

# Absolute Encoder Kit Singleturn 18Bit Optical reflective



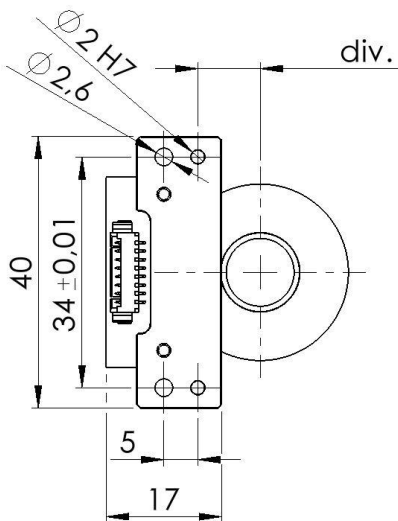
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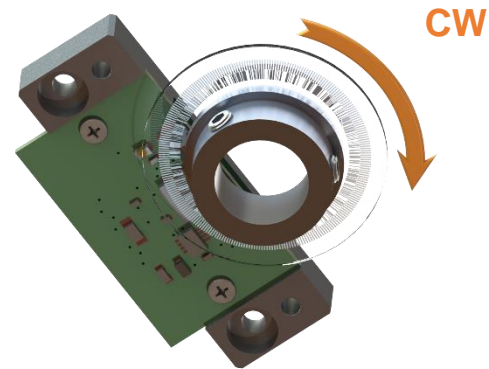
## Description

The ABG-Head Kit is an optical absolute encoder system. It's a reflective kit encoder that can be fixed quickly and easily on different hollow shaft applications and on different mounting situations. The encoder is developed for absolute positioning and rotational speed control. There are 3 different sizes of code discs available.

## Dimensions



## Direction of rotation



View from motor side

## Features

- Absolute encoder (singleturn)
- Absolute interface: BiSS/SSI/SPI
- Absolute resolution 18 Bit
- Power supply: 5 VDC
- Small size: 40.0 mm x 17.0 mm x 5.5mm
- Bearing free
- Operating temperature: -25°C to +85°C
- Compliant EU-directive 2011/65/EU (RoHS)

## Applications

- Motor feedback, Positioning
- Hollow-shaft, Multi-axis measurements systems

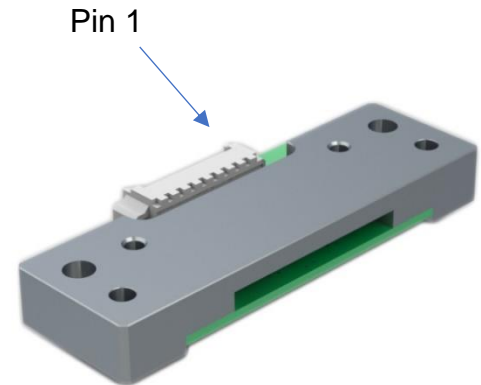
## Recommended operating conditions

Parameter	Symbol	Min.	Typ	Max.	Unit	Notes
Supply voltage	U <sub>B</sub>	4.75	5.0	5.25	V <sub>DC</sub>	
Supply current	I <sub>UB</sub>	30	50	80	mA	no Load
Startup time	t <sub>τ</sub>		20		ms	
Rotation speed	RPM			10,000	U/min	7,000@Ø138mm
<b>SSI / BiSS / SPI</b>						
Clock frequency	f	80		10,000	kHz	
Scan ratio of T		40	50	60	%	
Time lag	t <sub>v</sub>		150		ns	
Monoflop time	t <sub>m</sub>		2x1/f		µs	
<b>BiSS</b>						
CRC Polynomial			0x43		hex	x <sup>6</sup> + x <sup>1</sup> + x <sup>0</sup>
CRC Start Value			0x0000		hex	
CRC Bits			6			
CDM						inverted
<b>Err / Warn</b>						
High level output voltage	V <sub>oH</sub>	2.5			V <sub>DC</sub>	R <sub>L</sub> =510Ω
Low level output voltage	V <sub>oL</sub>			0.5	V <sub>DC</sub>	R <sub>L</sub> =510Ω
Output current	I <sub>out</sub>	-1.0		5.0	mA	
<b>Environment</b>						
Operating temperature	T <sub>A</sub>	-20	25	85	°C	
Storage temperature	T <sub>S</sub>	-30		85	°C	
Humidity exposure				90	%RH	not condensing
<b>System</b>						
Relative Angular Accuracy				+/- 0.01	°m	
Absolute Angular Accuracy				+/- 0.04	°m	
Acceleration	α <sub>max</sub>			160	10 <sup>3°/s<sup>2</sup></sup>	

**ESD Warning: Normal handling precautions should be taken to avoid static discharge damage to the sensor.**

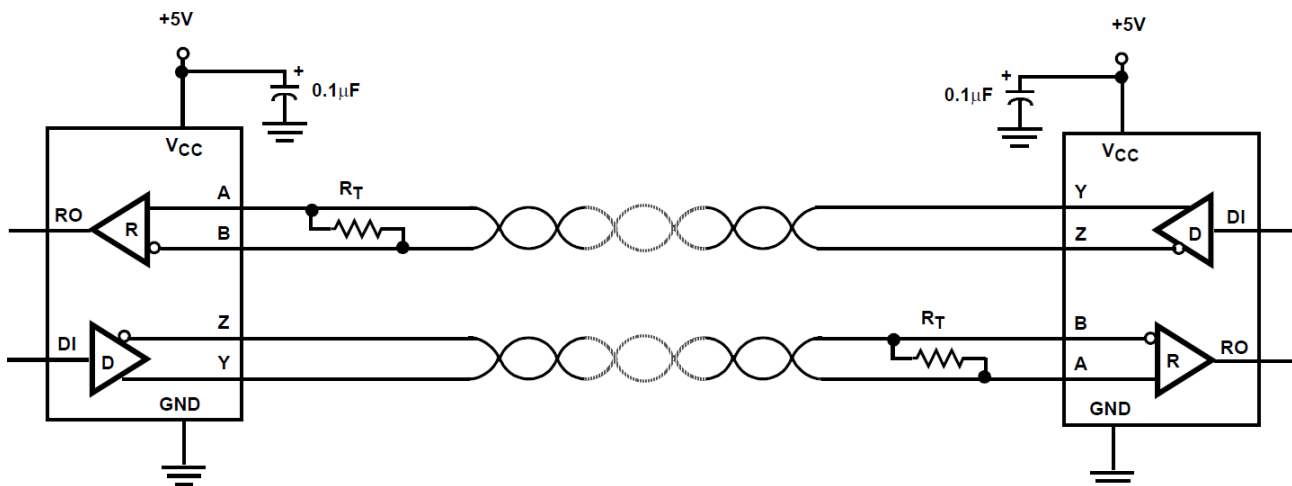
## Pin Description

Pin	Signal (BiSS)	Signal (SSI)	Signal (SPI)	Cable color
1	VCC	VCC	VCC	Red
2	Clock+	Clock+	Clock	Green
3	GND	GND	GND	Blue
4	Data-	Data-	MOSI	Purple
5	NC	Warn	NC	Brown
6	Clock-	Clock-	NCS	Yellow
7	NC	Err	NC	Orange
8	Data+	Data+	MISO	Black



(Housing connector for customer cable: Molex 51021-0800  
With terminals 50079-800)

## Typical operating circuit (for BiSS & SSI)



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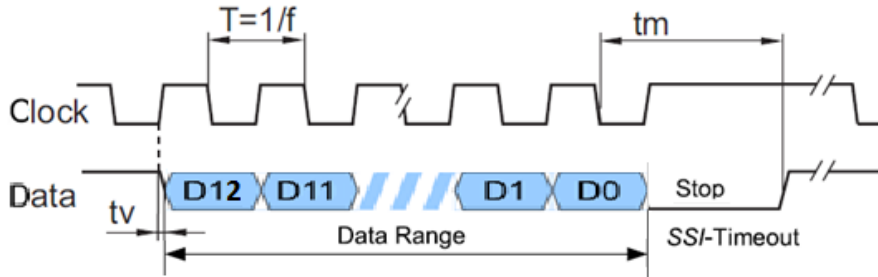
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## Interface

### Data transfer: SSI

### Gray-Code



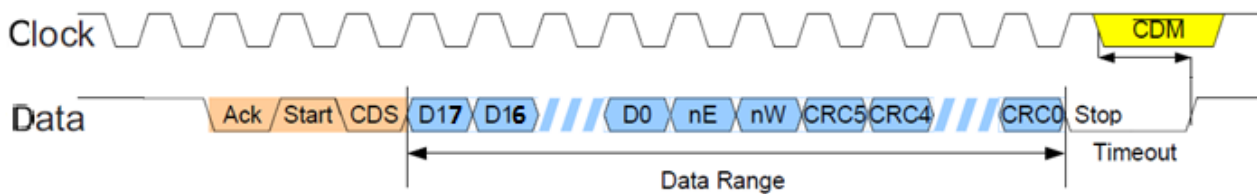
The position data decreases when the shaft rotates in the direction of clockwise.

Optionally the protocol is available with error bit (low active). Further variations on request.

The resolution is selectable between 13Bit and 18Bit.

### Data transfer: BiSS (C-Mode)

### Binary Code



Serial interface protocol	Definition
Ack	Acknowledge-Bit
Start	Start-Bit
CDS	Control-Bit
D0 - D17	Position-Data
nE	Low activ error
nW	Low activ warning
CRC0 - CRC5	Cyclic redundancy code
Stop	Stop-Bit
CDM	Control data master

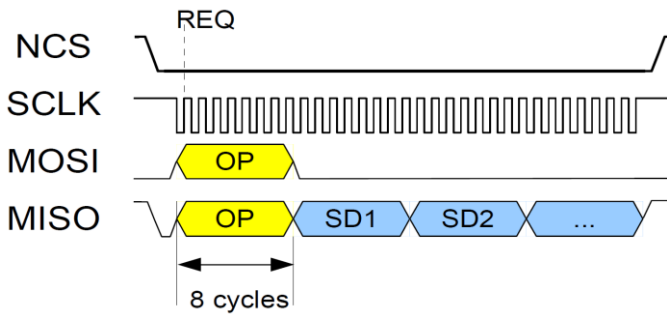
For a detailed description of the protocol, see separate interface specification.

The standard resolution is 18Bit. The position data decreases when the shaft rotates in the direction of clockwise.



**Data transfer: SPI**

This interface is specially for the direct connection to the micro-controller from the customer. It is appropriately for short cable length



OPCODE	
Code	Description
0xA6	Position Read
0x97	Register Read
0xAD	Read Register Status/Data

Table: OPCODE

Figure: SPI transmission, READ SENSOR DATA

The Data is sent in packages of 8 bits and with the MSB first. Each data transmission starts with the master sending an opcode to the slave.

Reading Sensor Data: The ABG-Head latches the absolute position on the first rising edge at SCLK, when NCS is at zero. Because ABG-Head can output the sensor data (SD) immediately, the master can transmit the SDAD Transmission command directly.

The sensor data in SPI are byte aligned. First comes 0-4 byte multiturn depending on the resolution, second are two bytes singleturn and at last one status byte including one error bit, one warning bit and six bits sign-of-life counter.

The standard resolution is 16Bit.

The position data decreases when the shaft rotates in the direction of clockwise.

The zero position can be set free at every arbitrary position (Preset).

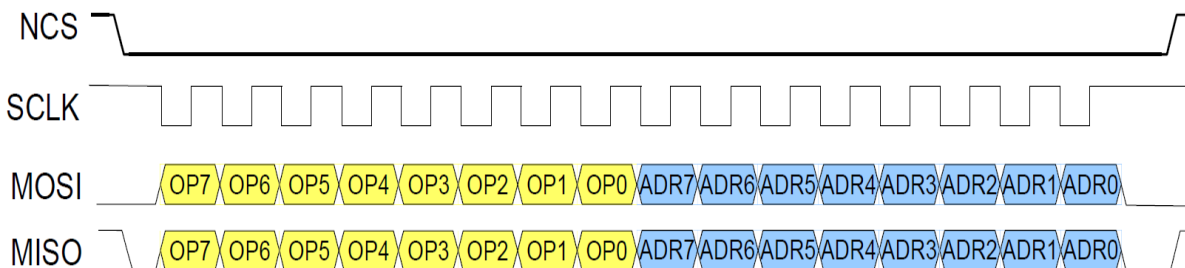
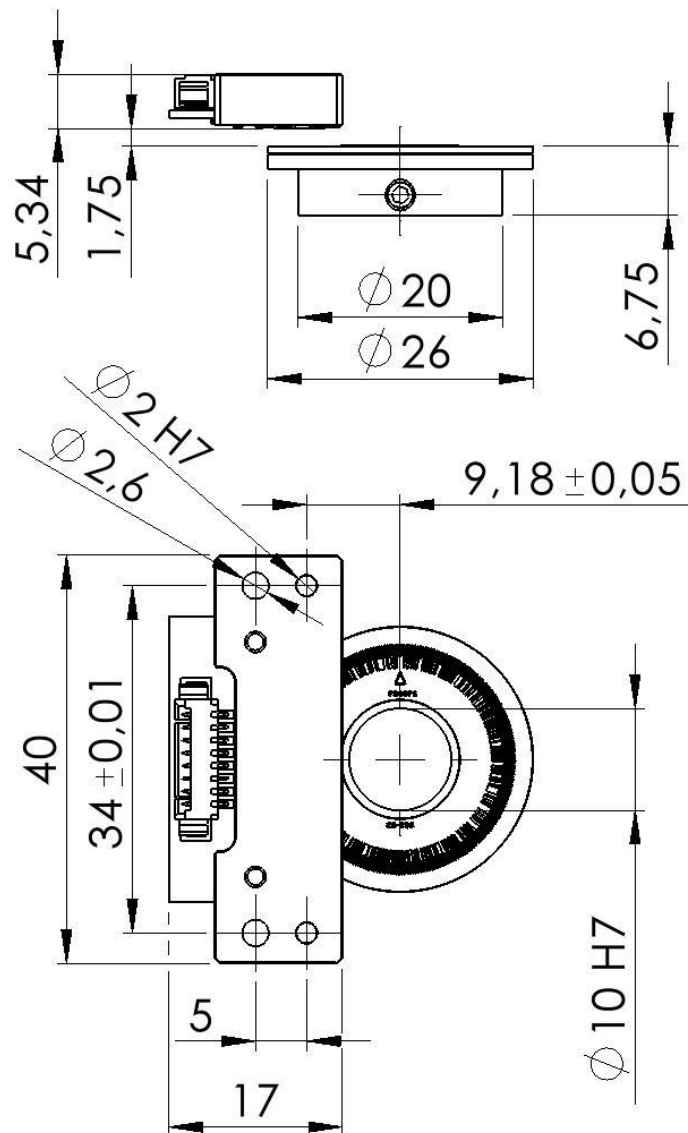


Figure: SPI transmission, using opcode READ REGISTER as an example

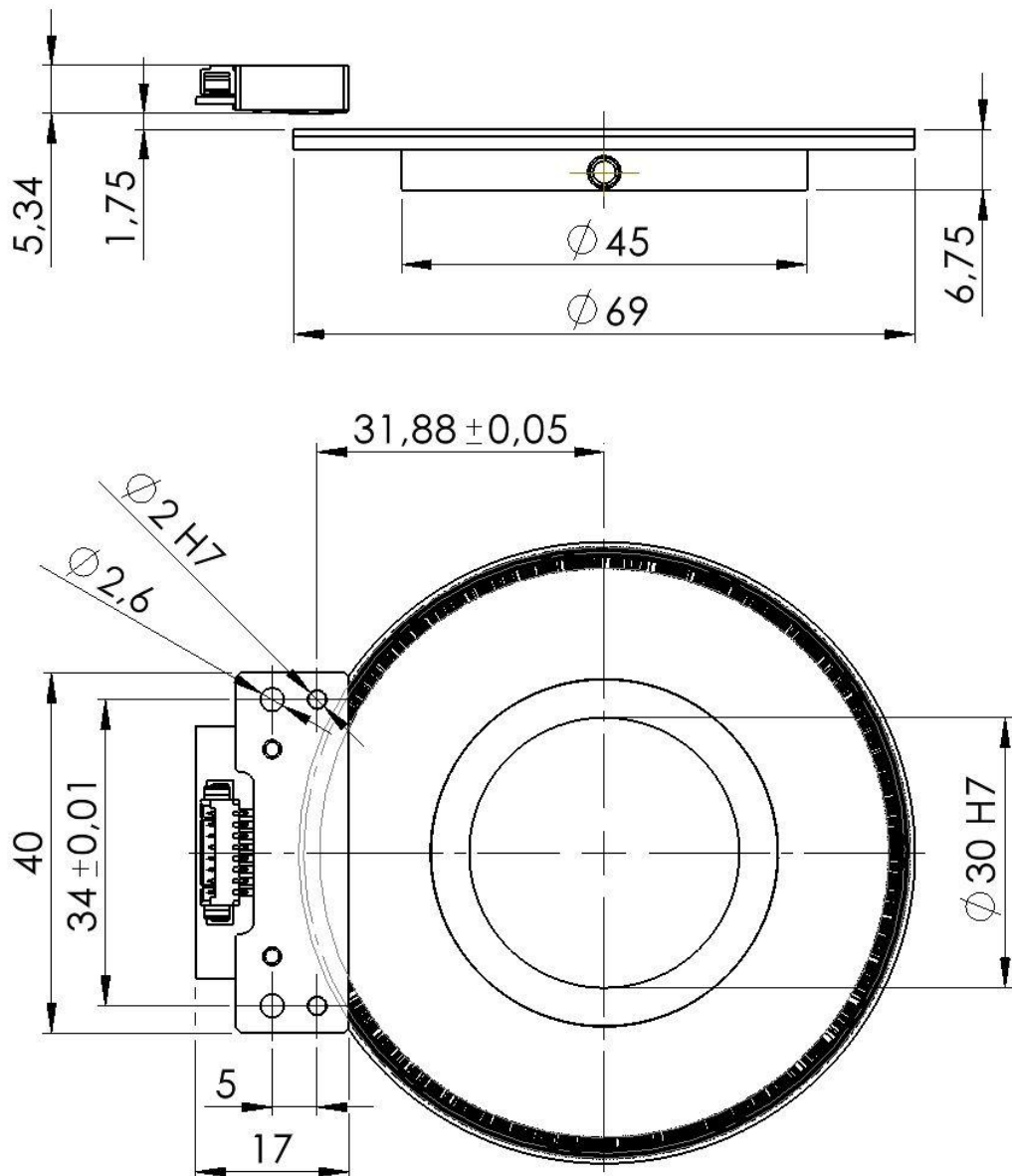
## Mechanical Dimensions: Type 26

10mm shaft diameter



## Mechanical Dimensions: Type 69

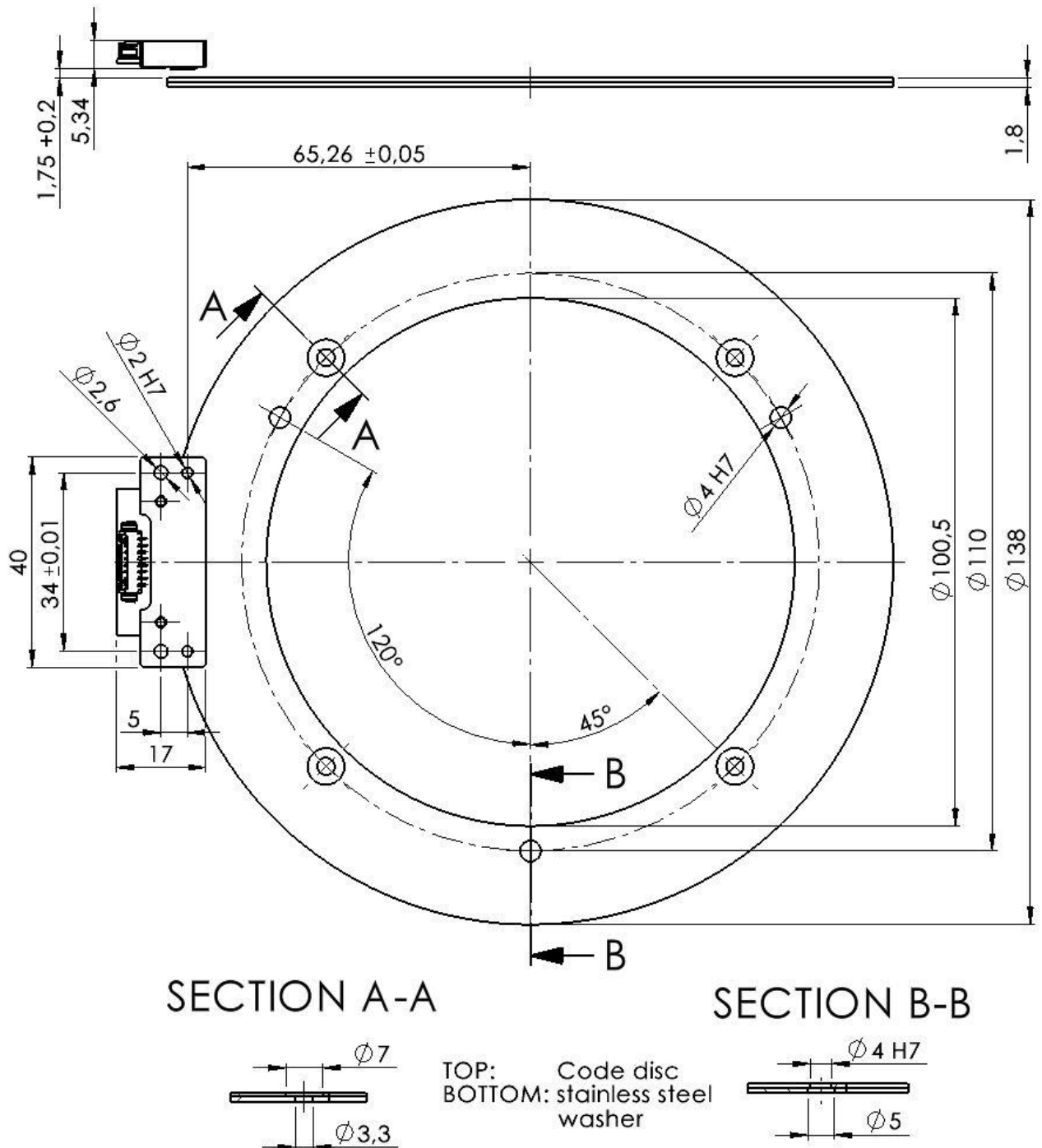
30mm shaft diameter





## Mechanical Dimensions: Type 138

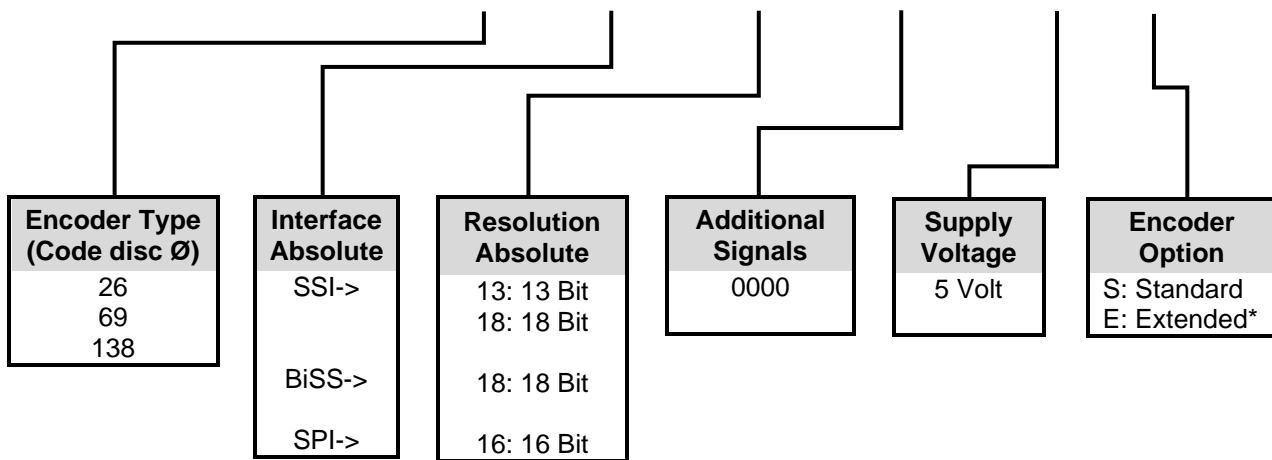
100mm shaft diameter



## Ordering Information

Ordering Code:

**ABG Head 26 – SSI – 18 – 0000 – 05 – S**






\*Customer specific version – feel free to ask us for special solution.

**Calibration is mandatory for the initial commissioning.**

Depending on the encoder interface, the corresponding programmer box is required for this. See last page under accessories.

## Necessary accessories

Description	Picture	Item number
<p>Accessory-Set: Cable 300mm, 2 screws, 2 cylindrical pins 2x6 (DIN 6325)</p>		<p>108546</p>
<p>SSI/BiSS Calibration box PWB5C USB to SSI/BiSS Converter</p>		<p>104255</p>
<p>SPI Calibration box PWB3C USB to SPI Converter</p>		<p>104750</p>