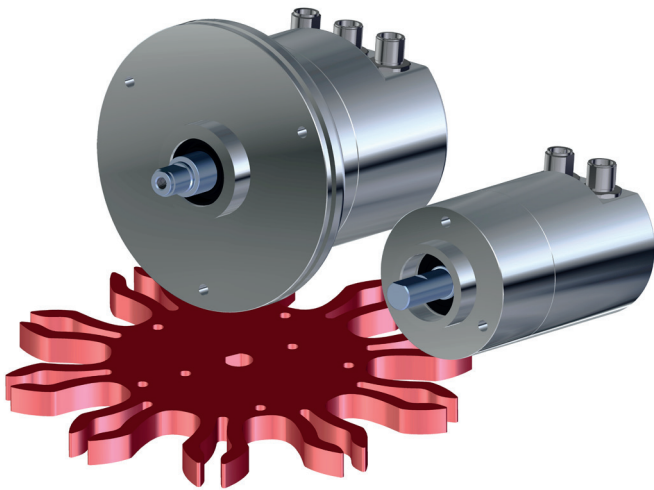


Play-free electronic switching cam encoder
 with electromagnetic absolute encoder / **analogue output**
 Models **NOCA64** und **NOCA120**

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- **Play-free version for use instead of electromechanical switching cam encoders**
- **For use in stationary and mobile machines and systems, particularly for power plants, wind turbines, cranes, etc.**
- **Up to four electronically controlled switching outputs consisting of**
 - **Relay: Changeover contacts**
 - **PhotoMOS: Normally open contacts**
- **Integrated absolute multiturn encoder with analogue interface 0(4) ... 20 mA or 0 ... 10 V**
- **Analogue output and switching outputs are adjustable**
- **High vibration and shock resistance thanks to the robust design**

Contens

Design	1
Description.....	2
Principle circuit diagram	2
Technical data.....	3
Electrical data	3
Mechanical data.....	3
Environmental data.....	3
Order code number	4
Analogue output	5
Teach-in function.....	5
Characteristic curve	6
Parameterisation of the analogue output.....	6
Switching outputs	7
Function	7
Electrical data of relays and PhotoMOS	8
Cam diagram	8
Preset inputs.....	9
Connectors - contact numbering	10
Installation drawings	11
Model NOCA64.....	11
Model NOCA120.....	12
Accessories	14
Play-compensating toothed gear ZRS.....	15
Programming example for analogue output and relays / cams.....	16
Table for factory programming according to customer specifications	17

Design

- Robust housing manufactured from seawater-proof aluminium (AlMgSi1) or stainless steel (material: 1.4305 optionally 1.4404).
- Shaft fitted with ball bearings bears the magnet for recording the angular position and the drive gear of the multiturn transmission for absolute revolution counting.
- Shaft and transmission are located in the prechamber. Sealed off from this, the main chamber contains all electronic components for position recording, evaluation and output.
- Available Versions:
 - **Ø 64 mm (standard)** with clamping collar and M6 threaded holes plus two device connectors. 2 x relay and 2 x PhotoMOS at maximum.
 - **Ø 120 mm (optional)** with clamping collar, M6 threaded holes and synchroniser groove. 4 relays at maximum.
 - **Ø 79 mm (on request)** with short housing length
- Electrical connection for voltage supply, switching outputs and analogue data via M12 connectors or cables. The number of connectors or cables varies (up to a maximum of three) depending on version or customer specifications.

Electronic switching cam encoder model NOCA

Description

General functional principle

This involves a play-free electronic switching cam encoder (abbreviated to: NOCA) with a maximum of four galvanically separated switching outputs (cams), which can be set by the customer and which are activated or deactivated depending on the relevant position of the drive shaft. A parameterisable multiturn absolute encoder with analogue interface plus the switching cam encoder printed circuit board with separate controller are integrated into the compact housing. The analogue signal and switching outputs can be parameterised separately using multifunction pins (MFP and PRE) in the connector.

Rotary encoder

The rotary encoder has an analogue interface. The D/A converter has a resolution of 12 bits (16 bits optional), which are distributed over the maximum measuring range of 4096 revolutions. The output signal can be parameterised and referenced via teach-in by means of two multifunction pins (MFP). The signal path (CW/CCW) can be set.

The characteristic output signal curve has an underflow and overflow range which is half that of the measuring range limit.

16 or 256 revolutions are possible as the maximum measuring range on request.

Switching outputs (cams)

The switching outputs are implemented using relays or PhotoMOS semiconductor component elements with a long service life.

All switching outputs (a maximum of 4) can be used to control potential-free, galvanically separated switching processes.

Each of the cam relays has a changeover contact which is routed out via an M12 connector. The PhotoMOS modules are normally open contacts (NO). Different connector assignments are possible on request by the customer.

The switching information for the cams is taken from the rotary encoder. In comparison with an electromechanical switching cam encoder, switching output activation and deactivation is carried out electronically without play or wear.

Certain of the individual switching outputs' switching flanks (one per contact) can be set precisely via teach-in by means of two multifunction/preset inputs (MFP/PRE) - with reference to the shaft position. This enables the definition of a limit switch. The cam length can be set in the factory.

The 120 mm special version offers a separate preset input for each of the four switching contacts.

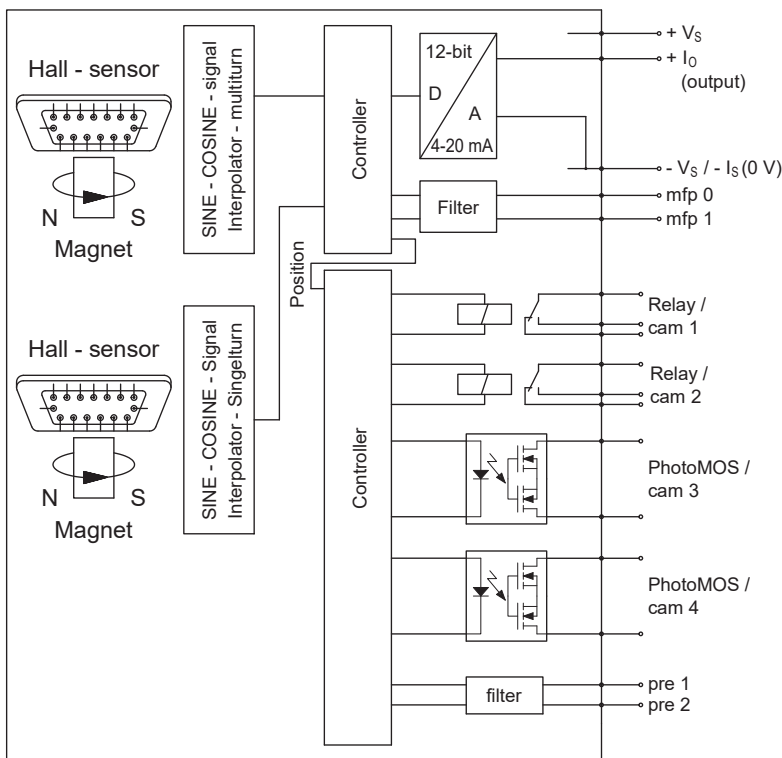
The preset function of the rotary encoder's analogue signal (centre of the measuring range) is superordinate and, on activation, shifts all of the switching flanks en bloc by the same angle difference as the analogue signal. When the measuring range concerning the analogue output is modified the cams will still switch at the same shaft position.

Within the measuring range, one on and off process is possible per switching output. Customer-specific switching procedures are also possible ex-works.

If operating voltage is missing, the cams do not switch.

Principle circuit diagram

standard version



At the special design NOCA120 the cams 3 and 4 are as well equipped with relays which include separate preset inputs. See page 10.

Electronic switching cam encoder model NOCA
Technical data
Electrical data

■ Sensor system:	ASIC with HALL elements
■ Operating voltage range:	18 VDC to 28 VDC
■ Power consumption:	< 2.5 W
■ Resolution:	4096 steps / 360° (12-bit)
■ Measuring range:	4096 revolutions (option 16 or 256 revs.)
■ D / A converter:	12-bit (option 16-bit)
■ Output signal:	0 (4) ... 20 mA or 0 ... 10 VDC
■ Absolute accuracy:	± 0.25% / 360°
■ Repeatability:	± 0.1% / 360°
■ Signal path:	CW or CCW (parameterisable)
■ Temperature drift:	± 30 ppm / K typ.
■ EMC standards:	
Interference emission:	EN 61000-6-4
Interference immunity:	EN 61000-6-2
■ Electrical connection:	max. 3 x connector M12 - NOCA 64 max. 3 x connector M12 - NOCA 120 Option: cable

Mechanical data

■ Shaft diameter:	12 mm with flattened area on one side, 11 mm
■ Operating speed:	1000 rpm max.
■ Angular acceleration:	10 ⁵ rad/s ² max.
■ Moment of inertia (rotor):	20 gcm ²
■ Operating torque:	≤ 8 Ncm (at speed 500 rpm)
■ Starting torque:	≤ 4 Ncm
■ Perm. shaft load:	250 N axial 250 N radial
■ Bearing service life:	≥ 10 ⁹ revolutions
■ Weight:	Approx. 0.8 kg (64 mm) Approx. 1.4 kg (120 mm)

Environmental data

■ Operating temperature range:	- 40 °C to + 85 °C
■ Storage temperature range:	- 45 °C to + 85 °C
■ Resistance:	
□ To shock: (DIN EN 60068-2-27)	250 m/s ² , 6 ms, 100 x each in 3 axes
□ To vibration: (DIN EN 60068-2-6) (Higher values optional)	100 m/s ² , 5 Hz ... 2000 Hz, 1 h each in 3 axes
■ Protection type:	IP67 (DIN EN 60529)

Electronic switching cam encoder model NOCA

Order code number

NOCA	64	- K	A	4	- 5760	W	S	B	01	→ Standard version
Electrical and mechanical variants *										
01 Standard										
Absolute encoder interface:										
A 0 ... 20 mA										
B 4 ... 20 mA										
C 0 ... 10 V										
Electrical connections:										
S Device connector M12										
K Cable connection										
Signal path:										
W CW										
C CCW										
Measuring range - ex-works:										
5760° 16 revolutions (arbitrary values up to 1.474.560° = 4096 rev. possible)										
Number of switching outputs:										
2 2 switching outputs, 4 at maximum										
Housing material:										
A Aluminium										
S Stainless steel 1.4305										
V Stainless steel 1.4404										
Flange:										
K Clamped flange (NOCA 64)										
M Assembly flange (NOCA 120)										
Design form:										
64 ø 64 mm										
120 ø 120 mm										
(Other flange designs on request, i.e. ø 58 mm)										
NOCA Electronic switching cam encoder with analogue interface										

* The basic versions according to the data sheet bear the number 01. Deviations are identified with a variant number and are documented in the factory.

Mating connector

(EMC-resistant, metal version, straight)

- M12, 4-pin, female: **STK4GS60**
- M12, 5-pin, female: **STK5GS56**
- M12, 8-pin, female: **STK8GS54**
- M12, 12-pin, female: **STK12GS93**
- M12, 4-pin, male: **STK4GP50** (plastic version)
- M12, 5-pin, male: **STK5GP90**
- M12, 8-pin, male: **STK8GP99**
- M12, 12-pin, male: **STK12GP108**

Note: For connector M12, 12-pin, the recommended maximum voltage at the pins is 30 V. At higher voltages, we recommend M12 connectors with fewer pins.

Electronic switching cam encoder model NOCA

Analogue output

Teach-in function

To precisely register and output the angle or the position of the shaft, the contactless electromagnetic sensor system is equipped with a 12-bit D/A converter, with the result that the measurement variable is available as an analogue signal from 0 (4) to 20 mA or 0 to 10 V. On request 16 bits are possible.

This model is set to a measuring range of 5760° (16 revolutions) in the factory. A maximum measuring range of 4096 can be ordered.

The measuring range and other parameters can be adapted to the application using the teach-in function without further aids.

The standard output characteristic curve has a symmetrically divided underflow and overflow range up to the maximum measuring range. See characteristic curve on page 6.

The information on the shaft's precise angular position - internal digital - is additionally used to control the four switching outputs (cams).

The preset function of the rotary encoder's analogue signal (e.g. centre of the measuring range) is superordinate and, on activation, shifts all of the switching flanks en bloc by the same angle difference as the analogue signal.

However, the cams' switching flanks can be set separately beforehand with reference to the analogue signal.

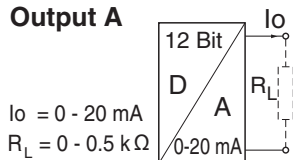
If necessary, the analogue output signal is set first.

Electrical output data

■ Current output	A:	0 to 20 mA
	B:	4 to 20 mA
	Accuracy:	± 50 µA
	Load resistance (burden):	0 ... 500 Ω
■ Voltage output	C:	0 to 10 VDC
	Accuracy:	At 0 V + 100 mV
		At 10 V ± 25 mV
	Output current:	Max. 5 mA (short-circuit-proof)
		Corresp. to load resistance ≥ 2 kΩ

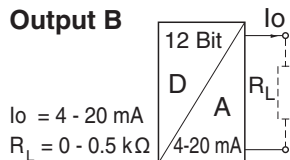
Output circuits

Output A



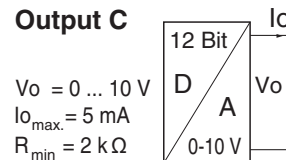
$I_o = 0 - 20 \text{ mA}$
 $R_L = 0 - 0.5 \text{ k}\Omega$

Output B



$I_o = 4 - 20 \text{ mA}$
 $R_L = 0 - 0.5 \text{ k}\Omega$

Output C



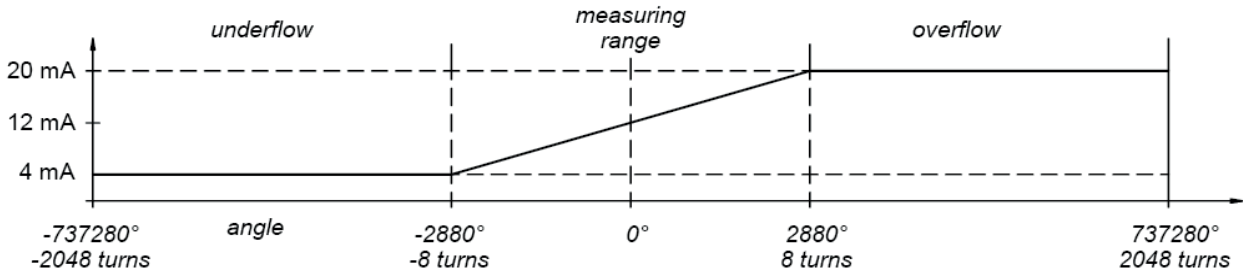
$V_o = 0 \dots 10 \text{ V}$
 $I_{o_{\text{max}}} = 5 \text{ mA}$
 $R_{\text{min}} = 2 \text{ k}\Omega$

Electronic switching cam encoder model NOCA

Analogue output

Characteristic curve

Basic setting 16 revolutions = 5760° with under- and overflow up to +/- 2048 revolutions.



Other characteristic curve versions on request, e.g. multiple characteristic curve repetition in the measuring range.

Parameterisation of the analogue output

The parameters for the **measuring range** or **zero point** and **end value** plus **signal path** and **preset value** can be set by the user according to the circumstances at the application location. Two multifunctional inputs MFP 0 and MFP 1 are provided in connector S2 for this purpose. The input circuit for the multifunctional inputs is E1 (see below). Basic setting is carried out in the factory with the default values for a measuring range of 5760° (16 revs.) with a signal path of CW, i.e. the output signal increases on rotating the

shaft clockwise when looking at the free end of the shaft. The preset value is set to the middle of the measuring range. Other values can be implemented in the factory. These default values can be reactivated at any time using the multifunctional inputs. Caution: The switching positions of the cams remain unaltered - in relation to the shaft position - when measuring range of analogue output is modified by multifunctional pins. Only 'Set preset value' of analogue output will cause that the cam positions will change as well.

Table for multifunctional inputs (MFP for analogue signal)			
Function	MFP 0	MFP 1	Remark
Set zero point	1	0	Set pin MFP 0 to logical one for the duration of ~2 s.
Set end value	0	1	Set pin MFP 1 to logical one for the duration of ~2 s.
Set default value	1	1	Simultaneously set pins MFP 0 and MFP 1 to logical one for the duration of ~2 s. The default setting is restored.
Changing the signal path CW / CCW	1	0	Attention: with the same shaft position! Set pin MFP 0 to logical one for the duration of ~2 s.
	0	1	After a pause of at least 0.5 s: Set pin MFP 1 to logical one for the duration of ~2 s.
Set preset value (middle of measuring range)	1	0	Attention: with the same shaft position! Set pin MFP 0 to logical one for the duration of ~2 s.
	1	0	After a pause of at least 0.5 s: Set pin MFP 0 to logical one for the duration of ~2 s.
Normal operation	0	0	

Same shaft position: Turn shaft less than 2.5°
 Timing diagrams: see page 7.
 Logical 0 and logical 1: see input circuit E1 on page 7.

The measuring range (slope of the 4 ... 20 mA (0 ... 10 V) ramp) is only adapted (changed) on using the function 'Set end value'. The function 'Set zero point' shifts the measuring range to the desired mechanical starting position without changing it. If the measuring range is to be changed, the zero point must be set first and then the end value.

Recommended procedure:

1. Set signal path (if necessary).

2. Move to mechanical starting point and activate function 'Set zero point'.

3. Move to mechanical end point and activate function 'Set end value' (the measuring range is only adapted to the application now).

4. Referencing (preset, if necessary) either via the function 'Set zero point' (referencing to start of measuring range, e.g. 4 mA) or via the function 'Set preset value' (referencing to middle of measuring range).

Electronic switching cam encoder model NOCA

Analogue output

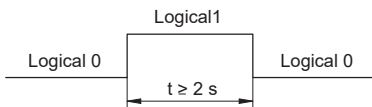
How do the cams react on the analogue teach function?

Only when using the 'preset function' at the analogue parameterization the switching positions of the cams will follow. When the analogue measuring range is modified the switching positions of the cams will not follow. They have to be set new to match them to the new slope of the analogue signal. The following way of parameterization is recommended: 1. Set behavior of analogue signal. 2. Set switching positions of cams. 3. Do 'analogue preset' to set analogue signal and switching positions of all cams to the desired shaft position. Or: Step 1, then 'analogue preset' (analogue signal is setted), at last set cams.

Timing diagrams for the MFP settings

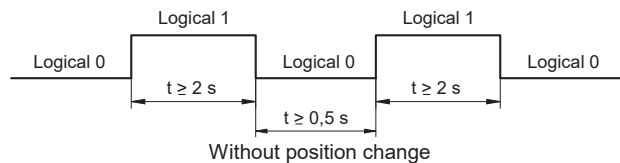
1. Set MFP 0 or MFP 1 once

Set zero point (MFP 0)
Set end value (MFP 1)



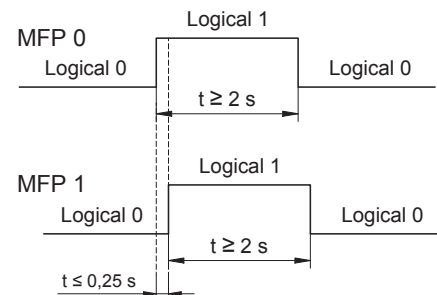
2. Set MFP 0 and/or MFP 1 twice with the same shaft position

Set preset value (2 x MFP 0)
Change the signal path (MFP 0 - MFP 1)

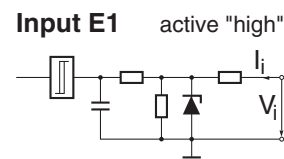


3. Set MFP 0 and MFP 1 simultaneously

Time difference between MFP 0 and MFP 1 ≤ 0.25 s.



Input circuit for multifunctional inputs (MFP): E1



Log 0 < 5 V or not connected
Log 1 = 11 ... Vs
E1 specification

Switching outputs

Function

The switching outputs can be set independently of the analogue output signal. The basis of the switching positions is the original and digital position signal which displays the whole measuring range.

The function of each of the switching outputs (cams) is implemented using a relay or a PhotoMOS component element. The relays have changeover contacts. The PhotoMOS modules are semiconductors with a normally open contact function. All contacts are routed out via the NOCA connector(s). All contacts are galvanically separated in terms of operating voltage and the analogue output signal.

The information regarding when which relay is to pick up and drop off again is made available to the relay control system by the internal controller. It receives the shaft position data from the NOCA's absolute encoder.

The switching flanks of all switching outputs are set to the same angle setting with regard to the shaft. See cam diagram on page 8 for the version with four relays. The measuring angle is represented in ° and in revolutions with regard to an arbitrary shaft reference point.

The switching length L ex-works is 4320° = 12 revolutions. The cams may also be pre-programmed according to the customer's specifications in the factory.

The precise location of the switching flanks, i.e. calibration of the cams, can be carried out on-site using the preset function by the customer. The two preset pins PRE 1 and PRE 2 are intended for this. These are used in accordance with the table on page 8.

Each cam has an ascending and a descending flank. In normal operation within the working range - no switching contact has tripped - all relays/PhotoMOS are picked up and the normally open (NO) contacts are closed. If the switching limits are reached, the relays drop off, and the normally open contacts open and interrupt the circuit → limit switch function.

In devices with four switching outputs, the following flanks respond to the preset function: **S1 and S3**: descending flank in **CCW** direction. **S2 and S4**: descending flank in **CW** direction. See cam diagram.

To avoid undesired switching back and forth (flutter) on the part of the relays when the shaft is stationary or as a result of slight shaft vibrations on the switching flank, a switching hysteresis of 10 digits (approx. 1°) is pre-programmed.

Electronic switching cam encoder model NOCA

Switching outputs

Switching output relay electrical data

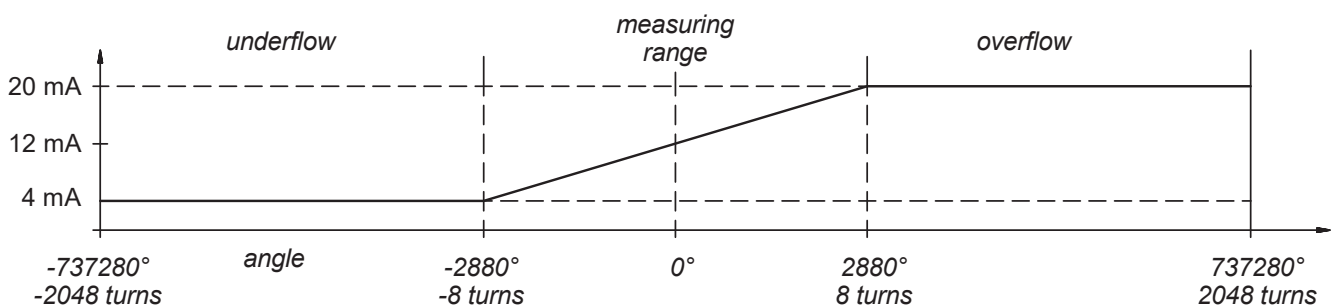
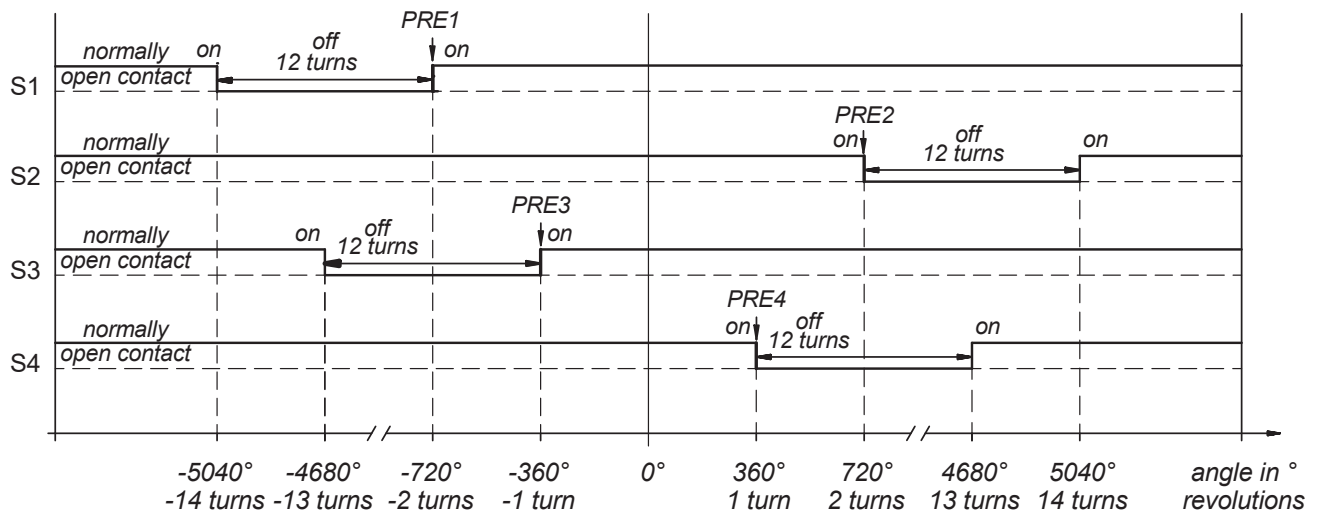
- Maximum switching current: 1.0 A at 30 VDC/VAC, 0.5 A at 60 VDC/VAC
- Maximum switching voltage: 60 VDC / VAC Note: The effective maximum voltage is dependent on the connector into which the switching contacts are integrated:
M12, 12-pin: max. 30 VDC, M12, 8-pin: max. 60 VDC.
- Response time: 3 ms (ON and OFF)
- Resistance ON: < 0.5 Ohms
- Relay service life: > 5 x 10⁵ operations
- Switching hysteresis: 10 digits (~1°)

PhotoMOS output electrical data

- Maximum load current: 0.5 A (continuous) / 1.5 A (peak)
- Maximum load voltage: 60 VDC / VAC Note: The effective maximum voltage is dependent on the connector into which the switching contacts are integrated:
M12, 12-pin: max. 30 VDC, M12, 8-pin: max. 60 VDC.
- Maximum power dissipation: 300 mW
- On resistance: 0.83 Ω typ.
- Maximum OFF state leakage current: 1 µA
- Turn ON / OFF time (90 % of final value): ON: 0.65 ms typ. / 2 ms max.
OFF: 0.04 ms typ. / 0.2 ms max.
- I/O capacitance: 1.5 pF max.
- Switching hysteresis: 10 digits (~1°)

Cam diagram

Standard factory setting in comparison with the switching cam encoder's analogue output signal with 4096 revolutions and output B (4 ... 20 mA). A different setting is possible in the factory.



Electronic switching cam encoder model NOCA

Switching outputs

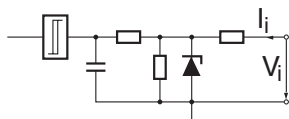
Preset inputs for switching contacts S1 to S4

Table for preset inputs (PRE) for NOCA 64			
Reaction of S1 and S3: descending flank in CCW direction, of S2 and S4: descending flank in CW direction			
Function	PRE 1	PRE 2	Remark
Set switching output 1 preset	1	1	Set PRE 1 to logical one and hold to release PRE 2. Set PRE 2 to logical one once for a duration of 0.5 to max. 5 s *. Then set PRE 1 and PRE 2 to logical 0 **
Set switching output 2 preset	1	1 1	Set PRE 1 to logical one and hold to release PRE 2. Set PRE 2 to logical one twice for a duration of 0.5 to max. 5 s. Pause of at least 0.5 s in between. Then set PRE 1 and PRE 2 to logical 0 **
Set switching output 3 preset	1	1 1 1	Set PRE 1 to logical one and hold to release PRE 2. Set PRE 2 to logical one three times for a duration of 0.5 to max. 5 s. Pause of at least 0.5 s in between. Then set PRE 1 and PRE 2 to logical 0 **
Set switching output 4 preset	1	1 1 1 1	Set PRE 1 to logical one and hold to release PRE 2. Set PRE 2 to logical one four times for a duration of 0.5 to max. 5 s. Pause of at least 0.5 s in between. Then set PRE 1 and PRE 2 to logical 0 **
Set default value (factory setting)	1	1	Simultaneously (within 0.5 s) set PRE 1 and PRE 2 to logical one for a duration of more than 5 s .
Normal operation	0	0	

*: If the holding time of 5 s is exceeded for PRE 2, the default setting is activated (see function further below in the table)
 **: As soon as PRE 1 and PRE 2 are set to logical 0, the preset process is executed. With logical 0 of PRE 2 the shaft position exactly in this moment will be taken for the related cam as new switching position (important if the shaft is turning slowly)
 Timing diagrams: see page 9. Logical 0 and logical 1: see input circuit E1 on page 9.

Input circuit for preset inputs (PRE): E1

Input E1 active "high"

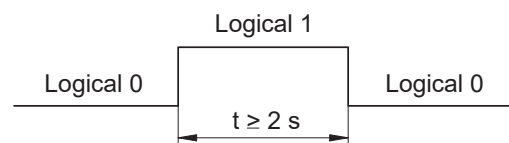
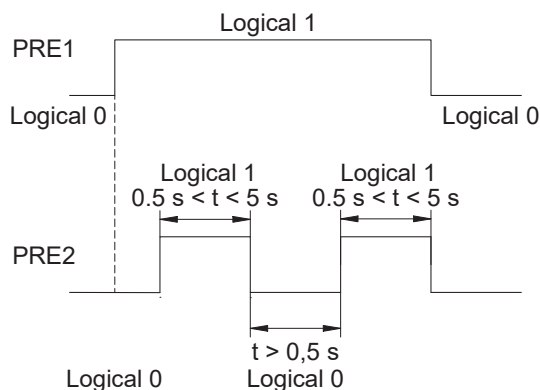


Log 0 < 5 V or not connected
 Log 1 = 11 ... Vs
 E1 specification

Timing diagram for PRE settings

Handling of PRE 1 and PRE 2 in combination (Table above)
 Example: Preset of switching output 2.

Handling of PRE 1 to PRE 4 (Table on [page 10](#))



Electronic switching cam encoder model NOCA

Switching outputs

Table for preset inputs (PRE) for NOCA 120

Function	PRE 1	PRE 2	PRE 3	PRE 4	Remark
Set switching output 1 preset	1				Set pin PRE 1 to logical 1 for the duration of >4 s
Set switching output 2 preset		1			Set pin PRE 2 to logical 1 for the duration of >4 s
Set switching output 3 preset			1		Set pin PRE 3 to logical 1 for the duration of >4 s
Set switching output 4 preset				1	Set pin PRE 4 to logical 1 for the duration of >4 s
Normal operation					All PREs open or set to $-V_s$

Field empty: logical 0

Logical 0 and logical 1: see input circuit E1 on page 9.

The default values can't be restored.

Connectors - contact numbering

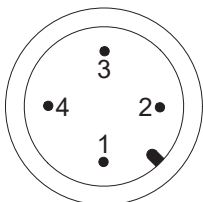
Contact arrangement and numbering

Viewed looking at the PIN side of the connector installed in the NOCA.

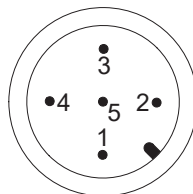
Different M12 connector combinations or assignments are possible at the request of the customer.

Please observe connection assignment TY enclosed with each device.

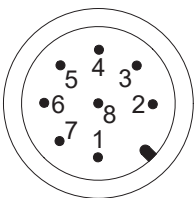
Connector, 4 pin



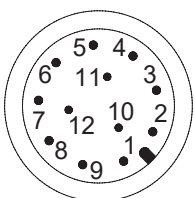
Connector, 5 pin



Connector, 8 pin



Connector, 12 pin



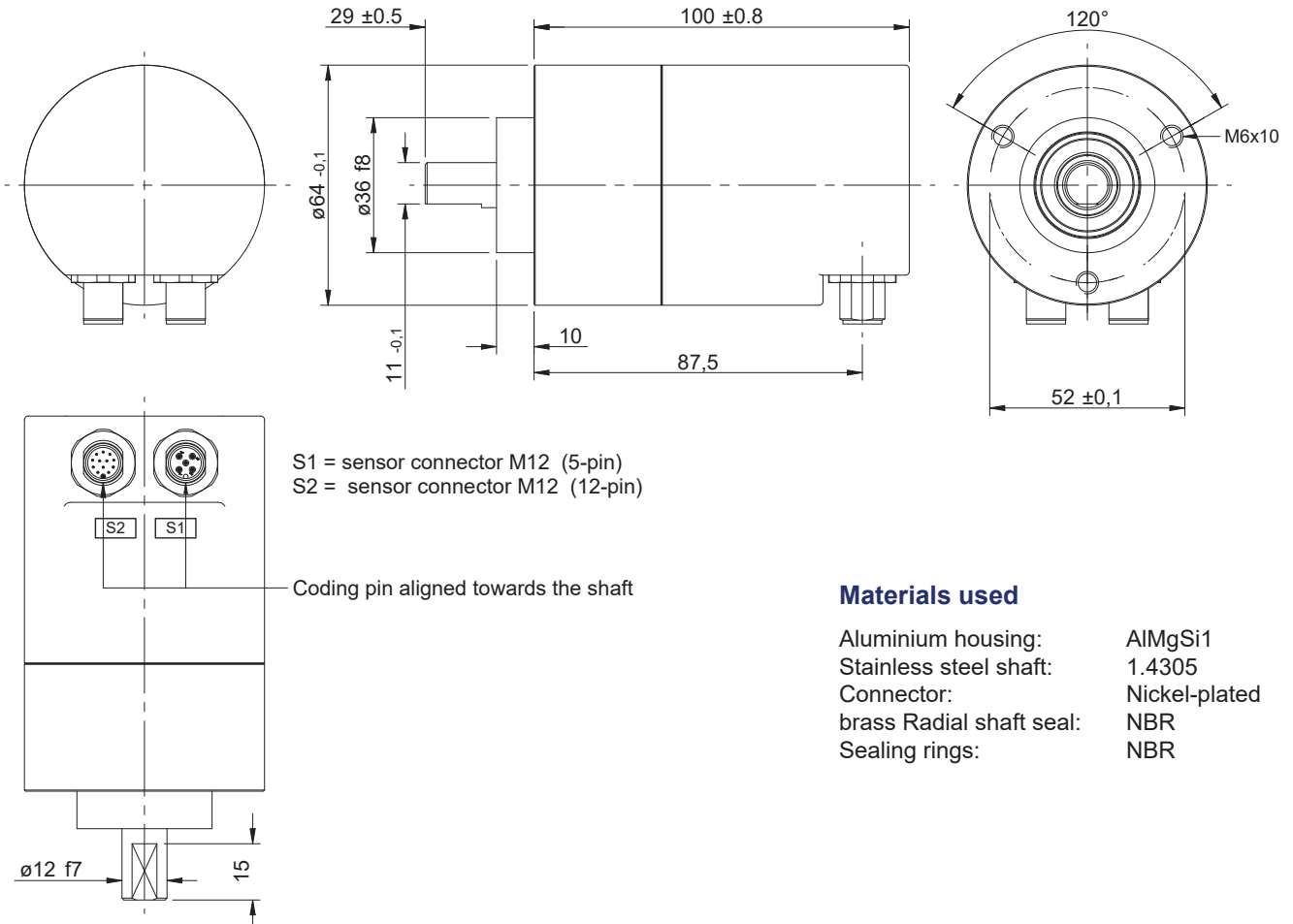
With M12, 12-pin, the recommended maximum voltage at the individual pins is 30 V.

Electronic switching cam encoder model NOCA

Installation drawings

Model NOCA64 with standard shaft

Dimensions in mm



Materials used

Aluminium housing:	AlMgSi1
Stainless steel shaft:	1.4305
Connector:	Nickel-plated
brass Radial shaft seal:	NBR
Sealing rings:	NBR

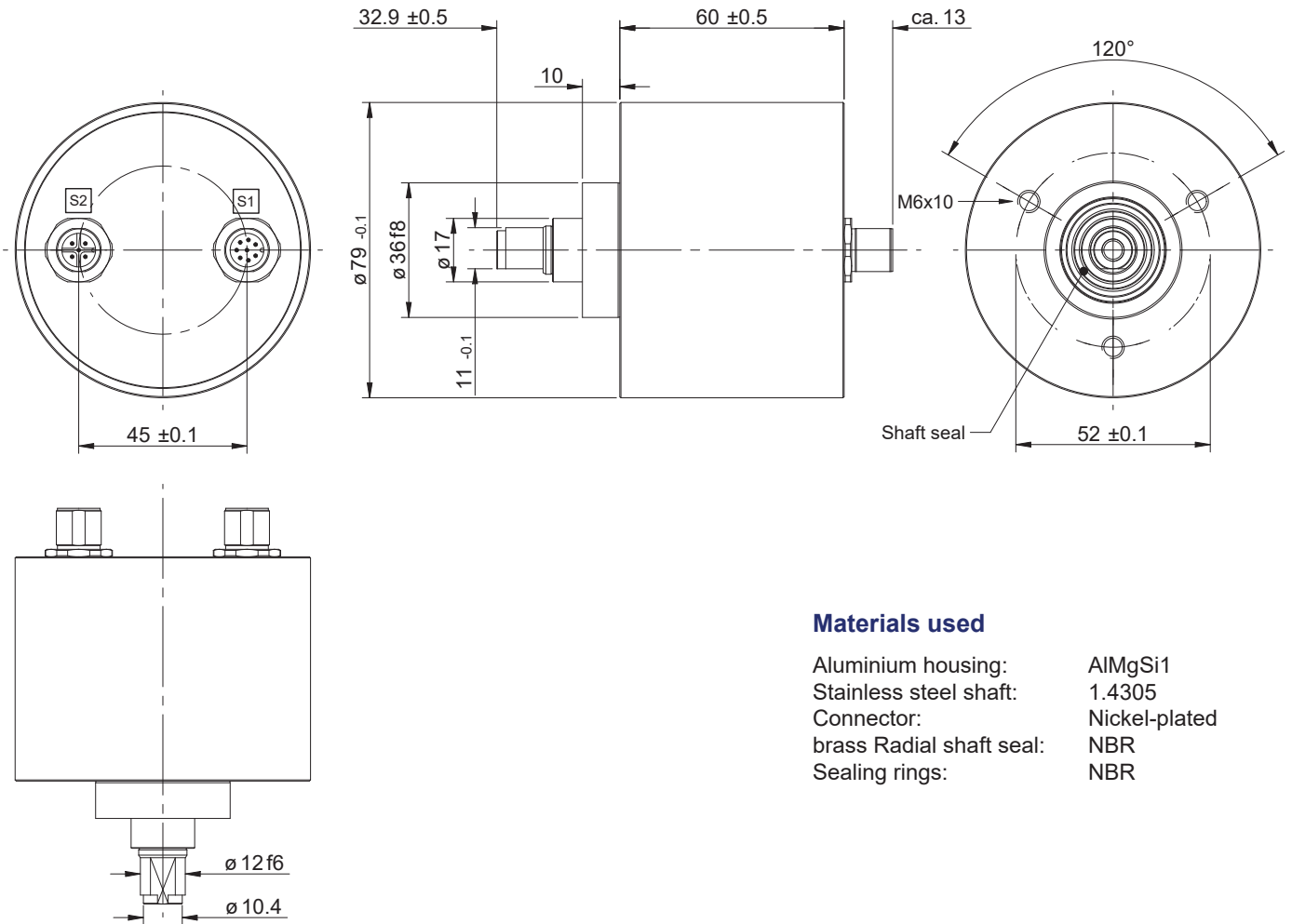
Electronic switching cam encoder model NOCA

Installation drawings

Special version NOCA79 on request

Model NOCA79-KZ (2 connectors axial)

Dimensions in mm



Materials used

Aluminium housing:	AlMgSi1
Stainless steel shaft:	1.4305
Connector:	Nickel-plated
brass Radial shaft seal:	NBR
Sealing rings:	NBR

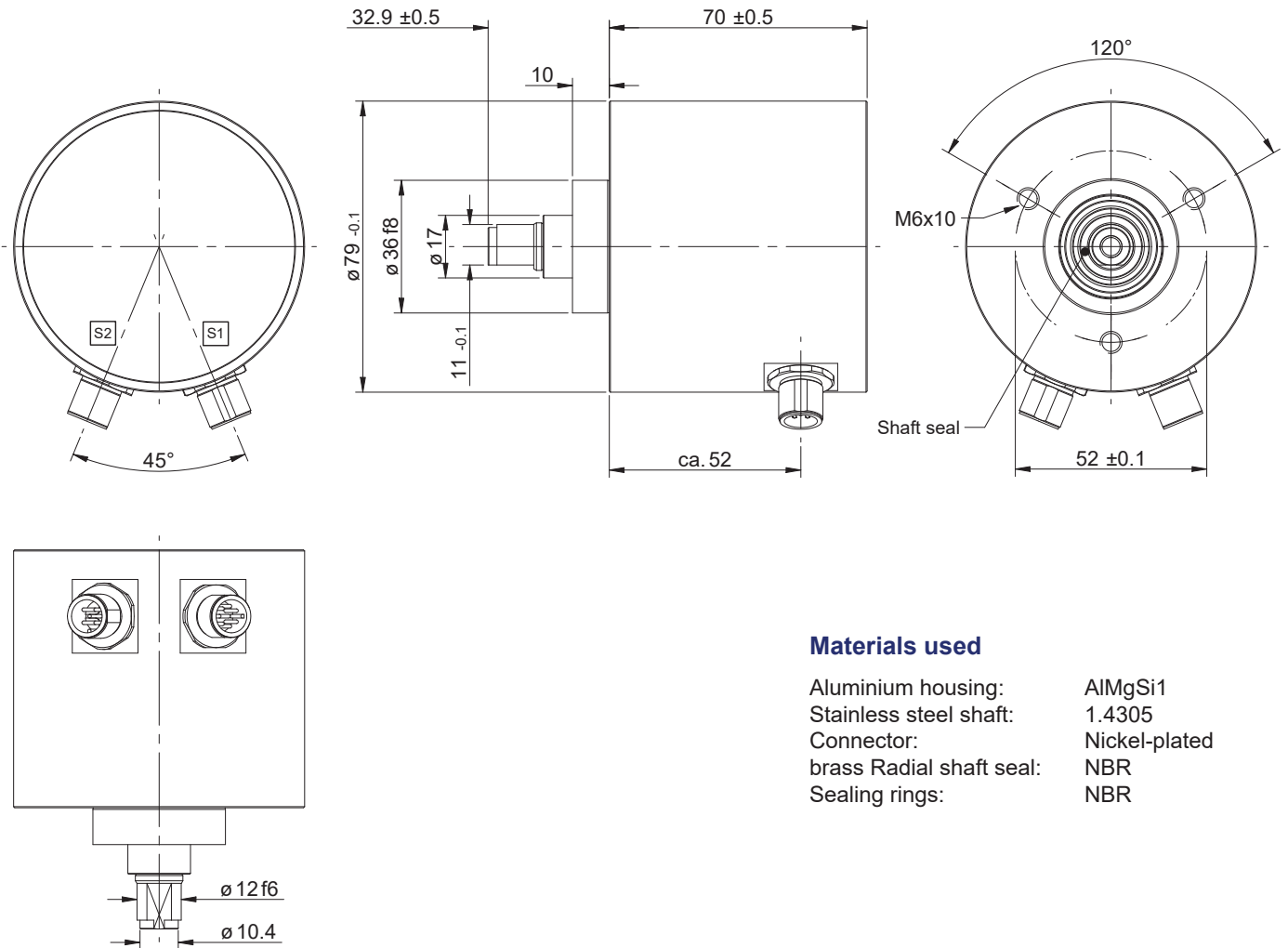
Electronic switching cam encoder model NOCA

Installation drawings

Special version NOCA79 on request

Model NOCA79-KZ (2 connectors radial)

Dimensions in mm



Materials used

Aluminium housing:	AlMgSi1
Stainless steel shaft:	1.4305
Connector:	Nickel-plated
brass Radial shaft seal:	NBR
Sealing rings:	NBR

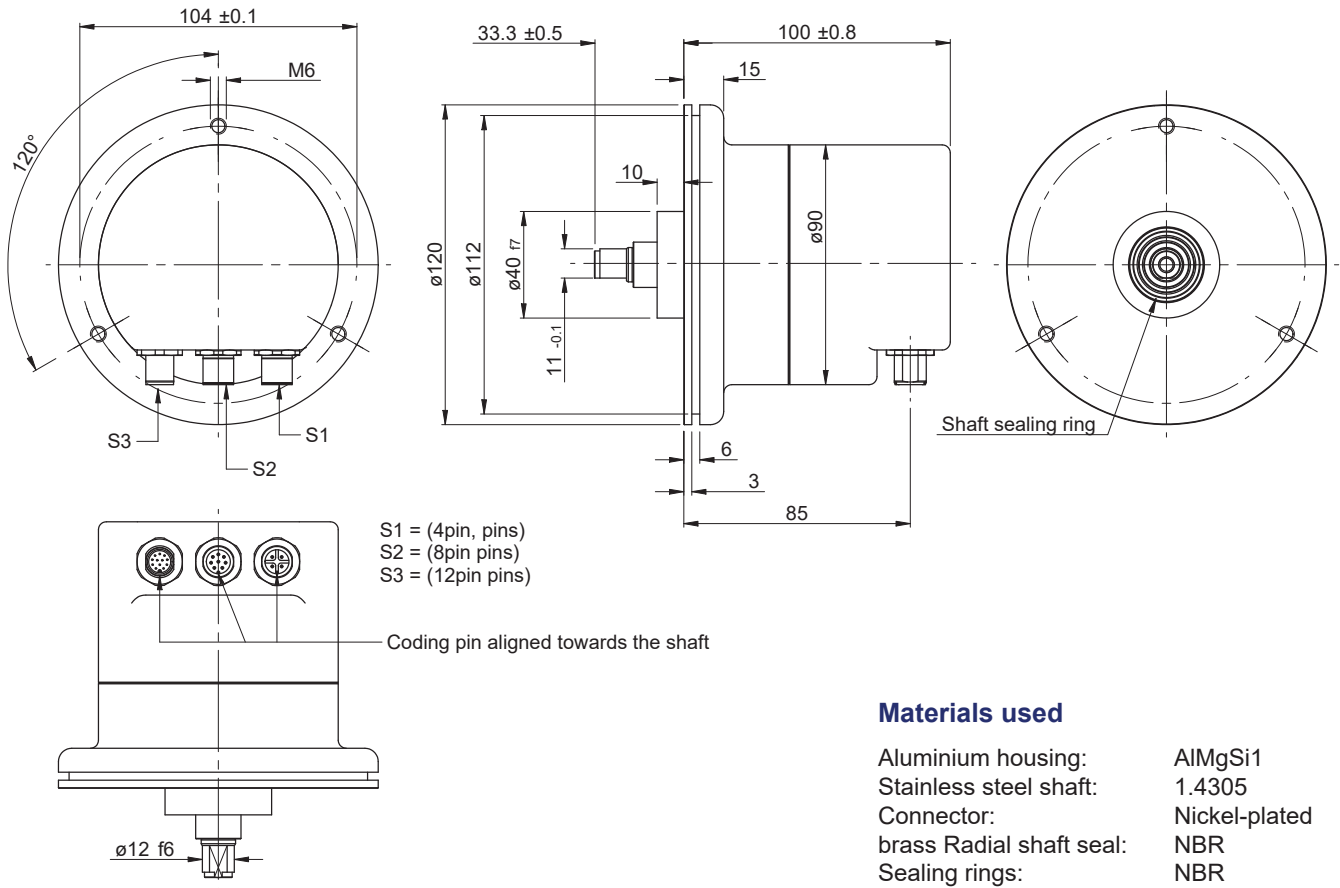
Electronic switching cam encoder model NOCA

Installation drawings

Model NOCA120

Wellenausführung für Anbindung des spielausgleichendes Zahnrades ZRS

Dimensions in mm



Materials used

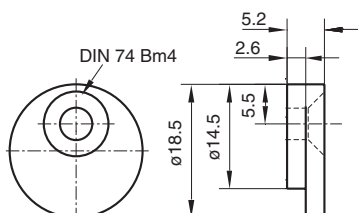
Aluminium housing:	AlMgSi1
Stainless steel shaft:	1.4305
Connector:	Nickel-plated
brass Radial shaft seal:	NBR
Sealing rings:	NBR

Accessories

Series KL 58-2 securing clamps

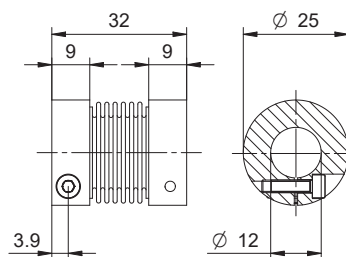
(See data sheet [MZ 10111](#))

- Pitch diameter: 140 +0.5 mm
- Material: Nickel-plated brass
- Required screws: M4 countersunk head with hexagon socket DIN 7991 (3 units required)

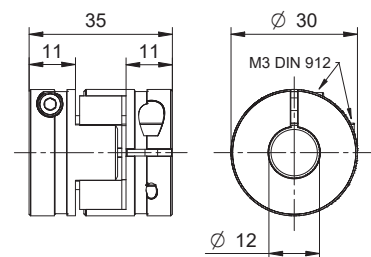


Folding bellows coupling BKK 32/x-y Clamp coupling KK14S/x-y

(See data sheet [BKK 11840](#))



Stainless steel, 1.4301



Aluminium / plastic

The couplings are also available with bores for other shaft diameters.

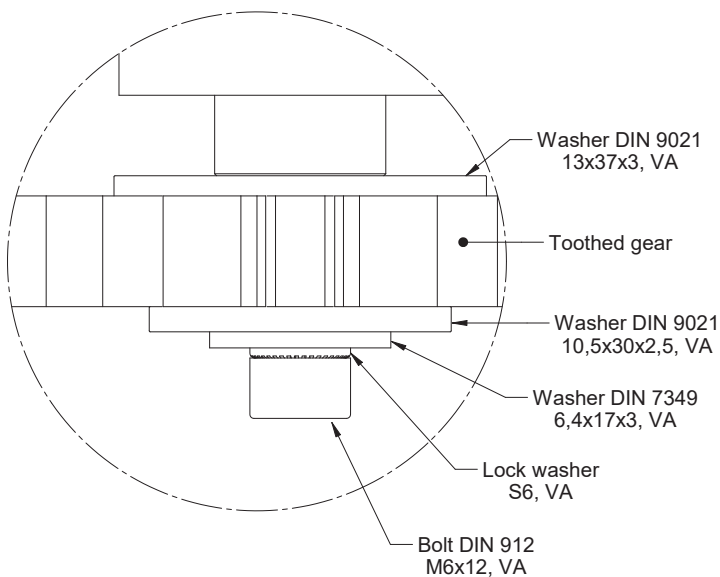
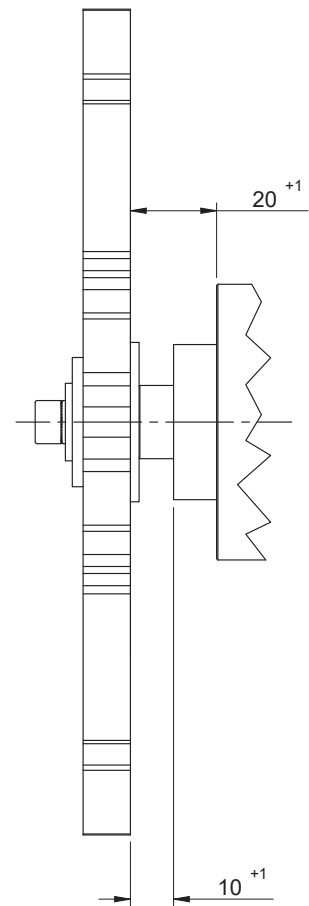
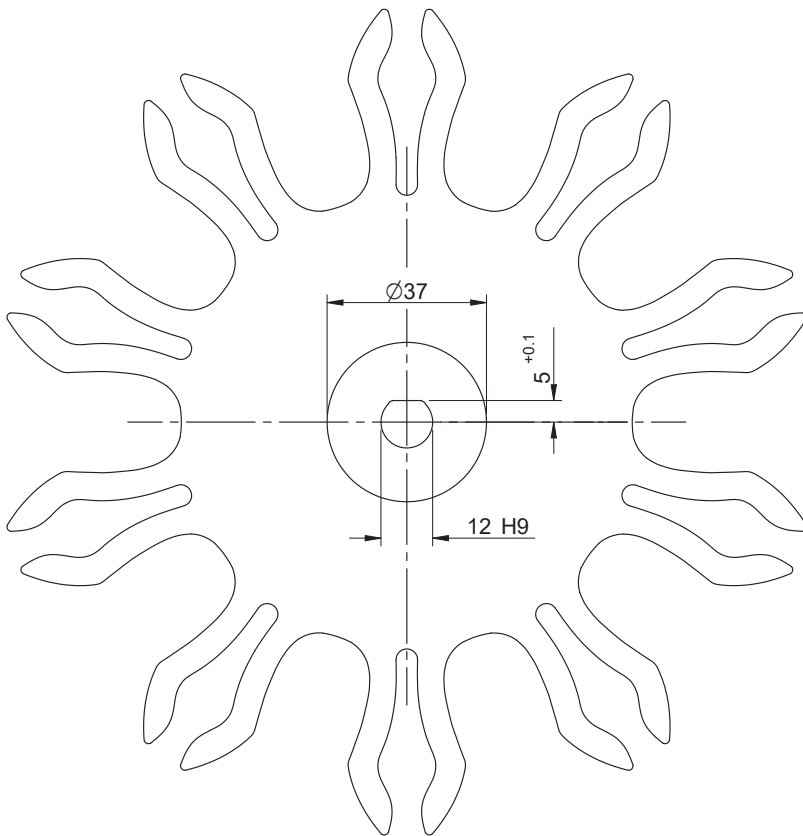
Electronic switching cam encoder model NOCA

Play-compensating toothed gear ZRS

(Subject to TWK utility model protection)

A 'play-compensating toothed gear' ZRS is available to mechanically drive the switching cam encoder shaft on a ring gear (slewing ring) or a rack without play. Different modules and numbers of teeth are available. ZRS material: polyamide. Also see data sheet [ZRS 11877](#). Mechanical connection necessitates a specific shaft version.

Installation recommendation: tighten 6 mm bolt to a torque of 6 Nm and secure with Loctite (medium adhesive strength).



Order code number

ZRS - 12 - 10 - A 01

Variants **:

A 01 Standard

Teeth:

10 No. of ZRS teeth *

Module:

12 5 to 24 *

Model:

ZRS toothed gear, play-compensating model

*: Other values on request

** : Please contact our technical support to select the required measuring gear.

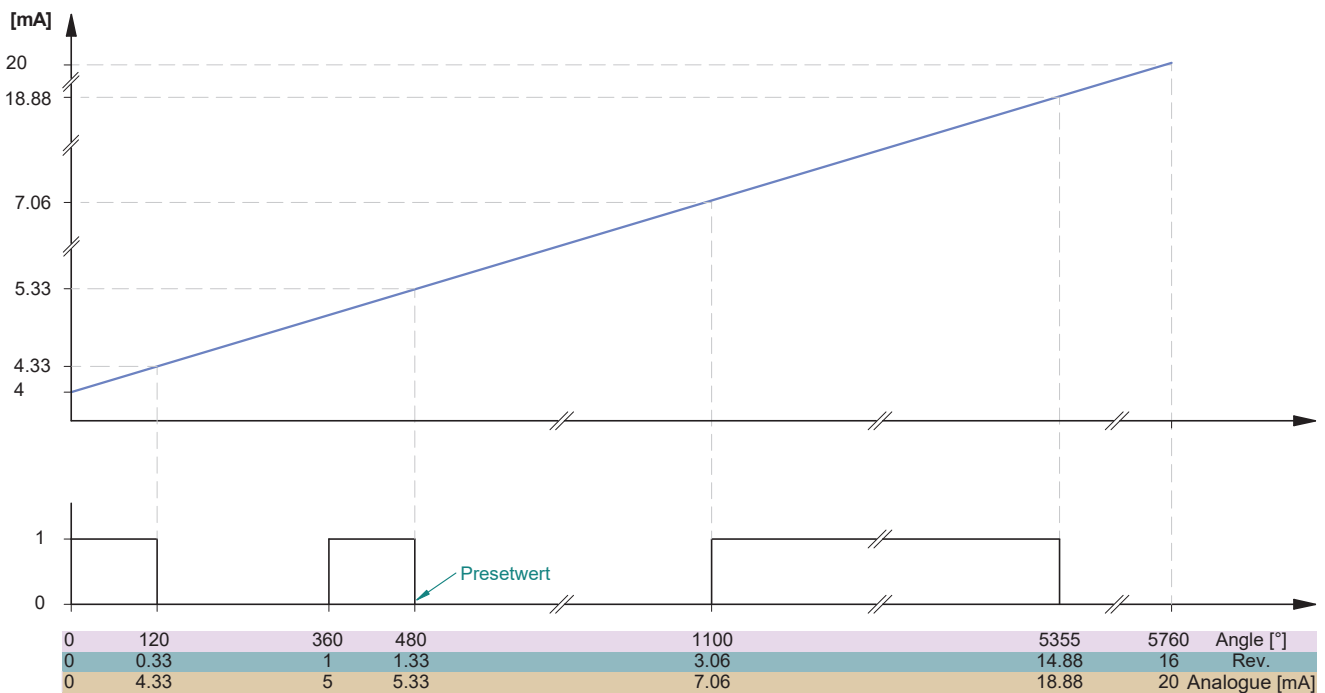
Electronic switching cam encoder model NOCA

Programming example for analogue output and relays / cams

Setting possible ex works

Example programming for relay 1							
Setting the analogue output signal (here 4 - 20 mA) to the number of revolutions: 16							
The analogue signal starts at the following angle reference value 0 ° (example)							
Output value	Rotation direction	Relay 1 Flank 1 = relay ON	Relay 1 Flank 2 = relay OFF	Relay 1 Flank 3 = relay ON	Relay 1 Flank 4 = relay OFF	Relay 1 Flank 5 = relay ON	Relay 1 Flank 6 = relay OFF
Angle value [°]	cw	0	120	360	480	1100	5355
No. of revolutions	"	0	0,33	1	1,33	3,06	14,8
Analogue [mA]	"	0	4.33	5	5.33	7.06	18.88
Preset value [mA]	5.33						

Example programming for cam 1 at 4 ... 20 mA over 16 revolutions.



Note: On activation of the preset function, the analogue signal and therefore also the switching outputs are set. The cams are assigned to specific analogue position values in the factory. In this example, the analogue value is preset to 5.33 mA and therefore also all of the switching output flanks (three cams), which lie at the total of six different mA values.

The procedure for cam 2 (3, 4) is the same. The preset function always refers to the analogue signal and the cams at the same time.

Electronic switching cam encoder model NOCA

Table for factory programming according to customer specifications

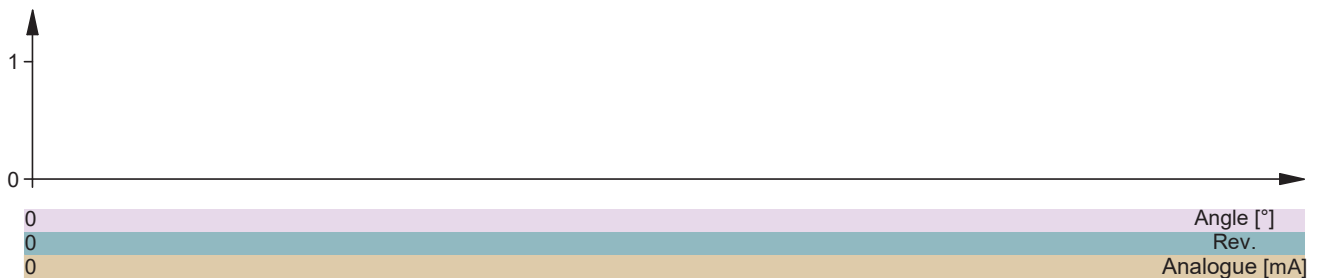
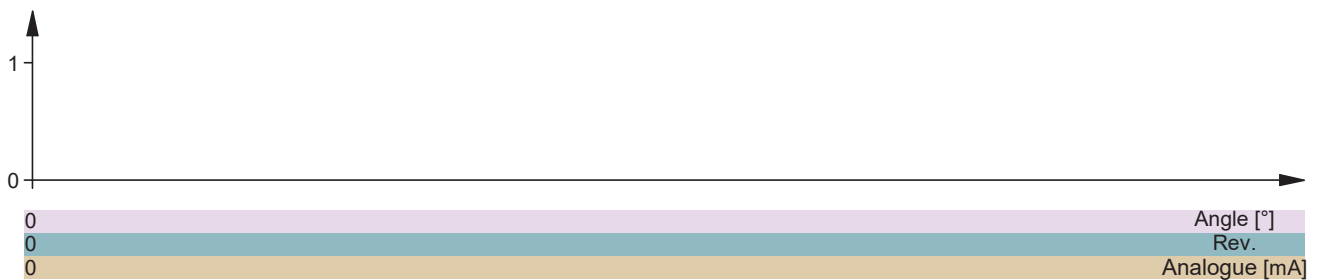
Please enter the desired pre-programming for the switching outputs in the table if it cannot be implemented with the standard setting and the preset function or if it is to be available as the default setting.

A maximum of three cams (switching on/off processes) in the measuring range per switching output. Enter the values (analogue current or voltage values) at which the switching flanks are to lie. Delivery from the factory is then carried out with this programming.

In the case of the analogue output, switching cycles may also lie outside of the analogue ramp, e.g. if the analogue ramp is not to extend over the entire measuring range.

Note: On digital output of the rotary encoder signal (in the case of NOCE / NOCN), the resolution is always 4096 steps per revolution over the entire measuring range (16 or 256 or 4096 revolutions). Refer to datasheet [NOC12555](#) (SSI), [NOC12523](#) (CANopen standard) and [NOC13099](#) (CANopen safety).

Programming as desired by the customer							
Setting the analogue output signal (0 - 10 V or 4 - 20 mA or 0 - 20 mA) to the number of revolutions:							
The analogue signal starts at the following angle reference value (e.g. 0°):							
Output value	Rotation direction	Relay ___ Flank ___	Relay ___ Flank ___	Relay ___ Flank ___	Relay ___ Flank ___	Relay ___ Flank ___	Relay ___ Flank ___
Angle value [°]							
No. of revolutions							
Analogue [mA / V]							
Preset value [mA / V]							



In the above charts you can enter how the cam switch should be programmed.