



## OFFICIAL DISTRIBUTOR

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ENCODER ROD 780 18000 ROD78018000 SIN/COS 18000 PPR +5V REPLACEMENT  
ID23626



**PRECIZIKA**  
METROLOGY



# A170

## PHOTOELECTRIC ANGLE ENCODER



Precision photoelectric angle encoder A170 is used for precise angular displacement measurement of rotary tables, dividers, comparators, antennas and other high precision equipment. It provides information about the value and direction of motion. The encoder is used in automatic control, on-line gauging, process monitoring systems, etc.

The stainless steel case of the encoder is mounted using screws. The angle encoder is connected to the motor shaft or spindle via coupling, available optionally.

Three versions of output signals are available:

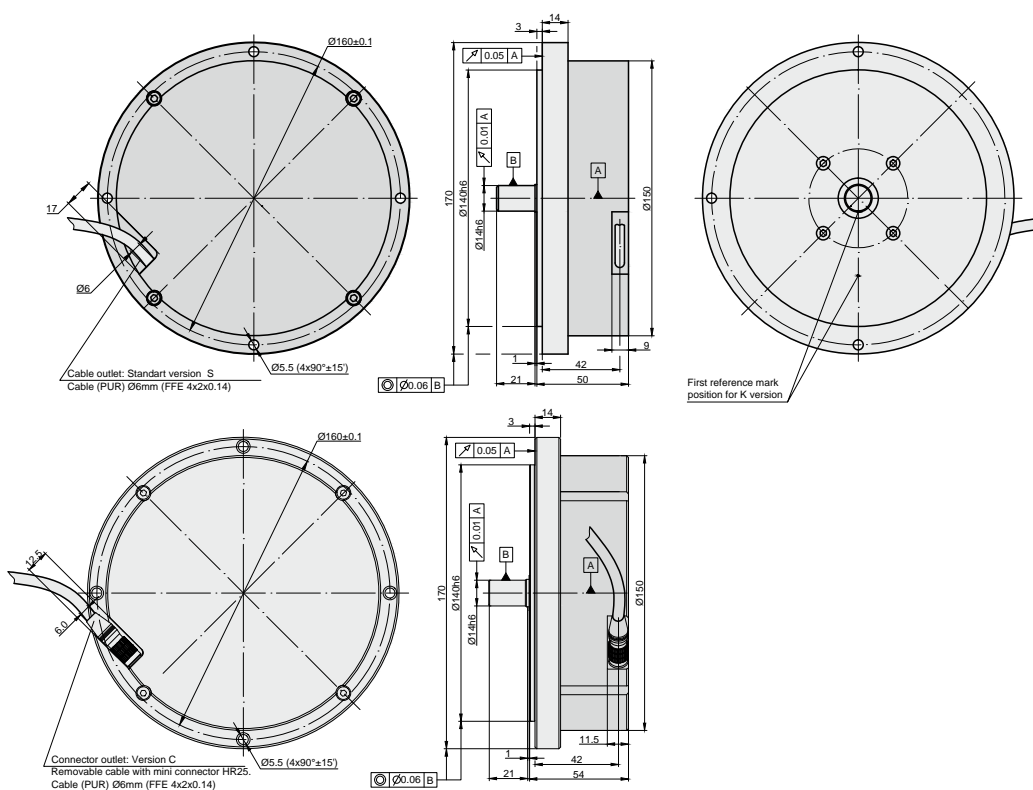
- A170-A - sinusoidal signals, with amplitude approx. 11  $\mu$ App;
- A170-AV - sinusoidal signals, with amplitude approx. 1 Vpp;
- A170-F - square-wave signals (TTL) with integrated subdividing electronics for interpolation x1, x2, x5, x10, x20, x25, x50 and x100.

The modification with distance-coded reference marks is available

### MECHANICAL DATA

|   |  |
|---|--|
| Line number on disc (Z)                                   | 18000, 36000   |
| Number of output pulses per revolution for A170-F         | Z x k, where k = 1, 2, 3, 4, 5, 8, 10, 20, 25, 50, 100 |
| Reference signal:   |  |
| - standard (S)  | One per shaft revolution                               |
| - distance-coded (K) for z = 18000                        | 36 per shaft revolution                                |
| - distance-coded (K) for z = 36000                        | 72 per shaft revolution                                |
| Permissible mech. speed                                   | $\leq 1000$ rpm  |
| Max. operating speed (depends on number of output pulses) | 300 to 500 rpm   |
| Accuracy  | $\pm 2.5; \pm 5.0$ arc. sec                            |

|                                   |   |
|-----------------------------------|---|
| Permissible shaft load:           |   |
| - axial                           | $\leq 30$ N                             |
| - radial                          | $\leq 30$ N                             |
| Starting torque at 20°C           | $\leq 0.012$ Nm                         |
| Rotor moment of inertia           | $< 3.7 \times 10^{-4}$ kgm <sup>2</sup> |
| Protection (IEC 529)              | IP64                                    |
| Maximum weight without cable      | 3.5 kg                                  |
| Operating temperature             | 0...+70 °C                              |
| Storage temperature               | -30...+85°C                             |
| Maximum humidity (non condensing) | 98 %                                    |
| Permissible vibration             | $\leq 100$ m/s <sup>2</sup>             |
| Permissible shock (6 ms)          | $\leq 300$ m/s <sup>2</sup>             |



## ELECTRICAL DATA

| VERSION                     | A170-A $\sim$ 11 $\mu$ App   | A170-AV $\sim$ 1 Vpp  | A170-F $\square$ TTL  |
|-----------------------------|--|---|---|
| Supply voltage ( $U_p$ )    | +5 V $\pm$ 5% 100 mA max.  | +5 V $\pm$ 5% 120 mA max.   | +5 V $\pm$ 5%; 150 mA max.  |
| Light source                | LED  | LED   | LED   |
| Incremental signals         | Two sinusoidal $I_1$ and $I_2$<br>Amplitude at 1 k $\Omega$ load:<br>- $I_1 = 7 \dots 16 \mu$ A<br>- $I_2 = 7 \dots 16 \mu$ A          | Differential sine +A/-A and +B/-B<br>Amplitude at 120 $\Omega$ load:<br>- A = 0.6...1.2 V<br>- B = 0.6...1.2 V                              | Differential square-wave $U1/\overline{U1}$ and $U2/\overline{U2}$ .<br>Signal levels at 20 mA load current:<br>- low (logic "0") $\leq$ 0.5 V<br>- high (logic "1") $\geq$ 2.4 V |
| Reference signal            | One quasi-triangular $I_0$ peak per revolution. Signal magnitude at 1 k $\Omega$ load:<br>- $I_0 = 2 \dots 8 \mu$ A (usable component) | One quasi-triangular +R and its complementary -R per revolution. Signals magnitude at 120 $\Omega$ load<br>- R = 2...8 V (usable component) | One differential square-wave $U0/\overline{U0}$ per revolution. Signal levels at 20 mA load current:<br>- low (logic "0") < 0.5 V<br>- high (logic "1") > 2.4 V                   |
| Maximum operating frequency | (-3 dB cutoff) $\geq$ 160 kHz  | (-3 dB cutoff) $\geq$ 180 kHz   | (160-2500 kHz (depends on interpolation factor)   |
| Direction of signals        | $I_2$ lags $I_1$ for clockwise rotation (viewed from encoder mounting side)  | +B lags +A for clockwise rotation (viewed from encoder mounting side)   | $U2$ lags $U1$ with clockwise rotation (viewed from encoder mounting side)  |
| Maximum rise and fall time  | -  | -   | < 0.5 $\mu$ s   |
| Standard cable length       | 1 m, without connector   | 1 m, without connector  | 1 m, without connector  |
| Maximum cable length        | 5 m  | 25 m  | 25 m  |
| Output signals              |  |   |   |

Note:

- Maximum working rotation speed (with proper encoder counting) is limited by maximum operating frequency and maximum mechanical rotation speed.
- If cable extension is used, power supply conductor cross-section should not be smaller than 0.5 mm<sup>2</sup>.

## ACCESSORIES

|                                |                               |                             |                               |                            |                              |                                |                               |                                     |
|--------------------------------|-------------------------------|-----------------------------|-------------------------------|----------------------------|------------------------------|--------------------------------|-------------------------------|-------------------------------------|
| <b>CONNECTORS FOR CABLE</b>    | B12<br>12-pin round connector | C9<br>9-pin round connector | C12<br>12-pin round connector | D9<br>9-pin flat connector | D15<br>15-pin flat connector | RS10<br>10-pin round connector | ONC<br>10-pin round connector | HR25<br>8-pins round mini connector |
| <b>DIGITAL READOUT DEVICES</b> | CS3000                        |                             |                               |                            | CS5000                       |                                |                               |                                     |
| <b>COUPLING</b>                | SC98-1                        |                             |                               |                            | SC98-2                       |                                |                               |                                     |
| <b>EXTERNAL INTERPOLATOR</b>   | NK                            |                             |                               |                            |                              |                                |                               |                                     |

## ORDER FORM

| A170 - X - XXXXXX/XXXXX - X - XX - X - XX/X - X |                                 |  |  |  |  |  |  |                                    |
|---|---------------------------------|--|--|--|--|--|--|------------------------------------|
| OUTPUT SIGNAL VERSION:                          | PULSE NUMBER PER REVOLUTION:    | OPTIONAL LINE NUMBER ON DISC (Z):      | REFERENCE SIGNAL:  | ACCURACY GRADE:                                | CABLE OR CONNECTOR OUTLET:                                     | CABLE LENGTH:                              | CONNECTOR TYPE:  | COUPLING:                          |
| A<br>AV<br>F                                    | 1...18000<br>...<br>1...3600000 | 18000<br>36000<br><br>*only for A170-F | S - one per revolution,<br>K - distance-coded                                  | 25 $\pm$ 2.5 arc.sec.<br>50 $\pm$ 5.0 arc.sec. | S - version S (cable outlet)<br>C-version C (connector outlet) | AR01 - 1m<br>AR02 - 2m<br>AR03 - 3m<br>... | W - without connector<br>B12 - round, 12 pins<br>C9 - round, 9 pins<br>C12 - round, 12 pins<br>D9 - flat, 9 pins<br>D15 - flat, 15 pins<br>RS10 - round, 10 pins<br>ONC - round, 10 pins | 0 - without coupling<br>1 - SC98-1 |
| ORDER EXAMPLES:                                 |                                 |  | 1) A170-F-360000/36000-K-25-C-AR01/C12-1<br>2) A170-F-360000-K-25-S-AR01/C12-1 |  |  |  |  |                                    |