

Compact magnetic	ESAV361 / ENAV361 (shaft / hollow shaft)	Analog
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The ESAV361 (shaft) and ENAV361 (hollow shaft) singleturn encoders with analog interface and magnetic sensor technology are particularly flexible in use due to their diverse interfaces and measuring ranges.

A green LED as reference point and a red LED as error indicator simplify both installation and error diagnosis.



Safety-Lock™	High rotational speed	Temperature range -40°... +85°C	High protection level IP	High shaft load capacity	Shock / vibration resistant	Reverse polarity protection	Surface protection salt spray tested optional

Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ design for resistance against vibration and installation errors.
- Reduced number of components ensures magnetic insensitivity.
- IP67 protection and wide temperature range -40 °C ... +85 °C.

Application oriented

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Different measuring ranges.
- Set input for easy start-up.

Order code **ESAV361** | XXXX | XXX **2**
Shaft version Type a b c d e f g

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.



- a** Flange
 1 = clamping flange, IP67, ø 36 mm [1.42"]
 3 = clamping flange, IP65, ø 36 mm [1.42"]
 2 = synchro flange, IP67, ø 36 mm [1.42"]
4 = synchro flange, IP65, ø 36 mm [1.42"]
- b** Shaft (ø x L), with flat
 1 = ø 6 x 12.5 mm [0.24 x 0.49"]
3 = ø 8 x 15 mm [0.32 x 0.59"]
 5 = ø 10 x 20 mm [0.39 x 0.79"]
 2 = ø 1/4" x 12.5 mm [0.49"]
- c** Output circuit ¹⁾
3 = current output
4 = voltage output

- d** Type of connection
 1 = axial cable, 1 m [3.28'] PVC
 A = axial cable, special length PVC *)
 2 = radial cable, 1 m [3.28'] PVC
 B = radial cable, special length PVC *)
 3 = axial M12 connector, 5-pin
4 = radial M12 connector, 5-pin
- *) Available special lengths (connection types A, B):
 2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
 order code expansion .XXXX = length in dm
 ex.: 8.M3651A.433A.3112.0030 (for cable length 3 m)
- e** Interface / resolution / supply voltage
3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC
4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC
 5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC

- f** Measuring range
1 = 1 x 360°
 2 = 1 x 180°
 3 = 1 x 90°
 4 = 1 x 45°
- g** Counting direction
1 = cw
2 = ccw
- Optional on request*
 - Ex 2/22 (only for connection types 3 and 4)
 - surface protection salt spray tested

Specifications subject to change without notice, 98-0ENC-03-A, released 11/27/2023

1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".

Compact magnetic

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Analog

Order code
Hollow shaft

ENAV361. **X****X****X****X**.**X****X****X****2**
Type **a** **b** **c** **d** **e** **f** **g**

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces.
Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.



a Flange

- 2 = with stator coupling, IP65, ø 46 mm [1.81"]
- 3 = with spring element, long, IP65
- 5 = with stator coupling, IP67, ø 46 mm [1.81"]
- 6 = with spring element, long, IP67

b Blind hollow shaft

- (insertion depth max. 18.5 mm [0.73"])
- 1 = ø 6 mm [0.24"]
- 3 = ø 8 mm [0.32"]
- 4 = ø 10 mm [0.39"]
- 2 = ø 1/4"

c Output circuit ¹⁾

- 3 = current output
- 4 = voltage output

d Type of connection

- 1 = axial cable, 1 m [3.28'] PVC
- A = axial cable, special length PVC *)
- 2 = radial cable, 1 m [3.28'] PVC
- B = radial cable, special length PVC *)
- 3 = axial M12 connector, 5-pin
- 4 = radial M12 connector, 5-pin
- *) Available special lengths (connection types A, B):
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
Ex.: 8.M3671A.243A.3112.0030 (for cable length 3 m)

e Interface / resolution / supply voltage

- 3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC
- 4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC
- 5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC

f Measuring range

- 1 = 1 x 360°
- 2 = 1 x 180°
- 3 = 1 x 90°
- 4 = 1 x 45°

g Counting direction

- 1 = cw
- 2 = ccw

Optional on request

- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".

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Technical data

Electrical characteristics current interface 4 ... 20 mA		
Supply voltage	10 ... 30 V DC	
Current consumption (no load)	max. 30 mA	
Reverse polarity protection of the supply voltage	yes	
Short-circuit proof outputs	yes ¹⁾	
Measuring range	45°, 90°, 180° or 360°	
DA converter resolution	12 bit	
Angular measurement deviation ²⁾	±0,5°	
Temperature coefficient	< 100 ppm/K	
Repeat accuracy, at 25°C [77°F]	±0.2°	
Output load	at 10 V DC	max. 200 Ohm
	at 24 V DC	max. 900 Ohm
	at 30 V DC	max. 1200 Ohm
Setting time	< 1 ms, R _{Burden} = 900 Ohm, 25°C [77°F]	
LEDs (green/red)	<ul style="list-style-type: none"> - system status - current loop interruption – input load too high - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1° 	
SET input	level = +V for 1 s minimum	
PowerON Time	< 1 s	
Update rate	1 ms	

Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V		
Supply voltage	output 0 ... 5 V	10 ... 30 V DC
	output 0 ... 10 V	15 ... 30 V DC
Current consumption (no load)	max. 30 mA	
Reverse polarity protection of the supply voltage	yes	
Short-circuit proof outputs	yes ¹⁾	
Measuring range	45°, 90°, 180° or 360°	
DA converter resolution	0 ... 10 V	12 bit
	0 ... 5 V	11 bit
Angular measurement deviation ²⁾	±0,5°	
Temperature coefficient	< 100 ppm/K	
Repeat accuracy, at 25°C [77°F]	±0.2°	
Current output	max. 10 mA	
Setting time	< 1 ms, R _{Load} = 1000 Ohm, 25°C [77°F]	
LEDs (green/red)	<ul style="list-style-type: none"> - system status - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1° 	
SET input	level = +V for 1 s minimum	
PowerON Time	< 1 s	
Update rate	1 ms	

Mechanical characteristics	
Maximum speed	shaft or blind hollow shaft version without shaft seal (IP65) 6000 min ⁻¹ 3000 min ⁻¹ (continuous)
	shaft or blind hollow shaft version with shaft seal (IP67) 4000 min ⁻¹ 2000 min ⁻¹ (continuous)
Starting torque at 20 °C [68 °F]	without shaft seal < 0.007 Nm with shaft seal (IP67) < 0.01 Nm
Shaft load capacity	radial 40 N axial 20 N
Weight	approx. 210 g [7.41 oz]
Protection acc. to EN 60529	IP65 or IP67
Working temperature range	-40 °C ... +85 °C [-40 °F ... +185 °F]
Materials	shaft / hollow shaft stainless steel flange aluminum housing zinc die-cast cable PVC
Shock resistance acc. to EN 60068-2-27	2500 m/s ² , 6 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 10 ... 2000 Hz

SET input	
Input	active HIGH
Input type	comparator
Signal level	HIGH min. 60 % of +V, max: +V LOW max. 30 % of +V (+V = supply voltage)
Input current	< 0.5 mA
Min. pulse duration (SET)	10 ms
Input delay	1 ms
New position data readable after	1 ms
Internal processing time	200 ms
<p>The encoder can be set to zero at any position by means of a HIGH signal on the SET input. Other preset values can be factory-programmed. The SET input has a signal processing time of approx. 1 ms, after which the new position data can be read. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the supply voltage must not be switched off.</p> <p>The SET function should be carried out whilst the encoder is at rest.</p> <p>The number of preset value writing cycles is limited to 10,000.</p> <p>If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.</p>	

Approvals	
E1 compliant in accordance with	ECE guideline
UL compliant in accordance with	File no. E224618
CE compliant in accordance with	EMC Directive 2014/30/EU RoHS Directive 2011/65/EU ATEX Directive 2014/34/EU (for Ex 2/22 variants)
UKCA compliant in accordance with	EMC Regulations S.I. 2016/1091 RoHS Regulations S.I. 2012/3032 UKEX Regulations S.I. 2016/1107 (for Ex 2/22 variants)

1) When the supply voltage is correctly applied.
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.
2) Over the whole temperature range.

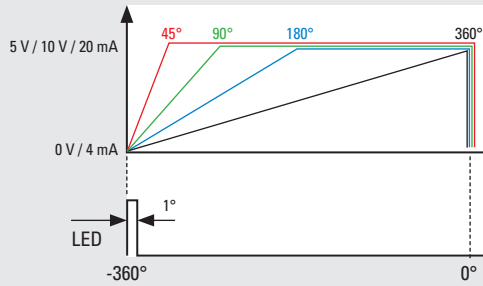
Compact magnetic

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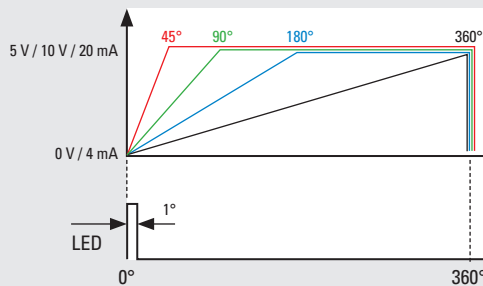
Analog

Example (output signal evolution)
Variante counting direction cw

Direction of rotation left

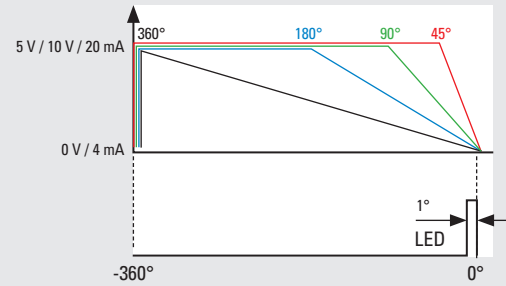


Direction of rotation right

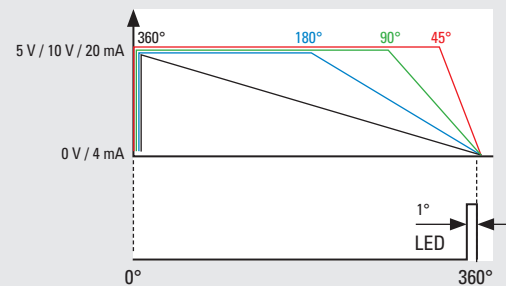


Example (output signal evolution)
Variante counting direction ccw

Direction of rotation left



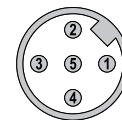
Direction of rotation right



Terminal assignment

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)				
3 (current)	1, 2, A, B	Signal:	0 V	+V	+I	SET
		Core color:	WH	BN	GN	GY
Interface	Type of connection	M12 connector, 5 pin				
3 (current)	3, 4	Signal:	0 V	+V	+I	SET
		Pin:	3	2	1	5
Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)				
4, 5 (voltage)	1, 2, A, B	Signal:	0 V	+V	+U	SET
		Core color:	WH	BN	GN	GY
Interface	Type of connection	M12 connector, 5 pin				
4, 5 (voltage)	3, 4	Signal:	0 V	+V	+U	SET
		Pin:	3	2	1	5

Top view of mating side, male contact base



M12 connector, 5-pin

- +V : Supply voltage encoder +V DC
- 0 V : Supply voltage encoder ground GND (0 V)
- +U : Voltage
- +I : Current
- SET : Set input

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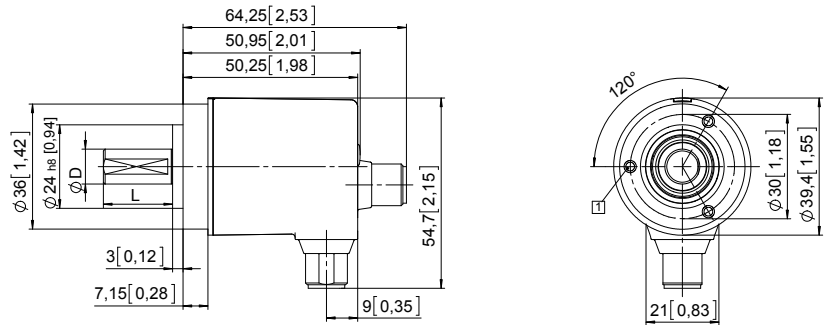
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

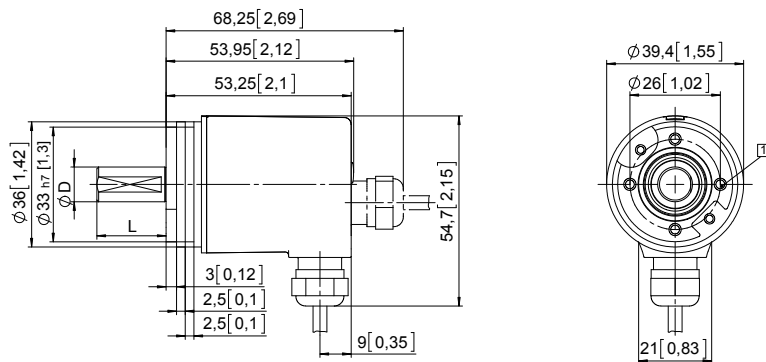


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

Synchro flange, ø 36 [1.42]

Flange type 2 and 4

1 4 x M3, 6 [0.24] deep



D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12.5 [0.49]

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Analog

Dimensions hollow shaft version

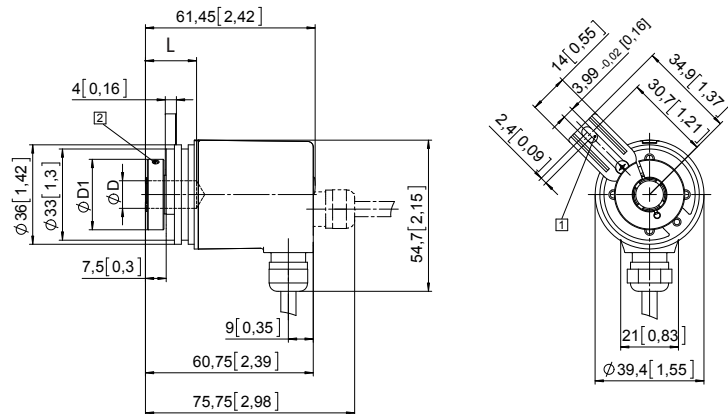
Dimensions in mm [inch]

Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: cylindrical pin DIN 7, \varnothing 4 [0.16]
- 2 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft



Flange with stator coupling, \varnothing 46 [1.81] Flange type 2 and 5

- 1 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]

L = insertion depth max. blind hollow shaft

