Operating instructions

V6

Relay trigger adapter, analog
ALMEMO® 8006-RTA3

V2.4
18.03.2014

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1. Operating controls

(1) Sockets P0/1 to P8/9
for ALMEMO® clamp connectors
P0/1 2 semiconductor relays R0, R1
P2/3 2 semiconductor relays R2, R3
P4/5 2 analog outputs (option)
P6/7 2 analog outputs (option)
P8/9 2 trigger inputs TR8, TR9

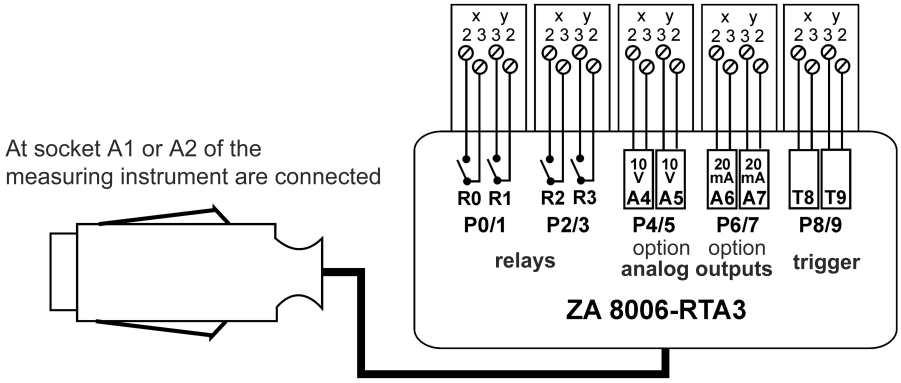
(2) DC socket
Mains adapter (ZA1312-NA1, 12V, 0.2A)

(3) LCD, graphics display
7 rows for functions
1 line for softkeys **F1,◄,▲,►, F2**
Shown in brackets : **<MENU>**

(4) Operating keys
<TR8 / 9> Trigger keys (softkeys)
▲, ▼ P: Port selection
<MENU> Main menu
<☼ON> Switch display illumination ON
▲, ▼, ► **F:** Function selection
<SET> Direct data selection
PROG Program
▲, ▼, ► **P:** Data entry

(5) ALMEMO® connecting cable
to measuring instrument, socket A1, A2..

2. Connection diagram



3. Contents

4. Function of relay trigger adapter, analog

The relay trigger adapter, analog, ZA 8006-RTA3, provides ALMEMO® V6 devices (as of 2008 and except 2390) with a universal trigger output interface with up to 10 interface elements (i.e. maximum 10 semiconductor relays, or 2 trigger inputs, or up to 4 electrically isolated analog outputs).
The adapter is connected via the ALMEMO® cable to output socket A1 to A5 (if available) on the ALMEMO® devices. All 10 interface elements of each module can be individually selected and configured as ports P0 to P9. Programming is via the ALMEMO® device (for a description please refer to the operating instructions for the device) or via its interface (for a description please refer to the Manual, 6.10.9.2). Addressing of the modules and ports is determined on the basis of the socket into which the module is plugged (see Man. 6.10.9.2) :

Modules in socket A1 :	Address 10 to 19
Modules in socket A2 :	Address 20 to 29, etc.

5. Power supply

The adapter is supplied with a voltage of 9 to 12 VDC via the measuring instrument. In the standard version the maximum requirement is 35 mA - even with illumination. It is only with optional analog outputs. in particular with electric current outputs, that the maximum supply current on the measuring instrument must take the sensors into consideration. If the maximum supply current is exceeded, a mains adapter (e.g. ZA1312-NA1) should be connected at the DC socket.

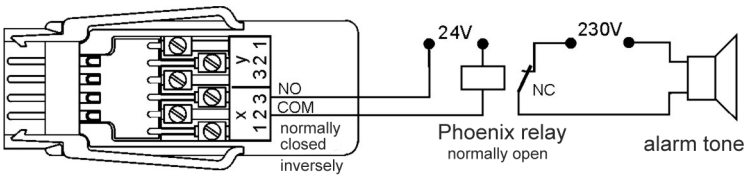
6. Interface elements

Sockets P0/1 and P2/3 are fitted as standard with four semiconductor relays, normally open type (or changeover type as option); socket P8/9 is fitted as standard with two trigger inputs.
Sockets P4/5 and P6/7 can (as options) be fitted with analog outputs.

6.1 Relays

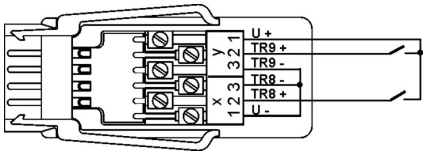
The **output relays** are driven by the measuring instruments automatically in the event of alarm or by means of interface commands (see Manual 6.10.10). The function of each relay can be freely set by configuration (see Manual 6.10.9.2). The assignment of limit value to relay can be programmed in the sensor by the device (see Manual 6.10.8). Whenever a relay is activated a programmable message appears and whenever there is a change in status a short acoustic alarm is sounded. The way in which these relays are driven can be configured by means of inversion so that they pick up in normal conditions and drop out in the event of alarm or power failure (see below).
In the following cases it is advisable to connect a mains voltage changeover relay downstream (e.g. Phoenix PLC-RSC-24DC/21, 250V 6A) :

- ► Current or voltage capacity greater than 50 V, 0.5 A
- ► For separating the mains voltage side
- ► For implementing an alarm in the event of failure on the control side



6.2 Trigger inputs

The **trigger inputs** TR8 and TR9 can be driven either via optocouplers by voltage levels (4 to 30 V) or via the two keys **F1** and **F2** (configuration, see 6.3.). When using floating switch contacts the optocouplers must be appropriately wired with supply U+ and U-
(see diagram).
The trigger function (as standard to start or stop a measuring operation) can also be freely configured (see Manual 6.10.9).



6.3 Analog outputs

The relay adapter can also - in various options - be fitted with electrically isolated **analog outputs** offering the following signals.

Option	**Output signal**	**Gain**
OA 8000-R2	0.000 to +10.000 V	0.5 mV / digit
or	0.000 to +20.000 mA	1 µA / digit

The output value normally corresponds to the measured value for the selected measuring point. Or alternatively the analog value can be specified as control variable via the interface (see Manual 6.10.7). The output signal can be programmed as standard output 0 to 10 V, 0 to 20 mA, 4 to 20 mA for any partial measuring ranges (see Manual 6.10.7).

6.4 Connecting peripheral equipment

Peripherals can be connected via the supplied ALMEMO screw connector according to the following schematic diagram :

Termi-nals	P0/1 Relay	P2/3 Relay	P4/5 Analog (option)	P6/7 Analog (option)	P8/9 Trigger
y1	R1 normally closed (NC) (option)	R3 normally closed (option)	(option)	(option)	U+
y2	R1 common	R3 common	AO5 +	AO7 +	TR9+
y3	R1 normally open (NO)	R3 normally open	AO5 -	AO7 -	TR9 -
x3	R0 normally open	R2 normally open	AO4 -	AO6 -	TR8 -
x2	R0 common	R2 common	AO4 +	AO6 +	TR8+
x1	R0 normally closed (option)	R2 normally closed (option)			U-

7. Commissioning

1. Connect the relay adapter to socket A2 on the ALMEMO® device; the integrated interface elements are then available as port P20 to P29.
2. Switch the ALMEMO® device ON; see 5.
3. Connect the peripheral equipment to the clamp connectors and on the relay adapter to the appropriate port sockets; see 6.4.
4. All the following programming functions can be performed via the device keypad in the "output modules" menu (if available) or using the AMR-Control software or by means of a terminal command.

Application Summated alarm :

1. For critical measuring points program limit values on the ALMEMO® device.
2. With ALMEMO® device program the first relay port to variant 0 ´Summated alarm´ using command ´i20 f9 k0´ (see Manual 6.10.9.2).
3. In the event of any limit value being overshot the associated relay is activated.
4. If it is intended that the relay should drop out in the event of an alarm it can be programmed to operate inversely.

Application Monitoring a measuring point :

1. Program the limit value for the critical measuring point xx on the ALMEMO® device.
2. Program relay yy as limit value action (special function) :
   Limit value maximum, command : ´Exx ipp f2 Ryy´,
   Limit value minimum, command : ´Exx ipp f3 Ryy´,
   The relay is configured automatically to the ´assigned´ variant.
3. If it is intended that the relay should drop out in the event of an alarm it can be programmed to operate inversely.

Application Driving via the interface :

1. With ALMEMO® device in the output modules menu program the relay port pp to variant 8 ´driven´ using command ´ipp f9 k8´.
2. If it is intended that the relay should drop out in the event of activation it can be programmed to operate inversely - using the command ´ipp f9 k-8´.

3. Activate the relay using the command ´ipp f1 Rpp´,
   Deactivate the relay using the command ´ipp f1 R-pp´.

Application Driving the analog output :

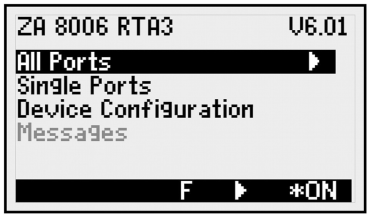
1. Configure analog output port 6 or 7; see Manual 6.10.7:
   e.g. selected analog type x (command ´ipp f9 Ax´)
   assigning to the selected measuring point (command ´ipp f9 E-00´)
   or assigning to any reference channel xx (command ´ipp f9 Exx´)
   or output the value yyyyy via the interface (command ´ipp f9 ayyyyy´)
2. Define the desired measuring range for the measuring point, to be output over the whole analog output range (0 to 10 V or 0 to 20 mA), using the parameters analog start and analog end in sensor programming, special functions, see Manual 6.10.7.
3. If for a current output the output range 4 to 20 mA is to be used (instead of 0 to 20 mA), the element flag for 4 to 20 mA must be activated for the appropriate measuring point; see Manual 6.10.3.

8. Display and operating controls

The adapter incorporates a graphics display that can show exactly all states affecting the interface elements. This is configured largely by the device itself.

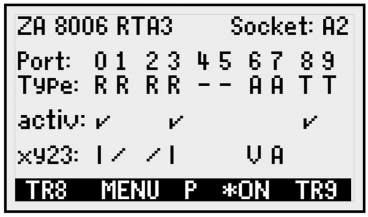
8.1 Main menu

The main menu is called up by pressing **<MENU>**. Here, by pressing **▲** / **▼**, you can access menu items **All Ports** or **Single Ports** or **Device configuration** and then, by pressing **▶** or **PROG**, activate these.
By means of **<☼ON>** you can switch on display illumination.



8.2 Showing all elements :

Below the port number the type of elements available is shown with its abbreviation. Below this the activation status of the relays and trigger inputs is shown and in line xy23 the actual switching status of the relays and the type of analog outputs.



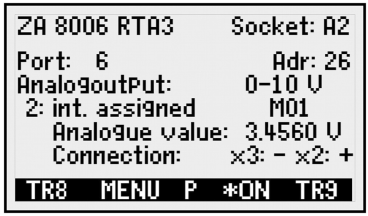
8.3 Showing single elements :

You can by pressing **▲** and **▼** scroll through and select any port individually and display details of address, element type, variant, and status.

With **relays** one can also see the actual switching status of the individual contacts.

Analog outputs

For analog outputs, the analog output type, the assigned measurement loop (reference channel) and the effective output signal are displayed at the corresponding terminals.

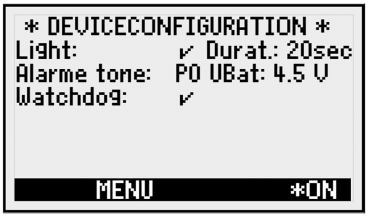


Trigger inputs

With **trigger inputs** the configurable trigger source can be seen on the device itself; the fields that follow show the trigger function, the activation status, and the contact assignment in the plug connector; this information if helpful when connecting.

8.4 Device configuration

In this menu the display illumination and the internal alarm signaling device can be configured and, if necessary, the watchdog function can be activated. The desired function can be selected by means of keys **PROG** and **▲** / **▼**. Programming is by means of the softkeys **<ON>**, **<OFF>** or **<SET>** and input is by means of keys **PROG**, **▲** / **▼**..., **PROG**.



Illumination

To switch display illumination ON press : **<☼ON>** **Illumination** ✓
To switch display illumination OFF press **<☼OFF>** **Illumination** -
To save battery consumption the duration **Duration : 20 seconds**
of display illumination can be set by means of : **<SET>** or **PROG**, **▲**..., **PROG**
To switch illumination ON permanently, Symbol: - -
To switch back ON again without this function press **ON** or **<MENU>**

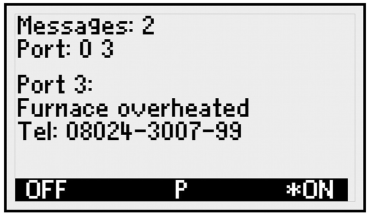
Alarm tone

Normal short alarm tone on each change : Symbol: **ON**
Having selected the function **Alarm tone**
the beeper can be reprogrammed by means of : **PROG**, **▲** / **▼** ..., **PROG**
e.g switched off by means of : Symbol: **OFF**
Assign relay ports configured in any way : Symbol: **Px**
In permanent alarm status : Symbol: `**Px**´ flashes.
To switch this signal OFF press (**<MENU>**), **<OFF>**

Watchdog
The watchdog function ensures that all relays drop out if the control of the measuring instrument or of controlled relays via the interface fails for a duration of 60 seconds, normally displayed as a watchdog alarm.

To switch the watchdog function ON press : **<ON>**
To switch the watchdog function OFF press : **<OFF>**
Watchdog alarm display: **Watchdog: ERROR**
Changing the Watchdog Duration: s.o. **Duration: 060s**
Switch off watchdog alarm with watchdog function and switch on again after restoring the control.

8.5 Messages



Each relay can be assigned a particular message - either via the AMR-Control software or a terminal; as soon as such a relay is activated the associated message will appear in the display in its own window. If several relays are active, you can leaf up and down through the associated messages by pressing ▲ / ▼. These windows can be closed by pressing **<OFF>** but can be reopened at any time via main menu (see 6.1), menu item **Messages**.

9. Programming via the device interface

The programming of the output ports with all variants is described in chapters 6.7, 6.9 and 6.10 of the manual. Here only an addition:
The port address pp is determined on the basis of the socket into which the module is plugged :

Modules in socket A1 : Port address pp = 10 to 19
Modules in socket A2 : Port address pp = 20 to 29
etc.

Function	**Interface command**
Port pp, relay variant, driven normally	`ipp f9 k8`
Port pp, relay variant, driven inversely :	`ipp f9 k-8`
To activate relay port pp	`f1 Rpp`
To deactivate relay port pp	`f1 R-pp`
To set analog value of analog output port pp	`ipp f9 ayyyyy`
Program message for port pp (e.g.):	`ipp $message-port pp`
Start new line with special character ´|´:	`|Tel: 123 <CRLF>`
To output message :	`ipp P48`
Response	`Message port pp` `Tel: 123 <CRLF>`
To output programming and status	`f3 P19`
Response	
Output module	`A2.ZA8006RTA3`

Pxx	**Interface element**	**Variant**	**Status**	**Contact**	
00	Normally open 0.5 A	Driven	Inactive	Open	`00:NO0 8 0 O`
01	Normally open 0.5 A	Driven inversely	Inactive	Closed	`01:NO0-8 0 C`
02	Normally closed 0.5 A	Driven	Inactive	**C**losed	`02:NC0 8 0 C`
03	Changeover 0.5 A	Driven inversely	Active	**O**pen	`02:CO0-8 1 O`
06	Analog output 10 V	Driven	by	value	`06:A05 COM +08.345 V`
07	Analog output 20 mA	Driven	by	value	`07:A06 COM +12.345mA`
08	Trigger key	Start / stop			`08:TR1 O`
09	Trigger Optocoupler	Manual			`09:TR2 1`

NO=**N**ormally **o**pen
NC=**N**ormally **c**losed
CO=**C**hange**o**ver

10. Electromagnetic compatibility

We, Ahlborn Mess- und Regelungstechnik GmbH, hereby declare that the ALMEMO® 8006-RTA3 device bears the CE mark and complies with the provisions of the Low Voltage Directive and the essential protection requirements of the 89/336/EEC Electromagnetic Compatibility Directive. The following standards were used to assess the product:

Security:	EN 61010-1: 2001
EMC	EN 61326: 2006

CE

If the product is changed without our consent, this declaration will lose its validity.

11. Appendix

11.1 Technical data

Relay : Semiconductor relay, 1 ohm Load capacity : 50 V, 0.5 A

Trigger inputs : Optocoupler 4 to 30 V Input current 2 mA

Analog outputs : Electrically isolated, switchable

OA 8006-R02	-4.00 to +10.0 V	0.5 mV / digit	Load > 100 kW
	0.0 to +20.0 mA	1 µA / digit	Load < 500 W
Accuracy:	± 0.1% of measured value ± 0.1% of final value		
Temperature drift :	10 ppm / K		
Time constant :	100 us		

Power supply : 9 to 12 VDC from the measuring instrument

Current consumption : Standard approx. 10 mA, with illumination approx. 25 mA
Per 2 analog outputs approx. 40 mA + 1.75 x I_{OUT}

Standard equipment : Graphics display 126 x 64 (55 x 30 mm)
7 silicone keys

Housing: (LxWxH) 127 x 83 x 42 mm ABS (acrylonitrile butadiene styrene), weight : approx. 260 g

Suitable conditions :

Operating temperature : -10 to +50 °C (storage temperature : -20 to +60 °C)
Ambient relative humidity : 10 to 90 % RH (non-condensing)

11.2 Product overview

	Order no.
ALMEMO® relay trigger adapter	
with 2 trigger inputs, 4 normally open relays, graphics display and keypad, including 1.5-meter ALMEMO® connecting cable and 3 ALMEMO® clamp connectors	ZA 8006-RTA3
Mains adapter with ALMEMO connector, 12 V, 1 A	ZA 1312-NA8
Options :	
2 additional relays (maximum 10), including 1 ALMEMO® clamp connector	OA 8006-SH2
2 additional normally closed relays per relay pair	OA 8006-OH2
2 analog outputs electrically isolated 0..10V or 0..20mA selectable, incl. 1 ALMEMO® clamp connector	OA 8006-R02
Fixture for top-hat rail mounting	ZB 2490-HS

11.3 Index

11.4 your contact