

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

## HMG10P-B - CANopen®



HMG10P-B - picture similar

### Technical data - electrical ratings

|                         |   |
|-------------------------|---|
| Voltage supply          | 10...30 VDC   |
| Short-circuit proof     | Yes   |
| Consumption w/o load    | ≤200 mA   |
| Initializing time       | ≤500 ms after power on  |
| Interface               | CANopen®  |
| Function                | Multiturn   |
| Transmission rate       | 10...1000 kBaud   |
| Device address          | Rotary switches in bus connecting box   |
| Steps per revolution    | 8192 / 13 bit   |
| Number of revolutions   | 65536 / 16 bit  |
| Additional outputs      | Square-wave TTL/HTL, TTL/RS422  |
| Sensing method          | Magnetic  |
| Interference immunity   | EN 61000-6-2  |
| Emitted interference    | EN 61000-6-3  |
| Programming interface   | RS485 (≤600 m)  |
| Programmable parameters | Bus system: see bus features<br>Additional output (number of pulses), switch-off and switch-on speeds |
| Diagnostic function     | Position or parameter error   |
| Status indicator        | DUO-LED (bus connecting box)<br>4 LEDs in device back side  |
| Approvals               | CE, UL approval / E256710   |

### Technical data - electrical ratings (speed switches)

|                           |   |
|---------------------------|---|
| Switching accuracy        | ±2 % (or 1 Digit)                                       |
| Switching outputs         | 1 output (Open collector, solid state relay on request) |
| Output switching capacity | 30 VDC; ≤100 mA   |
| Switching delay time      | ≤20 ms  |

### Features

- Interface CANopen®
- Magnetic sensing method
- Resolution: singleturn 13 bit, multiturn 16 bit
- Function display via LEDs
- Multiturn sensing with Energy Harvesting technology, without gear or battery
- Two-sided bearing system with hybrid bearings
- Special protection against corrosion C5-M

### Optional

- Integrated speed switch programmable
- Additional output incremental programmable

### Technical data - mechanical design

|                          |  |
|--------------------------|--|
| Size (flange)            | ø105 mm  |
| Shaft type               | ø16...20 mm (blind hollow shaft)<br>ø17 mm (cone shaft 1:10)                             |
| Flange                   | Support plate, 360° freely positionable  |
| Protection DIN EN 60529  | IP 66/IP 67  |
| Operating speed          | ≤6000 rpm  |
| Range of switching speed | ns (off) = ±2...6000 rpm,<br>factory setting 6000 rpm                                    |
| Operating torque typ.    | 10 Ncm   |
| Rotor moment of inertia  | 950 gcm <sup>2</sup>   |
| Admitted shaft load      | ≤450 N axial<br>≤650 N radial  |
| Materials                | Housing: aluminium alloy<br>Shaft: stainless steel                                       |
| Corrosion protection     | IEC 60068-2-52 Salt mist<br>for ambient conditions C5-M<br>(CX) according to ISO 12944-2 |
| Operating temperature    | -40...+85 °C   |
| Relative humidity        | 95 % non-condensing  |
| Resistance               | IEC 60068-2-6<br>Vibration 30 g, 10-2000 Hz<br>IEC 60068-2-27<br>Shock 400 g, 1 ms       |
| Weight approx.           | 2.2 kg (depending on version)  |
| Connection               | Bus connecting box<br>Terminal box incremental   |

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

HMG10P-B - CANopen®

## Part number

HMG10P 

|  |    |   |   |  |  |    |    |  |    |  |    |
|--|----|---|---|--|--|----|----|--|----|--|----|
|  | -B | H | . |  |  | C6 | .3 |  | 00 |  | .A |
|--|----|---|---|--|--|----|----|--|----|--|----|

### Additional output

- 0 Without
- 5 1024 ppr\* TTL/HTL (Vin=Vout), 6 channels, electrically isolated
- 6 1024 ppr\* TTL/RS422, 6 channels

### Resolution multiturn

- 0 Without
- 6 16 bit

### Voltage supply / interface

C6 10...30 VDC, CANopen® (DS 406)

### Connection

- F 1x bus connecting box with 3 cable glands M16, radial + 1x terminal box with 1 cable gland M20, radial
- Z 1x bus connecting box with 2 connectors M12, radial + 1x terminal box with 1 cable gland M20, radial

### Shaft diameter

- 6 ø16 mm, central screw
- 7 ø17 mm cone 1:10, central screw
- Z ø20 mm, central screw

### Protection

- D IP 66 and IP 67, optimized for dusty environments
- L IP 66 and IP 67, optimized for oily and wet environments

### Flange

- H Support for torque arm, shaft insulation hybrid bearing

### Speed switch

- Without
- D With speed switch / switching speed 6000 rpm\* (Standard: Open collector, solid state relay on request)

\* Factory setting, programmable

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

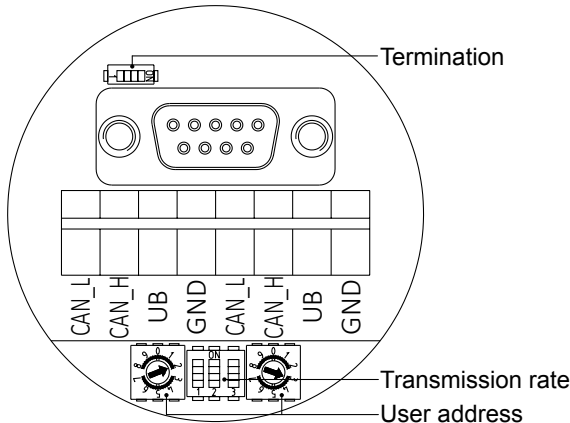
CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

## HMG10P-B - CANopen®

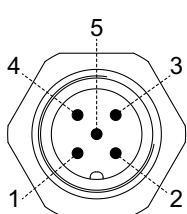
### CANopen® - Terminal assignment

View A<sup>1)</sup> - View inside bus connecting box

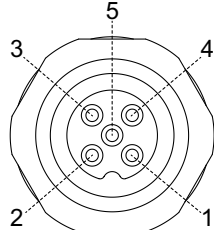


View A<sup>1)</sup> and A<sup>2)</sup> - View into connector

| male / female | Connection | Description                    |
|---------------|------------|--------------------------------|
| 1             | GND        | Ground for UB                  |
| 2             | UB         | Voltage supply 10...30 VDC     |
| 3             | GND        | Ground for UB                  |
| 4             | CAN_H      | CAN Bus signal (dominant HIGH) |
| 5             | CAN_L      | CAN Bus signal (dominant LOW)  |



Connector M12 (male, A<sup>1)</sup>)  
5-pin, A-coded



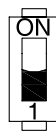
Connector M12 (female, A<sup>2)</sup>)  
5-pin, A-coded

Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections UB-UB and GND-GND is 1 A each.

### CANopen® - Features

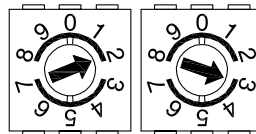
|                   |  |
|-------------------|--|
| Bus protocol      | CANopen®   |
| CANopen®-Features | Device Class 2 CAN 2.0B  |
| Device profile    | CANopen®<br>CiA DSP 406, V 3.0   |
| Operating mode    | Polling mode (asynch, via SDO)<br>Cyclic mode (asynch-cyclic)<br>Synch mode (synch-cyclic)<br>Acyclic mode (synch-acyclic) |
| Diagnosis         | The encoder supports the following error warnings:<br>- Position error   |
| Factory setting   | User address 00  |

### CANopen® - Termination



ON = final user  
OFF = user x

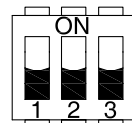
### CANopen® - User address



Defined by rotary switch.  
Example: User address 23

### CANopen® - Transmission rate

| Transmission rate | Dip switch position |     |     |
|-------------------|---------------------|-----|-----|
|                   | 1                   | 2   | 3   |
| 10 kBaud          | OFF                 | OFF | OFF |
| 20 kBaud          | OFF                 | OFF | ON  |
| 50 kBaud*         | OFF                 | ON  | OFF |
| 125 kBaud         | OFF                 | ON  | ON  |
| 250 kBaud         | ON                  | OFF | OFF |
| 500 kBaud         | ON                  | OFF | ON  |
| 800 kBaud         | ON                  | ON  | OFF |
| 1000 kBaud        | ON                  | ON  | ON  |



\* Factory setting

<sup>1)</sup> See dimensions

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

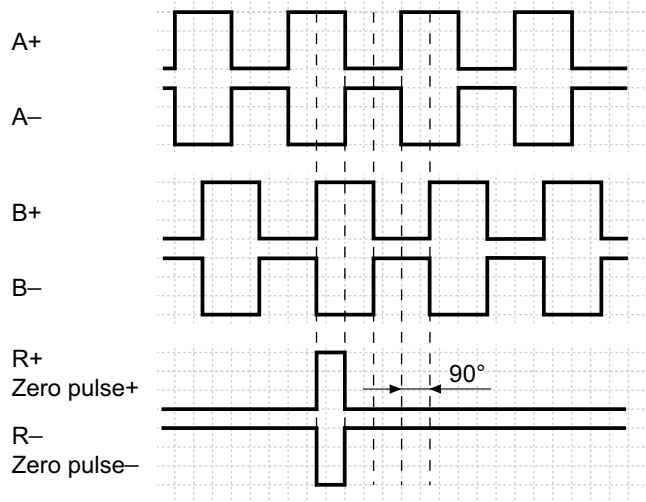
HMG10P-B - CANopen®

## Speed switch / additional output incremental - Terminal significance

|                   |   |
|-------------------|---|
| Ub <sup>2)</sup>  | Voltage supply  |
| 0V <sup>2)</sup>  | Ground  |
| A+ <sup>2)</sup>  | Output signal channel 1   |
| A- <sup>2)</sup>  | Output signal channel 1 inverted  |
| B+ <sup>2)</sup>  | Output signal channel 2 (offset by 90° to channel 1)                      |
| B- <sup>2)</sup>  | Output signal channel 2 inverted  |
| R+ <sup>2)</sup>  | Zero pulse (reference signal)   |
| R- <sup>2)</sup>  | Zero pulse inverted   |
| nE+               | System OK+ / error output   |
| nE-               | System OK- / error output inverted  |
| SP+ <sup>3)</sup> | DSL_OUT1 / speed switch<br>(Open collector, solid state relay on request) |
| SP- <sup>3)</sup> | DSL_OUT2 / speed switch<br>(0V, solid state relay on request)             |
| SA                | RS485+ / programming interface  |
| SB                | RS485- / programming interface  |
| dnu               | Do not use  |

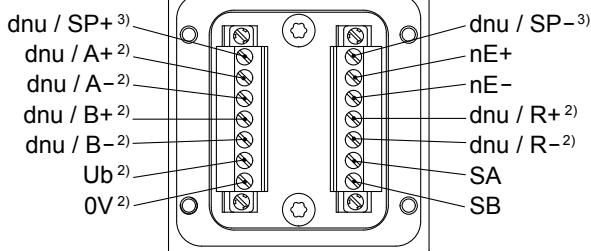
## Additional output incremental - Output signals

Version with additional output incremental at positive rotating direction<sup>1)</sup>

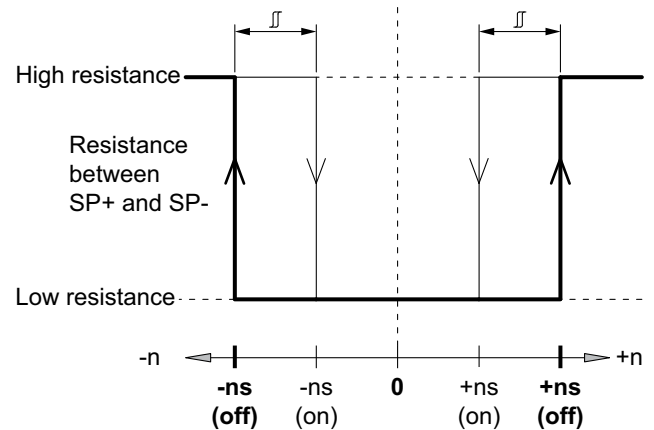


## Speed switch / additional output incremental - Terminal assignment terminal box

View B<sup>1)</sup>



## Speed switch - Switching characteristics



- n = Speed
- +ns (off) = Switch-off speed at shaft rotation in positive rotating direction<sup>1)</sup>.
- ns (off) = Switch-off speed at shaft rotation in negative rotating direction<sup>1)</sup>.

Switching hysteresis  $\square$ :  
5...100 % (factory setting = 10 % min. 1 Digit)

- +ns (on) = Switch-on speed at shaft rotation in positive rotating direction<sup>1)</sup>.
- ns (on) = Switch-on speed at shaft rotation in negative rotating direction<sup>1)</sup>.

## Additional output incremental - Trigger level

| Trigger level       | TTL/RS422  |
|---------------------|--|
| High / Low          | $\geq 2.5 \text{ V} / \leq 0.5 \text{ V}$  |
| Transmission length | $\leq 550 \text{ m @ } 100 \text{ kHz}$  |
| Output frequency    | $\leq 600 \text{ kHz}$   |
| Trigger level       | TTL/HTL (Vin = Vout)   |
| High / Low          | $\geq 2.5 \text{ V} / \leq 0.5 \text{ V (TTL)}$<br>$\geq U_b - 3 \text{ V} / \leq 1.5 \text{ V (HTL)}$ |
| Transmission length | $\leq 550 \text{ m @ } 100 \text{ kHz (TTL)}$<br>$\leq 350 \text{ m @ } 100 \text{ kHz (HTL)}$         |
| Output frequency    | $\leq 600 \text{ kHz (TTL); } \leq 350 \text{ kHz (HTL)}$  |

Electrically isolated:  
The output TTL/HTL (Vin = Vout) at the additional output incremental is electrically isolated and requires a separate power supply.

- See dimensions
- Additional output incremental (option)
- Speed switch (option)

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

## HMG10P-B - CANopen®

---

### Accessories

#### Connectors and cables

|          |  |
|----------|--|
| 11191145 | Adapter cable for programming the HMG10P/PMG10P bus interfaces series<br>D-SUB connector (male) 15-pin with connecting cable, D-SUB connector (male) 9-pin and 7-pin connecting terminal |
|----------|--|

#### Mounting accessories

|          |  |
|----------|--|
| 11043628 | Torque arm M6, length 67-70 mm   |
| 11004078 | Torque arm M6, length 120-130 mm (shortenable $\geq 71$ mm)            |
| 11002915 | Torque arm M6, length 425-460 mm (shortenable $\geq 131$ mm)           |
| 11054917 | Torque arm M6 insulated, length 67-70 mm                               |
| 11072795 | Torque arm M6 insulated, length 120-130 mm (shortenable $\geq 71$ mm)  |
| 11082677 | Torque arm M6 insulated, length 425-460 mm (shortenable $\geq 131$ mm) |
| 11077197 | Mounting kit for torque arm size M6 and earthing strap                 |
| 11077087 | Mounting and dismounting set   |

#### Programming accessories

|          |   |
|----------|---|
| 11190106 | Z-PA.SDL.1 - WLAN-Adapter<br>Programming unit for xMG10P series |
|----------|---|

# Absolute encoders - bus interfaces

Blind hollow shaft or cone shaft (1:10)

CANopen® / 13 bit ST / 16 bit MT / Speed switch

Number of pulses and switching speed freely programmable

HMG10P-B - CANopen®

## Dimensions

