Instructions
42-68-822 EN

Power Electronic Units for Field Installation EAN823, EBN853, EBN861 (Contrac)

For the Control of Contrac Actuators
of the PME, LME, RHD or RSD Series

Content

Legend

Danger
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury

Warning
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury or serious property damage.

Caution
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

Important
Indicates useful hints or other special information which, if not observed, could lead to a decline in operating convenience or affect the functionality.

1. Device Identification

1.1 General

The ID labels of the power electronics are located both on the base (power supply) and on the cover (electronics and software memory) of the unit. As the base and cover are considered as separate assemblies, they may have different serial numbers (F. no.).

1.2 ID Label on the Base

1	**Elektronik / Electronics Type: ....**			Made in Germany
2	B-Nr./No.	NL		
3	U = 190...260 V ...	Jahr/Year		
4	f = 50/60 Hz ± 5%	P = max. ..... W		
5	t = ...°C	IP 66	CE	
6	Ext. Sicherung / Fuse			
	Automation D-32425 Minden	ABB		

1. Electronics type
2. Device no./ No. of non-standard version
3. Permissible supply voltage range / Year of manufacture
4. Permissible frequency range / Max. power input
5. Permissible ambient temperature / Protection class
6. Information on external fuse

1.3 ID Labels on the Cover

ID Label for Software Description

1	Für / For Antrieb / Actuator Typ / Type . . . . .
2	Nennwerte / Rated values M=..... .....°/s
3	F-Nr. / No.: . . . . .
4	NL . . . . .
5	SW Version . . . . .
6	

1 Associated actuator type
2 Rated values for torque / force / speed
3 Fabrication No.
4 No. of non-standard version
5 Actuator firmware release

1.3.1 ID Label for Hardware Description

1	**Elektronik / Electronics Type: ....**			Made in Germany
2	B-Nr./No.	NL		
3		Jahr/Year		
4				
5	t = ...°C	IP 66	CE	
6				
	Automation D-32425 Minden	ABB		

1. Electronics type
2. Device number / No. of non-standard version
3. / Year of manufacture
4. /
5. Permissible ambient temperature / Protection class
6.

2. Application

Use this instruction only together with the actuator instruction.

3. General

3.1 Proper Use

Power electronics models EAN823, EBN853 and EBN861 are to be used exlusively for triggering elektrical actuators of the PME120, LME 620, RSD... or RHD... series. Do not use them for any other purpose. Otherwise, a hazard of personal injury or of damage to or impairment of the operational reliability of the device may arise.

3.2 Safety and Precautions

When mounting the electronics in areas which may be accessed by unauthorized persons, take the required protective measures.

- Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the electronics, and to make the electrical connection.
- When working on the electronics always observe the locally valid accident prevention regulations and the regulations concerning the construction of technical installations.
- Switch-off the voltage supply; make sure that unintentional switching on is not possible
- Make sure that cutting off the voltage supply does not affect the plant process
- Consider restoring process forces from the final control element when cutting off the voltage

4. Storage

The devices may be stored under moist and aggressive condition for a short time. The equipment is protected against external corrosive influences. However, direct exposure to rain, snow, etc. must be avoided

Condensation may occur in the terminal box. Therefore, it is protected by a desiccant, which ensures sufficient protection for approximately 150 days. The desiccant can be regenerated at a temperature of 90° C within 4 h.

The desiccant must be removed prior to commissioning the electronics.

4.1 Long-time Storage

If you intend to store or transport the device for a longer time, we recommend to wrap it in plastic foil and add desiccant. Regularly check if the desiccant is still active.

5. Delivery settings

Behavior in 0/100% position:	Keep closed with rated torque
Setpoint function:	Linear; setpoint = positioning value
Input (setpoint):	4 ... 20 mA [1)]
Function:	Positioner, parameter: setpoint
Output (actual value):	4 ... 20 mA [1)]
Digital inputs: [1)]	DI 1 switch-over manual/automatic and v.v. DI 2 / DI 3 manual control +/-
Digital outputs: [1)]	DO 1 ready to operate, DO 2/3 end position signalling
Range:	Not adjusted (to be adjusted during commissioning)

The configuration of your actuator may differ from the standard configuration specified above. It can be called up for display using a notebook / PC and the related configuration program.

[1)] not with fieldbus communication.

6. Assemblies

Power electronics EAN823, EBN853 and EBN861 consist of 2 parts each, one containing the connecting units (EAN823 and EBN853) and the transformer, the other containing the electronics and the local control panel (LCP) for local operation and adjustment of the actuator.

6.1 EAN823 / EBN853

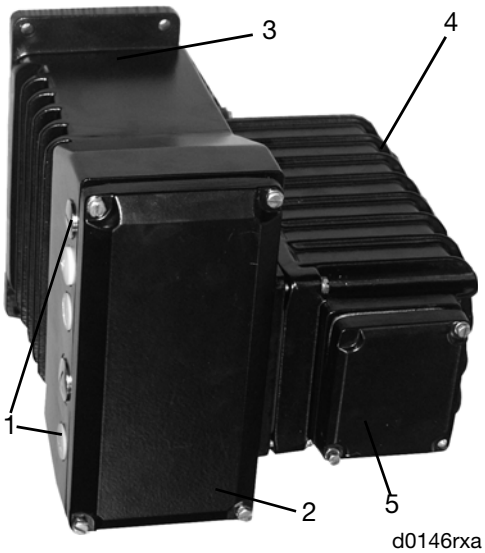


Fig. 1: Electronic unit EAN823

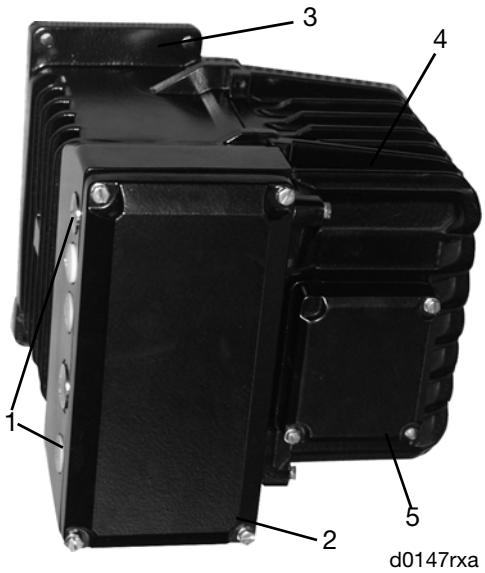


Fig. 2: Electronic unit EBN853

1 taphole for cable glands
2 cover for connection chamber
3 connection housing
4 electronic hod
5 cover for local control panel

6.1.1 Connection chamber

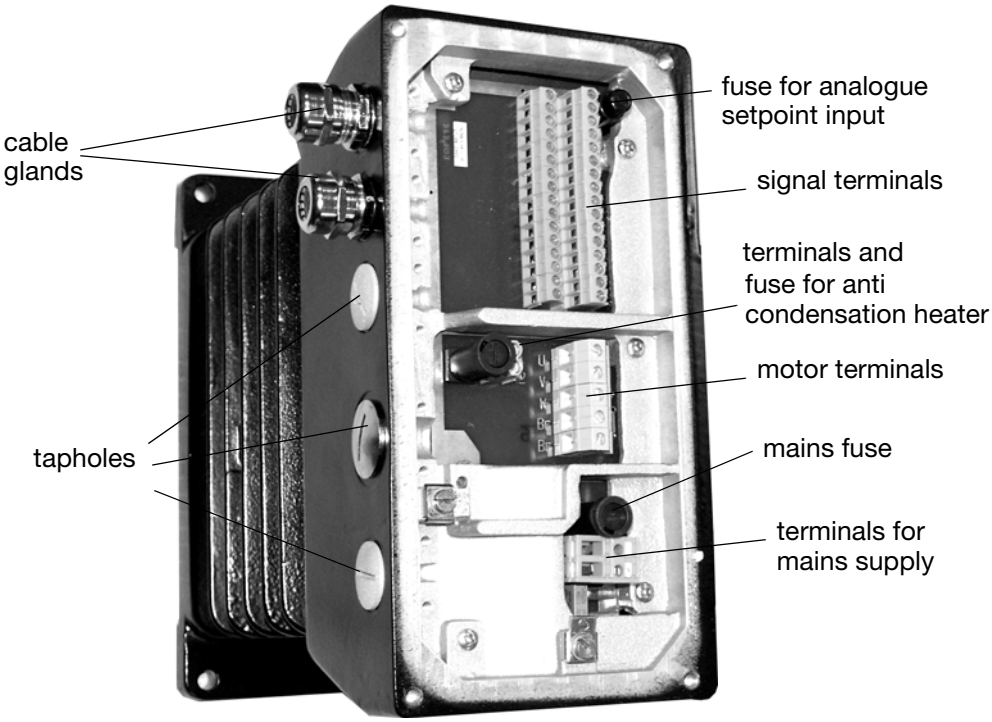


Fig. 3: connection chamber EAN823 / EBN853 with removed cover.

The standard scope of delivery considers tapholes covered with srew-in plugs. Adapters for PG or NPT cable glands are available on request.

6.2 EBN861

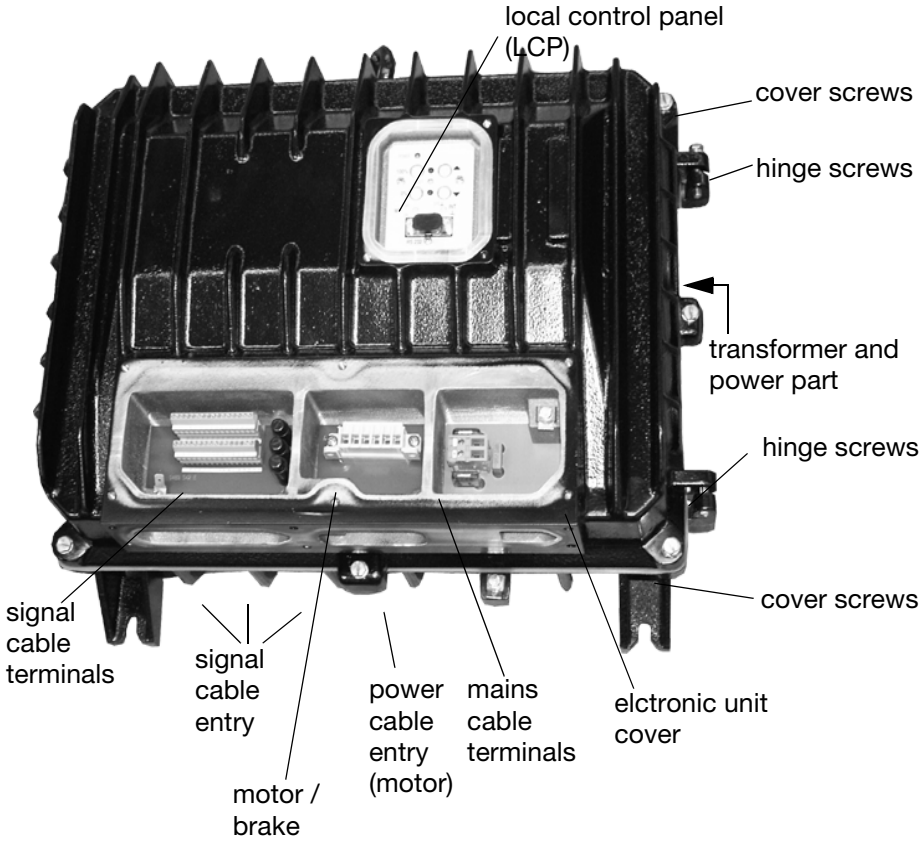


Fig. 4: EBN861 without LCP and connection chamber cover

7. Technical Data

7.1 General

	EAN823	EBN853	EBN861
Supply voltage	115 V AC (94 V ... 130 V) or 230 V AC (190 V ... 260 V) ; 47.5 ... 63 Hz; 1Ph		230 V AC (190 V... 260 V); 47.5 ... 63 Hz; 1Ph
External fuses	16 A; slow-blow		35 A fuse 16 A thermal safety cutout
Analog input[1)]	0 / 4 ... 20 mA; impedance 50 Ohm		
Analog output[1)]	0 / 4 ... 20 mA, electricallly isolated; max. load resistance 500 Ohm		
Digital inputs, DI[1)]	Logical 0:-3V ... + 5 V or open, electrically isolated Logical 1:+12 V ...+ 35 V, electrically isolated		
Digital outputs, DO [1)]	Potential-free relay contact, max. 60 V, 150 mA		
Digital communication	RS 232 for commissioning and service, optional FSK / HART® or PROFIBUS DP		
Default settings	Behavior in 0/100% position: Setpoint function: Input (setpoint): Function: Output (actual value): Digital inputs: Digital outputs:		Keeping closed with rated torque Linear; setpoint = positioning value 4 ... 20 mA[1)] Positioner, parameter: setpoint 4 ... 20 mA[1)] DI 1 switch-over manual/automatic and v.v., DI 2 / DI 3 manual control +/-[1)] DO 1 ready to operate, DO 2/3 end position signalling [1)]
Individual settings	See data sheet 68-2.40 or on request		
Protection class	IP 66		
Humidity	≤ 95% annual average (condensation permitted)		
Ambient temperature	-25° C ... +55° C		
Mounting orientation	Mounting on vertical mounting plate, cable glands to the left		Mounting on vertical mounting plate, cable glands at the bottom
Varnish	2-component epoxy resin (RAL 9005, black)		
Link cable between actuator and electronics	2 m... 30 m (max.)	2 m... 100 m (max.)	
Weight	approx. 10 kg	approx. 11 kg	approx. 42 kg

Table 1

[1)] Not available for communication via PROFIBUS DP

7.2 Current Consumption of EAN823

	I_{max} 115 V	I_{max} 230 V	$I_{pos.}$
PME 120 AN	1.0 A	0.55 A	each around 40 ... 50% of I_{max}
LME 620 AN	1.0 A	0.55 A	

Table 2

7.3 Current Consumption of EBN853

	I_{max} 115 V	I_{max} 230 V	$I_{pos.}$
RHD250-10	1.8 A	0.9 A	each approx. 40 .. 50% of Imax
RHD500-10	2.2 A	1.1 A	
RHD800-10	3.4 A	1.7 A	
RHD1250-12	6.0 A	3.0 A	
RHD2500-25	4.8 A	2.4 A	
RHD4000-40	4.0 A	2.0 A	
RHD8000-80	4.0 A	2.0 A	
RSD10-5,0	3.4 A	1.7 A	
RSD10-10,0	3.8 A	1.9 A	
RSD20-5,0	4.8 A	2.4 A	
RSD20-7,5	3.8 A	1.9 A	
RSD50-3,0	4.0 A	2.0 A	
RSD100-1,5	4.4 A	2.2 A	
RSD200-0,7	5.0 A	2.5 A	

Table 3

7.4 Current consumption of EBN861

	I_{max} 230 V	$I_{pos.}$
RHD2500-10	5.3	each approx. 40 ... 50% of Imax
RHD4000-10	10.0	
RHD8000-12	9.0	
RHD16000-30	10.2	
RSD50-10,0	6.4	
RSD100-10,0	12.5	
RSD200-5,5	13.0	

Table 4

7.5 Fuses

Electronic unit	Fuse type	Mounting site	U = 115 V	U = 230 V [1]
EAN823	External fuse	external	16 A, slow	
	Mains fuse	in connection chamber	6.3 A, slow	3.15 A, slow
	Analogue setpoint input	in connection chamber	40 mA; fast	
	Anti condensation heater	in connection chamber	2 A; slow	
EBN853	External fuse	external	16 A, slow	
	Mains fuse	in connection chamber	12.5 A, slow	10 A, slow
	Analogue setpoint input	in connection chamber	40 mA; fast	
	Brake fuse	power board	0.315 A, medium time-lag	
	Intermediate circuit fuse	power board	10 A, super-quick	
	Anti condensation heater	in connection chamber	2 A; slow	
EBN861	External fuses[1]	external	--	35 A fuse 16 A thermal safety cutout
	Brake fuse	on board (power section)	--	0.315 A, medium time-lag
	Intermediate circuit fuse	power board	--	15 A, medium time-lag

Table 5

[1] The 35 A fuse and the thermal safety cutout (16 A) are included in the scope of delivery. They ensure safe operation for the special swiching conditions of power electronics EBN861. Note that the cable cross-sectional area between the fuse and the electronics must be at least 2.5 mm^2.

7.5.1 External fuses for EBN861

Apart from the internal fuses (see also 7.5), the EBN861 power electronic unit requires two additional external fuses, which are supplied separately to the unit.

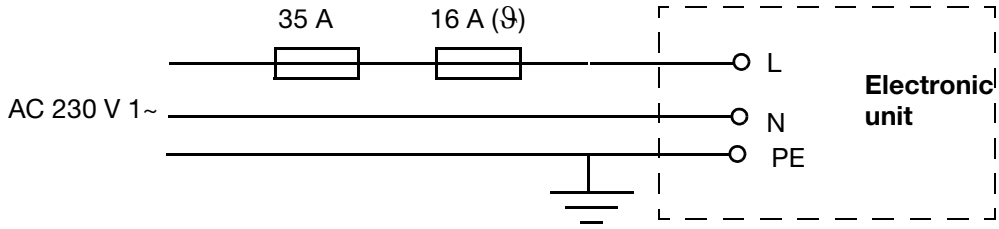


Fig. 5: External fuses

Fig. 6: External fuse; 35 A

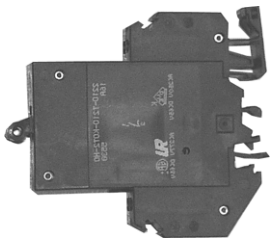


Fig. 7: External thermal fuse; 16 A

8. Mounting

Install the electronics close to the actuator. The connection is made via a 24-pin connector (additional 10-pin connector if heater is used) on the actuator side and screw terminals on the electronics side. The electronics are provided with the appropriate metric cable holes (see Figures 1 to 3 for the assignment).

8.1 Preparing the electronics

- Make sure that disconnection on site is possible.
- Shield all signal cables and the motor cable between the actuator and the electronics
- The shield of the connection cable between the electronics and the actuator must be applied to both housings.

8.2 Mounting of EAN823 / EBN853

Disconnect the electronics and the actuator prior to all installation and service works.

- Fasten the unit to the vertical mounting plate, using screws of property class 8.8 (tensile strength 800 N/mm^2; yield strength 640 N/mm^2)
- Make sure that there is enough spacing for mounting, and that the unit can be easily accessed
- Make sure that the cable holes are oriented to the left
- Remove the cover of the connection chamber (2)
- Insert the cables through the cable glands and connect them according to the wiring diagram.
- Use appropriate cable glands to ensure a water-tight installation
- Check if the cable is connected properly; then close the connection chamber cover.

Adjust as described in section 9.

8.3 Mounting of EBN861

Electronics unit EBN861 has a total weight of around 42 kg. For safety reasons it may be necessary to mount each of the two parts separately.

- Undo and remove the cover screws.
- Fold down the front part, then lift it off from the hinge bolts towards the top.
- Undo the internal connection between the two housing parts.
- Undo the hinge screw
- First mount the rear part of the housing
- Attach the front housing part to the hinge bolts, insert a screw into the top bolt and fasten.
- Make the internal connections between the two housing parts.
- Close the cover and fasten the cover screws
- Connect the cables

9. Electrical connection

Each actuator requires a Contrac electronic unit. Proper actuator operation requires an actuator specific software loaded in the associated electronic unit. Compare the data labels on both, electronic unit and actuator, in order to ensure a correct hardware and software assignment.

The electrical connection is done with a plug at the actuator and with screw terminals at the electronic unit.

9.1 EAN823 / EBN853 / EBN861 (Standard)

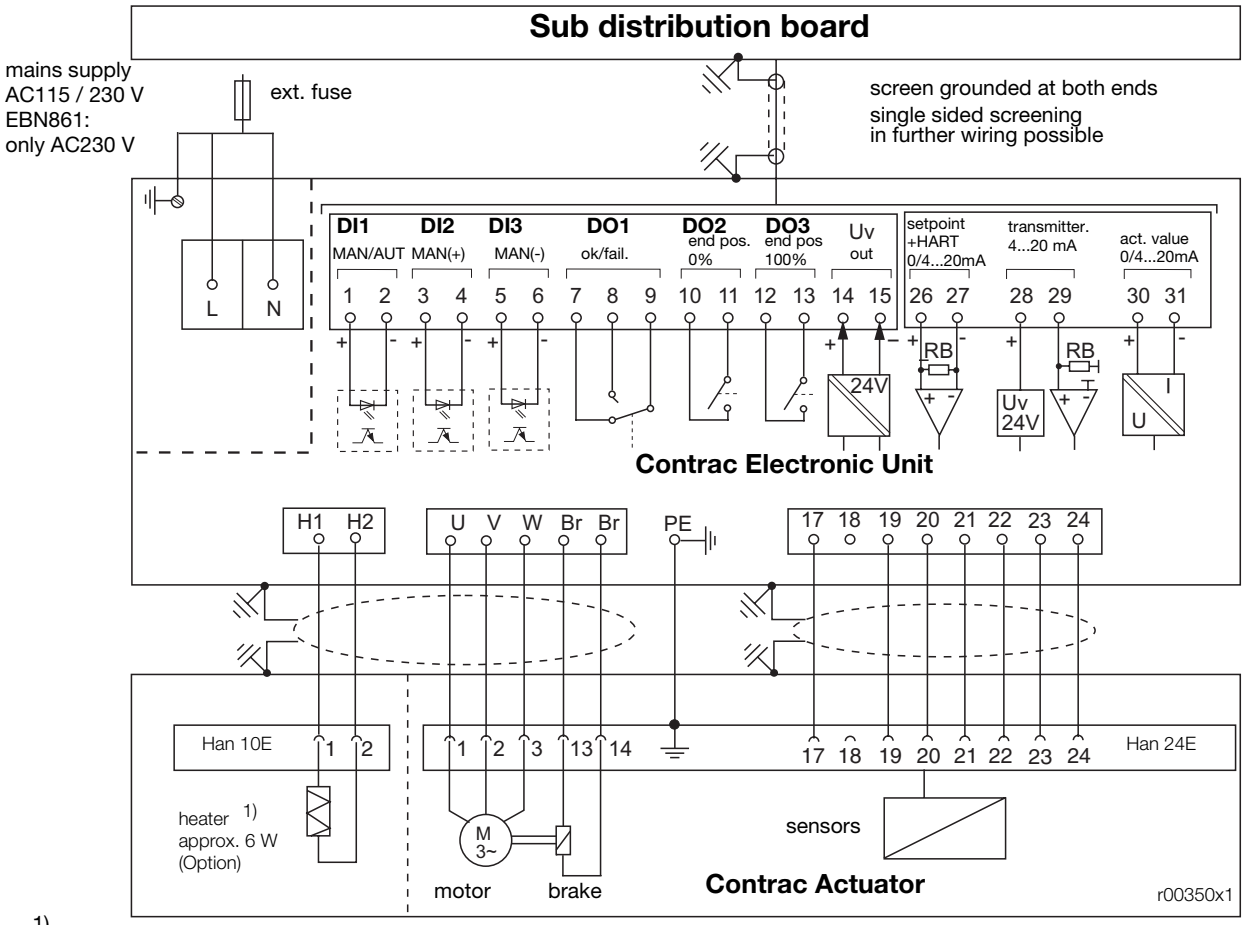


Fig. 8: 1) max 50W with EAN823 and actuator for temperature range -25° ... +55°C

9.2 EAN823 / EBN851 / EBN861 (PROFIBUS DP)

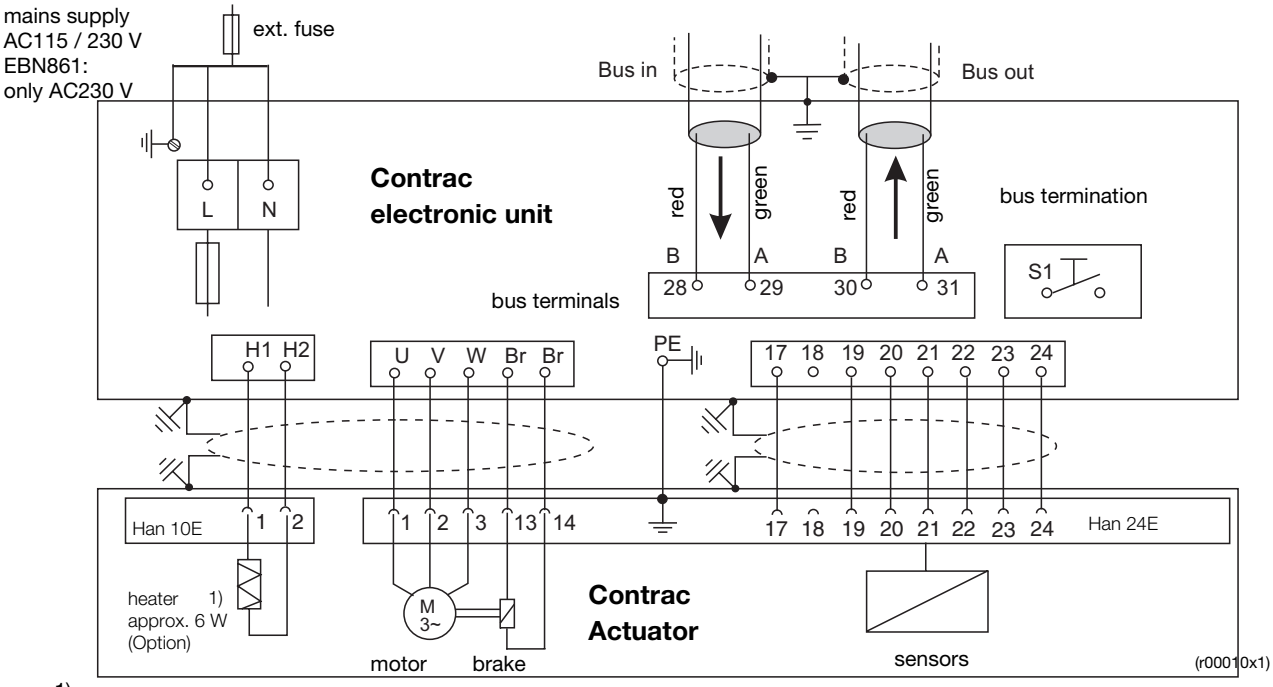
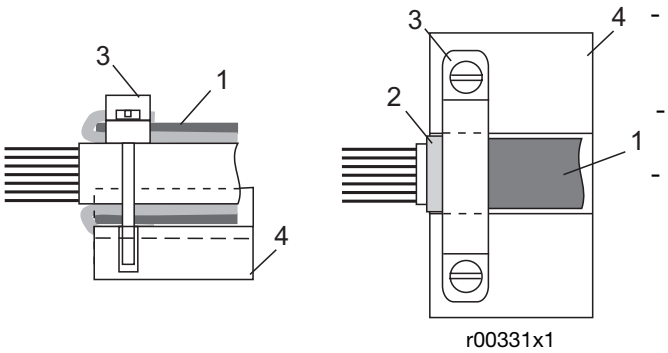


Fig. 9: 1)max 50W with EAN823 and actuator for temperature range -25° ... +55°C

9.3 Connecting the cable shield



- Remove approximately 2 cm of the cable sheathing (1) at the cable entry of the housing (4).
- Open the cable shield in this area and fold it back over the cable sheathing (1).
- Insert the cable end in the cable entry and fasten it with the clamp; make sure that the shield is folded back and in contact with the clamp and the electronics housing.

Fig. 10: Connecting the cable shield of EAN823; EBN853; EBN861

Screen connection at the actuator ist done accordingly.

9.4 Example for signal input / output

(conventional analogue / binary control)

Premises to switch the actuator into automatic mode (AUT):

- digital inputs D1, D2, and D3 may not be activated via the configuration software (standard configuration with default factory settings).
- activate the AUT mode using the configuration software (standard configuration with default factory settings).

9.4.1 Standard wiring (analogue setpoint)

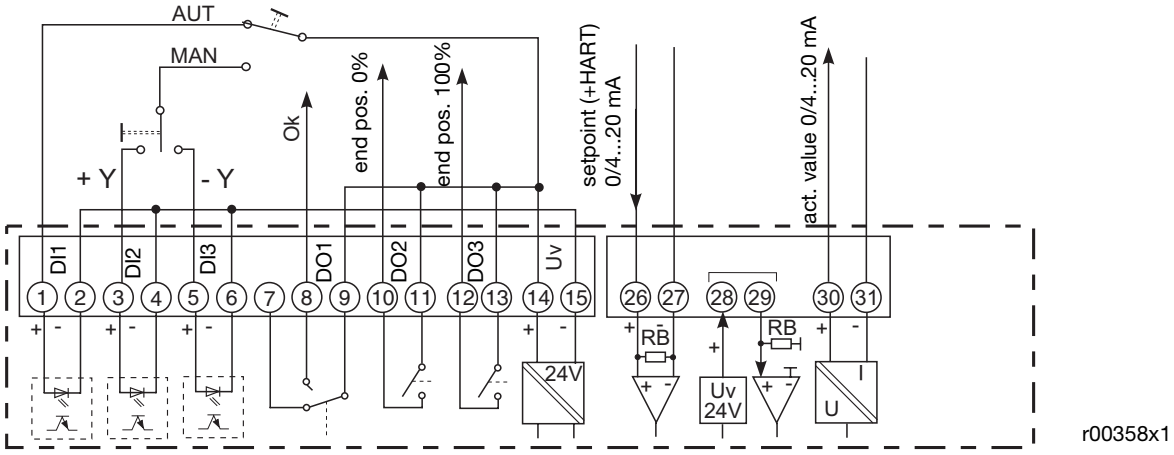


Fig. 11: Possible wiring for standard terminal assignment

9.4.2 Behind a step controller

(binary control without an analogue setpoint)

Contrac actuators feature smooth and continous operation even if the elctronic unit receives binary commands from a step controller. Use the configuration software for the appropriate settings. The electronic unit will then integrate the step commands and internally generate an analogue setpoint signal.

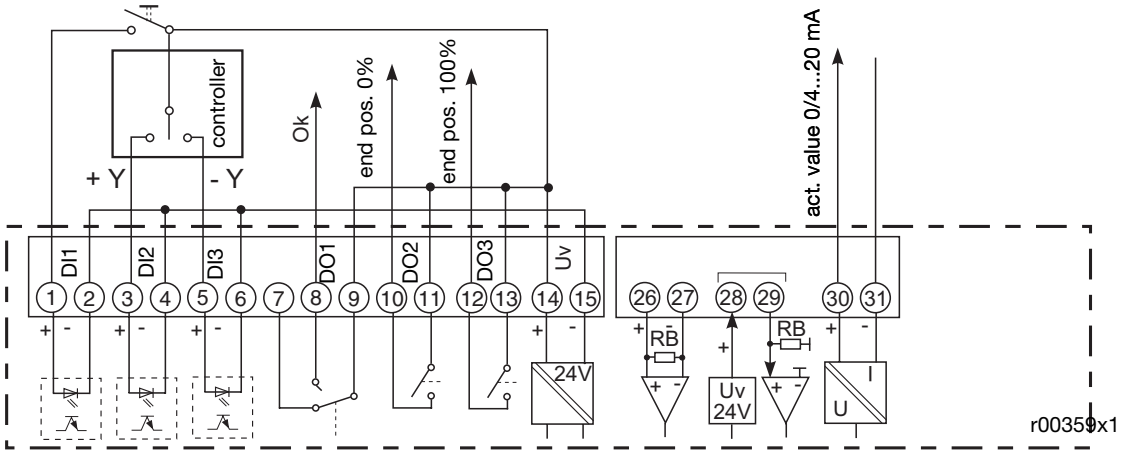


Fig. 12: Possible wiring for „operation behind step controller“

This operating mode requires the switch for the reference potential SYS ⊥ to be set to ⏚ .

9.5 Cable guidance at the plug

Pass and connect both the signal and the power cable separately within the plug housing in order to avoid electro magnetic interferences. A metal plate separates both cable areas from eachother. Connect the screen acc. to fig. 13.

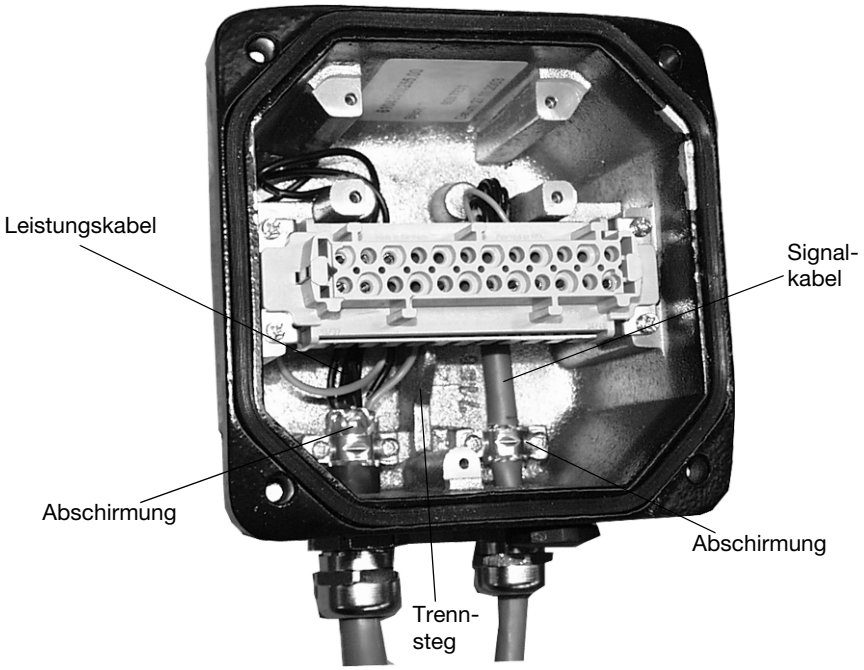


Fig. 13: Cable guidance within the plug

13.Setup

The actuator only requires the basic settings (adaptation to the operating range) in order to be operated with the standard or custumer specific configuration. Use the **L**ocal **C**ontrol **P**anel (LCP) for these settings. Use the appropriate configuration software for more detailed parameter changes or diagnosis functions.

13.1Set-up via local control panel (LCP)

13.1.1Operating elements

1. Write-protect switch (Default setting: OFF)
2. LED for 100% position Indication if adjustment procedure, saved position, or fault by different flash frequencies.
3. Drive buttons Press to cause drive motion
4. Reset button Press to restart processor
5. Power LED Indicates available mains supply
6. RS 232 socket Connection socket to PC
7. Potential toggle switch Connection of reference potential to the system or protective earth (by default set to system) of electronic unit
8. LED for 0% position Indication if adjustment procedure, saved position, or fault by different flash frequencies..
9. Accept button (0%) Press to define current position as 0%; simultaneously press push button 9 + 10 to complete the adjustment procedure.
10. Accept button (100%) Press to define current position as 100%; simultaneously press push button 9 + 10 to complete the adjustment procedure

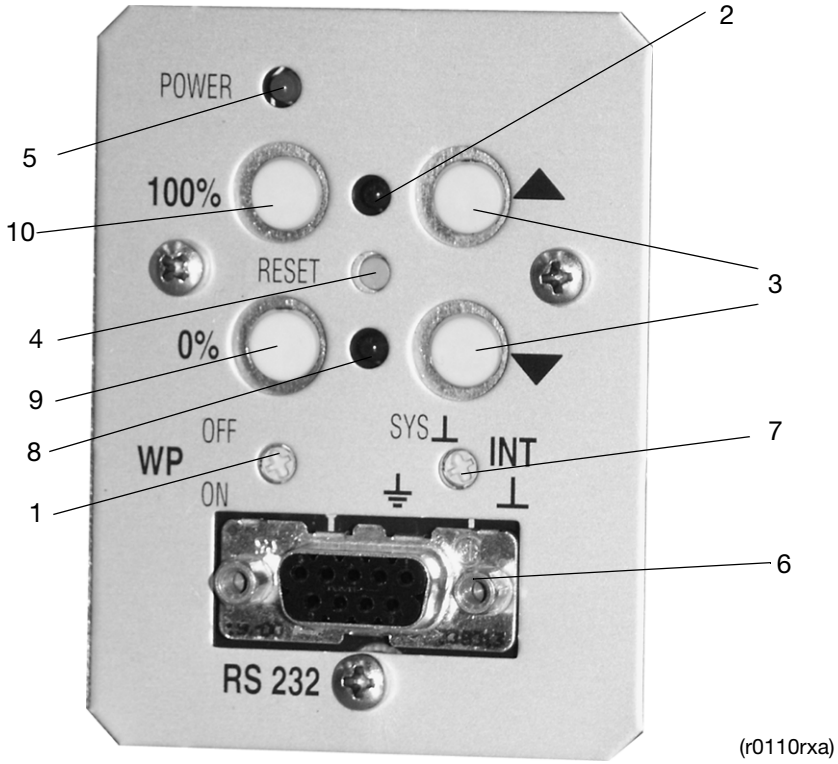


Figure 25: **L**ocal **C**ontrol **P**anel (LCP)

The actuator range is not preset in factory!

13.1.2Setup procedure

- Undo the screws of the LCP cover
- Swing the cover to the side

13.1.3Initial situation

- Electronics connected to power supply and actuator
- Write-protect switch (1) set to “OFF” position
- Electronics in operating mode “MAN” (no signal on DI 1)
- No fault (if a fault occurs, both LEDs flash alternately at 4 Hz)

13.1.4Setting

13.1.4.1 “Setting” mode

- Set electronics to “setting” mode by pressing both push buttons (3) simultaneously for approx. 5 seconds, until both LEDs (2 + 8) are flashing synchronously at approx. 4Hz. („setting mode“ is the standard electronic unit status after passing the final factory test)

13.1.4.2 Defining first position (0% or 100%)

(Higher precision in 2nd position)

- Move to desired position by pressing one of the push buttons (3).
- To accept the position for 0% or 100%, press push button (10) or (9); the associated LED flashes at approx. 2 Hz when value is correctly accepted, the other one continues to flash at approx. 4Hz

13.1.4.3 Defining second position (0% or 100%)

- Move to second position by pressing tho other of the push buttons (3).
- To accept the position, press push button (10) or (9); both LEDs (2) and (8) are flashing at approx. 2 Hz when values are accepted correctly.

13.1.4.4 Saving the settings

- Save the settings by simultaneously and shortly pressing the push buttons (10 + 9); the LEDs (2 + 8) are „ON“ (without flashing) for approx. 5 sec before they extinguish and the setting procedure is completed.
- If the selected range is too small for the actuator, both LEDs will flash again at 4Hz. Repeat the adjustment procedure with a wider range (min. positioning travel).
  (See positioning travel specification on actuator ID label)

13.1.4.5 Correction after setup

- If the setting is to be corrected after accepting the first value, first press the Reset button (4) and then repeat the setting.
- If the correction is to be re-done after saving the settings, the entire adjustment procedure must be repeated.

13.2Adjustment using the configuration program

Context-sensitive help information is available in the configuration program at all times. For basic handling and installation instructions refer to the associated manual, number 41/68-001.

A conductive ground connection is established between the PC and the CONTRAC electronics with the RS 232 communication cable. If the PC is grounded, this may cause a ground loop in the installation.

13.3Functions and signals at the LCP

Function	Indication
Adjustment	
Change-over to adjustment mode: Press and hold both drive buttons for approx. 5 seconds	Both LEDs flash synchronously at approx 4Hz after time has expired.
Moving to an end position Use associated drive button on LCP	Both LEDs continue to flash at 4Hz while driving.
Saving the first end position Press button 0% or 100%	The associated LED flashes at approx. 2Hz, the other continues at 4Hz.
Saving the second end position Press button 0% or 100%	The associated LED flashes at approx. 2Hz synchronously to the first one.
Confirm settings Press 0% and 100% buttons simultaneously	Both LEDs are briefly „ON“ together and then extinguish.
Operation	
Normal operation: MAN / AUT	LED off
Driving with button on CSF Priority over control system	LED off
Bootstrap mode	
Electronic is in bootstrap mode during the data transfer of e. g. firmware, objects or motor charcteristics; use ECOM688 software for this procedure.	Both LED are „ON“; actuator is not available
Fault (both LEDs flash alternately at 4Hz)	
Reset: Resets fault indications	If no „Failure“ conditions exist, both LEDs extinguish (if the actuator had been moved out of its operating range, drive it back prior to the reset).

Table 7:

14. Alarms / Failures

14.1 Definition

14.1.1 Alarms

The actuator / electronic unit is exposed to critical conditions (e. g. high temperature) which currently do not affect the actuator, the electronic unit, the process or persons. The actuator functions are still available. Previous alarms are saved in the „Saved Alarms“ memory of the electronic unit. Use the configuration software to display the current and saved alarms.

14.1.2 Failures

The actuator / electronic unit is exposed to critical conditions (e. g. setpoint monitoring signal) which instantly might affect the actuator, the electronic unit, the process or persons. The actuator will be switched off and the actuator functions are no longer available. Previous failures are saved in the „Saved Failures“ memory of the electronic unit. Use the configuration software to display the current and saved failures. Failure messages can not be reset as long as the reason for the failure exists.

14.2 Alarm scheme

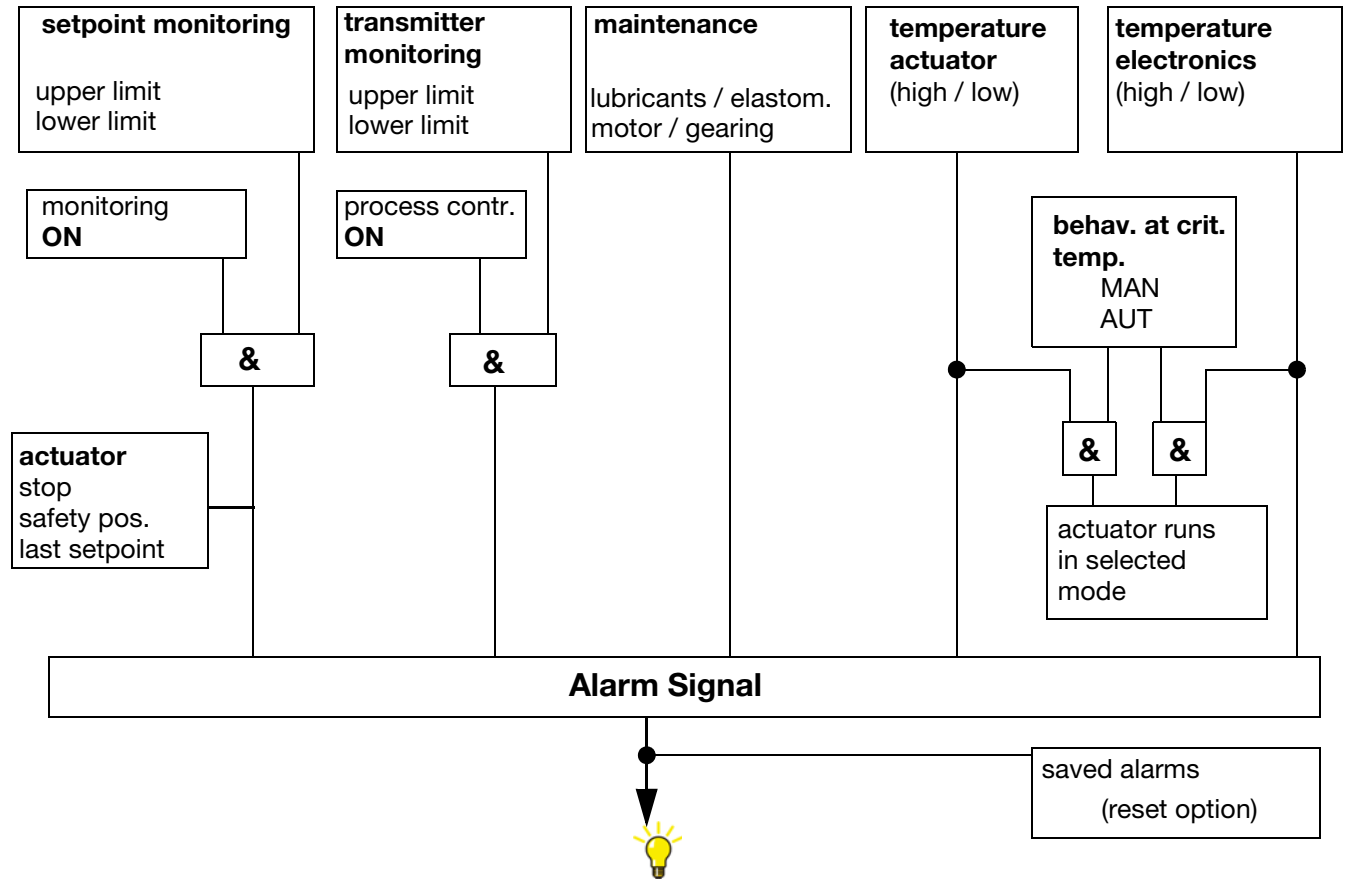


Fig. 26:

14.3 Failure scheme

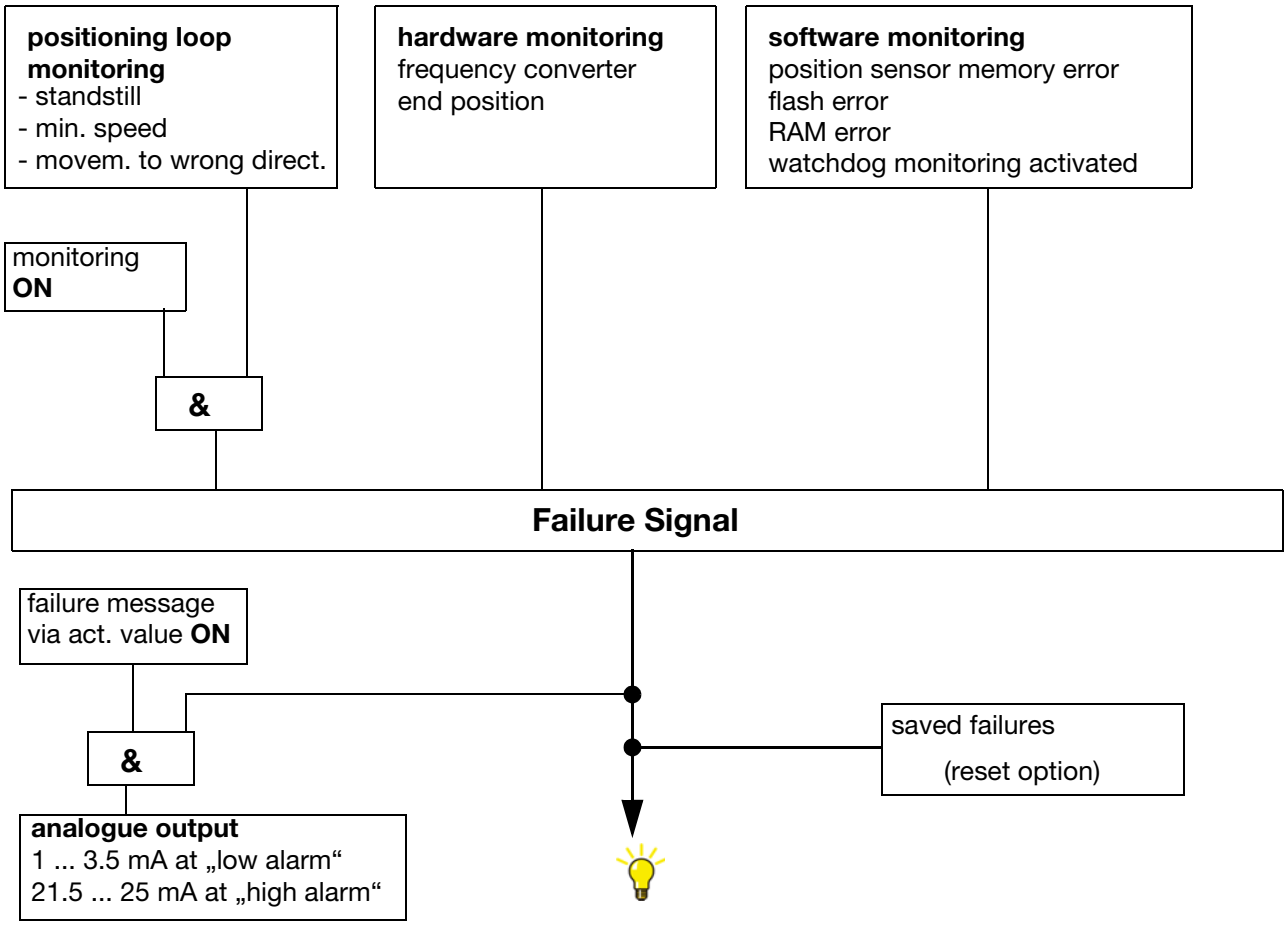


Fig. 27:

15. Troubleshooting

This section mainly describes how to handle hardware errors. Refer to the configuration program's on-line help for errors related to the software.

Error	Possible reason	Measures to be taken
Valve cannot be moved by actuator	Malfunction of actuator or valve (e.g. stuffing box tightened too much)	Disconnect the actuator from the valve. If the actuator is working properly then, the valve is likely to be defective. Otherwise, the actuator seems to be the error source.
Actuator does not react	Wrong electronic unit or wrong data	Compare data lables of actuator and electronic unit
	Faulty electronic unit settings	Check / modify settings using the configuration software
	Faulty communication to DCS	Check wiring
	Faulty wiring between the electronic unit and the actuator	Check wiring
	Motor / brake is defective	Check the winding resistances of the motor and brake. Check the brake fuse.
	Digital inputs of electronic unit are not connected	Connect
Actuator does not work in automatic mode, although "AUT" has been selected in the configuration program	Digital input 1 (DI 1) has not been connected.	- Connect DI 1 - Check software settings for digital inputs
LEDs on the commissioning and service field are flashing simultaneously	Actuator operating range has not been adjusted properly	Adjust the actuator operating range (see instruction for electronic unit).
Fault when approaching an end position	Actuator is working in the limit range of the position sensor	- Move the actuator either manually or with the LCP buttons to a position beyond the end position (disconnect from valve if required). - Move actuator back. If required, reconnect to to the valve (if applicable) - Adapt actuator to new operating range

Table 8:

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Printed in the Fed. Rep. of Germany (08.05)

42/68-822 EN Rev. D

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