Baumer
Passion for Sensors

Absolute encoders - combination

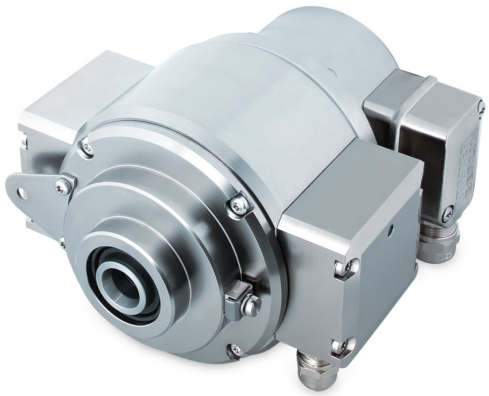
HMG 11 + FSL

Encoder with integrated centrifugal switch

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

Overview

- 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



SAFETY
HUBNER BERLIN
A Baumer Brand

Technical data

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
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	≤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

Technical data - electrical ratings (centrifugal switch)	
Switching accuracy	± 4 % (Δn = 2 rpm/s); 20 % (Δn = 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 (EAC: <50 VAC / 75 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 EN 60529	IP 67
Speed (n)	≤1.25 · ns
Range of switching speed (ns)	850...2800 rpm (Δn = 2 rpm/s)
Operating torque typ.	15 Ncm
Rotor moment of inertia	790 gcm²
Material	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 CX (C5-M) 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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Optional

- Additional incremental output (TTL / HTL)

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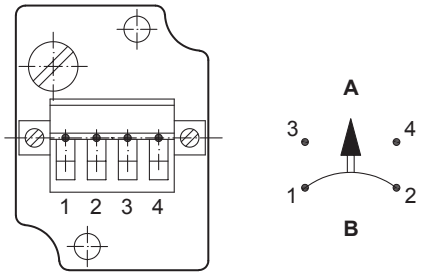
Terminal assignment

View D *(see dimension)*
Connecting terminal

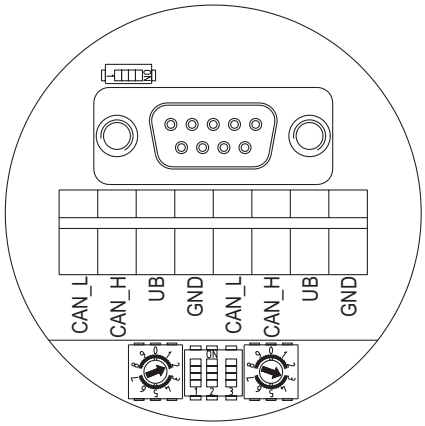


A = make contact, **B** = break contact

CANopen® features

Terminal assignment

View A - Connecting terminal in bus cover



Terminal significance

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 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.

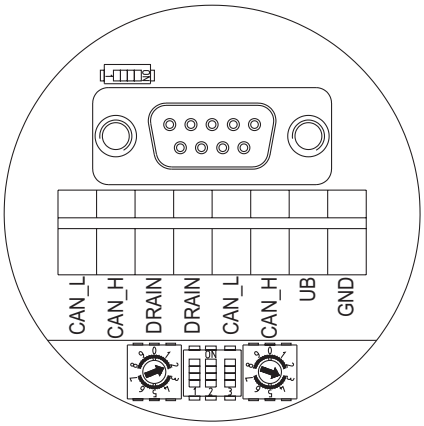
Features

Bus protocol	CANopen®
Features	Device Class 2 CAN 2.0B
Device profile	CANopen® CiA DSP 406, V 3.0
Operating modes	▪ 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 errror
Factory setting	User address 00

DeviceNet features

Terminal assignment

View A - Connecting terminal in bus cover



Terminal significance

CAN_L	CAN Bus Signal (dominant Low)
CAN_H	CAN Bus Signal (dominant High)
DRAIN	Shield
UB	Voltage supply 9...30 VDC
GND	Ground for 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

Bus protocol	DeviceNet
Device profile	Device Profil 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
Factory setting	User address 00

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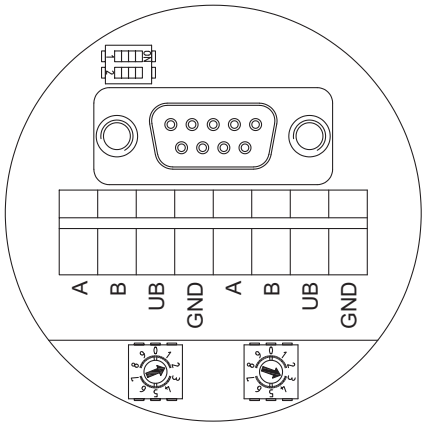
Profibus-DP features

Terminal assignment

View A - Connecting terminal in bus cover



Terminal significance

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 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.

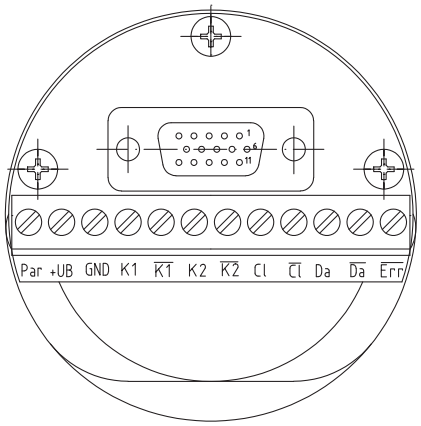
Features

Bus protocol	Profibus-DP V0
Features	Device Class 1 and 2
Data exchange 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
Factory setting	User address 00

SSI/Incremental features

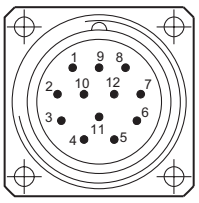
Terminal assignment

View B - Connecting terminal in cover



View C - Option
Flange connector M23, 12-pin, male contacts, counter-clockwise

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



* only for SSI

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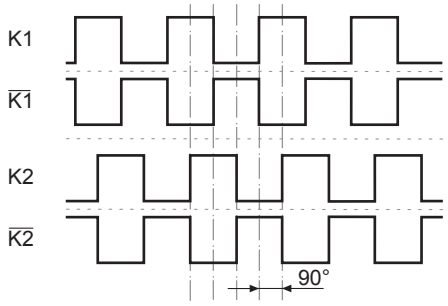
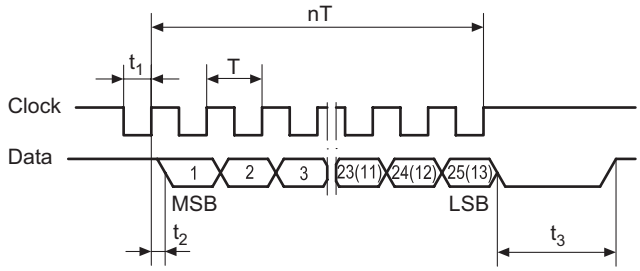
Output signals

HTL/TTL

At positive rotating direction *(see dimension)*



Data transfer



T =	1.25...10 µs
t_1 =	0.63...5 µs
t_2 =	0.4 µs
t_3 =	12...30 µs
n =	Number of bits
Clock frequency	100...800 kHz

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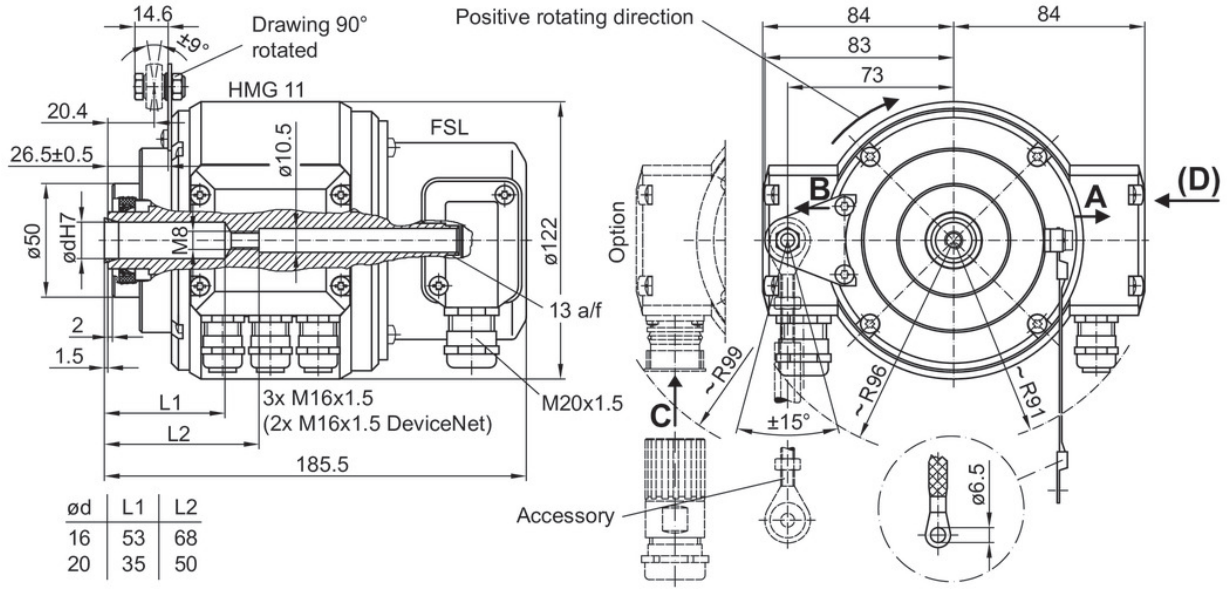
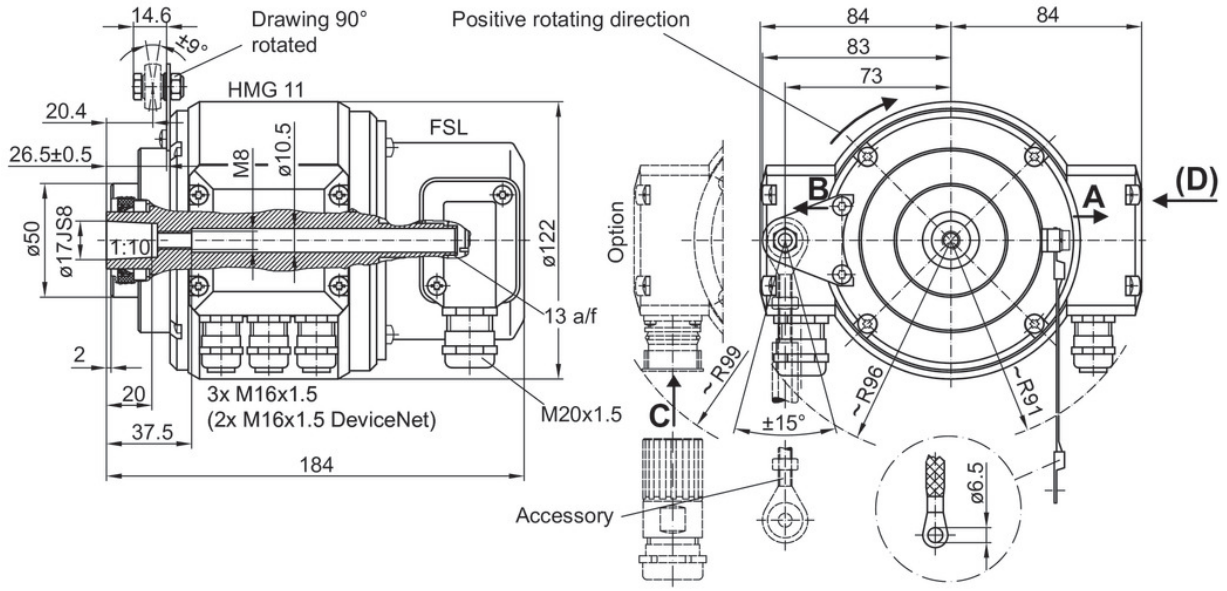
Dimensions



ød	L1	L2
16	53	68
20	35	50

Blind hollow shaft



Cone shaft

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Ordering reference

	HMG11	#	##	#####	######	######	+ FSL	#####
Product								
	HMG11							
Interface/interfaces								
SSI		S						
Profibus		P						
CANopen®		C						
DeviceNet		D						
2 x SSI		SS						
Profibus and SSI		PS						
CANopen® and SSI		CS						
DeviceNet and SSI		DS						
2 x Profibus		PP						
CANopen® and Profibus		CP						
DeviceNet and Profibus		DP						
2 x CANopen®		CC						
DeviceNet and CANopen®		DC						
2 x DeviceNet		DD						
Absolute share								
13 bit singleturn			13					
13 bit singleturn + 12 bit multiturn			25					
13 bit singleturn + 16 bit multiturn			29					
Additional output								
Without				Z0				
TTL level, 1024 pulses(1)				T1024				
TTL level, 2048 pulses(1)				T2048				
HTL level, 1024 pulses(1)				H1024				
HTL level, 2048 pulses(1)				H2048				
Shaft diameter								
Blind hollow shaft ø16 mm					16H7			
Blind hollow shaft ø20 mm					20H7			
Cone shaft ø17 mm (1:10)					17K			
Connection								
Without SSI/incremental								
Terminal box, radial						KLK		
Flange connector M23, radial (only SSI/incremental)						ST-M23		
Version speed switch								
Mechanical centrifugal switch							+ FSL	
Switching speed (ns)								
850...949 rpm (Δn = 2 rpm/s)(2)								6
950...1099 rpm (Δn = 2 rpm/s)(2)								5
1100...1299 rpm (Δn = 2 rpm/s)(2)								4
1300...1799 rpm (Δn = 2 rpm/s)(2)								3
1800...2499 rpm (Δn = 2 rpm/s)(2)								2
2500...4500 rpm (Δn = 2 rpm/s)(2)								1

(1) The incremental signals are duplicated with configuration SS. Please note: additional incremental output signals are not feasible with PP, CP, DP, CC, DC and DD interface.
(2) Please specify the exact switching speed in addition to the part number (factory setting).

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Accessories

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 (≥71 mm)
11002915	Torque arm M6, length 425...460 mm (≥131 mm)
11054917	Torque arm M6 insulated, length 67...70 mm
11072795	Torque arm M6 insulated, length 120...130 mm (≥71 mm)
11082677	Torque arm M6 insulated, length 425...460 mm (≥131 mm)