

Combination

Encoder with integrated centrifugal switch

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

SSI / Profibus / CANopen® / DeviceNet

HMG 11 + FSL



HMG 11 + FSL

Technical data - electrical ratings

Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Approval	CE

Technical data - electrical ratings (encoder)

Voltage supply	9...30 VDC
Consumption w/o load	≤100 mA (per interface SSI) ≤250 mA (per interface bus)
Sensing method	Optical
Initializing time	≤200 ms after power on
Interfaces	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	≤65536 / 16 bit
Additional outputs	Square-wave TTL (RS422) Square-wave HTL
Code	Gray (version SSI)
Code sequence	CW default
Inputs	SSI clock (version SSI)
Programmable parameters	Depending on the selected absolute interface
Diagnostic function	Position or parameter error
Status indicator	DUO-LED integrated in bus cover

Features

- Multiturn / SSI / Profibus / CANopen® / DeviceNet
- Singleturn 13 bit, multiturn 12 bit / 16 bit
- Mechanical speed monitoring based on centrifugal force
- Blind hollow shaft up to ø20 mm or cone shaft ø17 mm (1:10)
- Multiturn sensing with microGen technologie, without gear or battery
- Available with redundant absolute signals
- Special protection against corrosion

Optional

- Additional incremental output (TTL / HTL)

Technical data - electrical ratings (centrifugal switch)

Switching accuracy	±4 % ($\Delta n = 2$ rpm/s); = +20 % ($\Delta n = 1500$ rpm/s)
Switching deviation	≤3 % (cw-ccw rotation)
Switching hysteresis	~40 % of switching speed
Switching outputs	1 output, speed control
Output switching capacity	≤6 A / 230 VAC; ≤1 A / 125 VDC
Minimum switching current	50 mA

Technical data - mechanical design

Size (flange)	ø122 mm
Shaft type	ø16...20 mm (blind hollow shaft) ø17 mm (cone shaft 1:10)
Admitted shaft load	≤250 N axial, ≤400 N radial
Protection DIN EN 60529	IP 67
Speed (n)	≤1.25 · ns
Range of switching speed (ns)	850...2800 rpm ($\Delta n = 2$ rpm/s)
Operating torque typ.	15 Ncm
Rotor moment of inertia	790 gcm ²
Materials	Housing: aluminium alloy Shaft: stainless steel
Operating temperature	-20...+85 °C
Resistance	IEC 60068-2-6 Vibration 5 g, 10-2000 Hz IEC 60068-2-27 Shock 50 g, 11 ms
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C5-M (CX) according to ISO 12944-2
Connection	Bus cover; Terminal box; Flange connector M23, 12-pin
Weight approx.	3.5 kg (depending on version)

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Part number

							+ FSL	
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6 850...949 rpm ($\Delta n = 2$ rpm/s)**
5 950...1099 rpm ($\Delta n = 2$ rpm/s)**
4 1100...1299 rpm ($\Delta n = 2$ rpm/s)**
3 1300...1799 rpm ($\Delta n = 2$ rpm/s)**
2 1800...2499 rpm ($\Delta n = 2$ rpm/s)**
1 2500...2800 rpm ($\Delta n = 2$ rpm/s)**

KLK	Terminal box, radial (only SSI/incremental)
ST-M23	Flange connector M23, radial (only SSI/incremental)

16H7	Blind hollow shaft $\varnothing 16$ mm
20H7	Blind hollow shaft $\varnothing 20$ mm
17K	Cone shaft $\varnothing 17$ mm (1:10)

Z0	Without
T1024	TTL level, 1024 pulses*
T2048	TTL level, 2048 pulses*
H1024	HTL level, 1024 pulses*
H2048	HTL level, 2048 pulses*

13	13 bit singleturn
25	13 bit singleturn + 12 bit multiturn (only S and SS version)
29	13 bit singleturn + 16 bit multiturn

S	SSI
P	Profibus
C	CANopen®
D	DeviceNet
SS	2 x SSI
PS	Profibus and SSI
CS	CANopen® and SSI
DS	DeviceNet and SSI
PP	2 x Profibus
CP	CANopen® and Profibus
DP	DeviceNet and Profibus
CC	2 x CANopen®
DC	DeviceNet and CANopen®
DD	2 x DeviceNet

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

Combination

Encoder with integrated centrifugal switch

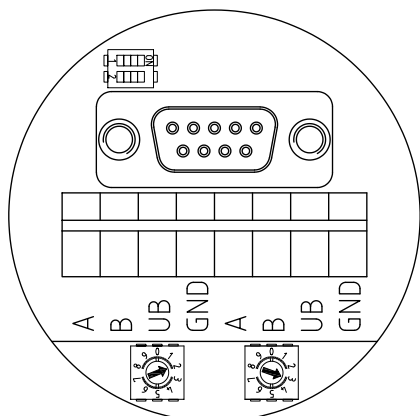
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Terminal assignment - Profibus

View A - Connecting terminal in cover



Terminal significance - Profibus

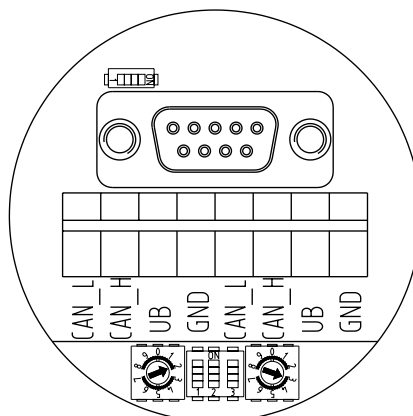
A	Negative serial data transmission, pair 1 and pair 2
B	Positive serial data transmission, pair 1 and pair 2
UB	Voltage supply 9...30 VDC
GND	Ground connection for UB
Terminals with the same label are internally connected.	

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

Combination

Encoder with integrated centrifugal switch

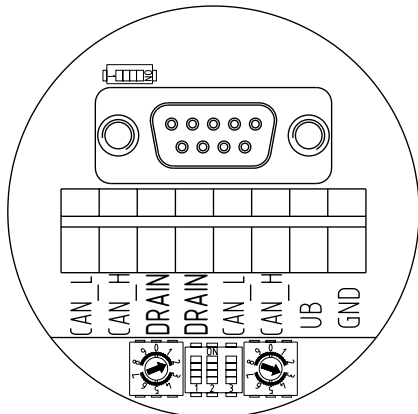
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Terminal assignment - DeviceNet

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

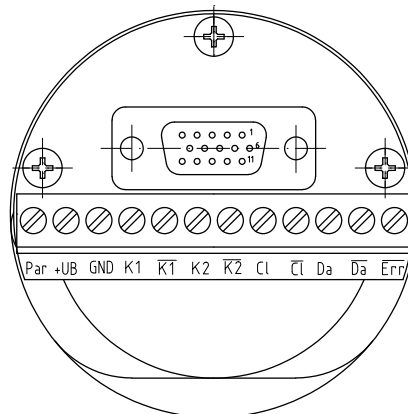
Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections UB-UB and GND-GND is 1 A each.

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 - Connecting terminal in cover

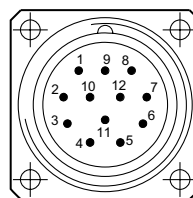


View C - Option

Flange connector M23, 12-pin, male contacts, counter-clockwise

Male	Assignment
Pin 1	K2
Pin 2	Clock *
Pin 3	Data *
Pin 4	Data *
Pin 5	K1
Pin 6	K1
Pin 7	Param *
Pin 8	K2
Pin 9	Error *
Pin 10	GND
Pin 11	Clock *
Pin 12	+UB *

* only for SSI



Combination

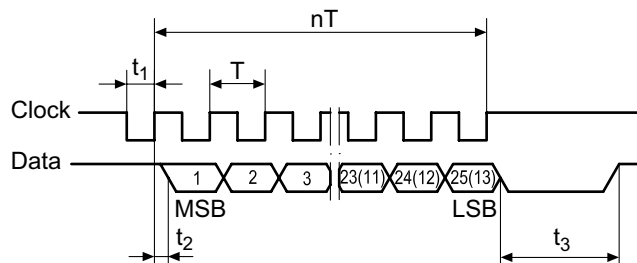
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Data transfer



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

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

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

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

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

Clock frequency 100...800 kHz

Accessories

Connectors and cables

HEK 8 Sensor cable for encoders

Mounting accessories

11077197 Mounting kit for torque arm size M6 and earthing strap

11077087 Mounting and dismounting set

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)

Diagnostic accessories

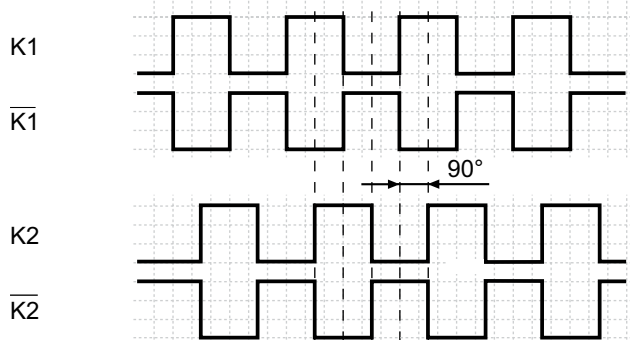
11075858 Analyzer for encoders HENQ 1100

11075880 Analyzer for encoders HENQ 1100 with a power pack

Output signals

Additional incremental signals

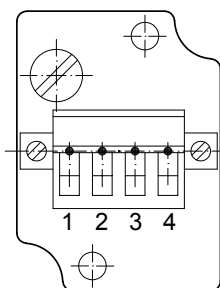
at positive rotating direction



Terminal assignment

Connecting terminal centrifugal switch FSL

View D



Make contact



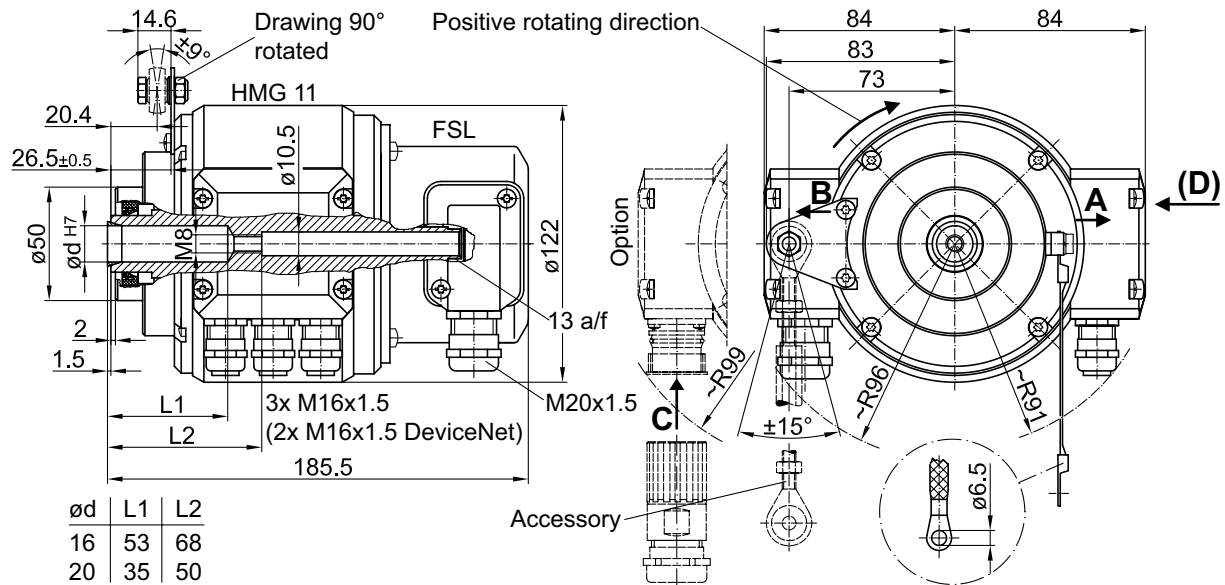
Break contact

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Dimensions

Blind hollow shaft



Cone shaft

