

# 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
- miniature housing
- zero point programmable
- SSI Interface

#### general data

voltage supply	5 VDC $\pm$ 10% <b>(05C)</b> 10 - 30 <b>(24C)</b>
max. supply current no load	typ. 100 mA (at 5 VDC) <b>(05C)</b> typ. 50mA (at 24 VDC) <b>(24C)</b>
output circuit	SSI, RS 422
max. revolution 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	typ. $12 \times 10^{-7}$ kgm <sup>2</sup>
torque	typ. 0,93 cNm (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. 190 g



#### order designation

**BMMH 42S1**   **12/13**  **5**

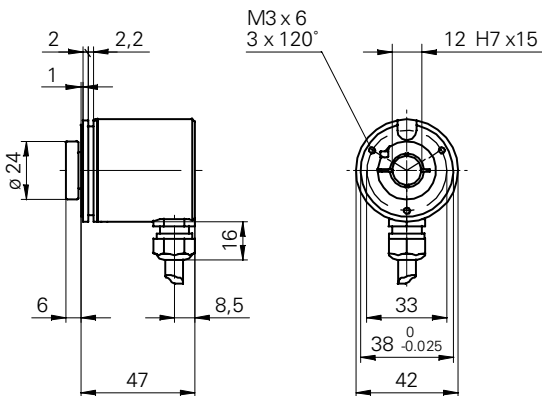
connector  
5 cable 1 m radial  
shaft  
**B2** end shaft 12 mm IP 42 with clamping ring  
**P2** end shaft 12 mm IP 65 with clamping ring  
resolution multi-turn  
**13** 13 bit  
resolution single-turn  
**12** 12 bit  
voltage range, output signals  
**05C** SSI interface, 5 VDC  
**24C** 10 - 30 VDC SSI interface  
signal code  
**G** Gray code  
**N** 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



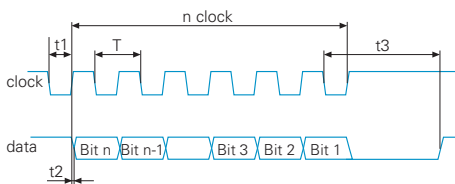
**dimensions**



**Note**

Mounting drawings see end of chapter.

**read out of position values**



pulse times:

$T = 1 \mu\text{s}$  to  $10 \mu\text{s}$  /  $t1 = 0,5$  to  $5 \mu\text{s}$

$t2 < 0,2 \mu\text{s}$  /  $t3 > 12 \mu\text{s}$  to  $25 \mu\text{s}$

**assignment cable**

cable color	signal	description
brown	+Vs	voltage supply
white	0 V	voltage supply
grey	data+	data line
pink	data-	data line
green	clock+	clock input
yellow	clock-	clock input
blue	zero	zero setting input
red	d.u.	do not use
cable data		$8 \times 0,14 \text{ mm}^2$

**SSI data output and clock input**

see page 2.05 chapter absolute single-turn encoders

**accessories**

clamp set	part nr. 110616
spring plate set	part nr. 138610
shaft adapter	see chapter accessories
clamping ring set	
12 mm hollow shaft	part nr. 142556

# Magnetic absolute multi-turn encoder BMMH – MAGRES CANopen

## features

- robust multi-turn encoder up to
  - 12 bit single-turn resolution
  - 18 bit multi-turn resolution
- miniature housing
- 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, 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
counter buffering	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)
product life conditions	depending on ambient (typ. 10 <sup>9</sup> revolutions.)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 190 g



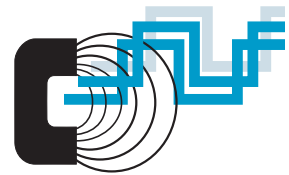
## order designation

**BMMH 42S1N 24B12/18** □ □

□	connection
<b>5</b>	cable 0,5 m radial
<b>N</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>18</b>	18 bit
	resolution single-turn
<b>12</b>	12 bit
	voltage range, output signals
<b>24B</b>	10 - 30 VDC, CANopen
	signal code
<b>N</b>	binary code

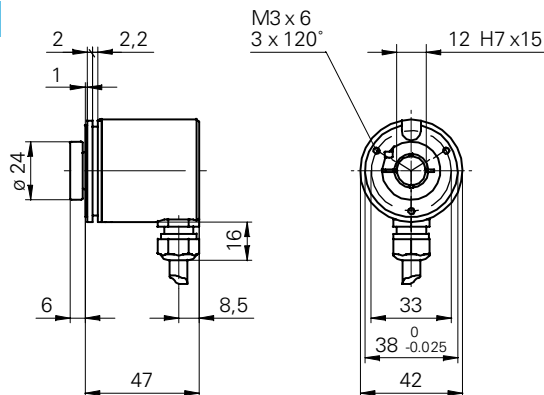
## ambient conditions

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**

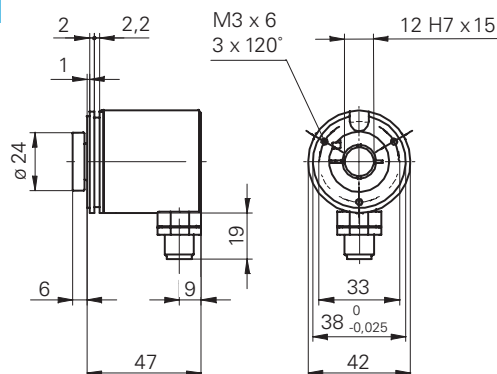
**-5**



**assignment cable**

cable color	signal	description
brown	+Vs	voltage supply
white	0 V	voltage supply
green	CAN_H	bus line (dominant HIGH)
yellow	CAN_L	bus line (dominant LOW)
grey	CAN_GND	CAN ground
pink	n.c.	not connected
blue	d.u.	do not use
red	d.u.	do not use
cable data		8 x 0,14 mm <sup>2</sup>

**-N**



**assignment connector M12 male**

pin	signals	connector
1	n.c.	not connected
2	+Vs	voltage supply
3	CAN_GND	CAN Ground / 0 VDC
4	CAN_H	bus line (dominant HIGH)
5	CAN_L	bus line (dominant LOW)

**Note**

Mounting drawings see end of chapter.

**accessories**

spring clamp set	part nr. 110616
field plate set	part nr. 138610
CD-ROM with GSD-/EDS-/XML-files and manuals	part nr. 147362
shaft adapters	see chapter accessories
clamping ring set	
12 mm hollow shaft	part nr. 142556
connector (female) M12 CAN	part nr. 153968
connector (male) M12 CAN	part nr. 153969
T connector M12 CAN	part nr. 153972
terminating resistor	part nr. 153974

# Magnetic absolute multi-turn encoder BMMH – MAGRES DeviceNet

## features

- robust multi-turn encoder up to
  - 12 bit single-turn resolution
  - 16 bit multi-turn resolution
- miniature housing
- 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 Encoders V1.0
signal code	natural binary code
max. resolution single-turn	12 bit (1 step = 5' 16")
multi-turn	16 bit (65'536 revolutions)
max error limit	±1°
repeatability	0,3°
max. baud rate	500 kbit/s
counter buffering	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)
product life conditions	depending on ambient (typ. 10 <sup>9</sup> revolutions.)
max. protection class	IP 65
material	housing: steel flange: aluminum
weight	approx. 190 g



## order designation

**BMMH 42S1N 24D12/16** □ □

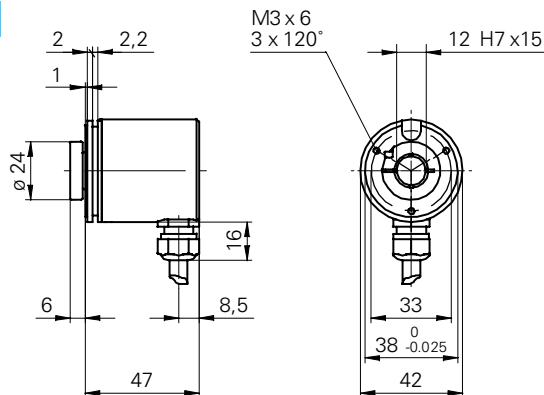
□	connection
<b>5</b>	cable 0,5 m radial
<b>N</b>	connector radial
	shaft
<b>B2</b>	end shaft 12 mm IP 42 with clamping ring
<b>P2</b>	end shaft 12 mm IP 65 with clamping ring
	resolution multi-turn
<b>16</b>	16 bit
	resolution single-turn
<b>12</b>	12 bit
	voltage range, output signals
<b>24D</b>	10 - 30 VDC, DeviceNet
	signal code
<b>N</b>	binary code

## ambient conditions

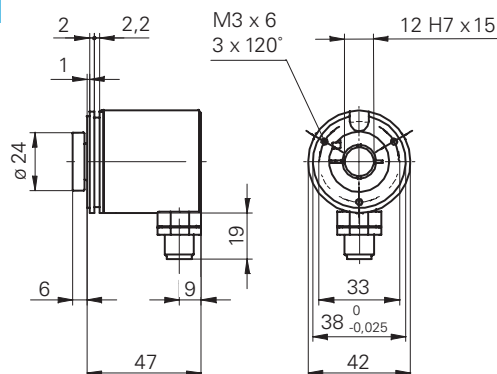
temperature range	-20...+85 °C
relative humidity	max. 95%
vibration	IEC 60068-2-6 (≤ 300 m/s <sup>2</sup> / 10 - 2'000 Hz)
shock	IEC 60068-2-27 (≤ 1'000 m/s <sup>2</sup> / 6 ms)
noise immunity	EN 61000-6-2
emitted interference	EN 61000-6-3

**dimensions**

**-5**



**-N**



**Note**

Mounting drawings see end of chapter.

**assignment cable**

cable color	signal	description
brown	+Vs	voltage supply
white	0 V	voltage supply
green	CAN_H	bus line (dominant HIGH)
yellow	CAN_L	bus line (dominant LOW)
grey	CAN_GND	CAN ground
pink	n.c.	not connected
blue	d.u.	do not use
red	d.u.	do not use
screen	CAN_SHLD	CAN shield
cable data		8 x 0,14 mm <sup>2</sup>

**assignment connector M12 male**

pin	signals	connector
1	CAN_SHLD	CAN shield
2	+Vs	voltage supply
3	CAN_GND	CAN Ground / 0 VDC
4	CAN_H	bus line (dominant HIGH)
5	CAN_L	bus line (dominant LOW)

**accessories**

spring clamp set	part nr. 110616
field plate set	part nr. 138610
CD-ROM with GSD-/EDS-/XML- files and manuals	part nr. 147362
shaft adapters	see chapter accessories
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