

# HMG10P-T - EtherCAT

Through hollow shaft / EtherCAT / 13 bit ST / 16 bit MT

Speed switch, number of pulses and switching speed freely programmable

## Overview

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



Picture similar

**HUBNER**  
BERLIN  
A Baumer Brand

**microGen**  
Energy Harvesting

## Technical data

### 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               | EtherCAT   |
| Function                | Multiturn  |
| Transmission rate       | 100 MBaud  |
| Device address          | Automatic address designation  |
| 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),<br>switch-off and switch-on speeds |
| Diagnostic function     | Position or parameter error  |
| Status indicator        | DUO-LED and LEDs link/activity in bus<br>connecting box 4 LEDs in device back<br>side                    |
| Approval                | CE<br>UL approval / E217823  |

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

|                    |  |
|--------------------|--|
| Switching accuracy | ± 2 % (or 1 Digit)   |
| Switching outputs  | 1 output (Open collector, solid state relay<br>on request) |

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

|   |  |
|---|--|
| Output switching capacity                 | 30 VDC; ≤100 mA  |
| Switching delay time                      | ≤20 ms   |
| <b>Technical data - mechanical design</b> |  |
| Size (flange)                             | ø105 mm  |
| Shaft type                                | ø16...20 mm (through hollow shaft)   |
| Flange                                    | Support plate, 360° freely positionable  |
| Protection EN 60529                       | IP 66 / IP 67  |
| Operating speed                           | ≤6000 rpm  |
| Range of switching speed                  | ns (off) = ±2...6000 rpm, factory setting<br>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  |
| Material                                  | Housing: aluminium alloy<br>Shaft: stainless steel   |
| Corrosion protection                      | IEC 60068-2-52 Salt mist<br>for ambient conditions CX (C5-M) accord-<br>ing 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   |

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### Optional

- Integrated speed switch programmable
- Additional output incremental programmable

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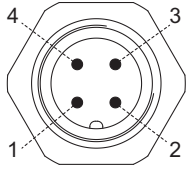
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## Terminal assignment

### View A1 (see dimension)

View into connector bus "voltage supply"

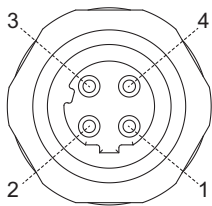


Connector M12 (male)  
4-pin, A-coded

| Pin | Connection |
|-----|------------|
| 1   | UB         |
| 2   | dnu        |
| 3   | GND        |
| 4   | dnu        |

### View A2 and A3 (see dimension)

View into connector bus „data transmission“



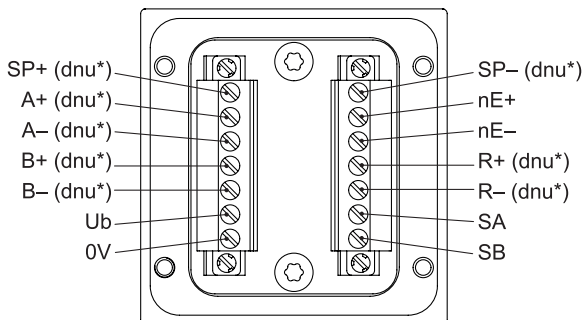
Connector M12 (female)  
4-pin, D-coded

| Pin | Connection |
|-----|------------|
| 1   | TxD+       |
| 2   | RxD+       |
| 3   | TxD-       |
| 4   | RxD-       |

### View B (see dimension)

Connecting terminal terminal box  
Programming interface / speed switch /  
additional output II (HTL, TTL)

\* Assignment depends on encoder version



## Terminal significance

### Bus interface

| Connection | Description                |
|------------|----------------------------|
| GND        | Ground for UB              |
| UB         | Voltage supply 10...30 VDC |
| TxD+       | Transmission data+         |
| TxD-       | Transmission data-         |
| RxD+       | Receiving data+            |
| RxD-       | Receiving data-            |
| dnu        | Do not use                 |

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

## EtherCAT features

|                 |   |
|-----------------|---|
| Bus protocol    | EtherCAT  |
| Device profile  | CoE (CANopen over EtherCAT) DSP406  |
| Features        | <ul style="list-style-type: none"> <li>100 MBaud Ethernet</li> <li>Automatic address designation</li> <li>Distributed clock for precise synchronization.<br/>Optional device configuration as „Reference Clock“</li> <li>Factory setting 10 byte PDO, configurable<br/>4 byte PDO / 2 byte PDO for shorter cycle times</li> </ul> |
| Process data    | Position value, Warnings, System time   |
| Cycle times     | Depending on sensor type, enabled scaling<br>functionality and length of PDO. Minimum<br>cycle time: 62,5 µs  |
| Synchronization | <ul style="list-style-type: none"> <li>0x00 Free Run, not synchronized</li> <li>0x03 Distributed clocks DC, synchronized<br/>with SYNCO/SYNC1 Event</li> </ul>  |

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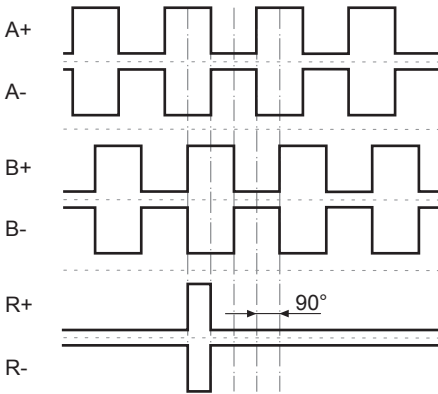
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## Output signals

### Additional output II (HTL/TTL)

At positive rotating direction (see dimension)



## Trigger level

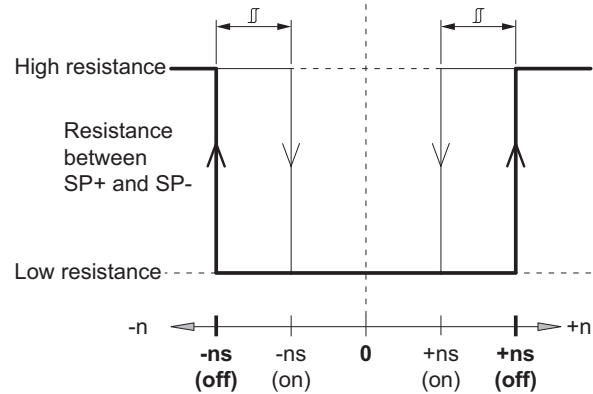
### Incremental HTL/TTL

Electrically isolated:  
The output TTL/HTL ( $V_{in} = V_{out}$ ) at the additional output II is electrically isolated and requires a separate power supply.

| 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 ( $V_{in} = V_{out}$ )   |
| 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)   |

## Switching characteristics

### Speed switch



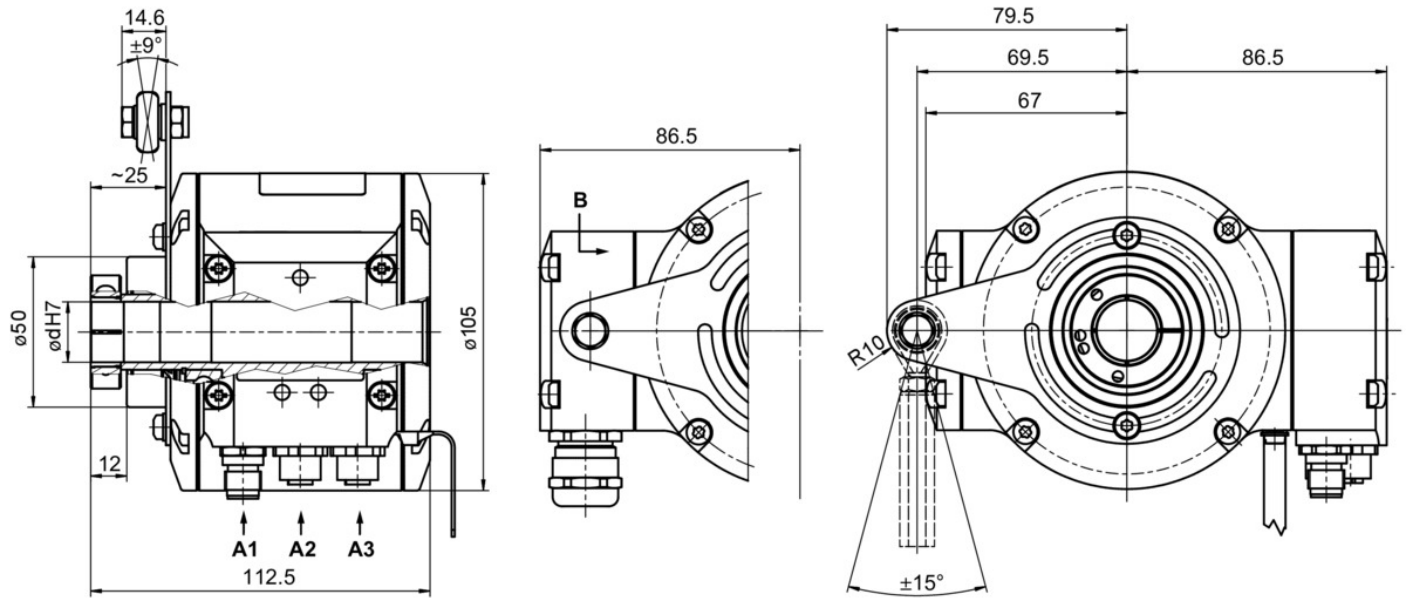
| n                | Speed  |
|------------------|--|
| <b>+ns (off)</b> | Switch-off speed at shaft rotation in positive rotating direction (see dimension). |
| <b>-ns (off)</b> | Switch-off speed at shaft rotation in negative rotating direction (see dimension). |
|                  | Switching hysteresis $\Delta n$ : 10...100 % (factory setting = 10 % min. 1 Digit) |
| <b>+ns (on)</b>  | Switch-on speed at shaft rotation in positive rotating direction (see dimension).  |
| <b>-ns (on)</b>  | Switch-on speed at shaft rotation in negative rotating direction (see dimension).  |

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## Dimensions



Through hollow shaft with terminal box

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## Ordering reference

|                                       | HMG10P   | #      | - | T | H | # | . | # | G | EC | . | 3 | # | 0 | 0 | # | . | A |
|---------------------------------------|--|--------|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|---|
| <b>Product</b>                        | Absolute encoder   | HMG10P |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |
| <b>Digital speed switch</b>           | Without  |        | - |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |
|                                       | With   |        | D |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |
| <b>Shaft type</b>                     | Through hollow shaft   |        |   | T |   |   |   |   |   |    |   |   |   |   |   |   |   |   |
| <b>Flange (Hollow shaft)</b>          | Support (Support plate) for torque arm, hybrid bearings  |        |   |   | H |   |   |   |   |    |   |   |   |   |   |   |   |   |
| <b>Protection class</b>               | IP 66 and IP 67, optimized for dusty, abrasive environment                                     |        |   |   |   | D |   |   |   |    |   |   |   |   |   |   |   |   |
|                                       | IP 66 and IP 67, optimized for oily, wet environment   |        |   |   |   | L |   |   |   |    |   |   |   |   |   |   |   |   |
| <b>Through hollow shaft</b>           | Ø16 mm, clamping ring, A end   |        |   |   |   |   |   |   | C |    |   |   |   |   |   |   |   |   |
|                                       | Ø20 mm, clamping ring, A end   |        |   |   |   |   |   |   | F |    |   |   |   |   |   |   |   |   |
|                                       | Ø16 mm, keyway   |        |   |   |   |   |   |   | P |    |   |   |   |   |   |   |   |   |
| <b>Connection</b>                     | Bus connecting box with 3 connectors M12, radial + terminal box with 1 cable gland M20, radial |        |   |   |   |   |   |   | G |    |   |   |   |   |   |   |   |   |
| <b>Supply voltage (field bus)</b>     | 10...30 VDC, EtherCAT  |        |   |   |   |   |   |   |   | EC |   |   |   |   |   |   |   |   |
| <b>Resolution singleturn position</b> | 13 Bit   |        |   |   |   |   |   |   |   |    |   | 3 |   |   |   |   |   |   |
| <b>Resolution multiturn position</b>  | No multiturn signal  |        |   |   |   |   |   |   |   |    |   |   | 0 |   |   |   |   |   |
|                                       | 16 Bit   |        |   |   |   |   |   |   |   |    |   |   | 6 |   |   |   |   |   |
| <b>Resolution speed</b>               | No speed signal  |        |   |   |   |   |   |   |   |    |   |   |   | 0 |   |   |   |   |
| <b>Resolution supplement I</b>        | No additional output I   |        |   |   |   |   |   |   |   |    |   |   |   |   | 0 |   |   |   |
| <b>Resolution supplement II</b>       | No additional output II  |        |   |   |   |   |   |   |   |    |   |   |   |   |   | 0 |   |   |
|                                       | 1024 ppr TTL/HTL push-pull (Vin=Vout), 6 channels, electrically isolated                       |        |   |   |   |   |   |   |   |    |   |   |   |   |   | 5 |   |   |
|                                       | 1024 ppr TTL (RS422), 6 channels   |        |   |   |   |   |   |   |   |    |   |   |   |   |   | 6 |   |   |
| <b>Operating temperature</b>          | -40...+85 °C   |        |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |   |

- (1) Switching speed 6000 rpm / factory setting, programmable  
 (2) Factory setting, programmable

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## Accessories

### Mounting accessories

|          |   |
|----------|---|
| 11043628 | Torque arm M6, length 67...70 mm                              |
| 11004078 | Torque arm M6, length 120...130 mm ( $\geq 71$ mm)            |
| 11002915 | Torque arm M6, length 425...460 mm ( $\geq 131$ mm)           |
| 11054917 | Torque arm M6 insulated, length 67...70 mm                    |
| 11072795 | Torque arm M6 insulated, length 120...130 mm ( $\geq 71$ mm)  |
| 11082677 | Torque arm M6 insulated, length 425...460 mm ( $\geq 131$ mm) |
| 11077197 | Mounting kit for torque arm size M6 and earthing strap        |
| 11077087 | Mounting and dismounting set                                  |
| 11238694 | CAM12.WS13-11238694   |

### Programming accessories

|          |                           |
|----------|---------------------------|
| 11190106 | Z-PA.SDL.1 - WLAN-Adapter |
|----------|---------------------------|