

Absolute encoders - bus interfaces

Shaft with EURO flange B10

Single and multiturn encoders 13 bit ST / 12 bit or 16 bit MT

CANopen / SSI / Profibus / DeviceNet

AMG 81



AMG 81 P (C, D) + incremental

Features

- Encoder multiturn / SSI / Profibus / CANopen / DeviceNet
- Optical sensing
- Resolution: singleturn 13 bit, multiturn 12 bit / 16 bit
- EURO-flange B10 / shaft $\varnothing 11$ mm
- Additional incremental signals (TTL / HTL)

Technical data - electrical ratings

Voltage supply	9...30 VDC
Consumption w/o load	≤ 100 mA (per interface SSI) ≤ 250 mA (per interface bus)
Initializing time	≤ 200 ms after power on
Interfaces	SSI, Profibus-DPV0, CANopen, DeviceNet
Function	Multiturn
Transmission rate	10...1000 kBaud (CANopen) 9.6...12000 kBaud (Profibus) 125...500 kBaud (DeviceNet)
Profile conformity	Profibus-DPV0 CANopen CiA DSP 406 V 3.0 Device Profile Encoder V 1.0
User address	Rotary switch in bus cover
Steps per turn	8192 / 13 bit
Number of turns	4096 / 12 bit, 65536 / 16 bit
Additional output signals	Square-wave TTL (RS422) Square-wave HTL
Incremental output	2048 pulses
Sensing method	Optical
Code	Gray or binary (version SSI)
Code sequence	CW default, programmable
Inputs	SSI clock (version SSI)
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Programmable parameters	Depending on the selected absolute interface
Diagnostic function	Position or parameter error
Status indicator	DUO-LED integrated in bus cover
Approval	UL approval / E256710

Technical data - mechanical design

Dimensions (flange)	$\varnothing 115$ mm
Shaft	$\varnothing 11$ mm
Flange	EURO flange B10
Protection DIN EN 60529	IP 55
Operating speed	≤ 3500 rpm (mechanical)
Operating torque	≤ 10 Ncm
Rotor moment of inertia	1.4 kgcm ²
Shaft loading	≤ 50 N axial ≤ 60 N radial
Materials	Housing: aluminium alloy Shaft: stainless steel
Operating temperature	-20...+85 °C
Resistance	IEC 60068-2-6 Vibration 10 g, 10-2000 Hz IEC 60068-2-27 Shock 100 g, 6 ms
Explosion protection	II3G Ex nA IIC T4 Gc (gas) II3D Ex tc IIIB T120°C Dc (dust)
Weight approx.	1.7 kg (depending on model)
Connection	Bus cover Connector M23, 12-pin (SSI/ incremental)

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Part number

Absolute encoder

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Additional incremental signals

Z0 Without

T2048 TTL level, 2048 pulses

H2048 HTL level, 2048 pulses

Absolute share

13 13 bit singleturn (only S version)

25 13 bit singleturn + 12 bit multiturn (only S version)

29 13 bit singleturn + 16 bit multiturn (only S version)

Interface/interfaces

S SSI

P Profibus

C CANopen

D DeviceNet

Accessories

Connectors and cables

HEK 8 Sensor cable for encoders

Mounting accessories

K 35 Spring disk coupling for shaft ø6...12 mm

K 50 Spring disk coupling for shaft ø11...16 mm

K 60 Spring disk coupling for shaft ø11...22 mm

Diagnostic accessories

HENQ 1100 Analyzer for encoders

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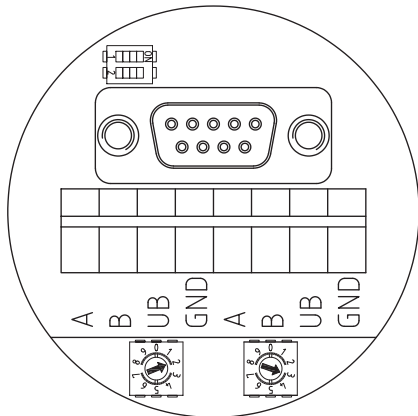
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Terminal assignment - Profibus

View A - Connecting terminal in cover



Terminal significance - Profibus

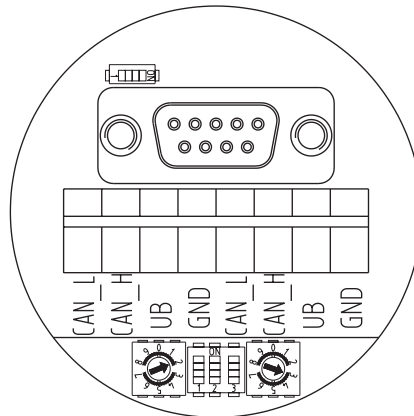
A	Negative serial data transmission, pair 1 and pair 2
B	Positive serial data transmission, pair 1 and pair 2
UB	Voltage supply +9 ... +30 VDC
GND	Ground connection for UB
Terminals with the same label are internally connected.	

Features - Profibus

Protocol	Profibus DP V0
Profibus features	Device Class 1 and 2
Data Exch. functions	Input: Position value Output: Preset value
Preset value	The „Preset“ parameter can be used to set the encoder to a predefined value that corresponds to a specific axis position of the system.
Parameter functions	Rotating direction: The relationship between the rotating direction and rising or falling output code values can be set in the operating parameter. Scaling: The parameter values set the number of steps per turn and the overall resolution.
Diagnostic	The encoder supports the following error messages: - Position error
Default settings	User address 00

Terminal assignment - CANopen

View A - Connecting terminal in cover



Terminal significance - CANopen

CAN_L	CAN Bus signal (dominant low)
CAN_H	CAN Bus signal (dominant high)
UB	Voltage supply +9 ... +30 VDC
GND	Ground connection for UB
Terminals with the same label are internally connected.	

Features - CANopen

Protocol	CANopen
CANopen features	Device class 2 CAN 2.0B
Device profile	CANopen CiA DSP 406, V 3.0
Operation modes	Polling mode (asynch, via SDO) Cyclic mode (asynch-cyclic) Synch mode (synch-cyclic) Acyclic mode (synch-acyclic)
Diagnostic	The encoder supports the following error messages: - Position error
Default settings	User address 00

Absolute encoders - bus interfaces

Shaft with EURO flange B10

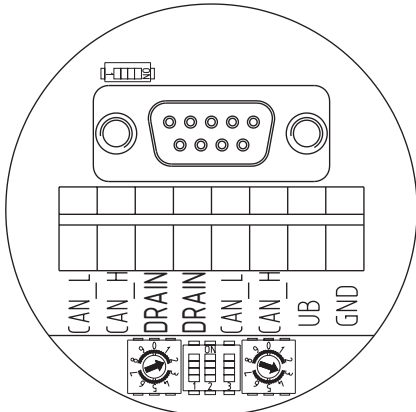
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Terminal assignment - DeviceNet

View A - Connecting terminal in cover



Terminal significance - DeviceNet

CAN_L CAN bus Signal (dominant Low)

CAN_H CAN bus Signal (dominant High)

DRAIN Shield connection

UB Voltage supply +9 ... +30 VDC

GND Ground connection relating to UB

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.

Features - DeviceNet

Protocol DeviceNet

DeviceNet features Device Profile for Encoders V 1.0

Operating modes I/O-Polling
Cyclic
Change of State

Preset value The „Preset“ parameter can be used to set the encoder to a predefined value that corresponds to a specific axis position of the system. The offset of encoder zero point and mechanical zero point is stored in the encoder.

Parameter functions Rotating direction:
The relationship between the rotating direction and rising or falling output code values can be set in the operating parameter.
Scaling:
The parameter values set the number of steps per turn and the overall resolution.

Diagnostic The encoder supports the following error warnings:
- Position and parameter error

Default settings User address 00

Terminal assignment - Incremental and/or SSI

View B - Connector M23

12-pin, male contacts, counter-clockwise

Male	Assignment
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Pin 1	K2
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Pin 2	Clock *
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Pin 3	Data *
-------	--------

Pin 4	Data *
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Pin 5	K1
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Pin 6	K1
-------	----

Pin 7	Param *
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Pin 8	K2
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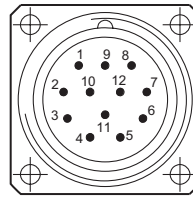
Pin 9	Error *
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Pin 10	GND
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Pin 11	Clock *
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Pin 12	+UB *
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* only for SSI



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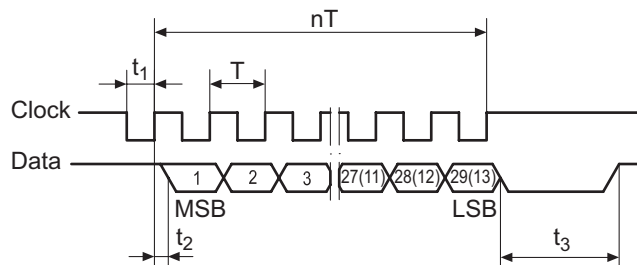
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Data transfer



$$T = 1.25 \dots 10 \mu\text{s}$$

$$t_1 = 0.63 \dots 5 \mu\text{s}$$

$$t_2 \leq 0.4 \mu\text{s}$$

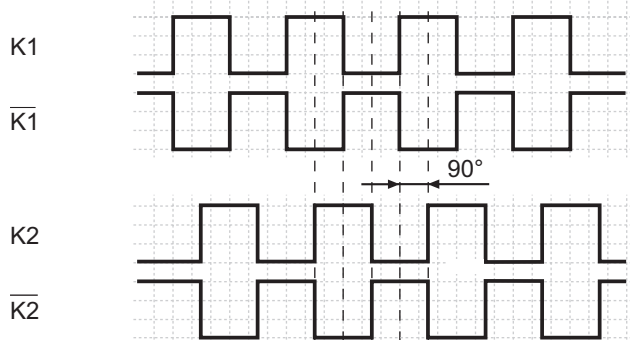
$$t_3 = 12 \dots 30 \mu\text{s}$$

$$n = \text{Number of bits}$$

$$\text{Clock frequency} = 100 \dots 800 \text{ kHz}$$

Output signals

Additional incremental signals
at positive rotating direction



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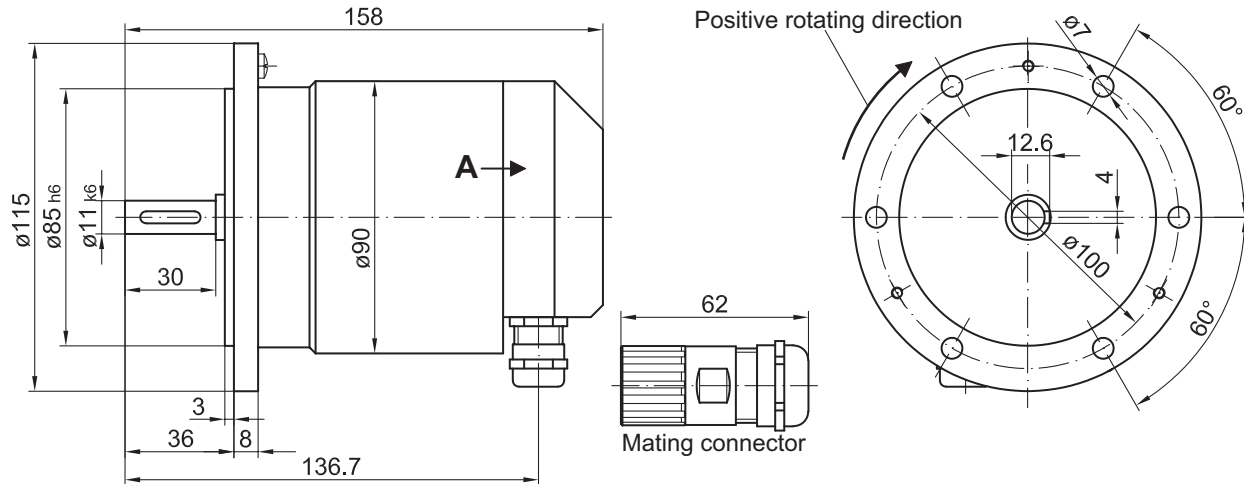
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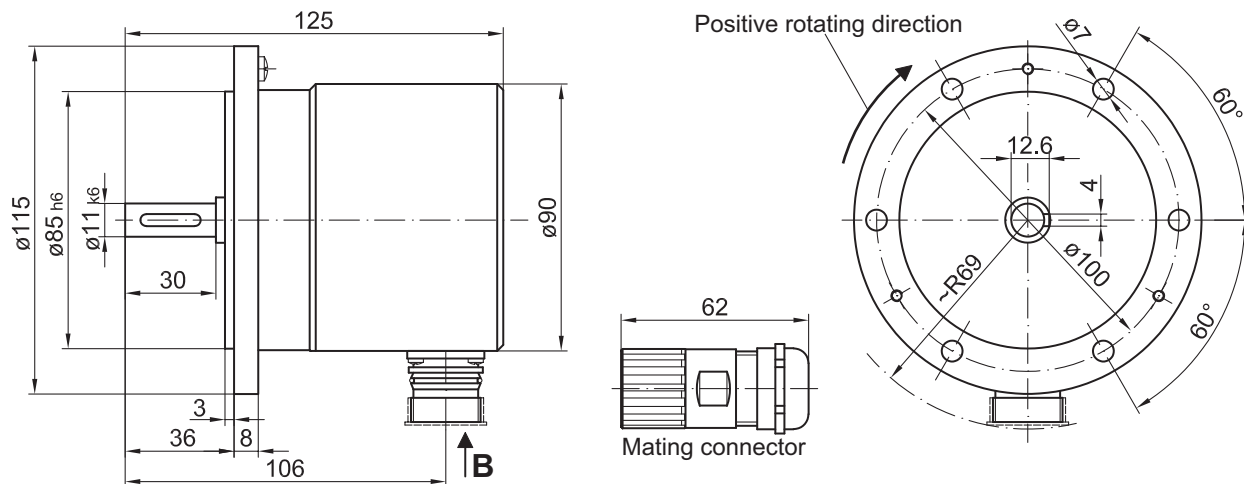
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Dimensions

Version with Profibus, DeviceNet or CANopenVersion



Version with SSI and/or incremental



Version with Profibus, DeviceNet or CANopenVersion and incremental

