

1. TS42 Sin/Cos Optical Encoder (Taper shaft)

1.1 Introduction:

TS42 is a taper shaft miniaturized design, compact, sturdy and safe, which can solve the user's use in high segmentation areas.

1.2 Feature:

- Encoder external diameter $\varnothing 42\text{mm}$, thickness 29.8mm , taper shaft $\varnothing 6.5\text{mm}$, achieved robust miniaturization.
- Adopt taper shaft with bolt locking structure;
- Adopt non-contact photoelectric principle.
- Resolution per turn Sin/Cos period 1024.

1.3 Application:

Motor, elevator, CNC and other automation control fields.

1.4 Connection:

- Radial socket (M12 8pin male connector)
- Cable connection (standard length 1000mm)

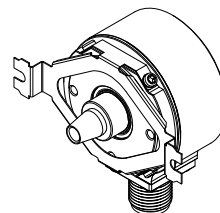
1.5 Protection:

IP65

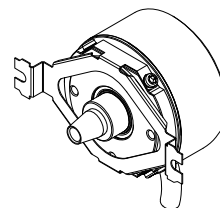
1.6 Weight:

about 150g

TS42-C

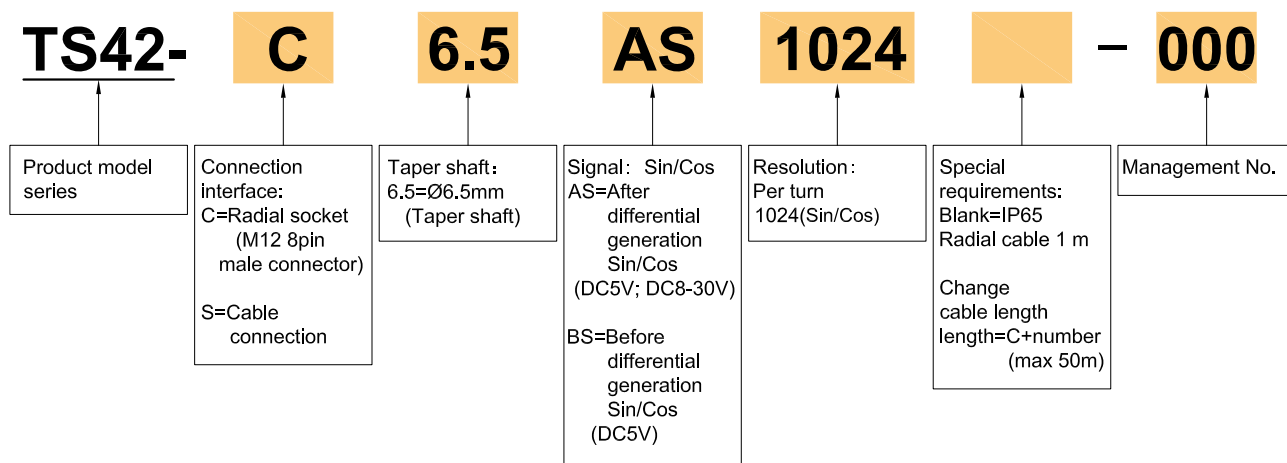


TS42-S



2. Model Selection Guide

2.1 Model composition(select parameters)



3. Technical parameters

3.1 Performance

Sine/cosine periods per revolution	1024
Measuring step	0.3 " For interpolation of the sine/cosine signals with e.g.12 bits ¹⁾
Initialization time	50ms ²⁾
Integral non-linearity	Typ.±45 Winkelsekunden(Loose stator coupling)
Differential non-linearity	±7 Winkelsekunden
Reference signal, number	1
Reference signal, position	90°, electrically,gated with Sinus and Cosinus

¹⁾ Not safety-related.

²⁾ Valid signals can be read thereafter.

3.2 Electrical Characteristics

Communication Interface	Incremental
Communication interface detail	Sin/Cos ¹⁾
Connection type	M12 8pin male connector; cable connection(two ways to choose)
Supply voltage	DC4.5V...5.5V; DC8V...30V
Maximum output frequency	≤200 kHz
Load resistance	≥120Ω
Power consumption max.(without load)	≤0.7 W
Power consumption	Without load
Reverse polarity protection	✓
Protection class	III (according to DIN EN 61140)
Short-circuit protection	✓ ²⁾

¹⁾ 1.0 Vss (Differential)

²⁾ Short-circuit to another channel or GND permitted for max.30s.

3.3 Mechanical Characteristics

Diameter of taper shaft	Ø6.5mm
Shaft material	Stainless steel
Starting torque	≤1.0 Ncm (at 20°C)
Operating torque	≤0.8 Ncm (at 20°C)
Permissible movement static	±0.3mm (radial) ; ±0.5mm (axial)
Permissible movement dynamic	±0.05mm (radial) ; ±0.1mm (axial)
Max.angular acceleration	≤500,000 rad/s ²
Operating speed	6000min ⁻¹ ¹⁾
Bearing lifetime	3.6x10 ⁹ ²⁾
Housing material	Aluminum alloy
Weight	Approx.150g

¹⁾ Allow for self-heating of approx.3.0K per 1000rpm regarding the permissible operating temperature.

²⁾ On maximum operating speed and temperature.

3.4 Environmental Specifications

Shell protection grade	IP65(IEC60529) ¹⁾
Permissible relative humidity	90°,Condensation not permitted
Operating temperature range	-40°C...+95°C
Storage temperature range	-40°C...+95°C
Resistance to shocks	100g, 6ms(EN60068-2-27) ²⁾
Frequency range of resistance to vibrations	30g, 10Hz...1,000Hz(EN60068-2-6) ³⁾

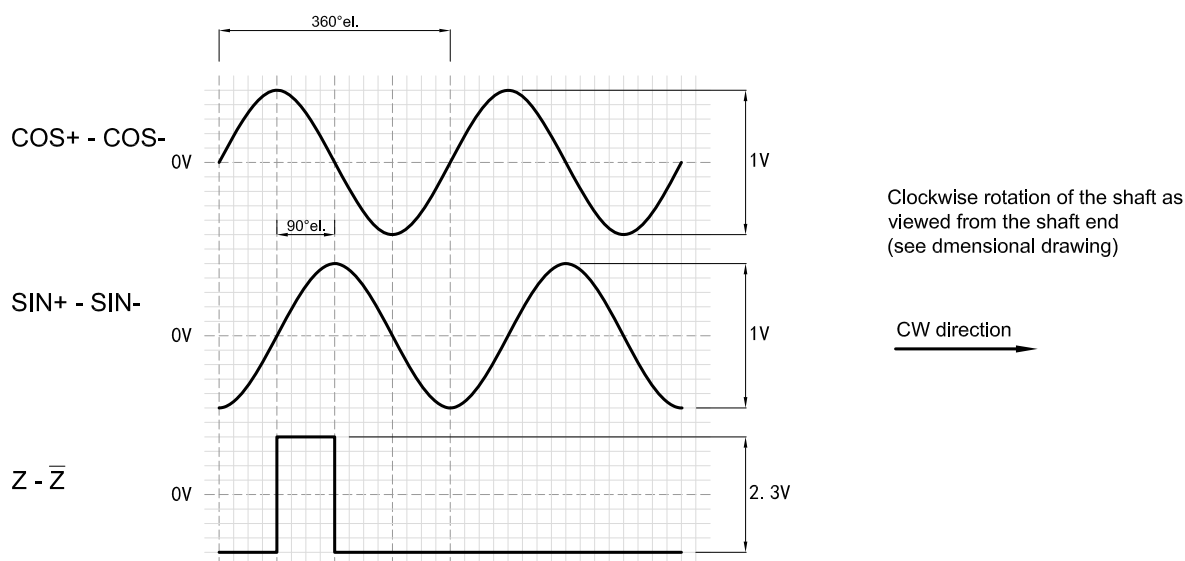
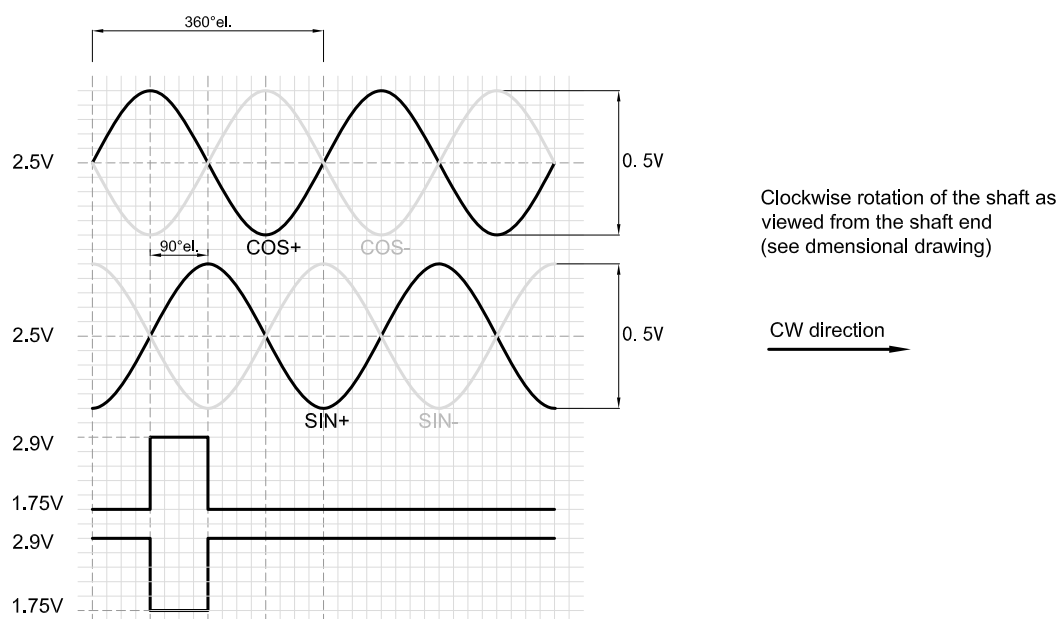
¹⁾ Plug in the matching plug, which has a protection class of at least IP65.

²⁾ Checked during operation using vector length monitoring.

³⁾ Checked during operation using vector length monitoring, including matching plug.

TS42 Sin/Cos

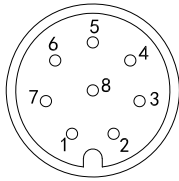
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4. Output wave form**4.1 Signal SIN/COS after differential generation****4.2 Signal SIN/COS before differential generation**

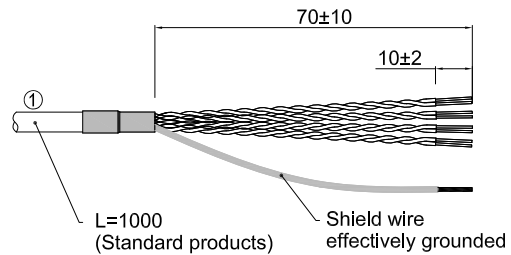
Supply voltage	Output	Signal	Bus Interface signals	Signals before differential generation	Signal offset
4.5V...5.5V	SIN/COS 1.0 Vss	+SIN -SIN +COS -COS	Analog,differential	0.5Vss±20%	2.5V±10%
		Z Z̄	Digital differential	Low:1.75V±15%, High:2.9V±15%	

5. Wiring table

M12 8pin male connector
pin distribution diagram



Cable connection

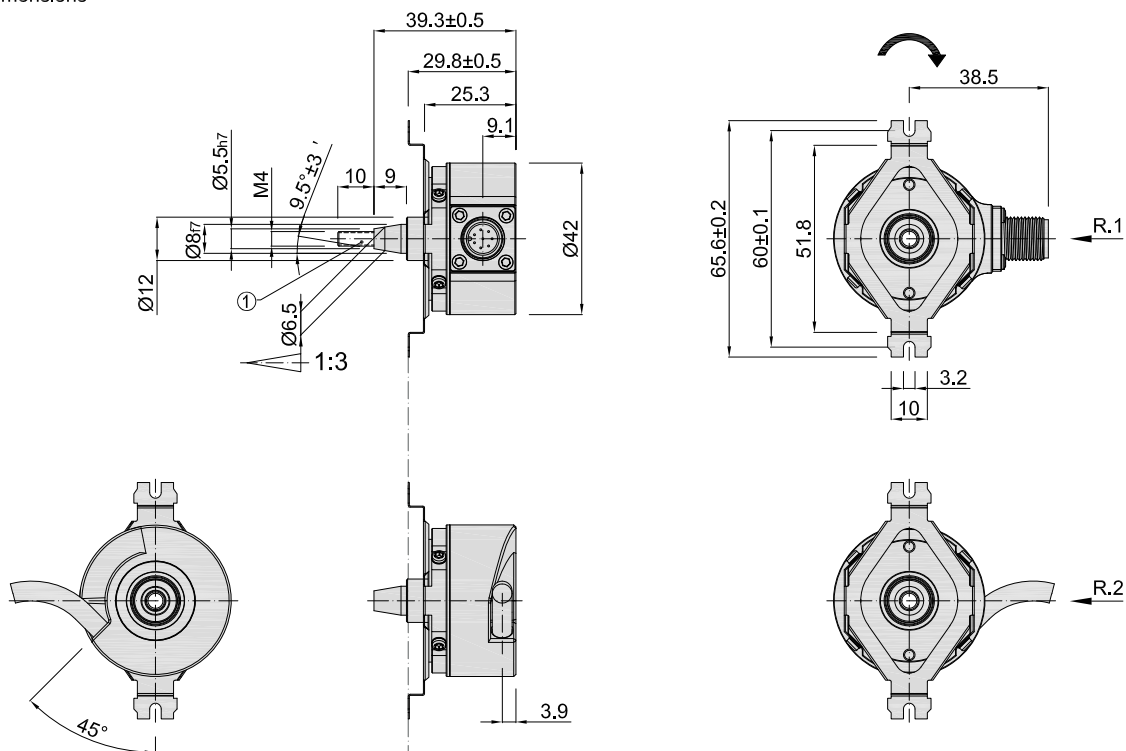


Pin Male connector M12 8-pin	Wire colors (cable connection)	Signal	Explanation	Twisted-paired cable
1	White/BK	-COS	Signal wire	
2	White	+COS	Signal wire	
3	Green/BK	-SIN	Signal wire	
4	Green	+SIN	Signal wire	
5	Yellow/BK	\bar{Z}	Signal wire	
6	Yellow	Z	Signal wire	
7	Black	0V	OV	
8	Red	Up	Power positive	
GND	GND	GND	GND	No encoder body connected

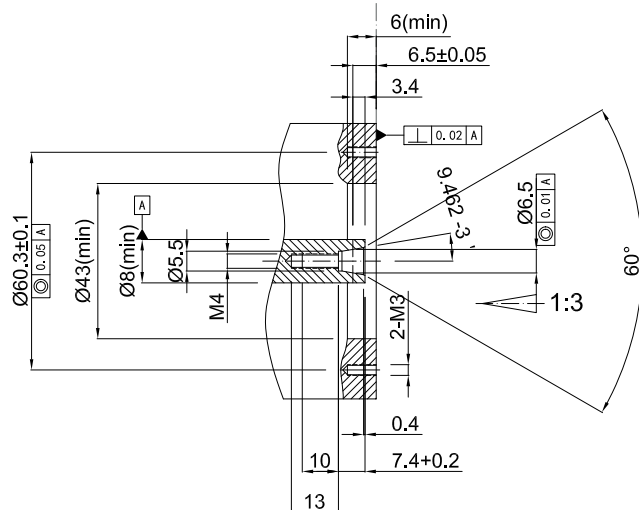
① Cable length 1M is our factory standard, the longest can be purchased up to 20M.

6. Basic Dimensions

6.1 Dimensions



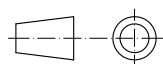
6.2 Mounting shaft requirements



Mounting screws

1. Inner hexagon bolt
+flat washer
Specification: M3*6
Material: stainless steel
Quantity: 2
2. Inner hexagon bolt
Specification: M4*45
Material: stainless steel
Quantity: 1

Unit: mm



= Shaft rotation direction of the signal output

R.1 = Radial socket (M12x1 8pin male connector)



R.2 = Cable connection (standard length 1000)

① = Shaft locking bolt (Inner hexagon M4*45)

About vibration

Vibration act on encoder always cause wrong pulse, so we should pay attention to working place. More pulse per revolution, narrower groovy spacing of grating, more effect to encoder by vibration, when rev is low or stop, vibration act on shaft or main body would cause grating vibrating, so encoder might make wrong pulse.

7. Recommended Accessories

Plug and cable	Brief description	No.	Order No.
	C01=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 2M 8-core with shield,halogen-free PUR	KS60C01	44400006
	C02=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 5M 8-core with shield,halogen-free PUR	KS60C02	44400007
	C03=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 1M 8-core with shield,halogen-free PUR	KS60C03	44400008
	C04=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 2M 8-core with shield,halogen-free PUR	KS60C04	44400009
	C05=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 5M 8-core with shield,halogen-free PUR	KS60C05	44400010