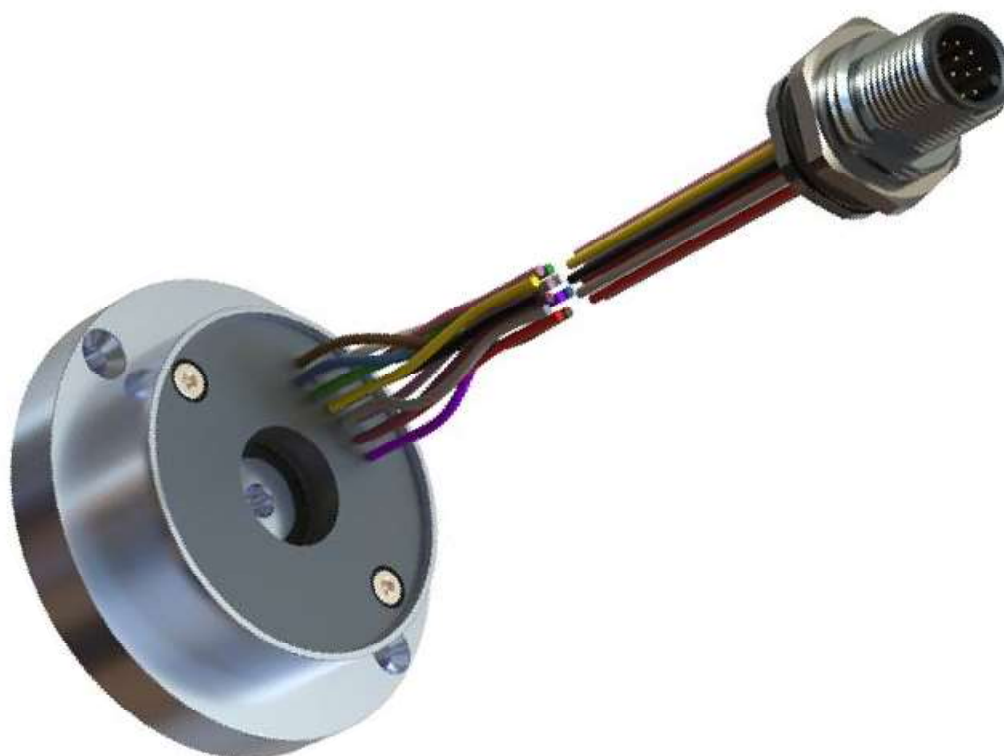


Absolute / Incremental Singleturn Encoder 18 Bit



PWB encoders GmbH
Am Goldberg 2
D-99817 Eisenach
Germany
Phone: +49 3691 72580-0

info@pwb-encoders.com
www.pwb-encoders.com

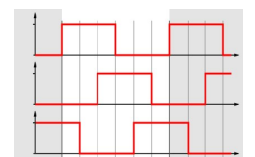
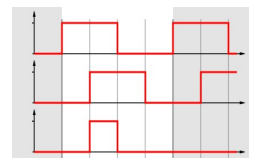
Description

The **ASA 42 Y01** is a high-resolution, multi-functional encoder. It offers a variety of common encoder interfaces. The **ASA 42 Y01** generates simultaneously position data as well as speed data. Thus, the encoder is ideal for positioning and rotation speed control.

The **ASA 42 Y01** is based on an off-axis hall sensing of a two track magnetic wheel by using the nonius principle. The differential sensing offers the advantage of effectively suppressing homogenous magnetic interferences. This is the reason why static fields don't have a significant influence on output signals.

Features

- Singleturn encoder
- Magnetic sensing
- 2 port output (absolute + incremental simultaneously)
- Interface: SSI (synchron serial interface) (18 Bit)
- BiSS ® (bidirectional serial synchron) (18 Bit)
- ABI (incremental interface) (up to 65.536 ppr)
- UVW (commutation signals) (up to 16 pole pairs)
- Compact size
- Bearing free
- Through hollow shaft
- Protection class IP 68
- Operating temperature: -20°C to +85°C
- Compliant EU-directive 2011/65/EU (RoHS)

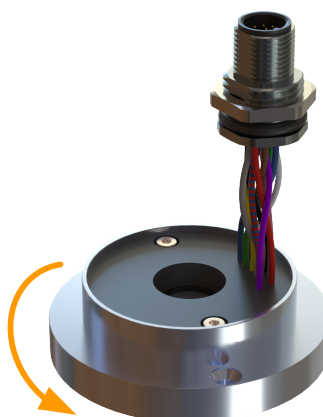


Applications

- Motor feedback
- BLDC motor commutation
- Multi-axis measurement systems
- Outdoor

Direction of rotation

Clockwise (CW)
(view from motor to encoder)



Recommended operating conditions

Electrical characteristics are only effective for the range of the operating temperatures.
Typical values at 25 °C.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply voltage	U_B	4.75	5.0	5.25	V_{DC}	
Supply current	I_{UB}	30	50	80	mA	no load
Reverse polarity protection	U_B	-30		0	V_{DC}	
Start up time	t_T		20		ms	
SSI / BiSS						
Clock frequency	f	80		10000	kHz	
Scan ratio of T		40	50	60	%	
Time lag	t_v		150		ns	
Monoflop time (SSI)	t_m		20 + T/2		μs	(BiSS: adaptive)
Rise time	t_r	3	11	25	ns	$R_L = 120\Omega$, $C_L = 100pF$
Fall time	t_f	3	11	25	ns	$R_L = 120\Omega$, $C_L = 100pF$
ABI / UVW						
High level output voltage	V_{OH}	2.0	3.0	5.25	V_{DC}	$R_L = 120\Omega$
Low level output voltage	V_{OL}			0.8	V_{DC}	$R_L = 120\Omega$
Output current per channel	I_{out}	-1.0		20	mA	overload protection
Environment						
Operating temperature	T_A	-20	25	85	°C	
Storage temperature	T_S	-30		100	°C	
System						
Relative Angular Accuracy			+/- 0,02 *		° m	depend on mechanic
Absolute Angular Accuracy			+/- 0,2 *		° m	depend on mechanic

* After calibration with the PWBxC converter box and the related calibration software

PWB encoders GmbH RESTRICTED

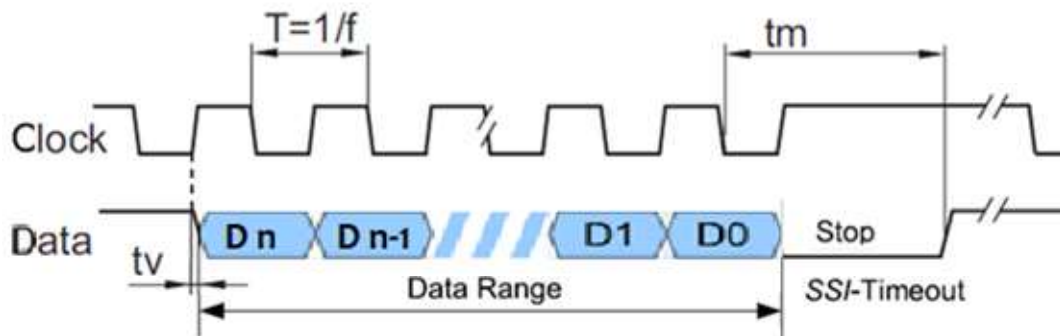
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Interface

Data transfer: SSI

Gray-Code

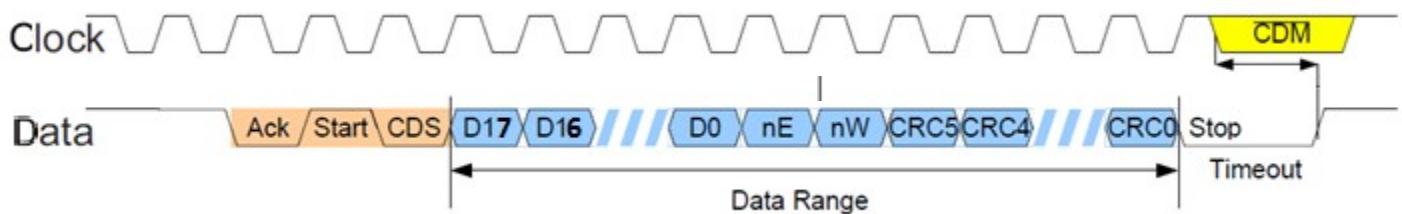


The resolution is 18Bit.

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

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 position data increases when the shaft rotates in the direction of clockwise.

Interface

Incremental

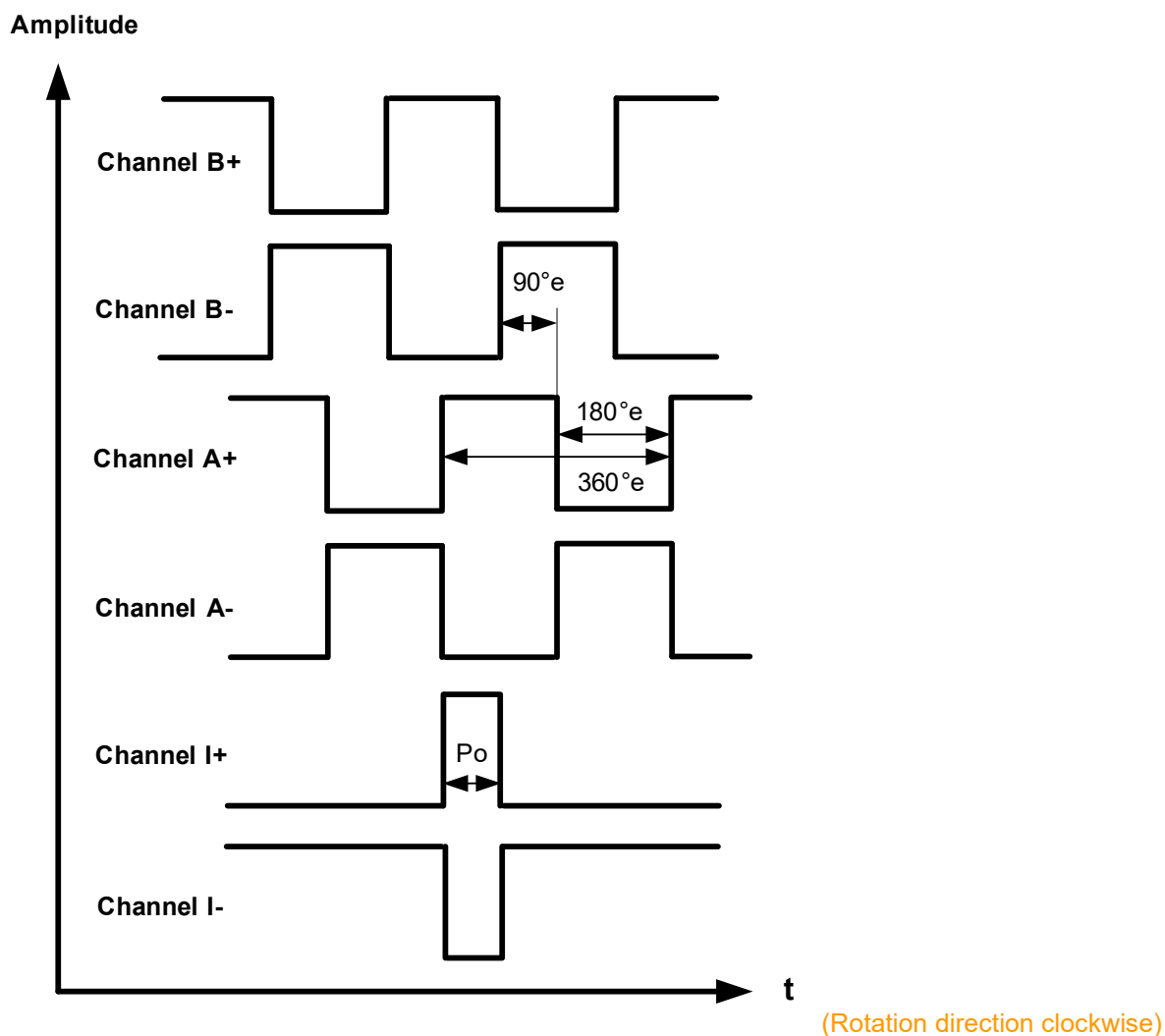


Figure: Incremental interface with differential signals

The position of the index pulse is in relation to the A/B signals.
The position of the Index can be set free (Preset).
Further variations are on request.

The resolution of incremental signals ABI can be programmed for each singleturn cycle within a range of 4 to 262,144 edges. That means a resolution from 1 to 65.536 ppr.
(1, 2, 3, 4, 5, ..., 65.535, 65.536)

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

Interface

Commutation

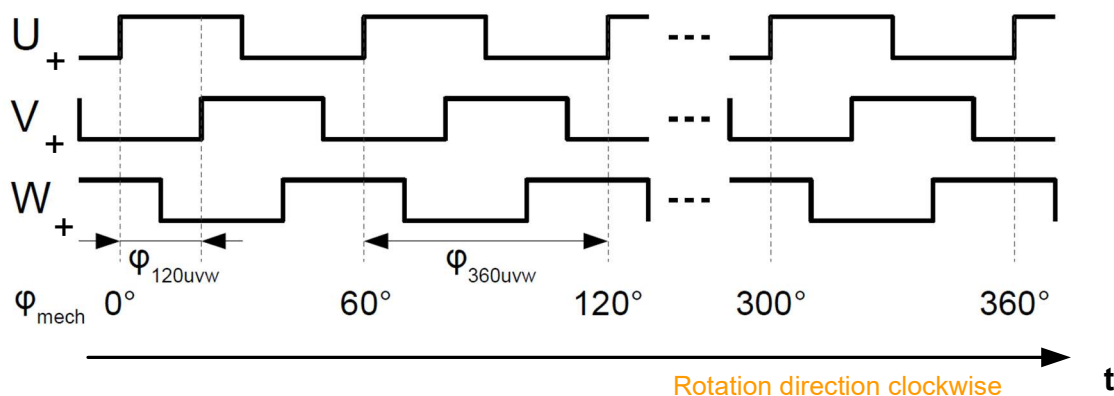


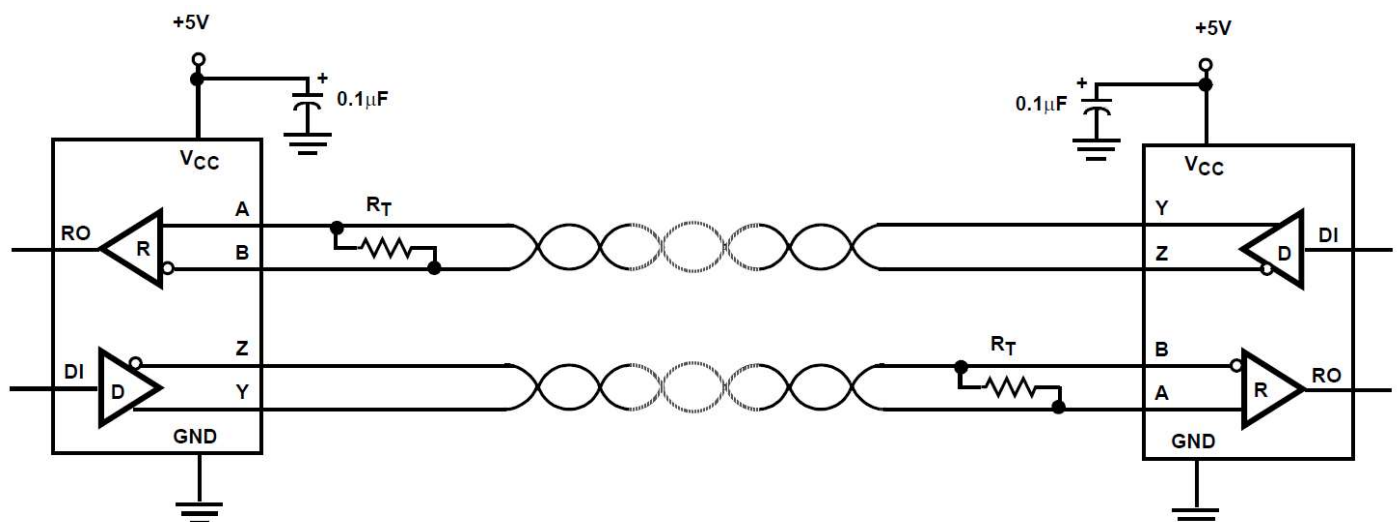
Figure: commutation sequence with 6 pole pairs.

The phaseshift between the commutation signals is 120°e.

The number of pole pairs for the commutation signals for BLDC motors are available from 1 up to 16.
(1, 2, 3, ..., 14, 15, 16 pole pairs)

The start angle for the offset of the winding of the BLDC and the Hall sensor signals can be set free.

Typical operating circuit *

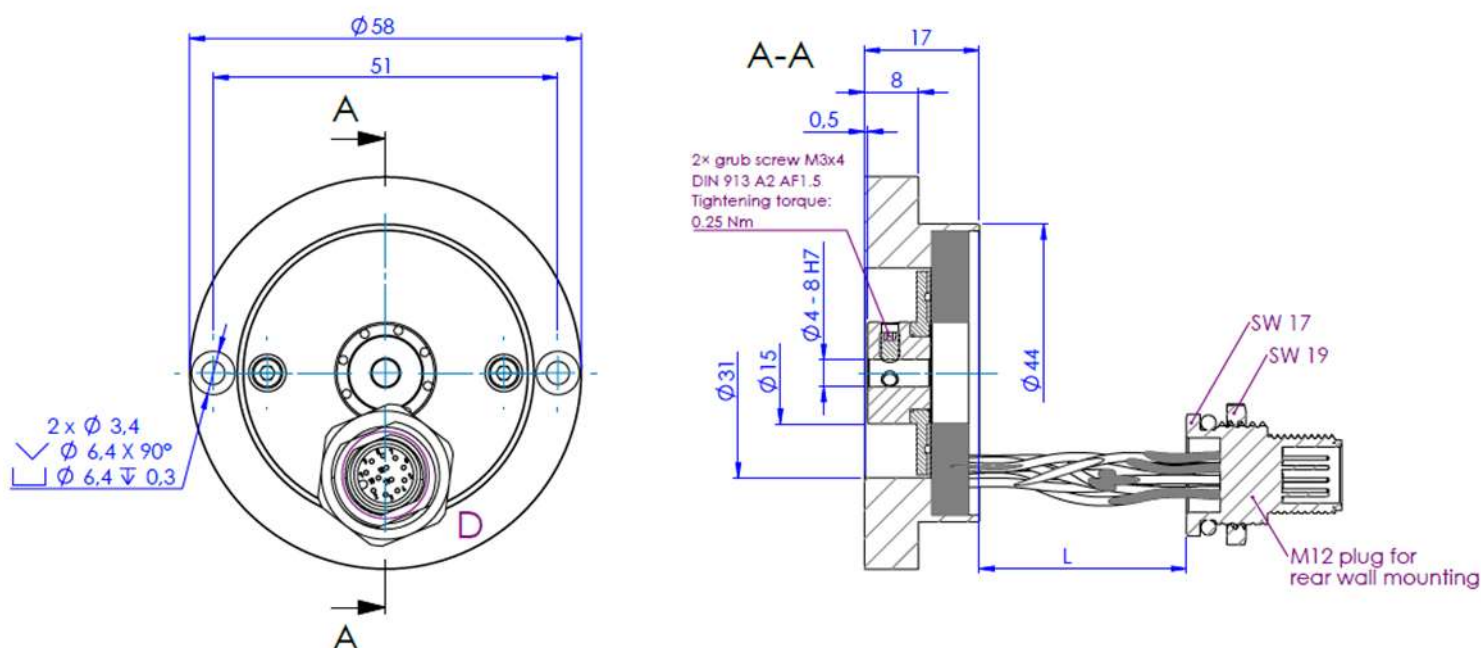


* $R_T = 470 \Omega$ (for SSI, BiSS, ABI, UVW)

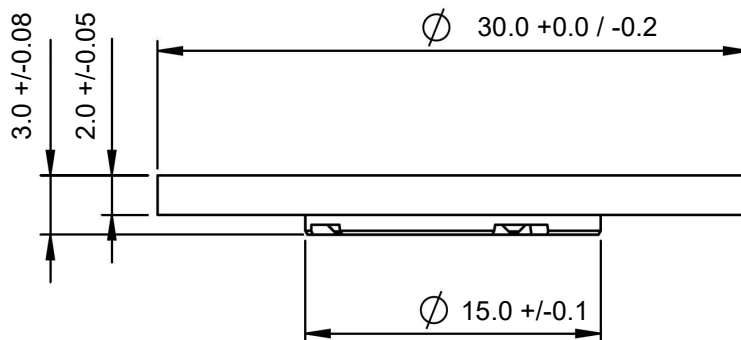
Mechanical Notes

Parameter	Value	Tolerance	Unit
Magnet wheel outer diameter $\varnothing$	30.0	+0.1 / -0.2	mm
Motor shaft diameter $\varnothing$	11.0 (only magnet)	± 0.025	mm
	4.0 - 8.0 (magnet with hub)	g6	mm
Permissible radial displacement	0	± 0.2	mm
Permissible tangential displacement	0	± 0.2	mm
Permissible axial displacement	0	± 0.1	mm
Permissible excentricity	0	± 0.05	mm
Sensor to magnet wheel distance	0.25	± 0.05	mm
Moment of inertia of the magnet wheel	10.0	± 1.0	gmm ²
Mounting screw size	M 3	-	-
Tightening torque of the screws	30	-5	Ncm
Permissible rotational speed	12.000	-	rpm
Total weight	80	-	g
Protection grade according to DIN 40500	IP68	-	-

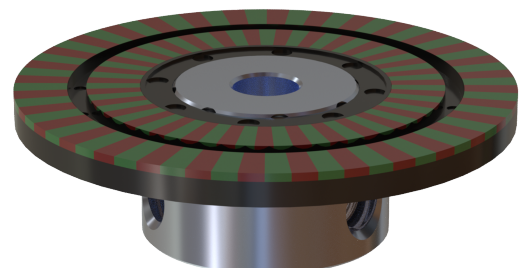
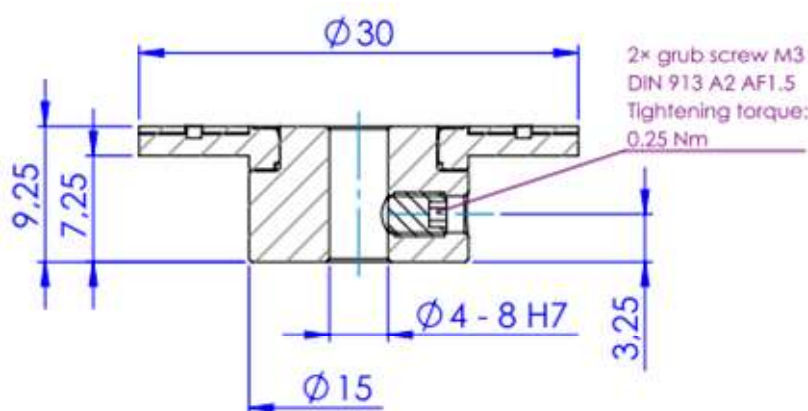
Mechanical Dimension



Magnet wheel:



Magnet wheel with hub:



The encoder must be calibrated during initial commissioning.

IMPORTANT NOTICE

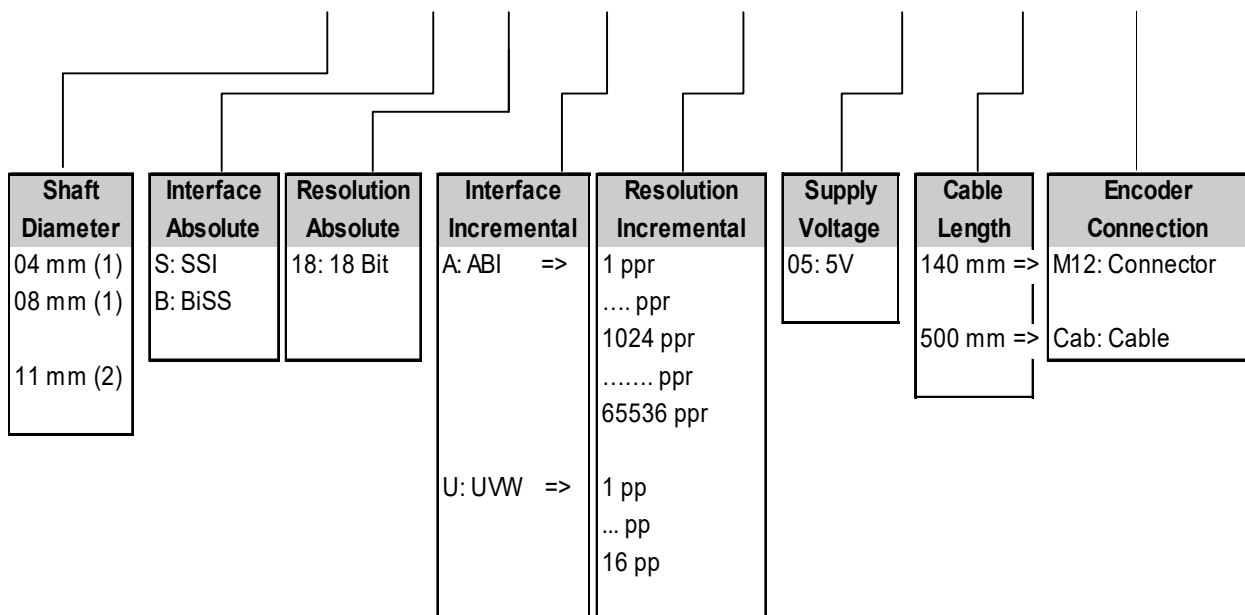
The guarantee will be voided by misuse, accident, modification, unsuitable physical or operating environment, operation in other than the specified operating environment, or failure caused by a product for which **PWB encoders GmbH** is not responsible.

PWB encoders GmbH reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services also datasheets at any time.

Ordering information

Ordering code:

ASA42 Y01 - XX - X - XX - X - XXXXX - 05 - XXX - XXX



(1) magnet with hub, (2) only magnet version

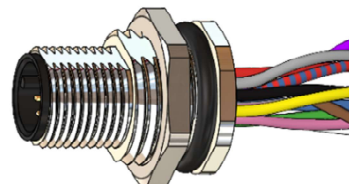
The incremental interface and the absolute interface are chosen freely in combination.

Pin-out description

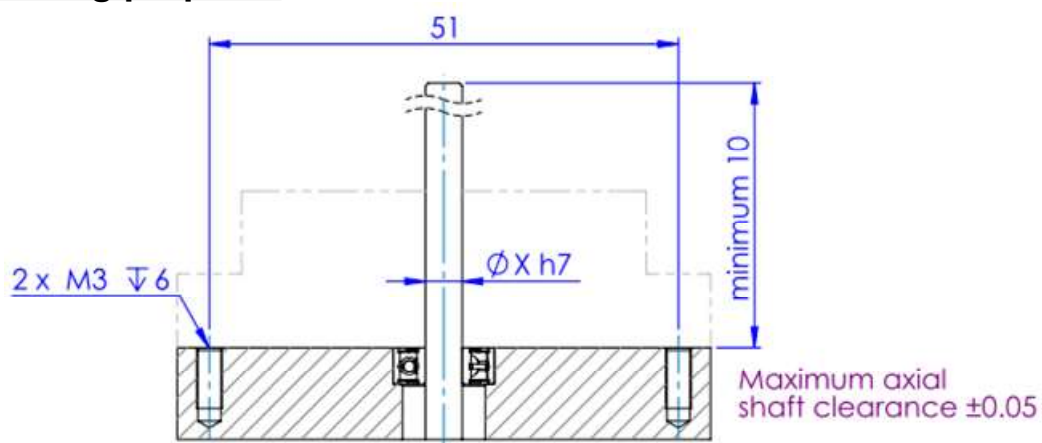
SSI, BiSS	ABI	UVW	Supply	<u>Connector M12</u> Pin no.	<u>Cable</u> Color of wire
			GND	1	blue
			UB	2	red
	A+	U+		3	green
	A-	U-		4	yellow
	I-	W-		8	purple
	I+	W+		7	black
	B-	V-		6	white
	B+	V+		5	brown
Da+				11	pink
Cl-				10	pink/grey
Da-				12	grey
Cl+				9	blue/red

Connector

M12M12A:
M12, 12 pin, straight, rear wall mounting, A-coded

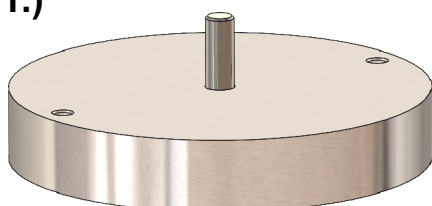


Mounting proposal

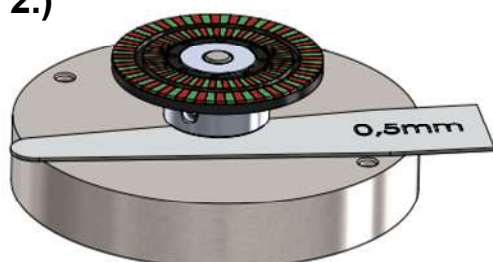


Mounting instruction

1.)



2.)



3.)

