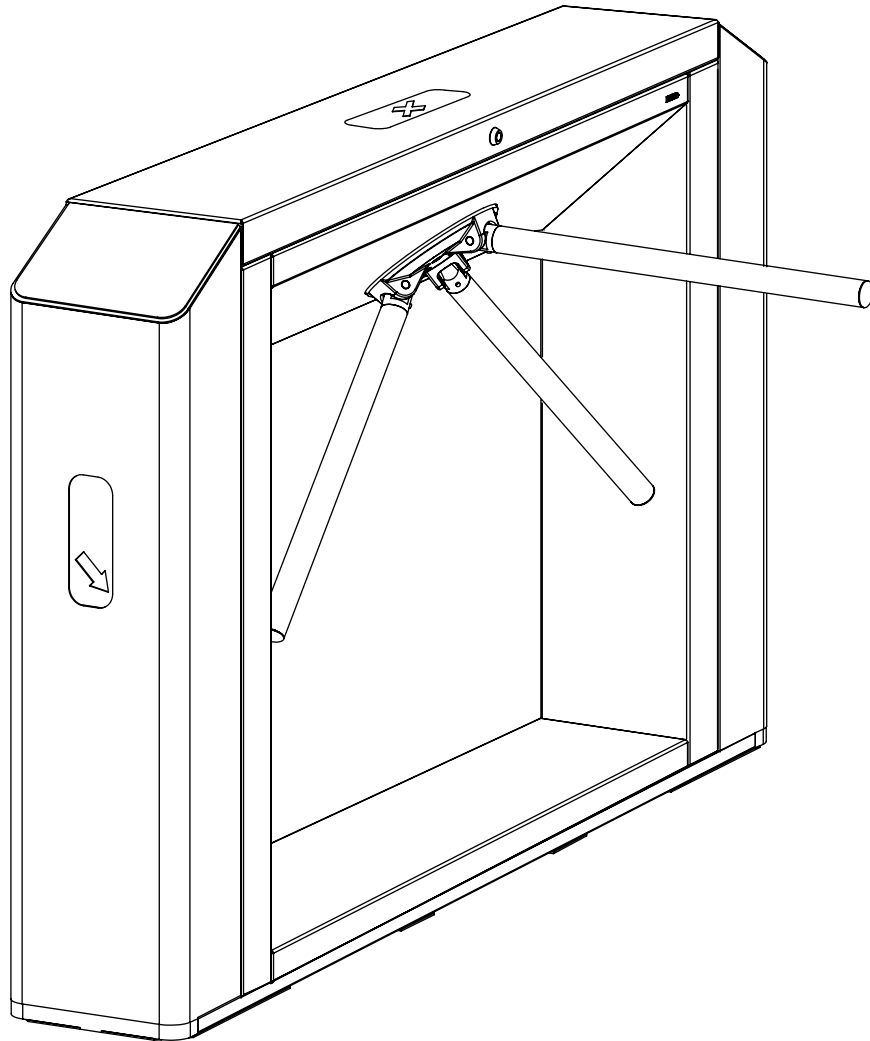


## ASSEMBLY AND OPERATION MANUAL



# TTD-12A

EAC  
CE

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

**CONTENTS**

1	APPLICATION .....	2
2	OPERATING CONDITIONS .....	2
3	TECHNICAL SPECIFICATIONS .....	3
4	DELIVERY SET .....	4
4.1	Standard delivery set .....	4
4.2	Additional equipment supplied on 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	Interface board .....	9
5.2.6	Control signals .....	11
5.2.7	Control modes .....	12
5.2.8	Turnstile operation algorithm .....	13
5.3	Operation contingencies and response .....	13
5.4	Control devices of the turnstile .....	15
5.4.1	RC-panel connection .....	15
5.4.2	Fire Alarm emergency unblocking device .....	16
5.4.3	Control of the turnstile in ACS .....	16
5.5	Additional devices connectable to the turnstile .....	17
5.5.1	Relay outputs .....	17
5.5.2	Intrusion detector and siren .....	18
5.5.3	Remote indicators .....	18
5.6	Operation contingencies and response .....	19
6	MARKING AND PACKAGING .....	19
7	SAFETY REQUIREMENTS .....	20
7.1	Installation safety requirements .....	20
7.2	Operation safety requirements .....	20
8	INSTALLATION .....	20
8.1	Installation details .....	20
8.2	Installation tools .....	21
8.3	Length of cables .....	21
8.4	Connection layout of the turnstile and additional equipment .....	22
8.5	Installation sequence .....	26
9	OPERATION INSTRUCTIONS .....	30
9.1	Power-up .....	30
9.2	Pulse control mode .....	30
9.3	Potential control mode .....	31
9.4	Algorithm of the card capture reader operation .....	32
9.5	Removal and installation of the card reader container .....	33
10	ACTIONS IN EMERGENCY .....	33
11	TROUBLESHOOTING .....	33
12	MAINTENANCE .....	34
13	TRANSPORTATION AND STORAGE .....	35
Appendix 1.	Design of different types of turnstile side covers .....	35
Appendix 2.	Algorithm of issuing command at pulse control mode .....	38
Appendix 3.	Algorithm of issuing command at potential control mode .....	39
Appendix 4.	Configuring PERCo ACS controller for operation with the card capture reader .....	40

## ***Dear Customer!***

*Thank you for purchasing PERCo product. Please follow instructions given in this Manual carefully and this high-quality product will provide many years of trouble-free use.*

**Assembly and operation manual for the TTD-12A motorized box tripod turnstile with automatic anti-panic arms and capability of additional equipment installation** (hereinafter – the *Manual*) contains data on transportation, storage, installation, operation and maintenance of the product. Installation of the product must be carried out by qualified installers in strict accordance to this Manual.

Abbreviations:

- ACS – access control system;
- RC-panel – remote control panel;
- WRC – wireless remote control.

## **1 APPLICATION**

The **TTD-12A motorized box tripod turnstile with automatic anti-panic folding arms and capability of additional equipment installation** (hereinafter – the *turnstile*) is designed for the organization of a double-sided access point to the controlled area. The motor drive provides a convenient passage through the turnstile due to the automatic rotation of the barrier arms. Also, the turnstile provides the quick opening of the passage zone in emergencies (the function of automatic “anti-panic”).

A distinctive feature of this product is its modular design, which makes it possible to integrate a wide range of additional equipment into the turnstile: card capture readers, proximity card readers, biometric readers, barcode readers, etc.

A standard version of the **TTD-12AB** turnstile is designed for embedding most types of additional equipment. Besides, there is a version with a built-in card capture reader **TTD-12AC**<sup>1</sup>.

The turnstile housing is made of stainless steel. Outdoor application is allowed (in standard version **TTD-12AB**).

It is recommended to determine the number of turnstiles required to ensure fast and convenient passage of people based on the throughput rate of the turnstile specified in Section 3. The manufacturer recommends installing one turnstile for every 500 people working in one shift or based on the peak load of 30 people per minute.

## **2 OPERATING CONDITIONS**

The turnstile with regard to resistance to environmental exposure complies with GOST 15150-69, category N1 (for an outdoor application).

Operation of the turnstile of the **TTD-12AB** standard version (without a card capture reader) is allowed at ambient air temperature from –40°C to +50°C (when installed under the canopy + 55°C) and relative air humidity of up to 90% at +30°C.

The **TTD-12AC** version with the built-in card capture reader can be operated indoors at ambient air temperature from +1°C to +55°C and at relative air humidity up to 95 % at + 25°C.



### **Attention!**

When installing other additional equipment, the installer must consider the operating conditions of the installed equipment.

The RC-panel, included in the standard delivery set, with regard to resistance to environmental exposure complies with GOST15150-69, category NF4 (operation in rooms with climate control).

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

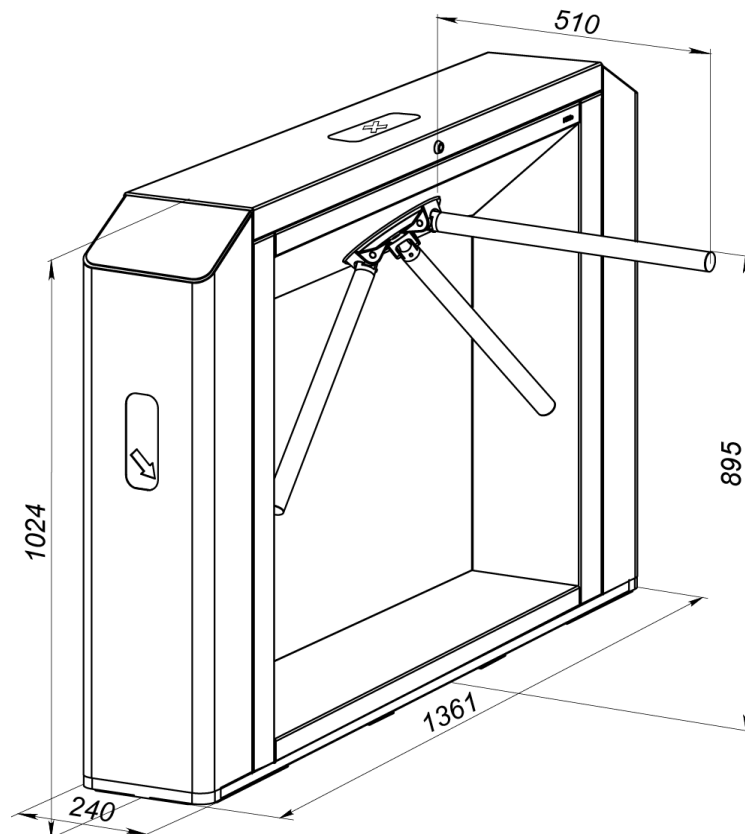


### **1 Attention!**

RFID-reader for proximity cards is not included in the set of built-in card capture reader, it should be purchased and installed by the customer himself inside the turnstile side module on a special bracket.

### 3 TECHNICAL SPECIFICATIONS

Operating voltage.....	22÷29 VDC
Current consumption .....	max 5.5 A <sup>1</sup>
Power consumption .....	15÷130 W <sup>2</sup>
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
RC-panel cable length .....	6.6 m <sup>3</sup>
Card container capacity <sup>4</sup> .....	350 cards
Ingress Protection Rating (EN 60529):	
standard version <b>TTD-12AB</b> .....	IP55
with built-in card capture reader <b>TTD-12AC</b> .....	IP41
Electric shock protection class .....	III (IEC 61140)
Mean time to failure .....	min 3,000,000 passages
Mean lifetime .....	8 years
Overall dimensions (L × W × H) <sup>5</sup>	
with barrier arm lowered .....	1361×240×1024 mm
with barrier arm raised.....	1361×750×1024 mm
Turnstile net weight.....	max. 100 kg



**Figure 1. Overall dimensions of the TTD-12A turnstile**

- <sup>1</sup> As a power supply of the turnstile, the manufacturer recommends using power supplies with an output voltage of 24VDC and a maximum load current of at least 6.5 A, excluding the consumption of additional equipment.
- <sup>2</sup> The power consumption of the turnstile can reach 130 W at maximum current consumption during the first 5 seconds after the power is turned on or the Fire Alarm is cleared. The rest of the time, the power consumption of the product does not exceed 15 watts.
- <sup>3</sup> Maximum allowable cable length of the RC panel is 40 m (supplied upon request).
- <sup>4</sup> For turnstile version with a built-in card capture reader **TTD-12AC**.
- <sup>5</sup> Overall dimensions are shown in Fig. 1.

## 4 DELIVERY SET

### 4.1 Standard delivery set

#### Box 1. TTD-12A main housing

Turnstile housing and base assembled .....	1
Main cover lock key .....	2
RC-panel with cable .....	1
Surge protector (LC filter) <sup>1</sup> .....	1
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
Self-adhesive PCB pillars .....	4
Technical documentation:	
Certificate .....	1
Assembly and operation manual .....	1

#### Box 2. Side modules

##### TTD-12AB (standard version):

Standard side module, right .....	1
Standard side module, left .....	1
Installation tools:	
Sealing rubber profile .....	2

##### TTD-12AC (with a built-in card capture reader):

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

#### In separate packings:

<b>C-10</b> side covers with installation kit.....	2 or 1 <sup>2</sup>
--	---------------------



#### Attention!

Side covers are separate items in the price list and are purchased separately. The type of cover is chosen by the customer when ordering the turnstile. Types of side covers and their application are shown in Table 1. Design and dimensions of different types of covers - see Appendix 1.

**Table 1. Types and application of serially produced side covers for TTD-12A turnstiles**

Type	Design	Application
<b>C-10B</b>	from stainless steel	without additional functions
<b>C-10R</b>	with a window from radio-transparent material	for built-in RFID-reader installation
<b>C-10P.1</b>	with a pole and a window made of radio-transparent material	for installing the built-in RFID reader and <b>BS10</b> , <b>BS11</b> brackets for additional equipment
<b>C-10P.2</b>	with a pole and a window made of radio-transparent material	for installing the built-in RFID reader and <b>BS7</b> , <b>BS8</b> , <b>BS9</b> , <b>BS14</b> brackets for additional equipment
<b>C-10Q.1</b>	from stainless steel with a window	for installing <b>Mertech T7821 P2D</b> barcode scanner
<b>C-10F.1</b>	with a bracket	for installing the <b>CL15</b> biometric controller
<b>C-10F</b>	with a bracket	for a third-party fingerprint scanner

<sup>1</sup> The network LC filter is designed to suppress HF interference in the turnstile power cable, which can affect the operation of electronic devices, which control lines are laid together with the turnstile power cable.

<sup>2</sup> For the **TTD-12AC** version, only one side cover is supplied separately. The **C-10RC** side cover with card reception slot is already installed in the side module with a built-in capture reader.



### **Attention!**

**C-10P.1** and **C-10P.2** side covers differ in rack height and are selected based on the equipment that needs to be installed on it. Cover **C-10P.1** is used for the installation of face recognition terminals (hereinafter referred to as FRT) "**Suprema FaceStation 2**" or "**Suprema FaceLite**", **C-10P.2** cover is used for installation of other FRTs.

Be sure to purchase a rack mount bracket that matches the product you are installing. A list of bracket types can be found on the [www.perco.com](http://www.perco.com) website.

## **4.2 Additional equipment supplied on request <sup>1</sup>**

WRC kit <sup>3</sup> .....	1
Anchor M10 with bolt and washers.....	4

## **5 DESIGN AND OPERATION**

### **5.1 Main features**

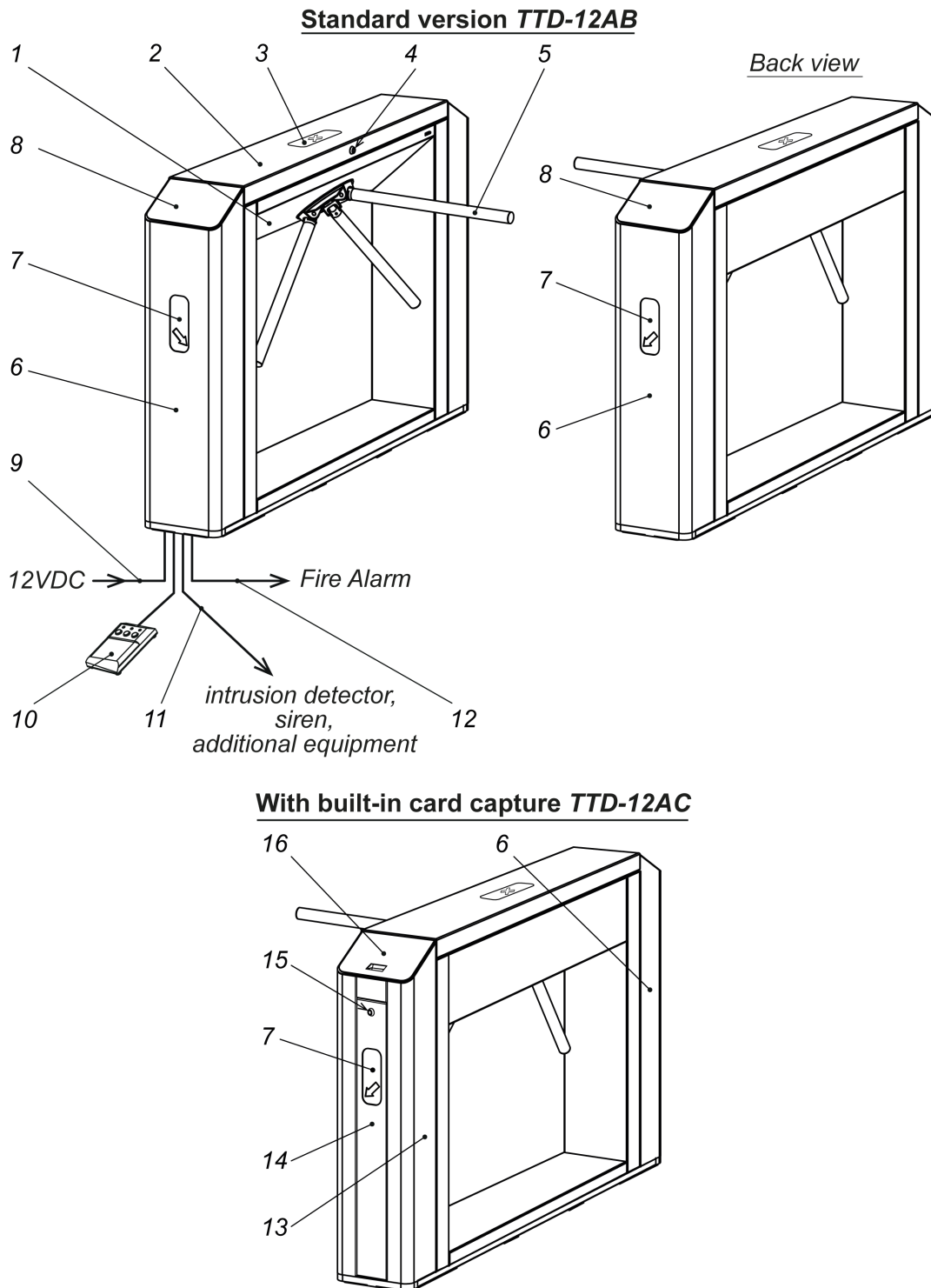
- The turnstile is designed for indoor and outdoor operation (see Sect. 2). The turnstile housing is made from high-quality stainless steel.
- The turnstile can operate as an operating device as a part of the ACS or as a standalone unit operated from the RC-panel or WRC.
- It is possible to install into the turnstile a wide range of additional equipment using special side turnstile modules and special side covers to integrate into the turnstile: proximity card readers, biometric readers, barcode readers, etc.
- The **TTD-12AC** turnstile model with a card capture reader is equipped with a mechanism for withdrawing temporary access cards when passing through the turnstile and a container for collecting them, as well as a bracket for installing a proximity card reader. The turnstile design allows changing the location of the card capture reader to organize the passage with the withdrawal of access cards in the desired direction. Access card readers are not included in the standard delivery set of the turnstile.
- The turnstile is equipped with automatic anti-panic folding arms for emergency opening of the passage. The barrier arm is set into a vertical position at a power loss or by the *Fire Alarm* signal. The *Fire Alarm* signal can be sent from an emergency unblocking device or an operator's emergency button.
- The turnstile is equipped with an LED display installed on the top cover of the main housing to display operation modes. Besides, the turnstile has extra indication of passage direction/ access denial on its side modules.
- The turnstile has outputs for the connection of remote indicators.
- The turnstile has relay outputs for the connection of an intrusion detector and a siren.
- The turnstile supports two control modes: pulse and potential.
- The turnstile mechanism provides automatic barrier arm rotation to the initial position after each pass.
- After the barrier arms are turned 60° or more, the reverse rotation is blocked.
- The rotor electric drive provides smooth and silent operation of the turnstile.
- The turnstile is supplied with safe 30V voltage.
- When several turnstiles are installed in a row, their posts form a passage zone, eliminating the need to install additional railings.

<sup>1</sup> Technical specifications of additional equipment are given in the operational documentation supplied with the specified equipment.

<sup>3</sup> The WRC kit includes a receiver connected to the turnstile control board and transmitters in the form of keyfobs with a range of up to 40 m.

## 5.2 Design

The design of the turnstile is shown in Fig. 2. Numbers correspond to Fig. 2.



**Figure 2. TTD-12A turnstile design**

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

<sup>1</sup> The design and application of various types of side covers, see Table 1 and Appendix 1.

<sup>2</sup> Not included in the standard delivery set.

The turnstile comprises a turnstile housing (1), a hub with three barrier arms (5), a main cover (2) with an indication block (3) and a lock (4), two side modules with side indication blocks (6 for **TTD-12AB**, and 6 and 13 for **TTD-12AC**) (constant indication of passage direction / access denial (7)) and with side covers (8), and a RC-panel (10). Fastening of barrier arms to the hub is hinged. The turnstile housing is fixed to the floor with 4 anchor bolts through holes in the turnstile housing base.

### 5.2.1 Main housing

Internal elements of the turnstile housing are accessed through the removable main cover (2). The main cover is fixed to the housing with a lock (4). While the turnstile is running, the main cover should be locked. Under the main cover, there is a bracket with an interface board and **XTU1** and **XTU2** remote terminal blocks (see Fig. 19). The indication block (3) is also integrated into the turnstile main cover and is connected to the control board with the cover indication cable via the **XTU3** terminal block.

The turnstile operating mechanism consists of a control board (located under the bracket with the interface board) and a rotation unit of the barrier arms.

The control board receives commands from the interface board and controls the operation of the electric motor, the operation of the blocking device, the automatic "anti-panic" device.

Rotary group consists of (see Fig. 22):

- drive assembled with electric motor and hub position sensor board;
- electromechanical blocking device with optical sensors;
- emergency unblocking device (Fire Alarm), anti-panic function of automatic arm folding.

### 5.2.2 Side modules

The customer can choose one of the turnstile versions. Various versions, differing in the design of the side modules (6, 13, 17) with / without a built-in card capture reader / coin acceptor, are shown in Fig. 2. Side modules are rigidly fixed to the main housing (1). Side covers (8) are installed on top of the side modules, which can have different functions according to their type (see Table 1). Blocks of constant indication of the direction of passage / prohibition of passage are situated on the side modules of the turnstile (see Fig. 4). Access to the four holes in the base of the housing for fixing the turnstile to the mounting surface is provided when removing the side modules.

#### Side module with a built-in card capture reader

The side module (13) has a built-in card capture reader mechanism with the **PA-460** control board installed. In the side module under the cover (14), which is fixed in the locked position by the lock (15), there is a card collector with the function of signalization about its filling. 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 foreseen by the manufacturer). The receiving slot has an LED backlight. Inside the module, there is a special bracket for installing a proximity card reader (the reader is purchased separately). When installing the reader on the bracket, the ID will be read from the card when the card is located in the receiving slot of the card capture reader. The use of the card capture reader is possible only as part of the ACS. The connection layout is shown in Fig. 17.

### 5.2.3 Indication blocks

The main cover indication block (3) is located in the main housing main cover and informs about the current state and a set operation mode of the turnstile (see Fig. 2, 3). The indication block has 3 mnemonic indicators:

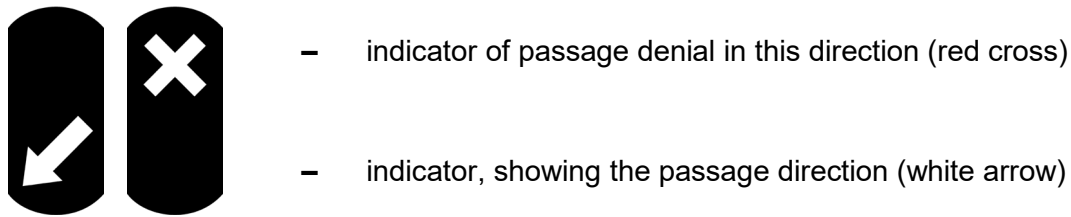


- indicator of passage permission  
indicator of one of passage direction (green arrow)
- indicator of passage denial (red cross)
- indicator of passage permission  
indicator of the other passage direction (green arrow)

**Figure 3. Main cover indication block**



Constant indication block (7) is designed for showing passage direction / denial through the turnstile. It displays the constant indication (white arrow or red cross):

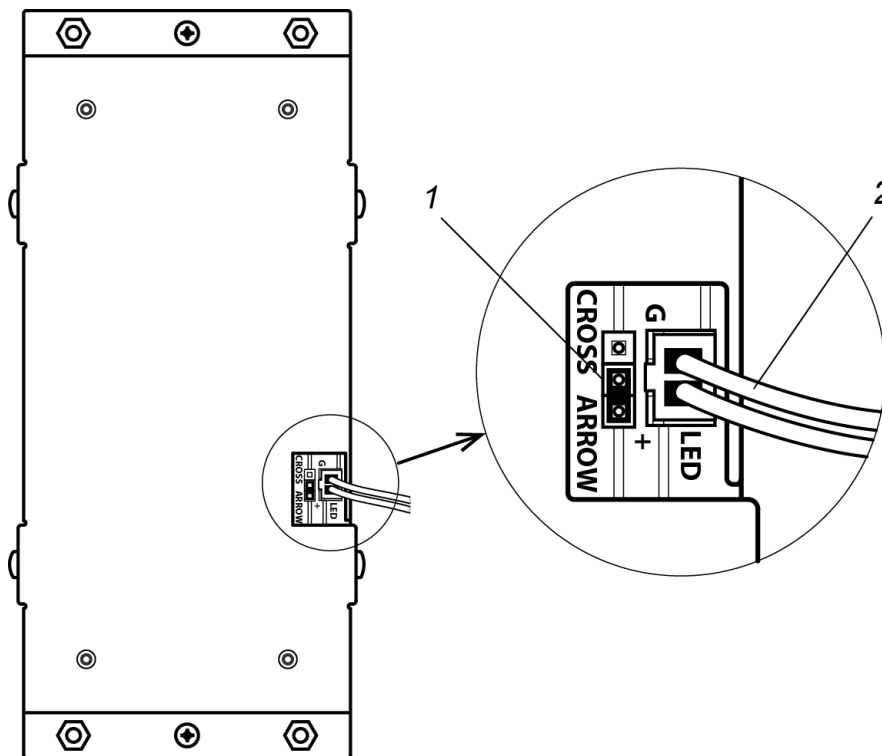


**Figure 4. Side indication block passage direction / passage denial**

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

To access the **CROSS / ARROW** jumper, remove the side module (see Fig. 19), and open the cover of the container with the key in the side module with built-in card capture reader.

To switch off the constant indication, remove the jumper. To select the indication **ARROW**, install the jumper to the **ARROW** position, to select the indication **CROSS** - to the **CROSS** position. By default, the jumper is in the **ARROW** position.



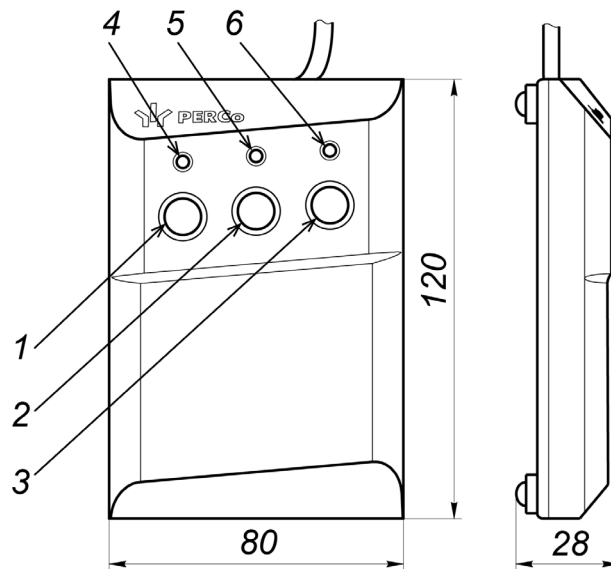
**Figure 5. Side indication block (view from inside the side module)**

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

#### 5.2.4 RC-panel

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

There are three control buttons on the RC front panel intended for setting the turnstile operating modes. The middle button on the RC-panel (hereinafter — the **STOP** button) is intended to set the turnstile to the “*Passage denial*” mode. The left (**LEFT**) and the right (**RIGHT**) buttons are intended to unlock the turnstile for passage in the chosen direction. Above the buttons, there are LED indicators for the turnstile turning mechanism. The “*Stop*” red indicator indicates that both passage directions are blocked. Available control commands and indications on the RC-panel for pulse and potential control modes are given in the Tables 6 and 7.



**Figure 6. Overall view and dimensions of the RC-panel**

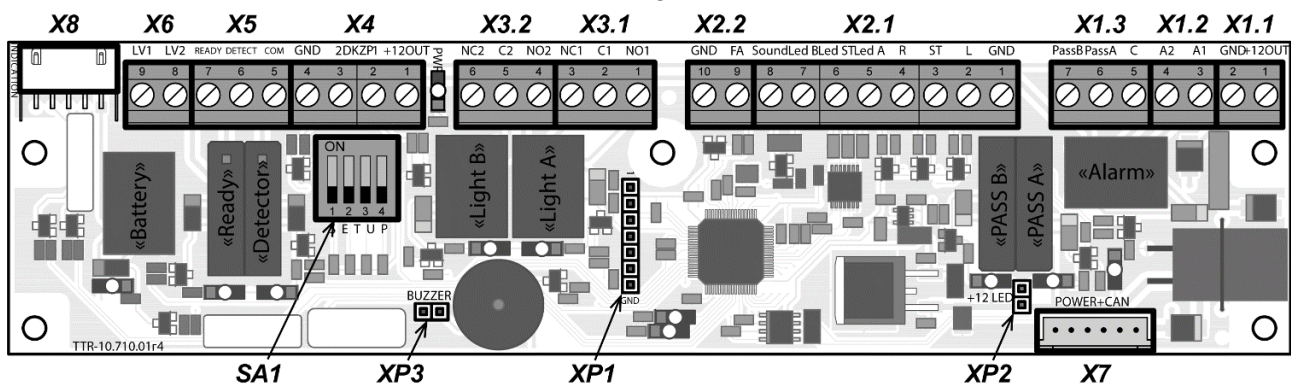
- 1, 2, 3 – buttons **LEFT**, **STOP**, **RIGHT** for setting the control commands;  
4, 6 – green indicators “Left”, “Right”, 5 – red indicator “Stop”

### 5.2.5 Interface board

The interface board processes the incoming commands (monitors the state of *L*, *ST*, *R*, and *FA* (*Fire Alarm*) contacts, reads information from the intrusion detector (*DKZP1* contact) and generates commands to the control board (9), as well as signals for external devices: for indication on the RC-panel (*Led A*, *Led ST*, and *Led B*), for the barrier arms rotation in the corresponding direction (*Pass A* and *Pass B*), for the alarm output *A1–A2* (*Alarm*) and relays a signal about the current state of the intrusion detector (*DETECT*).

Cables are connected to the interface board: a RC-panel / a WRC / an ACS controller, a device that sends an emergency opening command (hereinafter *the Fire Alarm device*), remote indication blocks and other additional equipment. The connection is made in accordance with the electrical connection layout shown in Fig. 15.

The overview of the interface board is shown in Fig. 7.



**Figure 7. Interface board**

For convenience, the contacts for connecting the turnstile power supply are placed on the **XTU1** terminal block, the connection to the turnstile indication units is carried out through the **XTU2** terminal block, the blocks are located on the bracket of the interface board. The connection is made in accordance with the connection diagram of the turnstile and additional equipment (Fig. 16, 17). The turnstile is powered by the power cable (9).

Interface board elements:

- **X1 (ACS)** – terminal blocks for powering additional equipment (**X1.1**), connecting the siren (**X1.2**) and the inputs of the ACS controller for PASS signals (**X1.3**);

- **X2 (RC)** – terminal blocks for connecting the RC-panel, control outputs of the WRC or the ACS controller (**X2.1**), as well as the *Fire Alarm* emergency unblocking device (**X2.2**);
- **X3 (Light)** – terminal blocks for connecting remote indicators ("open" / "closed", **X3.1** - for direction A, **X3.2** - for direction B);
- **X4-X6 (ADD)** – terminal blocks for connecting additional equipment (**X4** – for connecting the intrusion detector, **X5** – *Ready* and *Detect* signal outputs; **X6** – low voltage alarm relay output (low battery charge);
- **X7 (CAN)** – connector for connecting the communication cable to the control board;
- **X8 (INDICATION)** – connector for indication cable connection;
- **XP1** – programming connector (not used during operation);
- **XP2 (+12LED)** – jumper indicating the operation of the relay outputs of the board (the jumper is installed - the indication is on, removed - off);
- **SA1 (SETUP)** – a set of DIP switches:
  - SA1-1** – turnstile control mode selection: **ON** - pulse (set by default), **OFF** - potential,
  - SA1-2** – barrier arms turn force value selection:
    - **ON** – hard (used when the turnstile operates in the transport infrastructure, on mobile platforms, etc. to compensate for possible shaking and vibration of the turnstile arms),
    - **OFF** – soft (used when the turnstile operates on fixed surfaces, indoors, offices, etc.) set by default.
  - SA1-3, SA1-4** – not used during operation, must be in the **OFF** position.
- **PWR** – green LED indication for interface board power supply.

**Table 2. Functions of the control board terminal block contacts**

No	Contact	Function
<b>X1 (ACS)</b>		
1	+12OUT	+12V power supply for additional equipment (siren)
2	GND	
3	A1	"Alarm" relay output (siren connection)
4	A2	
5	C	Common for PASS relay outputs
6	Pass A	PASS A relay output (passage in A direction)
7	Pass B	PASS B relay output (passage in B direction)
<b>X2 (RC)</b>		
1	GND	Common
2	L	Control input - passage A granting
3	ST	Control input - passage denial
4	R	Control input - passage B granting
5	Led A	Passage A granting indication output on the RC-panel
6	Led ST	Passage denial indication output on the RC-panel
7	Led B	Passage B granting indication output on the RC-panel
8	Sound	RC-panel sound signal output
9	FA	Emergency passage unblocking control input
10	GND	
<b>X3 (LIGHT)</b>		
1	NO1	Normally open contact of the external <i>Light A</i> output
2	C1	Common contact of the external <i>Light A</i> output
3	NC1	Normally closed contact of the external <i>Light A</i> output
5	NO2	Normally open contact of the external <i>Light B</i> output
6	C2	Common contact of the external <i>Light B</i> output
7	NC2	Normally closed contact of the external <i>Light B</i> output

No	Contact	Function
<b>X4-X6 (ADD)</b>		
1	+12OUT	+12V output for optional equipment powering (intrusion detector)
2	DKZP1	Intrusion detector connection
3	DKZP2	
4	GND	
5	COM	Common for <i>DETECT</i> and <i>READY</i> signals
6	DETECT	<i>Det Out</i> relay output (intrusion detector state)
7	READY	<i>Ready</i> relay output (turnstile readiness)
8	LV1	The alarm relay output for low voltage (low battery)
9	LV2	
<b>XTU1 remote terminal block</b>		
1	+24V	Connecting an external power supply 24VDC
2	GND	
1	+24V	Splitter for external power supply +24V for add. equipment
2	GND	
<b>XTU2 remote terminal block</b>		
1	+12V	Connecting the indication cable from the indication block of the main cover (cable No.2)
2	R	
3	GND	
4	L	
5	+7V	
6	+7V	Connecting the cable from the right side indication block (cable No. 3.2)
7	+7V	Connecting the cable from the left side indication block (cable No. 3.1)
8	GND	Connecting the cable from the right side indication block (cable No. 3.2)
9	GND	Connecting the cable from the left side indication block (cable No. 3.1)

### 5.2.6 Control signals

The turnstile is controlled by applying a low-level signal relative to the *GND* contact to the *L*, *ST*, and *R* contacts of the **X2** terminal block of the interface board, while the control element can be a normally open relay contact or a circuit with an open collector output (see Fig. 8 and 9).

The emergency opening of the turnstile is carried out by removing the low-level signal relative to the *GND* contact from the *FA* contact of the **X2** terminal block of the interface board, while the control element can be a normally closed relay contact or a circuit with an open collector output. All turnstile control commands received at other inputs are ignored (see Sect. 5.4.2).

When a low-level signal is applied to the *FA* input, the directions of the turnstile switch to the mode according to the signal levels at the inputs *L*, *R*, and *ST*.

The fact of activation of the intrusion detector is monitored by removing a low-level signal from the *DKZP1* input of the interface board relative to the *GND* contact, while the control element can be a normally closed relay contact or a circuit with an open collector output.



#### Note:

Use 1 kOhm resistors connected to + 3.3 V voltage plane to generate a high-level signal on all input contacts (*L*, *ST*, *R*, *FA*, and *DKZP*).

Control element is to provide the following characteristics of the signals:

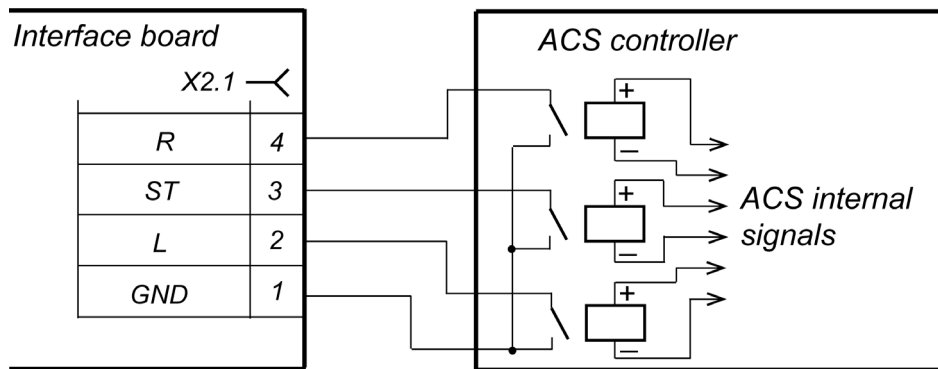
control element – relay contact:

minimum commutation current..... 2 mA

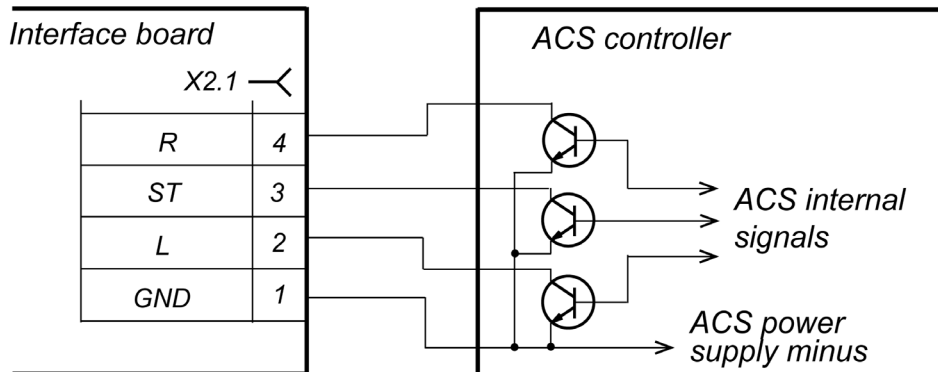
closed contact resistance (regarding connection cable resistance)..... max. 300 Ohm

control element – open collector output layout:

closed contact resistance (low level signal, on the control board input) ..... max. 0.8 V



**Figure 8. ACS control elements – normally open relay contact**



**Figure 9. ACS control elements – open collector output layout**

### 5.2.7 Control modes

There can be two control modes of the turnstile: pulse and potential. In both modes, turnstile is controlled by sending commands (i.e. control signals combinations) on operational control inputs: L, ST, and R and a special control input FA. Control command sending algorithm changes depending on the chosen mode (Tables 6 and 7).

The control mode is determined by the DIP switch **SA1-1** on the interface board. The connector location is shown in Fig. 7. Switch position **ON** – pulse control mode, **OFF** - potential control mode.



#### **Attention!**

The switch positions can only be changed when the turnstile power is switched off.

**Pulse control mode** is used to control the turnstile with RC-panel, WRC, and CLB, outputs of which support pulse control mode.

Control signal duration at sending control command to control inputs is to be not less than 100 ms. The initial passage waiting time is 8 seconds and it is independent of control signal (pulse) duration.

The turnstile operation description for this mode is given in Table 6. Control command sending algorithm is given in Appendix 2.

**Potential control mode** is used to control the turnstile using the ACS controller, the outputs of which support the potential control mode.

Control signal duration at sending control command to control inputs is to be not less than 100 ms. The passage waiting period equals the control signal duration. i.e., if by the moment of passage completion in the permitted direction, there is a low-level signal at the input of this direction, the turnstile remains open in this direction.

The turnstile operation description for this mode is given in Table 7. Control command sending algorithm is given in Appendix 3.

Sending a low-level signal to *ST* input, both directions are locked for signal duration time independently of signal levels at *L* and *R* inputs. When a low-level signal is removed from the *ST* input, the directions switch to states according to the signal levels at the *L* and *R* inputs.

The turnstile operation at the special *FA* control input is described in Section 5.4.2.

### 5.2.8 Turnstile operation algorithm

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

1. Turnstile initial position - the drive is turned off, passage denial indicator is on, when you try to turn the barrier arms more than 5° in any direction, the blocking device locks the hub, an alarm is turned on - passage through the turnstile is closed.
2. The command (combination of control signals) for single passage performance in one of the directions is sent from the control device (RC-panel, WRC, ACS controller) to the interface board inputs.
3. The microcontroller on the control board (9) processes the received combination of signals and creates a command for the turnstile mechanism to open the passage in the desired direction (blocking device opens).
4. The microcontroller monitors the state of the barrier arms hub rotation sensor and counts the elapsed time since the button on the RC-panel, that corresponds to the passage permission in the desired direction, was pressed.
5. When the user turns the barrier arms 10° in the authorized direction, the microcontroller sends a signal to the drive to smoothly rotate the hub in the passage direction to the next initial position, thereby providing a convenient passage in a set direction. When turning at an angle of 60°, the PASS A(B) signal is generated (the contacts *PASS A (B)* and *Common* are opened) with a duration of 250 ms.
6. After turning the barrier arms 60°, the possibility of reverse rotation is blocked by both the electric drive and blocking device - it is now possible to move forward to the next initial position only.
7. In case of passage denial, i.e., if after 8 seconds from the moment of passage permission the barrier arms were not rotated 60° or more, the microcontroller generates a command to the control mechanism to block the further passage in this direction, while the drive will return the barrier arms back to initial position.
8. When the barrier arms reach the initial position (120° rotation of the barrier arms or if the passage is denied by 0°), the microcontroller enters the standby mode.

In the "*Free passage ...*" operating modes, the algorithm remains the same, except the turnstile is not blocked at the end of the passage, but expects a new passage.

### 5.3 Operation contingencies and response

The turnstile is capable of providing information on the following operation contingencies:

1. Unauthorized access.
2. Passage delay for more than 10 sec.
3. Failure of the barrier arms rotation sensor.
4. Intrusion detector activation (Sect. 5.5.2).
5. Power failure (decrease below acceptable level).

In the cases 1-4, a special *Alarm* signal is generated by closing the *A1* and *A2* contacts of the **X1** connector. The "Alarm" relay output signals parameters are specified in Sect. 5.5.1.

When eliminating the cause of the *Alarm* signal, the "Alarm" relay contacts open and the signal is removed.

During operation, the microprocessor monitors the voltage supplied to the turnstile, and when the voltage is reduced (less than 21.8V), the "Battery" relay contacts (*LV1* and *LV2* of **X6** connector block on the interface board (10) will be closed to each other, indicating a low supply voltage (low battery). With a subsequent increase in voltage to 23.6V, the "Battery" relay contacts *LV1* and *LV2* will open, thus indicating a nominal supply voltage (battery charge). The parameters of the "Battery" relay output signals are specified in Sect. 5.5.1.

In case of a voltage drop below the threshold value for switching off the electronics (17V), the turnstile electronics will automatically disconnect from the power source. When voltage is restored above the threshold for switching the electronics on (18V), the turnstile electronics will automatically turn on.

1. In standby mode, the receiving slot of the card capture reader is constantly backlit by the built-in LED indicator. The access card identifier, 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 an employee's permanent card and does not require withdrawal, the ACS controller allows the passage through the turnstile in the set direction (gives the appropriate signal to the turnstile control mechanism). The shutter, blocking access to the card collector, remains closed, preventing the accidental withdrawal of the card. The backlight of the card slot remains constant.
3. If the presented card is a visitor's temporary card and requires withdrawal, the ACS controller sends a control signal to the input of the card capture reader control board "*Withdraw card*" (*INPUT* contact of the **XT1** connector, see Fig. 10). The backlight of the slot for receiving cards will switch to flashing mode with a frequency of 2 times per second, indicating that the card is subject to withdrawal.
4. If after this signal, the optical sensor detects the presence of a card in the receiving slot, then the card capture reader electromagnet opens a shutter blocking access to the card reader container, and the card falls into the card receiving container – it is withdrawn. If the card is not fixed in the receiving slot, then the electromagnet will not work and access to the inside of the card reader container will remain blocked.
5. The second optical sensor registers the fact of withdrawal when the card is dropped into the container. The card capture reader closes the shutter; the backlight of the receiving slot becomes constant again. In this case, the "*Card withdrawn*" (*OUT* contact of the **XT2** connector, Fig. 10) control signal is sent from the output of the control board of the card capture reader to the ACS-controller and serves as a confirmation of the withdrawal of the card and activates the passage permission. Upon receiving the signal, the ACS controller allows passage in this direction (sends a corresponding signal to the turnstile control mechanism) and, after passing through the turnstile, removes the "*Withdraw card*" signal. Upon removal of the "*Card withdrawn*" signal, the card capture reader removes the "*Card withdrawn*" signal.
6. The third optical sensor monitors the fact that the card reader container is filled. When it is full, the card capture reader sends an "*Alarm*" signal to the ACS controller (*Alarm* contact of the **XT2** connector, Fig. 10), the backlight of the card capture reader slot will switch to flashing mode with a frequency of 1 time per 2 seconds, thereby warning that the container is to be emptied. The card capture reader operation will be blocked after it has received another 9 cards if the container is not emptied. Unlocking of the card capture reader and deactivation of the "*Alarm*" signal will occur automatically when the container is emptied from cards (Sect. 9.5). Also, the "*Alarm*" signal is sent to the ACS controller in the event of a malfunction of the card capture reader mechanism.

**Parameters of control signals:**

The "*Capture card*" input is controlled by an output of a dry contact type or open collector 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).

Input parameters:

Voltage at the opened contact relatively to the " <i>GND</i> " .....	5±0,5 V
Voltage at the closed contact relatively to the " <i>GND</i> " .....	max. 0.8 V
Current through the closed contact.....	max. 1.5 mA

The *OUT* "*Card withdrawn*" and "*Alarm*" outputs are of the dry contact type. Each of these inputs is one of 2 relay contacts. Other relay contacts are banded and connected to a "*COM*" output (contact 7). The outputs are normally open, i.e., when a signal is issued, the corresponding output is closed to the *COM* contact.

Output parameters:

Maximum voltage between a corresponding output and " <i>COM</i> " contact .....	42 V
Maximum commutation current .....	200 mA

The control board overall view is shown in Fig. 10. On the board, there are terminal blocks:

- **XT1** – "*Withdraw card*" input of the card capture reader (*INPUT* and *GND* contacts).



- **XT2** - "Card withdrawn" (OUT and COM contacts) and "Alarm" (Alarm and COM contacts) outputs of the card capture reader.
- **XT5** - connector for connecting RS-485 interface lines from an ACS-controller (A and B contacts, only for **PERCo** controllers).
- **XT6** - connector for power supply of the card capture reader (+24V and GND contacts).
- **XT8** - connector for connecting a built-in card 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).

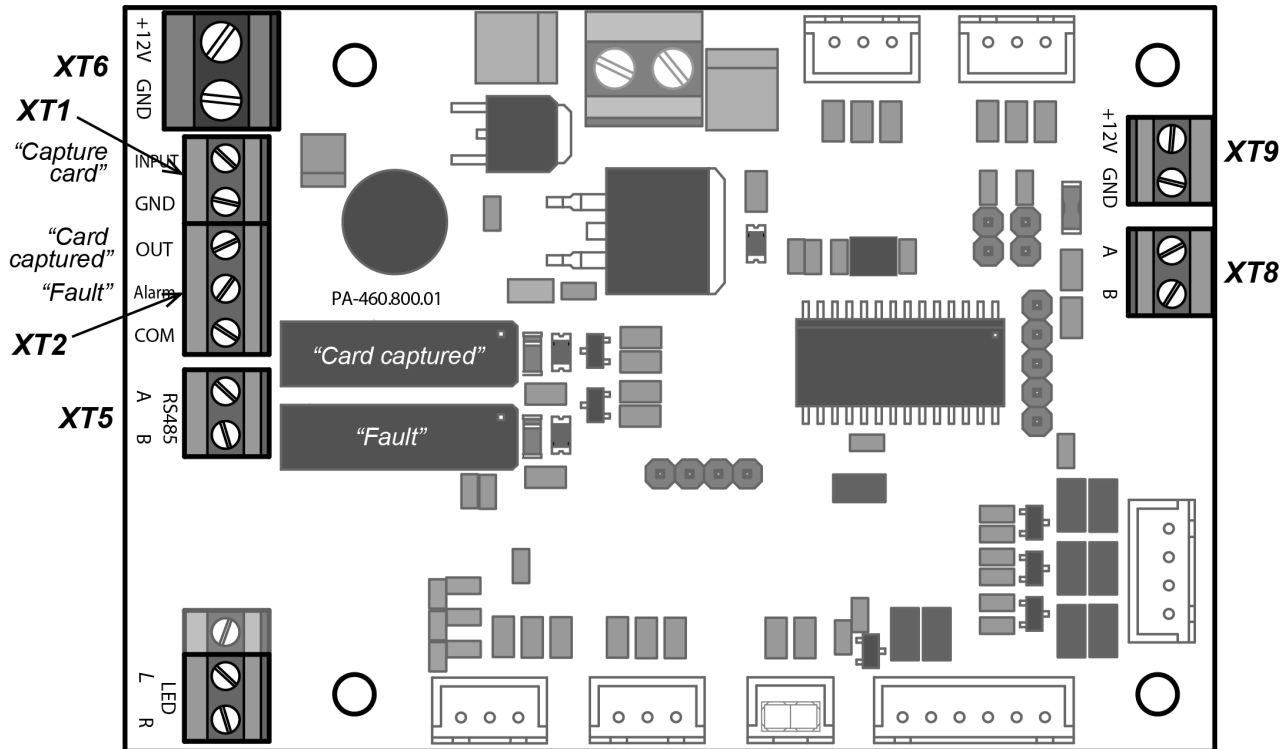


Figure 10. Control board of the card capture reader

## 5.4 Control devices of the turnstile

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

The above devices can be connected to the turnstile as follows: any device separately, in any combination with each other, and all devices simultaneously (in parallel).



### Note:

When several control devices are connected to the turnstile in parallel, there may be cases of overlapping control signals. In this case, the turnstile response will correspond to the response to the command generated by the combination of signals (see App. 2 and 3).

### 5.4.1 RC-panel connection

The remote control is connected with a flexible multicore cable to the *Unlock A*, *Stop*, *Unlock B*, *Led A*, *Led Stop*, *Led B*, and *GND* contacts of the **XTU2** remote terminal block in accordance with Table 3 and the electrical connection layout (Fig. 16, 17).

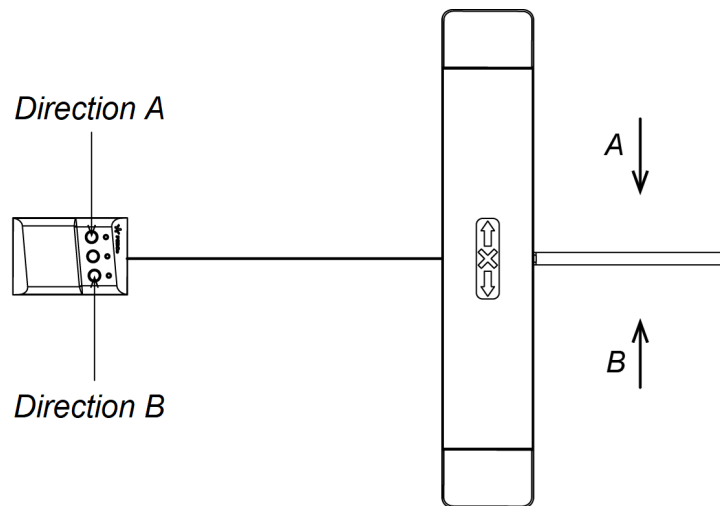
Standard RC-panel orientation regarding the turnstile post is shown in Fig. 11. If the operator workplace is located on the opposite side of the post, then for ease of operation, it is necessary to swap the wires from the remote control connected to the *Unlock A* and *Unlock B* contacts, as well as *Led A* and *Led B*, respectively (Table 3).



### Note:

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





**Figure 11. Standard RC-panel orientation regarding the turnstile post**

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

№	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

#### 5.4.2 Fire Alarm emergency unblocking device

The emergency unblocking device is connected to the *FA* and *GND* contacts of the **X2.1** terminal block on the interface board in accordance with the connection layout of the turnstile (Fig. 16, 17).

If the *Fire Alarm* is not used, it is necessary to set a wire jumper between the *FA* and *GND* contacts. The jumper is installed upon delivery.

When a control signal is sent to the *FA* input, the turnstile switches to the *Fire Alarm* emergency free passage mode with all the incoming turnstile control commands ignored. The central barrier arm automatically falls down under its own weight and takes up a vertical position, ensuring free passage. Both green direction arrows will flash, briefly changing to a red cross on the turnstile LED indication block (3).

If the *Fire Alarm* signal is received while making a passage, the *Fire Alarm* flashing will be activated on the LED indication, but the emergency unblocking function will be activated only after the rotation is finished.

After the *Fire Alarm* control signal has been removed, the red passage denial indicator on the turnstile LED indication lights up, and the turnstile goes into standby mode. To continue operation, the barrier arm must be manually fixed and set to the horizontal position.

Automatic anti-panic function is also activated at a power supply loss, e.g., in case of connected power supply unit breakdown.

#### 5.4.3 Control of the turnstile in ACS

The turnstile can be an operating device as part of an ACS. In the turnstile, it is possible to install built-in proximity card readers inside the side modules when using special side covers (see Table 1).

The outputs of the ACS controller are connected to the *GND*, *L*, *ST*, *R* contacts of the **X2.1** terminal block of the interface board. The ACS controller inputs are connected to *C* (*Common*), *Pass A* and *Pass B* contacts of the **X1.3** remote terminal block. The connection is made in accordance with the wiring diagram of the turnstile (see Fig. 16, 17).

If necessary, the controller inputs can be connected to the *READY*, *DETECT*, and *COM* contacts of the **X5** remote terminal block to monitor the corresponding turnstile states.

In pulse mode, the turnstile control using the ACS controller is similar to the control from the RC-panel.

In potential mode, to organize single passages, it is recommended to remove the low-level control signal after passing through the turnstile, i.e., at the beginning of the *PASS* signal of the corresponding direction.

## 5.5 Additional devices connectable to the turnstile

### 5.5.1 Relay outputs

Connection to the control board relay outputs is performed through the corresponding contacts of the **X1** and **X5** terminal blocks on the interface board. The following relay outputs are installed:

- «Alarm»: *A1* and *A2* contacts (Sect. 5.4.2);
- «PASS A»: *Pass A* and *C* contacts (Sect. 5.2.7);
- «PASS B»: *Pass B* and *C* contacts (Sect. 5.2.7);
- «Not ready»: *READY* and *COM* contacts;
- «Detector»: *DETECT* and *COM* contacts (Sect. 5.5.1);
- «Battery»: *LV1* and *LV2* contacts (Sect. 5.6).

Relays "PASS A" (*Pass A* and *C* contacts), "PASS B" (*Pass B* and *C* contacts), "Detector" and "Not ready" (*DETECT*, *READY* and *COM* contacts) have normally open contacts when the power is turned off. At the same time, the *C* and *COM* common contacts for these relays are not connected to the minus of the turnstile power supply.

Relays "Alarm" (*A1* and *A2* contacts) and "Battery" (*LV1* and *LV2* contacts) have normally open contacts when the power is off.

In the initial (inactive) state, when the power is on, the "PASS A" and "PASS B" relay contacts are closed (voltage is applied to the relay coil), and the "Detector", "Not ready", "Alarm" and "Battery" relay contacts are open (voltage is not applied to the relay coil).

The actuation / release of the "PASS A", "PASS B", "Ready", "Detector", "Alarm", and "Battery" relays can be determined by the lighting / extinguishing of green indicators that are installed near the indicated relays (see Fig. 7) (the indicators work when the **XP2** jumper is installed).

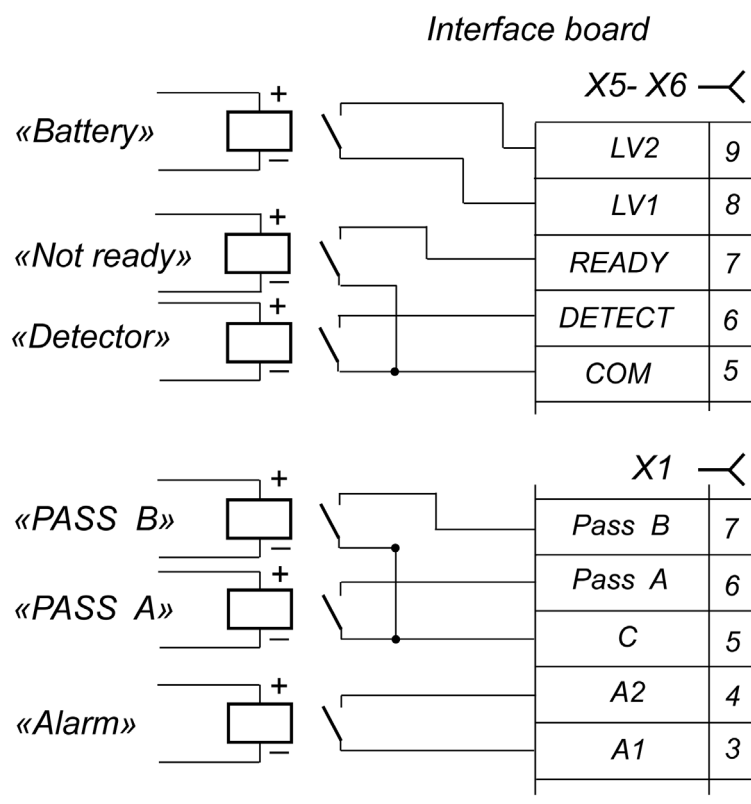


Figure 12. Output cascades for "PASS A", "PASS B", "Ready", "Det Out", and "Alarm"

The output cascades for "PASS A", "PASS B", "Ready", "Detector" are relay contacts (see Fig. 12) with the following signal characteristics:

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

The output cascades for "Alarm" and "Battery" are relay contacts (see Fig. 12) with the following characteristics:

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

### 5.5.2 Intrusion detector and siren



#### Attention!

Installation of the intrusion detector is made in accordance with the passage zone layout and climatic resistance of the detector. No intrusion detector installation inside the turnstile post is possible.

The intrusion detector is connected to the **X4** terminal block contacts, and the siren is connected to the **X1** terminal block on the interface board (10) according to the connection layout (Fig. 16, 17).

There should be normally closed contacts on the intrusion detector. In case the intrusion detector is not connected, it is necessary to set a wire jumper between the *DKZP1* and *GND* contacts of the **X4** terminal block. The jumper is installed upon delivery.

The siren is connected to the *Alarm 1*, *Alarm 2*, *GND* and *+12V* contacts of the **XT1.H** terminal block. The parameters of the alarm relay output signals "Alarm" are indicated in Sect. 5.5.1.

The "Alarm" output is activated if, with the turning mechanism of the turnstile locked (the command "Passage denial" or "Both directions are closed" is given, see Tables 6 and 7), the *DKZP1* input is activated, i.e., a control signal is received from the intrusion detector. The "Alarm" output is normalized 5 seconds after activation or upon receipt of any control command.



#### Note:

The control signal from the intrusion detector does not activate the *ALARM* output if the turnstile turning mechanism is unlocked in one of the directions or was blocked less than 3 sec. ago.

A signal about the intrusion detector current state is always transmitted to the *DETECT* and *COM* contacts (relay "Detector") of the **X5** terminal block on the interface board (Fig. 7).

The parameters of the "Detector" relay output signals are indicated in Sect. 5.5.1.

### 5.5.3 Remote indicators

Remote indicators for corresponding passage directions are connected to **X3 (LIGHT)** terminal blocks - *NO1*, *C1*, *NC1* and *NO2*, *C2*, *NC2* contacts.

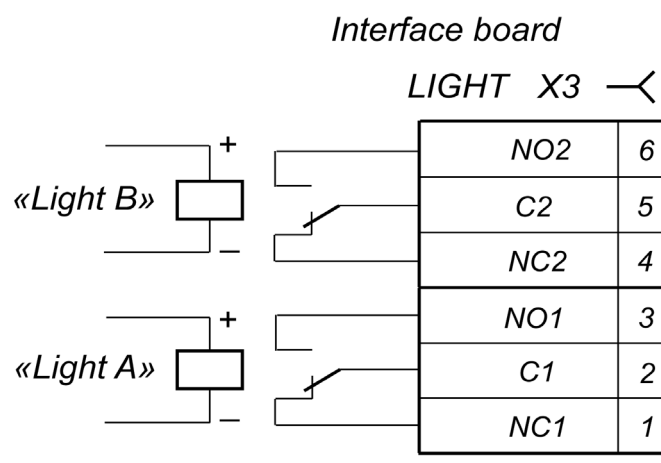


Figure 13. Output stages for Light A and Light B

The relay "Light A" ("Light B") is activated (voltage is supplied to its winding) when the green arrow corresponding to this direction of passage is lit on the LED indication block, and normalized (voltage is not supplied to its winding) when it is not lit. The fact of "Light A" and "Light B" relays operation can be determined by the state of the indicators that are installed near the indicated relays (Fig. 7) (this indication works when the **XP2 (+12LED)** jumper is installed).

Output stages for "Light A" and "Light B" are relay contacts (Fig. 13) with the following signal characteristics:

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

## 5.6 Operation contingencies and response

The turnstile is capable of providing information on the following operation contingencies:

1. Unauthorized access.
2. Passage delay for more than 10 sec.
3. Failure of the barrier arms rotation sensor.
4. Intrusion detector activation (Sect.5.5.2).
5. Power failure (decrease below acceptable level).

In the cases 1-4, a special *Alarm* signal is generated by closing the *A1* and *A2* contacts of **X1** connector. The "Alarm" relay output signals parameters are specified in Sect. 5.5.1.

When eliminating the cause of the *Alarm* signal, the "Alarm" relay contacts open and the signal is removed.

A device can be connected to the "Alarm" relay output to signal abnormal operation of the turnstile.

During operation, the microprocessor monitors the voltage supplied to the turnstile, and when the voltage is reduced (less than 21.8V), the "Battery" relay contacts (*LV1* and *LV2* of **X6** connector block) on the interface board (10) will be closed to each other, indicating a low supply voltage (low battery). With a subsequent increase in voltage to 23.6V, *LV1* and *LV2* contacts of the "Battery" relay will open, thus indicating a nominal supply voltage (battery charge). The parameters of the "Battery" relay output signals are specified in Sect. 5.5.1.

In case of a voltage drop below the threshold value for switching off the electronics (17V), the turnstile electronics will automatically disconnect from the power source. When voltage is restored above the threshold for switching the electronics on (18V), the turnstile electronics will automatically turn on.

## 6 MARKING AND PACKAGING

The turnstile is marked with a label and a sticker. The label is located inside the housing under the main top cover of the turnstile (2). The label includes the name of the product, its serial number, and the date of manufacture. The sticker is located on the inner surface of the top cover (2). The sticker shows a layout of the internal connections of the turnstile.

To access the label and sticker, the main cover of the turnstile must be removed. To do this, use the key to open the cover lock (4), carefully lift the main cover up by the front edge and, turning it towards the rear wall, remove it from the post. Be careful - when removing the cover, do not forget to disconnect the indication cable from the indication block of the main top cover (3)! The top cover is installed in reverse order.

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

Overall dimensions of box No. 1 (L×H×W) .....	146×110×40 cm
Weight of box No.1 (gross) .....	max. 97 kg
Overall dimensions of box No. 2 (L×H×W) .....	114×30×40 cm
Weight of box No.2 (gross) .....	max. 38 kg

## 7 SAFETY REQUIREMENTS

### 7.1 Installation safety requirements

The turnstile installation must be carried out by specialists who have fully studied this manual and passed safety training, in accordance with the general rules for the implementation of electrical and installation work.



#### **Attention!**

- The power supply or battery must be turned off and disconnected during installation of the turnstile.
- Only serviceable tools must be used for installation.
- When installing the turnstile post, before fixing it, be especially careful and protect it from falling.

Power supply unit installation must be made in accordance with the safety rules given in its certificate.

### 7.2 Operation safety requirements

Follow general electrical safety rules when operating the turnstile.



#### **Attention!**

- 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 supply voltage that does not comply with the requirements of Section 3 of the Manual.

The power supply unit should be used in compliance with its operational documentation.

## 8 INSTALLATION

Turnstile installation should be performed with observance of safety rules described in Sect. 7.1.

### 8.1 Installation details

The turnstile installation is an important operation, both the performance and service life of the product largely depend on it. Installation must be carried out by at least two specialists qualified as an installer and an electrician. It is recommended to study this section carefully prior to installation, and follow the given instructions.

#### **Installation surface recommendations:**

The turnstile should be mounted on a steady and level concrete (grade 400 or higher, strength class B22.5), stone, or similar foundation at least 150 mm thick.

The installation surface must be leveled the way the mounting points of the turnstile post are in the same horizontal plane (control with a level).

When installing the turnstile post on less steady foundation, it is necessary to use reinforcing foundation elements of at least 400×400×300 mm size. It is also possible to use a frame foundation.

#### **Passage zone organization**

The turnstile is equipped with an electric drive for the barrier arms rotation. When rotated 5° or more, the barrier arms turn in the passage direction (when rotated 60° or more, the barrier arms cannot be returned to their initial position since the return passage is blocked). When rotated at an angle of less than 60°, the barrier arms return to their initial position in 8 sec.

When the turnstile is operated under the control of the ACS controller, a passage event is registered when the barrier arms turn by an angle of more than 60°. Follow the recommendations (Fig. 14) to ensure the required angle of rotation when installing the turnstile.

When organizing the passage zone, it is essential to anticipate an extra emergency exit. For example, the “anti-panic” hinged section of **BH-02** railing can serve as such an exit.

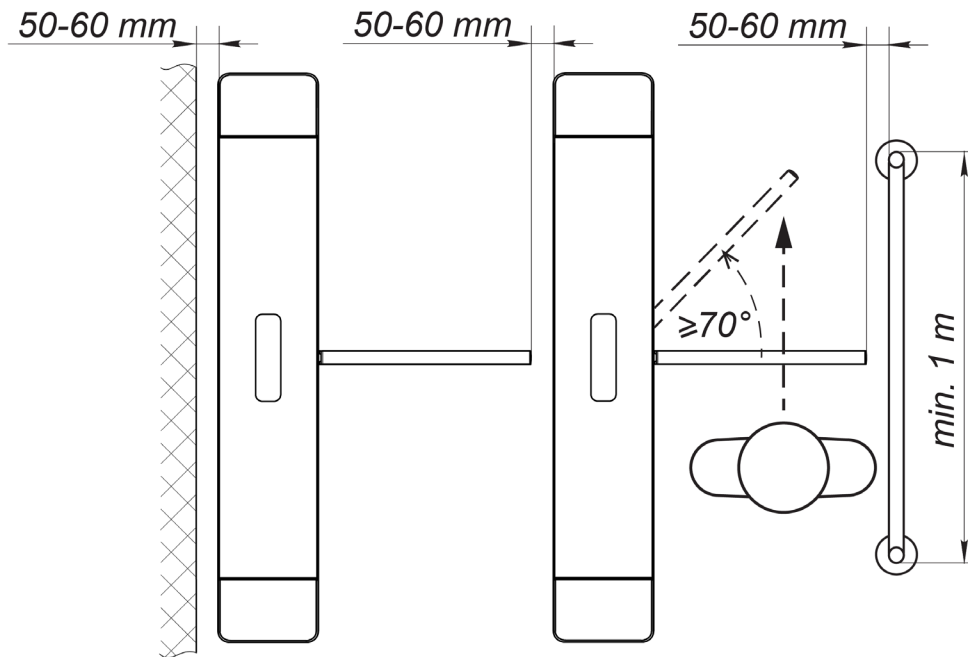


Figure 14. Recommendations for passage zone installation

## 8.2 Installation tools

- 1.2÷1.5kW hammer drill
- Hard-alloyed drill bit for anchor bolt sleeves
- Flat slot screwdriver No.2
- Flat slot screwdriver No.5 (150 mm)
- Cross-head screwdriver No.2
- Horn-type and socket wrenches: S17, S13, S10, S8, S7, S5.5
- Level
- Measuring tape (2 m)

It is allowed to use other equipment and measuring tools that provide the required parameters.

## 8.3 Length of cables

The cables, used for installation, are listed in Table 4.

Table 4. Cables used at the installation

No	Equipment	Cable length, m, max	Cable type	Cross-section, mm <sup>2</sup> , min	Example
1	Power supply	15	Twin cable	2.5	AWG 13; HO5VV-F 2×2.5, two-color
2	- Fire Alarm device - Additional equipment	30	Twin cable	0.2	RAMCRO SS22AF-T 2×0,22 CQR-2
3	RC-panel, ACS controller	40	8-core cable	0.2	CQR CABS8 8×0.22c
5	Power supply of the built-in card capture reader for <b>TTD-12AC</b>	1.5	Twin cable	1.5	AWG 15; HO5VV-F 2×1.5, two-color

### 8.4 Connection layout of the turnstile and additional equipment

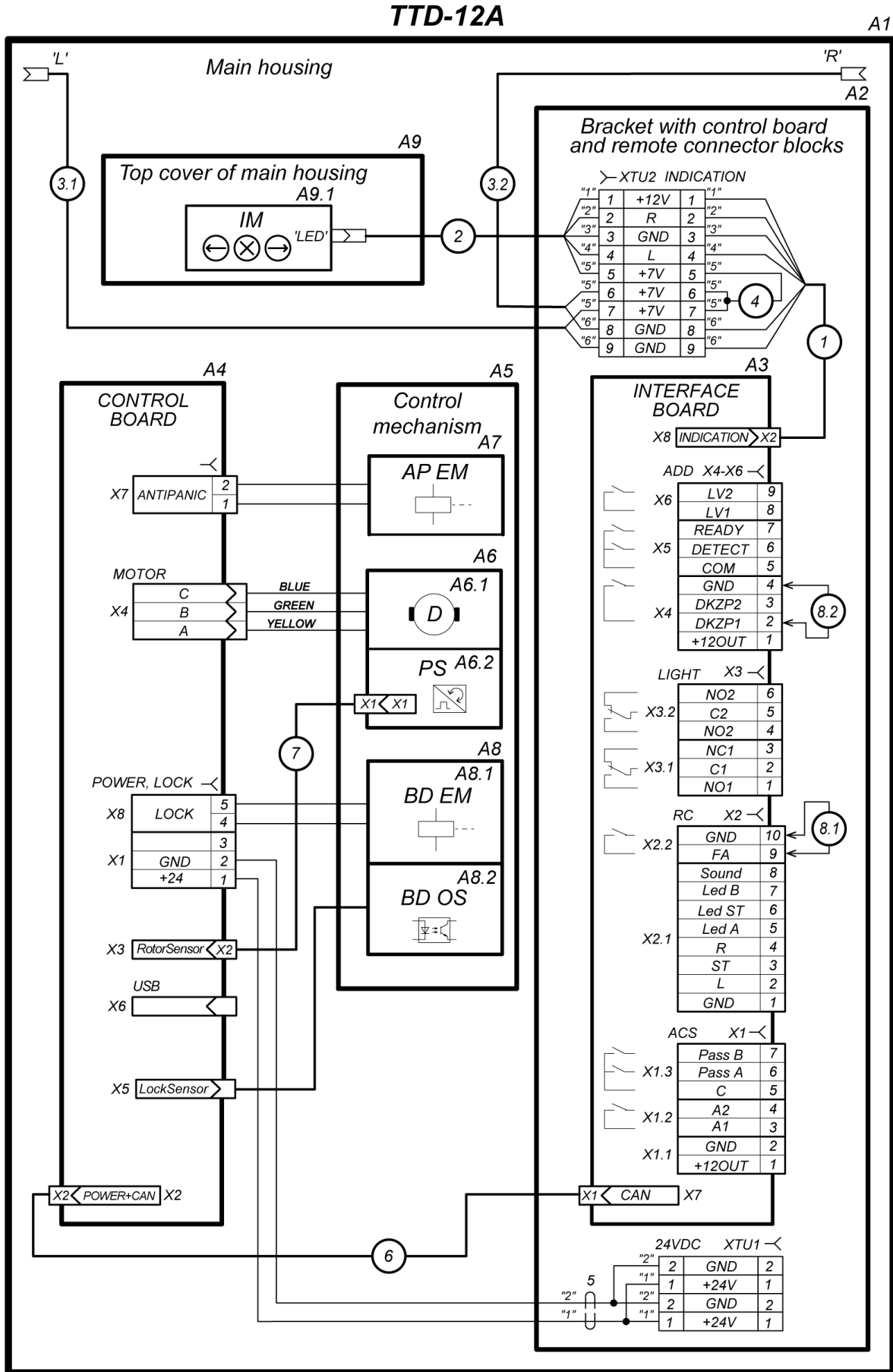


Figure 15. Internal connection layout of the main housing

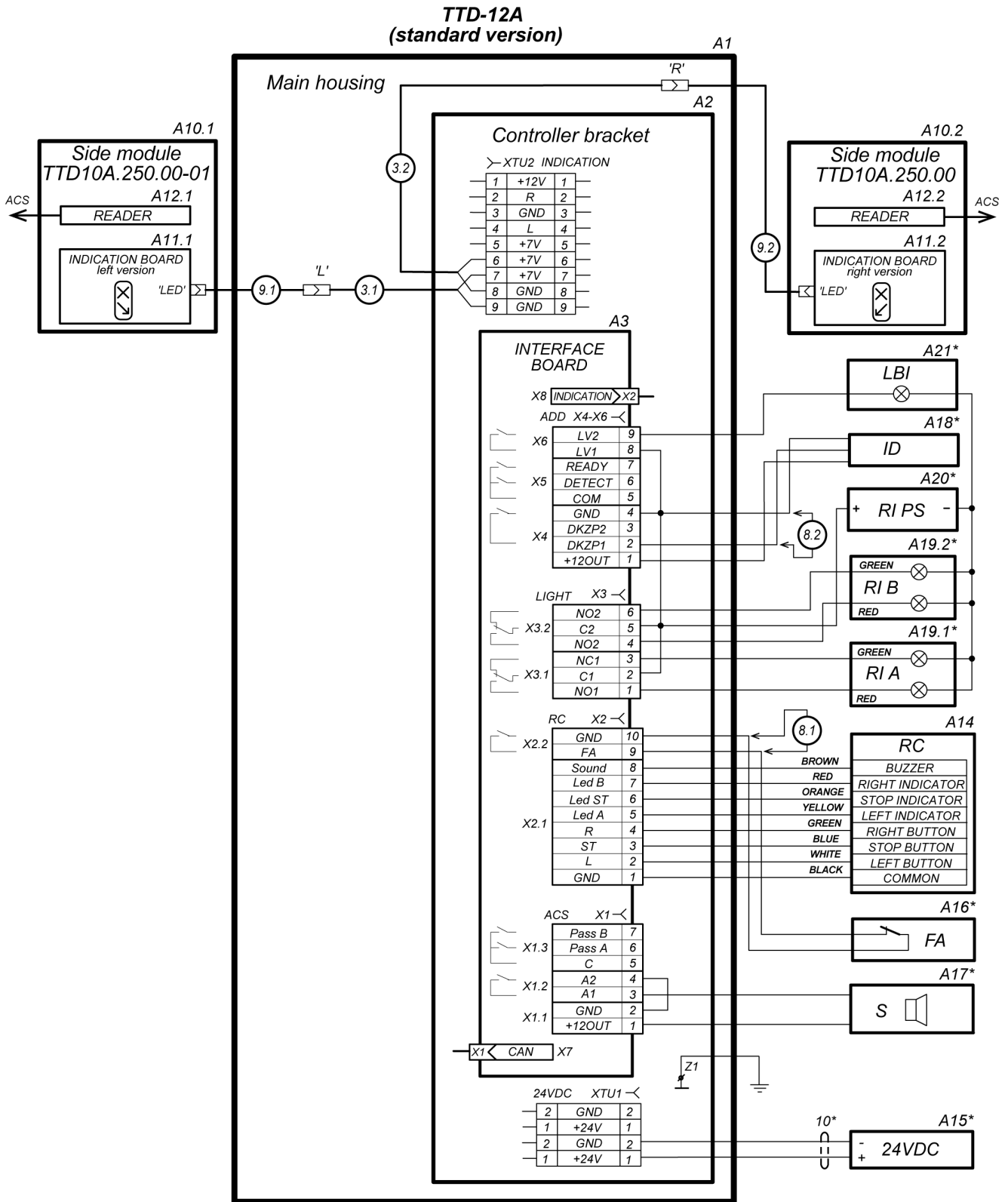
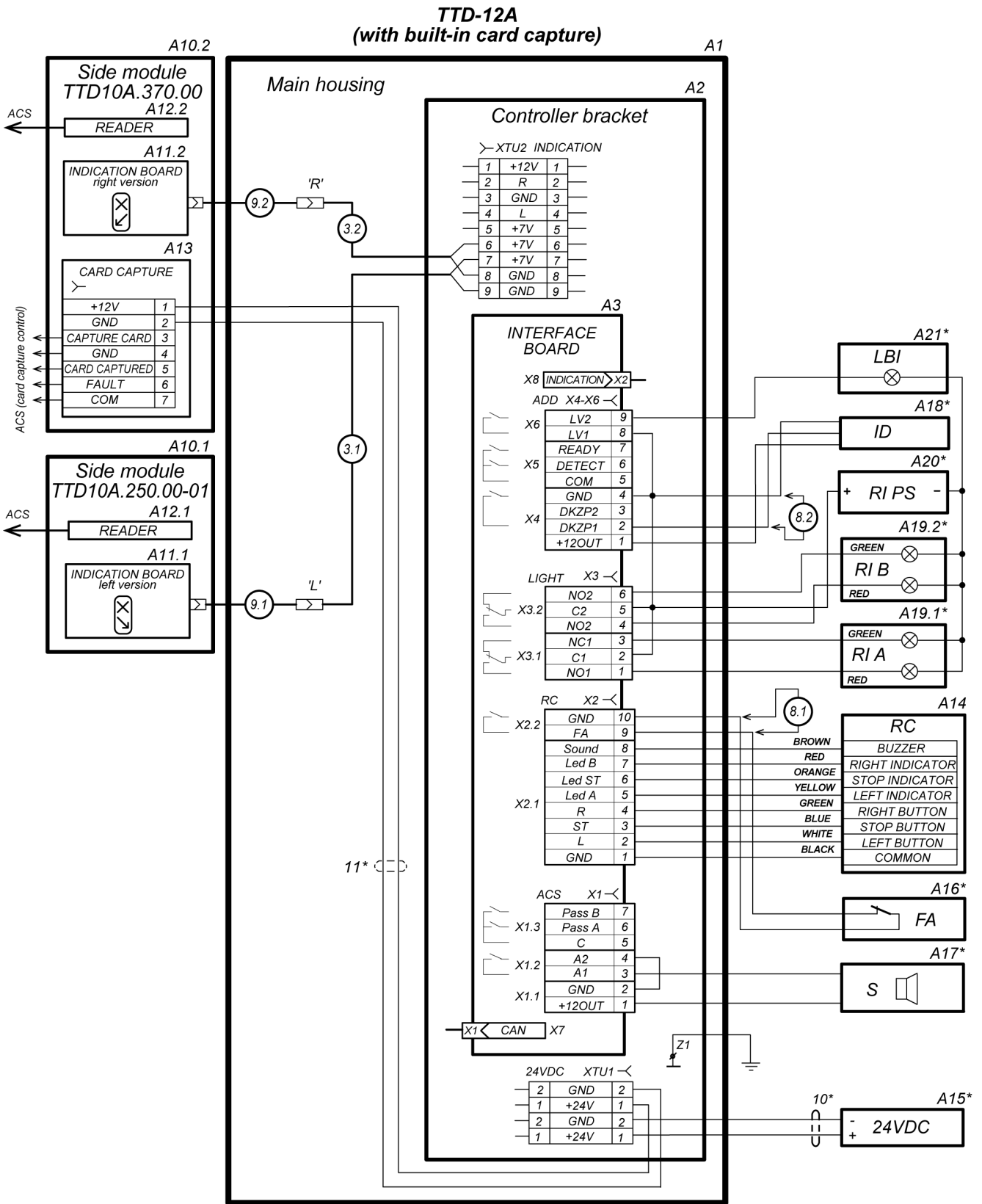


Figure 16. Connection layout of the turnstile and additional equipment for the TTD-12AB<sup>1</sup> standard version

<sup>1</sup> The layout elements are indicated in Table 5.

\* - Not included in the standard delivery set.





**Figure 17. Connection layout of the turnstile and additional equipment for the TTD-12AC<sup>1</sup> version with card capture reader**

<sup>1</sup> The layout elements are indicated in Table 5.

\*- Not included in the standard delivery set.

Table 5. Elements of the connection layout

Item	Description	Qty
<b>A1</b>	Main housing	1
<b>A2</b>	Bracket for interface board and additional controller	1
<b>A3</b>	Interface board	1
<b>A4</b>	Control board	1
<b>A5</b>	Rotary group	1
<b>A6</b>	Drive mechanism	1
<b>A6.1</b>	Drive motor	1
<b>A6.2</b>	Position sensor board	1
<b>A7</b>	“Anti-panic” device electric magnet	1
<b>A8</b>	Blocking device	1
<b>A8.1</b>	Blocking device electric magnet	1
<b>A8.2</b>	The board of optical sensors of the blocking device	1
<b>A9</b>	Main cover	1
<b>A9.1</b>	Indication block	1
<b>A10.1, A10.2</b>	Side modules, left and right versions	2
<b>A11.1, A11.2</b>	Side module indication boards, left and right versions	2
<b>A12.1, A12.2</b>	Readers for directions No. 1 and No. 2	2
<b>A13</b>	Card capture reader mechanism	1
<b>A13</b>	Sensor of container filling	1
<b>A14</b>	RC-panel	1
<b>A15<sup>1</sup></b>	Turnstile power supply (battery) 24V DC	1
<b>A16<sup>1</sup></b>	Emergency unblocking device <i>Fire Alarm</i>	1
<b>A17<sup>1</sup></b>	Siren DC 12V	1
<b>A18<sup>1</sup></b>	Intrusion detector	1
<b>A19.1<sup>1</sup>, A19.2<sup>1</sup></b>	Remote indicators	2
<b>A20<sup>1</sup></b>	Remote indicator power supply	1
<b>A21<sup>1</sup></b>	Low battery indicator	1
<b>XTU1</b>	Remote terminal block <i>Klemsan 1/4</i>	1
<b>XTU2</b>	Remote terminal block <i>Klemsan 1/12</i>	1
<b>1</b>	Internal cable to the indication block	1
<b>2</b>	Main cover indication cable	1
<b>3.1, 3.2</b>	Indication cables from the main housing to the side modules	2
<b>4</b>	Wire-splitter of <b>XTU2</b> terminal block	1
<b>5</b>	Internal turnstile power cable	1
<b>6</b>	CAN connection cable	1
<b>7</b>	Drive position sensor connection cable	1
<b>8.1, 8.2</b>	Jumper wires. Installed when the intrusion detector ( <b>A19</b> ) and emergency unblocking device <i>Fire Alarm</i> ( <b>A16</b> ) are not connected. Installed on default.	1
<b>9.1, 9.2</b>	Indication cables from the side modules	2
<b>10<sup>1</sup></b>	Turnstile external power cable	1
<b>11<sup>1</sup></b>	Power cable of the built-in card capture reader <sup>1</sup> (for <b>TTD-12AC</b> )	1

<sup>1</sup> Not included in the standard delivery set.

## 8.5 Installation sequence



### **Attention!**

The manufacturer shall not be liable for any damage caused as the result of improper installation and declines any claims arising thereof in case the installation is done not in compliance with the instructions provided in this Manual.

Installation order is described with regards to recommendations, given in Sect. 8.1. Installation tools are listed in Sect. 8.2. Cable types used in installation are listed in Sect. 8.3. Connection layouts of the turnstile and optional equipment are presented in Sect. 8.4.

During turnstile installation keep to the following installation order (the turnstile positions are indicated in accordance with Fig. 2):

1. Install the turnstile power supply to its designated place in accordance with its operational documentation.
2. Mark and drill holes for anchor bolt sleeves to fix the turnstile housing (see Fig. 18).
3. If you lay the cables under the floor surface, prepare the electric raceway to the cables laying zone of the turnstile housing. The cables layout inside the turnstile housing is shown in Fig. 19.



### **Attention!**

- It is necessary to leave a reserve of the length of the cables connected to the remote terminal block and the control board, sufficient to remove the bracket and gain access to the rotation unit of the barrier arms.
- Install and mount the housing after laying all cables in the cable duct and inside the housing.

4. Insert the sleeves for the anchor bolts into the holes so that they do not stick out above the floor surface.
5. Unpack the main housing of the turnstile (box №1). Remove the turnstile housing main cover (2), see Sect. 6.
6. Install the turnstile housing on the anchor sleeves, having previously inserted the connecting cables into it, and fasten it with M10 bolts through the holes in the base.
7. Connect the power cable (9) to the **XTU1** terminal block according to connection layout.
8. If necessary, install and connect the external ACS controller board inside the turnstile post on the interface board bracket (see Sect. 8.4).
9. If necessary, connect cables from other devices to the appropriate terminal blocks on the control board (see Sect. 8.4).
10. Use the jumper **J1** to select the turnstile control mode (pulse or potential, Sect. 5.2.7).
11. Unpack the side modules (6), (13) (box No. 2) and side covers (8) (packed separately).



### **Attention!**

If the turnstile is installed outside, the installation place of side module covers should be sealed. Use sealing rubber profile (included in the delivery set of each standard side module). Stick it to the upper top edge of the module tightly to the window edge throughout the side module cover. In mounting holes for covers, the seal should be placed between the window edge and the hole, not covering it. Please, pay attention so that with the next installation of the cover, the seal didn't get out of it and made the cover fit tight to the side module housing.

12. Decide which of the side modules (standard one (6) or with card capture reader (13)) will be left, and which is right for the turnstile housing. Note that the arrows on the side indication blocks (7) are pointed towards the passage through the turnstile. If necessary, switch the indication blocks.

---

<sup>1</sup> One of the options for connecting the power supply of the card capture reader is shown in Fig. 16. Power cable is not included in the delivery set.

To remove the constant indication block (7):

- for standard side module (Fig. 20):
  - remove the plate (4, Fig. 20) by unscrewing 6 screws (7, Fig. 20),
  - remove the bracket (3, Fig. 20) by unscrewing 4 nuts with washers (6, Fig. 20),
  - disconnect the connector of the indication cable from the indication block board,
  - remove the indication block (2, Fig. 20) by unscrewing 4 nuts with washers (5, Fig. 20).
- for side module with card capture reader (Fig. 21):
  - open the collector cover lock with the key (3, Fig. 21) and pull it with the key towards you until it stops,
  - disconnect the connector of the indication cable from the indication block board,
  - remove the indication block (2, Fig.21) by unscrewing 4 nuts with washers (4, Fig. 21).

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

13. Mount the side covers on the side modules. If necessary, in the side modules under the side covers or on them, install the necessary equipment: access card readers, barcode scanners, biometric readers, breathalyzers, etc. The installation of the side covers is described in Appendix 1. .



### **Attention!**

It is possible to install access card readers manufactured by PERCo inside the side modules on special brackets. When third-party readers are installed, they must meet the following specifications:

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

When installing another additional equipment, the side covers are purchased separately for specific equipment (see Sect. 4.1 and Appendix 1. ).

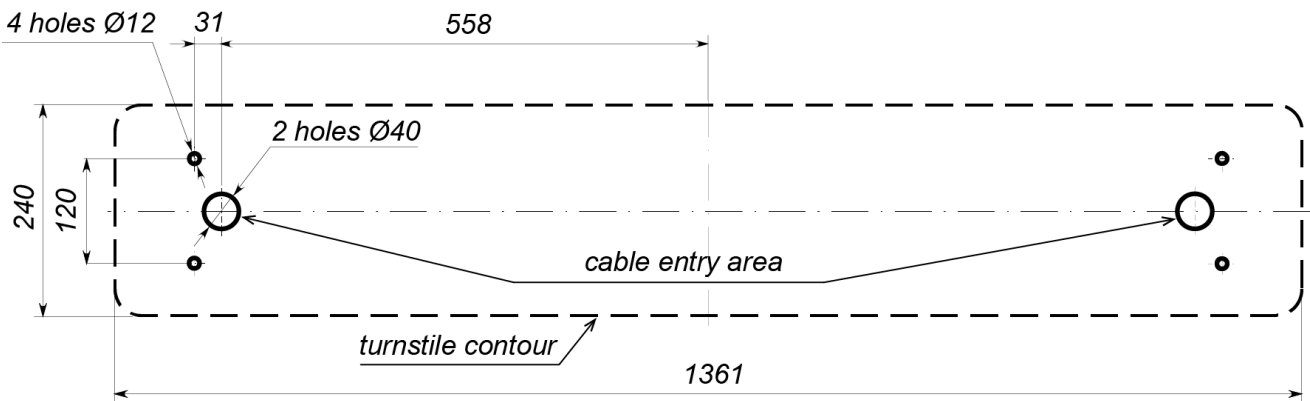


### **Note:**

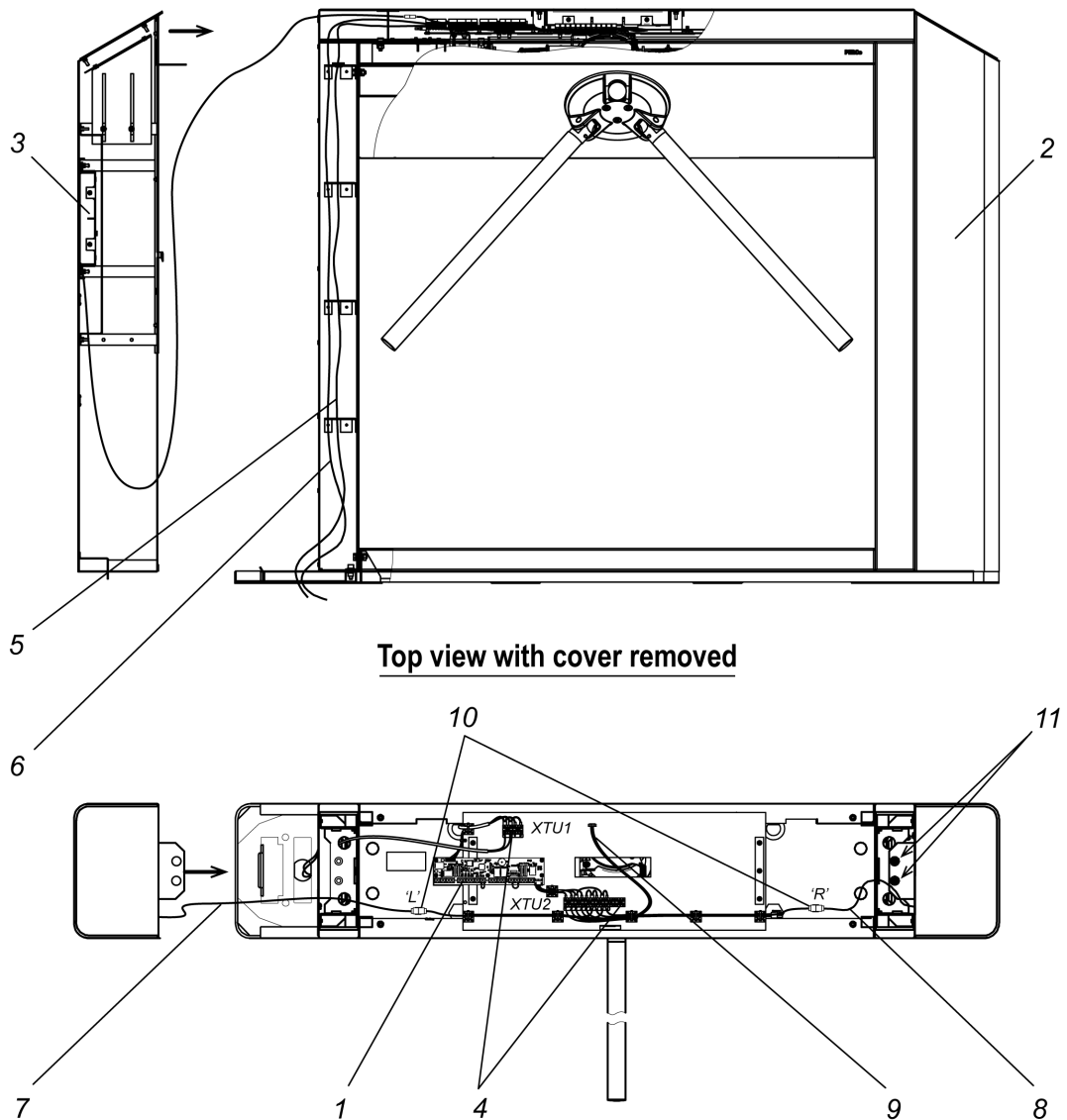
Installation of the access card reader in the side module with the built-in card capture reader of the **TTD-12AC** version is performed in the following order:

1. Remove the reader bracket (5, Fig. 21) by unscrewing the 2 screws.
2. Install the reader on the bracket area using double-sided tape or screws with nuts, drilling holes in place.
3. Replace the bracket. After the installation of the entire turnstile is completed, check the correctness of reading the access cards during their capture, if necessary, adjust the distance from the reader to the card receiving slot inside the side module, loosening the screws beforehand. After adjustment, tighten the screws.

14. Reinstall the side modules, 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 indicating cable from the side module to the control board bracket in the main housing not to damage it when installing the side module;
  - put the top of the side module back, herewith 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 screws M5×12 with two washers each – spring and flat enlarged (11, Fig. 19), screws and washers are included in the delivery set of the main turnstile post;
  - 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, Fig. 19).
15. Check that all electrical connections are correct and secure. Fasten all cables using self-adhesive tie mounts and non-releasable ties from the delivery set.
16. Replace the main cover of the turnstile (2), see Sect. 6.
17. Test the operation of the turnstile (see Sect. 9). The turnstile is ready for operation.

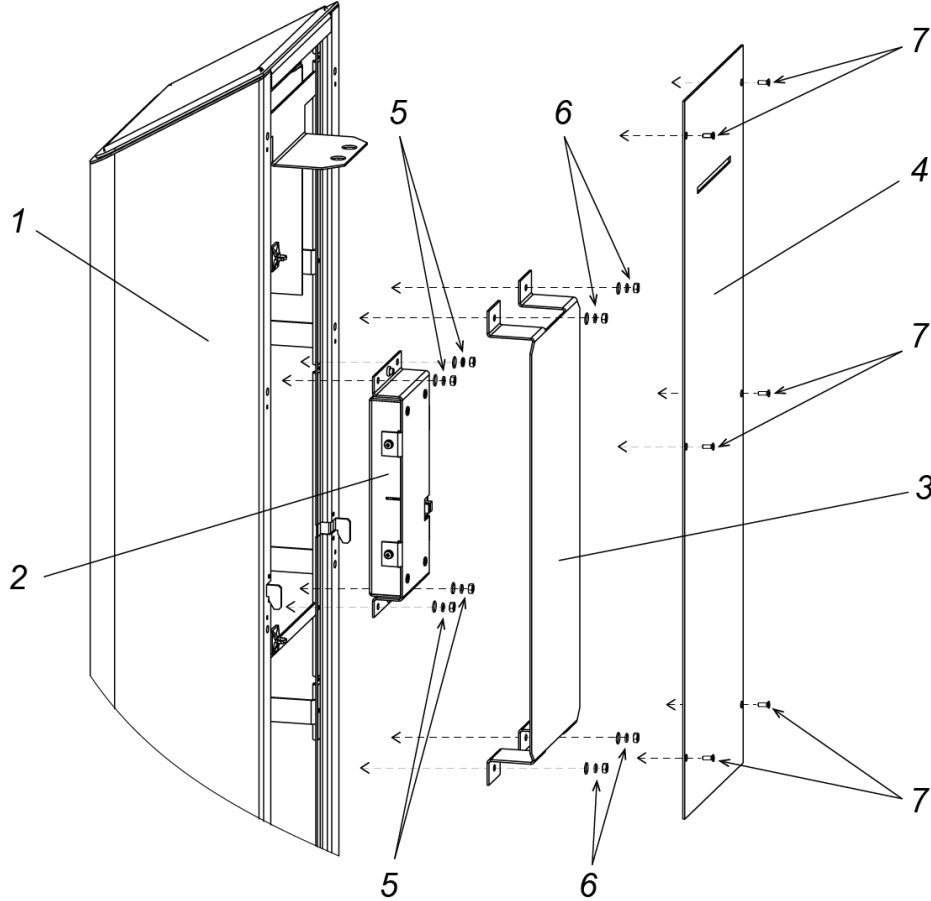


**Figure 18. TTD-12A turnstile housing installation layout**



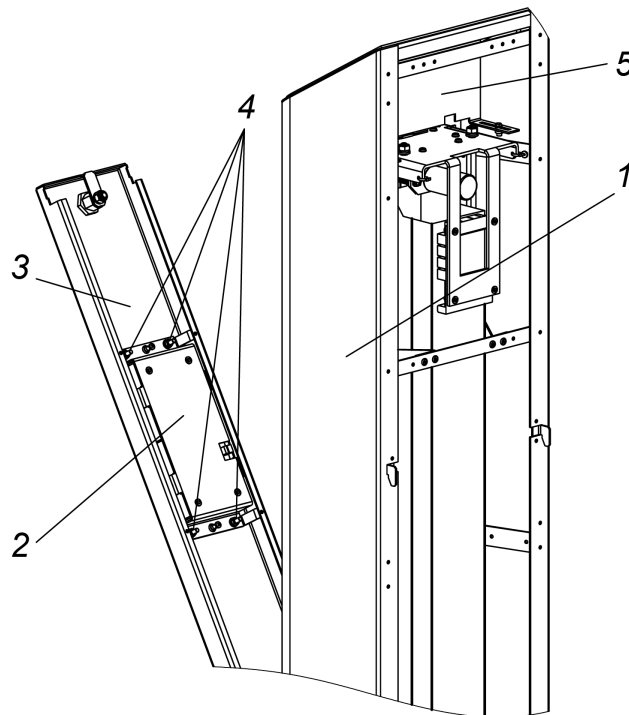
**Figure 19. Cable layout inside the housing**

- 1 – CLB; 2 – side module; 3 – side indication block;
- 4 – remote connector blocks **XTU1** and **XTU2**; 5 – power cable; 6 – cable of the RC-panel;
- 7, 8 – cables from side module indication block to the control board;
- 9 – cable with connector to the indication block on the turnstile cover;
- 10 – connectors of side module indication cables;
- 11 – M5×12 screws with washers fixing the side module



**Figure 20. Side 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 21. Side indication block (side module with built-in card capture reader)**

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

## 9 OPERATION INSTRUCTIONS

Follow the turnstile operation safety requirements (Sect.7.2).



### ***It is prohibited!***

- To move through the turnstile passage zone any objects with dimensions exceeding the width of the passageway.
- To jerk and hit any elements of the turnstile to prevent their mechanical deformation.
- To dismantle or adjust mechanisms ensuring operation of the turnstile.
- To use substances for cleaning the turnstile that may cause mechanical damage or corrosion of the surfaces.

### 9.1 Power-up

Follow these steps when you power up the turnstile:

1. Connect the power cable of the turnstile power supply to the network with the voltage and frequency indicated in the power source certificate.
2. Switch on the turnstile power supply. The turnstile automatically switches to “*Passage denial*” in pulse control mode. The turnstile switches to “*Both directions are closed*” in potential control mode. Red cross (passage denial) will appear on LED-indication. The indicator located above the **STOP** button will light up on the RC-panel.
3. Lift up the barrier arm (5). It will be fixed automatically.
4. Check the intrusion detector and siren operation (if included in the delivery set and installed accordingly), as well as the operation of other installed additional equipment in accordance with their operational documentation.

The turnstile is ready for operation.

### 9.2 Pulse control mode

Commands to control the turnstile from the RC-panel and their indication on the turnstile are carried out in accordance with Table 6. Passage directions are independent of each other, i.e., issuing a command for one direction does not change the state of the opposite passage direction.

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

Command	RC-panel operator actions	Indication		Turnstile state
		on the RC-panel	on the turnstile	
“ <i>Passage denial</i> ”	Press <b>STOP</b> .	The red indicator “Stop” is on.	The red crosses of each direction are on.	The turnstile is locked in both directions.
“ <i>Single passage in the set direction</i> ”	Press <b>LEFT</b> ( <b>RIGHT</b> ).	The green indicator of the set direction “Left” (“Right”) is on.	Green arrow for the set direction is on. After the passage, the green arrow goes out and the red cross lights up.	The turnstile is unlocked for a single passage in the set direction. In the other direction, the turnstile remains blocked.
“ <i>Bi-directional single passage (open in both directions for ‘one-by-one’ passage)</i> ”	Press both the <b>LEFT</b> and <b>RIGHT</b> buttons simultaneously.	Both green indicators (“Left” and “Right”) are on.	Green arrows for both passage directions are on. After the passage, the green arrow for this direction goes out. After the second passage, the second arrow goes out and the red cross is on.	Regardless the order of passage, the turnstile is unlocked for one-by-one single passage in both directions.

Command	RC-panel operator actions	Indication		Turnstile state
		on the RC-panel	on the turnstile	
<i>“Free passage in the set direction”</i>	Press both the <b>STOP</b> and <b>LEFT (RIGHT)</b> buttons simultaneously.	The green indicator of the set direction “Left” / “Right” is on.	The green arrow of the set passage direction is on.	The turnstile is unlocked for passage in the set direction. In the other direction, the turnstile remains locked.
<i>“Free passage in the set direction and single passage in the opposite direction”</i>	Press two buttons at the same time: <b>STOP</b> and <b>LEFT (RIGHT)</b> for one of the directions and <b>RIGHT (LEFT)</b> for the other.	Both green indicators (“Left” and “Right”) are on.	Green arrows for both passage directions are on. After the passage, set for single pass, green arrow goes out.	The turnstile is unlocked for free passage in the set direction. In the other direction, the turnstile unlocks for a single passage.
<i>“Free passage”</i>	Press all the 3 buttons on the RC-panel simultaneously: <b>LEFT, STOP, and RIGHT.</b>	Both green indicators (“Left” and “Right”) are on.	Green arrows for each passage direction are on.	The turnstile is unlocked in both directions.
<i>“Antipanic”</i>	All RC-commands are ignored.	Both “Left” and “Right” green indicators flash.	The arrows of both passage directions flash.	The barrier arm is lowered to the vertical position, the passage through the turnstile is free.

The RC-panel overall view is given in Fig. 6. Note that:

- In the *“Single passage in the set direction”* mode, the turnstile will close automatically after a person’s passage in the set direction. The turnstile will also close automatically, if the passage is not made within 5 sec.
- In the *“Bi-directional single passage”* mode after the passage in one direction, the countdown of the passage waiting time (5 sec.) for the opposite direction is recommenced.
- 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 to the *“Passage denial”* mode only.



**Note:**

When a button is pressed on the RC-panel, a low-level signal is applied to the corresponding contact of the interface board (*L*, *R*, or *ST*) relative to the *GND* contact.

The control of the turnstile using the WRC is similar to the control from the RC-panel. The buttons on the WRC perform the same functions as the RC-panel buttons.

### 9.3 Potential control mode

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

If by the time the passage is completed, a low-level signal is present at the contact of the corresponding passage direction, then the turnstile in this direction will remain open.



**Note:**

For ACS outputs:

- High level – contacts of the output relay are open 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 (no J1 jumper)**

Command	Operating signal	Indication		Turnstile state
		On the RC-panel	On the turnstile	
<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 red indicator “ <i>Stop</i> ” is on.	The “Red crosses” for each passage direction are on.	The turnstile is locked in both directions.
<i>“The passage direction is open”</i>	Low level at the contact of the specified direction. High level on other contacts.	The green indicator above the button of the chosen passage direction “ <i>Left</i> ” / “ <i>Right</i> ” is on.	The “Green arrow” in the set direction is on.	The turnstile is unlocked in the chosen passage direction.
<i>“Both passage directions are open”</i>	Low level on <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” for each passage direction are on.	The turnstile is unlocked in both directions.
<i>“Antipanic”</i>	All commands are ignored.	Both “ <i>Left</i> ” and “ <i>Right</i> ” green indicators flash.	The arrows of both directions flash.	The barrier arm is lowered to the vertical position, the passage through the turnstile is free.

### 9.4 Algorithm of the card capture reader operation<sup>1</sup>

The built-in card capture reader operation is possible only in 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’s necessary to insert it into the card slot. For the convenience of users in standby mode, the receiving slot of the card capture reader is permanently backlit by the built-in LED indicator.

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

If the presented card is a temporary visitor card and requires the withdrawal, the backlight of the card slot will start flashing with a frequency of 2 times per second. The shutter, blocking access to the card collector, will open and the card will fall into the card collector.

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

If for some reason the card is not withdrawn during the “**Confirmation Timeout**” (set in the ACS) (for example, the visitor will not insert the card or it will get stuck in the slot), the ACS controller will prohibit passage in this direction and the backlight of the receiving slot will become permanent. After that, the access card will have to be taken out of the card slot and presented for rereading and withdrawal.

<sup>1</sup> For the **TTD-12AC** turnstile version

When the card collector is full, the "Alarm" signal is sent to the ACS controller, the backlight of the card capture reader card slot goes into the flashing mode with a frequency of 1 time in 2 seconds, thereby warning about the need to empty the collector from the withdrawn cards. If the collector is not emptied, then after receiving 10 more cards, the work of the card capture reader is blocked, and the backlight of the card slot is extinguished. The "Alarm" signal release and card capture reader unblocking occur automatically after the collector is emptied from the cards (the procedure for the removal and installation of the collector is given in Sect. 9.5).

The "Alarm" signal is also sent to the ACS controller in case of card capture reader malfunction, the backlight of the receiving slot goes out until the fault is eliminated. If the card collector, installed in the turnstile, is empty but the blocking and the "Alarm" signal are not removed, the probable cause of this may be the malfunctions of the units providing the card capture reader operating. In this case, contact the PERCo technical support.

## 9.5 Removal and installation of the card reader container<sup>1</sup>

To remove the card reader container from the turnstile, use the key to open the lock of the card capture reader cover, then open the cover by pulling it towards you by the lock key and remove the container from the turnstile front panel.

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

## 10 ACTIONS IN EMERGENCY

In case of an emergency (f. e., the power supply failure), the passage zone of the turnstile can be used as an additional emergency exit.

It is possible to switch the turnstile to *Fire Alarm* mode from the emergency unblocking device of the passage (fire alarm device, emergency button, etc.). In this mode, the barrier arm of the turnstile, blocking the passage zone, falls down (takes a vertical position) and frees the passage in both directions, green arrows flash on the display unit, control commands from other devices and software are ignored (Sect. 5.4.2).

Also, the opening of the turnstile passage zone is performed automatically when the turnstile supply voltage is removed (lost).



### **Attention!**

For emergency evacuation of people from the territory of the enterprise in case of fire, natural disasters and other emergency situations, evacuation exits corresponding to safety requirements are used. Such emergency exit can be the **BH-02** anti-panic rotary section.

## 11 TROUBLESHOOTING

Possible faults to be corrected by the customers themselves are listed in Table 8.

**Table 8. Troubleshooting**

Fault	Most probable cause	Remedy
The power supply is on, but the turnstile does not run, there is no indication on the turnstile housing and the RC-panel	No supply voltage to the CLB	Switch off the power supply, remove the turnstile cover. Check the integrity of the power cable, check the reliability of the connection of the power cable in the terminal block
The turnstile is not controlled in one of the directions, and there is light indication on the turnstile housing and on the RC-panel	The CLB does not receive a control signal for this direction	Switch off the power supply, remove the turnstile cover. Check the integrity and reliability of the connection to the terminal block of the cable from the RC-panel / WRC receiver / ACS controller

If the failure couldn't be fixed, contact the closest **PERCo** Customer Services. The list of the Customer Services can be found in the certificate of the product.

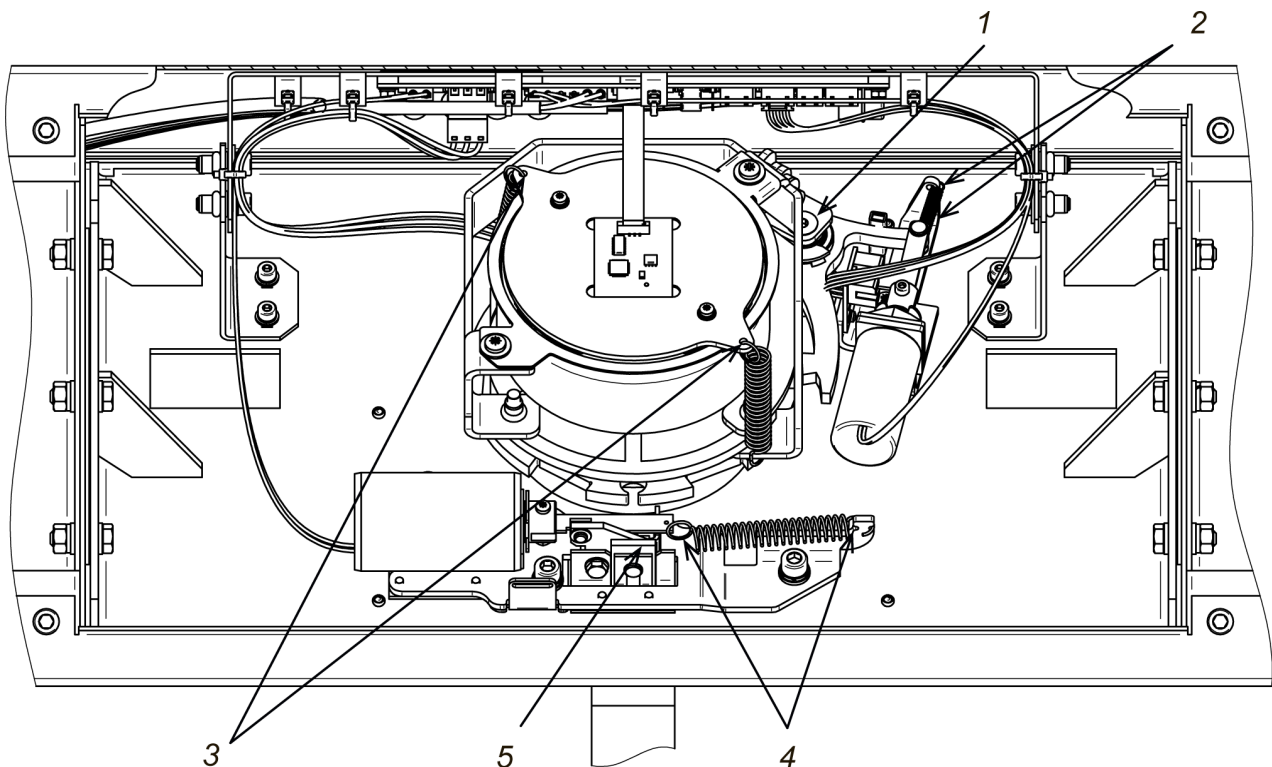
<sup>1</sup> For the **TTD-12AC** turnstile version.

## 12 MAINTENANCE

The turnstile maintenance is required once a year or in case of technical failures. The maintenance should be performed by qualified personnel only.

Follow these steps, when performing scheduled maintenance:

1. Switch off the turnstile power supply. The barrier arm will fall down automatically.
2. Unscrew three M8 screws to remove the hub with the barrier arms.
3. Check the barrier arms (5) mounting to the hub and tighten the barrier arms fixing screws if needed.
4. Lubricate the hinge and triggers contact points in the hub, as well as barrier arms hinged attachment points. Use molybdenum grease.
5. Remove the turnstile main cover (2) as described in Sect. 6 and place it on a flat steady surface.
6. To access the rotary group of turnstile barrier arms, take off the bracket with 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. Do not damage the connected cables!
7. Lubricate the friction units of the turnstile mechanism at the following points:
  - rotation axis of the stopper lever (point 1, Fig. 22) with **Chain and Rope Lube Spray – WEICON** or another with similar properties;
  - spring attachment points (points 2, 3, 4, Fig 22) – with molybdenum grease;
  - emergency unblocking mechanism components (automatic lowering of the anti-panic barrier arm, (point 5, Fig. 22) with **Chain and Rope Lube Spray - WEICON** or another with similar properties.



**Figure 22. The turnstile mechanism maintenance**  
(1 – 5 – lubrication points)

8. Check the reliability of the terminal blocks cable connections on the control and interface boards. Tighten the cable fixing screws if necessary.
9. Check the reliability of the turnstile fastening and, if necessary, tighten the nuts of the turnstile housing fastening.

10. Install the bracket with the interface board and remote terminal blocks in the reverse order of removal.
11. Install the hub with barrier arms in the reverse order of removal.
12. Check the fastening of the barrier arms (5) in the hinged units of the turnstile and, if necessary, tighten the fixing screws.
13. Dismantle the side modules (6, 13) in the order indicated in Section 8.5. Check the tightness of the four anchor bolts securing the turnstile housing to the floor and, if necessary, tighten them.
14. Reinstall the side modules in the reverse order of removal.
15. Return the main cover (2) in the reverse order of removal and lock it with a key.
16. Energize the turnstile and lift the folding arm.
17. Check the turnstile operation in accordance with Section 9 of this Manual.

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

If any defects in the nodes are detected during the maintenance of the turnstile, as well as after the expiration of the warranty period (see the certificate of the turnstile), it is recommended to contact the **PERCo** official distributor or **PERCo** Technical Support Department.

### 13 TRANSPORTATION AND STORAGE

The product in the original package is allowed to be transported only in closed-type cargo transport units (airplanes, railway wagons, containers, closed cars, holds, etc.).

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

The storage of the product is allowed indoors at ambient temperature from  $-40^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$  and relative air humidity up to 98% at  $+25^{\circ}\text{C}$ .

After transportation or storage at temperatures below zero or in high air humidity, before the installation the product must be kept unpacked for no less than 24 hours indoors in the climate conditions corresponding to the operating conditions.

## APPENDIXES

### 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. 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 fall into the corresponding holes in the module housing. The cover is fixed with 4 nuts with washers (S5 key).

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

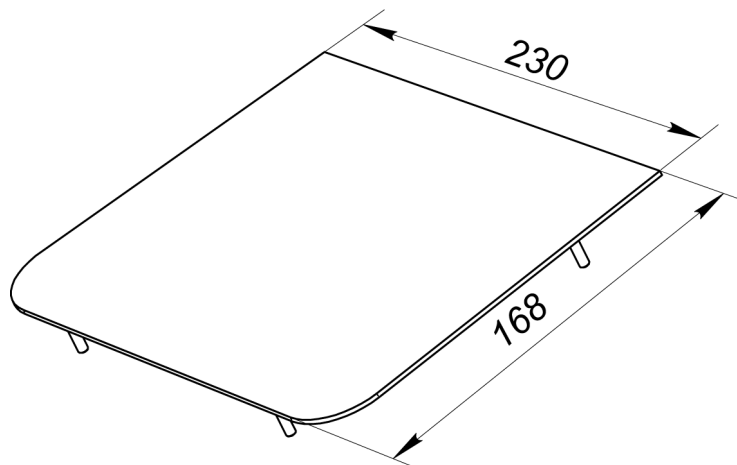


Figure 23. Dimensions of the **C-10B** side cover

- 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.

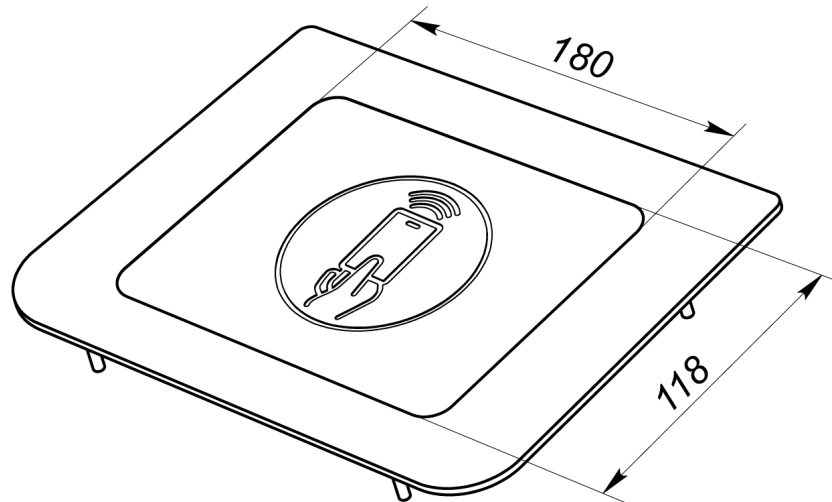


Figure 24. The **C-10R** side cover

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

It is made of stainless steel. It is possible to turn the bracket for installing the reader at an angle of up to 30° in any direction from the longitudinal axis of the turnstile for the convenience of presentation 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 desired position and then fix it with screws.



**Attention!**

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

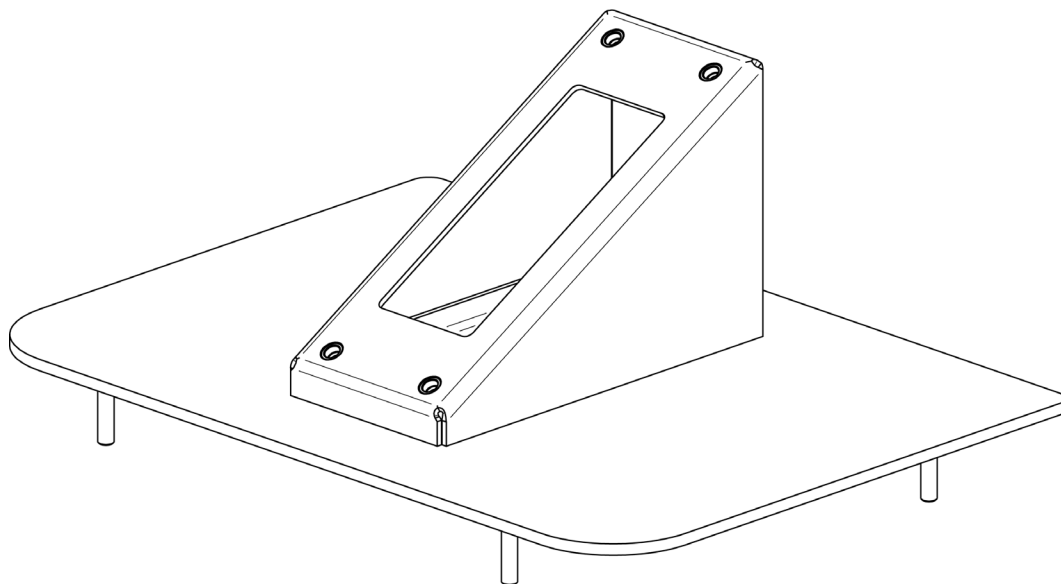


Figure 25. The **C-10F.1** side cover

- 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.

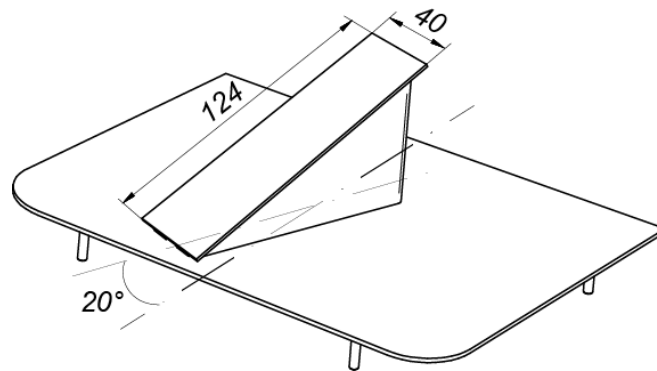


Figure 26. The **C-10F** side cover

5. The **C-10RC** side cover is intended for the installation into the turnstile in the **TTD-12AC** version with the built-in card capture reader.

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

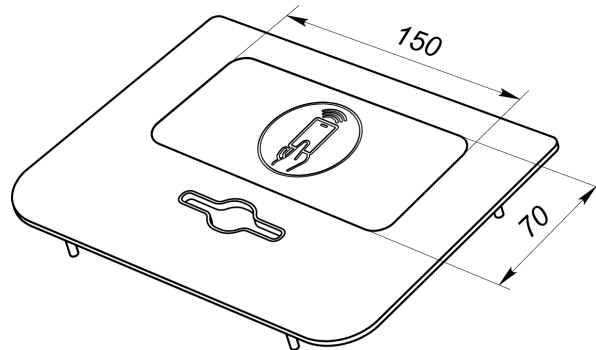


Figure 27. The **C-10RC** side cover

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

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 of the side cover.

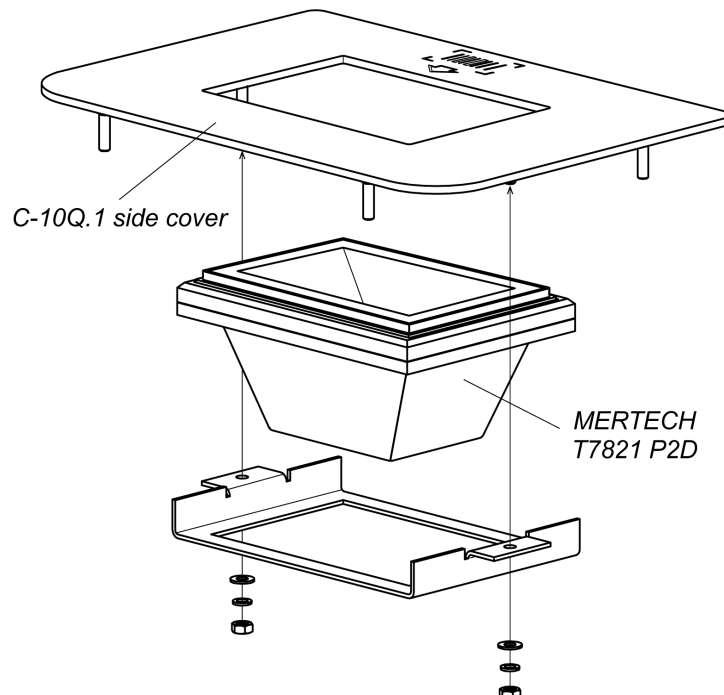


Figure 28. The **C-10Q.1** side cover with the **Mertech T7821 P2D** barcode scanner

7. The **C-10P.1** and **C-10P.2** top 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 bracket type **BS** with the additional equipment.
- A list of bracket types can be found on the [www.perco.com](http://www.perco.com) website.

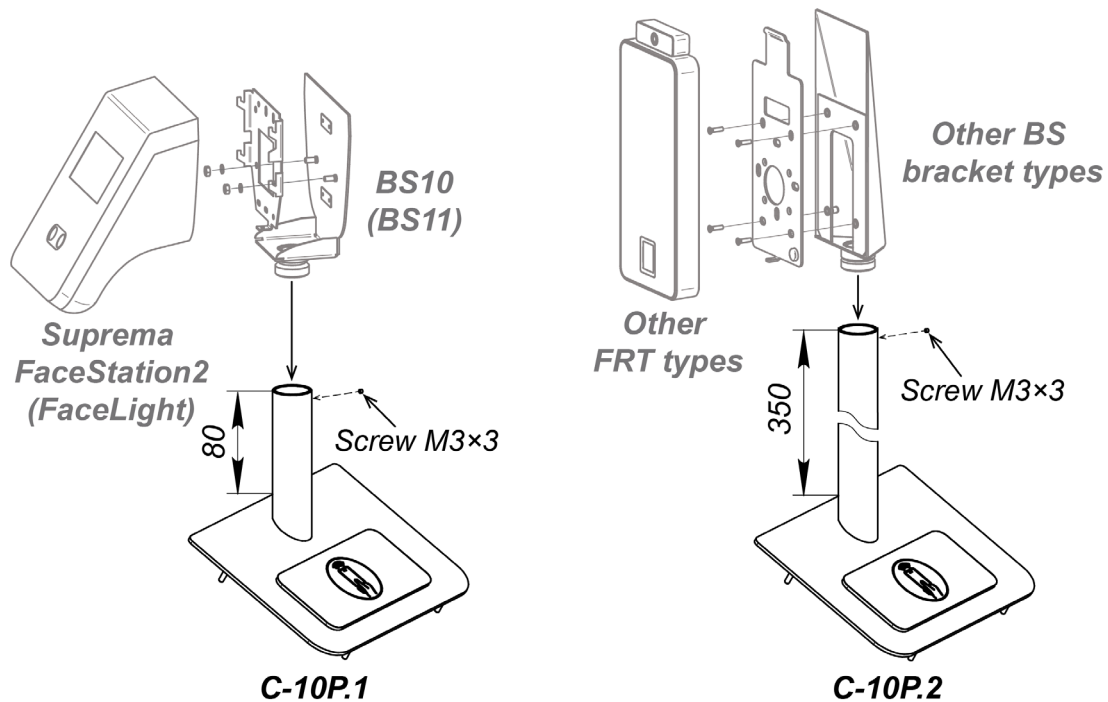


Figure 29. The C-10P.1 and C-10P.2 side covers

## Appendix 2. Algorithm of issuing command at pulse control mode



### Note:

For the RC-panel:

- Active front – pressing of the corresponding button on the RC-panel;
- Low level – the corresponding button on the RC-panel has been pressed;
- High level – the corresponding button on the RC-panel has not been pressed.

By applying the **X2** terminal block to the *Unlock A*, *Stop*, and *Unlock B* contacts of a low-level signal relative to the *GND* contact, the following commands can be formed (the command is the active front of the signal (the signal transition from high to low) on any of the contacts if there are corresponding signal levels on the other contacts):

“Passage denial” (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 locked 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, passage direction A opens either for 5 sec. or until the passage has been made in this direction or until the command “Passage denial” and the state of passage direction B does not change at that. The command is ignored if at the moment of its receipt the state of passage 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, the passage direction B opens either for 5 sec. or until the passage is completed in this direction or until the command “Passage denial”, and the state of passage direction A does not



change. The command is ignored if at the moment of its receipt the state of passage direction B is *“Free passage”*.

*“Bi-directional single passage”* (open in both directions for ‘one-by-one’ passage). 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 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 either for 5 sec. each or until the passage is completed in the set direction or until the command *“Passage denial”* is received. The command is ignored for the passage direction, which state at the moment of its receipt is *“Free passage”*.

*“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, passage direction A opens until the command *“Passage denial”* 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 *Unlock A* contact. At this command, passage direction B opens until the command *“Passage denial”* 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 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 command *“Passage denial”* is received.

### Appendix 3. Algorithm of issuing command at potential control mode



#### Note:

For ACS controller outputs:

- Low level – the relay output is closed or the output transistor is open;
- High level – the relay output is open or the output transistor is closed.

*“Both directions are closed”* (closed 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.

*“The 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 up to the low-level signal removal from the *Unlock A* contact or until the command *“Both directions are closed”* is received. The state of direction B does not change.

*“The 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 up to the low-level signal removal from the *Unlock B* contact or until the command *“Both directions are closed”* 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 up to the low-level signal removal from one of the *Unlock A* or *Unlock B* contacts or until the command *“Both directions are closed”* is received.



## Appendix 4. Configuring 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.
- Visitor cards subject to withdrawal must be set in the software for a mandatory verification process upon presenting them to the reader of the direction controlled by the card capture reader.

### In the ACS software "PERCo-Web"

1. Log in to *PERCo-Web* in a browser (see *PERCo-Web Admin Guide*).
2. Go to the **Administration** → **Configuration** section by using the navigation panel.
3. In the page work area, 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 appear.
5. In the appeared window, go to the **Additional outputs** tab.
6. Select **Additional output No...** (the output number should correspond to the controller output to which the "Withdraw card" input of the card capture reader is physically connected).
7. Specify the following parameters by using the drop-down list in the window work area:
  - the **Standard** value for the **Type** parameter;
  - the **Not energized** value for the **Normal state** parameter:

8. Go to the **Additional inputs** tab.
9. If the card capture reader acts as an external verification device for the controller ("Card is withdrawn" 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 is withdrawn"

output of the card capture reader) and set the following parameters by using the drop-down menu:

- set the **Confirmation from EVD** value for the **Type** parameter;
- set the **Open** value for the **Normal state of the contact** parameter;
- set the **OD ... direction ...** value for the **OD number** parameter (the number of OD and direction number must correspond to those 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

<div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 2px;">Additional input No.3</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.4</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.5</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.6</div>	<p><b>Additional input No.3</b></p> <p>Type  <input type="text" value="Confirmation from external verification device"/></p> <p>Normal condition of the contact  <input type="text" value="Disconnected"/></p> <p>Device number  <input type="text" value="Device 1 direction 2"/></p>
---	--

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...** (the input number must correspond to 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 **Open** value for the **Normal state of the contact** parameter.

✕
**Device properties**

Device name:

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

General

Additional inputs

Additional outputs

Status

External connections

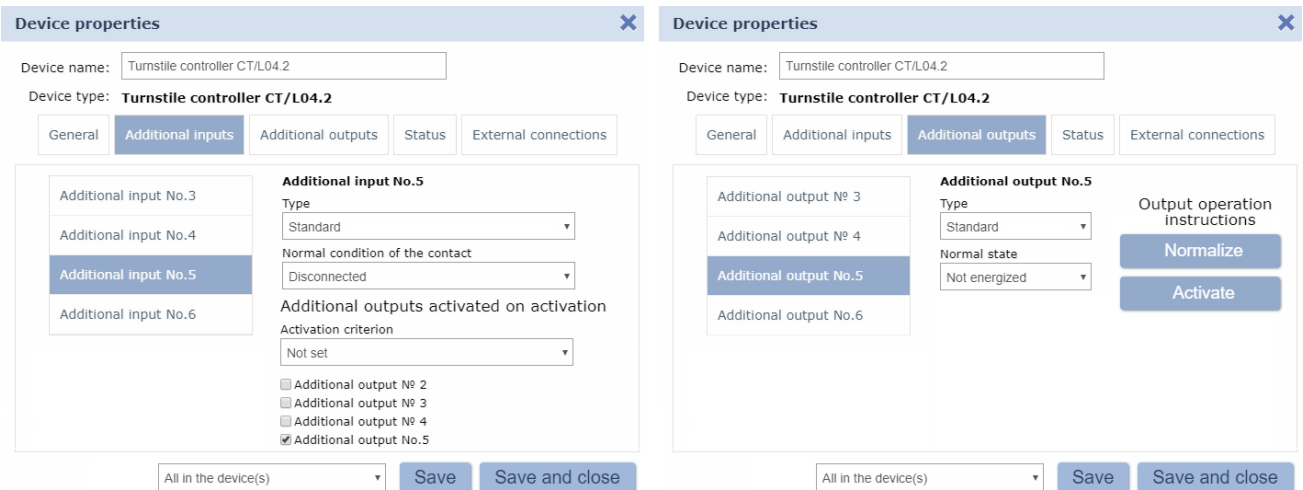
<div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.3</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px; background-color: #e6f2ff;">Additional input No.4</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.5</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Additional input No.6</div>	<p><b>Additional input No.4</b></p> <p>Type  <input type="text" value="Standard"/></p> <p>Normal condition of the contact  <input type="text" value="Disconnected"/></p> <p>Additional inputs, masked on OD activation  Masking out criterion  <input type="text" value="Not set"/></p> <p><input type="checkbox"/> Additional input No.2  <input type="checkbox"/> Additional input No.3</p>
--	---

All in the device(s) ▼

Save

Save and close

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



11.  **Attention!**

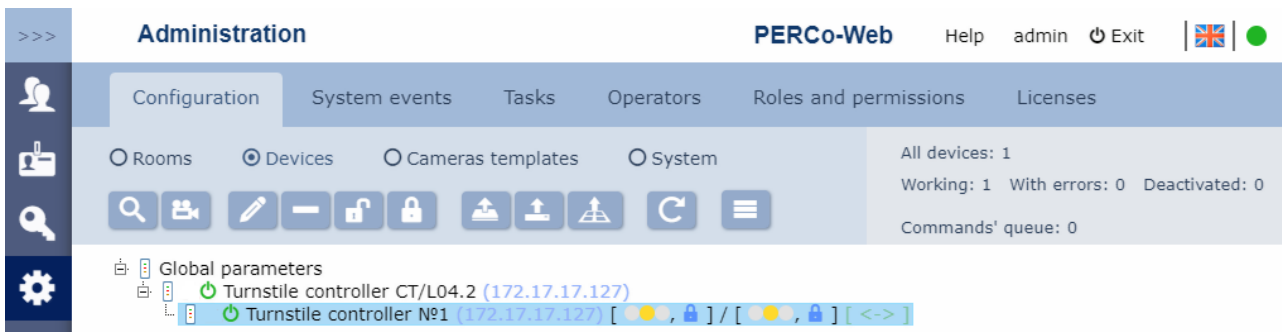
If the passage permission indication of the card capture reader is controlled directly from the control board of the turnstile, then, it is not necessary to fulfill the requirements of this paragraph.


In the window work area, select **Additional output No...** (the output number must match the output of the controller that is physically connected to the “LED” input 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 **Not energized** value for the **Normal state** parameter.

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

13. In the page work area within the main controller, select the controller of the OD, which is controlled by the card capture reader.



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

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

16. The “*Card is withdrawn*” signal sent by the card capture reader is considered as a confirmation of withdrawal of the card. To set up the confirmation, in the left part of the page work area, set the following values of the **Verification** parameter group:

- for the **Verification** parameter:
  - the **EVD** value if the card capture reader acts as an external verification device for the controller (the “*Card is withdrawn*” signal is sent to a separate input of the controller);
  - the **RC-panel** value if the “*Card is withdrawn*” 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:

- for the **Verify VISITORS IDs from the external verification device** parameter (or from **RC-panel**):
  - **Upon passage;**
  - **Upon passage with TIME VIOLATION;**
  - **Upon passage with ZONALITY VIOLATION.**
- for the **Verification confirmation waiting period from EVD** (or from **RC-panel**) parameter – the required value, during which the controller should wait for the signal "*Card is withdrawn*":

17. In the left part of the tab work area, select the group of parameters **Additional outputs activated upon VISITORS' valid identifiers** and set:
- the **For the operation time** value for the **Activation criteria** parameter by using the drop-down list.

- in the appeared window, select **Additional output No.3** (the output number to which the “Withdraw card” input of the card capture reader is connected):

18. In the left part of the window work area, select the **Withdraw identifiers of visitors after passage** checkbox:

19. Click **Save and close**. The **Controller properties** window will close, and the 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 are possible using 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 direction of the passage 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. In the **Configuration → Edit → Physical contacts** section:
  - Set the following parameter values for the input which is physically connected to the “*Card is withdrawn*” output of the card capture reader:
    - **Normal state** – **Open**,
    - **Function** – **EVD confirmation input**,
    - **OD** – **1** (number of OD that is physically connected to the card capture reader),
    - **Direction** – **1** or **2** (depending on the passage direction 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 which is physically connected to the “*Withdraw 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 response** section:

- **Source type – Visitor ID presentation,**
- **Source number – 1** (the OD number which is physically connected to the card capture reader),
- **Source direction – 1 or 2** (depending on the passage direction which is controlled by the card capture reader),
- **Receiver type – Activate output,**
- **Receiver number - 3** (the output number which is physically connected to the “*Capture card*” input of the card capture reader),
- **Response characteristic – Response time.**

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

Example of the **Internal responses** and **Physical contacts** sections after configuration (template – “Turnstile”, the card capture reader controls the “Direction 1”, “Input 6” and “Output 3” are used to control the card capture reader, “Input 5” is used to receive the “Alarm” 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



5. 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 that should be issued for a visitor, and in the opened window:
- on the **General** tab, select **Temporary** value for the **Card type** parameter, then determine the period of validity of the card,
  - on the **Access rights** tab, set the **Yes** value to 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**.

The image displays two side-by-side screenshots of a web interface for configuring access cards. Both windows have a title bar with the ID '65555' and a close button. The left window is on the 'General' tab, showing fields for 'Card type' (Temporary), 'Valid from' (01/10/2018), 'Valid till' (01/10/2018), 'Stop list' (No), 'Vehicle card' (No), and 'Full name' (Visitor). The right window is on the 'Access rights' tab, showing fields for '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), and 'Status' (Unblocked). Both windows have 'Delete', 'Save', and 'Cancel' buttons at the bottom.

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