3D FLY Mounting and Installation Guideline

Document TBS-060

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Release	Author	Comment
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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 FLY.

TBS Support

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

email: support@tbs-biometrics.com
phone: +41 (55) 533 2000

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 calling the TBS hotline.

WASTE DISPOSAL: This symbol means to not dispose of your product with your other household waste. Instead, you should protect the environment and human health by handing over the marked equipment to a designated recycling facility or an electrical and electronic waste collection point.

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.

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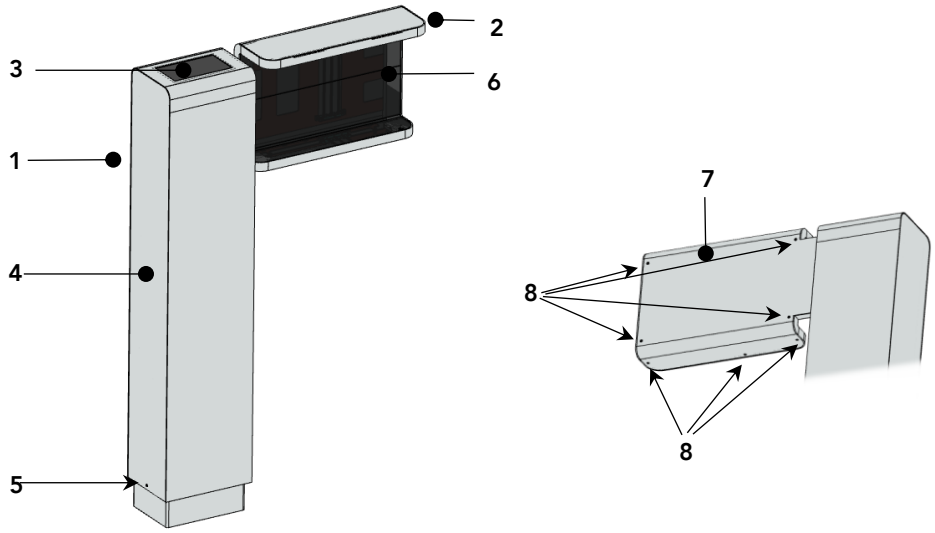
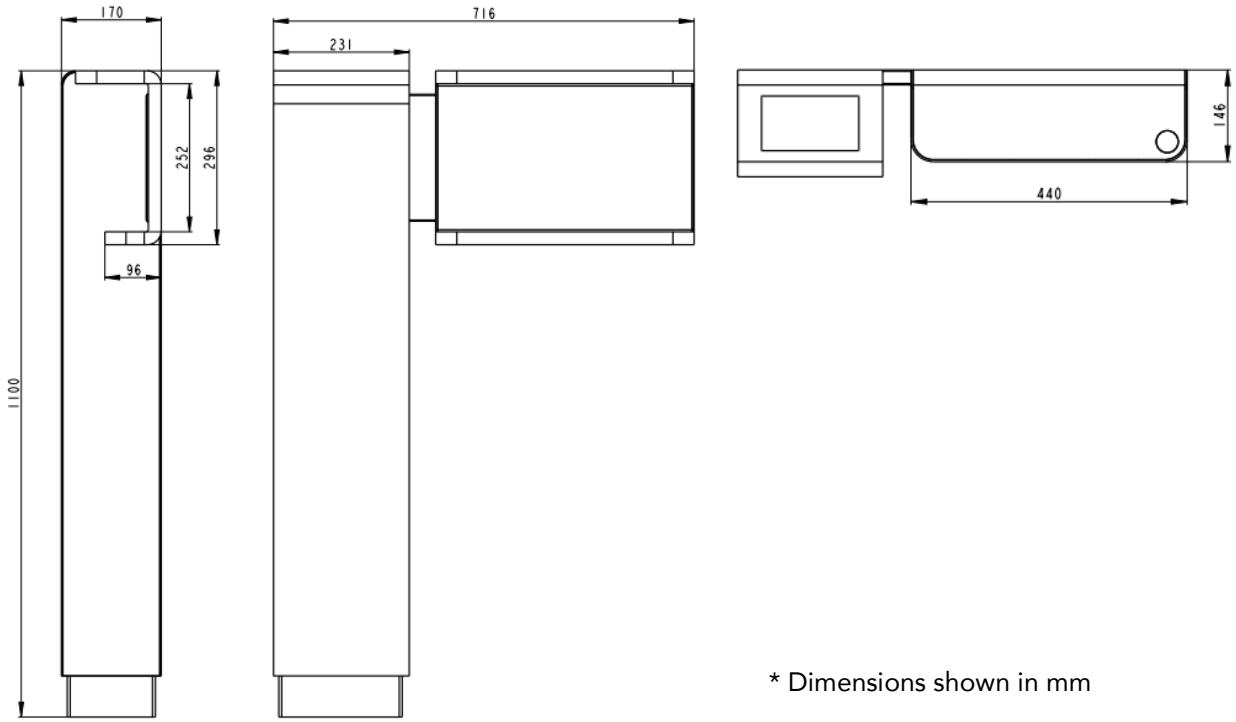
3 3D FLY Acquisition Gate

3.1 Components



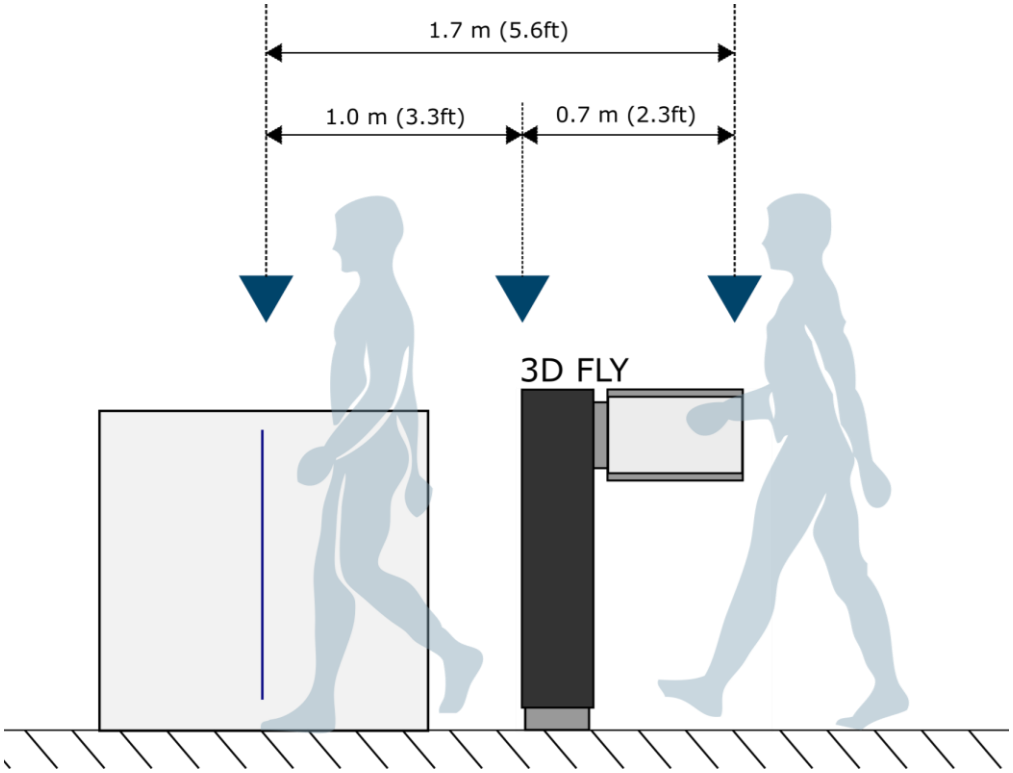
1. Main Pillar
2. Sensor Arm
3. Display
4. Pillar Back Panel
5. Pillar Back Panel Screw
6. Capture Area
7. Sensor Arm Back Panel
8. Sensor Arm Back Panel Screws (7 screws)

3.2 Dimensions



* Dimensions shown in mm

3.3 Recommended Configuration



- The TBS 3D FLY is a floor mounted device for fast biometric authentication during normal walking. The device is designed such that the access verification is performed within one second without the person having to stop. Therefore, the recommended mounting position is at least 1.0m- 1.5m in front of the access gate.
- The sensor arm of the 3D FLY is designed to be comfortably reachable by an average adult when walking, while considering the variation in height of different people. The capture area is located at the height of 95 cm.
- Strong ambient light and / or direct light into the sensor window of the 3D FLY should be avoided. Sunlight, halogen lamps or other strong illumination may reduce the performance of the 3D FLY and may result in failed authentication events.
- The 3D FLY was designed for indoor use only. This unit is not weatherproof and must not be exposed to water, ice, extreme temperatures or other adverse weather conditions.
- The device operates with hazardous line voltage. When servicing internal parts of the device, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against electric shocks.

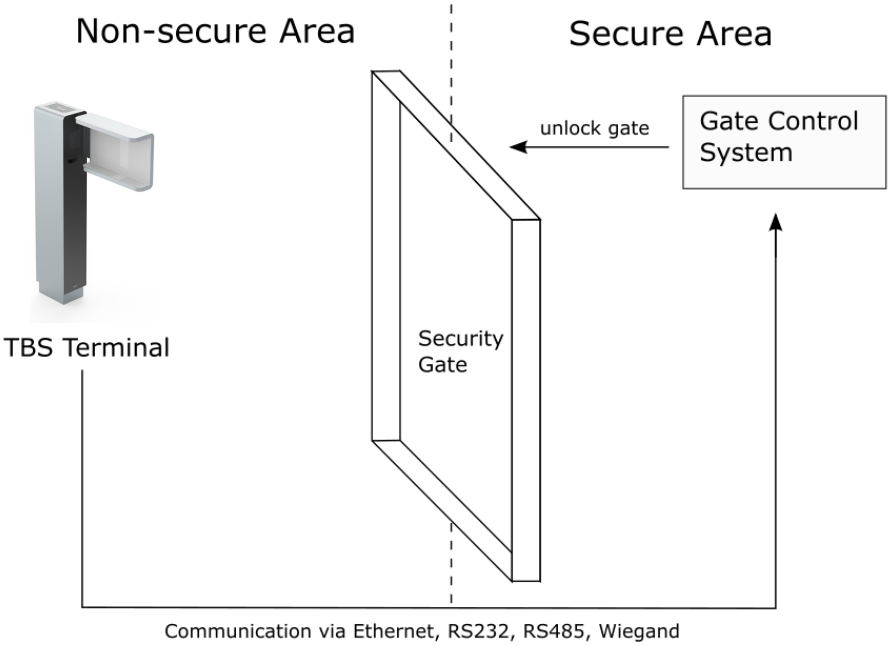
WARNING:

Excessive force acted upon the sensor arm may damage the device. The maximum weight exerted on the sensor arm from the top must not exceed 30 kg.

4 Mounting and Installation

4.1 Recommended Configuration

The recommended configuration for installation is to connect the TBS terminal, mounted in the non-secure area, via Ethernet, RS232, RS485 or Wiegand interfaces to the gate control system, located in the secure area.



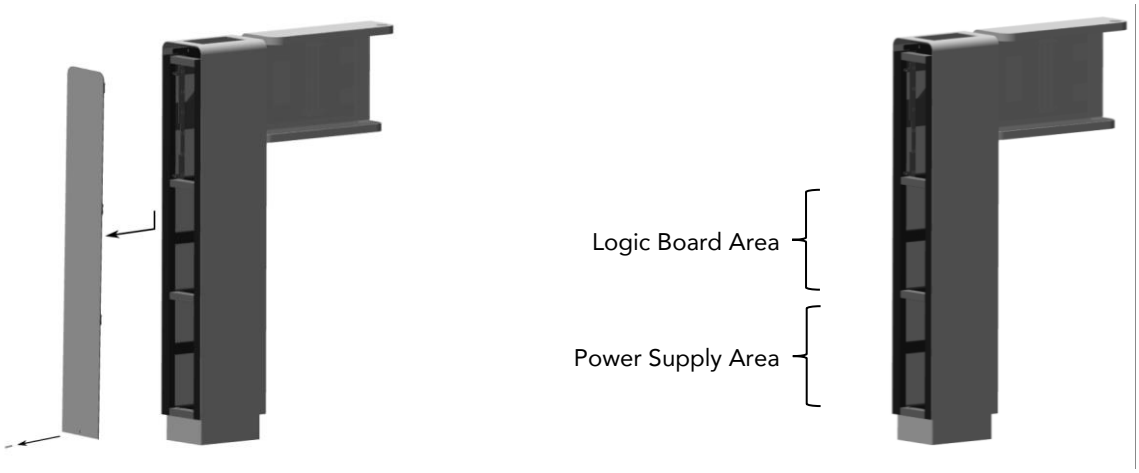
- The standard installation environment must meet these requirements:
  - Operating temperature -20 to +60 °C
  - Relative humidity 10 to 90%
  - Indoor environment

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

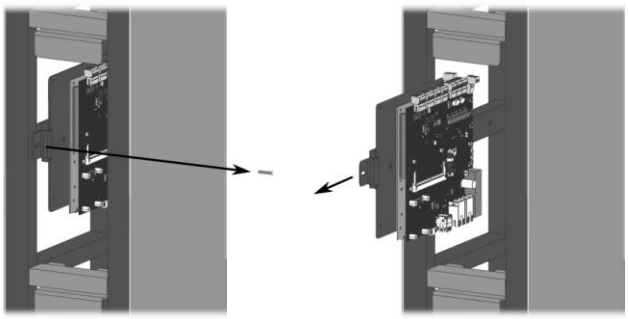
4.2 Accessing The Device

All the wire terminal connectors for power and signal wiring are inside of the pillar. To access the wire terminals, the back cover can be removed. Remove the back cover screw located on the bottom side of the panel. Then, slide the cover down about 2 cm. Now it can be removed without resistance.

The electronics inside the pillar are separated into two parts. The main power supplies are mounted in the lower area. The main board with all data connections is in the upper area.



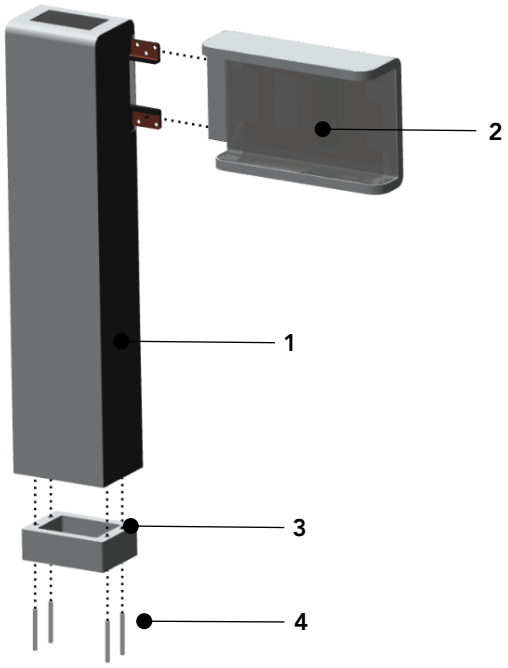
For simplified access, both the power supply and the main board are mounted on drawers that can be pulled out. To remove a drawer, first remove its securing screw. The drawers are designed such that they allow for servicing of parts even when not fully pulled out.



4.3 Mounting and Assembly

The 3D FLY is a stand-alone floor mounted terminal that consists of a pillar and arm assembly. The pillar should be bolted to the floor using four M12 bolts and is supported by a floor spacer. All electrical and data wiring terminals are accessible from the back or the side of the pillar.

The arm consisting of the trigger sensor and lighting assembly can be inserted into the main pillar once it is safely fixed to the ground. Connections to the internal wiring terminals are located inside the main pillar.



1. Main Pillar
2. Sensor Arm
3. Floor Spacer
4. M12 Threaded Mounting Rods (not included)

Assembly and mounting of the device are done at the same time. Please proceed with the following steps:

1. Secure four threaded rods (ideally M12 size) on the floor
2. Pull the floor spacer over the threaded rods
3. Place the main pillar on top of the floor spacer and secure it to the bolts using four nuts (ideally M12 size, fitting to the bolts used in Step 1)
4. Slide the sensor arm onto the main pillar and fasten the 7 hex screws

NOTE:

It is strongly recommended that the installation is performed by 2 persons. The device parts are large and unstable until properly secured in the assembly. A falling part may not only get damaged but may also cause injury.

4.3.1 Preparation

IMPORTANT:

Make sure that all power sources for the device are turned off before installation.

Before mounting the device, make sure of the following points to achieve an optimal installation of the device:

- The mounting strength of the terminal depends on the solidity and material of the floor. Make sure to use an appropriate method to anker the mounting bolts for the type of floor you are mounting the device on.
- Make sure to leave sufficient space in the floor underneath the installation for the passage of cables.
- Make sure that the installation floor is completely flat, to allow a nice and proper mounting.

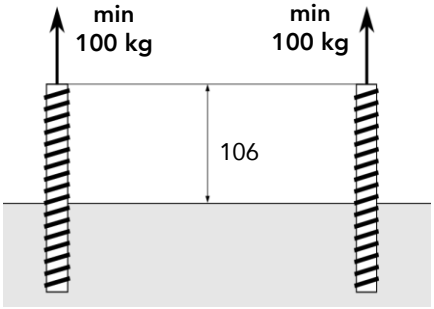
4.3.2 Mounting the bolts in the floor

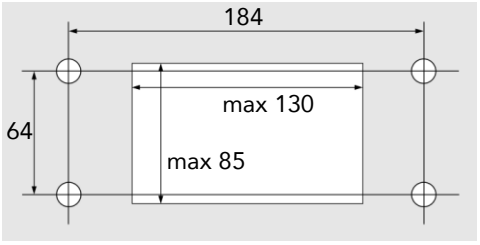
To mount the device directly to the floor, four threaded bolts (ideally of size M12) need to be secured such that each bolt can hold a pulling force of at least 100 kg along its axis. The bolts need to be spaced according to the schematic below.

Both power and signal cables are routed through a square hole of 85 x 130 mm size in the centre of the floor spacer to the inside of the pillar.

NOTE:

Depending on the floor material and composition it is recommended to use appropriate screw anchors or chemical adhesives to make sure the bolts hold the required minimum pulling force of 100 kg in the direction of the main axis.

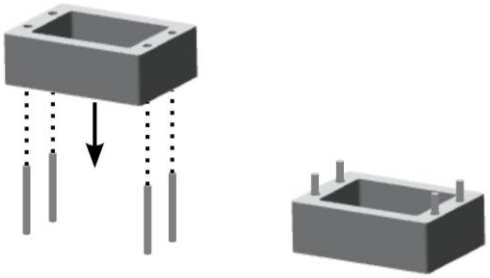




* Dimensions shown in mm

4.3.3 Adding the floor spacer

The floor spacer can be placed over the bolts. The tip of the bolts should exceed over the height of the spacer by at least 20 mm, as the main pillar will be secured to them with M12 nuts.



At this point, it is recommended to thread the cabling through the floor spacer. Route main power cable (optionally also a UTP network cable with RJ45 connector or other signalling cables for serial interfaces or relay switches) through the cable channel in the floor space. Inside of the main pillar you will need approx. 50 cm of power cable and approx. 75 cm of signal cables. The cables are wired to wire terminals once the main pillar is fixed to the bolts.

4.3.4 Mounting the Pillar

Detach the back cover by removing one torx 10 screw that is located towards the bottom. Slide the cover down by about 2 cm. Now it can be removed without resistance.

NOTE:
While handling the pillar before mounting, it is recommended to lay it on a soft pad, front glass facing down to avoid scratches or damage.

Place the aluminium base of the pillar on the bolts and route the cables through the bottom opening. Attach the pole to the pedestal using the provided washers and M12 nuts using the included 19 mm wrench.

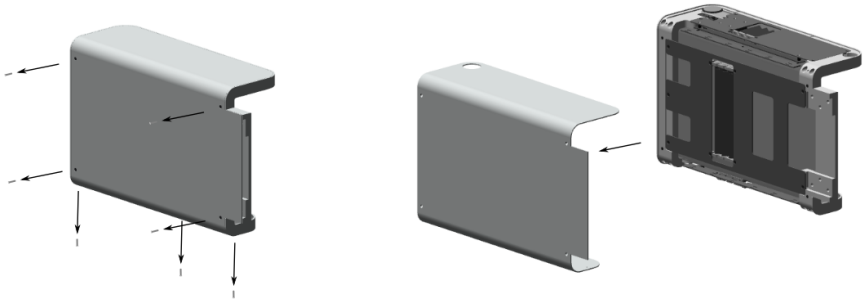
After securing the pillar to the bolts, connect the cables to the power supply and the main board (signal cables). Make sure that the wires are connected according to the description in Section 5.

4.3.5 Attaching the Sensor Arm

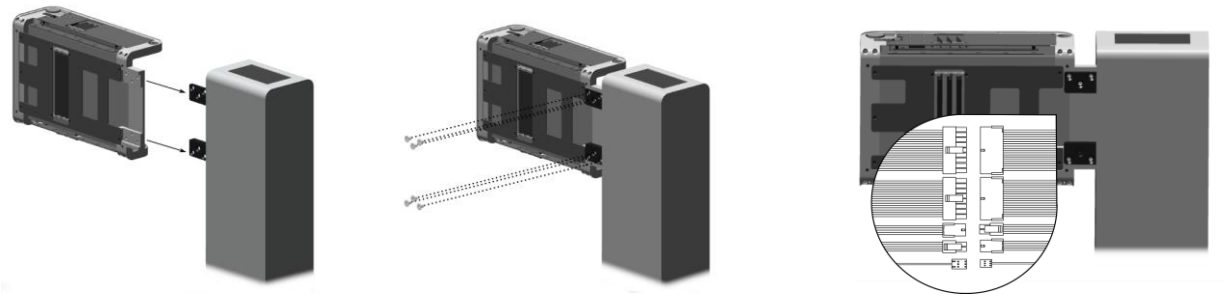
Once the pillar is securely mounted to the bolts on the floor, the sensor arm can be attached. The sensor arm is designed such that it can slide onto two metal extensions at the side of the pillar.

NOTE:
While handling the sensor arm before mounting, it is recommended to lay it on a soft pad to avoid scratches or damage.

First, the back cover of the sensor arm needs to be removed. This can be achieved by removing seven torx 10 screws. Four screws are on the back side of the sensor arm, three on the underside.



Second, the sensor arm can be attached to the pillar by sliding it over the metal extensions. The arm then needs to be secured with six 5mm hex screws to the pillar.



Third, connect the sensor cables to the pillar. There are 5 connectors coming from the back side of the sensor arm:

1. 4 Pin Molex Male
2. 4 Pin Molex Female
3. 16 Pin Molex Male
4. 18 Pin Molex Male
5. 4 Pin Single Row Molex SL Male

Connect these connectors to the respective plugs in the pillar. Attach the back cover back to the sensor arm (reverse the first step above).

NOTE:

Make sure that all cables and plugs connecting the sensor arm electronics to the pillar are securely stowed between the structural parts of the assembly before attaching the back cover. Loose wires may get damaged when they are squished between the back panel and the frame.

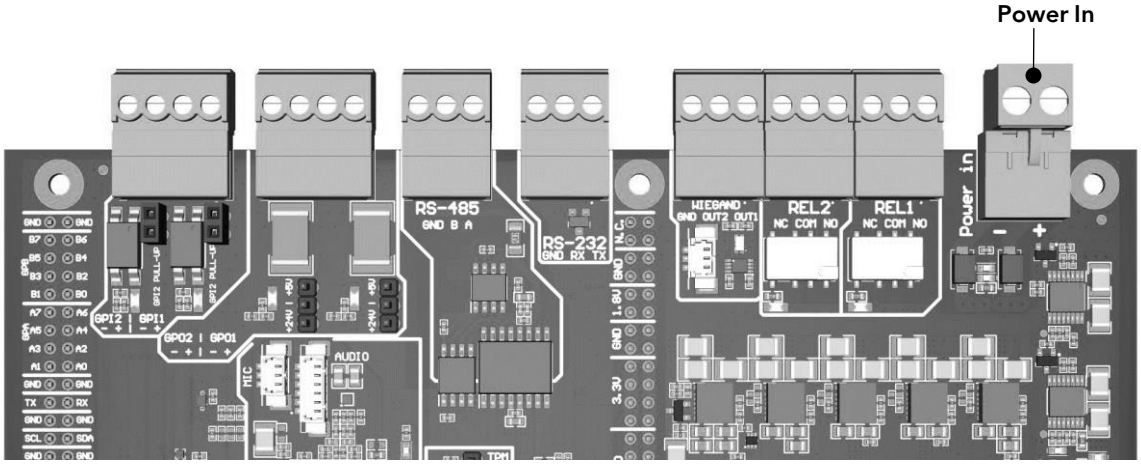
5 Power and Signal Wiring

IMPORTANT:

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

5.1 Power Supply

To power the device, we require a 24 VDC source to be connected to the assigned terminal on the main board. The source should be able to deliver at least 220 Watt to handle peak performance.



Wire Terminal Marking	Type	Specifications
Power in -	Ground	
Power in +	Power	24 VDC 9.2 A

NOTE:

The power cable must be accessible externally to enable power cycling of devices. The terminal has no switch built in to do this directly on the device itself.

5.1.1 Wiring Recommendations

We recommend using a AWG16 gauge and 24V DC power supply with at least 9.2A of current. The voltage specified is the one measured on the product block connector: 24V (-15% / +10%).

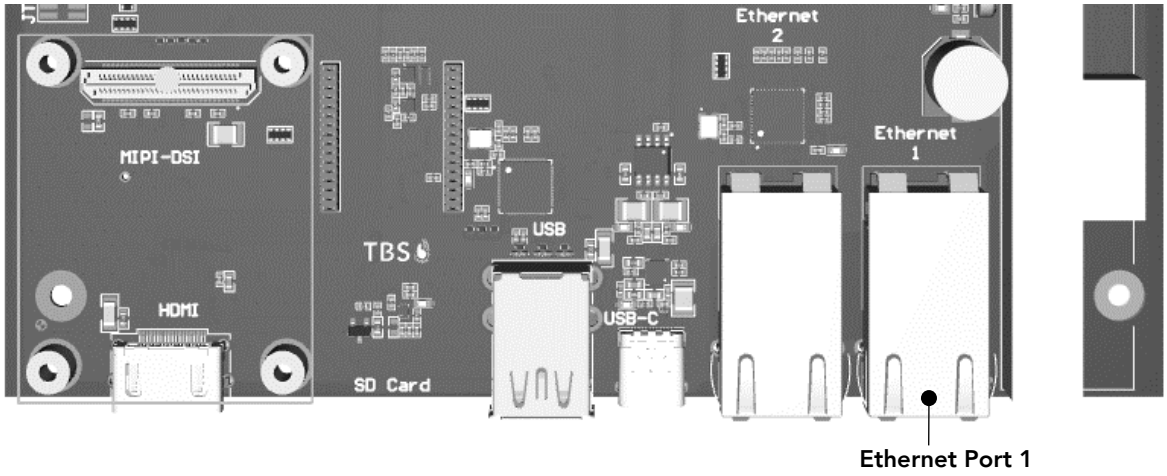
The voltage drop due to the cable shall be considered. Table 3 shows the maximum distance between power supply and one unique device, depending on cable gauge and power supply rating.

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

mm^2	AWG	for 24 V ±10%
0.32	22	70
0.52	20	115
0.82	18	185
1.31	16	280

5.2 Ethernet Connection

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



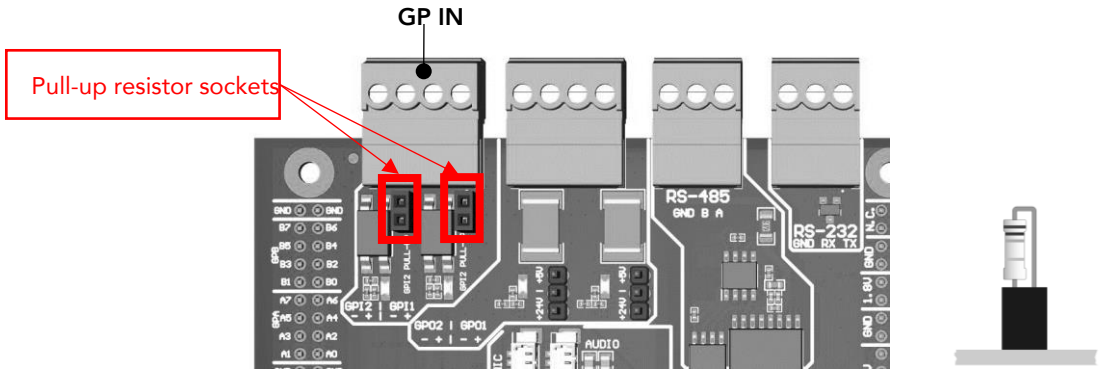
For connecting peripheral devices, the used cable should be of Cat5 or higher, and does not need to be crossed.

NOTE:
The Ethernet Port 2 is deactivated and should not be used.

5.3 General Purpose Inputs Outputs

5.3.1 General Purpose Inputs

There are two general purpose inputs available on a detachable wire terminal block. These inputs can be used for interconnection with a door monitoring switch, a request to exit button or other equipment. The inputs are optionally activated either by grounding the input line or by applying a voltage to the input line. For each input independently, the desired operating mode is set by adding an axial-lead 0.25W type resistor into the socket on the mainboard, or, respectively, removing it.



Socket	Effect
resistor added	the input is activated by grounding the line
no resistor	input is activated by applying a voltage (9-30V DC)

WARNING:
The correct resistor value needs to be properly calculated not to damage neither 3D FLY electronics nor the connected equipment.

GP IN pull-up resistor	Input Configuration	Input activated by
without	Standard	0 VDC logical low 5-30 VDC logical high
installed	Input with selectable pull-up resistor value*	ground line

* I = maximum current [A] for the device connected to the input
GP IN pull-up resistor value R = I * 105

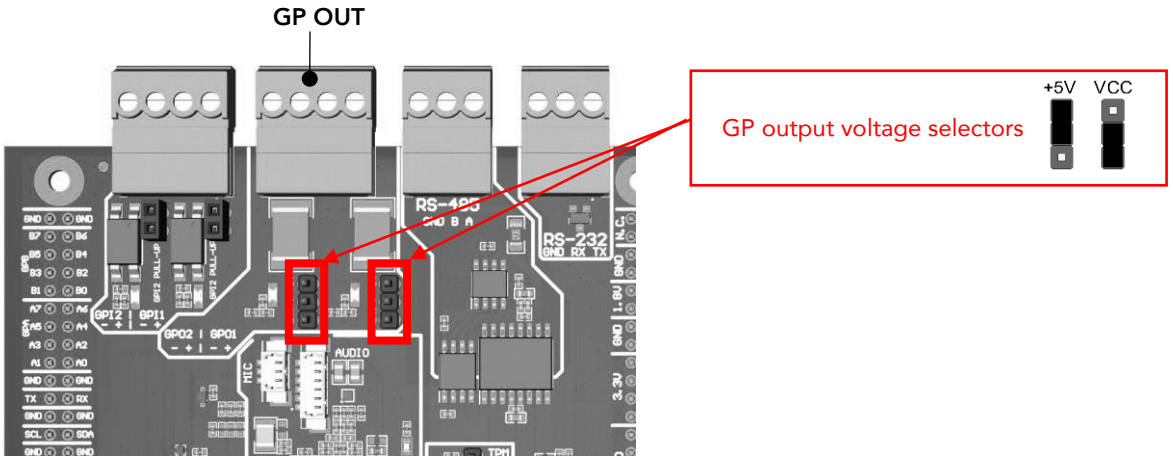
If none of the GP IN pull-up resistors are connected, GPIN works in standard configuration, with 0V logical low, and 5-30V logical high.

NOTE:
It is recommended to connect ground for reference.

Terminal Label	Wire Label	Power Rating
GPI1	+	0 VDC logical low 5-30 VDC logical high
	-	Ground
GPI2	+	0 VDC logical low 5-30 VDC logical high
	-	Ground

5.3.2 General Purpose Outputs

The device is equipped with two general purpose outputs on a detachable wire terminal block. These outputs can work with two voltage levels, 5 VDC or VCC voltage (a voltage supplied to POWER input or 12V in case of PoE power).



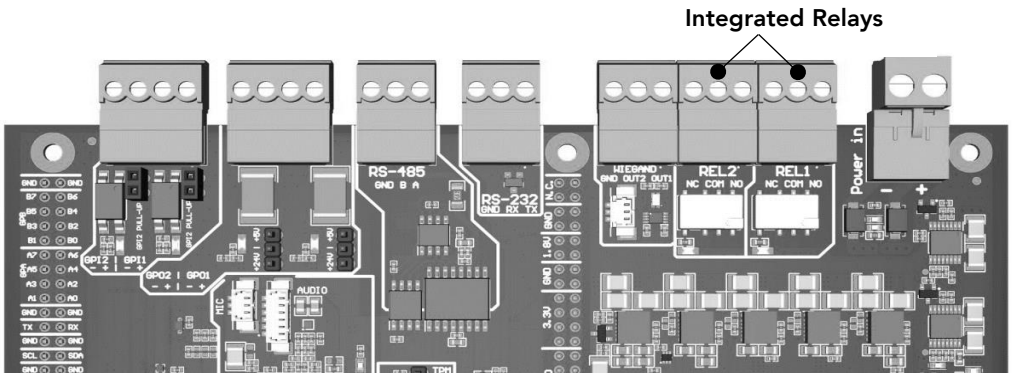
5 VDC level is set by default. To utilize the VCC voltage level, switch the jumper position of the respective voltage selector on the mainboard.

Terminal Label	Wire Label	Voltage Level
GPO1	+	0V Low - (VCC or 5V) High
	-	Ground
GPO2	+	0V Low - (VCC or 5V) High
	-	Ground

The maximum current on each output is limited to 200 mA @5V / 50 mA @24V.

5.4 Integrated Relays

There are two relay switches on the main board with a NO/NC switching contact available on the detachable wire terminal blocks.



Terminal Label	Wire Label	Usage	Power Rating	
REL1	NC	Normally Closed		
	COM	Common	30 V DC	2 A
	NO	Normally Open		
REL2	NC	Normally Closed		
	COM	Common	30 V DC	2 A
	NO	Normally Open		

DISCLAIMER:

The on-board relays should 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.

Use the data communication capabilities of the device (ethernet, serial interfaces) to communicate to relays inside the secure area to activate security access equipment.

5.5 Connecting TBS Controllers

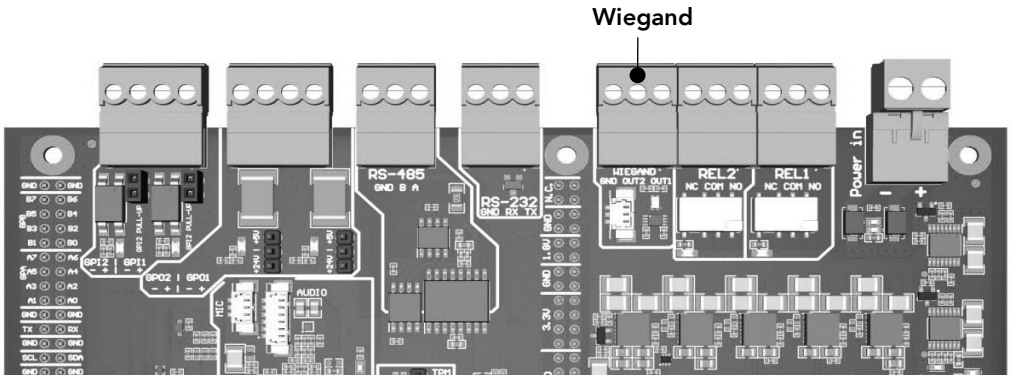
For various applications TBS Terminals need to be connected with external controllers, e.g. to open a door. TBS offers two own solutions:

- TBS CONTROLLER SMART (4 relays, 4x GPIN, 4x GPOut, RS-485 or LAN)
- TBS CONTROLLER LIGHT (2 relays, RS-485)

5.6 Third Party Controllers

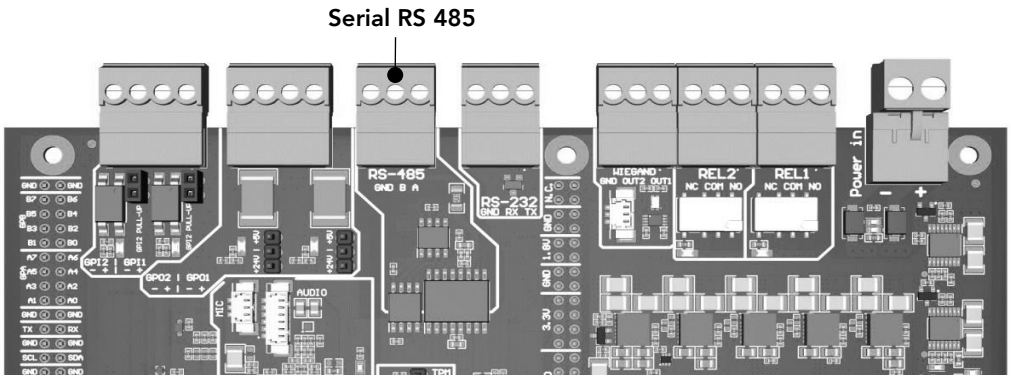
5.6.1 Wiegand Connection

Connection to 3rd party controllers is very often done via Wiegand interface. TBS devices offer Wiegand output lines supporting various standard formats (26 and 37bit). Wiegand OUT connections that can be directly connected to the corresponding 3rd party controller Wiegand IN.



Terminal Label	Wire Label	Name	Type	Voltage Level
WIEGAND	OUT1	Connection Zero	Out	Wiegand Out (5V TTL)
	OUT2	Connection One	Out	Wiegand Out (5V TTL)
	GND	Ground		Ground for Wiegand

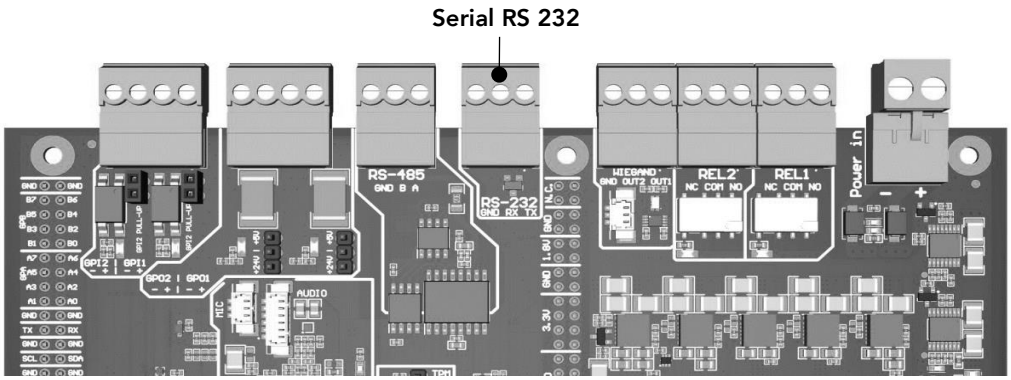
5.6.2 RS-485 Serial Interface



The device is equipped with an RS-485 serial interface on a detachable terminal block. There is no RS-485 bus termination resistor switch or socket on the device. Should such a resistor be required in the installation, please connect its leads to the wire terminal block.

Terminal Label	Wire Label	Name	Type	Voltage Level
RS-485	A	Data +	In/Out	-7 V to +12 V
	B	Data -	In/Out	-7 V to +12 V
	GND	Ground		

5.6.3 RS-232 Serial Interface



The device offers one serial RS-232 interface on a detachable terminal block to connect external controllers or other devices. The interface does not feature hardware flow control lines.

Terminal Label	Wire Label	Name	Type	Voltage Level
RS-232	TX	Transmit Line	Out	+3 to +15 V
	RX	Receive Line	In	+3 to +15 V
	GND	Ground		

6 Appendix

6.1 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.

Parts of the device are covered by a acrylic glass. Pay attention never to use aggressive chemical cleaning agents; these could attack plastic coatings around the sensor or the device itself.

Disinfection

TBS devices can be disinfected with antiseptic liquid, e.g. Sagrotan, Dettol or a similar disinfectant applied using a dry cloth. Please do not spray directly on the device, as it may get damaged that way.

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 sensor surfaces and openings 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.

6.2 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 error.	
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.	

6.3 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.

Port Assignments (current series12 terminals):

Machine	Port	Protocol	Comment	Inbound	Outbound
WebEdition (WE) Server PC					
Device channel	80	HTTP	default communication channel (SOAP needs to be enabled in firewall settings, if deep inspection mechanisms are used)	Yes	No
Secure device channel	443	HTTPS	optional secure communication channel (SOAP needs to be enabled, see above)	Yes	No
Biometric Client Service PC					
WE channel	80/443	HTTP/S	communication channel to WE server and Device Control Center (DCC)	No	Yes
Enrollment API	8281, 8282, 8284	HTTP/S	communication channel between NT service and JavaScript component	Yes (1)	No
Enrollment PC					
WE channel	80/443	HTTP/S	communication channel to WE server and Device Control Center (DCC)	No	Yes
Series12 terminal					
WebEdition	80/443	HTTP/S	communication channel to WE server and Device Control Center (DCC)	No	Yes
DeviceConfig 1/2	443	HTTPS	public web interface to configure devices	Yes	No
DeviceControl	8200	HTTPS	public interface to remotely control devices	Yes	No
RemoteControl	8220	HTTPS	internal interface to remotely control devices, incl. enrollment	Yes	No
RemoteEnroll (2)	8282	HTTPS	internal interface required for remote enrollment	Yes	No
TBS Hello	8789	UDP	required to detect TBS devices	Yes	Yes
TBS TAILGATE	8008	TCP	required to reach TBS TAILGATE	No	Yes
Terminal Updater PC					
UDP channel	47815	UDP	required for remote firmware update	Yes	No
TCP channel	47816	TCP	required for remote firmware update	Yes	No
TBS TAILGATE					
UDP channel (3)	1133	UDP	required for scanning sensors	No	Yes
TCP channel	8008	TCP	for communication with TBS terminal	Yes	No
TCP channel	443	HTTPS	for communication with TBS terminal	Yes	No

(1) Ports are bound only to localhost

(2) Port is not mandatory in FW 2.xx since DCC channel is used for enrollment

(3) PC where the sensor management tool is running should have this port open for inbound

6.4 References to other TBS documents

TBS 3D FLY Mounting and Installation Guideline

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/k42YFeTxcAzxxbT

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

TBS Terminal Firmware

https://biometrics.talentlms.com

TBS Partner Portal with full product documentation 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 FLY

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/S3PSUK6jCCML9RD

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

TBS Short instruction - Biometric Enrollment on 3D FLY

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/yN84gaxyDTx8v5L

Provides guidance for the enrollment process to TBS system operators.

TBS Manuals for TBS System Operators (Endusers)

Permanent link: https://cloud1.tbs-biometrics.com/index.php/s/w8wpye4QroasY8E

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