



LOT Ltd.

**Turnstile
with servomechanism**

ECO

Assembly and operation manual



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INTRODUCTION

Turnstile with servomechanism “Eco” assembly and operation manual (hereinafter - turnstile) contains information about transporting, storage, assembly, installation, operation and maintenance of the given product.

This assembly and operation manual is intended for the stuff that will assemble, install, operate and maintain the turnstile.

Assembly, installation, operation and maintenance of the given turnstile must be carried out only by qualified technical stuff who studied this assembly and operation manual.

Not following the recommendations of this assembly and operation manual can lead to the turnstile damage and losing the opportunity to get the guarantee service.

Manufacturing company does not take responsibilities for the damage because of improper use of the equipment.

Due to the permanent improvement of the turnstile, its design and software are subject to modifications made by the manufacturer, which do not affect the type of the turnstile operation and are not reflected in this manual.

Abbreviations adopted in the assembly and operation manual



USEFUL INFORMATION



WARNING

2. SAFETY REQUIREMENTS

2.1 General concept of safety

This equipment meets modern requirements of safety. But it is possible to get hurt in case of:

- improper use of the equipment;
- safety equipment does not conform the usage environment;
- not following safety instructions while using the electrical equipment.

All the changes in equipment configuration and software must be approved by the manufacturing company.



Note!

Improper use of the equipment may lead to getting injured. The equipment is intended only for passage and carrying the materials

Manufacturing company is not responsible for the damage in case of improper use or unagreed replacement of the components.

Turnstile operation and maintenance must be carried out according to its technical characteristics and in proper conditions.

2.2 Safety turnstile operation and maintenance requirements

Items that exceed the width of the passage are not allowed to be moved through the passage zone.

No excessive force or shocks should be applied to the turnstile tripods.

No detergents containing abrasive agents should be used for cleaning dirty surfaces of the turnstile.

2.3 Installation safety requirements

Industrial safety standards for electrical equipment and general safety regulations of the company must be strictly observed at installation and operation.

Turnstile must be connected to the power supply according to the turnstile connection scheme.

2.4 Safety requirements for the stuff

Authorities need to provide compulsory training for the stuff of how to use the turnstile.

Assembly, operation and maintenance of the turnstile can be carried out only by technical stuff that have studied this assembly and operation manual and were briefed for accident prevention.

3. PRODUCT DESCRIPTION



This part contains general information about the product and its purpose.

3.1 Purpose of the product

The device is a turnstile for pedestrian passage with or without luggage in both directions providing high level of safety and reliability.

Turnstile with servomechanism “Eco” is used for controlling people flow at control posts of industrial enterprises, banks, administrative buildings, shops, stations, airports etc.

The turnstile is intended for physical division of the territory on zones and secured premises protection from unauthorized entry.

The turnstile is intended to restrict free passage to the controlled territory and can be used both as a part of the monitoring and access control system and as a stand-alone unit with remote panel.

3.2 Operating conditions

- Environment air temperature – from - 0° C till 45° C;
- Relative air humidity – not more than 95% in the temperature of 25° C;
- Air pressure – 84...106,7 kPa (630...800 millimeters of mercury);
- Air should not contain dust, oil vapors, fuel and corrosion-active agents in the quantities exceeding their maximum permissible dose.

3.3 Technical characteristics

Supply voltage of the turnstile (direct current), V.....	24±3
Power consumption, Wt, not more than.....	30
Climatic execution by the State Standard 15150-69.....	UHL3.1
Dust and water protecting rating.....	IP42
Overall dimensions of the turnstile, mm	
Length.....	284
Width	240
Height.....	345
Width of entrance blocking, mm.....	550-600
Net weight, kg.....	13
Working capacity, persons/minute	
Free passing mode	60
Controlled passing mode	20
Average trouble-free life, passes, not less than.....	1500000
Average life-time, years.....	10

3.1 Turnstile design

3.1.1 Design of the turnstile

General view of the turnstile (pic. 1) is fabricated structure made of following parts: *turnstile case (1), tripod (2), the rotating mechanism (3), light passage indication panel (4), the drop-arm mechanism (5), the casing (6), protective cover (7), screws of fastening of a cover (8).*



Fig.1. General view of the turnstile

Four threaded rod (included to the delivery set) are used for mounting the turnstile. The length of the rod is chosen subject to the wall thickness and can be 100-500 mm.

For laying cable communications for connection of the turnstile to the power supply and to the control board (or Access control and management system) plastic corrugated pipes are used (mechanical strength more than 750 Newton).

3.1.2 Principle of the turnstile operation

General view of the turnstile servomechanism is given on the figures 2a and 2b.

The mechanism consists of: *base frame (4), blocking mechanism (1), “Antipanic” mechanism, electric motor (5) with belt-and-pulley arrangement (3).* Mechanism ensures the automatic additional turn of the turnstile tripod arm to the initial position after each passage.

Tripod turning control is provided by *code wheel with cutouts (8), optical position sensors (6 and 7),* which make it possible to register correctly the fact of passing.

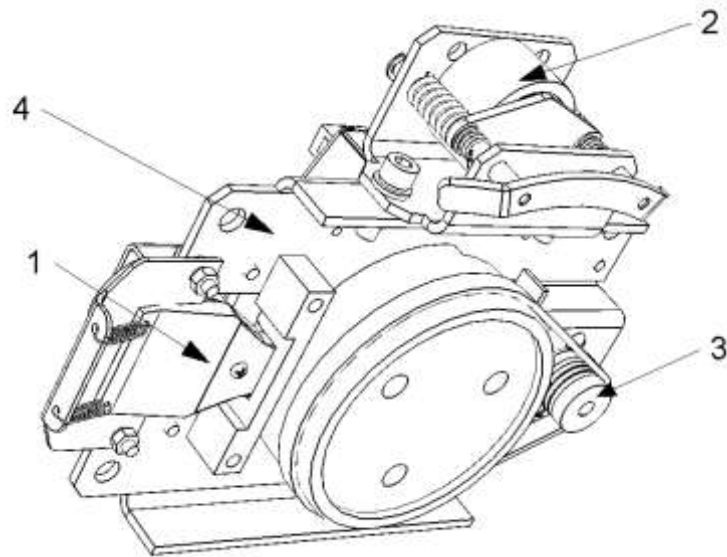


Fig.2a. Servomechanism — bottom view

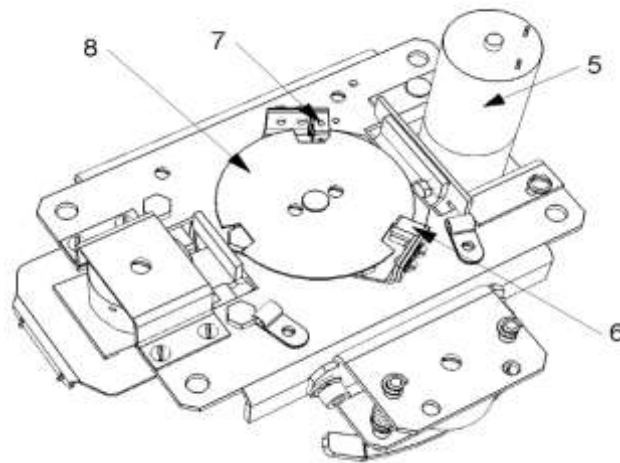


Fig.2b. Servomechanism— plan view

3.1.3 «Antipanic» system.

The turnstile is equipped with “Antipanic” system that ensures dropping of the occlusive arm of the tripod in the case of emergency. The system is switched on automatically during power supply fallout or by external managing signal.

“Antipanic” system (fig 3a) consists of the base frame, *electromagnet* (1), *pushing bar* (5) with *compensating springs* (3), adjusting channels are made in the base frame. When electromagnet is switched on, it attracts *the plate* (2) that in turn using *compensating springs* (3) and (4) holds the *push bar* (5). When the electric supply interrupts the push bar moving by springs hits *the pin* (1) (fig. 3b) that disengages from the slot of *the rod* (2). After the electric supply is recommenced, the servomechanism switches on and the rod automatically set into the working position.

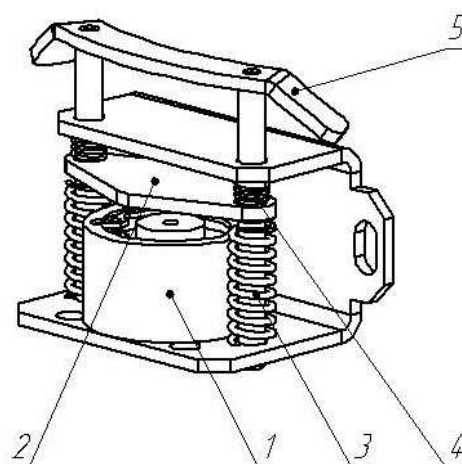


Fig. 3a — «Antipanic» system

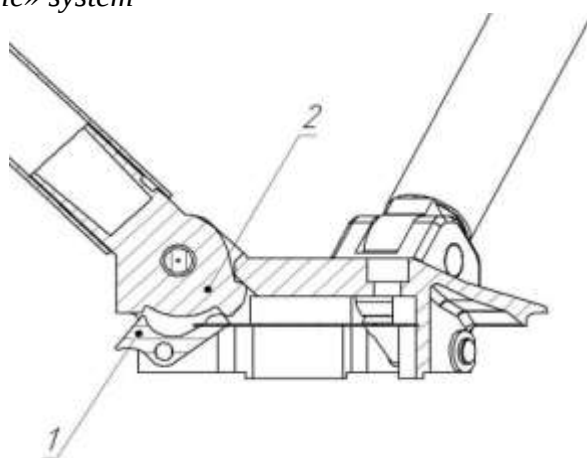


Fig.3b. Tripod

3.1.4 Blocking mechanism

Blocking mechanism is intended for tripod fixing from unauthorized turning and for controlling the authorization\blockage of the tripod turning.

Blocking mechanism (fig. 4) consists of *adjusting plate (1)*, which is sprung by two *lock springs (2)*, *non-magnetic insulting joints (3)*, *restricting bracket (4)*, and *electromagnet (5)*.

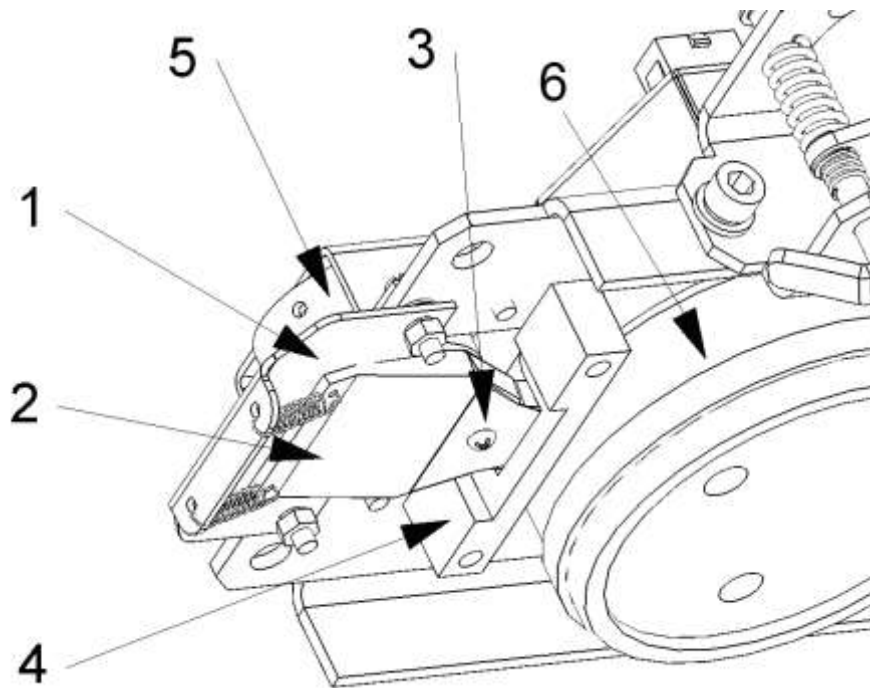
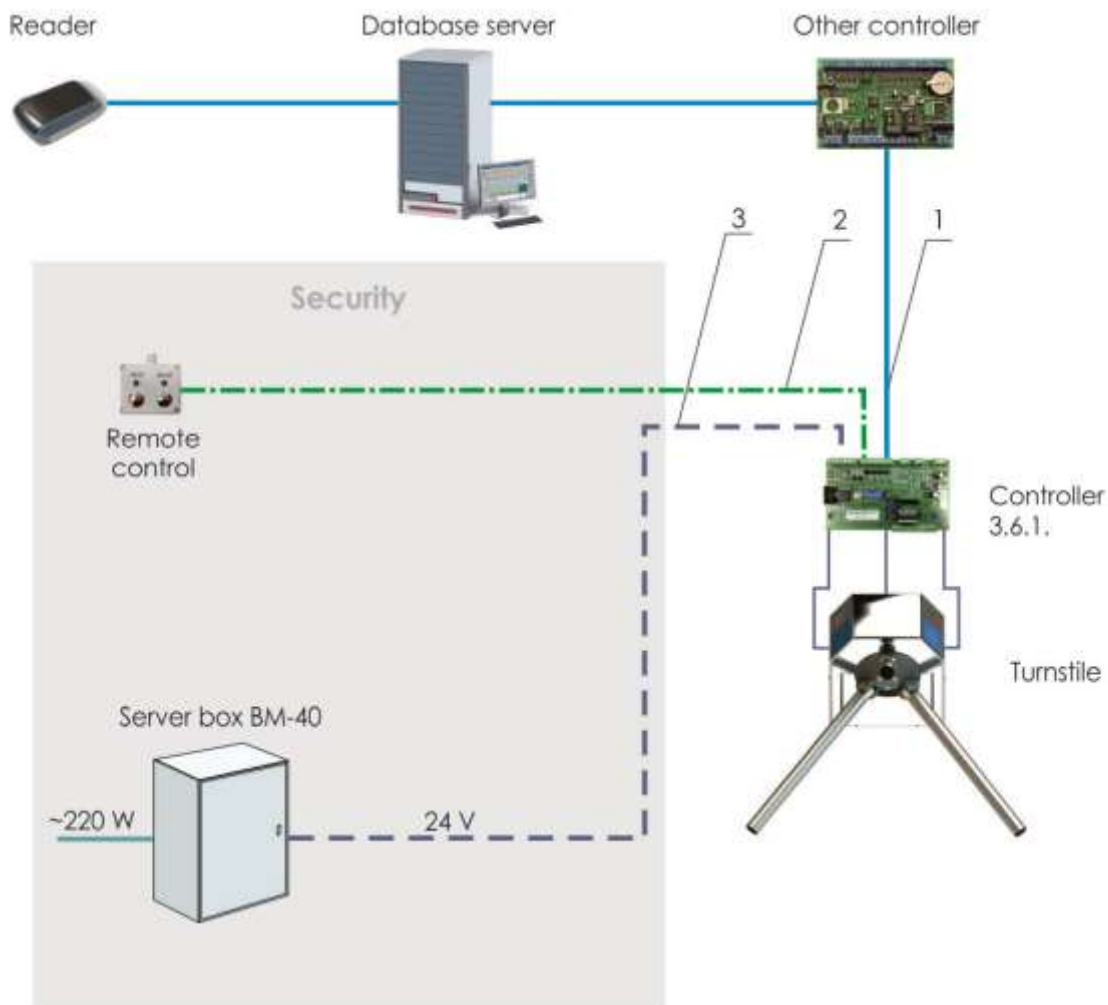


Fig. 4. Blocking mechanism

3.1.5 Communication lines for switching on the turnstile

To lay the communication line cables (fig.5) for switching on the turnstile to the power line and to the remote control (or to external controller of the access control system) plastic corrugated pipes, which were laid inside the floor beforehand, are used (corrugated pipe of the heavy type with broach with mechanic strength of more than 750 N). It is recommended to use different pipes for turnstile power cable and for the communication cable from the controller of the turnstile to the external controller of the access control system.



Cable	Cables	From	To	Notes
1	S-FTP 5 k	Other controller	Turnstile	Communication cable
2	W 4×0,22	Turnstile	Security	Cable for RC
3	ICW 3×1,5	Turnstile	Security	Power cable

Fig 5. . Communication line cabling

3.1.6 Work sequence

The turnstile works in the “normally closed” mode; that means that rotation of the tripod cannot be executed without managing signal that switches on the electromagnet (5) and pulling the lock (2) out of the barrel (6).

After turning the arm of the tripod on 20° the electric motor (5) (fig. 2b) is starting, after turning the mechanism on 80° the electromagnet is disabled and return spring (6) takes the lock (4) back to the initial position. (fig.4)

3.1.7 Design and principle of operation of the turnstile controller

The controller is installed behind the side cover of the case.

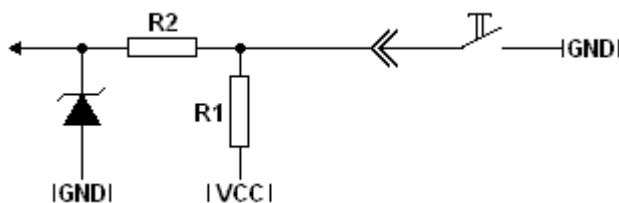
The controller of the turnstile has four managing signals (forming by the control board or ACMS):

- *Input* (XP2, contact 25) – single passage forward;
- *Output* (XPS2, contact 24) – single passage back;
- *Function* (XPS2,contact 23) – realization of the free passage function;
- *Alarm* (XP2, contact 22) – switching on the «Antipanic» mode.



Signals transmitted to the contacts 22-25 of the connector XP2 must be of low level (GND) and last not less than 40 sec.

Circuit representation of the managing inputs is shown on the picture 6.



*Fig. 6 – Circuit representation of the managing inputs
(for signals Input, Output, Function, Alarm)*

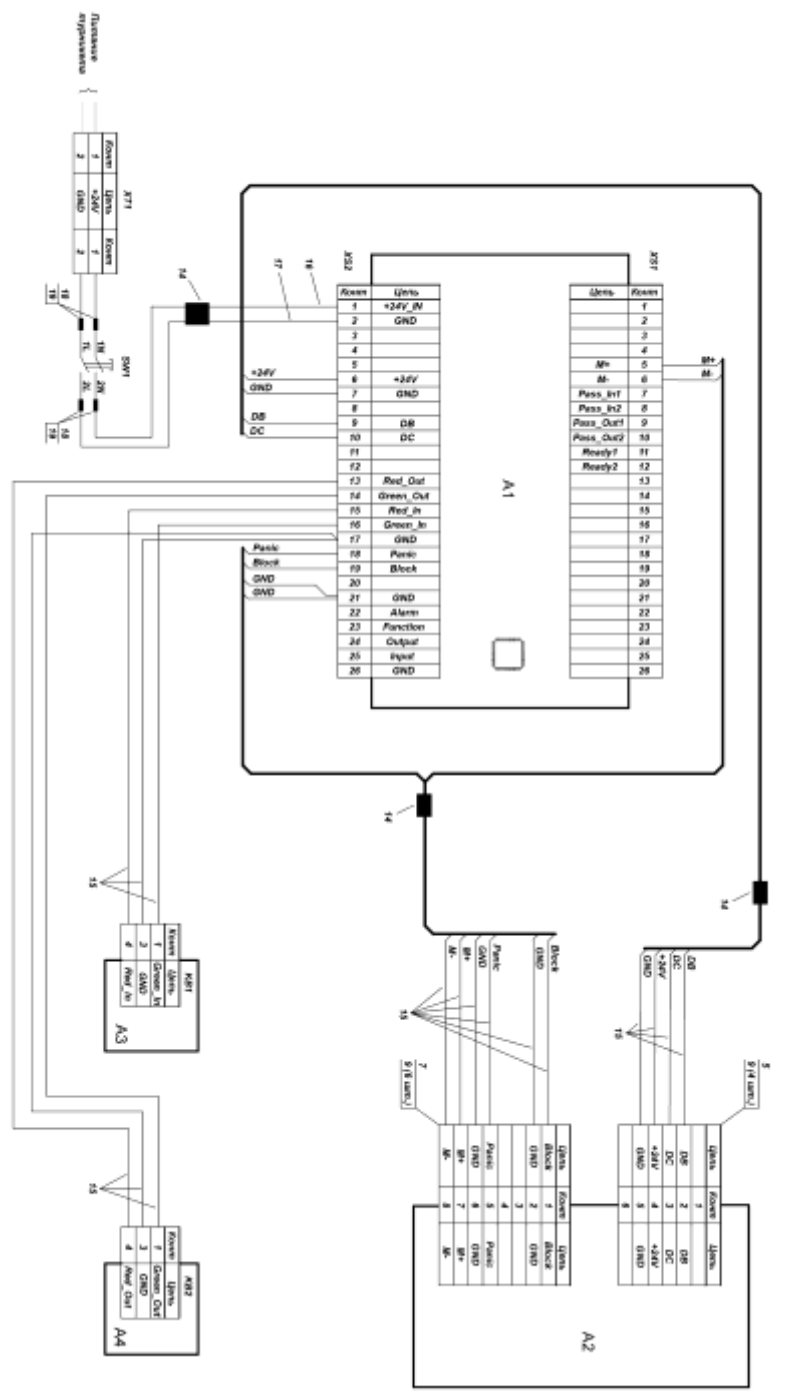


Fig. 7 – Connection circuit of the controller

Connection circuit of the controller is shown on the pic. 7. Following devices are connected to the controller:

- **Two electromagnets.** They are related to the signals: *Block* – blocking (allowance) of the entrance (exit); *Panic* – signal that manages the electromagnet included to the drop-arm mechanism and holding the arm of the tripod. After the switching on of the drop-arm electromagnet the arm of the tripod is on the starting (horizontal) position automatically;
- **Tripod position sensors** that give signals DB, BC. With the use of these sensors the control tripod position is executed;

- **Lighting indication** – consist of two groups, the first one (Red1 and Green1 signals) shows the conditions of the entrance (passing is allowed or disallowed) and the second one (Red2 and Green2 signals) – the conditions of the exit;
- **Electromotor of the direct current.**

The controller of the turnstile produces following signals for upper level of the access control and management system (see also the table 1):

- **Pass In** – in the reset state the contacts of the relay are broken. When the person executes the passing-in, after turning the arm to the 20° the contacts of the relay are closed and after completion of passing (turning the tripod to the starting position) the contacts of the relay are broken. Thereby single passing-in is indicated.
- **Pass Out** – in the reset state the contacts of the relay are broken. When the person executes the passing-out, after turning the arm to the 20° the contacts of the relay are closed and after completion of passing (turning the tripod to the starting position) the contacts of the relay are broken. Thereby single passing-out is indicated.

In the case signal “Emergency release” is given to the controller simultaneous closing of the relay contacts of Pass In and Pass Out is executed. Breaking the contacts of the relays Pass In and Pass Out is executed after repeated giving of the “Emergency release” signal.

- **Ready** – in the reset state the contacts of the relay are broken. This signal is used by the controller to inform the ACMS about: 1) delay in passing through the turnstile more than 20 seconds; 2) the tripod is not returned to the starting position.

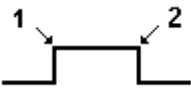
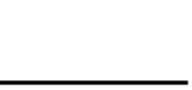
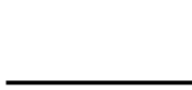
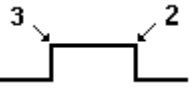
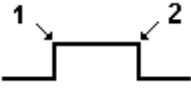
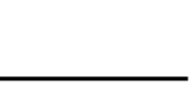
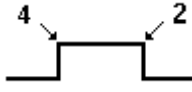
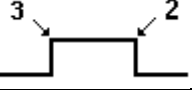
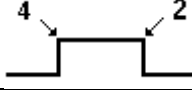
In the case of delay during passing through more than 20 seconds the signal Ready is formed as following. If during 20 seconds after the start of the passing through (turning of the tripod on 20°, activation of one of the sensors) the tripod does not turn to the right direction and does not turn back to the starting position the contacts of the relay are closed (starting of the signal Ready).

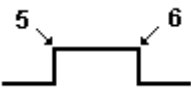
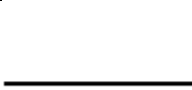
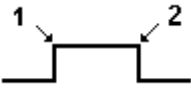
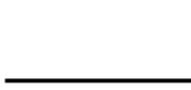
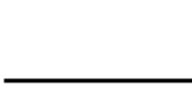
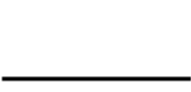
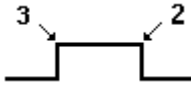
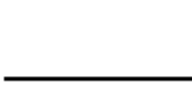
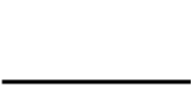
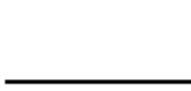
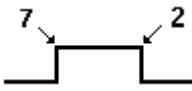
After turning the tripod back to the starting position the contacts of the relay are broken (ending of the signal Ready and Pass In/Pass Out).

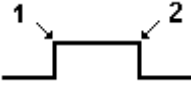
It's possible when during switching on the turnstile the tripod for any reasons couldn't settle to the starting position or the turnstile is on the starting position and somebody tries to turn the arm of the tripod forcibly. In this case after 7 seconds one signal Ready is given (the contacts of the relay are closed). After turning the tripod back to the starting position the contacts of the relay are broken (ending of the signal Ready).

Table 1

Forming of the signals for upper level of the ACMS

Working mode (conditions)	Relay (signal) Pass In	Relay (signal) Pass Out	Relay (signal) Ready
Single passing-in			
Single passing-out			
Delay more than 20 seconds during passing-in			
Delay more than 20 seconds during passing-out			

Emergency exit			
Free passing-in			
Free passing-out			
Delay more than 7 seconds of turning the tripod back to the starting position			

 - closing of the contacts by some event.

 - breaking of the contacts by some event.

To the upper level of the ACMS the following events can be signaled:

1. Turning the arm of the tripod on 20° while allowance of the passing-in;
2. Turning the tripod back to the starting position;
3. Turning the arm of the tripod on 20° while allowance of the passing-out;
4. Ending of the 20 seconds time period (waiting for turning the tripod back to the starting position);
5. Giving the command “Emergency release” (switching on drop-arm function);
6. Repeated giving the command “Emergency release” (switching off drop-arm function);
7. Ending of the 7 seconds time period (waiting for turning the tripod back to the starting position).

The contacts of the relay transmit signals of the following parameters:

- Maximum voltage of the direct current 24 V
- Maximum switching current 0,5 A
- Closed contact resistance, not more than 0,15 Ohm

3.2 Design options

Casing:

- brushed stainless steel
- polished stainless steel
- painted steel

3.3 Delivery set

3.3.1 *Standard delivery set.*

Basic equipment

- Turnstile casing
- Tripod
- Threaded rods (optional)

Operational documentation:

- Certificate
- Assembly and operation manual.

Package:

- Box (transportation packing)

3.3.2 *Optional equipment supplied on request*

On the customer's request it is possible to supply him with the optional set of equipment:

- Remote panel
- Radio-control unit
- RFID-reader unit



Additional equipment can be installed on the base of technical enquiry from the customer with the description of the all necessary requirements to the additional equipment.

3.4 Marking

The whole device and its components have different labels. Labels must not be removed and damaged.

The turnstile marking is made on the manufacturer's label located on the internal side wall of the right-hand and left-hand cabinet casing.

The manufacturer's label contains the following information (Fig. 8):

- manufacturer's trademark;
- turnstile model name;
- serial number;
- date of manufacture;
- manufacture's address;
- information about connection;
- number of the delivery contract.

Model: **ECO** Serial: № **2637**
 Surface mode: **Brushed stainless steel**
 Modification: **Electric drive** № **38.2.05.03.15**
 Tripod: № **16.04.15.08**
 Controller: v. **3.6.1** № **2.34.04.02.15**
 Date: **17.06.2015**

LOT LLC, 196, Poltavskiy Shliakh Str., Kharkov, 61177, Ukraine
 FAX +38 057 714-22-99, info@lotgate.com, www.lotgroup.eu

Fig.8 Marking



Note!
 If delivery contains more than one device, each device has its own number.

3.5 Packing

Turnstile is packed in shipping container which prevents it from damage during the transporting and storage.

The turnstile packaging, marking on the package and shipping container meet the requirements of the design documentation.

The product forwarding enterprise name is indicated on the shipping container.

The operational documentation is packed in a plastic bag.

4. BASIC OPERATION MODES

4.1 Brief review of the basic operation modes

At switching the power the turnstile tripod comes full circle. Tripod arm is fixed in horizontal position and the turnstile gets into initial position.

There is a set of eight DIP-switches on the controller board to set time outs, operating modes and signal assessment of turnstile control. To switch on/switch off the power for activation the settings which are set by the DIP-switches is not needed.

Table.2 DIP Switch

№ DIP	Function	Meaning
1	'Function' button	ON – 'Function' button controls the blocking mode
		OFF – 'Function' button controls the free passage mode

2	Storing the commands of the bidirectional single passage	ON – controller must store not more than 5 commands for each direction
		OFF – only the first command is stored in any direction
3	Free passage mode for entrance	ON – entrance operates in the free passage mode
		OFF – entrance operates in the single mode
4	Free passage mode for exit	ON – exit operates in the free passage mode
		OFF – exit operates in the single passage mode
5–7	Passage time out	000 – 2 seconds
		100 – 4 seconds
		010 – 8 seconds
		110 – 10 seconds
		001 – 15 seconds
		101 – 30 seconds
		011 – 60 seconds
		111 – infinity
8	Alarm signal (Antipanic)	ON – Alarm signal must be transmitted in potential mode.
		OFF – Alarm signal must be transmitted in impulsive mode.

Priority of the operation modes (from max to min):

- *Antipanic,*
- *Blocking,*
- *Free entry,*
- *Free exit,*
- *Single entry,*
- *Single exit.*

Current operation mode is stored in nonvolatile memory.

Following operation modes can be formed by transmitting the low level (GND) signals lasting not less than 40 sec to the contacts 22-25 of the connector XP2:

- *Initial position of the turnstile*
- *Single passage in forward direction*
- *Single passage in backward direction*
- *Emergency passage*
- *Blocking*
- *Free entry*
- *Free exit.*

4.2 Basic operation modes

4.2.1 Initial position of the turnstile

Turnstile initial position' mode is set at switching the power supply of the turnstile and at quitting some turnstile modes. In this condition bidirectional passage is locked. On the LED indication for entry and exit red arrow lights up and is continuously on.

4.2.2 *Single passage in forward direction*

‘Single passage in forward direction’ mode is formed by the transmitting the “*Input*” signal by access control system (or by short pressing the button ‘*Entry*’) if the rest of control signals are inactive.

In this mode single passage in forward direction is opened. Green LED indication is on at entry during the time which is set by DIP-switch. (tab. 1) and the turnstile is waiting for starting the passage (tripod arm rotation for 20°). If it does not happen, entry LED indication lights up red and passage is locked. If the passage is started but not finished within 10 seconds, LED indication on the turnstile entry lights up green.

Signal ‘*Ready*’ is transmitted to the upper level (together with the signal ‘*Pass in*’) and the turnstile is waiting for the passage completing. In case of normal starting and finishing the passage (without delays), signal ‘*Pass in*’ is transmitted to the upper level. LED indication at turnstile entry lights up red and entry is locked.

According to the DIP-switch № 2 (tab 1) position not more than five subsequent allowing single passage commands can be stored. At the storage of this mode in nonvolatile memory the number of allowed commands (the number of allowed passages) in nonvolatile memory is not stored.

Quitting this mode is possible:

- at completing the passage;
- with the help of transmitting the ‘*Function*’ signal (press button ‘*Function*’) and operating the turnstile in ‘*Blocking*’ mode (depends on the DIP-switch № 1 position (tab1));
- with the help of transmitting the ‘*Alarm*’ signal and switching over to operate in the ‘**Emergency pass**’ mode ;
- with the help of simultaneous transmitting of ‘*Entry*’ and ‘*Function*’ signals and switching to operate in the ‘**Free pass**’ mode (depends on the DIP-switch № 1 position (tab1));

‘*Input*’ signal transmitting is ignored:

- 1) if the turnstile is operated in the ‘**Free pass**’ mode;
- 2) if the turnstile is operated in the ‘**Blocking**’ mode;
- 3) if the turnstile is operated in the ‘**Emergency passage**’ mode;
- 4) in case of time out passage (passage is not completed within 10 seconds).

If the turnstile is operating in the ‘**Single passage in forward direction**’ mode, depending on the DIP-switch № 2 position (tab 1) “*Input*” signal can be ignored or allowance control counter of signal passage can be increased by 1.

‘Single passage in forward direction’ mode settings are:

- 1) transmit ‘*Entry*’ signal;
- 2) 40 ms or more delay;
- 3) take off ‘*Entry*’ signal;
- 4) 40 ms or more delay.

4.2.3 *Single passage in backward direction*

‘Single passage in backward direction’ mode is formed by transmitting the ‘*Exit*’ signal by access control system (or by short pressing the button ‘*Exit*’) if the rest of control signals are inactive.

In this mode single passage in backward direction is opened. Green LED indication lights up at exit and during the time which is set by DIP-switch (tab 1) the turnstile is waiting for starting the passage (tripod arm rotation for 20°). If it does not happen, exit LED indication lights up red and passage is blocked. If the passage is started but not finished within 10 seconds, exit LED indication continues to light green.

Signal 'Ready' is transmitted to the upper level (in addition to the 'Pass In' signal) and the turnstile is waiting for the passage completing. In case of normal (without delays) starting and finishing the passage only 'Pass Out' signal is transmitted to the upper level. LED indication lights up red and exit is blocked.

Quitting this mode is possible:

- 1) after finishing the passage;
- 2) with the help of transmitting the 'Function' signal (pressing the button 'Function') and operating the turnstile in the '**Blocking**' mode (depends on the DIP-switch № 1 position (tab1));
- 3) with the help of transmitting the 'Alarm' signal and operating the turnstile in the '**Emergency passage**' mode;
- 4) with the help of simultaneous transmitting of 'Exit' and 'Function' signals and switching over to operate in the '**Free pass**' mode (depends on the DIP-switch №1 position (tab1));

'Input' signal transmitting is ignored:

- 1) if the turnstile is operated in the '**Free pass**' mode;
- 2) if the turnstile is operated in the '**Blocking**' mode;
- 3) if the turnstile is operated in the '**Emergency passage**' mode;
- 4) in case of time out passage (passage is not completed within 10 seconds).

If the turnstile is operating in the '**Single passage in backward direction**' mode, depending on the DIP-switch № 2 position (tab 1) 'Exit' signal can be ignored or allowance control counter of signal passage can be increased by 1.

'Single passage in backward direction' mode settings are:

- 1) transmit 'Exit' signal;
- 2) 40 ms or more delay;
- 3) take off 'Exit' signal;
- 4) 40 ms or more delay.

4.2.4 «Emergency passage» mode

'Emergency passage' mode is formed by transmitting 'Alarm' signal by access control system (or by short pressing the button 'Emergency passage') if the rest of control signals are inactive.

Depending on the position of the DIP - switch 8, "Alarm" signal can be received in the impulse of potential mode. In impulse mode switching on/off of the emergency passage occurs according to the downlink signal edge of the 'Alarm' signal (by short pressing the button). In potential mode switching on of the emergency passage occurs at transmitting and holding the signal 'Alarm'. Switching off occurs by dismissing the signal 'Alarm'.

In this mode anti panic block's electromagnet is switched off and tripod arm is reset. At the same time 'Pass In' and 'Pass Out' signals are transmitted to the upper level and LED indication at entry and exit lights up green. Turnstile can be used for bidirectional clear passage. This command is transmitted in emergency conditions and situations related to the threat to life and health.

After repetitive 'Alarm' signal transmitting 'Pass In' and 'Pass Out' signals are reset. Turnstile tripod comes full circle. Tripod arm is fixed in horizontal position and the turnstile returns to the initial position.

Operating in this mode 'Entry', 'Exit' and 'Function' signals transmitting is ignored.

'Emergency passage' mode settings are:

- 1) transmit 'Alarm' signal;

- 2) 40 ms or more delay;
- 3) take off 'Alarm' signal;
- 4) 40 ms or more delay.

4.2.5 «Blocking» mode

'**Blocking**' mode is formed by transmitting 'Function' signal by access control system (or by short pressing the button 'Function') if the rest of control signals are inactive.

Opportunity to operate in this mode depends on DIP switch №1 position (tab1). In this mode bidirectional passage through the turnstile in both directions is blocked. LED indication at entry and exit switches over flashing red light.

After repetitive 'Function' signal transmitting the turnstile returns to the initial position.

Quitting this mode is possible:

- 1) with the help of the 'Function' signal transmitting (pressing 'Function' button) and returning the turnstile to the initial position;
- 2) with the help of 'Alarm' signal transmitting and operating in 'Emergency passage' mode.

Operating in this mode 'Entry' and 'Exit' signals transmitting is ignored.

'Function' signal transmitting is ignored if the turnstile is operated in 'Emergency passage' mode.

In case when '**Blocking**' mode was set and power supply is switched off and then DIP switch №1 is switched off too, after we switch on power supply the '**Blocking**' mode is restored (red LED indication is flashing). Quitting the '**Blocking**' mode is 'Function' signal transmitting (button 'Function'). But it is impossible to enter the '**Blocking**' mode as DIP switch №1 is off and button 'Function' operates the '**Free passage**' mode switching on and off.

4.2.6 «Free entry» mode

'**Free entry**' mode is formed by simultaneous 'Input' and 'Function' signals transmitting by access control system (or by short simultaneous pressing the buttons 'Function' and 'Input') if the rest of control signals are inactive.

Opportunity to operate in this mode depends on DIP switch №1 position (tab1).

In this mode passage in forward direction is opened for any number of visitors. LED indication at entry is flashing green. 'Pass In' signal is transmitted to the upper level at each passage (on the analogy of single entry). If the passage is started but not finished within 10 seconds, 'Ready' signal is transmitted to the upper level (in addition to 'Pass In' signal). 'Pass In' and 'Ready' signals transmitting is stopped when the passage is finished.

Quitting this mode is possible:

- 1) with the help of simultaneous 'Entry' and 'Function' signals transmitting and returning the turnstile into the initial position;
- 2) with the help of 'Alarm' signal transmitting and operating in 'Emergency passage' mode.

When the turnstile is operating in the '**Free entry**' mode the 'Entry' signal transmitting is ignored. '**Free entry**' mode which was set by simultaneous 'Entry' and 'Function' signals transmitting is stored in nonvolatile memory.

This mode can be set compulsorily without reference to 'Entry' and 'Function' signals. It can be done with the help of DIP switch № 3. (tab 1)

Quitting this mode is possible:

- 1) with the help of '*Alarm*' signal transmitting and operating in '*Emergency passage*' mode. At repetitive '*Alarm*' signal transmitting the turnstile returns to the '*Free entry*' mode (when DIP switch №3 is switched on)
- 2) with the help of '*Function*' signal transmitting (pressing '*Function*' button) and operating the turnstile in '*Blocking*' mode. At repetitive function signal transmitting the turnstile will return to the '**Free entry**' mode (when DIP switch № 3 is on);
- 3) with the help of DIP switch №3 switching off and returning to the initial position.

'**Free entry**' mode which was set with the help of DIP switch №3 is not stored in nonvolatile memory.

'**Free entry**' mode

- 1) transmit '*Entry*' signal;
- 2) 40 ms or more delay;
- 3) transmit '*Function*' signal;
- 4) 40 ms or more delay;
- 5) take off '*Function*' and '*Entry*' signals;
- 6) 40 ms or more delay.

4.2.7 «*Free exit*» mode

'**Free exit**' mode is formed by simultaneous '*Exit*' and '*Function*' signals transmitting by access control system (or by short simultaneous pressing the buttons '*Function*' and '*Exit*') if the rest of control signals are inactive.

Opportunity of switching over to operate in this mode depends on DIP switch №1 position (tab1).

In this mode passage in backward direction is opened for any number of visitors. LED indication at exit is flashing green. '*Pass Out*' signal is transmitted to the upper level at each passage (on the analogy of single entry). If the passage is started but not finished within 10 seconds, '*Ready*' signal is transmitted to the upper level (in addition to '*Pass Out*' signal). '*Pass Out*' and '*Ready*' signals transmitting is stopped when the passage is finished.

Quitting this mode is possible:

- 1) with the help of simultaneous '*Exit*' and '*Function*' signals transmitting and returning the turnstile into the initial position;
- 2) with the help of '*Alarm*' signal transmitting and operating in '**Emergency passage**' mode.

When the turnstile is operating in the '**Free exit**' mode the '*Exit*' signal transmitting is ignored. '**Free exit**' mode which was set by simultaneous '*Exit*' and '*Function*' signals transmitting is stored in nonvolatile memory. This mode can be set compulsorily without reference to '*Exit*' and '*Function*' signals. It can be done with the help of DIP switch № 4. (tab 1)

Quitting this mode is possible:

- 1) with the help of '*Alarm*' signal transmitting and operating in '**Emergency passage**' mode. At repetitive '*Alarm*' signal transmitting the turnstile returns to the '*Free exit*' mode (when DIP switch №4 is on);
- 2) with the help of '*Function*' signal transmitting (pressing '*Function*' button) and switching over to operate the turnstile in '**Blocking**' mode. At repetitive '*Function*' signal transmitting the turnstile will return to '*Free exit*' mode again (when DIP switch №4 is on);
- 3) with the help of switching off DIP switch №4 and returning to the initial position.

- 4) **'Free exit'** mode which is set with the help of DIP switch №3 is not stored in nonvolatile memory.

'Free exit' mode settings are:

- 1) transmit 'Exit' signal;
- 2) 40 ms or more delay;
- 3) transmit 'Function' signal;
- 4) 40 ms or more delay;
- 5) take off 'Function' and 'Exit' signals;
- 6) 40 ms or more delay.

'Free entry and exit' combined mode settings are:

Var. 1

- 1) transmit 'Exit' signal;
- 2) transmit 'Entry' signal;
- 3) 40 ms or more delay;
- 4) transmit 'Function' signal;
- 5) 40 ms or more delay;
- 6) take off 'Function', 'Entry' and 'Exit' signals;
- 7) 40 ms or more delay.

Var.2

- 1) transmit 'Entry' signal;
- 2) transmit 'Exit' signal;
- 3) 40 ms or more delay;
- 4) transmit 'Function' signal;
- 5) 40 ms or more delay;
- 6) take off 'Function', 'Entry' and 'Exit' signals;
- 7) 40 ms or more delay.

Var.3

- 1) transmit 'Function' signal;
- 2) 40 ms or more delay;
- 3) transmit 'Entry' signal;
- 4) transmit 'Exit' signal;
- 5) 40 ms or more delay;
- 6) take off 'Function', 'Entry' and 'Exit' signals;
- 7) 40 ms or more delay.

Var.4

- 1) transmit 'Function' signal;
- 2) 40 ms or more delay;
- 3) transmit 'Exit' signal;
- 4) transmit 'Entry' signal;
- 5) 40 ms or more delay;
- 6) take off 'Function', 'Entry' and 'Exit' signals;
- 7) 40 ms or more delay.

4.3 Possible faults and troubleshooting methods

4.3.1. Troubleshooting of the controller

Purposes of the signal light diodes (fig. 9) are mentioned in the table 3.

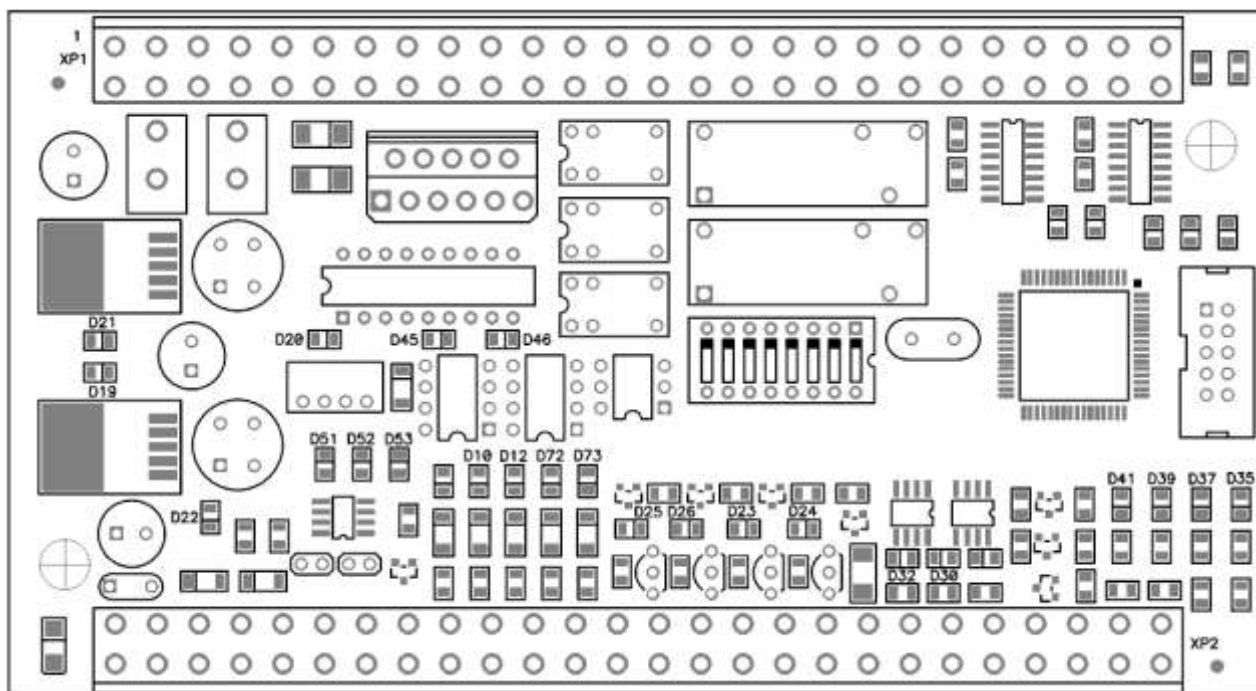


Fig 9. Turnstile controller

Таблица 3. Назначение сигнальных светодиодов

Name	Purpose
D10	Indication of transmitting the signal DB from the tripod position sensor. If the light diode is on the signal DB is transmitted.
D12	Indication of transmitting the signal DC from the tripod position sensor. If the light diode is on the signal DC is transmitted.
D19	Indication of presence of power supply to the processor (5V). If the light diode is on the power 5V is supplied.
D22	Indication of presence of input voltage 24V. If the light diode is on the voltage 24V is supplied.
D23	Indication of giving signal Red1 (light indication at the entrance, red light). If the light diode is on the Red1 signal is transmitted. This signal switches on LED “Red” for entrance.
D24	Indication of giving signal Green1 (light indication at the entrance, green light). If the light diode is on the Green1 signal is transmitted. This signal switches on LED “Green” for entrance.
D25	Indication of giving signal Red2 (light indication at the entrance, red light). If the light diode is on the Red2 signal is transmitted. This signal switches on LED “Red” for exit.
D26	Indication of giving signal Green2 (light indication at the entrance, green light). If the light diode is on the Green2 signal is transmitted. This signal switches on LED “Green” for exit.
D30	Indication of transmitting the signal Block. If the light diode is on the signal Block is transmitted. This signal switches on the electromagnet of the blocking (allowance) of the passing.

D32	Indication of transmitting the signal Panic. If the light diode is on the signal Panic is transmitted. This signal switches on the electromagnet of the drop-arm unit and the arm of the tripod should be fixated horizontally after the full turn.
D35	Indication of transmitting the signal Entry by the ACMS (or pushing relative button). If the light diode is on the signal Entry is transmitted (or the button is pushed).
D37	Indication of transmitting the signal Exit by the ACMS (or pushing relative button). If the light diode is on the signal Exit is transmitted (or the button is pushed).
D39	Indication of transmitting the signal Function by the ACMS (or pushing relative button). If the light diode is on the signal Function is transmitted (or the button is pushed).
D41	Indication of transmitting the signal “Emergency release” by the ACMS (or pushing relative button). If the light diode is on the signal “Emergency release” is transmitted (or the button is pushed).
D45	Indication of transmitting signal to the control circuit about counterclockwise rotation of the tripod. If the signal is off the light diode is on. If the light diode blinks (1 kHz) the signal is transmitted.
D46	Indication of transmitting signal to the control circuit about clockwise rotation of the tripod. If the signal is off the light diode is on. If the light diode blinks (1 kHz) the signal is transmitted.

After supplying the power 24V to the controller of the turnstile the tripod makes full turn and the occlusive arm is fixated horizontally.

4.3.2. Possible faults and troubleshooting methods

The list of possible malfunctions of the controller and the remedies is in the table 4.

Table 4. List of possible faults and troubleshooting methods

Trouble	Cause	Remedy
After power-up the turnstile does not work, no light diode on the controller is on.	1. Faulty power cable. 2. Wrong power cable connection (“+” and “-” are confused).	Examine the rightness of connection, power cable and remedy troubles.
After transmitting the signal Entry (pushing the button “Entry”) indication on the entry doesn’t light green, the turnstile doesn’t allow passing-in.	1. Faulty button “Entry”. 2. Faulty of cable connecting the control board and the controller. 3. The tripod of the turnstile is not in the starting position. 4. Tripod position sensor is broken.	Examine if the D10 and D12 diodes are on. If one of the diodes is off the tripod should be turned to the starting position or examine tripod position sensors. If D10 and D12 are on and the turnstile does not react on pushing button “Entry” examine D35 diode at the moment of pushing the button. If D35 doesn’t light examine the connection between control board and the controller.
After transmitting the signal Entry (pushing the button “Entry”) indication on the entry	1. Faulty in electromagnet that opens passing-in direction.	Examine if the D30 diode is on after transmitting the signal Entry (pushing the button “Entry”). If it is on then examine

begins green, but the turnstile doesn't allow passing-in.	2. Faulty of cable connecting the mechanism and the controller.	the connection between mechanism and the controller and also the electromagnet that opens passing-in direction.
After transmitting the signal Exit (pushing the button "Exit") indication on the exit doesn't light green, the turnstile doesn't allow passing-out.	1. Faulty button "Exit". 2. Faulty of cable connecting the control board and the controller. 3. The tripod of the turnstile is not in the starting position. 4. Tripod position sensor is broken.	Examine if the D10 and D12 diodes are on. If one of the diodes is off the tripod should be turned to the starting position or examine tripod position sensors. If D10 and D12 are on and the turnstile does not react on pushing button "Exit" examine D37 diode at the moment of pushing the button. If D37 doesn't light examine the connection between control board and the controller.
After transmitting the signal Exit (pushing the button "Exit") indication on the exit begins green, but the turnstile doesn't allow passing-out.	1. Faulty in electromagnet that opens passing-out direction. 2. Faulty of cable connecting the mechanism and the controller.	Examine if the D30 diode is on after transmitting the signal Exit (pushing the button "Exit"). If it is on then examine the connection between mechanism and the controller and also the electromagnet that opens passing-out direction.
After simultaneous transmitting of the signals Function and Entry (Exit) the turnstile is not in the Free passing mode	1. Faulty of the button "Function" or the button "Entry" ("Exit"). 2. Faulty of the cable connecting the control board and the controller.	Examine if the light diodes D35 and D39 (D37 and D39) after simultaneous pushing the buttons "Function" and "Entry" ("Function" and "Exit"). If one of the light diodes is off or both are off examine the connection between the control board and the controller.
After transmitting the signal "Emergency release" (pushing the button "Emergency exit") the turnstile does not change indication to green light and does not drop the arm.	1. Faulty of the button "Emergency exit". 2. Faulty of the cable connecting the control board and the controller.	Examine if D41 diode is on at the moment of pushing the button "Emergency exit". If D41 is off then examine the connection between the control board and the controller.
After transmitting the signal "Emergency release" (pushing the button "Emergency exit") the turnstile changes indication to green light but does not drop the arm.	1. Faulty of the electromagnet of the drop-arm unit. 2. Faulty of the cable connecting the mechanism and the controller.	Examine if D32 light diode is off after pushing the button "Emergency exit". If it's off then examine the working order of the drop-arm unit.
After repeated giving of the signal "Emergency	Faulty of the drop-arm unit if the turnstile.	Examine if D32 light diode is on. If it's on then wait while the

release” (pushing the button “Emergency exit”) light indication became red but the occlusive arm of the tripod is not in the starting position.		tripod end rotation, drop the arm down and then lift it up. If the arm is not fixated horizontally then it’s necessary to replace the mechanism entirely.
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5. PREPARATION FOR USE

5.1 Turnstile unpacking

After transportation and (or) storage of the turnstile the following is required:

- take off the package and remove the packing material;
- in case of any external damages of the stands revealing, to inform the supplier is required;
- place the turnstile for not less than three hours inside of the building in which the turnstile will be operated if the turnstile is brought from cold room into the warm one;

5.2 Assembly procedure and installation



The product is installed without using special tools. The removable panels of the turnstile provide free access to all units and assemblies of the product.



Manufacturing company does not take responsibilities for the damage because of improper assembly and installation and rejects any claims if assembly and installation were carried out not according to the recommendations given in this assembly and operation manual.

5.2.1 Safety requirements at assembly and installation

Assembly, operation and maintenance of the turnstile can be carried out only by technical stuff that have studied this assembly and operation manual and were briefed for accident prevention.

Only serviceable tools should be used for assembly and installation.

Connecting of all the cables should be carried out only when the power is off and the power supply is disconnected from the mains.

Observe general electrical safety rules when laying out the cables.

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

When installing the product, it is forbidden:

- to expose parts and units to shocks and falls;
- to start working without safety briefing and complete studying this assembly and operation manual;
- to use faulty tools and devices.

5.2.2 Installation tools

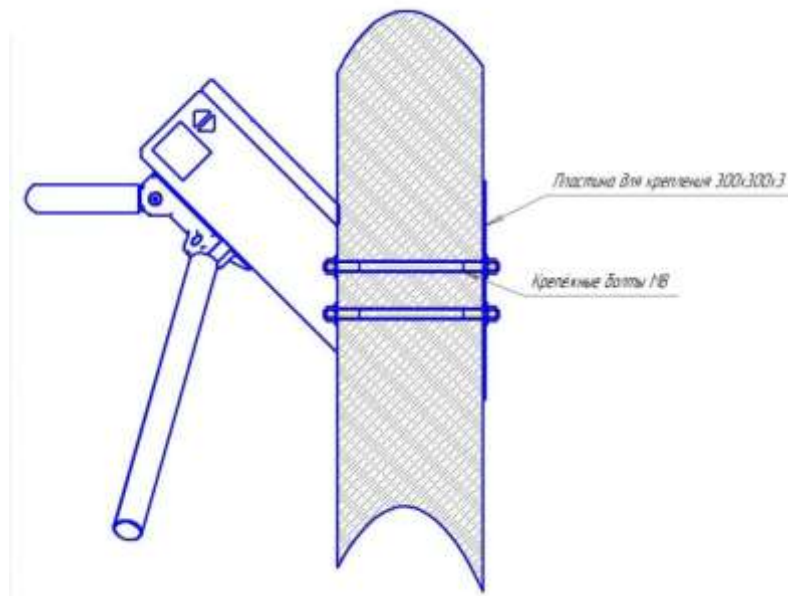
To install the turnstile the following set of tools is needed:

- Set of screwdrivers
- Set of hook wrenches
- Set of socket keys
- Nippers
- Pliers
- Hammer
- Rubber mallet
- Drill with bank of drills
- Angle grinder with the set of cutoff wheels and rotary files
- Perforator with the set of masonry drills
- Screw gun
- Tape-measure
- Builder's level 1m
- Insulation tape
- Heat shrink tube 3/1
- Plastic cable tie 100x3
- Cable shoes f1mm
- Cable shoes f 0,5mm
- Terminal block WAGO 222-412, WAGO 222-413, WAGO 22-415



It is allowed to use other testing equipment and measuring tools provided the equipment in use ensures the required parameters and measurement accuracy.

5.2.3 Turnstile mounting



The turnstile should be mounted on the strong and smooth concrete bases. Mounting of the turnstile to the wall is executed by four threaded rods and mounting plates. During mounting of the turnstile the electric supply cables, connection cables to the control board, connection cables to the external controller of the ACMS are laid. The place of installing the external managing controller of the ACMS should not be further than 20 meters from the turnstile.

The mounting of the turnstile should be done in the following order:

- Unpack the turnstile, check the package contents;
- Prepare 4 holes on the wall for threaded rods and hole for cabling;
- Lay the plastic pipes, make cabling.

For connecting the turnstile following cables are needed:

- Power cable – 2 wires ($d > 1,5 \text{ mm}^2$ each);
- Control board cable – 8 wires ($d > 0,22 \text{ mm}^2$ each) or another cable in accordance with ACMS requirements;
- Cable of the output signals for managing controller of the computer – 2 wires ($d > 0,22 \text{ mm}^2$ each) or another cable type twisted pair in accordance with connection circuit of interface converter.

Install the turnstile, fixate it to the base.

Mount the tripod to the mechanism

Connect the power cables, control board cables, external managing controller cables in accordance with pic. 7.

Cover and fixate by bolts covers of the turnstile and basement.

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5.2.4 Preparing to operation

Before switching on the turnstile it's necessary to ensure in rightness of all connections and good condition of connection cables by visual examination.

Clear the tripod rotation zone from foreign objects.

Connect the control board to power unit. Connect power unit cable to the electrical network 220V/50Hz.

For dead-load stress relief it's recommended to connect the case to the ground loop.

After switching on the electric supply the tripod of the turnstile makes full turn and the arm is fixated in the horizontal position after that the turnstile comes to starting position.



Warning: do not switch on the turnstile without mounted tripod.

6. MAINTENANCE

6.1 General information

Maintenance (M) of the turnstile is performed in order to ensure its fault-free operation during the whole life cycle.

When performing the maintenance, the safety requirements of this Manual should be observed.



Maintenance of the turnstile should be carried out only by the qualified personnel.

Before the cleaning switch off the power supply of the turnstile.

Do not let the water get inside the casing.

No detergents containing abrasive agents should be used for cleaning dirty surfaces of the turnstile.



Warning!

There is hazard of electric shock when electric parts contact with water.

6.2 Maintenance plan

The recommended maintenance (M) categories and intervals are given in Table 5.

Table 5. Maintenance categories

Category	Interval	Average number of working hours
M-1	1 time every 3 days	0.2
M-2	1 time every 6 months	0.5

M-1 includes:

- Visual examination of external damages;
- Visual examination of connection and net cables;
- Removal of dust and dirt from the external and internal parts of the case and the mechanism;
- Clearance of the electronic board of the control unit of the turnstile: the face of the board clear of dust and dirt with the use of dauber and then clean with the napkin of soft fabric saturated with spirit;
- Examining of the working modes of the turnstile in accordance with the table of this Assembly and operation manual.

M-2 includes:

- M-1.
- Removal of dust from printed boards of controllers by using a dauber wetted with alcohol followed by wiping with a soft cloth.
- Check of fastening of units, cables and parts of cabinets.

6.3 Material consumption rate.

Material consumption rate for maintenance of one cabinet per year: ethyl alcohol – 0,1 l, soft cotton cloth – 0,5 m².

7. REPAIR

The turnstile should be repaired only by properly qualified technicians who have studied this assembly and operation manual.

The turnstile repair should be carried out by substituting the faulty parts into fault free parts.

Faulty parts should be delivered to the manufacturing company.

8. STORAGE

The cabinets should be stored upright on shelves in the manufacturer's package.



Warning!

Stacking of turnstiles is forbidden!

The distance from the turnstile in the package located on the shelf to any other object (including walls and floor of the warehouse) should be min. 0,1 m.

The distance from the turnstile in the package to the heater should be min. 0,5 m.

The storage conditions of turnstile as to the exposure to climatic factors should comply with storage conditions of group 1 according to AUSS 15150-69:

- the air temperature should be from +5 to +40°C;
- the relative humidity should make max. 80 % at the temperature of +25°C;

The air must be free of dust, oil vapors, and inflammable and corrosion-active agents in amounts exceeding their maximum permissible concentrations.



Warning!

The product shelf-life should not exceed 2 years.

9. TRANSPORTATION

The turnstile is transported in the shipping container by any means of transport providing the protection from the exposure to atmospheric precipitation:

- direct transportation by motor transport on roads of the first category without speed limits or with speed up to 40 km/h on roads of the second and third category;
- combined transportation by other means of transport.

Arrangement and fastening of products in the transport vehicles should provide their steady position; exclude the possibility of product shifting and their impact on each other on the move.

The transportation conditions of turnstile as to the exposure to climatic factors should comply with storage conditions of group 3 according to AUSS 15150-69, at the same time the air temperature should be from minus 20 to +45°C, the relative humidity should make max. 95% at the temperature of 25°C.



Warning!

Stacking of turnstiles is forbidden!

10. DISPOSAL

The decision on decommissioning and disposal of the turnstile is made by the owner of the turnstile with account of the specified service life.

The turnstile should be disposed in accordance with requirements of regulatory legal act and regulations in force.