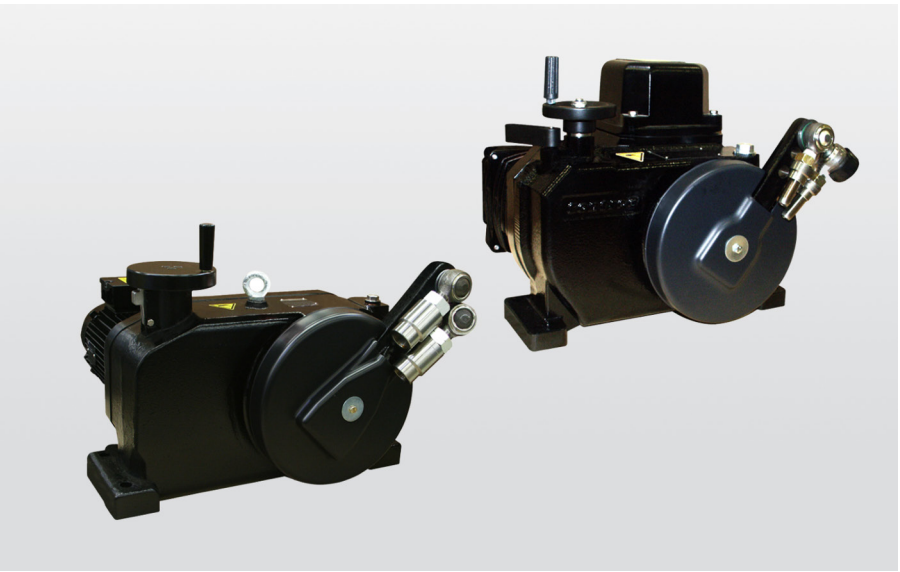
PME120/RHD250 to 4000 (Contrac)

Electrical rotary actuator



Electrical rotary actuator for the operation of final control elements

PME120
RHD250
RHD500
RHD800
RHD1250
RHD2500
RHD4000

Introduction

Compact actuator for the operation of final control elements with preferably 90° rotary movement such as valve flaps, ball valves, etc.

The nominal torque is transferred through a lever actuator. A special electronic unit controls the actuator. The special electronic unit serves as the interface between actuator and control system.

Additional Information

Additional documentation for PME120 / RHD250 / 500 / 800 / 1250 / 2500 / 4000 (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

Manufacturer's address

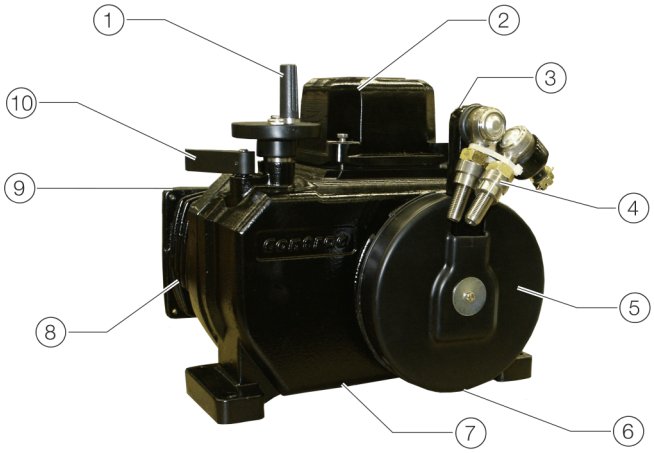
ABB AG
Measurement & Analytics
Schillerstr. 72
32425 Minden
Germany
Tel: +49 571 830-0
Fax: +49 571 830-1806

Service address

Customer service center
Tel: +49 180 5 222 580
Email: automation.service@de.abb.com

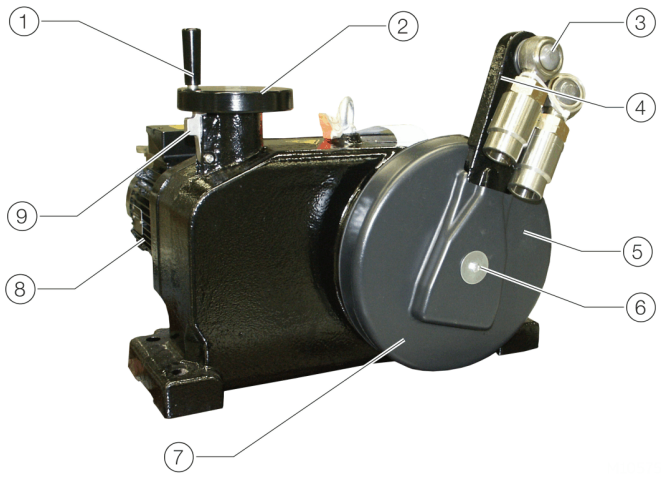
2 Design and function

Design



1. Hand wheel crank
2. Plug
3. Lever
4. Ball-and-socket joint
5. Lever cover
6. Adjustable stops (under the lever cover)
7. Gear housing
8. Control motor
9. Cover (for PME120-AI incl. electronic unit)
10. Hand wheel release

Figure 1: PME120 (illustrations may differ from actual installation)



1. Hand wheel crank
2. Handwheel
3. Ball-and-socket joint
4. Output lever
5. Lever cover
6. Output shaft
7. Adjustable stops (under the lever cover)
8. Control motor
9. Handwheel unlock

Figure 2: RHD (figures may differ from actual)

Principle of operation

Compact actuator for the operation of final control elements with preferably 90° rotary movement such as valve flaps, ball valves, etc.
The nominal torque is transferred through a lever actuator.
A special electronic unit controls the actuator. 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

PME120

	PME120-AI (integrated electronic unit)	**PME120-AI (separate electronic unit)**
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) −1 to 85 °C (30 to 185 °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 IMB 3 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)
Electrical connection	–	Electronic unit – Actuator connection cable: 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!)
Power supply for motor and sensors	Via Contrac electronic unit only	

	PME120-AI	**PME120-AN**
Nominal torque	100 Nm (80 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque	
Starting torque	1.2 × nominal torque (break-away torque in end positions for short time 2 × nominal torque)	
Rated time for 90°; adjustable	20 to 900 s	
Rated operating speed, adjustable	4.5 to 0.1 °/s	
Rated time for 90°; adjustable (Temperature design −1 to 85 °C)	45 to 900 s	
Rated operating speed, adjustable (Temperature design −1 to 85 °C)	2.0 to 0.1 °/s	
Operating angle	Typically 90° (min. 35°; max. 270°), with lever and limit stops the mechanical limits in accordance with operating instruction should be complied with.	
Weight	Approx. 36 kg (79 lb)	Approx. 32 kg (70 lb)
Associated electronic unit	Integrated electronic unit	For field installation: EAN823 For rack installation: EAS822
Motor	EM24 24 V 3~ asynchronous motor, insulation material class F DIN EN 60085	
Sensors	Position transmitter and temperature sensor always available	

RHD

	RHD250 / RHD500 / RHD800 / RHD1250 / RHD2500 / 4000
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 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 IMB 3 acc. to IEC 60034-7 / EN 60034-7
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

* 85 °C / 185 °F- design not available for all RHD variants.

	RHD250-10
Nominal torque	250 Nm (185 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque
Starting torque	1.2 × nominal torque (break-away torque in end positions for short time 2 × nominal torque)
Rated time for 90°; adjustable	10 to 900 s
Rated operating speed, adjustable	9.0 to 0.1°/s
Operating angle	Typically 90° (min. 35°; max. 270°), with lever and limit stops the mechanical limits in accordance with operating instruction should be complied with.
Weight	Approx. 45 kg (99 lb)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852
Motor	MCS 71 BA
Sensors	Position transmitter and temperature sensor always available

	RHD500-10	**RHD800-10**
Nominal torque	500 Nm (370 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque	800 Nm (590 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque
Starting torque	1.2 × nominal torque (break-away torque in end positions for short time 2 × nominal torque)	
Rated time for 90°; adjustable	10 to 900 s	
Rated operating speed, adjustable	9.0 to 0.1°/s	
Operating angle	Typically 90° (min. 35°; max. 140°), with lever and limit stops the mechanical limits in accordance with operating instruction should be complied with.	
Weight	Approx. 94 kg (207 lb)	Approx. 97 kg (214 lb)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852	
Motor	MCS 71 BA	MCS 80 BA
Sensors	Position transmitter and temperature sensor always available	

… 2 Design and function

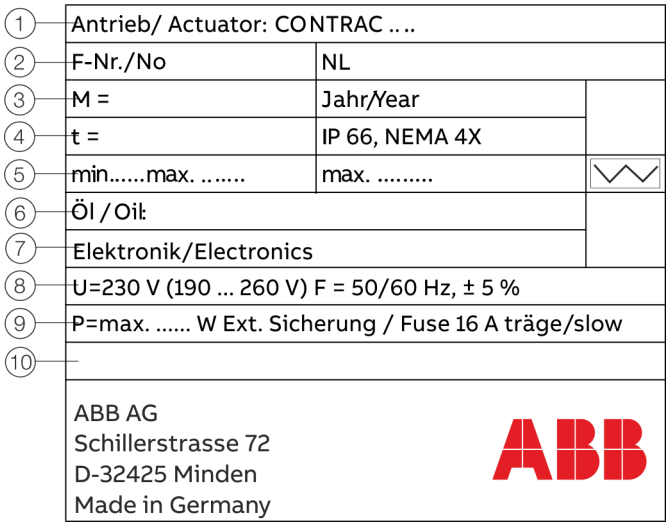
… Device designs

	RHD1250-12	**RHD2500-10**	**RHD2500-25**
Nominal torque	1250 Nm (920 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque	2500 Nm (1850 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque	
Starting torque	1.2 × nominal torque (break-away torque in end positions for short time 2 × nominal torque)		
Rated time for 90°; adjustable	12 to 900 s	10 to 900 s	25 to 900 s
Rated operating speed, adjustable	7.5 to 0.1°/s	9.0 to 0.1 °/s	3.6 to 0.1 °/s
Operating angle	Typically 90° (min. 35°; max. 140°), with lever and limit stops the mechanical limits in accordance with operating instruction should be complied with.		
Weight (including lever-type actuator)	Approx. 227 kg (500 lb)	Approx. 232 kg (511 lb)	Approx. 227 kg (500 lb)
Associated electronic unit	For field mounting: EBN853 For rack installation: EBS852	For field mounting: EBN861 For rack installation: EBS862	For field mounting: EBN853 For rack installation: EBS852
Motor	MCS 80 BA	MC 90 BA	MCS 80 BA
Sensors	Position transmitter and temperature sensor always available		

	RHD4000-10	**RHD4000-40**
Nominal torque	4000 Nm (2950 lbf-ft), adjustable to 0.5, 0.75 or 1 × nominal torque	
Starting torque	1.2 × nominal torque (break-away torque in end positions for short time 2 × nominal torque)	
Rated time for 90°; adjustable	10 to 900 s	40 to 900 s
Rated operating speed, adjustable	9.0 to 0.1°/s	2.25 to 0.1°/s
Operating angle	Typically 90° (min. 35°; max. 270°), with lever and limit stops the mechanical limits in accordance with operating instruction should be complied with.	
Weight	Approx. 290 kg (639 lb)	Approx. 283 kg (624 lb)
Associated electronic unit	For field mounting: EBN861 For rack installation: EBS862	For field mounting: EBN853 For rack installation: EBS852
Motor	MC 100 BA	MC 90 BA
Sensors	Position transmitter and temperature sensor always available	

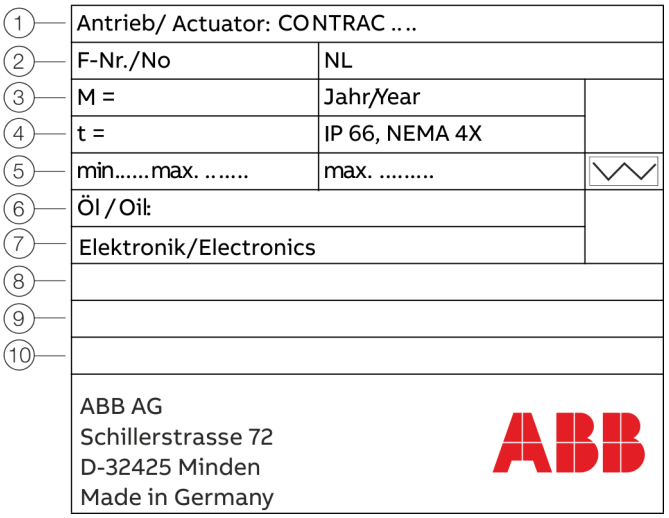
3 Product identification

Name plate



1. Full type designation
2. Manufacturing number / NL-no. (In the case of a non-listed design)
3. Output torque / Year of manufacture
4. Permissible ambient temperature / IP-IP rating / CE marking
5. Min., max. operating angle / max. operating speed / Heating (optional)
6. Filled oil types
7. Associated Contrac electronic unit
8. Permissible voltage range / mains frequency (for PME120-AI only)
9. Power consumption / specifications for fuse protection (for PME120-AI only)
10. Free for customer-specific information

Figure 3: PME name plate



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

Figure 4: RHD name plate

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 IMB 3.
- 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.

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 internal stops of the actuator are not tightly fastened when delivered. During commissioning, the stops should be adjusted in accordance with the description in **Assembly with the final control element** on page 12 and tighten with the torque specified in **Locking and fastening elements** on page 14.

… 5 Installation

… Mounting

Fastening the actuator

1. Place the actuator on the fastening device in the correct position. Pay attention to the rotating direction in combination with the final control element.
2. Fasten the actuator using four screws. Use the biggest possible screw diameter and observe the tightening torque (see table **Locking and fastening elements** on page 14).

Mounting position

The spur gearing of the actuator PME120 and RHD250 / RHD500 / RHD800 / RHD1250 / RHD2500 / RHD4000 (Contrac) are lubricated with oil. They contain the max. oil quantity when leaving the manufacturer. Once the actuator is installed replace the uppermost check plug by the separately supplied venting plug.

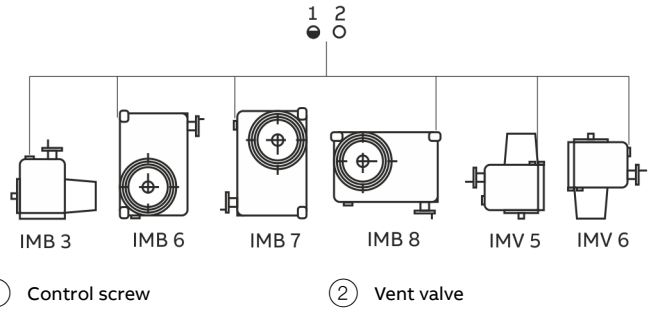


Figure 5: Permissible mounting positions

The mounting positions presented are permissible. To facilitate mounting and maintenance, however, it is recommended that you use position IMB 3 For each mounting position, you should check the specified oil level before commissioning, , **Filling volumes** on page 32.

Note

It is important that sufficient cooling air is supplied, sufficient space is available for changing components and free access is guaranteed to the electronic unit cover (PME120-AI).

To achieve this, allow for the following minimum distances:

Actuator	A
PME120	30 mm (1.18 in)
RHD250	40 mm (1.57 in)
RHD500 / RHD800	30 mm (1.18 in)
RHD1250 / RHD2500	40 mm (1.57 in)
RHD4000	40 mm (1.57 in)

Assembly with the final control element

⚠ WARNING

Risk of injuries due to crushing between the lever and the stops or between the lever and the coupling rod, respectively!

- Prior to starting any mechanical work on the device, switch off the voltage supply to the motor and take precautions to prevent unintentional switch-on.

⚠ WARNING

Risk of injury due to live parts!

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

NOTICE

Vibrational loading may cause the lever cover to come off!

- Secure the lever cover with the appropriate screw locking devices!

Note

Before finally coupling the actuator to the valve, let it once overshoot the actual ‘OPEN’ and ‘CLOSED’ end positions by at least 10 %.

Preparation for mounting with lever

1. Make sure that the shaft and lever hole surface are clean and free of grease.
2. Determine the length of the coupling tube (not included in the scope of delivery) on-site.
3. Move the final control element to the ‘CLOSED’ end position.
4. Use the handwheel to move the actuator into the proper end position. Observe the permissible angle.
5. Refer to relevant data sheet for the required length of the connection pipe.
6. In order to fasten the second ball-and-socket joint, provide a cone in the lever of the final control element, in accordance with the dimensions.
7. Insert the ball-and-socket joint, and secure with crown nut and split-pin.
8. Remove the welding bushings and weld them to the coupling tube.
9. Insert the link rod between the two ball-and-socket joints and screw it in.
10. The ‘L’ dimension can be adjusted by turning the link rod.
11. When adjustment is finished, fasten the counter nuts.

Travel-dependent stop adjustment

1. Remove the lever cover.
2. Move the actuator lever / final control element to the end position requiring finer mechanical adjustment.
3. Put the limit stop onto the toothing as close to the actuator lever as possible and fasten it with screws.
4. Do not fix the mechanical limit stops within the adjusted operating range.
5. Move the driver lever towards the limit stop using the handwheel; turn the link rod for fine adjustment.
6. Tighten the counter nuts.
7. Fasten the limit stop in the other mounting position close to the end position, depending on the toothing.
8. Re-attach the lever cover. Observe the tightening torque!

Force-dependent stop adjustment

1. First make adjustment as described in **Travel-dependent stop adjustment** on page 13 (action steps 1 to 4).
2. Prior to re-fastening the counter nut, turn the link rod with the hand wheel locked in place to provide pretension in the closed position of the valve.
3. Lock the hand wheel.
4. Turn the link rod or slightly shift the mechanical limit stop to get a small gap between the lever and the limit stop. The procedure depends on the stiffness of the linkage arrangement.
5. Tighten the counter-nuts and limit stop screws.
6. Re-attach the lever cover. Observe the tightening torque!

Preparing for installation with direct adapter for PME120

1. Make a hole in the direct adapter in accordance with the valve shaft. For the layout, make sure that the resulting torques can be transferred safely. Observe the position of keyed connection elements in relation to the possible mounting positions for the coupling.
2. Make sure that the valve shaft and direct adapter hole are clean and free of grease.
3. The direct adapter for the actuator is designed with an F10 flange in accordance with ISO5211. A corresponding centering ring is delivered loose with the actuator. Make sure that the flange for the direct adapter fits the flange for the valve.
4. Mount the actuator on the valve flange with four screws. Make sure the actuator is centered precisely. Tighten the screws using a torque of 50 Nm (37 lbf-ft). The valve-side and actuator-side section of the coupling must interlock.

Travel-dependent stop adjustment

1. Remove the cover from the adjustment screws.
2. Move the actuator coupling / final control element into the proper end position.
3. Release the lock nut of the adjustment screw for the limit stop lever and turn the adjustment screw against the limit stop. Tighten the lock nut with a torque of 70 Nm (52 lbf-ft).
4. Re-attach the lever cover. Observe the tightening torque.

Force-dependent stop adjustment

1. Remove the cover from the adjustment screws.
2. Make sure that the valve can be subjected to the resulting torques.
3. Move the actuator coupling / final control element into the proper end position.
4. The adjustment screw for the limit stop may not touch the limit stop lever. If the limit stop lever touches the set screw before reaching the end position, release the counter-nut and unscrew the set screw even more. Then tighten the counter nut with a torque of 70 Nm (52 lbf-ft).
5. Re-attach the lever cover. Observe the tightening torque.

… 5 Installation

… Mounting

Installation variants

Locking and fastening elements

Locking screws of mechanical limit stops	
Actuator	**Tightening torque Nm (lbf-ft)**
PME	46 (34)
RHD250	79 (58)
RHD500 / RHD800	195 (144)
RHD1250 / RHD2500	670 (494)
RHD4000	670 (494)

lever clamping screw	
Actuator	**Tightening torque Nm (lbf-ft)**
PME	23 (17)
RHD250	79 (58)
RHD500 / RHD800	195 (144)
RHD1250 / RHD2500	390 (288)
RHD4000	390 (288)

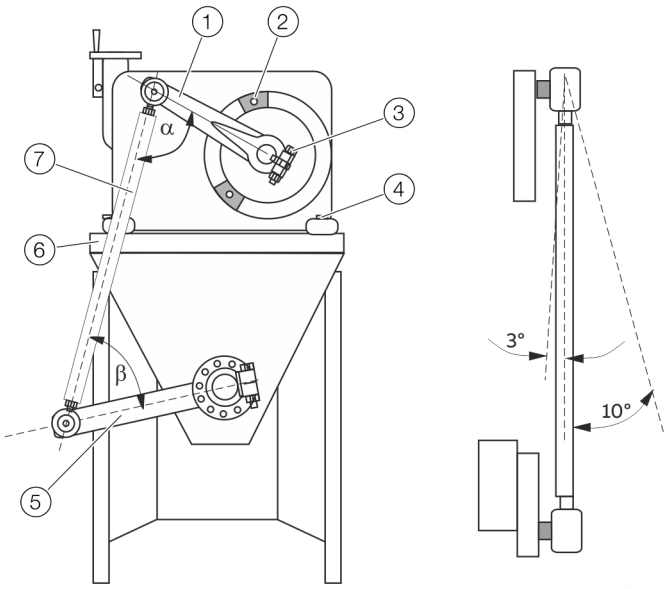
Mounting screw (property class 8.8)			
Actuator	**Hole diameter mm (in)**	**tensile strength N/mm² (lbf/in²)**	**Yield strength N/mm² (lbf/in²)**
PME	12 (0.47)	800 (116032)	640 (93550)
RHD250	12 (0.47)		
RHD500 / RHD800	18 (0.71)		
RHD1250 / RHD2500	20 (0.78)		
RHD4000	20 (0.78)		

Lever cover	
Actuator	**Tightening torque Nm (lbf-ft)**
PME	2.5 +0.5 (1.8 +0.4)
RHD250	2.5 +0.5 (1.8 +0.4)
RHD500 / RHD800	6.5 +0.5 (4.8 +0.4)
RHD1250 / RHD2500	25 +5 (18.4 +3.9)
RHD4000	25 +5 (18.4 +3.9)

PME direct adapter cover	
Actuator	**Tightening torque Nm (lbf-ft)**
PME	4.0 +0.5 (2.9 +0.4)

Specifications for linkage of ball-and-socket valve in driver lever cone			
Actuator	**Ball-and-socket joint**	**Thread**	**Tightening torque Nm (lbf ft)**
PME	A19	M10 × 1	18 (13)
RHD250	A24	M14 × 1.5	45 (33)
RHD500 / RHD800	B30	M18 × 1.5	93 (69)
RHD1250 / RHD2500	B35	M20 × 1.5	126 (93)
RHD4000	B50	M30 × 1.5	258 (190)

Mounting with lever



1. Actuator lever
2. Mechanical limit stop with locking screw
3. Lever clamping screw
4. Fixing screws
5. Flap lever
6. Mounting surface (rigid, level support)
7. Link rod α ≥ 15° (≥ 20°)*, β in accordance with final control element manufacturer

* For actuator types RHD(E)800, RHD(E)1250, RHD(E)2500 and RHD(E)4000

Figure 6: Lever components

Installation with additional output elements

When mounting an additional drive element instead of the standard lever, the following installation conditions must be observed:

Maximum permissible shaft loads

Type	radial force at distance x N (lbf)	Distance x from shaft edge mm (in)	axial force N (lbf)	Max. output torque
PME	943 (212)	30 (1.18)	164 (36.87)	Occasionally, 2-times nominal torque for short time
RHD250	1767 (397.24)	40 (1.57)	310 (69.69)	
RHD500 / RHD800	7542 (1695.51)	35 (1.38)	1310 (294.50)	
RHD1250 / RHD2500	10100 (2270.57)	50 (1.97)	1750 (393.42)	
RHD4000	14142 (3179.25)	55 (2.17)	2455 (551.91)	

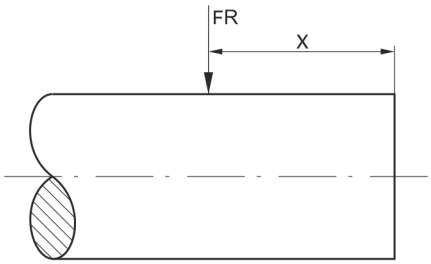


Figure 7: Stub shaft

Configuring the drive element hub

The new output element is mechanically connected to the actuator shaft via a hole with feather key groove. This connection should be designed so that the nominal torque and any possible max. output torque is transmitted securely. The drive element must be mounted securely on the output drive shaft with suitable measures to prevent axial shift. For the new drive element, you can use the current mechanical stops.

The following parameters must be observed:

Type	Hole diameter mm (in)	Feather key width mm (in)	Hub length mm (in)
PME	24 +0.033 (0.944 +0.0013)	8 −0.015/−0.051 (0.31 −0.0006 / −0.0020)	32 (1.26)
RHD250	30 +0.033 (1.18 +0.0013)	8 −0.015 / −0.051 (0.31 −0.0006 / −0.0020)	50 (1.97)
RHD500 / RHD800	50 +0.039 (1.97 +0.0015)	14 −0.018 / −0.061 (0.55 −0.0007 / −0.0024)	70 (2.76)
RHD1250 / RHD2500	70 +0.075 / +0.030 (2.76 +0.0030 / +0.0012)	20 −0.022 / −0.074 (0.79 −0.0311 / −0.0029)	100 (3.94)
RHD4000	85 +0.090 / +0.036 (3.35 +0.0035 / +0.0014)	25 −0.018 / −0.061 (0.98 −0.0007 / −0.0024)	140 (5.51)

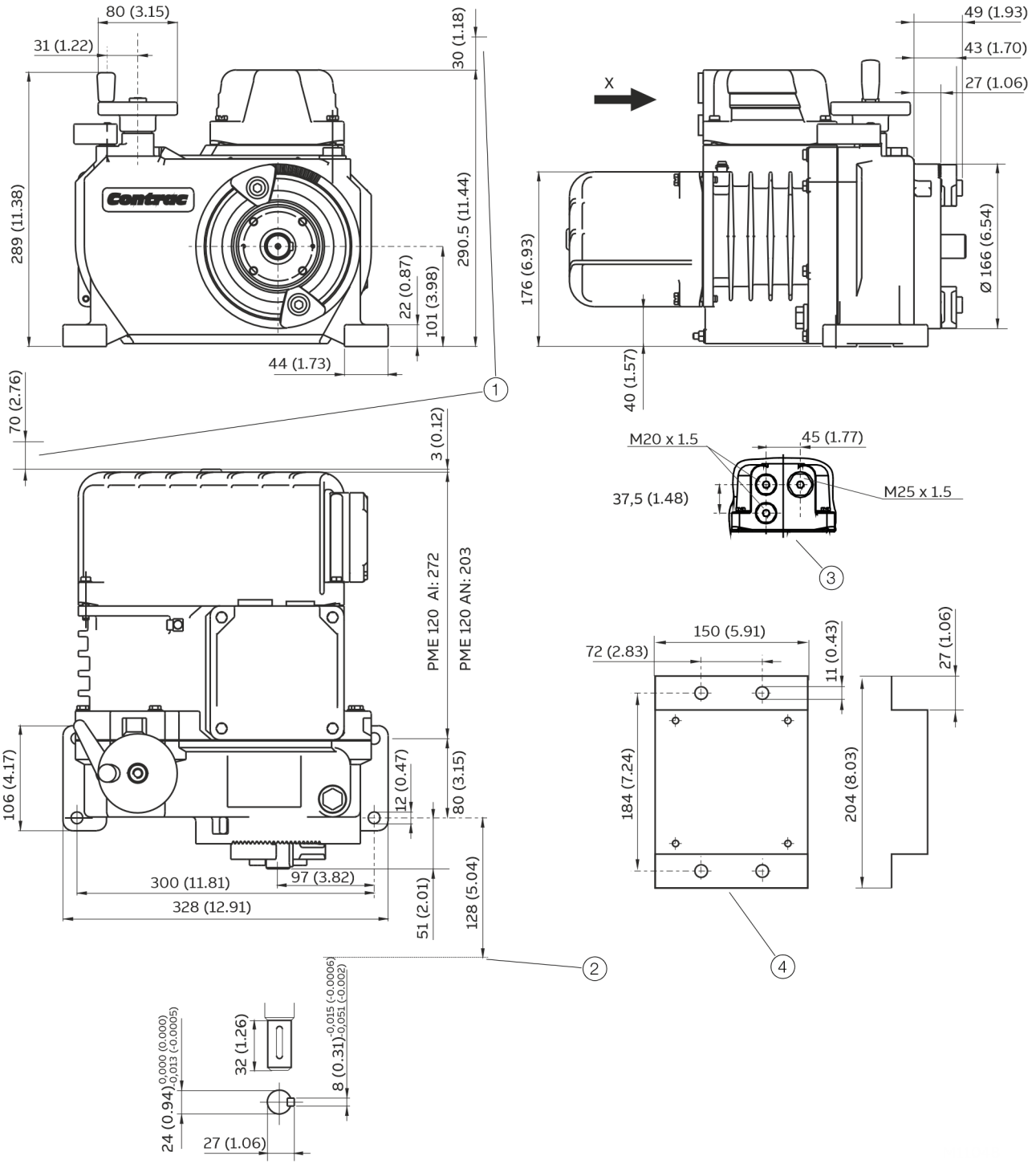
Minimum yield strength of the hub Rp 0.2 for all actuators:

- 320 N/mm^2 (46412.80 lbf/in^2)

… 5 Installation

Dimensions

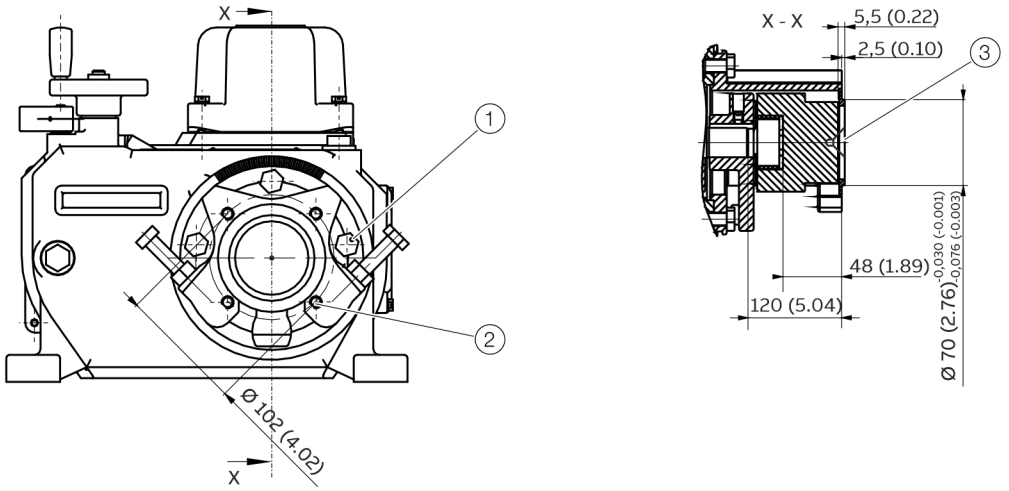
Control actuator PME120



1 Space for disassembly
2 Direct adapter
3 View 'X' plug only
4 Plug holder (not to scale)

Figure 8: Dimensions in mm (in)

Direct adapter PME120-AI/-AN



① M_A = 40 Nm

② M10; 15 deep

③ Centered, undrilled

Figure 9: Dimensions in mm (in)

F10 flange as per EN ISO 5211

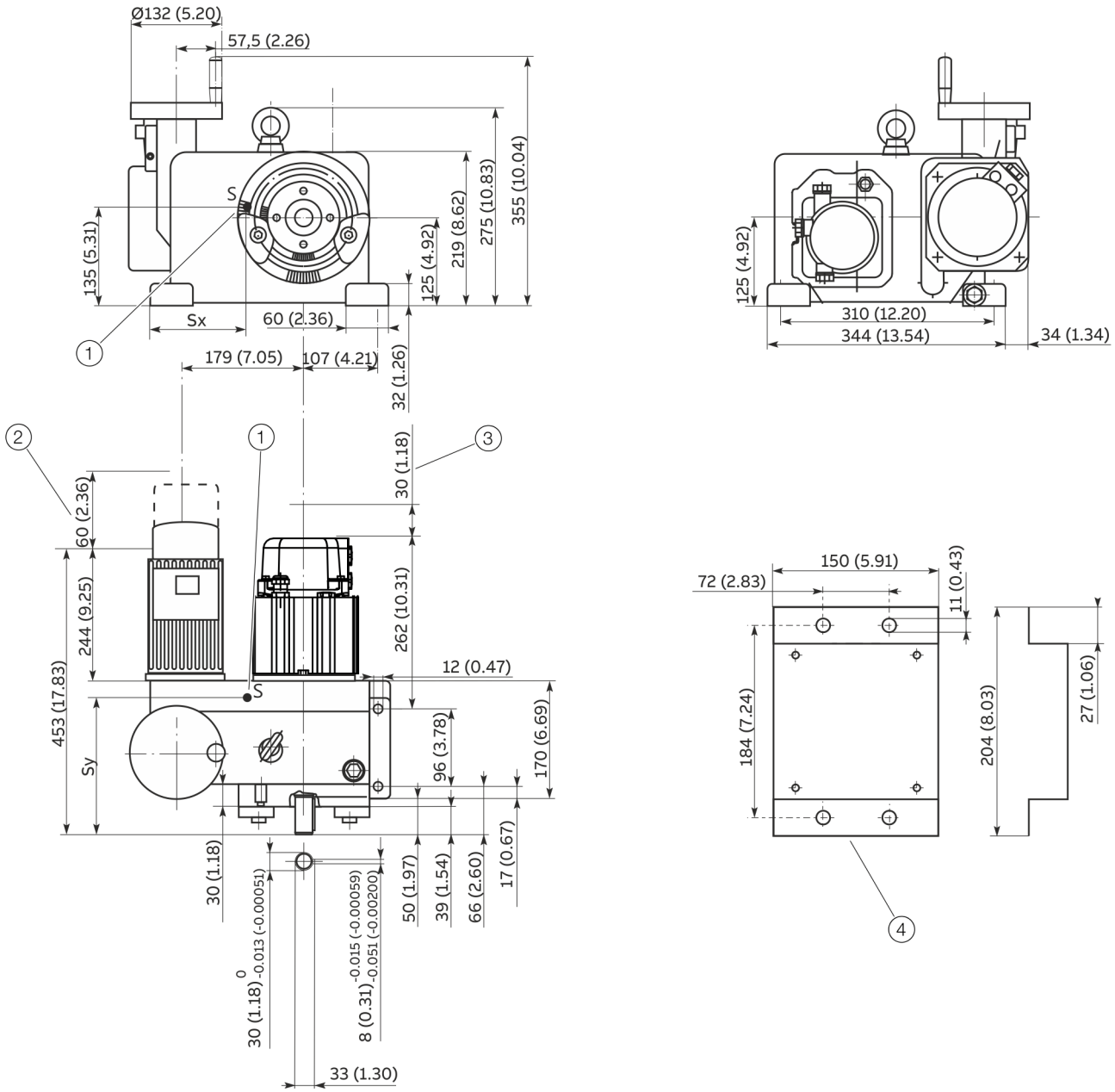
Materials

- Flange: EN-JS1050 as per DIN EN 1563 (GGG50 acc. to DIN 1693)
- Shaft: EN-JS1030 as per DIN EN 1563 (GGG40 acc. to DIN 1693)

… 5 Installation

… Dimensions

Control actuator RHD250



(1) S = Center of gravity

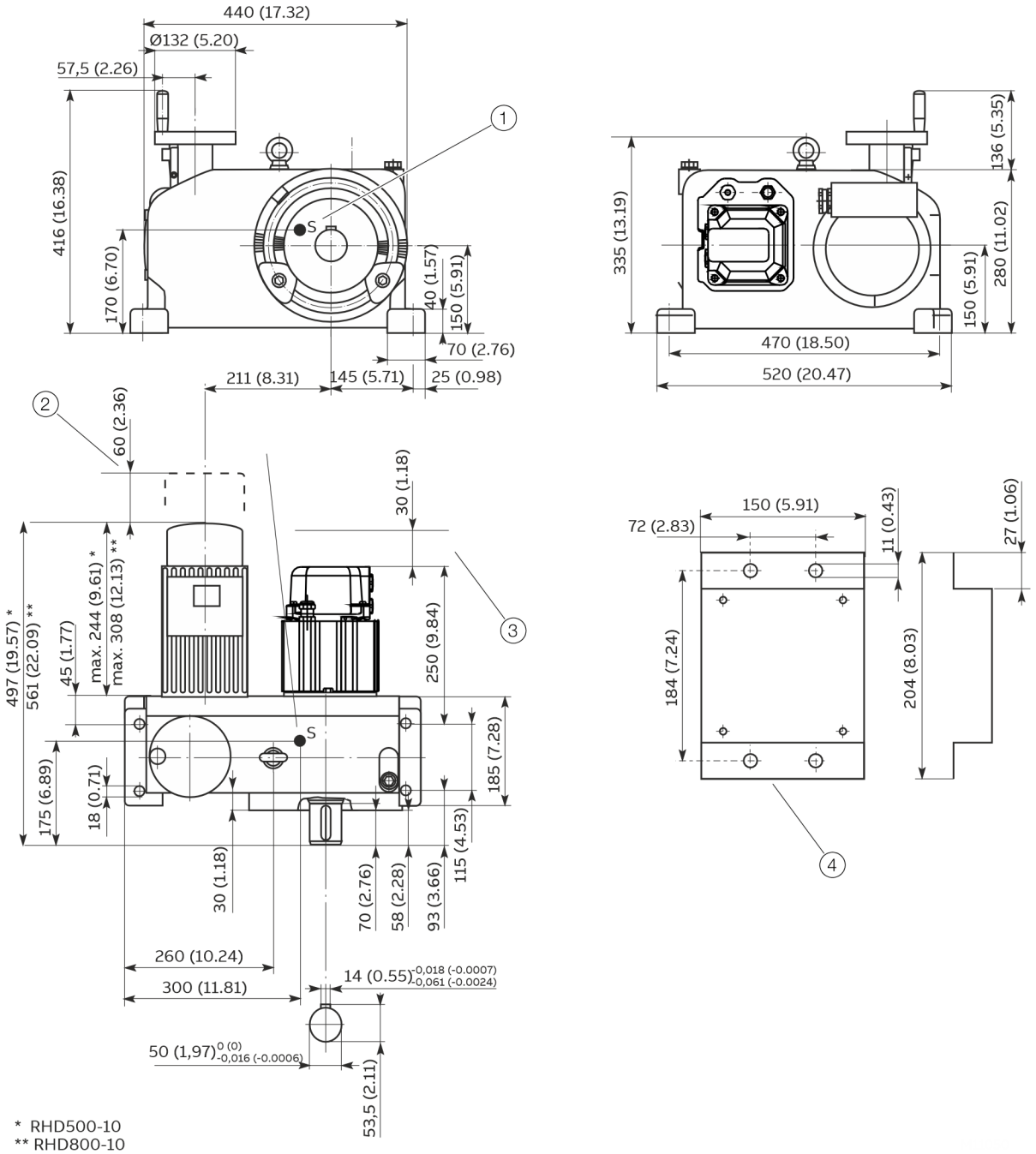
(2) Removal dimension

(3) Space for removing the cover

(4) Plug holder (not to scale)

Figure 10: Dimensions in mm (in)

Control actuator RHD500 / RHD800



* RHD500-10
** RHD800-10

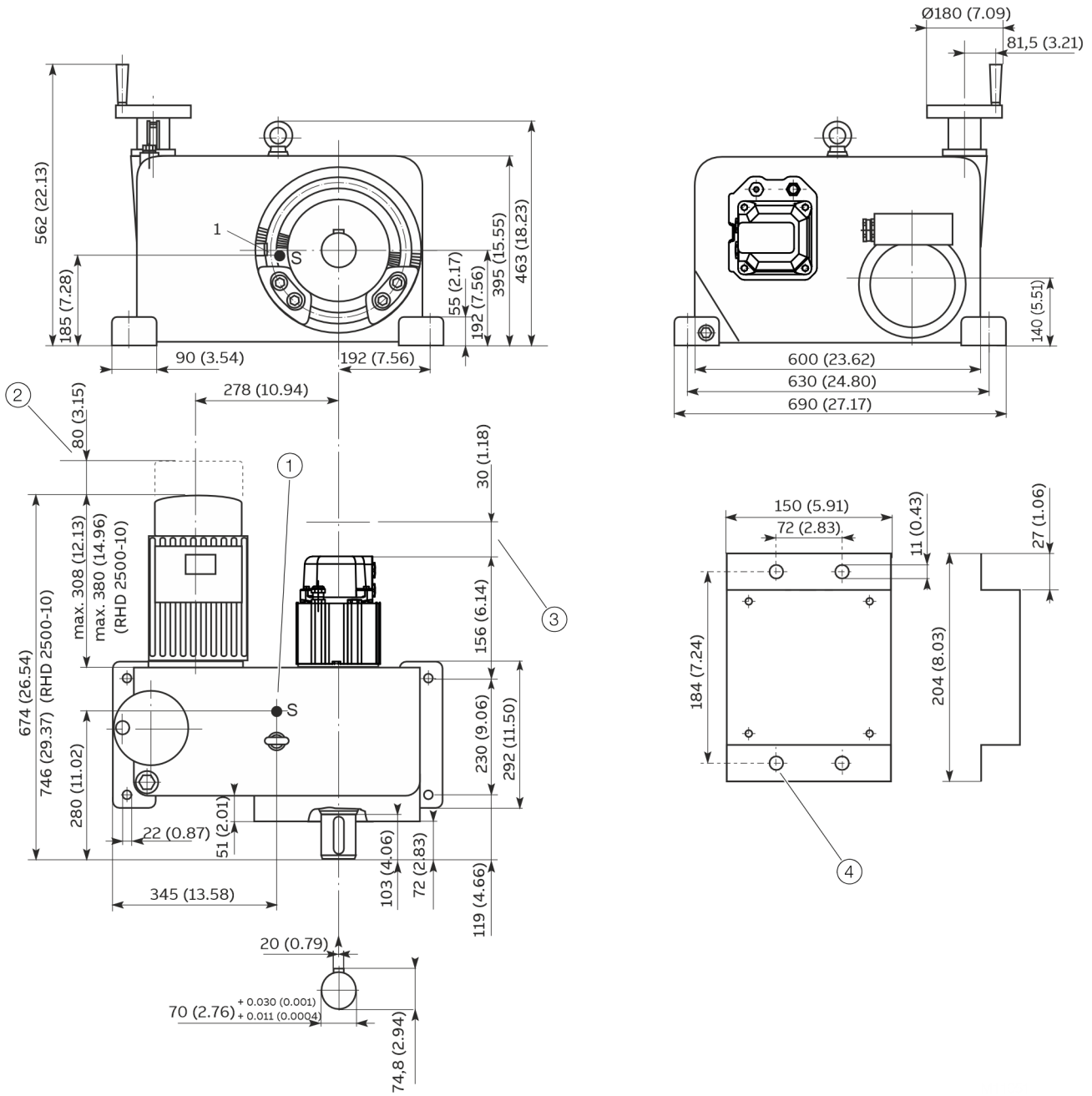
1. S = Center of gravity
2. Removal dimension
3. Space for removing the cover
4. Plug holder (not to scale)

Figure 11: Dimensions in mm (in)

… 5 Installation

… Dimensions

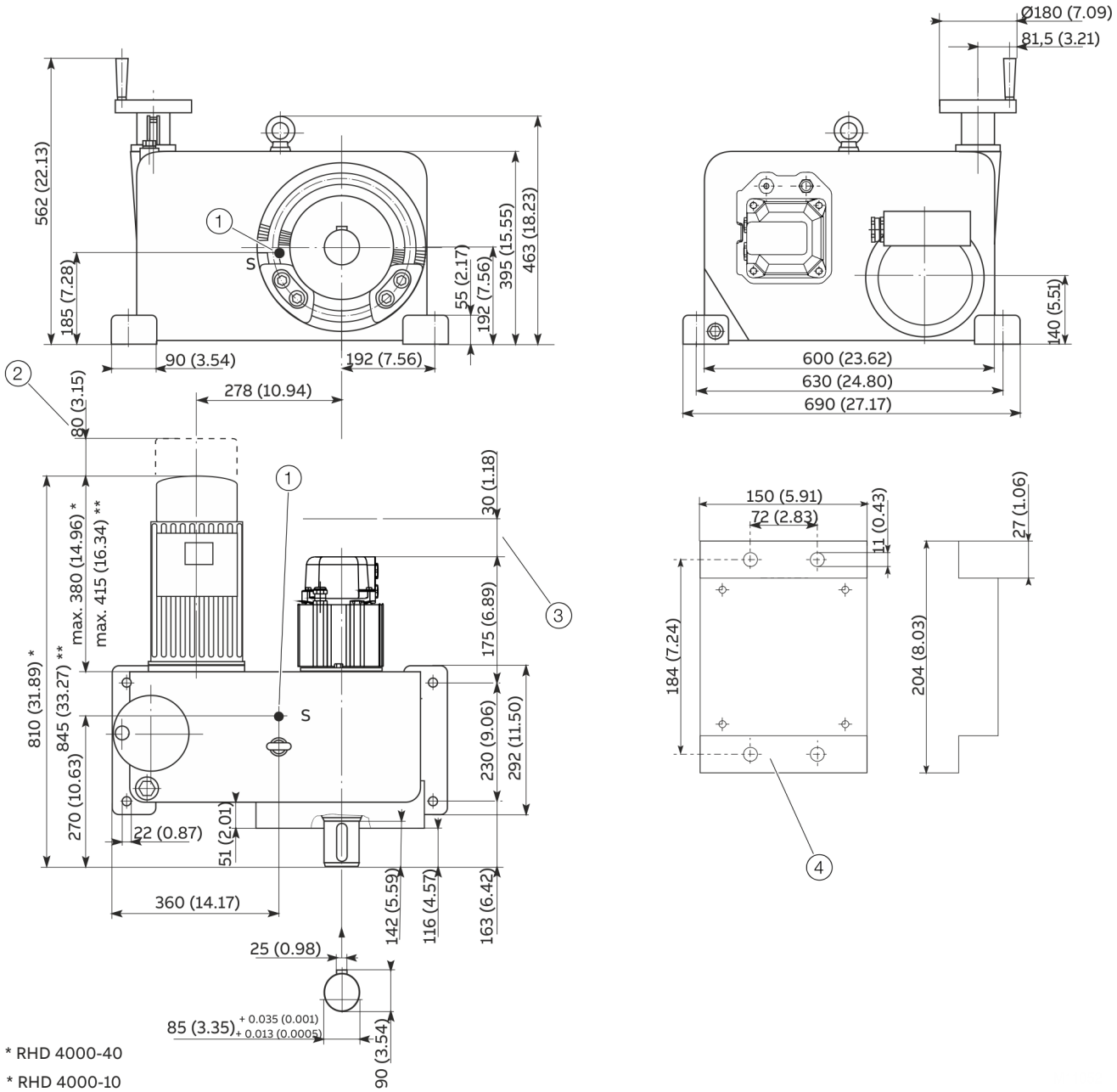
Control actuator RHD1250 / RHD2500



① S = Center of gravity
② Removal dimension
③ Space for removing the cover
④ Plug holder (not to scale)

Figure 12: Dimensions in mm (in)

Control actuator RHD4000



* RHD 4000-40

* RHD 4000-10

① S = Center of gravity

② Removal dimension

③ Space for removing the cover

④ Plug holder (not to scale)

Figure 13: Dimensions in mm (in)

… 5 Installation

… Dimensions

Connection pipe and link rod

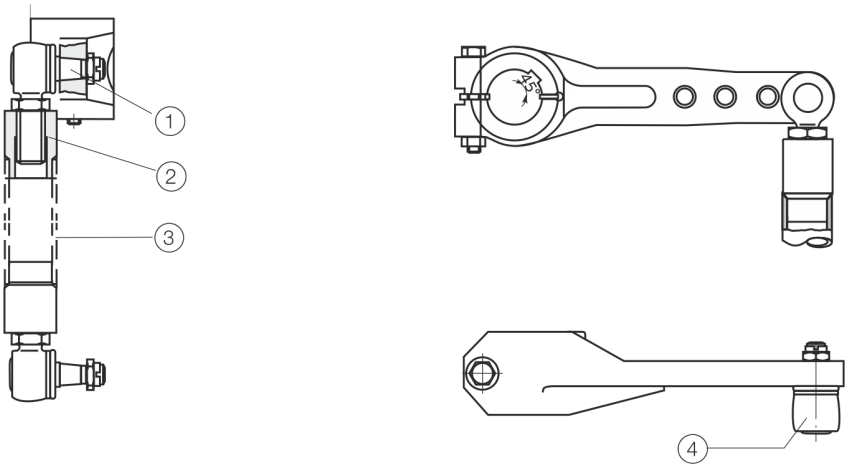


Figure 14: Link rod components and connection pipe dimensions

	PME120	RHD250	RHD500 / RHD800	RHD1250 / RHD2500	RHD4000
①	Cone 1:10				
②	Welding bushings are part of shipment				
③	Connection pipe ¾ in DIN EN 10255 / ISO 65 or ¾ in schedule 40 pipe. Size 'L' acc. to requirements. The pipe is not included in delivery.	Connection pipe 1 ¼ in DIN EN 10255 / ISO 65 or 1 ¼ in schedule 80 pipe. Size 'L' acc. to requirements. The pipe is not included in delivery.	Connection pipe 1 ½ in DIN EN 10255 / ISO 65 or 1 ½ in schedule 80 pipe. Size 'L' acc. to requirements. The pipe is not included in delivery.	Connection pipe 2 in DIN EN 10255 / ISO 65 or 2 in schedule 80 pipe. Size 'L' acc. to requirements. The pipe is not included in delivery.	Connection pipe 2 ½ in DIN EN 10255 / ISO 65 or 2 ½ in schedule 80 pipe. Size 'L' acc. to requirements. The pipe is not included in delivery.
④	Angular deflection of ball and socket joint: Pointing towards the actuator max. 3°; pointing away from the actuator max. 10°				

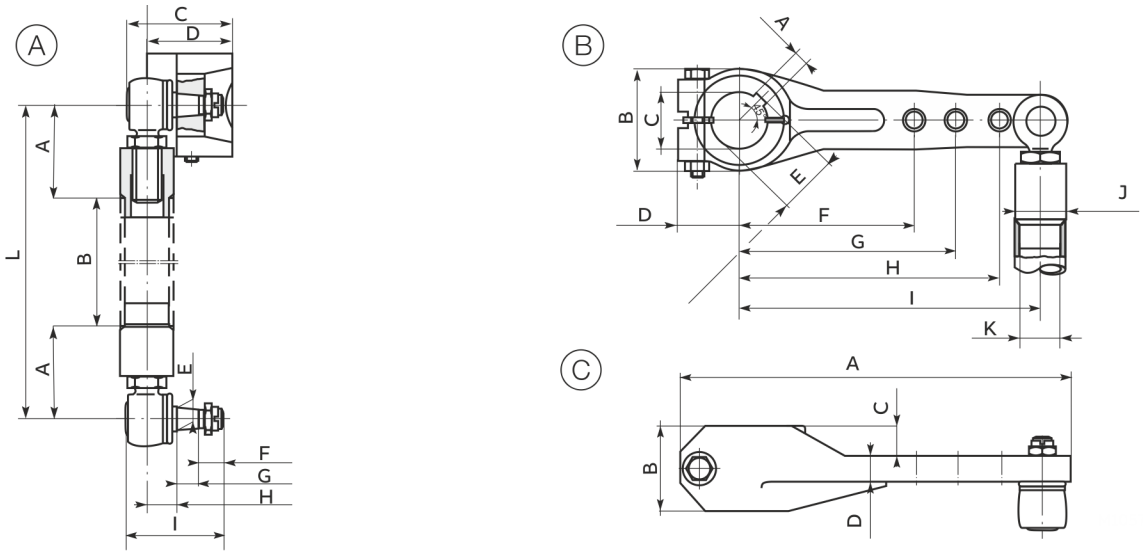


Figure 15: Link rod, all dimensions in mm (in)

		PME120	RHD250	RHD500 / RHD800	RHD1250 / RHD2500	RHD4000
(A)	A	62 to 78(2.44 to 3.07)	100 to 120(3.94 to 4.72)	105 to 120(4.13 to 4.72)	100 to 140(4.33 to 5.51)	135 to 165(5.31 to 6.50)
	B	=L−(2xA)	=L−(2xA)	=L−(2xA)	=L−(2xA)	=L−(2xA)
	C	60 (2.36)	99 (3.90)	99 (3.90)	120 (4.72)	163.5 (6.44)
	D	46 (1.81)	84 (3.31)	79 (3.11)	100 (3.94)	125.5 (4.94)
	E	Ø14 (Ø0.55)	Ø18 (Ø0.71)	Ø22 (Ø0.87)	Ø26 (Ø1.02)	Ø38 (Ø1.50)
	F	15 (0.59)	18 (0.71)	28 (1.10)	24.5 (0.96)	30.5 (1.20)
	G	14 (0.55)	18 (0.71)	21 (0.83)	25 (0.98)	37 (1.46)
	H	18 (0.71)	23 (0.91)	23 (0.91)	32 (1.26)	42.5 (1.67)
	I	61 (2.40)	74 (2.91)	91 (3.62)	104.5 (4.11)	141 (5.55)
(B)	A	8 −0.015 / −0.051 (0.31 +0.0006 / +0.002)	8 −0.015 / −0.051 (0.31 +0.0006 / +0.002)	14 −0.018 / −0.061 (0.55 +0.0007 / +0.0024)	20 −0.022 / −0.074 (0.79 +0.0009 / +0.0029)	25 −0.018 / −0.061 (0.98 +0.0007 / +0.0024)
	B	48 (1.89)	60 (2.36)	80 (3.15)	120 (4.72)	140 (5.51)
	C	Ø24 +0.033 / 0 (Ø0.95 +0.0013 / 0)	Ø30 +0.033 / 0 (Ø1.18 +0.001 / 0)	Ø50 +0.039 /0 (Ø1.97 +0.0015 / 0)	Ø70 +0.076 / +0.030 (Ø2.76 +0.030 / +0.001)	Ø85 +0.090 / +0.036 (Ø3.35 +0.090 / +0.001)
	D	32 (1.26)	40 (1.57)	63 (2.48)	75 (2.95)	87 (3.43)
	E	27 +0.2 (1.06 +0.008)	33.3 +0.2 (1.31 +0.079)	53.8 +0.2 (2.12 +0.0078)	74.9 +0.2 (2.95 +0.008)	90.4 +0.2 (3.56 +0.008)
	F	100 (3.94)	120 (4.72)	150 (5.91)	200 (7.87)	–
	G	125 (4.92)	150 (5.91)	200 (7.87)	250 (9.84)	–
	H	–	–	–	300 (11.81)	–
	I	150 (5.91)	200 (7.97)	250 (9.84)	350 (13.78)	400 (15.75)
	J	Ø25 (Ø0.98)	Ø40 (Ø1.57)	Ø48 (Ø1.89)	Ø60 (Ø2.36)	Ø76 (Ø2.99)
	K	Ø21, Ø20* (Ø0.83, Ø0.79*)	Ø35.5, Ø32* (Ø1.40, Ø1.26*)	Ø41, Ø37.5* (Ø1.61, Ø1.48*)	Ø52.5, Ø48,5* (Ø2.07, Ø1.91*)	Ø68, Ø58* (Ø2.68, Ø2.28*)
(C)	A	201 (7.91)	265 (10.43)	343 (13.50)	460 (18.11)	537 (21.14)
	B	32 (1.26)	50 (1.97)	70 (2.76)	100 (3.94)	140 (5.51)
	C	9 (0.35)	21 (0.83)	26 (1.02)	35 (1.69)	43 (1.69)
	D	19 (0.75)	21 (0.83)	25 (0.98)	30 (1.57)	40 (1.57)

* Level actuator US design

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

PME

Actuators with separate electronic unit		
Crimp pins		
Motor / brake / heater	max. 1.5 mm² (16 AWG)	
Signals	max. 0.5 mm² (20 AWG)	
Contact surface	Motor / brake / signals:	Gold-plated
	Heater:	Silver-plated

Actuators with separate electronic unit		
Screw terminals (optional)		
Motor / brake / heater / signals	0.2 to 2.5 mm² (24 to 14 AWG)	
Contact surface	Motor / brake / signals:	Gold-plated
	Heater:	Silver-plated

Actuators with integrated electronic unit	
Crimp pins	
Mains	max. 1.5 mm² (16 AWG)
Signals	max. 0.5 mm² (20 AWG)
Contact surface	Gold-plated

Actuators with integrated electronic unit	
Screw terminals (optional)	
Power supply, signals	0.2 to 2.5 mm² (24 to 14 AWG)
Contact surface	Gold-plated

RHD

Crimp pins		
Motor / brake / heater	max. 1.5 mm² (16 AWG)	
Signals	max. 0.5 mm² (20 AWG)	
Contact surface	Gold-plated	

Screw terminals (optional)		
Motor / brake / heater	max. 2.5 mm² (14 AWG)	
Signals	max. 2.5 mm² (14 AWG)	
Contact surface	Motor / brake / signals:	Gold-plated
	Heater:	Silver-plated

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

Risk of crushing between the lever and the stops or between the lever and the link rod, respectively!
- Do not reach into the danger zone.
- Start up the actuator with installed lever cover only.

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 mode / Handwheel mode

⚠ 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 controlled by the electronic unit controls the output shaft via the oil-lubricated gearing. This transmits the rated torque to the valve via a lever with ball-and-socket joints and a coupling rod. The position sensor detects backlash-free the current position of the output drive shaft.
Adjustable limit stops prevent overloading of the valve in the event of an operating error. The brake integrated in the motor carries out the stop function if the supply voltage is switched off.

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 to the right, this causes a left turn of the driver lever (rotating direction with view to the handwheel shaft or output drive shaft).

2. Turn the hand wheel to move the actuator lever 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.
	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 synchronously.	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). Drive the actuator back into the operating range and connect it to the valve. Readjust the actuator for the operating range.
Malfunction when approaching the end position.	Actuator in limit range of positioning sensor.	

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
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
Brake*	19.5 Ω	2120 Ω	2120 Ω	1620 Ω	1290 Ω

* Specified winding resistance ±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.

… 10 Maintenance

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 no process forces are exerted on the lever.

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 32 .
2. Open and release the vent valve, see **Figure 5** 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 32 and securely tighten the vent valve.

PME oil types

Actuator type	Ambient temperature		Oil types - DIN 51517	Motor bearing (grease)
	with heat	without heat		
PME120-AI	−25 to 55 °C	−10 to 55 °C	Mobil SHC 629 – DIN 51517 / ISO 12925-1	ESSO Beacon 325
(with integrated electronic unit)	(−15 to 130 °F)	(15 to 130 °F)		
PME120-AN	−25 to 55 °C	−10 to 65 °C		
(for separate electronic unit)	(−15 to 130 °F)	(15 to 150 °F)		
	–	−1 to 85 °C	Mobil SHC 632 – DIN 51517 / ISO 12925-1	
		(30 to 185 °F)		

RHD 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	-

… 10 Maintenance

… Oil change

Filling volumes

PME120-AI/-AN						
Mounting position	IMB 3	IMB 6	IMB 7	IMB 8	IMV 5	IMV 6
Minimum oil level l (gal)*	Approx. 2.2 (0.58)	Approx. 2.5 (0.66)	Approx. 2.2 (0.58)	Approx. 2.2 (0.58)	Approx. 2.5 (0.66)	Approx. 2.5 (0.66)
Minimum oil level under inspection plug mm (in)	45 mm (1.77)	2 mm (0.08)	42 (1.65)	20 (0.79)	23 (0.91)	17 (0.67)

RHD250					
Mounting position	IMB 3	IMB 6	IMB 7	IMV 5	IMV 6 / IMB 8
Minimum oil level l (gal)*	Approx. 4.7 (1.24)	Approx. 4.7 (1.24)	Approx. 4.7 (1.24)	Approx. 4.7 (1.24)	Approx. 4.7 (1.24)
Minimum oil level under inspection plug mm (in)	40 (1.57)	12 (0.47)	15 (0.59)	35 (1.38)	Lower edge of upper oil plug

RHD500 / RHD800					
Mounting position	IMB 3	IMB 6	IMB 7	IMV 5	IMV 6 / IMB 8
Minimum oil level l (gal)*	Approx. 10 (2.65)	Approx. 11.5 (3.04)	Approx. 10 (2.65)	Approx. 10 (2.65)	Approx. 10 (2.65)
Minimum oil level under inspection plug mm (in)	57 (2.24)	Lower edge of upper oil plug	15 (0.59)	37 (1.46)	Lower edge of upper oil plug

RHD1250 / RHD2500						
Mounting position	IMB 3	IMB 6	IMB 7	IMB 8	IMV 5	IMV 6
Minimum oil level l (gal)*	Approx. 29 (7.67)	Approx. 32 (8.47)	Approx. 24 (6.34)	Approx. 24 (6.34)	Approx. 33 (8.72)	Approx. 26.5 (7.01)
Minimum oil level under inspection plug mm (in)	75 (2.95)	90 (3.54)	200 (7.87)	Lower edge of upper oil plug. Delivered filled with 33 l (8.72 gal*).	34 (1.34)	35 (1.38)

RHD4000						
Mounting position	IMB 3	IMB 6	IMB 7	IMB 8	IMV 5	IMV 6
Minimum oil level l (gal)*	Approx. 29 (7.67)	Approx. 32 (8.47)	Approx. 24.5 (6.47)	Approx. 24 (6.34)	Approx. 34 (8.98)	Approx. 26.5 (7.01)
Minimum oil level under inspection plug mm (in)	75 (2.95)	90 (3.54)	200 (7.87)	Lower edge of upper oil plug. Delivered filled with 33 l (8.72 gal*).	34 (1.34)	35 (1.38)

* US liquid gallon

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

Trademarks

HART is a registered trademark of FieldComm Group, Austin, Texas, USA
PROFIBUS and PROFIBUS DP are registered trademarks of PROFIBUS & PROFINET International (PI)

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

Notes

ABB Measurement & Analytics

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

For more product information, visit:
www.abb.com/actuators

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