Sine-Wave Encoder S21

- Wide operating temperature range of –15 °C up to +120 °C, therefore optimum use of motor capacity
- High limiting frequency with excellent signal quality, allowing highest peak speeds and reduced non-productive time wastage
- Excellent immunity to interference (EN 61000-4-4, Class 4)
- High functional safety due to signal control and system monitoring (under-voltage, pollution, disc damage, end of LED service life)
- High signal quality through control and error compensation

The S21 has been constructed in line with the International Standard Resolver dimension 21, i.e. 2.1" (approx. 53 mm) and as a result is also suitable for smaller sized motors. The simplicity of connection rounds off advantages of the S21. The integrated cable plug connector combines the advantages of the plug with those of a cable connection. This leads to a fast, economical and space-saving installation.

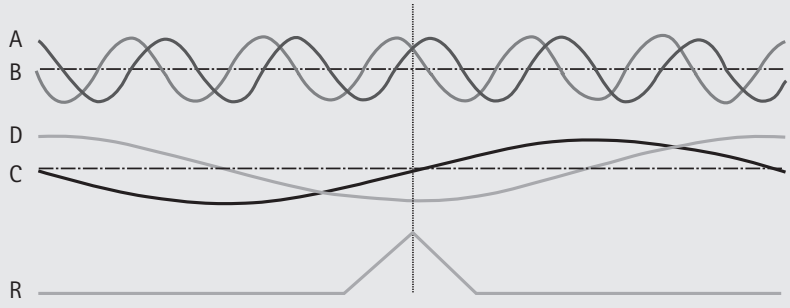
TECHNICAL DATA
Electrical

General Design	acc. DIN EN 61010-1, protection class III, contamination level 2, overvoltage category II
Supply voltage	5 V +/-10 %
Current consumption	max. 120 mA
Incremental signals: A, B	Sine - Cosine 1Vpp
Increments	2048
Accuracy	+/- 35"
Repeatability	+/- 7"
Max. frequency	500 kHz
Reference signal: R	> 0.4 V (1 pulse per rev.)
Commutation signal: C, D	Sine - Cosine 1Vpp (1 period per rev.)
Connection	PCB connector with cable

TECHNICAL DATA
Mechanical

Shaft form	Conical 1/10
Shaft variations	Hollow and solid
Shaft diameter	10 mm
Shaft load	radial 90 N, axial 20 N
Compensation	axial ± 0.5 mm, radial ± 0.1 mm
Nominal speed	12.000 min^{-1}
Maximum speed	15.000 min^{-1} (short time)
Torque	≤ 1 Ncm
Protection class	IP 40
Operating temperature	-15 °C ...+120 °C
Storage temperature	... -20 °C +80 °C
Vibration (IEC 68-2-6)	≤ 100 m/s^2 (10 ... 2000 Hz)
Shock (IEC 68-2-27)	≤ 1000 m/s^2 (6 ms)
Housing material	Aluminium

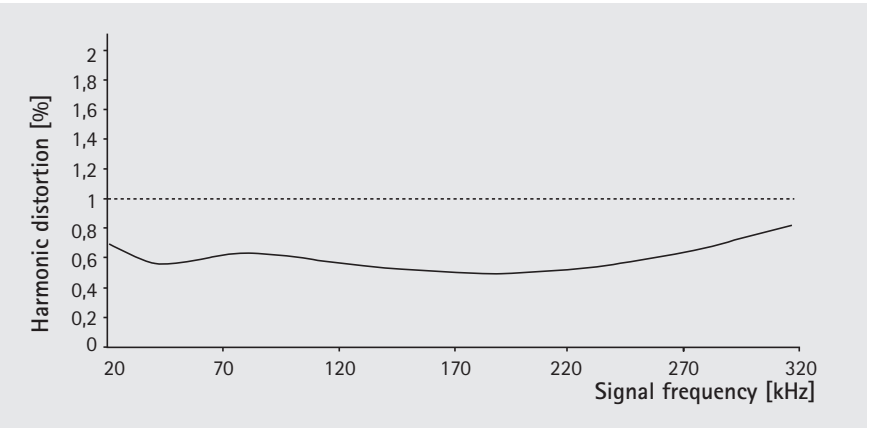
S21 SIGNALS



Signals shown at CW rotation with view on shaft's end

The incremental signals A and B and the zero signal R are differential voltage signals. The differential signal level is 1Vpp. The zero signal appears once per revolution and reaches its maximum value at the angle where the amplitudes of A and B Signals are equal. The coarse tracks C and D deliver one sinewave period per revolution and are utilized to determine the absolute rotor position of Brushless DC motors for startup commutation. All signals have a DC offset of 2.5 V.

S21 SIGNAL QUALITY

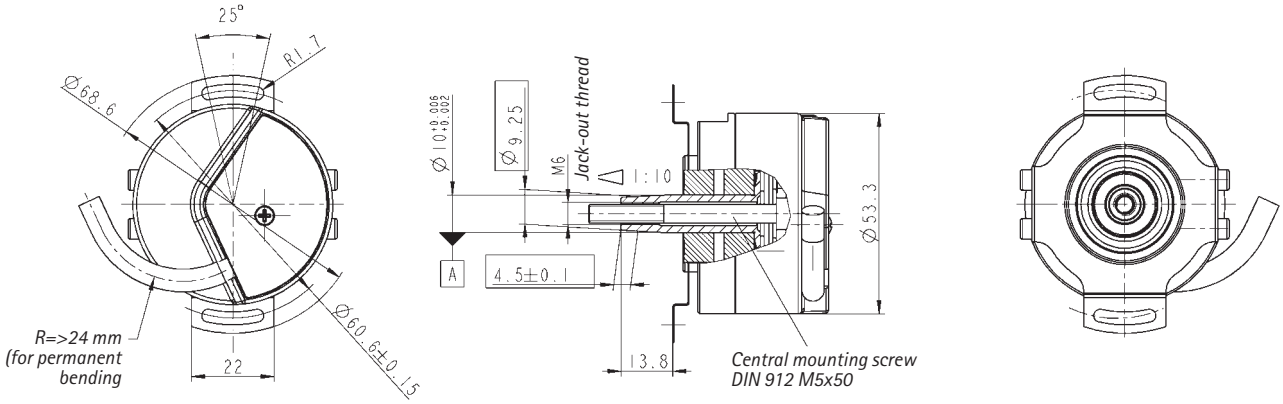


The quality of the servo loop is determined to a large extent by the absence of harmonics in the encoder's sinewave signals, particularly at low speed. In order to achieve high interpolation factors in the sequencing control, the incremental sinewave signals A and B are available with a harmonic distortion significantly under 1% throughout the specified temperature range. This delivers excellent synchronism and a high level of positional accuracy with servo axes.

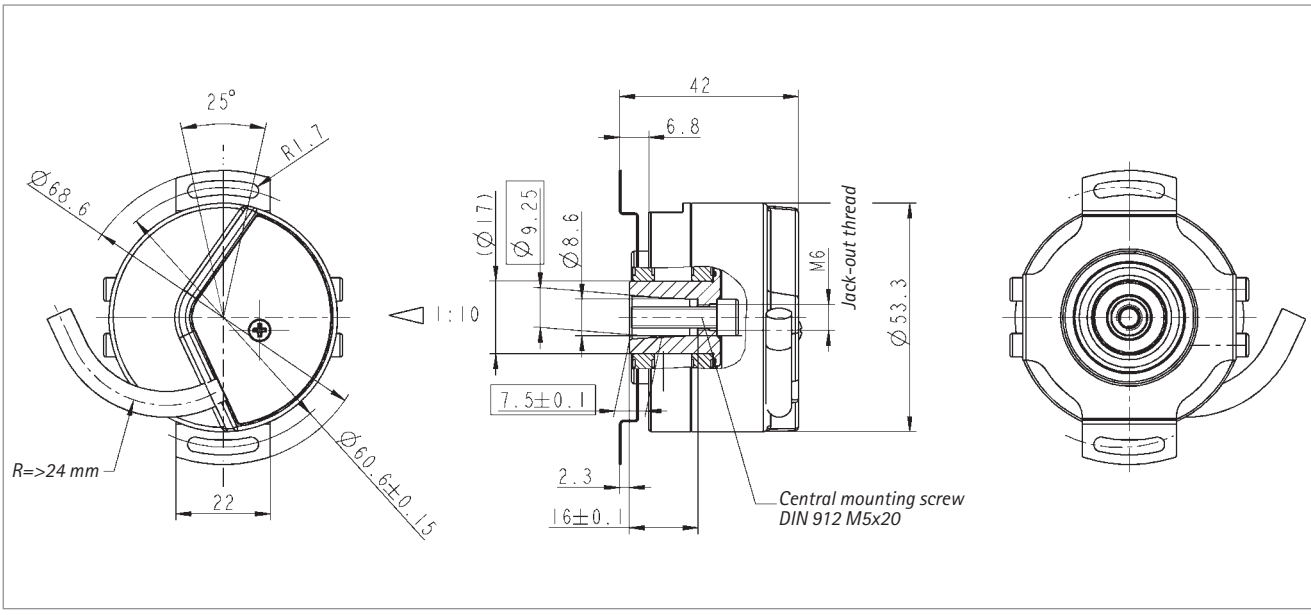
PCB – CONNECTOR PIN OUT:

Row b	5 V Sense rt/bl	D- vio	B- rd	R- pk	0 V Sense gn/br	A- ye	C- br
Row a	wt C+	gn A+	wt/gn GND	gr R+	bl B+	bk D+	gr/pk U_B

DIMENSIONED DRAWINGS SOLID SHAFT



DIMENSIONED DRAWINGS HOLLOW SHAFT



ORDERING CODE:

Solid shaft, with mounting support	0 548 011
Hollow shaft, with mounting support	0 548 021