



Application

Electric actuator for industrial applications

Special features

The electric actuator is suitable for mounting on Series 240, 250 and 280 Valves with 15 to 120 mm travel. The following limit switches and signaling components are included in the actuator:

- Two torque-dependent changeover switches
- Three travel-dependent changeover switches
- Anti-rotation fixture

Versions

- Three-step version
- Version with positioner
- Single-phase or multi-phase operation
- Operation with DC voltage
- Standard version with surface-cooled squirrel-cage motor

Options

- Electronic positioner with input and output signals 0/4 to 20 mA or 0 to 10 V
- Electronic position transmitter with an output signal from 0/4 to 20 mA
- One or two resistance transmitters 100, 200, 1000 or 2000 Ω
- Additional travel-dependent changeover switch
- Temperature monitor (depending on actuator model)
- Heating for the terminal compartment
- Integrated reversing contactor for multi-phase operation

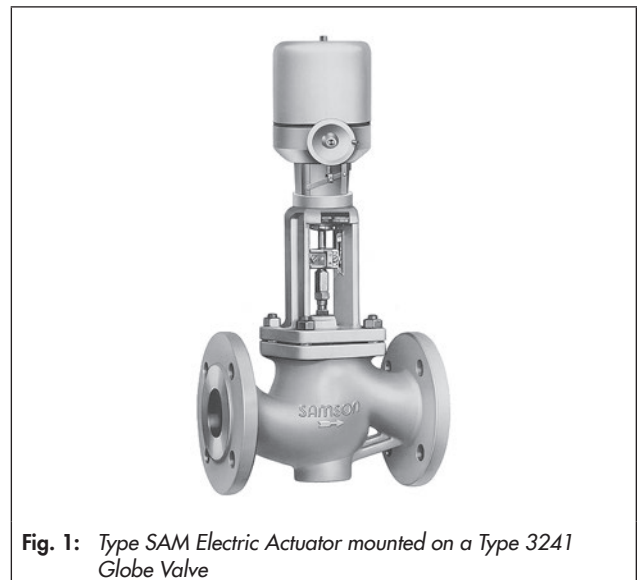


Fig. 1: Type SAM Electric Actuator mounted on a Type 3241 Globe Valve

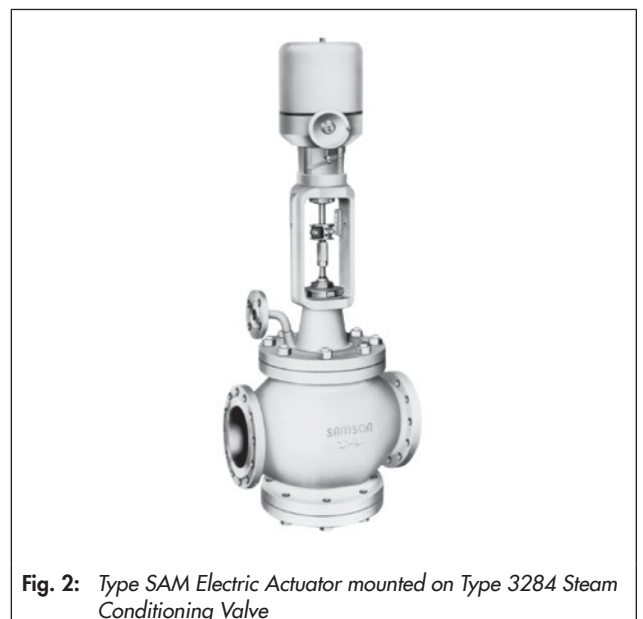


Fig. 2: Type SAM Electric Actuator mounted on Type 3284 Steam Conditioning Valve

Design and principle of operation

The actuator motor converts the output pulses of the three-step controller into steps of travel. The length of these steps and the direction of rotation depend on the amount and the sign of the control deviation.

The rotary motion of the motor is transferred to the gear wheel by the gearing; the gear wheel is shrunk on a bushing with female thread. The top section of the actuator stem which is provided with the matching male thread engages the female thread. Due to the rotary motion of the gear wheel and bushing, the actuator stem screws into the female thread and performs a lifting, linear motion. The actuator stem can be moved manually after decoupling the motor.

The electrical components are housed beneath the sealed actuator cover in a compartment where they are separated from the gearing. They are protected against dust in this compartment and can be easily accessed after lifting off the actuator cover.

- Switch

All versions are equipped with two torque switches (S1 and S2 in Fig. 4) switch off the motor when the adjusted force is reached, e.g. when the valve plug rests against the seat or when the linear motion is obstructed in any way.

The three floating travel switches (S3 to S5 in Fig. 4) can be continuously adjusted. They issue a limit signal when the adjusted limit values are exceeded.

The switch (S3) functions as a NC contact and is used to limit the travel in retracting direction. The actuator is switched off when the adjusted travel limit is reached.

The switches (S4 and S5) can be used to indicate the actuator stem position or when the adjusted travel is reached.

The travel switch S3 must be adjusted in such a way that the valve travel is restricted in the retracting direction by switching off the motor.

- Resistance transmitters

The resistance transmitters are linked to the motor gear and produces a resistance signal, which is proportional to the valve travel.

- Position transmitter (ESR)

The position transmitter is a 0/4 to 20 mA signal, which is proportional to the travel.

Mounting

The actuator can be combined with the Series 240, 250 and 280 Valves (form A). It is fastened to the valve bonnet with a ring nut. The actuator and plug stems are fastened together by a stem connector.

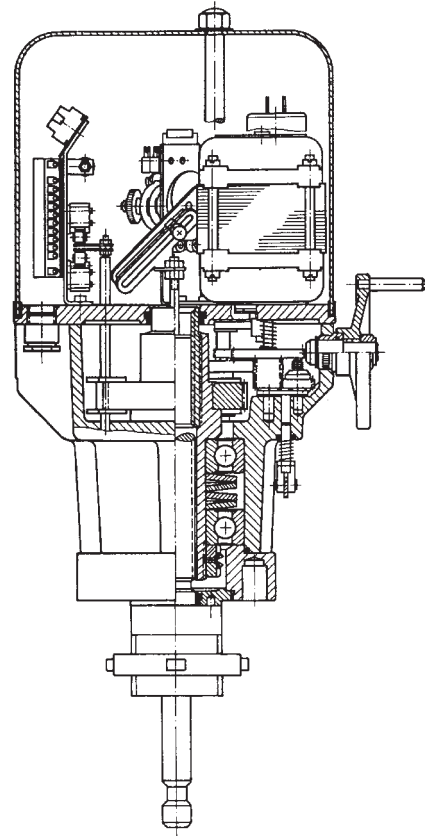


Fig. 3: Type SAM Electric Actuator

Electrical connection

Either the internal terminal block (standard version) or the 32-pole terminal block in the terminal box can be used to connect the actuator.

i Note

The wiring plan is stuck in the actuator cover.

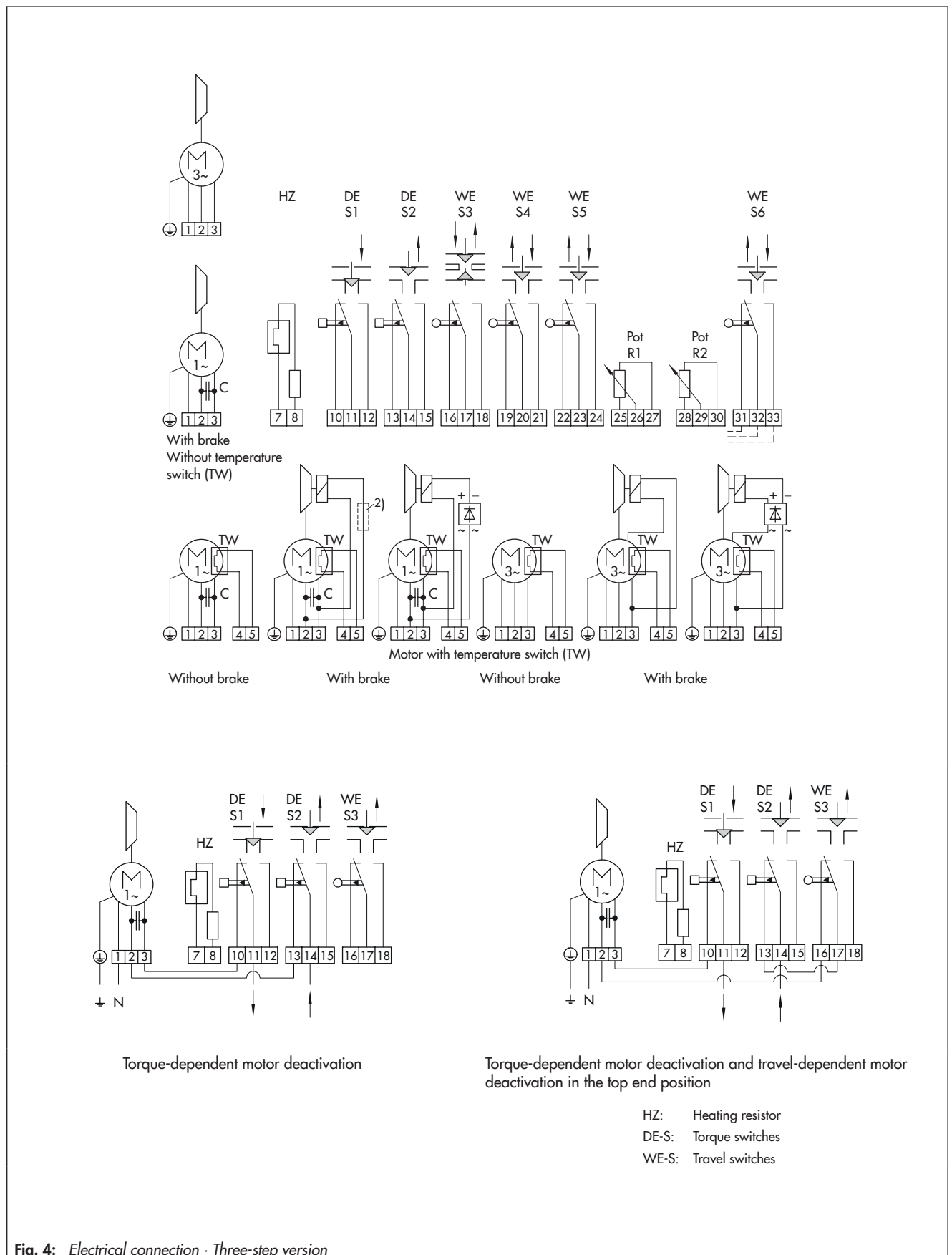
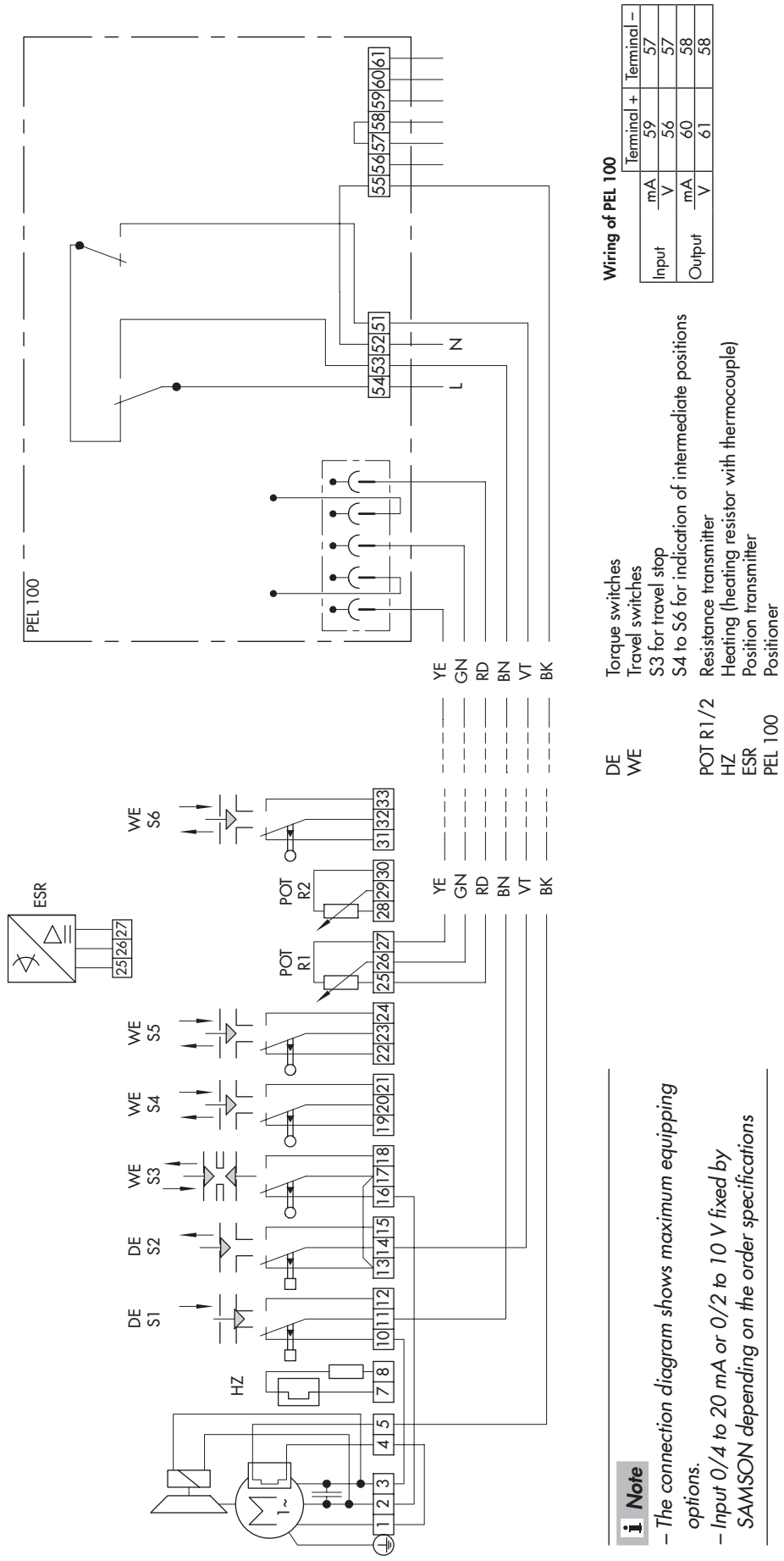


Fig. 4: Electrical connection · Three-step version



Note

- The connection diagram shows maximum equipping options.
- Input 0/4 to 20 mA or 0/2 to 10 V fixed by SAMSON depending on the order specifications

Fig. 5: Electrical connection · Version with positioner, single-phase operation

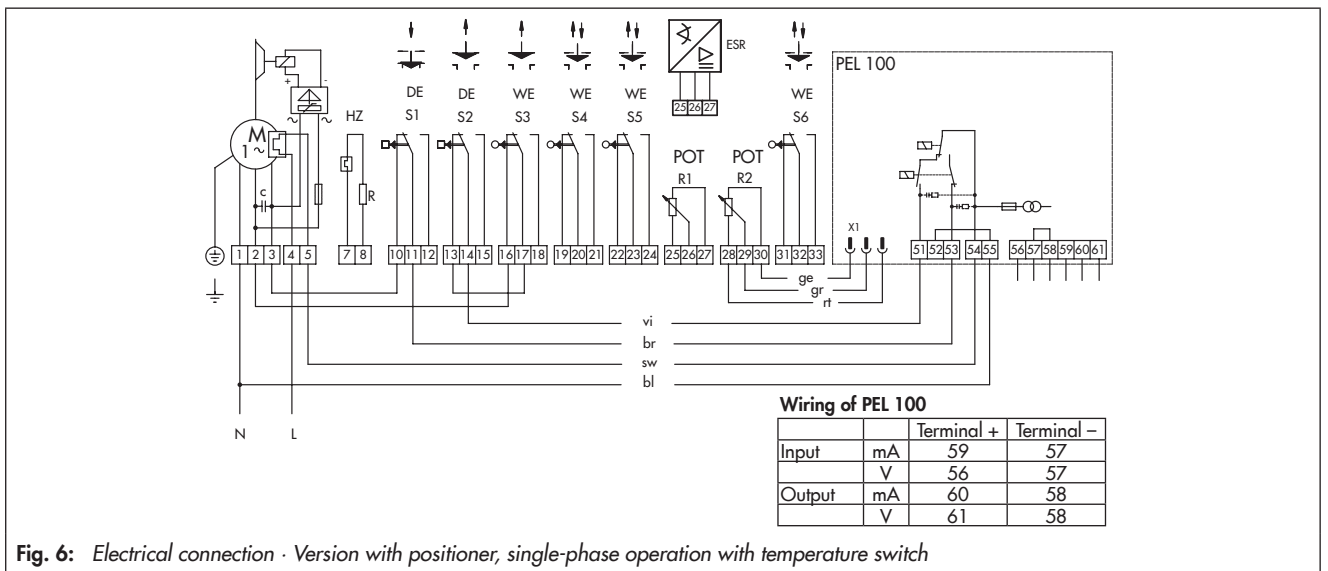


Fig. 6: Electrical connection · Version with positioner, single-phase operation with temperature switch

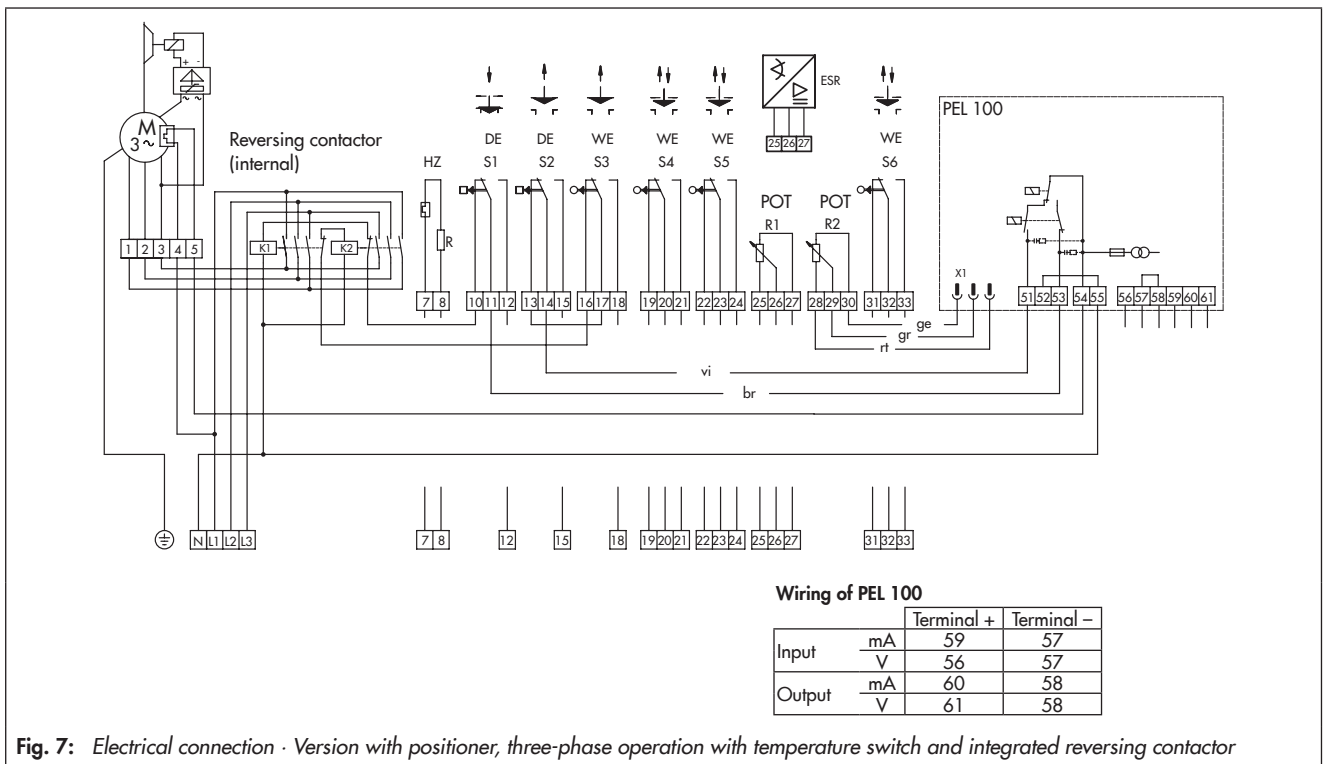


Fig. 7: Electrical connection · Version with positioner, three-phase operation with temperature switch and integrated reversing contactor

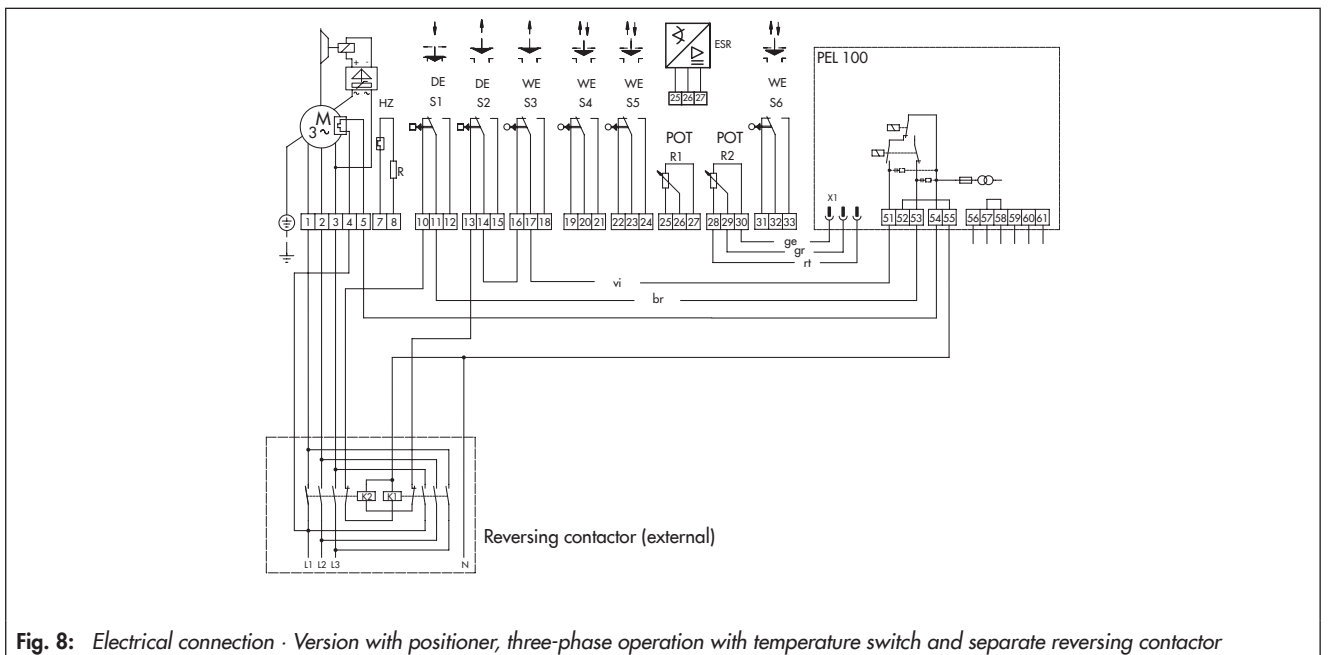


Fig. 8: Electrical connection · Version with positioner, three-phase operation with temperature switch and separate reversing contactor

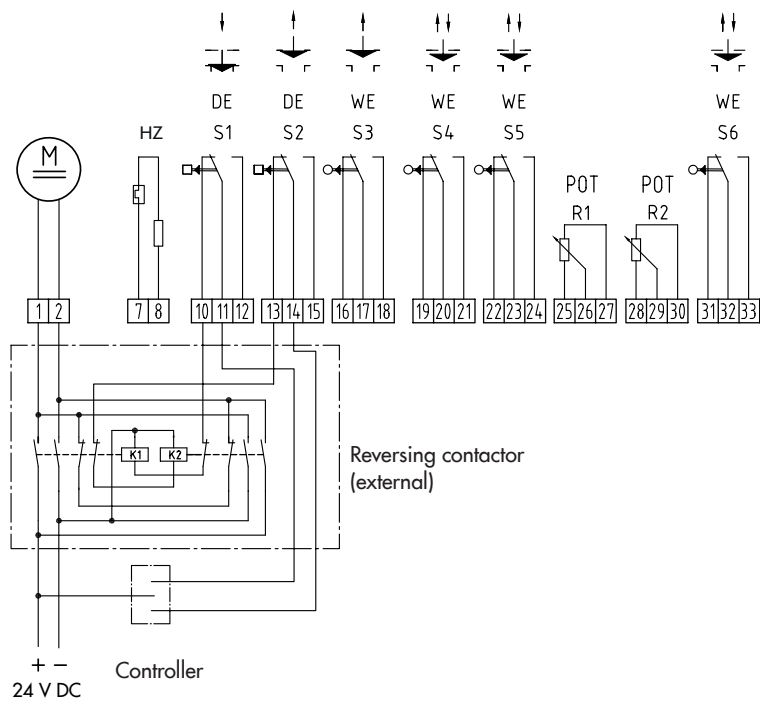
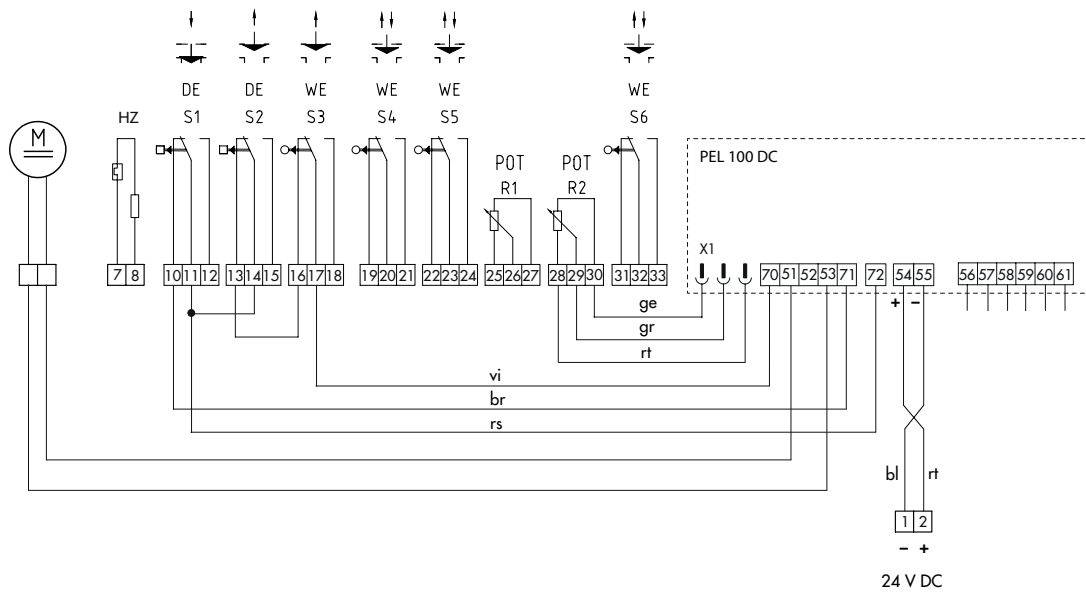


Fig. 9: Electrical connection · Three-step version for 24 V DC with external reversing contactor



Wiring of PEL 100 DC

| | | Terminal + | Terminal - |
|--------|----|------------|------------|
| Input | mA | 59 | 57 |
| | V | 56 | 57 |
| Output | mA | 60 | 58 |
| | V | 61 | 58 |

Fig. 10: Electrical connection · Three-step version for 24 V DC with external reversing contactor

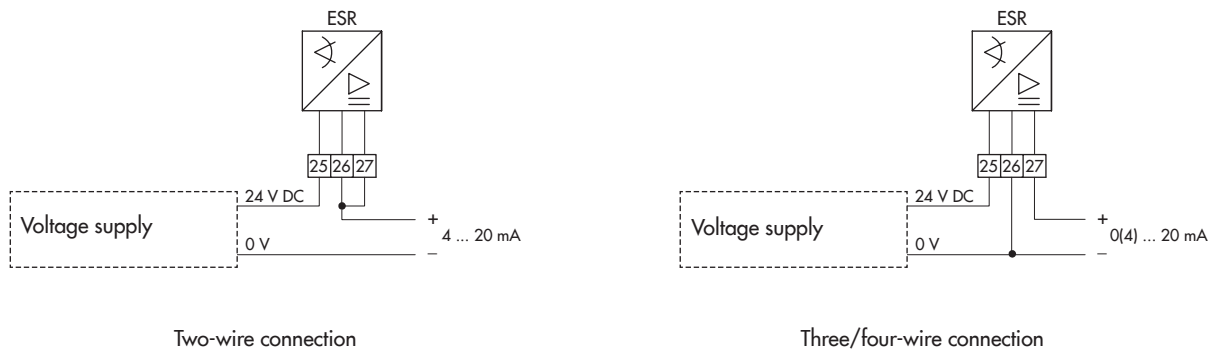


Fig. 11: Electrical connection · Position transmitter (ESR)

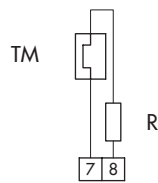


Fig. 12: Electrical connection · Heating resistor (R) with temperature switch (TW)

Terminal and connector assignment

Table 1: Terminal X2

| Terminal | Function |
|----------|--------------------|
| 54 | L (supply voltage) |
| 55 | N (supply voltage) |

Table 2: Terminal X3

| Terminal | Function |
|----------|---|
| 51 | L ↑ (connection for actuator stem retracts) |
| 52 | N (supply voltage) |
| 53 | L ↓ (connection for actuator stem extends) |

Table 3: Terminal X4

| Terminal | Function |
|----------|-----------------------------|
| 60 | 0/4 to 20 mA current output |
| 61 | 0/2 to 10 V voltage output |
| 58 | GND |
| 57 | GND |
| 56 | 0/2 to 10 V voltage input |
| 59 | 0/4 to 20 mA current input |

Table 4: Connector X4

| Pin | Function | Color code |
|-----|-----------------------|------------|
| 1 | Max. value | Blue |
| 2 | Sensing at the slider | Red |
| 3 | Zero point | Green |

Technical data

Table 5: Mechanical and general data

| Type SAM ... | -01 | -10 | -11 | -12 | -13 | -20 | -21 | -22 | -23 | -30 | -31 | -32 | -33 | -40 | -41 | -42 | -50 | -51 | -52 | |
|--|-----|--|--------------|-----|----------|----------------|-----|-----|------------------|----------------|--------------|-----|------------------|---------------|----------|---------------|------------------|----------|-----|----|
| Thrust | kN | 2 | 2 | 3.5 | 4.5 | 6 | 6 | 8 | 12 | 15 | 6 | 8 | 12 | 15 | 15 | 20 | 25 | 15 | 20 | 25 |
| Rated travel | mm | 15 · 30 | | | | | | | | | 15 · 30 · 60 | | | | | | 60 100 120 | 60 · 120 | | |
| Stroking speed in mm/min ¹⁾ | | 15 | 17 · 25 · 50 | | 17 34 | 13.5 · 25 · 50 | | | 13.5 22 40 | 13.5 · 25 · 50 | | | 13.5 22 40 | 15 · 25 50 | 25 50 | 15 · 25 50 | 25 50 | | | |
| Mounting orientation | | Any mounting position, however, not with the motor suspended | | | | | | | | | | | | | | | | | | |
| Actuator stem | | No mechanical travel stops, protected against being rotated by tongue and groove | | | | | | | | | | | | | | | | | | |
| Manual adjuster | | Side-mounted handwheel | | | | | | | | | | | | | | | | | | |
| Attachment | | M30x1.5 | | | | | | | | | M60x1.5 | | | | | | M100x2 | | | |
| Degree of protection | | IP 65 according to DIN EN 60529 | | | | | | | | | | | | | | | | | | |
| Protection class | | I according to DIN EN 61140 | | | | | | | | | | | | | | | | | | |
| Permissible ambient temperature range | | -20 to +60 °C | | | | | | | | | | | | | | | | | | |
| Conformity ²⁾ | | CE | | | | | | | | | | | | | | | | | | |

¹⁾ With 50 Hz power line frequency; stroking speed increased by 20 % with 60 Hz power line frequency

²⁾ Others on request

Table 6: AC supply voltage

| Type SAM ... | -01 | -10 | -11 | -12 | -13 | -20 | -21 | -22 | -23 | -23 | -20 | -21 | -22 | -23 | -40 | -41 | -42 |
|---|---|--------------|------|----------|-----------------|------------|------|----------------------|-----|-------------------|-----------|-----|-----|--------------|-----|------------|-----|
| | | | | | | -30 | -31 | -32 | -33 | -33 | -30 | -31 | -32 | -33 | -50 | -51 | -52 |
| Electrical connection | Terminal block inside actuator or inside a terminal box mounted onto the actuator | | | | | | | | | | | | | | | | |
| Supply voltage | 230 V, 50/60 Hz · 400 V, 50/60 Hz ¹⁾ | | | | | | | | | | | | | | | | |
| Power consumption in VA | 230 V, 50 Hz ²⁾ | 6.6 | 36.8 | 41.4 | 36.8 41.4 | 23 51.8 | 33.3 | 51.8 | 161 | 161 | 152 · 214 | | | | | | |
| | 400 V, 50 Hz ²⁾ | 6 | 44 | 32 | 44 32 | 24.8 44 | 340 | 44 | 116 | 116 | 160 · 280 | | | | | | |
| Stroking speed in mm/min ²⁾ | 15 | 17 · 25 · 50 | | 17 34 | 13.5 25 · 50 | | | 13.5 · 22 · 40 | 22 | 13.5 · 25 · 50 | | | 40 | 15 · 25 · 50 | | 25 · 50 | |
| Motor type (depending on the stroking speed) | | | | | | | | | | | | | | | | | |
| Synchronous motor | • | - | - | - | - | • | • | • | • | • | • | • | • | • | • | • | - |
| Asynchronous motor with brake | - | • | • | • | • | - | - | - | - | - | - | - | - | - | - | - | - |
| Asynchronous motor (optional brake, required with positioner) | - | - | - | - | - | • | • | • | • | • | • | • | • | • | • | • | • |
| Temperature monitoring | Not required, on request only | | | | | | | | | Bimetallic switch | | | | | | | |
| Duty type | Intermittent periodic duty S4-30 % ED-600 c/h according to EN 60034-1 | | | | | | | | | | | | | | | | |

¹⁾ Others on request

²⁾ With 50 Hz power line frequency; specifications 20 % higher with 60 Hz power line frequency

Table 7: DC supply voltage

| Type SAM ... | -01 to -13 | | | -20 to -33 | | | -40, -41, -50, -51 | | | | | | | | | | | |
|--|---|--|--|------------|--|--|--------------------|--|--|------|--|--|----|--|--|-----|--|--|
| Electrical connection | Terminal block inside actuator or inside a terminal box mounted onto the actuator | | | | | | | | | | | | | | | | | |
| Supply voltage | 24 V DC | | | | | | | | | | | | | | | | | |
| Power consumption in W ¹⁾ | 8.5 | | | 16.8 | | | 26.5 | | | 64.8 | | | 48 | | | 118 | | |
| Stroking speed in mm/min ²⁾ | 30 | | | 50 | | | 25 | | | 60 | | | 30 | | | 60 | | |
| Duty type | Intermittent periodic duty S4-30 % ED-600 c/h according to EN 60034-1 | | | | | | | | | | | | | | | | | |

¹⁾ The power consumption of actuators with positioners is 1.8 W higher.

²⁾ The stroking speed varies depending on the load acting on the actuator.

Table 8: Electrical equipment

| Torque switches DE | | |
|--|---|-------------------------------|
| Switch DE-S ... ¹⁾ | Two switches S1 and S2, max. 250 V AC | |
| Travel switches WE-... | | |
| Switch WE-S... ¹⁾ | One switch S3 for direction of action "retracting" and "extending" Two switches S4 and S5 for indication of intermediate positions or end positions One switch S6 as indication switch (optional) | |
| Load | $\cos \varphi = 1$: max. 5 A · $\cos \varphi = 0.8$: max. 3 A · Light bulbs: max. 2 A | |
| Additional electrical equipment | | |
| Resistance transmitters POT R ... | | |
| Potentiometer R ... | One or two potentiometers R1 and R2: 100 Ω, 200 Ω, 1 kΩ, 2 kΩ | |
| Load | Max. 1.5 W · Sliding contact current max. 30 mA | |
| Position transmitter (ESR) | | |
| Connection | Three/four-wire connection | Two-wire connection |
| Supply voltage U_H | 18 to 30 V DC | 18 to 30 V DC |
| Max. load R_L | $50 \times (U_H - 2.5) \Omega$ | $50 \times (U_H - 12) \Omega$ |
| Output signal | 0 to 20 mA or 4 to 20 mA | 4 to 20 mA |
| Current draw | Max. 30 mA | |
| Positioner (PEL 100) | | |
| Input and output signal | 0/4 to 20 mA or 0 to 10 V | |
| Current input impedance | 50 Ω | |
| Voltage input impedance | 20 kΩ | |
| Fuse with 230 V supply | 250 mA | |
| Fuse with 24 V supply | 1 A | |
| Heating | | |
| Heating resistor | With temperature switch 24 V, 110 V or 230 V (AC/DC), 15 W | |

¹⁾ Not wired upon delivery when actuators have an external reversing contactor unit

Dimensions

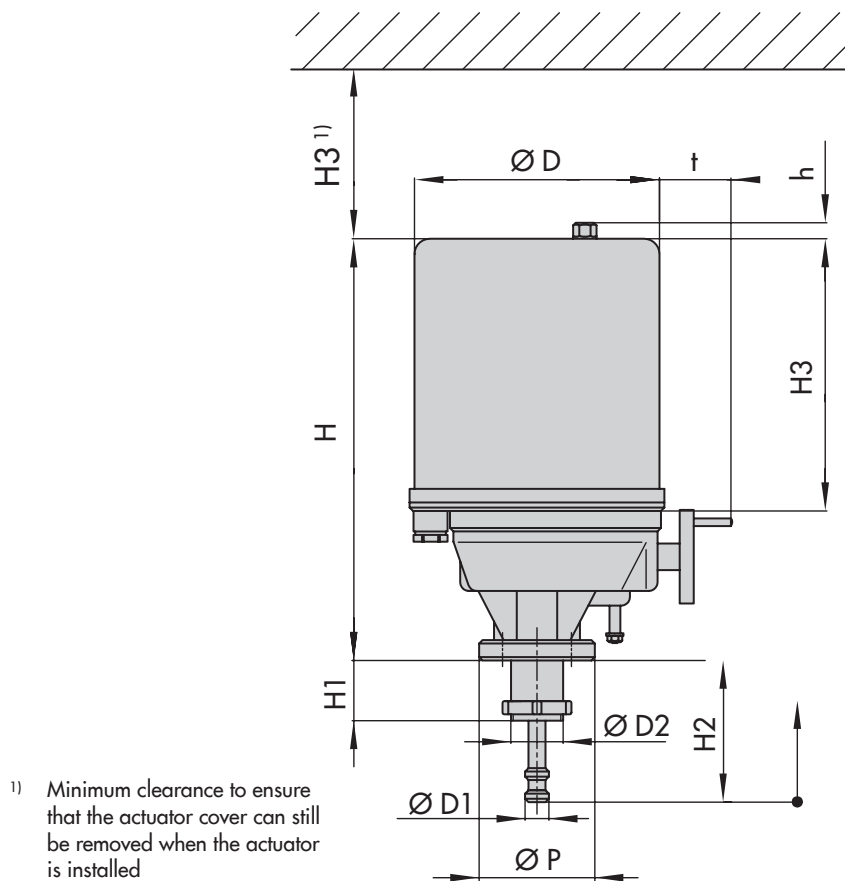


Fig. 13: Dimensions in mm

Table 9: Dimensions in mm and weights

| Type | SAM-01 to SAM-13 | SAM-20 to SAM-23 | SAM-30 to SAM-33 | SAM-40 to SAM-42 | SAM-50 to SAM-52 |
|------------------|------------------|------------------|------------------|------------------|------------------|
| Rated travel | 15/30 | 30 | 60 | 60 | 120 |
| H ¹⁾ | 268 (283) | 334 (357) | 334 (357) | 413 (452) | 448 (487) |
| H1 | 34 | 34 | 54 | 54 | 92 |
| H2 min. | 60/75 | 60 | 105 | 165 | 195 |
| H2 max. | 75/90 | 90 | 165 | 225 | 315 |
| H3 ¹⁾ | 156 (171) | 174 (197) | 174 (197) | 197(226) | 187 (226) |
| Ø D | 144 | 188 | 188 | 216 | 216 |
| Ø D1 | 16 | 16 | 22 | 22 | 40 |
| Ø D2 Thread | M30x1.5 | M30x1.5 | M60x1.5 | M60x1.5 | M100x2 |
| Ø P | 74 | 130 | 140 | 140 | 158 |
| t | 42 | 62 | 62 | 70 | 70 |
| h | 10 | 15 | 15 | 15 | 15 |
| Approx. weight | 5 kg | 6 kg | 7 kg | 15 kg | 19 kg |

¹⁾ Dimensions in parentheses apply to actuator with positioner

Accessories

| | Material ¹⁾ | Order no. |
|--|-------------------------------------|-----------|
| SAM-01 to SAM-13 and SAM-20 to SAM-23 (for valves with stem ends Ø 16 mm) | | |
| Mounting set Consisting of: 1x Castellated nut M30x1.5 2x Clamps for stem ends Ø 16 mm 2x Screws M6x25 | 1.0727+C 1.4301 (SS304) A4-70 | 0900-2679 |
| SAM-01 to SAM-13 and SAM-20 to SAM-23 (for valves with stem ends Ø 10 mm) | | |
| 1x Castellated nut M30x1.5 | 1.0727+C | 0250-0615 |
| 1x Clamp for stem ends Ø 10/16 mm Consisting of: 2x Clamps for stem ends Ø 10/16 mm 2x Screws M5x25 | 1.4404 (SS316) A4-70 | 1990-8689 |
| SAM-30 to SAM-33 and SAM-40 to SAM-42 | | |
| 1x Castellated nut M60x1.5 | 1.0727+C | 0250-0700 |
| 1x Clamp for stem ends Ø 22 mm | 1.4301 (SS304) | 0300-1084 |
| 1x Clamp for stem ends Ø 22 mm | 1.4301 (SS304) | 0300-1085 |
| 2x Screws M12x35 | 1.4301 (SS304) | 8320-0884 |
| SAM-50 to SAM-52 | | |
| 1x Castellated nut M100x2 | 1.0727+C | 0250-0701 |
| 1x Clamp for stem ends Ø 40 mm | 1.4301 (SS304) | 0300-1078 |
| 1x Clamp for stem ends Ø 40 mm | 1.4301 (SS304) | 0300-1079 |
| 2x Screws M16x50 | 1.4301 (SS304) | 8320-0973 |

¹⁾ Other on request

Ordering text

Type SAM-... Electric Actuator

Thrust

2 ... 25 kN

Rated travel

15/30/60/120 mm

Stroking speed

... mm/min

Supply voltage:

230 V/400 V/24 V, 50/60 Hz

24 V DC

Reversing contactor

Without/mounted before delivery (only with multi-phase operation or DC power supply)

Actuation

Three-step version/version with positioner

Brake motor (three-step version only, not with 24 V DC)

With/without

Additional electrical equipment

Additional travel switch

With/without

Resistance transmitters

None/1/2

100, 200, 1000, 2000 Ω

Position transmitter ESR

With/without

Heating

With/without

Mounting

Mounted on Type ... Valve

Associated Mounting and Operating Instructions

– Type SAM

▶ **EB 8330**