EBS852 / EBS862
Electronic unit for rack mount installation (Contrac)

Introduction
The electronic unit builds the interface between the actuator and the control system. During continuous positioning, the electronic unit varies the motor torque continuously until the actuator force and the control valve force are balanced.

High response sensitivity and high positioning accuracy with short positioning time ensure an excellent control quality and a long actuator life.

For the control of Contrac control actuators in potentially explosive atmospheres

Additional Information
Additional documentation on EBS852 / EBS862 is available for download free of charge at www.abb.com/actuators.
Alternatively simply scan this code:
# Table of contents

1 **Safety** ................................................................. 3  
   General information and instructions .................. 3  
   Warnings ............................................................. 3  
   Intended use ......................................................... 4  
   Improper use ......................................................... 4  
   Notes on data safety ............................................ 4  
   Warranty provisions ............................................. 4  
   Manufacturer's address ......................................... 4

2 **Use in potentially explosive atmospheres** .......... 5  
   Thermal motor monitoring .................................... 5  
   Cable harness for the connection of the actuator to the  
   electronic unit .................................................... 5  
   Specification ...................................................... 6  
   Overview ........................................................... 8

3 **Design and function** ........................................... 9  
   Design ................................................................. 9  
   EBS852 ............................................................... 9  
   EBS862 ............................................................... 9  
   Principle of operation ......................................... 10  
   Device designs .................................................... 11

4 **Product identification** ................................. 12  
   Scope of delivery ................................................ 12  
   Delivery status .................................................... 13

5 **Transport and storage** ..................................... 13  
   Inspection .......................................................... 13  
   Transporting the device ....................................... 13  
   Safety instructions ............................................. 13  
   Returning devices .............................................. 13  
   Storing the device .............................................. 13

6 **Installation** ..................................................... 14  
   Mounting ............................................................ 14  
   EBS852 ............................................................... 14  
   EBS862 ............................................................... 15  
   Assembly and cable routing in the mounting rack ... 15  
   Dimensions ......................................................... 16  
   Electronic unit EBS852 (Contrac) ......................... 16  
   Electronic unit EBS862 (Contrac) ......................... 17

7 **Electrical connections** ..................................... 19  
   Safety instructions ............................................. 19  
   General ............................................................. 19  
   Conductor cross-section on control actuator .......... 19  
   Conductor cross-section on electronic unit .......... 20  
   Cable glands ....................................................... 20  
   Selection of suited connection cables ............... 20  
   Potential equalization ....................................... 21  
   Actuator assignment and maximum cable lengths .... 22  
   Connection examples ......................................... 24  
   Electrical data for inputs and outputs ............... 26  
   Connection on the device .................................... 28

8 **Commissioning and operation** ....................... 30  
   General information .......................................... 30  
   Engineering Software ECOM688 and ECOM700 .... 30  
   Checks prior to commissioning ............................ 30  
   Before powering up the power supply ................. 30  
   After powering up the power supply ................... 30  
   Commissioning and service field ...................... 31  
   Meaning of the LED indicators ......................... 32  
   Hardware settings ............................................. 33  
   Basic Setup ...................................................... 33  
   Manual (MAN)- and Automatic Operation (AUT) .... 34

9 **Diagnosis / error messages** .......................... 35  
   Definition – Alarms and Errors .......................... 35  
   Alarm Diagram ................................................ 35  
   Error Diagram ................................................ 36  
   Hardware Errors ............................................... 37

10 **Maintenance** .................................................. 38  
    Electronic unit .................................................. 38  
    Control actuator ............................................... 38

11 **Repair** .......................................................... 38  
    Returning devices ............................................ 38  
    Fuses ............................................................... 39

12 **Recycling and disposal** ................................. 40  
    Notice on RoHS II-Directive 2011/65/EU ............... 40

13 **Approvals and certifications** ......................... 40

14 **Additional documents** .................................. 40

15 **Appendix** ...................................................... 41  
    Return form ..................................................... 41
1 Safety

General information and instructions

These instructions are an important part of the product and must be retained for future reference.
Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.
For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.
The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.
Modifications and repairs to the product may only be performed if expressly permitted by these instructions.
Information and symbols on the product must be observed. These may not be removed and must be fully legible at all times.
The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

Warnings

The warnings in these instructions are structured as follows:

⚠️ DANGER
The signal word ‘DANGER’ indicates an imminent danger. Failure to observe this information will result in death or severe injury.

⚠️ WARNING
The signal word ‘WARNING’ indicates an imminent danger. Failure to observe this information may result in death or severe injury.

⚠️ CAUTION
The signal word ‘CAUTION’ indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE
The signal word ‘NOTICE’ indicates possible material damage.

Note
‘Note’ indicates useful or important information about the product.
... 1 Safety

Intended use
The electronic units of type EBS852 / EBS862 interconnected as illustrated in this operating instruction are used exclusively to control the RHDE... or RSDE... series control actuators. The electronic unit must only be installed or commissioned outside of potentially explosive atmospheres. Using these actuators for any other purpose will introduce a risk of personal injury and can also damage or impair the device’s operational reliability.

Improper use
The following are considered to be instances of improper use of the device:

- For use as a climbing aid, for example for mounting purposes.
- For use as a bracket for external loads, for example as a support for piping, etc.
- Material application, for example by painting over the housing, name plate or welding/soldering on parts.
- Material removal, for example by spot drilling the housing.

Notes on data safety
This product is designed to be connected to and to communicate information and data via a network interface. It is operator's sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be). Operator shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and / or theft of data or information.

ABB Automation Products GmbH and its affiliates are not liable for damages and / or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and / or theft of data or information.

Warranty provisions
Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

Manufacturer's address
ABB Automation Products GmbH
Measurement & Analytics
Schillerstr. 72
32425 Minden
Germany
Tel: +49 571 830-0
Fax: +49 571 830-1806

Customer service center
Tel: +49 180 5 222 580
Email: automation.service@de.abb.com
2 Use in potentially explosive atmospheres

DANGER
Explosion hazard due to improper installation!
An explosion hazard is present when installing the electronic unit in potentially explosive atmospheres. The electronic unit must only be installed and operated outside of potentially explosive atmospheres.

Before the commissioning of the electronic unit, observe the following points:

- The electronic unit must not be installed or commissioned in an Ex area.
- Check whether the actuator is connected to the right electronic unit, see section Electrical data for inputs and outputs on page 26.
- Check whether the associated electronic unit has been configured using the correct actuator parameters. To do this, check the relevant information on the name plate of the actuator and the electronic unit with respect to actuator type, ambient temperature range of actuator, and NL number, if applicable.
- On delivery, the positioning time-out function of the electronic unit associated with the actuator is activated. Deactivating this setting is not permitted.
- Rapid traverse mode is not allowed to be used on Ex actuators. Therefore, it is not possible to select it via the user interface.
- Activating the breakaway function is not permitted.
- Activating the ‘Position dependent switch-off’ function with $2 \times$ torque/force is not permitted.
- The Contrac electronic unit must be upstream of the motor temperature monitoring unit SD241-B or a similar, certified tripping unit.

Cable harness for the connection of the actuator to the electronic unit

Installation information on the cable harness for actuators in Ex design
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.
If the specified cable harness does not meet all safety-relevant requirements, the proper installation material must be used.
For the specified motor connection cable, the shielding must be connected at both ends and connected with protective ground.

Thermal motor monitoring

In Contrac control actuators for use in potentially explosive atmospheres, additional independent monitoring of motor temperature is required.
Monitoring can be performed using the ABB SD241-B monitoring unit or a comparable certified tripping unit for thermistor temperature sensors.
The motor temperature monitoring unit interrupts the power supply as soon as the motor temperature up-scales the permissible limit value.
### 2. Use in potentially explosive atmospheres

#### Cable harness for the connection of the actuator to the electronic unit

<table>
<thead>
<tr>
<th>Specification</th>
<th>Motor connection</th>
<th>Motor temperature monitoring</th>
<th>Signal terminal (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire conductor</td>
<td>8 × 1.5</td>
<td>2 × 1.5</td>
<td>8 × 0.5</td>
</tr>
<tr>
<td>Mat.-No.</td>
<td>9280271</td>
<td>9280272</td>
<td>9280183</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Huber + Suhner</td>
<td>Huber + Suhner</td>
<td>Bröckskes (Helu-Kabel)</td>
</tr>
<tr>
<td>Type</td>
<td>RX125 S2 B 8g1.5 mm2 BK</td>
<td>RX125 S2 2×1.5 mm2 BK</td>
<td>So-LTG-PUR-8 × 0.5 (HK-So-Li12YC11Y-OB-8 × 0.5)</td>
</tr>
<tr>
<td>Sheathing diameter</td>
<td>14.3 ±0.4 mm (0.56 ±0.02 in)</td>
<td>8.0 ±0.4 mm (0.31 ±0.02 in)</td>
<td>8.5 ±0.4 mm (0.33 ±0.02 in)</td>
</tr>
<tr>
<td>Nominal voltage Uo / U</td>
<td>600 / 1000 V</td>
<td>600 / 1000 V</td>
<td>300 / 500 V</td>
</tr>
<tr>
<td>Wire / wire test voltage</td>
<td>3.5 kV</td>
<td>3.5 kV</td>
<td>1.2 kV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature range</th>
<th>Motor connection</th>
<th>Motor temperature monitoring</th>
<th>Signal terminal (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving</td>
<td>−25 to 125 °C (~−13 to 257 °F)</td>
<td>−25 to 125 °C (~−13 to 257 °F)</td>
<td>−40 to 90 °C (~−40 to 194 °F)</td>
</tr>
<tr>
<td>Not moving</td>
<td>−40 to 125 °C (~−40 to 257 °F)</td>
<td>−40 to 125 °C (~−40 to 257 °F)</td>
<td>−50 to 90 °C (~−58 to 194 °F)</td>
</tr>
<tr>
<td>Protective earth</td>
<td>GNYE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>UV-resistant and weather-proof</td>
<td>UV-resistant and weather-proof</td>
<td>UV-resistant and weather-proof</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specification</th>
<th>Motor connection</th>
<th>Motor temperature monitoring</th>
<th>Signal terminal (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable gland</td>
<td>13.5 to 18 / M25 × 1.5 Exe</td>
<td>4 to 8.5 / M20 × 1.5 Exe</td>
<td></td>
</tr>
<tr>
<td>Mat.-No.</td>
<td>9287589</td>
<td>9287588</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Rabe-System-Technik</td>
<td>Rabe-System-Technik</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>CMDEL-T</td>
<td>ADE IF</td>
<td></td>
</tr>
<tr>
<td>Article no.</td>
<td>00222574</td>
<td>00816674</td>
<td></td>
</tr>
<tr>
<td>Cable diameter</td>
<td>13.5 to 18 mm (0.53 to 0.71 in)</td>
<td>4 to 8.5 mm (0.16 to 0.33 in)</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Brass, nickel-plated</td>
<td>Brass, nickel-plated</td>
<td></td>
</tr>
<tr>
<td>Standard seal insert</td>
<td>Neoprene</td>
<td>Neoprene</td>
<td></td>
</tr>
<tr>
<td>O-ring</td>
<td>Perbunan</td>
<td>Neoprene</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>−40 to 100 °C (~−40 to 212 °F)</td>
<td>−40 to 100 °C (~−40 to 212 °F)</td>
<td></td>
</tr>
<tr>
<td>IP rating</td>
<td>IP 68 - 10 bar (140.04 psi)</td>
<td>IP 68 - 5 bar (72.52 psi)</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>LCIE 97 ATEX 6005 X / 01</td>
<td>LCIE 97 ATEX 6008 X / 03</td>
<td></td>
</tr>
<tr>
<td>Marking</td>
<td>Ex II 2 G D, Exe II</td>
<td>Ex II 2 G D, Exe II</td>
<td>Ex e II / Ex tD</td>
</tr>
</tbody>
</table>
### Option

<table>
<thead>
<tr>
<th>Option</th>
<th>Motor connection</th>
<th>Motor temperature monitoring</th>
<th>Signal terminal (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Pflitsch</td>
<td>Pflitsch</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>blue globe ATEX</td>
<td>blue globe ATEX</td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>M25 × 1.5 KAD20-16/16-11</td>
<td>M20 × 1.5 KAD14-9/9-5</td>
<td></td>
</tr>
<tr>
<td>Article no.</td>
<td>bg225 msex</td>
<td>bg220 msex</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40 to 115 °C (~-40 to 239 °F)</td>
<td>-40 to 115 °C (~-40 to 239 °F)</td>
<td></td>
</tr>
<tr>
<td>IP rating</td>
<td>IP 68</td>
<td>IP 68</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>PTB 06 ATEX 1036 X</td>
<td>PTB 06 ATEX 1036 X</td>
<td></td>
</tr>
<tr>
<td>Marking</td>
<td>Ⅱ 2 G Ex e II</td>
<td>Ⅱ 2 D Ex tD A21 IP68</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

If the specified cable harness does not meet all safety-relevant requirements, the proper installation material must be used.
2 Use in potentially explosive atmospheres

Overview

Figure 1: Allocation of the Contrac components when using in potentially explosive atmospheres (example)
3 Design and function

Design

EBS852

The EBS862 electronic unit is made up of two housing halves (electronic cover / electronic unit lower part) which can be separated for easier assembly.
... 3 Design and function

Principle of operation
The electronic unit builds the interface between the actuator and the control system. During continuous positioning, the electronic unit varies the motor torque continuously until the actuator force and the control valve force are balanced. High response sensitivity and high positioning accuracy with short positioning time ensure an excellent control quality and a long actuator life.

Electronic units are available for assembly in the field near the actuator, remotely in a mounting rack or for integrated assembly (smallest actuator type). In addition to the terminals, the electronic unit contains the microprocessor, frequency converter for motor control, analog and binary inputs and outputs, PROFIBUS® or HART® communication interfaces, the commissioning and service field and a plug connection to connect a PC.

No matter what the motor power of the respective actuator is, all electronic units are supplied single-phase by 230 V or 115 V mains supply (50 Hz or 60 Hz). The commissioning and service field enables the end positions and direction of rotation to be set on the actuator. Moreover, status information is displayed using LEDs. Push buttons can be used to operate the actuator and set the operating mode (Automatic, Out of Service).
**Device designs**

### EBS852

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP rating</strong></td>
<td>IP 20</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>≤ 75 % annual average; condensation not permitted</td>
</tr>
<tr>
<td><strong>Rack air inlet temperature</strong></td>
<td>0 to 45 °C (32 to 113 °F)</td>
</tr>
<tr>
<td><strong>Transport and storage temperature</strong></td>
<td>−25 to 70 °C (−13 to 158 °F)</td>
</tr>
<tr>
<td><strong>Long-term storage temperature</strong></td>
<td>−25 to 40 °C (−13 to 104 °F)</td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
<td>vertical; lateral connections, right</td>
</tr>
<tr>
<td><strong>Vibration stress</strong></td>
<td>2 to 9 Hz: maximum deflection: 3 mm (0.12 in)</td>
</tr>
<tr>
<td></td>
<td>9 to 200 Hz: acceleration: 1 g</td>
</tr>
<tr>
<td><strong>Paint</strong></td>
<td>2-layer component epoxy (RAL 9005, black)</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Mains supply via screw terminals; all other connections made via screw-type plug connectors</td>
</tr>
<tr>
<td></td>
<td>Maximum cable length electronic unit – actuator: *</td>
</tr>
<tr>
<td></td>
<td>270 m at 1.5 mm² (885 ft at 16 AWG)</td>
</tr>
<tr>
<td></td>
<td>460 m at 2.5 mm² (1510 ft at 14 AWG)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>11 kg (24 lbs)</td>
</tr>
</tbody>
</table>

* The maximum cable length depends on the actuator type and cable cross-section, see **Rotary actuators** on page 22.

### EBS862

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP rating</strong></td>
<td>IP 20</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>≤ 75 % annual average; condensation not permitted</td>
</tr>
<tr>
<td><strong>Rack air inlet temperature</strong></td>
<td>0 to 45 °C (32 to 113 °F)</td>
</tr>
<tr>
<td><strong>Transport and storage temperature</strong></td>
<td>−25 to 70 °C (−13 to 158 °F)</td>
</tr>
<tr>
<td><strong>Long-term storage temperature</strong></td>
<td>−25 to 40 °C (−13 to 104 °F)</td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
<td>vertical, cable glands down</td>
</tr>
<tr>
<td><strong>Vibration stress</strong></td>
<td>2 to 9 Hz: maximum deflection: 3 mm (0.12 in)</td>
</tr>
<tr>
<td></td>
<td>9 to 200 Hz: acceleration: 1 g</td>
</tr>
<tr>
<td><strong>Paint</strong></td>
<td>2-layer component epoxy (RAL 9005, black)</td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
<td>Mains supply via screw terminals; all other connections made via screw-type plug connectors</td>
</tr>
<tr>
<td></td>
<td>Maximum cable length electronic unit – actuator: *</td>
</tr>
<tr>
<td></td>
<td>470 m at 10 mm² (1542 ft at 8 AWG)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>40 kg (88 lbs)</td>
</tr>
</tbody>
</table>

* The maximum cable length depends on the actuator type and cable cross-section, see **Rotary actuators** on page 22.
4 Product identification

In electronic units which can be separated for assembly, the name plate for the hardware is located on the lower part of the electronic unit (Figure 1). The name plate for the software (Figure 2) and an additional name plate for the hardware (Figure 3) are located on the electronic unit cover. The lower part of the electronic unit and the electronic cover are independent assemblies, therefore the respective manufacturing numbers can differ.

Scope of delivery

EBS852
- Cable clamps for strain relief of the connection cable

EBS862
- Metric tap holes for cable entries with IP 66 sealing plugs
Delivery status

The individual actuator configuration may vary from the standard setup above. This information can be displayed via the user interface.

Unless otherwise specified by the user, the electronic units are delivered with the following standard configuration:

<table>
<thead>
<tr>
<th>Conventional communication</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function selection</td>
<td>Positioner, parameter: set point</td>
</tr>
<tr>
<td>Set point function</td>
<td>Analog set point</td>
</tr>
<tr>
<td>Set point range</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>Set point characteristic</td>
<td>Linear; set point = position value</td>
</tr>
<tr>
<td>Actual value range</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>Nominal torque / rated force in 1 direction</td>
<td>100 %</td>
</tr>
<tr>
<td>Automatic speed in ± direction</td>
<td>100 %</td>
</tr>
<tr>
<td>Action in 0 % / 100 % end position</td>
<td>Keep leak-tight with nominal torque / rated force</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital inputs</th>
<th>Digital output 1 ready for operation / error message, Digital output 2 / 3 end position signaling 0 % / 100 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital outputs</td>
<td>Digital input 1 Manual / Automatic switching, Digital input 2 / 3 Travel command ±</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brake Away Function</th>
<th>Deactivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shut-off function</td>
<td>Deactivated</td>
</tr>
<tr>
<td>Positioning loop monitoring</td>
<td>Deactivated</td>
</tr>
<tr>
<td>Set point monitoring</td>
<td>Deactivated</td>
</tr>
<tr>
<td>Alarm Type</td>
<td>Deactivated</td>
</tr>
<tr>
<td>Action after restoration of power</td>
<td>Switch to Automatic</td>
</tr>
<tr>
<td>Working range of actuator</td>
<td>Not set</td>
</tr>
</tbody>
</table>

5 Transport and storage

Inspection

Check the devices immediately after unpacking for possible damage that may have occurred from improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents. All claims for damages must be submitted to the shipper without delay and before installation.

Transporting the device

Safety instructions

⚠️ DANGER

Danger to life due to falling or toppling loads.
Risk of death or serious injury due to the device falling down or toppling over!
• Standing under suspended loads is prohibited.
• Do not detach the hoisting equipment until installation is complete.
• Only use the dedicated load pick-up devices (eyebolts) for suspending the components.

Consider the following items during transport:
• Pay attention to the device weight details.
• Do not expose the device to humidity during transport. Pack the device accordingly.
• Pay attention to the permissible transportation temperatures for the device.

Returning devices

For the return of devices, follow the instructions in Repair on page 38.

Storing the device

The electronic units EBS852 / EBS862 comply with IP rating IP 20. The electronic units should be stored in accordance with this IP rating. Condensation is not permitted.

The permissible storage temperatures as well as the ambient conditions (humidity) should be complied with (see Device designs on page 11).

For longer storage periods, we recommend packing the units in foil with a desiccant added. The desiccant must be checked for regularly for effectivity.
6 Installation

Mounting

**NOTICE**

Damage to components!
Damage to components caused by ingress of foreign bodies or humidity.
- Keep all housing covers and terminal compartments closed during installation to prevent the ingress of foreign bodies such as drilling shavings, liquids or dust.

The electronic unit is installed in the vicinity of the drive outside the hazardous area. Screw-type terminals are used to connect the two modules on the actuator side and on the electronics side:

The cables are connected to the actuator through two terminal compartments:
- Motor connection compartment (Ex d)
- Sensor terminal compartment (through Ex e terminals)

The SD241-B motor temperature monitoring unit or a similar, certified tripping unit must be connected to the power supply of the electronic unit. The motor temperature monitoring unit must be installed outside of the potentially explosive atmosphere.

When installing the electronic unit, observe the following points:
- You must be able to activate the power supply of the electronic unit on-site.
- All signal cables and the motor cable between the actuator and electronic unit must be shielded.
- The cable shield must be placed on both housings when connecting the electronic unit and the actuator.
- The maximum vibration load must be observed during installation, see **Device designs** on page 11.
- When mounting the electronic unit in work and traffic areas that may be accessed by unauthorized persons, the operator is required to take suited protective measures.

**EBS852**

1. Fasten the electronic unit to the vertical mounting rail of the mounting rack using grade 8.8 screws. Tensile strength 800 N/mm² (116032 pounds/square in.), yield strength 640 N/mm² (92826 pounds/square in.).
2. Provide adequate room for installation and ensure easy access.
3. The cable entries must be directed to the right.
**EBS862**

**Note**

The total weight of the electronic unit is 40 kg (88 lbs). For this reason, the electronic unit is equipped with a load-bearing eyelet.

If, for technical reasons, the load-bearing eyelet cannot be used, the two halves of the housing can be installed separately.

**Separating the housing halves**

1. Place the electronic unit on a horizontal surface.
2. Unscrew the cover screws (Figure 3).
3. Flip open the electronic unit cover.
4. Disconnect the internal plug connection between the housing halves.
5. Close the electronic unit cover.
6. Unscrew the hinge screw (Figure 3).
7. Flip the electronic unit cover forward while lifting it up and off the hinge pin. Precisely guide the cover of the electronic unit cover in the process.

**Mounting**

1. Fasten the electronic unit or the lower part of the electronic unit to the vertical mounting rail of the mounting rack using grade 8.8 screws. Tensile strength 800 N/mm² (116032 pounds/square in.), yield strength 640 N/mm² (92826 pounds/square in.).
2. Provide adequate room for installation and ensure easy access.
3. The cable entries must be directed down.

**Mounting the housing halves**

1. Set the electronic unit cover down on the hinge pin and screw in the hinge screw. Precisely guide the cover of the electronic unit cover in the process.
2. Reconnect the internal plug connection.
3. Close the electronic unit cover and screw in the cover screws (Figure 3).

**Assembly and cable routing in the mounting rack**

When installing the electronic units in a mounting rack (on site), we recommend laying the cables in accordance with the following illustrations.

![Assembly and cable routing in the mounting rack](example)
... 6 Installation

Dimensions

Electronic unit EBS852 (Contrac)

Figure 8: Dimensions in mm (in)
Electronic unit EBS862 (Contrac)

1. Front section open, rotated 90°
2. Rotational radius
3. Tap holes

Figure 9: Dimensions in mm (in)
... 6 Installation

... Dimensions

Fuses

Thermal circuit breaker

Safety fuse

Figure 10: Dimensions in mm (in)
7 Electrical connections

Safety instructions

⚠️ WARNING
Risk of injury due to live parts!
When the housing is open, contact protection is not provided and EMC protection is limited.
• Before opening the housing, switch off the power supply.

⚠️ WARNING
Danger due to electric current!
Danger of electric shock by residual voltage at the terminals after switching off the power supply.
• Before opening the terminal compartment, switch off the power supply and wait for > 2 minutes.

NOTICE
Damage to the device due to improper handling!
• When replacing the defective safety fuses, only fuses with types and characteristics should be used (see Fuses on page 39).

The electrical connection may only be established by authorized specialist personnel.
Notices on electrical connection in this instruction must be observed; otherwise, electric safety and the IP-rating may be adversely affected.
Safe isolation of electric circuits which are dangerous if touched is only guaranteed when the connected devices fulfill the requirements of EN 61140 (basic requirements for secure separation).
To ensure safe isolation, install supply lines so that they are separate from electrical circuits which are dangerous if touched, or implement additional isolation measures for them.

General

Each actuator requires a suited Contrac electronic unit with installed actuator-specific software. Observe the information in the operating instruction. The specifications on the name plates of the electronic unit and actuator must match to guarantee correct hardware and software allocation.

Please observe the following information when installing the cable set:
• The specific regulations governing the installation of electric systems in potentially explosive atmospheres must be observed during electric installation work. The provisions in accordance with EN 60079-14 must be observed, particularly in respect of installing the shield bonding and potential equalization between the actuator, electronic unit, and motor protection equipment, see Connection of cable shielding on page 29.
• The motor and position sensor may only be connected using IP 66 Ex cable glands in accordance with EN 60079 ff with EU type examination certificate in accordance with Directive 2014/34/EU.
• Use a cable lug or a solid wire, bended to a ‘U’, to connect the motor cable.
• Make sure that sufficient strain relief measures are in place for all cable connections.
• Protect all cables in the connection chambers sufficiently against contact with metal components. Guarantee a gap of at least 6 mm (0.24 in) between all conductive components.
• Remove the desiccant in the connection chamber of the motor and position sensor.
• Do not change the factory-set installation position of the motor junction box.
• Close off any cable entries that are not required using ATEX-certified IP 66 sealing plugs.

Conductor cross-section on control actuator

<table>
<thead>
<tr>
<th>Screw terminals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor/brake</td>
<td>max. 2.5 mm² (14 AWG)</td>
</tr>
<tr>
<td>Signals</td>
<td>max. 2.5 mm² (14 AWG)</td>
</tr>
</tbody>
</table>
...7 Electrical connections

Conductor cross-section on electronic unit

**Note**

Detailed information on separate electronic units can be found in the corresponding data sheets.

---

### EBS852 – Clamping connection

<table>
<thead>
<tr>
<th>Suited for cable Ø</th>
<th>Terminals for conductor cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains cable</td>
<td>13 mm (0.51 in) max. 4 mm² (12 AWG)</td>
</tr>
<tr>
<td>Signal cable (DCS)</td>
<td>8 mm (0.31 in) max. 1.5 mm² (16 AWG)</td>
</tr>
<tr>
<td>Transmitter (option)</td>
<td>8 mm (0.31 in) max. 1.5 mm² (16 AWG)</td>
</tr>
<tr>
<td>Motor cable</td>
<td>13 mm (0.51 in) max. 4 mm² (12 AWG)</td>
</tr>
<tr>
<td>Sensor cable</td>
<td>8 mm (0.31 in) max. 1.5 mm² (16 AWG)</td>
</tr>
</tbody>
</table>

### EBS862 – Clamping connection

<table>
<thead>
<tr>
<th>Terminals for conductor cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains cable</td>
</tr>
<tr>
<td>Signal cable (DCS)</td>
</tr>
<tr>
<td>Transmitter (option)</td>
</tr>
<tr>
<td>Motor cable</td>
</tr>
<tr>
<td>Sensor cable</td>
</tr>
</tbody>
</table>

### Tap holes for cable glands

<table>
<thead>
<tr>
<th>metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
</tr>
<tr>
<td>Signal cable</td>
</tr>
<tr>
<td>Motor cable</td>
</tr>
</tbody>
</table>

### Selection of suited connection cables

Please observe the following information when selecting cables:

- Use suited cables only for the electric connection between the Contrac control actuator in potentially explosive atmospheres and the components outside of the potentially explosive atmospheres.
- Use shielded cables for the motor / brake cable, the sensor cable, and the signal cable to the control system / controller.
- Connect the shielding of the motor / brake cable and the sensor cable on both sides (to the actuator and to the Contrac electronic unit).
- For the connection between the motor and motor temperature monitoring unit and for the power supply, shielded cables are not required.

### Cable glands

**DANGER**

**Risk of explosion!**

Risk of explosion due to the use of unsuitable cable glands.

- The cable glands used must be approved for type of protection 'Ex e – increased safety'.
- The cable glands used must guarantee correct contact of the cable shielding.

The actuators and electronic units are supplied without cable glands. Suited cable glands must be installed on site.

### Installation information on the cable harness for actuators in Ex design

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.

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

For the specified motor connection cable, the shielding must be connected at both ends and connected with protective ground.
Please observe the following information when installing the cable set:

- The specific regulations governing the installation of electric systems in potentially explosive atmospheres must be observed during electric installation work. The provisions in accordance with EN 60079-14 must be observed, particularly in respect of installing the shield bonding and potential equalization between the actuator, electronic unit, and motor protection equipment, see Connection of cable shielding on page 29.

- The motor and position sensor may only be connected using IP 66 Ex cable glands in accordance with EN 60079 ff with EU type examination certificate in accordance with Directive 2014/34/EU.

- Use a cable lug or a solid wire, bended to a ‘U’, to connect the motor cable.

- Make sure that sufficient strain relief measures are in place for all cable connections.

- Protect all cables in the connection chambers sufficiently against contact with metal components. Guarantee a gap of at least 6 mm (0.24 in) between all conductive components.

- Remove the desiccant in the connection chamber of the motor and position sensor.

- Do not change the factory-set installation position of the motor junction box.

- Close off any cable entries that are not required using ATEX-certified IP 66 sealing plugs.

### Potential equalization

In order to avoid the risk of an electric shock, it must not be possible to come into contact with dangerous live parts and conductive parts that can be touched should not become dangerous live parts either under standard conditions or under conditions when a single fault occurs.

The actual current flowing in the event of a fault is obtained from the phase to ground voltage and the total impedance present in the fault circuit.

For long cables, the voltage drop may be dangerous to come into contact with high current flowing. Preferably, the electronic unit and the actuator must be connected with low resistance (ground resistance < 0.1 Ω) to the potential equalization.

In the process, the respective standards of the VDE 100 series must be observed.

### Scenario 1

If the PE of the actuator is done only via the PE conductor of the motor cable, the maximum permissible cable lengths for the electronic units EAS822 and EBS852 are reduced in accordance with the following table.

The maximum permissible shutdown time of 200 ms in case of a fault is complied with in the process.

<table>
<thead>
<tr>
<th>Conductor cross-section</th>
<th>EBS852</th>
<th>EBS862</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 mm² (16 AWG)</td>
<td>176 m (577 ft)</td>
<td>48 m (157 ft)</td>
</tr>
<tr>
<td>2.5 mm² (14 AWG)</td>
<td>235 m (771 ft)</td>
<td>79 m (259 ft)</td>
</tr>
<tr>
<td>4 mm² (12 AWG)</td>
<td>460 m (1509 ft)</td>
<td>127 m (416 ft)</td>
</tr>
<tr>
<td>6 mm² (10 AWG)</td>
<td>–</td>
<td>190 m (623 ft)</td>
</tr>
</tbody>
</table>

### Scenario 2

By laying an extra potential equalization conductor between the electronic unit and the actuator, with a small conductor cross-section of the motor cable (e.g. 1.5 mm²), the maximum permissible cable length can be increased.

The ground resistance of the potential equalization conductor must be < 0.1 Ω.

The maximum permissible shutdown time of 200 ms in case of a fault is complied with in the process.

<table>
<thead>
<tr>
<th>Conductor cross-section</th>
<th>EBS852</th>
<th>EBS862</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 mm² (12 AWG)</td>
<td>460 m (1509 ft)</td>
<td>127 m (416 ft)</td>
</tr>
<tr>
<td>6 mm² (10 AWG)</td>
<td>460 m (1509 ft)</td>
<td>190 m (623 ft)</td>
</tr>
<tr>
<td>10 mm² (8 AWG)</td>
<td>460 m (1509 ft)</td>
<td>317 m (1040 ft)</td>
</tr>
</tbody>
</table>

### Scenario 3

If the cable lengths specified in Actuator assignment and maximum cable lengths on page 22 are fully utilized, an additional protective potential equalization must be connected.

To do this, the electronic unit and the actuator must be connected via a short cable with a minimum cross-section of 4 mm² (12 AWG) to the on-site potential equalization.

The installation regulations for setting up grounding systems must be observed and followed.
## 7 Electrical connections

### Actuator assignment and maximum cable lengths

#### Rotary actuators

<table>
<thead>
<tr>
<th>Electronic unit</th>
<th>Actuator</th>
<th>Cross-section of the motor cable / maximum permissible cable length*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5 mm² (16 AWG)</td>
<td>2.5 mm² (14 AWG)</td>
</tr>
<tr>
<td>EBS852</td>
<td>RHDE250-10</td>
<td>270 m (886 ft)</td>
</tr>
<tr>
<td></td>
<td>RHDE500-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE800-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE1250-12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE2500-25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE4000-40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE8000-80</td>
<td></td>
</tr>
<tr>
<td>EBS862</td>
<td>RHDE2500-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHDE4000-10</td>
<td>160 m (525 ft)</td>
</tr>
<tr>
<td></td>
<td>RHDE8000-15</td>
<td>70 m (230 ft)</td>
</tr>
<tr>
<td></td>
<td>RHDE16000-30</td>
<td></td>
</tr>
</tbody>
</table>

* Cable length between electronic unit and actuator. Signal cable cross-section 0.5 mm² (20 AWG)

#### Linear actuators

<table>
<thead>
<tr>
<th>Electronic unit</th>
<th>Actuator</th>
<th>Cross-section of the motor cable / maximum permissible cable length*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5 mm² (16 AWG)</td>
<td>2.5 mm² (14 AWG)</td>
</tr>
<tr>
<td>EBS852</td>
<td>RSDE10-5.0</td>
<td>270 m (886 ft)</td>
</tr>
<tr>
<td></td>
<td>RSDE10-110.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RSDE20-5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RSDE20-17.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RSDE50-3.0</td>
<td></td>
</tr>
<tr>
<td>EBS862</td>
<td>RSDE50-10.0</td>
<td>160 m (525 ft)</td>
</tr>
</tbody>
</table>

* Cable length between electronic unit and actuator. Signal cable cross-section 0.5 mm² (20 AWG)
Electronic unit EBS852 (Contrac) / EBS862 (Contrac)

Note
- The electrical connection is established via screw terminals on the control actuator and on the electronic unit.
- If you are using a separate heat supply, the heater must be protected with a 2 to 6 A medium time-lag fuse (e.g. NEOZED D01 E14).

Figure 11: Control via analog input 0/4 to 20 mA, HART® communication or digital inputs

BE = digital input
BA = digital output

Figure 11: Control via analog input 0/4 to 20 mA, HART® communication or digital inputs
... 7 Electrical connections

Connection examples

Operation following a continuous set point (standard)

In the standard configuration, the binary inputs are configured as ‘MANUAL OPERATION’.

To switch the actuator to automatic mode (AUT), the following conditions must be met:

- The binary input 1 must be connected with +24 V DC (automatic operation).
- The ‘AUT’ operating mode must be selected through the graphic user interface.

![Diagram of electrical connections](image-url)

Figure 12: Connection example for operation following a continuous set point (standard configuration)
Operation downstream from step controller

Contrac actuators can be driven using step controller pulses instead of an analog setpoint. The following conditions must be fulfilled in order to implement the step controller pulses:

- The binary inputs must be configured using the ‘STEP CONTROLLER’ function.
- The binary input 1 must be connected with +24 V DC (automatic operation).
- The ‘AUT’ operating mode must be selected through the graphic user interface.

Figure 13: Connection example for operation downstream from a step controller
### 7 Electrical connections

#### Electrical data for inputs and outputs

**Power supply**

<table>
<thead>
<tr>
<th>EBS852</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (standard actuators)</td>
<td>115 V AC (94 to 130 V) or 230 V AC (190 to 260 V); 47.5 to 63 Hz; single-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage (Ex actuators)</td>
<td>115 V AC (94 to 127 V) or 230 V AC (190 to 253 V); 47.5 to 63 Hz; single-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average power loss $P_{avg}$ and power consumption $I_{max}$ of the electronic unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actuator</td>
<td>$P_{avg}$</td>
<td>$I_{max}$ at 115 V</td>
<td>$I_{max}$ at 230 V</td>
</tr>
<tr>
<td>RHD(E)250-10</td>
<td>60 W</td>
<td>1.8 A</td>
<td>0.9 A</td>
</tr>
<tr>
<td>RHD(E)500-10</td>
<td>75 W</td>
<td>2.2 A</td>
<td>1.1 A</td>
</tr>
<tr>
<td>RHD(E)800-10</td>
<td>60 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
<tr>
<td>RHD(E)1250-12</td>
<td>80 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
<tr>
<td>RHD(E)2500-25</td>
<td>80 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
<tr>
<td>RHD(E)4000-40</td>
<td>80 W</td>
<td>5.8 A</td>
<td>2.7 A</td>
</tr>
<tr>
<td>RHD(E)8000-80</td>
<td>80 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
<tr>
<td>RSD(E)10-5,0</td>
<td>55 W</td>
<td>2.2 A</td>
<td>1.1 A</td>
</tr>
<tr>
<td>RSD(E)10-10,0</td>
<td>60 W</td>
<td>3.6 A</td>
<td>1.8 A</td>
</tr>
<tr>
<td>RSD(E)20-5,0</td>
<td>60 W</td>
<td>3.6 A</td>
<td>1.8 A</td>
</tr>
<tr>
<td>RSD(E)20-7,5</td>
<td>75 W</td>
<td>4.8 A</td>
<td>2.4 A</td>
</tr>
<tr>
<td>RSD(E)50-3,0</td>
<td>75 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
<tr>
<td>RSD100-1.5</td>
<td>75 W</td>
<td>5.0 A</td>
<td>2.5 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EBS862</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (standard actuators)</td>
<td>230 V AC (190 to 260 V); 47.5 to 63 Hz; single-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage (Ex actuators)</td>
<td>230 V AC (190 to 253 V); 47.5 to 63 Hz; single-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average power loss $P_{avg}$ and power consumption $I_{max}$ of the electronic unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actuator</td>
<td>$P_{avg}$</td>
<td>$I_{max}$ at 230 V</td>
<td>$I_{pos}$ (230 V): approx. 40 to 50 % of $I_{max}$</td>
</tr>
<tr>
<td>RHD(E)2500-10</td>
<td>80 W</td>
<td>5.3 A</td>
<td></td>
</tr>
<tr>
<td>RHD(E)4000-10</td>
<td>100 W</td>
<td>10.0 A</td>
<td></td>
</tr>
<tr>
<td>RHD(E)8000-12</td>
<td>115 W</td>
<td>8.0 A</td>
<td></td>
</tr>
<tr>
<td>RHDE(E)8000-15</td>
<td>115 W</td>
<td>8.0 A</td>
<td></td>
</tr>
<tr>
<td>RHD(E)16000-30</td>
<td>115 W</td>
<td>12.5 A</td>
<td></td>
</tr>
<tr>
<td>RSD(E)50-10,0</td>
<td>100 W</td>
<td>6.4 A</td>
<td></td>
</tr>
<tr>
<td>RSD100-10.0</td>
<td>115 W</td>
<td>12.5 A</td>
<td></td>
</tr>
</tbody>
</table>

External fuse for electronic unit

Safety fuse 35 A (Lindner) + thermal circuit breaker 16 A (ETA)

(fuses are in the scope of delivery)

External fuse for heating (dewing protection) 2 to 6 A, medium time-lag
### Binary inputs and outputs - communication

<table>
<thead>
<tr>
<th>Conventional communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input</td>
<td>0 / 4 to 20 mA, internal load: 300 Ω</td>
</tr>
<tr>
<td>Analog output</td>
<td>0 / 4 to 20 mA, electrically isolated, maximum load: 500 Ω</td>
</tr>
</tbody>
</table>
| 3 digital inputs, 1 to 3   | Digital 0: 3 to 5 V or open, electrically isolated  
|                            | Digital 1: 12 to 35 V, electrically isolated |
| 3 digital outputs, 1 to 3  | Potential-free relay contact, max. 60 V, 150 mA |
| Digital communication      | RS232 for commissioning and service, optionally FSK / HART® |
| Default settings           | **Conventional communication** on page 13 |
| Voltage output U<sub>V</sub> | 24 V, 15 mA, electrically isolated, for scanning external contacts, or similar applications |
| Connection for transmitter (optional) | Supply for two-wire transmitter with activated process controller in Contrac |
| Individual settings        | See data sheet ‘DS/CONTRAC/SETTING’ or available upon request. |
... 7 Electrical connections

... Electrical data for inputs and outputs

Connection on the device

Power supply
Observe the following points when connecting the power supply:

- You must be able to activate the power supply of the electronic unit on-site.
- In the power supply, the supplied fuses must be installed for certain electronic units (see External fuses for EBS862 on page 28).
- Connect the power supply to the corresponding terminals of the electronic unit (see electrical connections starting on page 23).

External fuses for EBS862

![External fuses diagram]

Note
The conductor cross-section between the fuses and the electronic unit must be at least 2.5 mm² (AWG 14).

In addition to the internal fuses, the EBS862 electronic unit requires two additional external fuses which are supplied separately with the assembly.

The fuses are switched externally in the power supply.

The fuses guarantee safe operation under the special starting conditions of the electronic unit.
Figure 16: Terminal box

1. Commissioning and service field
2. Ground terminal
3. Terminals (power supply)
4. Cable clamps (shielding)
5. Power supply cable
6. Motor cable
7. Terminals (motor)
8. Signal cable
9. Terminals (signals)

Figure 17: Cable shielding

1. Cable clip
2. Cable sheath
3. Shielding
4. Housing

1. Remove the cover for the terminal compartment.
2. Cut the cable sheath to the required length.
3. Separate the cable shield and pull it back over the outer sheath.
4. Push the cable through the cable gland and fasten it with the clamp.
5. Make sure that the cable shield is in contact with the clip and the housing.
6. Connect the cable (see electrical connections starting on page 23).
7. Check the cable connections for tight fit and fasten the cable gland.
8. Screw the cover of the connection chamber back on tight.

Note
When installing the cover for the connection area, take care not to damage the sealing ring. If the sealing ring is damaged, contact the manufacturer.
8 Commissioning and operation

Note
It is imperative that you observe the operating instruction of the corresponding actuator for the commissioning of the electronic unit!

Note
The operating range of the actuator is not factory-set. Set up the mechanical end stops in accordance with the operating instruction for the relevant actuator.

If there is a chance that safe operation is no longer possible, take the device out of operation and secure it against unintended startup.

General information
The basic settings ‘Define end positions’ and ‘Initial diagnosis’ can be configured via the commissioning and service field on the electronic unit.

The commissioning and service field is used to adjust the actuator to the working area and set the direction of action without using a PC.

The following configuration types are available for advanced adjustment of the actuator and its parameterization:
• With DTM
  Configuration can be performed within an FDT frame application that is approved for use with the DTM.
• With EDD
  Configuration can be performed within an EDD frame application that is approved for use with the EDD.

Communication with the electronic unit is optionally done through the RS 232 interface on the commissioning and service field or in field electronic units through digital communication with HART® or PROFIBUS®.

Note
For detailed information on the parameterization of the actuator, consult the associated configuration and parameterization instruction.

Engineering Software ECOM688 and ECOM700
Using the ECOM688 / ECOM700 engineering software, the user can read out, store, and write back the actuator-related data from the electronic unit of a Contrac control actuator.

Depending on the software version of the electronic unit, two different engineering software versions are available.
• Contrac electronic units with software version ≥ 2.00 require ECOM700.
• Contrac electronic units with software version < 2.00 require ECOM688.

Data cannot be read or written with an incorrect ECOM version.

Note
For detailed information, observe the corresponding operating instruction of the ECOM688 / ECOM700 Engineering Software.

Checks prior to commissioning

Before powering up the power supply
Before switching on the power supply and commissioning the device, check the following points:
• Correct wiring (see Electrical connections on page 19).
• Close all housing covers and terminal compartments.
• Do not open the housing cover or terminal compartments during operation!
• The actuator must have been installed in accordance with the corresponding operating instruction. The working zone and mechanical end stops must have been adjusted.
• Make sure that there is no danger of injury for persons due to movement of the actuator!

1. Switch on the power supply.

After powering up the power supply
Check the following items after powering up the power supply:
• The write protection switch on the commissioning and service field is in the ‘OFF’ position.
• The electronic unit is in the ‘MAN’ operating mode; there is no +24 V signal on binary input 1.
• No error (if an error is pending, both LEDs on the commissioning and service field will flash alternately at 4 Hz).

2. Perform parameterization and basic settings on the electronic unit.
Commissioning and service field

Operating element | Description
--- | ---
**Button 100 %** | Press to set the current position as 100 %; press briefly in combination with the 0 % button to end the adjustment process. Simultaneously pressing the 0 % button for at least 5 seconds switches the actuator to MAN operating mode (manual). (Software version 2.00 and higher)

**Button 0 %** | Press to set the current position as 0 %; press in combination with the 100 % button to end the adjustment process.

**LED 100 % / 0 %** | Depending on the flash rate, this LED indicates the adjustment process, position saved, MAN operating mode (manual via commissioning and service field from software version 2.00 or higher) or an error.

**Reset button** | Press to restart the processor. If the adjustment is not yet terminated, the set end positions are deleted.

**Write protection switch** | Activates the hardware write protection. Factory setting: OFF – write protection deactivated. Refer to [Hardware write protection](#) on page 33.

**Potential switch** | Selection of reference potential. Factory setting: SYS – Reference potential on the system. Refer to [Hardware write protection](#) on page 33.

**Travel button** | Pressing a button moves the actuator in the selected direction. Press and hold both buttons at the same time for at least 5 seconds to delete the existing end position setting.
... 8 Commissioning and operation

... Commissioning and service field

Meaning of the LED indicators

The LEDs 100 % / 0 % on the commissioning and service field (Figure 18 on page 31, Pos. ② + ⑥) flash at different rates, depending on the function that has been initiated.

<table>
<thead>
<tr>
<th>LED Flash code 0 % / 100 %</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Adjustment mode" /></td>
<td>Both LEDs flash synchronously at 4 Hz.</td>
</tr>
<tr>
<td><img src="image" alt="Accept 1" /></td>
<td>Position correct. Depending on which position is approached first, either LED 100 % flashes at 1 Hz and LED 0 % continues to flash at 4 Hz, or vice versa.</td>
</tr>
<tr>
<td><img src="image" alt="Accept 2" /></td>
<td>Position correct. Both LEDs flash at 1 Hz.</td>
</tr>
<tr>
<td><img src="image" alt="Failure" /></td>
<td>Both LEDs flash alternately at 4 Hz.</td>
</tr>
<tr>
<td><img src="image" alt="ECOM688 or ECOM700 mode" /></td>
<td>Both LEDs light continuously (from software version 2.00).</td>
</tr>
<tr>
<td><img src="image" alt="MAN operating mode (manual) through ISF" /></td>
<td>The LED 0 % flashes at 1 Hz, LED 100 % is off (from software version 2.00).</td>
</tr>
<tr>
<td><img src="image" alt="MAN (Manual) operating mode via binary input or graphical user interface" /></td>
<td>The LED 100 % lights continuously, LED 0 % is off (from software version 2.00).</td>
</tr>
</tbody>
</table>

Note
The flash codes for MAN (manual) operating mode through ISF or binary input / graphic user interface can also occur at the same time.
Hardware settings

Hardware write protection
If write protection is active, the device parameterization cannot be changed.
Activating and sealing the write protection switch WP (Figure 18, ⑦) protects the device against tampering.

<table>
<thead>
<tr>
<th>Number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Write protection active</td>
</tr>
<tr>
<td>OFF</td>
<td>Write protection deactivated</td>
</tr>
</tbody>
</table>

Potential switch
The potentials switch INT (Figure 18, ⑨) connects the reference potential either to the system or the protective ground.

<table>
<thead>
<tr>
<th>Number</th>
<th>Function / setting recommendation</th>
</tr>
</thead>
</table>
| SYS ⑨ | Reference potential on system potential
Conventional control with analog set point without external electrical isolation |
| SYS ⑨ | Reference potential on ground potential
Conventional control with analog set point and with external electrical isolation |
| SYS ⑨ | Reference potential on ground potential
With step control |

Basic Setup

Setting the end positions 0 % / 100 %

Note
Once commissioning is complete, set the write protection switch to 'ON'.

1. Switch the electronic unit to the 'Adjustment' operating mode. Press and hold down both travel buttons (Figure 18, pos. ⑩) for approx. 5 seconds, until both LEDs (Figure 18, pos. ② and ⑥) flash in sync at approx. 4 Hz.

Defining the initial position (0 % or 100 %)
2. Use one of the travel buttons to move to the desired position.
3. Press the Accept button to accept the position (Figure 18, pos. ③ or ⑤); if successful, the corresponding LED flashes at a rate of 1 Hz. The other LED will continue to flash at approx. 4 Hz.

Defining the second position (0 % or 100 %)
4. Use one of the travel buttons to move to the second position.
5. To accept the position, press the Accept button. If successful, both LEDs will flash at a rate of approx. 1 Hz.

Saving the settings
6. Press both Accept buttons to accept the settings. The LEDs will stop flashing after a short period of time and the setup process is complete.

Note
If the range selected for the actuator is too small, both LEDs begin to flash again at 4 Hz and the setup procedure must be repeated with a larger value (min. actuator travel). (Information regarding actuator travel appears on the actuator name plate.)

Correcting your settings
- If after accepting the initial value for the settings you need to make a correction, press the reset button and repeat the setting procedure.
- If you need to make a correction after saving your settings, you will need to repeat the entire setup procedure from the beginning.

After commissioning
After commissioning has been performed, it is recommended that you use the control system to operate the actuator and that you check the actuator’s response and its signaling behavior. In order for the actuator to go into automatic mode after commissioning, there must be a 24 V DC-signal on binary input 1 in actuators with active binary input function (standard setting). If the digital input function is switched off, the actuator will switch to automatic mode immediately on completion of the setup process.
Manual (MAN)- and Automatic Operation (AUT)

Software version 2.00 and higher
In the manual operating mode (MAN), the actuator solely reacts upon actuation of either of the two travel buttons on the commissioning and service field. Any control via the setpoint or digital input will be ignored.
The operating mode is saved in the non-volatile memory of the electronic unit. As a result, the actuator will not start up unintentionally after a power failure.

Activating manual operating mode (MAN) on the commissioning and service field
• Simultaneously press the Accept buttons 100 % / 0 % (Figure 18 on page 31, 3, 5) for at least 5 seconds. The LED for the 0%-Position will begin to flash.

Activating automatic operating mode (AUT) on the commissioning and service field
• Simultaneously press the Accept buttons 100 % / 0 % (Figure 18 on page 31, 3, 5) for a brief amount of time. The LED for the 0 %-Position will go out.

Activating the automatic operating mode (AUT) through the binary input or the graphic user interface
• Apply a +24 V DC signal to binary input 1 and / or select the AUT operating mode on the graphic user interface.
With the manual operating mode (MAN) activated, the LED for the 100 % position is continually lit up.

Signaling on the commissioning and service field

<table>
<thead>
<tr>
<th>Function</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device setup</td>
<td>Switch to Device setup: After this time, both LEDs will then flash in sync at 4 Hz. Press and hold down both travel buttons for approx. 5 s.</td>
</tr>
<tr>
<td>Approach an end position: Pressing the travel button. Both LEDs will continue to flash at 4 Hz during actuator travel.</td>
<td>Move to the desired end position by</td>
</tr>
<tr>
<td>Save the initial end position: The corresponding LED will flash at approx. 1 Hz, the other will continue to flash at 4 Hz.</td>
<td>Press the 0% or 100% button.</td>
</tr>
<tr>
<td>Save the second end position: The related LED will flash at approx. 1 Hz in sync with the first LED.</td>
<td>Press the 0% or 100% button.</td>
</tr>
</tbody>
</table>

Special Requirements

- Standard operation: MAN / AUT. The LEDs are not lit.
- Travel via the operating button on the commissioning and service field. The LEDs are not lit.

Error (both LEDs flashing alternately at 4 Hz)

Press the RESET button to reset the error messages. If there are no other errors pending, both LEDs will go out.
Reset if the operating range is overshot: After approx. 5 seconds, the LEDs will stop flashing briefly. After a ‘reset’, the electronic unit will be in Adjustment Mode.
Press and hold down both travel buttons for 5 seconds and then press the RESET button.

ECOM Mode

The ECOM688 engineering tool is used to access the electronic unit. Both LEDs light up continuously.
9 Diagnosis / error messages

Definition – Alarms and Errors

Alarms
The actuator / electronic unit is in a critical state (e.g., high temperature), which currently does not affect the actuator, electronic unit, process or persons. The actuator functions are available. Previous alarms are stored in the ‘Saved Alarms’ area in the electronic unit. Use the graphic user interface to read out saved alarms.

Errors
The actuator / electronic unit is in a critical state, e.g. control circuit monitoring, which is directly impairing the actuator, electronic unit, process or persons. The actuator is switched off and the actuator functions are no longer available. Previous error messages are stored in the ‘Saved Errors’ area in the electronic unit. Use the graphic user interface to read out saved errors. Error messages cannot be reset until the cause of the error has been eliminated.

Alarm Diagram
... 9 Diagnosis / error messages

Error Diagram

Positioning loop monitoring
- Standstill
- Min. speed
- Movement in incorrect direction

Hardware monitoring
- Frequency converter end positions

Software monitoring
- Error position transmitter memory
- Flash Error
- RAM error
- Watchdog monitoring activated

Monitoring ON

&

Error signal

Error message via actual value
ON

&

Analog output
1 to 3.5 mA with 'low alarm'
21.5 to 25 mA with 'high alarm'

Saved errors (reset option)

Interference display ON
# Hardware Errors

This chapter only covers hardware-related errors. For additional troubleshooting information, refer to the online help for the operator interface.

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible cause</th>
<th>Troubleshooting the Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve cannot be moved by actuator.</td>
<td>Failure either on the actuator or the final control element (e.g. packed gland too tight).</td>
<td>Disconnect actuator from valve. If the actuator moves, the valve is the possible cause. If the actuator does not move, the actuator is the possible cause.</td>
</tr>
<tr>
<td>The actuator does not respond.</td>
<td>Incorrect electronic unit or incorrect data set.</td>
<td>Compare information on name plates for actuator and electronic unit.</td>
</tr>
<tr>
<td></td>
<td>Incorrectly configured electronic unit.</td>
<td>Check / change.</td>
</tr>
<tr>
<td></td>
<td>No communication with the control system.</td>
<td>Check wiring.</td>
</tr>
<tr>
<td></td>
<td>Incorrect wiring between actuator and electronic unit.</td>
<td>Check wiring.</td>
</tr>
<tr>
<td></td>
<td>Motor / brake defective.</td>
<td>Check the winding resistance of the motor and brake. Check the brake lock.</td>
</tr>
<tr>
<td></td>
<td>Binary inputs on the electronic unit are not wired.</td>
<td>Make connection.</td>
</tr>
<tr>
<td></td>
<td>Brake does not release (no mechanical 'click')</td>
<td>Check the brake air gap (approx. 0.25 mm (0.010 in)) and electrical connection to the brake.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check winding resistance of the brake coil.</td>
</tr>
<tr>
<td>Actuator does not run in automatic mode, although automatic mode is selected in the user interface.</td>
<td>Digital input 1 (BE 1) not wired.</td>
<td>Make connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the software settings for the digital inputs.</td>
</tr>
<tr>
<td>Actuator does not respond to control (LED 5 flashing at 1 Hz (software version 2.00 and higher).</td>
<td>Actuator in manual mode (MAN) through commissioning and service field.</td>
<td>Switch actuator to automatic mode (AUT).</td>
</tr>
<tr>
<td>LEDs in the commissioning and service panel (ISF) are flashing synchronously.</td>
<td>Actuator is not adjusted properly.</td>
<td>Adjust actuator.</td>
</tr>
<tr>
<td>LEDs flash alternately.</td>
<td>Electronic unit / drive malfunction.</td>
<td>Drive the actuator beyond the adjusted end position, either manually or using the buttons on the commissioning and service field; (if necessary disconnect from final control element first). Drive the actuator back into the operating range and connect it to the valve. Readjust the actuator for the operating range.</td>
</tr>
</tbody>
</table>
10 Maintenance

Electronic unit

The electronic unit does not require any maintenance if it operated in line with intended use under normal operating conditions.

Note
Manipulation by users shall immediately render the warranty for the device invalid.

Control actuator

Note
For detailed information on the maintenance of the actuator, consult the operating instruction of the actuator!

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.

11 Repair

Repair and maintenance activities may only be performed by authorized customer service personnel.
When replacing or repairing individual components, use original spare parts.

Returning devices
Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes. Fill out the return form (see Return form on page 41) and include this with the device. In accordance with the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes:
All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 4 for nearest service location.
## Fuses

<table>
<thead>
<tr>
<th>Type</th>
<th>Fuse</th>
<th>Installation location</th>
<th>Design</th>
<th>Rated current of fuse at 115 V AC</th>
<th>Rated current of fuse at 230 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBS852</td>
<td>External fuse</td>
<td>External</td>
<td></td>
<td>16 A, time-lag</td>
<td>16 A, time-lag</td>
</tr>
<tr>
<td></td>
<td>Mains fuse</td>
<td>Connection area</td>
<td>G-fuse cartridge 5 × 20 mm</td>
<td>12.5 A, time-lag</td>
<td>10 A, time-lag</td>
</tr>
<tr>
<td></td>
<td>Brake fuse</td>
<td>Power supply board</td>
<td>G-fuse cartridge 5 × 20 mm</td>
<td>0.315 A, medium time-lag</td>
<td>0.315 A, medium time-lag</td>
</tr>
<tr>
<td></td>
<td>DC link fuse</td>
<td>Power supply board</td>
<td>G-fuse cartridge 6.3 × 32 mm</td>
<td>10 A, super fast-acting</td>
<td>10 A, super fast-acting</td>
</tr>
<tr>
<td></td>
<td>Fuse for binary outputs (3x)</td>
<td>Connection area</td>
<td>G-fuse cartridge 5 × 20 mm</td>
<td>–</td>
<td>0.2 A, medium time-lag</td>
</tr>
<tr>
<td>EBS862</td>
<td>External fuse*</td>
<td>External</td>
<td>Safety fuse / thermal circuit breaker</td>
<td>–</td>
<td>35 A / 16 A</td>
</tr>
<tr>
<td></td>
<td>Brake fuse</td>
<td>Power supply board</td>
<td>G-fuse cartridge 5 × 20 mm</td>
<td>–</td>
<td>0.315 A, medium time-lag</td>
</tr>
<tr>
<td></td>
<td>DC link fuse</td>
<td>Power supply board</td>
<td>G-fuse cartridge 6.3 × 32 mm</td>
<td>–</td>
<td>15 A, super fast-acting</td>
</tr>
<tr>
<td></td>
<td>Fuse for binary outputs (3x)</td>
<td>Connection area</td>
<td>G-fuse cartridge 5 × 20 mm</td>
<td>–</td>
<td>0.2 A, medium time-lag</td>
</tr>
</tbody>
</table>

* The 35 A safety fuse and the 16 A thermal circuit breaker are included in the scope of delivery. The conductor cross-section between the fuse and the electronic system must be at least 2.5 mm² (14 AWG).
12 Recycling and disposal

Note

Products that are marked with the adjacent symbol may not be disposed of as unsorted municipal waste (domestic waste). They should be disposed of through separate collection of electric and electronic devices.

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:

- As of 8/15/2018, this product will be under the open scope of the WEEE Directive 2012/19/EU and relevant national laws (for example, ElektroG - Electrical Equipment Act - in Germany).
- The product must be supplied to a specialist recycling company. Do not use municipal waste collection points. These may be used for privately used products only in accordance with WEEE Directive 2012/19/EU.
- If there is no possibility to dispose of the old equipment properly, our Service can take care of its pick-up and disposal for a fee.

13 Approvals and certifications

CE mark

The version of the device as provided by us meets the requirements of the following EU directives:

- EMC directive 2014/30/EU
- Machinery Directive 2006/42/EC / 2006/42/EG
- Low Voltage Directive 2014/35/EU
- RoHS II Directive 2011/65/EU (as of 7/22/2019)

14 Additional documents

Note

Detailed information on the RoHS Directive is available in the ABB download area.

www.abb.com/actuators

Notice on RoHS II-Directive 2011/65/EU

As of 7/22/2019, the products provided by ABB Automation Products GmbH fall within the scope of regulations on hazardous substances with restricted uses or the directive on waste electrical and electronic equipment in accordance with ElektroG.

Note

Detailed information on the RoHS Directive is available in the ABB download area.

www.abb.com/actuators
15 Appendix

Return form

Statement on the contamination of devices and components

Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted. Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:
Company: 
Address: 
Contact person: 
Telephone: 
Fax: 
Email: 

Device details:
Type: 
Serial no.: 
Reason for the return/description of the defect: 

Was this device used in conjunction with substances which pose a threat or risk to health?
☐ Yes ☐ No

If yes, which type of contamination (please place an X next to the applicable items):
☐ biological ☐ corrosive / irritating ☐ combustible (highly / extremely combustible)
☐ toxic ☐ explosive ☐ other toxic substances
☐ radioactive

Which substances have come into contact with the device?
1. 
2. 
3. 

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date 
Signature and company stamp
Trademarks
HART is a registered trademark of FieldComm Group, Austin, Texas, USA
Notes
Introduction

The electronic unit builds the interface between the actuator and the control system. During continuous positioning, the electronic unit varies the motor torque continuously until the actuator force and the control valve force are balanced. High response sensitivity and high positioning accuracy with short positioning time ensure an excellent control quality and a long actuator life.

Additional Information

Additional documentation on EBS852 / EBS862 is available for download free of charge at www.abb.com/actuators. Alternatively simply scan this code:

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

© ABB 2018 3KXE181010R4201