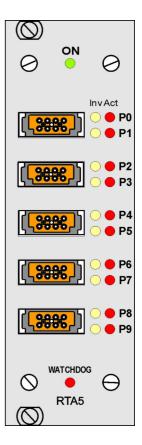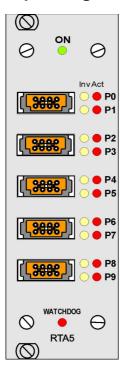# Operating instructions

**Relay trigger analog module
ALMEMO® 5690-RTA5**

V2.1
04.11.2014

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 (optional)
P6/7 2 analog outputs (optional)
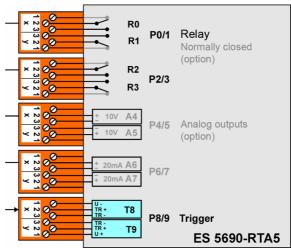**P8/9** 2 trigger inputs TR8, TR9

(2) LED signal lamps

ON Power supply ON
Px Act Port active
Px Inv Port driven inverted
WATCHDOG Drive failure

2. Connection diagram

3. Table of contents

4. Function of relay trigger analog adapter

Relay trigger analog module ES 5690-RTA5 operates as a universal trigger output interface for ALMEMO® 5690 systems; it provides up to 10 interface elements (4 semiconductor relays and 2 trigger inputs as standard but optionally up to 10 semiconductor relays or 10 electrically isolated analog outputs).

The module is simply plugged into a free slot, preferably just after the measuring inputs; it will be detected and recognized automatically as soon as the system is powered up. 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).

The ports are addressed following on from the number of output sockets Ax in use. (see Manual, 6.10.9.2)

Modules at socket A1:	Address 10 to 19
Modules at socket A2:	Address 20 to 29
1st plug-in module	Address 30 to 39
2nd plug-in module	Address 40 to 49, etc. up to 99

With CPU systems the first plug-in module starts at address 60.

5. Power supply

The adapter is supplied with a voltage of 9 to 12 VDC via the system itself. In the standard version only 20 mA is needed. It is only with optional analog outputs. in particular with electric current outputs, that the maximum supply current 400 mA per module must be observed.

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.

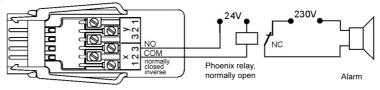Sockets P4/5 and P6/7 can (as options) be fitted with analog outputs.

6.1 Relays

The **output relays** are driven by means of interface commands or in the event of alarm automatically by the system. (see Manual, 6.10.10) The function of each relay can be freely configured. (see Manual, 6.10.9.2) The assignment of a limit value to a relay can be programmed in the sensor via the device. (see Manual, 6.10.8) Whenever a relay is activated a short acoustic alarm is sounded. The way in which these relays are driven can be configured as inverted 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.
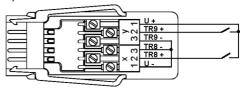
► For separating the mains voltage side.

► For implementing an alarm in the event of failure on the control side
(see diagram)

6.2 Trigger inputs

Trigger inputs P8 and P9 can be driven via optocouplers on the basis of voltage levels (4 to 30 V). (For 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

In various options the module can also be fitted with electrically isolated analog outputs, offering the following signals.

Option	Output signal	Gain
OA 5690-R02	0.000 V to +10.000 V	0.5 mV/digit
or	0.000 mA 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 via the interface be specified as control variable. (see Manual, 6.10.7) The output signal can in each case 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 connectors according to the following arrangements.

Terminals	P0/1 Relays	P2/3 Relays	P4/5 Analog (option)	P6/7 Analog (option)	P8/9 Trigger
y1	R1 normally closed (option)	R3 normally closed (option)	(option)	(option)	U+
y2	R1 common	R3 common	AO5 +	AO7 +	TR9+
y3	R1 normally open	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. Putting into service

1. The relay module should be plugged into a free slot in the ALMEMO® system; the integrated interface elements are then available as port P30 to P39.
2. Switch the ALMEMO® device ON see 5.
3. The peripheral equipment should be connected to the clamp connector and plugged in on the relay module at 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 or using the AMR-Control software or via terminal commands.

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 as inverted.

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 f2 Ryy´,
   Limit value minimum, command ´Exx 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 as inverted.

Application Driving via the interface
1. Using the ALMEMO® device and 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 as inverted using the command ´`ipp f9 k-8`´.
3. Activate the relay using the command ´`f1 Rpp`´.
   Deactivate the relay using the command ´`f1 R-pp`´.

Application Driving the analog output
1. Configure analog output port 6 or 7. (see Manual, 6.10.7)
   e.g. Select analog type x 1 = 10 V, 2 = 20 mA (command ´`ipp f9 Ax`´)
   Assign output to the selected measuring point. (command `ipp f9 E-00`´)
   or Assign to any reference channel xx (command ´`ipp f9 Exx`´)
   or Output the value yyyyy via the interface. (command ´`ipp f9 ayyyy`´)
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. Watchdog

If the signal needed to drive the measuring instrument or any driven relay, normally received via the interface, is affected by a failure that persists for one minute, the watchdog function ensures that all relays drop out. In the event of an alarm, in ´**Output modules**´, next to ´**Watchdog**´, an ´Error´ symbol will appear.
To switch the watchdog function ON press   <ON>
To switch the watchdog function OFF press   <OFF>

9. Programming via the device interface

Port address pp is defined by the number of output sockets and the numbering of the relay modules. e.g.:

2 output sockets A1 and A2 1st relay module Port address pp = 30 to 39
5 output sockets A1 to A5 1st relay module Port address pp = 60 to 69
etc.

Function	Interface command
Port pp, relay variant driven normally	`ipp f9 k8`
Port pp, relay variant driven inverted	`ipp f9 k-8`
To activate relay port pp	`f1 Rpp`
To deactivate relay port pp	`f1 R-pp`
To select analog type for port pp 1 = 10 V, 2 = 20 mA	`ipp f9 Ax`
To set analog value of analog output port pp	`ipp f9 ayyyyy`
To activate the watchdog (pp = port on the module)	`ipp o19`
To deactivate the watchdog (pp = port on the module)	`ipp o-19`
To output programming and status	`f3 P19`

Response

`B3.ES5690RTA5`

Pxx	Interfaceelement	Variant	Status	Contact	
00	Normally open 0.5A	driven	inactive	Open	`00:NO0 8 0 O`
01	Normally open 0.5A	driven inverted	inactive	Closed	`01:NO0-8 0 C`
02	Normally closed 0.5A	driven	inactive	Closed	`02:NC0 8 0 C`
03	Changeover 0.5A	driven inverted	active	Open	`02:CO0-8 1 O`
06	Analog output 10V	driven	by	Value	`06:AO5 COM +08.345 V`
07	Analog output 20mA	driven	by	Value	`07:AO6 COM +12.345mA`
08	Trigger key	Start / stop			`08:TR1 0`
09	Trigger optocoupler	manual			`09:TR2 1`

NO=**N**ormaly **O**pen
NC=**N**ormaly **C**losed
CO=**C**hange **O**ver

10. Electromagnetic compatibility

Peripheral adapter ES 5690-RTA5 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 this product.

IEC 61326:1997+A1:1998+A2:2000
IEC 61000-6-1:1997   IEC 61000-4-2: 1995+A1:1998+A2:2000 8kV
IEC 61000-6-3:1996   IEC 61000-4-4: 1995+A1:2000 2kV
                            IEC 61000-4-3: 1995+A1:1998+A2:2000 3V/m

11. Annex

11.1 Technical data

Relays   Semiconductor relay 1Ω Load capacity 50V, 0.5A
Trigger inputs   Optocoupler 4 to 30V, Input current 2mA
Analog outputs   electrically isolated Either
  OA 5690-R02   0.00 V to +10.0 V   0.5 mV/digit   Load > 100kΩ
                                    0.0 mA to +20.0 mA   1 µA/digit   Load < 500Ω
  Accuracy   ± 0.1% Mv. ± 0.1% v. of final value
  Temperature drift   10 ppm / K
  Time constant   100 µs
Power supply   9..12V DC from the measuring instrument
  Current consumption   Standard: approx. 10 to 20mA
                                    For each 2 an. outputs approx. 15mA + 1.75 x I_{OUT}
Housing   19" plug-in device 8 DU
Suitable conditions
Operating temperature   -10 to +50 °C (Storage temperature -20 to +60 °C)
Atmospheric humidity   10 to 90 % rH   (non-condensing)

11.2 Product overview   Order no.

ALMEMO® relay trigger module
ith 2 trigger inputs, 4 normally open relays,
and 3 ALMEMO® clamp connectors   ES 5690-RTA5

Options
2 additional relays (maximum 10),
including 1 ALMEMO® clamp connector   OA 5690-SH2
2 additional normally closed relays per relay pair   OA 5690-OH2
2 analog outputs, electrically isolated,
0 to 10 V or 0 to 20 mA, selectable,
including 1 ALMEMO® clamp connector   OA 5690-R02

11.3 Index

11.4 Your contact person

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