3D FLASH+ Mounting and Installation Guideline

Document TBS-061

NOTE: The latest version of this document always available at:
https://cloud1.tbs-biometrics.com/index.php/s/TWldCHnZtkRn0LV

Release	Author	Comment
July 15, 2023	AG	First version
Nov 01, 2023	AG	Update for Fingerprint Recognition Sensor

Content

1 Introduction

The TBS Terminal series brings Access Control and Time & Attendance applications featuring biometrics to a new level. They combine highest security with user convenience and the most flexible configuration options on the market.

This document describes the mounting and installation of the 3D FLASH+.

As an optional add-on, a Fingerprint sensor can be attached to the base reader.

The installation of this add-on and special software configuration options are explained in the TechNote 'TN 3D FLASH+ Getting Started' available here:

https://cloud1.tbs-biometrics.com/index.php/s/uMe8UE3XMi2yeXj

TBS Support

For any additional information please get in touch with TBS support:

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2 Legal and Safety Instructions

Allowed Applications

TBS products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of a TBS product can reasonably be expected to result in personal injury, death or severe property or environmental damage. TBS accepts no liability for inclusion and/or use of TBS products in such applications.

Inspection of goods received

If the packaging or product has been damaged in transport, or should you suspect that it may have a fault, the product must not be put into service. In this case, contact your TBS company representative.

Installation and Servicing

Installation, setup and servicing of our appliances must only be carried out by suitably trained personnel.

- Installation and electrical connections must only be made by correspondingly qualified specialists. The relevant national Electrical Engineers construction regulations must be observed.
- Setup and servicing must only be made by persons who have the know how to do so e.g. by reading the respective TBS manuals or attending TBS trainings / webinars.

When not otherwise stated, the following safety instructions apply:

- Installation and servicing of our appliances must be carried out when disconnected from the power supply, in particular appliances that are normally supplied by low-voltage current.
- It is prohibited to alter the device or to remove protective shields and covers.
- Do not attempt to repair an appliance after a defect, failure or damage, or to put it back into operation again. Please contact in such case your TBS company representative or the TBS hotline.

If there are still some points on which you are not entirely clear, please do not take a chance. All queries can be clarified by your TBS company representative, or by ringing the TBS hotline.

Disclaimers

TBS accepts no responsibility for any injuries or damage caused as a result of improper use.

Information in this document is believed to be accurate and reliable. However, TBS does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

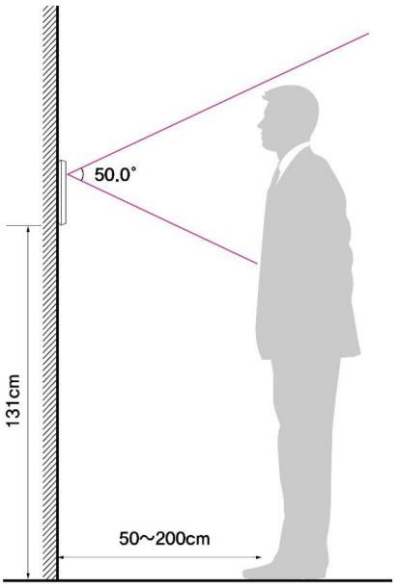
Should you discover any fault with the product or in its documentation, or have any suggestions for improvement, please confidently approach your TBS company representative or TBS hotline.

TBS reserves the right to make changes to information published in this document at any time and without notice.

3 Mounting and Installation

3.1 Recommended Mounting Information

- The recommended mounting height for the 3D FLASH+ is 131 cm (51 inches) from ground to the bottom of 3D FLASH+ (device mounted vertically, no tilting!).
- This relates to a person size of about 150 cm to 200 cm when scanning in the short distance; longer scanning distance means smaller and taller persons are within view as well.
- According to the typical size of the expect user group, you might adjust the mounting height up or down.
- Strong ambient light and / or direct light into the front side of the 3D FLASH+ should be avoided. Sunlight, halogen lamps or other strong illumination may reduce the performance of the 3D FLASH+ and may result in increased failure-to-capture rates or failed authentication events.
- The 3D FLASH+ was designed for indoor use only. The unit is not weatherproof and must not be exposed to water, ice, extreme temperatures, or other adverse weather conditions.



NOTE:
Installation in extreme environments without proper protection may cause permanent damage and voids warranty.

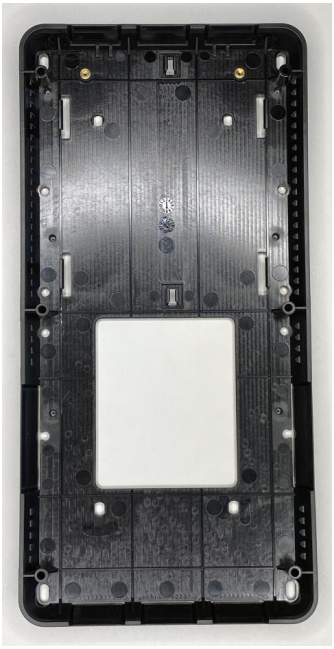
3.2 Prepare the Unit for Installation

- Place the 3D FLASH+ with the front down on a soft surface.
- Detach the metallic wall plate from the 3D FLASH+ by removing the two screws at the bottom of the unit. Separate the wall plate from the reader by lifting the plate upward. The screws will be re-used to attach the 3D FLASH+ to the plate following installing and wiring.

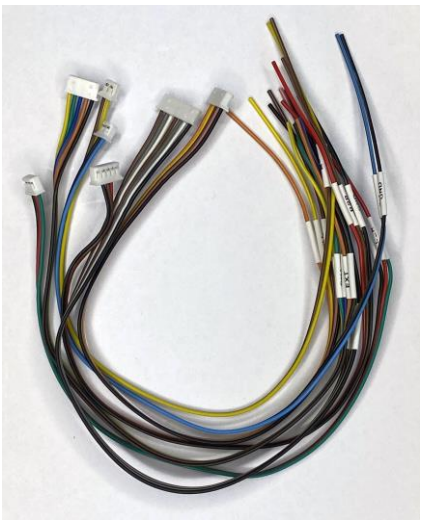
M2.5 x 5mm screw with Torx 8.
Can be replaced with security type screw.

3.3 Choose the Installation Type

- Installation can be accomplished by mounting directly to a wall (surface mount).
  You can choose your installation type from two versions: with or without backunit.
- A backunit is included in each package (first picture from the left below).
  When using it, first the backunit is mounted to the wall.
  Then the metallic wall plate is mounted on top of it, and the 3D FLASH+ can be secured back on it using the two bottom screws. The reader will then protrude further from the wall, allowing for ventilation.
  This version is recommended if a further upgrade with the fingerprint sensor module could be considered by the customer.



- The metallic wall plate can also be mounted directly on the wall, resulting in an installation as in the picture to the right above. On a flat surface, this installation looks slimmer, as the device then only extends 25 mm from the wall.
- The delivered package includes all required connection cables and mounting screws:

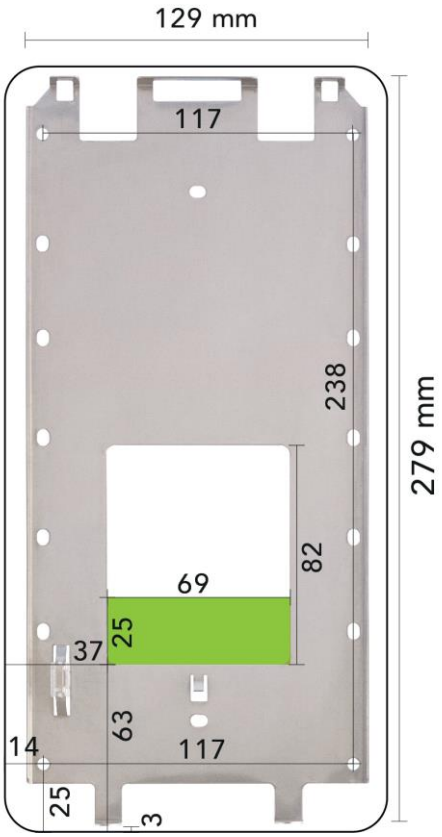


The 4 long screws are for mounting the backunit or wall plate to the wall
The 6 short screws are for mounting the wall plate on the backunit
The 2 metal thread screws are to secure 3D FLASH+ on the wall plate
The 2 distance screws are to mount an optional thermal sensor (not supported)

3.4 Direct Installation to Wall (without Backunit)

- Place the installation plate on the desired wall location and screw it into the wall as indicated in the Surface Mount diagram below. Please ensure that the bottom tab in the plate faces outward into the room and the cable routing opening in 3D FLASH+ (marked in green) matches the opening in the wall. Utilization of wall anchors is mandatory.

Backside view with wire connection pass through (power and LAN)



Front view of wall plate as mounted to the wall with outline of the reader. The bottom tabs face away from the wall. Lower edge of the reader is 3 mm lower than the lowest point of the plate.

Heads of the mounting screws should not protrude more than 5 mm from the wall plate and not be larger than 8 mm in diameter.

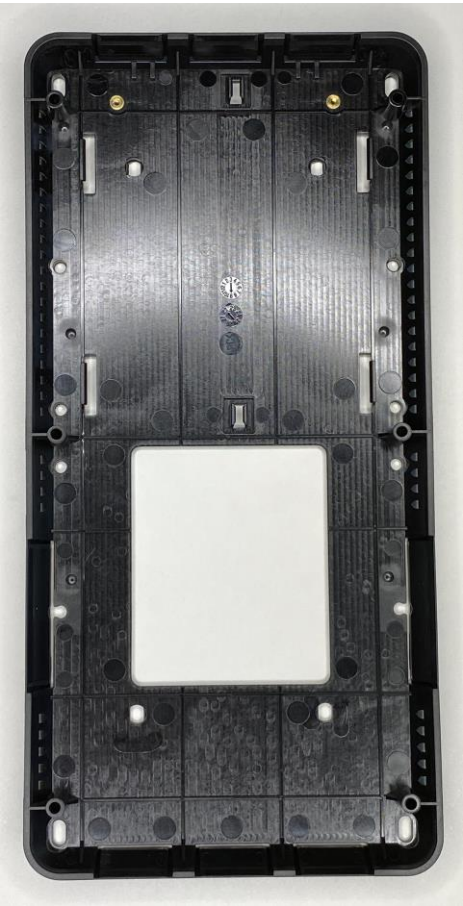
- To mount 3D FLASH+, slide the 3D FLASH+ into the wall plate from the top.
- Lock the 3D FLASH+ using the two M3 x 6mm screws on bottom. If required, replace the screws with security type screws.

3.5 Installation with Backunit

3D FLASH+ can be mounted on the backside unit, as described above.

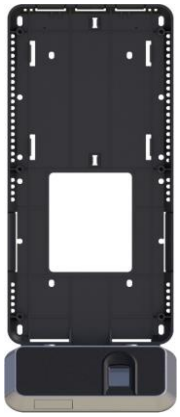
Please use the backunit directly to mark the drilling positions on the wall, and use the 6 large screws for installation.

Further details of dimensions will follow in a later update of this guide.



3.6 Installation with Fingerprint Recognition Sensor

3D FLASH+ can be equipped with an optional Fingerprint Recognition Sensor (FRS).



The installation steps for a new installation are:

1. Install the FRS to the wall. The backunit supplied with the 3D FLASH+ is not required.
2. Install the metal wall plate on the FRS with 6 screws.
3. Connect the USB plug from FRS to the 3D FLASH+, either of the two USB Ports can be used (see Figure 5).
4. Remove the grey plastic cover on the bottom of the 3D FLASH+ (tear it out).
5. Hook the 3D FLASH+ reader onto the metal plate and fix it with the 2 screws from below, as on the standard installation.
6. Power up the 3D FLASH+ and configure the reader using *DeviceConfiguration* web interface to set the desired operating mode.

A video for installation guidance will be linked in future updates.

Verification options to combine different ID factors will be developed on project request.

4 Power and Signal Wiring

4.1 3D FLASH+ Wiring Layout and Cables

This chapter describes the general wiring layout and the cables provided with the device.

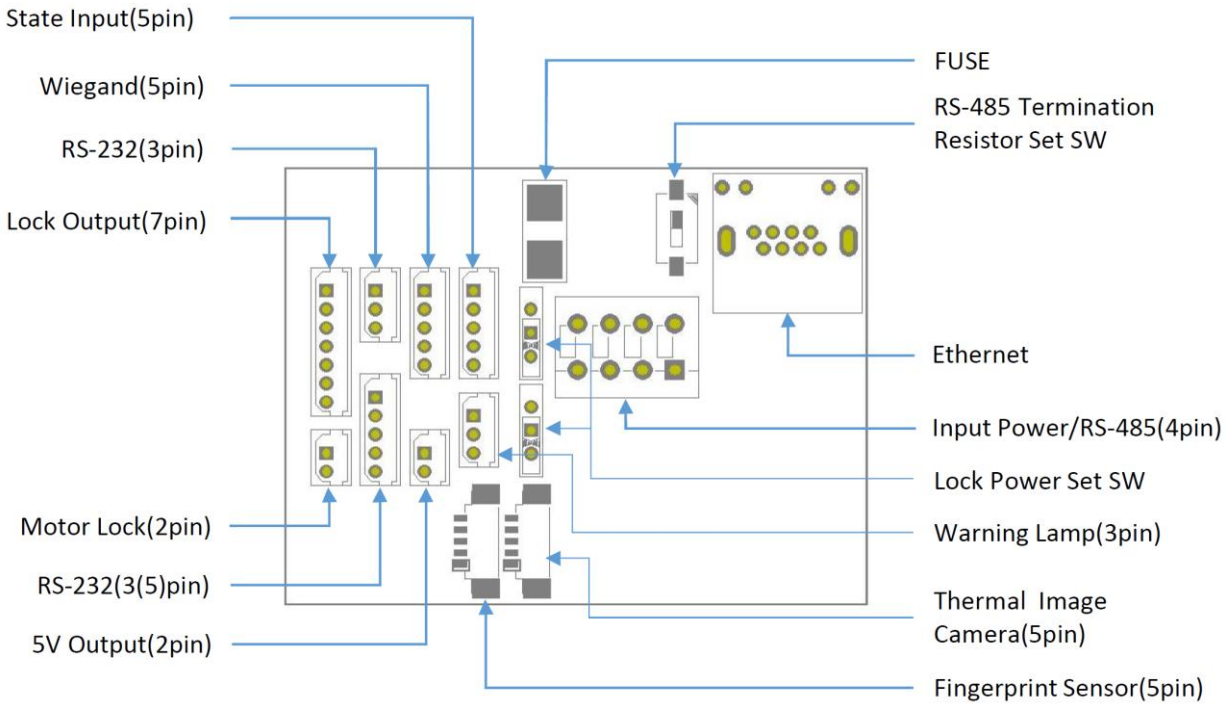
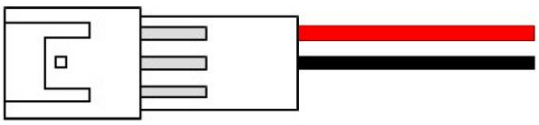


Figure: Overview of cable connections on the backside of 3D FLASH+

15V/24V Power Connection

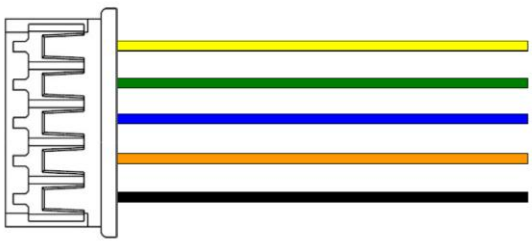


PIN	Function/Label	Color
1	Input Power/ 15V/24V	RED
2	Ground/GND	BLACK
3	nc	

5V Output Power Connection

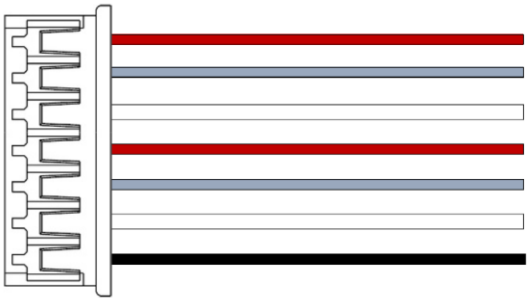
PIN	Function/Label	Color
1	5V Output/5V	SKY BLUE
2	Ground/GND	BLACK

State Input Connection



PIN	Function/Label	Color
1	Door Monitor 0/DM0	YELLOW
2	Door Monitor 1/DM1	GREEN
3	Door Monitor 2/DM2	BLUE
4	Inside Open/EXT	ORANGE
5	Ground/GND	BLACK

Lock Connection

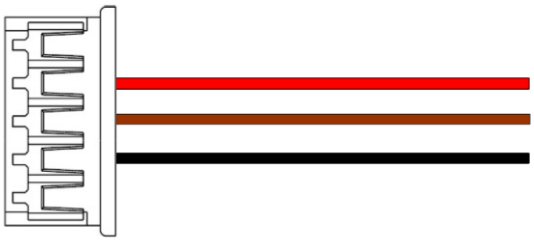


PIN	Function/Label	Color
1	Lock1 NC/L1NC	BROWN
2	Lock1 Com/L1C	GRAY
3	Lock1 NO/L1NO	WHITE
4	Lock2 NC/L2NC	BROWN
5	Lock2 Com/L2C	GRAY
6	Lock2 NO/L2NO	WHITE
7	Ground/GND	BLACK

Motor Connection

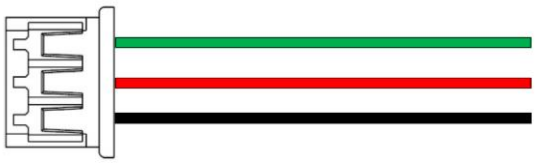
PIN	Function/Label	Color
1	Motor+ /M+	YELLOW
2	Motor- /M-	BROWN

RS-232 peripheral Device Connection



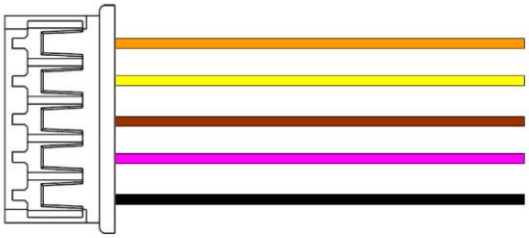
PIN	Function/Label	Color
1	nc	
2	RS232 TXD/R2T	RED
3	RS232 RXD/R2R	BROWN
4	Ground/GND	BLACK
5	nc	

Warning Lamp Connection



PIN	Function/Label	Color
1	Green Lamp/L_G	GREEN
2	Red Lamp/L_R	RED
3	Ground/GND	BLACK

Wiegand IN/OUT Connection



PIN	Function/Label	Color
1	Wiegand Out 0/WO0	ORANGE
2	Wiegand Out 1/WO1	YELLOW
3	Wiegand In 0/WI0	BROWN
4	Wiegand In 1/WI1	PINK
5	Ground/GND	BLACK

4.2 General Wiring Requirements

IMPORTANT:

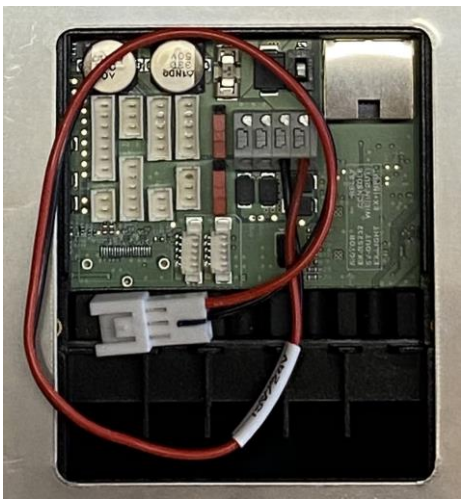
For all signal wiring, including ethernet cables, it is recommended to connect cables of less than 30m length to avoid surge current spikes that may damage the equipment.

The 3D FLASH+ requires at least the following wiring:

- Ethernet cable: Cat5 cable or better is recommended.
- Power input cable:
  - AWG 14 to 18: recommended
  - AWG 19 or 20: usable depending on the cable length (less than 10 meters)
- Power Input requirement: 15 – 24 VDC. The power consumption of the base device (with no fingerprint module attached) amounts to 12 W peak.
- The Power supply delivered by TBS provides 15 VDC @ 4A (60 W; PSU is included with the device)

IMPORTANT:

Use stable power supply and shorter power input cable if possible, with correct gauge wire.
Any over- or under-voltage applied to this unit may cause permanent damage and void the warranty.



The on-board wire terminals are located below the back cover of the terminal and are accessible after removing the screws of this cover.

To insert power cables into wire terminals please strip cable insulation off for ~5mm.

Use the cable set provided with the unit to connect serial interfaces.

NOTE:

Removing cables with force from the wire terminal may damage the wire terminal or the board. Unlock the latches before removing, otherwise wires can no longer be fixed, and board needs to be replaced. **This is not covered by TBS standard warranty!**

IMPORTANT:

Do not power the device before all cable connections are properly made. Otherwise, there is risk of damaging the device.

4.3 Power Supply Wiring Recommendations

TBS recommends using a AWG16 gauge and 15-24 VDC power supply. The voltage specified is the one measured on the product block connector: 15-24 VDC (-15% / +10%).

The voltage drop due to the cable shall be considered. Table 3 shows the maximum distance between power supply and one unique device, depending on cable gauge and power supply rating.

Table 1: Maximum cable length in meters between power supply and one TBS terminal

Wire Size		Maximum distance [m]	
mm^2	AWG	for 15 V ±10%	for 24 V ±10%
0.32	22	2	70
0.52	20	3	115
0.82	18	6	185
1.31	16	9	280

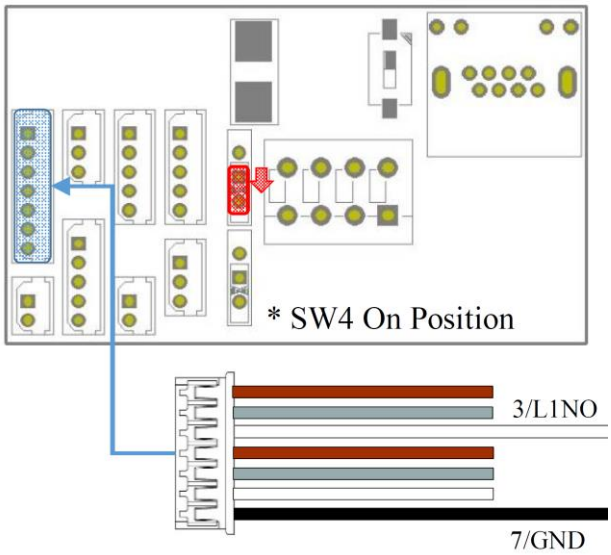
4.4 Ethernet Connection

For Ethernet connections, the wire terminal board provides a RJ45 LAN connector compliant with IEEE802.3at.

For connecting peripheral devices the cable should be of Cat5 or higher (it does not need to be crossed).

4.5 Integrated Relay

Depending on the 3D FLASH+ input voltage, set Switch 4 position to choose from 12 or 24 VDC.



DISCLAIMER:

On-board relays must not be used to activate security access equipment such as gates or doors to grant access to secure areas, as they can be accessed and bridged by an intruder. Only non-security critical functionality such as lights may be directly activated using the internal switch.

Instead, use the data communication capabilities of the device (ethernet, serial interfaces) to communicate to relays inside the secure area to activate security access equipment. For such, TBS offers two dedicated controllers.

4.6 Connecting TBS Controllers

For various applications TBS Terminals need to be connected with external controllers, e.g. to open a door. TBS offers two own solutions:

- TBS CONTROLLER SMART (4 relays, 4x GPIN, 4x GPOut, connected via RS-485 or LAN)
- TBS CONTROLLER LITE (RelayBoard with 2 relays, connected via RS-485)

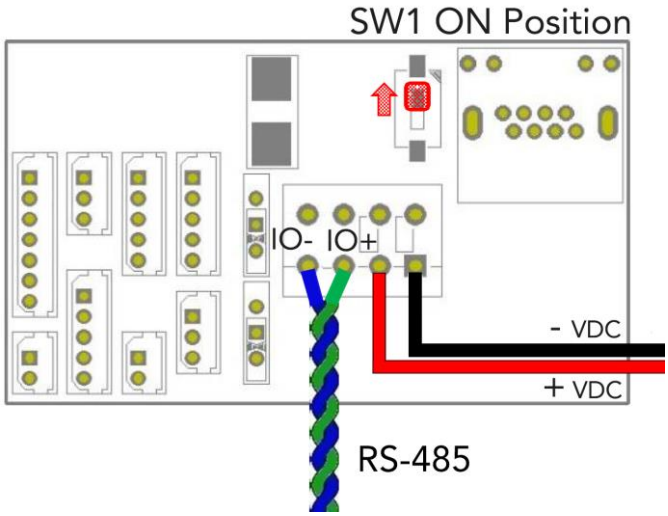
4.7 Connecting Third Party Controllers

4.7.1 RS485 Serial Interface

TBS recommends using RS485 and to protect communication using OSDP standard.

RS-485 cable can be connected up to 1.2 km length (when using AWG#24 twisted pair).

The RS-485 terminating resistor (SW1) must be set to ON for both products at both ends of the line.



Please connect from TBS device RS485 port directly to controller:

Label on TBS Terminal	Name	Type	Voltage Level
IO- (B-)	Data -	In/Out	0V-5V Bias (±7 V Offset)
IO+ (A+)	Data +	In/Out	0V-5V Bias (±7 V Offset)

For farthest terminal, a 120-Ohm resistor termination may be added outside the terminal between IO+ and IO-.

4.7.2 RS232 Serial Interface

Please connect from TBS device RS232 port directly to controller using the provided cable.

4.7.3 Wiegand Connection

Connection to 3rd party controllers can also be done via Wiegand interface. TBS devices offer Wiegand output lines supporting various standard formats (26 and 37bit).

The TBS terminal provides Wiegand OUT connections via the provided cable that can be directly connected to the corresponding 3rd party controllers Wiegand IN.

Label on TBS Terminal	Name	Type	Voltage Level
D0	Connection Zero	Out 1	Wiegand Out (5V TTL)
D1	Connection One	Out 2	Wiegand Out (5V TTL)
G	Ground		Ground for Wiegand

5 Appendix

5.1 Maintenance

Cleaning

Prior to disinfection the devices should be cleaned to remove dust or dirt.

Use warm water with a few drops of soap or a combined cleaning & disinfection liquid normally used to wash hands. Don't use aggressive detergents.

Use soft towels for cleaning only, don't use abrasive cleaning equipment.

Pay attention never to use aggressive chemical cleaning agents, as these could attack the plastic housing of the device.

Disinfection

TBS devices can be disinfected with antiseptic liquid, e.g. Sagrotan, Dettol or a similar disinfectant applied as a spray.

Function check

TBS terminals are designed for permanent usage. Therefore, problems in the operation of the devices are detected during regular usage. Special tests to check for correct functioning are therefore not required.

TBS recommends checking the integrity of the terminals at least every 6 months. If the devices are used in environments with dust or where oily substances are handled or other extraordinary environmental factors are present, the sensor surfaces need to be checked and cleaned with increased frequency.

Replacement Parts

When used in normal operation, no maintenance parts should be needed for 3D FLASH+.

5.2 Trouble Shooting

The following table provides brief description of device error codes and quick resolutions.

Error code	Description	Resolution
0	No error.	
1	General error.	
42	Sensor image caching (sensor returned two same images in a row).	
100	Unknown DB error.	
101	DB empty.	Add users or reload database from BioManager.
102	Database limit reached.	
103	DB corrupted.	Reload database from BioManager.
200	Unknown configuration error.	Verify the settings in DeviceConfig.
201	Wrong configuration set.	Verify the settings in DeviceConfig.
300	Unknown server communication error.	
301	Device blocked (Off Active flag on server).	Enable active flag on BioManager.
302	Device blocked remotely using RemoteControl interface.	
303	Device not connected to server (either wrong configuration or connection problems).	
304	Device not validated on server.	Validate the device on BioManager.
305	Device in non-operable state - DB reload in progress.	Wait for DB reload process to complete.

400	General HW error.	
401	Intrusion detected.	Resolve using DeviceConfig under Maintenance / Security / Intrusion Prevention page.
410	Unknown sensor error.	
411	Sensor lost from USB interface.	
412	Sensor incorrect behaviour - sensor thread stops etc.	
413	Wrong sensor configuration.	
414	Runtime sensor error.	
415	Sensor too long in pos. loop three times in row.	The sensor is continuously triggered either manually or by external light or object inside sensor cavity. Rectify the cause and re-power the device.
420	Unknown RFID error.	
421	RFID initialization failed.	Ensure that RFID module is connected.
422	RFID runtime error (e.g. communication with reader failed).	Shutdown and re-power the device.
423	RFID card reading error.	
430	Unknown Relay/GPIO error	
431	Relay/GPIO communication error	
440	General problem with external verification initiated from 3rd party software.	
441	Empty token comes from external device.	
500	General logic error.	
501	User presented card in smartmode and he does not have it allowed.	Enable RFID flag in 'Id factors' for user in BioManager.
600	Unknown profile set.	
601	Wrong profile configuration.	
602	Communication error in profile (e.g. with SmartController).	
701	Too many pending access infos (TnA records) in the cache (device offline for long time).	Verify the connection to XML or WE server.
702	Enrollment error appeared (e.g. due to UserID duplication reported by server).	Delete error user in Admin DB page and ensure duplicate UserID or PIN code is not enrolled again.
703	One or more enrollments are pending on device (device is offline).	Verify the connection to WE server.
800	Too old BSP version for current FW or BSP Unknown reported.	
900	Unknown (general) camera error.	
901	Camera service communication error.	Verify camera endpoint configuration in DeviceConfig and ensure camera service is running on server.
1000	General network error.	
1001	No Wifi signal.	
1002	Low Wifi signal.	

5.3 TBS port assignments

The following table lists all TCP/UDP ports that are used in TBS software and firmware as part of the biometric subsystem infrastructure.

In case an installation is not going to use all TBS components TBS offers, some of the available services will not be needed, and the respective ports do not have to be open.

Table: Port Assignments for BIOMANAGER ENTERPRISE installations (BME):

Machine	Port	Protocol	Comment	Inbound	Outbound
BME Server PC					
Secure device channel (1)	8808	HTTPS	default communication channel. BME installer sets required firewall settings by default	Yes	No
Biometric Client Service PC					
BME channel (1)	8808	HTTPS	communication channel to BME server and Device Control Center (DCC)	No	Yes
Enrollment API	8281, 8282, 8284	HTTP/S	communication channel between enrollment components.	Yes (2)	No
	8283	MQTT			
Enrollment PC					
BME channel (1)	8808	HTTPS	communication channel to BME server and Device Control Center (DCC)	No	Yes
Terminal					
BME On-Prem (1)	8808	HTTPS	communication channel to BME local server and Device Control Center (DCC)	No	Yes
BME CLOUD	443	HTTPS	communication channel to BME Cloud server	No	Yes
DeviceConfig	443	HTTPS	public web interface to configure devices	Yes	No
DeviceControl	8200	HTTPS	public interface to remotely control devices	Yes	No

(1) Can be customized during installation

(2) Ports are bound only to localhost

5.4 References to other TBS documents

TBS 3D FLASH+ Mounting and Installation Guideline

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/i1FHUoF0OSwfTrV

The QR code printed on the product opens this link, leading to the 3D FLASH+ product folder from where this manual is available.

TechNote 'TN 3D FLASH+ Getting Started'

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/pnzUHTbmIQDybHW

The reader can be equipped with a fingerprint sensor for two-factor biometric verification of users. This TechNote explains all configuration options in detail.

TBS Terminal Firmware

https://biometrics.talentlms.com

TBS Partner Portal with full product documentations and access to latest firmware for terminals. Access is restricted to registered TBS Partners.

TBS System Requirements

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/q8V3hzrLyR0Mnyg

Summarizes the prerequisites a site needs to offer regarding server & network to host a TBS installation.

TBS Enrollment with 3D FLASH+

Permanent link: *follows in a later update of this guide*

Description of the two available enrollment options, comprehensive manual for TBS system operators.

TBS Short instruction - Biometric Enrollment on 3D FLASH+

Permanent link: *follows in a later update of this guide*

One-pager providing guidance for the local enrollment process to TBS system operators.

TBS Manuals for TBS System Operators (Endusers)

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/JBNh6zAMJbRQoZD

Access all published manuals for TBS system operators, including the above short instructions.