damage, personal injury, or loss of equipment or property.

Cautions

PINCH POINTS: The drive and motor are located inside the enclosure and include a chain drive mechanism. Keep hands and fingers away from these components. Contact may result in personal injury, including loss of fingers.

A pinch point warning label is installed inside the machine near the power inlet.

INSPECTION: Inspect the equipment before use and verify that there is no visible damage or defects. Do not operate the system if any damage or defects are present.

Inspect the power cord and all connections for damage. If the power cord or its connections are damaged, do not use the equipment. Replace the power cord before operating the system.

ELECTRICAL WORK: Only Type 1 electrical work is permitted. Ensure the equipment is fully de-energized before performing any electrical work.

FIRE HAZARD: Fire hazards exist. Thermal and non-thermal damage may occur outside the equipment.

SHIPPING: The system is designed to remain stable under normal shipping and handling conditions when properly secured in its shipping container.

SEISMIC: The system is intended for table or shelf mounting. The system should be secured to the mounting surface using appropriate fastening methods to provide seismic restraint in accordance with manufacturer requirements. The table or shelf should also be secured to the floor per manufacturer specifications. Contact the manufacturer for additional guidance if required.

TABLE MOUNTING: The mounting surface must be rated for the system load, stable, and capable of supporting at least 300 lb.

Safety Procedures

Hazardous Energy Control (Lockout/Tagout)

The system must be locked out and tagged out before opening the enclosure or performing maintenance procedures.

Lockout/Tagout Procedure

1. Turn the system off using the main power switch located at the power inlet.
2. Disconnect the power cord from the facility power outlet, then disconnect it from the system.
3. Apply an approved lock and tag to the power cord and power inlet.
4. Verify the system cannot be energized by attempting to operate the system controls.

Return-to-Service Procedure

1. Ensure all tools and loose materials have been removed from the system.
2. Verify the enclosure cover is properly installed and all screws are secured.
3. Inform all affected personnel before removing locks and tags.
4. Remove the lock and tag devices.
5. Inspect the power cord for damage before use. Do not use a damaged power cord.
6. Reconnect the power cord to the system and verify the correct power cord is being used.
7. Ensure the system power switch is in the OFF position and all personnel are clear of the machine.
8. Connect the power cord to the facility power outlet.
9. Turn on the system and verify proper operation before returning the system to service.

EMO Emergency Machine Off

In the event of an emergency, immediately disconnect power to the PBFT system by unplugging the power cord from the wall outlet.

Operational Notes

Strain Gauge Operating Constraints

BATTERY PACK: The strain gauge is powered by a rechargeable Lithium-ion (Li-Ion) battery pack that is not accessible to the operator and should only be replaced by qualified maintenance or technical personnel.

The battery pack is normally charged via the internal powered USB hub within the PBFT system.

External USB charging may be used as a recovery method when the battery is fully discharged and normal charging via the internal USB hub is not effective. External charging shall only be performed when recommended or directed by GPD personnel. Do not use unapproved chargers or charging methods.

SPEED: Do not strike or jar the strain gauge. Apply force to the strain gauge clip using a controlled pulling or pushing motion; do not apply impact or sudden force. Applying force at excessive speed may result in permanent damage to this precision instrument.

FORCE: Do not apply force that exceeds the rated capacity of the installed strain gauge. Exceeding the rated capacity may permanently damage this precision instrument.

Operational Requirements

Power Cord Requirements: For use in the EU, the power cord shall comply with applicable CE marking requirements. The cord shall be rated for a minimum of 15 A, shall not exceed 2 m in length, and shall include a protective earth (ground) conductor.

Power Source: Operate the PBFT only within the input voltage range specified on the data plate.

Grounding: The PBFT is equipped with a three-wire grounding-type plug with a protective earth conductor. This plug is intended for use with a grounding-type outlet. If incompatible, contact a qualified electrician. Do not remove, modify, or bypass the grounding connection.

Water and Moisture: Do not operate the PBFT near water or in environments with moisture. Moisture may cause corrosion affecting carriage movement and measurement accuracy.

Attachments: Do not use attachments not recommended by GPD Global.

Decommissioning and Disposal Requirements

Items that become solid waste as a result of operation, maintenance, or servicing of the equipment may be subject to regulatory disposal requirements. These items may include substances such as beryllium-containing parts, vapor lamps, mercury switches, batteries, contaminated parts, grease, wipes, fuses, and other maintenance wastes.

When decommissioning the system, contact the manufacturer for guidance. Once decontaminated, the system is constructed from a range of low-hazard materials, including aluminum, steel, brass, glass, and various synthetic materials.

Printed circuit boards should be disposed of through a specialist salvage or recycling agency. The remaining structure may be dismantled and sorted by material. Most structural materials are metallic and recyclable. Specialist agencies can advise on the suitability of recycling synthetic materials.

Legislation varies by country, state, and region. Local environmental or health and safety authorities should be consulted to ensure compliance with applicable disposal regulations.

Trademarks

Throughout this guide, trademarks are used. Rather than include a trademark symbol with every occurrence of a trademarked name, such names are used in an editorial manner only, to the benefit of the trademark owners, and with no intention of infringement.

GPD Global is a registered trademark of GPD Global, Inc.

FORCEWare is a trademark of GPD Global, Inc.

InstaCal is copyrighted by Measurement Computing.

Windows is registered trademark of Microsoft Corporation in the United States and/or other countries.

Warranty

General Warranty. Subject to the remedy limitation and procedures set forth in the section “Warranty Procedures and Remedy Limitations,” GPD Global warrants that the system will conform to the written description and specifications furnished to Buyer in GPD Global’s proposal and specified in the Buyer’s purchase order, and that it will be free from defects in materials and workmanship for a period of one (1) year. GPD Global will repair or, at its option, replace any part which proves defective, in the sole judgment of GPD Global, within one (1) year from the date of shipment/invoice. Separate manufacturers’ warranties may apply to components or subassemblies purchased from third parties and incorporated into the system. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Limitations. GPD Global reserves the right to refuse warranty replacement where, in the sole opinion of GPD Global, the defect is attributable to the use of incompatible materials or to damage resulting from improper use or neglect.

This warranty does not apply if the GPD Global product has been damaged by accident or abuse, or if it has been modified without the written permission of GPD Global.

Items considered replaceable or rendered unusable through normal wear and tear are not covered under the terms of this warranty. Such items include, but are not limited to, fuses, lights, filters, and belts.

Warranty Procedures and Remedy Limitations. The sole and exclusive remedy of Buyer in the event that the system or any components of the system do not conform to the express warranties stated in the section “Warranties” shall be the replacement of the component or part. If on-site labor by GPD Global personnel is required to replace a non-warranted defective component, GPD Global reserves the right to invoice Buyer for component cost, personnel compensation, travel expenses, and all subsistence costs. GPD Global’s liability for a software error shall be limited to the cost of correcting the software error and the replacement of any system components damaged as a result of the software error. In no event and under no circumstances shall GPD Global be liable for any incidental or consequential damages; its liability is limited to the cost of the defective part or parts, regardless of the legal theory of any such claim. As to any part claimed to be defective within one (1) year from the date of shipment/invoice, Buyer shall order a replacement part, which will be invoiced in the ordinary course. If the replaced part is returned to GPD Global by Buyer and is found by GPD Global, in its sole judgment, to be defective, GPD Global will issue Buyer a credit in the amount of the price of the replacement part. GPD Global’s acceptance of any parts so shipped shall not be deemed an admission that such parts are defective.

Specifications, descriptions, and all information contained in this guide are subject to change or correction without prior notice.

Although reasonable care has been exercised in preparing this guide to ensure it is complete and accurate, it does not purport to cover all conceivable problems or applications pertaining to this machine.

Introduction

This guide provides installation, maintenance, calibration, troubleshooting, and service information for the PBFT VS USB1100.

Function

The GPD Global PBFT accurately measures and records the peel-back force required to separate the cover tape from the carrier tape. The PBFT accommodates tape widths from 8 mm to 56 mm and supports plastic, metal, and paper carrier tapes in single- and dual-sprocket configurations. Test results may be recorded for incoming or outgoing taped components.

Theory of Operation

Set up involves loading and aligning a reel or strip of component carrier tape, verifying peel speed, configuring the printer, and, as needed, modifying test parameters.

Mechanical Controls

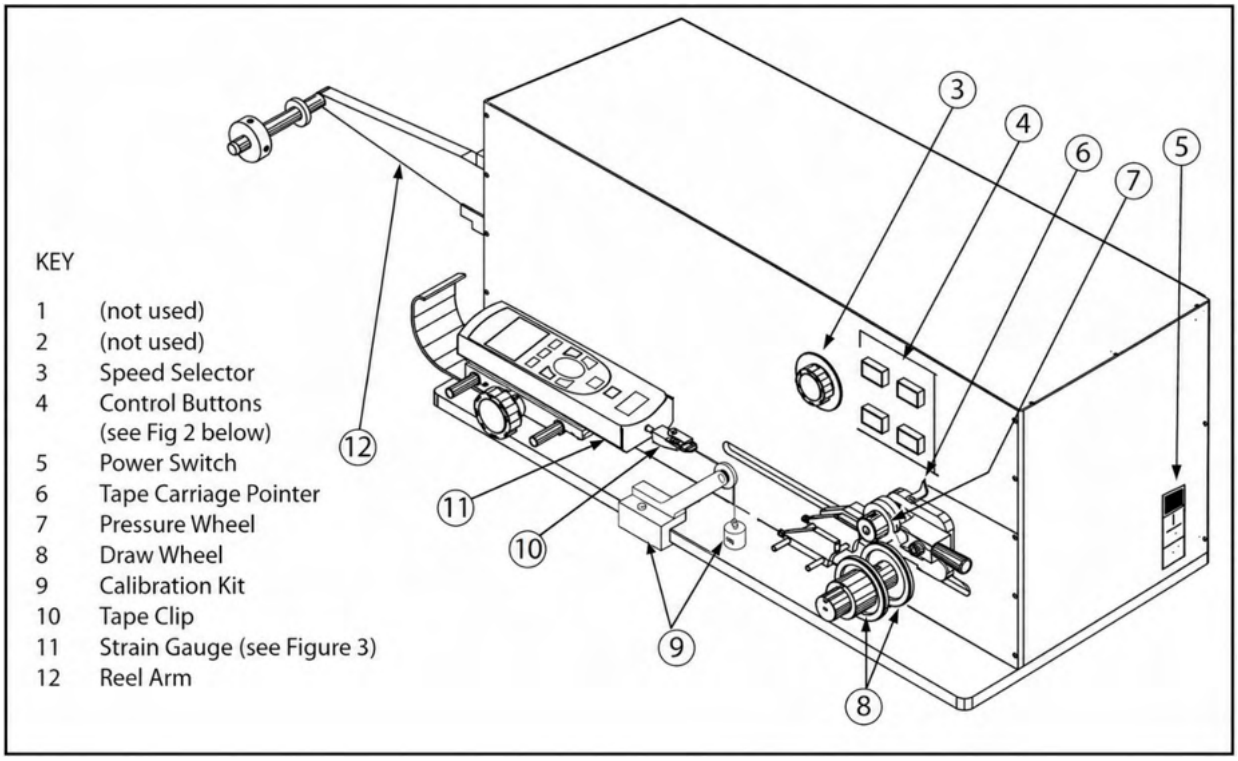


Figure 1: PBFT VS - key elements (shown with Calibration Kit installed)

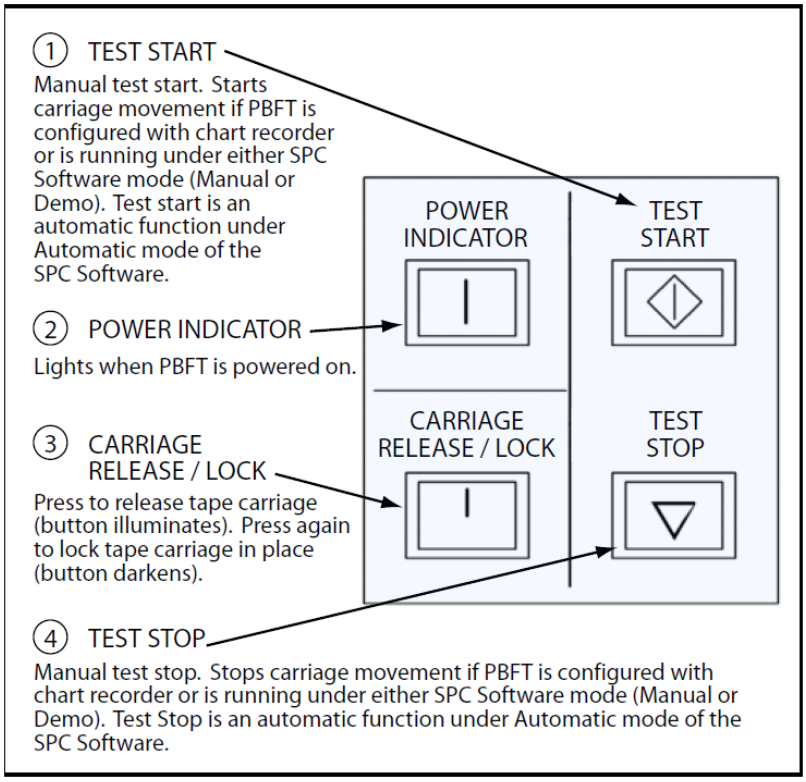


Figure 2: PBFT VS - control buttons

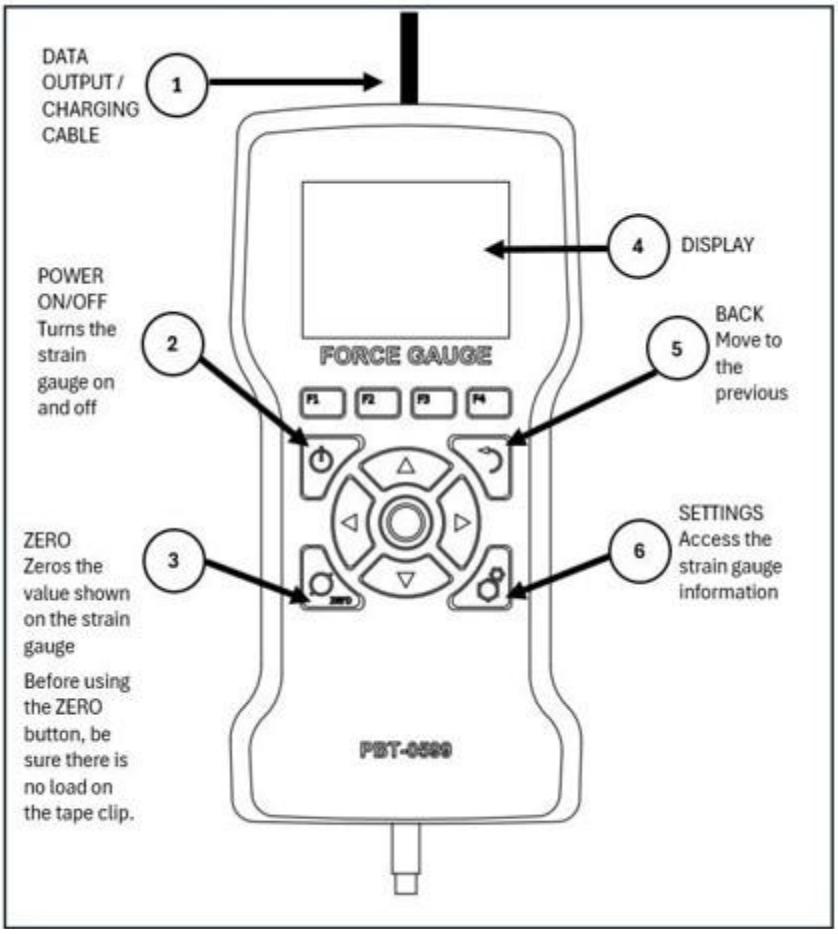


Figure 3: Strain Gauge - key elements

Hardware Installation

QUALIFIED PERSONNEL REQUIRED

Installation should only be performed by qualified maintenance or technical personnel fully aware of all safety precautions. Read all safety notices before proceeding.

IMPORTANT: Perform all installation steps in the order presented in this guide.

Unpack & Assemble

1. Carefully unpack the machine. This is a precision instrument and must be handled with care.
2. Place the machine on a stable, level surface.
3. Visually inspect the machine for shipping damage. If damage is observed, contact the GPD Global Service Department.

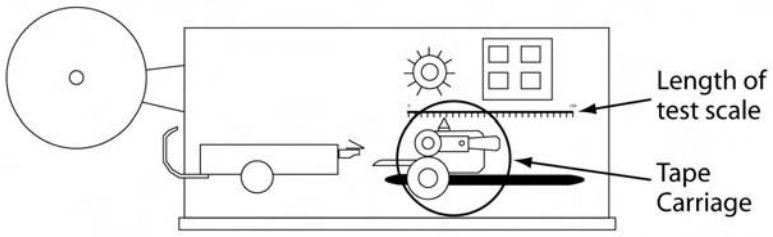
CAUTION – EQUIPMENT DAMAGE / PERSONAL INJURY RISK

Operation of a damaged machine may result in personal injury and/or invalidate the warranty.

4. Verify all accessories and documentation have been removed from the shipping container.
5. Verify draw wheel (**Figure 1, Item 8**) and pressure wheel (**Figure 1, Item 7**) are in place.
6. Install the reel arm (**Figure 1, Item 12**) with the provided screws.
7. Plug the PBFT power cord into the PBFT power outlet [located below the power switch (**Figure 1, Item 5**)]. Plug the other end into a suitable power outlet. See **Power Requirements (page 24)** for power details.

Verify Mechanical Operations

1. Turn on the PBFT power switch. The power indicator (**Figure 2, Item 2**) will illuminate.
2. Verify strain gauge (**Figure 1, Item 11**) operation and charging:
    a. Verify that the USB-C cable is securely connected to the strain gauge (**Figure 3, Item 1**).
    b. With the PBFT powered on, observe the strain gauge display (see **Figure 3, Item 4**). It should show the current battery charge level.
        i. Leave the strain gauge powered off for approximately 5 minutes. Verify that the battery charge level on the display increases. This confirms the strain gauge is receiving a charge from the PBFT.
        ii. If the display remains blank, allow the strain gauge to charge for at least 30 minutes. If the display still does not appear, refer to **Troubleshooting (page 22)**.
3. Verify that the tape carriage is functional:
    a. Press CARRIAGE RELEASE/LOCK (**Figure 2, Item 3**) to release the tape carriage.
    b. Manually position the tape carriage pointer (**Figure 1, Item 6**) with the zero (0) mark on the Length of Test scale (see below).



Align tape carriage

c. Press CARRIAGE RELEASE/LOCK to lock the carriage in place.
d. Select a speed on the speed selector (**Figure 1, Item 3**).
e. Press TEST START (**Figure 2, Item 1**). The following should occur:
    i. The tape carriage should travel smoothly to the end of its travel and stop automatically.
    ii. The TEST START lamp will turn off.

CAUTION – ABNORMAL OPERATION

If the TEST START lamp does not turn off, immediately turn off the power switch and contact GPD Global Service.

Maintenance

The following maintenance rules must be followed:

1. Only qualified maintenance or technical personnel who are fully aware of all safety precautions should perform preventive maintenance and troubleshooting procedures.
2. Read all safety notices before proceeding.
3. Always power off the PBFT and strain gauge before performing any maintenance.

Preventive Maintenance Schedule

Although the PBFT is a delicate apparatus, it requires minimal maintenance. Basic maintenance includes wiping dust from the exterior with a soft, clean cloth and covering the unit with a cloth cover during periods of non-use, in addition to the periodic maintenance procedures listed.

CAUTION: *Ensure the PBFT and strain gauge are powered off before performing any maintenance.*

IMPORTANT: *The PBFT is designed for accurate measurement; therefore, calibration should be verified on a regular basis (at least monthly).*

Interval	Location	Action
Weekly	Machine Exterior	Clean exterior panels using a soft, dry cloth. Do not use liquid or aerosol cleaners.
	Control Buttons	Inspect front panel button switches for proper operation. If a switch fails to actuate, refer to the “Control button does not initiate operation” symptom in **Troubleshooting (page 22)**. Inspect front panel button switches for illumination when pressed. If a switch does not illuminate, refer to the “Control button LED not illuminating” symptom in **Troubleshooting (page 22)**.
Monthly	Carriage Motor	Verify motor speed. Refer to the **Motor Speed Calibration Procedure (page 18)**.
	Strain Gauge	Verify strain gauge operation. Refer to the **Verify Strain Gauge Operations (page 19).**
Six Months	Set Screws	Remove the PBFT cover and inspect all set screws for looseness; tighten as necessary. Refer to the **Assembly and Parts List (page 28)**, for set screw locations.
	Travel Shafts	Lubricate both travel shafts. Refer to the **Assembly and Parts List (page 28)** for location. 1. Remove the PBFT cover to access internal components. 2. Clean both travel shafts using a soft, clean cloth to remove dust, debris, or residue. 3. Apply a small amount of light machine oil to both shafts to ensure smooth carriage movement.
	Gear Rack	Inspect the gear rack and clean debris from the teeth if necessary. Refer to the **Assembly and Parts List (page 28)** for location.

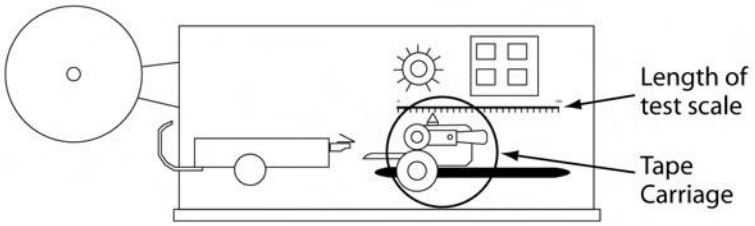
Calibration Accuracy

Motor speed and strain gauge operations are factory-verified for operational accuracy. If reverification is required, use the following procedures.

600 mm/min		
Speed under Test:	**Target Stop Position**	**Test Duration:**
100 mm	100 mm	60 seconds
150 mm	150 mm	
200 mm	100 mm	30 seconds
250 mm	125 mm	
300 mm	150 mm	
350 mm	175 mm	
400 mm	100 mm	15 seconds
450 mm	150 mm	20 seconds
500 mm	125 mm	15 seconds
550 mm	110 mm	12 seconds
600 mm	150 mm	15 seconds

Motor Speed Calibration Procedure

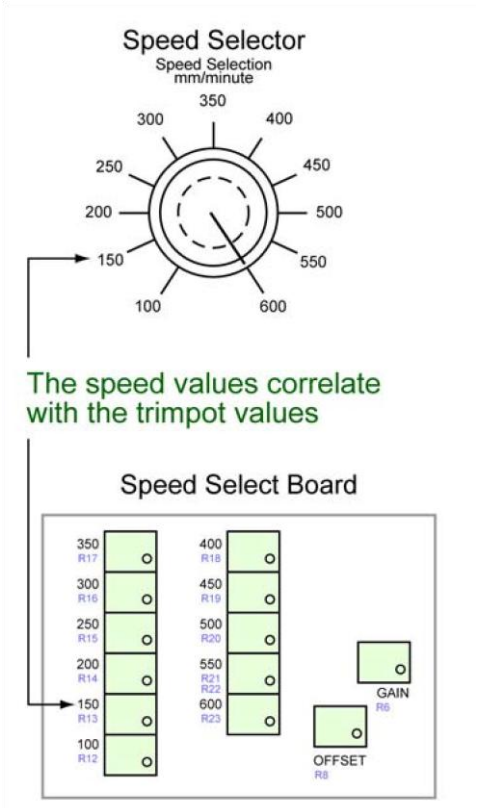
1. Remove the PBFT top cover to expose the speed select board.
2. For each speed listed in the calibration table:
   2.1. Align the tape carriage:



Location of Tape Carriage and Length of Test Scale

   a. Press CARRIAGE RELEASE/LOCK to release the tape carriage.
   b. Align the tape carriage pointer to zero on the Length of Test scale.
   c. Press CARRIAGE RELEASE/LOCK again to lock the tape carriage in position.

   2.2. Set the PBFT speed selector to the speed under test.
   2.3. Start the test and simultaneously start the stopwatch.
   2.4. Measure the elapsed time and compare it to the corresponding value in the calibration table.
   2.5. Locate the corresponding trim potentiometer on the speed select board.



   2.6. If the measured time is out of specification, adjust the trim potentiometer:
   - clockwise to increase speed
   - counterclockwise to decrease speed

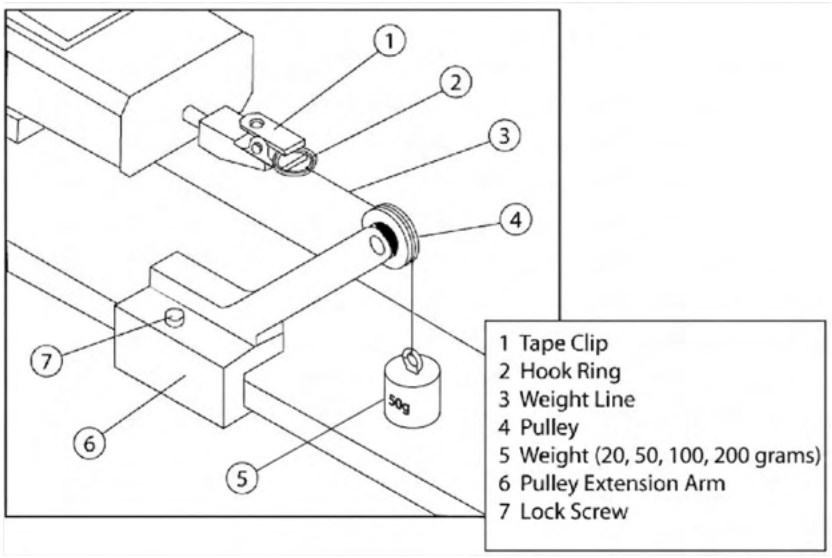
   2.7. Repeat Steps 2.1–2.6 for the same speed until the measured time is within specification.
3. Repeat Step 2 for all remaining speeds in the calibration table.

Verify Strain Gauge Operations

To verify strain gauge operations, install the Strain Gauge Calibration Kit (PBT-123).

IMPORTANT: Recalibration is required if the strain gauge is replaced or repaired.

1. Turn the PBFT power switch ON.
2. Verify strain gauge display behavior:
   - Battery charge level is displayed automatically when power is applied.
3. Press and hold the strain gauge power ON/OFF button for approximately 2 seconds, until the boot screen appears.
4. Verify unit of force is set to **gf (gram-force)**.
   - If not, push the **DOWN arrow once** to select the force units setting
   - Press the gauge's **center key (O)** to display the list of available units
   - Select **gf** from the listed units
5. Verify zero condition (no load applied):
   - Strain gauge should read **0.000**
6. Install the calibration kit pulley extension arm onto the PBFT base plate.



7. Place a calibration weight on the gauge block and position the pulley extension arm so that:
   - the weight line is supported, and
   - the weight is resting on the gauge block
8. Remove the gauge block so the weight hangs freely without obstruction.

CAUTION:

- Do not strike or jar the strain gauge.
- Do not apply excessive force or impact to the strain gauge clip.
- Support the weight while positioning it over the pulley.
- Gently release the load onto the strain gauge.

9. Verify strain gauge readings using the following weights:

Weight (g)	Expected Reading (gf)	Tolerance (gf)
20	20	±1
50	50	±3
100	100	±5
200	200	±10

   - Attach each weight, verify the reading, then remove before proceeding to the next.
10. If any measurement is outside tolerance, contact GPD Global Service Department.
11. Remove the calibration kit after verification is complete.

Replacement Parts & Accessories

Replacement Parts List

Part Description	Part Number	Qty. per Machine	Installed Location
USB Hub	2025-0150	1	USB Panel
PCB, PBFT Controller	2200-0244	1	Control Panel
PCB, USB DAQ	2200-0261	1	USB Panel
Power Supply 24V 5A	4000-0226	1	Power Panel
Power Supply DC-DC Converter 12V	4000-0227	2	Power Panel
Fuse 3.15A	4300-0209	2	Power Entry Module
Fuse 2.0A	4300-0210	4	Fused T-block (PSU2 and PSU3)
Fuse 1.0A	4300-0211	1	Fused T-block (USB Hub)
Momentary Switch, Illuminated Green	7100-0000	1	Control Panel (Start)
Latching Switch, Illuminated White	7100-0004	1	Control Panel (Carriage Release)
Indicator, Illuminated Green	7100-0006	1	Control Panel (Power Indicator)
LED Module White	7100-0007	1	Control Panel (Carriage Release Indicator)
LED Module Green	7100-0008	2	Control Panel (Start & Power Indicator)
LED Module Red	7100-0012	1	Control Panel (Stop Indicator)
Momentary Switch, Illuminated Red	7100-0015	1	Control Panel (Stop)

Available Accessories

Part Description	Part Number	Contents
Calibration Kit	PBT-123	Pulley extension arm with pulley Weights (20, 50, 100, and 200 grams) each with a line and hook ring Gauge block (0.15” (3.81mm)) Nylon lock screw Strain Gauge Calibration Verification Kit Instructions

Calibration Traceability Note:

All supplied calibration weights and the gauge block are NIST Class F traceable and include individual calibration certificates. Calibration weights are typically certified within ±0.02% of nominal value; exact certified tolerances for each supplied component are defined by its individual calibration certificate.

Troubleshooting

CAUTION: Only qualified maintenance or technical personnel familiar with all safety precautions shall perform preventive maintenance and troubleshooting procedures. Power off the PBFT and strain gauge before performing maintenance or troubleshooting, unless a procedure specifically requires power for verification.

Symptom	Possible Cause	Action
Machine does not power on	Input power fuses may be blown	Remove the fuse holder from the input power module. (Refer to **Exploded View – Items 1 and 23)** 1. Refer to Specifications for correct fuse rating. 2. Replace all input power fuses with fuses matching the specified rating. 3. Reinstall the fuse holder into the input power module.
	AC-DC power supply failure	Check AC-DC power supply status LED for operation and verify output voltage (24V nominal). If AC-DC power supply is not operating or output is incorrect, replace the AC-DC power supply.
Control button does not initiate operation	Control button switch may be defective	Replace defective switch: 1. Remove PBFT cover to access the rear of the control panel. 2. Identify the defective switch. **[See Exploded View (page 29)]** 3. Label and disconnect the quick-connect terminals from the wiring base. 4. Release and remove the wiring base from the switch by sliding the metal retaining tab. 5. Remove the switch retaining nut and washer from the front of the panel. 6. Remove the switch from the panel. 7. Install the new switch and secure with retaining hardware. 8. Reconnect wiring to the appropriate terminals. 9. Reinstall PBFT cover.
Control button LED not illuminating	LED module is defective	Power OFF the PBFT and ensure the system is safely de-energized before servicing. 1. Remove the PBFT top cover to access the internal side of the control panel switches. 2. From inside the machine, locate the switch assembly corresponding to the LED requiring replacement. 3. Slide the metal locking tab on the switch base to the release position. 4. Carefully pull the wiring base straight out from the rear of the panel-mount switch to expose the LED module. 5. Remove the LED module from the wiring base. 6. Install the new LED module into the wiring base, ensuring: • the side marked TOP on the LED module aligns with • the TOP marking on the wiring base. 7. Reinsert the wiring base back into the switch base. 8. Slide the metal locking tab back into the locked position to secure the assembly. 9. Reinstall the PBFT top cover.

Symptom	Possible Cause	Action
System does not respond when test is initiated.	Test start signal not received at control board	Using a multimeter, verify U2 Pin 1 (5 V logic ON/OFF from DAQ). If no signal is present, verify DAQ output stage. Verify U2 output changes state when input is active. If no switching response is observed, replace U2.
	Start button failure	1. Using a multimeter, verify signal at start button Pin 14 (Green/Black wire). 2. Press and hold the start button and confirm signal state changes while pressed. 3. If no change is observed, replace start button assembly. 4. Verify the same signal change is present at the control board input. 5. If no change is observed at the control board, repair wiring between button and control board.
	Relay failure	Replace K1 relay with a known-good relay.
	Internal power failure	Confirm PSU2 power indicator is ON. Visually inspect PSU2 input and output fuses for blown indicators. If fuses are good, verify PSU2 output is present and stable.
	Motor/drive system failure.	Verify voltage is present at motor terminals during operation. If voltage is present, replace motor.
Gantry fails to move properly during test	Clutch drive power failure	Confirm PSU3 power indicator is ON. Visually inspect PSU3 input and output fuses for blown indicators. If fuses are good, verify PSU3 output is present and stable.
Strain gauge display does not respond when USB power is applied	USB cable or connector is defective	Replace USB cable with a known-good cable. Inspect connectors for damage or poor fit. Re-test strain gauge response
	No USB power is being supplied from the system USB hub or power source	Verify USB hub is powered and functional. Test USB output with known-good device. Restore power to hub or replace faulty hub module if required
	Strain gauge is defective	Verify USB power is present at the connector using a known-good cable/source. If power is confirmed but no display response occurs, replace strain gauge assembly
Battery does not show increase in charge level over time	Battery cell is defective or no longer capable of accepting charge.	Connect the gauge to a known-good external USB cable and power source and allow sufficient time for charging. If the charge level does not increase, replace the battery.
Strain gauge display values do not match FORCEWare software values.	Strain gauge is defective.	1. Perform steps 1 and 2 of Verify Mechanical Operations (page 14). 2. Perform Verify Strain Gauge Operations (page 19). 3. If necessary, obtain new strain gauge.
	FORCEWare is not calibrated to the installed strain gauge output (after replacement or repair).	

Specifications

Size and Weight

Dimensions (Uncrated)	31.8 cm H × 73.7 cm W × 36.8 cm D (12.5” H × 29.0” W × 14.5” D)
Weight (Uncrated)	30 kg (66 lbs)
Crated Dimensions	63.5 cm × 96.5 cm × 68.6 cm (25” × 38” × 27”)
Crated Weight	65.3 kg (144 lbs)
Crate Material	Kiln-dried wood; stamped accordingly

Power Requirements

AC Input Voltage	100–240 VAC (auto-ranging)
AC Frequency	50/60 Hz
Power Consumption	60 watts maximum
Input Power Module Fuse (external inlet)	T3.15 A, 250 V
Auxiliary Fuse (internal)	T1 A, 250 V
Power Conversion Fuses (internal)	4x T2A, 250

Environmental

Operating Temperature Range	40°F to 110°F (5°C to 45°C)
Storage Temperature Range	0°F to 130°F (-17°C to 54°C)
Temperature Stability	0.03% per °F
Relative Humidity	20% to 80%
EMI, Radiated	EN 55011, Class A (100–240 VAC input)
EMI, Conducted	

Force Measurement System Specifications

Installed Gauge Model	Chatillon DFE3-002
Capacity / Resolution	2 lbf × 0.0001 lbf 10 N × 0.001 N 1 kgf × 0.0001 kgf 32 ozf × 0.001 ozf 1000 gf × 0.1 gf
Accuracy	±0.2% of full scale
Data Sampling Rates	Gauge internal sampling: 30 kHz Software acquisition: Up to 20 samples per second (selectable in software)
Display Update Rate	10 Hz
Peak Capture Rate	10 kHz
Battery Life (approximate)	30–40 hours continuous use
Certification	Calibration norms comply with the basic requirements of ISO 10012 and ANSI/NCSL Z540-1. NIST-traceable certificate of calibration included.

Peel Back Test Parameters

Force Measuring Range	0 – 250 grams (recommended gauge maximum)
Speed	100 – 600 mm/min ±5 mm/min in 50 mm increments
Angle	160 – 180 degrees

Tape Handling Specifications

Widths Accepted	8, 12, 16, 24, 32, 44, 56 mm (optional 8 – 120 mm)
Materials Accepted	Plastic, Paper, Metal
Configurations	Single / Dual Sprocket

Data Acquisition Module

Module Model	USB-1608FS Plus
I/O Configuration	Analog input used for discrete machine state detection and digital control outputs
Interface	USB connection to host computer (via internal USB hub)

Compliances

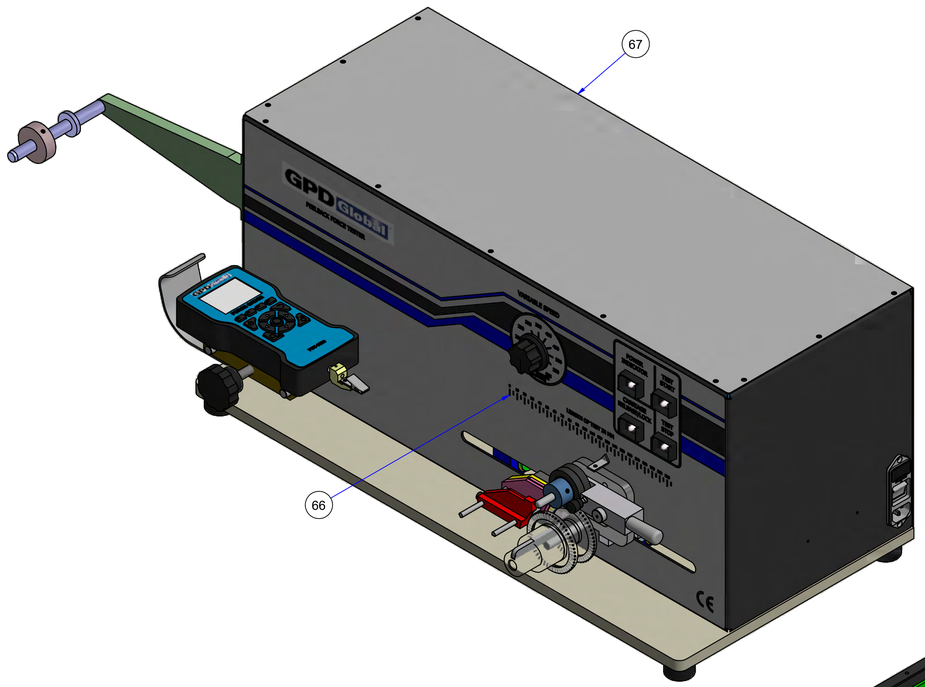
The system is designed to meet applicable industry standards and regulatory requirements. The following table identifies the standards and directives applicable to the system.

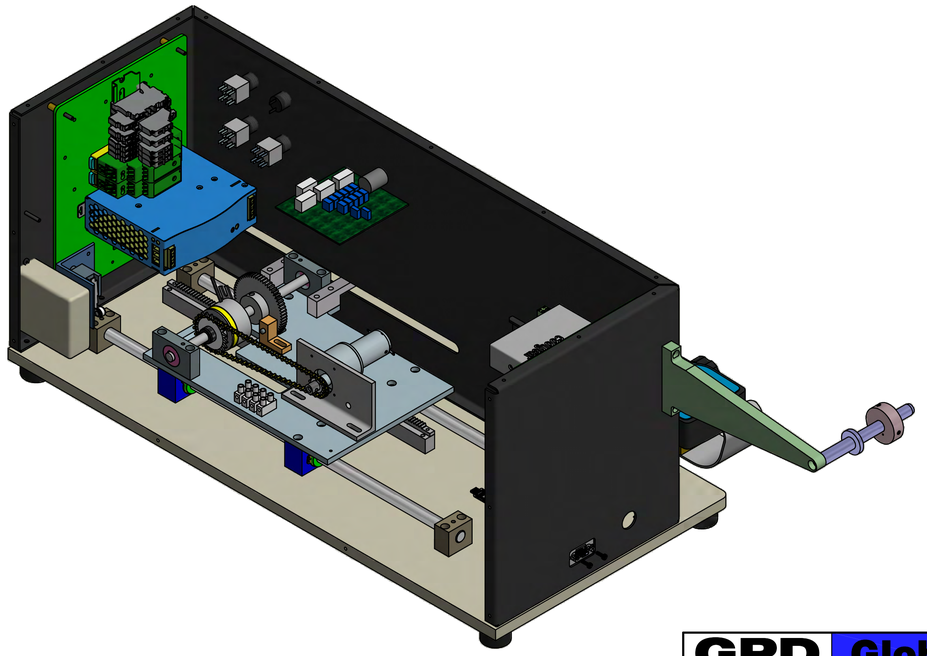
Region / Type	Standard / Directive	Notes / Description
EIA-J (Japan, Asia)	–	–
EIA (North America)	EIA-481-1, EIA-481-2, EIA-481-3	–
IEC (International / Europe)	IEC 61010-1:2010+AMD1:2016 CSV	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
European CE Safety Standards – Applicable Directives	2014/35/EU Low Voltage Directive (LVD)	Applies to electrical equipment operating within specified voltage limits
	2014/30/EU Electromagnetic Compatibility Directive (EMC)	Conformity is declared to Annex I and II – laws relating to EMC
	2006/42/EC Machinery Directive – 1st Edition Dec 2009	Conformity is declared to Annex I and II – laws relating to machinery

References

FORCEWare Software User Guide	Refer to this guide for software installation, configuration, operation, calibration, and test procedures.

REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
A	4/13/16	ARM	MOTOR 3500-0103 WAS 10/0173
B	12/3/2021	HTB	UPDATED PART LIST
C	4/28/2026	HTB	UPDATED PART LIST





Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	10/1398	AC ENTRY MODULE,FUSE HOLDER
2	1	10/1399	AC ENTRY MODULE,INSULATION COVER
3	1	10/1400	AC CORDSET,N.AMERICAN
4	1	10/1692	KNOB,#4 CAP SCREW
5	1	10/1694	SPRING,COMPRESS,SST_.24OD .81L .020WIRE
6	1	10/1752	KNOB, 8-32 FEMALE INSERT, 1/2 HIGH
7	1	10/4053	CLIP,TAPE_.22 OPENING WITH TEETH
8	1	10/4258	LABEL,PLASTIC,PBFT,SWITCHES
9	1	2100-0007	CONNECTOR,T-STRIP,4-POS
10	1	2200-0244	PCB, PBFT CONTROLLER
11	1	2200-0261	CONTROLLER,A/D 8CH, USB
12	1	2400-0002	KNOB,1/4 SHAFT
13	1	2400-0005	KNOB,MECH ADJ
15	11	2825-0014	ROUND SPACER_.15ID X .25 OD X 69LG
16	1	3500-0000	CLUTCH,COIL
17	1	3500-0005	CLUTCH,ROTOR_3/8 BORE-SF170
18	1	3500-0006	CLUTCH,ARMATURE_
19	1	3500-0007	RETAINING RING_EXTERNAL_5/8 SHAFT
20	1	3500-0103	MOTOR_GEAR_12VDC_500:1 REDUCTION
23	1	4300-0208	AC Entry Module w/Filter 10A
24	1	5100-0007	LIMIT SWITCH,15A SPDT ROLLER
31	4	B0201	BEARING,BALL,LINEAR_.500ID .875OD 1.25L
32	2	B8003	BEARING,BALL,RADIAL_12MMID 28MMOD 8MM
33	1	D1503	COLLAR,SET_1/4
34	1	D1504	COLLAR,SET_3/8
35	1	F5453	BOLT,SHOULDER_3/8 X 1L X 5/16-18
36	8	G4001	RING_SNAP_EXT_7/8 SHAFT
37	2	G4002	RING_SNAP_EXT_1/4 SHAFT
38	1	L0306	BEARING,THRUST,BRZ_1/4ID X 1/2OD X 1/16L
39	1	L0307	BEARING,FLANGE,.252IDX.377OD
40	4	LINESTOCK	1/16D X 1/4L ROLLPIN
41	1	LINESTOCK	3/16 X 3/4 LG DOWEL PIN
42	4	PBT-0001	BLOCK BASE
43	4	PBT-0002	LINEAR BEARING BLOCK
44	2	PBT-0004-B	MOUNT BLOCK
45	2	PBT-0005	RUBBER PRESSURE ROLLER
46	1	PBT-0006VS	DRIVE MOTOR MOUNT
47	1	PBT-0007	MOTOR MOUNT PLATE
48	1	PBT-0020	BEARING SHAFT
49	1	PBT-0021	SHAFT,PRESSURE ROLLER
50	1	PBT-0022	POINTER
51	1	PBT-0024	ADJUSTMENT ROD
52	2	PBT-0026	SLIDE SHAFT
53	2	PBT-0029-0001	GUIDE MOUNT
54	1	PBT-0030	ARM PRESSURE ROLLER
55	1	PBT-0031	SPACER BAR
56	1	PBT-0032	MOUNT BRACKET
57	1	PBT-0033	BEARING COLLAR
58	2	PBT-0036	BEARING R-6ZZ, GENERAL
59	1	PBT-0039	SWITCH BACKET
60	1	PBT-0041	CLUTCH HOLDER
61	1	PBT-0046	REEL HOLDER COLLAR
62	1	PBT-0048	TAPE DEFLECTOR
63	1	PBT-0053	REEL HOLDER ARM A
64	1	PBT-0054	BASE PLATE A
65	1	PBT-0056	REEL SHAFT 'A'
66	1	PBT-0068L	PBFT ENCLOSURE LABEL
67	1	PBT-0069	COVER,BACK SPC 2000 MODEL
68	1	PBT-100F	DRAW WHEEL ASSEMBLY
69	2	PBT-0101	TRAVEL SHAFT
70	1	PBT-0103	GEAR RACK
71	1	PBT-0104	GEAR
72	1	PBT-0108M	SPROCKET_1/4 PITCH
73	2	PBT-0119	SPRING ANCHOR - 6-32
74	1	PBT-0130	CHAIN.ROLLER-#25_
75	4	PBT-0309	RUBBER FOOT (BASE)
76	1	PBT-0310	HANDLE, PRESSURE ARM
77	1	PBT-0312	SPRING,EXT,MW_.312OD 1.0L .043WIRE
78	1	PBT-0514	GUIDE PLATE, BACK
79	2	PBT-0517	GUIDE BAR
80	1	PBT-0519	GUIDE CATCH

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
81	1	PBT-0529-0001	HOLDER,05 TAPE CLIP
82	1	PBT-0530	MOUNT,STRAIN GAUGE,07
83	1	PBT-0531	CLUTCH SPROCKET,100-600 MM PULL TEST
84	1	PBT-0532	FRONT TAPE GUIDE,05 MODEL
85	1	PBT-0533	REAR TAPE GUIDE,05 MODEL
86	1	PBT-0556	COVER,USB CIRCUIT BOARD
87	2	PBT-0557	ELECTRICAL PANEL-NEW
88	1	PBT-0558	ENCLOSURE,FRONT
89	1	PBT-0599	STRAIN GAUGE_DIGITAL_2LB
90	4	S5004	SPRING PLUNGER
107	1	6000-0985	CABLE_USB-C-M TO USB-C-F PM
108	1	PBT-0600	PANEL_USB B_ENCLOSURE
109	4	NSLA0632	NUT,LOCK_6-32
110	1	PBT-0601	PANEL_USB C_ENCLOSURE
111	1	7100-0015	Switch_Momentary_Illum Red_SPDT_PM16_12V
112	1	7100-0004	Switch_Latching_Illum Wht_SPDT_PM16_24V
113	1	7100-0000	Switch_Momentary_Illum Grn_SPDT_PM16_24V
114	1	7100-0006	Indicator_Illum Grn_PM16_24V
115	2	4300-0209	Fuse_3.15A_5x20mm_Slow-blow_250V
116	2	4000-0227	Power Supply_DC/DC_24V In_12V Out_1.25A
117	1	4000-0226	Power Supply_24V_5A_Din Mount
118	2	2100-1209	T-BLOCK_2002_2 POS_GRAY_15A
119	1	2100-1210	T-BLOCK_2002_2 POS_GRAY_ENDPLATE
120	1	2200-0372	JUMPER_BAR 2002_3 POS
121	5	7300-0003	T-Block_2002_2 Pos_Fused w/Ind_Gray
122	1	2100-0371	T-BLOCK_2002_4 POS_GRAY_20A
123	1	2100-1208	T-BLOCK_2002_4 POS_GRAY_ENDPLATE
125	1	2025-0150	HUB_USB 3.2_4 PORT_IND POWER
126	4	4300-0210	Fuse_1A_5x20mm_Slow-blow_250V
127	1	4300-0211	Fuse_2A_5x20mm_Slow-blow_250V
128	1	2200-0359	WAGO_SCREWLESS END STOP_6MM WIDE

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0.0 MM	±0.4 MM
X.XXX	± 0.005	0.00 MM	±0.1 MM
ANGULAR	± 0.5°		
RUNOUT	± 0.003 T.I.R.		

FINISH: NONE

HEAT TREATMENT: N/A

DWG SIZE: D

GPD Global

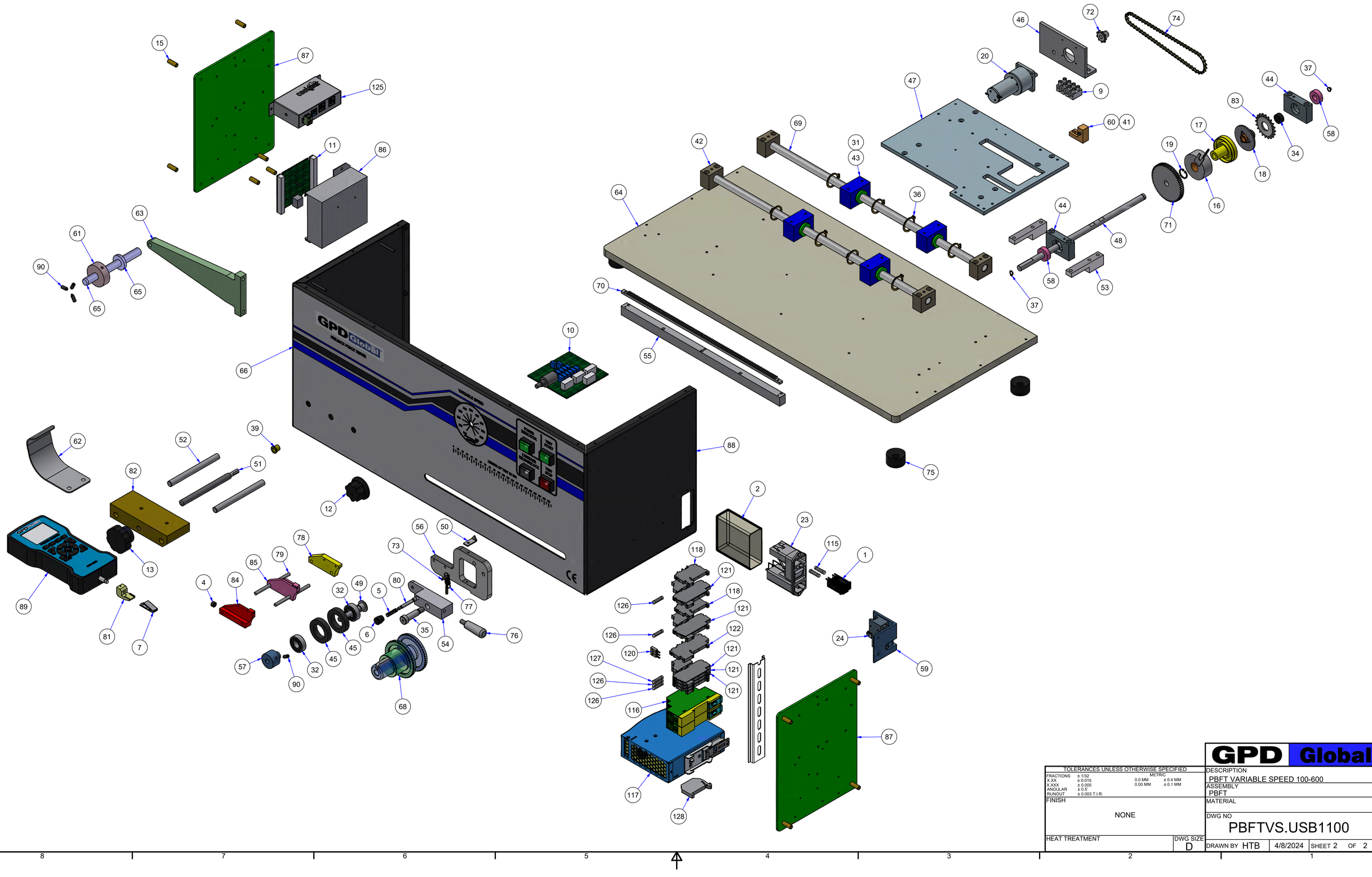
DESCRIPTION: PBFT VARIABLE SPEED 100-600

ASSEMBLY: PBFT

MATERIAL: NOTED

DWG NO: PBFTVS.USB1100

DRAWN BY HTB | 4/8/2024 | SHEET 1 OF 2



TOLERANCES UNLESS OTHERWISE SPECIFIED			
		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0.0 MM	± 0.4 MM
X.XXX	± 0.005	0.00 MM	± 0.1 MM
ANGULAR	± 0.5°		
RUNOUT	± 0.003 T.I.R.		

FINISH: NONE

HEAT TREATMENT

DWG SIZE: D

GPD Global

DESCRIPTION: PBFT VARIABLE SPEED 100-600

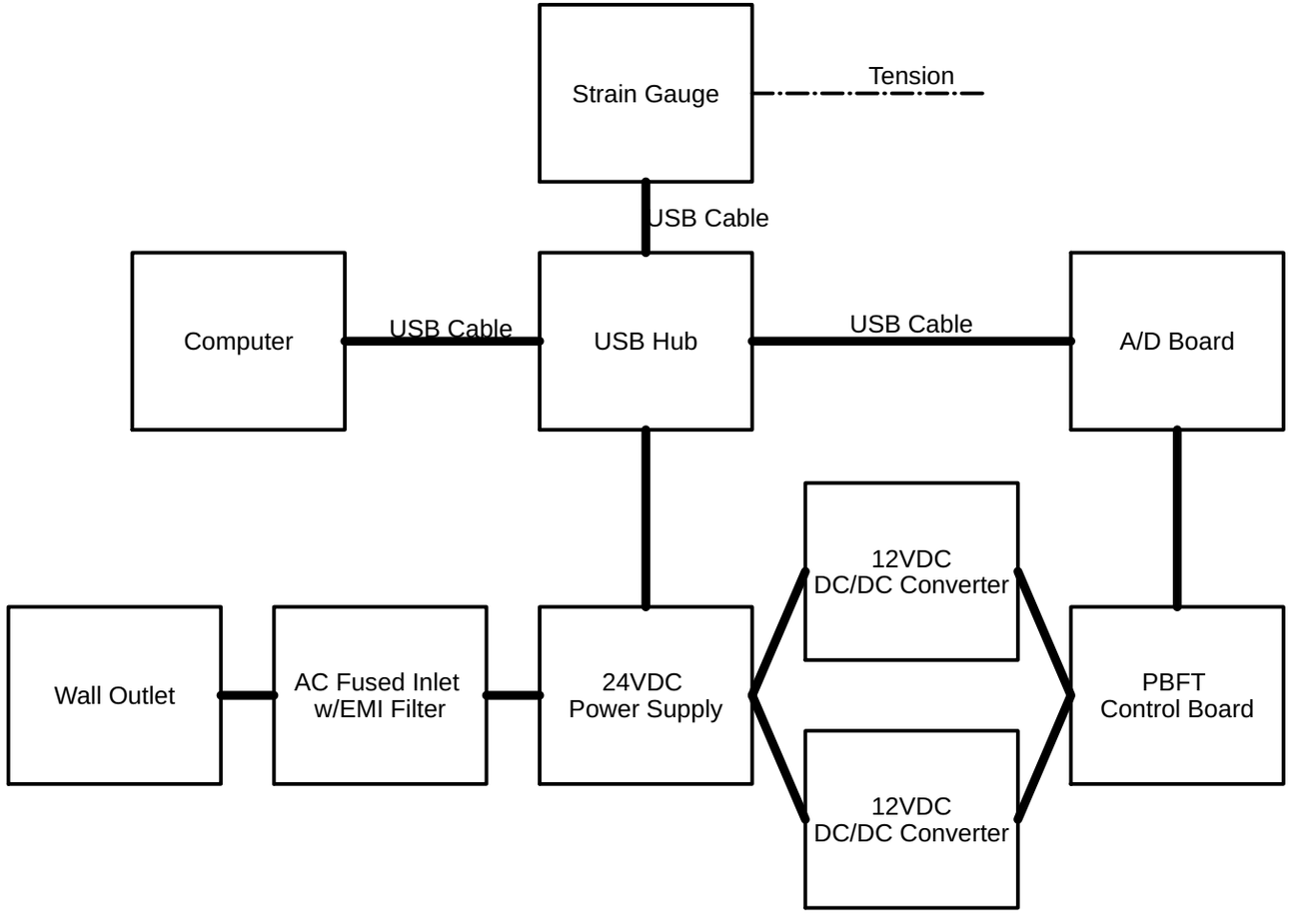
ASSEMBLY: PBFT

MATERIAL:

DWG NO: PBFTVS.USB1100

DRAWN BY HTB | 4/8/2024 | SHEET 2 OF 2

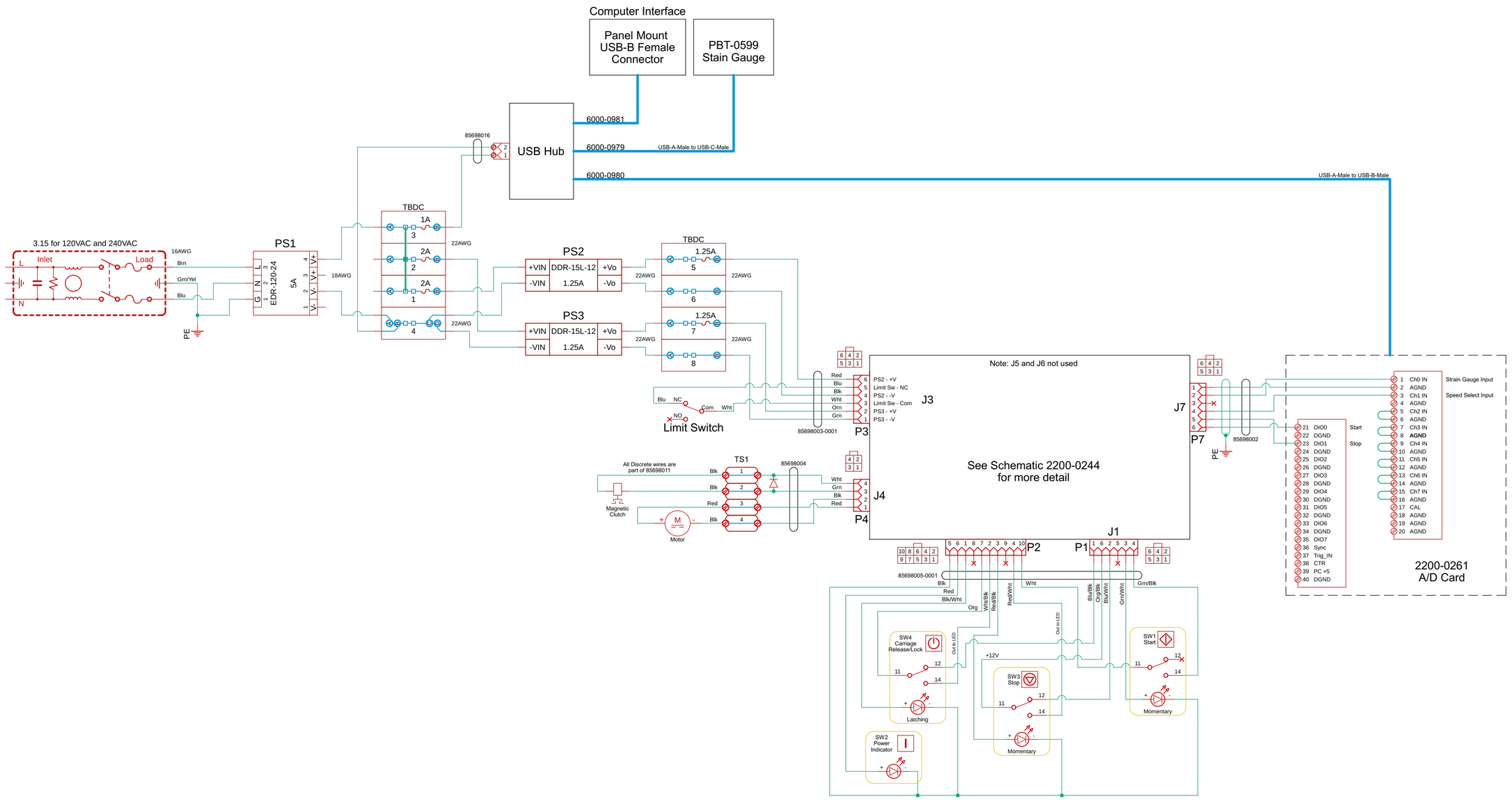
Revision History			
Initials	Rev.	Date:	Description:
RJM	A	04/23/24	Initial Release
RJM	B	08/10/26	Updated for New power system



GPD Global
Precision Dispensing Systems

Name: Block Diagram	
DWG No.: 85642002	
Drawn By: RJM	Date: 08/10/2026
Revision: B	Sheet: 1/1

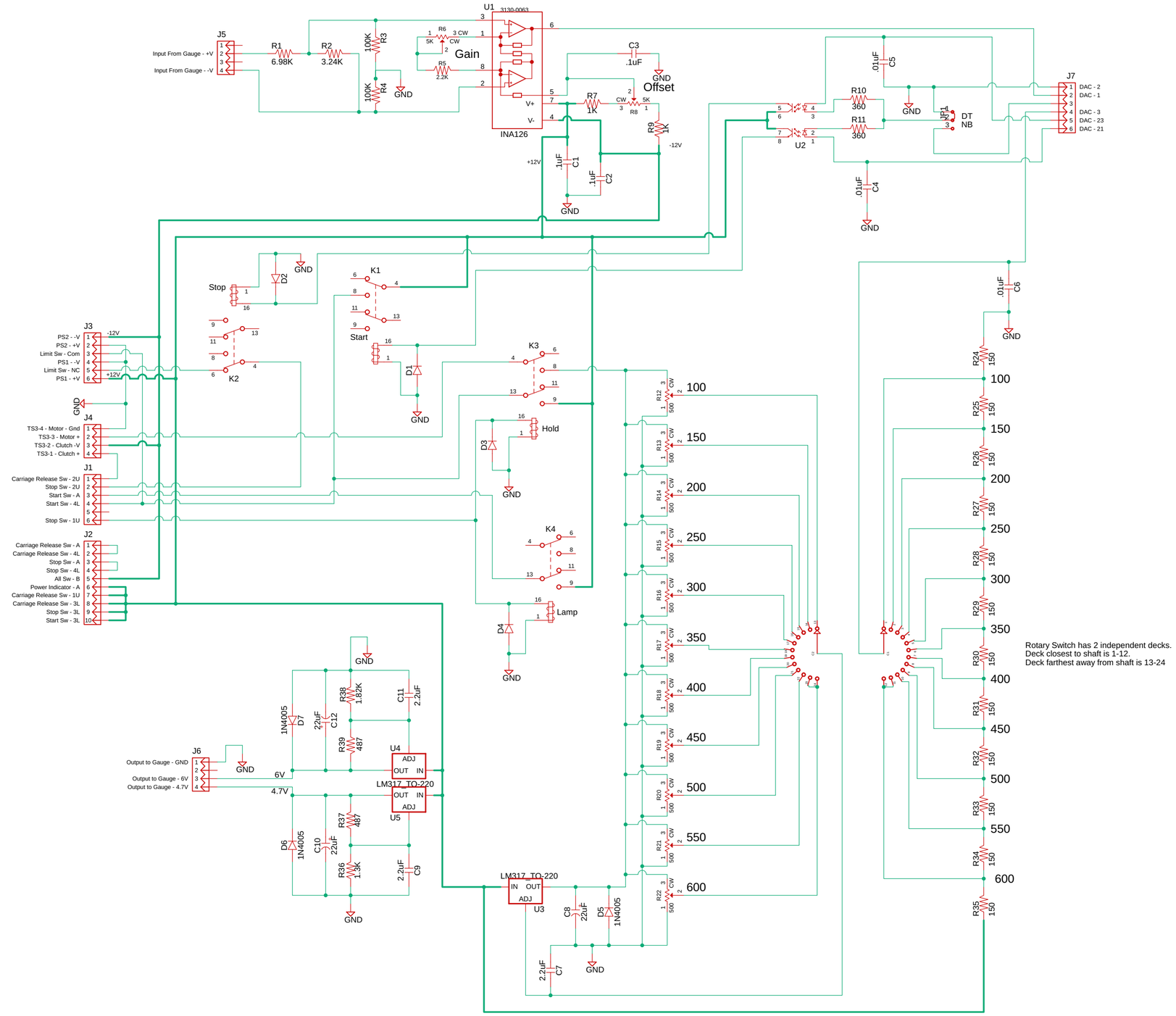
Revision History			
Initials	Rev.	Date:	Description:
RJM	A	01/21/26	Initial Release



GPD Global Precision Dispensing Systems	Name:	Peel Back Force Tester	
	DWG No.:	85642001-0001	
	Drawn By: RJM	Date: 01/21/2026	
	Revision: A	Sheet: 1/1	

Revision History

Initials	Rev.	Date:	Description:
SAH	A	07/12/07	Initial Release
RJM	B	01/03/24	Redrawn in Fusion360



Rotary Switch has 2 independent decks.
Deck closest to shaft is 1-12.
Deck farthest away from shaft is 13-24

GPD Global
Precision Dispensing Systems

Name:	PBFT Control Board
DWG No.:	2200-0244
Drawn By: RJM	Date: 01/03/2024
Revision: B	Sheet: 1/1