BOLID®

Access Controller
S2000-2

Installation Manual

This Installation Manual describes how to install S2000-2 controllers and to prepare them for operation.

Please refer to S2000-2 User's Manual to get full information about the controller and rules for programming and operating it (this Manual can be found at http://bolid.ru).

1 SAFETY PRECAUTIONS

⚠️
- *There are no potential hazard circuits within the controller.*
- *The design of the controller meets the requirements of electric and fire safety in accordance with Russian standards ГОСТ 12.2.007.0-75 and ГОСТ 12.1.004-91.*
- *The controller is designed to provide its fire safety while emergency operating and on violations of operation rules in accordance with ГОСТ 12.1.004-91.*
- ***Do SHUT OFF power from the controller before mounting, installing, and maintaining this one.***
- *Mounting and maintenance of the controller should be carried out by persons with the second or higher electric safety qualification level.*

2 MOUNTING THE CONTROLLER

The controller is intended to be installed on walls or other structures in the premises at places protected against atmospheric fallouts, mechanical damage, and unauthorized access.
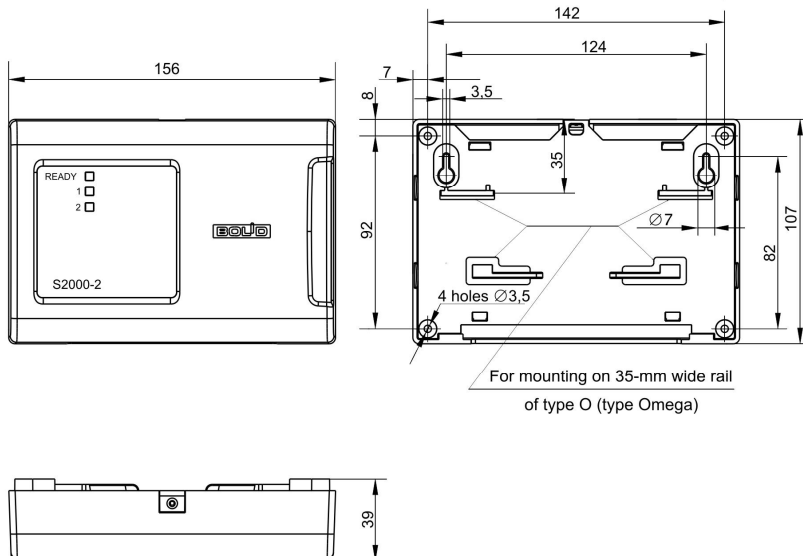

Figure 1. Overall and Mounting Dimensions of the Controller

The controller should be attached at a height suitable for operation and maintenance.

3   MOUNTING ROUTINE

3.1 Please read this Instruction Manual completely before using the mounting pattern.

3.2 Mounting on a Wall

3.2.1   Please ensure that the wall the controller is to be mounted on is solid, flat, clean, and dry.

3.2.2   Attach the controller to the wall in accordance with Variant 1 or Variant 2 below.

3.2.3   **Variant 1**. Apply Mounting Pattern to the wall (see p.16). Drill three holes (A, B and C or D).

3.2.4   Insert wall plugs to the holes and screw provided woodscrews to the two upper holes so that a distance between a screw head and the wall is about 7 mm.

3.2.5   Remove the cover from the controller as shown in Figure 2.

3.2.6   Hang the controller on the two screws. Screw the third screw into the bottom mounting hole and fasten the module to the wall.

3.2.7   **Variant 2**. Apply Mounting Pattern to the wall (see p.16). Drill three holes (E, F and C or D).

3.2.8   Insert wall plugs to the holes.

3.2.9   Remove the cover from the controller as shown in Figure 2.

3.2.10 Apply the controller to the wall so that the mounting holes match with the wall plugs.

3.2.11 Screw the woodscrews to the mounting holes and attach the controller to the wall.

3.3 Mounting on a DIN-rail

3.3.1   Select the mounting place for the module so that to provide free access to the tapping screw at the upper end of the controller front cover.

3.3.2   Install the controller on the DIN-rail as shown in Figure 3.

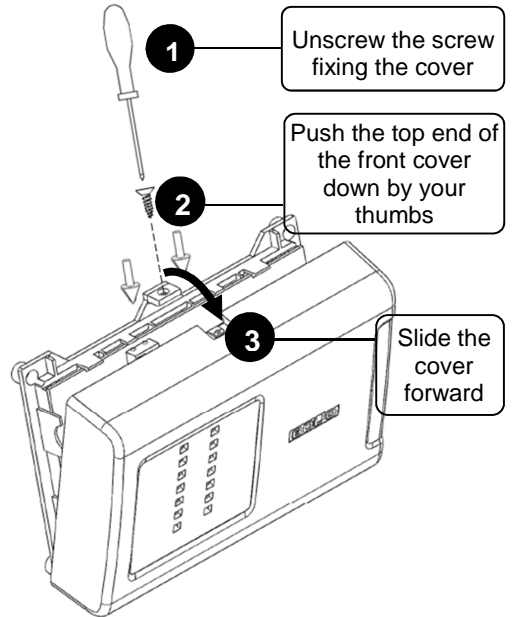3.3.3   Remove the cover from the controller as shown in Figure 2.

1 Unscrew the screw fixing the cover

2 Push the top end of the front cover down by your thumbs

3 Slide the cover forward

Figure 2. How to Remove the Cover

1 Place the hooks of the controller base under the lower edge of the DIN-rail

2 Slightly push on the lower edge of the controller

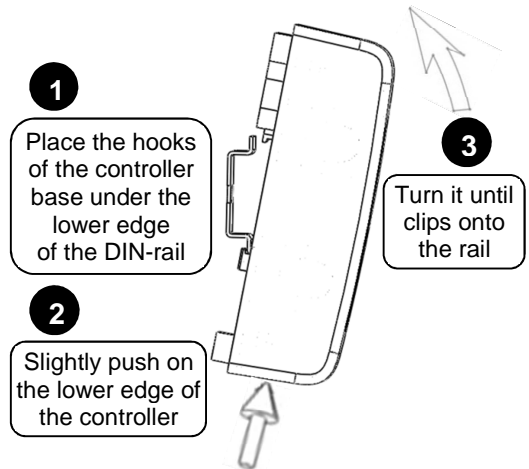**3** Turn it until clips onto the rail

**Figure 3**. Mounting the Controller on a DIN-rail

4 WIRING THE CONTROLLER
4.1 Connecting to RS-485 Interface Bus
4.1.1 Connect the A and B lines of the RS-485 interface bus to the «A» and «B» terminals respectively. The maximum wire cross section is 1.5 mm^2.

4.1.2 If the controller, the panel or another Orion system devices connected to the RS-485 interface are powered by various power supplies then link the GND terminal of the controller with 0 V circuits of the devices (see Figure 4).

4.1.3 Unless the controller is the first or the last device in the Rs-485 interface bus remove the jumper located on the controller PCB (see Figure 4).
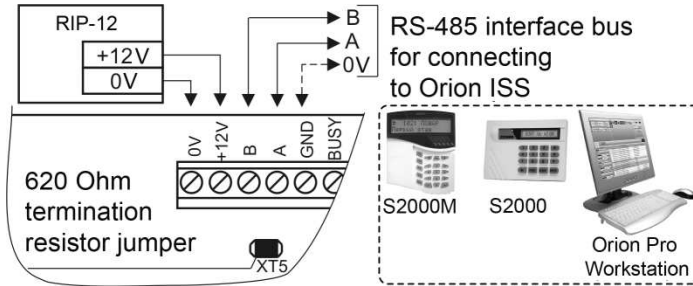
Figure 4. The Schematic for Connecting the S2000-2 to the RS-485 Interface Bus

4.2 Alarm Loops
4.2.1 Connect normally closed and normally open intrusion detectors or Enable Reading circuits and Open Access circuits to the terminals Z1 (Z2) and GND, observing polarity (see Figure 5). An alarm loop of the controller is designed to operate intrusion detectors with dry contact outputs.
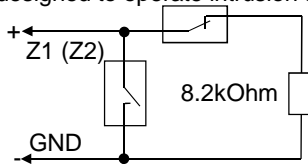
Figure 5. Connecting NC/NO Intrusion Detectors, Enable Reading and Open Access Circuits

4.3 BUSY Input / Output
4.3.1 To synchronize a number of controllers interconnect their BUSY contacts. If the controllers are powered by various power supplies, link their GND contacts. Up to ten controllers can be joined together.

4.3.2 If necessary, connect an occupancy sensor with normally open contact to the BUSY and GND terminals of the controller (see Figure 6). The number of the occupancy sensors connected in parallel is not limited.
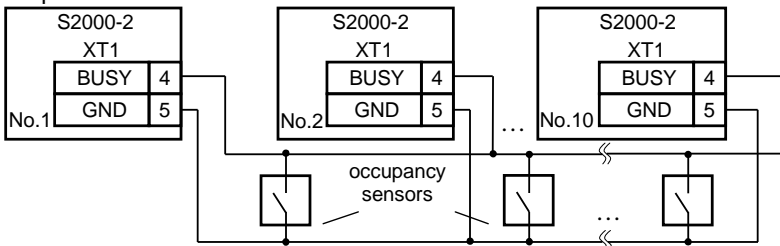
Figure 6. The Schematic for Connecting Controllers via Their BUSY Inputs/Outputs and Connecting Occupancy Sensors

4.4 Connecting EXIT, PERMIT (CONFIRM), and DENY Buttons

4.4.1 Connect EXIT buttons and, if necessary, PERMIT (CONFIRM) and DENY access buttons to the EXIT1 and EXIT2 contacts of the controller in accordance with Figure 7.
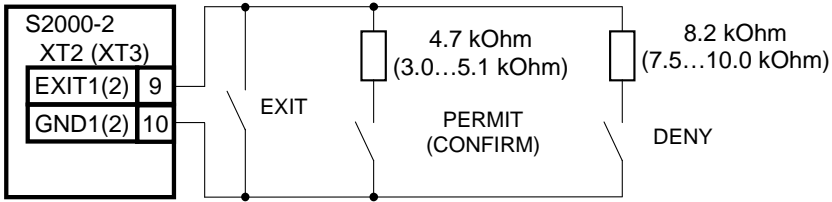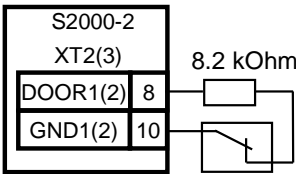

Figure 7. The Schematic for Wiring EXIT Buttons, CONFIRM Buttons, and DENY Buttons

4.5 Connecting Passage Sensors (Door Position Sensors)

4.5.1 Detectors with normally closed or normally open contact outputs or open collector outputs can be connected to the controller. The schematics for connecting passage sensors (door position sensors) are shown in Figure 8.
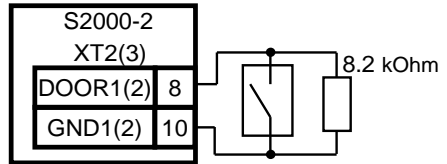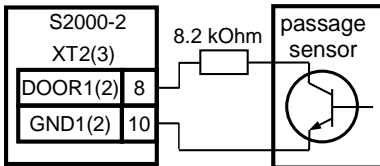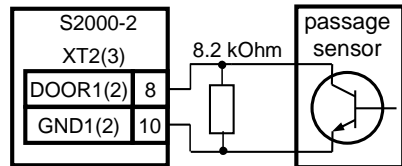

Figure 8. The Schematics for Connecting Passage Sensors (Door Sensors)

4.6 Connecting Readers

4.6.1 The controller provides connecting two Touch Memory (iButton) readers, or two Proximity card readers with such output interface as Touch Memory, Wiegand, or ABA-TrackII or two keypads to read PINs.

4.6.2 The schematics for connecting readers are shown in Figure 9 - Figure 15.

4.6.3 A digit 1 or 2 in the designation of a terminal specifies which reader the terminal is related to.

4.6.4 Assignment of the controller terminals for connecting a reader is shown in Table 1.

4.6.5 If the current consumed by a reader doesn't exceed 100 mA and the distance between the reader and the controller doesn't exceed 50 m then power voltage can be applied to the reader from the controller terminals.

4.6.6   If the current consumed by a reader exceeds 100 mA or the distance between the reader and the controller exceeds 50 m then the reader shall be powered by a separate power supply. The GND terminal of the reader shall be coupled with the GND terminal of the controller.

4.6.7   The distance between the controller and a reader must not exceed 100 m.

4.6.8 Readers with the ABA Track-II interface are to be connected by the same way as Wiegand readers are taking into account that the DATA output of the reader is connected to the D0 input of the controller and the CLOCK output of the reader is connected to the D1 input of the controller.

4.6.9   If the reader has only one input to operate the LED then this input is to be connected to the LEDG terminal of the controller without regard to the actual color the LED illuminates with.

4.6.10 The ARMING REQUEST button, if necessary, is connected between the D0-1 (D0-2) terminal and GND1 (GND2) terminal of the controller (see Figure 16) (S2000-Proxy-N is equipped with a built-in ARMING REQUEST button).

Table 1. Assignment of Contacts to Connect a Reader

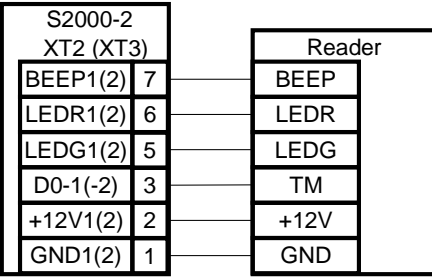| Terminal		Purpose
D0	Touch Memory Mode	Input/output for the data circuit of the reader
	Wiegand Mode	Input for connecting the D0 data circuit of the reader
	ABA Track-II Mode	Input for connecting the DATA data circuit of the reader
D1	Touch Memory Mode	Unused
	Wiegand Mode	Input for connecting the D1 data circuit of the reader
	ABA Track-II Mode	Input for connecting the CLOCK signal circuit of the reader
LEDR		Output to control the red LED of the reader
LEDG		Output to control the green LED of the reader
BEEP		Output to control the sounder of the reader
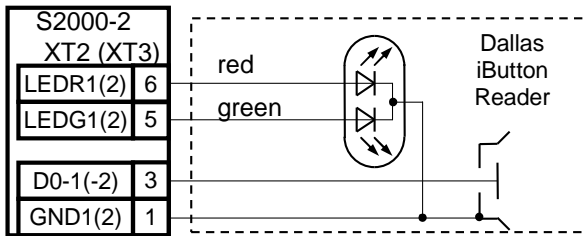
Figure 9. Connection Diagram for Dallas iButton Readers
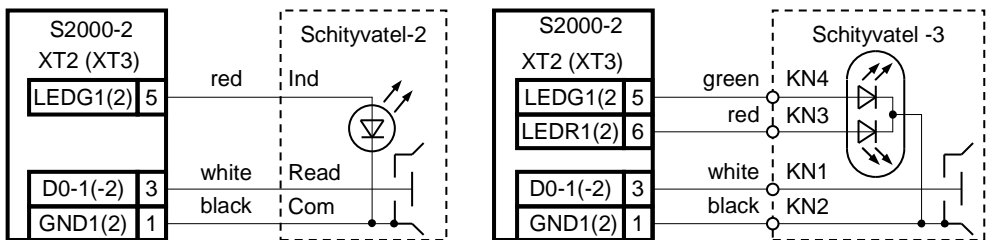
Figure 10. Connecting iButton Readers "Schityvatel-2" and "Schityvatel-3"
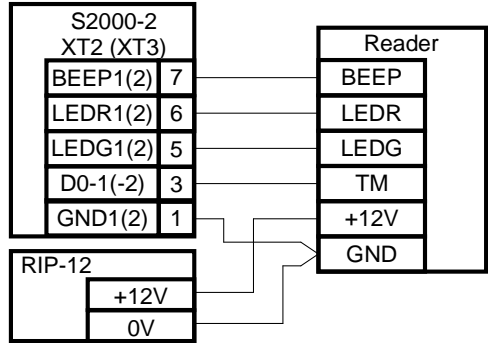
Variant 1
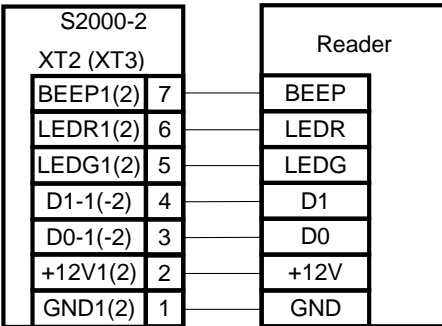For readers with current consumption under 100 mA and located within 50 m from the controller

S2000-2 XT2 (XT3)			Reader
BEEP1(2)	7	—	BEEP
LEDR1(2)	6	—	LEDR
LEDG1(2)	5	—	LEDG
D0-1(-2)	3	—	TM
+12V1(2)	2	—	+12V
GND1(2)	1	—	GND

Variant 2
For readers with higher current consumption or located farther than 50 m from the controller

S2000-2 XT2 (XT3)			Reader
BEEP1(2)	7	—	BEEP
LEDR1(2)	6	—	LEDR
LEDG1(2)	5	—	LEDG
D0-1(-2)	3	—	TM
GND1(2)	1	—	+12V
			GND

RIP-12	
+12V	
0V	

Figure 11. Schematic for Connecting Readers with Touch Memory Interface

Variant 1
For readers with current consumption under 100 mA and located within 50 m from the controller
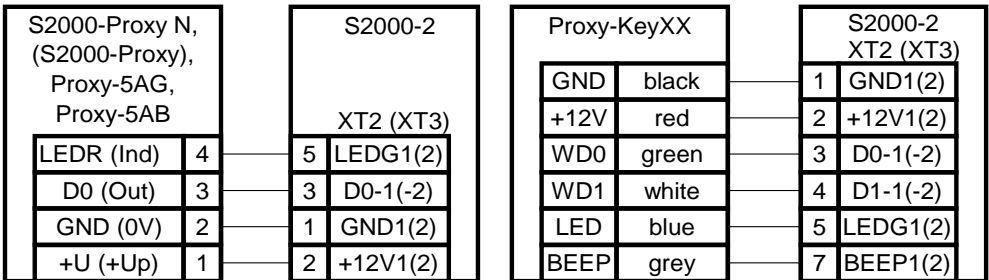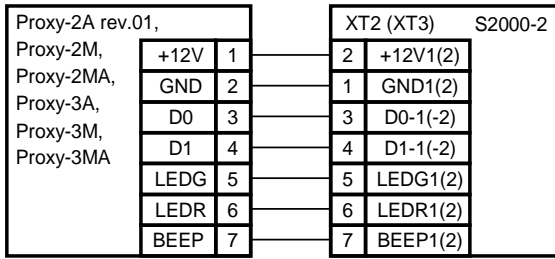
S2000-2 XT2 (XT3)			Reader
BEEP1(2)	7	—	BEEP
LEDR1(2)	6	—	LEDR
LEDG1(2)	5	—	LEDG
D1-1(-2)	4	—	D1
D0-1(-2)	3	—	D0
+12V1(2)	2	—	+12V
GND1(2)	1	—	GND

Variant 2
For readers with higher current consumption or located farther than 50 m from the controller

S2000-2 XT2 (XT3)			Reader
BEEP1(2)	7	—	BEEP
LEDR1(2)	6	—	LEDR
LEDG1(2)	5	—	LEDG
D1-1(-2)	4	—	D1
D0-1(-2)	3	—	D0
GND1(2)	1	—	+12V
			GND

RIP-12	
+12V	
0V	
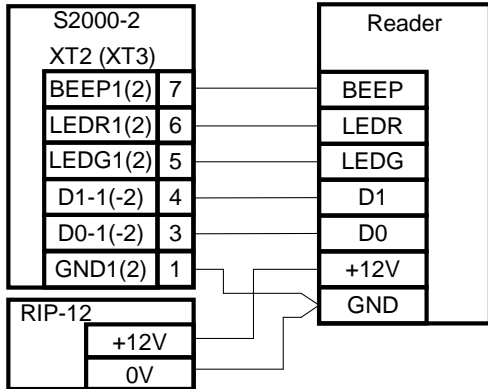
Figure 12. Schematic for Connecting Readers with Wiegand or ABA Track-II Interface

S2000-Proxy N, (S2000-Proxy), Proxy-5AG, Proxy-5AB			S2000-2 XT2 (XT3)	
LEDR (Ind)	4	—	5	LEDG1(2)
D0 (Out)	3	—	3	D0-1(-2)
GND (0V)	2	—	1	GND1(2)
+U (+Up)	1	—	2	+12V1(2)

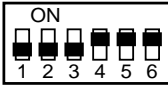| Proxy-KeyXX			S2000-2 XT2 (XT3)	
GND	black	—	1	GND1(2)
+12V	red	—	2	+12V1(2)
WD0	green	—	3	D0-1(-2)
WD1	white	—	4	D1-1(-2)
LED	blue	—	5	LEDG1(2)
BEEP	grey	—	7	BEEP1(2)

Figure 13. Schematic for Connecting S2000-Proxy, S2000-Proxy N, Proxy-5AG, Proxy-5AB, Proxy-KeyAV, Proxy-KeyAH, Proxy-KeyMV, Proxy-KeyMH

Proxy-2A rev.01, Proxy-2M, Proxy-2MA, Proxy-3A, Proxy-3M, Proxy-3MA				XT2 (XT3)	S2000-2	
	+12V	1		2	+12V1(2)	
	GND	2		1	GND1(2)	
	D0	3		3	D0-1(-2)	
	D1	4		4	D1-1(-2)	
	LEDG	5		5	LEDG1(2)	
	LEDR	6		6	LEDR1(2)	
	BEEP	7		7	BEEP1(2)	

DIP Switches Positions for Readers

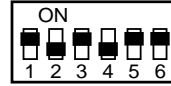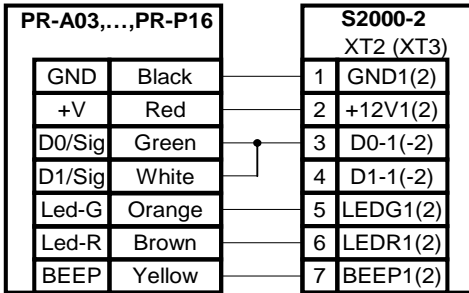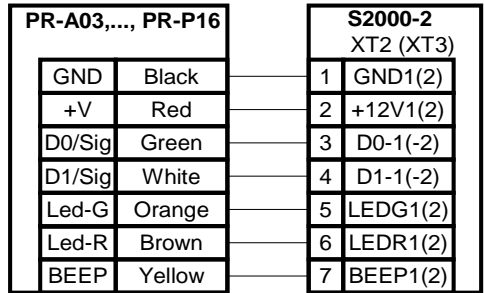**Variant 1. Touch Memory** Interface   **Variant 2. Wiegand** Interface

Figure 14. Schematic for Connecting Proxy-2A rev.01, Proxy-2M, Proxy-2MA, Proxy-3A, Proxy-3M, Proxy-3MA

Variant 1. Touch Memory Interface

PR-A03,…,PR-P16			S2000-2 XT2 (XT3)	
GND	Black	1	GND1(2)	
+V	Red	2	+12V1(2)	
D0/Sig	Green	3	D0-1(-2)	
D1/Sig	White	4	D1-1(-2)	
Led-G	Orange	5	LEDG1(2)	
Led-R	Brown	6	LEDR1(2)	
BEEP	Yellow	7	BEEP1(2)	

Variant 2. Wiegand Interface

PR-A03,..., PR-P16			S2000-2 XT2 (XT3)	
GND	Black	1	GND1(2)	
+V	Red	2	+12V1(2)	
D0/Sig	Green	3	D0-1(-2)	
D1/Sig	White	4	D1-1(-2)	
Led-G	Orange	5	LEDG1(2)	
Led-R	Brown	6	LEDR1(2)	
BEEP	Yellow	7	BEEP1(2)	

*For the readers **PR-H03, PR-H05, PR-M03**: in the Touch Memory mode the white wire (D1) is to be connected to nothing. Data format and polarity of indicator control signals are defined by jumper conditions:

Variant 1. Touch Memory Interface	
Red	Open
Yellow	Open
Orange	Open
Green	Open

Variant 2. Wiegand Interface	
Red	Closed
Yellow	Open
Orange	Closed
Green	Closed

Figure 15. The Schematic for Connecting PR-A03, PR-A05, PR-A09, PR-A16, PR-EH03, PR-EH05, PR-EH09, PR-H16, PR-M03, PR-P05, PR-P09, PR-P16

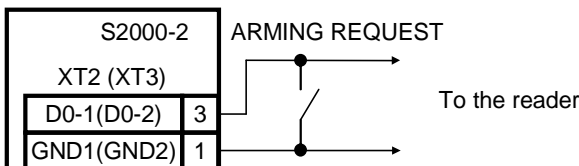| S2000-2 XT2 (XT3)		ARMING REQUEST
D0-1(D0-2)	3	
GND1(GND2)	1	To the reader

Figure 16. The Schematic for Wiring an Arming Request Button

4.7 Two Entrance Doors Mode

4.7.1 Connect hardware of the first door (a reader, a lock, an EXIT button, a door position sensor) to the controller terminals with "1" at the end of their designations and hardware of the second door to the terminals with "2" at the end of their designations (see Figure 17).

4.7.2 Connect the electromagnetic lock (strike) to a power supply (use either a separate power supply or the power supply of the controller). If the controller and the lock will be powered by the same power supply connect them by separate wire pairs coupling them only at the power terminals of the power supply.
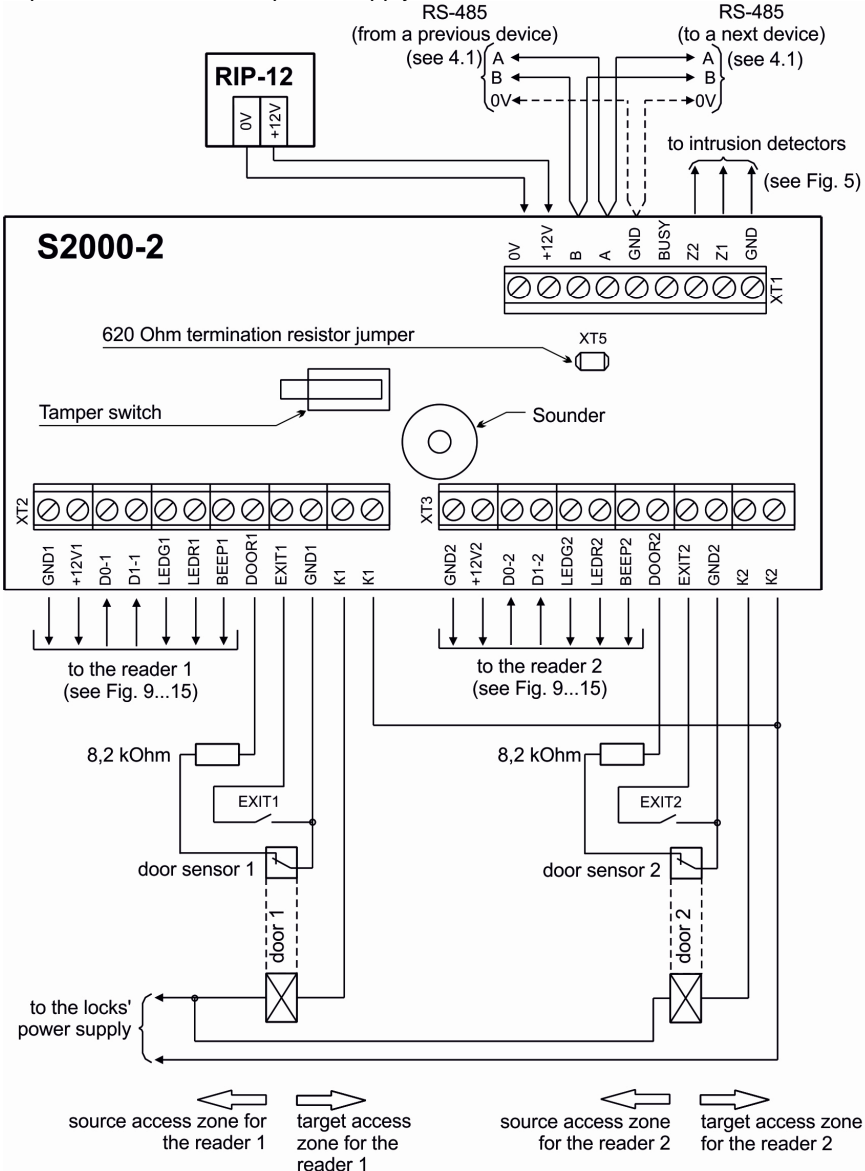
**Figure 17**. Wiring the S2000-2 in the Two Entrance Doors Operation Mode

4.8 One Entrance/Exit Door Mode

4.8.1   Connect the lock control circuits and passage sensor to the controller terminals with "1" at the end of their designation (see Figure 18). The second relay can be operated over the RS-485 interface by remote commands of the S2000(M) panel or the PC.

4.8.2   If the lock shall be controlled remotely then connect ENTRY and EXIT buttons (see Figure 7).

4.8.3   Connect the electromagnetic lock (strike) to a power supply (use either a separate power supply or the power supply of the controller). If the controller and the lock will be powered by the same power supply connect them by separate wire pairs coupling them only on the power terminals of the power supply.
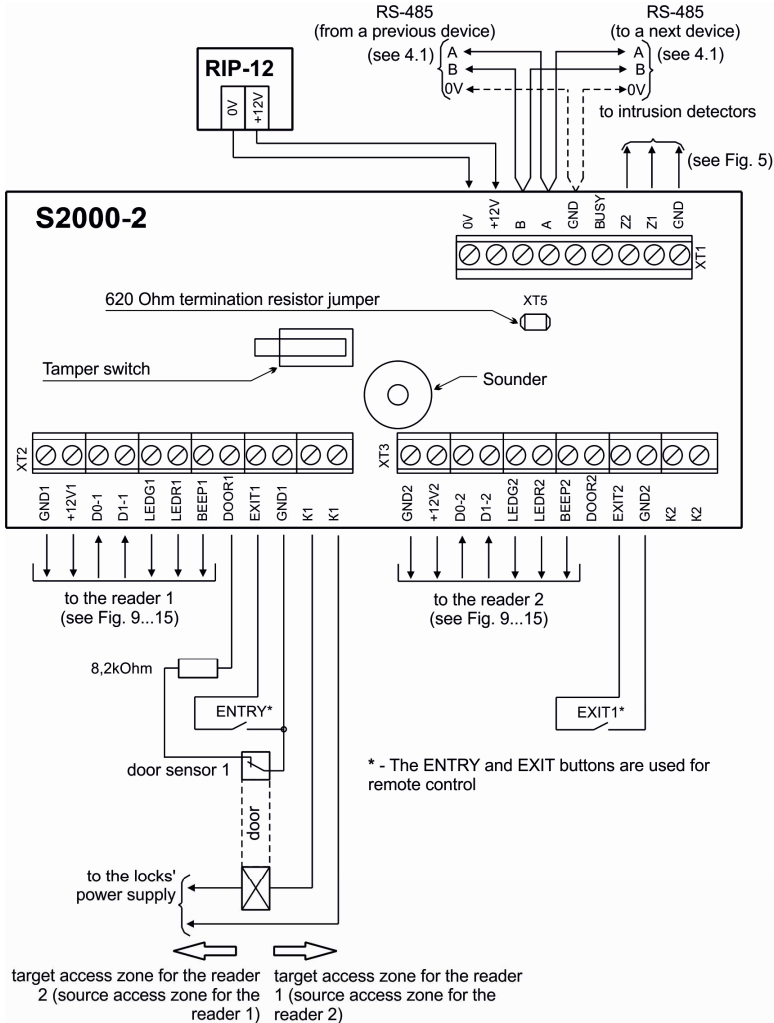

Figure 18. Wiring the S2000-2 for One Entrance/Exit Door Operation Mode

4.9 Turnstile Mode

4.9.1   Connect the control circuits of the turnstile and the passage sensors (rotation sensors) as shown in Figure 19. Figure 8 shows how to connect passage sensors with various output types.

4.9.2   If the turnstile is equipped with a single rotation sensor which responds for a passage in any direction, connect it in parallel to the relevant inputs of both channels of the controller as shown in Figure 21.
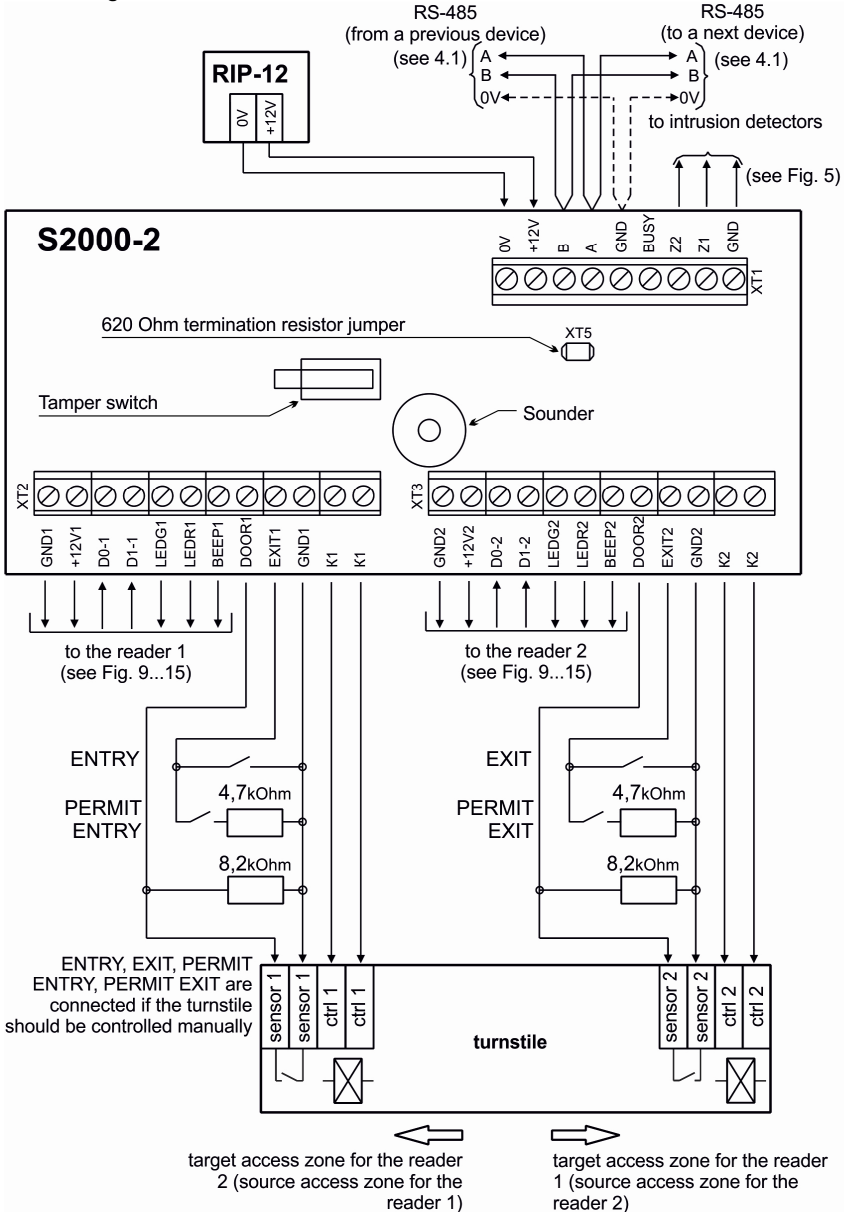
Figure 19. Wiring the S2000-2 for the Turnstile Operation Mode

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4.10 Boom Barrier Mode

4.10.1 Connect the control circuits of the boom barrier, the passage sensors, and the vehicle presence sensors as shown in Figure 20.
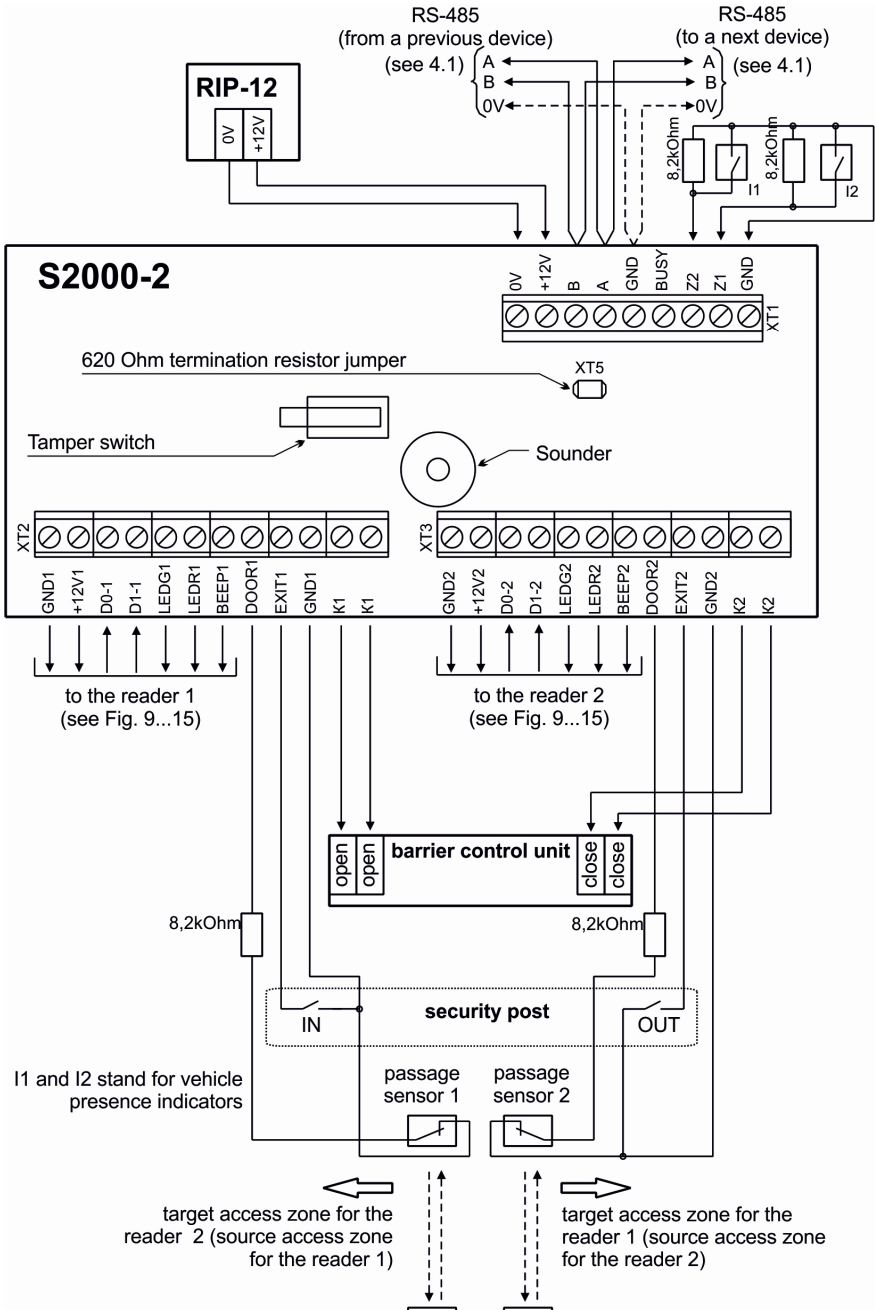

Figure 20. Wiring the S2000-2 for the Boom Barrier Operation Mode

4.10.2 If only one open relay is required to control the boom barrier, only the relay 1 of the S2000-2 is to be used.

4.10.3 If controlling the boom barrier requires commuting more than 30 V of voltage, or more than 7 A of current, or more than 100 W of power then relay amplifiers (for example, UK-VK) should be wired at the outputs of the controller.

4.10.4 If a single passage sensor is in use instead of two passage sensors then it is to be connected in parallel across the relevant inputs of both channels of the controller (see Figure 21).

A normally closed contact detector   A normally open contact detector
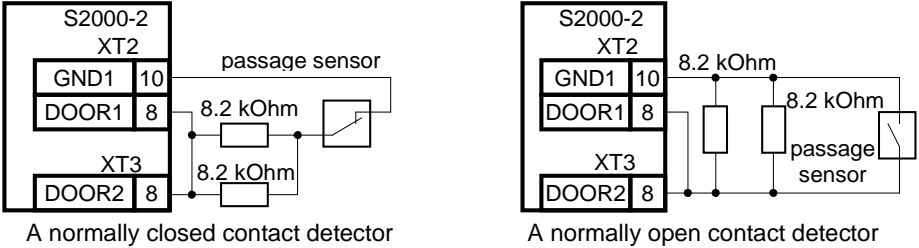
Figure 21. Connecting a Single Passage Sensor (Rotation Sensor)

4.10.5 If necessary, connect traffic lights via relay amplifiers UK-VK/06 commuting voltage up to 220 V (ac) and current up to 10 A (see Figure 22).
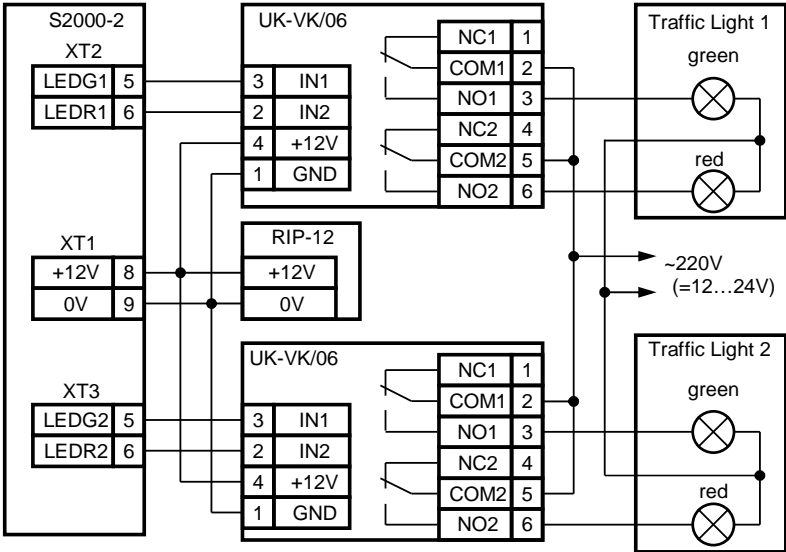

Figure 22. Schematic for Wiring Traffic Lights to the S2000-2 in the Boom Barrier Mode

4.11 Mantrap Mode

4.11.1 Install one reader at the entrance of each side of the mantrap (outside the mantrap itself). At the security post install two EXIT buttons, two CONFIRM buttons, and a DENY button.

4.11.2 Connect door open sensors to the DOOR1, GND1, DOOR2, GND2 terminals of the controller (see Figure 23).
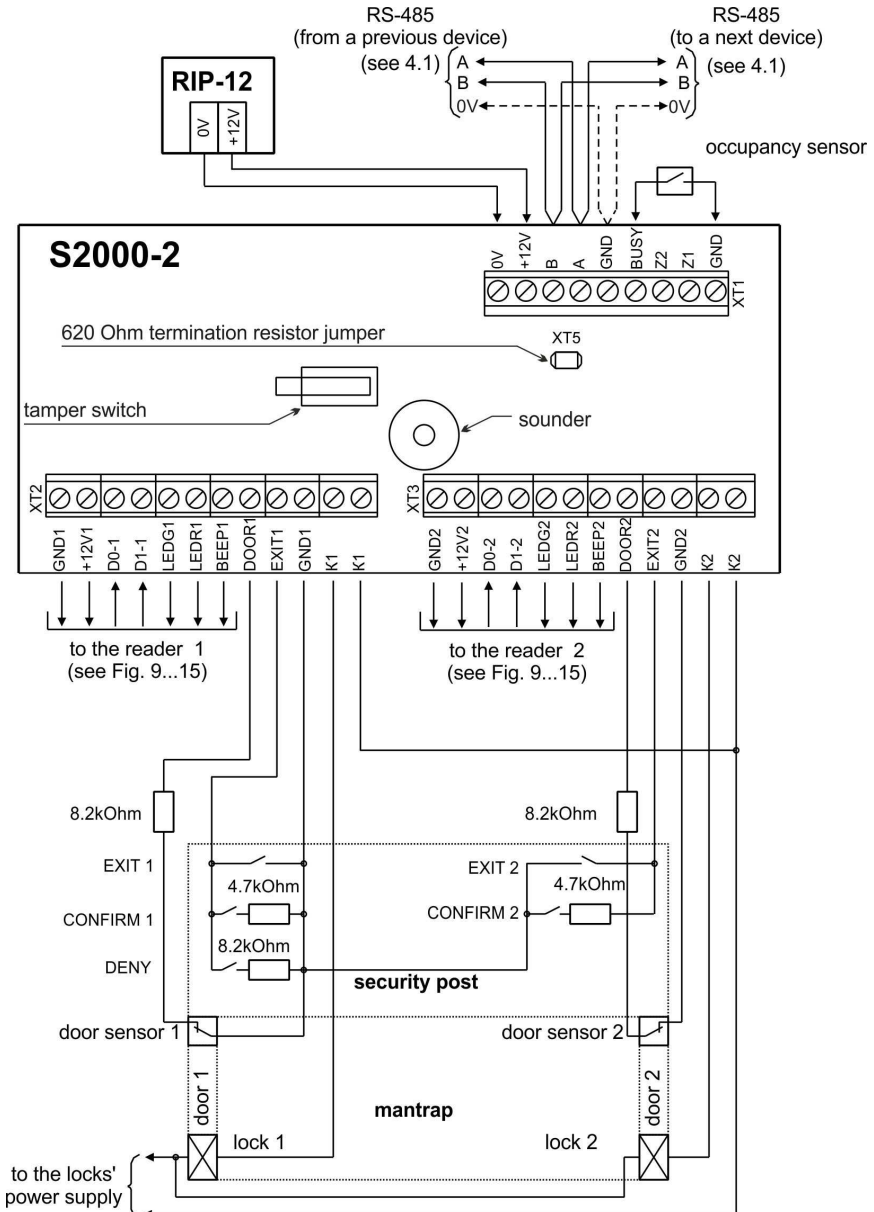
Figure 23. Wiring the S2000-2 for the Mantrap Operation Mode

4.11.3 Connect the electromagnetic lock (strike) to a power supply (use either a separate power supply or the power supply of the controller). If the controller and the lock will be powered by the same power supply connect them by separate wire pairs coupling them only at the power terminals of the power supply.

4.12 Connecting Power Supplies

4.12.1 Connect a good power supply to the «+12V» and «0V» terminals of the controller.
4.12.2 Please observe polarity connecting the controller to the power supply.

> *A battery backed power supply of RIP-12 series manufactured by the Bolid Company is recommended to be used with the controller*

4.13   Close the cover of the controller as shown in Figure 25.

5   TECHNICAL INSPECTION

5.1 The controller should be tested under the following ambient conditions (in accordance with ГОСТ 15150-69):
−   Relative humidity: (45 – 80)%;
−   Ambient temperature: (25 ± 10)℃;
−   Atmospheric pressure: (630 – 800) mm Hg, (84 – 106,7) kPa.
5.2 Do shut off power prior to connecting and disconnecting external circuits of the controller while testing.

5.3 Operability Inspection

5.3.1   To inspect operability of the controller use an S2000M panel. Connect the controller's RS-485 circuits and power circuits with the relevant terminals of the panel. If the controller operates standalone then Clauses 5.3.1, 5.3.4, 5.3.5 are not applicable.
5.3.2   Apply power to the controller and the panel (if used).
5.3.3   The READY indicator of the controller shall show solid green light within 5 s. The sounder of the controller shall play a "Start" signal.
5.3.4   Within a minute since powering up the panel shall display a message about detecting a device with the current address of the controller (the factory address of the controller is 127). Figure 24 demonstrates the display of the panel with the relevant message.

Figure 24

5.3.5   If several messages accumulated by the controller have been received by the console, you can browse them by the arrow buttons «◄» and «►» of the S2000M.

5.4 Self-Diagnostic Test

> ⚠ *Before testing the controller in self-diagnostic mode please disconnect all circuits to control locking devices which must not be actuated during the test*
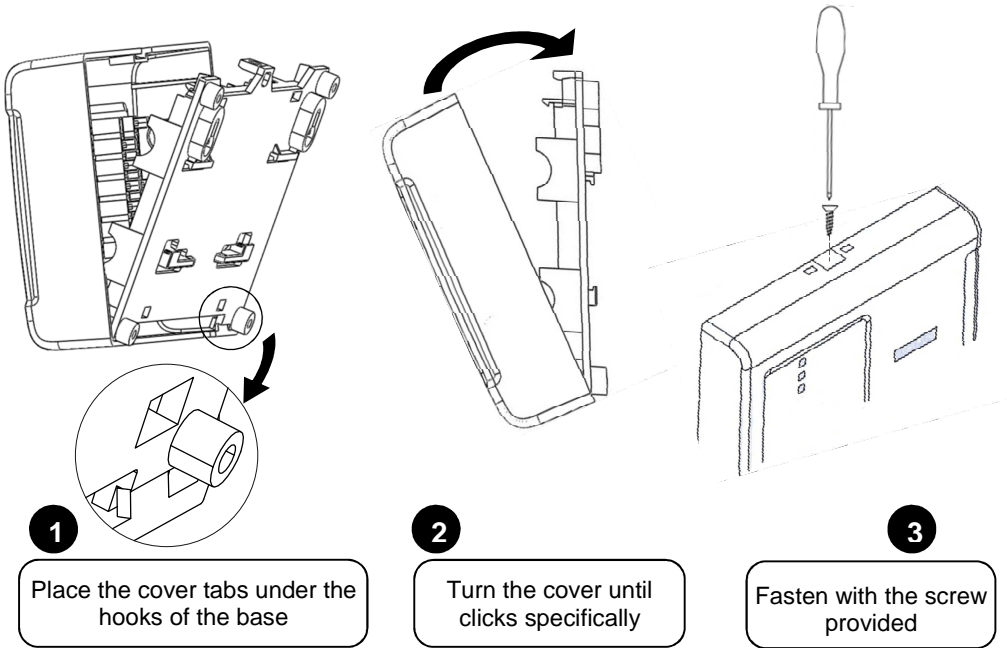
5.4.1   Initiate the self-diagnostic mode of the controller by performing three short-duration and one long-duration presses on its tamper switch (while the cover of the controller is open). A short-duration press means keeping the tamper switch pressed for 0.1 to 0.5 s. A long-duration press means keeping the tamper switch pressed for 1.5 s and longer. A pause between presses should be 0.2 to 1 s.
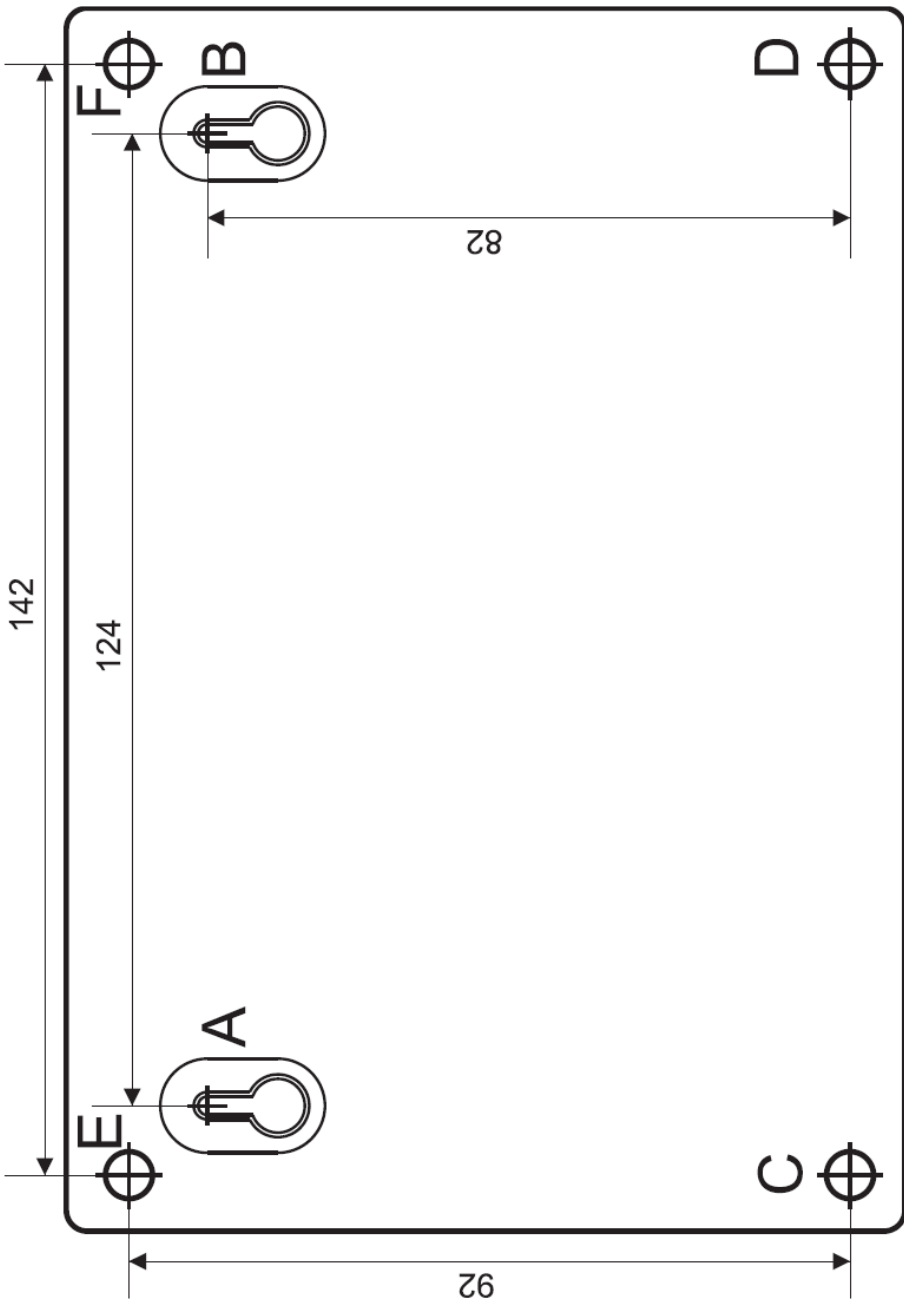5.4.2   If the controller operates properly, the READY LED pulses rapidly while its sounder issues two beeps. Then the indicators «1» and «2» in turns illuminate with red for 1 s and green

for 1 s alternately. The contact of the relay 1 is closed when the indicator «1» is lit while the contact of the relay 2 is closed when the indicator «2» is lit.

5.4.3 Ensure that the «K1» and «K2» outputs are actvated by measuring the resistance between the contacts.

1 Place the cover tabs under the hooks of the base

2 Turn the cover until clicks specifically

3 Fasten with the screw provided

Figure 25. Closing the Controller's Cover

Figure 26. Mounting Pattern