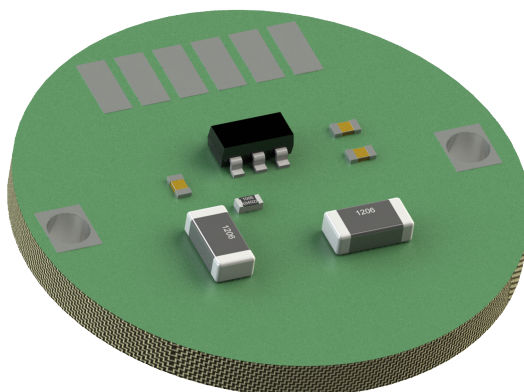


circuit board for absolute singleturn encoder **SSI / BiSS**



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Description

The **WEM20 PCB** is a circuit board for absolute singleturn encoders. This encoder module consists an axial quad hall sensing chip for magnetic detecting. The absolute position can be measured with a suitable diametrical magnet. It is important to pay attention to the appropriate air gap. The **WEM20 PCB** is for real time encoders with high speed applications and rough environments. The PCB can be fixed quickly and easily. The encoder module is ideal for positioning and rotation speed control.

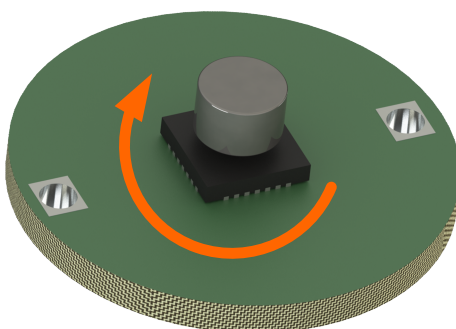
Main characteristics

- Absolute rotary encoder PCB
- Singleturn
- Magnetic sensing
- Interface: SSI (synchron serial interface) or BiSS ® (bidirectional serial synchron)
- Code: binary / gray
- Resolution: up to 14 Bit (16,384 steps per revolution)
- RS422 transceiver (differential)
- Operating Temperature: -40°C to +125°C
- High performance in compact size
- Quick and easy assembly



Direction of rotation

Clockwise (CW) when looking from motor side to the PCB



Rotation direction clockwise
(count up)

Recommended operating conditions

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}			80	mA	no load
Absolute accuracy			+/- 1.2		°	(unselected magnets)
			+/- 0,5		°	(after calibration via SW)
Rotation speed	RPM			10,000	U/min	up to 14 Bit
				80,000	U/min	up to 12 Bit
Hysteresis			0,35		°	
SSI / BiSS						
Clock frequency	f	1		10	MHz	
Scan ratio of T		40	50	60	%	
Monoflop time	t_m		2 x T		µs	adaptive timeout
High level output voltage	V_{OH}	2.0	3.0	5.5	V_{DC}	$R_L = 120\Omega$
Low level output voltage	V_{OL}			0.8	V_{DC}	$R_L = 120\Omega$
High level input voltage	V_{IH}	2.0		5.5	V_{DC}	
Low level input voltage	V_{IL}			0.8	V_{DC}	
Output current per channel	I_{out}		30	50	mA	overload protection
Time lag	t_v		150		ns	
Environment						
Operating temperature	T_A	-40	25	125	°C	
Storage temperature	T_S	-40		125	°C	

Description:

The encoder board WEM20 is one part of a magnetic kit system. The whole system consists the PCB including a magnetic hub.

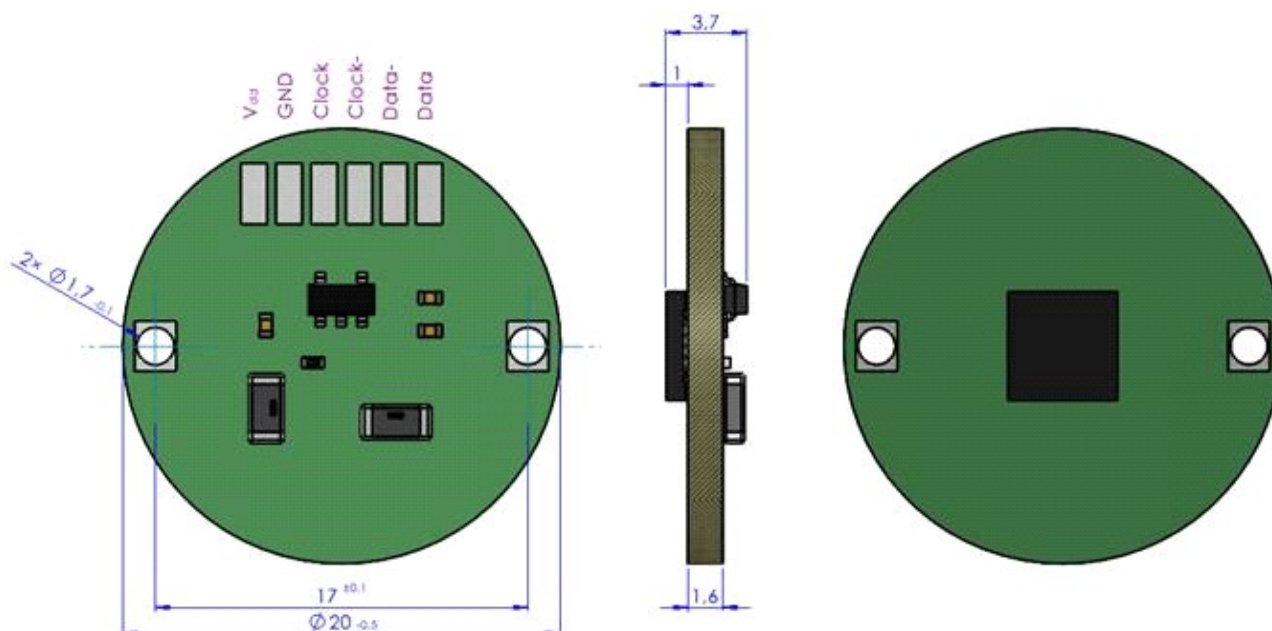
For communication with the WEM20, a USB converter box is available from PWB encoders. The software can be downloaded from the website. This can help for the first use and for visualization of the position data. It is not necessary for operation in the customer application with the customer control.

The angular accuracy can calibrate after the mechanical assembly (with the Software and the USB converter box).

Mechanical characteristics and drawings

Parameter	Value	Tolerance	Unit
PCB diameter	20	- 0.5	mm
PCB height	1.6	± 0.2	mm
Sensor chip height	0.9	± 0.1	mm
Weight	6	± 2	g
Magnet diametrically (diameter) $\varnothing$	5	± 1	mm
Air gap (magnet - chip)	0.85	± 0.25	mm
Space under PCB	2		mm
Protection class	IP00		

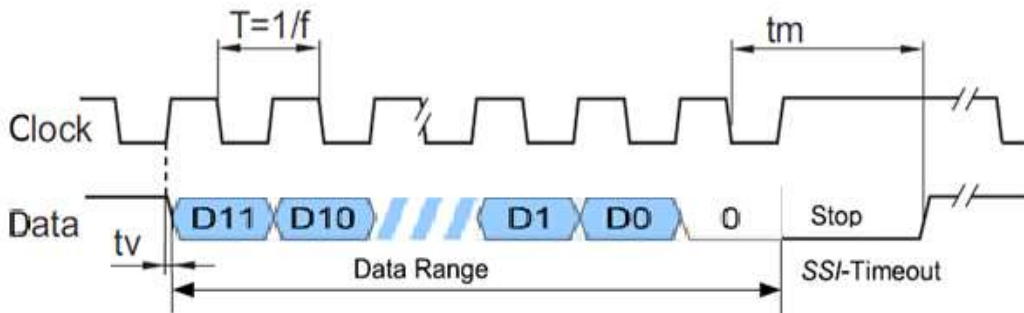
Dimensions and Pin out description:



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

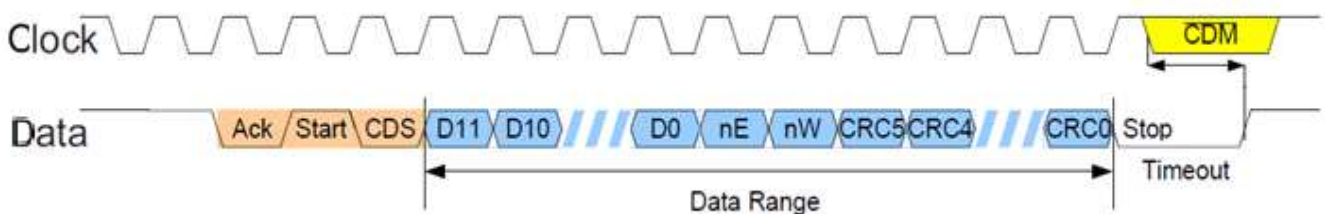
Interface:

Data transfer: SSI Gray-Code



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

Data transfer: BiSS (C-Mode) Binary-Code

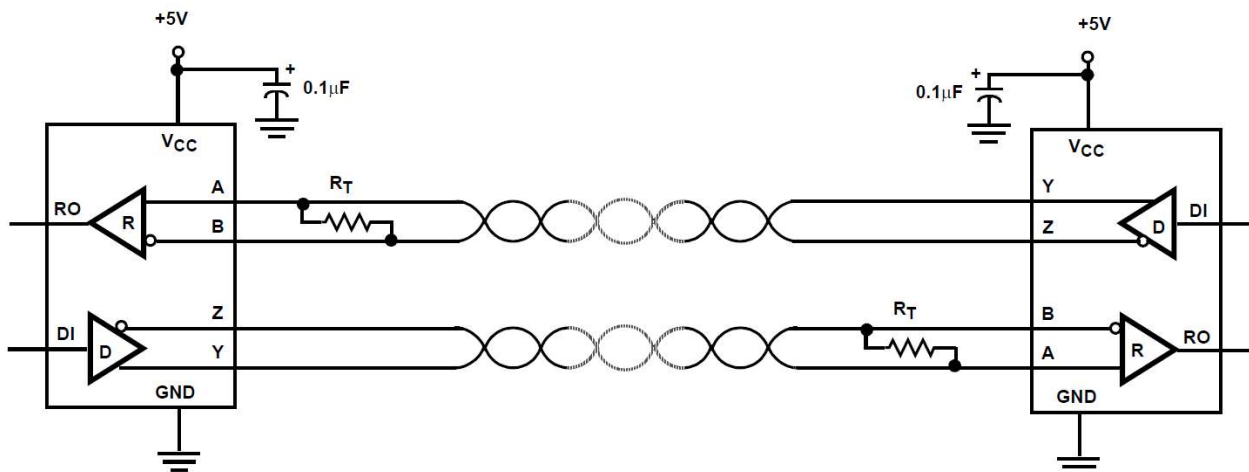


The position data increases when the shaft rotates in the direction of clockwise

Serial interface protocol	Definition
Cycle start sequence	Ack/Start/CDS
Length of sensor data	12 Bit + ERR + WARN
CRC Polynom	0b1000011
CRC Mode	Inverted
Ack	Acknowledge-Bit
Start	Start-Bit
CDS	Control-Bit
D0 - D11	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.

Typical application connection



Ordering information

Ordering code:

WEM 20 PCB - X - X - XX - XX - X.X - X

Encoder Interface	Interface Code *	Encoder Resolution	Supply Voltage	Output option	PCB option
S : SSI B : BiSS	G : Gray B : Binary	09 : 512 10 : 1,024 11 : 2,048 12 : 4,096 13 : 8,192 14 : 16,384	05 : 5V _{DC}	0.0: Pads without cable	S : Standard E : Extended M : With magnet V : Varnished

*
SSI only with gray code
BiSS only with binary code

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