


## RELIABLE, ESTABLISHED, AND MODULAR





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### Product description

The ATM60 PROFIBUS absolute multiturn encoder from SICK provides reliable positional and speed information even in harsh ambient conditions, with a resolution of up to 26 bits. This product family, which is proven in its field, is based on the principle of magnetic measurement. The 13 bit singleturn range is scanned by a sensor using permanent magnetic elements. The 13 bit multiturn range consists of a magnetic reduction gear.

Equipped with a zero set pushbutton, the encoder can be easily set to zero or to any other user-programmed value on site. The connection adapter, which can be removed from the device, enables simple user maintenance and mounting. With its magnetic scanning, rugged IP 67-rated housing and high level of resistance to shock and vibration, the ATM60 is optimally suited for use in harsh conditions.

### At a glance

- Extremely rugged, tried-and-tested absolute multiturn encoder with a resolution of up to 26 bits
- Mechanical interface: face mount flange, servo flange, blind hollow shaft, and extensive adapter accessories
- Zero-set and preset functions via hardware or software
- Electrical interface: PROFIBUS DP as per IEC61158 / RS 485 , electrically isolated.
- Electronically adjustable, configurable resolution
- Magnetic scanning

### Your benefits

- Fewer variants are required since one freely programmable encoder offers all singleturn and multiturn resolutions
- Easy setup due to various connectivity options (3x PG, 3x M12)
- Maintenance-free encoder, long service life
- Application flexibility due to easily interchangeable collets for the blind hollow shaft
- Quick commissioning using the zero set/preset function either at the press of the button on the device or via software
- Increased productivity due to highly reliable shock and vibration resistance
- Worldwide availability and service ensure quick and reliable customer service

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## Fields of application

- Measurement of absolute position in various machines and system such as wind power and solar plants, material transport equipment, textile machines, packaging systems, rollers, harbor facilities, printing machines

## Detailed technical data

### Performance

<b>Max. number of steps per revolution</b>	≤ 8,192
<b>Max. number of revolutions</b>	≤ 8,192
<b>Resolution</b>	13 bit x 13 bit
<b>Error limits</b>	± 0.25°
<b>Repeatability</b>	0.1°
<b>Measurement step</b>	0.043°
<b>Initialization time</b>	1,250 ms <sup>1)</sup>

<sup>1)</sup> Valid positional data can be read once this time has elapsed.

### Interfaces

<b>Electrical interface</b>	PROFIBUS
<b>Bus interface</b>	PROFIBUS DP, RS-485 <sup>1) 2) 3)</sup>
<b>Set (electronic adjustment)</b>	Via PRESET pushbutton or protocol
<b>Data protocol</b>	Profile for encoder (07hex) – Class 2
<b>Address setting</b>	0 ... 127, DIP switch or protocol
<b>Data transmission rate (baud rate)</b>	9.6 kBaud to 12 Mbaud, autodetect
<b>Status information</b>	LED green (running), LED red (bus activity)
<b>Bus termination</b>	DIP switch <sup>4)</sup>

<sup>1)</sup> EN 50 170-2.

<sup>2)</sup> DIN 19245 Part 1-3.

<sup>3)</sup> Electrically isolated through optocoupler.

<sup>4)</sup> Should only be connected in the final device.

### Electrical data

<b>Connection type</b>	Bus adapter with cable screw fixings or round connectors <sup>1)</sup>
<b>Operating voltage range</b>	10 V ... 32 V
<b>Max. power consumption without load</b>	≤ 2 W
<b>MTTFd: mean time to dangerous failure</b>	150 years (EN ISO 13849-1) <sup>2)</sup>

<sup>1)</sup> Please order the Profibus adapter separately.

<sup>2)</sup> This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of devices, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

### Mechanical data

<b>Shaft diameter</b>	
Face mount flange	10 mm x 19 mm
Servo flange	6 mm x 10 mm
Blind hollow shaft	6 mm, 8 mm, 10 mm, 12 mm, 14 mm, 15 mm, 1/4", 3/8", 1/2" <sup>1)</sup>
<b>Mass <sup>2)</sup></b>	0.59 kg
<b>Shaft material</b>	Stainless steel
<b>Flange material</b>	Aluminum

<sup>1)</sup> Order collets for 6, 8, 10, 12 and 14 mm or 1/4", 3/8" and 1/2" as separate extra accessories. No collets are necessary for 15 mm shaft diameter.

<sup>2)</sup> Relates to devices with cable outlet.

<sup>3)</sup> Take into account self-warming of 3.3 K per 1,000 rpm when designing operating temperature range

<b>Housing material</b>	Aluminum die cast
<b>Start up torque with shaft seal at 20 °C</b>	
Face mount flange, servo flange	2.5 Ncm
Blind hollow shaft	1.2 Ncm
<b>Start up torque without shaft seal at 20 °C</b>	
Face mount flange, servo flange	0.5 Ncm
<b>Operating torque with shaft seal at 20 °C</b>	
Face mount flange, servo flange	1.8 Ncm
Blind hollow shaft	0.8 Ncm
<b>Operating torque without shaft seal at 20 °C</b>	
Face mount flange, servo flange	0.3 Ncm
<b>Permissible shaft movement, axial static/dynamic</b>	
Blind hollow shaft	± 0.5 mm, ± 0.2 mm
<b>Permissible shaft movement, radial static/dynamic</b>	
Blind hollow shaft	± 0.3 mm, ± 0.1 mm
<b>Permissible shaft loading</b>	
Solid shaft	300 N (radial) 50 N (axial)
<b>Rotor moment of inertia</b>	35 gcm <sup>2</sup> 55 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.6 x 10 <sup>9</sup> revolutions
<b>Max. angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>
<b>Operating speed <sup>3)</sup></b>	
Face mount flange, servo flange	6,000 rpm
Blind hollow shaft	3,000 rpm

<sup>1)</sup> Order collets for 6, 8, 10, 12 and 14 mm or 1/4", 3/8" and 1/2" as separate extra accessories. No collets are necessary for 15 mm shaft diameter.

<sup>2)</sup> Relates to devices with cable outlet.

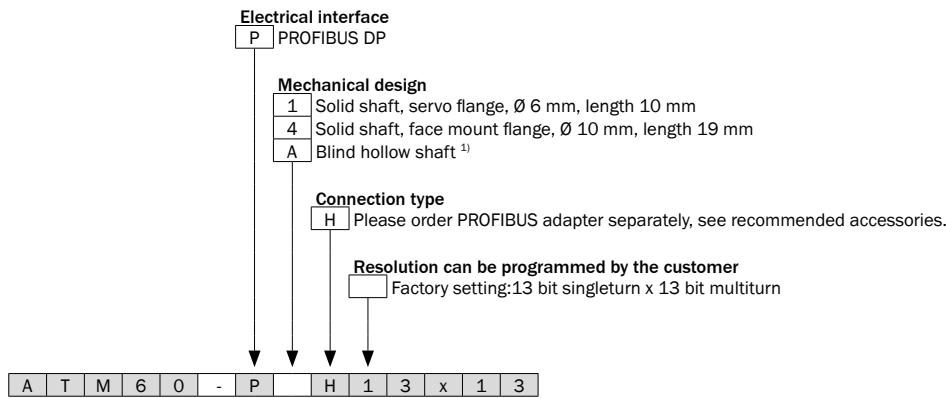
<sup>3)</sup> Take into account self-warming of 3.3 K per 1,000 rpm when designing operating temperature range

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP 67 with shaft seal (acc. to IEC 60529) <sup>1)</sup> IP 43 without shaft seal, not sealed on encoder flange (acc. to IEC 60529) <sup>1)</sup> IP 66 without shaft seal, sealed on encoder flange (acc. to IEC 60529) <sup>1)</sup>
<b>Permissible relative humidity</b>	98%
<b>Operating temperature range</b>	-20 °C ... +85 °C
<b>Storage temperature range</b>	-40 °C ... +100 °C, without packaging
<b>Resistance to shocks</b>	100 g, 6 ms (according to EN 60068-2-27)
<b>Resistance to vibrations</b>	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)

<sup>1)</sup> When mating connector is inserted.

Type code



<sup>1)</sup> Order collet for 6, 8, 10, 12 and 14 mm or 1/4", 3/8" and 1/2" as separate extra accessories (see recommended accessories). No collets are necessary for 15 mm shaft diameter.

Ordering information

Solid shaft, face mount flange

Shaft diameter	Electrical interface	Connection type	Number of steps	Resolution	Programmable	Type	Part no.
Ø 10 mm, length 19 mm	10 V ... 32 V, PROFIBUS	Bus adapter with cable screw fixings or round connectors	≤ 8,192	8,192 x 8,192	✓	ATM60-P4H13X13	1030013

Solid shaft, servo flange

Shaft diameter	Electrical interface	Connection type	Number of steps	Resolution	Programmable	Type	Part no.
Ø 6 mm, length 10 mm	10 V ... 32 V, PROFIBUS	Bus adapter with cable screw fixings or round connectors	≤ 8,192	8,192 x 8,192	✓	ATM60-P1H13X13	1030014

Blind hollow shaft

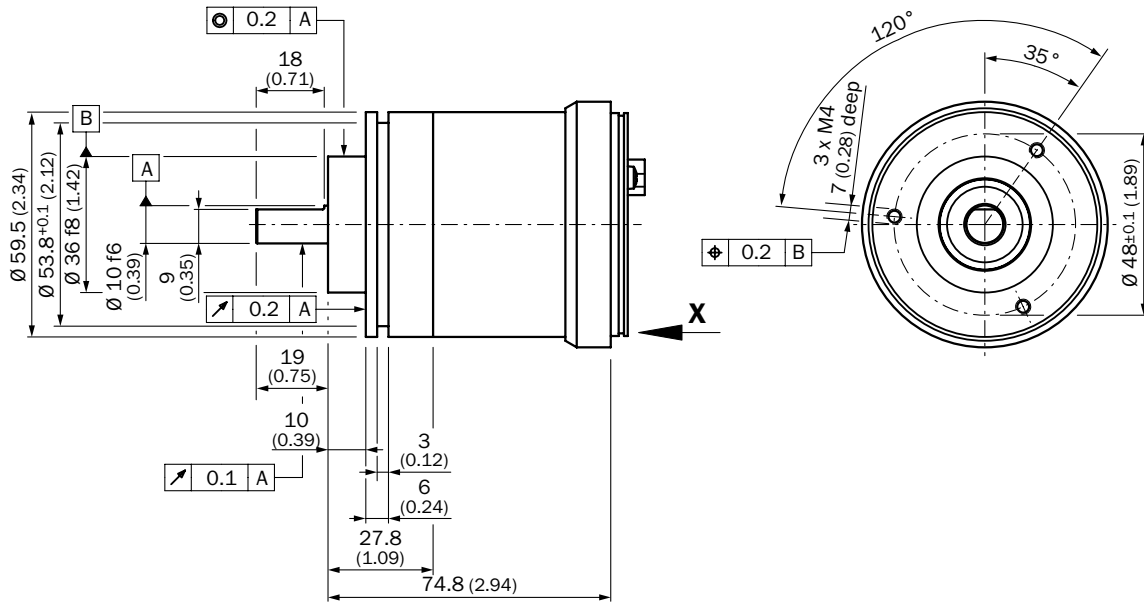
Shaft diameter	Electrical interface	Connection type	Number of steps	Resolution	Programmable	Type	Part no.
6 mm, 8 mm, 10 mm, 12 mm, 14 mm, 15 mm, 1/4", 3/8", 1/2" <sup>1)</sup>	10 V ... 32 V, PROFIBUS	Bus adapter with cable screw fixings or round connectors	≤ 8,192	8,192 x 8,192	✓	ATM60-PAH13X13	1030015

<sup>1)</sup> Order collets for 6, 8, 10, 12 and 14 mm or 1/4", 3/8" and 1/2" as separate extra accessories. No collets are necessary for 15 mm shaft diameter.



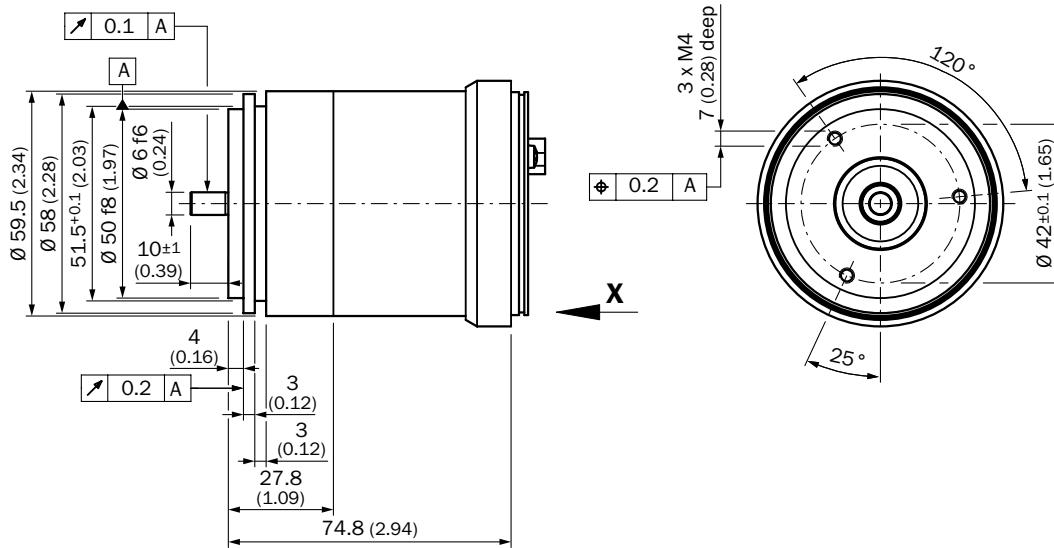
Dimensional drawings (dimensions in mm)

Face mount flange



General tolerances according to DIN ISO 2768-mk

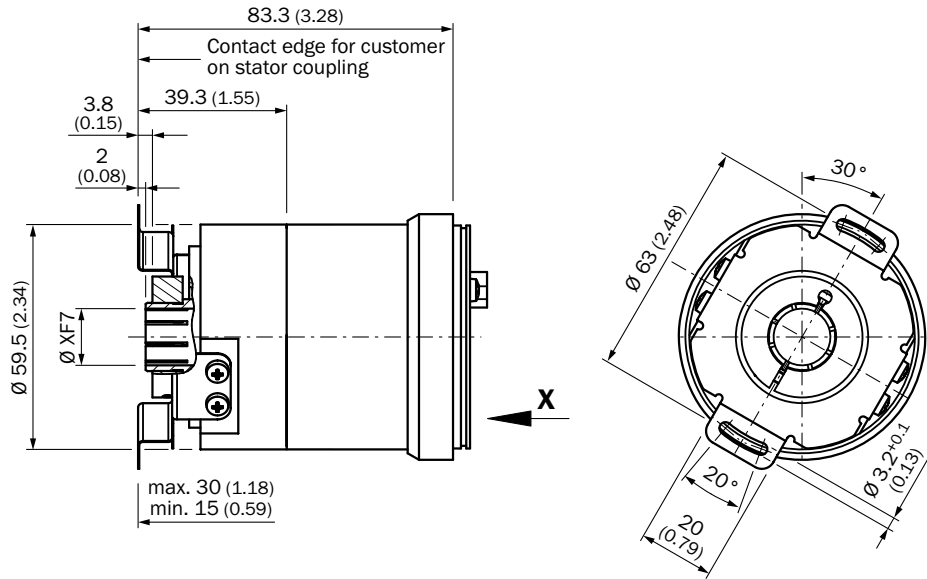
Servo flange



General tolerances according to DIN ISO 2768-mk

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Blind hollow shaft



General tolerances according to DIN ISO 2768-mk

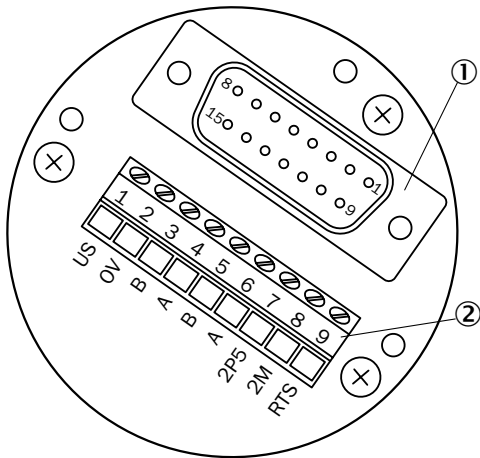


## PIN assignment

Terminal strip	Male connector, 4 pin	Male connector, 5 pin	Female connector, 5 pin	Signal	Explanation
1	1	-	-	U <sub>s</sub> (24 V)	Operating voltage 10 ... 32 V
2	3	-	-	0 V (GND)	Ground (0 V)
3	-	-	4	B	B cable PROFIBUS DP (out)
4	-	-	2	A	A cable PROFIBUS DP (out)
5	-	4	-	B	B cable PROFIBUS DP (in)
6	-	2	-	A	A cable PROFIBUS DP (in)
7	-	-	1	2P5 <sup>2)</sup>	+ 5 V (potential free)
8	-	-	3	2M <sup>2)</sup>	0 V (potential free)
-	2	1	-	N. C.	-
-	4	3	-	N. C.	-
-	-	5	5	Screen	Housing potential

<sup>1)</sup> Encoders with a PROFIBUS adapter are equipped with screws (metric/PG) for connecting bus and supply cables. The adapter is unscrewed from the full device to connect the cables. The following figure shows how the pins are assigned within the adapter.

<sup>2)</sup> Use for external bus terminations or to supply the sender/receiver with a optical fiber transmission.



① = Internal plug connector to the encoder

② = External connection to the bus

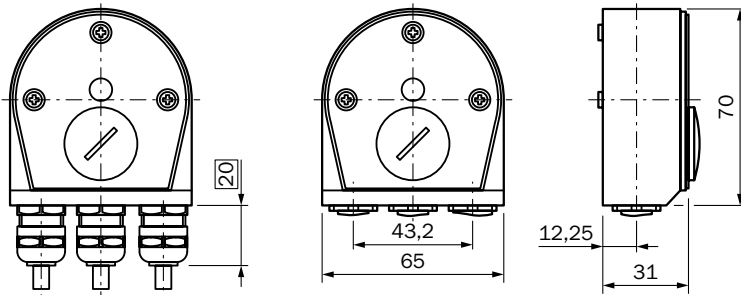
## Mandatory accessories

### Adapters and distributors

#### Bus adapters

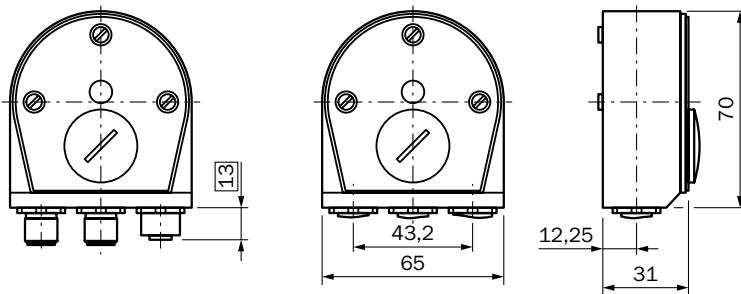
Figure	Brief description	Type	Part no.
	PROFIBUS DP, connection adapter KR3, 3 x PG	AD-ATM60-KA3PR	2029225
	PROFIBUS DP, connection adapter SR3, 3 x M12, 5-pin	AD-ATM60-SR3PR	2031985

#### AD-ATM60-KA3PR



General tolerances according to DIN ISO 2768-mk


#### AD-ATM60-SR3PR



General tolerances according to DIN ISO 2768-mk

### Shaft adaptation

#### Collets and clamping rings

Figure	Brief description	Type	Part no.
	Collet for blind hollow shaft, shaft diameter 6 mm, external diameter 15 mm	SPZ-006-AD-A	2029174
	Collet for blind hollow shaft, shaft diameter 8 mm, external diameter 15 mm	SPZ-008-AD-A	2029176
	Collet for blind hollow shaft, shaft diameter 10 mm, external diameter 15 mm	SPZ-010-AD-A	2029178
	Collet for blind hollow shaft, shaft diameter 12 mm, external diameter 15 mm	SPZ-012-AD-A	2029179
	Collet for blind hollow shaft, shaft diameter 14 mm, external diameter 15 mm	SPZ-014-AD-A	2048863
	Collet for blind hollow shaft, shaft diameter 1/2" (12.7 mm), external diameter 15 mm	SPZ-1E2-AD-A	2029180
	Collet for blind hollow shaft, shaft diameter 1/4" (6.35 mm), external diameter 15 mm	SPZ-1E4-AD-A	2029175
	Collet for blind hollow shaft, shaft diameter 3/8" (9.525 mm), external diameter 15 mm	SPZ-3E8-AD-A	2029177

Dimensional drawings → [page K-725](#)




Recommended accessories

Mounting systems

Mounting brackets and plates





Mounting bracket

Figure	Brief description	Type	Part no.
	Mounting bracket for encoder with centering hub 36 mm, including mounting kit for face mount flange	BEF-WF-36	2029164

Dimensional drawings → [page K-725](#)

Flanges

Flange plate





Figure	Brief description	Type	Part no.
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-050	2029160
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-060REC	2029162
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum	BEF-FA-036-060RSA	2029163
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum	BEF-FA-036-100	2029161

Dimensional drawings → [page K-725](#)

Other mounting accessories


Measuring wheels and measuring wheel systems



Figure	Brief description	Type	Part no.
	Measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020	5312988
	Measuring wheel with ridged plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020G	5318678
	Measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft, circumference 500 mm	BEF-MR-010050	5312989
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm	BEF-MR006020R	2055222
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 300 mm	BEF-MR006030R	2055634
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278



Dimensional drawings → [page K-725](#)

Mounting bell

Figure	Brief description	Type	Part no.
	Mounting bell for encoders with a servo flange, centering hub 50 mm, including mounting kit	BEF-MG-50	5312987




Dimensional drawings → [page K-725](#)

## Servo clamps

Figure	Brief description	Type	Part no.
	Half-shell servo clamps (2 pcs.) for servo flanges with a 50 mm centering hub	BEF-WG-SF050	2029165
	Servo clamps, large, for servo flanges (clamps, eccentric fastener), 3 pcs., without mounting material	BEF-WK-SF	2029166


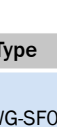
Dimensional drawings → [page K-725](#)

## Miscellaneous



Figure	Brief description	Type	Part no.
	Mounting kit for servo flange encoder on the bearing block, 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911	BEF-MK-LB	5320872
	Bearing block for hollow shaft encoder, including fixing screws	BEF-FA-B12-010	2042728
	Bearing block for servo and face mount flange encoder	BEF-FA-LB1210	2044591

Dimensional drawings → [page K-725](#)

## Shaft couplings

Figure	Brief description	Type	Part no.
	Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. speed 10,000 rpm, $-30^\circ\text{C}$ ... $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0606-B	5312981
	Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. speed 10,000 rpm, $-30^\circ\text{C}$ ... $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0610-B	5312982
	Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. revolutions 10,000 rpm, $-30^\circ$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1010-B	5312983
	Bellows coupling, shaft diameter 10 mm/12 mm; maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. revolutions 10,000 rpm, $-30^\circ$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1012-B	5312984
	Bar coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angle $\pm 3^\circ$ ; max. speed 10,000 rpm, $-10^\circ$ to $+80^\circ\text{C}$ , max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0606-S	2056406
	Bar coupling, shaft diameter 6 mm / 8 mm, maximum shaft offset radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angle $\pm 3^\circ$ ; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0608-S	5314179
	Bar coupling, shaft diameter 6 mm/10 mm, maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angular $\pm 3^\circ$ ; max. speed 10,000 rpm, $-10^\circ$ to $+80^\circ\text{C}$ , max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0610-S	2056407
	Bar coupling, shaft diameter 8 mm / 10 mm, maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angular $\pm 3^\circ$ ; torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0810-S	5314178
	Bar coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angle $\pm 3^\circ$ ; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-1010-S	2056408

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Figure	Brief description	Type	Part no.
	Double-loop coupling, shaft diameter 6 mm/10 mm, maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ\text{C} \dots +80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-0610-D	5326697
	Double-loop coupling, shaft diameter 8 mm/10 mm, maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ\text{C} \dots +80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-0810-D	5326704
	Double-loop coupling, shaft diameter 10 mm/10 mm, maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ\text{C} \dots +80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1010-D	5326703
	Double-loop coupling, shaft diameter 10 mm/12 mm, maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ\text{C} \dots +80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1012-D	5326702
	Spring washer coupling, shaft diameter 6 mm/10 mm, maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angular $\pm 2.5^\circ$ ; max. speed 12,000 rpm, $-10^\circ$ to $+80^\circ\text{C}$ , max. torque 60 Ncm; material: aluminum flange, fiber-glass reinforced polyamide membrane and tempered steel coupling pin	KUP-0610-F	5312985
	Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angular $\pm 2.5^\circ$ ; max. speed 12,000 rpm, $-10^\circ$ to $+80^\circ\text{C}$ , max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986

Dimensional drawings → [page K-725](#)

## Connectivity

Plug connectors and cables

Connecting cables with female connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 5-pin, straight Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 2 x 0.34 mm <sup>2</sup> , $\varnothing$ 8.0 mm	5 m	DOL-1205-G05MQ	6026006
		10 m	DOL-1205-G10MQ	6026008
		12 m	DOL-1205-G12MQ	6032636
		15 m	DOL-1205-G15MQ	6032637
		20 m	DOL-1205-G20MQ	6032638
		30 m	DOL-1205-G30MQ	6032639
		50 m	DOL-1205-G50MQ	6032861
	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: for power supply, suitable for drag chain, PVC, unshielded, 4 x 0.25 mm <sup>2</sup> , $\varnothing$ 5.0 mm	5 m	DOL-1204-G05M	6009866



Dimensional drawings → [page K-725](#)

Connecting cables with male connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 2 x 0.34 mm <sup>2</sup> , $\varnothing$ 8.0 mm Wire shielding: AL-PT foil, total shield, tin-plated C shield	5 m	STL-1205-G05MQ	6026005
		10 m	STL-1205-G10MQ	6026007
		12 m	STL-1205-G12MQ	6032635

Dimensional drawings → [page K-725](#)

## Female connectors (ready to assemble)


Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, straight, unshielded, for power supply, for cable diameter 4 mm ... 6 mm Head B: -	DOS-1204-G	6007302
	Head A: female connector, M12, 5-pin, straight, B-coded, shielded, for cable diameter 4 mm ... 9 mm Head B: -	DOS-1205-GQ	6021353

Dimensional drawings → [page K-725](#)

## Cables (ready to assemble)


Figure	Brief description	Length of cable	Type	Part no.
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, shielded, 2 x 0.25 mm <sup>2</sup> , Ø 8.0 mm	By the meter	LTG-2102-MW	6021355

## Other plug connectors and cables

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 4-pin, straight, B-coded Cable: terminator	STE-END-Q	6021156

Dimensional drawings → [page K-725](#)

## Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 5-pin, straight, B-coded, shielded, for cable diameter 4 mm ... 9 mm Head B: -	STE-1205-GQ	6021354

Dimensional drawings → [page K-725](#)→ [For additional accessories, please see page K-668 onwards](#)