Astra-BRA

Addressable Relay Unit

User guide

This operating manual is intended to study the principle of operation, proper use, storage and maintenance of the Astra-BRA addressable relay unit.The manufacturer reserves the right to make changes to the design, firmware, circuit solutions and product packaging that do not worsen its technical characteristics, do not violate mandatory regulatory requirements, without prior notice to the consumer.

Abbreviations:

SLC – Signaling line circuit;
ARM – Monitoring software;
IU - indication unit Astra-863;
BRA– Addressable relay unit Astra-BRA
Zone – notification source;
Tutorial - User guide built into the PKM Astra Pro or Astra-812 Pro setup instructions (available on the website www.teko.biz);
Control Panel – control panel Astra-8945 Pro or Astra-812 Pro with firmware version 5_0 and higher;
PKM Astra Pro – Astra Pro monitoring software package (available on the website www.teko.biz);
Keypad – Astra-814 Pro control keypad;
RPA – signalling line extender "Astra-A RPA»;
LP– Laser pointer Astra-942»;
NC – normally closed;
NO – normally open;
AL – alarm loop.

1 Function

1.1 BRA is designed to control smoke ventilation dampers, fire dampers of general ventilation, deluge dampers and other actuators powered by 220 V. The BRA is designed to operate in the SLC formed by the RPA.
1.2 BRA provides:

- possibility to control the damper of fire dampers of types: electromechanical with return spring, reversible, electromagnetic by command of the Control Panel received via SLC;
- monitoring the load of the relay for open and short circuits and transferring information about the integrity of the load line to the Control Panel;
- valve position control by limit switches;
- LED indication of BRA operation, valve status, outputs and SLC;
- Valve test

1.3 The BRA can operate in two modes:

- “Valve” mode, in which the BRA implements special valve control algorithms,
- "Relay unit" mode, in which the BRA provides operation
- one relay output with load circuit control.

In both modes, the BRA can operate with or without load continuity supervision (depending on configuration)
1.4 The sources of notifications for the BRA are partitions of the Control Panel.
1.5 BRA can only be controlled by one Control Panel.
1.6 BRA provides configuring of operating modes using the menu of the PKM Astra Pro configuration module.
1.7 The BRA (signal part) is powered from the SLC power line (terminals "+" and "-"), the power part (L1, N, L2) - from the 220 V AC network.
1.8 The power supply of the power part of the BRA (relay, AL) is carried out from the main (terminals L1, N) and backup (terminals L2, N) 220 V power supplies. In the absence of the main power supply, the BRA automatically switches to the backup; when the main power is restored - switches to the main power.

Attention!
ONLY 1 AND THE SAME PHASE CAN BE SUPPLIED TO INPUTS L1 AND L2! SUPPLY OF DIFFERENT PHASES IS FORBIDDEN!

2 Specifications

Power supply voltage, V:
- power unit ..... from 187 to 242 AC
- signal part (from SLC) ..... from 6.0 to 27.6 DC
(power and signal parts are galvanically isolated)
Current consumption from 220 V, mA, not more 20
Current consumption from SLC, mA, not more 0.5
Power consumption from 220 V (excluding consumption valve),W, not more 5
SLC interface cable length from BRA to RPA, m, max 1000
Number of relays 1

Relay specification (in "Relay unit" mode) (terminals RAB and Ncl):
Maximum switching voltage, V 250
Maximum switching current at a voltage of 250 V, A 1
Minimum switching current, mA * 0.6

AL Specification (terminals **+Zone1- , +Zone2-, +TST-**):
Standby voltage, V* ..... from 8.5 to 14
ripple voltage value on terminals AL, mV, no more 50
Short circuit current AL, mA, no more 20
AL integration time, msec ..... 300±30
AL wire resistance (excluding remote element), Ohm, no more 150
Leakage resistance between loop wires or each wire and "Ground", kOhm, not less than 50
Loop resistance, kOhm ..... see tables 7, 8

Boot time, sec, not more 10
Overall dimensions, mm ..... 216×135×39
Weight, kg, not more 0.35

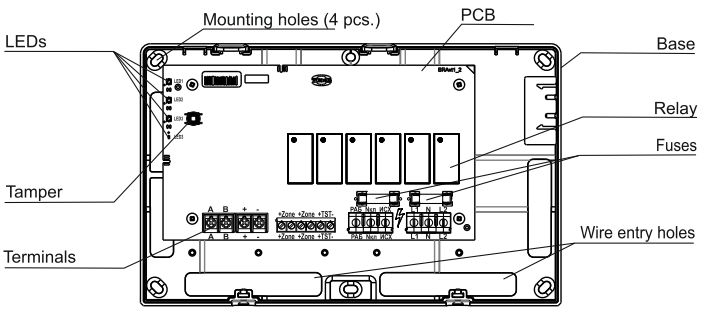
Operation conditions
Temperature range, ºC ..... from -30 to +55
Relative humidity ..... up to 93 at +40 ^{0}C
without moisture condensation

3 Delivery set

Relay unit wired address "Astra-BRA" ..... 1 pcs
Resistor 3.9 kOhm ..... 6 pcs
Screw ..... 4 pcs
Dowel ..... 4 pcs
Sticker ..... 2 pcs

4 Design

4.1 Structurally, the BRA is made in the form of a unit consisting of a base and a removable cover. PCB with radio elements is mounted inside the unit.



4.2 The PCB has indicators for monitoring the state of power supply and outputs of the BRA:
- **OPERATING** LED – is for indicate the power supply status of the BRA
- **OUTPUT** LED - to display the status of the valve control outputs;
- **STATUS** LED - to display valve position and faults;
- **SLC** LED - status indication SLC BRA with RPA.

4.3 The PCB has a tampering switch to control the state of the case (opened / closed).
4.4 The PCB has screw terminal units, the purpose of which is given in the table 1.

Table 1

Terminal	Terminal function
A, B	Connection to the data L1 (L2) RPA
+, -	Connection to the power L1 (L2) RPA
+Zone1-	Connecting the valve limit switch
+Zone2-	Connecting the valve limit switch
+TST-	Connecting the TEST button
РАБ	Valve connection
Nкл	
ИСХ	
L1, N	Input for connecting the main power supply 220 V
L2, N	Input for connecting the main power supply 220 V

** for relay in load circuit monitoring mode*

5 Indication

Table 2 – Notifications on the OPERATING LED and in the Control Panel (for both modes)

Status	OPERATING LED	Control Panel
Power-on test	X1 green/yellow altenate switching on for 2 sec	-
Power at inputs L1 and L2 is norm	Green	+
No main power at inputs **L1)**	x1 green flashes every 1 sec	+
No back up powerat inputs **L2**)	x2 green flashes per sec	+
Generic failure	x1 yellow flash every sec	+
Firmware update		-
No L1 and L2 power **supply**	Off	+
"+" – notification issued, "– " – notification is not issued		

Table 3 - Notifications to the **OUTPUT** LED and to the Control Panel (for both modes)

Status	OUTPUT LED	Control Panel
Power-on test	1 red/green alternate switching on for 2 sec	-
Power supply at the output of the **РАБ** is normal	x1 green flash every sec	+
Output power is normal	x2 green flashes every sec.	+
No power on **РАБ** and **ИСХ** outputs	Off	-
Short circuit on one of the outputs (**РАБ** or **ИСХ**)	x2 yellow flashes every sec	+
Open circuit at one of the outputs (**РАБ** or **ИСХ**)	x1 yellow flash every sec	+
"+" – notification issued, "– " – notification is not issued		

Table 4 - Notifications to the **STATUS** LED and to the Control Panel

Status	STATUS LED	Control Panel
Power-on test	x1 green/red alternate flash for 2 sec.	-
Initial	Solid green	+
Work	Solid red	+
Failure	x1 yellow flash every sec	+
Valve test	Solid Yellow	+
Condition change(for the transition delay time)	x2 green/red altenate flashes every sec	+
"+" – notification issued, "– " – notification not issued		

Table 5 - Notifications to the **SLC** LED and to the Control Panel

Status	SLC LED	Control Panel
SLC power failure	3-times flashes with a period of 25 sec.	+
Laser pointer test*	x1 flash for 2 sec.	+
Registration (via LP) *	x1 flash for 2 sec	-
«*» - service indication used during commissioning and maintenance of the BRA, «+» – notification issued, «-» – notification not issued		

6 BRA operating modes

6.1 BRA operating modes are set from the PKM Astra Pro software**:**
1) when specified from the PKM Astra Pro in the Configuration Module - in the menu item Hardwired devices / List of hardwired devices / BRA,

6.2 In the window "Setting the BRA" select the device type (Valve or Relay unit) and set its parameters.

Table 6 – Factory settings

Status	Initial condition	Range Changes
Operating mode	Valve	Valve Relay unit
Valve type	Closed	In the original closed (Closed) In the original opened (Opened)
Control of the integrity of the output circuits РАБ, ИСХ	no	no; ИСХ+РАБ; ИСХ; РАБ
РАБ output control tactics	No control	No control Switch on Switch on for some time (from 1 to 255 sec)
ИСХ output control tactics	No control	No control Switch on Switch on for some time (from 1 to 255 sec)
Control time of the valve to the operating position	30 sec	from 1 to 255 sec
Control time for the valve to return to its initial position	30 sec	from 1 to 255 sec
Valve operating position (Zone1)	Not used	In the "Valve" operating mode, the following types of loops are available: - not used (no limit switch control) - valve position control - "Limit switch closed" - valve position control - "Limit open"
Valve initial position (Zone2)		
Valve test (TST)	Not used	In the "Valve" operating , the following types of loops available: - valve test - not used

6.3 «Valve» operating mode

6.3.1 "Valve" operating mode BRA:
1) controls the condition of the valve limit switches via AL1 и AL2 (**+Zone1-** and **+Zone2-**)
2) if the control of limit switches is not configured, then the BRA determines the position of the valve according to the state of the outputs РАБ and ИСХ;
3) BRA through its AL (terminal TST) controls the state of the TEST button. According to the status of the alarm loop, the BRA generates a control impulse to transfer / return the valve to the working / initial state for local control (operability check);
4) The BRA stores the current state of the valve, limit switches, the TEST button, the state of the outputs РАБ and ИСХ, the state of the power inputs L1 and L2 and, based on this information, generates control commands to display the state on its own built-in indicators.
6.3.2 In the "Valve" mode, the BRA has no system outputs.
6.3.3 In the "Valve" operating mode, 3 types of loops are available for selection:
- «Limit switch closed»,
- «Limit switch open»,
- «Limit switch not active» (no limit switch control).

Table 7 – AL1 and AL2 parameters (**Zone1**)/(**Zone2**)

Type of limit switch	Resistance, kOhm				
	0 –1.5	1.5–3	3 – 5	5 -12	More than 12
Limit switch closed	short circuit	Norm	Alarm	Alarm	Open circ
Limit switch open	short circuit	Alarm	Norm	Alarm	Open circ
End switch not active	-	-	-	-	-

Note
1 When setting up, select the type of AL2, which is the opposite in meaning to that selected for AL1 (if the type "Limit switch closed" is selected for AL1, then the type "Limit switch is open" must be selected for AL2).
2 The determination of the state of the valve is always carried out by the state of the two limit switches. Therefore, the setting should provide for the use of only two limit switches at the same time, the limit switches cannot be used separately.

Table 8 – AL3 parameters (**TST**)

AL Type	Resistance, kOhm				
	0 –1.5	1.5–3	3 – 5	5 -12	More than 12
Valve test	short circuit	violation	norm	violation	Open circuit
Not used	-	-	-	-	-

6.4 Mode «Relay unit»

6.4.1 In the "Relay unit" mode, the BRA is one power relay output: (terminals РАБ and ИСХ)
- open (off) – no 220 V power supply to the load;
- closed (on) – there is 220 V power supply to the load from one of the power supply input lines L1 or L2 (with the ability to configure control of load communication lines).

Notice - In the "Relay unit" operating mode, loops are not available The tactics of the system output of the BRA is selected from the list offered in the Configuration Module of the PKM Astra Pro software.

7 Preparing for operating and set up

7.1 After transportation under conditions different from the operating conditions, the BRA should be kept unpacked in the operating conditions for at least 4 hours.

7.2 BRA registration into RPA (Extender)

1) Connect RPA to Control Panel via RS-485 interface.
2) Register the RPA in the Control Panel in accordance with the Instructions for Astra-812 Pro or the Instructions built into the Configuration Module of the PKM Astra Pro software.
3) Connect the BRA to the power line (terminals "+", "-") and the information line (terminals A and B) of the RPA, connect with the power off.
4) Turn on the power of the RPA, BRA.
5) Start the Registration mode of devices in the RPA on the Control Panel using the command via the Astra Pro or Pconf-Pro PKM menu, or the Astra-812 Pro Control Panel menu in accordance with the Instructions.
The mode takes 60 sec to register one device.
6) Run the registration mode on the BRA by lighting the SLC indicator from the bottom button of the Astra-942 laser remote control for at least 1 sec.

Attention!
Simultaneous launch of the registration procedure on several address devices is prohibited.

7) The registration test:

- in case of successful registration, the screen will display the abbreviated name "BRA" or the message: "BRAxxx registered",
- in case of unsuccessful registration, you must repeat the registration.

8) After registration, the BRA indicators will display the current power and load status in accordance with tables 2-5.
9) BRA registration is completed.

7.3 Removing BRA from RPA memory.

Deleting of the BRA from the RPA memory is carried out through the Configuration Module of the Astra Pro PKM software, or from the Astra-812 Pro control panel menu.

7.4 BRA setting

7.4.1 Setting and changing the operating modes of the BRA is performed:
1) using PKM Astra Pro from the menu item of the Configuration Module of PKM Astra Pro "Hardwired devices / List of addressable devices / BRAs",
In the window "Setting the BRA" select the device type (Valve or Relay unit) and set its parameters.

7.4.2 All BRA notification sources in the "Valve" and "Relay unit" modes must be assigned to technological partitions (to monitor the status of "Tampering", "Power failure", "Short circuit" or "Open circuit" of communication lines with the relay, etc.), see table 9 .

7.4.3 The number of BRA's notification sources and their purpose are presented in Table 9.

Table 9 – Display of BRA notification sources in Control Panel, PKM

BRA notification sources in "Valve" operating mode	BRA notification sources in "Valve" operating mode
BRA #xxx **BRA #xxx** – Tamper status, communication via SLC, power status via SLC, status of power inputs L1 and L2, test by laser control panel. **BRA #xxx/1** – Control of the integrity of the output line "WORK."; Limit switch control (Zone 1).**BRA #xxx/2 –** Control of the integrity of the output line "OUT."; Limit switch control (Zone 2).**BRA #xxx/3** – Checking the status of the "Test" button.**BRA #xxx/4** – Valve condition monitoring	**BRA #xxx** **BRA #xxx** – Tamper status, communication via SLC, power status via SLC, status of power inputs L1 and L2, test by laser control panel.**BRA #xxx/1** – Control of the integrity of the output line "Working"

To configure the display of the valve status on the Astra-863 indication unit, on the System outputs/IU, select "Valve status display" and assign the valves to the IU LEDs.

8 Installation

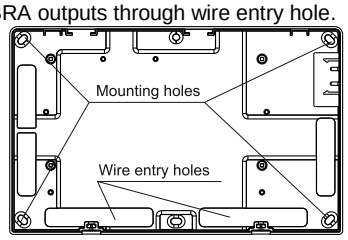
8.1 Specialists who have studied this user guide and are allowed to work with electrical installations up to 1000 V are allowed to work on the installation, maintenance and operation of the BRA.
8.2 Installation, mounting-dismantling should be carried out with the power supply of the BRA turned off.
8.3 BRA is installed on the walls or other structures of the protected premises in places protected from the effects of precipitation, mechanical damage and access by unauthorized persons.
8.4 When installing, it is allowed to use mounting devices (cabinets, boxes, etc.)

8.5 Installation order

1 Remove the cover by unscrewing the 2 screws on the bottom end surface of the BRA housing

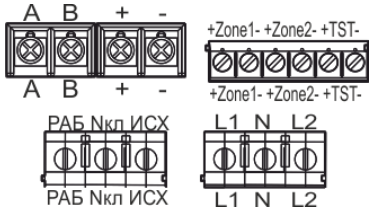
2 Mark the mounting holes on the bearing surface along the base of the BRA, mount the fasteners

3 Conduct wires from the power supply, interfaces RS-485, SLC, BRA outputs through wire entry hole.



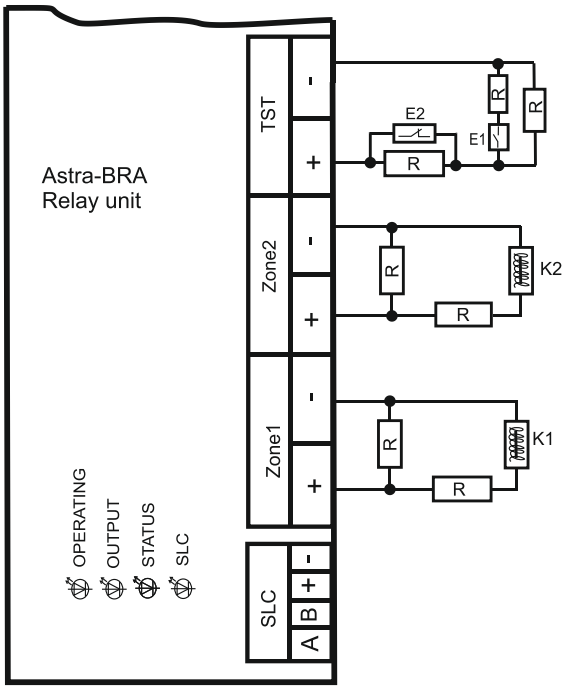
4 Fix the BRA on the bearing surface with screws

5 Conduct electrical installation to the output terminals of the BRA in accordance with Table 1 and the wiring diagram (p.9)



6 Replace the cover, tighten two screws.

9 Wiring diagram



R - resistance 3.9 kOhm ,
E1 - button with normally open contacts,
E2 - button with normally closed contacts,
K1, K2– valve limit switch

10 Test

Testing is taking place with one of two ways:

1 way – using button TEST which is connected to the TST terminal**:**
- set the TEST button to the “Violated” state (press or release depending on the type and setting of the BRA);
- visually control the transition of the valve to the РАБ (operation) state, then to *И*СХ (initial);
- control the state of the valve in Astra Pro РКМ (Astra-812 Pro Control Panel, Astra-814 Pro keypad): after the test is completed, the status is displayed as “Valve in the initial state”, which means that the equipment is configured correctly. Otherwise, the status is displayed as “Failure” and the BRA settings need to be adjusted.

2 way - using Astra-942**:**
- light up the SLC indicator of the BRA from the top button of the left side for at least 1 sec**;**
- the test is performed in the same way as described in the first method.

If during the test execution the BRA receives a command from the control panel, then the test execution is terminated, the new state “Transition to ...” is assigned to the valve state, the control panel generates the “Valve test completed” event, and the BRA executes the command from the control panel.

11 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.

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