Absolute encoders - bus interfaces
Blind / through hollow shaft or cone shaft (1:10)
CANopen® / 13 bit ST / 16 bit MT / Speed switch

HMG10 - CANopen®

HMG 10 - picture similar

Features

- **Interface CANopen®**
- **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 - 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 switch in bus connecting box (type-specific)
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 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

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 gcm²
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 - CANopen®

Shaft type	ø16...20 mm (blind hollow shaft) ø17 mm (cone shaft 1:10)

HMG10-T - CANopen®

Shaft type	ø16...20 mm (through hollow shaft)

Part number

Encoder with blind hollow shaft / cone shaft

HMG10		-B	H		.			C6	.3	00		.A

Additional output *
0 Without
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
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 F or Z

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Part number

Encoder with through hollow shaft

HMG10	-T	H		.			C6	.3	00		.A

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

* Only for connection F or Z

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Part number - tables		Accessories	

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 F or Z

Mounting accessories

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

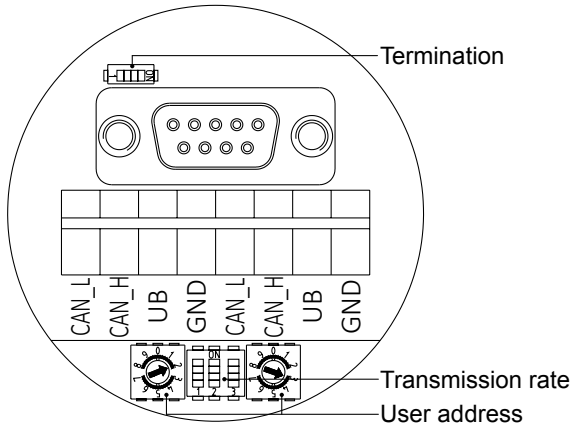# Absolute encoders - bus interfaces
Blind / through hollow shaft or cone shaft (1:10)
CANopen® / 13 bit ST / 16 bit MT / Speed switch

HMG10 - CANopen®

CANopen® - Terminal assignment

View A[1] - View inside bus cover

Termination

CAN_L CAN_H UB GND CAN_L CAN_H UB GND

Transmission rate
User address

View C[1] / **View D**[1] - 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, **C**[1])
5-pin, A-coded

Connector M12 (female, **D**[1])
5-pin, A-coded
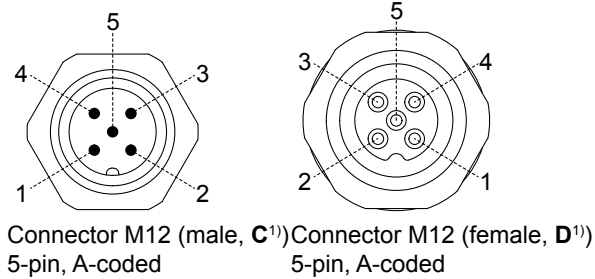
Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections UB-UB and GND-GND is 1 A each.

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
Default settings	User address 00

CANopen® - Termination
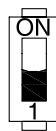
ON = final user
OFF = user x

CANopen® - User address
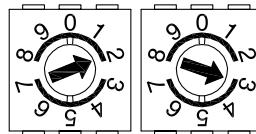
Defined by rotary switch.
Example: User address 23

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

* Default

[1] See dimensions

Absolute encoders - bus interfaces
Blind / through hollow shaft or cone shaft (1:10)
## CANopen® / 13 bit ST / 16 bit MT / Speed switch

HMG10 - CANopen®

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+[2]	DSL_OUT1 / speed switch (Open-Collector or Solid State Relay)
SP−[2]	DSL_OUT2 / speed switch (0 V or Solid State Relay)
SA[2]	RS485+ / programming interface
SB[2]	RS485− / programming interface

Incremental - Output signals

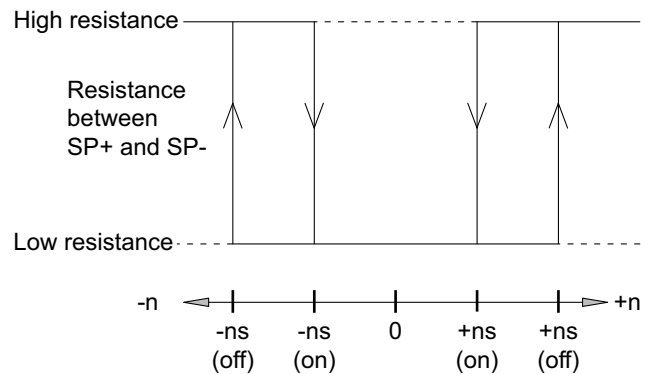Version with additional incremental output at positive rotating direction

A+
A-
B+
B-
R+ (Zero pulse+)
R- (Zero pulse-)
90°
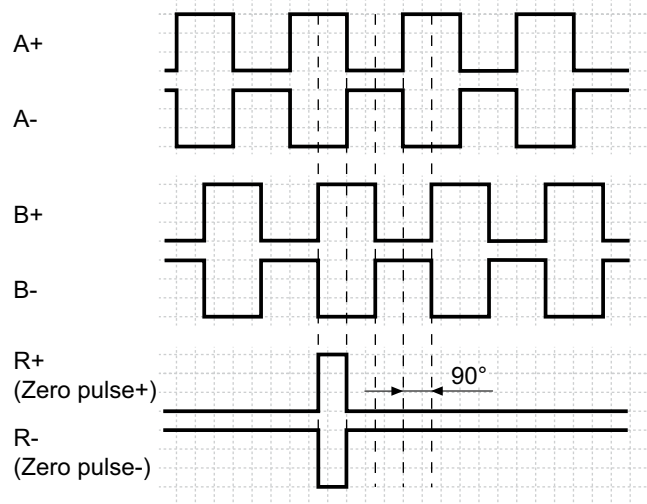
Speed switch/incremental - Terminal assignment terminal box

View B[1]

SP+[2]
A+
A−
B+
B−
+UB
⊥

SP-[2]
nE+
nE−
R+
R−
SA[2]
SB[2]
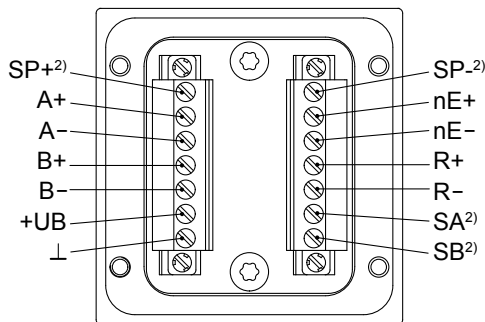
Speed switch - Switching characteristics

High resistance

Resistance between SP+ and SP-

Low resistance

-n   +n
-ns (off) -ns (on) 0 +ns (on) +ns (off)

n	=	Speed
+ns (on)	=	Activation speed at shaft rotation in positive rotating direction[1].
+ns (off)	=	Deactivation speed at shaft rotation in positive rotating direction[1].
-ns (on)	=	Activation speed at shaft rotation in negative rotating direction[1].
-ns (off)	=	Deactivation at shaft rotation in negative rotating direction[1].

[1] See dimensions

[2] Do not use at version without speed switch
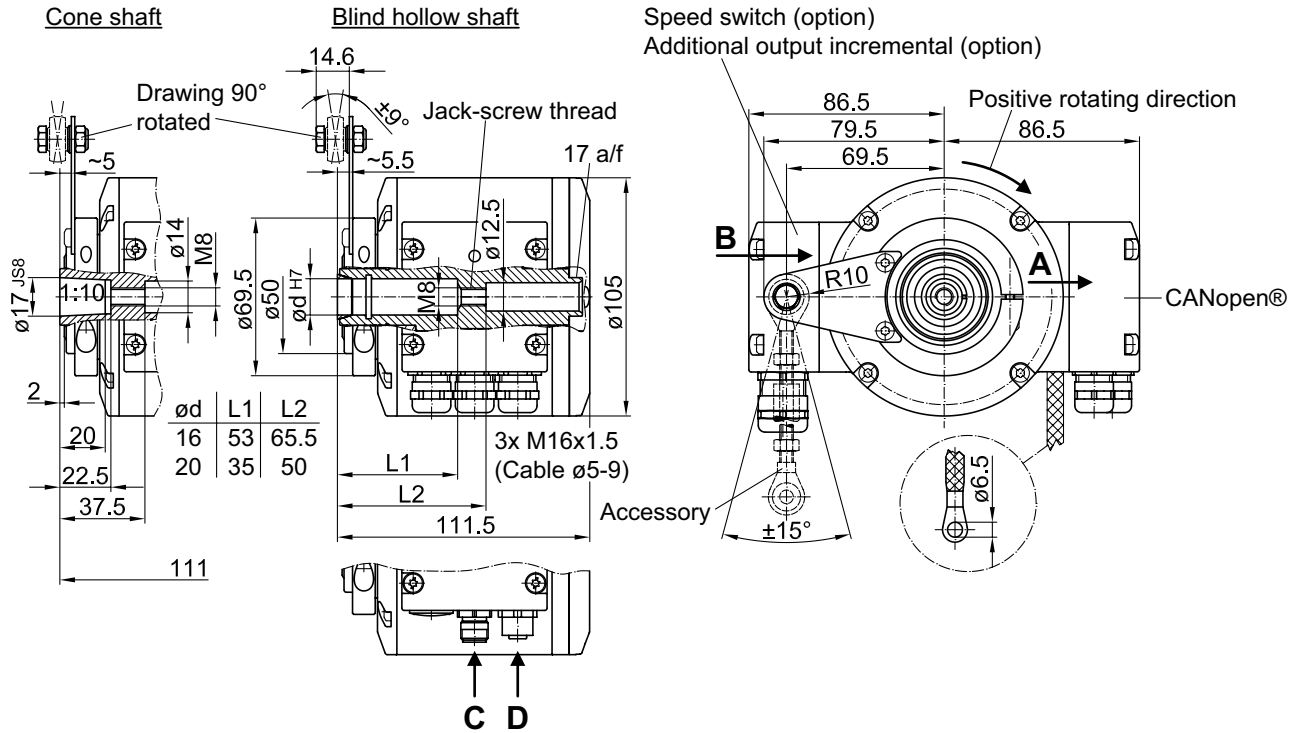
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HMG10 - CANopen®

Dimensions

Blind hollow shaft and cone shaft with radial terminal boxes

ød	L1	L2
16	53	65.5
20	35	50

Through hollow shaft with radial terminal boxes

9/8/2016