

# Absolute encoders - bus interfaces

Blind / through hollow shaft or cone shaft (1:10)

EtherCAT / 13 bit ST / 16 bit MT / Speed switch

## HMG10 - EtherCAT



HMG 10 - 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	EtherCAT
Function	Multiturn
Transmission rate	100 MBaud
Device address	Automatic address designation
Steps per turn	8192 / 13 bit
Number of turns	65536 / 16 bit
Additional outputs	Square-wave HTL/TTL (RS422)
Sensing method	Magnetic
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Programmable parameters	Steps per revolution Number of revolutions Preset, scaling, rotating direction
Diagnostic function	Position or parameter error
Status indicator	DUO-LED und LEDs link/activity in bus connecting box 4 LEDs in device back side
Approvals	CE, UL approval / E256710

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

Interface	RS485
Switching accuracy	±2 % (or Digit)
Switching outputs	1 output (Open-Collector or Solid State Relay)
Output switching capacity	30 VDC; ≤100 mA
Switching delay time	≤20 ms

### Features

- Interface EtherCAT
- Magnetic sensing method
- Resolution: singleturn 13 bit, multiturn 16 bit
- Function display via LEDs
- Multiturn sensing with Energy Harvesting technologie, without gear or battery
- Two hybrid bearings, one at each end
- Special protection against corrosion C5-M

### Optional

- Integrated speed switch, programmable
- Additional output incremental with zero pulse

### Technical data - mechanical design

Size (flange)	ø105 mm
Flange	Support plate, 360° freely positionable
Protection DIN EN 60529	IP 66/IP 67
Operating speed	≤6000 rpm
Range of switching speed	±2...6000 rpm, default 6000 rpm
Operating torque typ.	10 Ncm
Rotor moment of inertia	950 gcm <sup>2</sup>
Admitted shaft load	≤450 N axial ≤650 N radial
Materials	Housing: aluminium alloy Shaft: stainless steel
Operating temperature	-40...+85 °C
Relative humidity	95 % non-condensing
Resistance	IEC 60068-2-6 Vibration 30 g, 10-2000 Hz IEC 60068-2-27 Shock 400 g, 1 ms
Corrosion protection	IEC 60068-2-52 Salt mist Complies to ISO 12944-5:1998 Protective paint systems (C5-M)
Weight approx.	2.2 kg (depending on version)
Connection	Bus connecting box Terminal box incremental

### HMG10-B EtherCAT

Shaft type	ø16...20 mm (blind hollow shaft) ø17 mm (cone shaft 1:10)
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### HMG10-T EtherCAT

Shaft type	ø16...20 mm (through hollow shaft)
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## HMG10 - EtherCAT

### Part number

Encoder with blind hollow shaft / cone shaft

HMG10 

	-B	H	.			EC	.3		00		.A
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Additional output \*  
0 Without  
See also table "Additional output \*\*"

Resolution multiturn  
0 Without  
6 16 bit

Voltage supply / interface  
EC 10...30 VDC, EtherCAT

Connection  
3 1x bus connecting box with 3 connectors M12, radial  
G 1x bus connecting box with 3 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 / Programming  
Without  
D With speed switch \*  
(Standard: Open Collector, Solid State Relais on request)

\* Only for connection G

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## HMG10 - EtherCAT

### Part number

Encoder with through hollow shaft

HMG10 

	-T	H	.			EC	.3		00		.A
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Additional output \*  
0 Without  
See also table "Additional output \*\*"

Resolution multiturn  
0 Without  
6 16 bit

Voltage supply / interface  
EC 10...30 VDC, EtherCAT

Connection  
3 1x bus connecting box with 3 connectors M12, radial  
G 1x bus connecting box with 3 connectors M12, radial +  
1x terminal box with 1 cable gland M20, radial

Shaft diameter  
C ø16 mm, clamping ring on drive side  
F ø20 mm, clamping ring on drive side  
P ø16 mm, clamping ring on drive side with keyway

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 / Programming  
Without  
D With speed switch \*  
(Standard: Open Collector, Solid State Relais on request)

\* Only for connection G

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## HMG10 - EtherCAT

### Part number - tables

#### Additional output \*

0	(Without)
Q	(8192 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
P	(8192 ppr TTL (RS422), 6 channels)
G	(5000 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
H	(5000 ppr TTL (RS422), 6 channels)
K	(4096 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
J	(4096 ppr TTL (RS422), 6 channels)
7	(3072 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
8	(3072 ppr TTL (RS422), 6 channels)
9	(2048 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
4	(2048 ppr TTL (RS422), 6 channels)
5	(1024 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
6	(1024 ppr TTL (RS422), 6 channels)
1	(512 ppr TTL/HTL push-pull (Vin=Vout), 6 channels)
2	(512 ppr TTL (RS422), 6 channels)

\* Only for connection G

### 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	Insulated torque arm M6, length 67-70 mm
11072795	Insulated torque arm M6, length 120-130 mm ( $\geq 71$ mm)
11082677	Insulated torque arm M6, length 425-460 mm ( $\geq 131$ mm)
11077197	Mounting kit for torque arm size M6 and earthing strap
11077087	Mounting and dismounting set

# Absolute encoders - bus interfaces

Blind / through hollow shaft or cone shaft (1:10)

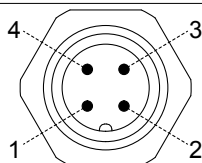
EtherCAT / 13 bit ST / 16 bit MT / Speed switch

## HMG10 - EtherCAT

### EtherCAT - Terminal assignment

View C<sup>1)</sup> - View into connector „Voltage supply“

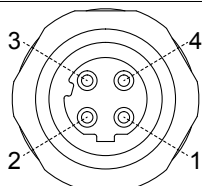
male	Connection	Description
1	UB	Voltage supply 10...30 VDC
2	-	Do not use
3	GND	Ground for UB
4	-	Do not use



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

View D<sup>1)</sup> and E<sup>1)</sup> - View into connector „Data transmission“

female	Connection	Description
1	TxD+	Transmission data+
2	RxD+	Receiving data+
3	TxD-	Transmission data-
4	RxD-	Receiving data-



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

### EtherCAT - Features

Bus protocol	EtherCAT
Device profile	CoE (CANopen over EtherCAT) DSP406
Features	100 Mbaud Ethernet Automatic address designation Distributed clock for precise synchronization. Optional device configuration as „Reference Clock“ Default 10 byte PDO, configurable 4 byte PDO / 2 byte PDO for shorter cycle times
Process data	Position value, Warnings, System time
Cycle times	Depending on sensor type, enabled scaling functionality and length of PDO. Minimum cycle time: 62,5 µs
Synchronization	0x00 Free Run, not synchronized 0x03 Distributed clocks DC, synchronized with SYNC0/SYNC1 Event

<sup>1)</sup> See dimensions

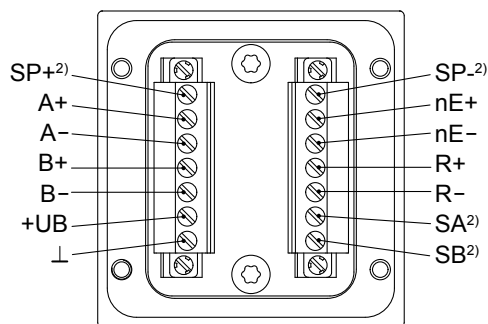
<sup>2)</sup> Do not use at version without speed switch

### Speed switch/incremental - Terminal significance

+UB	Voltage supply
⊥	Ground
A+	Channel A+
A-	Channel A- (channel A+ inverted)
B+	Channel B+
B-	Channel B- (channel B+ inverted)
R+	Zero pulse (reference signal)
R-	Zero pulse inverted
nE+	System OK+ / error output
nE-	System OK- / error output inverted
SP+ <sup>2)</sup>	DSL_OUT1 / speed switch (Open-Collector or Solid State Relay)
SP- <sup>2)</sup>	DSL_OUT2 / speed switch (0 V or Solid State Relay)
SA <sup>2)</sup>	RS485+ / programming interface
SB <sup>2)</sup>	RS485- / programming interface

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

View B<sup>1)</sup>



# Absolute encoders - bus interfaces

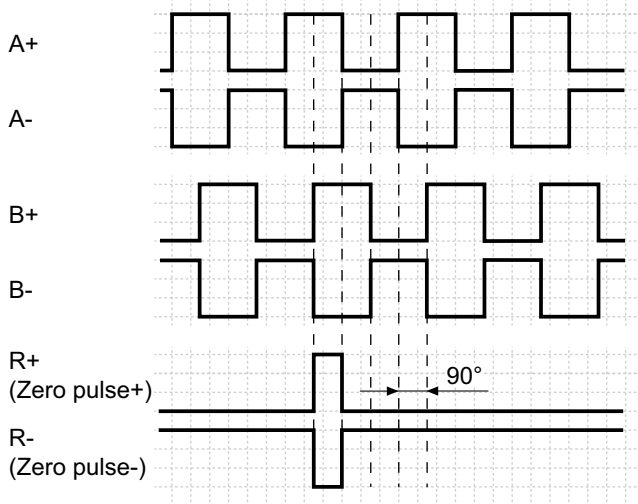
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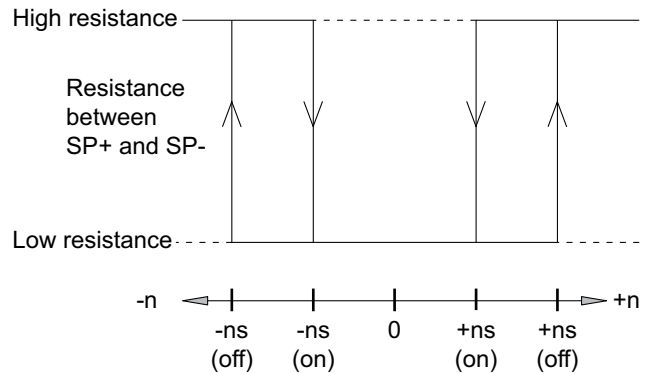
## HMG10 - EtherCAT

### Incremental - Output signals

Version with additional incremental output at positive rotating direction



### Speed switch - Switching characteristics



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

<sup>1)</sup> See dimensions

# Absolute encoders - bus interfaces

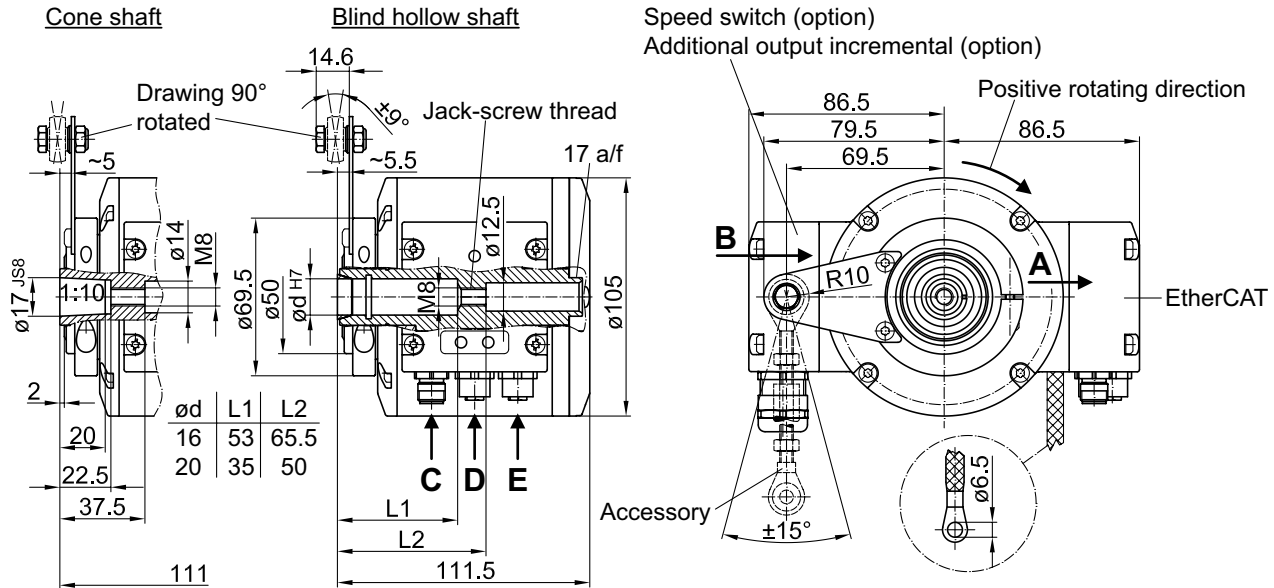
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## HMG10 - EtherCAT

### Dimensions

#### Blind hollow shaft and cone shaft with radial terminal boxes



#### Through hollow shaft with radial terminal boxes

