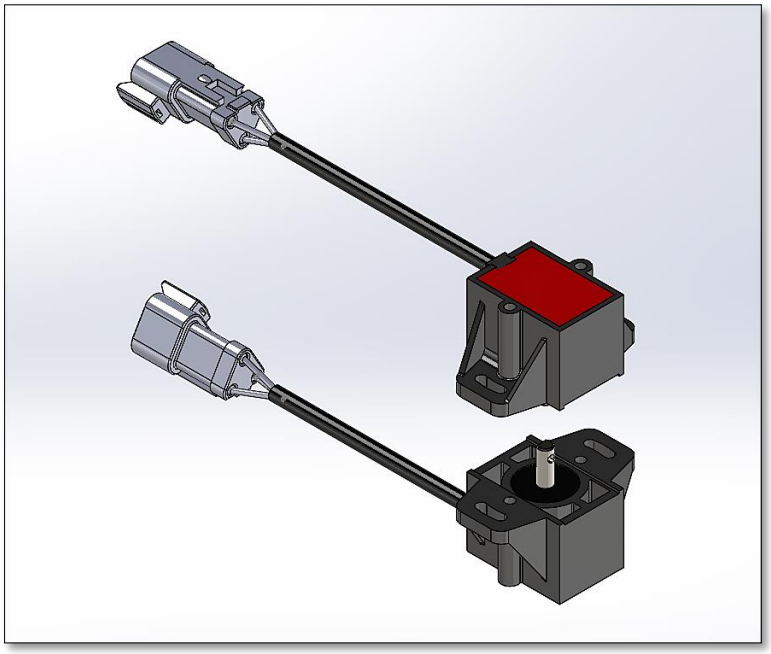
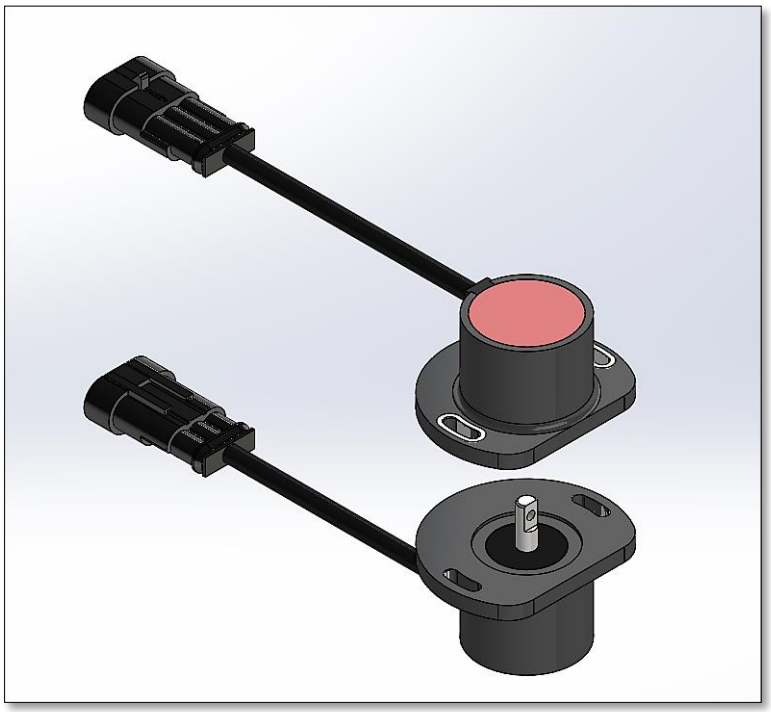
# ASBR – Angular Sensor – Solid Shaft
# Preliminary Datasheet*

*Changes may occur without prior notice.

## Angular Sensor





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## Specifications

### Mechanical characteristics

| | |
|---|---|
| **Shaft diameter *** | 6mm (0,236 pol) |
| **Recommended fixing screw** | M4 |
| **Shaft rotation range** | Unlimited |

** Another option on demand*

### Electrical characteristics

| | |
|---|---|
| **DC Supply** | 10 a 30 VDC. |
| **Linear output types*** | 0,5 V a 4,5 V<br>0 V a 5 V<br>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<br>ex.:<br>- Ascending<br>- Descending<br>- Trapezoidal<br>- N module |
| **Electrical protection** | Reverse polarity, short circuit and overvoltage |
| **Angular measuring range** | 18° a 360° |

**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 – SOLIF SHAFT

| 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 360° | | | | | | *Fully programmable for any range within the limits min. (0-18°) or max. (0-360°)* |
| | | | | 000° a 359° | | | | | | | *Fully programable for any specific angle (between 0 and 359°)* |
| | | | H | | | | | | | | Clockwise – CW |
| | | | A | | | | | | | | Counterclockwise – CCW |
| | U | S | | | | | | | | | Circular Housing + 6 mm Solid Shaft |
| ASBR | R | S | | | | | | | | | Rectangular Housing + 6 mm Solid Shaft |

* Another option on demand

### Codification example

**ASBR USA 000 120 A 1S 00 – Angular Sensor with circular housing, 6mm solid shaft (include 3mm recess and drilling), counterclockwise increment, 120º measuring range with center in 0º, 0,5 a 4,5 V output, cable with 0,1 m length and Superseal connector.**

## DIMENSION – SOLID SHAFT

## CODES 1 AND 2 – MECHANICS AND SHAFT

- **U – Circular Housing, solid shaft only (S)**

DIMENSIONS (mm)

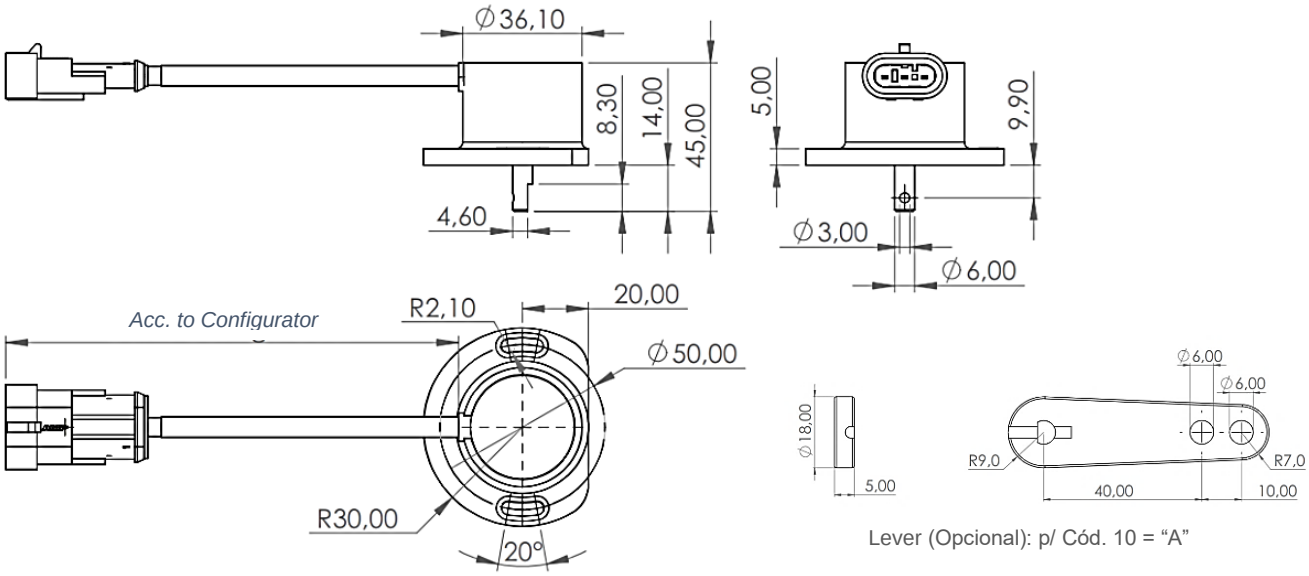



*Figure 1 – Circular housing details (solid shaft)*

- **R – Rectangular Housing, solid shaft (S)**

DIMENSIONS (mm)

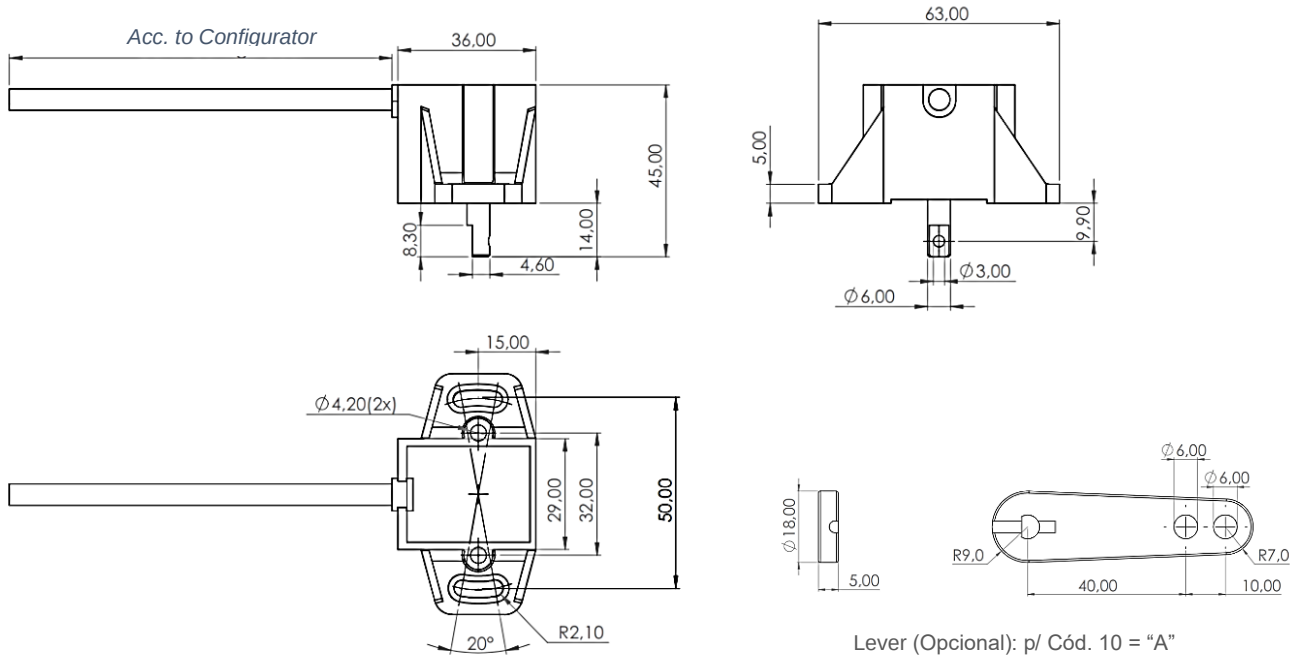



*Figure 2 – Rectangular housing details (solid shaft)*

## MECHANICAL REFERENCE – SOLID 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. 3.

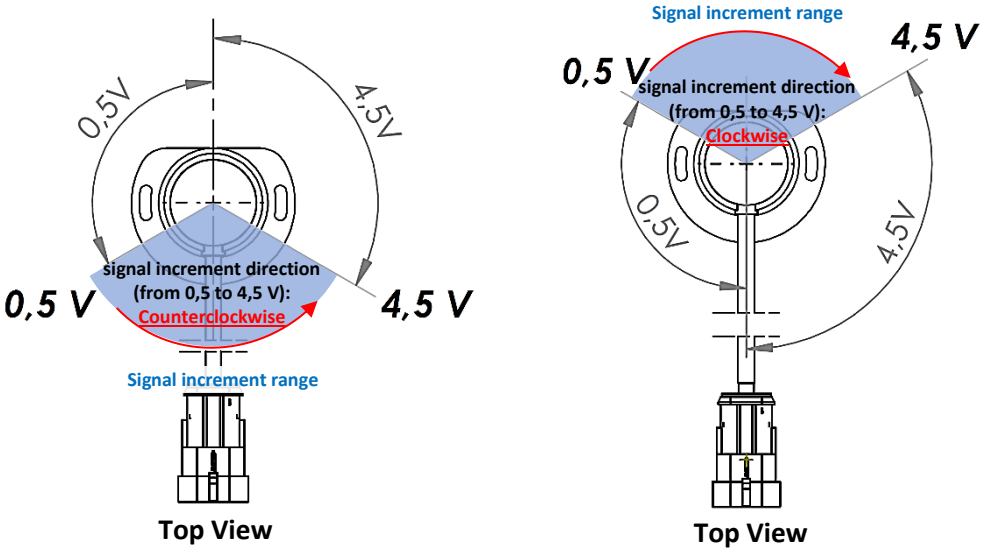



*Figure 3 – Signal Increment Direction (examples)*

### 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 (line over the sensor cable), clockwise, through the top view of the sensor (see Fig. 4).

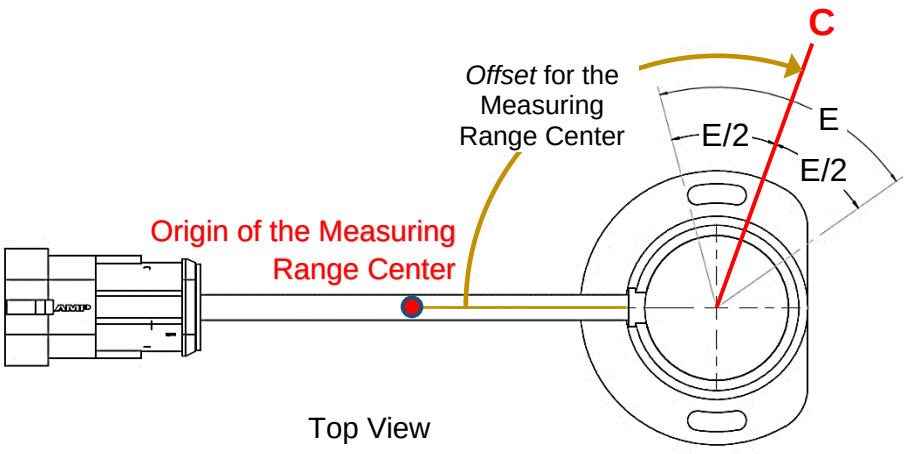



*Figure 4 – Representation of Measuring range (E) Center (C)*

In order Measuring Range Center can be a reference for the sensor output signals, it must be related to the **SHAFT** positioning. For the solid-shaft sensor, the referencing is through the milled **RECESS** of shaft, **ORIENTED** to the Measuring Range Center, also referenced from the sensor cable. See examples in Fig. 5.

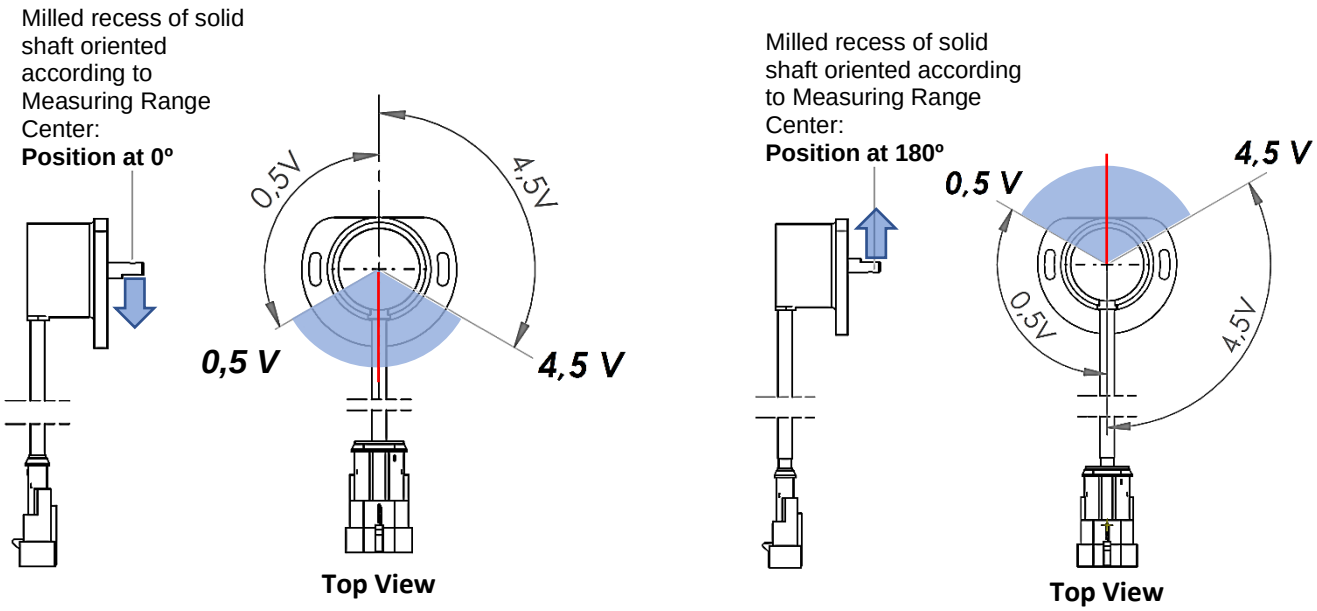



*Figure 5 – Referencing the solid shaft according to the Measuring Range Center*

Sometimes, it´s interesting to know the signal magnitude precisely in the Measuring Range Center, as shown in Fig. 6, below.

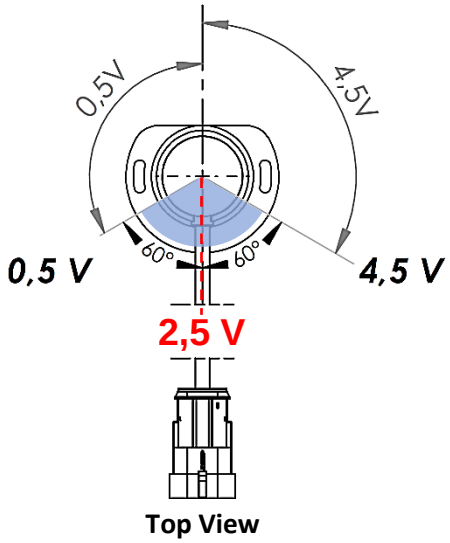



*Figure 6 – Signal magnitude in the Measuring Range Center*

The signal magnitude in the Measuring Range Center is calculated through the Equation 1, as follows.

$$signal\ magnitude\ (Measur.Range\ Center) = \left(\frac{Signal_{máx} - Signal_{mín}}{2}\right) + Signal_{mín} \quad \text{(Eq. 1)}$$

## CODE 5 – MEASURING RANGE

The **MEASURING RANGE** is the linear output region of the sensor signal (useful signal zone). In it occurs the proportional variation of the signal in relation to the sensor shaft movement. The Measuring Range has 2 segments, both referenced from the Center of Measuring Range. In addition to the example given in Fig. 4 (circular housing), see the Measuring Range in the Fig. 7, below (this time for the rectangular housing).

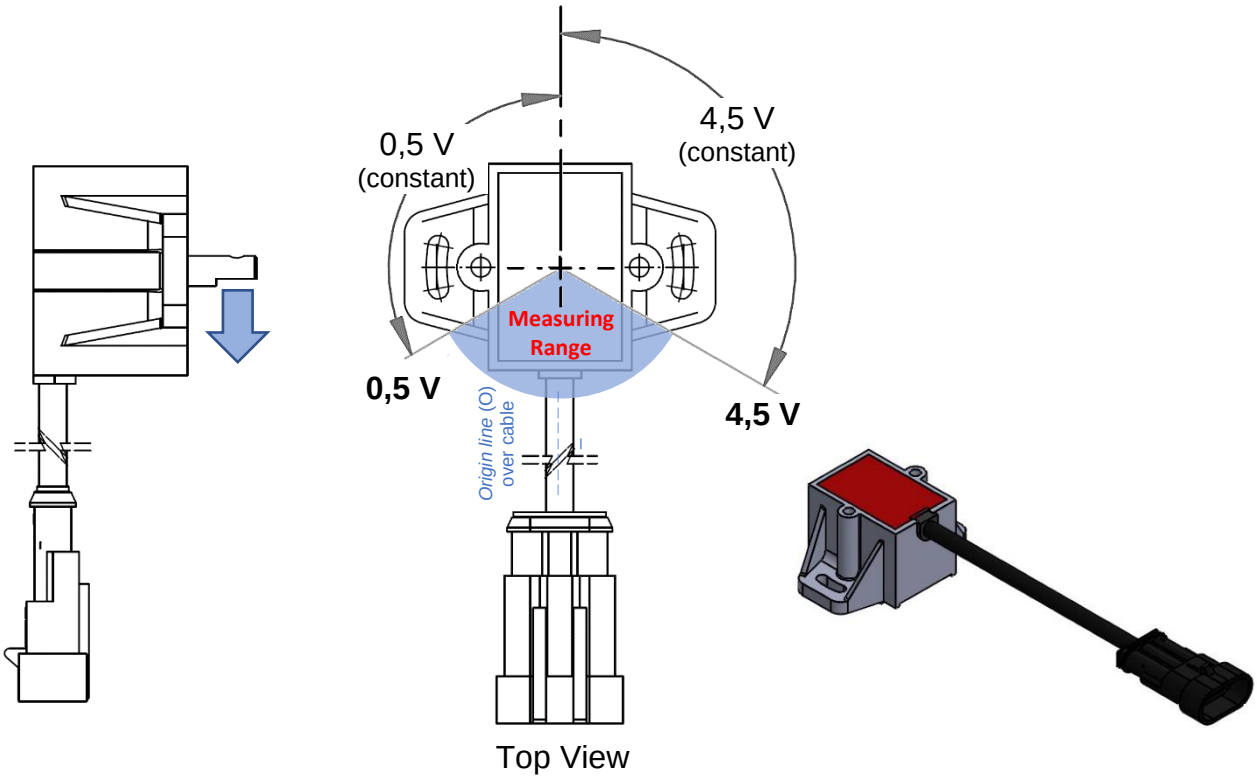



*Figure 7 – Representation of Measuring Range*

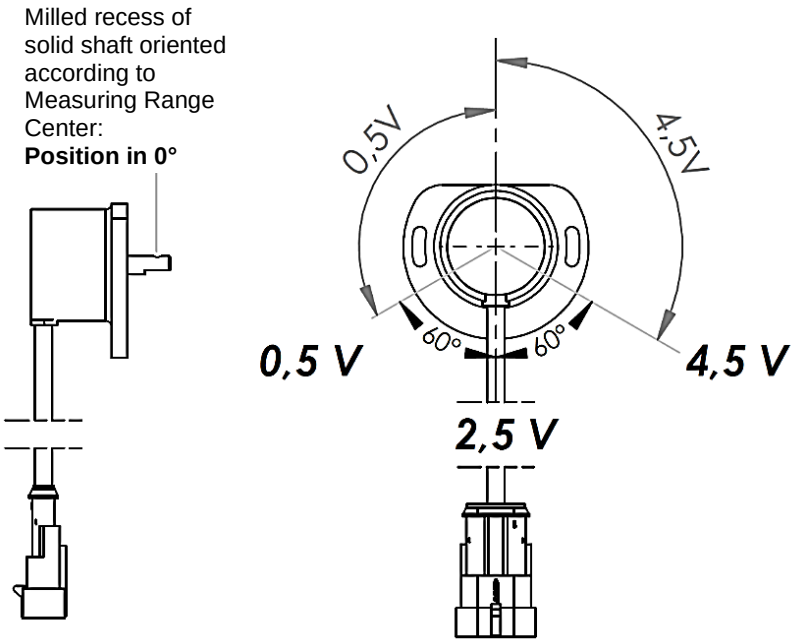
The measuring range is fully programmable for any condition between the minimum (0 a 18°) and maximum (0 a 360°).

### Conceptual Examples

- 120º Measuring Range: 2 segments of 60° having as axis of symmetry on the Measuring Range Center (acc. to Code 4; Fig. 4 and 6).
- 60º Measuring Range: 2 segments of 30° having as axis of symmetry on the Measuring Range Center.

## Codification examples and meaning

- **ASBR US A 000 120 A 1S 00**
  Signal Increment Direction = Counterclockwise
  Measuring Range Center = 0° (coincident with the sensor output cable)
  Measuring Range = 120° (2 segments of 60°)
  Output Type = “A” (0,5 V a 4,5 V)



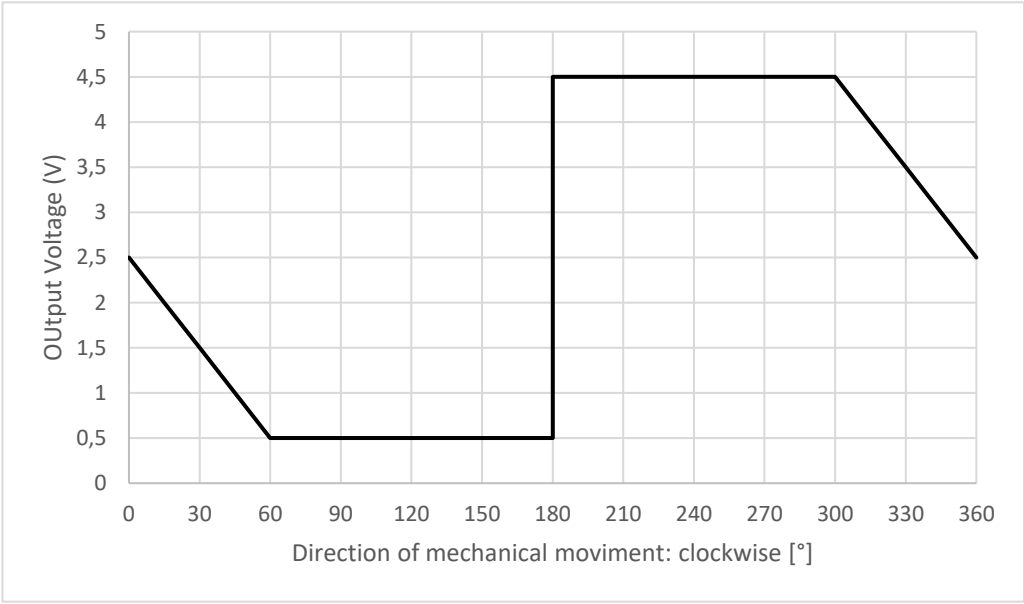
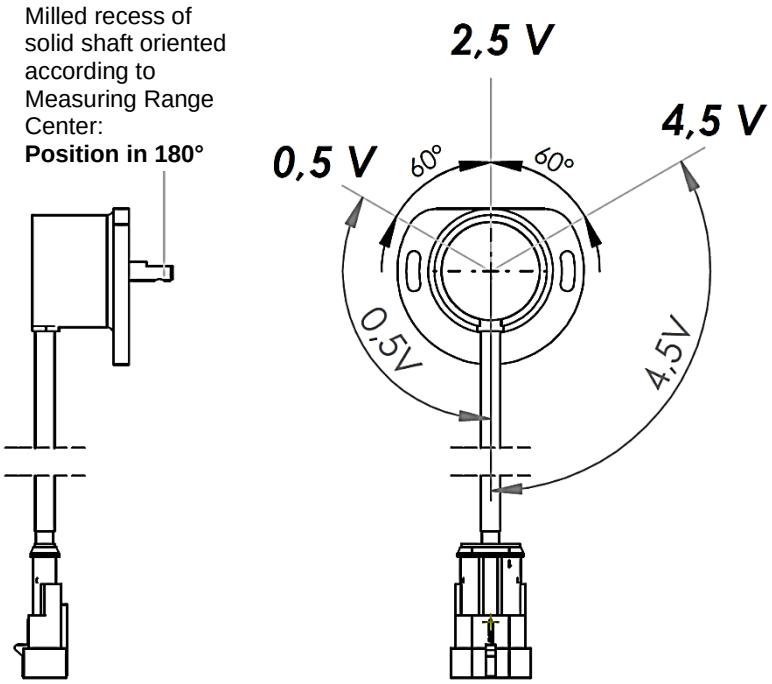




*Figure 8 – Representation for the codification ASBR US A 000 120 A 1S 00*

- **ASBR US H 180 120 A 1S 00**
  Signal Increment Direction = Clockwise
  Measuring Range Center = 180° (symmetrical opposite with the sensor output cable)
  Measuring Range = 120° (2 segments of 60°)
  Output Type = “A” (0,5 V a 4,5 V)



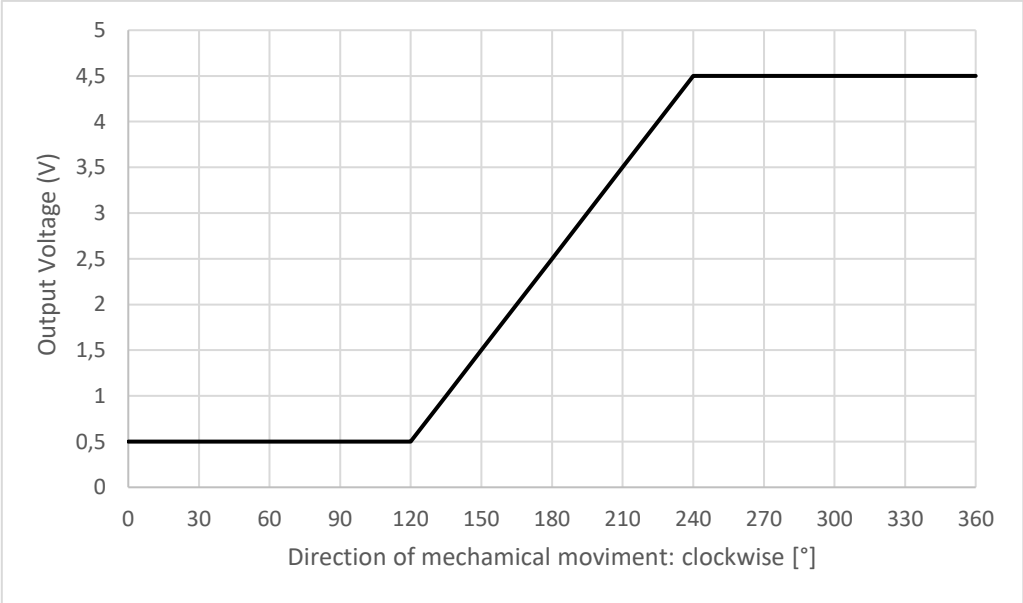




*Figure 9 – Representation for the codification ASBR US H 180 120 A 1S 00*

## CODE 6 – OUTPUT TYPE

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

- 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 are fully programmable.**

## EXAMPLES OF CHARACTERISTIC CURVES*

***Other curves on demand**

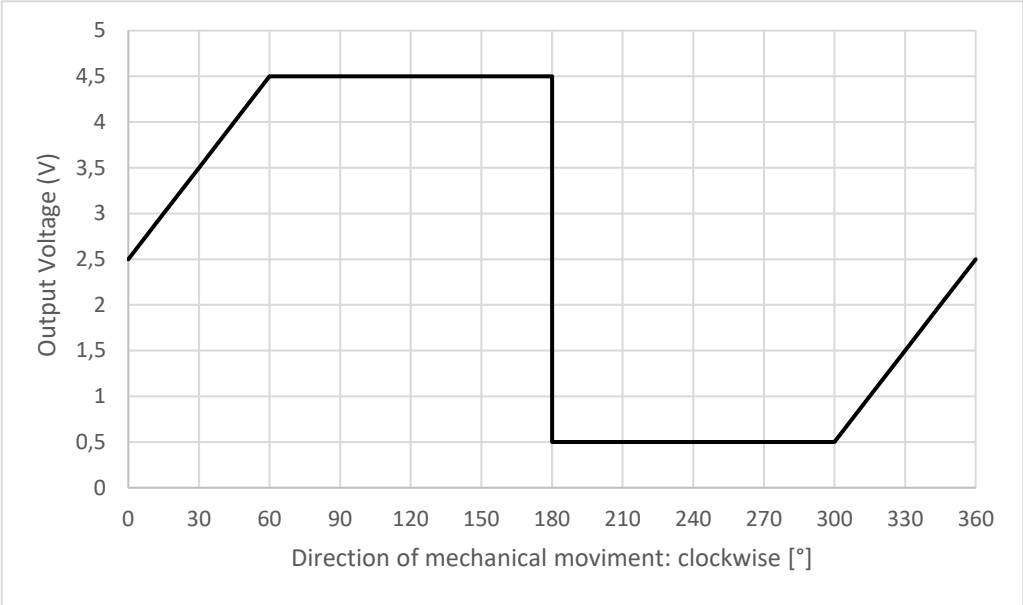



*Figure 10 – Measuring Range of 120º with Center in 0°, Signal Increment Direction: clockwise (0,5-4,5 V)*

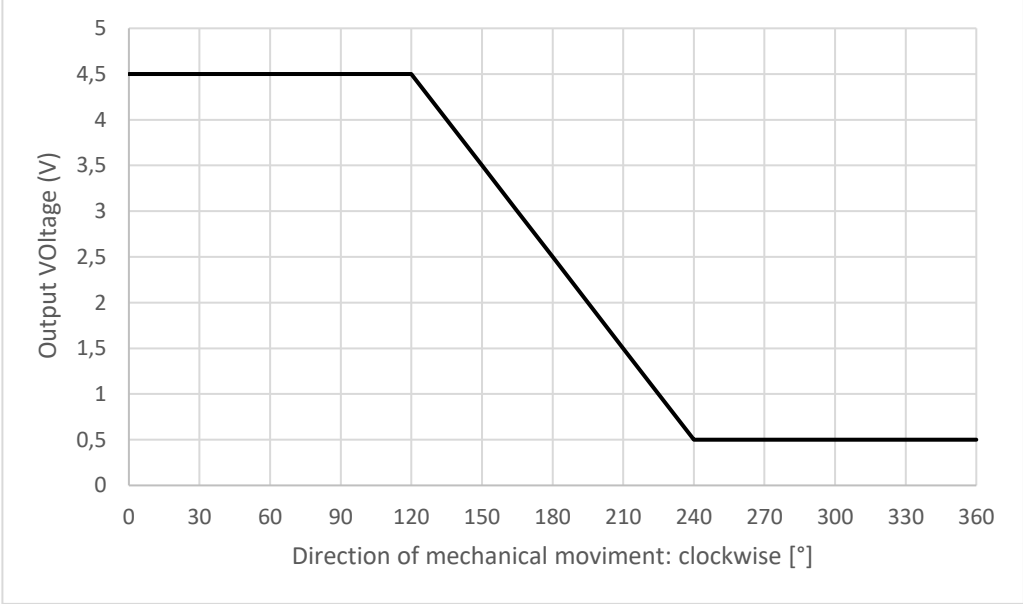



*Figure 11 – Measuring Range of 120º with Center in 180º, Signal Increment Direction: counterclockwise (0,5-4,5 V)*

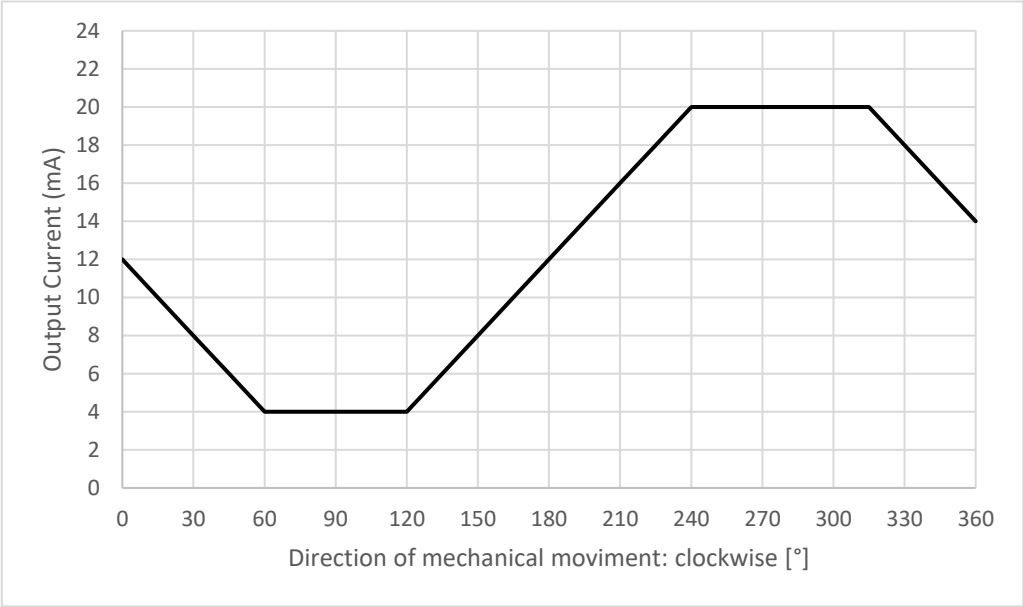



*Figure 12 – Measuring Range of 120º with Center in 0º, Signal Increment Direction: counterclockwise (and Measuring Range Center 180°, signal increment direction: clockwise), mirrored double-curve (trapezoidal), 4-20 mA*

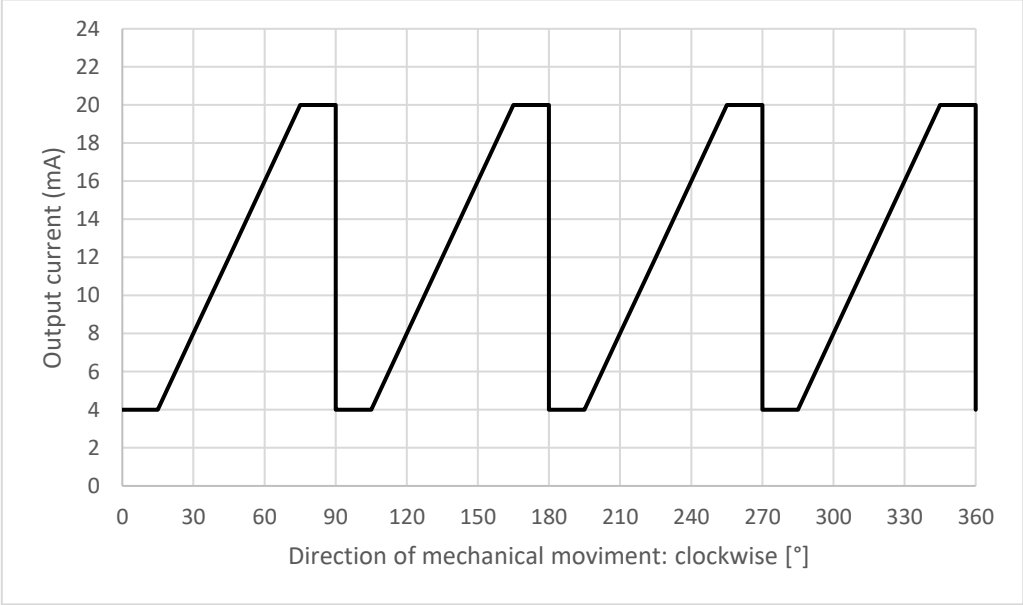
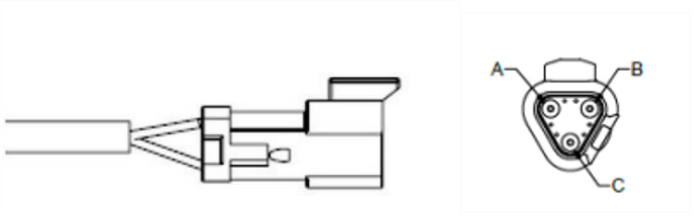



*Figure 13 – Measuring Range of 60º with Center in 45º, 135º, 225º and 315º, four module (4 curves), Signal Increment Direction: clockwise, 4-20 mA*

## PINOUT

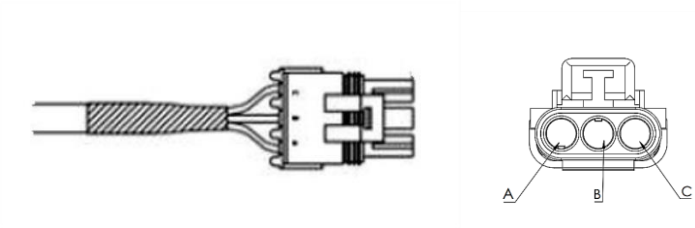
## CODE 8 – CONNECTOR

- **N – Deutsch Male**



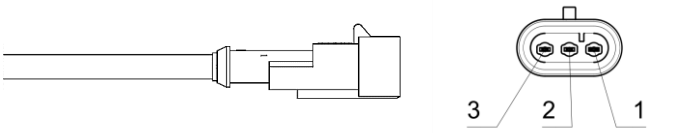

| Pin | Function |
|---|---|
| A | Channel A+ |
| B | GND |
| C | VCC |

- **P – Delphi Male**



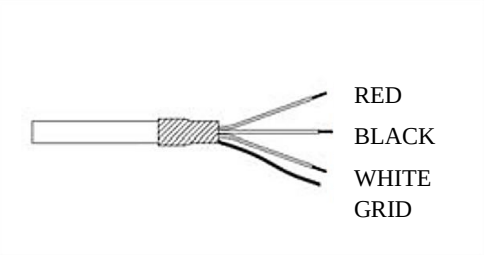

| Pin | Function |
|---|---|
| A | VCC |
| B | GND |
| C | Channel A+ |

- **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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