

Operating instructions



Relay adapter, analog **ALMEMO® ZA 8006-RTA4**

V1.0
04.03.2008

1. OPERATING CONTROLS



Rear of device

(6) Battery compartment

3 AA alkaline-manganese batteries

(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 semiconductor relays R8, R9

(2) Output socket A1

A1 V24 interface (ZA 1909-DK5)

Optic fiber (ZA 1909-DKL)

Ethernet (ZA 1945-DK)

(3) DC socket

Mains adapter (ZA1312NA1, 12V, 0.2A)

12 V + RS422 (ZA 5099-FSV)

9 V + USB (ZA 1919-DKUV)

(4) LCD, graphics display

7 rows for functions

1 line for softkeys F1, , , , F2

Shown in brackets: MENU

(5) Operating keys



P: Port selection



Main menu



Switch display illumination ON



F: Function selection



Direct data selection

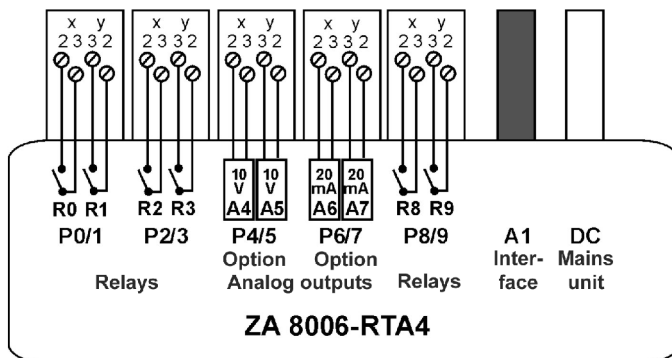


Programming



P: Data input

2. CONNECTION DIAGRAM



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4. FUNCTION OF RELAY ADAPTER, ANALOG

The analog relay adapter ZA 8006-RTA4 provides a universal output interface with up to 10 interface elements (i.e. maximum 10 semiconductor relays or up to 4 electrically isolated analog outputs). The adapter, in an ALMEMO® network, can be addressed via a PC and can also be used as a manual simulator for the purposes of putting regulating and control systems into service.

5. POWER SUPPLY

Power can be supplied to the adapter in any of the following ways :

3 AA alkaline batteries


Mains adapter 12 V, 0.2 A, with ALMEMO® connector ZA 1312-NA1

External DC voltage 10 to 30 V via ALMEMO® connector ZA 1000-FSV

Supply and RS422 network connection via ALMEMO® connector ZA 5099-FSV

Supply and USB connection via ALMEMO® data cable ZA 1919-DKUV




5.1 Battery operation and supply voltage monitoring

The measuring instrument is powered by 3 AA alkaline batteries. At a current consumption of on average 25 mA, these last for an operating time of approx. 100 hours. If display illumination is switched on, this operating period will be reduced to approx. 50 hours. The available operating voltage is displayed in the device configuration, thus allowing you to assess the remaining operating time; (see 7.3.5). As soon as the remaining battery capacity drops to approx. 10% the  symbol in the display header will start to flash and the illumination is switched off. If the batteries are completely discharged the device will switch off. To replace old batteries first unscrew the battery compartment cover (6) on the rear of the device.

5.2 External power supply

Via the output interface it is also possible to draw power from an external source – preferably with mains adapter ZA1312NA1 (12V / 0.2A) connected via the DC socket (3). Please ensure that the mains voltage is correct. At this socket it is also possible, via an ALMEMO® connector (ZA1000FSV) to connect any other DC voltage from 10 to 30 V (minimum 200 mA). Another interesting possibility is the combined connection of power supply and interface to the ALMEMO® network via ALMEMO® connector ZA5099FSV or to a USB interface via ALMEMO® cable ZA-1919DKUV.

5.3 Switching ON / OFF, reinitialization

To switch the device **ON** briefly press and release the key  (5) in the middle of the keypad; to switch the device **OFF** press and hold down the key . If interference (e.g. electrostatic) or a malfunction (e.g. battery failure) causes the device to behave abnormally, it can be reinitialized; to do so press key  when switching on. This will restore all settings to the factory default status.

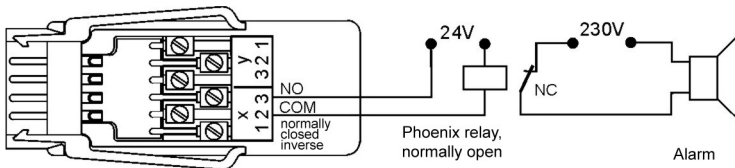
6. INTERFACE ELEMENTS

6.1 Relays

Sockets P0/1, P2/3, and P8/9 (1) are normally fitted with six semiconductor relays, normally open type (changeover type as option). The output relays can be addressed via the keypad and via interface commands (see REF). Whenever a relay is activated a programmable message appears and whenever there is a change in status a short acoustic alarm is sounded. The acoustic alarm can also be permanently assigned to any relay (see REF). The way in which these relays are addressed can also be configured by inverting (see REF) 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, 250 V, 6 A) :

- ▶ Current or voltage capacity is greater than 50 V, 0.5 A
- ▶ Separation of mains voltage side
- ▶ Implementation of an alarm in the event of failure on control side (see diagram)



6.2 Analog outputs

The relay adapter can also - in various options - be fitted with electrically isolated analog outputs at sockets P4/5 and P6/7 offering the following signals.

Option	Output signal	Gain
OA 8000-R2	0.000 to +10.000 V	0.5 mV / digit
OA 8000-R3	0.000 to +20.000 mA	1 μ A / digit

The output value can be specified either via the keypad (see 7.3.3) or via the interface (see 8).

6.3 Connecting peripheral equipment :

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

Terminals	P0/1 relay	P2/3 relay	P4/5 analog	P6/7 analog	P8/9 relay
y1	R1 normally closed (option)	R3 normally closed (option)	(option)	(option)	R9 normally closed (option)
y2	R1 common	R3 common	AO5 +	AO7 +	R9 common
y3	R1 normally open	R3 normally open	AO5 -	AO7 -	R9 normally open
x3	R0 normally open	R2 normally open	AO4 -	AO6 -	R8 normally open
x2	R0 common	R2 common	AO4 +	AO6 +	R8 common
x1	R0 normally closed (option)	R2 normally closed (option)			R8 normally closed (option)

7. DISPLAY AND OPERATION

The output interface comprises a keypad (5) and a graphic display (4) for the purposes of configuring the device and operating all interface elements.

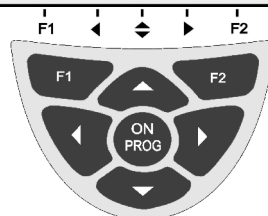
7.1 Function keys

The way in which the function keys (5) **F1**, **F2** and the cursor keys **◀**, **▶**, **▲**, **▼** operate may differ between menus. The function is indicated as an abbreviation in the bottom line of the display (softkeys). In the instructions and documentation these softkey abbreviations are shown in angle brackets, e.g. **<MENU>**.

```

ZA 8006 RTA4      Device: 00
Port: 0
Relay: normally closed 0.5A
-8: ext. steered inv.
State: inactive
Contact: x2-x3 closed
R ON MENU P *ON FCT

```



All port menus (see right) will initially provide the following key functions :

To select port press cursor keys :

The softkey symbol
lights up in the middle.

To return to the main menu :

To select function press keys :

The softkey symbol:
"lights up in the middle.

Depending on the function the keys are assigned an abbreviation :

Switch illumination ON / OFF :

Switch relay ON, Set parameter, etc. :

Cancel function :

▲ or **▼** ...
<P> for "port selection"

<MENU> or **◀**
PROG, **▲** or **▼** ...
<F> for "function selec-

<ON>
<R ON>, **<SET>**
<ESC>

7.2 Data input

For safety reasons data input is only possible if there is no interface connected. If this is the case you can select any programmed function (see 7.1) and then delete or reprogram the value directly.

To clear the programmed values press :

<CLR>

To program press :

PROG

You should now be in **programming mode**;
of the softkey line.

<P> should appear in the middle

The cursor blinks below the first input position.

Analog value : 0025.0 °C

To increment the selected digit, press :

▲ ...

To decrement the selected digit, press :

▼ ...

To change the arithmetic sign of a numeric value, press :

< +/- >

To select the next position press :

▶

The cursor blinks below the second digit

Analog value 0025.0 °C

To move back to the previous digit, press :

◀

Each position is programmed like the first

▲ / ▼ ..., ▶

To complete data input :

PROG

To cancel programming :

<ESC>

7.3 Menus

The interface adapter is operated via various menus.

7.3.1 Main menu

The main menu is called up by pressing <MENU>. Here by pressing ▲ / ▼ you can call up the sub-menus **All Ports** or **Individual Ports** or **Device configuration**. Here too, if you are using option OA 8006-R42 incorporating two analog outputs 0 to 10 V and 0 to 20 mA, the two simulator menus **Simulator xxx** can be called up directly.

```

ZA 8006 RTA4      V6.01
All Ports          ▶
Single Ports
Simulator 0-20 mA *
Simulator 0-10 V *
Deviceconfiguration
Messages
F ▶ *ON
  
```

To call up these menus press

▶ or PROG

7.3.2 All ports :

The menu **All Ports** lists all available ports. Under the port number the abbreviation indicates the type of elements available; R = relay, A = analog output. The line below this indicates whether the relays are activated; the xy23 line shows the actual switching status of the relays and the type of analog outputs 10 V or 20 mA at terminals x23 and y23.

```

ZA 8006 RTA4      Device: 00
Port: 01 23 45 67 89
Type: RR RR -- AA RR
Aktiv:  ✓  ✓                ✓
xy23:  | / |      VA
MENU P *ON
  
```

7.3.3 Individual ports

In the menu **Individual Ports** you can by pressing ▲ and ▼ scroll through and select any port individually and display details of element type, variant, and status.

Relays

For addressing the relays two different variants can be programmed.

Variant 8 : Driven externally

Variant -8 : Driven externally, inverse

This inversion has the effect of ensuring that in the event of alarm or power failure the relays all adopt the same status. Below the line indicating whether the relay is activated one can also see the actual switching status of the individual contacts.

```
ZA 8006 RTA4      Device: 00
Port: 0
Relay: normally closed 0.5A
-8: ext. steered inv.
State: inactive
Contact: x2-x3 closed
```

R ON MENU P *ON FCT

Analog outputs

With analog outputs (option) only the desired analog value can be programmed. The pin assignment is shown with the associated terminals.

By pressing <FCT> you can also call up other simulator functions (see 7.3.4).

```
ZA 8006 RTA4      Device: 00
Port: 7
Analogoutput:      0-10 V
8: ext. steered
Analoguevalue: 3.4560 V
Connection: 93: - 92: +
```

MENU P *ON FCT

7.3.4 Simulator

In order to quickly check a control process or a control element it is possible with the analog outputs (option) to systematically specify certain values either in steps or automatically as a ramp. For this purpose the following functions can be programmed.

1. Step-by-step, manual

Specify step percentage in %

Change the control variable step-by-step by pressing <MANU> from 0% up to 100% or up and down by pressing ▲ and ▼.

2. Step-by-step, automatic

ditto, plus waiting period per step

To run through all steps from 0% to 100% automatically press <START>. To terminate press <STOP>.

3. Ramp, automatic

This function runs automatically through the control variable from a start value up to a stop value in a certain period of time.

```
P7: Analogoutput: 0-10 V
Function:
2: Steps automatically
Steps height: 10 %
Time: 10 Sec
Analogue value: 4.000 V
```

START F4 *ON

7.3.5 Device configuration

In the menu **Device configuration** certain basic settings for the adapter can be made, namely the operating parameters **device address** and **baud rate** for the serial interface (see 8.), the menu language, the illumination mode, and certain monitoring functions.

```
* DEVICECONFIGURATION *
Deviceaddress: 00
Baudrate: 9600 Bd
Language: english
Light: ✓ Durat: 20sec
Watchdog: ✓ Contr: 50 %
Alarme tone: Port 0 UBat: 4.5 V
      MENU      *ON
```

Language

The user can choose between German / English / French as the menu language; (other languages are available on request). The softkeys are international; these cannot be changed.

To select the language press **<SET>** in function: **Language : German**.

Illumination

To switch display illumination ON press

<ON>

Illumination : ✓

To switch display illumination OFF press

<OFF>

Illumination : -

To specify the duration for display illumination enter
onds

Duration : 20 sec-

To switch illumination ON permanently enter

Duration : - -

To switch back ON again without this function press

ON or **<MENU>**

Display illumination can only be switched OFF when in battery mode - not when powered from the mains.

Watchdog

The watchdog function ensures that, in the event of a failure in interface addressing lasting for 1 minute, all relays will drop out. In the event of alarm the device configuration will be displayed and next to the "Watchdog" function a flashing "Error" symbol will appear.

To switch the watchdog function ON press

<ON>

To switch the watchdog function OFF press

<OFF>

Alarm tone

The integrated alarm signaling device is configured by default in such a way that whenever there is a change it issues a short alarm tone : Symbol: **ON**.

To reprogram the beeper select the **Alarm tone** function;
(see 7.2).

e.g switch beeper OFF with :

Symbol: **OFF**

e.g. assign to relay ports with

Symbol: **Px**

When this relay is activated the acoustic alarm tone sounds continuously; the associated message appears;

(see 7.3.6) e.g.:


Relay Px active

To switch the alarm tone OFF press



<OFF>

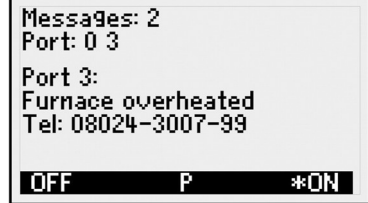
Battery voltage

7. Display and operation

The currently available battery voltage is shown in the function **UBat: 4.5 V**
As soon as the battery voltage drops below 3.5 V the display illumination is switched OFF : Symbol:  in the 1st line
As soon as the battery voltage drops to 3.0 V the device itself is switched OFF.

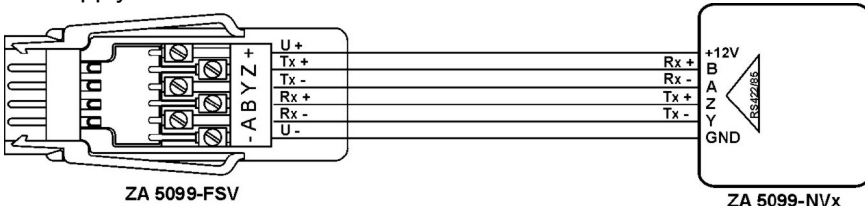
7.3.6 Messages

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 (see 8). 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 opened again at any time in the main menu (see 7.3.1) menu item **Mes-sages**. A message only disappears completely when the relay to which it is assigned is no longer active.



8. SERIAL INTERFACE

All ports can be controlled not only by pressing the appropriate keys but also via the serial interface 'COM' (see Manual, Chapter 6). For connecting to socket A1 (2) various data cables are available; (see Manual 5.2). The best way of connecting to a network distributor is over 6 wires with connector ZA 5099-FSV in the DC socket led to a free RS422 output; (see Manual 5.3). This combines power supply and data transmission.



The same combined connection is also implemented with the new USB data and supply cable ZA 1919-DKUV.

8.1 Device address

To communicate with networked devices it is absolutely indispensable that each device should have its own baud rate setting and its own dedicated address; this is because only one device should respond per command. Before starting network operation ensure therefore that all the measuring instruments and modules involved are assigned different device addresses. This can be checked in the **Device address** function in **Device configuration** (see 7.3.5). On leaving the factory address 00 is normally set. This can be modified as desired by entering the appropriate data (see 7.2).

8.2 Baud rate, Data format

On leaving the factory the baud rate for all interface modules is programmed to 9600 baud. In order to avoid unnecessary problems when networking several devices together the baud rate should not be altered; instead, the computer should be set to match. If for some reason this proves impossible you can, in the **Device configuration** menu under the **Baud rate** function, choose a value from 1200 / 2400 / 4800 / 9600 baud or 57.6 / 115.2 kilobaud.

To set the baud rate in this function (see 7.2): **Baud rate: 9600**
bd

Data format: Cannot be changed 8 data bits, 1 stop bit, no parity

8.3 Programming via the interface

Function	Command			
Relay variant controlled by port pp, normal	ipp f9 k8			
Relay variant controlled by port pp, inverse	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			
To program message of port pp	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	P0.ZA8006RTA4			
Pxx interface element	Variant	Status	Contact	
00 Normally open 0.5 A	Driven	Inactive	Open	00:N00 8 0 0
01 Normally open 0.5 A	Driven, inverse	Inactive	Closed	01:N00-8 0 C
02 Normally closed 0.5 A	Driven	Inactive	Closed	02:NC0 8 0 C
03 Changeover 0.5 A	Driven, inverse	Active	Open	02:C00-8 1 0
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
				NO=Normaly Open
				NC=Normaly Closed
				CO=Change Over

9. ELECTROMAGNETIC COMPATIBILITY (EMC)

Peripheral adapter ZA8006-RTA4 complies in full with the safety requirements specified in the EU directive relating to electromagnetic compatibility (EMC) (89/336/EEC).

The following standards have been applied in evaluating the product.

IEC 61326:1997+A1:1998+A2:2000

IEC 61000-6-1:1997

IEC 61000-6-3:1996

IEC 61000-4-2: 1995+A1:1998+A2:2000 8kV

IEC 61000-4-4: 1995+A1:2000 2kV

IEC 61000-4-3: 1995+A1:1998+A2:2000 3V/m

10. WARRANTY

Each and every device, before leaving our factory, undergoes numerous quality tests. We provide a guarantee, lasting two years from delivery date, that your device will function trouble-free. Before you return a device please refer to the operating instructions regarding the function in question and recheck. In the unlikely event that the device proves defective and you need to return it please wherever possible use the original packaging material for dispatch and enclose a clear and informative description of the fault and of the conditions in which it occurs.

This guarantee will not apply in the following circumstances :

- The customer attempts any form of unauthorized tampering and alteration inside the device.
- The device is used in environments and conditions for which it is not suited.
- The device is used with an unsuitable power supply and in conjunction with unsuitable peripheral equipment.
- The device is used for any purpose other than that for which it is intended.
- The device is damaged by electrostatic discharge or lightning.
- The user fails to observe the operating instructions.

The manufacturer reserves the right to change the product's characteristics in the light of technical progress or to benefit from the introduction of new components.

11. APPENDIX

11.1 Technical data

Relays

Semiconductor relay 1ohm Load capacity 50V, 0.5A
electrically isolated

Analog outputs :

OA 8006-R22	-4.00 to +10.0 V	0.5 mV / digit	Load > 100 kW
OA 8006-R32	0.0 to +20.0 mA	1 μ A / digit	Load < 500 W
Residual ripple	< 2 digits		
Accuracy	± 0.1 % ± 6 digits		
Temperature drift	1 digit / K		
Time constant	100 ms		

Power supply:

10 to 30 VDC

Current consumption

Standard approx. 20 mA,

with illumination approx. 35 mA

(from battery)

Per 2 analog outputs approx. 30 mA + 3.5 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

ALMEMO® relay adapter

with 6 normally open relays, graphics display, and keypad,
including 1.5-meter ALMEMO® connecting cable
and 3 ALMEMO® clamp connectors
Fixture for top-hat rail mounting

Order no.

ZA 8006-RTA4
ZB 2490-HS

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, including 1 ALMEMO® clamp connector
0 to 10.0 V, 0.5 mV / digit, Load > 100 k OA 8006-R22

2 analog outputs, electrically isolated, including 1 ALMEMO® clamp connector
0 to 20.0 mA, 0.1 mA / digit, Load <500 Ω OA 8006-R32

2 analog outputs, electrically isolated, including 1 ALMEMO® clamp connector
0 to 10.0 V, 0.5 mV / digit, Load > 100 k

0 to 20.0 mA, 0.1 mA / digit, Load <500 Ω OA 8006-R42

Accessories

Mains adapter with ALMEMO connector 12 V, 0.2 A ZA 1312-NA1

ALMEMO® supply connector ZA 1000-FSV

ALMEMO® data cable, V24 interface, electrically isolated, maximum 115.2 kilo-
baud ZA 1909-DK5

ALMEMO® data and supply cable, USB interface, 9 V, 200 mA ZA 1919-DKUV

ALMEMO® data and supply connector with RS422 interface ZA 5099-FSV

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12. YOUR CONTACT PARTNER(S)