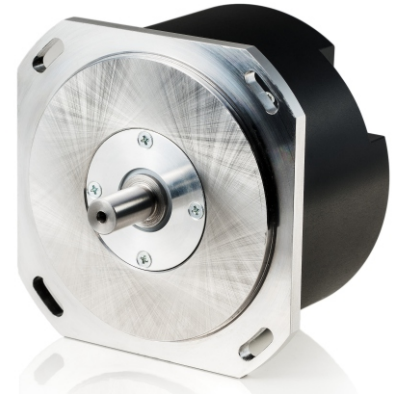


A110

PHOTOELECTRIC ANGLE ENCODER

(A110-A, A110-AV, A110-F)



The semi-precision photoelectric angle encoder **A110** is used to establish an informational link between the key machine components, industrial robots, comparators and DCC, NC or Digital Readout Units. It provides information about the value and direction of motion. The encoder is used in automatic control, on-line gauging, process monitoring systems, etc.

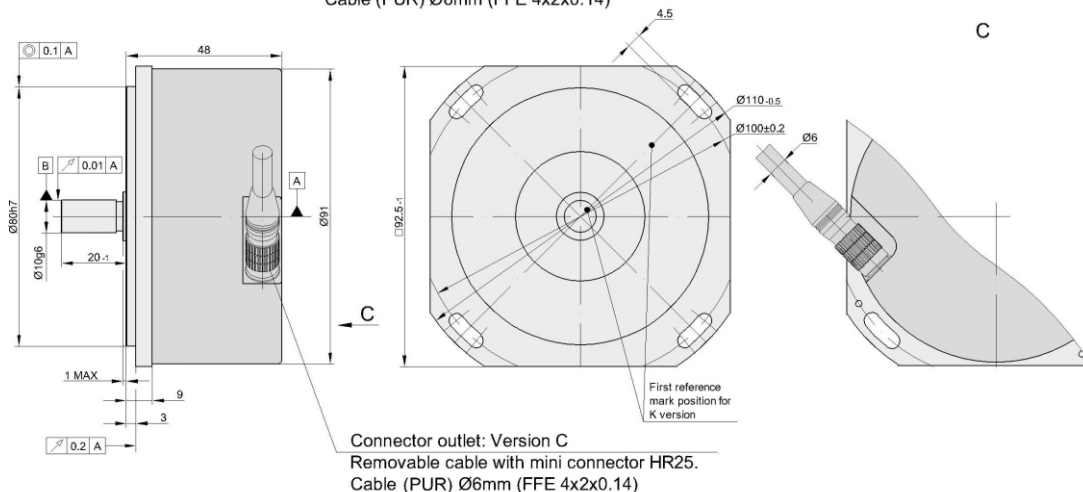
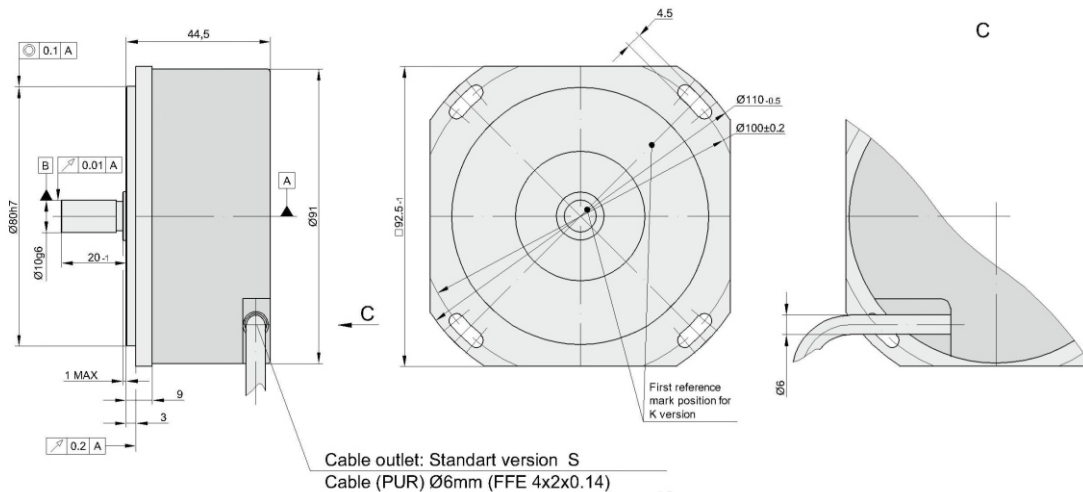
Three versions of output signals are available:

- **A110-A** - sinusoidal signals, with amplitude approx. $11 \mu A_{pp}$;
- **A110-AV** - sinusoidal signals, with amplitude approx. $1 V_{pp}$;
- **A110-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

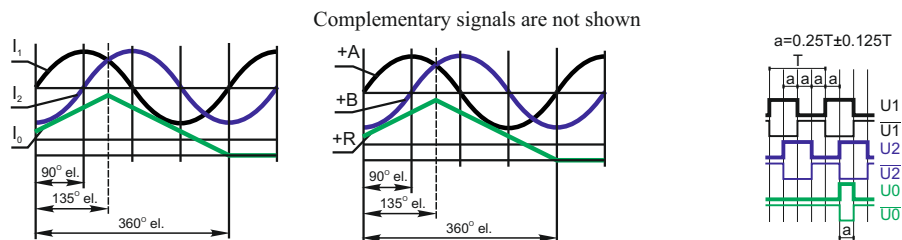
◆ Line number on disc:	18000	◆ Accuracy	$\pm 7.5; \pm 5.0$ arc. sec.
◆ Number of output pulses per revolution for A110-F :	18000, 36000, 90000, 180000, 360000, 450000, 900000, 1800000	◆ Starting torque at 20°C	≤ 0.01 Nm
◆ Reference signal:		◆ Rotor moment of inertia	$< 20 \times 10^{-6}$ kgm ²
- standard (S)	one per shaft revolution	◆ Protection (IEC 529)	IP64
- distance-coded (K)	36 per shaft revolution	◆ Maximum weight without cable	0.7 kg
◆ Maximum shaft speed	5000 rpm	◆ Operating temperature	0...+50 °C
◆ Maximum shaft load:		◆ Storage temperature	-30...+80 °C
- axial	10 N	◆ Maximum humidity (non condensing)	98 %
- radial (at shaft end)	10 N	◆ Permissible vibration	≤ 100 m/s ²
		◆ Permissible shock (6 ms)	≤ 300 m/s ²



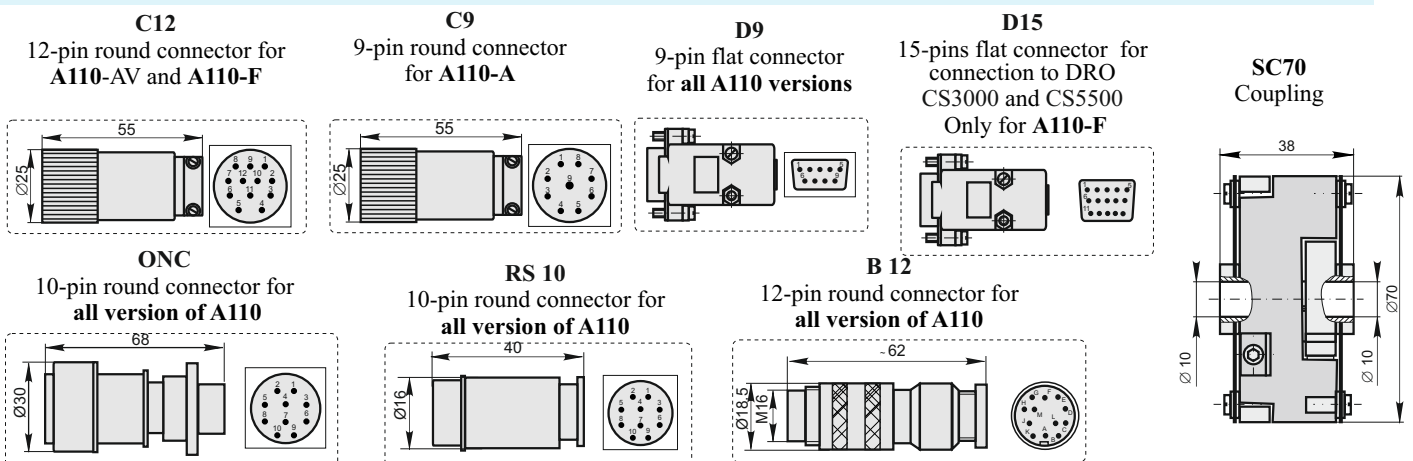
◆ Electrical Data

Version	A110-A $\sim 11 \mu\text{A}_{\text{pp}}$	A110-AV $\sim 1 \text{V}_{\text{pp}}$	A110-F \square TTL
◆ Power supply	+5 V $\pm 5\%$	+5 V $\pm 5\%$	+5 V $\pm 5\%$
◆ Maximum consumed current (without load)	80 mA	120 mA	120 mA
◆ Light source	LED	LED	LED
◆ Incremental signals	Two sinusoidal I_1 and I_2 . Amplitude at 1 k Ω load: - $I_1 = 7\text{-}16 \mu\text{A}$ - $I_2 = 7\text{-}16 \mu\text{A}$	Differential sine +A/-A and +B/-B Amplitude at 120 Ω load: - A = 0.6-1.2 V - B = 0.6-1.2 V	Differential square-wave $U1/\overline{U1}$ and $U2/\overline{U2}$. Signal levels at 20 mA load current: - low (logic "0") $\leq 0.5 \text{V}$ - high (logic "1") $\geq 2.4 \text{V}$
◆ Reference signal	One quasi-triangular I_0 peak per revolution. Signal magnitude at 1 k Ω load: - $I_0 = 2\text{-}8 \mu\text{A}$ (usable component)	One quasi-triangular +R and its complementary -R per revolution. Signal magnitude at 120 Ω load: - R = 2-8 V (usable component)	One differential square-wave $U0/\overline{U0}$ per revolution. Signal levels at 20 mA load current: - low (logic "0") $\leq 0.5 \text{V}$ - high (logic "1") $\geq 2.4 \text{V}$
◆ Maximum operating frequency	(-3 dB) $\geq 160 \text{kHz}$	(-3 dB) $\geq 180 \text{kHz}$	160 -1300 kHz, depends on interpolation factor
◆ Direction of signals	I_2 lags I_1 for clockwise rotation (viewed from shaft side)	+B lags +A for clockwise rotation (viewed from shaft side)	$U2$ lags $U1$ for clockwise rotation (viewed from shaft side)
◆ Maximum rise and fall time			$< 0.5 \mu\text{s}$
◆ Standard cable length	1 m, without connector	1 m, without connector	1 m, without connector
◆ Maximum cable length	5 m	25 m	25 m

Note: 1. Maximum working rotation speed (with proper encoder counting) is limited by maximum operating frequency and maximum mechanical rotation speed. 2. If cable extension is used, power supply conductor cross-section should not be smaller than 0.5 mm².



◆ Accessories



◆ Order form

A110 - X - X X X X X X X - X - XX - X - X X / X - X

Output signals version: A, AV or F	Pulse number per revolution: 18000... 1800000	Reference signal: S - one per revolution, K - 36 per revolution, distance coded	Accuracy grade: 50 - ± 5.0 arc. sec. 75 - ± 7.5 arc. sec.	Cable or connector outlet: S - version S (cable outlet) C - version C (connector output)	Cable length: AR01 - 1m AR02 - 2m AR03 - 3m ...-...	Connector type: W - without connector D9 - flat, 9 pin C9 - round, 9 pin C12 - round, 12 pin D15 - flat, 15 pins ONC - round, 10 pins RS 10 - round, 10 pins B12 - round, 12 pins	Coupling: 0 - without coupling 1 - with coupling
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Order example: A110-F-18000-K-50-S-AR02/C12-0