



# INTELLIGENT, POWERFUL, PRECISE

<sup>1)</sup> UL 508 compliant.

**More information**

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### Product description

The AFS60 and AFM60 EtherNet/IP encoders from SICK are the first sensors of their kind to feature an active web server as well as to make their function blocks available for fieldbus integration. Mechanical engineers, integrators and end customers all benefit from features including simple commissioning, significantly reduced configuration time and direct, continuous access to the encoder via the machine's HMI user interface.

Furthermore, the encoders are equipped with an FTP server, which allows a direct firmware update. The web server configuration option opens up brand-new opportunities for commissioning, service and maintenance by operating personnel who have different capabilities and levels of interface knowledge

### At a glance

- High-resolution, 30-bit absolute encoder
- Integrated web server and FTP server
- DLR (Device Level Ring)
- Function module
- Comprehensive diagnostic functions
- IP addressing via software or hardware
- Round axis functionality (transmission calculation)

### Your benefits

- Integrated web server for easy configuration without the need for specialized interface knowledge
- FTP server for firmware updates directly on site and in existing systems
- DLR (Device Level Ring) for enhanced system throughput thanks to redundant network communication
- Status display via five duo LEDs on the sensor for a quick initial indication of the operational status
- Comprehensive diagnosis via the 32-bit fault header
- Round axis functionality for full scalability for binary and non-binary resolutions as well as not complete multiturn revolutions (transmission calculation).
- Individual IP address via DHCP or pre-defined IP address via DEC switches

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## Fields of application

- Palletizing systems
- Storage systems
- Packaging
- Hydraulic presses
- Printing machines
- Robots
- Rotary tables

## Detailed technical data

### Performance

<b>Max. number of steps per revolution, AFS60 and AFM60</b>	262,144 (18 bit) (maximum viewing number of resolutions, page G-315)	
<b>Max. number of revolutions</b>	AFS60	1
	AFM60	4,096 (12 bit)
<b>Resolution</b>	AFS60	18 bit
	AFM60	30 bit
<b>Error limits</b>	± 0.03°	
<b>Repeatability</b>	± 0.002°	
<b>Measurement increment deviation</b>	± 0.002°	
<b>Measuring increment (360 ° / number of steps per revolution)</b>	0.001°	
<b>Initialization time</b>	Approx. 12 s	

### Interfaces

<b>Electrical interface</b>	EtherNet/IP
<b>Transfer rate</b>	10/100 MBit/s
<b>RPI (requested packet interval)</b>	5 ... 750 ms
<b>Transmission media</b>	CAT 5e cable
<b>DLR (Device Level Ring)</b>	✓
<b>Encoder profile</b>	0 x 22
<b>Configuration data</b>	Number of steps per revolution, number of revolutions, PRESET, counting direction, sampling rate for speed monitoring, unit for outputting the speed, acceleration, and temperature, output of scaleable limit values such as: position ranges, speed, acceleration, number of movements cw/ccw, direction changes, operating hours for power-on/motion, round axis functionality (only multiturn version), heartbeat
<b>Available diagnostic data</b>	Current, minimum and maximum temperature, maximum speed, power-on counter, operating hours counter for power-on/motion, counter of direction changes/number of movements cw/number of movements ccw, minimum and maximum operating voltage, signal monitoring for single and multiturn

### Electrical data

<b>Operating voltage range</b>	10 V DC ... 30 V DC
<b>Max. power consumption without load</b>	≤ 3 W
<b>Reverse polarity protection</b>	✓
<b>MTTFd: mean time to dangerous failure</b>	80 years (EN ISO 13849-1) <sup>1)</sup>

<sup>1)</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 8,760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Mechanical data

<b>Operating speed</b> <sup>1)</sup>	Solid shaft	9,000 rpm (maximum viewing number of resolutions, page G-315)
	Blind hollow shaft	6,000 rpm (maximum viewing number of resolutions, page G-315)
<b>Mass</b>		0.2 kg
<b>Permissible shaft load, solid shaft</b>		80 N (radial); 40 N (axial)
<b>Permissible shaft movement of the drive element, blind hollow shaft</b>		± 0.3 / ± 0.05 mm (radial, static/dynamic) ± 0.5 / ± 0.1 mm (axial, static/dynamic)
<b>Rotor moment of inertia</b>	Solid shaft	≤ 6.2 gcm <sup>2</sup>
	Blind hollow shaft	≤ 40 gcm <sup>2</sup>
<b>Bearing lifetime</b>		3 x 10 <sup>9</sup> revolutions
<b>Start up torque at 20 °C</b>	Solid shaft	0.5 Ncm
	Blind hollow shaft	0.8 Ncm
<b>Operating torque at 20 °C</b>	Solid shaft	0.3 Ncm
	Blind hollow shaft	0.6 Ncm
<b>Max. angular acceleration</b>		5 x 10 <sup>5</sup> rad/s <sup>2</sup>
<b>Shaft diameter</b>	Face mount flange, solid shaft	10 x 19 mm, 3/8"
	Servo flange, solid shaft	6 x 10 mm
	Blind hollow shaft, AFM60	8, 10, 12, 14, 15 mm, 1/4", 1/2", 3/8"
	Blind hollow shaft, AFS60	8, 10, 12, 14, 15 mm, 1/4", 1/2", 3/8", 5/8"
<b>Shaft material</b>		Stainless steel
<b>Flange material</b>	Solid shaft	Aluminum
	Blind hollow shaft, AFM60	Aluminum
	Blind hollow shaft, AFS60	Zinc die cast
<b>Housing material</b>		Aluminum

<sup>1)</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) <sup>1)</sup>	
<b>Enclosure rating as per IEC 60529</b>	Protection class housing side with connector outlet	IP 67, with mating connector fitted or sealing caps
	Shaft	IP 65
<b>Permissible relative humidity</b>	90% (condensation of optical surfaces not permitted)	
<b>Operating temperature range</b>	-40 °C ... +85 °C	
<b>Storage temperature range</b>	-40 °C ... +100 °C, without packaging	
<b>Resistance to shocks (according to EN 60068-2-27)</b>	100 g, 6 ms	
<b>Resistance to vibration (according to EN 60068-2-6)</b>	30 g, 10 Hz ... 2,000 Hz	

<sup>1)</sup> The EMC according to the standards quoted is achieved if shielded cables are used.

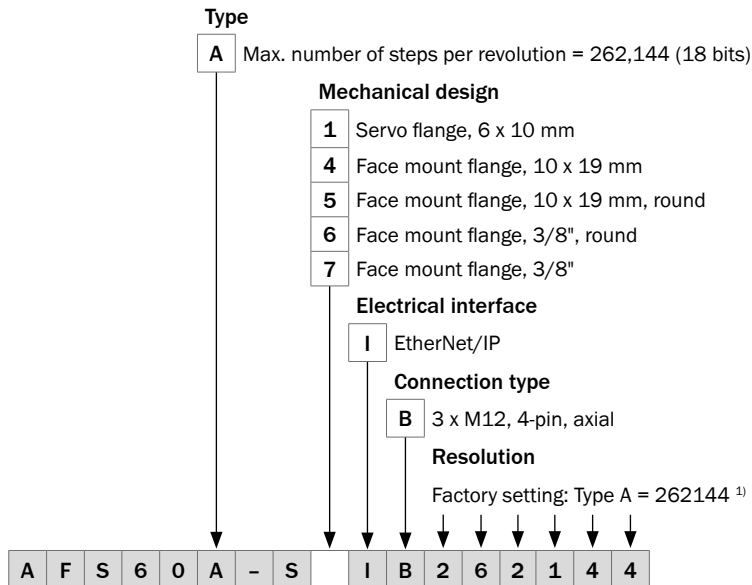


### Maximum viewing number of resolutions

The maximum singleturn resolution (= 18 bit) can be operated with the maximum operating speed (blind hollow shaft 6,000 rpm and solid shaft 9,000 rpm).

### Ordering information

Type code AFS absolute encoder, singleturn, solid shaft



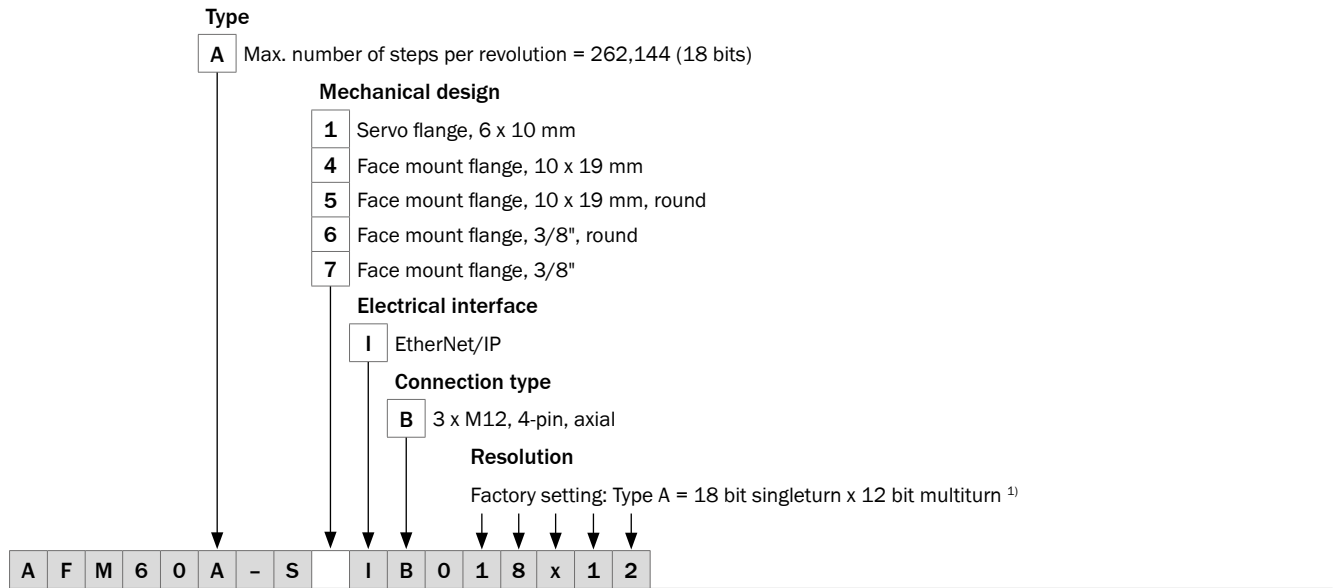
<sup>1)</sup> Number of steps programmable via control unit: Type A = 2 to 262144.

### Example orders

Mechanical design	Type	Part no.
Servo flange, Ø 6 mm, length 10 mm	AFS60A-S1IB262144	1055362
Face mount flange, Ø 10 mm, length 19 mm	AFS60A-S4IB262144	1055364



Type code AFM, multiturn absolute encoder, solid shaft



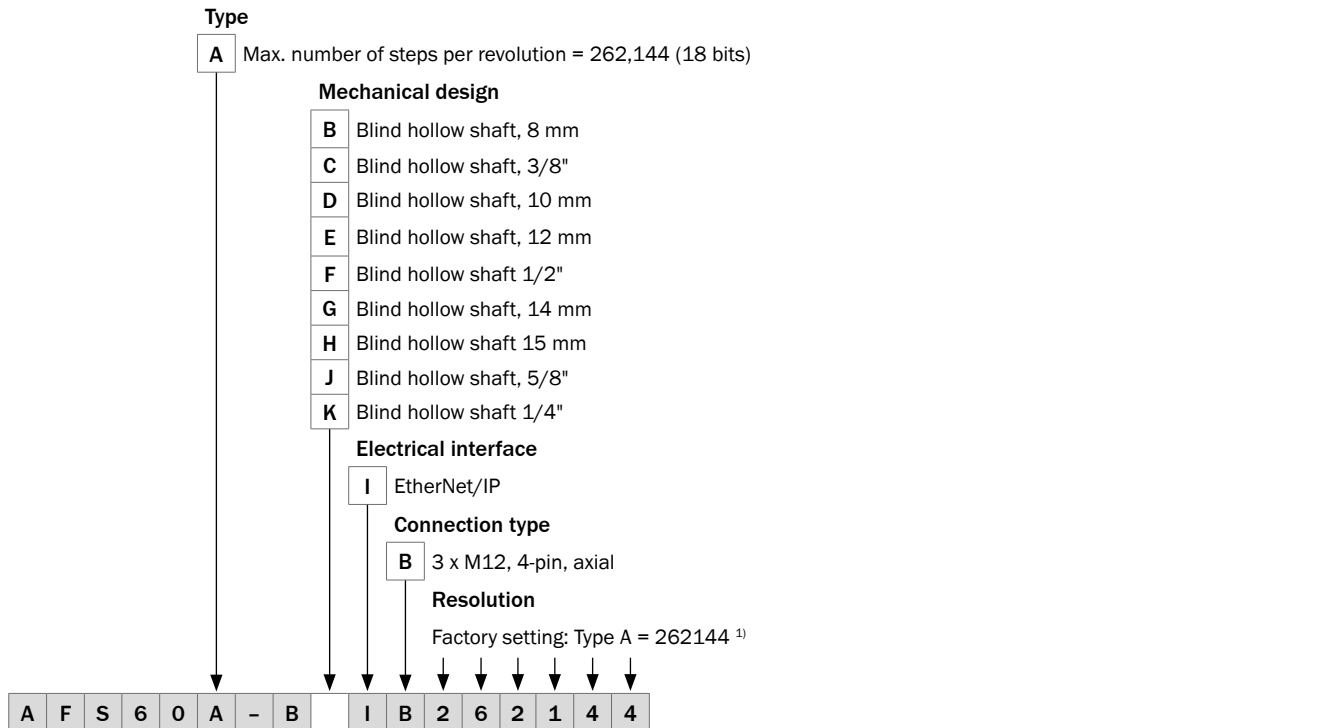
<sup>1)</sup> Programmable options for resolution via control unit.

Example orders

Mechanical design	Type	Part no.
Servo flange, Ø 6 mm, length 10 mm	AFM60A-S1IB018x12	1055331
Face mount flange, Ø 10 mm, length 19 mm	AFM60A-S4IB018x12	1055334



Type code AFS singleturn absolute encoder, solid shaft



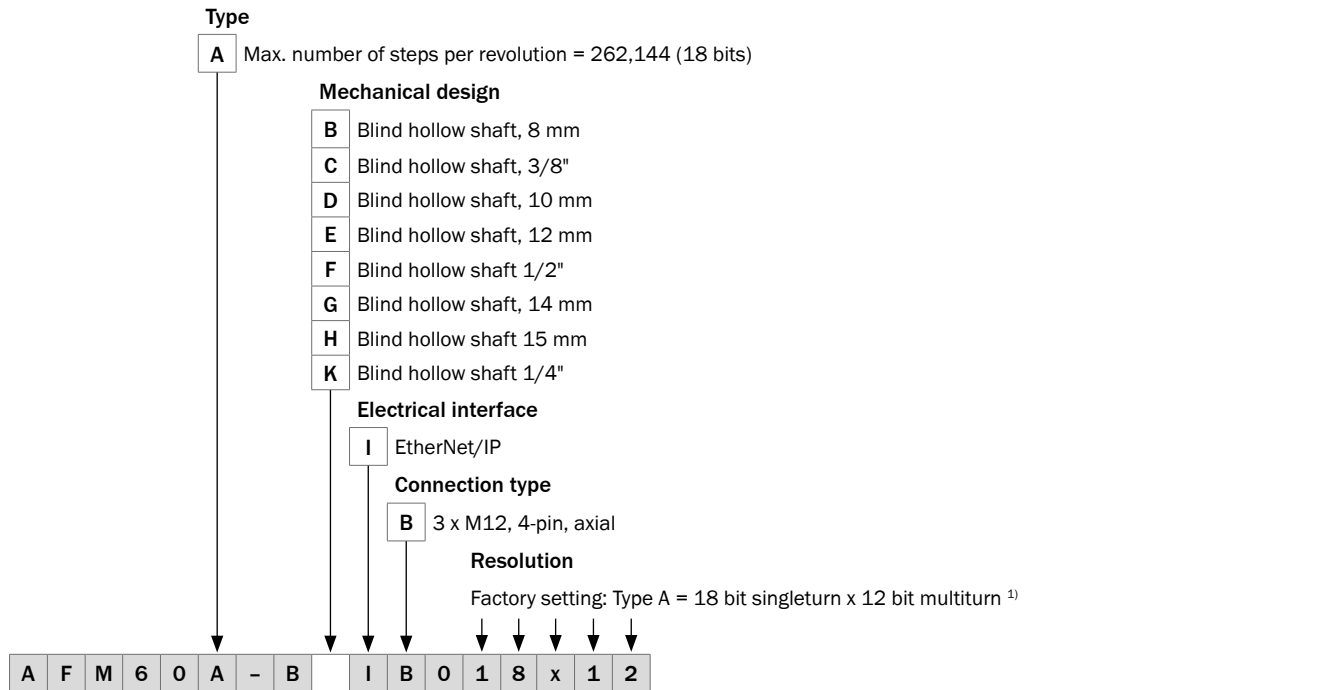
<sup>1)</sup> Number of steps programmable via control unit: Type A = 2 to 262144.

Example orders

Mechanical design	Type	Part no.
Blind hollow shaft, 10 mm	AFS60A-BDIB262144	1055356
Blind hollow shaft, 12 mm	AFS60A-BEIB262144	1055358
Blind hollow shaft 15 mm	AFS60A-BHIB262144	1055360



Type code AFM, multiturn absolute encoder, blind hollow shaft



<sup>1)</sup> Programmable options for resolution via control unit.

Example orders

Mechanical design	Type	Part no.
Blind hollow shaft, 10 mm	AFM60A-BDIB018x12	1055325
Blind hollow shaft, 12 mm	AFM60A-BEIB018x12	1055326
Blind hollow shaft 15 mm	AFM60A-BHIB018x12	1055328





## Sales kits

## Sales kit 01

EtherNet/IP encoder

- + 1 M12 male cable connector, 4-pin, angled, (STE-1204-WE, part number 6048152)
- + 1 M12 female cable connector, 4-pin, angled, (DOS-1204-W, part number 6007303)


	Encoder type (singleturn)	Description	Type	Part no.
	AFS60A-S1IB262144	Solid shaft, servo flange, 6 x 10 mm	AFS60A-S1IB sales kit 01	1057693
	AFS60A-S4IB262144	Solid shaft, face mount flange, 10 x 19 mm	AFS60A-S4IB sales kit 01	1057718
	AFS60A-BDIB262144	Blind hollow shaft, Ø 10 mm	AFS60A-BDIB sales kit 01	1057719
	AFS60A-BEIB262144	Blind hollow shaft, Ø 12 mm	AFS60A-BEIB sales kit 01	1057720
	AFS60A-BHIB262144	Blind hollow shaft, Ø 15 mm	AFS60A-BHIB sales kit 01	1057721


	Encoder type (multiturn)	Description	Type	Part no.
	AFM60A-S1IB018x12	Solid shaft, servo flange, 6 x 10 mm	AFM60A-S1IB sales kit 01	1057722
	AFM60A-S4IB018x12	Solid shaft, face mount flange, 10 x 19 mm	AFM60A-S4IB sales kit 01	1057723
	AFM60A-BDIB018x12	Blind hollow shaft, Ø 10 mm	AFM60A-BDIB sales kit 01	1057724
	AFM60A-BEIB018x12	Blind hollow shaft, Ø 12 mm	AFM60A-BEIB sales kit 01	1057725
	AFM60A-BHIB018x12	Blind hollow shaft, Ø 15 mm	AFM60A-BHIB sales kit 01	1057726

## Sales kit 02

EtherNet/IP encoder

- + 1 M12 male cable connector, 4-pin, angled, pre-wired with 5 m cable (STL-1204-W05ME90, part number 6047913)
- + 1 M12 female cable connector, 4-pin, angled, pre-wired with 5 m cable (DOL-1204-W05MC, part number 6025904)

	Encoder type (singleturn)	Description	Type	Part no.
	AFS60A-S1IB262144	Solid shaft, servo flange, 6 x 10 mm	AFS60A-S1IB sales kit 02	1057737
	AFS60A-S4IB262144	Solid shaft, face mount flange, 10 x 19 mm	AFS60A-S4IB sales kit 02	1057738
	AFS60A-BDIB262144	Blind hollow shaft, Ø 10 mm	AFS60A-BDIB sales kit 02	1057739
	AFS60A-BEIB262144	Blind hollow shaft, Ø 12 mm	AFS60A-BEIB sales kit 02	1057740
	AFS60A-BHIB262144	Blind hollow shaft, Ø 15 mm	AFS60A-BHIB sales kit 02	1057741


	Encoder type (multiturn)	Description	Type	Part no.
	AFM60A-S1IB018x12	Solid shaft, servo flange, 6 x 10 mm	AFM60A-S1IB sales kit 02	1057742
	AFM60A-S4IB018x12	Solid shaft, face mount flange, 10 x 19 mm	AFM60A-S4IB sales kit 02	1057743
	AFM60A-BDIB018x12	Blind hollow shaft, Ø 10 mm	AFM60A-BDIB sales kit 02	1057744
	AFM60A-BEIB018x12	Blind hollow shaft, Ø 12 mm	AFM60A-BEIB sales kit 02	1057745
	AFM60A-BHIB018x12	Blind hollow shaft, Ø 15 mm	AFM60A-BHIB sales kit 02	1057746




Sales kit 03

EtherNet/IP encoder

- + 2 M12 male cable connectors, 4-pin, angled, (STE-1204-WE, part number 6048152)
- + 1 M12 female cable connector, 4-pin, angled, (DOS-1204-W, part number 6007303)

	Encoder type (singleturn)	Description	Type	Part no.
	AFS60A-S1IB262144	Solid shaft, servo flange, 6 x 10 mm	AFS60A-S1IB sales kit 03	1057727
	AFS60A-S4IB262144	Solid shaft, face mount flange, 10 x 19 mm	AFS60A-S4IB sales kit 03	1057728
	AFS60A-BDIB262144	Blind hollow shaft, Ø 10 mm	AFS60A-BDIB sales kit 03	1057729
	AFS60A-BEIB262144	Blind hollow shaft, Ø 12 mm	AFS60A-BEIB sales kit 03	1057730
	AFS60A-BHIB262144	Blind hollow shaft, Ø 15 mm	AFS60A-BHIB sales kit 03	1057731


	Encoder type (multiturn)	Description	Type	Part no.
	AFM60A-S1IB018x12	Solid shaft, servo flange, 6 x 10 mm	AFM60A-S1IB sales kit 03	1057732
	AFM60A-S4IB018x12	Solid shaft, face mount flange, 10 x 19 mm	AFM60A-S4IB sales kit 03	1057733
	AFM60A-BDIB018x12	Blind hollow shaft, Ø 10 mm	AFM60A-BDIB sales kit 03	1057734
	AFM60A-BEIB018x12	Blind hollow shaft, Ø 12 mm	AFM60A-BEIB sales kit 03	1057735
	AFM60A-BHIB018x12	Blind hollow shaft, Ø 15 mm	AFM60A-BHIB sales kit 03	1057736


Sales kit 04

EtherNet/IP encoder

- + 2 M12 male cable connectors, 4-pin, angled, pre-wired with 5 m cable (STL-1204-W05ME90, part number 6047913)
- + 1 M12 female cable connector, 4-pin, angled, pre-wired with 5 m cable (DOL-1204-W05MC, part number 6025904)

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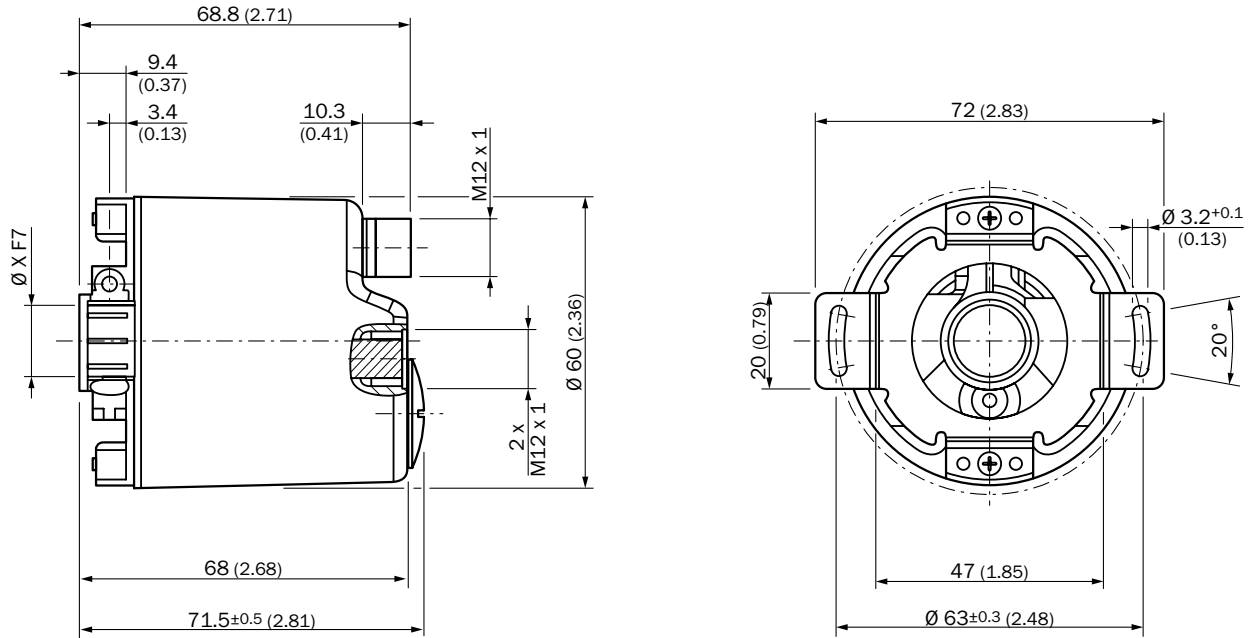
	Encoder type (singleturn)	Description	Type	Part no.
	AFS60A-S1IB262144	Solid shaft, servo flange, 6 x 10 mm	AFS60A-S1IB sales kit 04	1057747
	AFS60A-S4IB262144	Solid shaft, face mount flange, 10 x 19 mm	AFS60A-S4IB sales kit 04	1057748
	AFS60A-BDIB262144	Blind hollow shaft, Ø 10 mm	AFS60A-BDIB sales kit 04	1057749
	AFS60A-BEIB262144	Blind hollow shaft, Ø 12 mm	AFS60A-BEIB sales kit 04	1057750
	AFS60A-BHIB262144	Blind hollow shaft, Ø 15 mm	AFS60A-BHIB sales kit 04	1057751

	Encoder type (multiturn)	Description	Type	Part no.
	AFM60A-S1IB018x12	Solid shaft, servo flange, 6 x 10 mm	AFM60A-S1IB sales kit 04	1057752
	AFM60A-S4IB018x12	Solid shaft, face mount flange, 10 x 19 mm	AFM60A-S4IB sales kit 04	1057753
	AFM60A-BDIB018x12	Blind hollow shaft, Ø 10 mm	AFM60A-BDIB sales kit 04	1057754
	AFM60A-BEIB018x12	Blind hollow shaft, Ø 12 mm	AFM60A-BEIB sales kit 04	1057755
	AFM60A-BHIB018x12	Blind hollow shaft, Ø 15 mm	AFM60A-BHIB sales kit 04	1057756



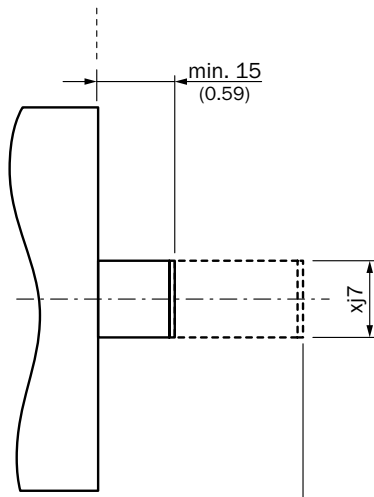


Blind hollow shaft



General tolerances according to DIN ISO 2768-mk

Mounting suggestion



General tolerances according to DIN ISO 2768-mk

xj7 = Shaft diameter, on the customer side

Diameter X F7	
AFS60 singleturn absolute encoder	AFM60 multiturn absolute encoder
Blind hollow shaft 1/4"	Blind hollow shaft 1/4"
Blind hollow shaft, 8 mm	Blind hollow shaft, 8 mm
Blind hollow shaft, 3/8"	Blind hollow shaft, 3/8"
Blind hollow shaft, 10 mm	Blind hollow shaft, 10 mm
Blind hollow shaft, 12 mm	Blind hollow shaft, 12 mm
Blind hollow shaft 1/2"	Blind hollow shaft 1/2"
Blind hollow shaft, 14 mm	Blind hollow shaft, 14 mm
Blind hollow shaft 15 mm	Blind hollow shaft 15 mm
Blind hollow shaft, 5/8"	



PIN assignment

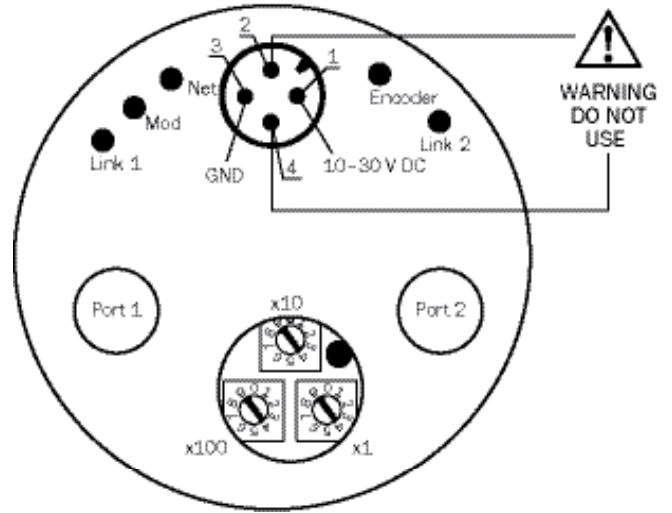
M12 - 4 x D coding



Port 1				
Signal	T x D+	R x D+	T x D-	R x D-
Pin	1	2	3	4

Port 2				
Signal	T x D+	R x D+	T x D-	R x D-
Pin	1	2	3	4



M12 - 4 x A coding




Power supply				
Signal	10 ... 30 V	Not connected	GND	Not connected
Pin	1	2	3	4



**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.
	Standard stator coupling	BEF-DS00XFX	2056812
	Stator coupling, one-sided, 81 mm long with slot	BEF-DS01DFS/VFS	2047428
	Stator coupling, one-sided, 179 mm long with slot	BEF-DS02DFS/VFS	2047430
	Stator coupling, one-sided, 248 mm long with slots	BEF-DS03DFS/VFS	2047431
	Stator coupling, 16.5 mm high	BEF-DS05XFX	2057423
	Stator coupling with hole circle diameter 63 mm	BEF-DS07XFX	2059368
	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 63 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-063REC	2034225

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 (Hytre) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020	5312988
	Measuring wheel with ridged plastic surface (Hytre) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020G	5318678
	Measuring wheel with smooth plastic surface (Hytre) 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 6 mm solid shaft, circumference 500 mm	BEF-MR006050R	2055225
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm	BEF-MR010020R	2055224
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm	BEF-MR010050R	2055227
	O-ring for measuring wheels (circumference 200 mm)	BEF-OR-053-040	2064061
	O-ring for measuring wheels (circumference 300 mm)	BEF-OR-083-050	2064076


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

Modular measuring wheel system

Brief description	Type	Part no.
Measuring wheel system, desired mounting position: left, for DBS60-S4, DFS60-S4, AFS60-S4, and AFM60-S4	BEF-MRS-10-1	2071958
Measuring wheel system, desired mounting position: right, for DBS60-S4, DFS60-S4, AFS60-S4, and AFM60-S4	BEF-MRS-10-2	2071957



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 adaptation

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, $-30^\circ\text{C} \dots +120^\circ\text{C}$ , 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, $-30^\circ\text{C} \dots +120^\circ\text{C}$ , 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, $-30^\circ\text{C} \dots +120^\circ\text{C}$ , 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, $-30^\circ\text{C} \dots +120^\circ\text{C}$ , 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, $-10^\circ\text{C} \dots +80^\circ\text{C}$ , 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, $-10^\circ\text{C} \dots +80^\circ\text{C}$ , 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
	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, $-10^\circ\text{C} \dots +80^\circ\text{C}$ , 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, $-10^\circ \dots +80^\circ\text{C}$ , max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986

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G

## Connectivity

## Power supply

		Power supply (A-coded)
<b>Mechanical parameters</b>	Number of pins	4
	Cable diameter	4.7 mm
	Minimum bend radius, secured in place	47 mm
	Minimum bend radius, movable	47 mm
	Maximum length of cable between participants	100 m
<b>Material</b>	Outer sheath	PUR
	Conductor	Bare copper strand
	Color of outer sheath	Black RAL 9005
<b>Cable parameters</b>	AWG	22
	Wire cross-section	0.34 mm <sup>2</sup>
	Wire colors	Brown, white, blue, black
	Conductor resistance	≤ 58 Ω/km
<b>Temperature range</b>	Fixed in place	-50 °C ... +80 °C
	Moving	-25 °C ... +80 °C
<b>Specific features</b>	Flame resistance	UL horizontal flame test/CSA FT2
	Halogen-free state	PUR halogen-free
	Microbe resistance	Excellent
	Hydrolysis resistance	Excellent

## Plug connectors and cables

## Connecting cables with female connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: for power supply, suitable for drag chain, PUR, halogen-free, unshielded, 4 x 0.34 mm <sup>2</sup> , Ø 4.7 mm	2 m	DOL-1204-G02MC	6025900
		5 m	DOL-1204-G05MC	6025901
		10 m	DOL-1204-G10MC	6025902
		25 m	DOL-1204-G25MC	6034751
	Head A: female connector, M12, 4-pin, angled Head B: cable Cable: for power supply, suitable for drag chain, PUR, halogen-free, unshielded, 4 x 0.34 mm <sup>2</sup> , Ø 4.7 mm	2 m	DOL-1204-W02MC	6025903
		5 m	DOL-1204-W05MC	6025904
		10 m	DOL-1204-W10MC	6025905
		25 m	DOL-1204-W25MC	6034754

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M12 round screw system

		Data cable (D-coded)
<b>Mechanical parameters</b>		
Number of pins		4
Cable diameter		6.4 mm
Minimum bend radius, secured in place		26 mm
Minimum bend radius, movable		26 mm
Maximum length of cable between participants		100 m
<b>Material</b>		
Outer sheath		PUR
Conductor		Bare copper strand
Color of outer sheath		Water blue RAL 5021
<b>Electrical parameters</b>		
Transmission properties (category)		CAT5 (IEC 11801:2002), CAT5e (TIA 568B:2001)
<b>Cable parameters</b>		
Cable structure		2 x 2 x AWG26/7 PIMF
Wire cross-section		0.14 mm <sup>2</sup>
Wire colors		White-green, white-orange
Conductor resistance		≤ 150 Ω/km
Shield		Braided tin-plated copper wires
<b>Temperature range</b>		
Fixed in place		-20 °C ... +80 °C
Moving		-20 °C ... +80 °C
<b>Specific features</b>		
Flame resistance		According to IEC 60332-1-2
Halogen-free state		According to IEC 60754-1
Oil resistance		According to DIN EN 60811-2-1
Other resistance		Microbe resistance in accordance with VDE 0282 Part 10 Hydrolysis resistance in accordance with DIN 53504
Smoke density		According to IEC 61034




Connecting cables with male connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: cable Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	STL-1204-G02ME90	6045284
		5 m	STL-1204-G05ME90	6045285
		10 m	STL-1204-G10ME90	6045286
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: cable Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	STL-1204-W02ME90	6047912
		5 m	STL-1204-W05ME90	6047913
		10 m	STL-1204-W10ME90	6047914
		25 m	STL-1204-W20ME90	6047915

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Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, straight, D-coded, shielded, for cable diameter 4 mm ... 8 mm Head B: -	DOS-1204-GE	6048153
	Head A: female connector, M12, 4-pin, angled, unshielded, for power supply, for cable diameter 3 mm ... 6.5 mm Head B: -	DOS-1204-W	6007303

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, angled, D-coded, shielded, for cable diameter 4 mm ... 8 mm Head B: -	DOS-1204-WE	6048154




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Other plug connectors and cables

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, D-coded Head B: female connector, RJ45, 8-pin Cable: shielded Switch cabinet feedthrough	Feedthrough female connector Ethernet RJ45	6048180

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Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, RJ45, 8-pin, straight, shielded, for cable diameter 4.5 mm ... 8 mm Head B: -	STE-0J08-GE	6048150
	Head A: male connector, M12, 4-pin, straight, D-coded, shielded, for cable diameter 4 mm ... 8 mm Head B: -	STE-1204-GE01	6048151
	Head A: male connector, M12, 4-pin, angled, D-coded, shielded, for cable diameter 4 mm ... 8 mm Head B: -	STE-1204-WE	6048152

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Connection cables with male and male connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: male connector, M12, 4-pin, straight, D-coded Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	SSL-1204-G02ME90	6045222
		5 m	SSL-1204-G05ME90	6045277
		10 m	SSL-1204-G10ME90	6045279
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, M12, 4-pin, straight, D-coded Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	SSL-1204-H02ME90	6047908
		5 m	SSL-1204-H05ME90	6047909
		10 m	SSL-1204-H10ME90	6047910
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, M12, 4-pin, angled, D-coded Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	SSL-1204-W02ME	6050632
		5 m	SSL-1204-W05ME	6050633
		10 m	SSL-1204-W10ME	6050634
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: male connector, RJ45, 8-pin, straight Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	SSL-2J04-G02ME60	6047916
		5 m	SSL-2J04-G05ME60	6047917
		10 m	SSL-2J04-G10ME60	6047918
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, RJ45, 8-pin, straight Cable: PUR, halogen-free, shielded, 2 x 2 x 0.14 mm <sup>2</sup> , Ø 6.4 mm	2 m	SSL-2J04-H02ME	6047911
		5 m	SSL-2J04-H05ME	6045287
		10 m	SSL-2J04-H10ME	6045288

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

