



Electromechanical Box Tripod Turnstile with Automatic Anti-Panic Arms

TTD-08A

ASSEMBLY AND OPERATION MANUAL



CE EAC



**Electromechanical Box Tripod
Turnstile with Automatic
Anti-Panic Arms**

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Dear Customer,

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

Assembly and Operation Manual (hereinafter - the Manual) for the **TTD-08A electromechanical tripod turnstile with automatic anti-panic folding arms** contains data that is necessary for the fullest use 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;
- RC panel – remote control panel;
- WRC – wireless control panel;
- CLB – control logic board.

1 APPLICATION

The **TTD-08A** electromechanical box tripod turnstile with automatic anti-panic folding arms (hereinafter - the turnstile) is designed for managing pedestrian flows at entrance points of industrial facilities, banks, administrative buildings, retail outlets, railway terminals, airports providing free passageway in emergency situations. Housing of the turnstile is made of stainless steel. Outdoor application is allowed.

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



Note:

Inside the turnstile housing, it is possible to install access card readers as manufactured by PERCo (**IR03.1**, **MR07 OEM**, **RP-15.2**), and third-party manufacturers. The choice of the type of readers, their acquisition and installation into the product is carried out by the customer (installer) in accordance with the design of the pass-through and the characteristics of the access control system and the control controller. Access cards readers of **are not included** in the standard delivery set of the turnstile!

Readers must meet the following requirements:

Overall dimension (L × W × H) max 135×90×30 mm
 Read range min 50 mm

It is also possible to install an ACS controller inside the turnstile. Limitations on its overall dimensionsmax 250×130×35 mm

2 OPERATION CONDITIONS

The turnstile with regard to resistance to environmental exposure complies with GOST15150-69, category N1 (for an outdoor application). Operation of the turnstile is allowed at ambient air temperature from –20°C to +50°C (when used under the canopy – to +55°C) and at relative air humidity of up to 80% at +25°C.

The remote control panel with regard to resistance to environmental exposure complies with GOST 15150-69, category NF4 (operation in premises with climate control). Operation of the remote control panel is allowed at ambient temperature from +1°C to +40°C and relative air humidity of up to 80% at +25°C.

3 TECHNICAL SPECIFICATIONS

Operating voltage..... 12±1.2VDC
 Consumption current..... max. 6.0 A

Power consumption	max. 72 W ¹
Throughput rate in a single passage mode	30 persons/min
Throughput rate in a free passage mode	60 persons/min
Passage width	560 mm
Barrier arm rotation force	max. 3 kgf
RC panel cable length ²	min. 6.6 m
Ingress Protection Rating	IP54 (EN 60529)
Electric shock protection class	III (IEC 61140)
Mean time to failure	min. 4,000,000 passages
Mean lifetime	8 years
Overall dimensions (L × W × H)	1166×750×1016 mm
Net weight of the turnstile	max. 70 kg

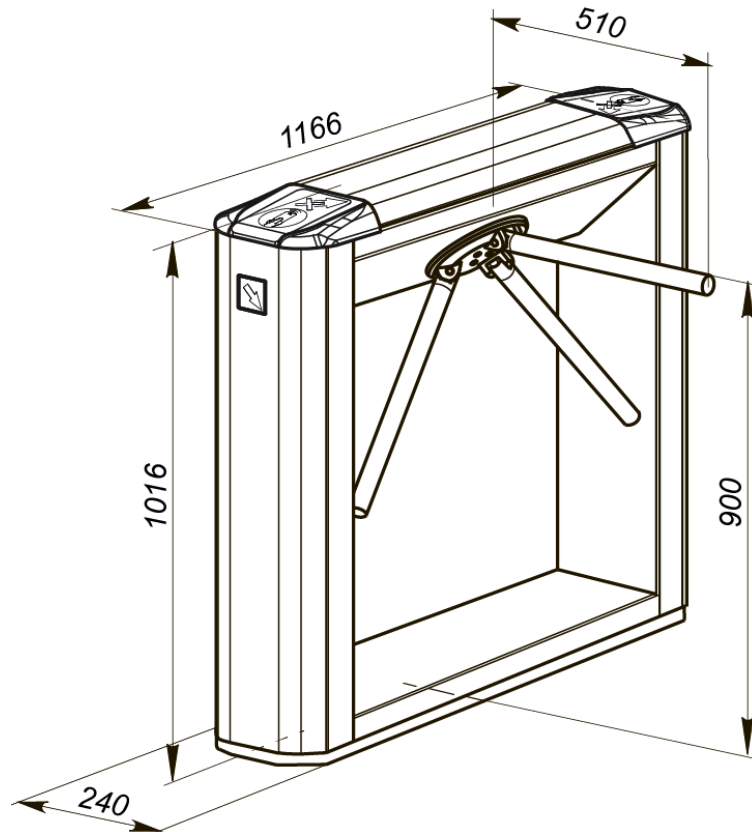


Figure 1 – Overall dimensions of the TTD-08A turnstile

4 DELIVERY SET

4.1 Standard delivery set

Basic equipment:

Turnstile housing with hub and barrier arms.....	1
SW2.5 Allen key to a housing top cover	1
RC panel with cable	1

Installation tools:

Self-adhesive cable tie mount	3
Nylon cable tie 100 mm	6
Self-adhesive PCB pillars FSS-5	4

Technical documentation:

Certificate	1
Assembly and operation manual	1

¹ The power consumption can rise to 72W within 5 sec. after power up or at taking off the *Fire Alarm* signal. In normal state the power consumption is no more than 30 W.

² Max. allowed cable length – 40 m (supplied on request).

4.2 Optional equipment supplied on request

WRC kit ¹	1
SORMAT anchor PFG IR 10-15	4

5 PRODUCT DESCRIPTION

5.1 Main features

- The turnstile is designed either for indoor application or outdoor (see Clause 2). Turnstile housing is produced from high quality stainless steel with ABS plastic covers.
- The turnstile plastic side covers are radio transparent that allows concealed mounting of the ACS readers inside the turnstile housing.
- The turnstile can be operated from the RC panel or WRC as well as from an ACS.
- The turnstile is equipped with automatic anti-panic folding arms. Automatically free of passageway is performed by bringing the barrier arm into vertical position at a power loss or by alarm signal. A purpose-designed «Fire alarm» control input is intended for opening the turnstile at the fire alarm command or from emergency opening button.
- The turnstile houses 2 LED indication displays intended for status and passage direction indication. Besides, the turnstile has an extra indication of passage direction on its side posts.
- The turnstile has outputs for connection of remote indicators.
- The turnstile has relay outputs for connection of an intrusion detector and a siren.
- There are two modes for the turnstile control — a pulse control mode and a potential control mode.
- After each passage the turnstile provides automatic complete rotation of the barrier arm to home position, i.e. automatic reset.
- After the turn of barrier arm for more than 60° angle its reverse rotation is blocked.
- Smoothness of reset and quiet operation are ensured by a damper.
- The optical arm rotation sensors are built into the turnstile housing to ensure accurate count of inputs to an ACS.
- The turnstile is supplied with safe voltage — maximum 14V.
- Galvanic decoupling of the outputs ensures noise-immunity of the turnstile electronics.
- Installed in a line several turnstile housings form a secured passage without installation of extra guide barriers.

5.2 Design

The design of the turnstile is shown in Fig. 2. Numbers in brackets correspond to Fig. 2 of this Manual. The overall dimensions of the turnstile housing are shown in Fig. 1.

The turnstile comprises a turnstile housing (1), hub with three barrier arms (4), RC panel (12). Fastening of barrier arms to the hub is hinged. The turnstile housing is fixed to floor with 4 anchor bolts through holes in the turnstile housing base (2).

5.2.1 Turnstile housing

Internal elements of the turnstile housing are accessed through the removable top cover (3). Fastening of the cap to the housing is accomplished with the help of driver screw (4). During operation of the turnstile top cover has to be locked. Under the top cover there is a bracket with control panel **PERCo-CLB.140** (further – control panel) and remote connector block **XS1**.

Both front sides of the turnstile housing feature indication modules (8, 9). Top covers are fixed fast on side walls (6, 7). Under side walls there are turnstile indication boards. On side walls there are extra indicators of passage direction, passage indication boards are located under them. When

¹ WRC kit consists of a receiver and transmitters (tags) with operation range up to 40 m.

removing side walls, assembled with top covers, there forms an access to four holes in the post base (2), in order to fix the turnstile to the mounting surface.

To access the rotation unit of barrier arms, it is necessary to remove the bracket of control board.

Rotation unit consists of (see Fig. 16):

- control mechanism with optic sensors of barrier arms rotation angle, which helps to register the passage correctly;
- rotation mechanism, which includes:
 - barrier arms resetting unit (pusher, spring and roller), providing automatic reset of barrier arms to the home position after every passage;
 - damper, providing smooth and soft-running work of rotary mechanism;
 - locking device, preventing the possibility of an unauthorized passage;
- electromechanical device for emergency opening of the passageway.

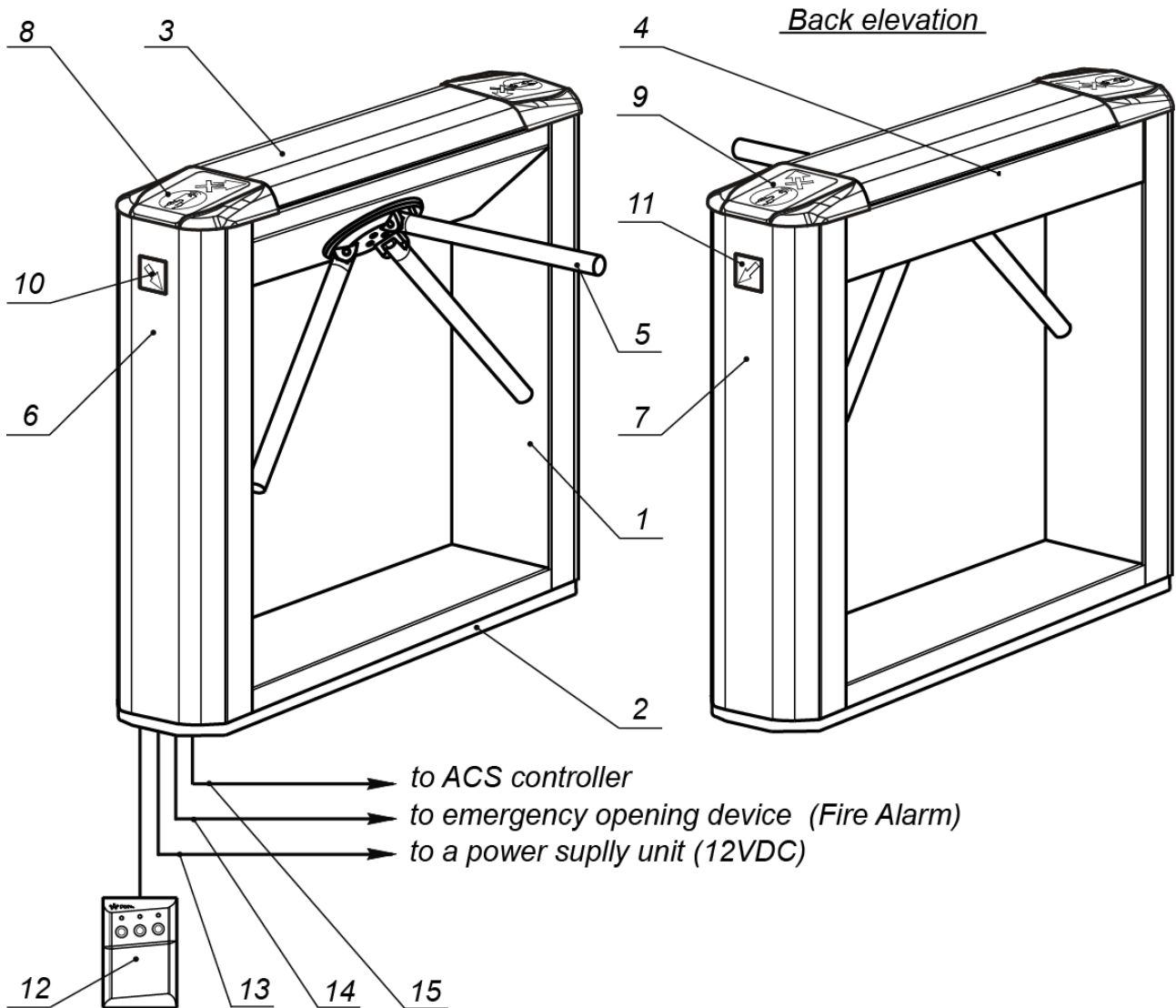


Figure 2 – TTD-08A turnstile overall view

Standard delivery set:

- 1 – frame; 2 – base; 3 – top cover; (items 1-3 form turnstile housing);
- 4 – drag screw for the top cover; 5 – folding arm; 6, 7 – turnstile housing sidewalls;
- 8, 9 – side covers with indication modules; 10, 11 – direction indicators; 12 – RC panel with cable

Not included in the standard delivery set:

- 13 – power cable; 14 – emergency opening device (Fire Alarm) cable; 15 – ACS connection cable.

5.2.2 Indication modules

To inform about a current status and a set module of the turnstile work both front sides of the turnstile housing feature indication modules (see Fig. 3). The indication module has 3 mnemonic indicators:

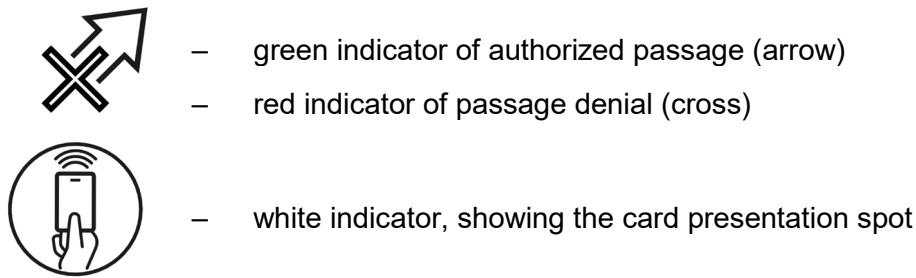


Figure 3 – Indication module

5.2.3 RC panel

The RC panel (12) is designed as a small desktop device with a shock-proof ABS plastic case and is intended for setting and indicating operating modes when the turnstile is operated manually. The RC panel overall view is shown in Fig. 4.

There are three control buttons on the RC front panel intended for setting the turnstile operating modes. The LED indicators are located above the buttons. The middle button on the RC panel (hereinafter — the **STOP** button) is intended to set the turnstile to the “Always locked” mode. The left (**LEFT**) and the right (**RIGHT**) buttons are intended to unlock the turnstile for passage in the chosen direction.

Control commands and corresponding indication on RC panel for impulse and potential modes are indicated in Table 5 and 6.

The RC panel is connected to the CLB with a multicore cable via the **XS1** connector block (see Fig. 13).

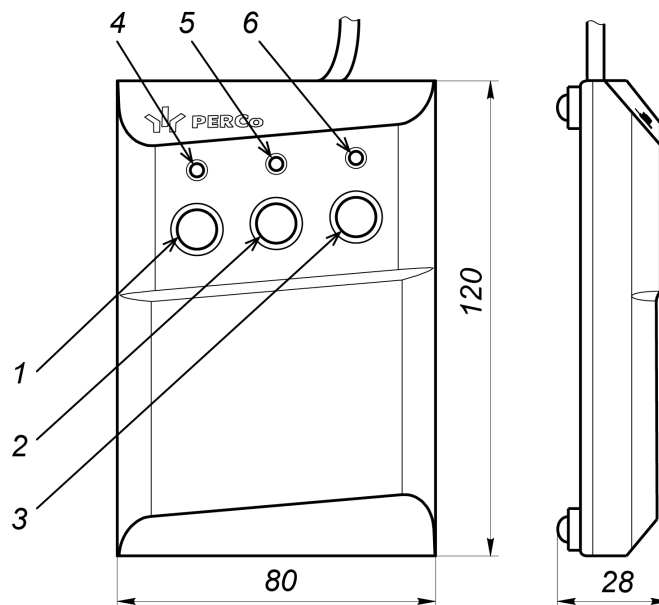


Figure 4 – RC panel overall view

- 1, 2, 3 – buttons **LEFT**, **STOP**, **RIGHT** for setting the passage mode;
 4, 6 – green indicators «Left», «Right»; 5 – red indicator «Stop»,

5.2.4 Control Logic Board

Turnstile control board (see Fig. 5) and remote connector block **XS1** are fixed on the bracket, located inside the post. To access the board, it is necessary to remove the turnstile cover, following the instructions of Clause 6.

On control board there is a microcontroller, which processes incoming control commands (inputs *Unlock A*, *Stop*, *Unlock B* and *Fire Alarm*), traces the condition of barrier arms optical sensors and basing on received data generates commands on control unit of the turnstile. Besides, microcontroller generates signals on outputs: for indication on RC panel (outputs *Led A*, *Led Stop* and *Led B*), for outer indication (outputs *Light A*, *Light B*), for passing in a corresponding direction (*PASS A* and *PASS B*), for turnstile readiness to run the command (*Ready*), for alarm (*Alarm*), to retransmit the signal of intrusion detector condition (*Det Out*).

The CLB (Fig. 5) includes:

- **X1 (LED)**, **X2 (SENS)**, **X3 (MOTOR)** connectors to connect the indication module, optical arm rotation sensors and control mechanism with a locking device (from the **X1**, **X2**, **X3** connectors with the turnstile cable).
- **XT1.L (In)** – connector block to connect the RC panel / WRC / ACS controller inputs as well as an emergency opening device (*Fire Alarm*) and intrusion detector (see Clauses 5.3.1, 5.3.2, 5.4.1).
- **XT1.H (Out)** – connector block to connect a siren and ACS outputs, providing the turnstile status data to the ACS controller (see Clause 5.4.1).
- **XT3 (+12VDC)** – connector block to connect the turnstile power supply.
- **XT4 (Light A)** and **XT5 (Light B)** – connector blocks to connect “open/closed” remote indicators, one indicator per each direction (see Clause 5.4.3).
- **XT6 (AntiPanic)** – connector block to connect the electromagnet of automatic anti-panic opening device.
- **J1** – connector to select the turnstile control mode, the jumper is fixed — the pulse control mode, the jumper is not fixed — the potential control mode. The jumper is fixed at the factory before the delivery (see Clause 5.2.6).
- **J2** – connector for programming.
- **Power** – power LED indicator on the control board.

For convenience, connection contacts of turnstile power supply and turnstile control units are set on the bracket on connector block **XS1**. Connection is conducted out in accordance to the connection diagram of the turnstile and optional equipment (see Fig. 13). Electric power supply is carried out through the power cable (13).

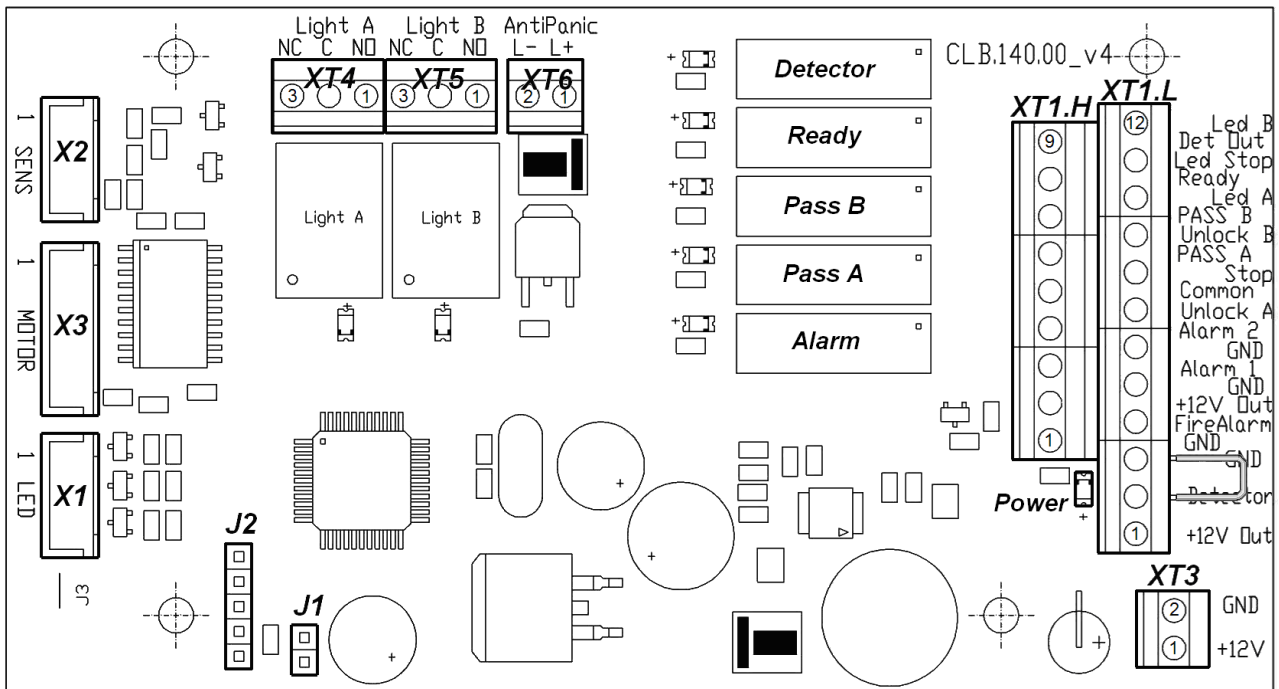


Figure 5 – Control Logic Board (CLB)

Table 1 – Contacts of the connector blocks

№	Item	Function of the contact
Connector blocks of the CLB.140		
XT1L (In)		
1	+12V	Output of power supply for ID
2	Detector	Input for connections ID
3	GND	Common contact for connections ID
4	Fire Alarm	Input for emergency opening device
5	GND	
6	GND	Common
7	Unlock A	Inputs for turnstile control
8	Stop	
9	Unlock B	
10	Led A	Indication outputs of RC panel
11	Led Stop	
12	Led B	
XT1H (Out)		
1	GND	Output of power supply for additional devices
2	+12V	
3	Alarm 1	Outputs for connections siren
4	Alarm 2	
5	Common	Common contact for <i>PASS A, PASS B signals</i>
6	Pass A	<i>PASS A</i> relay contact (passage in direction A)
7	Pass B	<i>PASS A</i> relay contact (passage in direction B)
9	Ready	Relay output <i>READY</i> (turnstile readiness)
10	Det Out	Relay output <i>DET OUT</i> (retransmission of intrusion detector condition)
XT3 (+12VDC)		
1	+12V	Connection of external power supply
2	GND	
XT4 (Light A)		
1	NO	<i>Light A</i> relay contacts – connection of remote indicator for direction A
2	C	
3	NC	
XT5 (Light B)		
5	NO	<i>Light B</i> relay contacts – connection of remote indicator for direction B
6	C	
7	NC	
Remote connector block XS1 on the bracket		
1	+12V	Connection of external power supply
2	GND	
3	Fire Alarm	Input for emergency opening device
4	GND	
5	GND	Common
6	Unlock A	Inputs for turnstile control
7	Stop	
8	Unlock B	
9	Led A	Indication outputs of RC panel
10	Led Stop	
11	Led B	
12	Common	Common contact for <i>PASS A, PASS B signals</i>
13	Pass A	<i>PASS A</i> relay contact (passage in direction A)
14	Pass B	<i>PASS A</i> relay contact (passage in direction B)

5.2.5 Parameters of control signals

The turnstile is operated by input of a low-level signal to the **XS1** 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 the turnstile control is carried out by removing 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 (Fig. 6 and 7).

Emergency unblocking of the turnstile is carried out by removing of a low-level relatively to the “GND” contact signal from the “Fire Alarm” contact. As a control element there can be used a normally closed relay contact or a circuit with open collector output at that. All turnstile control commands coming to other outputs are ignored (see Clause 5.3.2).

During the low signal injection on *Fire Alarm* output directions switch to the mode according to signal levels on inputs *Unlock A*, *Unlock B* and *Stop*.

Activation of intrusion detector is controlled by removing of a low-level relatively to the “GND” contact signal from the “Detector” contact. As a control element there can be used a normally closed relay contact or a circuit with open collector output at that.



Note:

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

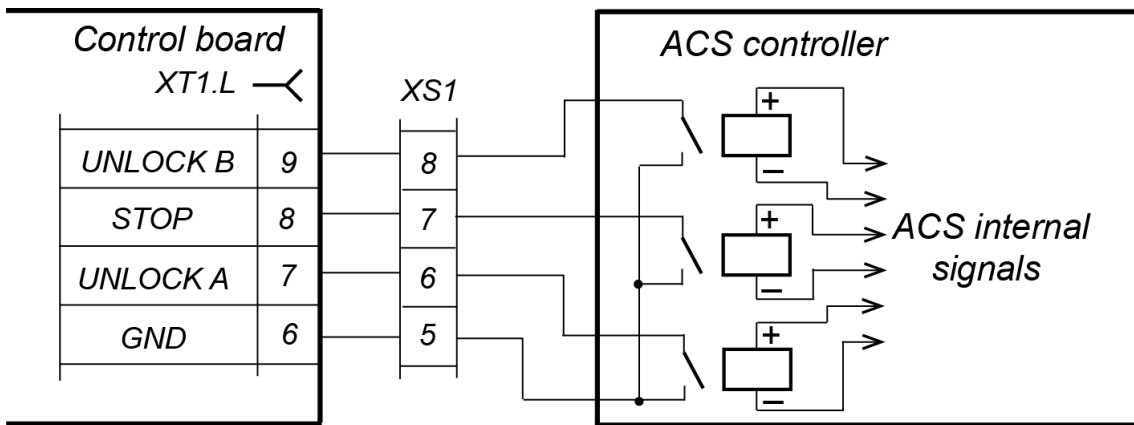


Figure 6 – ACS control element - normally open relay contact

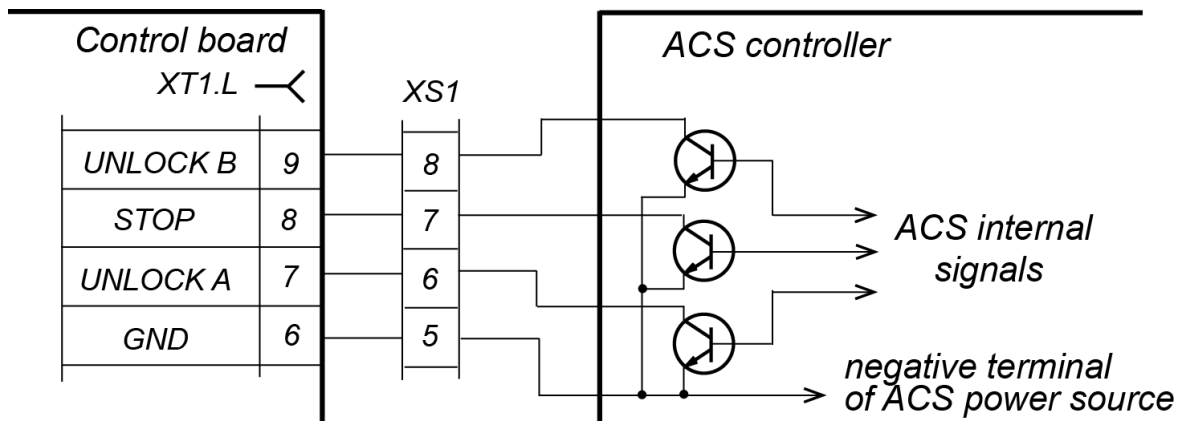


Figure 7 – ACS control element - circuit with open-collector output

The control element must provide the following signal characteristics:

the relay contact as the control element:

- minimum switched current no more than 2 mA
- closed contact resistance
- (with the resistance of the connected cable) no more than 300 Ohm

the circuit with open-collector output as the control element:

voltage at the closed contact

(low - level signal at the CLB input) no more than 0.8 V

5.2.6 Control modes of the turnstile

There can be two control modes of the turnstile: pulse and potential. In both modes turnstile control is conducted by command issuing (namely by combination of control signals) on operational control inputs: *Unlock A*, *Stop* and *Unlock B* and special control input *Fire Alarm*. Depending on a chosen mode the procedure of command issuing changes (see table 5 and 6).



Warning!

Installation and removal of the jumper is to be done only when the turnstile is switched off.

The control mode is set by removal / installation of the jumper on a **J1** connector on control board. The **J1** connector location is shown in Fig. 5. An installed jumper corresponds to the pulse control mode. In order to switch to potential mode, uninstall the jumper. The change of control mode will take place after switching on the turnstile.

Pulse control mode

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

Duration of control signal during command issuing on operational control inputs should be not less than 100mc. The passage waiting time is 5 seconds and it doesn't depend on duration of control signal (impulse).

Description of turnstile work in pulse control mode is described in Table 5. Procedure of command issuing is described in Appendix 1.

By removal of low-level signal from special control input *Fire Alarm*, turnstile switches to *Fire Alarm*, mode and therewith all incoming commands of turnstile control are ignored (see Clause 5.3.2).

During low-level signal issuing at the input *Fire Alarm* command «*Passage Denial*» is sent and turnstile rotary mechanism is blocked.

Potential control mode

The mode is used to control the turnstile with CLB, outputs of which support potential control mode.

Duration of control signal during command issuing on operational control inputs should be not less than 100mc.

The passage waiting time equals the duration of control signal: if by the moment of the passage in authorized direction at the entrance of this direction there is a low-level signal, then the turnstile will stay open in this direction.

At the low-level signal inputting to the "Stop" input, both directions will lock for the time of the signal duration regardless of the signal strength at the inputs "Unlock A" and "Unlock B". By the removal of a low-level signal from the "Stop" input, the directions will set to the modes according to the signal strength at the inputs "Unlock A" and "Unlock B".

Description of turnstile work in potential control mode is described in Table 6. Procedure of command issuing is described in Appendix 2.



Note:

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

5.2.7 Algorithm of the control mechanism

Procedure of turnstile work in the pulse control mode in case of a single passage in one of directions:

1. From control unit (RC panel, WRC, ACS) on control board inputs comes a command (combination of control commands) for execution of a single passage in one of directions.

2. Microcontroller, fixed on the control board, processes the received signal combination and forms a command to the turnstile control unit to unblock the rotary mechanism. Turnstiles hold time counting starts in the blocked mode.
3. Control mechanism unlocks the rotary mechanism for the rotation in a chosen direction. Passage in this direction becomes possible.
4. After the passage is complete, barrier arms rotation angle is monitored by microcontroller with optical sensors of control mechanism. With rotation angle of more than 67° the act of passage is registered. One of relay outputs *PASS A* or *PASS B*, according to the direction of the passage, becomes active. Microcontroller forms the instruction to the control mechanism for blocking the turnstile rotation mechanism.
5. After the passage is complete, i.e. when barrier arms are reset to the closed position (120° rotation), turnstile rotation mechanism is blocked. Relay output *PASS A / PASS B* becomes normal.
6. If barrier arms rotation hasn't started, then the command for blocking rotation mechanism is formed as hold time passes in unblocked mode (5 seconds from receiving the instruction by default).
7. Turnstile is ready for next passage.

5.3 Control devices of the turnstile

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

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



Note:

At the parallel connection of the above devices to the turnstile the superposition of the control signals from them may occur. In that case the turnstile response will conform to response to the obtained combination of input signals. (App. 1 and 2).

5.3.1 Connection of the RC panel

The RC panel is connected to the contacts *GND*, *Unlock A*, *Stop*, *Unlock B*, *Led A*, *Led Stop* and *Led B* of the **XS1** The RC panel is connected to the contacts *GND*, *Unlock A*, *Stop*, *Unlock B*, *Led A*, *Led Stop* and *Led B* of the Fig. 13).

Standard orientation of RC panel in regard to the housing is shown in Fig. 8. If working space of the operator is located on the opposite side of the housing, then for convenience of operation it is necessary to swap RC panel cables, connected to contacts *Unlock A* and *Unlock B*, as well as *Led A* and *Led B* correspondingly (see Table 2).



Note:

The WRC is connected to the contacts *GND*, *Unlock A*, *Stop* and *Unlock B* of the **XS1** connector block. Power supply of the WRC is connected to the contact +12V of the **XS1** connector block.

Table 2 – RC-cable connection to the XS1 connector block contacts 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

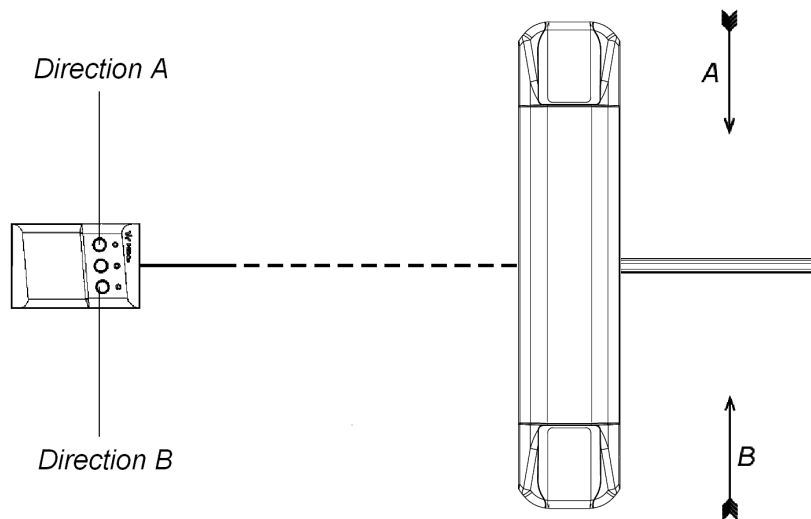


Figure 8 – Standard RC-panel orientation regarding turnstile

5.3.2 Emergency opening device Fire Alarm

The emergency opening device is connected to the contacts “*Fire Alarm*” and “*GND*” of the **XS1** connector block in accordance with the connection layout (see Fig. 13).

If the “*Fire Alarm*” input is not used, it is necessary to set a jumper between the contacts “*Fire Alarm*” and “*GND*”. This jumper is preset at the factory.

During release of control signal on *Fire Alarm* input, turnstile switches to the emergency *Fire Alarm* passageway opening. In this mode all incoming turnstile control signals are disregarded. Turnstile rotation mechanism is blocked for rotation in both directions. Central barrier arm falls down automatically by gravity and takes a vertical position which opens the passageway. The following indication in both directions is displayed simultaneously on indication modules: alternate switching on of green (for 1.25 sec) and red (for 0.25 sec) turnstile indicators.

If signal *Fire Alarm* comes on the turnstile during the passage, then on indication blocks appears an indication of *Fire Alarm* mode, but rotation mechanism blocking and passage emergency opening will take place only after resetting of barrier arm to its home position.

After release of control signal *Fire Alarm* on indication modules appears red indicator of passage denial and turnstile switches to the sleep mode with a dropped barrier. To proceed with the work, a barrier arm has to be manually set in horizontal position, where it fixes.

5.3.3 Control of the turnstile in ACS

Turnstile can be used as optional equipment while working as a part of ACS. Turnstile is provided for installation of built-in access card readers under plastic side covers.

The ACS controller outputs are connected to the contacts *GND*, *Unlock A*, *Stop* and *Unlock B* of the **XS1** connector block.

The ACS controller inputs are connected to the contacts *Common*, *PASS A*, *PASS B* of the **XS1** connector block and to the contacts *Ready* and *Det Out* of the **XT1.H** connector block.

Pin assignments of the connector blocks are given in Fig. 13.

5.4 Additional devices connectable to the turnstile

5.4.1 Relay outputs

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

- *ALARM*: contacts *Alarm 1* and *Alarm 2* (see Clause 5.4.2),
- *PASS A*: contacts *Pass A* and *Common* (see Clause 5.2.7),
- *PASS B*: contacts *Pass B* and *Common* (see Clause 5.2.7),
- *READY*: contacts *Ready* and *Common* (see Clause 5.5),
- *DETECTOR*: contacts *Det Out* and *Common* (see Clause 5.4.2).

Contacts *Pass A*, *Pass B* and *Common* are also located on connector block **XS1**.

Relays have normally open contacts. Therewith common for those relays contact *Common* is not connected with the negative of turnstile power supply (galvanically isolated). In initial (standard) condition with a switched on power supply relay contacts *PASS A*, *PASS B*, *READY* and *DETECTOR* are closed (relay coil gets energized), and relay contacts *ALARM* are opened (relay coil gets deenergized).

Relay winding energizing can be identified by lighting up of corresponding red LED, installed on control board near the corresponding relay (see Fig. 5).

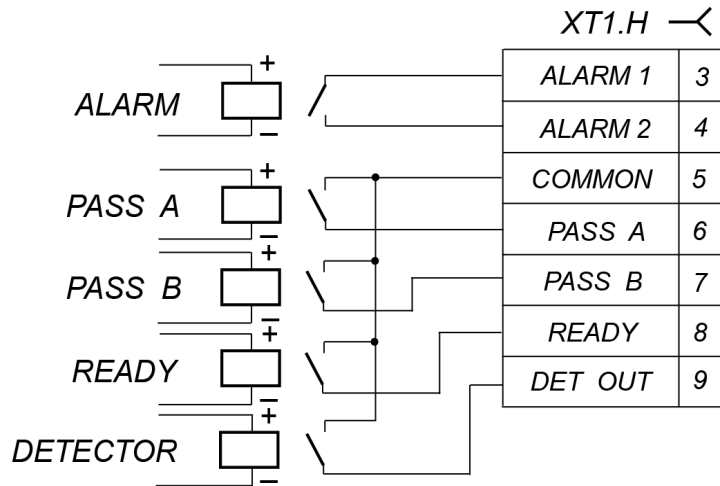


Figure 9 – Output cascades for PASS A, PASS B, Ready, Det Out and Alarm

The output cascades for *PASS A*, *PASS B*, *Ready*, *Det Out* and *Alarm* are the contacts with the following signal characteristics (Fig. 9):

- maximum commutation voltage42 VDC
- maximum switched current0.25 A
- closed contact resistanceno more than 0.15 Ohm

5.4.2 ID and siren



Warning!

Installation of intrusion detector inside the turnstile housing is not anticipated.

Intrusion detector is connected to contacts *Detector*, *GND* and *+12V* of connector block **XT1.L** of control board. Characteristics of input signals are indicated in sec. 5.2.5. Current condition of intrusion detector is transmitted on relay output *DETECTOR* (contacts *Det Out* and *Common* of connector block **XT1.H**).

Siren is connected to contacts *Alarm 1*, *Alarm 2* and *GND* and *+12V* of connector block **XT1.H**. Characteristics of relay output signals *ALARM* are indicated in sec. 5.4.1.

Output activation *ALARM* takes place, if activation of input *Detector* takes place with a blocked rotating mechanism of the turnstile (command «*Passage denial*» or «*Both directions closed*» is issued), i.e. control signal comes from the intrusion detector. Output *ALARM* gets stabilized in 5 seconds after activation or in case of any incoming control command.



Note:

Control signal from intrusion detector doesn't lead to *ALARM* output activation, if the rotating mechanism of the turnstile is blocked in one of directions or was blocked less than 3 seconds ago.

5.4.3 Remote indicators

Remote indication blocks for corresponding passage directions is connected to outputs *Light A* and *Light B*. Outputs are provided with the complete group of contacts: normally opened *NO*, normally closed *NC* and common *C*. Connection to the outputs is done correspondingly through connector blocks **XT4** and **XT5**.

If the passage in direction A/B is permitted, relay of corresponding passage direction *Light A/ Light B* gets activated (its winding gets energized), if the passage is denied – it gets stabilized. Relay winding energizing can be identified by lighting up of corresponding red LED, installed on control board near the corresponding relay.

Output cascades for the “Light A” and the “Light B” relays are nonbridging relay contacts (Fig. 10) with the following signal characteristics:

maximum switched voltage	30 VDC
maximum switched voltage	42 VAC
maximum switched AC/DC	3 A
closed contact resistance	no more than 0.15 Ohm

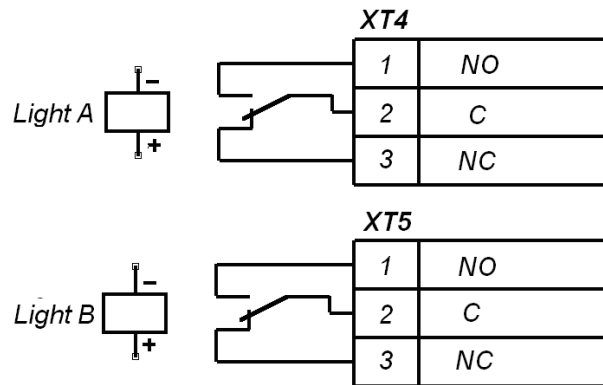


Figure 10 – Output cascades for Light A and Light B

5.5 Operation contingencies and response

Turnstile anticipates an alarm function of standard mode violation in case of unauthorized passage and in case of late barrier arms resetting to the home (closed) position. Barrier arms turn is controlled by activation of rotation unit light sensor. Sensor gets activated with barrier arms turn angle wider than 8 degrees from the home (closed) position.

- Unauthorized access is a rotation of barrier arms without a command to unblock the rotation unit.
- Barrier arms return to initial position is considered to be delayed if the passage zone is opened for more than 30 seconds.

In each of indicated cases the activation of switch *READY* takes place (switch coil is deenergized), therewith the output contacts *Ready* and *Common* get opened (ref. Section 5.4.1). When barrier arms reset to home position, normalization of switch *READY* takes place (switch coil is energized), the output contacts “Ready” and “Common” get closed.



Note:

If the optical sensor of barrier arms rotation unit breaks down, the activation of switch *READY* takes place as well until the fault is repaired.

6 MARKING AND PACKAGING

The turnstile has a marking sticker on the internal side of the turnstile top cover and a label – inside, on the rear side of the turnstile housing. The label contains trademark, contact information of the manufacturer, production date, power-supply voltage, power consumption.

To get access to the marking sticker and the label, open the top cover. To do so proceed as follows:

1. Switch off power supply of the turnstile.
2. Insert the Allen key into the hole in the rear part of the turnstile housing, use it to unscrew the drag screw (4), unlocking the top cover;
3. Holding the front edge of the top cover (3) carefully lift it and turning it remove it from the turnstile housing. Be careful not to damage the CLB located under the cover while removing the top cover.
4. Place the top cover on a flat steady surface.

Installation of the top cover back into its operation position is carried out in reverse order. After mounting the top cover, return the drag screw into initial position. Turn on the turnstile power supply.

The turnstile in the original package should be transported in closed freight containers or other closed type cargo transport units.

Box dimensions (length × width × height) 132×110×40 cm
Box weight (gross) max. 97 kg

7 SAFETY REQUIREMENTS

7.1 Installation safety requirements

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



Warning!

- All the cables should be connected up when the power supply is switched off from the AC mains.
- Only serviceable tools should be used for installation.
- Observe general electrical safety rules when laying out the cables.
- Before the turnstile first power on make sure its installation and connection have been made accordingly.

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

7.2 Operation safety requirements

Observe general electrical safety rules when operating the turnstile.



Warning!

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

Safety requirements on the power supply unit operation are shown in their certificates.

8 INSTALLATION INSTRUCTIONS

Follow the safety requirements during the installation (see Clause 7.1).

8.1 Installation details

Proper installation is critical to performance and serviceability of the turnstile. We strongly advise to study this section before installation work and follow the instructions to the latter.



Attention!

To provide minimum 50 mm gap between the turnstile and the wall for drag screw (4) access.

It is recommended:

- to mount the turnstile on steady and level concrete (grade 400 or higher, strength class B22,5), stone or similar foundations at least 150 mm thick;
- to level the foundation so that the anchoring points of the turnstile lie in the same plane (check it with a level);
- to apply reinforcing elements (400×400×200 mm) for installation on less steady foundation;
- to mark the mounting holes according to Fig. 14;
- to control vertical alignment of the turnstile with a level during installation;
- to do installation of the turnstile by at least 2 skilled installers;

- when arranging a passage area through the turnstile please take into account that the resetting mechanism operates as follows:
 - at the barrier arm turning at the angle of more than 60° the reset is effected in the direction of movement;
 - at the barrier arm turning at the angle less than 60° the reset is effected counter the movement direction (reset to home position).



Note:

The angle gradient, at which the barrier arm reset commences, may vary in the range of $\pm 5^\circ$. To ensure accurate passage tracking, when the turnstile is operated from an ACS, it is recommended to arrange the passage area in such a way that the barrier arms should turn in the direction of movement at the angle no less than 70° (Fig.11).

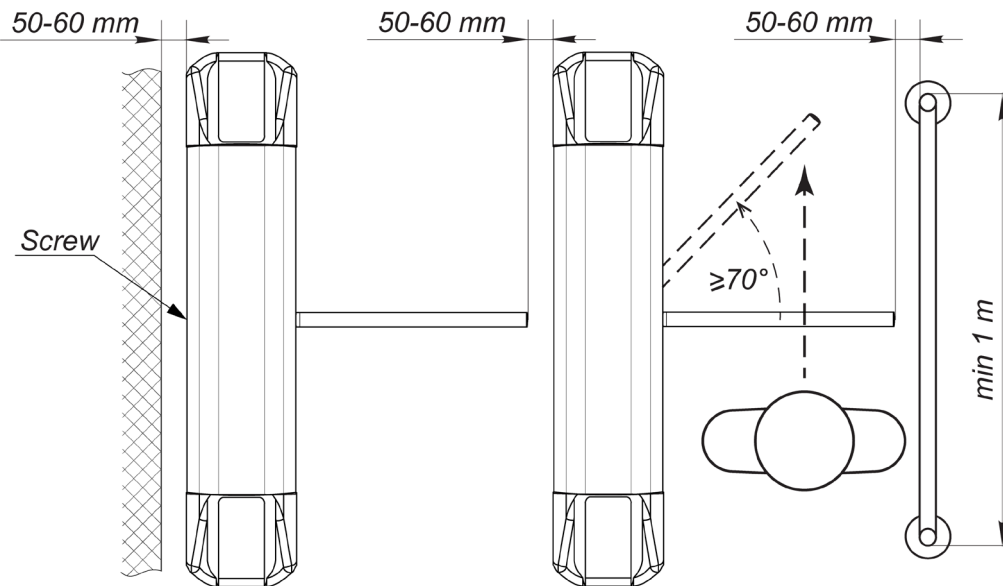


Figure 11 – Installation recommendations

By organization of the passage zone it is essential to anticipate an extra emergency exit. For example, “anti-panic” hinged section of **PERCo-BH02** railing (ref. Section 9.4) can serve as such an exit.

8.2 Installation tools

- 1.2÷1.5 kW hammer drill;
- $\varnothing 16$ mm hard-alloyed drill bits;
- Floor chaser for electric raceway;
- Flat slot screwdriver No.2;
- Cross-head screwdriver;
- Horn-type and socket wrenches: S17, S13 and S10;
- Set square 90° ;
- Allen key SW3, SW2.5;
- Level;
- Measuring tape (2 m);
- Hard wire 1.5 m long for cable pulling;
- Slide caliper.



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 Length of cables

Cables, used for installation, are listed in table 3.

Table 3 – Cables used during the installation

No	Equipment connected to the turnstile controller	Maximum cable length, m	Cable type	Minimum cross-section, mm	Example of the cable
1	Power supply	10	Twin wire	1.5	AWG 18; HO3VV-F 2×1.5 bi-colored
		15	Twin wire	2.5	AWG 13; HO5VV-F 2×2.5 bi-colored
2	- <i>Fire Alarm</i> - Additional equipment, connected to inputs or outputs of CLB	30	Twin wire	0.2	RAMCRO SS22AF-T 2×0.22 CQR-2
3	RC-panel	40	8 triad cable	0.2	CQR CABS8 8×0.22c
4	WRC	40	6 triad cable	0.2	CQR CABS6 6×0.22c
5	Controller ACS	30			

8.4 Connection layout of the turnstile and optional equipment

Table 4 – Elements of the connection layout

Legend	Name	Q-ty
A1	Control mechanism	1
A1.1	Rotation sensor unit	1
A1.2	Electromotors	1
A1.3	Electromagnet	1
A2, A3	Sidewalls with side covers assembly	2
A2.1, A3.1	Indication modules (on IM1 jumpers are in L position, on IM2 – in R position)	2
A2.2, A3.2	Modules of direction indicator (on MDI1 jumper is in L position, on MDI2 - in R position)	2
A4	Bracket with CLB and XS1 connector block	1
A5	Control logic board CLB.140	1
A6	RC-panel	1
A7 ¹	WRC device	1
A8 ¹	ACS controller	1
A9 ¹	Turnstile power supply DC 12V	1
A10 ¹	Intrusion detector	1
A11 ¹	Siren DC12V	1
A12 ¹	Emergency opening device (<i>Fire Alarm</i>)	1
A13.1 ¹ , A13.2 ¹	Remote indicators	2
A14 ¹	Remote indicator power supply	1
XS1	Remote connector block <i>Klemsan 1/12</i>	2
1	Cable (power of the CLB)	1
2	Control cable	1
3	Indication cable	1
4, 5	Cables of direction indicator	2
6	Intermediate indication cable	1
7	Wire jumper. Installed when the emergency opening device (A12) is not connected, installed on default	1
8	Wire jumper. Installed when the intrusion detector (A10) is not connected, installed on default	1

¹ Not included in standard delivery set.

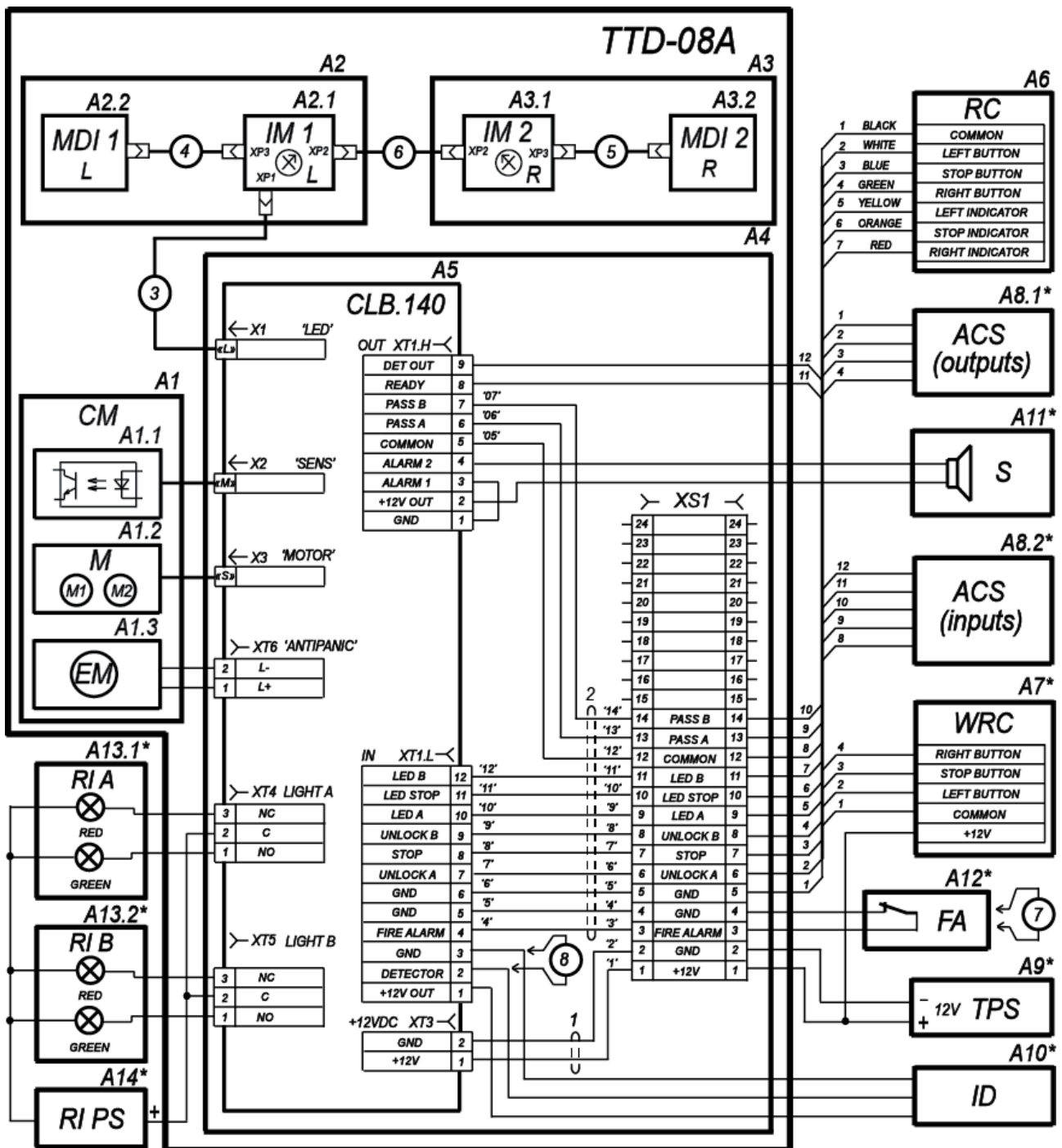


Figure 12 – Connection layout of the TTD-08A turnstile and optional equipment ¹

8.5 Installation procedure



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 if the installation is done not in compliance with the instructions provided in this Manual.

Content of installation procedures is presented per feedback in sec. 8.1. Equipments and tools, required for installation, are listed in sec. 8.2. Cable types, used during installation, are listed in sec. 8.3. Connection layouts of the turnstile and optional equipment are presented in sec. 8.4. Item numbers are listed in accordance to Fig. 2.

¹ Elements of the scheme are listed in Table 4. Elements, marked with a star sign (*) are not included in standard delivery set.

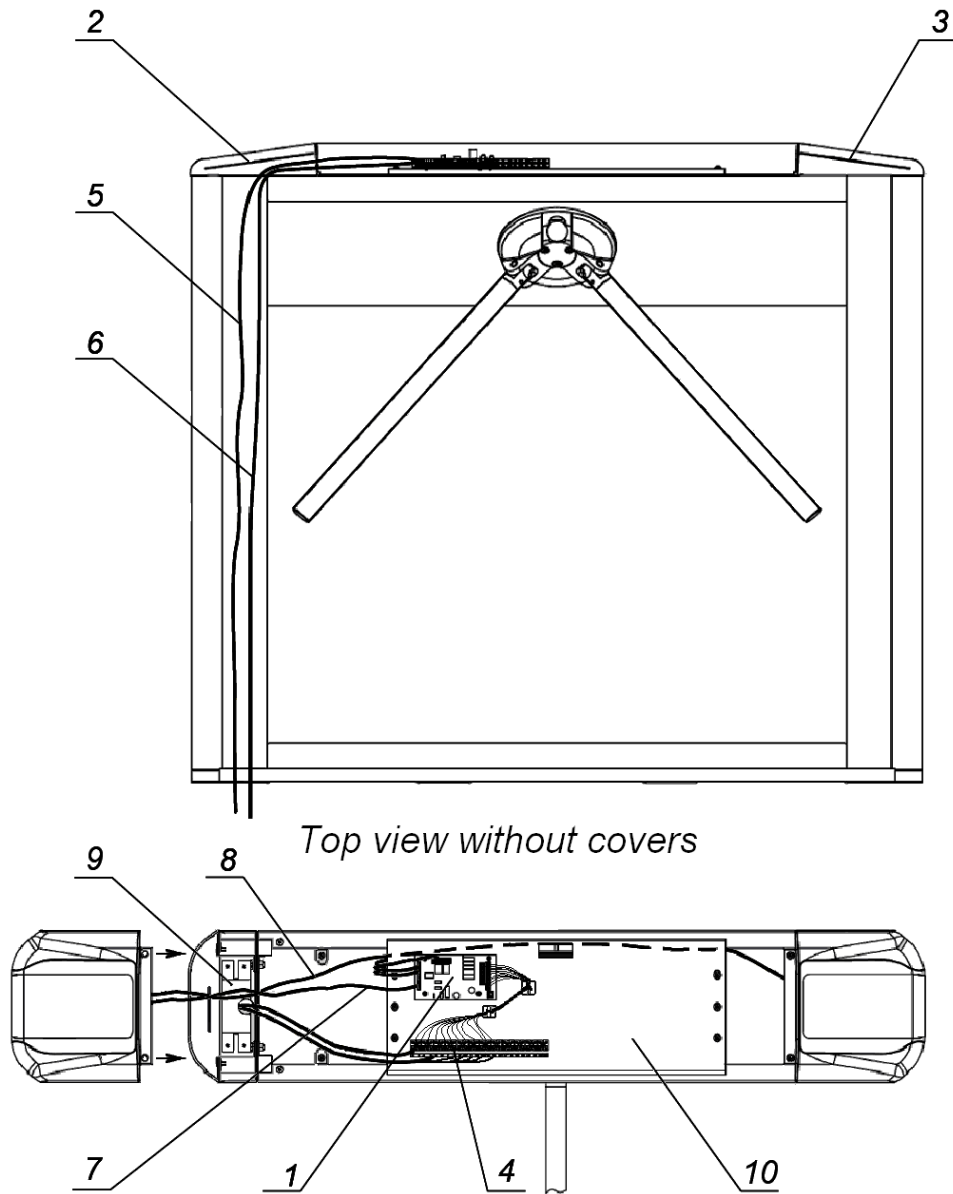


Figure 13 – Cable layout inside the housing

1 –CLB; 2 – indication module IM1; 3 – indication module IM2; 4 – remote connector block **XS1**;
 5 – power cable; 6 – cable from the RC panel (WRC device); 7 – indication cable (3 on Fig. 13);
 8 – intermediate indication cable from IM1 to IM2 (6 on Fig. 13); 9 – bracket for reader installation;
 10 – ACS installation zone

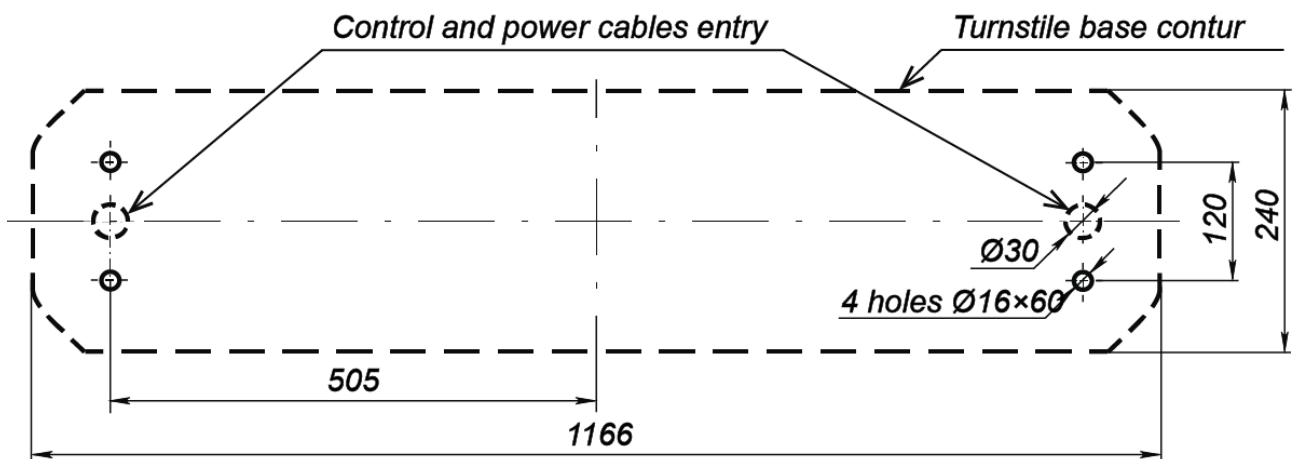


Figure 14 – TTD-08A turnstile housing installation layout

During turnstile installation keep to the following procedure:

1. Unpack the turnstile and check the completeness as per Section 4 of the product certificate.
2. Install the turnstile power supply unit in its place (See power supply unit certificate for installation procedure of the power supply unit).
3. Drill the holes for anchor bolt sleeves to fix the turnstile housing (Ref. Fig. 14).
4. 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. 12.



Caution!

- It is necessary to leave a reserve of length, enough for hinged joint removal and for the access to the barrier arms rotation unit, of those cables that are connected to the remote connector block and control board.
- Fix the housing after laying the cables in the electric raceway and inside the turnstile housing. Be careful and prevent the turnstile from falling before it is fixed.

5. Insert the sleeves for the anchor bolts into the holes so that they do not stick out above the floor surface.
6. Remove the turnstile housing top cover (3) (Ref. Section 6).
7. Remove the turnstile housing side cover (7), assembled with a top cover (9). For this purpose:
 - Loosen two screws (2 in Fig. 15).
 - Remove the wall from the housing and disconnect the cable, connecting indication plates (8 on Fig. 12) from indication plate 2, located under the cover.
 - Remove the back panel and accurately put it on the straight stable surface.
8. Remove the turnstile housing side cover (6), assembled with a top cover (8). In order to do that:
 - Loosen two screws (1 in Fig. 15).
 - Take a side cover aside and detach a cable (8 in Fig. 12), connecting indication blocks, from indication block IM1 (located under a top cover), and an indication cable (7 in Fig. 12), from control block.
 - Remove a side cover and accurately put it on the straight stable surface.
9. Set up the housing on anchor bolt sleeves and fix it with the M10 bolts through the holes in the post base.
10. Connect the power cable (13) to a connector block **XS1** (Ref. Fig. 13).
11. Connect the cable of the RC panel (12) to a connector block **XS1**.
12. If needed, connect cables from other devices to corresponding connector blocks of control board.
13. If needed, install the board of outer controller ACS inside the turnstile housing on the bracket (10 in Fig. 12); to do this, use clips with self adhesive foundations FSS-5 from the delivery set.
14. If needed, install card readers on, specially provided for it, brackets on the housing flanks (9 in Fig. 12). To ease the installation procedure, remove the bracket by loosening two nuts M3 with an open end wrench S5,5, located below under the bracket. To connect card readers, use free contacts (15 - 24) of the remote connector block **XS1**.



Attention!

Possibility of **PERCo** card reader's installation is anticipated in the turnstile housing. With installation of third manufacturers readers they should correspond with following technical characteristics:

overall readers dimensions	not more than 135×90×30 mm
sensors read range.....	not less than 50 mm

15. Check serviceability and accuracy of all the electrical connections.
16. Fix all cables with the help of self-adhesive foundations and fixed brace rods from the delivery set.
17. Put back side panels (6, 7), assembled with top covers (8, 9) in an order, opposite to removal.
18. Put back a top cover (3) in an order, opposite to removal.
19. Run a test switch on of the turnstile as specified in Clause 9.1.
20. Check the work of the turnstile with RC panel, according to section 9.2 or 9.3 depending on a switched control mode.

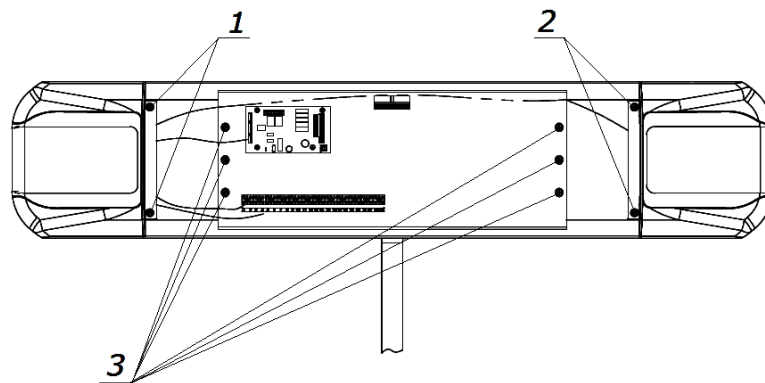


Figure 15 – Layout of bracket cap-screws

1, 2 - screws for fastening side panels with covers,

3 - screws for fastening the bracket with the control board and the remote connector block

After installation and testing have been completed, the turnstile is ready for operation.

9 OPERATION INSTRUCTIONS

When operation the equipment, observe precautions (Clause 7.2).



Warning!

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

9.1 Power-up

Follow these steps:

1. Check accuracy of all the connections.
2. Make sure the upper barrier arm is in emergency position (passage area is free).
3. Connect the turnstile power supply unit to the AC outlet with the voltage and frequency rating according to the certificate for the power supply unit. Red indicators (ban on passage) will light up on the indication modules, on the RC panel the red indicator above “Always locked” will light up.
4. Manually lift up the folding arm. The arm will be fixed in this position.
5. Check operation of the intrusion detector and siren (if included in the delivery set and installed accordingly). After the power-up wait until the moment of the test indicator (inside the intrusion detector) going off (from 10 to 50 sec). 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 RC panel. The sound will stop without pressing the button in 5 sec.

The turnstile is ready for operation.

9.2 Operating modes of the turnstile at pulse control mode

See Table 5 for the operating modes set from the RC panel and for the corresponding indication. 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.



Note:

Pressing the button on the RC panel corresponds to the low-level signal supply to the contacts (“Unlock A”, “Unlock B” and “Stop”) of the **XS1** connector block relatively to the contact “GND”.

Table 5 – Pulse control mode (the jumper is set on the J1 connector)

The turnstile operating modes	Actions to do	Indication		Turnstile status
		On the RC panel	On the turnstile	
<i>Always locked (Locked for entry and exit)</i>	Press the STOP button on the RC panel	The red indicator above the STOP button is on	The “Red crosses” for each passage direction are on	The turnstile is locked
<i>Single passage in the set direction (open for passage of one person in the chosen direction)</i>	Press the LEFT/RIGHT button on the RC panel	The green indicator above the button of the chosen passage direction « <i>Left</i> »/« <i>Right</i> » is on	The “Green arrow” in the chosen passage direction is on	When the passage is completed, the turnstile is locked
<i>Bi-directional single passage (open in both directions for ‘one-by-one’ passage)</i>	Press both the LEFT and RIGHT buttons on the RC panel simultaneously	The two green indicators (« <i>Left</i> » and « <i>Right</i> ») are on	The “Green arrow” for each passage direction is on. After the passage in the chosen direction the “Red cross” is on for that direction.	The turnstile is locked in the direction of completed passage
<i>Free passage in the set direction (open for free passage in the chosen direction)</i>	Press the STOP button and the button corresponding to the chosen passage direction LEFT/RIGHT simultaneously	The green indicator above the button of the chosen passage direction « <i>Left</i> »/« <i>Right</i> » is on	The “Green arrow” in the chosen passage direction is on.	Turnstile remains open in the set direction
<i>Free passage in the set direction and single passage in the opposite direction (open for free passage in the chosen direction and for passage of one person in the opposite direction)</i>	Set the “Free passage in the set direction” mode for one direction and “Single passage in the set direction” for the other.	The two green indicators (« <i>Left</i> » and « <i>Right</i> ») are on.	The “Green arrows” for each passage direction are on. After the single passage the “Red cross” is 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 gets locked in the single passage direction
<i>Always free (open for entry and exit)</i>	Press all the 3 buttons on the RC panel simultaneously: LEFT, STOP and RIGHT	The two green indicators (« <i>Left</i> » and « <i>Right</i> ») are on	The “Green arrows” for each passage direction are on.	The turnstile remains open

The RC panel overall view is given in Fig. 4. Herewith:

- 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.
- 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.

9.3 Operating modes of the turnstile at potential control mode

See Table 6 for the operating modes set from the RC 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.

If by the moment of passage 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.

Table 6 – Potential control mode (the jumper is taken off from the J1 connector)

The turnstile operating modes	Actions to do	Indication		Turnstile status
		On the RC panel	On the turnstile	
<i>Both passage directions are locked (the turnstile is locked both for entry and exit)</i>	The high level — on contacts “Unlock A” and “Unlock B” or low level — on the contact “Stop”	The red indicator above the STOP button is on	The “Red crosses” for each passage direction are on	The turnstile is locked
<i>One of the passage directions is open (the turnstile is open for passage in the set direction)</i>	The low level — on the contact corresponding to the passage direction, the high levels — on the other contacts	The green indicator above the button of the chosen passage direction “Left” / “Right” is on	The “Green arrow” in the chosen passage direction is on	When the passage is completed, the turnstile is locked
<i>Both passage directions are open (the turnstile is open both for entry and exit)</i>	The low level — on contacts “Unlock A” and “Unlock B”. The high level — on the contact “Stop”	The two green indicators (“Left” and “Right”) are on	The “Green arrows” for each passage direction are on	The turnstile remains open

9.4 Troubleshooting

Possible faults, which can be cleared by the users themselves, are listed in Table 7.

Table 7 – Possible faults and remedy

Fault	Possible cause	Remedy
At the power-up the turnstile doesn’t work, and there is no light indication on the turnstile housing and the RC panel	No supply voltage to the CLB	Switch off the turnstile power supply from the AC mains, open the turnstile housing cover. Check the power cable serviceability and reliability of its connection to the CLB XS1 and XT3 connector blocks
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 turnstile power supply from the AC mains, open the turnstile housing cover, and remove the outer panel. Check the RC panel / WRC kit / ACS controller cable serviceability and reliability of its connection to the CLB XS1 connector block

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

9.5 Actions in emergency

For urgent evacuation of people from business facilities in case of fire, natural calamities and other emergencies, the additional emergency exit should be provided. Such emergency exit can be the automatic anti-panic rotary section **BH-02**.

The additional emergency exit can be provided by the turnstile passage area. Construction of the turnstile enables immediate clear of passage way without use of any special keys or tools. By putting the *Fire Alarm* signal to turnstile logic board the barrier arm automatically falls down allowing the free exit.

The arm also drops down automatically at a power supply loss.

10 MAINTENANCE

The turnstile maintenance is required once a year and in case of any technical failures the turnstile must be serviced immediately after repair works. The maintenance should be carried out by qualified mechanic only after careful study of this Manual.

To do maintenance proceed as follows:

1. Disconnect the turnstile power supply from the AC mains, the folding arms will automatically fall down.
2. Remove the turnstile top cover (3) from the turnstile housing as described in Section 6. Lay the cover on a flat steady surface.
3. To access the rotation unit of turnstile barrier arms, take off the bracket with control board and remote connector block. For this purpose: unscrew 6 screws (3 on Fig. 15), which fix the bracket on the turnstile housing and accurately take a bracket aside without damaging connected cables.
4. Inspect the resetting mechanism (a pusher, springs and a roller), optic sensors and a damper (Ref. Fig. 16).
5. Remove dust from a rotation sensor disc, located in the spacing of the rotation optic sensors, with alcohol-gasoline blend applied with a cloth. Avoid ingress of dust into the operational spacing of the optic sensors.
6. Lubricate with machine oil (lubrication points are marked in Fig. 16):
 - four bushes of the resetting mechanism (two – on the rotation axis of the pusher;
 - two – on the fastening axis of the springs as well as holes in the fastening parts of the springs); 2-3 drops of oil in each lubrication point.



Attention!

Avoid ingress of lubricant on the rotation sensor disc and the roller surfaces.

7. Fix the bracket with control board and remote connector block in an order, opposite to removal.
8. Check reliability of the cable connections to the CLB connector blocks and if necessary tighten the cable fixing screws.
9. Check reliability of the barrier arm (5) fastening.
10. Remove side panels (6, 7), assembled with top covers (8, 9) in an order (ref. Section 8.5). Check reliability of the turnstile housing fastening to the floor and if necessary, tighten the anchor bolts.
11. Put back side panels (6, 7), assembled with top covers (8, 9) in an order, opposite to removal.
12. Return the top cover (3) into its operating position.
13. Energize the turnstile and lift up the folding arm.
14. Check operation of the turnstile in accordance with Section 9 of this Manual.

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

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

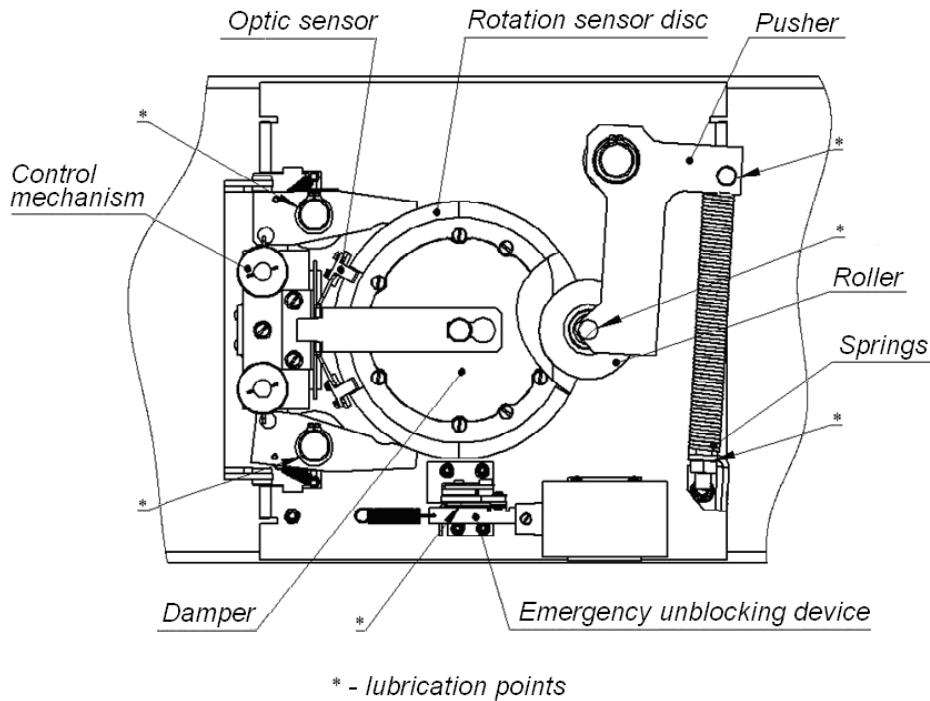


Figure 16 – Interior components of the turnstile mechanism

11 TRANSPORTATION AND STORAGE

The turnstile in the original package should be transported in closed freight containers or other closed type cargo transport units.

During storage and transportation, the boxes with the turnstiles can be stacked maximum 2 layers high.

Storage of the turnstile is allowed in dry indoor facilities at an ambient air temperature from –40°C to +55°C at relative air humidity 98% at +25°C.

After transportation or storage at temperatures below zero or at high air humidity, prior to installation the turnstile must be kept in the original package for no less than 24 hours indoors under conditions corresponding to operation conditions (Ref. Section 2).

Appendix 1. Control signal algorithm at pulse control mode



Note:

For the RC panel:

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

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. 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** (or **XS1**) connector block relatively to the contact “GND”:

Always locked (locked for entry and exit)

Active front is at the contact “Stop” while there is a high level at the contacts “Unlock A” and “Unlock B”. Both passage directions are locked at this command.

Single passage in the direction A (open for passage of one person in the direction A)

Active front is at the contact “Unlock A” while there is a high level at the contacts “Stop” and “Unlock B”. At this command the 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 the passage direction B does not change at that. The command is ignored if at the moment of its receipt the status of the passage direction A is «**Always free**».

Single passage in the direction B (open for passage of one person in the direction B)

Active front is at the contact “*Unlock B*” while there is a high level at the contacts “*Stop*” and “*Unlock A*”. At this command the 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 the passage direction A does not change. The command is ignored if at the moment of its receipt the status of passage direction B is «Always free».

Bi-directional single passage (open in both directions for ‘one-by-one’ passage)

Active front is at the contact “*Unlock A*” while there is a low level at the contact “*Unlock B*” and a high level at the contact “*Stop*”, or active front is at the contact “*Unlock B*” while there is a low level at the contact “*Unlock A*” and a high level at the contact “*Stop*”. At this command the both passage directions open either for 5 sec. each or until the passage has been effected in the given direction or until the command «Always locked» is received. The command is ignored for the passage direction, which status at the moment of its receipt is «Always free».

Free passage in the direction A (open for free passage in the direction A)

Active front is at the contact “*Unlock A*” while there is a low level at the contact “*Stop*” and a high level at the contact “*Unlock B*”, or active front is at the contact “*Stop*” while there is a low level at the contact “*Unlock A*” and a high level at the contact “*Unlock B*”. At this command the passage direction A opens until the command «Always locked» is received; the status of the passage direction B does not change at that.

Free passage in the direction B (open for free passage in the direction B)

Active front is at the contact “*Unlock B*” while there is a low level at the contact “*Stop*” and a high level at the contact “*Unlock A*”, or active front is at the contact “*Stop*” while there is a low level at the contact “*Unlock B*” and a high level at contact “*Unlock A*”. At this command the passage direction B opens until the command «Always locked» is received; the status of the passage direction A does not change at that.

Free passage (open for free passage in both directions)

Active front is at the contact “*Unlock A*” while there is a low level at the contacts “*Unlock B*” and “*Stop*”, or active front is at the contact “*Unlock B*” while there is a low level at the contacts “*Unlock A*” and “*Stop*”, or active front is at the contact “*Stop*” while there is a low level at the contacts “*Unlock A*” and “*Unlock B*”. The both directions open at this command until the command «Always locked» is received.

Appendix 2. Control signal algorithm at potential control mode**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.

Both directions are locked (locked for entry and exit)

There is a high level at the contacts “*Unlock A*” and “*Unlock B*”, or a low level at the contact “*Stop*”. Both passage directions close at this command.

The direction A is open (open for passage in the direction A)

There is a low level at the contact “*Unlock A*” while a high level is present at the contacts “*Stop*” and “*Unlock B*”. At this command the direction A opens up to the low-level signal removal from the contact A or until the command «Both directions locked» is received. The status of the direction B does not change at that

The direction B is open (open for passage in the direction B)

There is a low level at the contact “*Unlock B*” while there is a high level at the contacts “*Stop*” and “*Unlock A*”. At this command the direction B opens up to the low-level signal removal from the contact B or until the command «Both directions locked» is received. The status of the direction A does not change at that.

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

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

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