

# Technical Data

## Electric Rotary Actuators 2SA78 for continuous modulating duty



HiMod

<b>Contents</b>		<b>Page</b>
General data	Mounting position, duty classifications, noise level, paint finish and corrosion protection, lubrication, degree of protection, vibration performance, ambient temperature, installation altitude	2 - 3
Mechanical data	<ul style="list-style-type: none"> <li>• Actuating torque, tripping torque, manual force, flange size, output shaft design, output speed, position recording</li> <li>• Flange and output shaft dimensions</li> <li>• Dimensional drawings</li> </ul>	4 - 5  6  7 - 11
Electrical data	<ul style="list-style-type: none"> <li>• Power supply</li> <li>• Control and feedback signals</li> <li>• Wiring diagrams</li> </ul>	12  13 - 15  16 - 19

## 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..-

- Continuous modulating duty, class **D** according to EN 15714-2
- 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. It is applied with a minimum coating thickness of 60 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 epoxidic 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 <b>C5</b>	Very high corrosion protection, corrosivity category <b>C5</b> <b>with long protection time</b> >> 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

## Technical Data

### 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

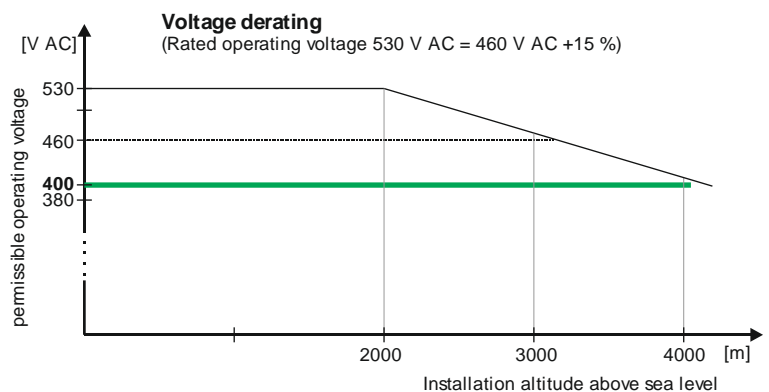
There are no functional restrictions for the temperature range of **-20 °C to +70 °C**. Lower or higher temperatures on request!

### 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 %).

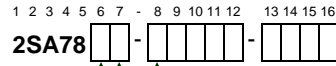
Technical Data

Mechanical data

Tripping torque

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

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						0	
F10	G0	10-20	20-40	40-80	87-122				Dimensions for A-shaft (d6), B1-shaft (d5) and C-shaft (d11)	
F12	-			40-80	87-175					
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	5
F30	G5							1400-2800	see page 8	6

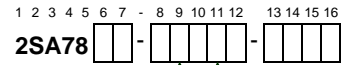
Dimensions to flanges and output shafts, see page 6

Output shaft design

form	DIN 1)	Output shaft with	Order-no. with
A	ISO 5210 103 2)	threaded bush	„ - Z " + Y18
B1	ISO 5210	bore with keyway	
C	3338	claw coupling	
B3	ISO 5210	bore with keyway	
B2 / B4 3)	ISO 5210	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 <sup>1)</sup>	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 <sub>min.</sub> – n <sub>max.</sub> )	adjustable in 2.5% increments between 12.5 - 100% n <sub>max.</sub> [rpm]							
	12.5%	...						35%
1.25 – 10	1.25	1.5	1.75	...	<b>3.5</b>	...	9.75	10
5 – 40	5	6	7	...	<b>14</b>	...	39	40
10 – 80	10	12	14	...	<b>28</b>	...	78	80

35% n<sub>max.</sub> 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“**

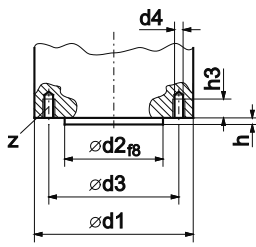
The non-intrusive version has no signaling gear. The exact number of rotations for the travel (max. 353.000 rev/stroke) are automatically determined and saved when approaching both end positions during end position adjustment.

2

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

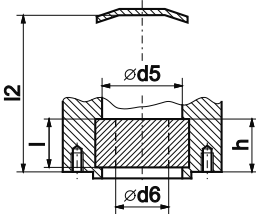
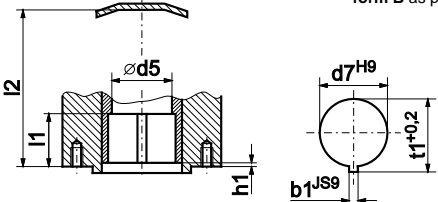
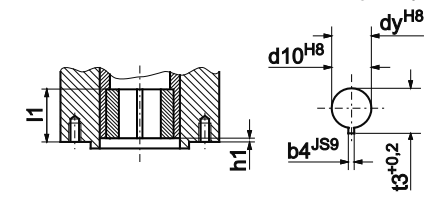
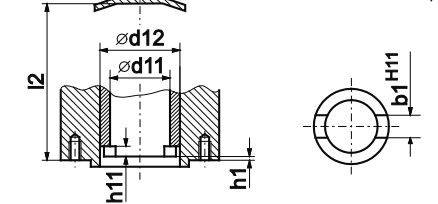
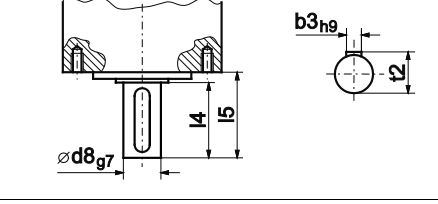
**Technical Data**

**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 —	F10 —	F12	F14 1/2	F16 3	F25 —	F30 —	F30 —
d1	90	125	125 <sup>7)</sup>	150 <sup>7)</sup>	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 <sup>1)</sup>	4	4	4	4	4	4	4	8		
h	3	3	3	3	4	5	5	5		
h3	12	17	17	20	25	32	24	30		

**Output shaft dimensions**

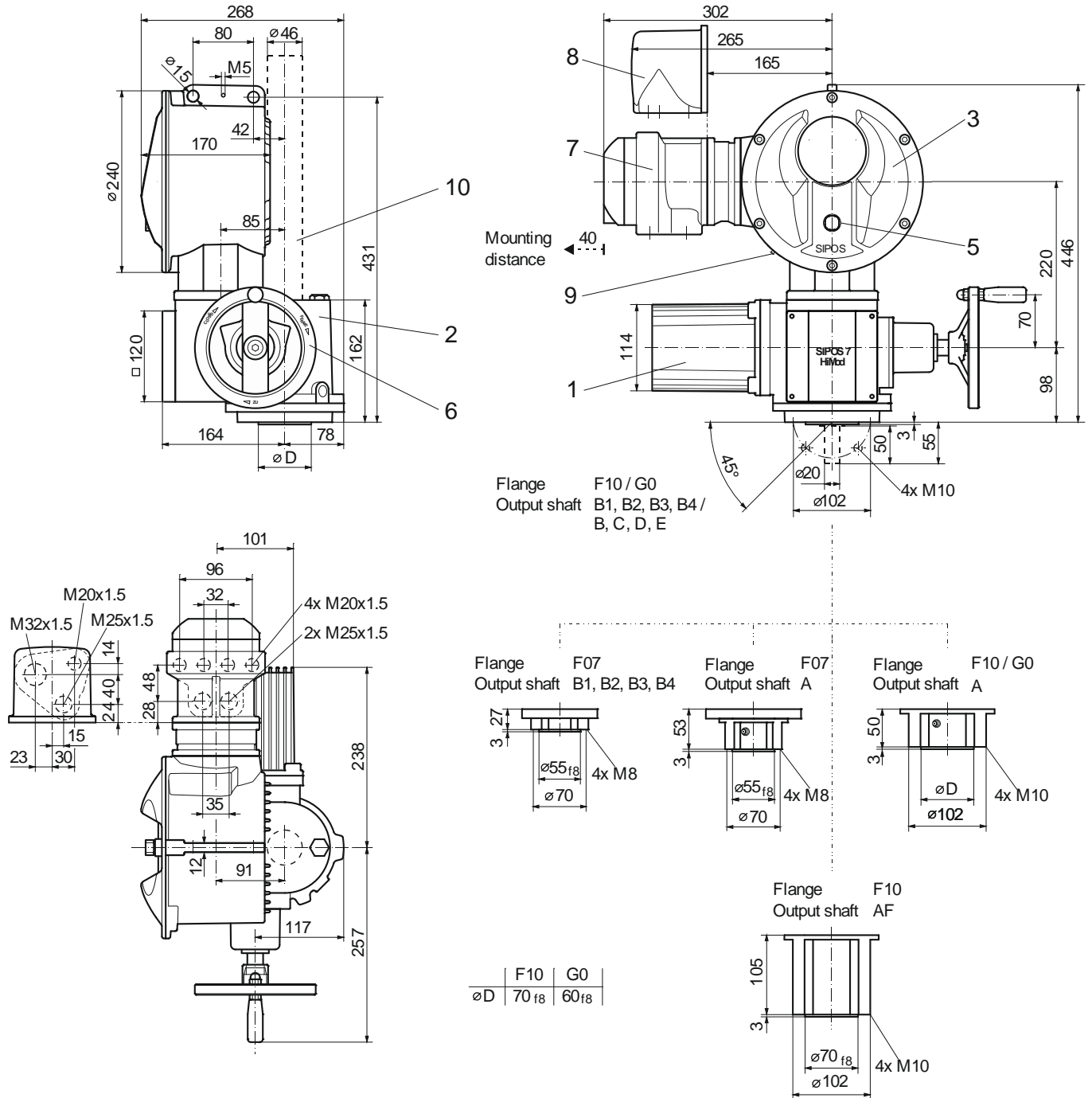
<b>Hollow shaft with threaded bush</b> 	form A as per DIN ISO 5210 and form A as per DIN 3210	d6 max. <sup>2)</sup>	26	32	48	48	52 <sup>4)</sup>	65	75	77	80 <sup>5)</sup>
		d5	32	34	55	55	55	80	80	80	92
		h	38	48	86	86	62	108	77	126	155
		l	37	47	85	85	61	108	76	126	155
		l2	175	173	267	267	243	347	316	691	782
<b>Bore with keyway</b> 	form B1 as per DIN ISO 5210 and form B as per DIN 3210	d7	28	42	42	50	60	80	100	120	
		d5 <sup>3)</sup>	28	34	42	50	55   60	80	80	80	
		b1	8	12	12	14	18	22	28	32	
		t1	31.3	45.3	45.3	53.8	64.4	85.4	106.4	127.4	
		l1	36	45	45	60	65   70	87	139	139	
		h1	0	0	0	0	0	0	2	2	
		l2	150	123	210	210	178   280	236	583	583	
<b>Bore with keyway</b> 	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.	28	30	42	50	45   60	60	80	95	
		dy max. <sup>6)</sup>	—	50	—	—	60	—	70	100	
		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	
<b>Hollow shaft with claw coupling</b> 	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	
<b>Free shaft end with featherkey</b> 	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	

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

Technical Data

Dimensional drawing 2SA781., 2SA782.

R866861

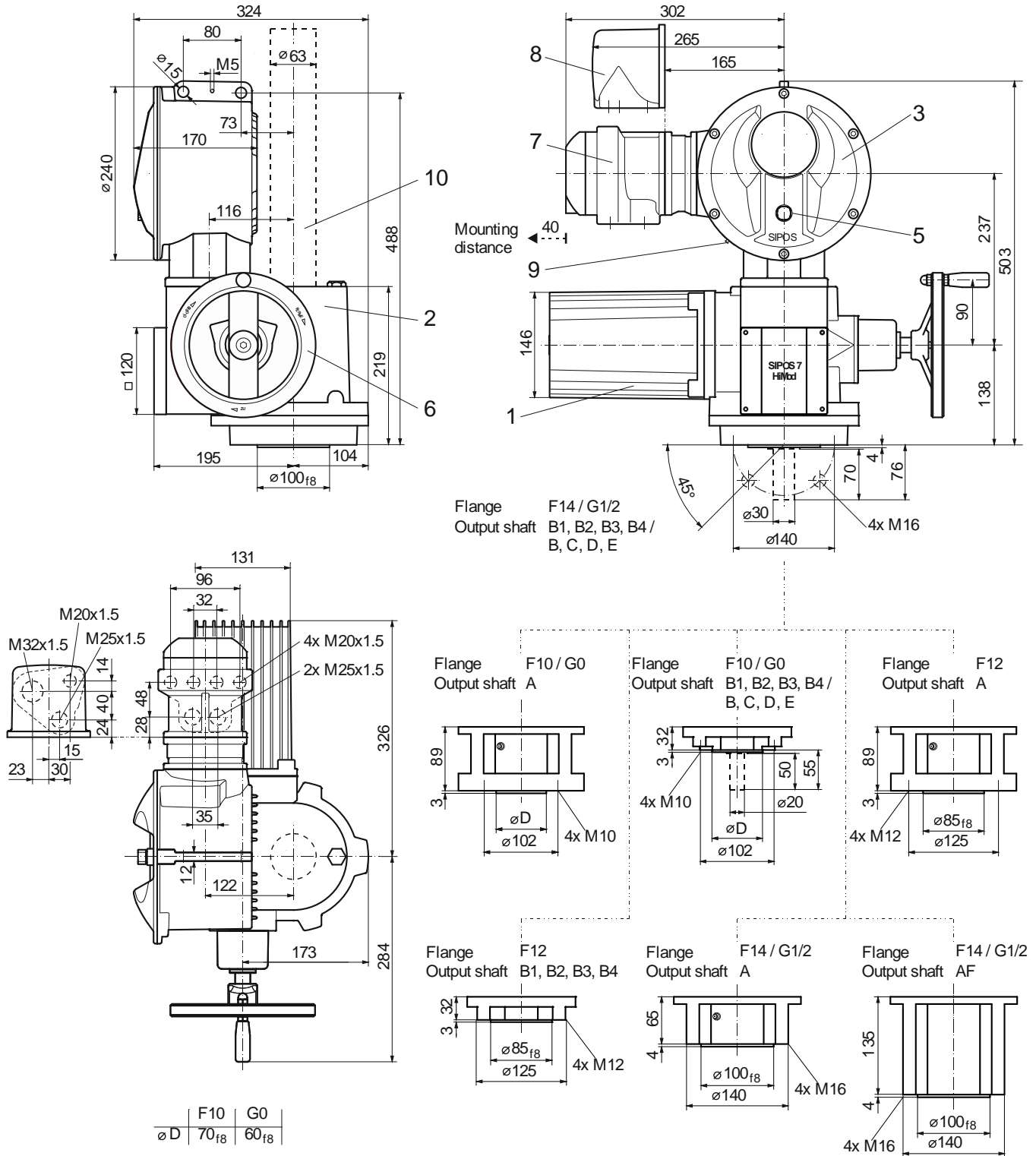


- |                    |                         |  |
|--------------------|-------------------------|--|
| 1 Motor            | 5 Local control station | 8 Plug connection                                    |
| 2 Gear unit        | 6 Hand wheel            | 9 USB interface                          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

Technical Data

Dimensional drawing 2SA783., 2SA784.-C

R866862



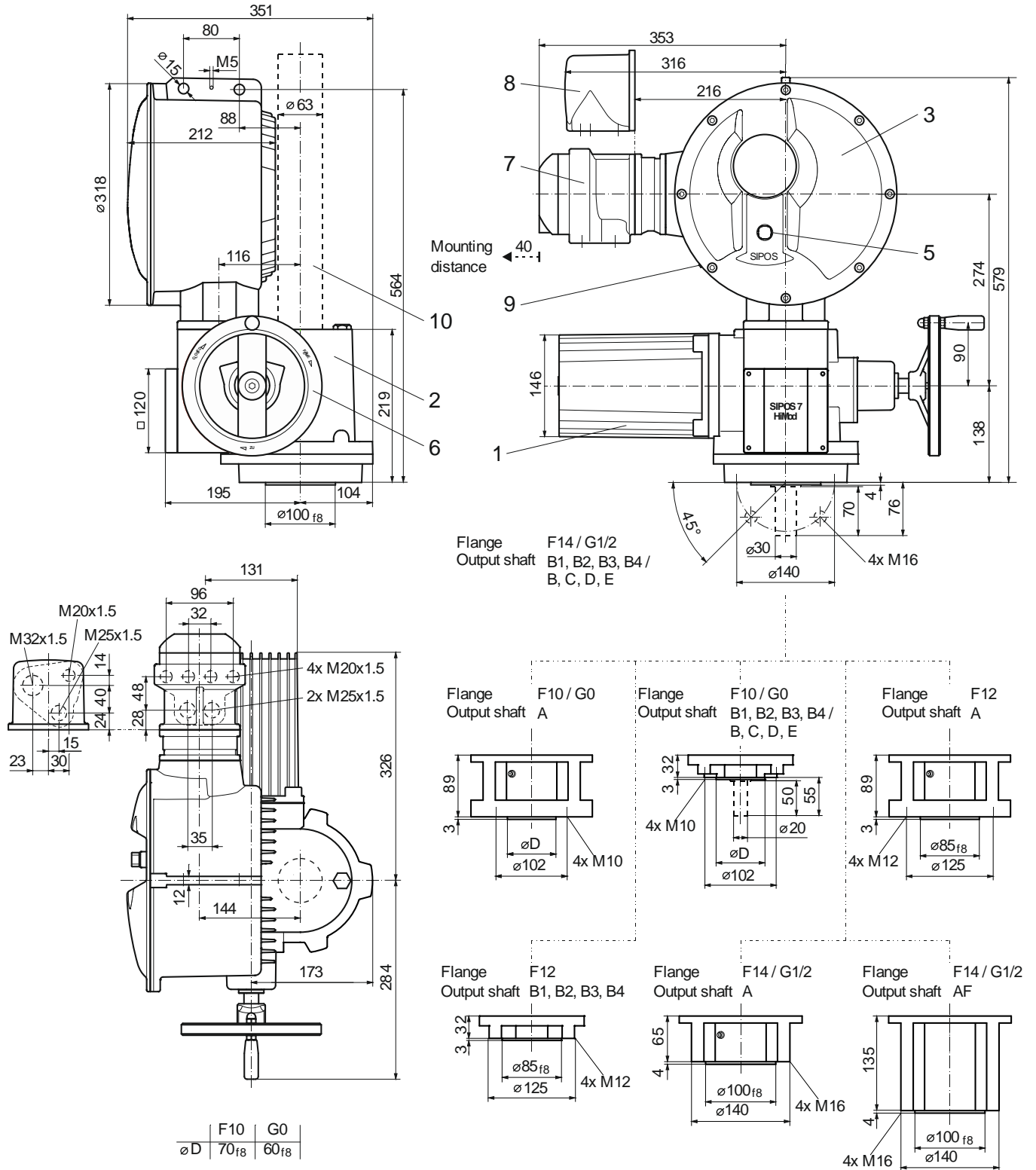
- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4 Flange
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)



Technical Data

Dimensional drawing 2SA784.-D

R866863

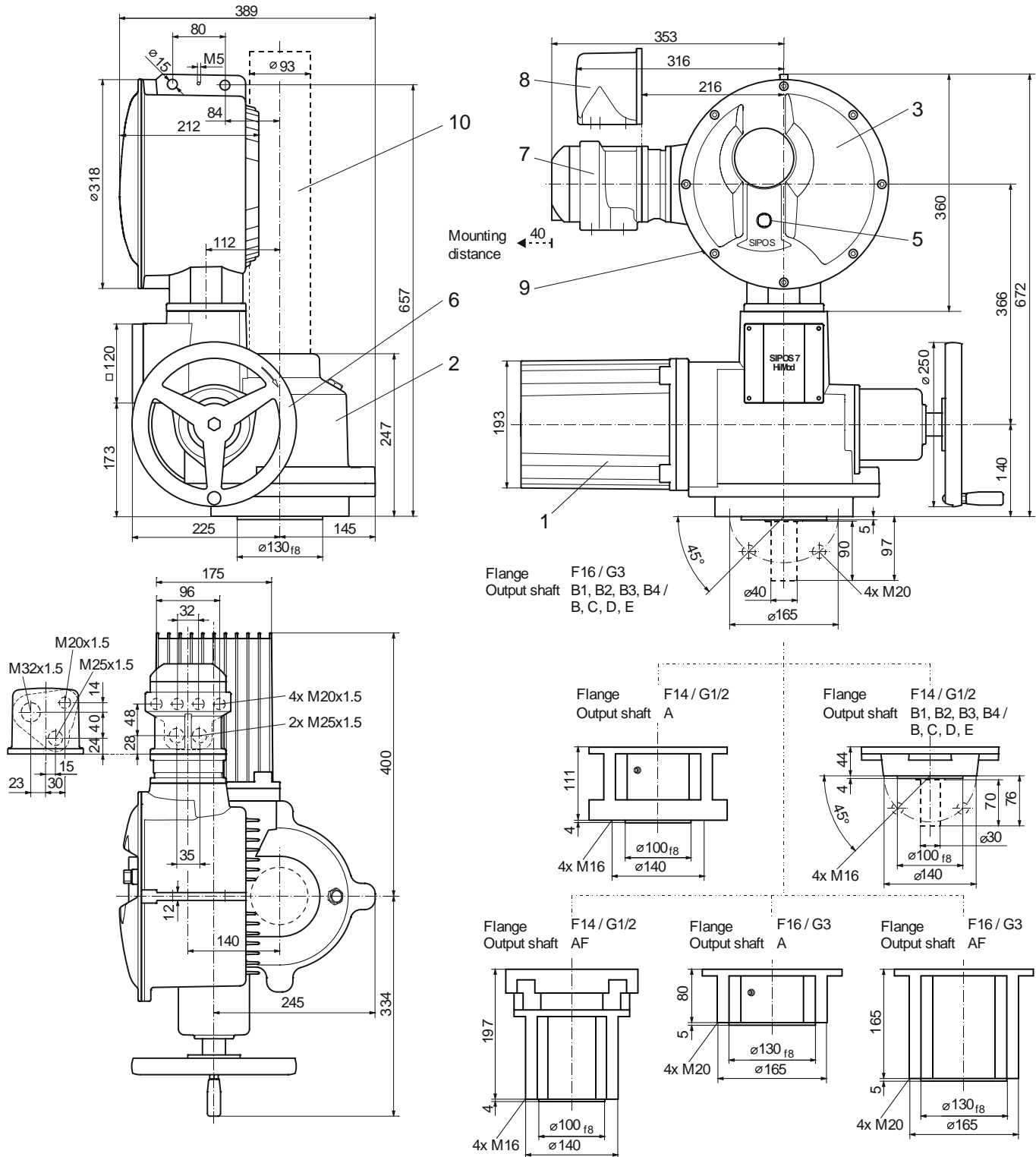


- 1 Motor
- 2 Gear unit
- 3 Electronics unit
- 4
- 5 Local control station
- 6 Hand wheel
- 7 Field bus connection
- 8 Plug connection
- 9 USB interface
- 10 Spindle protection tube (for length, see catalog)

Technical Data

Dimensional drawing 2SA785., 2SA786.

R866864

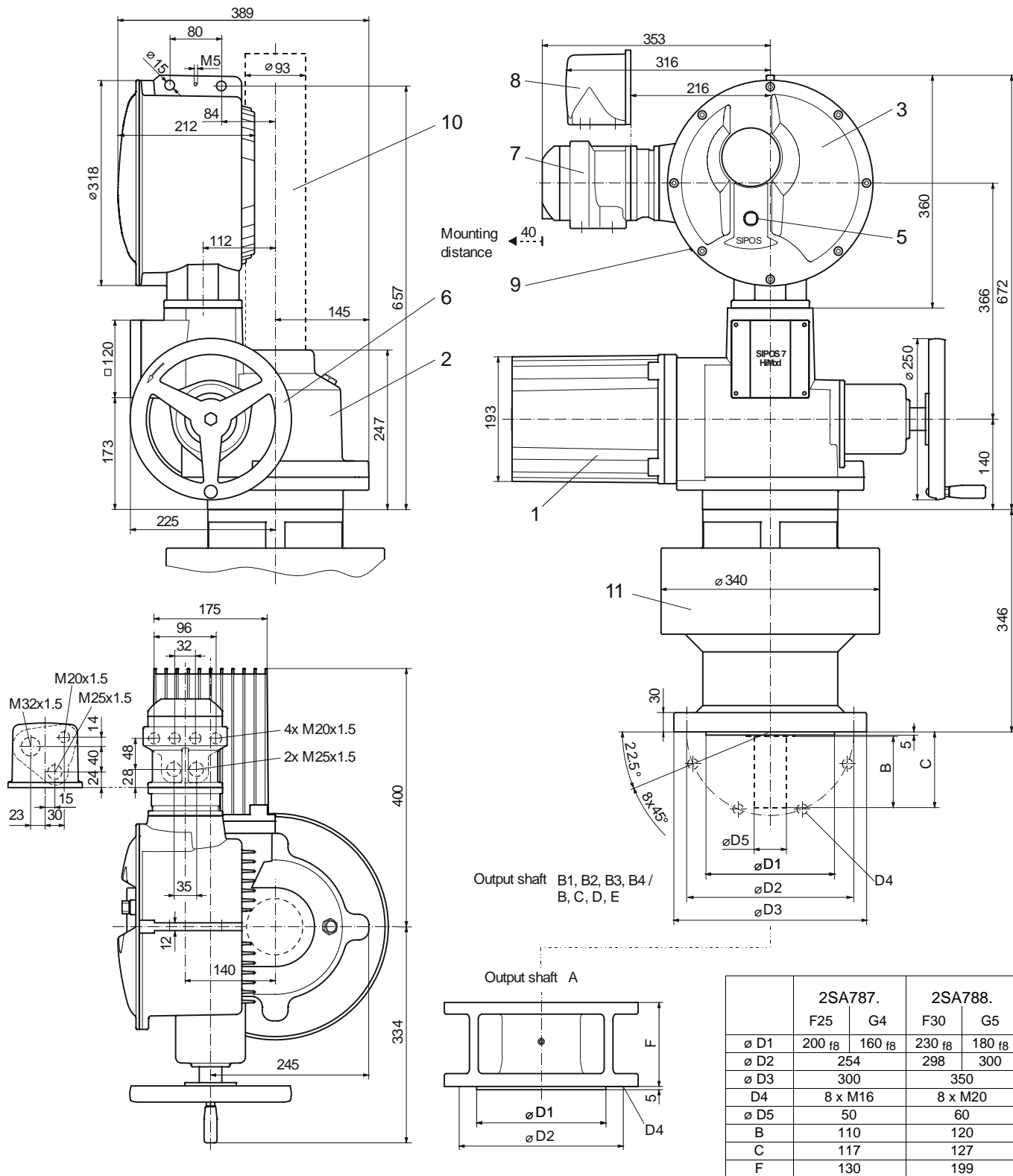


- |   |                  |   |                       |    |   |
|---|------------------|---|-----------------------|----|---|
| 1 | Motor            | 5 | Local control station | 8  | Plug connection                                   |
| 2 | Gear unit        | 6 | Hand wheel            | 9  | USB interface                                     |
| 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
- 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) <sup>2) 3)</sup>		Power $P_N$ <sup>4)</sup> [kW]	Motor power [kW]	Fuse slow blowing [A]
			Nominal current $I_N$ <sup>4)</sup> [A]	$\approx I_{max.}$ <sup>5)</sup> [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% <sup>1)</sup>) / +15%

Type 2SA78..	$n_{max.}$ [rpm]	$T_C max.$ [Nm]	Current (230 V) <sup>2) 3)</sup>		Power $P_N$ <sup>4)</sup> [kW]	Motor power [kW]	Fuse slow blowing [A]
			Nominal current $I_N$ <sup>4)</sup> [A]	$\approx I_{max.}$ <sup>5)</sup> [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% <sup>1)</sup>) / +15%

Type 2SA78..	$n_{max.}$ [rpm]	$T_C max.$ [Nm]	Current (200 V) <sup>2) 3)</sup>		Power $P_N$ <sup>4)</sup> [kW]	Motor power [kW]	Fuse slow blowing [A]
			Nominal current $I_N$ <sup>4)</sup> [A]	$\approx I_{max.}$ <sup>5)</sup> [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% <sup>1)</sup>) / +15%

Type 2SA78..	$n_{max.}$ [rpm]	$T_C max.$ [Nm]	Current (400 V) <sup>2) 3)</sup>		Power $P_N$ <sup>4)</sup> [kW]	Motor power [kW]	Fuse slow blowing [A]
			Nominal current $I_N$ <sup>4)</sup> [A]	$\approx I_{max.}$ <sup>5)</sup> [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.

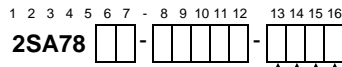
#### Motor space heater

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 remote control unit RCU + MODBUS RTU 1 channel
- Q
- 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	<i>Not used</i>	
8	Warning motor temp.	NC	Fault external voltage	NC	Warning motor temp.	NO	<i>Not used</i>	

NO = active high, NC = active low

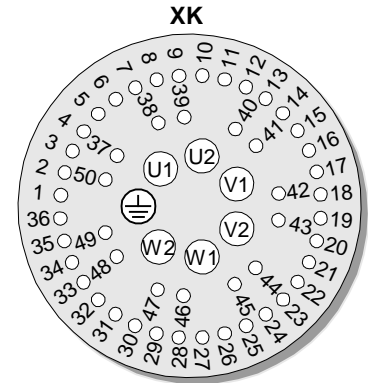
Optional free assignment of outputs, NO/NC optional (can be changed locally)

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 <sup>1)</sup> , 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 and 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 <sup>1)</sup> and 18 <sup>1)</sup>
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	
		[mA]	0 – 20 (max. 24)	[mA]	0 – 20 (max. 21)
Current	[mA]				
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
	30 V	50 V	300 V	
max. switching capacity	180 W (for 30 V)			1500 VA
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

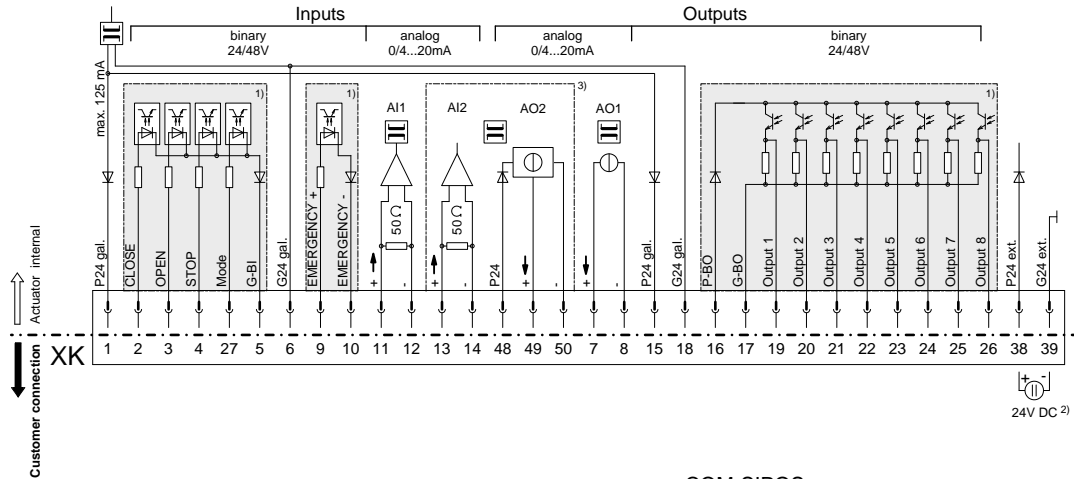
Technical Data

Wiring diagram

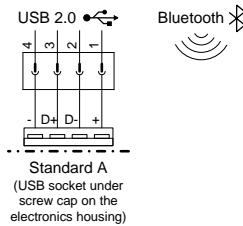
HiMod

Y070.251

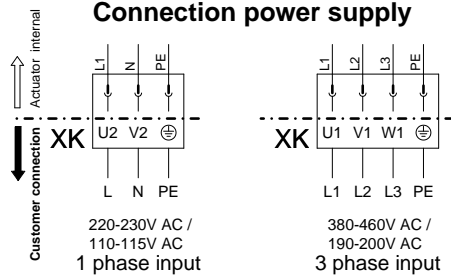
Connection control and feedback signals



COM-SIPOS



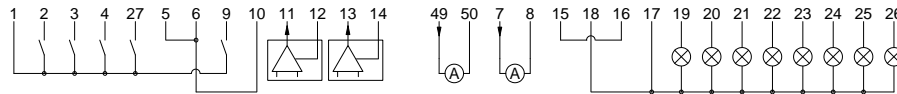
Connection power supply



Customer connection - wiring examples:

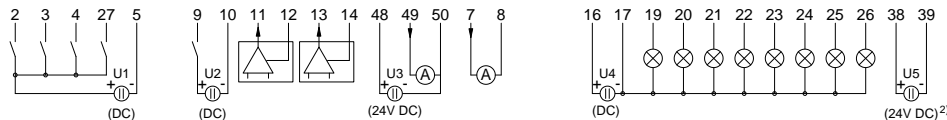
Wiring example I: „internal 24V DC supply“

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

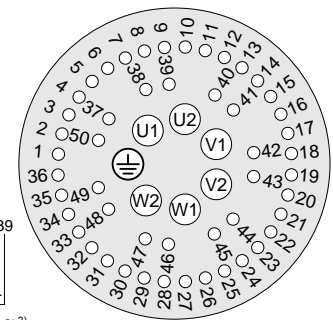


Wiring example II: „external 24/48V DC supplies“

(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 mm<sup>2</sup> Power supply
- 2.5 mm<sup>2</sup> Control and feedback signals

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

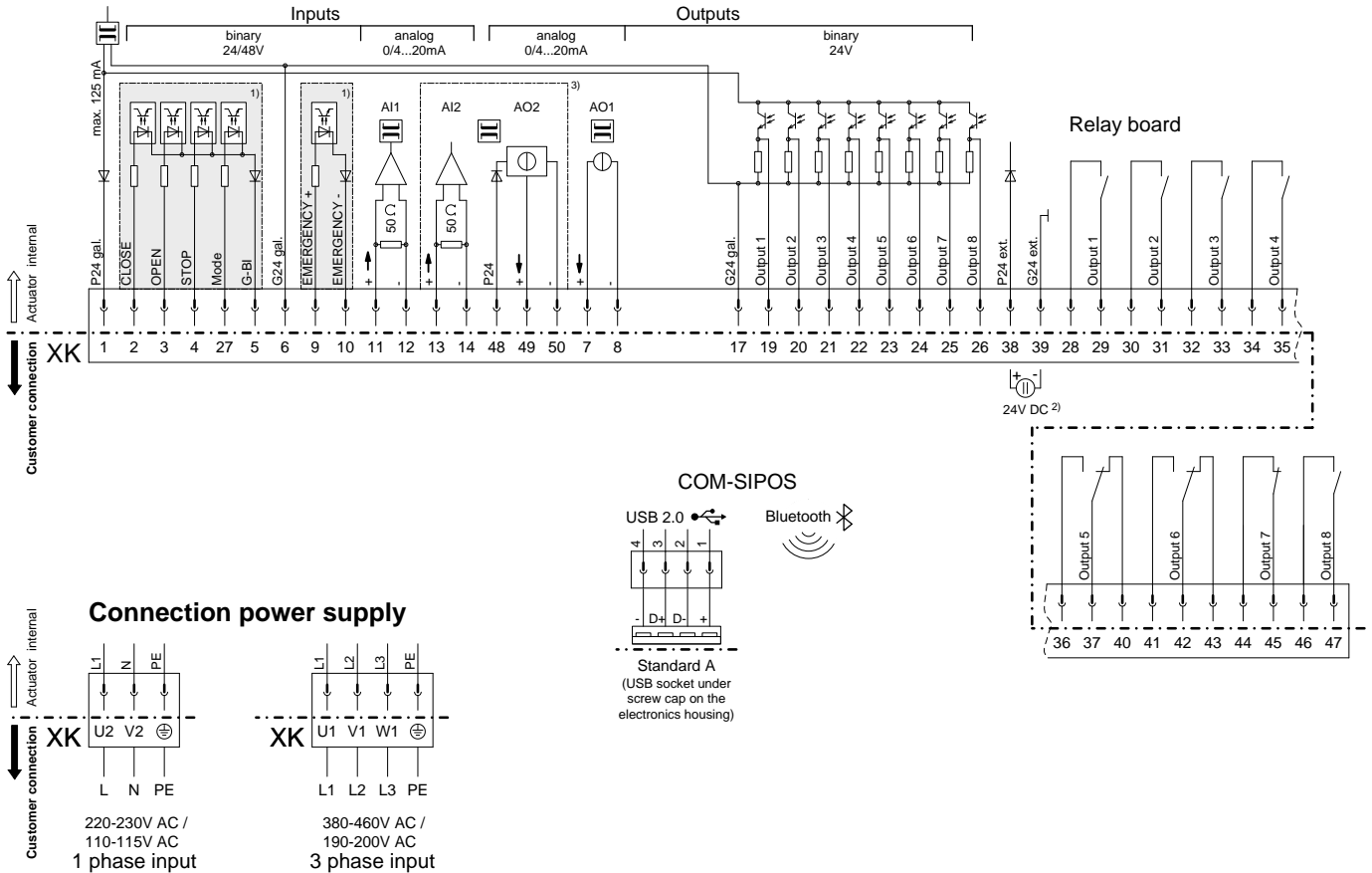


Technical Data

Wiring diagram **HiMod with relay board**

Y070.252

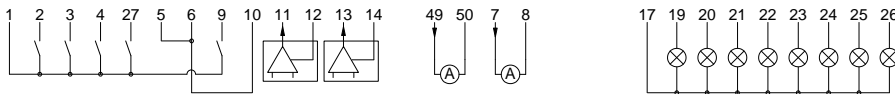
Connection control and feedback signals



Customer connection - wiring examples:

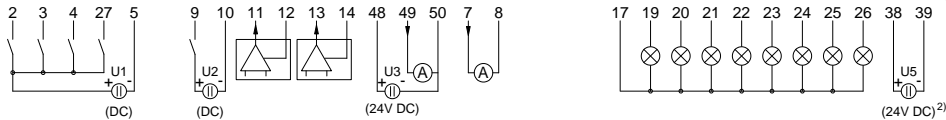
Wiring example I: „internal 24V DC supply“

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

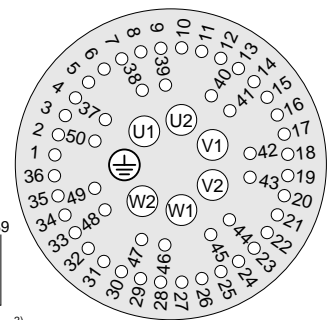


Wiring example II: „external 24/48V DC supplies“

(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 mm<sup>2</sup> Power supply
- 2.5 mm<sup>2</sup> Control and feedback signals

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

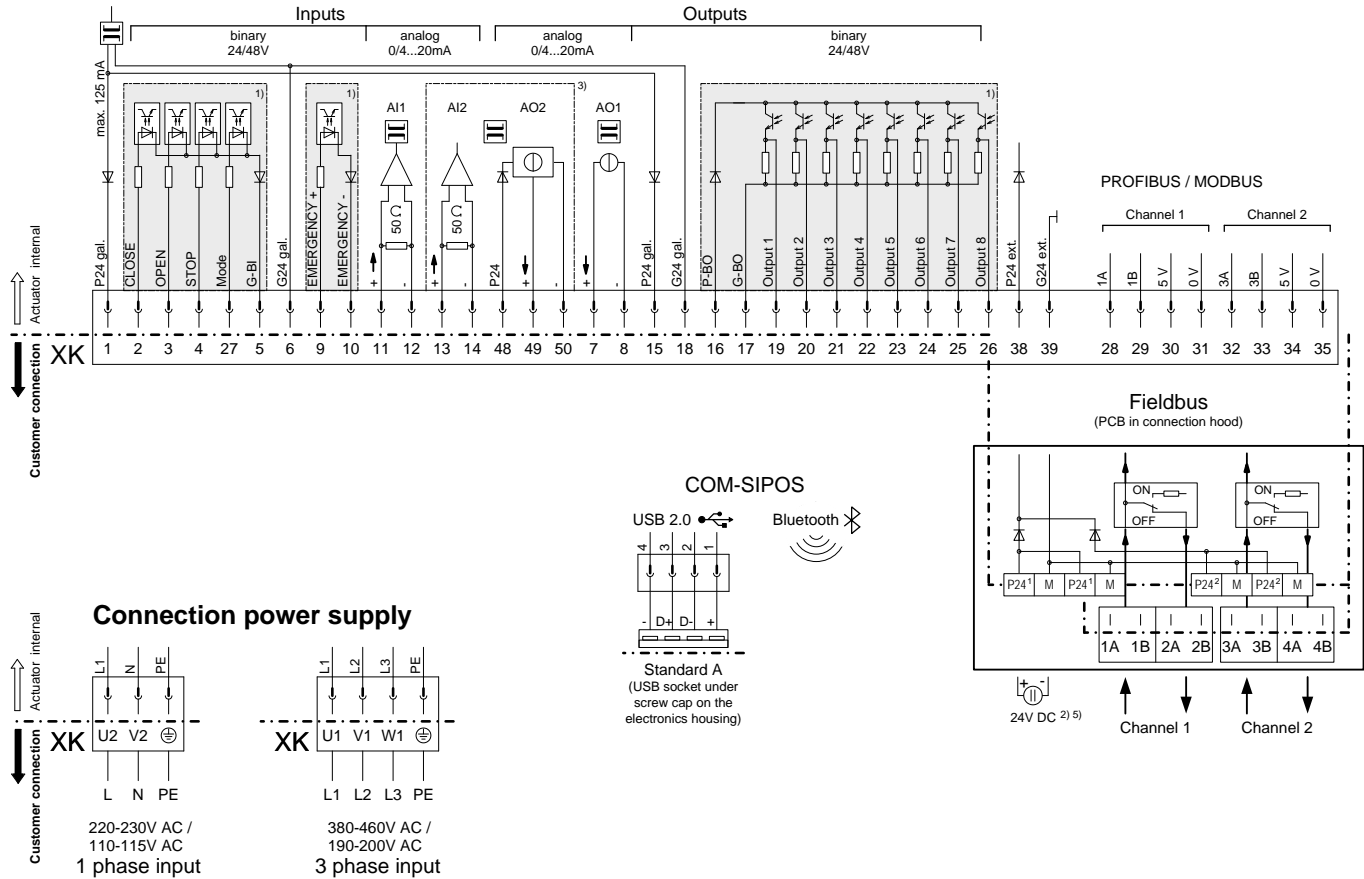
Technical Data

Wiring diagram

HiMod with Fieldbus

Y070.253

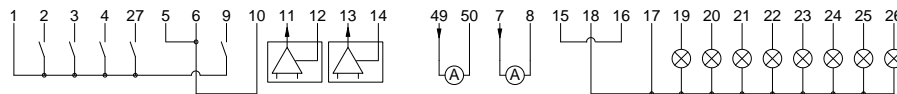
Connection control and feedback signals



Customer connection - wiring examples:

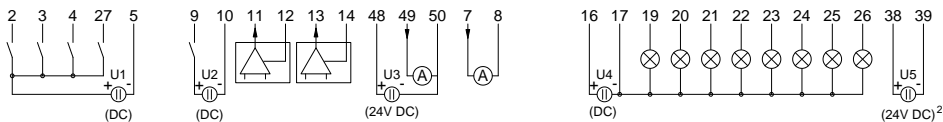
Wiring example I: „internal 24V DC supply“

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

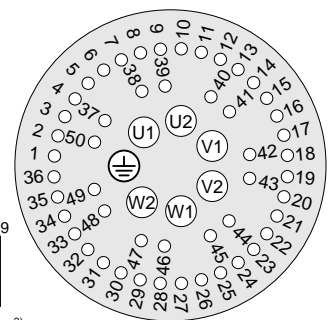


Wiring example II: „external 24/48V DC supplies“

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



Plug assignment XK



- galvanically isolated areas: can be supplied from different sources with 24/48V DC
- 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.)
- option
- up to 4 connectors P24 and M on the fieldbus connection PCB

Wire cross-section max.:

- 6 mm<sup>2</sup> Power supply
- 2.5 mm<sup>2</sup> Control and feedback signals

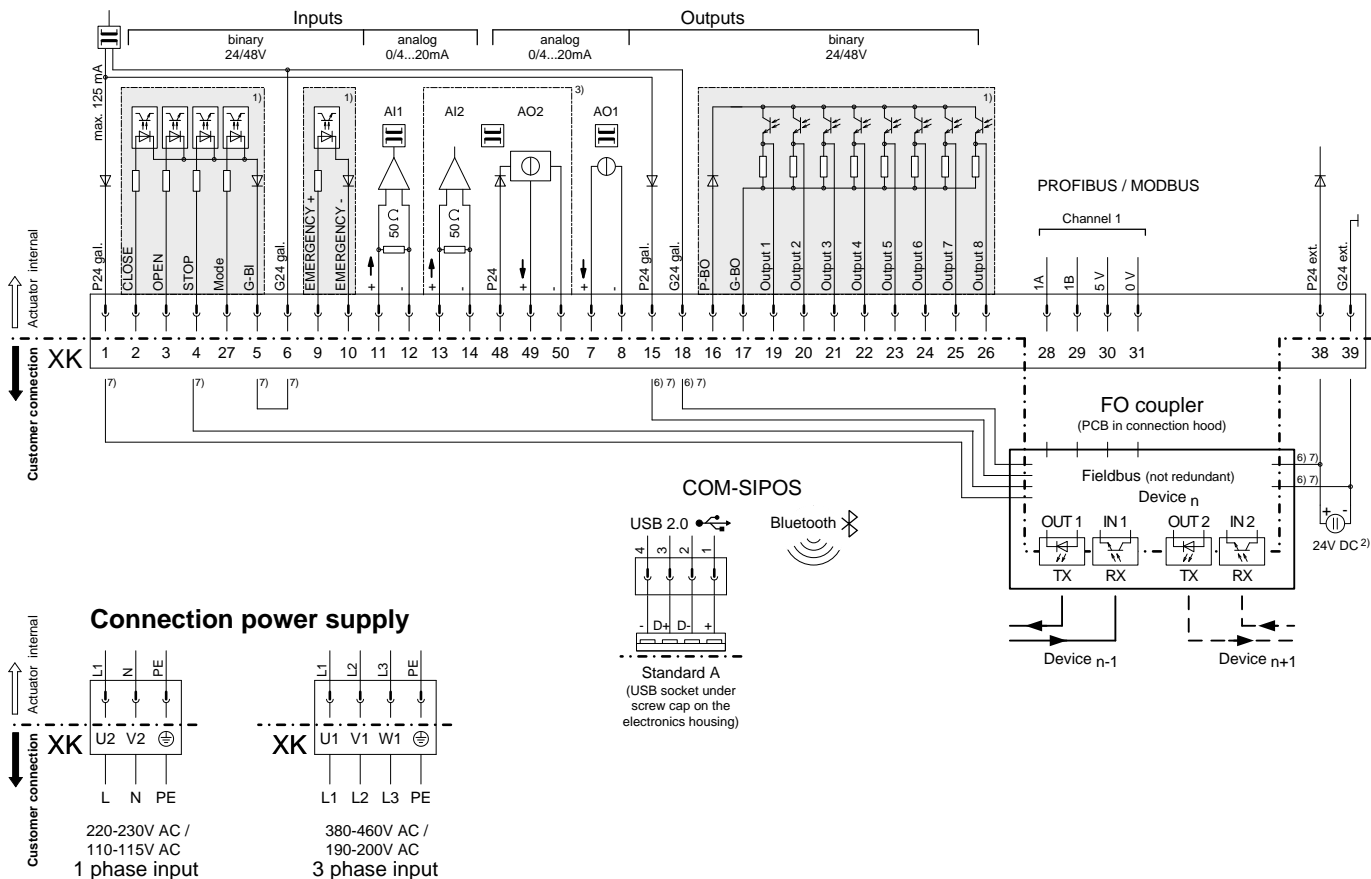
The control/feedback wire **must** be shielded!

Technical Data

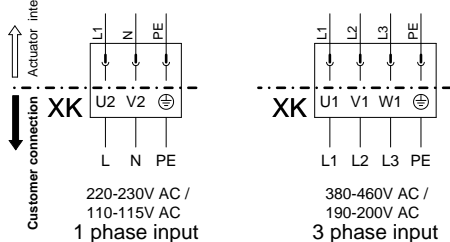
Wiring diagram **HiMod with Fieldbus and FO**

Y070.362

Connection control and feedback signals



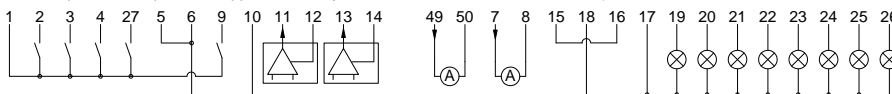
Connection power supply



Customer connection - wiring examples:

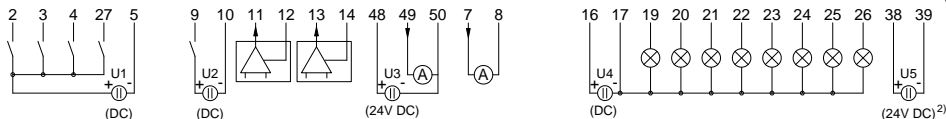
Wiring example I: „internal 24V DC supply“

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

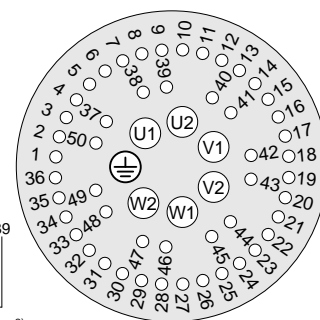


Wiring example II: „external 24/48V DC supplies“

(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
- 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.:

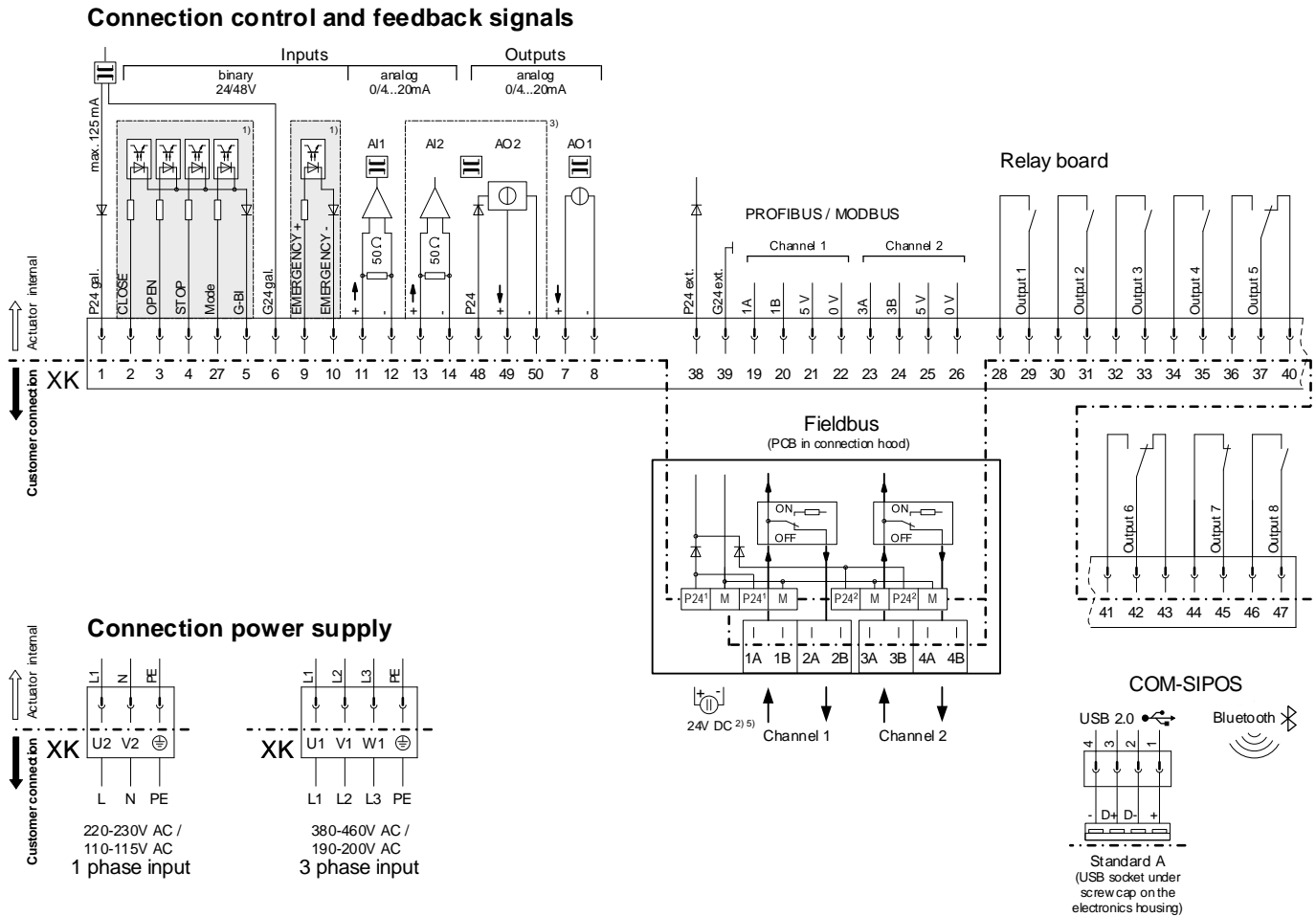
- 6 mm<sup>2</sup> Power supply
- 2.5 mm<sup>2</sup> Control and feedback signals

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

Technical Data

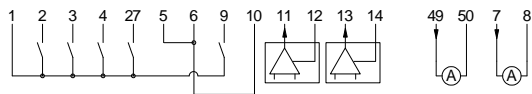
Wiring diagram **HiMod with Fieldbus and relay board**

Y070.471

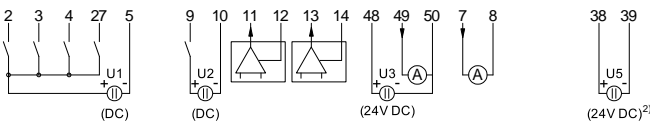


**Customer connection - wiring examples:**

**Wiring example I: „internal 24V DC supply“**  
(here all inputs and outputs are supplied internally from the electronics unit with 24V DC)

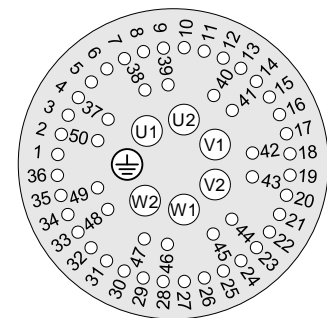


**Wiring example II: „external 24/48V DC supplies“**  
(in this example all galvanically isolated areas are supplied externally from different 24/48V DC power sources)



- 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

**Plug assignment XK**



Wire cross-section max.:  
 - 6 mm<sup>2</sup> Power supply  
 - 2.5 mm<sup>2</sup> Control and feedback signals  
 The control/feedback wire **must** be shielded!