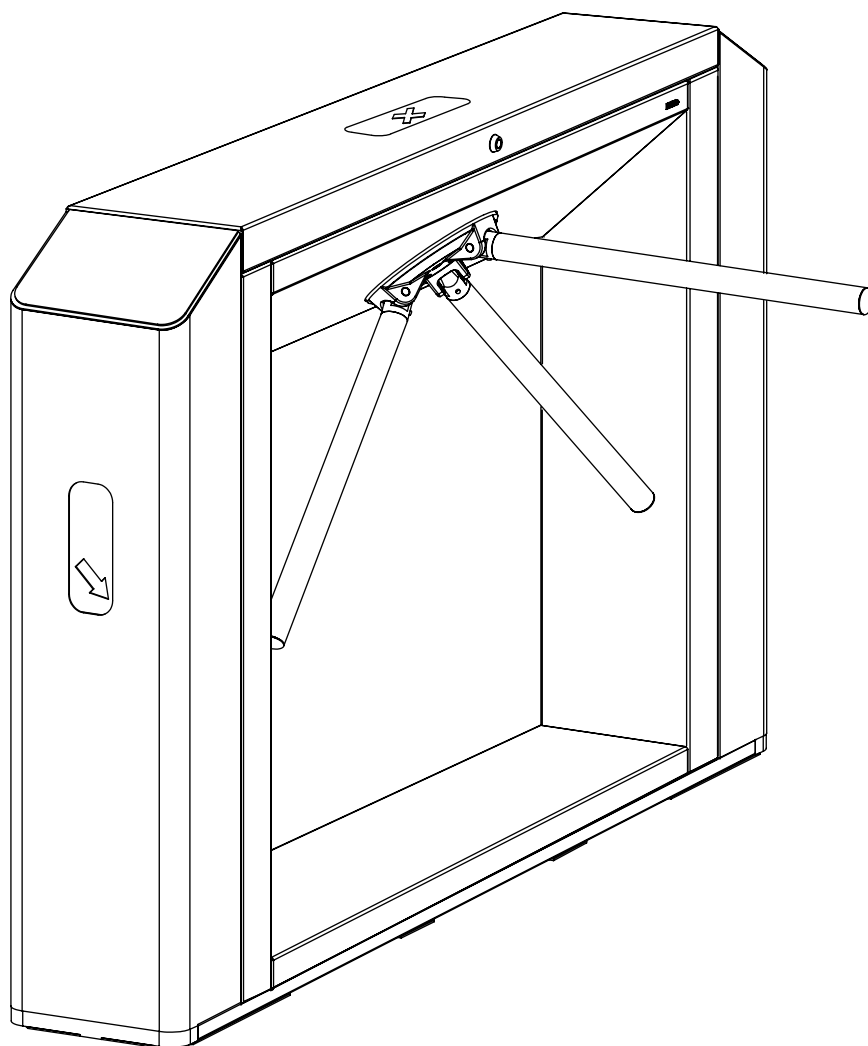


ASSEMBLY AND OPERATION MANUAL



TTD-10A

EAC
CE

Electromechanical box tripod turnstile with automatic anti-panic arms and capability of additional equipment installation

CONTENTS

1	APPLICATION	2
2	OPERATING CONDITIONS	2
3	TECHNICAL SPECIFICATIONS	3
4	DELIVERY SET	3
4.1	Standard delivery set	4
4.2	Additional equipment to be supplied upon request	5
5	DESIGN AND OPERATION	5
5.1	Main features	5
5.2	Design	6
5.2.1	Main housing	7
5.2.2	Side modules	7
5.2.3	Indication blocks	7
5.2.4	RC panel	8
5.2.5	Control logic board	9
5.2.6	Parameters of control signals	11
5.2.7	Control modes of the turnstile	12
5.2.8	Turnstile operation algorithm	13
5.2.9	Control of the built-in card capture reader mechanism	14
5.3	Turnstile control devices	15
5.3.1	RC panel connection	15
5.3.2	Fire Alarm device	16
5.3.3	Control via ACS	16
5.4	Additional devices connected to the turnstile	17
5.4.1	Relay outputs	17
5.4.2	Intrusion detector and siren	17
5.4.3	Remote indicators	18
5.5	Operation contingencies and response to those	18
6	MARKING AND PACKAGING	19
7	SAFETY REQUIREMENTS	19
7.1	Installation safety	19
7.2	Operation safety	19
8	ASSEMBLY AND INSTALLATION	19
8.1	Installation details	19
8.2	Tools and equipment required for installation	20
8.3	Cable lengths	21
8.4	Installation procedure	21
8.5	Electrical connection layout of the turnstile and additional equipment	27
9	OPERATION	31
9.1	Power-up	31
9.2	Pulse control mode	31
9.3	Potential control mode	33
9.4	Operation algorithm of the built-in card capture reader	33
9.5	Removal and installation of the card container	34
10	EMERGENCY RESPONSE	34
11	TROUBLESHOOTING	35
12	MAINTENANCE	35
13	TRANSPORTATION AND STORAGE	37
	Appendix 1. Design of different types of turnstile side covers	37
	Appendix 2. Command transmission algorithm in pulse control mode	40
	Appendix 3. Command transmission algorithm in potential control mode	41
	Appendix 4. Configuring the PERCo ACS controller for operation with the card capture reader	41

Dear Customer!

Thank you for choosing the turnstile made by PERCo.

You have purchased a high-quality product, which will serve you for many years to come, if you carefully follow installation and operation rules.

The **Assembly and Operation Manual for the TTD-10A Electromechanical box tripod turnstile with automatic anti-panic barrier arms and expandable design** (hereinafter referred to as the *Manual*) contains data required for safe transportation, storage, installation, operation, and maintenance of the said product.

The product must be installed only by persons who have fully studied this Manual.

Abbreviations adopted in the Manual:

- ACS — access control system;
- RC panel – remote control panel;
- WRC – wireless remote control;
- CLB – control logic board.

1 APPLICATION

The **TTD-10A Electromechanical box tripod turnstile with automatic anti-panic barrier arms and expandable design** (hereinafter referred to as the *turnstile*) is designed to organize a two-way access point for the controlled area. This product is distinguished by its modularity, which makes it possible to integrate a wide range of additional equipment into the turnstile: a card capture reader, proximity card readers, biometric readers, barcode scanners, breathalyzer, etc.

Integration of most additional equipment types is possible in the standard **TTD-10AB** turnstile version. Furthermore, there is a version with a built-in card capture reader (**TTD-10AC**) available.



Attention!

An RFID reader for proximity cards is not included into the built-in card capture reader set; it is to be purchased and installed inside the turnstile side module on a special bracket by the customer themselves.

The housing of the turnstile is made of stainless steel. Outdoor application is allowed (for the standard **TTD-10AB** version).

The number of turnstiles required to ensure fast and convenient pedestrian passage should be calculated based on the product's throughput rate as per Section 3. It is recommended to install one turnstile per 500 people working in one shift or assuming that the peak load totals 30 persons/minute.

2 OPERATING CONDITIONS

In terms of its resistance to environmental exposure, the turnstile complies with GOST 15150-69, category N1 (for outdoor application).

Operation of the turnstile in the standard **TTD-10AB** version (without a card capture reader) is allowed outdoors at an ambient air temperature from –20°C to +50°C (when used under shelter – to +55°C) and relative air humidity of up to 90% at +30°C.

The **TTD-10AC** modification with a built-in card capture reader may be operated indoors at an ambient air temperature from +1°C to +55°C and relative air humidity of up to 95% at +25°C.



Attention!

When installing other additional equipment into the turnstile, the installer must take into account the operating conditions of such equipment.

The RC panel, included in the standard delivery set, with regard to resistance to environmental exposure, complies with GOST 15150-69, category NF4 (operation in rooms with climate control).

Operation of the RC panel is allowed at an ambient air temperature from +1°C to +40°C and relative air humidity of up to 80% at +25°C.

3 TECHNICAL SPECIFICATIONS

Operating voltage.....	12±1.2 V DC
Consumption current.....	max. 7.0 A ¹
Power consumption	max. 84 W ²
Throughput rate in the single passage mode	30 persons/min
Throughput rate in the free passage mode	60 persons/min
Passageway width	560 mm
Barrier arm rotation force	max. 3 kgf
Remote control panel cable length ³	min. 6.6 m
Card container capacity ⁴	up to 350 cards
IP Code (EN 60529):	
standard TTD-10AB version.....	IP55
TTD-10AC version with a built-in card capture reader	IP41
Electric shock protection class	III (IEC 61140)
Mean time to failure	min. 4 000 000 passages
Mean lifetime	8 years
Overall dimensions (L × W × H):	
with a lowered barrier arm	1361×240×1024 mm
with a barrier arm in the working position	1361×750×1024 mm
Net weight of the turnstile	max. 100 kg

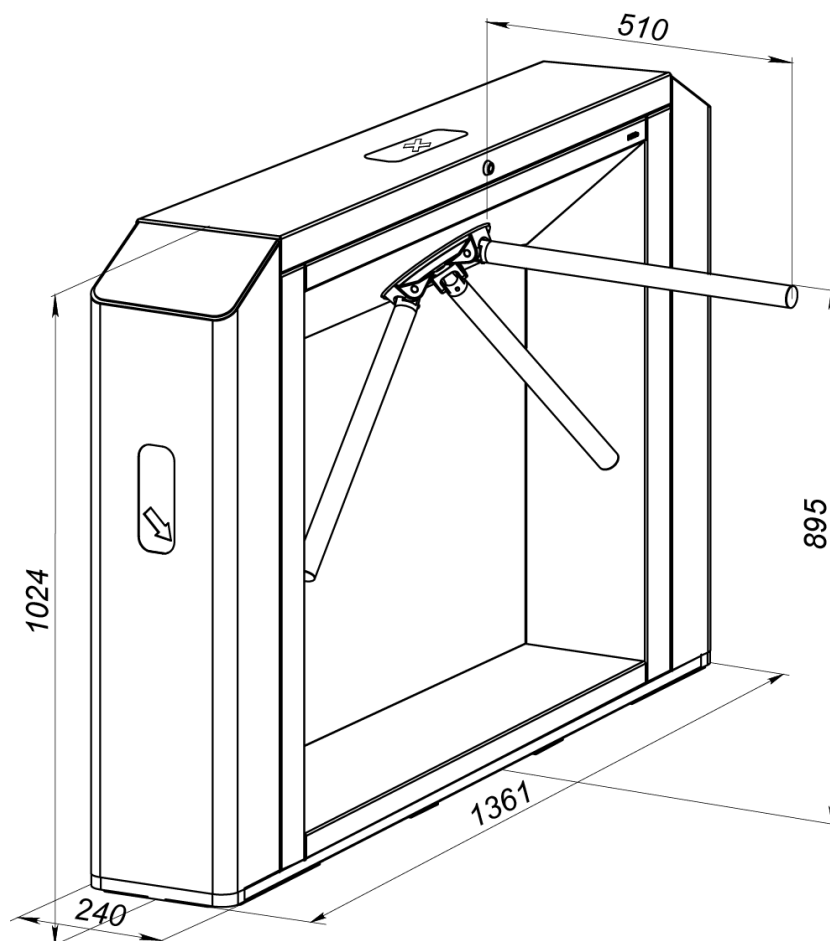


Figure 1. Overall dimensions of the TTD-10A turnstile

- ¹ For the turnstile, the manufacturer recommends using power supply units with an output voltage of 12 V DC and a maximum load current of at least 8 A.
- ² The power consumption can rise to 84 W within 5 sec. following its power-up or upon removal of the *Fire Alarm* signal at the maximum consumption current. In normal state, the power consumption does not exceed 40 W.
- ³ The maximum allowable length of the remote control panel cable amounts to 40 m (upon request).
- ⁴ For the **TTD-10AC** turnstile version with the built-in card capture reader.

4 DELIVERY SET

4.1 Standard delivery set

Box No. 1. Main housing of *TTD-10A*

Main turnstile housing assembled with a flywheel and barrier arms	1
Main cover lock key	2
Remote control panel with a cable	1
Assembly and installation tools:	
M5×12 screw	4
Spring washer (5)	4
Enlarged flat washer (5)	4
Self-adhesive cable tie mount	3
Non-releasable tie, 100 mm	6
FSS-5 self-adhesive PCB pillar	4
Operational documentation:	
Certificate	1
Assembly and Operation Manual.....	1

Box No. 2. Side modules

TTD-10AB (standard version):

Standard side module, right	1
Standard side module, left	1
Sealing rubber profile	2

TTD-10AC (version with the built-in card capture reader):

Side module with the built-in card capture reader, right	1
Key to the cover lock of the container of the card capture reader	2
Standard side module, left	1

In separate packaging:

C-10 side covers with an installation kit	2 or 1 ¹
--	---------------------



Attention!

Side covers are a separate item in the price list and are purchased separately; the cover type is chosen by the customer when ordering the turnstile. Types of side covers and their application are listed in Table 1. The design and dimensions of different types of covers are shown in Appendix 1.

Table 1. Types and application of serially produced side covers for *TTD-10A* turnstiles

Type	Design	Application
C-10B	from stainless steel	without additional functions
C-10R	with a window from radio-transparent material	for built-in RFID reader installation
C-10Q.1	from stainless steel with a window	for installing the Mertech T7821 P2D barcode scanner (to be supplied with the cover)
C-10F.1	with a bracket	for installing the CL15 biometric controller
C-10F	with a bracket	for installing a third-party fingerprint scanner
C-10P.1	with an 80 mm high pole and a window from radio-transparent material	for installing a built-in RFID reader and BS series brackets for additional equipment
C-10P.2	with a 350 mm high pole and a window from radio-transparent material	



Attention!

The **C-10P.1** and **C-10P.2** side covers differ in the pole height and are selected based on the equipment that needs to be installed thereon. The **C-10P.1** cover is used for the installation of such face recognition terminals (hereinafter referred to as FRT) as **Suprema**

¹ For the **TTD-10AC** version, only one side cover is supplied separately – in the side module with the built-in card capture reader, the **C-10RC** side cover with a card slot is already installed at the factory.

FaceStation 2 or **Suprema FaceLite**, and the **C-10P.2** cover is used for installation of FRTs manufactured by **ZKTeco** and breathalyzers.

Be sure to purchase a pole mounting bracket that matches the product you are installing:

Additional equipment	Bracket
Suprema FaceStation 2 FRT	BS10
Suprema FaceLite FRT	BS11
ZKTeco ProFace X FRT	BS8
ZKTeco SpeedFace V5 FRT	BS9

4.2 Additional equipment to be supplied upon request¹

WRC kit ²	1
Anchor with M10 bolt and washer	4

5 DESIGN AND OPERATION

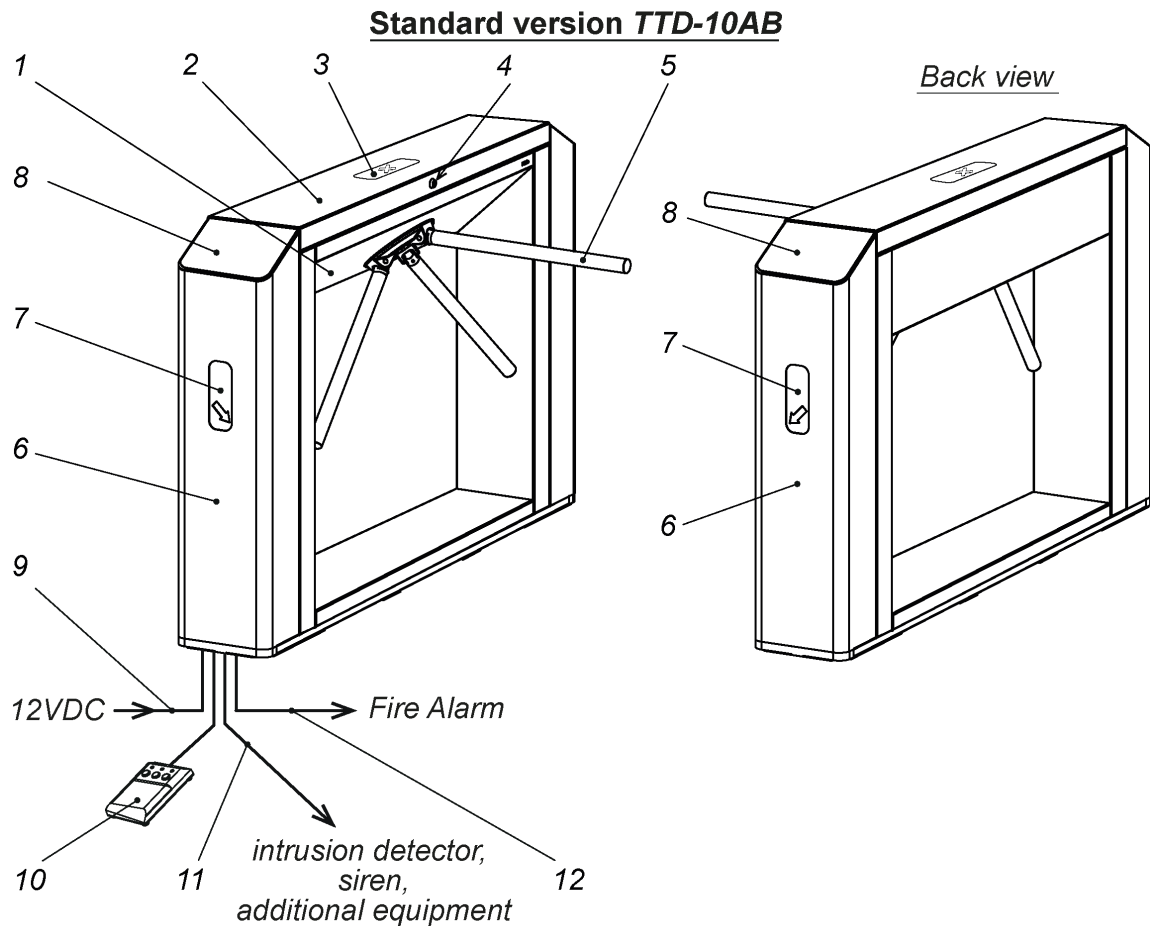
5.1 Main features

- The turnstile is designed both for indoor and outdoor application (see Section 2). The turnstile housing is produced from high-quality stainless steel.
- The turnstile can operate both as a stand-alone unit controlled via its RC panel or WRC and as part of an ACS.
- It is possible to outfit the turnstile with a wide range of additional equipment by using special turnstile side modules (with the built-in card capture reader for the corresponding turnstile version) and special side covers for integration of proximity card readers, biometric readers, barcode scanners, breathalyzer etc.
- The turnstile in the **TTD-10AC** version with the card capture reader is equipped with a mechanism for withdrawal of temporary access cards when passing through the turnstile and a container for their collection, as well as a bracket for installing a proximity card reader³. The turnstile design allows you to change the location of the card capture reader to organize passage in the required direction with withdrawal of access cards.
- The turnstile is equipped with automatic anti-panic barrier arms for emergency opening of the passage. This function is implemented as the upper barrier arm automatically lowers into a vertical position in case of power loss or upon the *Fire Alarm* command. The *Fire Alarm* command can be sent from an emergency passage unblocking device, i.e., from a security and fire alarm device or by the operator using an emergency button.
- The turnstile houses a built-in LED indication block installed in the main housing cover to display operation modes. In addition, the turnstile has extra constant indication blocks to display the passage direction / passage denial on its side modules.
- The turnstile has outputs for connection of remote indicators.
- The turnstile has outputs for connection of an external intrusion detector and siren.
- The turnstile supports two control modes: pulse and potential.
- The rotary mechanism of the barrier arms is equipped with a resetting mechanism, which ensures automatic return of the barrier arms to their initial position after each passage.
- When the barrier arms are turned 67° or more, their reverse rotation is blocked.
- Smooth and quiet operation of the turnstile is ensured by a damper of the rotary mechanism of the barrier arms.
- Optical sensors, which monitor the rotation of the barrier arms and are built into the turnstile, ensure correct passage registration.
- The turnstile is supplied with a safe operating voltage of up to 14 V.
- Installed in a line, several turnstile housings form a passage zone with no need to install extra railings.

¹ Technical specifications of additional equipment are listed in the operational documentation supplied with the said equipment.

² The WRC kit consists of a receiver, which is connected to the turnstile control board, and transmitters designed as radio fobs, with an operating range of up to 40 m.

³ The reader is not included in the delivery set and is to be purchased separately.



TTD-10AC with the built-in card capture reader

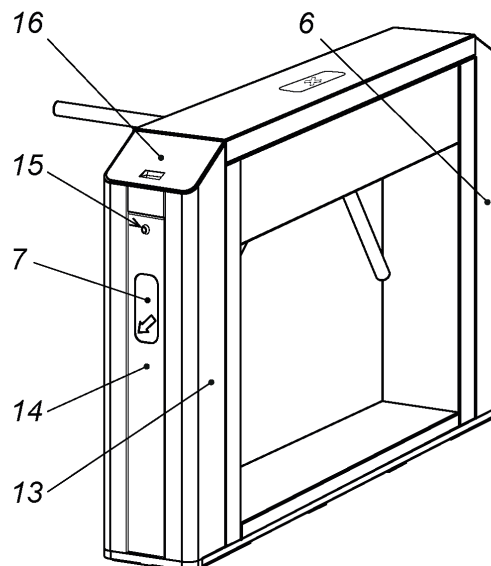


Figure 2. Design of the TTD-10A turnstile

1 – main housing; 2 – main top cover; 3 – main cover indication block; 4 – top cover lock; 5 – barrier arm; 6 – standard side modules; 7 – constant indication blocks for the passage direction / denial; 8 – side covers¹; 9 – power supply cable²; 10 – RC panel with a cable; 11 – cable of the emergency passage unblocking device (*Fire Alarm*)²; 12 – cable to additional equipment²; 13 – side module with the built-in card capture reader; 14 – card container cover; 15 – lock of the card container cover; 16 – **C-10RC** side cover with a receiving slot for cards.

¹ The design and application of various types of side covers are specified in Table 1 and Appendix 1.

² Not included in the standard delivery set.

5.2 Design

The design of the turnstile is shown in Fig. 2. Numbers of the items hereinafter are given in accordance with Fig. 2. The overall dimensions of the turnstile housing are shown in Fig. 1.

The turnstile comprises a main housing (1), installed flywheel with three barrier arms (5), main top cover (2) with an indication block (3) and lock (4), two side modules¹ with constant passage direction/denial indication blocks (7) and with side covers (8), and RC panel (10). The barrier arms are hinged to the flywheel. The turnstile is fixed to the mounting surface with 4 anchor bolts through holes in the housing base.

5.2.1 Main housing

Internal elements of the turnstile housing are accessed through a removable main top cover (2), which is fixed to the housing with a lock (4) and must be closed during operation of the turnstile. Under the main cover, there is a bracket with the **CLB.140** control board (hereinafter, the control board) and **XTU1**, **XTU2**, **XTU3** remote terminal blocks (see Fig. 16). An indication block (3) is also integrated in the turnstile's main cover and is connected to the control board with a cover indication cable via the **XTU3** terminal block.

A rotary group of the barrier arms functions as the turnstile actuation mechanism. The rotary group consists of (see Figure 22):

- control mechanism with optical sensors, which monitor the rotation angle of the barrier arms and help to register the fact of passage correctly;
- rotary mechanism, which includes:
 - resetting mechanism of the barrier arms (a pusher, springs, and a roller), which automatically resets the barrier arms to the initial position after every passage;
 - damper, ensuring smooth and silent operation of the rotary mechanism;
 - locking device, preventing the possibility of an unauthorized passage;
- electromagnetic mechanism for emergency passage unblocking.

To access the rotary group of the barrier arms, it is necessary to remove the main cover (2) and the control board bracket.

5.2.2 Side modules

The customer has an opportunity to choose one of the turnstile options. Various versions, differing in the design of their side modules (6, 13), i.e., presence / absence of a built-in card capture reader, are shown in Fig.2. The side modules are rigidly fixed to the main housing (1). On top of the side modules are installed side covers (8), which can differ in their functional application according to their type (see Table 1). Blocks of constant passage direction / denial indication are situated on the side modules of the turnstile (see Fig. 4). When the side modules are removed, access is provided to the four holes in the housing base for fixing the turnstile to the mounting surface.

Side module with the built-in card capture reader

The side module (13) has a built-in card capture reader mechanism with the **PA-450** control board installed. In the side module under a cover (14), which is fixed in the locked position by a lock (15), there is a card collection container, capable of signaling that it is full. The side module is equipped with a side cover (16) with a slot for capturing access cards (the possibility of replacing this cover with a side cover of another type is not provided by the manufacturer). The receiving slot is LED backlit. A special bracket for installing a proximity card reader, which is to be purchased separately, is embedded inside the module. Upon installation of the reader on the bracket, the identifier will be read from a card when it is located in the receiving slot of the card capture reader. The card capture reader can be used only as part of the ACS. The connection layout is shown in Fig. 21.

5.2.3 Indication blocks

To provide information about the current status and selected operation mode of the turnstile, a main cover indication block (3) is installed on the main top cover (see Fig. 2, 3). The indication block includes 3 mnemonic indicators:

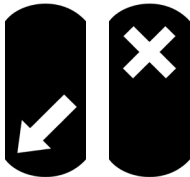
¹ (6) – for the standard **TTD-10AB** version, (6) and (13) – for the **TTD-10AC** version with the built-in card capture reader (ref. Fig. 2).



- indicator of passage permission in one of the directions (green arrow)
- indicator of passage denial (red cross)
- indicator of passage permission in the opposite direction (green arrow)

Figure 3. Mnemonic indicators of the main cover indication block

Constant indication blocks (7) on the side modules are designed to point out the direction of passage through the turnstile or of passage denial. They display constant indication (white arrow or red cross):



- indicator of passage denial in this direction (red cross)
- indicator showing the direction of authorized passage (white arrow)

Figure 4. Mnemonic indicators of the side block for constant passage direction / denial indication

The constant indication type (arrow or cross) is selected when installing the turnstile by means of the **CROSS / ARROW** jumper (see Fig.5), located in the constant indication block of the side module next to the indication cable connector.

To access the **CROSS / ARROW** jumper, remove the side module (see Fig.16), and in the side modules with the built-in card capture reader, open the container cover with its key.

Remove the jumper to disable the constant indication; switch the jumper to the **ARROW** position to select the “arrow” indication or to **CROSS** to select the “cross” indication. By default, the jumper is set in the **ARROW** position.

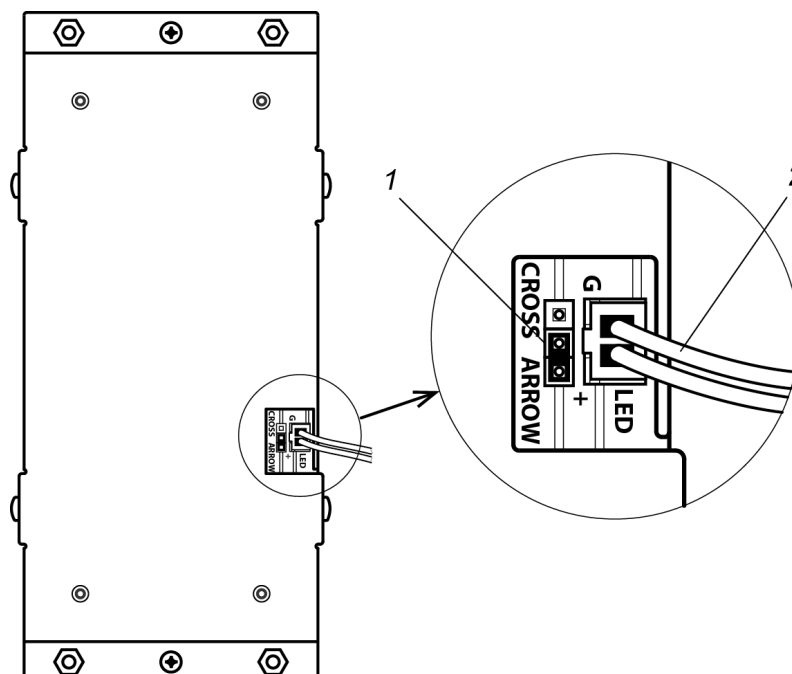


Figure 5. Constant indication block (view from inside the side module)

1 – **CROSS / ARROW** jumper, 2 – side module indication cable

5.2.4 RC panel

The RC panel (10) is designed as a small desktop device in a shockproof ABS plastic case and is intended for setting and indicating operation modes when the turnstile is controlled manually. The overall view of the RC panel is shown in Fig. 6.

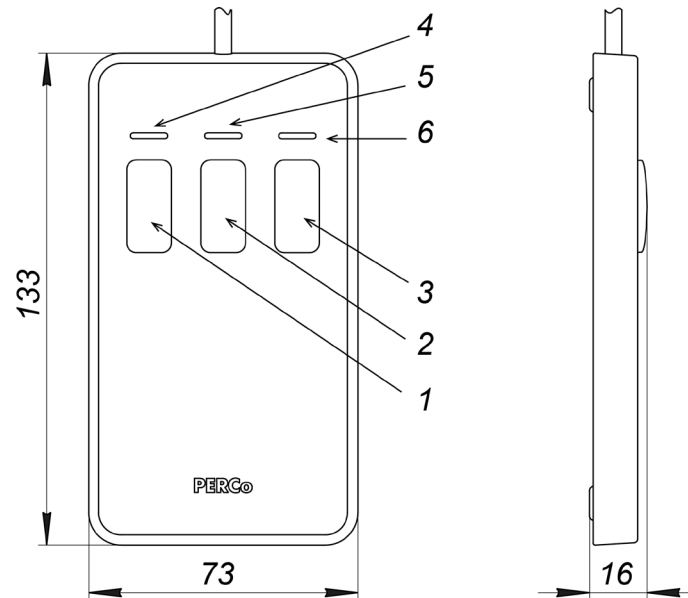


Figure 6. Overall view and dimensions of the RC panel

- 1, 2, 3 – **LEFT**, **STOP**, **RIGHT** buttons for setting operation modes;
 4, 6 – green *Left* and *Right* indicators; 5 – red *Stop* indicator

There are three control buttons for sending commands on the RC front panel. The middle **STOP** button sends the *Passage denial* command. The **LEFT** and **RIGHT** buttons are used to send a command to unlock the turnstile for passage in the selected direction. LED indicators of the status of the turnstile's rotary mechanism are located above the buttons. The red *Stop* indicator shows that both passage directions are blocked. Available control commands and RC panel indication for pulse and potential control modes are listed in Tables 6 and 7 respectively.

5.2.5 Control logic board

The turnstile control board (see Fig. 7) and the **XTU1**, **XTU2**, **XTU3** remote terminal blocks are fixed on the bracket located inside the main housing. To access the board, it is necessary to remove the turnstile's main cover, following the instructions of Section 6.

The control board contains a microcontroller, which processes incoming control commands (*Unlock A*, *Stop*, *Unlock B*, and *Fire Alarm* inputs), tracks the status of optical sensors for rotation of the barrier arms, and generates commands for the control mechanism of the turnstile relying on the received data. In addition, the microcontroller generates signals at the outputs: for indication on the RC panel (*Led A*, *Led Stop*, and *Led B* outputs), for external indication (*Light A* and *Light B* outputs), about passage made in the corresponding direction (*PASS A* and *PASS B*), about the turnstile's readiness to execute a new command (*Ready*), about the alarm (*Alarm*), and relays the signal of the current status of the intrusion detector (*Det Out*).

The CLB (Fig. 7) includes:

- **X1 (LED)**, **X2 (SENS)**, **X3 (MOTOR)** connectors to connect the indication board cables, a group of optical rotation sensors, and control mechanism with an electromechanical locking device.
- **XT1.L (In)** – terminal block to connect such control devices as an RC panel and WRC, control outputs of the ACS controller as well as an emergency unblocking device (*Fire Alarm*) and intrusion detector (see Sections 5.3.1, 5.3.2, 5.4.1).
- **XT1.H (Out)** – terminal block for connection to control board outputs (see Section 5.4.1).
- **XT3 (+12VDC)** – terminal block to connect the turnstile's power supply unit.
- **XT4 (Light A)** and **XT5 (Light B)** – terminal blocks to connect “open/closed” remote indicators, one indicator for each direction (see Section 5.4.3).
- **XT6 (AntiPanic)** – terminal block to connect the electromagnet of the emergency passage unblocking mechanism.
- **J1** – connector for the jumper that selects the turnstile control mode. By default, the jumper is installed, which activates the pulse mode. To switch to the potential control mode, you need to remove the jumper (see Section 5.2.7).
- **J2** – service connector for programming, which is not used during operation.
- **Power** – LED indicator of power supply to the control board.

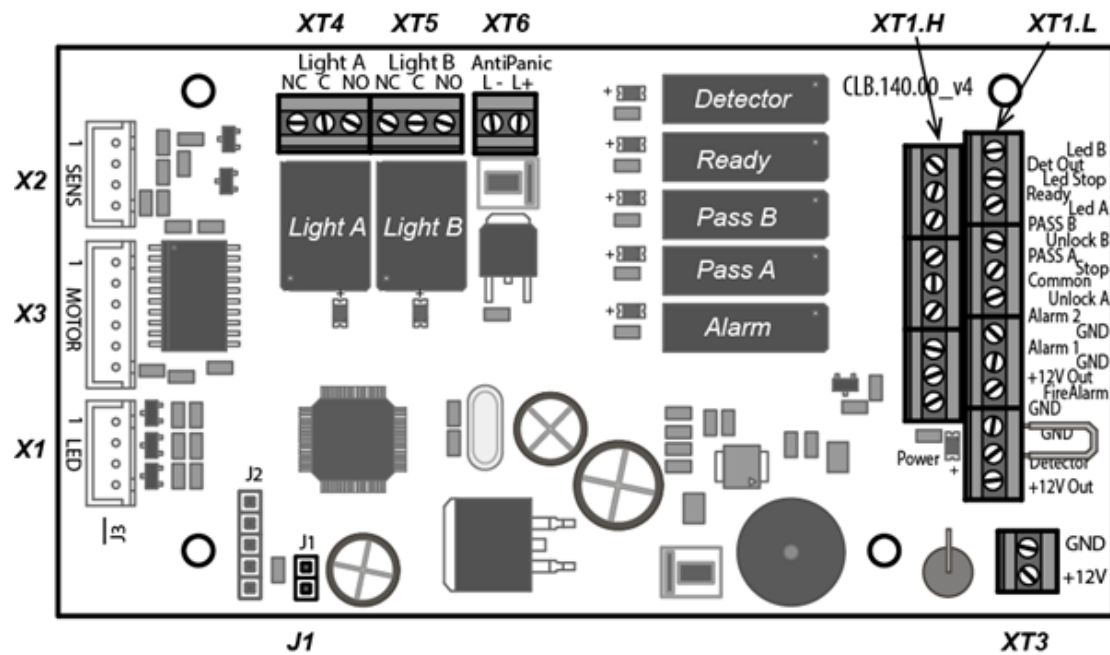


Figure 7. Control logic board (CLB)

Table 2. Contact functions of terminal blocks

No.	Contact	Function of the contact
Terminal blocks of the CLB.140 control board		
XT1L (In)		
1	+12V	Connection of +12 V power supply for the intrusion detector
2	Detector	Input for connection of the intrusion detector
3	GND	Common
4	Fire Alarm	Control input for emergency unblocking of the passage
5	GND	
6	GND	
7	Unlock A	Control input – opening of direction A
8	Stop	Control input – passage denial
9	Unlock B	Control input – opening of direction B
10	Led A	RC panel indication output – opening of direction A
11	Led Stop	RC panel indication output – passage denial
12	Led B	RC panel indication output – opening of direction B
XT1H (Out)		
1	GND	Common
2	+12V	+12 V output for power supply to additional equipment
3	Alarm 1	Siren connection output
4	Alarm 2	
5	Common	Common contact for the PASS A and PASS B outputs
6	Pass A	PASS A relay output (passage in direction A)
7	Pass B	PASS B relay output (passage in direction B)
8	Ready	READY relay output (turnstile readiness)
9	Det Out	DET OUT relay output (intrusion detector status)
XT3 (+12VDC)		
1	+12V	Connection of the power cable (from XTU1, cable No. 1)
2	GND	

No.	Contact	Function of the contact
XT4 (Light A)		
1	NO	Normally open contact of the control output for remote indication A
2	C	Common contact of the control output for remote indication A
3	NC	Normally closed contact of the control output for remote indication A
XT5 (Light B)		
5	NO	Normally open contact of the control output for remote indication B
6	C	Common contact of the control output for remote indication B
7	NC	Normally closed contact of the control output for remote indication B
XTU1 remote terminal block		
1	+12V	Connection of an external power supply unit (12 V DC)
2	GND	
1	+12V	Splitter of external power supply (+12 V) for additional devices
2	GND	
XTU2 remote terminal block		
3	Fire Alarm	Control input for emergency unblocking of the passage
4	GND	
5	GND	Common
6	Unlock A	Control input – opening of direction A
7	Stop	Control input – passage denial
8	Unlock B	Control input – opening of direction B
9	Led A	RC panel indication output – opening of direction A
10	Led Stop	RC panel indication output – passage denial
11	Led B	RC panel indication output – opening of direction B
12	Common	Common contact for the PASS A and PASS B outputs
13	Pass A	PASS A relay output (passage in direction A)
14	Pass B	PASS B relay output (passage in direction B)
XTU3 remote terminal block		
1	+12V	Connection of the indication cable from the main cover indication block (cable No. 4)
2	R	
3	GND	
4	L	
5	+7V	
6	+7V	Connection of the indication cable from the right side module (cable No. 5.2)
7	+7V	Connection of the indication cable from the left side module (cable No. 5.1)
8	GND	Connection of the indication cable from the right side module (cable No. 5.2)
9	GND	Connection of the indication cable from the left side module (cable No. 5.1)

For convenience, the contacts for connecting the turnstile's power supply unit and control devices are placed on the bracket on the **XTU1** and **XTU2** terminal blocks. The connection is carried out in accordance with the connection layout of the turnstile and additional equipment (see Fig. 19, 20, 21). The turnstile is energized via a power cable (9).

5.2.6 Parameters of control signals

The passage through the turnstile is controlled by a low-level signal relative to the *GND* contact sent to the *Unlock A*, *Stop*, and *Unlock B* inputs of the control board while the control element can be a normally open relay contact or a circuit with an open collector output (Fig. 8 and 9).

Emergency unblocking of the turnstile passage is carried out by removing a low-level signal relative to the *GND* contact from the *Fire Alarm* input of the control board. In this case, a normally closed relay contact or circuit with an open collector output can function as the control element. All

incoming control commands received at other inputs are ignored in this case (see Section 5.3.2). When a low-level signal is applied to the *Fire Alarm* input, the directions switch to the mode according to signal levels at the *Unlock A*, *Unlock B*, and *Stop* inputs.

The activation of the intrusion detector is monitored by removal of a low-level signal relative to the *GND* contact from the *Detector* input of the control board. A normally closed relay contact or circuit with an open collector output can function as the control element in this case.



Note:

To generate a high-level signal at all input contacts (*Unlock A*, *Stop*, *Unlock B*, *Fire Alarm*, and *Detector*), 2 kOhm resistors connected to the +5 V voltage plane are used.

The control element must ensure the following signal characteristics:

relay contact as the control element:

minimum commutation current min. 2 mA

closed contact resistance

(including the connection cable resistance) max. 300 Ohm

circuit with an open collector output as the control element:

voltage at the closed contact

(low-level signal at the CLB input) max. 0.8 V

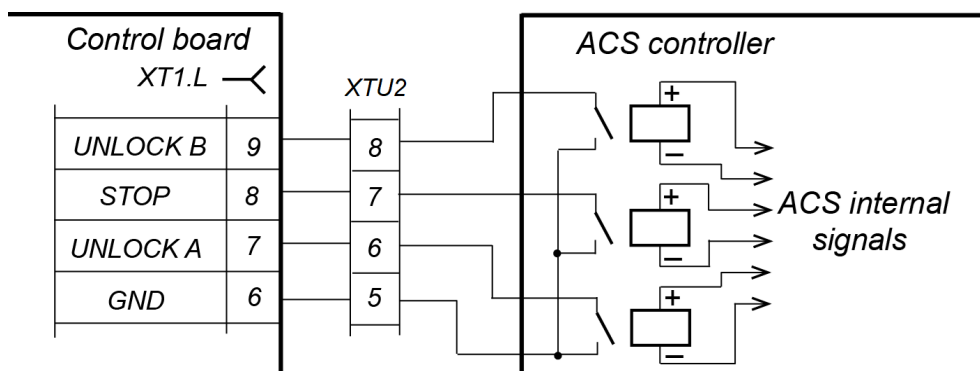


Figure 8. Control elements of an external device: normally open relay contact

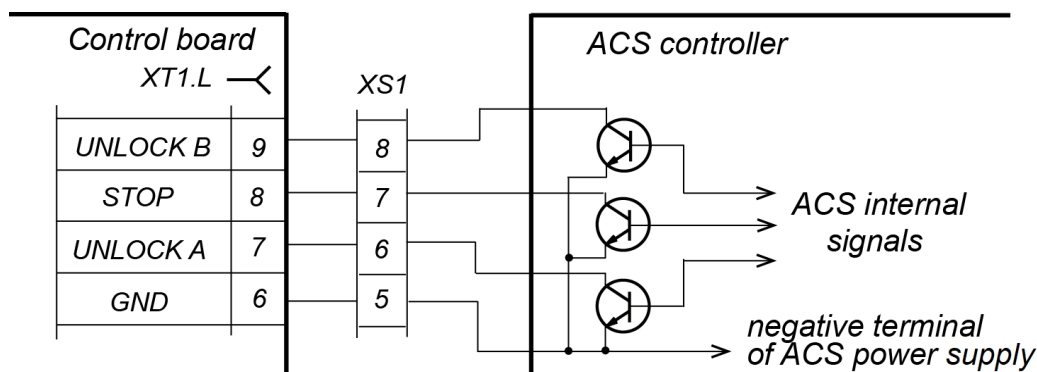


Figure 9. Control elements of an external device: circuit with an open collector output

5.2.7 Control modes of the turnstile

Two control modes of the turnstile are available: pulse and potential. In both modes, the turnstile is controlled by sending commands (i.e., combination of control signals) to standard control inputs: *Unlock A*, *Stop*, and *Unlock B* as well as to a special *Fire Alarm* control input. The selected mode determines the control command sending algorithm (see Tables 6 and 7).

The control mode is selected by removal / installation of a jumper on the **J1** connector of the control board. The location of the **J1** connector is shown in Fig. 7. By default, the jumper is installed, which activates the pulse control mode. In order to switch to the potential mode, remove the jumper. The control mode will change as soon as the turnstile is switched on.



Attention!

The jumper may be installed and removed only when the turnstile is switched off.

The algorithm of turnstile operation upon a special *Fire Alarm* signal is described in Section 5.3.2.

Pulse control mode

The mode is used to control the turnstile via its RC panel, WRC, and ACS controller, outputs of which support the pulse control mode.

When a control command is sent to standard control inputs, the control signal must last for at least 100 msec. The passage waiting time amounts to 5 seconds and does not depend on the control signal (pulse) duration.

The turnstile operation in pulse control mode is described in Table 6. The algorithm of sending control commands in this mode is described in Appendix 2.

Potential control mode

The mode is used to control the turnstile by means of the ACS controller, outputs of which support the potential control mode.

When a control command is sent to standard control inputs, the control signal must last for at least 100 msec. The passage waiting time is equal to the control signal duration: if there is a low-level signal at the input for the authorized direction by the time of passage in this direction, then the turnstile will stay open in this direction.

Upon sending a low-level signal to the *Stop* input, both directions are blocked for as long as it is active, regardless of signal levels at the *Unlock A* and *Unlock B* inputs. Upon removing a low-level signal from the *Stop* input, the directions will switch to the mode according to signal levels at the *Unlock A* and *Unlock B* inputs.

The turnstile operation in potential control mode is described in Table 7. The algorithm of sending control commands in this mode is described in Appendix 3.

**Note:**

To organize single passages in potential control mode, it is advisable to remove a low-level control signal from the *Unlock A / Unlock B* control input when activating the *PASS A / PASS B* relay output of the corresponding direction.

5.2.8 Turnstile operation algorithm

The turnstile operation algorithm in the pulse control mode in case of a single passage in one of the directions:

1. A command (combination of control signals) to allow a single passage in one of the directions is sent from the control device (RC panel, WRC, ACS) to the control board inputs.
2. The microcontroller on the control board processes the received combination of signals and generates a command for the turnstile control mechanism to unlock the rotary mechanism. The countdown of the unlocked state holding time starts.
3. The control mechanism unlocks the rotary mechanism for rotation in the selected direction. Passage in this direction becomes possible.
4. When a user passes through the turnstile, the microcontroller tracks the rotation angle of the barrier arms with optical sensors of the control mechanism. If the rotation angle exceeds 67°, the fact of passage is registered. One of the relay outputs, *PASS A* or *PASS B*, corresponding to the passage direction, becomes active. The microcontroller generates a command for the control mechanism to lock the turnstile's rotary mechanism.
5. After the passage is complete, i.e. after the barrier arms are reset to the closed position (120° rotation), the turnstile's rotary mechanism is locked. The *PASS A / PASS B* relay output is normalized.
6. If the rotation of the barrier arms has not started, then the locking command for the rotary mechanism is generated after the unlocked state holding time expires (5 seconds from receipt of the command by default).
7. The turnstile is ready for the next passage.

5.2.9 Control of the built-in card capture reader mechanism¹

The algorithm of the card capture reader mechanism:

1. In the standby mode, the receiving slot of the card capture reader is constantly illuminated by a built-in LED indicator. The identifier of an access card inserted into the receiving slot is read by the integrated reader and sent for analysis to the external ACS controller.
2. If the presented card is a permanent employee card and does not need to be captured, the ACS controller allows passage through the turnstile in this direction (gives the appropriate signal to the turnstile control mechanism). The shutter, blocking access to the card container, remains closed, preventing accidental withdrawal of the card. The illumination of the card slot remains constant.
3. If the presented card is a temporary visitor card and needs to be captured, the ACS controller gives a control signal to the *Capture card* control board input of the card capture reader (**INPUT XT1** contact, see Fig.10). The illumination of the card slot will start flashing with a frequency of 2 times per second, indicating that the card is to be withdrawn.
4. If, after the arrival of this signal, the optical sensor in the card capture reader detects the presence of the card in the receiving slot, the electromagnet of the card capture reader opens the shutter that blocks access to the card container, and the card falls into the card container, i.e., the card is captured. If there is no card in the receiving slot, the electromagnet will not be triggered, and access to the card container will remain blocked.
5. When a card falls into the card container, the second optical sensor records the fact of withdrawal of the card. In this case, the card capture reader closes the shutter, and the illumination of the card slot switches to continuous operation once again. Simultaneously, a control signal is sent from the *Card captured* output of the control board of the card capture reader (**OUT XT2** contact, Fig.10), which confirms passage permission for the ACS controller. After this signal, the ACS controller allows passage in the selected direction (gives the relevant signal to the turnstile control mechanism) and removes the *Capture card* signal after the passage through the turnstile. Upon removal of the *Capture card* signal, the card reader removes the *Card captured* signal.
6. The third optical sensor of the card capture reader tracks the fact of filling up the card container. When it is full, the card capture reader sends the *Fault* signal (**Alarm XT2** contact, Fig.10) to the ACS controller, and the illumination of the receiving slot of the card capture reader starts flashing once in 2 seconds, thereby warning that the container needs to be cleared of withdrawn cards. If the container is not emptied, then after capturing another 9 cards, the card capture reader will stop operating, and the illumination of the receiving slot will go out. The card capture reader will automatically resume its operation after the card container is emptied (the procedure for removal and installation of the card container is specified in Section 9.5). In addition, the *Fault* signal is sent to the ACS controller in case of malfunction of the card capture reader mechanism.

Parameters of control signals:

The *INPUT (Capture card)* input is controlled by an output of the dry contact or open collector type of the ACS controller. The input is normally open, i.e., when a control signal is sent, the ACS controller closes the input to the *GND* contact (contact 4).

The input parameters:

Voltage at the open contact relative to <i>GND</i>	5±0.5 V
Voltage at the closed contact relative to <i>GND</i>	max. 0.8 V
Current through the closed contact	max. 1.5 mA

The *OUT (Card captured)* and *Alarm (Fault)* outputs are of the dry contact type. Each of these outputs is one of 2 relay contacts. Other relay contacts are combined together and placed on the *COM* output (contact 7). The outputs are normally open, i.e., when a signal is sent, the relevant output closes with the *COM* contact.

The output parameters:

Maximum voltage between the relevant output and the <i>COM</i> contact	42 V
Maximum commutation current	200 mA

¹ For the **TTD-10AC** turnstile version with the card capture reader.

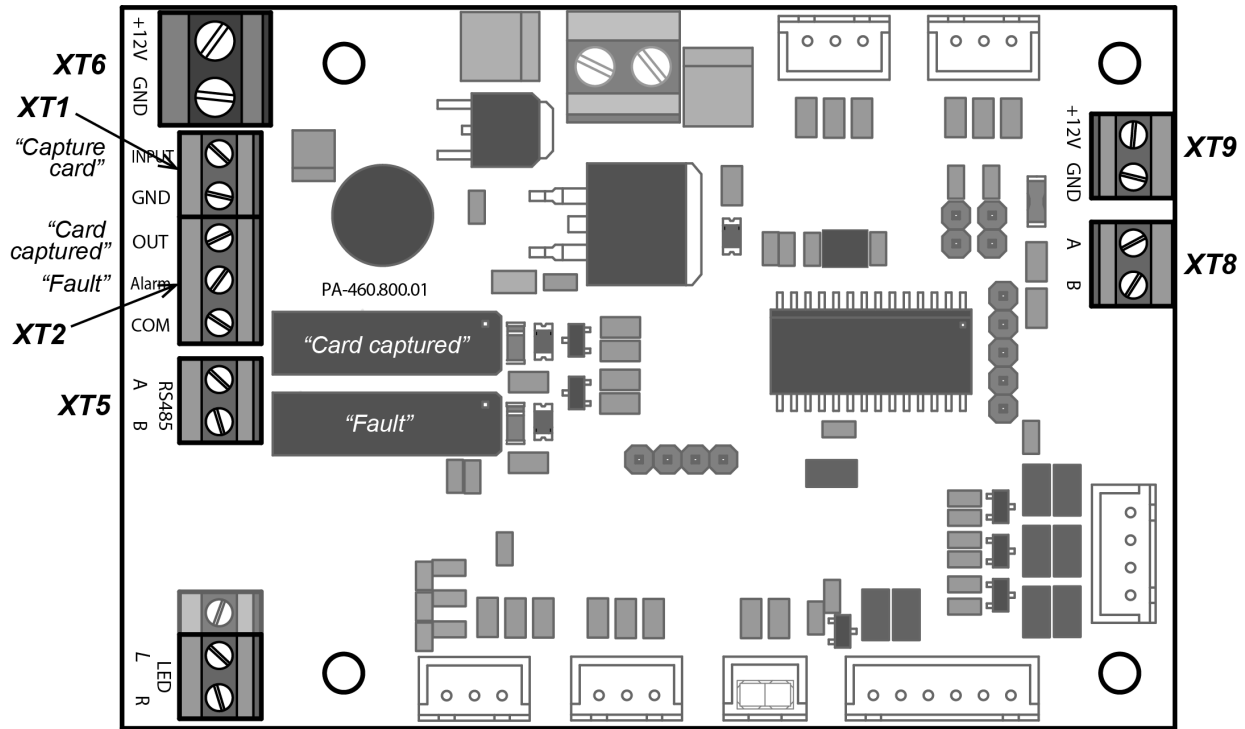


Figure 10. PA-450 control board of the card capture reader

The overall view of the card capture reader's control board is shown in Fig. 10. The board includes the following terminal blocks:

- **XT1** – *Capture card* input of the card capture reader (*INPUT* and *GND* contacts).
- **XT2** – *Card captured* (*OUT* and *COM* contacts) and *Fault* (*Alarm* and *COM* contacts) outputs of the card capture reader.
- **XT5** – connector for the *RS-485* interface lines from the ACS controller (*A* and *B* contacts, only for **PERCo** controllers).
- **XT6** – connector for power supply of the card capture reader (+12V and *GND* contacts).
- **XT8** – connector for connecting a reader (made by **PERCo**) to the *RS-485* interface lines (*A* and *B* contacts).
- **XT9** – connector for power supply of the built-in card reader (+12V and *GND* contacts).

5.3 Turnstile control devices

The turnstile can be operated from the following control devices: RC panel, WRC, ACS controller.

The above-mentioned devices can be connected to the turnstile separately, in any combination with each other, or all simultaneously (in parallel).



Note:

In case of parallel connection of the above-mentioned devices to the turnstile, their control signals might overlap. Should this happen, the turnstile will respond according to the combination of signals that has been generated (App. 2 and 3).

5.3.1 RC panel connection

The RC panel is connected to the *GND*, *Unlock A*, *Stop*, *Unlock B*, *Led A*, *Led Stop*, and *Led B* contacts of the **XTU2** remote terminal block with a flexible multicore cable in accordance with Table 3 and the electrical connection layout (Fig. 20, 21).

The standard orientation of the RC panel relative to the housing is shown in Fig 11.

If the operator's workplace is located on the opposite side of the housing, then, for ease of use, it is necessary to swap RC-panel wires connected to the *Unlock A* and *Unlock B* contacts as well as to *Led A* and *Led B* respectively (see Table 3).



Note:

The WRC is connected to the *GND*, *Unlock A*, *Stop*, and *Unlock B* contacts of the **XTU2** remote terminal block. Power supply of the WRC is connected to the +12V contact of the **XTU2** terminal block.

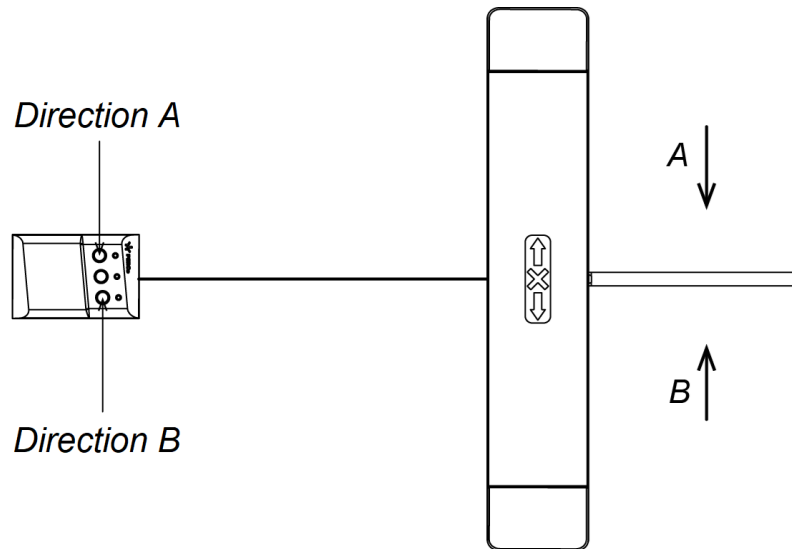


Figure 11. Standard RC panel orientation relative to the turnstile housing

Table 3. Connection of RC-panel cable wires to the *XTU2* terminal block for standard and reverse RC panel orientation

No.	Contact	RC panel orientation	
		Standard	Reverse
5	<i>GND</i>	black	black
6	<i>Unlock A</i>	white	green
7	<i>Stop</i>	blue	blue
8	<i>Unlock B</i>	green	white
9	<i>Led A</i>	yellow	red
10	<i>Led Stop</i>	orange	orange
11	<i>Led B</i>	red	yellow

5.3.2 Fire Alarm device

The emergency passage unblocking device is connected to the *Fire Alarm* (3) and *GND* (4) contacts of the *XTU2* remote terminal block in accordance with the turnstile's electrical connection layout (see Fig. 19).

If the *Fire Alarm* input is not used, a jumper wire needs to be installed between the *Fire Alarm* and *GND* contacts of the control board. This jumper is installed by default.

When a control signal is applied to the *Fire Alarm* input, the turnstile switches to the *Fire Alarm* emergency passage unblocking mode. In this mode, all incoming turnstile control commands are ignored. The turnstile's rotary mechanism is locked for rotation in both directions. The central barrier arm automatically falls by gravity and takes a vertical position, clearing the passage. The following indication is displayed on the indication block simultaneously for both directions: alternate flashing of green (for 1.25 sec.) and red (for 0.25 sec.) turnstile indicators.

If the *Fire Alarm* signal is received by the turnstile while a user is passing through it, the *Fire Alarm* mode will be displayed on the indication block, but the rotary mechanism locking and emergency passage unblocking functions will be activated only after the barrier arm returns to the initial position.

After the *Fire Alarm* control signal has been removed, the red passage denial indicator lights up on the indication block, and the turnstile switches to the standby mode with the lowered barrier arm. To continue operation, the barrier arm needs to be moved to the horizontal position manually so that it is fixed.

5.3.3 Control via ACS

The turnstile can be used as an operating device when functioning as a part of an ACS. The turnstile can be equipped with built-in proximity access card readers inside the side modules when using special side covers (see Table 1).

The ACS controller outputs are connected to the *GND*, *Unlock A*, *Stop*, and *Unlock B* contacts of the **XTU2** remote terminal block. The ACS controller inputs are connected to the *Common*, *PASS A*, and *PASS B* contacts of the **XTU2** remote terminal block and to the *Ready* and *Det Out* contacts of the **XT1.H** terminal block of the control board. The connection is carried out in accordance with the turnstile's electrical connection layout (Fig. 20, 21).

5.4 Additional devices connected to the turnstile

5.4.1 Relay outputs

Connection to the relay outputs of the control board is performed through the corresponding contacts of the **XT1.H** terminal block. The following relay outputs are installed:

- **ALARM**: *Alarm 1* and *Alarm 2* contacts (see Section 5.4.2),
- **PASS A**: *Pass A* and *Common* contacts (see Section 5.2.8),
- **PASS B**: *Pass B* and *Common* contacts (see Section 5.2.8),
- **READY**: *Ready* and *Common* contacts (see Section 5.5),
- **DETECTOR**: *Det Out* and *Common* contacts (see Section 5.4.2).

The *Pass A*, *Pass B*, and *Common* contacts are placed on the **XTU2** remote terminal block.

The relays have normally open contacts. At the same time, the *Common* contact for these relays is not connected to the negative terminal of the turnstile's power supply unit (it is galvanically isolated). In the initial (normalized) condition, when the power supply unit is switched on, the *PASS A*, *PASS B*, *READY*, and *DETECTOR* relay contacts are closed (voltage is applied to the relay coil), and the *ALARM* relay contacts are open (voltage is not applied to the relay coil).

Voltage supply to the relay coil is indicated by lighting up of the relevant red LED, installed on the control board near the corresponding relay (see Fig. 7).

The output stages for *PASS A*, *PASS B*, *READY*, *DETECTOR*, and *ALARM* are relay contacts with the following signal characteristics (Fig. 12):

maximum commutation voltage	42 V DC
maximum commutation current.....	0.25 A
closed contact resistance.....	max. 0.15 Ohm

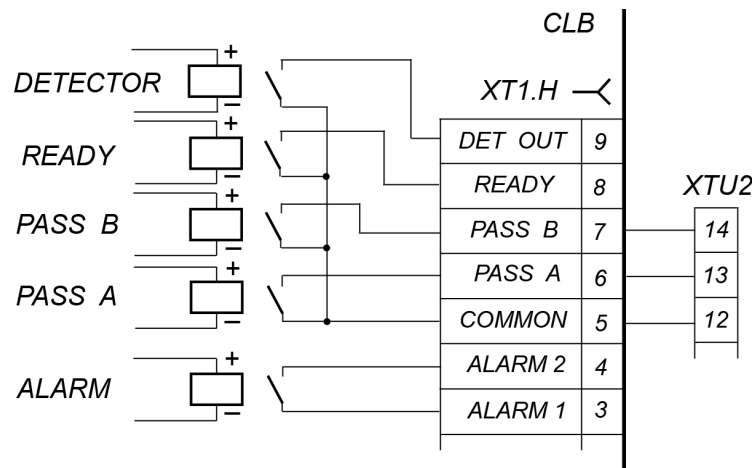


Figure 12. Output stages for *PASS A*, *PASS B*, *READY*, *DET OUT*, and *ALARM*

5.4.2 Intrusion detector and siren



Attention!

Installation of an intrusion detector inside the turnstile housing is not possible.

The intrusion detector is connected to the *Detector*, *GND*, and *+12V* contacts of the **XT1.L** terminal block of the control board. The parameters of the *Detector* input signals are specified in Section 5.2.6. The intrusion detector's current state is transmitted to the *DETECTOR* relay output (*Det Out* and *Common* contacts of the **XT1.H** terminal block).

The siren is connected to the *Alarm 1*, *Alarm 2*, *GND*, and *+12V* contacts of the **XT1.H** terminal block. The parameters of *ALARM* relay output signals are specified in Section 5.4.1.

The *ALARM* output is activated if, in case the turnstile's rotary mechanism is locked (the *Passage denial* or *Both directions are closed* command has been given), the *Detector* input is activated, i.e.,

a control signal is received from the intrusion detector. The *ALARM* output is normalized 5 seconds after the activation or when any control command is received.



Note:

The control signal from the intrusion detector does not activate the *ALARM* output if the turnstile's rotary mechanism is unlocked for one of the directions or was locked less than three seconds ago.

5.4.3 Remote indicators

Remote indication blocks for relevant passage directions are connected to the *Light A* and *Light B* outputs. The outputs are outfitted with a full group of contacts: normally opened *NO*, normally closed *NC*, and common *C*. Connection to the outputs is performed through the **XT4** and **XT5** terminal blocks respectively.

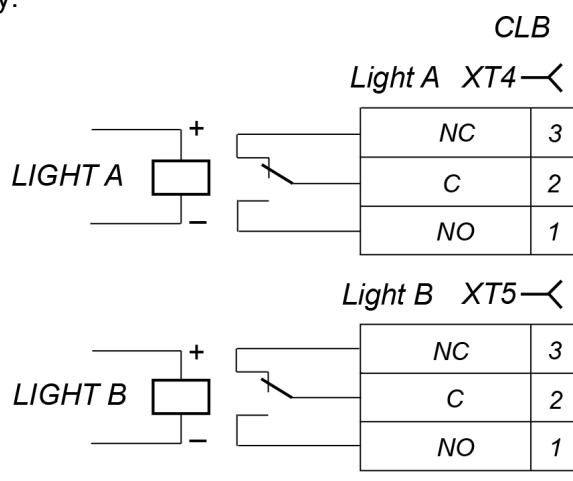


Figure 13. Output stages for Light A and Light B

If passage in direction A/B is permitted, the *Light A / Light B* relay of the corresponding passage direction is activated (its coil gets energized), and if passage is denied, the relay gets normalized. Voltage supply to the relay coil is indicated by lighting up of the red LED, installed on the control board near the corresponding relay.

The output stages for the *Light A* and *Light B* relays are changeover relay contacts (Fig. 13) with the following signal characteristics:

maximum commutation voltage	30 V DC
maximum commutation voltage	42 V AC
maximum commutation AC/DC current.....	3 A
closed contact resistance	max. 0.15 Ohm

5.5 Operation contingencies and response to those

The turnstile is equipped with an alarm function to signal violations of the normal operation mode in case of unauthorized passage or delayed return of the barrier arms to their initial (closed) position. The rotation of the barrier arms is tracked by activation of the optical sensor of the rotary group. The sensor is activated when the barrier arms turn at an angle of more than 8 degrees from the initial (closed) position.

- An unauthorized passage is the rotation of the barrier arms without a command sent to unlock the rotary group.
- A delay in the return of the barrier arms to their initial position is the passage zone staying in the open state for more than 30 seconds.

In each of these cases, the *READY* relay is activated (the relay coil is deenergized), while the *Ready* and *Common* output contacts are opened (see Section 5.4.1). When the barrier arms return to their initial position, the *READY* relay gets normalized (the relay coil is energized), and the *Ready* and *Common* output contacts are closed.



Note:

If the optical sensor of the barrier arms' rotary group becomes faulty, the *READY* relay is also activated until the fault is repaired.

6 MARKING AND PACKAGING

The turnstile has a marking label and sticker. The label can be found inside the turnstile housing, under the main top cover (2). It identifies the product's name, serial number, and date of manufacture. The sticker is located on the internal side of the top cover (2) and shows the internal connection layout of the turnstile. To get access to the marking sticker and label, remove the main top cover.

To do so, proceed as follows:

1. Switch off power supply of the turnstile.
2. Insert the key into the main cover lock (4) and open the lock.
3. Holding the front edge of the main cover (2), carefully lift it and, turning it in the direction of the rear side, remove it from the turnstile housing. Be sure to disconnect the indication cable from the main cover indication block (3) when removing the cover, and do not damage it!
4. Place the main cover on a flat steady surface.

Installation of the main cover back into its working position is carried out in reverse order.

The turnstile in the standard delivery set is packed in two transportation boxes (side covers are packed separately), which protect the product components from damage during transportation and storage.

Overall dimensions of box No.1 (length × height × width)	146×110×40 cm
Weight of box No.1 (gross)	max. 97 kg
Overall dimensions of box No.2 (length × height × width)	114×30×40 cm
Weight of box No.2 (gross)	max. 38 kg

7 SAFETY REQUIREMENTS

7.1 Installation safety

The turnstile shall be installed only by the persons that have fully studied this Manual and have been instructed in safety, in compliance with general rules of electrical and installation works.



Attention!

- All installation works may be performed only after the power supply unit is switched off and disconnected from the AC mains.
- Only serviceable tools may be used for installation.
- Be especially careful and diligent when installing the turnstile housing before it is fixed, and prevent it from falling over.

The power supply unit must be installed in accordance with the safety rules stipulated in its operational documentation.

7.2 Operation safety

Observe general electrical safety rules when operating the turnstile.



Warning!

- Do not use the turnstile under conditions that do not comply with the requirements of Section 2 of this Manual.
- Do not use the turnstile at a power supply voltage different from that specified in Section 3 of this Manual.

The power supply unit must be used with observance of safety requirements specified in its operational documentation.

8 ASSEMBLY AND INSTALLATION

When installing the product, observe the safety rules stipulated in Sect. 7.1.

8.1 Installation details

Proper installation is crucial to the performance and serviceability of the turnstile. Installation shall be carried out by at least two specialists properly qualified as an installer and electrician. It is necessary to study this section carefully before the start of installation works and then follow the instructions specified herein.

Recommendations for preparation of the mounting surface:

It is recommended that you should:

- mount the turnstile on steady and level concrete (grade 400 or higher, strength class B22.5), stone or similar foundations with a thickness of at least 150 mm;
- level the mounting surface so that the fixing points of the turnstile housing lie in the same horizontal plane (check it with a level);
- apply embedded reinforcing elements (400×400×300 mm) in case the turnstile has to be installed on a less steady foundation. A frame foundation can be applied as well.

Recommendations for the passage zone organization:

When passing through the turnstile, in case the turnstile is operated by the ACS controller, it is necessary to turn the barrier arms at least 70° to register a passage event. To ensure such an angle of rotation, please follow the recommendations given in Fig. 14 when organizing the passage zone.

The turnstile is equipped with a resetting mechanism for the barrier arms. In case of their rotation at an angle of more than 67°, the barrier arm is reset in the passage direction (in this case, the barrier arms cannot return to the initial position, and the return passage is blocked). If the barrier arms are turned less than 67°, they return to their initial position.

When organizing the passage zone, an additional emergency exit is required. For example, the **BH-02** anti-panic rotary railing section (ref. Section 10) can serve as such an exit.

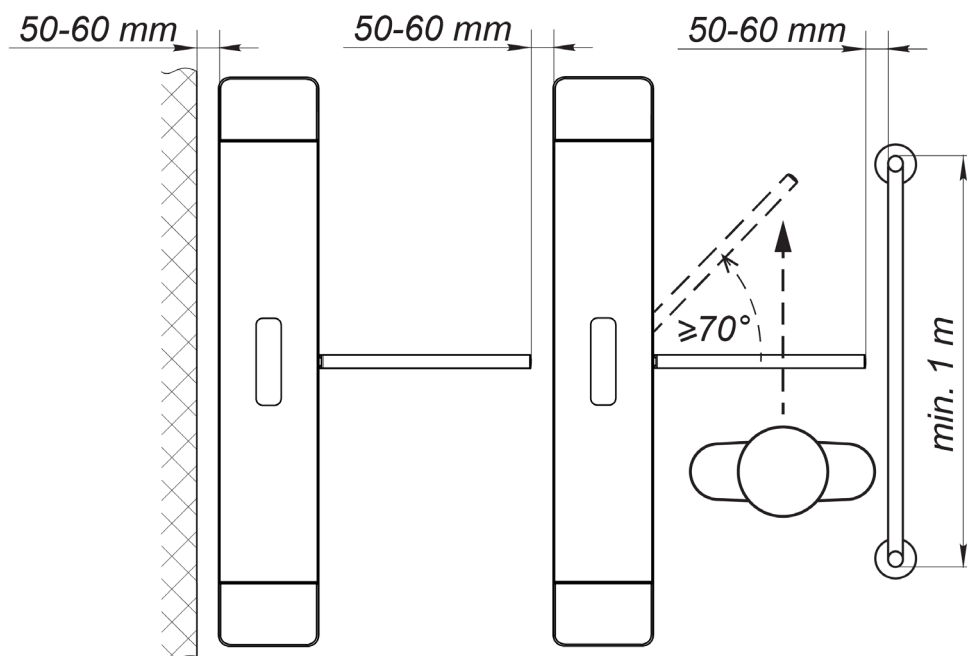


Figure 14. Recommendations for the passage zone organization

8.2 Tools and equipment required for installation

- 1.2÷1.5 kW electric hammer drill;
- hard-alloy drill bit to create holes for anchor sleeves;
- floor chaser for cable ducts;
- straight-slot screwdriver No.2;
- straight-slot screwdriver No.5 (150 mm);
- Phillips-head screwdriver No.2;
- horn-type and socket wrenches: S17, S13, S10, S8, S7, S5.5;
- level;
- measuring tape (2 m);
- slide caliper.



Note:

It is allowed to use other equipment and measuring tools provided they ensure the required parameters and measurement accuracy.

8.3 Cable lengths

Cables used for installation are listed in Table 4.

Table 4. Cables used during the installation

No.	Equipment to be connected	Maximum cable length, m	Cable type (number of cores)	Minimum cross-section, mm ²	Example of the cable
1	Power supply unit	10	Twin wire	1.5	AWG 15; HO3VV-F 2×1.5 bi-colored
		15	Twin wire	2.5	AWG 13; HO5VV-F 2×2.5 bi-colored
2	- Fire Alarm - Additional equipment connected to inputs or outputs of the CLB	30	Twin wire	0.2	RAMCRO SS22AF-T 2×0.22 CQR-2
3	RC panel	40	Eight core cable	0.2	CQR CABS8 8×0.22c
4	ACS controller	30	Six core cable	0.2	CQR CABS6 6×0.22c
5	Power supply of the built-in card capture reader f	1.5	Twin wire	1.5	AWG 15; HO3VV-F 2×1.5 bi-colored

8.4 Installation procedure



Attention!

The manufacturer shall not be liable for any damage caused by improper installation and declines any claims arising thereof in case if the installation is not carried out in compliance with the instructions provided in this Manual.

Installation procedures are described with due consideration for recommendations stipulated in Section 8.1. Equipment and tools required for installation are listed in Section 8.2. Types of the cables used for installation are listed in Section 8.3. Connection layouts of the turnstile and additional equipment are given in Section 8.5. Item numbers are stated in accordance with Fig. 2.

Perform the following sequence of actions when installing the turnstile:

1. Install the turnstile's power supply unit in its place in accordance with its operational documentation.
2. Drill holes for anchor sleeves in the floor to fix the turnstile housing in accordance with Fig. 15.

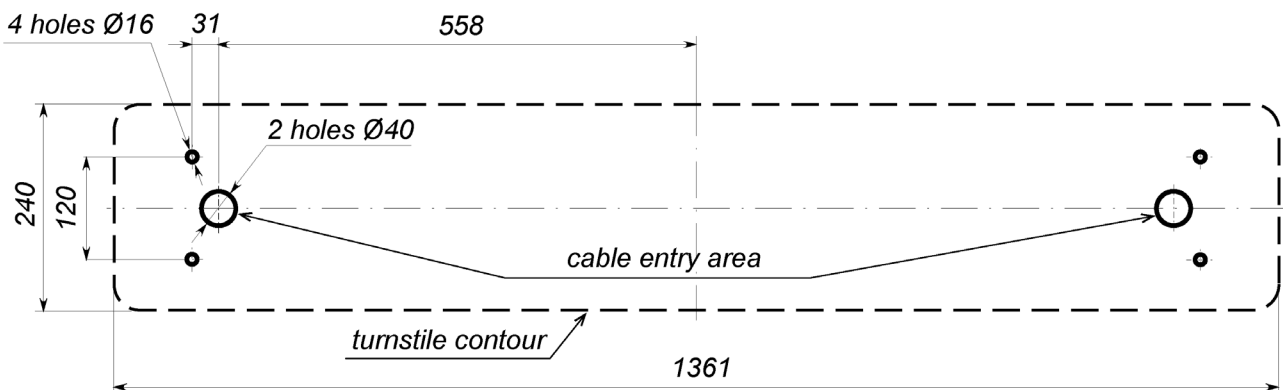


Figure 15. Marking layout for the TTD-10A turnstile housing installation¹

3. If it is necessary to lay cables under the floor surface, prepare a cable duct in the floor so that it leads to the area where these cables enter the turnstile housing. Cable routing inside the turnstile housing is shown in Fig. 16.

¹ The size of the holes in the layout is indicated for anchors of the PFG IR 10-15 SORMAT type; when using other types of anchors, it is necessary to make holes with a diameter and depth appropriate for those.



Attention!

- It is necessary to leave enough length of cables connected to the remote terminal block and control board to enable removal of the bracket and provide access to the rotary group of the barrier arms.
 - Install and fix the housing only after all the cables have been laid inside the turnstile housing and in the cable duct.
4. Insert anchor sleeves into the holes you have drilled so that they do not protrude from the floor surface.
 5. Unpack the main housing of the turnstile (box No. 1). Remove the main top cover of the turnstile (2) in accordance with Section 6.
 6. Mount the housing on the anchor sleeves after you have pulled connection cables into it, and fasten it with M10 bolts through the holes in the housing base.
 7. Connect the power cable (9) to the **XTU1** remote terminal block according to the connection layout.
 8. If necessary, install the board of the external ACS controller inside the turnstile housing on the bracket (9, Fig. 16) and connect it to the CLB board (ref. Section 8.5).
 9. Connect the RC-panel cable (10) or WRC receiver to the **XTU2** remote terminal block (ref. Section 8.5) or external ACS controller (ref. the controller's Operation Manual).
 10. If needed, connect cables from other devices to the relevant terminal blocks of the control board (ref. Section 8.5).
 11. Use the **J1** jumper to select the required turnstile control mode (pulse or potential, ref. Section 5.2.7).
 12. Unpack the side modules (6 or 13) (box No.2) and the side covers (8) (packed separately).



Attention!

If the turnstile is installed outdoors, the installation locations of side covers should be sealed. For this purpose, use a sealing rubber profile (included into the delivery set of each standard side module). Stick it on the upper edge of the module tightly to the side cover window edge around the perimeter. In installation holes for covers, the sealing profile should be placed between the window edge and the hole without covering the latter. Please pay attention that, when the cover is subsequently installed, the sealing rubber profile should not protrude from under it, and that the cover should fit tightly to the side module housing.

13. Decide which of the side modules (standard (6) or with the card capture reader (13)) will be left, and which will be right in relation to the turnstile housing. Make sure that the arrows on the constant indication blocks (7) point towards the passage through the turnstile. If necessary, swap the side module indication blocks.

To remove the constant indication block (7):

- for the standard side module (Fig. 17):
 - remove the plate (4, Fig. 17) by unscrewing 6 screws (7, Fig. 17),
 - remove the bracket (3, Fig. 17) by unscrewing 4 nuts with washers (6, Fig. 17),
 - disconnect the connector of the housing indication cable from the indication block board,
 - remove the indication block (2, Fig.17) by unscrewing 4 nuts with washers (5, Fig.17).
- for the side module with the card capture reader (Fig. 18):
 - open the container cover lock with its key (3, Fig. 18) and pull the cover by the key toward you until it stops,
 - disconnect the connector of the housing indication cable from the indication block board,
 - remove the indication block (2, Fig. 18) by unscrewing 4 nuts with washers (4, Fig. 18).

Installation of the indication blocks is carried out in reverse order. Before installation, shift the **CROSS / ARROW** jumper as needed on both indication blocks (see Section 5.2.3). If necessary, adjust the alignment of the external planes of the indication block and the side module housing with two adjusting screws.

14. Mount the side covers on the side modules¹. If necessary, install the necessary equipment, such as access card readers, barcode scanners, biometric readers, breathalyzers etc., in the side modules under or on the side covers. The installation of the side covers is detailed in Appendix 1.



Attention!

Access card readers made by **PERCo** can be installed inside the side modules on special brackets. If there is a need to install readers made by third-party manufacturers, they must meet the following specifications:

overall dimensions of the reader max. 175×120×50 mm
ID reading range min. 50 mm

When installing other additional equipment, side covers are to be purchased separately for specific equipment (see Appendix 1).



Note:

Installation of the access card reader in the **TTD-10AC** side module with the built-in card capture reader is performed in the following order:

- Remove the reader bracket (5, Fig. 18) by unscrewing the 2 screws.
- Install the reader on the bracket area using double-sided adhesive tape or screws and nuts and having drilled holes if necessary.
- Reinstall the bracket. After the installation of the entire turnstile is completed, check the correctness of reading the access cards upon their capture; if necessary, adjust the distance from the reader to the card receiving slot inside the side module, having loosened the screws beforehand. After the adjustment, tighten the screws completely.

15. Install the side modules in the required place, each in the following order:
- tilting the top of the side module toward you, insert its bottom into the appropriate place in the turnstile housing;
 - holding the side module, carefully lay the indication cable from the side module to the control board bracket in the main housing so as not to damage it when installing the side module;
 - put the top of the side module in place; please pay attention that the holes in its upper mounting plate must be aligned with the corresponding threaded bushings in the turnstile housing;
 - fix the side module using two M5×12 screws with two washers (11 in Fig. 16; each with a spring and enlarged flat washer); the screws and washers are included in the main housing delivery set;
 - connect the indication cable connector from the side module to the corresponding (right "R" or left "L") indication cable connector of the main housing (10 in Fig.16).
16. Check the serviceability and accuracy of all the electrical connections. Fix all the cables using self-adhesive cable tie mounts and non-releasable ties from the delivery set.
17. Reinstall the main cover (2) in reverse order to removal, see Section 6.
18. Perform a test run and check the performance of the turnstile according to Section 9.

The turnstile is ready for operation.

¹ For the **TTD-10AC** version, only one side cover is supplied separately. In the side module with the built-in card capture reader, the side cover with a slot for receiving cards is installed by default. No other side cover type can be used for this side module.

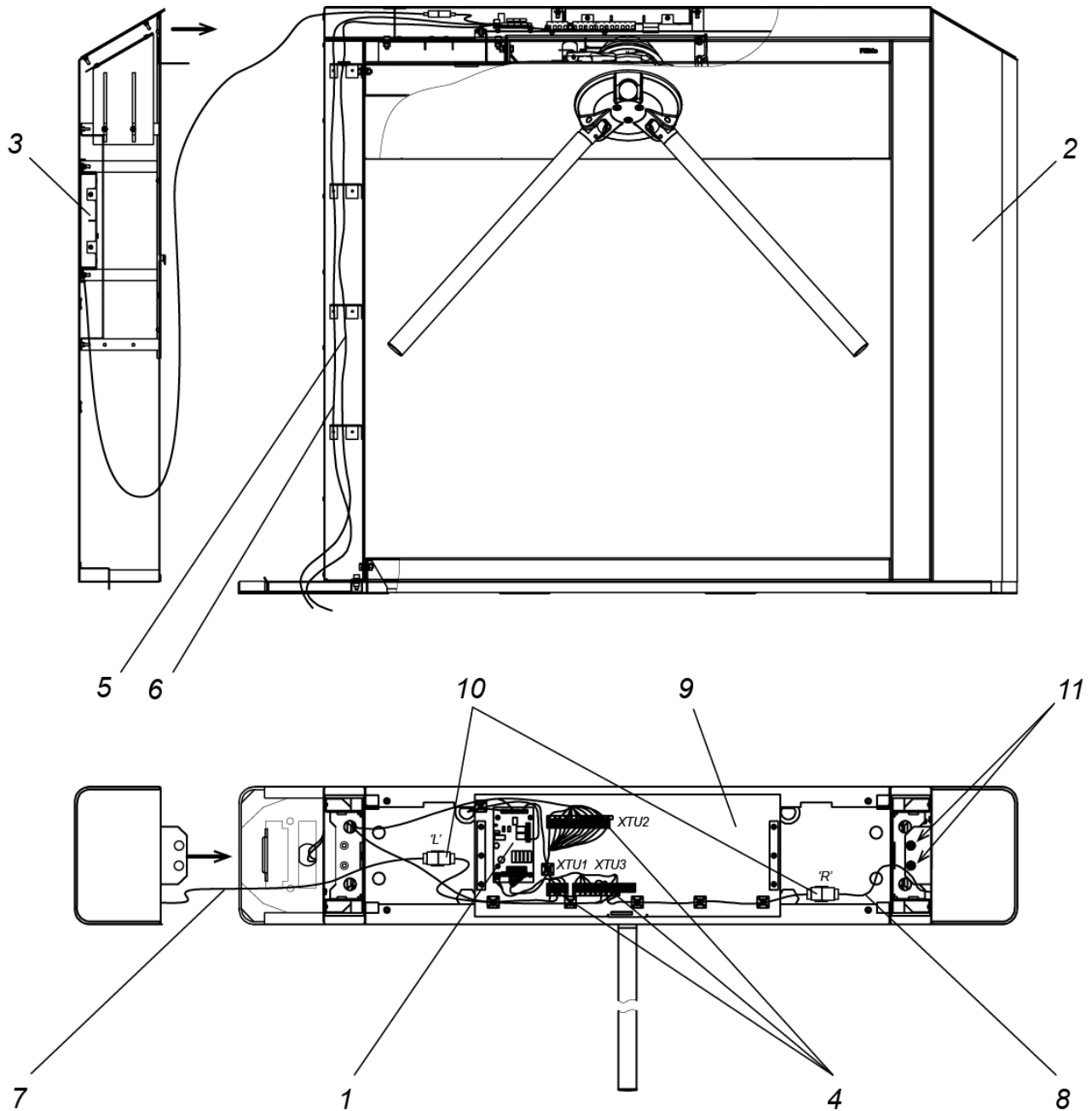


Figure 16. Cable routing inside the housing

- 1 – **CLB.140** control board; 2 – side module; 3 – side module indication block;
- 4 – **XTU** remote terminal blocks; 5 – power cable; 6 – cable from the RC panel (WRC);
- 7, 8 – cables leading from the side module indication blocks to the control board;
- 9 – ACS controller installation zone; 10 – side module indication cable connectors;
- 11 – M5×12 screws with washers fixing the side modules

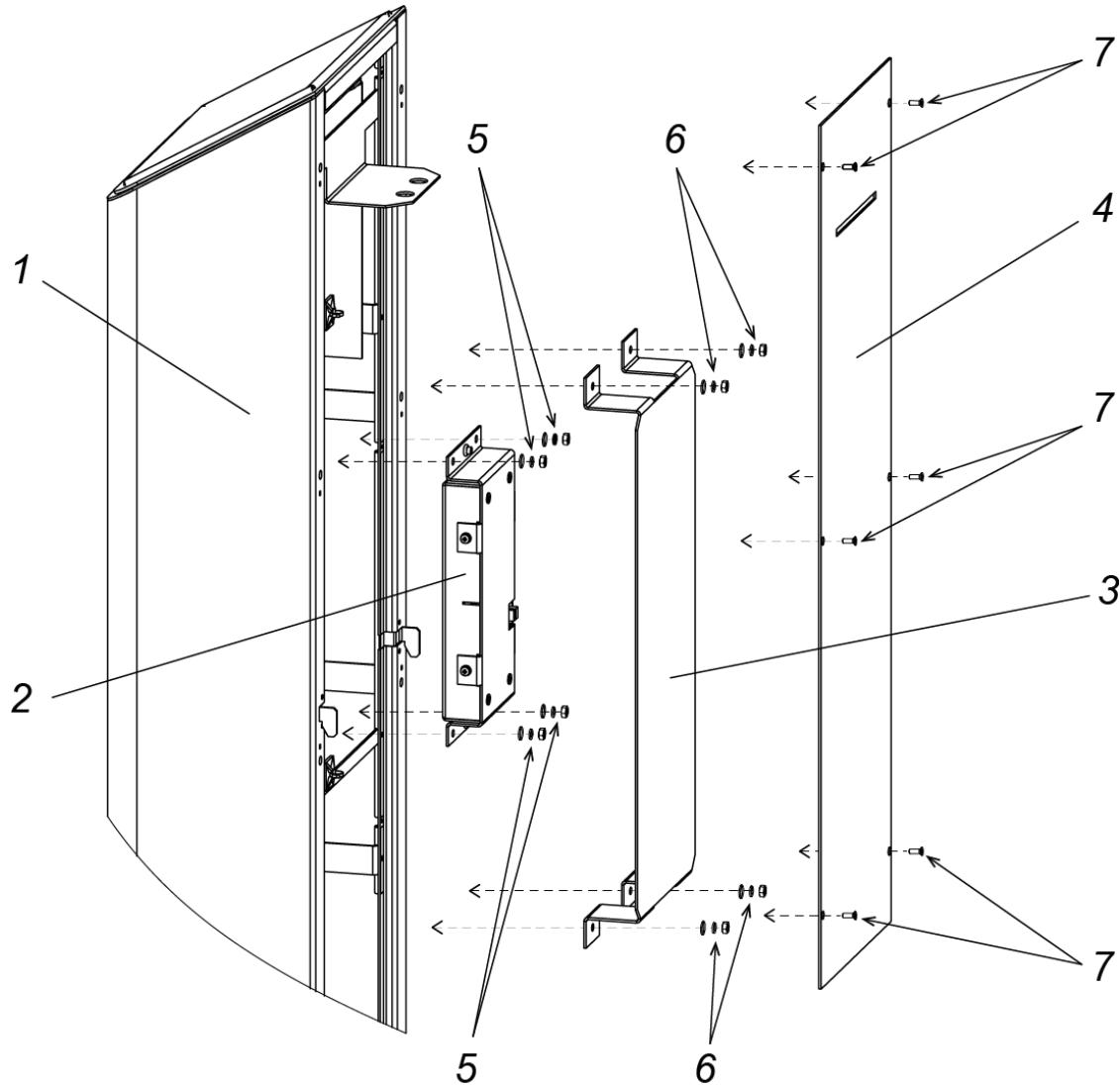


Figure 17. Constant indication block (standard side module)

1 – standard side module; 2 – indication block; 3 – bracket; 4 – plate;
 5 – nuts with washers for fixing the indication block;
 6 – nuts with washers for fixing the bracket, 7 – screws for fixing the plate

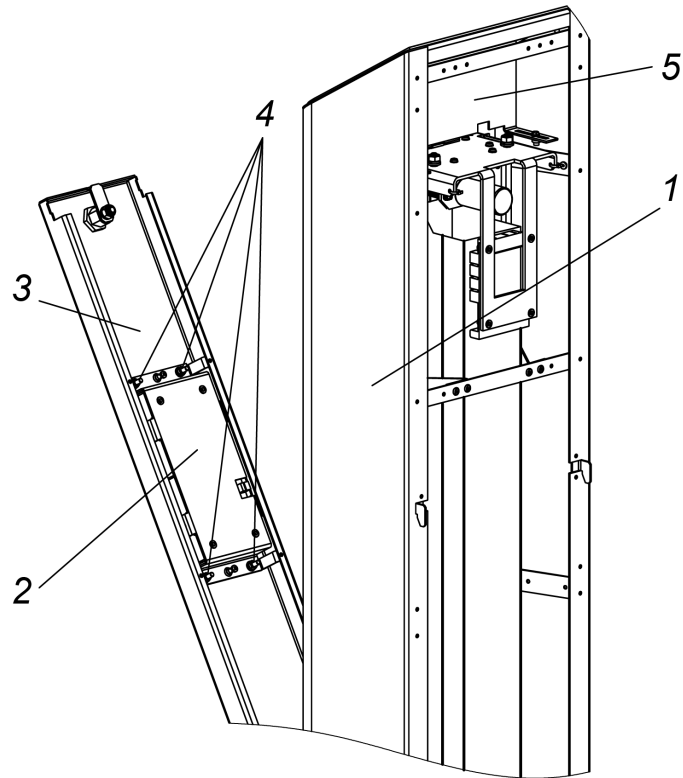


Figure 18. Constant indication block (side module with the built-in card capture reader)

- 1 – side module with the built-in card capture reader, 2 – container cover; 3 – indication block;
4 – nuts with washers for fixing the indication block, 5 – bracket for the card reader

8.5 Electrical connection layout of the turnstile and additional equipment

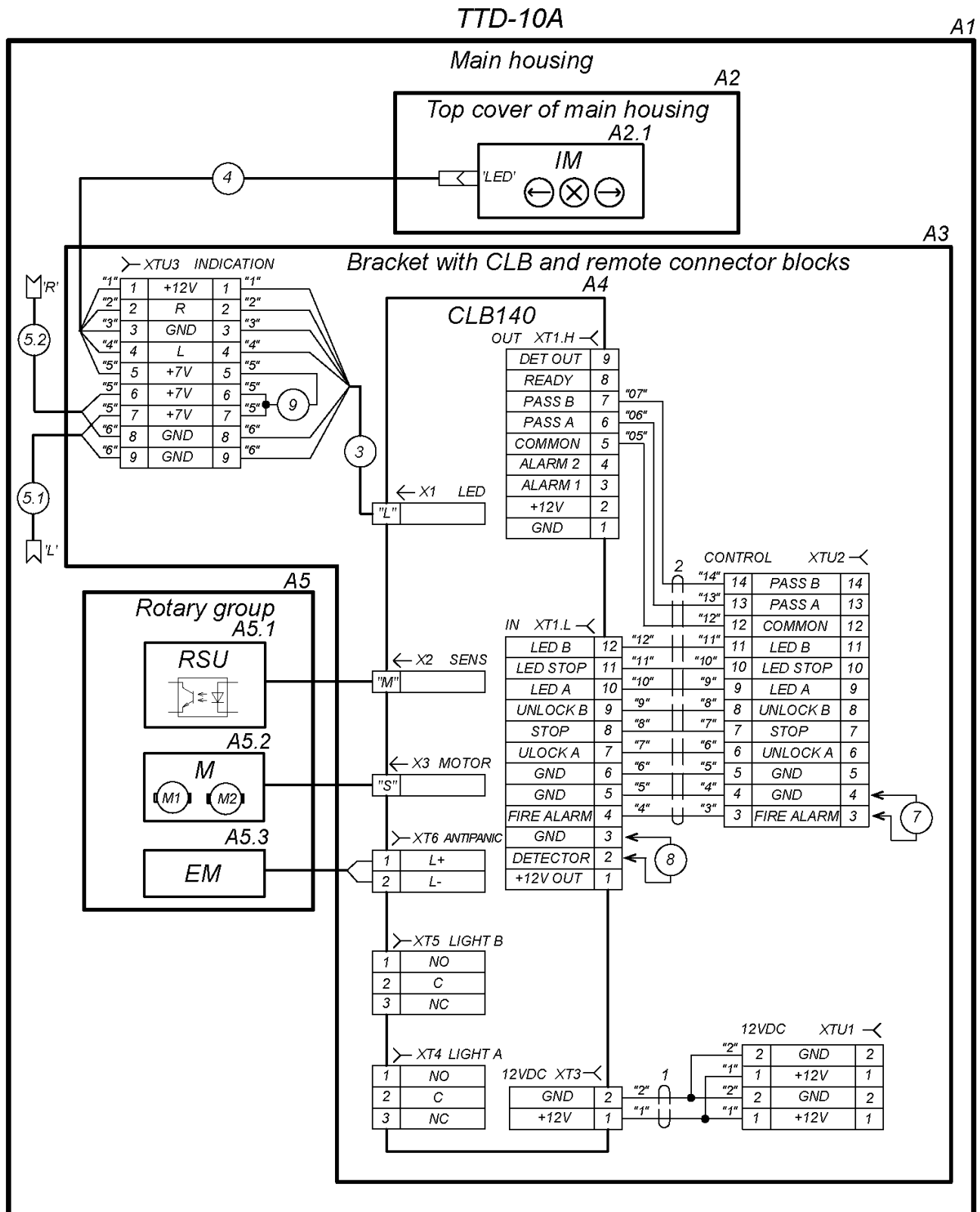


Figure 19. Layout of internal connections of the main housing

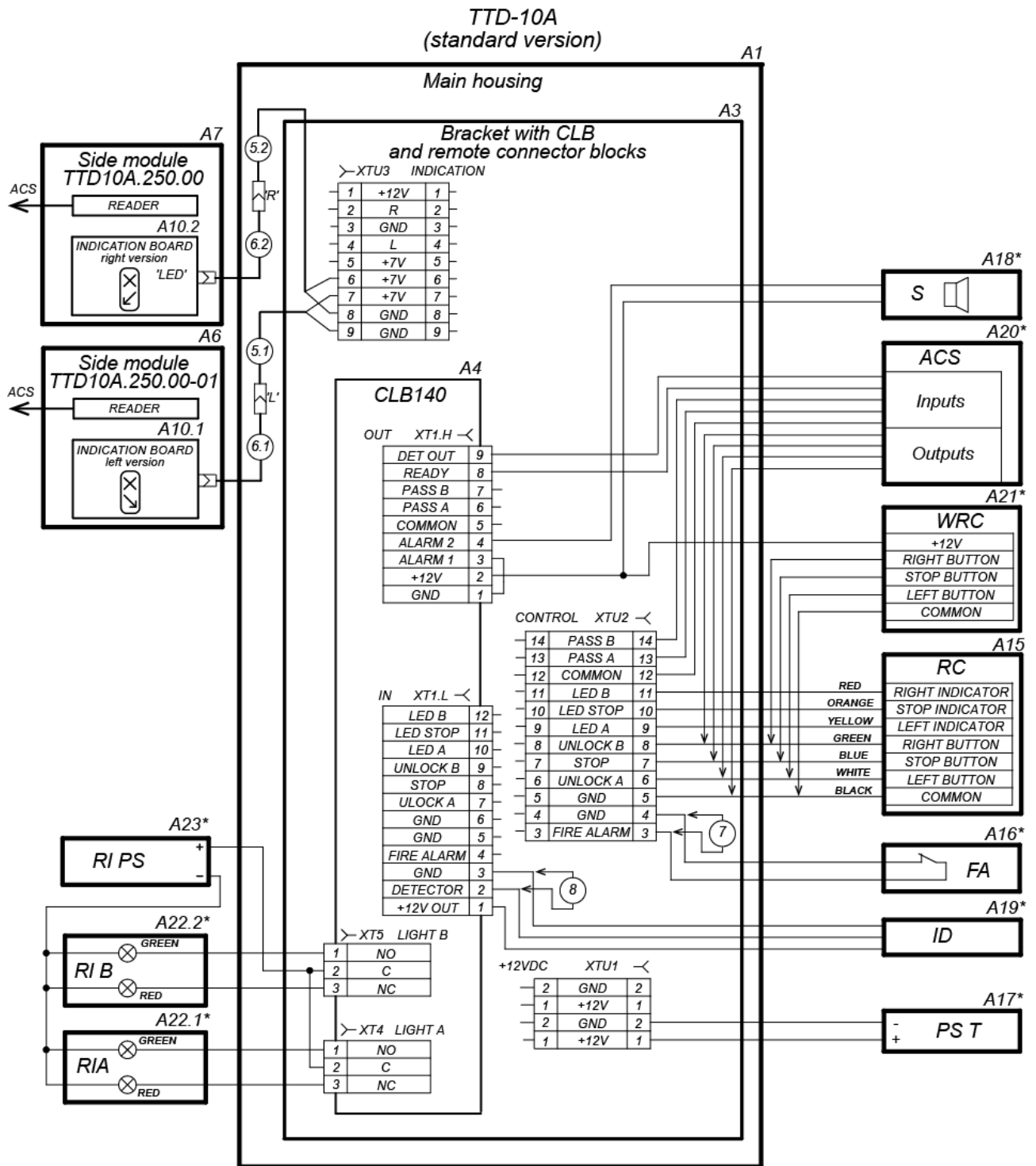


Figure 20. Connection layout of the turnstile (standard TTD-10AB version) and additional equipment¹

¹ Elements of the layout are listed in Table 5.

Elements marked with an asterisk (*) are not included in the standard delivery set.

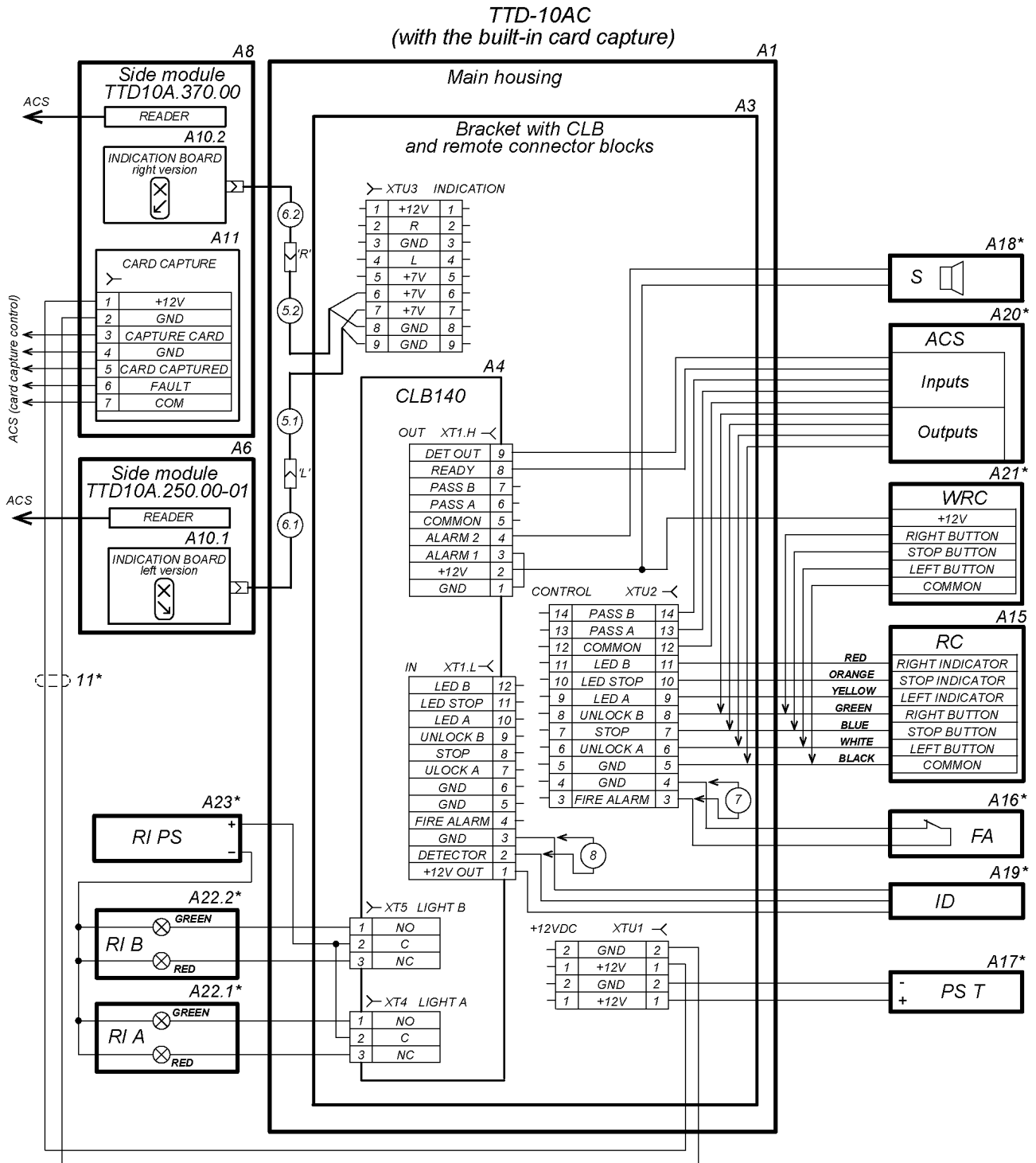


Figure 21. Example of the connection layout of the turnstile (TTD-10AC version with the card capture reader) and additional equipment¹

¹ Elements of the layout are listed in Table 5.

Elements marked with an asterisk (*) are not included in the standard delivery set.

Table 5. Elements of the connection layouts of the turnstile and additional equipment

Legend	Name	Quantity	Figure
A1	Main housing	1	19, 20, 21
A2	Assembled main cover	1	19
A2.1	Main cover indication board	1	19
A3	Controller bracket	1	19, 20, 21
A4	Control logic board CLB.140	1	19, 20, 21
A5	Rotary group	1	19
A5.1	Rotation sensor unit	1	19
A5.2	Electromotors	1	19
A5.3	Electromagnet of the emergency passage unblocking mechanism	1	19
A6	Side module (standard left)	1	19, 20, 21
A7	Side module (standard right)	1	20
A8	Side module (with the card capture reader)	1	21
A10.1	Side module indication board, left version	1	20, 21
A10.2	Side module indication board, right version	1	20, 21
A11	Card capture reader mechanism	1	21
A15	RC panel	1	20, 21
A16¹	Emergency passage unblocking device (<i>Fire Alarm</i>)	1	20, 21
A17¹	Turnstile's power supply unit, 12 V DC / 8 A	1	20, 21
A18¹	Siren, 12 V DC	1	20, 21
A19¹	Intrusion detector	1	20, 21
A20¹	ACS controller	1	20, 21
A21¹	WRC device	1	20, 21
A22.1¹, A22.2¹	Remote indicators	2	20, 21
A23¹	Remote indicators' power supply unit	1	20, 21
XTU1	Remote terminal block (<i>Klemsan 1/4</i>)	1	20, 21
XTU2	Remote terminal block (<i>Klemsan 1/12</i>)	1	20, 21
XTU3	Remote terminal block (<i>Klemsan 1/12</i>)	1	20, 21
1	Internal power cable of the turnstile	1	19
2	Internal control cable of the turnstile	1	19
3	Internal cable to the indication terminal block	1	19
4	Main cover indication cable	1	19
5.1, 5.2	Indication cables from the main housing to the side modules	2	19, 20, 21
6.1, 6.2	Indication cables from the side modules	2	20, 21
7	Jumper wire. Installed when no FA emergency passage unblocking device (A16) is connected. Installed by default	1	19, 20, 21
8	Jumper wire. Installed when no intrusion detector (A19) is connected. Installed by default	1	19, 20, 21
9	Splitter wire of the XTU3 terminal block	1	19
11¹	Power cable of the built-in card capture reader (for TTD-10AC) ¹	1	20

¹ Not included in the standard delivery set.

9 OPERATION

When operating the turnstile, comply with safety measures in accordance with Section 7.2.



Warning!

- Do not move any objects with the size exceeding the passageway width through the passage zone.
- Do not jerk and hit any elements of the turnstile so as to prevent their mechanical deformation.
- Do not dismantle or adjust mechanisms ensuring operation of the turnstile.
- Do not use such substances for cleaning of the turnstile that may cause mechanical damage of its surfaces or corrosion of its parts.

9.1 Power-up

Follow these steps to power up the turnstile:

1. Connect the mains cable of the turnstile power supply unit to the mains with the voltage and frequency specified in the unit's certificate.
2. Switch on the power supply unit. If the pulse mode is selected, the *Passage denial* command will be given automatically, and if the potential mode, the *Both directions are closed* command will be sent. Passage denial indication will light up on the main cover indication block (3) in the form of a red cross. On the RC panel (10), the red indicator above the **STOP** button will light up.
3. Move the barrier arm (5) to its working position by lifting it upwards as far as it will go. The arm will be fixed in this position automatically.
4. Check operation of the intrusion detector and siren if connected, as well as work of other installed additional equipment in accordance with their operational documentation.

The turnstile is ready for operation.

9.2 Pulse control mode

The turnstile control commands are sent from the RC panel, and their indication is displayed in accordance with Table 6. Passage directions are independent of each other, i.e., a command sent for one direction does not change the state of the opposite passage direction.

The RC panel buttons and light indicators are shown in Fig. 6. Please note the following:

- In the *Single passage in the set direction* mode, the turnstile will close automatically after passage of a user in the selected direction. If the passage is not performed during 5 seconds, the turnstile will automatically close as well.
- In the *Single passage in both directions* mode, after a single passage is made in one direction, the countdown of the passage waiting time, which totals 5 seconds, resumes for the opposite direction.
- The *Single passage in the set direction* mode can be changed to the *Free passage* mode for the same direction or to the *Passage denial* mode.
- The *Free passage in the set direction* mode can be changed only to the *Passage denial* mode.



Note:

Pressing a button on the RC panel sends a low-level signal to the relevant contact (*Unlock A*, *Unlock B*, or *Stop*) of the **XTU2** terminal block relative to the *GND* contact.

The turnstile control by means of the WRC is similar to its control via the RC panel. The buttons on the WRC fob implement the same functions as the RC-panel buttons.

¹ The layout in Fig. 20 shows one of the examples for connecting power supply of the card capture reader; the power cable is not included in the delivery set.

Table 6. Pulse control mode (the J1 jumper is installed)

Command	Actions to do via the RC panel	Indication		Turnstile status
		on the RC panel	on the main cover indication block	
<i>Passage denial</i>	Press the STOP button on the RC panel	The <i>Stop</i> red indicator is on	The red cross is lit	The turnstile is locked for both directions
<i>Single passage in the set direction</i>	Press the LEFT/RIGHT button on the RC panel	The green <i>Left / Right</i> indicator of the chosen passage direction is on	The green arrow for the chosen passage direction is lit. After the passage is made, the green arrow goes out, and the red cross lights up	The turnstile gets unlocked for a single user passing through in the set direction. In the opposite direction, the turnstile remains locked
<i>Single passage in both directions</i>	Press both the LEFT and RIGHT buttons on the RC panel simultaneously	The two green indicators (<i>Left</i> and <i>Right</i>) are on simultaneously	The green arrows for each passage direction are lit. After passage in each direction, the green arrow goes out for such a direction. After the second passage, the red cross lights up	The turnstile unlocks for a single passage in both directions regardless of the order of passage through the turnstile
<i>Free passage in the set direction</i>	Press the STOP button and the LEFT / RIGHT button, depending on the chosen passage direction, simultaneously	The green <i>Left / Right</i> indicator of the chosen passage direction is on	The green arrow for the chosen passage direction is lit	The turnstile remains open for free passage in the set direction. In the opposite direction, the turnstile remains locked
<i>Free passage in the set direction and single passage in the opposite direction</i>	Press the STOP button and the LEFT / RIGHT button for one of the directions simultaneously, and the RIGHT / LEFT button for the opposite direction	The two green indicators (<i>Left</i> and <i>Right</i>) are on simultaneously	The green arrows are lit for both directions. After a single passage in the authorized single passage direction, the relevant green arrow goes out	The turnstile remains open in one of the directions. In the opposite direction, the turnstile gets unlocked only for a single passage
<i>Free passage</i>	Press all the 3 buttons on the RC panel simultaneously: LEFT, STOP, and RIGHT	The two green indicators (<i>Left</i> and <i>Right</i>) are on simultaneously	The green arrows are lit for both directions	The turnstile remains open in both directions
<i>Anti-panic</i>	All RC panel commands are ignored	Both green indicators, <i>Left</i> and <i>Right</i> , are flashing	The arrows of both directions are flashing	The barrier arm is lowered to the vertical position, and the passage through the turnstile is unimpeded

9.3 Potential control mode

The turnstile control commands are sent, and their indication is displayed in accordance with Table 7. Passage directions are independent of each other, i.e., a command sent for one direction does not change the state of the opposite direction.

If there is a low-level signal on the contact of the relevant direction by the time of passage, the turnstile will remain open in this direction.



Note for ACS outputs:

- High level — contacts of the output relay are broken, or the output transistor is closed.
- Low level — contacts of the output relay are closed, or the output transistor is open.

Table 7. Potential control mode (the J1 jumper is removed)

Commands	Control signal	Indication		Turnstile status
		on the RC panel	on the main cover indication block	
<i>Both passage directions are closed</i>	High level on the <i>Unlock A</i> and <i>Unlock B</i> contacts or low level on the <i>Stop</i> contact	The <i>Stop</i> red indicator is on	The red cross is lit	The turnstile is locked for both directions
<i>Direction is open</i>	Low level on the contact of the selected direction. High level on all other contacts	The green <i>Left / Right</i> indicator of the chosen passage direction is on	The green arrow for the chosen passage direction is lit	The turnstile is open for the selected direction
<i>Both passage directions are open</i>	Low level on the <i>Unlock A</i> and <i>Unlock B</i> contacts. High level on the <i>Stop</i> contact	The two green indicators (<i>Left</i> and <i>Right</i>) are on simultaneously	The green arrows are lit for both directions	The turnstile remains open in both directions
<i>Anti-panic</i>	All RC commands are ignored	Both green indicators (<i>Left</i> and <i>Right</i>) are flashing	The arrows of both directions are flashing	The barrier arm is lowered to the vertical position, and the passage through the turnstile is unimpeded

9.4 Operation algorithm of the built-in card capture reader¹

The built-in card capture reader can function only as part of the ACS. The ACS controller is configured to operate the built-in card capture reader in accordance with its operational documentation.

To present an access card to the reader, it is necessary to insert it into the card slot. For convenience of users in the standby mode, the receiving slot of the card capture reader is constantly illuminated with a built-in LED indicator.

If the presented card is a permanent employee card and does not need to be withdrawn, the ACS controller allows passage through the turnstile in the required direction (gives the appropriate signal to the turnstile control mechanism). The shutter, blocking access to the card container, remains closed, preventing accidental withdrawal of the card. It is necessary to remove the card from the slot and pass through the turnstile. The illumination of the card slot remains constant.

¹ For the **TTD-10AC** version with the card capture reader.

If the presented card is a temporary visitor card and needs to be withdrawn, the illumination of the card slot will start flashing with a frequency of 2 times per second. The shutter, blocking access to the card container, will open, and the card will fall into the card container, i.e., it will be captured.

After the card withdrawal to the container, the shutter of the card capture reader automatically closes; the illumination of the card slot becomes constant again, and the ACS controller allows a single passage through the turnstile in the required direction.

If, for some reason, the card is not captured during the **Confirmation Timeout** (to be set in the ACS) (for example, if the visitor fails to release the card for withdrawal, or it gets stuck in the slot), the ACS controller will prohibit passage in this direction, and the illumination of the receiving slot will switch to continuous operation. After that, the access card will have to be taken out of the card slot and presented for rereading and withdrawal.

As cards are collected from users, the container fills up. When the card container is full, the *Fault* signal is sent to the ACS controller, and the illumination of the card capture reader's receiving slot starts flashing once in 2 seconds, thereby warning about the need to empty the container of the withdrawn cards. If the container is not emptied, then after receiving 10 more cards, the card capture reader stops operating, and the illumination of the card slot goes out.

The *Fault* signal is removed, and operation of the card capture reader is unblocked automatically after the container is emptied of cards (the procedure for removal and installation of the container is described in Section 9.5).

The *Fault* signal is also sent to the ACS controller in case of malfunction of the card capture reader while the illumination of the receiving slot goes out until the fault is eliminated. If the card container, installed in the turnstile, is empty, but the blocking and the *Fault* signal are not removed, this is probably caused by malfunctions of the units enabling operation of the card capture reader. In this case, it is recommended to contact the PERCo Technical Support Department.

9.5 Removal and installation of the card container¹

To remove the card container from the turnstile, do the following:

1. Turn the key of the cover lock of the card capture reader until it stops (open the lock).
2. Pull the key from the lock, thereby opening the cover and providing access to the container.
3. Remove the container from the turnstile.

The installation of the card container into the turnstile is carried out in reverse order.

10 EMERGENCY RESPONSE

In emergencies and abnormal situations, such as power loss, the passage zone of the turnstile can serve as an additional emergency exit.

The turnstile can be switched to the *Fire Alarm* mode via an emergency passage unblocking device (fire alarm device, emergency button, etc.). In this mode, the barrier arm, blocking the passage zone, drops (takes a vertical position) and clears the passage in both directions; green arrows are flashing on the indication blocks, and control commands from other devices and software are ignored (see Sect. 5.3.2).

In addition, the passage zone opens automatically when the turnstile's operating voltage is removed (lost).

¹ For the **TTD-10AC** version with the card capture reader.

**Attention!**

In case of fire, natural disasters, and any other emergency situations, it is necessary to use emergency exits, complying with safety requirements, to evacuate people from the facility urgently. For example, the **BH-02** anti-panic rotary railing section can be applied as such an exit.

11 TROUBLESHOOTING

Possible faults that can be cleared by the users themselves are listed in Table 8.

Table 8. Troubleshooting

Fault	Most probable cause	Remedy
The power supply unit is switched on, but the turnstile does not function, and there is no light indication on the turnstile housing and the RC panel	No operating voltage is applied to the control board	Switch off the turnstile's power supply unit, disconnect it from the AC mains, and remove the turnstile housing top cover. Check the integrity of the power cable and reliability of its connection to the terminal block
The turnstile is not controlled in one of the directions, but there is light indication on the turnstile housing and on the RC panel	No control signal is sent to the control board for this direction	Switch off the turnstile's power supply unit, disconnect it from the AC mains, and remove the turnstile housing top cover. Check the integrity of the RC panel / WRC / ACS controller cable and reliability of its connection to the terminal block

In case of other faults and defects, please contact the PERCo Technical Support Department (the PERCo TSD).

12 MAINTENANCE

The turnstile maintenance is required once a year and in case of any technical failures; the turnstile must be serviced immediately after repair works. The maintenance is to be carried out by a properly qualified mechanic only after careful study of this Manual. The item numbers are specified in accordance with Fig. 2 unless expressly stated otherwise.

Technical maintenance procedure:

1. Switch off the turnstile's power supply unit. This will automatically lower the upper barrier arm and open the passage.
2. Remove the flywheel with the barrier arms by unscrewing three M8 screws.
3. Lubricate points of contact between the triggers and hinge in the flywheel as well as hinged attachment points of the barrier arms with machine oil.
4. Remove the turnstile's main cover (2) from the turnstile housing as described in Section 6 and place it on a flat steady surface.
5. To access the rotary group of the turnstile's barrier arms, remove the bracket with the control board and remote terminal blocks. For this purpose: unscrew 6 screws, which fix the bracket on the turnstile housing, and carefully move the bracket aside without damaging connected cables.
6. Inspect the rotary group of the barrier arms: its resetting mechanism (a pusher, springs, and a roller), optical rotation sensors for the barrier arms, and damper (see Figure 22).

**Attention!**

Avoid ingress of the lubricant on the rotation sensor disk and roller surfaces when cleaning and lubricating the rotary group of the barrier arms.

7. Remove any possible dirt from a rotation sensor disk (6 in Figure 22), located in the gap of the optical rotation sensors for the barrier arms, with an alcohol-gasoline blend applied with a clean cloth. Avoid ingress of dirt into the working gaps of both optical rotation sensors.
8. Lubricate the following parts of the rotary group (lubrication points are marked in Figure 22):

- rotation axes of the pusher lever (17 in Figure 22), roller (15 in Figure 22), and stoppers (11, 12 in Figure 22) with the **Chain and Rope Lube Spray – WEICON** lubricant;
- parts of the emergency passage unblocking mechanism (4 in Figure 22) with the **Chain and Rope Lube Spray – WEICON** lubricant.
- attachment points of the resetting springs (20, 21 in Figure 22) with machine oil.

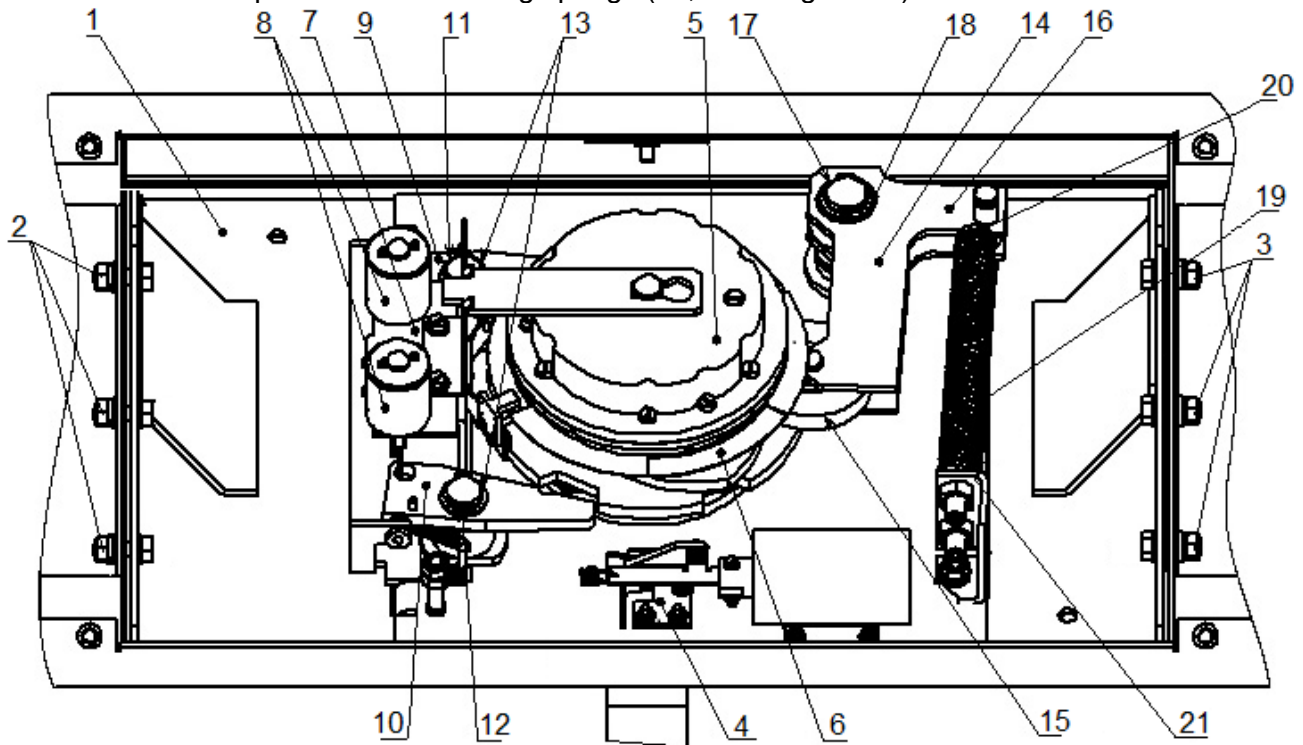


Figure 22. Rotary group of the turnstile's barrier arms

- 1 – base of the rotary group; 2, 3 – nuts fixing the base to the housing;
 4 – emergency passage unblocking mechanism; 5 – damper; 6 – rotation sensor disk;
 7 – control mechanism; 8 – electric motor of the stopper unit; 9, 10 – stopper;
 11, 12 – stopper axis; 13 – locking washers of stopper axes; 14 – pusher;
 15 – roller; 16 – pusher lever; 17 – lever axis; 18 – locking washer of the lever axis;
 19 – springs; 20, 21 – attachment points of the springs

9. Reinstall the bracket with the control board and remote terminal blocks in reverse order to removal.
10. Reinstall the flywheel with the barrier arms in reverse order to removal.
11. Check the reliability of the cable connections to the CLB terminal blocks and, if necessary, tighten the relevant cable-fixing screws with a screwdriver.
12. Check the reliability of the barrier arms' (5) fastening in the hinged units of the turnstile and, if necessary, tighten the fixing screws.
13. Remove side modules (6, 13) in a manner specified in Section 8.4 of this Manual. Check the tightness of the four anchor bolts securing the turnstile housing to the floor and, if necessary, tighten them.
14. Reinstall side modules in reverse order to removal.
15. Return the main cover (2) into its operating position in reverse order to removal and fix it with its key.
16. Energize the turnstile and move the barrier arm to its working position.
17. Check operation of the turnstile in accordance with Section 9 of this Manual.

After technical maintenance works and inspections are complete, the turnstile is ready for further operation.

In case of any defects revealed during technical maintenance, please contact the PERCo Technical Support Department (the PERCo TSD).

13 TRANSPORTATION AND STORAGE

The turnstile in the manufacturer's packaging is allowed to be transported only in closed transport (railway cars, containers, closed motor cars, ship holds, airplanes, etc.).

Do not stack the boxes with the turnstiles during transportation and storage.

Storage of the turnstile is allowed in dry indoor facilities at an ambient air temperature from -40°C to $+55^{\circ}\text{C}$ and relative air humidity of up to 98% at $+25^{\circ}\text{C}$.

After transportation or storage at temperatures below zero or at high air humidity, the turnstile needs to be kept in its packaging for no less than 24 hours prior to the start of installation works under normal climate conditions corresponding to its operating conditions.

APPENDICES

Appendix 1. Design of different types of turnstile side covers

The side covers of the turnstile are a variable functional element of the product and are designed for different applications, which are determined by their type. The type of each cover is selected by the customer when ordering the turnstile. The types of manufactured side covers and their applications are shown in Table 1.

The side cover is installed on the side module from above while four threaded posts should fit into the corresponding holes in the module housing. The cover is fixed with 4 nuts with washers (S5 wrench).

1. The **C-10B** side cover is a basic cover without additional functions, made of stainless steel.

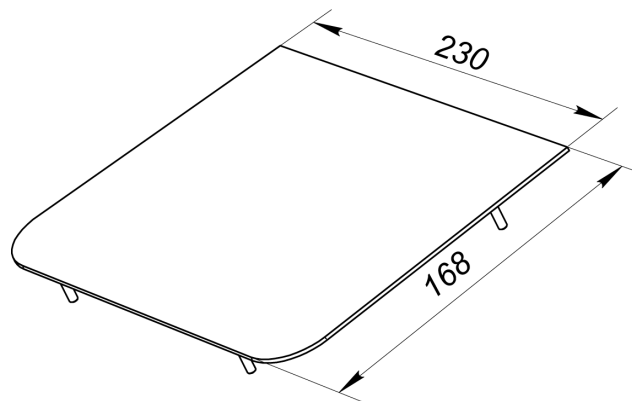


Figure 23. Dimensions of the **C-10B** side cover

2. The **C-10R** side cover is intended for the installation of a built-in RFID reader into the turnstile. It is made of stainless steel and has a window made of radio-transparent material.

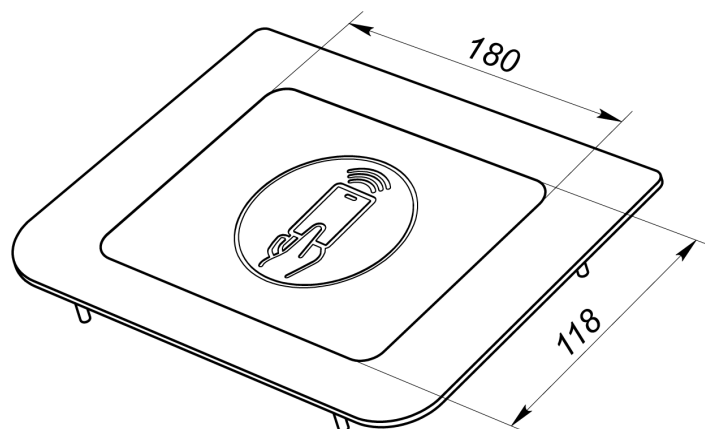


Figure 24. The **C-10R** side cover

3. The **C-10P.1** and **C-10P.2** side covers are intended for the installation of a built-in RFID reader and additional equipment, for example, a face recognition terminal or breathalyzer.

The side covers are made of stainless steel and have a window made of radio-transparent material and a pole for mounting **BS** brackets with additional equipment. They differ in the pole height and are selected with regard to equipment to be installed thereon.

Table of compliance of side cover types, brackets, and installed equipment:

Additional equipment	Bracket	Cover type
Suprema FaceStation 2	BS10	C-10P.1
Suprema FaceLite	BS11	
ZKTeco ProFace X	BS8	C-10P.2
ZKTeco SpeedFace V5	BS9	

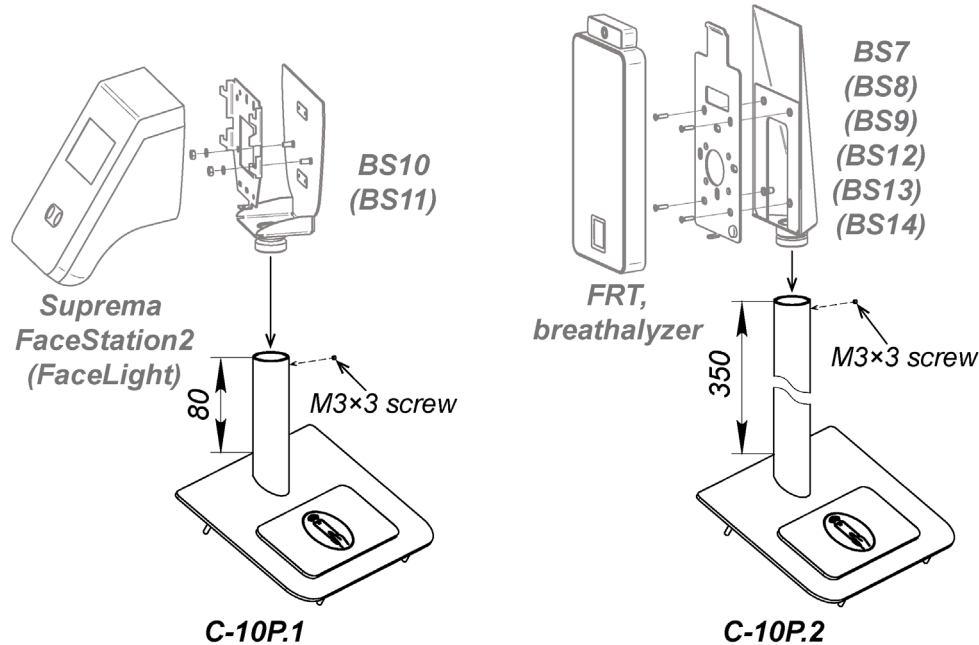


Figure 25. The C-10P.1 and C-10P.2 side covers

4. The **C-10F.1** side cover is intended for the installation of the **CL15** biometric controller with a built-in fingerprint scanner into the turnstile.

It is made of stainless steel. It is possible to turn the bracket for installing the controller at an angle of up to 30° in any direction from the longitudinal axis of the turnstile for the convenience of presenting a finger to the fingerprint scanner. To do this, loosen the two screws inside the bracket that fix it on the cover, turn it to the required position, and then fix it with the screws.



Attention!

Before turning the bracket, the screws must be loosened sufficiently to avoid scratching the cover when turning.

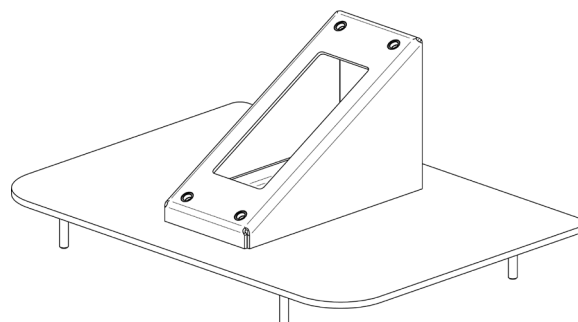


Figure 26. The C-10F.1 side cover

5. The **C-10F** side cover is intended for the installation of a third-party biometric fingerprint reader.

It is made of stainless steel and has a bracket for installing the reader. The bracket is turned by 20° from the longitudinal axis of the turnstile towards the passage for ease of reading; it is possible to turn the bracket in the other direction, depending on the side of the turnstile where the side cover will be installed. To do this, it is necessary to remove the bracket from the cover by unscrewing two nuts and reinstall it in another position.

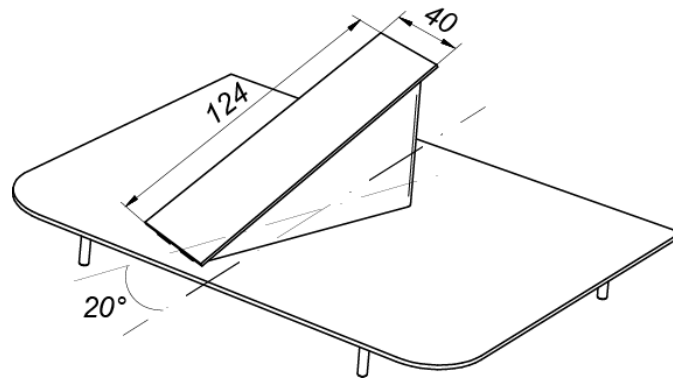


Figure 27. The C-10F side cover

6. The **C-10RC** side cover is intended for the installation only into the **TTD-10AC** turnstile version with the built-in card capture reader.

It is made of stainless steel with an ABS plastic insert for the operation of an RFID reader and with a receiving slot of the card capture reader.

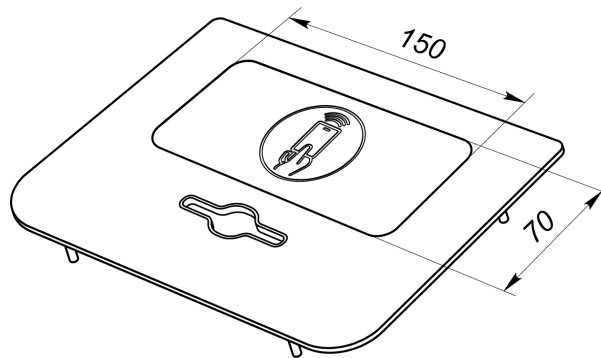


Figure 28. The C-10RC side cover

7. The **C-10Q.1** side cover is intended for the installation of the built-in **Mertech T7821 P2D** barcode scanner into the turnstile. The scanner comes complete with the cover.

The side cover is made of stainless steel. The barcode scanner is built directly into the side cover (see Fig. 29). Fasteners are included in the delivery set of the side cover.

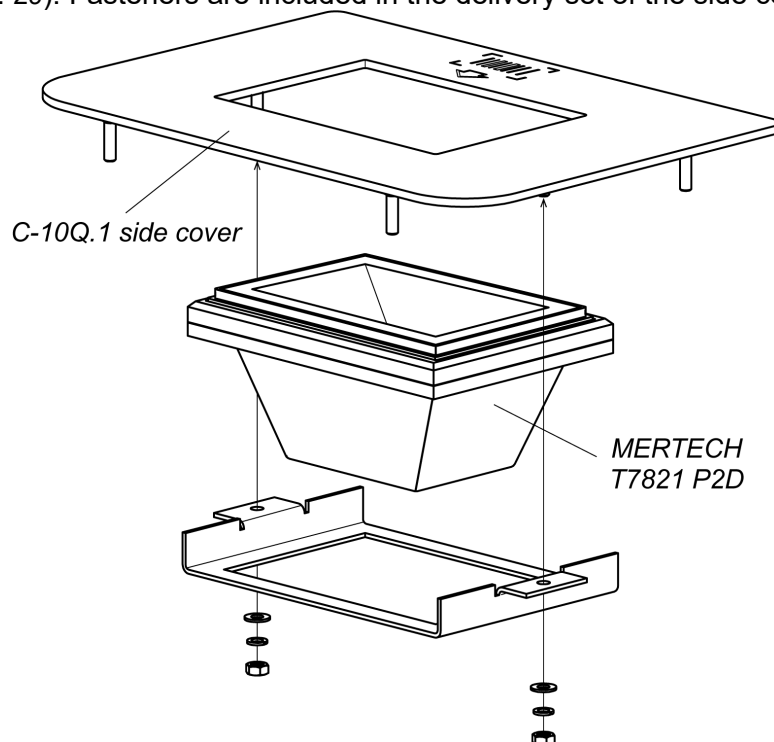


Figure 29. The C-10Q.1 side cover with the Mertech T7821 P2D barcode scanner

Appendix 2. Command transmission algorithm in pulse control mode



Note:

For the RC panel:

- active front — pressing of the relevant button on the RC panel;
- low level — the relevant button on the RC panel has been pressed;
- high level — the relevant button on the RC panel has not been pressed.

By applying a low-level signal relative to the *GND* contact to the *Unlock A*, *Stop*, and *Unlock B* contacts of the **XT1.L** terminal block (or **XS1** remote terminal block), the following commands can be generated (the command is the active front of a signal (signal transition from high to low) at any of the contacts if there are corresponding signal levels at other contacts):

Passage denial (the turnstile is locked for entry and exit). The active front is at the *Stop* contact while there is a high level at the *Unlock A* and *Unlock B* contacts. Both passage directions are blocked at this command.

Single passage in direction A (open for passage of one person in direction A). The active front is at the *Unlock A* contact while there is a high level at the *Stop* and *Unlock B* contacts. At this command, direction A opens either for 5 sec., or until the passage has been made in this direction, or until the *Passage denial* command, and the state of direction B does not change. The command is ignored if, at the time of its receipt, the state of direction A is *Free passage*.

Single passage in direction B (open for passage of one person in direction B). The active front is at the *Unlock B* contact while there is a high level at the *Stop* and *Unlock A* contacts. At this command, direction B opens either for 5 sec., or until the passage has been made in this direction, or until the *Passage denial* command, and the state of direction A does not change. The command is ignored if, at the time of its receipt, the state of direction B is *Free passage*.

Single passage in both directions (open in both directions for passage of one person in each direction). The active front is at the *Unlock A* contact while there is a low level at the *Unlock B* contact and a high level at the *Stop* contact, or the active front is at the *Unlock B* contact while there is a low level at the *Unlock A* contact and a high level at the *Stop* contact.

At this command, both passage directions open, each either for 5 sec., or until the passage is completed in the set direction, or until the *Passage denial* command is received. The command is ignored for the passage direction that is in the *Free passage* state at the time of its receipt.

Free passage in direction A (open for free passage in direction A). The active front is at the *Unlock A* contact while there is a low level at the *Stop* contact and a high level at the *Unlock B* contact, or the active front is at the *Stop* contact while there is a low level at the *Unlock A* contact and a high level at the *Unlock B* contact. At this command, direction A opens until the *Passage denial* command is received; the state of passage direction B does not change.

Free passage in direction B (open for free passage in direction B). The active front is at the *Unlock B* contact while there is a low level at the *Stop* contact and a high level at the *Unlock A* contact, or the active front is at the *Stop* contact while there is a low level at the *Unlock B* contact and a high level at the *Unlock A* contact. At this command, direction B opens until the *Passage denial* command is received; the state of passage direction A does not change.

Free passage (open for free passage in both directions). The active front is at the *Unlock A* contact while there is a low level at the *Stop* and *Unlock B* contacts, or the active front is at the *Unlock B* contact while there is a low level at the *Stop* and *Unlock A* contacts, or the active front is at the *Stop* contact while there is a low level at the *Unlock A* and *Unlock B* contacts. Both directions open at this command until the *Passage denial* command is received.

Appendix 3. Command transmission algorithm in potential control mode



Note:

For ACS controller outputs:

- low level – either contacts of the output relay are closed, or the output transistor is open.
- high level – either contacts of the output relay are broken, or the output transistor is closed.

Both directions are closed (the turnstile is locked for entry and exit). There is a high level at the *Unlock A* and *Unlock B* contacts, or a low level at the *Stop* contact. Both passage directions close at this command.

Direction A is open (open for passage in direction A). There is a low level at the *Unlock A* contact while a high level is present at the *Stop* and *Unlock B* contacts. At this command, direction A opens until removal of a low-level signal from the *Unlock A* contact or until the *Both directions are closed* command is received. The state of direction B does not change.

Direction B is open (open for passage in direction B). There is a low level at the *Unlock B* contact while there is a high level at the *Stop* and *Unlock A* contacts. At this command, direction B opens until removal of a low-level signal from the *Unlock B* contact or until the *Both directions are closed* command is received. The state of direction A does not change.

Both directions are open (open for both directions). There is a low level at the *Unlock A* and *Unlock B* contacts while there is a high level at the *Stop* contact. Both directions open at this command until removal of a low-level signal from one of the *Unlock A* or *Unlock B* contacts or until the *Both directions are closed* command is received.

Appendix 4. Configuring the PERCo ACS controller for operation with the card capture reader



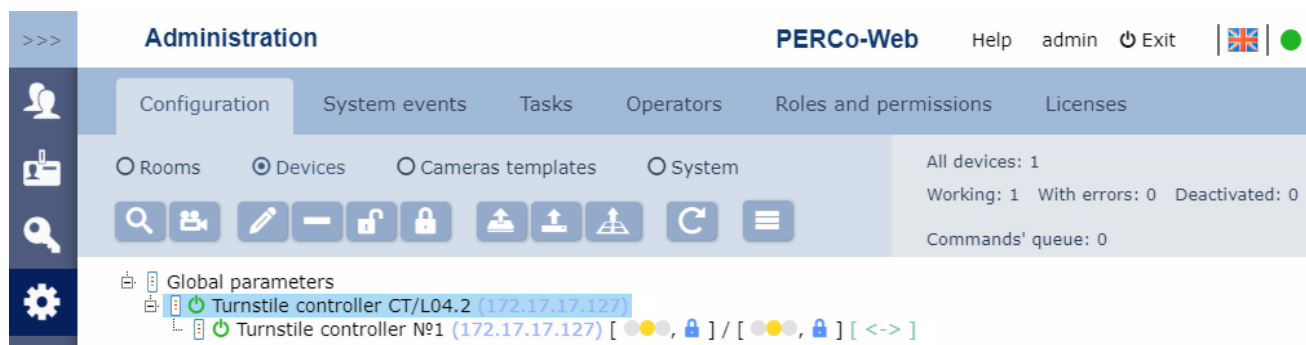
Attention!

- The Appendix deals only with the settings of the controller parameters related to the operation of the card capture reader.
- In respect of visitor cards subject to withdrawal, a mandatory process needs to be set in the software for their verification upon presenting them to the reader of the direction controlled by the card capture reader.

In this Appendix, configuration of the ACS controller for operation with the card capture reader is exemplified by the CTL04.2 controller manufactured by **PERCo**; controllers by other manufacturers need to be set by using a similar algorithm.

In the PERCo-Web software for ACS

1. Log into the system by using a Web browser (see *PERCo-Web Admin Guide*).
2. Go to the **Administration** → **Configuration** section by using the navigation panel.
3. In the working area of the page, select the main controller that is physically connected to the card capture reader:



4. Click the  **Edit** button on the page toolbar. The **Device properties** window will open.

5. In the opened window, select the **Additional outputs** tab.
6. In the working area of the window, select **Additional output No...** (number of the output must match the controller output to which the *Capture card* input of the card capture reader is physically connected).
7. Specify the following parameters by using the relevant drop-down list in the working area of the window:
 - set the **Standard** value for the **Type** parameter;
 - set the **Not energized** value for the **Normal state** parameter:

Device properties
✕

Device name:

Device type: **Turnstile controller CT/L04.2**

General

Additional inputs

Additional outputs

Status

External connections

Additional output № 3

Additional output № 4

Additional output No.5

Additional output No.6

Additional output № 3

Type

Output operation instructions

Normalize

Activate

Normal state

All in the device(s)

Save

Save and close

8. Go to the **Additional inputs** tab.
9. If the card capture reader functions as an external verification device for the controller (the *Card captured* signal is sent to a separate input of the controller), then select **Additional input No...** (number of the controller input that is physically connected to the *Card captured* output of the card capture reader) and set the following parameters by using the drop-down menu:
 - set the **Confirmation from external verification device** value for the **Type** parameter;
 - set the **Disconnected** value for the **Normal condition of the contact** parameter;
 - set the **Device ... direction ...** value for the **Device number** parameter (the operating device (OD) number and direction number must match those that are controlled by the card capture reader):

Device properties
✕

Device name:

Device type: **Turnstile controller CT/L04.2**

General

Additional inputs

Additional outputs

Status

External connections

Additional input No.3

Additional input No.4

Additional input No.5

Additional input No.6

Additional input No.3

Type

Normal condition of the contact

Device number

All in the device(s)

Save

Save and close

10. If necessary, configure the system response to the *Fault* signal sent by the card capture reader. To do this: select **Additional input No...** in the working area of the window (number of the input must match the input of the controller that is physically connected to the *Fault* output of the card capture reader) and set the following parameters by using the drop-down menu:
 - set the **Standard** value for the **Type** parameter,

- set the **Disconnected** value for the **Normal condition of the contact** parameter:

Device properties
✕

Device name:

Device type: **Turnstile controller CT/L04.2**

General
Additional inputs
Additional outputs
Status
External connections

Additional input No.3
Additional input No.4
 Additional input No.5
 Additional input No.6

Additional input No.4

Type

Normal condition of the contact

Additional inputs, masked on OD activation
 Masking out criterion

☐ Additional input № 2
☐ Additional input No.3

All in the device(s) ▼

Save

Save and close

- configure the controller's response to the activation of input No.5 as required by using the output activation or normalization parameters, for example, the activation of additional output No. 5 of the controller to which the alarm system is connected:

Device properties
✕

Device name:

Device type: **Turnstile controller CT/L04.2**

General
Additional inputs
Additional outputs
Status
External connections

Additional input No.3
 Additional input No.4
Additional input No.5
 Additional input No.6

Additional input No.5

Type

Normal condition of the contact

Additional outputs activated on activation
 Activation criterion

☐ Additional output № 2
☐ Additional output № 3
☐ Additional output № 4
☒ Additional output No.5

All in the device(s) ▼

Save

Save and close

Device properties
✕

Device name:

Device type: **Turnstile controller CT/L04.2**

General
Additional inputs
Additional outputs
Status
External connections

Additional output № 3
 Additional output № 4
Additional output No.5
 Additional output No.6

Additional output No.5

Type

Normal state

Output operation instructions

Normalize

Activate

All in the device(s) ▼

Save

Save and close

11. **Attention!**

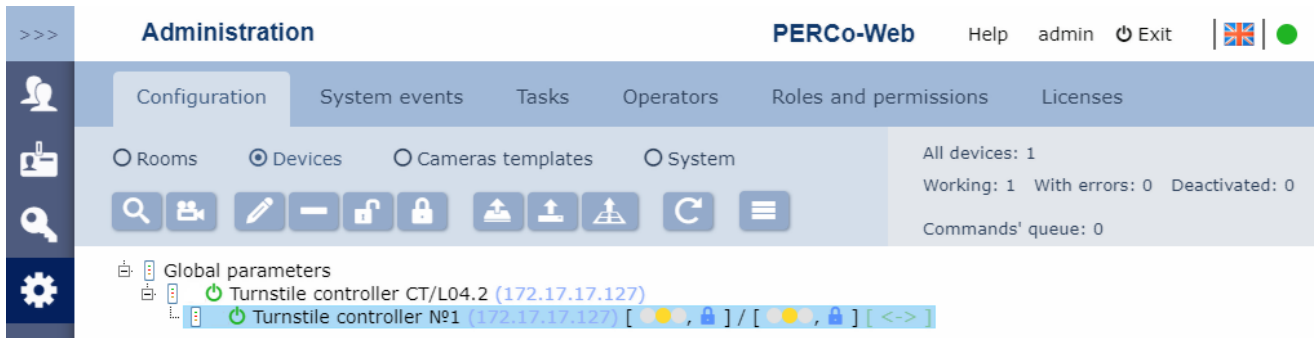
If the passage permission indication of the card capture reader is controlled directly from the control board of the turnstile, then, it is not necessary to fulfill the requirements of this paragraph.


To do this: select **Additional output No...** (the output number must match the controller output that is physically connected to the *LED* input of the card capture reader) and set the following parameters by using the drop-down menu in the working area of the window:

- set the **Standard** value for the **Type** parameter;
- set the **Not energized** value for the **Normal state** parameter.

12. Click the **Save and close** button. The **Device properties** window will close.

13. Within the main controller, select the OD controller, which is operated by the card capture reader:

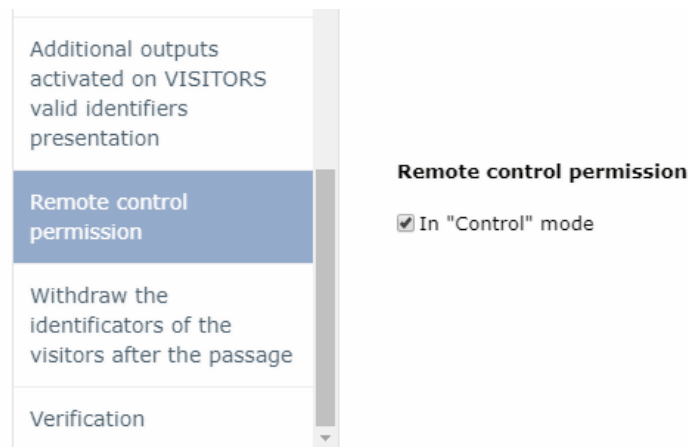


14. Click the  **Edit** button on the page toolbar. The **Device properties** window will open.

15. Switch to the **Reader No...** tab (number of the reader must match the reader controlled by the card capture reader).

16. The *Card captured* signal sent by the card capture reader confirms withdrawal of the card for the access controller. To configure the confirmation parameters, select the group of **Verification** parameters in the left part of the tab's working area and set the following values:

- For the **Verification** parameter:
 - set the **External verification device** value, if the card capture reader acts as an external verification device for the controller (the *Card captured* signal is sent to a separate input of the controller),
 - set the **Remote control** value, if the *Card captured* output of the card capture reader is connected to the controller in parallel with the RC panel. In this case, it is also necessary to check the **In "Control" mode** box on the left side of the **Remote control permission** window:



- Check boxes of the **Verify VISITORS IDs from the external verification device** parameter (or, respectively, **...from the remote control**):
 - **When passing**;
 - **When passing with VIOLATED TIMING**;
 - **When passing with ZONALITY VIOLATION**.
- specify the desired value for the **Waiting period for verification confirmation from the external verification device** parameter (or, respectively, **...from the remote control**), during which the controller will be waiting for the *Card captured* signal.

Device properties

Device name: Turnstile controller №1

Device type: Turnstile controller

Exit from: Undefined

Entry to: Undefined

Alarm generator
Turnstile
Reader 1
Reader 2
Double-check access cards list

Additional outputs activated on EMPLOYEES valid identifiers presentation
Additional outputs activated on VISITORS valid identifiers presentation
Remote control permission
Withdraw the identifiers of the visitors after the passage
Verification

Verification
Verification
External verification device
Verify VISITORS IDs from the external verification device
☒ When passing
☒ When passing with VIOLATED TIMING
☒ When passing with ZONALITY VIOLATION
Waiting period for verification confirmation from external verification device
5 Seconds
In case of no response from the external verification device
Ban

Reader commands
Set the "Open" operating mode
Set the "Control" operating mode
Set the "Closed" operating mode
Open (unblock) device
Close (block) the device

All in the device(s)
Save
Save and close

17. Select the **Additional outputs activated upon VISITORS valid identifiers presentation** group of parameters and choose the following:

- set **For the operation time** for the **Activation criterion** parameter by using the drop-down list.
- in the opened list of additional outputs, check **Additional output No.3** (number of the output that is connected to the *Capture card* input of the card capture reader):

Device properties

Device name: Turnstile controller №1

Device type: Turnstile controller

Exit from: Undefined

Entry to: Undefined

Alarm generator
Turnstile
Reader 1
Reader 2
Double-check access cards list

Additional outputs activated on EMPLOYEES valid identifiers presentation
Additional outputs activated on VISITORS valid identifiers presentation
Remote control permission
Withdraw the identifiers of the visitors after the passage
Verification

Additional outputs activated on VISITORS valid identifiers presentation
Activation criterion
For the operation time
☐ Additional output № 2
☒ Additional output № 3
☐ Additional output № 4
☐ Additional output No.5
☐ Additional output No.6
☐ Additional output No.7
☐ Additional output No.8
☐ Additional output No.9

Reader commands
Set the "Open" operating mode
Set the "Control" operating mode
Set the "Closed" operating mode
Open (unblock) device
Close (block) the device

All in the device(s)
Save
Save and close

18. In the left part of the tab, select such parameter as **Withdraw the identifiers of the visitors after the passage** and check the relevant box:

Device properties
✕

Device name:

Device type: **Turnstile controller**

Exit from: ⋮ ✕

Entry to: ⋮ ✕

Alarm generator
Turnstile
Reader 1
Reader 2
Double-check access cards list

Additional outputs activated on EMPLOYEES valid identifiers presentation

Additional outputs activated on VISITORS valid identifiers presentation

Remote control permission

Withdraw the identifiers of the visitors after the passage

Verification

Withdraw the identifiers of the visitors after the passage

☒ Withdraw the identifiers of the visitors after the passage

Reader commands

Set the "Open" operating mode

Set the "Control" operating mode

Set the "Closed" operating mode

Open (unblock) device

Close (block) the device

All in the device(s) ▼

Save

Save and close

19. Click the **Save and close** button. The **Device properties** window will close, and all settings will be saved.

In the Web interface of the CT/L04.2 controller



Attention!

Using the web interface, you can only configure the simplest algorithm of withdrawing cards from visitors; more advanced settings can be configured by means of the **PERCo-Web** software. The **CT/L04 (CT03)** controllers do not support the configuration of operation with the card capture reader via the web interface.

1. In the **Configuration → Edit → Operating devices** section, select the OD that is physically connected to the card capture reader, then select **Reader 1** or **Reader 2** depending on the passage direction controlled by the card capture reader. Set the following parameters for the reader:
 - set the **External verification device** value for the **Verification** parameter,
 - Within the **EVD in ACM "Control"** group of parameters, set the **Yes** value for the **Visitor pass verification** parameter and also set the required values for the **Visitor verification activation** and **EVD waiting period** parameters.
2. Set the following parameters in the **Configuration → Edit → Physical contacts** section:
 - Set the following parameter values for the input that is physically connected to the *Card captured* output of the card capture reader:
 - **Normal state** – **Open**,
 - **Function** – **EVD confirmation input**,
 - **OD** – **1** (number of the OD that is physically connected to the card capture reader),
 - **Direction** – **1** or **2** (depending on the passage direction that is controlled by the card capture reader):

Physical contact Input 6 (loop)

Normal state: Cut

Function: External verification device confirmation input

Operating device: 1

Direction: 1

Save Cancel

- Set the following parameter values for the output that is physically connected to the *Capture card* input of the card capture reader:
 - **Normal state** – **Not energized**,
 - **Function** – **Output**:

Physical contact Output 3

Normal state: Not Energized

Function: Output

Save Cancel

3. Add the following internal response in the **Configuration** → **Edit** → **Internal responses** section:
 - **Source type** – **Visitor ID presentation**,
 - **Source number** – **1** (the number of the OD that is physically connected to the card capture reader),
 - **Source direction** – **1** or **2** (depending on the passage direction controlled by the card capture reader),
 - **Receiver type** – **Activate output**,
 - **Receiver number** – **3** (the output number that is physically connected to the *Capture card* input of the card capture reader),
 - **Response characteristic** – **Response time**.

Internal response 1
✕

Number: 1

Source type: Visitor ID card presentation

Source number: 1

Source direction: 1

Receiver type: Activate output

Receiver number: 3

Receiver direction: 1

Response time: No

Response characteristic: Response time

Reset of the guard zone output in «ALARM» mode: No

Save Cancel

4. Any free input of the controller can be used for receiving the *Alarm* signal sent by the card capture reader. For this purpose, it is necessary to set the type of response to the activation of this input, for example, blocking of the reader in the passage direction that is controlled by the card capture reader:

Internal response 2
✕

Number: 2

Source type: Input

Source number: 5

Source direction: 1

Receiver type: Block reader

Receiver number: 1

Receiver direction: 1

Response time: No

Response characteristic: Response time

Reset of the guard zone output in «ALARM» mode: No

Save Cancel

Example of the general view of the **Internal responses** and **Physical contacts** sections after configuration (template – “Turnstile”; the card capture reader controls direction 1; Input 6 and Output 3 are used to control the card capture reader, and Input 5 is used to receive the *Fault* signal:

Add						
Number	Source			Receiver		
	Type	Number	Direction	Type	Number	Direction
1	Visitor ID card presentation	1	1	Activate output	3	1
2	Input	5	1	Block reader	1	1
3	Unblock device	1	1	Activate output	4	1

Contact	Function	Operating device	Direction	Normal
Input 1	Pass input	1	1	Closed
Input 2	Pass input	1	2	Closed
Input 3	Not specified			Cut
Input 4	Not specified			Cut
Input 5 (loop)	Input			Cut
Input 6 (loop)	External verification device confirmation output	1	1	Cut
Input 7	Remote control	1	1	Cut
Input 8	Remote control	1	3	Cut
Input 9	Remote control	1	2	Cut
Input 10	Fire alarm input			Closed
Output 1	Operating device control output	1	1	Not energized
Output 2	Operating device control output	1	2	Not energized
Output 3	Output			Not energized
Output 4	Output			Not energized
Output 5	Not specified			Not energized
Output 6	Not specified			Not energized
Output 7	Remote control indication output	1	1	Energized
Output 8	Remote control indication output	1	3	Energized
Output 9	Remote control indication output	1	2	Energized

- Temporary cards for visitors can be issued in the **Access cards** section of the Web-interface. First, include them into the main list of cards in the **Input** subsection, then in the **List** subsection, select the access card to be issued for a visitor, and in the opened window:
 - on the **General** tab, select the **Temporary** value for the **Card type** parameter, then determine the period of validity of the card in relevant lines,
 - on the **Access rights** tab, set the **Yes** value for the **Verification** parameter for reader 1 or 2 (depending on the passage direction controlled by the card capture reader); in this case, the **Status** of this set of rights should be **Unblocked**.

65555

General

Access rights

Card type:

Temporary

Valid from:

01/10/2018

Hour:

10

Min.:

15

Valid till:

01/10/2018

Hour:

17

Min.:

30

Stop list:

No

Vehicle card:

No

Full name:

Visitor

Delete

Save

Cancel

65555

General

Access rights

Card rights number:

1

Access time interval:

Time zone

Time criteria number:

0

Guard zone number:

1

Access permissions:

Permitted

Other cards double-check:

No

Antipassback:

No

Verification:

Yes

Status:

Unblocked

Delete

Save

Cancel

PERCo

Polytechnicheskaya str., 4, block 2
194021, Saint Petersburg
Russia

Tel: +7 812 247 04 64

**E-mail: export@perco.com
support@perco.com**

www.perco.com



www.perco.com