



Electromechanical Box Tripod Turnstile

TTD-03.2

OPERATION MANUAL



CE EAC



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TTD-03.2

Operation Manual

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Dear customers!

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

The operation manual for the TTD-03.2 electromechanical box tripod turnstile (hereinafter referred to as the “turnstile”) contains data that is necessary for the fullest 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-panel – remote control panel,
CLB – control logic board,
WRC – wireless remote control/

1 APPLICATION

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

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

2 OPERATION CONDITIONS

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

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

3 TECHNICAL SPECIFICATIONS

Turnstile input DC voltage	12±1.8 V
Turnstile power consumption	max. 8.5 W
Consumption current	max. 0.7 A
Throughput of the turnstile in the single passage mode	30 persons/min
Throughput of the turnstile in the free passage mode	60 persons/min
Passageway width	500 mm
Barrier arm rotation force	max. 3.5 kgf
RC panel cable length	min. 6.6* m
Ingress Protection Rating	IP41 (EN 60529)
Electric shock protection class	III (IEC 61140)
Mean time to failure	min. 4,000,000
Mean lifetime	8 years
Overall dimensions of the turnstile with established barrier arms (L × W × H) ...	980×664×1010 mm
Net weight of the turnstile (with a top cover installed)	max. 60 kg

4 DELIVERY SET**4.1 Standard delivery set****Basic equipment:**

Turnstile housing with cover	1
Barrier arm	3

**Note:**

Type of barrier arms is chosen by the buyer when ordering turnstile and specified in **TTD-03.2 Certificate**. Type of manufactured barrier arms: **Standard** and **Anti-panic drop** arms.

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

Turnstile housing cover key	2
Mechanical release key	2
RC panel	1
Installation tools:	
Self-adhesive wires retainer	2
Nylon cable tie 100 mm	2
Operational documentation:	
Certificate	1
Operation manual	1

4.2 Optional equipment supplied on request

SORMAT PFG IR M10-15 anchor bolts	4
Passive infrared sensor of intrusion detector	1
Siren (for alerts on unauthorized entry attempts)	1
WRC kit	1



Note:

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

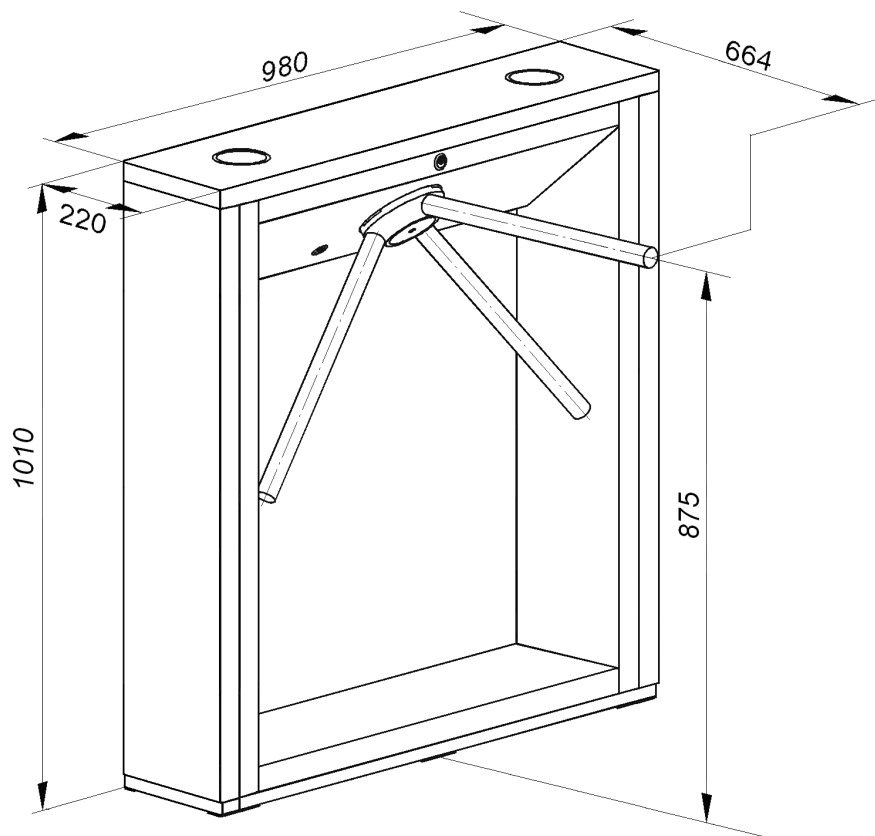


Fig. 1. TTD-03.2 box tripod turnstile. Overall dimensions

5 PRODUCT DESCRIPTION

5.1 Main features

- The turnstile can be operated both autonomously with the RC panel or WRC and with an ACS.
- The turnstile housing is supplied with the safe voltage – not more than 14 V (in case of the remote indicators application – not more than 42 V).
- The turnstile has low power consumption – not more than 8.5 W.
- At the power supply switching off the turnstile remains in the set position in both directions (closed, if the particular direction was closed at the moment of the power switching off, or open, if it was open at the moment of the power switching off).
- The turnstile ensures automatic reset of barrier arms to home position after each passage.
- The smoothness of the turnstile operation is ensured by a damper.

- The arm rotation optical sensors are built in the turnstile housing to ensure accurate count inputs to ACS.
- The mechanical release lock is built in the turnstile housing to ensure the turnstile unblocking with a key in emergency cases (free rotation of barrier arms).
- Several lined-up turnstiles form passageways without installation of extra guide barriers.
- Option for installation of an intrusion detector and siren to control the passageway is provided for.
- There are two variants of the turnstile control – pulse and potential.
- The turnstile has galvanic decoupling of outputs.
- The turnstile has outputs for connection of the remote indicators.
- The turnstile has an input for connection of an emergency unblocking device (for example, a fire alarm unit).

5.2 Design

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

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

5.2.1 Turnstile housing

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

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

Inside the turnstile housing there is a resetting mechanism consisting of a resetting device (a pusher, springs and roller), a control mechanism with arm rotation optical sensors and a locking device; and a mechanical release lock (7). Besides, on the resetting mechanism there is a rotation mechanism consisting of a damper, rotation sensor disk and a hub (16) with three barrier arms (6).

The interior components of the housing can be accessed through the removable top cover (1). During operation the turnstile cover is locked with the turnstile housing cover lock (9).

5.2.2 Indication module

Two indication modules (5) with pictograms are located on the turnstile housing cover (1) to indicate the turnstile status. The indication is made in the form of pictograms: "red cross" - indication of prohibited passage in this direction, and "green arrow" - indication of permission to pass in this direction. Indication modules are connected with a cable to connector "X2" on the turnstile control mechanism.

5.2.3 RC panel

The RC panel is designed in form of a small desktop device with a shockproof ABS plastic case and it is intended for setting and indication of the operating modes when the turnstile is operated manually. The RC panel overall view is shown in Fig. 3.

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

The RC-panel is connected to the CLB with a multi-thread floppy tape (13) via the "XT1.L" connector block (see Fig. 4).

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

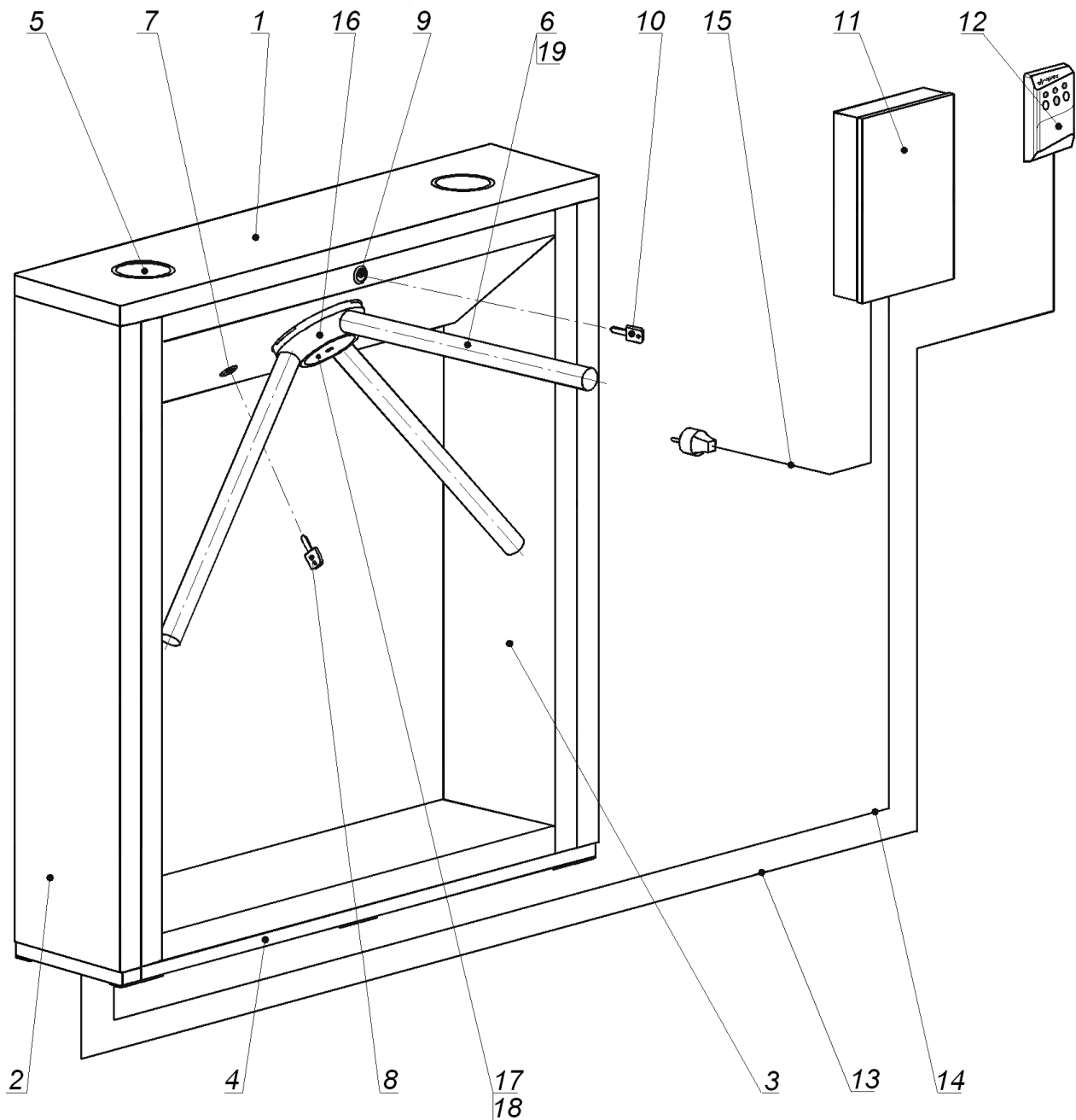


Fig. 2. TTD-03.2 box tripod turnstile. Overall view

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

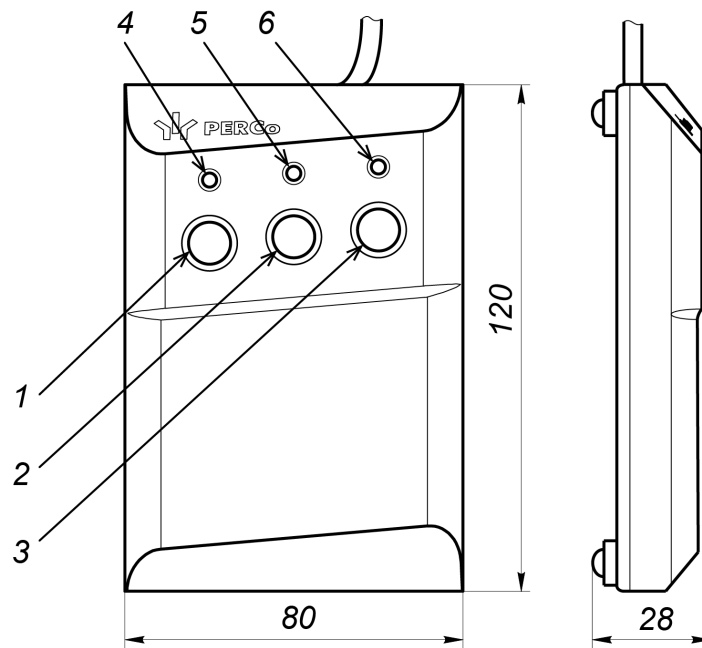


Fig. 3 RC-panel

- 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 board

Turnstile control board (see Fig. 4) located inside the turnstile housing under the left-side outer panel (2). It connects to: RC-panel, ACS controller outputs, WRC device, intrusion detector, emergency unlocking device Fire Alarm. External devices are connected in accordance with the turnstile electrical connection layout (see Fig.13).

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").

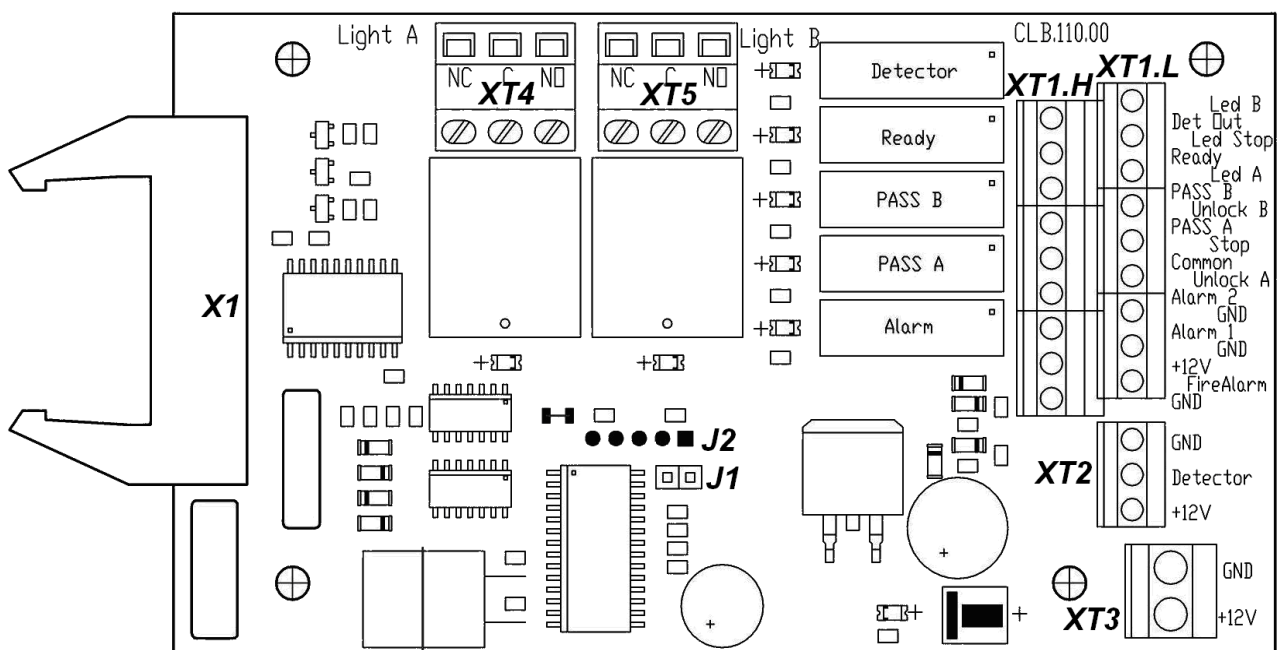


Fig. 4. Control Logic Board (CLB)

The CLB (see Fig. 3) contains:

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

5.2.5 Input and output signals and their parameters when operating the turnstile

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

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



Note:

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

The control element provides for the following signal characteristics:

Relay contact as the control element:

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

Circuit with open-collector output as the control element:

voltage at closed contact (low - level signal at the CLB input) max 0.8V

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

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

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

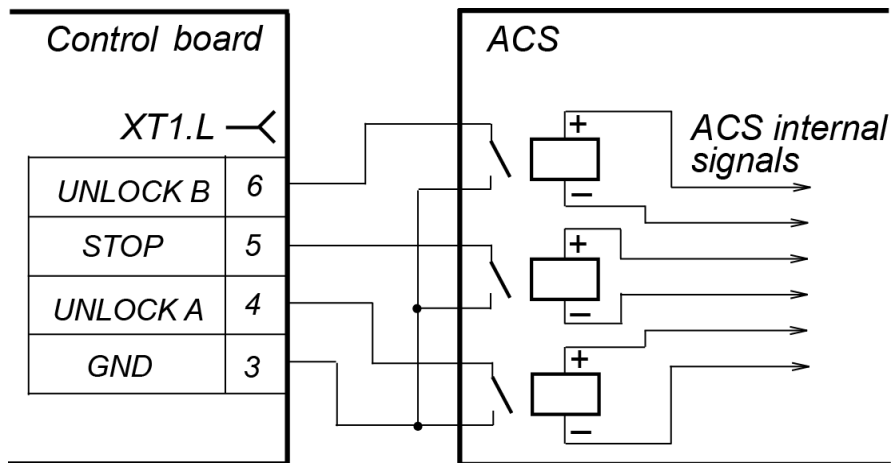


Fig. 5. Control elements of an external device a normally open relay contact

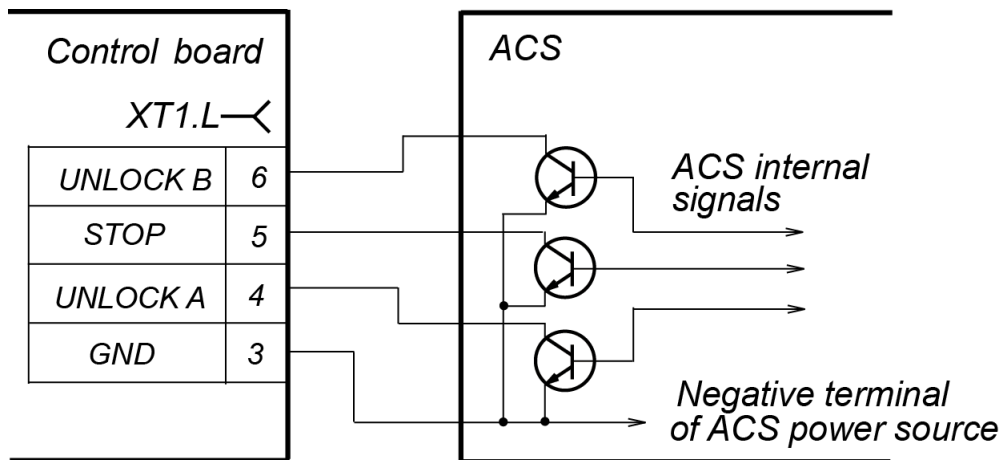


Fig. 6. ACS control element – circuit with open-collector output

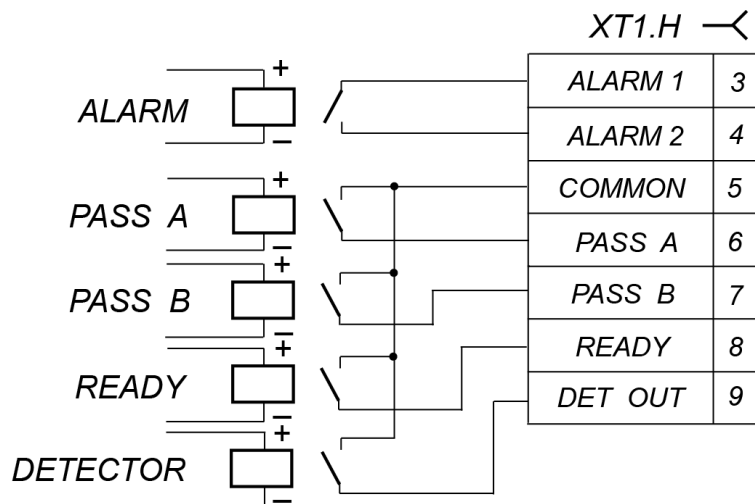


Fig. 7. Output cascades for PASS A, PASS B, Ready, Det Out and Alarm

5.2.6 Control modes of the turnstile

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

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

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

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

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

Special control input: "Fire Alarm".

See Table 3 for the turnstile operating modes at this control mode. The algorithm of control signals at this mode is stipulated in Appendix A.

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

See Clause 5.9 for the turnstile operation at special ("Fire Alarm") control output.

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

Standard control inputs: "Unlock A" and "Unlock B"

Special control inputs: "Stop" and "Fire Alarm".

See Table 4 for the turnstile operating modes at this control mode. The algorithm of control signals at this mode is stipulated in Appendix B.

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

See Clause 5.9 for the turnstile operation at special ("Fire Alarm") control output.

5.3 Control devices of the turnstile

Control of the turnstile can be achieved with the help of the following devices: RC-panel, WRC, ACS controller.

The above devices can be connected to the turnstile as follows: all together simultaneously; one of device separately; in any combination with each other.



Note:

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

Connection of the stipulated in Clause 5.3.1 devices is made with cable (6) to the corresponding connectors "XT1.L" or "XT1.H" of the CLB in accordance with the connection layout (Fig.3 and 4).

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.

The WRC is connected to the contacts "GND", "Unlock A", "Stop" and "Unlock B" of the "XT1.L" connector. Power supply of the WRC is connected to the contact "+12V" of the "XT1.H" connector.

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

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

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

5.3.1 Operation with the RC panel

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

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

1. When the button corresponding to the A (B) passage direction is pressed on the RC-panel, contacting the *Unlock A(B)* and the *GND* occurs (i.e. forming of the low-level signal on the contact *Unlock A(B)* relatively to the contact *GND*).
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).
3. The microcontroller traces the status of the optic rotation sensors, which become active/passive in a certain sequence at the barrier arm rotation, and counts the time passed since the moment of pushing the RC-panel button corresponding to the permitted passage direction A (B).
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. After the barrier arms turning at 67° or after 5 seconds since the moment of pushing the RC-panel 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 the upper (lower) edge of the key holt).
6. When the barrier arms reset to home position (barrier arms turning at 112°), the microcontroller removes the signal “*PASS A (B)*” (the “*PASS A (B)*” and “*Common*” contacting)

The “Always free” operating mode particularity: in this mode the command described in point 5, is not generated and the set passage direction remains open.

5.3.2 Operation with the WRC

Operation of the turnstile with the WRC is similar to that with the RC-panel.

The buttons on the WRC tag act the same way as those on the RC-panel.

The operation manual for the WRC is supplied within the delivery set of that item.

5.3.3 Operation with an ACS controller

At the pulse control mode control over the turnstile via an ACS controller is similar to that with the RC-panel.

At the potential control mode control over the turnstile via an ACS controller is similar to that with the RC-panel and lies in forming of a low-level signal on the contacts *Stop*, *Unlock A* and *Unlock B* relatively to the contact *GND*.

The difference in the operation logic at the potential control mode and at the pulse control mode (the command on the closing of the passage is generated only at the moment of releasing the RC button, corresponding to the passage direction A(B). Therefore, for arranging single passages at 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.

The passage through the turnstile in the A (B) direction is registered by a status of the outputs *PASS A(B)* and *Common*.

5.4 Additional devices connectable to the turnstile

The following additional devices can be connected to the turnstile:

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

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

**Attention!**

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

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

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

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

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

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

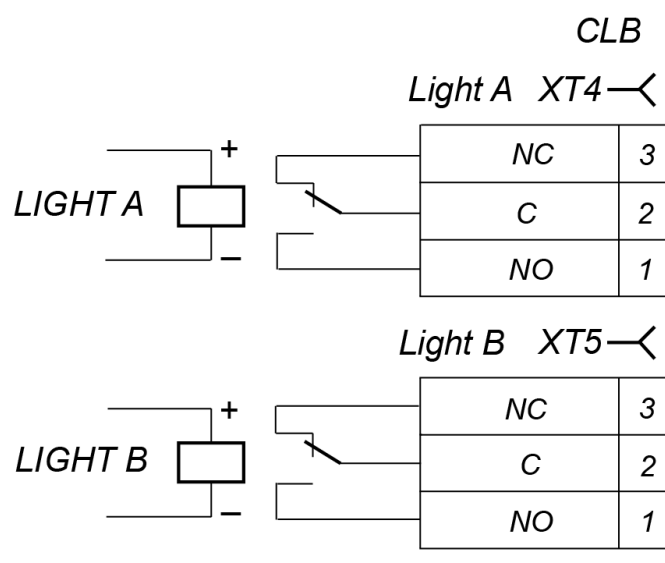


Fig. 8. Output cascades for Light A and Light B

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

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

5.5 Operation contingencies and response

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

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

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

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

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

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

6 MARKING AND PACKAGING

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

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

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

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

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

7 SAFETY REQUIREMENTS

7.1 Installation safety requirements

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



Caution!

- All cables must be connected with power off (including AC-main power).
- 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 (400×400×400 mm) for installation on less steady foundation;
- to organize the passage zone according Fig. 9;
- to mark the mounting holes according to Fig. 10;
- to control the vertical position of the turnstile during installation with a plumb line;
- to carry out installation by means of not less than two people which possess qualifications of skilled electrician and installer.



Note:

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

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

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

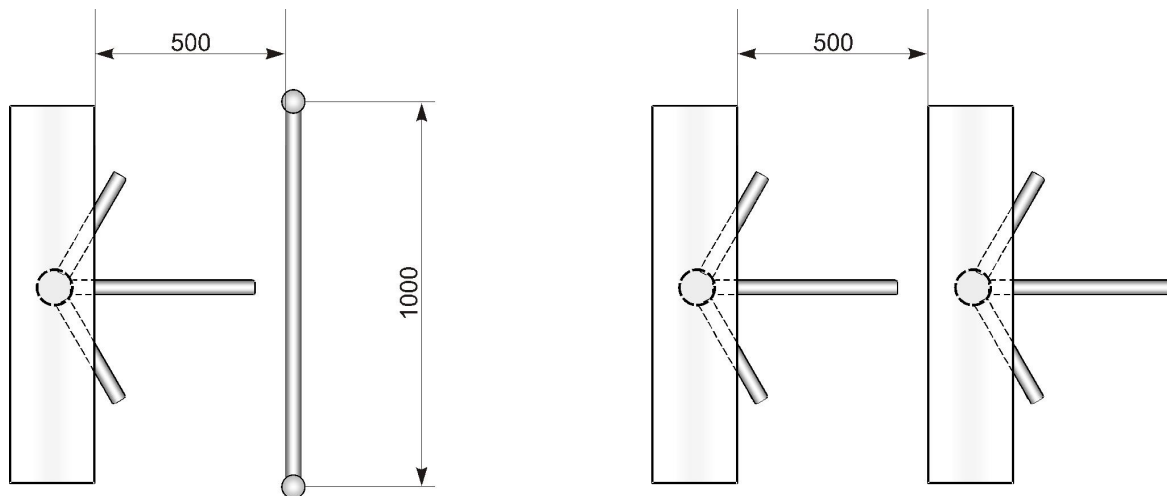


Fig. 9. Recommendations on creation of the passage area

8.2 Tools and equipment required for installation

Use the following tools for the installation work:

- 1.2÷1.5kW hammer drill;
- hard-alloy drill bits for anchor bolts sleeves, dia 16 mm;
- Flat slot screwdriver No.2, No.5 (150 mm);
- Phillips head screwdriver №2;
- Allen key S=6, S=8;
- Horn-type and socket wrenches S17, S13, S10, S8, S7;
- Plumb-line and level;
- Bail for electric raceway;
- Slide caliper;
- Measuring tape 2m.

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 RC panel / WRC / ACS controller cable is not more than 50 m. The maximum allowed length of the turnstile power supply cable depends on the cable cross-section and should be:

- for cable with 0.2 mm² cross-section (AWG 24) max 10 m
- for cable with 0.75 mm² cross-section (AWG 18)max 25 m
- for cable with 1.5 mm² cross-section (AWG 16)max 50 m

8.4 Installation procedure



Attention!

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

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

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

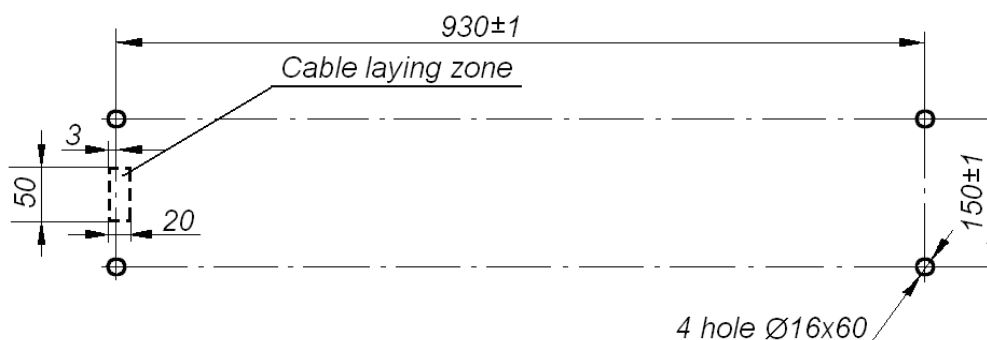
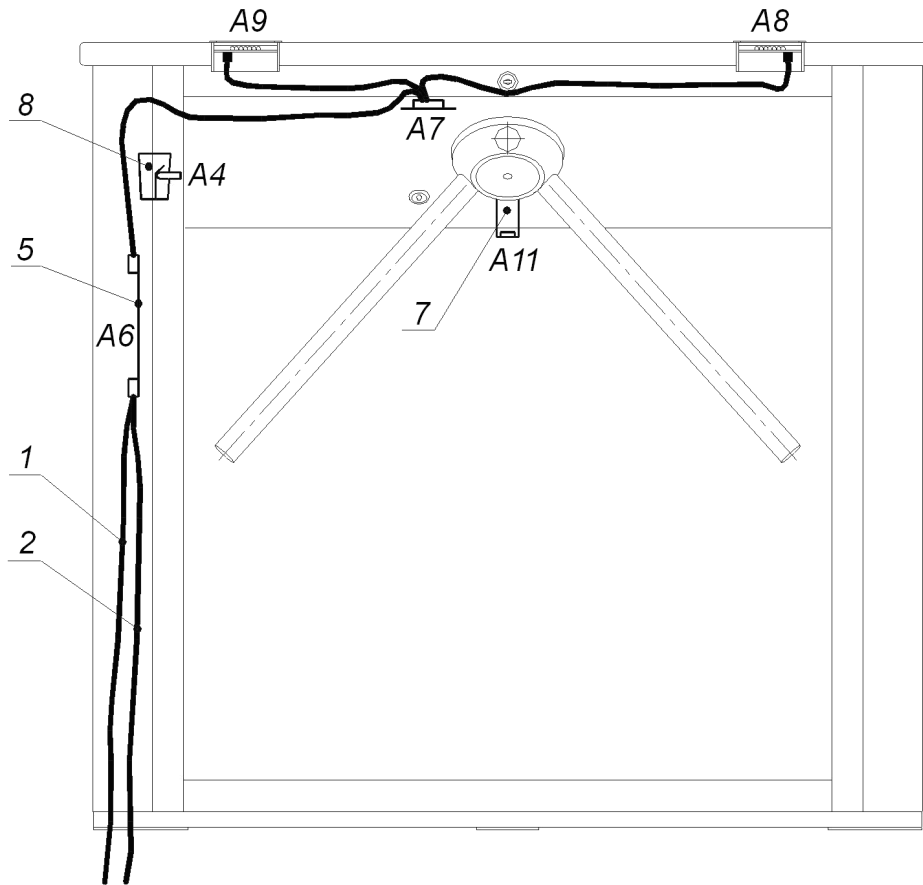


Fig. 10. Hole pattern for the turnstile housing mounting

3. If you lay the cables under the floor surface, prepare the electric raceway to the cables laying zone of the turnstile housing (see Fig. 10).
4. Insert the sleeves for the anchor bolts into the holes so that they do not stick out above the floor surface.
5. Mount the turnstile housing and fix it with the M10 anchor bolts.
6. To get an access to the mounting holes of the turnstile housing base (4) remove the turnstile housing cover (1) and both outer panels (2). Thus, you get an access to the mounting holes of the turnstile housing base (4). Fix the turnstile housing after laying the cables in the electric raceway and inside the turnstile housing.
7. The cables layout inside the turnstile housing is shown in Fig. 11.
8. Install the turnstile power supply (11) in its place (installation procedure for the turnstile power supply is given in the power supply certificate).
9. Connect the power cable (14) of the turnstile power supply (11) to the CLB "XT3" connector block. Connect the RC panel (12) cable (13) to the CLB "XT1.L" connector block. Connect all the other devices' cables to the corresponding CLB connector blocks (see Fig. 3 and 4).
10. When you connect the emergency unblocking device, remove the jumper wire set between the contacts Fire Alarm and GND of the CLB "XT1.L" (In) connector block.
11. If the turnstile is used in the potential mode, remove the jumper from the J1 connector (Fig. 3).
12. Check serviceability and accuracy of all the electrical connections. Fasten all the cables using self-adhesive wires retainers and fixed brace rods included in the delivery set. After all the cable connections and the turnstile housing fixing to the floor put the outer panels (2) and the turnstile housing cover (1) back into their places in the reverse order to the dismantling procedure.
13. To mount the turnstile housing cover (1) install it so that the middle strip on its under side is placed on the side of turnstile housing cover lock (9). Connect the indication cables mounted inside the turnstile housing to the indication module (5) connectors, after carefully install the turnstile housing

cover (1) on the frame (3). At that the cross angle sections on the turnstile housing cover (1) should be maximum close to relative plug-in guides in the frame (3). Adjust the turnstile housing cover (1) by moving it from right to left against stop and after fix it by the turnstile housing cover lock (9). The turnstile housing cover lock (9) is closed without key by pushing it.

14. To mount the barrier arms into the run position, remove the cover (17) from the hub (16) unscrewing the screw (18). Unscrew the fixing bolt (19) on the barrier arm (6). Fit the barrier arm into the mounting hole on the hub (16) and fasten it with the bolt (19). Put a spring washer under the bolt head. The bolts must be tightened so as to provide reliable fixation of the barrier arms without a gap.
15. Repeat the above-described procedure for fitting up the remaining barrier arms.
16. Put the cover (17) onto the hub (16) and fix it with the screw (18).



Turnstile housing without cover

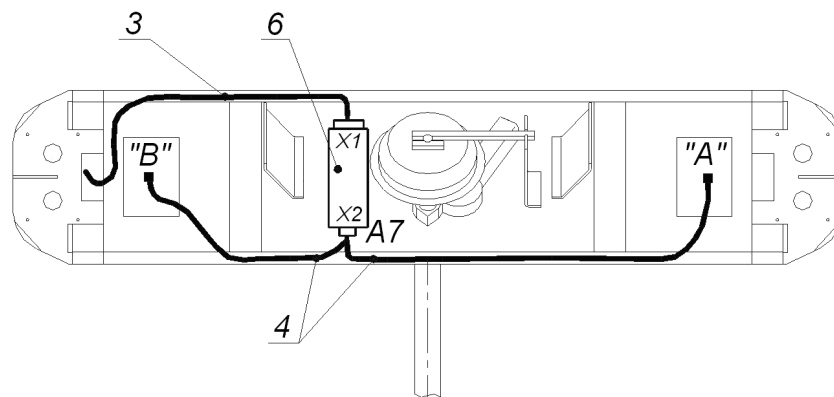


Fig. 11. Cables layout inside the turnstile housing

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

17. Control the turnstile housing and barrier arms fastening, check serviceability and accuracy of all the electrical connections.
18. Run a test switching-on of the turnstile as specified in Chapter 10. Check operation of the intrusion detector and the siren (if included in the delivery set).
19. 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)).
20. 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 ± 0.5 sec.

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

8.5 Connection layout

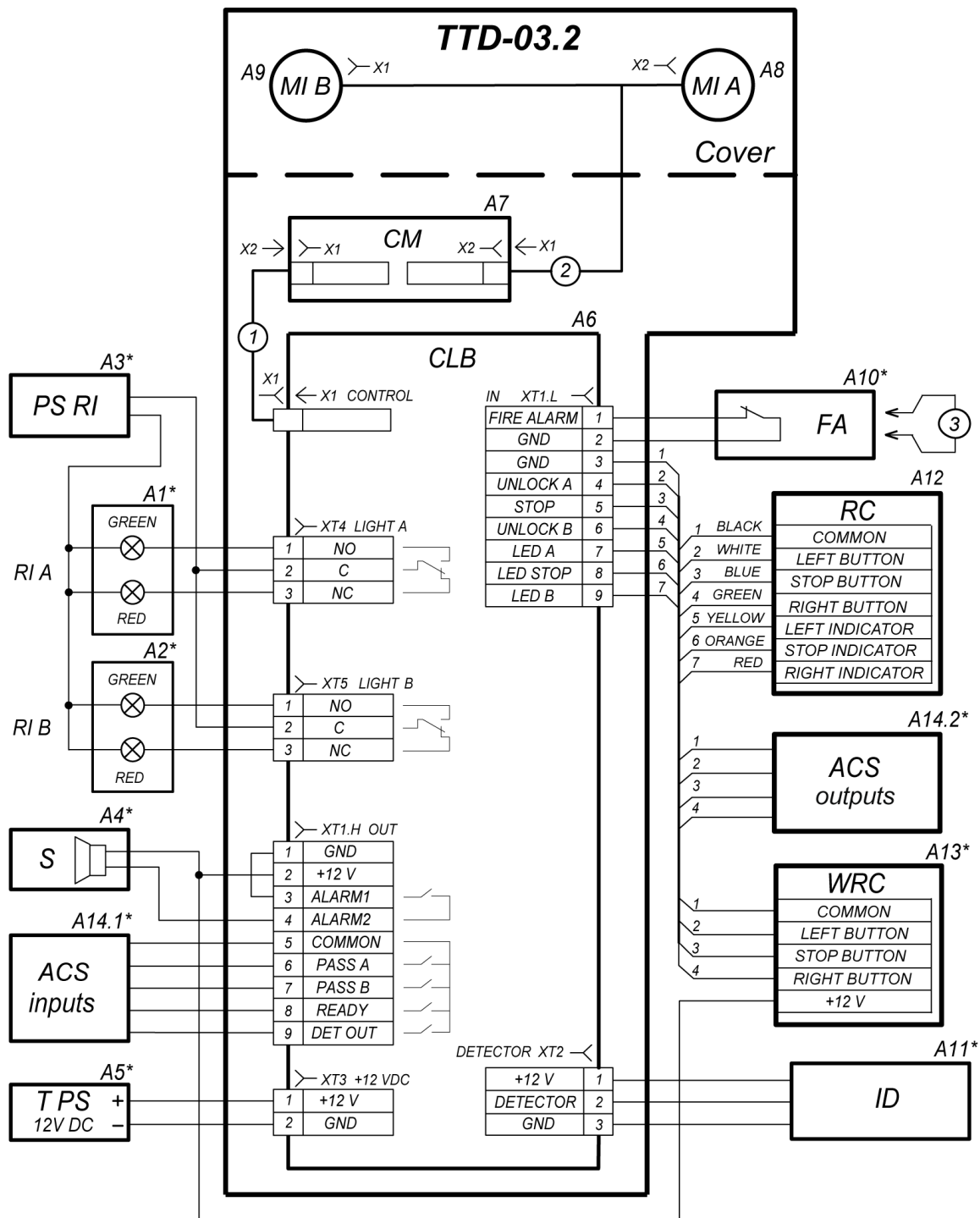


Fig. 12. Connection layout

Table 1. Legend to Fig. 4.

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

* Supplied on request

9 OPERATION INSTRUCTIONS

Observe general electrical safety requirements during the turnstile operation.



It is prohibited:

- to connect the turnstile power supply to the mains with the voltage and frequency rating other than specified in the power supply certificate
- to use abrasive or chemically active substances for cleaning of the external surfaces of the turnstile;
- to move through the turnstile passage area any objects with dimensions exceeding the width of the passageway;
- to jerk or hit barrier arms, turnstile housing and indication modules so as to prevent their mechanical deformation.

9.1 Power-up

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

9.2 Operating modes of the turnstile at pulse control mode

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

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



Note:

Pressing the button on the 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".

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

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

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

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

9.3 Operating modes of the turnstile at potential control mode

See Table 4 for the operating modes set with the 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 connector J1)

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



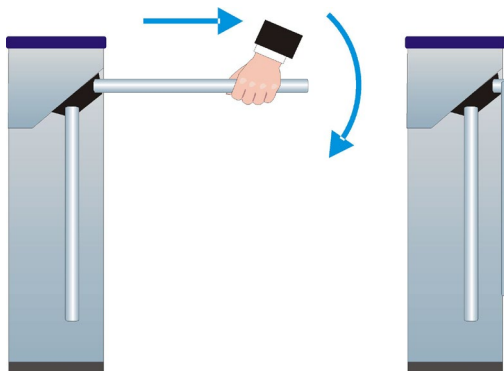
For the ACS outputs note the following:

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

9.4 Actions in emergency

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

The additional emergency exit can be provided by the turnstiles equipped with anti - panic drop arms. The anti - panic drop arms allow to set the passageway free without any special keys or tools. To drop the anti - panic arm down just pull out the arm towards its axis direction, until the rotation mechanism becomes free, and then turn the arm down (see Fig. 12).

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

When using the standard barrier arms, it is possible to provide free passage through the turnstile by unblocking it with the mechanical release key.

9.5 Mechanical unblocking of the turnstile

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

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

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.

9.6 Troubleshooting

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

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 RC panel / WRC kit / ACS controller cable serviceability and reliability of its connection to the CLB "XT1.L" and "XT1.H" connector blocks

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

10 MAINTENANCE

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

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

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

Check visually the resetting device (the pusher, the springs and the roller), the arm rotation optical sensors and the damper (see Fig. 13).

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

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

- four bushes of the resetting device (two — on the rotation axis of the pusher, two — on the fastening axis of the springs) (see Fig. 13);
- holes in the fastening parts of the springs;

- lock cylinder of the mechanical release lock (7) through the keyhole;
- lock cylinder of the turnstile housing cover lock (9) through the keyhole.



Attention!

Avoid the ingress of lubrication on the rotation sensors disk and the pusher's roller surfaces.

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

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

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

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

At the end of the maintenance works:

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

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

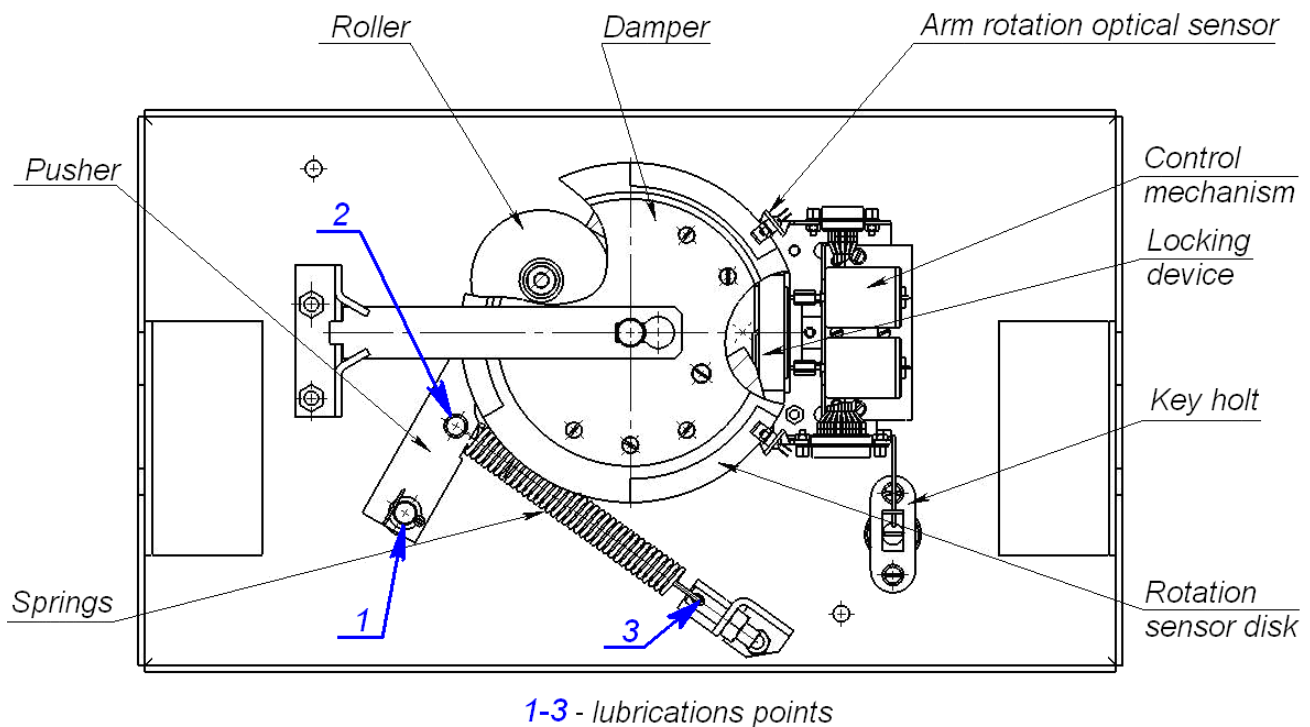


Fig. 14. Location of the interior components of the turnstile housing

11 TRANSPORTATION AND STORAGE

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

During storage and transportation, the boxes stacked is not allowed. The indoor storage of the turnstile is allowed at ambient temperature between -40°C and $+40^{\circ}\text{C}$ and at relative air humidity up to 98% at $+25^{\circ}\text{C}$.

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

Appendix A Control signal algorithm at pulse control mode

The 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** 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

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 for one passage in each direction)

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 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 B Control signal algorithm at potential control mode

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*. The both passage directions lock 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 till 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 till 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*.

The both directions open at this command till the low-level signal removal from one of the contacts A (B) or until the command "Both directions locked" is received.

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