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Installation Notes

Encoder Kit “E OI R007 C0128 DSET”

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1 Glossary

2 Introduction

In the following installation instructions the important details for integration of the encoder kit (E OI R007 C128 DSET) is shown by means of an example.

Consider ESD protection!

3 Mechanical overview

Figure 1 shows all parts of the encoder installed in a motor.

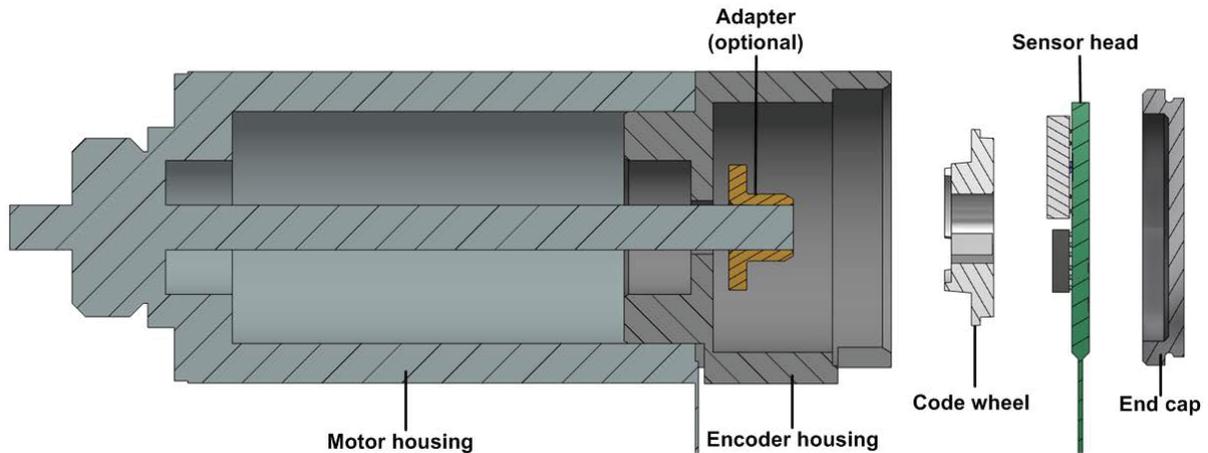


Figure 1: Items of the encoder and the motor

Figure 2 represents the built-in encoder in the motor.

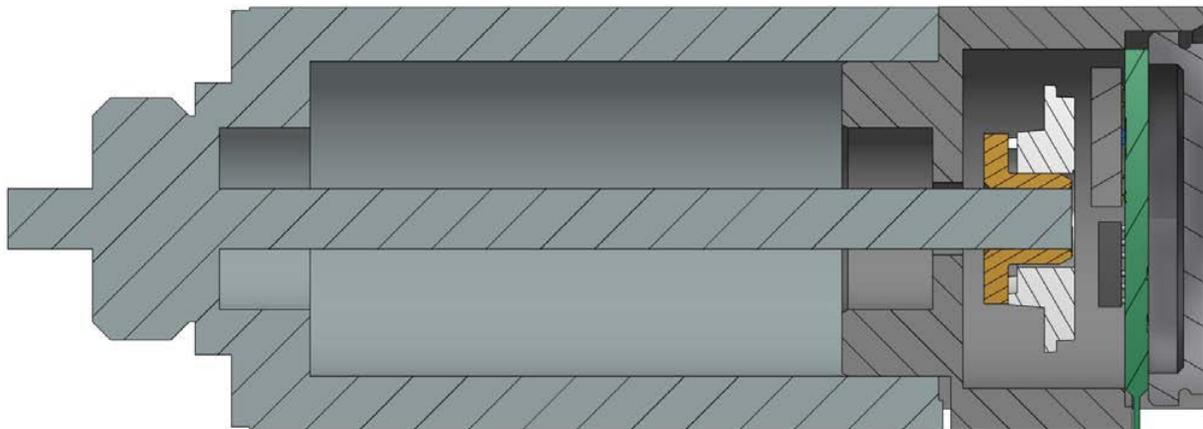


Figure 2: Built-in encoder in the motor

4 Mounting tolerances

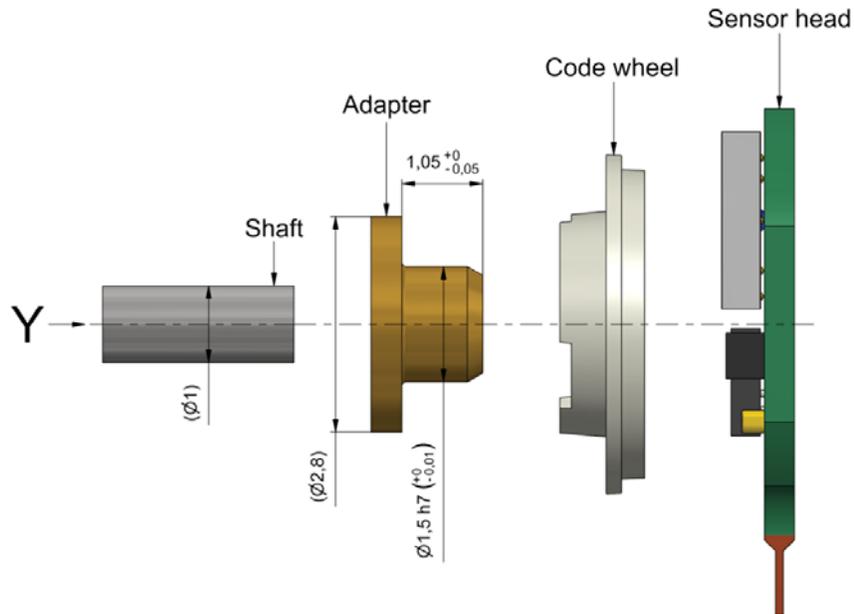


Figure 3: Exploded view of the encoder

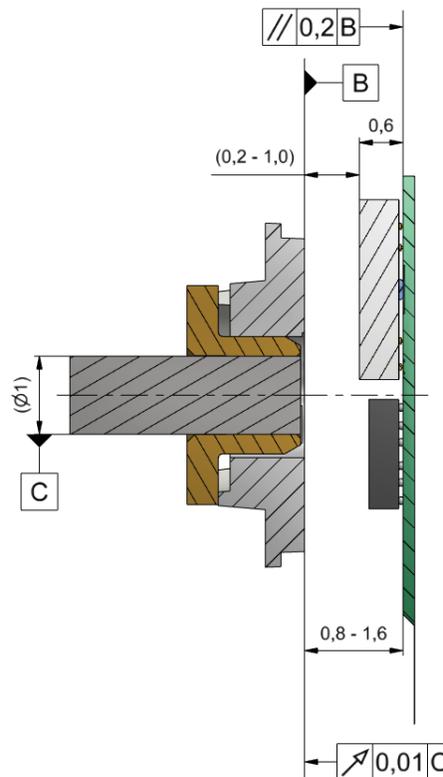


Figure 4: Sectional view X-X (Figure 5), assembled state (customer-specific shaft and adapter)

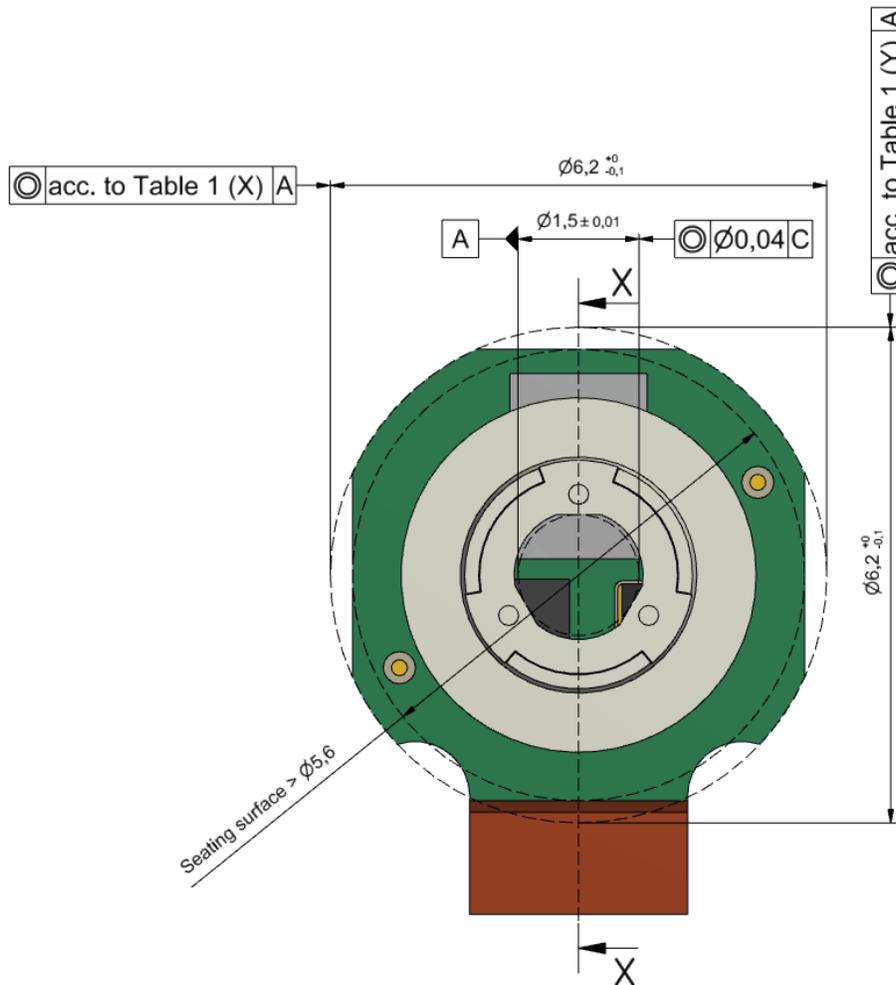


Figure 5: View of assembled state (customer-specific shaft and adapter hidden)

Distance Code wheel / Sensor in mm	Acceptable Displacement Code wheel / Sensor in mm		max. Phase difference A / B in °e
	X-Direction	Y-Direction	
0,20 - 0,40	± 0,10	± 0,05	90 ± 5
0,20 - 0,40	± 0,15	± 0,10	90 ± 10
0,20 - 0,40	± 0,20	± 0,15	90 ± 25
0,41 - 0,70	± 0,15	± 0,05	90 ± 5
0,41 - 0,70	± 0,15	± 0,10	90 ± 10
0,71 - 1,00	± 0,15	± 0,05	90 ± 5

Table 1: Mounting tolerances in X- and Y-Direction

5 Mounting instructions for the code wheel

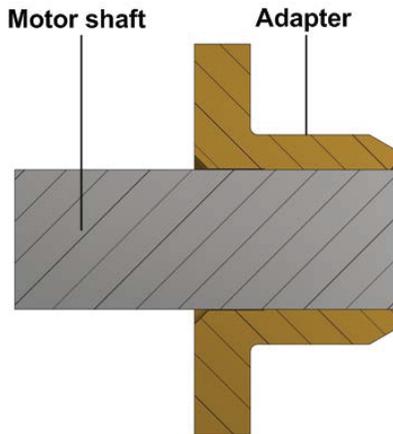


Figure 6: Motor shaft with adapter

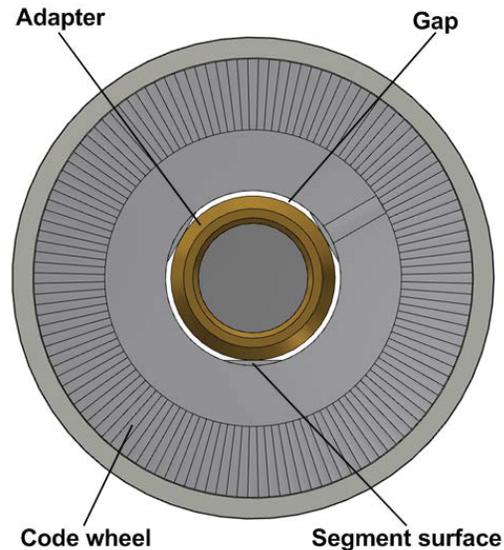


Figure 7: Code wheel with adapter (simplified illustration)

5.1 Code wheel design

The code wheel is made of PC (Polycarbonate).

The three segment surfaces of the code wheel centre the code wheel on the adapter or the shaft.

The three gaps are partially filled with an adhesive to fix the code wheel on the adapter or the shaft (Figure 7).

5.2 Adapter (optional)

Optional, an adapter can be used to compensate for different shaft diameters.

This is ideally made of brass and is pressed using a light press fit onto the customer-specific shaft (Figure 6).

5.3 Adhesive

The final fixing of the code wheel will be achieved by the application of an adhesive, which guarantees a good adhesion of the code wheel to the shaft or the adapter.

For example the adhesive "EPO-TEK 353ND" (or similar) can be used for combining Brass / Polycarbonate material.

Superglue is not recommended because it develops vapour which could interfere with the reflection of the code wheel surface.

Attention:

The reflecting surface of the code wheel must not be scratched or contaminated with adhesive or other dirt! Otherwise, this may compromise the functionality of the encoder.



The adhesive must be cured before the shaft is allowed to rotate.

6 Installation instructions for sensor head

The mechanical support for the sensor head has to ensure a centred positioning (centre of the sensor head relative to the centre of the code wheel) with a tolerance according to the Table 1.

The guide bearing for the shaft, on which the code wheel is located, should be designed that the position tolerances between the code wheel and the sensor are maintained over the entire lifetime of the motor.

6.1 Mechanical alignment errors in the X- and Y- direction

The position of the sensor head relative to the code wheel is determined by the manufacturing tolerances of the sensor head and the encoder housing. A precisely centred positioning is recommended (Figure 8).

Misalignments up to $\pm 0,2$ mm and their impact (also for the Z-Axis tolerances) can be seen in the Table 1.

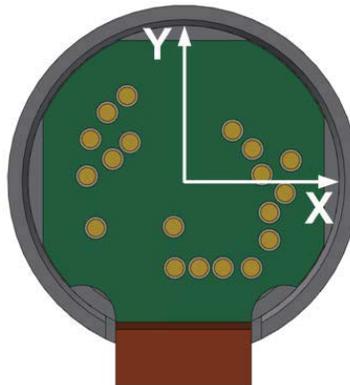


Figure 8: Definition of X- and Y-directions for alignment errors

6.2 Mechanical alignment errors in the Z-axis

The distance between the sensor on the sensor head and the code wheel is determined by the manufacturing tolerances of the encoder housing and the axial play of the motor shaft.

A distance of 0,2 mm up to 0,4 mm is recommended to achieve lower power consumption. Bigger the gap between the sensor and the code wheel the greater is the power consumption (Figure 9).

Distances between 0,2 mm and 1,0 mm and their impact (also for the X/Y installation tolerances) can be seen in the Table 1.

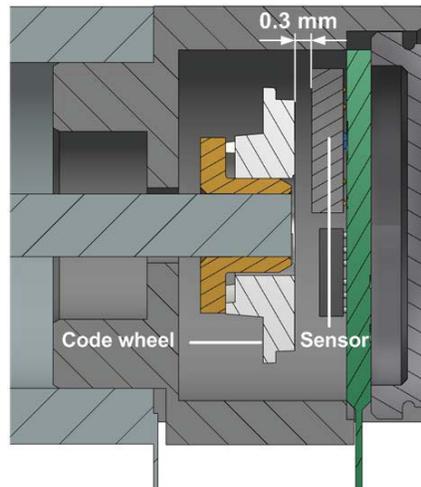


Figure 9: Distance between the code wheel and the sensor in the Z-direction

7 Example of installation / Assembly process

7.1 Mounting of the code wheel

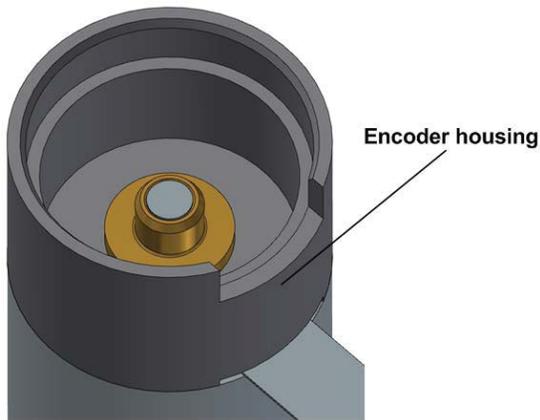


Figure 10: Encoder housing before installation of the encoder items

Description:

The adapter is already installed.

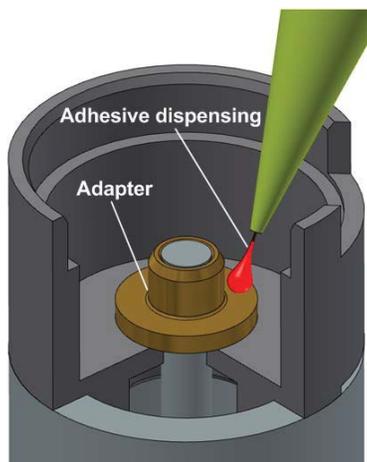


Figure 11: Applying the adhesive on the adapter

Description:

Apply adhesive on the adapter.

Example: EPO-TEK 353ND

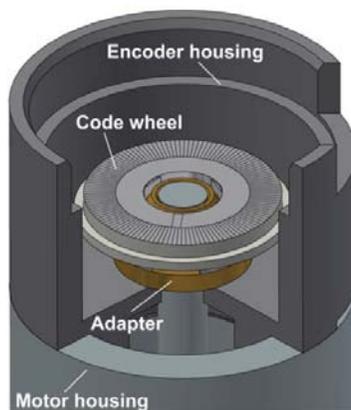


Figure 12: Mounted code wheel

Description:

Place the code wheel on the adapter.

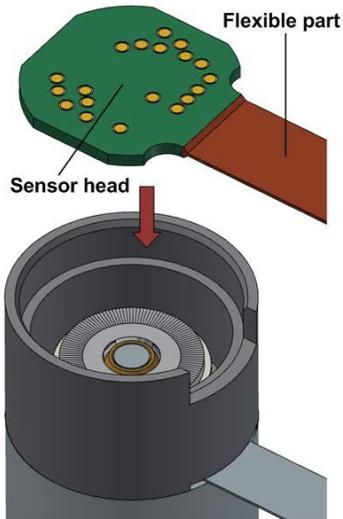
Attention:

The reflecting surface of the code wheel must not be scratched or dirty.

Adhesive needs to be cured!

(e.g. for EPO-TEK 353ND: at 80 °C, 30 minutes)

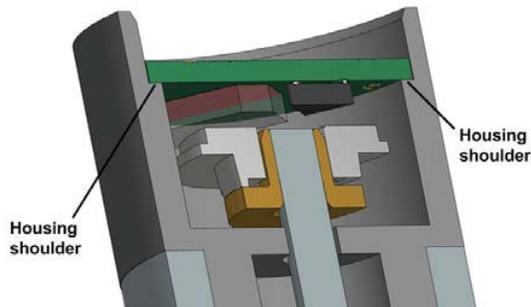
7.2 Mounting of the sensor head



Description:

Carefully insert the sensor head into the encoder housing.

Figure 13: Insertion of the sensor head in the encoder housing



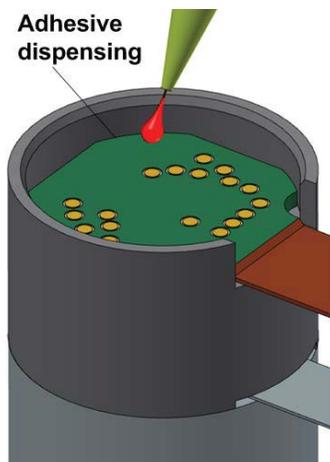
Description:

Place the sensor head with a slight pressure on the housing shoulder.

Attention:

The sensor head must be fixed parallel to the code wheel.

Figure 14: Insertion of the sensor head onto the housing shoulder



Description:

Apply adhesive on the edges between the sensor head and the encoder housing with a needle or dispenser.

Capillary action ensures a uniform distribution of the adhesive along the edge of the sensor head.

The flexible part must not touch the encoder housing (damage due to motor vibration)

(Possible adhesive: Araldite 2014)

Figure 15: Applying the adhesive for fixing the sensor head in the encoder housing

7.3 Mounting of the end cap (example)



Figure 16: End cap installation

Description:

The end cap is designed to protect the electronics from mechanical damage, the ingress of dust, moisture, and the irradiation of ambient light, which can lead to impairment of the function of the encoder.

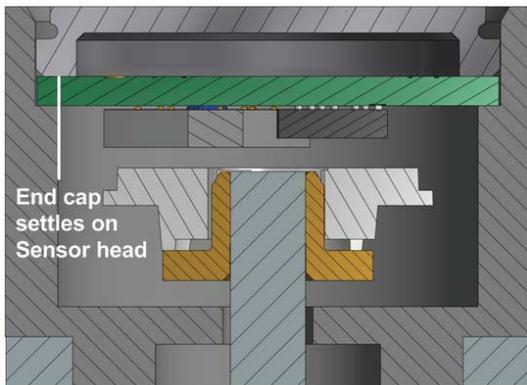


Figure 17: Encoder housing after installing the end cap

Final position of the end cap

Description:

Insert the end cap with slight pressure on the sensor head.

The fixation of the end cap and the sensor head can be done simultaneously.

During temperature treatment the end cap requires mechanical fixation.

(Possible adhesive: Araldite 2014)

Temperature: maximum 80 °C

Curing time: 15 minutes

Dependent on the application area it is recommended to use sealant between the end cap and the encoder housing.

Subsequent dismantling of a cured encoder can lead to its destruction.

After installing all the items of the encoder in the motor the encoder system is prepared for calibration and programming with the ELESTA calibration system (Encoder Final Inspection).