THORLABS

ENCXR25 and ENCXR50

Digital Position Readout Module for XR Series Translation Stages

User Guide



Original Instructions

Table of Contents

Chapter 1 Introduction and Overview 1

1.1. Introduction 1

Chapter 2 Installation 2

2.1. Mechanical Installation 2

2.1.1. Environmental Conditions 2

2.2. Mounting to an XR25 Series Translation Stage 3

2.3. Mounting to an XR50 Series Translation Stage 4

2.4. Connecting the Module 4

Chapter 3 Manual Operation 5

3.1. Introduction 5

3.2. Setup 5

3.3. Operating Menu 5

3.4. Calibration 6

3.5. Zeroing the position 6

Chapter 4 Software Operation 7

4.1. Introduction 7

4.2. Connect The Hardware 7

4.3. Verifying Software Operation 7

4.3.1. Initial Setup 7

Chapter 5 Software Reference 8

5.1. GUI Panel 8

5.2. Settings Panel 9

5.2.1. Display Tab 9

5.2.2. Defaults Tab 10

5.2.3. Calibration Wizard 10

Chapter 6 Specifications 11

Chapter 7 Safety 12

Chapter 8 Regulatory 13

8.1. Declarations Of Conformity 13

8.1.1. For Customers in Europe 13

8.1.2. For Customers in the USA 13

Chapter 9 Thorlabs Worldwide Contacts 15

Chapter 1 Introduction and Overview

1.1. Introduction

The ENC Series Digital Position Readout Module is a bolt on accessory compatible with our existing XR25 and XR50 stages. The module comprises a bolt on optical encoder scale assembly and a digital display. The module is powered via a USB mini-B connection.

The readout module is supplied complete with fixtures for the associated translation stage, XR25 or XR50.

Chapter 2 Installation

2.1. Mechanical Installation



Warning

Operation outside the following environmental limits may adversely affect operator safety.

2.1.1. Environmental Conditions

Location	Indoor use only
Temperature range	5°C to 40°C
Maximum Humidity	Less than 80% RH (non-condensing) at 31°C

To ensure reliable operation the unit should not be exposed to corrosive agents or excessive moisture, heat or dust.

If the unit has been stored at a low temperature or in an environment of high humidity, it must be allowed to reach ambient conditions before being powered up.

The unit must not be used in an explosive environment.

2.2. Mounting to an XR25 Series Translation Stage

> **Caution**
> The encoder scale is made of glass and is very fragile. Handle the scale holder like eggs and take care to avoid scratching the scale surface.

Perform the below steps:

1. Remove the locking plate and set aside prior to installation.
2. Using one of the M3 x 0.5 x 5 mm cap screws and 2.5 mm hex key, and the M2.5 x 0.45 x 6 mm socket cap screw and 2 mm hex key supplied, fit the encoder scale holder to the edge of the XR25 top plate.
3. Using the remaining M3 x 0.45 x 5 mm cap screw and 2.5 mm hex key supplied, fit the position readout box to the edge of the XR25 bottom plate, ensuring that the dowel pins fit correctly in their locating holes.

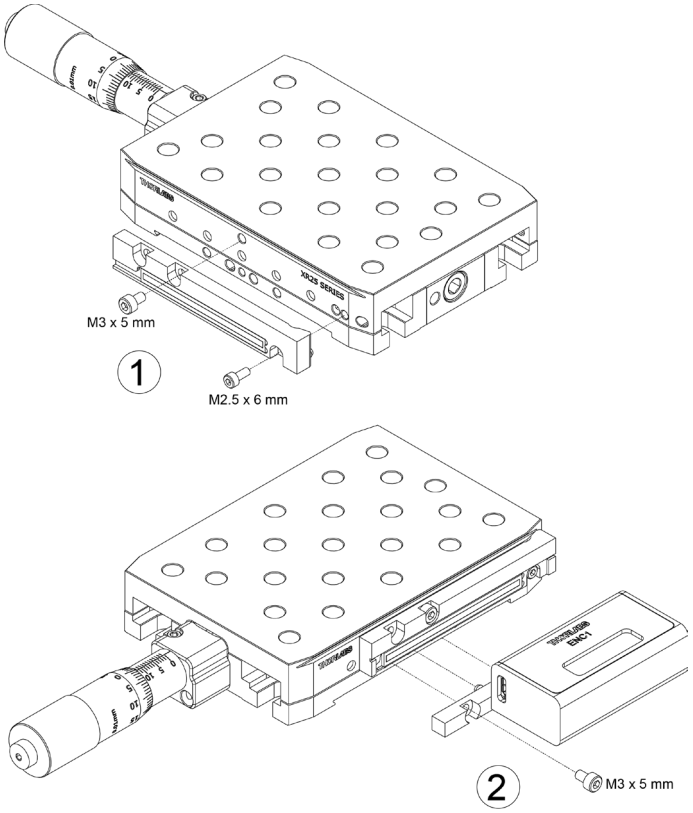


Figure 1 Mounting to an XR25 Series Translation Stage

2.3. Mounting to an XR50 Series Translation Stage

Caution
The encoder scale is made of glass and is very fragile. Handle the scale holder like eggs and take care to avoid scratching the scale surface.

Perform the below steps:

1. Remove the locking plate and set aside prior to installation.
2. Using the M3 x 0.5 x 5 mm cap screw and 2.5 mm hex key, and one of the M2.5 x 0.45 x 6 mm cap screws and 2 mm hex key supplied, fit the encoder scale holder to the edge of the XR50 top plate.
3. Using the remaining M2.5 x 0.45 x 6 mm cap screw and 2 mm hex key supplied, fit the position readout box to the edge of the XR50 bottom plate, ensuring that the dowel pins fit correctly in their locating holes.

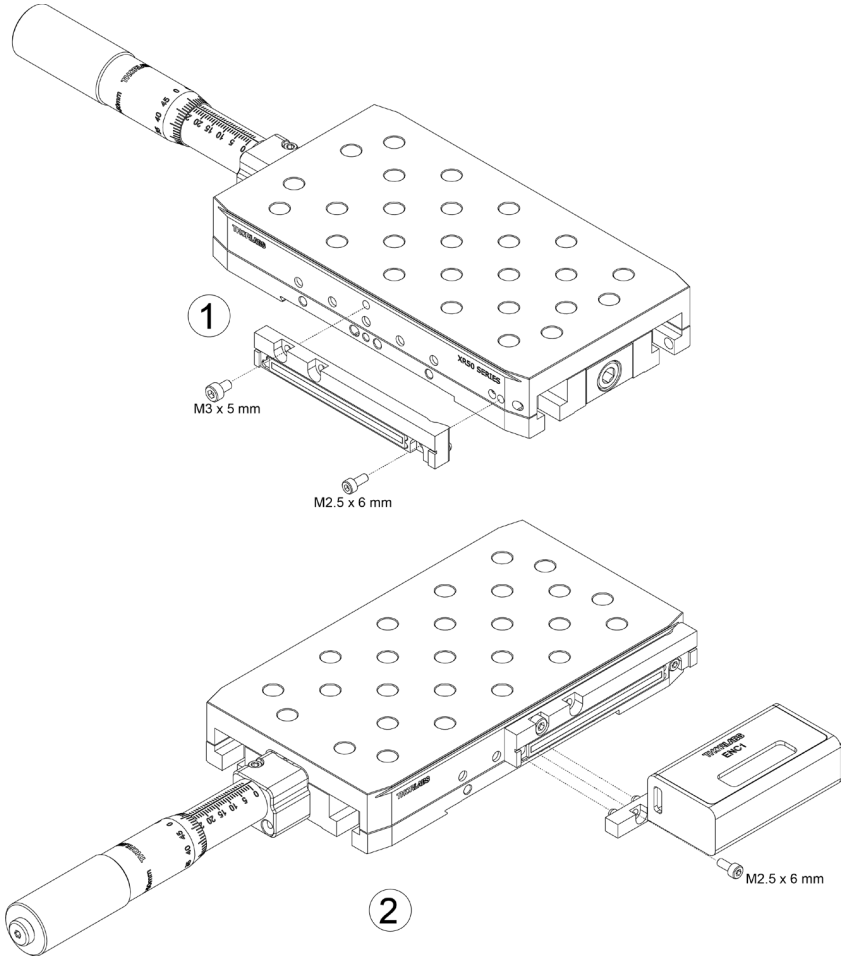


Figure 2 Mounting to an XR50 Series Translation Stage

2.4. Connecting the Module

The side of the unit is fitted with a USB Mini-B type socket providing connection to the PC USB port or USB hub. Connection to a PC also allows the unit to be operated via the Kinesis software.

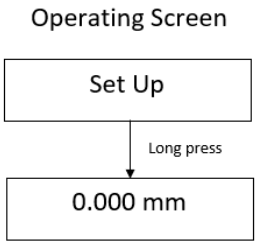
Chapter 3 Manual Operation

3.1. Introduction

When the stage is operated, the position is shown on the digital display in either inches or millimetres. The display also shows the operating menu.

3.2. Setup

When the unit is powered for the first time or after switching it on from shut down it will show the setup screen. Press and hold the button on the front of the module for 3 seconds.



3.3. Operating Menu

The button on the front of the module has a dual function: a short press is used to cycle through the operating menu and a long press is used to enter the current selection. A long press while on the position display will zero the position readout.

The various menu options are detailed below.

UNITS – displays the position in inches or millimetres.

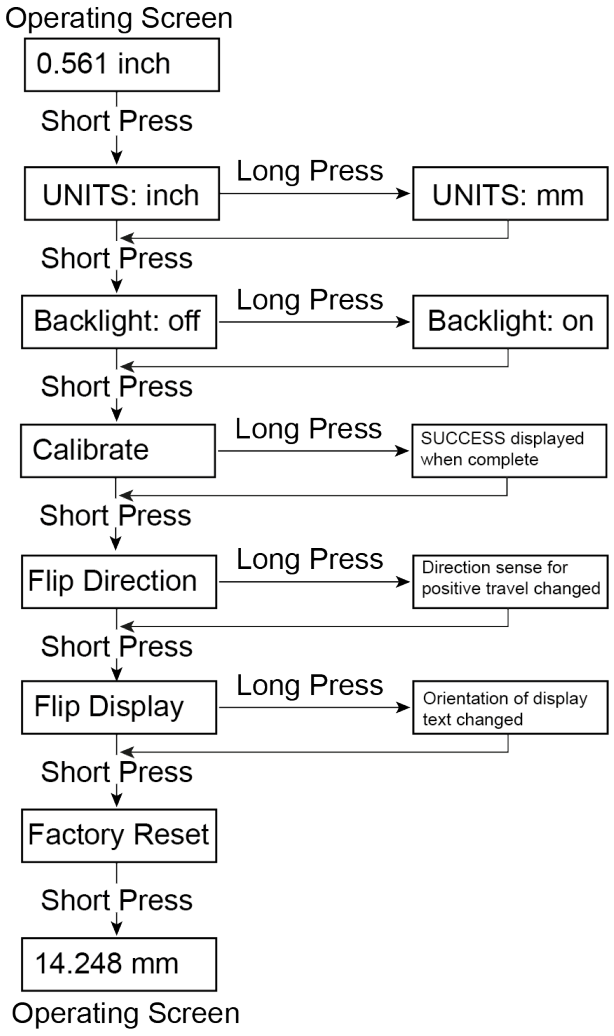
Backlight – turns the back light On and Off.

Calibrate – Starts the calibration routine (see below).

Flip Direction – changes the direction of positive (i.e. increasing) travel.

Flip Display: Changes the orientation of the display text.

Factory Reset: Sets the menu option back to the factory default values.



For example, to change from inches to millimetres:

1. Use short presses to scroll through the menu until the UNITS screen is displayed
2. Use a long press to toggle to mm.
3. Use short presses to scroll back to the operating (position) display

3.4. Calibration

After the unit is first fitted to a stage, the scale needs to be calibrated.

1. Scroll through the menu until 'Calibrate' is displayed, then press and hold the button.
2. The display will count down from 3 seconds. When the countdown begins, move the top platform of the stage backwards and forwards by hand a few times until 'Successful' is displayed.

3.5. Zeroing the position

The encoder unit can be set to zero at any position, with moves in a forward and reverse direction then shown as positive or negative moves from this position.

1. Move the stage to the required zero position
2. Ensure that the display shows the operating screen
3. Press and hold the button on the front of the module for around 3 seconds.

The unit is set to zero at the current position and all moves are now measured from this position.

Chapter 4 Software Operation

4.1. Introduction

The following brief tutorial guides the user through a typical set up procedure.

4.2. Connect The Hardware

1) Perform the mechanical installation as detailed in Chapter 2.
2) Install the Kinesis Software (V1.14.34 or higher).

> **Caution**
> During items (3) to (5) the instructions should be followed strictly in the order stated. Problems may occur if the process is not performed in the correct sequence.

3) If required, connect the unit to your PC.
(**Note**. The USB cable should be no more than 3 meters long. Communication lengths more than this can be achieved by using a powered USB hub).

4) Windows™ should detect the new hardware. Wait while Windows™ installs the drivers for the new hardware.

> **Note**
> If any problems are encountered during the connection and power up process, power cycle the unit to clear the error.

5) Perform a calibration routine as detailed in section 3.3 and section 5.2.3.

4.3. Verifying Software Operation

4.3.1. Initial Setup

1) Run the Kinesis software and check that the Graphical User Interface (GUI) panel appears and is active.

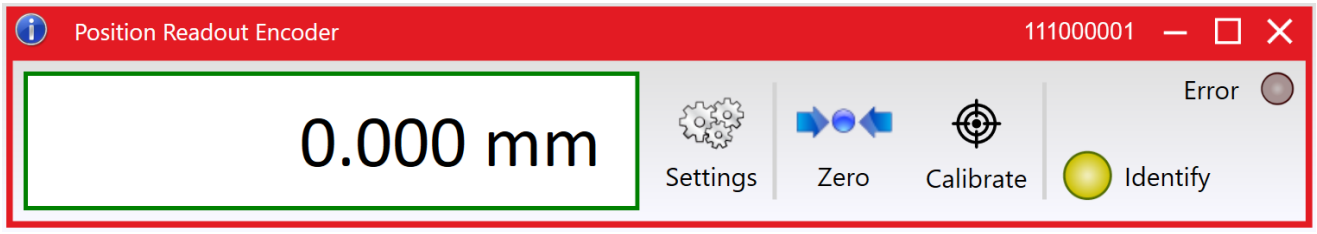
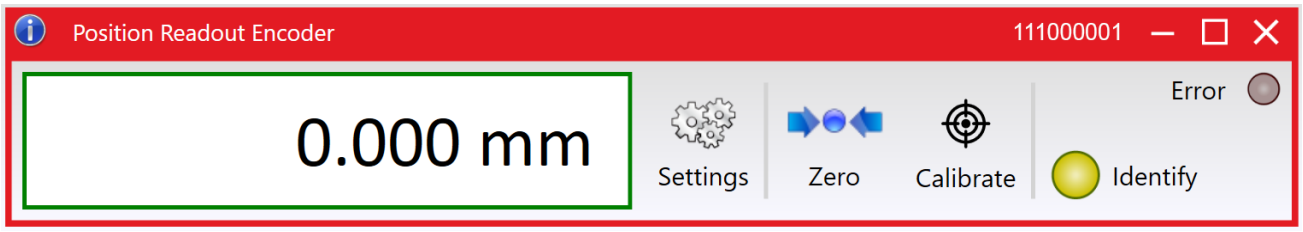


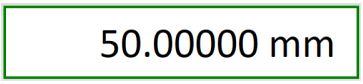
Figure 3 GUI Panel for ENC Position Readout Module

2) Click the 'Ident' button. The display on the associated unit flashes. This is useful in multi-channel systems for identifying which unit is associated with which GUI.
3) After the unit is first fitted to a stage, the scale needs to be calibrated. Click the Calibrate button. The display will count down from 3 seconds. When the countdown begins, move the top platform of the stage backwards and forwards by hand a few times until 'Successful' is displayed.

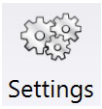
Chapter 5 Software Reference

5.1. GUI Panel





Position window - shows the position (in inches or mm) of the stage. The position will not be meaningful until after the stage is zeroed. After zeroing, the stage's position is reported relative to the zero-reference point.



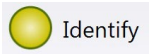
Settings - Displays the 'Settings' panel, which allows the operating parameters to be entered for the unit - see Section 6.2.



Zero – When this button is pressed, the display is zeroed at the present position. Moves in a forward and reverse direction are then shown as positive or negative moves from this position.



Calibrate - After the unit is first fitted to a stage, the scale needs to be calibrated. Click the Calibrate button. The display will count down from 3 seconds. When the countdown begins, move the top platform of the stage backwards and forwards by hand a few times until 'Successful' is displayed.



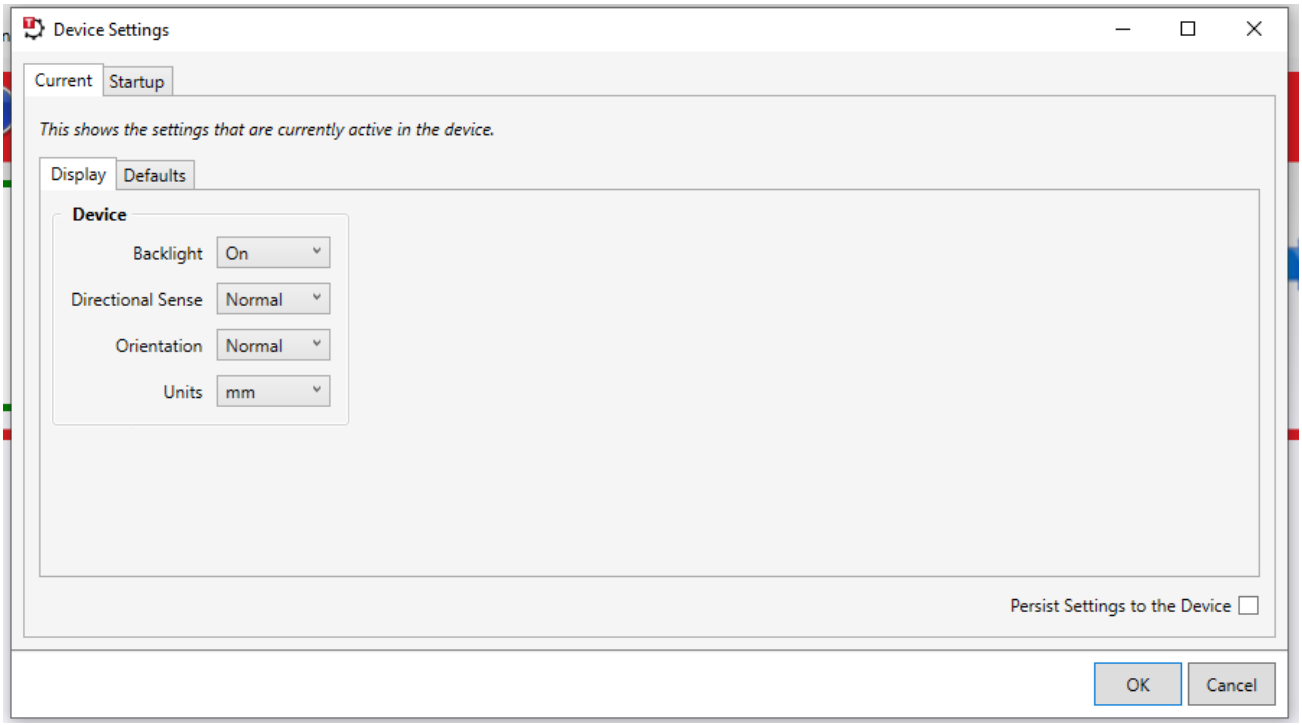
Identify - when this button is pressed, the display on the front panel of the associated hardware unit will flash for a short period.



Error -This LED is lit red when the calibration procedure fails. Hovering the mouse over the LED displays a description of the error.

5.2. Settings Panel

5.2.1. Display Tab



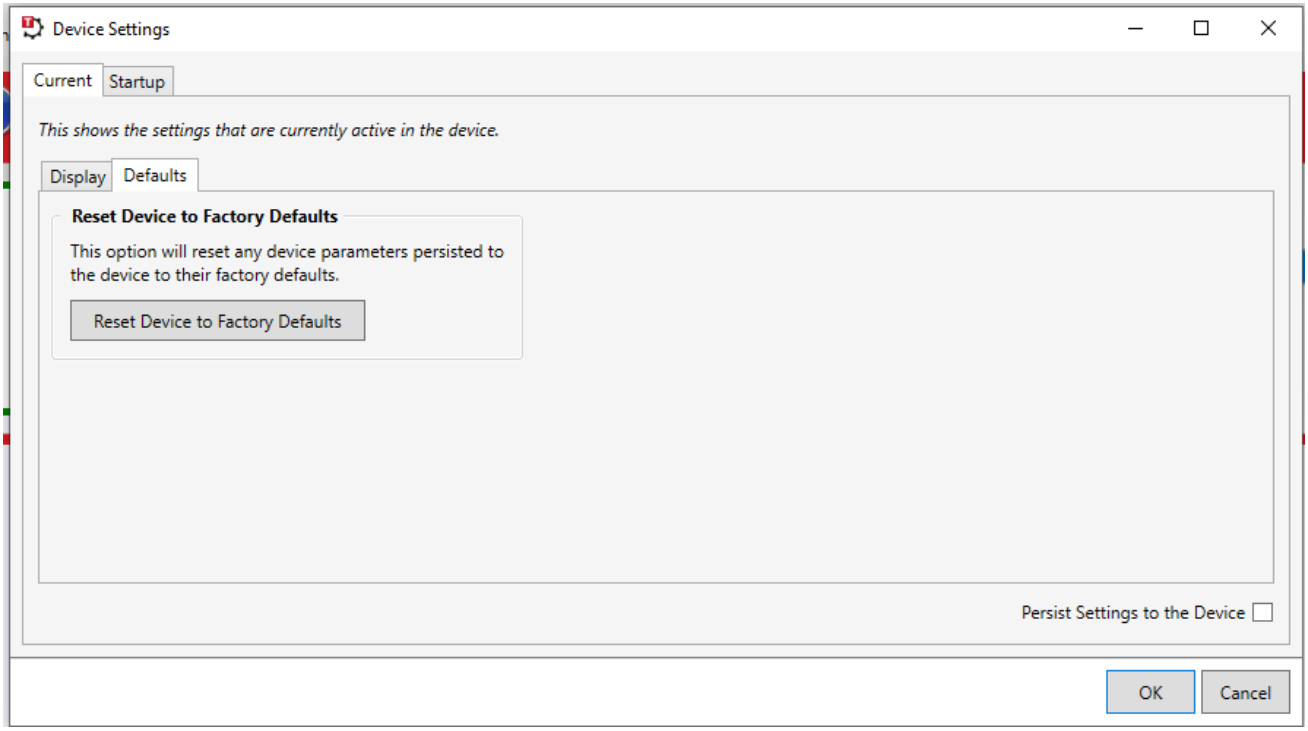
Backlight – Select whether the backlight is ON or OFF

Directional Sense – Changes the direction of positive (increasing) travel. Select whether the positive direction sense is Normal (away from the actuator) or Inverted (towards the actuator).

Orientation – Changes the orientation of the readout display. Select whether the display orientation is Normal (for reading when the actuator is positioned to the left) or Inverted (for reading when the actuator is to the right).

Units – Select whether the displays show the position in mm or inches.

5.2.2. Defaults Tab

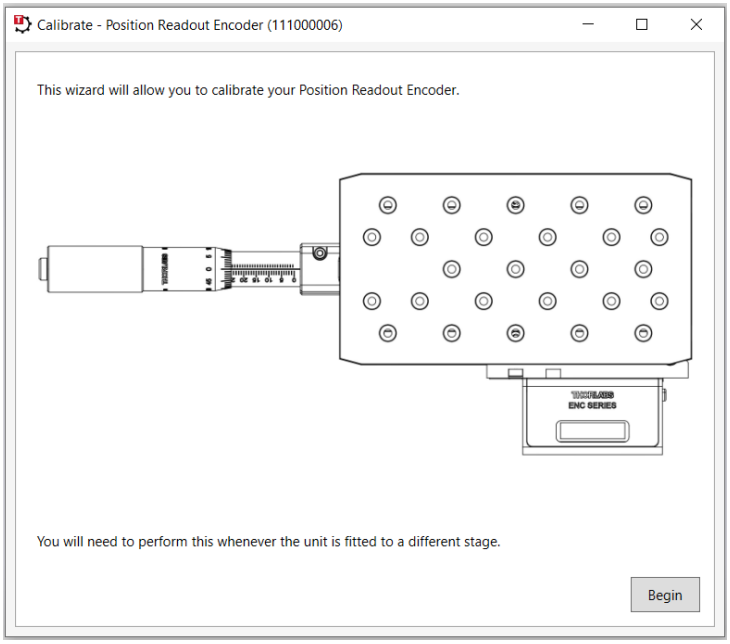


If adjustment of the parameter values previously described has resulted in unstable or unsatisfactory system response, this tab can be used to reset all parameter values to the factory default settings.

To restore the default values, click the 'Reset Stage to Factory Defaults' Button, then click OK. The unit must then be power cycled before the default values can take effect.

5.2.3. Calibration Wizard

To assist in calibrating the unit, when the 'Calibrate' button is clicked, a Calibration Wizard window is displayed to guide the user through the process. Simply click the 'Begin' button and follow the on-screen instructions.



Chapter 6 Specifications

Parameter	ENCXR25	ENCXR50	ENC Encoder
Typical On-Axis Accuracy	5.0 µm	10.0 µm	4.0 µm
Typical Repeatability	2.0 µm	2.0 µm	1.0 µm
Resolution	1.0 µm	1.0 µm	1.0 µm
Input Voltage	5 V Regulated DC		

Note: The ENC encoder data refers to the encoder unit when not mounted to a stage.

Chapter 7 Safety

For the continuing safety of the operators of this equipment, and the protection of the equipment itself, the operator should take note of the Warnings, Cautions and Notes throughout this handbook and, where visible, on the product itself.



Warning: Risk of Electrical Shock
Given when there is a risk of electrical shock.



Warning
Given when there is a risk of injury to the user.



Warning: Risk of Finger Trap
Given when there is a risk of trapping fingers between parts.



Caution
Given when there is a possibility of damage to the product.

Note
Clarification of an instruction or additional information.

General Warnings and Cautions

Warning
If this equipment is used in a manner not specified in the handbook, the protection provided by the equipment may be impaired. In particular, excessive moisture may impair operation.



Spillage of fluid, such as sample solutions, should be avoided. If spillage does occur, clean up immediately using absorbent tissue. Do not allow spilled fluid to enter the internal mechanism.

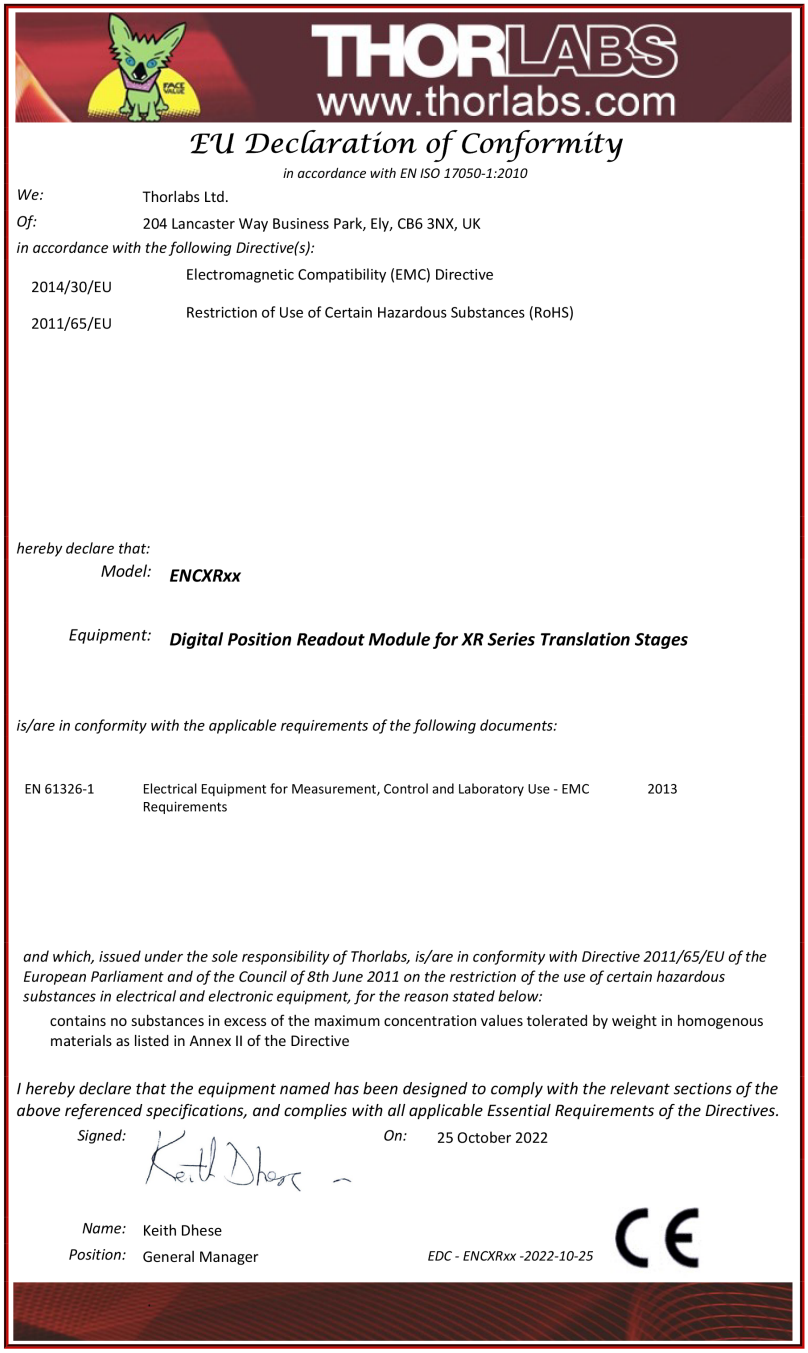
The equipment is for indoor use only.

The equipment is not designed for use in an explosive atmosphere.

Chapter 8 Regulatory

8.1. Declarations Of Conformity

8.1.1. For Customers in Europe



THORLABS
www.thorlabs.com

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs Ltd.

Of: 204 Lancaster Way Business Park, Ely, CB6 3NX, UK

in accordance with the following Directive(s):

2014/30/EU Electromagnetic Compatibility (EMC) Directive

2011/65/EU Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: ***ENCXRxx***

Equipment: ***Digital Position Readout Module for XR Series Translation Stages***

is/are in conformity with the applicable requirements of the following documents:

EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is/are in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

contains no substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed: *On:* 25 October 2022

Name: Keith Dhese

Position: General Manager

EDC - ENCXRxx -2022-10-25

CE

8.1.2. For Customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference

when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the company could void the user's authority to operate the equipment.

Chapter 9 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.



USA, Canada, and South America
Thorlabs, Inc.
sales@thorlabs.com
techsupport@thorlabs.com

UK and Ireland
Thorlabs Ltd.
sales.uk@thorlabs.com
techsupport.uk@thorlabs.com

Europe
Thorlabs GmbH
europe@thorlabs.com

Scandinavia
Thorlabs Sweden AB
scandinavia@thorlabs.com

France
Thorlabs SAS
sales.fr@thorlabs.com

Brazil
Thorlabs Vendas de Fotônicos Ltda.
brasil@thorlabs.com

Japan
Thorlabs Japan, Inc.
sales@thorlabs.jp

China
Thorlabs China
chinasales@thorlabs.com

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return "end of life" Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out "wheelie bin" logo (see right), were sold to and are currently owned by a company or institute within the EC and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. "End of life" units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.



Annex I



THORLABS

www.thorlabs.com