

Electrical Linear Actuator RSDE10 ... 50 (Contrac)

Rated forces
10 ... 50 kN (2200 ... 11000 lbf)
In explosion-proof design



HART
FIELD COMMUNICATIONS PROTOCOL

PROFI
BUS

Electrical Linear Actuator RSDE10 ... 50 (Contrac)

Operating Instructions

42/68-287-EN

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Rev. D

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1	Safety	5
1.1	General Safety Information	5
1.2	Proper use	5
1.3	Technical limits	5
1.4	Warranty provision	6
1.5	Labels and symbols	6
1.5.1	Symbols and warnings	6
1.5.2	Name plate	7
1.6	Operator liability	7
1.7	Personnel qualification	7
1.8	Returning devices	8
1.9	Disposal	8
1.9.1	Information on WEEE directive 2002/96/EC (Waste Electrical and Electronic Equipment)	8
1.10	Transport safety information	8
1.11	Storage conditions	9
1.12	Installation safety information	9
1.13	Electrical installation safety information	9
1.14	Operating safety information	10
1.15	Maintenance safety information	10
2	Explosion-protection safety precautions	11
2.1	Operation via frequency transformer	11
2.2	Preventing electrostatic charging	11
3	Design and function	12
4	Installation	13
4.1	Actuator check	13
4.2	Mounting position	13
4.2.1	RSDE10 / RSDE20	13
4.2.2	RSDE50	14
4.3	Installation instructions	14
4.3.1	Valve requirements	15
4.4	Mounting examples	15
4.5	Adaptation of actuator stroke to the valve stroke	16
4.6	Assembly with the valve	16
5	Electrical connection	17
5.1	Cable shield	18
5.1.1	Signal part	18
5.1.2	Motor	18
5.2	Terminal connection diagrams	19
5.2.1	Power Electronic Unit EBN853 (Contrac)	19

Contents

5.2.2	Power Electronic Unit EBN861 (Contrac)	21
5.2.3	Power Electronic Unit EBS852 (Contrac) / EBS862 (Contrac)	23
6	Operation	24
6.1	Automatic / manual mode	24
6.2	Manual operation	24
7	Maintenance	25
7.1	Inspection and overhaul	25
7.2	Brake adjustment	27
7.3	Oil change	27
7.4	Filling capacity	28
8	Trouble shooting	29
8.1	Electrical test values	29
9	Technical data	30
9.1	General information	30
9.2	Technical data RSDE10 ... RSDE20	30
9.3	Technical Data RSDE50	31
9.4	Technical data for the cable set (for Ex-relevant range)	32
10	Appendix	33
10.1	Permits and certifications	33
11	Index	44

1 Safety

1.1 General Safety Information

The “Safety” chapter provides an overview of the safety aspects to be observed for the operation of the device.

The device is built based on state-of-the-art technology and is operationally safe. It was tested and left the factory in a proper state. The requirements in the manual as well as the documentation and certificates must be observed and followed in order to maintain this state for the period of operation.

The general safety requirements must be complied with completely during operation of the device. In addition to the general information, the individual chapters of the manual contain descriptions about processes or procedural instructions with specific safety information.

Only the observance of all safety information enables the optimal protection of personnel as well as the environment from hazards and the safe and trouble-free operation of the device.

1.2 Proper use

The actuators are used for operating final control elements (valves, vanes, etc.). They may only be operated using the appropriate Contrac electronic unit for field or rack installation. Do not use these actuators 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. In addition to these operating instructions, the relevant documentation for the electronic unit and software tools must be observed.

Repairs, alterations and enhancements or the installation of replacement parts is only permissible as far as described in the manual. Further actions must be verified with ABB Automation Products GmbH. Excluded from this are repairs performed by ABB-authorized specialist shops.

1.3 Technical limits

The device is designed for use exclusively within the stated values on the name plate and in the technical specifications (see “Technical Specifications” chapter and data sheet). These must be complied with accordingly, e.g.:

- The maximum operating temperature may not be exceeded.
- The permitted operating temperature may not be exceeded.
- The housing protection system must be observed.

1.4 Warranty provision

A use contrary to the device's stipulated use, disregarding of this manual, the use of under-qualified personnel as well as unauthorized alterations excludes the manufacturer of liability from any resulting damages. The manufacturer's warranty expires.

1.5 Labels and symbols

1.5.1 Symbols and warnings

**Danger – <Serious damage to health / risk to life>**

One of these symbols in conjunction with the "Danger" warning indicates an imminent danger. If it is not avoided, death or serious injury will result.

**Warning – <Bodily injury>**

The symbol in conjunction with the "Warning" message indicates a possibly dangerous situation. If it is not avoided, death or serious injury could result.

**Caution – <Slight injuries>**

The symbol in conjunction with the "Caution" message indicates a possibly dangerous situation. If it is not avoided, slight or minor injury can result. May also be used for property damage warnings.




**Notice – <Property damage>!**

The symbol indicates a possibly damaging situation. If it is not avoided, the product or something in its area can be damaged.

**Important**

The symbol indicates operator tips or especially useful information. This is not a message for a dangerous or damaging situation.

1.5.2 Name plate

1	Antrieb / Actuator: CONTRAC		
2	F-Nr./No	NL	
3	M =	Jahr/Year	CE 
4	t =	IP 66	
5	min.....max.	max.	
6	Öl / Oil:		
7	Mit / With Elektronik/Electronics EBN ../EBS...		
8	II 2 G/D ck EEx de [ib] ib II B T4 bzw IP6x T=130°C		
9	ZELM 04 ATEX 0209 X		
10			
ABB Automation D-32425 Minden Made in Germany 			

M00305

Fig. 1

- | | |
|--|--------------------------------------|
| 1 Complete model name | 6 Filled oil types |
| 2 Fabrication no./ NL no. (no. of non-standard version) | 7 Associated Contrac electronic unit |
| 3 Output torque / Year of manufacture | 8 Explosion protection class |
| 4 Permissible ambient temperature and protection class / CE mark with information about the monitoring authority | 9 Certification authority |
| 5 min./max. crank angle and max. actuating speed | 10 Free for customer-specific entry |

1.6 Operator liability

The operators must strictly observe the applicable national regulations in their countries with regards to installation, function tests, repairs, and maintenance of electrical devices.

1.7 Personnel qualification

The installation, commissioning and maintenance of the device may only be carried out through trained specialist personell authorized by the plant operator. The specialist personnel must have read and understood the manual and comply with its instructions.

1.8 Returning devices

Use the original packaging or a suitably secure packaging for returning the device for repair or for recalibration. Include the properly filled out return form (see attachment) with the device.

According to EC guidelines for hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for its shipping:

All delivered devices to ABB Automation Products GmbH must be free from any hazardous materials (acids, alkali, solvents, etc.).

1.9 Disposal

ABB Automation Products GmbH actively promotes environmental consciousness and has an operational management system in accordance with DIN EN ISO 9001:2000, EN ISO 14001:2004 and OHSAS 18001. Our products and solutions should have minimum impact on the environment and persons during manufacture, storage, transport, use and disposal.

This includes the environmentally friendly use of natural resources. Through its publications ABB conducts an open dialog with the public.

This product/solution is manufactured from materials that can be reused by specialized recycling companies.

1.9.1 Information on WEEE directive 2002/96/EC (Waste Electrical and Electronic Equipment)

This product/solution is not subject to the WEEE directive 2002/96/EC and relevant national laws (e.g., ElektroG in Germany).

Dispose of the product/solution directly in a specialized recycling facility and do not use the municipal garbage. Only privately used products may be disposed of in the municipal garbage according to the WEEE directive 2002/96/EC. Proper disposal prevents negative effects on people and the environment, and supports the reuse of valuable raw materials.

If it is not possible to dispose of old equipment properly, ABB Service can accept and dispose of returns for a fee.

1.10 Transport safety information

Check the devices for possible damage that may have occurred from improper transport. Damages in transit must be recorded on the transport documents. All claims for damages must be claimed without delay against the shipper and before the installation.

1.11 Storage conditions

The actuators 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.

Actuators, equipped with an anti condensation heater, are additionally protected by desiccant, which is placed in the following locations:

Position sensor:	in connection chamber
electronic unit (separately supplied):	electrical connection area

The desiccant guarantees sufficient protection for approximately 150 days. It can be regenerated at a temperature of 90 °C (114 °F) within 4 h.



Important

Remove the desiccant prior to commissioning the actuator or the electronic unit.

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

1.12 Installation safety information

- The actuators perform movements for positioning vanes and valves, etc.
- Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the control actuator, and to make the electrical connection.
- When working on the actuator itself or the electronics always observe the locally valid accident prevention regulations and the regulations concerning the construction of technical installations.
- The eyebolt at the top of the actuator may only be used to lift or lower the actuator vertically.
- Do not use the handwheel to lift or to lower the actuator..
- Do not use it if the actuator is mounted at the valve! Make sure that the final control element is not exposed to process forces.

1.13 Electrical installation safety information

The electrical connection may only be performed by authorized specialist personnel according to the electrical plans.

Comply with electrical connection information in the manual. Otherwise, the electrical protection class can be affected.

The secure separation of contact-dangerous electrical circuits is only guaranteed when the connected devices fulfill the requirements of the DIN EN 61140 (VDE 0140 Part 1) (basic requirements for secure separation).

For secure separation, run the supply lines separated from contact-dangerous electrical circuits or additionally insulate them.

1.14 Operating safety information

**Warning - risk of injury!**

Note that the actuator position may be changed accidentally by the repelling power of the valve when the brake is released!

Before switching on, ensure that the specified environmental conditions in the “Technical Specifications” chapter or data sheet are complied with and that the power supply voltage corresponds with the voltage of the actuator.

When there is a chance that safe operation is no longer possible, put the device out of operation and secure against unintended operation.

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

- Lock the handwheel with a cotter pin in order to avoid unintentional manual actuator operation. Switch-off the power supply to the motor prior to any manual operation.

1.15 Maintenance safety information

- When changing the oil of the actuator, thoroughly remove any oil that may have run down on the floor during the procedure to avoid accidents.
- Dispose of the waste oil in compliance with the respective local regulations. Make sure that no oil reaches the water cycle.
- Switch off the supply voltage for the power electronic unit and separate anti-condensation heater (option) when working on the actuator or related subassemblies and take precautions to prevent unintentional switch-on.
- Make sure that any oil leaking from the device cannot come into contact with hot parts

2 Explosion-protection safety precautions



Important

Technical modifications to the actuator or motor cancel the explosion protection.

- Before installing the actuator, review the information on the ID label regarding device class, Ex category, Ex zone and temperature class to make sure the actuator is approved for operation in the relevant hazardous area. In the event of deviations, the actuator may not be put into operation.
- Check the oil level and mounting position prior to commissioning the device in explosive atmospheres.

2.1 Operation via frequency transformer

- The frequency converter (electronic unit) may not be installed or used within the hazardous area.
- Check whether the electronic unit is loaded with the parameters of the actuator it is connected to.
- Check the electronic unit for proper connection to the correct actuator.
- Setpoint monitoring is activated as default setting when the electronic unit leaves the manufacturer. Do not de-activate this setting.
- Rapid traverse mode is not allowed on Ex actuators, and the feature cannot be activated from the user interface.
- The Contrac power electronic unit must be upstream from the motor temperature monitoring unit SD241B or similar, certified tripping unit.

2.2 Preventing electrostatic charging

Due to potential unallowed charging of the housing, the effects of high voltage sources on the equipment must be prevented. Wiping with a dry rag or circulating dust loaded atmosphere may also cause electrostatic charge. In order to avoid this charge only use a wet rag. Avoid circulation by throttling or separation.

3 Design and function

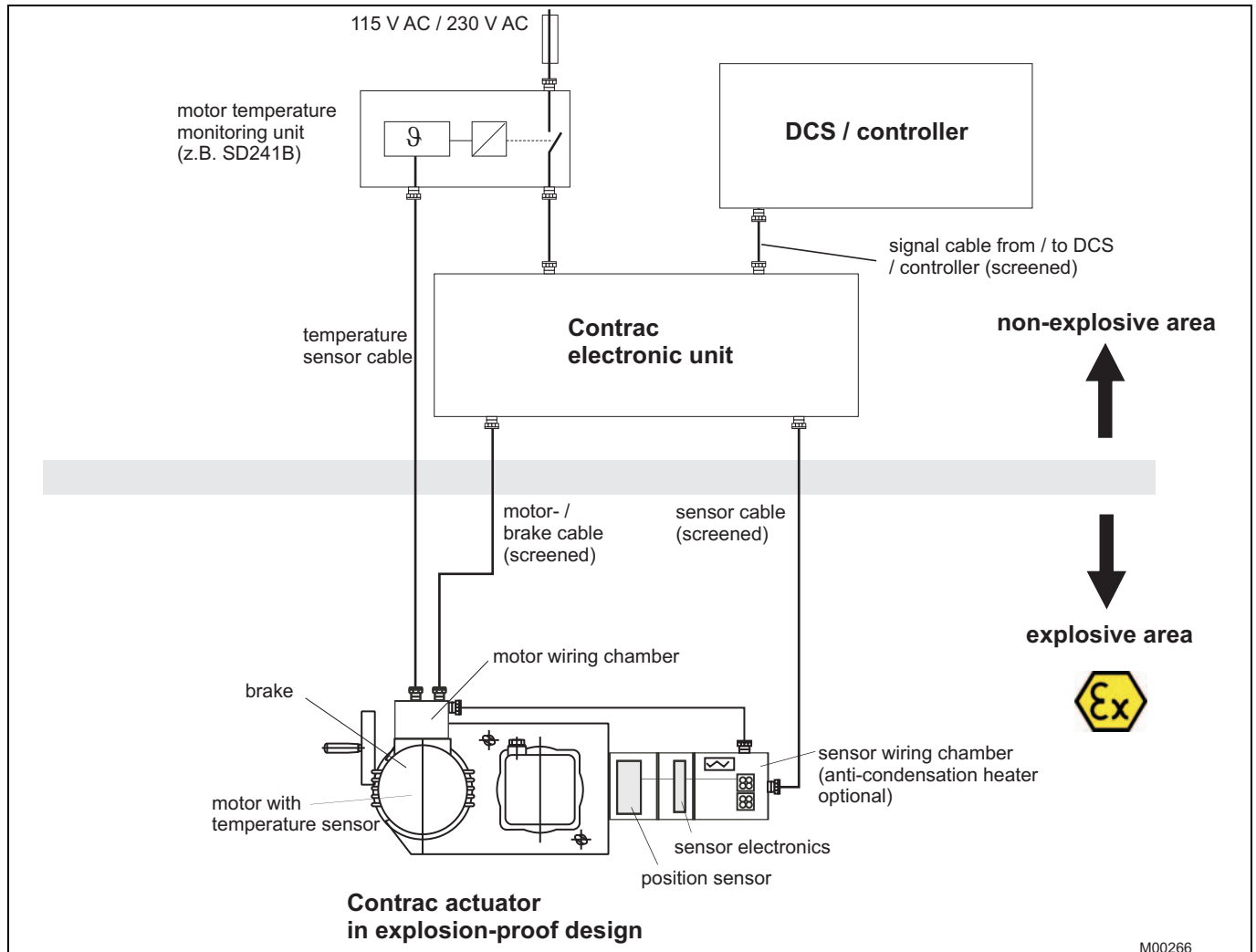


Fig. 2: Ex design

M00266

4 Installation

4.1 Actuator check

Before you start to install the actuator make sure that the delivery status corresponds to the ordered status and to the intended use.

- Check the oil level when installing the device in positions other than IMV 1.
- Did you fasten the separately delivered venting plug (spare part no. 9287338) in the uppermost bore (depending on the mounting orientation)?
- Make sure that the motor and the connection chambers are free of dirt, moisture and corrosion.
- Make sure adequate travel is provided for the valve stroke.

4.2 Mounting position

The gears of the actuator RSDE10 ... 50 (Contrac) are oil lubricated. They contain the max. oil quantity when leaving the manufacturer. Once the actuator is installed replace the uppermost check plug by the separately supplied venting plug.

4.2.1 RSDE10 / RSDE20

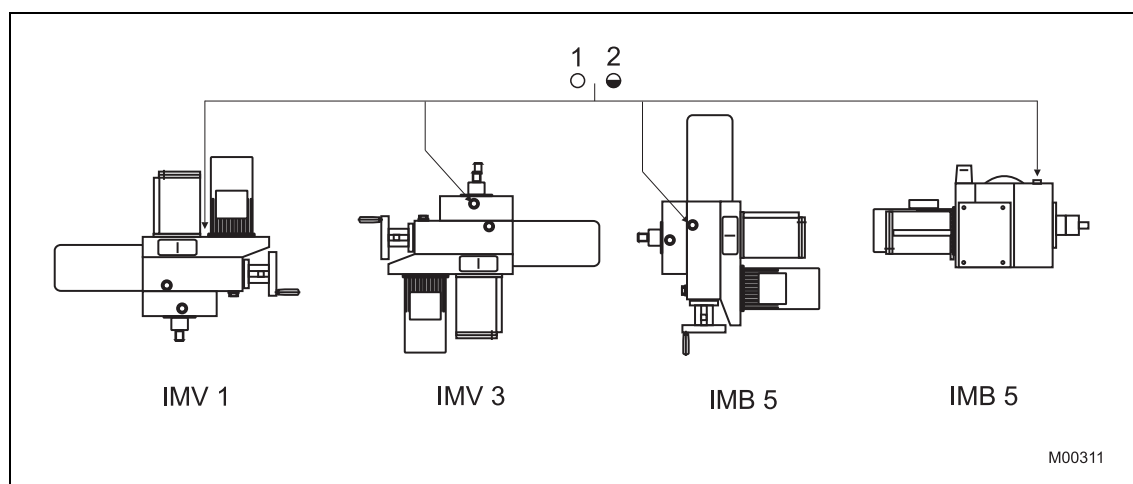


Fig.3

- 1 Inspection plug
- 2 Venting plug

4.2.2 RSDE50

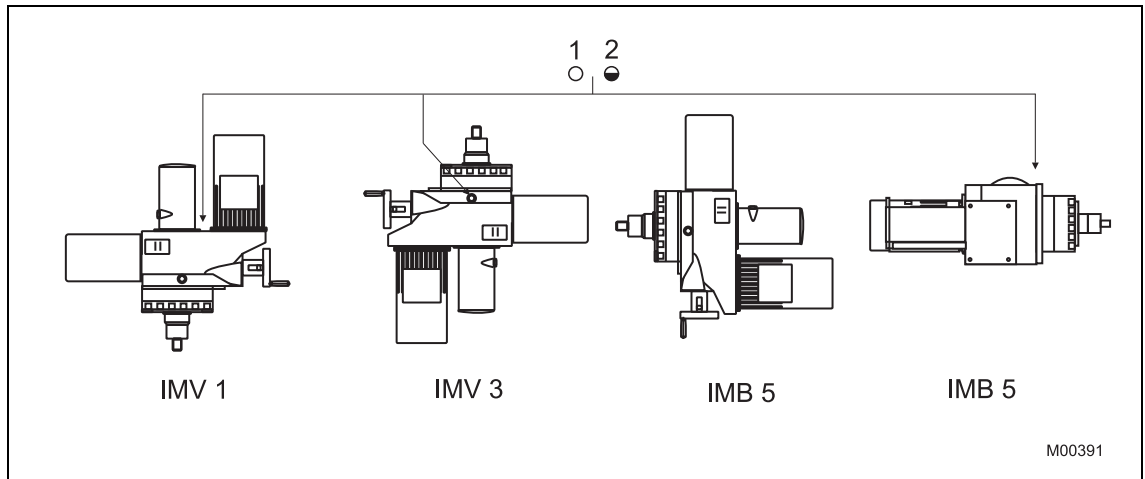


Fig. 4

- 1 Inspection plug
- 2 Venting plug

All mounting orientations shown in Fig.3 and Fig. 4 are permissible. To facilitate mounting and maintenance, however, it is recommended to use orientation IMV 1. For each mounting position, check the oil level prior to commissioning.

In order to ensure sufficient ventilation and space for motor de-/installation allow for min. 80 mm (3.15 inch).

4.3 Installation instructions

- Make sure that the actuator is accessible from all sides to ensure convenient hand wheel operation, electrical connection, and replacement of assemblies.
- Avoid direct exposure to rain, snow and other environmental influences.
- The surface temperature increase during the operation caused by the heat transfer via the interface between actuator and valve may not exceed a surface temperature of 100 °C (212 °F). Check the surface temperature at regular intervals.
- In IMV 1 mounting position, the actuators are resistant against vibrational loading acc. to EN 60068-2-6, table C.2 up to 150 Hz and additionally 1 g / 30 min. If the operating conditions do not clearly allow you to estimate whether the vibrational loading remains significantly below the proven contingent, reduce the maintenance intervals accordingly to avoid oil leakage.
- Make sure that the thrust rod and the valve stem are not exposed to additional vibrational loading that exceeds by double the rated force (e.g., by a spring coupling or a vibration absorber between thrust rod and valve stem).
- The maximum rated force of the actuator may not be permanently exceeded. For a short period, the force can be increased by up to twice the rated force is permitted.
- When mounting the actuator close to heat sources use an insulating layer or shielding.
- The ambient temperature may not exceed 60 °C (140 °F). If necessary, use an appropriate roof to avoid heat radiation.
- The internal stroke limiter prevents the actuator thrust rod from leaving the housing. Make the mechanical adjustment so that in the end position there is still a 3% gap to its internal counterpart.

4.3.1 Valve requirements

- The force in the end position can be up to 2.5 times higher than the rated force.

4.4 Mounting examples

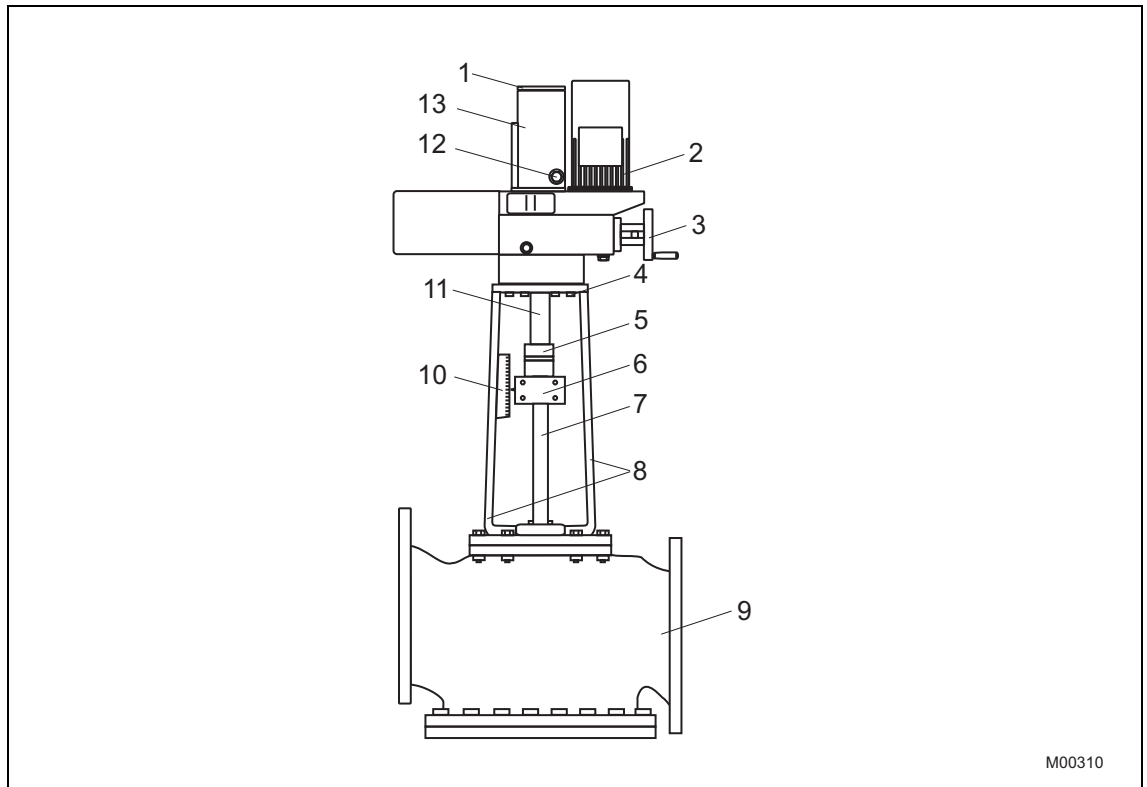


Fig. 5: Installation example RSDE10 ... 50 (Contrac)

- | | |
|-------------------------|----------------------------------|
| 1 Cover for thrust rod | 9 Valve |
| 2 Servo motor | 10 Mechanical position indicator |
| 3 Hand wheel | 11 Thrust rod |
| 4 Mounting screws (8.8) | 12 Screw plug for stop position |
| 5 external stop | 13 Thrust rod cover |
| 6 Coupling | |
| 7 Valve stem | |
| 8 Valve yoke | |

4.5 Adaptation of actuator stroke to the valve stroke

The factory-set actuator stroke corresponds to the stroke named on the ID-label + 1 mm (0.04 inch). If an application requires stroke adjustment, proceed as follows (comply with min./max. stroke; see technical data):



Important

With a mounting position other than IMV 1, drain the oil until the oil level is below the thrust rod cover (Fig. 5/13).

1. Drive the thrust rod manually completely out. The internal limit stop should now be touching the driving sleeve.
2. Loosen the screws of the thrust rod cover and remove the cover.
3. Open the screw plug in the thrust rod cover.
4. Both Allen clamping screws are accessible through the opening. Loosen the screws.
5. Use the hand wheel to drive in the thrust rod until the actuator stroke matches the required valve stroke.
6. Turn the internal limit stop (slotted ring nut) clockwise until it is touching the drive sleeve. Finally, turn it back approx. 1 turn.
7. Tighten both Allen screws to the required torque (26 Nm (19.18 Lbf-ft)).
8. Reattach the cover for the thrust rod.
9. Screw in the lateral screw plug.
10. Fill the oil according to mounting position.

4.6 Assembly with the valve

1. Drive the thrust rod completely in and put the actuator onto the valve yoke.
2. Make sure the valve stem is aligned with the center of the bore and at right angles to the actuator seat (permissible parallel deviation < 0.1 mm (0.009 inch) with regard to total stroke).
3. Fasten the actuator to the yoke with screws of property class 8.8 (tensile strength 800 N/mm² (116032 pounds/square inch); yield strength 640 N/mm² (93550 pounds/square inch)).
4. Use the hand wheel to drive the thrust rod out; link the rod with the valve stem via the coupling.
5. Manually retract the thrust rod to check whether or not the external stop of the actuator is on the housing flange before the valve cone touches the cover.
6. If required, adjust with the coupling (only possible within certain limits!).

5 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.



Instructions regarding use in Ex applications

The electrical connection between the Contrac electronic unit and the Contrac actuator can be established using the cable set (order code 695). The cable harness is not part of the Ex prototype test certificate and must therefore be tested for safety-relevant functionality within the complete installation by the installer or operator.

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 (see 1) in chapter "**Cable shield**", page 18 and chapter "**Terminal connection diagrams**", page 19 ff.
- For the connection of the motor and the position transmitter only use ATEX certified EEx e cable glands with IP 66 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 IP 66 plugs.
- Use a certified cut-off unit for the thermal motor monitoring. Permitted units are, e.g.:
 - ABB motor temperature monitoring unit SD 241 B
 - 3 RN 1011-1 CK 00 , Ex II (2) GD , PTB 01 ATEX 3218, Siemens

5.1 Cable shield

5.1.1 Signal part

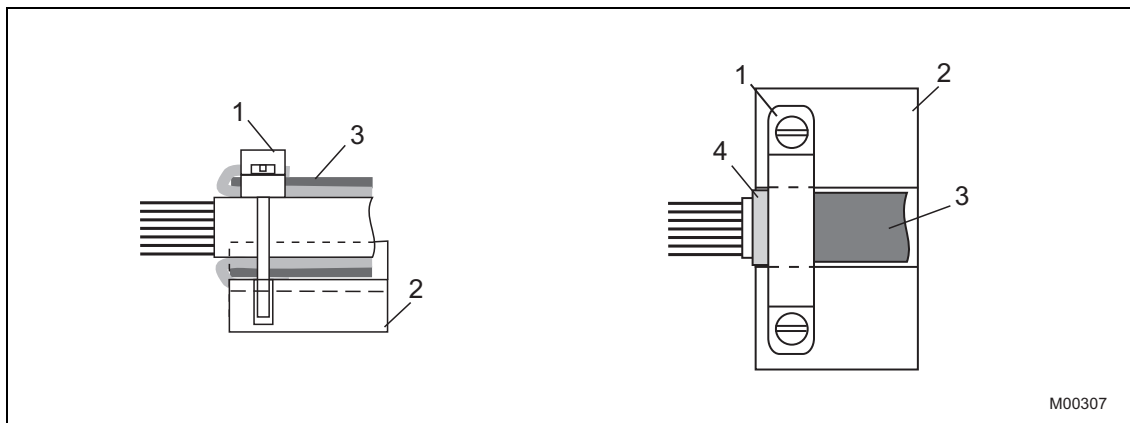


Fig. 6: Fitting the shield

1. Remove approx. 2 cm of cable sheathing (3) from the end of the cable.
2. Separate the shield and peel it back to its inner sheathing (4).
3. Push the cable through the cable gland and fasten with clamp (1).
4. Make sure that the shielding is touching the clamp and the electronic unit housing (2).

5.1.2 Motor

The cable shield must be connected to the motor in a proper manner.

5.2 Terminal connection diagrams

5.2.1 Power Electronic Unit EBN853 (Contrac)

5.2.1.1 Analog / digital



Important

The electrical connection is provided by terminals on the actuator and on the electronic unit.

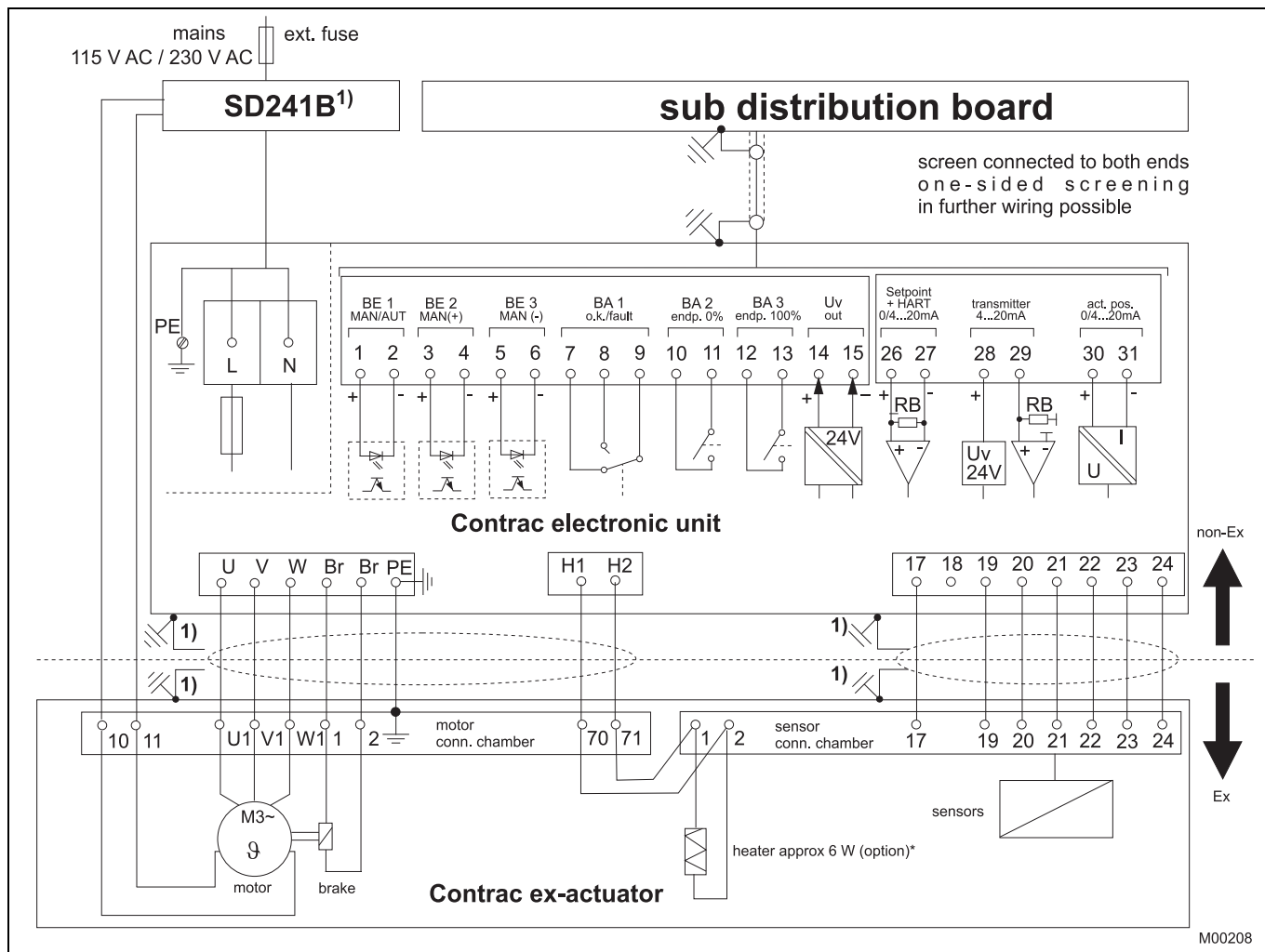


Fig. 7: Electrical connection: Ex actuator analog / digital

Electrical connection

5.2.1.2 PROFIBUS DP

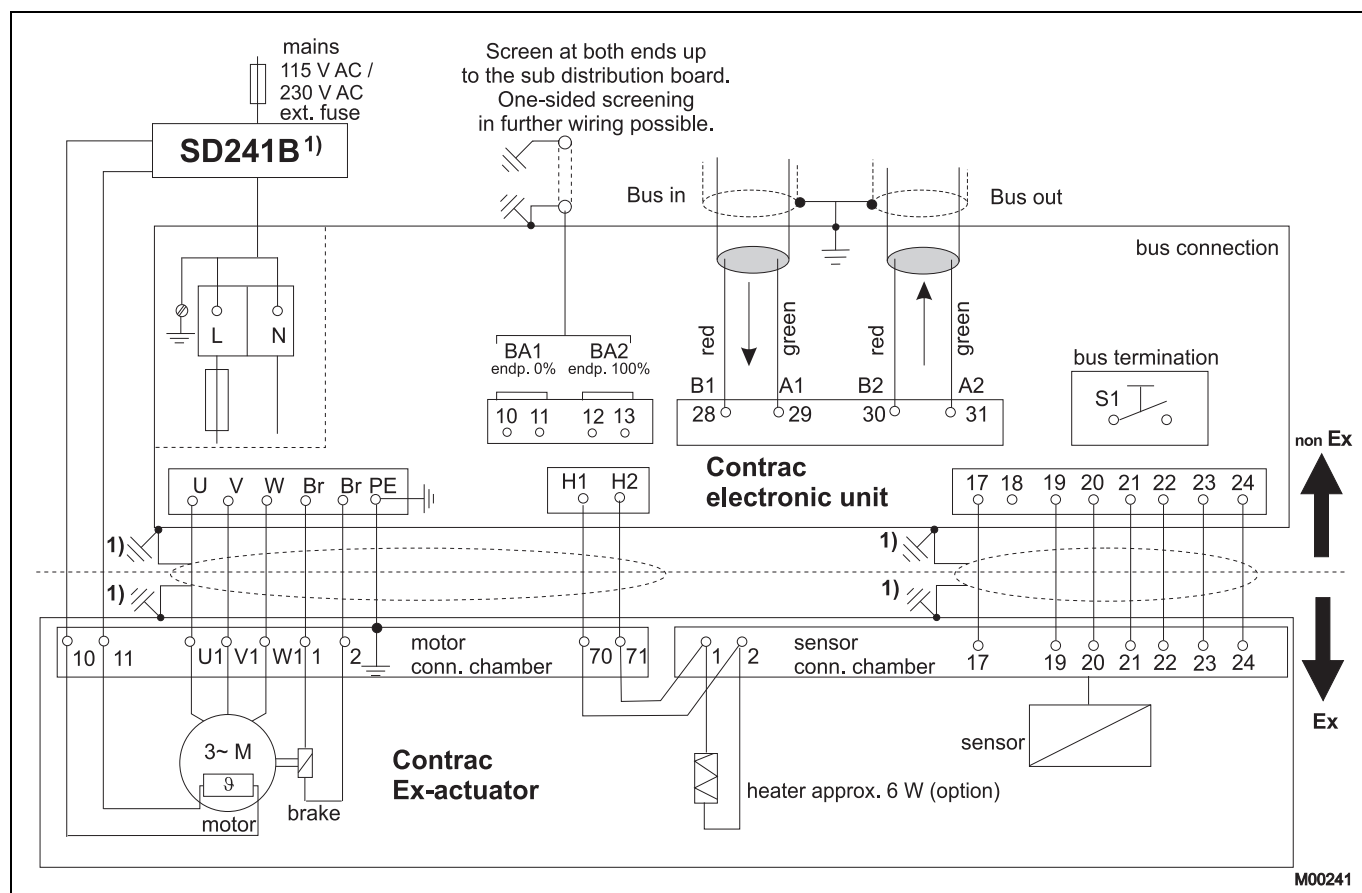


Fig. 8: Electrical connection: PROFIBUS DP option

5.2.2 Power Electronic Unit EBN861 (Contrac)

5.2.2.1 Analog / digital



Important

The electrical connection is provided by terminals on the actuator and on the electronic unit.

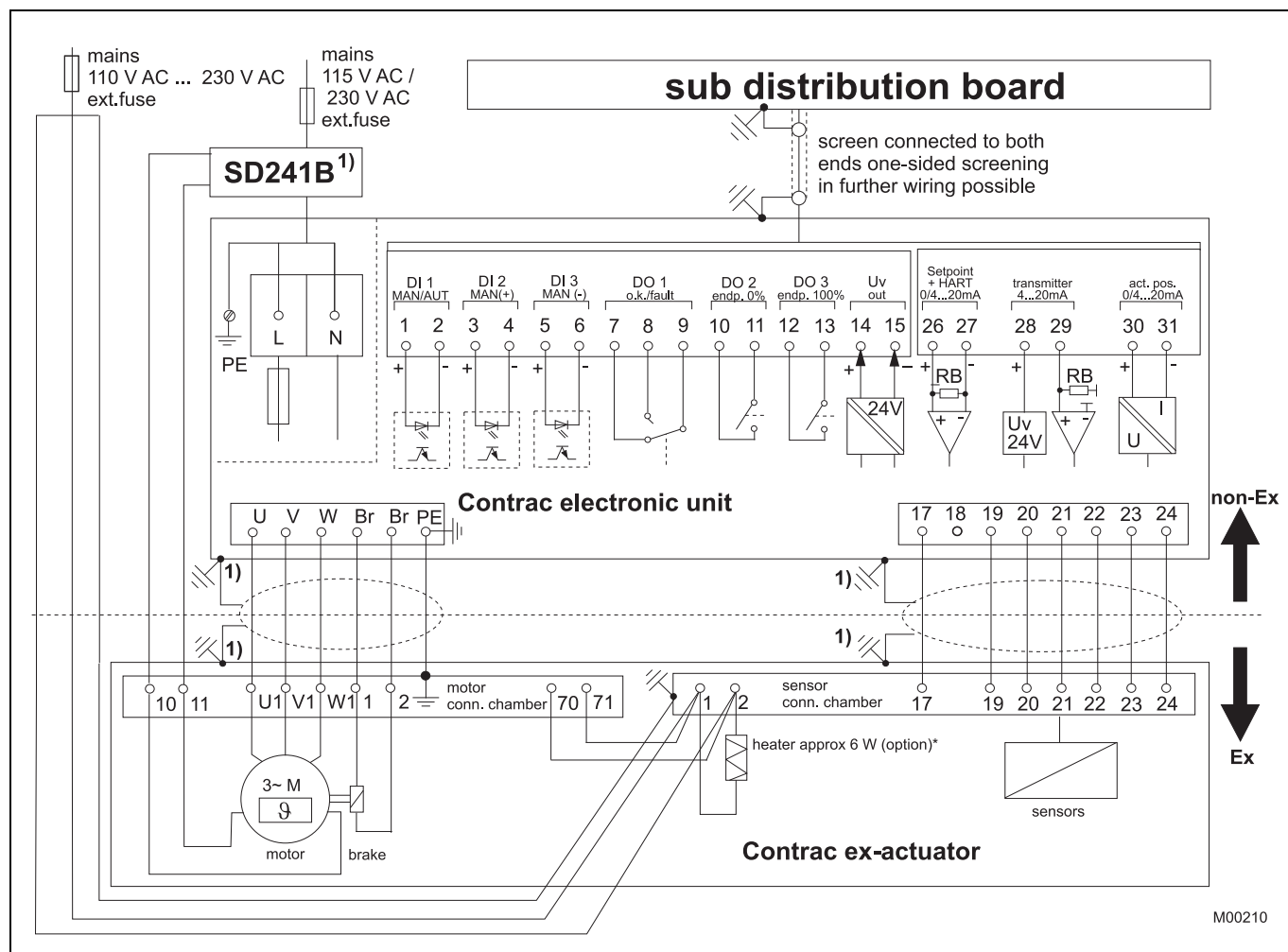


Fig. 9: Electrical connection: Ex actuator analog / digital



Important

* For separate heat supply, protect the heater with 2 ... max. 6 A medium time-lag fuses (e.g., Neozed D01CE14).

Electrical connection

5.2.2.2 PROFIBUS DP

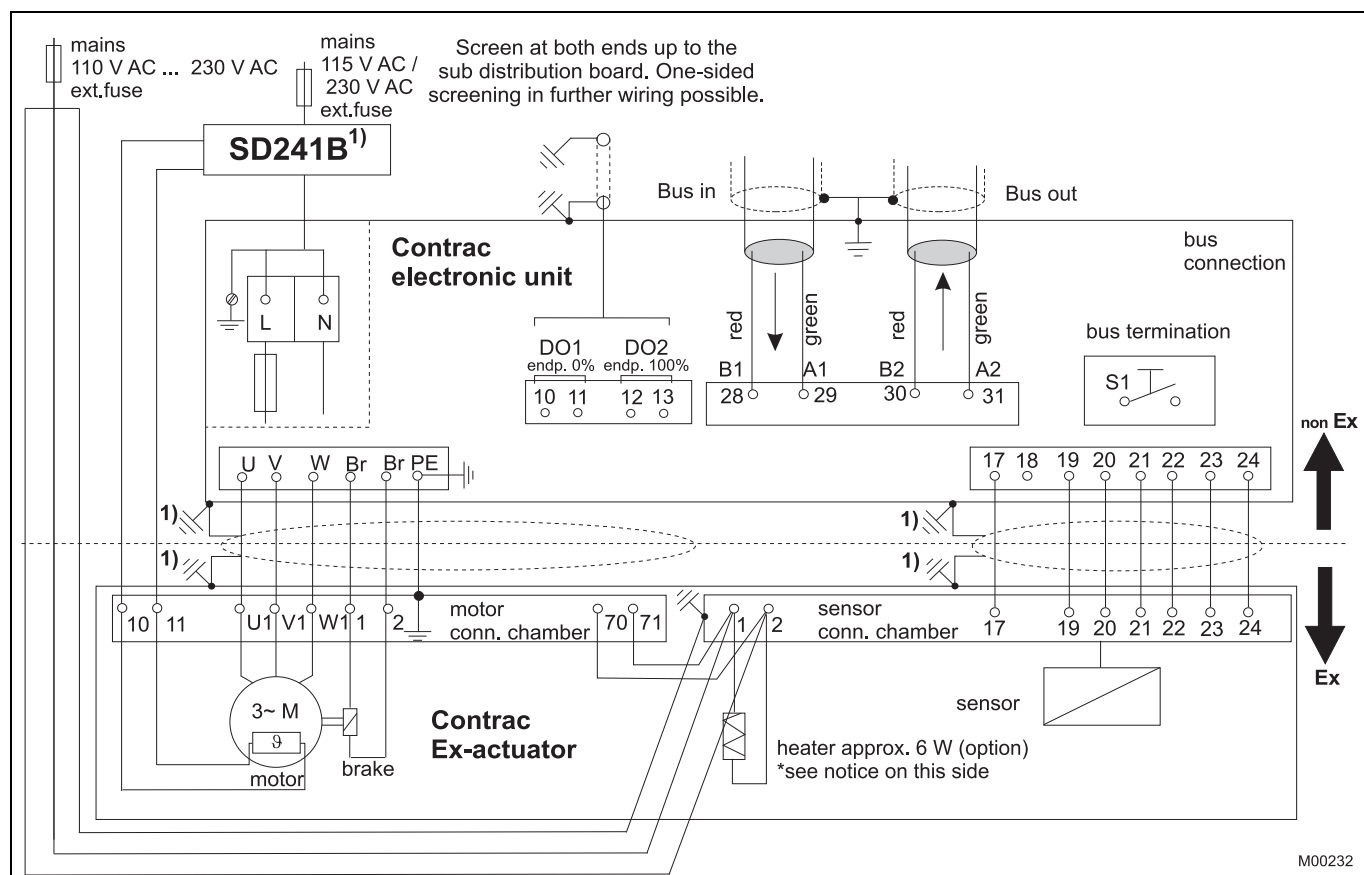


Fig. 10: Electrical connection: PROFIBUS DP option

i

Important

* For separate heat supply, protect the heater with 2 ... max. 6 A medium time-lag fuses (e.g., Neozed D01CE14).

5.2.3 Power Electronic Unit EBS852 (Contrac) / EBS862 (Contrac)

5.2.3.1 Analog / digital



Important

The electrical connection is provided by terminals on the actuator and on the electronic unit.

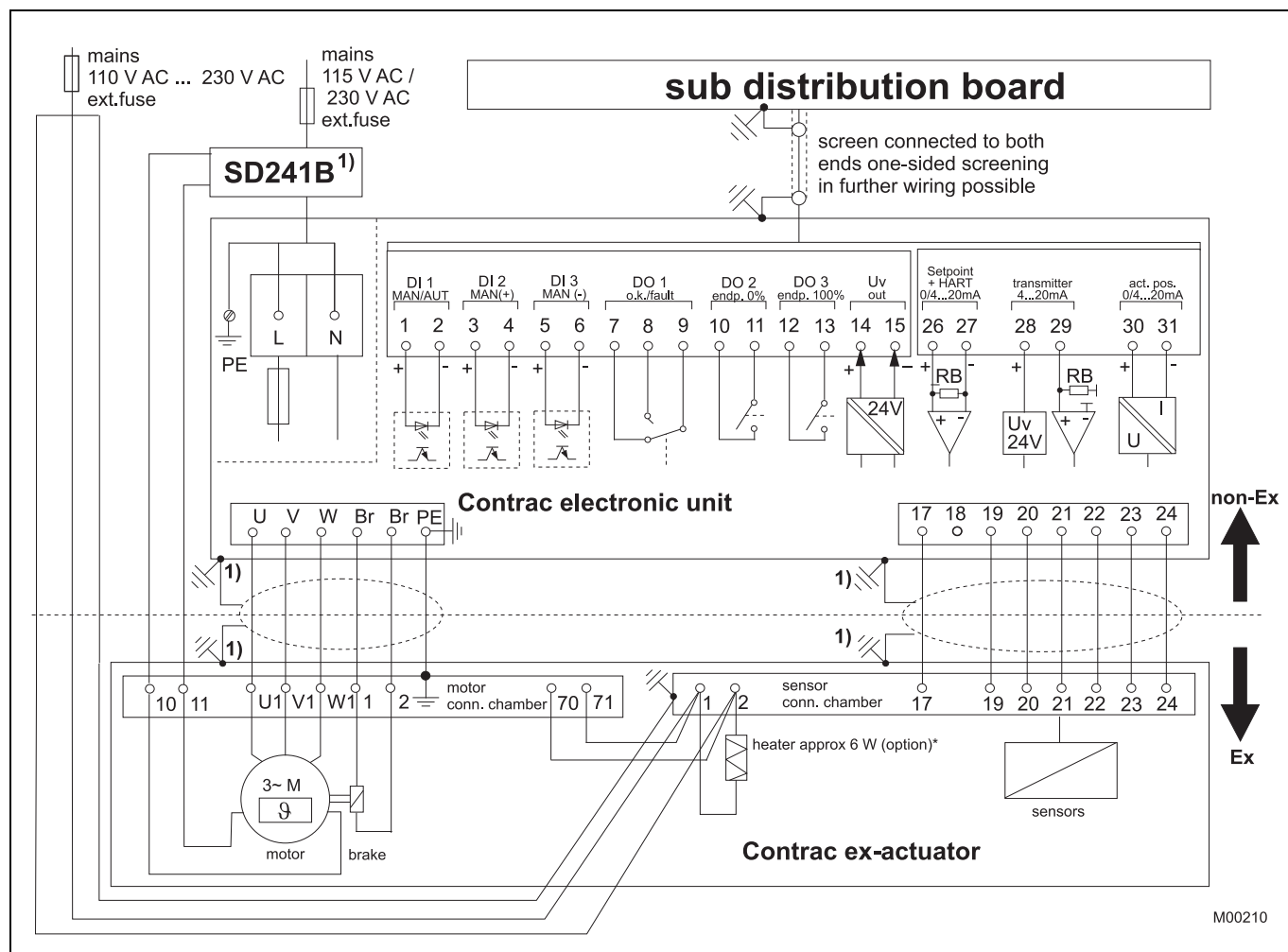


Fig. 11: Electrical connection: Ex actuator analog / digital



Important

* For separate heat supply, protect the heater with 2 ... max. 6 A medium time-lag fuses (e.g., Neozed D01CE14).

6 Operation



Important

The actuator is supplied with activated positioning loop monitoring in the power electronic unit as default settings. Do not de-activate this setting.

6.1 Automatic / manual mode

The motor triggered by the power electronics controls the axially fixed drive sleeve /nut assembly via oil-lubricated spur gears. A ball bearing screw (see Figure Fig. 12) radially fixed by an anti-twist arrester converts the rotary motion to a linear one. The screw is the upper part of the thrust rod and has an adjustable mechanical stop.

A position sensor detects backlash-free the thrust rod position via mechanical reduction gearing.

The motor brake locks the actuator in the current position if the power supply is cut off.



Fig. 12: Ball bearing screw with nut, cross-section

6.2 Manual operation

Manual mode allows you to move the actuator manually when the electrical power is off.



Warning - risk of injury!

Note that the actuator position may be changed accidentally by the repelling power of the valve when the brake is released!

1. Remove the cotter pin.
2. Press the hand wheel lock.
3. Turn the hand wheel to move the part-turn actuator to the desired position.
4. Release the lock.
5. Insert the cotter pin.

7 Maintenance



Important

All maintenance activities may only be performed by properly qualified persons.

Contrac actuators feature a robust construction. As a result, they are highly reliable and require minimal maintenance. The maintenance intervals depend upon the effective load and are therefore not specified here.

The built-in microprocessor evaluates the actual load factors (e.g. torques, forces, temperatures, etc.) and derives the remaining operating time until the next routine maintenance is required.

Use the configuration program to view this information.

7.1 Inspection and overhaul

- Only use genuine spare parts such as ball bearings, gaskets and oil.
- Proceed acc. to table when performing maintenance activities.
- Inspection or maintenance is due after the time specified in the table.
- Interpolate the replacement intervals for the thrust rod sealing ring (see Fig. 13/1), the associated O-ring (see Fig. 13/2), the scraper ring (see Fig. 13/3) and the (flange) O-ring (see Fig. 13/4).

Overhaul intervals:

Interval	Measures	
1 x per year	Visual check of the gaskets for leaks, change if necessary.	
every 2 years	functional check: drive the actuator 2 x through the entire stroke range and check for correct speed reduction.	
every 4 years	Check oil level	
max. every 10 years, preferably after the expiry of the calculated remaining service time	Change oil, roller bearings and gaskets on motor and gearing. Check gear wheels for wear; replace if necessary.	
thrust rod sealing, associated O-ring, scraper ring and (flange) O-ring	change after	at surface temperature
	5 years	100 °C (212 °F)
	10 years	20 °C (68 °F)

- Do not move the actuator during the oil check.
- Make sure that no chippings or other material get into the gearbox during the maintenance work.
- If the actuators are used within a II2D classified area, clean the surfaces regularly in order to avoid dirt deposits of more than 5 mm (0.20 inch). In order to avoid electrostatic charging use a damp cloth to clean the device.

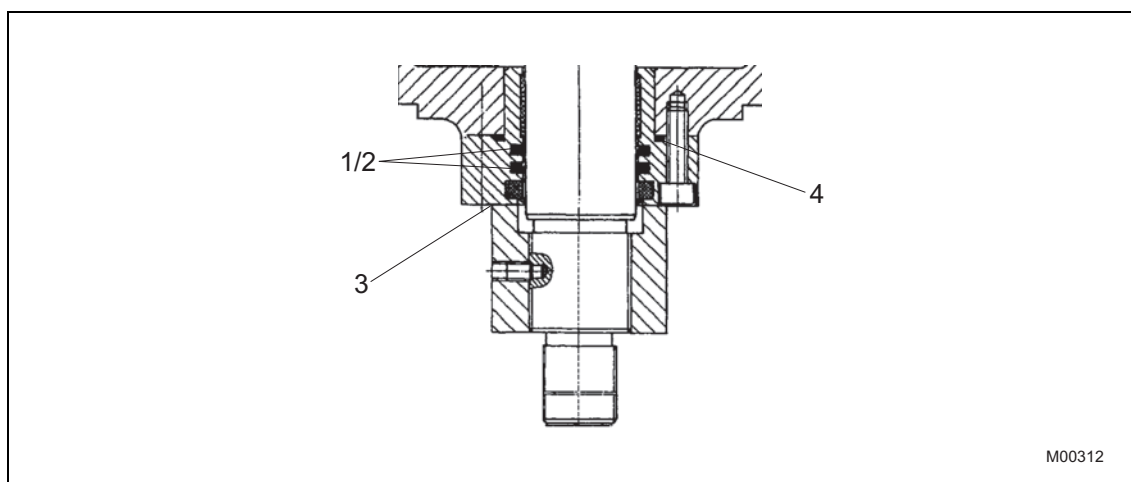


Fig. 13: Illustration of the thrust rod gaskets; item 4 not for RSDE10 / RSDE20

7.2 Brake adjustment

**Warning - risk of injury!**

Note that the actuator position may be changed accidentally by the repelling power of the valve when the brake is released!

Since the brake is permanently released in AUT mode it is not exposed to mechanical wear. Any readjustment is not necessary. Enables users to test the configuration software of the brake.

7.3 Oil change

Proceed as follows to drain or change the oil:

1. Provide a container capable of holding the expected oil quantity acc. to chapter Filling capacity.
2. Open and remove the venting plug, see Fig. 4.
3. Unscrew the lowermost inspection plug and drain the oil.
4. Make sure all the oil is out of the actuator.
5. Screw in and tighten the oil drain plug.
6. Fill the container with the proper volume of oil and tighten the venting plug.

Ambient temperature	Oil types (default oil filled with delivery)
-20 ... 60 °C (-4 ... 140 °F)	Mobil SHC 629

7.4 Filling capacity

Model	RSDE10 / RSDE20			
Mounting position	IMV 1	IMV 3	IMB 5	IMB 5
oil quantity, approx. max. stroke 100 mm (4 inch)	3.8 l (1.01 gal. ¹⁾)	5.4 l (1.43 gal. ¹⁾)	3.8 l (1.01 gal. ¹⁾)	3.8 l (1.01 gal. ¹⁾)
max. stroke 300 mm (11.8 inch)	6.4 l (1.69 gal. ¹⁾)	8.8 l (2.33 gal. ¹⁾)	6.4 l (1.69 gal. ¹⁾)	6.7 l (1.77 gal. ¹⁾)
oil level below check screw with retracted thrust rod	40 mm (1.57 inch)	0 mm (0 inch)	28 mm (1.10 inch)	75 mm (2.95 inch)

Model	RSDE50			
Mounting position	IMV 1	IMV 3	IMB 5	IMB 5
oil quantity, approx. max. stroke 120 mm (4.72 inch)	7 l (1.85 gal. ¹⁾)	10 l (2.65 gal. ¹⁾)	upon request	7 l (1.85 gal. ¹⁾)
max. stroke 300 mm (11.8 inch)	10 l (2.65 gal. ¹⁾)	12 l (3.17 gal. ¹⁾)		9.5 l (2.51 gal. ¹⁾)
oil level below check screw with retracted thrust rod	49 mm (1.93 inch)	0 mm (0 inch)	upon request	75 mm (2.95 inch)

¹⁾ US liquid gallon

8 Trouble shooting

This chapter only covers failures caused by the hardware. Use the online-help of the configuration software for an extended troubleshooting.

failure pattern	possible reason	troubleshooting
actuator can not move the valve.	failure either at the actuator or at the final control element (e.g., stuffing box tightened too much).	detach actuator from valve. if the actuator moves the valve is the possible cause. if the actuator does not run, the actuator is the possible cause.
actuator does not react.	incorrect electronic unit or incorrect data set.	Compare the nameplate data on the actuator and electronic unit.
	Incorrectly configured electronic unit.	Check/update the settings for the parametrization software
	no communication with the control system.	Check wiring
	incorrect wiring between actuator and electronic unit.	Check wiring
	motor / brake faulty.	Check the winding resistance of the motor and brakes Check the brake lock
	Binary inputs on the electronic unit are not wired.	Make connection
	Brake does not release (no mechanical "click").	Check the brake air gap (approx. 0.25 mm) and electrical connection to the brake check winding resistance of the brake coil
actuator does not run in AUT mode, although "AUT" is selected in the user interface.	Binary input 1 (BE 1) not wired.	Make connection Check the software settings for the binary inputs
LEDs in the commissioning and service panel (CSP) flash synchronously.	Actuator is not adjusted properly.	Adjust actuator
LEDs flash alternately.	Electronic unit / drive failure.	drive the actuator beyond the adjusted end position (either manually or using the push buttons on the CSP); <:hr>(if necessary disconnect from valve or damper)
failure when approaching the end position.	Actuator in limit range of positioning sensor.	drive the actuator back into the operating range and connect it to the valve / damper re-adjust the operating range

8.1 Electrical test values

	BD 80 K-4B	BD 80 L-4B	BD 90 L2-4B	BD 100 L2-4B
Winding resistance $\pm 5\%$ at 20 °C (68 °F)				
motor	18,2 Ω	8,04 Ω	3,88 Ω	2,57 Ω
brake	910 Ω	910 Ω	648 Ω	575 Ω

9 Technical data

9.1 General information

Operating mode	S9; stallproof acc. to IEC 60034-1 / EN 60034-1
Protection class	IP 66; explosion proof
Humidity	≤ 95% average; condensation not permitted
Ambient temperature	-20 ... 65° C (-4 ... 150° F) (Reduced positioning speed at rated load and below -10° C (14 °F))
Transport- and storage temperature	-20 ... 60 °C (-4 ... 140 °F)
Mounting position	IMV1; IMV3; IMB5; preferably IMV1 acc. to IEC 60034-7 / EN 60034-7
Coating	2-layer component epoxy (RAL 9005, black)
Anti condensation heater	Motor winding: Directly from the electronic unit. Signal space: Separate heating resistor; separate power supply or power feed from Contrac electronic unit
Electrical connection	terminals in EEx e connection chamber; separately for motor and signals connecting cable electronic unit – actuator optional (see ordering information for electronic unit)
Power supply for motor and sensors	Only via Contrac electronic unit (refer to the data sheet for the electronics)

9.2 Technical data RSDE10 ... RSDE20

Model	RSDE10-5,0	RSDE10-10,0	RSDE20-5,0	RSDE20-7,5
Rated force	10 kN (2200 lbf) (adjustable to 0.5 / 0.75 or 1x rated force)		20 kN (4400 lbf) (adjustable to 0.5 / 0.75 or 1x rated force)	
Starting force	1.2 x rated force (break-away torque in end positions for short time 2 x rated force)			
Operating speed, adjustable	0.1 ... 5,0 mm/s (254 ... 5 s/inch)	0.1 ... 10,0 mm/s (254 ... 2.5 s/inch)	0.1 ... 5,0 mm/s (254 ... 5 s/inch)	0.1 ... 7.5 mm/s (254 ... 3.4 s/inch)
Stroke	min.: 0 ... 15 mm (0 ... 0.59 inch) / max. 0 ... 100 mm (0 ... 4 inch) or min.: 0 ... 50 mm (0 ... 1.97 inch) / max. 0 ... 300 mm (0 ... 11.8 inch)			
Weight (100 mm stroke)	approx. 57 kg (126 lb)			approx. 60 kg (132 lb)
Weight (300 mm stroke)	approx. 82 kg (181 lb)			approx. 85 kg (187 lb)
Related electronics	For field installation:	Model EBN853 ¹⁾		
	For rack installation:	Model EBS852 ²⁾		
Thermal motor monitoring	With motor temperature monitoring equipment SD241B ³⁾ or similarly certified tripping unit for PTC thermistor detectors			
Motor type	BD 80 K-4B			BD 80L-4B
Sensors	Position and temperature sensors always available			

¹⁾ Data Sheet EBN853: 10/68-8 27

²⁾ Data Sheet EBS852: 10/68-8 24

³⁾ Data Sheet SD241B: 10/68-8 30

9.3 Technical Data RSDE50

Model	RSDE50-3,0	RSDE50-10,0
Rated force	50 kN (11000 lbf) (adjustable to 0.5 / 0.75 or 1x rated force)	
Starting force	1.2 x rated force (break-away torque in end positions for short time 2 x rated force)	
Operating speed, adjustable	0.1 ... 3.0 mm/s (254 ... 8.5 s/inch)	0.1 ... 10.0 mm/s (254 ... 2.5 s/inch)
Stroke	min.: 0 ... 15 mm (0 ... 0.59 inch) / max. 0 ... 120 mm (0 ... 4.7 inch) or min.: 0 ... 60 mm (0 ... 2.36 inch) / max. 0 ... 300 mm (0 ... 11.8 inch)	
Weight (120 mm stroke)	approx. 130 kg (287 lb)	approx. 146 kg (322 lb)
Weight (300 mm stroke)	approx. 155 kg (342 lb)	approx. 171 kg (377 lb)
Related electronics	For field installation: Model EBN853 ¹⁾ For rack installation: Model EBS852 ²⁾	For field installation: Model EBN861 ³⁾ For rack installation: Model EBS862 ⁴⁾
Thermal motor monitoring	With motor temperature monitoring equipment SD241B ⁵⁾ or similarly certified tripping unit for PTC thermistor detectors	
Motor type (with brake and PTC)	BD 90 L2-4B	BD 100 L2-4B
Sensors	Position and temperature sensor always available	

¹⁾ Data Sheet EBN853: 10/68-8 27

²⁾ Data Sheet EBS852: 10/68-8 24

³⁾ Data sheet EBN861: 10/68-8 22

⁴⁾ Data sheet EBS862: 10/68-8 25

⁵⁾ Data Sheet SD241B: 10/68-8 30

9.4 Technical data for the cable set (for Ex-relevant range)

	Motor connection	motor temperature monitoring	Signal terminal (option)
Wire conductor:	8 x 1.5	2 x 1.5	8 x 0.5
Mat. no.:	9280271		9280183
Manufacturer:	Huber+Suhner	Huber+Suhner	Bröckskes (HeluKabel)
Type:	RX125 S2 B 8g1.5 mm2 BK	RX125 S2 2x1.5 mm2 BK	So-LTG-PUR-8 x 0.5 (HK-So-Li12YC11Y-OB-8 x 0.5)
Sheathing diameter:	14.3 ± 0.4 mm (0.56 ± 0.02 inch)	8.0 ± 0.4 mm (0.31 ± 0.02 inch)	8.5 ± 0.4 mm (0.33 ± 0.02 inch)
Rated voltage U _o /U (U _o applies to wire/shielding):	≥ 600 / 1000 V	≥ 600 / 1000 V	≥ 300 / 500 V
Wire-wire test voltage:	≥ 3.5 kV	≥ 3.5 kV	≥ 1.2 kV
Temperature range:			
moves:	-25 ... 125 °C (-13 ... 257 °F)	-25 ... 125 °C (-13 ... 257 °F)	-40 ... 90 °C (-40 ... 194 °F)
fixed:	-40 ... 125 °C (-40 ... 257 °F)	-40 ... 125 °C (-40 ... 257 °F)	-50 ... 90 °C (-58 ... 194 °F)
Protective conductor:	gnge		
Environment:	UV-resistant and weather-proof	UV-resistant and weather-proof	UV-resistant and weather-proof
Cable gland	13.5 ... 18 / M25 x 1.5 Exe	4 ... 8.5 / M25 x 1.5 Exe	
Mat. no.:	9287589	9287588	
Manufacturer:	Rabe-System-Technik	Rabe-System-Technik	
Type:	CMDEL-T	ADE 1F	
Item no.:	00222574	00816674	
Cable diameter:	13.5 ... 18 mm (0.53 ... 0.71 inch)	4 ... 8.5 mm (0.16 ... 0.33 inch)	
Material:	Brass nickel-plated	Brass nickel-plated	
Standard seal insert:	Neoprene	Neoprene	
O-ring:	Perbunan	Neoprene	
Temperature range:	-40 ... 100 °C (-40 ... 212 °F)	-40 ... 100 °C (-40 ... 212 °F)	
Protection class:	IP 68 - 10 bar (140.04 psi)	IP 68 - 5 bar (72.52 psi)	
Certificate:	LCIE 97 ATEX 6008 X	LCIE 97 ATEX 6008 X	
Designation:	Ex II 2 GD, EExe II	Ex II 2 GD, EExe II	
Option			
Manufacturer:	Pflitsch	Pflitsch	
Type:	blue globe ATEX	blue globe ATEX	
Diameter:	M25 x 1.5 KAD20-16/16-11	M20 x 1.5 KAD14-9/9-5	
Item no.:	bg225 msex	bg220 msex	
Temperature range:	-40 ... 115 °C (-40 ... 239 °F)	-40 ... 115 °C (-40 ... 239 °F)	
Protection class:	IP 68	IP 68	
Certificate:	PTB 06 ATEX 1036 X	PTB 06 ATEX 1036 X	
Designation:	Ex II 2G/D, Ex e II	Ex II 2G/D, Ex e II	





Important

If the specified cable harness does not meet all safety-relevant requirements, the proper installation material must be used.

10 Appendix

10.1 Permits and certifications

	Symbol	Description
CE mark		<p>The CE mark indicates that the device complies with the following directives and their basic safety requirements:</p> <ul style="list-style-type: none"> • CE mark on the nameplate of actuator. <ul style="list-style-type: none"> – Conforms with EMC directive 89/336/EWG. – Conforms with the machinery directive 2006/42/EC. <p>By placing the CE mark on its devices, ABB Automation Products GmbH declares its conformance with these directives.</p>
Ex approvals		<p>The symbol indicates devices with an ignition-proof design.</p> <p>For devices in Ex design, according to identification on an additional nameplate, the following also applies:</p> <ul style="list-style-type: none"> – Conforms with ATEX directive 94/9/EC. <p>By placing the CE mark on its devices, ABB Automation Products GmbH declares its conformance with this directive.</p>



Important

All documentation, declarations of conformity and certificates are available in the download area of ABB Automation Products GmbH.

www.abb.com/instrumentation

XXXX = Refer to the device nameplate for the monitoring authority



Prüf- und Zertifizierungsstelle

ZELM Ex



(1) **EC-TYPE-EXAMINATION CERTIFICATE**
(Translation)

(2) Equipment and Protective Systems Intended for Use in
Potentially Explosive Atmospheres - Directive 94/9/EC

(3) EC-TYPE-EXAMINATION CERTIFICATE Number:

ZELM 04 ATEX 0209 X

(4) Equipment: **Electrical Part Turn Actuators Contrac RHDE....**

(5) Manufacturer: **ABB Automation Products GmbH**

(6) Address: **Schillerstrasse 72, 32425 Minden, Deutschland**

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Prüf- und Zertifizierungsstelle ZELM Ex, notified body No. 0820 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report ZELM Ex 0530617460.

(9) Compliance with the Essential Health and Safety Requirements has been assured by consideration of:

EN 50 014: 1997+A1+A2

EN 50 018: 2000

EN 50 019 :2000

EN 50 020: 2002

EN 50 281-1-1: 1998

EN 13 463-1 :2001

prEN 13 463-5: 2003

prEN 13 463-8: 2003

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this Certificate.

(12) The marking of the equipment shall include the following:



II 2 GD ck EEx ed [ib] ib IIB T4 bzw. IP6x T130°C

Zertifizierungsstelle ZELM Ex

Braunschweig, June 17, 2004

Dipl.-Ing. Harald Zelm



Page 1/3

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Prüf- und Zertifizierungsstelle

ZELM Ex



SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE ZELM 04 ATEX 0209 X**

(15) Description of equipment

The electromechanical regulating part turn actuators, consisting of the following main components: motor, gear box, position indicator incl. evaluation electronic and a connection box are constructed for the moving of valves, shutters, ball valves and other mechanical actuators.

Dependent on the used force, resp. torque different motor – gear box combinations are inserted. The motor of the variable speed drive may only be used with the associated frequency converter and the associated motor ptc thermistor temperature monitoring unit, having a separate EC – type – examination Certificate.

The part turn actuators are designed for a maximum ambient temperature range of –25°C to +60°C, resp. –30°C to 40°C. The each appropriate ambient temperature range is specified on the type plate.

The type designation of the equipment is:

RHDE250-10;	RHDE500-10
RHDE800-10;	RHDE1250-12
RHDE2500-10;	RHDE2500-25
RHDE4000-10;	RHDE4000-40

Data

Part Turn Actuators Contrac:

Nominal rating:

Supply voltage: 115 V (94 V to 127 V) 47,5 to 63Hz

associated nominal current: 1,8 A to 5,2 A depending on design

resp.

Supply voltage: 230 V (190 V to 253 V) 47,5 to 63 Hz

associated nominal current: 0,9 A to 10 A depending on design

The allocation is made by the labelling, resp. the instruction manual.

Degree of IP protection: minimum IP 6x according to EN 60529:1991

(16) Report No.

ZELM Ex 1250315291

Page 2/3

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Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 04 ATEX 0209 X

(17) Special conditions for safe use

1. The electrical connexion of the part turn actuators may only be realised by the labelled, resp. in the instruction manual mentioned frequency converter.
2. The electrical and mechanical installation instructions have to be observed. Particularly the different ambient temperature ranges of the part turn actuators as well as the associated frequency converter and ptc thermistor temperature monitor unit components.
3. The construction of the system components may only be made by consideration of the wiring plan included in the instruction manual.
4. The electrical part turn actuators may only be used in combination with the motor temperature monitoring unit SD 241B. Alternatively the temperature monitoring unit may be conveniently used in combination with a separat EC – type – examination Certificate if authorised by the manufacturer.
5. The instruction manual has to be observed in particluar the stipulations made concerning the maximum thickness of dust layers in explosion hazardous areas of category 2D.
6. If the equipment is used in dust atmospheres it has to be secured that the constructive default level of protection IP 6x for the housing and the cable glands is maintained.

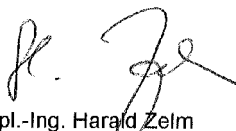
(18) Essential Health and Safety Requirements

Fulfilled by standards.

Zertifizierungsstelle ZELM Ex



Braunschweig, June 17, 2004


Dipl.-Ing. Harald Zelm

Page 3/3

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1. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 04 ATEX 0209 X

Equipment: **Electrical Part Turn Actuators Contrac RHDE...-..**
Manufacturer: **ABB Automation Products GmbH**
Address: **Schillerstrasse 72, 32425 Minden, Germany**

Description of supplement

The changings refer to the extension of the model range by the types RHDE8000-15, RHDE8000-80 and RHDE16000-30. The construction of the controller unit remain unchanged. The gear box and the motors were changed. The special conditions remain unchanged. The electrical data is:

Data

Part Turn Actuators Contrac:

Nominal rating:

Supply voltage:

associated nominal current:

resp.

Supply voltage:

associated nominal current:

115 V (94 V to 127 V)

47,5 to 63Hz

4,0 A RHDE8000-80

230 V (190 V to 253 V)

47,5 to 63 Hz

2,0 A to 10,2 A depending on design

The allocation is made by the labelling, resp. the instruction manual.

Degree of IP protection:

minimum IP 6x according to EN 60529:1991

Report No.

ZELM Ex 0800415356

Special conditions for safe use

not applicable


Essential Health and Safety Requirements

The essential health and safety requirements are furthermore fulfilled by accordance to the listet standards in the EC – type – examination Certificate.

Zertifizierungsstelle ZELM Ex



Braunschweig, June 23, 2004


Dipl.-Ing. Harald Zelm

Page 1/1

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2. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 04 ATEX 0209 X

Equipment: **Electrical Part Turn Actuators Contrac RHDE...-..**
Manufacturer: **ABB Automation Products GmbH**
Address: **Schillerstrasse 72, 32425 Minden, Germany**

Description of supplement

The changings refer to the extension of the position measuring system by an alternativ sensor. The construction of the controller unit and the position measuring system remain unchanged. The special conditions remain unchanged and also apply to this second supplement. The electrical and mechanical data remain unchanged.

Report No.

ZELM Ex 0190511394


Essential Health and Safety Requirements

The essential health and safety requirements are furthermore fulfilled by accordance to the listet standards in the EC – type – examination Certificate.

Zertifizierungsstelle **ZELM Ex**



Braunschweig, May 4, 2005


Dipl.-Ing. Harald Zelm

Page 1/1

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3. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 04 ATEX 0209 X

Equipment: **Electrical Part Turn Actuators Contrac RHDE....-**
 Manufacturer: **ABB Automation Products GmbH**
 Address: **Schillerstrasse 72, 32425 Minden, Germany**

Description of supplement

The Contrac part turn actuator series is supplemented by a completely changed mechanical construction. Instead of controlling a part turn actuator the electronic controls a linear actuator. This drives transform a rotating movement into a linear movement by a ball spindle. The movement is absorbed by internal stops. The linear actuators are available in two different positioning lengths, 100 mm RSDE10 / 20, resp. 120 mm RSDE50 and 300 mm. The construction of the controlling unit remain unchanged, the adaptations are realised by software modifications.

The linear actuator is constructed for a maximum ambient temperature range of -20°C to $+60^{\circ}\text{C}$.

The type marking of the equipment is:

**RSDE10-5;
 RSDE10-10;
 RSDE20-5;
 RSDE20-7,5;
 RSDE50-5;
 RSDE50-10**

The data and the special conditions for safe use of the previous actuators remain unchanged. For the actuators mentioned above the following specifications apply:

Data

Part Turn Actuators Contrac:

Nominal rating:	
Supply voltage:	115 V (94 V to 127 V) 47,5 to 63 Hz
associated nominal current:	3,4 A to 4,8 A depending on design, except RSDE50-10
resp.	
Supply voltage:	230 V (190 V to 253 V) 47,5 to 63 Hz
associated nominal current:	1,7 A to 6,4 A depending on design
	The allocation is made by the labelling, resp. the instruction manual.
Degree of IP protection:	minimum IP 6x according to EN 60529:1991

Page 1 / 2

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3. Supplement to EC – type examination Certificate ZELM 04 ATEX 0209 X

Report No.

ZELM Ex 1360411355

Special conditions for safe use

The special conditions for safe use of the EC – type – examination Certificate ZELM 04 ATEX 0209 X remain unchanged. For the linear actuators examined in this supplement the special conditions for safe use are extended by the following points:

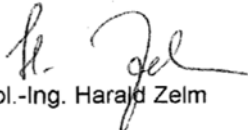
7. At the contacting point between actuator and the driven element maximum temperatures of 100°C are allowed. If the linear actuator is used under such conditions, the service intervals for the sealings in that area have to be reduced adequately. The specifications made in the instruction manual shall be considered.
8. If it is not clear, whether the real vibration stress falls below the proven vibrations stress (see instruction manual), the service intervalls shall be reduced adequately. Not allowed is the assembly in horizontal position if vibrations are present. Possible is the isolation of the linear actuators from the vibration source by taking adequate measures. Are those measures realised, the service intervals mentioned in the instruction manual shall be retained.

Essential Health and Safety Requirements

The essential health and safety requirements are furthermore fulfilled by accordance to the listet standards in the EC – type – examination Certificate.

Zertifizierungsstelle ZELM Ex

Braunschweig, May 4, 2005


Dipl.-Ing. Harald Zelm



Page 2 / 2

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Prüf- und Zertifizierungsstelle

ZELM Ex



4. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 04 ATEX 0209 X

Equipment: **Electrical Part Turn Actuators Contrac RHDE...-..**
 Manufacturer: **ABB Automation Products GmbH**
 Address: **Schillerstrasse 72, 32425 Minden, Germany**

Description of supplement

The hitherto existing part turn actuators of the types RHD250, RHDE500/800 and the linear actuators RSDE10/20 are complemented by changed materials in the gear box. The previously idealized assumed advantage factors were replaced by measured ones. While introducing the new materials some gear boxes have been modified. Furthermore arised some changes regarding the maximum allowable pivoting range, resulting of measurements made in different pivoting ranges of the part turn actuators. The data of the previous actuators remain unchanged.

Report No.

ZELM Ex 0360611480

Special conditions for safe use

The spezial conditions for safe use mentioned in the EC – type – examination Certificate ZELM 04 ATEX 0209 X remain unchanged. The special conditions for safe used for the part turn actuators are extended by the following point:

9. The pivoting range reaches from 35° to 140°.


Essential Health and Safety Requirements

The essential Health and Safety Requirements are further met by concordance with the standards scheduled in the EC – type – examination Certificate.

Zertifizierungsstelle **ZELM Ex**



Braunschweig, 6th September, 2006


 Dipl.-Ing. Harald Zelm

Page 1/1

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Prüf- und Zertifizierungsstelle
ZELM Ex



5. Supplement

(Supplement according to EC-Directive 94/9 Annex III letter 6)

to EC-type-examination Certificate

ZELM 04 ATEX 0209 X

Equipment: Electrical Part Turn Actuators Contrac RHDE....
Manufacturer: ABB Automation Products GmbH
Address: Schillerstrasse 72, 32425 Minden, Germany

Description of supplement

The hitherto existing part turn actuators of the types RHDE1250/2500, RHDE4000 and the linear actuators RSDE50 are complemented by changed materials in the gear box. The previously idealized assumed advantage factors were replaced by measured ones. While introducing the new materials some gearbox parts have been modified. The connection options for the internal heating were changed. In the operating instructions the option of using different output elements which can replace the hitherto existing pre-assembled lever were added.

Report No.

ZELM Ex 0370611552

Special conditions for safe use

The technical data of the EC – type – examination Certificate ZELM 04 ATEX 0209 X and the existing supplements remain unchanged. The special conditions for safe use for the part turn and linear actuators are extended by the following points:

10. The operating instructions have to be observed. In particular the details concerning electrostatic charge. Cleaning shall only be performed with a wet cloth. Because of a possible inadmissible electrostatic charge of the equipment the effective influence of high voltage sources shall be avoided.
11. In case of using alternative output elements the information given in the operating instructions shall be observed.

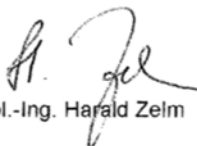
Essential Health and Safety Requirements

The essential Health and Safety Requirements are further met by concordance with the standards mentioned in the EC – type – examination Certificate.

Zertifizierungsstelle ZELM Ex



Braunschweig, 19th September, 2007


Dipl.-Ing. Harald Zelm

Page 1/1

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex. This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig

Statement about the contamination of devices and components

The repair and/or maintenance of devices and components will only be performed when a completely filled out explanation is present.

Otherwise, the shipment can be rejected. This explanation may only be filled out and signed by authorized specialist personnel of the operator.

Customer details:

Company:

Address:

Contact person:

Telephone:

Fax:

E-Mail:

Device details:

Type:

Serial no.:

Reason for the return/description of the defect:

Was this device used for working with substances which pose a threat or health risk?

☐ Yes ☐ No

If yes, which type of contamination (please place an X next to the applicable items)

biological	<input type="checkbox"/>	corrosive/irritating	<input type="checkbox"/>	combustible (highly/extremely combustible)	<input type="checkbox"/>
toxic	<input type="checkbox"/>	explosive	<input type="checkbox"/>	other harmful substances	<input type="checkbox"/>
radioactive	<input type="checkbox"/>				

Which substances have had contact with the device?

1. _____

2. _____

3. _____

We hereby certify that the devices/parts shipped were cleaned and are free from any dangerous or poisonous materials.

City, Date

Signature and company stamp

11 Index

A

Actuator check	13
Adaptation of actuator stroke to the valve stroke	16
Appendix	33
Assembly with the valve	16
AUT mode	27
Automatic / manual mode	24

B

Brake adjustment	27
------------------------	----

C

Cable shield	18
CE mark	33
Contrac electronic unit	17

D

Design and function	12
Disposal	8
Downloads	33

E

Electrical installation safety information	9
EMC directive	33
Ex applications	17
Explosion-protection safety precautions	11

F

Filling capacity	28
------------------------	----

G

Gearing	13
General information	30
General Safety Information	5

I

Ignition protection approvals	33
Ignition-proof design	33
Inspection and overhaul	25
Installation	13
Installation instructions	14
Installation safety information	9

L

Labels and symbols	6
--------------------------	---

M

Maintenance	25
Maintenance intervals	25
Manual operation	24
Motor	18
Mounting position	13

N

Name plate	7
------------------	---

O

Oil change	27
Operating safety information	10
Operation	24
Operation via frequency transformer	11
Operator liability	7

P

Permits and certifications	33
Personnel qualification	7
Power Electronic Unit EBN853 (Contrac)	19
Power Electronic Unit EBN861 (Contrac)	21
Power Electronic Unit EBS852 (Contrac) / EBS862 (Contrac)	23
Preventing electrostatic charging	11
PROFIBUS DP	20, 22
Proper use	5

R

Repelling power	27
Returning devices	8

S

Safety	5
Storage conditions	9
Symbols and warnings	6

T

Technical data	30
Technical data RSDE10 ... RSDE20	30
Technical Data RSDE50	31
Technical limits	5
Terminal connection diagrams	19
Time until next maintenance is required	25

Transport safety information	8
Trouble shooting	29
V	
Valve requirements	15

W	
Warranty provision	6
WEEE directive	8

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