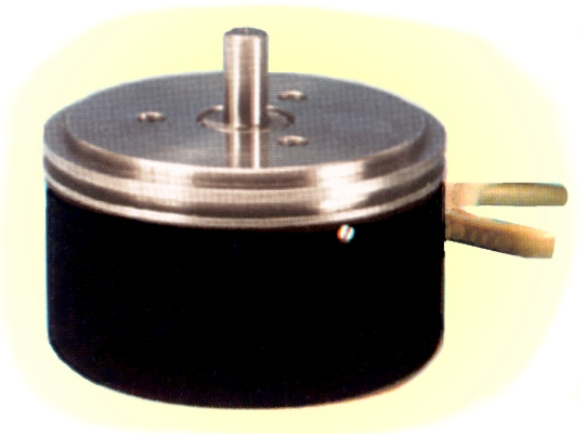# A90X2 PHOTOELECTRIC ROTARY ENCODER

(A90X2-A, A90X2-AV, A90X2-F)

*The semi-precision encoder **A90X2** has two tacks and two signals outputs. The encoder is similar to the Heidenhain ROD 2271 in electrical parameters and signal outputs.*

The semi-precision photoelectric rotary encoder **A90X2** is used to measure angular position of the key components of machines, industrial robots, comparators, rotary tables and to establish an informational link with DCC or NC units. It gives information about the value and direction of the motion components. Low line number track is used for high shaft speeds while the high line track is used for high positioning accuracy.

The case of the encoder is fixed to an object by means of special fasteners included in delivery set. The hollow shaft of the encoder is connected with an object shaft by virtue of a compensating coupling. The encoder has three versions by its output signals:

A90X2-A - sinusoidal signals for both tracks, with amplitude approx. 11 μA_{PP};

A90X2-AV - sinusoidal signals for both tracks, with amplitude approx. 1 V_{PP};

A90X2-F - square-wave signals (TTL) for both tracks, with integrated subdividing electronics for track No. 2 with high number of line.

■ Mechanical Data

Line number for **A90X2-A** and **A90X2-AV** (track 1/track 2):	1024/9000	Maximum shaft load:	
		- axial	10 N
		- radial (at shaft end)	10 N
Number of output pulses per revolution for **A90X2-F**:	1024/9000, 1024/18000	Starting torque at 20°C	≤ 0.01 Nm
	1024/45000, 1024/90000	Moment of inertia of rotor	$< 0.2 \times 10^{-4}$ kgm^2
	1024/225000	Protection (IEC 529)	IP64
	1024/450000	Maximum weight without cable	0.8 kg
Permissible mech. speed	≤ 4000 rpm	Operating temperature	0...+70 °C
Max. operating speed:		Storage temperature	-30...+85 °C
- track 1	≤ 4000 rpm	Maximum humidity	
- track 2 (depends on number of output pulses)	600-1000 rpm	(without condensation of moisture)	98 %
		Permissible vibration (55 to 2000 Hz)	≤ 100 m/s^2
Accuracy	±7.5 arc. sec.	Permissible shock (5 ms)	≤ 300 m/s^2

Output track 1 Cable 6

Output track 2 Cable 7
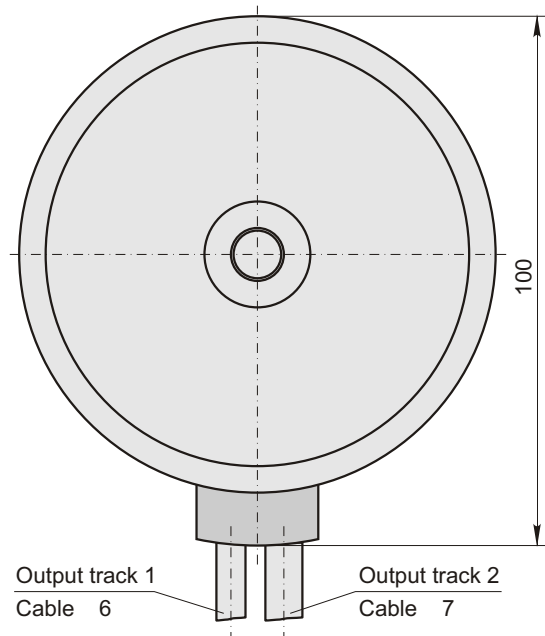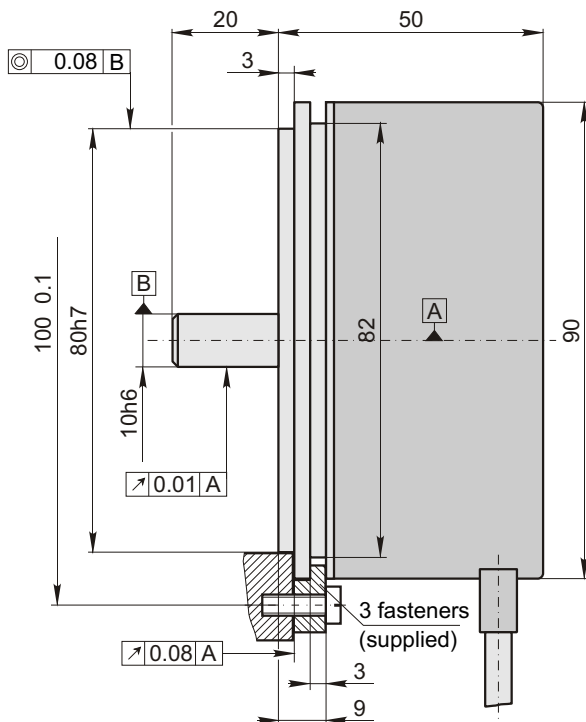
| Version	A90X2-A, 2 $\sim$ 11 μApp	A90X2-AV, 2 $\sim$ 1 Vpp	A90X2-F, 2 ▢ TTL
Power supply	+5 V ±5%	+5 V ±5%	+5 V ±5%
Max. consumed current (without load)	2 100 mA	2 120 mA	2 150 mA
Light source	LED	LED	LED
Incremental signals (both tracks)	Two sinusoidal I_1 and I_2. Amplitude at 1 k load: - I_1 = 7...16 μA - I_2 = 7...16 μA	Two sinusoidal A and B. Amplitude at 120 load: - A = 0.6...1.2 V - B = 0.6...1.2 V	Square-wave U1, U2 and their inverted $\overline{U1}$, $\overline{U2}$. Signal levels at 20 mA load current: - low ("0" logic) $\leq$ 0.5 V - high ("1" logic) $\geq$ 2.4 V
Reference signal (both tracks)	One quasi-triangle I_0 peak per revolution. Signal magnitude at 1 k load: - I_0 = 2...8 μA (usable component)	One quasi-triangle R per revolution. Signal magnitude at 120 load: - R = 0.2...0.8 V (usable component)	One square-wave U0 and its inverted $\overline{U0}$ per revolution. Signal levels at 20 mA load current: - low ("0" logic) $\leq$ 0.5 V - high ("1" logic) $\geq$ 2.4 V
Max. operating frequency - track 1 - track 2	(-3dB cutoff) $\geq$ 160 kHz (-3dB cutoff) $\geq$ 160 kHz	(-3dB cutoff) $\geq$ 180 kHz (-3dB cutoff) $\geq$ 180 kHz	160 kHz 600-4500 kHz (depends on interpolation factor)
Direction of signals	I_2 lags I_1 with clockwise rotation (viewed from encoder mounting side)	B lags A with clockwise rotation (viewed from encoder mounting side)	U2 lags U1 with clockwise rotation (viewed from encoder mounting side)
Max. rising and falling time			< 0.5 μs
Standard cable length	1 m, without connector	1 m, without connector	1 m, without connector
Max. cable length	3 m	15 m	15 m
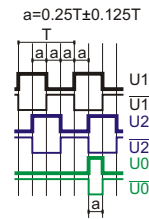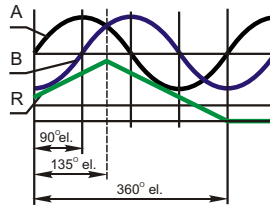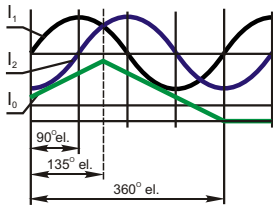
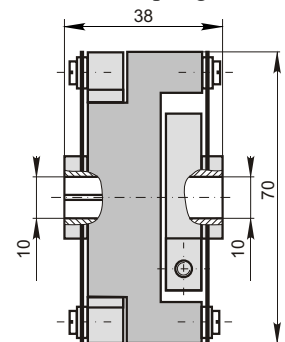

■ Accessories

C9
9-pin round connector for **A90X2-A**
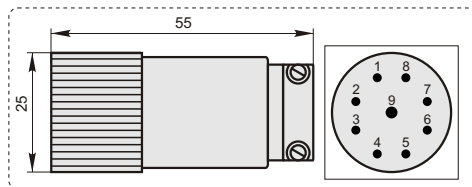
D9
9-pin flat connector
for all versions of **A90X2**
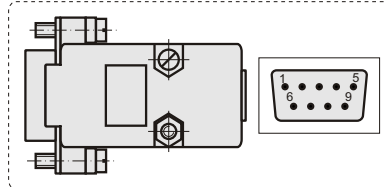
SC70
Coupling

C12
12-pin round connector for
A90X2-**AV** and **A90X2-F**
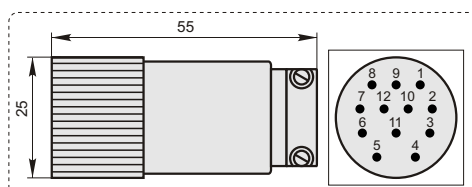
■ Order form

A90X2 – X – X X X X X – X X / X – X

Version by output signals: **A**, **AV** or **F**	Impulse number for output No.2: **9000**... **450000**	Cable length: **01** - 1m **02** - 2m **03** - 3m ... - ...	Type of connectors: **W** - without conn. **D9** - flat, 9 pins **C9** - round, 9 pins **C12** - round, 12 pins	Coupling: **0** - without coupling **1** - with coupling