

# Magnetic absolute multi-turn hollow shaft encoder

## BMMH – MAGRES

### SSI

#### features

- robust multi-turn encoder up to
  - 12 bit single-turn resolution
  - 13 bit multi-turn resolution
- SSI interface
- zero setting input



#### general data

voltage supply	5 VDC $\pm 10\%$ <b>(05C)</b> 10 - 30 VDC <b>(24C)</b>
max. supply current no load	typ. 100 mA (at 5 VDC) <b>(05C)</b> typ. 50 mA (at 24 VDC) <b>(24C)</b>
output circuit	SSI, RS 422
signal code	Gray and binary code
max. resolution single-turn	12 bit (1 step = 5' 16'')
multi-turn	13 bit (8'192 revolutions)
max. error limit	$\pm 1^\circ$
repeatability	0,3°
max. clock frequency	1 MHz
input signal	clock input, zero (zero setting: < 0,4 V, > 2 ms off state: 3,3 V or open)
counter buffering	with Lithium cell typ. 19 years
direction of rotation	looking at the flange, position counts up as the shaft rotates clockwise (CW)

#### mechanical data

max. revolutions	6'000 rpm
moment of inertia	$12 \times 10^{-7}$ kgm <sup>2</sup>
torque	typ. 0,93 cNm (B2) (3'000 rpm / 20 °C / IP 42)
product life	depending on ambient conditions (typ. 10 <sup>9</sup> revolutions.)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 300 g

#### order designation

**BMMH 58S1**   **12/13**

	connection
<b>5</b>	cable 2 m radial
<b>A</b>	connector radial
	shaft
<b>B2</b>	end shaft 12 mm IP 42 with clamping ring
<b>P2</b>	end shaft 12 mm IP 65 with clamping ring
	resolution multi-turn
<b>13</b>	13 bit
	resolution single-turn
<b>12</b>	12 bit
	voltage range, output signals
<b>05C</b>	5 VDC SSI interface
<b>24C</b>	10 - 30 VDC SSI interface
	signal code
<b>G</b>	Gray code
<b>N</b>	binary code

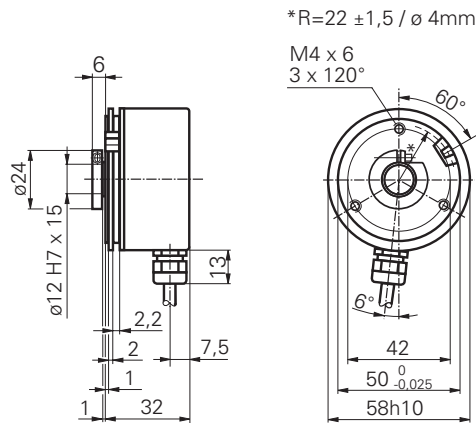
#### ambient conditions

temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 ( $\leq 300$ m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 ( $\leq 1'000$ m/s <sup>2</sup> / 6 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3

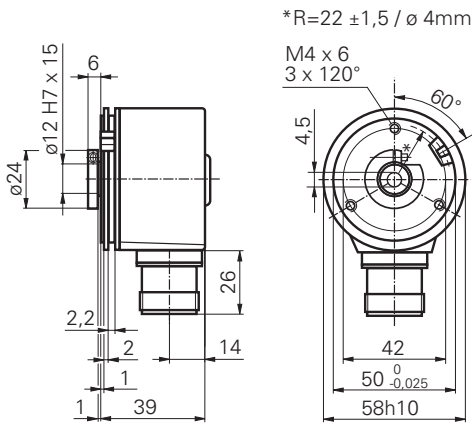


**dimensions and connection dimensions**

**-5**



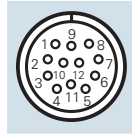
**-A**



**Note**  
Mounting drawings see end of chapter.

**assignment cable / connector M23 male**

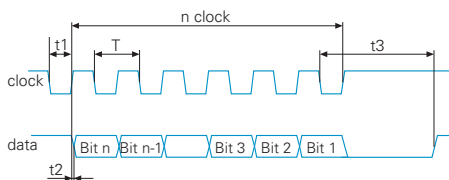
for connection reference **-A** and **-5**



view on encoder

pin	color	signals	description
1	yellow	clock-	clock signal
2	green	clock+	clock signal
3	grey	data+	data signal
4	pink	data-	data signal
5	blue	zero	zero setting input
6	-	n.c.	-
7	-	n.c.	-
8	-	n.c.	-
9	red	d.u.	do not use
10	-	n.c.	-
11	brown	+Vs	voltage supply
12	white	0 V	voltage supply
cable data			8 x 0,14 mm <sup>2</sup>

**read out of position values**



pulse times:  
 $T = 1 \mu s$  to  $10 \mu s$  /  $t1 = 0,5$  to  $5 \mu s$   
 $t2 < 0,2 \mu s$  /  $t3 > 12 \mu s$  to  $25 \mu s$

**SSI-data output and clock input**

see page 2.05 chapter absolute singleturn encoder

**accessories**

connector 12-pin	part nr. 116717
cable with connector (pre-assembled)	
2 m	part nr. 153334
5 m	part nr. 153335
clamp set	part nr. 110616
torque pin	part nr. 107540
torque spring <sup>1)</sup>	part nr. 109520
spring plate set	part nr. 136635
couplings	see chapter accessories
clamping ring set	
12 mm hollow shaft	part nr. 142556

<sup>1)</sup> encoder is delivered with fixed rubber torque spring

**3**

# Magnetic absolute multi-turn hollow shaft encoder

## BMMH – MAGRES

### Profibus-DP

#### features

- robust and compact multi-turn encoder
  - 13 bit single-turn resolution
  - 16 bit multi-turn resolution
- Profibus-DP interface
- bus in and bus out connector
- switches for bus address

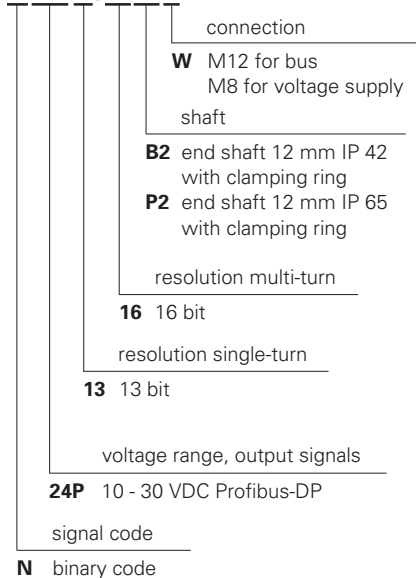


#### general data

voltage supply	10 - 30 VDC
max. supply current no load	typ. 100 mA (24 VDC)
bus protocol	Profibus-DP
Profibus features	device class 1 and 2
default setting	user address 03
max. resolution single-turn	13 bit (1 step = 2' 38'')
multi-turn	16 bit (65'536 revolutions)
max. error limit	±1°
repeatability	0,3°
direction of rotation	looking at the flange, position counts up as the shaft rotates clockwise (CW), programmable

#### order designation

**BMMH 58S1N 24P13/16**   **W**

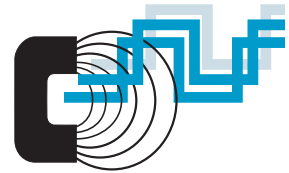


#### mechanical data

max. revolutions	6'000 rpm
moment of inertia	12 x 10 <sup>-7</sup> kgm <sup>2</sup>
torque	typ. 0,93 cNm (3'000 rpm 20 °C / IP 42)
storage life	depending on ambient conditions (typ. 10 <sup>9</sup> revolutions)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 300 g

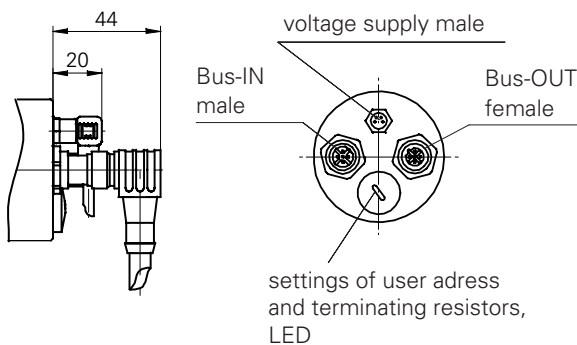
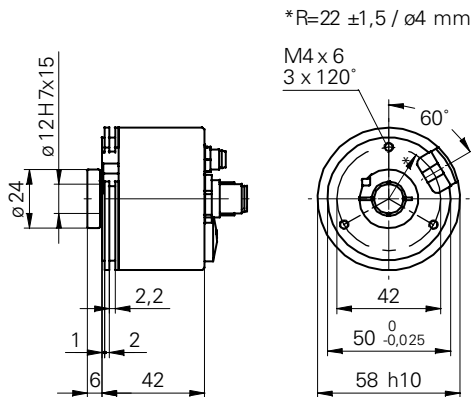
#### ambient conditions

temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 (≤ 300 m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 (≤ 1000 m/s <sup>2</sup> / 6 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3



**Profibus-DP**

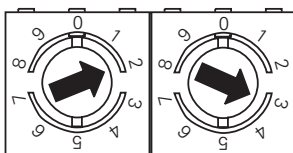
**dimensions and connection dimensions**



**Note**

Mounting drawings see end of chapter.

**settings of user address for Profibus-DP**



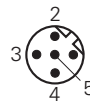
Address can be set with rotary switch.  
Example: User address 23

**settings of terminating resistors for Profibus-DP**



ON = Last User  
OFF = User X

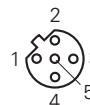
**assignment M12 Bus-IN male**



pin	signal	description
1	n.c.	-
2	A line green	cable green / Profibus-DP
3	n.c.	-
4	B line red	cable red / Profibus-DP
5	n.c.	-

B-coded

**assignment M12 Bus-OUT female**



pin	signal	description
1	+VsDP	VP Profibus +5 VDC <sup>1)</sup>
2	A line green	cable green / Profibus-DP
3	0 VDP	DGND Profibus <sup>1)</sup>
4	B line red	cable red / Profibus-DP
5	n.c.	-

B-coded

**assignment M8 voltage supply**



pin	signal	description
1	+Vs	voltage supply
2	n.c.	-
3	0 V	voltage supply
4	0 V	voltage supply

**accessories**

CD-ROM with GSD/EDS/XML-files and manuals	part nr. 147362
cable with M8 connector (female) for voltage supply, shielded	
connector straight	5 m part nr. 148326
connector angled	5 m part nr. 148328
cable with M12 connector (male) and M12 connector (female) for Bus-IN, Bus-OUT	
connector straight	2 m part nr. 157909
	5 m part nr. 157910
connector angled	2 m part nr. 157911
	6 m part nr. 157912
clamp set	part nr. 110616
torque pin	part nr. 107540
torque spring <sup>2)</sup>	part nr. 109520
spring plate set	part nr. 136635

<sup>1)</sup> for optional external terminating resistor

<sup>2)</sup> encoder is delivered with fixed rubber torque spring

# Magnetic absolute multi-turn encoder BMMH – MAGRES CANopen

## features

- robust multi-turn up to
  - 12 bit single-turn resolution
  - 18 bit multi-turn resolution
- CANopen interface integrated
- programmable resolution and preset values



## general data

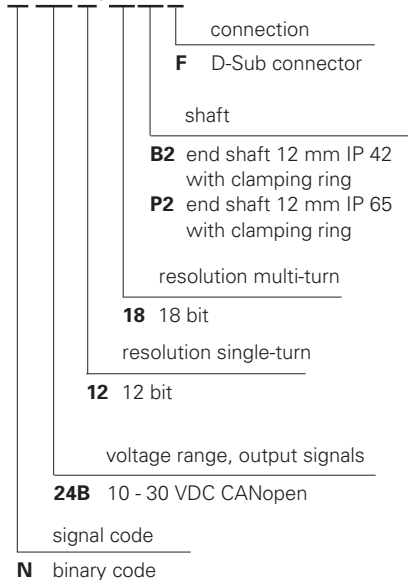
voltage supply	10 - 30 VDC
max. supply current no load	typ. 100 mA (at 24 VDC)
output circuit	CAN-bus, standard ISO/DIS 11898
specification	CAN 2.0B
protocol/profile	CANopen/CIA, DS-301 V4.01, DSP-305 V1.0 (LSS), DS-406 V3.0
signal code	natural binary code
max. resolution single-turn	12 bit (1 step = 5' 16'')
multi-turn	18 bit (262'144 revolutions)
max. error limit	±1°
repeatability	0,3°
max. baud rate	1 Mbit/s
product life	with Lithium cell typ. 19 years
direction of rotation	looking at the flange, position counts up as the shaft rotates clockwise (CW), programmable

## mechanical data

max. revolutions	6'000 rpm
moment of inertia	12 x 10 <sup>-7</sup> kgm <sup>2</sup>
torque	typ. 0,93 cNm (3'000 rpm 20 °C / IP 42)
storage life	depending on ambient conditions (typ. 10 <sup>9</sup> revolutions)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 300 g

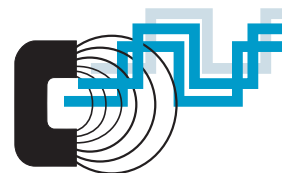
## order designation

**BMMH 58S1N 24B 12/18**  **F**



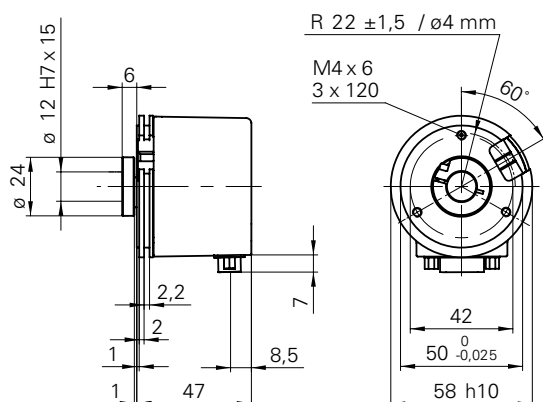
## ambient conditions

temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 (≤ 300 m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 (≤ 1'000 m/s <sup>2</sup> / 6 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3



**CANopen**

**dimensions and connection dimensions**



**assignment D-Sub 9-pin male connector**

pin number	signal	description
1	d.u.	do not use
2	CAN_L	bus line (dominant LOW)
3	CAN_GND	CAN ground
4	d.u.	do not use
5	n.c.	-
6	0 V	voltage supply
7	CAN_H	bus line (dominant HIGH)
8	n.c.	-
9	+Vs	voltage supply

**accessories**

CD-ROM with GSD-/EDS-/XML-files and manuals	part nr. 147362
D-Sub female angled CAN-bus	part nr. 145023
clamp set	part nr. 110616
torque pin	part nr. 107540
torque spring <sup>1)</sup>	part nr. 109520
spring plate set	part nr. 136635
coupling and shaft adapter	see chapter accessories
clamping ring set	
12 mm hollow shaft	part nr. 142556

<sup>1)</sup> encoder is delivered with fixed rubber torque spring

# Magnetic absolute multi-turn encoder BMMH – MAGRES DeviceNet

## features

- robust multi-turn up to
  - 12 bit single-turn resolution
  - 16 bit multi-turn resolution
- DeviceNet interface integrated
- programmable resolution and preset values



## general data

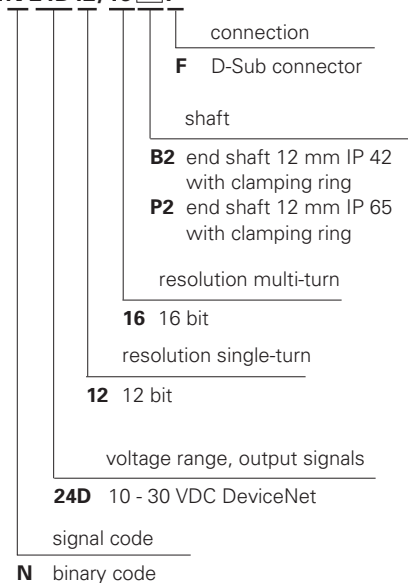
voltage supply	10 - 30 VDC
max. supply current no load	typ. 100 mA (at 24 VDC)
output circuit	CAN-bus, standard ISO/DIS 11898
protocol/profile	DeviceNet, Device Profile for Encoder V1.0
signal code	natural binary code
max. resolution single-turn multi-turn	12 bit (1 step = 5' 16") 16 bit (65'536 revolutions)
max. error limit	±1°
repeatability	0,3°
max. baud rate	500 kbit/s
product life	with Lithium cell typ. 19 years
direction of rotation	looking at the flange, position counts up as the shaft rotates clockwise (CW), programmable

## mechanical data

max. revolutions	6'000 rpm
moment of inertia	12 x 10 <sup>-7</sup> kgm <sup>2</sup>
torque	typ. 0,93 cNm (3'000 rpm 20 °C / IP 42)
storage life	depending on ambient conditions (typ. 10 <sup>9</sup> revolutions)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 300 g

## order designation

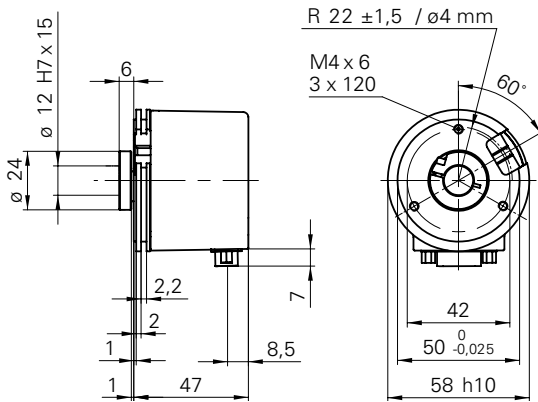
**BMMH 58S1N 24D12/16**  **F**



## ambient conditions

temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 (≤ 300 m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 (≤ 1'000 m/s <sup>2</sup> / 6 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3

**dimensions and connection dimensions**



**assignment D-Sub 9-pin male connector**

pin number	signal	description
1	d.u.	do not use
2	CAN_L	bus line (dominant LOW)
3	CAN_GND	CAN Ground
4	d.u.	do not use
5	CAN_SHLD	CAN shield
6	0 V	voltage supply
7	CAN_H	bus line (dominant HIGH)
8	n.c.	-
9	+Vs	voltage supply

**accessories**

CD-ROM with GSD-/EDS-/XML-files and manuals	part nr. 147362
D-Sub female angled CAN-bus	part nr. 145023
clamp set	part nr. 110616
torque pin	part nr. 107540
torque spring <sup>1)</sup>	part nr. 109520
spring plate set	part nr. 136635
coupling and shaft adapter	see chapter accessories
clamping ring set	
12 mm hollow shaft	part nr. 142556

<sup>1)</sup> encoder is delivered with fixed rubber torque spring



# Magnetic absolute multi-turn hollow shaft encoder

## BMMH flexible – MAGRES

### Profibus-DP, CANopen, DeviceNet, EtherCAT

#### features

- robust multi-turn up to
  - 12 bit single-turn resolution
  - 18 bit multi-turn resolution
- modular bus cover
- simple mounting via servo flange
- programmable bus parameter
- programmable resolution and preset values

#### general data

voltage supply	10 - 30 VDC
supply current no load	typ. 100 mA (at 24 VDC)
max. resolution single-turn	Profibus-DP, DeviceNet 12 bit (1 step = 5' 16")
multi-turn	16 bit (65'536 revolutions)
single-turn	CANopen 12 bit (1 step = 5' 16")
multi-turn	18 bit (262'144 revolutions)
max. error limit	±1°
repeatability	0,3°
preset	value programmable within resolution range
address	selectable via dip switches
baud rate	selectable via dip switches
direction of rotation	looking at the flange, position counts up as the shaft rotates clockwise (CW), programmable

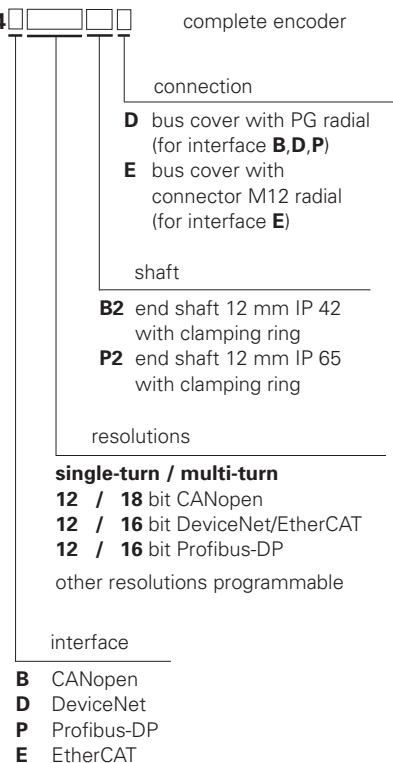
#### mechanical data

max. revolutions	6'000 rpm
moment of inertia	12 x 10 <sup>-7</sup> kgm <sup>2</sup>
torque	typ. 0,93 cNm (3'000 rpm / 20 °C / IP 42)
product life	depending of ambient conditions (typ. 10 <sup>9</sup> revolutions)
max. protection class	IP 65
material	housing: steel bus cover: zinc die cast flange: aluminum
weight	approx. 480 g



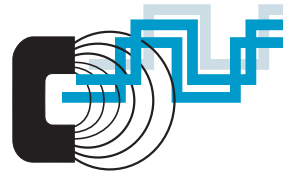
#### order designation

**BMMH 58S1N 24C12/18**  **G** base encoder  
without bus cover  
**BMMH 58S1N 24**    complete encoder



#### ambient conditions

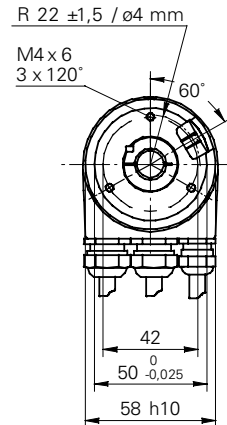
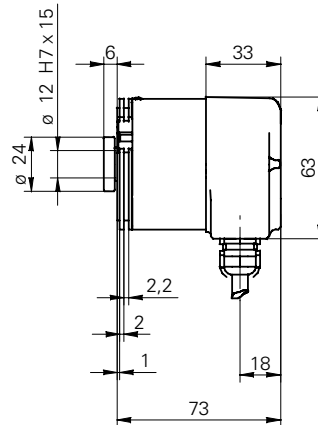
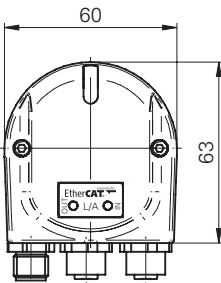
temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 (≤ 100 m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 (≤ 500 m/s <sup>2</sup> / 11 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3



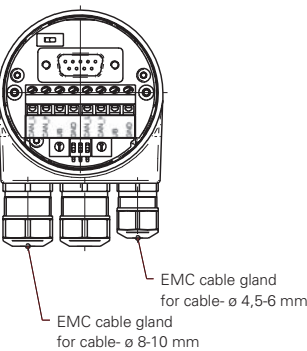
**Profibus-DP, CANopen, DeviceNet, EtherCAT**

**dimensions**

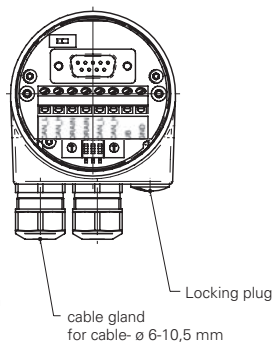
**-B** bus cover



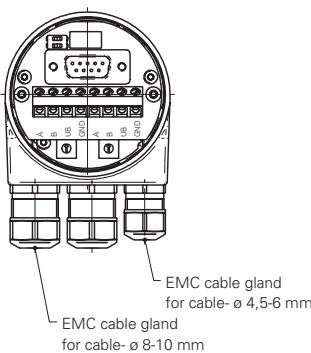
**-B** bus cover



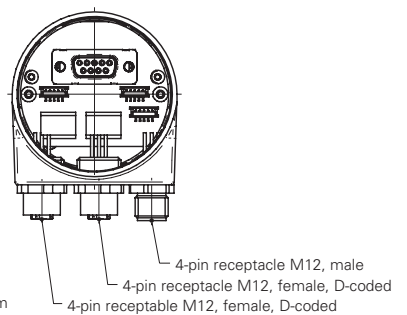
**-D** bus cover



**-P** bus cover



**-E** bus cover



**3**

**accessories**

clamp set	part nr. 110616
tourque pin	part nr. 107540
torque spring <sup>1)</sup>	part nr. 109520
spring plate set	part nr. 136635
CD-ROM with GSD-/EDS-/XML-files and manuals	part nr. 147362
coupling and shaft adapter	see chapter accessories
bus cover	see chapter accessories
for Profibus-DP	part nr. 145145
for CANopen	part nr. 145144
for DeviceNet	part nr. 145143
for EtherCAT	part nr. 159110
cable EtherCAT M12 male-male, d-coded	
M12 straight, 5 m	part nr. 160565
clamping ring set	
12 mm hollow shaft	part nr. 142556