Combination

Encoder with integrated electronic speed switch
Single and multiturn 13 bit ST / 12 or 16 bit MT
SSI / Profibus / CANopen® / DeviceNet

HMG 11 + ESL 93

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Features

- **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**

Optional

- **Additional incremental output (TTL / HTL)**

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
Interfaces	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 switches)

Voltage supply	12 VDC ±10 %
Consumption w/o load	≤5 mA
Switching accuracy	±4 % (≤1500 rpm) ±2 % (>1500 rpm)
Switching hysteresis	=30 % of switching speed
Switching outputs	3 outputs, speed control
Current each output	40 mA (DC)
Switching delay time	≤40 ms

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)	≤3500 rpm
Range of switching speed (ns)	200...3500 rpm
Operating torque typ.	15 Ncm
Rotor moment of inertia	790 gcm²
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 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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Part number

HMG11									+ ESL93	...		...		...

Switching speed 3 (ns3)
... 200...3500 rpm

Switching speed 2 (ns2)
... 200...3500 rpm

Switching speed 1 (ns1)
... 200...3500 rpm

Connection
Without SSI/incremental
KLK Terminal box, radial (only SSI/incremental)
ST-M23 Flange connector M23, radial (only SSI/incremental)

Shaft diameter
16H7 Blind hollow shaft ø16 mm
20H7 Blind hollow shaft ø20 mm
17K Cone shaft ø17 mm (1:10)

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

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

Interface/interfaces
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

* 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.
Please indicate the exact switching rotation speeds (factory setting).

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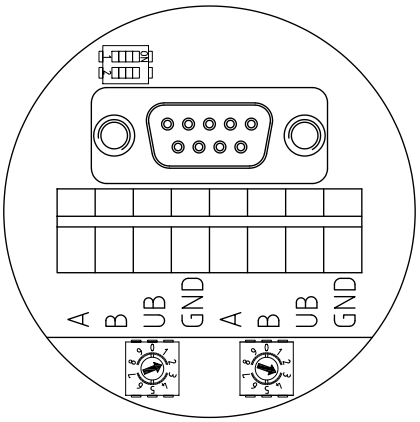
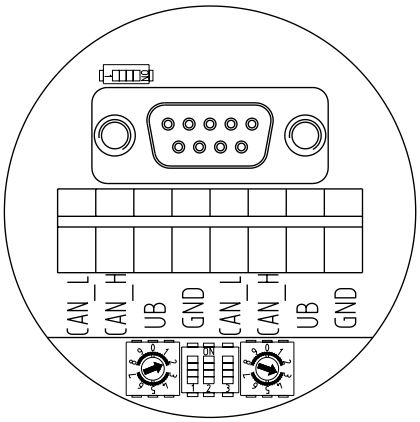
Terminal assignment - Profibus

View A - Connecting terminal in cover



Terminal assignment - CANopen®

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.

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 - Profibus

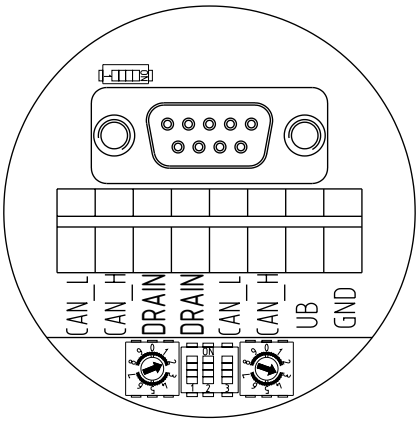
Protocol	Profibus DP V0
Profibus features	Device Class 1 and 2
Data Exch. functions	Input: Position value Output: Preset value
Preset value	The „Preset“ parameter can be used to set the encoder to a predefined value that corresponds to a specific axis position of the system.
Parameter functions	Rotating 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

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

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

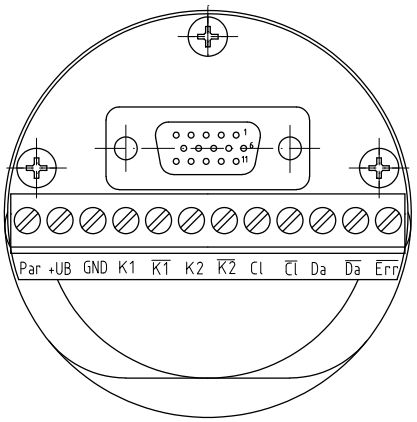
Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections UB-UB and GND-GND is 1 A each.

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

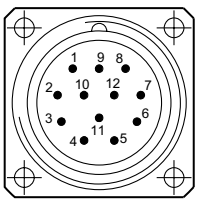
View B - Connecting terminal in cover



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

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

* only for SSI



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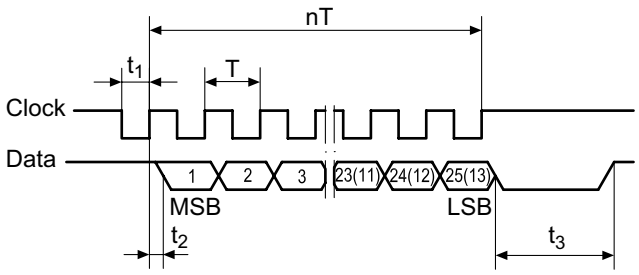
Data transfer



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

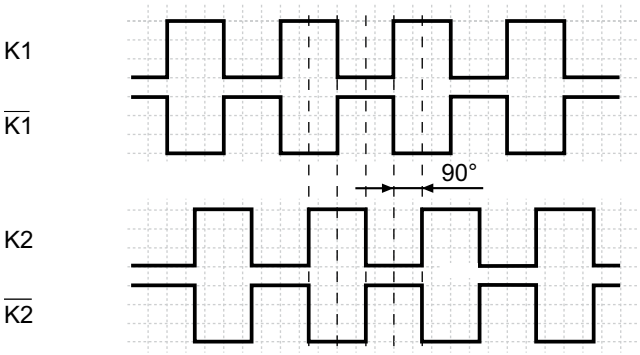
Clock frequency	100...800 kHz

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

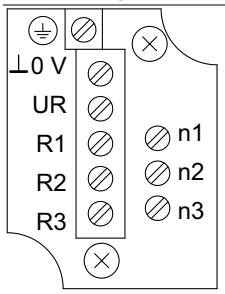
Output signals

Additional incremental signals
at positive rotating direction



Terminal assignment

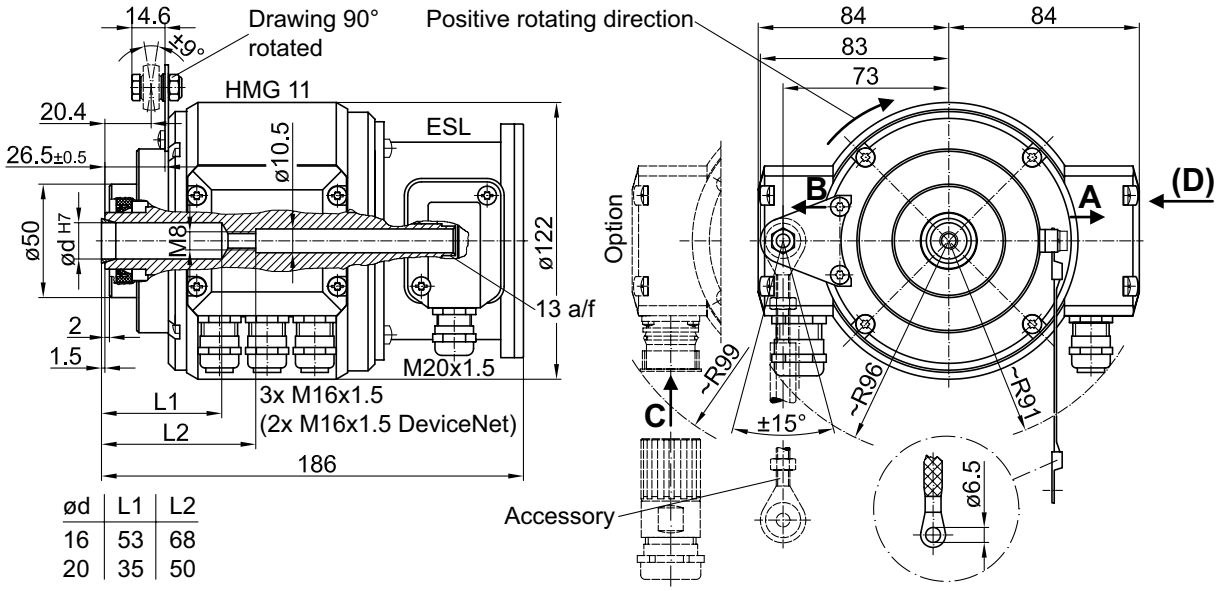
View D
Connecting terminal electronic speed switch ESL 93



3 transistor outputs
For connecting to a relay modul,
for example ES 93 R (accessory)

Dimensions

Blind hollow shaft



ød	L1	L2
16	53	68
20	35	50

Cone shaft