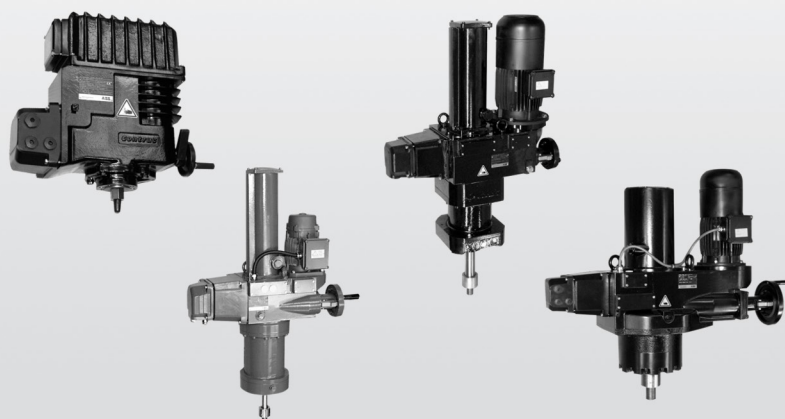


LME / RSD10 / RSD20 / RSD50 / RSD100 (Contrac)

Electrical linear actuator



Electric linear actuator for
operating final control elements.

Rated force

4 to 100 kN (900 to 22500 lbf)

—
LME620-AN
LME620-AI
RSD10
RSD20
RSD50
RSD100

Introduction

Actuator for the operation of final control elements with preferably linear movement. The thrust rod transfers the force directly to the final control element.

A continuous electronic unit controls the actuators. The special electronic unit serves as the interface between actuator and control system.

Additional Information

Additional documentation on LME / RSD10 / RSD20 / RSD50 / RSD100 (Contrac) is available for download free of charge at www.abb.com/actuators. Alternatively simply scan this code:



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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.

Intended use

Control actuators are used exclusively for operating final control elements (valves, valve flaps, etc.).

They may only be operated using a suited Contrac electronic unit for field installation or mounting rack installation.

In addition to this operating instruction, the relevant documentation for the electronic unit and software tool must be observed.

Improper use

The following are considered to be instances of especially 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.

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.

... 1 Safety

Cyber security disclaimer

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 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.

Software downloads

By visiting the web pages indicated below, you will find notifications about newly found software vulnerabilities and options to download the latest software. It is recommended that you visit this web pages regularly:

www.abb.com/cybersecurity

[ABB-Library – Contrac – Software Downloads](#)



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Service address

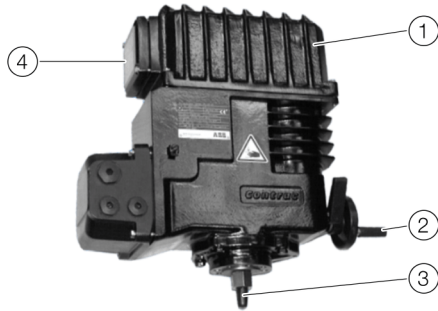
Customer service center

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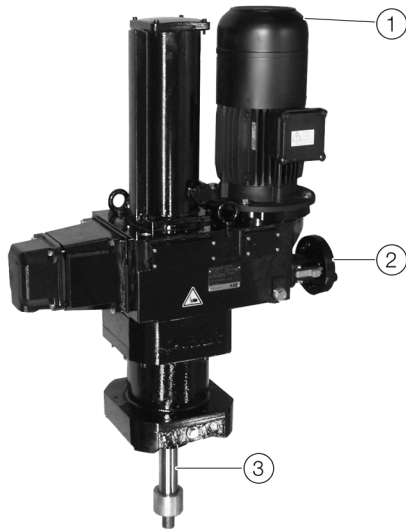
2 Design and function

Design



- ① Cover (LME620-AI, only)
- ② Handwheel
- ③ Thrust rod
- ④ Commissioning and service field (ISF), (for LME620-AI)

Figure 1: LME120 (figures may differ from actual installation)



- ① Control motor
- ② Handwheel
- ③ Thrust rod

Figure 2: RSD (figures may differ from actual)

Principle of operation

Actuator for the operation of final control elements with preferably linear movement. The thrust rod transfers the force directly to the final control element.

A special electronic unit controls the actuators. The special electronic unit serves as the interface between actuator and control system.

During continuous positioning, the electronic unit varies the motor torque steplessly 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.

... 2 Design and function

Device designs

LME120

	LME620-AI	LME620-AN
Operating mode	S9 – 100%; stall-proof acc. to IEC 60034-1/EN 60034-1	
IP rating	IP 66 acc. to IEC 60529/EN 60529 NEMA 4X acc. to CAN/CSA22.2 No. 94	
Humidity	≤ 95% annual average; condensation not permitted	
Ambient temperature	-10 to 55 °C (15 to 130 °F) -25 to 55 °C (-15 to 130 °F)	-10 to 65 °C (15 to 150 °F) -25 to 55 °C (-15 to 130 °F)
Transport and storage temperature	-25 to 70 °C (-15 to 160 °F)	-40 to 70 °C (-40 to 160 °F)
Long-term storage temperature	-25 to 40 °C (15 to 105 °F)	-30 to 40 °C (-25 to 105 °F)
Mounting position	any position; preferably IMV 1 acc. to IEC 60034-7 / EN 60034-7	
Coating	2-layer component epoxy (RAL 9005, black)	
Anti-condensation heater	–	Optional (separate power supply or power feed from Contrac electronic unit)
Power supply for motor and sensors	Via Contrac electronic unit only	
Cable between actuator and electronic unit	–	Optional 5 m (16 ft), 10 m (32 ft) or 20 m (65 ft) max. 30 m (98 ft) for electronic unit EAN823 max. 480 m (1575 ft) for electronic unit EAS822 (Follow the 'electronic unit' data sheet!)

	LME620-AI	LME620-AN
Rated force	4 kN (900 lbf) (adjustable to 0.5 / 0.75 or 1× rated force)	
Starting force	1.2 × rated force (break-away torque in end positions for short time 2 × rated force)	
Rated operating speed, adjustable	2 mm/s (12.7 s/in); 0.1 to 2.0 mm/s (254 to 12.7 s/in)	
Stroke	min.: 0 to 12 mm (0 to 0.47 in) / max. 0 to 60 mm (0 to 2.36 in)	
Weight	Approx. 21 kg (46 lb)	Approx. 17 kg (38 lb)
Associated electronic unit	Integrated electronic unit	For field installation: EAN823 For rack installation: EAS822
Thermal motor monitoring	With motor temperature monitoring equipment SD241B or similarly certified tripping unit for thermistor temperature sensors	
Motor	24 V 3~ asynchronous motor	
Sensors	Position and temperature sensor always available	

RSD

	RSD10 / RSD20 / RSD50 / RSD100
Operating mode	S9%; stall-proof acc. to IEC 60034-1 / EN 60034-1
IP rating	IP 66 acc. to IEC 60529/EN 60529 NEMA 4X acc. to CAN/CSA22.2 No. 94
Humidity	≤ 95% annual average; condensation not permitted
Ambient temperature	-10 to 65 °C (15 to 150 °F) -30 to 50 °C (-20 to 125 °F) -1 to 85 °C (30 to 185 °F)*
Transport and storage temperature	-40 to 70 °C (-40 to 160 °F)
Long-term storage temperature	-30 to 40 °C (-22 to 104 °F)
Mounting position	any position; preferably IMV 1; IMV3; IMB 3 acc. to IEC 60034-7 / EN 60034-7 (other mounting positions available upon request).
Coating	2-layer component epoxy (RAL 9005, black)
Anti-condensation heater	Motor winding: directly from electronic unit. Signal space: separate heating resistor; separate power supply or power feed from Contrac electronic unit
Electrical connection	Plug connection with crimp snap-in contacts or screw terminals Connection cable for electronic unit – actuator available as an option (see ordering information for electronic unit)
Power supply for motor and sensors	Via Contrac electronic unit only

* only for RSD10 / RSD20

	RSD10-5.0	RSD10-10.0	RSD20-5.0	RSD20-7.5
Rated force	10 kN (2200 lbf) (adjustable to 0.5 / 0.75 or 1 × rated force)		20 kN (4400 lbf) (adjustable to 0.5 / 0.75 or 1 × rated force)	
Starting force	1.2 × rated force (break-away torque in end positions for short time 2 × rated force)			
Rated operating speed, adjustable	0.1 to 5.0 mm/s (254 to 5 s/in)	0.1 to 10.0 mm/s (254 to 2.5 s/in)	0.1 to 5.0 mm/s (254 to 5 s/in)	0.1 to 7.5 mm/s (254 to 3.4 s/in)
Stroke	min.: 0 to 15 mm (0 to 0.59 in) / max. 0 to 100 mm (0 to 4 in) or min.: 0 to 50 mm (0 to 1.97 in) / max. 0 to 300 mm (0 to 11.8 in)			
Weight (100 mm stroke)	Approx. 57 kg (126 lb)	Approx. 57 kg (126 lb)	Approx. 57 kg (126 lb)	Approx. 60 kg (132 lb)
Weight (300 mm stroke)	Approx. 82 kg (181 lb)	Approx. 82 kg (181 lb)	Approx. 82 kg (181 lb)	Approx. 85 kg (187 lb)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852			
Motor	MCS 71 BA	MCS 71 BA	MCS 71 BA	MCS 80 BA
Sensors	Position and temperature sensor always available			

... 2 Design and function



... Device designs

	RSD50-3.0	RSD50-10.0
Rated force	50 kN (11240 lbf) (adjustable to 0.5 / 0.75 or 1× rated force)	
Starting force	1.2 × rated force (break-away torque in end positions for short time 2 × rated force)	
Rated operating speed, adjustable	0.1 to 3.0 mm/s (254 to 8.5 s/in)	0.1 to 10.0 mm/s (254 to 2.5 s/in)
Stroke	min.: 0 to 15 mm (0 to 0.59 in) / max. 0 to 120 mm (0 to 4.7 in) or min.: 0 to 60 mm (0 to 2.36 in) / max. 0 to 300 mm (0 to 11.8 in)	
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)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852	For field mounting: EBN861 For rack installation: EBS862
Thermal motor monitoring	With motor temperature monitoring equipment SD241B or similarly certified tripping unit for thermistor temperature sensors	
Motor	MC 90 BA	MC 100 BA
Sensors	Position and temperature sensor always available	

	RSD100-1.5	RSD100-10.0
Rated force	100 kN (22500 lbf) (adjustable to 0.5 / 0.75 or 1x rated force)	
Starting force	1.2 × rated force (break-away torque in end positions for short time 2 × rated force)	
Rated operating speed, adjustable	0.1 to 1.5 mm/s (254 to 17 s/in)	0.1 to 10.0 mm/s (254 to 2.5 s/in)
Stroke	min.: 0 to 25 mm (0 to 0.98 in) / max. 0 to 150 mm (0 to 5.9 in) or min.: 0 to 60 mm (0 to 2.36 in) / max. 0 to 300 mm (0 to 11.8 in)	
Weight (120 mm stroke)	Approx. 215 kg (474 lb)	Approx. 242 kg (534 lb)
Weight (300 mm stroke)	Approx. 275 kg (606 lb)	Approx. 273 kg (602 lb)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852	For field mounting: EBN861 For rack installation: EBS862
Motor	MC 90 BA	MC 112 BA
Sensors	Position and temperature sensor always available	



3 Product identification

Name plate

①	Antrieb / Actuator: CONTRAC		
②	F-Nr./No	NL	
③	F =	Jahr/Year	
④	t =	IP 66, NEMA 4X	
⑤	s = min. max.	V = mm/s	
⑥	Fett / Grease		
⑦	Elektronik/Electronics		
⑧	U = 230 V (190 bis 260 V) F = 50/60 Hz, ± 5 %		
⑨	P = max. W Ext. Sicherung / Fuse 16 A träge/slow		
⑩			
ABB AG Schillerstrasse 72 D-32425 Minden Made in Germany 			

- | | |
|---|---|
| ① Full type designation | ⑥ Filled oil types |
| ② Manufacturing number / NL-no.
(In the case of a non-listed design) | ⑦ Associated Contrac electronic unit |
| ③ Rated force / Year of manufacture | ⑧ Permissible voltage range / mains frequency (for LME120-AI only) |
| ④ Permissible ambient temperature / IP-IP rating / CE marking | ⑨ Power consumption / specifications for fuse protection (for LME120-AI only) |
| ⑤ Min., max. stroke / max. operating speed / heating (optional) | ⑩ Free for customer-specific information |

Figure 3: LME name plate

①	Antrieb / Actuator: CONTRAC		
②	F-Nr./No	NL	
③	F =	Jahr/Year	
④	t =	IP 66, NEMA 4X	
⑤	s = min...max...	v =mm/s	
⑥	Öl / Oil:		
⑦	Elektronik/Electronics		
⑧			
⑨			
⑩			
ABB AG Schillerstrasse 72 D-32425 Minden Made in Germany 			

- | | |
|---|--|
| ① Full type designation | ⑥ Filled oil types |
| ② Manufacturing number / NL-no.
(In the case of a non-listed design) | ⑦ Associated Contrac electronic unit |
| ③ Rated force / Year of manufacture | ⑧ Free |
| ④ Permissible ambient temperature / IP-IP rating / CE marking | ⑨ Free |
| ⑤ Min., max. stroke / max. operating speed / heating (optional) | ⑩ Free for customer-specific information |

Figure 4: Name plate RSD

4 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 .

Storing the device

Note

The storage data provided below assumes that the devices are fully closed and thus comply with the IP rating stated in the specification.

When devices are supplied, their IP rating is guaranteed. If the devices have been tested or commissioned, the IP rating needs to be guaranteed before they are put into storage.

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

The permissible storage and transport temperatures must be observed.

Devices equipped with a heater are also protected by desiccant, which is placed in the following locations where condensation may be a problem:

Position sensor:	In connection chamber
Electronic unit	In electrical connection chamber

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

Remove the desiccant prior to commissioning the actuator or the electronics.

If you intend to store or transport the device for a prolonged period (> 6 months), we recommend that you wrap it in plastic film and add desiccant.

Protect uncovered metallic surfaces with an appropriate long-term corrosion inhibitor.

The relevant long-term storage temperatures must be observed.

5 Installation

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.

Please observe the following safety instructions

- Only qualified specialists may mount and adjust the control actuator, and make the electrical connection.
- When working on the actuator or the electronics always observe the locally valid accident prevention regulations and the regulations concerning the construction of technical installations.
- Switch off the supply voltage and take precautions to prevent unintentional switch-on.

Mounting

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. Add oil if necessary.
- Once the actuator is installed, fasten the vent valve in the uppermost oil hole.
- Prior to commissioning the device, make sure that the motor and the connection chambers are free of dirt, humidity and corrosion.
- Make sure adequate actuator travel is provided for the valve stroke.

Installation instructions

- Make sure that no process forces are exerted on the final control element.
- Do not lift the actuator by the motor or handwheel.
- The load pick-up device (eyebolt) attached to the actuator may only be loaded in the vertical direction. Only use the load pick-up device to lift / lower the actuator (without final control element mounted).
- Make sure that the actuator is accessible from all sides so that convenient handwheel operation, electrical connection, or exchange of assemblies is possible.
- Select the installation location such to avoid direct exposure to rain, snow and other environmental influences.
- The control actuators can withstand vibration loadings in accordance with EN 60068-2-6, Table C.2 to 150 Hz and max. 2 g.
- The substructure should be designed to be level and torsion-resistant.
- When mounting the actuator close to heat sources use an insulating layer or shielding.
- Make sure that the maximum ambient temperature is not up-scaled. If required, provide a sunshield to protect against direct sunlight.
- The maximum rated force of the actuator may not be permanently exceeded. Occasionally and for short periods only, loads of up to twice the rated force are permissible.
- The internal stops of the actuator are not tightly fastened when delivered. During commissioning, the stops should be adjusted in accordance with the description in **Adaptation of actuator stroke to the valve stroke (RSD, only)** on page 13 and tightened.

Valve design requirements

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

... 5 Installation

Mounting position

LME620

The actuator's gearing LME620 is lubricated with grease. This means that any mounting position can be selected.

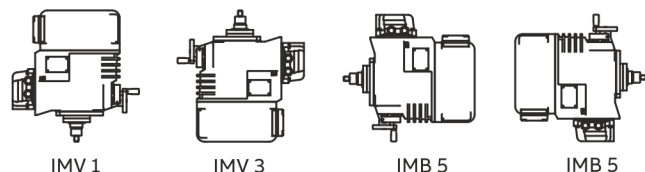


Figure 5: Mounting positions LME620

RSD10 / RSD20 / RSD50 / RSD100

The spur gears of the RSD10 / RSD20 / RSD50 and RSD100 (Contrac) actuators are oil lubricated. When delivered, the actuator is filled at the factory with the oil volume in accordance with IMV 1. Once the actuator is installed replace the uppermost check plug by the separately supplied venting plug.

The mounting positions shown in Figure 7 and Figure 6 are permissible. To facilitate mounting and maintenance, however, it is recommended to use orientation IMV 1. For each mounting position, you should check the specified oil level before commissioning, , see **Filling volumes** on page 26.

Note

Maintain a minimum distance of 80 mm (3.15 in) to ensure sufficient cooling air supply and for possible module replacement.

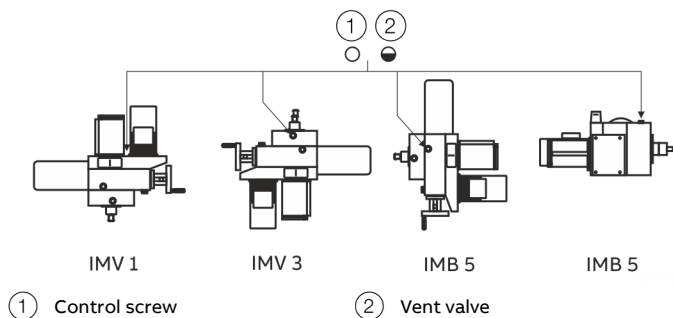


Figure 6: RSD10 / RSD20 mounting positions

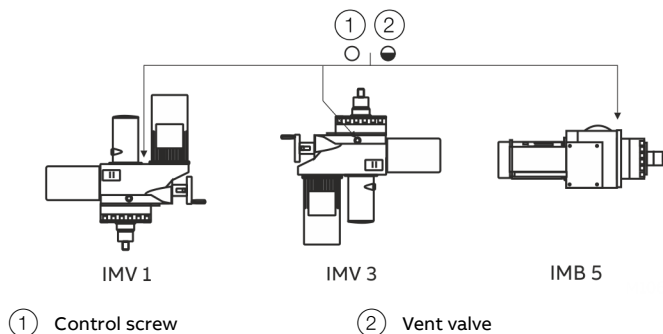
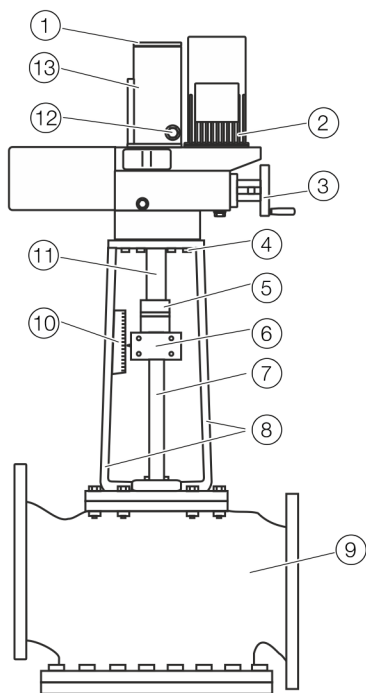


Figure 7: RSD50 / RSD100 mounting positions

Mounting examples



- | | |
|-------------------------------|----------------------------------|
| ① Thrust rod cover (only RSD) | ⑧ Valve yoke |
| ② Control motor | ⑨ Valve |
| ③ Handwheel | ⑩ Mechanical position indication |
| ④ Fixing screws (8.8) | ⑪ Thrust rod |
| ⑤ External limit stop | ⑫ Screw plug for stop (only RSD) |
| ⑥ Coupling | ⑬ Thrust rod cover (only RSD) |
| ⑦ Valve stem | |

Figure 8: Mounting examples

Adaptation of actuator stroke to the valve stroke (RSD, only)

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

Note

With a mounting position other than IMV 1, drain the oil until the oil level is below the thrust rod cover (see Figure 8, ⑬).

1. Drive the thrust rod completely out with the handwheel. 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 handwheel to drive in the thrust rod until the actuator stroke matches the required valve stroke.
6. Turn the internal limit stop (slotted ring nut) with a screwdriver clockwise until it is touching the drive sleeve. Finally, turn it back approx. 1 turn.
7. Tighten both Allen screws to the required torque.

RSD10 / RSD20:	26 Nm (19.18 lbf-ft)
RSD50:	26 Nm (19.18 lbf-ft)
RSD100:	40 Nm (29.5 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.

... 5 Installation

Assembly with the final control element

1. Retract the thrust rod fully and place 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 in) in relation to the total stroke).
3. Fasten the actuator on the valve yoke using slightly oiled screws of property class 8.8 (tensile strength 800 N/mm² [116,032 lbf/in²]; yield strength 640 N/mm² [93,550 lbf/in²]).

Note

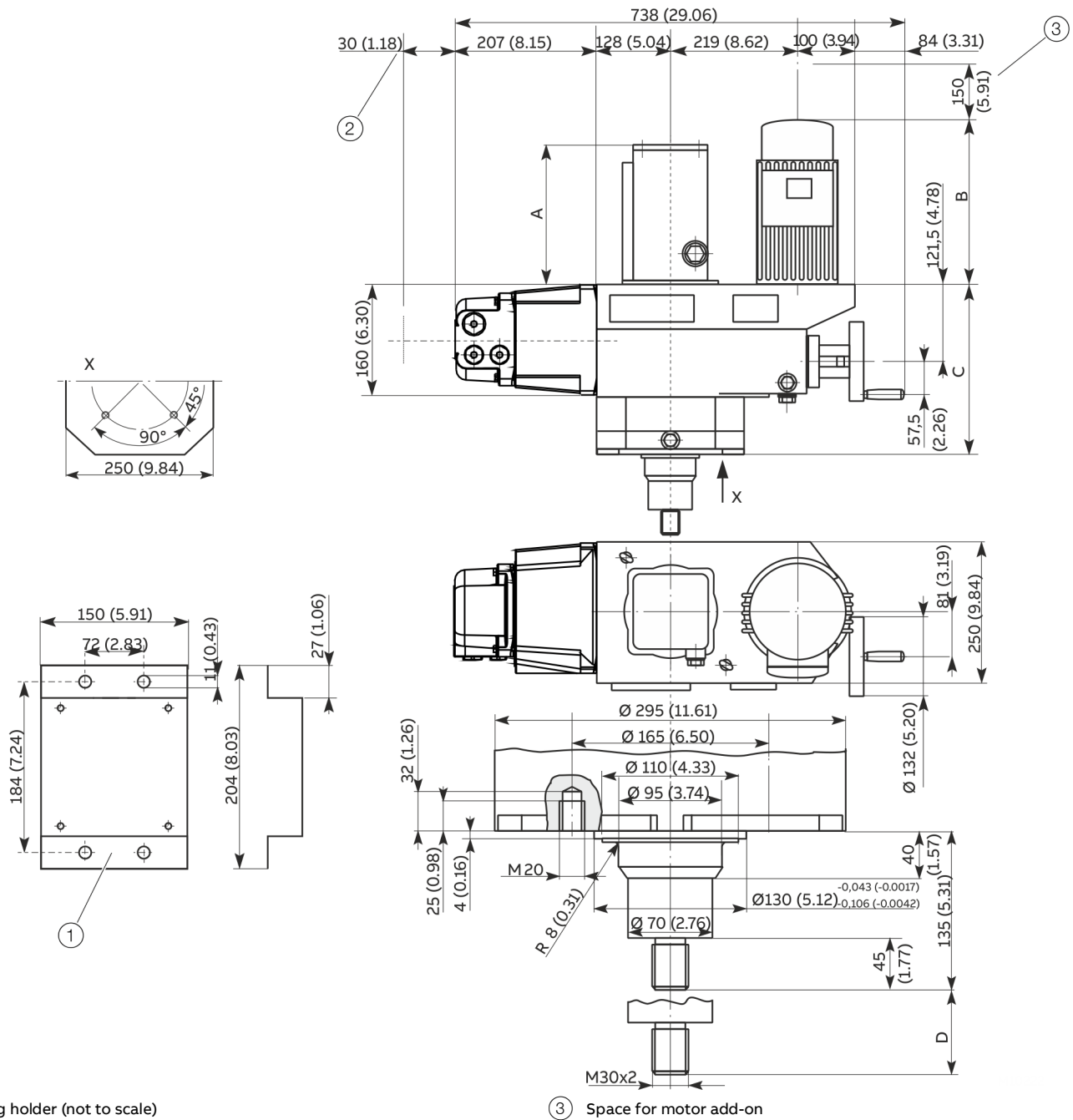
Observe the fastening torques and thread dimensions in the actuator flange!

Actuator	Tightening torque	Flange thread
LME	20 Nm (14.75 lbf-ft)	M8-15 deep
RSD10 / RSD20	175 Nm (129.07 lbf-ft)	M16-20 deep
RSD50	340 Nm (250.77 lbf-ft)	M20-25 deep
RSD100	340 Nm (250.77 lbf-ft)	M20-25 deep

4. Use the handwheel to extend the thrust rod; link the rod with the valve stem via the coupling.
5. Manually retract the thrust rod to check whether or not the external limit 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!).

mm (in)	A	B	C	D	
With stroke 100 (3.94)	210 (8.27)	max. 244 (9.61)	RSD20-7.5: Max.308 (12,13)	248 (9.76)	100 (3.94)
With stroke 300 (11.81)	410 (16.14)			448 (17.64)	300 (11.81)

Control actuator RSD50



- ① Plug holder (not to scale)
 ② Space for removing the plug

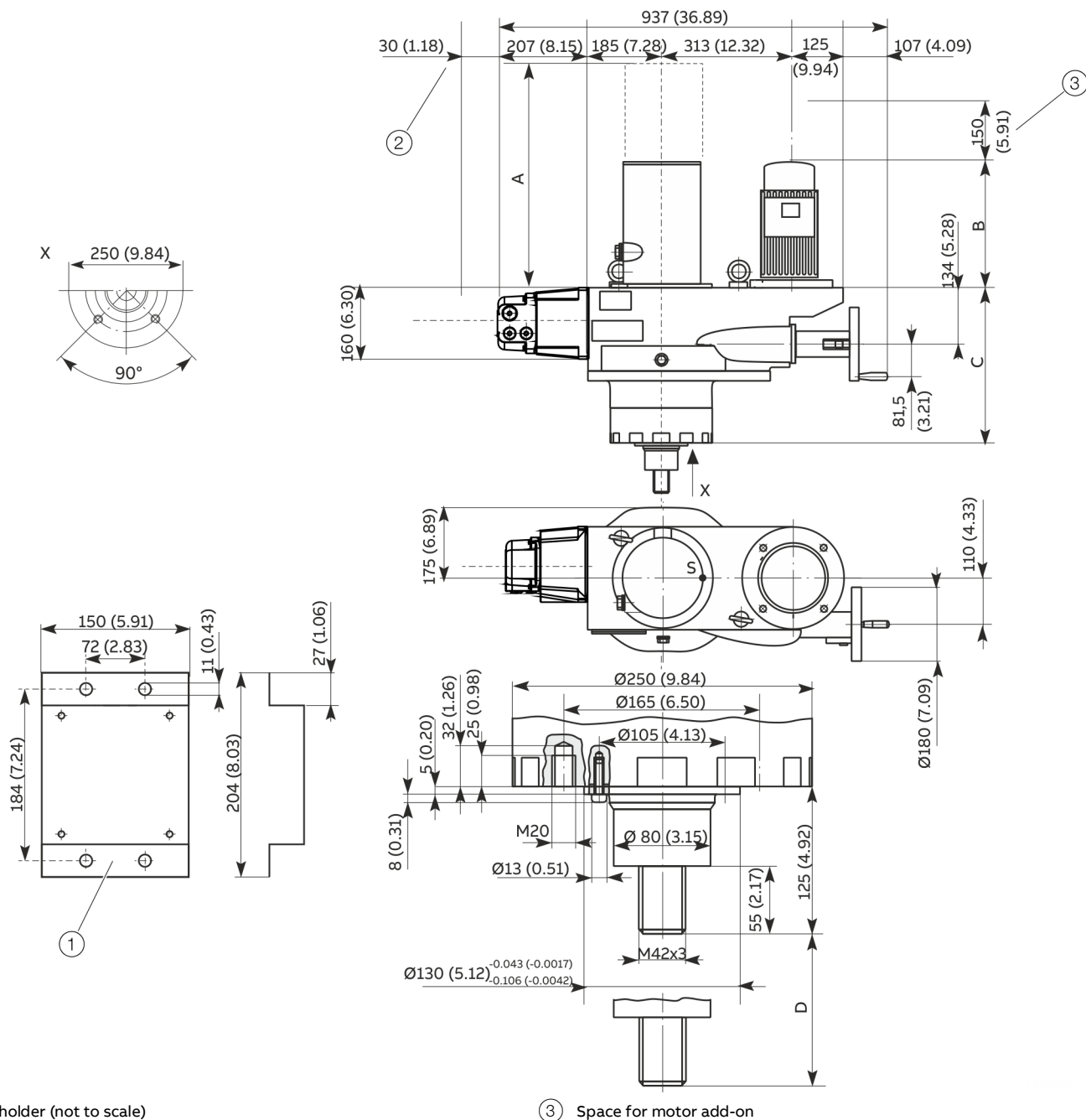
Figure 11: Dimensions in mm (in)

mm (in)	A	B	C	D
With stroke 120 (4.72)	239 (9.41)	RSD50-3.0: Max. 380 (14.96) RSD50-10.0: max. 415 (16.34)	299 (11.77)	120 (4.72)
With stroke 300 (11.81)	422 (16.61)		479 (18.86)	300 (11.81)

... 5 Installation

... Dimensions

Control actuator RSD100



① Plug holder (not to scale)

② Space for removing the plug

③ Space for motor add-on

Figure 12: Dimensions in mm (in)

mm (in)	A	B	C	D
With stroke 150 (5.91)		RSD100-1.5: Max. 380 (14.96)	377 (14.84)	150 (5.91)
With stroke 300 (11.81)	462 (18.19)	RSD100-10.0: max. 455 (17.91)	527 (20.75)	300 (11.81)

6 Electrical connections

Safety instructions

WARNING

Risk of injury due to live parts!

Risk of death or serious injuries due to electricity and unexpected machine movements. In automatic mode the motor is always under power, even at standstill.

- When working on the actuator or the related subassembly, switch off the supply voltage for the electronic unit and separate anti-condensation heater (option), and take precautions to prevent unintentional switch-on.

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.

Terminal assignment

Note

Detailed information regarding the electrical connection of the actuators to the associated electronic unit can be found in the circuit diagram of the electronic unit in the operating instruction.

Conductor cross-section on universal plug

LME

		Crimp pins		Screw terminals (optional)	
Separate electronic unit	Cable cross-section	Motor / brake / heater:	max. 1.5 mm ² (16 AWG)	Motor / brake / heater /	0.2 to 2.5 mm ²
		Signals:	max. 0.5 mm ² (20 AWG)	signals:	(24 to 14 AWG)
	Contact surface	Motor / brake / signals:	Gold-plated	Motor / brake / signals:	Gold-plated
		Heater:	Silver-plated	Heater:	Silver-plated
integrated electronic unit	Cable cross-section	Power supply:	max. 2.5 mm ² (14 AWG)	Power supply / signals:	0.2 to 2.5 mm ²
		Signals:	max. 0.5 mm ² (20 AWG)		(24 to 14 AWG)
	Contact surface	Power supply / signals:	Gold-plated	Power supply / signals:	Gold-plated

RSD

Crimp pins			
Motor / brake / heater	max. 1.5 mm ² (16 AWG)		
Signals	max. 0.5 mm ² (20 AWG)		
Contact surface	Gold-plated		
Screw terminals (optional)			
Motor / brake / heater	max. 2.5 mm ² (14 AWG)		
Signals	max. 2.5 mm ² (14 AWG)		
Contact surface	Motor / brake / signals:	Gold-plated	
	Heater:	Silver-plated	

... 6 Electrical connections

Conductor cross-section on electronic unit

Note

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

EAN823 – Screw terminals

Motor/brake	fixed: 1.5 to 6 mm ² (16 to 10 AWG) flexible: 1.5 to 4 mm ² (16 to 12 AWG)
Mains	fixed: 0.5 to 6 mm ² (20 to 10 AWG) flexible: 0.5 to 4 mm ² (20 to 12 AWG)
Signals	fixed: 0.5 to 6 mm ² (20 to 10 AWG) flexible: 0.5 to 4 mm ² (20 to 12 AWG)

EBN853 – Screw terminals

Motor/brake	fixed: 1.5 to 6 mm ² (16 to 10 AWG) flexible: 0.2 to 4 mm ² (24 to 12 AWG)
Mains	fixed: 1.5 to 6 mm ² (16 to 10 AWG) flexible: 0.5 to 4 mm ² (20 to 12 AWG)
Signals	fixed: 0.5 to 4 mm ² (20 to 12 AWG) flexible: 0.5 to 2.5 mm ² (20 to 14 AWG)

EBN861 – Screw terminals

Motor/brake	fixed: 1.5 to 6 mm ² (16 to 10 AWG) flexible: 1.5 to 4 mm ² (16 to 12 AWG)
Mains	fixed: 0.5 to 6 mm ² (20 to 10 AWG) flexible: 0.5 to 4 mm ² (20 to 12 AWG)
Signals	fixed: 0.5 to 4 mm ² (20 to 12 AWG) flexible: 0.5 to 2.5 mm ² (20 to 14 AWG)

EAS822 – Clamping connection

	Suited for cable Ø	Terminals for conductor cross-section
Mains cable	13 mm (0.51 in)	max. 4 mm ² (12 AWG)
Signal cable (DCS)	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)
Transmitter (option)	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)
Motor cable	13 mm (0.51 in)	max. 4 mm ² (12 AWG)
Sensor cable	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)

EBS852 – Clamping connection

	Suited for cable Ø	Terminals for conductor cross-section
Mains cable	13 mm (0.51 in)	max. 4 mm ² (12 AWG)
Signal cable (DCS)	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)
Transmitter (option)	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)
Motor cable	13 mm (0.51 in)	max. 4 mm ² (12 AWG)
Sensor cable	8 mm (0.31 in)	max. 1.5 mm ² (16 AWG)

EBS862 – Clamping connection

	Terminals for conductor cross-section
Mains cable	max. 6 mm ² (10 AWG)
Signal cable (DCS)	max. 4 mm ² (12 AWG)
Transmitter (option)	max. 4 mm ² (12 AWG)
Motor cable	max. 6 mm ² (10 AWG)
Sensor cable	max. 4 mm ² (12 AWG)

Cable glands

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

Tap holes for cable glands

	metric	optional adapters for*	
Signals	M20 × 1.5 (2 ×)	PG 16 (2 ×)	NPT ½ in (2 ×)
Motor	M25 × 1.5 (1 ×)	PG 21 (1 ×)	NPT ¾ in (1 ×)

* Adapter for PG or NPT thread must be ordered separately

Selection of suited connection cables

Please observe the following information when selecting cables:

- 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).

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.

7 Commissioning

Note

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

8 Operation

Safety instructions

⚠ DANGER

Danger to life due to unexpected movement of the actuator!

Unexpected movement of the actuator may lead to very serious injuries or to death.

- Make sure that the actuator can move without posing a danger to people!

⚠ WARNING

Danger of crushing between external limit stop and valve yoke / actuator housing!

- Do not reach into the danger zone.

Note

Positioning loop monitoring in the electronic unit must always be active, it is set as default at the factory and cannot be deactivated nor changed afterwards.

- Before power-up, make sure that the ambient conditions specified in the data sheet are complied with and that the power supply corresponds with the information specified on the name plate of the electronic unit.
- If it can be assumed that safe operation is no longer possible, take the unit out of operation and secure against unintended startup.
- When the actuator is installed in work or traffic areas that may be accessed by unauthorized persons, the operator must put appropriate protective measures in place.
- Switch off the power supply to the motor before handwheel operation.

Automatic operation

⚠ WARNING

Risk of injury due to live parts!

Risk of death or serious injuries due to electricity and unexpected machine movements. In automatic mode the motor is always under power, even at standstill.

- When working on the actuator or the related subassembly, switch off the supply voltage for the electronic unit and separate anti-condensation heater (option), and take precautions to prevent unintentional switch-on.

The motor triggered by the electronic unit controls the axially fixed drive sleeve /nut assembly via oil-lubricated spur gears. A ball bearing screw that is radially fixed by an anti-twist arrester converts the rotary motion into a linear one (Figure 13). The screw is the upper part of the thrust rod and has an adjustable mechanical limit stop (RSD, only).

A position sensor detects the current thrust rod position via mechanical reduction gearing without backlash.

The brake integrated in the motor carries out the stop function if the supply voltage is switched off.



Figure 13: Ball bearing screw with nut, cross-section

... 8 Operation

Manual operation

Handwheel mode allows you to move the actuator when the supply voltage is switched off.

CAUTION

Risk of injury!

Risk of injury due to unexpected movement of the handwheel. When pressing the handwheel unlock, the handwheel can unexpectedly move due to the reset force of the valve.

- Hold the handwheel in place with your free hand when pressing the handwheel unlock.

1. Press the handwheel unlocking catch.

Note

When the handwheel is turned clockwise, the thrust rod is retracted at the LME and extended at the RSD10 to RSD100.

2. Turn the handwheel to move the valve stem to the desired position.
3. Release the unlocking catch.

Handwheel operation in combination with positioning loop monitoring

The positioning loop monitoring of the electronic unit monitors actuator behavior. It monitors whether the travel commands trigger the corresponding processes.

When the supply voltage is switched off, the positioning time-out function is disabled and handwheel operation is no longer monitored. If the actuator is moved via the handwheel while the supply voltage is switched on, the positioning loop monitoring recognizes this state as 'travel without travel command'. A corresponding signal is output.

There are several options for resetting this positioning loop error:

- Resetting via the commissioning and service field
- Resetting via the graphical user interface
- Changing the setpoint signal by at least 3 % for more than 1 s
- Wiring of digital inputs BE2 or BE3 (not with step controller)

If the 'positioning loop monitoring' is switched off, the actuator continues to be monitored for 'wrong direction', and a corresponding message is generated in case of an error.

9 Diagnosis / error messages

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

Error	Possible cause	Troubleshooting the Instrument
Valve cannot be moved by actuator.	Failure either on the actuator or the final control element (e.g. packed gland too tight).	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.
The actuator does not respond.	Incorrect electronic unit or incorrect data set.	Compare information on name plates for actuator and electronic unit.
	Incorrectly configured electronic unit.	Check / change. Change the settings via the parameterization software.
	No communication with the control system.	Check wiring.
	Incorrect wiring between actuator and electronic unit.	Check wiring.
	Motor / brake defective.	Check the winding resistance of the motor and brake. Check the brake lock.
	Binary inputs on the electronic unit are not wired.	Make connection.
LEDs in the commissioning and service panel (ISF) are flashing synchronously.	Brake does not release (no mechanical 'click')	Check the brake air gap (approx. 0.25 mm (0.010 in)) and electrical connection to the brake. Check winding resistance of the brake coil.
	Actuator does not run in automatic mode, although automatic mode is selected in the user interface.	Digital input 1 (BE 1) not wired. Make connection. Check the software settings for the digital inputs.
Actuator does not respond to control (LED 5 flashing at 1 Hz) (software version 2.00 and higher).	Actuator in manual mode (MAN) through commissioning and service field.	Switch actuator to automatic mode (AUT).
LEDs in the commissioning and service panel (ISF) are flashing alternately.	Actuator is not adjusted properly.	Adjust actuator.
LEDs flash alternately.	Electronic unit / drive malfunction.	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).
Malfunction 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. Readjust the actuator for the operating range.

Electrical test values

The specified resistance values for the motor refer to measurements between the external conductors.

	EM24	MCS 071 BA	MCS 080 BA	MC 090 BA	MC 100 BA	MC 112 BA
Motor*	L1 (blue) – L2 (black): 3.4 Ω L1 (blue) – L3 (purple): 3.4 Ω	45.6 Ω	21.6 Ω	9.6 Ω	7.6 Ω	2.4 Ω
Brake*	19.5 Ω	2120 Ω	2120 Ω	1620 Ω	1290 Ω	1059 Ω

* Specified winding resistance $\pm 5\%$ bei 20 °C (68 °F)

10 Maintenance

Safety instructions

WARNING

Risk of injury due to live parts!

Risk of death or serious injuries due to electricity and unexpected machine movements. In automatic mode the motor is always under power, even at standstill.

- When working on the actuator or the related subassembly, switch off the supply voltage for the electronic unit and separate anti-condensation heater (option), and take precautions to prevent unintentional switch-on.

WARNING

Injury hazard due to heavy weight

Improper transport of the device or components can lead to death or serious injury.

- Consider the weight of the device or components during maintenance work (see weight information in **Device designs** on page 6).
- Use suitable lifting equipment to transport the device or components.
- Only use the dedicated load pick-up devices (eyebolts) for suspending the device and components.

Notice on auxiliary and operating materials

- Observe the manufacturer's regulations and safety data sheets!
- Mineral oil and grease can contain additives that, under special conditions, may lead to adverse effects.
- Skin contact with oil or grease may cause skin damage (skin irritations, inflammations, allergies). Avoid long-term, excessive or repeated skin contact. If lubricants contact your skin, immediately wash with water and soap! Do not allow lubricants to get in contact with open wounds!
- If lubricant splashes into the eye, rinse with plenty of water for at least 15 minutes and then consult a doctor!
- When handling lubricants use suited skin protection and care products or wear oil-resistant gloves.
- Lubricants that dripped to the floor are a potential source of danger, due to the slip hazard created. Spread sawdust or use oil adsorbent to bind and remove the lubricants.

Repair and maintenance activities may only be performed by authorized customer service personnel.

When replacing or repairing individual components, use original spare parts.

General

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.

Inspection and overhaul

- Only use genuine spare parts for maintenance of the actuators (e.g., ball bearings, gaskets, and oil).
- Maintenance work needs to be performed after the life cycle has expired.
- Inspection / maintenance is due once the intervals specified have passed, at the very latest.

Maintenance plan

Interval	Measures
1 × per year	Visual check of the gaskets for leaks. Remove and replace if leaks are present.
Every 2 years	Functional check: drive the actuator 2 × 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	Replace oil, roller bearings, and gaskets on motor and gears. Check gear wheels for wear; replace if necessary.

Make sure that no chippings or other materials get into the gears during maintenance work.

Do not move the actuator during the oil level check.

Removing the motor and adjusting the brakes

WARNING

Risk of injury!

The actuator position may be changed accidentally by the repelling power of the valve when the motor is removed or the brake is released.

- Make sure that process forces are not exerted on the thrust rod.

In automatic mode, the brake is nearly not exposed to any mechanical wear, since it is permanently released. Any readjustment is not necessary. Use the test function of the configuration software to check the brake.

Oil change

Note

Oils for different temperature ranges may not mixed.

During an oil change, thoroughly remove any oil that may have escaped to avoid accidents.

Dispose of old oil according to local regulations. Make sure that the oil does not enter the water cycle. Make sure that any oil leaking from the device cannot come into contact with hot components.

Proceed as follows to drain or change the oil:

1. Provide a collecting vessel capable of holding the expected oil quantity in accordance with **Filling volumes** on page 26 .
2. Open and release the vent valve, see **Mounting position** on page 12.
3. Unscrew the lowermost drain plug to drain the oil.
4. Collect the oil in the collection vessel.
5. Make sure all of the oil has been removed from the actuator housing.
6. Screw the drain plug back in.
7. Refill with the proper volume of oil in accordance with **Filling volumes** on page 26 and securely tighten the vent valve.

... 10Maintenance

... Oil change

RSD oil types

Ambient temperature	Oil types - DIN 51517	
	Default oil filled with delivery	Alternative oil
-10 to 65 °C (15 to 150 °F)	Castrol Alpha BMB 220 – DIN 51517	ESSO Spartan EP 220 – DIN 51517 / ISO 12925-1 BP Energol GR-XP 220 – DIN 51517 Shell Omala 220 – DIN 51517 / ISO 12925-1 Mobilgear 630 – DIN 51517 / ISO 12925-1
-30 to 50 °C (-20 to 130 °F)	Mobil SHC 629 – DIN 51517 / ISO 12925-1	-
-1 to 85 °C (30 to 185 °F)	Mobil SHC 632 – DIN 51517 / ISO 12925-1	-

Filling volumes

RSD10 / RSD20

Mounting position	IMV 1	IMV 3	IMB 5 (Handwheel down)	IMB 5
Minimum oil level I (gal)*				
Max. stroke 100 mm (4 in)	Approx. 3.8 (1.01)	Approx. 5.4 (1.43)	Approx. 3.8 (1.01)	Approx. 3.8 (1.01)
Max. stroke 300 mm (11.8 in)	Approx. 6.4 (1.69)	Approx. 8.8 (2.33)	Approx. 6.4 (1.69)	Approx. 6.7 (1.77)
Minimum oil level below inspection plug when thrust rod retracted mm (in)	40 (1.57)	0 (0)	28 (1.10)	75 (2.95)

RSD50

Mounting position	IMV 1	IMV 3	IMB 5
Minimum oil level I (gal)*			
Max. stroke 120 mm (4.72 in)	Approx. 7 (1.85)	Approx. 10 (2.65)	Approx. 7 (1.85)
Max. stroke 300 mm (11.8 in)	Approx. 10 (2.65)	Approx. 12 (3.17)	Approx. 9.5 (2.51)
Minimum oil level below inspection plug when thrust rod retracted mm (in)	49 (1.93)	0 (0) 150 (5.91) [300 (11.81) stroke]	95 (3.74)

RSD100

Mounting position	IMV 1	IMV 3	IMB 5
Minimum oil level I (gal)*			
Max. stroke 150 mm (5.91 in)	Approx. 11 (2.91)	Approx. 18 (4.76)	Approx. 13 (3.43)
Max. stroke 300 mm (11.8 in)	Approx. 15 (3.96)	Approx. 23 (6.08)	Approx. 9.5 (2.51)
Minimum oil level below inspection plug when thrust rod retracted mm (in)	47 (1.85)	15 (0.059) [150 (5.91) stroke] 130 (5.12) [300 (11.81) stroke]	43 (1.69)

* US liquid gallon

Grease lubrication

Basic gearing (except DU female connectors)	Recirculating ball screw	Motor mounting
Tribol GR 1350-2.5 PD, Castrol	Tribol GR 1350-2.5 PD, Castrol	ASONIC GLY 32
All components must be sufficiently wetted.	The recirculating ball screw must be completely wetted after being actuated several times.	The motor bearings must be completely filled with the lubricant.

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) 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.

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 Additional documents

Note

All documentation, declarations of conformity, approvals, certificates and additional documentation are available in the ABB download area.

www.abb.com/actuators

14 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

PROFIBUS and PROFIBUS DP are registered trademarks of PROFIBUS & PROFINET International (PI)

Notes

Notes

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
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