

Technical Data

Electric Rotary Actuators 2SA78 for continuous modulating duty



HiMod

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Technical Data

General data

SIPOS actuators are suitable for automatic and safe operation of industrial valves in accordance with EN 15714-2.

Mounting position

The actuator can be mounted in **any position**. To make local operation easier, e.g. reading information on the display, a regular mounting is recommended, i.e. the mounting flange of the valve should be positioned below the actuator.
The electronics unit of the actuator can be **mounted separately** (e.g. wall bracket) using our separate mounting kit (e.g. order add-on **S41**).

Duty classifications

2SA78..-

- o Continuous modulating duty, class **D** according to EN 15714-2
- o Modulating duty, class **C** according to EN 15714-2

The actuators can be operated for all torque and speed combinations for the entire temperature range from -20 °C to +70 °C.

Noise level

The noise level caused by the actuator (sound pressure level at 1 m distance) is **< 70 dB (A)**.

Paint finish and corrosion protection

All outside screws are exclusively made of **stainless steel**. The housing material consists of a **corrosion-resistant aluminum alloy** for normal atmospheric ambient conditions. Rotary actuators 2SA78 can be used without coating but are painted with a 2K-PUR-single layer coat (two-component polyurethane single layer coating) as standard.
The single layer coating is UV-resistant and decontaminable. It is applied with a minimum coating thickness of 80 µm when dry, in color similar to **RAL 7037** (silver-gray). Other RAL colors (add Y35 + number of RAL color to order) are available.
After roughening and cleaning the surfaces, the single layer coating can be painted with all common painting material. This includes epoxid lacquers, nitrocellulose lacquers etc.

Protection against corrosion from outside is stipulated in corrosivity categories in accordance with EN15714-2 (EN ISO 12944-2):

| | | |
|---|---|--|
| Version | Standard version: Corrosivity category C5 | Very high corrosion protection, corrosivity category C5 with long protection time >> superior to 300 µm conventional paint thickness << |
| Installation / Environmental condition | - Industrial areas with high humidity and aggressive atmosphere - Areas with almost permanent condensation and with high pollution | - Coastal and offshore areas with high salinity - Industrial areas with high humidity and aggressive atmosphere - Areas with almost permanent condensation and with high pollution |
| Order add-on | --- | L38 |

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Lubrication

The gears are filled with durable gear oil. They therefore require little maintenance. The maintenance intervals after commissioning must be observed (refer to recommendations in operating manual). The bearings of output shaft type A are lubricated with grease.

Degree of protection

The actuators meet the requirements of **IP68** protection as standard (DIN EN 60529). They are fully screen-protected (electrical voltage and moving parts) and protected against the ingress of foreign bodies (dust), and against harmful quantities of water on continuous immersion up to max. 3 m head of water for a duration of max. 72 hours. During flooding up to 10 motor operations (switching cycles) are permitted.
IP68-8, continuous immersion up to max. 8 m head of water, on request!

Vibration performance

Electric rotary actuators 2SA7 are certified according to:

| | Acceleration | Frequency range | Throughput speed | Test duration |
|--------------------|--------------|-----------------|------------------------------|---|
| Germanischer Lloyd | 0.7 g | 5 – 200 Hz | in the resonance frequencies | min. 1.5 h / in 3 directions |
| EN 60068-2-6 | 2 g | 5 – 500 Hz | 1 octave/min | 20 sweeps (10 cycles) / in 3 directions |

Standard for 2SA781 to 2SA784

Loads according to EN 60068-2-6 up to **2 g** for types 2SA785 and 2SA786 on request.

Loads according to EN 60068-2-6 up to **5 g** for separate mounting of electronics and gear unit on request.

The actuators can withstand a continuous load caused by plant-generated vibrations within a frequency range of 5 Hz – 200 Hz at up to **0.5 g**.

Ambient temperature

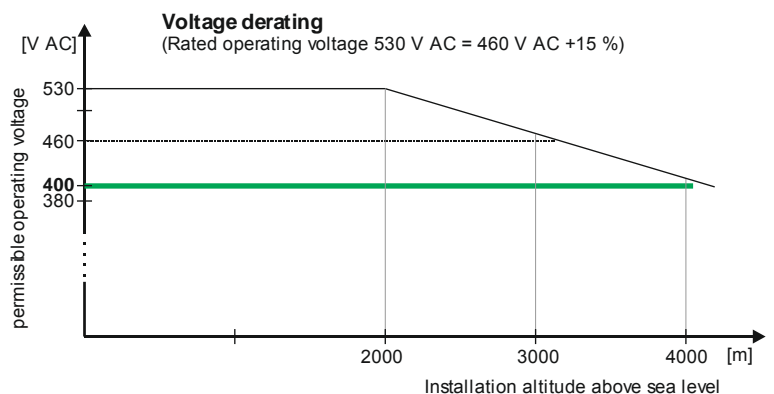
There are no functional restrictions for the temperature range of **-20 °C to +70 °C**. Lower or higher temperatures on request!

Installation altitude above sea level

The actuators are designed for an installation altitude up to 2,000 m above sea level.

Since the insulating properties of air decrease with increasing installation altitude, a voltage derating for the maximum permissible operating voltage has to be considered at installation altitudes above 2,000 m.

| Installation altitude above sea level [m] | Derating factor | permissible operating voltage [V AC] |
|---|-----------------|--------------------------------------|
| 2000 | 1 | 460 + 15 % (530 + 0 %) |
| 3000 | 0.88 | 405 + 15 % (465 + 0 %) |
| 4000 | 0.77 | 355 + 15 % (410 + 0 %) |



When considering a limited permissible voltage tolerance, SIPOS actuators can be safely operated at installation altitudes of up to 4,000 m with 3- phase 400 V AC (-15 %/+0 %).

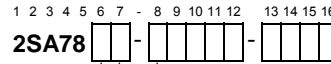
Technical Data

Mechanical data

Tripping torque

| Max. act. torque (modulating torque) | Adjustable tripping torque T_C [Nm] | Weight \approx [kg] | |
|--------------------------------------|---------------------------------------|-----------------------|---|
| 15 | 10 - 20 | 20 | 1 |
| 30 | 20 - 40 | 22 | 2 |
| 60 | 40 - 80 | 36 | 3 |
| 125 | 87 - 175 | 39 | 4 |
| 250 | 175 - 350 | 70 | 5 |
| 500 | 350 - 700 | 70 | 6 |
| 1000 | 700 - 1400 | 137 | 7 |
| 2000 | 1400-2800 | 137 | 8 |

| Force for manual mode | |
|--------------------------------|----------------|
| Crank length / hand wheel dia. | at $T_{C,max}$ |
| 70 mm / \varnothing 160 mm | 18 N |
| 90 mm / \varnothing 200 mm | 56 N |
| \varnothing 250 mm | 88 N |
| | 175 N |
| | 92 N |
| | 184 N |



Adjustable tripping torque in steps of 10% from 50% - 100% max. torque $T_{C,max}$.

50% $T_{C,max}$ is default setting

| Tripping torque range [Nm] | Tripping torque setting at .. % of $T_{C,max}$ [Nm] | | | | | | |
|----------------------------|---|------|------|------|------|-------|--|
| | 50 % | 60 % | 70 % | 80 % | 90 % | 100 % | |
| 10 - 20 | 10 | 12 | 14 | 16 | 18 | 20 | |
| 20 - 40 | 20 | 24 | 28 | 32 | 36 | 40 | |
| 40 - 80 | 40 | 48 | 56 | 64 | 72 | 80 | |
| 87 - 175 | 87 | 105 | 122 | 140 | 157 | 175 | |
| 175 - 350 | 175 | 210 | 245 | 280 | 315 | 350 | |
| 350 - 700 | 350 | 420 | 490 | 560 | 630 | 700 | |
| 700 - 1400 | 700 | 840 | 980 | 1120 | 1260 | 1400 | |
| 1400 - 2800 | 1400 | 1680 | 1960 | 2240 | 2520 | 2800 | |

permitted tolerance: $\pm 10\%$ of $T_{C,max}$.

Manual mode

>> Switchover only when drive is at standstill! <<
Switchover takes place by pressing in the hand wheel, motor stops operating automatically. Electrical operation restarts automatically after releasing hand wheel.

Direction of rotation: Turning hand wheel clockwise results in clockwise rotation of output shaft (Exception: 2SA787.- and 2SA788.-).

Self-locking: The hand wheel acts directly on the motor shaft when turned by hand; the self-locking function is thus retained for self-locking actuators.

Self-locking

Rotary actuators for modulating duty are self-locking actuators. The gear ratio is $i=40$.

Flange size

| DIN ISO 5210 | DIN 3210 | Flange size for tripping torque [Nm] | | | | | | | Spindle opening [mm] | |
|--------------|----------|--------------------------------------|-------|-------|--------|---------|---------|-----------|---|-----------|
| F07 | - | 10-20 | 20-40 | | | | | | Dimensions for A-shaft (d6), B1-shaft (d5) and C-shaft (d11) see page 8 | 0 |
| F10 | G0 | 10-20 | 20-40 | 40-80 | 87-122 | | | | | 1 |
| F12 | - | | | 40-80 | 87-175 | | | | | 2 |
| F14 | G1/2 | | 20-40 | 40-80 | 87-175 | 175-350 | 350-490 | | | 3 |
| F16 | G3 | | | | | 175-350 | 350-700 | 700-980 | | 4 |
| F25 | G4 | | | | | | 350-700 | 700-1400 | | 1400-1960 |
| F30 | G5 | | | | | | | 1400-2800 | | 6 |

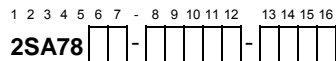
Dimensions to flanges and output shafts, see page 6

Output shaft design

| form | DIN 1) | Output shaft with | | | |
|------------|-----------------|---------------------|------------------------------|--|---|
| A | ISO 5210 103 2) | threaded bush | | | 0 |
| B1 | ISO 5210 | + acme screw thread | Order-no. with „ - Z “ + Y18 | | 2 |
| C | 3338 | bore with keyway | | | 3 |
| B3 | ISO 5210 | claw coupling | | | 5 |
| B2 / B4 3) | ISO 5210 | bore with keyway | | | 9 |
| | | bore with keyway | Order-no. with H2Y | | |

1) Special output shaft and output shaft design acc. to DIN 3210 on request.
2) Acme screw thread LH according to DIN 103, Part 2, thread nominal diameter as listed in Line 1, pitch according to preferred series. The acme screw thread must be expressly stated, e.g. Tr 16 x 4 LH DIN 103!
3) The special bore must be stated, e.g. $\varnothing 26$ with featherkey A8x7 DIN 6885!

Technical Data



Output speed

| Speed range | Output speed [rpm] | | | | default setting |
|----------------------|--------------------------|-------|-----------|------------------------|-----------------|
| | for tripping torque [Nm] | | | | |
| 1.25 – 10 | 700-1400 | | 1400-2800 | | 3.5 |
| 5 – 20 ¹⁾ | 10-20 | 20-40 | 40-80 | | 14 |
| 5 – 40 | 10-20 | 20-40 | 40-80 | 87-175 175-350 350-700 | |
| 10 – 80 | 10-20 | 20-40 | 40-80 | 87-175 175-350 | 28 |

continuous adjustable output speed within the selected speed range

| Speed range (n_{min} – n_{max}) | adjustable in 2.5% increments between 12.5 - 100% n_{max} [rpm] | | | | | | | |
|--|--|-----|------|-----|------------|-----|------|-----|
| | 12.5% | ... | | | | | | 35% |
| 1.25 – 10 | 1.25 | 1.5 | 1.75 | ... | 3.5 | ... | 9.75 | 10 |
| 5 – 40 | 5 | 6 | 7 | ... | 14 | ... | 39 | 40 |
| 10 – 80 | 10 | 12 | 14 | ... | 28 | ... | 78 | 80 |

35% n_{max}
is default
setting

Speed setting

Speed is set via the hermetically sealed control button "DriveController" of the local control, via fieldbus or the PC programming software "COM SIPOS".

Different speeds can be set for OPEN, CLOSE, EMERGENCY OPEN and EMERGENCY CLOSE.

Position recording

| Position recording |
|--|
| nIP (non-intrusive position encoder), without mechanical position indicator, with contactless position detection (without battery), data stored in non-volatile memory, resolution 0.0005 %, position indication via progress bar and additional value indication [%] on the display |

„non-intrusive“

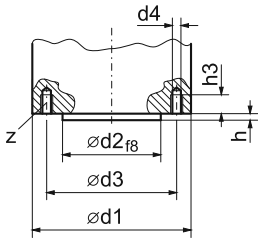
The non-intrusive version has no signaling gear.
The exact number of rotations for the travel (max. 353.000 rev/stroke) are automatically determined and saved when approaching both end positions during end position adjustment.

2

1) reduced speed range for 110 – 115 V connection voltage

Technical Data

Flange sizes



| Rotary actuator type | 2SA7 . □□ | 10 20 | 11 21 | 31 41 | 32 42 | 33 43 | 53 63 | 54 64 | 75 | 86 |
|----------------------|--------------------------|----------|---------------|-------------------|-------------------|------------|----------|---------------|---------------|-----|
| Flange size as per | DIN ISO 5210 DIN 3210 | F07 | F10 — 0 | F10 — 0 | F12 | F14 1/2 | F16 3 | F25 — 4 | F30 — 5 | |
| d1 | | 90 | 125 | 125 ⁷⁾ | 150 ⁷⁾ | 175 | 210 | 210 | 300 | 350 |
| d2 | | 55 | 70 60 | 70 60 | 85 | 100 | 130 | 200 160 | 230 180 | |
| d3 | | 70 | 102 | 102 | 125 | 140 | 165 | 254 | 298 300 | |
| d4 | | M8 | M10 | M10 | M12 | M16 | M20 | M16 | M20 | |
| z ¹⁾ | | 4 | 4 | 4 | 4 | 4 | 4 | 8 | 8 | |
| h | | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | |
| h3 | | 12 | 17 | 17 | 20 | 25 | 32 | 24 | 30 | |

Output shaft dimensions

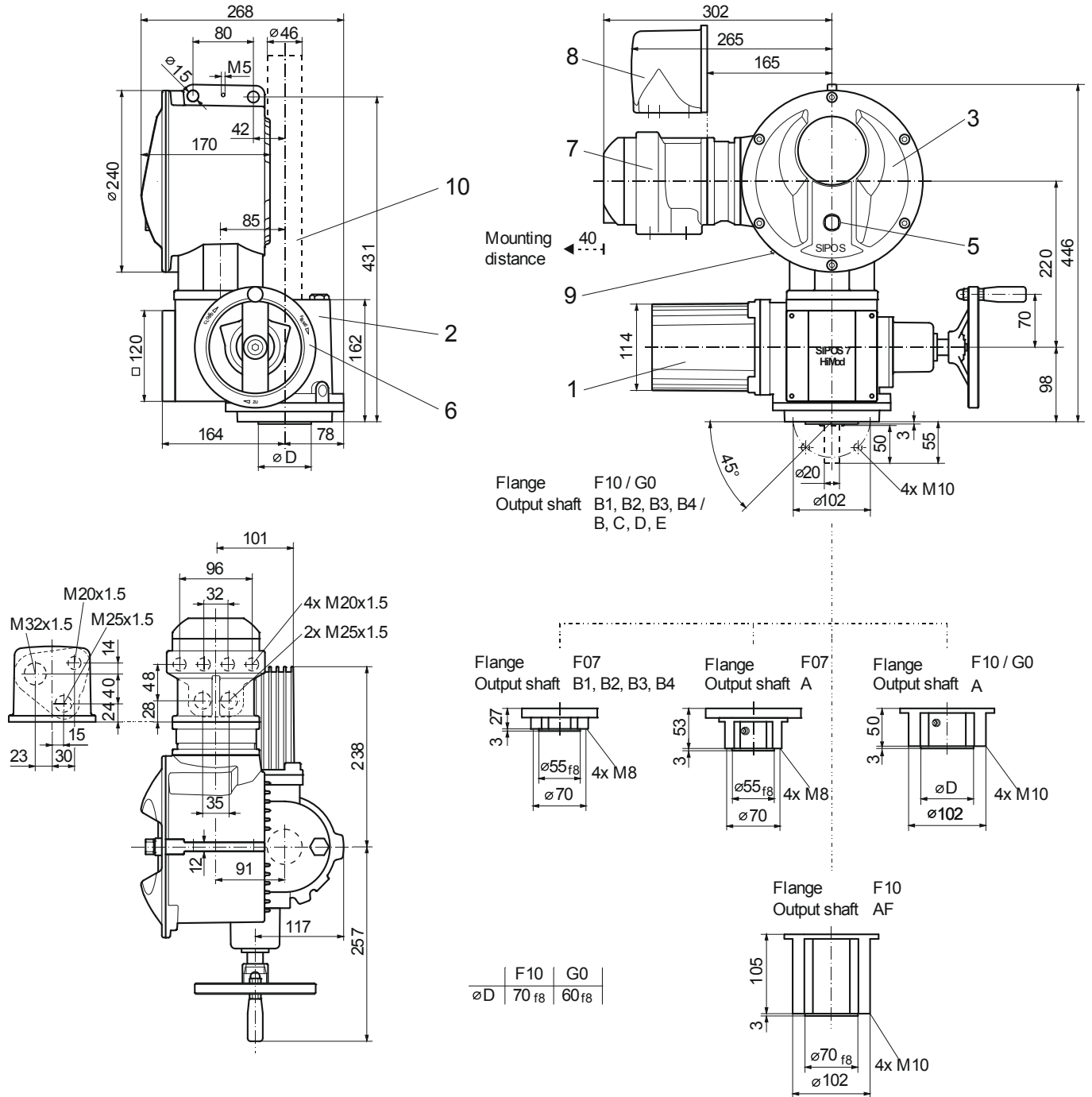
| | | | | | | | | | | | |
|--|---|----------------------------------|------|------|------|------|------------------|------|-------|-------|------------------|
| Hollow shaft with threaded bush | form A as per DIN ISO 5210 and form A as per DIN 3210 | d6 max. ²⁾ | 26 | 32 | 48 | 48 | 52 ⁴⁾ | 65 | 75 | 77 | 80 ⁵⁾ |
| | | d5 | 32 | 34 | 55 | 55 | 55 | 80 | 80 | 80 | 92 |
| | | h | 38 | 48 | 86 | 86 | 62 | 108 | 77 | 126 | 155 |
| | | l | 37 | 47 | 85 | 85 | 61 | 108 | 76 | 126 | 155 |
| | | l2 | 175 | 173 | 267 | 267 | 243 | 347 | 316 | 691 | 782 |
| Bore with keyway | form B1 as per DIN ISO 5210 and form B as per DIN 3210 | d7 | 28 | 42 | 42 | 50 | 60 | 80 | 100 | 120 | |
| | | d5 ³⁾ | 28 | 34 | 42 | 50 | 55 60 | 80 | 80 | 80 | 80 |
| | | b1 | 8 | 12 | 12 | 14 | 18 | 22 | 28 | 32 | 32 |
| | | t1 | 31.3 | 45.3 | 45.3 | 53.8 | 64.4 | 85.4 | 106.4 | 127.4 | 127.4 |
| | | l1 | 36 | 45 | 45 | 60 | 65 70 | 87 | 139 | 139 | 139 |
| | | h1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 |
| | | l2 | 150 | 123 | 210 | 210 | 178 | 280 | 236 | 583 | 583 |
| Bore with keyway | form B3 as per DIN ISO 5210 and form E as per DIN 3210; form B2/B4 (dy max.) | d10 | 16 | 20 | 20 | 25 | 30 | 40 | 50 | 60 | |
| | | dy max. dy max. ⁶⁾ | 28 | 30 | 42 | 50 | 45 60 | 60 | 80 | 95 | |
| | | b4 | 5 | 6 | 6 | 8 | 8 | 12 | 14 | 18 | |
| | | t3 | 18.3 | 22.8 | 22.8 | 28.3 | 33.3 | 43.3 | 53.8 | 64.4 | |
| | | l1 | 36.5 | 45 | 52 | 60 | 65 70 | 80 | 139 | 139 | |
| | | h1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | |
| | | | | | | | | | | | |
| Hollow shaft with claw coupling | form C as per DIN 3338 and form C as per DIN 3210 | d12 | — | 42 | 42 | — | 60 | 80 | 100 | 120 | |
| | | d11 | — | 28 | 28 | — | 38 | 47 | 64 | 75 | |
| | | b1 | — | 14 | 14 | — | 20 | 24 | 30 | 40 | |
| | | h1 | — | 0 | 0 | — | 0 | 0 | 2 | 2 | |
| | | h11 | — | 9 | 9 | — | 10 | 12 | 11 | 13 | |
| | | l2 | — | 123 | 210 | — | 178 280 | 236 | 583 | 583 | |
| Free shaft end with featherkey | form D as per DIN 3210 | d8 | — | 20 | 20 | — | 30 | 40 | 50 | 60 | |
| | | l4 | — | 50 | 50 | — | 70 | 90 | 110 | 120 | |
| | | l5 | — | 55 | 55 | — | 76 | 97 | 117 | 127 | |
| | | b3 | — | 6 | 6 | — | 8 | 12 | 14 | 18 | |
| | | t2 | — | 22.5 | 22.5 | — | 33.0 | 43.0 | 53.5 | 64.0 | |

1) number of tapped holes d4 2) max. diameter for the spindle 3) max. diameter for the spindle, if spindle protection tube is necessary; see dimension d6max. (form A) 4) for version with spindle protection tube max. 50 mm 5) max. ø77 for spindle stroke ≥ 541 mm for form A resp. ≥ 348 mm for form B1 (dimensions from connection flange) 6) with adaptation flange (height on request) 7) 175 mm with output shaft form A

Technical Data

Dimensional drawing 2SA781., 2SA782.

R866861

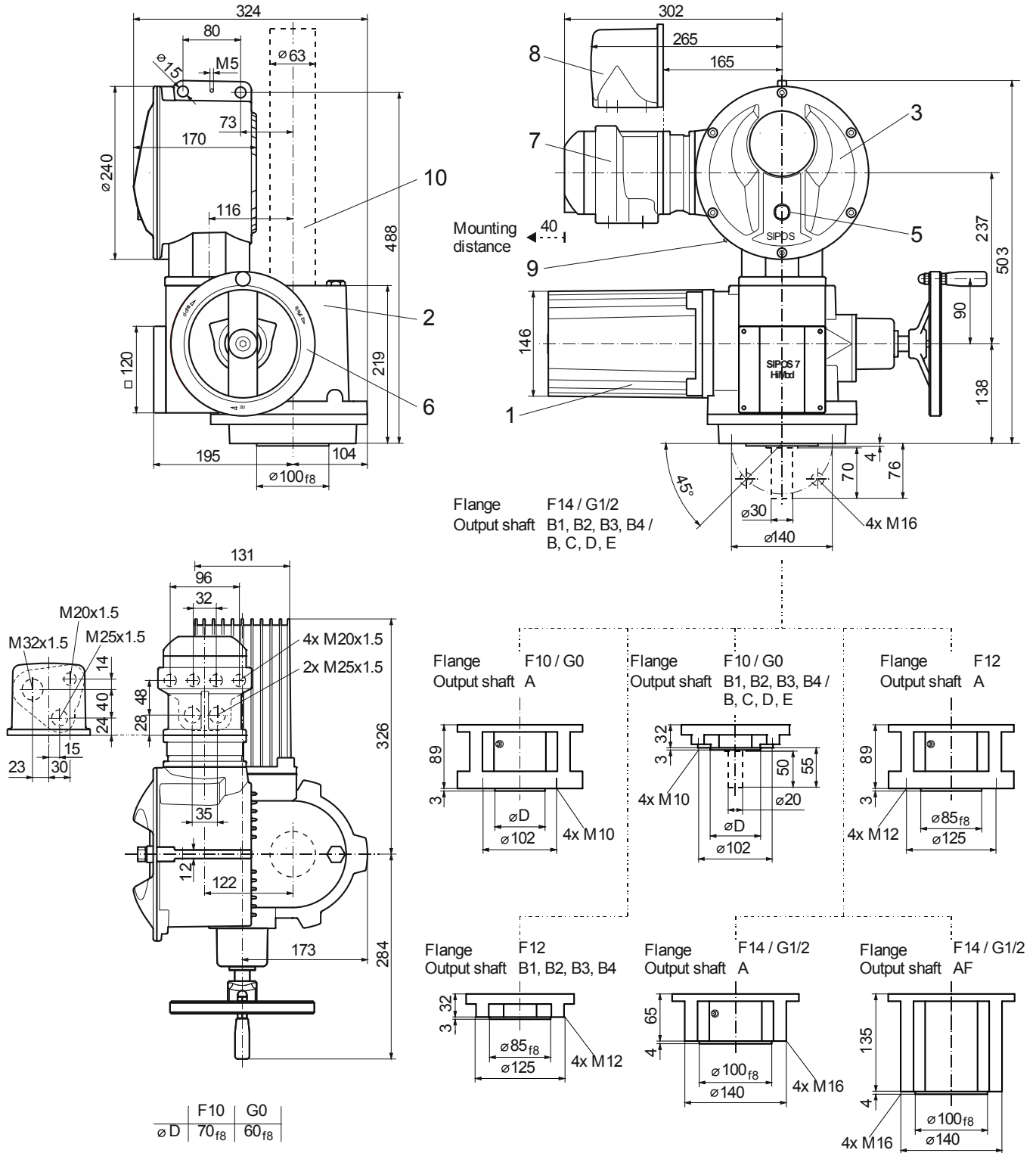


- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)

Technical Data

Dimensional drawing 2SA783., 2SA784.-C

R866862

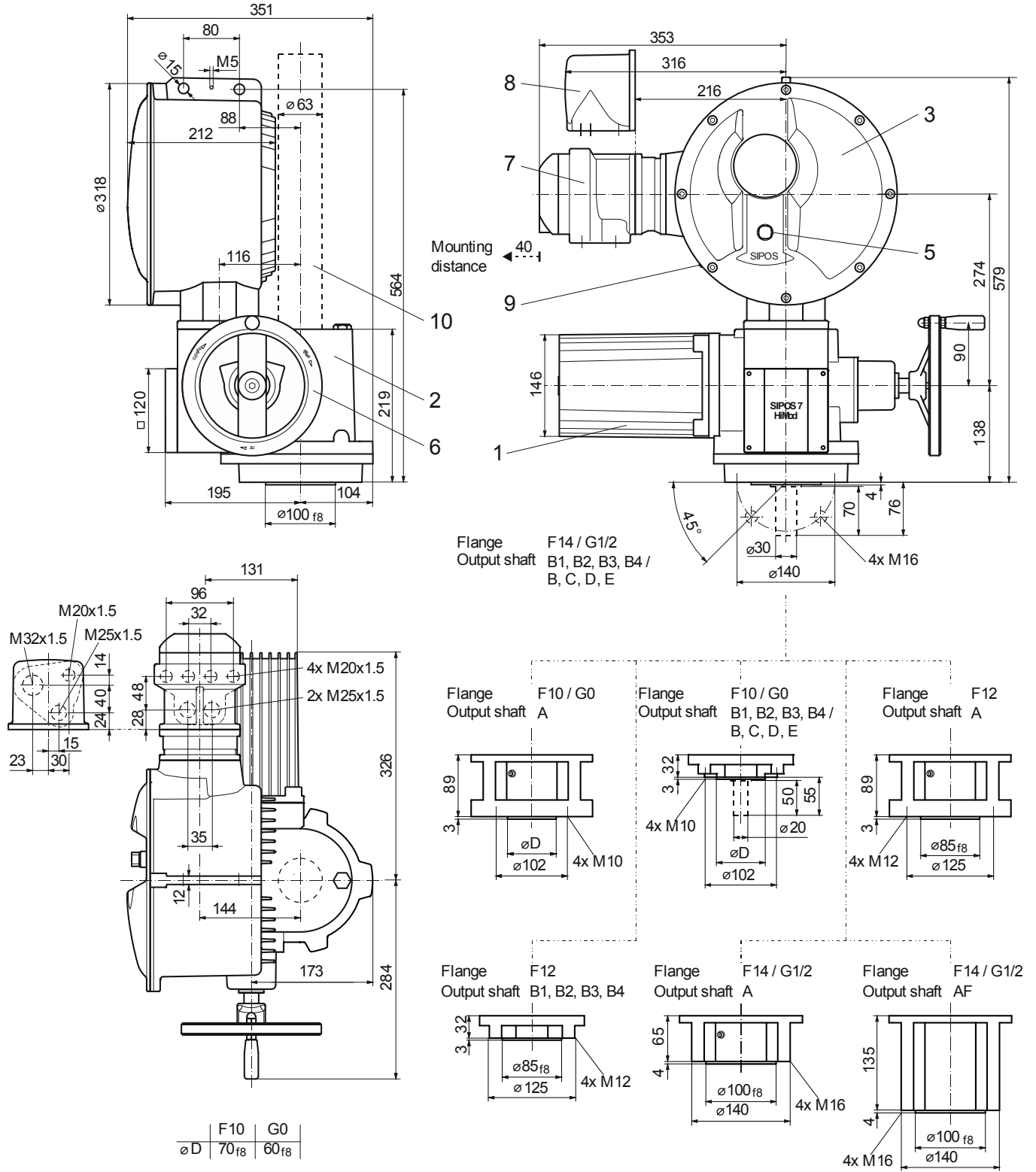


- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)

Technical Data

Dimensional drawing 2SA784.-D

R866863

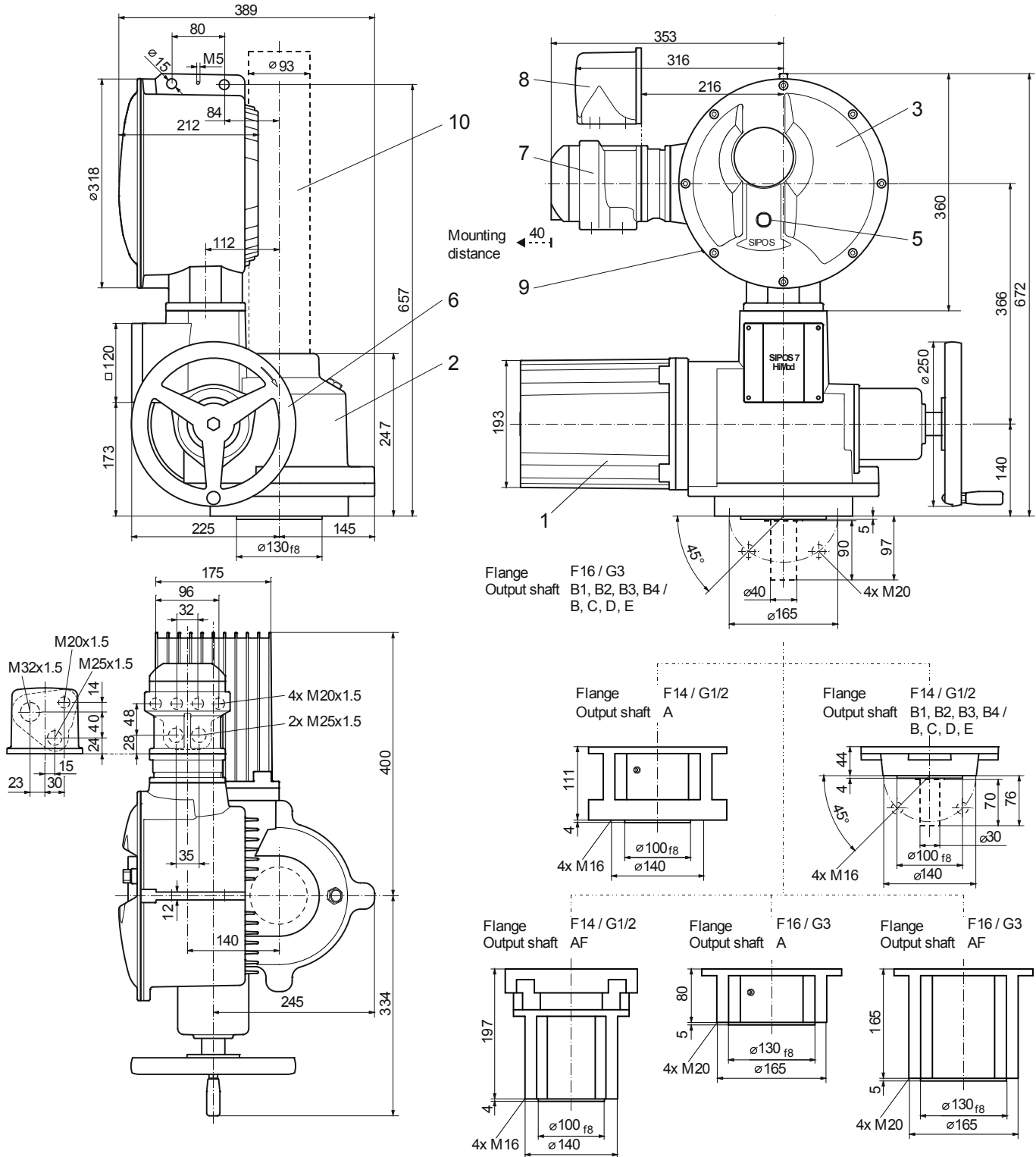


- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)

Technical Data

Dimensional drawing 2SA785., 2SA786.

R866864

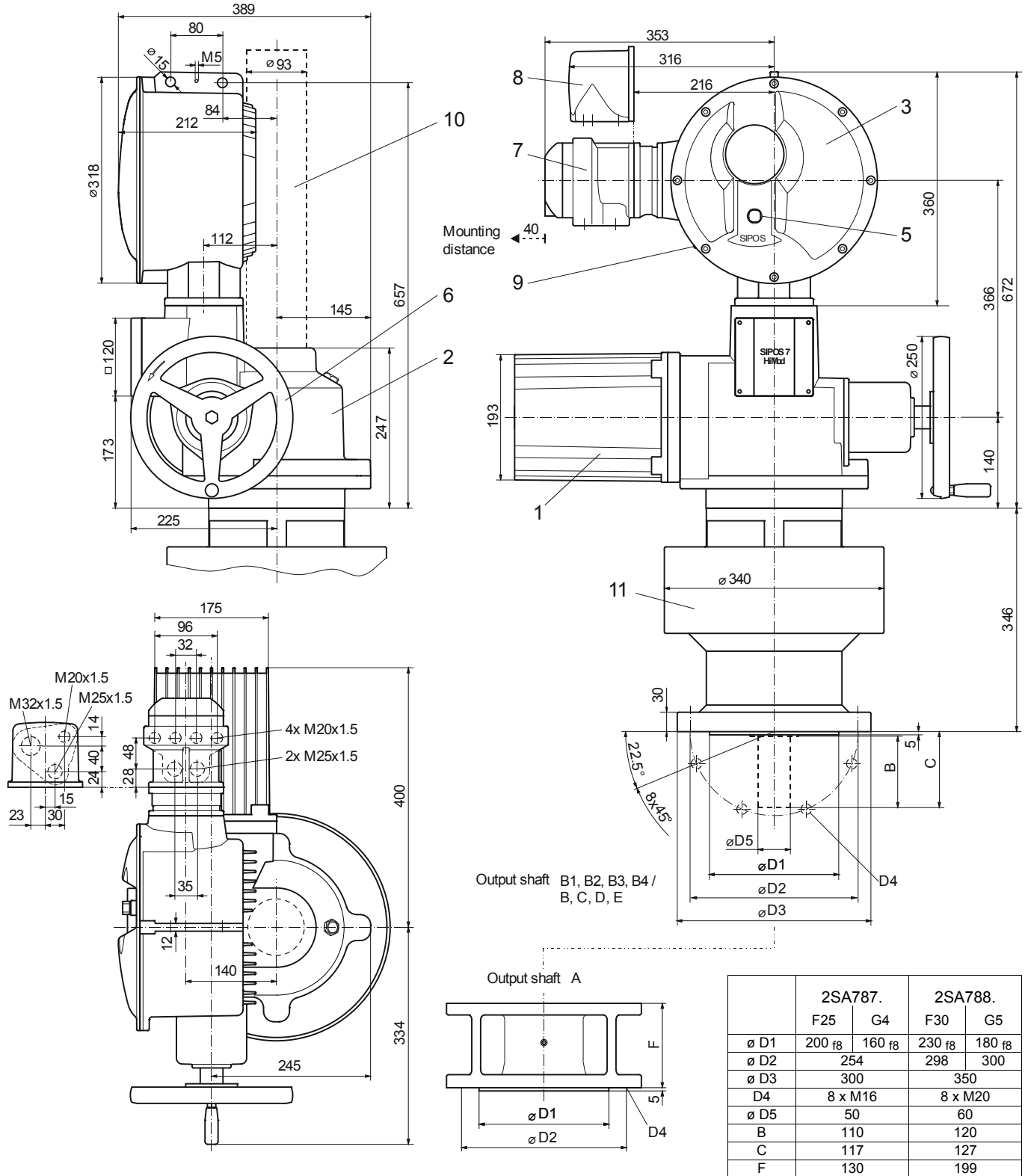


- | | | | | | |
|---|------------------|---|-----------------------|----|---|
| 1 | Motor | 5 | Local control station | 8 | Plug connection |
| 2 | Gear unit | 6 | Hand wheel | 9 | USB interface |
| 3 | Electronics unit | 7 | Field bus connection | 10 | Spindle protection tube (for length, see catalog) |

Technical Data

Dimensional drawing 2SA787., 2SA788.

R866865



- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4 Intermediate gear (supplied separately)
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)
- 11 Intermediate gear (supplied separately)

Technical Data

Electrical data – Power supply

Connection voltage U_N 1-phase, 110 – 115 V AC (40 – 70 Hz)

permissible voltage tolerance: -10% / +15%

| Type 2SA78.. | $n_{max.}$ [rpm] | $T_C max.$ [Nm] | Current (110 V) ^{2) 3)} | | Power P_N ⁴⁾ [kW] | Motor power [kW] | Fuse slow blowing [A] |
|-----------------|---------------------|--------------------|--|---|-----------------------------------|------------------------|-----------------------------|
| | | | Nominal current I_N ⁴⁾ [A] | $\approx I_{max.}$ ⁵⁾ [A] | | | |
| 1. -CB | 20 | 20 | 1.9 | 2.6 | 0.1 | 0.75 | 10 |
| 2. -CB | | 40 | 2.4 | 3.8 | 0.2 | | |
| 3. -CB | | 80 | 4.2 | 8.3 | 0.3 | | |

↓
small
electronics-
unit

Connection voltage U_N 1-phase, 220 – 230 V AC (40 – 70 Hz)

permissible voltage tolerance: -10% (-30%¹⁾ / +15%

| Type 2SA78.. | $n_{max.}$ [rpm] | $T_C max.$ [Nm] | Current (230 V) ^{2) 3)} | | Power P_N ⁴⁾ [kW] | Motor power [kW] | Fuse slow blowing [A] |
|-----------------|---------------------|--------------------|--|---|-----------------------------------|------------------------|-----------------------------|
| | | | Nominal current I_N ⁴⁾ [A] | $\approx I_{max.}$ ⁵⁾ [A] | | | |
| 1. -CD | 40 | 20 | 1.3 | 1.9 | 0.2 | 0.75 | 10 |
| | 80 | | 2.6 | 3.8 | 0.4 | | |
| 2. -DD | 40 | 40 | 1.7 | 2.8 | 0.2 | 0.75 | 10 |
| | 80 | | 3.4 | 5.6 | 0.4 | | |
| 3. -CD | 40 | 80 | 3.4 | 6.2 | 0.4 | 0.75 | 10 |

↓
small
electronics-
unit

Connection voltage U_N 3-phase, 190 – 200 V AC (40 – 70 Hz)

permissible voltage tolerance: -10% (-30%¹⁾ / +15%

| Type 2SA78.. | $n_{max.}$ [rpm] | $T_C max.$ [Nm] | Current (200 V) ^{2) 3)} | | Power P_N ⁴⁾ [kW] | Motor power [kW] | Fuse slow blowing [A] |
|-----------------|---------------------|--------------------|--|---|-----------------------------------|------------------------|-----------------------------|
| | | | Nominal current I_N ⁴⁾ [A] | $\approx I_{max.}$ ⁵⁾ [A] | | | |
| 1. -CJ | 40 | 20 | 0.9 | 1.4 | 0.2 | 0.75 | 6 |
| 2. -CJ | | 40 | 1.2 | 2.0 | 0.2 | | |
| 3. -CJ | | 80 | 2.5 | 4.5 | 0.4 | | |

↓
small
electronics-
unit

Connection voltage U_N 3-phase, 380 – 460 V AC (40 – 70 Hz)

permissible voltage tolerance: -10% (-30%¹⁾ / +15%

| Type 2SA78.. | $n_{max.}$ [rpm] | $T_C max.$ [Nm] | Current (400 V) ^{2) 3)} | | Power P_N ⁴⁾ [kW] | Motor power [kW] | Fuse slow blowing [A] |
|-----------------|---------------------|--------------------|--|---|-----------------------------------|------------------------|-----------------------------|
| | | | Nominal current I_N ⁴⁾ [A] | $\approx I_{max.}$ ⁵⁾ [A] | | | |
| 1. -CE | 40 | 20 | 0.5 | 0.7 | 0.2 | 0.75 | 6 |
| | 80 | | 1.0 | 1.4 | 0.4 | | |
| 2. -DE | 40 | 40 | 0.9 | 1.7 | 0.2 | 0.75 | 6 |
| | 80 | | 1.8 | 3.4 | 0.4 | | |
| 3. -CE | 40 | 80 | 1.2 | 1.8 | 0.5 | 1.50 | 10 |
| | 80 | | 2.4 | 3.6 | 1.0 | | |
| 4. -DE | 40 | 175 | 1.6 | 3.0 | 0.7 | 3.00 | 10 |
| | 80 | | 3.2 | 6.0 | 1.4 | | |
| 5. -CE | 40 | 350 | 3.0 | 5.0 | 1.3 | 5.50 | 16 |
| | 80 | | 6.0 | 10.0 | 2.6 | | |
| 6. -DE | 40 | 700 | 5.1 | 9.5 | 2.3 | 5.50 | 16 |
| 7. -AE | 10 | 1400 | 3.0 | 5.0 | 1.3 | 3.00 | 10 |
| 8. -AE | | 2800 | 5.1 | 9.5 | 2.3 | 5.50 | 16 |

↓
small
electronics-
unit
↑
big
electronics-
unit

Motor operation

The frequency converter generates a frequency/amplitude adjustable 3-phase AC voltage for the motor from the single or 3-phase main voltage supply. Motor speed and thus actuator output speed are internally adjusted via the frequency.

Motor protection

The motor has a thermistor-type motor protection against thermal damage. The winding temperature is monitored continuously by the microcontroller. The response after exceeding the permitted winding temperature is programmable.

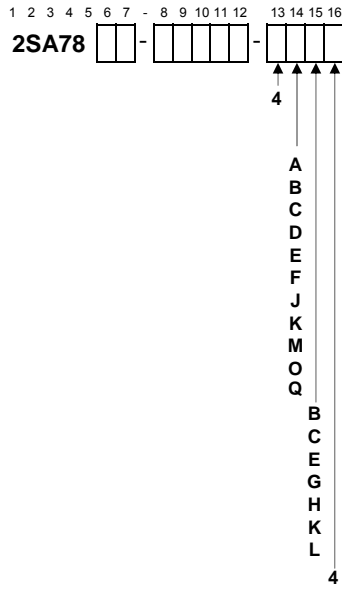
Motor space heater

The microcontroller continuously monitors the current winding temperature by means of a temperature sensor integrated in the motor winding. When the motor space heater is activated by the program, the motor winding is heated by a DC voltage via the frequency converter depending on the cooling characteristic of the motor winding when the motor is switched off.

- 1) full torque for voltage fluctuations between -30 % and +15 %
(in case of undervoltage from U_N -30% to -10%, operation may be performed at reduced output speed n)
- 2) lower voltage increases the current, higher voltage reduces the current
- 3) starting current $I_A \leq$ nominal current I_N
- 4) at 35% of the maximum torque $T_C max.$
- 5) maximum current $I_{max.}$ is present for torque-dependent cut-off mode and for a running torque of 70% the maximum torque $T_C max.$

Technical Data

Electrical data – Control and feedback signals



5 binary inputs 24/48 V DC (OPEN, CLOSE, STOP, EMERGENCY, Mode), 8 binary outputs 24/48 V DC, 1 analog output 0/4 – 20 mA (actual position value), 1 analog input 0/4 – 20 mA (position setpoint), multicolor graphic display with status indication

A electronics unit without hardware extension
 B relay board with 8 outputs
 C PROFIBUS DP 1 channel - with V1 and V2 services
 D PROFIBUS DP 2 channel - with V1 and V2 services
 E MODBUS RTU 1 channel
 F MODBUS RTU 2 channel
 J HART
 K HART + relay board
 M MODBUS TCP/IP 1 channel
 O prepared for
 Q remote control unit RCU + MODBUS RTU 1 channel

B positioner (standard)
 C process controller
 E positioner + travel dependent output speed adjustment
 G positioner + external analog output speed setpoint
 H positioner with split-range functionality
 K positioner + travel dependent freely adjustable positioning times
 L process controller + travel dependent freely adjustable positioning times

4 round plug

Signal assignment for the binary outputs

- for HiMod (also refer to wiring diagrams, signals 1-8):

| Output | default setting | with option „Y12“ | with option „Y15“ | with option „Y90“ |
|--------|-------------------------|----------------------------|----------------------------|----------------------------|
| 1 | End position OPEN NO | Intermediate contact OP NO | Intermediate contact OP NO | Intermediate contact OP NO |
| 2 | End position CLOSED NO | Intermediate contact CL NO | Intermediate contact CL NO | Intermediate contact CL NO |
| 3 | Torque OPEN reached NC | Ready+Remote NO | Torque OPEN reached NO | Torque OPEN reached NO |
| 4 | Torque CLOSE reached NC | Torque OPEN reached NC | Torque CLOSE reached NO | Torque CLOSE reached NO |
| 5 | Fault NC | Torque CLOSE reached NC | Ready+Remote NO | Local NC |
| 6 | Local NO | Local NO | Local NO | Fault NC |
| 7 | Blinker NO | Warning motor temp. NO | Blinker NO | Not used |
| 8 | Warning motor temp. NC | Fault external voltage NC | Warning motor temp. NO | Not used |

NO = active high, NC = active low

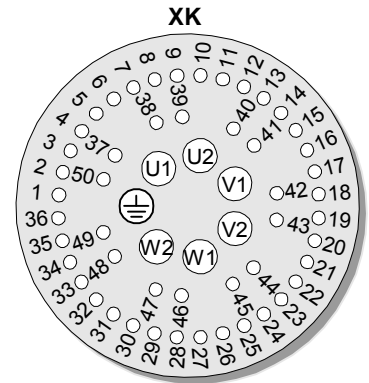
Optional free assignment of outputs, NO/NC optional (can be changed locally)

| |
|------------------------------|
| End position CLOSED |
| End position OPEN |
| Torque CLOSE reached |
| Torque OPEN reached |
| Torque CL/OP reached |
| Fault |
| Blinker |
| Ready |
| Ready+Remote |
| Local |
| Intermediate contact CL |
| Intermediate contact OP |
| Fault motor temperature |
| Warning motor temp. |
| Fault external voltage |
| Maintenance |
| Run indication CLOSE |
| Run indication OPEN |
| Run indication OPEN/CLOSE |
| Blinker+ End position CLOSED |
| Blinker+ End position OPEN |
| Travel end CLOSE |
| Travel end OPEN |

Technical Data

Connections at round plug (plug assignment)

| Inputs and outputs | | HiMod |
|---|-----------|--|
| Binary | Inputs | 2, 3, 4, 5, 9, 10 and 27 |
| | Outputs | 16 ¹⁾ , 17, 19, 20, 21, 22, 23, 24, 25 and 26 |
| Analog | Inputs | 11 and 12, 13 and 14 (option) |
| | Outputs | 7 and 8, 48, 49 and 50 (option) |
| Relay outputs (option) | | 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 42, 43, 44, 45, 46 und 47 |
| Fieldbus (option) | 1 channel | 28, 29, 30 and 31 |
| | 2 channel | 28, 29, 30, 31, 32, 33, 34 and 35 |
| Voltage output „P24 int.“ resp. „P24 gal.“ | | 1, 6, 15 ¹⁾ and 18 ¹⁾ |
| Auxiliary 24 VDC supply for electronics unit „P24 ext.“ | | 38 and 39 |



Plug assignment for the external round plug connection

Position recording

Position recording is performed via a non-intrusive position encoder (niP) with microcontroller evaluation. The travel recording (max. 353,000 revolutions/stroke) of this magnetic position encoder is contactless and stored safe from power failure; it is therefore also functioning in manual operation during power failure (without battery). Accuracy at e.g. 36 revs/stroke: 0.002 %, with a resolution of 0.0005 %.

Positioner

Defining an analog position setpoint (0/4–20mA) for the positioner results in precise control of the position corresponding to this value.

The **positioner** works adaptively. This leads to a continuous automatic adaptation of the threshold value to the controlled system:

| | |
|--------------------------------|---|
| hysteresis | 0.4% of the travel |
| response threshold (dead band) | adjustable, default setting: 0.2 to 2.5 % of the travel |
| upward adaptation | response threshold is enlarged by 0.1 %, if an OPEN ==> CLOSE ==> OPEN command sequence occurs within 6 seconds |
| downward adaptation | response threshold is reduced by 0.01 %, when no control has taken place within 10.8 seconds |

1) Not applicable for version with relay board.

Technical Data

Power and consumption values

Binary inputs and outputs

- binary inputs** - Control inputs OPEN, CLOSED, STOP, Emergency and Mode
- binary outputs** - 8 binary electronic outputs for signals

All binary inputs and outputs are galvanically isolated and potential-free.
Binary outputs are resistant to both short-circuits and overloads.

| | | | Input | | Output | |
|-------|-------------------------------|--------|---------|---------|----------|---------|
| | | | 24 V DC | 48 VDC | 24 V DC | 48 VDC |
| Level | L - potential (low -) | [V DC] | 0 – 4 | 0 – 4 | 0 – 2.5 | 0 – 2.5 |
| | H - potential (high -) | [V DC] | 16 – 30 | 16 – 60 | 18 – 30 | 18 – 60 |
| | Current (per input or output) | [mA] | 4 – 7 | 7 – 15 | max. 100 | max. 50 |
| | Resistance | [Ω] | 4000 | 4000 | max. 10 | max. 10 |

Analog inputs and outputs

- analog inputs** - AE1: 0/4-20mA
- AE2: 0/4-20mA (add-on PCB)
- analog outputs** - AA1: Position actual value (0/4-20mA) active, i.e. with internal power supply 24 V DC
- AA2: Position actual value (0/4-20mA) passive, i.e. with external power supply 24 V DC (add-on PCB)

Analog inputs and outputs are galvanically isolated.
AE2 and AA2 are located on a common add-on PCB and have the same potential.
For existing add-on PCB (AE2+AA2), assignment of AE1 and AE2 analog inputs as well as AA1 and AA2 analog outputs is freely programmable.
Analog outputs are resistant to both short-circuits and overloads.

| | | Input | Output |
|-------------------|------|------------------|------------------|
| Current | [mA] | 0 – 20 (max. 24) | 0 – 20 (max. 21) |
| Resistance / load | [Ω] | 45 | max. 600 |

Ranges 0-20mA or 4-20mA with rising or falling level can be adjusted.

Relay outputs

Relay outputs are galvanically isolated.

| | DC for resistive load | | | AC |
|------------------------|--------------------------|------------------|--------|-------|
| | max. switching capacity | 180 W (for 30 V) | | |
| max. switching voltage | 30 V | 50 V | 300 V | 250 V |
| max. switching current | 6 A | 0.6 A | 0.15 A | 6 A |

The relay board has 8 relay outputs (5 NO, 1 NC and 2 change-over contacts).

Internal 24 V power supply

Binary inputs and outputs are galvanically isolated from the electronics in case of internal 24V DC power supply via „P24 gal.“.

External 24 V power supply

During power failure, both actual position value and device state are still sent via the external 24V DC supply „P24 ext.“ to the binary signal outputs (signals 1-8) and communication via COM-SIPOS or fieldbus is available.
During mains operation, own supply via actuator.

| External 24V power supply | Input P24 ext. | Current consumption | |
|--|----------------|--------------------------------------|-----------|
| | | min. 20 V (21 V with relay board) | typ. 24 V |
| Σ current standard version | [mA] | 165 | 150 |
| additional load: | | | |
| with PROFIBUS DP / Modbus RTU, 1 channel | [mA] | +20 | +20 |
| with PROFIBUS DP / Modbus RTU, 2 channel | [mA] | +40 | +40 |
| with Modbus TCP/IP | [mA] | +50 | +50 |
| with HART | [mA] | +18 | +21 |
| with relay board | [mA] | +50 | +60 |
| with actual position value | [mA] | +20 | +20 |
| with Bluetooth | [mA] | +10 | +10 |

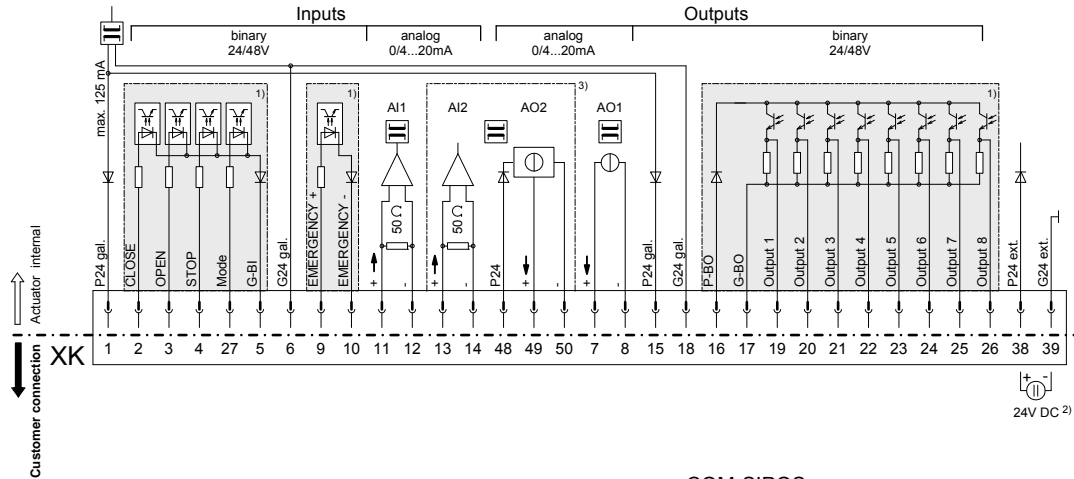
Technical Data

Wiring diagram

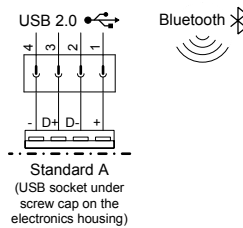
HiMod

Y070.251

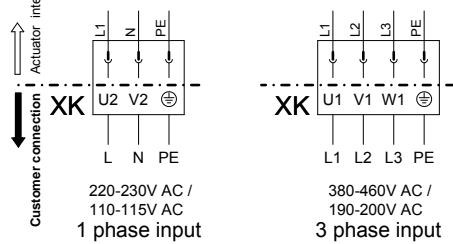
Connection control and feedback signals



COM-SIPOS



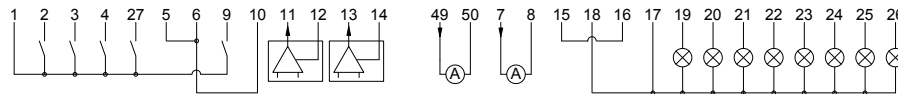
Connection power supply



Customer connection - wiring examples:

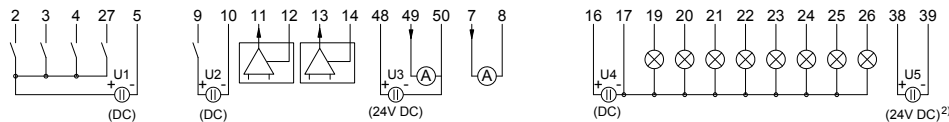
Wiring example I: „internal 24V DC supply“

(here all inputs and outputs are supplied internally from the electronics unit with 24V DC)

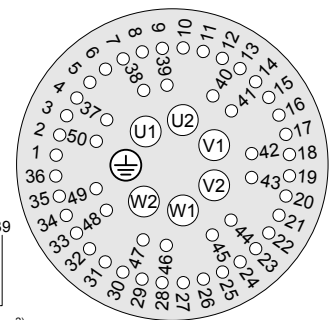


Wiring example II: „external 24/48V DC supplies“

(in this example all galvanically isolated areas are supplied externally from different 24/48V DC power sources)



Plug assignment XK



- 1) galvanically isolated areas: can be supplied from different sources with 24/48V DC
- 2) auxiliary 24V DC supply for electronics unit (if required)
(In case of mains failure both actual position value and actuator status (binary outputs 1-8) will continued to be signalled.
Communication via COM-SIPOS – changes of parameters resp. download of actuator data – is possible.)
- 3) option

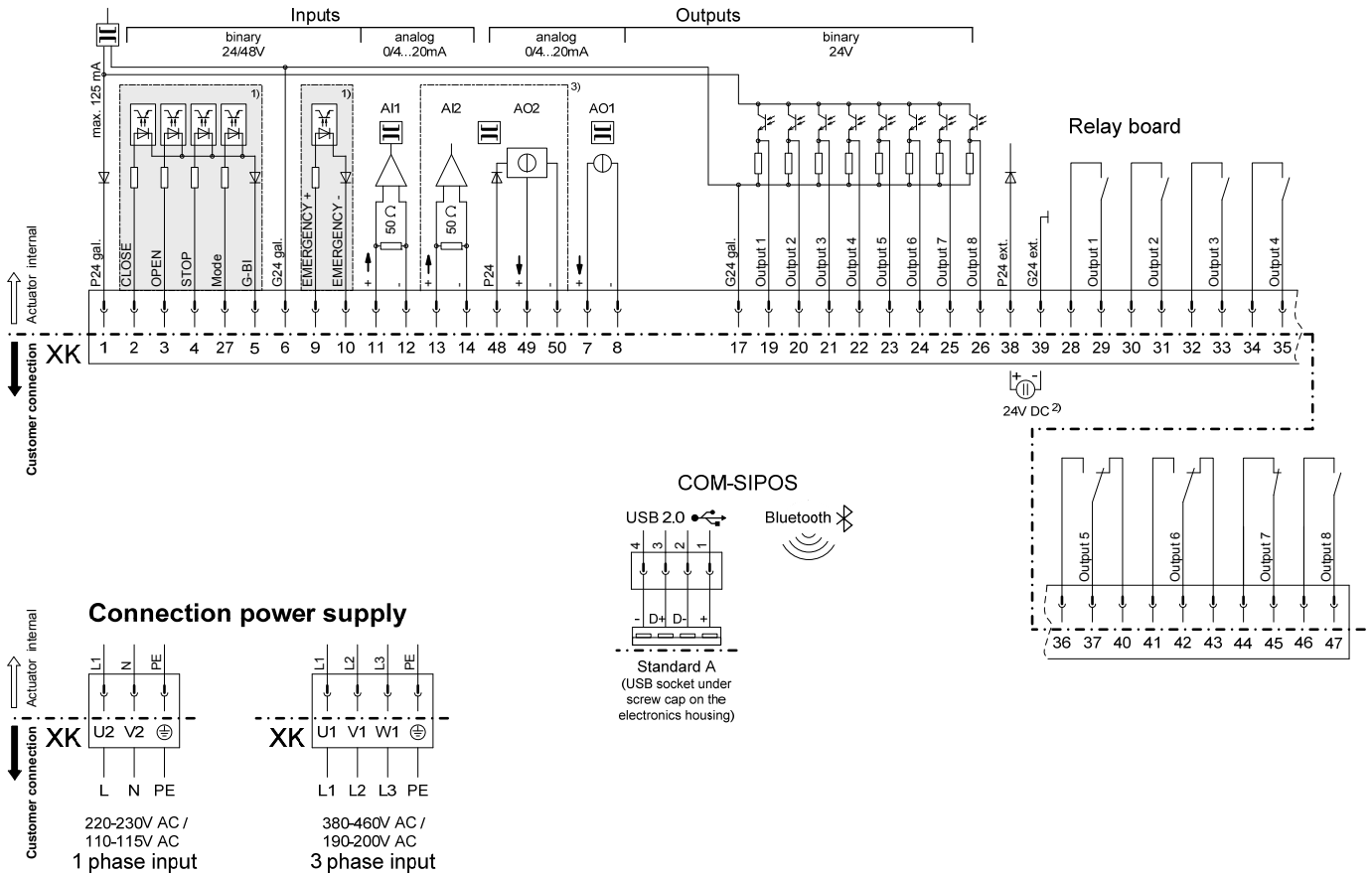
Wire cross-section max.:
 - 6 mm² Power supply
 - 2.5 mm² Control and feedback signals
 The control/feedback wire **must** be shielded!

Technical Data

Wiring diagram **HiMod with relay board**

Y070.252

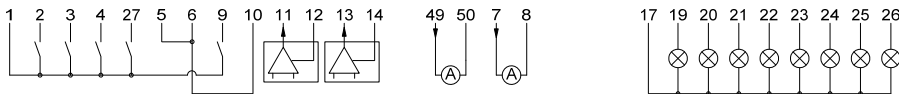
Connection control and feedback signals



Customer connection - wiring examples:

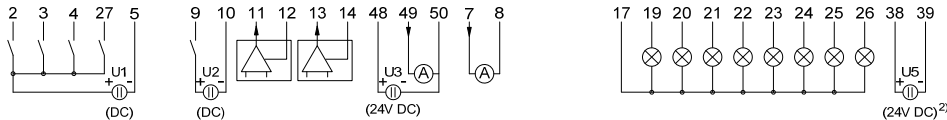
Wiring example I: „internal 24V DC supply“

(here all inputs and outputs are supplied internally from the electronics unit with 24V DC)

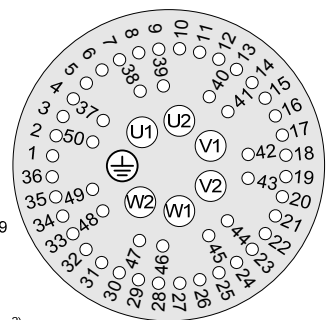


Wiring example II: „external 24/48V DC supplies“

(in this example all galvanically isolated areas are supplied externally from different 24/48V DC power sources)



Plug assignment XK



- 1) galvanically isolated areas: can be supplied from different sources with 24/48V DC
- 2) auxiliary 24V DC supply for electronics unit (if required)
(In case of mains failure both actual position value and actuator status (binary outputs 1-8) will continued to be signalled. Communication via COM-SIPOS – changes of parameters resp. download of actuator data – is possible.)
- 3) option

Wire cross-section max.:

- 6 mm² Power supply
- 2.5 mm² Control and feedback signals

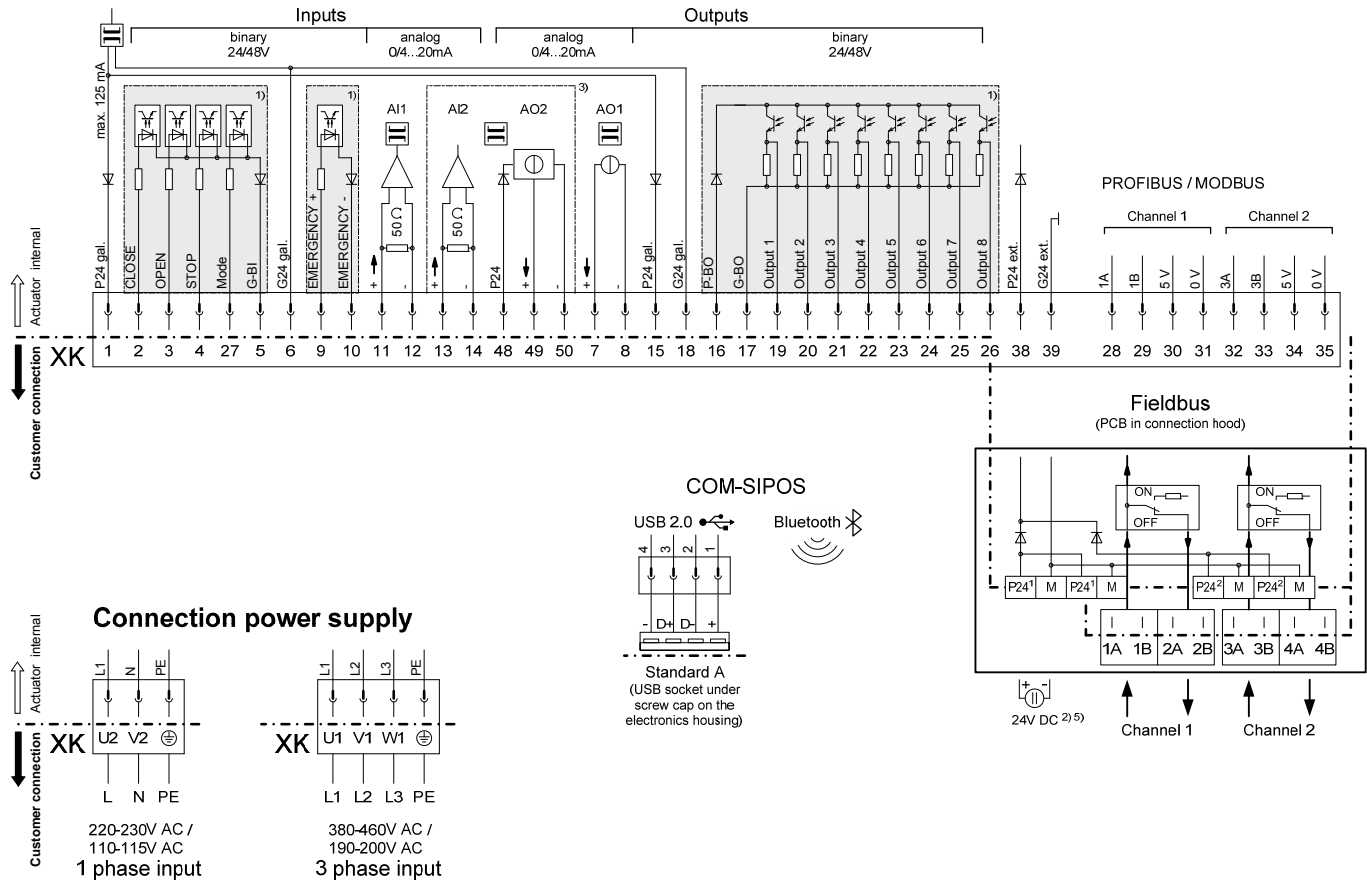
The control/feedback wire **must** be shielded!

Technical Data

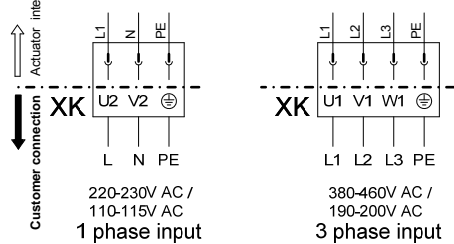
Wiring diagram **HiMod with Fieldbus**

Y070.253

Connection control and feedback signals



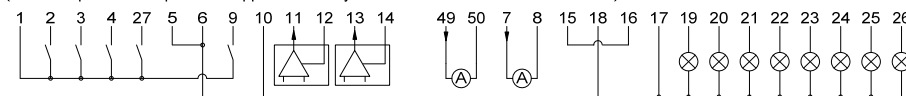
Connection power supply



Customer connection - wiring examples:

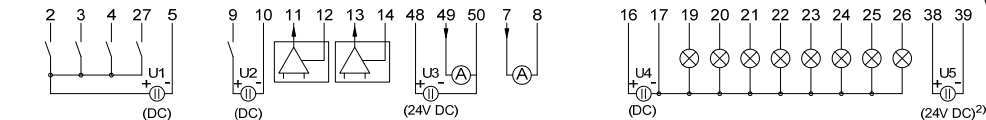
Wiring example I: „internal 24V DC supply“

(here all inputs and outputs are supplied internally from the electronics unit with 24V DC)

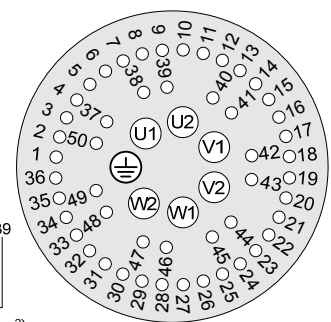


Wiring example II: „external 24/48V DC supplies“

(in this example all galvanically isolated areas are supplied externally from different 24/48V DC power sources)



Plug assignment XK



- 1) galvanically isolated areas: can be supplied from different sources with 24/48V DC
- 2) auxiliary 24V DC supply for electronics unit (if required)
(In case of mains failure both actual position value and actuator status (binary outputs 1-8) will continued to be signalled.
Communication via COM-SIPOS or fieldbus – changes of parameters resp. download of actuator data – is possible.)
- 3) option
- 5) up to 4 connectors P24 and M on the fieldbus connection PCB

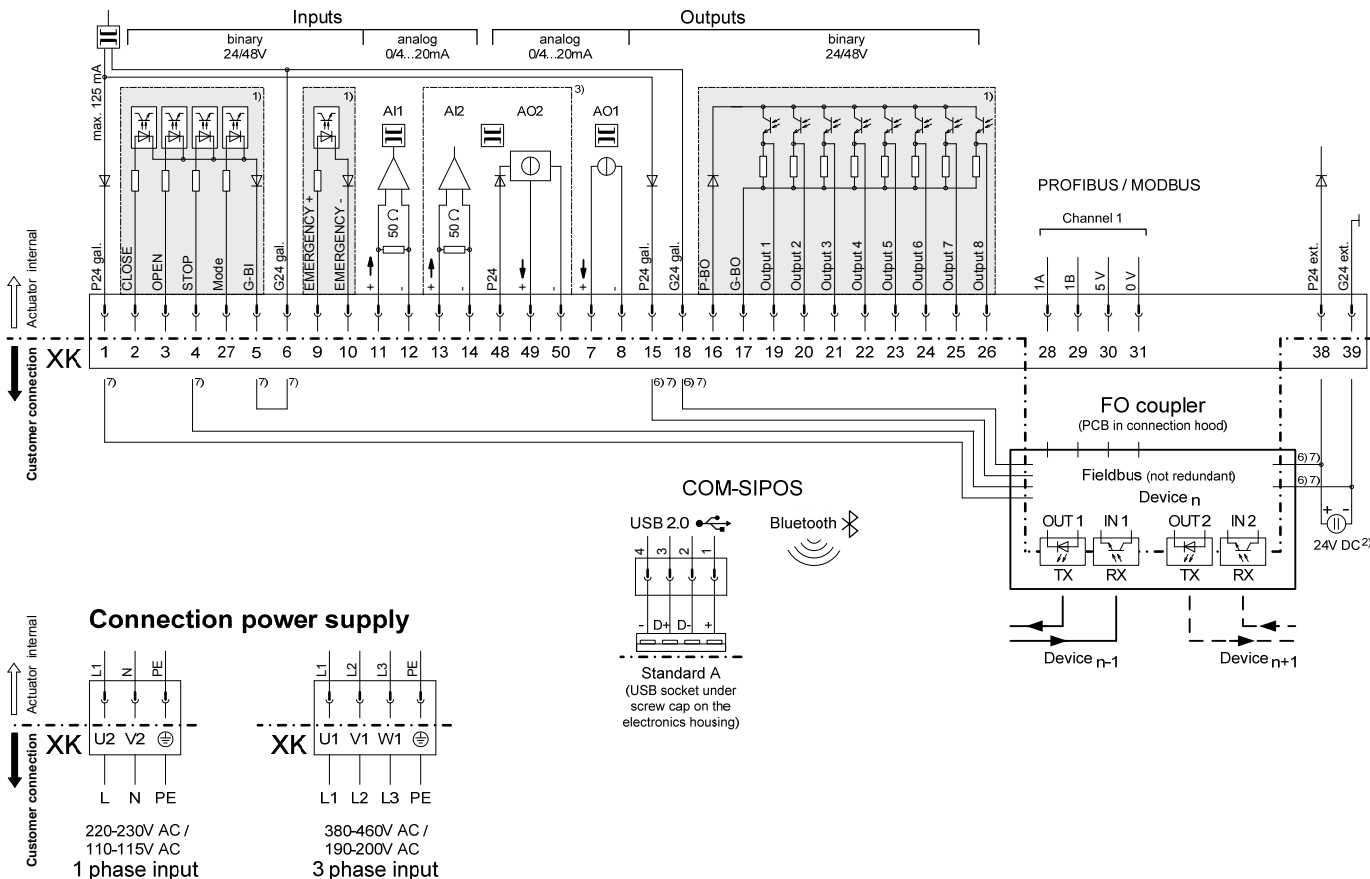
Wire cross-section max.:
 - 6 mm² Power supply
 - 2.5 mm² Control and feedback signals
 The control/feedback wire **must** be shielded!

Technical Data

Wiring diagram **HiMod with Fieldbus and FO**

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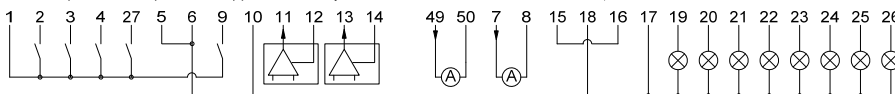
Connection control and feedback signals



Customer connection - wiring examples:

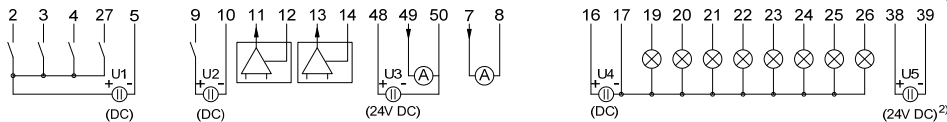
Wiring example I: „internal 24V DC supply“

(here all inputs and outputs are supplied internally from the electronics unit with 24V DC)

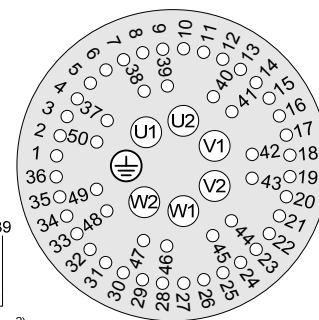


Wiring example II: „external 24/48V DC supplies“

(in this example all galvanically isolated areas are supplied externally from different 24/48V DC power sources)



Plug assignment XK



- 1) galvanically isolated areas: can be supplied from different sources with 24/48V DC
- 2) auxiliary 24V DC supply for electronics unit (if required)
(In case of mains failure both actual position value and actuator status (binary outputs 1-8) will continued to be signalled.
Communication via COM-SIPOS or fieldbus – changes of parameters resp. download of actuator data – is possible.)
- 3) option

- 6) factory-wired connection cable only with option „C17“ (FO in linear or star topology)
- 7) factory-wired connection cable only with option „C18“ (PROFIBUS, FO in ring topology)

Wire cross-section max.:

- 6 mm² Power supply
- 2.5 mm² Control and feedback signals

The control/feedback wire **must** be shielded!