

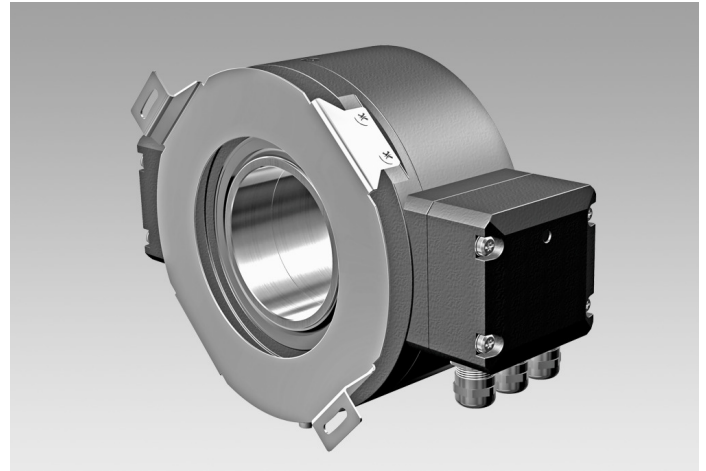
## HMG 161

Encoder with through hollow shaft max.  $\varnothing 70$  mm

Single and multiturn 13 bit ST / 12 or 16 bit MT SSI / Profibus / CANopen® / DeviceNet

### Overview

- Multiturn / SSI / Profibus / CANopen® / DeviceNet
- Optical sensing method
- Singleturn 13 bit, multiturn 12 bit / 16 bit
- Through hollow shaft  $\varnothing 38...70$  mm
- Multiturn sensing with microGen technologie, without gear or battery
- Special protection against corrosion



### Technical data

#### Technical data - electrical ratings

Voltage supply	9...30 VDC
Consumption w/o load	$\leq 100$ mA (per interface SSI) $\leq 250$ mA (per interface bus)
Initializing time	$\leq 200$ ms after power on
Interface	SSI Profibus-DPV0 CANopen® DeviceNet
Function	Multiturn
Transmission rate	9.6 ... 12000 kBaud (Profibus) 10 ... 1000 kBaud (CANopen®) 125 ... 500 kBaud (DeviceNet)
Profile conformity	Profibus-DPV0 CANopen® CiA DSP 406 V 3.0 Device Profile Encoder V 1.0
Device adress	Rotary switches in bus cover
Steps per revolution	8192 / 13 bit
Number of revolutions	$\leq 65536$ / 16 bit
Additional outputs	Square-wave TTL (RS422) Square-wave HTL
Sensing method	Optical
Code	Gray (version SSI)
Code sequence	CW default
Inputs	SSI clock (version SSI)
Incremental output	2048 pulses per revolution
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Programmable parameters	Depending on the selected absolute interface

#### Technical data - electrical ratings

Diagnostic function	Position or parameter error
Status indicator	DUO-LED integrated in bus cover
Approval	CE UL approval / E217823

#### Technical data - mechanical design

Size (flange)	$\varnothing 160$ mm
Shaft type	$\varnothing 38...70$ mm (through hollow shaft)
Protection EN 60529	IP 56
Operating speed	$\leq 3500$ rpm (mechanical)
Operating torque typ.	15 Ncm
Rotor moment of inertia	$28.5 \text{ kgcm}^2 (\varnothing 50)$
Admitted shaft load	$\leq 350$ N axial $\leq 500$ N radial
Material	Housing: aluminium Shaft: stainless steel
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C4 according to ISO 12944-2
Operating temperature	$-20...+85$ °C
Resistance	IEC 60068-2-6 Vibration 10 g, 10-2000 Hz IEC 60068-2-27 Shock 200 g, 6 ms
Explosion protection	II 3 G Ex ec IIC T4 Gc (gas) II 3 D Ex tc IIIB T135°C Dc (dust) (only with option ATEX)
Weight approx.	5 - 6.4 kg (depending on version)
Connection	Bus cover Connecting terminal (SSI/incremental)

### Optional

- Additional incremental output (TTL / HTL)
- Insulated bearing

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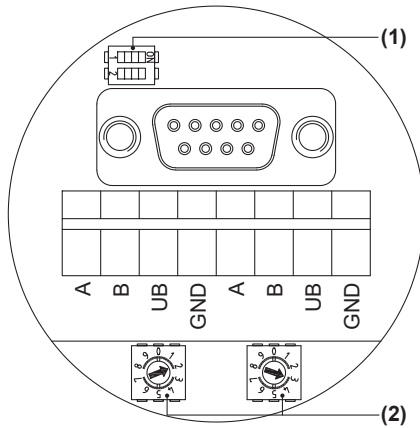
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### Terminal assignment

#### Profibus-DP - View A (see dimension)

View inside bus connecting box Profibus



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.

#### Profibus-DP - Terminating resistor (1)

ON = Last user

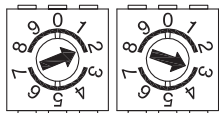
OFF = User x



#### Profibus-DP - User address (2)

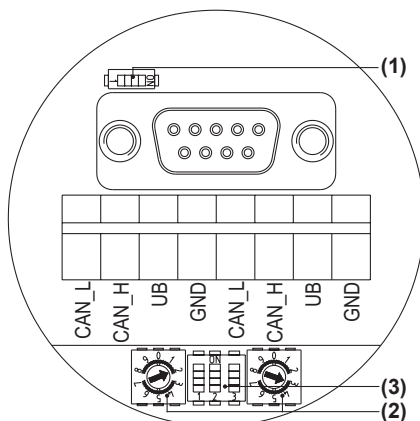
Defined by rotary switch.

Example: User address 23



#### CANopen - View A (see dimension)

View inside bus connecting box CANopen®



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.

### Terminal assignment

#### CANopen - Terminating resistor (1)

ON = Last user

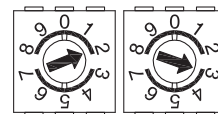
OFF = User x



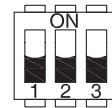
#### CANopen - User address (2)

Defined by rotary switch.

Example: User address 23



#### CANopen - Transmission rate (3)

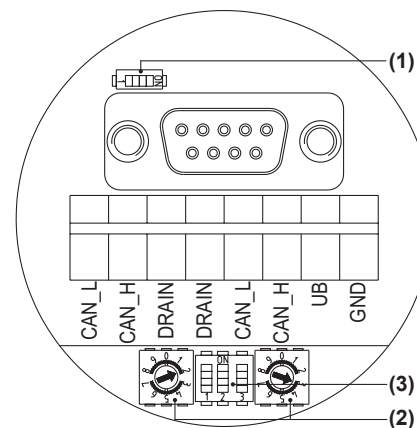


Transmission rate	Setting DIP switches		
	1	2	3
10 kBaud	OFF	OFF	OFF
20 kBaud	OFF	OFF	ON
50 kBaud*	OFF	ON	OFF
125 kBaud	OFF	ON	ON
250 kBaud	ON	OFF	OFF
500 kBaud	ON	OFF	ON
800 kBaud	ON	ON	OFF
1000 kBaud	ON	ON	ON

\* Factory setting

#### DeviceNet - View A (see dimension)

View inside bus connecting box DeviceNet



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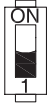
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### Terminal assignment

#### DeviceNet - Terminating resistor (1)

ON = Last user

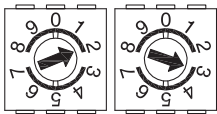
OFF = User x



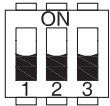
#### DeviceNet - User address (2)

Defined by rotary switch.

Example: User address 23



#### DeviceNet - Transmission rate (3)



Transmission rate	Setting DIP switches		
	1	2	3
125 kBaud*	X	OFF	OFF
250 kBaud	X	OFF	ON
500 kBaud	X	ON	OFF
125 kBaud	X	ON	ON

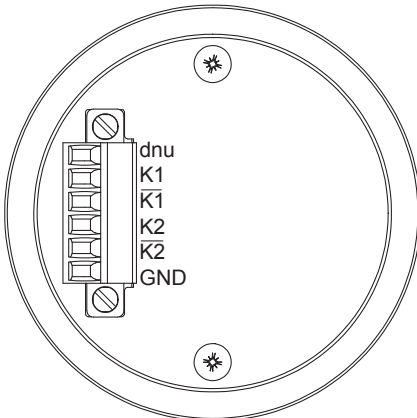
X = Without function

\* Factory setting

#### Incremental - View B (see dimension)

Connecting terminal terminal box

Incremental output (HTL, TTL)

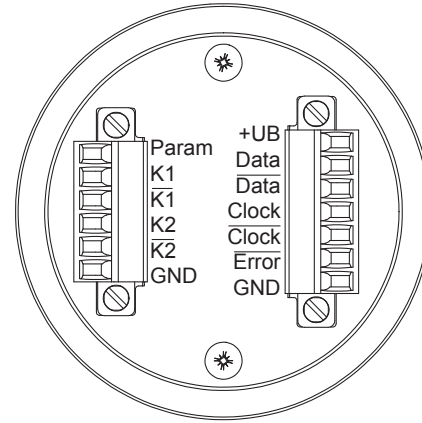


### Terminal assignment

#### SSI - View B (see dimension)

Connecting terminal terminal box

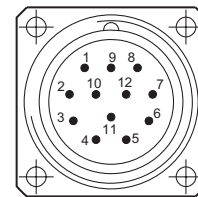
SSI / incremental output (HTL, TTL)



#### SSI - View C (see dimension)

Assignment flange connector (option)

SSI / incremental output (HTL, TTL)



Flange connector M23, male, 12-pin, counter-clockwise (CCW)

Pin	Assignment
1	$\overline{K2}$
2	Clock*
3	Data*
4	Data*
5	K1
6	K1
7	Param*
8	K2
9	$\overline{\text{Error}}^*$
10	0V ( $\perp$ )
11	$\overline{\text{Clock}}^*$
12	+UB*

\* Only for SSI

### Terminal significance

#### Profibus

Connection	Description
GND	Ground for UB
UB	Voltage supply 10...30 VDC
A	Negative serial data transmission
B	Positive serial data transmission
dnu	Do not use

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### Terminal significance

#### CANopen®

Connection	Description
GND	Ground for UB
UB	Voltage supply 10...30 VDC
CAN_H	CAN Bus signal (dominant HIGH)
CAN_L	CAN Bus signal (dominant LOW)

#### DeviceNet

Connection	Description
GND	Ground for UB
UB	Voltage supply 10...30 VDC
CAN_H	CAN Bus signal (dominant HIGH)
CAN_L	CAN Bus signal (dominant LOW)
DRAIN	Shield connection

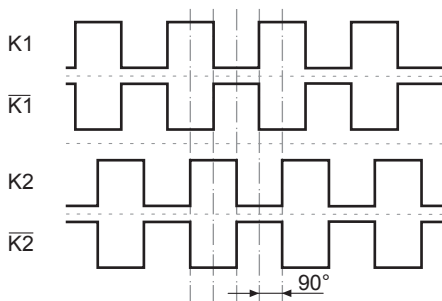
#### SSI / incremental output (HTL, TTL)

+UB	Voltage supply
0V (┴, GND)	Ground
K1	Output signal channel 1
K1	Output signal channel 1 inverted
K2	Output signal channel 2 (offset by 90° to channel 1)
K2	Output signal channel 2 inverted
Clock	SSI clock
Clock	SSI clock inverted
Data	SSI data
Data	SSI data inverted
Param	Parameter
Error	Error output
dnu	Do not use

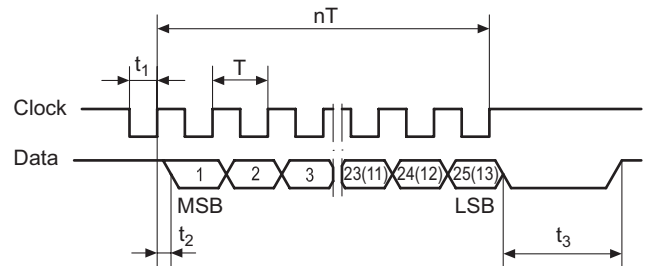
### Output signals incremental

#### HTL/TTL

At positive rotating direction (*see dimension*)



### Data transfer



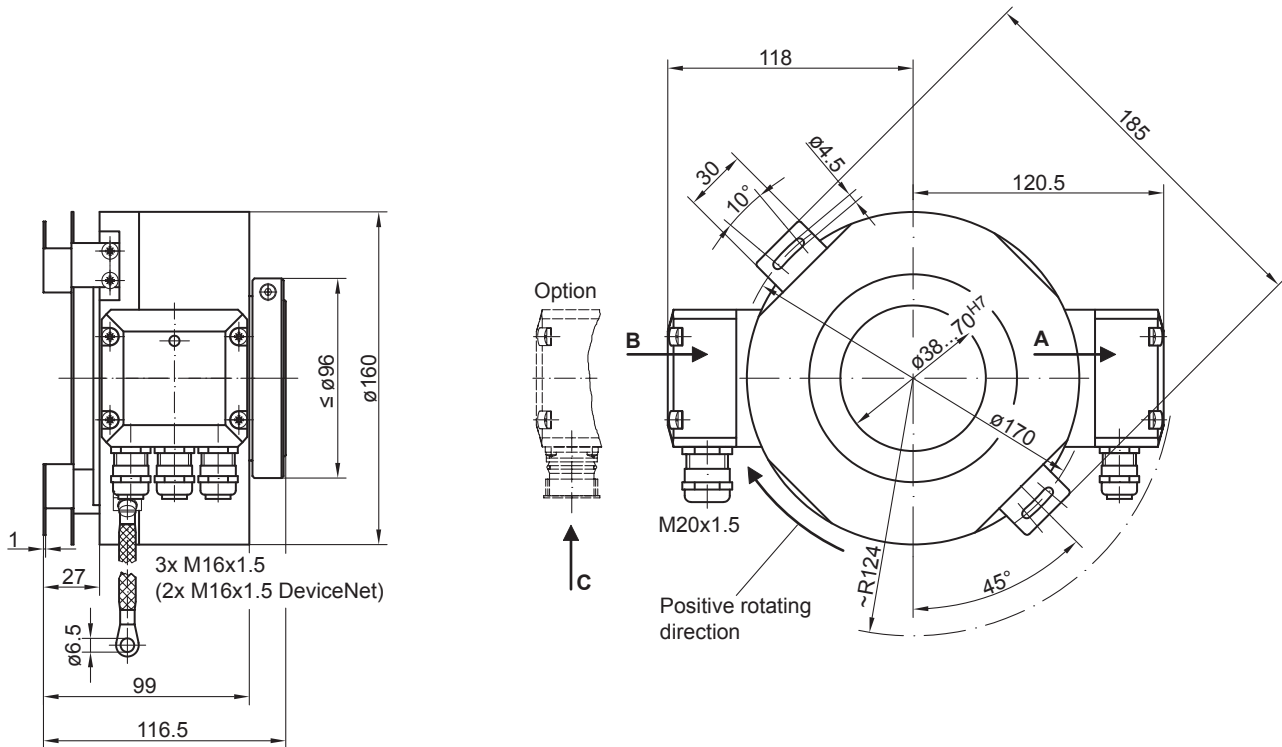
T =	1.25...10 $\mu$ s
t <sub>1</sub> =	0.63...5 $\mu$ s
t <sub>2</sub> =	0.4 $\mu$ s
t <sub>3</sub> =	12...30 $\mu$ s
n =	Number of bits
Clock frequency	100...800 kHz

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## Dimensions



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### Ordering reference

	HMG161	#	##	#####	#####
<b>Product</b>					
Absolute encoder	HMG161				
<b>Interface/interfaces</b>					
SSI		S			
Profibus		P			
CANopen®		C			
DeviceNet		D			
<b>Absolute share</b>					
13 bit singleturn		13			
13 bit singleturn + 12 bit multiturn <sup>(1)</sup>		25			
13 bit singleturn + 16 bit multiturn <sup>(2)</sup>		29			
<b>Additional output</b>					
Without			Z0		
TTL level, 2048 pulses			T2048		
HTL level, 2048 pulses			H2048		
<b>Shaft diameter</b>					
Blind hollow shaft ø38 mm					38H7
Through hollow shaft ø40 mm					40H7
Through hollow shaft ø42 mm					42H7
Through hollow shaft ø50 mm					50H7
Through hollow shaft ø55 mm					55H7
Through hollow shaft ø60 mm					60H7
Through hollow shaft ø65 mm					65H7
Through hollow shaft ø70 mm					70H7

(1) Only version S

(2) Only version P, C und D

### Accessories

#### Diagnostic accessories

11075858	Analyzer for encoders HENQ 1100
11075880	Analyzer for encoders HENQ 1100 B