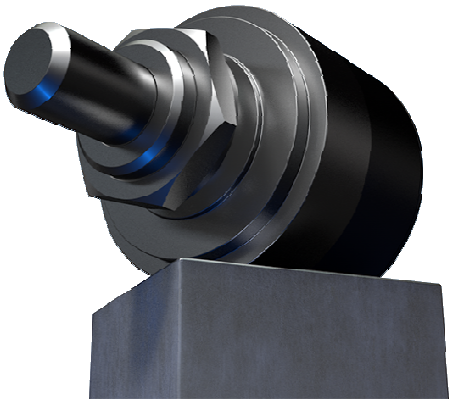
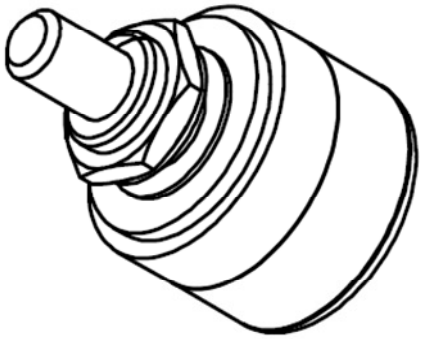
Description

The ME22S is a reliable optical shaft encoder. It is suitable as a potentiometer substitute. The ME22S can be fixed quickly and easily.
The encoder provides two square wave outputs in quadrature (90 degrees phase shifted) for counting and direction information and one optional index channel (one pulse per revolution).
The resolution of the encoder is determined by the number of counts per revolution (CPR).
Power supply and signals are provided by a 5 pin Molex connector.





Features

- Small size: 22.0 mm diameter x 15.8 mm length.
- Output channels: 2 (quadrature) + 1 optional index-channel
- Power supply: 5 VDC
- Output type: TTL compatible
- Output circuit: pull-up
- Resolution up to 360 CPR (counts per revolution)
- Operating temperature: -20 °C to 85 °C
- Frequency: 60 kHz
- Compliant EU-directive 2011/65/EU (RoHS)

Recommended operating conditions

Electrical characteristics are only effective for the range of the operating temperatures.
Typical values at 25 °C and Vcc = 5 VDC.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating temperature	T_A	-20	25	85	°C	
Supply voltage	V_{cc}	4.5	5.0	5.5	V_{DC}	
Supply current (two channels)	I_{cc}	13	15	18	mA	
Supply current (three channels)	I_{cc}	33	35	38	mA	
Load capacitance	C_L			100	pF	internal pull-up 2.7 kΩ
Count frequency	f			60	kHz	rpm x N / 60 x 10^{-3}
A & B Channel						
High level output voltage	V_{oH}	2.4		Vcc	V_{DC}	I_{oH} = -0.2 mA
Low level output voltage	V_{oL}			0.4	V_{DC}	I_{oL} = 8.0 mA
Rise time	t_r		500 / $(7)^2$		ns / $(\mu s)^2$	C_L = 25 pF;
Fall time	t_f		100 / $(1.3)^2$		ns / $(\mu s)^2$	R_L = 2.7 kΩ
Index Channel						
High level output voltage	V_{oH}	2.4		Vcc	V_{DC}	I_{oH} = -0.2 mA
Low level output voltage	V_{oL}			0.4	V_{DC}	I_{oL} = 8.0 mA
Rise time	t_r		7		µs	C_L = 25 pF;
Fall time	t_f		1.3		µs	R_L = 2.7 kΩ

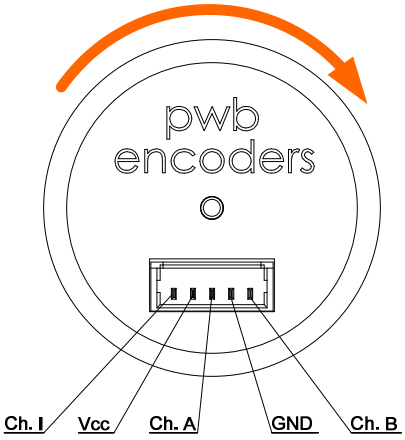
1. on demand
2. only for 1,2,4,8 CPR variant

Absolute maximum ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage temperature	T_s	-40		85	°C	
Operating temperature	T_A	-20		85	°C	
Humidity exposure				90	%RH	not condensing
Supply voltage	V_{cc}	-0.5		7	V_{DC}	
Output voltage	V_o	-0.5		V_{cc}	V_{DC}	
Output current per channel	I_{out}	-1.0		8	mA	

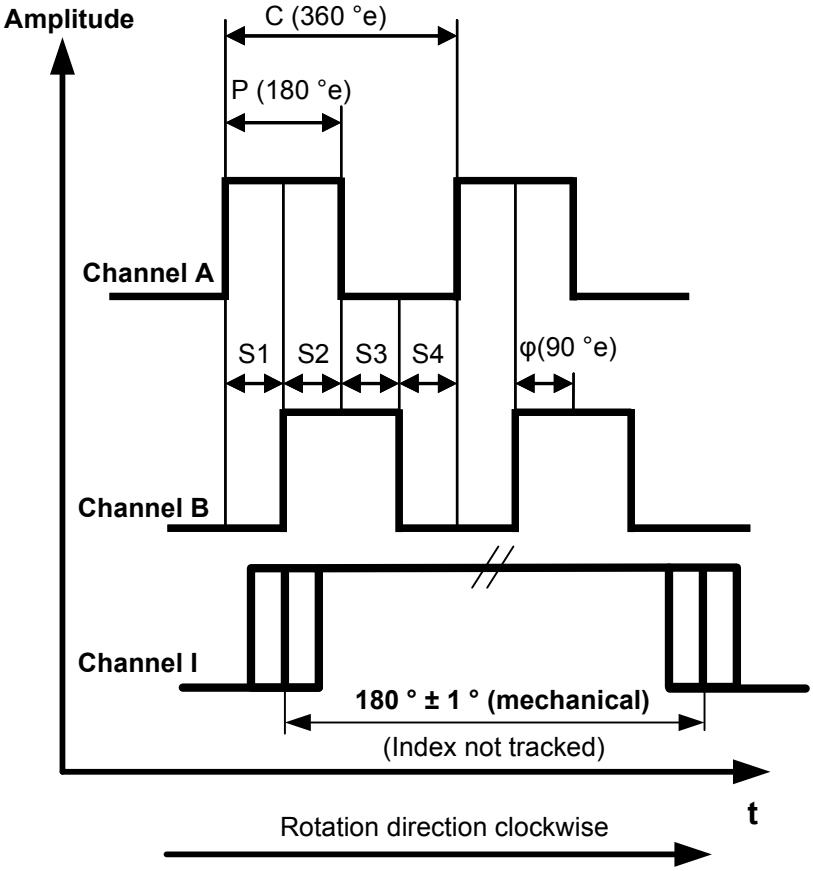
ESD Warning: Normal handling precautions should be taken to avoid static discharge damage to the sensor.

Electrical interface



Encoding characteristics channel A & B

Parameter	Symbol	Nominal	Max.Error	Unit
Pulse width	P	180	±70	°e
Phase shift	φ	90	±60	°e



Definitions

Counts per Revolution (CPR):
The number of bar and window pairs or increments per revolution of the code wheel.

One Cycle (C):
360 electrical degrees (°e), one period of the signal, caused by one pair of bar and window.

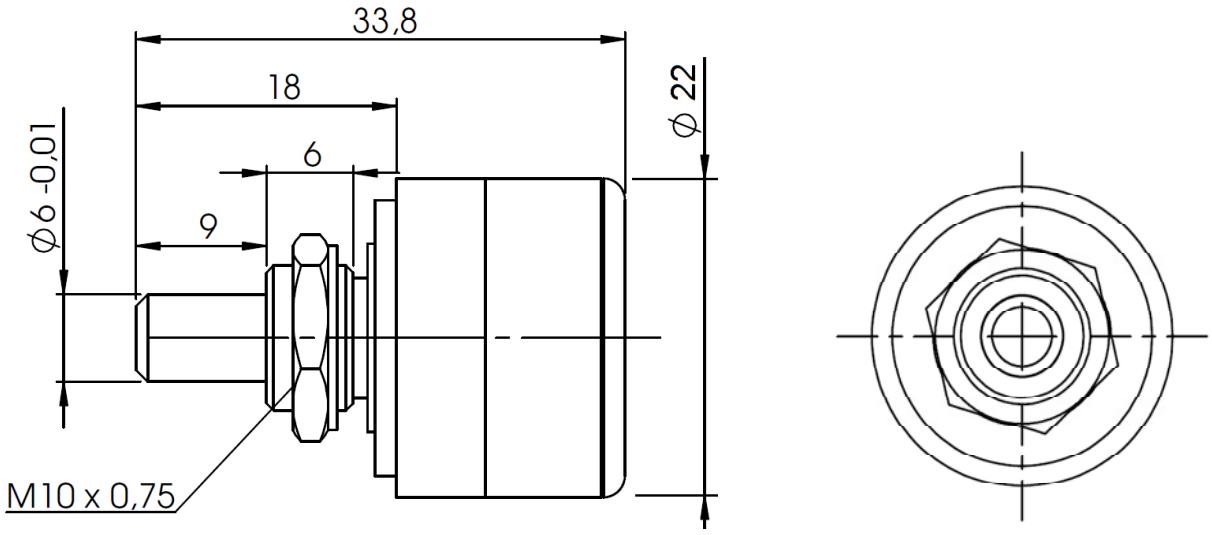
Pulse Width (P):
The number of electrical degrees that an output is high during one cycle. This value is nominally 180 °e.

State Width (S):
The number of electrical degrees between a transition in the output of channel A and the neighbouring transition in the output of channel B. There are 4 states per cycle, each nominally 90 °e.

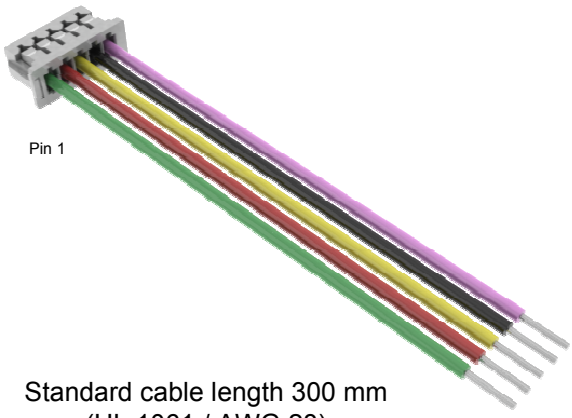
Phase (φ):
The number of electrical degrees between the centre of the high state of channel A and the center of the high state of channel B. This value is nominally 90 °e.

Position Error (ΔQ):
The angular difference between the actual angular shaft position and the position indicated by the encoder cycle count.

Dimensions:



Available accessories



Standard cable length 300 mm
(UL 1061 / AWG 28)

Bel. Anschlusskabel 5pol. 300 mm		
Pin-Nr.	Aderfarbe	Belegung
1	grün	Kanal I
2	rot	Vcc = 5VDC
3	gelb	Kanal A
4	schwarz	GND
5	violett	Kanal B

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:

ME22S - XXX - X.XXX - X - XXX

Encoder Resolution (CPR)*	Motor Shaft Diameter (mm)	Number of Channels	Output option
001 **	4.000	1 : 1 Channel	LF : connector without cable
002 **	6.000	2 : 2 Channels	LS : connector + standard cable
004 **		3 : 3 Channels	
008 **			
050 ***			
064 ***			
100			
108			
120			
124			
125			
128			
150			
160			
200			
250			
256			
300			
360			

Note:
* other encoder resolutions on request
** only two channel
*** only one channel

Available accessories see page 9 (no parts of standard delivery):
- cable 300 mm length (UL1061 / AWG28)

Patents: U.S 5,828,047 ; U.S 5,508,088 ; U.S 5,859,425 ; U.S 6,462,442