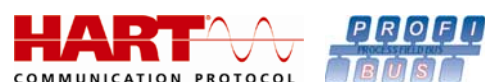


For continuous positioning,  
Rated torque 100 Nm (80 lbf-ft),  
with integrated electronics or for use with separate electronic unit

---



# Electrical Part Turn Actuator PME120-AI/AN (Contrac)

## Operating Instructions

42/68-151-EN

06.2008

Rev. D

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# **1 Safety**

## **1.1 General Safety Information**

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

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

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

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

The actuators are used for operating final control elements (valves, vanes, etc.). They may only be operated using the appropriate Contrac electronic unit. Do not use these actuators for any other purpose. Otherwise, a hazard of personal injury or of damage to or impairment of the operational reliability of the device may arise. In addition to these operating instructions, the relevant documentation for the electronic unit and software tools must be observed.

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

## **1.2 Technical limits**

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

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

### 1.3 Warranty provision

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

### 1.4 Labels and symbols

#### 1.4.1 Symbols and warnings

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

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

**Warning – <Bodily injury>**

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

**Caution – <Slight injuries>**

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

**Notice – <Property damage>!**

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

**Important**

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

### 1.4.2 Name plate

|                                                     |                                                     |           |                                                                                     |
|-----------------------------------------------------|-----------------------------------------------------|-----------|-------------------------------------------------------------------------------------|
| 1                                                   | Antrieb / Actuator: CONTRAC ....                    |           |                                                                                     |
| 2                                                   | F-Nr./No                                            | NL        |                                                                                     |
| 3                                                   | M =                                                 | Jahr/Year | CE                                                                                  |
| 4                                                   | t =                                                 | IP 66     |                                                                                     |
| 5                                                   | min.....max. ....                                   | max. .... |  |
| 6                                                   | Öl / Oil:                                           |           |                                                                                     |
| 7                                                   | Elektronik/Electronics                              |           |                                                                                     |
| 8                                                   | U=230 V (190 ... 260 V) F = 50/60 Hz, ± 5 %         |           |                                                                                     |
| 9                                                   | P=max. .... W Ext. Sicherung / Fuse 16 A träge/slow |           |                                                                                     |
| 10                                                  |                                                     |           |                                                                                     |
| ABB Automation<br>D-32425 Minden<br>Made in Germany |                                                     |           |                                                                                     |

M00392

Fig. 1

- |                                                                  |                                                                               |
|------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1 Complete model name                                            | 6 Filled oil types                                                            |
| 2 Fabrication no./ NL no. (no. of non-standard version)          | 7 Associated Contrac electronic unit                                          |
| 3 Output torque / Year of manufacture                            | 8 Permissible voltage range / mains frequency (for PME120-AI only)            |
| 4 Permissible ambient temperature and protection class / CE mark | 9 Power consumption / specifications for fuse protection (for PME120-AI only) |
| 5 min./max. crank angle and max. actuating speed                 | 10 Blank for customer-specific entry                                          |

### 1.5 Operator liability

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

### 1.6 Personnel qualification

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

## **1.7 Returning devices**

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

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

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

## **1.8 Disposal**

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

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

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

### **1.8.1 Information on WEEE directive 2002/96/EC (Waste Electrical and Electronic Equipment)**

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

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

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

## **1.9 Transport safety information**

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

### 1.10 Storage conditions

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

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

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

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



#### Important

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

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

### 1.11 Installation safety information

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

### 1.12 Electrical installation safety information

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

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

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

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

### 1.13 Operating safety information

**Warning - risk of injury!**

Note that the actuator position may be changed accidentally by the repelling power of the valve when the brake is released! Make sure that process forces are not exerted on the lever.

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

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

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

Switch off the power supply to the motor for manual operation.

### 1.14 Maintenance safety information

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

## 2 Design and function

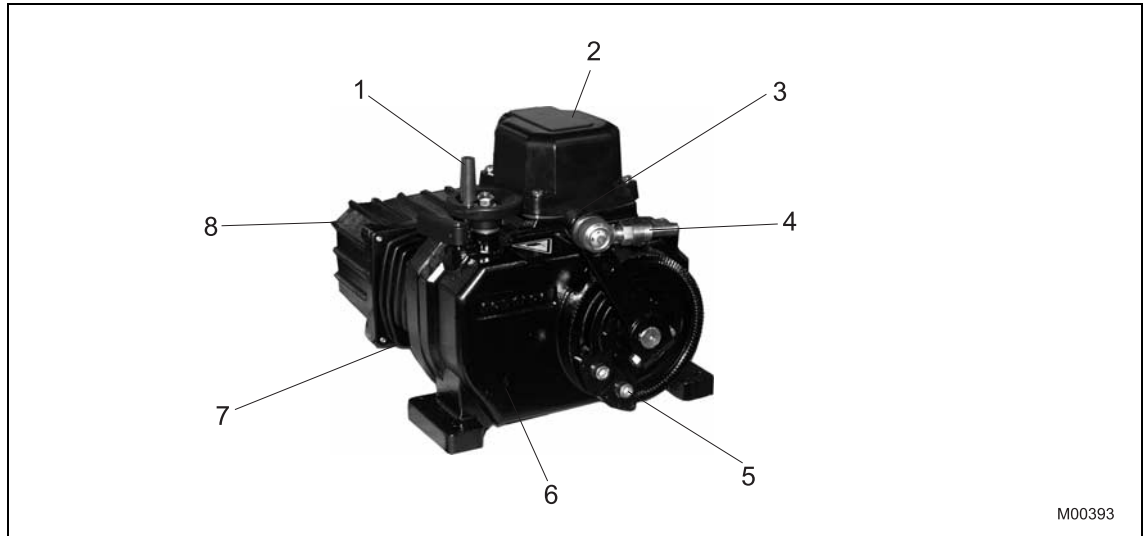


Fig. 2: PME120

- |                         |                                               |
|-------------------------|-----------------------------------------------|
| 1 Hand wheel            | 5 Mechanical stops                            |
| 2 Plug                  | 6 Gear case                                   |
| 3 Lever                 | 7 Motor                                       |
| 4 Ball-and-socket joint | 8 Cover (for PME120-AI incl. electronic unit) |

### Functionality

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

The torque is transferred via a lever / linkage bar assembly or the actuator is directly coupled to the cock flange.

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

During continuous positioning the power electronic unit varies the motor torque steplessly until the actuator force and the restoring process forces are balanced. High response sensitivity and high positioning accuracy with short positioning time ensure an excellent control quality and a long actuator life.

### 3 Installation

#### 3.1 Actuator check

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

- Check the oil level when installing the device in positions other than IMB 3.
- Did you fasten the separately delivered venting plug in the uppermost bore (depending on the mounting orientation)?
- Make sure that the motor and the connection chambers are free of dirt, moisture and corrosion.

#### 3.2 Mounting position

The spur gears of the actuator PME120-AI/AN (Contrac) are oil lubricated. They contain the max. oil quantity when leaving the manufacturer. Once the actuator is installed replace the uppermost check plug by the separately supplied venting plug.

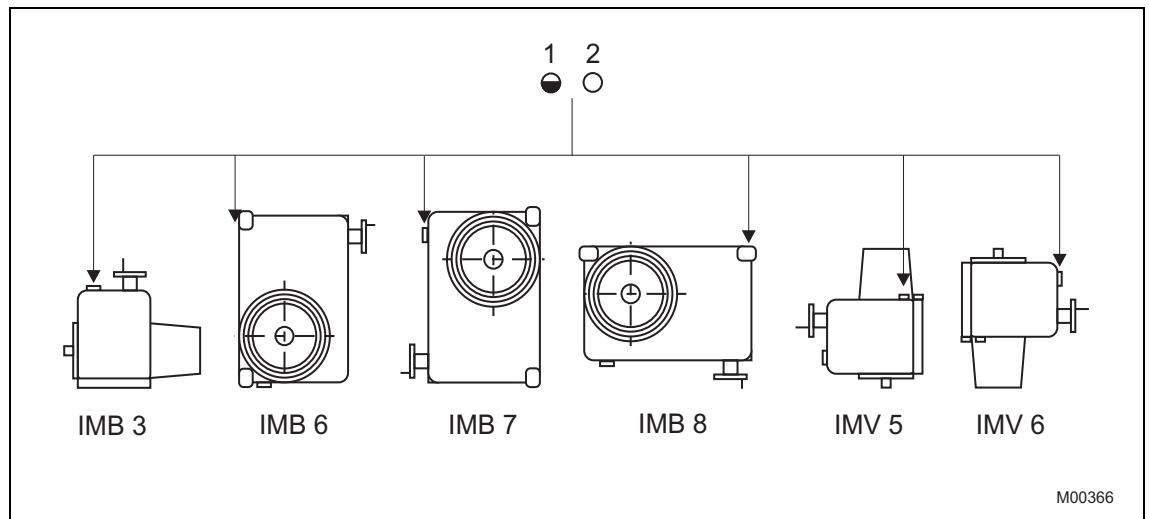


Fig. 3

1 Inspection plug

2 Venting plug

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

To ensure proper access to the electronic unit, maintain a minimum separation of 60 mm (2.36 inch).

### 3.3 Installation instructions

- Make sure that the actuator is accessible from all sides to ensure convenient handwheel operation, electrical connection, and replacement of assemblies.
- Avoid direct exposure to rain, snow and other environmental influences.
- The actuators can withstand vibration loadings up to 150 Hz and max. 2 g acc. to EN 60068-2-6, table C2.
- Exclusively mount the actuator on a rigid, non-vibrating support to avoid relative motions between the actuator and the valve.
- Spring couplings or vibration absorbers in the coupling rod may cause additional load. The drive elements (lever, coupling rod) may not cause additional vibration loadings, which exceed the rated torque more than twice.
- The maximum rated torque of the actuator may not be permanently exceeded. A short-term overload (up to twice the rated torque) is possible.
- When mounting the actuator close to heat sources use an insulating layer or shielding.
- The ambient temperature may not be exceeded. If necessary, use an appropriate roof to avoid heat radiation.

### 3.4 Assembly with the valve

#### 3.4.1 Preparation for mounting with lever

**Warning – Electrical voltage risk!**

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

1. Make sure that the shaft and lever bore surface are clean and free of grease.
2. Determine the length of the coupling tube (not included in the scope of delivery).
3. Move the valve to the "CLOSED" position.
4. Use the handwheel to move the actuator into the proper end position. Observe the permissible angle.
5. Refer to the dimensioned drawings for the required length of the connection pipe.
6. Drill a cone bore into the valve lever for mounting the second ball-and-socket joint, as shown in the dimensioned drawings section.
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. If required adjust "L" by turning the link rod.
11. When all adjustment steps are finished, fasten the counter nuts.

### 3.4.1.1 Adjusting the stops for travel

1. Move the output lever / valve to the position requiring fine adjustment.
2. Put the stop onto the tothing as close to the output lever as possible and fasten it with screws.
3. The mechanical limit stops may not be fixed within the adjusted operating range.
4. Move the output lever towards the stop using the handwheel; turn the coupling rod for fine adjustment.
5. Fasten the counter nuts.
6. Fasten the stop in the other mounting position close to the end position, depending on the tothing.

### 3.4.1.2 Adjusting the stops for torque

1. First proceed as described above for travel-dependent adjustment.
2. Prior to re-fastening the counter-nut provide pretension in the valve's "CLOSED" position.
3. Lock the hand wheel.
4. Turn the coupling tube or slightly shift the limit stops to get a small gap between lever and limit stop.
5. The procedure and gap size depend on the stiffness of the linkage arrangement.
6. Tighten the counter-nuts and limit stop screws.

### **3.4.2 Preparation for mounting with direct adapter**

1. Make the hole in the direct adapter based on the valve shaft. For the layout, ensure 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 bore 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. Use screws with a torque of 50 Nm (37 lbf-ft). The valve-side and actuator-side section of the coupling must interlock.

#### **3.4.2.1 Adjusting the stops for travel**

1. Use the hand wheel to move the actuator coupling / valve into the proper end position.
2. Release the lock nut of the set screw for the stop lever and turn the set screw against the stop. Tighten lock nut with torque of 70 Nm (52 lbf-ft).

#### **3.4.2.2 Adjusting the stops for torque**

1. Make sure that the valve can be subjected to the resulting torques.
2. Use the hand wheel to move the actuator coupling / valve into the proper end position.
3. The set screw for the stop may not touch the stop lever. If the stop lever touches the set screw before reaching the end position, release the counter-nut and unscrew the set screw further. Tighten lock nut with a torque of 70 Nm (52 lbf-ft).

## 3.5 Mounting examples

### 3.5.1 Fastening elements

|                                                            | PME120-AI/AN (Contrac)                                        |
|------------------------------------------------------------|---------------------------------------------------------------|
| clamping screws for mech. limit stop<br>tightening torque: | 46 Nm (34 Lbf-ft)                                             |
| lever clamping screw<br>tightening torque:                 | 23 Nm (17 Lbf-ft)                                             |
| Mounting screw (property class 8.8)<br>tensile strength:   | 12 mm (0.47 inch)                                             |
| tensile strength:                                          | $\geq 800 \text{ N/mm}^2$ ( $\geq 116032$ pounds/square inch) |
| Yield strength:                                            | $\geq 640 \text{ N/mm}^2$ ( $\geq 93550$ pounds/square inch)  |

### 3.5.2 Mounting with lever

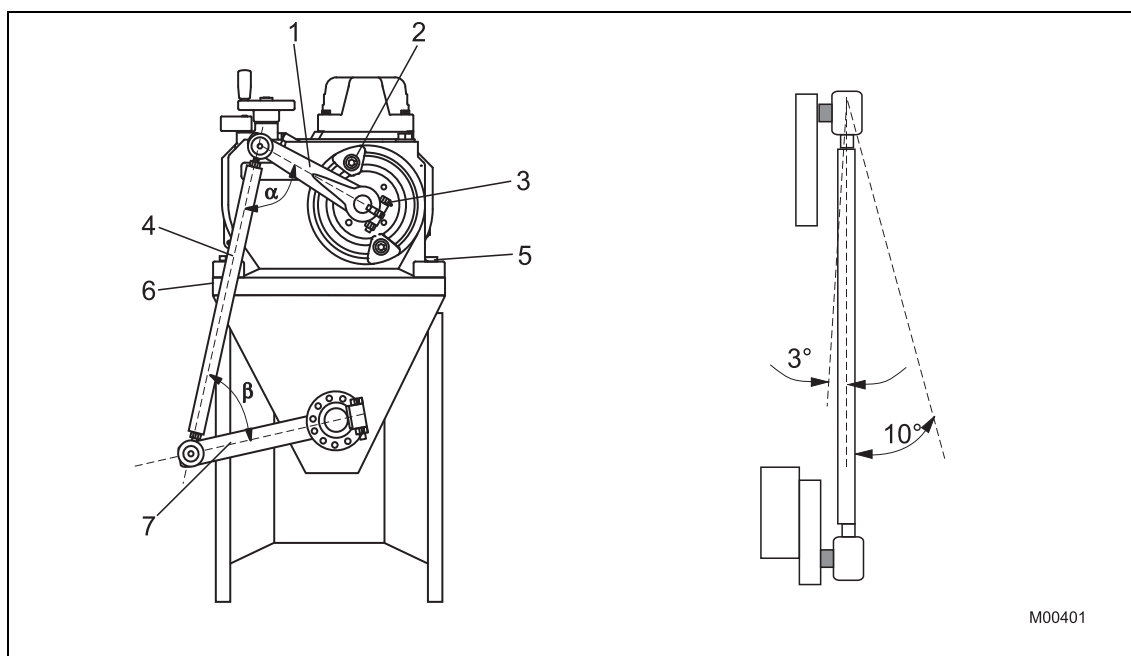


Fig. 4

- 1 Output lever
- 2 mech. limit stop with clamping screws
- 3 lever clamping screw
- 4 coupling tube
- $\alpha \geq 15^\circ$

- 5 Mounting screws
- 6 rigid, level support
- 7 Flap lever

$\beta$  based on requirements of the valve manufacturer

### 3.5.3 Lever PME120-AI/-AN

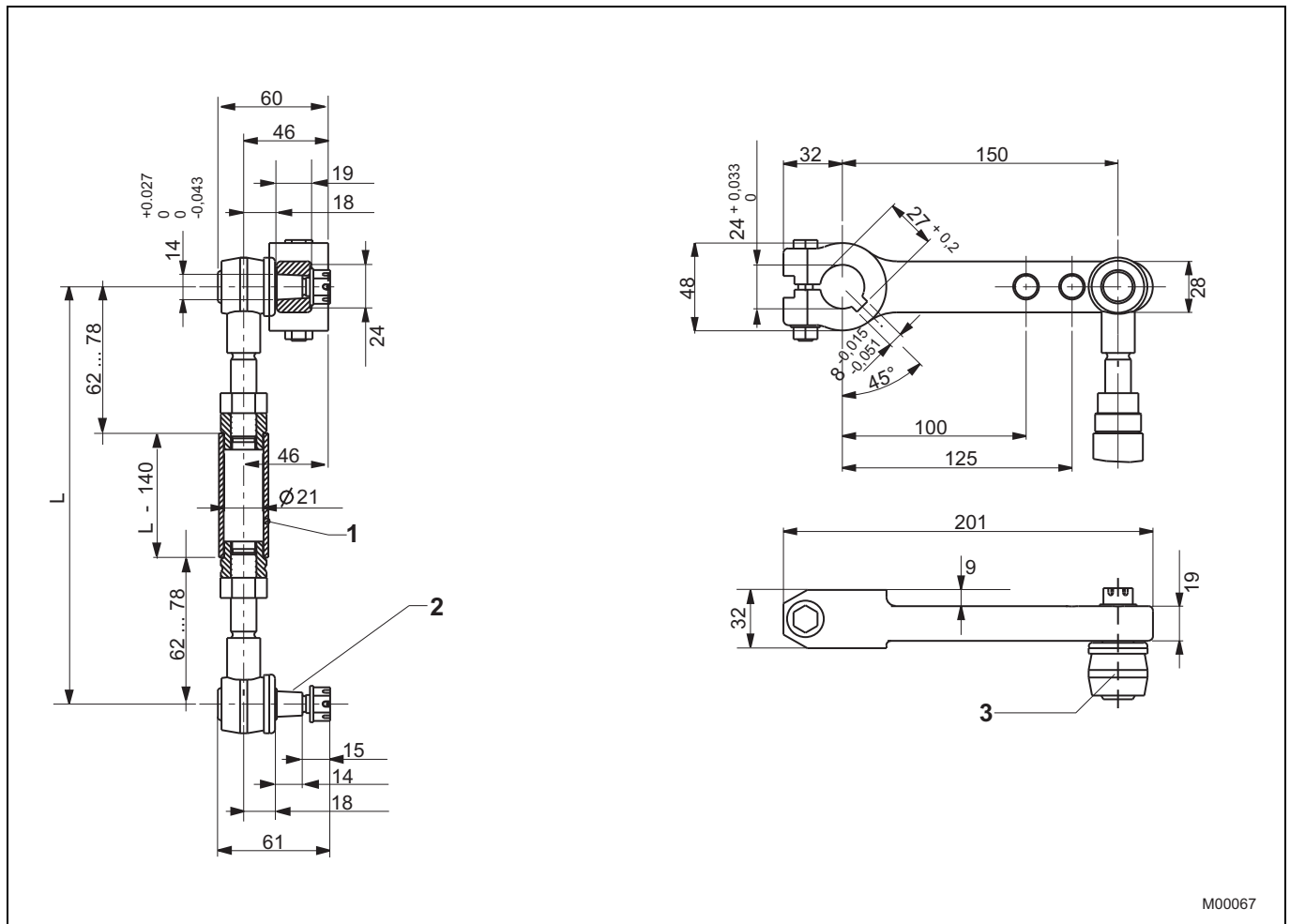


Fig. 5: Dimensions in mm

- 1 Connection pipe 3/4" DIN 2440 resp. 3/4" schedule 40 pipe size "L" acc. to requirements. The pipe is not included in shipment.
- 2 Cone 1 : 10

- 3 Angular deflection of ball and socket joint:  
Pointing towards the actuator: max. 3°  
Pointing away from the actuator: max. 10°

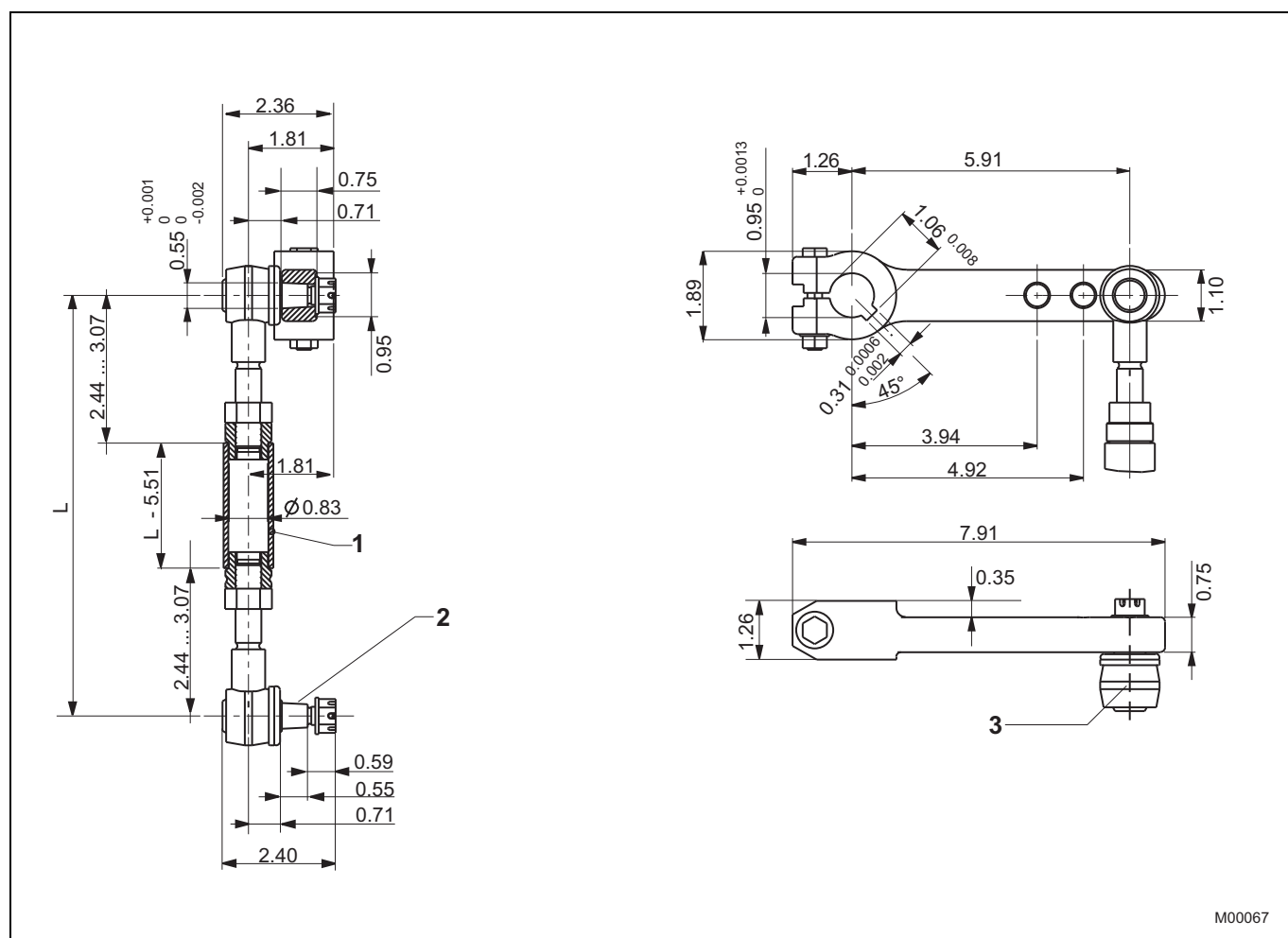


Fig. 6: Dimensions in inch

- 1 Connection pipe 3/4" DIN 2440 resp. 3/4" schedule 40 pipe size "L" acc. to requirements. The pipe is not included in shipment.
- 2 Cone 1: 10

- 3 Angular deflection of ball and socket joint:  
Pointing towards the actuator: max. 3°  
Pointing away from the actuator: max. 10°

### 3.5.4 Direct adapter PME120-AI/-AN

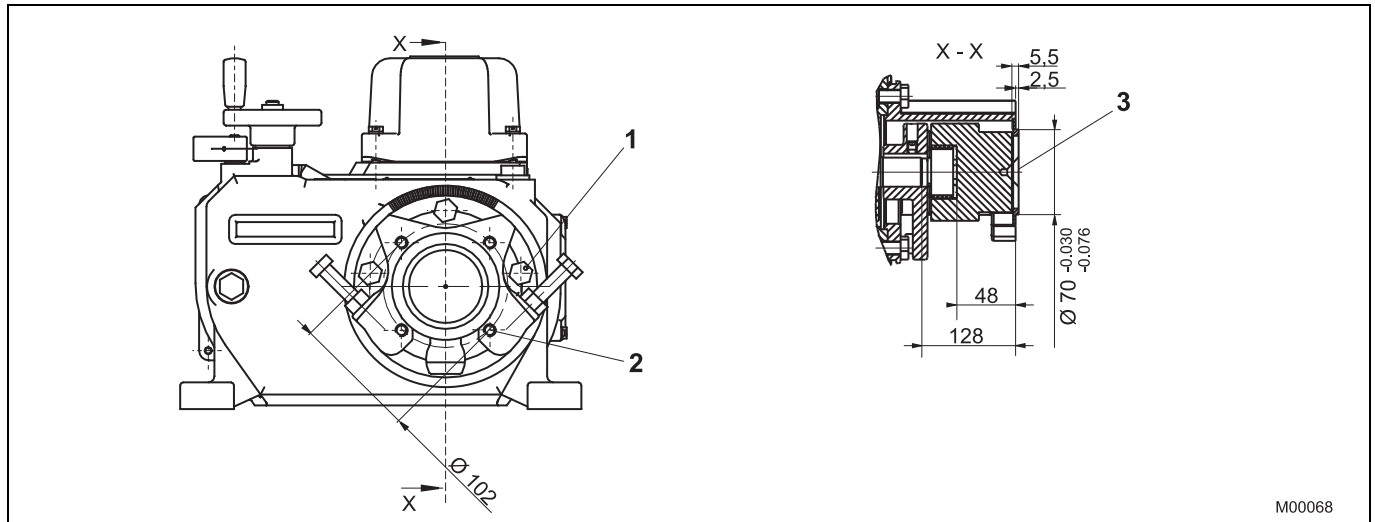


Fig. 7: Dimensions in mm

- 1  $M_A = 40$  Nm
- 2 M10; 15 deep

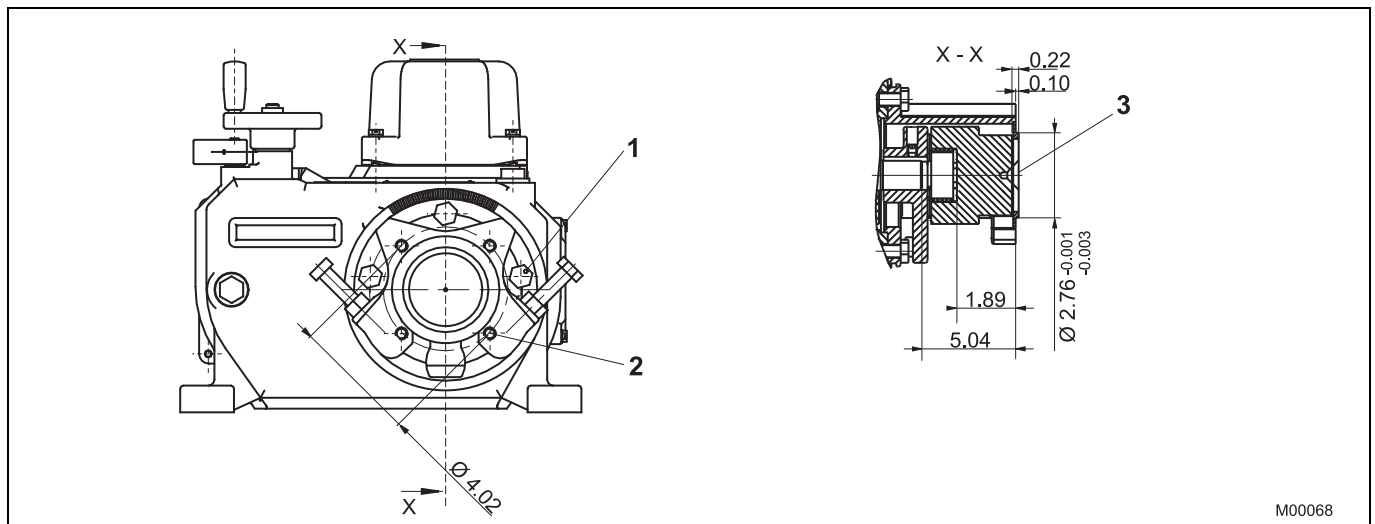


Fig. 8: Dimensions in inch

- 1  $M_A = 40$  Nm
- 2 M10; 15 deep

## 4 Electrical connection

Each actuator requires a Contrac electronic unit which is loaded with the type specific-software. Carefully consider the instructions for the electronic unit and compare the data labels of the actuator and the electronic unit in order to ensure a proper hard- and software assignment.

### 4.1 Cable shield

#### 4.1.1 Signal part

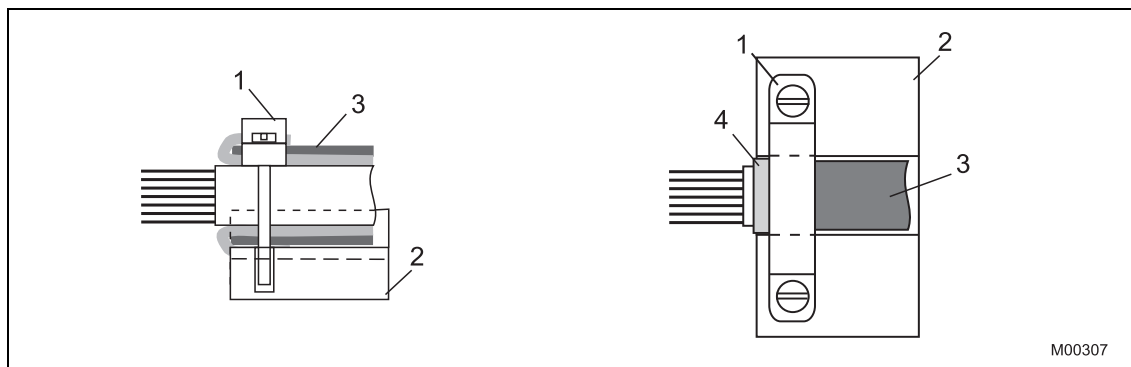


Fig. 9: Fitting the shield

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

## 4.2 Integrated Electronic Unit AI (standard)



### Important

The power and signal cables are connected by universal plug to the integrated actuator electronic unit.

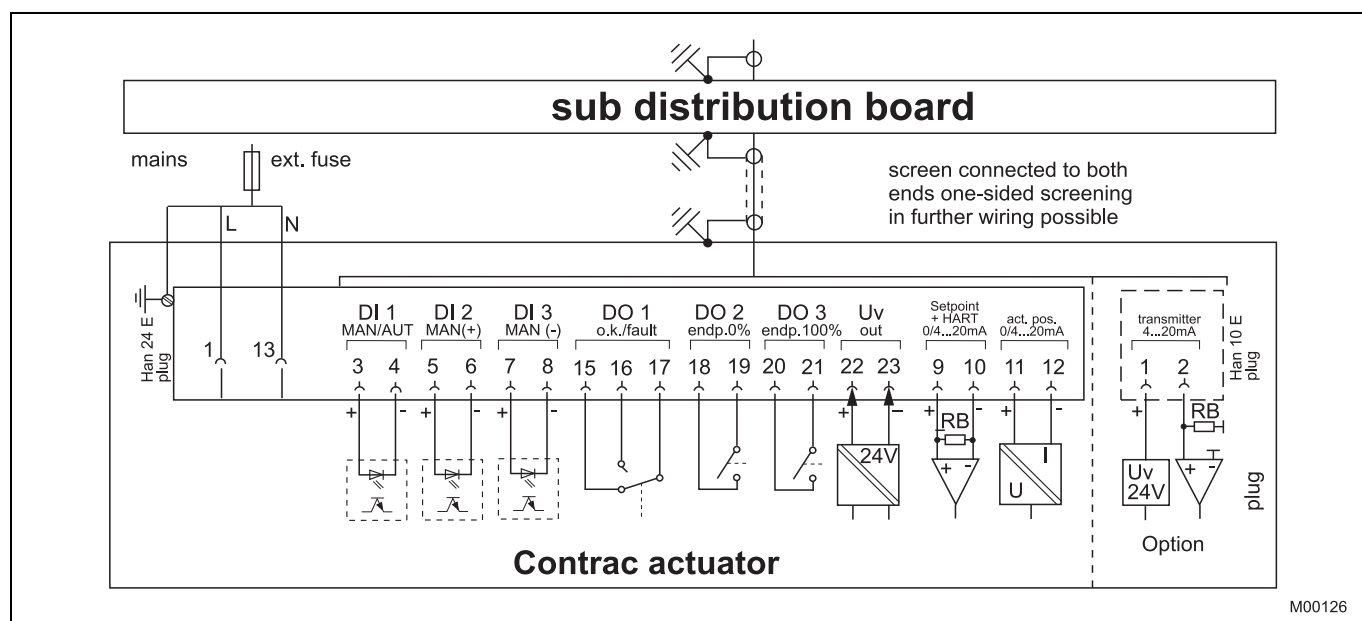


Fig. 10

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

- Digital inputs DI1, DI2 and DI3 must be activated via the operator interface.
- Power must be on for the digital input (DI1).
- AUT is activated via operator interface.

## 4.3 Integrated Electronic Unit AI (bus communication)

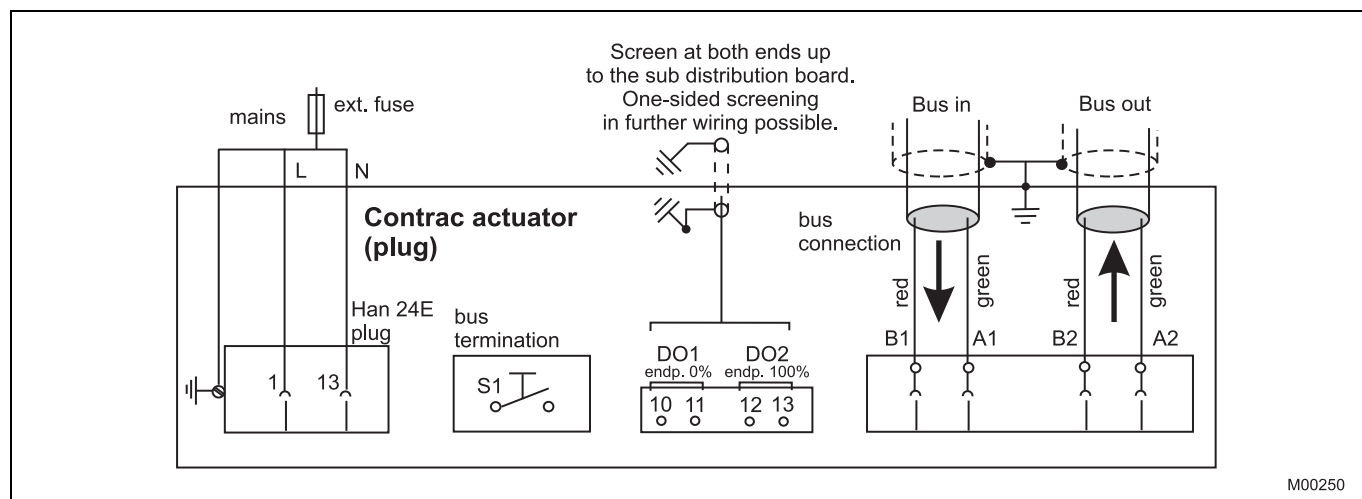


Fig. 11: PROFIBUS DP

## 4.4 Electronic unit in field mount EAN823 (standard)

**i**

### Important

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

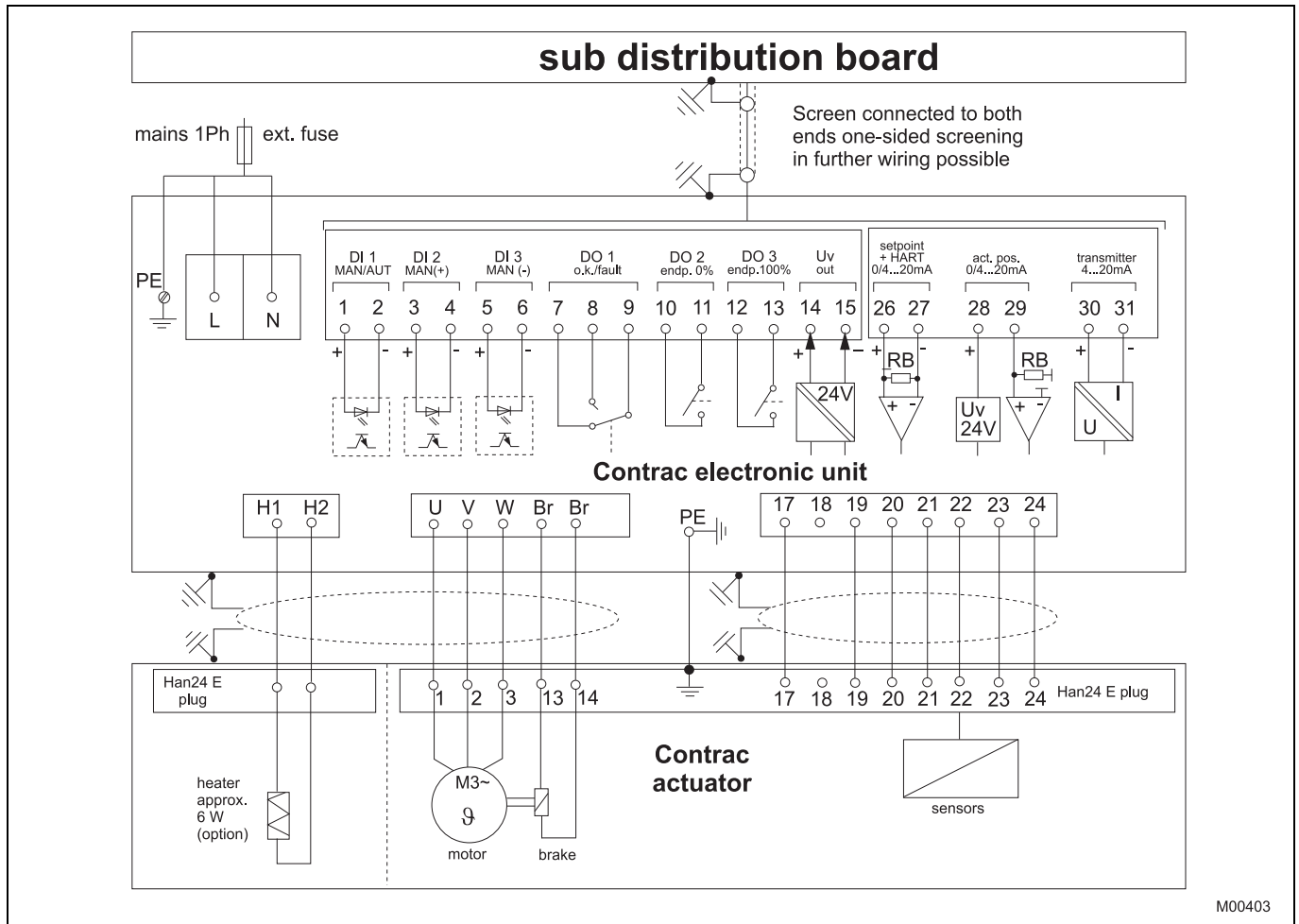


Fig. 12

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

- Digital inputs DI1, DI2 and DI3 must be activated via the operator interface.
- Power must be on for the digital input (DI1).
- AUT is activated via operator interface.

#### 4.5 Electronic unit in field mount EAN823 (bus communication)

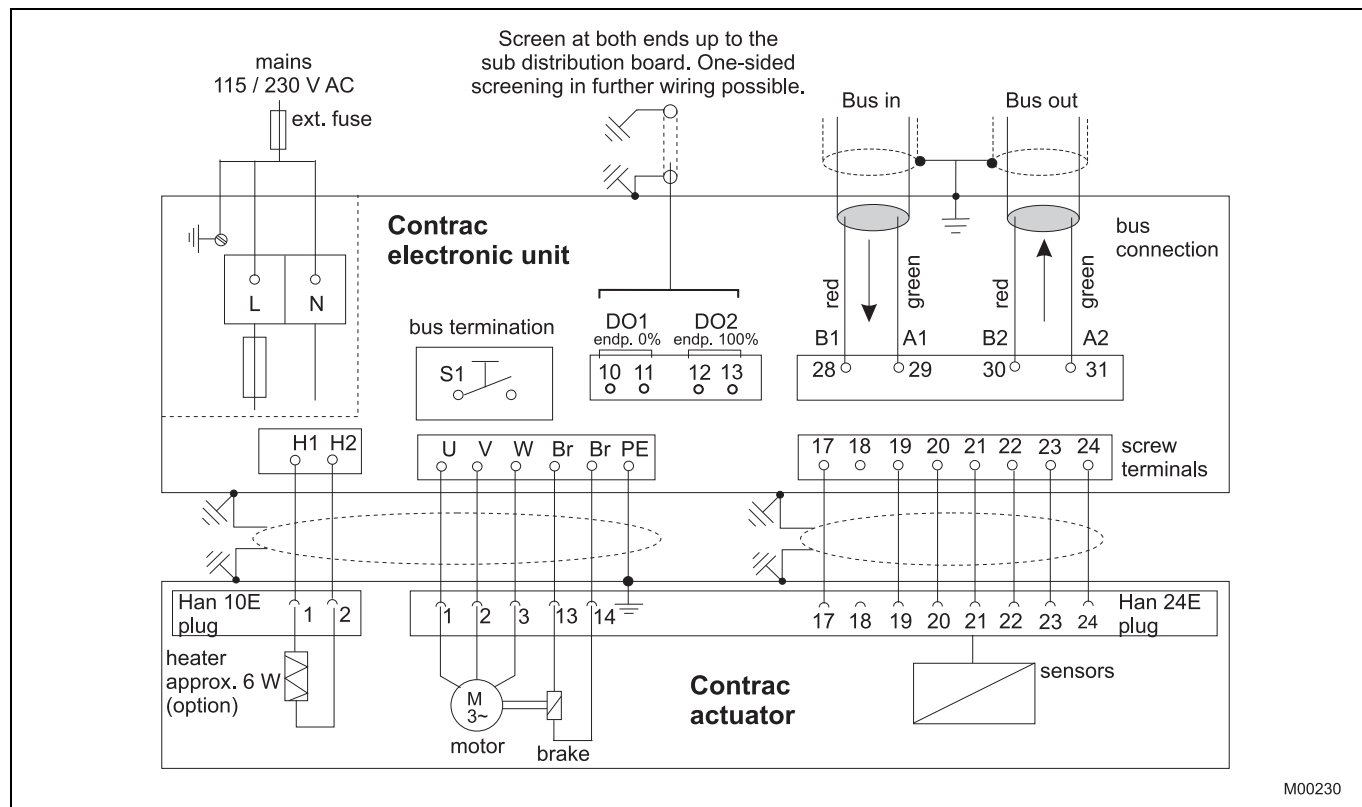


Fig. 13: PROFIBUS DP

#### 4.6 Configuration of digital input/output signals (standard control)

##### 4.6.1 Standard

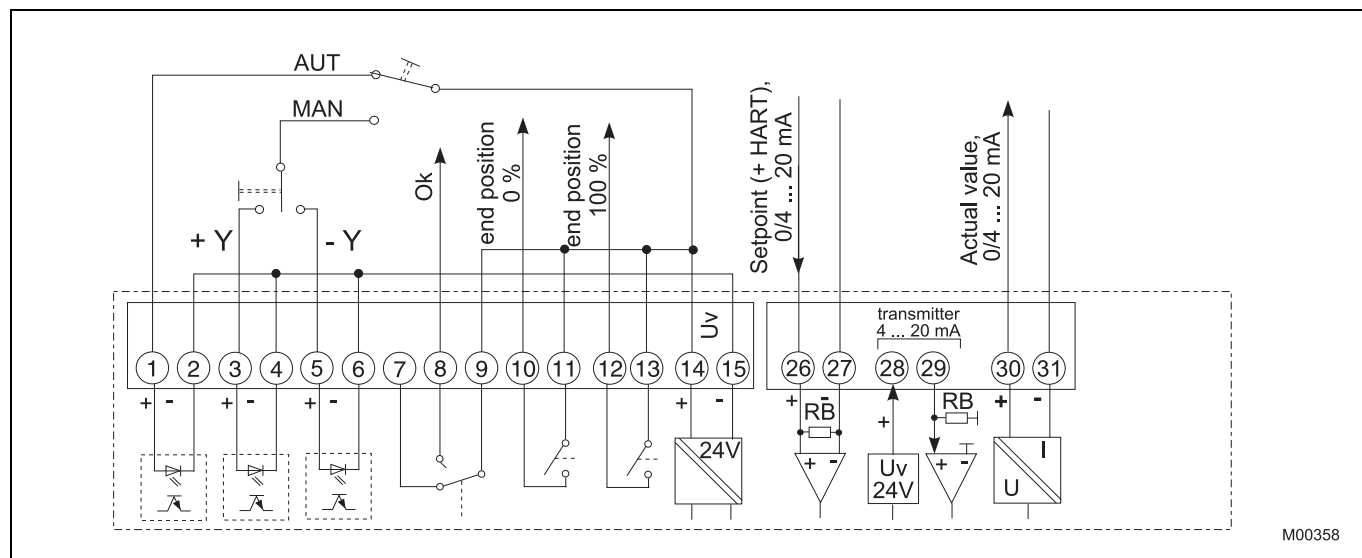


Fig. 14: Potential wiring for default assignments

## 4.6.2 Downstream from step controller

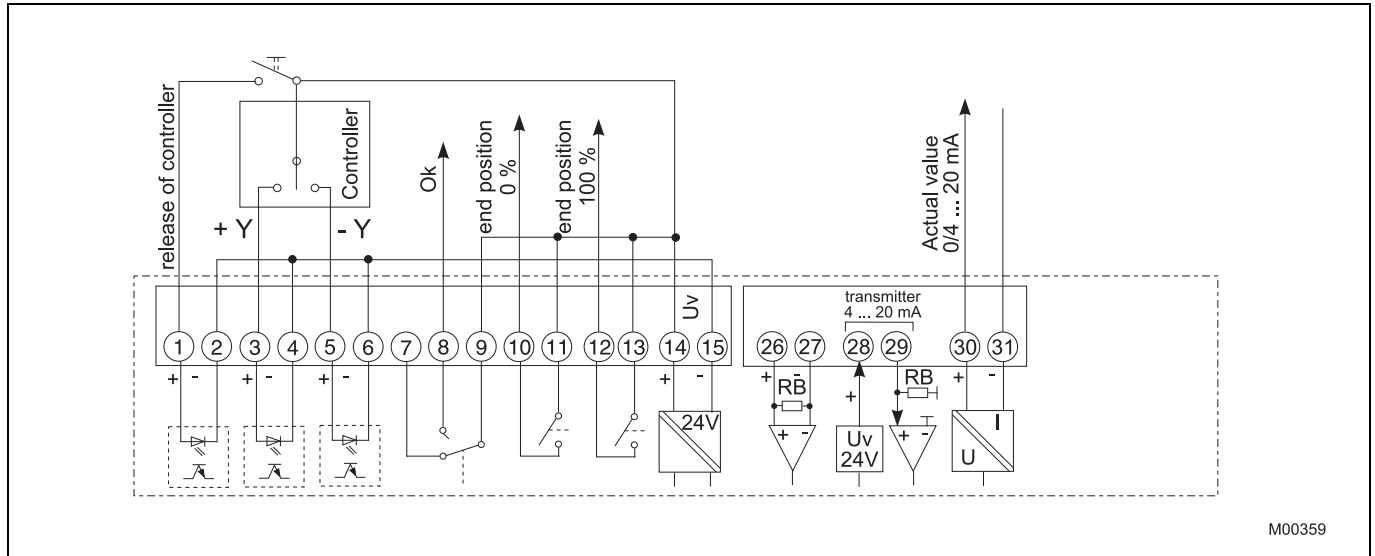


Fig. 15: Potential wiring for "Downstream from step controller" operation

**i**

### Important

When operating the unit downstream from a step controller, the selector switch must be in the  $\perp$  position.

**i**

### Important

When DI1 is assigned with DC +24 V, the electronic unit is write-protected.

## 5 Local operation

### 5.1 General information on operation

The basic settings "Define end positions" and "Initial diagnosis" can be configured via the commissioning and service field (ISF). It can be used to adjust the actuator to the working area and set the direction without using a PC. The actuator can be further parametrized using a graphic user interface.



#### **Important**

The commissioning and service field is located on the electronic unit.

## 5.2 Operating elements of the service field (ISF)

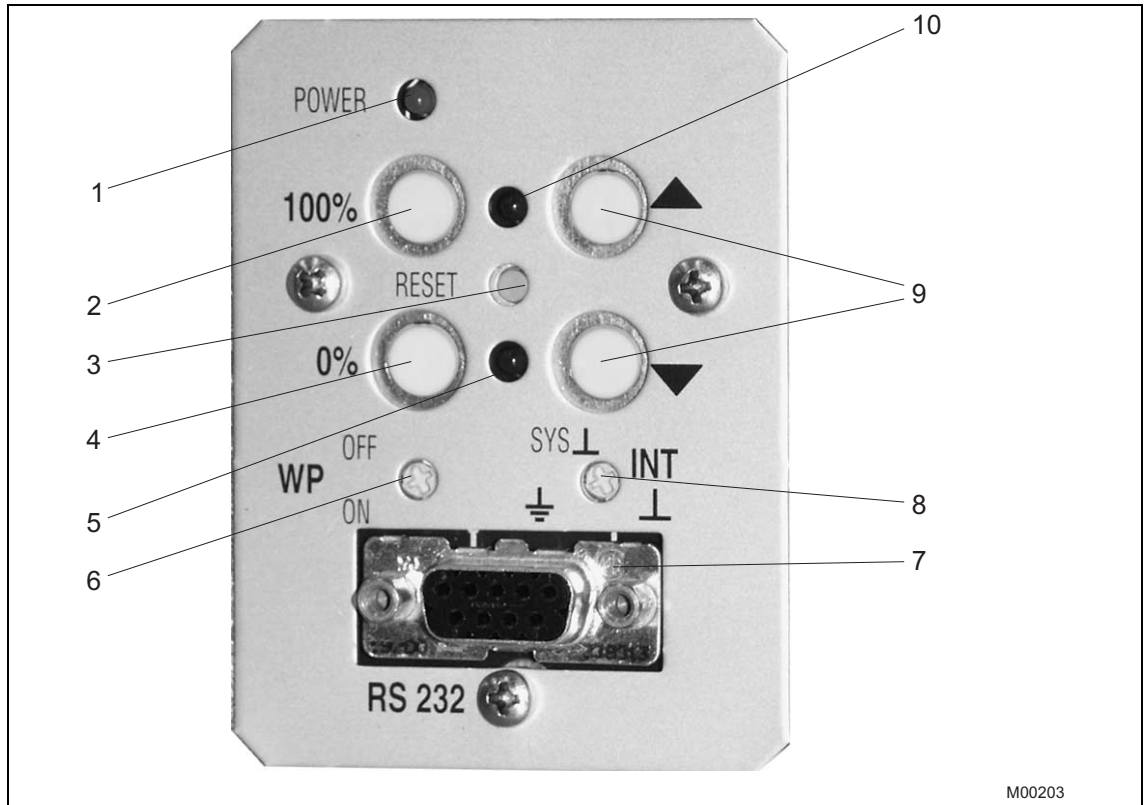


Fig. 16: Commissioning and service field (ISF)

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Power LED: Displays supply by line voltage.</p> <p>2 Accept button (100 %): Press to set the current position as 100 %; press in combination with the 4 button to end the adjustment process.</p> <p>3 Reset button: Press to restart the processor and delete any values assigned positions 0 % and 100 %.</p> <p>4 Accept button (0 %): Press to set the current position as 0 %; press in combination with the 2 button to end the adjustment process.</p> | <p>5 LED for 0 % position: Depending on the flash rate, this LED indicates either adjustment, position saved or error.</p> <p>6 Write-protection switch (default: ON).</p> <p>7 RS232 connector: Connection for a PC.</p> <p>8 Potential switch: Connection of reference potential either to system or protective ground (default setting: to system).</p> <p>9 Travel button: Press to initiate actuator movement.</p> <p>10 LED for 100 % position: Depending on the flash rate, this LED indicates either adjustment, position saved or error.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6 Commissioning and service field (ISF)

### 6.1 Typical commissioning with the service field (ISF)



#### Important

The operating range of the actuator is not adjusted at time of delivery.

For information on setting up the mechanical end stops, refer to the operating instructions of the relevant actuator.

Part of the commissioning activities below can only be performed by opening the cover flap of the ISF.

#### 6.1.1 Status

- The electronic unit is connected to the power supply and wired to the actuator.
- The electronic unit is in the MAN operating mode; no signal at digital input 1 (DI 1).
- No error (if an error exists, the LEDs flash alternately at 4 Hz).

#### 6.1.2 Opening the cover flap of the ISF

- Release the screws for the cover flap.
- Swing the cover flap to the side.

#### 6.1.3 Operating mode "Device setup"

- Switch the electronic unit to the "Device setup" operating mode. Press and hold both travel buttons (9) at once for approx. 5 s until both LEDs (items 5 and 10 in **Fig. 16**) flash in sync at a rate of 4 Hz.

#### 6.1.4 Setup via user interface

Context-sensitive online Help can be called at any time via the graphical user interface.



#### Important

The RS232 communication cable provides a conductive ground connection between the computer and the Contrac electronic unit. If the PC is grounded, a ground loop may form in the system.

### 6.1.5 Defining the initial position (0 % or 100 %)

- Use a travel button (9) to move to the desired position.
- Press the Accept button (2) or (4) to accept the position; if successful, the corresponding LED flashes at a rate of 1 Hz. The other LED continues to flash at approx. 4 Hz.

### 6.1.6 Defining the second position (0 % or 100 %)

- Use a button (9) to move to the second position.
- To accept the position, press the Accept button (2) or (4). If successful, both LEDs(5) and (10) flash at a rate of approx. 1 Hz.

### 6.1.7 Saving your settings

- Press both Accept buttons (2 + 4) to accept the settings. The LEDs (5 + 10) stop flashing after a short period of time and the adjustment process is completed.
- If the range selected for the actuator is too small, both LEDs begin to flash again at 4 Hz and the setup procedure must be repeated with a larger value (min. actuator travel).

(Information regarding actuator travel on the model plate)

### 6.1.8 Correcting settings

- If after accepting the initial value for the settings you need to correct this value, press the reset button (3) and repeat the settings.
- If you need to make corrections after saving, the complete setup procedure must be performed again.

### 6.1.9 Signals on the commissioning and service field (ISF)

| Function                                                                                                     | Signals                                                                                                                |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Device Setup</b>                                                                                          |                                                                                                                        |
| Switch to Device Setup: Press and hold both travel buttons for approx. 5 s.                                  | Both LEDs then flash in sync at 4 Hz.                                                                                  |
| Reaching an end position: Use the appropriate button on the ISF.                                             | Both LEDs continue to flash at 4 Hz during actuator travel.                                                            |
| Save the initial end position: Press 0 % or 100 %.                                                           | The corresponding LED flashes at approx. 1 Hz, the others continue to flash at 4 Hz.                                   |
| Save the second end position: Press 0 % or 100 %.                                                            | The related LED flashes at approx. 1 Hz in sync with the first LED.                                                    |
| Finish Adjustment: Press 0 % and 100 % at once.                                                              | Both LEDs light up briefly and then stop flashing.                                                                     |
| <b>Operation</b>                                                                                             |                                                                                                                        |
| Standard operation: MAN / AUT                                                                                | The LEDs are switched off.                                                                                             |
| Positioning via the button on the ISF takes priority over the control system.                                | The LEDs are switched off.                                                                                             |
| <b>Error (both LEDs flash alternately at 4 Hz)</b>                                                           |                                                                                                                        |
| Reset: Resets error messages.                                                                                | If no other error exists, both LEDs stop flashing.                                                                     |
| Reset if the operating range is overshoot: Hold both travel buttons for 5 s and then press the Reset button. | After approx. 5 s, the flashing is briefly interrupted. After a reset, the electronic unit will be in adjustment mode. |



#### Important

After startup, it is recommended that you use the control system to operate the actuator and check the behavior as well as signaling of the actuator.

To place the actuator in automatic mode after startup, a 24 V DC signal at the digital input 1 must be present for actuators with active digital input functions (default setting).

If the digital function is switched off, the actuator switches to automatic mode immediately after completing the adjustment process.

## 6.2 Positions for the potential switch

The potential switch connects the reference potential either to the system or the protective ground.

(See page 26 **Fig. 16**: pos. 8)

|             |       |
|-------------|-------|
| Name:       | INT ⊥ |
| Position A: | SYS ⊥ |
| Position B: | ⊥     |

Settings:

|                                        |       |
|----------------------------------------|-------|
| Standard control with analog setpoint: | SYS ⊥ |
| Step action control:                   | ⊥     |
| Bus communication:                     | ⊥     |

## 6.3 Fuses for integrated actuator electronic unit

| Fuse type                                                   | U= 115 V           | U= 230 V         |
|-------------------------------------------------------------|--------------------|------------------|
| Pre-fuse (external)                                         | 16 A; time-lag     |                  |
| Mains fuse                                                  | 6.3 A; time-lag    | 3,15 A; time-lag |
| Heater (only for actuators in low temperature design)       | 2.0 A; time-lag    |                  |
| Fuse protection against active feed at 20 mA setpoint input | 40 mA, fast-acting |                  |

### 6.3.1 Installation locations for fuses

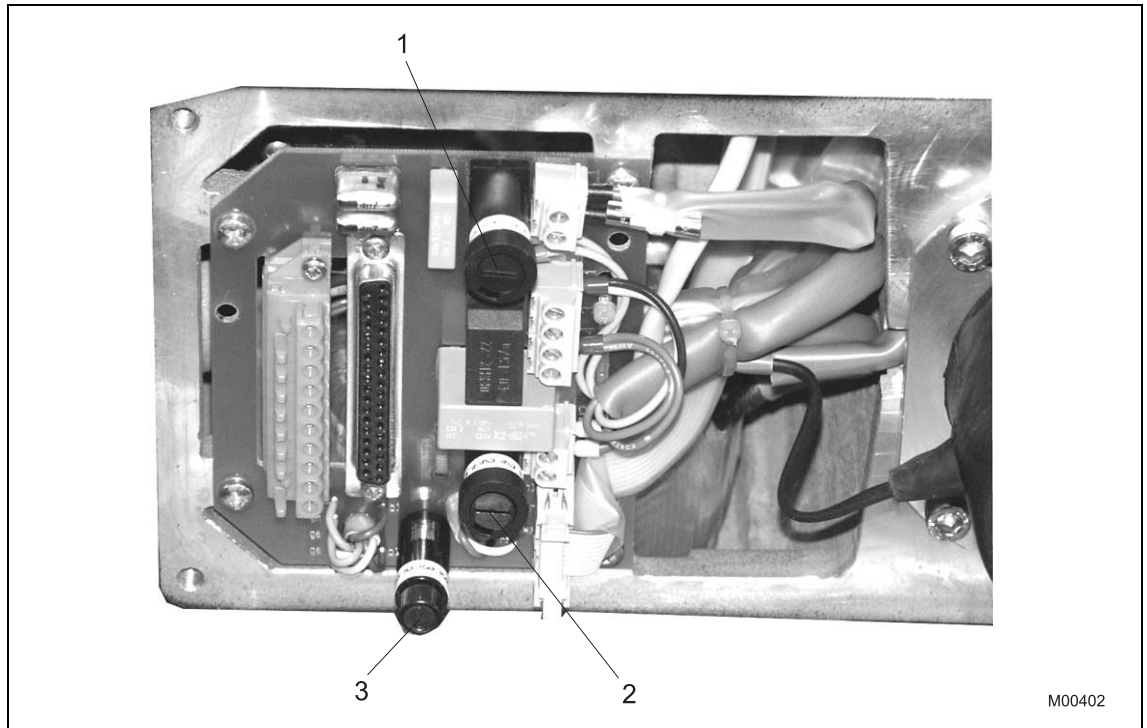


Fig. 17: Installation location for fuses

- 1 Mains fuse
- 2 Heater
- 3 Fuse protection against active voltage supply at 20 mA setpoint input

## 7 Operation

### 7.1 Automatic / manual mode

The motor triggered by the power electronics controls the drive shaft via oil-lubricated spur gears. This transmits the torque to the valve via a lever with ball-and-socket joints and a coupling rod. A position sensor detects backlash-free the current position of the drive shaft.

Adjustable limit stops prevent overloading of the valve in the event of an operating error. The motor brake locks the actuator in the current position if the power supply is cut off.

### 7.2 Manual operation

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



#### **Caution - Risk of injury!**

When pressing the release lever, the restoring force from the valve may be present in the hand wheel. To prevent the hand wheel from turning unintentionally, hold the hand wheel with one hand.

1. Press the release lever.
2. Turn the hand wheel to move the part-turn actuator to the desired position.
3. Let go of the release lever.

## 8 Maintenance



### Important

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

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

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

Use the configuration program to view this information.

### 8.1 Inspection and overhaul

- Only use genuine spare parts such as ball bearings, gaskets and oil may be used to overhaul the actuators.
- Proceed acc. to table when performing maintenance activities.
- Inspection or maintenance is due after the time specified in the table.

Overhaul intervals:

| Interval                                                                                  | Measures                                                                                                               |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 1 x per year                                                                              | Visual check of the gaskets for leaks, change if necessary.                                                            |
| max. every 10 years, preferably after the expiry of the calculated remaining service life | Change oil, roller bearings and gaskets on motor and gearing.<br><br>Check gear wheels for wear; replace if necessary. |

Don't drive the actuator during the oil check.

Make sure that no chippings or other material get into the gearbox during the maintenance work.

## 8.2 Brake adjustment



### Warning - risk of injury!

Note that the actuator position may be changed accidentally by the repelling power of the valve when the brake is released! Make sure that process forces are not exerted on the lever.

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

## 8.3 Oil change



### Important

Oils for different temperature ranges may not mixed. Dispose of old oil according to local regulations. Make sure that the oil does not enter the water cycle.

Proceed as follows to drain or change the oil:

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

| Actuator type                                   | Ambient temp.                     |                                  | Type of oil      | Motor mounting (grease) |
|-------------------------------------------------|-----------------------------------|----------------------------------|------------------|-------------------------|
|                                                 | with heat                         | without heat                     |                  |                         |
| PME 120 AI<br>(with integrated electronic unit) | -25 ... 55 °C<br>(-15 ... 130 °F) | -10 ... 55 °C<br>(15 ... 130 °F) | Mobil<br>SHC 629 | ESSO Beacon 325         |
| PME 120 AN<br>(for separate electronic unit)    | -25 ... 65 °C<br>(-15 ... 150 °F) | -10 ... 65 °C<br>(15 ... 150 °F) |                  |                         |

## 8.4 Filling capacity

| Filling capacity for PME120-AI/-AN         |                                     |                                     |                                     |                                     |                                     |                                     |
|--------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Mounting orientation                       | IMB 3                               | IMB 6                               | IMB 7                               | IMB 8                               | IMV 5                               | IMV 6                               |
| Minimum oil quantity, approx.:             | 2,2 l<br>(0,58 gal. <sup>1)</sup> ) | 2,5 l<br>(0,66 gal. <sup>1)</sup> ) | 2,2 l<br>(0,58 gal. <sup>1)</sup> ) | 2,2 l<br>(0,58 gal. <sup>1)</sup> ) | 2,5 l<br>(0,66 gal. <sup>1)</sup> ) | 2,5 l<br>(0,66 gal. <sup>1)</sup> ) |
| Min. oil level [mm] under inspection plug: | 45 mm<br>(1.77 inch)                | 2 mm<br>(0.08 inch)                 | 42 mm<br>(1.65 inch)                | 20 mm<br>(0.79 inch)                | 23 mm<br>(0.91 inch)                | 17 mm<br>(0.67 inch)                |

<sup>1)</sup> US liquid gallon

## **9 Alarms / Errors**

### **9.1 Definition**

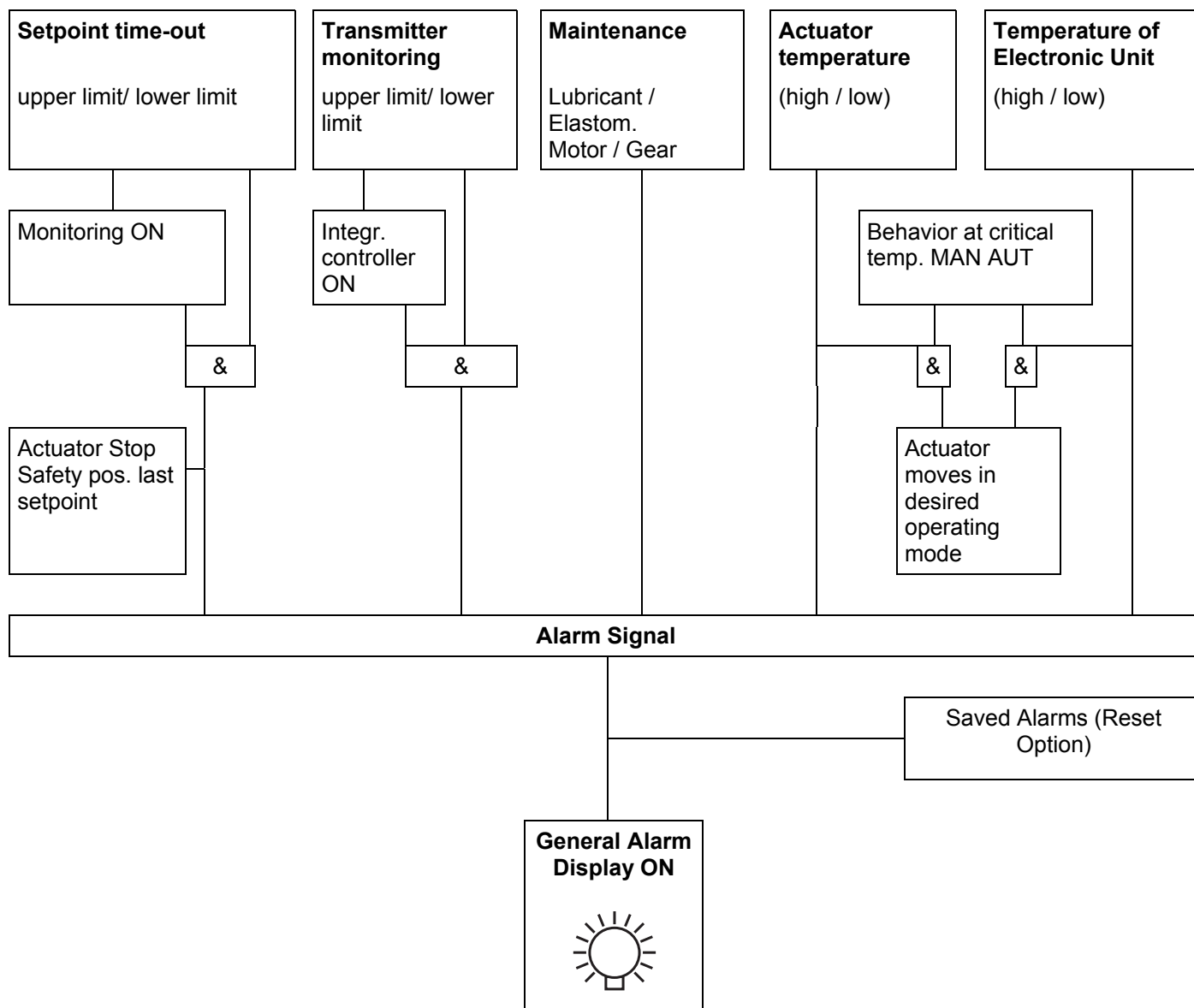
#### **9.1.1 Alarms**

The actuator or electronic unit is in a critical state (e.g., high temperature), which currently does not affect the actuator, electronic unit, process or persons. The actuator functions are available. Previous alarms are stored in the "Saved Alarms" area in the electronic unit. The graphic user interface use to output the stored alarms.

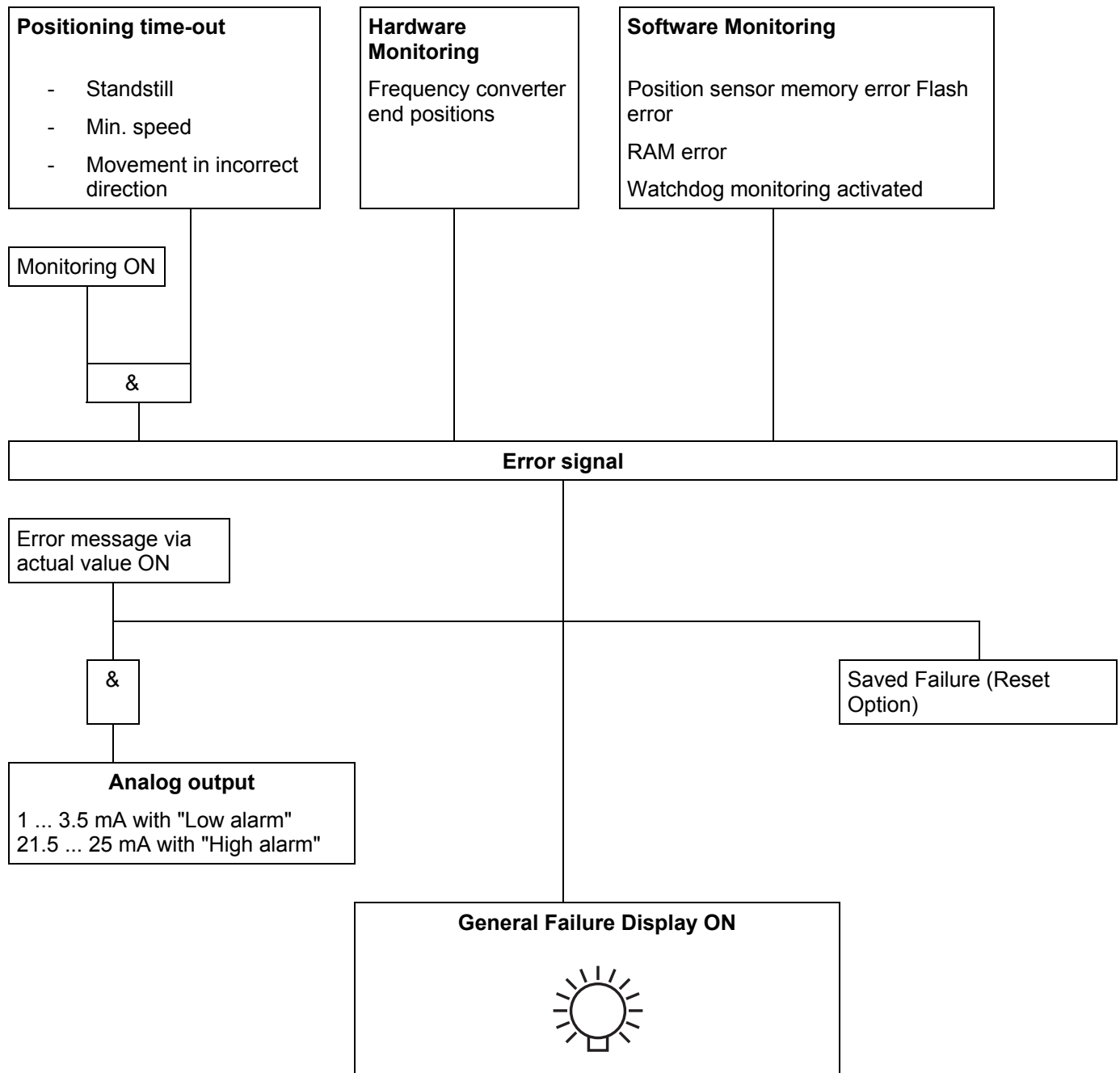
#### **9.1.2 Error**

The actuator or electronic unit is in a critical state, e.g., positioning time-out, which currently is impairing the actuator, electronic unit, process or persons. The actuator is switched off and the actuator functions are no longer available. Previous error messages are stored in the "Saved Errors" area in the electronic unit. Use the graphic user interface to output the stored errors. Error messages cannot be reset until the cause of the error has been eliminated.

## 9.2 Alarm diagram



### 9.3 Error diagram



## 10 Trouble shooting

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

| Error                                                                                | Possible cause                                                                       | Troubleshooting                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Valve cannot be moved by actuator.                                                   | Failure either on the actuator or the valve (e.g., stuffing box tightened too much). | Disconnect actuator from valve.<br>If the actuator moves, the valve is the possible cause.<br>If the actuator does not move, the actuator is the possible cause.                                                                                                                   |
| The actuator does not respond.                                                       | Incorrect electronic unit or incorrect data record.                                  | Compare information on name plates for actuator and electronic unit.                                                                                                                                                                                                               |
|                                                                                      | Incorrectly configured electronic unit.                                              | Check/update the settings for the parametrization software.                                                                                                                                                                                                                        |
|                                                                                      | No communication with the control system.                                            | Check wiring.                                                                                                                                                                                                                                                                      |
|                                                                                      | Incorrect wiring between actuator and electronic unit.                               | Check wiring.                                                                                                                                                                                                                                                                      |
|                                                                                      | Defective motor/brake.                                                               | Check the winding resistance of the motor and brake.<br>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 inch)) and electrical connection to the brake.<br>Check winding resistance of the brake coil.                                                                                                                                      |
| Actuator does not run in AUT mode, although "AUT" is selected in the user interface. | Digital input 1 (DI 1) not wired.                                                    | Make connection.<br>Check the software settings for the digital inputs.                                                                                                                                                                                                            |
| LEDs in the commissioning and service panel (CSP) flash 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 pushbuttons on the CSP). Disconnect from valve, if necessary.<br>Drive the actuator back into the operating range and connect it to the valve.<br>Readjust the actuator for the operating range. |
| Malfunction when approaching the end position.                                       | Actuator in limit range of positioning sensor.                                       |                                                                                                                                                                                                                                                                                    |

## 10.1 Electrical test values

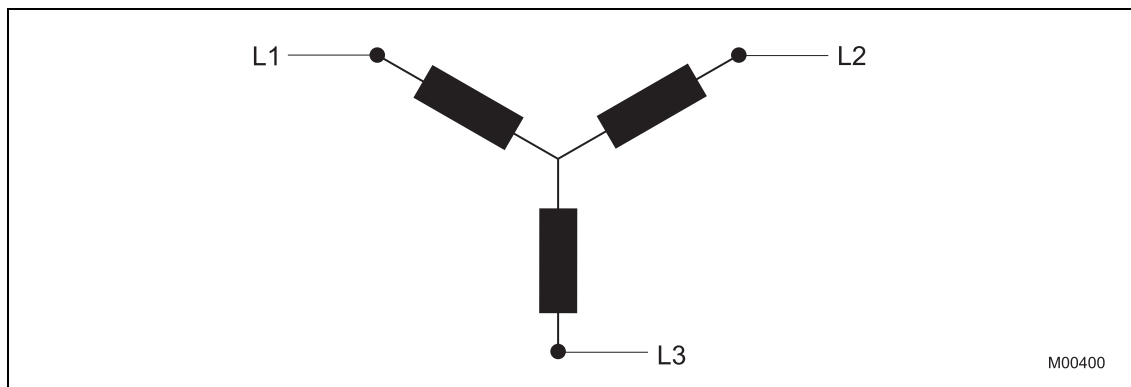


Fig. 18

| Winding resistance $\pm 5\%$ at 20 °C (68 °F) |                                                                         |
|-----------------------------------------------|-------------------------------------------------------------------------|
| motor                                         | L1 (bl.) - L2 (sw): 3,4 $\Omega$<br>L1 (bl.) - L3 (viol.): 3,4 $\Omega$ |
| Brake                                         | 50 $\Omega$                                                             |

## 11 Technical data

### 11.1 General information

|                                            | PME120-AI (integrated electronic unit)                                             | PME120-AN (separate electronic unit)                                                                                                                                                                      |
|--------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating mode                             | S9 - 100 %; stall proof acc. to IEC 60034-1 / EN 60034-1                           |                                                                                                                                                                                                           |
| Protection class                           | IP 66                                                                              |                                                                                                                                                                                                           |
| Humidity                                   | ≤ 95 % average; condensation not permitted                                         |                                                                                                                                                                                                           |
| Ambient temperature                        | -10 ... 55 °C (15 ... 130 °F)<br>-25 ... 55 °C (-15 ... 130 °F)                    | -10 ... 65 °C (15 ... 150 °F)<br>-25 ... 55 °C (-15 ... 130 °F)<br>-1 ... 85 °C (30 ... 185 °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                                                                                                                                |
| Power supply for motor and sensors         | Only via Contrac electronic unit (refer to the data sheet for the electronic unit) |                                                                                                                                                                                                           |
| Cable between actuator and electronic unit | -                                                                                  | Select from 5 m (16 ft), 10 m (32 ft) or 20 m (65 ft)<br>max. 30 m (98 ft) for EAN823 electronic unit<br>max. 480 m (1575 ft) for EAS822 electronic unit<br>(read the data sheet for the electronic unit) |
| Weight, approx.                            | 32 kg (70 lb)                                                                      | 36 kg (79 lb)                                                                                                                                                                                             |

| Model                                   | PME120-AN; PME120-AI                                                                                                                                                  |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated torque                            | 100 Nm (80 lbf-ft), adjustable to 0.5; 0.75 or 1x rated torque                                                                                                        |
| Starting torque                         | 1.2 x rated torque (break-away torque in end positions for short time 2 x rated torque)                                                                               |
| Rated time for 90° (Operating speed)    | Adjustable from 20 ... 900 s (4.5 ... 0.1°/s)                                                                                                                         |
| Operating angle                         | Typically 90 ° (min. 35°; max. 270°), see manual for reduced angle with lever and limit stop                                                                          |
| Associated electronic unit (data sheet) | PME120-AI: integrated electronic unit<br>PME120-AN: Designed for field installation:<br>EAN823 (10/68-8.26)<br>Designed for rack installation:<br>EAS822 (10/68-8.23) |
| Motor                                   | 24 V 3~ asynchronous motor for operation with electronic unit EAN823 or EAS822                                                                                        |
| Sensors                                 | Position and temperature sensor always available                                                                                                                      |

## 12 Appendix

### 12.1 Permits and certifications

|         | Symbol                                                                            | Description                                                                                                                                                                                                                                             |
|---------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CE mark |  | By placing the CE mark on the model plate, ABB Automation Products GmbH declares its conformance with the following directives: <ul style="list-style-type: none"> <li>- EMC directive 89/336/EEC.</li> <li>- Machinery directive 2006/42/EC</li> </ul> |



#### Important

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

[www.abb.com/instrumentation](http://www.abb.com/instrumentation)

## Statement about the contamination of devices and components

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

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

### Customer details:

Company:

Address:

Contact person:

Telephone:

Fax:

E-Mail:

### Device details:

Type:

Serial no.:

Reason for the return/description of the defect:

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

☐ Yes ☐ No

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

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

Which substances have had contact with the device?

1.

2.

3.

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

City, Date

Signature and company stamp

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