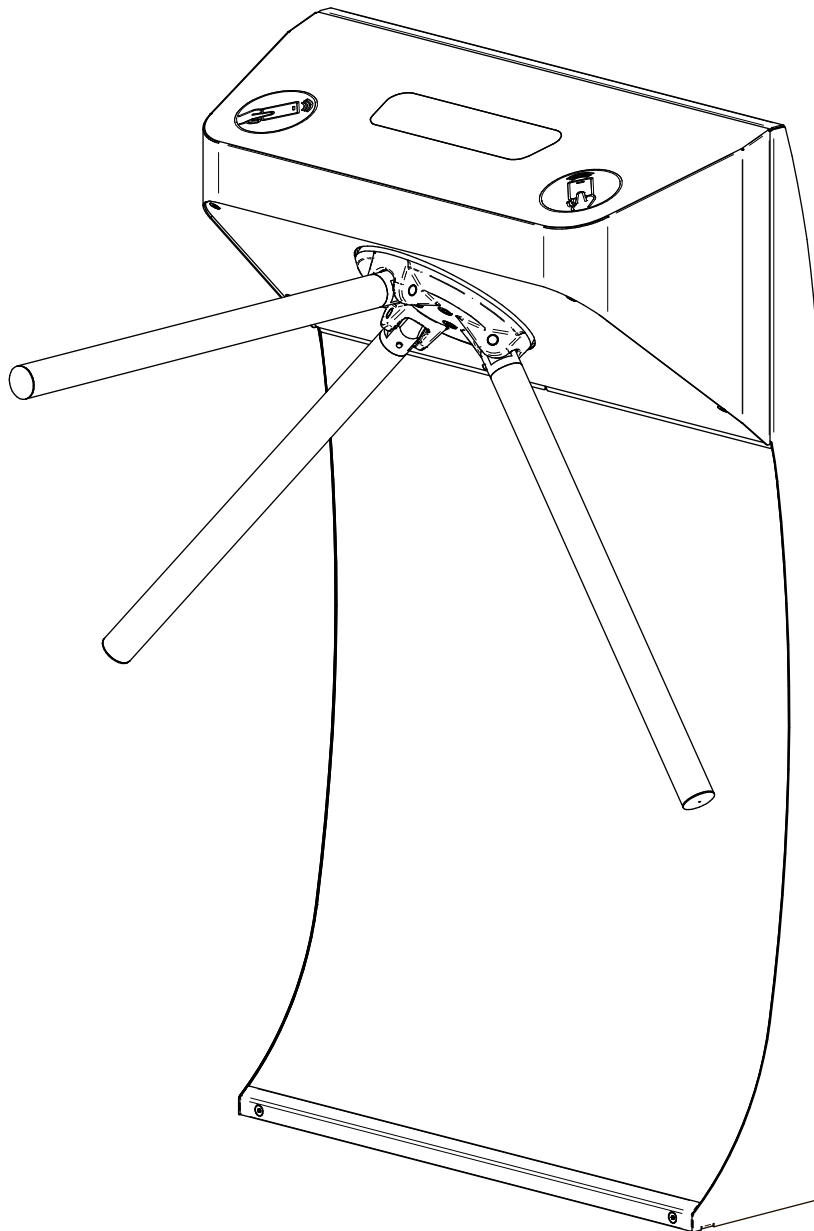


PERCo[®]

ASSEMBLY & OPERATION MANUAL



TTR-11A

Motorized tripod turnstile
with automatic anti-panic arms

EAC
CE



TTR-11A
**Motorized tripod turnstile
with automatic anti-panic arms**

Assembly and Operation Manual

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Dear Customer,

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

Assembly and operation manual for the TTR-11A motorized tripod turnstile with automatic anti-panic arms (hereinafter - the *Manual*) contains data necessary for the utter use of the turnstile operating advantages. Packaging, installation and maintenance information is provided as well.

Installation and maintenance must be carried out by qualified personnel only, after studying this Manual carefully.

Abbreviations:

RC-panel – remote control panel;
ACS – access control system;
WRC – wireless remote control.

1 APPLICATION

TTR-11A motorized tripod turnstile with automatic anti-panic arms (hereinafter - the *turnstile*) is a motorized, weatherproof blocking device, designed as a part of paid access systems, as well as for managing the pedestrian flow at industrial enterprises, banks, administrative institutions, shops, train stations, airports, etc. For a more comfortable passage, the turnstile is equipped with an electric drive for smooth barrier arms rotation and provides the ability to quickly open the passage area in case of emergency.

The inner side of the turnstile features brackets for mounting RFID-readers; upper part features pictograms indicating card presentation zone (see Fig. 2).

The number of turnstiles needed to ensure quick and convenient passage is recommended to be determined upon calculation of the turnstile throughput rate (Sect. 3). The manufacturer recommends installing one turnstile according to the 500 people per shift criterion or based on the peak load of 30 people per minute.

24V DC output voltage power supply or rechargeable batteries are used to power the turnstile (for the range of permissible voltages, see Section 3 “Technical specifications”).

2 OPERATING CONDITIONS

The turnstile, with regard to environmental exposure resistance, complies with GOST15150-69, category N2 (for outdoor application or under shelter).

The turnstile operation is allowed under shelter protected from precipitations at temperature range from -40°C to +50°C and at relative air humidity of up to 80% at +25°C.

3 TECHNICAL SPECIFICATIONS

Operating voltage	22÷29V DC
Current consumption.....	max 5.5 A
Power consumption	15÷150 W ¹
Turnstile throughput rate in the single passage mode	30 persons / min
Turnstile throughput rate in the free passage mode	60 persons / min
Passageway width	500 mm
Arm rotation force	max 1.5 kgf
Built-in RFID-reader admissible dimensions.....	max 150×70×28 mm
RC-panel cable length	6.6 ² m
Ingress Protection Rating	IP42 (EN 60529)
Electric shock protection class	III (IEC 61140)
Vandal protection rating	IK09 (IEC 62262)

¹ Power consumption can reach 150 W only for a short time in certain turnstile conditions. The rest of the time, power consumption does not exceed 15 W.

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

Vibration resistance rating	M28 and M29 (IEC 721-3-5)
Mean time to failure	min 3,000,000 passages
Mean lifetime	8 years
Turnstile overall dimensions with barrier arm raised (see Fig. 1).....	800×760×1055 mm
Turnstile net weight:	max 75 kg

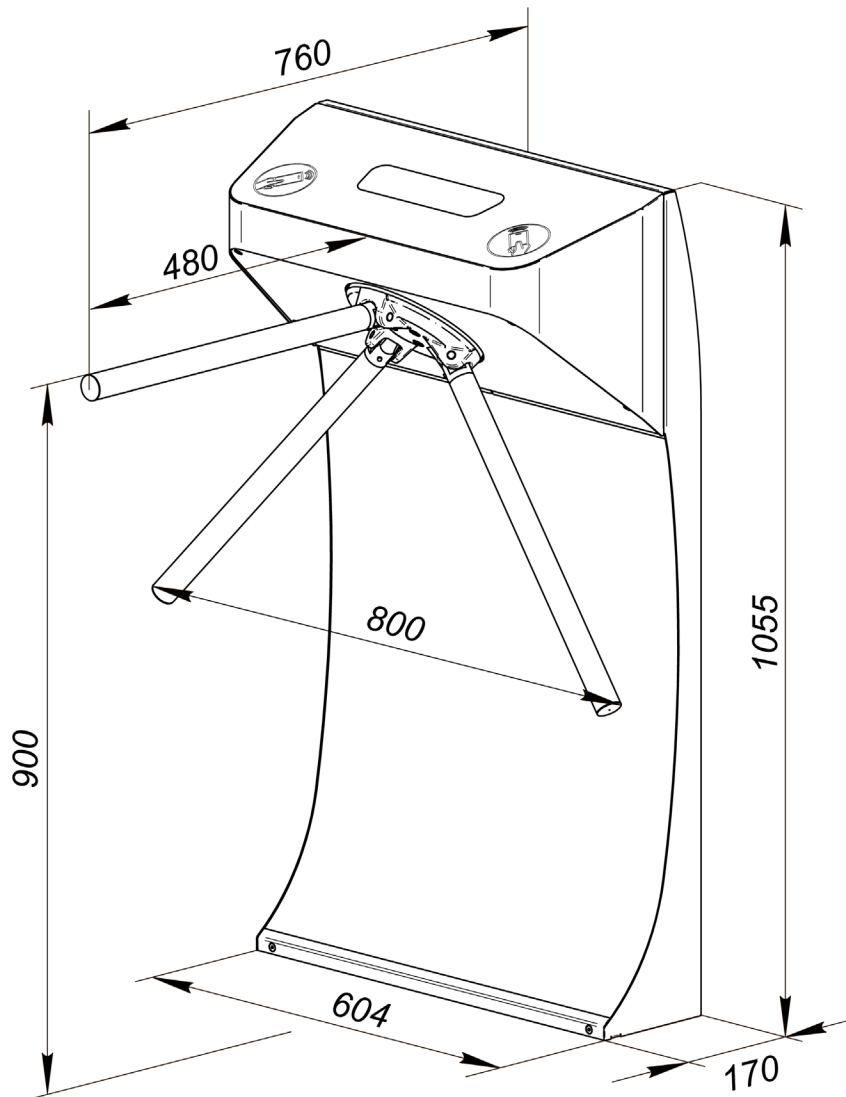


Figure 1. Turnstile overall view

4 DELIVERY SET

4.1 Standard delivery set

Basic equipment:

Turnstile housing and base assembled	1
Hub with barrier arms	1
RC-panel with cable	1

Installation tools:

M8×25 screws with spring washers for mounting the hub	3
Anaerobic adhesive sealant for fixing the hub screws (20 ml)	1
SW3 Allen key	1
100 mm cable ties	5

Technical documentation:

Certificate	1
Assembly and operation manual	1

4.2 Optional equipment supplied on request

Mounting arms to install optional equipment brackets C-11P.1 , C-11P.2 ¹	1 or 2
WRC kit ²	1
Intrusion detector	1
Siren	1
M10 anchor with bolt and washer	4

5 DESCRIPTION

5.1 Main features

- The turnstile is designed to operate both indoors and outdoors being protected from the precipitations, for example, by the canopy. The turnstile housing is made of high quality stainless steel; front panel – powder coated metal sheet, upper part of the housing – laminated plastic with polycarbonate insert.
- The turnstile can operate independently or with control devices: the RC-panel, WRC or ACS.
- The turnstile is equipped with automatic anti-panic folding arms. The barrier arm is set into vertical position at a power loss or by emergency unblocking device *Fire Alarm* signal.
- There are brackets for RFID-readers mounting located inside the turnstile under the radio-transparent upper panel; installation of optional equipment on the upper part of the housing is also available.
- The turnstile is equipped with an operating mode indication. The turnstile provides an output for connecting an additional external display as well.
- The turnstile is equipped with relay inputs for an intrusion detector, a siren and the emergency unblocking *Fire Alarm* device (i.e. fire protection system) connection.
- The turnstile is equipped with an output for a power supply low voltage alarm connection.
- There are two modes for the turnstile control - a pulse control mode and a potential control mode.
- The turnstile mechanism provides automatic barrier arm rotation to the initial position after each pass.
- After the barrier arms are turned 60° or more, the reverse rotation is blocked.
- The rotor electric drive provides smooth and silent operation of the turnstile.
- The turnstile is supplied with safe 24V voltage.

5.2 Design

The design of the turnstile (Fig. 2). Numbers in brackets correspond to Fig. 2 and 3 of this Manual.

The turnstile features turnstile base (6), housing (1) LED indication block (2), hub (4) with three barrier arms (3) and RC-panel. Moreover, the turnstile is equipped with mounting brackets to fix proximity readers inside the turnstile under the upper part of the housing. Optional equipment that is not included in the main delivery set is supplied upon request.

5.2.1 Turnstile housing and base

You can access the internal components of the turnstile by detaching the housing (1). The housing and the turnstile base are secured with four mounting screws (7) for SW3 Allen key. When operating the turnstile, the housing must be secured to the base. Inside the base under the upper part of the housing (Fig. 3): the drive control board (11), interface board (12), two brackets for mounting proximity readers (see Fig. 15) and the turnstile mechanism are located including:

- drive (14) assembled with electric motor and position sensor board;
- electromechanical blocking device (16) with optical sensors;
- emergency unlocking device (*Fire Alarm*) (13) (anti-panic function of automatic arms folding).

¹ You can get acquainted with the possible options for brackets for additional. equipment on the website <https://www.perco.ru/> or in the technical support of the PERCo company.

² The WRC kit consists of a receiver connected to the control board and transmitters.

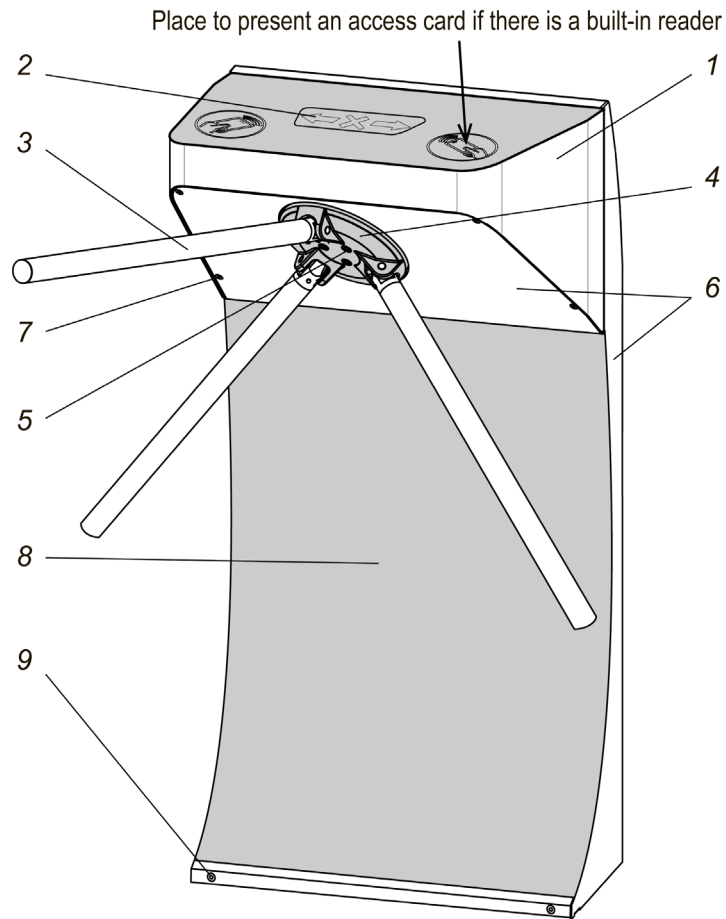


Figure 2. Turnstile overview

1 – turnstile housing; 2 – LED indication block; 3 – barrier arm; 4 – hub; 5 – hub mounting screws; 6 – turnstile base; 7 – housing mounting screws; 8 – front panel; 9 – front panel screws

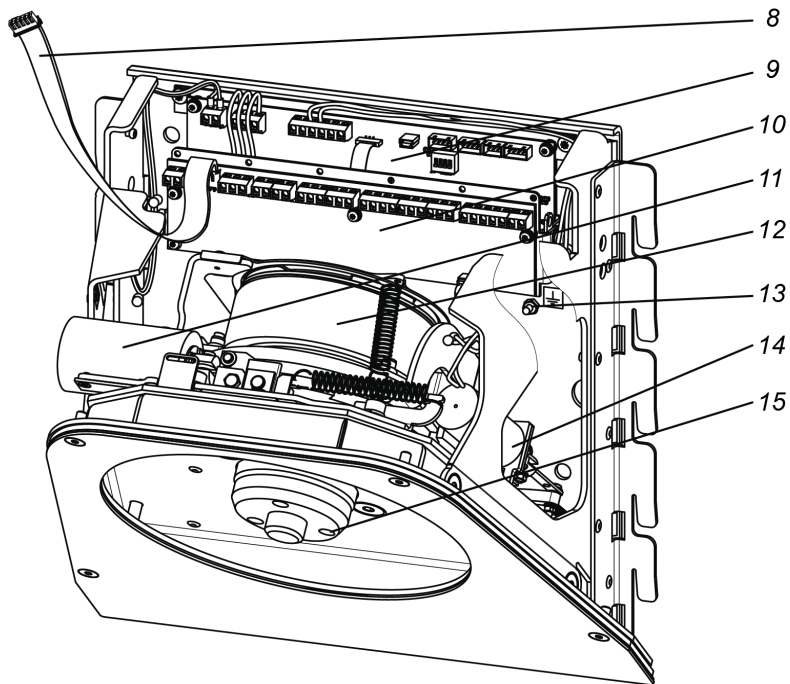
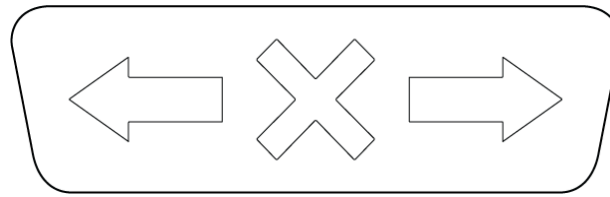


Figure 3. Turnstile components (with the housing and the hub removed)

10 – indication cable; 11 – control board; 12 – interface board;
 13 – emergency unlocking device (*Fire Alarm*); 14 – assembled drive;
 15 – grounding point; 16 – blocking device; 17 – hub mounting holes

5.2.2 LED indication block

The housing (1) features LED indication block (2) to inform about the turnstile current status and the established operating mode (Fig. 2 and 4). The display has three pictographic indicators:



passage granting indicator in one of the directions (green arrow) passage denial indicator (red cross) passage granting indicator in the other direction (green arrow)

Figure 4. LED indication block

5.2.3 RC-panel

The RC-panel is designed as a small desktop device with a shockproof ABS plastic case and is intended for setting and indicating operating modes when the turnstile is operated manually. The RC-panel overall view (Fig. 5).

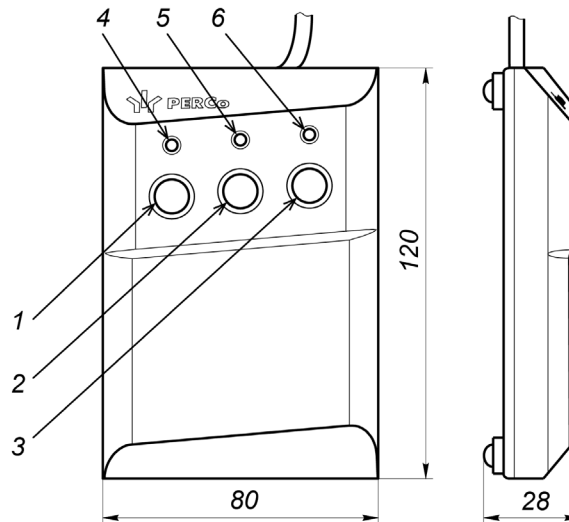


Figure 5. RC-panel design

1, 2, 3 – buttons **LEFT**, **STOP**, **RIGHT** for setting the control commands;
4, 6 – green indicators “*Left*”, “*Right*”; 5 – red indicator “*Stop*”

There are three control buttons on the RC front panel intended for setting the turnstile operating modes. The middle button on the RC-panel (hereinafter — the **STOP** button) is intended to set the turnstile to the “*Always locked*” mode. The left (**LEFT**) and the right (**RIGHT**) buttons are intended to unlock the turnstile for passage in the chosen direction. Above the buttons, there are LED indicators for the turnstile turning mechanism. A red “*Stop*” indicator indicates that both passage directions are blocked. Available control commands and indications on the RC-panel for pulse and potential control modes are given in the Tables 5 and 6. The RC-panel is connected to the interface board in accordance with the wiring diagram (Sect. 5.3.1 and Fig. 16).

5.2.4 Control and interface boards

The control board (11) receives commands from the interface board (12) and controls the operation of the electric motor, the operation of the blocking device, and the emergency unlocking device.

All units of the turnstile mechanism are connected to the control board with internal wiring. Turnstile power supply is connected to it with an external cable as well. Connection is made in accordance with the wiring diagram (Fig. 16). The overview of the control board (11) is shown in Fig. 6.

Control board elements:

- **X1 (+24 GND)** – turnstile power supply terminal block;
- **X2 (POWER+CAN)** – connector to connect communication cable with interface board;
- **X3 (Rotor Sensor)** – the rotor position sensor board terminal block (part of the drive (14));
- **X4 (A, B, C)** – terminal block for connecting the electric motor phases (part of the drive (14));
- **X5 (Lock Sensor)** – terminal block for connecting the blocking device sensor optocouplers;
- **X6 (USB UDP)** – USB port (not used during operation);
- **X7 (ANTIPANIC)** – terminal block to connect the electromagnet of automatic anti-panic unblocking device (anti-panic function of automatic folding arms);
- **X8 (LOCK)** – terminal block to connect the locking device electromagnet;
- **XP1** – programming connector (not used during operation);
- **XP2 (USB UPD)** – the jumper of the board software update via USB. If the jumper is fixed - the update mode is **ON**, if removed – the update mode is **OFF**;
- **SA1 (CONTROL)** – a set of DIP switches for setting the electric drive, must be in the **OFF** position (not used during operation);
- **PWR** – green LED indicator for interface board power supply.

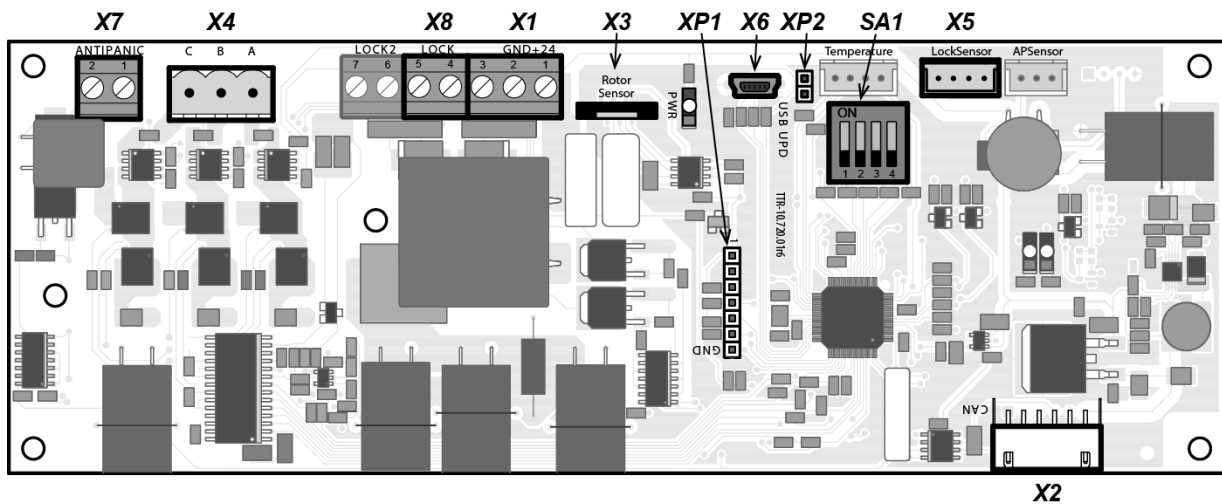


Figure 6. Control board

The interface board (12) processes the incoming commands (monitors the status of *L*, *ST*, *R* and *FA* (Fire Alarm) contacts; reads information from the intrusion detector (*DKZP1* contact) and generates commands to the control board (11), as well as signals for external devices, for RC-panel indications (*Led A*, *Led ST* and *Led B*), for the barrier arms rotation in the corresponding direction (*Pass A* and *Pass B*), for the alarm output *A1* – *A2* (Alarm) and relays the signal about the current status of the intrusion detector (*DETECT*).

The following devices are connected to the interface board: RC-panel / WRC / ACS controller, *Fire Alarm* emergency unlocking device, remote indication blocks and other optional equipment. Wired connection is carried out in accordance with the wiring diagram (Fig. 16).

The overall view of the interface board (12) (Fig. 7).

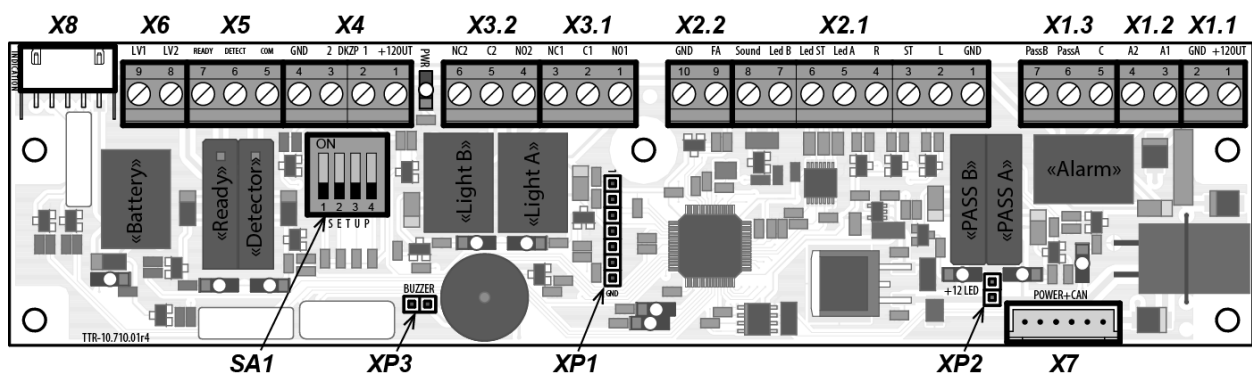


Figure 7. Interface board

Interface board elements:

- **X1 (ACS)** – optional equipment power supply terminal blocks (**X1.1**), siren connection (**X1.2**) and ACS controller inputs for PASS signals (**X1.3**);
- **X2 (RC)** – terminal blocks for connecting the RC-panel, WRC or ACS controller (**X2.1**), as well as *Fire Alarm* emergency unlocking device (**X2.2**);
- **X3 (Light)** – terminal blocks for connecting remote indicators (“open” / “closed”, **X3.1** – for direction A, **X3.2** – for direction B);
- **X4-X6 (ADD)** – terminal blocks for connecting optional equipment (**X4** - for intrusion detector connection, **X5** - Ready and Detect signal outputs; **X6** - the alarm relay output for low voltage (low battery));
- **X7 (CAN)** – connector for interface board and communication cable interconnection (11);
- **X8 (INDICATION)** – indication cable connection connector (10);
- **XP1** – programming connector (not used during operation);
- **XP2 (+12LED)** – the jumper of board outputs relay operation indication. If the jumper is fixed - indication is *ON*, if removed – indication is *OFF*;
- **SA1 (SETUP)** – a set of DIP switches:
 - SA1-1** – turnstile control mode selection: **ON** - pulse (set by default), **OFF** - potential,
 - SA1-2** – barrier arms turn force value selection:
 - **ON** – hard;
 - **OFF** – soft, set by default.
 - SA1-3, SA1-4** – not used during operation, must be in the **OFF** position.
- **PWR** – green LED indicator for interface board power supply.

Table 1. Pin assignment of terminal blocks

No	Item	Designation
Control board terminal blocks		
X1 (POWER)		
1	+24	Turnstile power supply 24V DC, 9A
2	GND	
Interface board terminal blocks		
X1(ACS)		
1	+12OUT	+12V power supply for additional equipment (siren)
2	GND	
3	A1	“Alarm” relay output (siren connection)
4	A2	
5	C	Common for PASS relay outputs
6	Pass A	PASS A relay output (passage in A direction)
7	Pass B	PASS B relay output (passage in B direction)
X2 (RC)		
1	GND	General
2	L	Control input - passage A granting
3	ST	Control input - passage denial
4	R	Control input - passage B granting
5	Led A	Passage A granting indication output on the RC-panel
6	Led ST	Passage denial indication output on the RC-panel
7	Led B	Passage B granting indication output on the RC-panel
8	Sound	RC-panel sound signal output
9	FA	Emergency passage unlocking control input
10	GND	

No	Item	Designation
X3 (LIGHT)		
1	NO1	Normally open contact of the external <i>Light A</i> output
2	C1	Common contact of the external <i>Light A</i> output
3	NC1	Normally closed contact of the external <i>Light A</i> output
4	NO2	Normally open contact of the external <i>Light B</i> output
5	C2	Common contact of the external <i>Light B</i> output
6	NC2	Normally closed contact of the external <i>Light B</i> output
Remote terminal blocks X4-X6 (ADD)		
1	+12OUT	+12V output for optional equipment powering (intrusion detector)
2	DKZP1	Intrusion detector connection
3	DKZP2	
4	GND	
5	COM	
6	DETECT	<i>Det Out relay output</i> (intrusion detector status)
7	READY	<i>Ready relay output</i> (turnstile readiness)
8	LV1	The alarm relay output for low voltage (low battery)
9	LV2	

5.2.5 Control signals

Turnstile operation is performed by sending a control signal to *L*, *ST* and *R* X2 terminal block contacts on the interface board. The control signal is a low-level signal regarding the *GND* contact. Normally open relay contact or circuit with an open collector output can serve as a control element (Fig. 8 and 9).

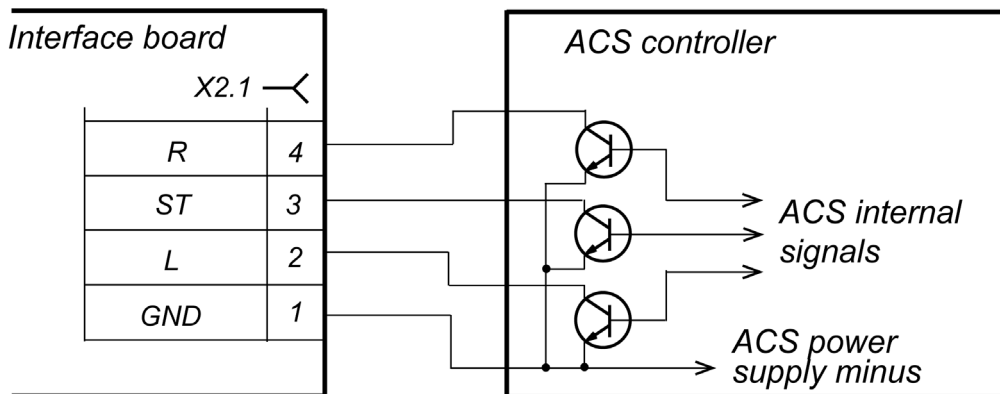


Figure 8. ACS control elements – normally open relay contact

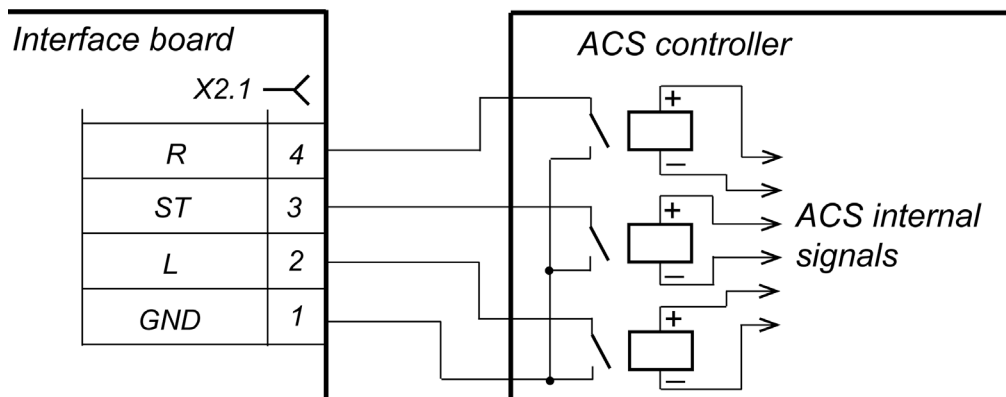


Figure 9. ACS control elements – circuit with an open collector output

Turnstile emergency unlocking is performed by a low-level signal release from *FA* connector of the **X2** terminal block on the interface board regarding the *GND* contract. A normally closed relay contact or a circuit with an open collector output can serve as a control element. In this case all other incoming control commands are ignored. (Sect. 5.3.2)

Sending a low-level signal to *Fire Alarm* input, you put the turnstile directions into the mode according to the signal levels at the inputs *L*, *R*, and *ST*.

Intrusion detector activation is monitored by a low-level signal release from the *DKZP1* input on the interface board regarding the *GND* contract. A normally closed relay contact or a circuit with an open collector output can serve as a control element.



Note:

Use 1 kOhm resistors, connected to +3.3V power line to generate a high-level signal on all input contacts (*L*, *ST*, *R*, *FA* and *DKZP*).

Control element is to provide the following characteristics of the signals:

control element – relay contact:

minimum switched current max 2mA

closed contact strength (with regards to connecting cable strength) max 300 Ohm

control element – circuit with an open collector output:

closed contact voltage (low-level signal, on the control board input) max 0.8V

5.2.6 Turnstile control modes

There are two turnstile control modes – pulse and potential. In both modes the turnstile is controlled by sending commands (i.e. control signals combinations) to *L*, *ST* and *R* control inputs and to a special *FA* control input. Control command sending algorithm changes depending on the chosen mode (Tables 5 and 6).

The control mode is set either **ON** or **OFF** by **SA1 (SETUP)** switch on the interface board (12). Switch location (Fig. 7). Shift the switch into **ON** position to place the turnstile into pulse mode. Shift the switch into **OFF** position to place the turnstile into potential control mode.



Caution!

Shift the switch with de-energized equipment only.

Pulse control mode is used for turnstile operation from RC-panel, WRC and ACS controller with the outputs supporting pulse control mode.

Control signal duration at sending control command to control inputs is to be not less than 100ms. The initial passage waiting time is 8 sec., regardless of control signal (pulse) duration.

The turnstile operation description for this mode is given in Table 5. Control command sending algorithm is given in Appendix 1.

Potential control mode is used for turnstile operation with ACS controller. The outputs of the ACS controller are to support potential control mode.

Control signal duration at sending control command to control inputs is 100ms. minimum. The passage waiting time is equal to low-level signal duration, i.e. if by the moment of passage completion in the permitted direction, there's a low-level signal on the input of this direction, the turnstile remains open in this direction.

The turnstile operation description for this mode is given in Table 6. Control command sending algorithm is given in Appendix 2.

By sending a low-level signal to *ST* input, both directions are locked in accordance to signal duration time, independently of signal levels on *L* and *R* inputs. Removing low-level signal from *ST* input, the directions shift into the modes, according to signal levels on *L* and *R* inputs.

The turnstile operation at the *FA* control input is described in Sect. 5.3.2.

5.2.7 Turnstile mechanism operation algorithm

Turnstile operation algorithm at pulse control mode in case of single passage in one of the directions:

1. Turnstile starting position - the drive is turned off, passage denial indicator is on, when you try to turn the barrier arms more than 5° in any direction, the blocking device locks the hub, an alarm is turned on - passage through the turnstile is closed.
2. The command (combination of control signals) for single passage performance in one of the directions is sent from the control device (RC-panel, WRC, ACS controller) to the interface board inputs.
3. The microcontroller on the control board (9) processes the received combination of signals and creates a command for the turnstile mechanism to open the passage in the desired direction (blocking device opens).
4. The microcontroller monitors the barrier arms hub rotation sensor status and counts the elapsed time since the button on the RC-panel, that corresponds to the passage permission in the desired direction, was pressed.
5. When the user turns the barrier arms 10° in the authorized direction, the microcontroller sends a signal to the drive to smoothly rotate the hub in the passage direction to the next starting position, thereby providing a comfortable passage in a given direction. When turning the barrier arms 60°, a *PASS A (B)* signal with a duration of 250ms. is generated (*PASS A (B)* and *Common* contacts open).
6. After turning the barrier arms 60°, the possibility of reverse rotation is blocked by both the electric drive and blocking device - it is now possible to move forward to the next starting position only.
7. In case of passage denial, i.e. if after 8 seconds from the moment of passage permission the barrier arms were not rotated 60° or more, the microcontroller generates a command to the control mechanism to block the further passage in this direction, while the drive will return the barrier arms back to the home position.
8. When the barrier arms reach the home position (120° rotation of the barrier arms or if the passage is denied by 0°), the microcontroller enters the standby mode.

In the “*Free passage ...*” operating modes, the algorithm remains the same, except the turnstile is not locked at the end of the passage but is ready for a new passage.

5.3 Control devices

RC-panel / WRC or ACS controller can be used for turnstile operation. These devices can be connected to the turnstile separately, simultaneously (in parallel) or in any combination with each other.



Note:

In case several control devices are connected to the turnstile simultaneously there can be a control signal overlap. In this case the turnstile reaction will correspond to the reaction to the resulting input signal combination (Appendixes 1 and 2).

5.3.1 RC-panel connection

RC-panel is connected to *GND*, *L*, *ST*, *R*, *Led A*, *Led ST* and *Led B* contacts of the **X2.1** terminal block (Fig. 17).

Standard RC-panel orientation regarding the turnstile post is stated in Fig. 16.

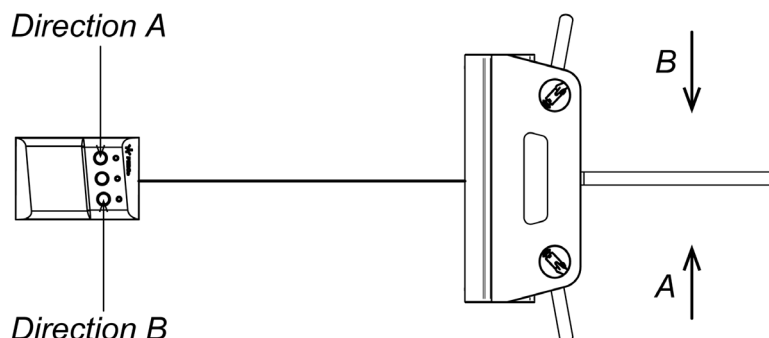


Figure 10. Standard RC-panel orientation regarding the turnstile post

If the operator is located on the opposite side regarding the turnstile post, it will be more convenient to shift the RC-panel wires, which are connected to *L* and *R* contacts, as well as *Led A* and *Led B* (Table 2).

Table 2. Connection of RC-panel cable wires to the X2.1 terminal block for standard and reverse RC-panel orientation

№	Contact	RC-panel orientation	
		Standard	Reverse
1	<i>GND</i>	black	black
2	<i>L</i>	white	green
3	<i>ST</i>	blue	blue
4	<i>R</i>	green	white
5	<i>Led A</i>	yellow	red
6	<i>Led Stop</i>	orange	orange
7	<i>Led B</i>	red	yellow
8	<i>Sound</i>	brown	brown



Note:

WRC is connected to *L*, *ST*, *R* and *GND* contacts of the **X2.1** terminal block on the interface board. WRC power supply can be connected to +12OUT contact of the **X4** terminal block or **X1.1** terminal block.

When the RC-panel buttons are pressed, the corresponding contact *L*, *ST* and *R* closes with the *GND* contact (i.e., a low-level signal formation relative to the *GND* contact).

Turnstile control using the WRC device is similar to that with RC-panel.

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

The WRC operation manual is supplied with the device.

5.3.2 Fire Alarm emergency unlocking device

The emergency unlocking device is connected to the contacts *FA* and *GND* of the **X2.1** terminal block on the interface board in accordance with the wiring diagram of the turnstile (Fig. 7 and 16).

If the *Fire Alarm* is not used, it is necessary to set a wire jumper between the *FA* and *GND* contacts. The jumper is installed upon delivery.

When a control signal is sent to the *FA* input, the turnstile switches to the *Fire Alarm* emergency free passage mode with all the incoming turnstile control commands ignored. The central barrier arm automatically falls down under its own weight and takes up a vertical position, ensuring free passage. Both green direction arrows will flash, briefly changing to a red cross on the turnstile LED indication block (2).

If the *Fire Alarm* signal is received while making a passage, the *Fire Alarm* flashing will be activated on the LED indication, but the emergency unlocking function will be activated only after the rotation is finished.

After the Fire Alarm control signal has been removed, the red passage denial indicator on the turnstile LED indication lights up, and the turnstile goes into standby mode. To continue operating, the barrier arm must be manually fixed and set to the horizontal position.

Automatic anti-panic function is also activated at a power supply loss, e.g. in case of connected power supply unit breakdown.

5.3.3 Operation with an ACS controller

The turnstile can be an operating device as part of an ACS. The ACS controller outputs are connected to the *GND*, *L*, *ST*, *R* contacts of the **X2.1** terminal block on the interface board. ACS controller inputs are connected to the contacts *C* (*Common*), *Pass A*, *Pass B* of the **X1.3** remote terminal block. Connection is made in accordance with the wiring diagram of the turnstile (see Fig. 16).

If necessary, the controller inputs can be connected to the *READY*, *DETECT* and *COM X5* terminal block contacts to monitor the corresponding turnstile conditions.

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

For organizing single passes in the potential control mode, it is recommended to remove the low-level control signal upon passage through the turnstile, i.e. at the beginning of the corresponding direction *PASS* signal.

5.4 Additional devices connectable to the turnstile

5.4.1 Relay outputs

Connection to the control board relay outputs is performed through the corresponding contacts of the **X1** and **X5** terminal blocks on the interface board. The following relay outputs are installed:

- “Alarm”: contacts *A1* and *A2* (Sect. 5.4.2);
- “PASS A”: contacts *Pass A* and *C* (Sect. 5.2.7);
- “PASS B”: contacts *Pass B* and *C* (Sect. 5.2.7);
- “Not ready”: contact *READY* and *COM* (Sect. 5.5);
- “Detector”: contacts *DETECT* and *COM* (Sect. 5.4.2);
- “Battery”: contacts *LV1* and *LV2* (Sect. 5.5).

Relays “PASS A” (*Pass A* and *C* contacts), “PASS B” (*Pass B* and *C* contacts), “Detector” and “Not ready” (*DETECT*, *READY* and *COM* contacts) have normally open contacts when the power is off. Moreover, the *C* and *COM* contacts common to these relays are not connected to the turnstile power supply minus.

“Alarm” (contacts *A1* and *A2*) and “Battery” (*LV1* and *LV2*) relays have normally open contacts when the power is off.

In the initial (inactive) state when the power is on, the “PASS A” and “PASS B” relay contacts are closed (voltage is applied to the relay coil), and the “Detector”, “Not ready”, “Alarm” and “Battery” relay contacts are open (voltage to relay coil is not applied).

The actuation / release of the “PASS A”, “PASS B”, “Ready”, “Detector”, “Alarm” and “Battery” relays can be determined by the light-on / off of the green indicators installed near the indicated relays (Fig. 7) (indicators operate with the **XP2** jumper installed).

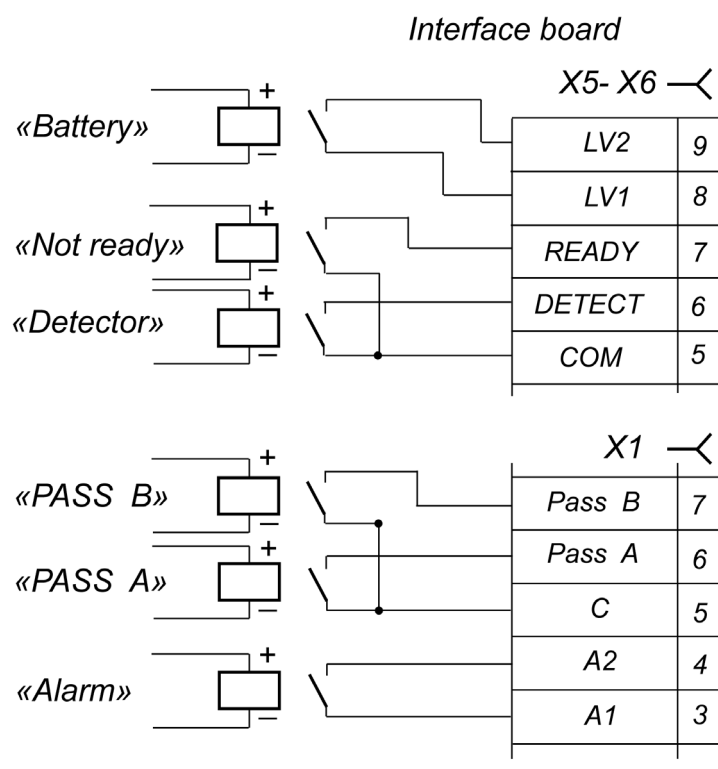


Figure 11. Pass elements PASS A, PASS B, Ready, Det Out and Alarm

Pass elements for “PASS A”, “PASS B”, “Ready”, “Detector” - relay contacts (Fig. 11) with the following signal characteristics:

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

Pass elements for «Alarm» and «Battery» – relay contacts (Fig. 11) with the following characteristics:

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

5.4.2 Intrusion detector and siren



Caution!

Installation of the intrusion detector is made in accordance with the passage area layout and climatic resistance of the detector. No intrusion detector installation inside the turnstile post is possible.

The intrusion detector is connected to the **X4** terminal block contacts, and the siren is connected to the **X1** terminal block on the interface board (12) according to the wiring diagram (Fig. 7 and 16). There should be normally closed contacts on the intrusion detector. In case the intrusion detector is not connected, it is necessary to set a wire jumper between the contacts *DKZP1* and *GND* of the **X4** terminal block. The jumper is installed upon delivery.

The siren is connected to the *Alarm 1*, *Alarm 2* and *GND* contacts and +12V of the **XT1.H** terminal block. The parameters of the alarm relay output signals “Alarm” are indicated in Sect. 5.4.1.

If the turnstile is locked (the command “*Always Locked*” or “*Both passage directions are locked*” is given, Tables 5 and 6) the *DKZP1* input is activated and a signal comes from the intrusion detector, the “Alarm” output is activated. The “Alarm” output is disabled 5 sec. after activation or by executing 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.



Note:

The control signal from the intrusion detector does not activate the *ALARM* output if the turnstile turning mechanism is unlocked in one of the directions or was blocked less than 3 sec. ago.

A signal about the intrusion detector current state is always transmitted to the *DETECT* contacts (relay “Detector”) and *COM* of the **X5** terminal block on the interface board (Fig. 7).

The parameters of the “Detector” relay output signals are indicated in Sect. 5.4.1.

5.4.3 Remote indicators

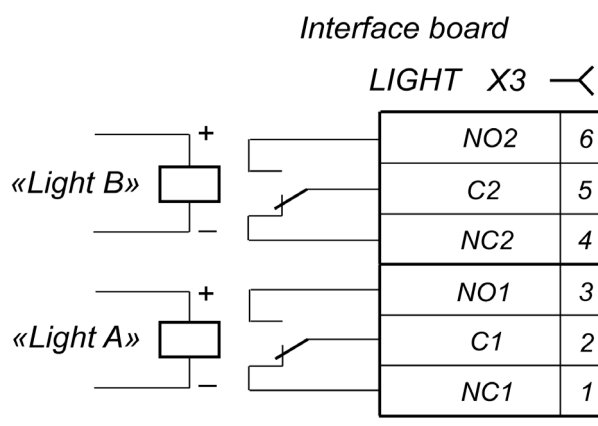


Figure 12. Light A and Light B pass elements

Remote indicators for corresponding passage directions are connected to **X3 (LIGHT)** terminal blocks - *NO1*, *C1*, *NC1*, *NO2*, *C2*, *NC2*. The relay “Light A” (“Light B”) is activated (voltage is supplied to its winding) when the green arrow corresponding to this direction of passage is lit on

the LED indication unit, and normalized (voltage is not supplied to its winding) when it is not lit. The fact of "Light A" and "Light B" relays operation can be determined by the state of the indicators that are installed near the indicated relays (Fig. 7) (this indication operates when the **XP2 (+12LED)** jumper is installed).

Pass elements for "Light A" and "Light B" - relay transfer contacts (Fig. 12) with the following signal characteristics:

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

5.5 Operation contingencies and response

The turnstile is capable of providing information on the following operation contingencies:

1. Unauthorized access.
2. Passage delay for more than 10 sec.
3. Barrier arms rotation sensor failure.
4. Intrusion detector activation (Sect. 5.4.2).
5. Power failure (decrease below acceptable level)

In the cases 1-4, a special *Alarm* signal is generated by closing the *A1* and *A2 X1* connector contacts. The "Alarm" relay output signals parameters are indicated in Sect. 5.4.1.

When eliminating the cause of the *Alarm* signal, the "Alarm" relay contacts open and the signal is removed.

An alarm lamp (buzzer) in the driver's cab can be connected to the output of the "Alarm" relay, alerting the turnstile emergency operation.

During operation, the microprocessor monitors the voltage supplied to the turnstile, and when the voltage is reduced (less than 21.8V), the "Battery" relay contacts (*LV1* and *LV2* of **X6** terminal block on the interface board (12)) will be closed to each other, indicating a low supply voltage (low battery). With a subsequent increase in voltage to 23.6V, the "Battery" relay contacts *LV1* and *LV2* will open, thus indicating a nominal supply voltage (battery charge). The parameters of the "Battery" relay output signals are indicated in Sect. 5.4.1.

In case of a voltage drop below the threshold value for switching off the electronics (17V), the turnstile electronics will automatically disconnect from the power source. When voltage is restored above the threshold for switching the electronics on (18V), the turnstile electronics will automatically turn on.

6 MARKING AND PACKAGING

The turnstile has the marking on the inner surface of the side wall of the turnstile base. The label contains manufacturer's trademark and contact details, year and month of production, operating voltage and power consumption of the turnstile.

To get access to the label it is necessary to detach the turnstile housing (1) from the turnstile base in the following way:

1. Unscrew the four fixing screws of the housing (7) using the SW3 Allen key. The screws are located on the lower surface of the turnstile base, the hub side.
2. Lift the turnstile housing by the lateral faces to half the height of the turnstile base.
3. Separate the indication cable (10) from LED indication unit (2).
4. Detach the housing carefully and put it on a plain and steady surface.

The housing is mounted on the turnstile base in the reverse order. When lowering the housing, make sure that the indicator cable (10) folds forward and is not pinched by structural elements.

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

Transportation box dimensions (L×H×W)	114×74×36 cm
Transportation box weight (gross)	max 100 kg

7 SAFETY REQUIREMENTS

7.1 Installation safety requirements

The turnstile installation must be carried out by specialists who have fully studied this manual and passed safety training, in accordance with the general rules for the implementation of electrical and installation work.



Warning!

- The power supply or battery must be turned off and disconnected during installation of the turnstile.
- Only serviceable tools must be used for installation.
- Lay the cables in compliance with the electrical installations rules of operation.
- Before turning on the turnstile for the first time, make sure it is installed and connected correctly.

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

7.2 Operation safety requirements

Follow general electrical safety rules when operating the turnstile.



It is prohibited!

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

The power supply unit should be used in compliance with its operational documentation.

8 INSTALLATION INSTRUCTIONS

Follow the safety requirements during the installation (Sect. 7.1).



Warning!

The manufacturer is not responsible for any damage to the turnstile or other equipment, as well as other damages caused by improper installation, and rejects any consumer complaints if the installation is performed in violation of the instructions given in this manual.

8.1 Installation details

The turnstile installation is a demanding operation, both performance and service life of the product largely depend on it. Installation must be carried out by at least two specialists qualified as an installer and an electrician. It is recommended to study this section carefully prior to installation, and follow the given instructions.

Installation surface recommendations:

The turnstile must be installed on strong, even, stone or concrete (grade 400 or higher) or other bases with a thickness of at least 150 mm, using four M12 anchor bolts. In this case, the installation surface must be leveled the way the mounting points of the turnstile post are in the same horizontal plane (control with a level). When installing the turnstile post on a less solid base, it is necessary to use embedded foundation elements of at least 300×300×300 mm size. It is also possible to use a frame base.

Passage zone organization:

The turnstile is equipped with an electric drive for the barrier arms rotation. When rotated 5° or more, the barrier arms turn in the passage direction (when rotated 60° or more, the barrier arms cannot be returned to their original position, since the return passage is blocked). When rotated at an angle of less than 60° the barrier arms return to their original position in 8 sec. To ensure accurate 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 passage direction by an angle of more than 60° (Fig. 13).

Follow the recommendations (Fig. 13) to ensure the required angle of rotation when installing the turnstile.

When organizing the passage area, it is recommended to arrange an additional emergency exit. For example, it can be the **BH-02** automatic rotary section (Sec. 9.4).

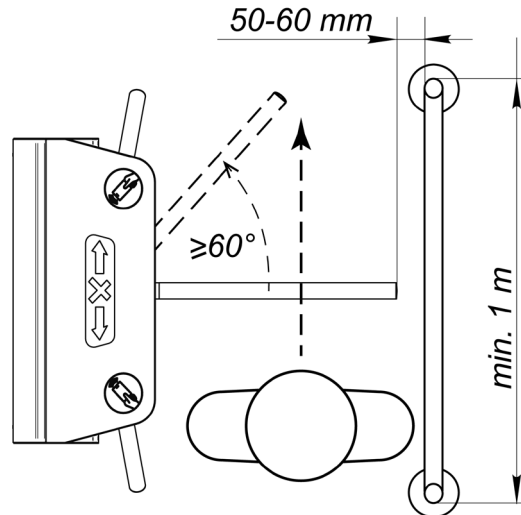


Figure 13. Passage area. Recommendations

8.2 Installation tools

Tools recommended for the turnstile installation:

- 1.2÷1.5kW hammer drill;
- Ø16 mm hard-alloyed drill bits;
- Floor chaser for electric raceway;
- Flat slot SL3×0.5 screwdriver;
- Horn-type and socket wrenches: S13, S17;
- Torque wrench (8 - 25Nm);
- SW3 Allen key (imbus);
- 90° set square;
- Level and measuring tape (2m);



Note:

Other tools that do not reduce the required quality of installation work are allowed.

8.3 Length of cables

Table 3. Cables, used at the installation

No	Equipment	Cable length, m, max	Cable type	Cross-section, mm ² , min	Example
1	Power supply	15	Twin cable	2.5	AWG 15; HO5VV-F 2×2.5
2	- Fire Alarm - Optional equipment	30	Twin cable	0.2	RAMCRO SS22AF-T 2×0.22 CQR-2
3	RC-panel	40	Eight core cable	0.2	CQR CABS8 8×0.22c
4	ACS controller	30	Six core cables	0.2	CQR CABS6 6×0.22c
5	Grounding	10	Single core cable	1.5	Copper wire 1.5 mm ²

8.4 Installation procedure

The turnstile wiring diagram is given in Fig. 16. The terminal blocks location on the control (11) and interface (12) boards is given in Fig. 6 and 7. The cables used during installation and their maximum

lengths are indicated in Sect. 8.3. The installation surface and passage area recommendations are given in Sect. 8.1. Follow this sequence of actions, when installing the turnstile:

1. Unpack the turnstile and check the completeness as per Sect. 4.
2. Install the turnstile power supply to its designated place in accordance with its operational documentation.
3. Route all cables in the cable ducts to the turnstile.
4. Mark and drill holes in the floor for anchors to fix the turnstile and cable channel in the cable entry zone (see Fig. 14). The marking can be carried out by tracing the base of the mounting post.

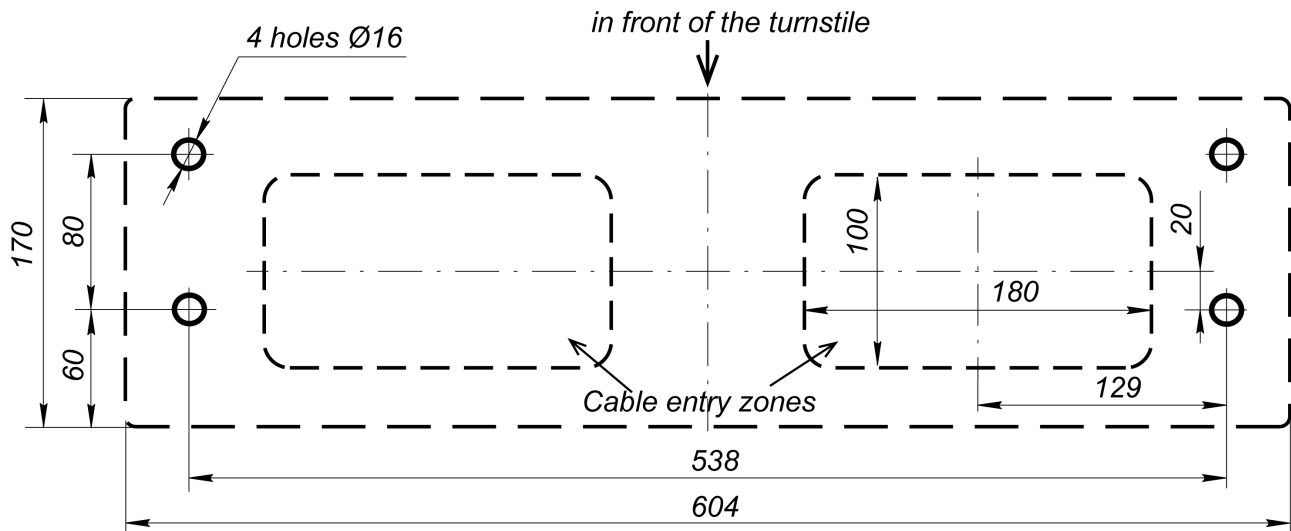


Figure 14. Hole marking on the mounting surface

5. Route the cables in the cable channel to the cable entry zone; spare cable must be min. 1.5 m.
6. Remove the front panel (8) from the housing; to do so, unscrew two screws at the bottom (9).
7. Secure the turnstile on the mounting surface using 4 PFG IR10-15 anchor bolts. Control the vertical positioning of the post by level.



Attention!

Be cautious before securing the turnstile, prevent it from falling.

8. Remove the housing (1) from the turnstile base:
 - Unscrew the four fixing screws on the housing (7) using the SW3 Allen key. The screws are located on the lower surface of the turnstile base, the hub side.
 - Lift the turnstile housing by the lateral faces to half the height of the turnstile base.
 - Separate the indication cable (10) that connects the LED indication block (2) and the interface board (12).
 - Detach the housing carefully and put it on a plain and steady surface.
9. Put the cables inside the post and route them through the housing holes to the control and interface boards. Secure the cables inside the post with cable ties.
10. Put the front panel back (9) and fix it with screws (10).
11. Connect the power cable from the turnstile power supply to **X1** terminal block on the control board (11). Connect the ground wire to the grounding point (15) (Fig. 3). For connection ease, unscrew the two fixing screws a few turns on the sides of the interface board and push it towards you until it stops.
12. Connect the RC-panel (WRC or ACS controller) cable to the **X2** terminal block on the interface board (Fig. 16).
13. If necessary, install proximity readers inside the turnstile under the upper plastic panel of the housing. Readers are mounted on special brackets: remove the brackets first from the housing rack by unscrewing two M2.5 screws with washers, then install the readers on the brackets and install the brackets back on the rack (see Fig. 15).



Note:

RFID-readers admissible dimensions: 150×70×28 mm.

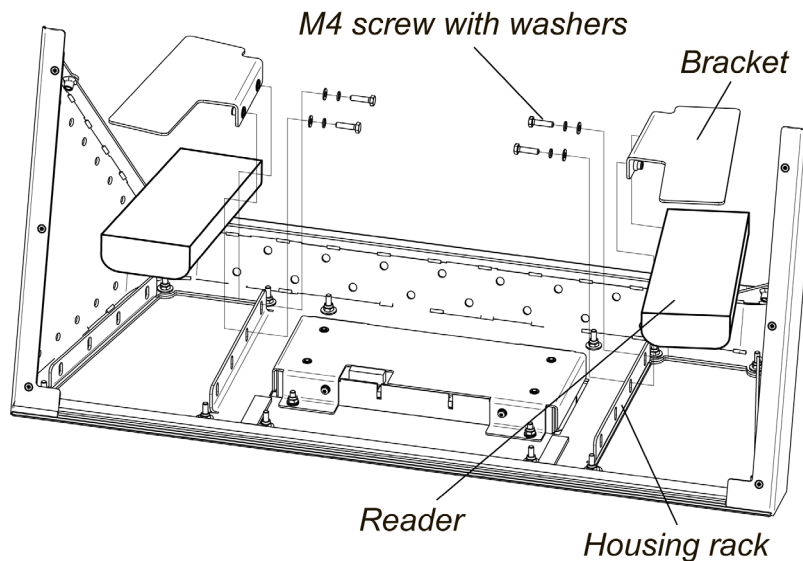


Figure 15. Built-in RFID-readers installation

14. Install and connect optional equipment if necessary: ACS controller, intrusion detector and siren; *Fire Alarm* emergency unlocking device, remote indicators, etc. (Fig. 1).
15. Check serviceability and accuracy of all the electrical connections in accordance with the diagram in Fig. 1. Slide the interface board back into place and tighten the lock screws. Carefully lay and secure all connected cables on a holed horizontal shelf with the supplied cable ties.
16. If it is necessary to set the turnstile to potential control mode, set the switch **No. 1 SA1 (SETUP)** on the interface board to the **OFF** position.
17. If necessary, set the barrier arms turn effort to “hard” - set the switch **No. 2 SA1 (SETUP)** on the interface board to the **ON** position.



Note:

The “hard” value of barrier arms turn effort should be used if the turnstile is used outdoors in northern regions to compensate for grease thickening at low temperatures. In all other cases, it is recommended to use the “soft” value of barrier arms rotation for more comfortable passage.

18. Install the housing (1) on the turnstile base:
 - Put on the housing till to the half of its height.
 - Connect the indication cable (10) to the turnstile LED-indication and to the **X8 (INDICATION)** connector on the interface board and put the housing all the way down. When lowering the housing, make sure that the indication cable (10) folds forward and is not pinched by structural elements. Correct housing installation does not require great physical effort.
 - Secure the housing with four screws (7) on the bottom of the base.
19. Install the hub (4) with barrier arms (3) in the following order:
 - Insert the hub into the appropriate mounting seat on the turnstile mechanism shaft.
 - Secure the hub with three screws with spring washers (5); preliminary, to fix the screws securely, apply a bit of the supplied sealant to the bottom of their threads. Tightening the screws should ensure reliable hub fixation relative to the turnstile mechanism shaft (without backlash and distortions). The tightening force of the hub screws is 15Nm.



Caution!

For correct hub installation, before final tightening of the screws, it is necessary to supply power to the turnstile, move the barrier arm to its horizontal position and use a square to set an angle of 90° in a horizontal plane between the arm and the turnstile base.

Run a test switch on of the turnstile (Sect. 9.1).

8.5 Wiring diagram

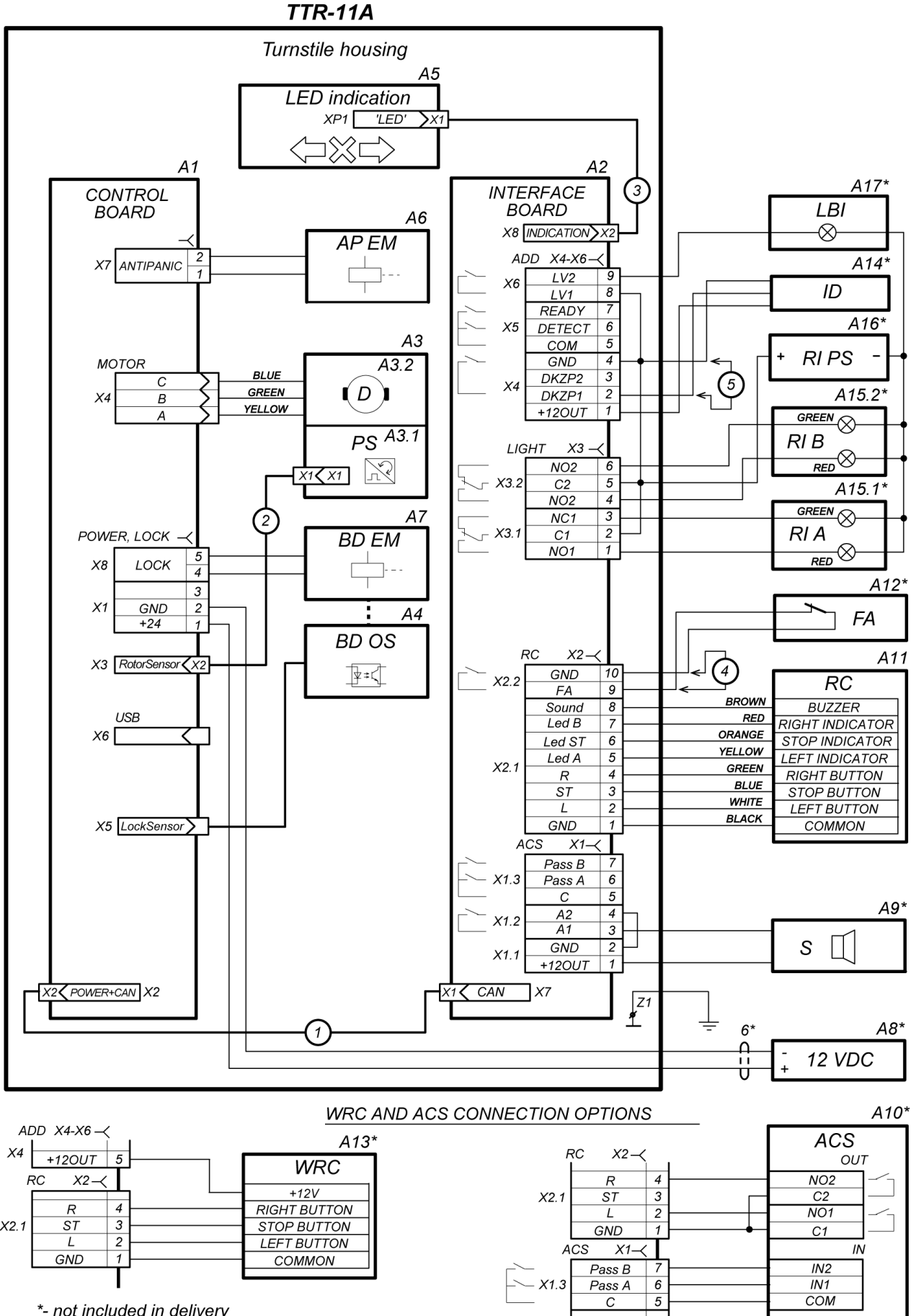


Figure 16. Wiring diagram

Table 4. Wiring diagram description

Item	Description	Q-ty
A1	Control board	1
A2	Interface board	1
A3	Drive assembled	1
A3.1	Position sensor board	1
A3.2	Electric drive motor	1
A4	Blocking device optical sensors board	1
A5	LED indication unit	1
A6	“Anti-panic” device electric magnet	1
A7	Blocking device electric magnet	1
A8 ¹	Turnstile power supply (battery) 24V	1
A9 ¹	Siren DC 12V	1
A10 ¹	ACS controller	1
A11 ¹	RC-panel	1
A12 ¹	Emergency unblocking device <i>Fire Alarm</i>	1
A13 ¹	WRC	1
A14 ¹	Intrusion detector	1
A15.1 ¹ , A5.2 ¹	Remote indicators for A and B directions (RI A, RI B)	2
A16 ¹	Remote indicator power supply	1
A17 ¹	Low battery indicator	1
1	CAN connection cable	1
2	The rotor position sensor connection cable	1
3	Indication cable	1
4 ²	Wire jumper if FA device is not installed (A12)	1
5 ²	Wire jumper if intrusion detector is not installed (A14)	1
6 ¹	Turnstile power cable	1

9 OPERATION INSTRUCTIONS

Follow the turnstile operation safety requirements (Sect. 7.2).



It is prohibited!

- To move through the turnstile passage area any objects with dimensions exceeding the width of the passageway.
- To strike the turnstile components.
- To disassemble and adjust the turnstile nodes.
- To use abrasive or chemically active substances for cleaning of the turnstile external surfaces.

9.1 Power-up

Follow these steps when you power up the turnstile:

1. Connect the power cable of the turnstile power supply to the network with the voltage and frequency indicated in the power source certificate.
2. Switch on the turnstile power supply. The turnstile automatically switches to “*Always locked*” in pulse control mode. The turnstile switches to “*Both directions locked*” in potential control mode. Red cross (passage denial) will appear on LED-indication. The indicator located above the **STOP** button will light up on the RC-panel.
3. Lift up the barrier arm (3). It will be fixed automatically.
4. Check the intrusion detector and siren operation (if included in the delivery set and installed accordingly). After the power-up wait until the test indicator (inside the intrusion detector) goes off (it takes 10-50 sec). Put your hand to the intrusion detector. The intrusion detector

¹ Supplied on request.

² The jumper is installed upon delivery.

activation will turn a continuous sound signal on. The sound will stop in 5 sec. To eliminate the sound signal, press any button on the RC-panel.

The turnstile is ready for operation.

9.2 Operating modes of the turnstile at pulse control mode

After switch on the power supply the turnstile is automatically switched to “*Always locked*” mode.

See Table 5 for the turnstile control modes and indication. Setting the operating modes for each direction is independent, i.e. setting the operating mode for one direction does not affect the operating mode for the opposite one.

The RC-panel overall view is given in Fig. 5:

- The “*Single passage in the set direction*” mode can be changed to the “*Always free*” mode for the same direction, or to the “*Always locked*” mode;
- The “*Free passage in the set direction*” mode can be changed to the “*Always locked*” mode only;
- In the “*Single passage in the set direction*” mode the turnstile will close automatically after a person’s passage in the set direction. The turnstile will also close automatically, if the passage is not made within 5 sec.;
- In the “*Bi-directional single passage*” mode after the passage in one direction the countdown of the passage waiting time (5 sec.) for the opposite direction is recommenced.



Note:

Pressing the button on the RC-panel corresponds to the low-level signal supply to the **X2** terminal block contacts (*L*, *R* and *ST*) on the interface board relatively to the *GND* contact.

Table 5. Pulse control mode (the J1 jumper is set)

Operating modes	Actions to do on RC-panel	Indication on		Turnstile status
		RC-panel	LED display	
“ <i>Always locked</i> ”	Press the STOP .	The red indicator “ <i>Stop</i> ” is on.	The red cross indicator is on.	The turnstile is locked in both directions.
“ <i>Single passage in the set direction</i> ”	Press the LEFT / RIGHT button.	The green indicator “ <i>Left</i> ” / “ <i>Right</i> ” is on.	Green arrow for the chosen passage direction is on.	The turnstile is unlocked for a single passage in the set direction. In the other direction, the turnstile remains blocked.
“ <i>Bi-directional single passage</i> ”	Press both the LEFT and RIGHT buttons simultaneously.	Both green indicators (“ <i>Left</i> ” and “ <i>Right</i> ”) are on.	Green arrows for both passage directions are on. After the passage, the green arrow for this direction goes out. After the second passage, the second arrow goes out and the red cross is on.	Regardless the order of passage, the turnstile is unlocked for sequential single passage in both directions.
“ <i>Free passage in the set direction</i> ”	Press the STOP button and LEFT or RIGHT simultaneously.	The green indicator of the chosen passage direction “ <i>Left</i> ” / “ <i>Right</i> ” is on.	Green arrow for chosen direction is on.	The turnstile is unlocked for passage in the set direction. In the other direction, the turnstile remains locked.

Operating modes	Actions to do on RC-panel	Indication on		Turnstile status
		RC-panel	LED display	
<i>“Free passage in the set direction and single passage in the opposite direction”</i>	Set the <i>“Free passage in the set direction”</i> mode for one direction and <i>“Single passage in the set direction”</i> for the other.	Both green indicators (<i>“Left”</i> and <i>“Right”</i>) are on.	Green arrows for both passage directions are on. After the passage, set for single pass, green arrow goes out.	The turnstile is unlocked for free passage in the set direction. In the other direction, the turnstile unlocks for a single passage.
<i>“Always free”</i>	Press all 3 buttons simultaneously: LEFT, STOP and RIGHT.	Both green indicators (<i>“Left”</i> and <i>“Right”</i>) are on.	Green arrows for each passage direction are on.	The turnstile is unlocked in both directions.

9.3 Operating modes of the turnstile at potential control mode

See Table 6 for the turnstile control modes and indication. Setting the operating modes for each direction is independent, i.e. setting the operating mode for one direction does not affect the operating mode for the opposite one.

If by the moment of passage through the turnstile the low level is present on the contact, corresponding to the set passage direction, the turnstile remains open in the set direction.

Table 6. Potential control mode (no J1 jumper)

Operating mode	Operating signal	Indication on		Turnstile status
		RC-panel	Post	
<i>“Both passage directions are locked”</i>	The high level on contacts <i>L</i> and <i>R</i> or low level on <i>“ST”</i> contact.	Red indicator <i>“Stop”</i> is on.	Red crosses for each passage direction are on.	The turnstile is locked.
<i>“One of the passage directions is open”</i>	The low level on the contact corresponding to the passage direction, the high level on the other contacts.	The green indicator of the chosen direction <i>“Left”</i> (<i>“Right”</i>) is on.	Green arrow in the chosen passage direction and green line pictograms are on.	The turnstile is unlocked in the set direction.
<i>“Both passage directions are open”</i>	The low level on contacts <i>L</i> and <i>R</i> , high level on <i>“ST”</i> contact.	Both green indicators <i>“Left”</i> and <i>“Right”</i> are on.	Green arrows for both passage directions and green line pictograms are on.	The turnstile is unlocked in both directions.



Note:

For ACS outputs:

- High level — contacts of the output relay are open 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

In emergency situations (for example, in the event of power supply failure), the turnstile passage area can be used as an additional emergency exit.

It is possible to turn the turnstile into *Fire Alarm* mode from the emergency unblocking device (fire alarm device, emergency button, etc.). In this mode, the turnstile barrier arm falls down (takes a vertical position) allowing the free passage in both directions, LED display shows the green (for 1.25 sec) and red (for 0.25 sec) indicators, control commands from other devices and software are ignored (Sect. 5.3.2).

The barrier arm is set into vertical position at a power loss as well.



Caution!

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

9.5 Troubleshooting

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

Table 7. Possible faults and remedies

Fault	Possible cause	Remedy
At the power-up the turnstile doesn't operate, and there is no indication on the turnstile housing and the RC-panel.	No supply voltage to control board.	Switch off the turnstile power supply, detach the turnstile housing with the display unit from the turnstile base. Check the power cable serviceability and reliability of its connection to the X1 terminal block on the control board.
The turnstile is not controlled in one of the directions. The turnstile housing and RC-panel indication is on.	The interface board does not receive a control signal for this direction.	Switch off the turnstile power supply, detach the turnstile housing with the display unit from the turnstile base. Check the RC-panel / WRC / ACS controller cable serviceability and reliability of its connection X2 terminal block on the interface board.

If the problem remains, we recommend contacting your nearest **PERCo** service center. The list of **PERCo** service centers is given in the product certificate.

10 MAINTENANCE

The turnstile maintenance is required once a year or in case of technical failures. The maintenance should be performed by qualified personnel only.

Follow these steps, when performing scheduled maintenance:

1. Switch off the turnstile power supply. The barrier arm will fall down automatically.
2. Unscrew three M8 screws to remove the hub with the barrier arms.
3. Check the barrier arms (3) mounting to the hub and tighten the barrier arms fixing screws if needed.
4. Lubricate the hinge and triggers contact points in the hub, as well as barrier arms hinged attachment points. Use molybdenum grease.
5. Detach the turnstile housing (1) with LED indication from the turnstile base. Follow steps given in Sect. 6.
6. Remove dust from the surfaces and internal cavities of the turnstile mechanism with a vacuum cleaner and an air bulb.
7. Lubricate friction joints of the turnstile mechanism in the following points:
 - the rotation axis of the stopper lever (point **1**, Fig. 18) with **Chain and Rope Lube Spray – WEICON** or another with similar properties;
 - spring attachment points (points **2, 3, 4** in Fig. 17) with molybdenum grease;
 - emergency unlocking mechanism components (automatic lowering of the anti-panic barrier arm, (**5** in Fig. 17)) with **Chain and Rope Lube Spray - WEICON** or another with similar properties.
8. Check the reliability of the terminal blocks cable connections on the control (11) and interface (12) boards. Tighten the cable fixing screws if necessary.
9. Check the reliability of the turnstile mounting. Tighten the nuts of the turnstile base if necessary.
10. Insert the lower part of the housing hooks into the base grooves (6) and lower it half the height. Connect the indication cable (10) to the turnstile LED-indication and to the **X8 (INDICATION)** connector on the interface board and put the housing all the way down. When lowering the housing, make sure that the indication cable (10) folds forward and is not pinched by structural elements. Secure the housing with four screws on the bottom of the base.

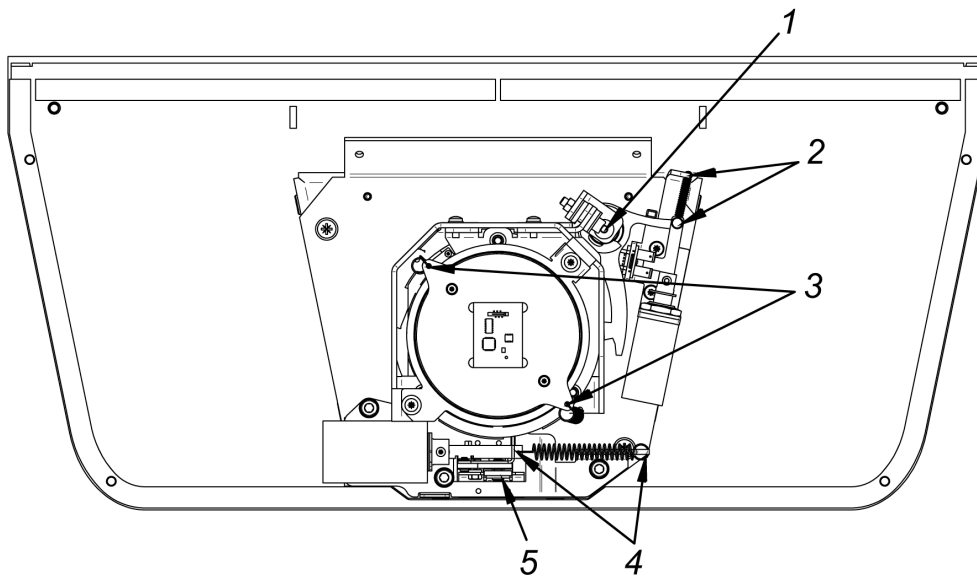


Figure 17. The turnstile mechanism maintenance

- 1 – lubrication point of the rotation axis of the stopper lever; 2 – stopper spring attachment points;
 3 – brake spring attachment points; 4 – automatic anti-panic spring attachment points;
 5 – automatic anti-panic mechanism

11. Install the hub (4) with barrier arms (3) in the following order:
- Insert the hub into the appropriate mounting seat on the turnstile mechanism shaft.
 - Secure the hub with three screws with spring washers (5); preliminary, to fix the screws securely, apply a bit of the supplied sealant to the bottom of their threads.
 - Turn on the turnstile;
 - Move the barrier arm to its horizontal position and use a square to set an angle of 90° in a horizontal plane between the arm and the turnstile base;
 - Tighten the hub screws with 15Nm force.
12. Check the reliability of electromechanical barrier arm unlocking device by turnstile power on/off.
- In case of any defects revealed during visual check please contact your nearest **PERCo** service center. The list of **PERCo** service centers is given in the product certificate.

11 TRANSPORTATION AND STORAGE

The turnstile in the original packaging of the manufacturer should be transported in closed transport only (train cars, containers, closed trucks, holds, etc.), as well as on airplanes.

During storage and transportation, the boxes can be stacked no more than 3 layers high.

The storage of the turnstile is allowed indoors at ambient temperature from -40°C to +55°C and at relative air humidity up to 98% at +25°C.

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

Appendix 1. Control signal algorithm at pulse control mode



Note:

For the RC-panel:

- Active front - pressing of the relevant button on the RC-panel.
- Low level - the relevant button on the RC-panel has been pressed.
- High level - the relevant button on the RC-panel has not been pressed.

The command is a signal active front (signal transfer from the high level to the low level) at any of the contacts at presence of the corresponding signal levels at the other contacts. The following commands can be formed by sending a low-level signal to the **X2** terminal block contacts *L*, *ST* and *R* relatively to the contact *GND*:

"Always locked" (locked for entry and exit) - Active front is at the contact *ST* while there is a high level at the contacts *L*, *ST* and *R*. 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 *L* while there is a high level at the contacts *ST* and *R*. 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"*, the status of the passage direction **B** does not change at that. The command is ignored if at the moment of its receipt the status of the passage direction **A** is *"Always free"*.

"Single passage in the direction B" (open for passage of one person in the direction **B**) - active front is at the contact *R* while there is a high level at the contacts *ST* and *L*. At this command the passage direction **B** opens either for 5 sec. or until the passage has been made in this direction or until the command *"Always locked"*, the status of the passage direction **A** does not change. The command is ignored if at the moment of its receipt the status of passage direction **B** is *"Always free"*.

"Bi-directional single passage" (open in both directions for 'one-by-one' passage) - active front is at the contact *L* while there is a low level at the contact *R* and a high level at the contact *ST*, or active front is at the contact *R* while there is a low level at the contact *L* and a high level at the contact *ST*. At this command both passage directions open either for 5 sec. each or until the passage has been made in the given direction or until the command *"Always locked"* is received. The command is ignored for the passage direction, which status at the moment of its receipt is *"Always free"*.

"Free passage in the direction A" (open for free passage in the direction **A**) - active front is at the contact *L* while there is a low level at the contact *ST* and a high level at the contact *R*, or active front is at the contact *ST* while there is a low level at the contact *L* and a high level at the contact *R*. 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 *R* while there is a low level at the contact *ST* and a high level at the contact *L*, or active front is at the contact *ST* while there is a low level at the contact *R* and a high level at contact *L*. 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 *L* while there is a low level at the contacts *R* and *ST*, or active front is at the contact *R* while there is a low level at the contacts *L* and *ST*, or active front is at the contact *ST* while there is a low level at the contacts *L* and *R*. The both directions open at this command until the command *"Always locked"* is received.

Appendix 2. Control signal algorithm at potential control mode



Note:

For ACS controller outputs:

- Low level - either contacts of the output relay are closed or the output transistor is open.
- High level - either contacts of the output relay are open or the output transistor is closed.

"Both passage directions are locked" (locked for entry and exit) - there is a high level at the contacts *L* and *R*, or a low level at the contact *ST*. Both passage directions close at this command.

"The direction A is open" (open for passage in the direction **A**) - there is a low level at the contact *L* while a high level at the contacts *ST* and *R*. At this command the direction **A** opens up to the low-level signal removal from the contact *A* or until the command *"Both directions locked"* is received. The status of the direction **B** does not change at that.

"The direction B is open" (open for passage in the direction **B**) - there is a low level at the contact *R* while there is a high level at the contacts *ST* and *L*. At this command the direction **B** opens up to the low-level signal removal from the contact *B* or until the command *"Both directions locked"* is received. The status of the direction **A** does not change at that.

"Both directions are open" (open for entry and exit) - there is a low level at the contacts *L* and *R* while there is a high level at the contact *ST*. Both directions open at this command until the low-level signal removal from one of the contacts *A* (*B*) or until the command *"Both directions closed"* is received.

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