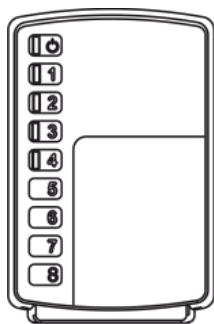




# Astra-823 Power relay unit User Guide

This User Guide is intended to study the principle of operation, operating conditions and maintenance of the power relay unit "Astra" (Pic. 1). The manufacturer reserves the right to make changes to the design, firmware, circuit solutions and product packaging that do not worsen its technical parameters, do not violate mandatory regulatory requirements, without prior notice to the consumer. The technical features of the product not listed in the User Guide in terms of design, firmware and circuit solutions are standard for the product, if they do not worsen the declared technical characteristics.



Picture 1

## Abbreviations:

- RU** – power relay unit Astra-823;
- Tutorial** – Tutorial built into the PKM Astra Pro software or Astra-812 Pro setup instructions from the keypad;
- Control panel** – control panel 8945 Pro or 812 Pro;
- PAK Astra** – TEKO cloud server platform;
- PKM** – PKM Astra Pro configuring and monitoring software package (see on the website [www.teko.biz](http://www.teko.biz));
- NC** – normally closed;
- NO** – normally open;
- AL** – Alarm Loop.

## 1 FUNCTION

- 1.1** RU is intended for controlling relay outputs by commands from the control panel via the RS-485 interface.
- 1.2** RU operates in two modes (for switching the load power supply according to the commands of the Control panel):
  - with circuit integrity control (relay 1, 2)
  - high-voltage circuit switching (AC/DC 250 V) without circuit continuity control (relay 1-4).
- 1.3** The source of commands for RU is partitions of the Control panel.
- 1.4** RU can be controlled by only one Control panel.
- 1.5** Up to 64 RU can be connected to one Control panel via RS-485 interface.
- 1.6** Assigning to a specific partition number, types of processed notifications and the mode of operation of each relay is performed during system outputs configuration from the Control panel or PKM menu.
- 1.7** RU provides integrity control of the RS-485 interface, activation of 1-4 type of alerts.
- 1.8** To power RU, you can use a power supply with a voltage from (11.0 ± 0.5) V to (15.0 ± 0.5) V. Using a linear resistance of one wire core of 100 Ohm/km, the length of the supply wire should be no more than 25 m (for example, when using 2×0.2 wire, it is permissible to use a supply wire up to 25 m long; wires should be no more than 40 m).

## 2 SPECIFICATION

- Supply voltage, V..... from 10.5 to 15.5
- Consumption current, mA, not more:
  - relays off..... 50
  - using **1 relay\*\*** (without control of the load circuit and without taking into account the current consumption of the load) ..... 70
  - using **1 relay\*\*\*** (with load circuit control, without taking into account the current consumption of the load)..... 75
  - using **4 relays** (relay 1, 2 with load circuit control, without taking into account the current consumption of the load)..... 170
- Max RS-485 cable length to control panel, m, ..... 1000
- Relay 1, 2 Characteristics in continuity mode load circuits:
  - switching voltage range (at the Vdc terminal), V ..... from 5 to 30
  - switched current range, A ..... from 0.6 to 2.0
  - Minimum switching current, mA ..... 0.6-0.5
  - Load shedding current at short circuit, A ..... 2.0+0.5
- Relay 1, 2 in non-continuity mode specifications:
  - load circuits and relays 3.4 (NO-COM-NC):
    - maximum switching voltage (AC), V..... 250
    - maximum switching voltage (DC), V ..... 30
    - maximum switched current, A..... 3
    - maximum switching power, W..... 750
  - Recovery time after short circuit recovery, sec, not more ..... 10

\*\* The use of each subsequent relay (without control the load circuit) **increases the current consumption by 30 mA.**  
 \*\*\* The use of each subsequent relay (with load circuit supervision) **increases the current consumption by 35 mA.**

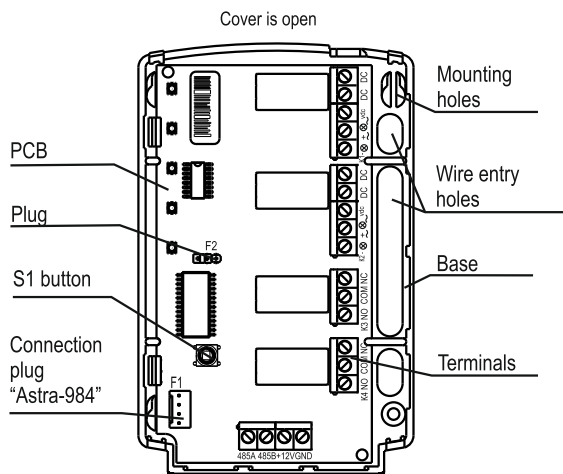
- Boot time, sec, not more ..... 2
- Maximum cable cross square, mm<sup>2</sup>, not more than ..... 2,5
- Overall dimensions ..... 120.5×79×30.5
- Weight, kg, not more..... 0.120
- Operating conditions**
- Temperature range, °C ..... from - 30 to +55
- Relative humidity ..... up to 93 at + 40 °C  
without moisture condensation

## 3 DELIVERY SET

- Screw ..... 4 pc.
- Dowel ..... 4 pc.
- Label..... 2 pc.

## 4 DESIGN

**4.1** Structurally, RU is made in the form of a block consisting of a base and a removable cover. PCB with radio elements is mounted inside the block (Pic. 2).



Picture 2

- 4.2** Tampering switch is installed on the PCB.
- 4.3** The PCB has LEDs to control the informativity of the RU.
- 4.4** Function of terminals (Table 1).

Table 1

Terminal	Function
485A, 485V	Connecting the RS-485 interface line
+12V, GND	Power supply
DC (Relay 1,2)	Connecting a jumper when control the integrity of the switched circuit
Vdc / ~ (Relay 1,2)	Load supply voltage (actuating device) when operating in the mode of control the integrity of the switched circuit / terminal for switching the high-voltage circuit AC/DC 250 V
+ / ~ (Relay 1,2)	Load connection with VDC supply voltage / high-voltage switching terminal AC/DC 250 V
- (Relay 1,2)	Load connection with VDC supply voltage
NO (Relay 3, 4)	Normally open relay contact
NC (Relay 3, 4)	Normally closed relay contact
COM (Relay 3, 4)	Common (for NO and NC) relay contact

## 5 RU FUNCIONS

### 5.1 The principle of operation of the relay with the integrity control of the switched circuit (relay 1, 2)

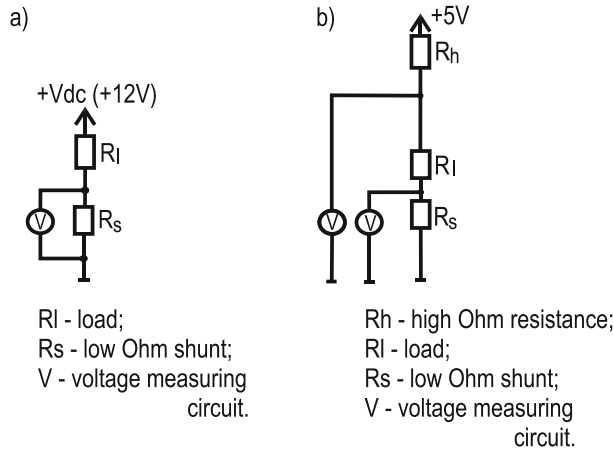
**5.1.1** In the switched circuit continuity mode, the supply voltage is supplied to the load from the VDC terminal. The load is connected to the "+" and "-" terminals, observing the polarity. To check the continuity of the circuits, you need to close the DC terminals. No voltage control at **VDC** terminal.

**5.1.2** The principle of control the continuity of the circuit when the relay is closed is based on measuring the voltage drop across a low-resistance shunt connected in series with the load circuit.

The voltage drop across it determines the state of the load circuit: when the circuit is broken, the voltage drop across the shunt is zero, in case of a short circuit it is large (close to the supply voltage). The equivalent circuit is shown on Pic. 3a.

**5.1.3** When the relay is open, the principle of control the integrity of the circuit slightly changes. In addition to the shunt, a high-resistance resistor is connected in series with the load to the power supply. In addition to the shunt, a high-resistance resistor is connected in series with the load.

The difference between the voltage on the shunt and on the high-resistance determines the state of the integrity of the load circuit: in case of a break, the difference is large and equal to the voltage power supply, in case of a short circuit, the difference tends to zero. The equivalent circuit is shown in Pic.3.



Pic.3

## 5.2 The principle of operation of the relay without the integrity control of the circuit


When operating in the high-voltage circuit switching mode (AC / DC 250 V) without circuit integrity control, relays 1 and 2 work in the circuit as an NO switch. The load is connected to the "-" terminals.

**Relays 3 and 4 operate as NO or NC switches.** The load is connected to the "NO" and "COM" terminals in the case of an NO switch or to the "NC" and "COM" terminals in the case of an NC switch.


### Attention!

**The DC terminals in the high-voltage circuit switching mode (AC/DC 250 V) must be open.**

## 6 INDICATION

**Led**  displays the state of the supply voltage and the firmware change mode (Table 2).

**Leds 1 - 4:** display relay states (Table 3). The duration of the notification indication is until the relay switches to another state or until it is restored.

Table 2 – LED notifications  and control panel


Notification	LED 	Control panel
Power on	Green	+
Supply voltage low (11.2 <sub>-0.4</sub> ) V	1 time red flash every sec.	+
Supply voltage lower (10,7 <sub>-0.4</sub> ) V	Off	+
Firmware change	Red	-
"+" notification issued, "-" notification not issued		

Table 3 – LED notifications 1 – 4

Reason	1	2	3	4
When the power is turned on, if supply voltage below (10.7 <sub>-0.4</sub> ) V	off	off	off	off
No connection with control panel	2 times red flashed every sec.	2 times red flashed every sec	2 times red flashed every sec	2 times red flashed every sec
An unregistered RU is connected or during RU registration	off	off	off	off
Load state "normal" and: a) relay open	1 time green flash per sec.	1 time green flash per sec.	-	-
	Green	Green	-	-
b) relay closed	Green	Green	-	-
In the load circuit - short circuit, relay open / closed	1 time red flash per sec.	1 time red flash per sec.	-	-
When the load circuit is broken, the relay open / closed	Red	Red	-	-
Switching circuit AC/DC 250 V. If: a) relay open	Red	Red	1 time green flash per sec.	1 time green flash per sec
	Red	Red	Green	Green
b) relay closed	Red	Red	Green	Green
Software change	Is off	Is off	off	Off

**Note** - LED number corresponds to the number of relay RU (LED 1 - relay 1, LED 2 - relay 2, etc.).

### Types of notifications RU issued to the RS-485 line:

"Power on", " Supply voltage low", " Supply voltage low recovery", "Opening / Restoration of opening", "Open circuit of the load / Recovery of the load circuit" (**Relays 1, 2 only**), short circuit in the load circuit / recovery after short circuit (Relays 1, 2 only).

## 7 OPERATION MODES

Relays RU can operate in one of the typical modes according to the logic of the control panel.

## 8 CONFIGURATION

### 8.1 RU registration in the control panel.

- 1) Connect RU to control panel via RS-485 line (terminals 485A and 485B).
- 2) Connect +12V power supply to terminals +12V, GND.
- 3) Check plug F2 (should not be closed).
- 4) Power on RU, while checking the LEDs 1 - 4 - they must be off.
- 5) Install the PKM Astra Pro to your PC.
- 6) Start the **registration mode** for the device on the control panel (according to Tutorial\* of the control panel).
- 7) Registration check:  
 - in case of successful registration, the abbreviated name "RU" will appear on the screen or the message: "RUxxx registered",  
 - in case of unsuccessful registration, it is necessary to repeat the registration procedure. After registration, leds 1 - 4 will display the current state of the load in accordance with Table 3.
- 8) RU Registration is completed.

### 8.2 RU RESET

If the RU was previously registered to another control panel, or the RU was disconnected from the RS-485 interface and removed from the control panel and re-registered in the same control panel, then leds 1-4 will notify that there is no connection with the control panel: 2 times red flashes per sec. In this case, RU registration is performed as follows:

- 1) Short term (for a period of 1 to 2 sec), close plug F2.
- 2) Within 60 sec. after closing, press the tampering switch and hold until leds 1-4 turn off (about 2 sec.).
- 3) Start registration mode (see paragraph 8.1 of steps 6, 7).
- 4) After registration, indicators 1-4 will display the current state of the load in accordance with Table 3.
- 5) RU registration is completed.

### 8.3 Setting relay outputs of the RU

Configuring relay outputs of the RU from the control panel menu Astra-812 Pro or PKM Astra Pro.

#### System number assignment

From the menu item of the PKM Astra Pro configuration module "System outputs":

- double-click the left mouse button on an empty line to open the nested window of the system output parameters
- choose a device type: RU
- choose the address of the RU
- select the physical output corresponding to the relay number in the selected RU
- Click the "Save" button in the program window.

#### 8.3.1 Operating mode of the RU

In the menu item of the PKM Astra Pro configuration module "System outputs":

- On the selected system output, double-click the left mouse button to open the nested window of the system output parameters
  - select the operating mode of this system output from the proposed list
  - Click the "Save" button in the program window
  - assign system output to partitions
- Repeat point 8.3.2 for each relay RU.

#### 8.3.2 Assigning to emergency partitions

Assign load integrity control circuits RU to technological partitions from the menu item of the Configuration Module PKM Astra Pro "Partitions".

**Attention! Before changing the type of a partition, you must de-assign all zones from that partition.**

**The procedure for registering and configuring the system operation is described in more detail in the Tutorials.**

## 9 INSTALLATION

9.1 Those, who have studied the User Guide for operation and are allowed to work with electrical installations up to 1000 V are allowed to operate on the installation, maintenance and operation of the RU.

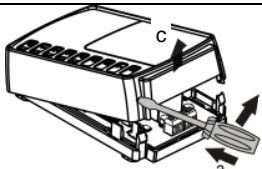
9.2 Installation, mounting-dismantling should be carried out with the power supply switched off RU.

9.3 RU is installed on the walls or other structures of the protected premises in places protected from the effects of atmospheric precipitation, mechanical damage and access by unauthorized persons.

### 9.4 Installation procedure

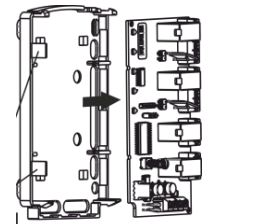
**1**

Remove the cover by inserting the blade of a flathead screwdriver into the slots in the cover and turning the blade until the latches on the base are out of the slots in the cover



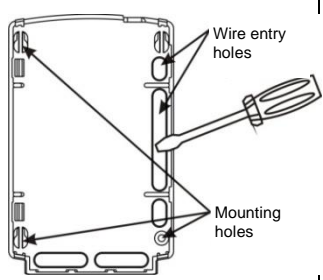
**2**

Bend the hooks on the base, remove the PCB

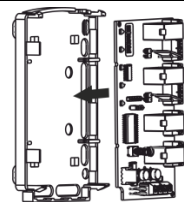


**3**

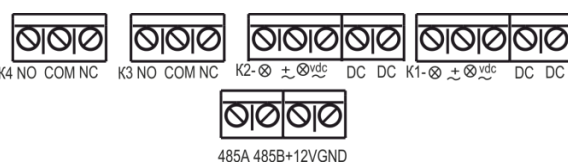
- Press out the plugs of the selected wire entry holes in the RU base.
- Mark the mounting holes on the bearing surface along the RU base, mount the fasteners.
- Pass the wires from the power supply, RS-485 interface and relay outputs through the wire entry hole.
- Fix the base RU to the supporting surface with screws.




**4** Install the PCB



**5** Carry out electrical installation to the output terminals RU



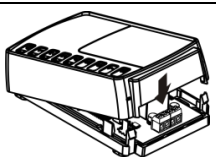
**6** Power on RU:

- LED  is green - power supply is normal or is flashing red 1 time per sec. at reduced supply voltage,
- LED 1 – 4:
  - unregistered RU – is off,
  - registered RU - display the state of the outputs acc. to Table 3,
  - previously registered RU in other control panel – 30 sec after power on, 2 times red flashes per sec.

**7** Add RU to the control panel, if it has not been previously added, in accordance with p. 8.1 or p. 8.2

**8** Set relay outputs RU in accordance with clause 8.3

**9** Replace the cover (until click)



## 10 WARRANTY

The operation warranty period is **5 years** from the date of operation start-up, but **no longer than 5 years 6 months** from the date of manufacturing subject to the requirements of User guide.

#### Manufacturer:

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