

CA6S Absolute Encoder

Features

- Any resolution from 2 to 32,768 ppr
- Parallel or **SSI** absolute output
- Electronic zero position set
- Available with shaft, hub shaft or hollow shaft
- 2 to 3 day shipment

Featuring

CoreTechTM
by **STEGMANN**



Technical Data and Characteristics to DIN 32878

Resolution (Z) per revolution		2 to 32,768 steps
Interfaces		SSI or parallel
Dimensions		see drawings
Mass	Solid shaft and hollow shaft	approx. 0.3 kg
Moment of inertia of the rotor	Face mount with 10 mm shaft Servo flange with 6 mm shaft Through hollow shaft Blind hollow shaft	54 gcm ² 48 gcm ² 45 gcm ² max 54 gcm ² max
Code direction when viewing the clockwise rotating shaft		CW
Measurement range		1 revolution
Measuring step		360°/Z
Repeatability		0.005°
Error limits	Binary number of steps Non-binary number of steps	0.035° 0.046°
Measuring step deviation	Binary number of steps Non-binary number of steps	0.005° 0.016°
Measured value backlash		0.005°
Response threshold		0.003°
Max. angular acceleration		5 x 10 ⁵ rad/s ²
Max. operating speed	Face mount and servo flange With shaft seal Without shaft seal Hollow shaft designs	6,000 min ⁻¹ 10,000 min ⁻¹ 3,000 min ⁻¹
Operating torque	Face mount flange 10 mm shaft Servo flange 6 mm shaft Through hollow shaft Blind hollow shaft	typ. 0.3 Ncm typ. 0.2 Ncm typ. 1.6 Ncm typ. 0.4 Ncm
Start-up torque	Face mount flange 10 mm shaft Servo flange 6 mm shaft Through hollow shaft Blind hollow shaft	typ. 0.4 Ncm typ. 0.25 Ncm typ. 2.2 Ncm typ. 0.6 Ncm
Permissible shaft loading, solid shaft	Radial/axial	90 N/90 N
Permissible movement of the drive element (hollow shafts)	Static/dynamic radial movement Static/dynamic axial movement	±0.5/±0.1 mm ±0.1 mm
Bearing lifetime ¹		3.6 • 10 ⁹ revolutions
Working temperature range		-20 to +85°C
Storage temperature range		-40 to +100°C
Permissible relative humidity (condensation not permitted)		90%
EMC to EN 50082-2 and EN 50081-2		

(Continued on next page)

Technical Data and Characteristics to DIN 32878 (continued)

Resistance to shocks (DIN IEC 68 Parts 2-27)	50 g/11 ms
Resistance to vibration (DIN IEC 68 Parts 2-6)	20 g/10-150 Hz
Protection class ²	
Solid shafts — Connector outlet with mating connector fitted	IP65
Blind hollow shafts — Cable outlet	IP66
Through hollow shaft	IP64
Operating voltage range (Vs)	10 to 32 V
Operating current SSI/parallel	typ. 60/90 mA
Switching level of the control inputs	Logic H = 0.7 x Vs Logic L = 0 V to 0.3 x Vs
Operation of zero-set (only with shaft stationary, note installation time)	100 ms
Installation time after power on	40 ms

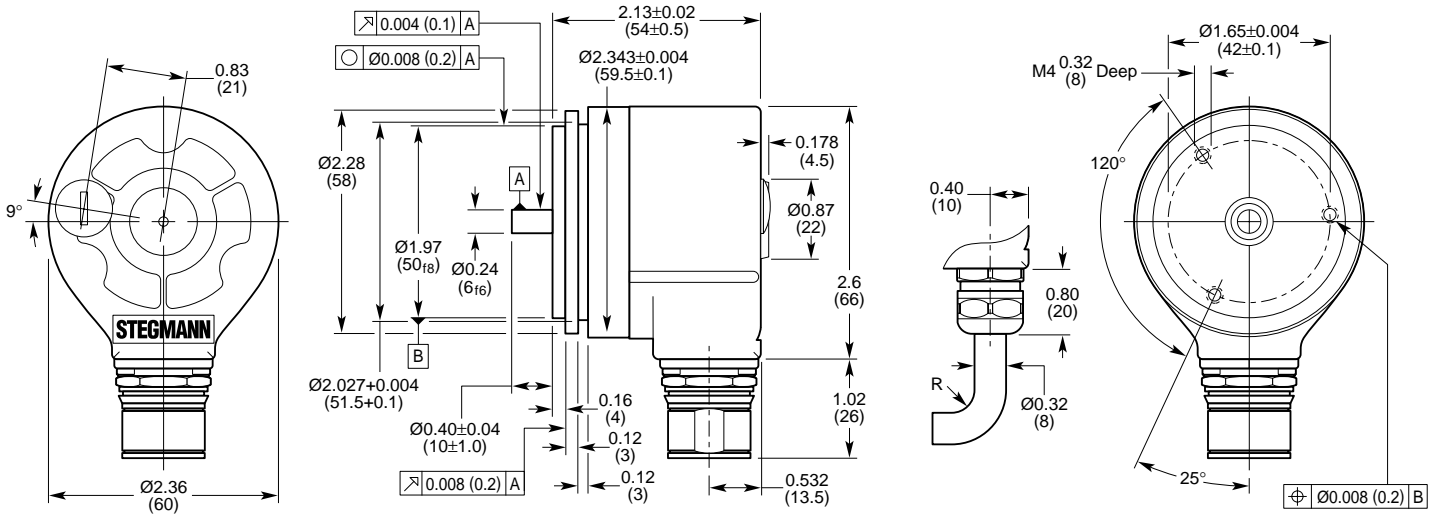
Notes: 1. Bearing lifetime is at typical loads of 20N and 10N axial. Bearing lifetime at maximum loads is 2.0×10^8 cycles.

2. Protection class is with shaft seal.

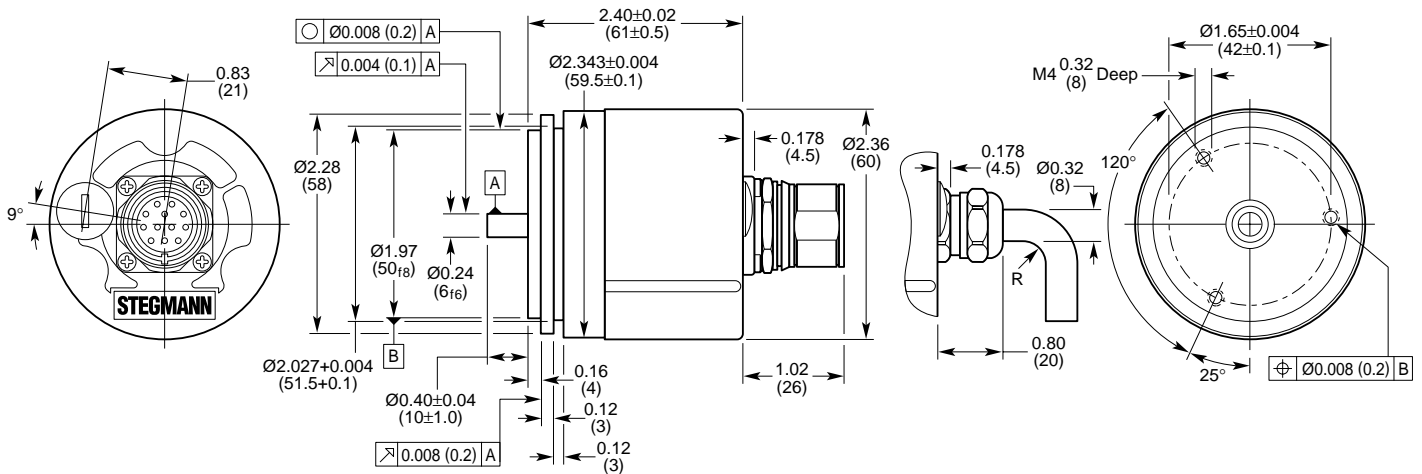
Dimensions (mm)

R = bending radius min 40 mm

Servo flange, solid shaft 6 x 10, radial



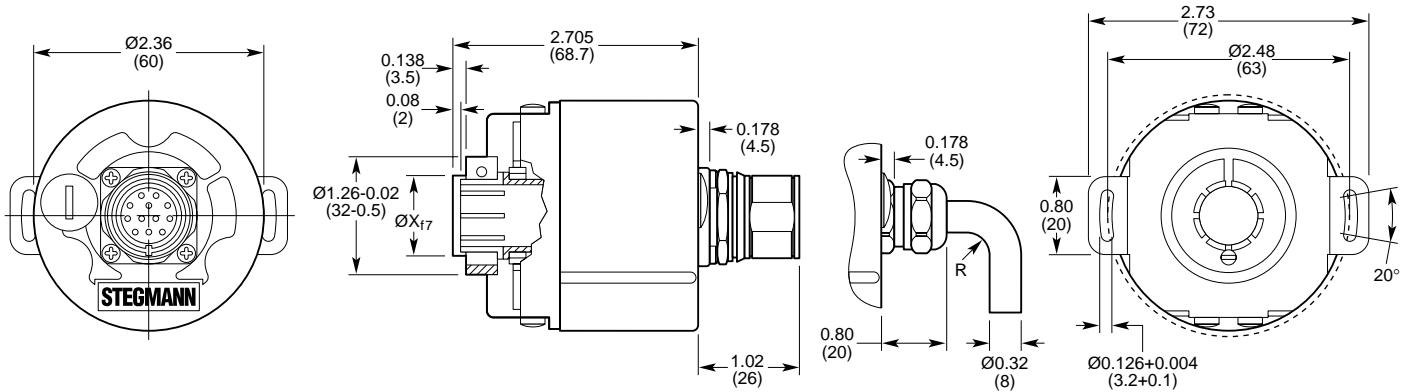
Servo flange, solid shaft 6 x 10, axial



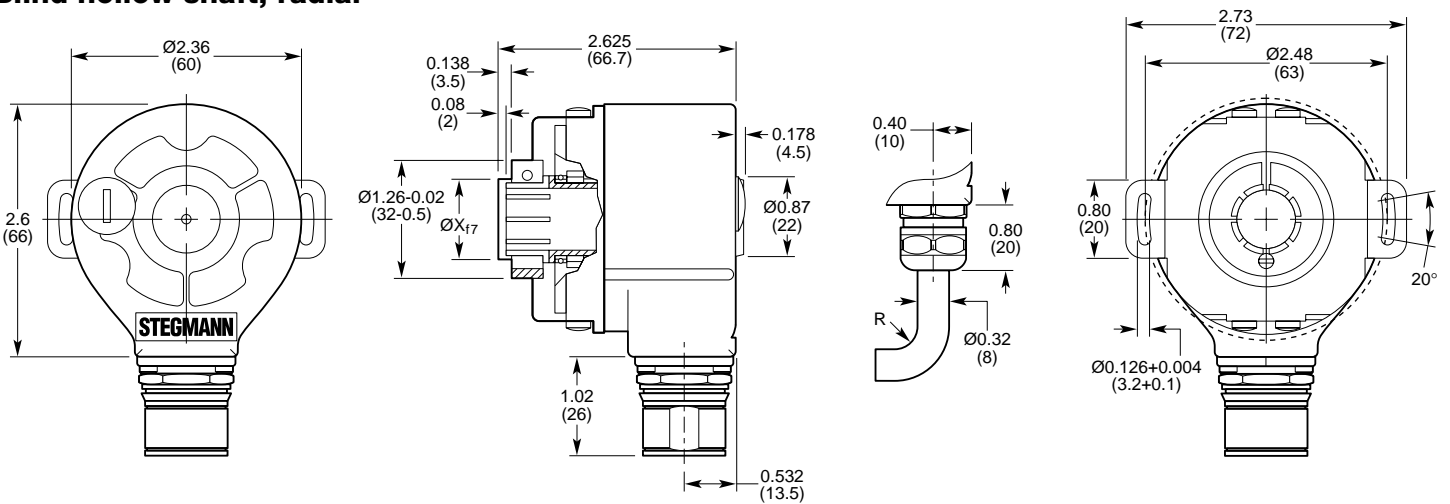
Dimensions (mm)

R = bending radius min 40 mm

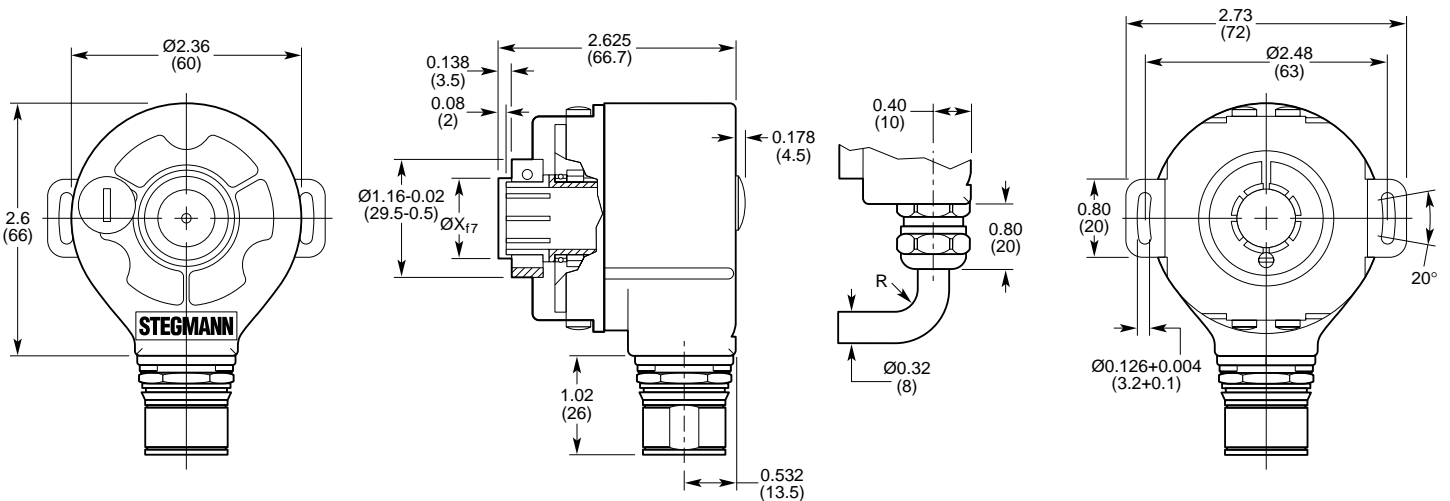
Blind hollow shaft, axial



Blind hollow shaft, radial



Through hollow shaft, radial



SSI Interface

Line driver and receiver to EIA RS-422 (see also Technical Information 910 940 001 557 synchronous serial interfaces for absolute encoders)

Data Format

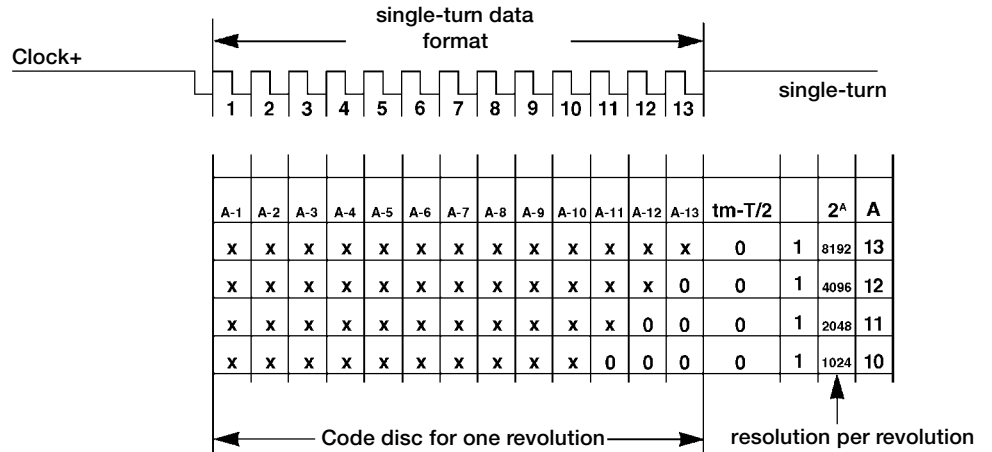
In order to be compatible with the data formats on the market, a distinction is made in the CA6S between two data formats:

The first data format applies to the encoder designs with resolutions up to 13 bits.

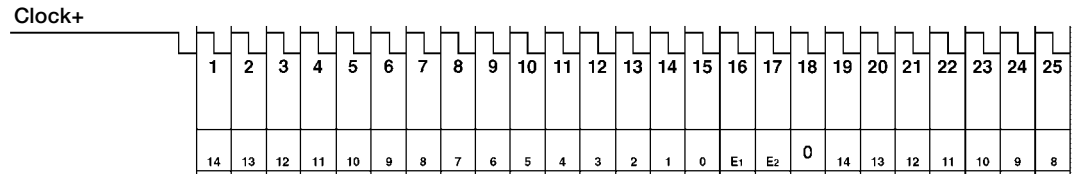
This is the standard data format for the single turn absolute encoder.

The second data format applies to the encoder with a resolution of 14 and 15 bits.

SSI data format for resolutions 8192 (1-13 bits)



SSI data format for resolutions > 8192 (14 and 15 bits)



The data transmitted is left justified. The 14/15 data bits are followed by two error bits.

Error 1 (E₁) = position error

During the determination of the position, an error has occurred since the last SSI transmission. This error bit will be deleted during the next SSI transmission

Error 2 (E₂) = light source monitoring

CA6S Signal Functions

Signal	Description
CW/CCW	Clockwise/counterclockwise: this input programs the counting direction of the encoder. If not connected, the input floats high. When the encoder shaft, as viewed from the shaft end, rotates in the clockwise direction, the encoder counts in an increasing direction. If customer requires opposite count direction, the CW/CCW line must be connected to GND (zero volts).
Enable [†]	This input floats low and activates the data output driver when low. When a high level is applied, the outputs are disabled and in a tristate mode.
Store*	This input floats high, and stores the current encoder data in Gray Code when a low level is applied. This insures that all bits of the stored data are correct. The stored data can be read in any code format. While this input is at a low level, the output data is stable whether the encoder shaft rotates or not.
Parity*	This output supplies a high level when the Binary checksum of the data bits is even.
Set Zero	This input serves to set the zero position electronically. If this line is connected to +Vs for more than 100ms, the mechanical position becomes the zero position.

* Available with parallel outputs only.

† Available with 10-30 V Push-Pull (7272) parallel output only.

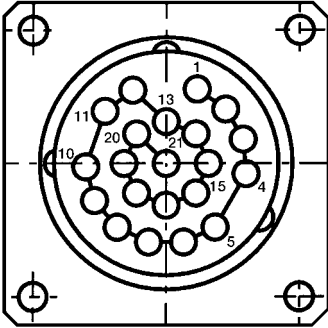
Code Types and Resolutions

# of Bits	Resolutions	
	Gray, Excess Gray, and Binary Codes**	Binary Coded Decimal**
1	2	2
2	3-4	3-4
3	5-8	5-8
4	9-16	9-10
5	17-32	11-20
6	33-64	21-40
7	65-128	41-80
8	129-256	81-100
9	257-512	101-200
10	513-1,024	201-400
11	1,025-2,048	401-800
12	2,049-4,096	801-1,000
13	4,097-8,192	1,001-2,000
14	8,193-16,384	2,001-4,000
15	16,385-32,768	4,001-8,000

**Binary and binary coded decimal are available with parallel outputs only.

Connector and Pin Allocation

Single, Parallel



View of the connector fitted to the encoder body.

Mating connectors are sold separately.

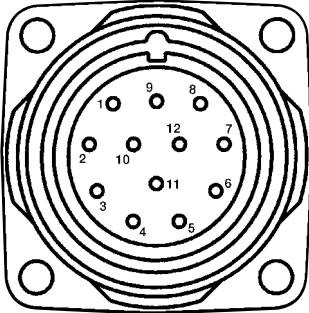
Pin Allocation with a 21-Pin Connector

PIN	Wire Color	Binary	Gray	BCD
1	Violet	2^0	G_0	$2^0 \times 10^0$
2	White/Brown	2^1	G_1	$2^1 \times 10^0$
3	White/Green	2^2	G_2	$2^2 \times 10^0$
4	White/Yellow	2^3	G_3	$2^3 \times 10^0$
5	White/Grey	2^4	G_4	$2^0 \times 10^1$
6	White/Pink	2^5	G_5	$2^1 \times 10^1$
7	White/Blue	2^6	G_6	$2^2 \times 10^1$
8	White/Red	2^7	G_7	$2^3 \times 10^1$
9	White/Black	2^8	G_8	$2^0 \times 10^2$
10	Brown/Green	2^9	G_9	$2^1 \times 10^2$
11	Brown/Yellow	2^{10}	G_{10}	$2^2 \times 10^2$
12	Brown/Grey	2^{11}	G_{11}	$2^3 \times 10^2$
13	Brown/Pink	2^{12}	G_{12}	$2^0 \times 10^3$
14	Brown/Blue	2^{13}	G_{13}	$2^1 \times 10^3$
15	Brown/Red	2^{14}	G_{14}	$2^2 \times 10^3$
16	Green		Parity	
17	Pink		Store_	
18	Yellow		Enable_	
19	Brown		V/R_	
*)	Grey		SET	
20	Blue		GND	
21	Red		Vs	
Housing			Screen	

*) Set line only possible with cable outlet (parallel output)

Connector and Pin Allocation (continued)

Signal, SSI



View of the connector fitted to the encoder body.

Mating connectors are sold separately.

Signal	12-Pin Round Connector	11-Core Cable Outlet
GND	1	Blue
Data (+)	2	White
Clock (+)	3	Yellow
N. C.	4	—
V/R ₋	5	Pink
N. C.	6	—
N. C.	7	—
V _s	8	Red
SET	9	Orange
Data (-)	10	Brown
Clock (-)	11	Violet
N. C.	12	—

How To Order

Use the numbered chart below to construct your ordering code as shown below.

T2 2 - 4 - 8000 - 3 - 4 3 0
① ② ③ ④ ⑤ ⑥ ⑦ (default)

① CA6S Absolute Encoder	② Interface	③ Code Type	④ Resolution per 360°*	⑤ Mounting Arrangement	⑥ Shaft Size and Type	⑦ Electrical Connection*
T2	1 SSI	1 Gray 2 Gray excess	Max. 32,768	1 Face mount flange Ø 60 mm	1 Solid shaft 10 x 19 mm	1 Radial connector 2 Radial cable 1.5 m 3 Axial connector 4 Axial cable 1.5 m 5 Radial cable 3 m 6 Axial cable 3 m 7 Radial cable 5 m 8 Axial cable 5 m * Other cable lengths on request
	2 Parallel	1 Gray 2 Gray excess 3 BIN		2 Servo flange Ø 60 mm	1 Solid shaft 6 x 10 mm	
		4 BCD	Max. 8,000	3 Stator coupling, blind hollow shaft Ø 60 mm	Blind hollow shaft (x) 1 6 mm 2 1/4 in. 3 8 mm 4 3/8 in. 5 10 mm 6 12 mm 7 1/2 in. 8 15 mm	
				4 Stator coupling, through hollow shaft Ø 60 mm	Through hollow shaft (x) 1 6 mm 2 1/4 in. 3 8 mm 4 3/8 in. 5 10 mm 6 12 mm 7 1/2 in.	

*Specify resolution as a decimal number. Final part number will have a base 32 coded resolution.



Example for ordering

A CA6S absolute encoder with parallel interface, BCD code type, a resolution of 8,000 steps, stator coupling, 3/8 in. blind hollow shaft and axial connector = **T22-4-8000-3-430**