

Operating and Mounting Considerations with Agilent AEDA-3300 Series Ultra Miniature Kit Encoders

Application Note 5248

Introduction

Agilent's AEDA-3300 Series Encoders are designed for easy mounting at the customer applications. The AEDA-3300 encoders are pre-aligned in the factories, where a precision codewheel is integrated with the high-resolution encoder in an ultra-small package. For a controlled rotational movement, a precision bearing stage is integrated into the encoder package. Detail descriptions of the encoder are available in the AEDA-3300 product datasheet. For increased flexibility to the customers, the AEDA-3300 is offered in two different mounting options, i.e. direct mounting or with a flexible coupling plate.

Recommended Mounting Considerations

Top-Down Mounting (AEDA-3300-Txx, With a Flexible Coupling Plate)

For the top-down mounting options, a coupling plate and two M2 mounting screws are provided. Fix the coupling plate to the bottom of the housing by using the provided mounting screws. Recommended mounting torque is 0.34 Nm (3

in-Lbs). In addition, thread-locking glue such as HERNON 431 is recommended for the two mounting screws for extra mounting strength. After assembly, the AEDA-3300 encoder will be as shown below in Figure 1. Note that the required mechanical tolerance described in this document is in general $x.x = \pm 0.1$ mm, unless otherwise stated.

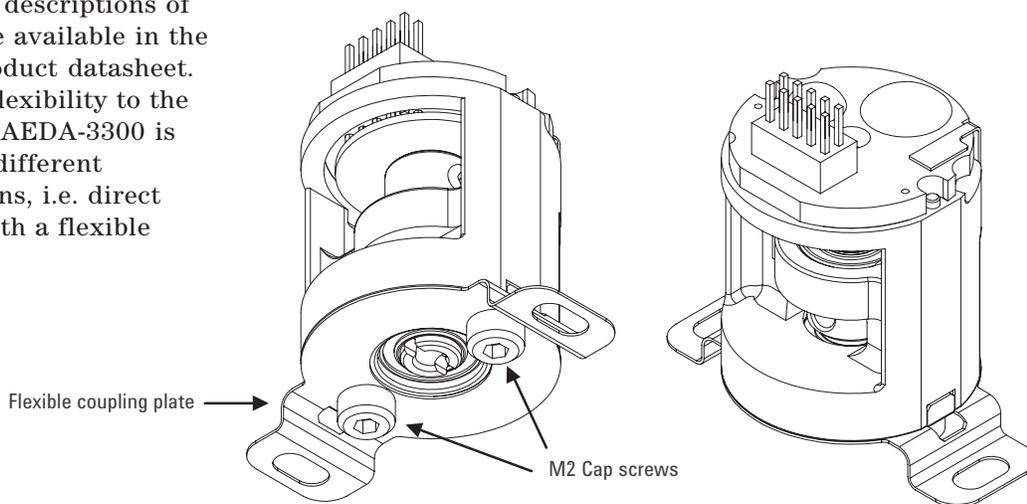
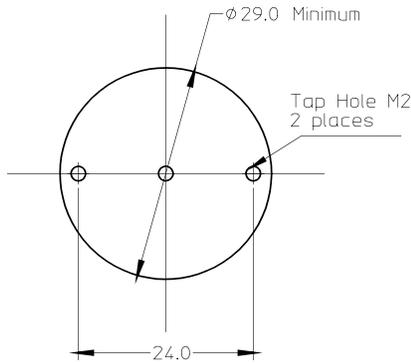


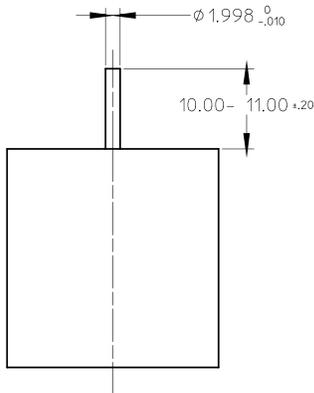
Figure 1. AEDA-3300-Txx encoder unit after the flexible coupling plate has been assembled



Figure 2.a shows the top view of a typical customer base plate. The locations of the M2 tap holes are shown, at 24 mm diameter circle. The indicated 29mm diameter for the customer base plate is just an example; it can be modified depending on the customer's specific requirements for different type of applications or mounting requirements.



a)



b)

Figure 2.
a) Top View of suggested Customer Base Plate where two M2 tap holes are equally spaced on a 24 mm diameter circle.
b) Recommendation on customer shaft diameter and length

Figure 2.b shows the recommended shaft length from the base of the mounting surface and the required shaft diameter to fit the nominal 2.0 mm hub for the AEDA-3300 encoder.

Two M2x2 set-screws for securing the encoder codewheel to the customer solid shaft are included.

Recommended tightening torque for the set-screw is 0.23 Nm (2 in-Lbs). However, this value is for guidance only and customers may use different values due to variation in material and surface finishing quality. Again, thread-locking glue such as HERNON 431 is recommended to further secure the set-screws.

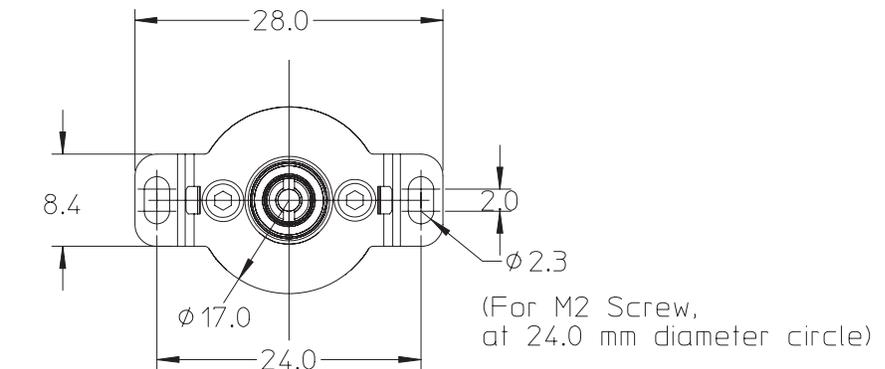
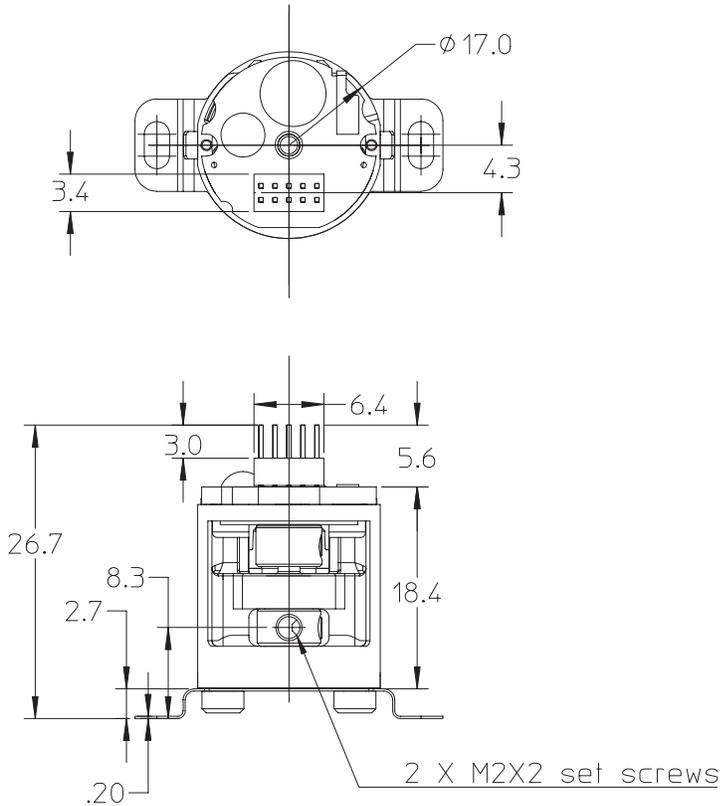


Figure 3. AEDA-3300-Txx encoder dimension

Bottom-Up Mounting (AEDA-3300-Bxx Direct Mounting)

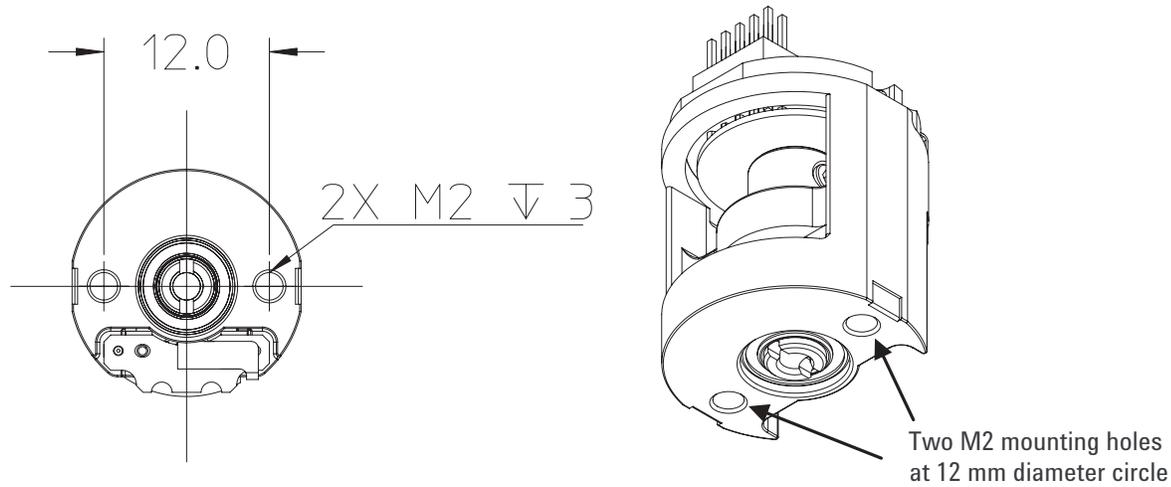


Figure 4. Mounting holes location for the AEDA-3300-Bxx encoder

The AEDA-3300-Bxx mounting option is suitable for applications where the encoder can be directly mounted onto the base plate of motor or a coupling stage. The minimum form factor of the encoder is achieved with this direct-mount option. The two M2 mounting holes are located at a circle with 12 mm diameter. A mounting torque of 0.34 Nm

(3 in-Lbs) is recommended. Similarly, thread-locking glue is recommended to further secure the two mounting screws. A solid shaft length of 7.3 to 8.0 mm is required to fit the nominal 2 mm hub of the encoder. The codewheel hub has two set-screw holes, where a recommended tightening torque is 0.23 Nm (2 in-Lbs). Note that this torque

value is for guidance only, as the frictions from customer shaft material and quality of machining may require different torque value. Again, thread-locking glue is recommended.

The recommended conditions and dimensions for fitting the AEDA-3300 are summarized in the following table:

Condition/Dimension	Value	Remarks
Standard Shaft Diameters	1.998 +0/-0.01mm (+0/-0.0005in)	
Shaft Length	10.0 to 11.0 mm (Txx) 7.3 to 8.3 mm (Bxx)	From mounting surface of customer base
Mounting Holes Circle Diameter	24.0 mm (Txx) 12.0 mm (Bxx)	
Mounting Screw Size	M2	2 pieces (included for Option Txx only)
Set-Screw Size For Shaft	M2x2	2 pieces
Tightening Torque for Mounting Screw	0.34 Nm (3 in-Lbs)	
Tightening Torque for Shaft Set-Screw	0.23 Nm (2 in-Lbs)	
Recommended Thread-Locking Glue	Heron 431	For both set-screws and the mounting screws.

Environmental Considerations

The AEDA-3300 series utilize transmissive optical technology to generate a set of analog incremental signals. The analog signals are fed through a signal compensation IC to produce high purity sinusoidal signals for further interpolation. As a result, high performance digital quadrature signals are produced.

As in any open optical encoders, customer applications should ensure that the operating environment is controlled such that minimal

contaminants can reach the sensitive parts of the optical encoders. The contaminants may affect the encoder performance overtime if accumulated on the surface of the codewheel, reticle, or lens. If the operating environment has high level of contaminants, e.g. dust, moisture, and oil, an enclosed protection to the kit encoder or the assembly system is recommended. Consult the factory for further advice in such applications.

The AEDA-3300 series are tested to the maximum values of mechanical shock and

vibration as stated in the product datasheet. To ensure the proper functioning of the encoder, these values should never be exceeded, as the encoder may be damaged due to the impact of the mechanical stress, either during mounting or operation. As the bearing used in the encoder is subject to wear, various factors will influence the lifetime of the bearing, including the shaft load, temperature, and the rotational speed.

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