

## DriveLine | Actuators



**Success is the result of a commitment to precision, innovation and customer benefit**

"Precision is SIKO's top priority and standard!" True to this philosophy, SIKO has been developing and producing innovative solutions in distance and angle measurement technology for more than 45 years now. Based in Buchenbach in the foothills of the Black Forest, the company produces its own measurement technologies, which are a global success in all areas of mechanical engineering. Even today, SIKO's core concept is still manifest in its innovative power, product development and company spirit. Since taking over the business in 1990, industrial engineer Horst Wandres, son of its founder, has continued to develop this philosophy with impressive results.



We speak the same language: At SIKO, a willingness to participate in open dialog enhances engineering performance. Our production site advantages are not interchangeable.

**Intelligent solutions**

Attentive ears will always find the right solution. Automation and process optimization are the cornerstones of SIKO's ambitious new technologies and goal-oriented measurement solutions. The company pursues a clear, consistent line of development, ranging from digital position indicators and handwheels through incremental encoders, absolute encoders and measurement displays to future-oriented technologies with electronically programmable or magnetic measurement systems (MagLine).

SIKO again follows the road to success with its compact, ultra-resilient actuators (DriveLine), which enable automated adjustment of machine axles.

**6 distinctive product lines**

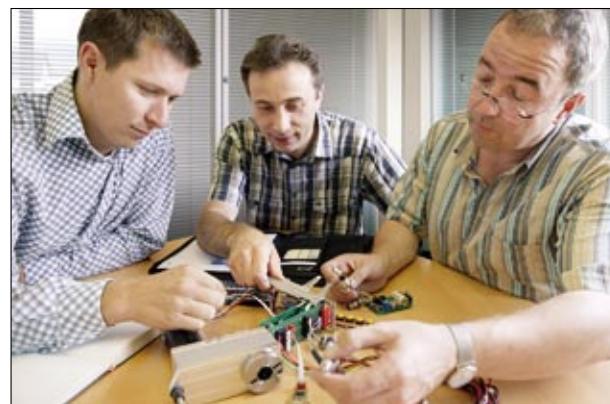
<b>PositionLine</b>	Mechanical and electronic position indicators, handwheels with analog indicators, control knobs
<b>RotoLine</b>	Magnetic and optical encoders, geared potentiometers
<b>LinearLine</b>	Wire-actuated encoders
<b>DriveLine</b>	Actuators
<b>MagLine</b>	Magnetic length and angle measurement systems
<b>DisplayLine</b>	Measurement displays

**Consistent teamwork**

The secret of SIKO's development prowess lies in the motivation and team spirit of its workers. SIKO has a conscious policy of integrating the experiences of its 170 employees, which has a dynamic effect on all areas of company life. Outstanding individual performances blend together to enhance the efficiency of the whole organization.

Not one for all but all together – this motto typifies SIKO's synergetic development process, delivering solutions which dominate the market in all aspects of "measurement technology in mechanical engineering".

This is SIKO today. Precision in motion, dynamic and open for the future ...



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## 4.1 | Actuators

4.1

<b>General information and areas of application</b>	4
<b>Technical details</b>	6
<b>Function and application</b>	8
<b>Product matrix</b>	9
<b>Products</b>	
AG01 incremental	10
AG01 analog	13
AG02 incremental	16
AG02 analog	19
AG02 fieldbus	22
AG03 incremental	25
AG03 fieldbus	28
AG04B fieldbus	31
AG05 fieldbus	34
AG12 incremental	37

4.2

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<b>4.2   Accessories</b>	41
<b>4.3   Product index, Contact information</b>	61

4.3

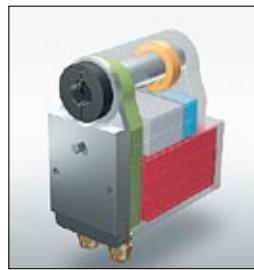
## Drive Technology: New dynamics for production processes

SIKO's intelligent, compact DriveLine actuators offer you greater flexibility for your production process as well as significant benefits as far as productive time and product quality are concerned.

Minimizing the adjustment times of machines and the wastage produced has a considerable impact on a company's efficiency and cost-effectiveness. Adjustments with DriveLine actuators are about four times faster and much more precise than those conducted manually. Users speak of an increased production performance of up to 30 %.

An actuator consists of the following precisely matched components:

- High-performance DC motor
- Spur gear/epicyclic gear in hollow or solid shaft configuration
- Position encoder
- Power/control electronics



- Drive
- Gear
- Encoder
- Electronics
- Compact construction promises short reaction times

The actuators can be connected to all commercially available position regulators designed for 24 V DC motors. Configurations without a built-in encoder are available on request.

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### Benefits

- Automation technology with an excellent price-performance ratio
- Simple control behavior
- High starting torque enables dirt-bound spindles to break free
- Long service life

### Versatile application

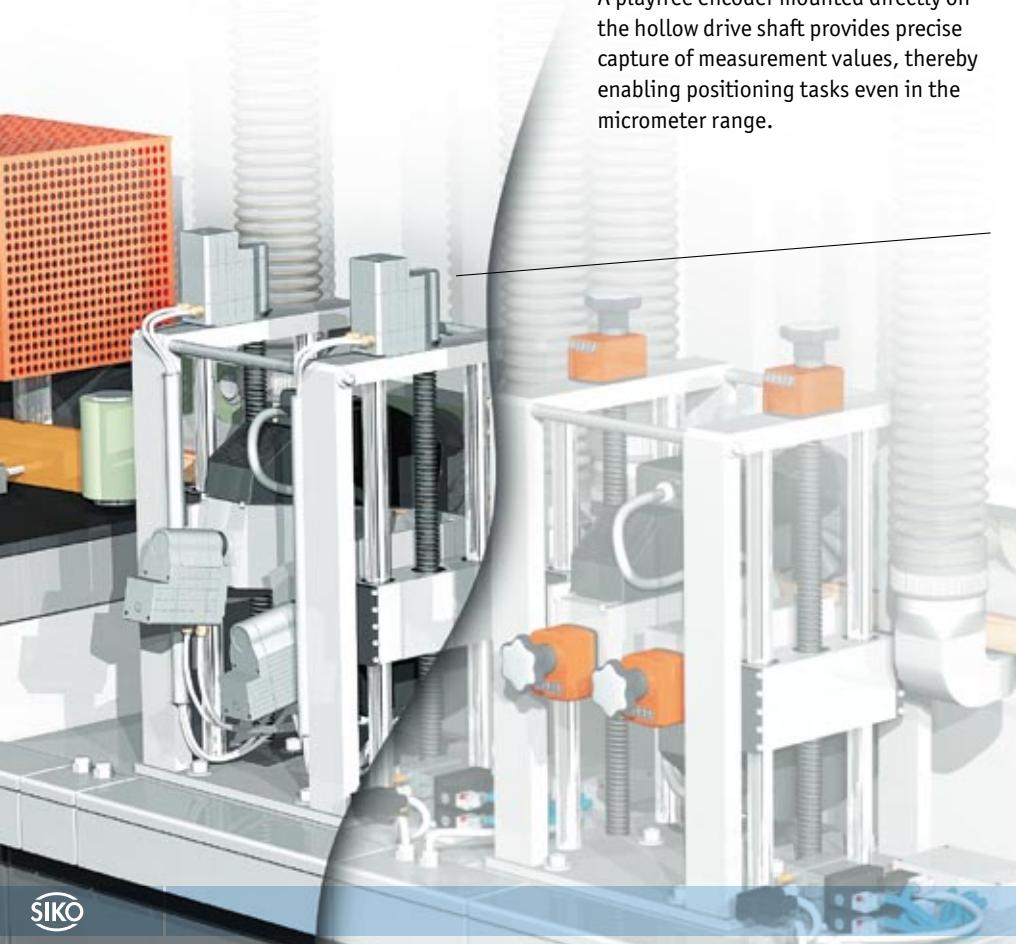
The mechanical engineer also profits by this flexible, modular automation: It enables him to design his products in a variety of versions – from the basic model to the fully automated version, providing the end user with his own tailor-made solution from the point of view of price and performance.

Combining these components in a carefully engineered, extremely compact modular design sets new standards with regard to size and performance. The gearbox housing is made of zinc die casting and aluminum. The spur gear transmission, available in a series of gear ratios, has cogwheels of high-tensile special steel.

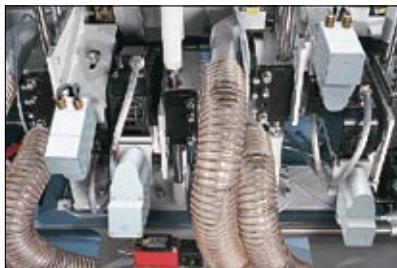
The drive is provided by 24 V DC high-performance motors. For their low construction volume, they deliver an enormous output of up to 160 W with maximized service life and dynamics! The hollow shaft is mounted by simply sliding on and locking the drive shaft by means of a clamping ring (keyway optional), thus dispensing with expensive couplings or mounting flanges.

A playfree encoder mounted directly on the hollow drive shaft provides precise capture of measurement values, thereby enabling positioning tasks even in the micrometer range.

**More efficient axle adjustment:** The true strength of DriveLine actuators lies in the useful series connection. When these modules are centrally controlled, they accomplish the adjustment work in only one cycle.



## Areas of application



[1] DriveLine actuators have proven their value in application on edge-gluing presses and guarantee consistent product quality for "on-the-fly" production changes. [2] Insert the part to be glued and press the start button: semi-automated gluing process with measurement feedback via a combination of magnetic ring and sensor (SIKO MagLine). [3] Measurable time-savings: autonomous mass production at a bottling plant. [4] Many adjustments quickly performed: the advantages of central workflow control. [5] Spacing of guide rollers is regulated in a laser welding system for stainless steel pipes.

Industrial production requires precise, economical solutions. Particularly with frequently repeated adjustment changes, manual intervention often proves too costly and time-consuming. Centrally controlled units of SIKO drive technology, with their robust components combined in a compact housing, work together logically to provide an efficient solution. They enable all adjustment spindles of a machine to be operated within only one cycle time.

Constant product change and widely varying product sizes are everyday occurrences in many branches of industry and require numerous setting and adjustment changes to the feed and auxiliary axes. The precise repeatability of each adjustment is important, as is the performance of tasks in difficult to reach positions. Versatility with regard to changing production goods increases, while product quality improves.

DriveLine actuators work best in a team. They are used in production machines in the metal, packaging, wood, glass, printing and plastic industries and in tool machines and special machines.

Typical applications are in the wood and metal processing industries for shaping and refining products and surfaces, as well as in cardboard processing for the manufacture of folding boxes of different dimensions.

**4.1**



## Performance charts

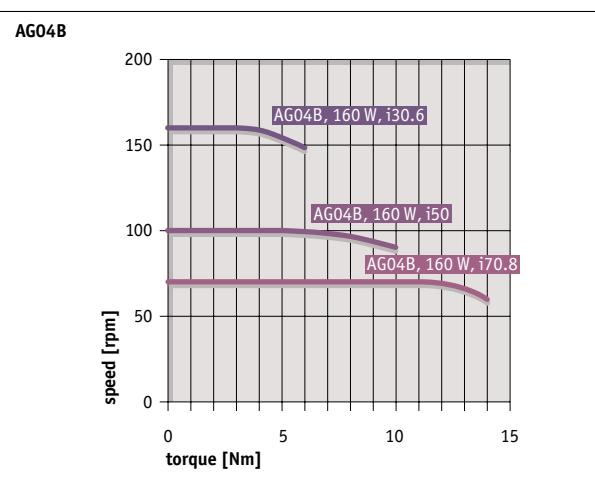
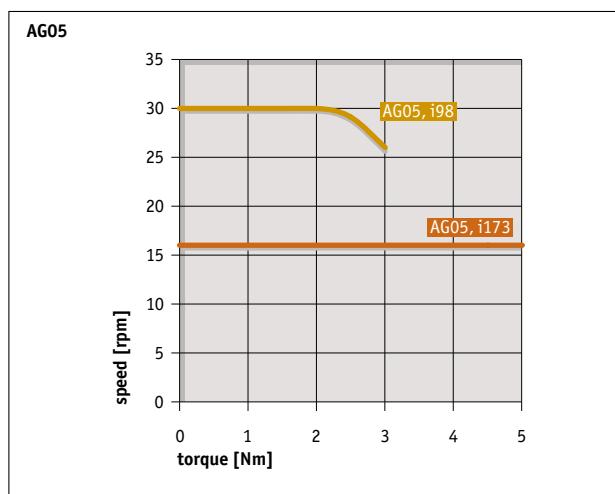
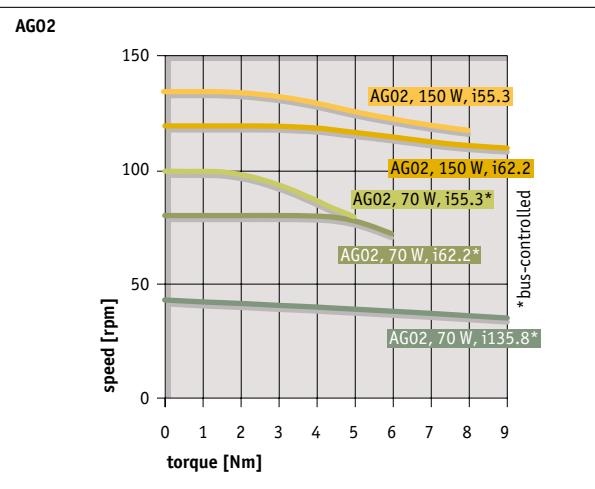
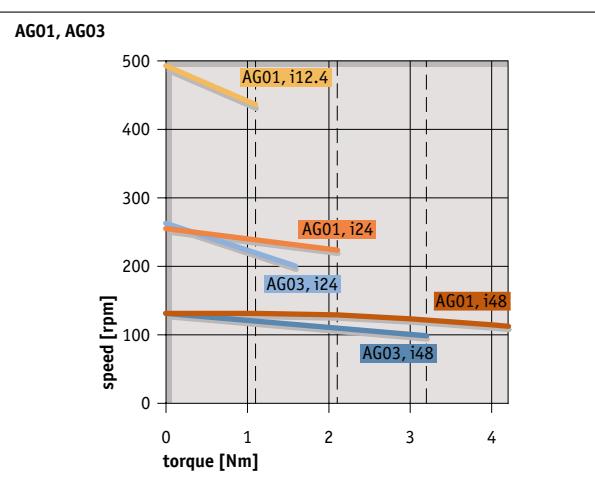
Key performance characteristics can be seen and compared in the following charts.

### Measurement procedure

The performance chart of a DriveLine actuator shows the maximum performance curve (rpm/Nm) in relation to a particular motor/gear combination. All the characteristics refer to 24 V DC motors.

It can be seen that, performance data can deviate from the displayed values in actual use. This is due to a number of factors, such as motor-induced revolution divergences of  $\pm 15\%$ . We will be pleased to give you more detailed advice on these special cases.

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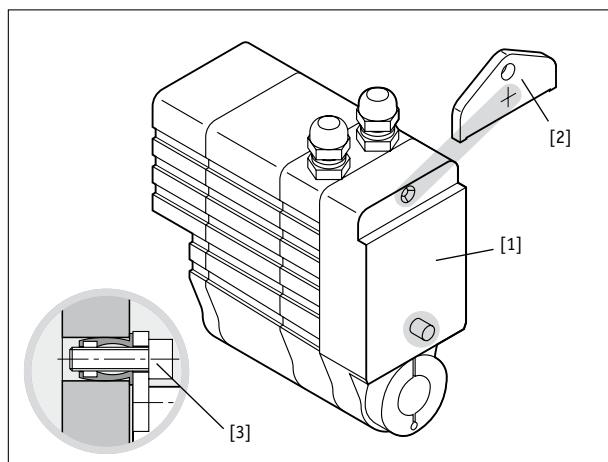


## Torque support

The hollow shaft design of the DriveLine actuators AG01, AG02, AG03 and AG04B makes for very simple mounting. A clamping ring on the device mounting side provides secure connection to the machine shaft.

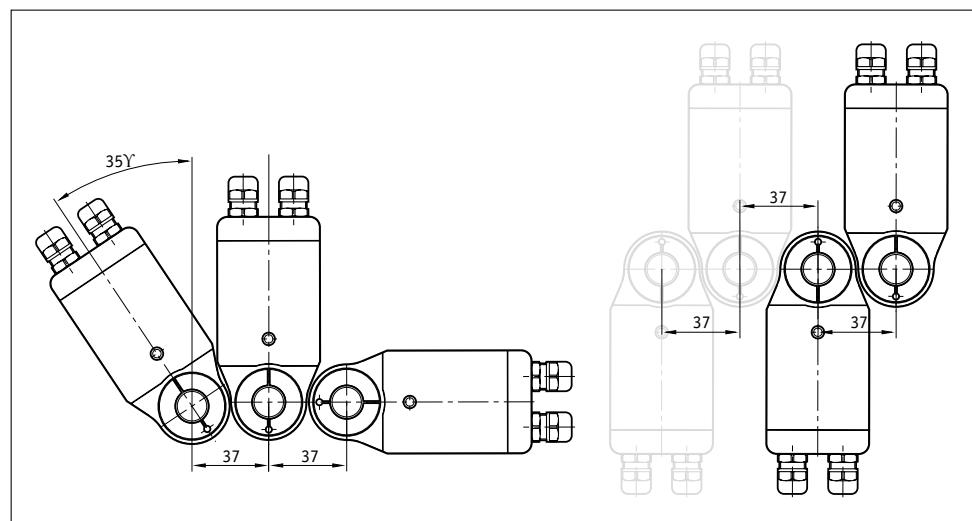
The torque bracing to the machine frame is by means of a pin [1]. Alternatively, a mounting bracket can be used [2]. This type of securing enables use of an **elastomeric bushing** [3], which provides a low-tension connection from the actuator to the machine shaft.

**Advantage:** The distortion forces on the bearing are reduced.



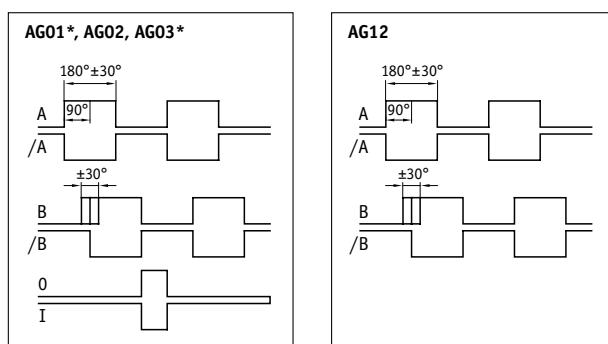
## Mounting variants

The cleverly engineered design of the AG01 and AG03 opens up a host of installation variations. The tapered construction in the area of the hollow shaft makes small center-to-center distances of as little as 37 mm achievable.



## Output signals incremental

**Note (AG01, AG03):** The status of the signals A and B with regard to the reference signal 0/I is not defined and may deviate from this drawing.



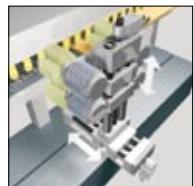
## Motor control

Combining an actuator with an internal or external motor control (e.g., motor control module MS02, see product page, chapter on accessories) also enables use of the revolution range below the highest curve plot. The torque is then generally preserved. Motor controls change the performance of a drive by **pulse width modulation** (PWM).

### Ambient conditions

### Examples of use

#### Wood, metal and plastic processing

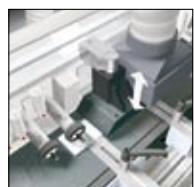


##### **Direct adjustment:**

Direct action via axle or spindle. The principle of action corresponds to that of a compound table or of linear guides.

4.1

e.g., stop adjustment on saws and milling machines, tool settings according to the compound table principle ...



e.g., angle and position adjustment in the wood and metal industries ...

#### Paper/converting



##### **Indirect adjustment:**

Indirect action (offset) on racks via cogwheel or worm gear.

e.g., automated format, distance or throughput adjustment with spooling slitting machines (paper, foil), printing presses, filling machines ...

#### Logistics



e.g., adjustment of plants to rapidly changing tasks of conveyor belts ...

##### **Rotating adjustment:**

Direct action on the rotation axis or indirect action (offset) on a rotation axis via bevel gear or worm gear.

## Actuators



Page	10	13	16	19	25	37
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### Speed/torque

Rated torque max.	4.2 Nm	4.2 Nm	9 Nm	9 Nm	3.2 Nm	15 Nm
Rated speed max.	500 min <sup>-1</sup>	500 min <sup>-1</sup>	120 min <sup>-1</sup>	120 min <sup>-1</sup>	250 min <sup>-1</sup>	1600 min <sup>-1</sup>

Driving shaft	14 mm hollow shaft	10 mm solid shaft				
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### Encoder

Without	•		•		•	
Potentiometric		•		•		
Current source 4 ... 20 mA		•		•		
Voltage 0 ... 10 V DC		•		•		
Incremental LD5	•		•			
Incremental LD24	•		•		•	
Incremental OP	•		•		•	

### Motor control

Integrated		option	option		•	
External	option	option	option	option		option

4.1

## Actuators



Page	22	28	31	34
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### Speed/torque

Rated torque max.	9 Nm	3.2 Nm	14 Nm	5 Nm
Rated speed max.	100 min <sup>-1</sup>	250 min <sup>-1</sup>	150 min <sup>-1</sup>	30 min <sup>-1</sup>

Driving shaft	14 mm hollow shaft	14 mm hollow shaft	20 mm hollow shaft	14 mm hollow shaft
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### Outputs

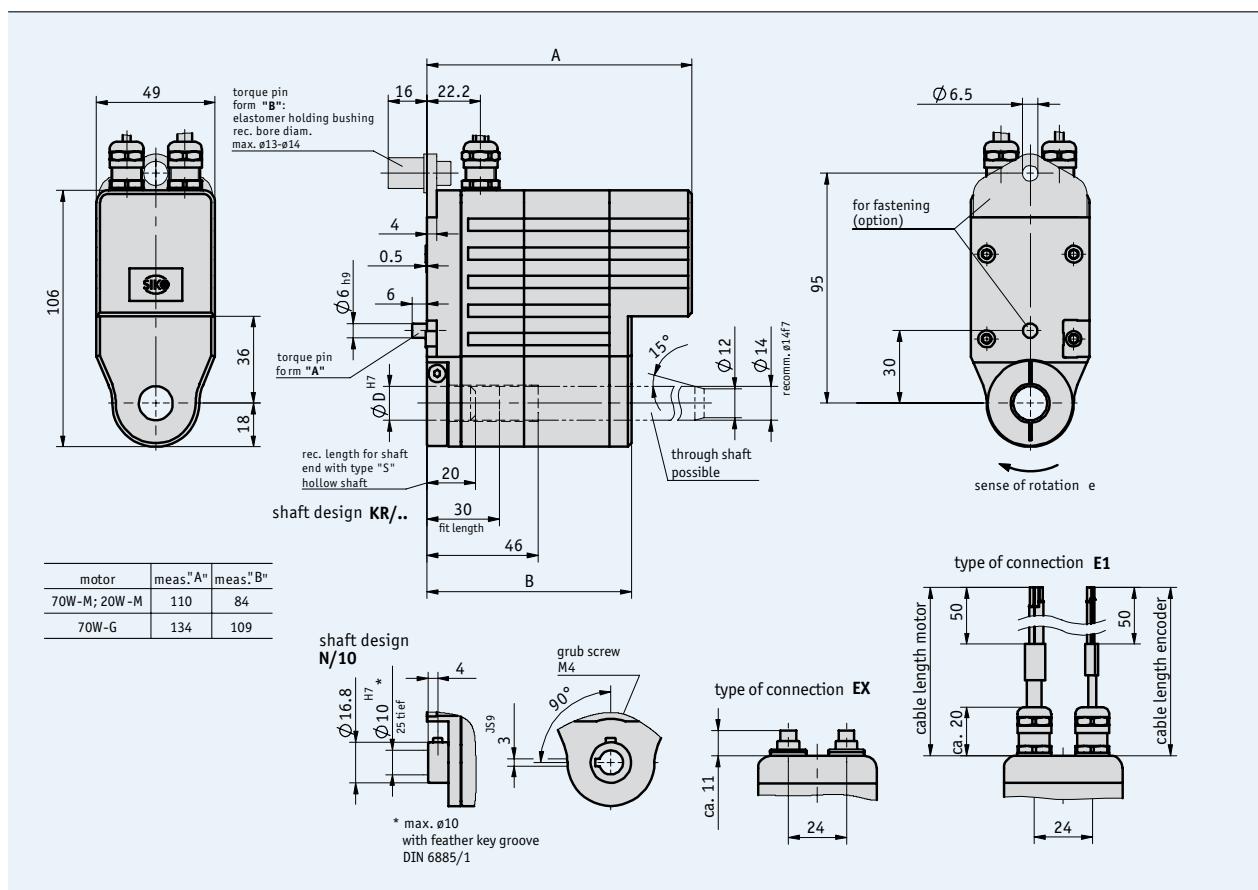
Absolute digital	•	•	•	•
Fieldbus (option)	Profibus CANopen	Profibus	Profibus	CANopen

## Profile

- Easy mounting
  - Through hollow shafts up to max. Ø 14 mm possible
  - Integrated magnetic position encoder on output shaft
  - Electrical connection via cable or connector



4.1



## Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum, zinc die-cast powder-coated	
Nominal torque	1.1 Nm, 430 rpm 2.1 Nm, 225 rpm 4.2 Nm, 110 rpm	with $i = 12.4$ with $i = 24$ with $i = 48$
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +70 °C	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	according to DIN 57530, VDE 0530 part 1
Interference protection class	acc. to EN 61000-6-2 and EN 61000-6-4	
Protection category	IP63, others on request	according to DIN VDE 0470
Weight	approx. 1.5 kg	

## Electrical data

4.1

### ■ Motor data

Feature	Technical data	Additional information
Motor voltage supply	0 ... 24 V DC	
Power consumption, fed	70 W	
Rated current	2.9 A ±10 % (70 W-M) 4.1 A ±10 % (70 W-G)	max. load current 3.2 A max. load current 4.5 A

### ■ Encoder data

Feature	LD5	LD24	OP
Voltage supply	5 V DC ±5 %	24 V DC ±20 %	24 V DC ±20 %
Power consumption	≤50 mA	≤25 mA	≤25 mA
Output circuit	line driver (RS422)	line driver (RS422)	push-pull (OP)
Output signals	(A, B, 0, /A, /B, /0)	(A, B, 0, /A, /B, /0)	(A, B, 0, /A, /B, /0)
Pulse frequency max.	20 kHz	20 kHz	20 kHz

## Pin assignment

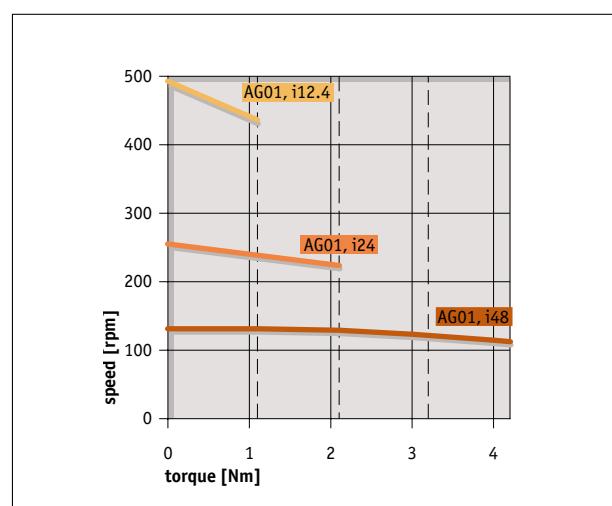
### ■ Motor

Signal	EX	E1
+	1	M1, white imprinted
+	2	
-	3	M2, white imprinted
-	4	

### ■ Encoder

Signal	EX	E1
B	1	white
+UB	2	brown
0	3	green
A	4	yellow
GND	5	gray
/A	6	pink
/B	7	blue
I	8	red

## Performance curve



## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	48	A i = 48	
	24	B i = 24	
	12.4	C i = 12.4	
Motor rating	70W-M	D 24 V DC	
	70W-G	E 24 V DC	
		F others on request	
Shaft design	KR/14	G clamp ring, Ø 14 mm	
	KR/12	H clamp ring, Ø 12 mm	
	N/10	I keyway, Ø 10 mm	only with hollow shaft type S
Hollow shaft type	S	J blind hole	
	D	K through	
Torque support (form)	A	L bolt, Ø 6 mm	
	B	M lug I	incl. elastomer bushing
Type of connection	E1	N open cable	
	EX	O socket on the device	
Motor cable length	2.0	P in m	
		Q others on request	
Encoder cable length	2.0	R in m	
		S others on request	
Encoder	LD24	T incremental encoder 1024 pulses	
	LD5	U incremental encoder 1024 pulses	
	OP	V push-pull with inversion	
	0	W without	

### ■ Order code

AG01 -  A -  B -  C -  D -  E -  F -  G -  H -  I

**Scope of delivery:** AG01, User information

→ **Accessories:**

Mating connectors  
Cable extension  
Motor control MS02

Page 48  
Page 50  
Page 42

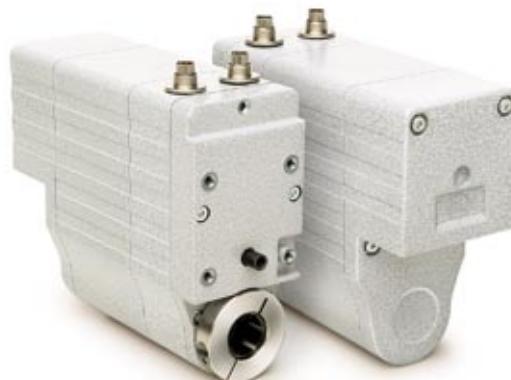
**Additional information:**

General information and areas of application

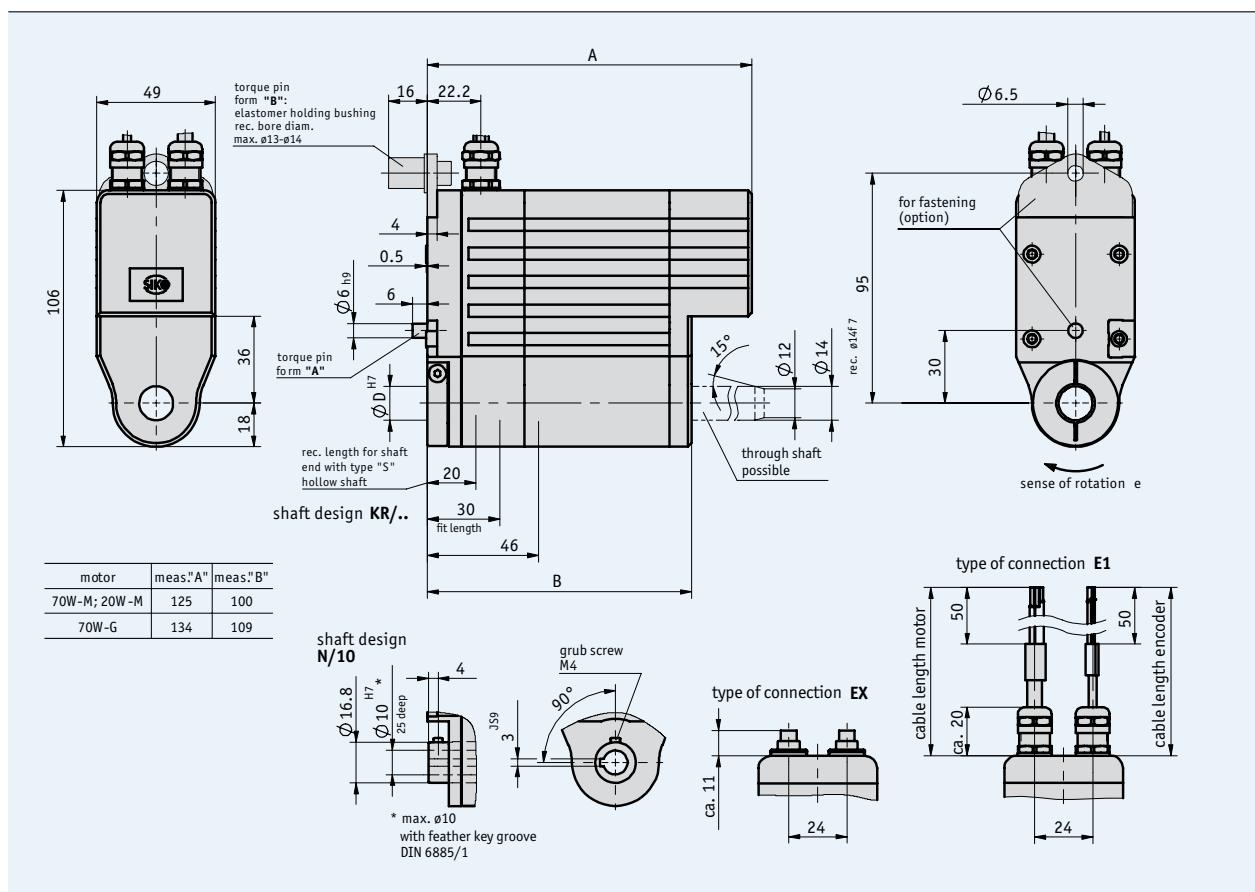
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### Profile

- Easy mounting
- Through hollow shafts up to max. Ø 14 mm possible
- Integrated analog absolute position encoder
- Electrical connection via cable or connector



4.1



## Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum, zinc die-cast powder-coated	
Nominal torque	1.1 Nm, 430 rpm 2.1 Nm, 225 rpm 4.2 Nm, 110 rpm	with $i = 12.4$ with $i = 24$ with $i = 48$
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +70 °C	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	according to DIN 57530, VDE 0530 part 1
Interference protection class	acc. to EN 61000-6-2 and EN 61000-6-4	
Protection category	IP63, others on request	according to DIN VDE 0470
Weight	approx. 1.4 kg	

## 4.1

## Electrical data

### ■ Motor data

Feature	Technical data	Additional information
Motor voltage supply	0 ... 24 V DC	
Power consumption, fed	70 W	
Rated current	2.9 A ±10 % (70 W-M) 4.1 A ±10 % (70 W-G)	max. load current 3.2 A max. load current 4.5 A

### ■ Potentiometer data

Feature	Technical data	Additional information
Resistance tolerance	±5 %	
Linearity tolerance	±0.25 %	
Power rating	2 W at 40 °C	potentiometer
Standard terminal resistor	0.5 % oder 1 Ω, others on request	(always the higher value)

## Pin assignment

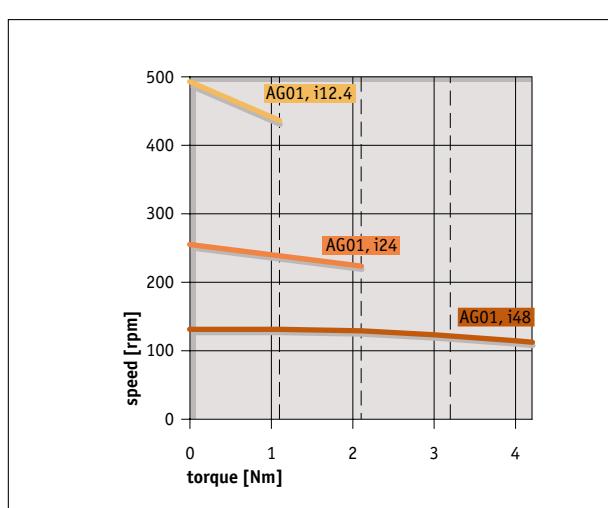
### ■ Motor

Signal	EX	E1
+	1	M1, white imprinted
+	2	
-	3	M2, white imprinted
-	4	

### ■ Potentiometer

P10	MWU	MWI	EX	E1
Po	+24 V DC	I+	1	brown
S	Uout		2	green
Pe	GND	I-	3	white

## Performance curve



### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	48	A i = 48	
	24	B i = 24	
	12.4	C i = 12.4	
Motor rating	70W-M	D 24 V DC	
	70W-G	E 24 V DC	
		F others on request	
Shaft design	KR/14	G clamp ring, Ø 14 mm	
	KR/12	H clamp ring, Ø 12 mm	
	N/10	I keyway, Ø 10 mm	J only with hollow shaft type S
Hollow shaft type	S	K blind hole	
	D	L through	
Torque support (form)	A	M bolt, Ø 6 mm	
	B	N lug I	O incl. elastomer bushing
Type of connection	E1	P open cable	
	EX	Q socket on the device	
Motor cable length	2.0	R in m	
		S others on request	
Encoder cable length	2.0	T in m	
		U others on request	
Encoder	P10	V potentiometer 10 kΩ	W 10-turn potentiometer
	MWI	X transducer 4 ... 20 mA	Y 10-turn potentiometer
	MWU	Z transducer 0 ... 10 V	A 10-turn potentiometer
		B others on request	
Potentiometer gear ratio*	...	C 1 ... 128 max.	D only with encoders P10, MWI and MWU
Sense of rotation	i	F clockwise ascending values	G only with encoders MWI or MWU
	e	H counter-clockwise ascending values	I only with encoders MWI or MWU

\* Calculation of potentiometer gear ratio: For example, if 120 revolutions are required for one adjustment, then a gear ratio of 12 should be indicated for the 10-turn potentiometer. To be precise: number of revolutions required/10 (10-turn potentiometer) = potentiometer gear ratio

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#### ■ Order code

AG01 -  -  -  -  -  -  -  -  -  -  -   
 A     B     C     D     E     F     G     H     I     K     L

**Scope of delivery:** AG01, User information

**Accessories:**

Mating connectors  
Cable extension  
Motor control MS02

Page 48  
Page 50  
Page 42

**Additional information:**

General information and areas of application

Page 4 cont.

# Actuator AG02

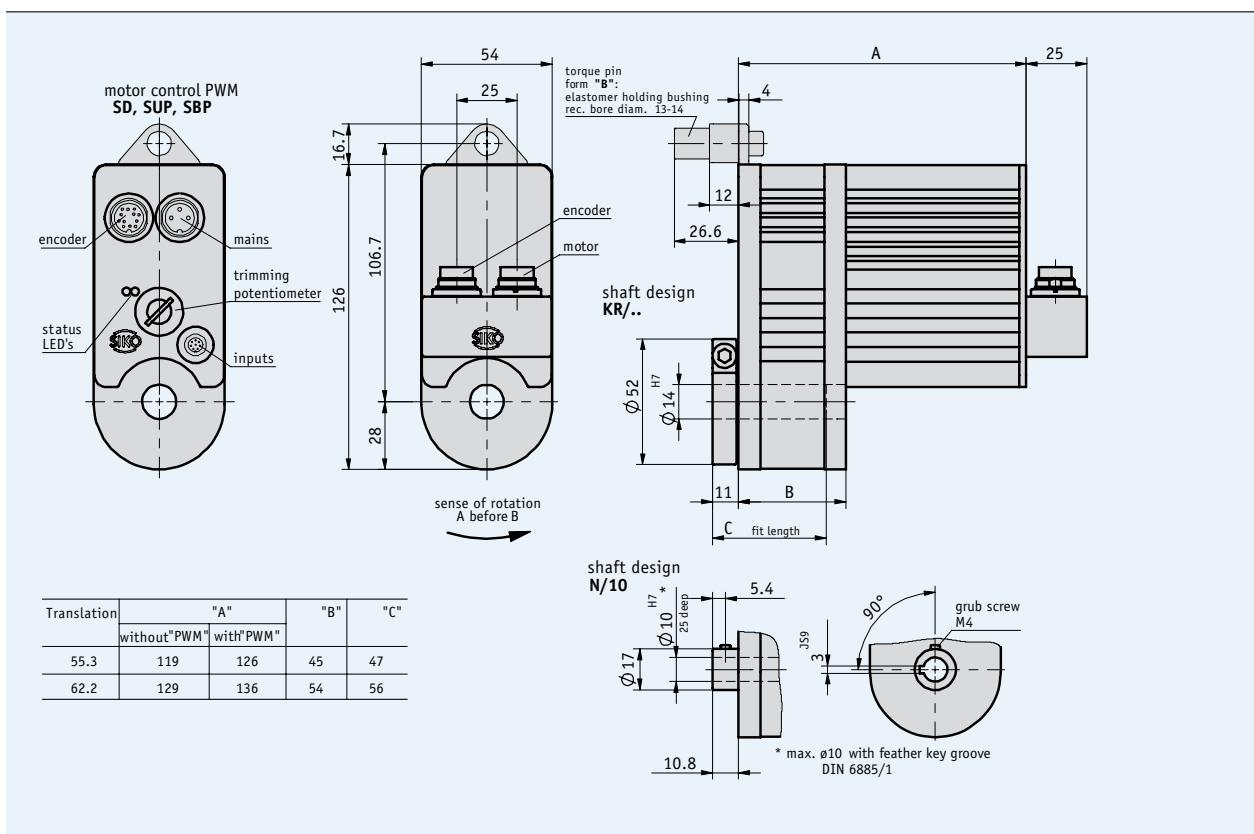
## Incremental

### Profile

- Easy mounting
- Through hollow shafts up to max. Ø 14 mm
- Integrated magnetic position encoder on output shaft
- Integrated motor control (option)



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### Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum	
Nominal torque	5 Nm, 80 rpm (motor 70 W/M) 6 Nm, 70 rpm (motor 70 W/M) 8 Nm, 120 rpm (motor 150 W/M) 9 Nm, 110 rpm (motor 150 W/M)	with i = 55.3 with i = 62.2 with i = 55.3 with i = 62.2
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	-10 ... +80 °C	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	according to DIN 57530, VDE 0530, part 1
Interference protection class	acc. to EN 61000-6-2 and EN 61000-6-4	
Protection category	IP50, others on request	according to DIN VDE 0470
Weight	approx. 1.6 kg	

## Electrical data

### ■ Motor/voltage supply data

Feature	Technical data	Additional information
Voltage supply	0 ... 24 V DC, 24 V DC ±10 %	
Power consumption, fed	150 W; 70 W	
Max. load current	5.8 A ±4 % (150 W) 2.9 A ±4 % (70 W-M)	with $i = 55.3$ with $i = 62.2$
PWM (pulse width modulation)	~16 kHz continuous, 0 ... 100 %	soft start
Inputs	analog, digital	digital with LED indicator
Digital inputs	15 ... 30 V, typically 10 mA	
Analog inputs	0 ... +10 V, -10 ... +10 V	impedance >1.3 MΩ

### ■ Encoder data

Feature	LD5	LD24	OP
Voltage supply	5 V DC ±5 %	24 V DC ±20 %	24 V DC ±20 %
Power consumption	≤50 mA	≤25 mA	≤25 mA
Output circuit	line driver (RS422)	line driver (RS422)	push-pull (OP)
Output signals	(A, B, 0, /A, /B, /0)	(A, B, 0, /A, /B, /0)	(A, B, 0, /A, /B, /0)
Pulse frequency max.	20 kHz	20 kHz	20 kHz

## Pin assignment

### ■ Motor/voltage supply

Signal	PIN
Motor +/ +Ub	1
N.C.	2
Motor -/ 0V	3

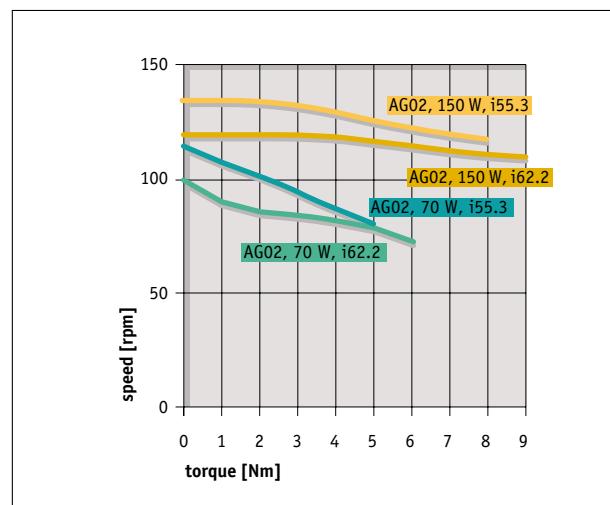
### ■ Encoder

LD24, OP	LD5	PIN
/B	/B	A
N.C.	+SUB (sensor)	B
0	0	C
I	I	D
A	A	E
/A	/A	F
B	B	H
GND	GND	K
N.C.	SGND (sensor)	L
+UB	+UB	M
N.C.	N.C.	G, J

### ■ Motor control PWM

Digital	Analog unipolar	Analog bipolar	PIN
Clockwise plus	enable plus	enable plus	1
Clockwise ground	enable ground	enable ground	2
Counter-clockwise plus	cw/ccw plus	N.C.	3
Counter-clockwise ground	cw/ccw ground	N.C.	4
Fast/creep plus	analog 0 ... +10 V	analog -10 ... +10 V	5
Fast/creep ground	analog ground	analog ground	6
			7, 8

## Performance curve



## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	55.3 62.2	A i = 55.3 A i = 62.2	
Motor rating	150 W 70 W-M	B	only with SD, SUP or SBP motor controls
Shaft design	KR/14 N/10	C clamp ring, Ø 14 mm C keyway, Ø 10 mm C others on request	not with gear ratio 62.2 and motor rating 150 W
Torque support (form)	B OD	D lug D without	incl. elastomer bushing
Position of electrical connection	LR LA	E radial E axial	with external motor control with integrated motor control
Position encoder	LD24 LD5 OP O	F incremental encoder 1000 pulses F incremental encoder 1000 pulses F push-pull with inversion F without	24 V DC ±20 % 5 V DC ±5 % 24 V DC ±20 % only with "Position of electrical connection" LR
Motor control PWM	OMS SD SUP SBP	G without G digital input G analog input, unipolar 0 ... 10 V G analog input, bipolar -10 ... +10 V	only with motor rating 150 W

### ■ Order code

AG02 -   -   -   - D -   -   -   -   - XX/XX - OFB  
A B C D E F G

**Scope of delivery:** AG02, User information

→ **Accessories:**

- Mating connectors Page 48
- Cable extension Page 50
- Motor control MS02 Page 42

**Additional information:**

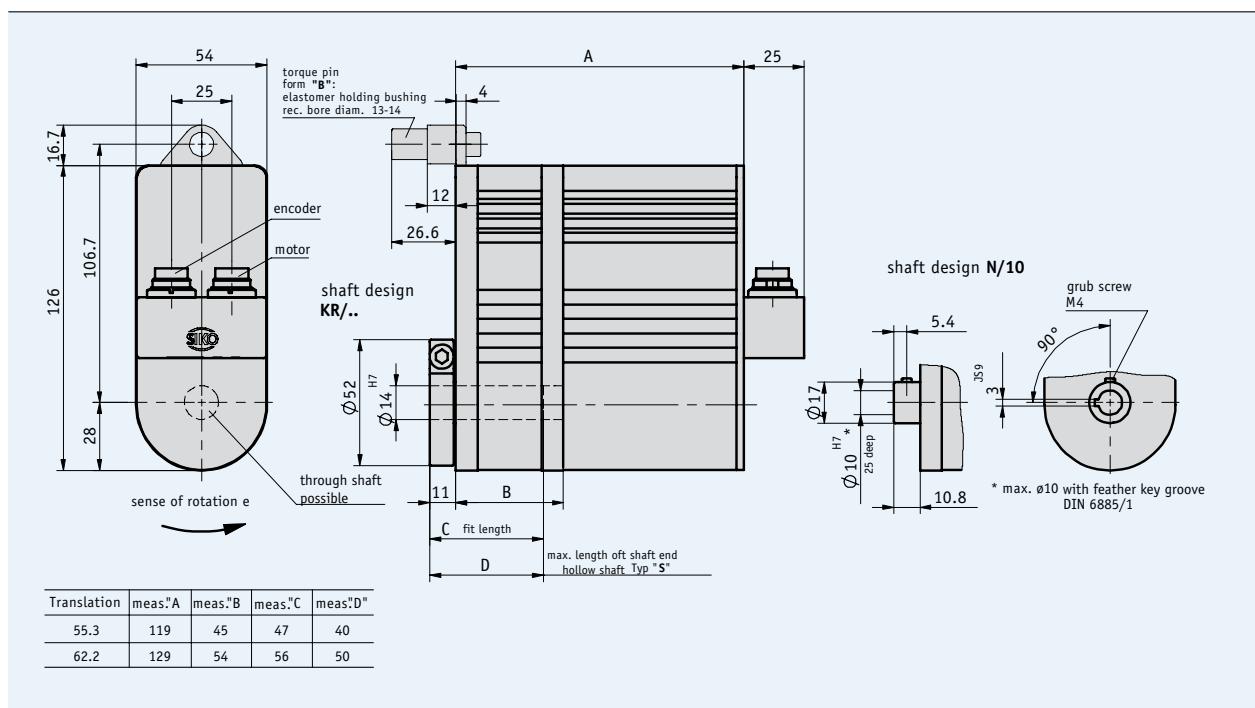
- General information and areas of application Page 4 cont.

### Profile

- Easy mounting
- Optional through hollow shafts up to max. Ø 14 mm
- Integrated analog absolute position encoder



4.1



### Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum	
Nominal torque	8 Nm, 120 rpm (motor 150 W) 9 Nm, 110 rpm (motor 150 W)	with i = 55.3 with i = 62.2
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	-10 ... +80 °C, 0 ... +70 °C mit transducer	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	according to DIN 57530, VDE 0530, part 1
Interference protection class	acc. to EN 61000-6-2 and EN 61000-6-4	
Protection category	IP50, others on request	according to DIN VDE 0470
Weight	approx. 1.8 kg	

## Electrical data

### ■ Motor data

Feature	Technical data	Additional information
Voltage supply	0 ... 24 V DC	
Power consumption, fed	150 W	
Max. load current	5.8 A ± 4 % (150 W)	

### ■ Potentiometer data

Feature	Technical data	Additional information
Resistance tolerance	±5 %	
Linearity tolerance	±0.25 %	
Power rating	2 W at 40 °C	potentiometer
Standard terminal resistor	0.5 % oder 1 Ω, others on request	always the higher value

## 4.1 Pin assignment

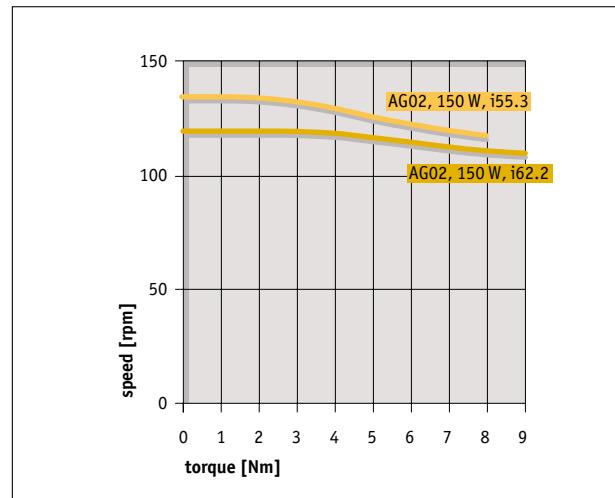
### ■ Motor

Signal	PIN
Motor +	1
N.C.	2
Motor -	3

### ■ Potentiometer

P01/P10	MWI	MWU	PIN
Pe	I-	GND	1
Po	I+	+24 V DC	2
S	N.C.	Uout	3
N.C.	N.C.	N.C.	4-7

## Performance curve



## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	55.3 62.2	A i = 55.3 A i = 62.2	
Shaft design	KR/14 N/10	B clamp ring, Ø 14 mm B keyway, Ø 10 mm B others on request	only with gear ratio 55.3
Hollow shaft type	S D	C blind hole C through	max. shaft end length, see Dimensions
Torque support (form)	B OD	D lug I D without	incl. elastomer bushing
Position encoder	MWI MWU PO1 P10	E transducer 4 ... 20 mA E transducer 0 ... 10 V E potentiometer 1 kΩ E potentiometer 10 kΩ E others on request	10-turn potentiometer 10-turn potentiometer 10-turn potentiometer 10-turn potentiometer
Potentiometer gear ratio*	...	F 1 ... 128 max.	
Sense of rotation	i e	G clockwise ascending values G counter-clockwise ascending values	only with MWI and MWU encoders only with MWI and MWU encoders

\*\* Calculation of potentiometer gear ratio: For example, if 120 revolutions are required for one adjustment, then a gear ratio of 12 should be indicated for the 10-turn potentiometer. To be precise: number of revolutions required/10 (10-turn potentiometer) = potentiometer gear ratio

### ■ Order code

AG02 - [ ] - 150W - [ ] - [ ] - [ ] - LR - [ ] - [ ] - [ ] - OMS - XX/XX - OFB  
 A      B      C      D      E      F      G

*Scope of delivery: AG02, User information*

→ **Accessories:**

- Mating connectors      Page 48
- Cable extension      Page 50
- Motor control MS02      Page 42

**Additional information:**

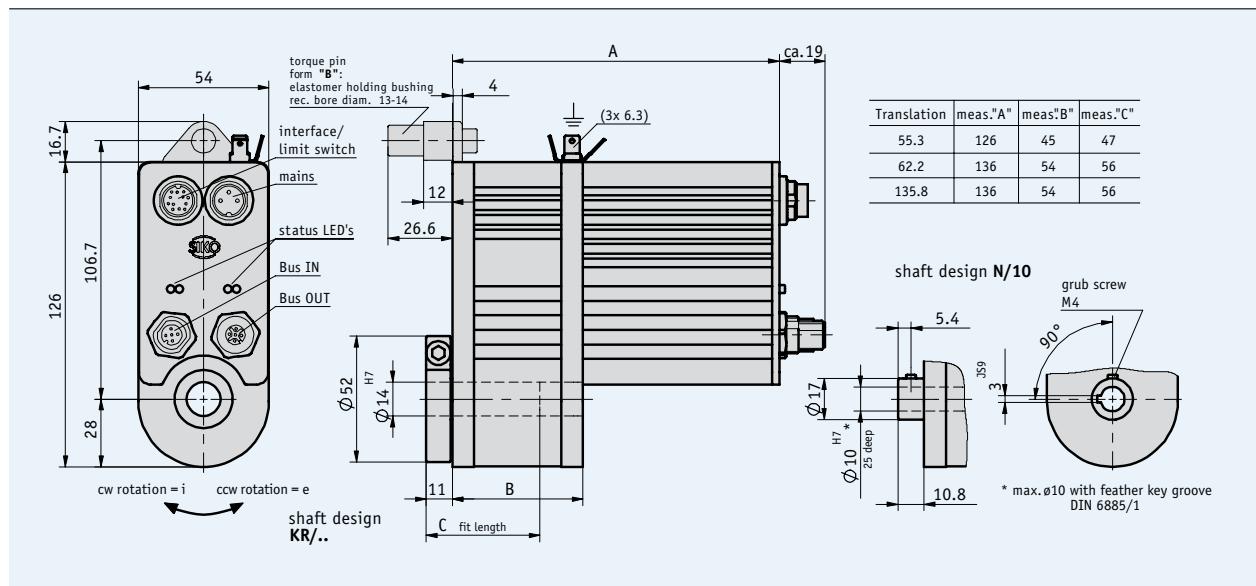
- General information and areas of application      Page 4 cont.

## Profile

- Easy mounting
  - Through hollow shafts up to max. Ø 14 mm
  - Integrated magnetic absolute position encoder on the output shaft
  - Integrated positioning controller
  - Integrated fieldbus interface (option)



4.1



## Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum	
Nominal torque	5 Nm, 80 rpm (motor 70 W/M) 6 Nm, 70 rpm (motor 70 W/M) 9 Nm, 30 rpm (motor 70 W/M)	with i = 55.3 with i = 62.2 with i = 135.8
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +50 °C	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	according to DIN 57530, VDE 0530, part 1
Interference protection class	acc. to EN 61000-6-2 and EN 61000-6-4	
Protection category	IP50, others on request	according to DIN VDE 0470
Weight	approx. 1.2 kg	

## Electrical data

### ■ Motor/voltage supply data

Feature	Technical data	Additional information
Voltage supply	24 V DC $\pm 10\%$	
Power consumption, fed	70 W	
Max. load current	2.9 A $\pm 4\%$	with $i = 55.3$ , $i = 62.2$
	2.1 A $\pm 4\%$	with $i = 135.8$

### ■ Encoder data

Feature	Technical data	Additional information
Resolution absolute encoder (ABM)	$\pm 6250$ revolutions 1600 steps per revolution	

## Pin assignment

### ■ Voltage supply

Signal	PIN
+Ub	1
N.C.	2
-	3

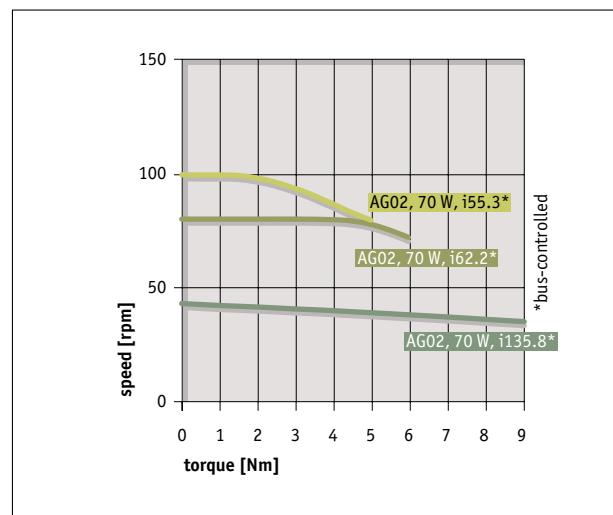
### ■ Fieldbus

Profibus-DP	CANopen	PIN
+5 V DC	N.C.	1
BUS A	N.C.	2
GND	CAN_GND	3
BUS B	CAN_H	4
N.C.	CAN_L	5

### ■ Interface/limit switch

Signal	PIN
ES1	A
ES2	B
Enable (24 V DC)	C
RXD/ DÜA	G
TXD/ DÜB	H
GND/ serial interface	J
GND (ES1, ES2, Emergency-off, CAL)	K
CAL	L
N.C.	D-F, M

## Performance curve



4.1

## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	55.3 62.2 135.8	A i=55.3 i=62.2 i=135.8	
Shaft design	KR/14 N/10	B clamp ring, Ø 14 mm keyway, Ø 10 mm others on request	only with gear ratio 55.3 or 62.2
Torque support (form)	B OD	C lug I without	incl. elastomer bushing
Interface/protocol	S1/00 S3/00	D RS232, standard, electronic controller RS485, standard, electronic controller	
Fieldbus	OFB PB CAN	E without fieldbus Profibus-DP CANopen	

4.1

### ■ Order code

AG02 - **A** - **70 W** - **B** - **D** - **C** - **LA** - **ABM** - **OMS** - **D** - **E** - **SW**

**Scope of delivery:** AG02, User information  
CD (manual, GDS and EDS files)

**Accessories:**

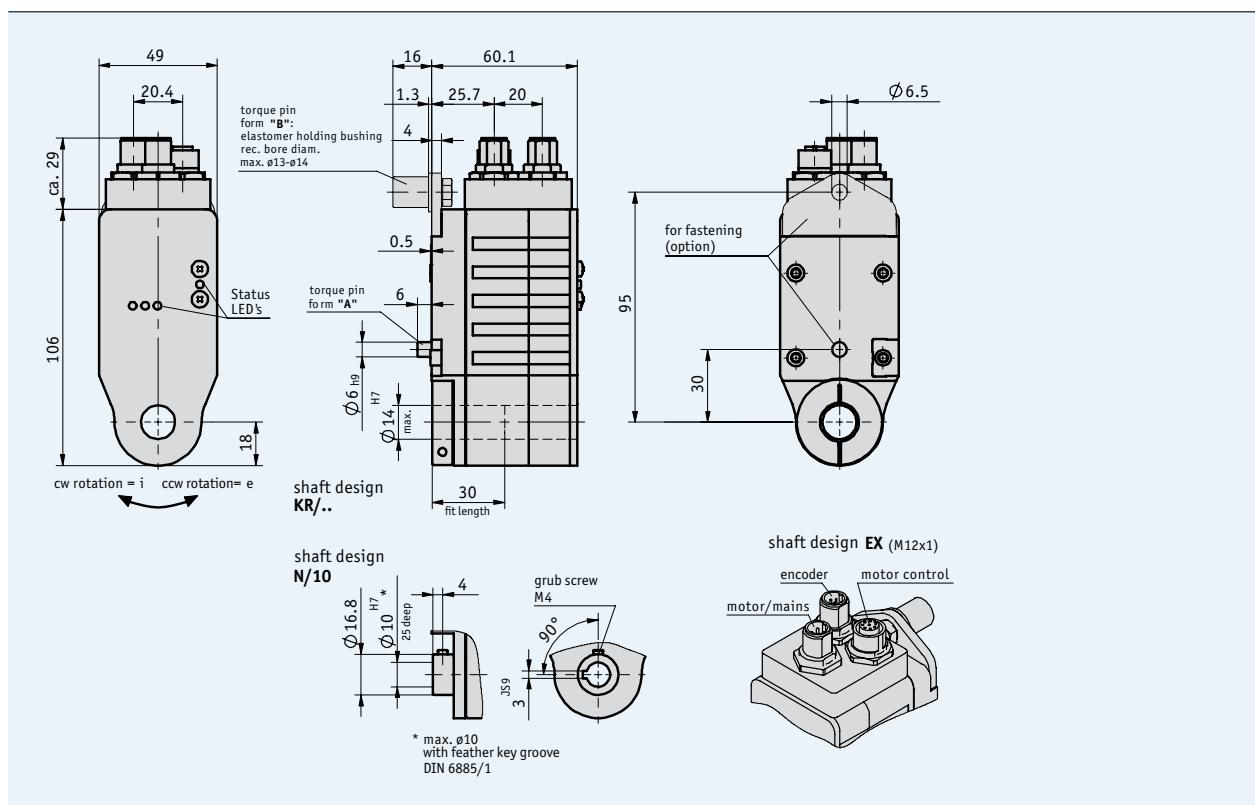
- |                        |            |
|------------------------|------------|
| Mating connectors      | Page 48    |
| Cable extension        | Page 50    |
| Programming tool PT232 | Page 44    |
| Programming tool PT485 | Page 46    |
| S7 module              | on request |

**Additional information:**

- |  |              |
|--|--------------|
| General information and areas of application | Page 4 cont. |
|--|--------------|

## Profile

- Space-saving, easy mounting
  - Through hollow shafts up to max. Ø 14 mm
  - Integrated magnetic position encoder on output shaft
  - Brushless EC motor with a long service life
  - Integrated power and control electronics with inverse polarity and overload protection
  - Electrical connection via M12 connector



4.1

## Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum, zinc die-cast powder-coated	
Nominal torque	1.6 Nm, 200 rpm 3.2 Nm, 100 rpm	with $i = 24$ with $i = 48$
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +80 °C	condensation inadmissible
Ambient temperature	0 ... +45 °C	
Operating mode	short-time operation S2, 25 % duty cycle	DIN 57530, VDE 0530 part 1
Interference protection class	category C2	EN 61800-3
Protection category	IP50, IP63, IP65	DIN VDE 0470
Weight	approx. 0.7 kg	

## Electrical data

### ■ Motor/control data

Feature	Technical data	Additional information
Voltage supply	+24 V DC ±10 %	with inverse-polarity protection
Power consumption, fed	58 W	
Rated current with output value 100 %	2.4 A ±7 % (50W-M)	max. load current 2.58 A
Idle current (with gear)	300 mA ±20 %	
PWM (pulse width modulation)	~16 kHz continuous, 0 ... 100 %	soft start
Inputs	analog, digital	digital with LED indicator
Digital inputs	15 ... 30 V, typically 10 mA	
Analog inputs	0 ... +10 V, -10 ... +10 V	impedance >1.3 MΩ

### ■ Encoder data

Feature	LD24	OP
Voltage supply	24 V DC ±20 %	24 V DC ±20 %
Power consumption	≤25 mA	≤25 mA
Output circuit	line driver (RS422)	push-pull (OP)
Output signals	(A, B, 0, /A, /B, /0)	(A, B, 0, /A, /B, /0)
Pulse frequency max.	20 kHz	20 kHz

## Pin assignment

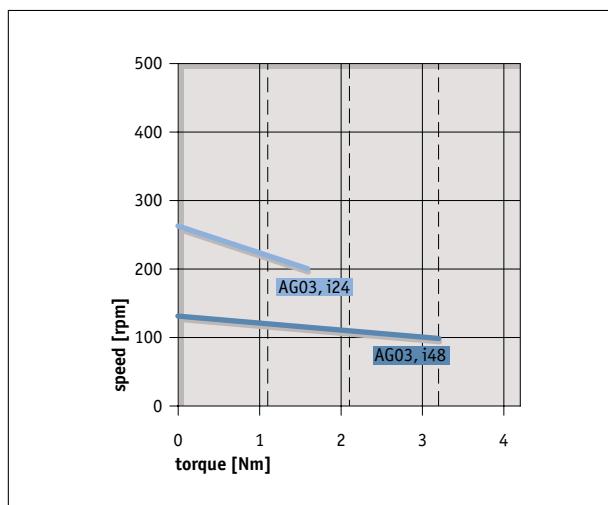
### ■ Motor/voltage supply

Signal	PIN
+	1
N.C.	2
-	3
N.C.	4

### ■ Encoder, LD24/OP, 8-pin

Signal	PIN	Additional information
+SUB	1	sensor
SGND	2	sensor
A	3	
/A	4	
B	5	
/B	6	
0	7	
I	8	

## Performance curve



### ■ Motor control PWM

digital	Analog unipolar	Analog bipolar	PIN
Clockwise plus	enable plus	enable plus	1
Clockwise ground	enable ground	enable ground	2
Counter-clockwise plus	cw/ccw plus	N.C.	3
Counter-clockwise ground	cw/ccw ground	N.C.	4
Fast/creep plus	analog 0 ... +10 V	analog -10 ... +10 V	5
Fast/creep ground	analog ground	analog ground	6
N.C.	N.C.	N.C.	7, 8

## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	48	i = 48	25 % duty cycle
	24	A i = 24	25 % duty cycle
Protection category	IP50	B	
	IP63		
	IP65		
Shaft design	KR/14	C clamp ring, Ø 14 mm	
	KR/12	clamp ring, Ø 12 mm	
	N/10	keyway, Ø 10 mm	
Torque support (form)	A	D bolt, Ø 6 mm	
	B	D lug I	incl. elastomer bushing
Encoder	LD24	E incremental encoder 1024 pulses	
	OP	E push-pull with inversion	
	O	without	
Motor control PWM	SD	F digital	galvanically isolated
	SUP	F analog unipolar	0 ... +10 V
	SBP	F analog bipolar	-10 ... +10 V

### ■ Order code

AG03 -   - 50W-M -   -   -   - EX -   -   - OFB

A      B      C      D      E      F

**Scope of delivery:** AG03, User information

**Accessories:**  
Mating connectors

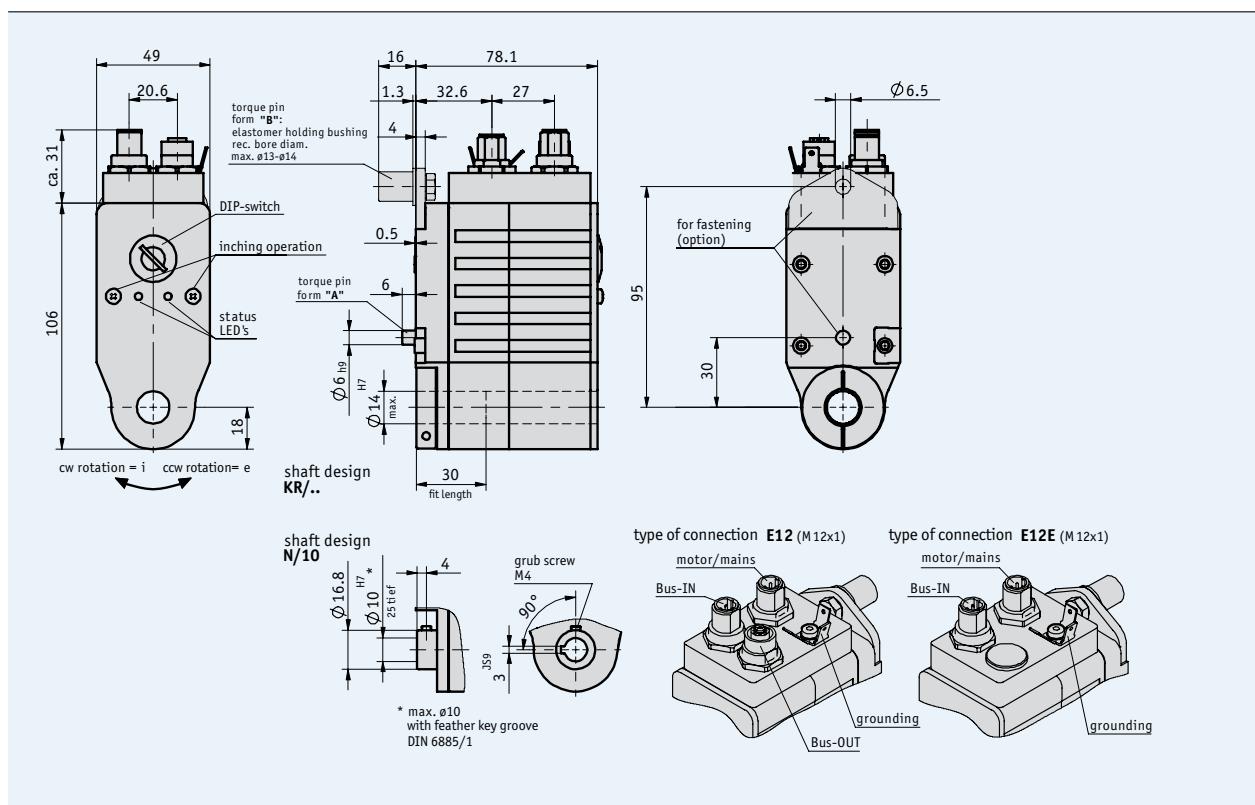
Page 48

**Additional information:**  
General information and areas of application

Page 4 cont.

### Profile

- Space-saving, easy mounting
- Through hollow shafts up to max. Ø 14 mm
- Integrated magnetic absolute position encoder on the output shaft
- Brushless EC motor with a long service life
- Integrated position controller
- Integrated fieldbus interface
- Electrical connection via M12 connector



### Mechanical data

Feature	Technical data	Additional information
Hollow shaft	browned steel	
Housing	aluminum, zinc die-cast powder-coated	
Nominal torque	1.6 Nm, 200 rpm 3.2 Nm, 100 rpm	with i = 24 with i = 48
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +80 °C	condensation inadmissible
Ambient temperature	0 ... +45 °C	
Operating mode	short-time operation S2, 25 % duty cycle	DIN 57530, VDE 0530 part 1
Interference protection class	category C2	EN 61800-3
Protection category	IP50, IP63, IP65	DIN VDE 0470
Weight	approx. 0.8 kg	

## Electrical data

### ■ Motor/control data

Feature	Technical data	Additional information
Voltage supply	+24 V DC $\pm 10\%$	with inverse-polarity protection
Power consumption, fed	58 W	
Rated current with output value 100 %	2.4 A $\pm 7\%$ (50W-M)	max. load current 2.58 A
Idle current (with gear)	300 mA $\pm 20\%$	

### ■ Encoder data

Feature	Technical data	Additional information
Resolution absolute encoder (ABM)	$\pm 6250$ revolutions 1600 steps per revolution	

## Pin assignment

### ■ Voltage supply

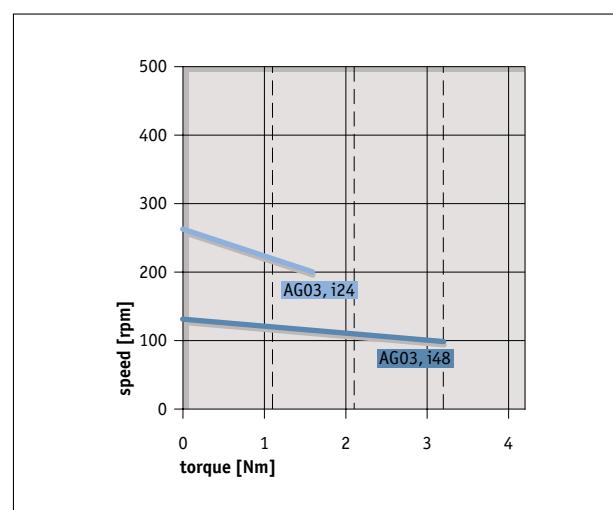
Signal	PIN
+ Ub (24 V DC)	1
Enable (24 V DC)	2
- GND	3
N.C.	4

### ■ Fieldbus

Profibus-DP	CANopen	PIN
N.C.	N.C.	1
BUS A	N.C.	2
N.C.	CAN_GND	3
BUS B	CAN_H	4
N.C.	CAN_L	5

## Performance curve

4.1



## Order

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	48	<b>A</b>	25 % duty cycle
	24		25 % duty cycle
Protection category	IP50	<b>B</b>	
	IP63		
	IP65		
Shaft design	KR/14	<b>C</b>	clamp ring, Ø 14 mm
	KR/12		clamp ring, Ø 12 mm
	N/10		keyway, Ø 10 mm
Torque support (form)	A	<b>D</b>	bolt, Ø 6 mm
	B		lug I incl. elastomer bushing
Type of connection	E12	<b>E</b>	Bus-IN/Bus-OUT
	E12E		Bus-IN
Fieldbus	PB	<b>F</b>	Profibus-DP
	CAN		CANopen

### ■ Order code

AG03 - **A** - **50W-M** - **B** - **C** - **D** - **E** - **ABM** - **OMS** - **F** - **SW**

**Scope of delivery:** AG03, User information  
CD (manual, GDS and EDS files)

**Accessories:**  
Mating connectors  
S7 module

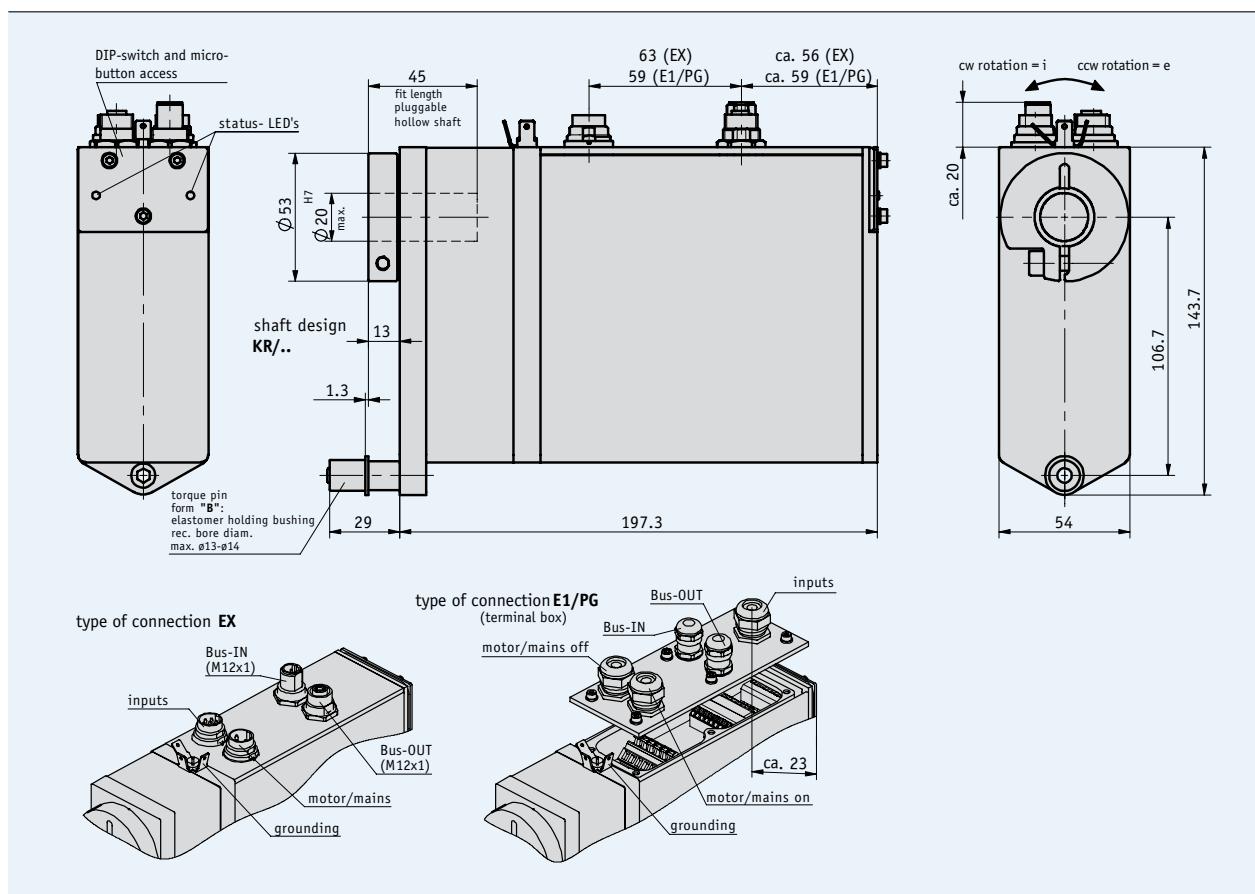
Page 48  
on request

**Additional information:**  
General information and areas of application

Page 4 cont.

## Profile

- Easy mounting
  - Stainless steel hollow shafts up to max. Ø 20 mm
  - "Manual" traveling without control via micro-button
  - Brushless 160 W, 24 V DC motor with long service life
  - Integrated magnetic absolute position encoder on the output shaft
  - Electrical connection via spring terminals or connector
  - Integrated positioning controller
  - Integrated fieldbus interface
  - Integrated spring-operated brake (option)



## Mechanical data

Feature	Technical data	Additional information
Hollow shaft/clamp ring	stainless steel	Nirosta
Housing	aluminum	
Nominal torque	6 Nm, 150 rpm ( $\pm 5\%$ ) 10 Nm, 90 rpm ( $\pm 5\%$ ) 14 Nm, 64 rpm ( $\pm 5\%$ )	with $i = 30.6$ with $i = 50.0$ with $i = 70.8$
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	0 ... +80 °C	condensation inadmissible
Ambient temperature	0 ... +45 °C	
Operating mode	short-time operation S2, 25 % duty cycle	DIN 57530, VDE 0530 part 1
Interference protection class	category C3	EN 61800-3
Protection category	IP50, IP54, IP65	DIN VDE 0470
Weight	approx. 3.2 kg	

## Electrical data

4.1

### ■ Motor/control data

Feature	Technical data	Additional information
Voltage supply	24 V DC $\pm 20\%$	with inverse-polarity protection
Power consumption, fed	approx. 160 W	
Rated current	6.5 A	with output value 100 %
Idle current	350 mA $\pm 20\%$	

### ■ Encoder data

Feature	Technical data	Additional information
Resolution	1024 increments/revolution	10 bit
Number of revolutions	254	8 bit (rounded)
	4094	12 bit (rounded)

## Pin assignment

### ■ Motor/voltage supply

Signal	EX	E1 (terminal)
+Ub	1	X1.1 X1.2
Enable	2	X3.5
GND	3	X1.3 X1.4
Screen		X1.5 X1.6

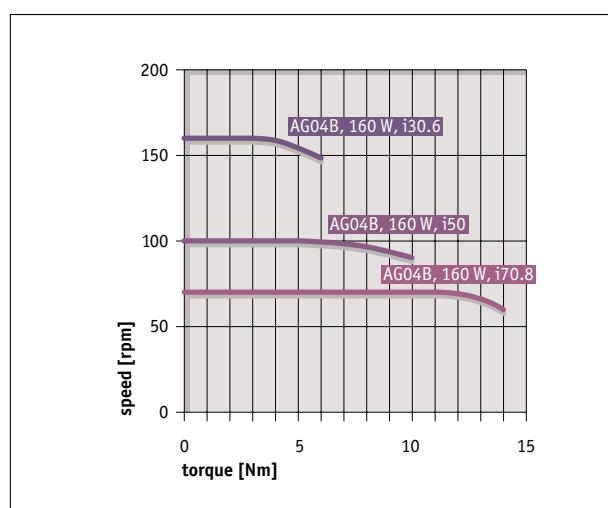
### ■ Fieldbus

Signal	EX	E1 (terminal)
do not connect!	1	
BUS A	2	X2.2, X2.9
do not connect!	3	
BUS B	4	X2.1, X2.10
do not connect!	5	X2.3, X2.4, X2.5, X2.6, X2.7, X2.8

### ■ Inputs

Signal	EX	E1 (terminal)
Limit switch 1	1	X3.1
Limit switch 2	2	X3.2
Input 1	3	X3.3
Input 2	4	X3.4
N.C.	5-7	
Enable		X3.5
EXT_GND		X3.6
GND		X3.7

## Performance curve



## Order

### ■ Order table

Feature	Order data	Specification	Additional information
Gear ratio	<b>70.8</b>	A i = 70.8	approx. 14 Nm at 60 rpm
	<b>50</b>	i = 50.0	approx. 10 Nm at 90 rpm
	<b>30.6</b>	i = 30.6	approx. 6 Nm at 150 rpm
		others on request	
Motor/brake	<b>160W/MB</b> <b>160W/OB</b>	B 160 W EC motor with brake 160 W EC motor without brake	
Protection category	<b>IP50</b> <b>IP54</b> <b>IP65</b>	C	
Shaft design/diameter	<b>KR/20</b> <b>KR/14</b>	D clamp ring Ø 20 mm stainless steel hollow shaft clamp ring Ø 14 mm stainless steel hollow shaft others on request	
Type of connection	<b>EX</b> <b>E1/PG</b>	E industry connector (2x M12, 2x M16) terminal box (5x PG9)	without network output with network output
Number of revolutions	<b>254</b> <b>4094</b>	F 8-bit (rounded) 12-bit (rounded)	254 revolutions 4094 revolutions

### ■ Order code

AG04B - **A** - **B** - **C** - **D** - **B** - **E** - **F** - **PB** - **SW**

**Scope of delivery:** AG04B, User information, CD (manual, GSD file)

**Accessories:**

Mating connectors  
Cable extension  
S7 module

Page 48  
Page 50  
on request

**Additional information:**

General information and areas of application

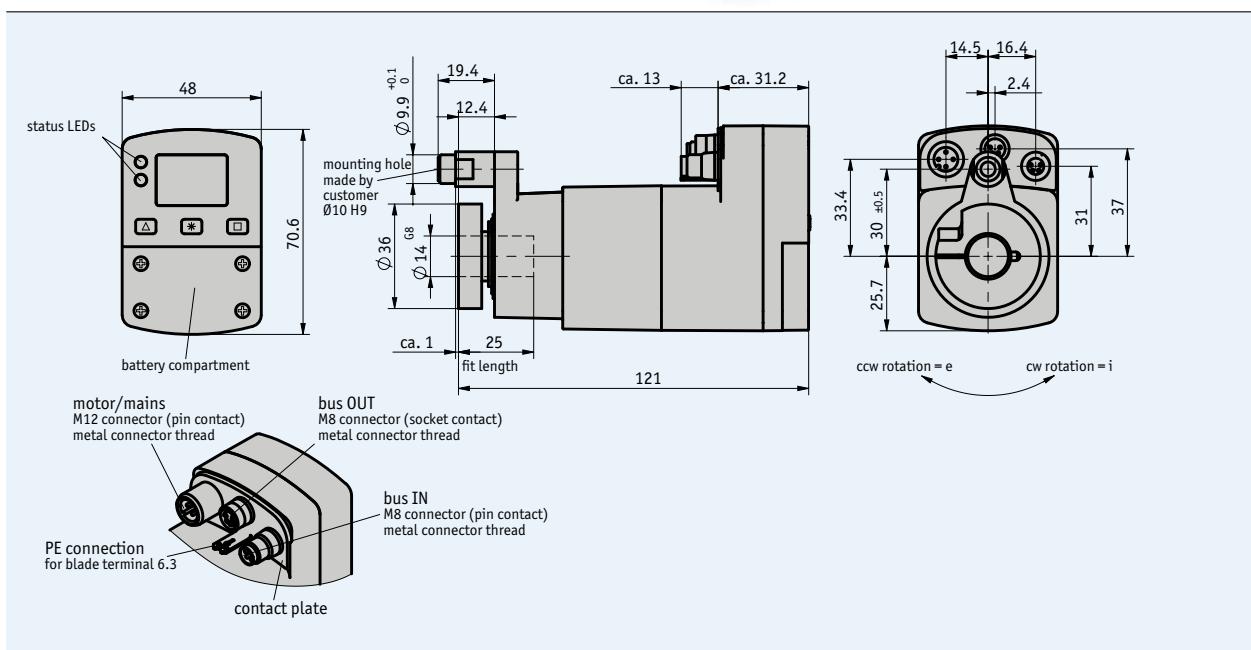
Page 4 cont.

### Profile

- easy mounting, no additional coupling needed
- stainless steel 14 mm hollow shaft, glass fibre reinforced casing
- brushless 24 VDC motor with long life cycle
- solid absolute sensor, magnetic sensing technology
- 2-line LCD for target and position value and programming keys
- 2 LEDs for user prompting
- integral RS485 or CANopen interface
- integral position controller
- M8 + M12 component mounting technology



4.1



### Mechanical data

Feature	Technical data	Additional information
Pluggable hollow shaft	stainless steel	
Clamping ring/torque pin	aluminium hard anodized	
Housing	glass fiber reinforced plastic	
Nominal torque (max.), nominal rated speed	3 Nm, 26 min <sup>-1</sup> ± 10 %, with i = 98 5 Nm, 16 min <sup>-1</sup> ± 10 %, with i = 173	25 % ED-S2, DIN 57530-1, basis time 10 min 25 % ED-S2, DIN 57530-1, basis time 10 min
Shock resistance	50 g, 8 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	max. 10 g, 5 ... 150 Hz	DIN EN 60068-2-6
Ambient temperature	0 ... +45 °C	
Storage temperature	0 ... +50 °C	
Humidity	condensation inadmissible	
Interference protection class	category C1	EN 61800-3
Protection category	IP54, IP65	DIN VDE 0470, with mounted mating connectors
Weight	~0.45 kg	
Display	LCD	7-segment plus decimal; two lines each with 5 digits, special signs
Special signs	battery, directional arrows	
Display signs	~7mm high	double display
Signal display	two LEDs	function description (see manual)
Keyboard	parametrizing, reset, inching operation, setpoint setting	

## Electrical data

### ■ Motor/voltage supply data

Feature	Technical data	Additional information
Operating voltage	24 V DC $\pm 10\%$ reverse-polarity protection	
Power input	$\sim 26\text{ W}$	
Rated current, power	$1\text{ A} \pm 10\%$	with maximum torque
Maximum current draw	1.1 A	with output value 100 %
Battery service life	$\sim 5\text{ years}$	depending on ambient conditions
Type of connection	1x M12, 2x M8 connector	4-pin, 1xsocket, 2xplug, earthing via flat connector 6.3 mm
Bus connection	RS485	no galvanic isolation

### ■ Encoder data

Feature	Technical data	Additional information
Resolution	720 increments/revolution	
Anzahl Umdrehungen	$\pm 1300$ revolution, with $i=98$	
	$\pm 750$ revolution, with $i=173$	

4.1

## Pin assignment

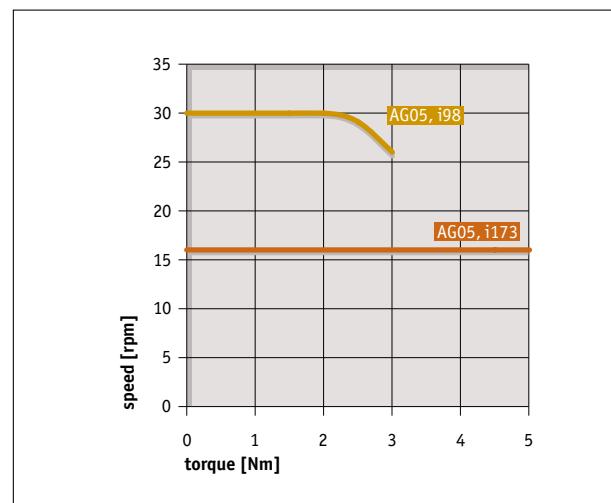
### ■ Power/electronics M12 (A encoded)

Signal	PIN
+24 V power/output stage	1
+24 V control unit	2
GND power/output stage	3
GND control unit	4

### ■ Interfaces M8

Signal	PIN
TxRx-/DÜB	1
TxRx+/DÜA	2
N.C.	3
GND	4

## Performance curve



## Order

### ■ Order table

Feature	Order data	Specification	Additional information
Gear ratio	98	i = 98	~ 3 Nm, 26 rpm
	173	A i = 173	~ 5 Nm, 16 rpm
Protection category	IP54	B	
	IP65	B on request	
Shaft design/diameter	KR/14	C clamping ring Ø 14 mm	
		C others on request	
Interface/protocol	S5/00	D RS485	
	CAN	D CANopen	

### ■ Order code

AG05 -   - 30W -   -   - ABM -   D

4.1

**Scope of delivery:** AG05, Mounting instructions,  
CD (manual, EDS file)

**Accessories:**  
Mating connectors  
Cable extension

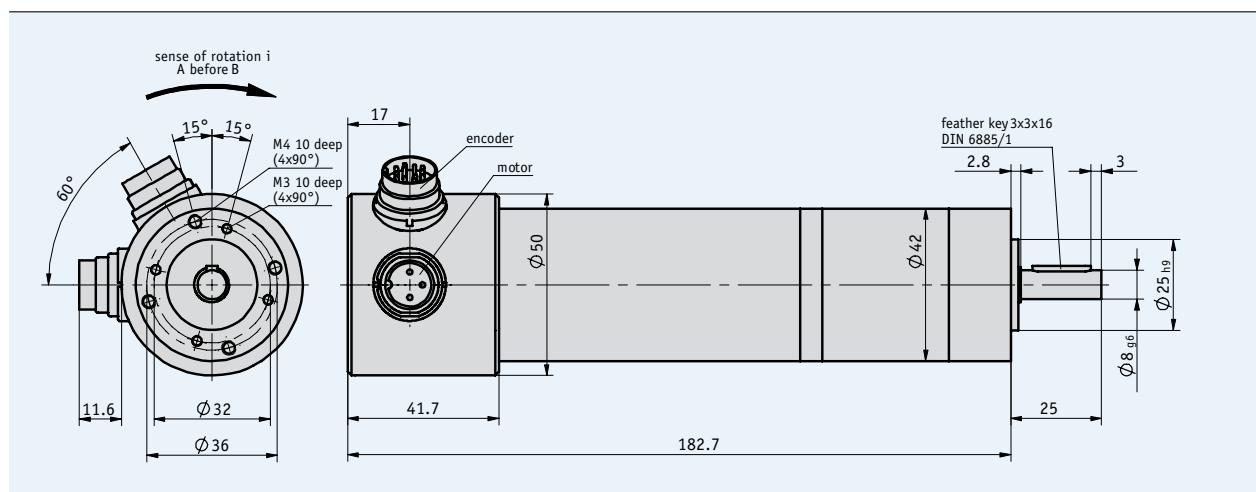
Page 48  
Page 50

**Additional information:**  
General information and areas of application

Page 4 cont.

### Profile

- Solid 10 mm shaft with feather
- Integrated magnetic position encoder



4.1

### Mechanical data

Feature	Technical data	Additional information
Shaft	steel	
Housing	steel, aluminum	
Flanges	aluminum	
Nominal torque	4.2 Nm, 140 rpm	with $i = 45.56$
Shock resistance	50 g, 11 ms	DIN EN 60068-2-27
Vibration resistance axial, radial	10 g, 50 Hz	DIN EN 60068-2-6
Operating temperature	-10 ... +80 °C	condensation inadmissible
Operating mode	short-time operation S2, 25 % duty cycle	DIN 57530, VDE 0530 part 1
Interference protection class	EN 61000-6-2, EN 61000-6-4	
Protection category	IP40	according to DIN VDE 0470
Weight	approx. 1.1 kg	

## Electrical data

### ■ Motor data

Feature	Technical data	Additional information
Motor voltage supply	0 ... 24 V DC	
Power consumption, fed	77 W	
Rated current	4.6 A ±20 %	

### ■ Encoder data

Feature	Technical data	Additional information
Voltage supply encoder	24 V DC ±20 %	use terminating resistors ≥470 Ω
Encoder	magnetic	25 pulses/revolution (motor shaft)
Power consumption encoder	<70 mA	
Output circuit	line driver (A, B, /A, /B)	LD 24 V DC

## Pin assignment

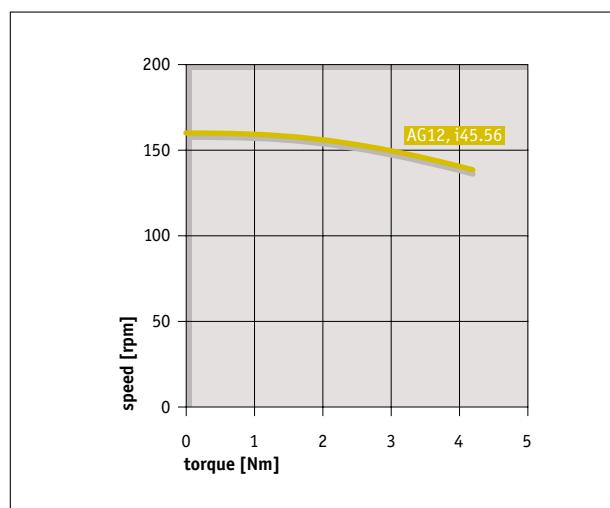
### ■ Motor

Signal	PIN
+	1
N.C.	2
-	3

### ■ Encoder

Signal	PIN	Additional information
/B	A	
+SUB	B	sensor
A	E	
/A	F	
B	H	
GND	K	
SGND	L	sensor
+UB	M	
N.C.	C, D, G, I	

## Performance curve



## Order

### ■ Calculation formula

Pulse number/revolution on the driving shaft

$$\text{pulses/revolution} = i \times 25$$

i = gear ratio

### ■ Order table

Feature	Order text	Specification	Additional information
Gear ratio	<b>45.56</b>	i = 45.56 others on request	

### ■ Order code

**AG12** -   - EX  
A

**Scope of delivery:** AG12, User information

#### Accessories:

Mating connectors  
Motor control MS02

Page 48  
Page 42

#### Additional information:

General information and areas of application

Page 4 cont.

**4.1**

# 4 · ?



**4.1 | Actuators**

3

**4.2 | Accessories**

**4.1**

<b>Products</b>		
Motor Control Module MS02	42	
Programming Tool PT232	44	
Cable Adaptor KA232	45	
Programming Tool PT485	46	
Cable Adaptor KA485	47	
Mating Connectors	48	
Cable extension KV02S0	51	
Cable extension KV03S0	52	
Cable extension KV04S0	54	
Cable extension KV07S0	56	
Cable extension KV08S0	57	
Cable extension KV12S0	58	

**4.2**

**4.3 | Product index, Contact information**

61

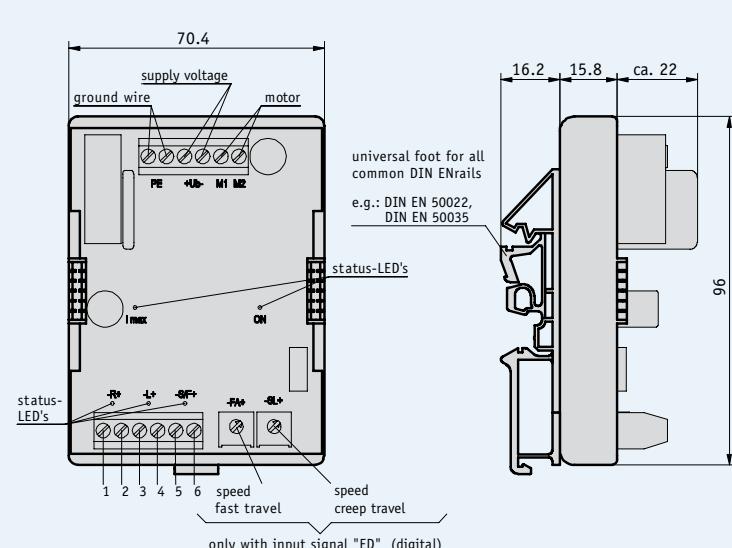
**4.3**

# Motor control module MS02

## Accessories

### Profile

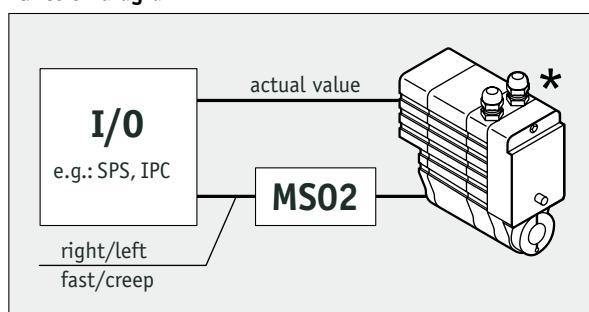
- Easy mounting (top-hat rail)
- Variable control variants
- Use with different positioning controls
- Fast or creep motion continuously variable
- Pulse width modulation (PWM) for 24 V DC actuators



### Mechanical data

Feature	Technical data	Additional information
Temperature range	0 ... +50 °C	
Humidity	0 ... 95 % rF, condensation inadmissible	

### Function diagram



\* can be used with AG01, AG02, AG12

## Electrical data

Feature	Technical data	Additional information
Supply voltage	24 V DC $\pm 20\%$ (regulated)	with LED indicator
Motor current (continuous)	3/5/6 A (max. 12 A peak)	
PWM (pulse width modulation)	$\sim 16$ kHz, continuous, 0 ... 100 %	soft start
Inputs	digital, analog	digital with LED indicator
Digital inputs	+15 ... +30 V, typically 10 mA	
Analog inputs	0 ... +10 V; -10 ... +10 V	impedance $>1.3 \text{ M}\Omega$
Protection	inverse-polarity prot., overcurrent prot.	with multi-fuse and LED indicator

## Pin assignment

### Terminal board

digital	Analog unipolar	Analog bipolar	PIN
Clockwise ground	enable ground	enable ground	1
Clockwise plus	enable plus	enable plus	2
Counter-clockwise ground	cw/ccw ground	N.C.	3
Counter-clockwise plus	cw/ccw plus	N.C.	4
Fast/creep ground	analog ground	analog ground	5
Fast/creep plus	analog 0 ... +10 V	analog -10 ... +10 V	6

4.2

## Order

### Order table

Feature	Order text	Specification	Additional information
Load current	3A 5A 6A	A	others on request, max. 12 A
Input signal	ED EUP EBP	B	digital 0 ... +10 V, impedance $>1.3 \text{ M}\Omega$ analog unipolar -10 ... +10 V, impedance $>1.3 \text{ M}\Omega$ analog bipolar

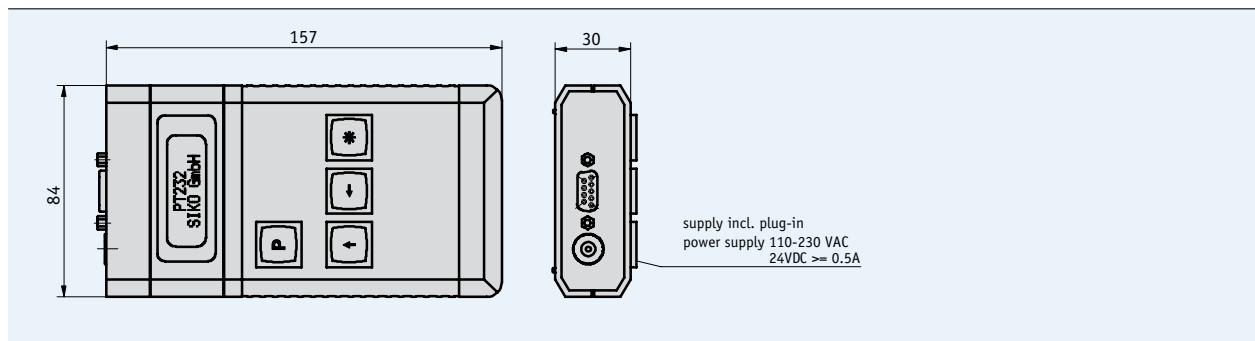
### Order code

MS02 -  -   
 

Scope of delivery: MS02, User information

### Profile

- Illuminated 2-line plain text LC display
- Easy handling thanks to a clear menu structure
- Unambiguous programming and reading of parameters
- Can be connected directly to the appropriate terminal device via KA232 cable adaptor



### Mechanical data

Feature	Technical data	Additional information
Supply	24 V DC with inverse-polarity protection	round low-voltage connector (5.5 mm external/2.1 mm internal)
Display	LCD dot matrix, backlit	2x12 characters
Temperature range	0 ... +50 °C	

### Pin assignment

#### ■ Supply

Signal	PIN
+UB	internal
GND	external

#### ■ D-SUB

Signal	PIN
+UB	1
RXD	2
TXD	3
GND	5
N.C.	4, 6-9

### Order

#### ■ Order code

**PT232**

**Scope of delivery:** PT232, User information,  
Connector power pack 110 ... 230 VAC

**Accessories:**  
KA232 Cable adaptor

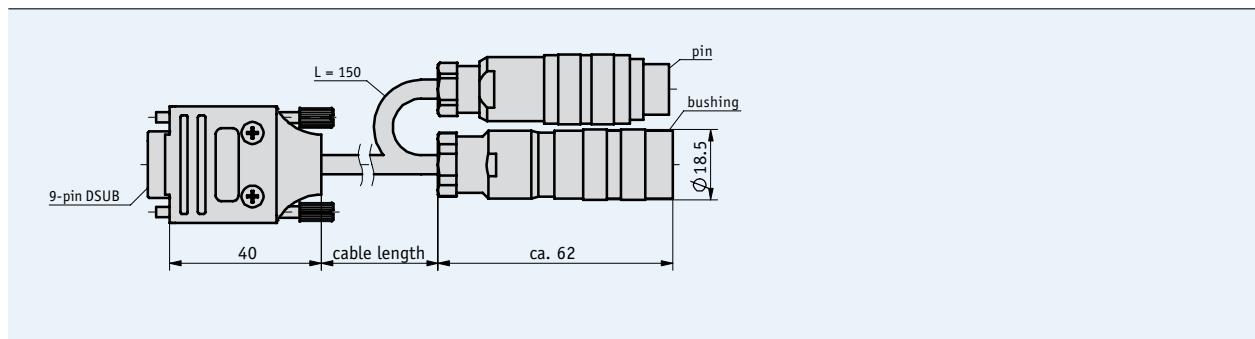
Page 45

**Additional information:**  
General information and areas of application

Page 4 cont.

### Profile

- Ready-to-use cable connection
- Cable lengths up to 5 m



### Mechanical data

Feature	Technical data	Additional information
Cable	PVC	
Temperature range	-30 ... +80 °C	

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Cable length in m	... <b>A</b>	<b>1.0, 2.0, 5.0</b>	

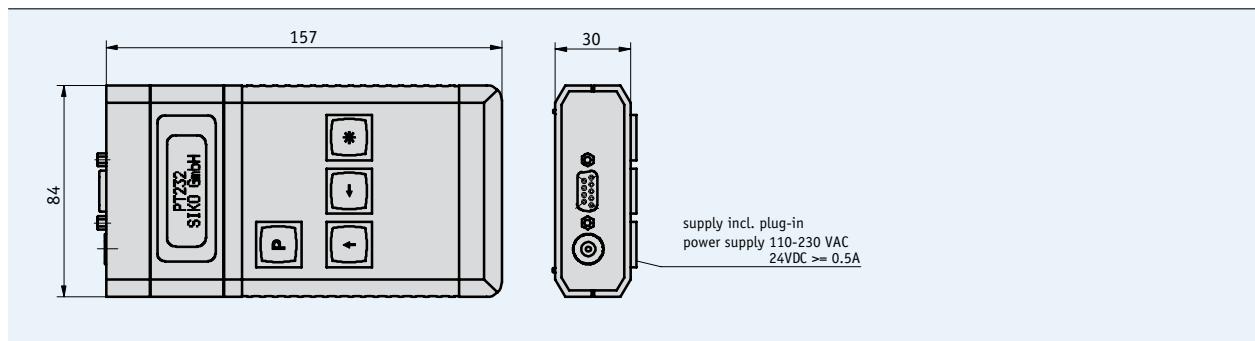
#### ■ Order code

**KA232** - **AG02/S1/00** - **A**

*Scope of delivery: KA232*

### Profile

- 2-line illuminated LC plain text display
- Easy handling thanks to a clear menu structure
- Unambiguous programming and reading of parameters
- Can be connected directly to the appropriate terminal device via KA485 cable adaptor



### Mechanical data

Feature	Technical data	Additional information
Supply	24 V DC with inverse-polarity protection	round low-voltage connector (5.5 mm external/2.1 mm internal)
Display	LCD dot matrix, backlit	2x12 characters
Temperature range	0 ... +50 °C	

### Pin assignment

#### ■ Supply

Signal	PIN
+UB	internal
GND	external

#### ■ D-SUB

Signal	PIN
+UB	1
DÜA	3
GND	5
DÜB	8
N.C.	2, 4, 6, 7, 9

### Order

#### ■ Order code

**PT485**

**Scope of delivery:** PT485, User information,  
Connector power pack 110 ... 230 VAC

**Accessories:**  
Cable adaptor KA485

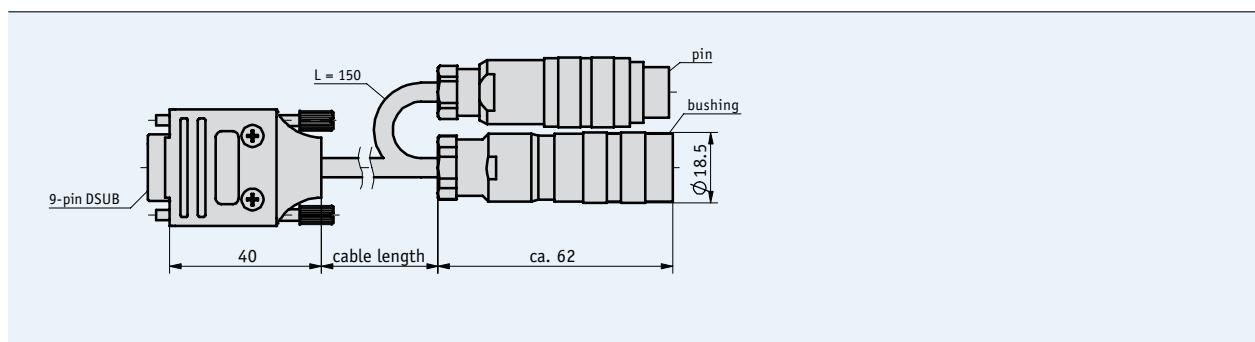
Page 47

**Additional information:**  
General information and areas of application

Page 4 cont.

### Profile

- Ready-to-use cable connection
- Cable lengths up to 5 m



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PVC	
Temperature range	-30 ... +80 °C	

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Cable length in m	...	A 1.0, 2.0, 5.0	

#### ■ Order code

KA485 - **AG02/S3/00** - **A** - **OS**

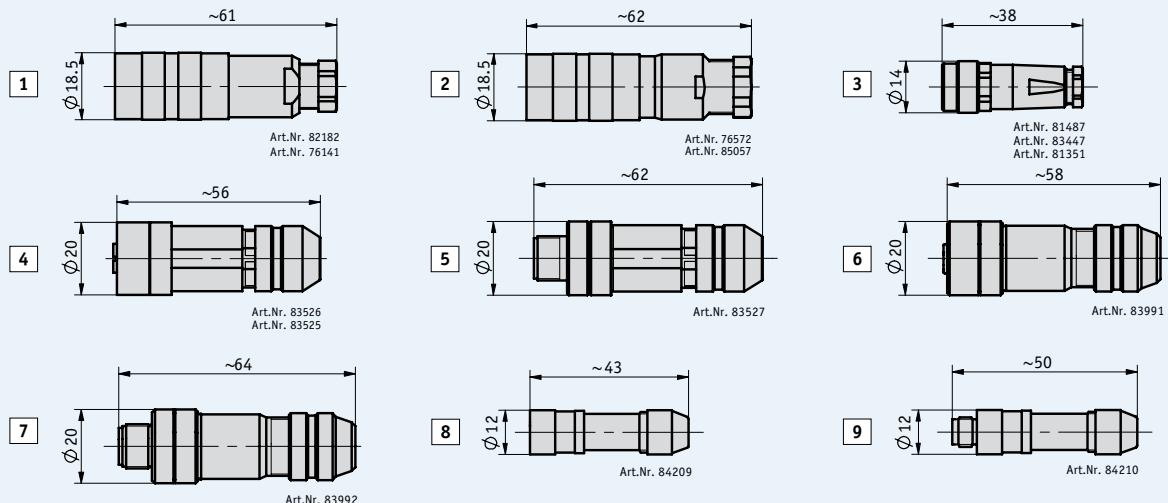
*Scope of delivery: KA485*

### Profile

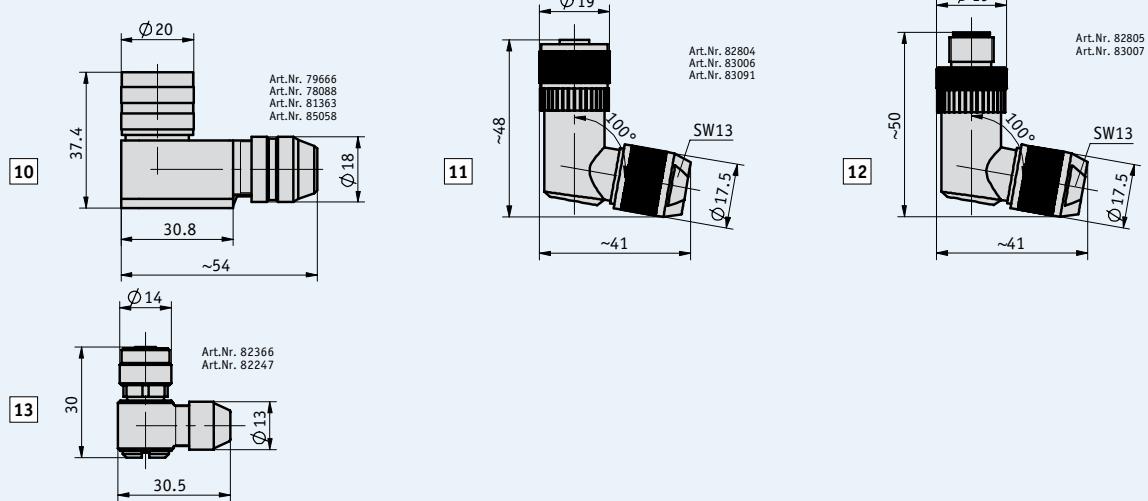
- Mating connectors, straight
- Mating connectors, offset
- Bus terminator, straight

 When screwed, the distance to the device will increase by approx. 3 mm.

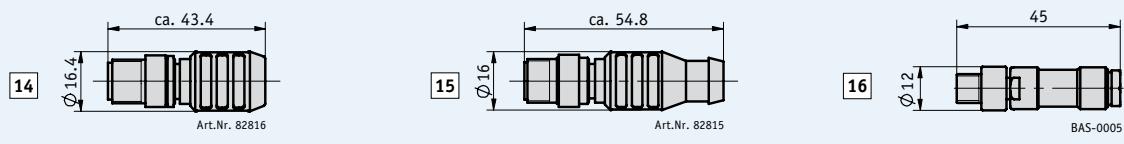
#### Mating connectors, straight



#### Mating connectors, offset



#### Bus terminator, straight



## Order

### ■ Order matrix

				Actuators									
				AG01 incre- mental	AG01 analog	AG02 incre- mental	AG02 analog	AG02 fieldbus	AG03 incre- mental	AG03 fieldbus	AG04B fieldbus	AG05 fieldbus	AG12 incre- mental
	Pict.	PIN	Ø cable	Order data									
<b>Mating connectors, straight</b>													
Encoder/ digital inputs	1	7	4 ... 6	76141				•			•		
Encoder	2	12	6 ... 8	76572			•		•				•
	3	8	3.5 ... 5	81351	•					•			
	4	8	6 ... 8	83525									
Potentiometer	3	3	3.5 ... 5	81487		•							
Motor/ voltage supply	1	3	4 ... 6	82182			•	•	•				•
	2	3	6 ... 8	85057							•		
Motor	3	4	3.5 ... 5	83447	•	•							
Voltage supply	4	4	6 ... 8	83526					•	•			
Motor control	3	8	3.5 ... 5	81351			•						
	5	8	6 ... 8	83527					•				
Fieldbus IN	8	4	3.5 ... 5	84209								•	
Fieldbus OUT	9	4	3.5 ... 5	84210								•	
Profibus IN	6	5	6 ... 8	83991				•		•	•		
Profibus OUT	7	5	6 ... 8	83992				•		•	•		
CANopen IN	6	5	6 ... 8	84109				•		•			
CANopen OUT	7	5	6 ... 8	84732				•		•			
<b>Mating connectors, offset</b>													
Encoder/ digital inputs	10	7	4 ... 6	78088				•			•		
	10	12	6 ... 8	79666			•		•				•
Motor/ voltage supply	10	3	4 ... 6	81363		•		•	•				•
	10	3	6 ... 8	85058							•		
Motor	13	4	3.5 ... 5	82247	•								
Voltage supply	13	4	3.5 ... 5	82247					•				
Voltage supply	11	4	3.5 ... 5	83091							•		
Potentiometer	13	3	3.5 ... 5	82366	•								
Profibus IN	11	5	4 ... 8	82804				•		•	•		
Profibus OUT	12	5	4 ... 8	82805				•		•	•		
CANopen IN	11	5	4 ... 8	83006				•		•			
CANopen OUT	12	5	4 ... 8	83007				•		•			
<b>Bus terminator, straight</b>													
Profibus	14	5		82816					•				
CAN-Bus	15	5		82815					•				
Fieldbus	16	4		BAS-0005								•	

4.2

### ■ Order code (see Product matrix)

*Scope of delivery: Mating connector*

## DriveLine accessories

### ■ Matrix for cable extensions

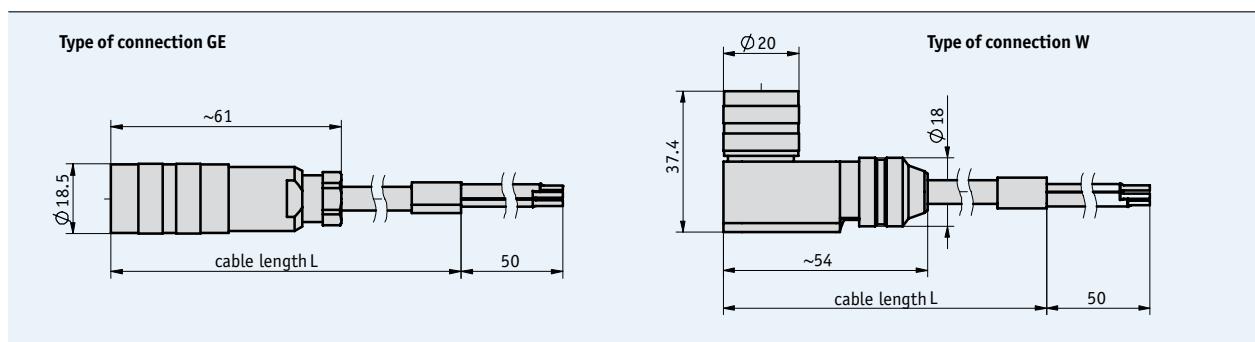
Cable extensions are available for a number of DriveLine actuators. The appropriate pin assignments can be found on the relevant product pages (see matrix).

	Actuators							
	AG01 incre- mental	AG01 analog	AG02 incre- mental	AG02 analog	AG02 fieldbus	AG04B fieldbus	AG05 fieldbus	AG12 incre- mental
<b>4.2</b>								
<b>Page</b>	<b>Cable</b>	<b>Products</b>						
<b>Cable extension</b>								
<a href="#">51</a>	PVC	KV02S0		•	•	•		•
<a href="#">52</a>	PUR	KV03S0	•					
<a href="#">53</a>	PVC	KV03S1				•		
<a href="#">54</a>	PVC	KV04S0	•	•				
<a href="#">55</a>	PUR	KV04S1					•	
<a href="#">56</a>	PUR	KV07S0			•		•	
<a href="#">57</a>	PVC	KV08S0	•	•				
<a href="#">58</a>	PUR	KV12S0		•	•			•

### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

**!** *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PVC, Ø6.3 mm, 2 x 0.75 mm <sup>2</sup>	
Temperature range	-30 ... +80 °C	

### Pin assignment

#### KV02S0

Cable number	PIN
1 (black)	1
	2
2 (black)	3

### Order

#### Order table

Feature	Order text	Specification	Additional information
Type of connection	GE A	straight connector	
	W B	angle connector	not for KV12S1

Cable length ... B 1 ... 20 m, in steps of 1 m

#### Order code

KV02S0 -   -    
A      B

*Scope of delivery: KV02S0, User information*

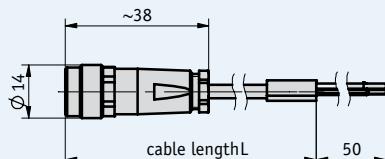
### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

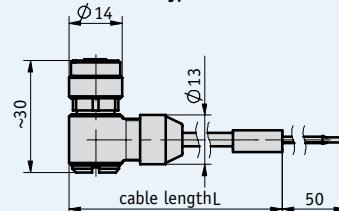
**!** *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



Type of connection GE



Type of connection W



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PUR, Ø3.5 mm, 3 x 0.15 mm <sup>2</sup>	
Temperature range	-30 ... +80 °C	

### Pin assignment

- KV03SO

Cable color	PIN
brown	1
green	2
white	3

### Order

- Order table

Feature	Order text	Specification	Additional information
Type of connection	GE A	straight connector	
	W B	angle connector	not for KV12S1

Cable length ... B 1 ... 20 m, in steps of 1 m

- Order code

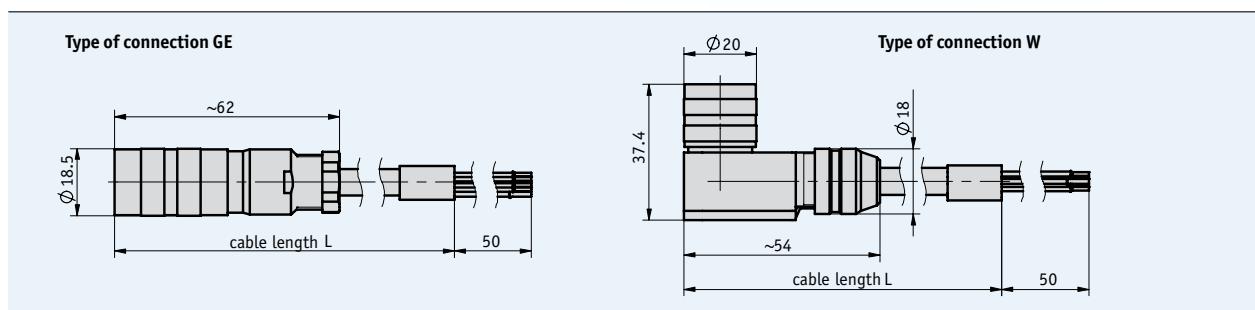
KV03SO - **A** - **B**

*Scope of delivery: KV03SO, User information*

### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

 *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PUR, Ø7.5 mm, 3 x 0.75 mm <sup>2</sup>	
Temperature range	-30 ... +100 °C	

### Pin assignment

#### ■ KV03S1

Cable number	PIN
1 (black)	1
2 (black)	2
3 (black)	3

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Type of connection	GE W	A straight connector B angle connector	
Cable length	... B	1 ... 20 m, in steps of 1 m	

#### ■ Order code

KV03S1 -   -    
A      B

*Scope of delivery: KV03S1, User information*

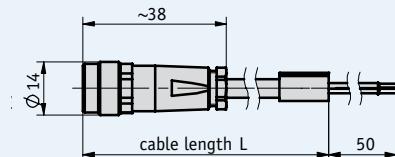
### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

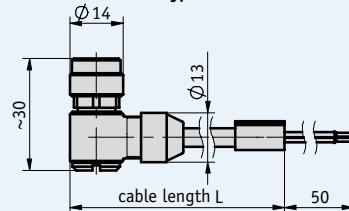
**!** *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



Type of connection GE



Type of connection W



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PVC, Ø4.8 mm, 4 x 0.15 mm <sup>2</sup>	
Temperature range	-30 ... +80 °C	

### Pin assignment

#### ■ KV04S0

Cable color	PIN
white	1
brown	2
green	3
yellow	4

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Type of connection	GE W	A straight connector angle connector	not for KV12S1
Cable length	...	B 1 ... 20 m, in steps of 1 m	

#### ■ Order code

KV04S0 - **A** - **B**

*Scope of delivery: KV04S0, User information*

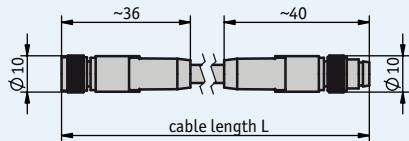
### Profile

- Ready-to-use cable connection
- Cable lengths up to 10 m

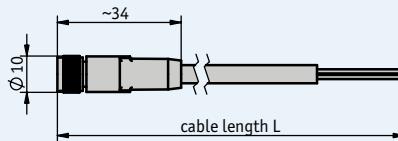
 *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



Type of connection GE/GE



Type of connection GE



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PUR, Ø4.8 mm, 4 x 0.25 mm <sup>2</sup>	
Temperature range	-30 ... +100 °C	

### Pin assignment

#### ■ KV04S1

Cable color	PIN
brown	1
white	2
blue	3
black	4

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Type of connection	GE GE/GE A	M8 bushing, flying leads M8 bushing, M8 connector	only cable length 3.0, 5.0, 10.0 m
Cable length	... B	0.5, 1.0, 3.0, 5.0, 10.0 m	others on request

#### ■ Order code

KV04S1 -   -    
A      B

# Cable extension KV07SO

## Accessories

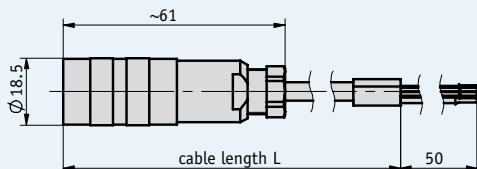
### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

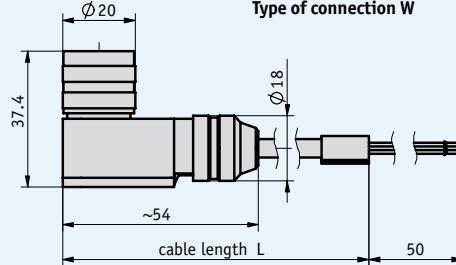
**!** Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.



Type of connection GE



Type of connection W



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PUR, Ø5.1 mm, 7 x 0.14 mm <sup>2</sup>	
Temperature range	-30 ... +80 °C	

### Pin assignment

#### ■ KV07SO

Cable color	PIN
white	1
brown	2
green	3
yellow	4

Cable color	PIN
gray	5
pink	6
blue	7

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Type of connection	GE      A	straight connector	
	W      B	angle connector	not for KV12S1

Cable length      ...      B      1 ... 20 m, in steps of 1 m

#### ■ Order code

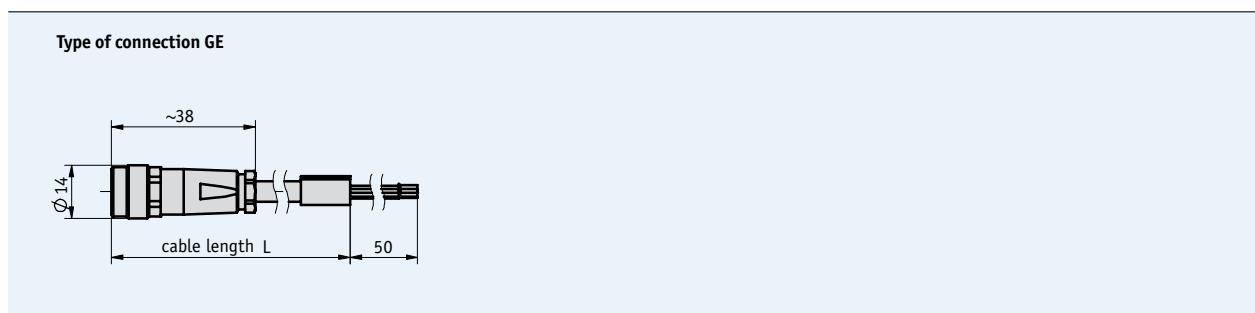
KV07SO -    -     
A      B

Scope of delivery: KV07SO, User information

### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

 *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



### Mechanical data

Feature	Technical data	Additional information
Cable	PVC, Ø5.4 mm, 8 x 0.14 mm <sup>2</sup>	
Temperature range	-30 ... +80 °C	

### Pin assignment

#### ■ KV08S0

Cable color	PIN
white	1
brown	2
green	3
yellow	4

Cable color	PIN
gray	5
pink	6
blue	7
red	8

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Cable length	...	A 1 ... 20 m, in steps of 1 m	

#### ■ Order code

KV08S0 -   
A

*Scope of delivery: KV08S0, User information*

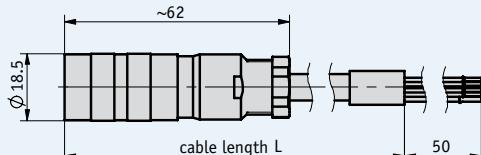
### Profile

- Ready-to-use cable connection
- Cable lengths up to 20 m

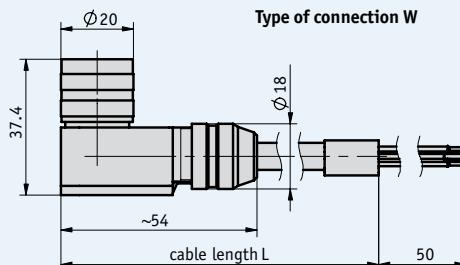
 *Voltage drop should be envisaged with increasing cable length. This should be taken into account for the electrical design.*



Type of connection GE



Type of connection W



4.2

### Mechanical data

Feature	Technical data	Additional information
Cable	PUR, Ø 7.3 mm, 12 x 0.25 mm <sup>2</sup>	
Temperature range	-30 ... +100 °C	

### Pin assignment

#### ■ KV12S0

Cable color	PIN
blue	A
violet	B
green	C
red	D
yellow	E
pink	F

Cable color	PIN
red-blue	G
white	H
gray-pink	J
gray	K
black	L
brown	M

### Order

#### ■ Order table

Feature	Order text	Specification	Additional information
Type of connection	GE W	A straight connector B angle connector	
Cable length	...	B 1 ... 20 m, in steps of 1 m	

#### ■ Order code

KV12S0 -   -    
 A       B

*Scope of delivery: KV12S0, User information*

**4.2**

# 4.3



<b>4.1   Actuators</b>	3
<b>4.2   Accessories</b>	41
<b>4.3   Product index, Contact information</b>	61

4.1

4.2

4.3

**Actuators****PT485**

**AG04B**  
**AG01**  
**MS02**

Device	Type	Page
<b>A</b>		
AG01	Actuator, incremental, hollow shaft	10
AG01	Actuator, analog, hollow shaft	13
AG02	Actuator, incremental , hollow shaft	16
AG02	Actuator, analog, hollow shaft	19
AG02	Actuator, fieldbus, hollow shaft	22
AG03	Actuator, incremental, hollow shaft	25
AG03	Actuator, fieldbus, hollow shaft	28
AG04B	Actuator, fieldbus, hollow shaft	31
AG05	Actuator, fieldbus, hollow shaft	34
AG12	Actuator, incremental, solid shaft	37

**4.3**

KA232	Cable adaptor	45
KA485	Cable adaptor	47
KV02S0	Cable extension	51
KV03S0	Cable extension	52
KV03S1	Cable extension	55
KV04S0	Cable extension	54
KV04S1	Cable extension	54
KV07S0	Cable extension	56
KV08S0	Cable extension	57
KV12S0	Cable extension	58

M		
	Mating connectors	48
MS02	Motor control	42

P		
PT232	Programming Tool	44
PT485	Programming Tool	46

## Germany

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