

User Manual

Filament Storage Management BIQU Vault L46

Shenzhen BIQU Innovation Technology Co., Ltd.
Version: V1.0 | English

1. Important Safety Information

Read Before Installation

This product is a floor-standing modular filament management rack. Complete structural assembly and cable connections with the power disconnected. Do not load filament or connect power until all fasteners are tightened and the rack is level and stable.

- Indoor use only. Place the device on a solid, level, and dry floor. Keep it away from rain, dripping water, heavy condensation, and corrosive environments.
- Before installation, servicing, cable adjustment, or removing/installing electronic modules, turn off the device and disconnect external power.
- Use only the power adapter and connection cables that meet the ratings specified in this manual.
- Do not exceed 1.5 kg per storage bay or 70 kg total load per rack. Both limits must be observed at the same time.
- Do not climb, sit, stand, or hang on the rack, or use it as a ladder. Keep children away from climbing areas unless supervised by an adult.
- Route the cable between the main rack and expansion rack naturally. Avoid pulling, pinching, abrasion, or prolonged contact with sharp metal edges.
- If you notice an unusual odor, abnormal heating, smoke, a damaged power cable, or obvious structural looseness, disconnect power immediately and stop using the product.

2. Product Overview

BIQU Vault is a modular smart filament management rack designed for 3D printing filament storage and inventory management. The system consists of a main rack and optional expansion racks. The main rack integrates control, display, weighing, NFC identification, local storage, and communication functions, while expansion racks add filament storage bays, bay status detection, and position guidance.

Users can register filament information through weighing and NFC identification. After filament is placed in an individual storage bay, the bay trigger detects its occupancy status. When locating filament, the system provides position guidance through rack-level and bay-level indicator lights. One main rack can connect to up to three expansion racks.

3. Key Features

- Modular expansion: One main rack serves as the control center and supports up to three expansion racks.
- Independent bay detection: Each storage bay uses a trigger switch to detect occupied/free status.
- Filament weighing: The main rack includes a weighing area with a maximum capacity of 2 kg and 1 g resolution.
- NFC identification: Reads compatible filament tags for filament identification and inventory management.
- Position guidance: Rack-level and bay-level indicator lights help users quickly locate target filament.
- 5-inch touchscreen: Used to view device status, manage filament, and configure basic system settings.
- Environmental monitoring: Built-in temperature and humidity sensors record the environment around the rack.
- Local storage and peripheral interface: Supports local storage on a TF/microSD card and provides a USB port for compatible peripherals or USB flash drives.

4. Product Specifications

Product Name	Filament Storage Management
Model	BIQU Vault L46

System Configuration	1 Main Rack + 1 Expansion Racks
Main Rack Dimensions	1061 x 280 x 1420 mm (L x W x H)
Expansion Rack Dimensions	1061 x 280 x 1420 mm (L x W x H)
Operating Voltage	DC 24 V
Adapter Input	100–240 V~, 50/60 Hz
Adapter Output	DC 24 V = 1 A
Operating Environment	Ambient temperature 10-40°C; relative humidity <95%, non-condensing
Max. Load per Bay	1.5 kg
Max. Total Load per Rack	70 kg
Weighing Capacity / Resolution	Max. 2 kg / 1 g
Display	Approx. 5-inch touchscreen
Filament Identification	NFC
Wireless Communication	2.4G Wi-Fi + Bluetooth
Local Storage	TF / microSD card
External Interfaces	USB, main/expansion rack connection interface, DC power interface, etc.

4.1 Rated Current and Power Reference

Configuration	Typical Operating Current	Estimated Power at 24 V
Main Rack Only	0.32 A	7.68 W (peak: 0.36 A / 8.64 W)
Expansion Rack Only	0.21 A	5.04 W (peak: 0.25 A / 6.00 W)
1 Main + 1 Expansion	0.53 A	12.72 W (peak: 0.61 A / 14.64 W)

5. Product Components and Interfaces

5.1 Main Rack Components

- Left and right side frames, base feet, and leveling caster assemblies;
- Five crossbars, five round tubes, and three reinforcing panels;
- Individual filament storage bays, bay trigger switches, and bay indicator lights;
- Weighing and NFC identification module;
- 5-inch touchscreen module and main control box;
- Temperature and humidity sensors, buzzer, and operating status indicators;
- TF/microSD card slot, USB port, expansion-rack connection port, and DC power input;
- Physical TARE (tare/zero) button.

5.2 Expansion Rack Components

The expansion rack adds filament storage capacity and includes the rack frame, storage bays, trigger switches, indicator lights, a buzzer, control circuitry, and the main/expansion rack connection interface. It does not duplicate the main rack's weighing, NFC identification, or primary user-interface modules.

5.3 Interfaces and Labels

TARE	Tare/zero the weighing platform. Ensure the platform is ready for the operation.
TF / microSD	Stores the local filament database, device parameters, logs, and other data.
USB	Connects compatible external devices (such as TD1S) or a USB flash drive. USB output electrical specifications are not stated in this manual.
Expansion Rack Connection Interface	Provides data communication and power between the main rack and expansion rack. Use the supplied cable.
DC IN	Connect the DC 24 V power adapter.

6. Installation

6.1 Preparation Before Installation

At least two people are recommended. Before installation, check all structural parts, electronic modules, and fasteners. Prepare a 5 mm hex key, a 13 mm open-end wrench, and tools for the remaining screws.

- Keep the device powered off during installation.
- Do not load filament until assembly and leveling are complete.
- Stop installation if any side frame, crossbar, panel, or electronic module is deformed, cracked, or damaged in transit.
- Do not use screws to force severely misaligned parts into position; this may cause permanent deformation.

6.2 Main Rack Assembly - Steps 01-04

1. Install the first base: Use 2 x M8x90 screws, 2 x M8 nuts, and 4 x M8 washers. Fit the base as shown, then install 2 leveling casters and 2 studs.
2. Install the other base: Repeat on the other side frame, matching the orientation shown.
3. Install the five crossbars: Secure them with 10 x M3x15 screws, aligning each crossbar with its slot. The second mounting slot on the main rack is reserved for the weighing module.
4. Attach the other side frame: Use 10 x M3x15 screws. Pre-tighten only, leaving 1-2 turns loose for installation of the round tubes and panels.

Assembly Tip

Do not fully tighten the 10 screws from Step 04. Fully tighten them only after the round tubes and three reinforcing panels are installed and the frame is aligned.

Steps 01-04: Fasteners and Checkpoints

Step	Main Components / Fasteners	Checkpoints
01	M8x90 x2; M8 nuts x2; M8 washers x4	Base orientation correct; 2 leveling casters and 2 studs installed.
02	M8x90 x2; M8 nuts x2; M8 washers x4	Other side orientation matches the illustration.
03	M3x15 x10	All 5 crossbars seated; second main-rack slot reserved for the weighing module.
04	M3x15 x10	Pre-tighten only; leave 1-2 turns loose. Do not fully tighten yet.

Assembly Diagram A - Steps 01-04 (Original Assembly Diagram)

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ASSEMBLY AT A GLANCE

01

/ 02

Tools: 5 mm hex key, 13 mm open-end wrench and drivers for the other screws.

01

FIT THE FIRST BASE



2 × M8×90 screws • 2 × M8 nuts • 4 × M8 washers

Attach the base as shown. Fit 2 leveling casters and 2 caster studs.

02

FIT THE OTHER BASE



2 × M8×90 screws • 2 × M8 nuts • 4 × M8 washers

Repeat on the other side frame with 2 leveling casters and 2 studs. Match the orientation shown.

03

FIT THE FIVE CROSSBARS



10 × M3×15 screws

Align each crossbar with its slot and secure it to the main frame.

Only the weighing assembly fits the second slot.

04

JOIN THE OTHER SIDE FRAME



10 × M3×15 screws

Align the other side frame with the crossbars and start the screws.

Leave screws 1-2 turns short of tight for assembly.

6.3 Main Rack Assembly - Steps 05-07

5. Install the five round tubes: Use 10 x M6x48 screws and 20 x M6 washers. Fit the 5 round tubes in the positions shown and secure both ends with washers.
6. Install the three reinforcing panels: Use 12 x M6x48 screws and 24 x M6 washers. The flat side of each panel must face inward. It is recommended to let the panel hang naturally first, align the upper hole at one end, and install one screw while leaving it approximately 1-2 turns loose as a temporary pivot. Then rotate the other end upward until the panel is horizontal and install the remaining screws. After all three panels are installed and the frame alignment is confirmed, fully tighten the fasteners.
7. Final tightening: Fully tighten the 10 x M3x15 screws that were left loose in Step 04.
8. Install the weighing module: On the main rack, install the weighing module at the specified position on the second level using 3 x M3 studs and 3 x M3x3 screws. Do not pinch or bend the load sensor or its cable, and make sure the weighing platform does not mechanically interfere with surrounding structures.

Note

The weighing module is installed only on the main rack. Do not perform the weighing-module installation step on an expansion rack. Avoid overtightening the weighing module, as this may deform the module or sensor.

Steps 05-07: Fasteners and Checkpoints

Step	Main Components / Fasteners	Checkpoints
05	M6x48 x10; M6 washers x20; round tubes x5	Secure both ends of each round tube; do not correct severe misalignment by forcefully tightening fasteners
06	M6x48 x12; M6 washers x24; panels x3	Flat side faces inward; tighten all fasteners only after the frame is aligned
07	M3 studs x3; M3x3 screws x3; weighing module x1	Main rack only; sensor and cable are not pinched and have no interference

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ASSEMBLY & FINAL CHECK

02

/ 02

Continue from the front. Complete assembly before loading filament.

05

FIT THE FIVE ROUND TUBES



10 × M6×48 screws • 20 × M6 washers • 5 tubes

Fit the tubes in the positions shown. Secure both ends with the washers and screws.

06

FIT THE REINFORCING PANELS



12 × M6×48 screws • 24 × M6 washers • 3 panels

Fit all three panels as shown. Check frame alignment, then tighten the fasteners.

Fully tighten the 10 screws left loose in Step 04.

07

FIT THE WEIGHING MODULE



3 × M3 studs • 3 × M3×3 screws • 1 module

Install the studs, module and screws at the second level as shown.

6.4 Expansion Rack Assembly

Assemble the expansion rack side frames, bases, crossbars, round tubes, and reinforcing panels according to the corresponding expansion-rack assembly diagram. Do not install the main rack's dedicated weighing/NFC identification module or primary control-interface module on an expansion rack. If structural parts are shared between the main and expansion racks, follow the part and interface labels in the expansion-rack package. Do not force main-rack weighing-module parts onto an expansion rack.

6.5 Connecting the Main Rack and Expansion Rack

Connect the main rack and expansion rack only after mechanical assembly and stability checks are complete. Turn off the main rack before connecting or disconnecting the main/expansion rack cable.



Connection principle: The main rack is the system control center and supports up to three expansion racks. Use only the supplied main/expansion rack connection cable. Do not substitute unverified cables.

6.6 Final Installation Check

All Fasteners	Installed and fully tightened, with no obvious looseness
Five Round Tubes	Both ends are securely fastened
Three Reinforcing Panels	Correct orientation and securely fastened
Frame	No obvious skewing or permanent deformation
Weighing Module (Main Rack)	Securely installed with no mechanical interference from surrounding structures
Leveling Casters / Support Feet	Even contact with the floor; no obvious rack wobble
Main/Expansion Rack Connection Cable	Correct interface, fully inserted, with no pinching or abnormal stress
Bay Switches / Indicator Lights	No obvious damage or structural interference

7. Power Connection and First Startup

9. Confirm that all mechanical assembly and cable connections are complete and that the rack is level with no obvious wobble.
10. Make sure there are no objects or abnormal external forces on the weighing platform.
11. Connect a power adapter that meets the requirements of this manual to the DC input on the main rack.
12. Connect AC power, turn on the device, and wait for the touchscreen to enter the startup screen.
13. Follow the on-screen prompts to complete basic settings such as language and network. Network setup may be optional depending on the functions available in the current firmware.

Power Requirements
Adapter input: 100-240 V~, 50/60 Hz; output: DC 24 V = 1 A. Do not use a power supply with an incompatible output voltage, polarity, or connector.

8. Basic Operation

8.1 Weighing and Tare

If the weighing platform does not display zero when unloaded, press the TARE button to zero/tare the scale. Place one filament spool steadily in the weighing area and wait for the reading to stabilize before registering or storing it.

Do not exceed the 2 kg weighing capacity, and do not drop or throw filament onto the weighing platform from a height.

8.2 Filament Identification and Storage

Typical workflow: Identify/weigh filament -> system confirms the filament -> place the filament in an available storage bay -> the corresponding bay trigger switch activates -> the system records the bay status. Bay detection includes delay/debounce logic; specific prompts and timing parameters depend on the current firmware version.

8.3 Removing Filament and Position Guidance

After filament is removed from a storage bay, the bay trigger switch is released and the system determines the actual removal status according to the configured delay parameters. When locating filament, the system can indicate the target position using rack-level and bay-level indicator lights. The lights are for position/status indication only and should not be used as the sole basis for device fault diagnosis.

8.4 TF Card and USB

TF / microSD card	Used for local data storage. Insert it in the correct orientation and do not force the card in backwards.
USB	Used to connect officially supported peripherals or a USB flash drive. USB output electrical specifications are not declared in this version of the manual. Do not connect high-power devices that exceed the interface capability or have not been verified.

9. Maintenance and Cleaning

- Regularly check screws and the connections at the side frames, crossbars, round tubes, panels, and bases for looseness.
- Regularly check whether the rack is tilted or wobbles abnormally. Re-level it if necessary.
- Turn off the device and disconnect power before cleaning. Wipe with a dry or slightly damp soft cloth.
- Do not rinse the device with large amounts of water, and do not use highly corrosive solvents to clean the control box, screen, or sensors.
- Promptly remove filament debris, dust, and foreign objects from the storage bays and weighing area.
- Protect the weighing platform from impact and from prolonged loads exceeding its rated capacity.

10. Troubleshooting

Device Does Not Power On	Check the AC outlet, power adapter, DC plug, and main-rack power input.
Expansion Rack Offline	Power off, then check cable orientation, connection, and damage.
Abnormal Bay Status	Confirm the filament is positioned correctly and triggers the bay switch. Remove any obstruction.
Scale Cannot Be Zeroed	Remove all items, ensure the platform does not touch surrounding structures, then press TARE.
Abnormal Weight Reading Fluctuation	Check for rack contact, an unstable floor, or structural pressure on the weighing module.
NFC Tag Not Recognized	Reposition the tag in the recognition area and confirm that it is compatible.
TF Card or USB Device Not Recognized	Check insertion direction, media condition, and compatibility. Power off and reconnect if needed.

11. Compliance and Manufacturer Information

Manufacturer	Shenzhen BIQU Innovation Technology Co., Ltd.
Product Name	BIQU Vault
Main Rack Model	BIQU Vault L46
Country of Origin	Made in China
Target Certifications	RoHS / CE / FCC

Electrical modifications, cable replacements, or structural changes not expressly approved by the manufacturer may affect safety, function, certification status, and warranty. Certification marks, wireless parameters, nameplate information, and final ratings are subject to the certification sample and final certification results.

FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by the party responsible for Compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help important announcement .

Radiation Exposure Statement

To comply with FCC RF exposure compliance requirements, this grant is applicable to only mobile configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.