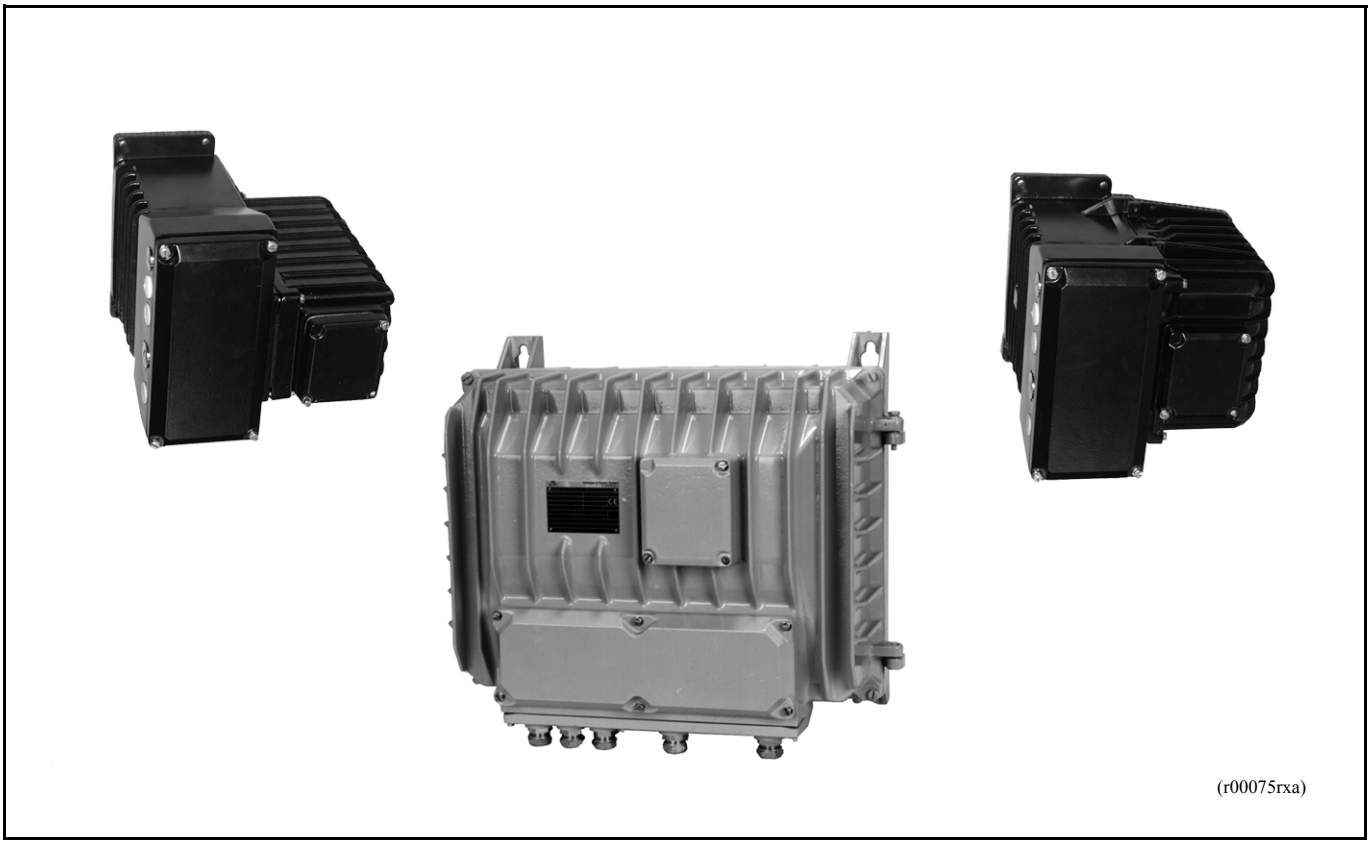
Electronics for Electrical, Continuous Actuators

EAN 823, EBN 853, EBN 861

Power Electronics
For Field Mounting

Operating Instructions

42-68-822EN Rev. 2



(r00075rxa)

Content

Legend

ELECTRICAL WARNING

.An instruction with reference to electrical components or equipment. It draws attention to the risk of injury or death to persons or damage to the product, process or surroundings

WARNIG

General instruction that draws attention to the risk of injury or death to persons or damage to the product, process or surroundings

INFORMATION

Further reference for more detailed information or technical details.

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 (BA numbers).

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%	Pmax. = ... W		
5	t = ...°C	IP 66	CE	
6	Ext. Sicherung / Fuse			
	Automation D-32425 Minden			

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

1.3.1 ID Label for Software Description

1	Für / For Antrieb / Actuator . . . . .
2	Mit / NL. Nr./No. . . . .
3	Eingestellt / adjusted auf/for M=..... .....°/s
4	F-Nr. / No. Software Version . . . . .
5	

1 Associated actuator
2 Number of non-standard version (if required)
3 Adjusted torque / Adjusted speed
4 Device number of cover
Downloaded software version
5 Available for customer-specific information

1.3.2 ID Label for Hardware Description

1	**Elektronik / Electronics Type: ....**			Made in Germany
2		NL		
3		Jahr/Year		
4				
5	t = ...°C	IP 66	CE	
6				
	Automation D-32425 Minden			

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

2. General

2.1 Proper Use

Power electronics models EAN 823, EBN 853 and EBN 861 are to be used exlusively for triggering elektrical actuators of the PME 120, 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.

2.2 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.

3. 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.

3.1 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.

4. Delivery settings

Behavior in 0/100% position:	Shut-off 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

The configuration of your actuator may differ from the standard configuration specified above. It can be called up for display using the configuration program.

1) not with fieldbus communication.

5. Assemblies

Power electronics EAN 823, EBN 853 and EBN 861 consist of 2 parts each, one containing the connecting units (EAN 823 and EBN 853) and the transformer, the other containing the electronics and the commissioning and service panel (CSP) for local operation and adjustment of the actuator.

5.1 EAN 823 / EBN 853

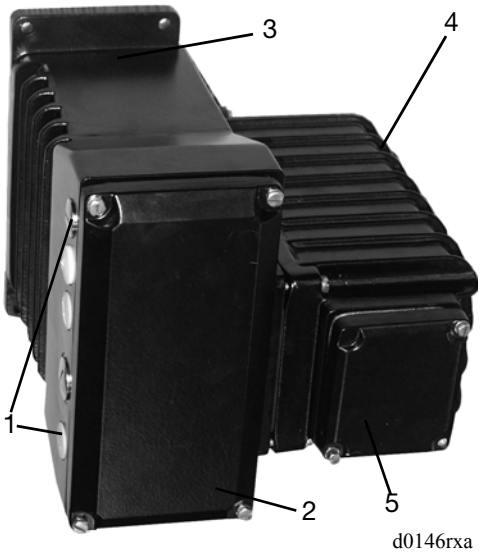


Figure 1: Electronic unit EAN 823

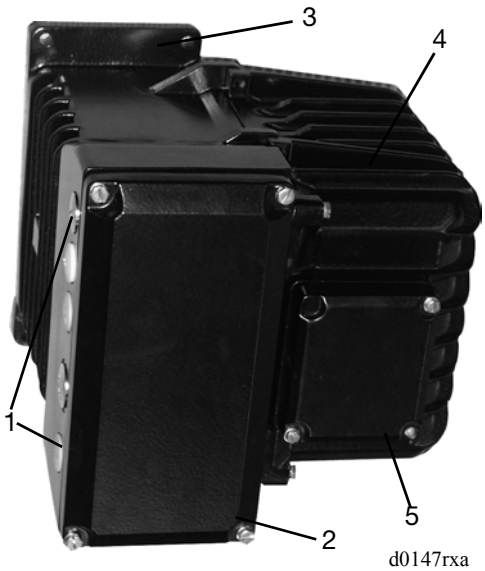


Figure 2: Electronic unit EBN 853

1 taphole for cable glands
2 cover for connection chamber
3 connection housing
4 electronic hod
5 cover for comissiooning and service panel

5.1.1 Connection chamber

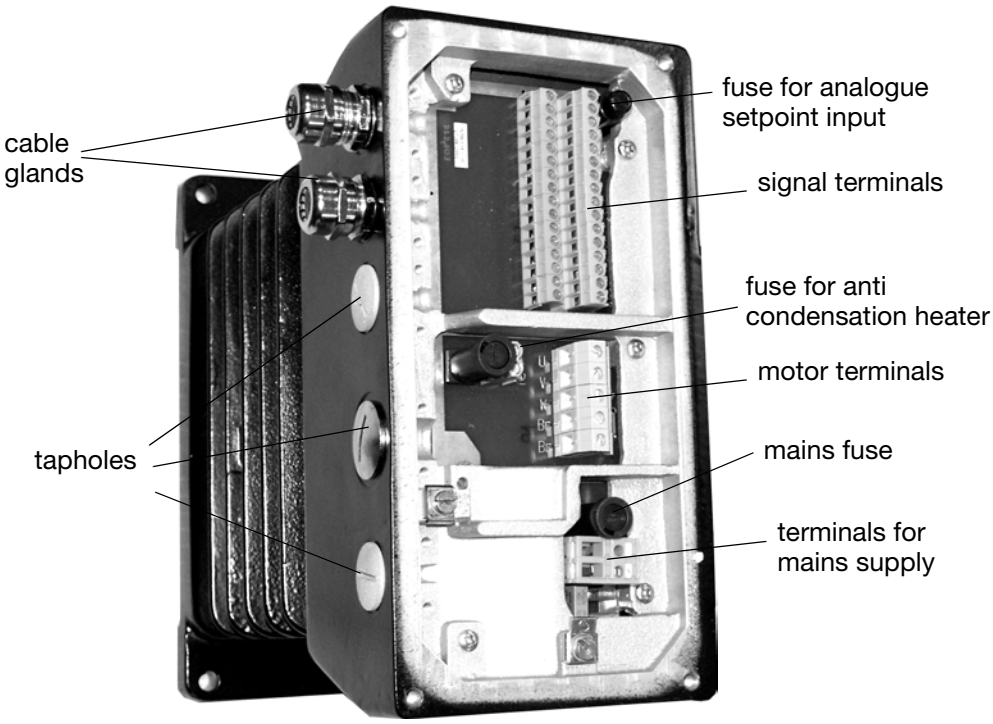


Figure 3: connection chamber EAN 823 / EBN 853.

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

5.2 EBN 861

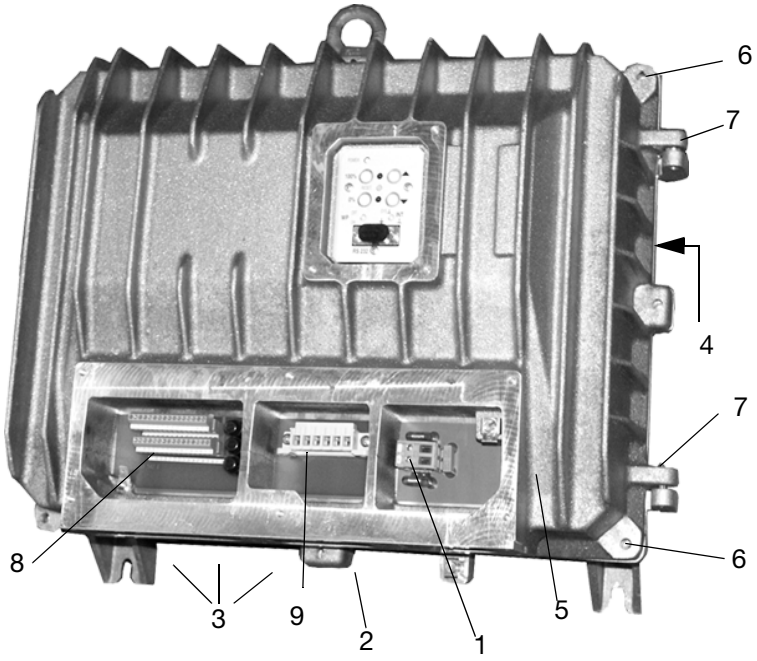


Figure 4: EBN 861

1 Mains cable
2 Power cable (motor) to the actuator
3 Link cable (signals)
4 Transformer and power part
5 Part for electronics and for commissioning and service field
6 Cover screws
7 Hinge screws
8 Terminal strip (signals)
9 terminal strip (motor / brake)

6. Technical Data

6.1 General

	EAN 823	EBN 853	EBN 861
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... 60 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		
Analog output[1)]	0 / 4 ... 20 mA, electrically isolated		
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 relaiy 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:		Shut-off with rated torque Linear; setpoint = positioning value 4 ... 20 mA[1)] Positioner, parameter: set-point 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 signal-ling [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 elec-tronics	optionally 5m, 10m or 20m		
Weight	approx. 10 kg	approx. 11 kg	approx. 42 kg

Table 1:

[1)] Not available for communication via Profibus DP

6.2 Current Consumption of EAN 823

	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:

6.3 Current Consumption of EBN 853

	I_{max} 115 V	I_{max} 230 V	$I_{pos.}$
RHD 250-10	1.8 A	0.9 A	each around 40 .. 50% of I_{max}
RHD 500-10	2.2 A	1.1 A	
RHD 800-10	3.4 A	1.7 A	
RHD 1250-12	6.0 A	3.0 A	
RHD 2500-25	4.8 A	2.4 A	
RHD 4000-40	4.0 A	2.0 A	
RHD 8000-80	4.0 A	2.0 A	
RSD 10-5,0	3.4 A	1.7 A	
RSD 10-10,0	3.8 A	1.9 A	
RSD 20-5,0	4.8 A	2.4 A	
RSD 20-7,5	3.8 A	1.9 A	
RSD 50-3,0	4.0 A	2.0 A	
RSD 100-1,5	4.4 A	2.2 A	
RSD 200-0,7	5.0 A	2.5 A	

Table 3:

6.4 Current consumption of EBN 861

	I_{max} 230 V	$I_{pos.}$
RHD 2500-10	5.3	around 40 ... 50% of I_{max}
RHD 4000-10	10.0	
RHD 8000-15	8.0	
RHD 16000-30	12.5	
RSD 50-10,0	6.4	
RSD 100-10,0	12.5	
RSD 200-5,5	13.0	

Table 4:

6.5 Fuses

Electronics	Fuse type	Mounting site	U = 115 V	U = 230 V [1]
EAN 823	Series fuse	external	16 A, slow	
	Mains fuse	in connection chamber	6.3 A, slow	3.15 A, slow
	Relay fuse for DO 1, DO 2, DO 3	on processor board, contact manufacturer for replacement	3 x 0.5 A; medium time-lag	
EBN 853	Series fuse	external	16 A, slow	
	Mains fuse	in connection chamber	12.5 A, slow	10 A, slow
	Relay fuse for DO 1, DO 2, DO 3	on processor board, contact manufacturer for replacement	3 x 0.5 A; medium time-lag	
	Brake fuse	power board	0.315 A, medium time-lag	
	Intermediate circuit fuse	power board	10 A, super-quick	
EBN 861	Series fuses[1]	external	35 A fuse 16 A thermal safety cutout	
	Relay fuse for DO 1, DO 2, DO 3	on processor board, contact manufacturer for replacement	3 x 0.5 A; medium time-lag	
	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 EBN 861. Note that the cable cross-sectional area between the fuse and the electronics must be at least 2.5 mm^2.

7. Mounting

Install the electronics close to the actuator. The connection is made via a 32-pin connector on the actuator side and screw terminals on the electronics side. The electronics are provided with the appropriate PG cable glands (see Figures 1 to 3 for the assignment).

7.1 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.

7.2 Mounting of EAN 823 / EBN 853

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 glands 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.
- Check if the cable is connected properly; then close the connection chamber cover.

Adjust as described in section 9.

7.2.1 Mounting electronics EBN 861

Electronics unit EBN 861 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 (4).
- Undo the hinge screw (5)
- 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.
- 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 (4)
- Connect the cables

The item numbers refer to Figure 1 to 4.

8. Electrical Connection

The electrical connection is done with a combined plug on the actuator and with screw terminals on the electronics.

8.1 Wiring diagram EAN 823 (Conventional)

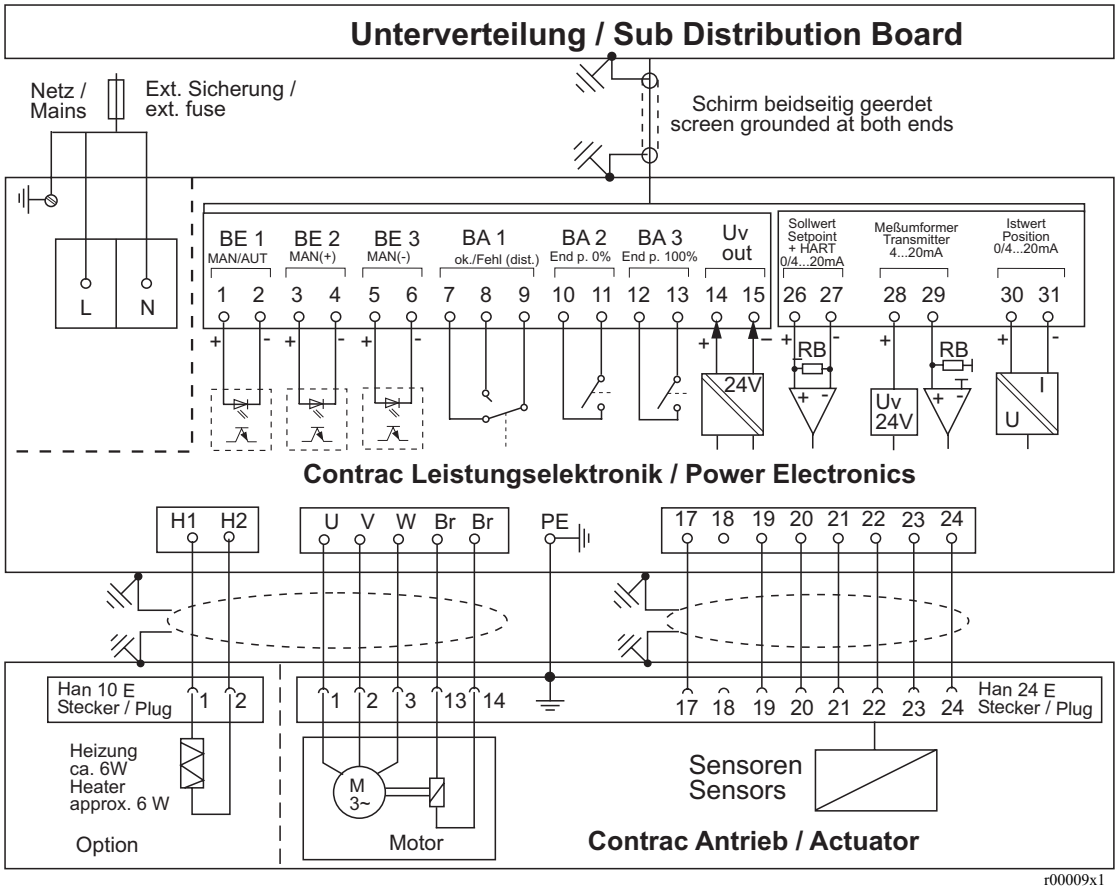


Figure 5:

8.2 Wiring diagram EAN 823 (Profibus DP)

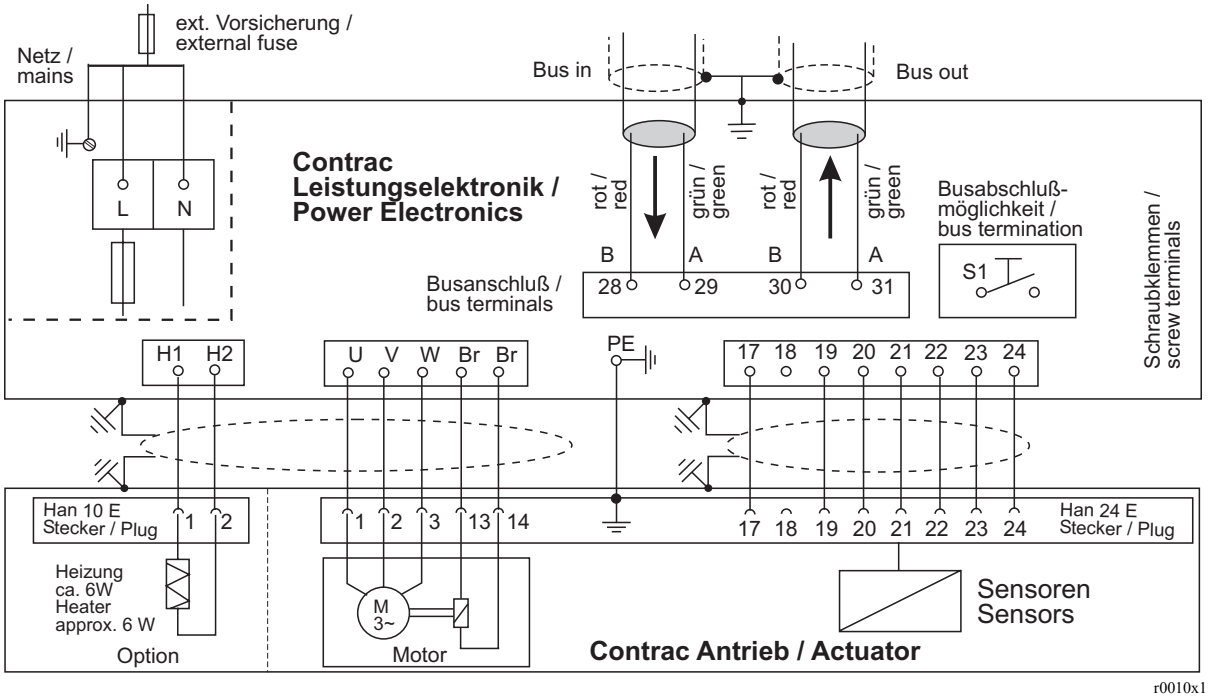


Figure 6:

8.3 Wiring diagram EBN 853 (Conventional)

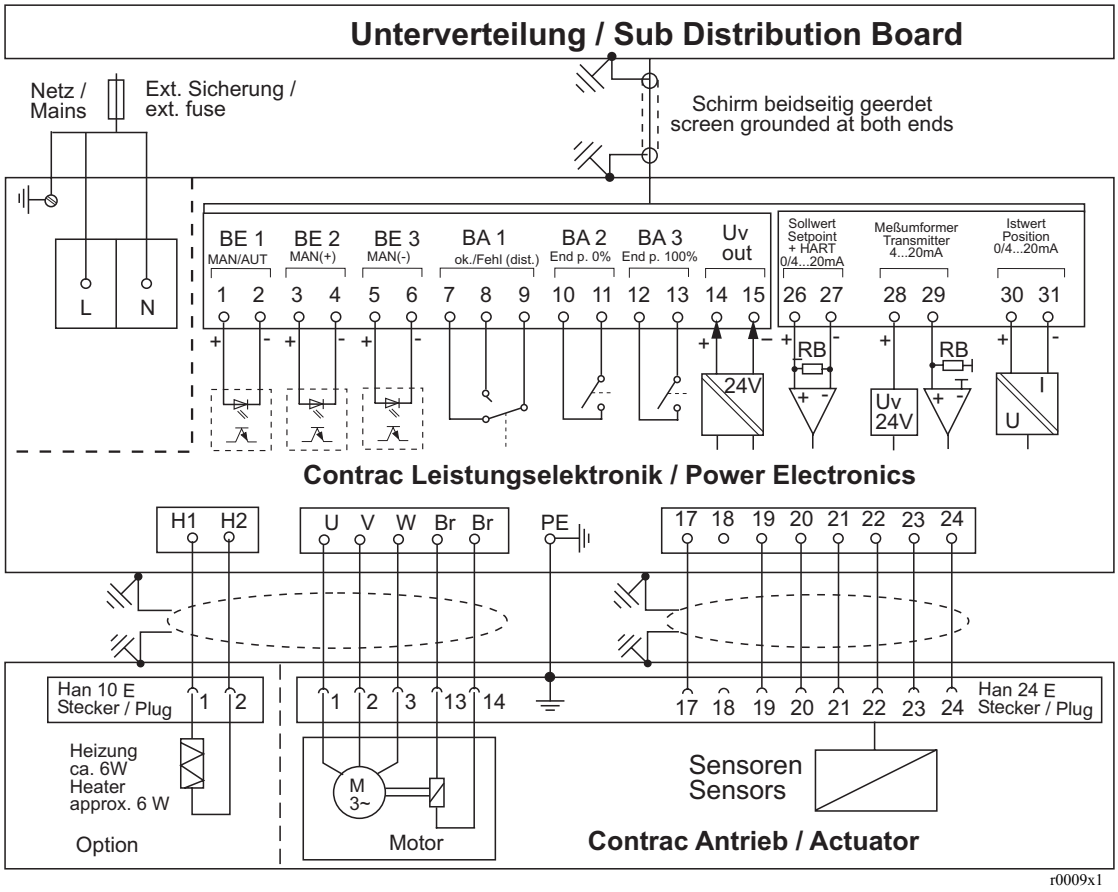


Figure 7:

8.4 Wiring diagram EBN 853 (Profibus DP)

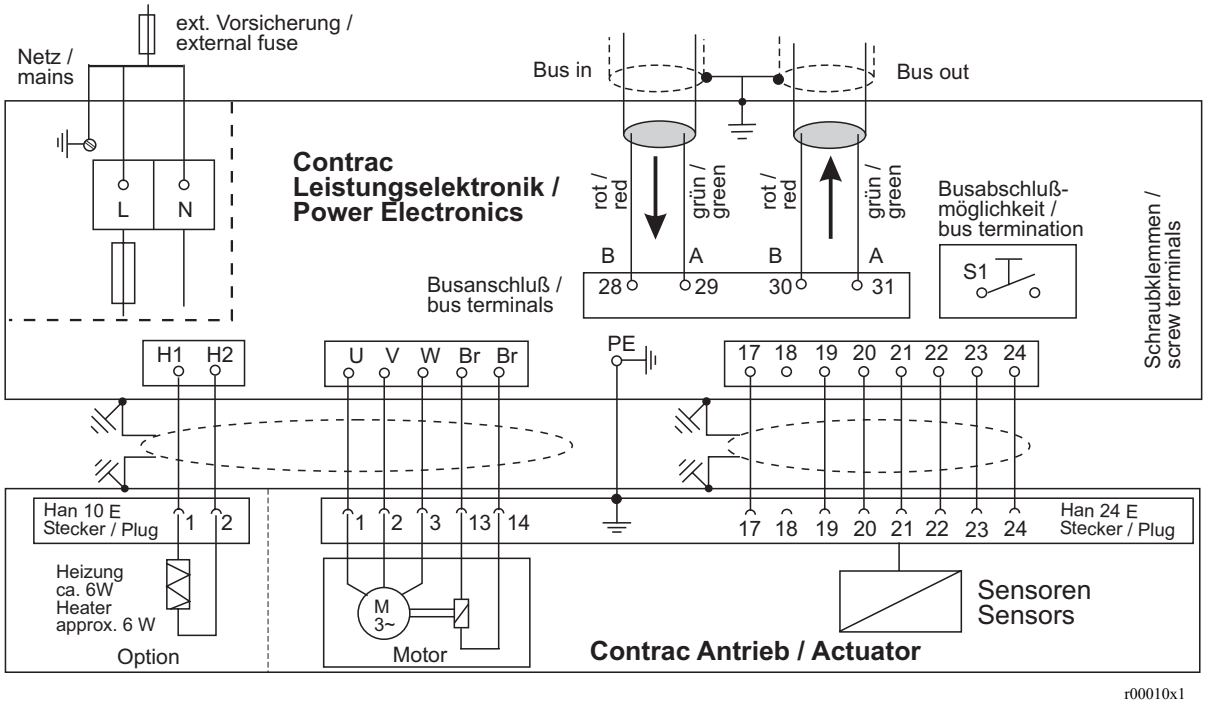


Figure 8:

8.5 Wiring diagram EBN 861 (Conventional)

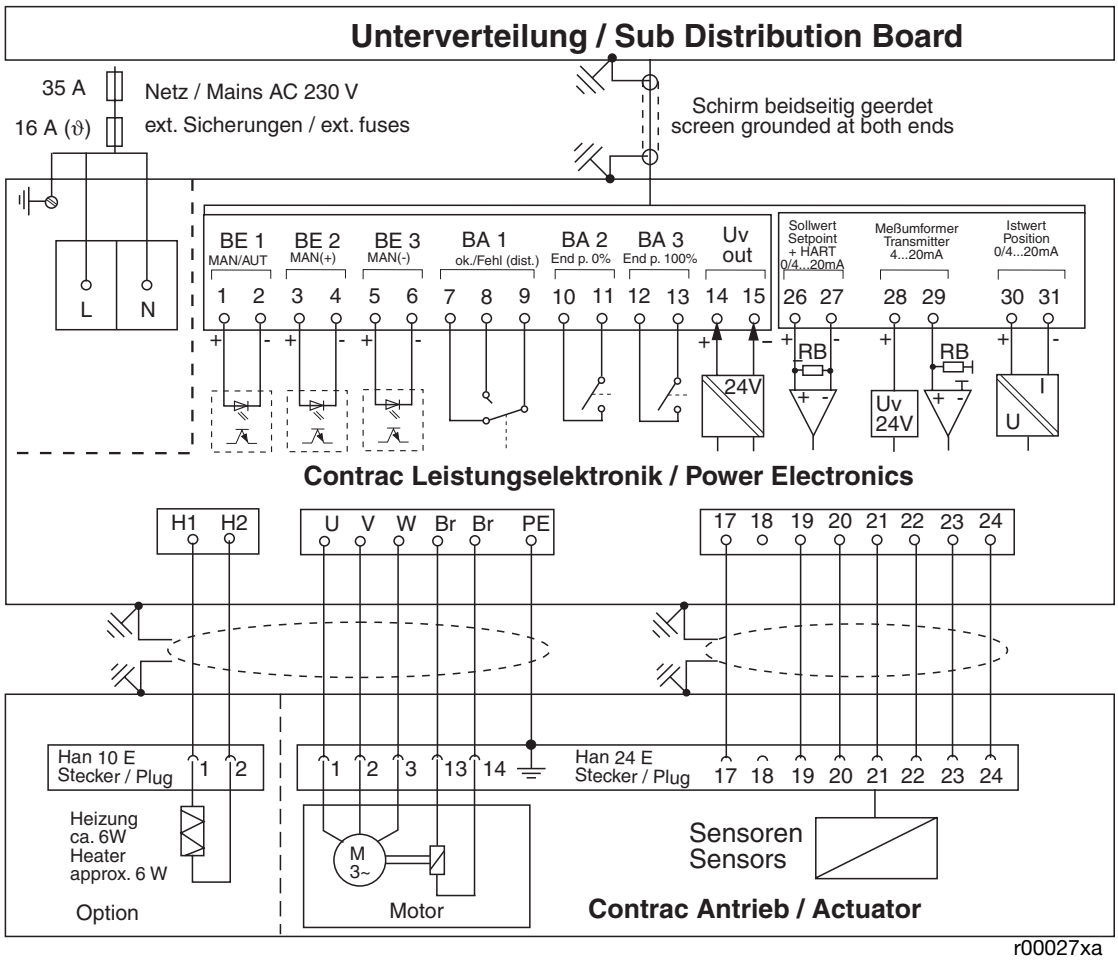


Figure 9:

8.6 Wiring diagram EBN 861 (Profibus DP)

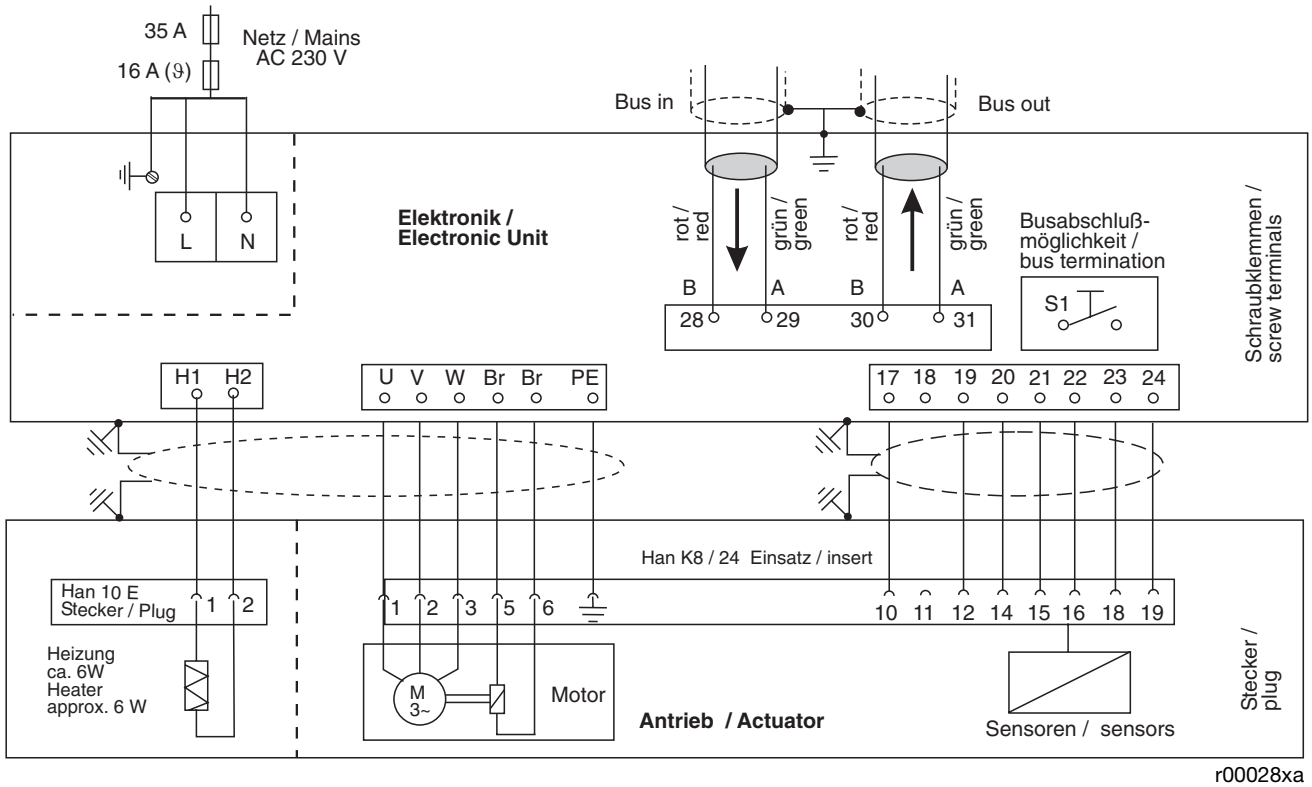


Figure 10:

8.7 Signal Inputs and Outputs

8.7.1 Standard

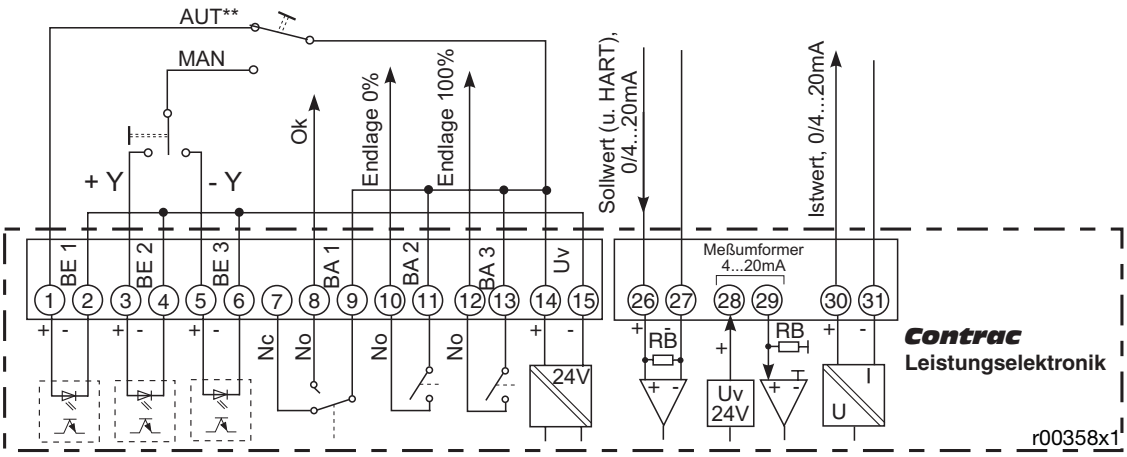


Figure 11:

8.7.2 Operation after a Step Controller

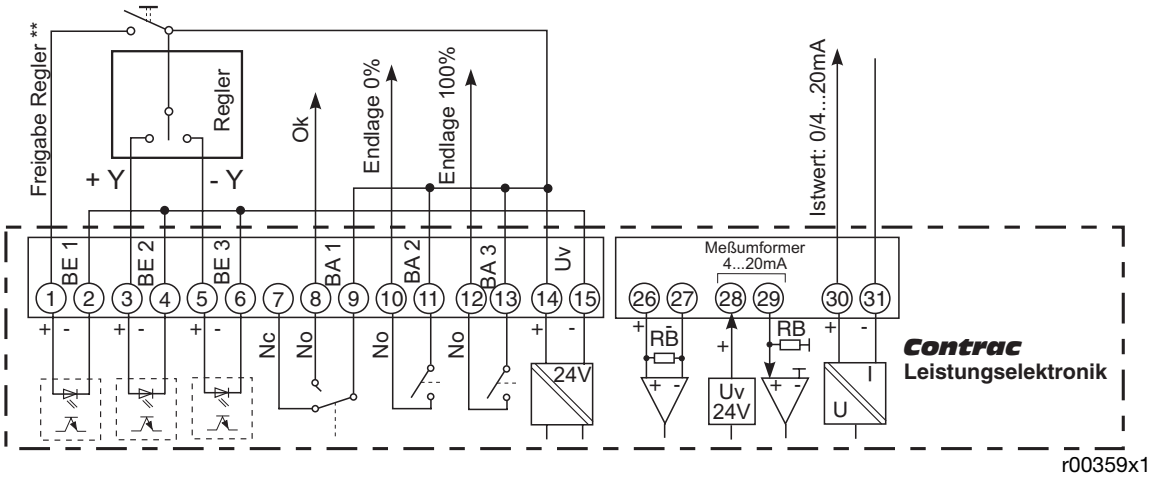


Figure 12:

8.8 Connecting the Cable Shield

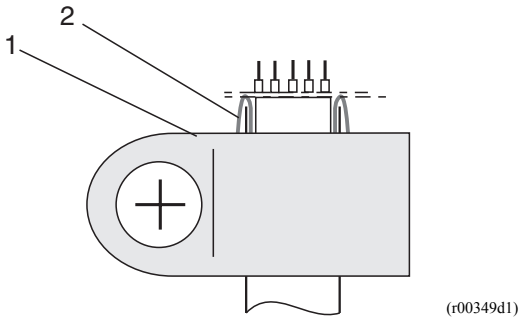
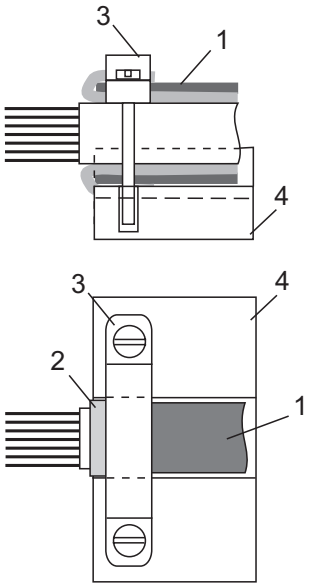


Figure 13: Connecting the cable shield of EAN 823 and EBN 853



- 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.

Figure 14: Connecting the cable shield of EBN 861

9. Setup

The basic settings (definition of end positions) can be made via the **L**ocal **C**ontrol **P**anel (LCP). It is used for adapting the actuator to the operating range and the effective direction without a PC. The actuator can be set up and configured completely using the appropriate configuration program.

The commissioning and service field is located on the electronics!

9.1 Setup via LCP

9.1.1 Operating 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 and clear any 0% and 100% values.
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)
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 11 to complete the adjustment procedure.
10.	Accept button (100%)	Press to define current position as 100%; simultaneously press push button 10 to complete the adjustment procedure

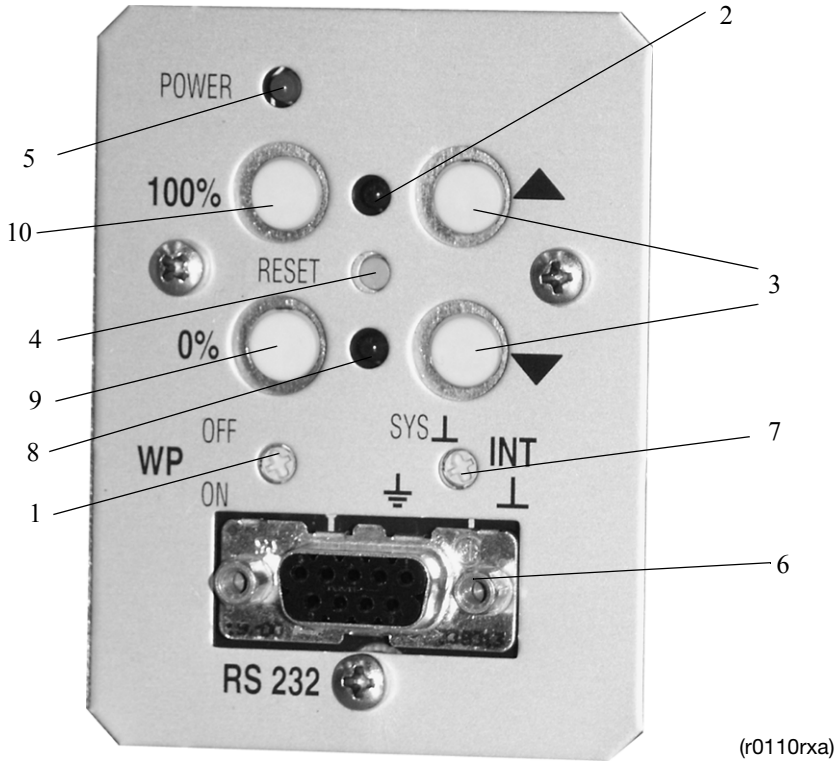


Figure 15: **L**ocal **C**ontrol **P**anel (LCP)

The actuator range is not preset in factory!

9.1.2 Initial 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)

9.1.3 Setup procedure

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

9.1.3.1 “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. 4 Hz.

9.1.3.2 Defining first position (0% or 100%)

- Move to desired position by pressing one push button (3).
- To accept the position, press push button (10) or (9); the associated LED flashes at approx. 1 Hz when value is correctly accepted, the other continues to flash at approx. 4 Hz

(Higher precision in 2nd position)

9.1.3.3 Defining second position (0% or 100%)

- Move to second position by pressing one push button (3).
- To accept the position, press push button (10) or (9); both LEDs (2) and (8) are flashing at approx. 1 Hz when value is accepted correctly.

9.1.3.4 Saving the settings

- The settings are accepted by simultaneously pressing the push buttons (10 + 9); the LEDs (2 + 8) extinguish after a short time, and the adjustment procedure is completed.
- If the selected range is too small for the actuator, both LEDs will flash again at 4 Hz. Repeat the adjustment procedure a larger value (min. positioning travel). (See positioning travel specification on actuator ID label)

9.1.3.5 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 done after saving the settings, the entire adjustment procedure must be repeated.

9.2 Adjustment 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.

9.3 Indication at LCP

Function	Indication
Adjustment	
Change-over to adjustment mode: Press and hold both drive switches for approx. 5 seconds	Both LEDs flash synchronously at approx 4 Hz after time has expired.
Moving to an end position Use respective drive button on CSF	Both LEDs continue to flash at 4 Hz while driving.
Saving the first end position Press button 0% or 100%	The associated LED flashes at approx. 1 Hz, the other continues at 4 Hz.
Saving the second end position Press button 0% or 100%	The associated LED flashes at approx. 1 Hz synchronously to the first one.
Terminate adjustment Press 0% and 100% buttons simultaneously	Both LEDs are briefly lit together and then extinguish.
Operation	
Normal operation: MAN / AUT	LED off
Driving with button on CSF Priority over control system	LED off
Fault (both LEDs flash alternately at 4 Hz)	
Reset: Resets fault indications	If no other fault conditions exist, both LEDs extinguish.
Reset if operating range is exceeded; press and hold both drive button for 5 seconds, then press Reset button	After approx. 5 seconds the flash rhythm is briefly interrupted. After “Reset” the electronics switch to adjustment mode.

Table 6:

Subject to technical changes.

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