SICK STEGMANN

Data sheet

Motorfeedback-System
SNS50-TBA0-S01
Order number 1 034 100

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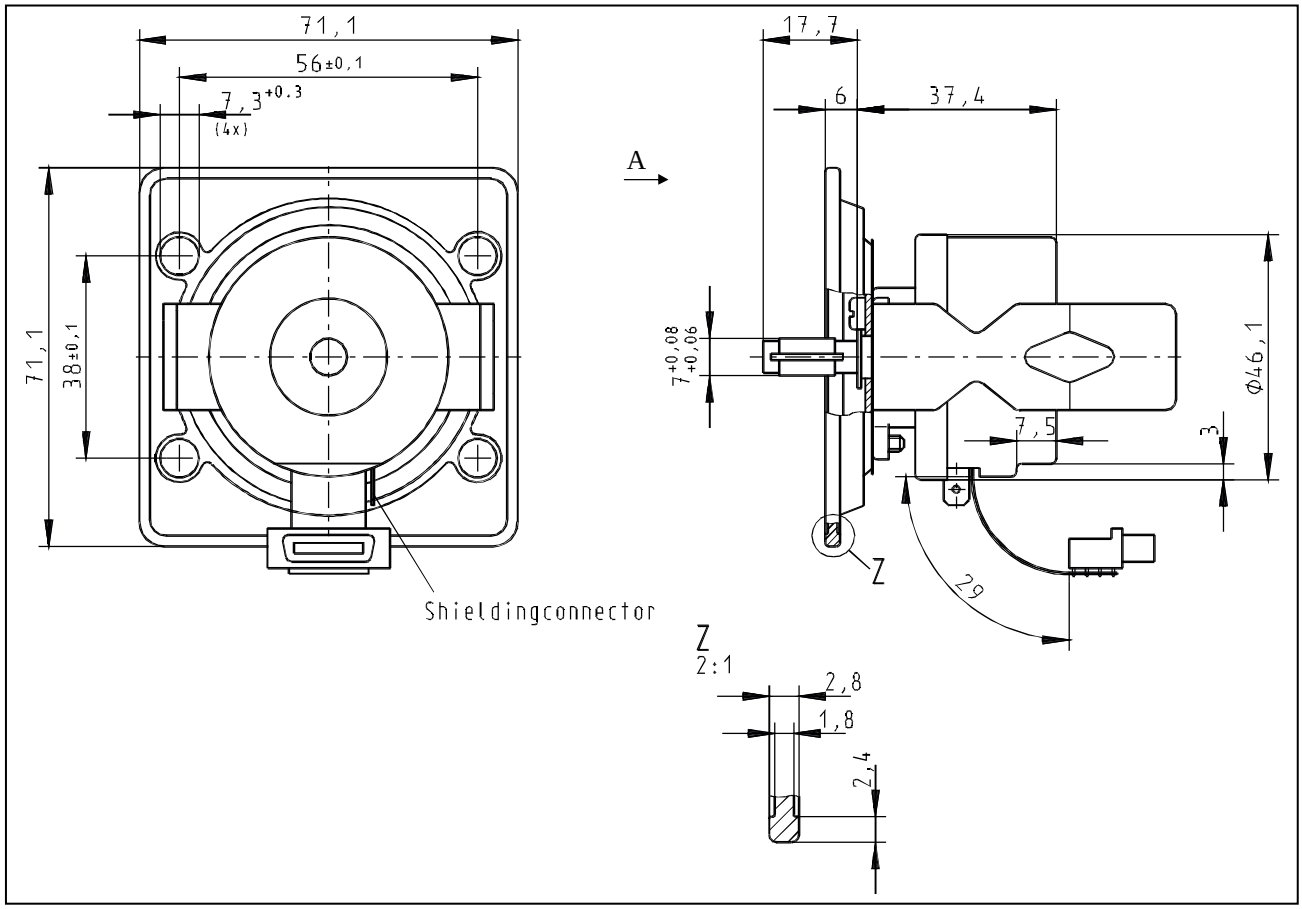
compatible to:

CT - Coder C4
6C7 100 200 004

	SNS50-TBA0-S01 **Order number 1 034 100**	CT-Coder C4***** 6C7 100 200 004
Housing colour	--------	--------
Cable colour	--------	--------
Lable	--------	--------
Marking	Serialnumber	Serialnumber
		***No longer available!**

SNS50-TBA0-S01 Dimensional drawing and features



- CT-Coder motor feed back system for installation in electric motors
- 2 90°- offset sine-like signals with 1024 p eriods per revolution
- 2 90°- offset sine-like signals with 1 peri od per revolution
- Reference pulse (square-wave pulse)
- High working temperature range
- High linearity of the angle of rotation
- Integrated EEPROM parameter memory
- With earth-strip
- Stator coupling material HNBR
- the lower part of housing is screwed

SNS50-TBA0-S01 Technical data and characteristic to DIN 32878

			Unit
Number of sine, cosine periods per revolution		1024 and 1	
Dimensions		see drawing	mm
Mass		0,1	kg
Moment of inertia of the rotor		10	gcm^2
Measurement step after arctan calculation with 8 bit resolution		5	Seconds of arc[2)]
Error limits of the coarse track (1 perod/revolution)		± 4[1)]	Degrees[2)]
Error limits during evaluation of the 1024th signals, 1024 er Signale, integral nonlinearity		± 60[1)]	Seconds of arc^2
Nonlinearity within one sine, cosine period, differential nonlinearity		± 40[1)]	Seconds of arc^2
Max. output frequency for sine, cosine signals (1024) (50% signal amplitude)		100	kHz
Working speed		6000	min^{-1}
Operating speed		9000	min^{-1}
Max. angular acceleration		$0,2 \times 10^6$	$1/s^2$
Operating torque		0,2	Ncm
Starting torque		0,4	Ncm
Permissible shaft movement			
- Radial movement	static	$\pm$ 0,5	mm
	dynamic	$\pm$ 0,05	mm
- Axial movement	static	$\pm$ 0,75	mm
	dynamic	$\pm$ 0,25	mm
- Angular movement perpendicular to axis of rotation	static	$\pm$ 0,005	mm/mm
	dynamic	$\pm$ 0,0025	mm/mm
Bearing life		$3,6 \times 10^9$	revolutions
Working temperature range		0 .... +100	°Celsius
Operating temperature range		-20 .... +125	°Celsius
Storage temperature range		-40 .... +125	°Celsius
Permissible relative humidity (condensation not permissible)		90	%
Resistance to shocks in mounted state, to DIN IEC 68 part 2-27		100/10	g/ms
Resistance to vibration in mounted state, to DIN IEC 68 part 2-6		20/0 ... 2000	g/Hz
Degree of protection to DIN VDE 0470 part 1 in mounted state		IP 40	
Operating voltage 1		5 $\pm$ 10%	V
Operating current 1	without load	40	mA
Operating voltage 2	V+ / V-	12 / -0,7 $\pm$5%	V
Operating current 2	without load I+ / I-	+20 / -10	mA
Reference voltage		2,4 ... 2,6	V
Size of EEPROM		256	word (16 Bit)
Interface signals SIN, REFSIN, COS, REFCOS = *Process data channel* Microwire interface = *Parameter channel*		analog differential digital	

1) Calculated with corrected value, as described on page 10

2) Referred to one shaft revolution

- ***Differential nonlinearity***

is the linearity error within one of the 1024 periods of one revolution. It is always better than 10% reffered to the respective period.

The linearity error, referred to the revolution of the shaft, is then:

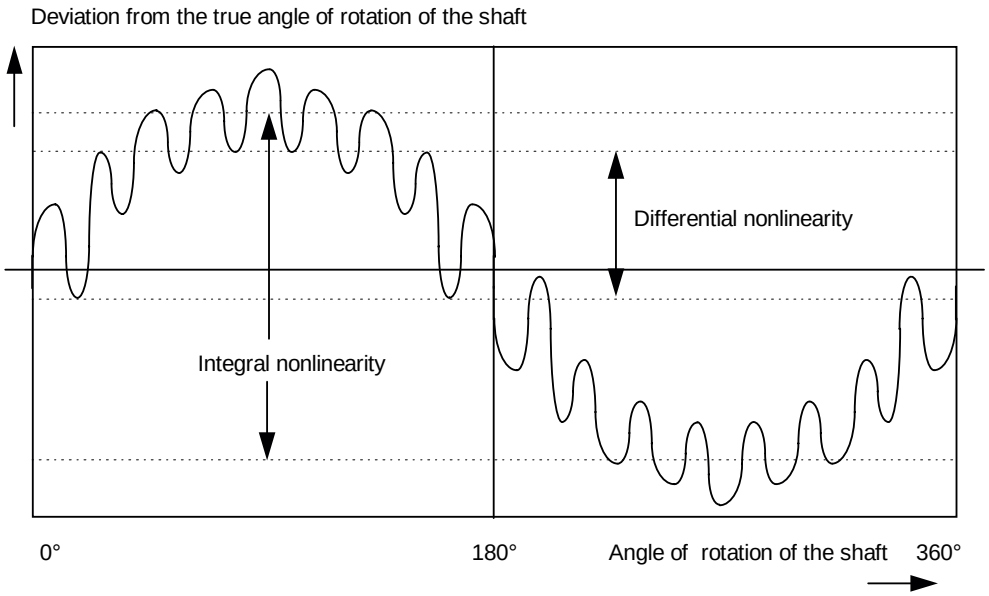
$$0{,}1 \times \frac{360 \times 60 \times 60}{1024} \cong 126''$$

- ***Integral nonlinearity***

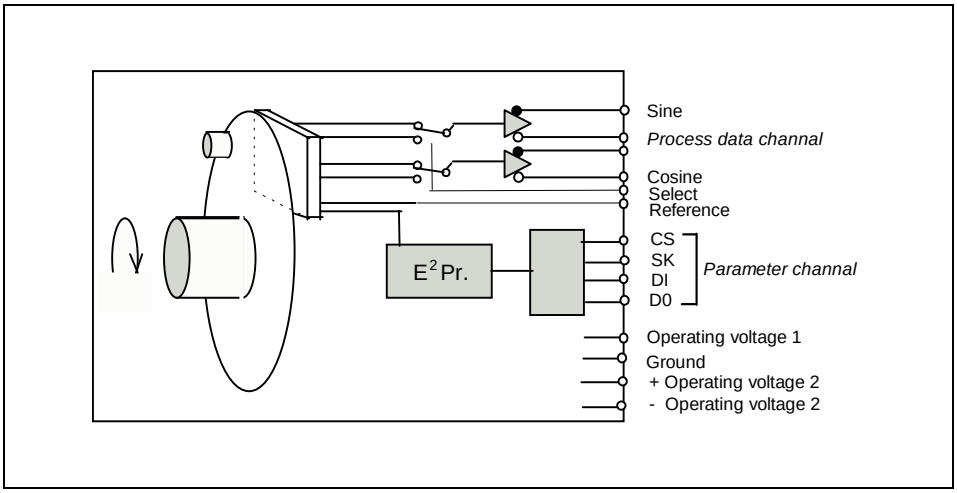
is the deviation of the angle of rotation determined at an arbitrary angular position in relation to the true angle of rotation. This error is always superimposed on the differential linearity error.

The error is produced by the unavoidable eccentricity of the scanned code disc and the nonroundness of the balls in the ball bearings used.
By means of the use of precision ball bearings and precise centring of the code disc on the rotaring shaft in the series product, the integral linearity error can be kept to better than 2 minutes.

Graphical representation of the linearity errors



CT-Coder block diagram



The new type

Known systems of optical encoders are so-called incremental encoders or absolute encoders.
Absolute encoders, because of the great outlay necessary for their production in the conventional way, are relatively expensive.
This conventional way is the reading of binary information encoded on a glass disc. Here, appropriate optical scanning is necessary for each binary position. All these scans must be set in relation to one another under all conditions such that no reading error can arise. The interface of such absolute encoders also transmits the complete absolute value *every time.*

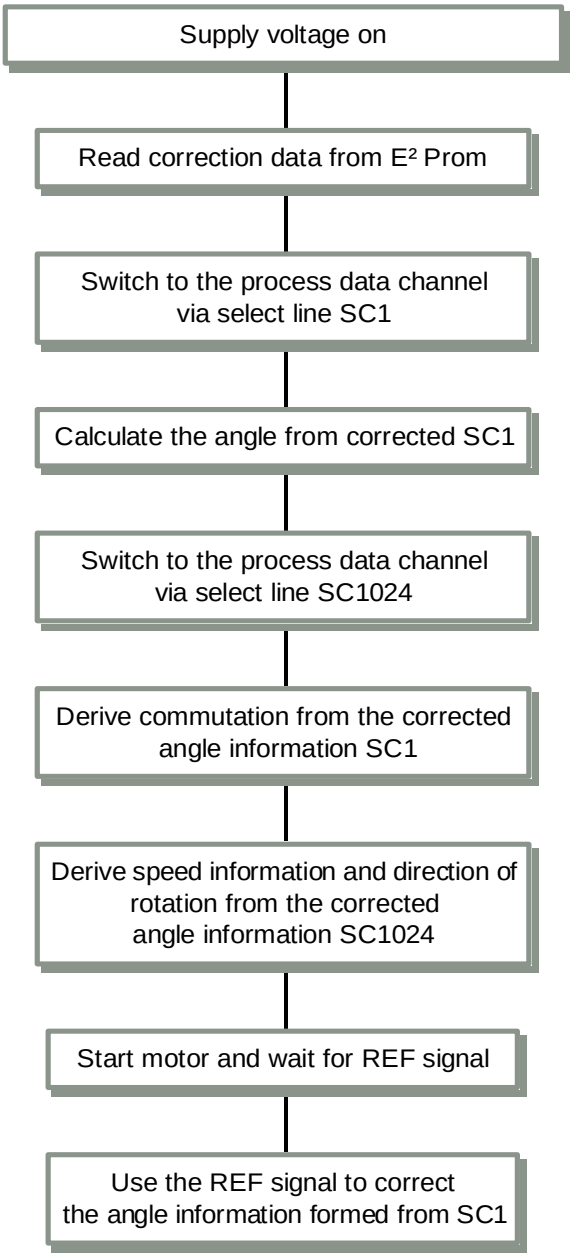
The CT coder system is a mixture of incremental encoder and absolute encoder.
The interface consists of a process data channel and a parameter channel.
The CT coder has the following basic information available internally:

1. A sine/cosine signal with 1024 periods per revolution (SC1024).

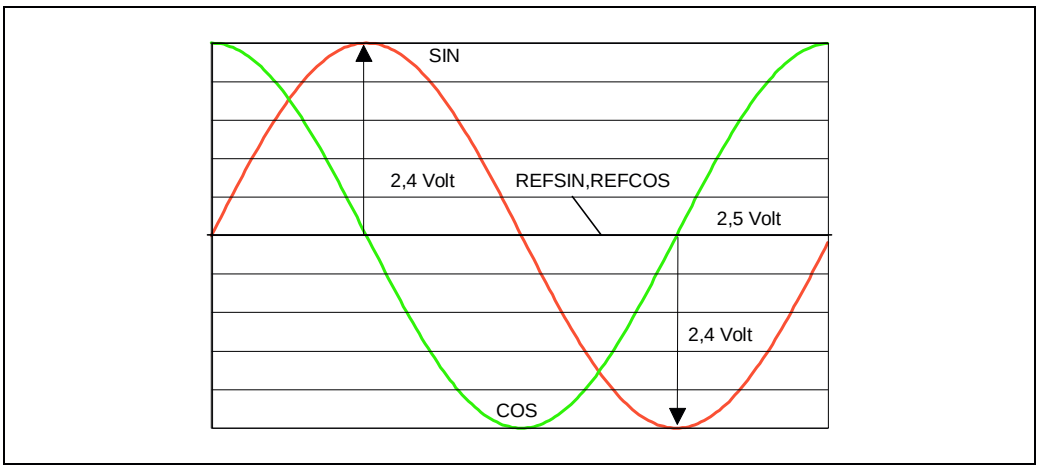
2. A sine/cosine signal with one period per revolution (SC1).

3. A reference signal (REF) which appears once per revolution.
The length of the signal is given on page eleven „signal specification of the reference pulse“.

Sequence of determining the position in the CT Coder



Signal spezification of the process data channel
Viewing direction „A“ and clockwise rotation of the shaft



The access to the process data which are used for the actual speed control that is to say the sine and cosine signals, is virtually always „on line“.

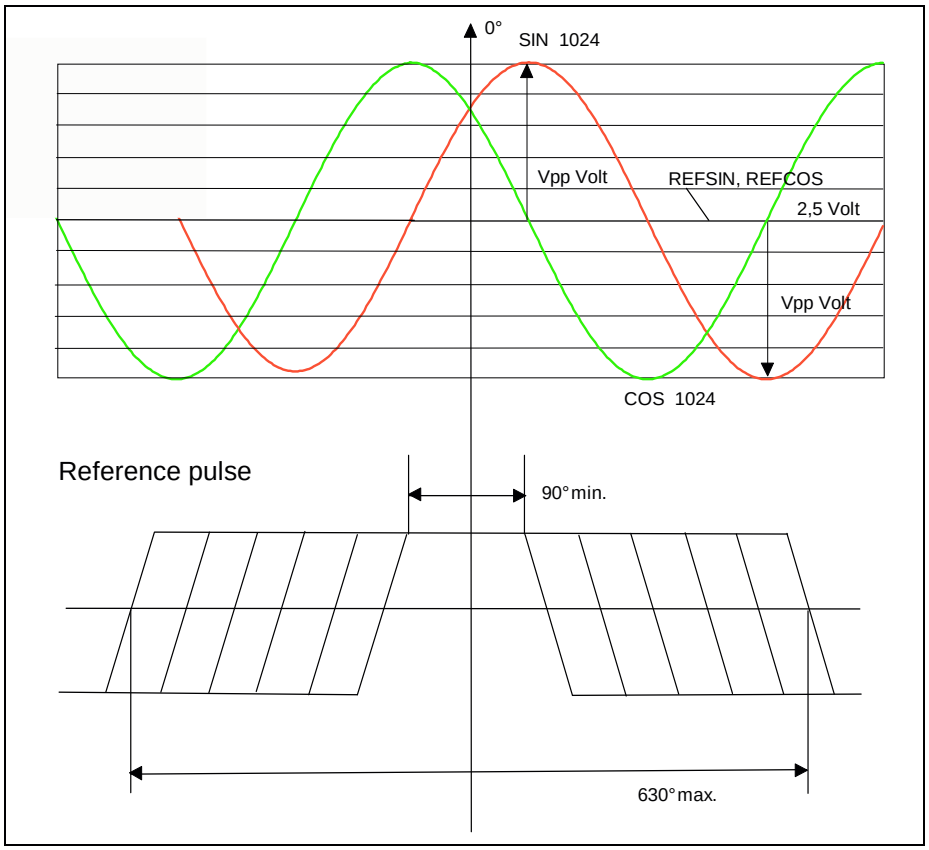
When the supply voltage is switched on, the speed controller always has access to this information at any time.

Characteristics valid for all specified environmental conditions		Unit
Signal peaks, peaks Vpp of SIN, COS	3,6 ... 4,8	V
Signal offset SIN, COS,	REF $\pm$ 0,35	V
Signal offset REFSIN, REFCOS	2,4 ... 2,6	V
Static linearity after arctan formation	10	%

Selection of the track on the process data channel by means of the select line

Select = Low ≙ 1024th track
Select = High ≙ 1st track

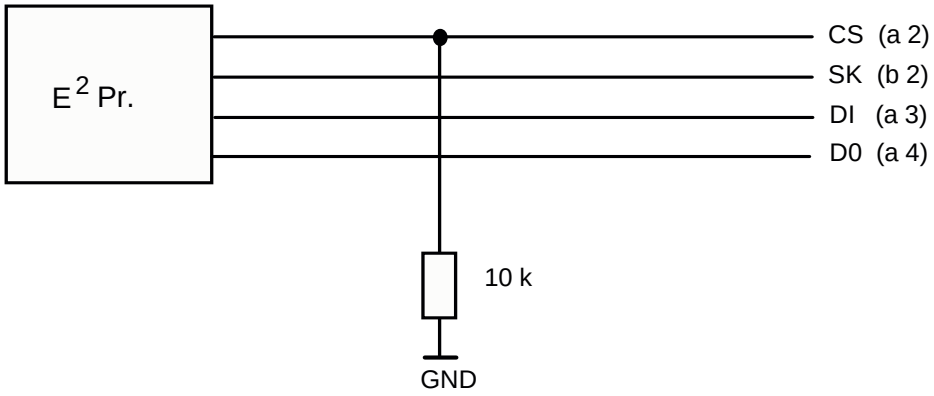
Signal spezification of the reference pulse



The reference signal appears once per revolution.

The parameter channel is a microwire interface.

The physical parameter channel interface in the CT-Coder



E^2- Prom memory assignment
The E^2- Prom is word (16 Bit) organize

HEX address	Assignment
0000 - 0013	Initialized data (see page 10)
0014 - 00FF	Free

Read offset and amplitude correction values

By accounting for the offset and amplitude errors, the accuracy of the tracks can be increased.
The production-induced offset and amplitude fluctuations are stored in the E^2-Prom.

The data in the E^2-Prom are in integer format. The offset correction values are measured with simple differential amplification and are added to the signal after forming the difference.

The values are stored with the low byte on the lower addresses (low-endian).

Description of the data in the E^2-Prom

Address	Data	Integer (16 Bit)
0	SIN 1024 offset	[Offset (mV) x 4.096] / 5 + 2048
1	COS 1024 offset	[Offset (mV) x 4.096] / 5 + 2048
2	Maximum SIN 1024 amplitude	4,8 / amplitude (V) x 16384
3	Maximum COS 1024 amplitude	4,8 / amplitude (V) x 16384
4	SIN single offset	[Offset (mV) x 4.096] / 5 + 2048
5	COS single offset	[Offset (mV) x 4.096] / 5 + 2048
6	SIN single amplitude	4,8 / amplitude (V) x 16384
7	COS single amplitude	4,8 / amplitude (V) x 16384
8	Number of zero pulses	
9	00	
10	00	
11	00	
12	00	
13	00	
14 - 18	Serial number	
19	Check sum *	

* The check sum is formed by adding up all the 16 bit words.

Pin assignment for the Hirose-plug

Pin	Signal	
a1	Thermistor connection (at flexi-connector)	
a2	CS	E^2-Prom
a3	DI	E^2-Prom
a4	D0	E^2-Prom
a5	+ 5 V	
a6	0V	
a7	Resolution select	
a8	0V	
a9	Reference	
a10	0V	
b1	Thermistor connection (at flexi-connector)	
b2	SK	E^2-Prom
b3	V-	
b4	-REFsin	
b5	SIN	
b6	-REFsin	
b7	V+	
b8	-REFcos	
b9	COS	
b10	-REFcos	

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