«TiSO-PRODUCTION» Company

INDOOR SHORTENED SINGLE FULL-HEIGHT TURNSTILE T2.1.BXO.HP

OPERATION MANUAL
AUIA.411.2 OM

2013

CONTENTS

INTRODUCTION

This Operation Manual (hereinafter referred to as the OM), combined with certificate, covers the Indoor Shortened Single Full-Height Turnstile (hereinafter referred to as the turnstile). The Operation Manual contains information about design, specifications, installation, proper operation and maintenance of the turnstile.

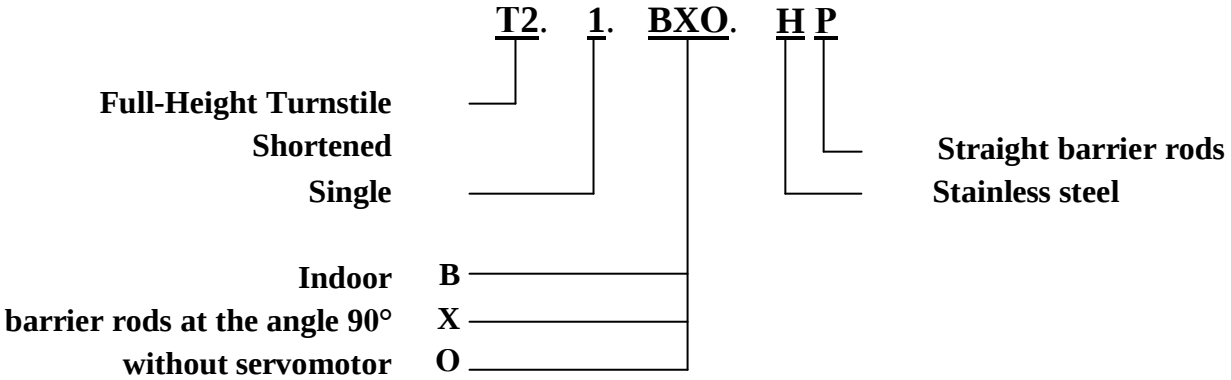
This Operation Manual is prepared in compliance with the specification requirements TU U 31.6-31.6-32421280-003:2010.

The turnstile should be serviced only by the qualified staff having the relevant class of permit to work with electrical facilities with voltage up to 1000V, who carefully studied this Operation Manual, obtained safety instructions and trained for operation and maintenance of the turnstile.

Reliability and durability of the turnstile operation is provided with observation of modes and conditions of transportation, storage, installation and operation. So, fulfillment of all requirements specified in this document is mandatory.

In view of regularly performed works on improvement of the product, its design can be modified without degradation of parameters and quality of the product.

Depending on the purpose and design features of the turnstile, the following pattern of product reference designation is accepted:



Example of reference designation of the Servo-operated Shortened Single Full-Height Turnstile with straight barrier rods and stainless steel housing when the turnstile

T2.1. BXO.HP TU U 31.6-32421280-003:2010 is ordered.

WARNINGS TO THE CUSTOMER

ON SAFE OPERATION OF THE TURNSTILE

These warnings are designed for ensuring of safety during operation of the turnstile to prevent violation of safety characteristics by improper installation or operation. These warnings are aimed at drawing attention of the customer to safety problems.

GENERAL WARNINGS

Safety measures and requirements specified in this in this OM must be observed:

– the turnstile must be connected to ground loop prior to operation;
– the turnstile should be connected to AC network with parameters specified in the paragraph 1.2 «Specifications»;
– inspection, adjustment and repair should be performed only after the turnstile is deenergized.

After purchasing of the turnstile it should be unpacked and its integrity should be checked. In case of doubt in integrity of the turnstile it should not be used and the customer should refer to the supplier or to the manufacturer.

Packing accessories (wooden pallet, nails, clips, polyethylene bags, cardboard etc.) as potential sources of hazard must be removed to unacceptable place prior to proper use of the turnstile.

As electric shock protection device the turnstile is related to 01 protection class according to the GOST (State Standard) 12.2.007.0-75 and is not intended for operation in explosive and fire-hazardous areas by the «Rules for design of electrical installations».

Using of the turnstile for unintended purpose, improper installation, nonobservance of conditions of transportation, storage, installation and operation specified by this OM, may result in damage to people, animals or property for which the manufacturer is not responsible.

1 DESCRIPTION AND OPERATION

1.1 General Information and Designation

1.1.1 Name of product: Indoor Shortened Single Full-Height Turnstile
Climatic version: NF4

1.1.2 The turnstile is designed for pedestrian movement control at access points of industrial enterprises, banks, stadiums, administrative facilities etc. under actuation of control signals (coming from magnetic card readers, keypad etc.) of access control system or manually (from control panel). Traffic flow capacity of the turnstile without personal identification is at least 20 persons per minute.

1.1.3 Dimensions and weight of the turnstile correspond to the values are specified in the Table 1.

Table 1

Designation of modification	Dimensions, mm			Max. weight, kg
	H	L	W	
T2.1.BXO.HP	1550	1478	1595	250

1.1.4 The parameters defining operation conditions according to the GOST 15150-69 and the GOST 12997-84 are specified in the Table 2.

Table 2

Operation conditions	For climatic version	Parameter value
Ambient temperature	NF4	+1°C to + 40°C
Relative humidity		80% at + 25º C
Ambient temperature allowable pressure		84 to 106,7kPa
Transportation temperature range		- 50°C to + 50°C
Storage temperature range		+ 5°C to + 40°C
Group of mechanical application		L3
Altitude above sea level		up to 2000 m
Environment		Explosion-proof, does not contain current-conducting dust, aggressive gases and vapours in concentration destroying isolation and metals, disturbing normal operation of the equipment installed in turnstiles
Installation site		In enclosed spaces in the absence of direct impact of precipitations and solar radiation
Running position		Vertical, deviation from vertical position no more than 1º to any side is tolerated

1.1.5 Reliability indices:

– mean time to repair (without delivery time of spare parts, tools and accessories) – at most 6 hours;
– mean time to failure – at least 1 500 000 accesses;
– mean service life between overhauls – at least 10 years.

1.2 Specifications

Principal parameters of the turnstile are specified in the Table 3.

Table 3

Parameter description	Unit measure	Parameter value
Traffic flow capacity in free access mode is at least	man/min.	20
Max. passage width	mm	550
Supply voltage:		
– AC power supply (primary)	V Hz	100÷240 ~ 50/60
– DC power supply (secondary)	B	12
Max. power consumption	V·A	75
Index of protection according to GOST 14254-96	–	IP54

1.3 Configuration and Completeness of Delivery

1.3.1 Turnstile design

1.3.1.1 Design of the Shortened Single Full-Height Turnstile includes the following principal devices and components:
– frame;
– rotor;
– support;
– two enclosure walls;
– container with control mechanism and counter;
– LED displays;
– control panel;
– electrical equipment.

1.3.1.2 The turnstile modification with Straight barrier rods (reference designation T2.1.BXO.HP).

1.3.1.3 The turnstile modification is manufactured from polished or brushed stainless steel.

Modification, overall and installation dimensions of the turnstile are shown in the Appendix A.

1.3.2 Completeness of Delivery

The turnstile is supplied ready-to-install or by components.
Completeness of delivery is specified in the Table 4.

Table 4

Name of product	Product designation/parameters	Quantity, piece	Notes
Indoor Shortened Single Full-Height Turnstile	T2.1.BXO.HP	1 kit	The turnstile is delivered ready-to-install
<u>Components</u>			
Control panel	AUIA.114.02.00.00	1	–
Battery*	12V; 17A·h	1	Backup Power Supply
Mounting kit	Redibolt 92F112A2-0 (12×120 M10)	4	Anchor with jacket and screw
	Redibolt 92F110A2-0 (10×120 M8)	12	
Certificate	AUIA.411.2 PS	1	–
Packing	–	1	–
* Optional			

When the turnstile is ordered ready-to-install it is delivered in one package: the turnstile packing (with container), dimensions of which are (HxLxW): 1735x1586x1436mm.

1.4 Design and operation

1.4.1 Turnstile design

1.4.1.1 The turnstile design is prefabricated (see the Appendix A) and consists of frame 7, enclosure 6, rotor 1 and support 8. The top connecting bar of the structure is container 3, inside which the turnstile control mechanism and electrical equipment (power supply and control unit, battery, controllers etc.) are located.

1.4.1.2 Revolving rotor 1, divided into three sectors, each of 90º, is located between enclosures. Bottom part of rotor is fixed to support 8, which in its turn is mounted to the frame's base plate sheet. Fixation to the floor is performed by means of Redibolt. The upper part of rotor is linked with shaft of control mechanism through clutch half-coupling.

1.4.1.3 Design of control mechanism (see the Figure 1) consists of bottom and upper plates (1 and 2), on which primary components of the structure are located.
On the shaft between the plates ratchet gears (3 and 4) are located, which are locked with latches (5 and 6). In interlocking position with ratchet gears the latches are pushed by springs (7 and 8). Ratchet gears are disconnected by means of solenoids (9 and 10), which, when actuated, provide rotation of the relevant latches and unlocking of the relevant ratchet gear.
Rotor is brought to initial position (when ratchet gear with its tooth abuts against latch) by actuator consisting of profile cam 11, lever 12 with roller 13 and spring. Impact forces, appearing during rotation of rotor, are absorbed by damper 16.
Control sensors of rotor initial position and direction of its rotation is optocouple (18) operating in consolidation with sprocket disk (17) rigidly connected to the shaft of ratchet gears.
Locks (23 and 24) are designed for manual unlocking of the turnstile.
Position of mechanical unlocking locks is controlled by microswitches (25 and 26).
Solenoids (9 and 10) operate in «boost» mode (i.e. supply of additional voltage up to the level of 24V-27V) provided by microswitches (27 and 28) depending on position of latches.

1.4.1.4 Electrical equipment of the turnstile, installed and located inside container, is designed for operation control of actuating mechanisms and LED display of the turnstile both as part of access control system (ACS) and by means of control panel.

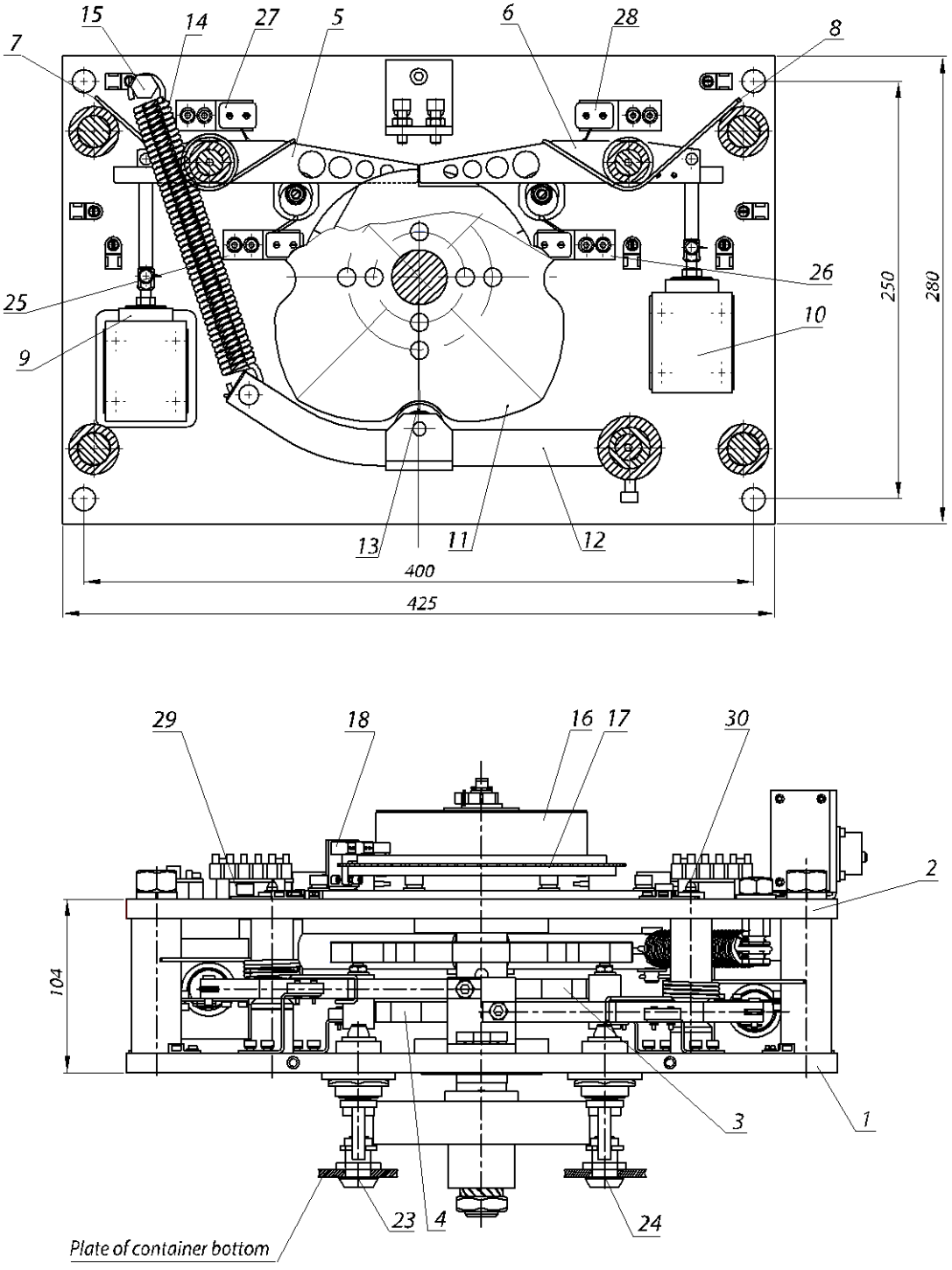
Electrical equipment of the turnstile includes: controller, power supply, battery, wired and distribution electrical accessories.

1.4.1.5 LED displays are located on container of the turnstile from the entrance side and they are designed for visual display of information about assignment and execution of commands coming from control system (control panel, ACS or keypad) to actuating mechanisms of the turnstile.

1.4.1.6 Control panel is made as small desktop device in plastic case designed for setting and indication of operation modes during manual operation of the turnstile. Control panel and its connection diagram are shown in the Appendix B.

1.4.1.7 In order to ensure operation of the turnstile as part of access control system (ACS) the following components are used as elements of this system:
– Complex of ACS technical means;
– ACS software;
– Card, badge etc. readers;
– Cards, badges etc;
– Technical means of badge issuance.

The Manufacturer delivers the listed above as agreed by the parties under separate contract.



1 – bottom plate;
2 – upper plate;
3, 4 – ratchet gears;
5, 6 – latches;
7, 8 – springs;
9, 10 – solenoids;
11 – profile cam;
12 – lever
13 – roller;
14 – spring;
15 – axis;
16 – damper;
17 – sprocket disk;
18 – optocouple;
23, 24 – locks;
25, 26, 27, 28 – microswitches;
29, 30 – converters

Figure 1 – Control mechanism

1.4.2 Principle of operation

1.4.2.1 In the initial state (when solenoids of control mechanism are deenergized) rotor is locked from rotation in both directions.

1.4.2.2 When access enabling command is given to controller in one of directions:
– Green arrow is lit on LED display;
– The relevant solenoid is energized;
– The turnstile is unlocked in the relevant direction and the turnstile accessor is able to turn rotor manually to 90°.

1.4.2.3 As soon as rotor starts revolving the red symbol « ›‹ » is lit on LED display.

1.4.2.4 Rotor is brought to zero position by actuator of control mechanism and after that the turnstile is automatically locked from rotation in both directions.

1.4.2.5 When rotor reaches the angle 45°, its reverse movement is automatically locked.
More detailed description of the turnstile operation modes is given in the paragraph 1.8 «Description and operation of controller as component of the turnstile».

1.4.2.6 12V DC power voltage is provided by power supply unit.

1.4.2.7 When mains power supply is off, the turnstile is automatically switched to power supply from battery (optional), which ensures the turnstile's operation within at least 2 hours.

1.4.2.8 The turnstile’s wiring diagram is shown in the Appendix C.

1.5 Instrumentation, tools and accessories

Dedicated tools are required for installation of the turnstile (multi-purpose measurement instrumentation and installation tools are enough).

1.6 Marking

1.6.1 Marking of turnstiles to be delivered within Ukraine is in Ukrainian language and for export delivery in English.

Each turnstile is marked as follows:
– name of manufacturer and trade mark;
– reference designation of turnstile modification;
– index of protection;
– serial number;
– value of voltage, type of current, frequency and current consumption;
– weight, kg;
– date of manufacture;
– inscription «MADE IN UKRAINE».

Marking plate is located on container of the turnstile.

1.6.2 Marking of transportation packing contains as follows:
1) Information inscriptions:
  – reference designation of the turnstile modification;
  – dimensions of cargo package in centimeters;
  – gross and net weight in kg;
  – volume of package in cubic meters;
  – contract number;
  – name of consignee;
  – name of exporter;
  – full address of consignor;
2) Handling marks:
  – «Fragile. Handle with Care»;

– «Keep dry»;
– «Centre of gravity»;
– «Top».

1.6.3 Shipping documentation is packed with bag from polyethylene film. Marking is applied on insert from cardboard or paper.

1.7 Packing

1.7.1 The turnstile is delivered ready-to-install.
Types of packing:
– consumer packaging (corrugated cardboard case);
– transportation packaging (cases from wood-fiber board or crates).

The turnstile is fixed from displacement in the middle of transportation package with LOCKING lumbers. Cushion pads are placed between the turnstile and lumbers.

1.7.2 Shipping documentation sealed in a bag from polyethylene film is enclosed to the package No.1.

1.8 DESCRIPTION AND OPERATION OF CONTROLLER AS COMPONENT OF THE TURNSTILE

1.8.1 **The turnstile's controller 112.21.20.00**

Controller is designed for acquisition of control commands from peripherals (control panel, access control system etc.), generation of feedback signals, control of turnstile's LED displays and operation of the motorized device controller.

The controller is assembled on (104x68)mm card and designed for installation inside the turnstile housing.

Appearance of the controller is shown in the Figure 2.

19 light emitting diodes are installed on the controller card. Their purpose is as follows:

- 5 light emitting diodes display state of the external connection inputs «INP1» ÷ «INP5»;
- the light emitting diode «POWER» displays existence of 5V power supply voltage;
- the light emitting diode «OPERATE» displays operating capacity of microprocessor;
- 7 light emitting diodes display state of the external connection outputs «OUT1» ÷ «OUT7»;
- 3 light emitting diodes «SENSOR» display state of rotor position sensor;
- the light emitting diodes «RX» and «TX» display transceiving on serial port.

40 terminal clips for connection of wires are installed on the card, 14 of which are designed for external connections and the rest are designed for connection to the turnstile units or are standby.

1.8.2.2 Technical features

The controller technical features are specified in the Table 5.

Table 5

Parameter description	Parameter value
Number of inputs for reception of control commands	5
Number of signal outputs	7
Type of inputs	logical
Type of outputs	open collector
Voltage of logical «1»	(3÷5)V
Voltage of logical «0»	(0÷2,2)V
Maximum peak voltage supplied to the inputs «INP1» ÷ «INP5»	15V
Peak voltage switched by transistors of signal output transistors	50V
Peak current switched through signal outputs	0,1A
Power supply voltage of controller	(9÷15)V
Peak consumption current	0,15A

Number of signal transceiving serial ports (RS-485)	1
Climatic version and category of location according to the GOST 15150-69	NF4

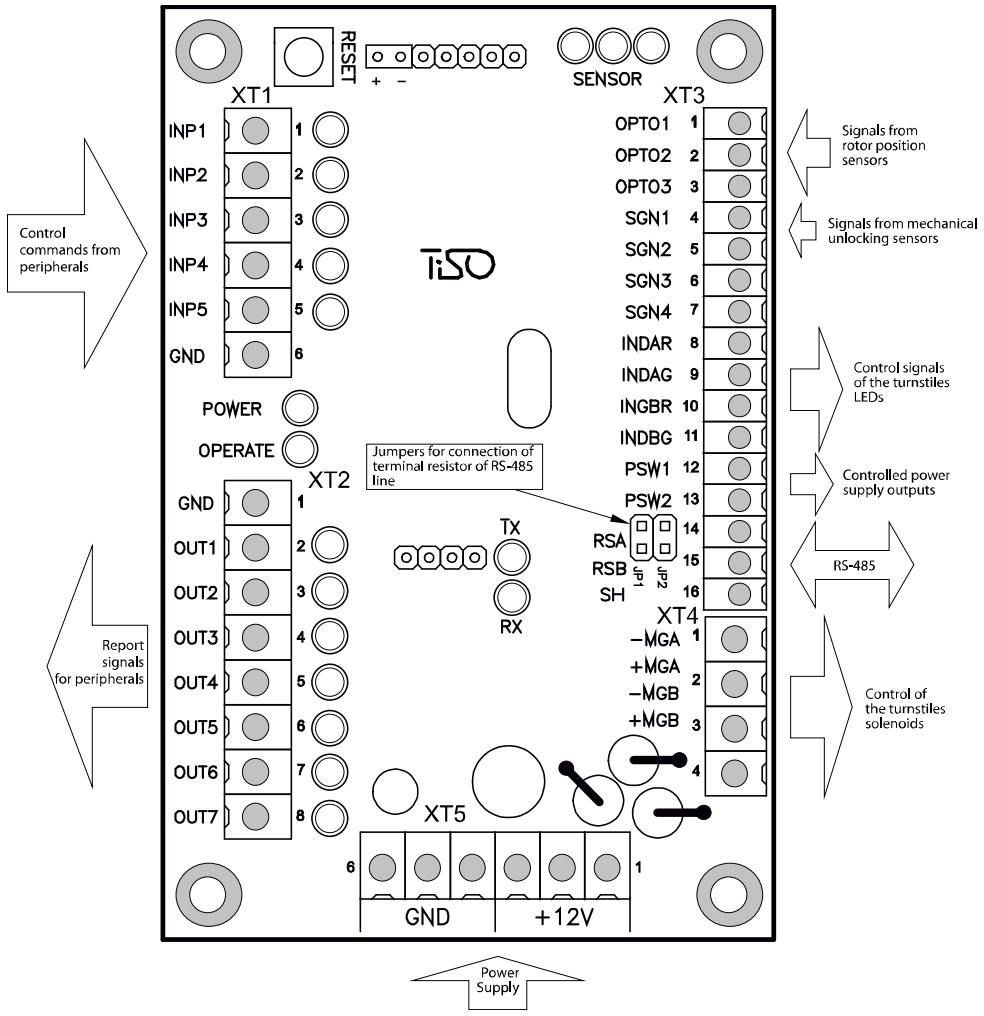


Figure 2 – Appearance of controller PCB.112.21.20.00

1.8.1.3 Description of operation

Controller operates according to the program entered into memory of microprocessor. Mechanism and LED display of the turnstile are controlled depending on control commands and rotor position sensors based on the logic entered into program. Control commands can be transmitted via RS-485 (from control panel) or logical inputs by means of closing and opening «INP1» ÷ «INP5» on «GND».

Controller (and therefore the turnstile) can be in «INITIAL STATE» (closed for access) or in one of the following access modes:

- «SINGLE ACCESS IN ONE DIRECTION»;
- «FREE ACCESS IN ONE DIRECTION»;
- «MECHANICAL UNLOCKING IN ONE DIRECTION».

Other operating modes are combinations of various or identical basic modes in different directions:

- Single access in one direction and any of basic modes in opposite direction.
- Free access in one direction and any of basic modes in opposite direction.
- Mechanical unlocking in one direction and any of the above modes in opposite direction.

1.8.1.3.1 «INITIAL STATE»
Controller is in this mode if the commands «TO BE OPENED A/B» are absent and the turnstile rotor is set to the point 0º. In this mode solenoids are deenergized and rotor is locked.
Inhibitive red LED display are lit in both directions.

1.8.1.3.2 «SINGLE ACCESS IN ONE DIRECTION»
In this mode controller unlocks rotor via solenoid in one direction with possibility of its rotation to 90º. It enables turnstile access of one pedestrian.

Controller goes to «SINGLE ACCESS IN ONE DIRECTION», if in «INITIAL STATE» it receives the command «TO BE OPENED A/B» (active level of signal is given to the input «INP4» or «INP5». Command may also come via the interface RS-485.

In this case, if command is received via the input «INP4» or «INP5», controller waits for start of rotor rotation during active status of signal on the relevant input «INP4» or «INP5» and if controller receives the command «TO BE OPENED A/B» via RS-485, then start of rotor rotation is expected before ending of delay «WAITING FOR START OF ACCESS».

Sequence of actions of controller after acquisition of the command «TO BE OPENED A/B» is as follows:

- Delay of «WAITING FOR START OF ACCESS» is initiated (if command comes via RS-485, factory setting is 5 sec.).
- Controller energizes solenoid and thus unlocks rotor in the relevant direction and sends the relevant command to controller of motorized device.
- LED display corresponding to authorized access is switched from red to green.

If during delay of «WAITING FOR START OF ACCESS» rotor rotation starts, then further behaviour of controller depends on the angle of rotor rotation:

- 5º of rotor rotation – LED display is switched from red to green indicating occupation of access. The output signal «START OF ACCESS A/B» («OUT1» or «OUT2») assumes active status. Delay of «WAITING FOR START OF ACCESS» is cancelled;
- 43º of rotor rotation – status of the relevant input «START OF ACCESS A/B» («OUT1» or «OUT2») is cancelled and the signal «NO RETURN POINT» («OUT5») appears;
- 45º of rotor rotation – when this point is passed rotor can't be returned to the point 0º (in reverse direction);
- 48º of rotor rotation – the signal «DETECTION OF ACCESS A/B» («OUT3» or «OUT4») appears.
- 53º of rotor rotation – the relevant solenoid is deenergized preparing rotor for locking in the point 90º (0º for next access).
- 90º of rotor rotation – the signals «NO RETURN POINT» («OUT5») and the relevant signal «DETECTION OF ACCESS A/B» («OUT3» or «OUT4») are cancelled and after that availability of the command «TO BE OPENED A/B» («INP4» or «INP5») corresponding to the current direction of access is checked and if command by that moment is active then controller goes to the «FREE ACCESS» mode.

1.8.1.3.3 «FREE ACCESS IN ONE DIRECTION»
In this mode rotor can easily rotate in direction of free access. In the «FREE ACCESS» mode green LED of the relevant direction is blinking.

Controller is switched to this mode in three cases.

- First: when the «TO BE OPENED A/B» (input «INP4» or «INP5») command is kept in active status at the moment of crossing the point 90° by rotor when «SINGLE ACCESS» is completed.
- Second: immediately after acquisition of the «FREE ACCESS» command in the relevant direction via RS-485.

Quitting from this mode in «INITIAL STATE» is taken place after cancellation of the «TO BE OPENED A/B» command or acquisition of the «FREE ACCESS CANCELATION» command via RS-485. But it will take place not instantly and only when rotor reaches one of the starting points 0º, 90° etc., i.e. if the free access cancellation arises during the started access it will be completed as free.

1.8.1.3.4 «MECHANICAL UNLOCKING»

In this mode rotor can easily rotate in direction of mechanically unlocked access. It is made to have possibility to access through the turnstile in case of emergency as well as when backup battery is completely discharged or malfunction of operation of electrical equipment.

The turnstile is switched to this mode by turning of mechanical key. Having acquired a signal from the microswitch linked with mechanical key, controller goes to the «MECHANICALLY UNLOCKED» mode in the appropriate direction. Since in this mode controller can't effect the access operation, so LED display is identical to free access, i.e.: green LED display of unlocked access is blinking and red LED display is off.

Quitting from this mode is taken place after turning of the «MECHANICAL UNLOCKING» key to initial state.

1.8.1.3.5 «AUTHORIZATION OF SINGLE ACCESS IN TWO DIRECTIONS»

Since the turnstile having one rotor can't be rotated in two directions simultaneously, controller can only unlock rotor in two directions and after access in one of directions is started, the opposite direction will be closed.

Controller is switched to this mode if in the «INITIAL STATUS» it simultaneously acquires «TO BE OPENED A» and «TO BE OPENED B» commands. The second signal also can come during the time when the first signal is already active but rotation of rotor did not start yet.

In this case:

- Controller unlocks rotor in two directions via solenoids and sends the relevant commands to the motorized device controller.
- Switches both LEDs from red to green.
- Initiates two delays of «WAITING FOR START OF ACCESS A and B» (if commands come from RS-485) for each access separately, which are counted from the moment of acquisition of commands.
- Controller waits for starting of access.
- After rotor is revolved to 5º in any side, the opposite direction will be locked and LED will be switched to red and delay of «WAITING FOR START OF ACCESS» will be cancelled.
- Then controller is operating as described in the chapter «SINGLE ACCESS IN ONE DIRECTION».
- If during active status of the «TO BE OPENED A» and «TO BE OPENED B» signals or during «WAITING FOR START OF ACCESS» rotor was not turned to any side to the angle > 5º, controller is switched to the «INITIAL STATE».

Purpose of the controller contacts designed for connection of peripherals is specified in the Table 6.

Table 6

Connector / Contact No	Designation	Direction	Description	Signal parameters and description
XT1/1	INP1	ENTRY	Not applicable	1) logical «0» (0÷2,2)V; 2) logical «1» (3÷5)V; 3) active level of signal (factory setting) – logical «0»; 4) voltage on open input
XT1/2	INP2	ENTRY		
XT1/3	INP3	ENTRY		
XT1/4	INP4 («TO BE OPENED A»)	ENTRY	Command «TO BE OPENED FOR SINGLE/FREE ACCESS»; Free access appears when entry is kept in active states	
XT1/5	INP5 («TO BE	ENTRY		

	OPENED B»)		after the angle 90° is reached by rotor	< 5V
XT1/6	GND (common)			
XT2/7	GND (common)			
XT2/8	OUT1 («START OF ACCESS A»)	EXIT	Signal is generated by controller when the command «TO BE OPENED» is acquired and detection of rotor in the same direction	1) type of output – open collector; 2) peak voltage on privacy key 55V; 3) peak current of public key 100mA; 4) resistance of public key (5÷7)Ohm;
XT2/9	OUT2 («START OF ACCESS B»)	EXIT		
XT2/10	OUT3 («DETECTION OF ACCESS A»)	EXIT	Signal is generated by controller when rotor is rotated from 48º	
XT2/11	OUT4 («DETECTION OF ACCESS B»)	EXIT		
XT2/12	OUT5 («NO RETURN POINT»)	EXIT	Signal is generated by controller when rotor reaches the angle 43º	
XT2/13	OUT6 («ERROR»)	EXIT	Signal is generated by controller when fault of behaviour is detected	5) active level of signal (factory setting) – logical «0»
XT2/14	OUT7 («ACCES IS OCCUPIED»)	EXIT	Signal is generated by controller starting from the angle 2º to 88º	
XT3/15	OPTO1	ENTRY	Used for obtaining of information about turnstile rotor position	1) logical «0» (0÷2,2)V; 2) logical «1» (3÷5)V; 3) active level of signal (factory setting) – logical «0»; 4) voltage on open input < 5V
XT3/16	OPTO2	ENTRY		
XT3/17	OPTO3	ENTRY		
XT3/18	SGN1	ENTRY	Used for obtaining of information about mechanical unlocking of the turnstile rotor	
XT3/19	SGN2	ENTRY	Selection of turnstile type	
XT3/20	SGN3	ENTRY	Not applicable	
XT3/21	SGN4	ENTRY		
XT3/22	INDAR	EXIT	Used for control of turnstile LED displays	1) type of output – open collector; 2) peak voltage on privacy key 30V 3) peak current of public key 2A 4) resistance of public key 0,1Ohm
XT3/23	INDAG	EXIT		
XT3/24	INDBR	EXIT		
XT3/25	INDBG	EXIT		
XT3/26	PSW1	EXIT	Used for energization of peripherals	1) type of output – open emitter; 2) voltage on output in ON state 12V; 3) peak current

XT3/27	PSW2	EXIT		consumed from the output 1A; 4) resistance of public key 0,25Ohm
XT3/28	RSB		Used for data transmission via serial port	Interface RS-485
XT3/29	RSA			Interface RS-485
XT3/30	SH		RS-485 SCREEN	
XT4/31	- MGA	EXIT	Used for control of solenoids of rotor device	1) type of output – open collector; 2) peak voltage on privacy key 50V; 3) peak current of public key 9A; 4) resistance of public key 0,11Ohm
XT4/333	- MGB	EXIT		
XT4/32	+ MGA		Connection of cathodes of protective diodes to positive output of solenoids power supply	
XT4/34	+ MGB			
XT5/35	+ 12 V			1) power supply voltage 12V; 2) consumption current < 150mA
XT5/36	+ 12 V			
XT5/37	+ 12 V			
XT5/38	GND (common)			
XT5/39	GND (common)			
XT5/40	GND (common)			

2 INTENDED USE

2.1 Operation limitations

2.1.1 The turnstile must be used in the environment specified in the p. 1.1.4 of this document subject to the specifications listed in the section 1.2.

2.1.2 **IT IS PROHIBITED:**

1) UNINTENDED USE OF THE TURNSTIL (see the Chapter 1 «DESCRIPTION AND OPERATION»);

2) TO USE THE TURNSTILE UNEARTHED;

3) TO USE HEATING PIPES AND RADIATIONS AS WELL AS PIPES OF CENTRAL WATER SUPPLY FOR EARTHING;

4) TO REPAIR AND ADJUST WITHOUT DEENERGIZING;

5) TO RELOCATE THE OBJECTS EXCEEDING THE PASSAGEWAY WIDTH THROUGH THE TURNSTILE ACCESS AREA;

6) TO JERK AND IMPACT BARRIER RODS, LED DISPLAY OR OTHER PARTS THE PRODUCT, WHICH MAY CAUSE THEIR MECHANICAL DEFORMATION OR DAMAGE.

2.1.3 It is not allowed to use the turnstile:

- at the presence of mechanical rattle in movable parts of the turnstile;
- when metalwork of the turnstile and its components and accessories are mechanically damaged.

2.1.4 **List of special conditions of operation**

- Mean time of the turnstile access (in single access mode) equals to 3 sec.
- The turnstile mechanism enables to clear access in case of emergency by means of antipanic function.

- The force applied by accessor to barrier rod should not exceed 600 H.
- Escape door, portal or pedestrian gate can be installed near the turnstile to grow the turnstile traffic flow capacity growth in case of emergency.

2.1.3 It is not allowed to use the turnstile:
– at the presence of mechanical rattle in movable parts of the turnstile;
– when metalwork of the turnstile and its components and accessories are mechanically damaged.

2.1.4 **List of special conditions of operation**
- Mean time of pedestrian turnstile access (in single access mode) equals to 3 sec.
- The turnstile mechanism enables to perform emergency unlocking with the use of key.
- The force applied by accessor to the center of barrier rod should not exceed 600 H.
- Escape door, portal or pedestrian gate can be installed near the turnstile to grow the turnstile traffic flow capacity growth in case of emergency.

ATTENTION: MANUFACTURER WARNS OF NECESSITY TO KEEP SEALS OF THE MANUFACTURER ON THE TURNSTILE'S COMPONENT PARTS!

2.2 Layout and installation

2.2.1 The turnstile and components of delivery kit are delivered to the installation site in the factory packing. The turnstile should be unpacked only on installation site.

2.2.2 Preparation of the turnstile for installation (dismounting) and commissioning should be performed according to this OM with mandatory observation of the safety measures specified in p. 2.1 and general electrical safety code.

2.2.3 The turnstile should be installed in the following sequence:
– inspect the turnstile for integrity, absence of visual damages and defects;
– verify the turnstile's completeness;
– prepare installation site for mounting of the turnstile: surface should be plain, hard and without defects (corrugations, overlaps etc.);
– prepare cable conduits and holes for the turnstile fixation;
– rotor 1 is installed and fixed on the frame 7 to be installed and fixed on the prepared site (See the Appendix A). Container1 is installed on the top. Control mechanism and rotor are aligned as per one axis and connected by means of half-coupling.

Installation and fixation of the turnstile should be performed only after pulling of all the turnstile electrical connection cables. The turnstile should be fixed on installation site by means of Redibolt (anchor with jacket and crew). Make sure of stability of the installed turnstile and then open both locks of mechanical unlocking by keys and check by hand rotation of rotor: rotor should easily rotate to both sides. Install enclosures 6.

Fixation of structure, final installation of smaller components and cabling should be performed according to the wiring diagram (see the Appendix C);
– the turnstile should be grounded;
– it is necessary to provide the input of UPS with AC voltage to actuate the turnstile.

2.3 Preparation for use

2.3.1 Commissioning instructions

Prior to energizing of the turnstile:
1) make sure of proper connection and good condition of all connecting cables;
2) clear the rotor rotation area from foreign particles;
3) verify by keys that locks of the turnstile mechanical unblocking are closed (turnstile is mechanically locked).

When mains cable of power supply unit is connected to the network, solenoids of the turnstile control mechanism are energized, rotor is locked from rotation in both directions barring access.

The turnstile is set in initial state: entry and exit LED displays are red (« ›‹ » is lit).

2.3.2 Required inspections

2.3.2.1 When the turnstile is commissioned it is necessary to perform inspections specified in the Table 9. During inspections the wiring diagram according to the Appendix C and the control panel according to the Appendix B should be used.

Table 9

Operation Mode	Mode Setting	LED Display
1 Turnstile is closed in both directions (initial state)	–	Red LED display is lit
2 Single access in one direction	Push the «SINGLE» access button to access in selected direction («A» or «B»)	Green arrow of single access is lit in chosen direction and red LED display is lit in opposite direction
3 Single access in both directions	Push both «SINGLE» access buttons to access in two directions («A» or «B»)	Green arrows of single access are lit in both directions
4 Free access in one direction	Push the «FREE» access button to access in the selected direction («A» or «B»)	Green arrow of free access in chosen direction is blinking and red LED display is lit in opposite direction
5 Free access in both directions	Push both «FREE» access buttons to access in two directions («A» or «B»)	Green arrow of authorized free access is blinking in chosen direction and green arrow is blinking
6 Single access in one direction and free access in opposite direction	Push the «SINGLE» access button to access in the selected direction and «FREE» access button to pass in opposite direction	Green arrow of authorized single access is lit in chosen direction and green arrow of authorized free access is blinking in opposite direction
7 Single access in one direction and locked access in opposite direction	Push the «SINGLE» access button to access in the selected direction («A» or «B») and the «LOCK» button to lock access in opposite direction	Green arrow of authorized single access is lit in chosen direction and red LED display is blinking in the locked access direction
8 Free access in one direction and locked access in opposite direction	Push the «FREE» access button to access in selected direction («A» or «B») and the «LOCKING» button to lock access in opposite direction	Green arrow of authorized free access is blinking in chosen direction and red LED display is blinking in the locked access direction
9 Locked access in one direction	Push the «LOCKING» button to lock access in selected direction («A» or «B»)*	Red LED display of locked access in one chosen direction is blinking
10 Locked access in both directions	Push both «LOCKING» button to lock access in two directions («A» or «B»)**	Red LED display of locked access in both directions is blinking
* In this case other control panel buttons of single and free access in chosen direction are locked ** In this case all control panel buttons of single and free access in both directions are locked		

2.3.2.2 The turnstile is ready for long-term operation.

2.4 Contingency actions

In case of human emergency evacuation from rooms and provision of free personnel exit the turnstile can be unlocked from control panel by sending the relevant command or manually by turning locks with key in the top part of container.

3 MAINTENANCE

3.1 General instructions

3.1.1 Commissioning and subsequent maintenance of the turnstile should be performed only by the staff to be in charge of the turnstile.

3.1.2 The turnstile can be serviced only by the staff having the relevant electrical safety qualification level according to the national requirements.

3.1.3 The turnstile should be installed and operated only by the qualified safety instructed staff having the relevant class of permit to work with electrical facilities with voltage up to 1000V, being aware of this OM, design and the turnstile's principle of operation.

3.2 Safety Measures

3.2.1 During maintenance of the turnstile the relevant safety measures, specified in p. 2.1, must be observed.

IT IS FORBIDDEN TO USE DEFECTIVE APPLIANCES, TOOLS, FUSES, INSTRUMENTATION SERVICE LIFE OF WHICH EXPIRED. MEASURING DEVICES, WHICH TERM OF CHECKING EXPIRED.

3.2.2 When instrumentations are prepared for operation it is necessary to comply with the safety requirements specified in instrumentation instruction manuals.

3.3 Maintenance procedure

3.3.1 Maintenance of the turnstile includes preventive measures which are taken according to established frequency to maintain the turnstile in operational condition, decreasing of component wearing and prevention of faults and malfunctions.

3.3.2 Daily and periodic maintenance of the turnstile are recommended.

Normally the daily maintenance is carried out before the beginning of work or during operational timeout and includes visual inspection of the turnstile's housing, and, if required, mechanical troubleshooting, elimination of corrosion and surface pollution.

IT IS FORBIDDEN TO USE ABRASIVE AND CHEMICALLY ACTIVE SUBSTANCES DURING CLEANING OF CONTAMINATED EXTERNAL SURFACES OF THE PRODUCT.

3.3.3 Periodic maintenance for the purpose of troubleshooting includes as follows:

- monthly periodic maintenance (maintenance-1): visual inspection of control mechanism for the present of deformations and other defects, checking of soft movement of latches and absence of jamming and gripping, checking of correct traveling of closer. Furthermore, optocouple 18 and sprocket disk 17 are inspected (see the Figure 1). Mating surfaces of optocouple gap and sprocket disk are cleaned from dust and dirt as well as tightening of screw fastenings of turnstile units to frame, if necessary;
- semiannual periodic maintenance (maintenance-2) includes all activities of the maintenance-1 as well as checking of solenoid consumption current, the value of which should not exceed 2,5A in the sucking mode and 0,15A in retention mode, lubrication of latch axes of with grease lubricant of solid oil type;
- annual periodic maintenance (maintenance-3) includes all the maintenance-2 activities as well as the following:
    1) checking of fixation of optocouple 18 and functional gap size in relation to disk;

2) checking of optocouple 18 regarding the absence of alarm related to movement during swinging of rotor shaft in both sides until latches touch functional surfaces of ratchet gears;
3) checking of status of pressure rollers of microswitches 27 and 28 as well as replacement of microswitches, if necessary;
4) checking of state of roller 13 and its replacement, if necessary;
5) checking of state of grommets connecting rotors and control mechanism and their replacement, if necessary.

4 ROUTINE MAINTENANCE

4.1 General instructions

Possible malfunctions of the turnstile listed in the Table 10 are remedied by the customer. More complicated malfunctions are remedied by manufacturer's representative.

ATTENTION: INSPECTION, CLEANING, REPAIR OF THE TURNSTILE'S COMPONENTS MUST BE PERFORMED ONLY AFTER DEENERGIZING OF THE TURNSTILE!

4.2 List of possible malfunctions

List of possible malfunctions and their remedies are specified in the Table 10.

Table 10

Symptom	Possible cause	Remedy
1 Turnstile is out of operation and LED displays are not lit	Abnormal contact in the turnstile ~ 220V terminal block	~ 220V input to turnstile to be restored
2 Turnstile operation is not provided from battery when mains power supply is cutoff	Battery is discharged	Battery maintenance to be performed according to instruction manuals
	Battery service life expired	Battery to be replaced
3 Turnstile does not respond to commands of control panel	Connection of control panel with turnstile is broken	Connection of control panel with turnstile to be restored
	Control panel is out of order	Control panel to be replaced

4.3 Postrepair checkout

After repair the turnstile operating capacity is checked by means of control panel according to the Table 9.

5 TRANSPORTATION AND STORAGE

5.1 It is forbidden to subject the turnstile to jerks and impacts during storage. For lifting and handling of the turnstile it is necessary to use transportation trolleys. In storage facility there should not be aggressive gases and vapours causing corrosion. Storage ambient temperature should not be below +5°C and above +40°C and relative humidity should not be more than 80% at the temperature 20°C.

5.2 The ready-to-install turnstile is transported in railway or special containers, closed vehicle, waterborne (in ship's hold) according to transportation regulations related to the relevant mode of transport.
Transportation on open platforms is allowed. In this case the packed turnstile should be covered with canvas. Ambient temperature during transportation should not be below - 50°C and above +50°C.

After transportation or storage of the turnstile at negative temperatures or increased humidity the turnstile should be kept indoor with normal climatic conditions without original packing within 12 hours before commissioning:

1) ambient temperature: + 15°C to +35°C;
2) relative humidity: 45% to 80%;
3) atmospheric pressure: 84,0 to 106,7kPa (630-800 mm Hg).

6 UTILIZATION

The turnstile does not contain hazardous materials and special measures are not required during its utilization.

7 MANUFACTURER'S WARRANTY AND CONDITIONS OF WARRANTY MEAINTENANCE

7.1. The manufacturer guarantees good state and declared quality of the turnstile if conditions of transportation, storage, installation and operation are observed by the consumer.

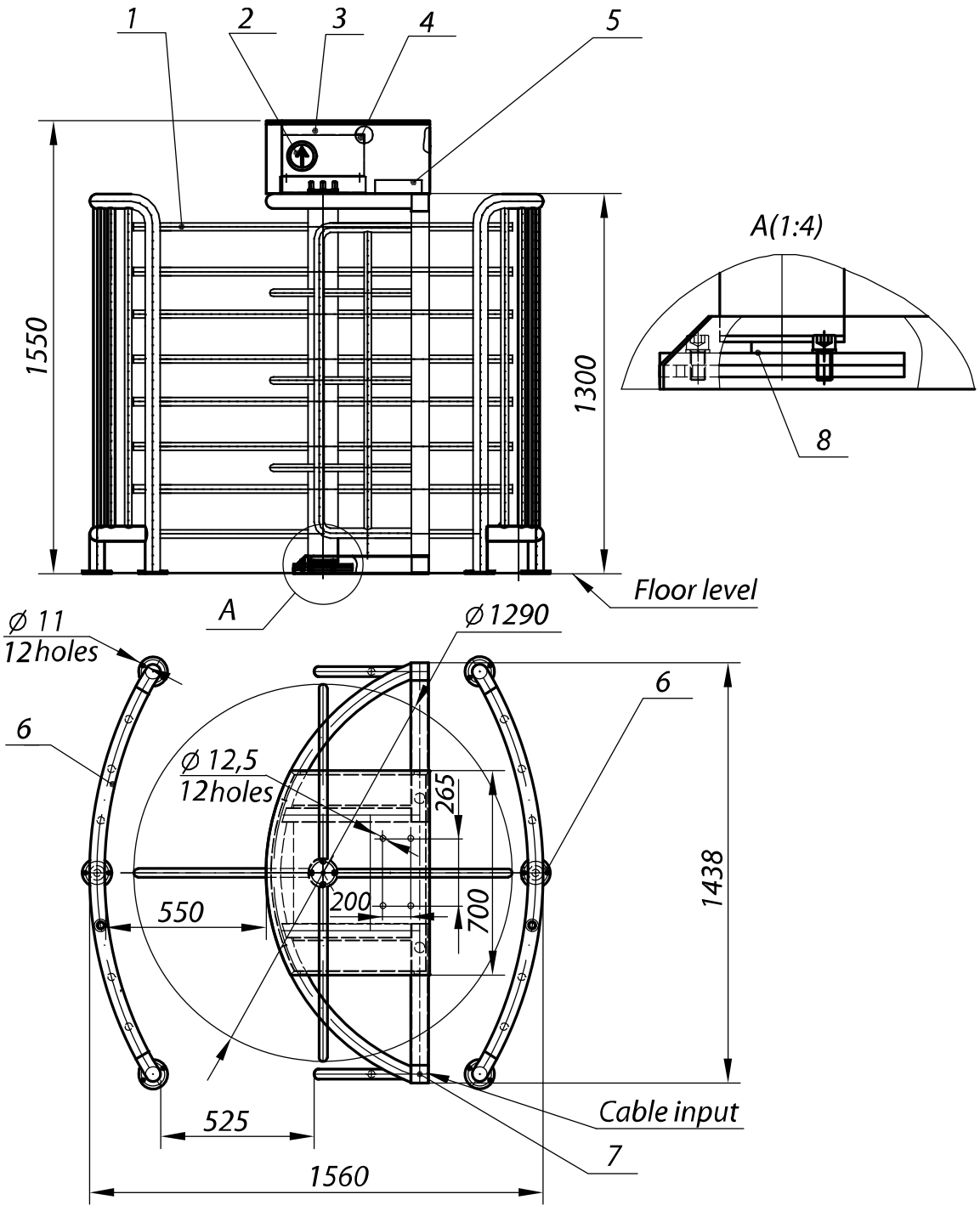
7.2 The warranty period of the turnstile from the date of sale is 12 months, unless otherwise specified by mutual agreement.

Manufacturer:
«**TiSO-PRODUCTION**» **Company**
72 Yamskaya str., 03680, Kiev, Ukraine
Tel.: +38 (044) 461-79-69
Tel../Fax: +38 (044) 586-46-47
E-mail: export@tiso.ua, log1@tiso.ua
www.tiso-turnstiles.com

Our equipment complies with requirements of the European Standards:
EN ISO 12100:2010; EN 614-1:2006+A1:2009; EN 1037:1995+A1:2008; EN 60204-1:2006; EN 953:1997+A1:2009; ISO 3864:1995; EN ISO 13857:2008; EN ISO 13849-1:2006; EN 1088:1995; EN ISO 13732-1:2008
and is in conformity with requirements of the following EC Directives:
2004/108/EC; 2006/95/ EC; 2006/42/ EC

Appendix A

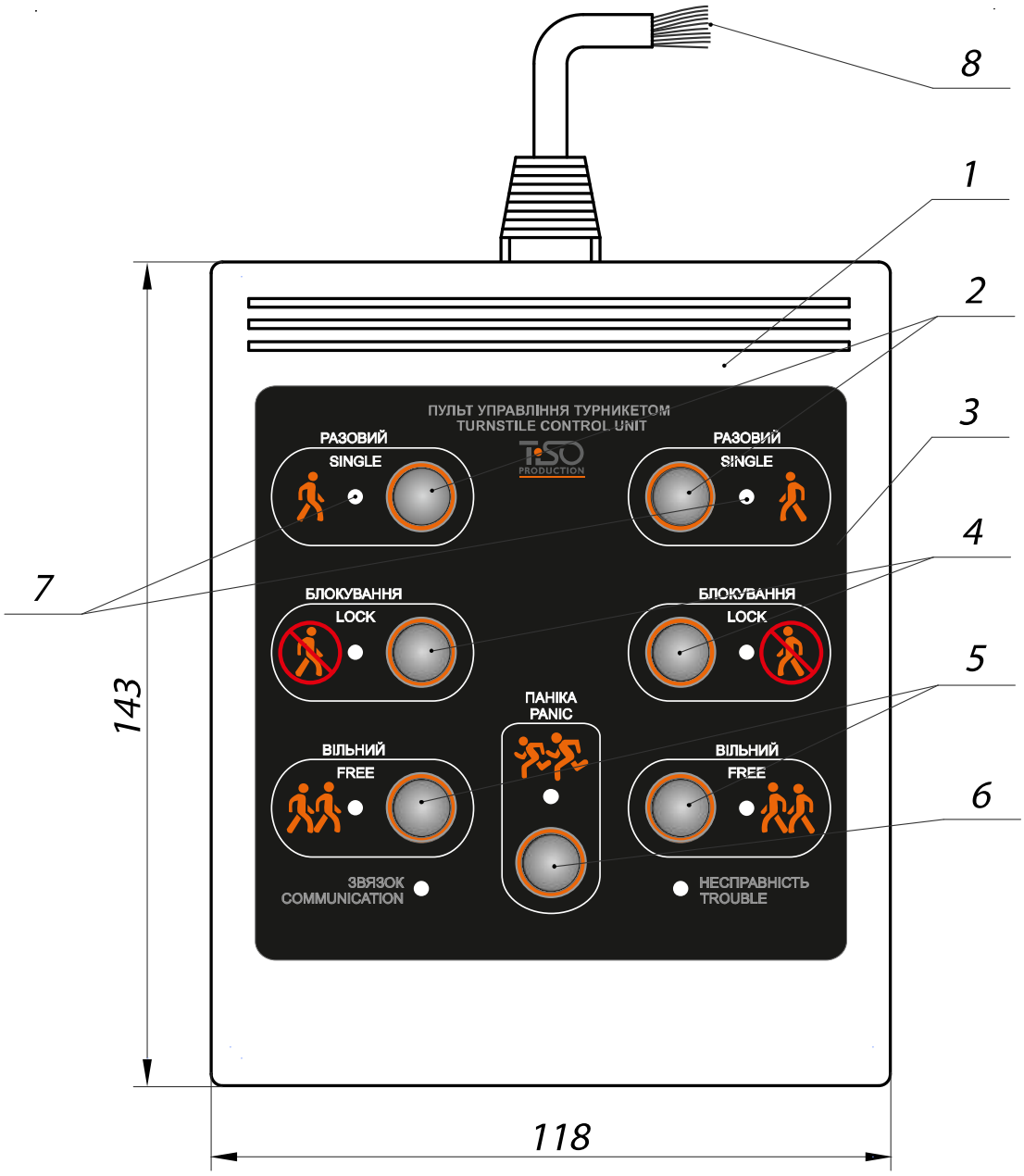
Design, overall and installation dimensions
of Indoor Shortened Single Full-Height Turnstile



1 – rotor with rods;
2 – LED display;
3 – ready-mounted container;
4 – control mechanism;
5 – control panel;
6 – enclosure;
7 – ready-mounted frame;
8 – support

Figure A.1 – The turnstile T2.1.BXO.HP

Appendix B
Control panel and connection diagram



1 – housing;
2 – «SINGLE ACCESS» mode control button;
3 – front plate;
4 – «LOCKING» mode control button;
5 – «FREE ACCESS» mode control button;
6 – «PANIC» mode control button;
7 – access direction LED display;
8 – controller connection terminals

Figure B.1 – Control panel AUIA.114.02.00.00

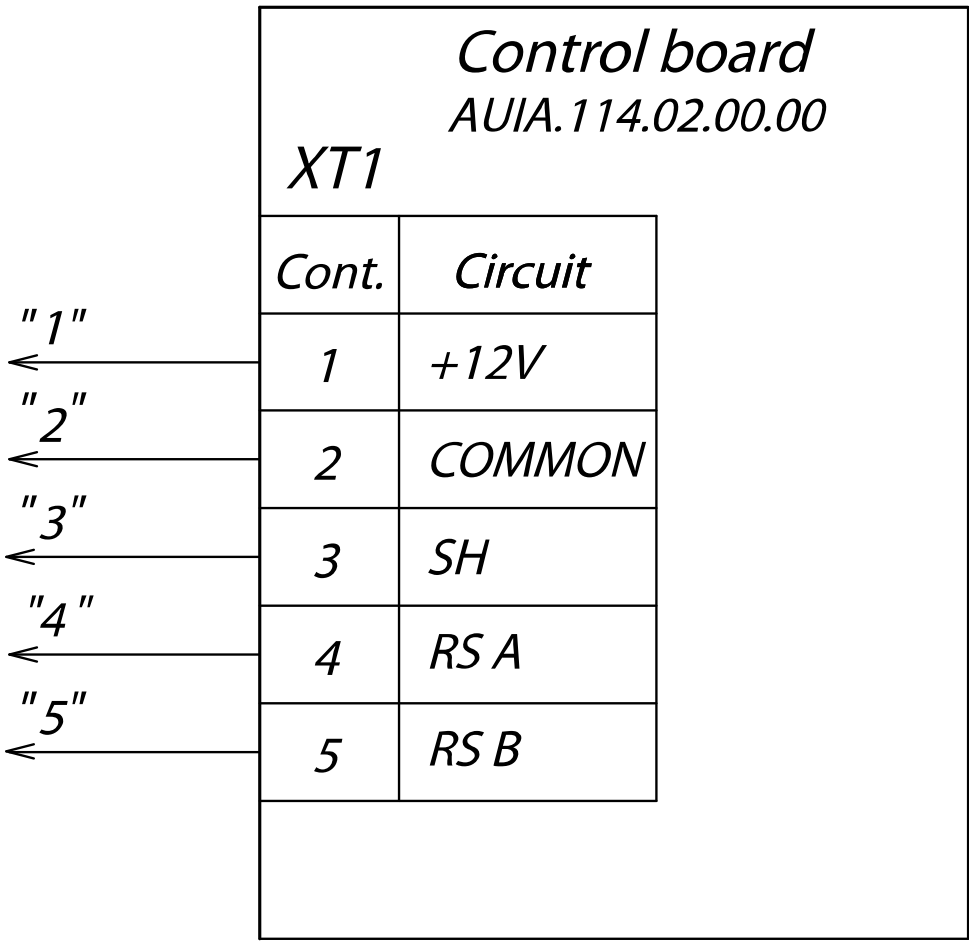


Figure B.2 – Connection diagram of the control panel
AUIA.114.02.00.00

Appendix C
Wiring Diagram of the turnstile

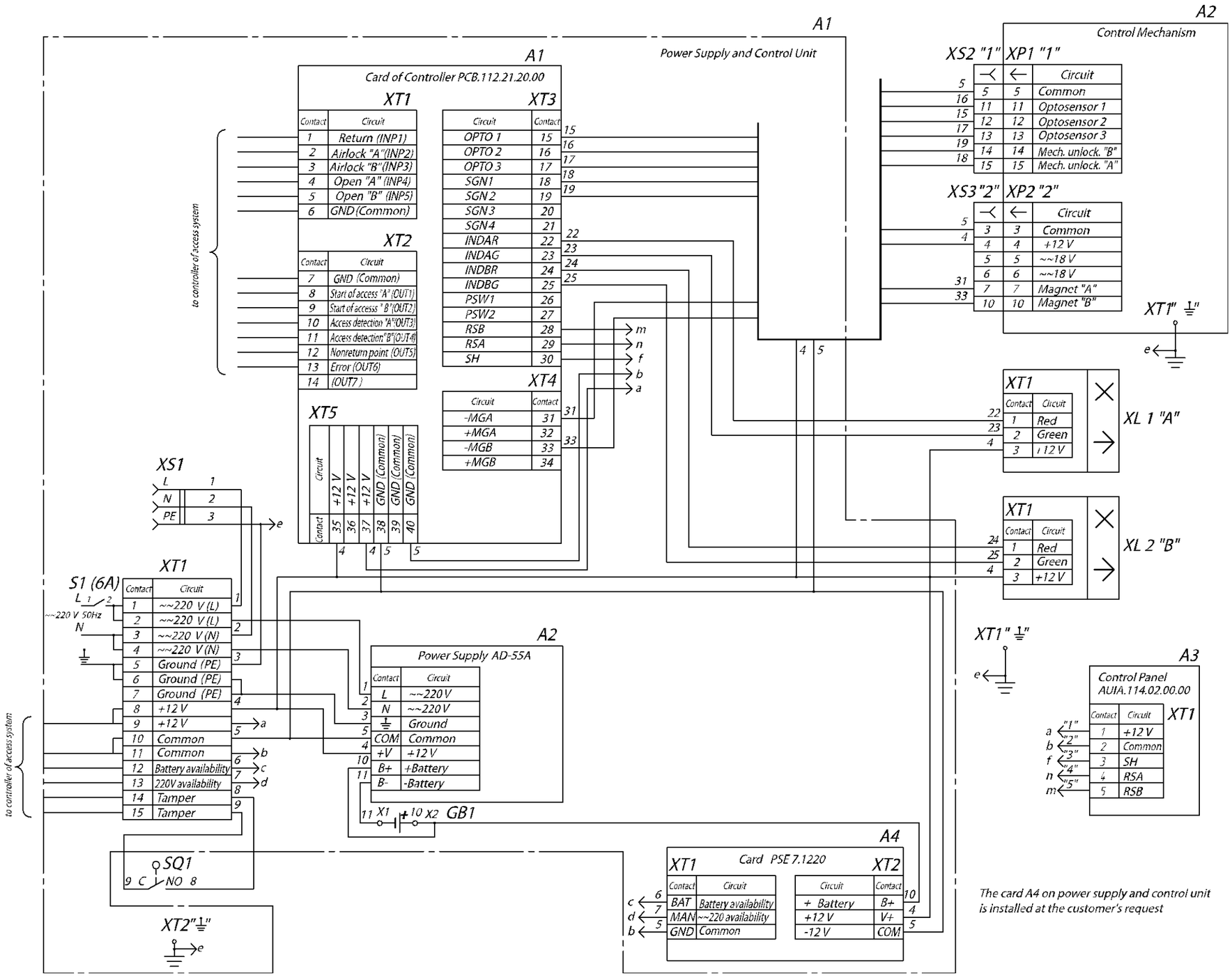


Figure C.1 – Wiring diagram of the turnstile