

<b>Compact electronic multiturn, magnetic</b>	<b>ESAV36 / ENAV36 (shaft / hollow shaft)</b>	<b>Analog</b>
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The ESAV36 (shaft) and ENAV36 (hollow shaft) with Energy Harvesting Technology is an electronic multiturn encoder in miniature format, without gear and without battery. With a size of just 36 x 53 mm it offers a blind hollow shaft of up to 10 mm.



Safety-Lock™	High rotational speed	Temperature range	High protection level	High shaft load capacity	Shock / vibration resistant	Reverse polarity protection	Surface protection salt spray tested optional	Energy Harvesting

### 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.
- Without gear and without battery, thanks to the Energy Harvesting technology.

### Application oriented

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Measuring range scalable.
- Limit switch function.

**Order code**      **ESAV36** . **XXXX** . **XX** **12**  
**Shaft version**      Type      a b c d e f

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 <sup>1)</sup>

- 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.M3661.433A.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 = 16 revolutions / cw
- 2 = 16 revolutions / ccw
- 3 = scalable up to 65,536 revolutions, with limit switch function / cw
- 4 = scalable up to 65,536 revolutions, without limit switch function / cw
- 5 = scalable up to 65,536 revolutions, with limit switch function / ccw
- 6 = scalable up to 65,536 revolutions, without limit switch function / 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-02-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".

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electronic multiturn, magnetic**

**ESAV36 / ENAV36 (shaft / hollow shaft)**

**Analog**

**Order code  
Hollow shaft**

**ENAV36** . **XXXXX** . **XX12**  
Type      **a** **b** **c** **d**      **e** **f**

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 <sup>1)</sup>

- 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.M3681.243A.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 = 16 revolutions / cw
- 2 = 16 revolutions / ccw
- 3 = scalable up to 65,536 revolutions, with limit switch function / cw
- 4 = scalable up to 65,536 revolutions, without limit switch function / cw
- 5 = scalable up to 65,536 revolutions, with limit switch function / ccw
- 6 = scalable up to 65,536 revolutions, without limit switch function / 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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**Analog**

## Technical data

### Mechanical characteristics

<b>Maximum speed</b>	
shaft or blind hollow shaft version without shaft seal (IP65)	6000 min <sup>-1</sup> 3000 min <sup>-1</sup> (continuous)
shaft or blind hollow shaft version with shaft seal (IP67)	4000 min <sup>-1</sup> 2000 min <sup>-1</sup> (continuous)
<b>Starting torque at 20 °C [68 °F]</b>	
without shaft seal	< 0.007 Nm
with shaft seal (IP67)	< 0.01 Nm
<b>Shaft load capacity</b>	
radial	40 N
axial	20 N

### Electrical characteristics current interface 4 ... 20 mA

<b>Supply voltage</b>	10 ... 30 V DC
<b>Current consumption (no load)</b>	max. 30 mA
<b>Reverse polarity protection of the supply voltage</b>	yes
<b>Short-circuit proof outputs</b>	yes <sup>1)</sup>
<b>Measuring range</b>	factory setting 2 <sup>4</sup> revolutions optionally scalable up to 2 <sup>16</sup> revolutions
<b>DA converter resolution</b>	12 bit
<b>Singleturn accuracy, at 25 °C [77 °F]</b>	±1°
<b>Temperature coefficient</b>	< 100 ppm/K
<b>Repeat accuracy, at 25 °C [77 °F]</b>	±0.2°
<b>Output load</b>	at 10 V DC max. 200 Ohm at 24 V DC max. 900 Ohm at 30 V DC max. 1200 Ohm
<b>Setting time</b>	< 1 ms, R <sub>Burden</sub> = 900 Ohm, 25 °C [77 °F]
<b>LEDs (green/red)</b>	- 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° - status in teach mode
<b>Options</b>	- output signal scalable via the teach inputs - output signal scalable via the teach inputs + limit switch function
<b>Teach inputs</b>	level = +V for 1 s min.
<b>PowerON Time</b>	< 1 s
<b>Update rate</b>	1 ms
<b>E1 compliant acc. to (pending)</b>	EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637)
<b>UL approval</b>	File no. E224618
<b>CE compliant acc. to</b>	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

<b>Weight</b>	approx. 210 g [7.41 oz]
<b>Protection acc. to EN 60529</b>	IP65 or IP67
<b>Working temperature range</b>	-40 °C ... +85 °C [-40 °F ... +185 °F]
<b>Materials</b>	shaft / hollow shaft stainless steel flange aluminum housing zinc die-cast cable PVC
<b>Shock resistance acc. to EN 60068-2-27</b>	2500 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance acc. to EN 60068-2-6</b>	300 m/s <sup>2</sup> , 10 ... 2000 Hz

### Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V

<b>Supply voltage</b>	output 0 ... 5 V 10 ... 30 V DC output 0 ... 10 V 15 ... 30 V DC
<b>Current consumption (no load)</b>	max. 30 mA
<b>Reverse polarity protection of the supply voltage</b>	yes
<b>Short-circuit proof outputs</b>	yes <sup>1)</sup>
<b>Measuring range</b>	factory setting 2 <sup>4</sup> revolutions optionally scalable up to 2 <sup>16</sup> revolutions
<b>DA converter resolution</b>	0 ... 10 V 12 bit 0 ... 5 V 11 bit
<b>Singleturn accuracy, at 25 °C [77 °F]</b>	±1°
<b>Temperature coefficient</b>	< 100 ppm/K
<b>Repeat accuracy, at 25 °C [77 °F]</b>	±0.2°
<b>Current output</b>	max. 10 mA
<b>Setting time</b>	< 1 ms, R <sub>Load</sub> = 1000 Ohm, 25 °C [77 °F]
<b>LEDs (green/red)</b>	- system status - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1° - status in teach mode
<b>Options</b>	- output signal scalable via the teach inputs - output signal scalable via the teach inputs + limit switch function
<b>Teach inputs</b>	level = +V for 1 s min.
<b>PowerON Time</b>	< 1 s
<b>Update rate</b>	1 ms
<b>E1 compliant acc. to (pending)</b>	EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637)
<b>UL approval</b>	File no. E224618
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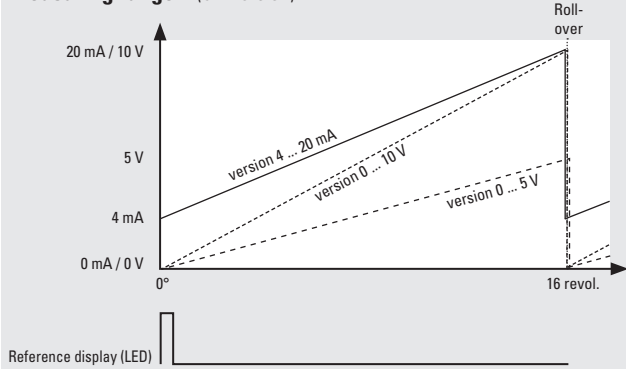
1) When the supply voltage is correctly applied.  
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.

**Compact electronic multiturn, magnetic**

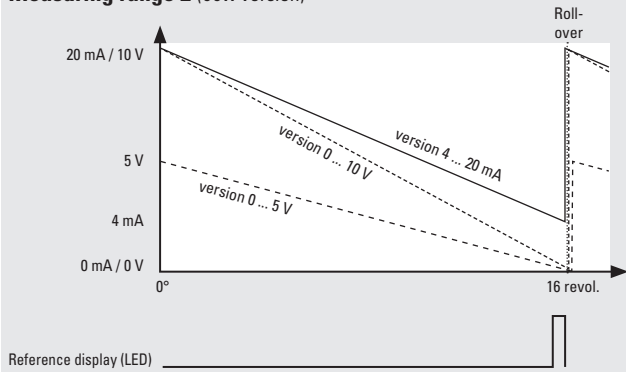
**ESAV36 / ENAV36 (shaft / hollow shaft) Analog**

**Example (output signal evolution) – factory setting**

**Measuring range 1 (cw version)**

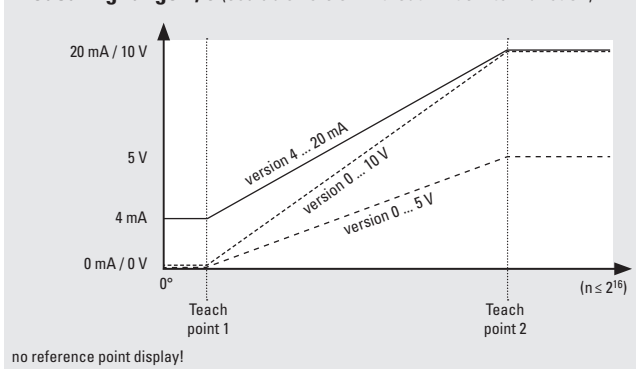


**Measuring range 2 (ccw version)**

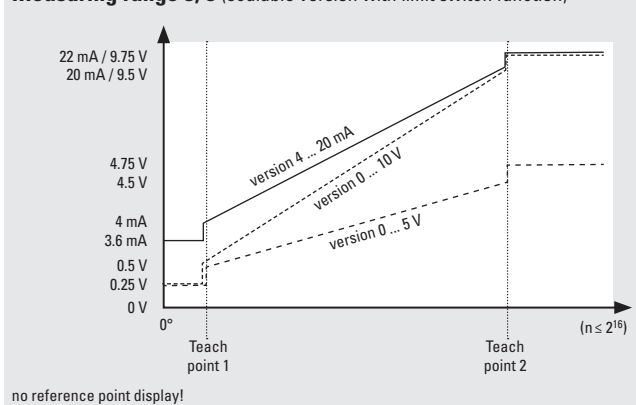


**Example (output signal evolution) – option: scalable**

**Measuring range 4, 6 (scalable version without limit switch function)**



**Measuring range 3, 5 (scalable version with limit switch function)**



<b>Factory-set measuring range</b>	2 <sup>4</sup> revolutions with roll-over			
<b>Limit switch function</b>	version	0 ... 10 V	0 ... 5 V	4 ... 20 mA
	limit switch low	0.25 V	0.25 V	3.6 mA
	limit switch high	9.75 V	4.75 V	22.0 mA

**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 1 <sup>1)</sup>	SET 2 <sup>1)</sup>
		Core color:	WH	BN	GN	GY	PK

Interface	Type of connection	M12 connector, 5 pin					
3 (current)	3, 4	Signal:	0 V	+V	+I	SET 1 <sup>1)</sup>	SET 2 <sup>1)</sup>
		Pin:	3	2	1	5	4

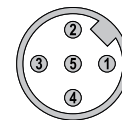
Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
4, 5 (voltage)	1, 2, A, B	Signal:	0 V	+V	+U	SET 1 <sup>1)</sup>	SET 2 <sup>1)</sup>
		Core color:	WH	BN	GN	GY	PK

Interface	Type of connection	M12 connector, 5 pin					
4, 5 (voltage)	3, 4	Signal:	0 V	+V	+U	SET 1 <sup>1)</sup>	SET 2 <sup>1)</sup>
		Pin:	3	2	1	5	4

+V : supply voltage encoder +V DC      +U : voltage      SET 1 : set input for teachpoint 1  
 0 V : supply voltage encoder ground GND (0 V)      +I : current      SET 2 : set input for teachpoint 2

1) For scalable version.

**Top view of mating side, male contact base**



M12 connector, 5-pin

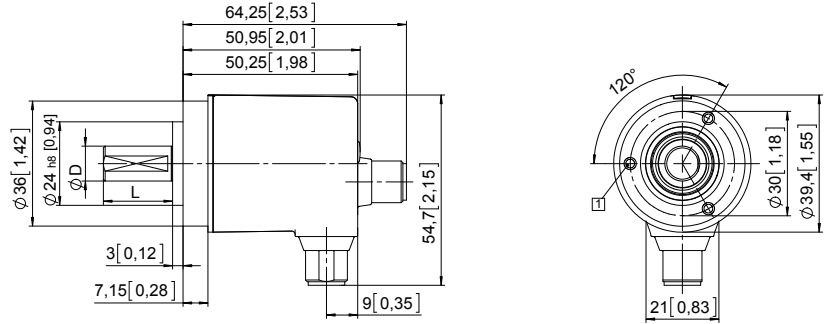
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### Dimensions shaft version

Dimensions in mm [inch]

#### Clamping flange, $\varnothing 36$ [1.42] Flange type 1 and 3

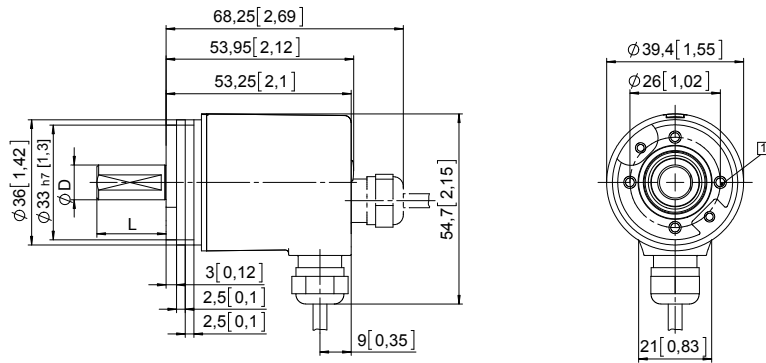
- 1 3 x M3, 6 [0.24] deep



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, $\varnothing 36$ [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]

## Compact electronic multiturn, magnetic

## ESAV36 / ENAV36 (shaft / hollow shaft) Analog

### Dimensions hollow shaft version

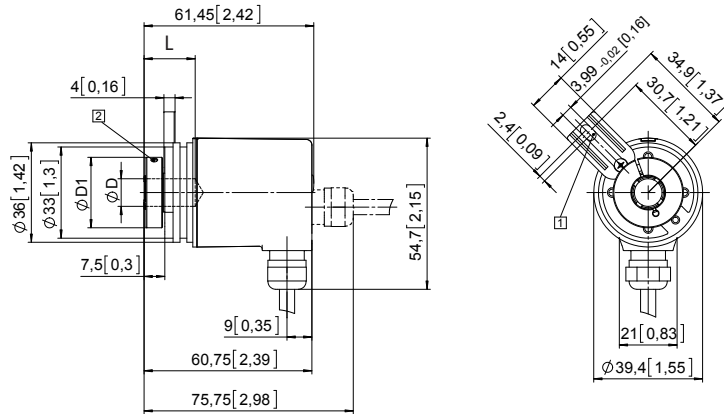
Dimensions in mm [inch]

#### 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

