

## Electromechanical Tripod Turnstile

# TTR-04.1

OPERATION MANUAL





# **Electromechanical 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 TTR-04.1 electromechanical 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;  
RC – remote control;  
WRC – wireless remote control;  
CLB – control logic board;  
LED - light-emitting diode.

## **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.

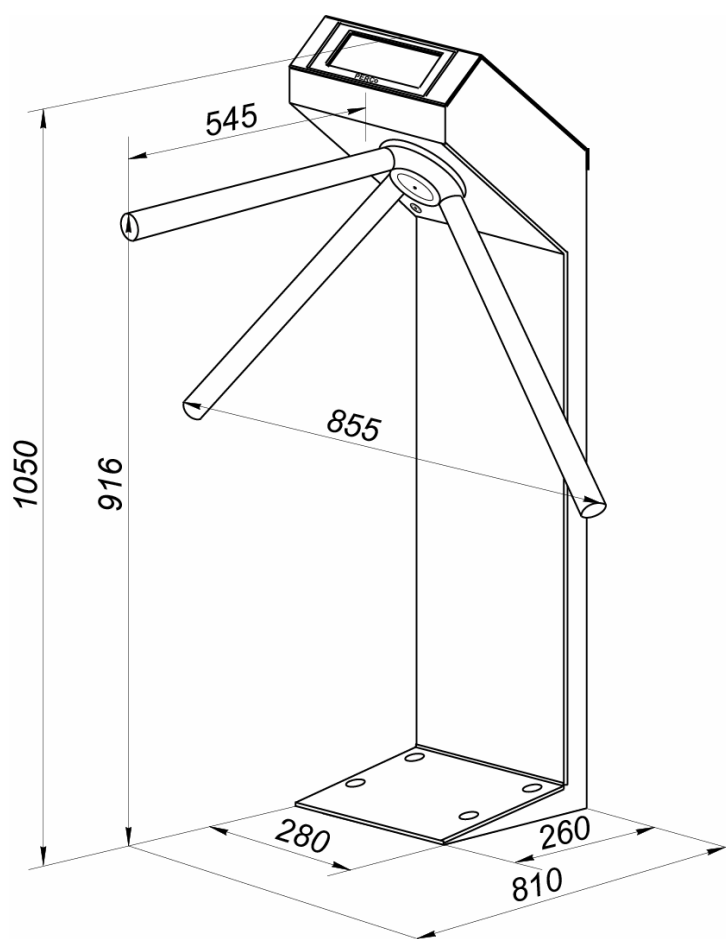
## **2 OPERATION CONDITIONS**

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±1.2 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 .....   | 600 mm                               |
| Barrier arm rotation force .....                               | max. 3.5 kgf                         |
| Remote control panel cable length .....                        | min. 6.6* m                          |
| Ingress Protection Rating .....                                | IP41 under EN 60529                  |
| Electric shock protection class .....                          | III according to GOST R IEC 335-1-94 |
| Mean time to failure .....                                     | min. 1,500,000                       |
| Mean lifetime .....  | 8 years                              |
| Turnstile housing overall dimensions (L × W × H) .....         | 855×810×1050 mm                      |
| Net weight of the turnstile (with a top cover installed) ..... | max. 30 kg                           |



**Figure 1. Overall dimensions of the TTR-04.1 turnstile:**

\* Maximum allowable cable length is 40 m (available on request)

## 4 DELIVERY SET

### 4.1 Standard delivery set

#### Basic equipment:

|   |   |
|---|---|
| Turnstile housing .....   | 1 |
| Barrier arm (type to be specified at time of order placement) ..... | 3 |



#### **Note:**

The type and color options of the turnstile housing cover and barrier arms are specified in the Certificate TTR-04.1.

|                              |   |
|------------------------------|---|
| Mechanical release key ..... | 2 |
| Remote control panel .....   | 1 |

#### Installation tools:

|                     |   |
|---------------------|---|
| Plastic plugs ..... | 5 |
|---------------------|---|

#### Operational documentation:

|                        |   |
|------------------------|---|
| Certificate .....      | 1 |
| Operation manual ..... | 1 |

#### Packaging:

|           |   |
|-----------|---|
| Box ..... | 1 |
|-----------|---|

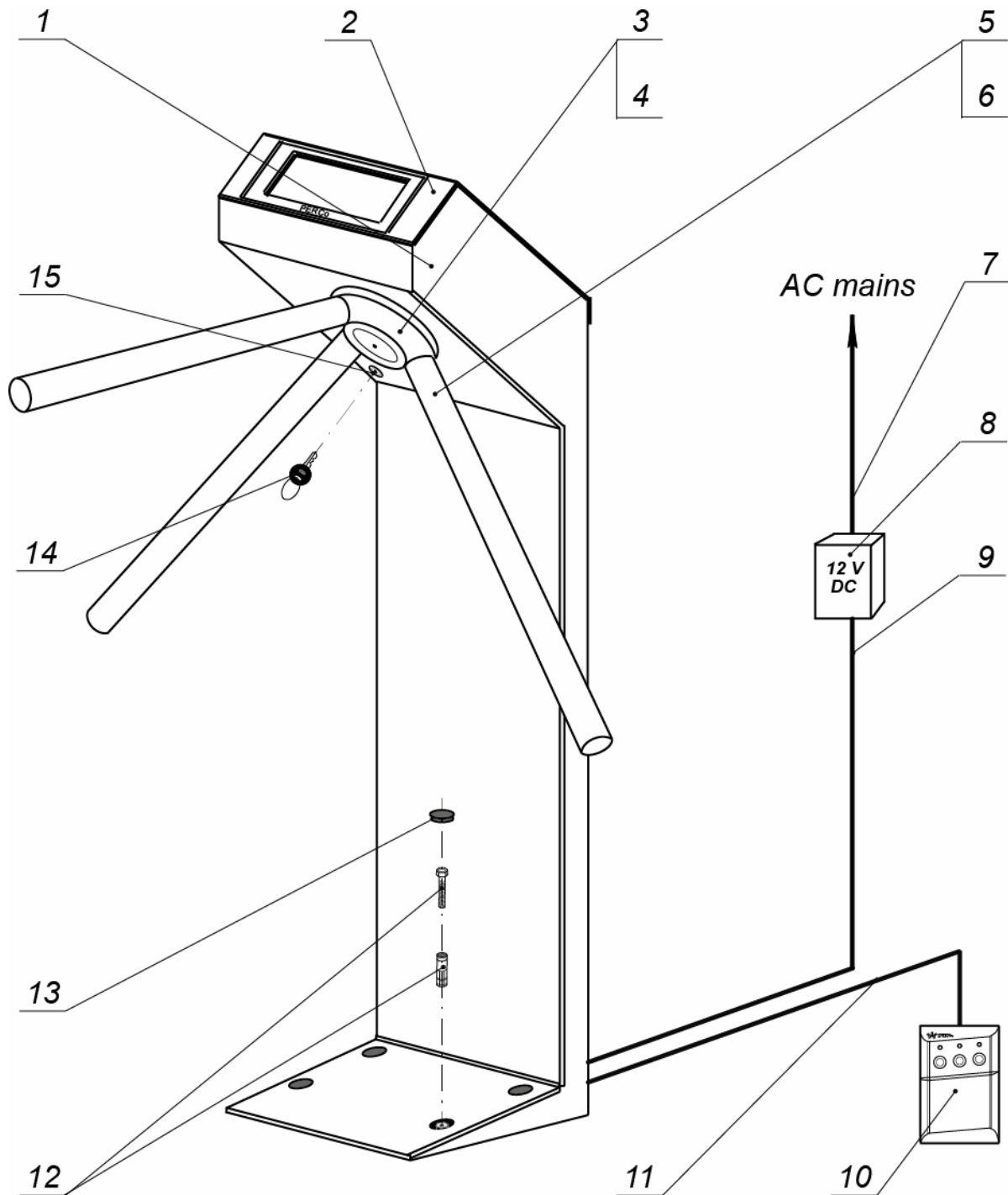
### 4.2 Optional equipment supplied on request

|   |   |
|---|---|
| SORMAT PFG IR10-15 anchor bolts .....                   | 4 |
| Turnstile power supply .....                            | 1 |
| Passive infrared sensor of intrusion detector .....     | 1 |
| Siren (for alerts on unauthorized entry attempts) ..... | 1 |
| Wireless remote control kit .....                       | 1 |



#### **Note:**

Wireless remote control kit consists of a receiver and transmitter (tag) with operation range up to 40 m.



**Figure 2. TTR-04.1 electromechanical tripod turnstile. Overall view:**

- 1 – turnstile housing; 2 – cover with LED indication display; 3 – hub;
- 4 – rotation mechanism; 5 – barrier arm; 6 – M8 bolt for barrier arm fastening;
- 7 – AC power cable; 8 – turnstile power supply; 9 – turnstile power cable;
- 10 – RC panel / WRC kit / ACS controller; 11 – cable of RC / WRC / ACS controller;
- 12 – anchor bolt; 13 – plastic plugs; 14 – mechanical release key; 15 – mechanical lock.

## 5 PRODUCT DESCRIPTION

### 5.1 Main features

- The turnstile can be operated from the RC panel or WRC kit as well as from an ACS.
- The turnstile is supplied with safe voltage — maximum 14 V (with remote indicators — maximum 42 V).
- The turnstile has low power consumption — maximum 8.5 W.
- The turnstile retains the set position for each direction when the power is switched off — the open passage direction remains open, the locked passage direction remains locked.
- After each passage the turnstile provides automatic complete rotation of the barrier arms to home position, i.e. automatic reset.
- 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 mechanical release lock built into the turnstile housing ensures the turnstile unlocking with a key in emergency cases (free rotation of barrier arms).
- 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.
- Galvanic decoupling of the outputs ensures noise-immunity of the turnstile electronics.
- The turnstile has outputs for connection of remote indicators.
- A purpose-designed “Fire alarm” control input is intended for unlocking the turnstile at the fire alarm command or from emergency unblocking button.

### 5.2 Design

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

5.2.1 The turnstile comprises a turnstile housing (1) a remote control panel (10) with cable (11) and a set of barrier arms (5). The turnstile housing (1) is a formed and welded metal structure with a cover (2). On the front panel of the cover there is a LED indication display. Inside the turnstile housing there are a Control Logic Board (CLB) and a self-centering mechanism consisting of a resetting device (a pusher, springs and a roller), a control mechanism with optical arm rotation sensors and a locking device, and a mechanical release lock (15). The housing contains a rotation mechanism (4), consisting of a damper, an arm rotation sensor disc and a hub (3), with three barrier arms (5).

5.2.2 The large LED indication display with bright pictograms (located on the cover (2)) is intended for status and direction indication: a Green Arrow indicates the direction of authorised passage (the turnstile is open in the set direction); a Red Cross indicates ban on passage (the turnstile is locked).

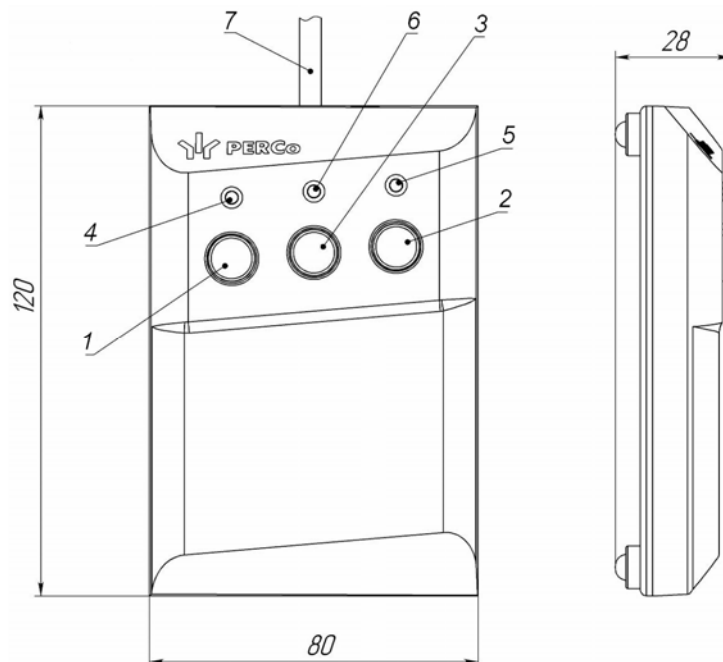




**Figure 3. LED indication display**

5.2.3 The RC panel/wireless remote control/ACS controller (10) and the turnstile power supply unit (8) are connected to the CLB with the cables (9 and 11) in accordance with the connection layout (see Fig. 6).

5.2.4 The RC panel is designed as a small desktop device with a shockproof 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.



**Figure 4. RC panel overall view**

- 1, 2, 3 – buttons **LEFT**, **RIGHT**, **STOP** for setting the passage mode;  
 4, 5 – green indicators «*Left*», «*Right*»;  
 6 – red indicator «*Stop*», 7 – RC cable.

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.

The RC panel is connected to the CLB with a multicore cable (11) via the *XT1.L* connector block (See Fig. 5 and Fig. 6).

If the turnstile orientation relatively to the operator's terminal is not standard (e.g. the terminal is placed at the backside of the turnstile housing), the RC panel orientation towards the turnstile 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. 5 and Fig. 6).

5.2.5 The CLB (Fig. 5) contains:

- **X1 (Control)** – connector to connect the control mechanism (connected to the “X1” connector of the control mechanism with the turnstile cable);
- **XT1.L (In)** – connector block to connect the RC panel / WRC / inputs of an ACS controller as well as an emergency unblocking device;
- **XT1.H (Out)** – connector block to connect a siren and outputs providing the turnstile status data to the ACS controller;
- **XT2 (Detector)** – connector block to connect an intrusion detector;
- **XT3 (+12VDC)** – connector block to connect the turnstile power supply;
- **XT4 (Light A)** and **XT5 (Light B)** – connector blocks to connect “Open/closed” light indicators, one pair per each direction;
- **J1** – connector to select the turnstile control mode;
- **J2** – connector for programming.

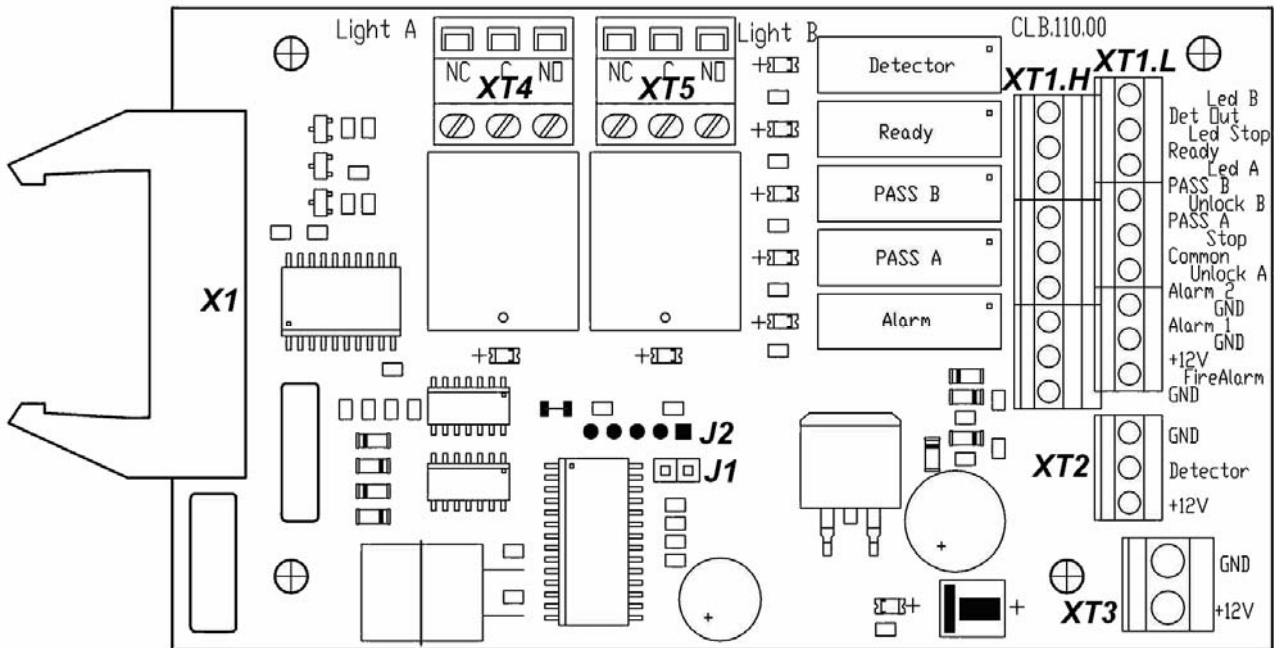


Figure 5. Control Logic Board (CLB)

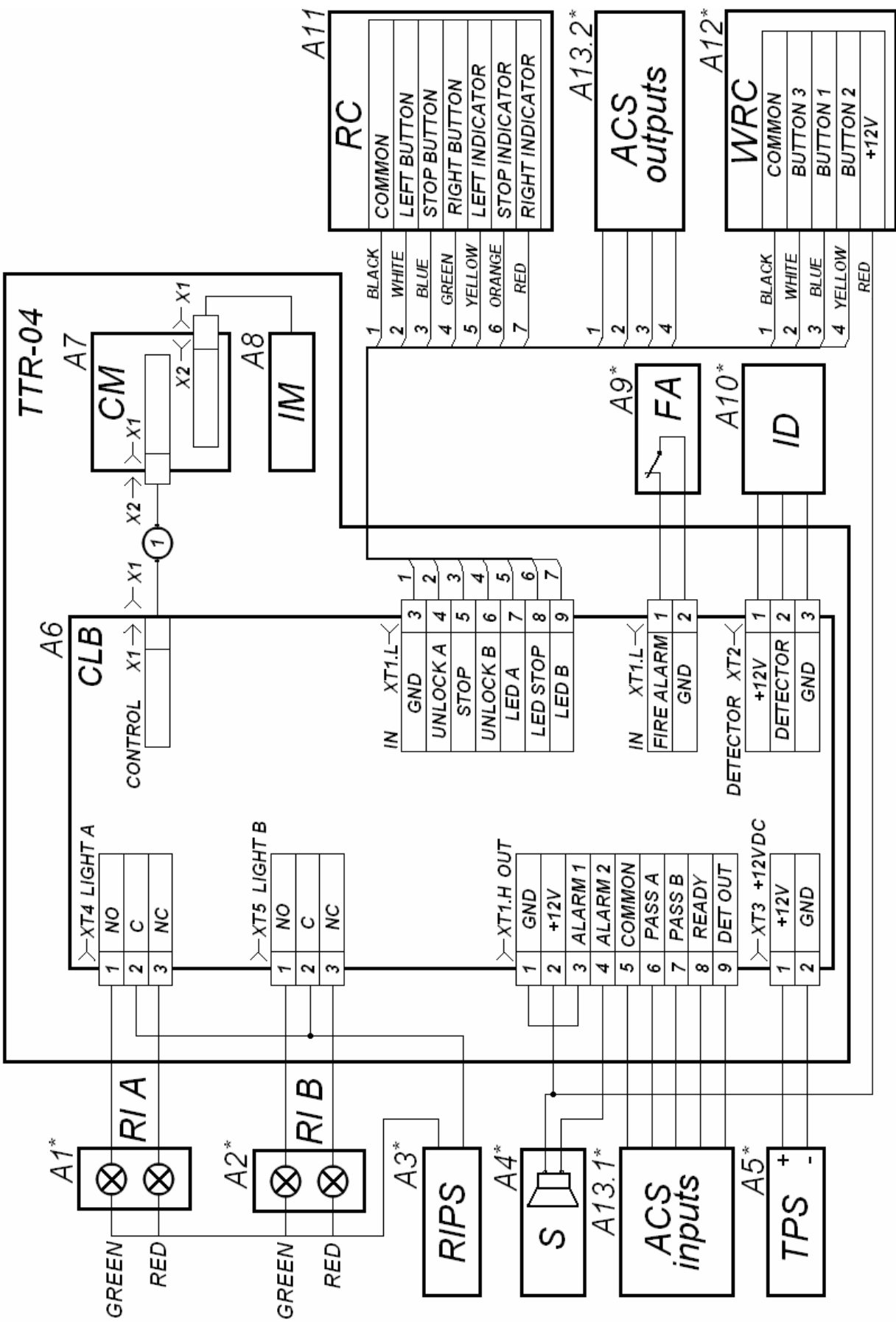


Figure 6. Connection layout

**Table 1. Legend to Figure 6**

| LEGEND   | ITEM                                     | Q-ty | NOTE   |
|----------|--|------|--------|
| A1*, A2* | Remote indicators                        | 2    |        |
| A3*      | Remote indicator power supply            | 1    |        |
| A4*      | Siren, 12V DC                            | 1    |        |
| A5*      | Turnstile power supply                   | 1    |        |
| A6       | CLB                                      | 1    |        |
| A7       | Control mechanism                        | 1    |        |
| A8       | Indication module                        | 1    |        |
| A9*      | Emergency unblocking device (Fire Alarm) | 1    |        |
| A10*     | Intrusion detector                       | 1    | CLIP-4 |
| A11      | RC panel                                 | 1    |        |
| A12*     | Wireless remote control kit              | 1    | MSRF-4 |
| A13*     | Access control system                    | 1    |        |
| 1        | Turnstile cable                          | 1    |        |

\* Available upon request

### 5.3 Control over the turnstile

5.3.1 The turnstile can be operated from the following control devices:

- the remote control panel (the RC panel);
- the wireless remote control;
- the 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 (Appendices A and B).

5.3.2 Connection of the devices stated in Clause 5.3.1 is made with the cable (11) to the corresponding connector blocks *XT1.L* or *XT1.H* of the CLB in accordance with the connection layout (Fig. 5 and Fig. 6).

5.3.3 The RC 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 WRC kit 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 The ACS controller outputs are connected to the contacts *GND*, *Unlock A*, *Stop* and *Unlock B* of the *XT1.L* connector block.

5.3.6 The 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 the CLB connector blocks are given in Fig.5 and on a label located on the inner surface of turnstile cover (2) with LED indication display.

## 5.4 Input and output control signals and their parameters

5.4.1 The CLB microcontroller processes the incoming commands (i.e. traces the status of the contacts *Unlock A*, *Stop*, *Unlock B* and *Fire Alarm*), keeps track of the signals from the optical arm rotation sensors and from the intrusion detector (contact *Detector*) and basing on those signals, generates commands to the control mechanism and to the external devices – indication on the RC PANEL (*Led A*, *Led Stop* and *Led B*), the signal of hub turning in the corresponding direction (*PASS A* and *PASS B*), the signal of the turnstile ready for a current command (*Ready*), the alarm output signal (*Alarm*) and relays the signal of the current status of the intrusion 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*, *Stop* and *Unlock B* 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. 7 and Fig. 8).



### Note:

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

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

5.5.3 Control over the turnstile is effected by input of the control signal to the turnstile at both control modes. The passage waiting time in the pulse control mode is 5 seconds regardless of the control signal length. In the potential control mode the passage waiting time equals the length of the control signal.

5.5.4 The pulse control mode is intended for the turnstile operation from the RC panel, the wireless remote control or the ACS controller, outputs of which support the pulse control mode.

Standard control inputs: *Unlock A*, *Stop* and *Unlock B*.

Special control input: *Fire Alarm*.

See Table 2 for the turnstile operating modes at this control mode. The algorithm of control signals at this mode is stipulated in Appendix A.

maximum commutation voltage..... 42 V DC  
maximum switched current..... 0.25 A  
closed contact resistance ..... no more than 0.15 Ohm

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 (inactive) state, when the power is on, the relay contacts *PASS A*, *PASS B*,

*Ready* and *Detector* are closed (voltage is supplied to the relay coil) and the *Alarm* relay contacts 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 (Fig. 5). The output cascades for PASS A, PASS B, Ready, Det Out and Alarm are the contacts with the following signal characteristics (Fig. 9):

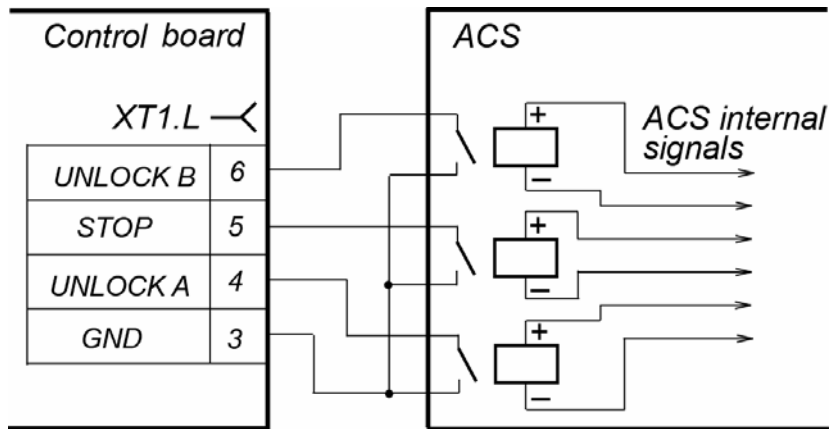


Figure 7. ACS control element — normally open relay contact

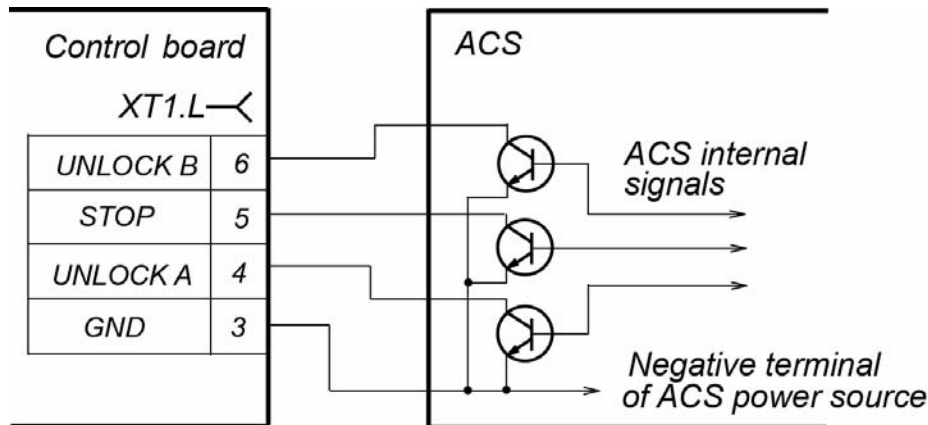


Figure 8. ACS control element — circuit with open-collector output

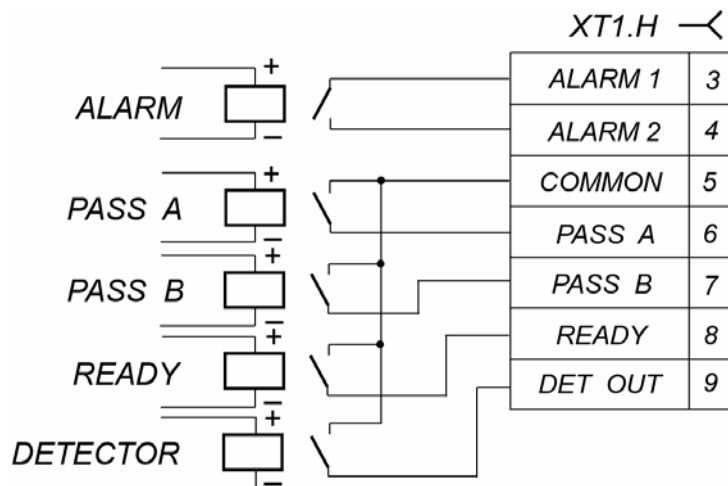


Figure 9. Output cascades for PASS A, PASS B, Ready, Det Out and Alarm

## 5.5 Control modes

5.5.1 There are two modes of the turnstile control - a **pulse control mode** and a **potential control mode**. They determine available **operating modes** of the turnstile (Table 2 and Table 3).

5.5.2 The control mode is set by the jumper on the J1 connector (the J1 connector location is shown on Fig.5 and on a label located on the inner surface of turnstile cover (2): 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.

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 input.

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

Standard control inputs: *Unlock A* and *Unlock B*.

Special control inputs: *Stop* and *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 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 low-level signal duration (the turnstile remains open in the set direction if a low-level signal exists at the set direction input by the moment of passage).

At the low-level signal inputting to the *Stop* input, both directions are locked for the time of the signal duration regardless the signal strength at the inputs *Unlock A* and *Unlock B*. At the low-level signal removing 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 the special Fire Alarm control input.

## 5.6 Operation with RC panel

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

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

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

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

5.6.2.3 The microcontroller traces the status of the optical arm rotation sensors, which become active/passive in a certain consequence at the barrier arm rotation, and counts the time passed since the moment of pushing the RC button corresponding to the permitted passage direction A (B).

5.6.2.4 At the barrier arms turning at 67° the microcontroller forms signal *PASS A(B)* (breaking the contacts *PASS A(B)* and *Common* takes place).

5.6.2.5 After the barrier arms turning at 67° or after 5 seconds since the moment of pushing the RC button corresponding to the permitted passage direction A (B), the

microcontroller generates a command to the control mechanism, which closes the passage direction A (B) (drops down the upper (lower) edge of the key holt).

5.6.2.6 When the barrier arms reset to home position (barrier arms turning at 112°), the microcontroller removes the signal *PASS A(B)* (contacting the *PASS A(B)* and *Common* takes place).

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

## 5.7 Operation with wireless remote control

5.7.1 Control over 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 RC panel.

5.7.3 The wireless remote control operation manual is supplied with that device.

## 5.8 Operation with ACS controller

5.8.1 In the pulse control mode control over the turnstile with an ACS controller is similar to that with the RC panel.

5.8.2 In the potential control mode control over the turnstile with an ACS controller is similar to that with the RC 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 in the potential control mode and in the pulse control mode (as per Clause 5.6.2 the command described in Clause 5.6.2.5 is generated **only** at the moment of releasing the RC button, corresponding to the passage direction A(B). Therefore for arranging single passages in the potential control mode it is recommended to remove the control low-level signal at the beginning of the *PASS* signal for the corresponding direction.

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

## 5.9 Optional external devices connected to the turnstile

5.9.1 The following external 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 (Fig.5 and 6). There should be normally closed contacts on the intrusion detector.



### **Attention!**

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

If the turnstile is locked (the “Always locked” mode / “Both directions closed” mode when both directions are locked, Tables 2 and 3) and a signal comes from the intrusion detector, the “Alarm” signal is generated. The “Alarm” signal is disabled after 5 sec. or by executing of any received command. The signal from the intrusion detector is ignored for the period of authorized unlocking 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 also ignored.

The intrusion detector status signal is constantly transmitted to the *Det Out* and *Common* contacts of the CLB *XT1.H* connector block (Fig. 5).

5.9.3 The emergency unblocking device is connected to the *XT1.L* connector block of the CLB in accordance with the connection layout (Fig. 5 and 6). 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.

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

5.9.3.1 In the pulse control mode, when a low-level signal is removed from the *Fire Alarm* input, both passage directions become open for the whole period of the signal absence. Other control 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 In the potential control mode, when a low-level signal is removed 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 passage 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 are 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 the relay coil), when the “Green arrow” pictogram on the LED indication display, corresponding to the set passage direction, lights, and it is passive, when the “Green arrow” pictogram on the Led display does not light. The response/release of the 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 (Fig. 5). 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 ..... 30V DC;  
 maximum switched voltage ..... 42V AC;  
 maximum switched AC/DC..... 3 A;  
 closed contact resistance ..... no more than 0.15 Ohm.

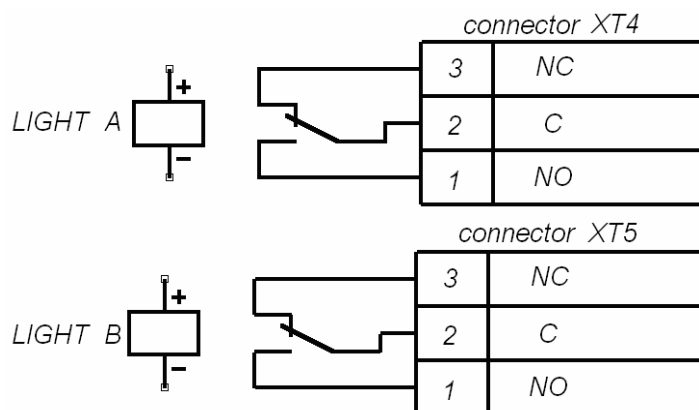


Figure 10. Output cascades for Light A and Light B

## 5.10 Key override control

5.10.1 The key override option allows an operating technician to unlock both directions of the turnstile if there is need to override the access control system or in case of emergency or power failure.

5.10.2 To unblock the turnstile it is necessary to insert the key (14) into the lock (15), turn it at 90° clockwise and then take out. Then 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 of providing information on the following operation contingencies:

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

A special signal "Ready" is generated in each of the above cases.

5.11.2 In case of unauthorized access the "Ready" signal is formed as follows: at 8° arm rotation one of the optical sensors (Fig. 14) responds and the output contacts *Ready* and *Common* get broken (the beginning of the signal). When the barrier arms reset to home position, the both optical sensors become passive and the output contacts *Ready* and *Common* get closed (the finish of the signal).

5.11.3 In case of delay of an authorized passage for more than 30 sec. 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 no less than 8° (i.e. activation of one of the optical sensors), the reset of barrier arms to home position does not happen, the output contacts *Ready* and *Common* break (the beginning of the signal). When the barrier arms reset to home position, the both optical sensors become passive and the output contacts *Ready* and *Common* are closed (finish of the signal).

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

## 6 MARKING AND PACKAGING

The turnstile has the marking on the turnstile housing in the form of a label located on the inner panel of the turnstile housing (to get access to the label unscrew the fixing bolt of the cover, located beneath the hub (3), close to the lock (15), with the S10 socket wrench and carefully lift up the cover with the LED indication display (2) by turning it in direction of the display.

The complete delivery set of the turnstile (Chapter 4.1) is packed in a transportation box, which keeps it undamaged during the transportation and storage.

Box overall dimensions (length × width × height) ..... 114×32×32 cm  
Gross weight ..... max. 35 kg

## 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:

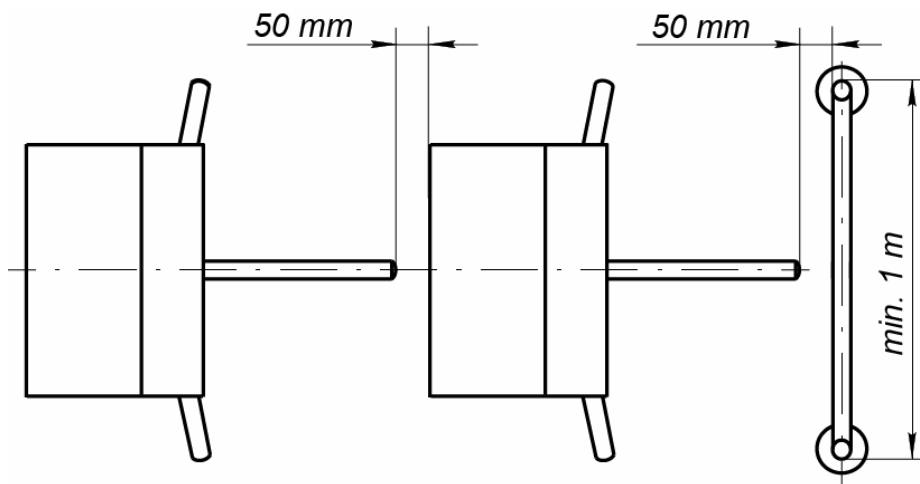
- to mount the turnstile on steady and level concrete (grade 400 or higher, strength group V22.5), stone or similar foundations at least 150 mm thick;
- to level the foundation so that the anchoring points of the turnstile lie in the same plane (to be verified with a builder's level);
- to apply reinforcing elements (300×300×300 mm) for installation on less steady foundation;
- to organize the passage zone according Fig. 11;
- to mark the mounting holes according to Fig. 12;
- to control the vertical position of the turnstile during installation
- to arrange additional emergency exit;
- 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 is effected in the direction of movement;
  - at the barrier arm turning at the angle less than 60° the reset is effected in the counter to 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 create the passage area in such a way that the barrier arms should turn in the direction of movement at the angle no less than  $70^\circ$  (Fig. 11).



**Figure 11. Site preparation. Recommendations**

## 8.2 Installation tools

- 1.2÷1.5 kW hammer drill;
- Ø16mm hard-alloyed drill bits;
- Floor chaser for electric raceway;
- Cross-head screwdriver No.2;
- Flat slot screwdriver No.5 (150mm);
- Flat slot screwdriver No.2
- Horn-type and socket wrenches S17, S13, S10, S8, S7;
- Plumb line and level;
- Hard wire 1.5 m long for cable pulling.
- Measuring tape (2 m);
- 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 Cable length

The maximum allowed length of the remote control panel / wireless remote control / ACS controller cable is no more than 50 m.

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

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

## 8.4 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 not done in compliance with the instructions provided in this Manual.

8.4.1 Unpack the turnstile; check the completeness as per Chapter 3 of the Certificate.

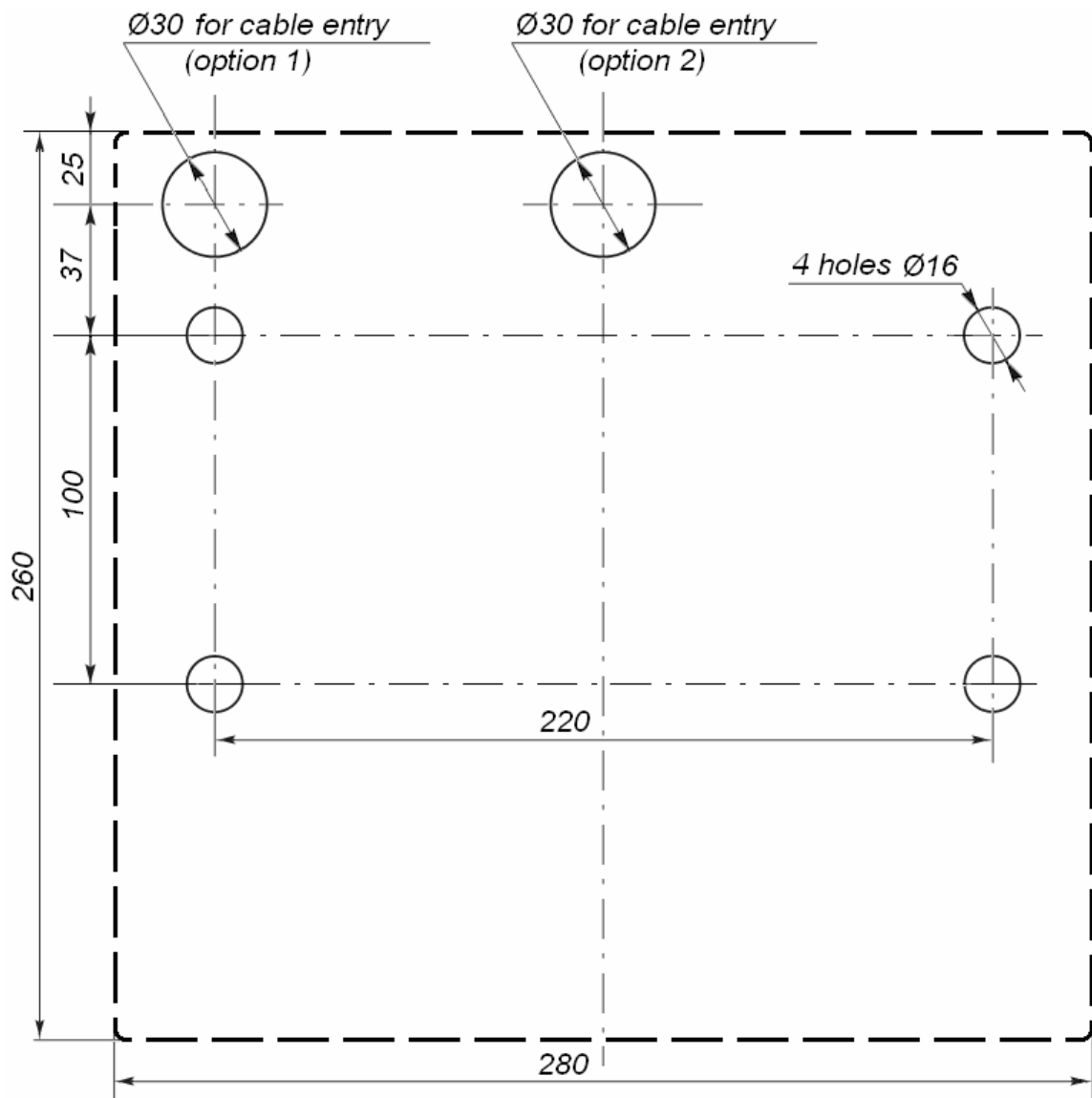
8.4.2 Make the holes for anchor bolt (15) sleeves for the turnstile housing installation (Fig. 12).

8.4.3 Insert sleeves for anchor bolts into the holes so that they do not stick out above the floor surface. Set up the housing and fix it with the M10 bolts using S17 socket wrench. Put the plastic plugs (13) in their places.



### **Note:**

If you lay out cables under the floor surface, make an electric raceway to the cables laying zone of the turnstile housing (option 1 or 2 in Fig. 12). Fix the housing after laying the cables in the electric raceway and inside the turnstile housing.



**Figure 12. Floor anchor position and cable entries for housing installation**

8.4.4 Remove the cover with LED indication display (2) in the following way:

- unscrew the central bolt of the cover with LED indication display (2), located beneath the hub (3) close to the mechanical release lock (15) with the S10 socket wrench;
- pull the bolt out of the turnstile housing hole;
- remove the cover with LED indication display (2), by lifting the cover by its rear edge in the LED indication display direction and taking it out of the hooks;
- carefully disconnect the indication board cable header from the control mechanism connector and place the cover with light display (2) on the level steady surface.

8.4.5 Install the turnstile power supply unit (8) in its place (See power supply unit certificate for installation procedure of the turnstile power supply).

8.4.6 Connect the power cable (9) from the turnstile power supply (8) to the CLB XT3 connector block. Connect the remote control panel (10) cable (11) to the CLB XT1.L connector block. Connect all the other devices cables to the corresponding CLB connector blocks (see Fig. 5 and Fig. 6).

8.4.7 Check serviceability and accuracy of all the electrical connections. Fasten all the cables in two points to the hole in the turnstile housing horizontal plane and to the hole in the mechanical release lock inside the turnstile housing, using hook and loop cable ties. Additionally, fasten the remote indicator cables to the self-adhesive cable tie mount, located on the sidewall of the turnstile housing. Connect the indication board cable header to the control mechanism connector and mount the cover with LED indication display (2) back into its place in the reverse order. When the cover with LED indication display (2) mounting is carried out correctly it does not need much effort.

8.4.8 To mount the barrier arms into the run position remove the cover from the hub (3) after unscrewing the screw. Unscrew the bolt (6), on the barrier arm (5). Fit the barrier arm (5) into the mounting hole on the hub (3) and fasten it with the bolt (6). Put a spring washer under the bolt head. The bolts must be tightened so as to ensure reliable fixation of the barrier arms without a gap.

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

Put the cover onto the hub (12) and fix it with the screw.

8.4.9 Run a test switch on of the turnstile as specified in Chapter 10. Check operation of the intrusion detector and 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.

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

## 9 OPERATION INSTRUCTIONS

### 9.1 Power-up



#### **WARNING!**

Observe general electrical safety requirements during the turnstile operation.

Check the accuracy of all the connections and the power supply cable operability (see Clause 8.4.6).

Connect the AC power cable (7) of the turnstile power supply (8) to the AC outlet with the voltage and frequency rating according to the certificate for power supply.



#### **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.

Switch on the turnstile power supply (8), At the same time the “Red cross” pictogram on the LED indication display of the turnstile housing and the indicator above the **STOP** button on the RC panel (10) light up.



#### **Attention! It is prohibited:**

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

### 9.2 Turnstile operating modes in pulse control mode

See Table 2. for the operating modes set from the RC panel and for the corresponding indication. Please note the following:

- 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;
- 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.

At the turnstile power supply switching-on the reset state of the turnstile is “Closed” (the mechanical release lock (15) is locked with the key (14) at that).

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



**Table 2. Pulse control mode (the jumper is set on the J1 connector)**

| N | The turnstile operating modes  | Actions to do  | Indication on the RC panel   | Indication on the LED display                                    | Turnstile status  |
|---|--|--|--|--|---|
| 1 | Always locked (Locked for entry and exit)  | Press the <b>STOP</b> button on the RC panel   | The red indicator above the <b>STOP</b> button is on                       | The "Red cross" pictogram is on                                  | The turnstile is locked   |
| 2 | Single passage in the set direction (open for passage of one person in the chosen direction)   | Press the button on the RC panel 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 is on | When the passage is completed, the turnstile is locked  |
| 3 | Bi-directional single passage (open in both directions for 'one-by-one' passage)   | Press both the left and right side buttons on the RC panel simultaneously                                | The two green indicators (left and right) are on                           | The two "Green arrow" pictograms (left and right) are on         | The turnstile is locked in the direction of completed passage   |
| 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 is 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 passage of one person 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 locked in the single passage direction |
| 6 | Always free (open for entry and exit)  | Press all the 3 buttons on the RC panel simultaneously   | The two green indicators (left and right) are on                           | The two "Green arrow" pictograms (left and right) are on         | The turnstile remains open  |

**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 *XT1.L* connector block relatively to the contact *GND*.

### 9.3 Turnstile operating modes in potential control mode

See Table 3 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.

**Table 3. Potential control mode (the jumper is taken off from the J1 connector)**

| No | The turnstile operating modes  | Levels on the contacts should be provided   | Indication on the RC panel   | Indication on the led display                                    | Turnstile status   |
|----|--|---|--|--|--|
| 1  | Both directions are locked (the turnstile is locked both for entry and exit)                   | The high level — 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 “Red cross” pictogram is on                                  | The turnstile is locked  |
| 2  | One of the passage directions is open (the turnstile is open for passage in the set direction) | 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 is on | The “Green arrow” pictogram, showing the passage direction is on | 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 |
| 3  | Both passage directions are open (the turnstile is open for passage in both directions)        | The low levels — are on the contacts corresponding to the both directions, the high level — 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 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 |

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

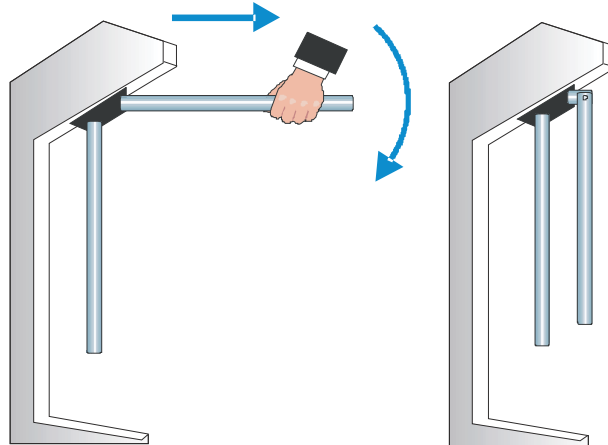
High level — contacts of the output relay are broken or the output transistor is closed;

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 and other emergencies, the additional emergency exit should be provided.

The additional emergency exit can be provided by the turnstiles equipped with anti-panic folding arms. Without any special keys or tools the folding arm allows to clear the passageway in emergency situations — just pull it out towards its axis direction, until the rotation mechanism is free, and then turn down (Fig. 13).



**Figure 13. Anti-panic folding arms**

To provide unobstructed and fast escape routes in emergency cases through the turnstile, the key override control is used. The sequence of actions is described in Clause 5.10 of the Manual.

## 9.5 Troubleshooting

Possible faults, which can be cleared by the users themselves, are listed in Table 4.

**Table 4. 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 panel                 | 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 panel | 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 |

All other faults shall be cleared by the Manufacturer or his representatives only.

## 10 MAINTENANCE

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

Remove the cover with LED indication display (2) from the turnstile housing in the following way:

- unscrew the central bolt of the cover with light display (2), located beneath the hub (3), close to the mechanical release lock (15), with the S10 socket wrench;
- pull the bolt out of the turnstile housing hole;
- remove the cover with LED display (2), by lifting the cover by its rear edge in the light display direction and taking it out of the hooks;
- carefully disconnect the indication board cable header from the control device connector and place the cover (2) on the level steady surface.

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

Remove dust from the arm rotation sensor disc, located in the spacing of the arm rotation optical sensors, with alcohol-gasoline blend applied with a cloth. Avoid the ingress of dust on the operational spacing of the both arm rotation optical 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 lock (15) through the keyhole



### **Note!**

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

Check the reliability of the cable connections to the CLB connector blocks and if necessary tighten the cable fixing screws.

Connect the cable header of the indication board to the control mechanism connector and mount the cover with LED display (2) back into its place in the reverse order to the dismantling. When the cover (2) mounting is carried out correctly it does not need much effort.

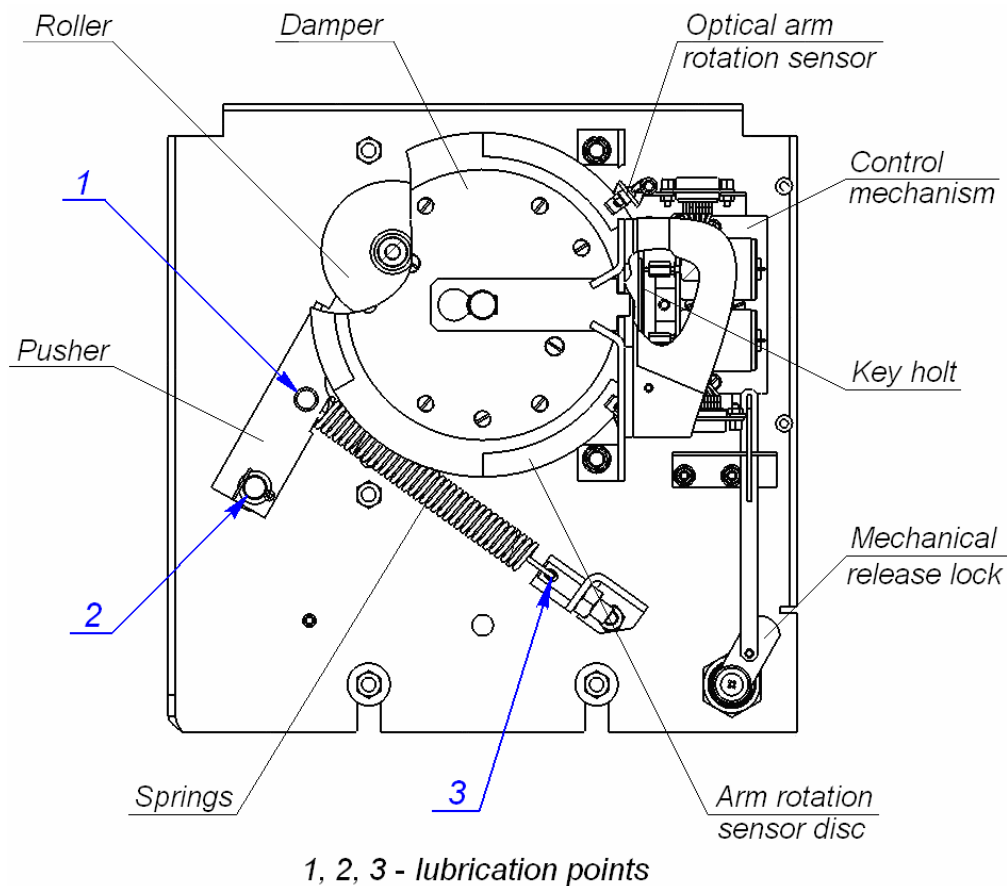
Check the reliability of the barrier arm (5) fastening and, if necessary, tighten the bolts (6) of the barrier arms. To tighten the bolts:

- remove the cover from the hub (3), of the turnstile housing, unscrewing the screw;
- tighten the bolts (6) of the barrier arms (5) with the S13 socket wrench;
- put the cover onto the hub (3), and fix it with the screw.

Check the reliability of the turnstile housing fastening to the floor and if necessary, tighten the anchor bolts (12) with S17 socket wrench.

To do that:

- remove plastic plugs (13) out of the holes in the turnstile housing base;
- tighten the anchor bolts (12);
- put the plastic plugs (13) into their places.



**Figure 14. Location of the interior components of the turnstile housing (CLB is not shown)**

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

## 11 TRANSPORTATION AND STORAGE

The turnstile in the original package should be transported in closed freight containers or in other closed type cargo transport units. During storage and transportation the boxes can be stacked no more than 4 layers high.

The storage of the turnstile is allowed indoors at ambient temperature from  $-40^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  and at relative air humidity up to 80% at  $+15^{\circ}\text{C}$ . The environment should be free of acid and alkali vapours and gases that cause corrosion.

After transportation or storage at temperatures below zero or at high air humidity, prior to the installation the turnstile must be kept in the original package for no less than 24 hours indoors at room temperature.

## 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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