

Absolute encoders - bus interfaces

Through hollow shaft

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

HMG10-T - CANopen®



HMG10-T - picture similar

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
- Additional output incremental with zero pulse

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 adress	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
Programmable parameters	Steps per revolution Number of revolutions Preset, scaling, rotating direction
Diagnostic function	Position or parameter error
Status indicator	DUO-LED (bus connecting box) 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

Technical data - mechanical design

Size (flange)	ø105 mm
Shaft type	ø16...20 mm (through hollow shaft)
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, factory setting 6000 rpm
Operating torque typ.	10 Ncm
Rotor moment of inertia	950 gcm ²
Admitted shaft load	≤450 N axial ≤650 N radial
Materials	Housing: aluminium alloy Shaft: stainless steel
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C5-M (CX) according to ISO 12944-2
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
Weight approx.	2.2 kg (depending on version)
Connection	Bus connecting box Terminal box incremental

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Part number

HMG10

-T	H	.			C6	.3		00		.A
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Additional output*

0 Without

5 1024 ppr TTL/HTL (Vin=Vout), 6 channels, electrically isolated

6 1024 ppr TTL/RS422, 6 channels

See also table "Additional output"

Resolution multiturn

0 Without

6 16 bit

Voltage supply / interface

C6 10...30 VDC, CANopen® (DS 406)

Connection

5 1x bus connecting box with 3 cable glands M16, radial

1 1x bus connecting box with 2 connectors M12, radial

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

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*

Without

D With speed switch *)**)

(Standard: Open collector, solid state relay on request)

* Only for connection with 1x bus connecting + 1x terminal box (F or Z)

** Please specify the exact switching speed in addition to the part number (factory setting).

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Part number - tables

Additional output*

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

Accessories

Mounting accessories

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

Absolute encoders - bus interfaces

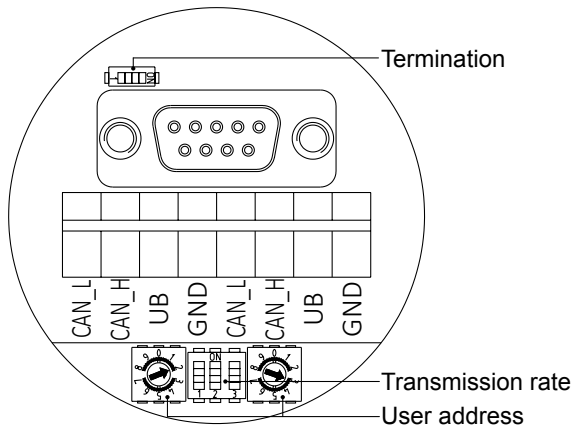
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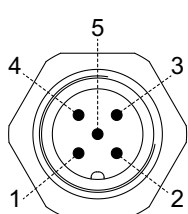
CANopen® - Terminal assignment

View A¹⁾ - View inside bus connecting box

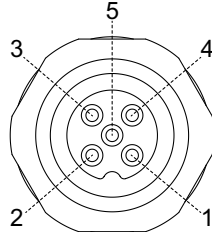


View A¹⁾ and A²⁾ - View into connector

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, A¹⁾)
5-pin, A-coded



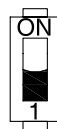
Connector M12
(female, A²⁾)
5-pin, A-coded

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

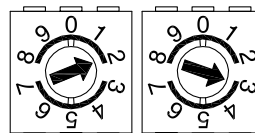
Bus protocol	CANopen®
CANopen®-Features	Device Class 2 CAN 2.0B
Device profile	CANopen® CiA DSP 406, V 3.0
Operating mode	Polling mode (asynch, via SDO) Cyclic mode (asynch-cyclic) Synch mode (synch-cyclic) Acyclic mode (synch-acyclic)
Diagnosis	The encoder supports the following error warnings: - Position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

Transmissi- on 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

¹⁾ See dimensions

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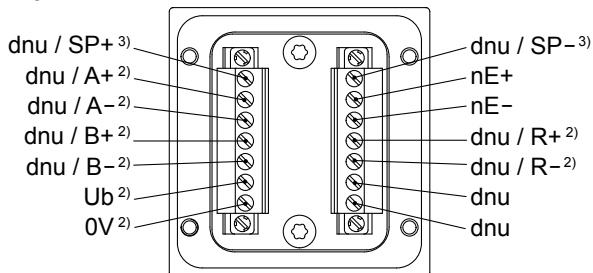
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Speed switch / additional output incremental - Terminal significance

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

Speed switch / additional output incremental - Terminal assignment terminal box

View B¹⁾



Additional output incremental - Trigger level

Trigger level	TTL/RS422
High / Low	≥2.5 V / ≤0.5 V
Transmission length	≤550 m @ 100 kHz
Output frequency	≤600 kHz
Trigger level	TTL/HTL (Vin = Vout)
High / Low	≥2.5 V / ≤0.5 V (TTL) ≥Ub - 3 V / ≤1.5 V (HTL)
Transmission length	≤550 m @ 100 kHz (TTL) ≤350 m @ 100 kHz (HTL)
Output frequency	≤600 kHz (TTL); ≤350 kHz (HTL)

Electrically isolated:

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

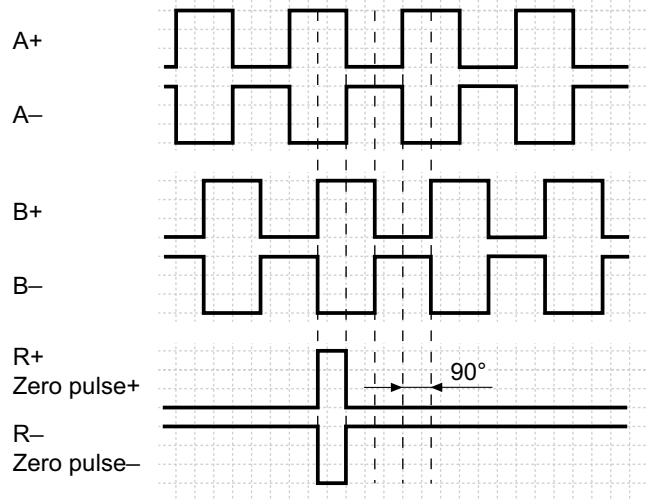
¹⁾ See dimensions

²⁾ Additional output incremental (option)

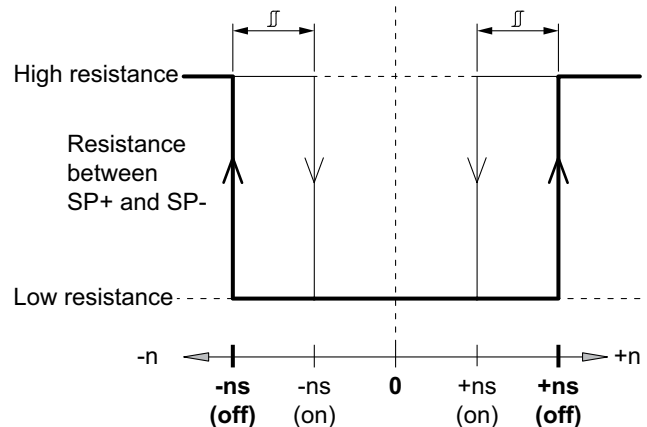
³⁾ Speed switch (option)

Additional output incremental - Output signals

Version with additional output incremental at positive rotating direction¹⁾



Speed switch - Switching characteristics



n = Speed

+ns (off) = Switch-off speed at shaft rotation in positive rotating direction¹⁾.

-ns (off) = Switch-off speed at shaft rotation in negative rotating direction¹⁾.

Switching hysteresis Δ :

5...100 % (factory setting = 10 % min. 1 Digit)

+ns (on) = Switch-on speed at shaft rotation in positive rotating direction¹⁾.

-ns (on) = Switch-on speed at shaft rotation in negative rotating direction¹⁾.

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Dimensions

