

Electromechanical Tripod Turnstile



T-5 Assembly and Operation Manual



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Dear Customer,

Thank you for purchasing the PERCo T-5 turnstile . Please follow the instructions given in the Manual carefully, and this quality product will provide many years of trouble-free use.

The assembly and operation manual (the Manual) for the **T-5** electromechanical tripod turnstile (hereinafter referred to as the “**turnstile**”) contains data on transportation, storage, installation, operation and maintenance of the product.

The installation and maintenance should be carried out with strict accordance to this Manual.

Abbreviations used in the Manual:

- ACS — access control system;
- RC — remote control panel.

1. APPLICATION

The turnstile is designed for managing pedestrian flows at entrance points 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 500 people working in the same shift, or on the basis of maximum working load 30 persons/min (ref. Section 3 for information on the throughput capacity of the turnstile).

2. OPERATION CONDITIONS

The turnstile, in accordance with the resistance to environmental exposure, is compliant with GOST 15150-69, category NF 4 (operation in premises with climate control).

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

3. TECHNICAL SPECIFICATIONS

Operational voltage.....	12±1.8V DC
Turnstile power consumption.....	no more than 8.5W
Turnstile overall dimensions (L x W x H).....	280x260x1025 mm
RC overall dimensions (L x W x H).....	127x84x30 mm
Passageway width	600 mm
Net weight of the turnstile.....	no more than 35 kg
Net weight of the RC.....	no more than 0.35 kg
RC cable length.....	no less than 6.6 m
Barrier arm rotation force.....	no more than 3.5 kgf
Throughput capacity in the free passage mode	60 persons/min.
Throughput capacity in the single passage mode.....	30 persons/min.
Mean time to failure.....	no less than 1,500,000 passages
Mean lifetime.....	8 years
Electric shock protection class.....	III, according to GOST R IEC 335-1-94

4. DELIVERY SET**4.1 Standard delivery set:**

Turnstile housing.....	1
Barrier arm.....	3
RC (remote control panel).....	1
Mechanical release key.....	2

Plug.....	5
Fixing tape, 100 mm long.....	5
Overpack box.....	1
Certificate.....	1
Operation manual.....	1

4.2 Optional equipment (available upon request):

Wireless remote control kit (a receiver and 2 transmitters with operation range of up to 40m).....	1
Siren (for alerts on unauthorized entry attempts).....	1
Intrusion detector.....	1
Turnstile power supply 12V DC@1A	1

5. BRIEF DESCRIPTION

5.1 Main features

5.1.1 The turnstile can be operated both as a standalone unit from the remote control panel (RC) or wireless remote control and as part of an access control system via an ACS controller.

5.1.2 The turnstile is supplied with safe voltage — not more than 14V.

5.1.3 The turnstile has low power consumption — no more than 8.5W.

5.1.4 The turnstile retains the set position for each direction when the power supply voltage is removed — the open passage direction remains open, the closed passage direction remains closed.

5.1.5 The resetting mechanism ensures automatic reset of barrier arms to home position after each passage.

5.1.6 Smooth and quiet operation of the turnstile is ensured by the damper.

5.1.7 The optical arm rotation sensors are built into the turnstile housing to ensure accurate count inputs to an ACS.

5.1.8 The mechanical release lock built into the turnstile housing ensures the turnstile manual unlocking with a key in emergency cases (free rotation of the barrier arms).

5.1.9 The turnstile has relay outputs for connection of an intrusion detector and a siren.

5.1.10 There are two modes for the turnstile control — a pulse mode and a potential mode.

5.1.11 Galvanic decoupling of the outputs ensures noise-immunity of the turnstile electronics.

5.1.12 A purpose-designed «Fire alarm» control input is intended to unlock the turnstile at the fire alarm command or from emergency unblocking button.

5.2 Design

The design of the turnstile is shown in Fig. 1. Numbers in brackets correspond to Fig. 1 of the Manual except noted otherwise.

5.2.1 The turnstile consists of a turnstile housing (1) with a built-in control logic board (CLB), a remote control panel (5) and a set of barrier arms (2).

The turnstile housing (1) is a formed and welded metal structure with a cover (14).

Inside the turnstile housing there are a Control Logic Board (CLB) and a resetting 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 (11). The resetting mechanism contains a rotation mechanism (13) consisting of a damper, an arm rotation sensor disc and a hub (12) with three barrier arms (2).

5.2.2 The side panels of the turnstile head are equipped with “Open/closed” light indicators (15) to show whether the passage is authorized (the green indicator is on) or not (the red indicator is on).

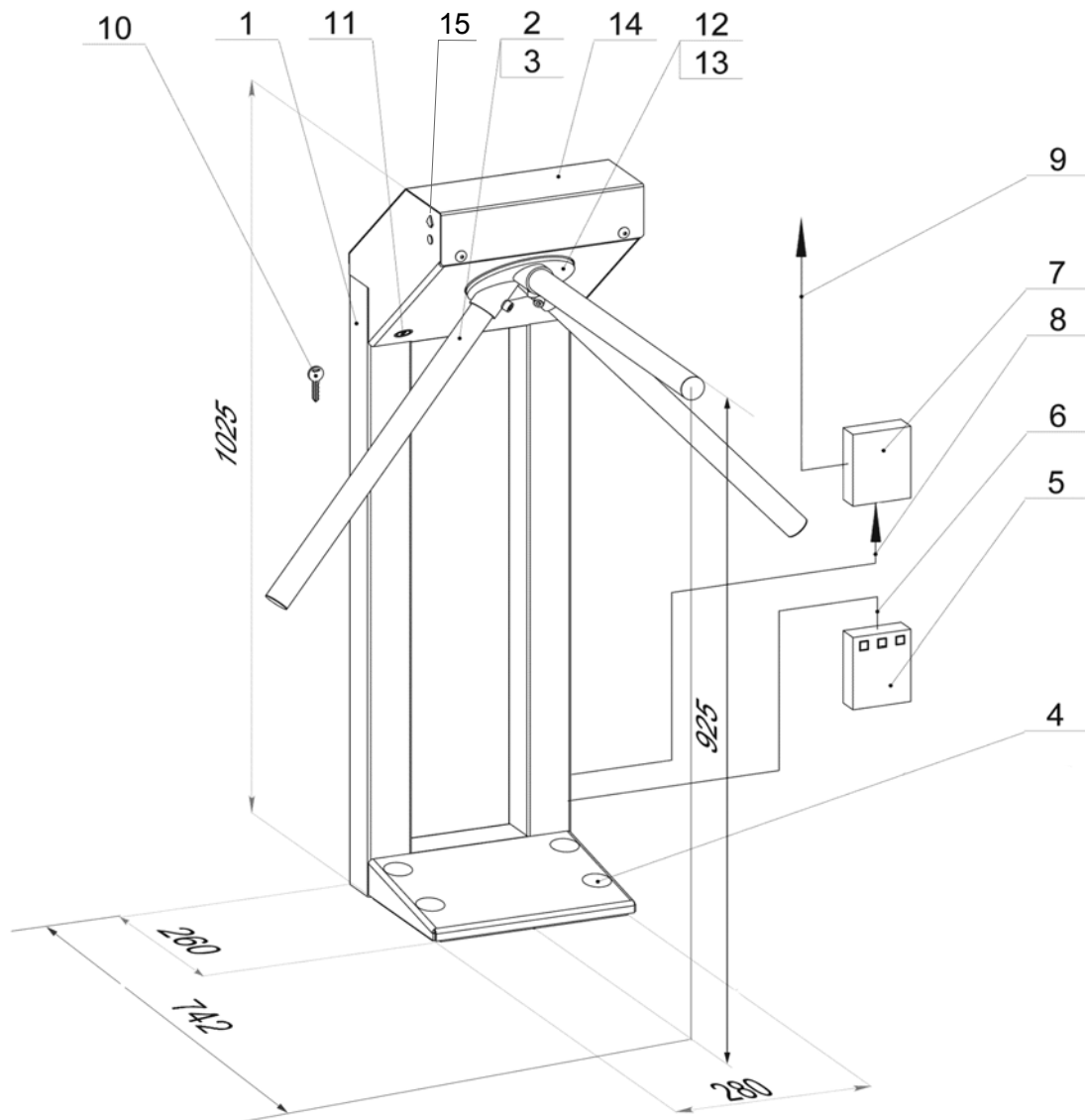


Fig. 1. T-5 electromechanical tripod turnstile. Overall view:

1 — turnstile housing; 2 — barrier arm; 3 — M8 bolt for barrier arm fastening; 4 — plastic plug; 5 — RC / wireless remote control kit / ACS controller; 6 — cable of RC / wireless remote control / ACS controller; 7 — turnstile power supply; 8 — turnstile power cable; 9 — AC power cable; 10 — mechanical release key; 11 — mechanical lock; 12 — hub; 13 — rotation mechanism; 14 — cover; 15 — “Open/closed” light indicator

5.2.3 The RC/wireless remote control/ACS controller (5) and the turnstile power supply unit (7) are connected to the CLB with the cables (6, 8) in accordance with the connection layout (ref. Fig. 3).

5.2.4 The remote control panel (RC) is designed as a small desktop device with a shockproof ABS plastic case and intended for setting and indication of the operating modes when the turnstile is operated manually. The RC is connected to the CLB with a multicore cable (13) via the “XT1.L” connector block (ref. Fig. 2 and Fig. 3).

There are three control buttons on the RC front panel, which are intended for setting the turnstile operating modes. The LED indicators are located above the buttons.

The middle button on the RC (hereinafter — the **STOP** button) is intended to set the turnstile to the “Always locked” mode (red light indicator). The left and the right buttons (green light indicators) are intended to unlock the turnstile for passage in the chosen direction.

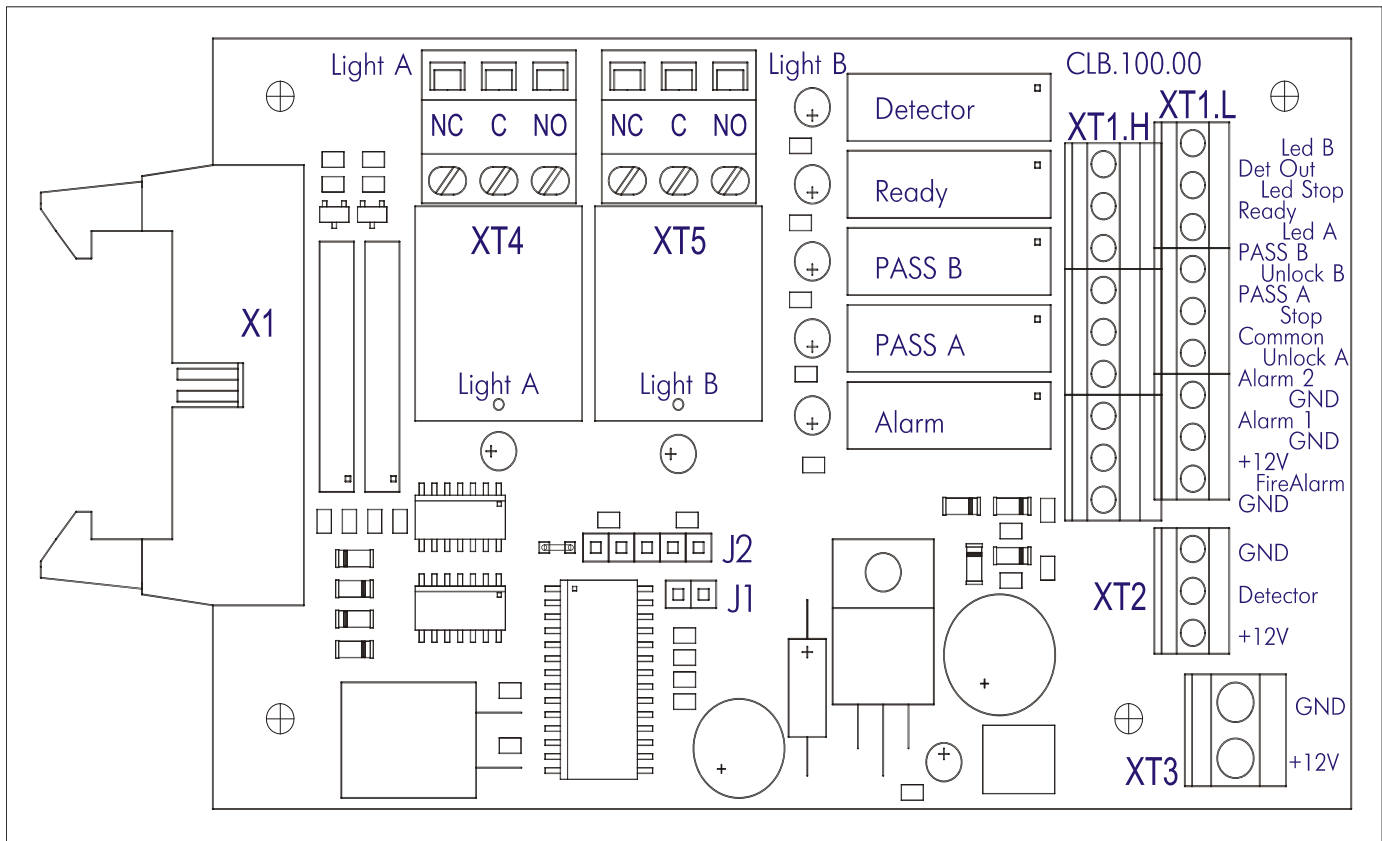


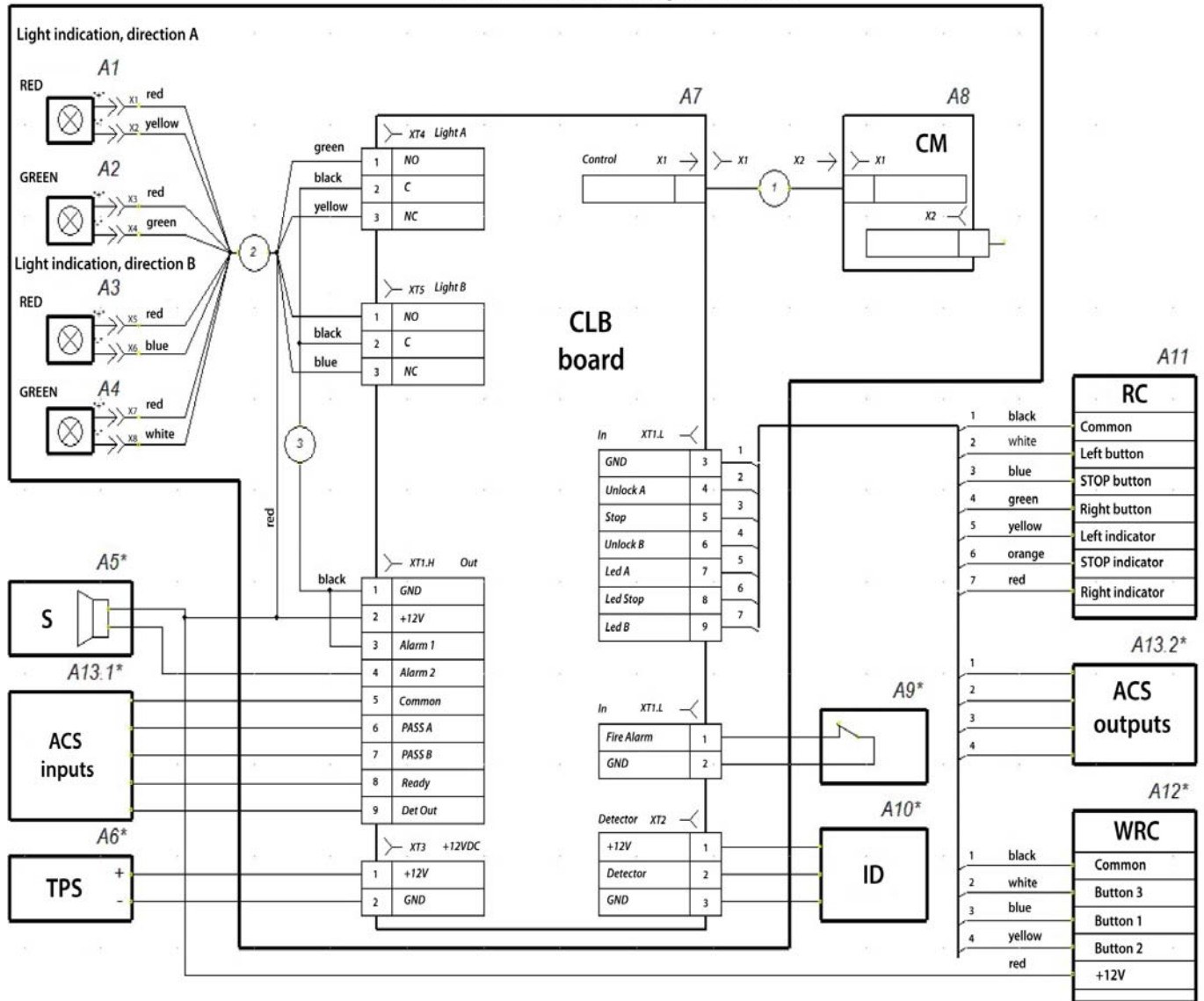
Fig. 2. Control Logic Board (CLB)

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 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 (ref. Fig. 2 and Fig. 3).

5.2.5 The CLB (Fig. 2) contains:

- “X1” (Control) connector to connect the control mechanism from the “X1” control mechanism connector with the turnstile cable;
- “XT1.L” (In) connector block to connect the RC/the wireless remote control/ACS controller inputs 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.

T-5 Electromechanical Tripod Turnstile



Legend	Item	Q-ty	Note
A1, A3	"Open/closed" light indicators, red	2	
A2, A4	"Open/closed" light indicators, green	2	
A5*	Siren, 12V DC	1	
A6*	Turnstile power supply	1	
A7	CLB	1	
A8	Control mechanism TTR-06.140.00	1	
A9*	Emergency unblocking device	1	
A10*	Intrusion detector	1	CLIP-4
A11	RC	1	
A12*	Wireless remote control kit	1	MSRF-4
A13*	Access control system	1	
1	Turnstile cable	1	
2	Light indicators cable T-05.900.00	1	
3	Cable T-05.910.00	1	

* Available upon request

ID — Intrusion detector;
TPS — Turnstile power supply;

CM — Control mechanism;
RC — remote control panel;

WRC — Wireless remote control;
S — siren; ACS — Access control system

Fig. 3. Connection layout

5.3 Turnstile control devices

5.3.1 The turnstile can be operated from the following devices:

- the remote control panel (the RC);
- a wireless remote control;
- an ACS controller.

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

- 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 (6) to the corresponding connector blocks “XT1.L” or “XT1.H” of the CLB in accordance with the connection layout (Fig. 2 and Fig. 3).

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

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

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

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

5.3.7 Denotations and pin assignments of the CLB connector blocks are given in Fig.2.

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 (“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 retransmits 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 relative to the “GND” contact at the contacts “Unlock A”, “Unlock B” and “Stop” of the connector block “XT1.L” while either a normally open relay contact or a circuit with open-collector output can be used as the control element.

At emergency the turnstile unlocking is carried out by removing of a low-level signal relative to the “GND” contact from the “Fire Alarm” contact while either a normally closed relay contact or a circuit with open-collector output can be used as the control element (Fig. 4 and Fig. 5).

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 “+ 5V” are used.

The control element must provide the following signal characteristics:

the relay contact as the control element:

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

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

- voltage at the closed contact.....no more than 0.8V.
(low - level signal at the CLB input)

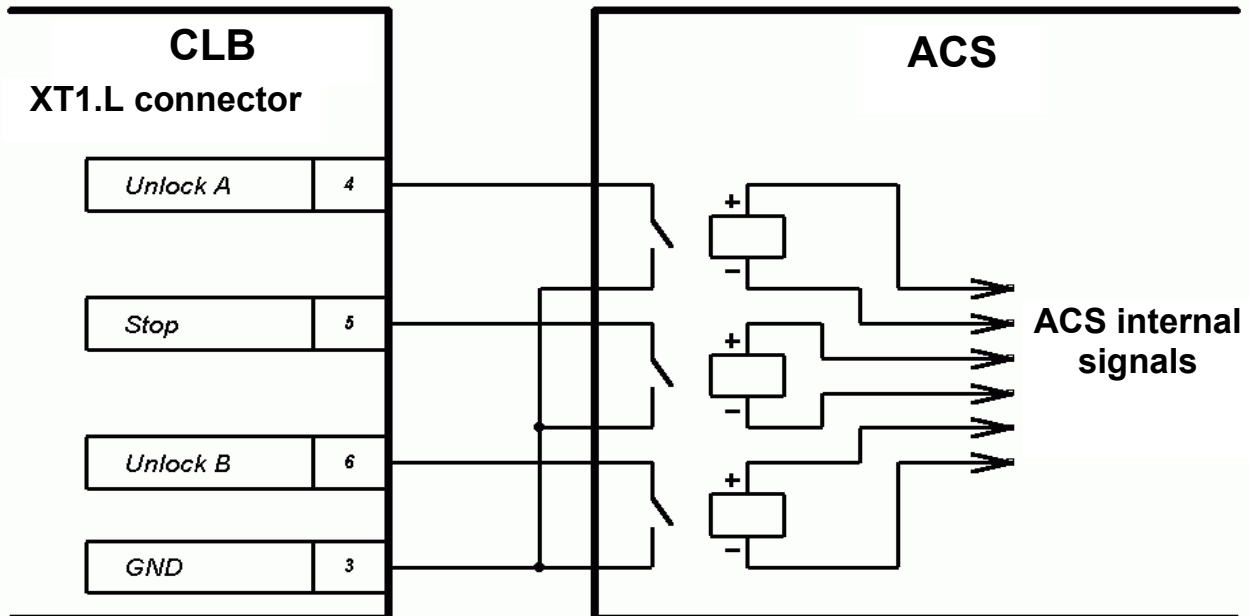


Fig. 4. ACS control element — normally open relay contact

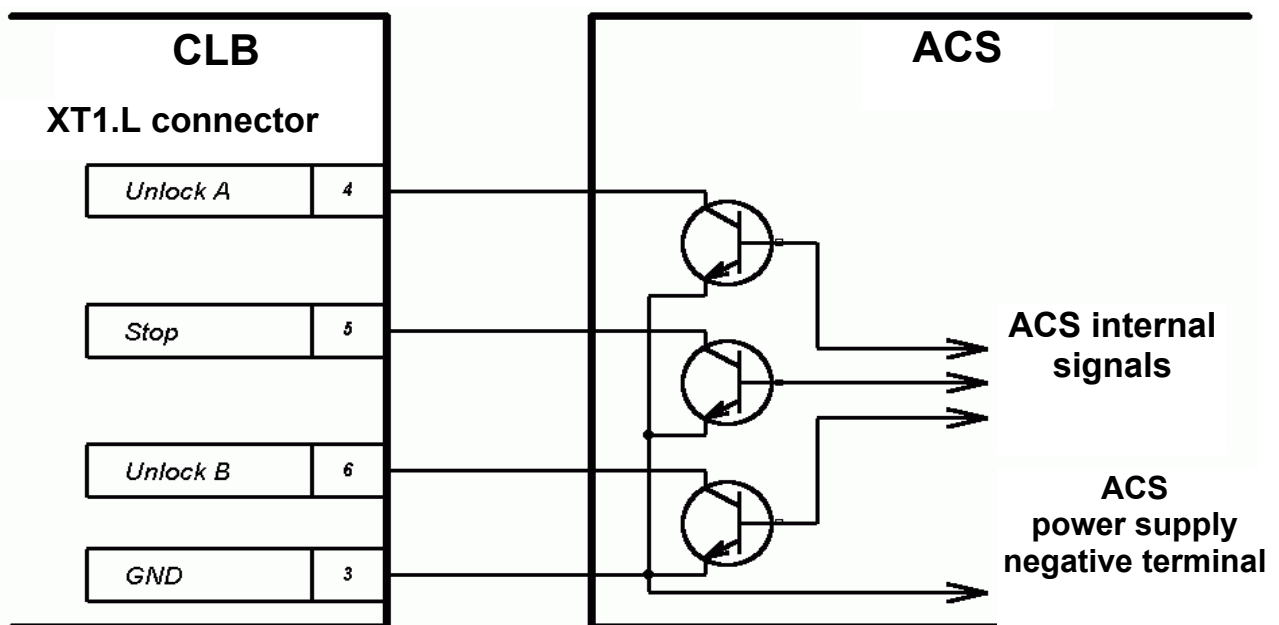


Fig. 5. ACS control element — circuit with open-collector output

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. 2).

The output cascades for “PASS A”, “PASS B”, “Ready”, “Det Out” and “Alarm” are the relay contacts with the following signal characteristics (Fig. 6):

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

5.5 Control modes

5.5.1 There are two modes of the turnstile control - **a pulse mode** and **a potential mode**.

They determine available **operating modes** of the turnstile (Table 1 and Table 2).

5.5.2 The control mode is set by the jumper on the J1 connector (the J1 connector location is shown on Fig. 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.

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 duration. In the potential control mode the passage waiting time equals the duration of the control signal.

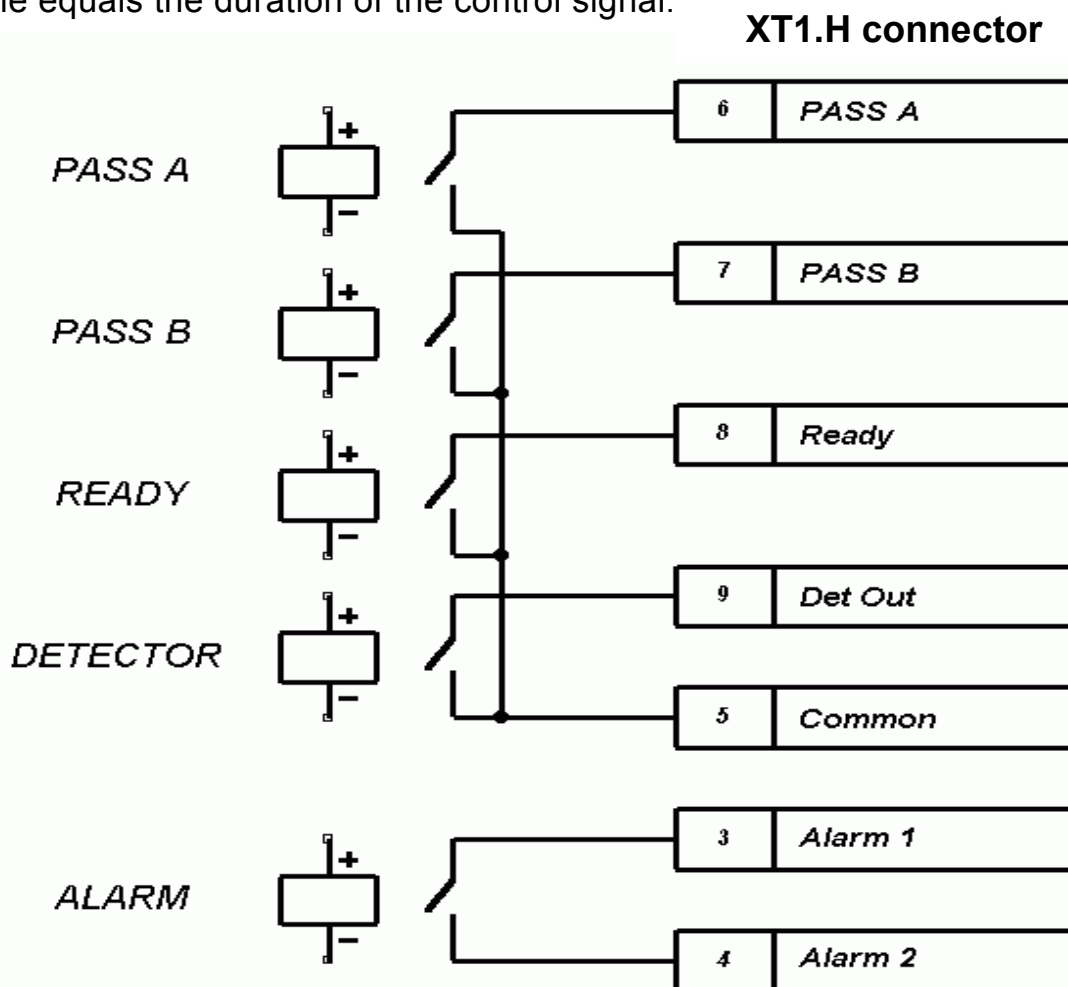


Fig. 6. Output cascades for PASS A, PASS B, Ready, Det Out and Alarm

5.5.4 The pulse control mode is intended for the turnstile operation from the RC, a wireless remote control or an ACS controller with outputs supporting the pulse control mode.

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

Special control input: "Fire Alarm".

Operating modes of the turnstile at this control mode are given in Table 1, algorithm of control signals is stipulated in Appendix A.

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

The turnstile operation from the special control input "Fire Alarm" is described in Clause 5.9.3.1.

5.5.5 The potential control mode is intended for the turnstile operation from an ACS controller with outputs supporting the potential control mode (for example, a lock controller).

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

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

Operating modes of the turnstile at this control mode are given in Table 2, algorithm of control signals is stipulated in Appendix B.

The minimum input signal duration, when the operating mode can be changed, should be 100msec. The passage waiting time is equal to a low-level signal duration (the turnstile remains open in the set direction if a low-level signal is supplied at the corresponding input by the moment of passage).

Once the low-level signal is supplied at the "Stop" input, both directions are closed for the period of the signal duration regardless of the signals level at the inputs "Unlock A" and "Unlock B".

At the low-level signal removing from the "Stop" input, the directions turn to the operating mode according to the signals level at the inputs "Unlock A" and "Unlock B".

The turnstile operation from the special control input "Fire Alarm" is described in Clause 5.9.3.2.

5.6 Operation from the RC

5.6.1 When the buttons on the RC 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" and the "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, 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").

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)" (the "PASS A (B)" and "Common" contacting).

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 from a wireless remote control

5.7.1 Control over the turnstile from a wireless remote control is similar to that from the remote control panel.

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

5.7.3 An operation manual for a wireless remote control is supplied with that device.

5.8 Operation via an ACS controller

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

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

5.8.3 The difference in the operation logic at the potential control mode and at the pulse control mode (as per Clause 5.6.2) is as follows: 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 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.

5.8.4 The passage through the turnstile in the A (B) direction is fixed in accordance with the status of the outputs "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;
- *) siren;
- **) emergency unblocking device.

5.9.2 An intrusion detector is connected to the "XT2" connector block, and a siren is connected to the "XT1.H" connector block of the CLB according to the connection layout (Fig.2 and Fig.3). There should be normally closed contacts on the intrusion detector.

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

If the turnstile is locked (the "Always locked"/"Both directions closed" mode, ref. Tables 1 and 2) and a signal comes from the intrusion detector, the "Alarm" signal is generated. The "Alarm" signal is removed 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 the signal from the intrusion detector comes within 3 sec. after the "Always locked"/"Both directions closed" mode is set, it is also ignored.

*) available upon request

**) not supplied by the manufacture

The intrusion detector status signal is constantly transmitted to the “Det Out” and “Common” contacts of the CLB “XT1.H” connector block (Fig. 2).

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. 2 and Fig. 3).

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 an emergency unblocking device:

5.9.3.1 At the pulse control mode, when a low-level signal is removed from the “Fire Alarm” input, both passage directions open for the period of the signal absence. Other control commands are ignored at that.

Once the low-level signal is supplied at the “Fire Alarm” input, the turnstile turns to the “Always locked” mode.

5.9.3.2 At the potential control mode, when a low-level signal is removed from the “Fire Alarm” input, both passage directions open for the period of the signal absence. Other control commands are ignored at that.

Once the low-level signal is supplied at the “Fire Alarm” input, the passage directions turn to the operating mode in accordance with the signals level at the “Unlock A”, “Unlock B” and “Stop” inputs.

5.10 “Open/closed” light indicators

5.10.1 The “Open/closed” light indicators are connected to the connector blocks “XT4” (“Light A”) and “XT5” (“Light B”) of the CLB. Herein the “Light A” (“Light B”) relay is active (the voltage is applied to the relay coil), when the green indicator corresponding to the authorized passage direction is on and the red indicator is off.

The “Light A” (“Light B”) relay is passive (the voltage is not applied to the relay coil), when the green indicator corresponding to the authorized passage direction is off and the red indicator is on.

The response/release of the relays “Light A” and “Light B” can be detected by reaction of the red indicators installed near the relays (ref. Fig. 2).

Output cascades for the “Light A” and the “Light B” relays are changeover relay contacts (ref. Fig. 7) 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.

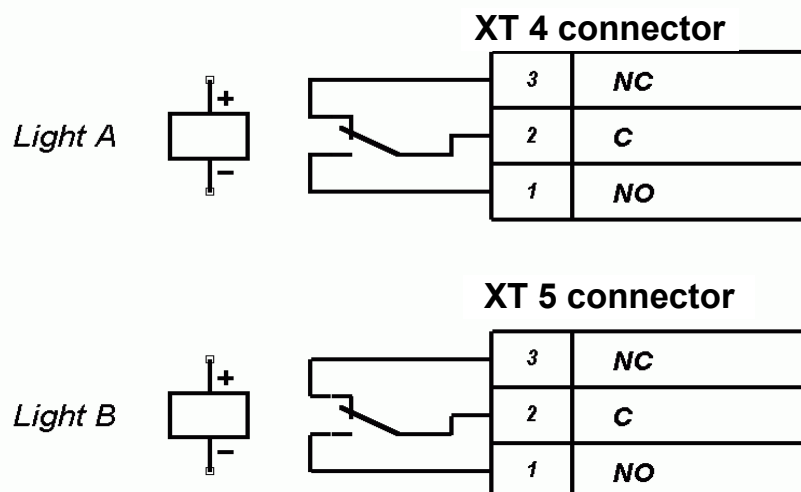


Fig. 7. Output cascades for Light A and Light B

5.11 Key override control

5.11.1 The key override option allows the 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 unlock the turnstile it is necessary to insert the key (10) into the lock (11), turn it at 90° clockwise and then take out. Then the barrier arms can be freely turned in both directions.

5.12 Operation contingencies and response

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

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

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

5.12.2 In case of unauthorized access the “Ready” signal is formed as follows:

- at 8° arm rotation one of the optical sensors (Fig. 11) becomes active; the output contacts “Ready” and “Common” get broken (the beginning of the signal);
- when the barrier arms return to home position, the both optical sensors become passive and the output contacts “Ready” and “Common” get closed (the signal completion).

5.12.3 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 beginning of passage determined by the arm rotation at no less than 8° (i.e. activation of one of the optical sensors) the barrier arms do not return to home position, the output contacts “Ready” and “Common” get broken (the beginning of the signal);
- when the barrier arms return to home position, the both optical sensors become passive and the output contacts “Ready” and “Common” get closed (the signal completion).

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 closing of the contacts “Ready” and “Common” is renewed.

6. MARKING AND PACKAGING

The turnstile is marked by a label placed on the housing interior wall. When it is necessary to access the label, unscrew the fixing bolts of the cover (14) on the front and the back surfaces of the turnstile housing.

The complete delivery set of the turnstile (ref. Section 4) is packed in the overpack box, which keeps it undamaged during the transportation and storage.

The overpack box overall dimensions (L x W x H) are 1110x340x320 mm.

7. SAFETY REQUIREMENTS

7.1 Installation safety requirements

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

7.1.2 Only serviceable tools should be used for installation.

7.1.3 All work should be carried out only when the power is off and the power supply is disconnected from the mains.

7.1.4 Observe general electrical safety rules when laying out the cables.

7.1.5 Safety requirements on the power supply units installation are shown in their certificates.

7.2 Operation safety requirements

7.2.1 Always observe general electrical safety rules when operating the product.

7.2.2 DON'T use the turnstile:

- when operation conditions don't conform to those given in Section 2;
- when the supply voltage differs from that given in Section 3.

7.2.3 The power supply operation should be carried out according to safety requirements in its in-line documentation.

DON'TS:

- **Do not use abrasive or chemically active substances to clean surfaces.**
- **Do not let bulky objects with dimensions exceeding the passageway width be carried through the passageway area.**
- **Do not let the barrier arms, the turnstile housing and the light indicators be subjected to jerks and jolts that can cause mechanical deformation.**

8. INSTALLATION INSTRUCTIONS

8.1 Installation details

It is recommended:

- to mount the turnstile on steady and level concrete (grade 400 or higher), stone or similar foundations at least 150mm thick;
- to level the foundation so that the anchoring points of the turnstile lie in the same plane;
- to apply reinforcing elements (300x300x300mm) for installation on less steady foundation (frame foundation, for example);
- to mark the mounting holes according to Fig. 9;
- 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:
 - when the barrier arm turns more than 60°, the reset is in the direction of movement;
 - when the barrier arm turns less than 60° the reset is in the direction counter to the movement (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° (Fig. 8).

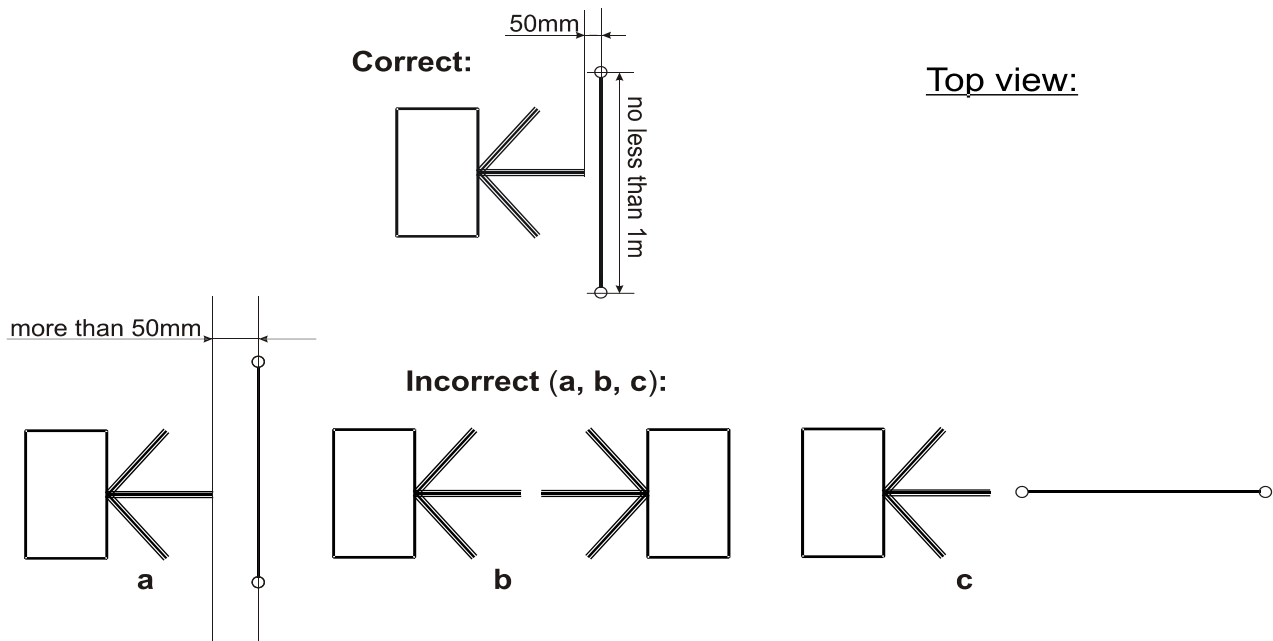


Fig. 8. Site preparation. Recommendations

8.2 Installation tools

- 1.2 - 1.5kW perforator;
- Ø16mm hard-alloyed drills;
- Bail for electric raceway;
- Cross-head screwdriver;
- №2 flat slot screwdriver;
- S17, S13, S4 socket wrenches;
- Plumb line and level;
- Hard wire 1.5m 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

Maximum length of the RC / wireless remote control / ACS controller cable should be no more than 50m.

Maximum length of the turnstile power cable depends on the cable cross-section and should be:

- | | |
|---|---------------------|
| – for cable with 0.2mm ² cross-section (AWG 24) | — no more than 10m; |
| – for cable with 0.75mm ² cross – section (AWG 18) | — no more than 25m; |
| – for cable with 1.5mm ² cross – section (AWG 16) | — no more than 50m. |

8.4 Installation procedure

Attention! The manufacturer will not accept liability for any damage or otherwise loss resulting of improper installation, and will dismiss any claims by the customer should the installation is not carried out in strictly accordance with this Manual.

8.4.1 Unpack the turnstile, check the completeness as per Section 3 of the Certificate.

8.4.2 Make the holes for anchor bolt sleeves for the turnstile housing installation (Fig. 9).

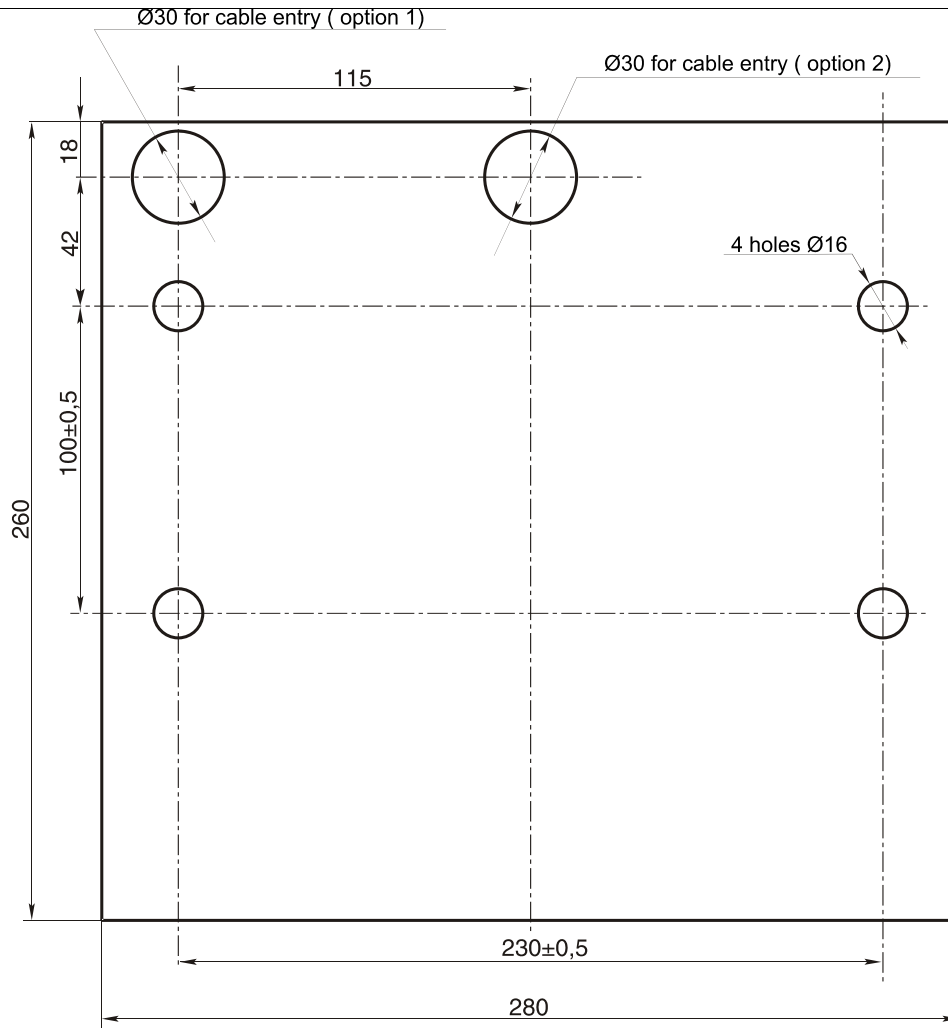


Fig. 9. Floor anchor position and cable entries for housing installation

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 the S17 socket wrench. Put the plastic plugs (4) 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.9). Fix the housing after laying the cables in the electric raceway and inside the turnstile housing.

8.4.4 Remove the cover (14) as follows:

- using the S4 hexagon socket wrench, unscrew the bolts fixing the cover (14);
- remove the cover and place it on a stable level surface.

8.4.5 Place the powers supply unit (7) in its designated location (refer to its documentation installation instructions).

8.4.6 Connect the power cable (8) from the turnstile power supply (7) to the CLB “XT3” connector block. Connect the RC cable (6) to the CLB “XT1.L” connector block. Connect cables of all the other devices to the corresponding CLB connector blocks (ref. Fig. 2 and Fig. 3).

8.4.7 Check the accuracy, reliability and safety of all electrical connections. Using the fixing tapes included in the delivery set, secure all the cables in two points: to the special opening on the turnstile housing horizontal plane and to the special opening in the mechanical release lock inside the turnstile housing. Return the cover (14) back in its operative position in the order reverse to its removal.

8.4.8 To mount the barrier arms into the operative position, first unscrew the bolt (3) on the barrier arm (2) with the S13 socket key. Install the barrier arm into the corresponding slot on the hub (12) and fix it with the bolt (3). 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 same for the other barrier arms.

8.4.9 Carry out a test power-up of the turnstile according to the Section 9.

Check operation of an intrusion detector and a siren (if included in the delivery set) as described below.

After the power-up wait until the test indicator inside the intrusion detector turns off (from 10 to 50 sec). The turnstile should be in the "Always locked" operating mode at the pulse control mode or in the "Both directions closed" mode at the potential control mode. Put your hand before the intrusion detector. The continuous siren alarm will sound when the intrusion detector activates. To cancel the alarm press any button on the RC, otherwise the sound will stop in 5 ± 0.5 sec.

Once the installation and tests are completed, the turnstile is ready for operation.

9. OPERATION INSTRUCTIONS

9.1 Power-up

WARNING! Observe general electrical safety requirements during the turnstile operation.

Make sure all the connections are correct and the power supply cable is in order (ref. Clause 8.4.6.).

Connect the turnstile power supply (7) to the mains with electric parameters as per its documentation.

WARNING! Do not connect the turnstile power supply to the mains with the parameters rating other than specified in the power supply certificate.

Turn the power supply (7) on. The red light indicators (15) on the side panels of the turnstile head are on, the red indicator above the STOP button on the RC panel (5) is on.

9.2 Turnstile operating modes at the pulse control mode

9.2.1 Setting of the operating modes by the RC and the corresponding indication are detailed in Table 1.

Please notice that:

- the passage directions are independent of each other, i.e. setting an operating mode in one direction will not change an already set operating mode in another;
- the "Single passage in the set direction" operating 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" operating mode can be changed to the "Always locked" mode only.

9.2.2 After the turnstile power-up the reset state of the turnstile is closed (providing the mechanical release lock (11) is locked with the key (10).

9.2.3 In the single passage mode the turnstile will be automatically locked after the passage in the authorized direction is completed. If the passage has not occurred within 5 sec., the turnstile will be automatically locked as well.

9.2.4 When passage is authorized for both directions, after one passage is completed, a countdown of the passage waiting time (5 sec.) for another direction starts.

Note: Pressing the button on the RC corresponds to the low-level signal supply to the respective contacts of the "XT1.L" connector block ("Unlock A", "Unlock B", "Stop") relative to the contact "GND".

9.3 Turnstile operating modes at the potential control mode

Setting of the operating modes by the RC and the corresponding indication are detailed in Table 2.

Please notice that the passage directions are independent of each other, i.e. setting an operating mode in one direction will not change an already set operating mode in another.

TABLE 1

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

No	TURNSTILE OPERATING MODES	ACTIONS TO DO	RC INDICATION	TURNSTILE INDICATION	TURNSTILE STATUS
1	Always locked (closed for entry and exit)	Press the STOP button on the RC.	The red indicator above the STOP button is on.	The red indicators for both directions are on.	The turnstile is locked.
2	Single passage in the set direction (open for passage by one person in the chosen direction; closed in the opposite direction)	Press the button on the RC corresponding to the chosen passage direction.	The green indicator above the button corresponding to the chosen passage direction is on.	The "Green arrow" indicator for the authorized direction and the red indicator for another direction are on.	The turnstile is unlocked in the authorised direction and will be automatically locked after the passage is completed.
3	Bi-directional single passage (open for a single passage in each direction)	Press both the left and the right buttons on the RC simultaneously.	The two green indicators (left and right) are on.	The "Green arrow" indicators for both directions are on.	The turnstile is unlocked for a single passage in each direction and will be automatically locked in the direction of the completed passage.
4	Free passage in the set direction (open in the chosen direction; closed in the opposite direction)	Press the STOP button and the button corresponding to the chosen passage direction simultaneously.	The green indicator above the button corresponding to the chosen passage direction is on.	The "Green arrow" indicator for the authorized direction and the red indicator for another direction are on.	The turnstile is unlocked for multiple passages in the authorised direction.
5	Free passage in the set direction and single passage in the opposite direction (open for free passage in the chosen direction and a single passage in another)	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 "Green arrow" indicators for both directions are on.	The turnstile is unlocked indefinitely for multiple passages in the free passage direction and a single passage in the opposite direction.
6	Always free (open for entry and exit)	Press all the three buttons on the RC simultaneously.	The two green indicators (left and right) are on.	The "Green arrow" indicators for both directions are on.	The turnstile is unlocked indefinitely for multiple passages in both directions.

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

No	TURNSTILE OPERATING MODES	SIGNAL LEVELS ON THE CONTACTS SHOULD BE PROVIDED	RC INDICATION	TURNSTILE INDICATION	TURNSTILE STATUS
1	Both directions are closed (closed for entry and exit)	High level on the contacts "Unlock A" and "Unlock B" or low level on the contact Stop.	The red indicator above the STOP button is on.	The red indicators for both directions are on.	The turnstile is locked.
2	One of the passage directions is open (open for free passage in the chosen direction; closed in the opposite direction)	Low level on the contact corresponding to the chosen passage direction, high level on the other contacts	The green indicator above the button corresponding to the chosen passage direction is on.	The "Green arrow" indicator for the authorized direction and the red indicator for another direction are on.	The turnstile is unlocked in the authorised direction and remains open after the passage is completed, if the low level signal is supplied to the contact corresponding to the set passage direction.
3	Both directions are open (open for entry and exit)	Low level on the contacts corresponding to the both passage directions, high level on the contact Stop	The two green indicators (left and right) are on.	The "Green arrow" indicators for both directions are on.	The turnstile is unlocked and remains open in the authorised direction after the passage is completed, if the low level signal is supplied to the respective contact.

For the ACS outputs note the following:

1. High level — contacts of the output relay are broken or the output transistor is closed;
2. 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.

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 5.11 of the Manual.

An additional emergency exit can be arranged by means of anti-panic barrier arms. The design of the barrier arms enables arranging of a free escape passage without any special means or tools.

To make the passageway free, just pull the horizontal barrier arm along its axis outwards the hub until released, then fold the arm down (ref. Figure 10).

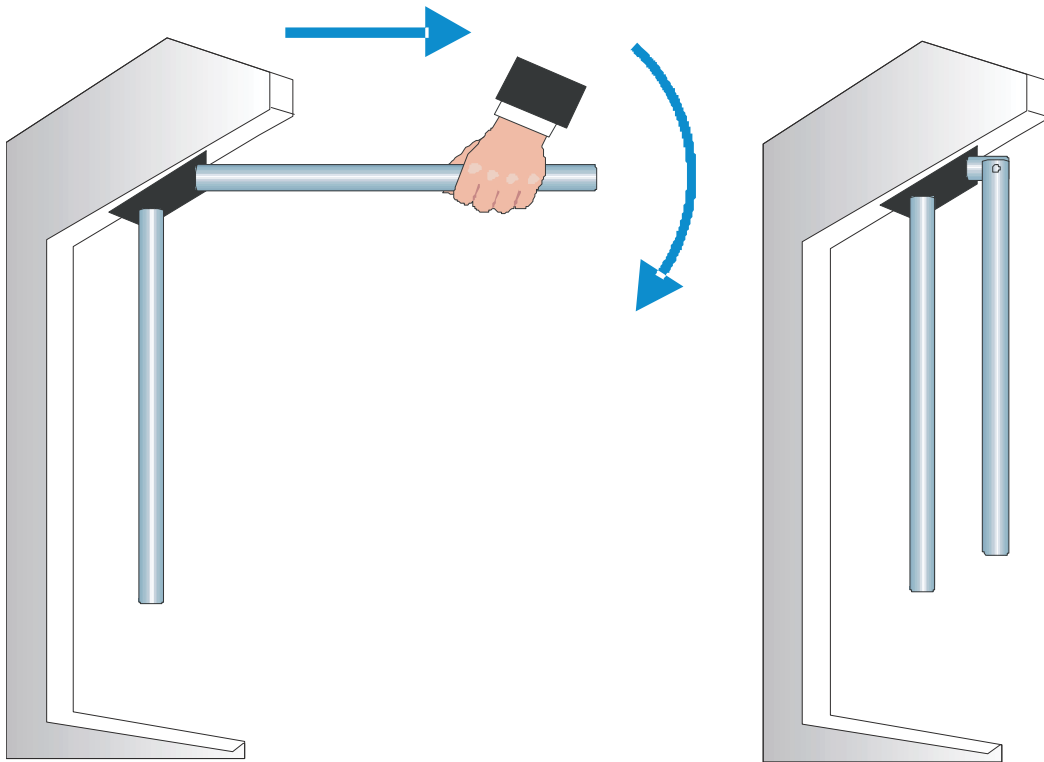


Fig. 10. Anti-panic folding arms

9.5 Troubleshooting

Possible faults to be corrected by the users themselves are listed in Table 3.

TABLE 3

Fault	Most possible cause	Remedy
When power-up, the turnstile does not work, light indication on the turnstile housing and the RC is off.	No supply voltage to the CLB	Turn off the turnstile power supply from the mains, remove the cover (14). 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, light indication on the turnstile housing and the RC is on.	The CLB does not receive a control signal corresponding to this direction.	Turn off the turnstile power supply from the mains, remove the cover (14). Check the RC/ 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 events of malfunction. Maintenance must be undertaken only by a qualified technician well acquainted with the Manual.

Prior to the turnstile maintenance works turn off the turnstile power supply from the mains.

Remove the cover (14) as follows:

- using the S4 socket wrench, unscrew the bolts fixing the cover (14);
- remove the cover (14) and place it on an even stable surface.

Inspect the resetting device (the pusher, the springs and the roller), the optical rotation sensors for the barrier arms and the damper (ref. Fig. 11).

Using a clean rag soaked with alcohol gasoline blend, remove dirt and stains, when necessary, from the the arm rotation sensor disc; make sure the dirt does not gets into the operating clearances of the optical sensors.

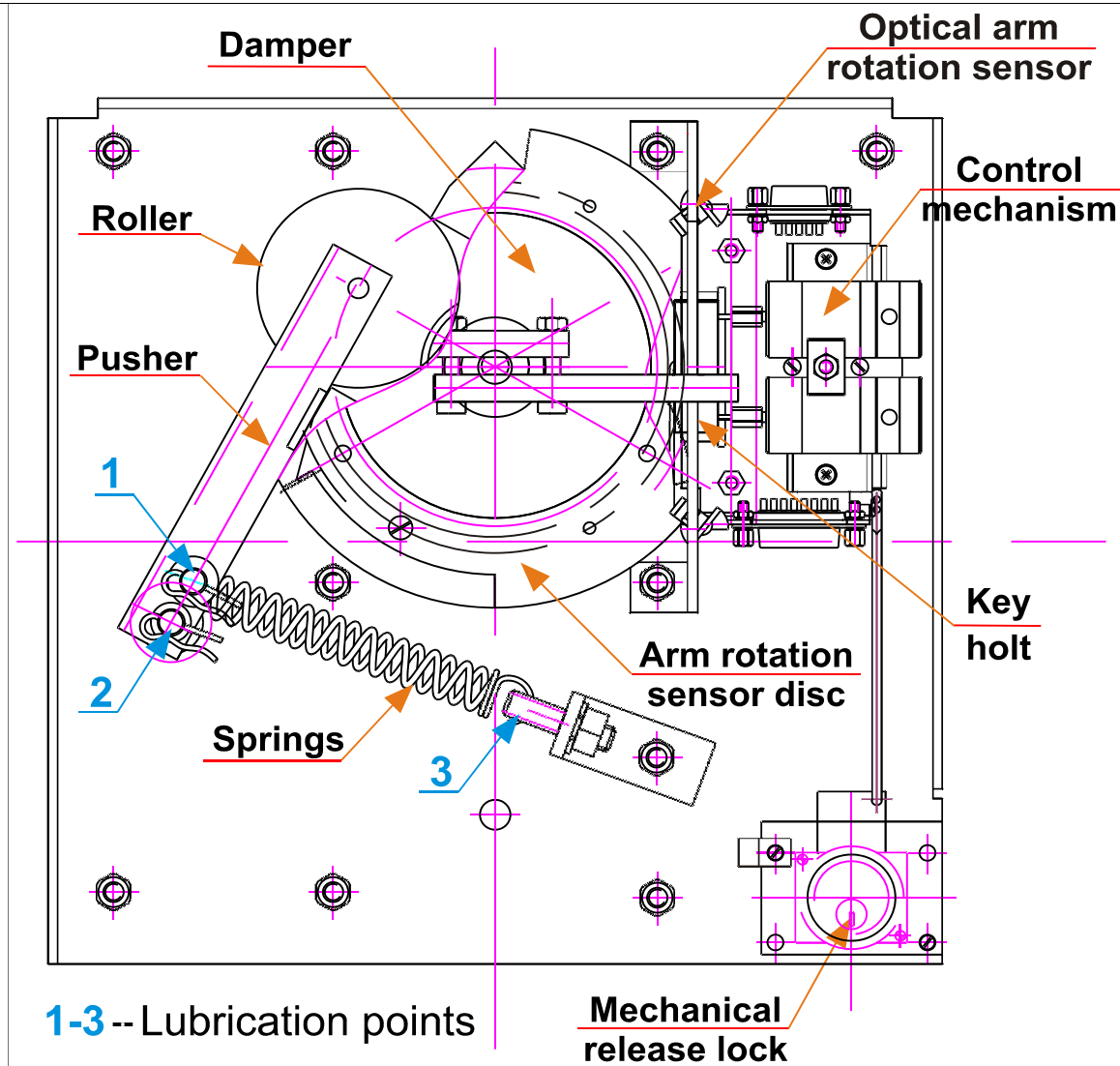


Fig. 11. Location of the interior components of the turnstile housing (CLB is not shown)

Lubricate the following parts with machine oil:

- four bushes of the resetting device (two on the rotation axis of the pusher, two on the fastening axis of the springs);
- holes in the fastening parts of the springs;
- lock cylinder of the mechanical lock (11) through the keyhole.

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; tighten the fixing bolts when necessary.

Return the cover (14) back in its operative position in the order reverse to its removal. Make sure the barrier arms (2) are secured in place and, if necessary, tighten the bolts (3) of the barrier arms.

Check the reliability of the turnstile housing fastening to the floor, tighten the anchor bolts with S17 socket wrench when necessary:

- remove plastic plugs (4) out of the holes in the turnstile housing base;
- tighten the anchor bolts (15) with the S17 socket wrench;
- return the plastic plugs (4) back on their places.

If during the operational maintenance some components are found defective, please apply to the PERCo Technical Support Department (the PERCo TSD).

11. TRANSPORTATION AND STORAGE

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

11.2 During storage and transportation the identical boxes can be stacked no more than 5 layers high (70 kg-f maximum load) .

11.3 The turnstile should be stored in dry indoor facilities at the ambient air temperatures from -40 °C to +40 °C and relative air humidity up to 98% at +25 °C.

11.4 After transportation or storage at temperatures below zero or in high air humidity, prior to the installation the product must be kept unpacked for no less than 24 hours indoors in the climate conditions as per given in Section 2.

APPENDIX A

CONTROL SIGNAL ALGORITHM AT THE PULSE CONTROL MODE

Note: The command is the falling edge of the signal at any of the contacts while the corresponding signal levels are present at the other contacts.

The falling edge of the signal — when the signal level changes from high to low.

Input of a low-level signal relative to the «GND» contact at the contacts “Unlock A”, “Stop” and “Unlock B” of the “XT1.L” connector block can generate the following commands:

Always locked (closed for entry and exit)

– the falling edge at the contact “Stop” with the high signal level at the contacts “Unlock A” and “Unlock B”.

This command closes both directions.

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

– the falling edge at the contact “Unlock A” with the high signal level at the contacts “Stop” and “Unlock B”.

This command opens the direction A either for the passage waiting time or until the passage in this direction is completed, or until the «Always locked» command is received, while the direction B mode remains unchanged. The command is ignored if at the moment of its receipt the direction A is in the «Always free» mode.

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

– the falling edge at the contact “Unlock B” with the high signal level at the contacts “Stop” and “Unlock A”.

This command opens the direction B either for the passage waiting time or until the passage in this direction is completed, or until the «Always locked» command is received, while the direction A mode remains unchanged. The command is ignored if at the moment of its receipt the direction B is in the «Always free» mode.

Bi-directional single passage (open for one passage in each direction)

– the falling edge at the contact “Unlock A” with the low signal level at the contact “Unlock B” and the high signal level at the contact “Stop”,

– or the falling edge at the contact “Unlock B” with the low signal level at the contact “Unlock A” and the high signal level at the contact “Stop”.

This command opens both directions, each for the passage waiting time or until the passage in this direction is completed, or until the «Always locked» command is received. The command is ignored for the direction which at the moment of its receipt is the «Always free» mode.

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

– the falling edge at the contact “Unlock A” with the low signal level at the contact “Stop” and the high signal level at the contact “Unlock B”,

- or the falling edge at the contact “Stop” with the low signal level at the contact “Unlock A” and the high signal level at the contact “Unlock B”.

This command opens the direction A until the command «Always locked» is received, while the direction B mode remains unchanged.

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

- the falling edge at the contact “Unlock B” with the low signal level at the contact “Stop” and the high signal level at the contact “Unlock A”,

- or the falling edge at the contact “Stop” with the low signal level at the contact “Unlock B” and the high signal level at the contact “Unlock A”.

This command opens the direction B until the command «Always locked» is received, while the direction A mode remains unchanged.

Free passage (open for free passage in both directions)

- the falling edge at the contact “Unlock A” with the low signal level at the contacts “Unlock B” and “Stop”,

- or the falling edge at the contact “Unlock B” with the low signal level at the contacts “Unlock A” and “Stop”,

- or the falling edge at the contact “Stop” with the low signal level at the contacts “Unlock A” and “Unlock B”.

This command opens both directions until the command «Always locked» is received.

Note! For the remote control panel (the RC):

- the falling edge — the moment the corresponding RC button is pressed;
- the low signal level — the corresponding RC button remains pressed.
- the high signal level — the corresponding RC button is not pressed.

APPENDIX B

CONTROL SIGNAL ALGORITHM AT THE POTENTIAL CONTROL MODE

Both directions are closed (closed for entry and exit)

- the high signal level at the contacts “Unlock A” and “Unlock B”,
- or the low signal level at the contact “Stop”.

This command closes both directions.

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

- the low signal level at the contact “Unlock A” with the high signal level at the contacts “Unlock B” and “Stop”.

This command opens the direction A until the low-level signal is removed from the contact A or the command «Always locked» is received, while the direction B remains unchanged.

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

- the low signal level at the contact “Unlock B” with the high signal level at the contacts “Unlock A” and “Stop”.

This command opens the direction B until the low-level signal is removed from the contact B or the command «Always locked» is received, while the direction A remains unchanged.

Both directions are open (open for entry and exit)

- the low signal level at the contacts “Unlock A” and “Unlock B” with the high signal level at the contact “Stop”.

This command opens both directions until the low-level signal is removed from one of the contacts (A or B) or the command «Always locked» is received.

Note! For an ACS controller outputs:

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