



# Incremental rotary encoder ENI90HO-R

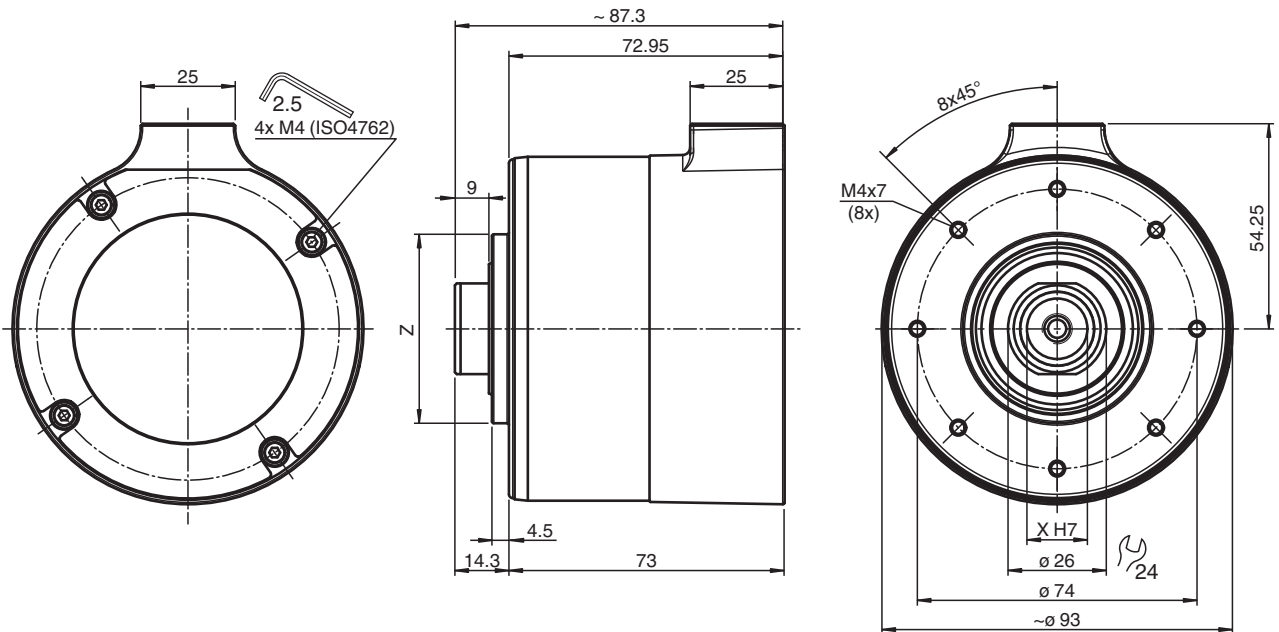
- Housing Ø 93 mm
- Up to 5000 pulses
- Universal output driver
- BlueBeam technology for ultimate precision
- Resistant to salt water
- Recessed hollow shaft



## Dimensions

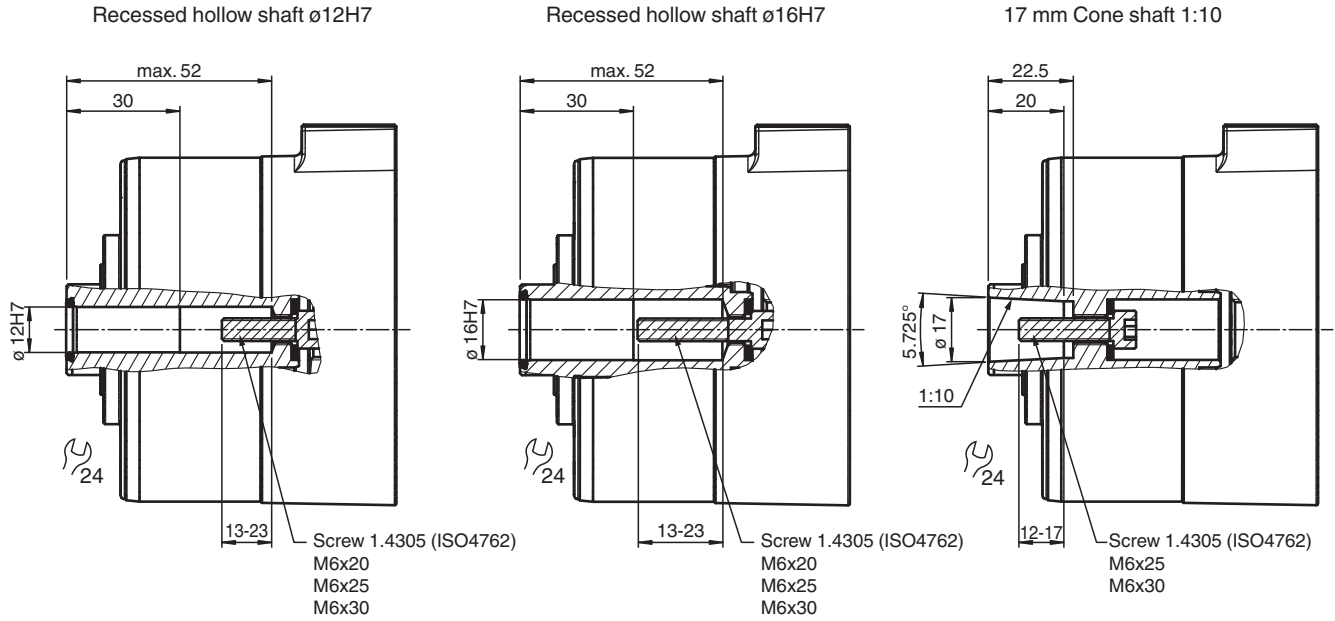
Recessed hollow shaft and cone shaft with cable and connector M12, M23

Hollow shaft X	X [mm]	Z [mm]
ø 12	ø 12	ø 50
ø 16	ø 16	ø 50
ø 17 conus	ø 17 conus	ø 50

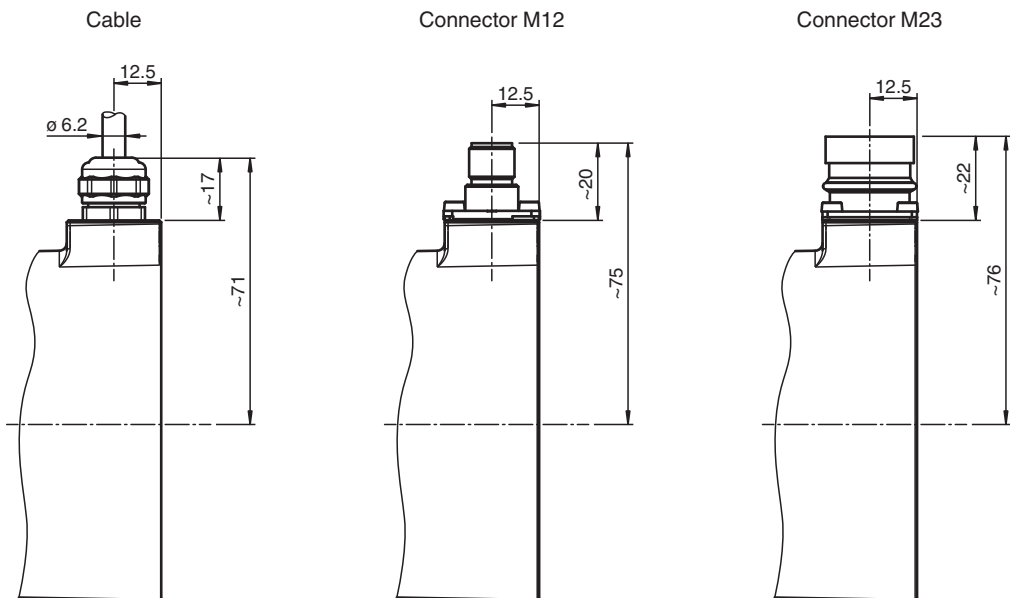


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**Dimensions**



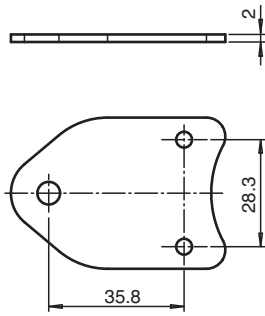
**Connections**



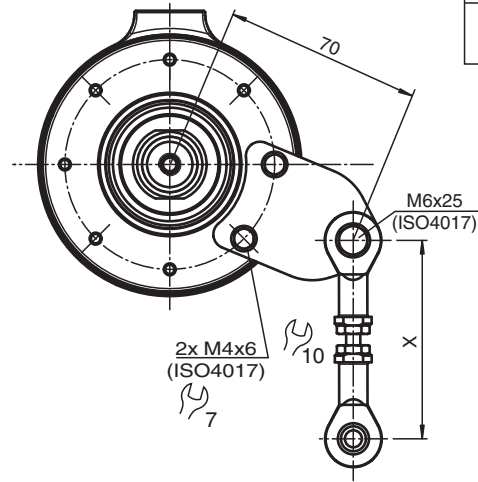
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**Dimensions**

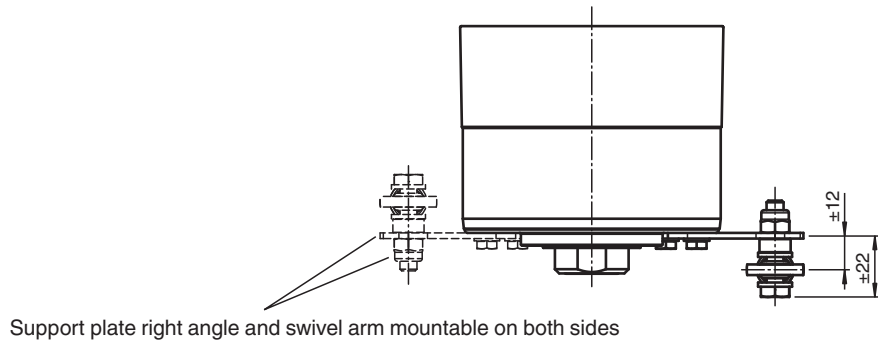
**Support plate 70 mm short with swivel arm**



Support plate mountable in 45° steps (8x45°)



Swivel arm X [mm]
70 (69-79)
120 (117-127)

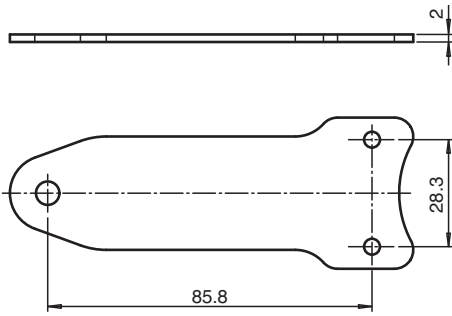


Support plate right angle and swivel arm mountable on both sides

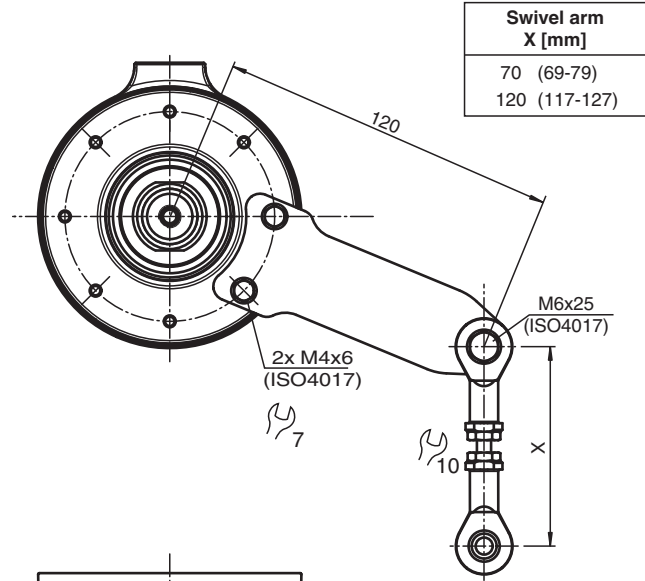
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**Dimensions**

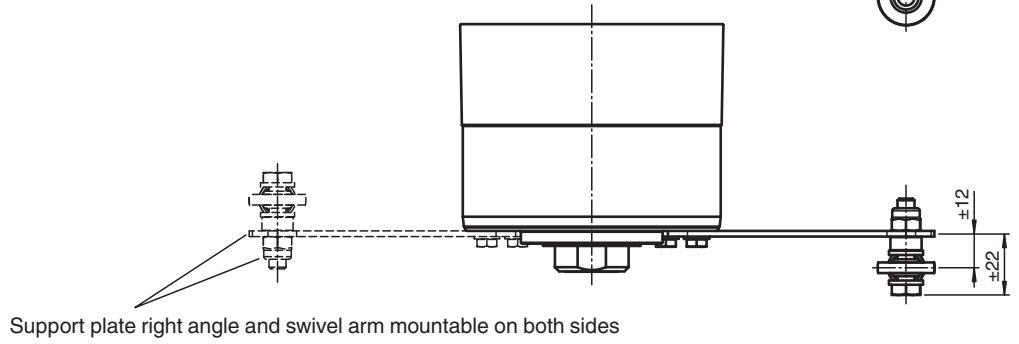
**Support plate 120 mm straight with swivel arm**



Support plate mountable in 45° steps (8x45°)



Swivel arm X [mm]
70 (69-79)
120 (117-127)

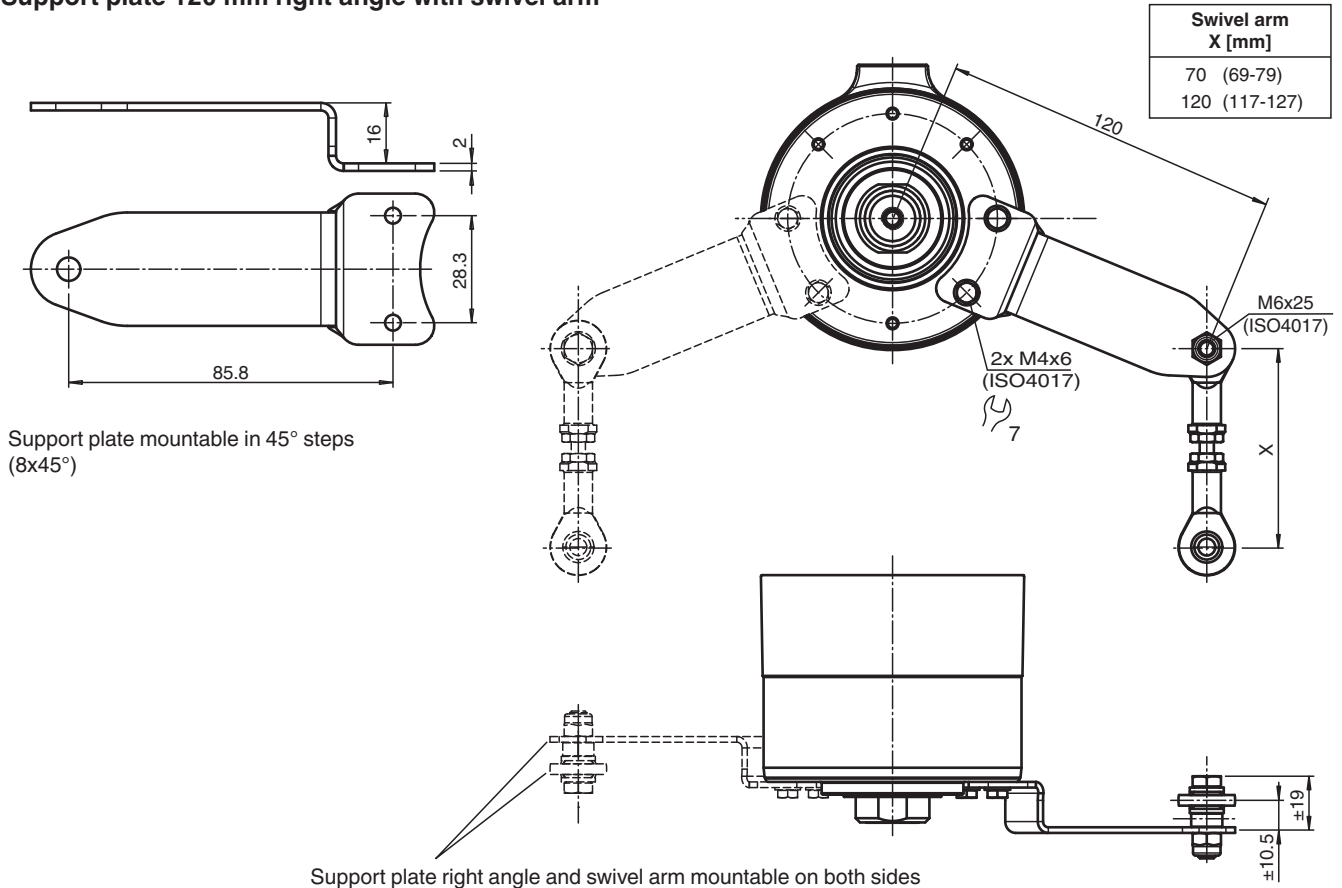


Support plate right angle and swivel arm mountable on both sides

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**Dimensions**

**Support plate 120 mm right angle with swivel arm**



**Technical Data**

General specifications	
Detection type	photoelectric sampling
Linearity error	± 0.025 °
Pulse count	max. 5000
Functional safety related parameters	
MTTF <sub>d</sub>	435 a
Mission Time (T <sub>M</sub> )	10 a
Diagnostic Coverage (DC)	0 %
Electrical specifications	
Operating voltage	U <sub>B</sub> 4.75 ... 30 V DC
No-load supply current	I <sub>0</sub> max. 50 mA
Output	
Output type	push-pull or RS422 (universal output driver, output level depending on input voltage)
Load current	max. per channel 40 mA , short-circuit protected, reverse polarity protected
Output frequency	max. 400 kHz
Rise time	300 ns
Phase position A to B	
Pulse counts < 3600	90 ° ± 9 ° electrical
Pulse counts ≥ 3600	90 ° ± 25 ° electrical
Duty cycle	1/2 ± 10 %
Connection	

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**Technical Data**

Connector	M12 connector, 8-pin M12 connector, 5 pin M23 connector, 12-pin , clockwise rotation M23 connector, 12-pin , counter clockwise rotation
Cable	Ø6 mm, 4 x 2 x 0.14 mm <sup>2</sup>
Terminal compartment	Cable duct for cable diameter Ø4.0 mm ... 9.5 mm
<b>Standard conformity</b>	
Degree of protection	DIN EN 60529, IP66, IP67
Climatic testing	DIN EN 60068-2-78 , no moisture condensation
Salt spray test	DIN EN 60068-2-52 , 672 h
Emitted interference	EN IEC 61000-6-4:2019
Noise immunity	EN IEC 61000-6-2:2019
Shock resistance	DIN EN 60068-2-27, 200 g, 6 ms
Vibration resistance	DIN EN 60068-2-6, 20 g, 10 ... 2000 Hz
<b>Approvals and certificates</b>	
UL approval	E223176 , cULus Listed, General Purpose, Class 2 Power Source, Type 1 enclosure , if UL marking is marked on the product. For use in NFPA 79 Applications only. adapters providing field wiring on request
Maximum permissible ambient temperature	max. 80 °C (max. 176 °F)
<b>Ambient conditions</b>	
Operating temperature	-40 ... 85 °C (-40 ... 185 °F) , cable, fixed installation -5 ... 85 °C (23 ... 185 °F) , movable cable
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
<b>Mechanical specifications</b>	
Material	
Housing	powder coated aluminum
Flange	aluminium, salt water resitant
Shaft	Stainless steel 1.4305 / AISI 303
Mass	< 1100 g without cable
Rotational speed	max. 3000 min <sup>-1</sup>
Starting torque	≤ 0.25 Nm
Shaft insulation	max. 2.5 kV (for dielectric strength version)
Shaft load	
Axial	≤ 100 N
Radial	≤ 300 N
Dimensions	
Length	84.5 mm
Diameter	93 mm

**Type Code**

**Structure of the type code**

E	N	I	9	0	H	O	-	R	(1)	(1)	(2)	(2)	E	-	(3)	(3)	(3)	(3)	(4)	(4)	(4)	(4)	-	R	(5)	(5)
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<b>ENI</b>	<b>Device type</b>
ENI	Incremental rotary encoder

<b>90</b>	<b>Size</b>
90	Housing diameter 90 mm

<b>HO</b>	<b>Version</b>
HO	Offshore

<b>R</b>	<b>Shaft type</b>
R	Recessed hollow shaft

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## Type Code

(1) (1)	Shaft diameter
12	12 mm
16	16 mm
T1	17mm conus
R1	16 mm, dielectrically strong
R2	17 mm conus, dielectrically strong
RA	12 mm, dielectrically strong

(2) (2)	Flange
NA	Support plate 70 mm, straight
NB	Support plate 120 mm, straight
NC	Support plate 120 mm, right ankle
T1	Support plate 70 mm, straight, with articulated arm 70 mm
T2	Support plate 120 mm, straight, with articulated arm 70 mm
T3	Support plate 120 mm, straight, with articulated arm 70 mm
V1	Support plate 70 mm, straight, with articulated arm 120 mm
V2	Support plate 120 mm, straight, with articulated arm 120 mm
V3	Support plate 120 mm, right ankle, with articulated arm 120 mm
NN	No fastening element

E	Degree of protection
E	IP66 / IP67

(3) (3) (3) (3)	Pulse count
0100	100 pulses
0360	360 pulses
0500	500 pulses
1000	1000 pulses
1024	1024 pulses
2048	2048 pulses
2500	2500 pulses
3072	3072 pulses
4096	4096 pulses
5000	5000 pulses

(4) (4) (4)	Electrical interface
UD1	Universal output driver, $U_B$ 5 V ... 30 V
UD2	RS422, $U_B$ 5 V ... 30 V

R	Connection alignment
R	Radial

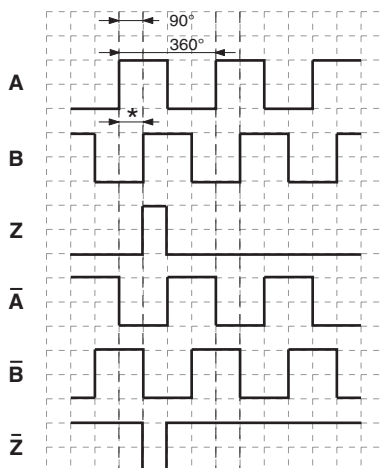
(5) (5)	Connection type
C1	Cable, 1 m
C2	Cable, 2 m
C3	Cable, 3 m
C5	Cable, 5 m
CA	Cable, 10 m
AA	M23 device plug, cw (type 9416)
AB	M23 device plug, ccw type 9416L)
BE	M12 device plug, 8- pin (type V19)
BD	M12 device plug, 5-pin (type V15)
TC	Cable duct (available only without UL Listed)

**Connection**

Signal	Cable	Connector M23, 12-pin, clockwise, counterclockwise	Connector M12 x 1, 8-pin	Connector M12 x 1, 5-pin	Terminals
GND	White	10	1	3	0V
U <sub>b</sub>	Brown	12	2	1	U <sub>B</sub>
A	Green	5	3	2	A
B	Grey	8	5	4	B
$\bar{A}$	Yellow	6	4	-	$\bar{A}$
$\bar{B}$	Pink	1	6	-	$\bar{B}$
Z	Blue	3	7	5	Z
$\bar{Z}$	Red	4	8	-	$\bar{Z}$
NC	-	2	-	-	-
NC	-	7	-	-	-
NC	-	9	-	-	-
NC	-	11	-	-	-
Shielding	Shield	Housing	Housing	Housing	Grounding
	<p><b>Note:</b> Unused cores must be insulated individually before commissioning in order to avoid interference.</p>				

**Operation**

**Signal outputs**



↺ ccw - with view onto the flange  
phase relationships electrical  
\* 1 Measuring step is 90° electrical

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