



2D SENSE Mounting and Installation Guideline

Document TBS-032 for TCOM400 board revision 02



NOTE: The latest version of this document is always available at:
<https://cloud1.tbs-biometrics.com/index.php/s/nihEFQvY0vuDdns>

Revision	Author	Comment
October 22, 2021	AG/TO	First Release
April 13, 2022	AG/TO	Name change from 2D TERMINAL to 2D SENSE
June 8, 2022	AG/TO	Updated installation environment
December 23, 2022	AG	Added Wiegand 3.3V limitation

Content

Chapter	Page
1 Introduction	3
2 Legal and Safety Instructions	4
3 Declarations of Conformity	5
3.1 European Union (CE) regulatory notices.....	5
3.2 USA (FCC) regulatory notices	5
3.3 Canada (IC) regulatory notices.....	5
4 Mounting and Installation	6
4.1 Recommended Configuration.....	6
4.2 Accessing The Device	7
4.2.1 Opening the Device	7
4.2.2 Closing the Device.....	8
4.3 Mounting Instructions	9
4.3.1 Preparation	9
4.3.2 Wall Mount Terminal	9
4.3.3 Flush Mount Terminal.....	10
5 Power and Signal Wiring.....	11
5.1 Electrical Connection and Cabling.....	11
5.2 Power Supply	12
5.2.1 Wiring Recommendations	13
5.2.2 Power on Ethernet.....	13
5.3 Ethernet Connection.....	13
5.4 General Purpose Input Output	14
5.5 Integrated Relay.....	15
5.6 Connecting TBS Controllers.....	15
5.7 Connecting Third Party Controllers	16
5.8 Tamper Switch	18
6 Appendix	19
6.1 Maintenance.....	19
6.2 Trouble Shooting	19
6.3 TBS Port Assignments.....	21
6.4 References to other TBS documents	22

1 Introduction

The TBS 2D SENSE brings Access Control and Time & Attendance applications featuring biometrics to a new level. It combines highest security with user convenience and the most flexible configuration options on the market.

This installation manual provides information and instruction for the 2D SENSE. The product is available as flush mount or wall mount option.

Table 1: Product Models available for 2D SENSE

Terminal Class	Mounting Option	RFID Card Reader Option	Model Number
2D SENSE Capacitive sensor	Wall Mount PVC	none	TBS-032-std-wm
		HID iClass	TBS-032-icl-wm
		HID PROX	TBS-032-pro-wm
		Legic, Mifare Classic or Desfire	TBS-032-lem-wm
	Flush Mount IP54	none	TBS-032-std-fm
		HID iClass	TBS-032-icl-fm
		HID PROX	TBS-032-pro-fm
		Legic, Mifare Classic or Desfire	TBS-032-lem-fm

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 ringing the TBS hotline.



WASTE DISPOSAL: This symbol means do 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.

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

3 Declarations of Conformity

3.1 European Union (CE) regulatory notices



Products bearing the CE marking comply with one or more of the following EU Directives as may be applicable:

- EMC directive 2014/30/EU
- REACH Directive 1907/2006
- RoHS Directive 2015/863/EU

Compliance with these directives is assessed using applicable European Harmonized Standards.

2D SENSE is intended to be used for professional application only (buildings, airport...).

This is an EMC Class A product according to EMC directive 2014/30/EU. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcast. The full Declaration of Conformity is available on demand to your reseller. Please, provide him the product model name or its Regulatory Model Number (Model on the label).

3.2 USA (FCC) regulatory notices



The 2D SENSE complies with FCC 47 CFR Part 15B. 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.

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

Touchless Biometric Systems AG
Rietbrunnen 2
8808 Pfäeffikon
Switzerland

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to FCC 47 CFR Part 15B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

3.3 Canada (IC) regulatory notices



WARNING TO USERS IN CANADA / ATTENTION POUR LES UTILISATEURS AU CANADA

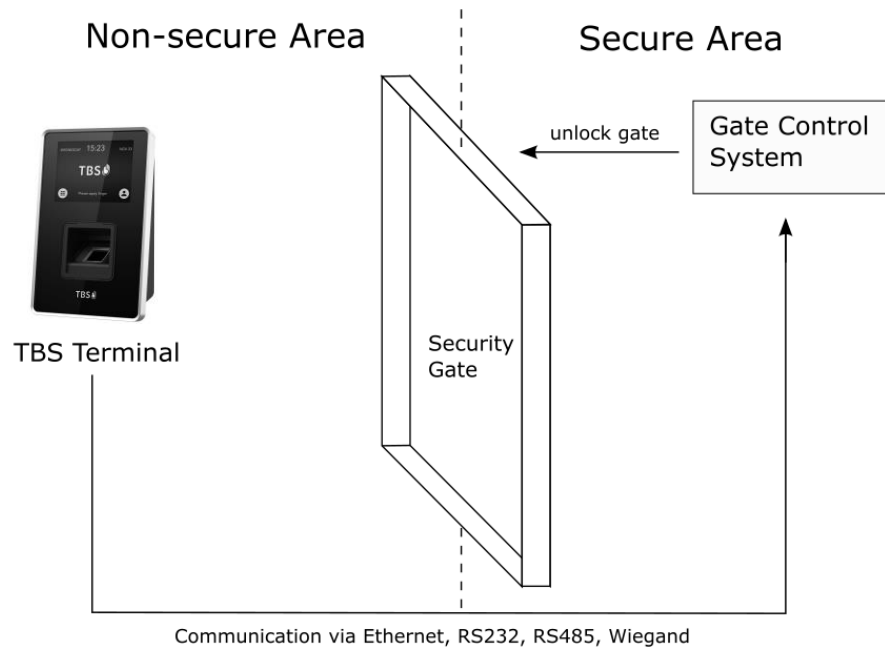
The 2D SENSE complies with ICES 003: 2017 and 2016. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le 2D SENSE est conforme à la norme ICES 003 : 2017 et 2016. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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%
 - Outdoor device use is not compliant with UL294
- Terminals with standard PVC wall mount box (TBS-032-WM variants) are designed for indoor use only. This box is not weatherproof and must not be exposed to water, ice, extreme temperature, direct sunlight, or other adverse weather conditions.
- Terminals with standard flush mount box (TBS-032-FM variants) are rated IP54. This box is designed for use in protected outdoor areas such as shaded entrances or refuges. This box is not suited to be directly exposed to water, ice, extreme temperatures, direct sunlight, or other adverse weather conditions.

NOTE:

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

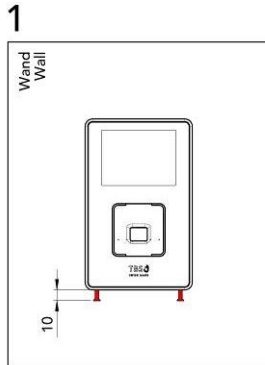
4.2 Accessing The Device

The terminal can be accessed by opening two screws on the bottom and removing the front panel. The process is the same for both mounting variants (wall mount, flush mount)

4.2.1 Opening the Device

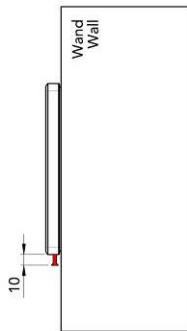
IMPORTANT:

Always disconnect power supply before opening terminals.



Unlock

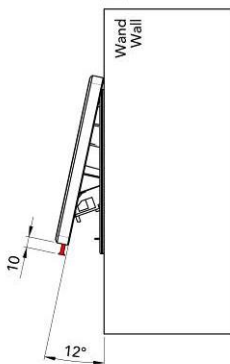
Unscrew both screws (red) with Allen wrench (size 2) by ~10 mm



2

Open

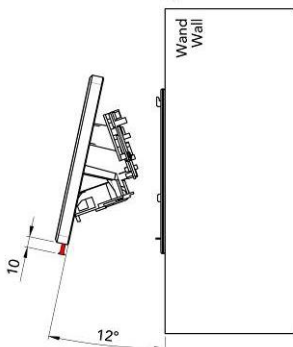
Lift up bottom part to have it angled ~12° from vertical axis, then carefully slide upwards. Please do not press hard!



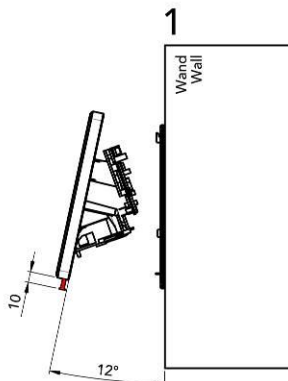
3

Remove

Remove device carefully from back cover.
Remove cables if required.

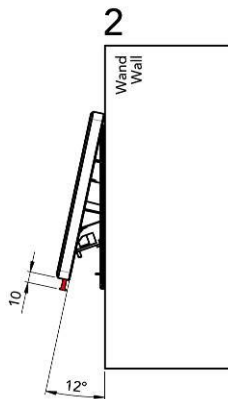


4.2.2 Closing the Device



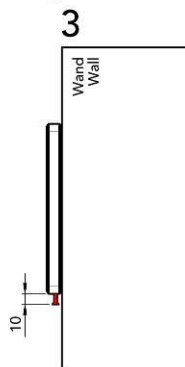
Align and position

Unscrew both screws (red) with Allen wrench (size 2) by ~10 mm



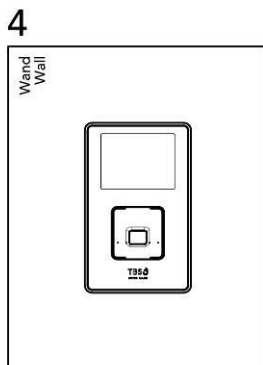
Hook in

Hook in device to back cover at the top. Keep device angled ~12° from vertical axis



Close

Slightly press bottom part towards back cover



Lock

Screw both screws with Allen wrench (size 2) into device. Be careful not to overtighten the screws, this is not necessary and may mean that they cannot be loosened later.

IMPORTANT:

Please do not press hard! Take care of cabling, cables must not press on electronic boards!

To avoid destruction and electrical shorts please ensure no cable or metal parts press against the electronic boards inside the device!

Please keep cables inside the device as short as possible. Do not feed other cables through device!

4.3 Mounting Instructions

4.3.1 Preparation

IMPORTANT:

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

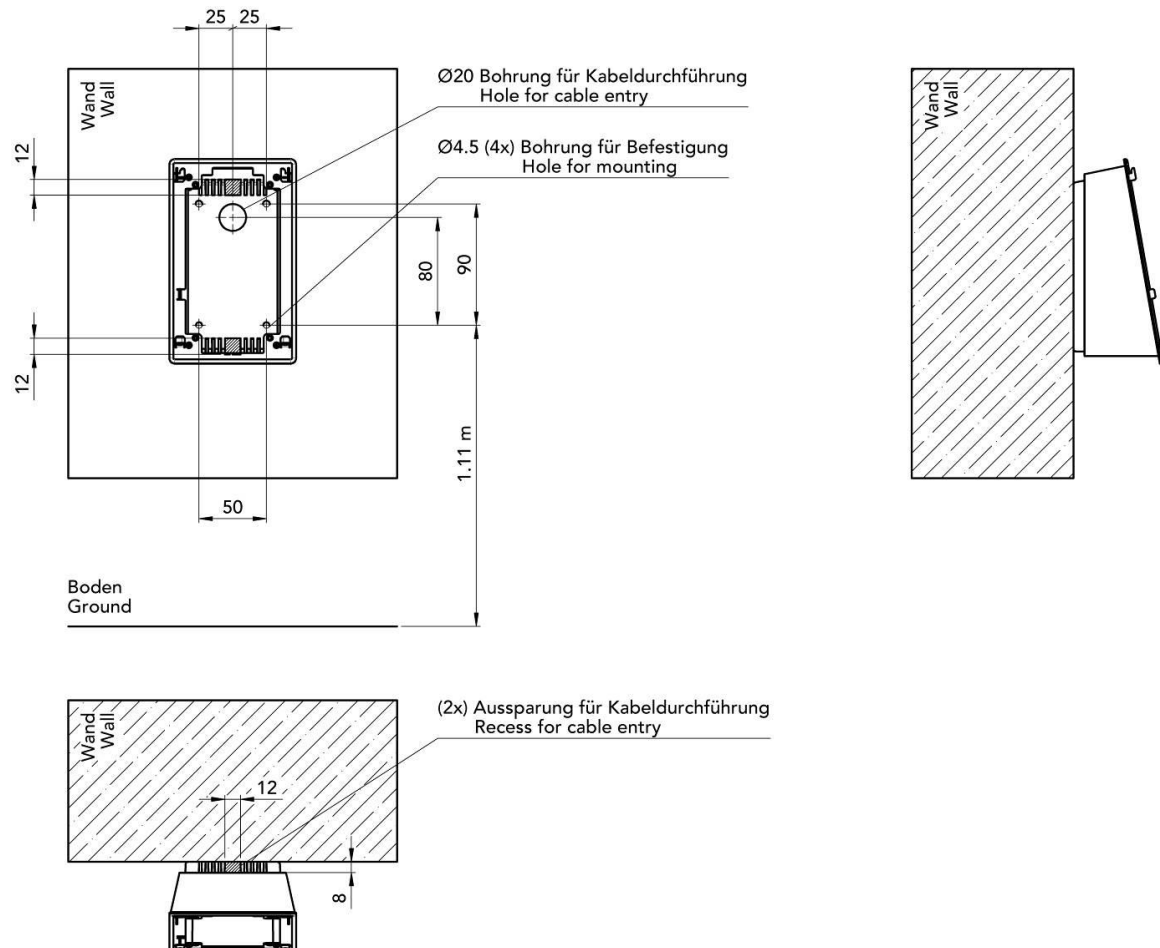
Before mounting the device, make sure of the following points to achieve an optimal installation:

- The mounting strength of the terminal depends on the solidity and material of the wall. Make sure to use an appropriate method to anchor the mounting screws such as raw plugs.
- Make sure to leave sufficient space in the wall behind the installation for the passage of cables.
- Make sure that the installation wall is completely flat, to allow a nice and proper mounting. TBS provides very accurately manufactured enclosures that only fit to the mounting box if no obstacles are present between the wall and the terminal front.

4.3.2 Wall Mount Terminal

The following equipment and tools are required for mounting the wall mount variant.

- Four ø4-5mm screws and fitting raw plugs suitable for the wall material (not included)
- One screwdriver appropriate to drive the above screws
- One drill with a drill bit of an appropriate diameter for the above raw plugs
- One Allen wrench (size 2) screwdriver to open the terminal

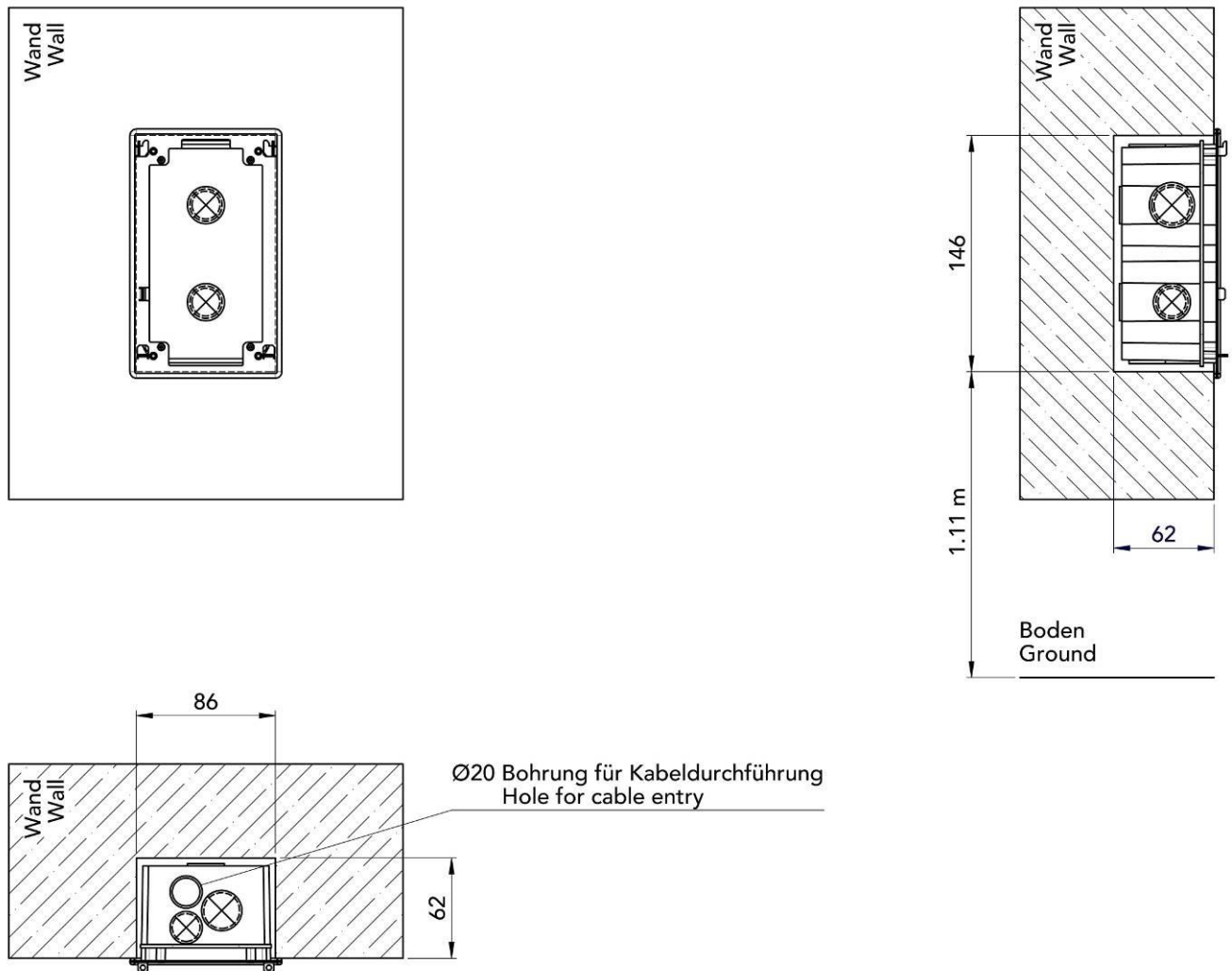


The recommended mounting height of the terminal is 1.11 m, measured from the floor to the lower screw holes of the back cover.

4.3.3 Flush Mount Terminal

The following equipment and tools are required for mounting the flush mount variant.

- Four ø3.5mm screws and fitting raw plugs suitable for the wall material (not included)
- One screwdriver appropriate to drive the above screws
- One drill with a drill bit of an appropriate diameter for the above raw plugs
- One Allen wrench (size 2) screwdriver to open the terminal



The recommended mounting height of the terminal is 1.11 m, measured from the floor to the lowest part of the flush mount cover box.

IMPORTANT:

It is strongly recommended to use upper cable duct. Please do not use cable ducts marked ⊗ (see above).

5 Power and Signal Wiring

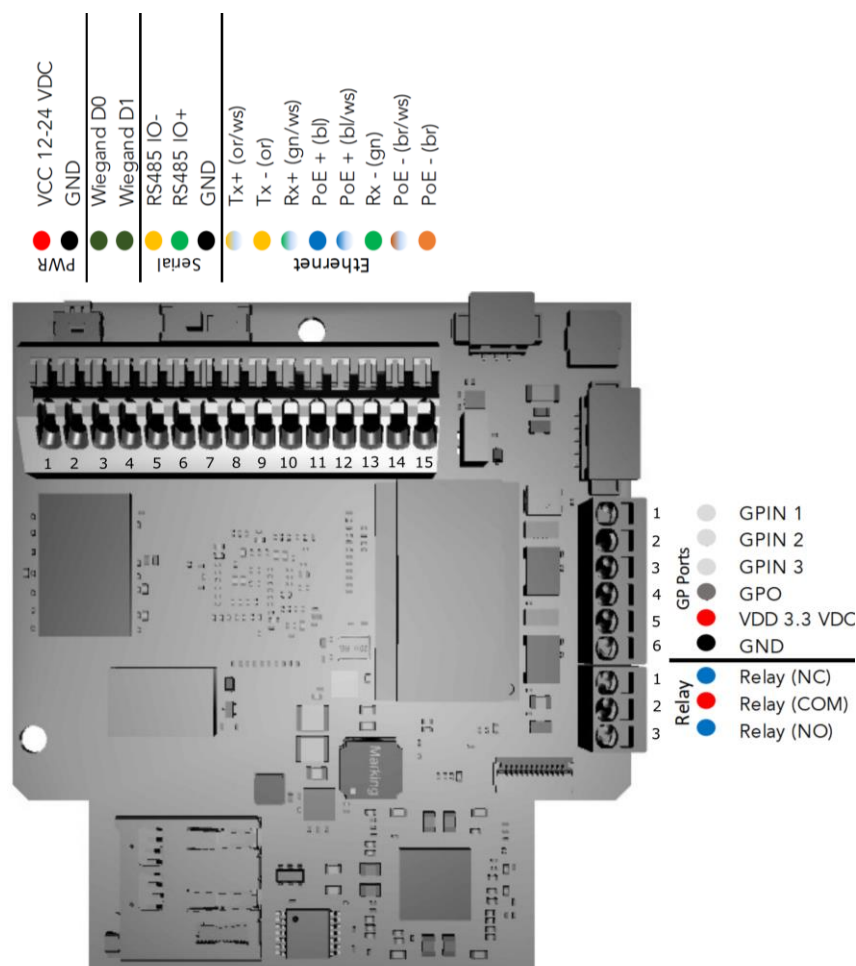
IMPORTANT:

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 Electrical Connection and Cabling

Since Q3/2021 all TBS 2D SENSE are equipped with 'TCOM400' boards. An adhesive tag marks the installed board type.

The on-board wire terminals are located on the main board of the terminal and are accessible after separating the front and back panels.



IMPORTANT:

For GPIN 1-3 the VDD 3.3 VDC can be used.

For serial interface, connect 'Serial GND' to GND of your controller.

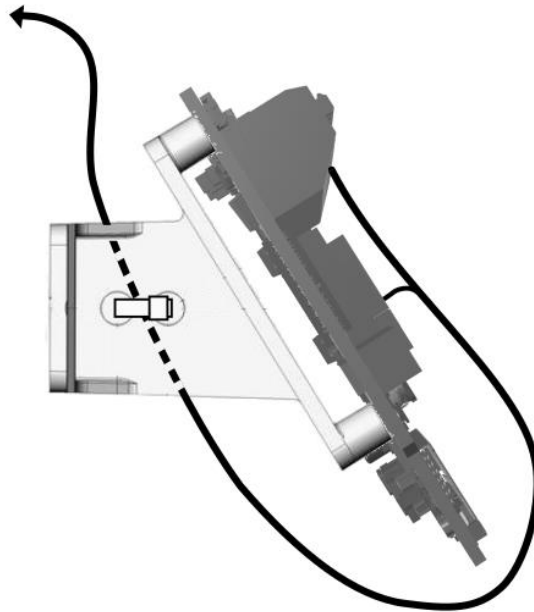
Do not power the device before all cable connections are properly made. Otherwise, there is risk of damaging the device.

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!**

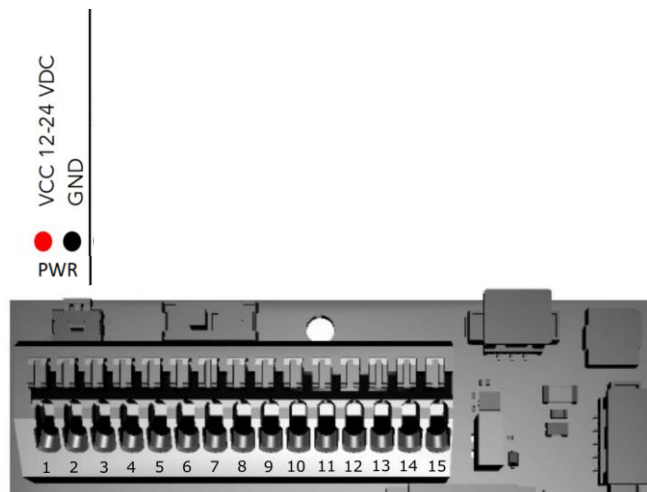
To relieve any installed cables from undesired stress on the wire terminals, the following strain relief method can be employed. All cables leading out from the terminals should be routed down over the board and then underneath and through the mounting bracket out.

There are two separate holes in the mounting bracket that allow to fixate the cables with a zip tie.



5.2 Power Supply

Power and ground shall be supplied to the PWR wire terminals located on the top.



Wire Terminal Number	2D SENSE Label	Type
1	VCC 12-24 VDCC	Voltage
2	GND	Ground

5.2.1 Wiring Recommendations

We recommend using a AWG16 gauge and 12-24V power supply when PoE supply is not used. The voltage specified is the one measured on the product block connector: 12V-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 2: Maximum cable length in meters between power supply and one TBS terminal

Wire Size		Maximum distance [m]	
mm ²	AWG	for 12 V \pm 10%	for 24 V \pm 10%
0.32	22	2	70
0.52	20	3	115
0.82	18	6	185
1.31	16	9	280

5.2.2 Power on Ethernet

Power supply to the 2D SENSE can also be provided by Ethernet (Power over Ethernet mode - IEEE802.3at type 2 compliant). TBS recommends using an ethernet cable of Cat5e standard or higher.

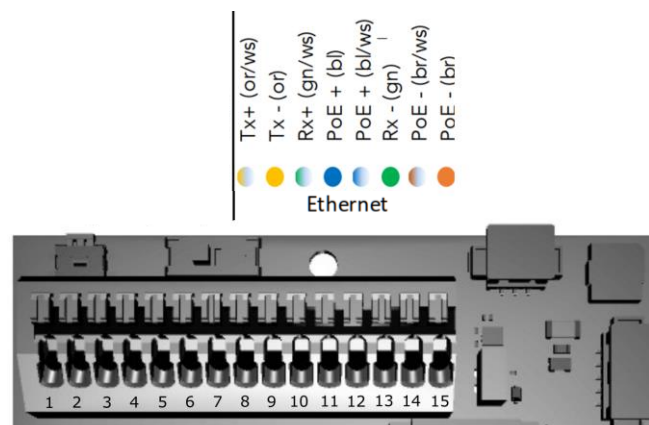
The terminal may be powered via a UL 294 compliant PoE power injector or switch. According to the PoE standard two modes are available: power on data pins and power on dedicated pins. Use either one of these modes depending on PoE implementation on your local Ethernet network.

NOTE:

If several terminals are powered through the same PoE switch, make sure the switch can provide enough power to each device (minimum 5 W per device).

5.3 Ethernet Connection

For Ethernet connections, the wire terminal board provides LAN connectors compliant with IEEE802.3at. The strands of the cable need to be individually inserted into the wire terminal according to the table below.

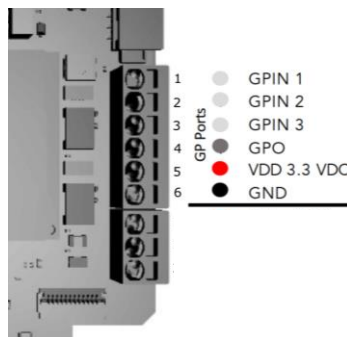


Wire Terminal Number	2D SENSE Label / Wire Standard	Standard Wire Color	
8	Tx+	orange/white	
9	Tx-	orange	
10	Rx+	green/white	
11	PoE +	blue	
12	PoE +	blue/white	
13	Rx -	green	
14	PoE -	brown/white	
15	PoE -	brown	

NOTE:

The coloring of the individual cable strands may vary from cable type to cable type. Make sure that you are connecting them according to the ethernet cable labels.

5.4 General Purpose Input Output



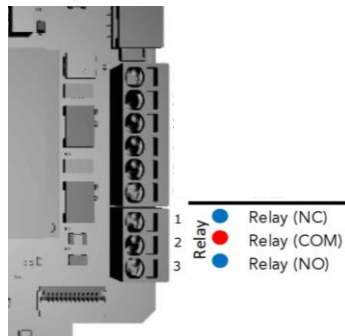
Three general purpose inputs and one general purpose output are available on a detachable wire terminal block. These inputs can be used for interconnection with a door monitoring switch, request to exit button or other equipment.

2D SENSE Label	Name	Power Rating
1	GP In 1	3.3 V TTL Compatible
2	GP In 2	3.3 V TTL Compatible
3	GP In 3	3.3 V TTL Compatible
4	GP Out	3.3 V TTL Compatible
5	3.3V Line	
6	Ground	

NOTE:

It is recommended to connect ground for reference.

5.5 Integrated Relay



Wire Terminal Number	2D SENSE Label	Usage	Power Rating
1	Relay (NC)	Normally Closed	
2	Relay (COM)	Common	30 VDC, 1A
3	Relay (NO)	Normally Open	

We recommend to not operate the relay at the upper level of the voltage range for long periods of time as this may shorten its life span.

We recommend not to power devices constantly through the relay as this may shorten its life span.

DISCLAIMER:

The on-board relay must not be used to activate security access equipment such as gates or doors to grant access to secure areas, as it 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. For such, TBS offers two dedicated controllers.

5.6 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:

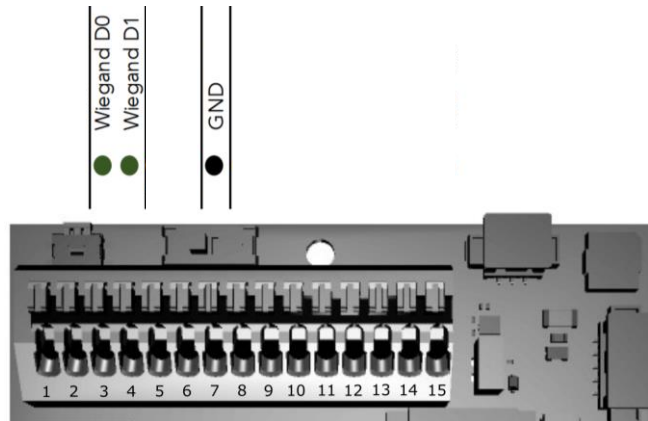
- TBS CONTROLLER SMART (4 relays, 4x GPIN, 4x GPOut, connected via RS-485 or LAN)
- TBS CONTROLLER LITE (RelayBoard with 2 relays, connected via RS-485)

5.7 Connecting Third Party Controllers

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 Connection

The 2D SENSE provides Wiegand OUT connections that can be directly connected to the corresponding 3rd party controller Wiegand IN.



Wire Terminal Number	2D SENSE Label	Name	Type	Voltage Level
3	Wiegand D0	Connection Zero	Out	Wiegand Out (3.3 V)
4	Wiegand D1	Connection One	Out	Wiegand Out (3.3 V)
7	GND	Ground		Ground for Wiegand

The 2D SENSE's Wiegand interface works with LV-TTL (3.3 VDC) voltage level. In most cases, this level is sufficient to drive TTL (5V) inputs on the receiver's side.

Should the controller in use not be able to work properly with LV-TTL voltage, an external 3.3V-to-5V level shifter must be added to both D0 and D1 lines.

Serial Interface (standard set to RS485)

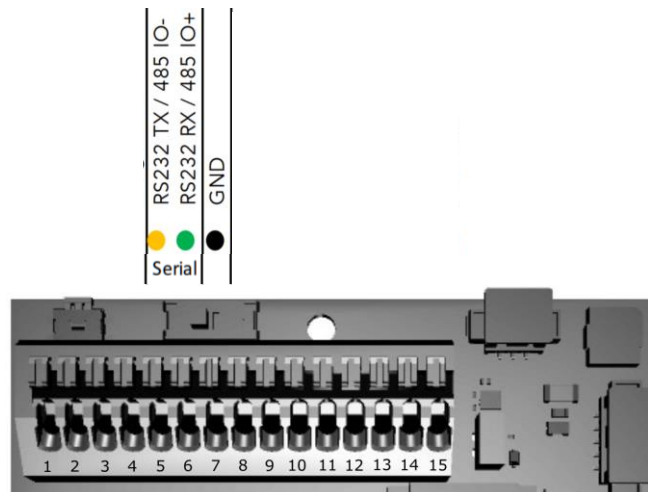
The TCOM400 board features an on-board switch allowing to set the serial interface type to either RS485 or RS232. This switch is set to RS485 as standard.

The switch positions are marked in the picture:

To use RS232, make sure the device is powered off and disconnected, then move the switch.



Please connect the RS485 or RS232 serial lines directly from TBS device to controller:



Wire Terminal Number	2D SENSE Label	Name	Type	Voltage Level
5	RS 485 IO-	Data -	In/Out	0V-5V Bias (+-7V Offset)
6	RS 485 IO+	Data +	In/Out	0V-5V Bias (+-7V Offset)
7	GND	Ground		

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

IMPORTANT:

The TCOM4 platform requires common RS485 GND connection with the Controller to work and prevent damaging the board. Hence it is mandatory to connect 'Serial GND' to the GND of your controller.

If your door controller does not offer a dedicated RS485 GND line, it is up to the installer to select a fitting GND source for the serial interface. In case the 2D SENSE is powered from the controller, RS485 GND can be connected to PWR GND.

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

5.8 Tamper Switch

TBS 2D SENSE can be equipped by a tamper switch that detects when the device front is lifted off from the mounting box.

Function

Activation creates a trigger in the TBS reader that can be used for actions, like deleting the internal database or sending an alarm output via relay or GPOUT.

Installation

Remove the TCOM board holder.

Remove the sensor holder and replace it with the new unit.

Re-install the TCOM board holder.

Connect the two cables to the TCOM400 board to VDD and one of the 3 available GPIN.

Configuration

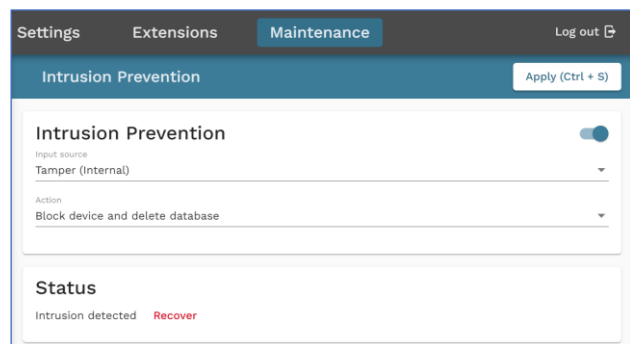
Login to DeviceConfig web interface of the reader and go to 'Maintenance' tab.

In menu 'Intrusion Prevention' activate the slider for 'Intrusion Prevention', select 'Tamper (internal)' input source and select your preferred action. Available are:

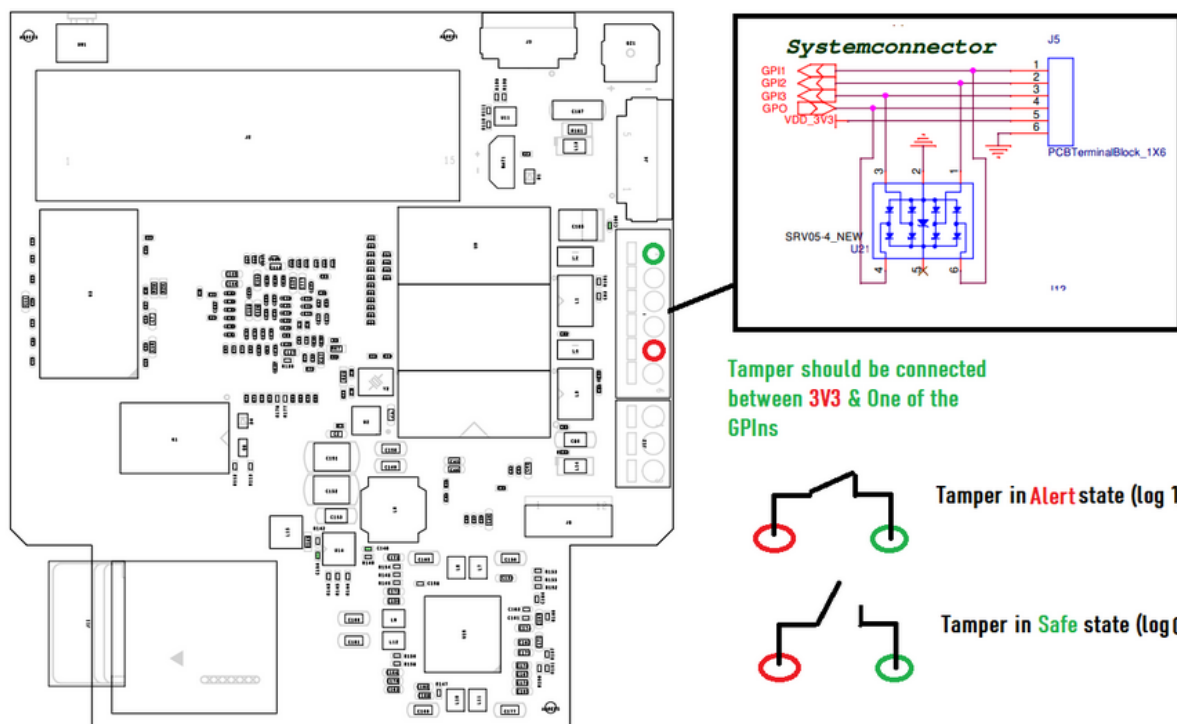
None (only internal event is logged)

Block device

Block device and delete database



To recover from an intrusion, click on 'Recover', and if needed reload database using command from TBS server (Client list -> reload DB on client).



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.

The capacitive sensor of 2D SENSE is susceptible to scratches. Use soft towels for cleaning only, don't use abrasive cleaning equipment.

Pay attention never to use aggressive chemical cleaning agents; these could attack the sensor surface and the 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 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 sensor surfaces 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 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.

Error code	Description	Resolution
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 tables list all TCP/UDP ports that are used in TBS software and firmware as part of the biometric subsystem infrastructure.

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
DeviceConfig 2/2	18883	MQTT	additional web sockets based control channel, used in combination with local server (WebEdition R10.x)	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 2D SENSE Mounting and Installation Guideline

Permanent link: <https://cloud1.tbs-biometrics.com/index.php/s/Pn7MZFC1EwLzwED>

The QR code printed on the product opens this link, leading to the 2D SENSE 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/q8V3hztLyR0Mnyg>

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

TBS Short instruction - Biometric Enrollment on 2D SENSE

Permanent link: <https://cloud1.tbs-biometrics.com/index.php/s/03t1BGE38ZwWouf>

Provides guidance for the enrollment process to TBS system operators.

TBS Short instruction - Finger positioning 2D SENSE

Permanent link: <https://cloud1.tbs-biometrics.com/index.php/s/F3BfAC9o8SJQcZV>

Provides guidance for finger positioning on a 2D capacitive sensor to TBS system operators.

TBS Manuals for TBS System Operators (Endusers)

Permanent link: <https://cloud1.tbs-biometrics.com/index.php/s/w8wp4QroasY8E>

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