Instruction
42/68-830 EN

Electronic Units for Field Installation EBN853, EBN861 (Contrac)

For the control of Contrac actuators
in explosion-proof design

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 electronic units 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 sub-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 = 230 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 dissipation
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
2	Nennwerte / Rated Values M= w=
3	F-Nr. / No.
4	NL.
5	Software Version
6	

1 Associated actuator
2 Rated values for force / torque and speed)
3 Device number of cover
4 No. of non-standard version
5 Loaded software version
6 Available for customer-specific information

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 electronic units EBN853 and EBN861 may be used exlusively for triggering electrical actuators of the RSDE... or RHDE ... 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 electronic units 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 electronic units, and to make the electrical connection.
- When working on the electronic units 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, avoid direct exposure to rain, snow, etc.

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.

Remove the desiccant prior to commissioning the electronic units.

4.1 Actuator operation via frequency converter

- The frequency converter (electronic unit) may not be installed or operated within the hazardous area.
- Check the electronic unit for proper parameter settings.
- Make sure that the electronic unit is connected to tho associated actuator.
- The actuator default settings include the acivation of the positioning loop monitoring. A later de-activation is not allowed.
- The hand wheel must be locked with a cotter pin in order to avoid accidental operation. Disconnect the power supply prior to manual operation.
- Actuators in explosion-proof design do not allow for rapid traverse operation. This function will be ignored if you select it via the user interafce.

4.2 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
Positioning loop monitoring:	activated
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 electronic units EBN853 and EBN861 consist of 2 parts each, one containing the connecting units (EBN853) and the transformer, the other containing the electronics and the local control panel (LCP) for local operation and basic actuator adjustment.

6.1 EBN853

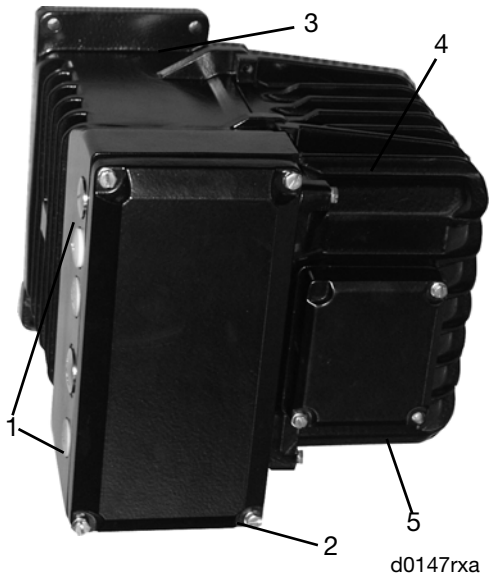


Fig. 1:

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

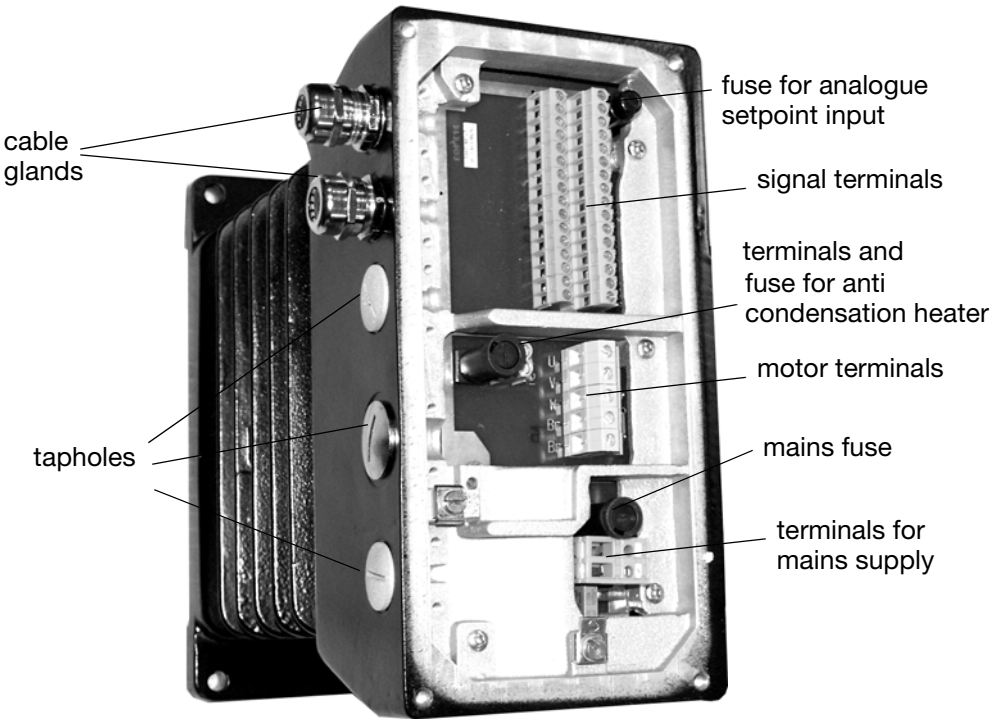


Fig. 2: Connection chamber EBN853 with removed cover.

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

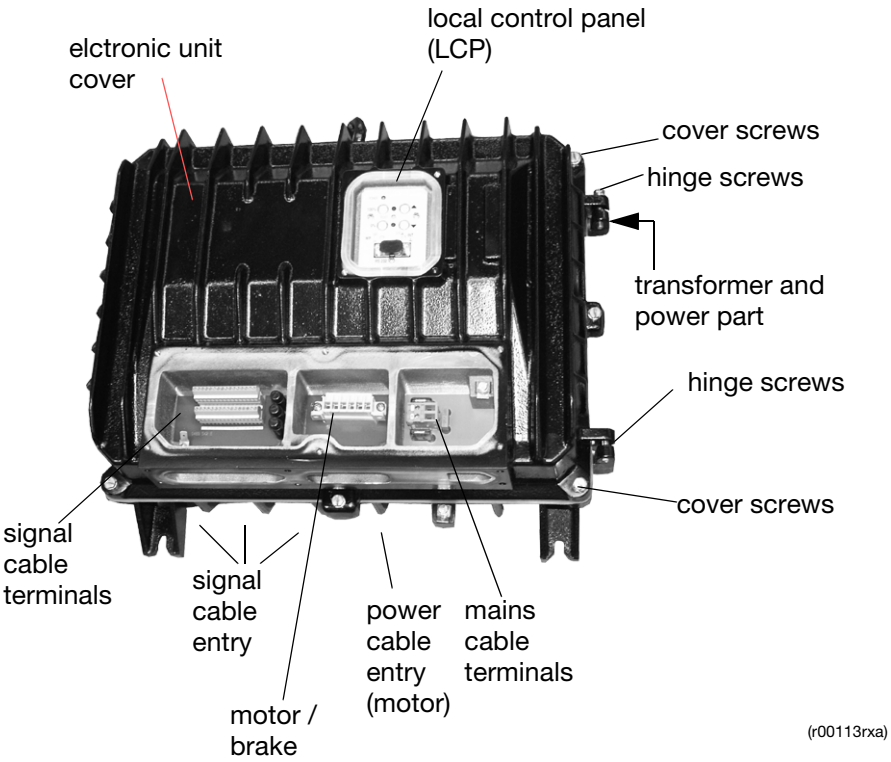


Fig. 3: EBN861 without LCP and connection chamber cover

7. Technical Data

7.1 General

	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	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, electrically 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: Setpoint monitoring:	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)] for explosion-proof actuators always activated
Individual settings	See data sheet 68-2.40 or on request	
Protection class	IP 66	
Protection against contact	protection classl I acc. to EN 50178; grounding required	
Humidity	≤ 95% annual average (condensation permitted)	
Ambient temperature	-25° C ... +55° C	
Transport and storage 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	max. 100m	
Weight	approx. 11 kg	approx. 42 kg

Table 1

[1)] Not available for communication via PROFIBUS DP

7.2 Current Consumption of EBN853

	I_{max} 115 V	I_{max} 230 V	$I_{pos.}$
RHDE250-10	1.8 A	0.9 A	each approx 40 .. 50% of I_{max}
RHDE500-10	2.2 A	1.1 A	
RHDE800-10	3.4 A	1.7 A	
RHDE1250-12	6.0 A	3.0 A	
RHDE2500-25	4.8 A	2.4 A	
RHDE4000-40	4.0 A	2.0 A	
RHDE8000-80	4.0 A	2.0 A	
RSDE10-5,0	3.4 A	1.7 A	
RSDE10-10,0	3.8 A	1.9 A	
RSDE20-5,0	4.8 A	2.4 A	
RSDE20-7,5	3.8 A	1.9 A	
RSDE50-3,0	4.0 A	2.0 A	
RSDE100-1,5	4.4 A	2.2 A	

Table 2

7.3 Current consumption of EBN861

	I_{max} 230 V	$I_{pos.}$
RHDE2500-10	5.3 A	approx. 40 ... 50% of I_{max}
RHDE4000-10	10.0 A	
RHDE8000-15	9.0 A	
RHDE16000-30	12.5 A	
RSDE50-10,0	6.4 A	
RSDE100-10,0	12.5 A	

Table 3

7.4 Fuses

Electronic unit	Fuse type	Mounting site	U = 115 V	U = 230 V [1]
EBN853	Series 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	Series 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
	Anti condensation heater	in connection chamber (motor terminals)	2 A; slow	

Table 4

[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.

7.4.1 External fuses for EBN861

Apart from the internal fuses (see also 7.4), the EBN861 power electronic unit requires two additional external fuses, which are supplied separately to the unit.

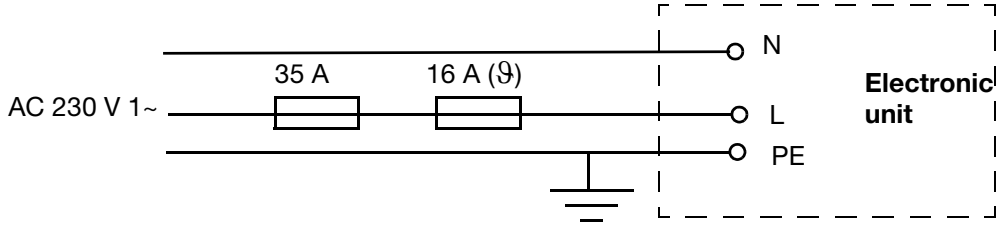
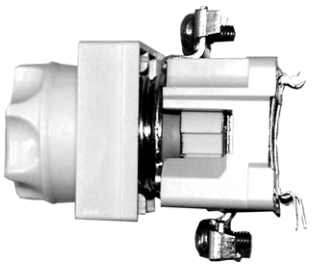
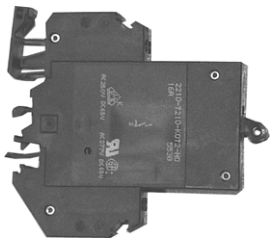


Fig. 4: External fuses



r00176rxa

Fig. 5: External fuse; 35 A



r00177rxa

Fig. 6: External thermal fuse; 16 A

8. Mounting

Install the electronic unit outside the hazardous area. Connect the actuator and the electronic unit via the screw associated screw terminals. The electronic units are provided with the appropriate metric cable holes (see Figures 1 to 3 for the assignment).

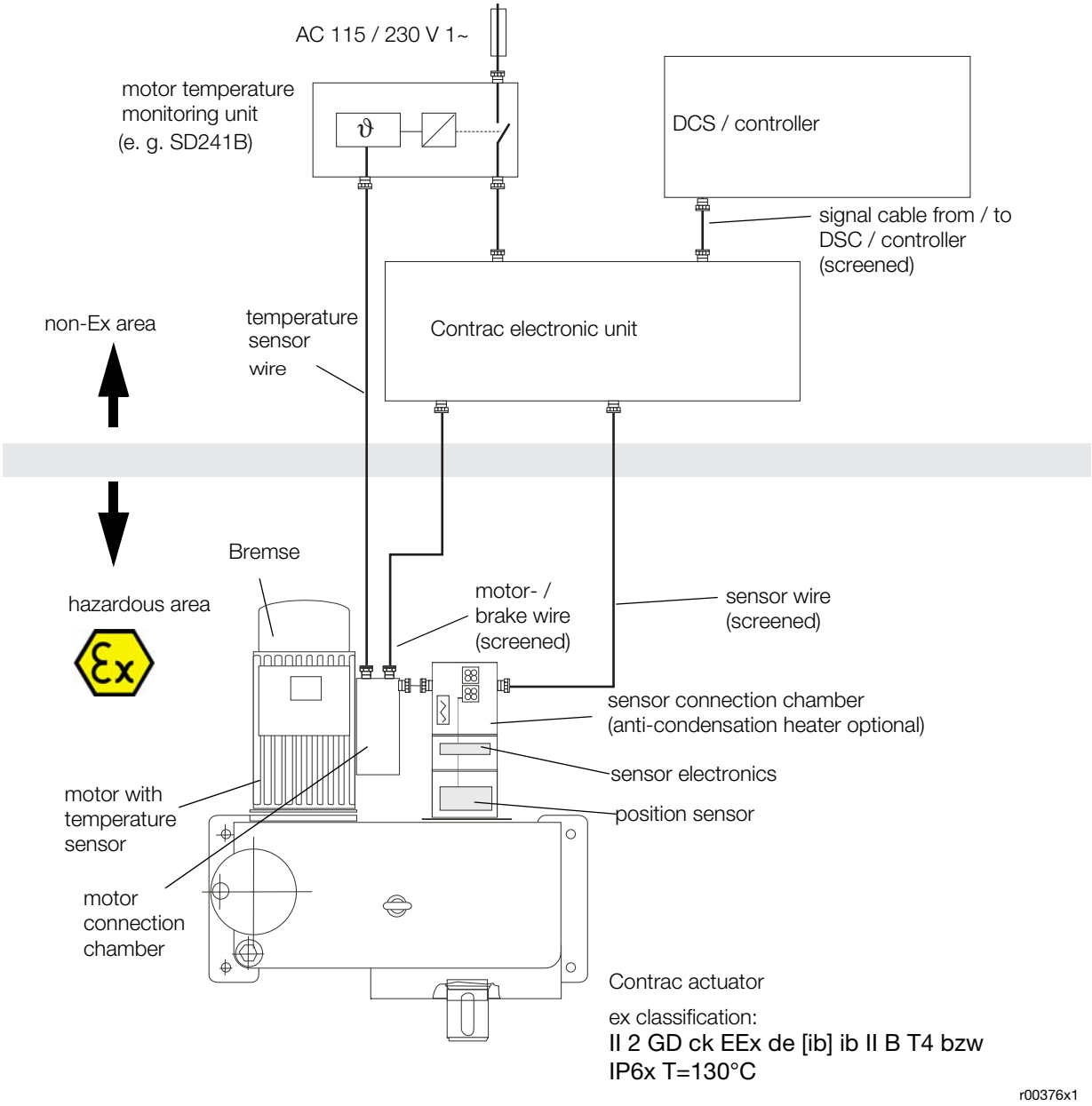


Fig. 7: Arrangement of the components

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 EBN853

Disconnect the electronic unit 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.

8.2.1 EBN861

Electronic 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 which is loaded with the type specific-software. Carefully consider the instructions for the electronic unit and compare the data labels of the actuator and the electronic unit in order to ensure a proper hard- and software assignment.

The cable between the actuator and the electronic unit is connected to terminals. Consider the following issues:

- Consider the local regulation concerning the setup of electrical devices within hazardous areas. This applies particularly to EN 60079-14 for the setup of the screen and the potential compensation between the actuator, the electronic unit and the motor protection unit (refer 1) to fig. 8 and 9).
- For the connection of the motor and the position transmitter only use ATEX certified EEx e cable glands with IP66 acc. to EN 50019.
- Use a cable socket or a solid wire, bended to a „U“, to connect the motor cable.
- Ensure a proper strain relief for all cable connections.
- Protect all cables in the connections chambers against contact with metal components. Ensure a gap of at least 6 mm between all conductive components.
- Remove the desiccant in motor and position sensor.
- Do not change the factory-set position of the motor terminal chamber.
- Seal all not used cable entries with ATEX certified IP66 plugs.
- Use a certified cut-off unit for the thermal motor monitoring. Permitted units are e. g.:
  type 3RN1, ident no. II (2) G, PTB 01 ATEX 3218 , Siemens or
  type EMT6-..., ident no. II (2) G, PTB 02 ATEX 3162 , Moeller

The ABB motor temperature monitoring unit SD241B may also be used for these measures.

For details see instructions for electronic units for rack installation.

9.1 Wiring diagram EBN853 / EBN861 (Standard)

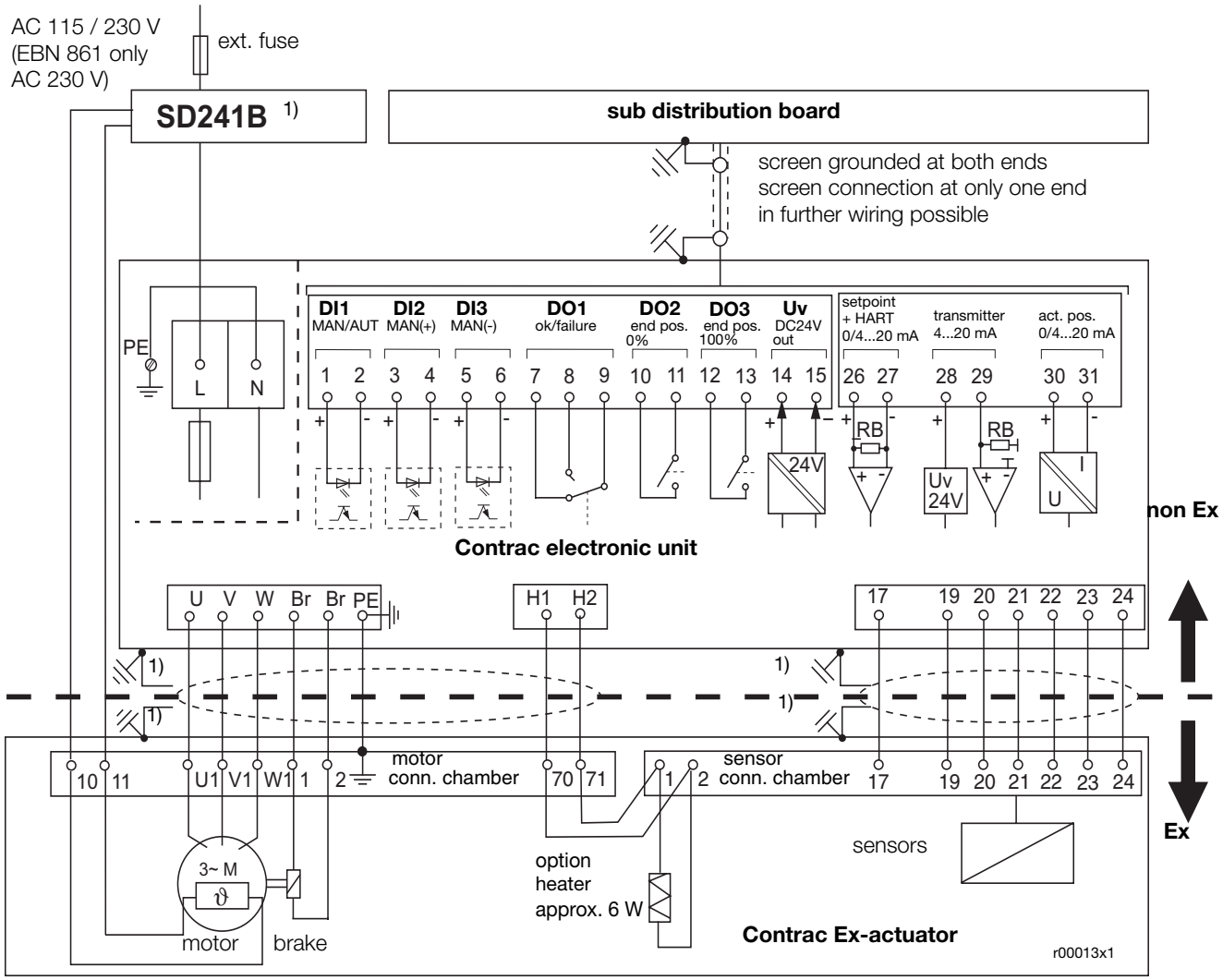


Fig. 8:

9.2 EBN853 / EBN861 (fieldbus communication)

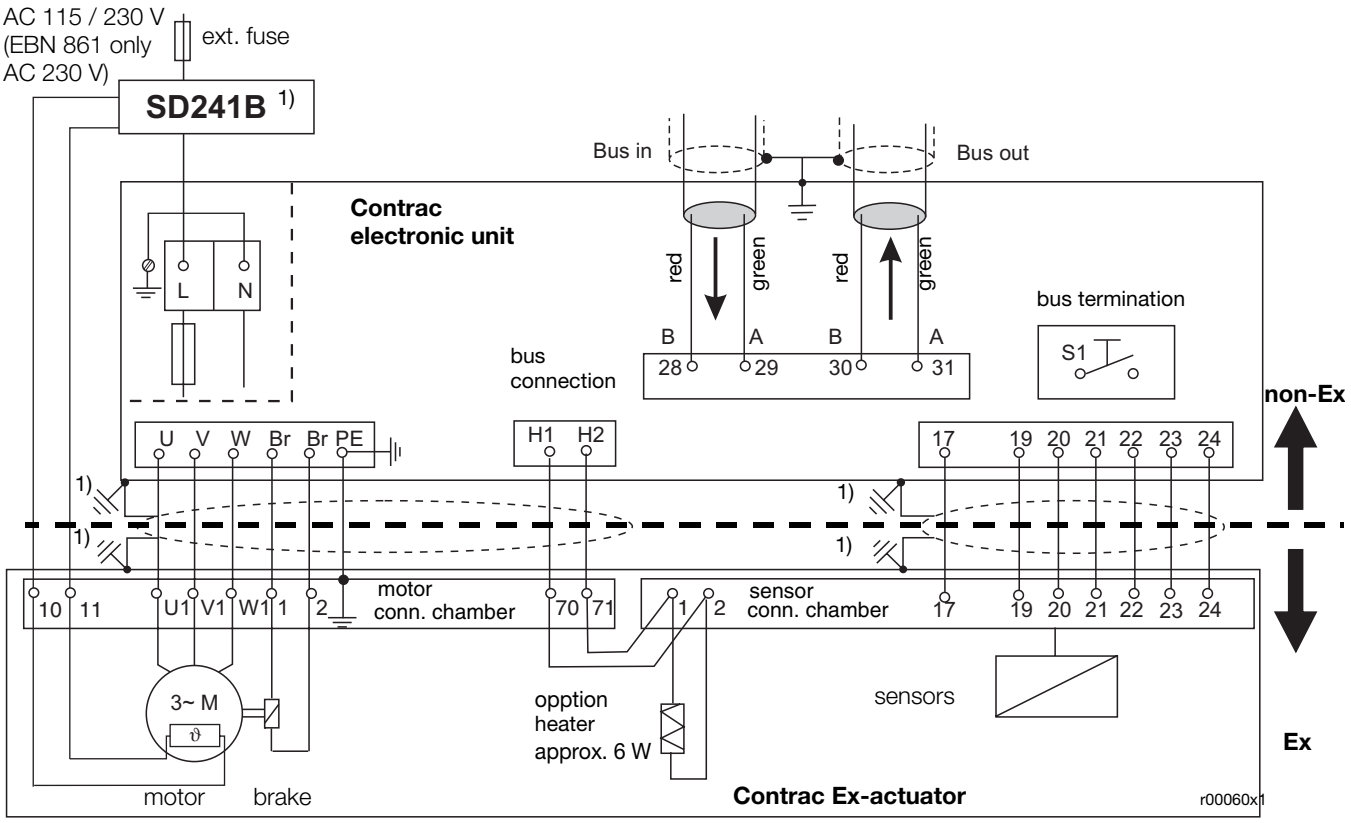


Fig. 9:

9.3 Example for signal input / output

(conventional analogue / binary control)

Procede as follows to switch the actuator into automatic mode (AUT):

- activate digital inputs D1, D2, and D3 using the configuration software (standard configuration with default factory settings).
- activate the AUT mode using the configuration software (standard configuration with default factory settings).

9.3.1 Standard wiring (analogue setpoint)

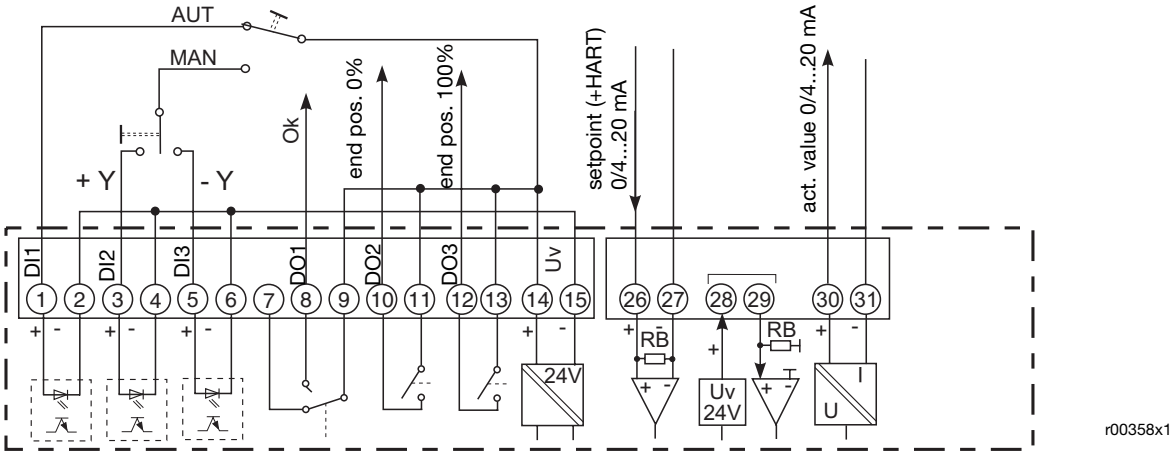


Fig. 10:

9.3.2 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.

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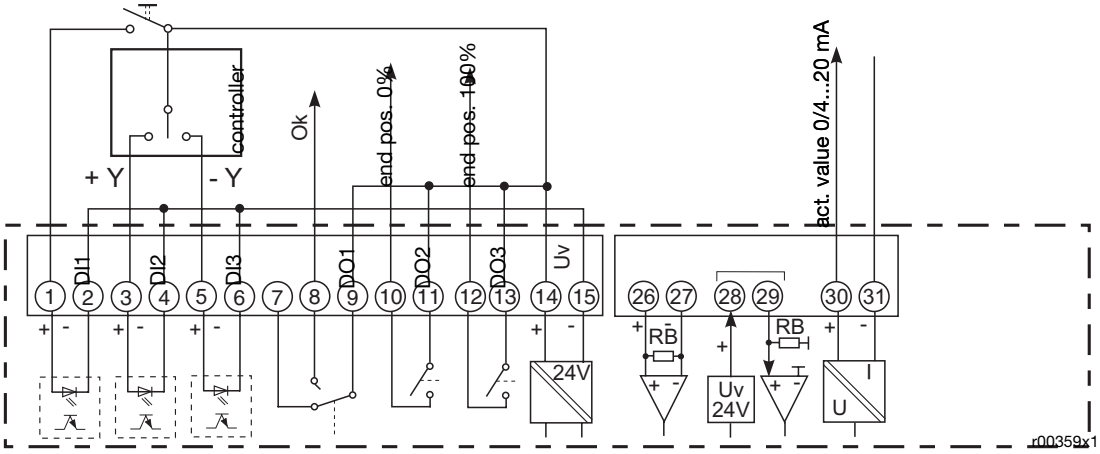
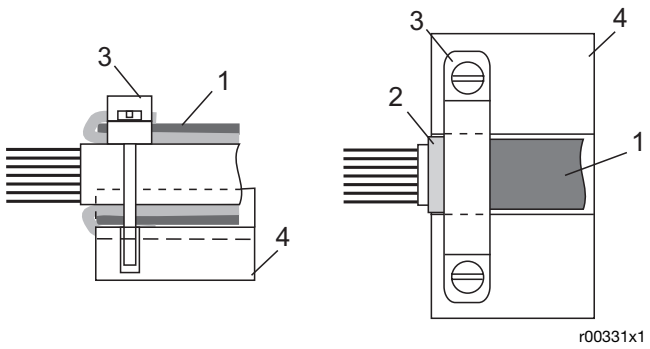


Fig. 11:

9.4 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. 12: Connecting the cable shield of EAN823; EBN853; EBN861

Connect the screen at the actuator accordingly.

10.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.

10.1Set-up via local control panel (LCP)

10.1.1Operating 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

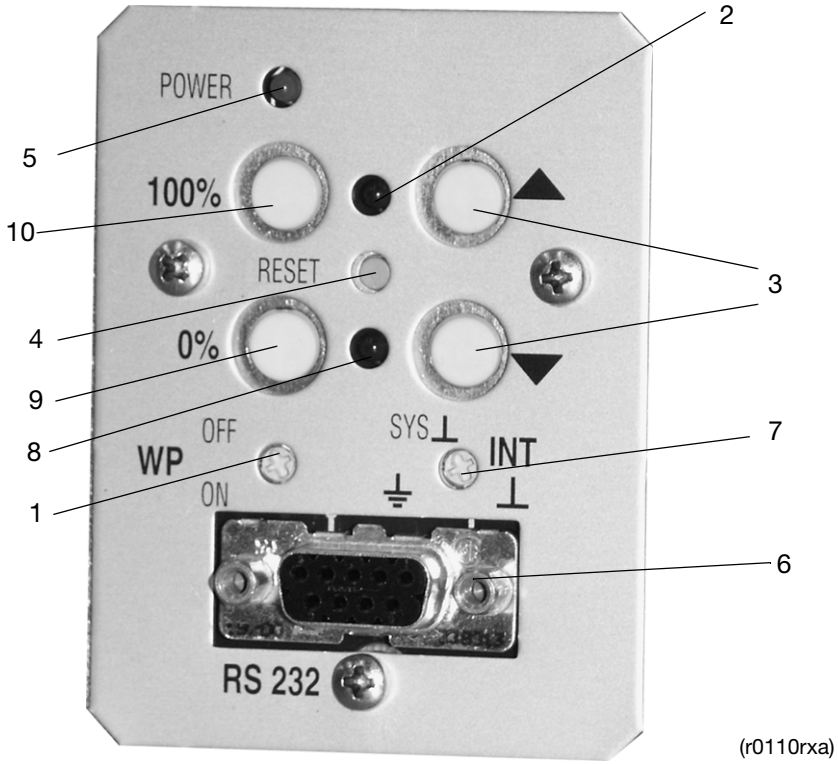


Figure 13: **L**ocal **C**ontrol **P**anel (LCP)

The actuator range is not preset in factory!

10.1.2Setup procedure

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

10.1.3Initial 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)

10.1.4Setting

10.1.4.1 “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)

10.1.4.2 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

10.1.4.3 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.

10.1.4.4 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)

10.1.4.5 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.

10.2Adjustment 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.

10.3Functions 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 6:

11. Alarms / Failures

11.1 Definition

11.1.1 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.

11.1.2 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.

11.2 Alarm scheme

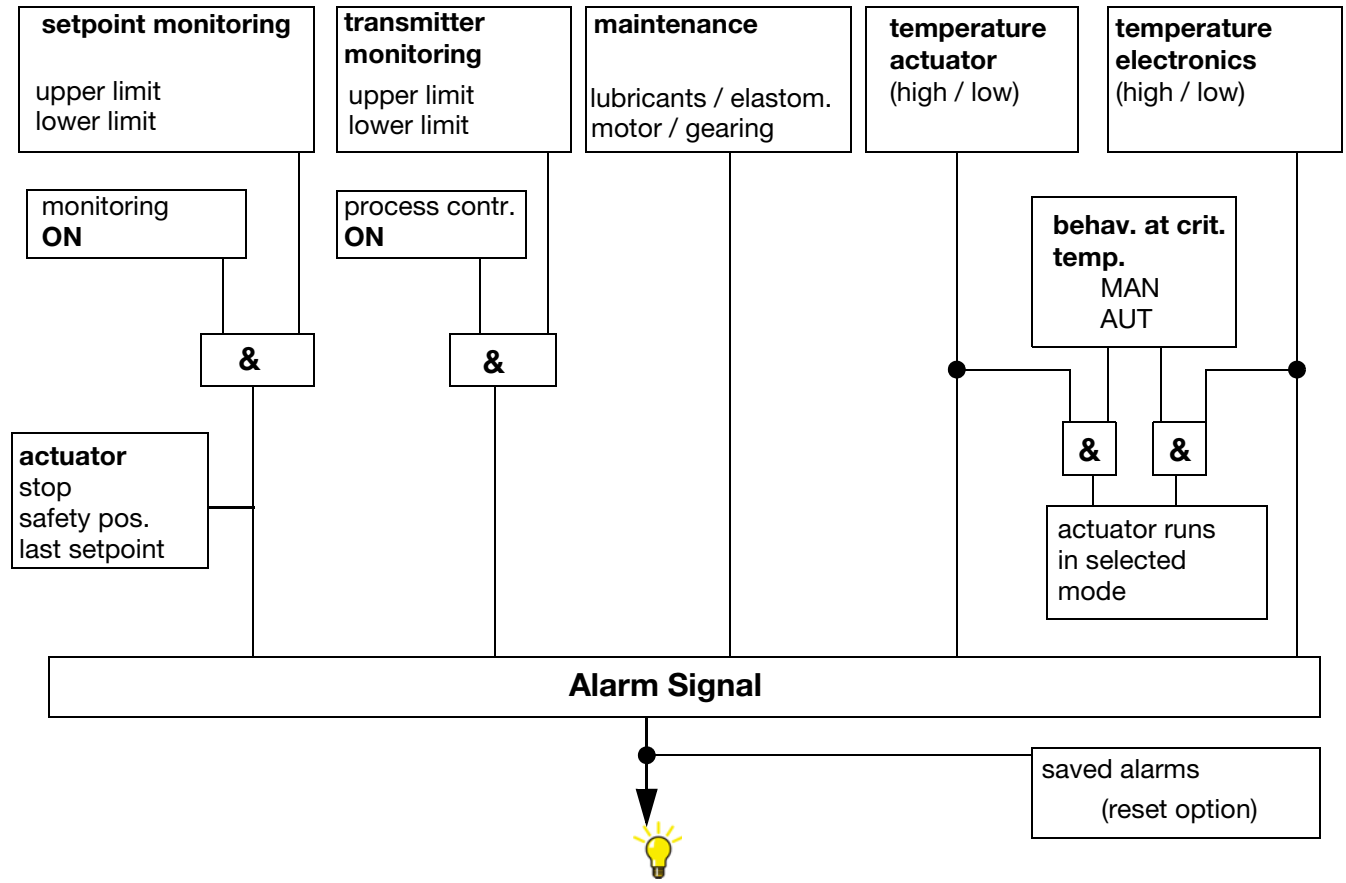


Fig. 14:

11.3 Failure scheme

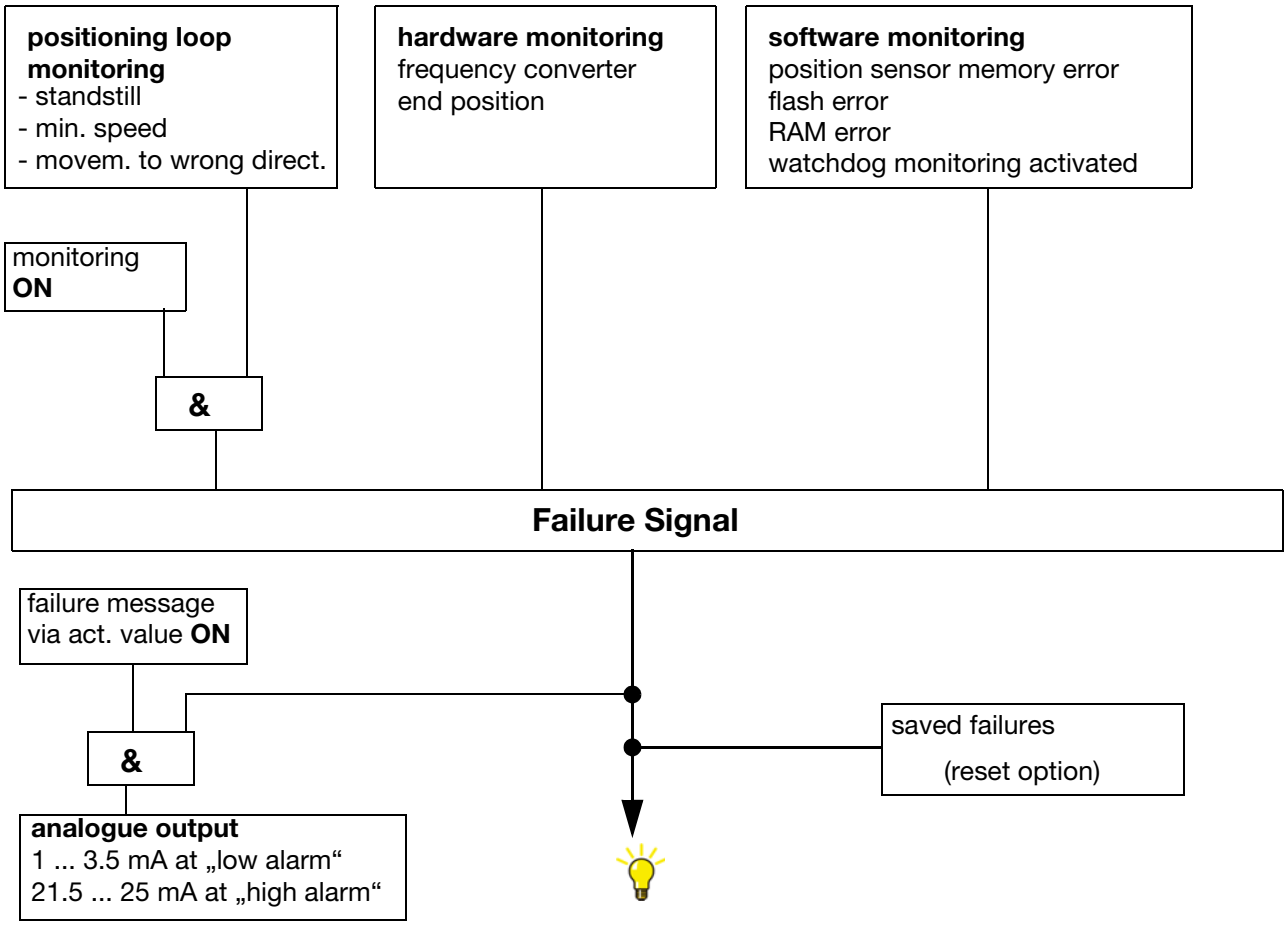


Fig. 15:

12. 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 7:

ABB has Sales & Customer Support
expertise in over 100 countries worldwide..

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The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

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