

IP-Stile

KT-02

**Assembly &
Operation Manual**



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Dear Customer!

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

This Assembly & Operation Manual (the Manual) of the KT-02 IP-Stile contains data on transportation, storage, installation, operation and maintenance of the product.

Installation of the product must be carried out with strict accordance to this Manual.

Abbreviations adopted in the Manual:

- LAN — local area network;
- ACS — access control system;
- KT-02 IP-Stile - entrance control system;
- RC — remote control panel.

1 APPLICATION

1.1 **KT-02 IP-Stile** (KT-02) is designed for control of access to a facility by means of proximity cards under authorized/non-authorized principle, featuring event logging in nonvolatile memory and personnel movement report generation.

1.2 The number of KT-02's to ensure fast and convenient passage should be calculated based on the KT-02 throughput capacity (refer to the section 3 below) and the following manufacturer's recommendations:

- install one KT-02 per each 500 people working the same shift, making sure the peak pedestrian flow does not exceed KT-02 throughput capacity;
- if more than 500 people work the same shift, or the peak pedestrian flow exceeds the KT-02 throughput capacity, install a proportionate number of KT-02 operating under PERCo-S-20 software.

2 OPERATION CONDITIONS

2.1 KT-02, with regard to environmental exposure, conforms to GOST 15150-69, category NF 4 (operation in premises with climate control).

2.2 KT-02 operation is allowed at ambient temperature from +1 °C to +40 °C and relative air humidity up to 80% at +25 °C.

3 TECHNICAL SPECIFICATIONS

Operational voltage	12±1,2 V DC
Maximum power consumption	15 W
Throughput capacity in single passage mode	30 persons/min
Throughput capacity in free passage mode	60 persons/min
Passageway width	500 mm
Maximum barrier arm rotation force	3,5 kgf
Number of readers	2
Minimum card reading range at the nominal operational voltage:	
EM-Marin cards	6 cm
Number of inputs:	
remote control	3
testing	2
Number of outputs:	
relay (relay outputs NC, C and NO)	2
"open collector" type	2
Communication interface standard	Ethernet (IEEE 802.3)
Number of users (access cards)	
KT-02 1-01	up to 10000 cards
KT-02 2-01	up to 50000 cards
Event memory capacity	
KT-02 1-01	up to 10000 events
KT-02 2-01	up to 50000 events
RC cable length	no less than 6.6 m
RC overall dimensions (L x W x H)	127x84x30 mm
Maximum RC net weight	0,35 kg
Electric shock protection class	III under GOST R IEC 335-1-94
Minimal mean time to failure	2,000,000 passages
Mean lifetime	8 years

Overall dimensions with barrier arms (LxWxH),_____640x683x1040 mm

Maximum net weight_____35 kg

4 DELIVERY SET

4.1 Standard delivery set

Primary parts:

- KT-02 IP-Stile housing (with the CT02 x-01 CLB: the 1-01 version — for 10,000 cards, the 2-01 version — for 50,000 cards)_____1
- barrier arm (itemized separately in the price list, type chosen by the Customer)_____3
- key to housing cover lock_____2
- mechanical release key_____2
- remote control with cable no less than 6.6 m_____1
- jumper_____1
- stop spring_____2

Mounting hardware:

- self-adhesive wire retainer_____3
- fixing tape 100 mm_____6
- insulation bushing_____2
- plug Ø30 mm_____5

Spare parts:

- plug Ø30 mm_____1

Technical documentation:

- Certificate_____1
- KT-02 Assembly & Operation Manual_____1
- KT-02 User Guide_____1

Package:

- transportation box _____1

4.2 Optional devices and mounting hardware

4.2.1 Some optional devices and mounting hardware can be supplied to customer order.

4.2.2 Optional devices:

- KT-02 power supply unit _____ 1
- wireless remote control _____ 1
- intrusion detector and siren (used only when KT-02 operates as part of the PERCo-S-20 system).

4.2.3 Recommended mounting hardware¹

- PFG IR 10-15 anchor bolts (by SORMAT, Finland) _____ 4

Note – technical specifications of optional devices are given in corresponding documentation to the same devices.

5 DESIGN AND OPERATION

5.1 Main features

- KT-02 can operate either as a stand-alone unit by means of the remote control panel (RC) or wireless remote control, or as part of the ACS by means of the proximity card readers, or by a PC connected to a LAN through Ethernet (IEEE 802.3).
- KT-02 uses safe supply voltage no more than 14 V.
- Low energy consumption no more than 15 W.
- When the power is off, both passage directions retain the status set at the moment of the shutoff: closed if this direction was closed at the moment of the shutoff; or open if the direction was open before the shutoff.
- The resetting mechanism ensures automatic reset of barrier arms in the home position after each passage.
- The damper ensures smooth and quiet operation of the turnstile.
- Optical arm rotation sensors provide accurate count inputs to ACS.
- The built-in mechanical release lock ensures safe emergency unlocking with a key providing free rotation of the barrier arms.
- If several KT-02's are installed in one line, their housings form passageways without installation of extra guide barriers.
- The KT-02 housing end faces are provided with graphic indication modules.
- Inbuilt proximity card readers.
- Operation zones of the readers share location with the indication modules.

5.2 KT-02 design

5.2.1 The KT-02 design is given in Figure 1, the numbers of the

¹ Not supplied by the manufacturer

parts in the Operation Manuals being designated accordingly.

The overall dimensions are given in Figure 2. KT-02 consists of a housing with an inbuilt controller and two readers, three barrier arms and a control panel (ref. Figure 1 1, parts 1-3, 5 и 9).

The housing is fixed to the floor by four anchor bolts through the holes in the base (2). The housing contains the resetting mechanism consisting of a resetting device (a pusher, springs and a roller), a control mechanism with optical sensors of arm rotation and a locking device, and the mechanical release lock (7). The resetting mechanism also includes a rotation mechanism consisting of a damper, a rotation sensors disk and a hub for barrier arms; The cap (6) covers the points where the barrier arms are attached to the rotation mechanism. The barrier arms are automatically reset in the home position after each passage through KT-02.

The interior components can be accessed by opening the removable top cover (3); during the operation the top cover lock (4) is closed.

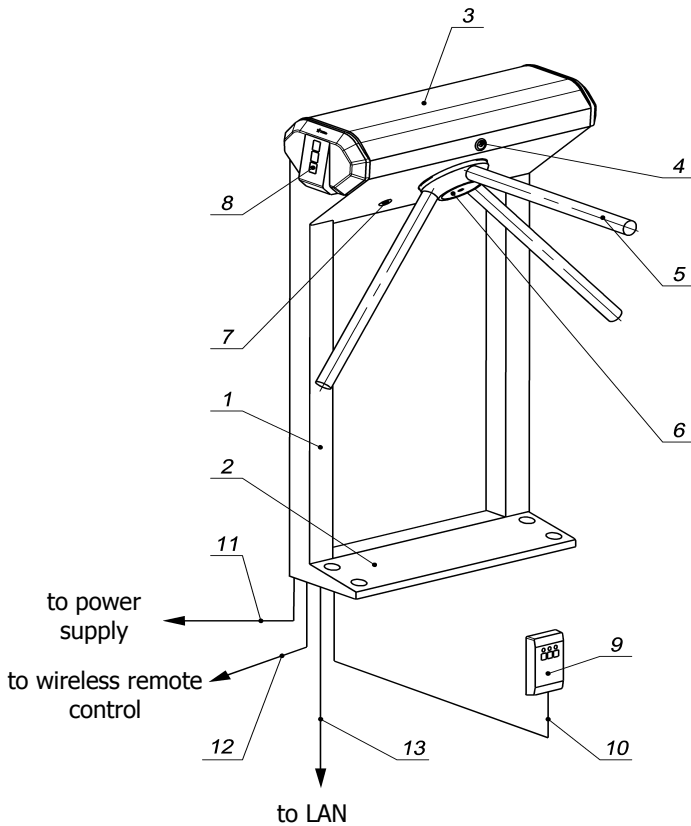


Figure 1 – KT-02 design:

Standard delivery set:

1 — frame; 2 — base; 3 — top cover; parts 1-3 make housing; 4 — top cover lock;
5 — barrier arm, 6 — cap to cover barrier arms adjusting points; 7 — mechanical release
lock; 8 — indication module; 9 — control panel; 10 — control panel cable;

*Not included in standard delivery set:

11 — power cable; 12 — wireless remote control cable;
13 — LAN connection cable.

5.2.2 Two indication modules (8) located at the housing end faces inform about the current KT-02 status. An inbuilt proximity card reader is placed under each indication module inside the housing.

The indication module features three visual indicators:

- the green light indicates that the passage is authorized (go);
- the amber light indicates that card presentation is expected;
- the red light indicates that the access is denied.

5.2.3 The housing contains the PERCo-CT02 x-01 controller board to which the control panel, a power supply unit and wireless remote control* (if any) are connected by means of cables (10), (11)* and (12)* according to the connection layout for KT-02 and optional devices (ref. Figure A.1, Appendix A).

5.2.4 The remote control panel (RC) is designed as a small desktop device with a shockproof ABS plastic case intended for setting and indication of the operating modes when KT-02 is operated manually. The RC is connected to the PERCo-CT02 x-01 board with a multi-thread floppy tape (10) via the "XT3" connector block (ref. Figure 3).

The three control buttons with above indicators on the RC front panel are for setting KT-02 operating modes. The middle button DUST (hereinafter — the STOP button) is for setting the "Always locked" mode. The left and right buttons are for unlocking the passage in authorized direction. If KT-02 installation is not standard (e.g. the guard box is placed behind rather than in front of KT-02), the RC orientation towards KT-02 can be changed by swapping the RC wires to the contacts DUA and DUB as well as to the contacts Led A and Led B respectively (Ref. Figure 3 and A.1. Appendix A).

5.2.5 The PERCo-CT02 x-01 control board (Figure 3) houses:

- control device connector "X1" (Control) for connection of the control device with the turnstile cable;
- connector block "XT1" (In) for connection of additional inputs (used only for operation with PERCo-S-20 system);
- connector block "XT2" (Out) for connection of additional outputs (used only for operation with PERCo-S-20 system);
- connector block "XT3" for connection of the control panel/wireless remote control;
- connector block "XT4" for connection of proximity card readers;
- connector block "XT5" (+12VDC) for connection of a power supply unit;
- connector S1 for connection of LAN through Ethernet (IEEE 802.3);
- connector XP1 for jumper installation.

5.2.6 KT-02 is powered via the power cable (11)*. We recommend using a DC power supply unit with linear voltage regulation and the output ripple amplitude no more than 50 mV.

* Cable (11) is not included in the standard delivery set.

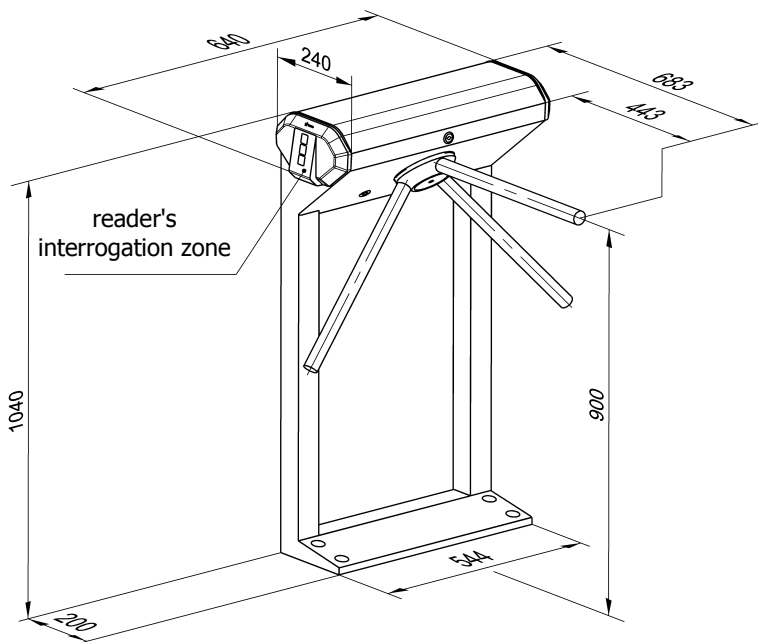


Figure 2 —KT-02 Overall dimensions

5.3 Controlling devices

5.3.1 KT-02 can operate either as a stand-alone unit (by means of stand-alone devices), or as part of ACS:

5.3.1.1 stand-alone operation is controlled by the following devices:

- remote control panel;
- wireless remote control;

These stand-alone controlling devices can be connected to KT-02

- either device separately;
- both devices together (parallel connection).

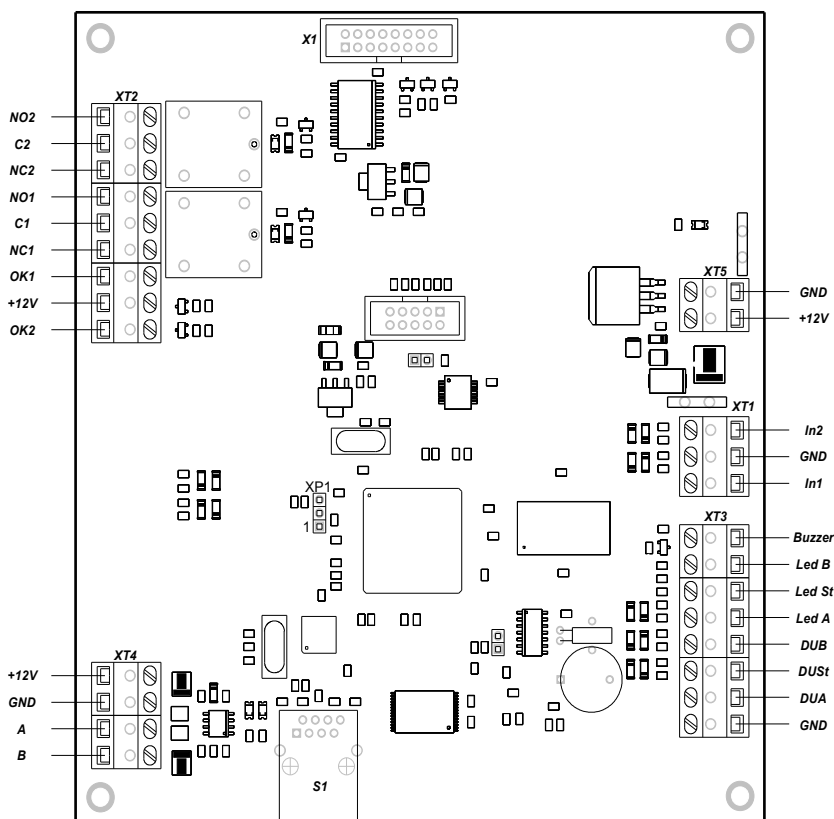
Note – If both such devices are connected to KT-02, it may lead to signal overlapping and KT-02 will respond to the resulting combination of output signals accordingly (ref. APPENDIX B).

5.3.1.2 operation as part of ACS s controlled by the following devices:

- access card readers;
- PC connected to a LAN through Ethernet (IEEE 802.3).

Note – If KT-02 receives control commands by stand-alone devices and ACS simultaneously, a higher priority command will be executed. Priority of command in descending order: by reader - by PC - by stand-alone device.

5.3.2 The stand-alone devices indicated in section 5.3.1 are connected to the respective connector blocks "XT3" and "XT5" on the PERCo-CT02 x-01 controller board (Figure 3) by cables (10) and (12) according to the connection layout (Figure A.1, Appendix A).



**Figure 3 — PERCo-CT02 2-01 controller board
(for the 1-01 version the DD8 chip is not installed)**

5.3.3 The remote control panel is connected to the contacts GND, DUA, DUST, DUB, Led A, Led St, Led B and Buzzer on the connector block "XT3".

5.3.4 Wireless remote control is connected to the contacts DUA, DUST and DUB on the connector block "XT3". Power supply of the wireless remote control device is connected to the contact +12V on the connector block "XT5".

5.3.5 For reception of alerts from optional devices, the latter's outputs are connected to the contacts GND, In1 and In2 on the connector block "XT1" (used only for operation with PERCo-S-20 system).

5.3.6 Additional devices can be operated when connected to the contacts NO1(2), C1(2), NC1(2), OK1(2) and +12V on the connector block "XT2" (used only for operation with PERCo-S-20 system).

5.3.7 Symbols of the connector blocks on the PERCo-CT02 x-01 board and designation of their contacts are shown in Figure 3 and a label similar to Figure A.1, Appendix A, placed on the top cover(3) inside (refer to section 6.1 for how to remove the top cover).

5.4 Input signals at KT-02 stand-alone operation

5.4.1 The microcontroller on the PERCo-CT02 x-01 board processes incoming commands (monitors the status of the contacts DUA, DUST and DUB), follows signals from the optical rotation sensors and generates consequent commands for the control mechanism, as well as signals for the control panel indication (Led A, Led DUST and Led B).

5.4.2 KT-02 is operated by input of a low-level signal relative to the «GND» contact at the contacts DUA, DUST and DUB of the connector block "XT3" while either a normally open relay contact or a circuit with open-collector output can be used as the control element. (ref. Figure 4).

Note — 2-KOHm resistors wired to a power supply bus + 3.3 V are used as a means of high-level signal generation at all the input contacts (DUA, DUST and DUB).

The control element must provide the following signal characteristics:

a relay contact as the control element:

- minimum switched current..... 1 mA;
- maximum closed contact resistance (inclusive resistance of the connecting cable)..... 300 Ohm;

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

- maximum voltage at the closed contact (low-level signal at the PERCo-CT02 x-01 board input)..... 0,8 V.

5.4.3 Characteristics of other input and output signals are given in Section 3.6 of the PERCo-S-20 Operational Manual (used only for operation with PERCo-S-20 system).

5.5 KT-02 stand-alone operation

KT-02 stand-alone operation is controlled by control signals fed at the PERCo-CT02 x-01 board inputs, with the passage waiting time being set in the software configuration (the default setting is 4 sec.) and independent of the control signal (pulse) duration.

Operating modes for KT-02 in stand-alone operation are given in Table 1, the sequence of control signals -in Appendix B.

The minimum duration of an input signal for operating mode change is 100 ms.

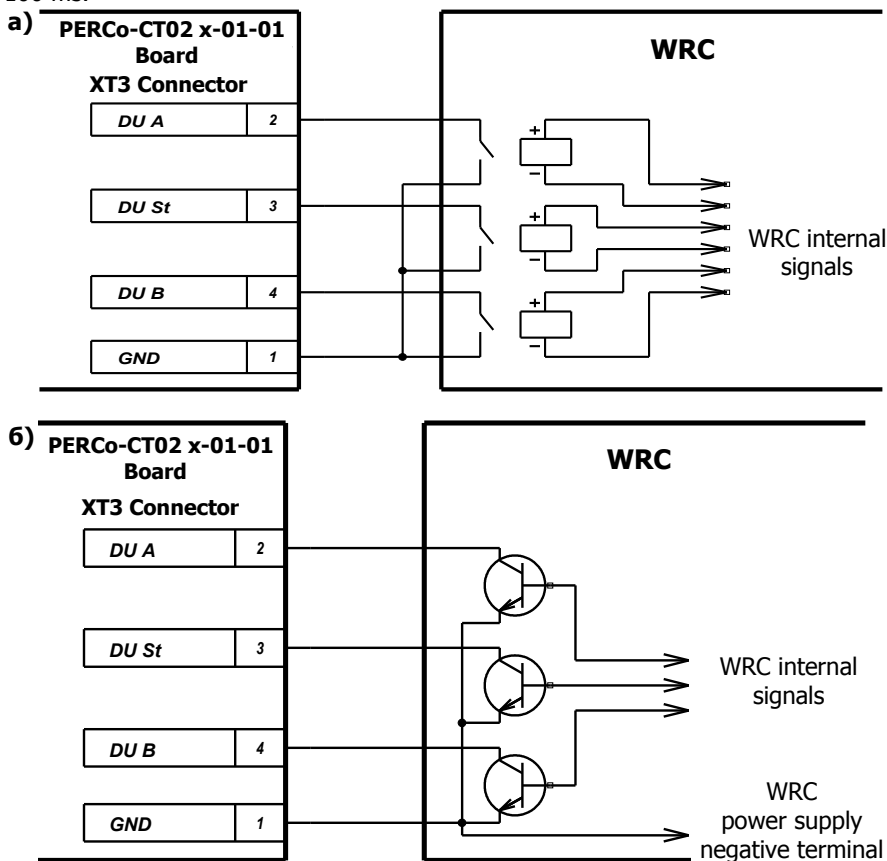


Figure 4 – Control elements of wireless remote control (WRC):

a – normally open relay contact;

b – circuit with open-collector output.

5.5.1 Operation by remote control panel

5.5.1.1 Pressing of the buttons on the remote control panel (the «STOP» button and one button for each direction) results in closing of either DUA, DUST or DUB contacts the GND contact (i.e. generation of a low-level signal relative to the GND contact).

5.5.1.2 The operational sequence during the single passage in direction A (B) is as follows:

5.5.1.2.1 Pressing of the button responsible for passage authorisation in the direction A(B) results in closing of the DUA(B) contact with the GND contact (i.e. generation at the DUA(B) contact of a low-level signal relative to the GND contact).

5.5.1.2.2 The microcontroller of the PERCo-CT02 x-01 board processes the incoming command and generates a command to the control mechanism to open the passage in the direction (the upper (lower) end of the dowel is raised).

5.5.1.2.3 The microcontroller follows the status of the optical rotation sensors that are activated / deactivated in a certain sequence during rotation of the barrier arms and counts the time since pressing of the button responsible for passage authorisation in the direction A (B).

5.5.1.2.4 When the barrier arms rotate 67°, the microcontroller registers a passage in the corresponding direction.

5.5.1.2.5 After the barrier arms rotate 67°, or the time since the moment of pressing of the A(B) direction button exceeds the passage waiting time, the microcontroller generates a command for the control mechanism to close the passage in the A(B) direction (the upper (lower) end of the dowel is lowered). From this moment the controller is ready to execute the next command in this direction.

5.5.1.2.6 When the barrier arms return in the home position (the barrier arms have rotated 112°), the microcontroller registers that KT-02 has returned to the reset state.

5.5.1.3 Distinction of the «Always free» mode: the command described in the section 5.5.1.2.5 is not generated, and the passage in this direction remains open.

5.5.2 Operation by wireless remote control*

5.5.2.1 KT-02 operation by wireless remote control is similar to operation by the remote control panel.

5.5.2.2 The buttons on a wireless remote control tag will be responsible for the same functions as the remote control panel buttons.

5.5.2.3 For further details refer to the corresponding documentation for your wireless remote control device.

* Not supplied by the manufacturer

5.6 KT-02 operation as part of ACS

5.6.1 KT-02 operation as part of ACS can be controlled by access card readers and a PC connected to a LAN through Ethernet (IEEE 802.3).

5.6.2 Operation by access card readers is possible after configuration and entering the access cards into the software, providing access control to the facility under authorized/non-authorized principle and event logging in nonvolatile memory.

5.6.3 Operation by a PC connected to a LAN through Ethernet (IEEE 802.3) is performed according to Operation Manuals to the respective software modules.

5.7 Optional external devices

5.7.1 When KT-02 operates as part of the PERCo-S-20 system, it can be optionally equipped with an intrusion detector and a siren.

5.7.2 The intrusion detector can be connected to the connector block "XT1", while siren to the connector block "XT2" on the PERCo-CT02 x-01 board (location of the connector blocks is shown in Figure 3).

Attention! Installation of the intrusion detector on the KT-02 housing can be carried out only at the manufacturer's works.

Functioning of the intrusion detector and the siren is described in the Technical Specification to the PERCo-S-20 system.

5.8 Purpose and installation of a jumper on the controller board

5.8.1 The board of the inbuilt controller houses the **connector XP1** (Figure 3), designated for selection of the mode the system operates (manual or dynamic IP-address assignment) and reset to default settings (with password reset). The above actions are made by installing on the connector **XP1** the jumper included in the standard delivery set.

Available jumper installation options:

- manual IP-address assignment — the jumper is **not installed**;
- dynamic IP-address assignment — the jumper is installed between the contactes 1-2 (**IP MODE** position);
- reset to default settings — the jumper is installed between the contactes 2-3 (**IP DEFAULT** position).

5.8.2 **In absence of** the jumper on the connector, the controller IP-address and, when necessary, the gateway IP-address and the subnet mask of the system are set manually by the system administrator at the configuration stage. When the power is on, the KT-02 controller will start working with current user settings (when KT-02 is delivered, they are the same as default settings). When these settings are changed, the controller accepts the new settings without power switching and cuts off all current connections with old settings (if any such connections are open).

5.8.3 If the jumper is installed in the **IP MODE** position, the controller IP-address and, if necessary, the gateway IP-address and the subnet mask are set when the system is configured by means of DHCP protocol when KT-02 operates in networks with dynamic IP-address assignment. When the power is on with this jumper position, the KT-02 controller will request the corresponding user settings from the DHCP-server and, if they have been determined, be trying to operate with them. If the user settings are not determined, or not able to operate with (refuse by the DHCP-server to extend the settings), the controller will start operating with new settings received from the DHCP-server, and will keep them as the user's.

5.8.4 If the jumper is installed in the **IP DEFAULT** position, when the power is on, the KT-02 controller starts operating with default settings of its IP-address, the gateway IP-address and the subnet mask (ref. section C.1, Appendix C). If the corresponding user settings are earlier determined, they will remain. Furthermore, the controller will flush its access password.

5.8.5 KT-02 is delivered with the jumper not installed. If necessary, the jumper can be installed either during the installation or later in the service life.

Proceed as follows to install /remove the jumper on the connectorXP1:

- turn KT-02 power off;
- remove the top cover (3) (ref. section 6.1 as per how to);
- install the jumper on the connector XP1 in required position (ref. sections 5.8.1, 5.8.3 and 5.8.4) or remove it (ref. section 5.8.2); Use a pincer for installation or removal of the jumper through a special opening in the controller cover;
- return the top cover in its operative position (3).

6 MARKING AND PACKAGING

6.1 The KT-02 marking label is placed inside on the back of the housing. When it is necessary to access the label, remove the top cover (3) taking the following steps:

- turn KT-02 power off;
- insert the key into the top cover lock (4), turn it clockwise until stop and

open the lock (the lock internal mechanism will move out together with the latch);

- holding the back edge of the cover with one hand, lift the front edge gently by another — the cover must turn relative to the inside hooks. Remove the cover carefully making sure not to damage the controller underneath;

- Lay the cover on an even steady surface.

Make sure the cover is returned in its operative position observing all the mentioned precautions. When the cover is on, close the cover lock pressing on the internal mechanism and recessing it into the housing until it clicks. Turn the power on for KT-02 to continue operation.

6.2 KT-02 standard delivery set (ref. section 4.1) is packed in a transportation box for protection against damage during transportation and storage.

Box overall dimensions (L x W x H) — 1120x720x350 mm.

Maximum gross weight of the boxed KT-02 is 42 kg (standard delivery set).

7 SAFETY REQUIREMENTS

7.1 Installation safety requirements

7.1.1 Proper installation is critical to performance and serviceability of the product. We strongly advise to thoroughly study this section before beginning the installation work as well as observe general electrical and work safety rules during the installation.

7.1.2 During the installation work:

- **all work should be carried out only when the power is off and power supply is disconnected from the mains;**

- use only serviceable tools;

- be extra careful and cautious when mounting the housing before it is anchored to the floor, make sure the housing does not fall;

- check the installation and connections accuracy before the first power-up.

7.1.3 Power supply installation must be carried out according to safety requirements given in its in-line documentation.

7.2 Operation safety requirements

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

7.2.2 **DON'T use KT-02:**

- when operation conditions don't conform to those given in the section 2;

- when the supply voltage differs from that given in the section 3.

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

8 INSTALLATION INSTRUCTIONS

8.1 General

During the installation work we advise:

- mounting the KT-02 housing on firm and even concrete floors (grade 400 or higher), stone or similar foundations at least 150 mm thick;
- levelling the mounting pad so that all the anchorage points are in one horizontal plane (check with a level gauge);
- using reinforcing elements (550x550x200mm) if the housing is being mounted on a less firm foundation;
- marking the mounting holes as per Figure 6;
- checking the housing verticality during the mounting work with a plumb line or a level gauge;
- having at least two technicians skilled in electrical and mounting work in carrying out the installations.
- arranging an emergency exit;

Note the following features of the resetting mechanism when arranging the passageway through KT-02:

- when the barrier arms rotate over 60°, they are automatically turned further in the passage direction until reset in the home position.
- if the barrier arms rotate less than 60° and stop, they are automatically turned in the direction opposite to the passage direction until reset in the home position.

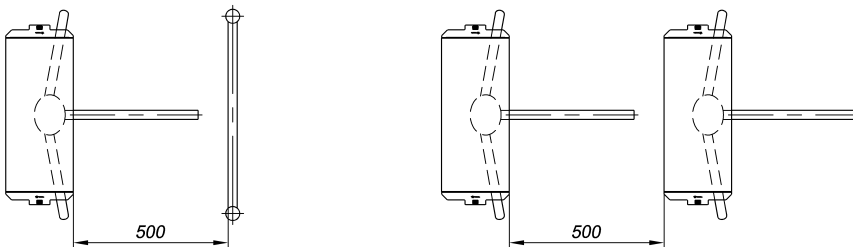


Figure 5 — Recommended passageway arrangements

Note – the value of the angle resetting of the barrier arms starts can vary $\pm 5^\circ$. Therefore, in order to ensure correct registration of passages through the turnstile, the passageway must be arranged in such manner that during the passage the barrier arms rotate at least 70° and the recommended passage width is observed (ref. Figure 5).

8.2 Installation tools

- 1,2÷1,5 kW electric perforator;
- Ø16 mm carbide drill bits for anchoring;
- №2 cross-tip screwdriver;
- №5 straight- slot screwdriver, 150 mm long;
- S17, S13, S10, S8, S7 horn and hex-nut wrenches;
- a level gauge;
- a 2 m tape measure.

Note — Similar tools with the same characteristics can be used as long as proper installation work can be carried out.

8.3 Cable lengths

Maximum cable length of the remote control panel/wireless control providing reliable operation — 50 meters.

Maximum allowable cable length for the power supply depends on its cross-section:

- for cables 0,75 mm² (AWG 18) no more than 10 meters;
- for cables 1,5 mm² (AWG 16)no more than 30 meters.

8.4 Installation sequence

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

8.4.1 Unpack the product, check the contents of the package as per its delivery set in the Certificate.

8.4.2 Mark the mounting surface with mounting holes as per Figure 6. Cut the raceway if concealed wiring is required. Prepare openings in the floor for anchor bushings to mount the housing. Install and fix the housing only after all the cable laying inside the raceways and the housing is completed. The cable layout inside the housing and positions of the holes to insert the insulation bushings included in the standard delivery set are shown in Figure 7.

8.4.3 Put the anchor bushings inside the openings so that the bushings do not project above the surface. Erect the housing on the bushings and anchor it with M10 bolts.

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

8.4.5 Connect the power cable (11) the connector block "XT3" on the PERCo-CT02 x-01 board. Connect the cable (10) of the remote control panel (9) to the connector block "XT3" on the PERCo-CT02 x-01 board. If necessary, connect cables of other devices to the corresponding connector blocks of the PERCo-CT02 x-01 board (ref. Figure 3 and Figure A.1 of Appendix A). Install the jumper on the connector XP1 (ref. section 5.8.5)

8.4.6 Check the accuracy, reliability and safety of all electrical connections. Fix all the cables using the self-adhesive wire retainer and fixing tape included in the delivery set. After connecting all the cables and anchoring the housing to the floor, return the top cover (3) in its operative position (ref. section 6). Cap the four anchor openings in the housing base (2) and the auxiliary opening for cable connection in the case (1) lower part (if not used) with the Ø30 mm plugs included in the delivery set.

8.4.7 For installation of the barrier arms into operational position, first unscrew the M4x25 bolt and take the cap (6) off the rotation mechanism. Unscrew the M8x30 bolts on the barrier arms (5). Install the barrier arm into the corresponding slots and fix it using the bolts with spring washers. Make sure the bolts are tightened enough to provide secure no-play fixing of the barrier arm.

Repeat this sequence install other barrier arms.

Return the cap (6) in its operation position fixing it with the bolt.

8.4.8 Carry out an KT-02 test power-up according to the section 9.

When the installation is completed, KT-02 is ready for operation.

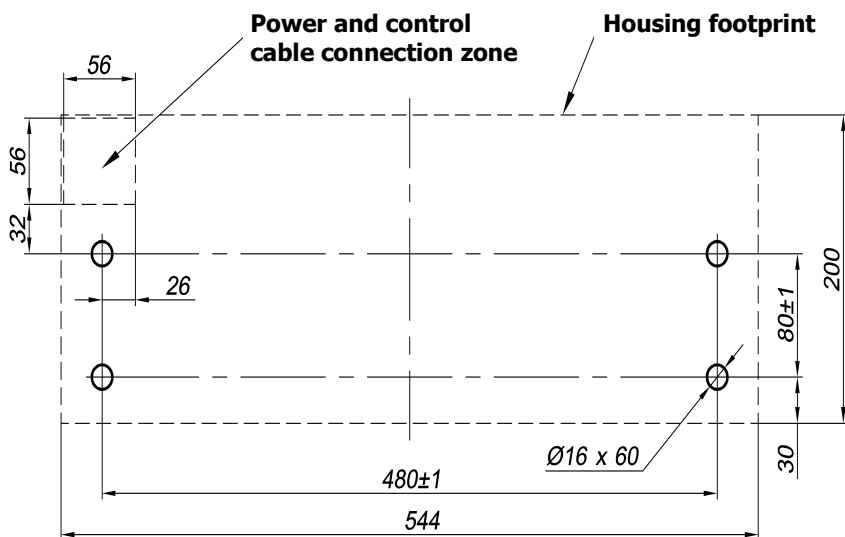


Figure 6 — Hole pattern for mounting of the housing

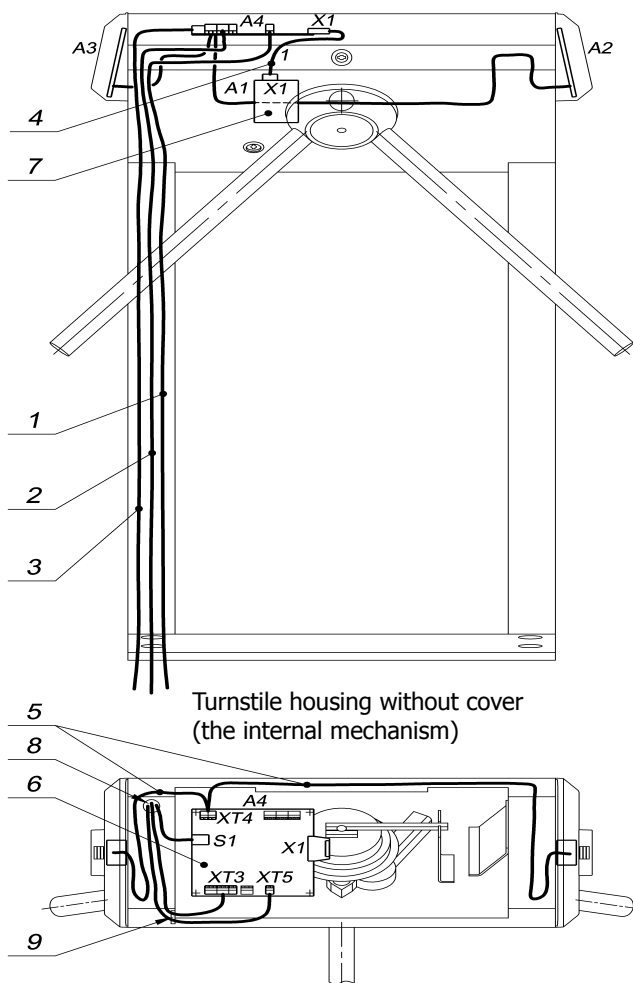


Figure 7 — Cable layout inside the housing

1 — power cable; 2 — remote control panel/wireless control cable; 3— LAN cable (through Ethernet IEEE 802.3); 4 — turnstile cable; 5 — readers connecting cables; 6 — PERCo-CT02 x-01 board; 7 — operating mechanism; 8 — opening for running the cables 1-3; 9 — opening for running the cables 1-2; during installation of KT-02, the openings 8 and 9 are sealed with the insulation bushings (referred to as A1-A4 in Figure A.1, Appendix A)

9 OPERATION

9.1 Power-up

Make sure all connections are correct (ref. sections 8.4.5-8.4.6). Make sure the barrier arms are in the home position (the passageway is blocked by a barrier arm). Make sure the mechanical release lock is closed (KT-02 is mechanically locked, ref. section 10.2).

Connect the power supply to the mains with electric parameters as per its documentation.

Turn the power on. At the first power-up KT-02 is not yet configured, all three indicators of the indication modules are blinking and the red indicator above the STOP button is on. After configuration and subsequent power-ups the indication will reflect the corresponding operating modes as currently set by the PC or the remote control panel (ref. sections 5.6 and 9.3).

9.2 Stand-alone operating modes

Setting of the operation modes by the remote control panel and the corresponding indication is detailed in Table 1.

Please notice that:

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

- the "Single passage in the set direction» operating mode can be changed for the free passage in the same direction or the "Always locked" mode;

- the "Free passage in the set direction" can only be changed for the "Always locked" mode.

Note — Pressing a button on the remote control panel results in sending a low-level signal relative to the GND contact to the corresponding contacts on the connector block "XT3" (DUA, DUB and DUST).

Table 1

KT-02 Operating Modes

No	Operating mode	Sequence of buttons to push	RC indication	Turnstile indication	KT-02 status
1	« Always locked » (KT-02 is closed for both entrance and exit)	Press the Stop button shortly	The red indicator is on	The amber indicators for both directions are on	The barrier arms are locked in the home position. The passageway is blocked by the barrer arm.
2	« Single passage in the set direction » (KT-02 is open for a single passage by one person in the set direction and closed for passage in another direction)	Press shortly the Go button responsible for the authorized direction	The green indicator above the Go button responsible for the authorized direction is on	The green indicator for the authorized direction and the amber indicator for another direction are on	The barrier arms are unlocked for a single turn in the authorized direction. After the turn the arms are locked.
3	« Bidirectional single passage » (KT-02 is open for a single passage in each direction)	Press both Go buttons together shortly	Both green indicators are on	The green indicators for both directions are on	The barrier arms are unlocked for consecutive single turns in each authorized direction. After each turn the arms are locked in the corresponding direction.

4	«Free passage in the set direction» (KT-02 is open for free passage in the authorized direction and closed in another	Press shortly the Stop button together with the Go button responsible for the authorized direction	The green indicator above the Go button responsible for the authorized direction is on	The green indicator for the authorized direction and the amber indicator for another direction are on	The barrier arms are unlocked indefinitely for multiple turns in the authorized direction
5	«Free passage in the set direction and a single passage in the opposite direction» (KT-02 is open for free passage in the authorized direction and a single passage in another)	Press shortly the Stop button together with the Go button responsible for the free passage direction; then press the other Go button shortly	Both green indicators are on		The barrier arms are unlocked indefinitely for multiple turns in the free passage direction and a single turn in the single passage direction
6	«Free passage in both directions» (KT-02 is open for free passage in both directions)	Press shortly the three buttons together	Both green indicators are on	The green indicators for both directions are on	The barrier arms are unlocked indefinitely for multiple turns in both directions

When the power is off, the KT-02 reset state is closed (providing the mechanical release lock (7) is closed).

In the single passage mode KT-02 will be closed as soon as a single passage in the authorized direction is completed. If the passage is not completed within the passage waiting time preset by the software during the configuration(default setting is 4 sec.), KT-02 will be automatically closed even if the passage has not occurred. When passage is authorized for both directions, after one passage is completed, the passage waiting time countdown for another direction starts.

When an access card not entered in the list is presented, the red indicator on the side of the presentation goes on for 3 seconds, the audio signal sounds, KT-02 is not unlocked and returns to the reset state in 3 seconds.

9.3 Troubleshooting

Possible faults to be corrected by the customer themselves are given below. Contact your local dealer if other fault or malfunction occurs.

POSSIBLE FAULTS:

9.3.1 The controller is operating stand-alone but not recognised by the software

This fault can occur as a result of the following causes.

1. A wrong password entered to this controller. Enter the right controller password into the software.

2. Faults related to the PC (software, data bases, etc.).

Determine the fault by running the command ping 10.x.x.x (where 10.x.x.x is IP-address of the controller). If this command runs without error, the fault must be either in the software or in the network settings (faulty settings of the gateways). How to sort out such faults is partly given in Appendix C.

3. Faults related to LAN equipment between the PC and the controller (the hub, the switch and other network apparatus including the communication cables).

Such faults can be determined by running the command ping 10.x.x.x (where 10.x.x.x is IP-address of the controller). If this command fails, the fault must relate to either the network settings or the connecting LAN apparatus including the communication cables, or to the controller (refer to the next section). How to sort out such faults is partly given in Appendix C.

4. Faults related to the controller (malfunction of the elements providing connection through the Ethernet interface (IEEE 802.3)).

To determine this fault, observe operation of two indicators near the LAN connection point (remove the cover if the controller casing is made of plastic or open the cover if the controller casing is made of metal):

1. LINK —connection evidence (the green indicator on — the controller recognises the LAN connection, the green indicator is off — the controller does not recognise the LAN connection);
2. ACT — data exchange evidence (the red indicator blinking — the controller recognises data exchange through the LAN, the red indicator off — the controller does not recognise data exchange through the LAN).

If the controller does not recognise the LAN connection, connect it to the cable of another controller a PC. If the controller still does not recognise the LAN connection, the controller is faulty and must be sent for repair.

9.3.2 The controller is not working

Remove the cover (3) as described in section 6 of this Manual to get access to the controller for testing.

Testing of the relay outputs is helped by test LEDs beside each of the relays. Activation / release of the relay is evident by the LEDs going on/ off.

Possible causes of the controller malfunction are as follows:

- Loose cable fixing in the connector blocks on the controller board — tighten the cable fixing bolt with a screwdriver.
- Faulty power supply of the controller — make sure the power supply is functional.
- Faulty controller connection lines of other devices (readers, KT-02 housing, remote control panel, wireless remote control, siren, etc.) — make sure the connection lines are operable.
- Malfunction of the devices connected to the controller — make sure the connected devices are faultless.
- Faulty radio components on the controller board — the controller needs repair at the manufacturer's.

10 EMERGENCY ACTIONS

For a fast safe escape from the facilities in case of fire, natural disaster or other emergencies, an emergency exit is often required. Such an exit can be arranged by means of the BH-01 anti-panic hinged sections.

10.1 Emergency exit by use of anti-panic barrier arms

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

To make the passageway free, just pull the horizontal barrier arm along its axis outwards the hub until released, then fold the arm down (ref. Figure 8).

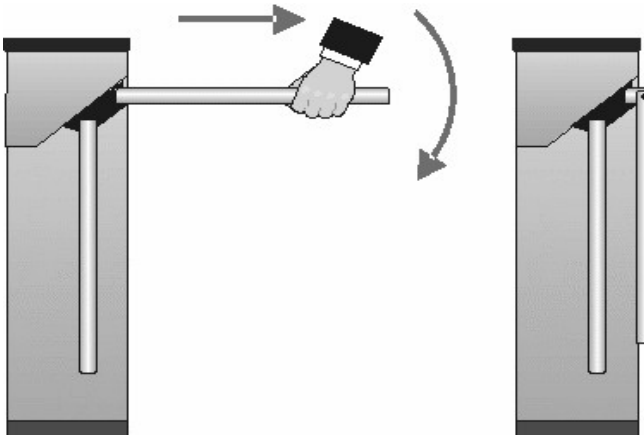


Figure 8 — Anti-panic barrier arms operation

10.2 Mechanical unlocking

The mechanical unlocking feature is designed for unlocking the barrier arms in case of emergency, e.g. the power supply is down.

Proceed as follows to mechanically unlock KT-02:

- insert the key into the mechanical release lock (7);
- turn the key clockwise until it stops (open the lock, the lock internal mechanism moving out);
- make sure KT-02 is unlocked by rotating the barrier arms a few turns in each direction.

To lock KT-02 mechanically:

- set the barrier arms in the home position;
- press the internal lock mechanism recessing it into the housing until it clicks;
- make sure KT-02 is locked and the barrier arms can not be rotated in either direction.

11 MAINTENANCE

11.1 Normally, only yearly operational maintenance is required. In an unlikely event of malfunction, maintenance should be carried out upon fault elimination. Maintenance must be undertaken only by a qualified technician well acquainted with this Manual.

11.2 The operational maintenance sequence is as follows:

- turn off the power;
- remove the cover (3) as described in section 6;
- Lay the cover on an even steady surface;
- inspect the resetting device (the pusher, the springs and the roller), the optical rotation sensors for the barrier arms and the damper (ref. Figure 9);
- using a clean rag soaked with alcohol gasoline blend, remove dirt and stains, when necessary, from the the arm rotation sensor disc; make sure the dirt does not gets into the operating clearances of the optical;
- lubricate the following parts with machine oil:
 - four bushes of the resetting device (two on the rotation axis of the pusher and two on the fastening axis of the spring), as well as the holes in the fastening parts of the springs: two-three oil drops into each lubrication point (the lubrication points are shown in Figure 9). Avoid ingress of the lubricant on the arm rotation sensor disc and the roller surfaces;
 - the internal mechanisms of the mechanical release locks' (7) and top cover's (4) through the keyholes;

- check the reliability of the cable connections to the connector blocks of the PERCo-CT02 x-01 controller board, tighten the fixing bolts when necessary;

- make sure the barrier arms (5) are secure in place, proceeding as follows:

- unscrew the M4x25 bolt fixing the top cover (6) and remove the top cover;

- if necessary, tighten the M8x30 bolts fixing the barrier arms with S13 wrench;

- return the cover in the operational position and fix it with the bolt;

- Cap the four anchor openings in the housing base (2) and if the auxiliary opening for cable connection in the case (1) lower part (if not used) with the Ø30 mm plugs included in the delivery set. remove the plugs from the anchor openings in the housing base, check the anchor bolts tightening them if necessary with S17 wrench; return the plugs back on the anchor openings;

- return the top cover (3) in its operational position (ref. section 6), do not apply much force in doing this; the top cover lock is closed by pressing the lock internal mechanism without turning the key.

- test KT-02 operation according section 9 of this Manual.

After completion of maintenance work and testing KT-02 is available for further use.

If during the operational maintenance some KT-02 components are found defective, or after the expiration of the warranty period (ref. KT-02 Certificate), we recommend to contact your local dealer for advice and closer inspection of KT-02 components.

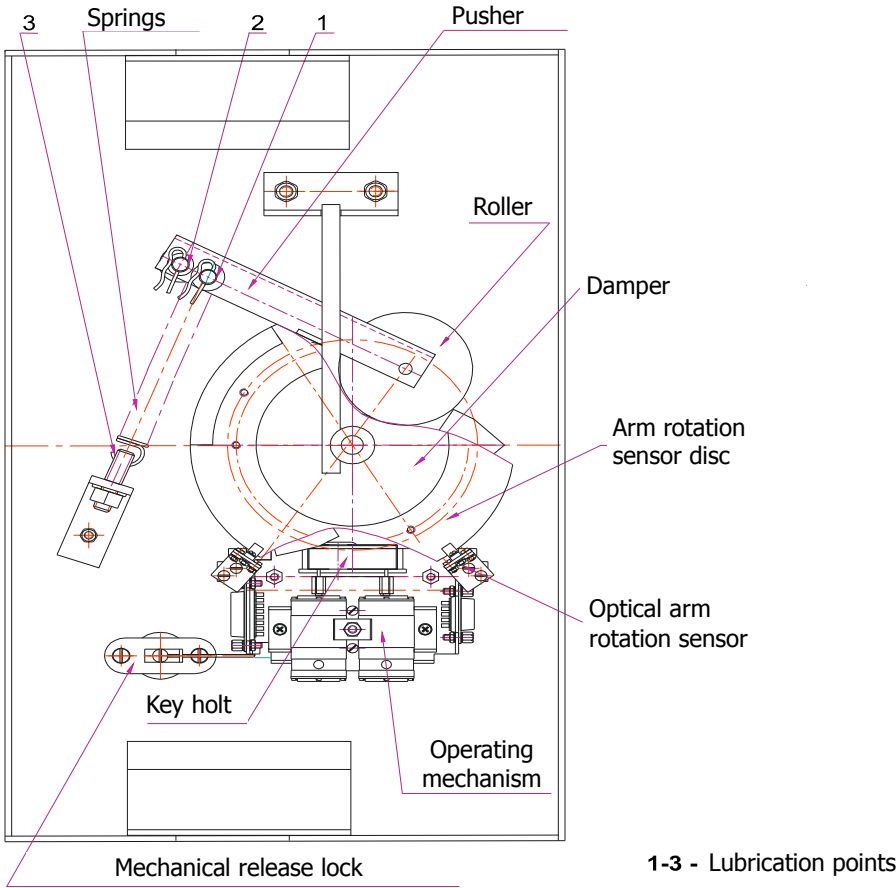


Figure 9 — Arrangement of the components inside the KT-02 housing

12 TRANSPORTATION AND STORAGE

12.1 KT-02 in the original package should be transported in closed freight containers or other closed type cargo transport units.

12.2 During storage and transportation the boxes can be stacked no more than 4 layers high.

12.3 The storage of the product is allowed indoors at ambient temperature from – 25 °C to + 40 °C and relative air humidity up to 98% at +25 °C

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

APPENDIX A

Connection layout for the IP-Stile and optional equipment

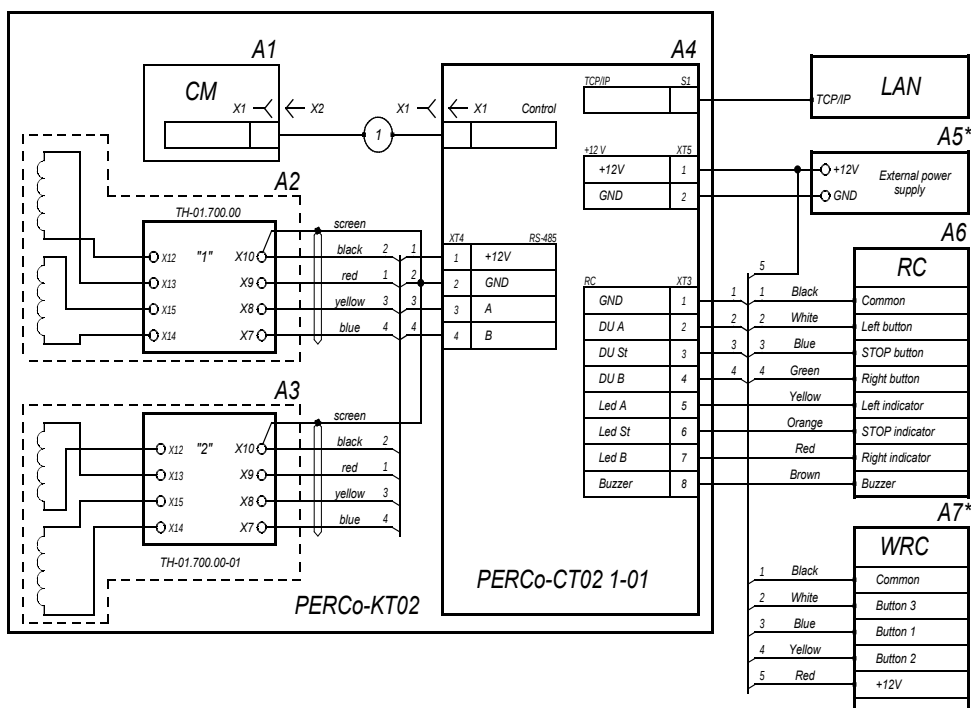


Figure A.1 — Connection layout for KT-02 and optional equipment*

* The components are itemised in Table A.1.

The components list of the connection layout for KT-02 and optional equipment.

Table A.1

Legend	Item	Qty	Notes
A1	TTR-06.140.00-1 Operating mechanism	1	
A2	TH-01.700.00 reader	1	
A3	TH-01.700.00-01 reader	1	
A4	PERCo-CT02 x-01 controller	1	
A5*	Power supply	1	ref. section 5.2.6
A6	remote control panel	1	
A7*	wireless remote control	1	MSRF-4
1	TTR-04.1.900.00 turnstile cable	1	
* not included in the standard delivery set			

CM — control mechanism;

RC — remote control panel;

WRC — wireless remote control.

APPENDIX B

Algorithm of control signals generation during stand-alone operation

Input of a low-level signal relative to the «GND» contact at the contacts DUA, DUS_t and DUB of the connector block "XT3" can generate the following commands:

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

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

Always locked (KT-02 is closed for both entry and exit) -

the falling edge at the contact DUS_t with the high signal level at the contacts DUA and DUB.

This command closes both directions.

Single passage in the direction A (KT-02 is open for passage of one person in the direction A) -

the falling edge at the contact DUA with the high signal level at the contacts DUS_t, DUB.

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

Single passage in the direction B (KT-02 is open for passage by one person in the direction B) -

the falling edge at the contact DUB with the high signal level at the contacts DUS_t, DUA.

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

Bidirectional single passage (KT-02 is open for one passage in each direction) -

the falling edge at the contact DUA with the low signal level at the contact DUB and high level at the contact DUS_t

or the falling edge at the contact DUB with the low signal level at the

contact DUB and high level at the contact DUS_t.

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

Free passage in the direction A (KT-02 is open for free passage in the direction A) -

the falling edge at the contact DUA with the low signal level at the contact DUS_t and high level at the contact DUB,

or the falling edge at the contact DUS_t with the low signal level at the contact DUA and high level at the contact DUB.

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

Free passage in the direction B (KT-02 is open for free passage in the direction B) -

the falling edge at the contact DUB with the low signal level at the contact DUS_t and high level at the contact DUA,

or the falling edge at the contact DUS_t with the low signal level at the contact DUB and high level at the contact DUA.

По этой команде открывается the direction B until the the command «**Always locked**» is given while the direction A remains unchanged.

Free passage (KT-02 is open for free passage in both directions) -

the falling edge at the contact DUA with the low signal level at the contacts DUB, DUS_t,

or the falling edge at the contact DUB with the low signal level at the contacts DUA, DUS_t,

or the falling edge at the contact DUS_t with the low signal level at the contacts DUA, DUB.

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

Note — For the remote control panel:

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

APPENDIX C

General information about the inbuilt controller, ETHERNET network and PC requirements

C.1 General information on the inbuilt PERCo-CT02 x-01 turnstile controller

The controller provides:

- connection with the PC and other controllers through the Ethernet (IEEE 802.3) interface;
- support of the protocol stack TCP/IP (ARP, IP, ICMP, TCP, UDP, DHCP);
- support of the system communications protocol (application layer);
- the possibility for software storage regeneration via the Ethernet.

At the production stage the controller is assigned with a unique physical address (MAC-address) and IP-address (given in the label of the processor microchip), the subnet mask(255.0.0.0) and IP-address of the gateway (0.0.0.0).

IP-address of the controller (and, if necessary, IP-address of the gateway and the subnet mask) can be changed at the configuration stage by one of two means: using the DHCP protocol or manually by the system administrator. Configuration mode is chosen by installation of the jumper on the controller board (ref. section 5.8 of the Manual).

The controller PERCo-CT02 1-01 features nonvolatile memory capable of storing information on up to 10,000 access control cards and up to 10,000 events.

The controller PERCo-CT02 2-01 features nonvolatile memory capable of storing information on up to 50,000 access control cards and up to 50,000 events.

The controller also features a nonvolatile RTC-timer (real time clock).

The controller operates with the TH-01.700.00 and TH-01.700.00-01 readers through the RS-485 interface.

The controller enables connection of the PERCo-H-05/4 remote control panel (henceforth the remote control panel):

- the controller features 3 inputs for control of passage through KT-02: DUA, DUST, DUB.

- the controller features 4 outputs for control of the remote control panel indication: Buzzer, Led A, Led St, Led B.

For connection to the local Ethernet the controller has the connector RJ45 featuring two indicators:

- LINK — connection evidence (green, ON/OFF);
- ACT — data exchange evidence (red, ON/OFF).

The controller, as ACS element, provides the following Operating Modes:

- «Open»;
- «Control»;
- «Closed».

When operating as part of the PERCo-S-20 software:

The controller provides status control for two inputs In1 and In2. Additional devices with dry-contact (OD) outputs can be connected to these inputs.

The controller provides control of the outputs (used both as the Alarm output and as the output for connection of optional devices):

- two relay outputs Out1 and Out2 (relay outputs NC, C and NO);
- two “open-collector” outputs Out3 and Out4.

Characteristics of the input signals at the stand-alone operation are given in section 5.4 of the Manual. For characteristics of other input as well as output signals refer to section 3.6 of Technical specification to the PERCo-S-20 software.

C.2 Ethernet network and PC requirements

Operation of the network controllers requires Ethernet 10-BaseT, 100-BaseTX or 1000-BaseTX. For direct data transfer IP-addresses of the controllers and UDP protocol are used.

Availability of such servers and services as DNS and WINS is not necessary.

The correct setting of the data transfer system in the current topology of the entity using the PERCo-S-20 software will require understanding of the realized data transfer mechanism.

Given below is information that is necessary for network administrators when the entity is using several subnetworks, internetworking routers, screens, etc.

A protocol stack (ref. Figure C.1). is used for data exchange in the system.

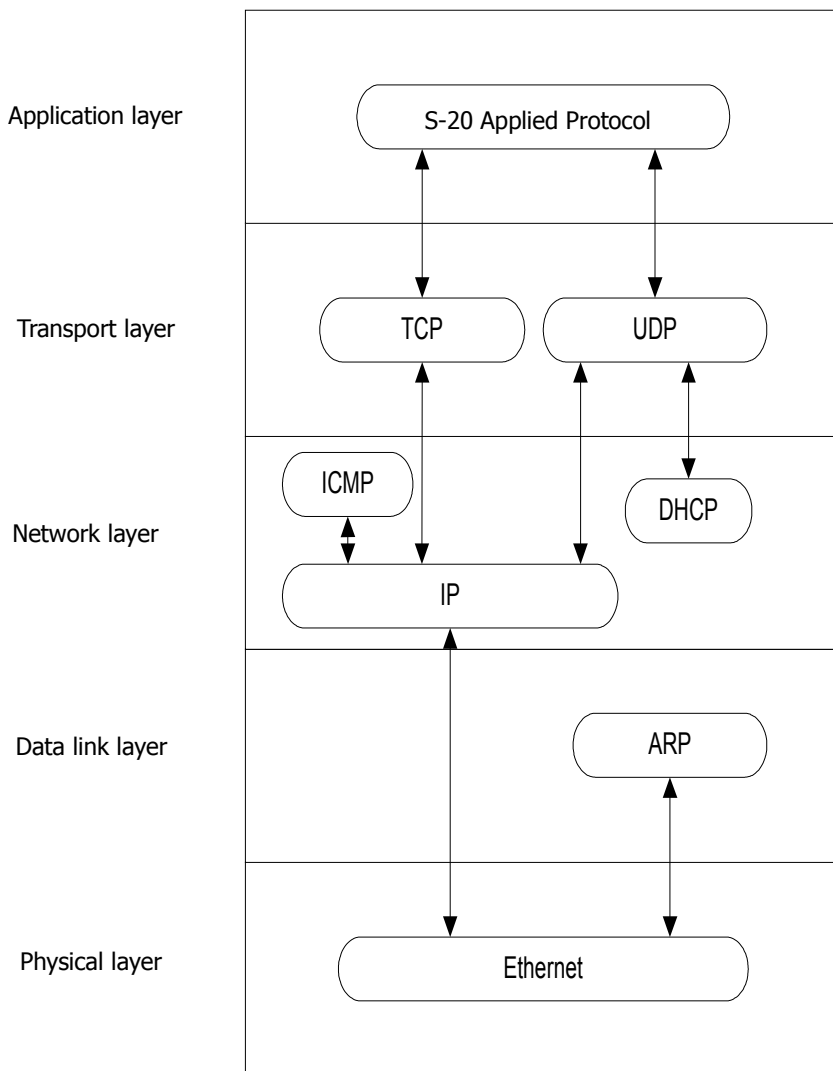


Figure C.1 - Protocol stack used for data exchange in the system

Ports, employed for data transfer are shown in Table C.1.

Table C.1

Protocol	Port	Function
UDP	18900	Controller controller network parameters
	18901	Broadcast frames (only between controllers inside the subnetwork)
TCP	18902	Controller port for configuration, control and testing
	18903	Controller port for log file receipt
	18904	Controller port for indicating device registration
	18905	Controller port for verification device registration
	18906	Controller port for monitoring receipt and review

The ports listed in Table C.1 must be free, not used by other systems or services of the entity network.

If either personal or Windows XP-integrated Firewalls are used, the data from Table C.1 must be used for their configuration.

As far as network switches or similar devices are concerned, note that the controllers and server of the PERCo-S-20 system use not only address packet transfer (transfer of the data to each controller address) but broadcast transfer as well. However, if broadcast packets can be transferred within their subnet, this condition will be sufficient and transfer to other subnets will not be necessary. When the controllers are installed into other subnets for providing connection to the PERCo-S-20 software, their addresses in other subnets have to be entered into the PERCo-S-20 software manually.

The network controllers do not support IP-packets fragmentation. Therefore, if your entity has a well developed network using routers, hubs and network modems, make sure IP-packets are not fragmented all the route from the PERCo-S-20 server to the controller:

1. Using a PC with the network settings similar to those by the would-be installed controller, make sure there is proper connection (correct routing, no faulty cables, etc.) between connection points of the PERCo-S-20 server

and the controller.

To check the connection (for Windows OS):

a) on the toolbar click on Start → Run → enter cmd.exe in the opened window;

b) enter ping XX.XX.XX.XX in the appearing console

(XX.XX.XX.XX is the address of the controller, that is the address planned to be assigned to the controller).

If the connection is correct, the following line will appear:

Response from 193.124.71.56: byte number=32 time<10ms TTL=128.

If the connection faulty (no response), check the routing settings of your network.

2. Connect the setup controller (ref. below).

3. Ping the controller from the port to be connected with the S-20 server.

For this purpose enter ping XX.XX.XX.XX -l 576 into the same console.

If the connection is correct and minimum standard packets (576 bytes) are not fragmented, lines as below will appear:

Response from 193.124.71.56: byte number=576 time<10ms TTL=128.

This means that IP-packets smaller than 576 bytes are not fragmented and the selected connection must be working.

If no positive response is received, the likeliest cause is some switching equipment along the IP-packets transfer line which fragments packets smaller than 576 bytes. Check settings of the switching devices increasing the MTU size if possible. Normally this setting appears as either MaxMTU or IPMTU.

Use the below command if several switching options are available,:

ping XX.XX.XX.XX -l 576 -t.

Changing the switching options, watch the response time and select the connection with the fastest response.