

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



HMG 11 + ESL

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 (per interface SSI) ≤250 mA (per interface 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 turn	8192 / 13 bit
Number of turns	≤65536 / 16 bit
Additional output signals	Square-wave TTL (RS422) Square-wave HTL
Code	Gray (SSI), CW default

Technical data - electrical ratings (speed switches)

Switching accuracy	±4 % (≤1500 rpm) ±2 % (>1500 rpm)
Switching hysteresis	≤30 % of switching speed
Switching delay time	≤40 ms

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Switching outputs	1 output, speed control
Output switching capacity	≤6 A / 250 VAC; ≤1 A / 48 VDC
Minimum switching current	100 mA

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Voltage supply	12 VDC ±10 %
Consumption w/o load	≤5 mA
Switching outputs	3 outputs, speed control
Current each output	40 mA (DC)

Technical data - mechanical design

Size (flange)	ø122 mm
Shaft type	ø16...20 mm (blind hollow shaft) ø17 mm (cone shaft 1:10)
Shaft loading	≤250 N axial ≤400 N radial
Protection DIN EN 60529	IP 67
Speed (n)	≤3500 rpm
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
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
Approvals	CE, RoHS

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Range of switching speed (ns)	650...3500 rpm
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Range of switching speed (ns)	200...3500 rpm
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Part number

HMG11 **+ESL90** **...**

Switching speed (ns)

... 650...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 incremental signals

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 required switching rotation speed (permanent parameter defined at works).

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Part number

HMG11

					+ESL93
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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 incremental signals

Z0 Without

T1024 TTL level, 1024 pulses*

T2048 TTL level, 2048 pulses*

H1024 HTL level, 1024 pulses*

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Absolute share

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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

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Encoder with integrated electronic speed switch

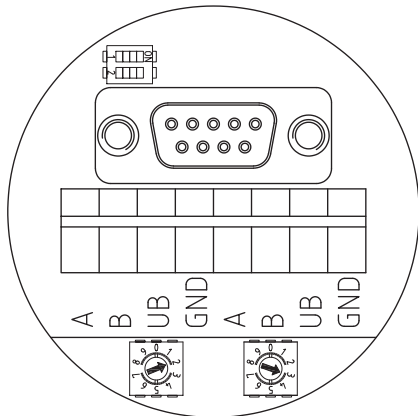
Single and multiturn 13 bit ST / 12 or 16 bit MT

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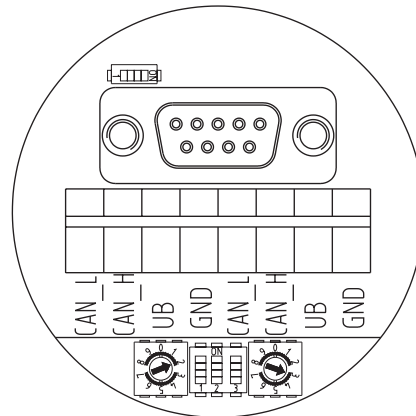
Terminal assignment - Profibus

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

Combination

Encoder with integrated electronic speed switch

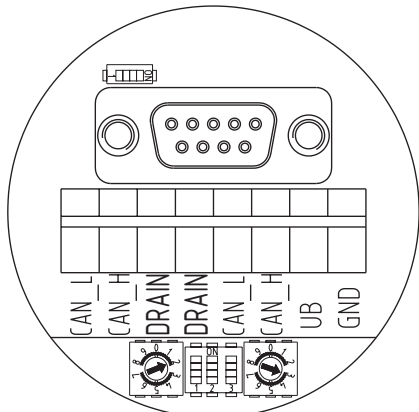
Single and multiturn 13 bit ST / 12 or 16 bit MT

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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

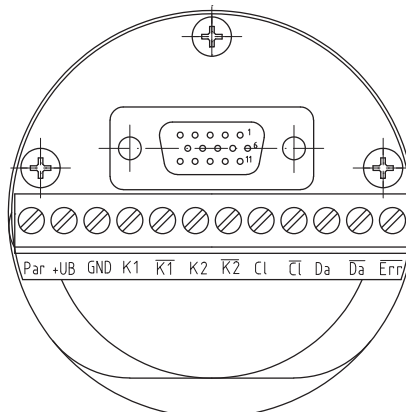
Terminals of the same significance are internally connected and identical in their functions. Max. load on the internal terminal connections UB-UB and GND-GND is 1 A each.

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

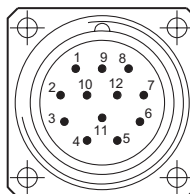


View C - Option

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

Male	Assignment
Pin 1	$\overline{K2}$
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

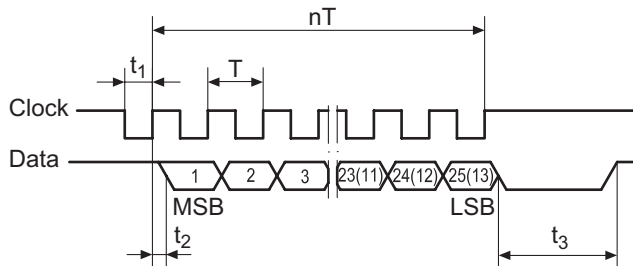


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Data transfer



T	=	1.25 ... 10 μ s
t_1	=	0.63 ... 5 μ s
t_2	\leq	0.4 μ s
t_3	=	12 ... 30 μ s
n	=	Number of bits

Clock frequency 100...800 kHz

Accessories

Diagnostic accessories

HENQ 1100 Analyzer for encoders

Mounting accessories

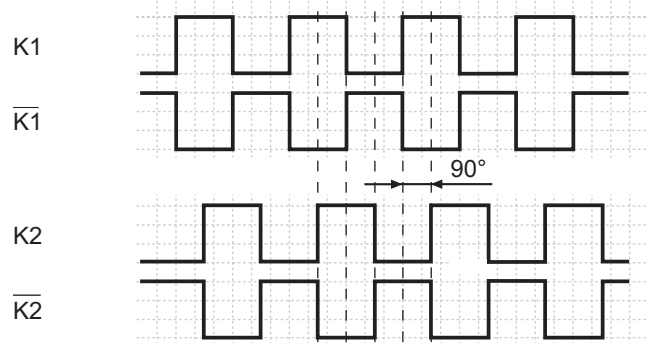
DMS 6 Torque arm size M6

Connectors and cables

HEK 8 Sensor cable for encoders

Output signals

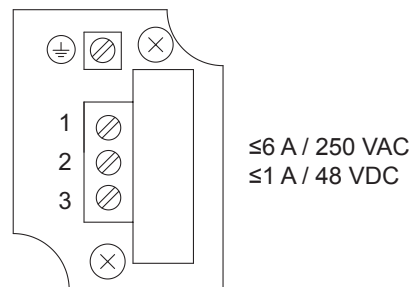
Additional incremental signals at positive rotating direction



Terminal assignment

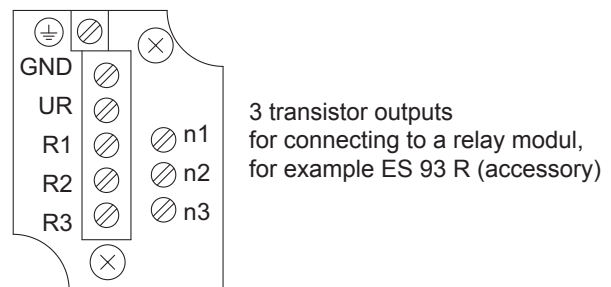
View D

Connecting terminal electronic speed switch ESL 90



View D

Connecting terminal electronic speed switch ESL 93



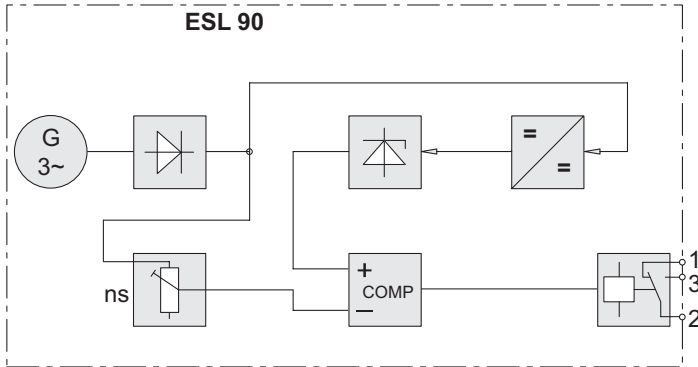
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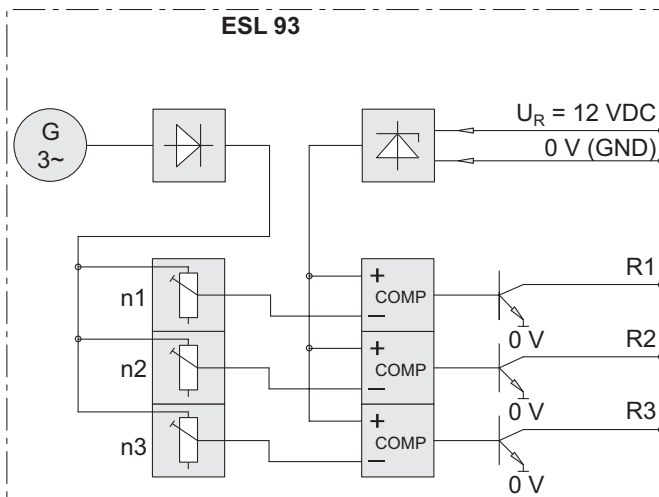
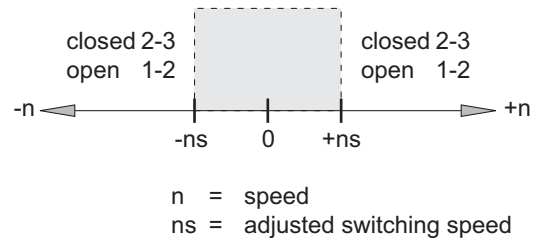
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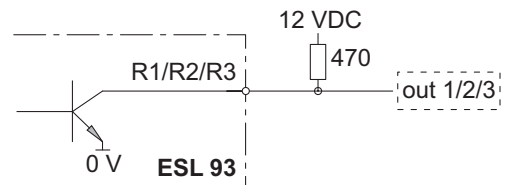
Block circuit diagram



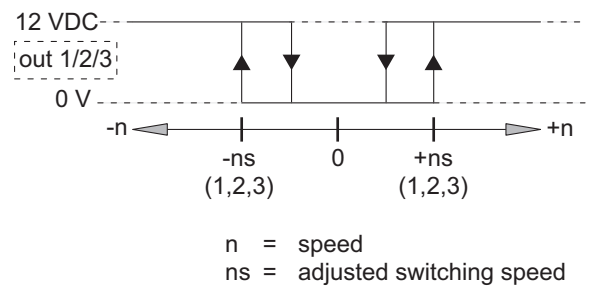
Switching characteristics



Recommended output circuit



Switching characteristics



Combination

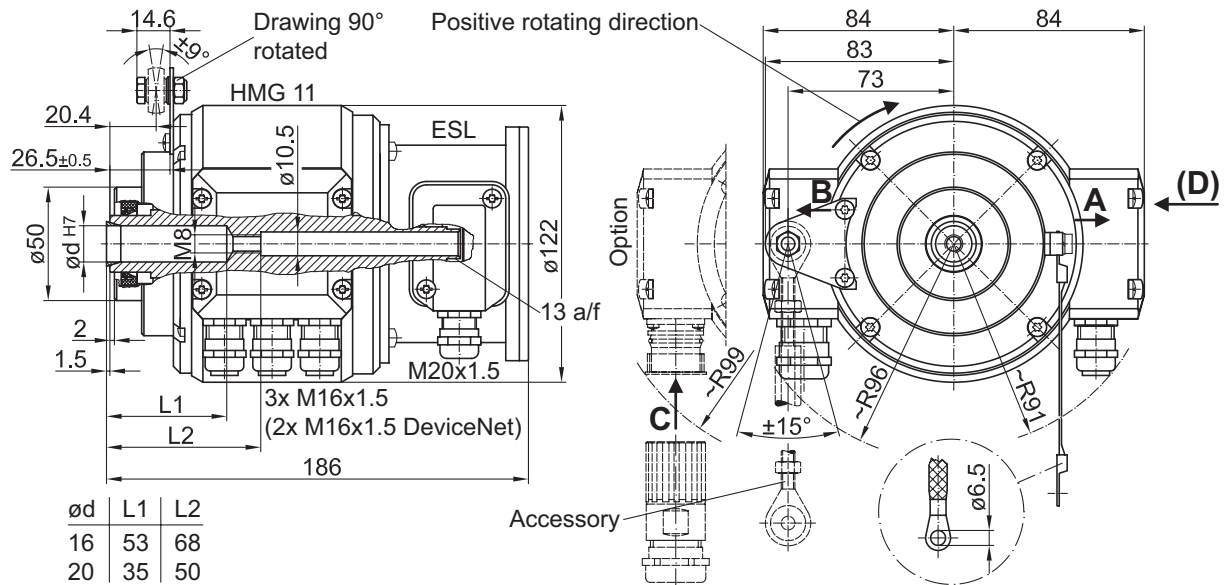
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Dimensions

HMG 11 + ESL - Version with blind hollow shaft



HMG 11 + ESL - Version with cone shaft

