Service manual
Optical Encoder ME 22

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Description

The ME 22 is a optical incremental encoder, He is a reliable low cost hollow shaft encoder that can be fixed quickly and easily on different sizes of motor shafts.
The encoder provides two square wave outputs in quadrature (90 degrees phase shifted) for counting and direction . The resolution of the encoder is determined by the number of counts per revolution (CPR). The power supply and signals they are provided by a 5-pin Molex connector.

Features

- Small size: 22.0 mm diameter x 21.9 mm length
- Quick and easy assembly without coming into contact with sensitive components
- Output channels: 2 (quadrature) + 1 index-channel optional
- Power supply: 5 VDC
- Output type: TTL Compatible.
- Output circuit: pull up
- Resolution: up to 360 CPR (counts per revolution)
- Max. shaft diameter: 9,525 mm (3/8”)
- Operating temperature: -20 °C to +85 °C.
- Frequency: 60 kHz.
- Compliant EU-directive 2002/95/EG (RoHS)

Ordering information

ME22	100	6.000	2	LS

Encoder Resolution (CPR)*	Motor Shaft Diameter (mm)	Number of channels	Output option
001 **	1.500	1 = 1 Channel	LS = Connector + standard cable
002 **	2.000	2 = 2 Channel	
004 **	2.300		
008 **	2.500		
050 ***	3.000		
064 ***	3.175 (1/8”)		
100	3.969 (5/32”)		
108	4.000		
120	4.763 (3/16”)		
124	5.000		
128	6.000		
150	6.350 (1/4”)		
160	8.000		
200	9.000		
250	9.525 (3/8”)		
256			
300			
360			

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

Preferential codes

Available accessories, see page. 8

- cable 300 mm length (UL1061 / AWG28)
- centering gauge (not included as standard part)
- fastening screws DIN 84 M1.6x3

Recommended operating conditions

Electrical characteristics are only effective for the range of the operating temperatures.
Standard values at 25 °C and VDC = 5 V ± 5%.

Parameter	Symbol	Nominal	Min.	Max.	Unit	Notes
Operating temperature	T_A	+25	- 20	+85	° C	
Supply voltage	V_{DC}	5.0	4.5	5.5	V_{DC}	
Supply current (two channels)	I_{CC}	15	13	18	mA	
Line capacity (admissible value)	C_L			100	pF	internal pull-up 2.7 kΩ
Count frequency	f			60	kHz	rpm x N / 60 x 10^{-3}
A and B Channel						
High level output voltage (standard version))	V_{OH}		2.4		V_{DC}	I_{OH} = -0.2 mA
Low level output voltage (standard version)	V_{OL}			0.4	V_{DC}	I_{OL} = 8 mA
Rise time (standard version)	T_r	500/(7)*			ns /(µs)*	C_L = 25 pF
Fall time (standard version)	T_f	100/(1.3)*			ns /(µs)*	R_L = 2.7 kΩ

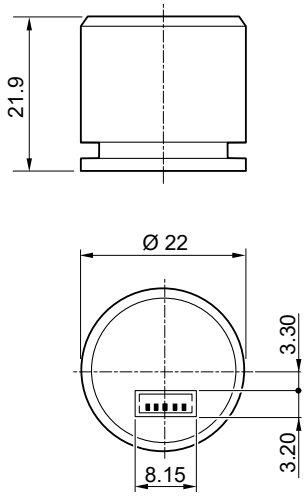
* only for 1, 2, 4, 8 CPR

Absolute maximum ratings

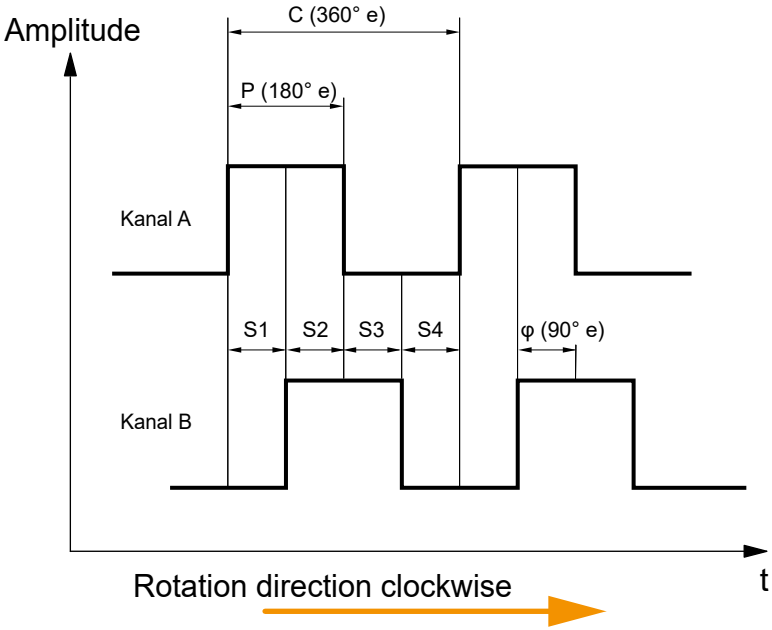
Environment	Symbol	Min.	Max.	Unit	Notes
Storage temperature	T_S	- 40	+ 85	° C	
Operating temperature	T_A	- 20	+ 85	V_{DC}	
Humidity exposure			90	% RH	not codensing
Supply voltage	V_{DC}	- 0.5	7	V_{DC}	
Output voltage	V_O	- 0.5		V_{DC}	
Output current for channel	I_{OUT}	- 1.0	8	mA	
Vibration			2000	Hz	20 g

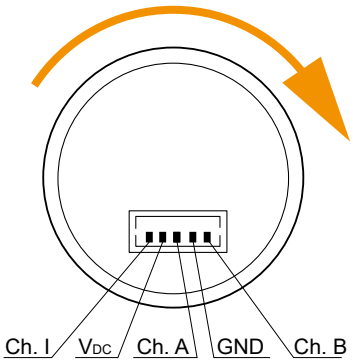
ATTENTION
ESD Warning: (Electrostatic discharges):
handle with care to avoid damaging the sensor with electrostatic discharges

Dimensions



Electrical interface





Definitions:

- **CPR -** Counts per Revolution: number of notches on the optical disc or periods per rotation of the encoder.
- **C -** One cycle: 360 electrical degrees (°e), one period of the signal.
- **P -** Pulse Width: The number of electrical degrees that an output is high during one cycle. This value is nominally 180 ºe or half a cycle.
- **S -** State Width: 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 ºe
- **φ -** Phase: 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 ºe .
- **ΔQ -** Position error: angular difference between the current angular position of the shaft and the position indicated by the encoder cycle count

A and B channel encoding features:

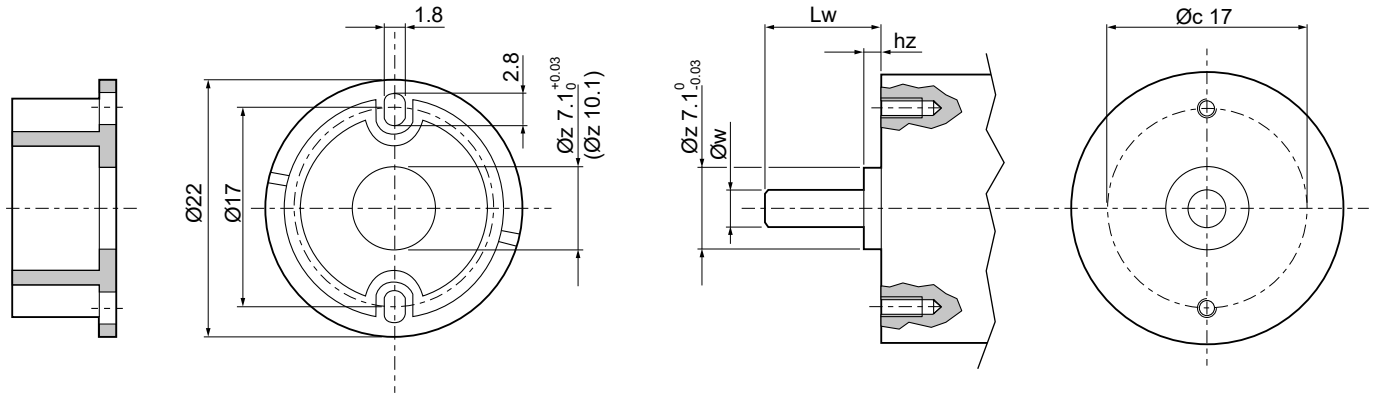
Parameter	Symbol	Nominal	Max *Error*	Unit
Pulse width	P	180	± 70	°e
Phase error	φ	90	± 60	°e

Mechanical notes

Parameter	Symbol	Value	Tolerance	Unit
Outer dimensions		Ø 22,0 x 21,9	-	mm
Shaft diameter	**Øw**	1,5 / 2,0 / 2,3 / 2,5 / 3,0 / 3,175 / 3,969 / 4,0 4,763 / 5,0 / 6,0 / 6,35 / 8,0 / 9,0 / 9,525	± 0.01	mm
Required shaft length	**Lw**	9,5	+ 2.0	mm
Max. allowable axial shaft play of motor		0,6	-	mm
Max. allowable radial shaft play of motor		0,025	-	mm
Mounting screw size (DIN 84)		M1.6	-	-
Tightening torque of the screws		15	- 5	Ncm
Pitch circle diameter	**Øc**	17,0	± 1.0	mm
Flange inside bore diameter	**Øz**	7,1 o 10,1	+ 0.03	mm
Mounting boss diameter	**Øm**	7,1	- 0.03	mm
Max. mounting boss height	**hz**	1,5	- 0.1	mm
Mating connector (Molex)		5 pin 50079-8000 housing 51021-0500	-	
Total weight		7	-	g
Moment of inertia of the hubwiththe magnet		5,2	± 1.0	g·mm^2
Protection grade according to DIN 40500		IP50	-	-

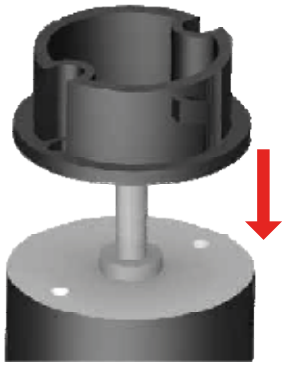
Mounting considerations

The ME22 encoder is designed to self align by using a mounting boss. You need a tool centering gauge.The drawing shows the configuration of the mounting boss along with the location of the mounting screw holes. Shaft diameter and tolerances are given in the above mentioned chart.



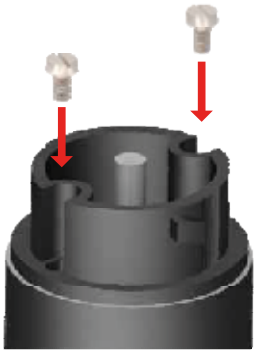
ME22 mounting instructions

1



Align the base plate to the motor shaft using the centering tool

2



Then fix the base plate to the motor flange using two screws

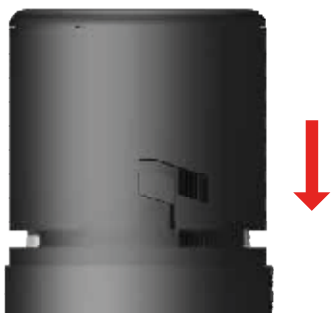
3

Align the housing to the base plate and slide it over the latter

4

The hub is thus automatically centered on the motor shaft

5



From this position the housing cannot be locked

6

Press the housing into the final position

ME22 mounting instructions

RoHS compliant

7

The housing can now be locked

8

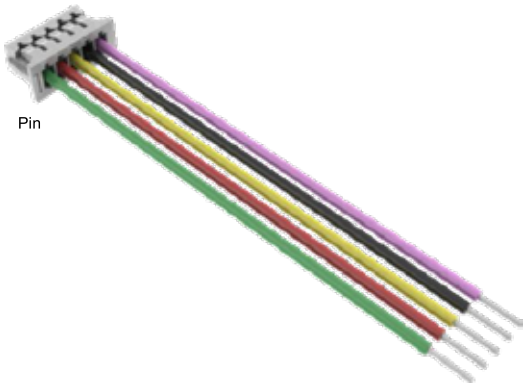
Turn the housing into its final position, the encoder is now ready for use

WARNING

DO NOT ROTATE AND PULL OUT THE ENCODER AFTER ASSEMBLY OR WHEN IT IS IN OPERATION.

ATTENTION
The encoder is designed that it may be assembled only one time, otherwise the guarantee will be voided. Note: see IMPOR-TANT NOTICE (page 8)

Available accessories



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

- Centering gauge for centering the ME base plate on the motor flange or an adapter plate

- Screws DIN84 M1.6 X 3

IMPORTANT NOTICE

The encoder is designed that it may be assembled only one time, otherwise the guarantee will be voided. 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 the manufacturer is not responsible.

The manufacturer reserves the right to make correctio
other changes to its products and services also datash