

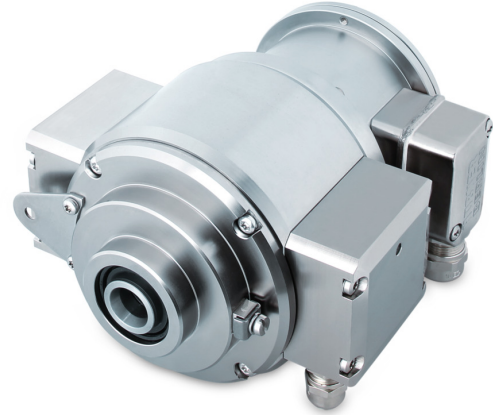
HMG 11 + ESL 90

Encoder with integrated electronic speed 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
- Electronic speed monitoring
- Circuit breaker with up to three selectable threshold speeds
- Multiturn sensing with microGen technologie, without gear or battery
- Available with redundant absolute signals
- Special protection against corrosion



Technical data

Technical data - electrical ratings (encoder)

Voltage supply	9...30 VDC
Consumption w/o load	≤100 mA (SSI); ≤250 mA (bus)
Sensing method	Optical
Initializing time	≤200 ms after power on
Interface	SSI Profibus-DPV0 CANopen® DeviceNet
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
Steps per revolution	8192 / 13 bit
Number of revolutions	≤65536 / 16 bit
Additional outputs	Square-wave TTL (RS422) Square-wave HTL
Code	Gray (SSI), CW default

Technical data - electrical ratings (speed switch)

Switching accuracy	± 4 % (≤1500 rpm) ± 2 % (>1500 rpm)
Switching hysteresis	= 30 % of switching speed
Switching outputs	1 output, speed control
Output switching capacity	≤6 A / 250 VAC; ≤1 A / 48 VDC (EAC: <50 VAC / 75 VDC)
Minimum switching current	100 mA
Switching delay time	≤40 ms

Optional

- Additional incremental output (TTL / HTL)

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)	≤3500 rpm
Range of switching speed (ns)	650...3500 rpm
Operating torque typ.	15 Ncm
Rotor moment of inertia	790 gcm ²
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 or flange connector M23, 12 pin (SSI/incremental)
Weight approx.	3.5 kg (depending on version)
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Approval	CE

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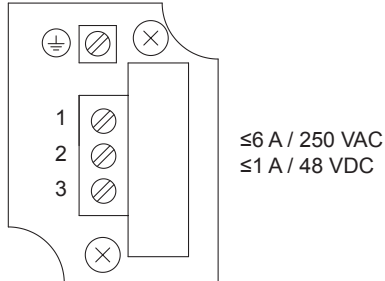
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Terminal assignment

View D (see dimension)

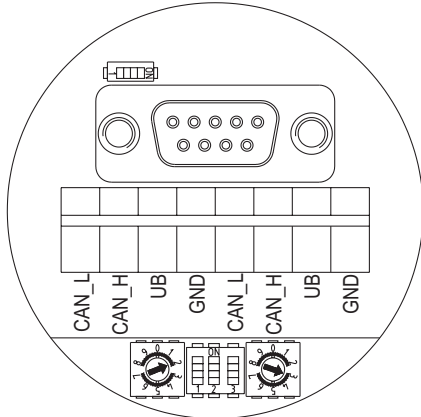
Connecting terminal speed switch ESL 90



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.

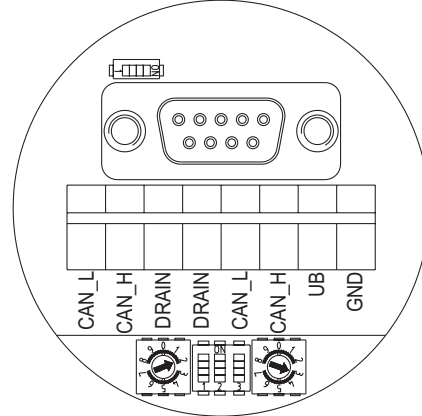
Features

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 error
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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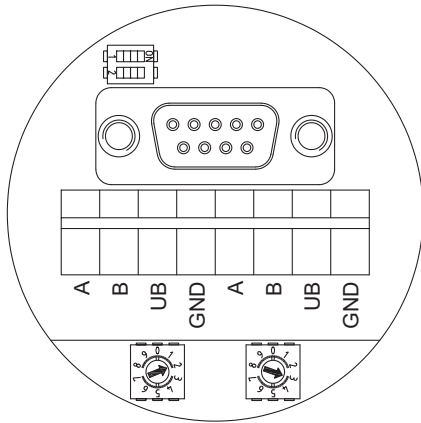
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Profibus-DP features

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.

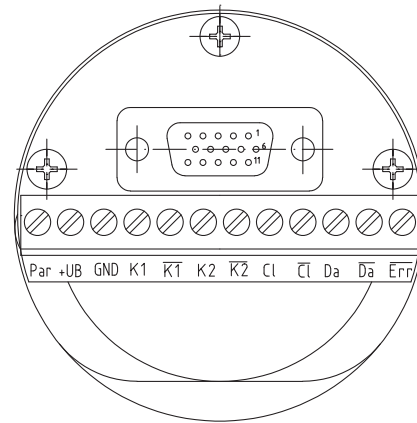
Features

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

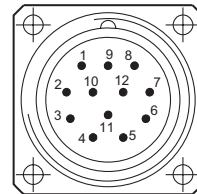
View B - Connecting terminal in cover



View C - Option

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

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



* only for SSI

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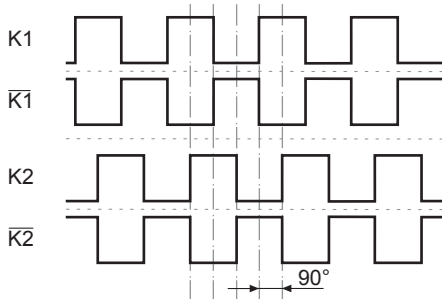
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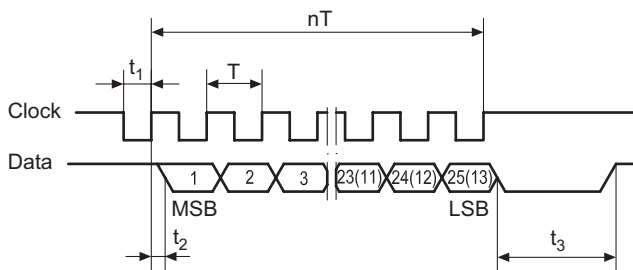
Output signals

HTL/TTL

At positive rotating direction (see dimension)



Data transfer



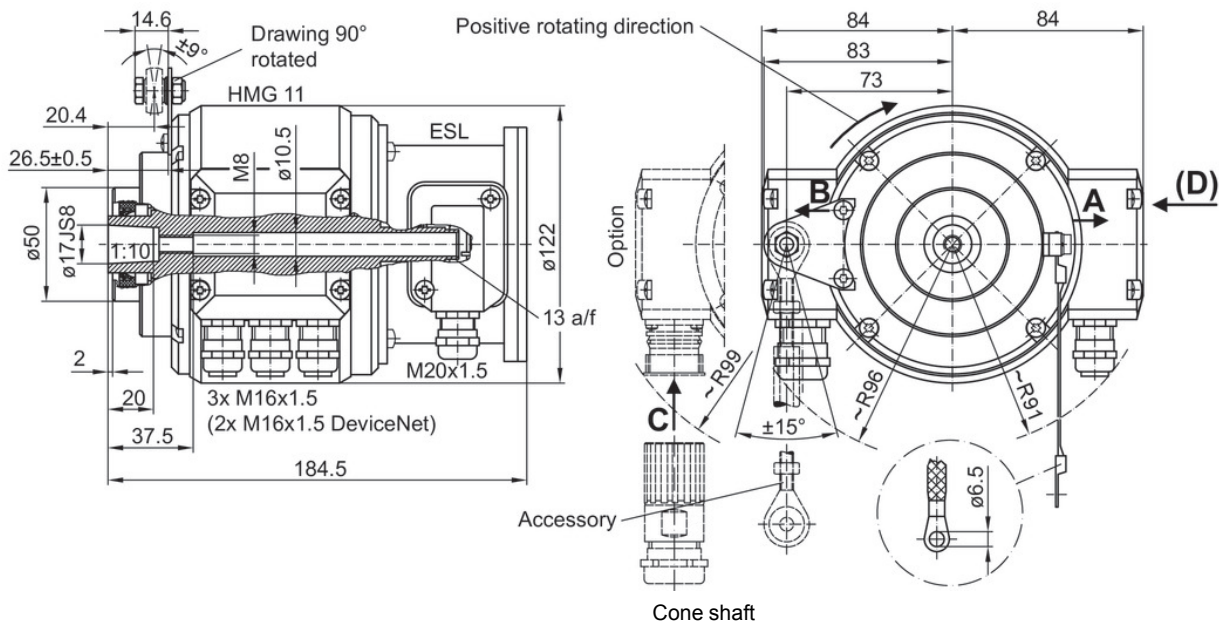
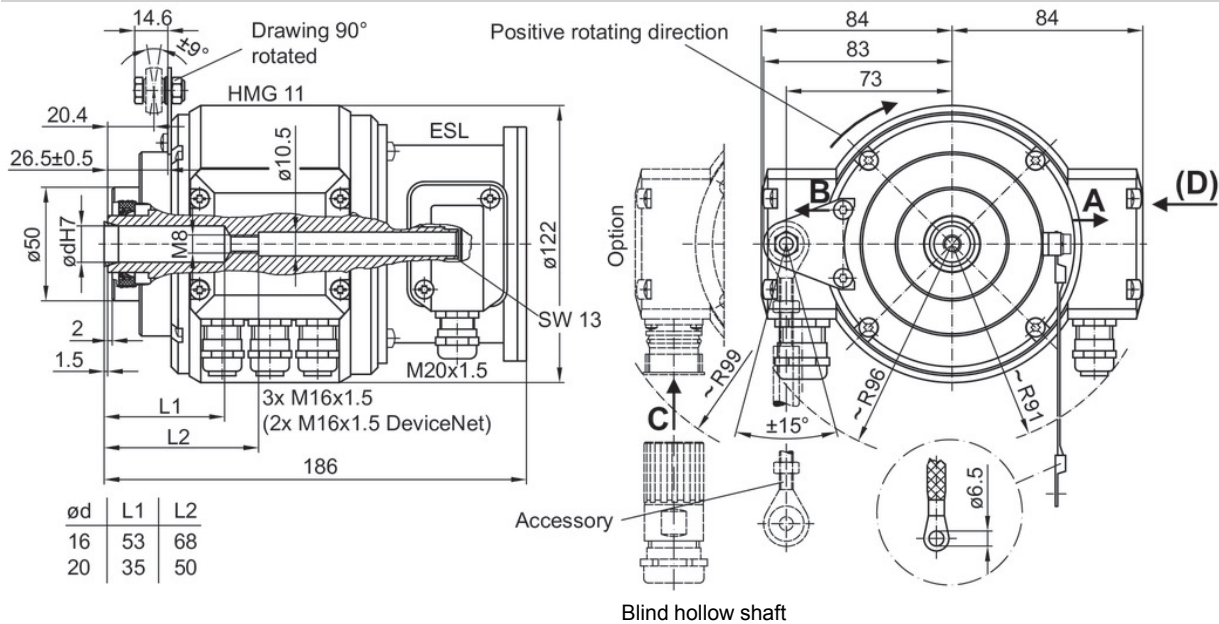
$T =$	1.25...10 μs
$t_1 =$	0.63...5 μs
$t_2 =$	0.4 μs
$t_3 =$	12...30 μs
$n =$	Number of bits
Clock frequency	100...800 kHz

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Dimensions



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Encoder with integrated electronic speed switch

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Ordering reference

	HMG11	#	##	#####	#####	#####	+ESL90	...
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								
Electronic speed switch, 1 output, speed control							+ESL90	
Switching speed (ns)⁽²⁾								
650...6000 rpm								...

(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 dismantling 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)