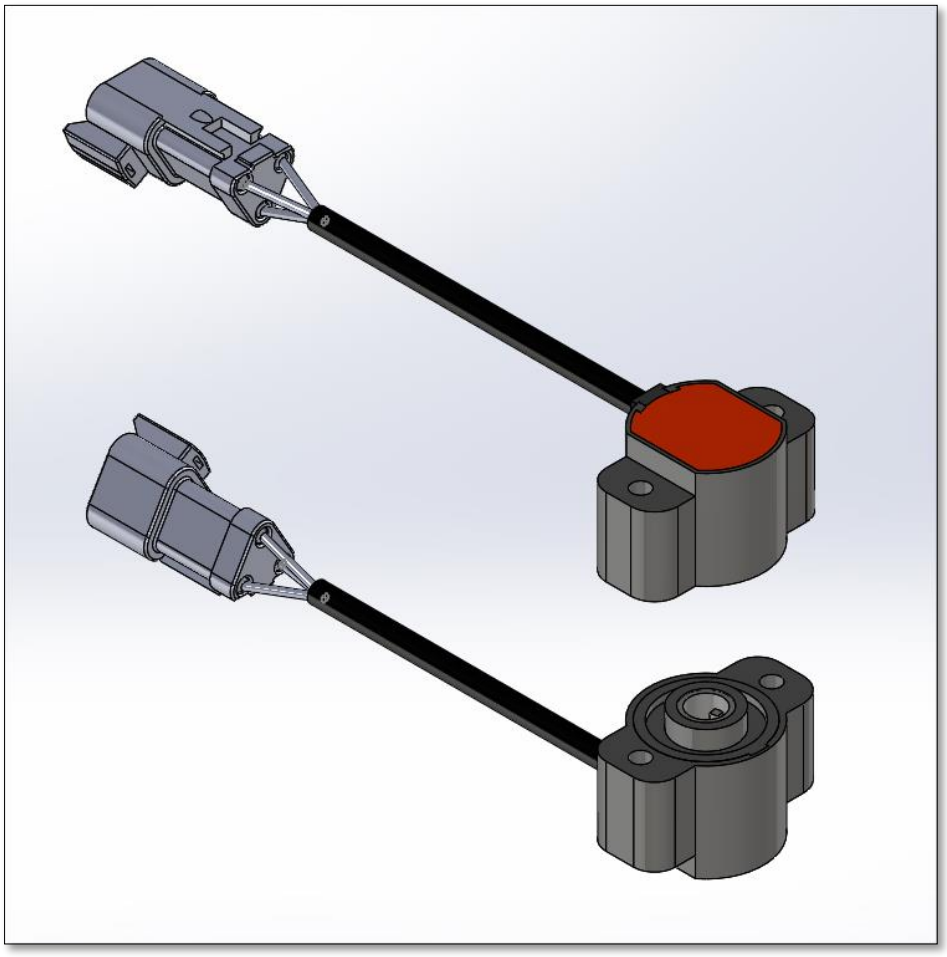
ASBR – Angular Sensor – Hub Shaft
Preliminary Datasheet*

*Changes may occur without prior notice.

Angular Sensor



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CARACTERÍSTICAS

Mechanical characteristics

Shaft diameter *	9,5mm (with internal rebound)
Recommended fixing screw	M5
Shaft rotation range	180° (with spring return)

** Another option on demand*

Electrical characteristics

DC Supply	10 a 30 VCC.
Linear output types*	0,5 V a 4,5 V 0 V a 5 V 4 mA a 20 mA
Output load voltage	Minimum load > 10 KΩ
Output load current	Maximum load < 250 Ω
Power consumption (without load)	< 10 mA
DAC resolution	0,088º (12 bits)
Characteristic curves (signal output profiles)*	Fully Programmable ex.: - Ascending - Descending - Trapezoidal - N module
Electrical protection	Reverse polarity, short circuit and overvoltage
Angular measuring range	18° a 180°

** Another option on demand*

Ambiental characteristics

Operational temperature	-10°C to 80°C
Storage temperature	-10°C to 80° C
Ingress Protection code (IP)	IP69
Conformity	RoHS Compliant

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CONFIGURATOR – EIXO SEMI-VAZADO (*HUBSHAFT*)

Serie	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10	
ASBR	Mechanics	Shaft	Signal Increment Direction	Measuring Range Center	Measuring Range	Output	Cable Length	Connector	Special Code	Accessories	Description
										0	No accessories
										A	Solid Shaft lever
									0		Standard Curve
									D		Double Mirrored Curve (trapezoidal)
									*		*Another option on demand*
								0			No connector
								N			Deutsch 3 pins, male
								P			Delphi 3 pins, male
								S			Superseal 3 pins male
								*			*Another available connector*
							1				0,1 m
							*				*Another available length*
						A					0,5 V a 4,5 V (Voltage)
						B					0 V a 5,0 V (Voltage)
						C					4-20 mA (Current)
						*					*Another available amplitude*
					018° a 180°						*Fully programmable for any range within the limits min. (0-18°) or max. (0-360°)*
				009° a 171°							*Fully programmable for any specific angle (between 0 and 359º)*
			H								Clockwise – CW
			A								Counterclockwise – CCW
ASBR	H	H									Standard Housing + *Hubshaft* with spring return and rotation range up to 180°

* Another option on demand

DIMENSION – *HUBSHAFT*

CODES 1 E 2 – MECHANICS AND SHAFT

- **H – Standard Housing, *Hub shaft***

DIMENSIONS (mm)

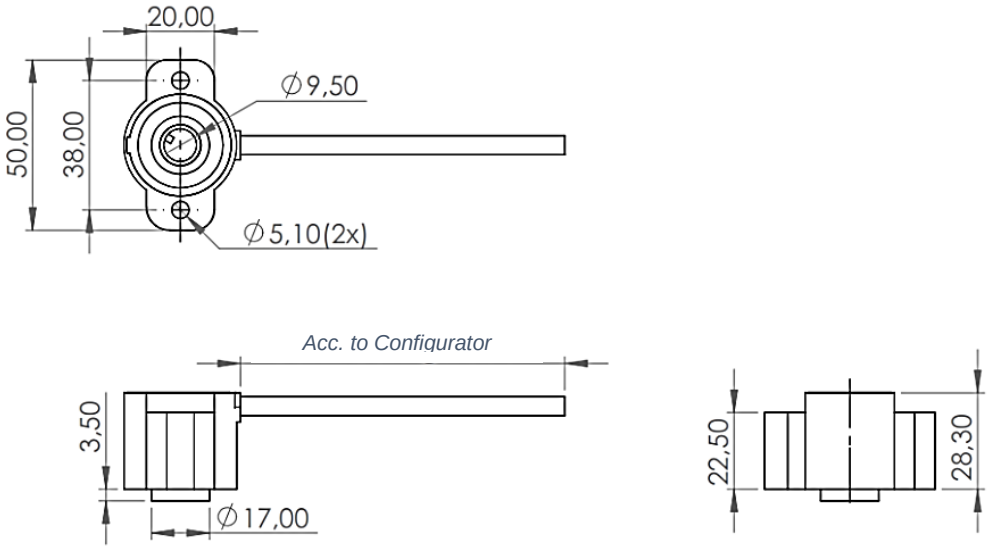


Figure 1 – Standard housing details (hub shaft)

MECHANICAL REFERENCE – HUB SHAFT

CODE 3 – SIGNAL INCREMENT DIRECTION

The **SIGNAL INCREMENT DIRECTION** is the rotational direction (Clockwise: "*CW*", or Counterclockwise: "*CCW*") for the signal increment range (from the minimal to the maximal amplitude, either in voltage or current), established in the measuring range (useful signal zone, as defined in 'Code 5' section).

The **SIGNAL INCREMENT DIRECTION** is referenced in relation to the top view of the sensor (resin side of housing or the opposite view of the shaft), acc. the Fig. 2.

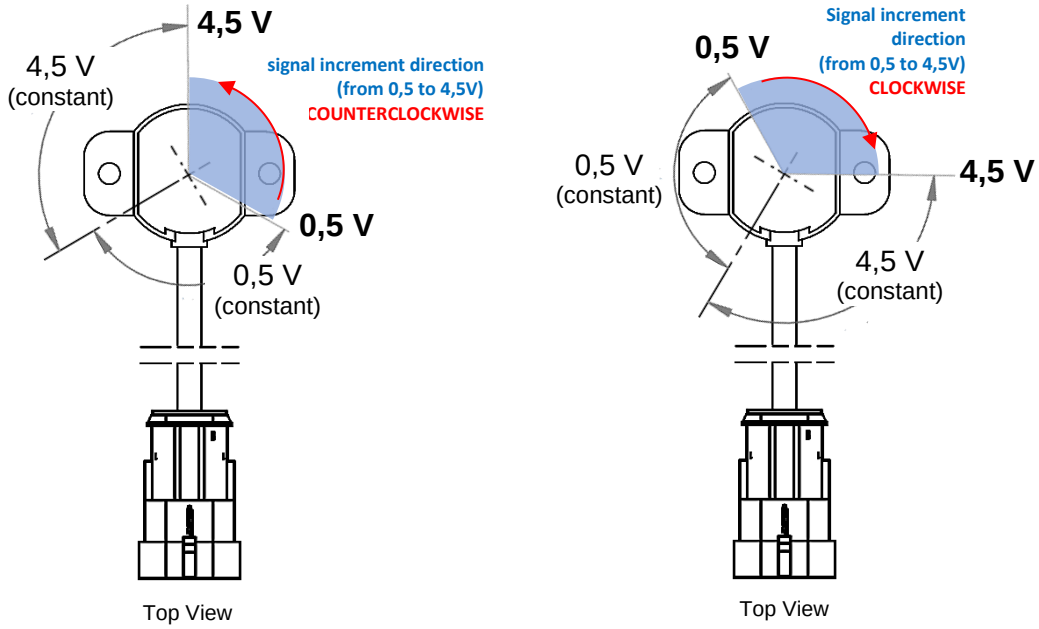


Figure 2 – Signal Increment Directiont (examples)

CODE 4 – MEASURING RANGE CENTER

The **MEASURING RANGE CENTER** is a reference for the positioning (*offset*) of the Measuring Range (as definition in 'Code 5', below), which consists of 2 symmetric segments The Measuring Range **CENTER** is measured from the Origin, which makes a 150º angle clockwise with the sensor cable, through the top view of the sensor (resin side), as shown in Fig. 3.

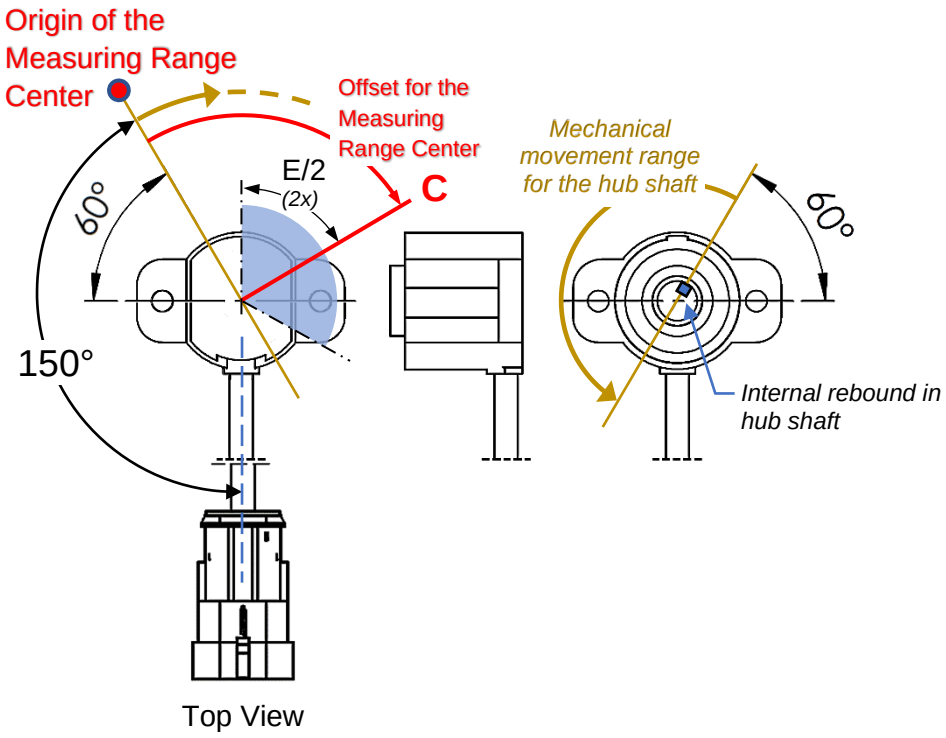


Figure 3 - Representation for the Center (C) of Measuring Range (E)

The 150º angle is actually directly related to the positioning of the internal rebound in the hub shaft for its rest position ("stop"), since hub shaft version has a return spring system. From this position, the shaft (under spring tension) can be rotated mechanically through 180º.

Given this mechanical movement restriction of the shaft (for the viability of its spring return), there is a mathematical relationship to the Measuring Range itself. Besides, the Measuring Range Center may be located in any position (specific angle) between 9º and 171º (from the Origin and measured clockwise).

Logically, there is a compromise relationship between the Measuring Range and its Center, which in the hub shaft sensor is defined by the Equation 1.

$$\left(\frac{Measur.\,Range}{2}\right) \leq Measuring\ Range\ Center \leq \left[180 - \left(\frac{Measur.\,Range}{2}\right)\right] \quad \text{(Eq. 1)}$$

Sometimes, it´s interesting to know the signal magnitude precisely in the Measuring Range Center, as show in Fig. 4, below.

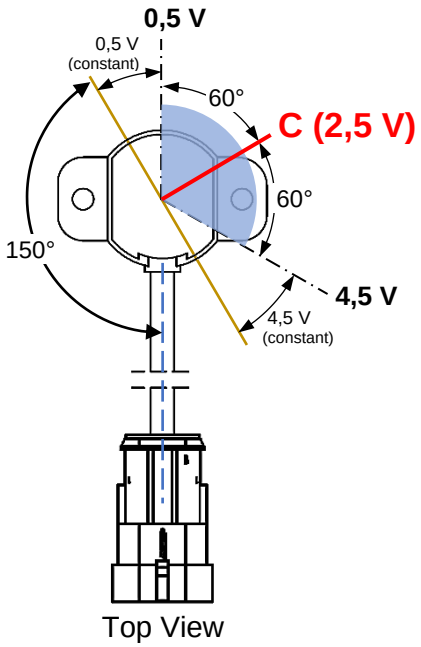


Figure 4 - Signal magnitude in the Measuring Range Center

The signal magnitude in the Measuring Range Center is calculated through the Equation 2, as follows.

$$Signal\ magnitude\ (Measur.Range\ Center) = \left(\frac{Signal_{\ máx} - Signal_{\ mín}}{2}\right) + Signal_{\ mín} \quad \text{(Eq. 2)}$$

CODE 5 – MEASURING RANGE

The **MEASURING RANGE** is the linear output region of the signal sensor (useful signal zone). In it occurs the proportional variation of the signal in relation the movement of the sensor shaft. The Measuring range has 2 segments, both referenced from the measuring range center (“C”), as seen in Figure 5. The Measuring Range is fully programmable for any condition between the minimal (0 to 18º) and maximum (0 to 180º) range.

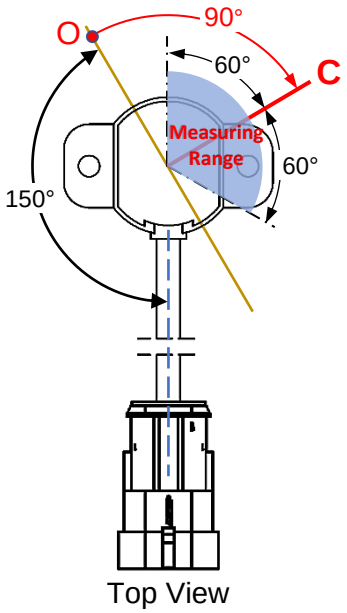
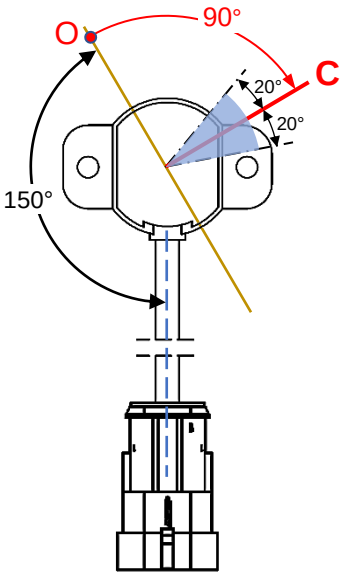


Figure 5 - Representation of Measuring Range

Codification examples and meaning

- **ASBR HHH 090 040 A 1000**
  Direction of increment = Clockwise
  Measuring range center = 90° (half of mechanical movement range shaft, 180º)
  Measuring range = 40° (2 segments of 20°)
  Output Type = “A” (0,5 V a 4,5 V)

  This codification could be illustrated by Figure 6, below (the coincidence in colors between the image and the graph is intentional).



Top View

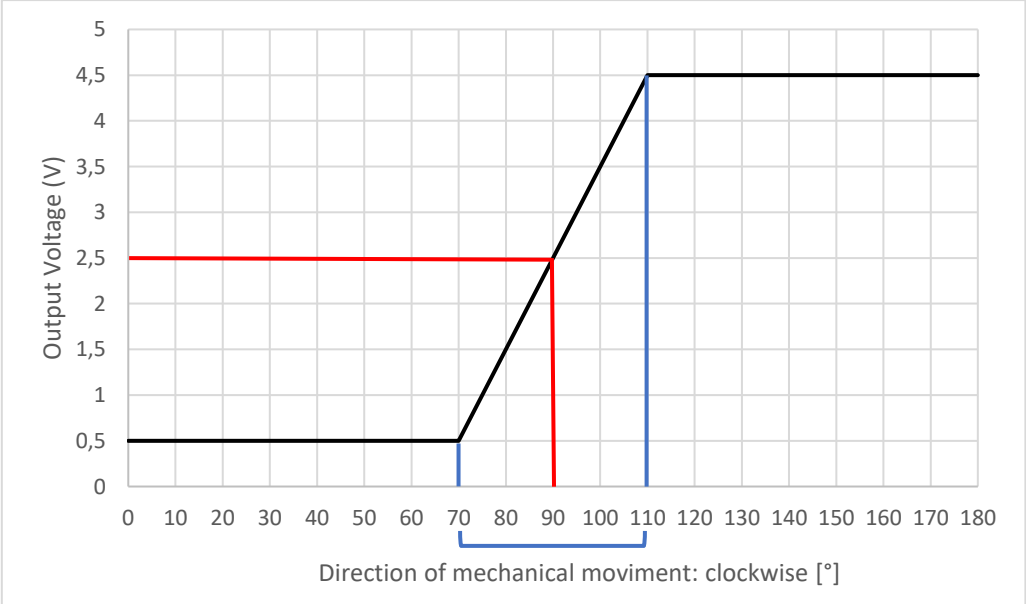


Figure 6 - Measuring range of 40º with center in 90°, Clockwise increment (0,5 a 4,5 V). Note that the mechanical drive shaft only reaches 180° (hub shaft restriction with spring return)

CODE 6 – OUTPUT TYPE

Regarding to the type of output signal, the angular sensor has 2 types.

- Output Voltage
  - A: 0,5 a 4,5 V
  - B: 0 a 5,0 V
- Output Current: 4 a 20mA

Other amplitudes are available on request, as the output types is fully programmable.

EXAMPLES OF CHARACTERISTIC CURVES*

***Other curves on demand**

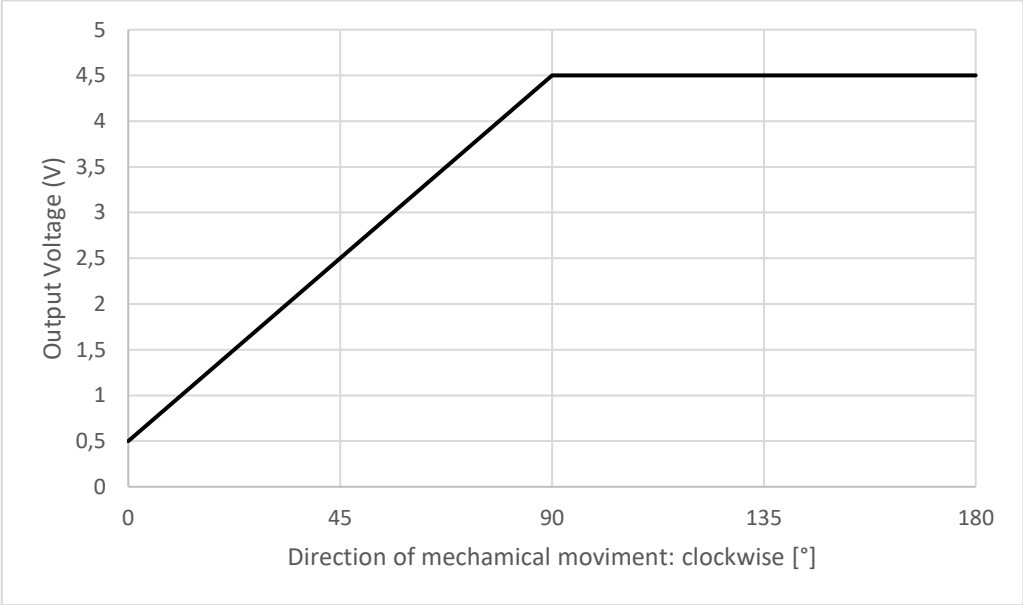


Figure 7 – Measuring range of 90º with center in 45°, clockwise increment, output 0,5 to 4,5 V

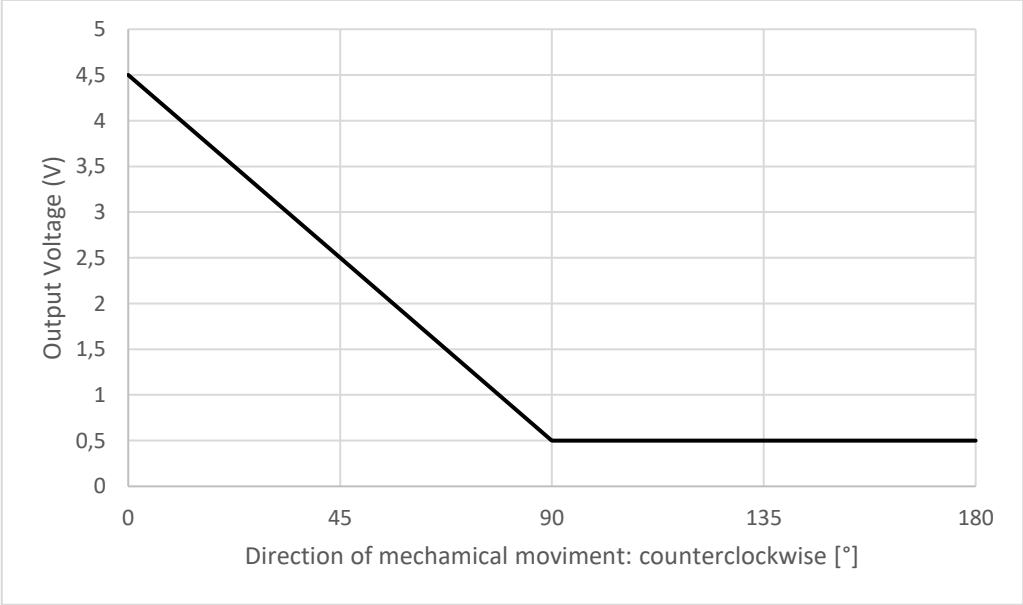


Figure 8 - 90ºMeasuring range of 90º with center in 45°, counterclockwise increment, output 0,5 to 4,5 V

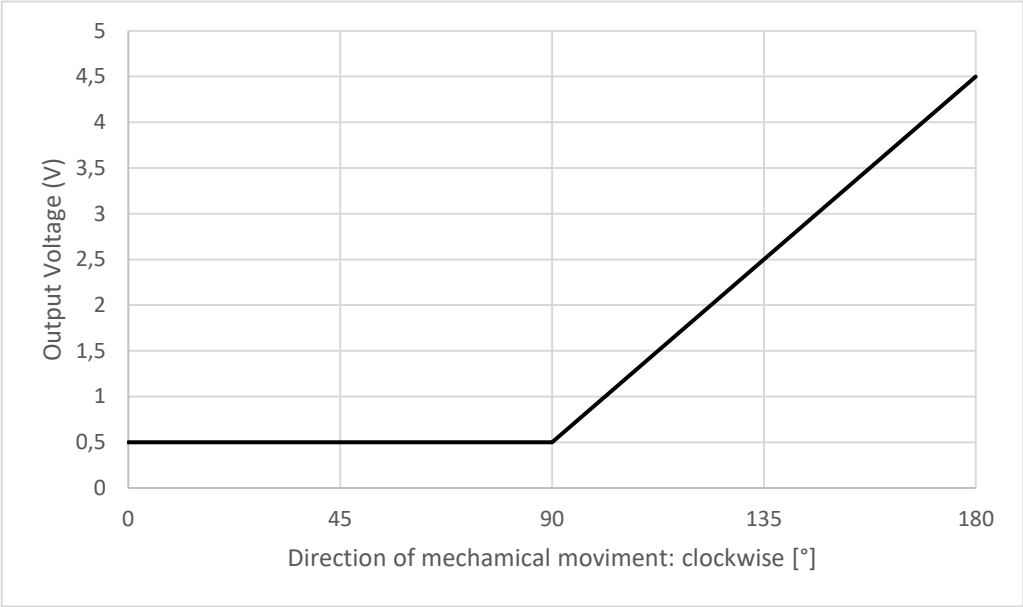


Figure 9 – Measuring range of 90º with center 135°, clockwise increment, output 0,5 to 4,5 V

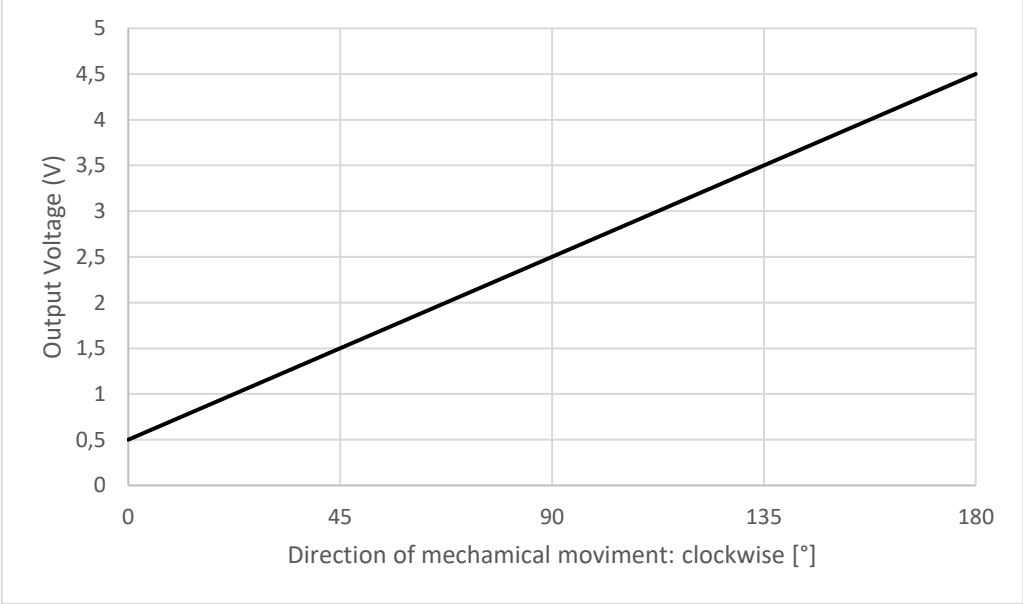
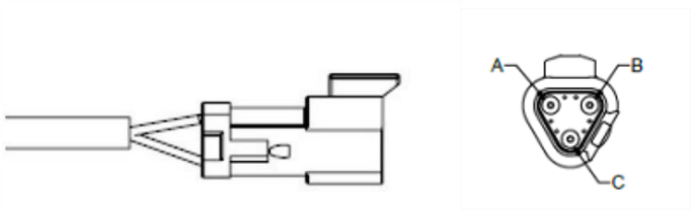


Figure 10 - Measuring range of 180º with center in 90°, clockwise increment, output 0,5 to 4,5 V

PINOUT

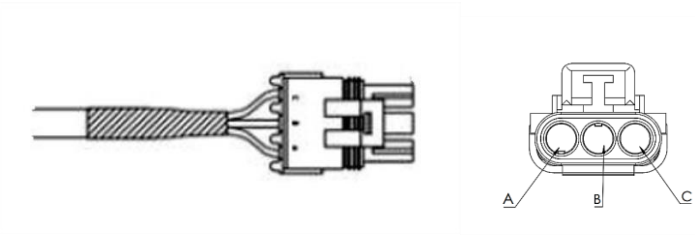
CODE 8 – CONNECTOR

- **N – Deutsch Male**



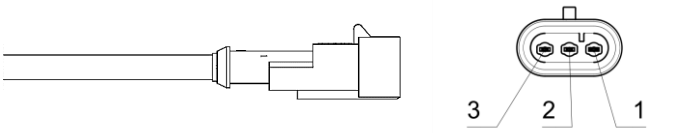
Pin	Function
A	Channel A+
B	GND
C	VCC

- **P – Delphi Male**



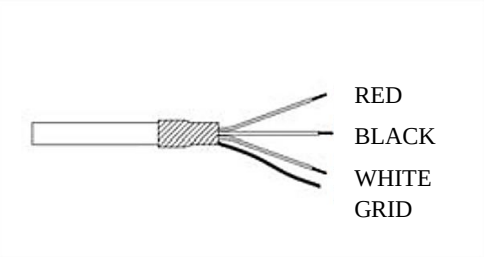
Pin	Function
A	VCC
B	GND
C	Channel A+

- **S – Superseal Male**



Pin	Function
1	GND
2	VCC
3	Channel A+

- **0 – Cabo (without connector)**



Color	Function
Black	GND
Red	VCC
White	Channel A+

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