



## Electromechanical Box Tripod Turnstile

# TTD-03.1

OPERATION MANUAL



CE EAL



# **Electromechanical Box Tripod Turnstile**

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## ***Dear customers!***

*We thank You for choosing the turnstile manufactured by PERCo.  
You have purchased a high quality product, which will be long lasting  
in operation provided that installation and operation rules are observed.*

The operation manual for the TTD-03.1 electromechanical box tripod turnstile (hereinafter referred to as the “turnstile”) contains data that is necessary for the most full usage of operating advantages of the turnstile as well as chapters on packaging, installation and maintenance.

Only qualified personnel, following the instructions of this Manual, must carry out installation and maintenance.

Abbreviations:

ACS – access control system.

## **1 APPLICATION**

The turnstile is designed for managing pedestrian flows at entrance checkpoints of industrial facilities, banks, administrative buildings, retail outlets, railway terminals, airports, etc.

To ensure fast and convenient passage it is recommended to install one turnstile per every 500 people, working in the same shift, or on the basis of maximum working load 30 persons/min. See Chapter 3 for information on the throughput of the turnstile.

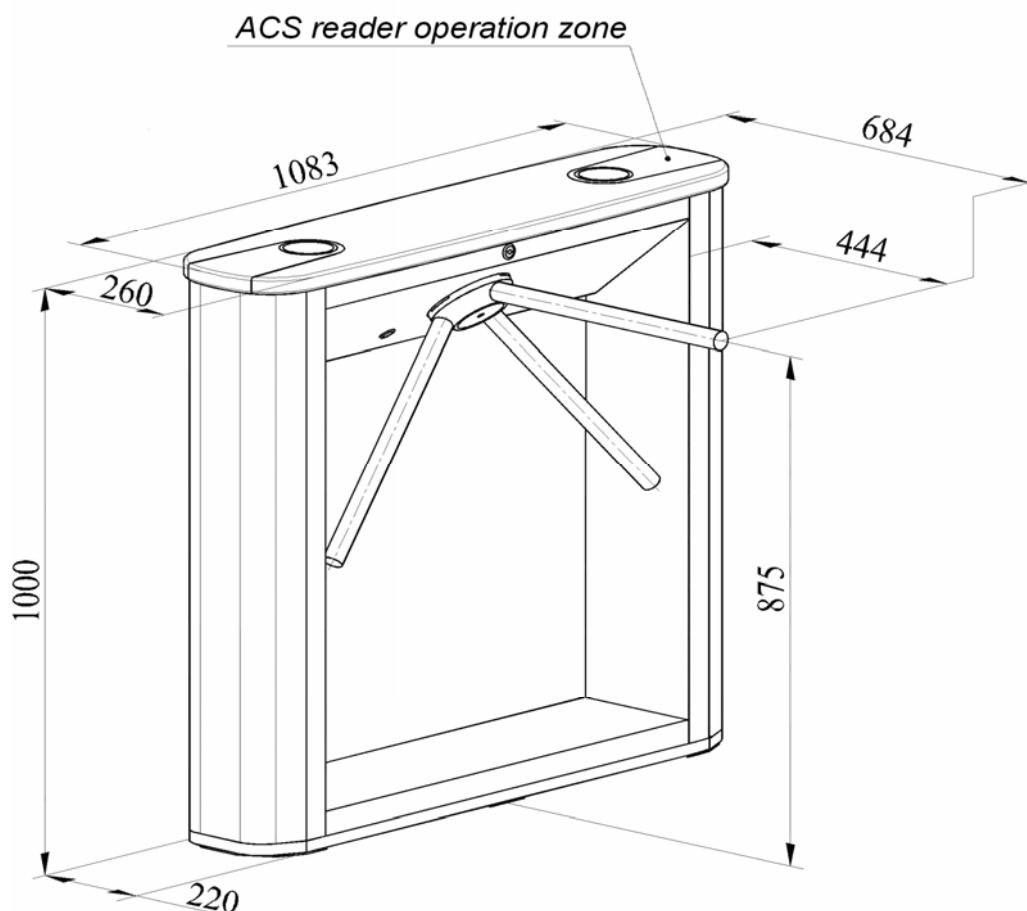
## **2 OPERATION CONDITIONS**

The turnstile, in accordance with the resistance to environmental exposure, is compliant with GOST 15150-69, category NF4 (operation in premises with climate control).

Operation of the turnstile housing is allowed at ambient temperature between +1°C and +40°C and relative air humidity up to 80% at +25°C.

### 3 TECHNICAL SPECIFICATIONS

Turnstile input DC voltage .....	12±1.8 V
Turnstile power consumption .....	max. 8.5 W
Consumption current .....	max. 0.7 A
Throughput of the turnstile in the single passage mode .....	30 persons/min
Throughput of the turnstile in the free passage mode .....	60 persons/min
Passageway width .....	500 mm
Barrier arm rotation force .....	max. 3.5 kgf
Remote control panel cable length .....	min. 6.6* m
Remote control panel overall dimensions (length × width × height) .....	120×80×21 mm
Net weight of the remote control panel .....	max. 0.2 kg
Ingress Protection Rating .....	IP41 (EN 60529)
Electric shock protection class .....	III (IEC 61140)
Mean time to failure .....	min. 4,000,000
Mean lifetime .....	8 years
Overall dimensions of the turnstile with established barrier arms (length × width × height) .....	1083×684×1000 mm
Net weight of the turnstile (with a top cover installed) .....	max. 69 kg



**Fig. 1 TTD-03.1 box tripod turnstile. Overall dimensions**

\* Maximum allowable cable length is 50 m (available on request)

## 4 DELIVERY SET

### 4.1 Standard delivery set

#### Basic equipment:

Turnstile housing .....	1
Turnstile housing cover .....	1
Barrier arm .....	3



#### **Note:**

The type and color options of the turnstile housing cover and barrier arms are specified in the Certificate TTD-03.1.

Turnstile housing cover key .....	2
Mechanical release key .....	2
Remote control panel .....	1

#### Operational documentation:

Certificate .....	1
Operation manual .....	1

#### Installation tools:

Self-adhesive wires retainer .....	2
Fixed brace rod 100 mm .....	2

#### Packaging:

Box 1 (for turnstile housing).....	1
Box 2 (for turnstile housing cover).....	1

### 4.2 Optional equipment supplied on request

SORMAT PFG IR M10-15 anchor bolts .....	4
Passive infrared sensor of intrusion detector .....	1
Siren (for alerts on unauthorized entry attempts) .....	1
Turnstile power supply .....	1
Wireless remote control kit .....	1



#### **Note:**

Wireless remote control kit consists of a receiver and 2 transmitters (tags) with operation range up to 40 m.

## 5 PRODUCT DESCRIPTION

### 5.1 Main features

- The turnstile can be operated both autonomously with the remote control panel or wireless remote control and with an ACS.
- The turnstile housing is supplied with the safe voltage – not more than 14 V (in case of the remote indicators application – not more than 42 V).
- The turnstile has low power consumption – not more than 8.5 W.
- At the power supply switching off the turnstile remains in the set position in both directions (closed, if the particular direction was closed at the moment of the power switching off, or open, if it was open at the moment of the power switching off).
- The turnstile ensures automatic reset of barrier arms to home position after each passage.
- The smoothness of the turnstile operation is ensured by a damper.
- The arm rotation optical sensors are built in the turnstile housing to ensure accurate count inputs to ACS.
- The mechanical release lock is built in the turnstile housing to ensure the turnstile unblocking with a key in emergency cases (free rotation of barrier arms).
- Several lined-up turnstiles form passageways without installation of extra guide barriers.
- The turnstile housing cover has radio transparent covering, which allows concealed mounting of the ACS readers inside the turnstile housing. The reader operation zone is marked out with color (see Fig. 1).
- Option for installation of an intrusion detector and siren to control the passageway is provided for.
- There are two variants of the turnstile control – pulse and potential.
- The turnstile has galvanic decoupling of outputs.
- The turnstile has outputs for connection of the remote indicators.
- The turnstile has an input for connection of an emergency unblocking device (for example, a fire alarm unit).

### 5.2 Design

The turnstile overall view is shown in Fig. 2. Numbers in brackets correspond to Fig. 2 of this Manual.

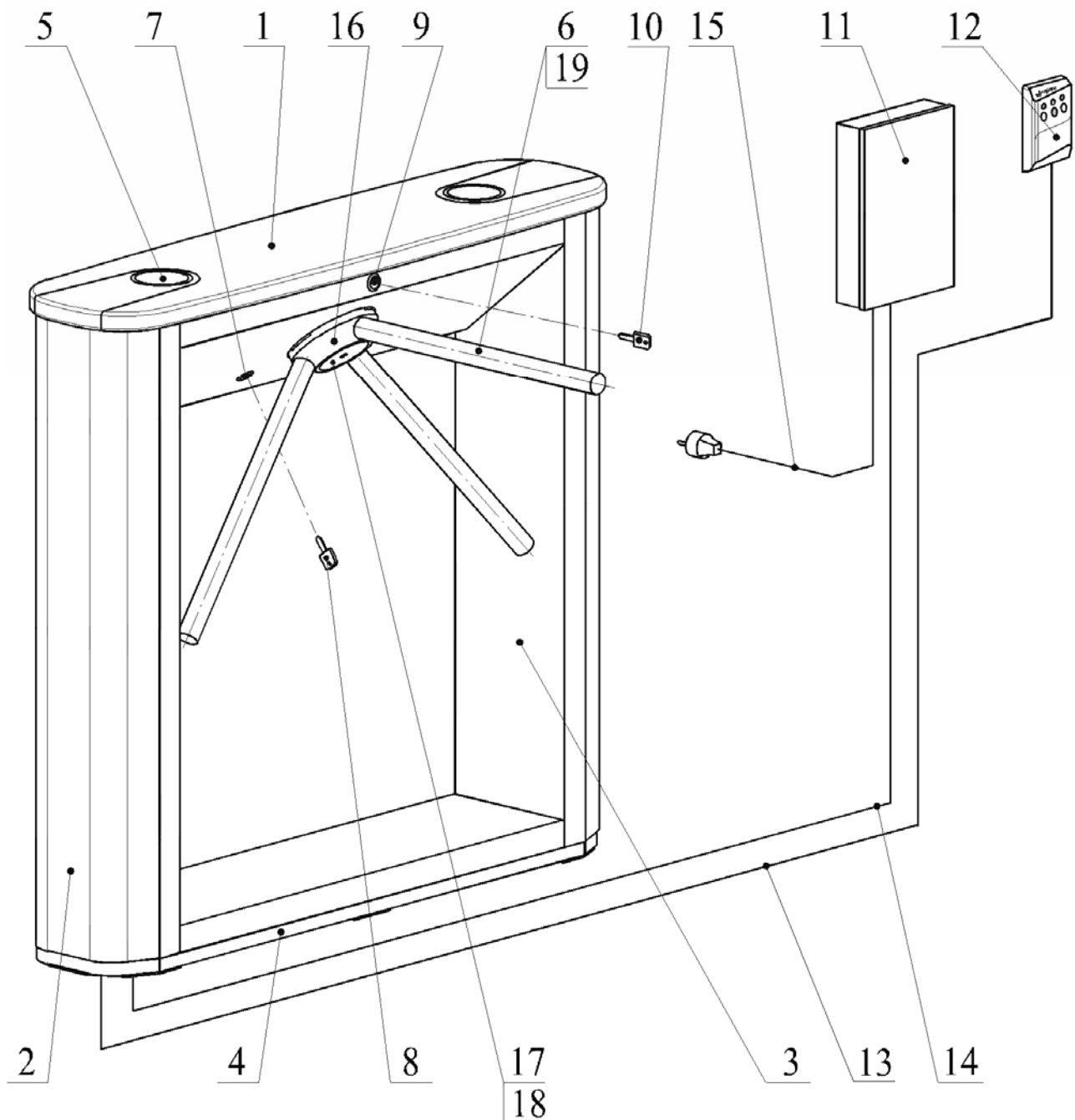
5.2.1 The turnstile consists of a turnstile housing, turnstile housing cover (1), barrier arms (6) and optional equipment, which is not included in the delivery set.

The turnstile housing has the welded sheet metal frame (3) and two outer panels (2). The frame is fixed on the frame base (4), which is fixed on the floor with four anchor bolts.

The CLB (Control Logic Board) is set on the frame (3) sidewall under the left-side outer panel (2).

Inside the turnstile housing there is a resetting mechanism consisting of a resetting device (a pusher, springs and roller), a control mechanism with arm rotation optical sensors and a locking device; and a mechanical release lock (7). Besides, on the resetting mechanism there is a rotation mechanism consisting of a damper, rotation sensor disk and a hub (16) with three barrier arms (6). The interior components of the housing can be accessed through the removable top cover (1).

During operation the turnstile cover is locked with the turnstile housing cover lock (9).



**Fig.2 TTD-03.1 box tripod turnstile. Overall view**

- 1 – turnstile housing cover; 2 – outer panel; 3 – frame; 4 – base;  
 5 – indication module; 6 – barrier arm; 7 – mechanical release lock;  
 8 – mechanical release key; 9 – turnstile housing cover lock;  
 10 – turnstile housing cover key; 11 – turnstile power supply;  
 12 – remote control panel / wireless remote control kit / ACS controller;  
 13 – remote control panel / wireless remote control kit / ACS controller cable;  
 14 – power cable; 15 – AC power cable; 16 – hub; 17 – cover;  
 18 – M4×25 screw; 19 – M8×30 bolt

5.2.2 Two indication modules (5) with pictograms are located on the turnstile housing cover (1) to indicate the turnstile status.

5.2.3 The remote control panel / wireless remote control / ACS controller (12) and the turnstile power supply (11) are connected to the CLB with cables (13, 14) in accordance with the connection layout (see Fig.4).



5.2.4 The remote control panel (RC) is designed in form of a small desktop device with a shockproof ABS plastic case and it is intended for setting and indication of the operating modes when the turnstile is operated manually. The RC is connected to the CLB with a multi-thread floppy tape (13) via the “XT1.L” connector block (see Fig. 3). There are three control buttons on the RC front panel, which are intended for setting the turnstile operating modes. The LED indicators are located above the buttons. The middle button on the RC (hereinafter — the **STOP** button) is intended to set the turnstile to the “Always locked” mode. The left and the right buttons are intended to unblock the turnstile for passage in the chosen direction.

If the turnstile housing installation is not standard (e.g. the operator’s terminal is placed at the backside of the turnstile housing and not at the front side), the RC orientation towards the turnstile housing can be changed by exchanging places of the RC wires to the contacts “Unlock A” and “Unlock B” as well as contacts “Led A” and “Led B” accordingly (see Fig. 3 and Fig. 4).

5.2.5 The CLB (see Fig. 3) contains:

- control mechanism connector – “X1” (Control) (using the turnstile cable for connection to the “X1” connector of the control mechanism);
- connector block for connection of the remote control panel / wireless remote control/ ACS controller inputs and the emergency unblocking device — “XT1.L” (In);
- connector block for connection of a siren and ACS outputs, providing the turnstile status data to the ACS controller – “XT1.H” (Out);
- intrusion detector connector block – “XT2” (“Detector”);
- turnstile power supply connector block – “XT3” (“+12VDC”);
- remote indicator connector blocks (open/closed, one indicator per each direction) – “XT4” and “XT5” (“Light A” and “Light B” accordingly);
- J1 connector for turnstile control mode selection (see below);
- J2 connector for programming.

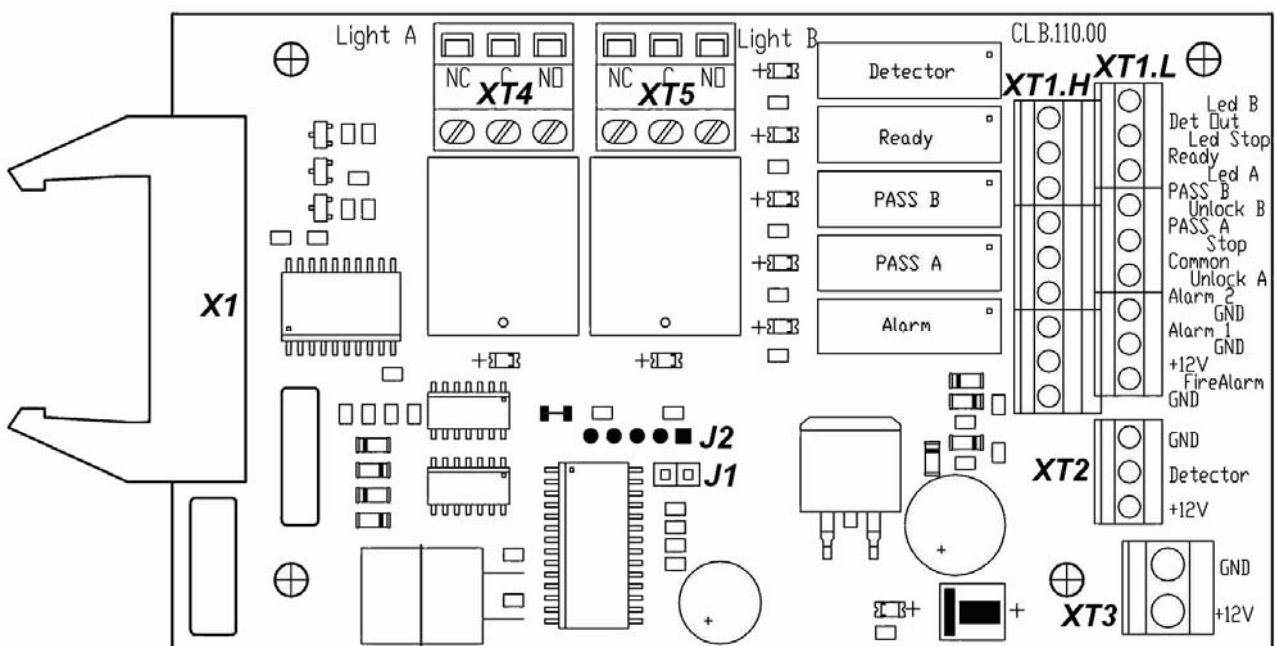


Fig. 3 Control Logic Board (CLB)

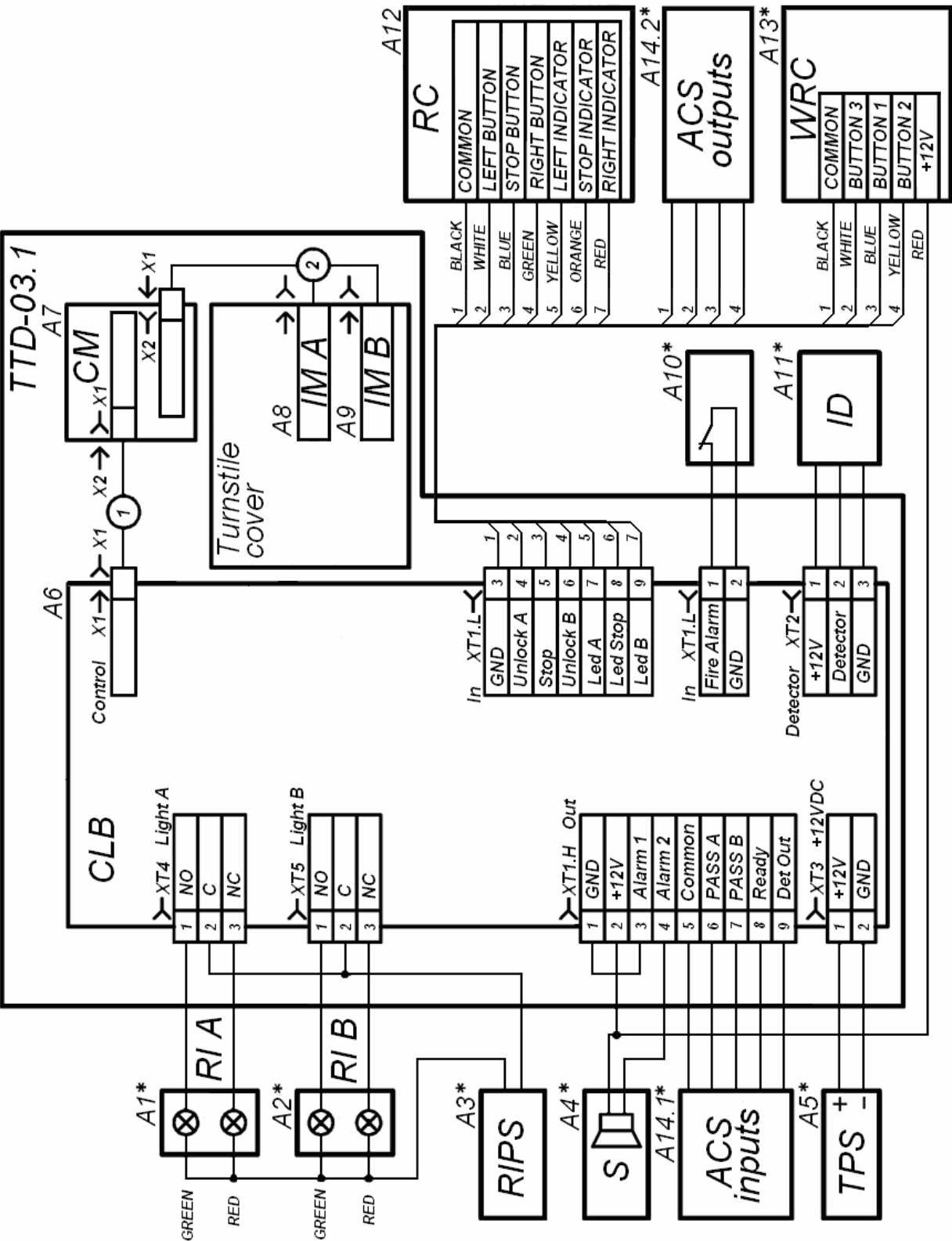


Fig.4 Connection layout

**Table 1 Legend to Fig. 4.**

<b>Legend</b>	<b>Item</b>	<b>Q-ty</b>	<b>Note</b>
A1*, A2*	Remote indicators	2	
A3*	Remote indicator power supply	1	
A4*	Siren, 12 V DC	1	
A5*	Turnstile power supply	1	
A6	CLB	1	
A7	Control mechanism	1	
A8, A9	Indication modules	2	
A10*	Emergency unblocking device	1	
A11*	Intrusion detector	1	CLIP-4
A12	Remote control panel	1	
A13*	Wireless remote control kit	1	MSRF-4
A14*	Access control system	1	
1	Turnstile cable	1	
2	Indication cable	1	

\* Supplied on request

## 5.3 Control devices of the turnstile

5.3.1 Control of the turnstile can be achieved with the help of the following devices:

- Remote control panel;
- Wireless remote control;
- ACS controller .

The above devices can be connected to the turnstile as follows:

- All together simultaneously ;
- One of device separately;
- In any combination with each other.



### **Note:**

At the parallel connection of the above devices to the turnstile the superposition of control signals from those devices may occur. In that case the turnstile response will conform to response to the obtained combination of input signals. See Appendices A and B).

5.3.2 Connection of the stipulated in Clause 5.3.1 devices is made with cable (6) to the corresponding connector blocks “XT1.L” or “XT1.H” of the CLB in accordance with the connection layout (see Fig.3 and 4).

5.3.3 The remote control panel is connected to the contacts “GND”, “Unlock A”, “Stop”, “Unlock B”, “Led A”, “Led Stop” and “Led B” of the “XT1.L” connector block.

5.3.4 The wireless remote control is connected to the contacts “GND”, “Unlock A”, “Stop” and “Unlock B” of the “XT1.L” connector block. Power supply of the wireless remote control is connected to the contact “+12V” of the “XT1.H” connector block.

5.3.5 ACS controller outputs are connected to the contacts “GND”, “Unlock A”, “Stop” and “Unlock B” of the “XT1.L” connector block.

5.3.6 ACS controller inputs are connected to the contacts “Common”, “PASS A”, “PASS B”, “Ready” and “Det Out” of the “XT1.H” connector block.

5.3.7 Pin assignments of those connector blocks are given on the CLB and on the label on the turnstile frame sidewall under the left-side outer panel (2) (see Fig. 3).

## 5.4 Input and output signals and their parameters when operating the turnstile

5.4.1 The microcontroller set on the CLB processes the incoming commands (i.e. traces the status of contacts “Unlock A”, “Stop”, “Unlock B” and “Fire Alarm”), keeps tracing the signals from the arm rotation optical sensors and from the intruder detector (contact “Detector”), and sends commands to the control mechanism basing on those signals. It also processes signals for the external devices: indication on the remote control panel (“Led A”, “Led Stop” and “Led B”), the signal of hub turning in the corresponding direction (“PASS A” and “PASS B”), the signal about readiness of the turnstile to effect the current command (“Ready”), alarm output signal (“Alarm”) and relays the signal of the current status of the intruder detector (“Det Out”).

5.4.2 The turnstile is operated by input of a low-level signal to the “XT1.L” connector block contacts “Unlock A”, “Unlock B” and “Stop” relatively to the “GND” contact. As the control element there can be used a normally open relay contact or a circuit with open collector output at that. At the emergency unblocking device input the turnstile control is carried out by elimination of a low-level signal from the “Fire Alarm” contact relatively to the “GND” contact. As the control element there can be used a normally closed relay contact or a circuit with open collector output at that (see Fig. 5 and 6).



### **Note:**

For generating a high-level signal at all the input contacts (“Unlock A”, “Stop”, “Unlock B”, “Fire Alarm” and “Detector”) “2 kOhm” resistors connected to the power supply bus “+ 5V” are used.

The control element provides for the following signal characteristics:

Relay contact as the control element:

minimum switched current .....	2 mA
closed contact resistance (considering resistance of the connected cable) .....	max 300 Ohm

Circuit with open-collector output as the control element:

voltage at closed contact (low - level signal at the CLB input).....	max 0.8V
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5.4.3 The relays “PASS A” (contacts “PASS A” and “Common”), “PASS B” (contacts “PASS B” and “Common”), “Ready” (contacts “Ready” and “Common”), “Detector” (contacts “Det Out” and “Common”) and “Alarm” (contacts “Alarm 1” and “Alarm 2”) have normally open contacts. The “Common” contact, at that, is not connected to the CLB power supply negative terminal. In the initial state (inactive, when the power is on) the relay contacts “PASS A”, “PASS B”, “Ready” and “Detector” are closed (voltage is supplied to the relay coil), the relay contacts “Alarm” are broken (voltage is not supplied to the relay coil). The CLB relay operation/release is indicated by lighting up/going down of the red test indicators, located near the corresponding relays (see Fig.3).

The output cascades for “PASS A”, “PASS B”, “Ready”, “Det Out” and “Alarm” are the contacts with the following signal characteristics (see Fig. 7):

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

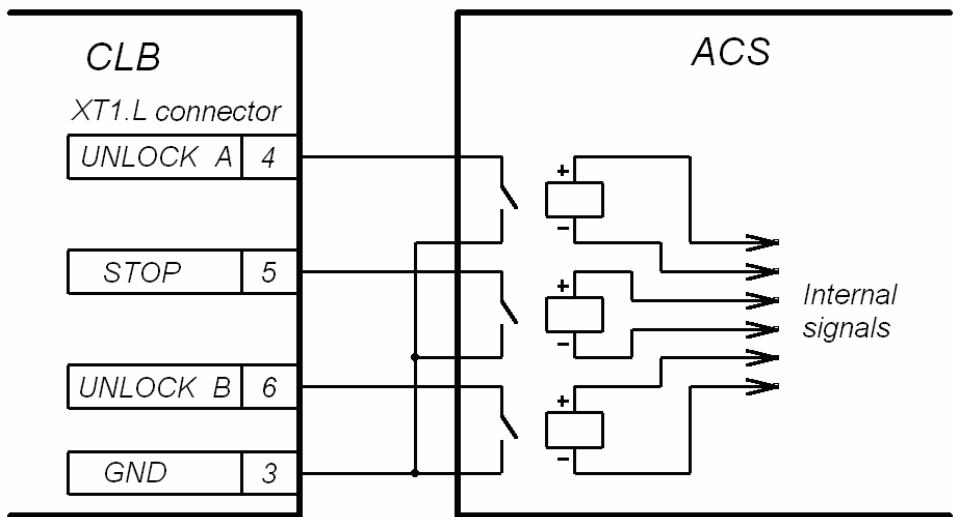


Fig. 5 Control elements of an external device a normally open relay contact

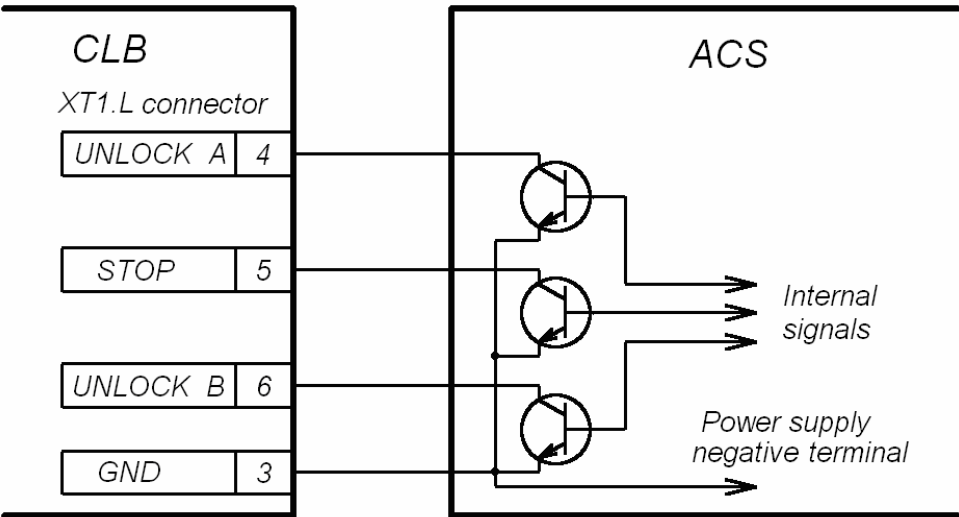


Fig. 6 ACS control element – circuit with open-collector output

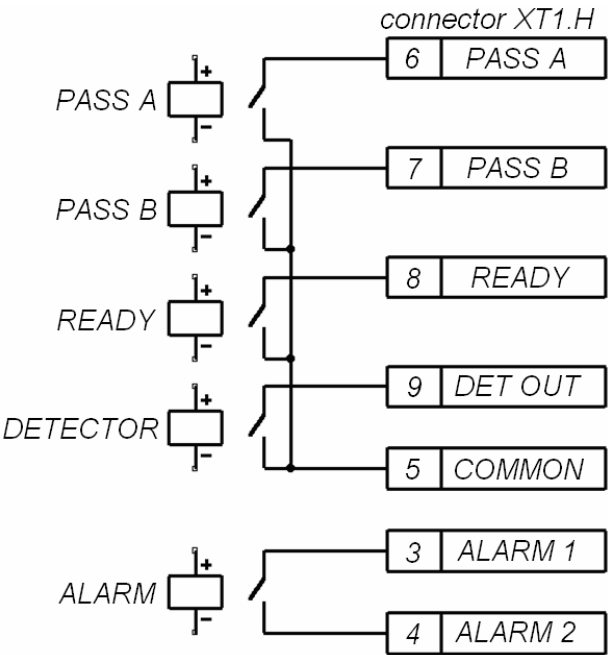


Fig. 7 Output cascades for PASS A, PASS B, Ready, Det Out and Alarm

## 5.5 Control modes of the turnstile

5.5.1 There can be two **control modes** of the turnstile: **pulse** and **potential**. Those control modes determine available **operating modes** of the turnstile (see Tables 3 and 4).

5.5.2 The control mode variant is set by the jumper on the J1 connector (for the J1 connector – see Fig. 3 or the label on the turnstile frame sidewall under the left-side outer panel (2)): the jumper is fixed — pulse control, the jumper is not fixed — potential control. The jumper is fixed at the factory before the delivery.

5.5.3 Control of the turnstile is effected by input of the controlling signal to the turnstile in both control modes. The passage waiting time at the pulse control mode is 5 seconds at that and it does not depend on the controlling signal (pulse) duration. At the potential control mode the passage waiting time is equal to the duration of controlling signal.

5.5.4 The pulse control mode is intended for the turnstile control with the remote control panel, the wireless remote control and ACS controller, outputs of which support the pulse control mode.

Standard control inputs: “Unlock A”, “Unlock B” and “Stop”.

Special control input: “Fire Alarm”.

See Table 3 for the turnstile operating modes at this control mode.

The algorithm of control signals at this mode is stipulated in Appendix A.

The minimum input signal duration, when the operating mode can be changed, should be 100 msec. The passage waiting time is 5 sec. and it does not depend on the input signal duration.

See Clause 5.9.3.1 for the turnstile operation at special (“Fire Alarm”) control output.

5.5.5 The potential control is intended for the turnstile control with an ACS controller, outputs of which support the potential control mode (for example, lock controller).

Standard control inputs: “Unlock A” and “Unlock B”

Special control inputs: “Stop” and “Fire Alarm”.

See Table 4 for the turnstile operating modes at this control mode.

The algorithm of control signals at this mode is stipulated in Appendix B.

The minimum input signal duration, when the operating mode can be changed, should be 100 msec. The passage waiting time is equal to the input signal duration (if a low-level signal exists at the set direction input by the moment when the passage in the set direction is made, the turnstile remains open in the set direction). At the low-level signal inputting to the “Stop” input, both directions are closed for the time of the signal duration regardless the signal strength at the inputs “Unlock A” and “Unlock B”. At the low-level signal elimination from the “Stop” input, the directions are set to the control mode according to the signal strength at the inputs “Unlock A” and “Unlock B”.

See Clause 5.9.3.2. for the turnstile operation at special (“Fire Alarm”) control output.

## 5.6 Operation with the remote control panel

5.6.1 When buttons (the STOP button and the two other buttons corresponding to the passage direction) on the remote control panel are pressed, the closing of the relevant contact “Stop”, “Unlock A” or “Unlock B” to the contact “GND” (i.e. forming of the low-level signal relatively to contact “GND”) occurs.

5.6.2 Operation logic of the turnstile at the single passage in direction A(B) at the pulse control mode.

5.6.2.1 When the button corresponding to the passage in direction A (B) is pressed on the remote control panel, the closing of contact “Unlock A(B)” to the contact “GND” (i.e. forming of the low-level signal on the contact “Unlock A(B)” relatively to contact “GND”) occurs.

5.6.2.2 The microcontroller set on the CLB processes the incoming command and sends the command to the control mechanism, which opens the passage in direction A (B) (lifts the upper (lower) edge of the key holt).

5.6.2.3 The microcontroller traces the status of the arm rotation optical sensors, which at the rotation of barrier arms activate/normalize in a certain consequence, and counts the time passed from the moment of pressing (on the remote control panel) of the button corresponding to the passage in direction A (B).

5.6.2.4 At the barrier arm turning at 67° the microcontroller forms signal “PASS A (B)” (the breaking of contacts “PASS A (B)” and “Common” takes place).

5.6.2.5 After the barrier arm turning at 67°, or after 5 seconds from the moment of pressing (on the remote control panel) of the button corresponding to the passage in direction A (B), the microcontroller sends a command to the control mechanism, which closes the passage in direction A (B) (drops down the upper (lower) edge of the key holt)

5.6.2.6 When the barrier arms reset to the initial state (barrier arms turning at 112°), the microcontroller eliminates the signal “PASS A (B)” (the closing of contacts “PASS A (B)” and “Common” takes place).

5.6.3 “Always free” mode particularity: in this mode the command described in Clause 5.6.2.5 is not formed and the passage in the set direction remains open.

## **5.7 Operation with the wireless remote control**

5.7.1 Operation of the turnstile with the wireless remote control is similar to that with the remote control panel.

5.7.2 The buttons on the wireless remote control tag act the same way as those on the remote control panel.

5.7.3 The operation manual for the wireless remote control is supplied within the delivery set of that item.

## **5.8 Operation with an ACS controller**

5.8.1 At the pulse control mode the control of the turnstile with an ACS controller is similar to that with the remote control panel.

5.8.2 At the potential control mode the control of the turnstile with an ACS controller is similar to that with the remote control panel and lies in forming of low-level signal on the contacts “Unlock A”, “Stop”, and “Unlock B” relatively to the contact “GND”.

5.8.3 The difference of the operation logic at the potential control mode from the one described in Clause 5.6.2 the command described in Clause 5.6.2.5, is only formed at the moment of releasing of the button (on the remote control panel) corresponding to passage direction A (B). Thus for arranging of single passages at the potential control mode it is recommended to eliminate the control low-level signal at the beginning of “PASS” signal for the corresponding direction.

5.8.4 The passage through the turnstile in direction A (B) is fixed in accordance with the status of output contacts “PASS A(B)” and “Common”..

## 5.9 Additional devices connectable to the turnstile

5.9.1 The following additional devices can be connected to the turnstile:

- Intrusion detector and siren;
- Emergency unblocking device;
- Remote indicators.

5.9.2 The intrusion detector is connected to the “XT2” connector block, and the siren is connected to the “XT1.H” connector block of the CLB according to the connection layout (see Fig. 3 and 4). There should be normally closed contacts on the intruder detector.



### **Note!**

Only the manufacturer should carry out the installation of the intrusion detector on the turnstile housing.

If the turnstile is blocked (“Always locked” mode or “Both directions closed” one, see Tables 3 and 4) and a signal comes from the intrusion detector, the “Alarm” signal is generated. The “Alarm” signal is disabled after 5 sec. or by performing of any received command. The signal from the intrusion detector is ignored for the period of authorized unblocking of the turnstile (in either or both directions). If within 3 sec after the “Always locked”/“Both directions closed” mode is set, the signal from the intrusion detector comes, it is ignored. The intrusion detector status signal is constantly transmitted to the “Det Out” and “Common” contacts of the CLB “XT1.H” connector block (see Fig. 3).

5.9.3 The emergency unblocking device is connected to the “XT1.L” connector block of the CLB in accordance with the connection layout (see Fig. 3 and 4). If the “Fire Alarm” input is not used, it is necessary to set a jumper between contacts “Fire Alarm” and “GND”. This jumper is set at the factory before the delivery.

Operation of the turnstile under commands of the emergency unblocking device:

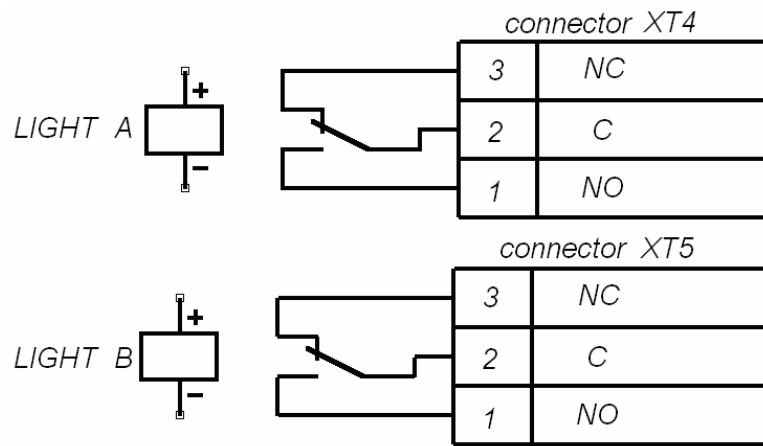
5.9.3.1 At the pulse control mode and when a low-level signal is eliminated from the “Fire Alarm” input, both passage directions become open for the whole period of the signal absence. Other controlling commands are ignored at that. When the low-level signal appears at the “Fire Alarm” input, the turnstile turns to the “Always locked” mode.

5.9.3.2 At the potential control mode and when a low-level signal is eliminated from the “Fire Alarm” input, both directions become open for the whole period of the signal absence. Other controlling commands are ignored at that. When the low-level signal appears at the “Fire Alarm” input, the directions turn to the mode in accordance with the signal levels at the inputs “Unlock A”, “Unlock B” and “Stop”.

5.9.4 The remote indicators can be connected to the connector blocks “XT4” (“Light A”) and “XT5” (“Light B”). At that the “Light A” (“Light B”) relay is active (the voltage is supplied to relay coil), when the “Green arrow” pictogram on the indication module (5) corresponding to the set passage direction lights, and it is normalized, when the “Green arrow” pictogram on the indication module (5) does not light. The response/trip of relays “Light A” and “Light B” can be defined according to lighting up/going down of the red indicators, which are installed near the above mentioned relays (see Fig. 3). Output cascades for “Light A” and “Light B” are nonbridging relay contacts (see Fig. 8) with the following signal characteristics:

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





**Fig.8 Output cascades for Light A and Light B**

## 5.10 Mechanical unblocking of the turnstile

5.10.1 Possibility to unblock the turnstile manually is specially provided for unblocking of the turnstile in the emergency mode at the power supply failure.

5.10.2 To unblock the turnstile it is necessary to insert the key (8) into the mechanical release lock (7) and turn it clockwise up to the stop (the lock cylinder moves out of the case). The barrier arms can be freely turned in both directions

5.10.3 Deactivating mechanical unblocking of the turnstile in the following order:

- install barrier arms to the starting position;
- click on the lock mechanism mechanical release, sinking it into the housing until it clicks;
- make sure that the turnstile is locked, and the barrier arms do not rotate in any direction.

## 5.11 Operation contingencies and response

5.11.1 The turnstile is capable to provide information on the following operation contingencies:

- unauthorized access;
- passage delay for more than 30 sec;
- one or both optical sensors of arm rotation out of order.

A special signal "Ready" is formed in each of the above case.

5.11.2 In case of unauthorized access signal "Ready" is formed as follows. At arm rotation at 8° one of the optical sensors responds and the output contacts "Ready" and "Common" get broken (beginning of the signal). When the barrier arms reset into initial state the both optical sensors become normalized and the output contacts "Ready" and "Common" get closed (finish of the signal).

5.11.3 In case of delay of an authorized passage for more than 30 seconds the signal "Ready" is formed as follows: If within 30 seconds from the moment of passage commencing, which is determined by the arm rotation at not less than 8° (i.e. activation of one of the optical sensors), the reset of barrier arms to the initial state does not happen, the output contacts "Ready" and "Common" break (beginning of the signal). When the barrier arms reset to the initial state the both optical sensors are normalized and the output contacts Ready and Common are closed (finish of the signal).

5.11.4 When one or both of the optical sensors are out of order the output contacts "Ready" and "Common" are broken (beginning of the signal "Ready"). After elimination of the fault the closed status of contacts "Ready" and "Common" is renewed.

## 6 MARKING AND PACKAGING

Marking of the turnstile is made in form of a label and sticker.

The label is located inside, on the rear panel of the turnstile housing. To get access to the label, remove the turnstile housing cover (1) by unlocking the turnstile housing cover lock (9) with the key (10) and turning it clockwise up to the stop (the lock cylinder moves out of the case). Shift the cover to the right up to the stop (slight push is allowed). Lift the cover and carefully remove it. Be careful! The indication modules (5), located on the turnstile housing cover are connected to the control device with cables, which must be disconnected before taking the cover off. Place the turnstile housing cover on a steady and level surface. The sticker corresponds to Fig.3. To get access to it, remove the turnstile housing cover (1). Undo two M6 nuts, fixing the upper parts of the left-side outer panel (2). Lift the outer panel and take it off carefully.

The outer panel and the turnstile housing cover mounting is carried out in the reverse order.

The turnstile in the delivery set (see Clause 4.1) is packed in two boxes, which keep it undamaged during the transportation and storage.

Box 1(for packaging of the turnstile housing)

overall dimensions (length × width × height) ..... 122×38×112 cm

Box 2 (for packaging of the turnstile housing cover)

overall dimensions (length × width × height) ..... 119×36×17 cm

## 7 SAFETY REQUIREMENTS

### 7.1 Installation safety requirements

The installation should be only carried out by the qualified personnel after the careful study of this Manual.



#### **Caution!**

- All the cables should be connected up when the power supply is switched off from the AC mains.
- Use only the serviceable tools for installation.
- Observe general electrical safety rules when laying out the cables.

See certificates of the power supply units for the safety requirements to those power supply units.

### 7.2 Operation safety requirements

Observe general electrical safety rules when operating the turnstile.



#### **Do not use!**

- Do not use the turnstile under conditions that do not comply with the requirements of Chapter 2 of this Manual.
- Do not use the turnstile at supply voltage that does not comply with the requirements of Chapter 3 of this Manual.

See certificates of the power supply units for the safety requirements to those power supply units.

## 8 INSTALLATION INSTRUCTIONS

### 8.1 Installation details

It is recommended:

- to mount the turnstile on steady and level concrete (grade 400 or higher, strength group V22.5), stone or similar foundations at least 150mm thick;
- to level the foundation so that the anchoring points of the turnstile lie in the same plane (to be verified with a builder's level);
- to apply reinforcing elements (400×400×400 mm) for installation on less steady foundation;
- to organize the passage zone according Fig. 9;
- to mark the mounting holes according to Fig. 10;
- to control the vertical position of the turnstile during installation with a plumb line;
- to carry out installation by means of not less than two people which possess qualifications of skilled electrician and installer.

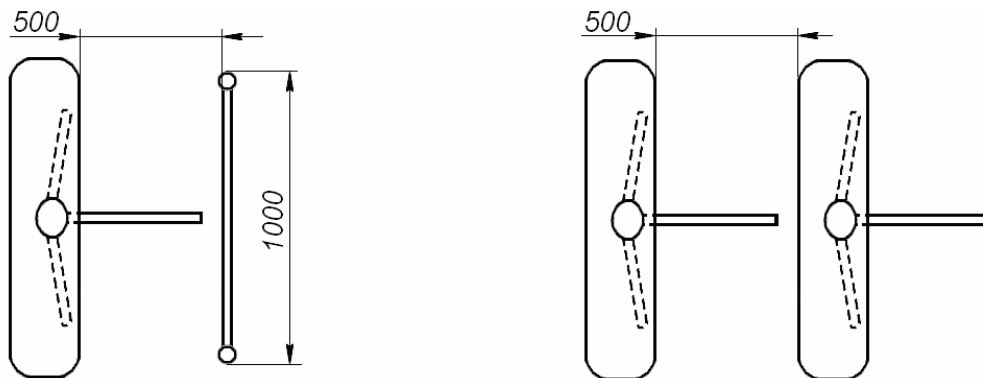


**Note:**

When creating the passage area through the turnstile take into account that the resetting device operates as follows:

- at the barrier arm turning at the angle of more than 60° the reset to home position is effected in the direction of movement;
- at the barrier arm turning at the angle less than 60° the reset to home position is effected in the counter to the movement direction (reset to home position)

To ensure accurate passage tracking when the turnstile is operated with an ACS, it is recommended to create the passage area in such a way that the barrier arm turning in the direction of movement must be at the angle of not less than 70° (Fig. 9).



**Fig.9 Recommendations on creation of the passage area**

### 8.2 Tools and equipment required for installation

Use the following tools for the installation work:

- 1.2÷1.5kW hammer drill;
- hard-alloy drill bits for anchor bolts sleeves, dia 16 mm;
- Phillips head screwdriver №2;
- Allen key S=6,
- Allen key S=8;
- Knife assembly;
- Plumb-line and level;

- Bail for electric raceway;
- Flat slot screwdriver No.2;
- Flat slot screwdriver No.5 (150 mm);
- Horn-type and socket wrenches S17, S13, S10, S8, S7;
- Slide caliper;
- Measuring tape 2m.

**Note:**

It is allowed to use other testing equipment and measuring tools provided the equipment in use ensures the required parameters and measurement accuracy.

### 8.3 Cable length

The maximum allowed length of the remote control panel / wireless remote control / ACS controller cable is not more than 50m.

The maximum allowed length of the turnstile power supply cable depends on the cable cross-section and should be:

- for cable with 0.2 mm<sup>2</sup> cross-section (AWG 24) ..... max 10 m
- for cable with 0.75 mm<sup>2</sup> cross – section (AWG 18)..... max 25 m
- for cable with 1.5 mm<sup>2</sup> cross – section (AWG 16)..... max 50 m

### 8.4 Installation procedure

**Note!**

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

Recommendations on how to prepare mounting holes in the foundation (the mounting surface) are given with regard to metal anchor bolts for solid concrete floors or similar foundations (ref. Table 2). Use relevant mounting hardware for installation on different foundations.

**Table 2**

Anchor bolt type	Drill bit diameter, mm	Drill depth, mm
PFG IH 10	16	60

8.4.1 Unpack the turnstile, check the completeness of the delivery set as per Chapter 3 of the Certificate.

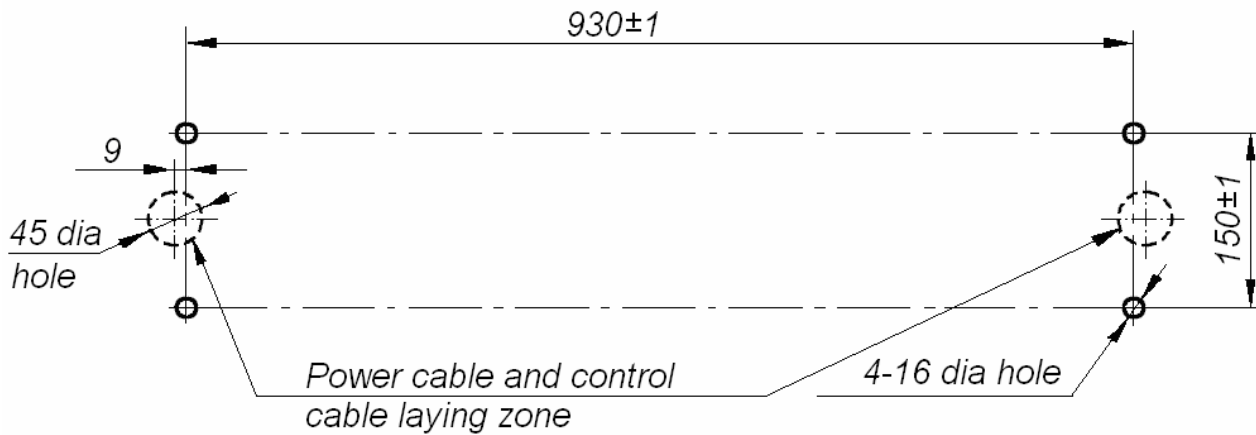
8.4.2 Drill the holes for anchor bolt sleeves for fixing of the turnstile housing (see Fig. 10).

8.4.3 If you lay the cables under the floor surface, prepare the electric raceway to the cables laying zone of the turnstile housing (see Fig. 10).

8.4.4 Insert the sleeves for the anchor bolts into the holes so that they do not stick out above the floor surface.

8.4.5 Mount the turnstile housing and fix it with the M10 anchor bolts.

To get an access to the mounting holes of the turnstile housing base (4) remove the turnstile housing cover (1) and both outer panels (2). Thus you get an access to the mounting holes of the turnstile housing base (4). Fix the turnstile housing after laying the cables in the electric raceway and inside the turnstile housing.



**Fig.10 Hole pattern for the turnstile housing mounting**

8.4.6 The cables layout inside the turnstile housing is shown in Fig. 11.

8.4.7 Install the turnstile power supply (11) in its place (installation procedure for the turnstile power supply is given in the power supply certificate).

8.4.8 Connect the power cable (14) of the turnstile power supply (11) to the CLB “XT3” connector block. Connect the remote control panel (12) cable (13) to the CLB “XT1.L” connector block. Connect all the other devices’ cables to the corresponding CLB connector blocks (see Fig. 3 and 4).

8.4.9 When you connect the emergency unblocking device, remove the jumper wire set between the contacts Fire Alarm and GND of the CLB “XT1.L” (In) connector block.

8.4.10 If the turnstile is used in the potential mode, remove the jumper from the J1 connector (see Fig. 3).

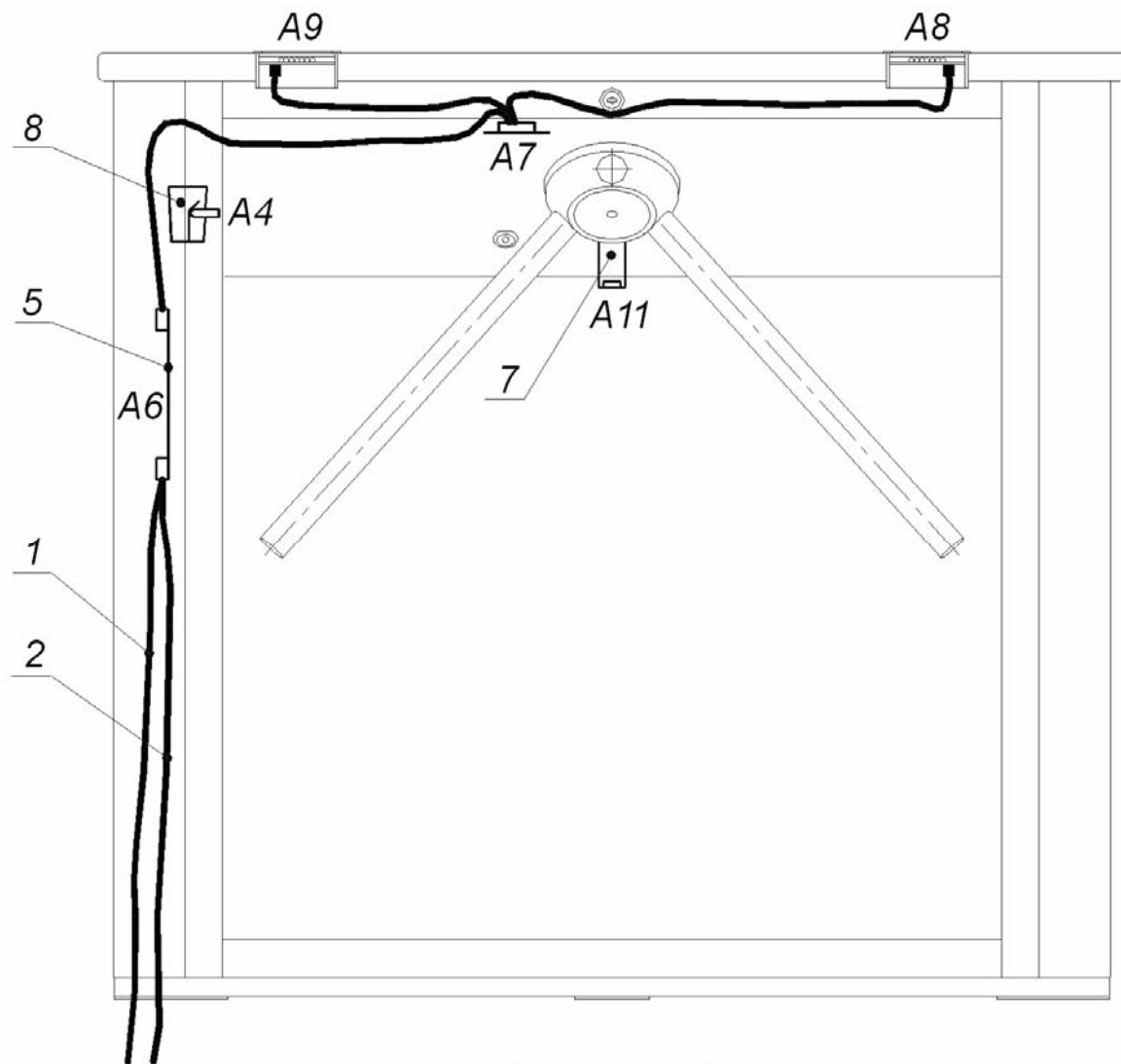
8.4.11 Check serviceability and accuracy of all the electrical connections. Fasten all the cables using self-adhesive wires retainers and fixed brace rods included in the delivery set. After all the cable connections and the turnstile housing fixing to the floor put the outer panels (2) and the turnstile housing cover (1) back into their places in the reverse order to the dismantling procedure.

8.4.12 To mount the turnstile housing cover (1) install it so that the middle strip on its under side is placed on the side of turnstile housing cover lock (9). Connect the indication cables mounted inside the turnstile housing to the indication module (5) connectors, after carefully install the turnstile housing cover (1) on the frame (3). At that the cross angle sections on the turnstile housing cover (1) should be maximum close to relative plug-in guides in the frame (3). Adjust the turnstile housing cover (1) by moving it from right to left against stop and after fix it by the turnstile housing cover lock (9). The turnstile housing cover lock (9) is closed without key by pushing it.

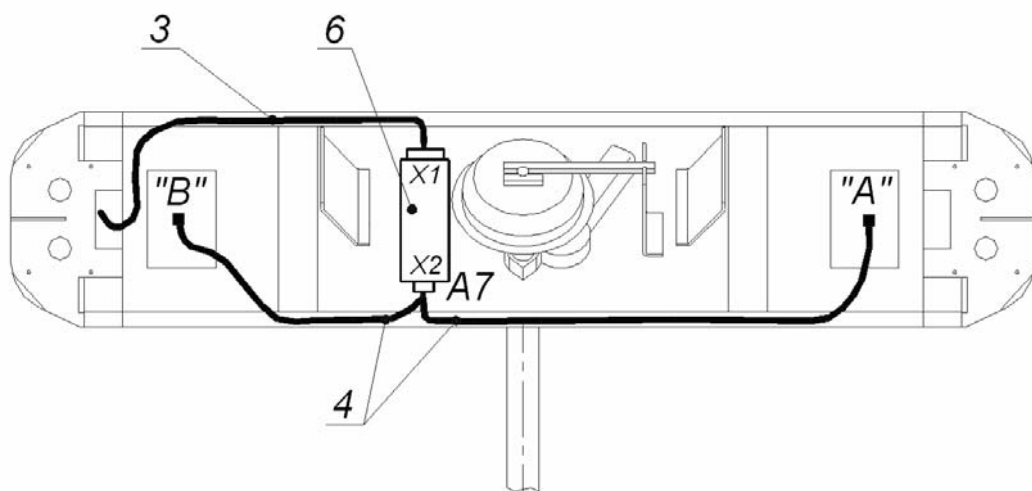
8.4.13 To mount the barrier arms into the run position remove the cover (17) from the hub (16) unscrewing the screw (18). Unscrew the fixing bolt (19) on the barrier arm (6). Fit the barrier arm into the mounting hole on the hub (16) and fasten it with the bolt (19). Put a spring washer under the bolt head. The bolts must be tightened so as to provide reliable fixation of the barrier arms without a gap.

Repeat the above-described procedure for fitting up the remaining barrier arms.

Put the cover (17) onto the hub (16) and fix it with the screw (18).



*Turnstile housing without cover*



**Fig.11 Cables layout inside the turnstile housing**

- 1 – power supply cable,
- 2 – remote control panel/wireless remote control/ACS controller cable,
- 3 – turnstile cable, 4 – indication cable, 5 – CLB,
- 6 – control mechanism, 7 – intrusion detector, 8 – siren;
- A4, A6 – A9, A11 – see Fig. 4.

8.4.14 Control the turnstile housing and barrier arms fastening, check serviceability and accuracy of all the electrical connections.

8.4.15 Run a test switching-on of the turnstile as specified in Chapter 10. Check operation of the intrusion detector and the siren (if included in the delivery set).

After the power-up wait until the moment of the test indicator (inside the intrusion detector) going off (from 10 to 50 sec, the turnstile should be in the "Always locked" mode (at the pulse control mode) or in the "Both directions closed" (at the potential control mode)).

Put your hand before the intrusion detector. The continuous signal will sound when the intrusion detector activates. To eliminate that sound signal press any button on the remote control panel. The sound will stop without pressing the button in  $5 \pm 0.5$  sec.

8.4.16 Once the installation has been completed, the turnstile is ready for operation.

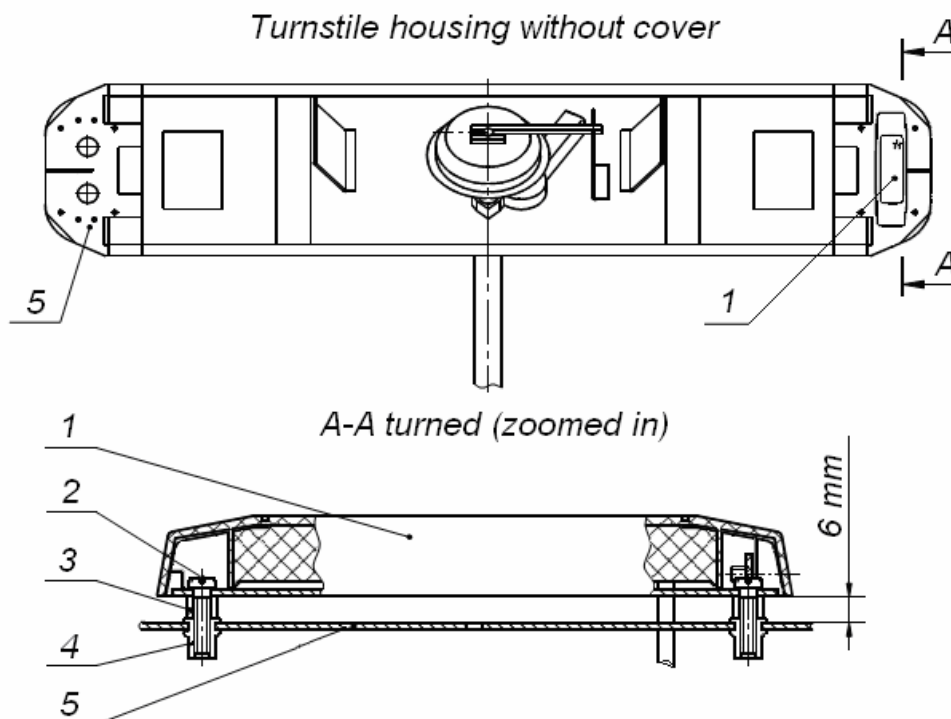


**Note. ACS reader mounting:**

The turnstile construction allows concealed mounting of the ACS readers with reading range not less than 80 mm. For that purpose the mounting slots are provided for in the mounting brackets (5, Fig. 12). The thread bushes (4, Fig. 12) are curled into the mounting bracket for installation of PERCo readers of RP-15 type (1, Fig. 12) through the distance sleeves (3, Fig. 12) with screws (2, Fig. 12).

The readers of other manufacturers with different overall and installation dimensions can be mounted in a similar way.

Mounting of all the readers should be symmetric relatively to the mounting slots of the mounting bracket. The reader cable should have enough length for the ACS connection.



**Fig.12 ACS reader mounting**

1 – ACS reader; 2 – M3x20 screw;  
3 – distance sleeve; 4 – thread bush; 5 – mounting bracket.

## 9 OPERATION INSTRUCTIONS

Observe general electrical safety requirements during the turnstile operation.



### **Warning!**

Do not connect the turnstile power supply to the mains with the voltage and frequency rating other than specified in the power supply certificate.

It is prohibited:

- to use abrasive or chemically active substances for cleaning of the external surfaces of the turnstile;
- to move through the turnstile passage area any objects with dimensions exceeding the width of the passageway;
- to jerk or hit barrier arms, turnstile housing and indication modules so as to prevent their mechanical deformation.

### 9.1 Power-up

1. Make sure of the accuracy of all the connections and of the power supply cable operability (see Clause 8.4.5 of this Manual).
2. Connect the AC power cable (15) of the turnstile power supply (11) to the AC outlet socket with the voltage and frequency rating according to the power supply certificate.
3. Switch on the turnstile power supply (11). At the same time the pictogram “Red cross” on the indication modules (5) of the turnstile housing and the indicator above the STOP button on the RC (12) light up.

### 9.2 Operating modes of the turnstile at pulse control mode

See Table 3 for the operating modes set with the remote control panel and for the indication. Please note the following:

- setting the operating modes for each direction is independent: setting the operating mode for one direction does not change the operating mode set earlier for the opposite one;
- the “Single passage in the set direction” mode can be changed to the “Always free” mode for the same direction, or to the “Always locked” mode;
- the “Free passage in the set direction” mode can be changed to the “Always locked” mode only.



### **Note:**

Pressing the button on the remote control panel corresponds to the low-level signal supply to the contacts (“Unlock A”, “Unlock B” and “Stop”) of the “XT1.L” connector block relatively to the contact “GND”.



**Table 3 Pulse control mode (the jumper is set on the connector J1)**

No	The turnstile operating modes	Actions to do	Indication on the RC	Indication on the turnstile housing display	Response to the barrier arm turning
1	Always locked (Closed for entry and exit)	Press the <b>STOP</b> button on the RC	The red indicator above the <b>STOP</b> button is on	The two "Red cross" pictograms (left and right) are on	
2	Single passage in the set direction (open for passage of one person in the chosen direction)	Press the button on the RC corresponding to the chosen passage direction	The green indicator above the button of the chosen passage direction is on	The "Green arrow" pictogram, showing the passage direction, and the "Red cross" pictogram from the opposite side are on	Turnstile gets blocked
3	Bidirectional single passage (open for one-by-one person passage in each direction)	Press both the left and right side buttons on the RC simultaneously	The two green indicators (left and right) are on	The two "Green arrow" pictograms (left and right) are on	Turnstile gets blocked for passage in that direction
4	Free passage in the set direction (open for free passage in the chosen direction)	Press the <b>STOP</b> button and the button corresponding to the chosen passage direction simultaneously	The green indicator above the button of the chosen passage direction is on	The "Green arrow" pictogram, showing the passage direction, and the "Red cross" pictogram from the opposite side are on	Turnstile remains open in the set direction
5	Free passage in the set direction and single passage in the opposite direction (open for free passage in the chosen direction and for a person's passage in the opposite direction)	Carry out actions stated in Chapters 2 and 4 of the present table in any order	The two green indicators (left and right) are on	The two "Green arrow" pictograms (left and right) are on	After the passage in the free passage direction the turnstile remains open in both directions. After the passage in the single passage direction the turnstile remains open in the free passage direction but it is gets blocked in the single passage direction
6	Always free (open for entry and exit).	Press all the 3 buttons on the RC simultaneously	The two green indicators (left and right) are on	The two "Green arrow" pictograms (left and right) are on	Turnstile remains open

At the turnstile power supply switching-on the turnstile initial state is closed (the mechanical release lock (7) should be locked with the key (8)).

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 "Bidirectional single passage" mode after the passage in one direction the countdown of the passage waiting time (5 sec) for the opposite direction is recommenced.

### 9.3 Operating modes of the turnstile at potential control mode

See Table 4 for the operating modes set with the remote control panel. Setting the operating modes for each direction is independent, i.e. setting the operating mode for one direction does not change the operating mode set earlier for the opposite one.

**Table 4 Potential control mode (the jumper is taken off from the connector J1)**

No	The turnstile operating modes	Actions to do	Indication on the RC	Indication on the turnstile housing display	Response to the barrier arm turning
1	Both directions are closed (the turnstile is blocked both for entry and exit)	The high level is on contacts Unlock A and Unlock B or low level on the contact Stop	The red indicator above the <b>STOP</b> button is on	The two "Red cross" pictograms (left and right) are on	
2	One of the passage directions is open (the turnstile is open for passage in the set direction)	The low level is on the contact corresponding to the passage direction, the high level is present on the other contacts	The green indicator above the button of the chosen passage direction is on	The "Green arrow" pictogram, showing the passage direction, and the "Red cross" pictogram from the opposite side are on	If by the moment of passing through the turnstile the low level is present on the contact corresponding to the set passage direction, the turnstile remains open in the set direction
3	Both passage directions are open (the turnstile is open for passage in both directions)	The low level is on the contacts corresponding to the both directions, the high level is on the contact Stop	The two green indicators (left and right) are on	The two "Green arrow" pictograms (left and right) are on	If by the moment of passing through the turnstile the low level is present on the contact corresponding to the set passage direction, the turnstile remains open in the set direction



**For the ACS outputs note the following:**

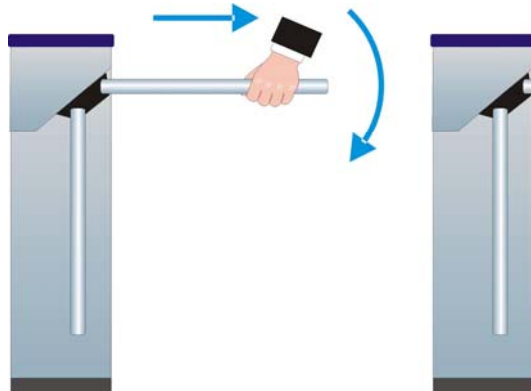
High level — contacts of the output relay are broken or the output transistor is closed.

Low level — contacts of the output relay are closed or the output transistor is open.

## 9.4 Actions in emergency

For urgent evacuation of people from business facilities in case of fire, natural calamities or other emergencies, the additional emergency exit should be provided. The anti-panic barrier section of rotary type can be used as an emergency exit

The additional emergency exit can be provided by the turnstiles equipped with anti - panic drop arms. The anti - panic drop arms allow to set the passageway free without any special keys or tools. To drop the anti - panic arm down just pull out the arm towards its axis direction, until the rotation mechanism becomes free, and then turn the arm down (see Fig. 13).



**Fig. 13 Anti-panic drop arms application**

When using the standard barrier arms, it is possible to provide free passage through the turnstile by unblocking it with the mechanical release key. The sequence of actions is described in Clause 5.10.

## 9.5 Troubleshooting

Possible faults, which can be cleared by the users themselves, are listed in Table 5.

**Table 5 Possible faults and remedy**

Fault	Possible cause	Remedy
At the power-up the turnstile won't work, and there is no light indication on the turnstile housing and the RC.	No supply voltage to the CLB	Switch off the turnstile power supply from the AC mains, open the turnstile housing cover, and remove the outer panel. Check the power cable serviceability and reliability of its connection to the CLB "XT3" connector block
The turnstile is not controlled in one of the directions, and there is light indication on the turnstile housing and on the RC.	The CLB does not receive a control signal from this direction	Switch off the turnstile power supply from the AC mains, open the turnstile housing cover, and remove the outer panel. Check the remote control panel / wireless remote control kit / ACS controller cable serviceability and reliability of its connection to the CLB "XT1.L" and "XT1.H" connector blocks

Other possible faults shall be eliminated by representatives of the manufacturer.

## 10 MAINTENANCE

The turnstile maintenance is required once a year or in case of some technical failures. The maintenance should be only carried out by qualified mechanic. Prior to the turnstile maintenance procedure disconnect the turnstile power supply from AC mains.

Remove the turnstile housing cover (1) following the below:

1. Unlock the turnstile housing cover lock (9) with the key (10) and turn it clockwise up to the stop (the lock cylinder moves out of the case)
2. Shift the turnstile housing cover to the right up to the stop (slight push is allowed). Lift the cover and turn it over to gain access to the indication module connectors;
3. Disconnect indication cable connectors from the corresponding indication modules;
4. Place the turnstile housing cover (1) on the level and steady surface.
5. Undo the M6 nuts, fixing both outer panel (2) upper parts, and then remove the outer panels by lifting them up.

Check visually the resetting device (the pusher, the springs and the roller), the arm rotation optical sensors and the damper (see Fig. 14).

Remove dust from the rotation sensors disk, located in the spacing of the optic arm rotation sensors, with alcohol - gasoline mixture applied with a cloth. Avoid the ingress of dust on the operational spacing of the both optic arm rotation sensors.

Lubricate the friction units of the resetting device with the machine oil:

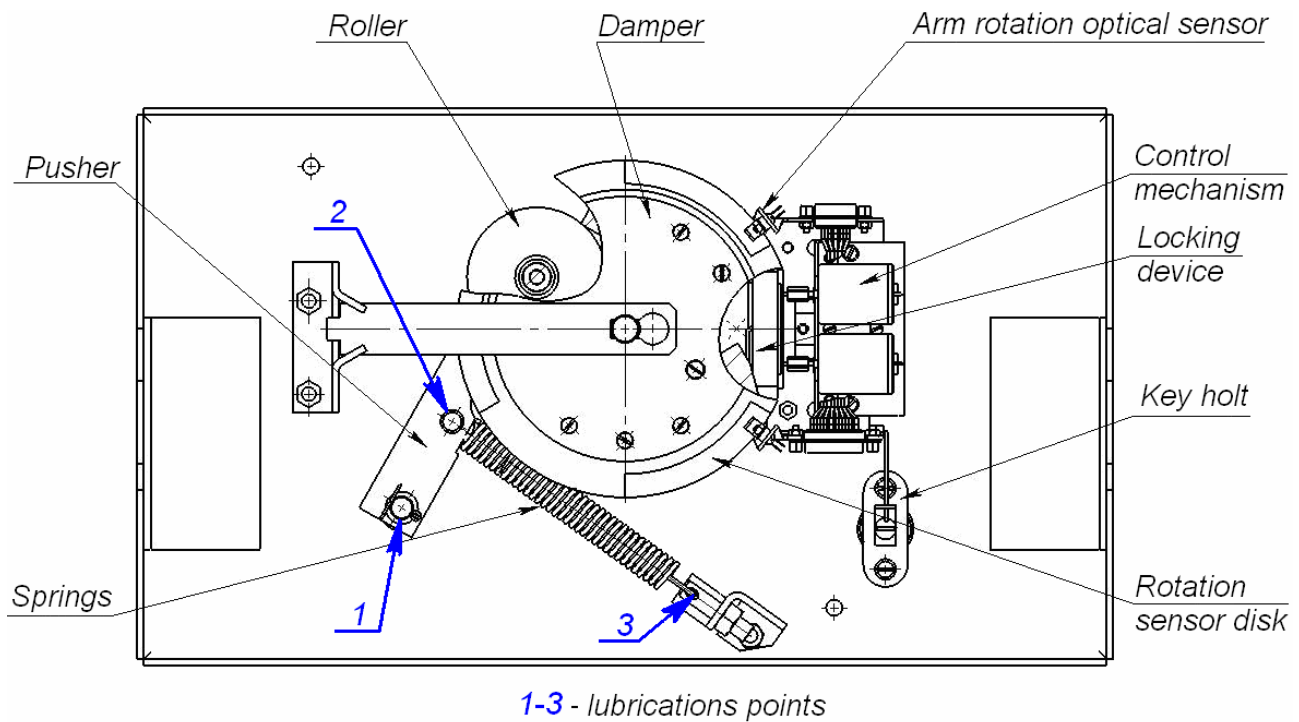
- four bushes of the resetting device (two — on the rotation axis of the pusher, two — on the fastening axis of the springs) (see Fig. 14);
- holes in the fastening parts of the springs;
- lock cylinder of the mechanical release lock (7) through the keyhole;
- lock cylinder of the turnstile housing cover lock (9) through the keyhole.

Avoid the ingress of lubrication on the rotation sensors disk and the pusher's roller surfaces. Check the reliability of the cable connections to the CLB connector blocks; tighten the cables fixing screws, if necessary.

Check the reliability of the barrier arms (6) fastening and, if necessary, tighten the bolts (19) of the barrier arms. To tighten the fixing bolts:

1. remove the cover (17) from the hub (16) of the turnstile housing, unscrewing the screw (18);
2. tighten the bolts (19) of the barrier arms (6) with the S13 socket wrench;
3. put the cover (17) onto the hub (16) and fix it with the screw (18)

Check the reliability of the turnstile housing fastening to the floor and, if necessary, tighten the base (4) fixing bolts with the S17 socket wrench.



**Fig. 14 Location of the interior components of the turnstile housing**

At the end of the maintenance works:

1. mount the outer panels (2) of the turnstile back into their places;
2. mount the turnstile housing cover (1) in the reverse order as described above. The housing cover mounting does not need much effort.

In case of any defects revealed during visual check please apply to PERCo Technical Support Department.

## 11 TRANSPORTATION AND STORAGE

The turnstile in the original package can be only delivered by means of transportation with covering facilities (railroad cars, covered truck car bodies, vessel holds) and by air transport.

It is not allowed to stockpile the boxes with the turnstile housings while in transit but it is allowed to stockpile the boxes with the turnstile housing covers in 6 rows. The indoor storage of the turnstile is allowed at ambient temperature between  $-40^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$  and at relative air humidity up to 98% at  $+25^{\circ}\text{C}$ .

After the transportation or storage at temperatures below zero or at high air humidity the turnstile must be kept unpacked for not less than 24 hours indoors within normal climate conditions prior to putting it in operation.

## Appendix A Control signal algorithm at pulse control mode

The following commands can be formed by sending a low-level signal to the contacts "Unlock A", "Stop" and "Unlock B" of the "XT1.L" connector block relatively to the contact "GND" (The command is a signal active front (signal transfer from the high level to the low level) at any of the contacts at presence of the corresponding signal levels at the other contacts):

### **Always locked (closed for entry and exit) -**

Active front is at contact "Stop" while there is a high level at contacts "Unlock A" and "Unlock B".

Both passage directions get closed at this command.

### **Single passage in direction A (open for passage of one person in direction A) -**

Active front is at contact "Unlock A" while there is a high level at contacts "Stop" and "Unlock B".

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 **«Always locked»**, and the status of passage direction B does not change. The command is ignored if at the moment of its receipt the status of passage direction A was **«Always free»**.

### **Single passage in direction B (open for passage of one person in direction B) -**

Active front is at contact "Unlock B" while there is a high level at contacts "Stop" and "Unlock A".

At this command passage direction B opens either for 5 sec. or until the passage has been effected in this direction or until the command **«Always locked»**, and the status of passage direction A does not change. The command is ignored if at the moment of its receipt the status of passage direction B was **«Always free»**.

### **Single passage in both directions (open for single passage of one person at a time in each direction) -**

Active front is at contact "Unlock A" while there is a low level at contact "Unlock B" and a high level at contact "Stop",

or active front is at contact "Unlock B" while there is a low level at contact "Unlock A" and a high level at contact "Stop".

At this command the both passage directions open either for 5 sec. each or until the command **«Always locked»** is received. The command is ignored for the passage direction, which status at the moment of its receipt was **«Always free»**.

### **Free passage in direction A (open for free passage in direction A) -**

Active front is at contact "Unlock A" while there is a low level at contact "Stop" and a high level at contact "Unlock B",

or active front is at contact "Stop" while there is a low level at contact "Unlock A" and a high level at contact "Unlock B".

At this command passage direction A opens until the command **«Always locked»** is received and the status of passage direction B does not change.

**Free passage in direction B (open for free passage in direction B) -**

Active front is at contact “Unlock B” while there is a low level at contact “Stop” and a high level at contact “Unlock A”,

or active front at contact “Stop” while there is a low level at contact “Unlock B” and a high level at contact “Unlock A”.

At this command passage direction B opens until the command **«Always locked»** is received and the status of passage direction A does not change.

**Free passage (open for passage in both directions) -**

Active front is at contact “Unlock A” while there is a low level at contacts “Unlock B” and “Stop”,

or active front is at contact “Unlock B” while there is a low level at contacts “Unlock A” and “Stop”,

or active front is at contact “Stop” while there is a low level at contacts “Unlock A” and “Unlock B”.

The both directions open at this command until the command **«Always locked»** is received.



***Note! For the remote control panel:***

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

## Appendix B Control signal algorithm at potential control mode

### **Both directions are closed (closed for entry and exit) -**

There is a high level at contacts “Unlock A” and “Unlock B” or there is a low level at contact “Stop”.

The both passage directions close at this command.

### **Direction A is open (open for passage in direction A) -**

There is a low level at contact “Unlock A” while a high level is present at contacts “Stop” and “Unlock B”.

At this command direction A opens up to the elimination of low-level signal from contact A or until the command «Both directions closed» is received, and the status of direction B does not change.

### **Direction B is open (open for passage in direction B) -**

There is a low level at contact “Unlock B” while there is a high level at contacts “Stop” and “Unlock A”.

At this command direction B opens up to the elimination of low-level signal from contact B or until the command «Both directions closed» is received, and the status of direction A does not change.

### **Both directions are open (open for entry and exit) -**

There is a low level at contacts “Unlock A” and “Unlock B” while there is a high level at contact “Stop”.

The both directions open at this command up to the elimination of low-level signal from one of the contacts A (B) or until the command «Both directions closed» is received.



#### ***Note! For an ACS controller outputs:***

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



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