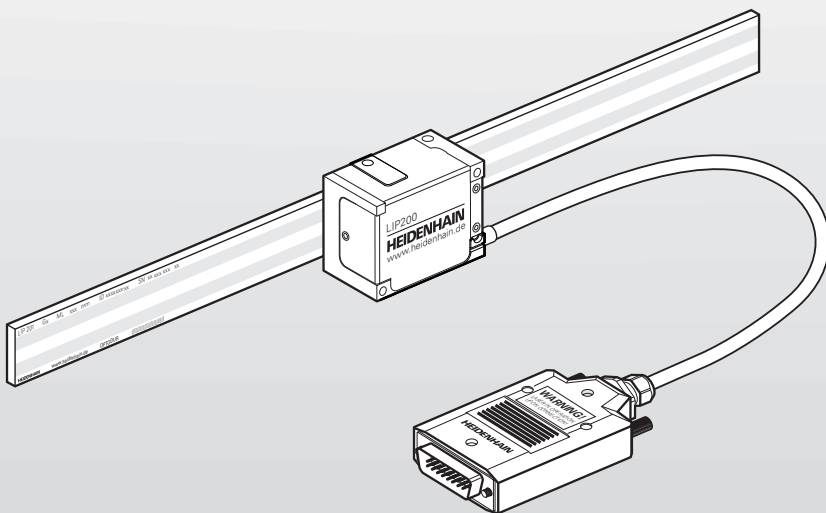




# HEIDENHAIN



## Mounting Instructions

LIP 2x1

English (en)  
05/2023

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## 1 Basic information

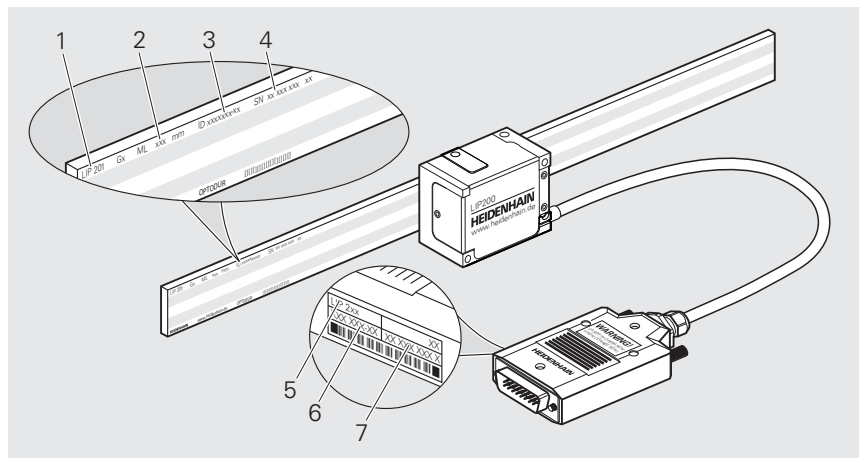
This chapter contains information about the product and the Mounting Instructions.

### 1.1 Validity of the documentation

These Mounting Instructions apply to encoders of the LIP 2x1 series.

- ▶ Prior to using the documentation, check whether the documentation and encoder model match
- The encoder designation is printed on the ID label.

#### ID label



ID label with legend

- 1 Product name of scale
- 2 Measuring length (ML)
- 3 Part number (ID) of scale
- 4 Serial number (SN) of scale
- 5 Product name of scanning head
- 6 ID number of scanning head
- 7 Serial number of scanning head

### 1.2 Target groups of the Mounting Instructions

The Mounting Instructions must be read and observed by every person who performs any of the following tasks:

- Design
- Mounting
- Removal

## 1.3 Notes on reading the documentation

### WARNING

#### **Fatal accidents, personal injury or property damage caused by non-compliance with the documentation!**

Failure to comply with the documentation may result in fatal accidents, personal injury or property damage.

- ▶ Read the documentation carefully from beginning to end
- ▶ Keep the documentation for future reference

The following table lists the various parts of the documentation in their order of reading priority.

Document type	Description
Addendum	An addendum supplements or supersedes the corresponding contents of the Operating Instructions and, if applicable, of the Mounting Instructions. If an addendum is included in the shipment, it has the highest priority for reading. All other documentation content retains its validity.
Operating Instructions	The Operating Instructions contain all of the information and safety instructions for the proper and intended operation of the device. The Operating Instructions (English language version) are included in delivery and can also be downloaded in other languages from <b><a href="http://www.heidenhain.com/documentation">www.heidenhain.com/documentation</a></b> . The Operating Instructions must be read prior to commissioning the product. The Operating Instructions have the second highest priority for reading.
Mounting Instructions	The Mounting Instructions contain all the information and safety precautions needed for the proper mounting and installation of a product. The Mounting Instructions are not included in delivery and must be downloaded from <b><a href="http://www.heidenhain.com/documentation">www.heidenhain.com/documentation</a></b> . The Mounting Instructions have the third highest priority for reading.

#### **Have you found any errors or would you like to suggest changes?**

We are continuously striving to improve our documentation for you. Please help us by sending your suggestions to the following e-mail address:

**[userdoc@heidenhain.de](mailto:userdoc@heidenhain.de)**

## 1.4 Symbols and fonts used for marking text

In these instructions the following symbols and fonts are used for marking text:

Format	Meaning
▶ ... > ...	Identifies an action and the result of this action Example: ▶ Tilt the shipping brace to remove it <b>(c)</b> > The shipping brace has been removed now
■ ... ■ ...	Identifies an item of a list Example: ■ Solid contaminants: class 3 ■ Max. pressure dew point: class 4
<b>Bold</b>	Identifies elements in figures and illustrations, such as positions, dimensions and worksteps Example: <b>S</b> marks the beginning of the measuring length <b>(ML)</b> .

## 1.5 Notes in this documentation

### Safety precautions

Precautionary statements warn of hazards in handling the device and provide information on their prevention. Precautionary statements are classified by hazard severity and divided into the following groups:

#### **DANGER**

**Danger** indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **will result in death or severe injury**.

#### **WARNING**

**Warning** indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **could result in death or serious injury**.

#### **CAUTION**

**Caution** indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **could result in minor or moderate injury**.

#### **NOTICE**

**Notice** indicates danger to material or data. If you do not follow the avoidance instructions, the hazard **could result in property damage**.

### Informational notes

Informational notes ensure reliable and efficient operation of the device. Informational notes are divided into the following groups:



The information symbol indicates a **tip**.  
A tip provides important additional or supplementary information.



The book symbol indicates a **cross reference**.  
A cross reference leads to external documentation, for example: further documentation from HEIDENHAIN or another supplier.

## 1.6 Units and tolerances

Unless otherwise specified, the dimensions stated in these Mounting Instructions are given in millimeters.

Unless otherwise specified, the tolerances stated in these Mounting Instructions correspond to ISO 8015 and ISO 2768 standards.

mm  
  
 Tolerancing ISO 8015  
 ISO 2768:1989-mH  
 $\leq 6 \text{ mm: } \pm 0.2 \text{ mm}$



## 2 Safety

This chapter provides important safety information needed for the proper mounting and installation of the product.

### 2.1 Personnel qualification

Mounting, initial configuration and removal must be conducted by a qualified specialist under compliance with local safety regulations.

### 2.2 General safety precautions

#### WARNING

##### **Risk of injury from laser radiation**

Class 3B laser exposure causes serious eye and skin injuries.

- ▶ Mount the scanning head correctly
- ▶ Wear eye protection, protective clothing and protective gloves
- ▶ Never stare into the laser beam or the reflection of the laser beam
- ▶ Do not touch the laser beam
- ▶ Shield the laser beam
- ▶ Structurally prevent reflections of the laser beam

#### WARNING

##### **Danger of electric shock due to connection to unsuitable downstream electronics!**

If you connect unsuitable downstream electronics to the encoder, fatal accidents or severe personal injuries can occur.

- ▶ Connect the encoder only to downstream electronics whose supply voltage comes from PELV systems

#### WARNING

##### **Live plug connections**

If you disengage plug connections while the equipment is under power, this may result in fatal accidents or severe personal injury.

- ▶ Do not engage or disengage any connecting elements while the product is under power

#### WARNING

##### **Risk of injury from damaged or worn components!**

Safety functions can fail if damaged or worn components are installed. Failed safety functions can result in death or serious injury.

- ▶ Do not use any damaged or worn components
- ▶ In case of replacement, repair the thread
- ▶ In case of replacement, use new screws, spring pins and nuts
- ▶ Secure screws and nuts with suitable material-bonding anti-rotation lock

**NOTICE****Property damage due to mechanical stress**

- ▶ Do not drop the encoder or subject it to major vibration
- ▶ Do not expose the encoder to mechanical stress

**NOTICE****Property damage due to electrical stress**

- ▶ Do not engage or disengage any connecting elements while the product is under power
- ▶ Do not touch the contacts of the plug connections

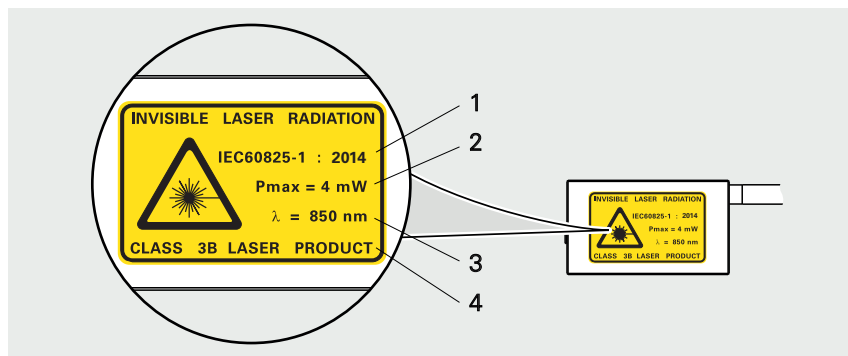
**NOTICE****Electrostatic discharge (ESD)!**

This device contains electrostatic-sensitive components that can be destroyed by electrostatic discharge (ESD).

- ▶ It is essential to observe the safety precautions for handling ESD-sensitive components
- ▶ Never touch connector pins without ensuring proper grounding
- ▶ Wear a grounded ESD wristband when handling device connections

## 2.3 Laser radiation

A class 3B laser is installed in the encoder. See the sticker on the encoder for more detailed information about the emitted laser radiation.



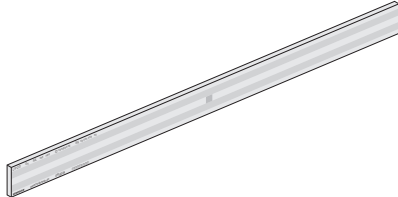
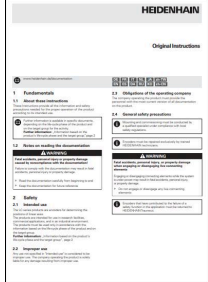

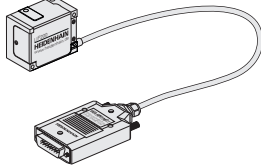
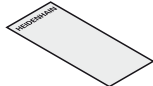
- 1 Underlying technical standard
- 2 Maximum emitted power or energy
- 3 Wavelength
- 4 Laser class

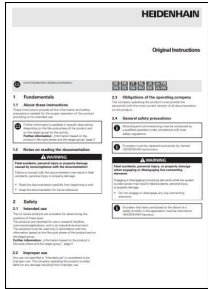
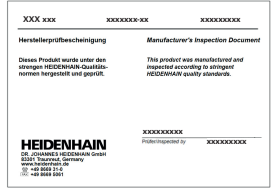
### 3 Items supplied and accessories

This chapter contains information on the items supplied and the available accessories of the encoder.

#### 3.1 Items supplied


##### 3.1.1 Items supplied with the linear scale

Component	Figure
Scale	
Operating Instructions	
Quality Inspection Document	
3.1.2 Items supplied with the scanning head	
Component	Figure
Scanning head	
Spacer shim	

Component	Figure
Operating Instructions	
Manufacturer's Inspection Document	

### 3.2 Mounting accessories

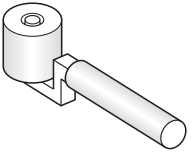
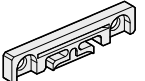
The following accessories can be obtained separately from HEIDENHAIN.

 For more information on the listed products, please refer to the applicable Mounting Instructions and the **Exposed Linear Encoders** brochure.



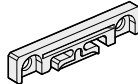
- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **208960**

#### 3.2.1 Accessories for mounting the linear scale

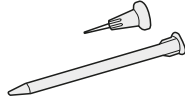
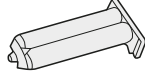
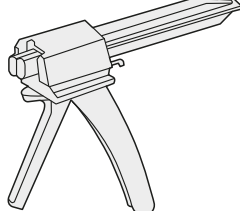
##### Accessories for mounting with adhesive film

Designation	ID	Figure
Roller	276885-01	
Fixed-point elements	1176475-xx	

**Accessories for mounting with fixing clamps**

Designation	ID	Figure
Spacer shim	1176441-xx	
Fixing clamps	1176458-xx	
Fixed-point elements	1176475-xx	

**3.2.2 Accessories for fixed-point bonding**

Designation	ID	Figure
Dispensing nozzles and mixing tubes	1176444-01	
Adhesive 3M DP 460 EG	1180444-01	
Double-cartridge gun	1180450-01	

## 4 Mounting

This chapter describes the mounting prerequisites, different mounting variants, and all other tasks necessary when mounting.

### 4.1 Prerequisites and notes

Choose a mounting attitude such that the traverse range is within the measuring length (**ML**) of the linear scale.

Protect the graduation from direct contamination.

(**S**) = Beginning of measuring length (**ML**)

#### **WARNING**

##### **Risk of injury from laser radiation**

There is a risk of injury from laser radiation if the indicated measuring length is exceeded.

- ▶ Move the scanning unit only within the specified measuring length

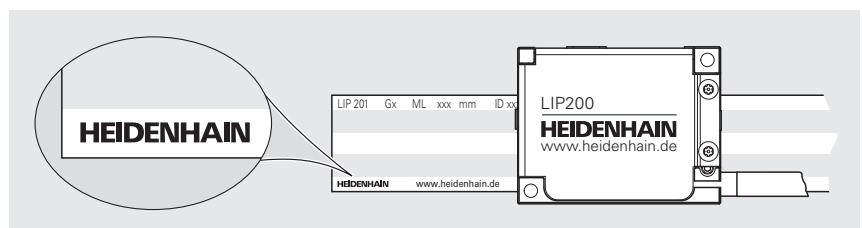
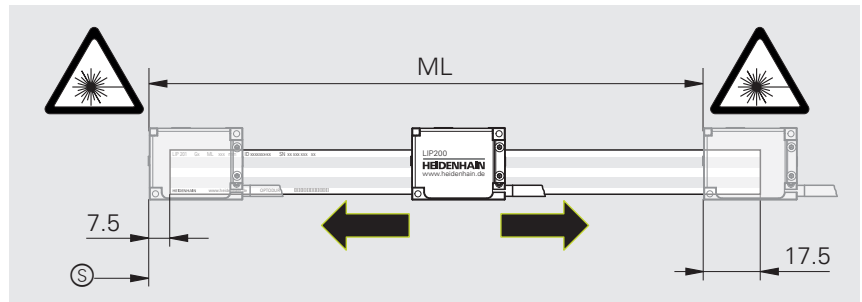
#### **NOTICE**

##### **Property damage resulting from severe contamination or liquids**

The encoder is not protected against the ingress of severe contamination or liquids, and an electrical short-circuit can occur.

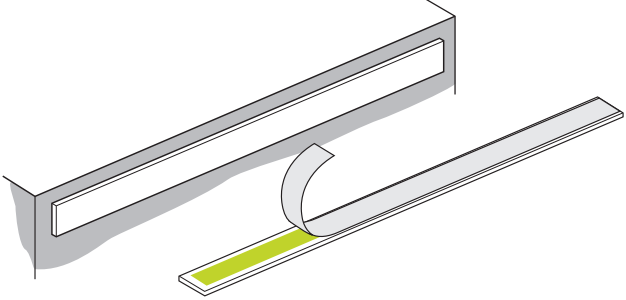
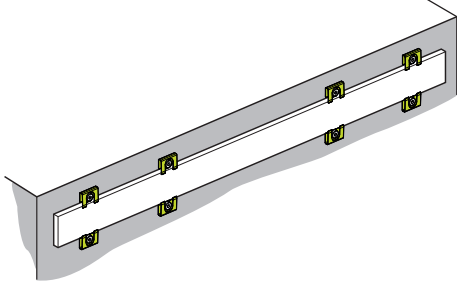
- ▶ If necessary, protect the encoder by attaching a protective plate or something similar

In order to avoid signal interferences, ensure correct positioning of the scale to the scanning head.



## 4.2 Mounting the linear scale

### 4.2.1 Mounting variants

Mounting with adhesive film	Mounting with fixing clamps
	
Page 15	Page 19

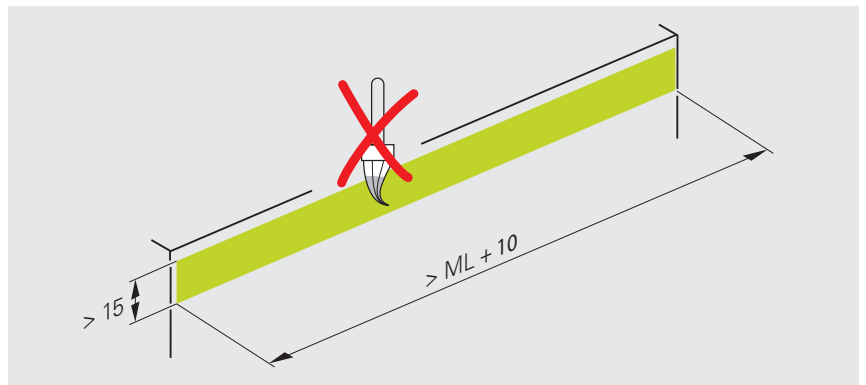
### 4.2.2 Variant: Mounting with adhesive film

The mounting variant in this chapter refers to mounting of the linear scale with an adhesive film.

The mounting variant with fixing clamps is described on Page 19.

#### Notes on mounting with adhesive film

Note that the mounting surface, as well as the surface of the scale, must be clean and free of paint, dust or grease.



You can mount the scale by means of stop pins or an aligning rail.

The mounting tolerances refer to the machine guideway **(F)**.

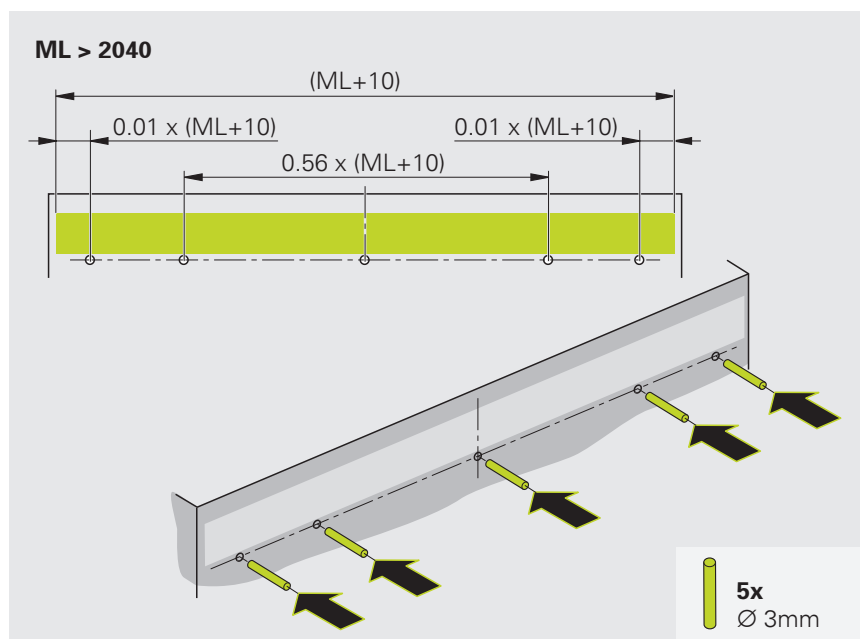
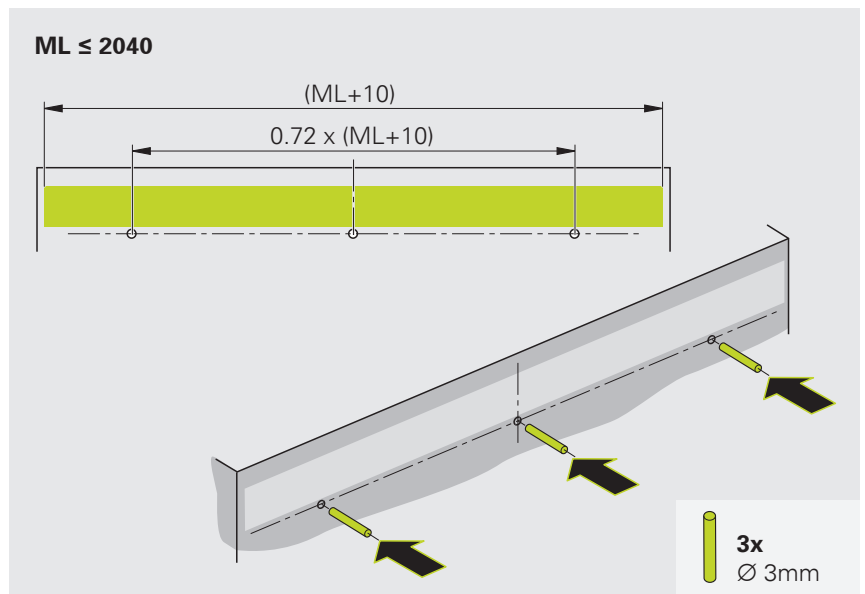


### Number of stop pins to be used

Recommended diameter of the stop pins: 3 mm.

For a measuring length of **ML ≤ 2040**, use three stop pins to stabilize the scale sufficiently.

For a measuring length of **ML > 2040**, use five stop pins to stabilize the scale sufficiently.



### Materials and tools

For this task, the following materials and tools are needed:

#### Included in delivery

#### To be provided separately

- Roller
- Stop pins
- Fixed-point elements
- Adhesives
- 4 screws (DIN 7984 – M3×6)
- Torque wrench (hexagon socket for 2.5 mm)

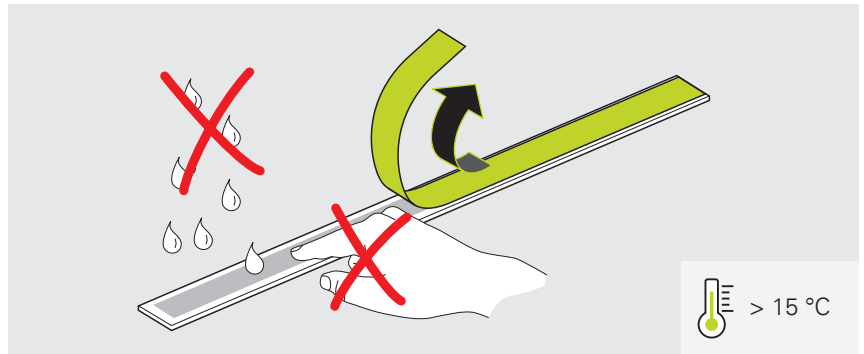


### Gluing the linear scale

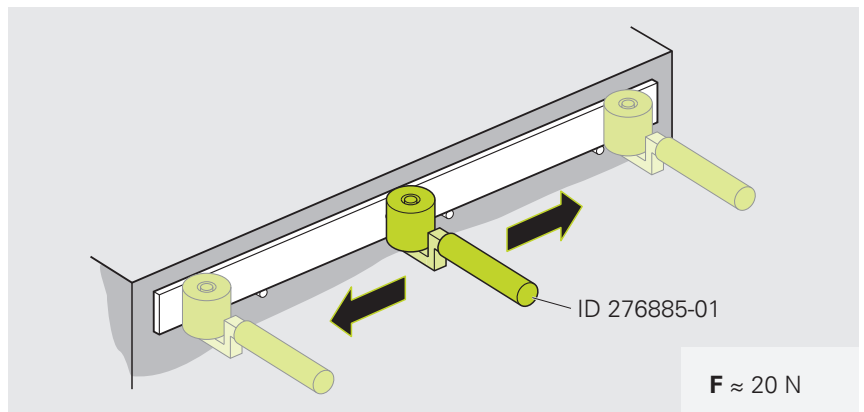
Attach the scale with adhesive mounting film only at a temperature of  $> 15\text{ °C}$ .

Pay attention to the expiration date on the package.

- ▶ Insert the stop pins
- ▶ Remove the protective foil from the adhesive film

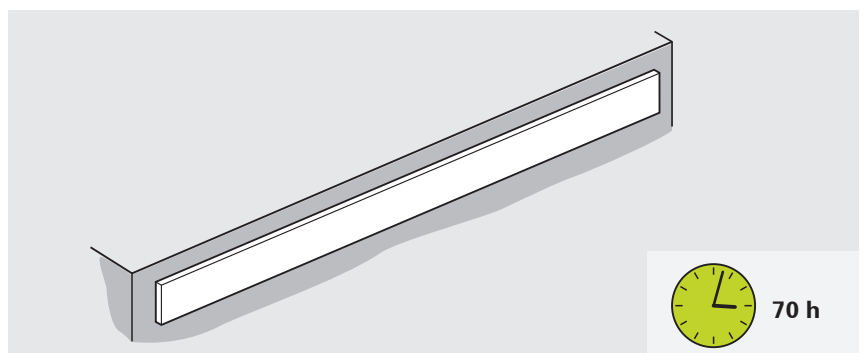


- ▶ Carefully place the scale onto the stop pins
- ▶ Starting from the center, evenly press the scale onto the mounting surface using the roller
- ▶ Remove the stop pins



- ▶ Do not perform further work on the scale until the maximum adhesive force has been reached

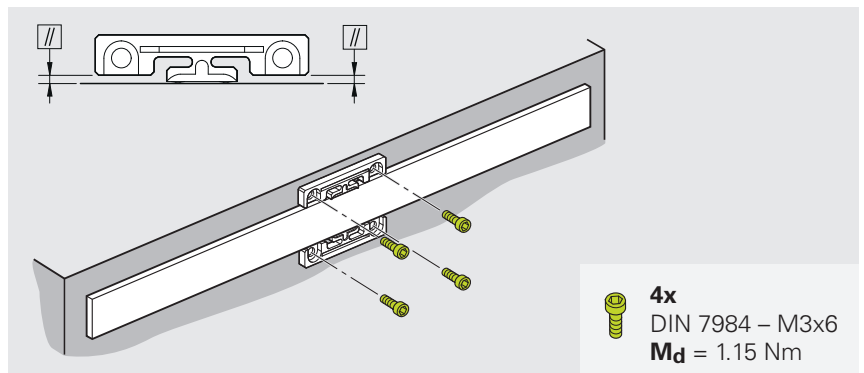
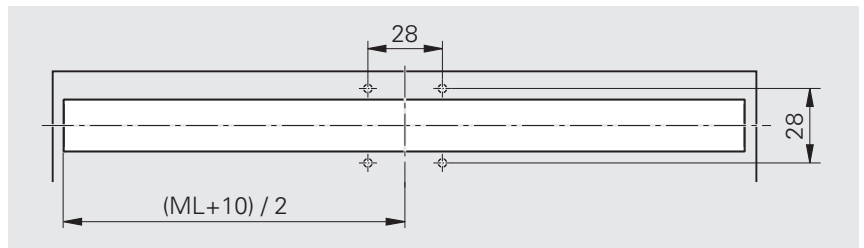
**i** The maximum adhesive force of the mounting film is reached at room temperature after approx. 70 hours.



### Mounting the fixed-point elements

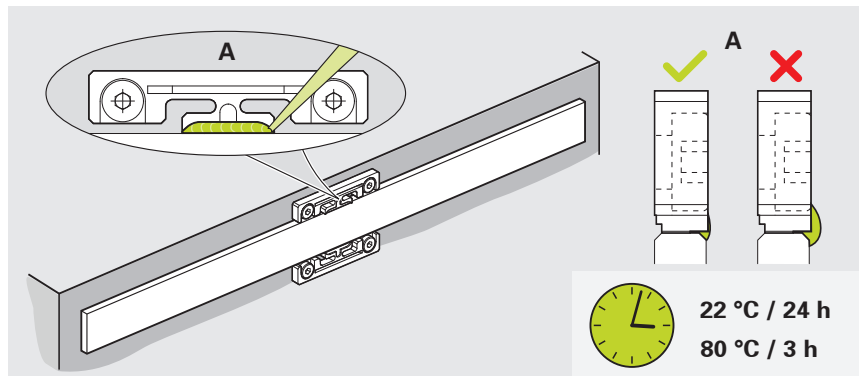
Pay attention to the mounting dimensions. Deviations from the mounting dimensions lead to imprecise measurement results during operation.

- ▶ Align the fixed-point elements in parallel
- ▶ Lightly press the fixed-point elements against the scale and fasten them with screws using the prescribed torque



**i** Pay attention to the work instructions in the applicable documentation.

- ▶ Apply a bead of adhesive with a double cartridge gun and a dispensing nozzle.
- ▶ Allow the adhesive to harden as appropriate for the intended operating temperature
- ▶ Do not add more adhesive



**i** To ensure high fixed-point rigidity, pay attention to the specifications for curing temperature and curing time.

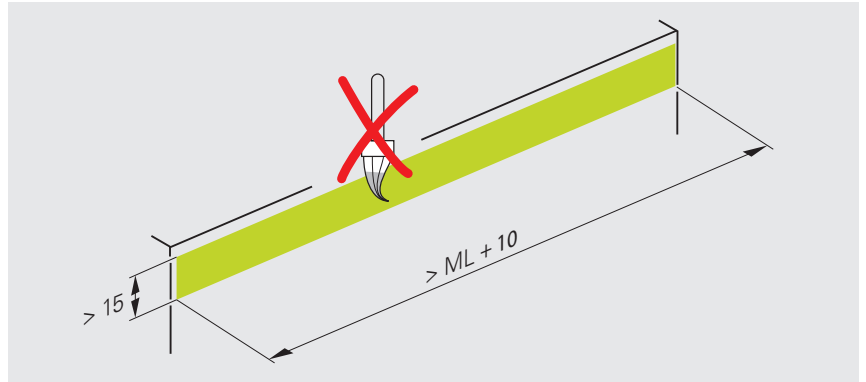
Operating temperature	Curing temperature	Curing time
-10 °C to +30 °C	22 °C	24 hours
-10 °C to +70 °C	80 °C	3 hours

### 4.2.3 Variant: Mounting with fixing clamps

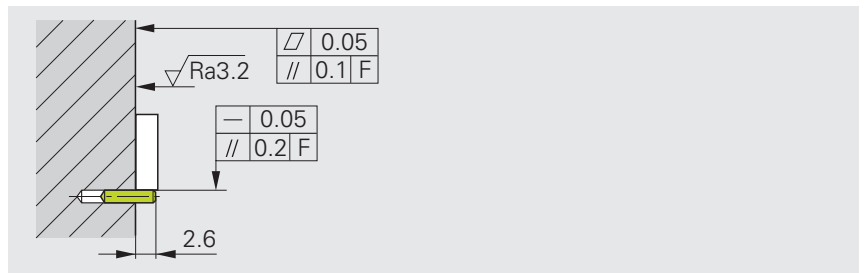
The mounting variant in this chapter refers to mounting of the linear scale with fixing clamps. The mounting variant with adhesive film is described on Page 15.

#### Notes on mounting with fixing clamps

Note that the mounting surface, as well as the surface of the scale, must be clean and free of paint, dust or grease.



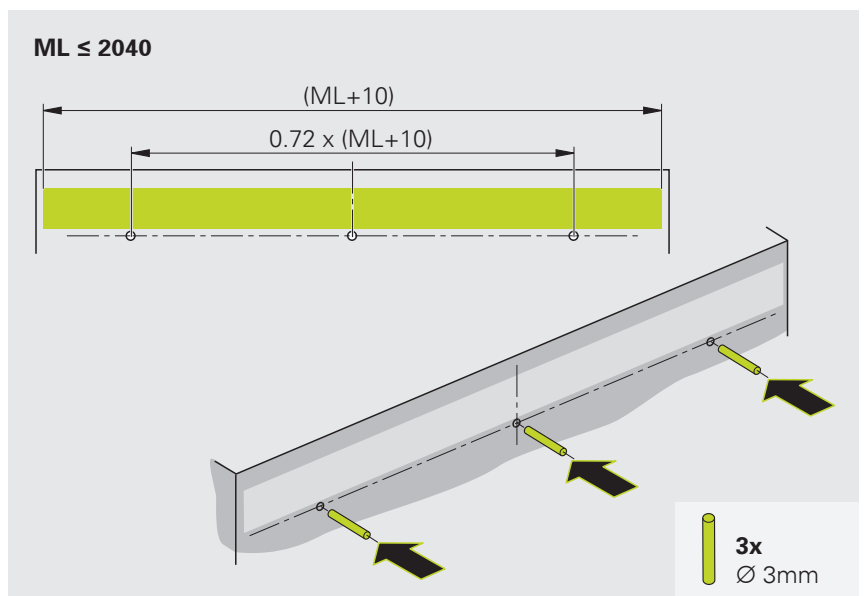
The mounting tolerances refer to the machine guideway (F).



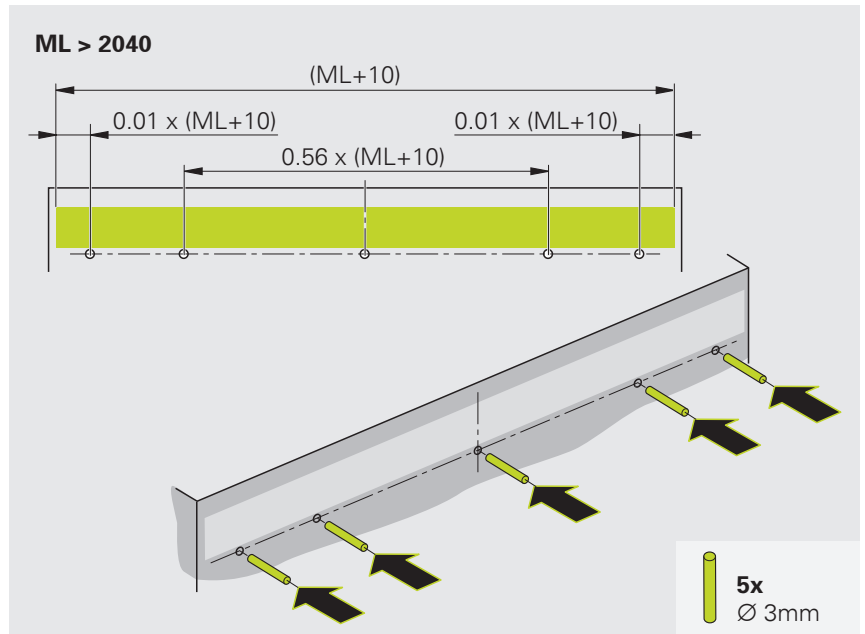
#### Number of stop pins to be used

Recommended diameter of the stop pins: 3 mm.

For a measuring length of **ML ≤ 2040**, use three stop pins to stabilize the scale sufficiently.



For a measuring length of **ML > 2040**, use five stop pins to stabilize the scale sufficiently.



### Materials and tools

For this task, the following materials and tools are needed:

#### Included in delivery

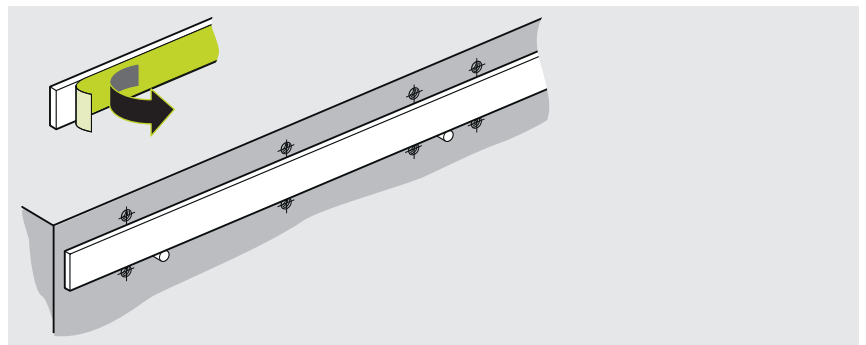
#### To be provided separately

- Fixing clamps
- Spacer shims
- Stop pins
- Fixed-point elements
- Adhesive
- Screws (DIN 7984 – M3x6)
- Tooth lock washers (D6.0/3.2)
- Torque wrench (hexagon socket for 2.5 mm)

### Mounting the scale

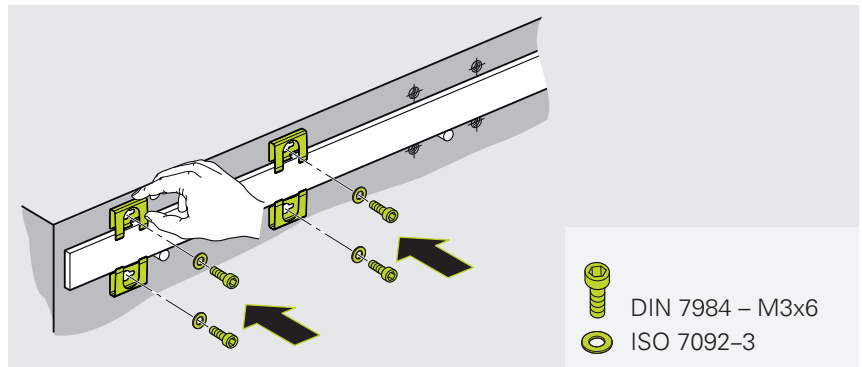
#### Mounting the fixing clamps

- ▶ Insert the stop pins
- ▶ Remove the protective film of the scale
- ▶ Carefully place the scale onto the stop pins



## Mounting | Mounting the linear scale

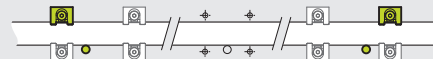
- ▶ Press all fixing clamps lightly in the direction of the scale and fasten them with screws and washers. Tighten the screws only lightly



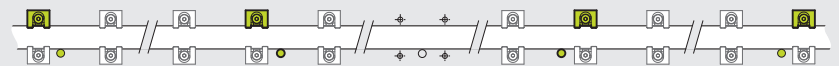
Perform the following steps only with those fixing clamps that are nearest to, but across from, a stop pin:

- i** For a measuring length of  $ML \leq 2040$   
= 2 fixing clamps  
For a measuring length of  $ML > 2040$   
= 4 fixing clamps

**ML  $\leq$  2040**  
= 2x

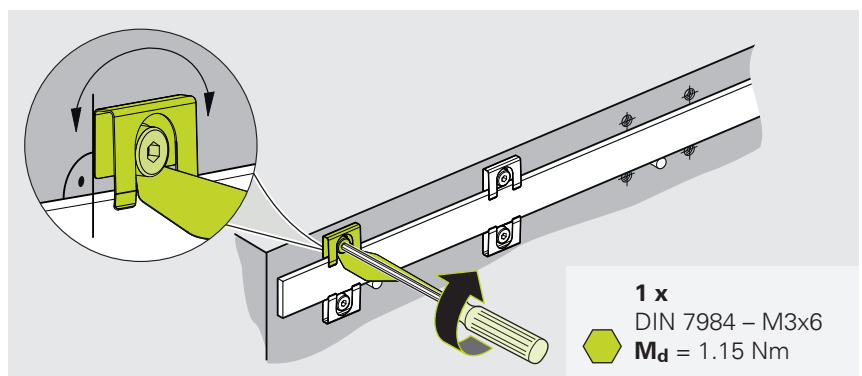


**ML > 2040**  
= 4x



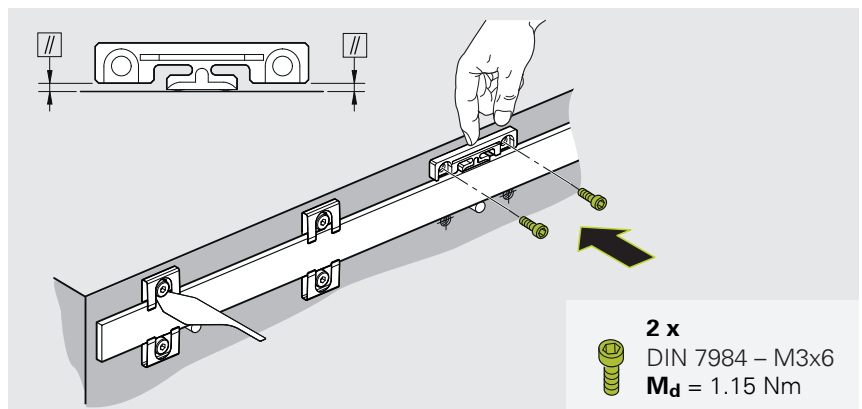
- ▶ Place the spacer shim between the fixing clamp and scale
- ▶ Align the fixing clamp at a right angle to the scale
- ▶ Tighten the screw using the prescribed torque

- i** Do not remove the spacer shims.

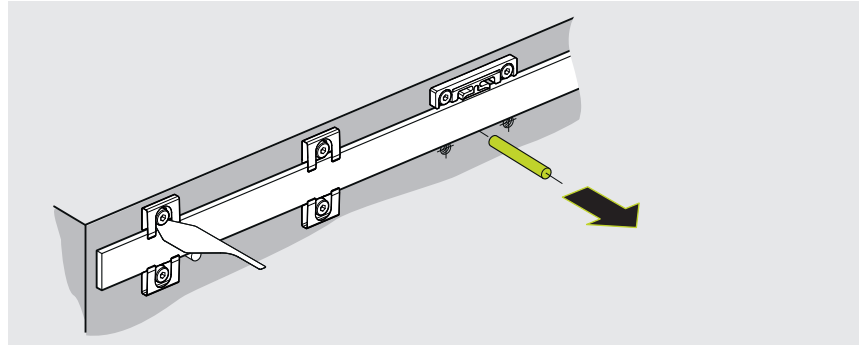


### Mounting the fixed-point element

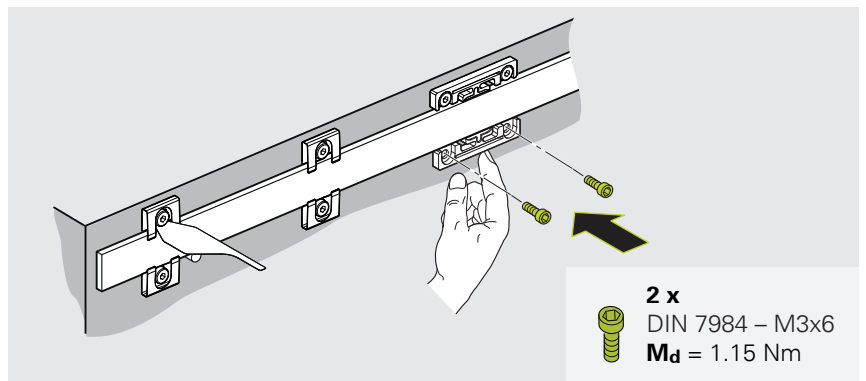
- ▶ Align the fixed-point element in parallel
- ▶ Lightly press the upper fixed-point element against the scale and fasten it with screws using the prescribed torque



- ▶ Remove the stop pin



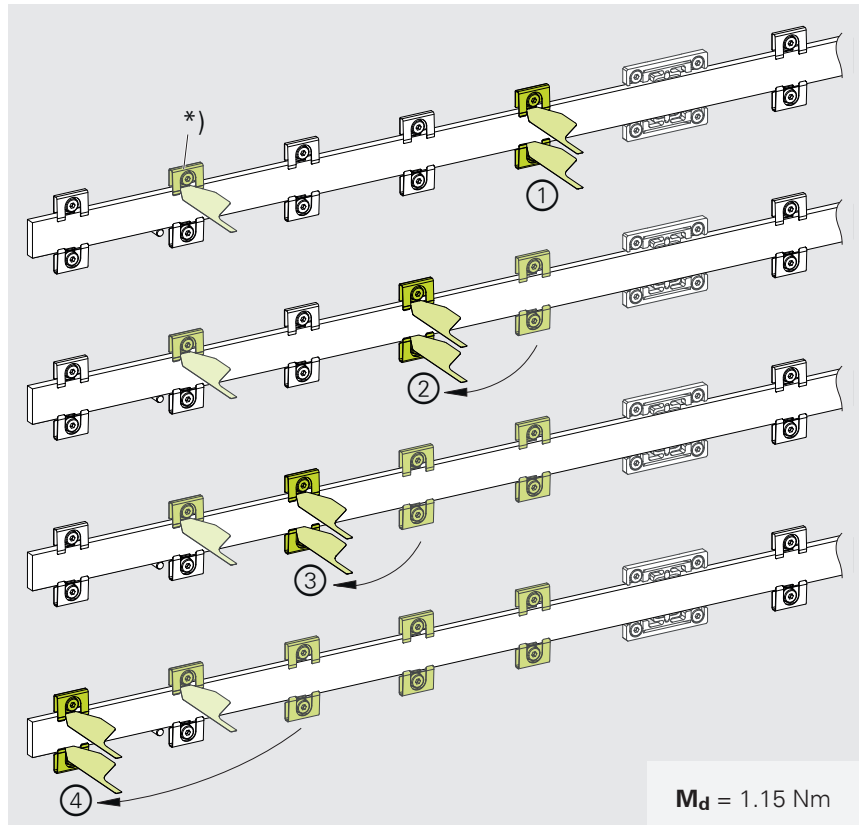
- ▶ Align the fixed-point element in parallel
- ▶ Lightly press the lower fixed-point element against the scale and fasten it with screws using the prescribed torque



### Tightening the fixing clamps

- i**
- The figure shows an example. The number and position of the fixing clamps and stop pins depends on the length of the linear scale.
  - Always tighten the fixing clamps in pairs.

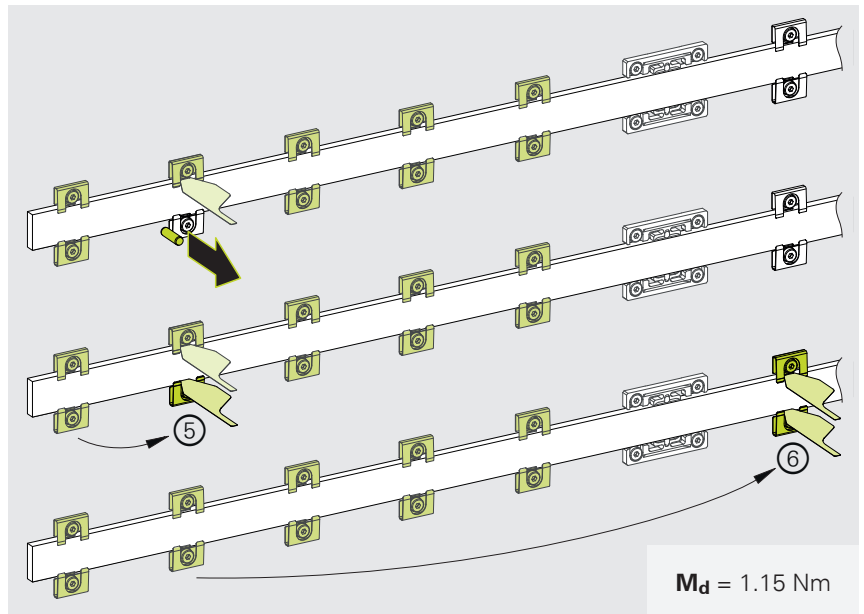
- ▶ Place the spacer shims between each pair of fixing clamps and the scale
- ▶ Tighten the screws using the prescribed torque
- ▶ Remove the spacer shims and use them for the next pair of fixing clamps
- ▶ Tighten the screws in the sequence shown



\*) Do not remove the spacer shims from the first tightened fixing clamps until all fixing clamps have been tightened.

## Mounting | Mounting the linear scale

- ▶ Remove the stop pin
- ▶ Finally, tighten the fixing clamp opposite the first fixing clamp that was tightened
- ▶ Tighten the screws on the other side of the fixed-point element according to the same pattern

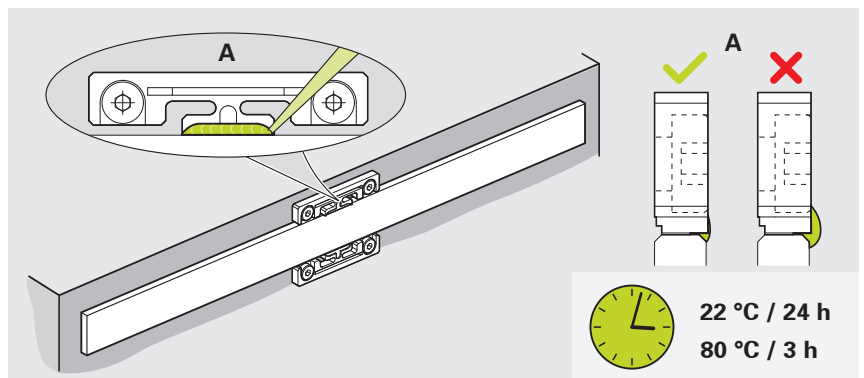


### Gluing the fixed-point element

**i** Pay attention to the work instructions in the applicable documentation.

**i** Do not add more adhesive afterwards.

- ▶ Apply a bead of adhesive with a double cartridge gun and a dispensing nozzle.
- ▶ Allow the adhesive to harden as appropriate for the intended operating temperature
- ▶ Do not add more adhesive



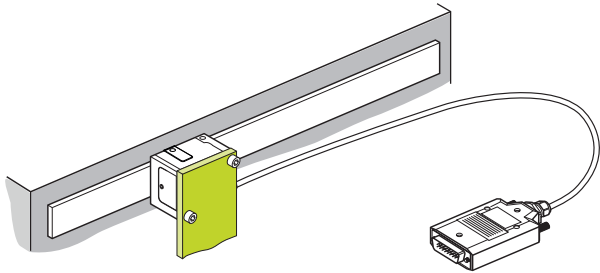
**i** To ensure high fixed-point rigidity, pay attention to the specifications for curing temperature and curing time.

Operating temperature	Curing temperature	Curing time
-10 °C to +30 °C	22 °C	24 hours
-10 °C to +70 °C	80 °C	3 hours

### 4.3 Mounting the scanning head

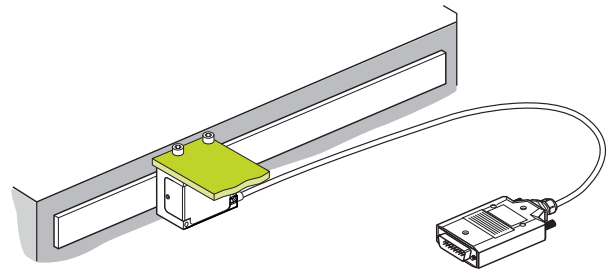
#### 4.3.1 Mounting variants

##### Mounting with the holder on the side



Page 24

##### Mounting with the holder at top



Page 25

#### 4.3.2 Variant: Mounting with the holder on the side

**i** The mounting variant in this chapter refers to mounting of the scanning head with the holder on the side. The mounting variant with the holder at top is described on Page 25.

##### Notes on mounting the scanning head with the holder on the side

**i** The tightening torques of the mounting screws are only valid for mounting on steel.

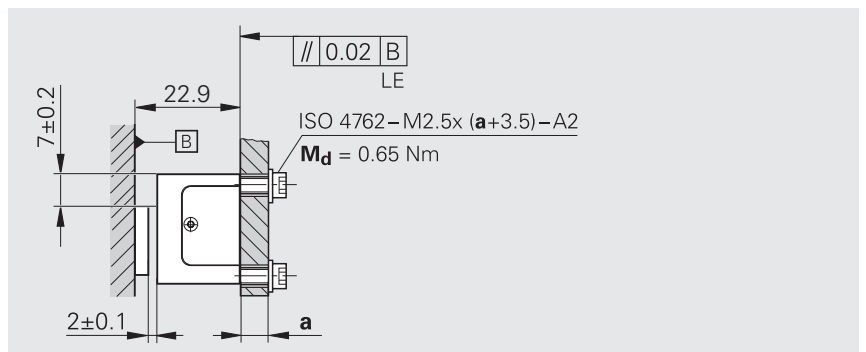
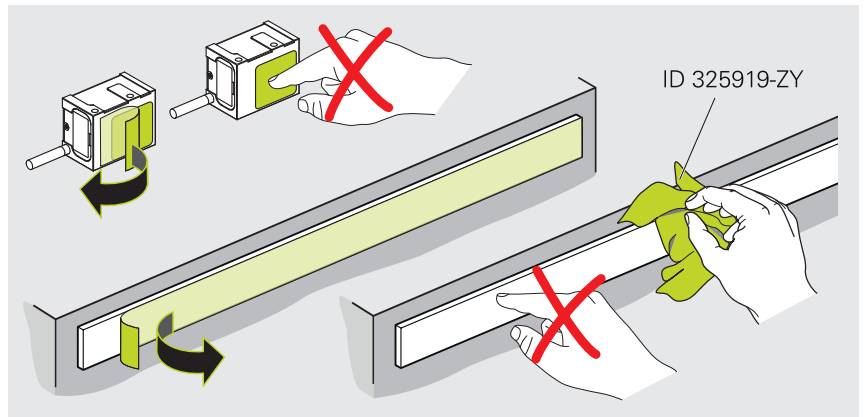
**i** If necessary, clean the graduation and the scanning head with a lint-free cloth and isopropyl alcohol.

#### NOTICE

##### Property damage due to unsuitable cleaning agents

- ▶ Use only isopropyl alcohol to clean the encoder
- ▶ Clean the encoder with a lint-free cloth

Pay attention to the mounting dimensions. Deviations from the mounting dimensions lead to imprecise measurement results during operation.





### Materials and tools

For this task, the following materials and tools are needed:

#### Included in delivery

- Spacer shim

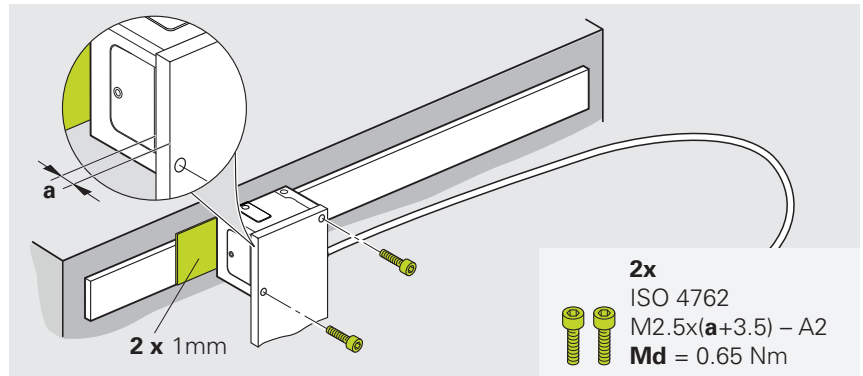
#### To be provided separately

- 2 screws (ISO 4762 – M2.5×(a+3.5))
- Torque wrench (hexagon socket for 2 mm)

### Mounting the scanning head

**i** Do not insert the spacer shims near the fixing clamps.

- ▶ Use the spacer shims to set the mounting clearance
- ▶ Insert the screws and tighten them using the specified torque
- ▶ Remove the spacer shims individually



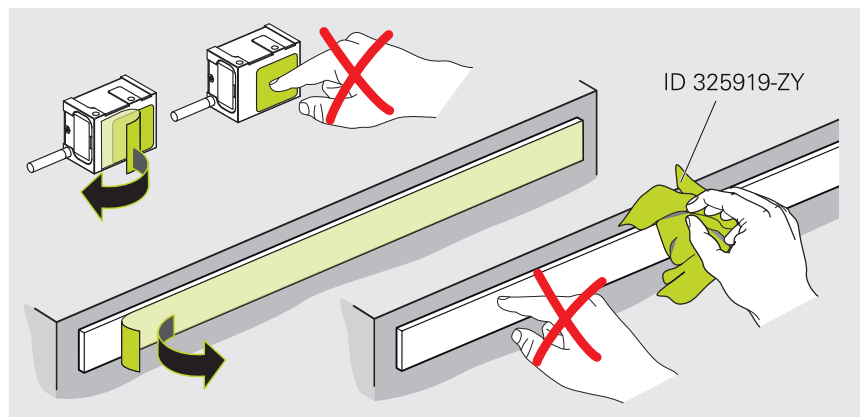
### 4.3.3 Variant: Mounting with the holder at top

**i** The mounting variant in this chapter refers to mounting of the scanning head with the holder at top. The mounting variant with the holder on the side is described on Page 24.

#### Notes on mounting the scanning head with the holder at top

**i** The tightening torques of the mounting screws are only valid for mounting on steel.

**i** If necessary, clean the graduation and the scanning head with a lint-free cloth and isopropyl alcohol.

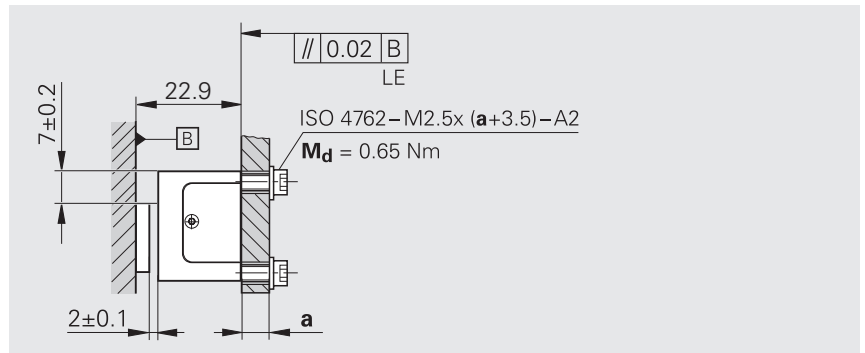


### NOTICE

#### Property damage due to unsuitable cleaning agents

- ▶ Use only isopropyl alcohol to clean the encoder
- ▶ Clean the encoder with a lint-free cloth

Pay attention to the mounting dimensions. Deviations from the mounting dimensions lead to imprecise measurement results during operation.



### Materials and tools

For this task, the following materials and tools are needed:

#### Included in delivery

- Spacer shim

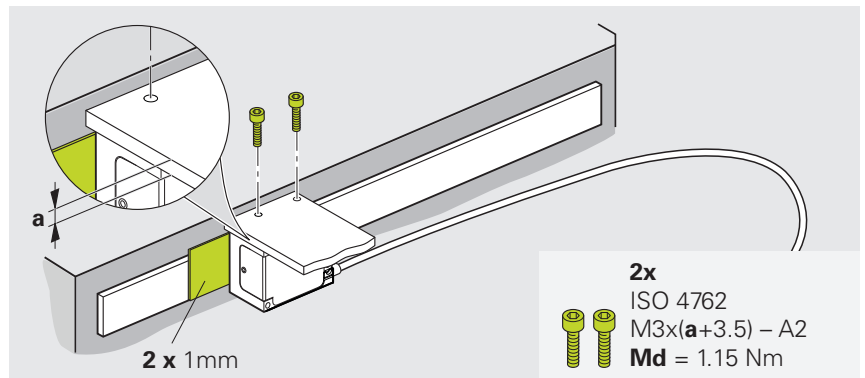
#### To be provided separately

- 2 screws (ISO 4762 – M3x(a+3.5))
- Torque wrench (hexagon socket for 2.5 mm)

### Mounting the scanning head

**i** Do not insert the spacer shims near the fixing clamps.

- ▶ Use the spacer shims to set the mounting clearance
- ▶ Insert the screws and tighten them using the specified torque
- ▶ Remove the spacer shims individually



## 5 Final steps

### 5.1 Performing the continuity check

#### Materials and tools

For this mounting step, the following materials and tools are needed:

#### Included in delivery

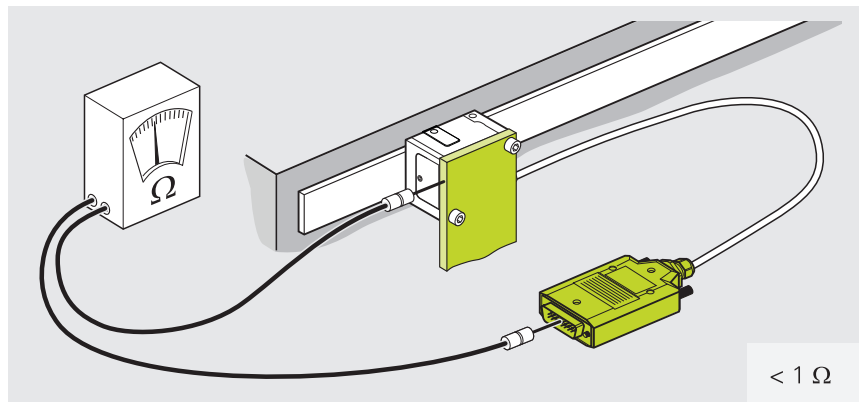
#### To be provided separately

- Resistance measuring device

#### 5.1.1 Measuring the resistance

- ▶ Check the resistance between the connector housing and the machine

**i** The resistance between the connector housing and the machine must be  $< 1 \Omega$ .



- ▶ Connect the shield with the machine earth (field ground)

### 5.2 Connecting the encoder

#### **⚠ WARNING**

#### **Danger of electric shock due to plug connections under voltage**

Connecting and disconnecting live cables and plug connections in the equipment can result in death or serious injury.

- Only connect and disconnect cables and plug connections when no current is flowing through them
- Disconnect the downstream electronics from power before connecting the encoder
- For cables without connectors, pay attention to the pin layout

- ▶ Connect the encoder to the downstream electronics

#### **NOTICE**

#### **Property damage resulting from incorrect routing of the connecting cable**

Connecting cables may become damaged as a result of incorrect routing.

- ▶ Observe the maximum permissible bend radii
- ▶ Do not cross connecting cables in drag chains
- ▶ Route connection cables professionally



For more information on the cable characteristics and cable routing, refer to the **Cables and Connectors** brochure.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **1206103**



For more information on the pin layouts, refer to the **Cables and Connectors** brochure.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **1206103**



For more information on sources of interference, refer to the **Interfaces of HEIDENHAIN Encoders** brochure.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **1078628**

## 6 Adjustment and diagnosis

This chapter describes how adjustment and diagnosis are performed using the PWM 21 and the Adjusting and Testing Software (ATS).

The PWM 21 phase angle measuring unit together with the ATS software serves for the diagnosis and adjustment of HEIDENHAIN encoders.

It consists of the following components:

- PWM 21
- ATS software, version 3.6, with integrated local encoder database for automatic encoder identification.

The ATS software is available for download free of charge from the [www.heidenhain.com/service/downloads/software/](http://www.heidenhain.com/service/downloads/software/) area on the HEIDENHAIN website.



For more information, see the **Exposed Linear Encoders** brochure.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **208960**



For more information, see the associated Adjusting and Testing Software documentation.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **543734**



You can adjust and perform diagnostics on the encoder with default settings or with user-defined settings.

For information about adjustment and diagnostics with default settings, see "Connecting an encoder using its ID", Page 29.

For information about adjustment and diagnostics with user-defined settings, see "Connecting the encoder manually", Page 31.

### 6.1 Connecting an encoder using its ID

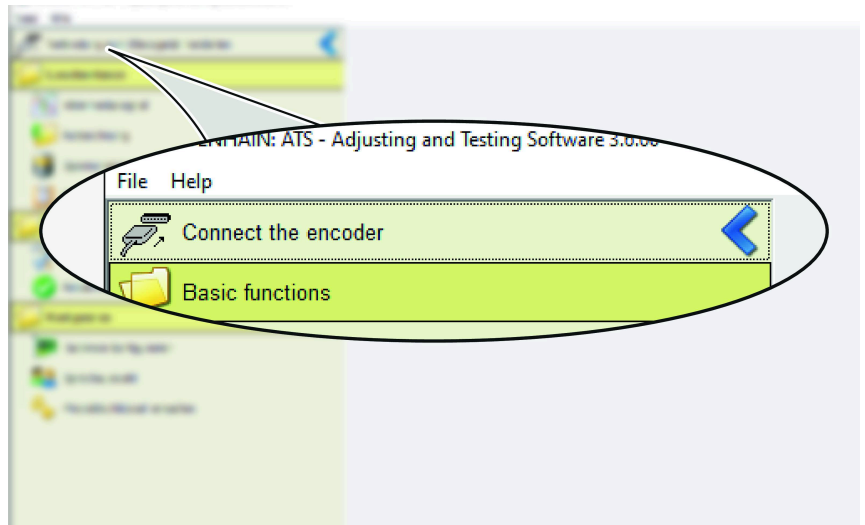
#### ⚠ WARNING

##### **Risk of injury from laser radiation**

Class 3B laser exposure causes serious eye and skin injuries.

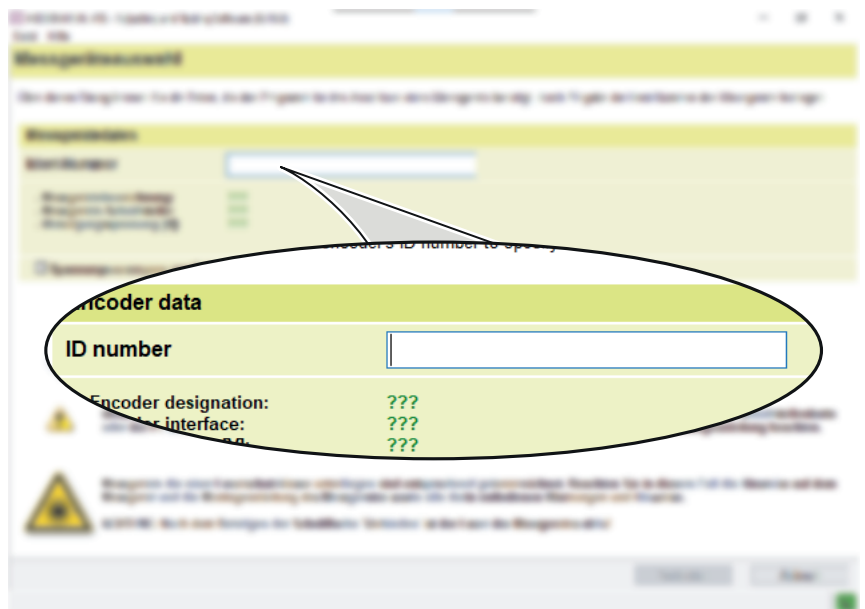
- ▶ Mount the scanning head correctly
- ▶ Wear eye protection, protective clothing and protective gloves
- ▶ Never stare into the laser beam or the reflection of the laser beam
- ▶ Do not touch the laser beam
- ▶ Shield the laser beam
- ▶ Structurally prevent reflections of the laser beam

- ▶ Double-click **Connect the encoder** in the function menu
- ▶ The Adjusting and Testing Software displays the **Encoder selection** dialog.



Function menu

- ▶ Enter the encoder ID in the **ID number** field
- ▶ The determined encoder parameters are shown in the **Encoder data** field.
- ▶ Click **Connect**
- ▶ The connection to the encoder is established.
- ▶ The **Function menu** is displayed.



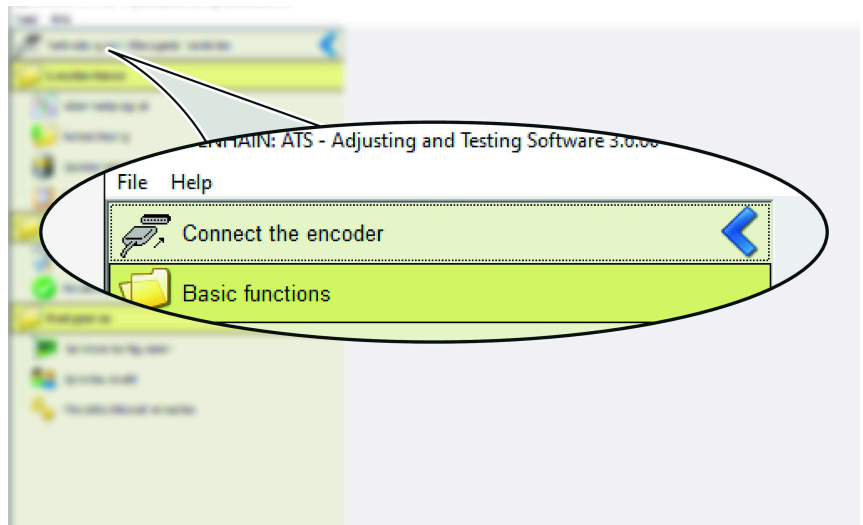
Encoder selection dialog



If you cannot connect the encoder using its ID, proceed as described in the "**Connecting the encoder manually**" chapter.

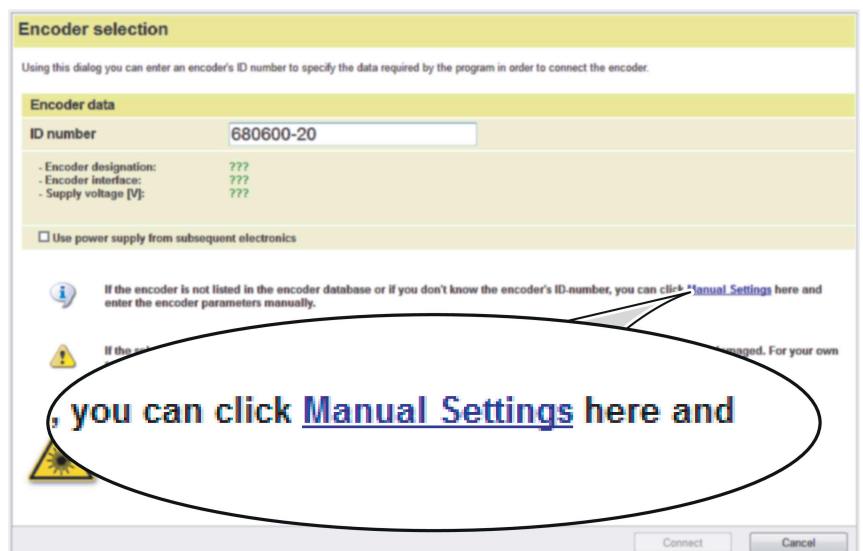
## 6.2 Connecting the encoder manually

- ▶ Double-click **Connect the encoder** in the function menu
- The Adjusting and Testing Software displays the **Encoder selection** dialog.



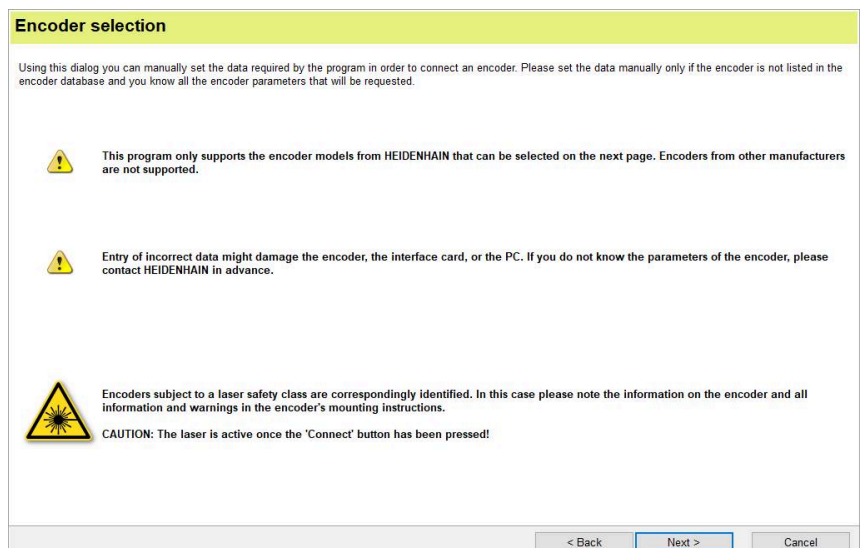
Function menu

- ▶ Click **Manual Settings**
- The Adjusting and Testing Software displays the **Encoder selection** dialog.



Encoder selection dialog

- ▶ Follow the safety instructions
- ▶ Click **Next**
- The Adjusting and Testing Software displays the **Encoder selection** dialog.



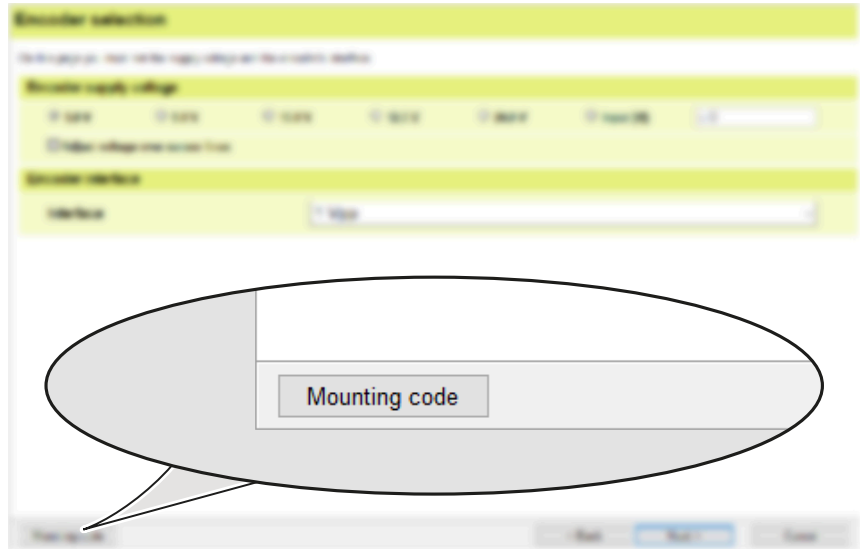
Encoder selection dialog



For more information on the supply voltage and interfaces, refer to the **Exposed Linear Encoders** brochure.

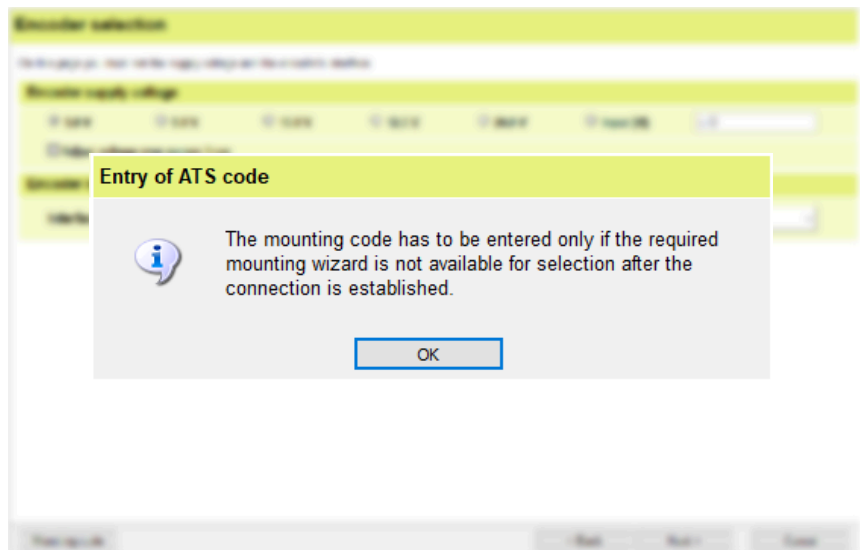
- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **208960**

- ▶ Select the permissible encoder supply voltage in the **Encoder supply voltage** section
- ▶ To activate voltage readjustment by the PWM, check the box **Adjust voltage over sensor lines**
- ▶ Select the interface type in the **Encoder interface** section
- ▶ If the EnDat 3 interface is selected, the mounting code is entered automatically. Continue with the step "Click **Connect**".
- ▶ Click **Mounting code**
- ▶ The **Entry of ATS code** note appears.



Encoder selection dialog

- ▶ Click **OK**
- ▶ The **Encoder selection** dialog with the mounting code appears



The **Entry of ATS code** note



**Values for the mounting code**

LIP 28	I004-A003
LIP 21	E001-A007
LIP 29	E002-A007

- ▶ For the **Mounting code**, enter the value
- ▶ Click **Next**
- ▶ The **Encoder selection** dialog with the encoder data appears

The screenshot shows the 'Encoder selection' dialog box. The 'Mounting code' section is highlighted with a red oval, and the 'ATS / Communication code' input field is also highlighted with a red oval. The dialog box has a light blue header and a white body. The 'Encoder selection' section is at the top, followed by 'Encoder supply voltage', 'Encoder interface', and 'Mounting code'. The 'Mounting code' section contains the 'ATS / Communication code' input field.

Encoder selection dialog with the mounting code

- ▶ Click **Connect**
- ▶ The **Function menu** appears.

The screenshot shows the 'Encoder selection' dialog box with the 'Encoder data' section. The data is as follows:

- Encoder interface:	1 Vpp
- Supply voltage [V]:	5.0
- Adjust voltage:	No
- ATS code:	I004-A003

Below the data, there are two warning icons:

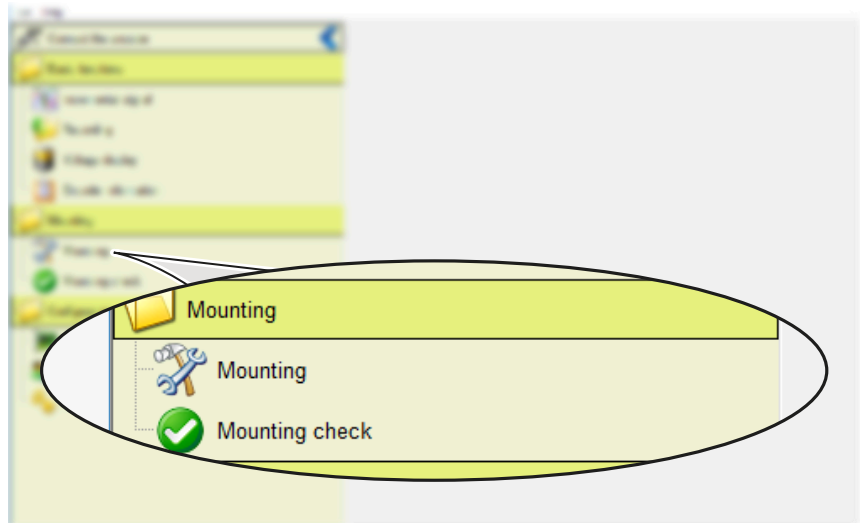
- ▶ A yellow warning triangle with an exclamation mark: Entry of incorrect data might damage the encoder, the interface card, or the PC.
- ▶ A yellow warning triangle with a laser symbol: Encoders subject to a laser safety class are correspondingly identified. In this case please note the information on the encoder and all information and warnings in the encoder's mounting instructions. CAUTION: The laser is active once the 'Connect' button has been pressed!

At the bottom of the dialog box, there are three buttons: '< Back', 'Connect', and 'Cancel'.

The **Encoder selection** dialog with the encoder data

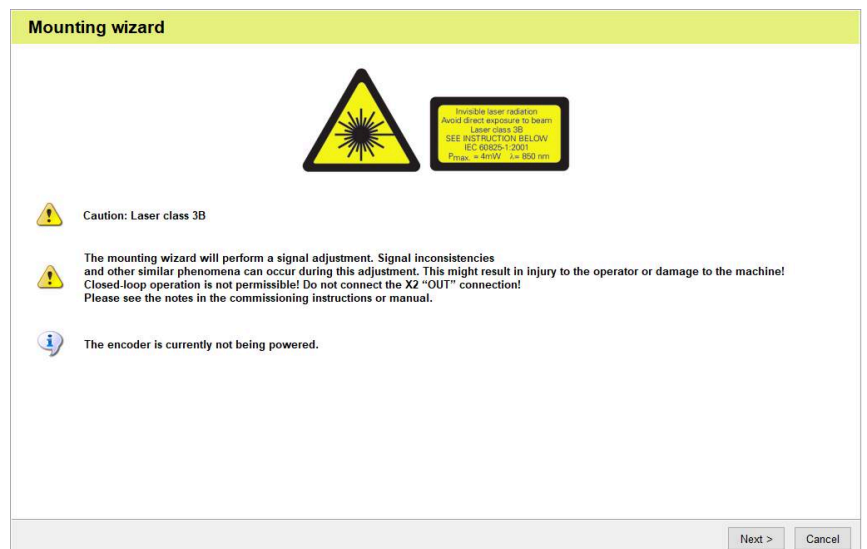
### 6.3 Starting the LIP21/LIP29 mounting wizard

- ▶ Double-click **Mounting**
- ▶ The **Laser class 3B** warning appears.



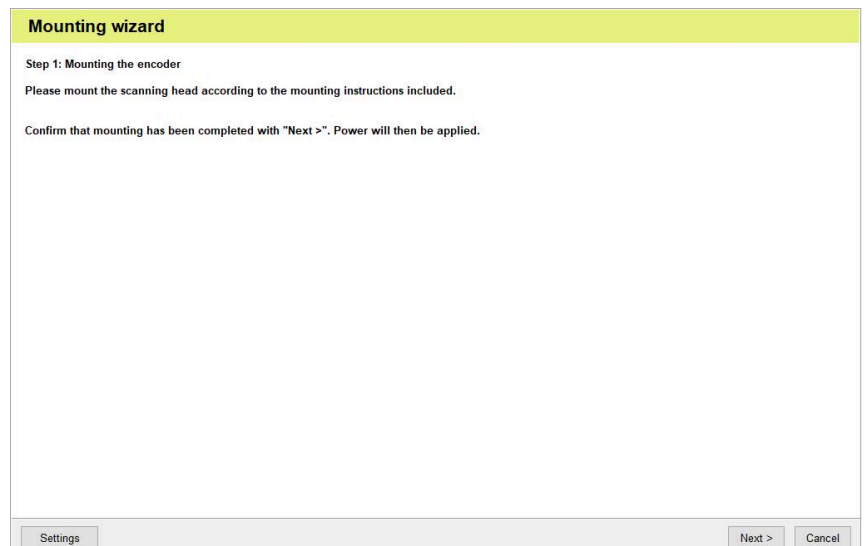
Function menu

- ▶ Click **Next**
- ▶ The **Step 1: Mounting the encoder** dialog appears.



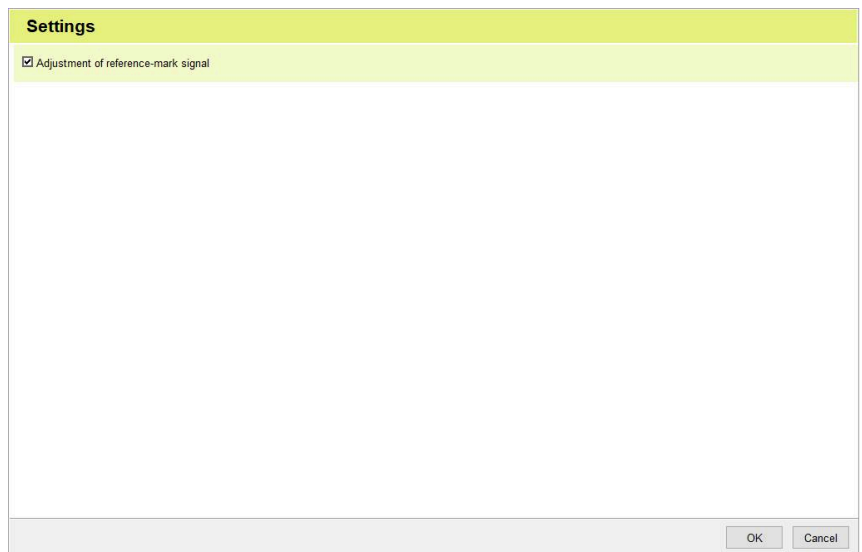
The **Laser class 3B** warning

- ▶ Optionally, click **Settings**
- ▶ The **Settings** dialog appears.

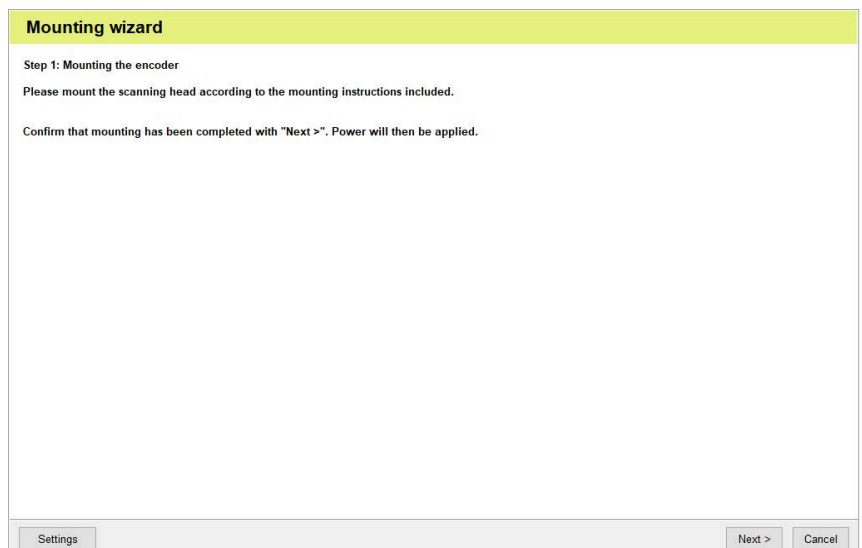


The **Step 1: Mounting the encoder** dialog

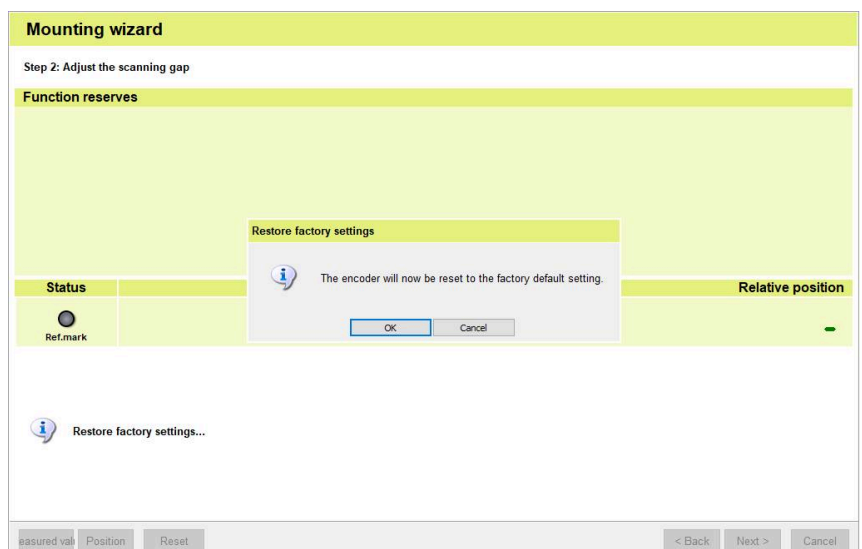
- ▶ If there is no reference mark, deactivate **Adjustment of reference-mark signal**
- ▶ Click **OK**
- > The **Step 1: Mounting the encoder** dialog appears.

The **Settings** dialog

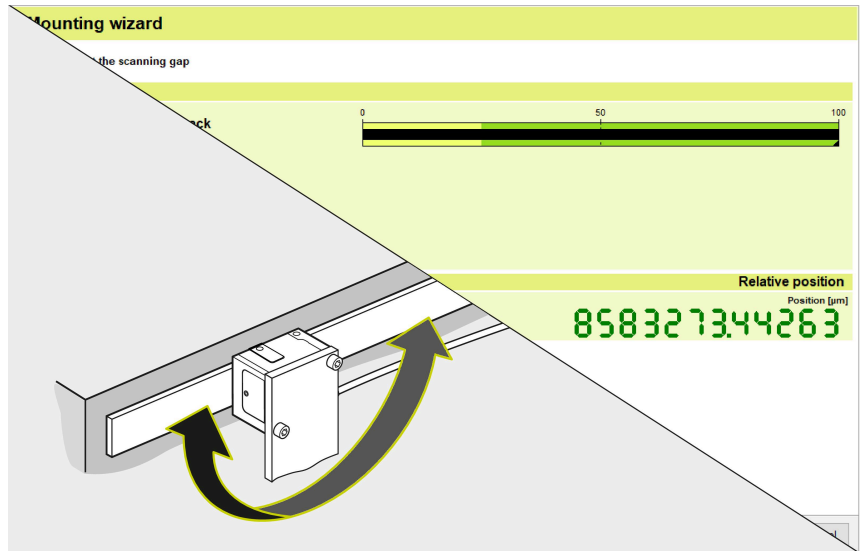
- ▶ Click **Next**
- > The **Restore factory settings** message appears.

The **Step 1: Mounting the encoder** dialog

- ▶ Click **OK**
- > The dialog **Step 2: Adjust the scanning gap** appears.

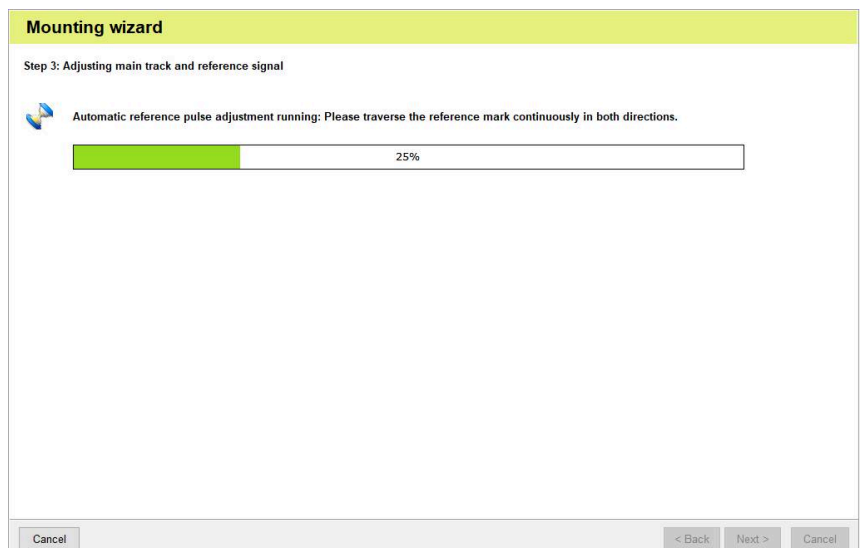
The **Restore factory settings** message

- ▶ Align the scanning head so that the black bar in the Adjusting and Testing Software is as far to the right as possible
- ▶ Click **Next**
- ▶ The **Step 3: Adjusting main track and reference signal** dialog appears.



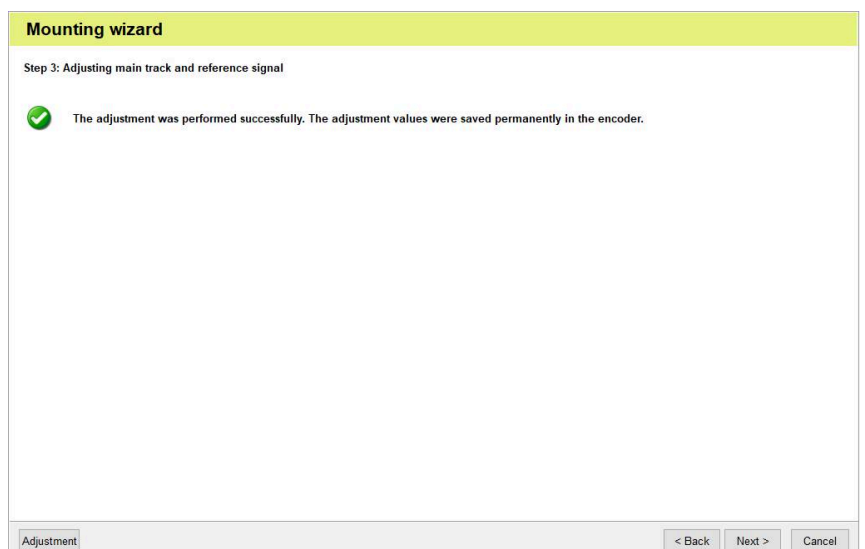
The **Step 2: Adjust the scanning gap** dialog

- ▶ Traverse the reference mark in both directions until "Progress: 100%" has been reached
- ▶ The **Adjustment was performed successfully** message appears.



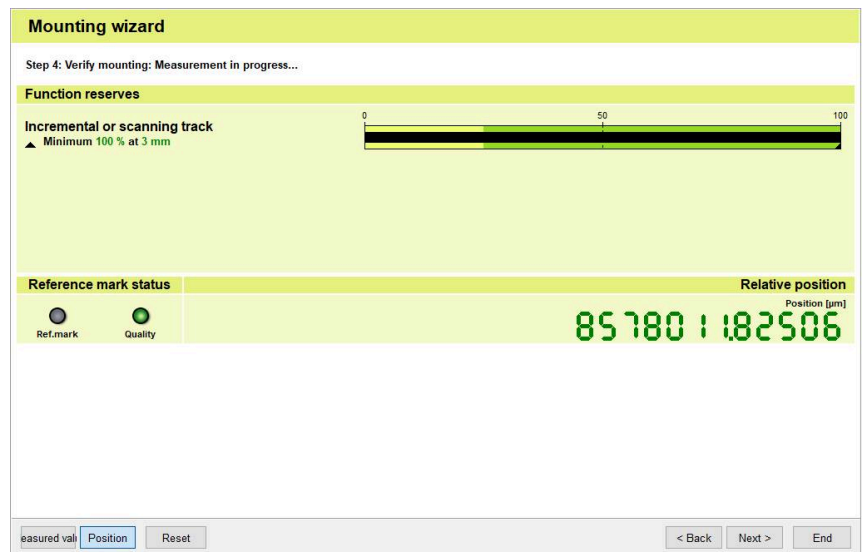
The **Step 3: Adjusting main track and reference signal** dialog

- ▶ The adjustment was performed successfully. The adjustment values were saved permanently in the encoder
- ▶ Click **Next**
- ▶ The **Step 4: Verify mounting: Measurement in progress...** dialog appears.



The **Adjustment was performed successfully** message

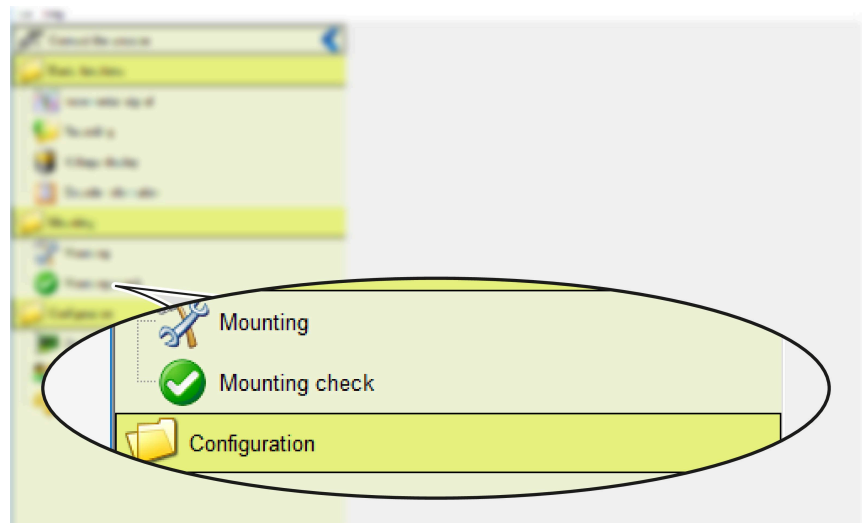
- ▶ Click **Next**
- > The **mounting wizard** restarts with **Step 1: Mounting the encoder**.
- ▶ Click **End**
- > The **mounting wizard** closes.



The **Step 4: Verify mounting: Measurement in progress...** dialog

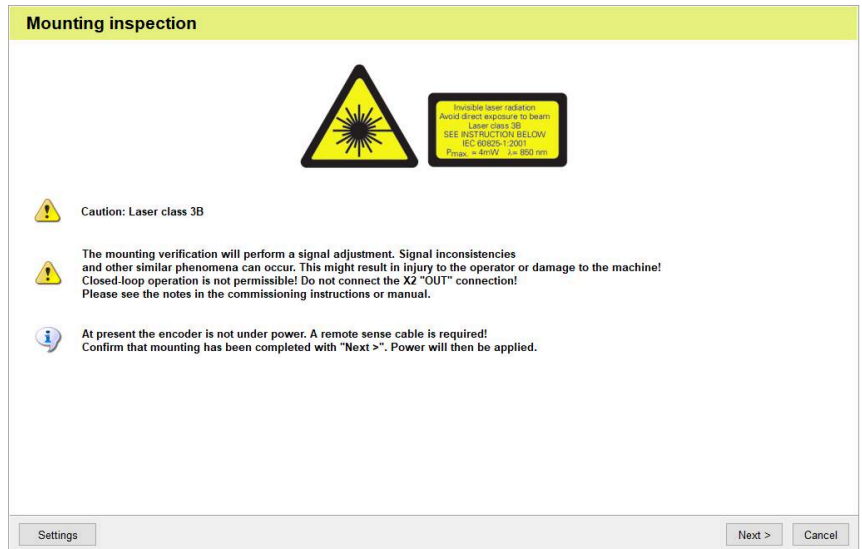
## 6.4 Checking the mounting of the LIP21/LIP29

- ▶ Double-click **Mounting check**
- > The **Mounting inspection** dialog with the **Laser class 3B** warning appears.



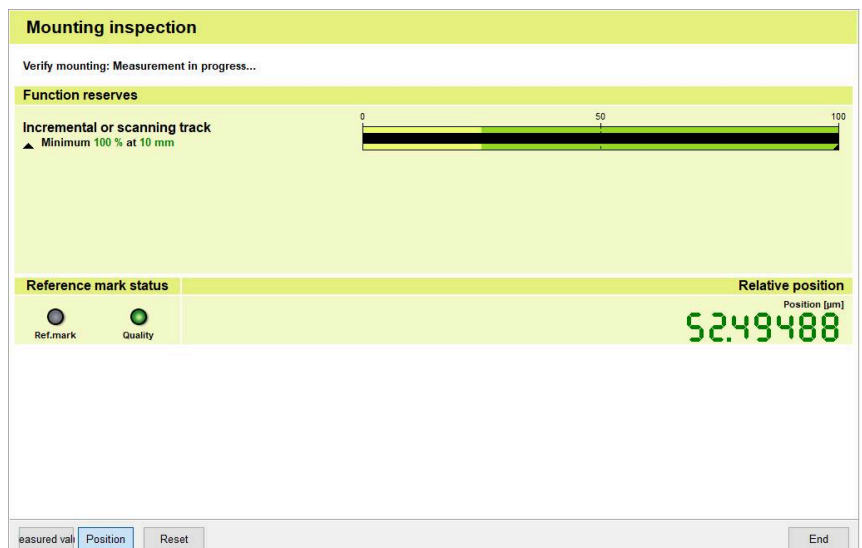
Function menu

- ▶ Click **Next**
- ▶ The **Verify mounting: Measurement in progress...** dialog appears.



The **Mounting inspection** dialog with the **Laser class 3B** caution

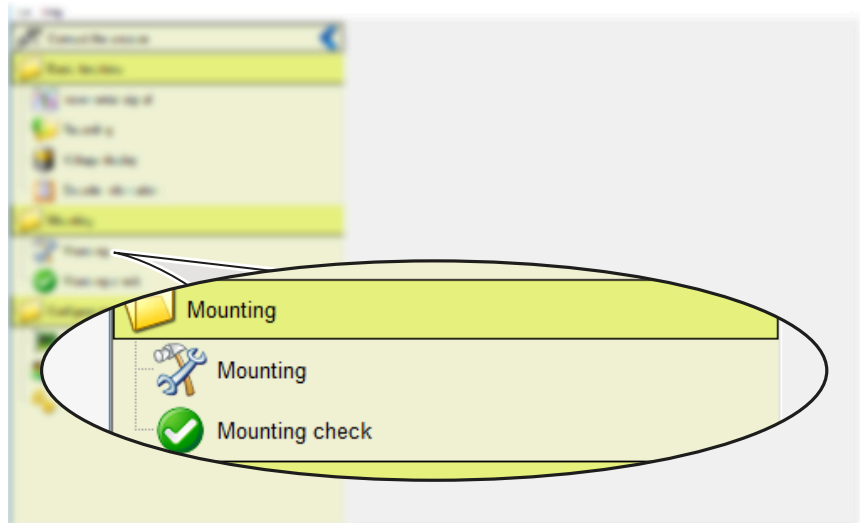
- ▶ Click **End**
- ▶ **Mounting inspection** is completed.



The **Mounting inspection: Measurement in progress...** dialog

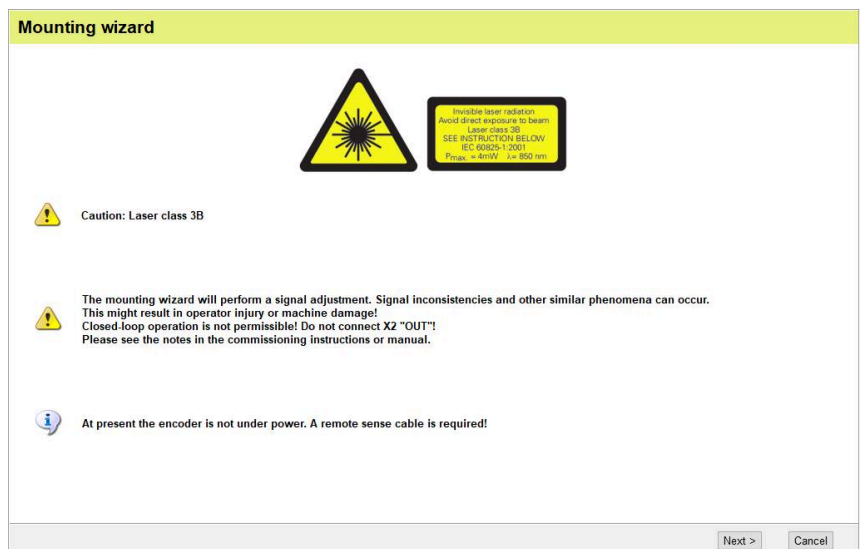
## 6.5 Starting the LIP28 mounting wizard

- ▶ Double-click **Mounting**
- > The **Laser class 3B** warning appears.

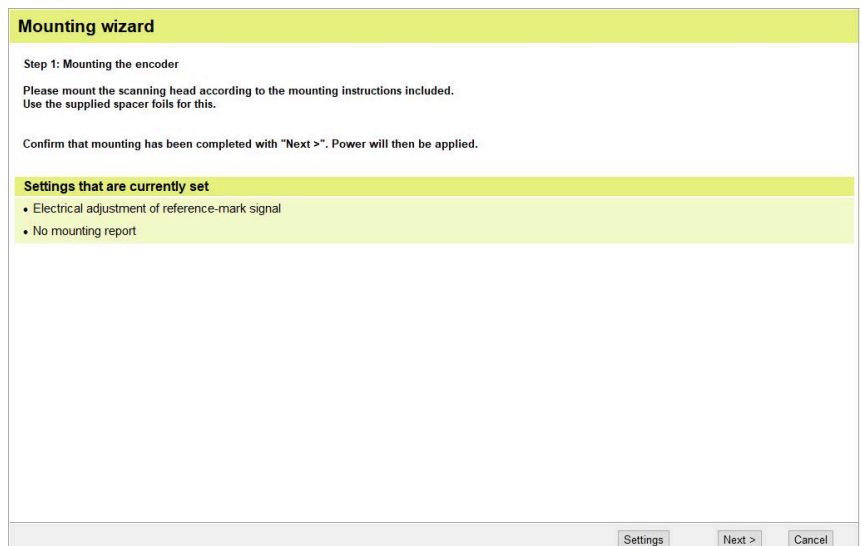


Function menu

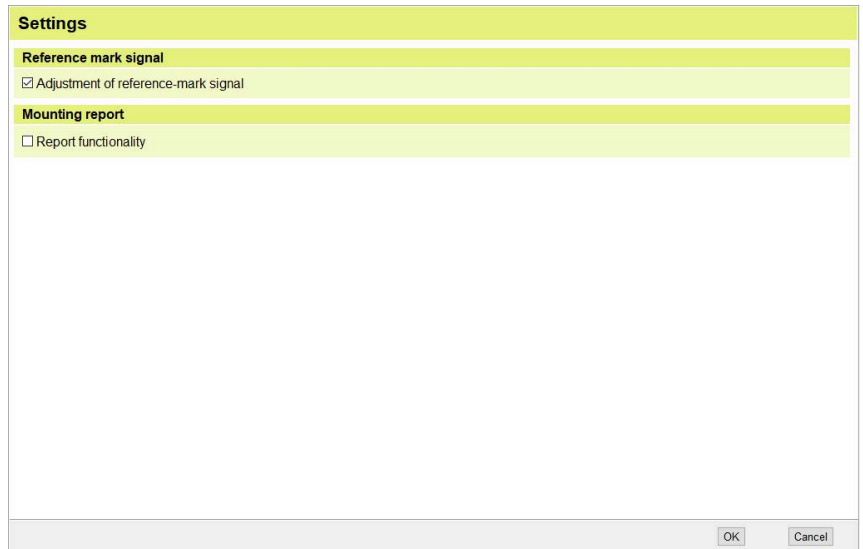
- ▶ Click **Next**
- > The **Step 1: Mounting the encoder** dialog appears.

The **Laser class 3B** warning

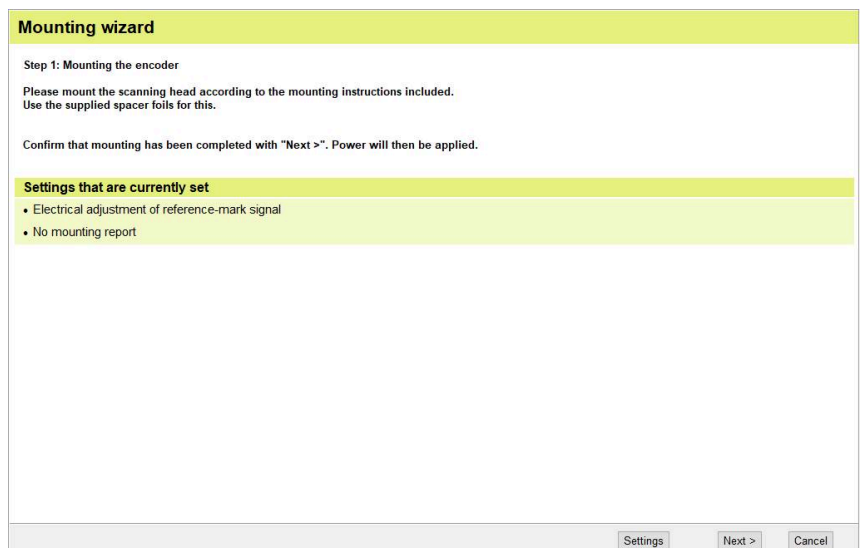
- ▶ Click **Settings** to change the **Settings that are currently set**
- > The **Settings** dialog appears.

The **Step 1: Mounting the encoder** dialog

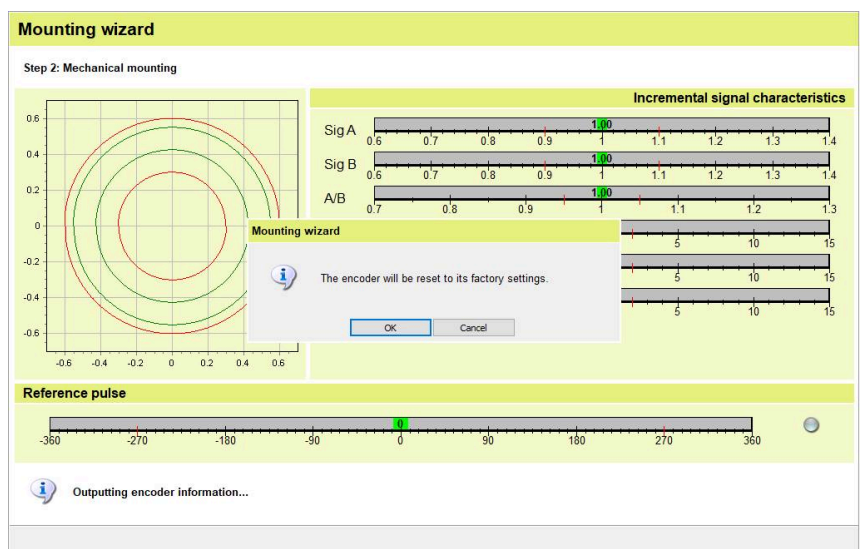
- ▶ If there is no reference mark, deactivate **Adjustment of reference-mark signal**
- ▶ Click **OK**
- ▶ The **Step 1: Mounting the encoder** dialog appears.

The **Settings** dialog

- ▶ Click **Next**
- ▶ The **Encoder will be reset to its factory settings** message appears.

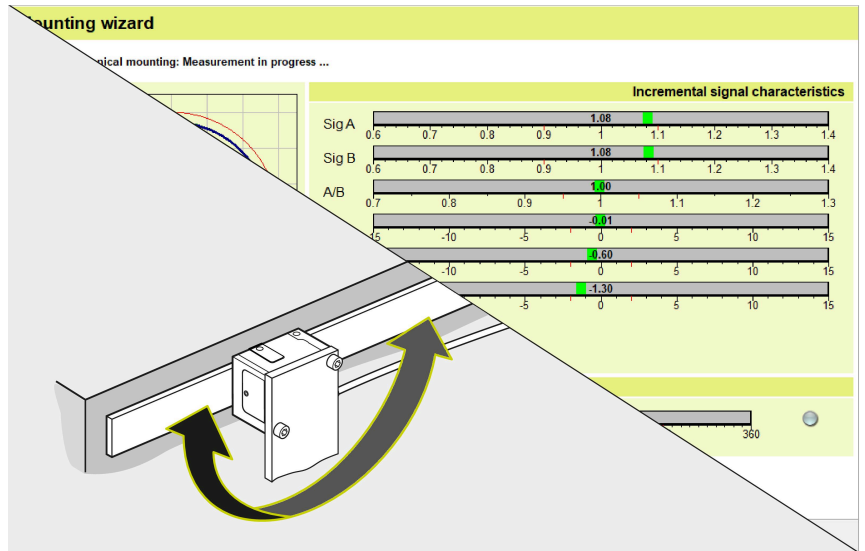
The **Step 1: Mounting the encoder** dialog

- ▶ Click **OK**
- ▶ The **Step 2: Mechanical mounting: Measurement in progress...** dialog appears.

The **Encoder will be reset to its factory settings** message

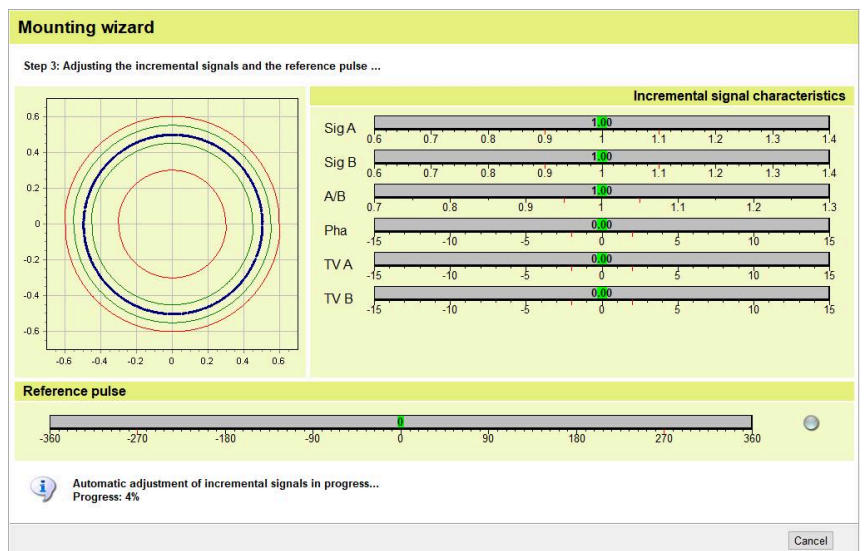


- ▶ Align the scanning head so that the signals of the Adjusting and Testing Software are in the green range
- ▶ Click **Next**
- ▶ The **Step 3: Adjusting the incremental signals and the reference pulse ...** dialog appears.



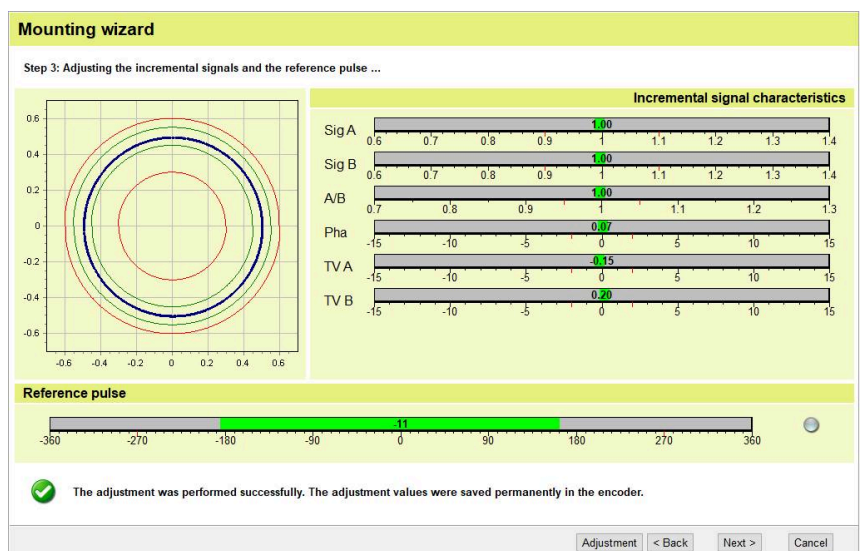
The **Step 2: Mechanical mounting: Measurement in progress ...** dialog

- ▶ Traverse the reference mark in both directions until "Progress: 100%" has been reached
- ▶ The **Adjustment was performed successfully** message appears.



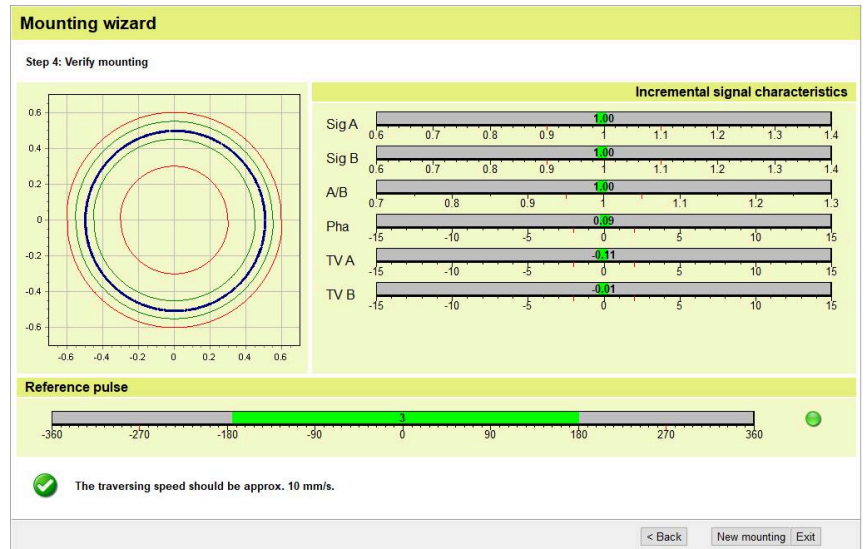
The **Step 3: Adjusting the incremental signals and the reference pulse ...** dialog

- ▶ The adjustment was performed successfully. The adjustment values were saved permanently in the encoder.
- ▶ Click **Next**
- ▶ The **Step 4: Verify mounting:** dialog appears.



The **Adjustment was performed successfully** message

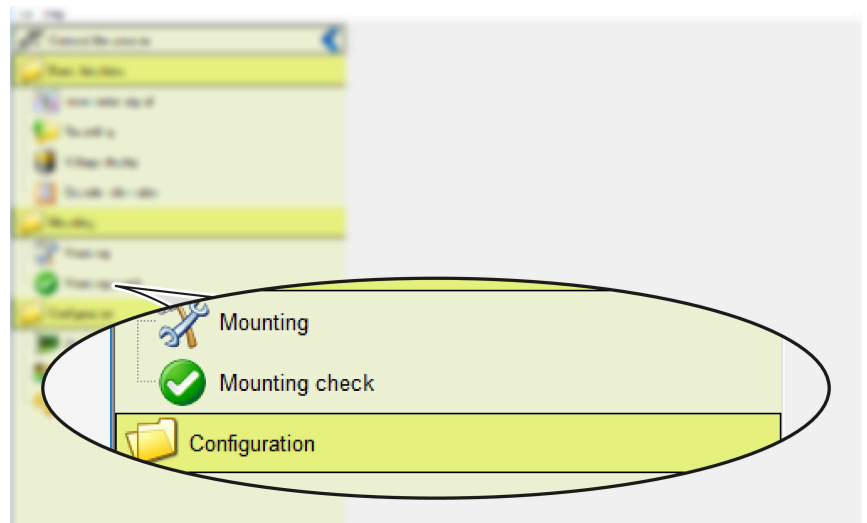
- ▶ Click **New mounting**
- > The **mounting wizard** restarts with **Step 1: Mounting the encoder**
- ▶ Click **Exit**
- > The **mounting wizard** closes.



The **Step 4: Verify mounting** dialog

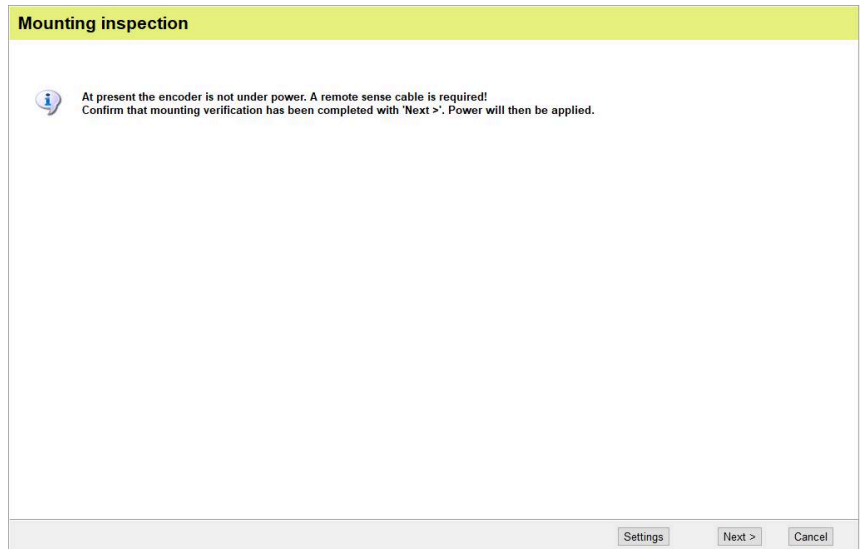
## 6.6 Checking the mounting of the LIP28

- ▶ Double-click **Mounting check**
- > The **Mounting inspection** dialog with a message appears.

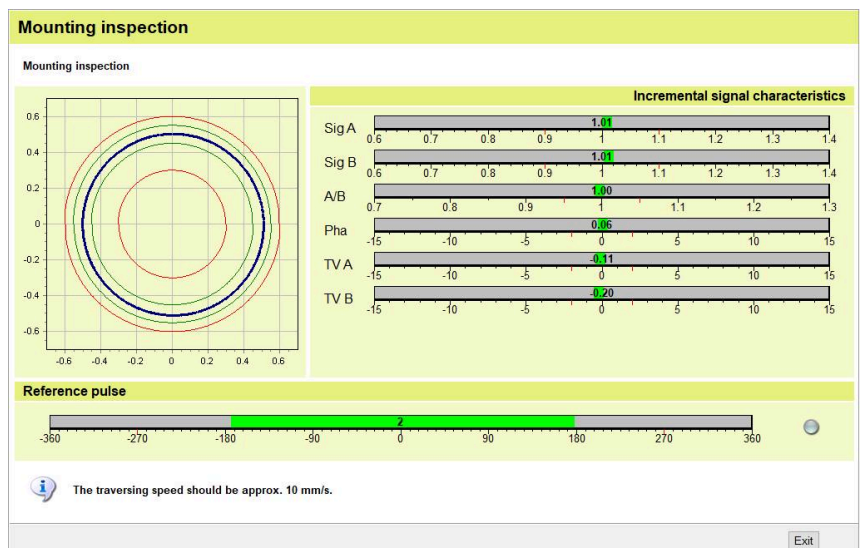


Function menu

- ▶ Click **Next**
- > The **Mounting inspection** dialog with the **Traversing speed...** message appears.

The **Mounting inspection** dialog with a message

- ▶ Click **Exit**
- > **Mounting inspection** closes.

The **Mounting inspection** dialog with the **Traversing speed...** message

## 7 Removal

This chapter describes the disassembly of the product.

### 7.1 Safety precautions regarding removal

#### WARNING

##### Live plug connections

If you disengage plug connections while the equipment is under power, this may result in fatal accidents or severe personal injury.

- ▶ Do not engage or disengage any connecting elements while the product is under power

#### WARNING

##### Moving machine parts

Risk of injury due to moving machine parts depending on the installation location and the application

- ▶ Observe all of the machine manufacturer's notes on working on the machine, e.g., always disconnect the machine from the power supply

#### CAUTION

##### Fragile carrier material of the scale unit or the scale itself

Risk of injury from splinters and sharp edges of the carrier material

- ▶ Wear protective gloves and safety goggles
- ▶ Do not bend or deform the scale unit or scale excessively

### 7.2 Removing the scanning head

- ▶ Remove the scanning head in the reversed sequence of mounting. **Further information:** "Mounting the scanning head", Page 24

### 7.3 Removing the scale



Further information can be found in the **Disassembly Instructions**.

- ▶ [www.heidenhain.com/documentation](http://www.heidenhain.com/documentation)
- ▶ Enter the document ID **1185755**

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