RSF Elektronik

Scales and Scale Tapes for MS 1x, MS 2x, MS 3x, MS 4x, MS 8x, MC 1x

Disassembly Instructions

Exposed Linear Encoders

English (en)
05/2025

Table of contents

1 Basic information

This chapter contains information about the product and these Disassembly Instructions.

1.1 Applicability of the documentation

These Disassembly Instructions are valid for linear scales and scale tapes of the MS 1x, MS 2x, MS 3x, MS 4x, MS 8x, and MC 1x series.

- ▶ Prior to using the documentation, check whether the documentation and measuring device type match

The designation of the measuring device is printed on the ID label.

1.2 Target group for the Disassembly Instructions

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

- Disassembly

1.3 Notes on reading this document

⚠ 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

In the following, linear scales and scale tapes will be referred to as **measuring standard**.

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

Documentation	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 reading priority. 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 **www.heidenhain.com/documentation**. The Operating Instructions must be read prior to commissioning the product. The Operating Instructions have the second highest reading priority.
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 **www.heidenhain.com/documentation**. The Mounting Instructions have the third highest reading priority.
Disassembly Instructions	The Disassembly Instructions contain all the information and safety precautions for the proper removal of a product. The Disassembly Instructions are not included in delivery and must be downloaded from **www.heidenhain.com/documentation**. The Disassembly Instructions have the fourth highest reading priority.

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: ▶ Tap **OK** > The message is closed
■ ... ■ ...	Identifies an item of a list Example: ■ TTL interface ■ EnDat interface ■ ...

1.5 Notes in this documentation

Safety precautions

Precautionary statements warn of hazards in handling the product 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

Caution indicates danger to material or data. If you do not follow the avoidance instructions, the hazard **could result in things other than personal injury, such as property damage**.

Informational notes

Informational notes ensure reliable and efficient operation of the product. 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 RSF Elektronik or another supplier.

The globe symbol represents a **cross reference** to a source on the Internet, e.g. **www.heidenhain.com**

2 Safety

This chapter provides important safety information needed for the proper disassembly of the product.

2.1 Personnel qualification

The disassembly must be conducted by a qualified specialist under compliance with local safety regulations.

2.2 General safety precautions

⚠ WARNING

Fatal accidents, personal injury, or property damage when engaging or disengaging live connecting elements!

Engaging or disengaging connecting elements while the system is under power may result in fatal accidents, personal injury, or property damage.

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

⚠ CAUTION

Risk of injury due to sharp-edged aids

If you use sharp-edged aids, you may cut yourself. Sharp-edged aids are implements like strip steel or safety knives, for example.

- Wear protective gloves and safety goggles

⚠ CAUTION

Danger of burns due to hot parts

Use of a hot-air gun or a heating plate causes some parts of the devices and the treated components to become very hot. These hot parts may cause burns to the skin. They can also lead to the ignition of solvents.

- Wear protective gloves and safety goggles
- Do not touch hot parts of the hot-air gun or heating plate, and prevent them from coming into contact with solvents
- Do not touch hot components and surfaces, and prevent them from coming into contact with solvents
- Place the hot-air gun in a safe place to cool after use or let the heating plate cool down

⚠ CAUTION

Danger of chemical burns and poisoning due to solvents

Coming into contact with solvents or inhaling the vapors of solvents can cause chemical burns to the skin or eyes.

- Wear protective gloves and safety goggles
- Wear respiratory protection
- Keep the workplace well ventilated
- Follow the safety data sheets of the solvents used

NOTICE

Damage to the measuring standard due to mechanical load

Excessive stress on the measuring standard may lead to breakage of the scale or deformation of the scale tape. The deformed measuring standard can lead to signal failure or signal impairments.

- Do not bend or deform the measuring standard excessively
- Pull the strip steel from one side to the other; always pull in the same direction
- Apply only a light pulling force in the longitudinal direction
- Never pull the strip steel away from the mounting surface

NOTICE

Material damage caused by solvents

Use of solvents can cause damage to the measuring standard, the mounting surface or the scale tape carrier.

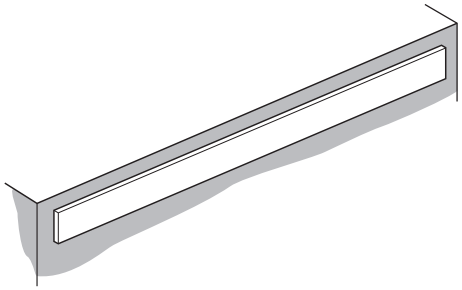
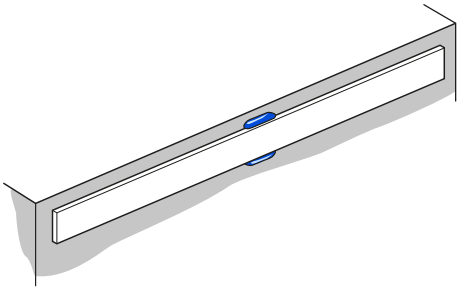
- Check the solvent resistance of the measuring standard, mounting surface and scale tape carrier

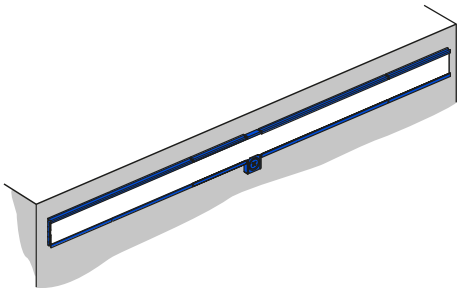
3 Disassembly

This chapter describes the different variants of disassembly of the measuring standard.

3.1 Disassembly variants

Depending on the mounting type of the measuring standard and the quality of the mounting surface, there are various ways of disassembly.

Adhesive tape	Adhesive tape and fixed-point bond
	
Page 11	Page 14

Scale-tape carrier, glued

Page 21

3.2 Variant: Measuring standard with adhesive tape

This chapter describes how to remove a measuring standard secured with adhesive tape.

⚠ CAUTION

Risk of injury due to sharp-edged aids

If you use sharp-edged aids, you may cut yourself. Sharp-edged aids are implements like strip steel or safety knives, for example.

- Wear protective gloves and safety goggles

⚠ CAUTION

Danger of chemical burns and poisoning due to solvents

Coming into contact with solvents or inhaling the vapors of solvents can cause chemical burns to the skin or eyes.

- Wear protective gloves and safety goggles
- Wear respiratory protection
- Keep the workplace well ventilated
- Follow the safety data sheets of the solvents used

NOTICE

Material damage to the mounting surface

Sharp-edged tools can damage sensitive surfaces (e.g., aluminum).

- Use the following aids
  - Hot-air gun with temperature control
  - Cotton thread or plastic thread (e.g., dental floss)
- Heat the measuring standard to a core temperature of max. 80 °C
- Keep a distance of 50 mm between the hot-air gun and the surface of the measuring standard

3.2.1 Materials and tools

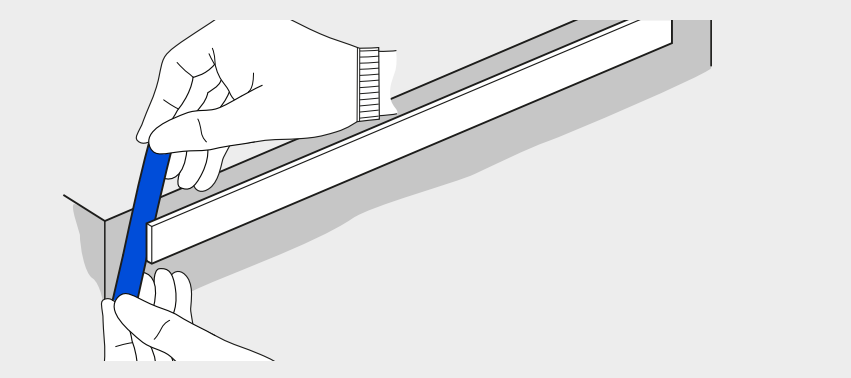
For this task, the following materials and tools are needed:

Included in delivery	To be provided separately
	■ Strip steel or metal foil with a thickness of 0.04 mm to 0.06 mm ■ Solvent (e.g., isopropyl alcohol) ■ Cleaning cloths: soft, lint-free, silicone-free, free from parting agents

3.2.2 Detaching a measuring standard secured with adhesive tape

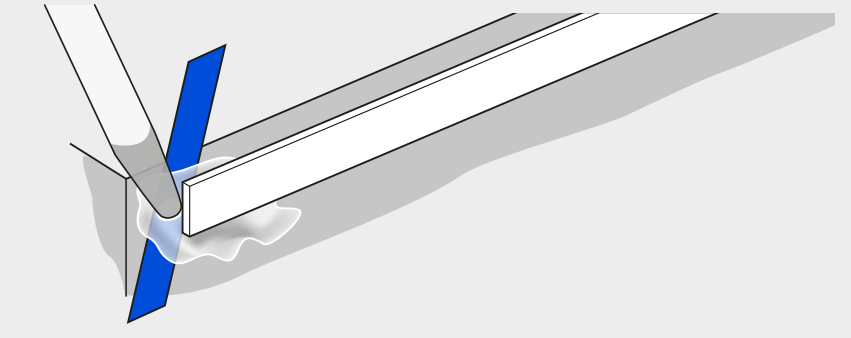
To lift the measuring standard:

- ▶ At a corner at the beginning of the measuring standard, insert the strip steel between the bottom of the measuring standard and the mounting surface at a slight angle to the longitudinal direction



To soak the adhesive tape:

- ▶ Apply solvent to the sides of the measuring standard until the gap between the measuring standard and the mounting surface is completely filled.



NOTICE

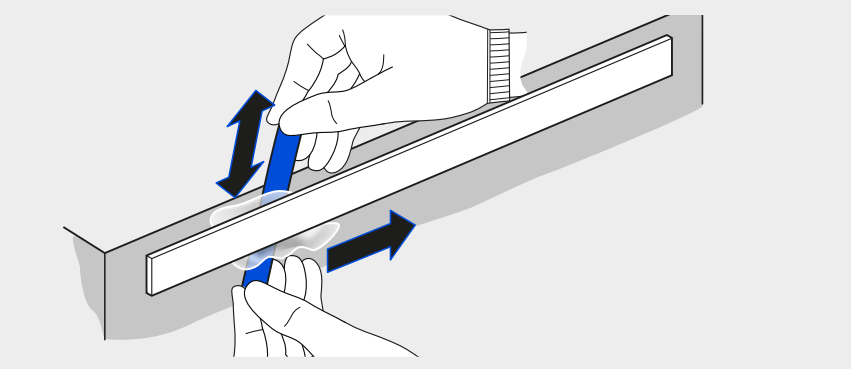
Damage to the measuring standard due to mechanical load

Excessive stress on the measuring standard may lead to breakage of the scale or deformation of the scale tape. The deformed measuring standard can lead to signal failure or signal impairments.

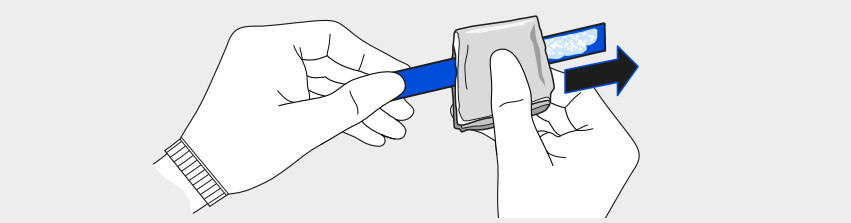
- ▶ Do not bend or deform the measuring standard excessively
- ▶ Pull the strip steel from one side to the other; always pull in the same direction
- ▶ Apply only a light pulling force in the longitudinal direction
- ▶ Never pull the strip steel away from the mounting surface

To cut through the adhesive tape:

- ▶ Pull the steel strip under the measuring standard in a sawing motion from one side to the other

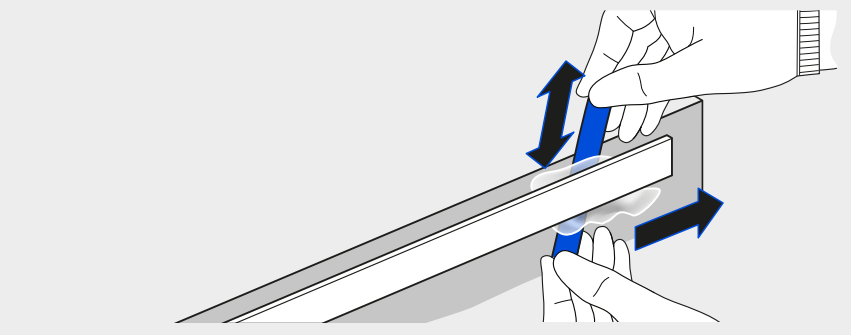


- ▶ Wipe the strip steel clean with a cloth soaked in solvent



> Note that residues of adhesive deposit on the strip steel.
>
> - ▶ Clean the strip steel every time you have pulled it through

- ▶ Apply some more solvent to the measuring standard
- ▶ Carefully reinsert the strip steel
- ▶ Continue detaching the adhesive bond as described above



> The measuring standard is separated from the mounting surface.

3.3 Variant: Measuring standard with adhesive tape and fixed-point bond

This chapter describes how to remove a measuring standard secured with adhesive tape and fixed-point bonding.

⚠CAUTION

Risk of injury due to sharp-edged aids

If you use sharp-edged aids, you may cut yourself. Sharp-edged aids are implements like strip steel or safety knives, for example.

- Wear protective gloves and safety goggles

⚠CAUTION

Danger of burns due to hot parts

Use of a hot-air gun or a heating plate causes some parts of the devices and the treated components to become very hot. These hot parts may cause burns to the skin. They can also lead to the ignition of solvents.

- Wear protective gloves and safety goggles
- Do not touch hot parts of the hot-air gun or heating plate, and prevent them from coming into contact with solvents
- Do not touch hot components and surfaces, and prevent them from coming into contact with solvents
- Place the hot-air gun in a safe place to cool after use or let the heating plate cool down

⚠CAUTION

Danger of chemical burns and poisoning due to solvents

Coming into contact with solvents or inhaling the vapors of solvents can cause chemical burns to the skin or eyes.

- Wear protective gloves and safety goggles
- Wear respiratory protection
- Keep the workplace well ventilated
- Follow the safety data sheets of the solvents used

NOTICE

Material damage due to hot surfaces

Excessive surface temperatures can damage or destroy the measuring standard.

- Avoid surface temperatures >110 °C
- Avoid spot-heating
- Keep the nozzle of the hot-air gun at least 50 mm away from the surface of the measuring standard
- Make sure the hot-air gun is set to an appropriate temperature
- Keep in mind the heat dissipation of the mounting surface

NOTICE

Material damage due to insufficient clearance

If you get closer than 50 mm to the fixed-point bond when detaching the adhesive tape, the measuring standard can become deformed or even break.

- Always keep a distance of at least 50 mm to fixed-point bonds

NOTICE

Material damage to the mounting surface

Sharp-edged tools can damage sensitive surfaces (e.g., aluminum).

- Use the following aids
  - Hot-air gun with temperature control
  - Cotton thread or plastic thread (e.g., dental floss)
- Heat the measuring standard to a core temperature of max. 80 °C
- Keep a distance of 50 mm between the hot-air gun and the surface of the measuring standard

3.3.1 Materials and tools

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

Included in delivery

To be provided separately

- Hot-air gun with temperature control
- Pliers
- Safety knife with thin blade or craft knife
- Strip steel or metal foil with a thickness of 0.04 mm to 0.06 mm
- Solvent (e.g., isopropyl alcohol)
- Cleaning cloths: soft, lint-free, silicone-free, free from parting agents

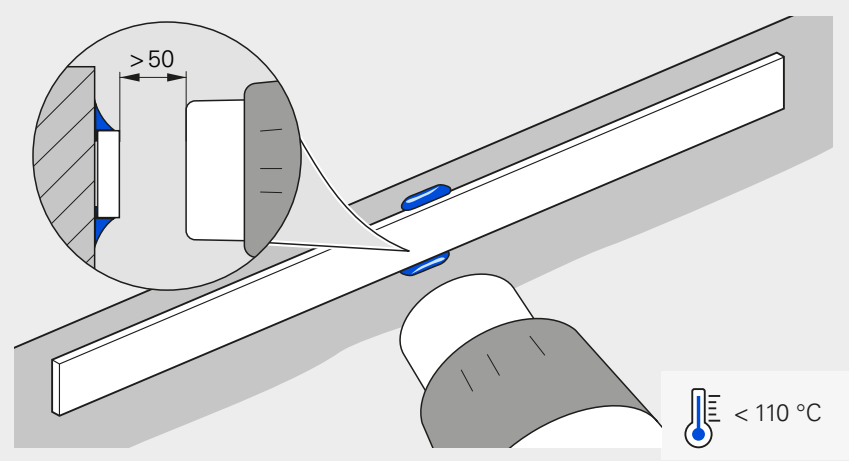
3.3.2 Detaching a measuring standard secured with adhesive tape and fixed-point bond

To remove the protruding portion of the fixed-point bond:

- Heat the fixed-point bond to the softening point of the adhesive used or to a maximum of 110 °C

For the softening point of the adhesive used, please refer to the Technical Data Sheet for the adhesive.

The time required to heat the adhesive to the softening point will vary depending on the material of the mounting surface and its heat dissipation.



NOTICE

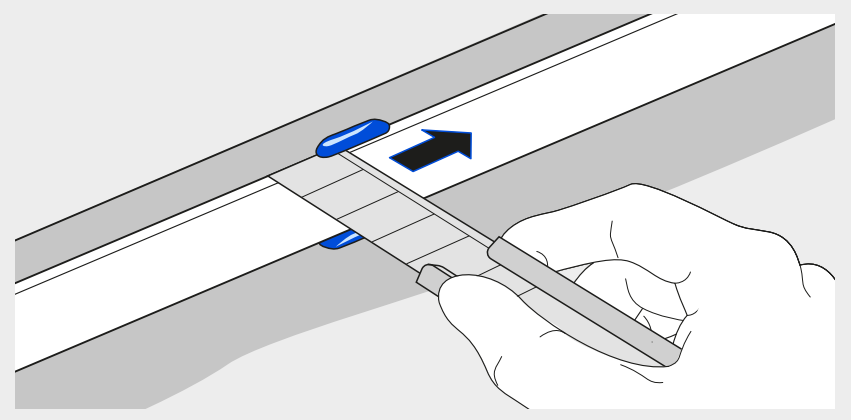
Material damage due to deep cuts

If you cut too deeply, you can damage the mounting surface.

- Do not cut too deeply
- Pay attention to the surface

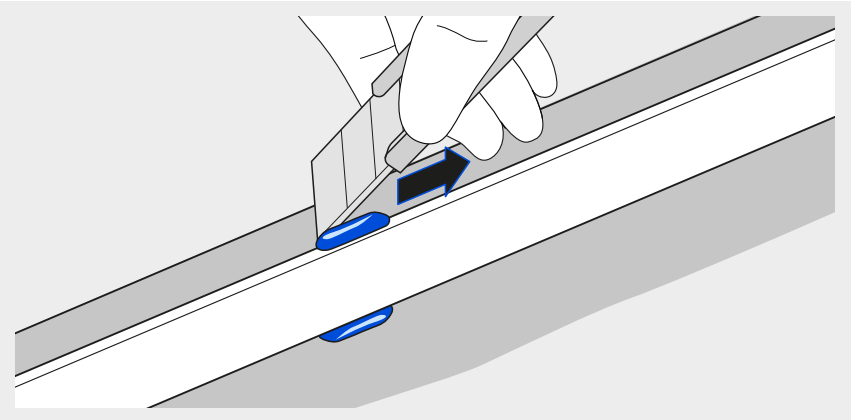
When the softening point of the adhesive is reached:

- With a blade, cut into the adhesive layer along the side of the measuring standard



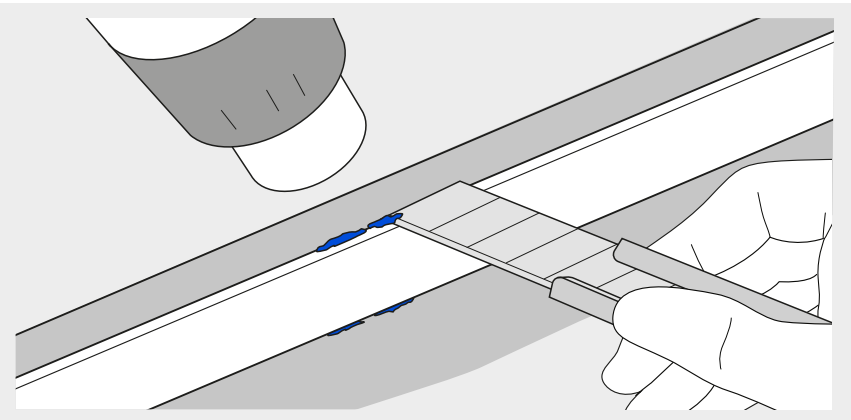
To detach the adhesive bead:

- Hold a safety knife flat and slide it across the mounting surface



To remove adhesive residues:

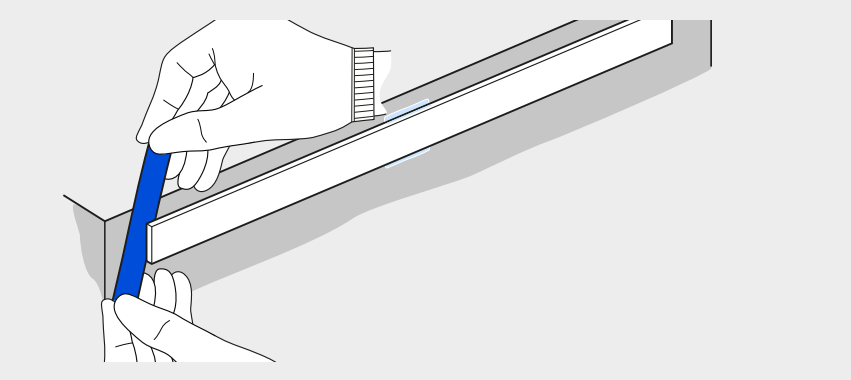
- Use a safety knife to remove adhesive residues



Maintain the temperature throughout the detachment process. Ideally, have a second person operate the hot-air gun.

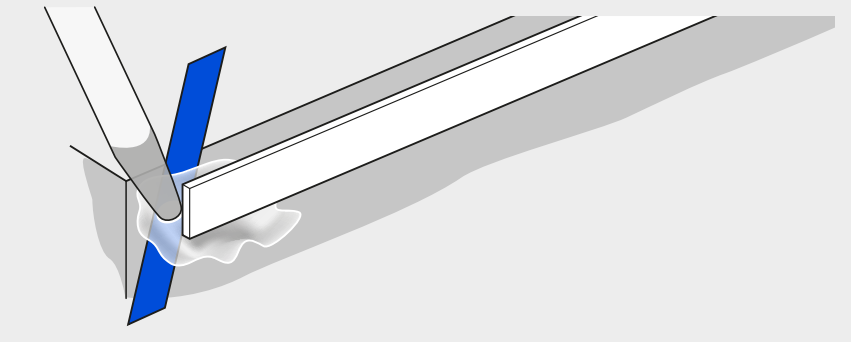
To detach the adhesive tape:

- At a corner at the beginning of the measuring standard, insert the steel strip between the bottom of the measuring standard and the mounting surface



To soak the adhesive tape:

- Apply solvent to the sides of the measuring standard until the gap between the measuring standard and the mounting surface is completely filled.



NOTICE

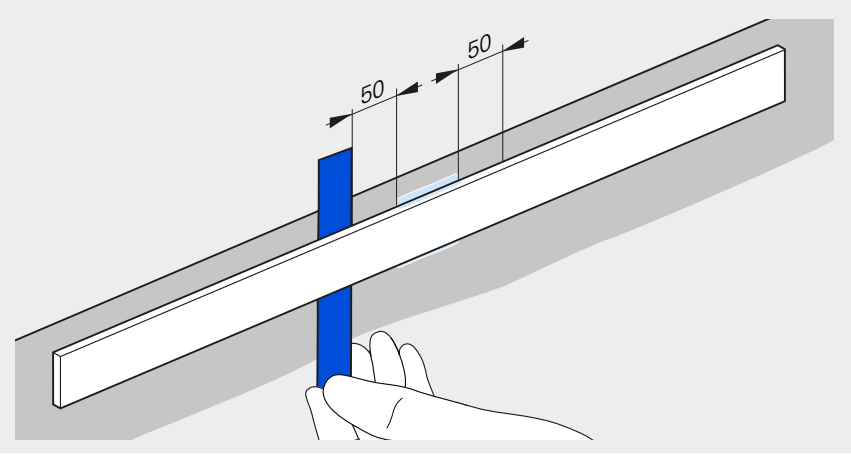
Damage to the measuring standard due to mechanical load

Excessive stress on the measuring standard may lead to breakage of the scale or deformation of the scale tape. The deformed measuring standard can lead to signal failure or signal impairments.

- Do not bend or deform the measuring standard excessively
- Pull the strip steel from one side to the other; always pull in the same direction
- Apply only a light pulling force in the longitudinal direction
- Never pull the strip steel away from the mounting surface

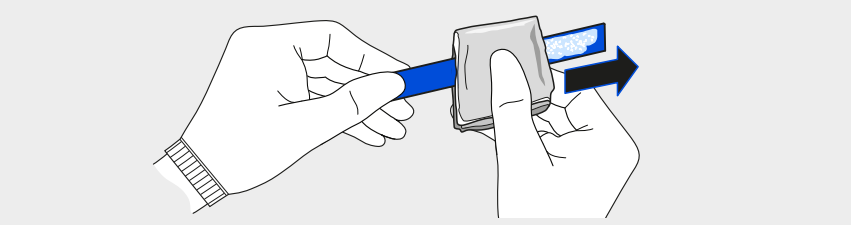
To cut through the adhesive tape until the steel strip is no closer than 50 mm from the fixed-point bond:

- Pull the steel strip under the measuring standard in a sawing motion from one side to the other

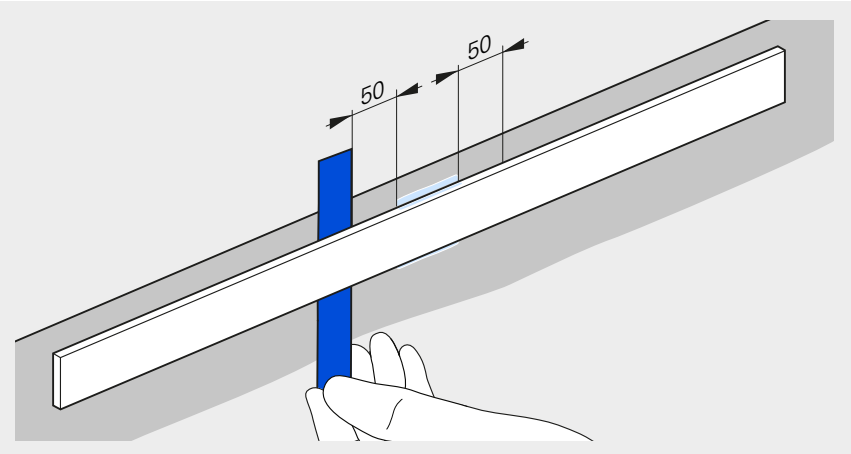


- Wipe the strip steel clean with a cloth soaked in solvent

> Note that residues of adhesive deposit on the strip steel.
>
> - Clean the strip steel every time you have pulled it through



- Apply some more solvent to the measuring standard
- Carefully reinsert the strip steel
- Continue detaching the adhesive bond until 50 mm from the fixed-point bond
- Let the solvent evaporate



⚠ CAUTION

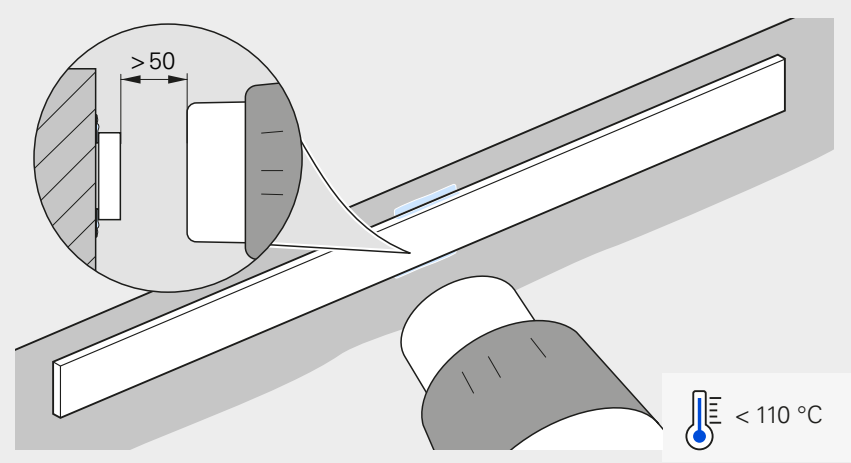
Risk of burns due to solvent deflagration

Deflagration may occur when heating solvent. This can cause burns to the skin.

- Before heating the measuring standard with the hot-air gun, make sure that the solvent has evaporated completely

To loosen the remaining fixed-point bond and the remaining adhesive tape by using the hot-air gun:

- Heat the fixed-point bond and adhesive tape
- Keep a distance of 50 mm between the hot-air gun and the surface of the measuring standard
- Pay attention to the measuring standard's maximum temperature of 110 °C
- Use a heated steel strip to cut through the fixed-point bond



NOTICE

Material damage due to high leverage forces

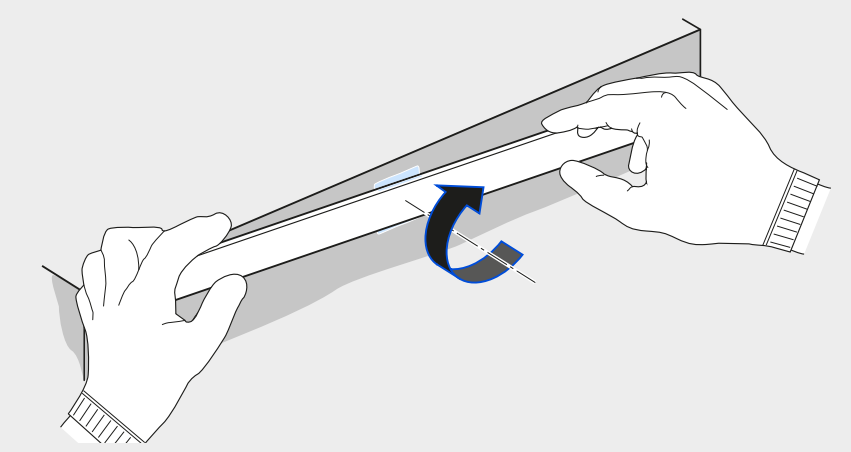
When you disassemble scales with lengths greater than 0.7 m, the greater deflection may lead to reduced rotation. The scale can break.

- Use the disassembly method for scales with lengths greater than 0.7 m

Further information: "Detaching linear scales longer than 0.7 m", Page 20

To detach the adhesive bond:

- Carefully rotate the scale about the fixed point as the centerline
- Maintain the temperature throughout the detachment process
- Ensure an even application of force
- Do not apply force to the extreme ends of the scale



NOTICE

Material damage if scale falls down

Scales with lengths greater than 0.7 m may fall off the mounting surface and get damaged during disassembly.

- With two persons, evenly apply pressure to the scale to distribute the force uniformly along the entire length of the scale

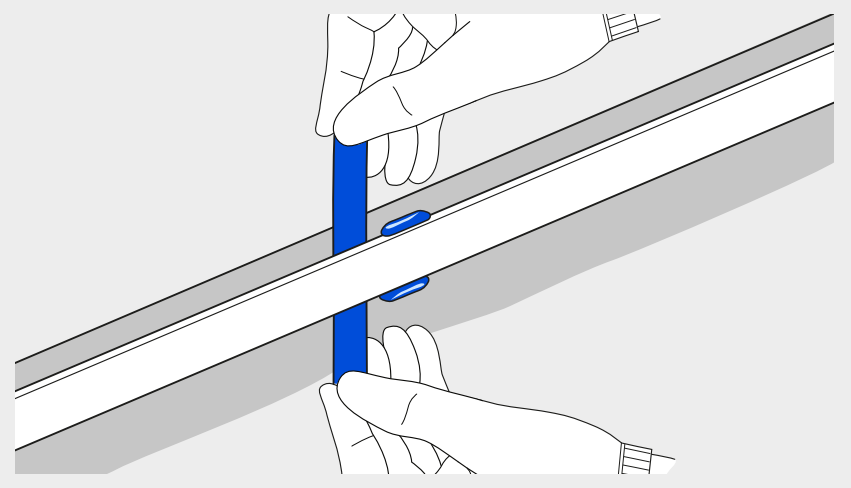
or

- Use something stable to prevent the scale from falling down

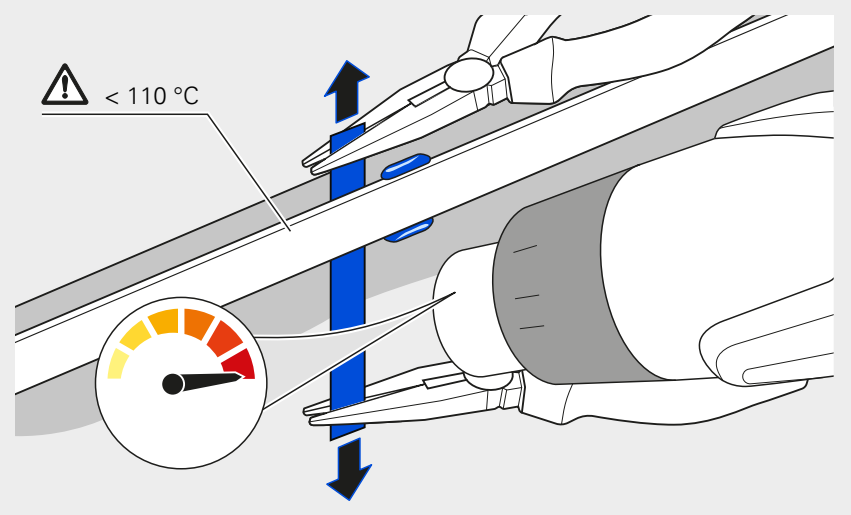
> The measuring standard is separated from the mounting surface.

Detaching linear scales longer than 0.7 m

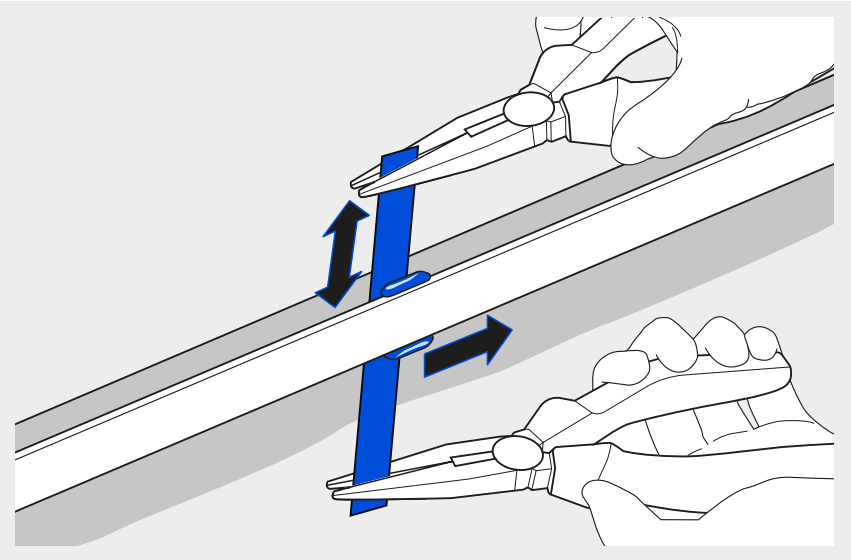
- Slide the strip steel under the scale until you reach the remaining adhesive bond



- Use pliers to hold the strip steel and keep it taut
- Set the hot-air gun to maximum heating temperature
- Heat the strip steel using the hot-air gun
- Keep a distance of 50 mm between the hot-air gun and the surface of the scale
- Pay attention to the scale's maximum temperature of 110 °C



- Pull the strip steel through the fixed-point bond in a slow sawing motion
- Reheat the strip steel between the individual passes



> The measuring standard is separated from the mounting surface.

3.4 Variant: Scale-tape carrier with adhesive tape

This chapter describes how to remove a measuring standard secured with a scale-tape carrier and adhesive tape.

⚠ CAUTION

Risk of injury due to sharp-edged aids

If you use sharp-edged aids, you may cut yourself. Sharp-edged aids are implements like strip steel or safety knives, for example.

- Wear protective gloves and safety goggles

⚠ CAUTION

Risk of injury due to fragile carrier material of the measuring standard

There is a risk of injury from splinters and sharp edges of the carrier material.

- Wear protective gloves and safety goggles
- Do not bend or deform the measuring standard excessively

⚠ CAUTION

Danger of burns due to hot parts

Use of a hot-air gun or a heating plate causes some parts of the devices and the treated components to become very hot. These hot parts may cause burns to the skin. They can also lead to the ignition of solvents.

- Wear protective gloves and safety goggles
- Do not touch hot parts of the hot-air gun or heating plate, and prevent them from coming into contact with solvents
- Do not touch hot components and surfaces, and prevent them from coming into contact with solvents
- Place the hot-air gun in a safe place to cool after use or let the heating plate cool down

⚠ CAUTION

Danger of chemical burns and poisoning due to solvents

Coming into contact with solvents or inhaling the vapors of solvents can cause chemical burns to the skin or eyes.

- Wear protective gloves and safety goggles
- Wear respiratory protection
- Keep the workplace well ventilated
- Follow the safety data sheets of the solvents used

NOTICE

Material damage due to hot surfaces

Excessive surface temperatures can damage or destroy the measuring standard.

- Avoid surface temperatures >110 °C
- Avoid spot-heating
- Keep the nozzle of the hot-air gun at least 50 mm away from the surface of the measuring standard
- Make sure the hot-air gun is set to an appropriate temperature
- Keep in mind the heat dissipation of the mounting surface

3.4.1 Materials and tools

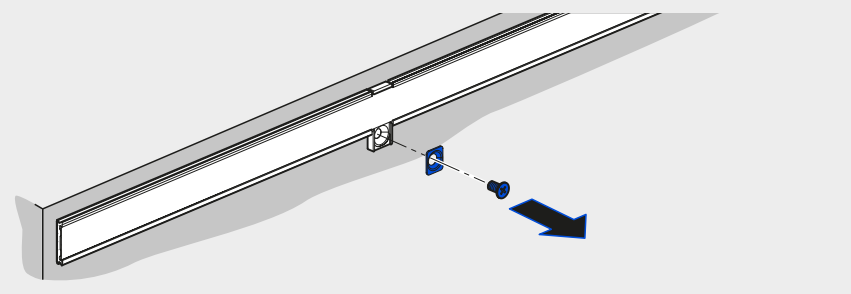
For this task, the following materials and tools are needed:

Included in delivery	To be provided separately
	■ Strip steel or metal foil with a thickness of 0.04 mm to 0.06 mm ■ Solvent (e.g., isopropyl alcohol) ■ Cleaning cloths: soft, lint-free, silicone-free, free from parting agents

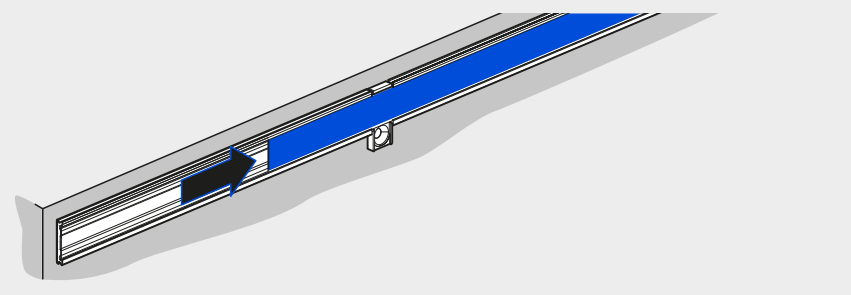
3.4.2 Detaching a measuring standard secured with adhesive tape

Removing the clamping element

- ▶ Remove the screws from the clamping element
- ▶ Remove the the clamping element

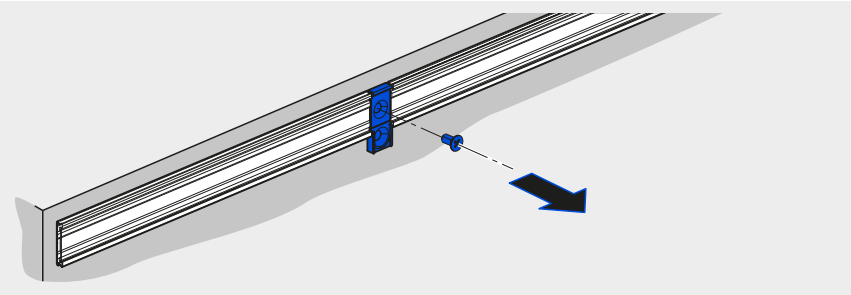


- ▶ Push the scale tape out of the scale tape carrier



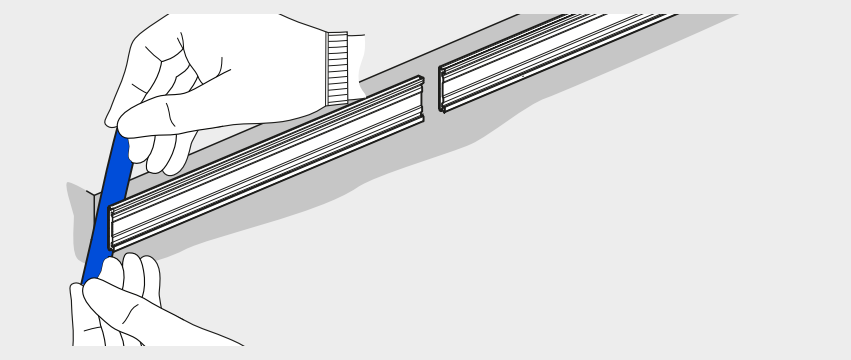
To remove the scale tape carrier:

- ▶ Remove the screws from the scale tape carrier
- ▶ Take off the scale tape carrier



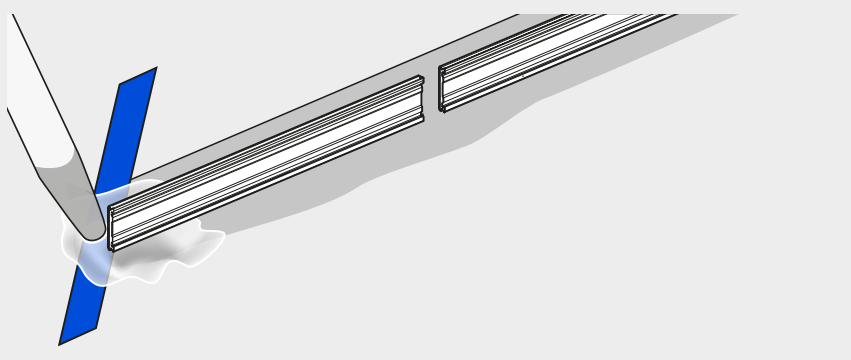
To lift the scale tape carrier:

- ▶ At a corner at the beginning of the scale tape carrier, insert the strip steel between the bottom of the scale tape carrier and the mounting surface at a slight angle to the longitudinal direction



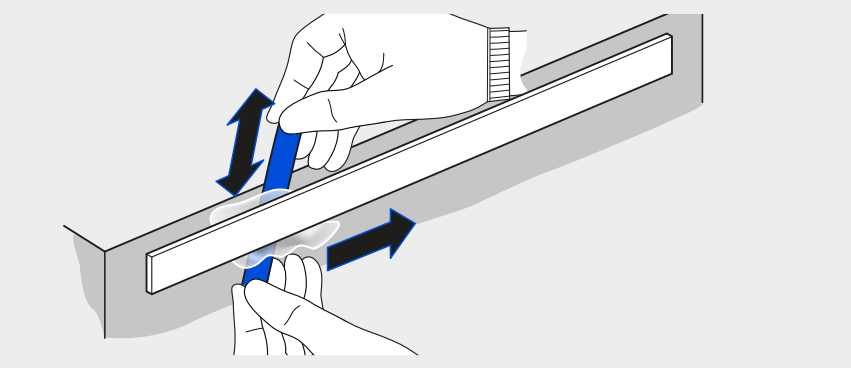
To soak the adhesive tape:

- Apply solvent to the sides of the scale-tape carrier until the gap between the scale-tape carrier and the mounting surface is completely filled

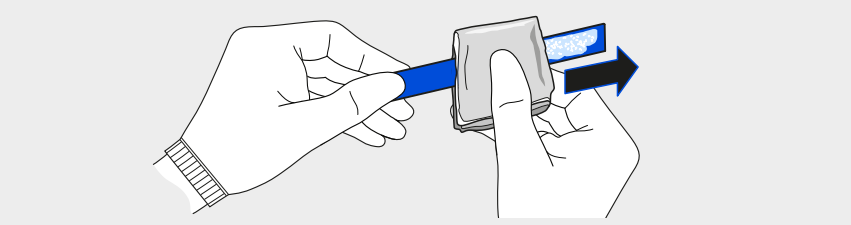


To cut through the adhesive tape:

- Pull the steel strip under the scale-tape carrier in a sawing motion from one side to the other

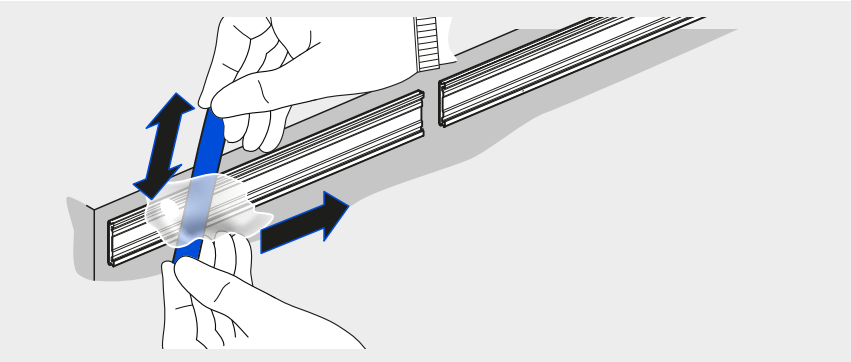


- Wipe the strip steel clean with a cloth soaked in solvent



> Note that residues of adhesive deposit on the strip steel.
>
> - Clean the strip steel every time you have pulled it through

- Apply some more solvent to the scale tape carrier
- Carefully reinsert the strip steel
- Continue detaching the adhesive bond as described above



> The measuring standard has been removed from the mounting surface.

4 Cleaning and reassembly

This chapter describes how you can clean and reassemble the mounting surface, the measuring standard or the scale tape carrier after disassembly.

4.1 Notes about cleaning

⚠ CAUTION

Risk of injury due to sharp-edged aids

If you use sharp-edged aids, you may cut yourself. Sharp-edged aids are implements like strip steel or safety knives, for example.

- Wear protective gloves and safety goggles

⚠ CAUTION

Danger of chemical burns and poisoning due to solvents

Coming into contact with solvents or inhaling the vapors of solvents can cause chemical burns to the skin or eyes.

- Wear protective gloves and safety goggles
- Wear respiratory protection
- Keep the workplace well ventilated
- Follow the safety data sheets of the solvents used

NOTICE

Material damage caused by solvents

Use of solvents can cause damage to the measuring standard, the mounting surface or the scale tape carrier.

- Check the solvent resistance of the measuring standard, mounting surface and scale tape carrier

NOTICE

Property damage due to inappropriate tools!

Using inappropriate tools for mounting or removal of the encoder may cause damage to the encoder.

- Do not use hammers
- Do not use pointed or sharp-edged tools

ⓘ Ensure that gloves, cleaning cloths and solvents are free from parting agents.

4.2 Materials and tools

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

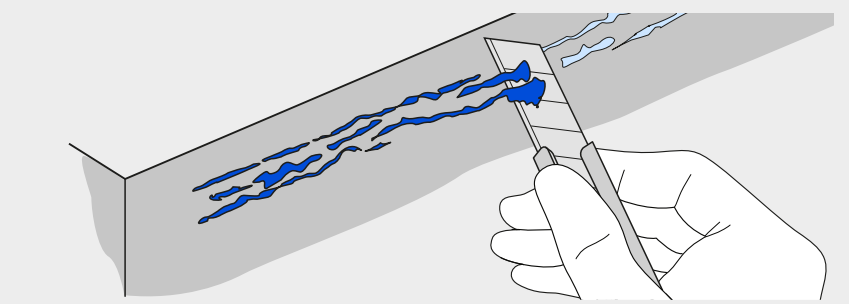
Included in delivery	To be provided separately
	■ Safety knife with thin blade or plastic scraper ■ Soft cloths or sheets of paper ■ Solvent (e.g., isopropyl alcohol) ■ Cleaning cloths: soft, lint-free, silicone-free, free from parting agents ■ Whetstone or similar

4.3 Cleaning the mounting surface

After you remove the measuring standard or the scale-tape carrier, stubborn residues of the adhesive tape and fixed-point bond will remain on the mounting surface.

To remove these residues:

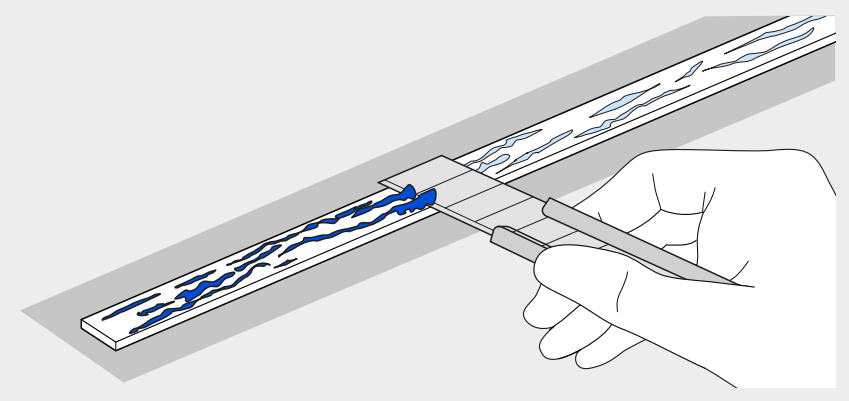
- ▶ Loosen the residues of the fixed-point bond and adhesive tape with solvent
- ▶ Remove the loosened residues of the adhesive and adhesive tape with a safety knife



4.4 Cleaning the measuring standard or scale-tape carrier

- ▶ Place the removed measuring standard or removed scale tape carrier face down on a flat, clean surface

> To avoid damage to the measuring standard or scale-tape carrier, RSF Elektronik recommends placing it on soft cloths. As an alternative, you can also use sheets of paper.



- ▶ Use a safety knife to remove the residues of the adhesive tape and fixed-point bond

4.5 Removing remaining contamination

Please note that condensation on the components needs to air before you attach new adhesive tapes or adhesives.

- Let the components air
- If necessary, dry the components and mounting surface

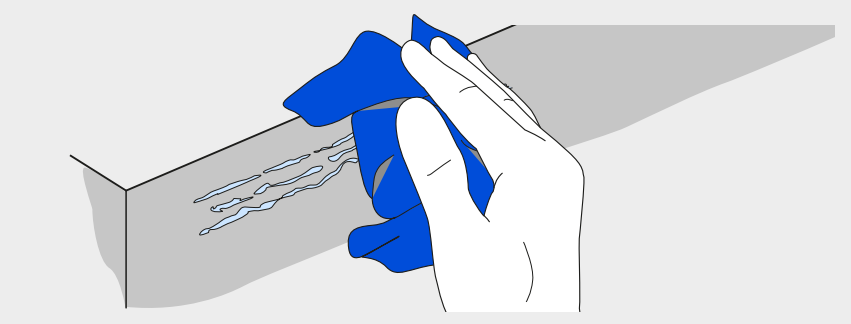
Avoid residues of solvent or lints from the cleaning cloths.

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

To remove any remaining contamination from the mounting surface, measuring standard or scale tape carrier:

- Soak cloths in solvent

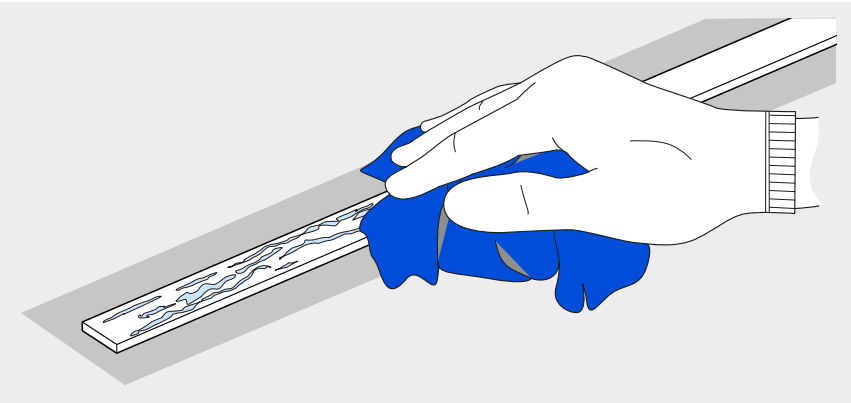
With solvents such as acetone, ethanol or methyl ethyl ketone, you can achieve excellent results.



- Wipe the mounting surface, measuring standard or scale tape carrier with soaked cloths

The cloths take up loosened residues of the adhesive tape and fixed-point bond. If you then wipe the cloths over the mounting surface, measuring standard or scale tape carrier again, you will get smears.

- Change the cloth after one or two wipes, and use a new cloth soaked in solvent



4.6 Final steps

Check the cleaned mounting surface. If you detect small damage such as scratches, you need to rework the mounting surface before a measuring standard is mounted again with adhesive.

- Remove any burrs with a whetstone or similar

If burrs were removed mechanically, these spots must be cleaned and dried again.

4.7 Reassembly

To reassemble the measuring standard, please refer to your RSF Elektronik contact partner or use the contact form under **www.rsf.at/en/company/contact/**

5 Disposal

This chapter contains information and environmental protection specifications for the disposal of the product.

NOTICE

Environmental damage caused by incorrect disposal of the product!

Incorrect disposal of the product can cause environmental damage.

- Do not dispose of electrical waste and electronic components in domestic waste
- Forward the product to recycling in accordance with the applicable local disposal regulations

- If you have any questions about the disposal of the product, please contact an RSF Elektronik service agency

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