measurement display control
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DriveLine

Drive Technology:

...New Dynamics for Production Processes.

SIKO

In a nutshell...

Functional comparison of all DriveLine products.

	AG01	AG02	AG03	AG12
Speed/torque				
Torque max.	4.2 Nm	9.0 Nm	3.2 Nm	15.0 Nm
Speed max.	500 min^{-1}	120 min^{-1}	200 min^{-1}	1600 min^{-1}
driving shaft				
Hollow shaft, max. diameter	clamping ring/14 mm	clamping ring/14 mm	clamping ring/14 mm	
Solid shaft, max. diameter				keyed/10 mm
transmitter				
Incremental Encoder	•	•	•	•
Potentiometer	•	•		
Absolute encoder		•		
Outputs				
Without	•	•	•	
Potentiometric	•	•		
Current source 4 ... 20 mA	•	•		
Voltage 0 ... 10 V DC	•	•		
Incremental LD5	•	•		
Incremental LD24	•	•	•	•
Incremental OP	•	•	•	
Absolute digital		•		
Fieldbus (optional)		ProfiBus/CANopen		
Motor control				
Integrated/external [i/e]	[e] optional	[i/e] optional	[i]	[e] optional

Product philosophy
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.

Constant product change and widely varying product sizes are everyday occurences in many branches of industry and require numerous setting and adjustment changes to the feed and auxiliary axes.

Typical applications are to be found in production machines in the metal, packaging, wood, glass, print and plastics industries as well as in tool machines and special machines.

Acceleration Factor 4
Minimizing the adjustment times of the 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 per cent. Other advantages of the actuators are their excellent price-performance ratio, simple control behavior, long service life and, last but not least, the high starting torque, which enables dirt-bound spindles to break free.

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.

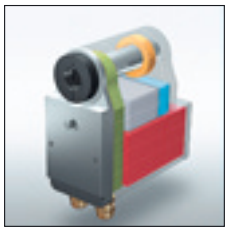
Contents


AG02 with Hollow shaft


AG12 with solid shaft

DriveLine: the driving force in the dynamic race against time.

Control centrally, change locally: Motor spindle drives make it possible



■ Drive,
■ gear,
■ encoder,
■ electronics:
Compact construction promises short reaction times.

With its DriveLine actuators, SIKO is pursuing an innovative concept, which enables central control and local, automatic execution of spindle adjustment.

An actuator consists of the following precisely matched components:

- high-performance DC motor
- spur gear/epicyclic gear in hollow or solid shaft configuration
- position transducer
- power/control electronics

Combining these components in a well thought-out, extremely compact, modular design sets new standards with regard to size and performance.

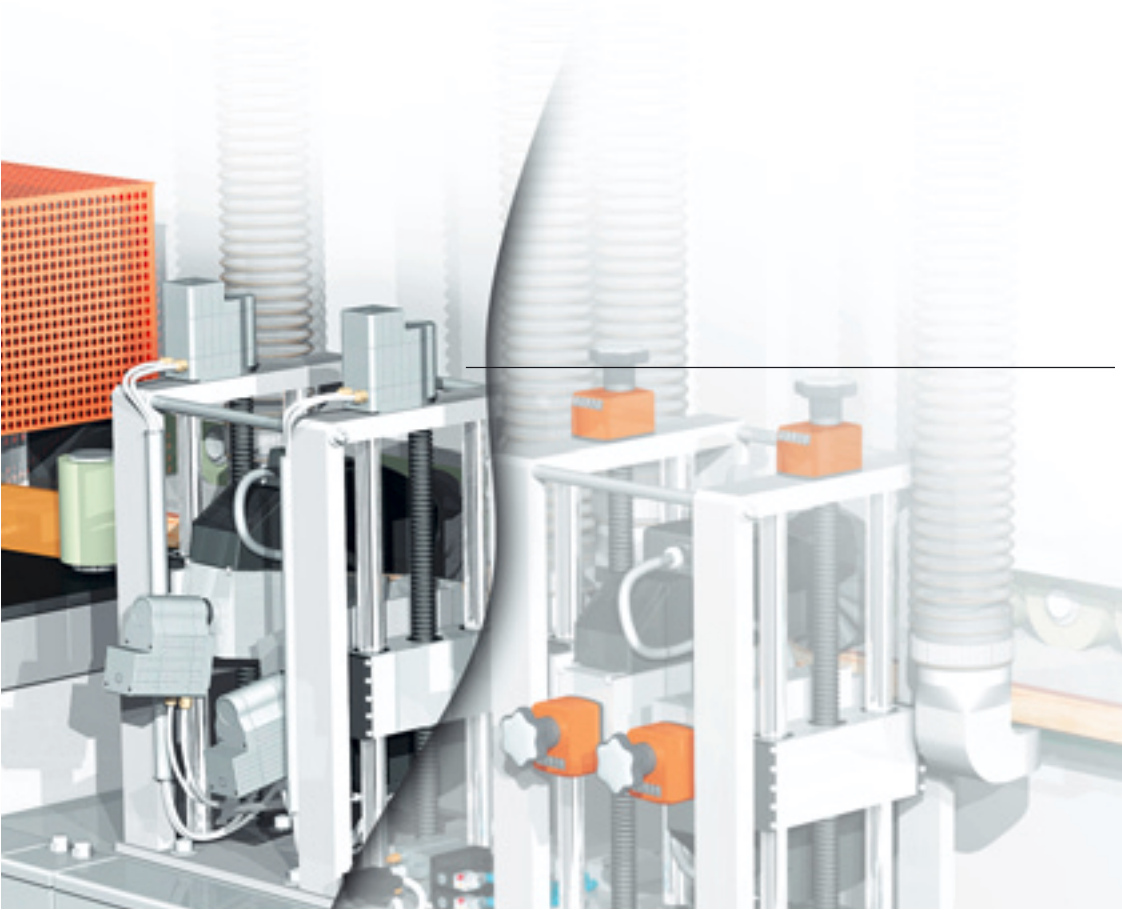
The gearbox housing is made of zinc die casting and aluminum. The spur gear transmission, available in a series of gear ratios, has cogwheels of high-tensile special steel.

The drive is provided by 24 V DC high-performance motors. For their low construction volume, they deliver an enormous output of up to 150 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 clamp ring (keyway optional), thus dispensing with expensive couplings or mounting flanges.

A playfree (incremental) encoder mounted directly on the hollow drive shaft provides precise measured value sensing, thereby enabling positioning tasks even in the micrometer range.

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



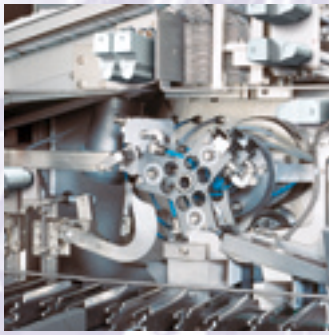
Manual adjustments are a thing of the past: The true strength of the DriveLine actuators lies in the useful series connection. When these modules are centrally controlled, they accomplish the adjusting work in only one cycle.

Application in the metal work-ing industry: Spacing of guide rollers is regulated in a laser welding system for stainless steel pipes.

Industrial production requires precise, economic solutions. Particularly with frequently repeated setting changes, manual intervention often proves too expensive.

Centrally controlled units of the SIKO drive technology, with its robust components combined in a compact housing and working logically together, provide an efficient solution here. They enable all adjustment spindles of a system to be operated within only one cycle time.

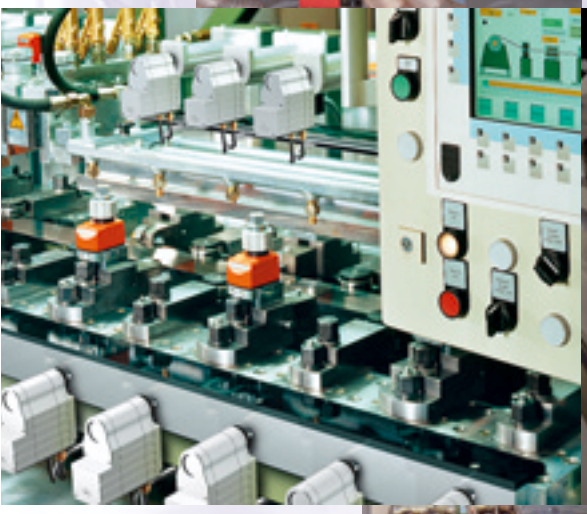
Fast set-up times, perfect finish: DriveLine actuators have proven their value in application on edge gluing presses and guarantee consistent quality for "on-the-fly" production changes.



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.

Highly dynamic production environments such as these folding box systems require teamwork: DriveLine actuators ensure quick, precise equipment positioning.

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



Many adjustments in the shortest possible time, performable from a control terminal: The exceptional utility of this ultra-compact adjustment and control technology is demonstrated here.

Watchmen over time and quality: DriveLine actuators open up new perspectives for intelligent automation (above: gluing robots; on the left: autonomous mass-production at a bottling plant).

Pictures taken at company works: Bosch, Brandt, Dreistern, Hebrock, Homag, SIKO

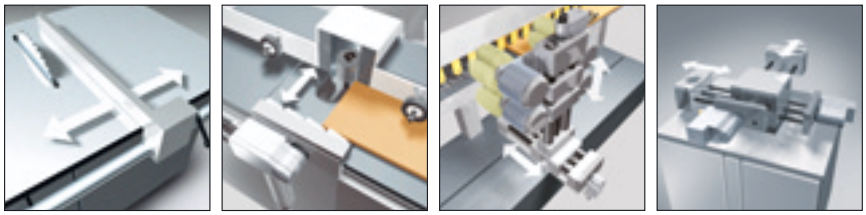
Key application areas

DriveLine – active adjustment technology for production tasks where timing is critical

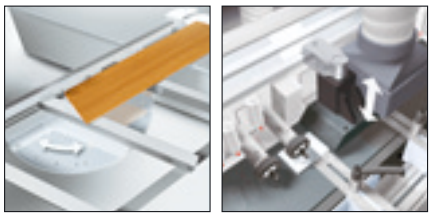
Mode of action	Functional areas / Advantages

Direct adjustment:
Direct action via the axis or spindle. Similar to the principle of cross table or linear guides.

Wood, metal and plastics processing



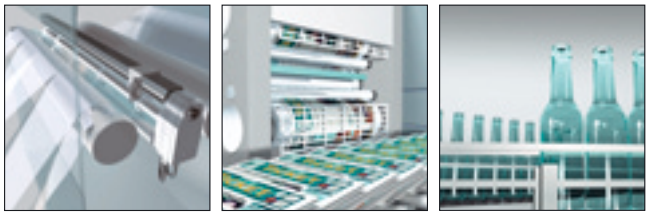
e.g., limit-stop settings for saws and shapers, tool settings according to the „cross table“ principle ...



e.g. angle and position adjustments in the wood and metal industries ...

Indirect adjustment:
Indirect action (angled/offset) via cogwheel or worm gear on racks.

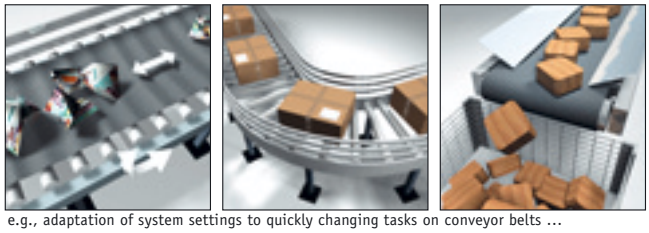
Paper/Packaging materials



e.g., automated format, distance or throughput adjustments for rolling and cutting lines (paper, foil), print machines, bottling plants ...

Rotative adjustment:
Direct action on the rotation axis or indirect (angled/offset) on a rotation axis via bevel gear or worm gear.

Logistics



e.g., adaptation of system settings to quickly changing tasks on conveyor belts ...

Performance charts

Which actuator suits which task?

The key performance features can be seen and compared on the adjacent diagrams.

Measuring process

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 in actual use performance data can deviate from the displayed value. This is due to a number of factors such as e.g. motor-induced revolution divergences of ±15 %. We will be pleased to give you more detailed advice on these special cases.

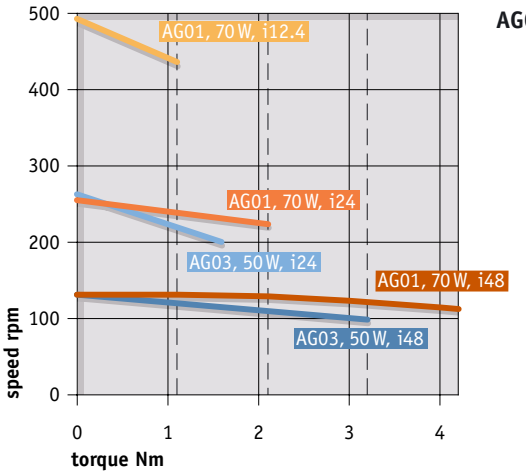
Motor control

Combining an actuator with an internal or external motor control (e.g. motor control module MS02) also enables use of the revolution range below the highest curve plot. The torque is then generally preserved.

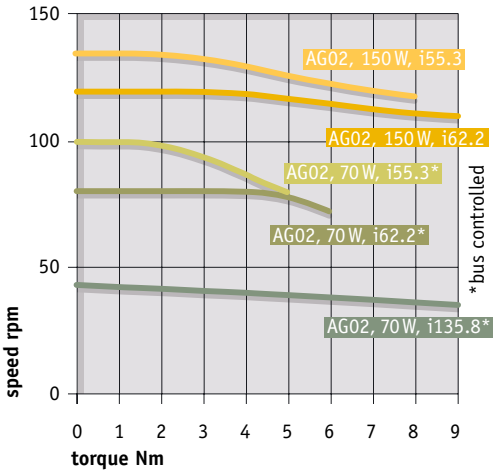
Motor controls change the performance of a drive by **pulse width modulation** (PWM).

Motor control MS02

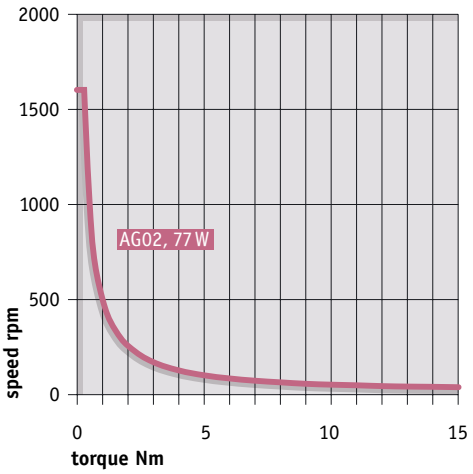
AG01, AG03



AG02

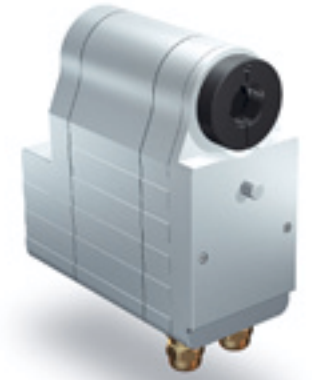


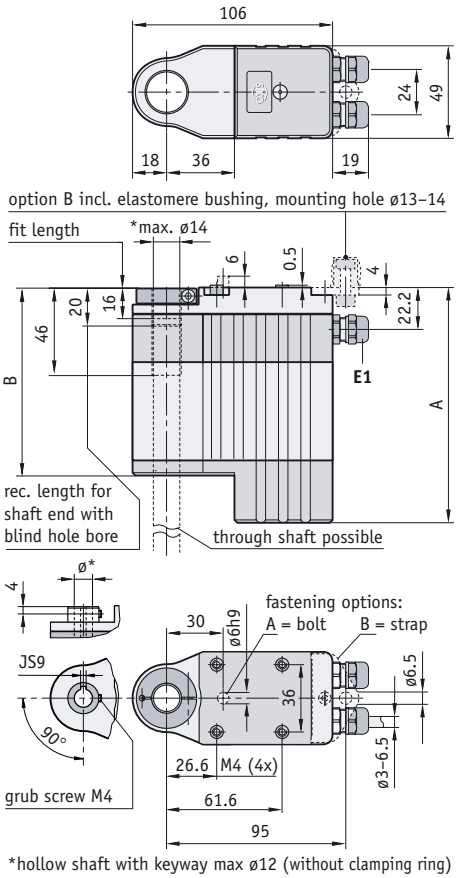
AG12



Actuator AG01 – incremental

Compact high-performance actuator with a small size.
A high-resolution incremental encoder attached directly to the hollow shaft allows precise positioning.





*hollow shaft with keyway max ø12 (without clamping ring)

Features:

- easy mount
- through hollow shaft up to ø14 mm max.
- high-performance motor 70 W, 24 V DC
- various speeds
- integrated magnetic position encoder
- separate motor control on request

Motor pin assignment

PIN	Signal	Cable color
1	+	M1, white, printed
2	+	
3	–	M2, white, printed
4	–	

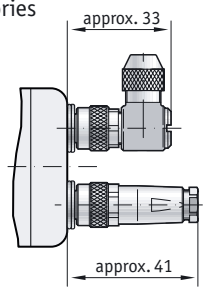
Encoder pin assignment

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

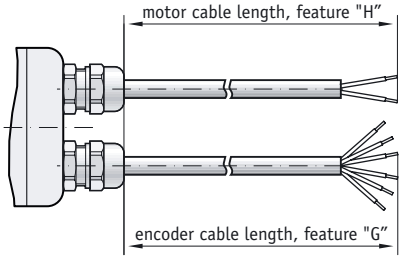
Motor	Length A	Length B
70 W-M	110	84
70 W-G	134	109

Type of connection EX

Accessories



Type of connection E1



Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium, zinc die casting powder-coated	
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

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

Encoder data		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

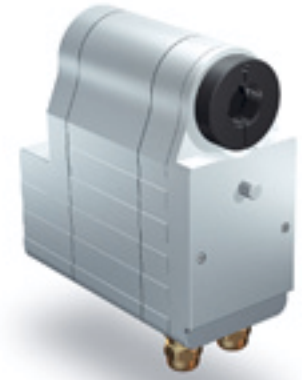
Ambient conditions			
Operating temperature		0 ... +70 °C	(condensation not permitted)
Operating mode		short-time operation S2 (25 % ED)	acc. to DIN 57530/ VDE 0530 part 1
Test mark, interfer. protection class		conforming with CE	acc. to EN 61000-6-2 and EN 61000-6-4
Type of protection		IP63	acc. to DIN VDE 0470

Feature	Order text		Technical data	Additional information
Gear ratio	48	A	i = 48	
	24		i = 24	
	12.4		i = 12,4	
Motor performance	70W-M	B	24 V DC	**standard**, others on request
	70W-G		24 V DC	
Shaft design	KR/14	C	clamping ring, ø14 mm	
	KR/12		clamping ring, ø12 mm	
	N/10		feather key nut JS9 DIN 6889, 1, ø10 mm	
Hollow shaft type	S	D	blind hole	
	D		through	
Torque support (form)	A	E	bolt ø6	
	B		strap I	incl. elastomere bushing
Type of connection	E1	F	open cable	
	EX		connector socket on the device	mating connectors separately available
Motor cable length	2.0	G	in [m]	others on request
Encoder cable length	2.0	H	in [m]	others on request
Encoder	LD24	I	incremental encoder 1024 pulses	
	LD5		incremental encoder 1024 pulses	
	OP		push-pull with inversion	

Your order: AG01 – [A] – [B] – [C] – [D] – [E] – [F] – [G] – [H] – [I]

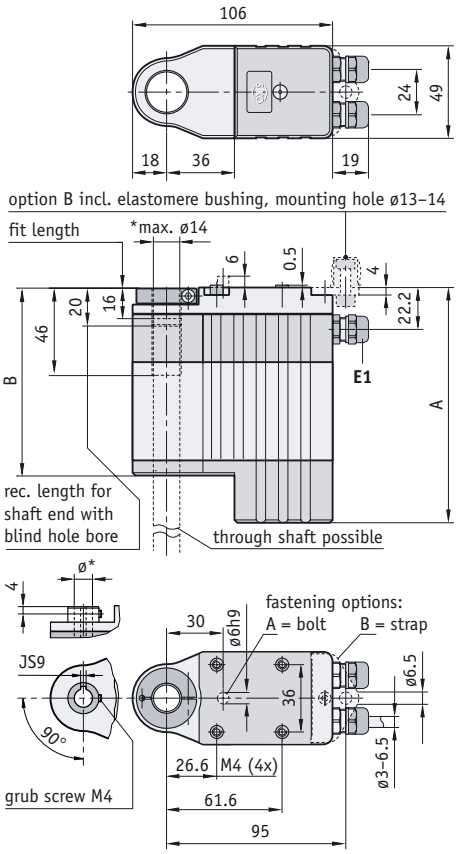
Actuator AG01 – analog

Compact high-performance actuator with a small size. Equipped with an integrated geared potentiometer, it is suitable for precise, absolute positioning.



Features:

- easy mount
- through hollow shaft up to diam. 14 mm max.
- high-performance motor 70 W, 24 V DC
- various speeds
- separate motor control on request



*hollow shaft with keyway max ø12 (without clamping ring)

Motor pin assignment

PIN	Signal	Cable color
1	+	M1, white, printed
2	+	
3	–	M2, white, printed
4	–	

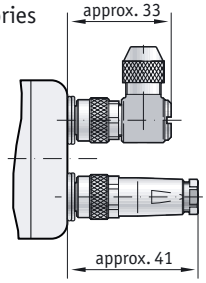
Potentiometer pin assignment

PIN	Signal	Cable color
Encoder without transducer		
1	Po	brown
2	S	green
3	Pe	white
Encoder with transducer MWU		
1	+24 V DC	brown
2	U_{out}	green
3	GND	white
Encoder with transducer MWI		
1	I+	brown
3	I–	white

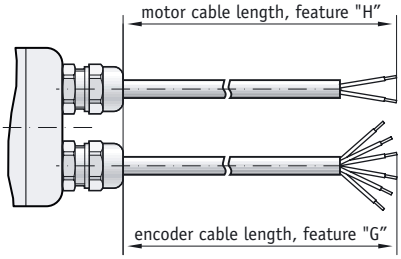
Motor	Length A	Length B
70 W-M	125	100
70 W-G	134	109

Type of connection EX

Accessories



Type of connection E1



Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium, zinc die casting powder-coated	
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor data			
Voltage supply		0 ... 24 V DC	
Power input, fed		70 W	
Rated current		2.9 A ±10 % (70 W-M)	max. load current 3.2 A
		4.1 A ±10 % (70 W-G)	max. load current 4.5 A

Potentiometer data			
Resistance tolerance		±5 %	
Linearity tolerance		±0.25 %	
Power rating		2 W at 40 °C	potentiometer
Standard terminal resistor		0.5 % or 1 Ohm	(each the higher value)

Ambient conditions			
Operating temperature		0 ... +70 °C	(condensation not permitted)
Operating mode		short-time operation S2 (25 % ED)	acc. to DIN 57530 / VDE 0530 part 1
Test mark, interfer protection class		conforming with CE	acc. to EN 61000-6-2 and EN 61000-6-4
Type of protection		IP63	acc. to DIN VDE 0470

Feature	Order text		Technical data	Additional information
Gear ratio	48	A	i = 48	
	24		i = 24	
	12.4		i = 12,4	
Motor performance	70W-M	B	24 V DC	**standard**, others on request
	70W-G		24 V DC	
Shaft design	KR/14	C	clamping ring, ø14 mm	
	KR/12		clamping ring, ø12 mm	
	N/10		feather key nut JS9 DIN 6889, 1, ø10 mm	
Hollow shaft type	S	D	blind hole	
	D		through	
Torque support (form)	A	E	bolt ø6	
	B		strap I	incl. elastomere bushing
Type of connection	E1	F	open cable	
	EX		connector socket on the device	mating connectors separately available
Motor cable length	2.0	G	in [m]	others on request
Encoder cable length	2.0	H	in [m]	others on request
Encoder	P10	I	potentiometer 10 kOhm	10-coil potentiometer, others on request
	MWI		transducer 4 ... 20 mA	10-coil potentiometer, others on request
	MWU		transducer 0 ... 10 V	10-coil potentiometer, others on request
	0		without	10-coil potentiometer, others on request
Gear ratio potentiometer*	1 ... 128max.	K		only with encoders P10, MWI and MWU
Sense of rotation	i	L	clockwise ascending values	only with encoder MWI or MWU
	e		counter-clockwise ascending values	only with encoder MWI or MWU

* Potentiometer-Gear ratio calculation: e.g., if 120 revolutions are required for one adjustment, a gear ratio of 12 should be given for the 10-turn potentiometer. Specifically: number of required revolutions/10 (10-turn potentiometer) = potentiometer gear ratio

Your order: AG01 – [A] – [B] – [C] – [D] – [E] – [F] – [G] – [H] – [I] – [K] – [L]

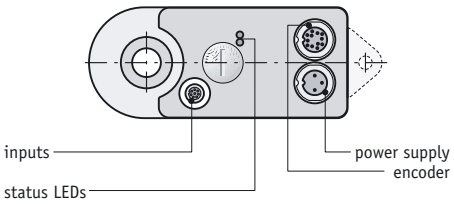
Actuator AG02 – incremental

This robust, compact actuator is available in two power versions. A high-resolution incremental encoder attached directly to the hollow shaft allows precise positioning.

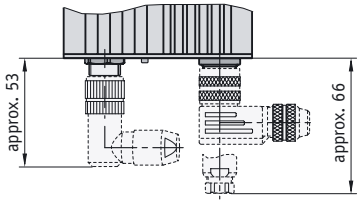
Featu

- easy mounting
- through hollow shaft up to diam. 14 mm max.
- high-performance motors 150 W or 70 W, 24 V DC
- various speeds
- integrated magnetic position encoder (option)
- integrated motor control (option)

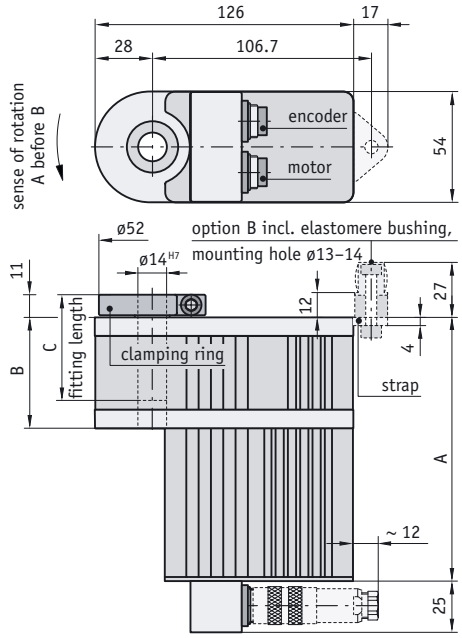
with motor control PWM „SD, SUP, SBP“



position of electrical connection "LA"



without motor control, electrical connection "LR"



Motor/Mains pin assignment

PIN	Signal
1	motor +/ +Ub
2	N.C.
3	motor – / 0V

Pin assignment incremental

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

Motor control PWM pin assignment

PIN	digital	analog unipolar	analog bipolar
1	cw rotation plus	enable plus	enable plus
2	cw rotation ground	enable ground	enable ground
3	ccw rotation plus	cw/ccw plus	N.C.
4	ccw rotation ground	cw/ccw ground	N.C.
5	fast/slow plus	analog 0 … +10 V	analog -10 … +10 V
6	fast/slow ground	analog ground	analog ground
7, 8	N.C.	N.C.	N.C.

Table of dimensions

Gear ratio	Dim. A, "PWM" without	Dim. A, "PWM" with	Dim. B	Dim. C
55.3	119	126	45	47
62.2	129	136	54	56

Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium	
Nominal torque		5 Nm at 80 min^{-1} (motor 70 W/M)	at i = 55.3
		6 Nm at 70 min^{-1} (motor 70 W/M)	at i = 62.2
		8 Nm at 120 min^{-1} (motor 150 W/M)	at i = 55.3
		9 Nm at 110 min^{-1} (motor 150 W/M)	at i = 62.2
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor / network data			
Voltage supply		0 ... 24 V DC, 24 V DC ±10 %	
Power input, fed		150 W; 70 W	
Max. load current		5.8 A ±4 % (150 W); 2.9 A ±4% (70 W/M)	at i = 55.3, i = 62.2
		2.1 A ±4 % (70 W/M)	at i = 135.8

Encoder data		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

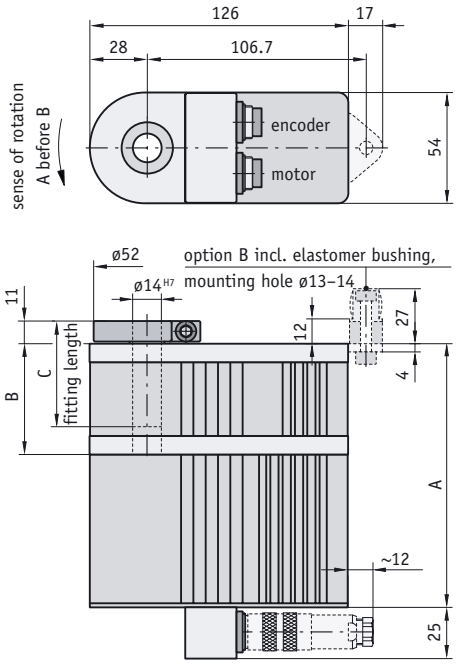
Ambient conditions			
Operating temperature		-10 ... +80 °C	condensation not permitted
Operating mode		short-time operation S2, 25 % duty cyle	acc. to DIN 57530, VDE 0530, part 1
Type of protection		IP 50, higher ones on request	acc. to DIN VDE 0470
Test mark, interfer. protection class		conforming with CE	acc. to EN 61000-6-2 and EN 61000-6-4

Feature	Order text		Technical data	Additional information
Gear ratio	55.3	A	i = 55.3	
	62.2		i = 62.2	
Motor performance	150 W	B		
	70 W/M			only with motor control SD, SUP or SBP
Shaft design	KR/14	C	clamping ring, ø14 mm	
			others on request	
Torque support (form)	B	D	strap	incl. elastomere bushing
	OD		without	
Position of electrical connection	LR	E	radial	with external motor control
	LA		axial	with integrated motor control
Position encoder	LD24	F	incremental encoder 1000 pulses	24 V DC ±20 %
	LD5		incremental encoder 1000 pulses	5 V DC ±5 %
	OP		push-pull with inversion	24 V DC ±20 %
	0		without	only with "Position of electrical connection" LR
Motor control PWM	OMS	G	without	only with motor performance 150 W
	SD		digital input	
	SUP		analog input unipolar 0 ... 10 V	
	SBP		analog input bipolar -10 ... +10 V	

Your order: AG02 – [A] – [B] – [C] – D – [D] – [E] – [F] – [G] – XX/XX – OFB

Actuator AG02 – analog

Compact high-performance actuator with a small size. This AG02 is equipped with an integrated geared potentiometer for precise, absolute positioning.



Features:

- easy mounting
- through hollow shaft up to diam. 14 mm max. as an option
- high-performance motor 150 W, 24 V DC
- various speeds
- integrated position encoder with analog output

Motor pin assignment

PIN	Signal
1	Motor +
2	N.C.
3	Motor –

Potentiometer pin assignment

PIN	P01/P10	MWI	MWU
1	Pe	I–	GND
2	Po	I+	+24 V DC
3	S	N.C.	U_{out}
4–7	N.C.	N.C.	N.C.

Table of dimensions

Gear ratio	Dim. A	Dim. B	Dim. C	Dim. D*
55.3	119	45	47	40
62.2	129	54	56	50

* dimension "D" is not shown, corresponds to max. length of customer's shaft end

Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium	
Nominal torque		8 Nm at 120 min^{-1} (motor 150 W)	at i = 55.3
		9 Nm at 110 min^{-1} (motor 150 W)	at i = 62.2
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor data			
Voltage supply		0 ... 24 V DC	
Power input, fed		150 W	
Max. load current		5.8 A ± 4 % (150 W)	

Potentiometer data			
Resistance tolerance		±5 %	
Linearity tolerance		±0,25 %	
Power rating		2 W at 40 °C	potentiometer
Standard terminal resistor		0,5 % or 1 Ohm	(each the higher value)

Ambient conditions			
Operating temperature		-10 ... +80 °C (condensation not permitted)	0 ... +70° C with transducer (condensation not permitted)
Operating mode		short-time operation S2, 25 % duty cyle	acc. to DIN 57530, VDE 0530, part 1
Type of protection		IP 50, higher ones on request	acc. to DIN VDE 0470
Test mark/interfer. protection class		conforming with CE	acc. to EN 61000-6-2 and EN 61000-6-4

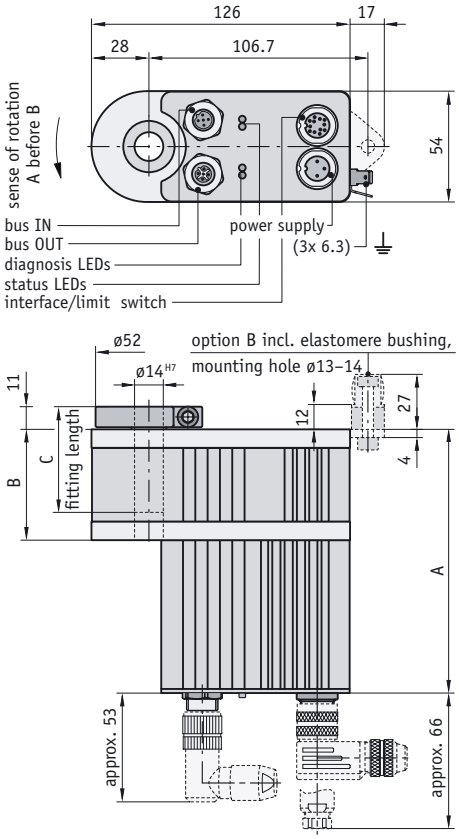
Feature	Order text		Technical data	Additional information
Gear ratio	55.3	A	i = 55.3	
	62.2		i = 62.2	
Shaft design	KR/14	B	clamping ring, ø14 mm	
			others on request	
Hollow shaft type	S	C	blind hole	max. length shaft end see table of dimensions
	D		through	
Torque support (form)	B	D	strap I	incl. elastomere bushing
	OD		without	
Position encoder	MWI	E	transducer 4 ... 20 mA	10-coil potentiometer (others on request)
	MWU		transducer 0 ... 10 V	10-coil potentiometer (others on request)
	P01		potentiometer 1 kOhm	10-coil potentiometer (others on request)
	P10		potentiometer 10 kOhm	10-coil potentiometer (others on request)
Gear ratio potentiometer*	...	F	1 ... 128 max.	
Sense of rotation	i	G	clockwise ascending values	only with encoder MWI and MWU
	e		counter-clockwise ascending values	only with encoder MWI and MWU

* Potentiometer-Gear ratio calculation: e.g., if 120 revolutions are required for one adjustment, a gear ratio of 12 should be given for the 10-turn potentiometer. Specifically: number of required revolutions/10 (10-turn potentiometer) = potentiometer gear ratio

Your order: AG02 – [A] – 150 W – [B] – [C] – [D] – LR – [E] – [F] – [G] – OMS – XX/XX – OFB

Actuator AG02 – fieldbus

Robust, compact actuator with high output torque and application-proven hollow shaft principle. Flexibility is enhanced by the integrated fieldbus interface and control technology..



Featu

- easy mounting
- through hollow shaft up to diam. 14 mm max.
- integrated position encoder: magnetic, absolut
- integrated positioning controller
- integrated CANopen/Profibus-DP interface (option)
- service interface RS232/RS485

Mains pin assignment

PIN	Signal
1	+Ub
2	N.C.
3	–

Fieldbus pin assignment

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

Interface/limit switch pin assignment

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

Table of dimensions

Gear ratio	Dim. A	Dim. B	Dim. C
55.3	126	45	47
62.2	136	54	56
135.8	136	54	56

Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium	
Nominal torque		5 Nm, 80 min^{-1} (motor 70 W/ M)	at i = 55.3
		6 Nm, 70 min^{-1} (motor 70 W/ M)	at i = 62.2
		9 Nm, 30 min^{-1} (motor 70 W/ M)	at i = 135.8
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor data			
Voltage supply		24 V DC ±10 %	
Power input, fed		70 W	
Max. load current		2.9 A ±4 %	at i = 55.3, i = 62.2
		2.1 A ±4 %	at i = 135.8

Encoder data			
Resolution absolute encoder (ABM)		±6250 rev. with 1600 steps/revolution	

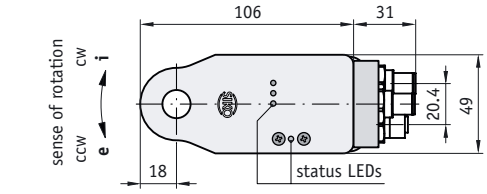
Ambient conditions			
Operating temperature		0 ... +50 °C	condensation not permitted
Operating mode		short-time operation S2, 25 % duty cyle	acc. to DIN 57530, VDE 0530, part 1
Type of protection		IP 50, higher ones on request	acc. to DIN VDE 0470
Test mark, interfer. protection class		conforming with CE	acc. to EN 61000-6-2 and EN 61000-6-4

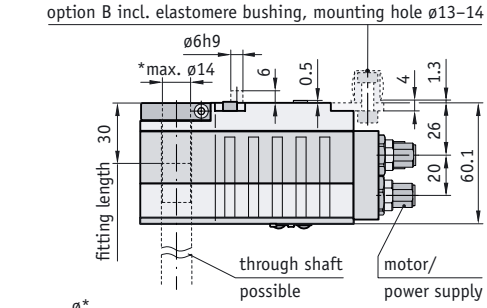
Feature	Order text		Technical data	Additional information
Gear ratio	55.3	A	i = 55.3	
	62.2		i = 62.2	
	135.8		i = 135.8	
Shaft design	KR/14	B	clamping ring, ø14 mm	
			others on request	
Torque support (form)	B	C	strap I	incl. elastomere bushing
	OD		without	
Interface/protocol	S1/00	D	RS232, standard, control electronics	
	S3/00		RS485, standard, control electronics	
Fieldbus	OFB	E	without fieldbus	
	PB		Profibus-DP	
	CAN		CANopen	

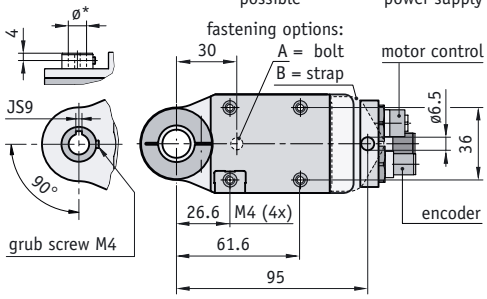
Your order: AG02 – [A] – 70 W – [B] – D – [C] – LA – ABM – OMS – [D] – [E] – SW

Actuator AG03 – incremental

The most compact actuator of its class – with built-in sensor electronics, control electronics and the versatile hollow shaft principle. Very flexible application due to the integration of various control techı







*hollow shaft with keyway max ø12 (without clamping ring)

Features:

- spacve-saving, easy
- through hollow shaft up to diam. 14 mm max.
- brushless 50 W, 24 V EC-Motor with long service life
- integrated performance and control electronics with polarity and overload protection
- integrated magnetic position encoder
- M12 connection technique

Motor/mains pin assignment

PIN	Signal
1	+
2	N.C.
3	–
4	N.C.

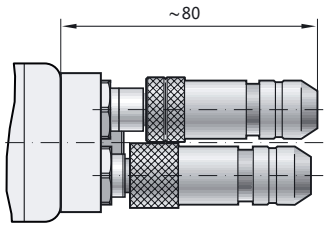
Pin assignment encoder, LD24/OP, 8-pin

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

Pin assignment Motor control PWM

PIN	digital	analog unipolar	analog bipolar
1	cw rotation plus	enable plus	enable plus
2	cw rotation ground	enable ground	enable ground
3	ccw rotation plus	cw/ccw plus	N.C.
4	ccw rotation ground	cw/ccw ground	N.C.
5	fast/slow pus	analog 0 … +10 V	analog -10 … +10 V
6	fast/slow ground	analog ground	analog ground
7, 8	N.C.	N.C.	N.C.

Type of connection EX



Mechanical data		Technical data	Additional information
Hollow shaft		blued steel	
Housing		aluminium, zinc die casting powder-coated	
Nominal torque		1.6 Nm, 200 min^{-1}	at i = 24
		3.2 Nm, 100 min^{-1}	at i = 48
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor / control data			
Voltage supply		+24 V DC ±10 %	
Power input, fed		58 W	
Rated current at adjust. value 100 %		2.4 A ±7 % (50W-M)	max. load current 2.58 A
Idle current (with driving gear)		300 mA ±20 %	
PWM (pulse width modulation)		~16 kHz contin. var., 0 ... 100 %, soft start	
Inputs		analog, digital	digital with LED indicator
Digital inputs		15 ... 30 V, typ. 10 mA	
Analog inputs		0 ... +10 V; -10 ... +10 V	impedance >1.3 MOhm

Encoder data		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	

Ambient conditions			
Operating temperature		0 ... +80 °C (condensation not permitted)	ambient temperature: 0 ... +45 °C
Operating mode		short-time operation S2 (25 % ED)	DIN 57530/VDE 0530 part 1
Test mark, interfer. protection class		conforming with CE	EN 61000-6-2, EN 61000-6-4
Type of protection		IP50 / IP63	DIN VDE 0470

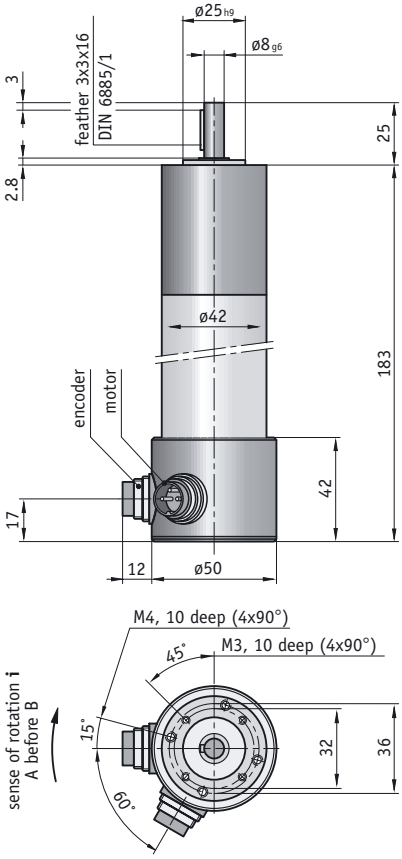
Feature	Order text		Technical data	Additional information
Gear ratio	48	A		25 % ED (duty cyle)
	24			25 % ED (duty cyle)
Motor performance	50W-M		24 V DC	
Type of protection	IP50	B		
	IP63			
Shaft design	KR/14	C	clamping ring, ø14 mm	
	KR/12		clamping ring, ø12 mm	
	N/10		feather key nut JS9 DIN 6885, 1, ø10 mm	
Torque support (form)	A	D	bolt ø6	
	B		strap I	incl. elastomere bushing
Type of connection	EX		connector socket on the device	mating connectors separately available
Encoder	LD24	E	incremental encoder 1024 pulses	
	OP		push-pull with inversion	
	0		without	
Motor control PWM	SD	F	digital	galvanically insolated
	SUP		analog unipolar	0 ... +10 V
	SBP		analog bipolar	-10 ... +10 V

Your order: AG03 – [ ] – 50 W-M – [ ] – [ ] – [ ] – EX – [ ] – [ ] – XX/XX – OFB

A B C D E F

Actuator AG12

Very compact actuator with solid shaft and integrated sensor electronics. Despite its small design, the AG12 has huge power reserves.



Features:

- DC drive 77 W
- epicyclic gear
- torques up to max. 15 Nm (at n = 21 min^{-1})
- speeds up to max. 1600 min^{-1} (at M = 0.35 Nm)
- encoder 25 pulses/revolution (motor shaft)

Motor pin assignment

PIN	Signal
1	+
2	N.C.
3	–

Encoder pin assignment

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

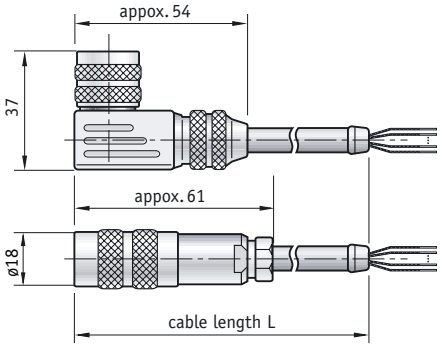
Calculation formula

Pulse number/revolution on the driving shaft

pulses/revolution = i x 25

i = Gear ratio

Type of connection EX



Mechanical data		Technical data	Additional information
Shaft		steel	
Housing		steel, aluminium	
Flanges		aluminium	
Nominal torque		4.2 Nm, 140 min^{-1}	at i = 45,56
Shock resistance		50 g, 11 ms	DIN-IEC 68-2-27
Vibration resistance axial, radial		10 g, 50 Hz	DIN-IEC 68-2-6

Motor data			
Motor voltage supply		0 ... 24 V DC	
Power input, fed		77 W	
Rated current		4.6 A ±20 %	

Encoder data			
Voltage supply encoder		24 V DC ±20 %	use terminators ≥470 Ohm
Encoder		magnetic	25 pulses/revolution (motor shaft)
Power consumption encoder		<70 mA	
Output circuit		Line Driver (A, B, /A, /B)	LD 24 V DC

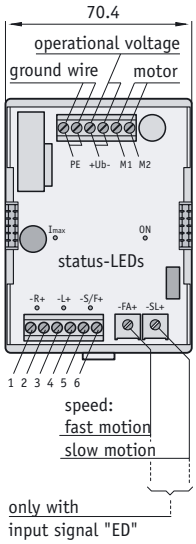
Ambient conditions			
Operating temperature		-10 ... +80 °C	condensation not permitted
Type of protection		IP 40	acc. to DIN VDE 0470
Operating mode		short-time operation S2 (25 % ED)	DIN 57530, VDE 0530 part 1
Test mark, interfer. protection class		conforming with CE	EN 61000-6-2, EN 61000-6-4

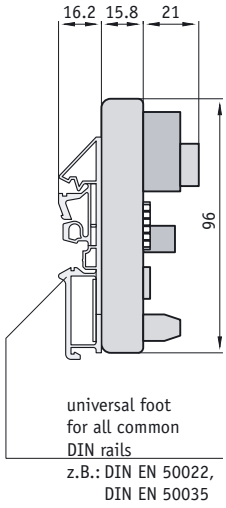
Feature	Order text	Technical data	Additional information
Gear ratio	45,56 A	others on request	**standard**

Your order: AG12 – [ ] – EX
A

Motor control module MS02

This compact module is inserted as a link to connect an axle control to digital/analog outputs and 24 V DC actuators. It reduces the revolutions by means of pulse width modulation, the torque is generally preserved.

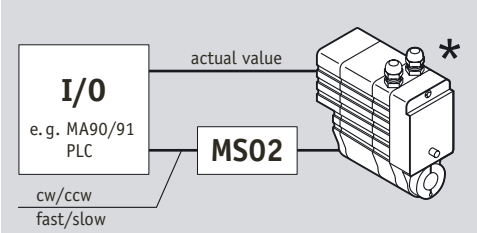




Features:

- easy mounting (top-hat rail)
- variable control variants enable the use on different positioning controls
- fast/slow motion can be set continuously variable
- pulse width modulation (PWM) for 24 V DC actuators

Functional diagram



* Use possible with AG01, AG02, AG12

Terminal strip pin assignment

PIN	digital	analog unipolar	analog bipolar
1	cw rotation ground	enable ground	enable ground
2	cw rotation plus	enable plus	enable plus
3	ccw rotation ground	cw/ccw ground	N.C.
4	ccw rotation plus	cw/ccw plus	N.C.
5	fast/slow ground	analog ground	analog ground
6	fast/slow plus	analog 0 ... +10 V	analog -10 ... +10 V

Feature		Technical data	Additional information
Supply voltage		24 V DC ±20 % (controlled)	with LED indicator
Motor current (duration)		3/5/6 A (max. 12 A peak)	
PWM (pulse width modulation)		~16 kHz, contin. var., 0 ... 100 %, soft start	
Inputs		digital, analog	digital with LED indicator
Digital inputs		+15 ... +30 V, typ. 10 mA	
Analog inputs		0 ... +10 V; -10 ... +10 V	impedance >1.3 MOhm
Protection		polarity protection, overcurrent protection	with multifuse and LED indicator
Temperature range		0 ... +50 °C	
Humidity		0 ... 95 % rh, condensation not permitted	

Feature			Technical data	Additional information
Load current	3A	A		others on request, max. 12A
	5A			
	6A			
Input signal	ED	B	digital	
	EUP		analog unipolar	0 ... +10 V; impedance >1.3 MOhm
	EBP		analog bipolar	-10 ... +10 V; impedance >1.3 MOhm

Your order: MS02 – [ ] – [ ]
A B

Appendix
System components

Plug connections

Available in 3-, 4-, 7-, 8- and 12-wire versions with twisted screening braid. The mass-produced article is stripped and tinned at the cable ends. Due to their various designs, the actuators have different pole counts. We will be pleased to explain the various options to you. Please contact us and let us know your particular needs.

Available connectors

suitable for	Ordering data	Technical data	Additional information
AG01 incremental	83447	mating connector motor	4-pin, straight coupling socket
	82247	mating connector motor	4-pin, angular socket
	81351	mating connector encoder	8-pin, straight coupling socket
AG01 analog	83447	mating connector motor	4-pin, straight coupling socket
	82247	mating connector motor	4-pin, angular socket
	81487	mating connector potentiometer	3-pin, straight coupling socket
	82366	mating connector potentiometer	3-pin angular socket
AG02 incremental	82182	mating connector motor/mains	3-pin straight coupling socket
	81363	mating connector motor/mains	3-pin angular socket
	76572	mating connector encoder	12-pin straight coupling socket
	79666	mating connector encoder	12-pin angular socket
	81351	mating connector PWM	8-pin straight coupling socket
AG02 analog	82182	mating connector motor	3-pin straight coupling socket
	76141	mating connector encoder	7-pin straight coupling socket
AG02 fieldbus	82182	mating connector mains	3-pin straight coupling socket
	81363	mating connector mains	3-pin angular socket
	76572	mating connector interface/limit switch	12-pin straight coupling socket
	79666	mating connector interface/limit switch	12-pin angular socket
	82804	mating connector Profibus IN	5-pin angular socket
	82805	mating connector Profibus OUT	5-pin angular connector
	83006	mating connector CANopen IN	5-pin angular socket
	83007	mating connector CANopen OUT	5-pin angular connector
	82816	bus terminator Profibus	5-pin straight connector
	82815	bus terminator CANopen	5-pin straight connector
AG03	83525	mating connector encoder	8-pin, straight coupling socket
	83526	mating connector motor/mains	4-pin, straight coupling socket
	83527	mating connector motor control	8-pin, straight coupling connector
AG12	82182	mating connector motor	3-pin straight coupling socket
	81363	mating connector motor	3-pin angular socket
	76572	mating connector encoder	12-pin straight coupling socket
	79666	mating connector encoder	12-pin angular socket

PT232, PT485
Programming tools

Programming instrument for direct parametrization of SIKO actuators with an RS232 or RS485 interface. No PC, PLC or level transducer is required.

The programming tool has a two-line, illuminated LCD display with a plain text indicator. It offers easy handling thanks to the clear menu structure and provides unmistakable programming and reading of parameters with no add-on device required.

MA90, MA91
Single-axis positioning control

Single-axis control for direct positioning via setpoint input. A memory enables the storage of 99 required values. Required and actual values can be read simultaneously from the two-digit display. Various drives can be positioned via switching outputs.

3D-drawings
CAD-formats

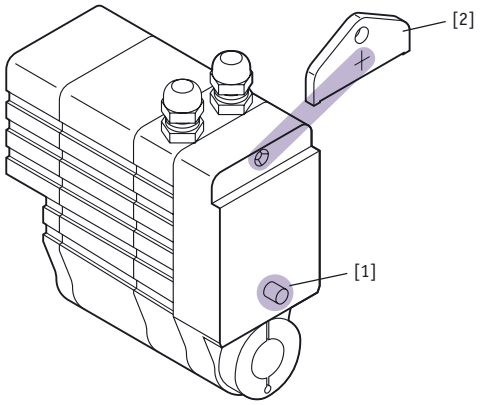
SIKO is currently in the process of developing a data pool with 3D drawings. The purpose of this is to support mechanical engineering constructors in their development tasks at an early stage. Even now 3D data is available for a number of devices.

Interested? Then send us an e-mail. Conditions of use, technical requirements (CAD formats) and availability are obtainable from **info@siko.de**

Appendix

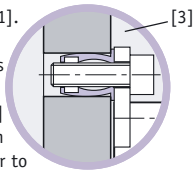
Mounting examples, Output signals

Torque support



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

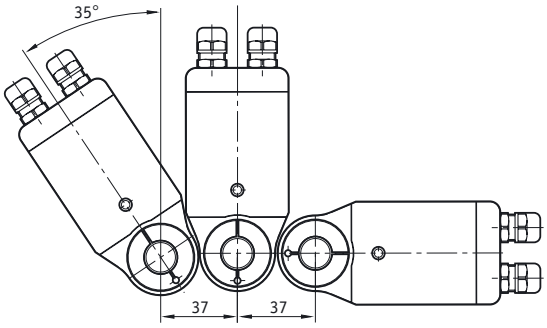
The torque bracing to the machine frame is by means of a pin [1]. Alternatively, a mounting bracket [2] can be used. This type of securing enables use of an elastomere bushing [3] which provides a low-tension connection from the actuator to the machine shaft.

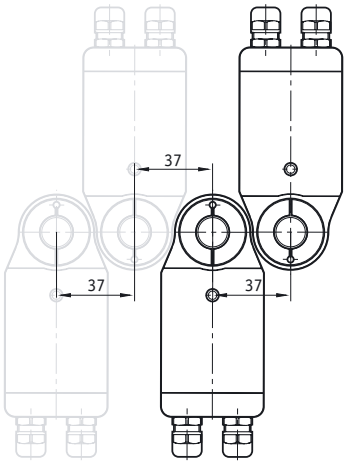


Advantage: The distortion forces on the bearing are reduced..

Mounting variants

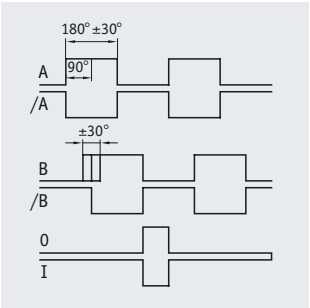
The cleverly designed form opens up a host of installation variations. The tapered construction in the area of the hollow shaft makes small center-to-center distances of as little as 37 mm achievable.



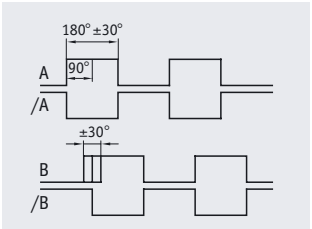


Output signals incremental

AG01*, AG02, AG03*



AG12



*** Note:** The status of the signals A and B regarding the reference signal 0/I is not defined and may deviate from this drawing.

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