

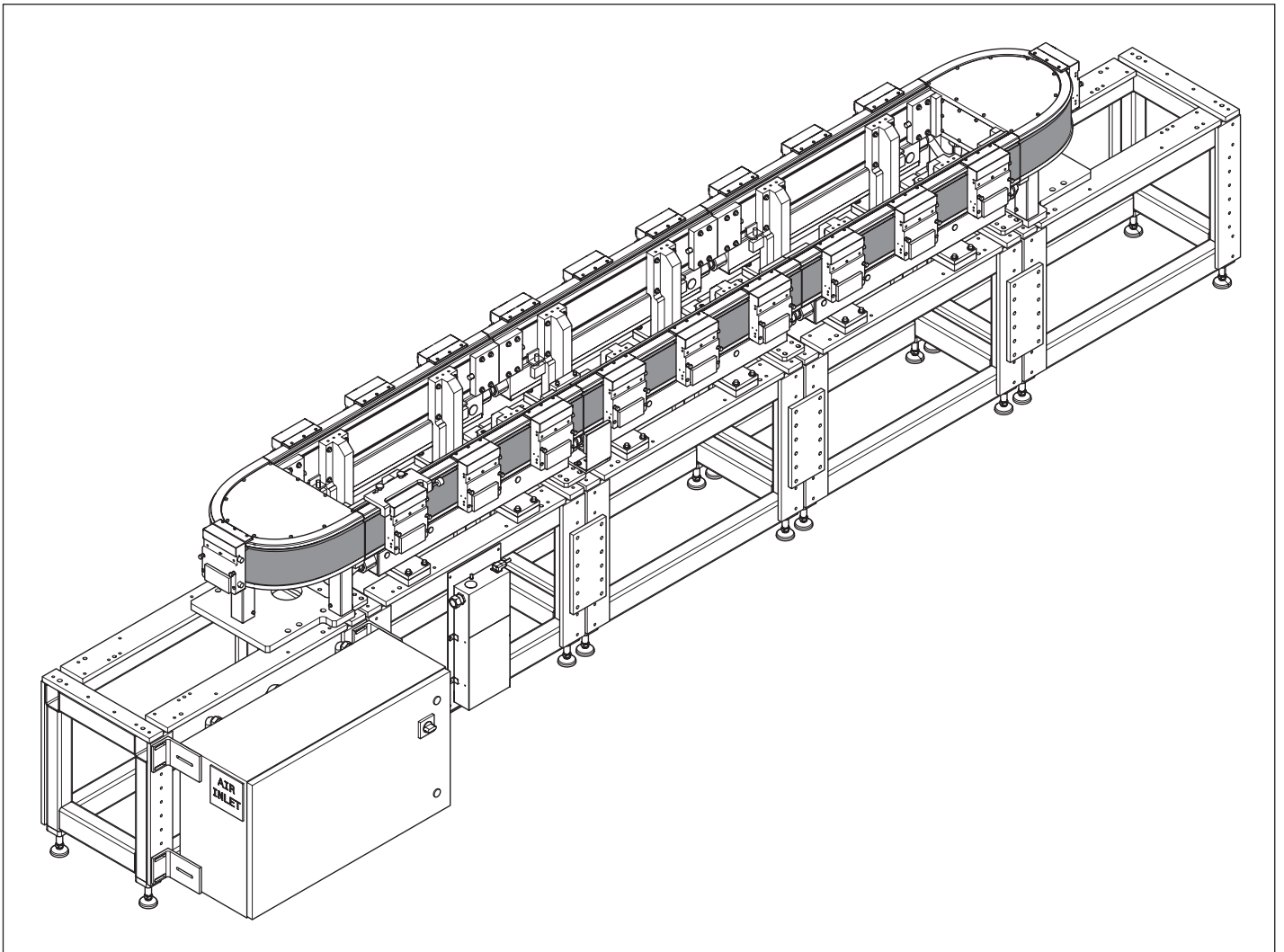
ActiveMover

Linear motor system

Assembly instructions
3 842 559 521/2018-07

Replaces: 2018-06
ENGLISH

ENGLISH



The information in this manual is for product description purposes only. Any information on how to use the product is only an example and a recommendation. Catalog information is not binding. This information does not release the user from their duty to exercise their own judgment and conduct their own tests. Our products are subject to natural wear and aging.

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The cover depicts a sample configuration. The actual product may vary.

The original assembly instructions are in German.

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1 About this document

1.1 Validity

This document applies to the following products:

- ActiveMover linear motor system

It is intended for fitters, operators, service engineers and system end users. It contains important information relating to the safe and proper assembly, transportation, start-up, operation, use, maintenance and disassembly of the product, and on how to correct simple malfunctions.

- ▶ Read this entire document before working with the product, specifically Section 2 “Safety instructions” and Section 3 “General information on property and product damage”.

1.2 Required and supplementary documentation




- ▶ Only start up the product if the document marked with the book symbol  is available and you have understood and followed the instructions in it.

Table 1: Required and supplementary documentation

Title	Document number	Document type
 Safety instructions for ActiveMover components	3 842 557 189	
AMpro manual		Download from www.boschrexroth.com/mediadirectory
 Instructing employees on safety	3 842 527 147	

1.3 Presentation of information

Standardized safety instructions, symbols, terms and abbreviations are used so that you can use this document to work quickly and safely with your product. These are explained in the following sections to help you understand them better.

1.3.1 Safety instructions




This document contains safety instructions in Section 2.6 “Product-specific safety instructions” and Section 3 “General information on property and product damage”, as well as before any series of actions or any required action which involves a risk of personal injury or property damage. Be sure to take all safety precautions.

Safety instructions are set out as follows:

 SIGNAL WORD
<p>Type and source of hazard</p> <p>Consequences of noncompliance.</p> <ul style="list-style-type: none"> ▶ Necessary precaution. ▶ Etc.

- **Warning sign:** points out the hazard
- **Signal word:** indicates the severity of the hazard
- **Type and source of hazard:** indicates the type and source of the hazard
- **Consequences:** describes the consequences of noncompliance
- **Prevention:** states how the hazard can be avoided


Table 2: Hazard categories per ANSI Z535.6-2006

Warning sign, signal word	Meaning
 DANGER	Indicates a hazardous situation that will result in death or serious injury if not avoided.
 WARNING	Indicates a hazardous situation that may result in death or serious injury if not avoided.
 CAUTION	Indicates a hazardous situation that may result in minor to moderate injury if not avoided.
NOTICE	Property damage: The product or the surrounding area could be damaged.

1.3.2 Symbols

The following symbols indicate important information that is not related to safety but makes the document easier to understand.

Table 3: Meaning of symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/or operated as designed.
▶	Single, independent action
1.	Numbered steps: The numbers indicate that the steps must be performed in order.
2.	
3.	

1.3.3 Terms

This document uses the following terms:

Table 4: Terms

Term	Meaning
ActiveMover	ActiveMover linear motor system
IR	Infrared
WT	Workpiece pallet
UPS	Uninterruptible power supply

2 Safety instructions

2.1 About this section

This product has been manufactured to be state-of-the-art. Nevertheless, there is a risk of personal injury and property damage if you do not read this section and follow the safety instructions in this document.

- ▶ Read this document carefully and completely before you start working with the product.
- ▶ Keep it accessible to all users at all times.
- ▶ Always include it when giving the product to a third party.

2.2 Intended use

This product is an incomplete machine under the Machinery Directive (2006/42/EC). It is designed for the following uses:

- Transporting products on specific workpiece pallets
- Positioning products on specific workpiece pallets
- Max. load/section load: See “Technical data” on page 169.
- For the ambient conditions, see “Technical data” on page 169.

The product is strictly intended for commercial use and not for private use. Intended use also means that you have read this document completely and fully understood it, specifically Section 2 “Safety instructions”.

2.3 Improper use

Any use other than that described as intended use is considered improper. Bosch Rexroth AG is not liable for any loss or damage resulting from improper use. The user alone bears any risks associated with improper use.

The following foreseeable misuses also constitute improper use:

- Transporting goods other than those specified
- Operating the product without a guard
- Using the product in accumulation mode
- Transporting people on the product or transported material
- People climbing onto the product – the product is not designed to be climbed on
- Private use

2.4 Personnel qualifications

The activities described in this document require basic knowledge of mechanical and electrical principles, as well as knowledge of the appropriate technical terms. Additional knowledge of how to use lifting gear and the appropriate slings is required for transporting and handling the product. To ensure safe use, these activities should only be performed by a specialist or a person under the direction and supervision of a specialist.

“Specialist” refers to someone who can recognize possible hazards and take the appropriate safety measures given his/her technical training, knowledge and experience, and knowledge of relevant regulations. A specialist must follow with the relevant rules specific to his/her occupation and have the necessary expertise.



Bosch Rexroth offers training support in specific areas. You can find an overview of the training content online at: <http://www.boschrexroth.de/didactic>.

2.5 General safety instructions

- Observe applicable accident prevention and environmental protection regulations.
- Observe the safety rules and regulations of the country in which the product is being used.
- Only use Rexroth products that are in proper working order.
- Observe all the notices on the product.
- Persons who assemble, operate, disassemble or maintain Rexroth products should not be under the influence of alcohol, drugs or medication that may affect their ability to respond.
- Only use original accessories and spare parts by Rexroth to prevent putting others at risk due to unsuitable spare parts.
- Observe the technical data and ambient conditions specified in the product documentation.
- Only start up the product if it has been determined that the end product (e.g. a machine or system) into which the Rexroth products have been installed complies with country-specific regulations, safety regulations and application standards.

2.6 Product-specific safety instructions

DANGER

Death or serious injury from improper connection/wiring of multiple safety circuits!

Systems with multiple safety circuits in which the section modules have been improperly connected to power pose a risk of death or serious injury.

- ▶ Perform a risk assessment per DIN EN ISO 12100 before starting up a conveyor system for the first time or returning one to service.
- ▶ The section/curve modules of different safety circuits should not be connected to the same power supply (PCBs can be connected to the same logic power supply).

Death or serious injury from electric shock!



In areas that are marked with this hazard symbol, there is a risk of death or serious injury and burns from electric shock.

- ▶ Observe all NFPA 79 (NA) and EN 60204-1 (EU) requirements for safely working on electrical systems, as well as all national and international regulations applicable at the place of use.
- ▶ Wear personal protective equipment that is appropriate for the place of use and use suitable tools.

Death or serious injury from residual energy!



After the power supply to the section and curve module motors has been shut off, there is still a risk of death or serious injury and burns from energy stored in the capacitors.

- ▶ After the power supply has been shut off, access should remain blocked by an interlocking guard with locking mechanism to allow the energy in the capacitors to discharge.

CAUTION

Uninterruptible power supply!

Voltage may be present even with the main switch off!



Coming into contact with electrical components can result in injury and burns from electric shock.

! CAUTION

Strong magnetic field



Risk of injury from strong magnetic fields in areas marked with this hazard symbol.



Workpiece pallets generate a strong magnetic field when they are not mounted to the linear motor system.

- This strong magnetic field can be harmful to persons with pacemakers and other medical implants.

- The magnetic field of the ActiveMover linear motor system can cause magnetic materials to move, which may result in flying objects or crushing/dismemberment.

- Electronic equipment and magnetic data carriers can be affected by the magnetic field.

- ▶ Persons with pacemakers or other medical implants should maintain a min. distance of 30 cm between the implant and the workpiece pallet.
- ▶ Persons with pacemakers or other medical implants should not perform maintenance on or service the product.
- ▶ Keep metallic objects away from the workpiece pallets and the section/curve modules.
- ▶ When workpiece pallets are unmounted, keep their protection plates on them. For mounting instructions, see Page 77.
- ▶ Also follow the safety instructions in Section “General safety instructions for magnets” on page 33.

NOTICE

What to do in case of an accident involving permanent magnets

Whenever you are working with permanent magnets, have the following emergency tools on hand to free trapped body parts (e.g. finger, hand, arm, etc.) in case of an accident:

- Hammer made of nonmagnetic material (e.g. brass)
- Min. 2 wedges with a wedge angle of approx. 10 - 15° made of nonmagnetic material, such as brass, hardwood, etc. for driving into the gap.

In case of an accident:

- ▶ Remain calm.
- ▶ If the machine is live, disconnect it from power (emergency off switch).
- ▶ Administer FIRST AID or call in appropriate aid (e.g. emergency physician).
- ▶ Use the emergency tools to separate the contacting parts to free the trapped body part (e.g. finger, hand, foot, etc.).
To do this, use the hammer to drive the wedges into the gap between the parts to free the trapped body part.

- General**

 - Do not attempt to alter or modify the product.
 - Never improperly expose the product to mechanical loads. Never use the product as a handhold or step. Do not place any objects on the product.
 - Always secure the product from tipping over.
- During transport**

 - Follow the transport instructions on the packaging.
- During assembly**

 - Inspect the product for obvious shipping damage.
 - Lay cables and lines so they cannot be damaged and no one can trip over them.
 - Make sure the system component you are working on is depressurized and dead before assembling the product or inserting or removing plugs.
 - Secure the system component against restarting.
 - Before start-up, make sure all plug-in connector seals and caps are correctly installed and undamaged in order to prevent fluids and foreign material from getting into the product.
- When working on the electrical system**

 - Follow the 5 safety rules:
 - Disconnect from power.
 - Secure against restarting.
 - Verify the system is dead.
 - Ground and short-circuit the system.
 - Cover or shield adjacent live parts.
- During start-up**

 - Allow the product to acclimatize for a few hours prior to start-up in order to prevent condensation from forming in the housing.
 - Make sure all electrical connections are either being used or are capped.
 - Review the safety requirements in DIN EN 619.
 - Only start up a product that has been fully installed.
 - Make sure all safety equipment belonging to the product is present, has been properly installed and is fully functional. Do not move, bypass or disable any safety equipment.
 - Do not reach into moving parts.
 - Check the product for malfunctions.
- During operation**

 - Make sure only authorized personnel perform the following tasks as part of the intended use of the product:
 - Starting or operating the system, or interfering with its normal operation
 - Operating component or part adjusters
 - Only allow persons in the immediate vicinity of the product during operation if they are authorized by the operator. This also applies while the product is idle.
 - Make sure:
 - There are no obstacles preventing access to the EMERGENCY STOP controls.
 - All delivery points, workstations and passages are kept clear.
 - Do not use the EMERGENCY STOP controls for routine stopping/shutdown.
 - Regularly check the EMERGENCY STOP controls to ensure they are functioning properly.
 - After an EMERGENCY STOP, or in the event of a fault or other irregularity, turn the product off and secure it against restarting.
 - Do not reach into moving parts.
 - An idle system is not necessarily safe, as stored energy can be released unintentionally or through improper maintenance procedures.
- EMERGENCY STOP, malfunction**

 - After an EMERGENCY STOP or a malfunction, only restart the system when you have established and rectified the cause of the fault.
- During maintenance and servicing**

 - Make sure access to maintenance and inspection points is kept unobstructed.

- Perform the prescribed maintenance at the intervals prescribed in Section 10.3 “Maintenance”.
- Make sure no cables, connectors or components are disconnected while the system is pressurized and powered. Secure the system against restarting.
- Dispose of the product in accordance with the regulations in your country.

During disposal

2.7 Personal protective equipment

- Wear appropriate protective clothing when handling the product (e.g. safety shoes, close-fitting clothing, hair net for long, loose hair).

As the system owner or operator, you are personally responsible for ensuring the use of appropriate protective equipment when the product is being used.

All pieces of personal protective equipment should be intact.

2.8 Owner responsibilities

- Perform a risk assessment per DIN EN ISO 12100 before starting up a conveyor system for the first time or returning one to service.
- Before initial start-up, make sure there are no protruding or sharp-edged parts that may be a hazard to personnel working or moving in the area.
- Instruct operating personnel on safety before initial start-up or return to service, and then at regular intervals.

3 General information on property and product damage

The warranty only applies to the product as delivered.

- The warranty is void in the event of improper installation, start-up and operation, as well as improper use and/or improper handling.
- **During cleaning** Cleaning personnel should be instructed on the potential hazards of the system before starting work.
- Avoid letting cleaning agents get into the system.
- Never use solvents or aggressive cleaning agents.
- Do not use a pressure washer for cleaning.

4 Scope of delivery

The scope of delivery includes the following:

- Individual components of the ActiveMover linear motor system per the customer's order

4.1 Condition on delivery

- Unassembled

5 About this product

5.1 Specifications

5.1.1 Use of ActiveMover linear motor system

- Short-cycle transport of products on specific workpiece pallets
- Short-cycle positioning of products on specific workpiece pallets

5.2 Product description

- A:** Base frame
3 842 559 450
- B:** Base frame
3 842 559 451
- C:** Section module connecting kit
3 842 559 452
- D:** Curve module connecting kit
3 842 559 453
- E:** Fixing plate (2x)
3 842 559 454
- F:** Fixing plate
3 842 559 455
- G:** Section module
3 842 559 426
- H:** Module holder (2x)
3 842 559 429
- I:** Curve module
3 842 559 430
- J:** Workpiece pallet
 - 2 magnets **3 842 559 433**
 - 3 magnets **3 842 559 434**
- K:** IR reading head fastening parts kit
3 842 559 440
- L:** IR reading head
3 842 559 441
- M:** IR data carrier
3 842 559 447
- N:** Power supply
3 842 559 435
- O:** Control cabinet
3 842 559 459 and
3 842 559 462
- P:** Connecting kit
3 842 559 438
- Q:** Connecting kit
3 842 559 449
- R:** Interface modules
3 842 559 444,
3 842 559 445,
3 842 559 446
- S:** Remover tool
3 842 559 439
- T:** Calibration set
3 842 559 456

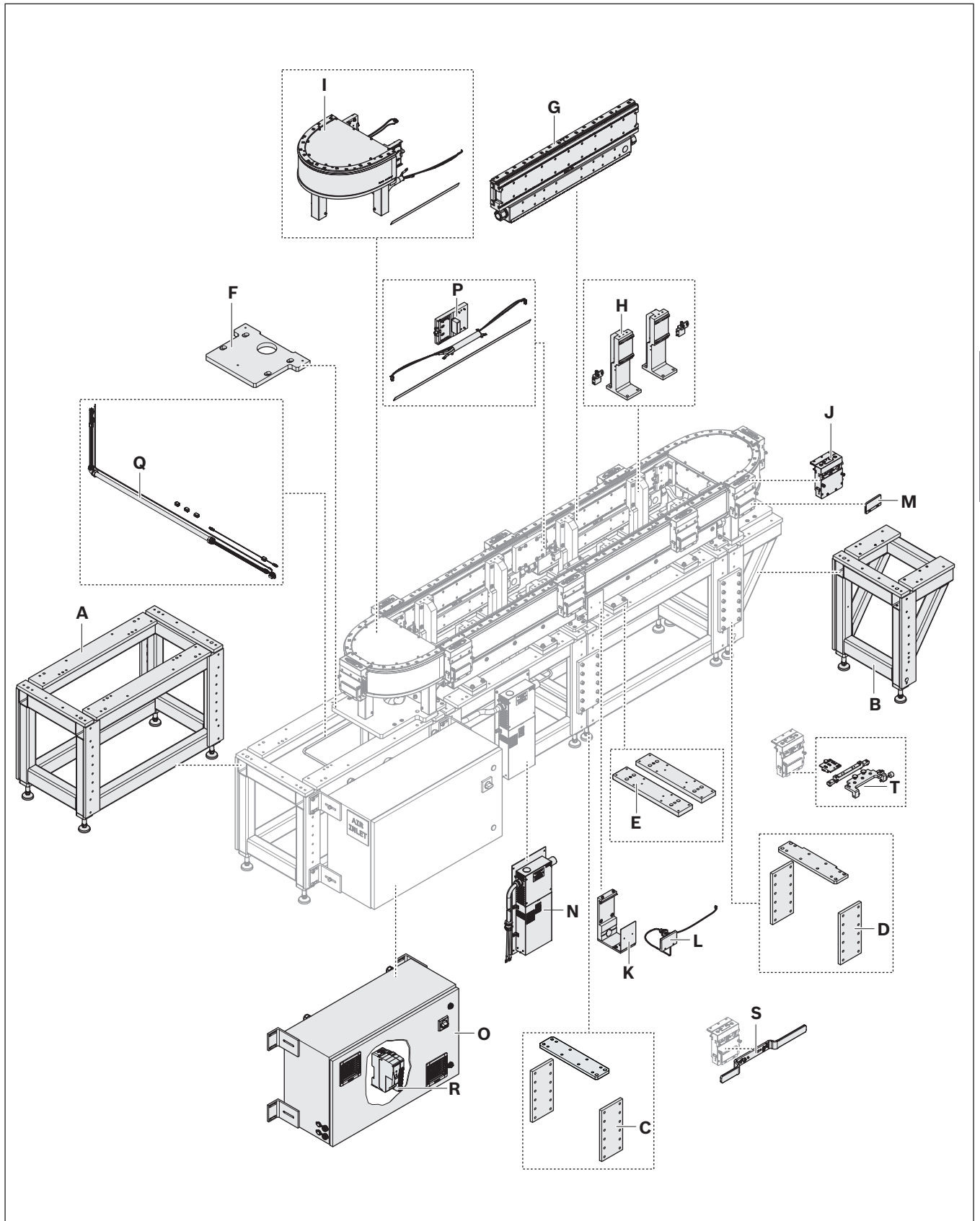


Fig. 1: ActiveMover linear motor system components

557 186-01

5.2.1 Base frame

- A:** Base frame (for section and curve modules)
3 842 559 450
- B:** Base frame (short, for curve module only)
3 842 559 451
- C:** Hinged foot

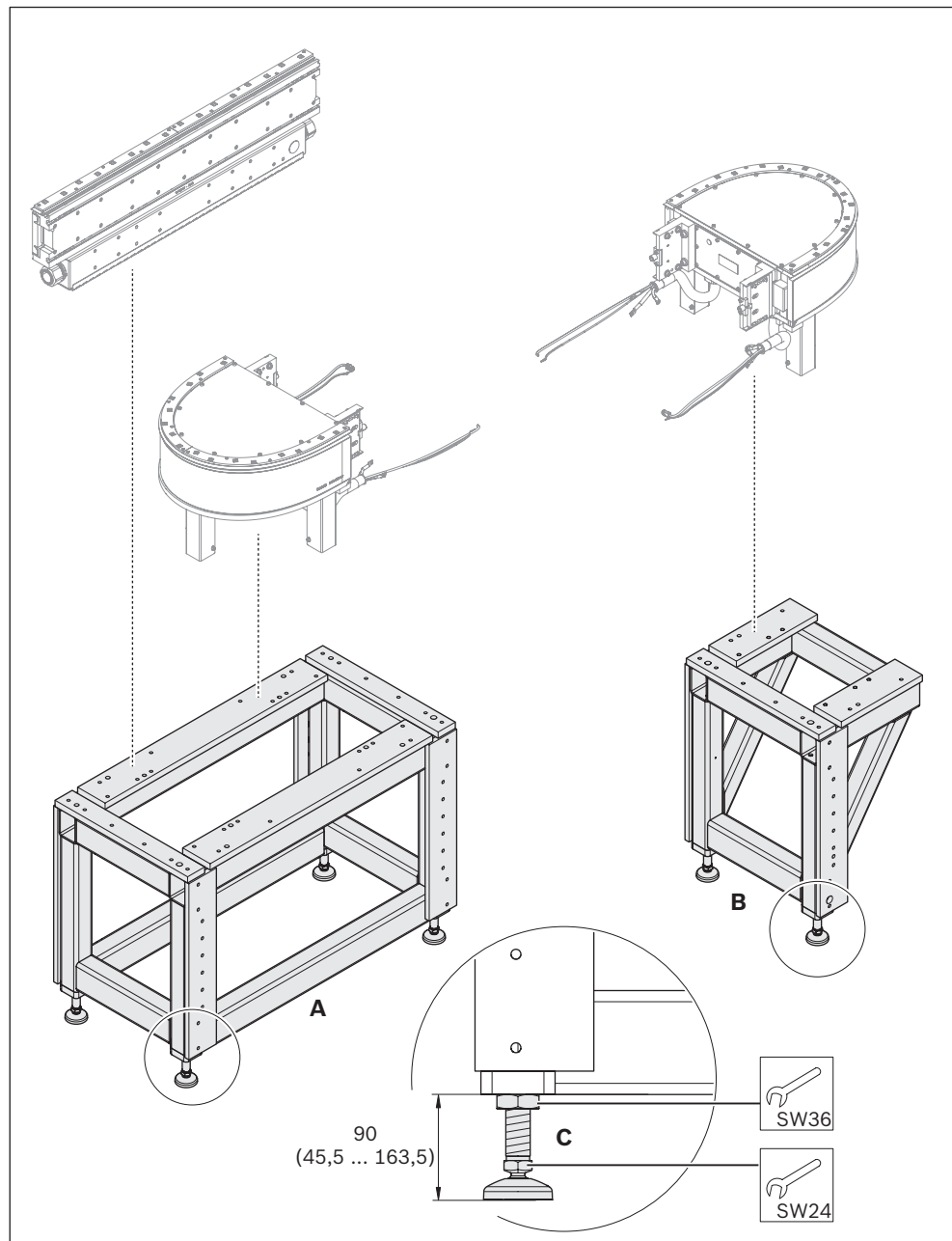


Fig. 2: Base frame for section and curve modules

557 186-02

Connecting kit for
connecting two base frames
3 842 559 450 with section
modules

5.2.2 Section module connecting kit 3 842 559 452

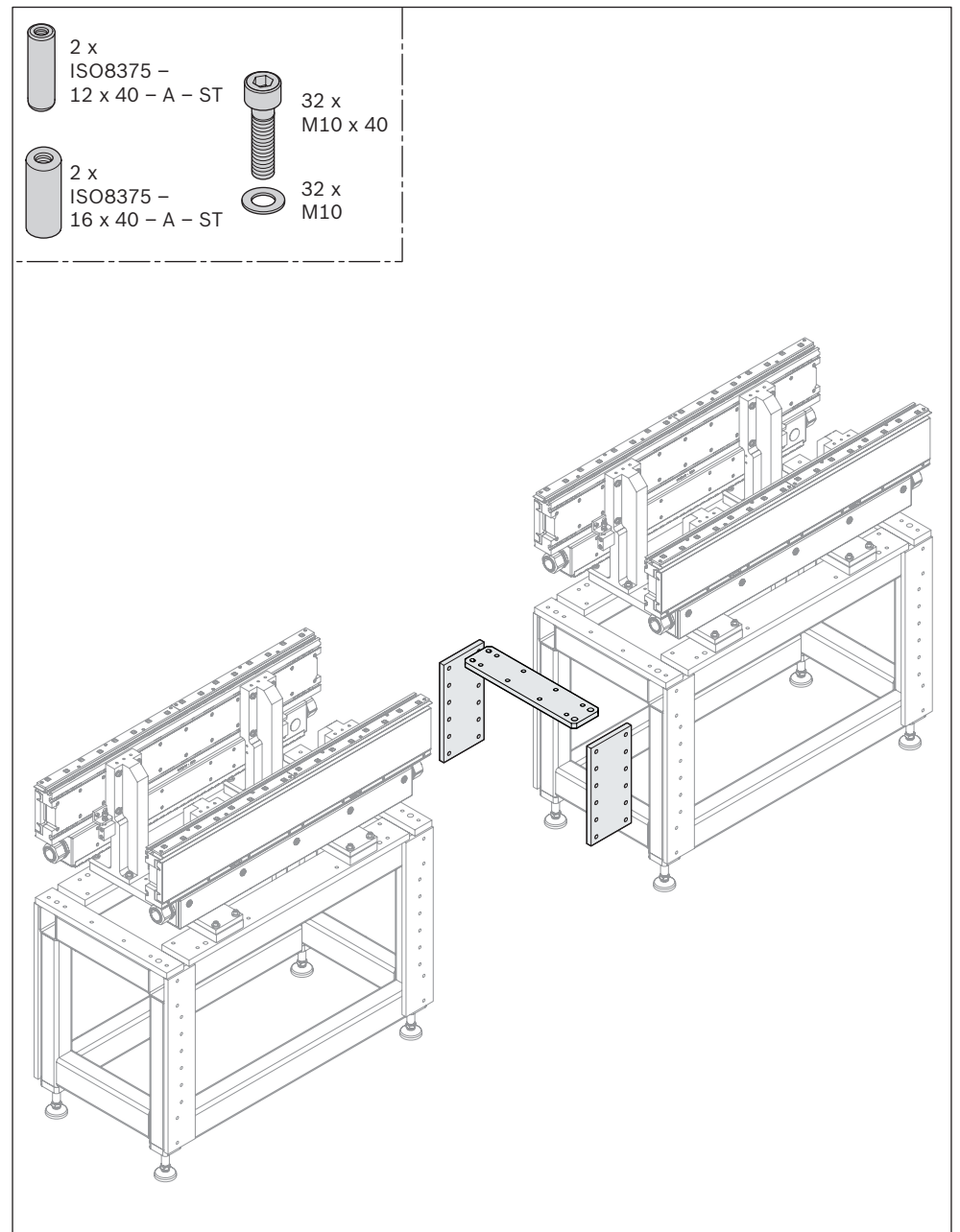


Fig. 3: Connecting kit 3 842 559 452

557 186-03

Connecting kit for connecting a base frame **3 842 559 450** with a section module with a base frame **3 842 559 450** or **3 842 559 451** with a curve module

5.2.3 Curve module connecting kit 3 842 559 453

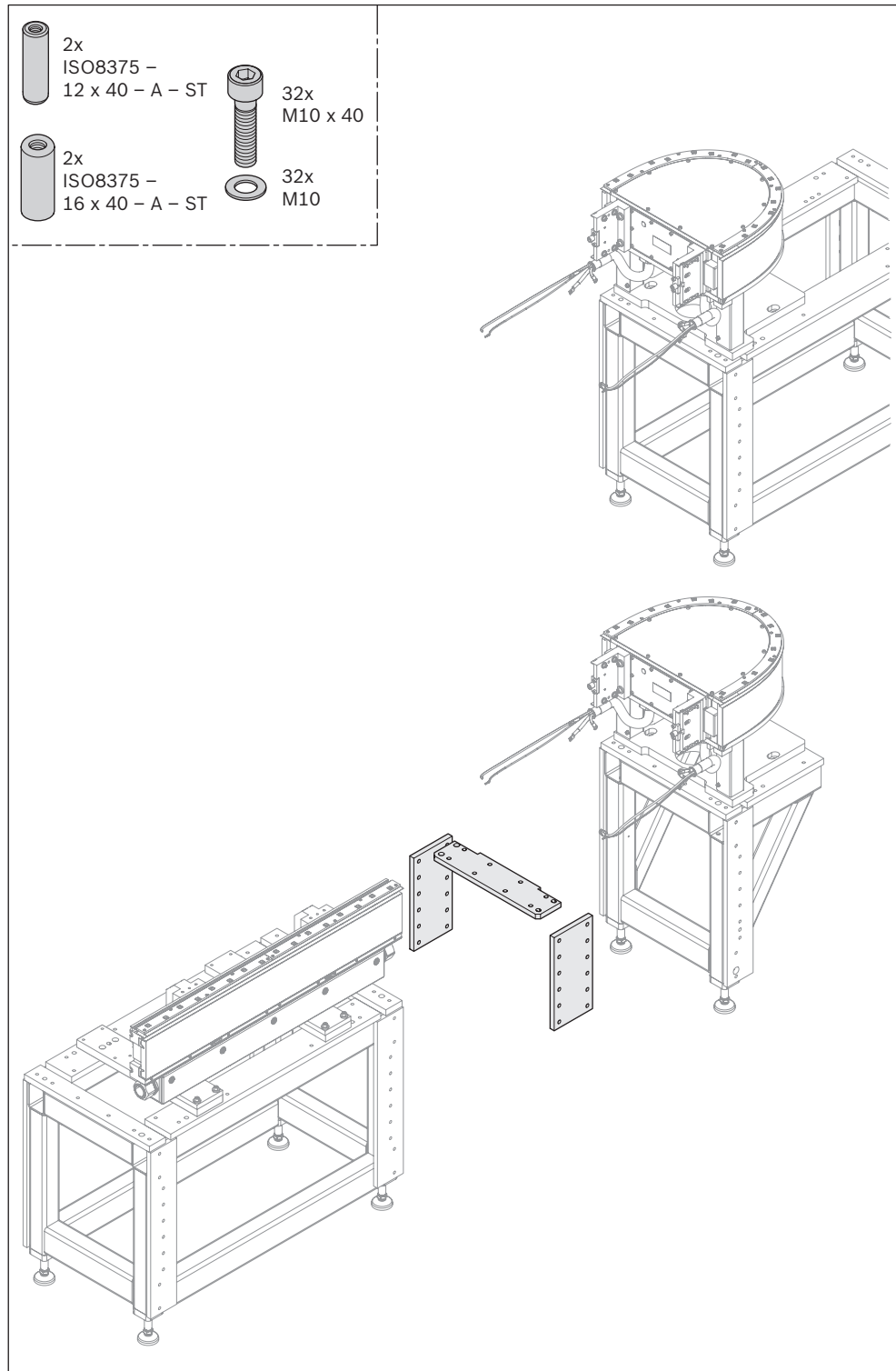


Fig. 4: Connecting kit 3 842 559 453

557 186-04

Fixing plates for mounting two module holders 3 842 559 429 on a base frame 3 842 559 450

5.2.4 Fixing plates 3 842 559 454

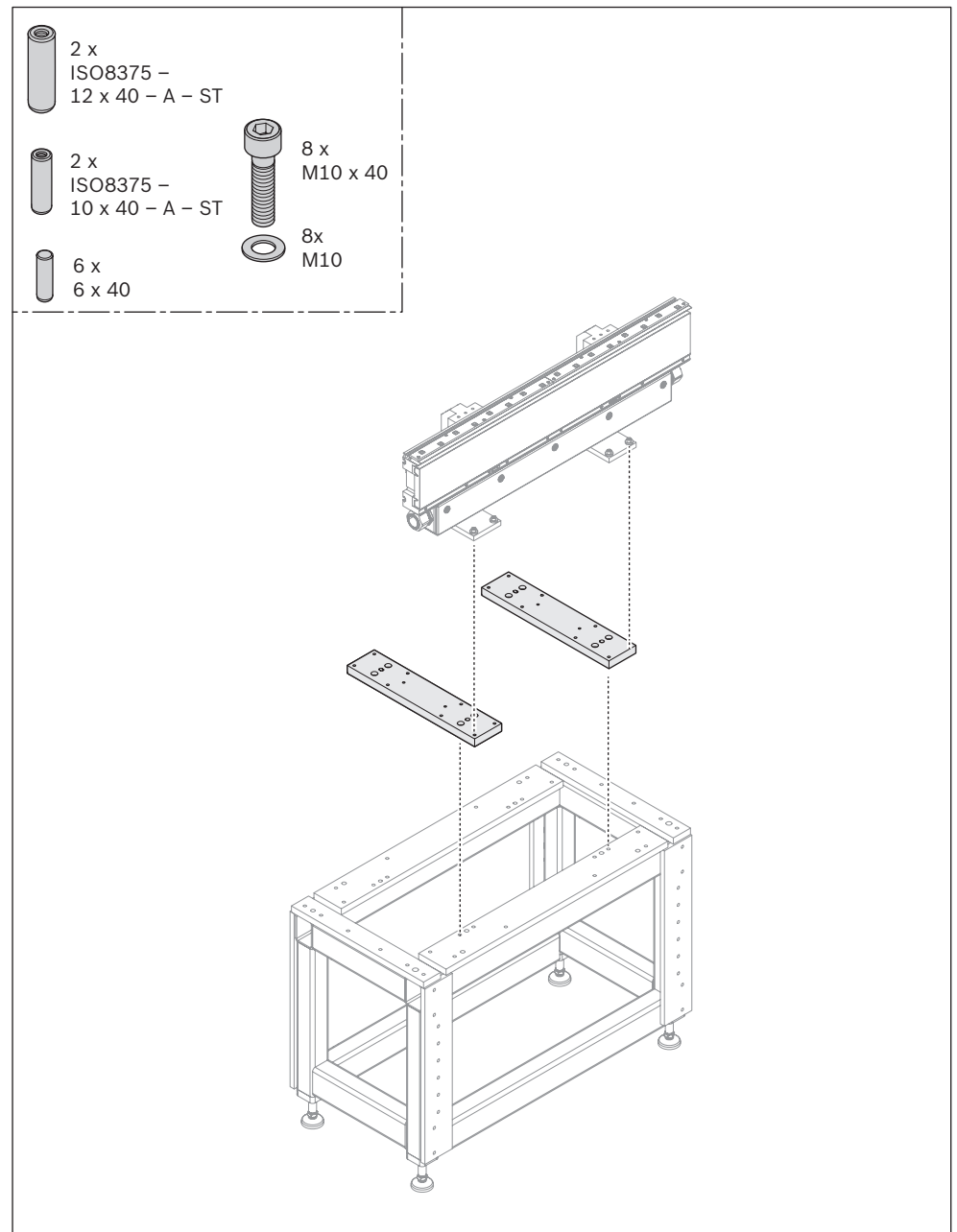


Fig. 5: Connecting kit 3 842 559 454

557 186-05

ENGLISH

Fixing plate for mounting a curve module **3 842 559 430** on a base frame **3 842 559 450** or **3 842 559 451**

- A:** Fixing plate
- B:** Cable passage

5.2.5 Fixing plate 3 842 559 455

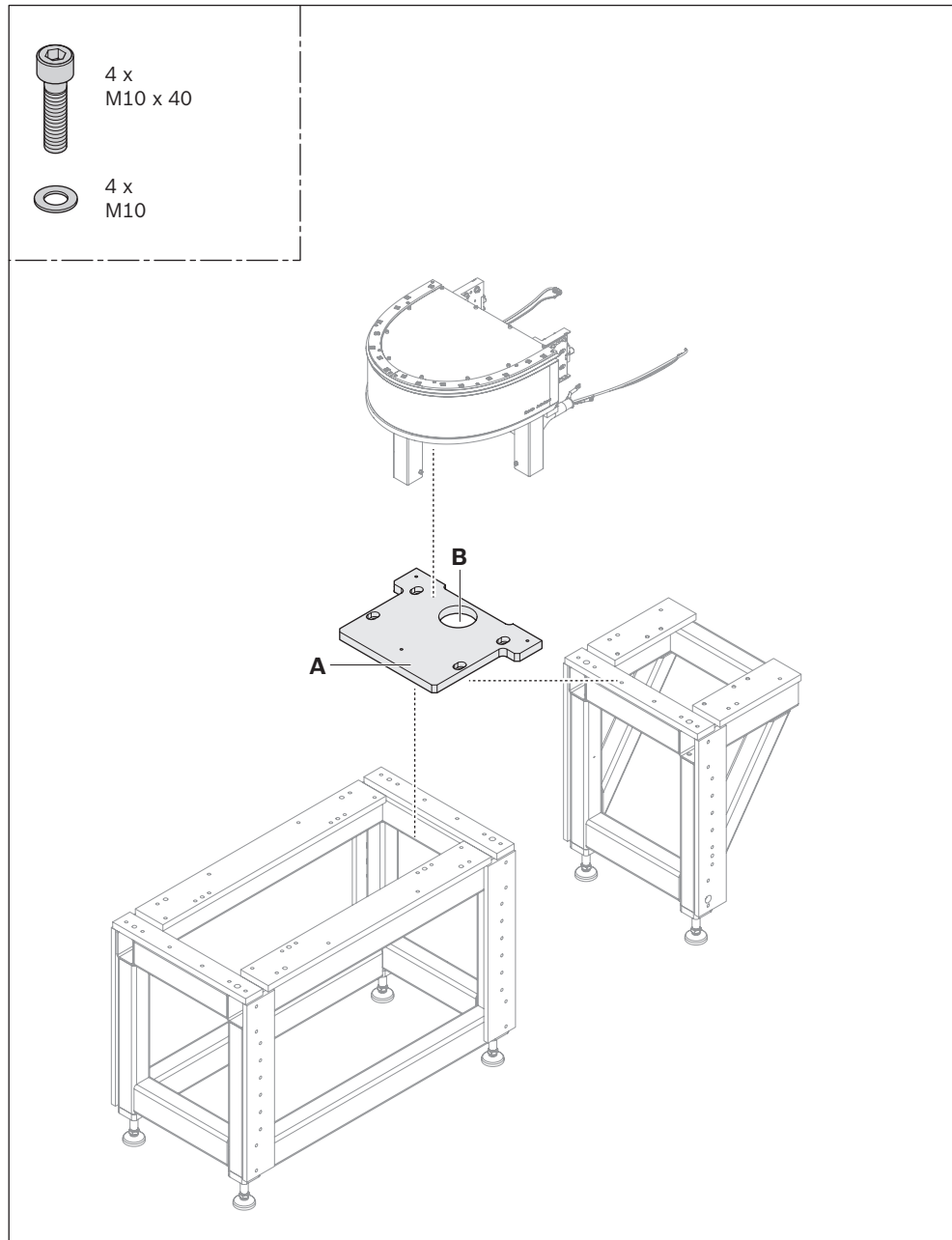


Fig. 6: Fixing plate 3 842 559 455

557 186-06

5.2.6 Module holder 3 842 559 429

Module holders for mounting a section module 3 842 559 426 on a connecting kit 3 842 559 454

- A:** Module holder (2x)
- B:** Vertical adjustment (2x)
- C:** Support (2x)
- D:** Mounting bracket (2x)
- E:** Adjusting screw (2x)
- F:** T-slot stones (4x)
- G:** Headless setscrew (4x)

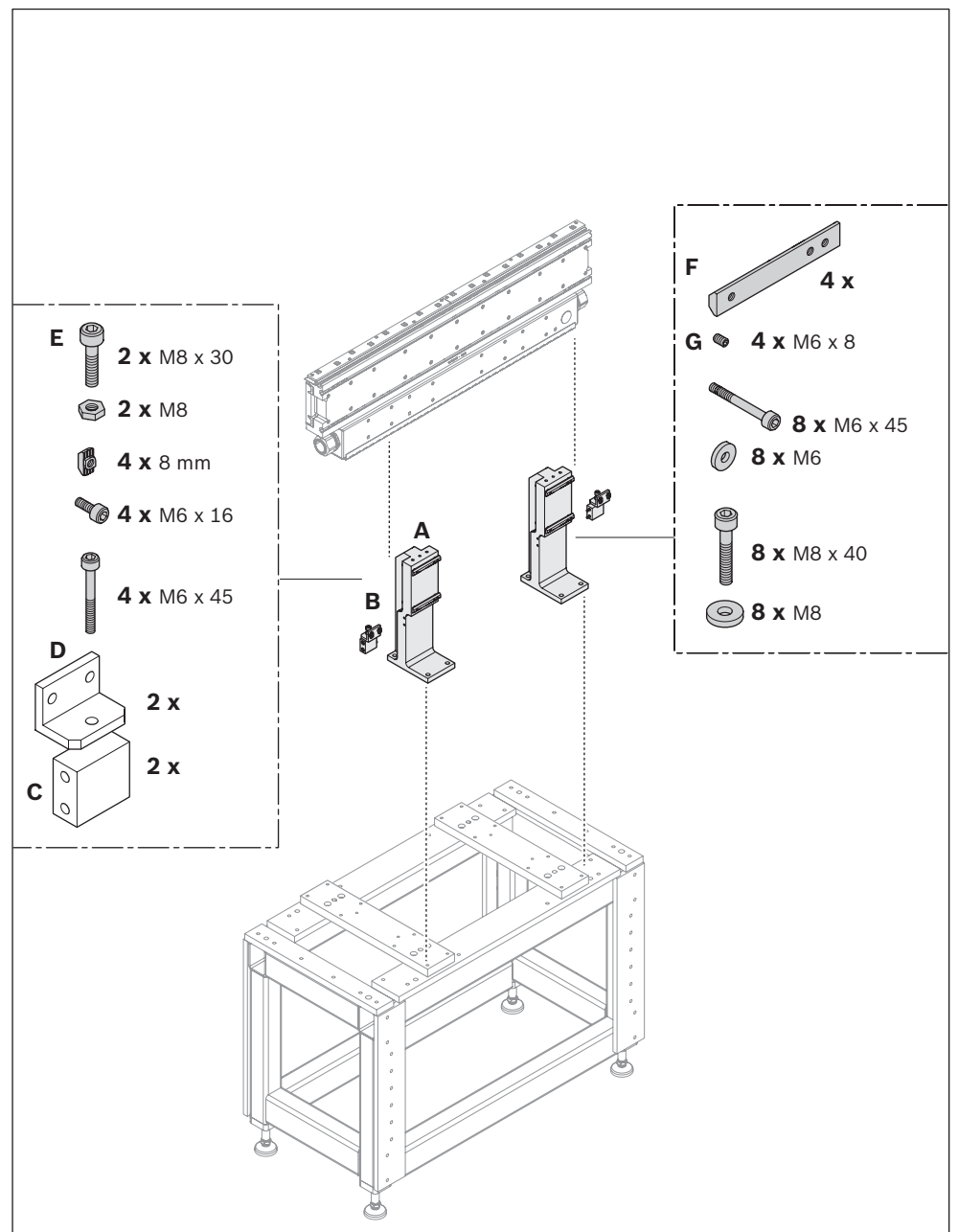


Fig. 7: Module holder 3 842 559 429

557 186-07

5.2.7 Section module 3 842 559 426

- A:** Coil cover
- B:** Electronic box
- C:** Left measuring system (encoder)
- D:** Right measuring system (encoder)
- E:** V-rail
- F:** Run profile
- H:** Cable guide
- I:** Centering piece
- J:** Magnet

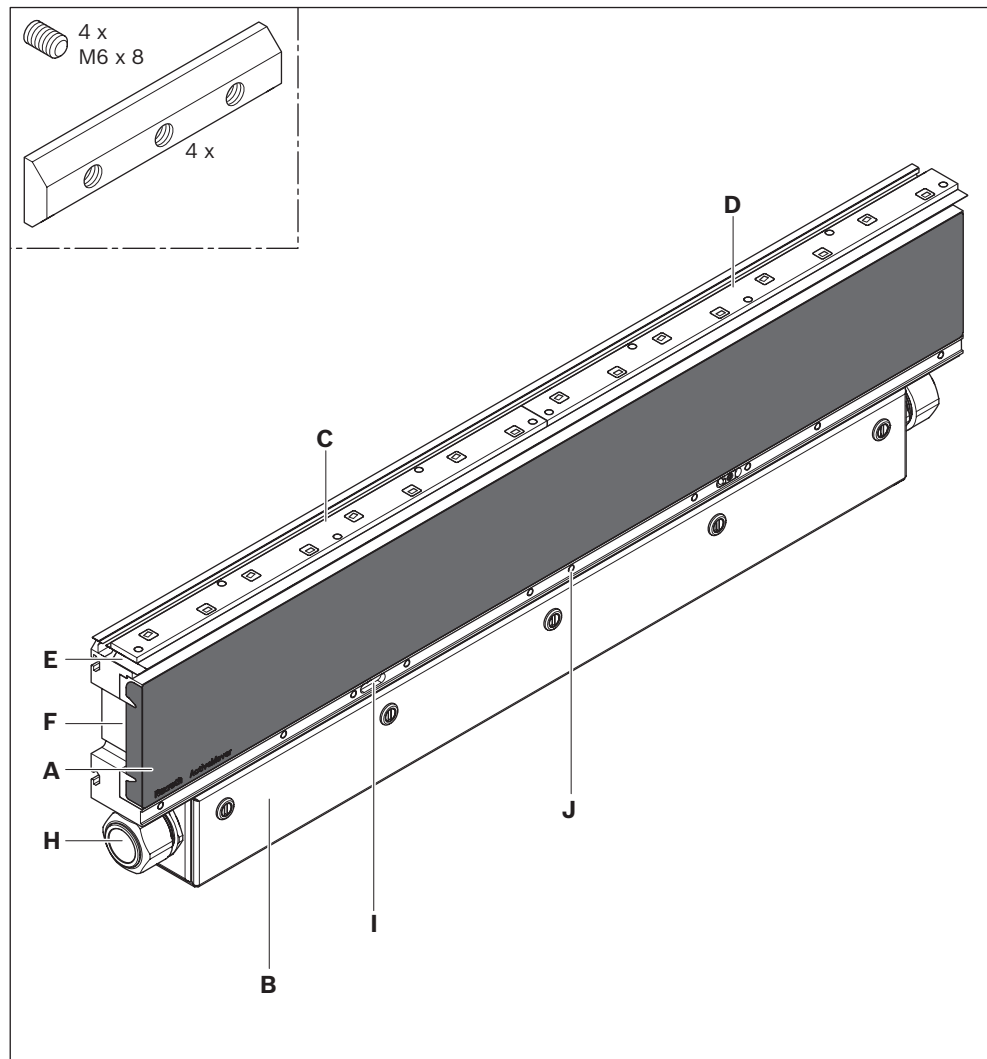


Fig. 8: Section module

557 186-08

- A: Electronic box
- B: PCB (coil)
- C: PCB (gateway)
- D: PCB (coil)

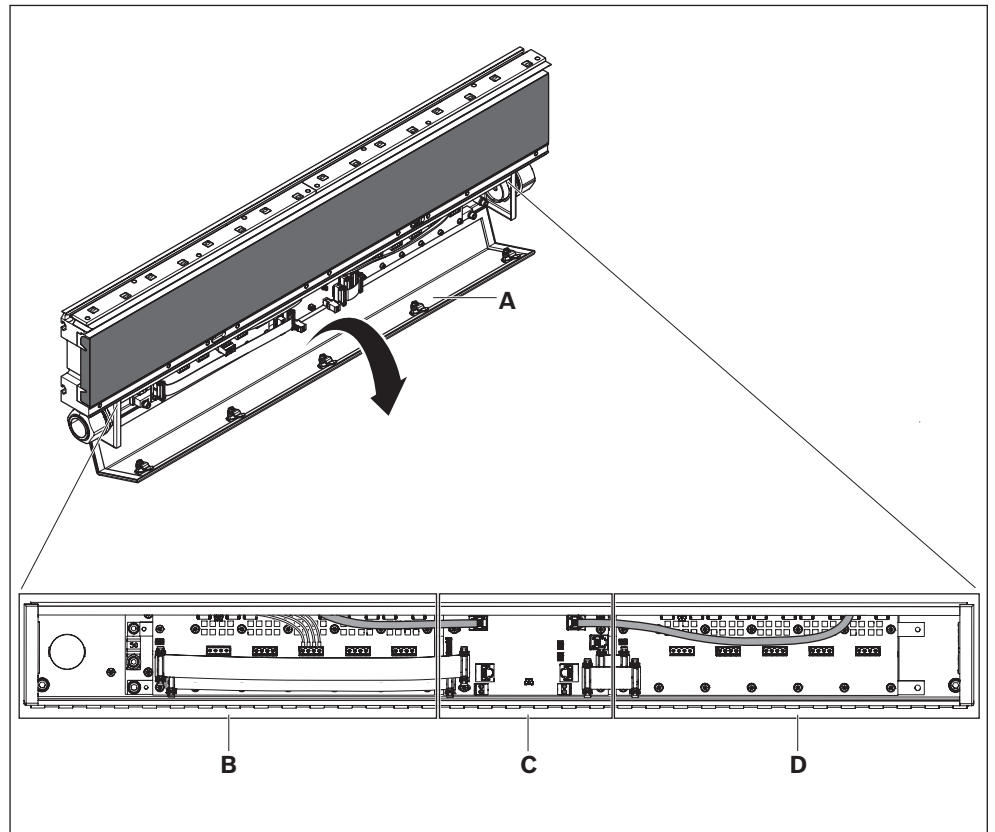
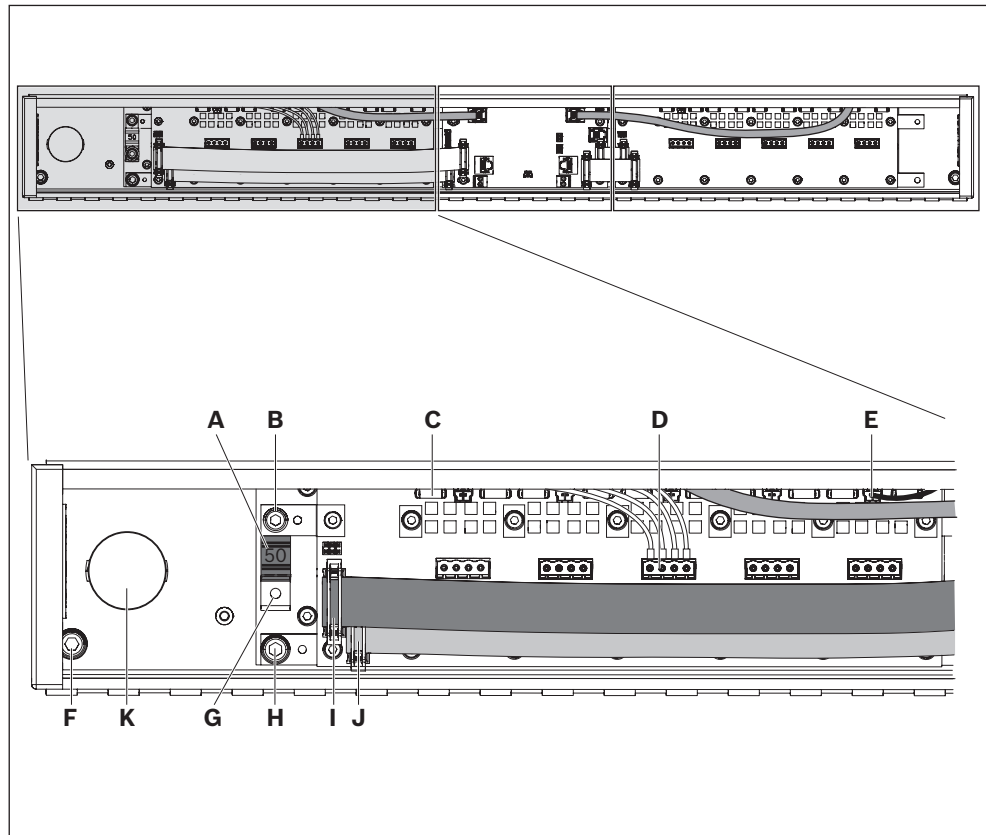


Fig. 9: Section module with open electronic box

557 186-09

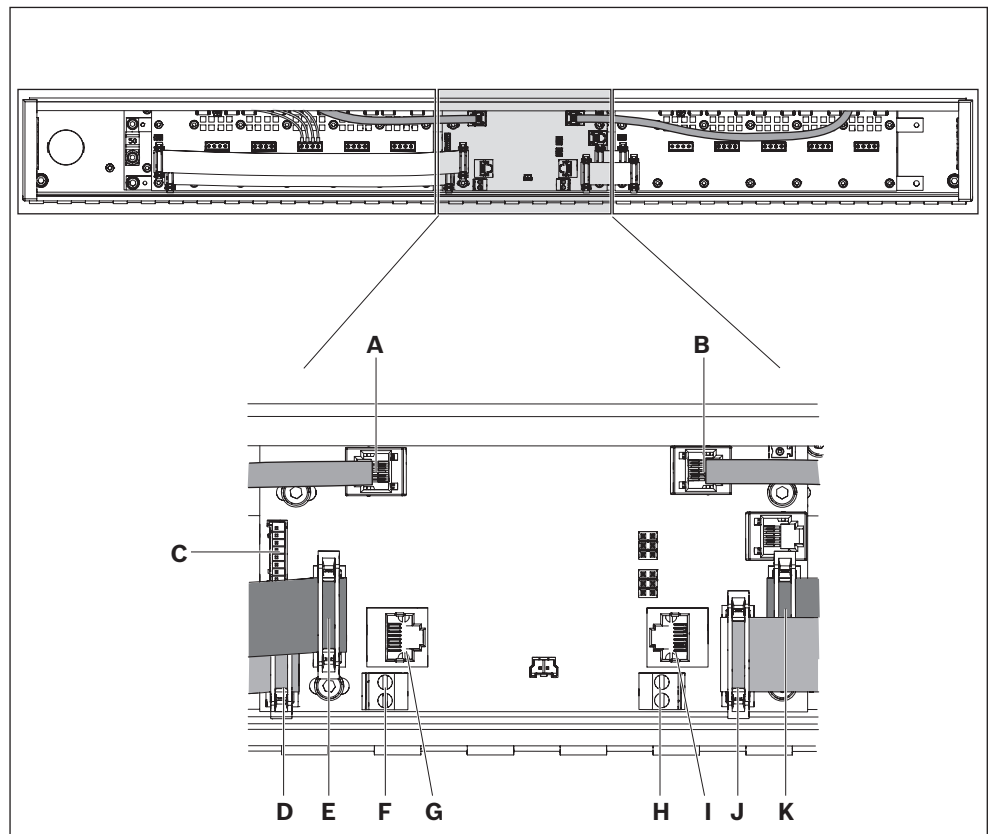
- A:** 50 A fuse
- B:** Power supply cable connection (28 V)
- C:** Fuse (coil)
- D:** Plug-in connector (coil)
- E:** Thermo resistor
- F:** Grounding cable connection
- G:** Motor cable connection (28 V)
- H:** Motor cable connection (0 V)
- I:** Top left ribbon cable (section module)
- J:** Bottom left ribbon cable (section module)
- K:** Cable socket



557 186-10

Fig. 10: Left power supply PCB (shown here with power supply connected)

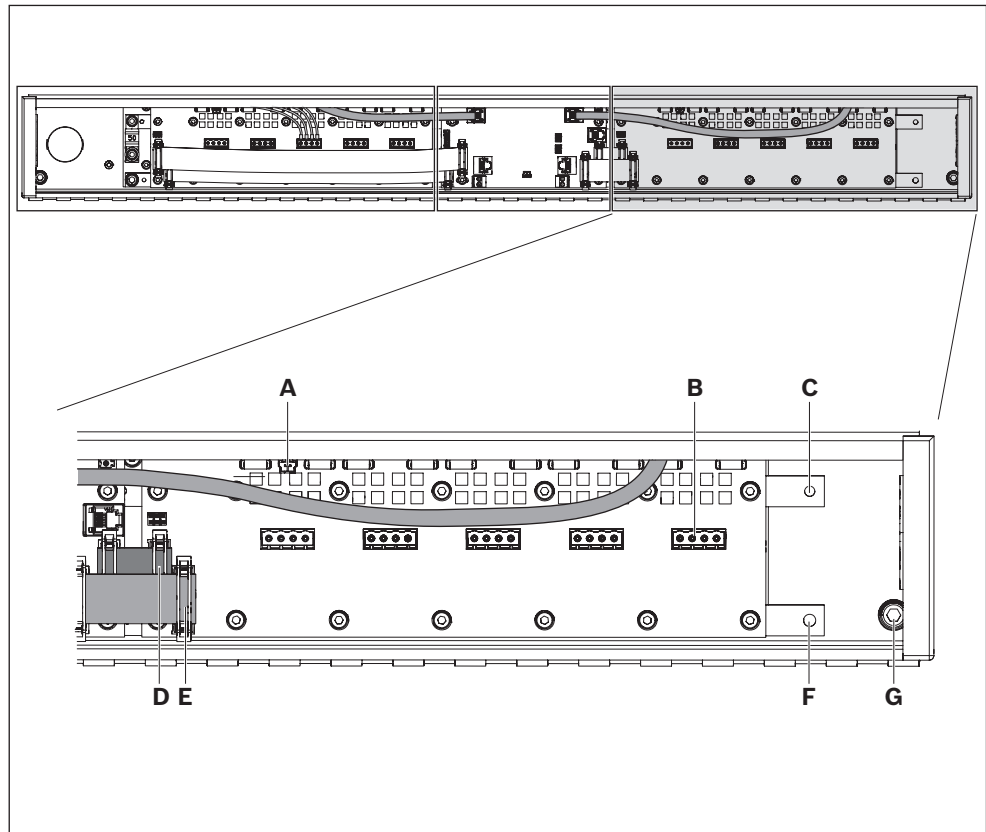
- A:** Left measuring system (encoder) cable
- B:** Right measuring system (encoder) cable
- C:** IR reading head cable
- D:** Top left ribbon cable (section module)
- E:** Bottom left ribbon cable (section module)
- F:** Control voltage connection (24 V)
- G:** Network cable connection
- H:** Control voltage connection (24 V)
- I:** Network cable connection
- J:** Top right ribbon cable (section module)
- K:** Bottom right ribbon cable (section module)



557 186-11

Fig. 11: PCB (gateway)

- A:** Thermo resistor
- B:** Plug-in connector (coil)
- C:** Motor cable connection (28 V)
- D:** Bottom right ribbon cable (section module)
- E:** Top right ribbon cable (section module)
- F:** Motor cable connection (0 V)
- G:** Grounding cable connection



557 186-12

Fig. 12: Right power supply PCB

5.2.8 Curve module 3 842 559 430

- A: Cover
- B: Cover (coil)
- C: Module holder
- D: Grounding cable
- E: Connecting kit (2x)
- F: Section module connecting cable (2x)
- G: Right measuring system (encoder)
- H: Left measuring system (encoder)
- I: Connecting block (2x)
- J: PCB (coil)
- K: PCB (coil)
- L: PCB (gateway)
- M: 500 mm guide rail
- N: Network cable (Ethernet)
- O: Control voltage cable (24 V)
- P: Power cable (28 V DC)
- Q: Grounding cable
- R: Power cable (0 V)
- S: Cable guard pipe

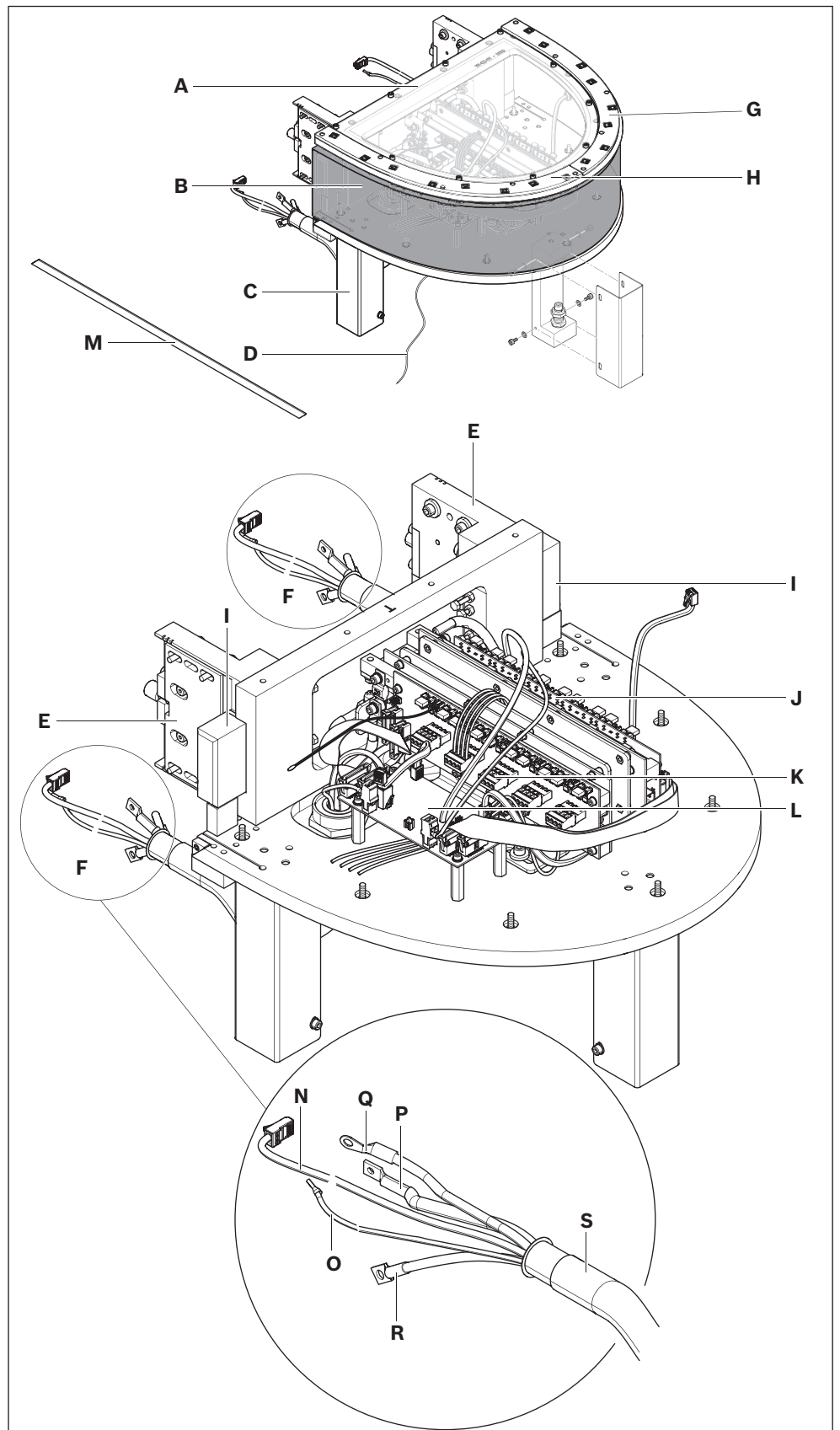


Fig. 13: Curve module

557 186-13

- A:** 50 A fuse
- B:** Motor cable connection (28 V)
- C:** Fuse (coil)
- D:** Plug-in connector (coil)
- E:** Thermo resistor
- F:** Motor cable connection (0 V)
- G:** Top left ribbon cable (section module)
- H:** Bottom left ribbon cable (section module)

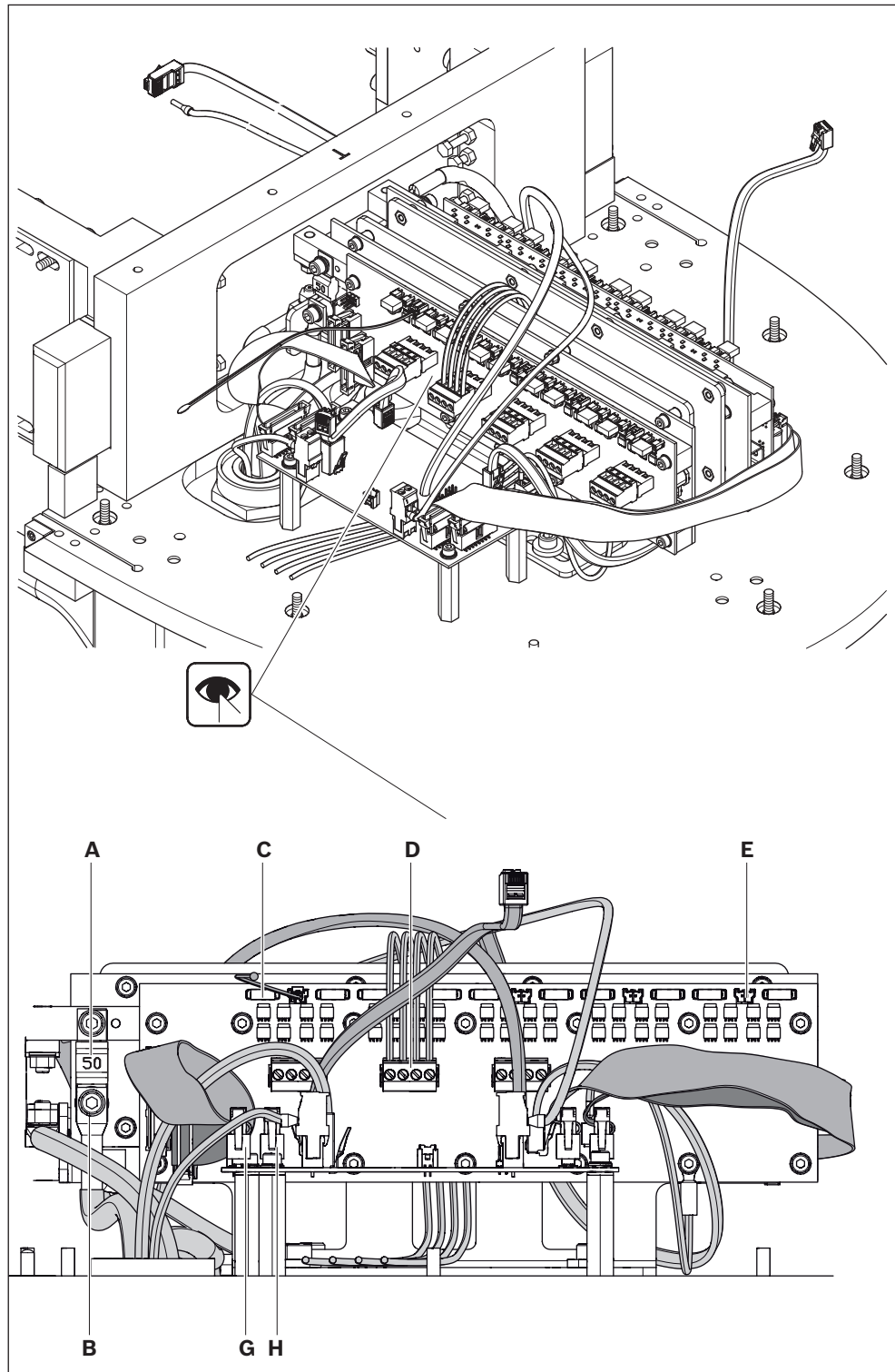


Fig. 14: Left power supply PCB

557 186-14

- A:** Left measuring system (encoder) cable
- B:** Right measuring system (encoder) cable
- C:** IR reading head cable
- D:** Top left ribbon cable (section module)
- E:** Bottom left ribbon cable (section module)
- F:** Control voltage connection (24 V)
- G:** Network cable connection
- H:** Control voltage connection (24 V)
- I:** Network cable connection
- J:** Top right ribbon cable (section module)
- K:** Bottom right ribbon cable (section module)

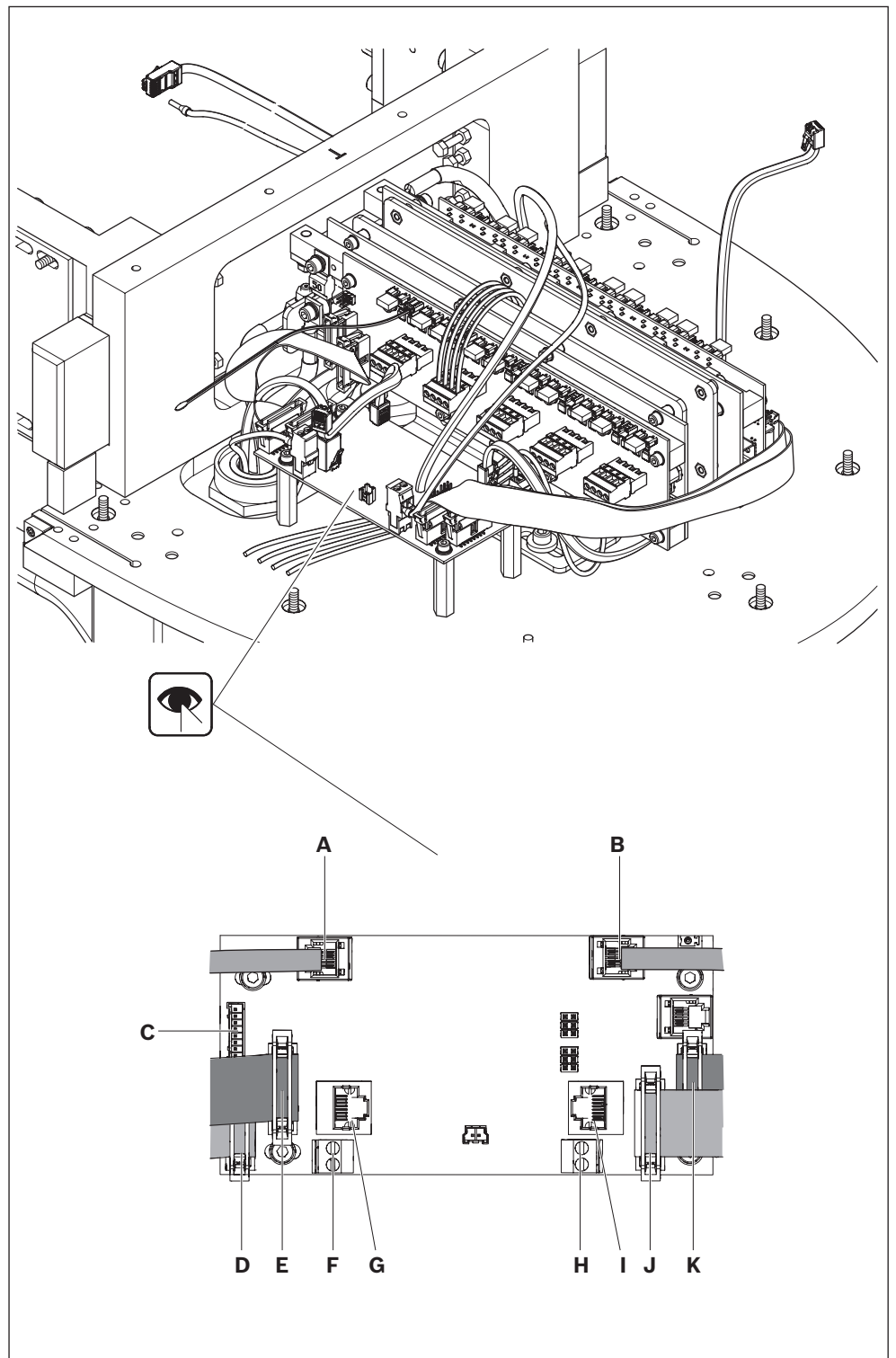


Fig. 15: Printed circuit board (Gateway)

- A:** Thermo resistor
- B:** Plug-in connector (coil)
- C:** Motor cable connection (28 V)
- D:** Bottom right ribbon cable (section module)
- E:** Top right ribbon cable (section module)
- F:** Motor cable connection (0 V)
- G:** Grounding cable connection

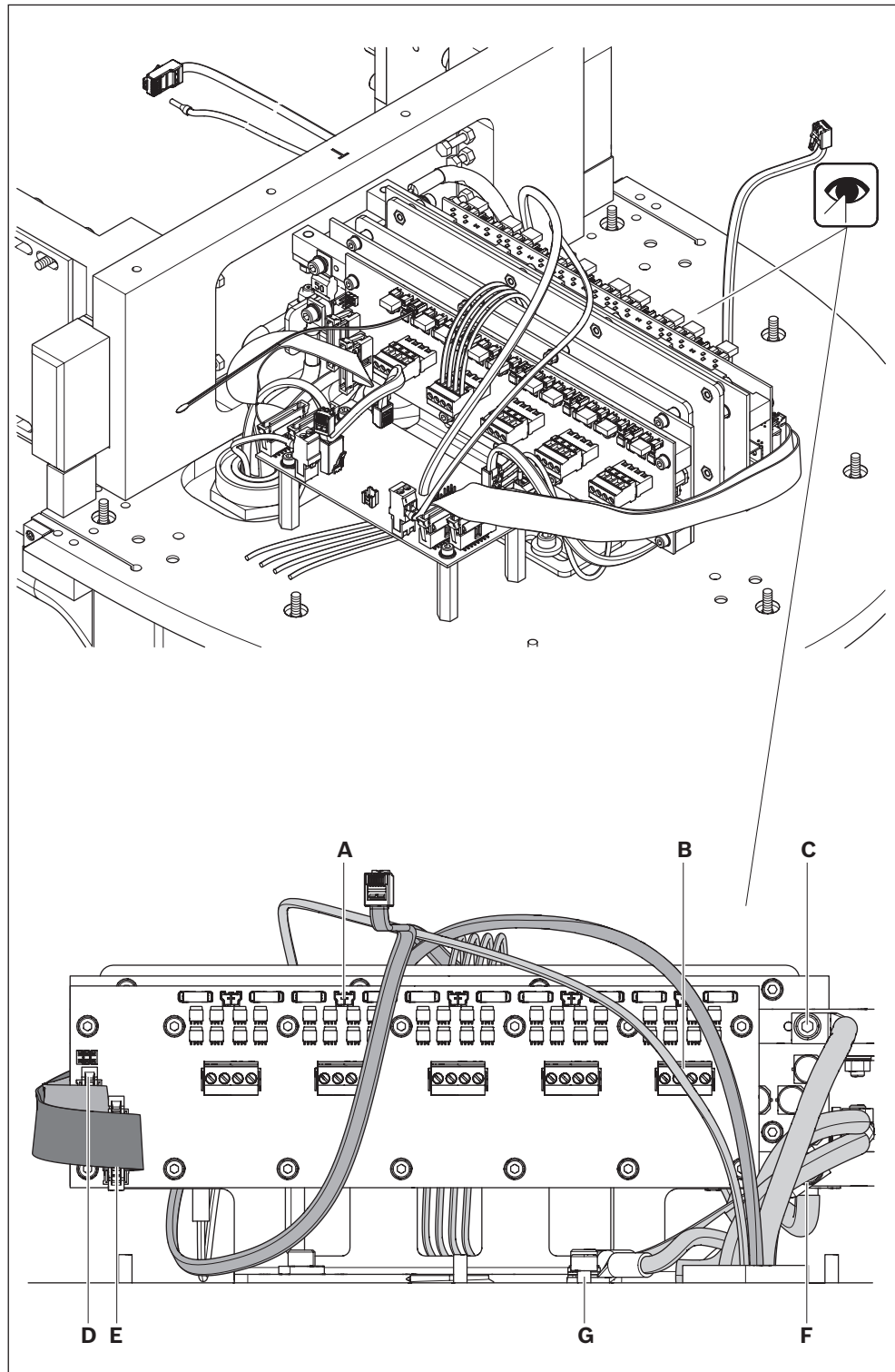


Fig. 16: Right power supply PCB

557 186-16

5.2.9 Workpiece pallet 3 842 559 433 (2 magnets)/3 842 559 434 (3 magnets)**NOTICE****What to do in case of an accident involving permanent magnets**

Whenever you are working with permanent magnets, have the following emergency tools on hand to free trapped body parts (e.g. finger, hand, arm, etc.) in case of an accident:

- Hammer made of nonmagnetic material (e.g. brass)
- Min. 2 wedges with a wedge angle of approx. 10 - 15° made of nonmagnetic material, such as brass, hardwood, etc. for driving into the gap

In case of an accident:

- ▶ Remain calm.
- ▶ If the machine is live, disconnect it from power (emergency off switch).
- ▶ Administer FIRST AID or call in appropriate aid (e.g. emergency physician).
- ▶ Use the emergency tools to separate the contacting parts to free the trapped body part (e.g. finger, hand, foot, etc.).
To do this, use the hammer to drive the wedges into the gap between the parts to free the trapped body part.

General safety instructions for magnets

Magnetic and electromagnetic fields are generated in the immediate vicinity of live conductors or permanent magnets in electric motors, and can pose a serious danger to certain groups of individuals.

- ▶ The machine owner is responsible for taking appropriate steps (e.g. warning signs, protective equipment, labeling hazard zones) to adequately protect personnel active in these areas from any harm.
- ▶ Follow the safety instructions found below in these assembly instructions.
- ▶ Observe the applicable regulations in your country. For Germany, the requirements of the BGV B11 and BGR B11 regarding “electromagnetic fields” must be observed.

WARNING

Crushing injuries



The permanent magnets exert pull on all magnetic materials.

- This pull increases significantly at close range (< 100 mm).
- Loose, magnetic parts nearby can suddenly and inadvertently collide with the permanent magnets.

- ▶ Use extreme caution when handling components with permanent magnets. Never underestimate how strong the magnetic pull can be.
- ▶ Never work alone.
- ▶ Wear personal protective equipment (e.g. protective gloves, safety glasses).
- ▶ Do not take multiple components with permanent magnets out of the packaging or place them next to one another at the workstation without securing them.
- ▶ Take components with permanent magnets out of the packaging one at a time when needed for assembly and install as soon as possible.
- ▶ Do not bring magnetized or magnetic objects in the immediate vicinity of the permanent magnets. If the use of magnetic tools cannot be avoided, keep a firm grip on the tool, move slowly and keep in mind the strength of the permanent magnet's pull.

Pacemakers, implants and pregnant women



Persons with active implants (e.g. pacemakers) and passive metallic implants (e.g. hip replacement), as well as pregnant women may be exposed to risk from electromagnetic or magnetic fields in the immediate vicinity of components that generate magnetic fields.

Entering the following areas may be hazardous to these individuals:

- Areas where ActiveMover components (e.g. workpiece pallet) are being started up and operated
- Areas where components with permanent magnets are being stored, repaired or installed
- ▶ The persons mentioned above should consult their physician before entering these areas.
- ▶ Observe the health and safety regulations applicable in the place of operation.

WARNING

Heavy objects



Excessive or sudden loads, fatigue and material defects can result in a magnet/properly mounted workpiece pallet releasing.

Falling objects can cause serious injury.

- ▶ The indicated pull strength is only achieved under ideal conditions. Include a considerable safety factor.

Metal fragments



Magnets are brittle. When two magnets or a magnet and a ferromagnetic material collide, they can splinter.

Sharp fragments can fly several meters and injure your eyes.

- ▶ Avoid collisions between magnets and between a magnet and a ferromagnetic material.
- ▶ When handling large magnets, wear safety glasses and protective gloves.
- ▶ Make sure persons in the vicinity are also protected or keep their distance.

CAUTION

Magnetic field



Magnets generate a strong, wide-ranging magnetic field. They can damage items such as televisions, laptops, hard drives, credit and debit cards, data carriers, mechanical watches, hearing aids and speakers.

- ▶ Keep magnets away from all devices and objects that can be damaged by strong magnetic fields.

Nickel allergy



Magnets contain nickel, even those without nickel plating.

- Some people experience an allergic reaction to touching nickel.
- Nickel allergies can develop from prolonged contact with objects containing nickel.

- ▶ Avoid prolonged skin contact with magnets.
- ▶ Do not handle magnets if you already have a nickel allergy.

CAUTION

Air freight



Magnetic fields generated by improperly packaged magnets can affect the navigation equipment on aircraft.

In the worst-case scenario, this can result in an accident.

- ▶ Only ship magnets/workpiece pallets with the proper protective cover attached and in the original packaging.
- ▶ Observe relevant regulations.

Postal dispatch



Magnetic fields generated by improperly packaged magnets can disrupt sorting equipment and damage sensitive items in other parcels.

- ▶ Only ship magnets/workpiece pallets with the proper protective cover attached and in the original packaging.
- ▶ Observe relevant regulations.

NOTICE

Effect on humans

According to current knowledge, magnetic fields from permanent magnets have no measurable positive or negative effect on humans. It is unlikely the magnetic field of a permanent magnet poses a health risk, however it cannot be completely ruled out.

- ▶ For your safety, avoid prolonged contact with the magnets.
- ▶ Keep large magnets at least 1 meter from your body.
- ▶ Observe the separate provisions for persons with pacemakers and implants, and pregnant women.

NOTICE

Oxidation, corrosion, rust

Untreated magnets oxidize quickly and disintegrate.

This is why magnets have a thin nickel-copper-nickel plating to protect them from corrosion.

- ▶ Only use magnets in a dry, indoor area or protect them against environmental factors.
- ▶ Avoid damaging the plating.

Temperature resistance

Magnets have a max. operating temperature.

Most magnets permanently lose some of their pull strength at temperatures over 80 °C.

- ▶ Do not store the magnets where they are exposed to extreme heat.

Product-specific safety instructions for workpiece pallets** CAUTION****Strong magnetic field!**

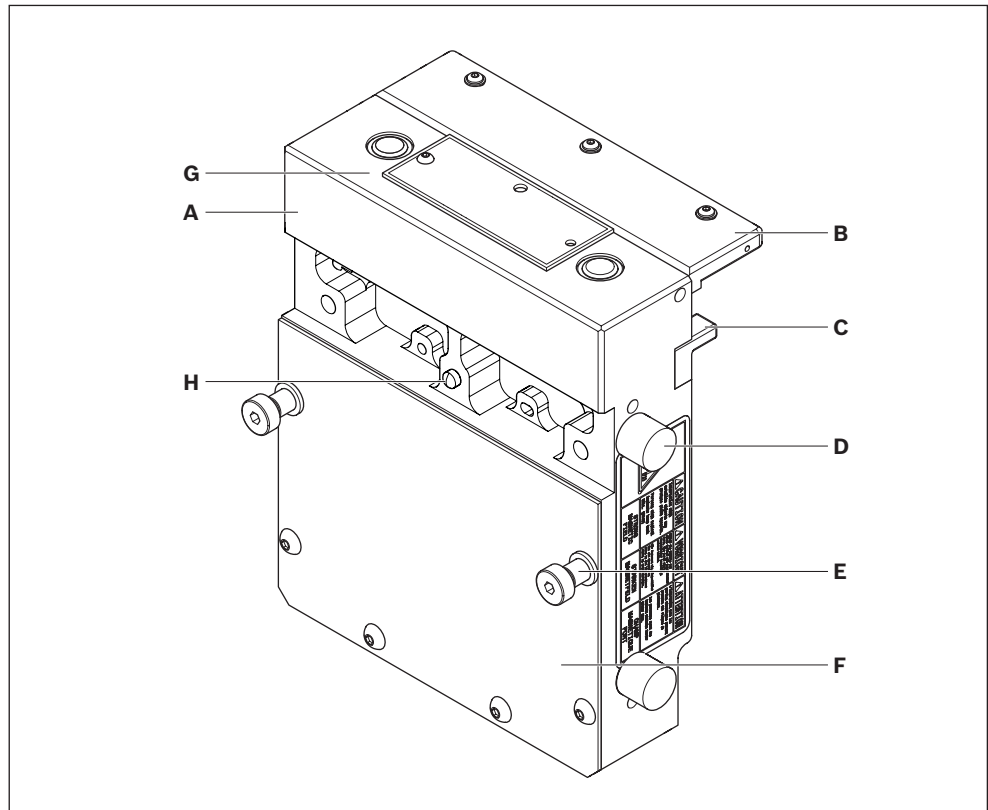
Risk of injury from strong magnetic fields in areas marked with this hazard symbol.



Workpiece pallets generate a strong magnetic field when they are not mounted to the linear motor system.

- This strong magnetic field can be harmful to persons with pacemakers and other medical implants.
 - The magnetic field of the ActiveMover linear motor system can cause magnetic materials to move, which may result in flying objects or crushing/dismemberment.
 - Electronic equipment and magnetic data carriers can be affected by the magnetic field.
- ▶ Persons with pacemakers or other medical implants should maintain a min. distance of 30 cm between the implant and the workpiece pallet.
 - ▶ Persons with pacemakers or other medical implants should not perform maintenance on or service the product.
 - ▶ Keep metallic objects away from the workpiece pallets and the section/curve modules.
 - ▶ When workpiece pallets are unmounted, keep their protection plates on them. For attachment instructions, see Page 77.
 - ▶ Also follow the safety instructions in Section “General safety instructions for magnets” on page 33.

- A:** Base body
- B:** Measuring system
(support and magnetic strip)
- C:** Positioning element
- D:** Rubber buffer
- E:** Detent screw
- F:** Cover
- G:** Protective cap
- H:** Dowel pin



557 186-17

Fig. 17: Workpiece pallet (front view)

- A:** Measuring system
(support and magnetic strip)
- A1:** Support
- A2:** Magnetic strip
- B:** V-roller
- C:** Discharger brush
- D:** Magnet kit
(2 magnets)
- E:** Guide roller (flat)
- F:** Positioning element
- G:** Lubrication system
(lubricating felt + support + fastening element)
- H:** Magnet kit
(3 magnets)
- I:** Protection plate

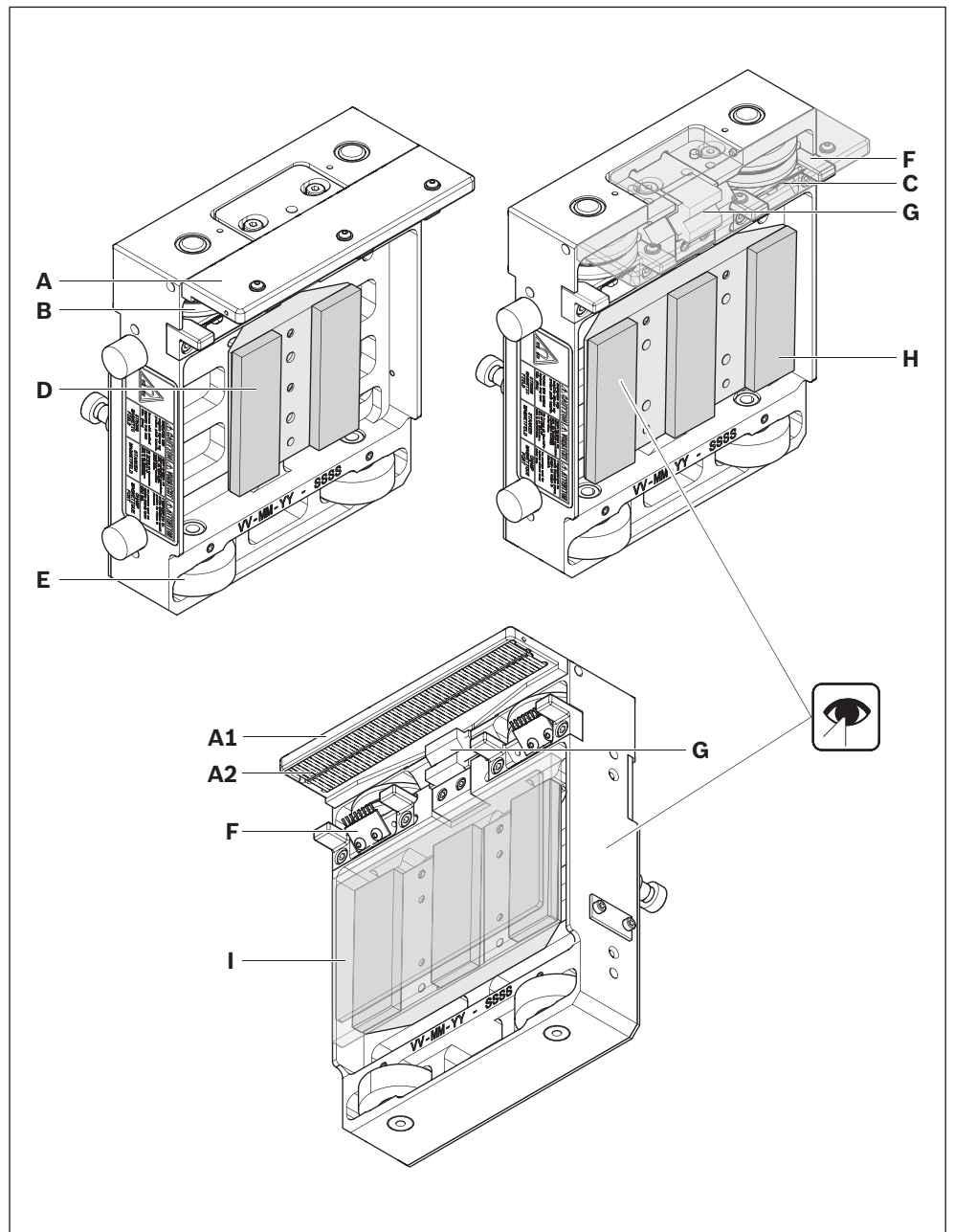


Fig. 18: Workpiece pallet (rear view)

5.2.10 IR ID system

CAUTION

Laser radiation

Class 1 laser under DIN EN 60825-1:2008.

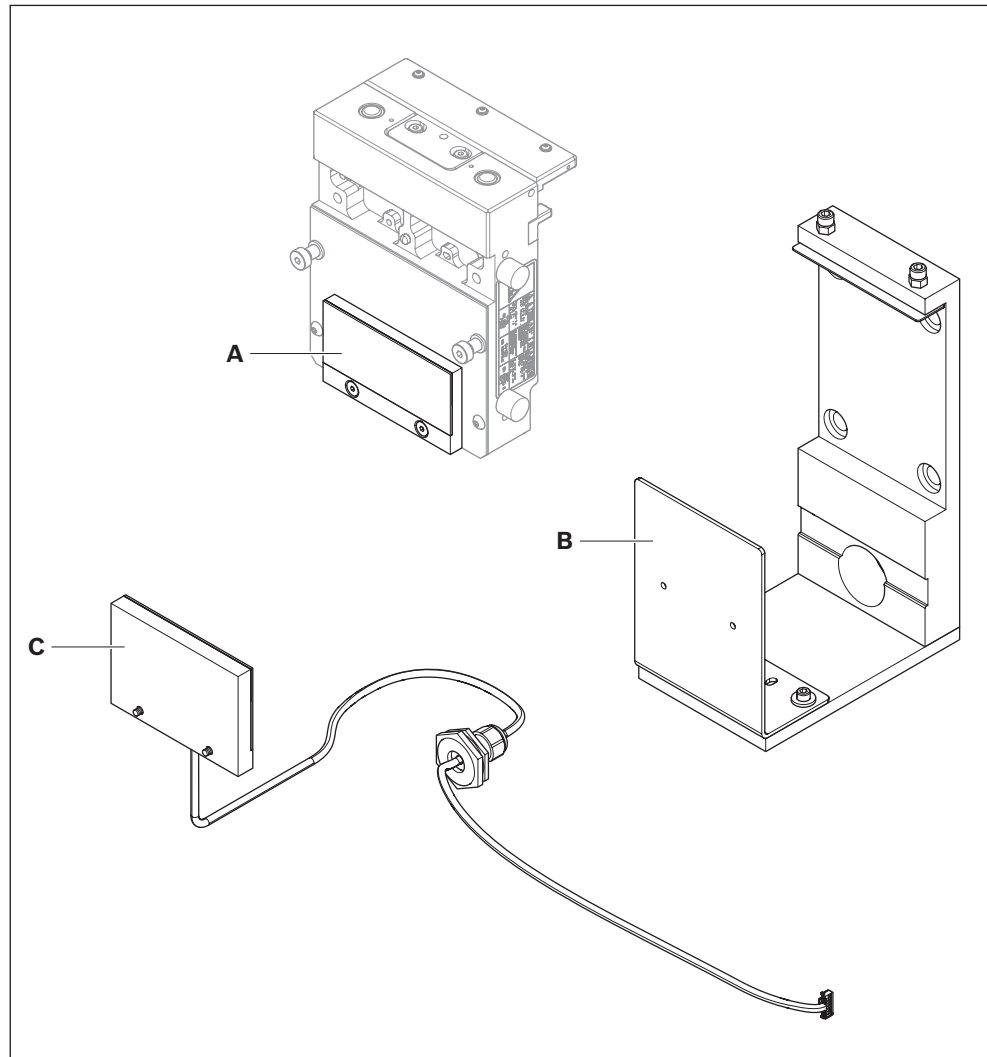
► Do not look directly at the laser with optical instruments.

- A:** IR data carrier
3 842 559 447
- B:** IR reading head
fastening parts kit
3 842 559 440
- C:** IR reading head with
connecting cable and
cable gland
3 842 559 441



Please note:

The IR data carrier has a preassigned number and cannot be reprogrammed. This number is engraved on the edge of the IR data carrier.

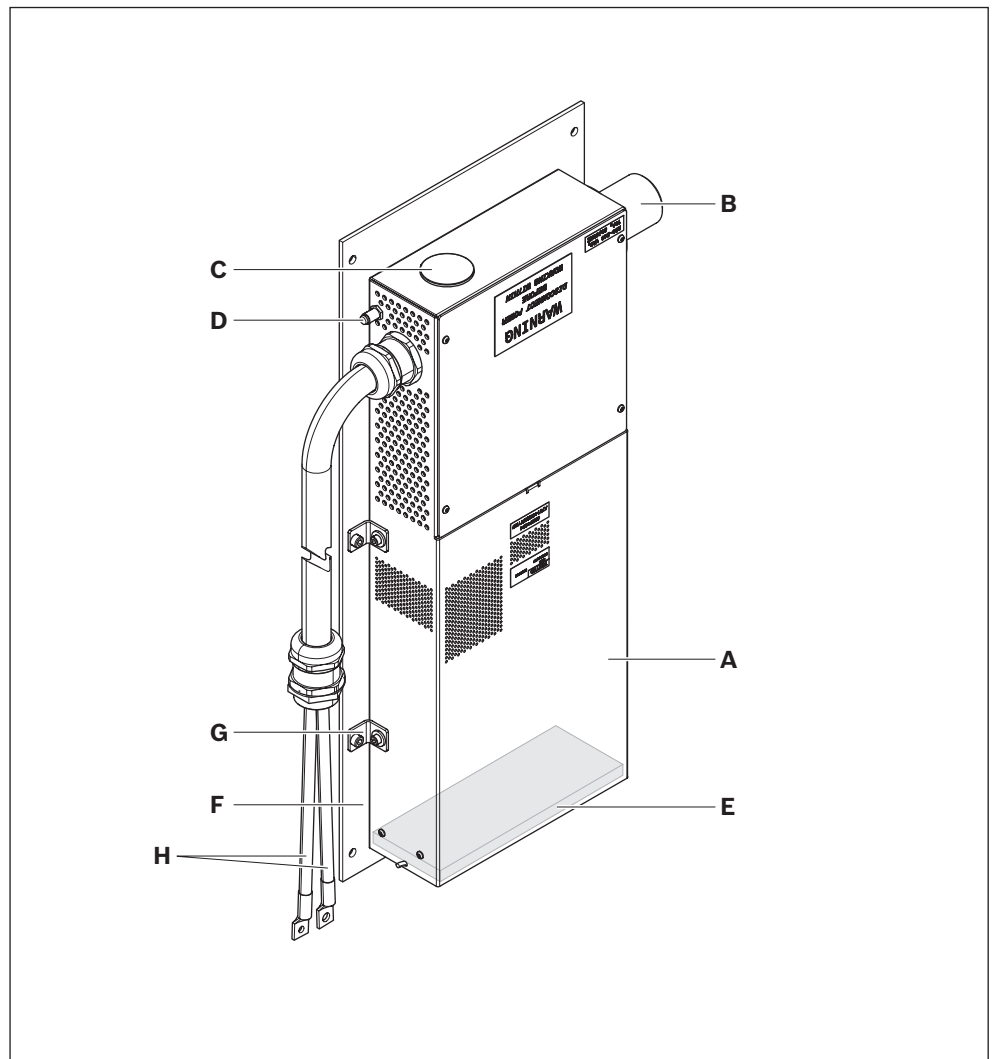


557 186-19

Fig. 19: IR ID system components

5.2.11 Power supply 3 842 559 435

- A:** Housing
- B:** Plug connector (230 V)
- C:** Alternative plug connector (230 V AC)
- D:** PLC monitor connection output (24 V DC)
- E:** Filter
- F:** Fixing plate
- G:** Mounting bracket
- H:** Connecting cable (0 V, 28 V DC)

**Fig. 20: Power supply**

557 186-20

5.2.12 Control cabinet 3 842 559 459 and 3 842 559 462

- A:** Mounting bracket (4x)
- B:** Door lock (2x)
- C:** Main switch
- D:** Fan
- E:** PLC controller connection
- F:** AMpro connection
- G:** Filter
- H:** Power port
- I:** Connection for connecting kit **3 842 559 449**
- J:** PLC controller connection (optional)
- K:** Power supply connection

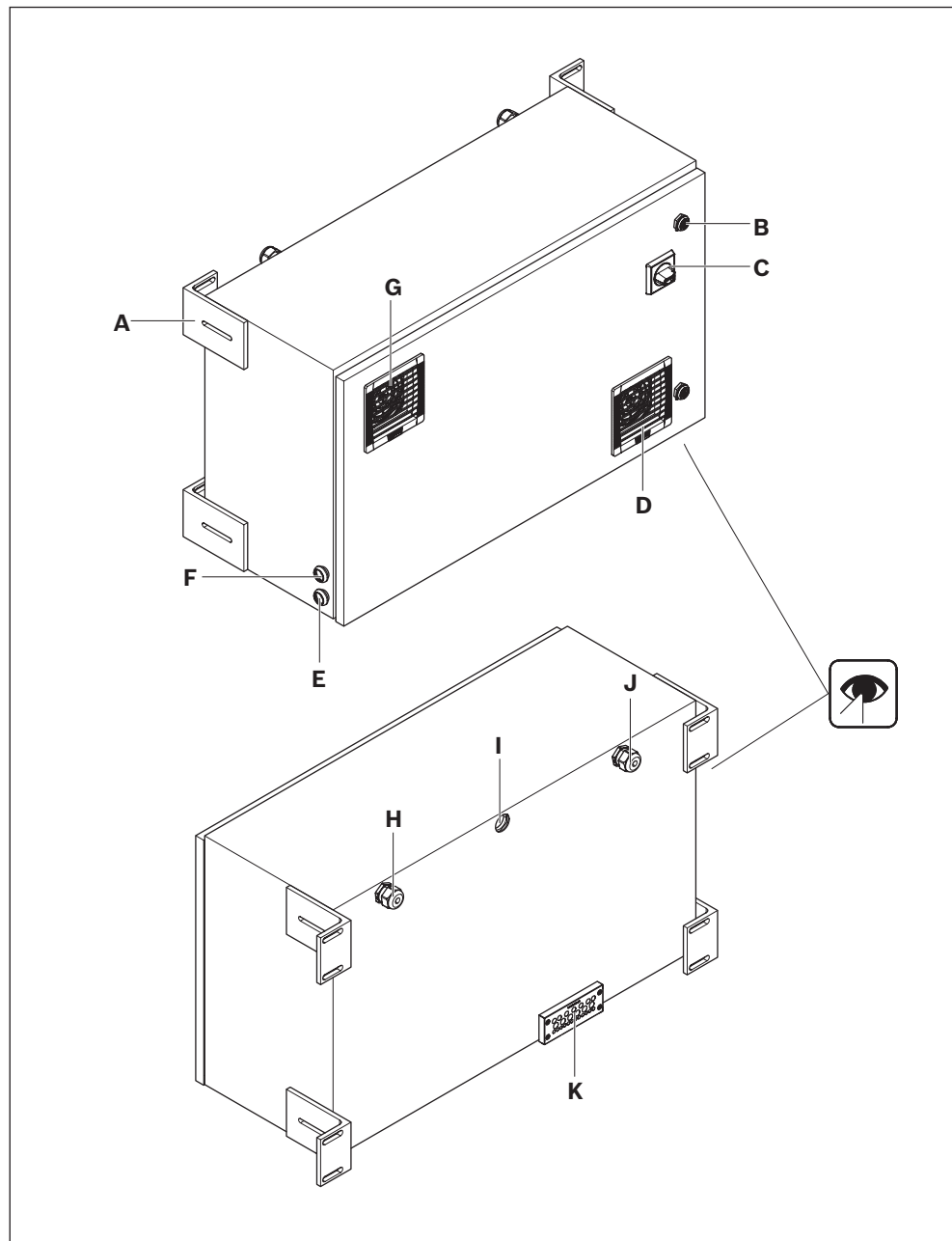


Fig. 21: Control cabinet

557 186-21

5.2.13 Connecting kit 3 842 559 438

Connecting kit for electrically connecting and mechanically adjusting 2 section modules
3 842 559 426.

- A:** Adjusting screw
- B:** Adjusting wedge
- C:** Connecting block
- D:** Profile connector
- E:** 1,000 mm guide rail
- F:** Network cable (Ethernet)
- G:** Power cable (28 V DC, blue)
- H:** Grounding cable
- I:** Power cable (0 V DC, blue/white)
- J:** Cable guard pipe
- K:** Control voltage cable (24 V)

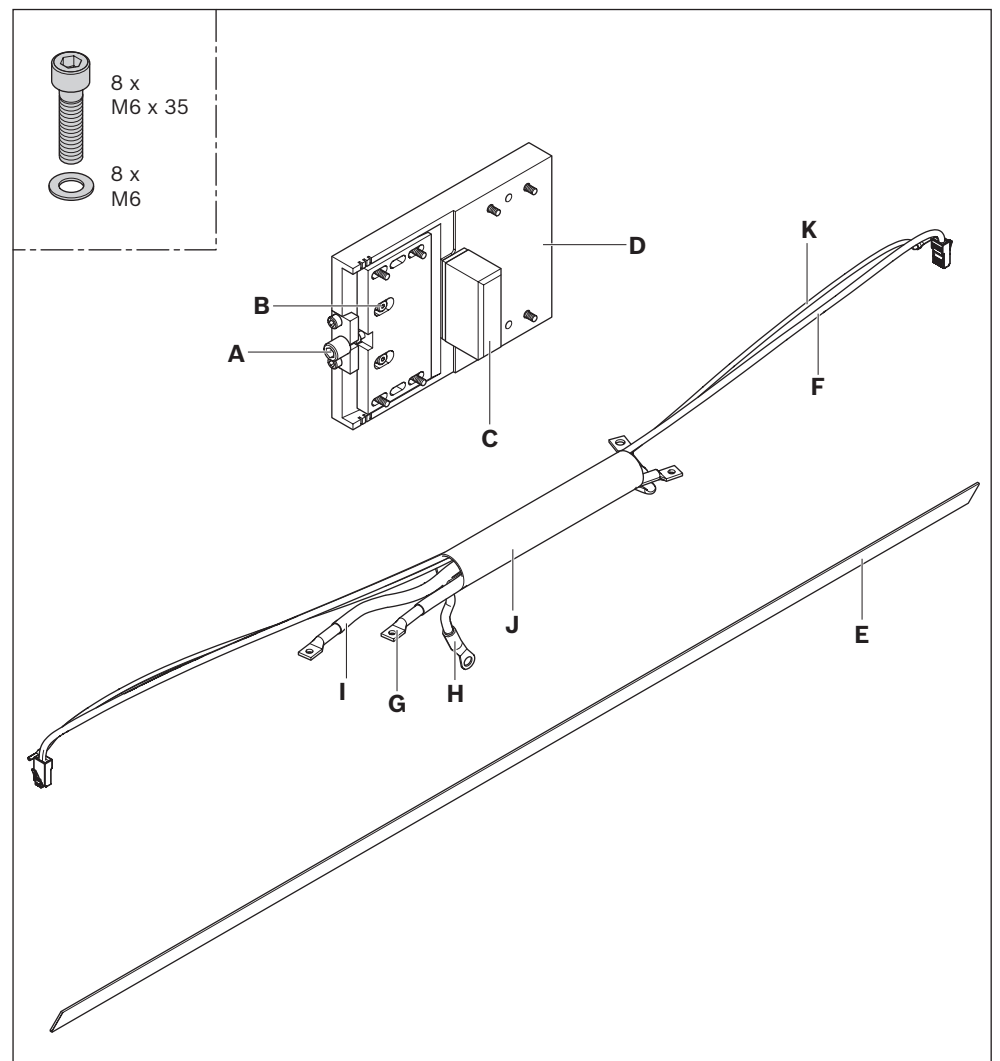


Fig. 22: Connecting kit 3 842 559 438

557 186-22

5.2.14 Connecting kit 3 842 559 449

Connecting kit for electrically connecting curve module 3 842 559 430 and control cabinet

- A:** Control cabinet
- B:** Curve module
- C:** Grounding cable
- D:** Network cable (7,600 mm)
- E:** Control voltage cable (24 V DC/0 V)
- F:** Network cable (1,000 mm)
- G:** Ferrite
- H:** Cable guard pipe (6,500 mm)

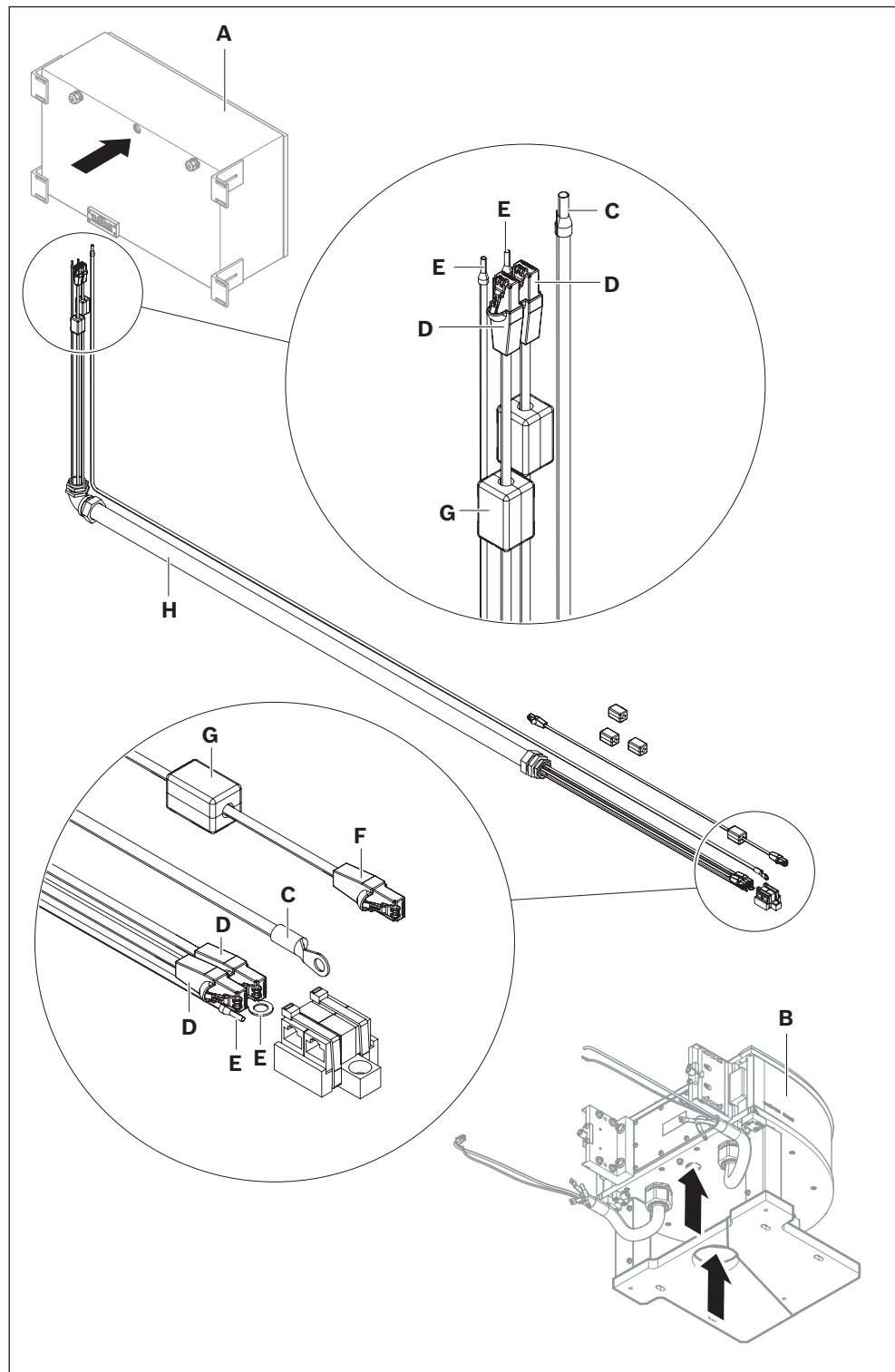


Fig. 23: Connecting kit 3 842 559 449

557 186-23

Interface modules with various protocols for connecting to a higher-level controller

5.2.15 Interface modules 3 842 559 444, 3 842 559 445, 3 842 559 446

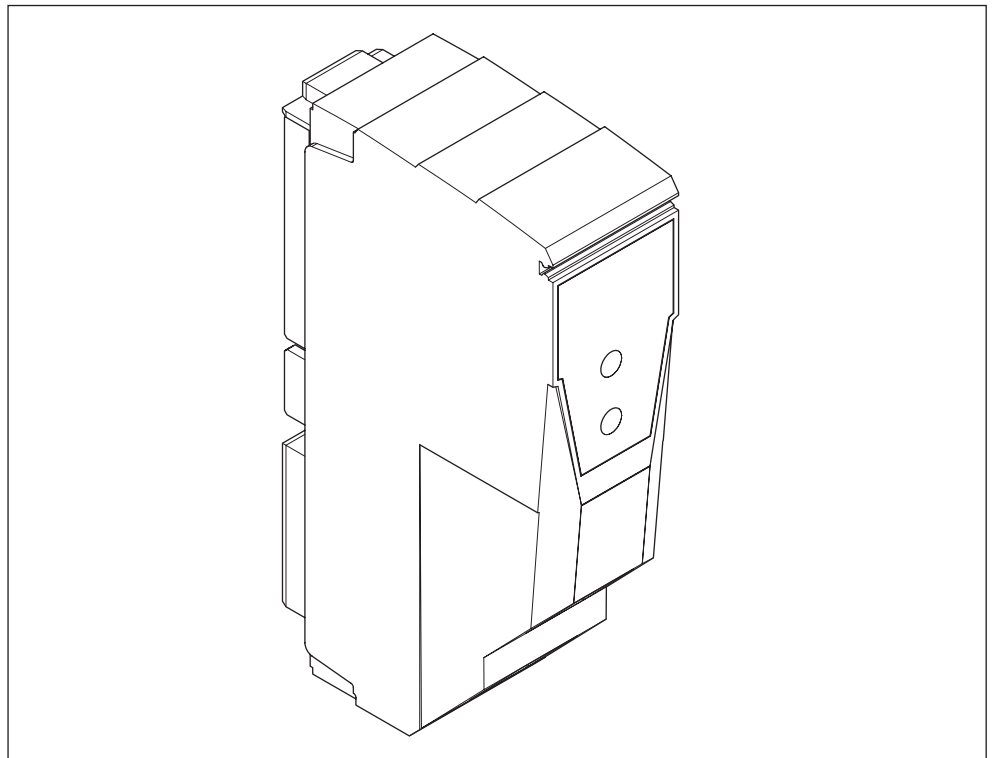


Fig. 24: Interface modules

557 186-24

5.2.16 Remover tool 3 842 559 439

Tool for removing/mounting
workpiece pallets

- A:** Remover tool
- B:** Locking hook

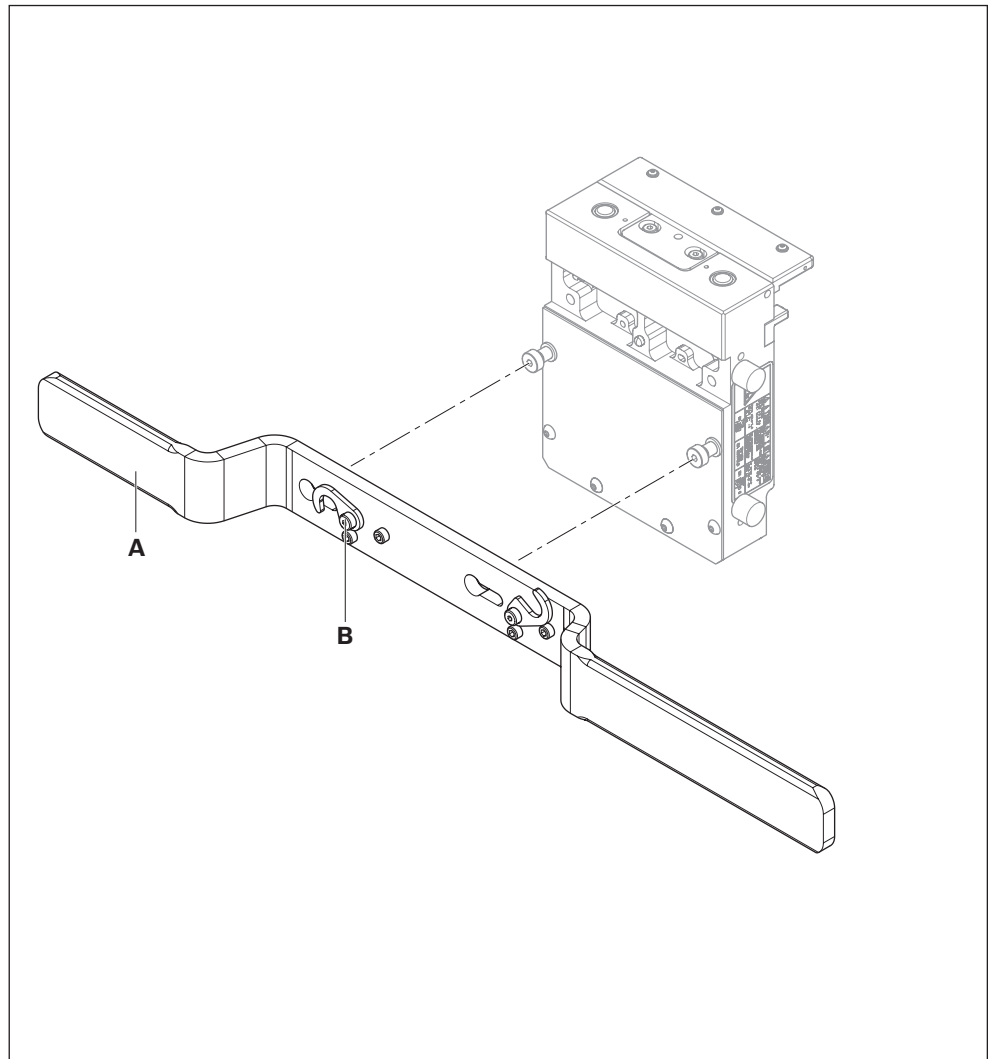


Fig. 25: Remover tool 3 842 559 439

557 186-25

5.2.17 Calibration set 3 842 559 456

**Please note:**

The calibration set is required to adjust/calibrate the measuring system on the WT.

- A:** Position indicator
- B:** Reference system
- C:** Aligning block
- D:** Knurled thumbscrew
- E:** Fixing element
- F:** Knurled thumbscrew

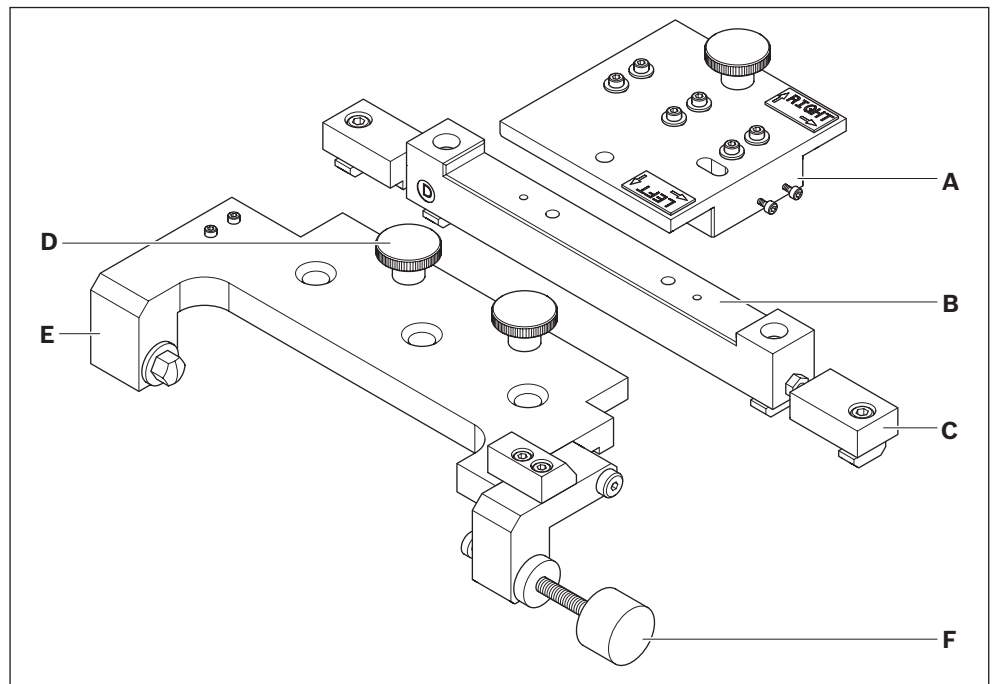


Fig. 26: Calibration set

5.3 Product identification

- A:** Material number
(order number)
- B:** Name
- C:** Information on version
and dimensions

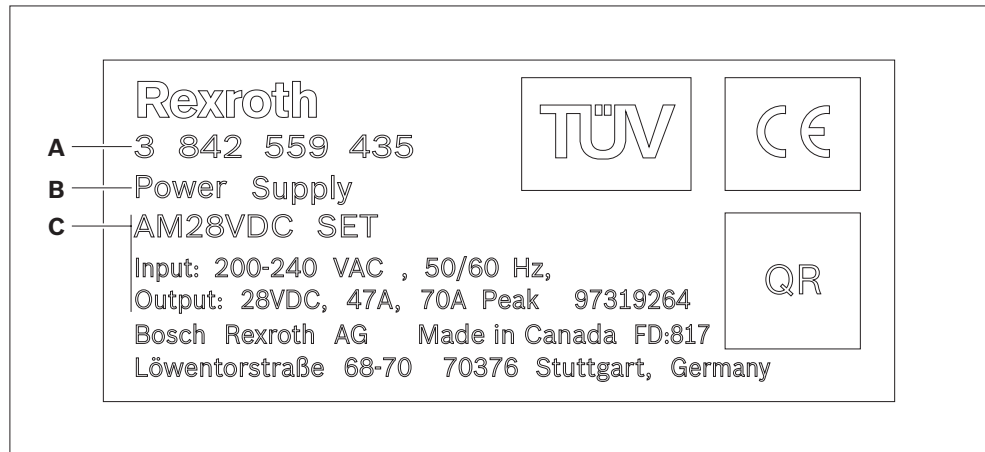


Fig. 27: Nameplate

6 Transport and storage

- Follow the transport instructions on the packaging.
- Transport weight: See shipping documents.
- Secure the product against tipping over.
- Always maintain ambient conditions during storage and transport, see “Technical data” on page 169.
- Observe the max. dimensions and axle loads for your means of transport.
- Make sure the packaging of the transported material is proper and intact.

6.1 Transporting the product

WARNING

Lifted loads may fall

Falling loads can cause serious injury (or even death).

- ▶ Wear appropriate protective equipment (e.g. safety shoes, protective gloves, etc.).
- ▶ Only use suitable lifting gear/slings with sufficiently high load capacity (see shipping documents for product weight).
- ▶ Inspect the load securing equipment.
- ▶ Make sure the lifting straps are correctly fastened before lifting the product.
- ▶ Secure the product against tipping over during lifting.
- ▶ Make sure no one but the operator is in the hazard zone during lifting and lowering.

6.2 Storing the product

- Always set the product down on a flat surface.
- Protect the product from mechanical stress.
- Protect the product from environmental factors, such as dirt and moisture.
- Observe the ambient conditions, see “Technical data” on page 169.

7 Assembly

7.1 Unpacking

- ▶ Lift the product out of the packaging.
- ▶ Dispose of the packaging in accordance with the regulations in your country.

7.2 Installation requirements

- ▶ During installation, be sure to maintain the ambient conditions specified in “Technical data” (see page 169).

7.2.1 Installation position

- ▶ Install the product so it is level, plumb, square and true. This ensures proper functioning and prevents premature wear.

7.3 Required tools

7.3.1 Mechanical

- Precision level (min. sensitivity 0.02 mm/m)
- Precision straight edge
- Rubber mallet
- 1 set of wrenches
- 1 set of hex socket wrenches
- Precision straight edge
- 0.1, 0.2, 0.25, 0.5 mm shims

7.3.2 Electrical

- Various screwdrivers with insulated handles
- Wire cutters with insulated handles
- Wire stripper with insulated handles
- Multimeter

7.4 Symbols used

Table 5: Symbols used

	<p>Connection with T-bolt and flange nut. Make sure the T-bolt is in the correct position when inserting into and tightening in the slot. The notch at the head of the T-bolt indicates its orientation. 1 = T-bolt insertion position in the slot 2 = T-bolt clamping position in the slot Tightening torque: 25 Nm</p>
<p>M_D = 20Nm</p>	<p>Hex wrench AF = width across flats [mm] M_D = required tightening torque [Nm]</p>
<p>M_D = 8Nm</p>	<p>Hex key AF = width across flats [mm] M_D = required tightening torque [Nm]</p>
<p>5 ... 10 No-Tox® HD Food Grade Oil 46</p>	<p>Lubricate/lubricate with specific oil: • No-Tox® HD Food Grade Oil 46 (www.belray.com)</p>
	<p>Parts marked with this symbol are not required for the described assembly. Dispose of them or use them for other purposes.</p>
	<p>Graphic order of the assembly steps. The numbers correspond to the order of the assembly steps in accordance with the instructions in the accompanying text.</p>
	<p>Identification of components in illustrations. The letters identify the components mentioned in the accompanying text.</p>
	<p>Detail view from a different direction, e.g. the back or the bottom of the product.</p>

7.5 Assembling the product

7.5.1 During assembly

- ▶ First assemble all section/curve modules for a system on the appropriate base frame.
 - ➔ These assembled components will be referred to as **system sections**.
- ▶ Assemble the system sections at the position of later use.
- ▶ Use a precision level (min. sensitivity 0.02 mm/m) to make sure the base frame is plumb, level and square.
- ▶ Use these system sections to assemble the overall system.

Overall systems with a length ≥ 10 m

- ▶ Begin assembly with a center system section with a section module ❶.
 - ➔ These will be referred to as **reference system sections**.

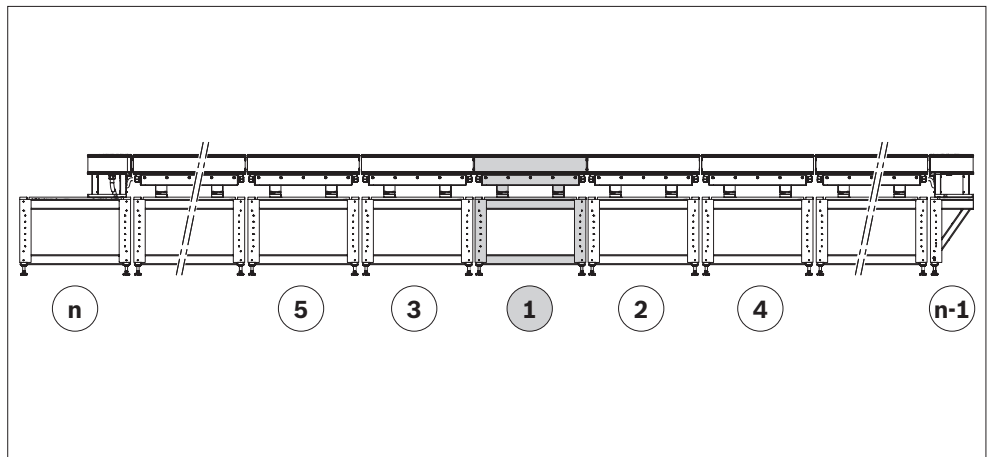


Fig. 28: Order of assembly for overall system with a length ≥ 10 m

557 186-28

- ▶ Mount additional system sections with section/curve modules on the left and right in a symmetrical manner.
- ▶ Make sure all other mounted system sections are plumb, level and square with the reference system section.

Overall systems with a length < 10 m

- ▶ Begin assembly with a system section with a section module ❶ to the left or right of a system section with a curve module.
- ▶ These system sections with section modules will be referred to as **reference system sections**.

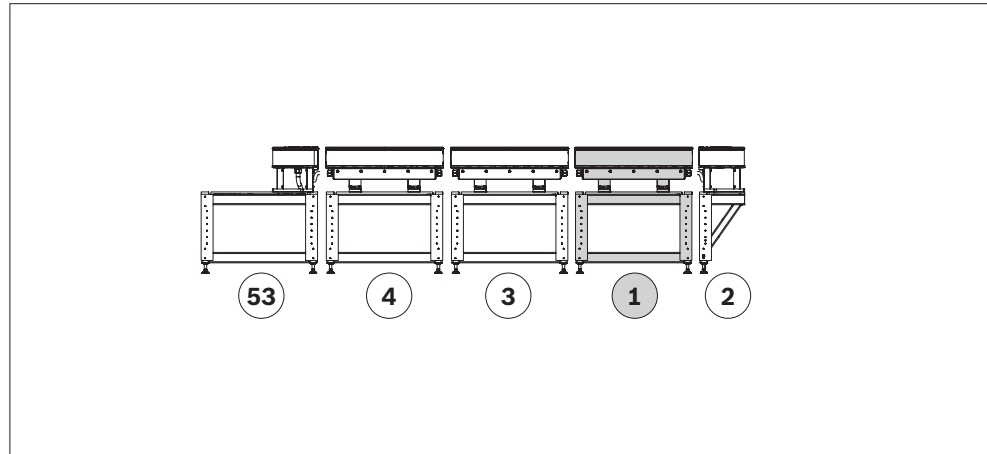


Fig. 29: Order of assembly for overall system with a length < 10 m

557 186-29

- ▶ Mount additional, adjacent system sections.
- ▶ Make sure all other mounted system sections are plumb, level and square with the reference system section.

Final inspections and adjustments

- ▶ Make sure the module spacing is 0.5 mm.
- ▶ Make sure the laminations of the linear motors between the section/curve modules are flush.
- ▶ Assemble the profile connectors on the back side of the joint between the section/curve modules.
- ▶ Adjust the transition of the V-rail with the profile connector.
- ▶ Check the transition between the section/curve modules with a workpiece pallet.

7.5.2 Setting up and aligning a base frame



Please note:

Base frames provided by the customer must:

- Be sized and designed according to the anticipated loads.
- Have the necessary mounting holes according to the dimensional drawing.

1. Set up the base frame at the final location of use.
2. Use a precision frame to make sure the base frame is level, plumb and square.

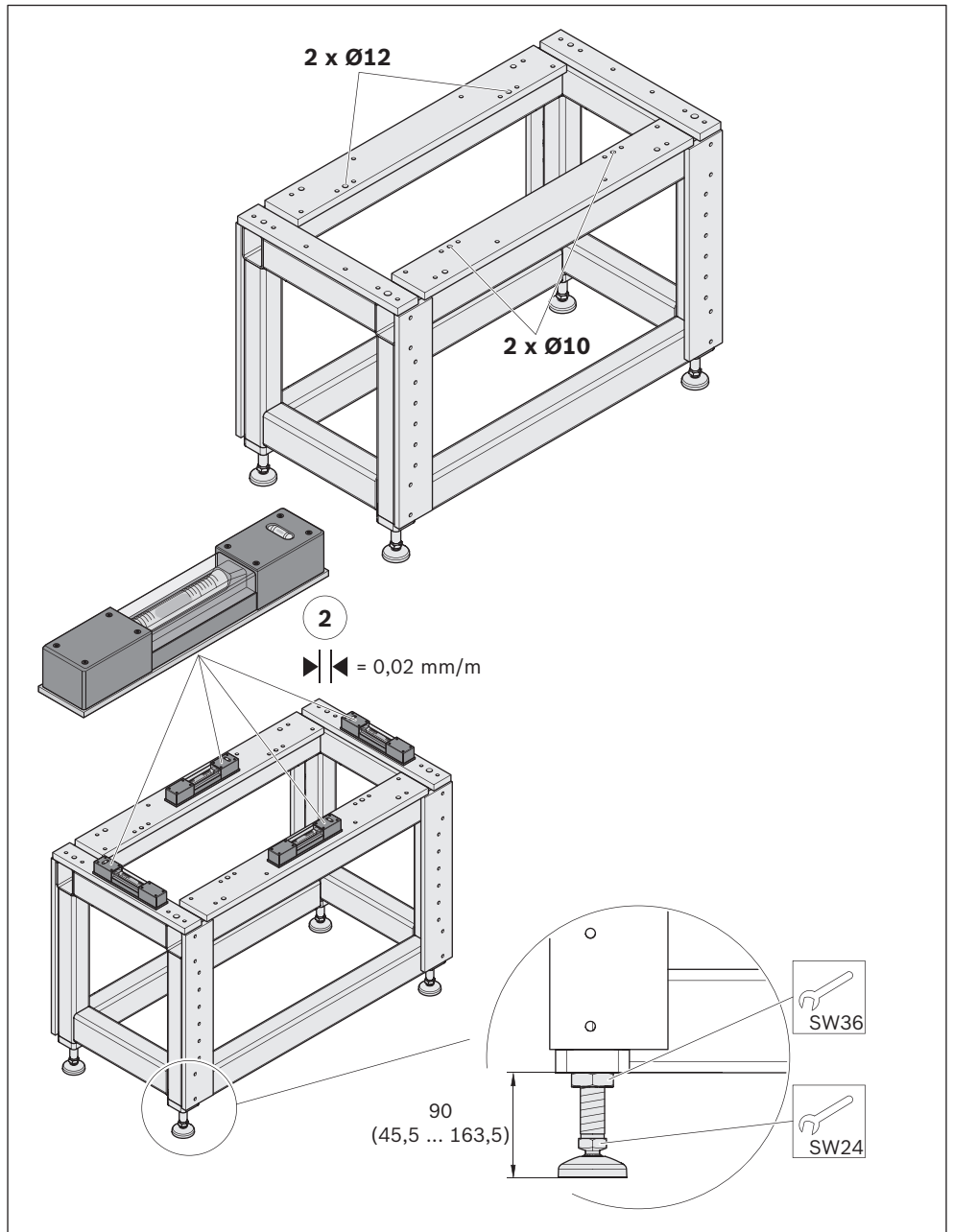


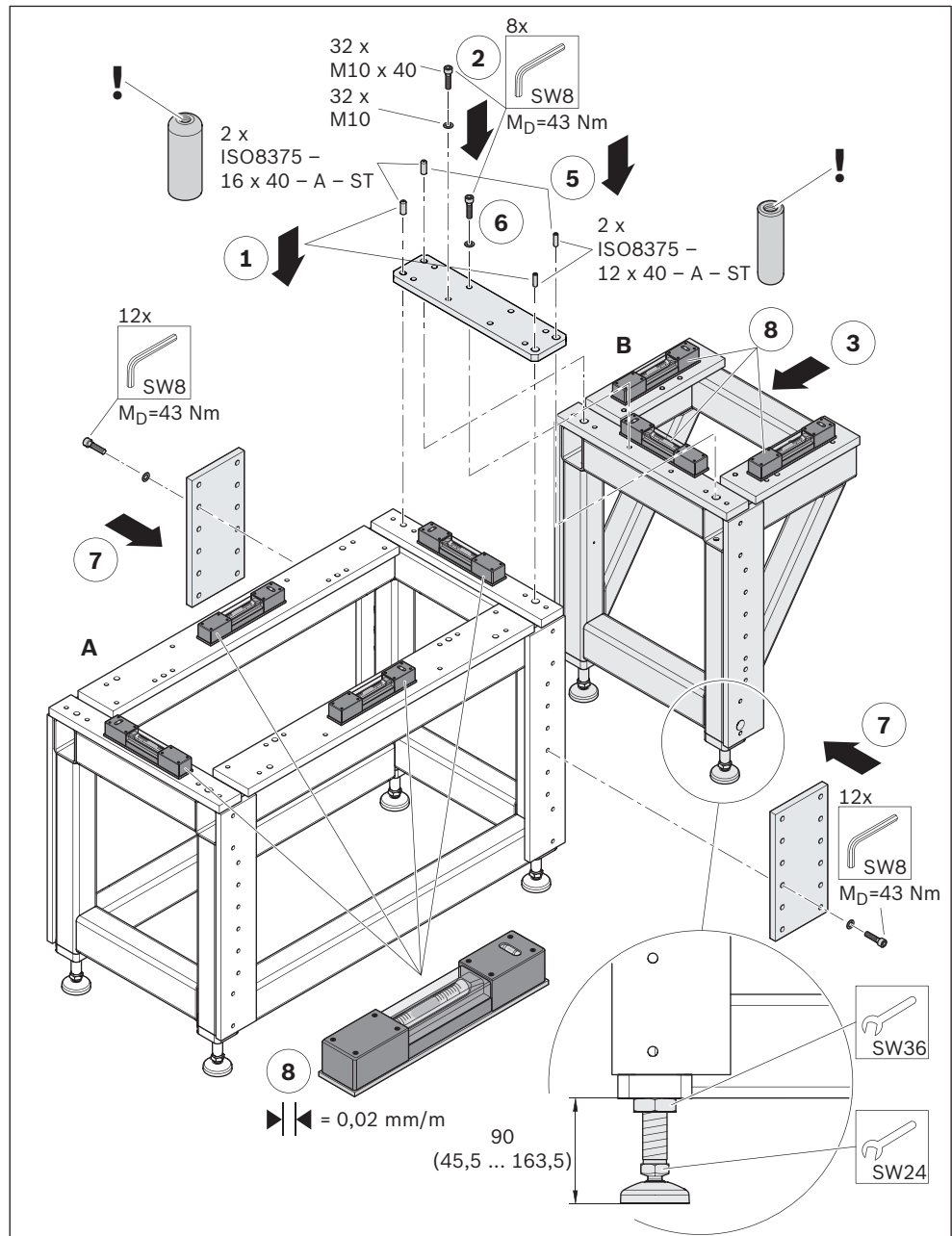
Fig. 30: Setting up and aligning a base frame 3 842 559 450

557 186-30

**Please note:**

The base frame **3 842 559 451** (short, for curve module only) is mounted with the connecting kit **3 842 559 453** to a base frame **3 842 559 450** that has already been **aligned** and aligned with it.

1. Place the upper connection plate on the base frame and fix it with 2 straight pins.
2. Tighten the upper connection plate.
3. Position the short base frame under the mounted connection plate.
4. Align the short base frame vertically and horizontally.
5. Insert 2 straight pins for fixing to the upper connection plate.
6. Tighten the upper connection plate.
7. Mount the side connection plates (on both sides).
8. Use a precision level to make sure both base frames are level, plumb and square.



557 186-31

Fig. 31: Setting up and aligning a base frame 3 842 559 451

7.5.3 Mounting section module on a base frame



Please note:

The base frame must be mounted in the final place of use on a base frame that has already been aligned (see Fig. 30 on page Page 53).

1. Position the fixing plates over the mounting holes in the base frame.
2. Hammer the straight pins through the locating holes in the fixing plates and into the holes in the base frame.

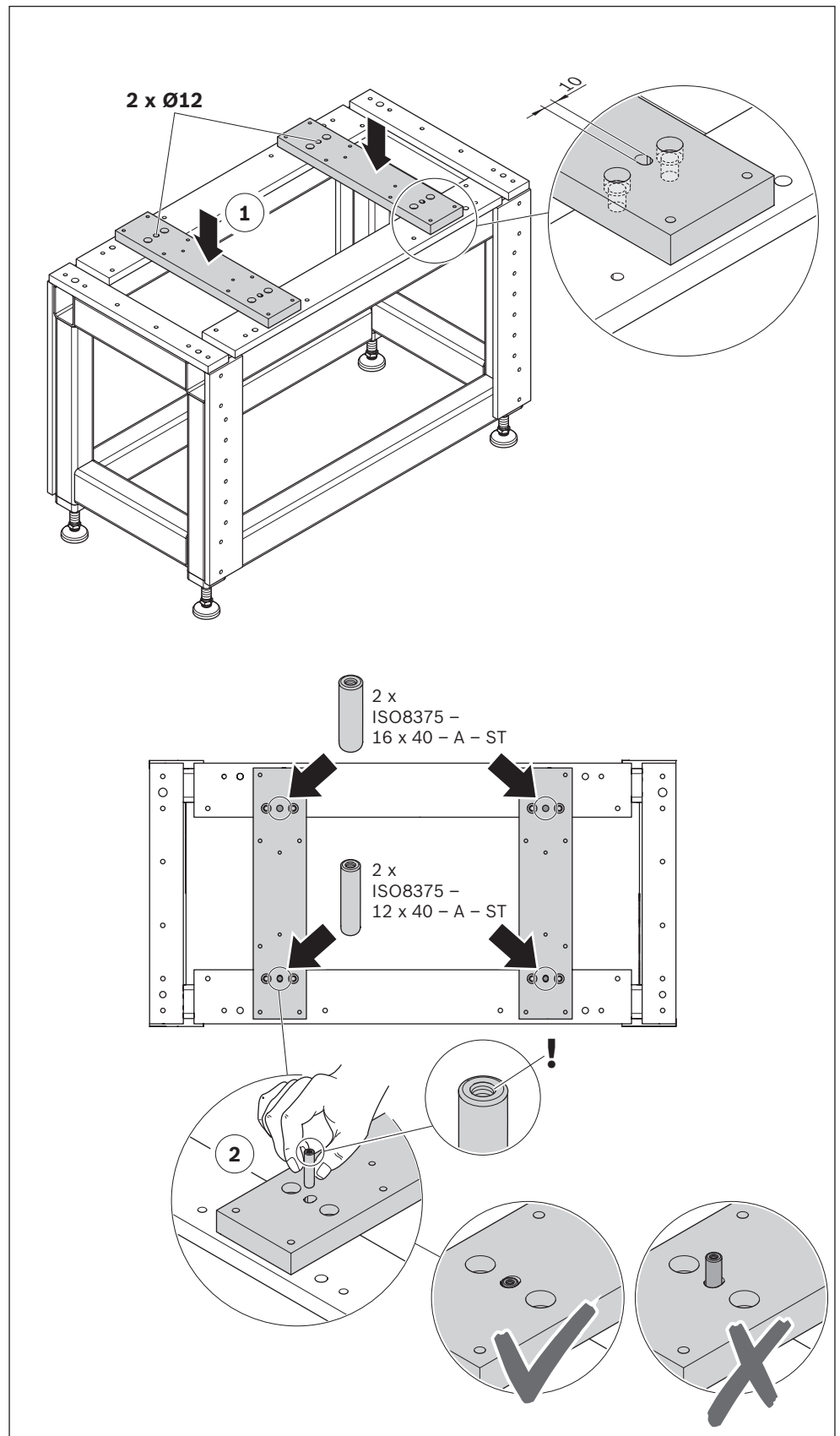
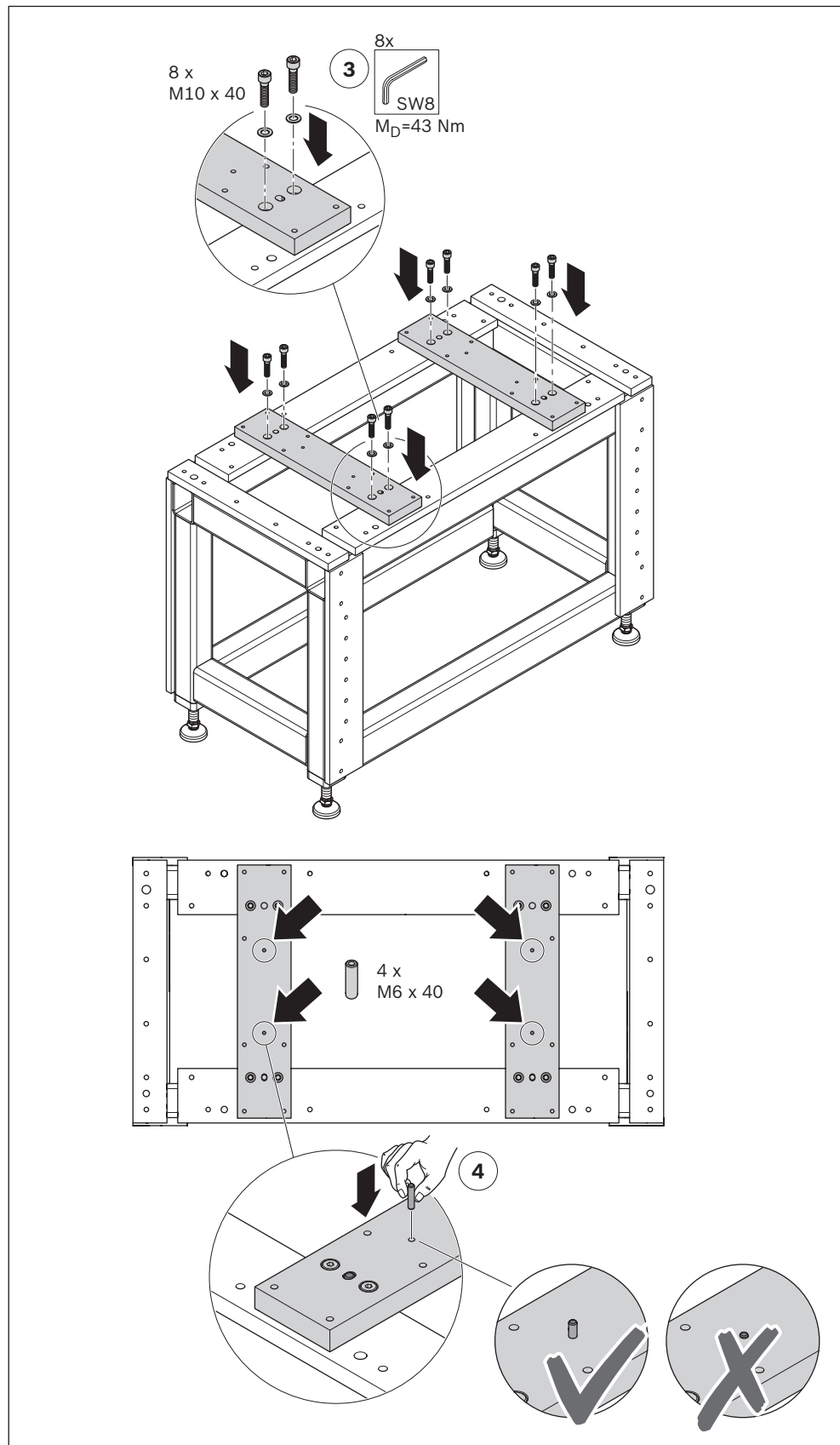


Fig. 32: Mounting fixing plates (1)

3. Screw down the fixing plates.
4. Hammer 4 straight pins halfway into the fixing plates.



557 186-33

Fig. 33: Mounting fixing plates (2)

5. Place the section module on a firm surface.
6. Remove the T-slot stones for fixing the profile connector.
7. Push the T-slot stones for the module holders into the slots in the section module. The thread for the headless setscrew needs to be over the index hole in the section module.
8. Screw the headless setscrew through the T-slot stones and into the run profile.

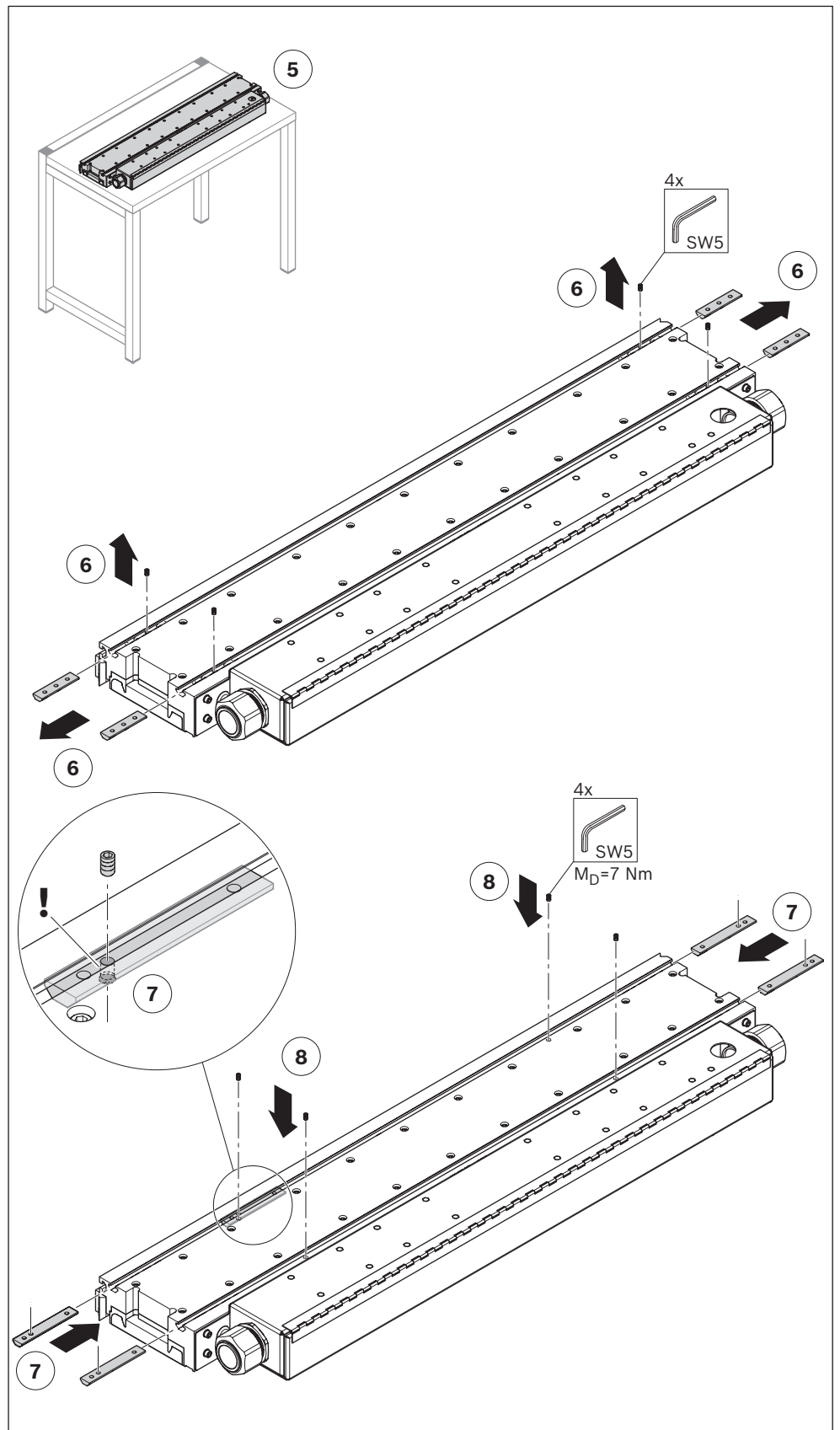


Fig. 34: Mounting module holder on a section module (1)

9. Install the module holders and align them.

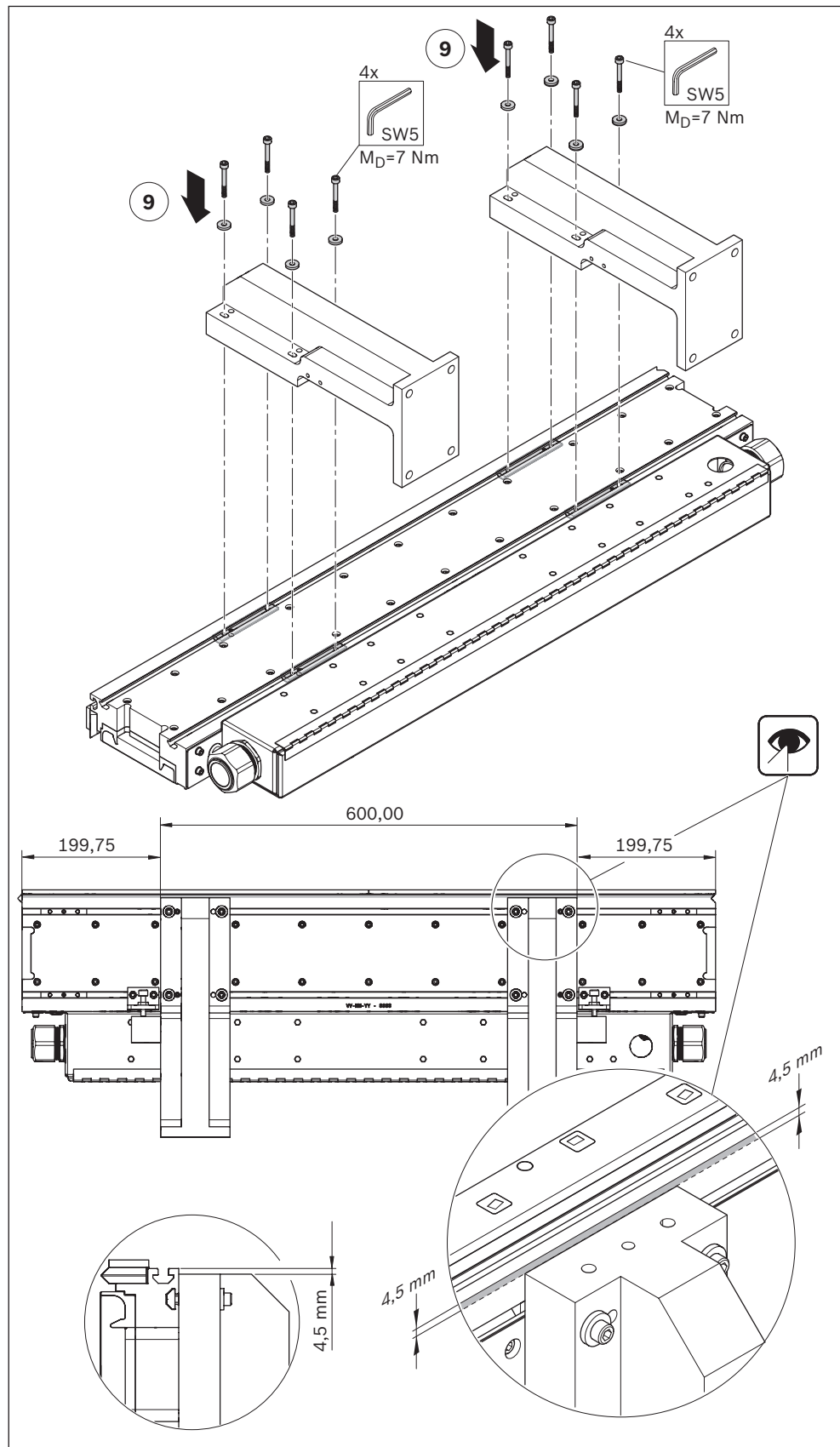


Fig. 35: Mounting module holder on a section module (2)

557 186-35

- 10. Mount the section module in the center of the fixing plates. Slightly tighten the fastening screws.
- 11. Place a straight pin between each module holder and the straight pin in the fixing plate.
- 12. Push the section module against the straight pin.
- 13. Tighten the fastening screws.

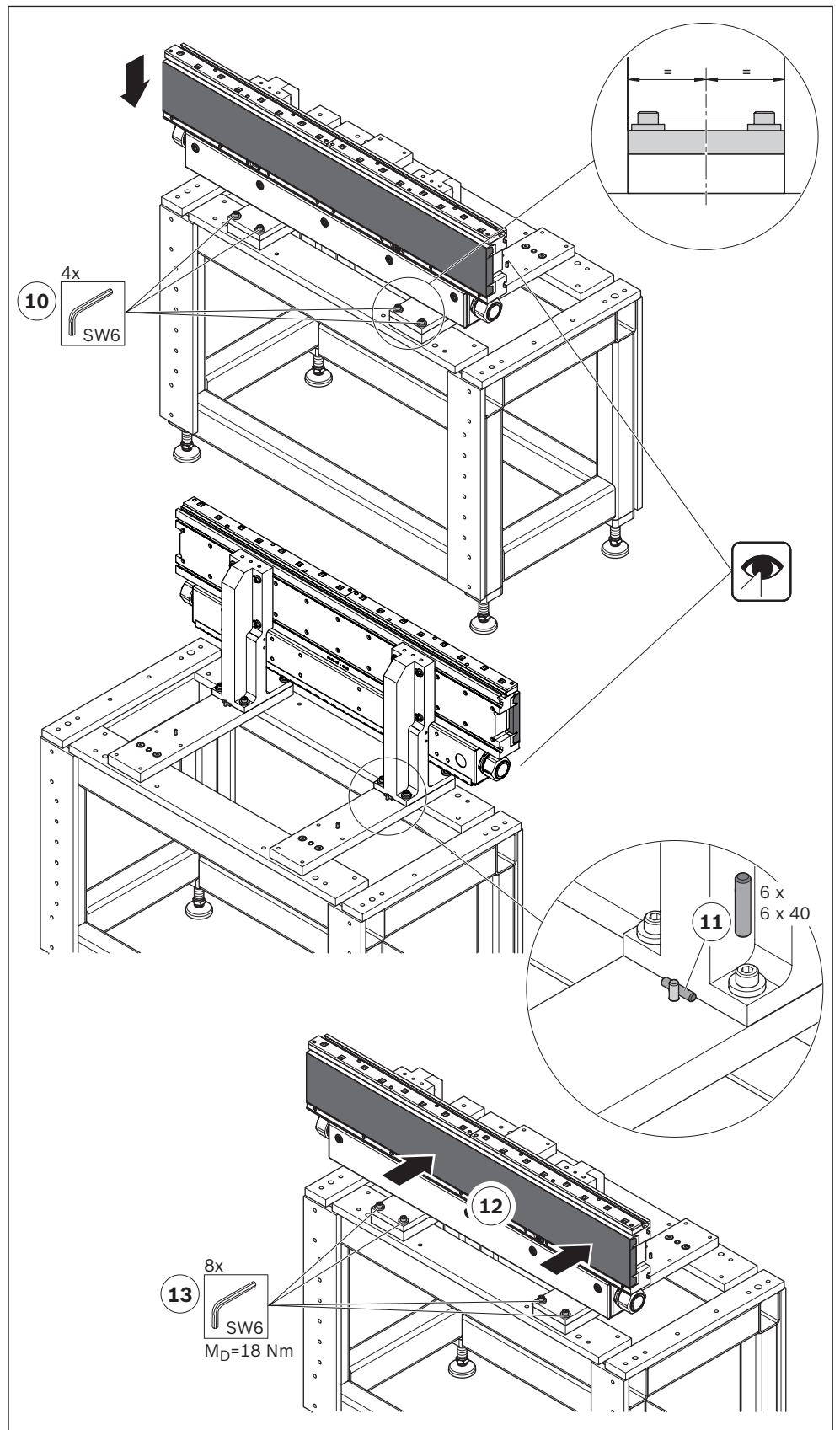


Fig. 36: Mounting section module on a base frame (1)

- 14. Install the vertical adjustment.
- 15. Turn the adjusting screw all the way down on the block and lock the screw.
- 16. Install the T-slot stones for fixing the profile connector. The thread for the headless setscrew needs to be over the index hole in the section module.

► Mount the second section module on the base frame accordingly.

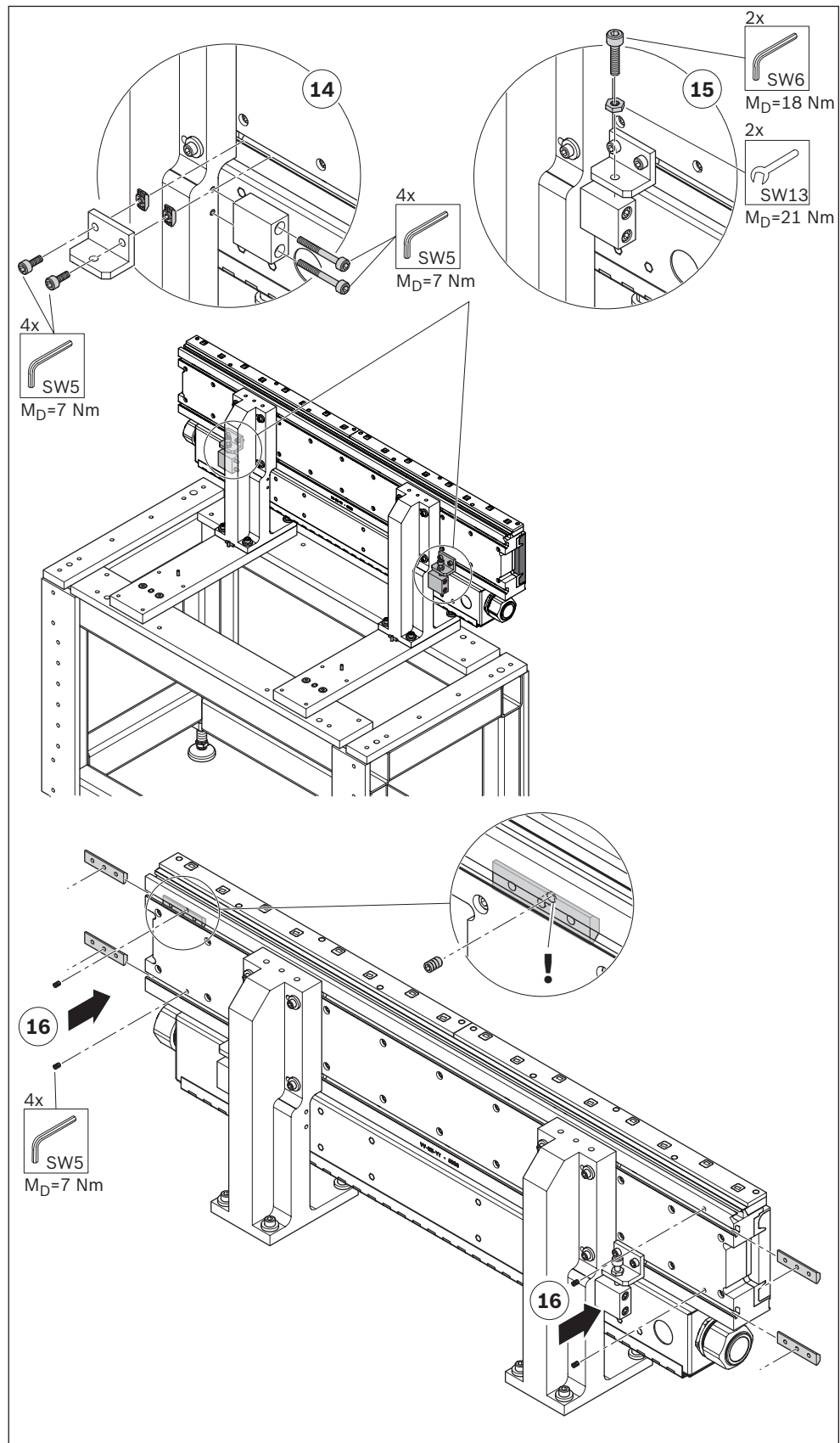


Fig. 37: Mounting section module on a base frame (2)

557 186-37

- 17. Check that the fronts of both section modules are flush.
- 18. Use a precision level to make sure both section modules are level, plumb and square.



Please note:

If the section modules not be properly aligned, recheck the alignment of the base frame and the mounting dimensions for the section module in Fig. 35. If necessary, repeat/check the entire assembly.

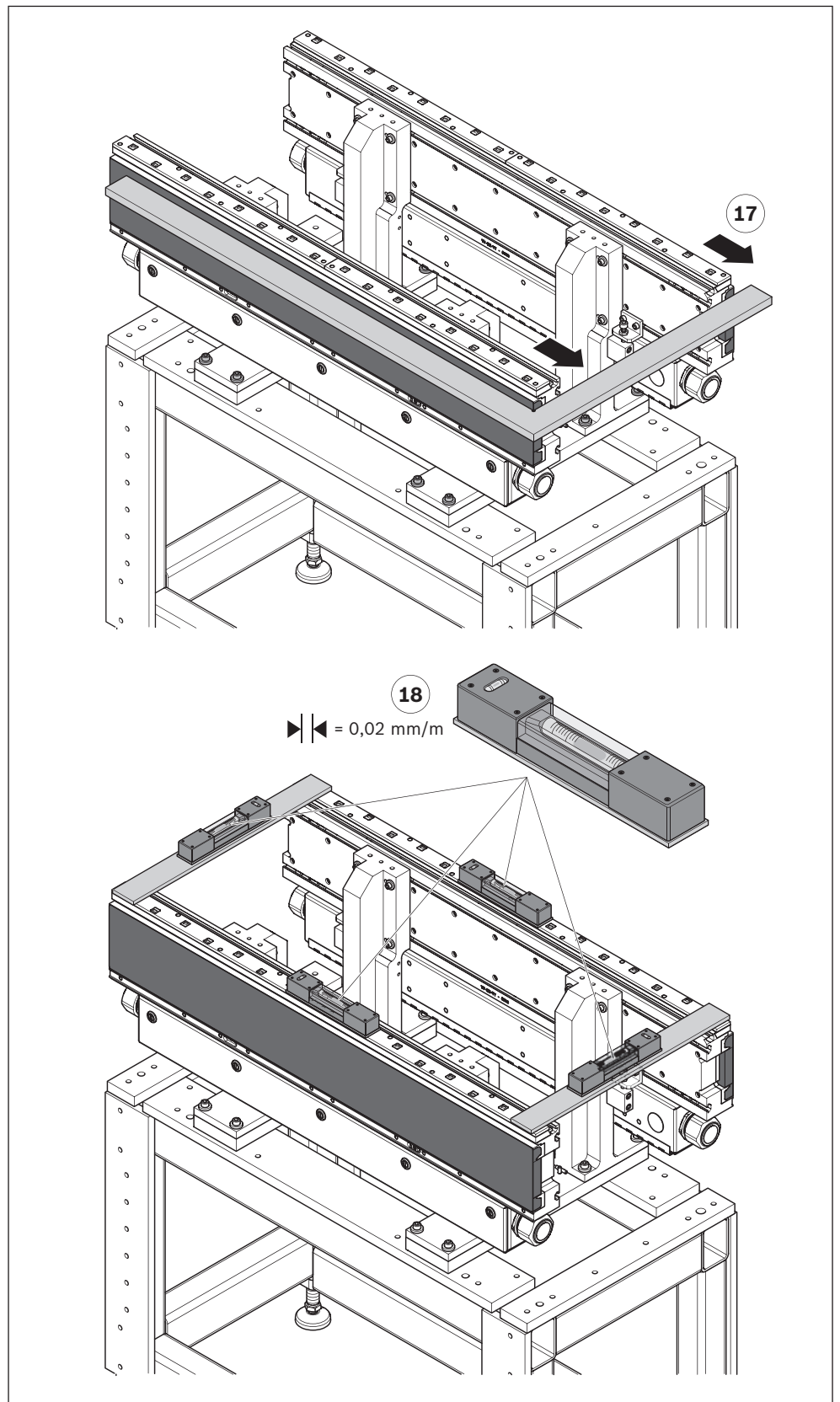


Fig. 38: Checking section module alignment

7.5.4 Mounting curve module on a base frame

**Please note:**

- Assembly should be done in the final place of use on a **system section that has already been aligned** (see Fig. 31 on Page 54).
- Assemble on a short base frame in the same fashion.

1. Mount the fixing plate for the curve module on the base frame.
2. Set the curve module on the fixing plate. Only tighten the screws somewhat.
3. Insert an adjusting screw in each curve module holder.

A: M8 x 75 fastening screw

B: M6 spring washer

C: Adjusting screw

D: Lock nut

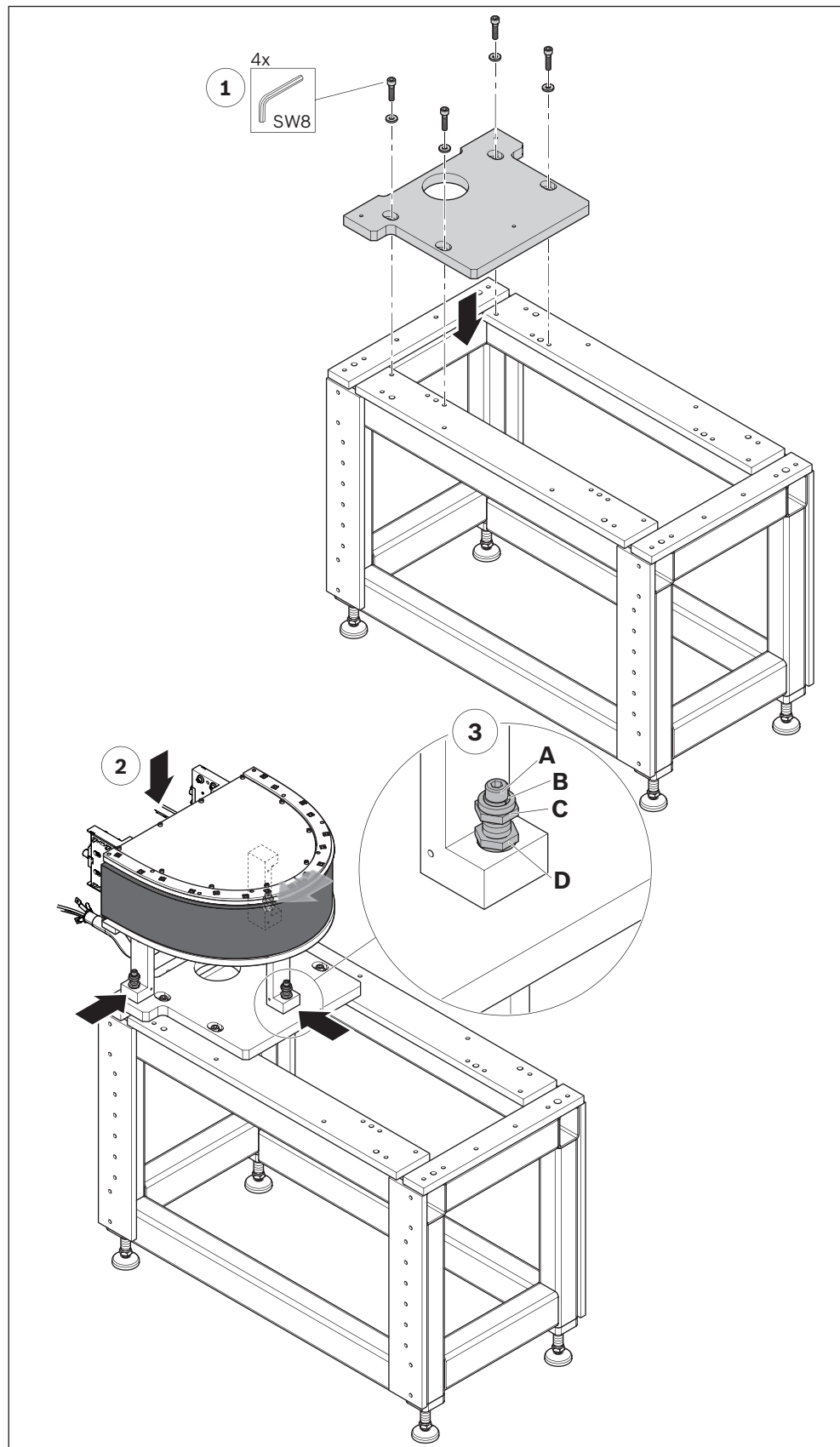


Fig. 39: Mounting curve module on a base frame (1)

557 186-39



Please note:

It may be necessary to readjust the position and vertical alignment of the curve module when assembling the entire system.

4. For more precise aligning, remove the cover from the curve module.
5. Use a precision level and the adjusting screws to make sure the curve module is level, plumb and square.
6. Lock the adjusting screws with the locking nuts.
7. Tighten the fastening screws.
8. Align the curve module with the front center of the base frame.
9. Tighten the fastening screws in the fixing plate.
10. Install the module holder covers.
11. Install the curve module cover.

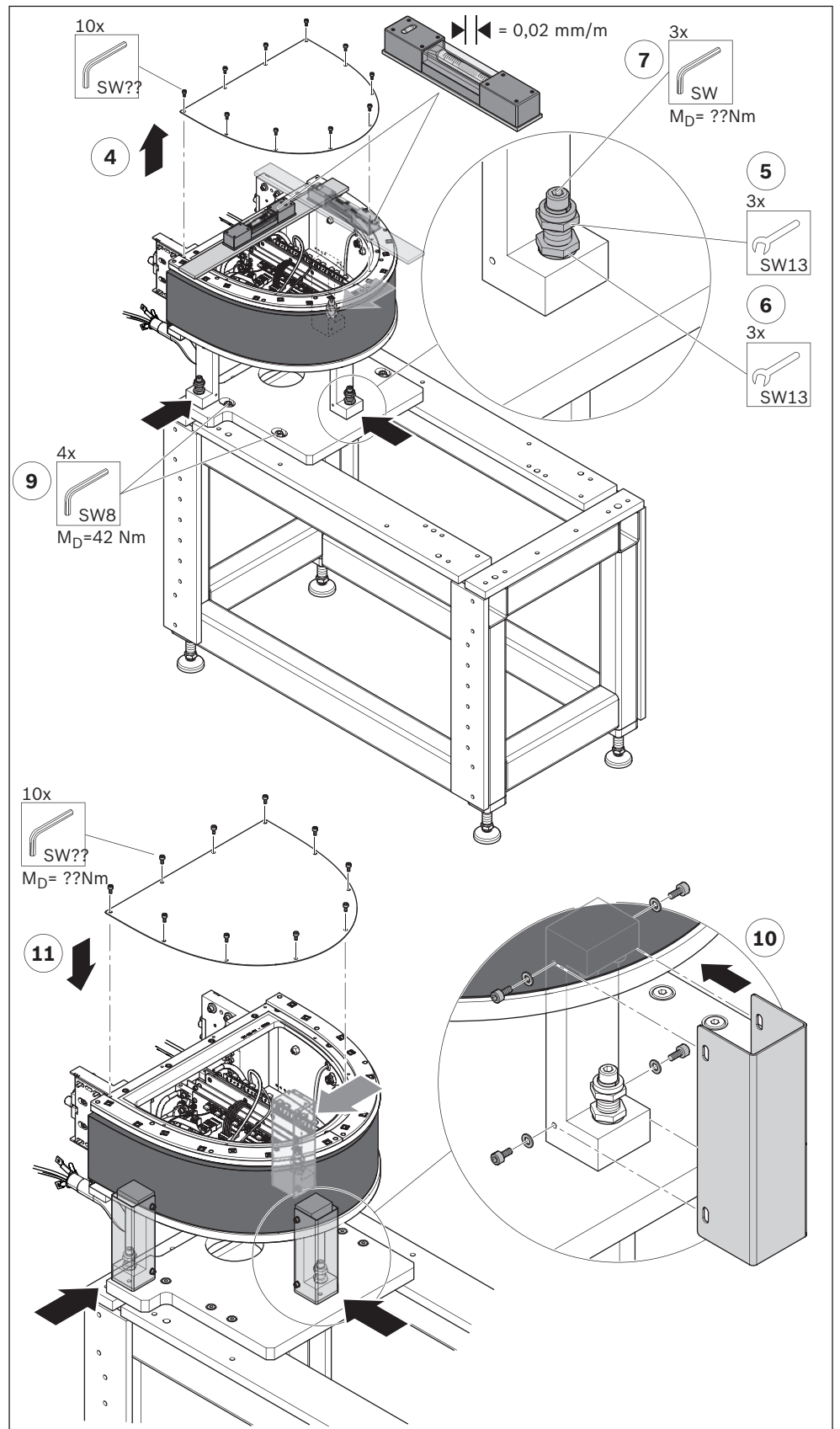


Fig. 40: Mounting curve module on a base frame (2)

7.5.5 Adding and connecting system sections

**Please note:**

Before adding and connecting the system sections, check that they are all aligned with and the same height as the reference system section.

- A:** System section with section module
- B:** System section with curve module
- C:** Holding-down clamp
- D:** Top lock nut
- E:** Bottom lock nut
- F:** Leveling foot

1. Check the alignment of the system section with section module (see Fig. 38 on page 61).
2. Check the alignment of the system section with curve module (see Fig. 40 on page 63).
3. If necessary, adjust the height to match the reference system section:
Loosen the top lock nut (D) and screw the leveling foot (F) in or out accordingly. Tighten the top lock nut.

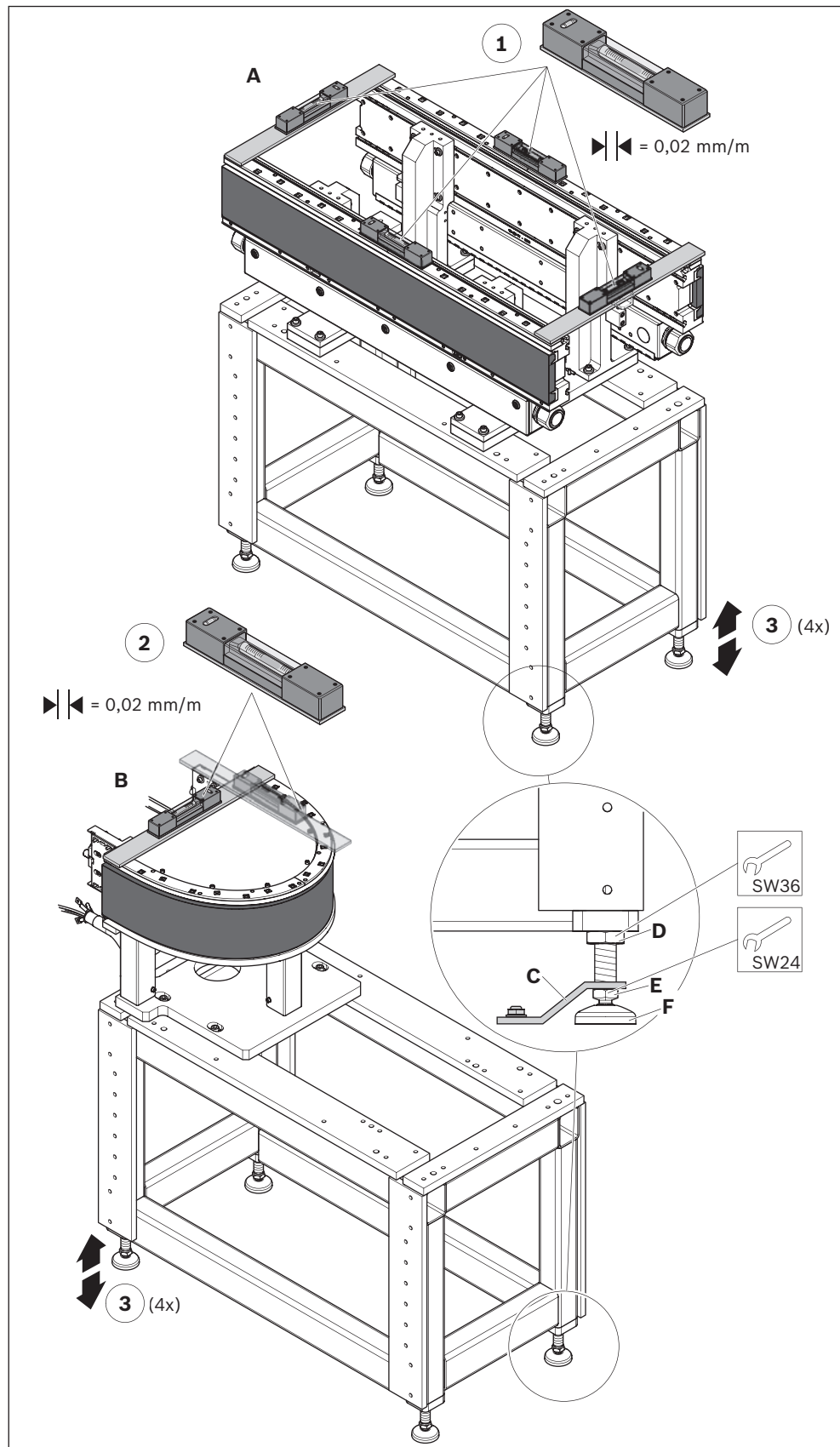


Fig. 41: Checking system section alignment

557 186-41



Please note:

Unlike the connection plate for the section module, the top connection plate of the curve module is recessed on the left and right.

Use the following connecting kits depending on the system section being added:

- Section module connecting kit **3 842 559 452**
- Curve module connecting kit **3 842 559 453**

A: Reference system section

B: System section being added

4. Place both top connection plates on the base frame of the reference system section (A) and fix them with straight pins.

5. Tighten both top connection plates.

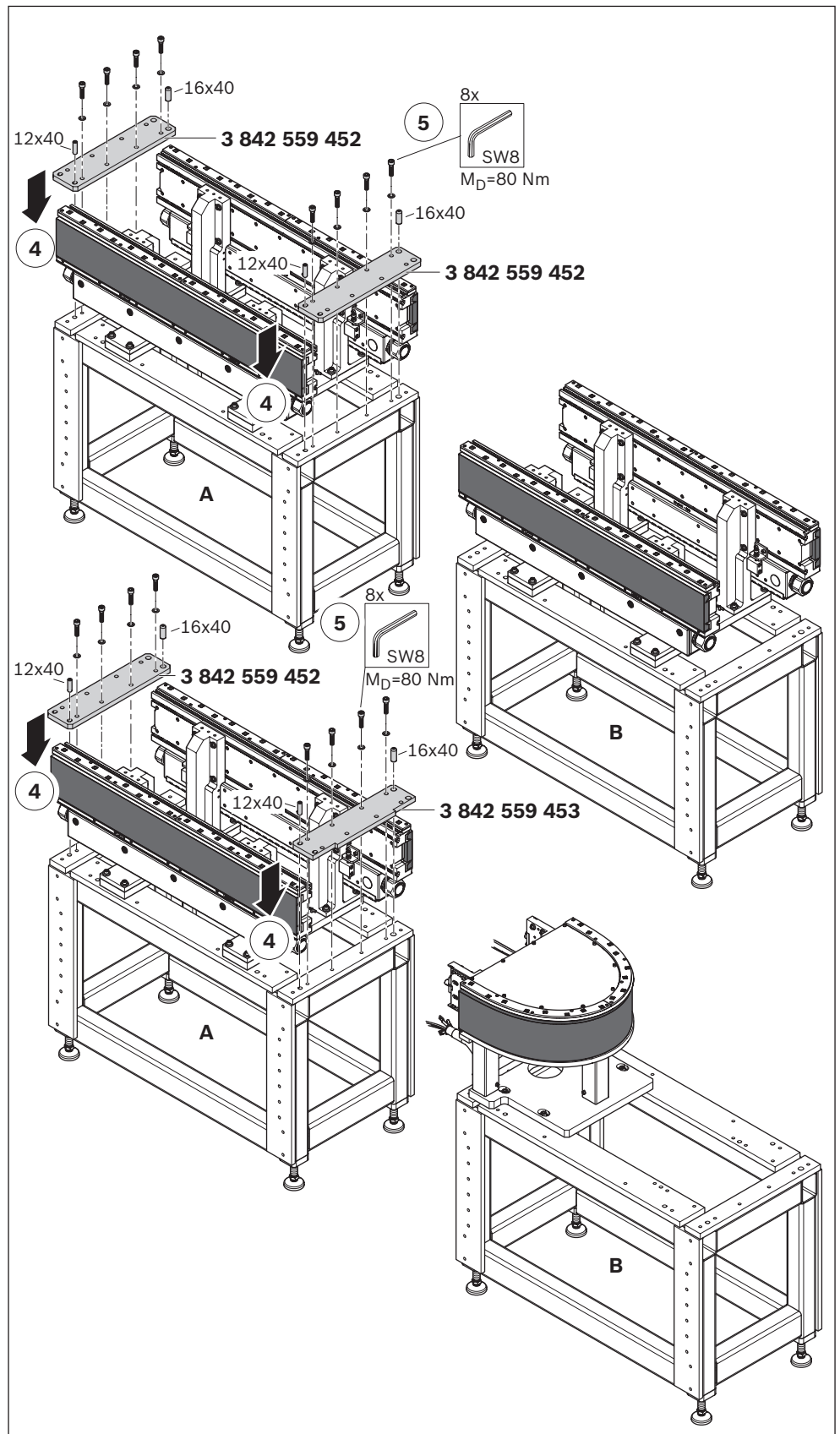


Fig. 42: Mounting upper connecting plate

6. Position the system section being added (B) under the connection plate on the reference system section (A).
7. Align the system section so it is level, plumb, square and the same height as the reference system section (see Fig. 41 on page 64).
8. Insert 2 straight pins for fixing to the upper connection plate.
9. Tighten the top connection plate somewhat.
10. Mount the side connection plates loosely (on both sides).

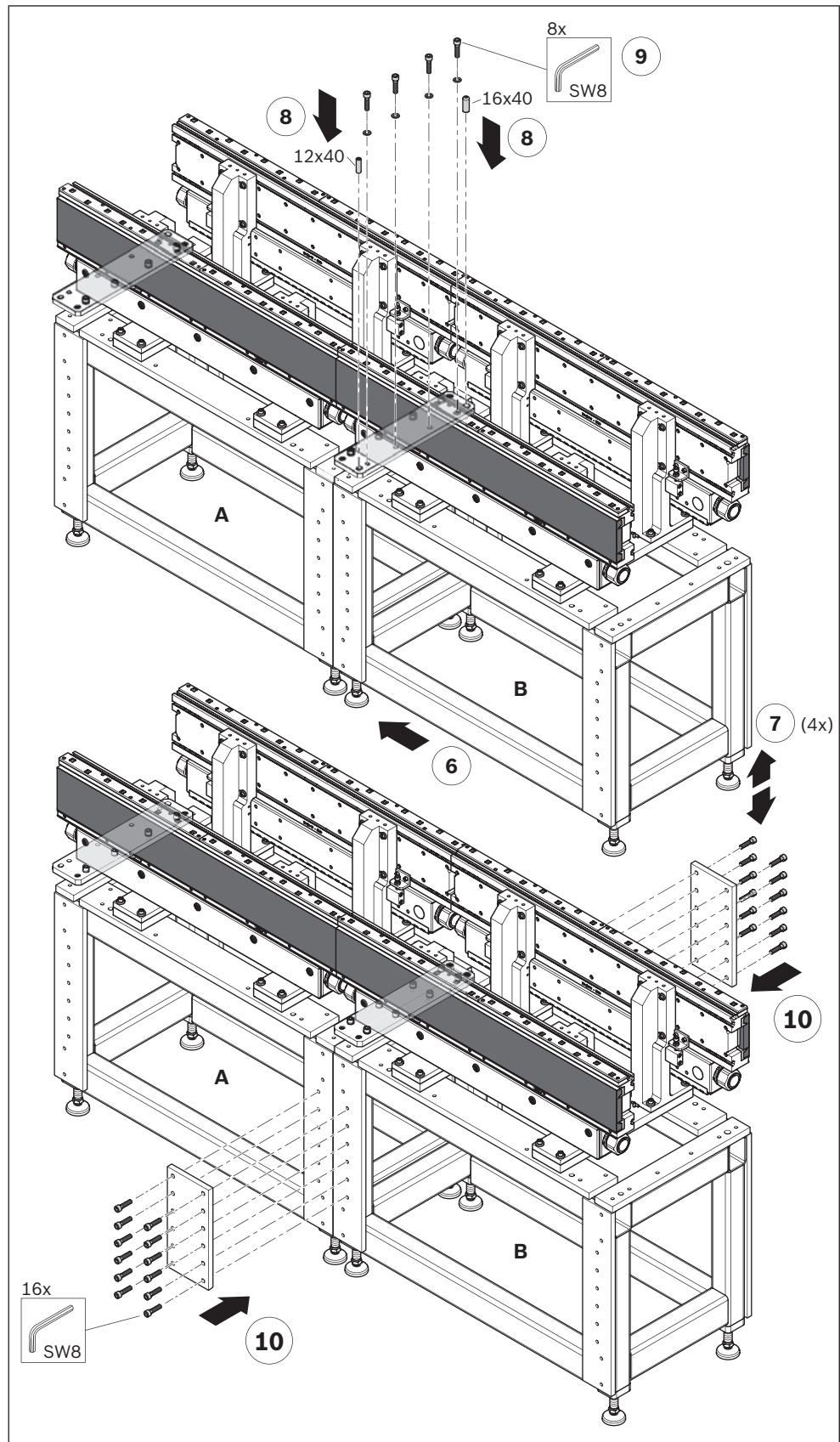


Fig. 43: Connecting system sections (2 section modules shown here) (1)

557 186-43



Please note:

Due to thermal expansion during operation, the modules should always have a min. spacing of 0.5 mm from each other. This spacing should never be less than 0.5 mm.

Required tool

- 0.5 mm plastic feeler gauge

11. Make sure all modules have a min. spacing of 0.5 mm from each other.

12. Tighten the upper connection plate.

13. Tighten the side connection plates (on both sides).

- Add all other system sections in the same fashion.

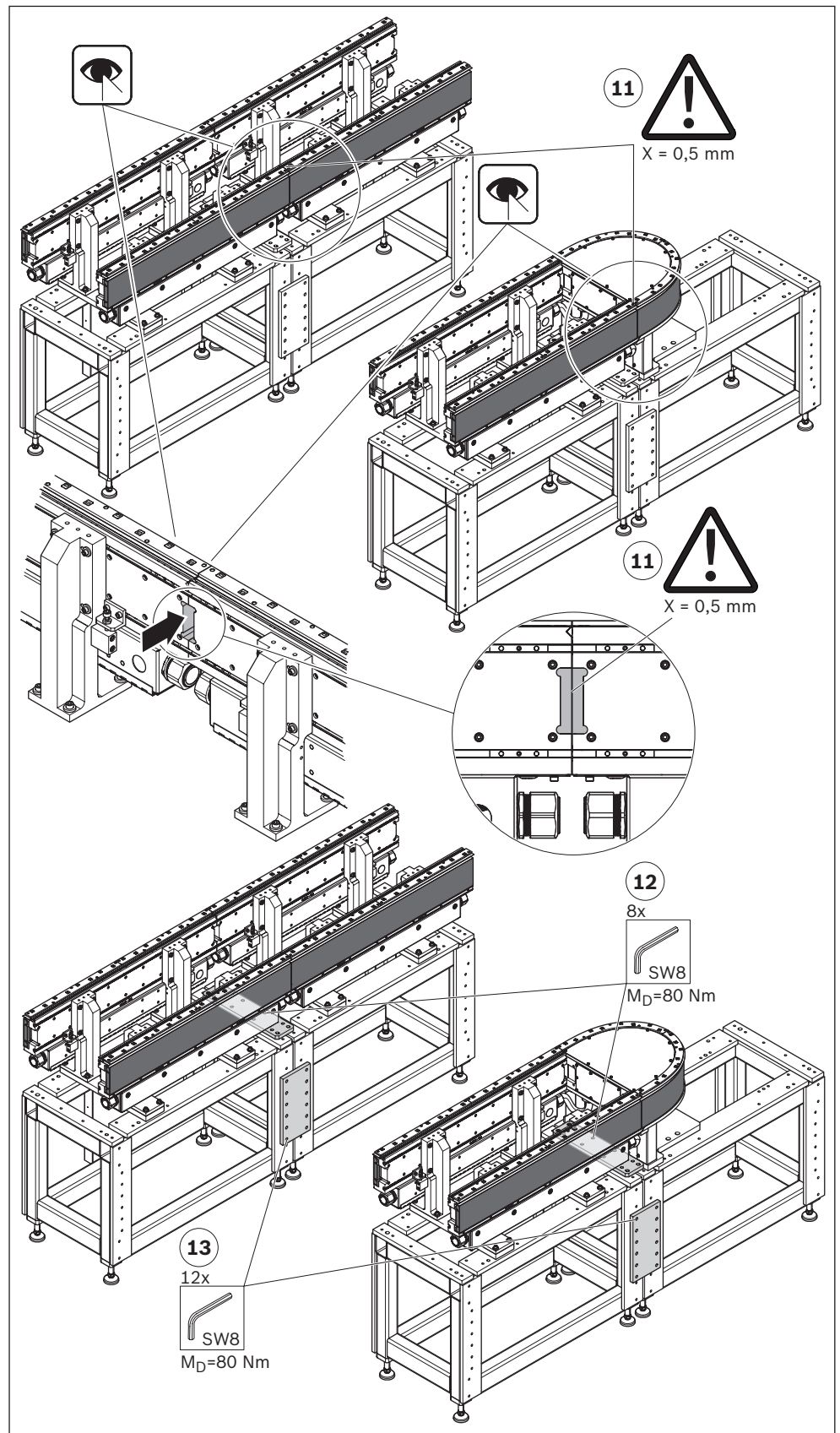


Fig. 44: Connecting system sections (2)

7.5.6 Aligning section modules (rough adjustment)

**Please note:**

- Minimize lateral offset during this step as much as possible. Fine adjustments will be made later.
- Due to thermal expansion during operation, the modules should always have a min. spacing of 0.5 mm from each other. This spacing should never be less than 0.5 mm.

Required tool

- 0.5 mm plastic feeler gauge

1. Use your finger and a straight edge to check that the V-rails have the lowest possible **lateral offset** at the joints.
2. To align the section modules, loosen the bottom fastening screws in both module holders and move them accordingly.
3. Make sure all modules have a min. spacing of 0.5 mm from each other.
4. Tighten the fastening screws.

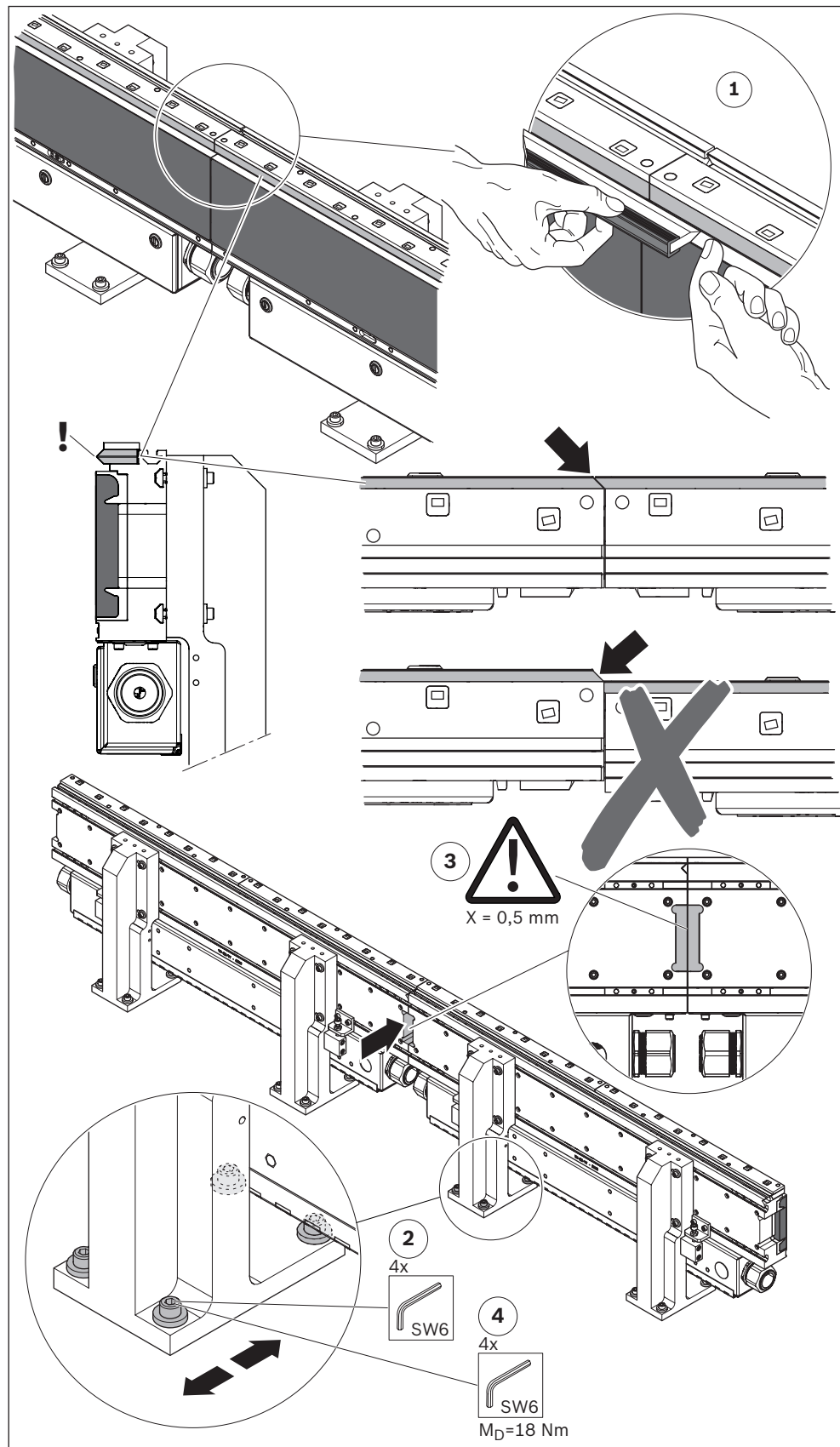


Fig. 45: Adjusting lateral offset of section modules (rough adjustment)

557 186-45

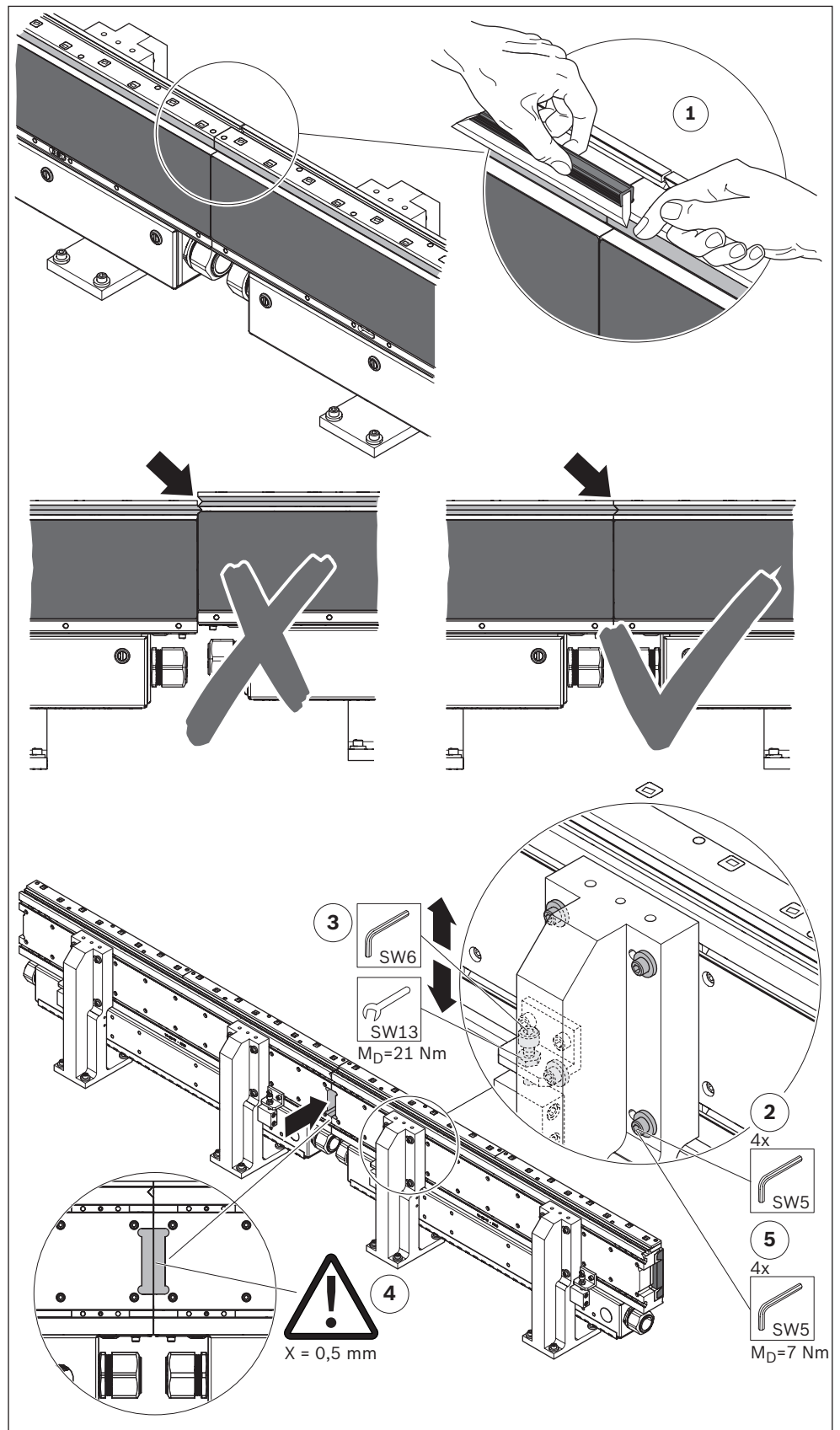
i Please note:

- Minimize height offset during this step as much as possible. Fine adjustments will be made later.
- Due to thermal expansion during operation, the modules should always have a min. spacing of 0.5 mm from each other. This spacing should never be less than 0.5 mm.

Required tool

- 0.5 mm plastic feeler gauge

1. Use your finger and a straight edge to check that the V-rails have the lowest possible **height offset** at the joints.
2. To align the section modules, loosen the top fastening screws in both module holders.
3. Adjust the height with the adjusting screw.
4. Make sure all modules have a min. spacing of 0.5 mm from each other.
5. Tighten the fastening screws.



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Fig. 46: Adjusting height offset of section modules (rough adjustment)

557 186-46

**Please note:**

Profile connectors (B) are mounted symmetrically in the connection point (C) between:

- 2 section modules, or
- 1 section module and 1 curve module

1. Make sure the corner of the adjusting wedge is flush with the center groove of the profile connector.
2. Make sure the foam part (D) is glued on.
3. Insert the connecting block (A) with the chamfer facing outward.

**Please note:**

The connecting block should be in direct contact with both coil cores (iron on iron).

4. Install the profile connector (B) in the T-slots of the section modules and tighten the screws.
5. Tighten the lock screws in the T-slot stones.

7.5.7 Installing profile connectors

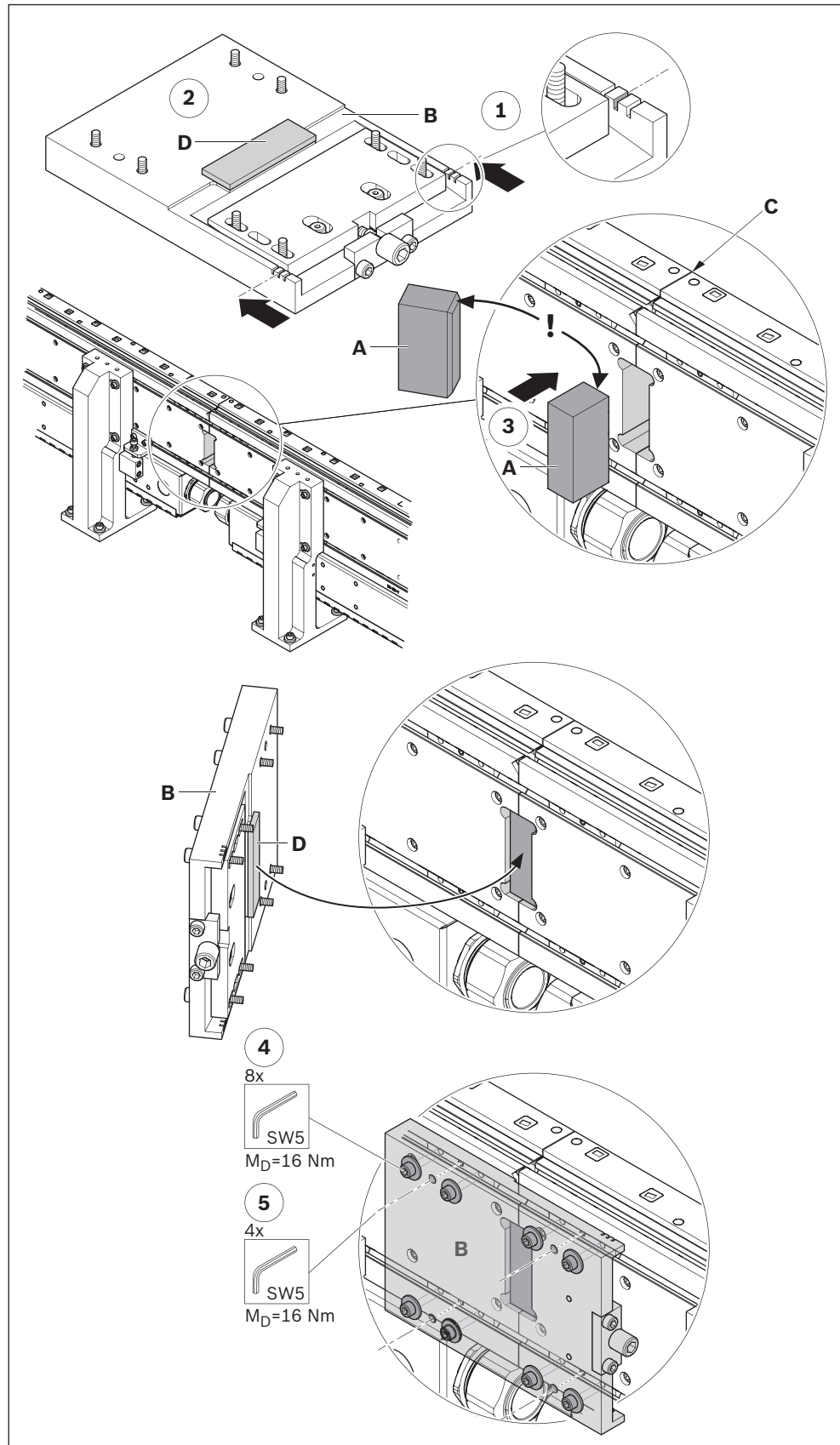


Fig. 47: Installing profile connector between 2 section modules

557 186-47

1. Make sure the corner of the adjusting wedge is flush with the center groove of the profile connector.
2. Make sure the foam part (D) is glued on.
3. Insert the connecting block (A) with the chamfer facing outward.



Please note:

The connecting block should be in direct contact with both coil cores (iron on iron).

4. Install the profile connector (B) in the T-slots of the section modules and the mounting holes of the curve module. Tighten the screws.



Please note:

The screws for the curve module are longer (M6 x 45).

5. Tighten the lock screws in the T-slot stones.

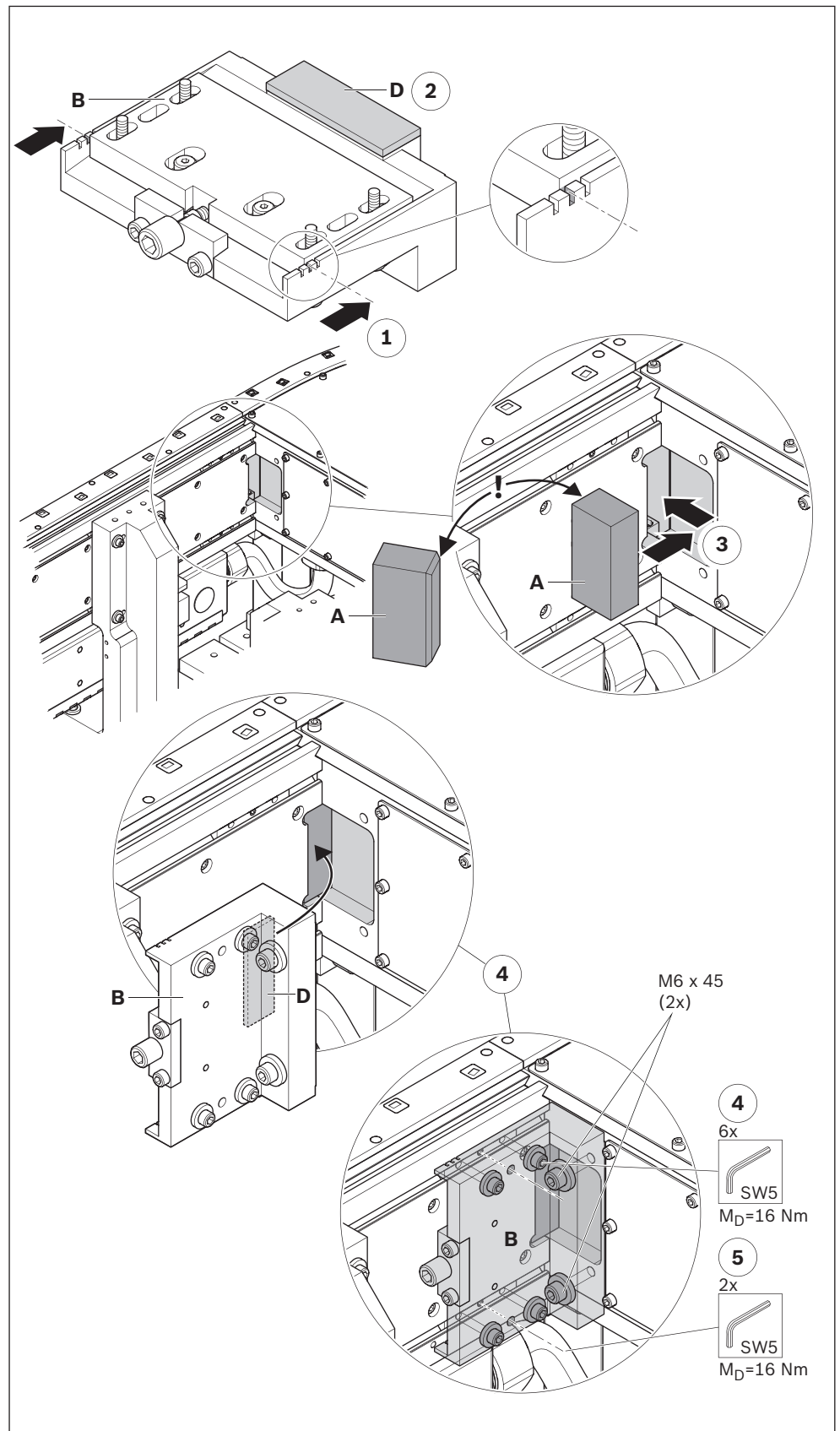


Fig. 48: Installing profile connector between section module and curve module

7.5.8 Aligning the V-rail (fine adjustment)



Please note:

- Adjust the height and lateral offset of the V-rail in alternating fashion until the rail is flush throughout and the transition between guide rails when the workpiece pallet crosses the joint is no longer audible.
- If the lateral offset is $> \pm 0.05$ mm, first consult Fig. 52 and then Fig. 51.

1. Make sure all fastening screws in the connecting kit (A) and module holders (B) are tight.
2. Check the height and lateral offset of the guide rails with your finger and a straight edge.
3. Adjust the height offset (see Fig. 50 on page 73).
4. Adjust the lateral offset (see Fig. 51 on page 73).

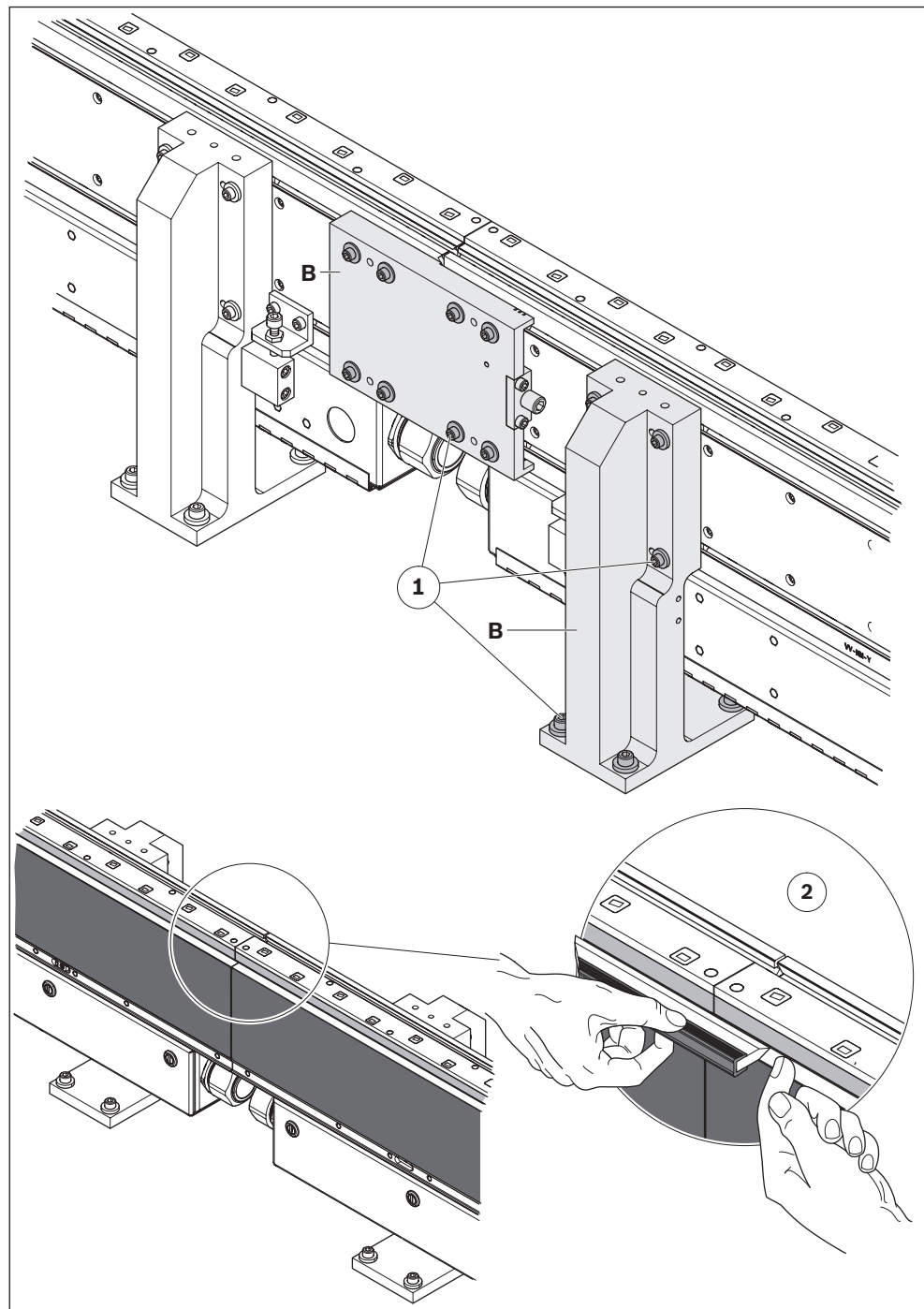


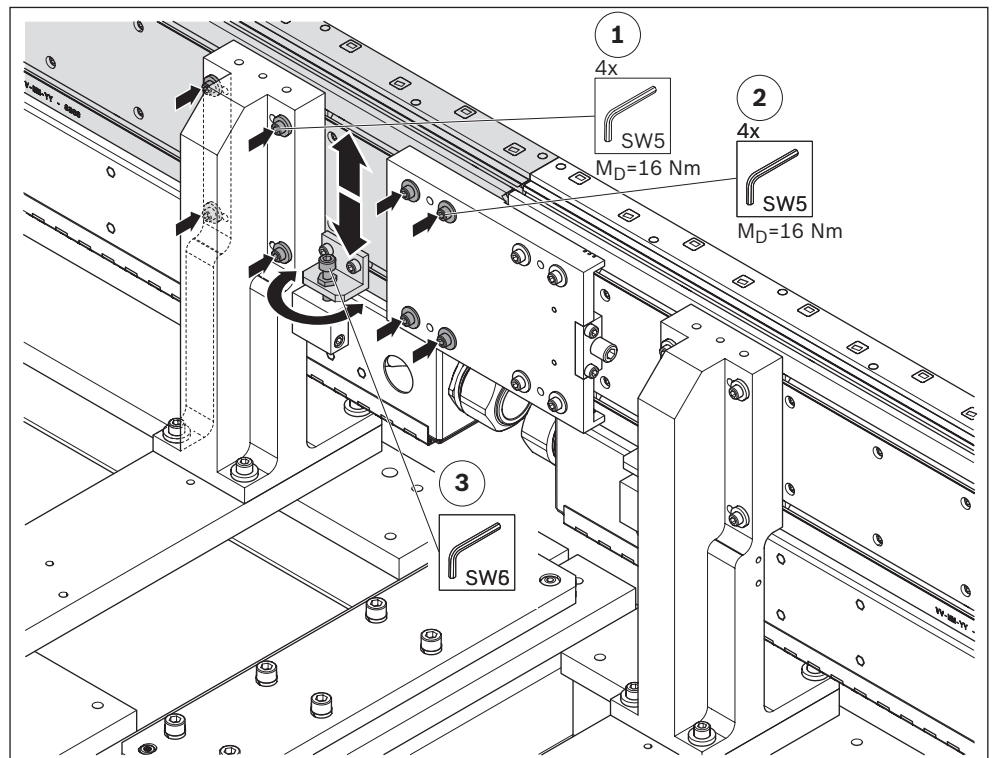
Fig. 49: Checking height and lateral offset of the V-rail

557 186-49

1. Loosen the fastening screws for the module holder.
2. Loosen the fastening screws for the connecting kit.
3. Turn the adjusting screw on the vertical adjustment until the guide rails are flush.

Rotational direction	Adjustment
Right	Up
Left	Down

4. Tighten the fastening screws for the module holder and connecting kit, and lock the adjusting screw.



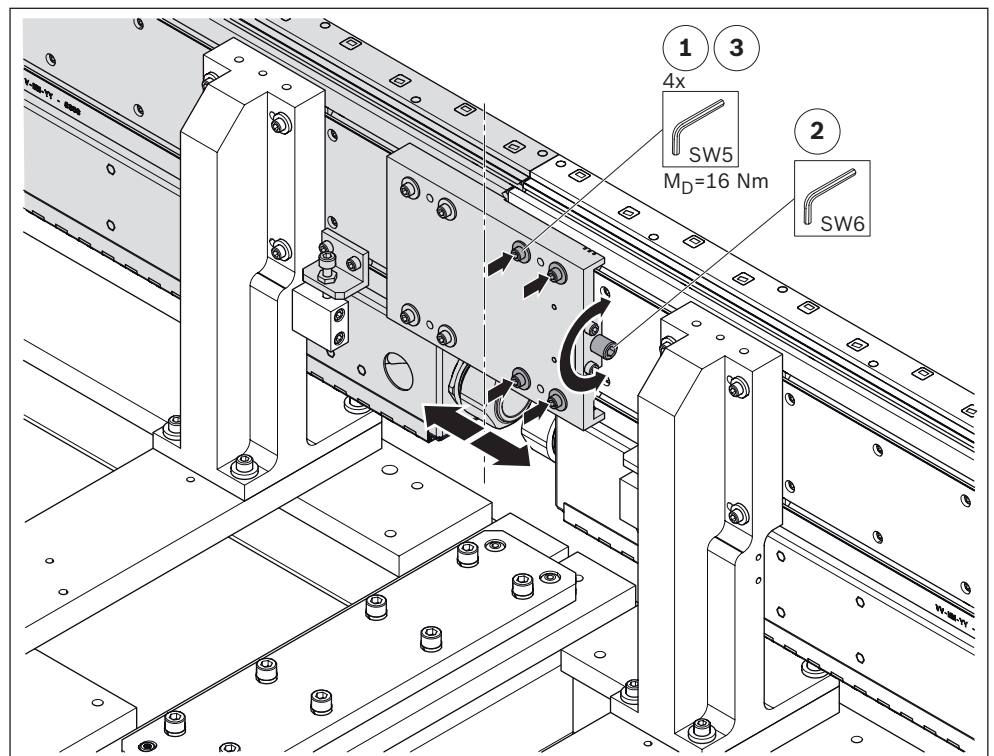
557 186-50

Fig. 50: Adjusting height offset to $\leq \pm 0.05$ mm (fine adjustment)

1. Loosen the fastening screws for the connecting kit.
2. Turn the adjusting screw on the lateral adjuster until the guide rails are flush.

Rotational direction	Adjustment
Right	In
Left	Out

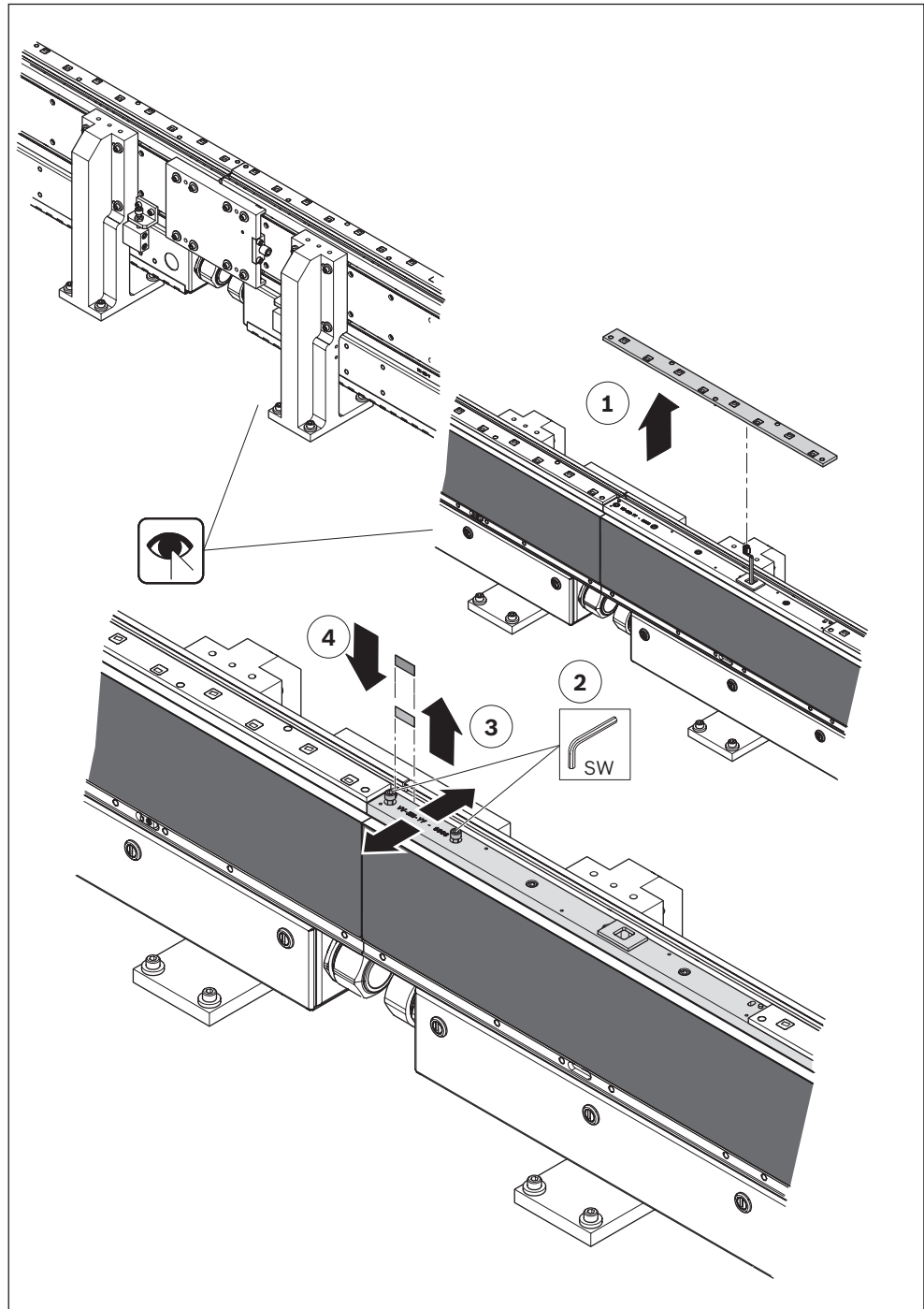
3. Tighten the fastening screws for the connecting kit.



557 186-51

Fig. 51: Adjusting lateral offset to $\leq \pm 0.05$ mm (fine adjustment)

1. Remove the measuring system (encoder) (see Section 10.4.23).
 2. Loosen the screws in the V-rail.
 3. Remove the inserted spacer (0.25 mm) from the V-rail being adjusted.
 4. Insert a spacer of the required thickness in the same location.
- Install the V-rail and measuring system (encoder) in reverse order.



557 186-52

Fig. 52: Adjusting lateral offset to $> \pm 0.05$ mm

7.5.9 Mounting and aligning guide rails

1. Place the guide rails (A) on the magnets (B). Pay attention to the coding (X).



Please note:

- The long 1,000 mm guide rails should always be over the joint between 2 section modules.
- The short 500 mm guide rails should always be at the end of a section module joining a curve module.

2. If the guide rail in the section module is not flush with the guide rail in the curve module, loosen the screws in the adjuster (C).
3. Turn the adjusting screw (D) in the adjuster until you can no longer feel an offset between the guide rails.
4. Tighten the screws in the adjuster (C).

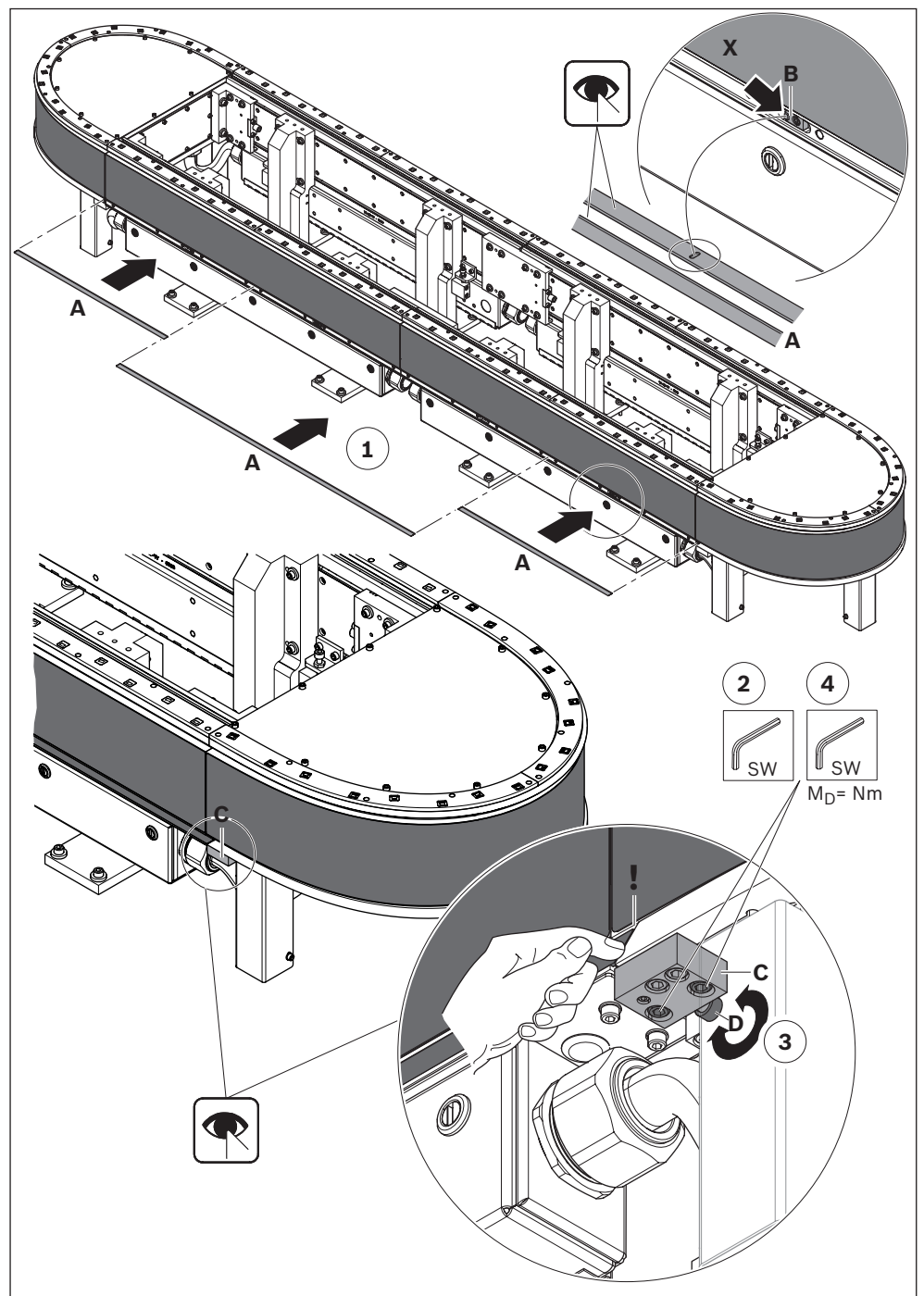


Fig. 53: Mounting and aligning guide rails

557 186-53

7.5.10 Mounting/removing workpiece pallets

CAUTION

Strong magnetic field!



Risk of injury from strong magnetic fields in areas marked with this hazard symbol.



Workpiece pallets generate a strong magnetic field when they are not mounted to the linear motor system.

- This strong magnetic field can be harmful to persons with pacemakers and other medical implants.
- The magnetic field of the ActiveMover linear motor system can cause magnetic materials to move, which may result in flying objects or crushing/dismemberment.
- Electronic equipment and magnetic data carriers can be affected by the magnetic field.
- ▶ Persons with pacemakers or other medical implants should maintain a min. distance of 30 cm between the implant and the workpiece pallet.
- ▶ Persons with pacemakers or other medical implants should not perform maintenance on or service the product.
- ▶ Keep metallic objects away from the workpiece pallets and the section/curve modules.
- ▶ When workpiece pallets are unmounted, keep their protection plates on them. For attachment instructions, see Page 77.
- ▶ Also follow the safety instructions in Section “General safety instructions for magnets” on page 33.

Injury from workpiece pallets suddenly releasing during removal

Removing the workpiece pallet requires a considerable amount of force even with the remover tool. Once the magnetic pull strength is overcome, the workpiece pallet will release suddenly.

- ▶ Only use the included remover tool.
- ▶ Always hold the remover tool with both hands.
- ▶ Secure your footing to keep from falling backward.
- ▶ Be prepared for the workpiece pallet to release suddenly.

Risk of crushing when mounting/removing workpiece pallets

The other workpiece pallets near the remover tool pose a risk of hands and fingers being crushed.

- ▶ Remove all workpiece pallets near the remover tool.

Crushing injury when placing the protection plate on the magnet kit of the WT!

The high magnetic pull strength will suddenly pull the protection plate toward the magnet kit as it approaches it.

- ▶ Be prepared for the high pull strength.
- ▶ Set the protection plate on the magnet kit **with the plastic cover on**.
- ▶ Do not put any body parts between the protection plate and the magnet kit.



Please note:

- Keep the protection plates in a safe place. Always attach the protection plates during removal.
- Set the protection plate on the magnet kit **with the plastic cover on**.
- The discharger brush guards should be in the slot below the V-rail.

1. Remove all workpiece pallets near the remover tool.
2. Open the locking hook (B) on the remover tool (A).
3. Attach the remover tool (shorter arm on the left).
4. Secure the remover tool with the locking hook (B) and the detent screw (C).

NOTICE

Damage due to negligent workpiece pallet mounting

If the workpiece pallet is set on the section or curve module too hard, it can damage the WT itself or the section/curve module cover.

- ▶ Only use the included remover tool.
- ▶ Always hold the remover tool with both hands.
- ▶ Be prepared for the high pull strength.
- ▶ Set the WT on the section/curve module carefully and as gently as possible.

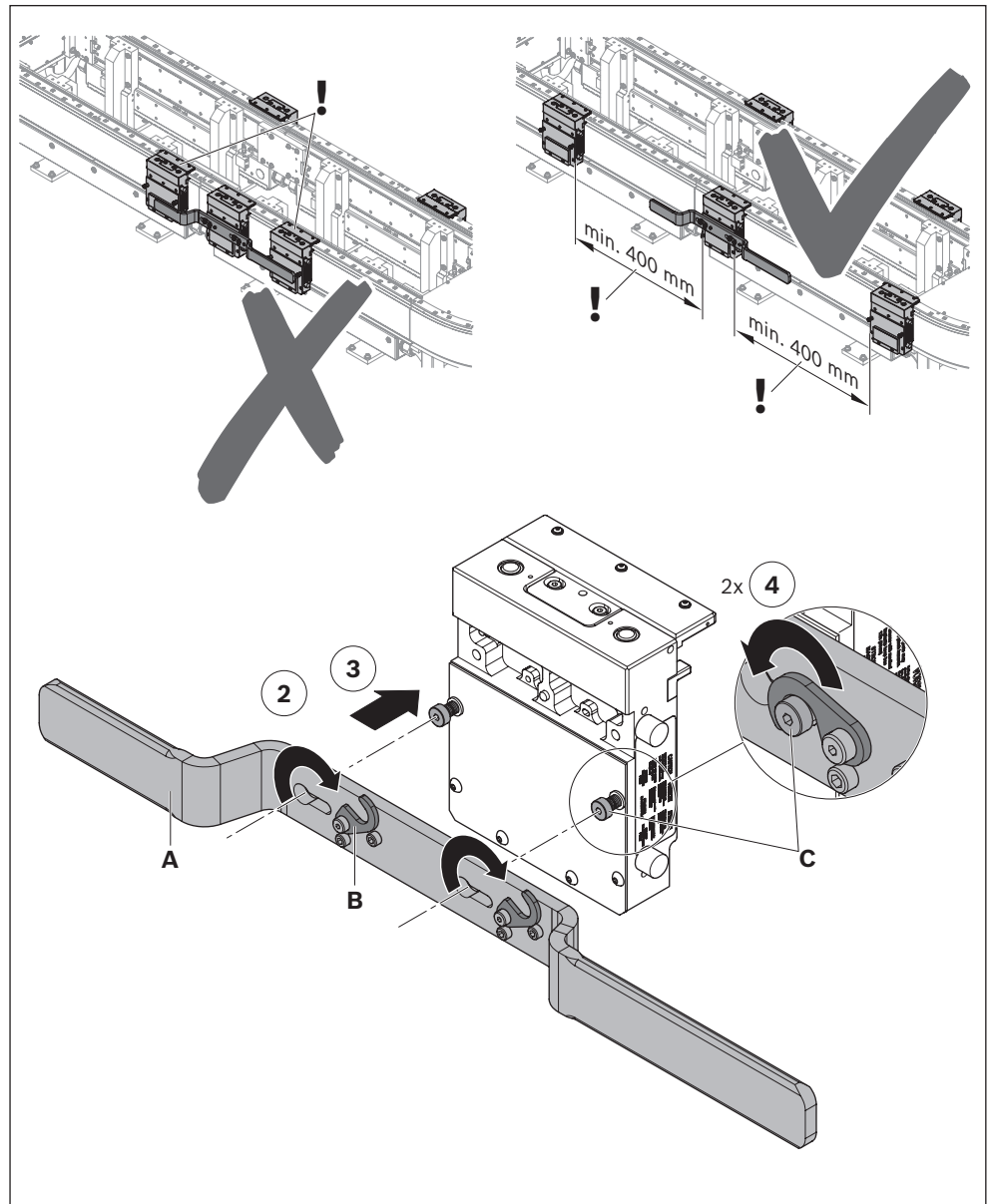


Fig. 54: Mounting workpiece pallet (1)

557 186-54

5. Pull off the protection plate.
 6. Hold the remover tool firmly with both hands and set the left end of the workpiece pallet on the module.
 7. Tilt the workpiece pallet right onto the section or curve module.
 8. Detach the remover tool.
 9. Check the spacing of the measuring system (encoder and magnetic strip), see Section 10.5.1.
- Disassemble in reverse order.

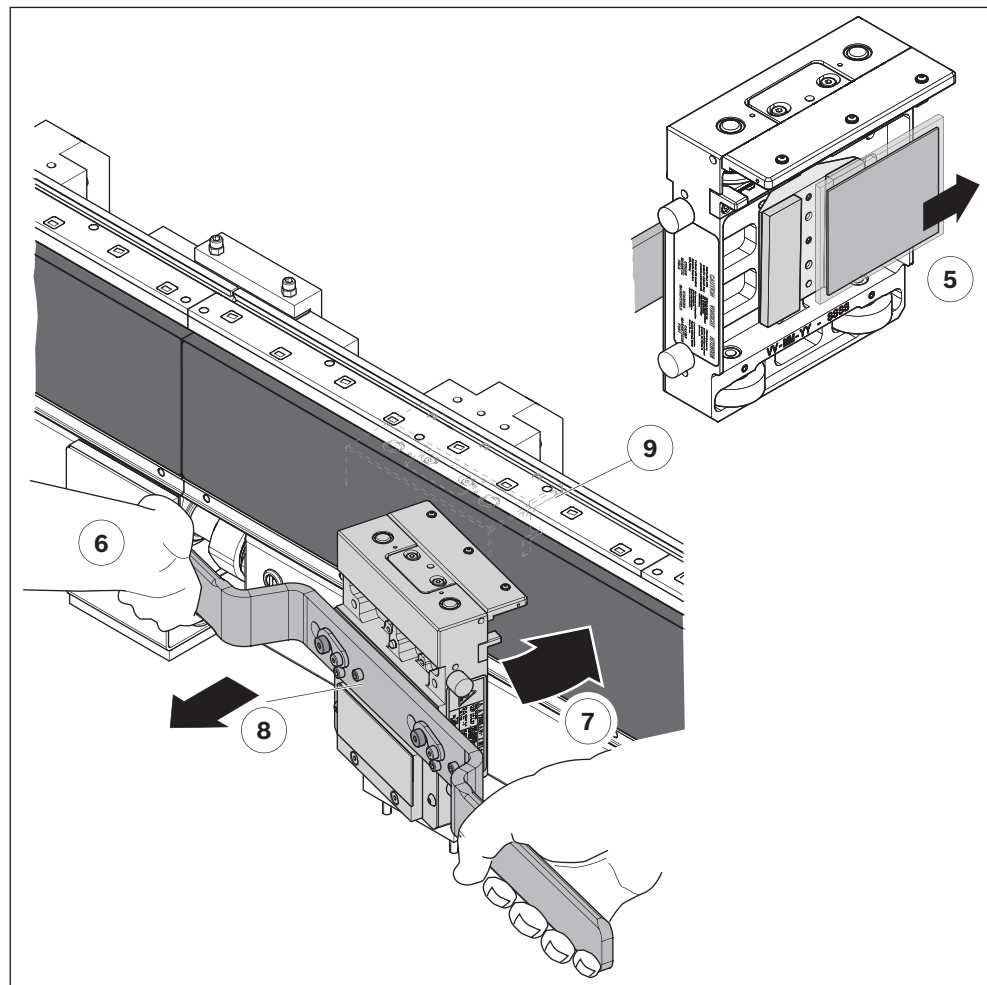


Fig. 55: Mounting workpiece pallet (2)

557 186-55



Please note:

- The fastening parts kit for the IR reading head is attached to the profile connector (D) at the joint between 2 section modules (X).

1. Mount the IR reading head (A) on the fastening parts kit (B).
2. Insert the connecting cable (C) for the IR reading head through the hole in the fastening parts kit.
3. Slide the long end of the fastening parts kit under the section modules and set the fastening parts kit on the fastening screws in the profile connector (D) from behind.
4. Tighten the clamp screws and lock them.
5. Set the spacing between the IR data carrier and the IR reading head to as close to 1.0 mm as possible. To do this, loosen the fastening screws (E) and move the support of the IR reading head bracket.

7.5.11 Mounting, adjusting and connecting ID system IR reading head

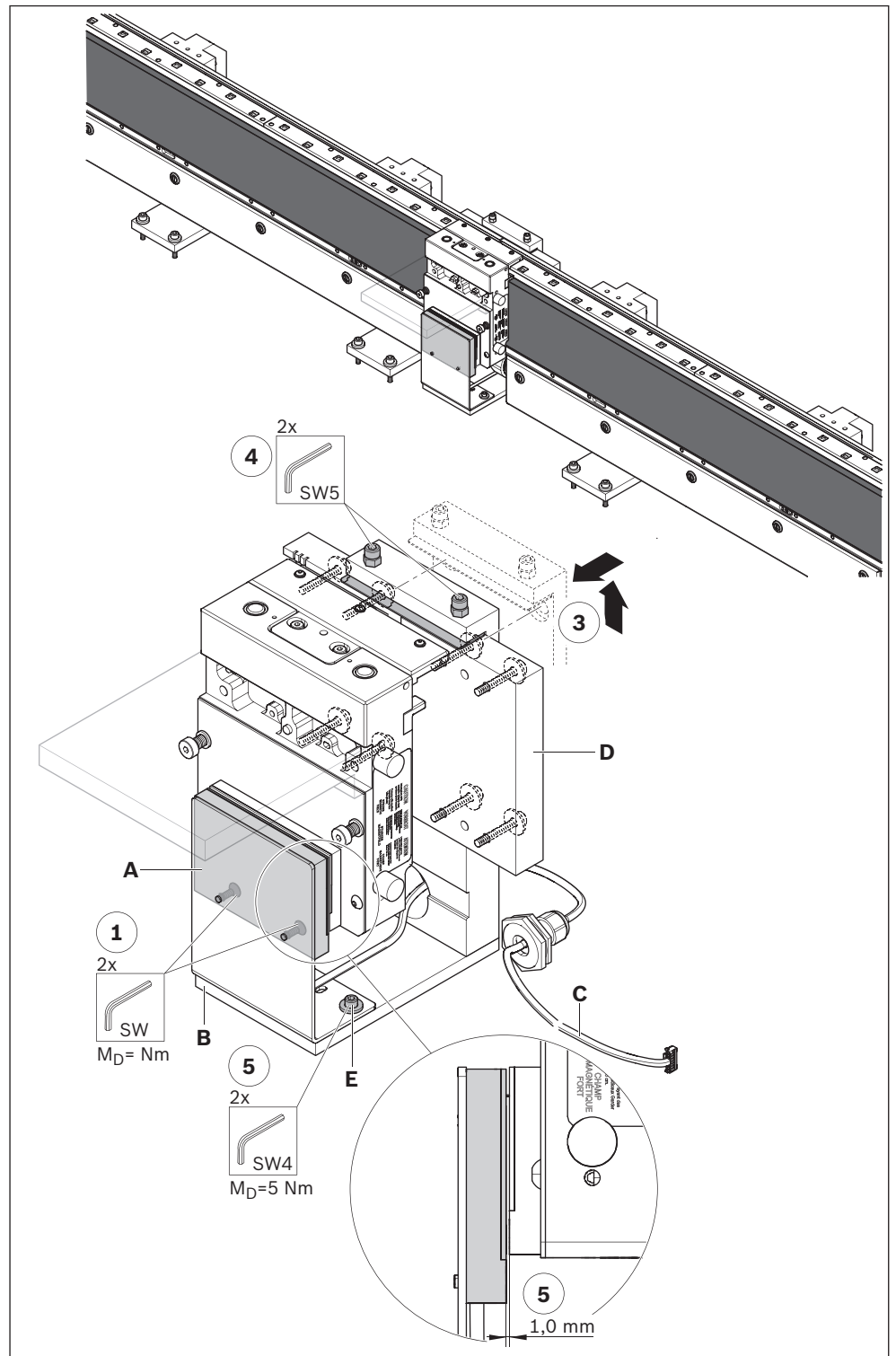


Fig. 56: Mounting and adjusting IR reading head

**Please note:**

The connecting cable for the IR reading head should be protected against being damaged, e.g. by securing it with cable fasteners.

X: Front view

Y: Rear view

1. Remove the protective cap from the cable socket in the back of the electronic box on the right of the IR reading head.
2. Insert the connecting cable for the IR reading head into the electronic box and install the cable gland.
3. Connect the connecting cable for the IR reading head to the PCB (gateway).

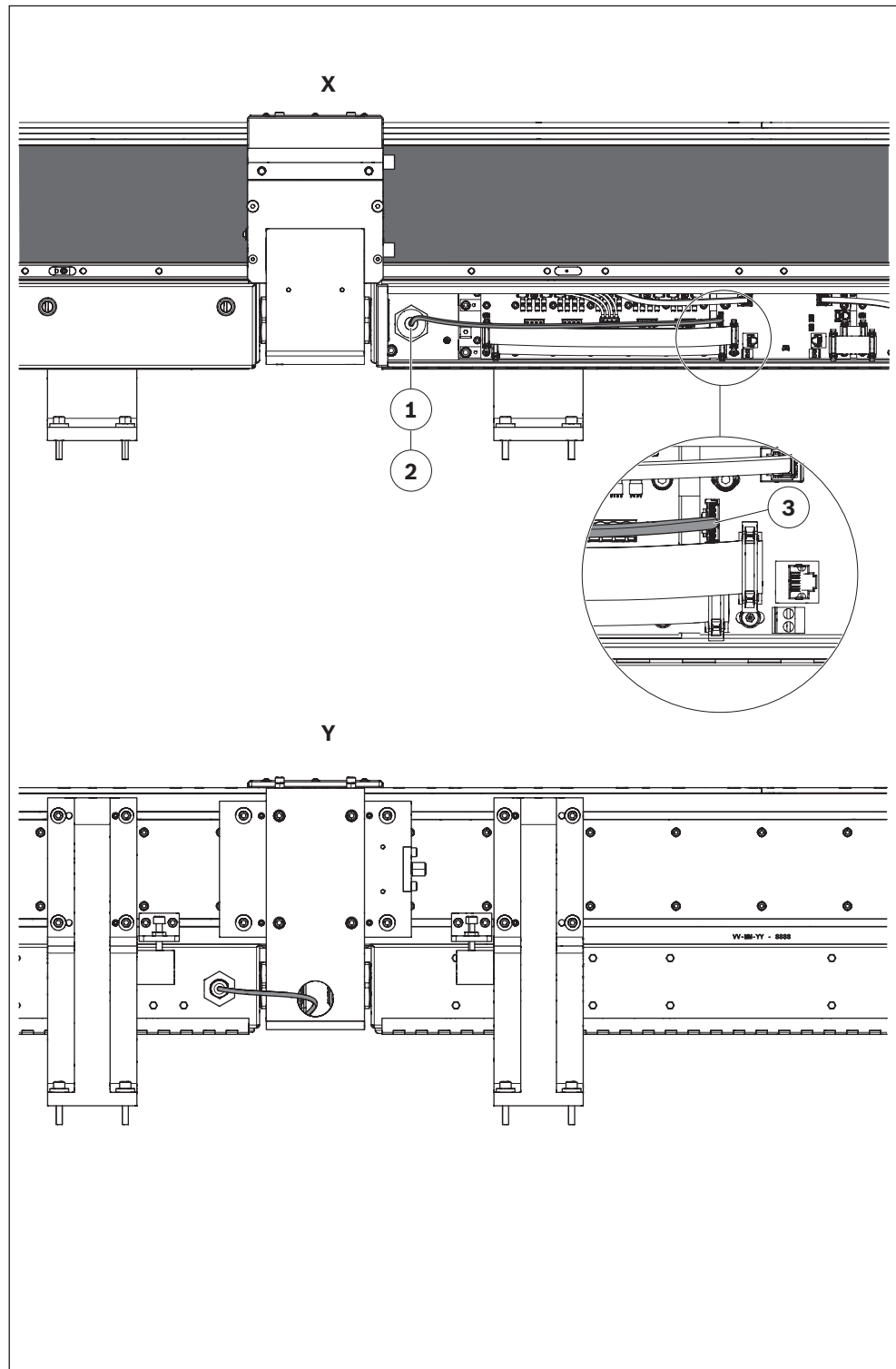
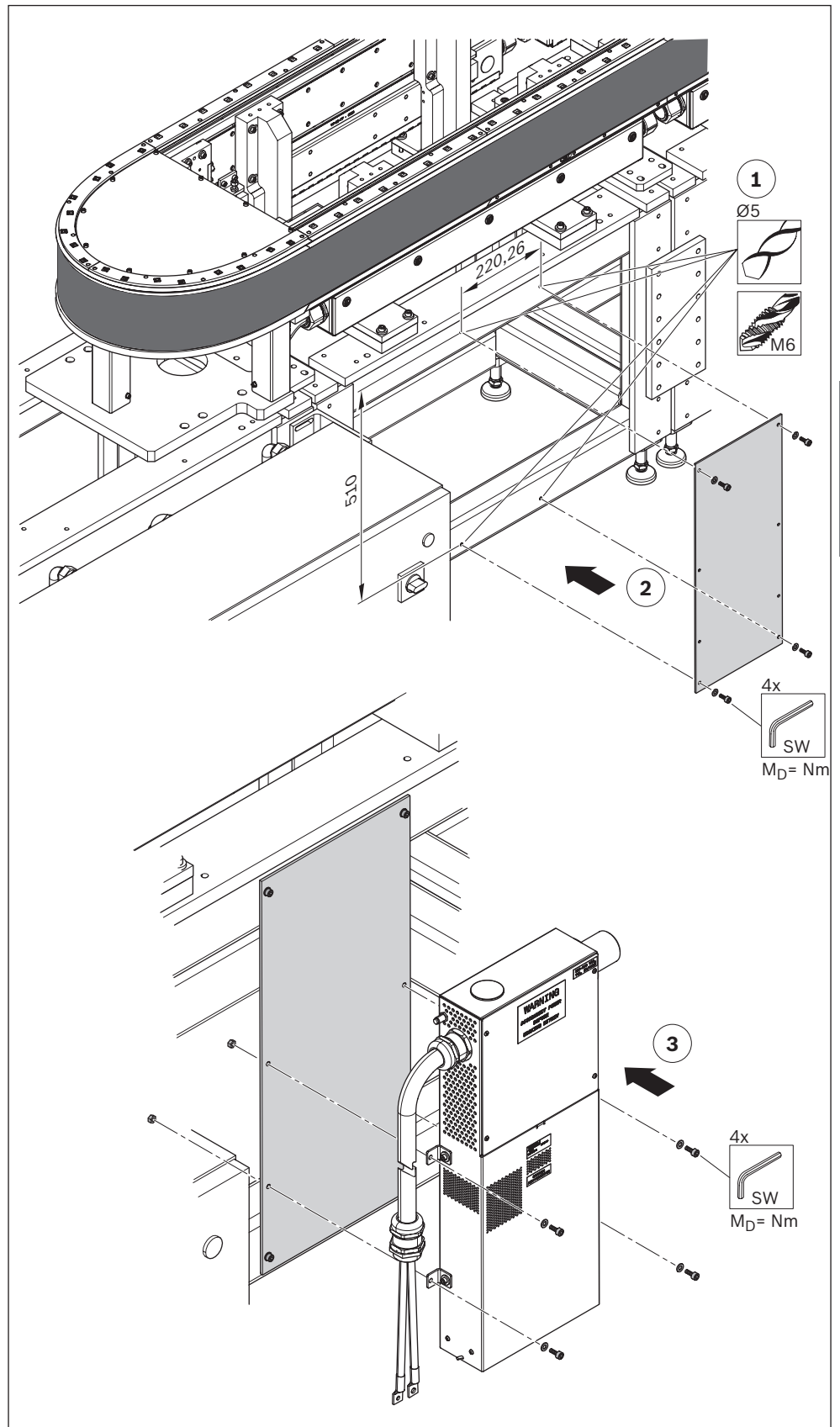


Fig. 57: Connecting ID system IR reading head

7.5.12 Mounting power supply

1. Drill 4 mounting holes according to the drawing dimensions.
2. Install the mounting plate.
3. Install the power supply.



ENGLISH

Fig. 58: Mounting power supply

557 186-58

7.6 Connecting product to power

DANGER

Death or serious injury from improper connection/wiring of multiple safety circuits!

Systems with multiple safety circuits in which the section modules have been improperly connected to power pose a risk of death or serious injury.

- ▶ Perform a risk assessment per DIN EN ISO 12100 before starting up a conveyor system for the first time or returning one to service.
- ▶ The section/curve modules of different safety circuits should not be connected to the same power supply (PCBs can be connected to the same logic power supply).

Death or serious injury from electric shock!



In areas that are marked with this hazard symbol, there is a risk of death or serious injury and burns from electric shock.

- ▶ Observe all NFPA 79 (NA) and EN 60204-1 (EU) requirements for safely working on electrical systems, as well as all national and international regulations applicable at the place of use.
- ▶ Wear personal protective equipment that is appropriate for the place of use and use suitable tools.

Death or serious injury from residual energy!



After the power supply to the section and curve module motors has been shut off, there is still a risk of death or serious injury and burns from energy stored in the capacitors.

- ▶ After the power supply has been shut off, access should remain blocked by an interlocking guard with locking mechanism to allow the energy in the capacitors to discharge.

WARNING

High electrical voltage

Risk of death or serious injury from electric shock.

- ▶ Make sure the relevant system component is dead before assembly.
- ▶ Secure the system against unintentional restarting.

CAUTION

Uninterruptible power supply!

Voltage may be present even with the main switch off!



Coming into contact with electrical components can result in injury and burns from electric shock.

NOTICE

Follow the 5 safety rules when working on the electrical system

- ▶ Disconnect from power.
 - ▶ Secure against restarting.
 - ▶ Verify the system is dead.
 - ▶ Ground and short-circuit the system.
 - ▶ Cover or shield adjacent live parts.
-
- Choose control and sensor elements that comply with EN ISO 13849. Factor in the load being transported and the transport speed.
 - Only qualified personnel should implement electrical connections.
 - Observe DIN EN 60204-1 or the equivalent regulations in your country.
 - Observe the established line voltage.
 - Observe the electrical ratings on the nameplate, see Fig. 27 on page 48.
 - **Observe the circuit diagram included in the scope of delivery.**

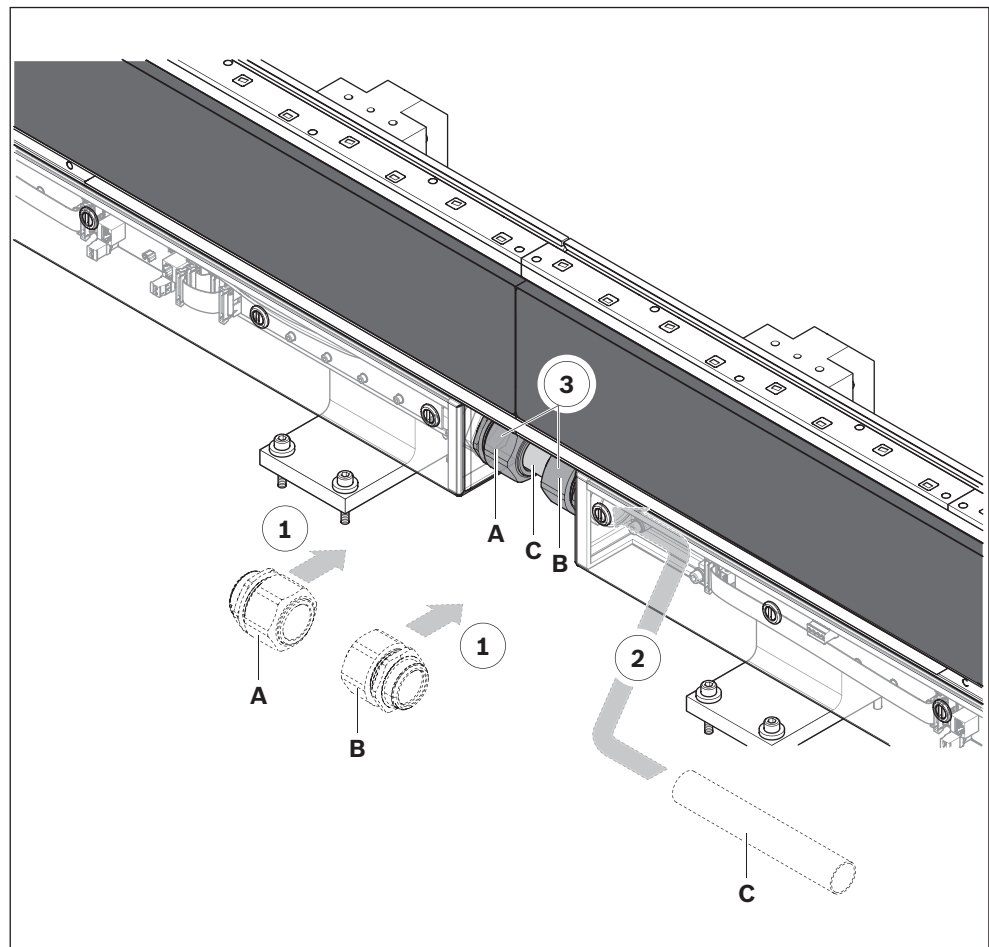
**Please note:**

Use only the included cable glands. One of these cable glands has a shielded EMC connector.

- A:** Cable gland with shielded EMC connector
- B:** Cable gland without shielded EMC connector
- C:** Cable guard pipe

1. Install the cable glands (A + B) in the section/curve modules.
2. Push the cable guard pipe (C) into the cable glands between the section/curve modules.
3. Tighten the cable glands.

7.6.1 Installing EMC cable glands and cable guard pipes



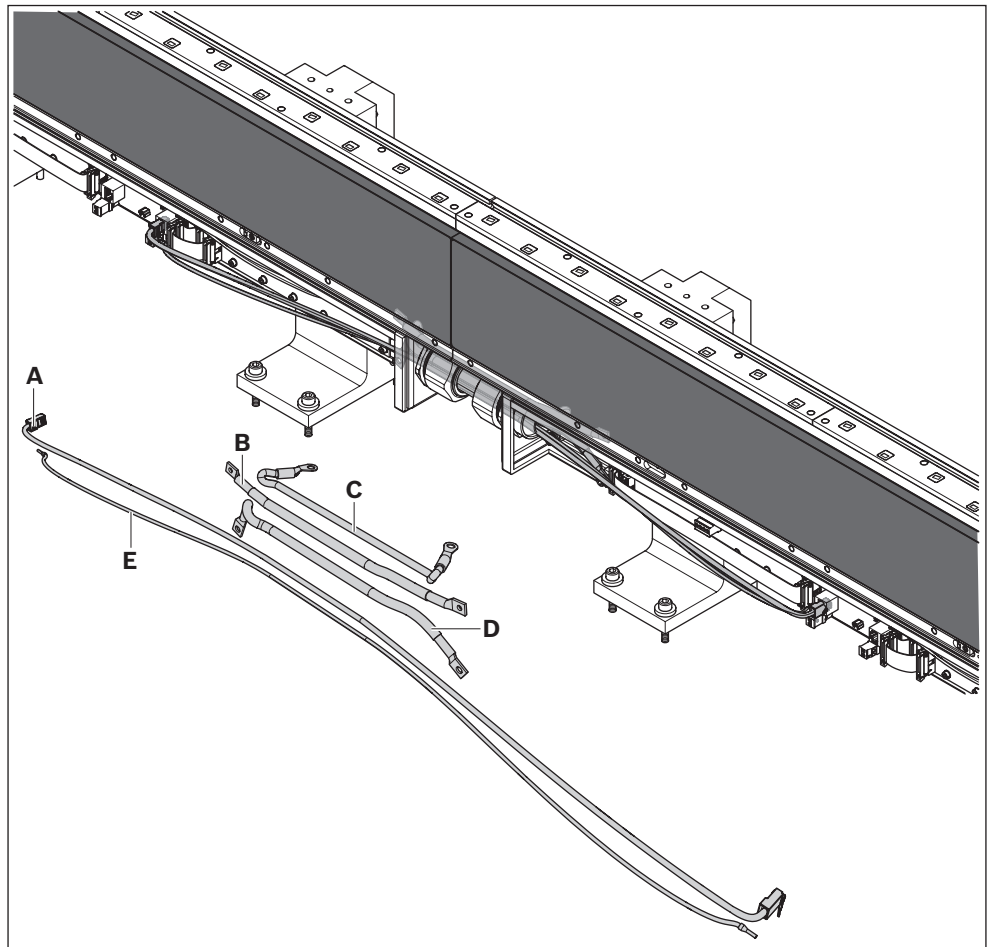
557 186-59

Fig. 59: Installing EMC cable glands and cable guard pipes

7.6.2 Inserting connecting cables

- ▶ Pull the included cables through the cable guard pipes.

- A:** Network cable (Ethernet)
- B:** Power cable (28 V DC)
- C:** Grounding cable
- D:** Power cable (0 V)
- E:** Control voltage cable (24 V)



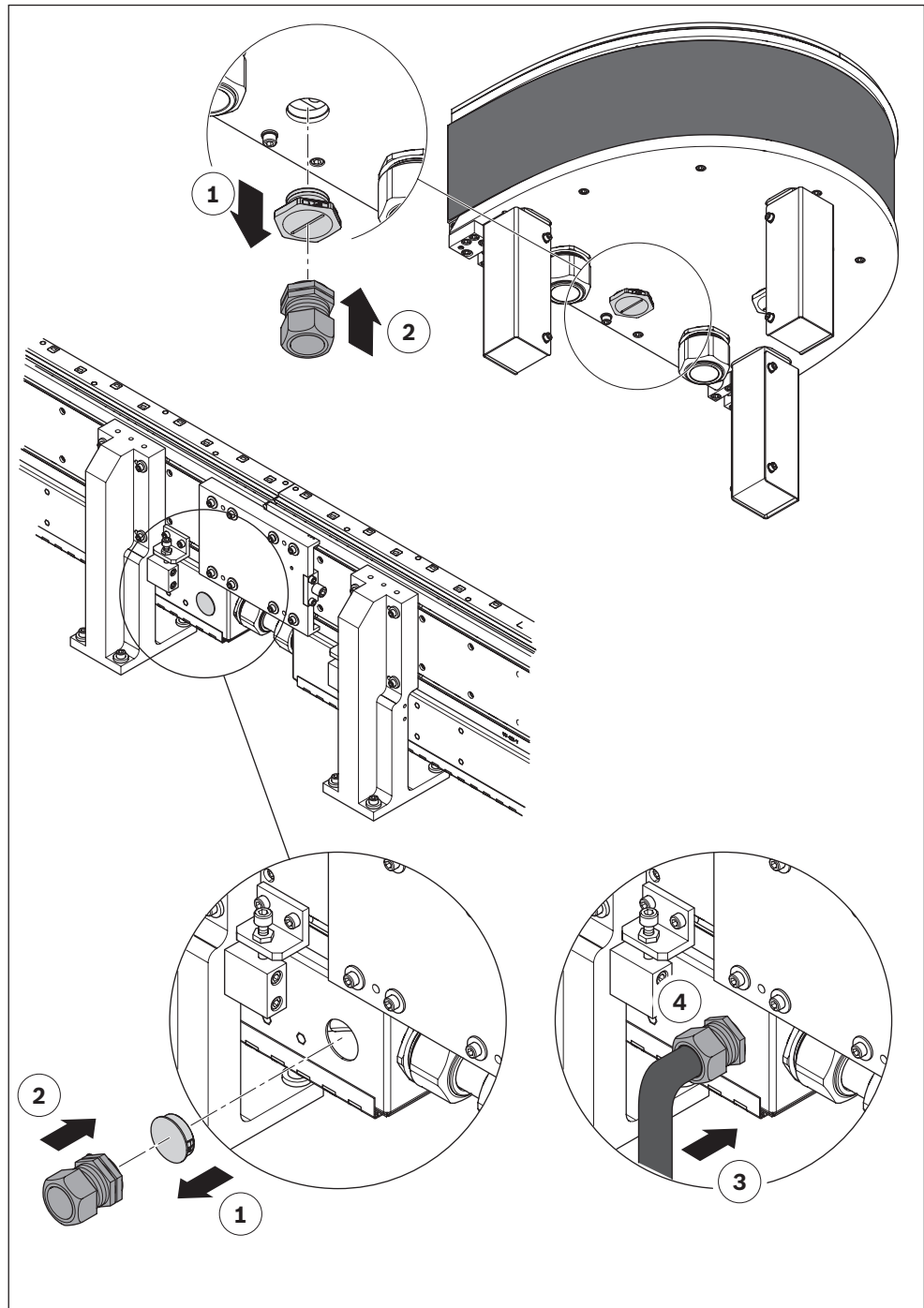
ENGLISH

557 186-60

Fig. 60: Inserting connecting cables (shown here in a section module)

7.6.3 Inserting power supply line in section/curve module

1. Remove the caps.
2. Install the cable glands.
3. Insert the power supply cable through the cable gland.
4. Tighten the cable glands.



557 186-61

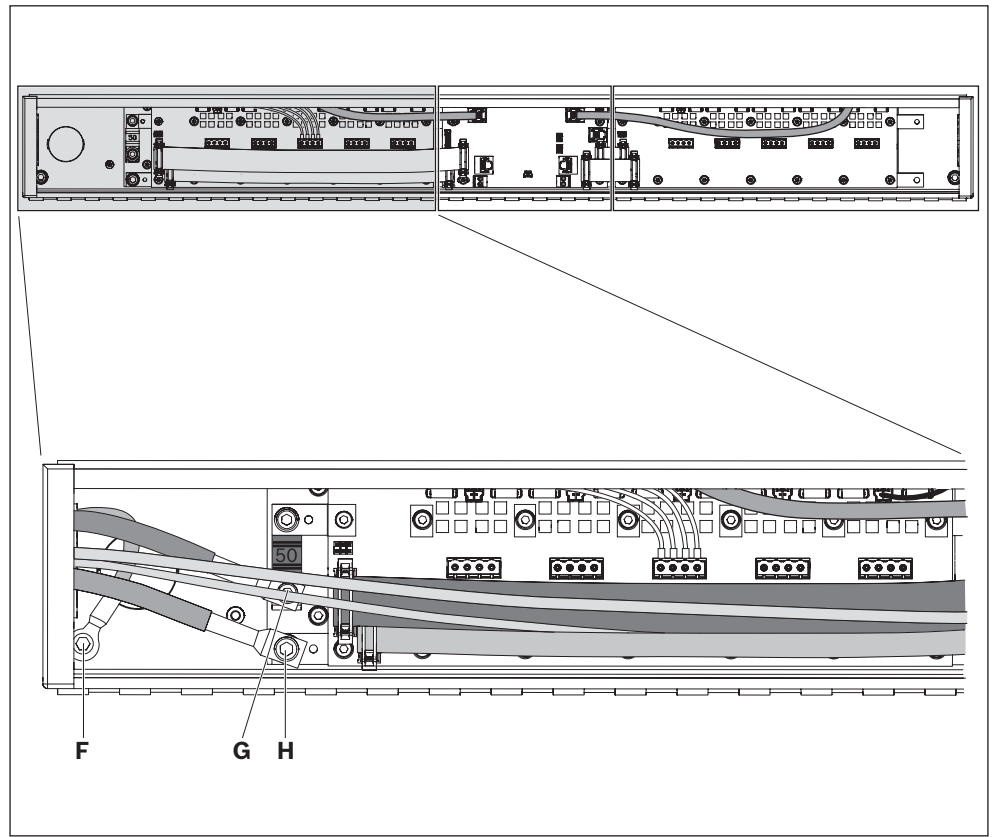
Fig. 61: Inserting power supply line in section/curve module

**Please note:**

- Connecting to an adjacent curve module is the same as connecting to an adjacent section module.
- See the circuit diagram included in the scope of delivery for more information on electrical connections.

1. Connect the grounding cable (YE/GN) to the housing (F).
2. Connect the power cable (28 V DC, blue) to Terminal G.
3. Connect the power cable (0 V, blue/white) to Terminal H.

7.6.4 Connecting ground and power cables (28 V) (from left section/curve module)



557 186-62

Fig. 62: Connecting ground and power cables (from left section/curve module without power supply connected)

**Please note:**

- Connecting to an adjacent curve module is the same as connecting to an adjacent section module.
 - Make sure a short circuit does not occur between the connecting cables and the cable guard pipe.
 - See the circuit diagram included in the scope of delivery for more information on electrical connections.
1. Connect the grounding cable (YE/GN) to the housing (J).
 2. Connect the power cable (28 V DC, blue) to Terminal D.
 3. Connect the power cable (0 V, blue/white) to Terminal I.

7.6.5 Connecting ground and power cables (28V) (from right section/curve module)

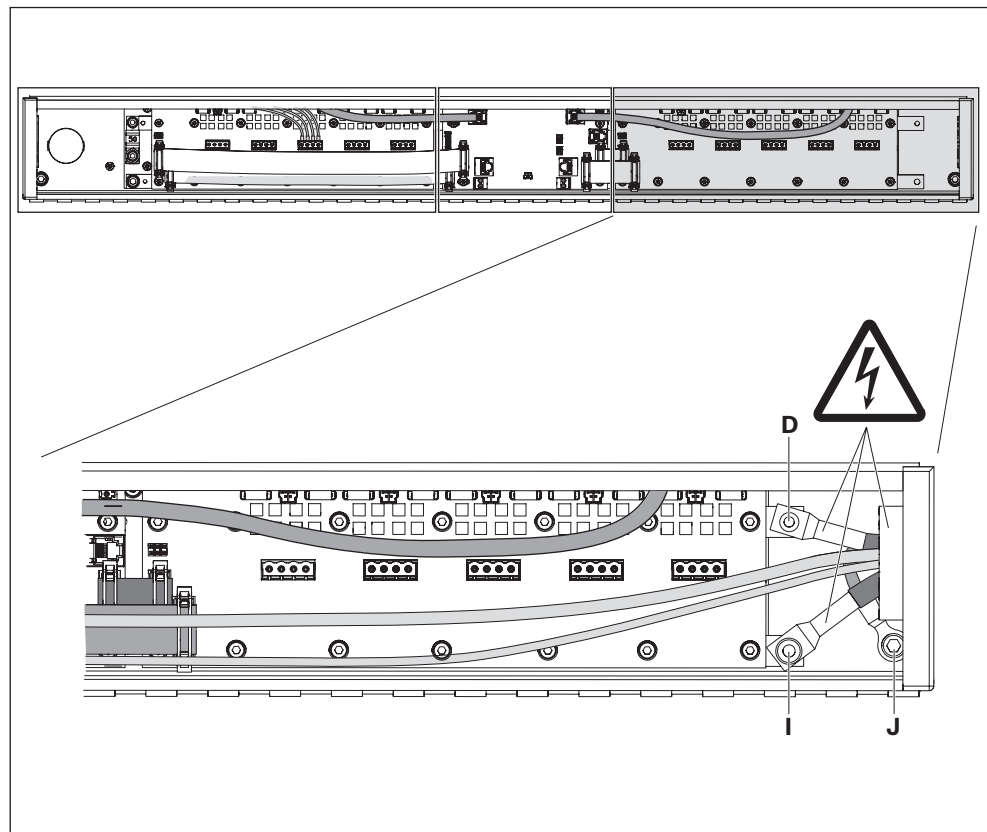


Fig. 63: Connecting ground and power cables (right section/curve module)

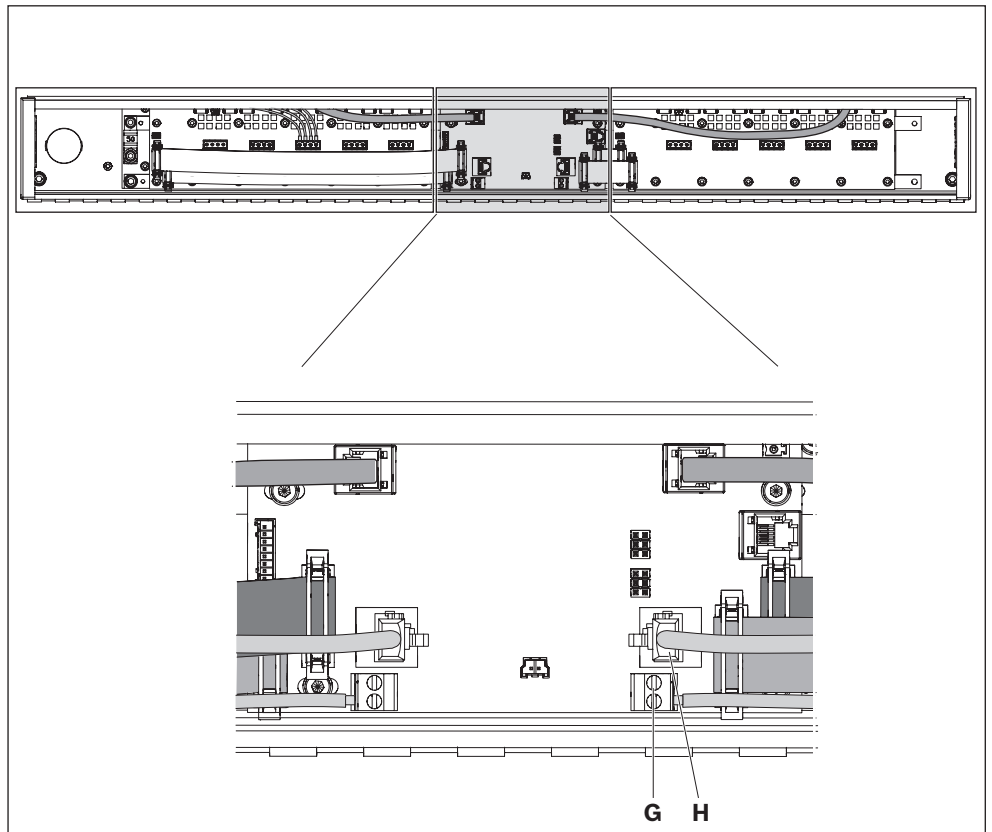
557 186-63



Please note:

- Connecting to an adjacent curve module is the same as connecting to an adjacent section module.
 - See the circuit diagram included in the scope of delivery for more information on electrical connections.
 - The control voltage cable (24 V) can be connected to either contact on Terminal G.
1. Connect the network cable to Terminal H on the PCB (gateway).
 2. Connect the control voltage cable (24 V) to Terminal G.

**7.6.6 Connecting network and control voltage cables (24 V)
(from left section/curve module)**



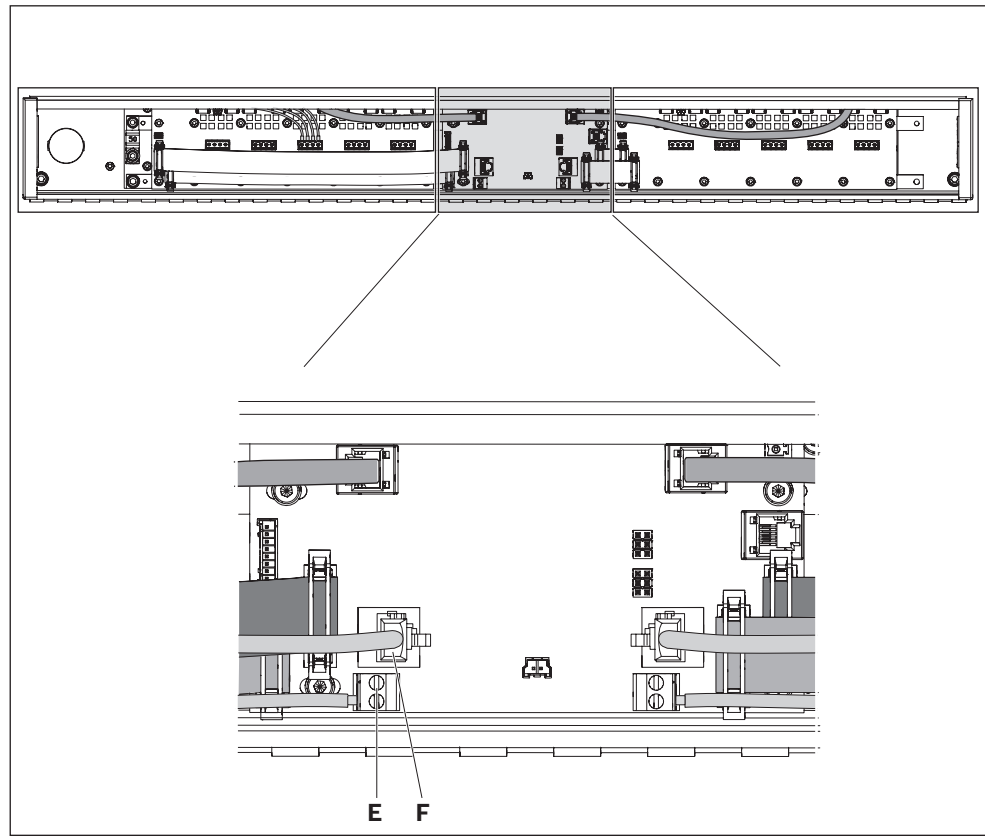
557 186-64

Fig. 64: Connecting network and control voltage cables (from left section/curve module)

**Please note:**

- Connecting to an adjacent curve module is the same as connecting to an adjacent section module.
 - See the circuit diagram included in the scope of delivery for more information on electrical connections.
 - The control voltage cable (24 V) can be connected to either contact on Terminal G.
1. Connect the network cable to Terminal F on the PCB (gateway).
 2. Connect the control voltage cable (24 V) to Terminal E.

7.6.7 Connecting network and control voltage cables (24 V) (from right section/curve module)



557 186-65

Fig. 65: Connecting network cable (from right section/curve module)

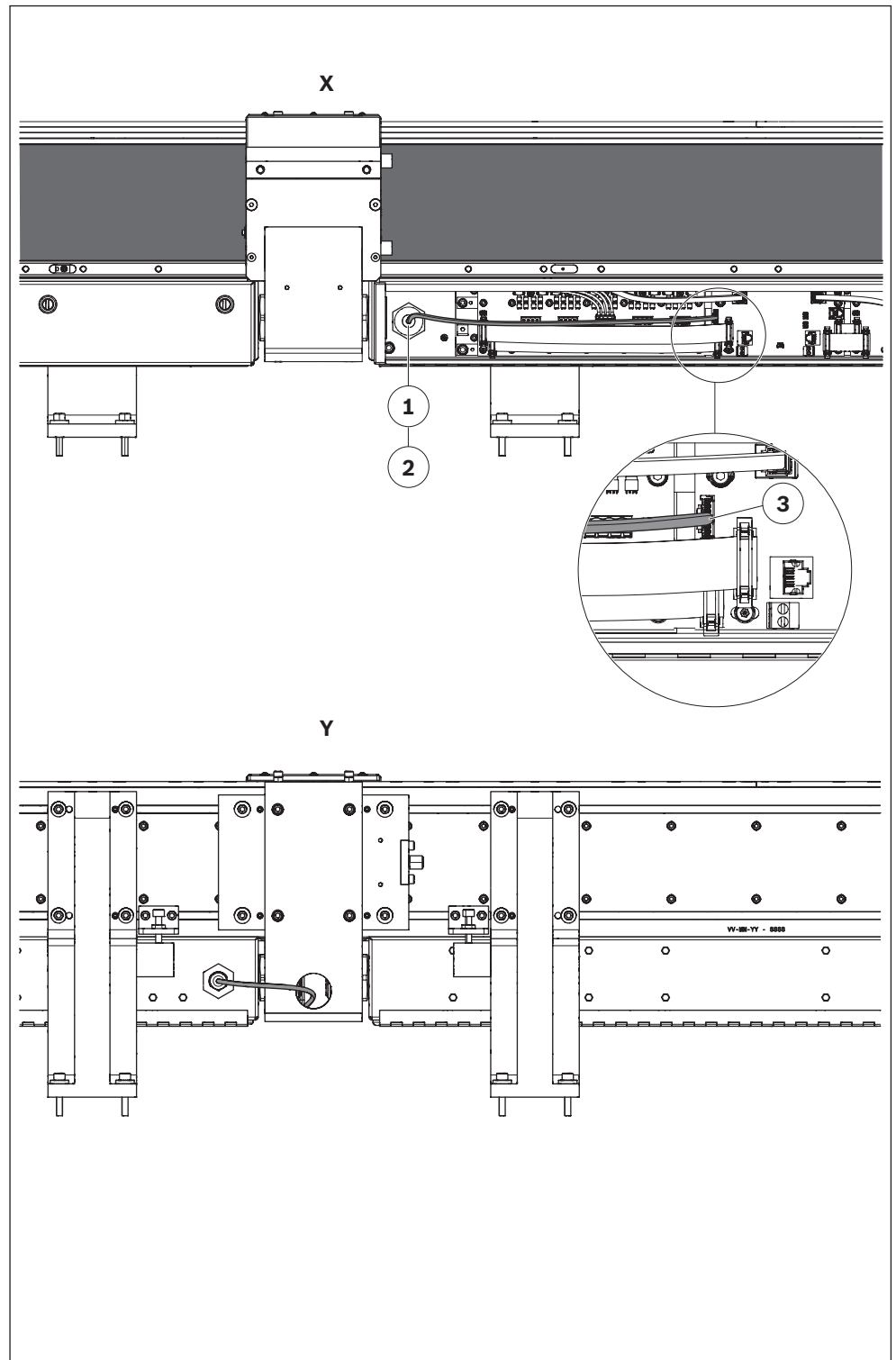
7.6.8 Connecting the network connections and power supplies in the control cabinet

- Please refer to the corresponding information from the circuit diagram.

7.6.9 ID system IR reading head (optional)

X: Front view
Y: Rear view

1. Remove the protective cap from the cable socket in the back of the electronic box on the right of the IR reading head.
2. Insert the connecting cable for the IR reading head into the electronic box and install the cable gland.
3. Connect the connecting cable for the IR reading head to the PCB (gateway).



ENGLISH

557 186-66

Fig. 66: Connecting ID system IR reading head (optional)

7.6.10 Network



Please note:

- Insert the network cable for connecting the PCBs (gateway) through the fittings with the cable gland in the section/curve modules.

- ▶ Connect the PCBs (gateway) according to the adjacent wiring diagram.

- A:** RJ45 Right network (not connected)
- B:** RJ45 Left network
- C:** RJ45 Left network (not connected)
- D:** RJ45 Right network
- E:** Right section start
- F:** Ferrite (6x)
- G:** RJ45 network coupler
- H:** RJ45 Right network cable to controller
- I:** RJ45 Left network cable to controller
- J:** Right section end
- K:** Left section end
- L:** Left section start
- M:** Network connection
- N:** Feed module
- O:** Left network connection cable
- P:** Control cabinet

NOTICE

Malfunctions due to incorrect assembly and start-up

The product can be damaged and its service life shortened.

- ▶ Do not allow network cables to cross.

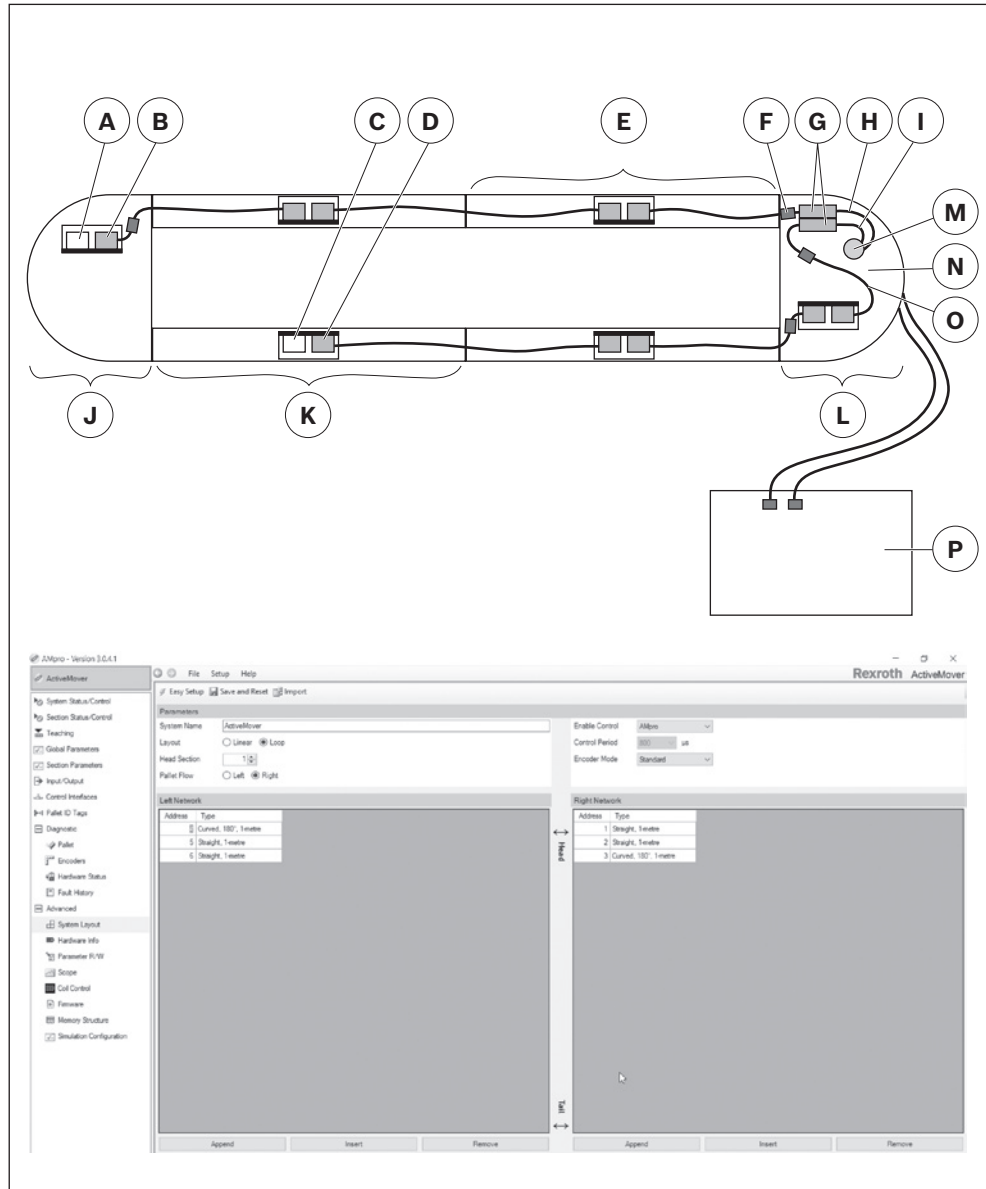


Fig. 67: Connecting PCBs (gateway)

557 186-67

- ▶ Connect the network cable according to the circuit diagram.

- A:** RJ45 Right network cable
- B:** RJ45 Left network cable
- C:** Right network
- D:** Network connection
- E:** Left network

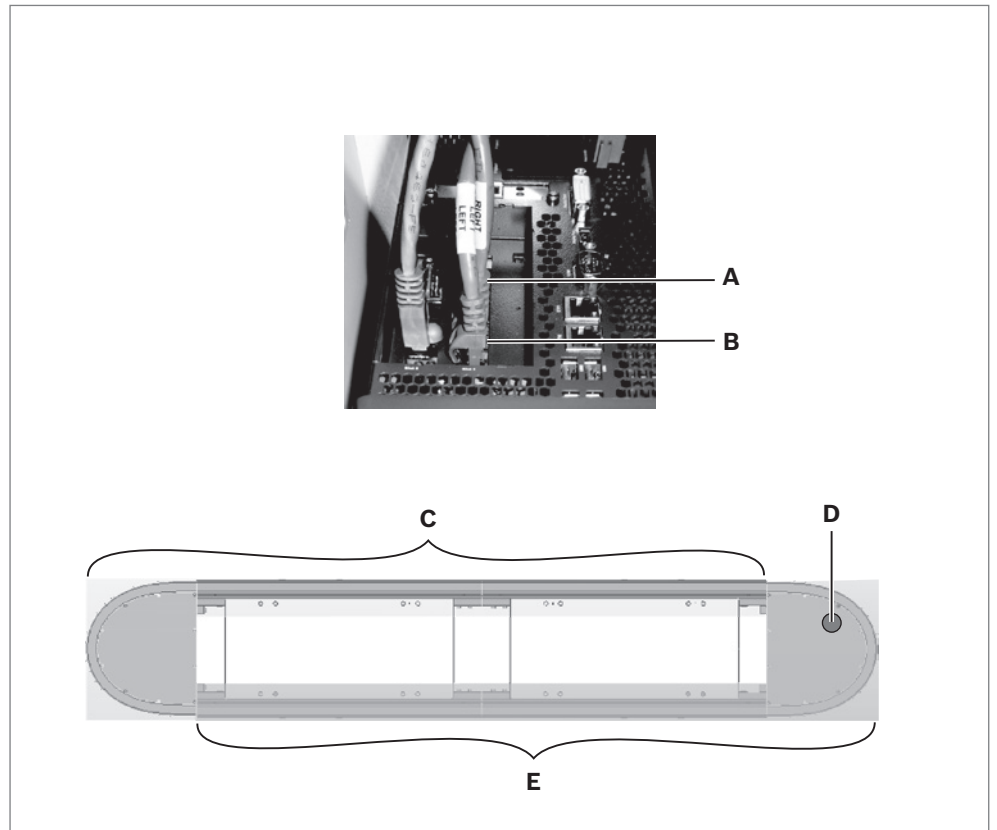


Fig. 68: Left and right network connection

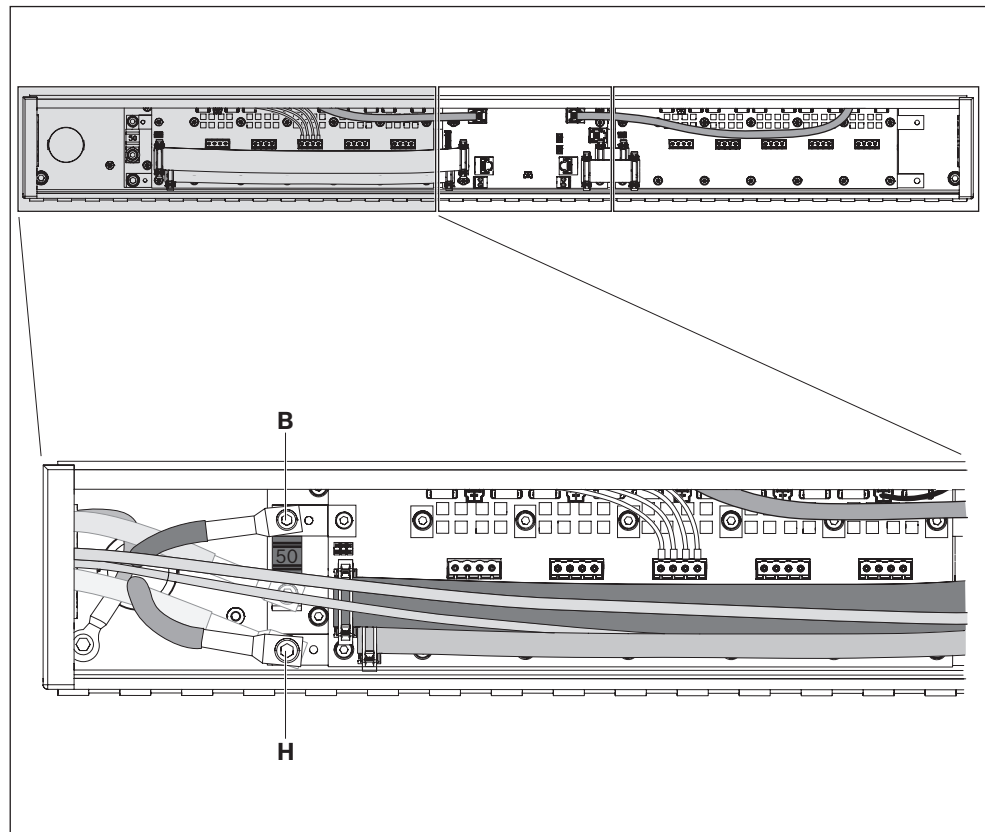
557 186-68

**Please note:**

See the circuit diagram included in the scope of delivery for more information on electrical connections.

1. Insert the power supply cable into the section module from the rear.
2. Connect the power cable (28 V DC, blue) to Terminal B.
3. Connect the power cable (0 V, blue/white) to Terminal H.

7.6.11 Connecting power supply in the section module



557 186-69

Fig. 69: Connecting power supply in the section module

7.6.12 Connecting power supply in the curve module

**Please note:**

- To give a better view of the terminals, the curve module is shown here without coil and measuring system.
- See the circuit diagram included in the scope of delivery for more information on electrical connections.

1. Remove the top curve module cover.
2. Insert the power supply cable into the curve module from below.
3. Connect the power cable (28 V DC, blue) to Terminal A.
4. Connect the power cable (0 V, blue/white) to Terminal B.

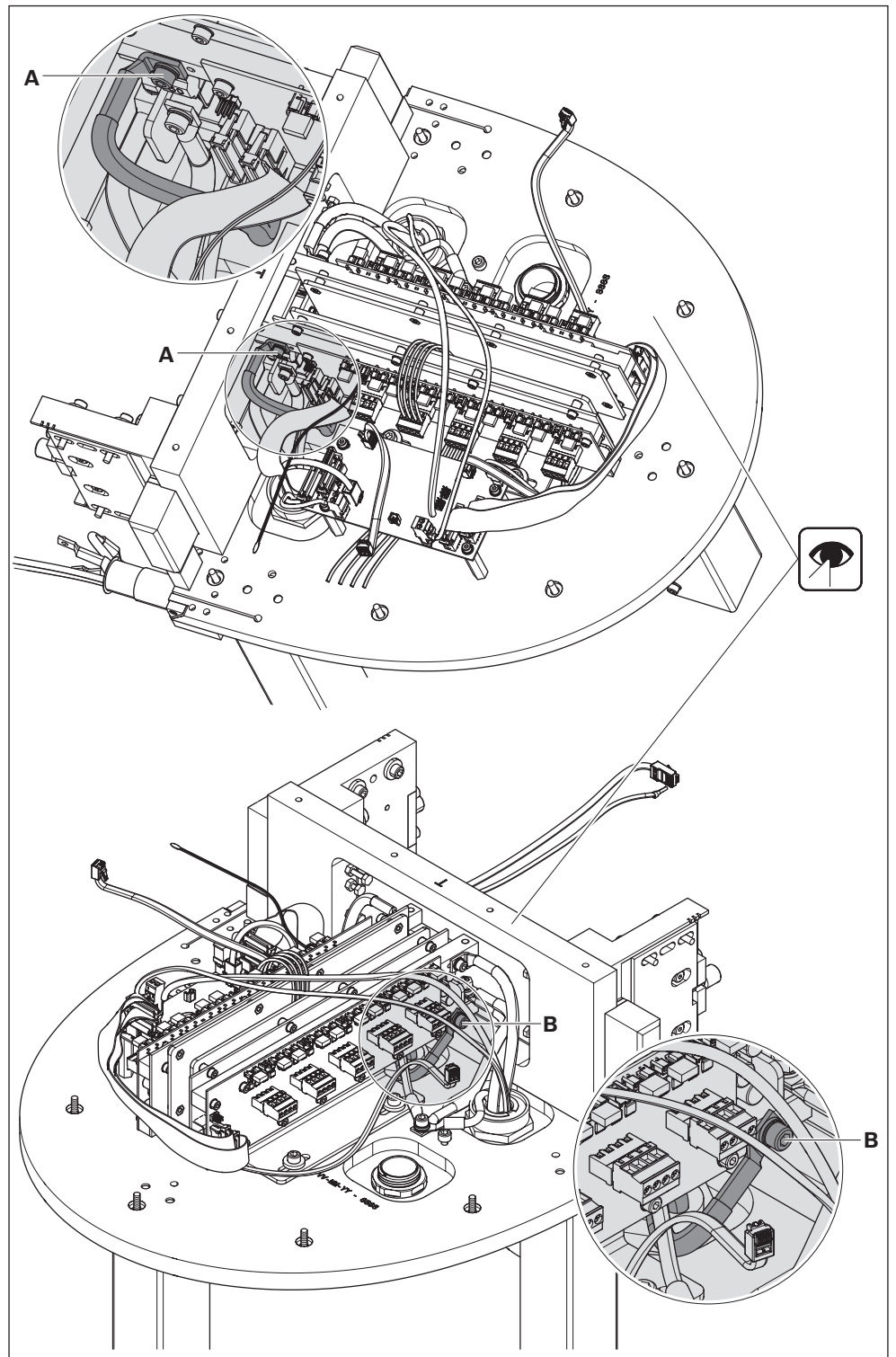


Fig. 70: Connecting power supply in the curve module

557 186-70

7.6.13 Connecting power supply in the control cabinet

**Please note:**

See the circuit diagram included in the scope of delivery for more information on electrical connections.

Required accessories

- 230 V power cable (not included in the scope of delivery, see catalog for specifications)

1. Insert the 230 V power supply cable into the control cabinet.
2. Connect the power cable according to the circuit diagram.
3. Insert the plug connector (230 V AC) for the power cable into the power supply.

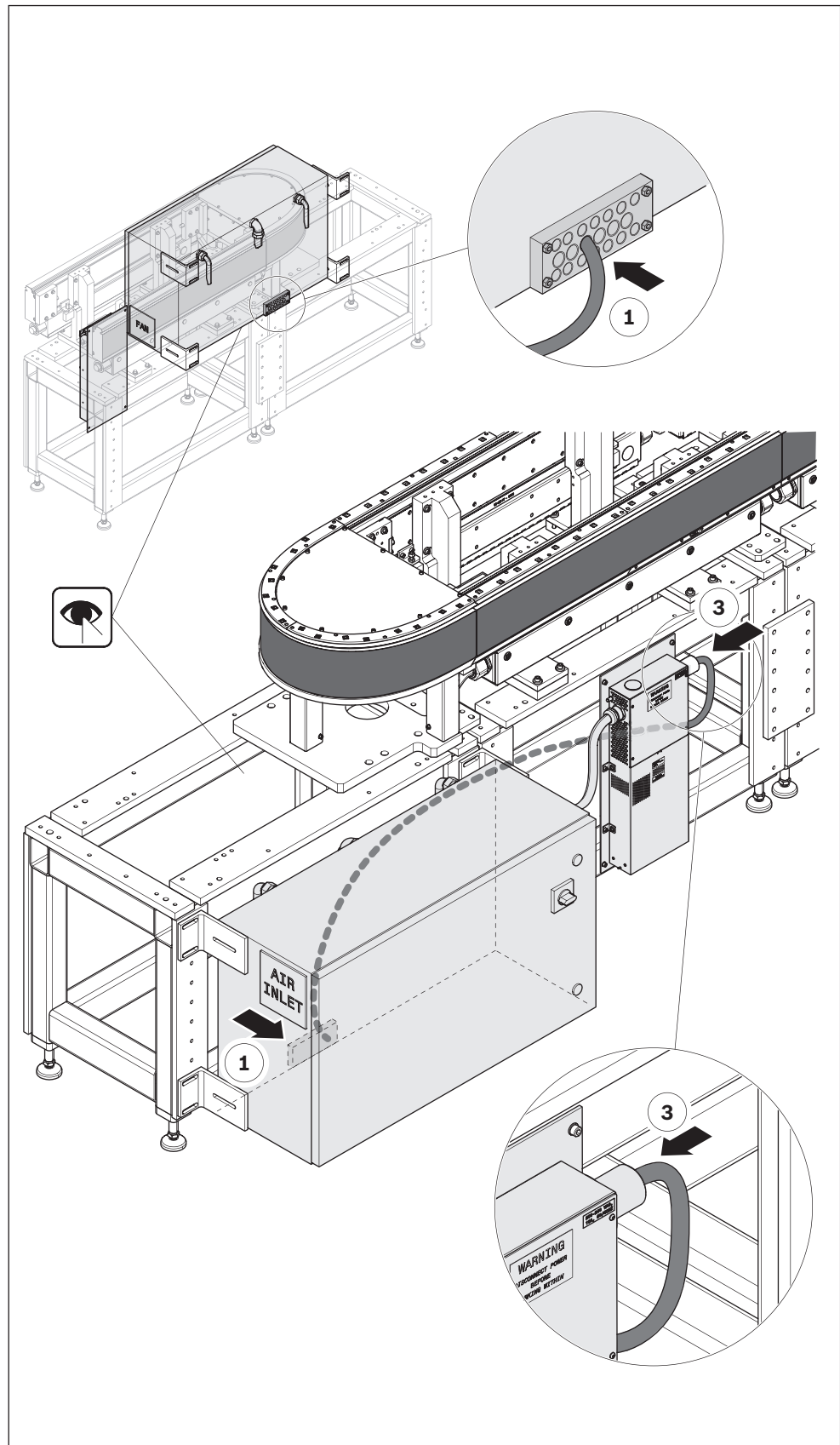


Fig. 71: Connecting power supply in the control cabinet

557 186-71

7.6.14 Ethernet POWERLINK



Please note:

- This wiring is done inside the control cabinet and connects the ActiveMover controller to the bus controller.
 - Both connecting cables are included in the scope of delivery.
- Connect the ActiveMover controller to the bus controller according to the circuit diagram.

A: Ethernet port

B: Ethernet port

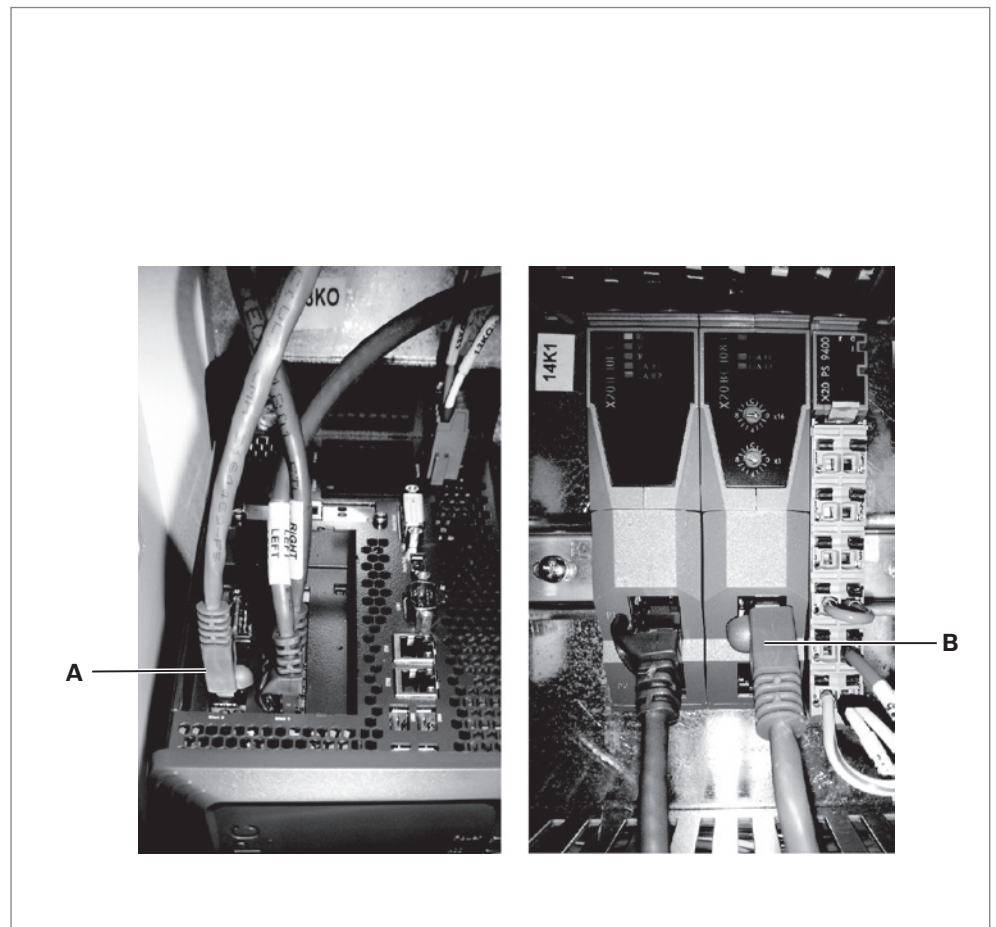


Fig. 72: Ethernet POWERLINK connection

557 186-72

7.6.15 Ethernet port (Windows PC)



Please note:

- The AMpro configuration software is required for communication/parameterization via the Ethernet port (runnable on a PC with Windows 7 or higher).
 - The connecting cable is **not** included in the scope of delivery.
- Connect the Ethernet port according to the circuit diagram.

A: Ethernet port

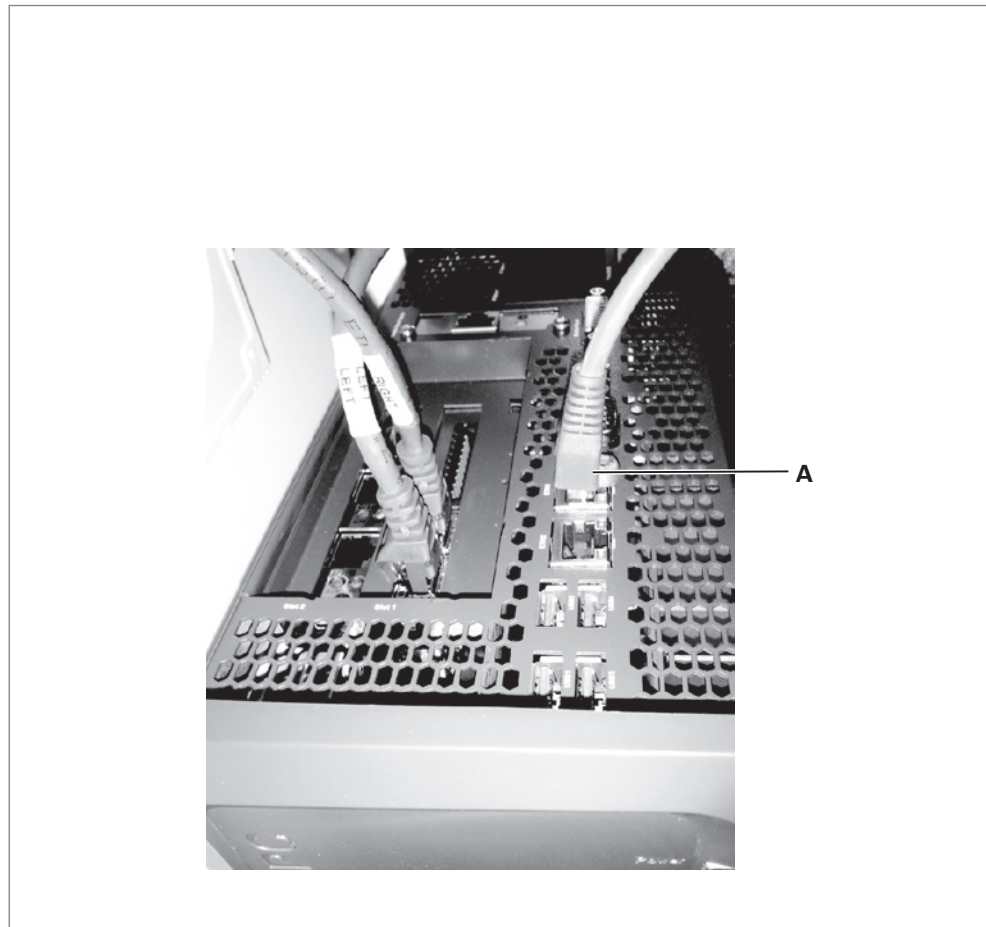


Fig. 73: Ethernet port connection

557 186-73

7.6.16 PLC



Please note:

- The bus protocol for the connection module depends on the customer's order (e.g. EtherNET/IP™, PROFINET®, etc.).
- The connecting cable for the PLC connection (A) is **not** included in the scope of delivery.
- To change the rotary switch settings, proceed as follows:
 - Turn off the main switch on the control cabinet.
 - Change the rotary switch settings.
 - Turn on the main switch.

1. Insert the connecting cable through the cable gland in the back of the control cabinet (B).
2. Connect the PLC according to the circuit diagram.
3. Configure the rotary switch as shown in the illustration.

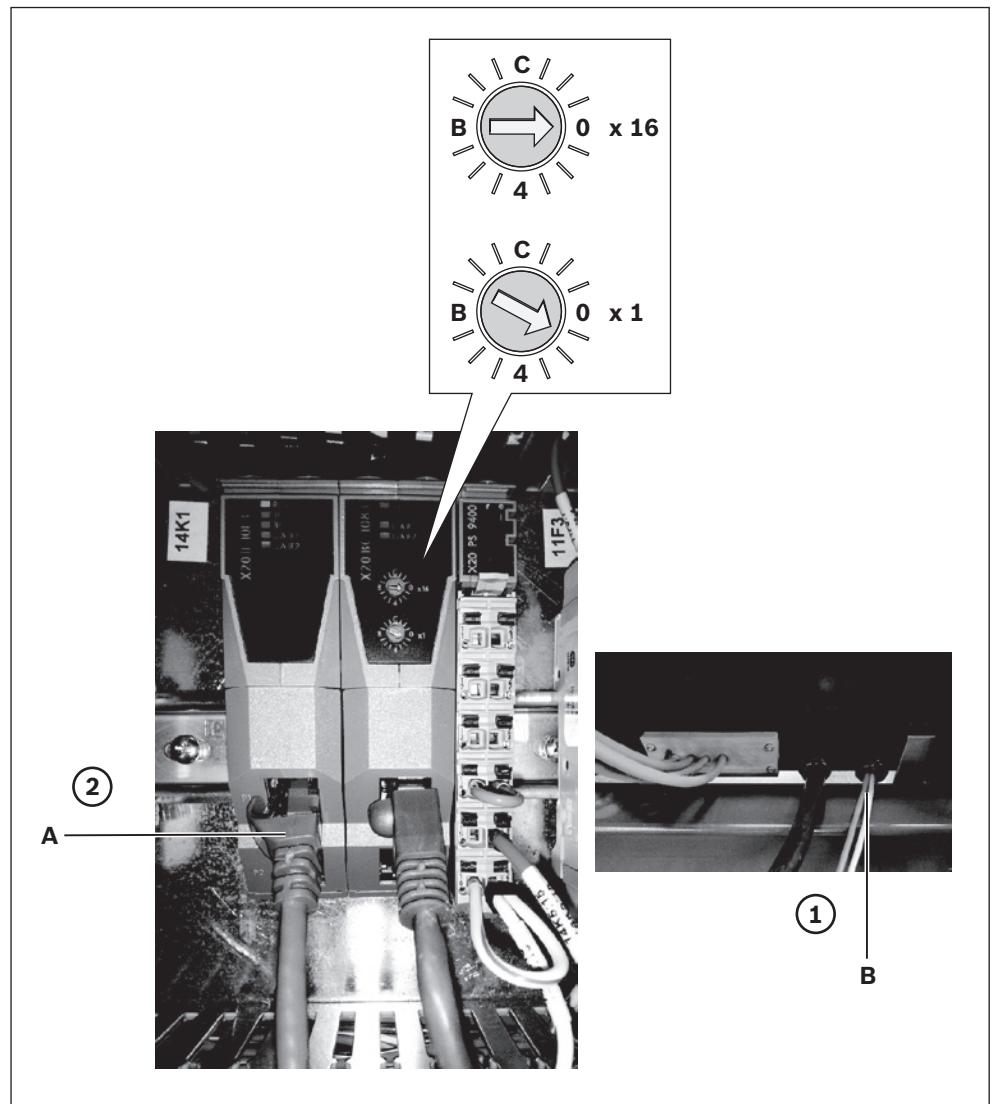


Fig. 74: PLC connection

- A:** PLC connection
- B:** Cable socket

7.6.17 Emergency stop safety circuit



Death or serious injury from failing to meet emergency stop safety circuit specifications

The emergency stop safety circuits must meet the following specifications:

- Stop Category 1 per DIN EN 60204-1

The system should be completely surrounded by a guard as defined in DIN ISO EN 14120.

- Access doors should have an electrical interlock and a locking mechanism.
- Access doors should remain locked for min. 5 s after power to the curve and section module motors has been shut off.
- The necessary performance level under DIN EN ISO 13849 should be $PL_r = d$.
- It should not be possible to start the ActiveMover with the safety door open.

- ▶ Connect the emergency stop safety circuits according to the circuit diagram.

7.6.18 Line voltage

! WARNING

High electrical voltage

Risk of death or serious injury from electric shock.

- ▶ Switch off the main power switch (OFF position).
- ▶ Secure the main power switch against being switched back on unintentionally.



Please note:

- See the circuit diagram included in the scope of delivery for more information on electrical connections.
- The connecting cable is **not** included in the scope of delivery.

1. Insert the connecting cable through the cable gland in the back of the control cabinet (A).
2. Connect the line voltage according to the circuit diagram.
3. Screw down the cable gland.

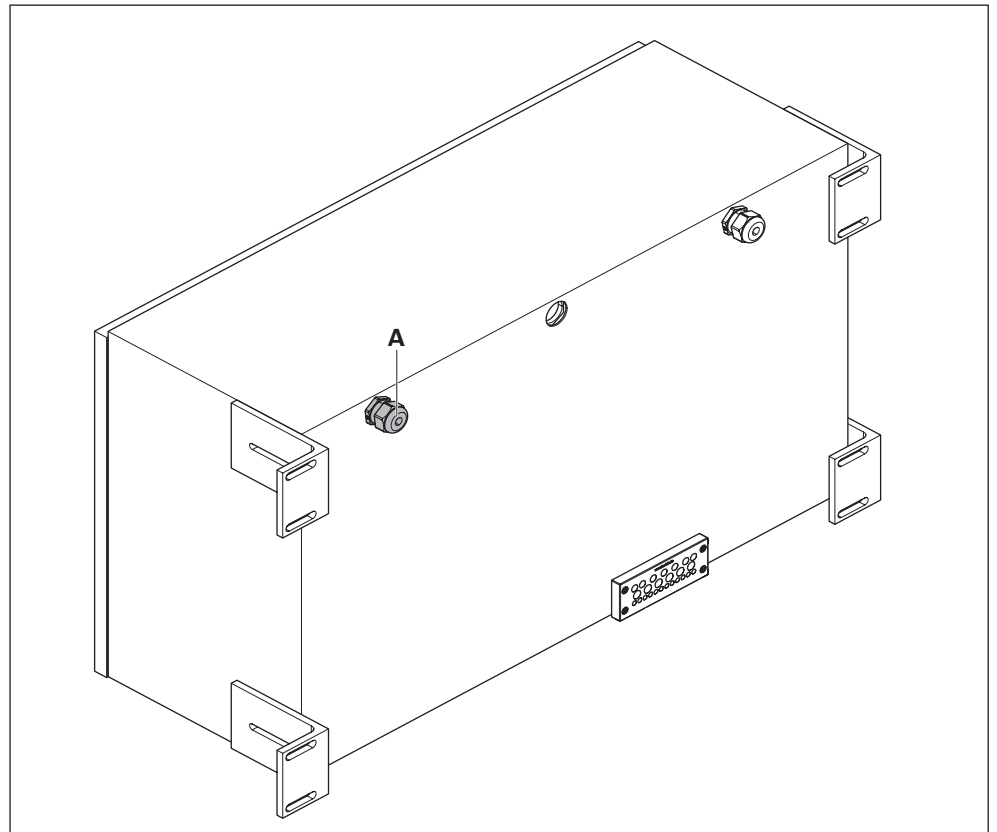


Fig. 75: Cable gland for line voltage cable

8 Start-up

8.1 Initial start-up

DANGER

Death or serious injury from failing to meet emergency stop safety circuit specifications

The emergency stop safety circuits must meet the following specifications:

- Stop Category 1 per DIN EN 60204-1

The system should be completely surrounded by a guard as defined in DIN ISO EN 14120.

- Access doors should have an electrical interlock and a locking mechanism.
- Access doors should remain locked for min. 5 s after power to the curve and section module motors has been shut off.
- The necessary performance level under DIN EN ISO 13849 should be “d”.
- It should not be possible to start the ActiveMover with the safety door open.

CAUTION

Sudden movements, falling objects

- ▶ Injury due to sudden movements and falling objects.
- ▶ Make sure the product has been correctly assembled by qualified personnel (see page 10) before starting it up.

NOTICE

Malfunctions due to incorrect assembly and start-up

The product can be damaged and its service life shortened.

- ▶ Start-up requires basic mechanical and electrical knowledge.
- ▶ The product should only be started up by qualified personnel (see page 10).

Damage due to inadequate lubrication

The product can be damaged and its service life shortened.





- ▶ Make sure there is a WT at least every 2 m along the transport path.
- ▶ Give the lubricating felt of each WT an additional 20 drops of lubricant (see Section 10.3.1).
- ▶ Add lubrication to the V-rail. Use the same lubricant as the WT.

- Perform a risk assessment per DIN EN ISO 12100 before starting up a conveyor system for the first time or returning one to service.
- Under the EU Machinery Directive (2006/42/EC), the transfer system must be equipped with EMERGENCY STOP controls.
- Make sure all electrical connections are either used or capped. Make sure all thread connectors and plug-in connectors are properly seated. All relevant protective covers must be installed.

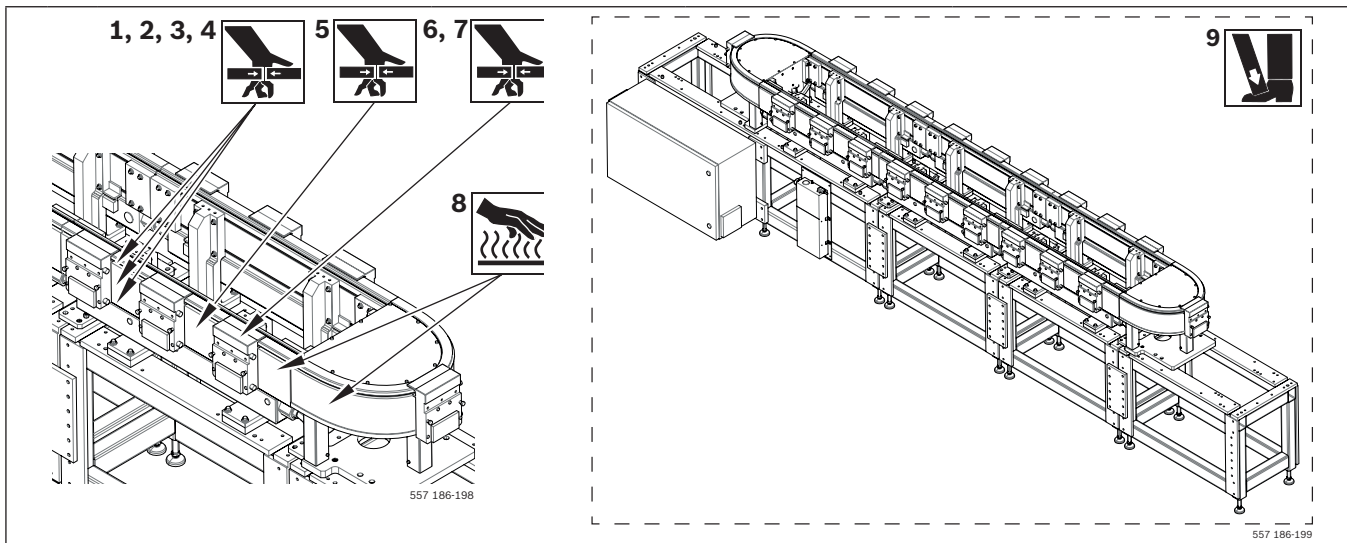
- Only inspect and adjust continuous conveyors in motion or operation when the guards are in place.
- Observe DIN EN ISO 13857 when removing or replacing guards and/or bypassing safety equipment.
- Only start up the product if all safety equipment has been installed in the system and is functional.
- Only start up a product that has been fully installed.

8.2 Residual risks

Table 6: Residual risks

Life stage ¹⁾ , Location		Situation	Hazard	Action	
1	2 9 21	Between WT and section/curve module		Crushing/ dismemberment	Keep hands out of the system while it is running. Secure access to work areas, e.g. with a locking guard as defined in DIN EN ISO 14120 (PLr = d per zDIN EN ISO 13849).
	2	Between WT and V-rail			
	3	Between WT rollers and slide rail			
	4	Between WT tip guard (discharger brush) and V-rail			
	5	Between WTs			
6	2 9 21	WT, collision with body part		Crushing/ dismemberment/ impact	Keep hands out of the system while it is running. Secure access to work areas, e.g. with a locking guard as defined in DIN EN ISO 14120 (PLr = d per DIN EN ISO 13849).
	7	WT, uncontrolled ejection/falling			
8	2 9 21	Section/curve module surface		Burning	Keep hands out of the system while it is running. Secure access to work areas, e.g. with a locking guard as defined in DIN EN ISO 14120 (PLr = d per DIN EN ISO 13849).
9	2 9 21	Around the entire system		Crushing	Observe max. load specifications and process force. See Section 16 Technical data. Keep hands out of the system while it is running. Secure access to work areas, e.g. with a locking guard as defined in DIN EN ISO 14120 (PLr = d per DIN EN ISO 13849).

¹ Life stages of the machine according to EN 12100 Section 5.4 a /b (No. 1–27), Section 5.4 a (see Page 105).



8.2.1 Life stages of the machine

According to EN 12100 Section 5.4 a /b (No. 1–27), Section 5.4 a

- 1 Transport, assembly and installation
- 2 Start-up
- 3 Use
- 4 Disassembly, shutdown and disposal
- 5 Setup
- 6 Inspection
- 7 Teaching/programming
- 8 Changeover
- 9 Warm-up
- 10 All operating modes
- 11 Loading the machine
- 12 Unloading the machine
- 13 Shutting the machine down
- 14 Shutting the machine down in an emergency
- 15 Restoring operation after backup or blockage
- 16 Restarting after unscheduled shutdown
- 17 Troubleshooting and fault clearance (intervention by operating personnel)
- 18 Cleaning and keeping clean
- 19 Preventive maintenance
- 20 Corrective maintenance

Operating states of the machine (Section 5.4 b)

- 21 Normal operation
- 22 Change in a property or dimension of the material or workpiece being processed
- 23 Failure of one or more components or supply units
- 24 External disturbances (e.g. impact, vibration, electromagnetic interference)
- 25 Design faults or defects (e.g. software errors)
- 26 Power supply fault
- 27 Environmental conditions (e.g. damaged floors)

8.3 Returning to service

Follow the steps for initial start-up.

8.4 AMpro configuration software

The AMpro configuration software is required for start-up, configuration, parameterization, calibration and troubleshooting.

For the description of the software, see the separate AMpro manual.

You can download the manual online at:

www.boschrexroth.com/mediadirectory

9 Operation

9.1 Information on operation

9.1.1 Wear

- Some components are inherently subject to unavoidable wear. We have designed the machine and selected its materials to ensure functional reliability over its entire service life. However, wear also depends on the operating, maintenance and ambient conditions in the place of use (resistance, fouling).
- Overloading conveyor sections can cause the conveyor medium to fail and lead to the premature failure of motors and gears.
- Overloaded components cannot be guaranteed to function.

9.1.2 Steps to reduce wear

The following common-sense actions will reduce wear:

- Switch off the conveyor section during system shutdowns, e.g. during breaks, at night and on weekends.
- Do not select a higher speed for the conveyor section than required for the function in question.
- Avoid fouling from abrasive media, reduce fouling by cleaning on a regular basis.

9.1.3 Loading the workpiece pallet

The modular units were designed and tested under the assumption that the workpiece pallets will not all have the same weight during a single cycle on one line section. Not all workpiece pallets may be loaded.

Significantly different weights may require special steps to avoid malfunctions.

NOTICE

Damage and malfunctions due to incorrect selection of center of gravity

The product can be damaged and its service life shortened.

- ▶ The center of gravity and the max. torques specified in the ActiveMover product catalog must be taken into account.

9.1.4 Environmental factors

- Our products are resistant to many media commonly found in a manufacturing environment, such as water, mineral oil, grease and detergents. Contact your Rexroth representative if you have any doubts about resistance to specific chemicals, such as test oil, doped oils, aggressive cleaning agents, solvents or brake fluid.
- Avoid prolonged contact with highly reactive acidic or alkaline materials.
- Fouling – specifically from abrasive media from the surrounding area, such as sand and silicates, e.g. from construction or even machining processes in the transfer system (e.g. welding beads, pumice powder, cullet, chips, waste parts, etc.) – can greatly increase wear. Maintenance intervals should be significantly reduced under these circumstances.

- Resistance to media and fouling does not mean that functional reliability is always guaranteed.
 - Liquids that thicken as they evaporate and become highly viscous or adhesive can lead to malfunctions.
 - If carried onto systems with rollers, media with a lubricating effect can lead to a reduction in the drive power transmitted via friction.

In such instances, special care should be taken when planning the system and the maintenance intervals should be shortened accordingly.

10 Maintenance and servicing

DANGER

Death or serious injury from electric shock!



In areas that are marked with this hazard symbol, there is a risk of death or serious injury and burns from electric shock.

- ▶ Observe all NFPA 79 (NA) and EN 60204-1 (EU) requirements for safely working on electrical systems, as well as all national and international regulations applicable at the place of use.
- ▶ Wear personal protective equipment that is appropriate for the place of use and use suitable tools.

Death or serious injury from residual energy!



After the power supply to the section and curve module motors has been shut off, there is still a risk of death or serious injury and burns from energy stored in the capacitors.

- ▶ After the power supply has been shut off, access should remain blocked by an interlocking guard with locking mechanism to allow the energy in the capacitors to discharge.

WARNING

High electrical voltage

Risk of death or serious injury from electric shock.

- ▶ Disconnect the system component requiring maintenance or servicing before starting.
- ▶ Secure the system against unintentional restarting.

CAUTION

Sudden movements, falling objects

Injury due to sudden movements and falling objects.

- ▶ Only carry out work on the ActiveMover when the system is switched off and in safe condition.
- ▶ Secure the system against unintentional restarting.

Hot surfaces up to 80 °C on section/curve module during operation

Risk of burns from touching hot surfaces over 65 °C.

- ▶ Install appropriate guards.
- ▶ Allow the system to cool down for at least 30 min before performing maintenance and/or servicing.

CAUTION

Uninterruptible power supply!

Voltage may be present even with the main switch off!



Coming into contact with electrical components can result in injury and burns from electric shock.

Strong magnetic field!



Risk of injury from strong magnetic fields in areas marked with this hazard symbol.



Workpiece pallets generate a strong magnetic field when they are not mounted to the linear motor system.

- This strong magnetic field can be harmful to persons with pacemakers and other medical implants.

- The magnetic field of the ActiveMover linear motor system can cause magnetic materials to move, which may result in flying objects or crushing/dismemberment.

- Electronic equipment and magnetic data carriers can be affected by the magnetic field.

- ▶ Persons with pacemakers or other medical implants should maintain a min. distance of 30 cm between the implant and the workpiece pallet.
- ▶ Persons with pacemakers or other medical implants should not perform maintenance on or service the product.
- ▶ Keep metallic objects away from the workpiece pallets and the section/curve modules.
- ▶ When workpiece pallets are unmounted, keep their protection plates on them. For attachment instructions, see Page 77.

Injury from workpiece pallets suddenly releasing during removal

Removing the workpiece pallet requires a considerable amount of force even with the remover tool. Once the magnetic pull strength is overcome, the workpiece pallet will release suddenly.

- ▶ Only use the included remover tool.
- ▶ Always hold the remover tool with both hands.
- ▶ Secure your footing to keep from falling backward.
- ▶ Be prepared for the workpiece pallet to release suddenly.

Risk of crushing when mounting/removing workpiece pallets

The other workpiece pallets near the remover tool pose a risk of hands and fingers being crushed.

- ▶ Remove all workpiece pallets near the remover tool.

CAUTION

Crushing injury when placing the protection plate on the magnet kit of the WT!

The high magnetic pull strength will suddenly pull the protection plate toward the magnet kit as it approaches it.

- ▶ Be prepared for the high pull strength.
- ▶ Set the protection plate on the magnet kit **with the plastic cover on**.
- ▶ Do not put any body parts between the protection plate and the magnet kit.

NOTICE

Follow the 5 safety rules when working on the electrical system

- ▶ Disconnect from power.
- ▶ Secure against restarting.
- ▶ Verify the system is dead.
- ▶ Ground and short-circuit the system.
- ▶ Cover or shield adjacent live parts.

- Only inspect and adjust continuous conveyors in motion or operation when the guards are in place.
- Observe DIN EN ISO 13857 when removing or replacing guards and/or bypassing safety equipment.

10.1 Cleaning and care

DANGER

Death or serious injury due to ignorance of potential hazards

Ignorance of the potential hazards of the system poses a risk of death or serious injury, including burns.

- ▶ Cleaning personnel should be instructed on the potential hazards of the system before starting work.

NOTICE

Bearing failure

Applying grease-dissolving substances on the bearing points, e.g. during cleaning, leads to bearing failure. There is a risk of property damage and service life may be reduced.

- ▶ Keep degreasers or aggressive cleaning agents away from the bearings!
- ▶ Only clean the product with a damp cloth.

10.1.1 Section/curve module V-rail and guide rails

Clean deposits and fouling from the V-rail and guide rails at least once per week with isopropyl alcohol (IPA) and a clean, soft cloth.

After cleaning with isopropyl alcohol, the V-rail and guide rails must be relubricated to avoid damaging the WTs.

10.1.2 Section/curve module base frame

Clean deposits and fouling from the base frame of the section/curve modules at least once per week using a clean, soft cloth.

10.1.3 Workpiece pallets

Clean deposits and fouling from the workpiece pallets at least once per month using a clean, soft cloth.

10.1.4 Measuring system**NOTICE****Damage to measuring system**

The measuring system can be destroyed by magnetic fields.

- ▶ Do not touch the measuring system with magnetic objects.

Carefully clean deposits and fouling from the measuring system with a clean, soft cloth as needed and after disassembly.

For disassembling the measuring system, see Section 10.4.5.

For inspecting the measuring system, see Section 10.2.6.

10.1.5 Control cabinet fan

Clean deposits and fouling from the fan with a clean, soft cloth as needed.

10.2 Inspection

10.2.1 Workpiece pallets

Inspect the workpiece pallet at least once per month and after removal (see Section 7.5.10) as described in Table 7:

Table 7: Workpiece pallet inspections

WT components	Inspections	Further work
All screws	Make sure that all screws in the WT are properly seated.	Tighten any loose screws.
Rubber buffers	Check that all rubber buffers are present and show no signs of damage.	Replace the rubber buffers, if necessary (see Section 10.4.3).
Discharger brushes	Check that all fastening screws in the discharger brushes are properly seated.	Tighten any loose screws.
	Check the discharger brushes for visible wear. The discharger brushes must be in contact with the V-rail.	Replace the brushes if they are no longer in contact with the V-rail (see Section 10.4.4).
Measuring system	Check the measuring system for visible fouling and damage.	Clean the measuring system (see Section 10.1.4). Check the measuring system (see Section) and replace it, if necessary (see Section 10.4.5).
Felt (WT lubricating device)	Check the lubricating felt for visible damage and wear.	Replace the lubricating felt, if necessary (see Section 10.4.6).
	Check that the lubricating felt contains lubricant.	Lubricate the WT felt (see Section 10.3.1).
	Check the pressure spring of the lubricating felt. Press on the lubricating felt, then release it. The lubricating felt should return to its initial position.	Clean the spring seat/replace the pressure spring (see Section 10.4.8).
Magnet kit	Check the magnet kit for visible fouling, wear and damage.	Clean/replace the magnet kit, if necessary (see Section 10.4.8).
Guide rollers (flat)	Check that all fastening screws in the guide rollers are properly seated.	Tighten any loose screws.
	Check the guide rollers for damage and sticking.	If the guide rollers are damaged, also check the guide rails for damage. Replace the guide rollers, if necessary (see Section 10.4.9). Replace the guide rails, if necessary (see Section Fig. 53).
	Check the vertical and horizontal play of the guide rollers. Slight vertical play is normal.	Replace the guide rollers, if necessary (see Section 10.4.9).

WT components	Inspections	Further work
V-rollers	Check the vertical play of the guide rollers.	Tighten any loose fastening screws.
	Check the guide rollers for damage and sticking.	If the guide rollers are damaged, also check the V-rail for damage. Replace the guide rollers, if necessary (see Section 10.4.10/10.4.12). Replace the V-rail, if necessary (see Section 10.4.11/10.4.12).

10.2.2 Control cabinet fan

Inspect the control cabinet fan for damage, loose connecting cables, dust and fouling at least once per month. For cleaning the fan, see Section 10.1.5.

10.2.3 Control cabinet air filter

Inspect the control cabinet air filter for dust and fouling at least once per month.

10.2.4 Control cabinet power supply

Inspect the control cabinet power supply for dust and fouling at least once per month. For replacing the air filter, see Section 10.4.25.

10.2.5 All screws

Inspect all ActiveMover components for loose fastenings and screws at least once per month.

10.2.6 Inspecting the measuring system (magnetic strip)

For disassembling the measuring system, see Section 10.4.5.

For cleaning the measuring system, see Section 10.1.4.

- Inspect the measuring system (magnetic strip) with a test foil.

All poles in the measuring system (magnetic strip) should be parallel to one another and easily visible.

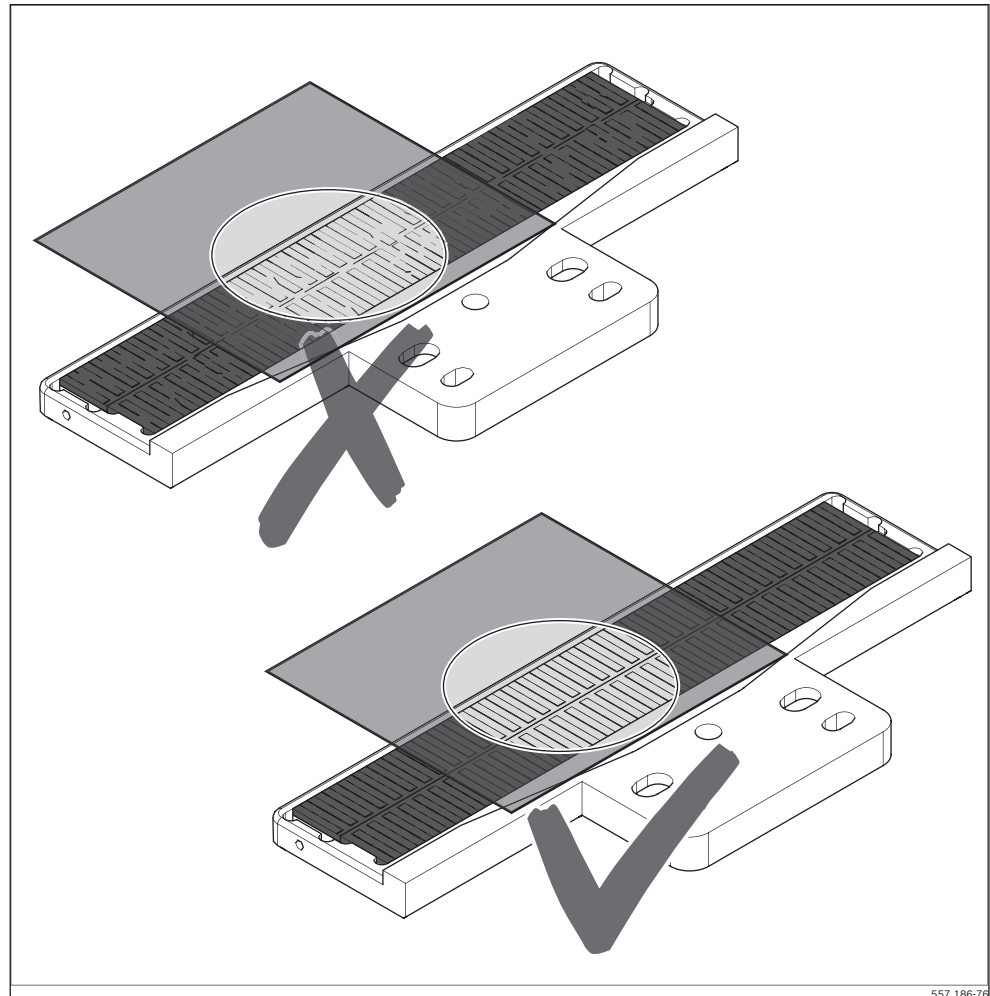


Fig. 76: Inspecting the measuring system

Should individual poles not be visible or appear damaged, replace the measuring system (magnetic strip).

10.3 Maintenance

10.3.1 Lubricating workpiece pallets

Lubricate the WT lubricating felt during assembly/start-up with 5 to 10 drops of lubricant. Afterward, lubricate as needed per Table 7 on Page 112.



Please note:

The workpiece pallet does **not** have to be removed for lubrication.

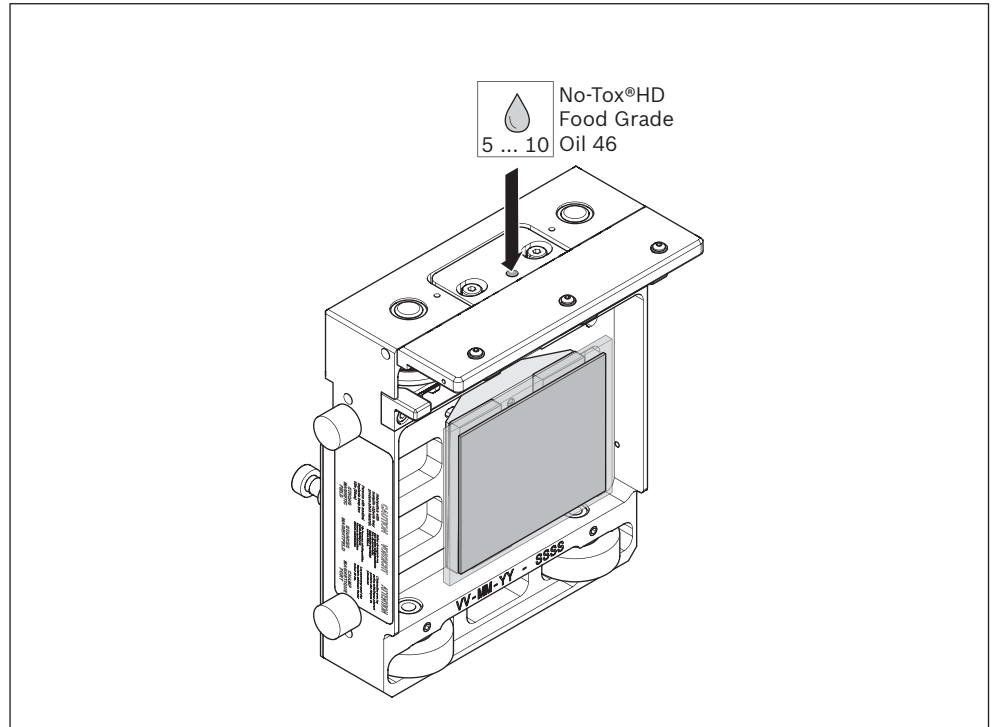


Fig. 77: Lubricating the workpiece pallet

10.4 Servicing

10.4.1 Required mechanical tools

- Hex wrench AF13
- Hex socket wrenches AF3, AF4, AF5, AF6
- Phillips screwdriver PZ2
- 500 mm caliper
- Rubber mallet
- Punch

10.4.2 Required electrical tools

- Various screwdrivers with insulated handles
- Wire cutters with insulated handles
- Wire stripper with insulated handles
- Multimeter

CAUTION

Strong magnetic field!



Risk of injury from strong magnetic fields in areas marked with this hazard symbol.



Workpiece pallets generate a strong magnetic field when they are not mounted to the linear motor system.

- This strong magnetic field can be harmful to persons with pacemakers and other medical implants.

- The magnetic field of the ActiveMover linear motor system can cause magnetic materials to move, which may result in flying objects or crushing/dismemberment.

- Electronic equipment and magnetic data carriers can be affected by the magnetic field.

- ▶ Persons with pacemakers or other medical implants should maintain a min. distance of 30 cm between the implant and the workpiece pallet.
- ▶ Persons with pacemakers or other medical implants should not perform maintenance on or service the product.
- ▶ Keep metallic objects away from the workpiece pallets and the section/curve modules.
- ▶ When workpiece pallets are unmounted, keep their protection plates on them. For attachment instructions, see Page 77.
- ▶ Also follow the safety instructions in Section “General safety instructions for magnets” on page 33.

 **CAUTION****Injury from workpiece pallets suddenly releasing during removal**

Removing the workpiece pallet requires a considerable amount of force even with the remover tool. Once the magnetic pull strength is overcome, the workpiece pallet will release suddenly.

- ▶ Always hold the remover tool with both hands.
- ▶ Secure your footing to keep from falling backward.
- ▶ Be prepared for the workpiece pallet to release suddenly.

Risk of crushing when mounting/removing workpiece pallets

The other workpiece pallets near the remover tool pose a risk of hands and fingers being crushed.

- ▶ Remove all workpiece pallets near the remover tool.

Crushing injury when placing the protection plate on the magnet kit of the WT!

The high magnetic pull strength will suddenly pull the protection plate toward the magnet kit as it approaches it.

- ▶ Be prepared for the high pull strength.
- ▶ Set the protection plate on the magnet kit **with the plastic cover on**.
- ▶ Do not put any body parts between the protection plate and the magnet kit.

NOTICE**Risk of destruction of electronic components/PCBs by ESD**

- ▶ Always wear an anti-static wristband to prevent electrostatic charging when working on electronic components/PCBs.

10.4.3 Replacing rubber buffers

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the rubber buffers.
4. Install the new rubber buffers.

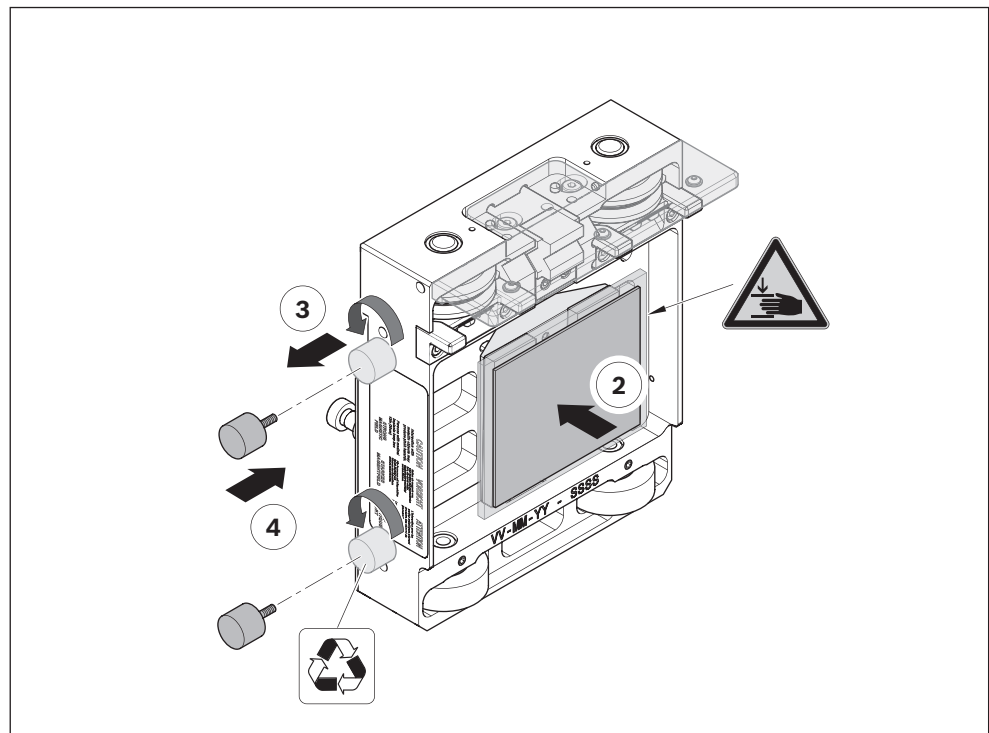


Fig. 78: Replacing rubber buffers

557 186-78

**Please note:**

Improper handling can bend the discharger brushes and it will no longer be possible to install them.

Required spare parts

- Discharger brush (2x)

3 842 550 985

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the discharger brushes.
4. Align the discharger brushes with the outer holes in the tip guard.
5. Install the fastening screws for the discharger brushes and tighten them.

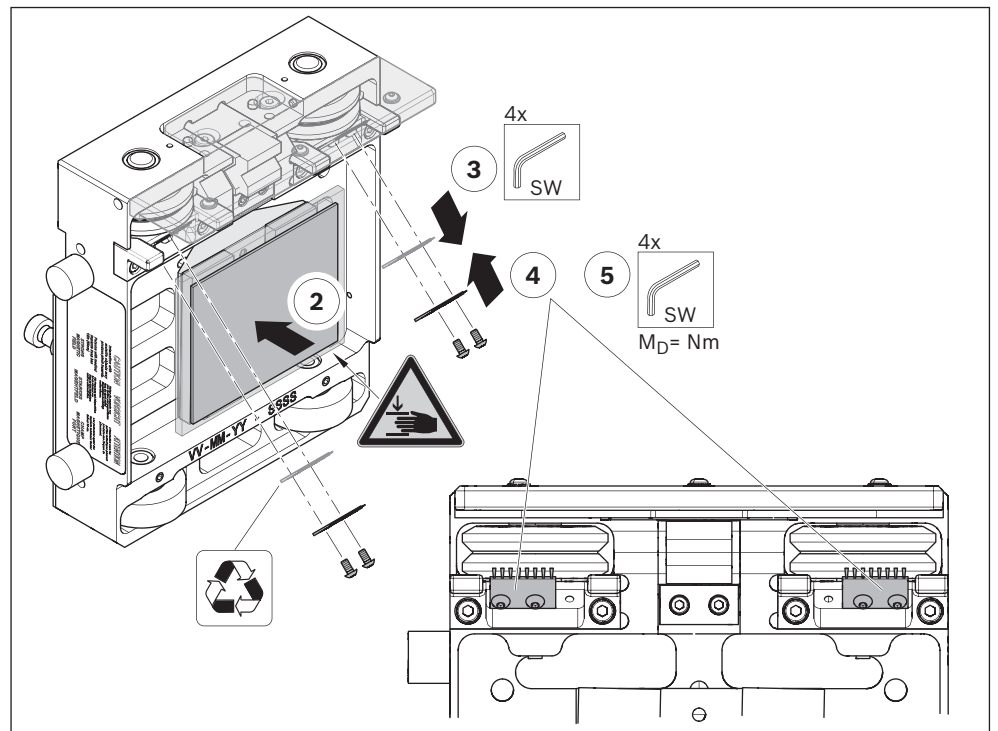
10.4.4 Replacing discharger brushes

Fig. 79: Replacing discharger brushes

**Please note:**

- After replacing the measuring system, the magnetic strip must be recalibrated/repositioned. Otherwise, the WT will no longer function.
- The measuring system can be destroyed by magnetic fields. Do not touch the measuring system with magnetic objects.

Required spare parts

- Measuring system

3 842 555 977

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Loosen the two screws on the side of the WT.
4. Remove the measuring system.
5. Install the new measuring system in reverse order.
6. Check the spacing of the measuring system (encoder and magnetic strip), see Section 10.5.1.
7. Recalibrate the WT (see Section 10.5.4 ff).

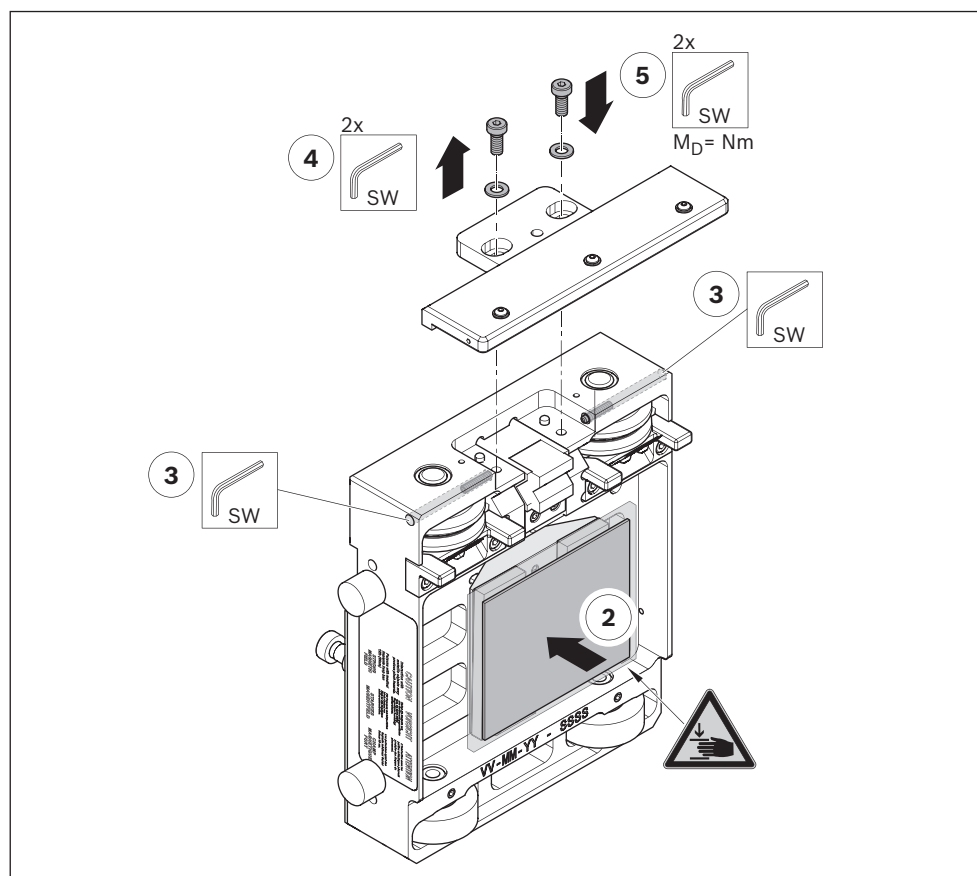
10.4.5 Replacing the measuring system

Fig. 80: Replacing the measuring system

557 186-80

10.4.6 Replacing the felt (WT lubricating device)

Required spare parts

- Lubricating felt
3 842 555 984

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the fastening block from the lubricating felt holder.
4. Remove the lubricating felt holder.
5. Remove the lubricating felt.
6. Install the new lubricating felt in reverse order.
7. Lubricate the WT (see Section 10.3.1).

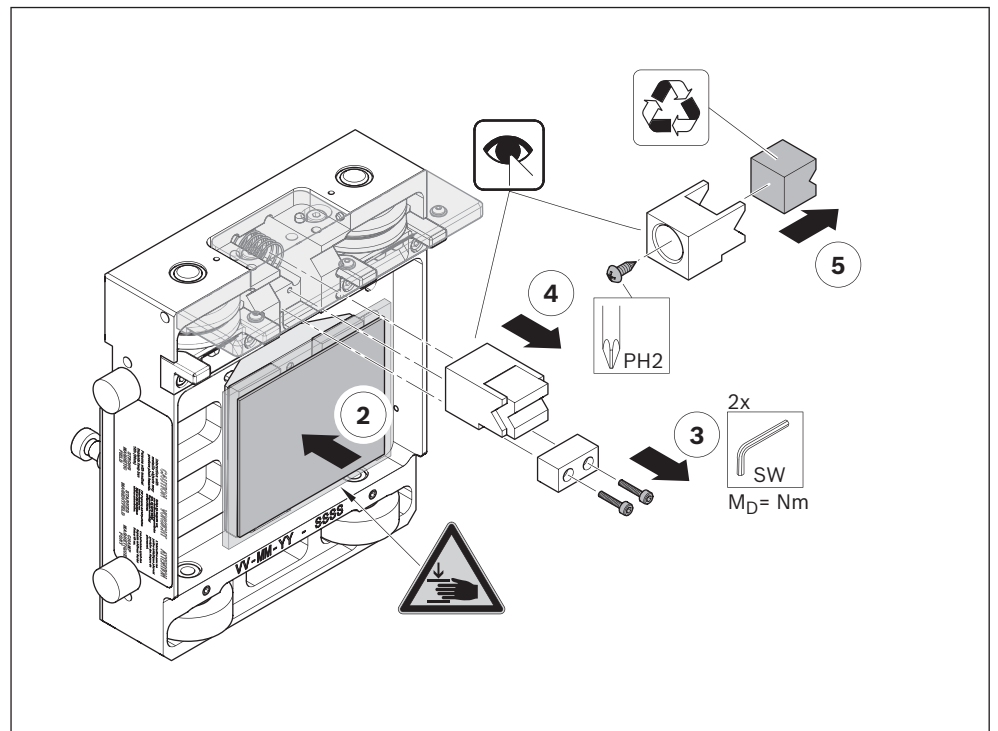


Fig. 81: Replacing the felt (WT lubricating device)



Please note:

The V-groove in the felt should be arranged horizontally in the V-rollers.

10.4.7 Replacing the pressure spring

Required spare parts

- Pressure spring

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the lubricating felt holder (see Section 10.4.6).
4. Remove the pressure springs.
5. Install the new pressure spring and lubricating felt holder in reverse order.

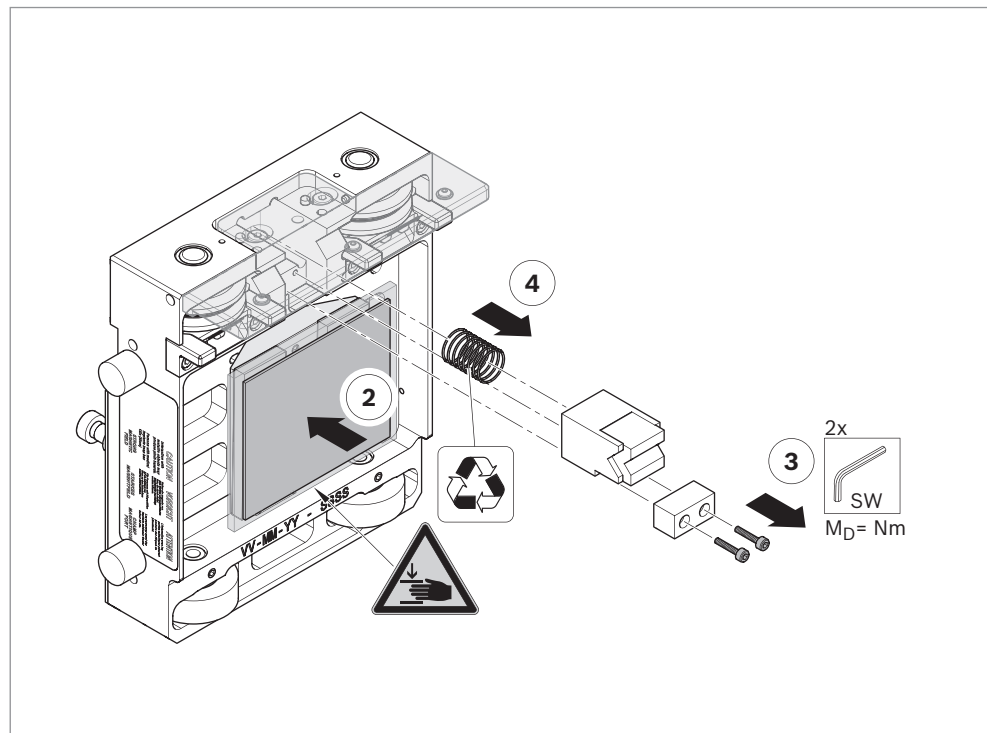


Fig. 82: Replacing the pressure spring

557 186-82

10.4.8 Replacing the magnet kit

Required spare parts

- Magnet kit (2 magnets)
3 842 555 979
- Magnet kit (3 magnets)
3 842 555 980

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the front plate of the WT.
4. Remove the magnet kit.



Please note:

- The kit with 2 magnets is fastened with 2 screws.
 - The kit with 3 magnets is fastened with 4 screws.
5. Install the new magnet kit and the front plate in reverse order.

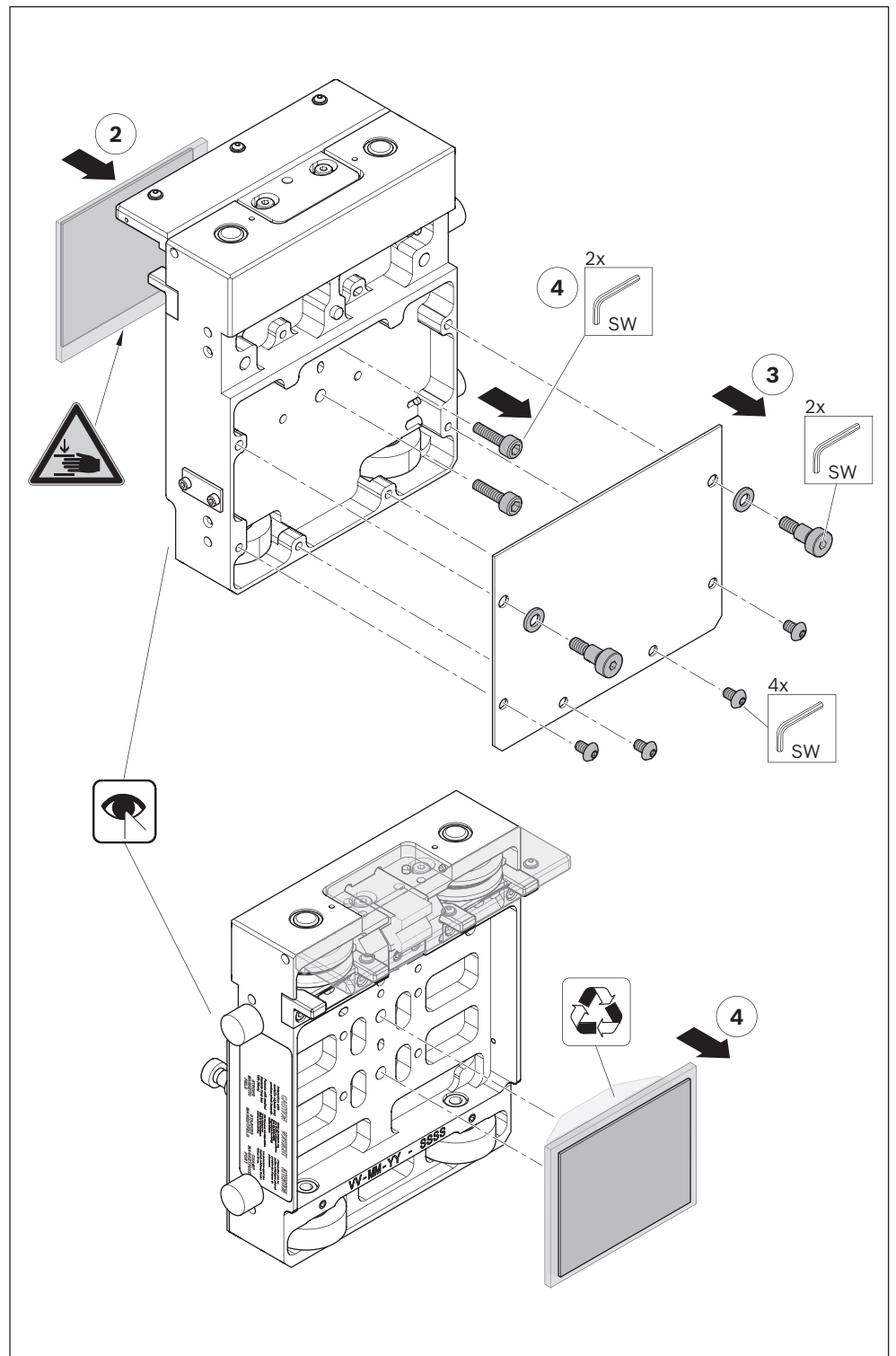


Fig. 83: Replacing the magnet kit

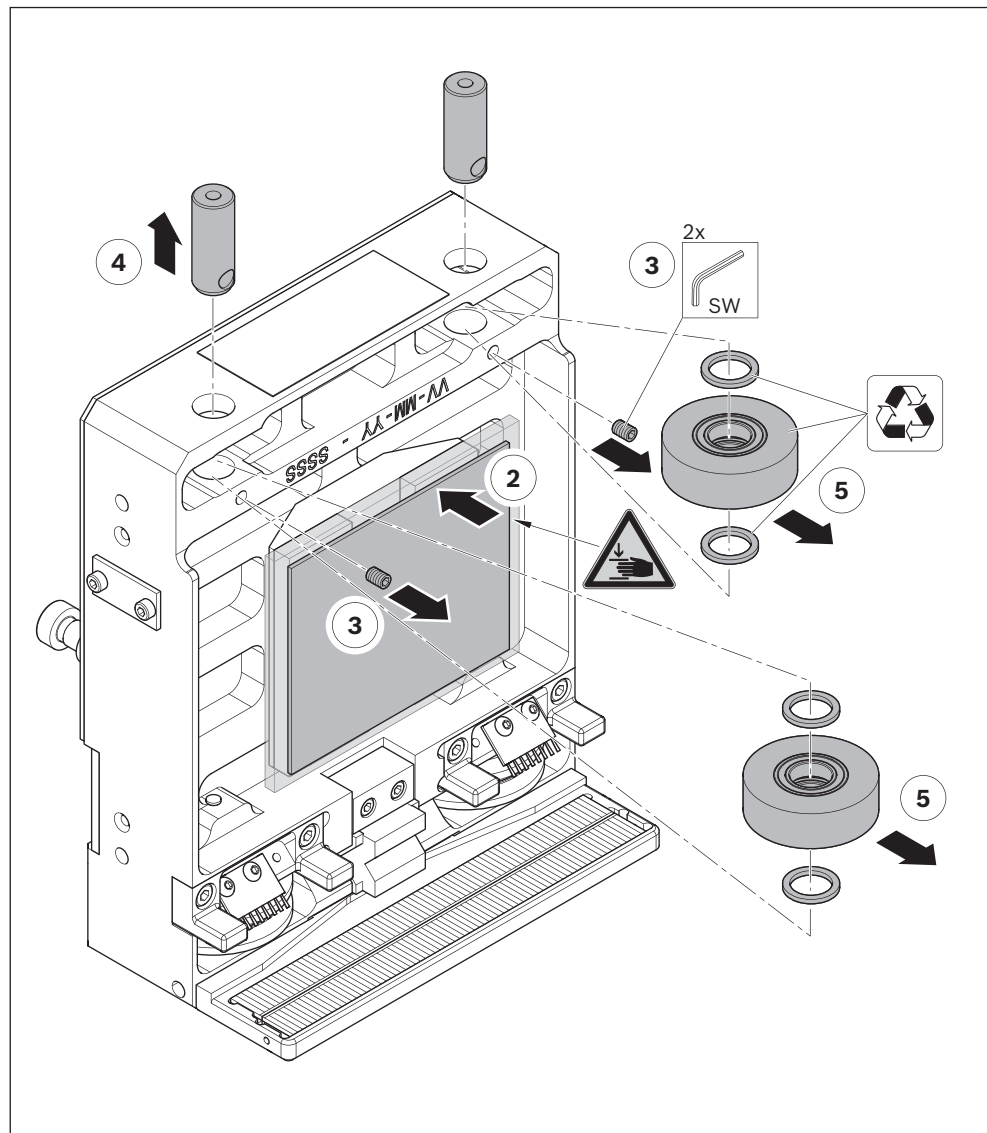
10.4.9 Replacing guide rollers (flat)

Required spare parts

- Flat guide roller (2x)

3 842 555 983

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Loosen the lock screws in the guide rollers.
4. Remove the axles from the guide rollers.
5. Remove the guide rollers and washers.
6. Install the new guide rollers and washers (2 per guide roller) in reverse order.



557 186-84

Fig. 84: Replacing guide rollers (flat)

10.4.10 Replacing V-rollers

Required spare parts

- V-roller (2x)

3 842 555 982

1. Remove the WT from the ActiveMover (see Section 7.5.10).
2. Set the protection plate on the magnet kit **with the plastic cover on**.
3. Remove the discharger brush guard.
4. Remove the protective caps.
5. Remove the hex socket screws.
6. Remove the shims.
7. Remove the bearing pins.
8. Remove the guide rollers.
9. Install the new guide rollers in reverse order.

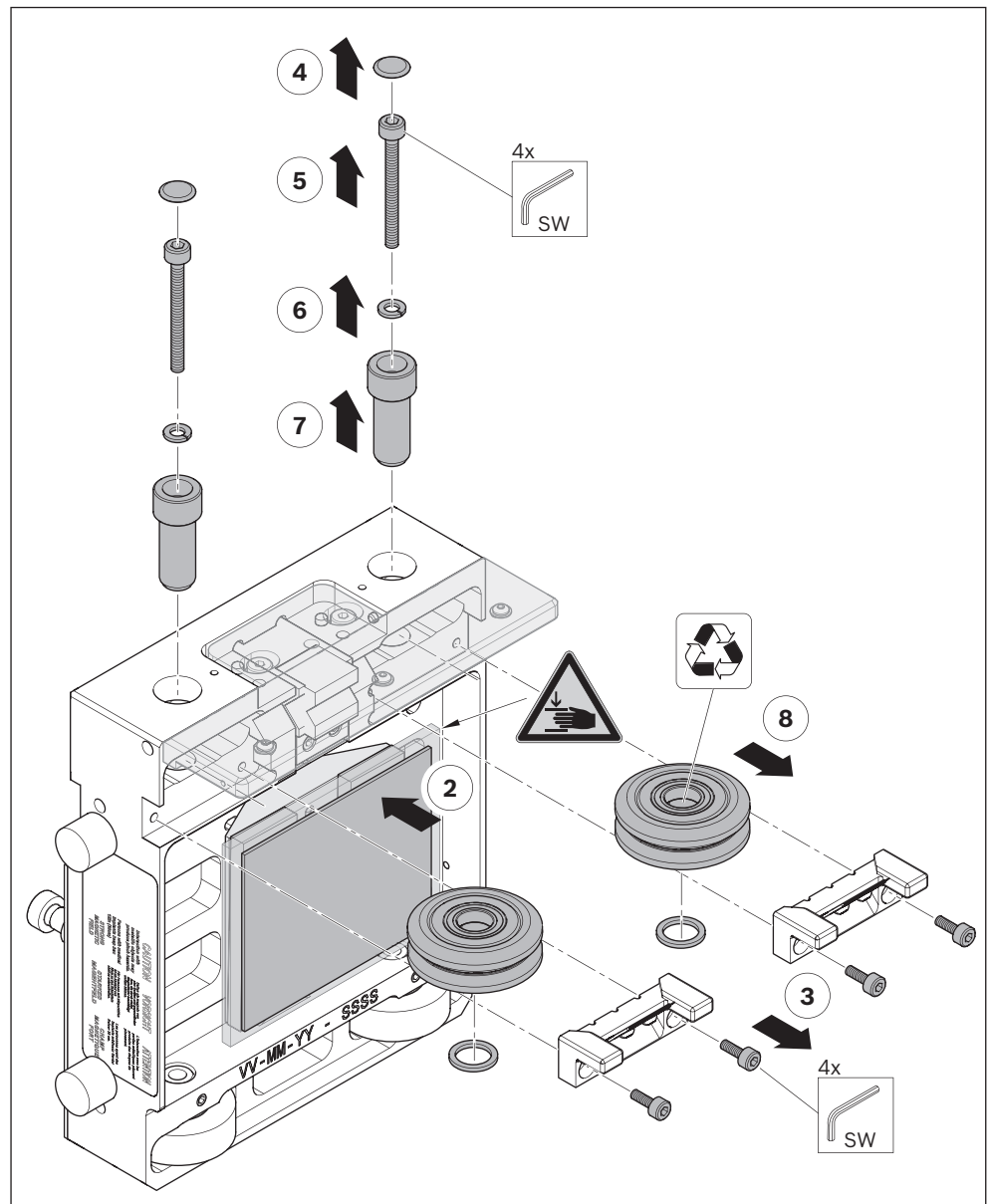


Fig. 85: Replacing V-rollers

10.4.11 Replacing the V-rail (section module)



Please note:

The removed shims need to be replaced in the exact same spot when installing the new V-rail.

Required spare parts

- Section module V-rail
3 842 555 965

1. Remove the left and right measuring system sensor units (see Section 10.4.23).
2. Remove the fastening screws (11x) from the V-rail.
3. Pull the V-rail forward to remove.
4. Note the location of the shims and do not lose it.
5. Clean the top of the section module with a soft cloth.
6. Install the V-rail in reverse order.
7. If necessary, align the V-rail (see Section 7.5.8).
8. Calibrate the measuring system sensor units (see Section 10.5).

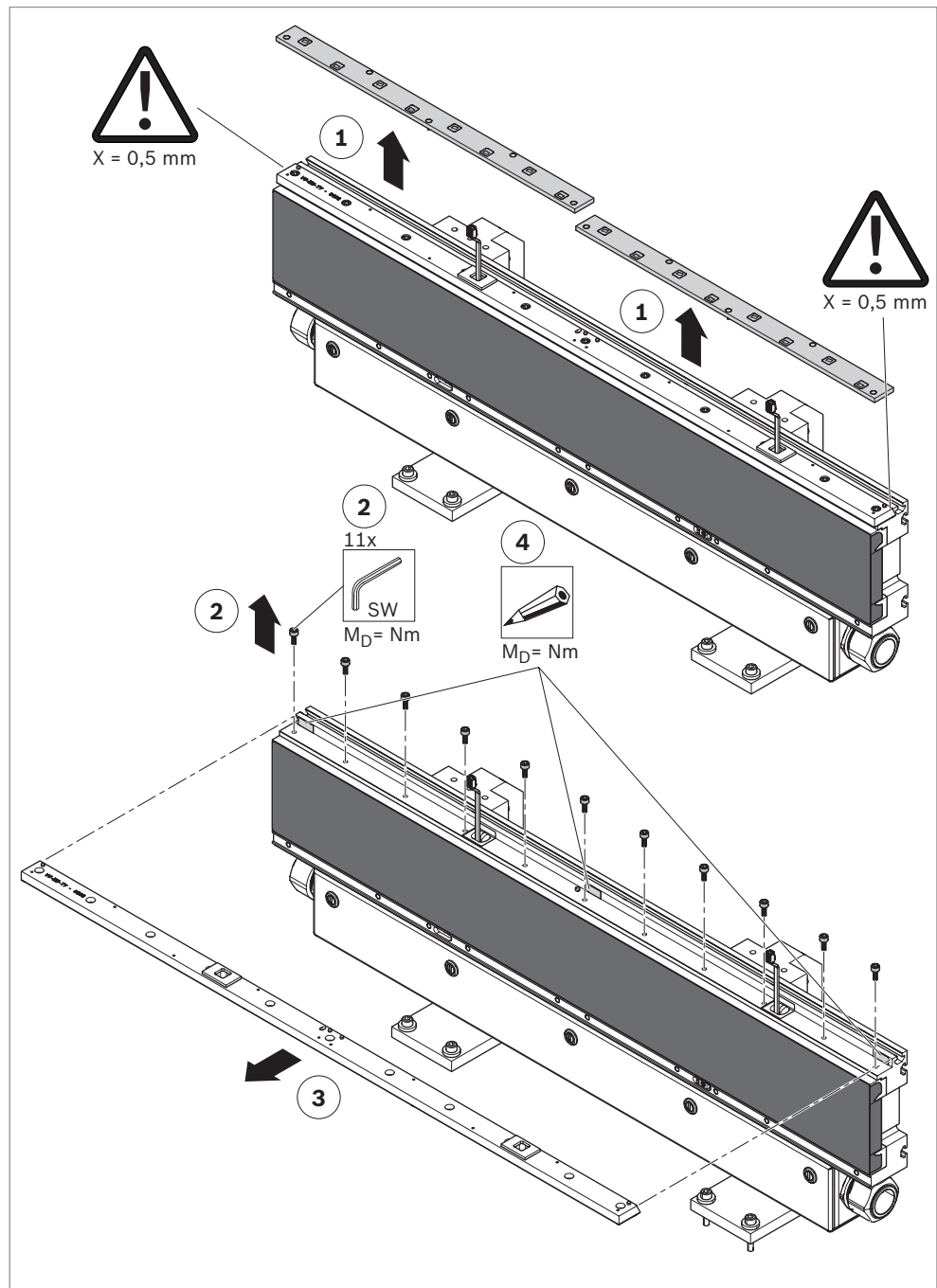


Fig. 86: Replacing the V-rail (section module)

557 186-86



Please note:

- The V-grooves on both sides of the V-rail prevent it from rising.
- The gaps at both ends of the V-rail should be approx. 0.5 mm.

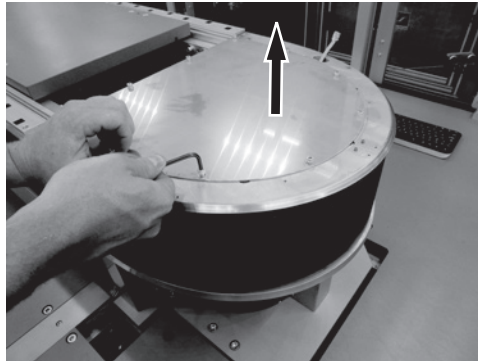
10.4.12 Replacing the V-rail (curve module)

Required spare parts

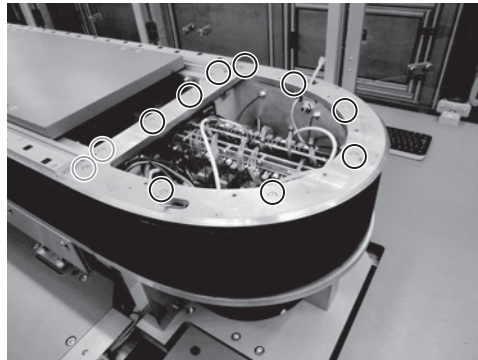
- Curve module V-rail

1. Remove the V-rails from both adjacent section modules (see Section 10.4.11).
2. Remove the left and right measuring system sensor units (see Section 10.4.24).
3. Remove the protective cover from the curve module.
4. Remove the fastening screws (11x) from the V-rail.
5. Pull the V-rail up and off.
6. Clean the top of the curve module with a soft cloth.
7. Install the V-rail in reverse order.
8. If necessary, align the V-rail (see Section 7.5.8).
9. Calibrate the measuring system sensor units (see Section 10.5).

3



4



5

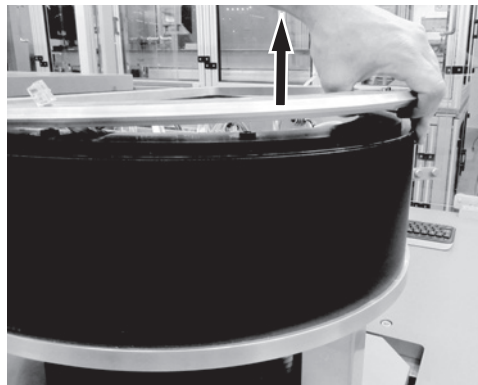


Fig. 87: Replacing the V-rail (curve module)

10.4.13 Replacing guide rails (section module)



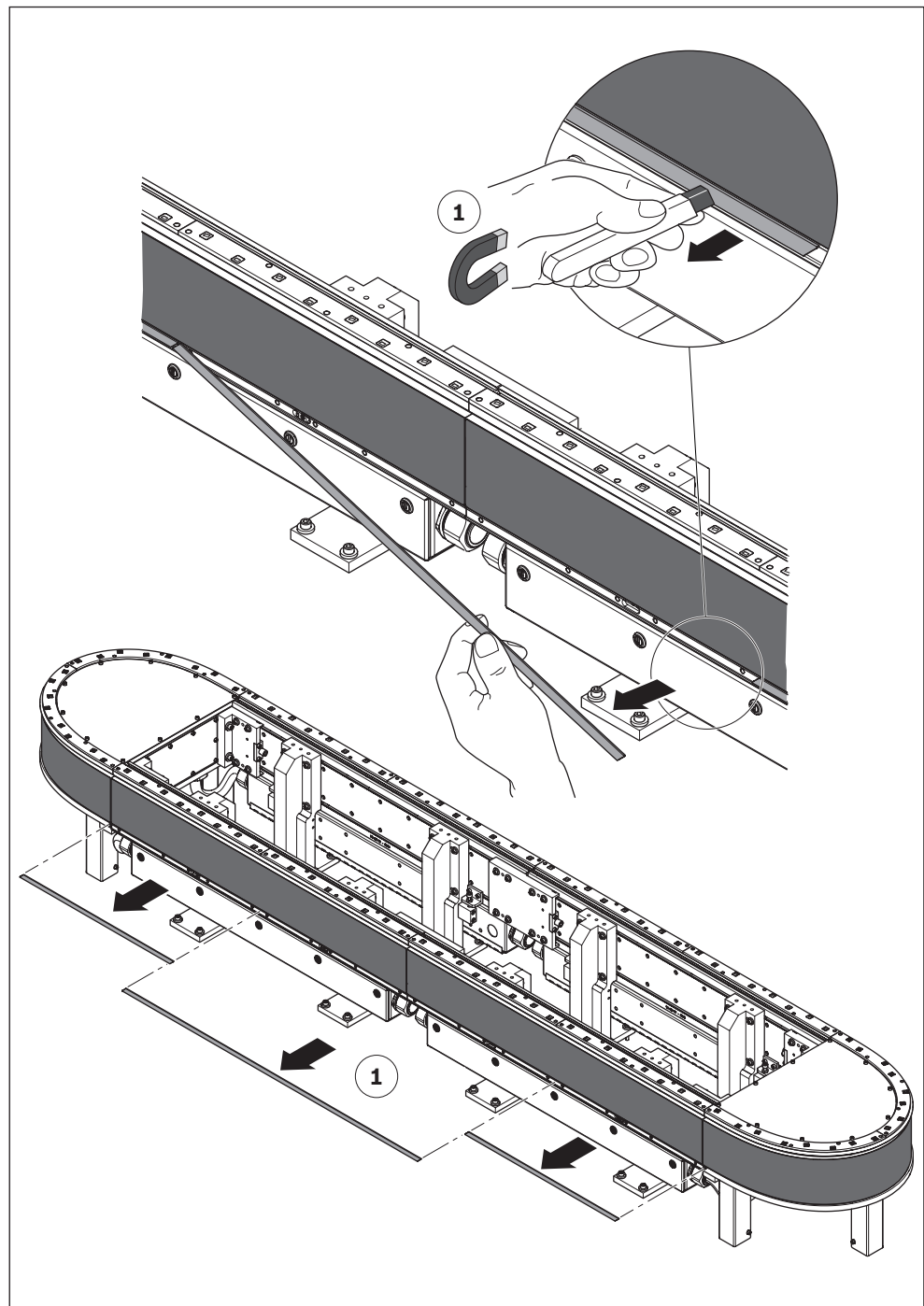
Please note:

- The long 1,000 mm guide rails should always be over the joint between 2 section modules.
- The short 500 mm guide rails should always be at the end of a section module joining a curve module.

Required spare parts

- 1,000 mm guide rail
3 842 555 963
- 500 mm guide rail
3 842 555 964

1. Use a strong magnet to pull the guide rail out of the groove at one end.
2. To install the new guide rail, see Fig. 53 on Page 75.



557 186-88

Fig. 88: Replacing guide rails (section module)

10.4.14 Replacing the coil cover (section/curve module)

Required spare parts

- Section module coil cover
3 842 554 510
- Curve module coil cover
3 842 554 516



Please note:

The cover is glued to the coil but can be removed.

1. Pull the cover off the coil.
2. Clean any adhesive residue off the coil, e.g. with isopropyl alcohol (IPA).
3. Remove the protective film from the back of the new cover.
4. Put the cover on the top corner of the coil and press the cover on carefully from top to bottom.
5. Press out any air bubbles from the inside out.



Fig. 89: Replacing the coil cover (shown here on a section module)

557 186-89

10.4.15 Replacing the power supply

**Please note:**

- Disconnect the power cables from the system components and not from the power supply.
- The 230 V power supply cable is removable.
- The power supply mounting plate does not need to be removed.

1. Disconnect the power supply cables from the system components.
2. Remove the plug connector (230 V AC) from the power socket.
3. Remove the power supply from the mounting plate.

- Mount and connect the new power supply in reverse order.

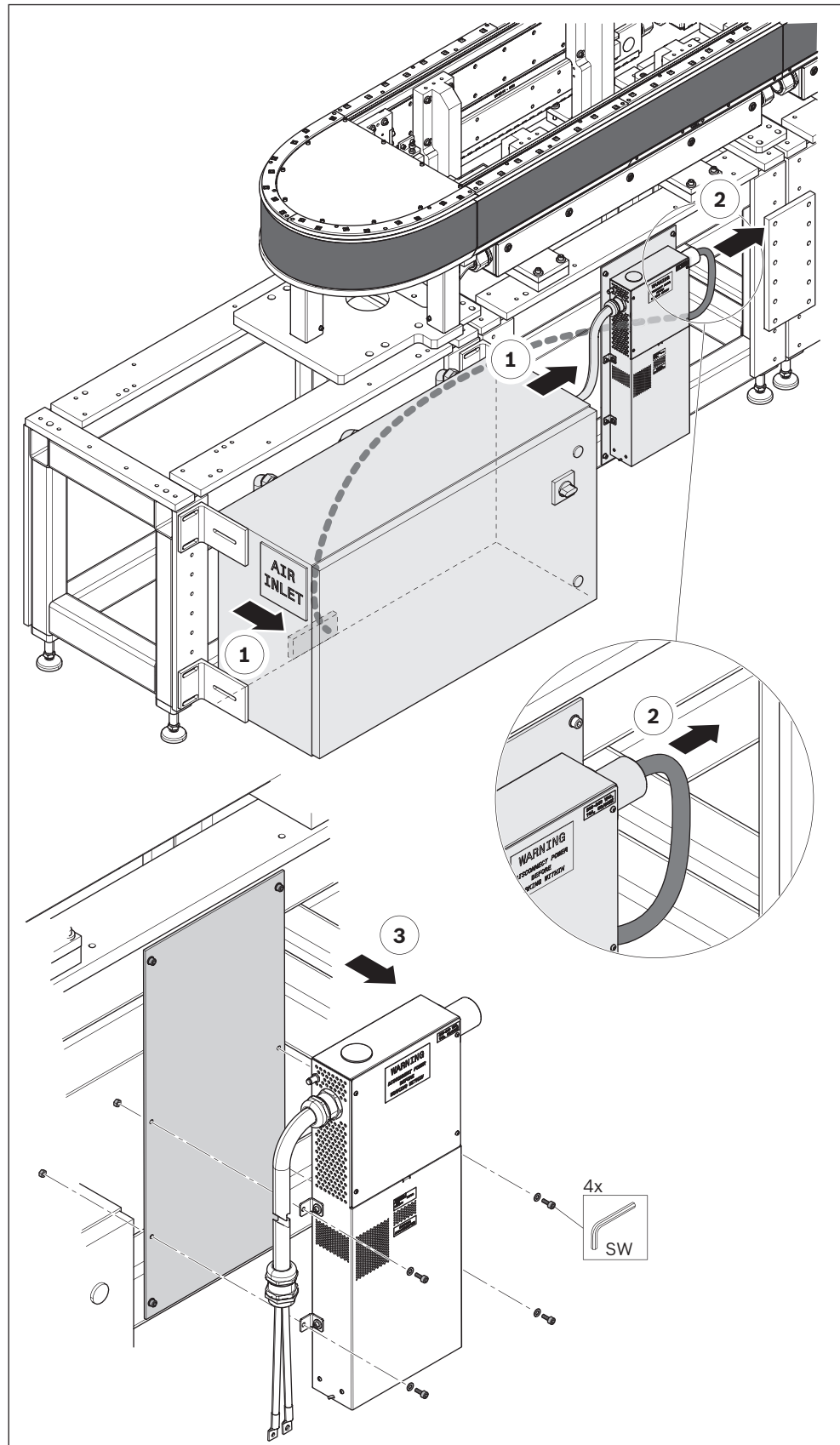


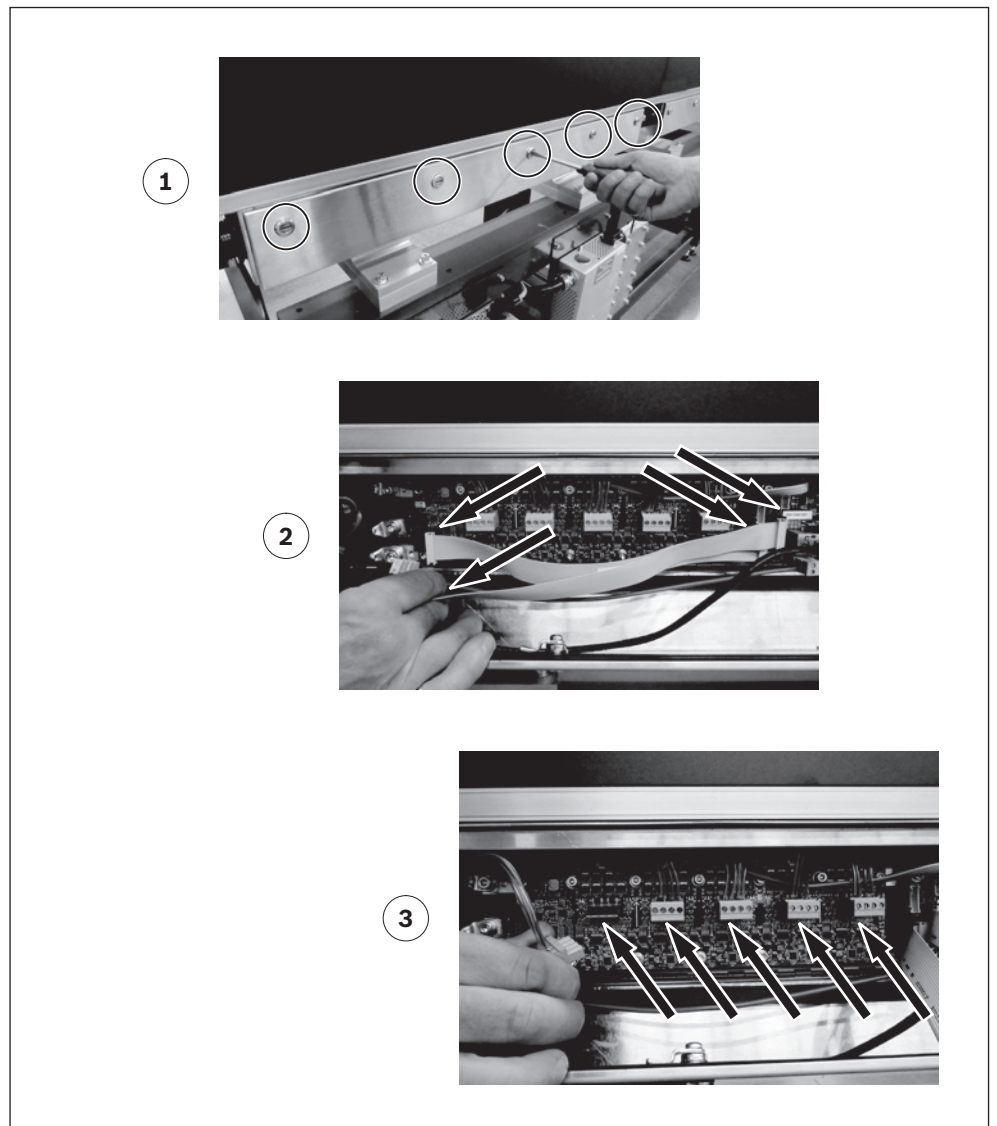
Fig. 90: Replacing the power supply

557 186-90

10.4.16 Replacing the power supply PCB (section module)**Required spare parts**

- Power supply PCB
3 842 555 967

1. Open the protective panel on the electronic box on the section module.
2. Disconnect the 2 ribbon cables from the PCB.
3. Disconnect the 5 coil plugs.

**Fig. 91: Replacing the power supply PCB (section module)**

557 186-91

4. Remove the PCB (1 plastic screw + 13 metal screws).
 5. Remove the PCB and disconnect the 5 thermistor plugs.
 6. Check that all 10 fuses (15 A) are present on the new PCB.
- Install the new PCB in reverse order.

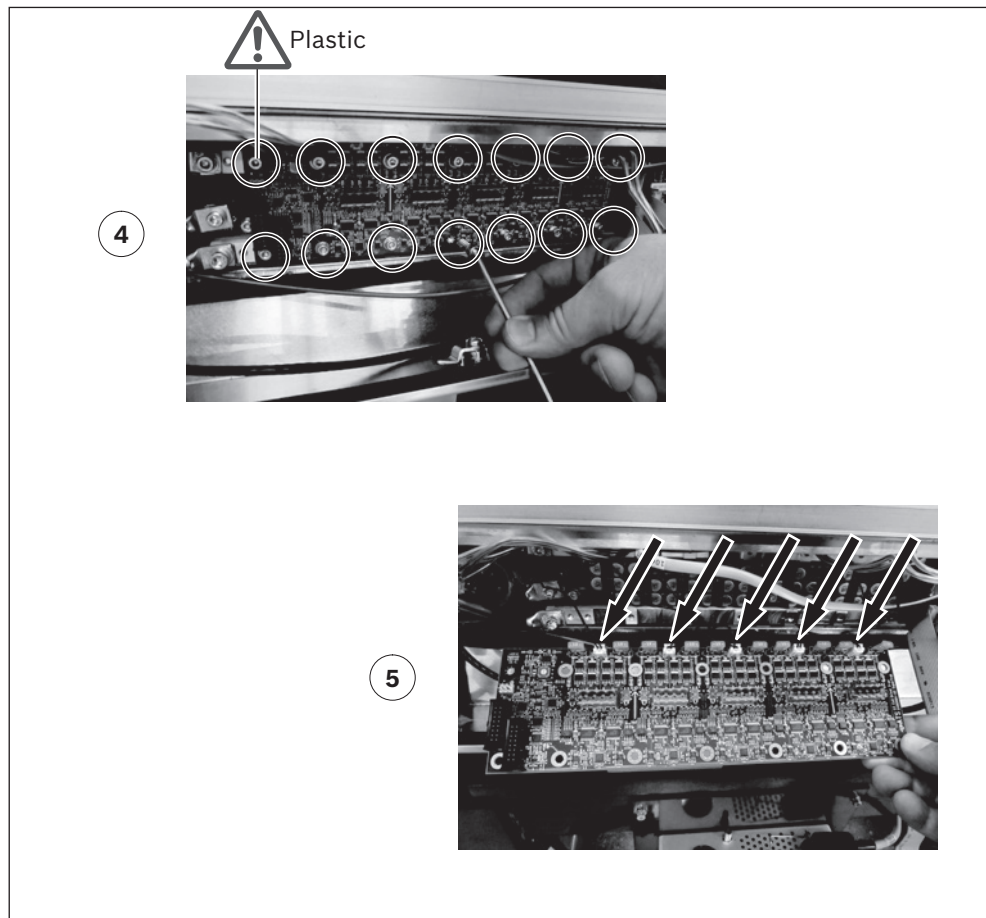


Fig. 92: Replacing the power supply PCB (section module)

557 186-92

10.4.17 Replacing the power supply PCB (curve module)

Required spare parts

- Power supply PCB

3 842 555 967

1. Remove the protective cover from the curve module.
2. Disconnect the 2 ribbon cables from the PCB.
3. Disconnect the 5 coil plugs.
4. Remove the PCB (1 plastic screw + 13 metal screws).
5. Remove the PCB and disconnect the 3 thermistor plugs.
6. Check that all 10 fuses (15 A) are present on the new PCB.

- ▶ Install the new PCB in reverse order.

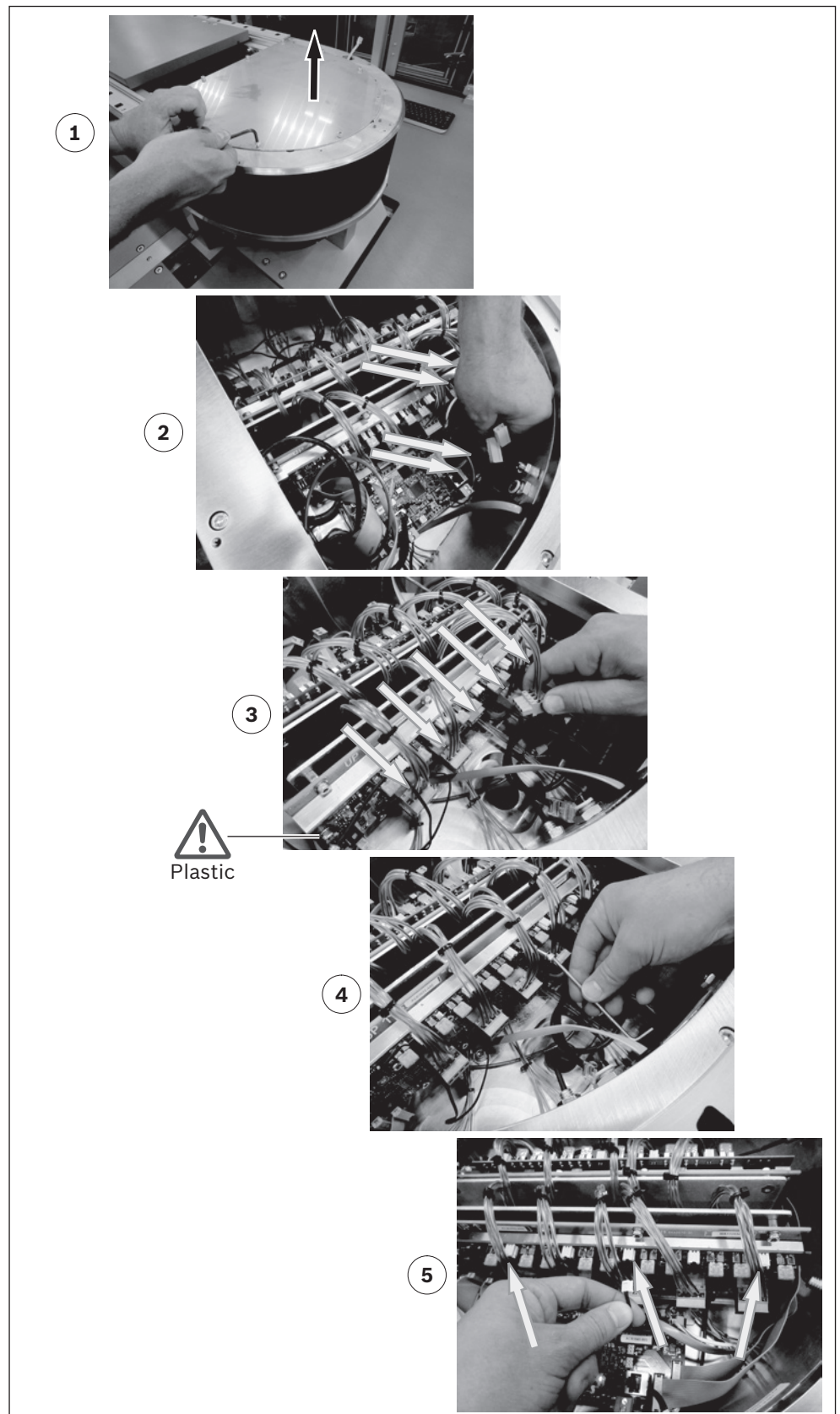


Fig. 93: Replacing the power supply PCB (curve module)

557 186-93

10.4.18 Replacing the PCB (gateway) (section module)

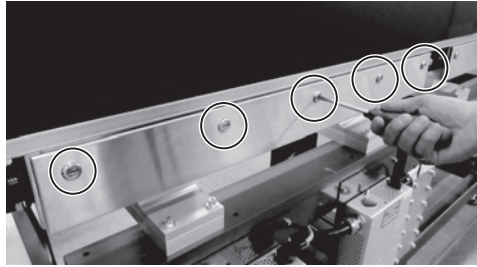
Required spare parts

- PCB (gateway)

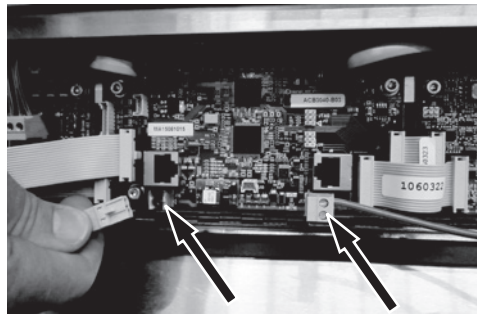
3 842 555 968

1. Open the protective panel on the electronic box on the section module.
2. Disconnect the 2 ribbon cables from the 24 V power supply.
3. Disconnect the network cable (1 or 2).
4. Disconnect the 4 ribbon cables.

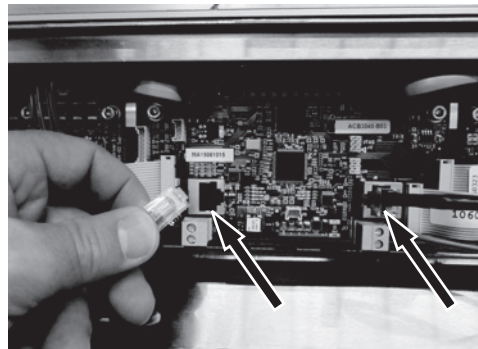
1



2



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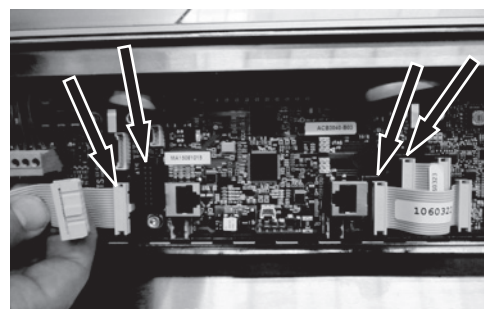


Fig. 94: Replacing the PCB (gateway) (section module)

557 186-94

5. Disconnect the 2 encoder cables.
 6. Loosen the 4 fastening screws. Do not remove the screws completely.
 7. Remove the PCB (gateway).
 8. Check that there are 3 plastic discs on all 4 fastening screws in the new PCB (gateway).
- Install the new PCB (gateway) in reverse order.

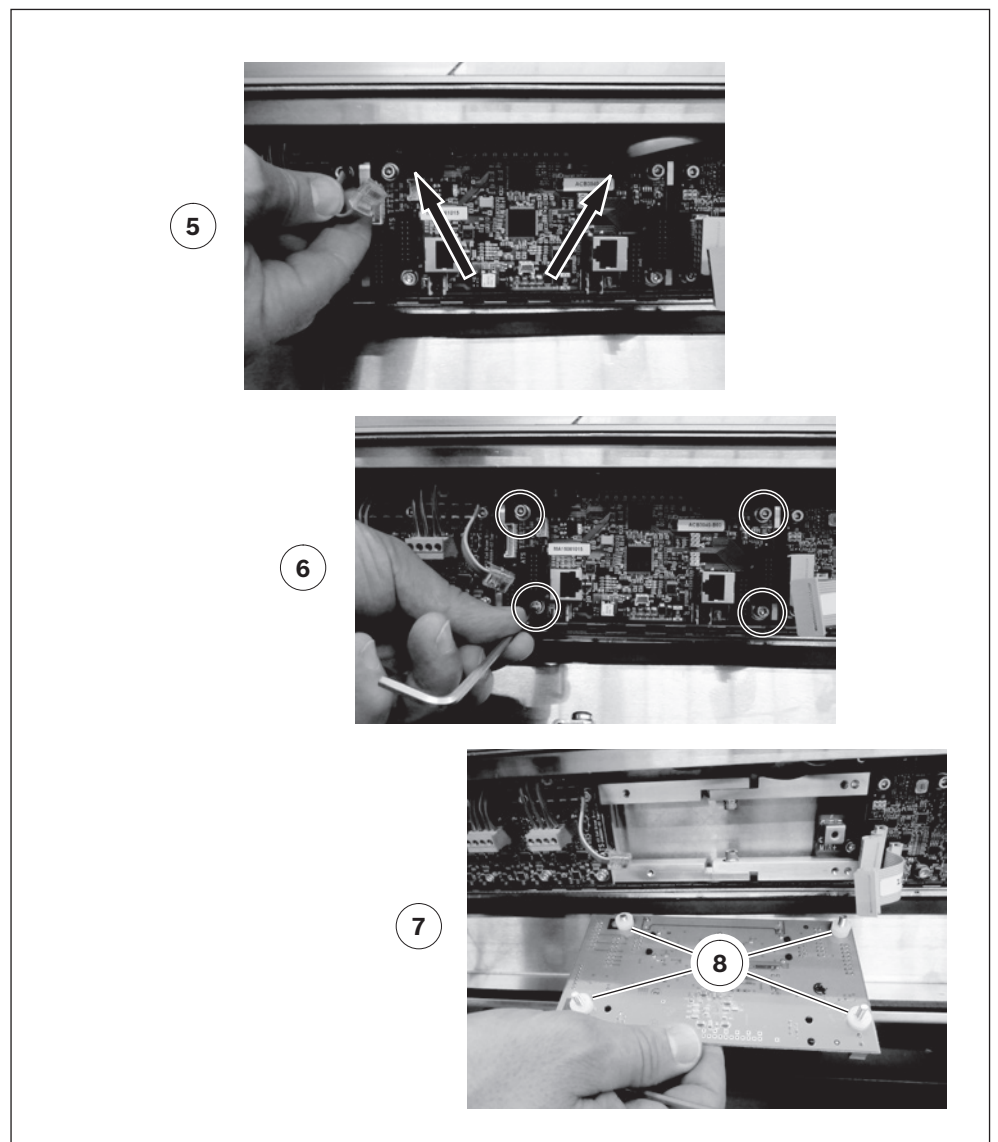


Fig. 95: Replacing the PCB (gateway) (section module)

557 186-95

10.4.19 Replacing the PCB (gateway) (curve module)

Required spare parts

- PCB (gateway)
3 842 555 968

1. Remove the protective cover from the curve module.
2. Disconnect the 2 ribbon cables from the 24 V power supply.
3. Disconnect the 4 ribbon cables.
4. Disconnect the 2 encoder cables.

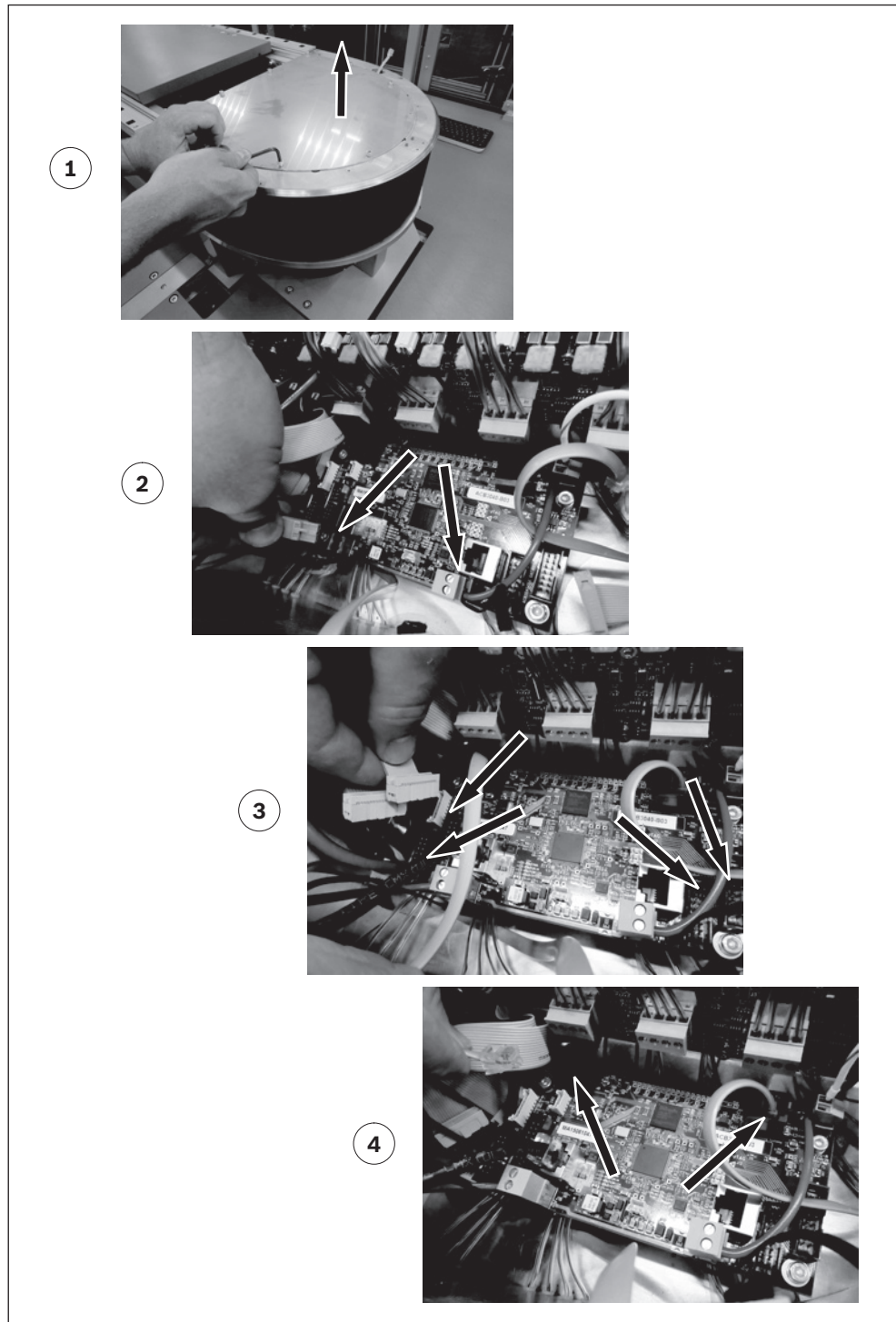
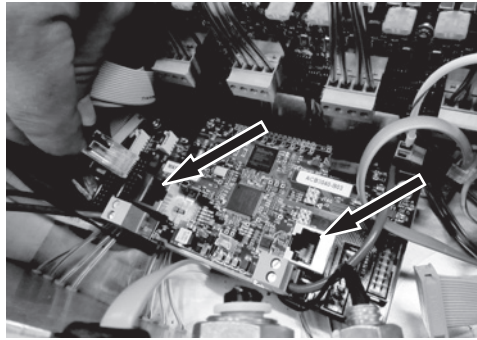


Fig. 96: Replacing the PCB (gateway) (curve module)

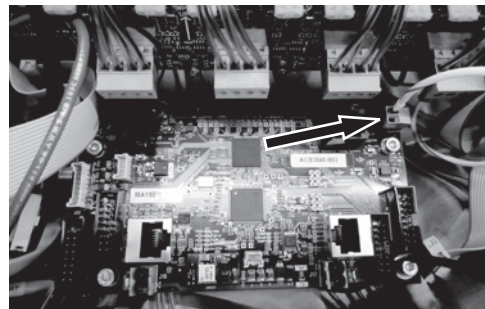
557 186-96

5. Disconnect the network cable (1 or 2).
 6. Disconnect the grounding cable.
 7. Loosen the 4 fastening screws and remove the PCB (gateway). Do not remove the screws completely.
 8. Check that there are 3 plastic discs on all 4 fastening screws in the new PCB (gateway).
- Install the new PCB (gateway) in reverse order.

5



6



7

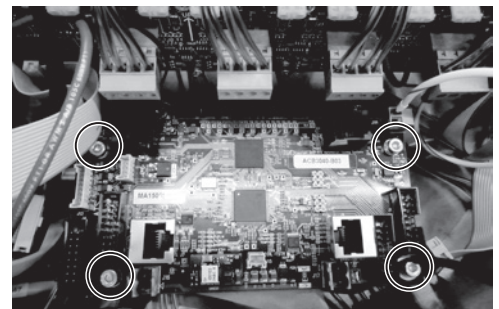


Fig. 97: Replacing the PCB (gateway) (curve module)

10.4.20 Replacing drive thermistors

Required spare parts

- Drive thermistor
3 842 555 971

1. Open the protective panel on the electronic box on the section module/remove the protective cover from the curve module.
2. Disconnect the thermistor cable plug connector from the power supply PCB.
3. Remove the thermistor from the thermistor mounting.
4. Install the new thermistor in reverse order.

i Please note:
The thermistor needs to be pushed all the way into the thermistor mounting.

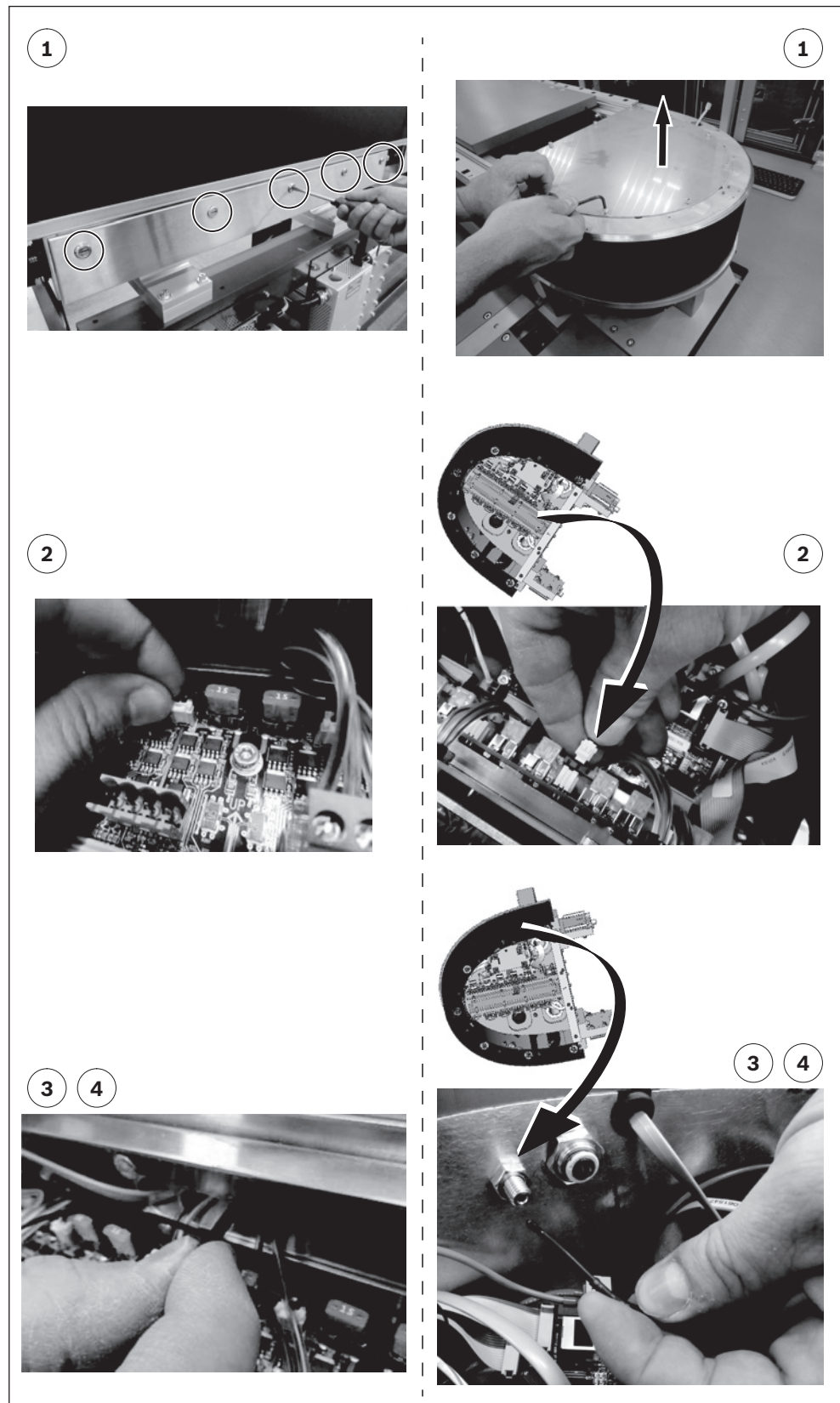


Fig. 98: Replacing drive thermistor

557 186-98

10.4.21 Replacing the main fuse (section/curve module)

**Please note:**

The main fuse of the section/curve module is located on the left power supply PCB.

Required spare parts

- 50 A section/curve module main fuse **3 842 555 970**

1. Open the protective panel on the electronic box on the section module/remove the protective cover from the curve module.
2. Remove the fastening screws from the main fuse.
3. Install the new main fuse (50 A) in reverse order.

**Please note:**

Install the main fuse with a screws, lock washers and regular washers.

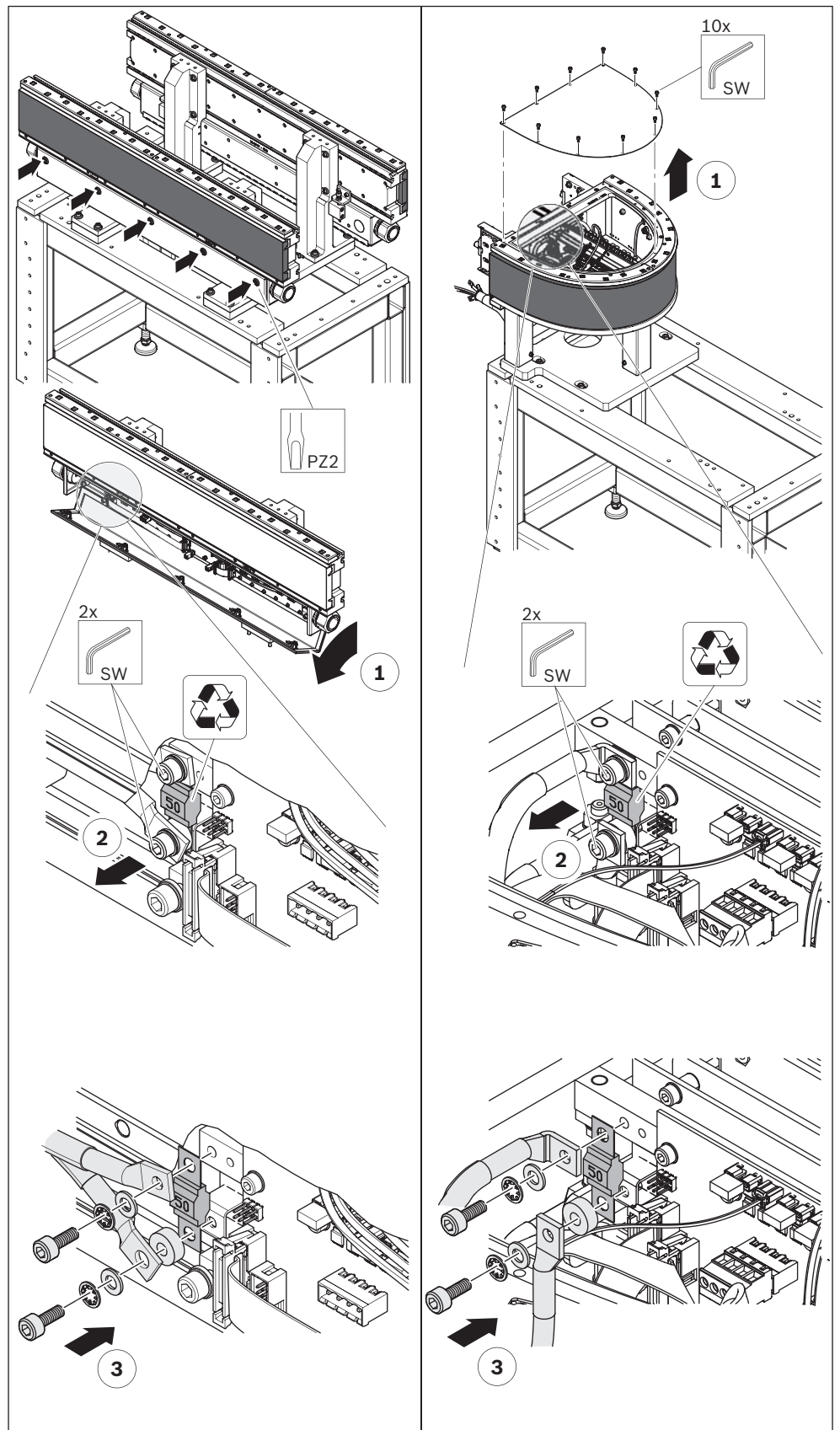


Fig. 99: Replacing the main fuse (section/curve module)

10.4.22 Replacing the coil fuse (section/curve module)



Please note:

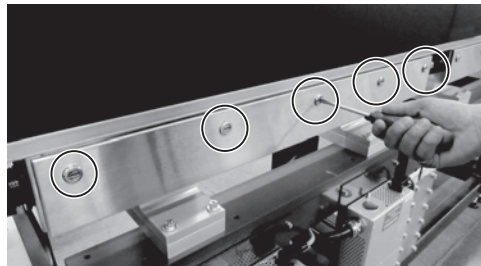
The coil fuses for the section/curve modules are located on the left and right power supply PCBs.

Required spare parts

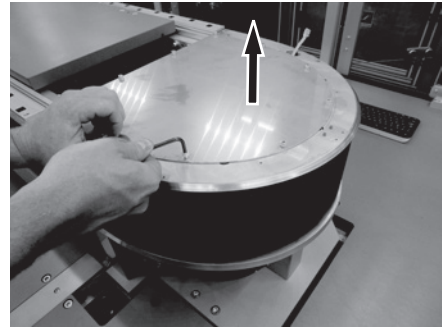
- 15 A section/curve module coil fuse
3 842 555 986

1. Open the protective panel on the electronic box on the section module/remove the protective cover from the curve module.
2. Pull the coil fuse out of the fuse holder.
3. Install the new (15 A) coil fuse in reverse order.

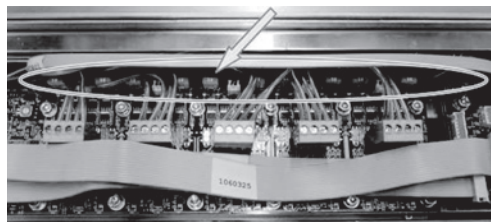
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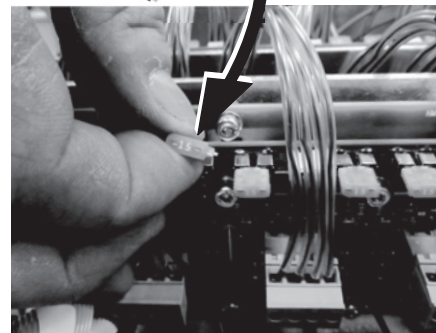
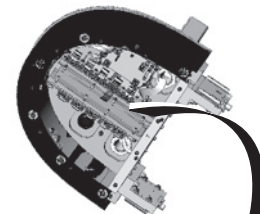
1



2 3



2 3



557 186-100

Fig. 100: Replacing the coil fuse (section/curve module)

10.4.23 Replacing the measuring system (encoder) (section module)

Required spare parts

- Measuring system
(encoder) (section module)
3 842 555 962

1. Remove the sensor unit.
2. Disconnect the connecting cable.
3. Install the new sensor unit in reverse order.
4. Calibrate the new sensor unit (see Section 10.5).

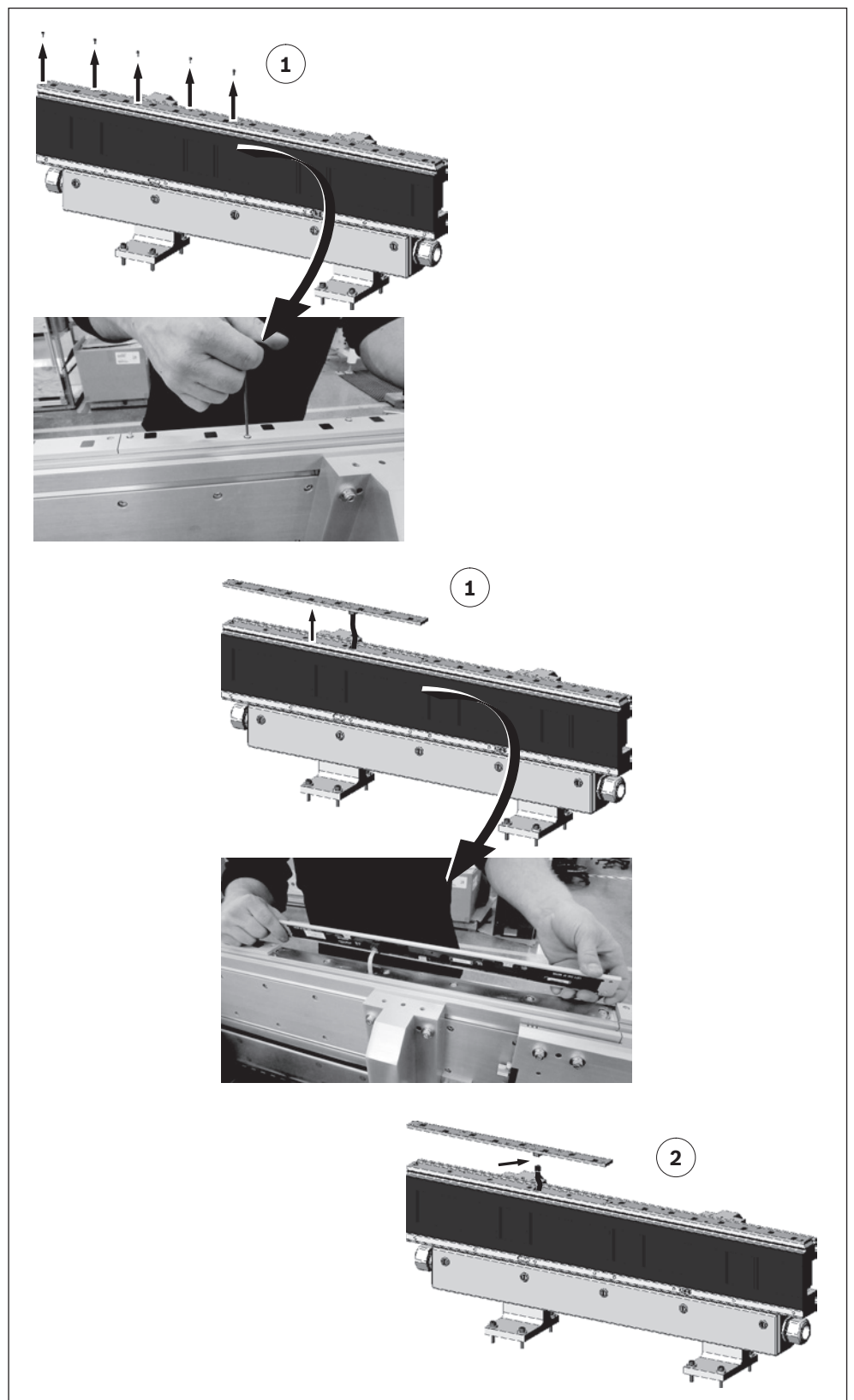


Fig. 101: Replacing the measuring system (encoder) (section module)

10.4.24 Replacing the measuring system (encoder) (curve module)

Required spare parts

- Left measuring system (encoder) (A)
3 842 555 960
- Right measuring system (encoder) (B)
3 842 555 961

1. Remove the caps to the fastening screws.
2. Remove the sensor units.
3. Disconnect the connecting cable.
4. Install the new sensor units in reverse order.
5. Calibrate the new sensor units (see Section 10.5).

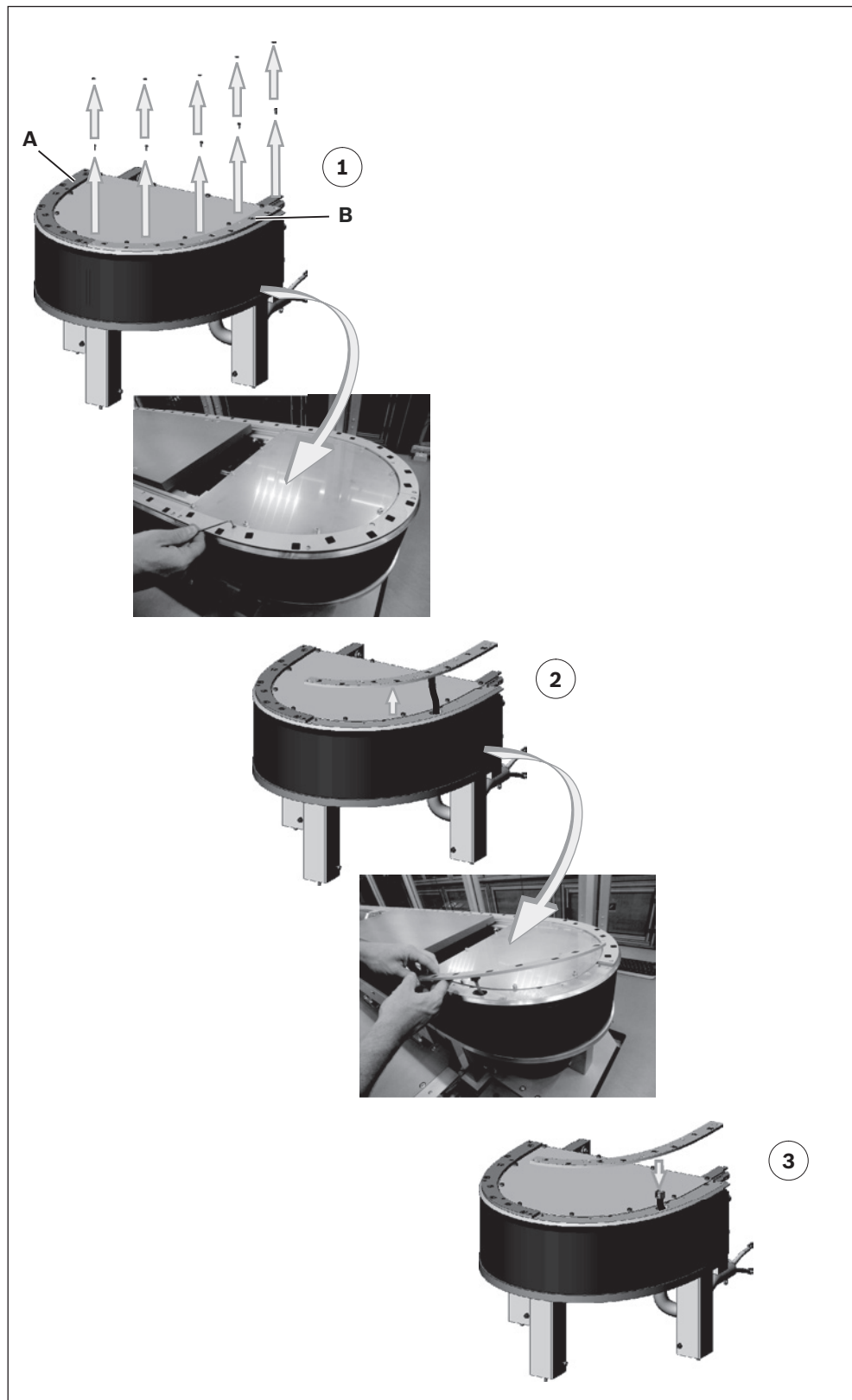


Fig. 102: Replacing the measuring system (encoder) (curve module)

557 186-102

10.4.25 Replacing the ActiveMover power supply air filter

Required spare parts

- ActiveMover power supply air filter **3 842 555 969**

1. Remove the retaining clip from the air filter.
2. Replace the air filter.
3. Install the retaining clip.

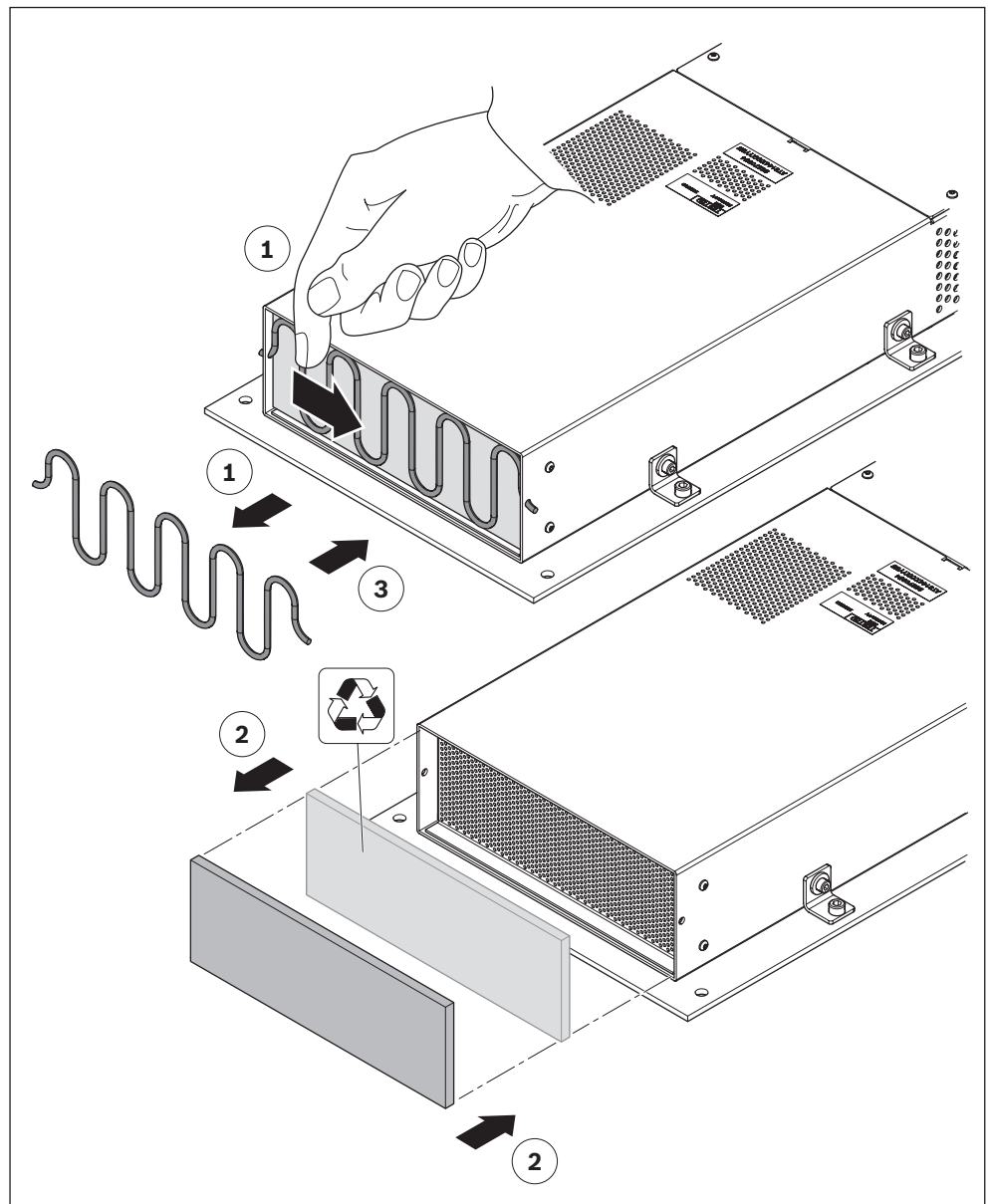


Fig. 103: Replacing the ActiveMover power supply air filter

10.5 Adjustment and calibration

10.5.1 Checking and adjusting measuring system distance

Required tool

- 0.2–0.8 mm plastic feeler gauge



Please note:

Before adjusting, check the following:

- Guide rollers per Table 7 on page 112
- Measuring system per Table 7 on page 112
- Proper installation of the measuring system (see Section 10.4.5)

1. Check the spacing (X) between measuring system and sensor unit.

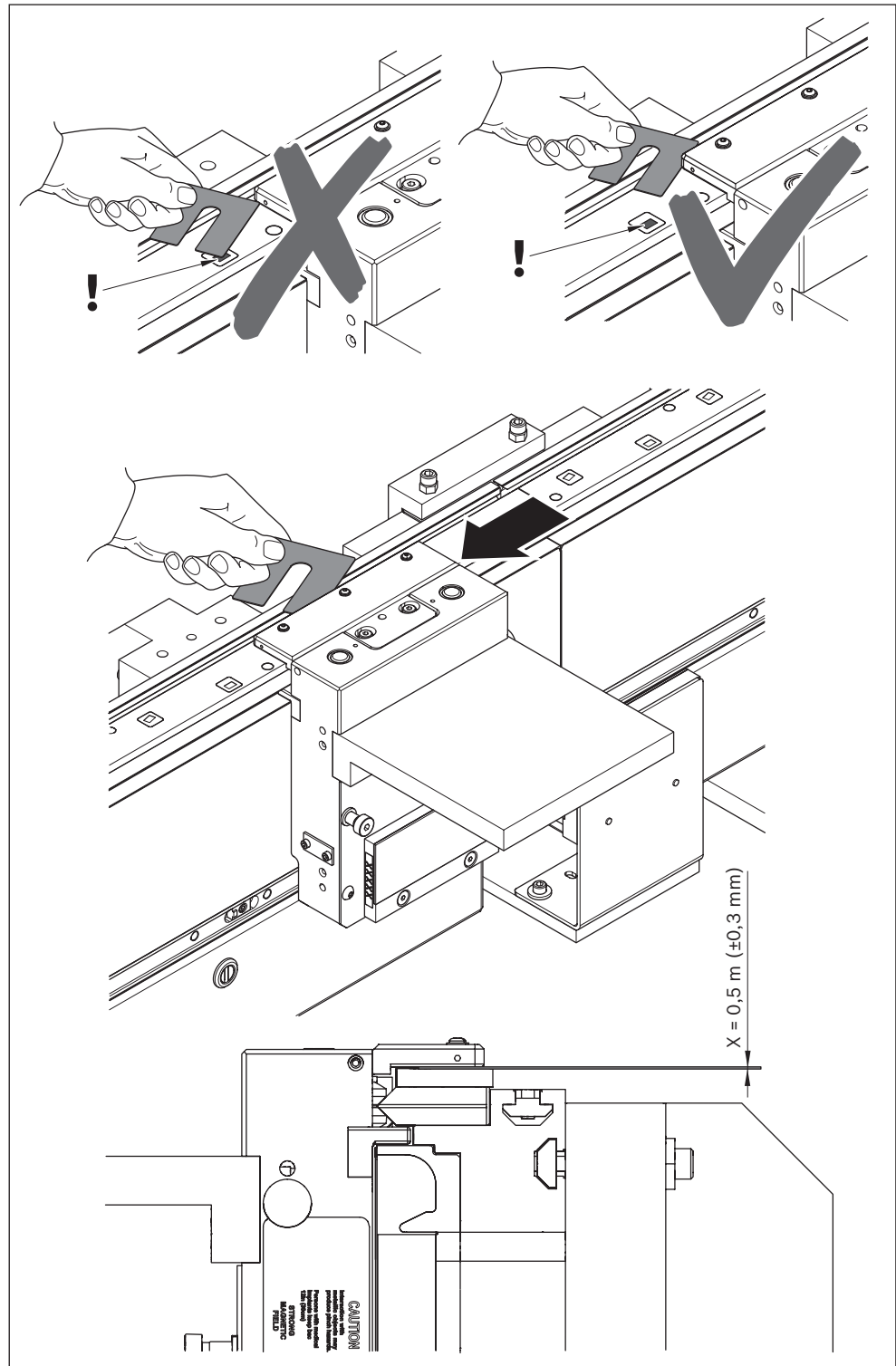


Fig. 104: Checking measuring system distance

557 186-104

Adjust the spacing, if necessary:



Please note:

The measuring system can be destroyed by magnetic fields. Do not touch the measuring system with magnetic objects.

2. Remove the measuring system (see Section 10.4.5).
3. Remove the shim.
4. Install a suitable shim to maintain the spacing $X = 0.5 \text{ mm} (\pm 0.3 \text{ mm})$.
5. Assemble in the reverse order.

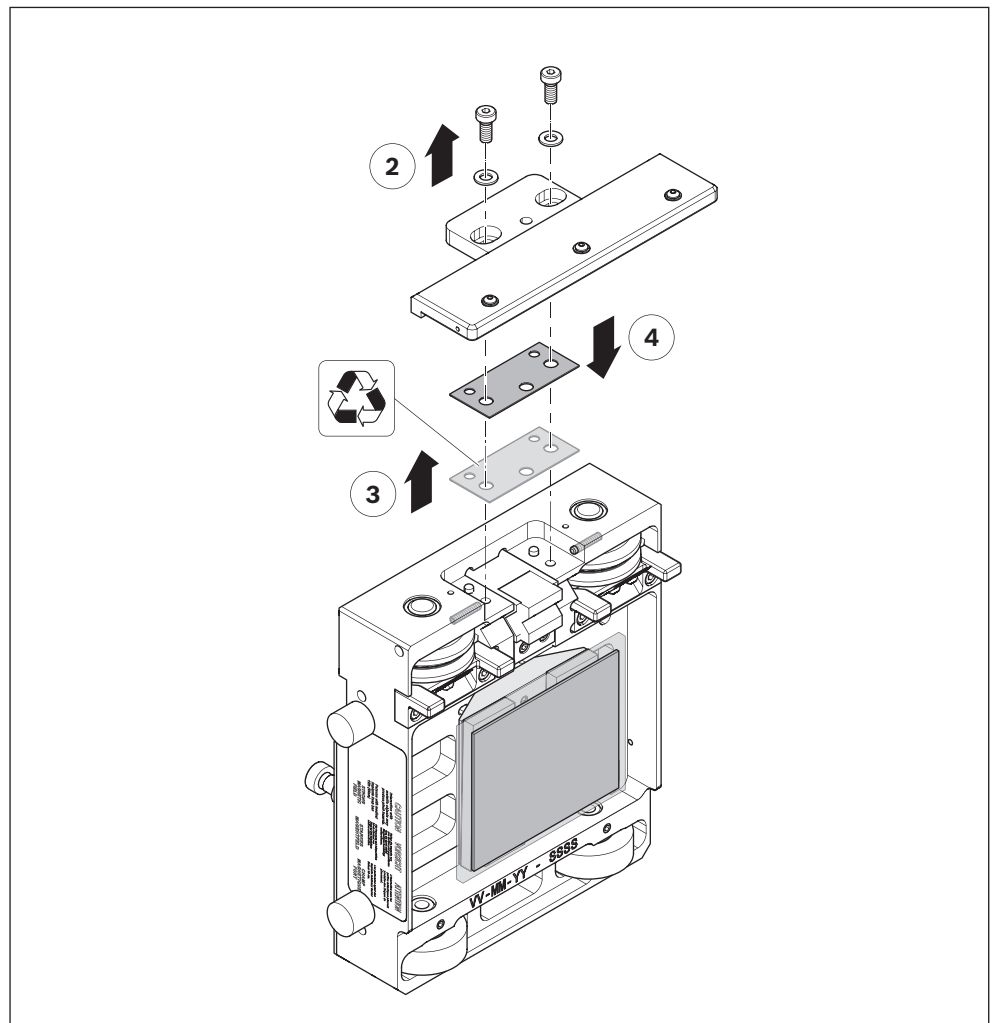


Fig. 105: Setting measuring system distance

557 186-105

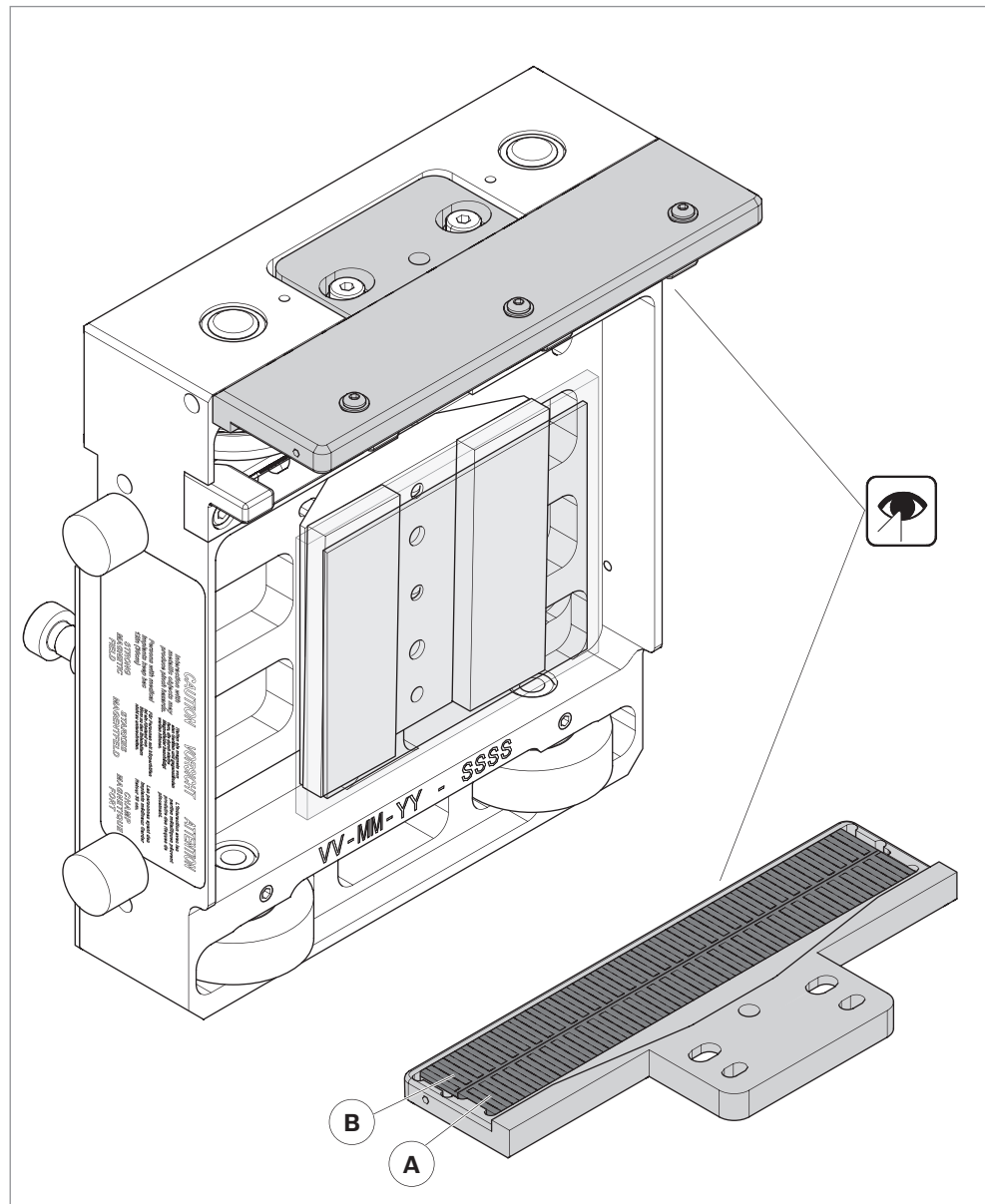
10.5.2 Primary and secondary measuring system



Please note:

- The measuring system can be destroyed by magnetic fields. Do not touch the measuring system with magnetic objects.
- Each magnetic strip measuring system consists of a primary and a secondary measuring system.
- Both measuring systems need to be calibrated separately.
- The secondary measuring system comes calibrated and should not need to be recalibrated under normal circumstances.

- A:** Primary measuring system
- B:** Secondary measuring system



557 186-106

Fig. 106: Primary and secondary measuring system

10.5.3 Encoder numbering and order



Please note:

- The measuring system sensor units consist of encoders that register the workpiece pallets' position.
- Each section and curve module has 2 sensor units.
- Each sensor unit consists of 8 encoders.
- Encoder numbering starts at the left side of the left sensor unit with 0 and ends at the right side of the right sensor unit with 15.

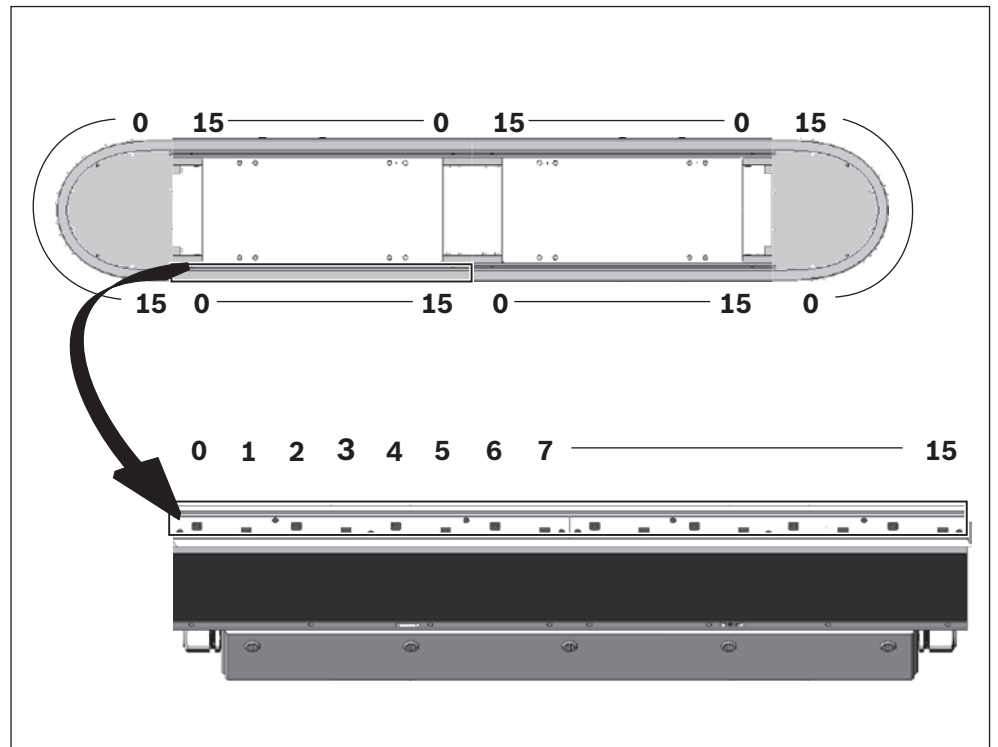


Fig. 107: Encoder numbering and order

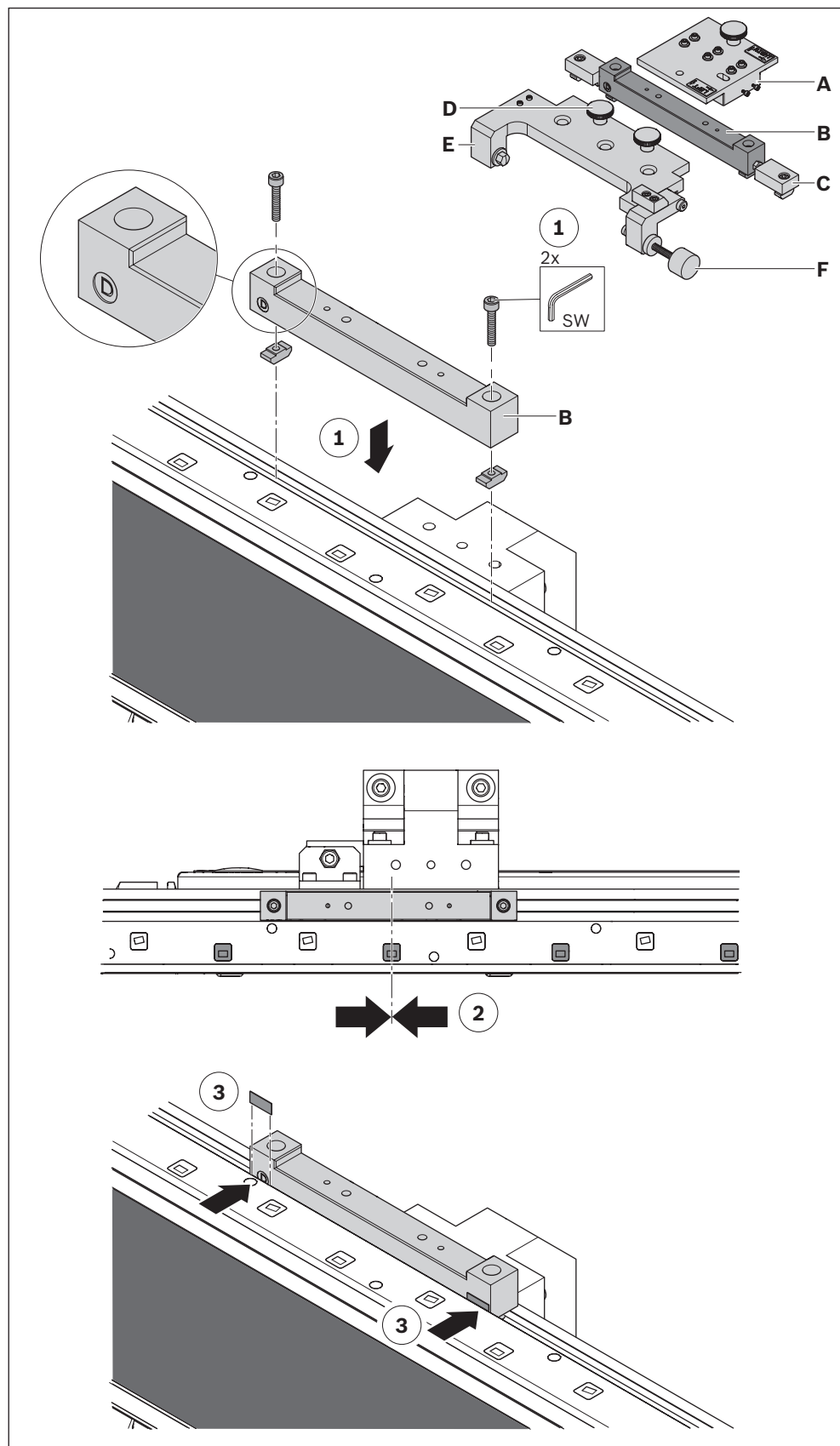
557 186-107

**Please note:**

- The calibration set is required to adjust/calibrate the measuring system on the WT.
- Improper use of the calibration set can damage the WT and ActiveMover.
- Remove the calibration set before start-up.

- A:** Position indicator
B: Fixing element
C: Aligning block
D: Knurled thumbscrew
E: Reference system
F: Knurled thumbscrew

1. Set the fixing element (B) in the groove behind the sensor unit on a section module. The side marked "D" should be facing the sensor unit.
2. Center the fixing element on an odd-numbered encoder (see also Section 10.5.3).
3. To press the mount back and align it as parallel to the V-rail as possible, insert suitable shims between the fixing element and the sensor unit.

10.5.4 Installing and aligning the calibration set (optional)**Fig. 108: Installing measuring system adjusting tool (1)**

557 186-108

4. Tighten the fixing element screws.
5. Mount the adjusting blocks on both sides of the fixing element.
6. Tighten the lock screws.
7. For greater accuracy, you can also check/calibrate how parallel the fixing element is to the V-rail with a dial indicator mounted to the WT.

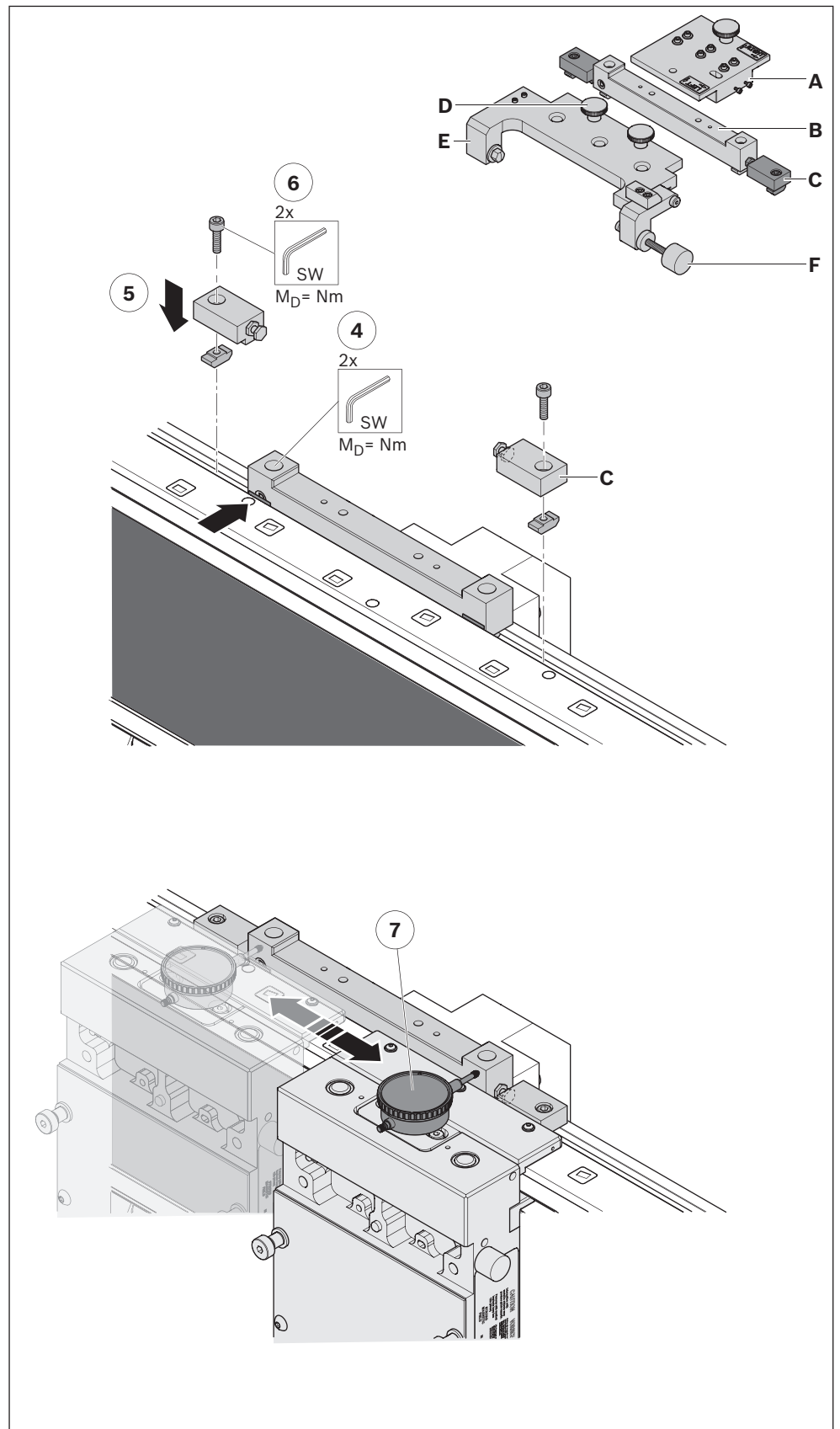


Fig. 109: Installing calibration set (2)

8. Mount the position indicator on the left and rear of the fixing element.
9. Tighten the knurled thumbscrew.
10. Start **AMpro** and navigate to **Diagnostic**
 - ▶ **Encoders** ▶ **Fixture Setup**.
11. Click on the **encoder** on which the fixing element is centered (odd number).
12. Click on **Accept**.

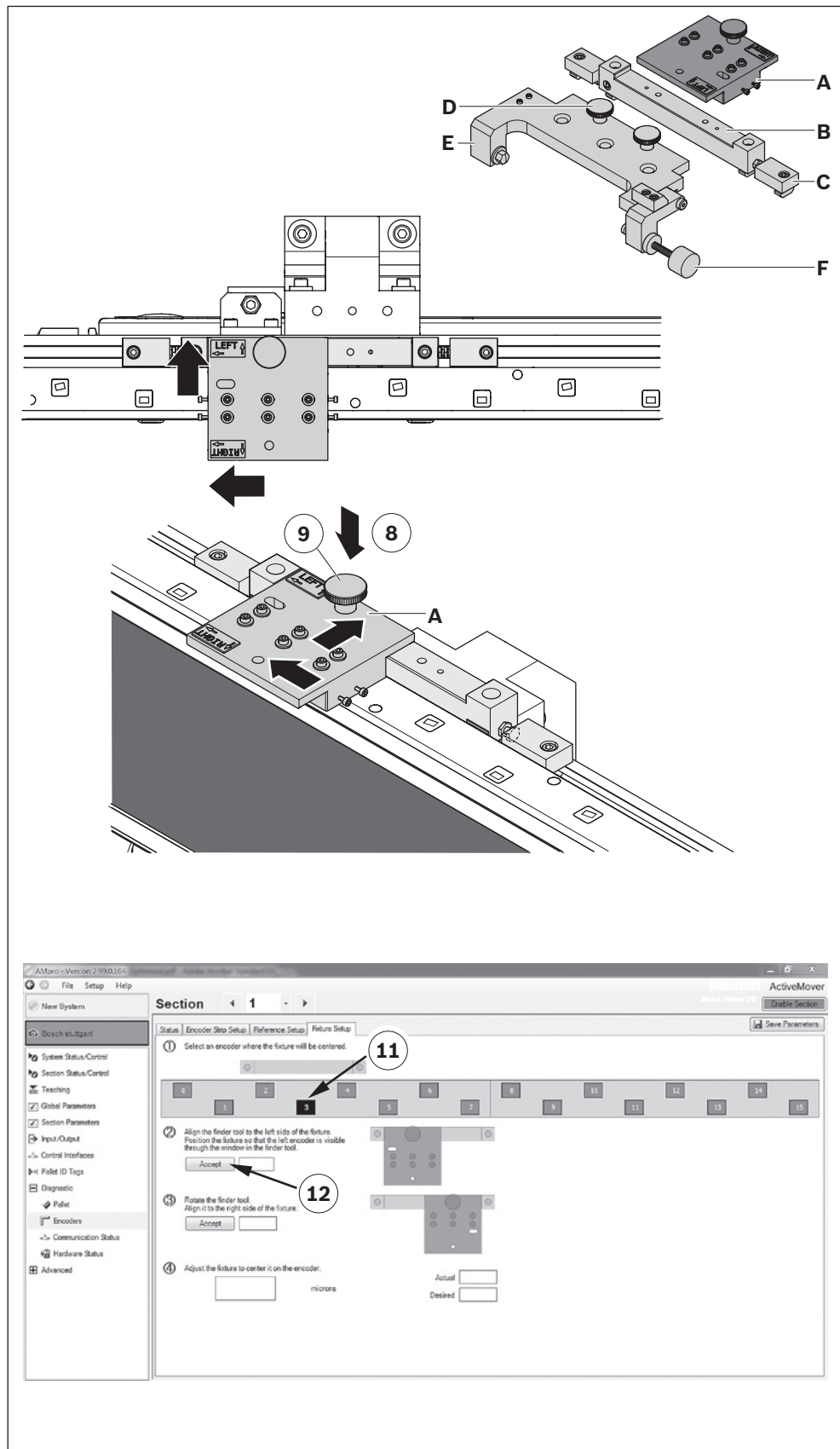


Fig. 110: Aligning fixing element to an encoder (1)

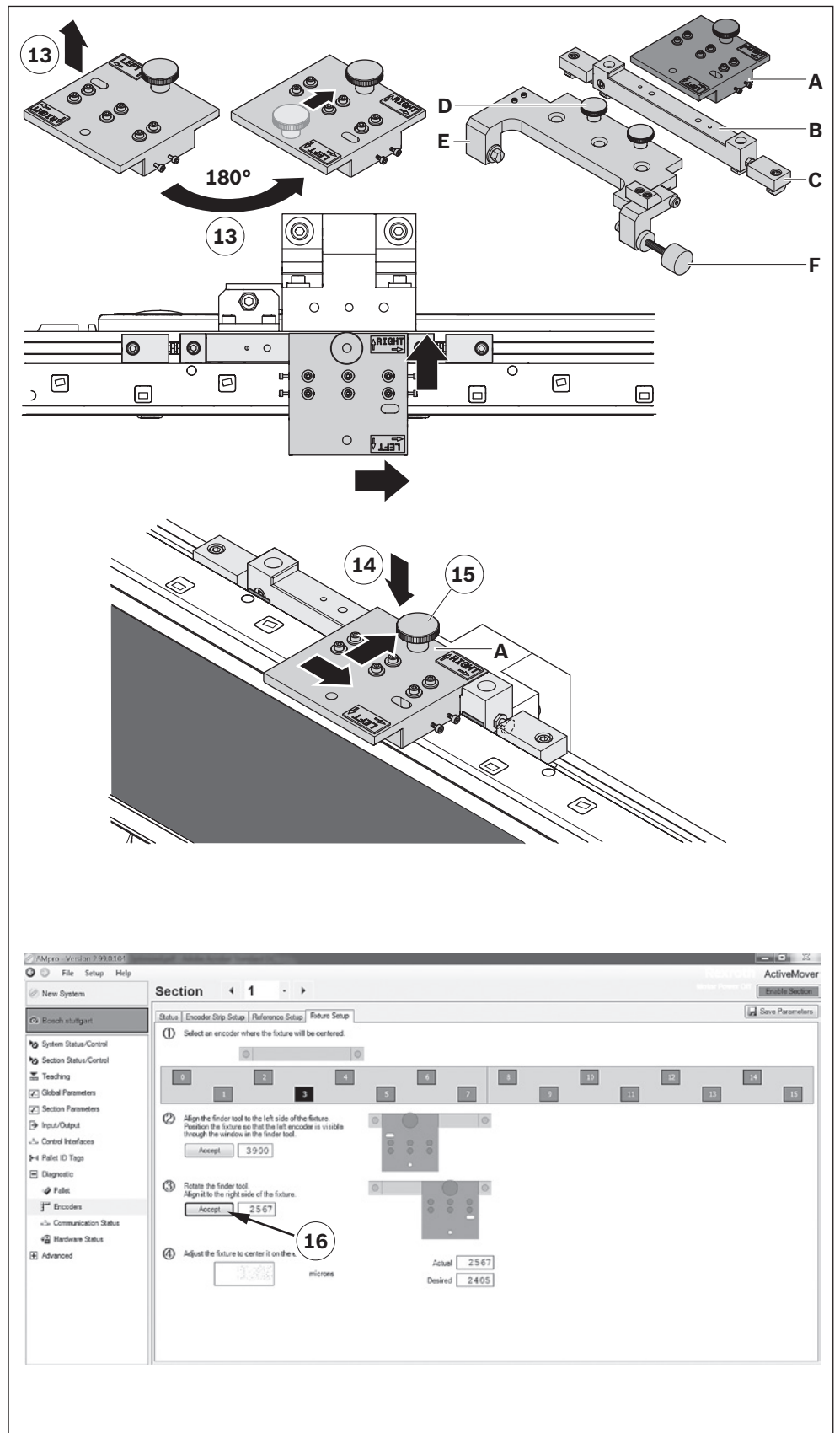
557 186-110

- 13. Remove the position indicator and rotate it 180°.
- 14. Mount the position indicator on the right and rear of the fixing element.
- 15. Tighten the knurled thumbscrew.
- 16. Click on **Accept**.



Please note:

The indicated value of **158** and the arrow \leftarrow mean the calibration set needs to be moved **158 μm** to the **links**.



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Fig. 111: Aligning fixing element to an encoder (2)

17. Tighten the fixing element screws.
18. Loosen the adjusting screw lock nuts on both sides.
19. Use both adjusting screws to move the fixing element as slightly as possible.
20. Click on **Accept** to restart the calibration process.
21. Repeat steps 10 to 20 until $\pm 2 \mu\text{m}$ is shown (ideal value is 0).
22. Tighten the fixing element screws.
23. Tighten the adjusting screw lock nuts.

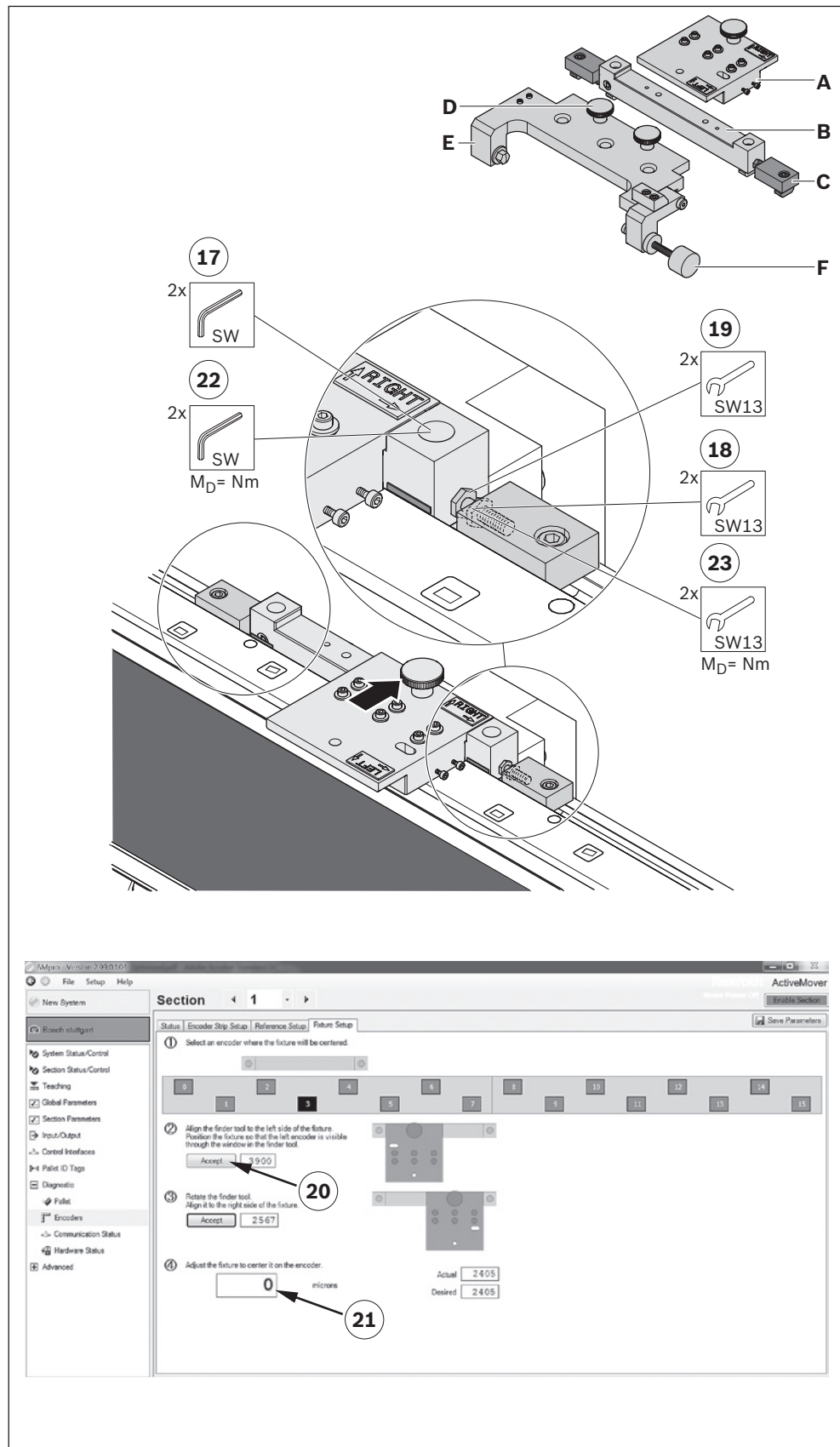
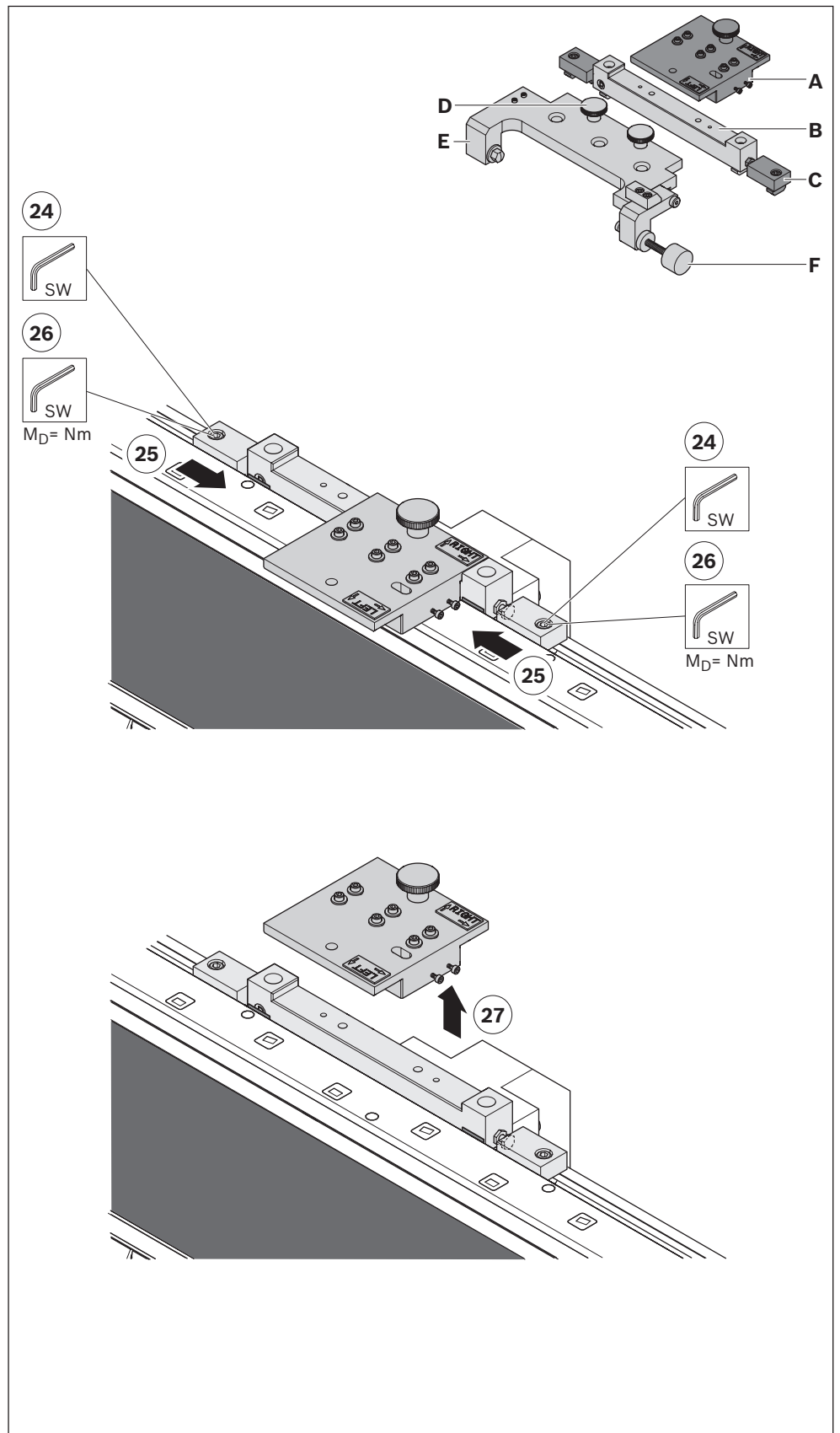


Fig. 112: Aligning fixing element to an encoder (3)

557 186-112

- 24. Loosen the fastening screws for both adjusting blocks.
- 25. Push the adjusting blocks against the fixing element.
- 26. Tighten the fastening screws.
- 27. Remove the position indicator.



ENGLISH

Fig. 113: Aligning fixing element to an encoder (4)

557 186-113

10.5.5 Checking calibration set position



Please note:

- Perform this check to make sure the mounted calibration set is correctly positioned.
- This check requires a reference WT with a properly calibrated measuring system to be mounted.

1. Mount the reference system on the left and rear of the fixing element.
2. Flip the knurled thumbscrew up.
3. Carefully move the reference WT under the reference system. Do not let the WT collide with the reference system.
4. Flip the knurled thumbscrew down.
5. Gently press the WT to the left and tighten the knurled thumbscrew slightly.



Please note:

Depending on the tightening torque of the knurled thumbscrew, the position can vary by $\pm 5 \mu\text{m}$. Always apply the same tightening torque.

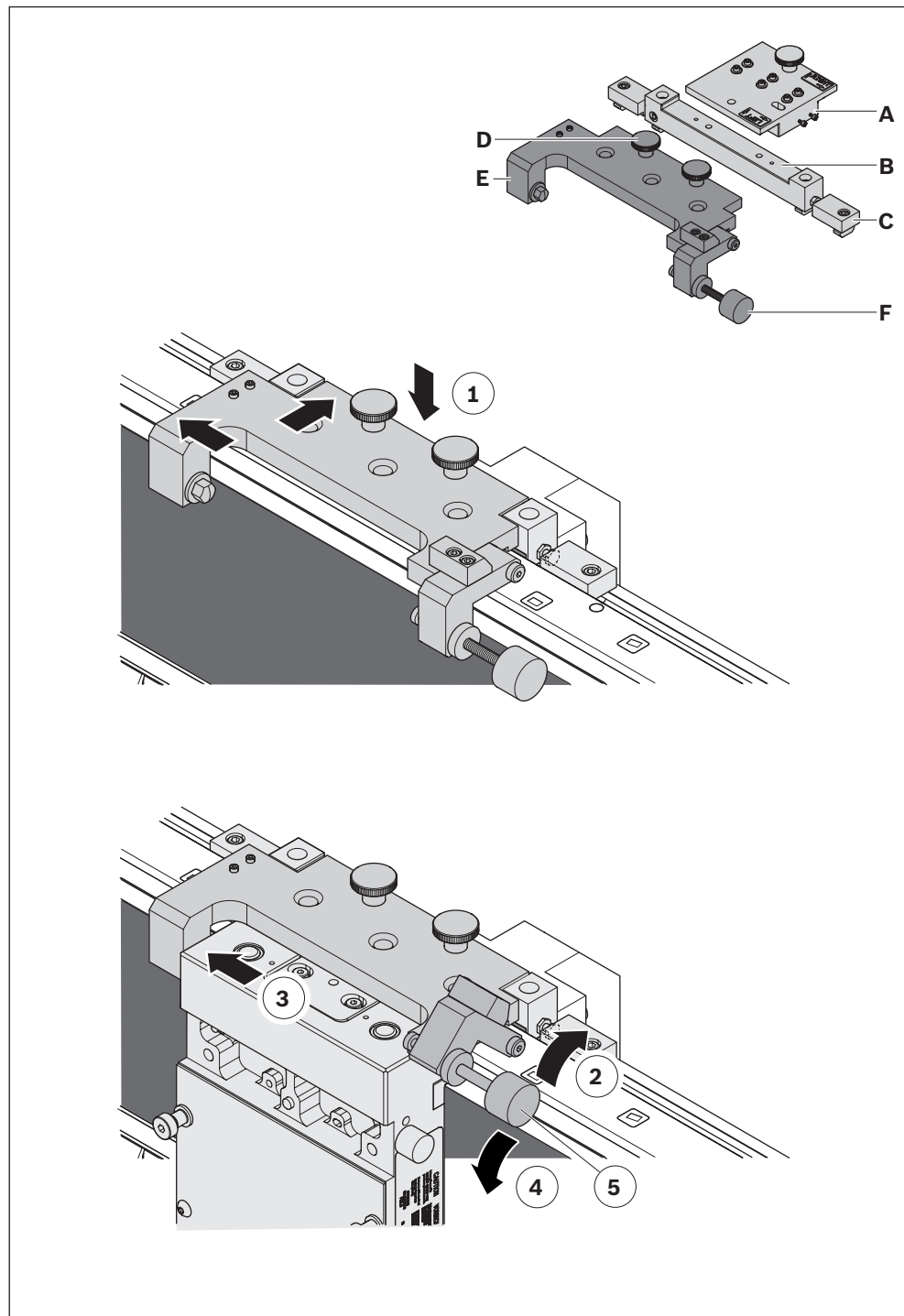


Fig. 114: Checking calibration set position (1)

6. Start **AMpro** and navigate to **Diagnostic** ► **Encoders** ► **Encoder Strip Setup**.
7. Click on the **encoder** on which the fixing element is centered (odd number).
8. The display should read $\pm 4 \mu\text{m}$.

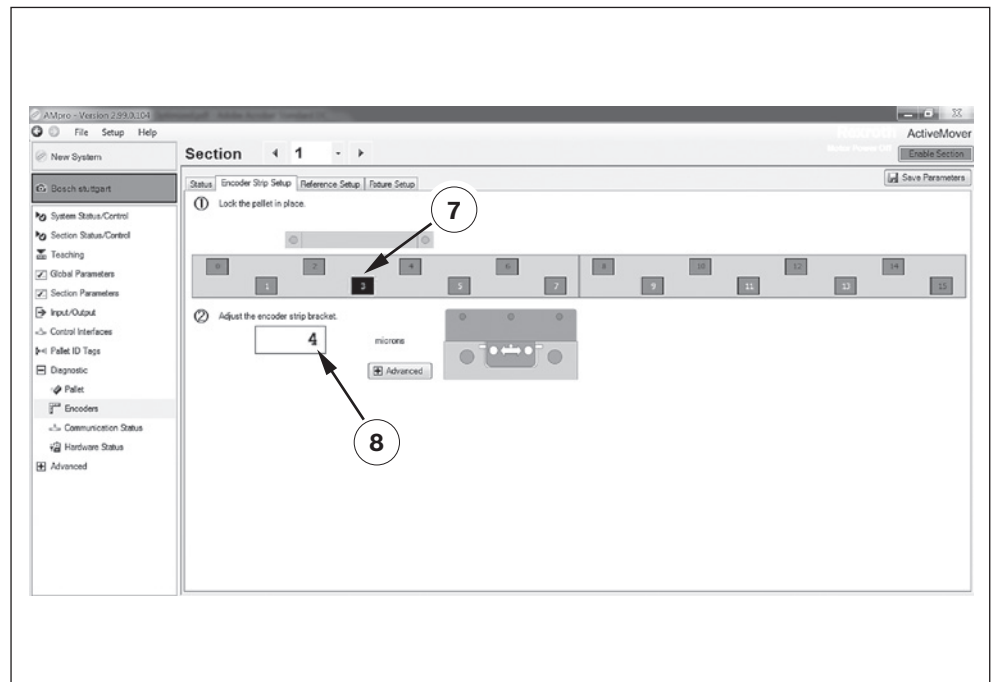


Fig. 115: Checking calibration set position (2)

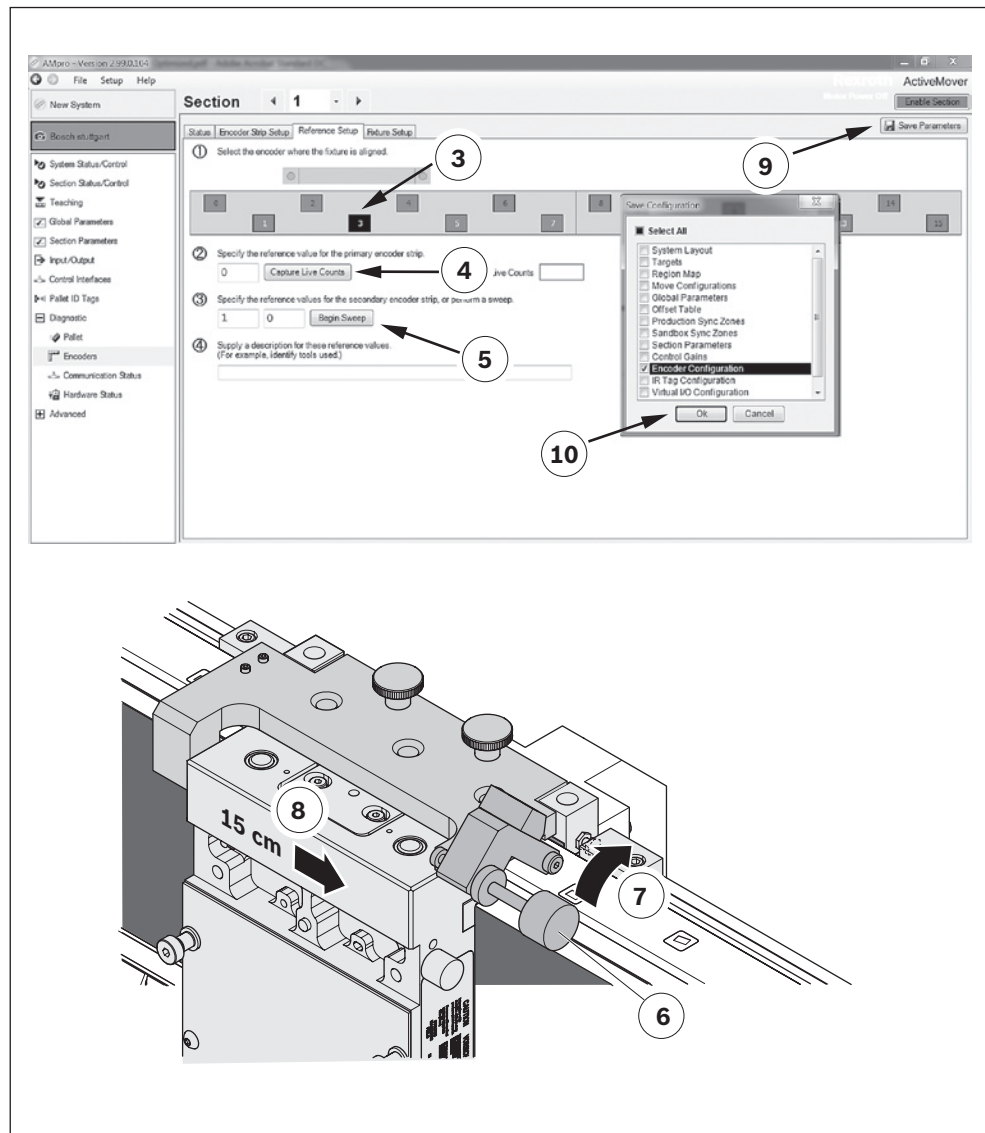
**Please note:**

- This procedure measures the physical distance between 2 encoders on the same section module.
- Perform this procedure on a section module with a mounted calibration set after a measuring system (encoder) has been replaced.

1. Check the position of the calibration sets (see Section 10.5.5).
2. Start **AMpro** and navigate to **Diagnostic** ► **Encoders** ► **Reference Setup**.
3. Click on the **encoder** on which the fixing element is centered (odd number).
4. Click on **Capture Live Counts**.
5. Click on **Begin Sweep**.
6. Loosen the knurled thumbscrew.
7. Flip the knurled thumbscrew up.
8. Move the WT 15 cm to the right.
9. Click on **Save Parameters**.

The **Save Configuration** window opens. **Encoder Configuration** is preselected.

10. Click on **OK**.

10.5.6 Referencing encoder position**Fig. 116: Referencing encoder position**

557 186-116

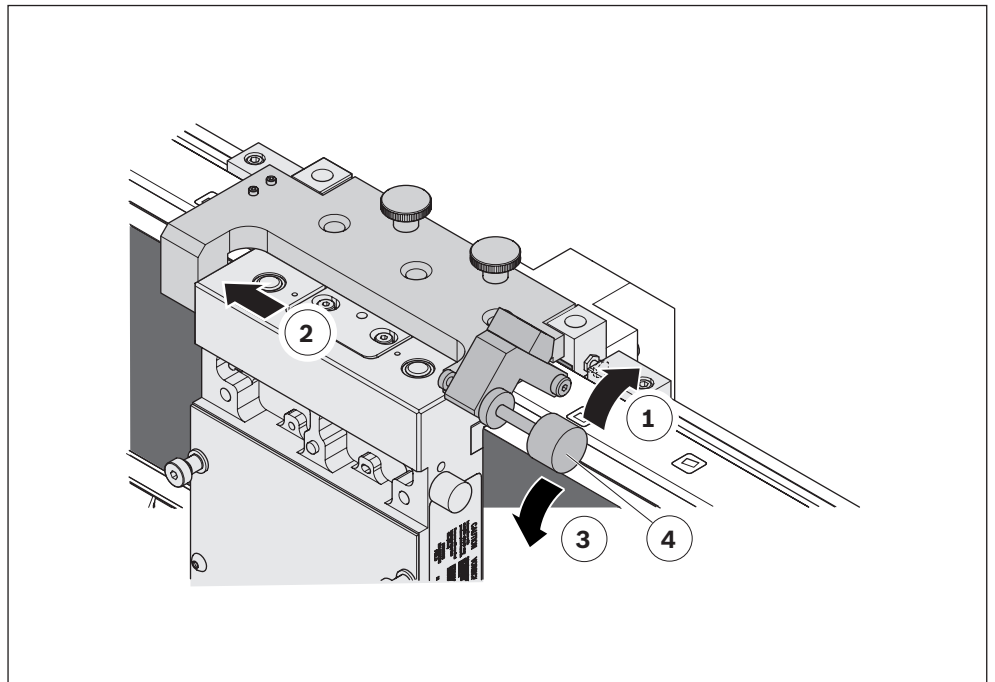
**Please note:**

- For ideal WT repeat accuracy, WTs need to have the same measuring system value in AMpro.
- It is more important for all measuring systems to be calibrated the same than it is for the encoders to be set to 0.

This procedure adjusts the center of the measuring system to the center of the WT. Adjust the primary measuring system if:

- The measuring system has been replaced.
- The spacing between measuring system and sensor unit has been adjusted.
- Positioning errors occur in a WT.

1. Flip the knurled thumbscrew for the reference system up.
2. Carefully move the reference WT under the reference system. Do not let the WT collide with the reference system.
3. Flip the knurled thumbscrew down.
4. Gently press the WT to the left and tighten the knurled thumbscrew slightly.

10.5.7 Adjusting the primary measuring system

557 186-117

Fig. 117: Adjusting the primary measuring system (1)**Please note:**

Depending on the tightening torque of the knurled thumbscrew, the position can vary by $\pm 5 \mu\text{m}$. Always apply the same tightening torque.

5. Start **AMpro** and navigate to **Diagnostic**
 - ▶ **Encoders** ▶ **Encoder Strip Setup**.
6. Click on the **encoder** on which the fixing element is centered (odd number).

If the display is green ($\pm 4 \mu\text{m}$), the measuring system is properly calibrated.
 If the display is red, readjustment is needed.

7. Slightly loosen the measuring system screws.
8. Carefully adjust the value with 2 long hex socket wrenches on the inner adjusting screws until the display turns green.

i Please note:

- When making adjustments, it is recommended to always loosen one inner adjusting screw and then slightly tighten the other.
 - Do not overtighten the adjusting screws. This could move the calibration set.
9. Tighten the measuring system screws.
 10. Check the display again.

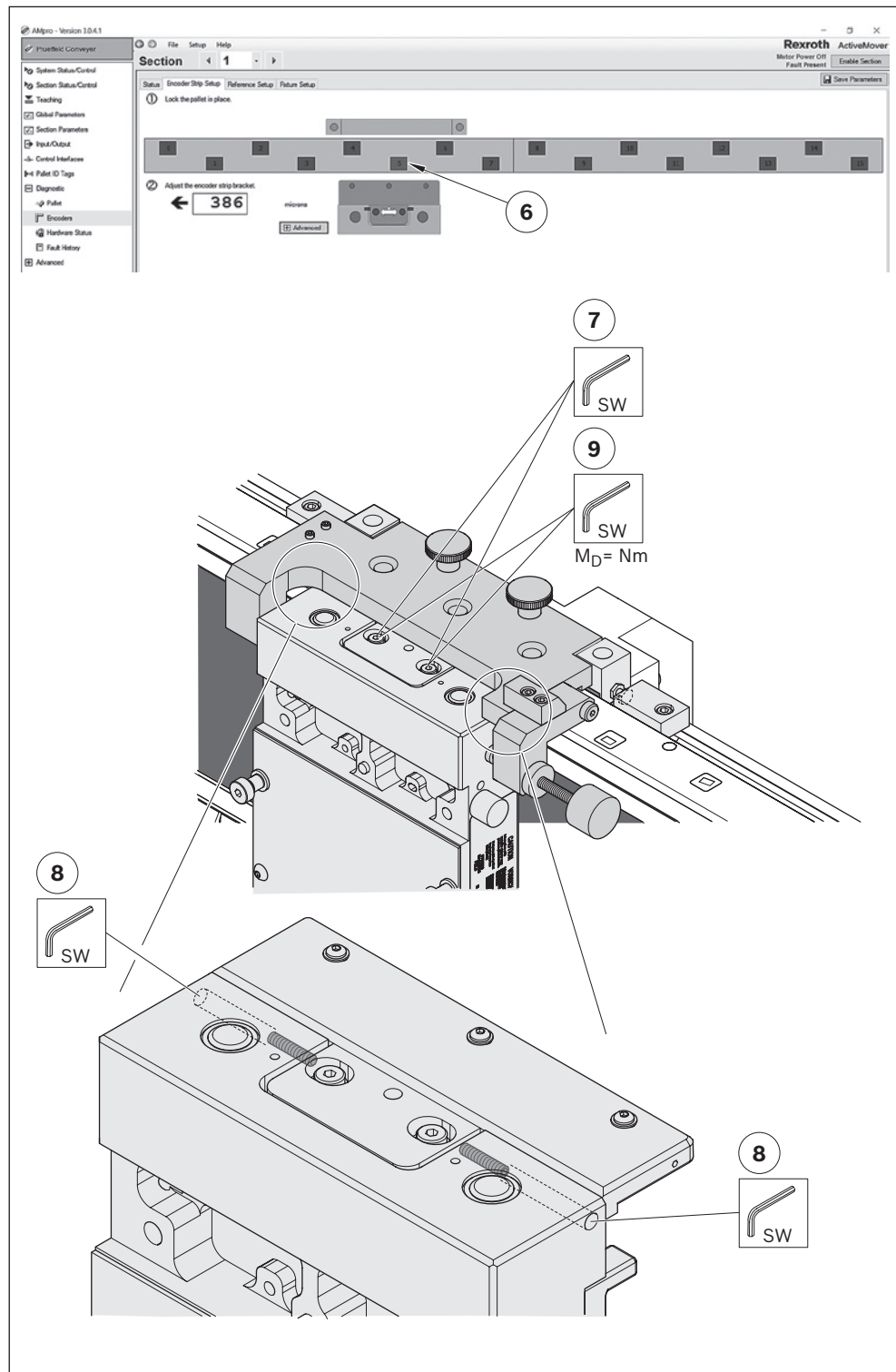


Fig. 118: Checking calibration set position (2)

557 186-118

10.5.8 Adjusting the secondary measuring system

This procedure uses the primary measuring system to adjust the secondary measuring system.

Perform this procedure if:

- Positioning errors occur in the WT and the primary measuring system has already been adjusted.

1. After adjusting the primary measuring system, loosen the knurled thumbscrew.
2. Flip the knurled thumbscrew up.
3. Move the WT to the right.
4. Slightly loosen the measuring system screws.
5. Install 2 screws as adjustment aids.



Please note:

Do not overtighten the helper screws. This could bend the measuring system.

6. Carefully move the reference WT under the reference system. Do not let the WT collide with the reference system.
7. Flip the knurled thumbscrew down.
8. Gently press the WT to the left and tighten the knurled thumbscrew slightly.

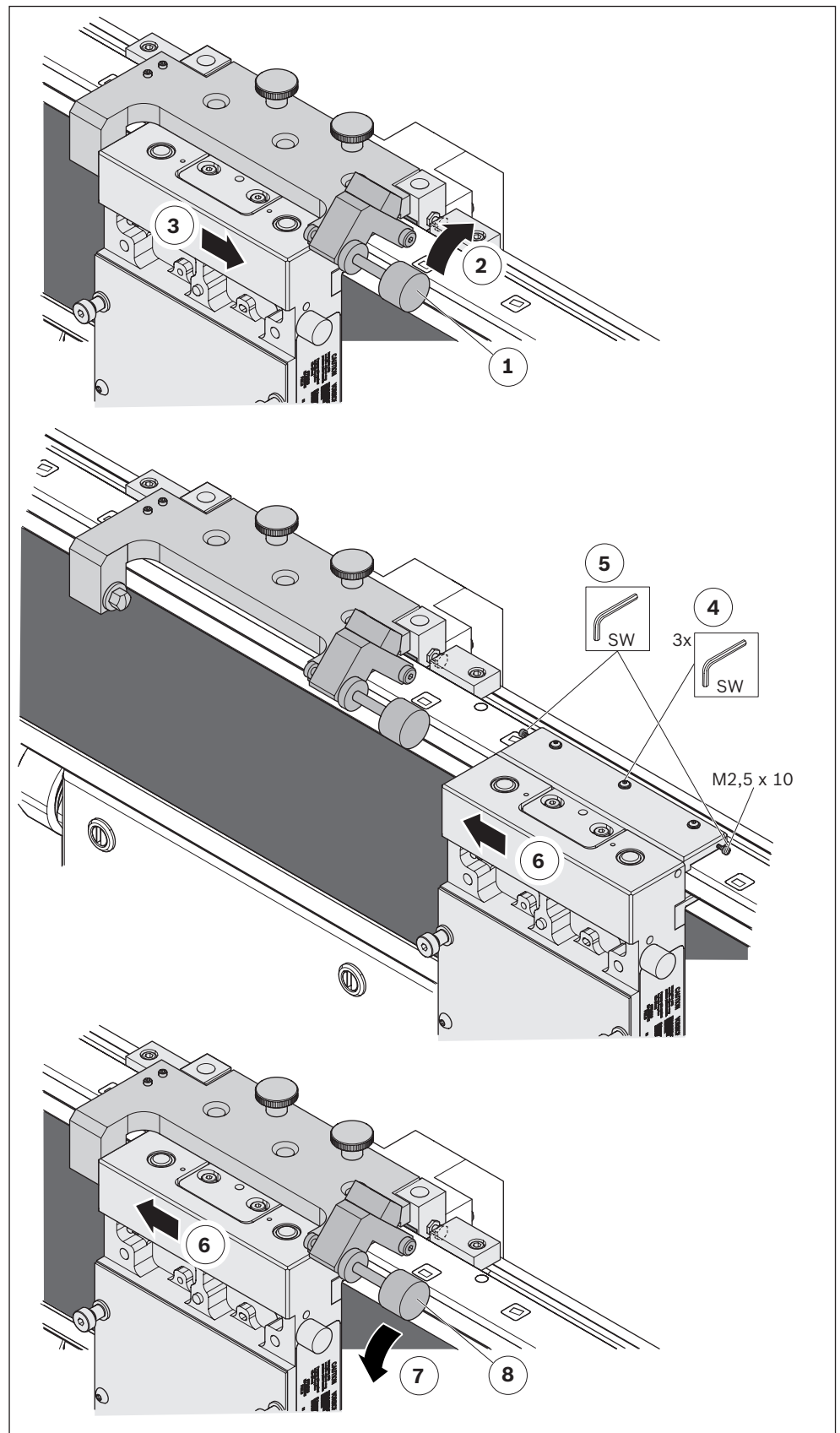


Fig. 119: Adjusting the secondary measuring system (1)

557 186-119

9. Start **AMpro** and go to **Advanced**.
10. Click on the appropriate **encoder** (odd number).
11. Use the helper screws to move the measuring system until the display turns green.
12. Click on **Accept**.
13. Loosen the knurled thumbscrew.
14. Flip the knurled thumbscrew up.
15. Move the WT 15 cm to the right.
16. Repeat steps 6 to 8.
17. Monitor the fine adjustment value and use the helper screws to move the measuring system until the display turns green.

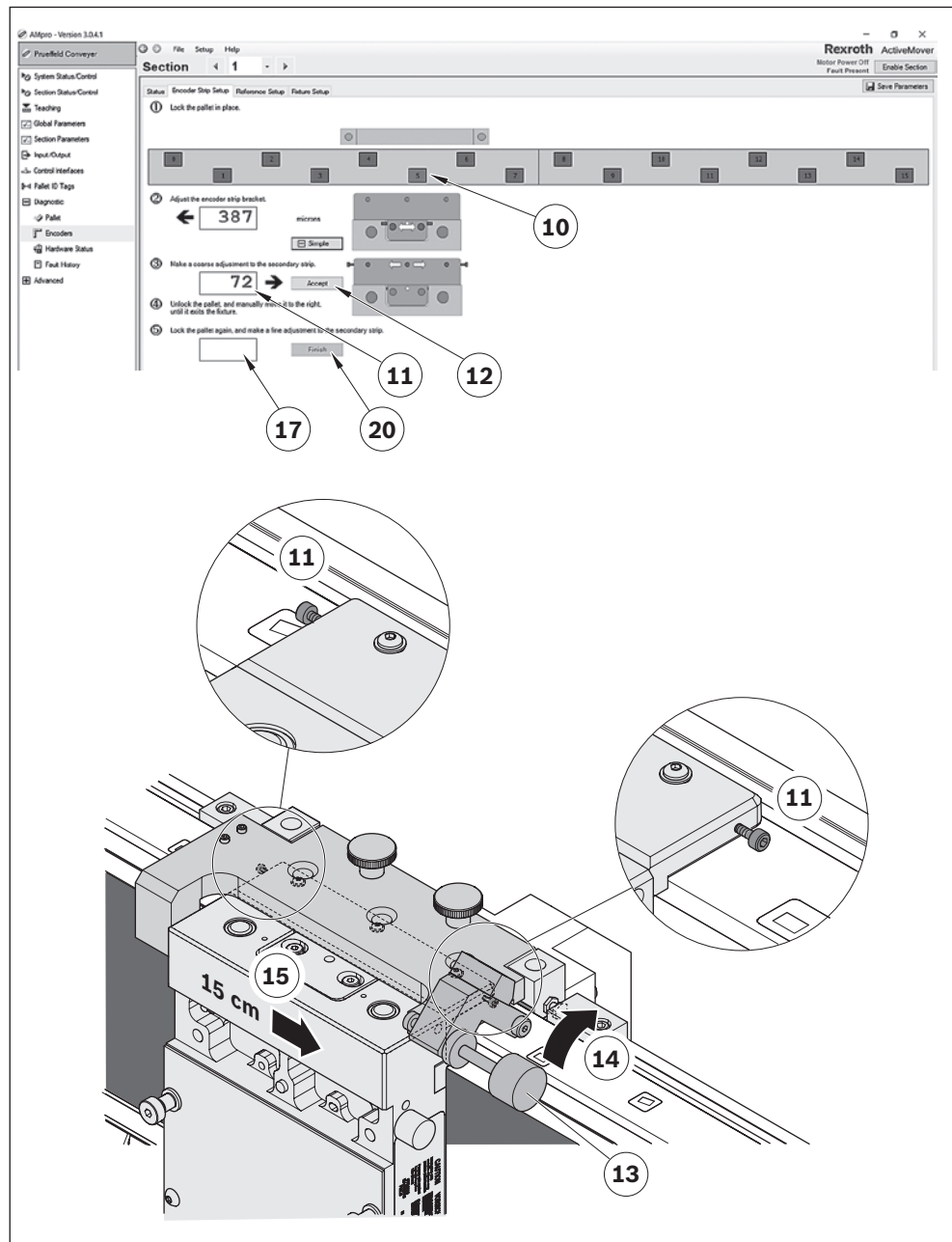
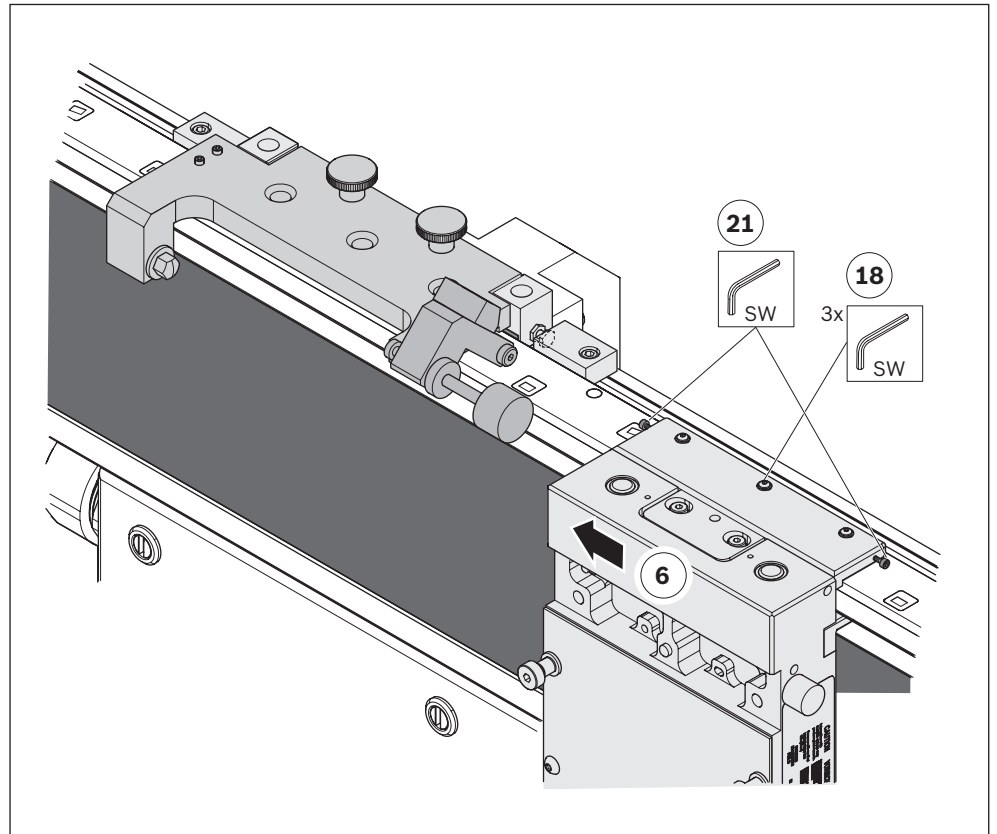


Fig. 120: Adjusting the secondary measuring system (2)

557 186-120

18. Tighten the measuring system screws.
19. Check the display again.
20. Click on **Finish**.
21. Remove the helper screws.



557 186-121

Fig. 121: Adjusting the secondary measuring system (3)

10.5.9 Installing/removing the WT mount (optional)



Please note:

- The WT mount is required to adjust/calibrate mounting/machining operations on the WT.
- Improper use of the WT mount can damage the WT and ActiveMover.
- Remove all WT mounts before start-up.

- A:** Knurled thumbscrew
B: Mounting support
C: WT mounting
D: Knurled thumbscrew

1. Mount the mount support (B) on a section module.
2. Position a WT under a mount support.
3. Place the WT mount (C) on the support.
4. Tighten the top knurled thumbscrews (A) in order to connect the WT mount to the support.
5. Tighten the knurled thumbscrew slightly. The knurled thumbscrew has a friction clutch.

- Disassemble in reverse order.

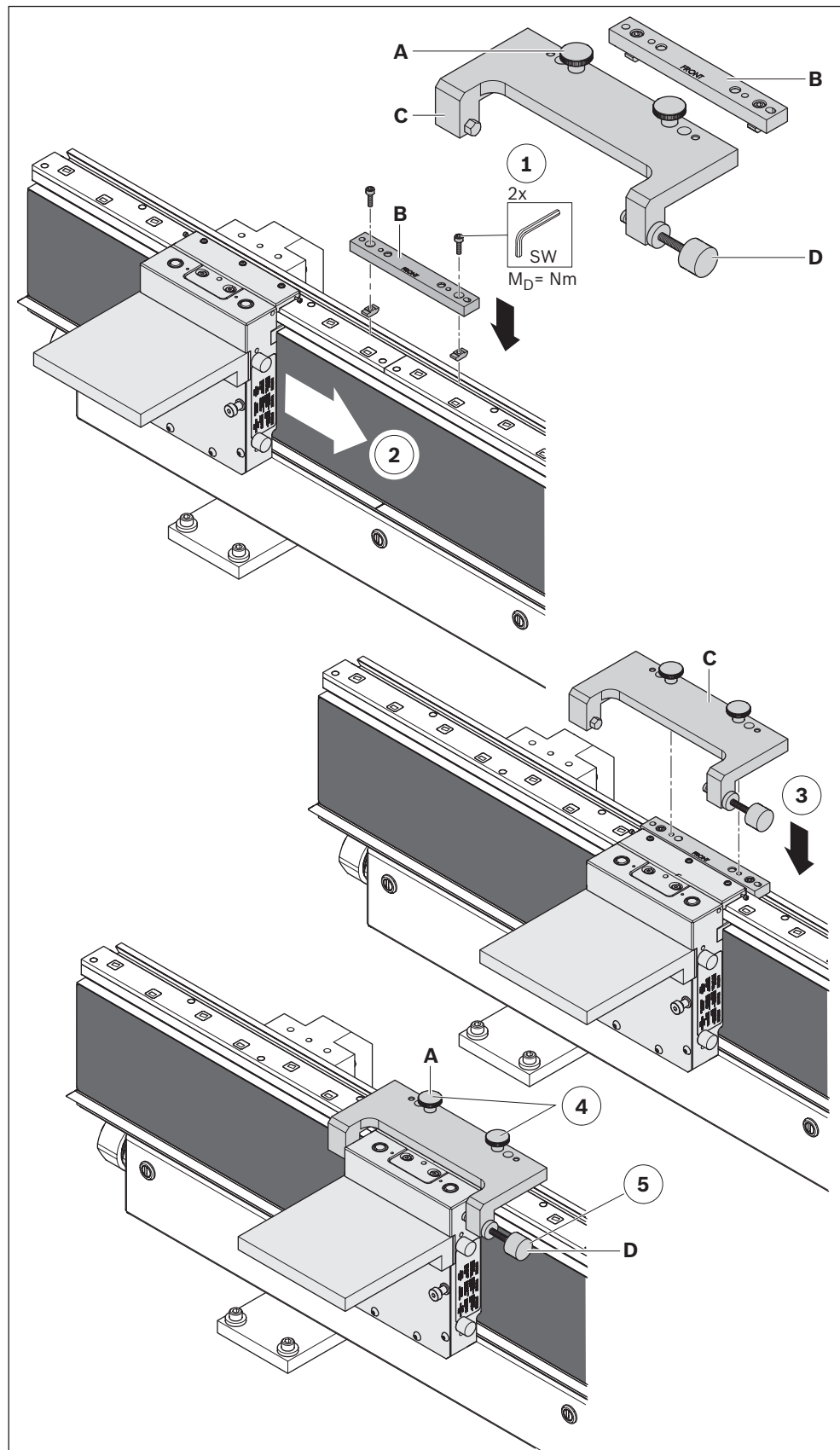


Fig. 122: Installing/removing the WT mount

557 186-122

11 Troubleshooting

This section serves as a troubleshooting guide for ActiveMover for qualified and trained service personnel.

11.1 Operating modes

Fault	Remedy
Service mode	"Reset Controller" not working. Switch off main switch, wait 5 s, then switch on main switch. Let ActiveMover controller boot up and check whether controller starts in RUN mode. If fault persists, repeat max. 4–5x, then contact Bosch Rexroth Service.

11.2 Power supply and workpiece pallets

Consult the Help function in the AMpro configuration software for suggestions on correcting faults in the power supply and workpiece pallets.

11.3 Communication

In case of a communication error:

1. Check the error message and search for a solution in AMpro.
2. Check for voltage in all electrical components.
3. Switch off the power supply of the control and gateway PCBs (24 V).
4. Check that all power lines are connected properly.
5. Make sure all wiring has been installed correctly and that all plug connectors are properly inserted and locked.
6. Switch the power supply on again.

11.4 Diagnostic LEDs

11.4.1 ActiveMover controller

(in control cabinet)

LED	Color	Status	Normal status	Possible fault/error
Power	Green	ON	●	
		Flashing		Controller hardware fault • Contact Customer Service.
	Red	ON		Controller off • Turn controller on.
		Flashing		Controller hardware fault • Contact Customer Service.
	Red/ green	Flashing		
HDD	Yellow	Intermittent flashing	●	
Link	Yellow	ON	SDL display connected	
		Flashing		SDL display power supply interrupted • Check power cables.
		OFF	No SDL display connected	
Run	Green	ON	●	
		Flashing	●	Controller start sequence still running • Wait a few minutes.
	Red	ON		Controller software error • Contact Customer Service.
		Flashing		

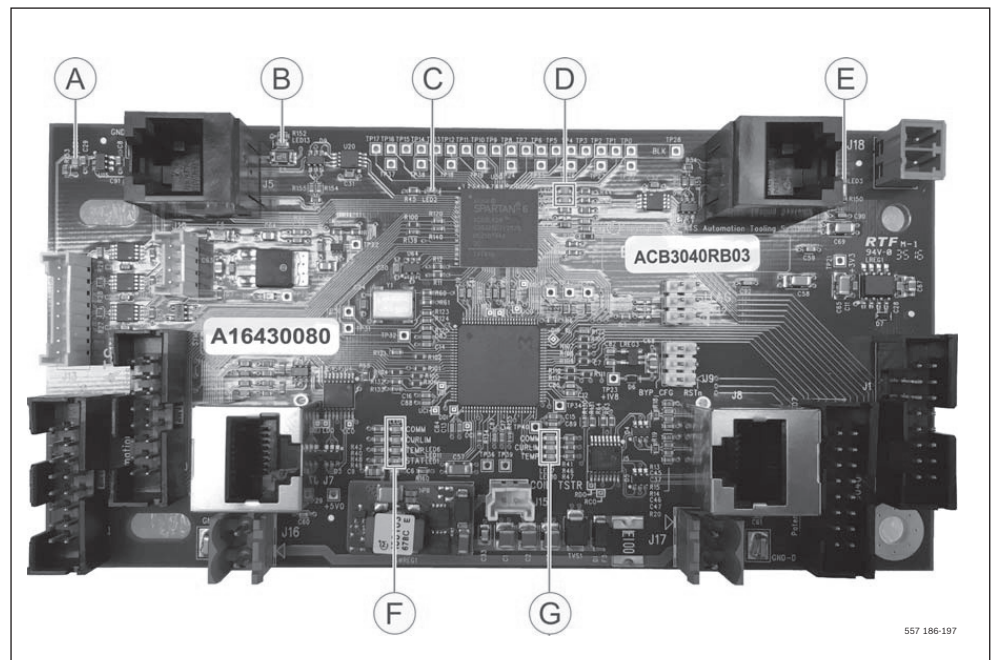
11.4.2 Power supply PCB

(in the section/curve module electronic box)

LED color	Status	Normal status	Possible fault/error
Green	ON	●	
	OFF		Power supply off • Turn power supply on.
Red	ON		A/D CPLD (complex programmable logic device) not programmed • Contact Customer Service.
	OFF	●	

11.4.3 PCB (gateway)

(in the section/curve module electronic box)



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Loc.	LED	Color	Status	Normal status	Possible fault/error
F	1 STAT	Green	ON	●	
			Very slow flashing		Network not configured
			Slow flashing		FPGA (field-programmable gate array) not configured
			Fast flashing		FPGA ready, but inactive
			OFF		Power supply off
C	2	Green	Any	—	Software diagnostic LED, for development purposes only
E	3	Red	ON		Power supply shut off due to excessive load current • Short circuit in encoder PCB or encoder connecting cable
			OFF	●	
F and G	4 COMM and 5 COMM	Orange or blue	ON		No communication between PCB (gateway) and controller
			Fast flashing		No coil current setting received
			OFF	●	
F and G	6 CURLIM and 7 CURLIM	Red	Fast flashing	●	Motor power supply off
			OFF	●	
D	8	Red	Any	—	Software diagnostic LED, for development purposes only
D	9	Yellow	Any	—	Software diagnostic LED, for development purposes only
G	10 TEMP ¹	Yellow	ON	●	Last PCB (gateway) in network
			OFF	●	Not last PCB (gateway) in network
F	11 TEMP ¹	Yellow	ON	●	PCB (gateway) only configured for left network
			OFF	●	PCB (gateway) only configured for right network

Loc.	LED	Color	Status	Normal status	Possible fault/error
B	13	Red	ON		Power supply shut off due to excessive load current • Short circuit in encoder PCB or encoder connecting cable
			OFF	●	
A	14	Red	ON		Power supply for IR reading head shut off due to excessive load current • Short circuit in IR reading head or IR reading head connecting cable
			OFF	●	

1 PCBs (gateway) manufactured before mid-2016 that have not had a CPLD firmware update have the following alert indications:

Loc.	LED	Color	Status	Normal status	Possible fault/error
G	10 TEMP	Yellow	ON		Defective thermistor detected
and	and		Fast flashing		Max. operating temperature exceeded
F	11 TEMP		OFF	●	Motor temperature within tolerance

12 Shutdown

The product is a component that does not need to be separately shut down. Accordingly, this section has been left blank.

13 Disassembly and replacement

WARNING

High electrical voltage

Risk of death or serious injury from electric shock.

- ▶ Disconnect the system component requiring maintenance or servicing before starting.
- ▶ Secure the system against unintentional restarting.

Lifted loads may fall

Falling loads can cause serious injury (or even death).

- ▶ Only use suitable slings with sufficiently high load capacity (see shipping documents for product weight).
- ▶ Make sure the lifting straps are correctly fastened before lifting the product.
- ▶ Secure the product against tipping when lifting.
- ▶ Make sure no one but the operator is in the hazard zone during lifting and lowering.

13.1 Preparing the product for storage/later use

- Always set the product down on a flat surface.
- Protect the product from mechanical stress.
- Protect the product from environmental factors, such as dirt and moisture.
- Observe the ambient conditions, see “Technical data” on page 169.
- For products with a mounted motor: Support the product so that the motor is not placed under mechanical stress.

14 Disposal

- The materials used are environmentally friendly.
- They can be recycled or reused (components may have to be processed and replaced).
The selection of materials and disassembly capability ensures recyclability.
- Careless disposal may result in environmental contamination.
- Dispose of the product in accordance with the regulations in your country.

15 Upgrading and modification

- Do not modify the product.
- The Bosch Rexroth warranty only applies to the product as delivered, and to approved upgrades. Unauthorized modifications or upgrades will void the warranty.

16 Technical data

16.1 Mechanical data

• Max. speed	Standard straight section:	2.5 m/s
	Low power straight section:	0.15 m/s
	In a curve:	Approx. 2.5 m/s with 1 kg
• Acceleration		
	– 1 kg load	Standard straight section: 40 m/s ² Curve: 2.5 m/s ²
– 10 kg load	Standard straight section: 10 m/s ² Low power straight section: 1 m/s ² Curve: 10 m/s ²	
• Load		
	– WT w/ 3 magnets	10 kg
	– WT w/ 2 magnets	Approx. 2 kg max.

16.2 Electrical data

• Operating voltage		
	– Europe	400 V AC (3-phase 230 V AC) + PE, 50 Hz
– America	208 V AC (3-phase 120 V AC) + PE, 60 Hz	
• Short-circuit resistance	5 kA	
• Max. current consumption	20 A	
• Input power	10 W/section, 150–225 W/WT	
	(Depending on application)	
• Power supply output	Max. 1500 W	
• Control voltage	24 V DC (digital)	
	28 V DC (motor)	
• Full-load current	30 A	
• UPS voltage	24 V DC 50/60 Hz	
	Rate current strength 10 A/15 A	

16.3 Dimensions and weight

Base frame 3 842 559 450 (w/o leveling feet)

• Length x width x height	900 x 500 x 603 mm
• Weight	135 kg

Base frame 3 842 559 451 (w/o leveling feet)

• Length x width x height	383.25 x 500 x 603 mm
• Weight	62 kg

Section module connecting kit 3 842 559 452

• Weight	17 kg
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Curve module connecting kit 3 842 559 453

• Weight	17 kg
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Fixing plate (2x) 3 842 559 454

- Weight 6.68 kg

Fixing plate 3 842 559 455

- Weight 8.41 kg

Section module 3 842 559 426

- Length x width x height 1005 x 78 x 276 mm
- Weight 40.68 kg

Module holder 3 842 559 429

- Weight 8 kg

Curve module 3 842 559 430

- Length x width x height 515 x 473 x 357 m
- Weight 65 kg

2-magnet workpiece pallet 3 842 559 433

- Weight 2.18 kg

3-magnet workpiece pallet 3 842 559 434

- Weight 2.65 kg

IR reading head fastening parts kit 3 842 559 440

- Weight 2.32 kg

IR reading head 3 842 559 441

- Weight 0.27 kg

IR data carrier 3 842 559 447

- Weight 0.09 kg

Power supply 3 842 559 435

- Weight 10 kg

Control cabinet

- Weight 70 kg

Connecting kit 3 842 559 438

- Weight 3.3 kg

Connecting kit 3 842 559 449

- Weight 5 kg

Interface modules

- Weight 0.06 kg

Remover tool 3 842 559 439

- Weight 0.8 kg

Calibration set 3 842 559 456

- Weight 2.14 kg

16.4 Ambient conditions

ActiveMover is designed for stationary use in indoor areas.

- Floor The floor should be level and able to support the mechanical stress caused by ActiveMover.
- Max. load capacity of floor: 1,000 kg/m²
- Ambient temperature 0–50 °C
- Relative humidity 10–95%, non-condensing

17 Appendix

17.1 Trademark information

- EtherNET/IP™ is a trademark of ODVA Inc.
- PROFINET® is a registered trademark of PROFIBUS Nutzerorganisation e.V.
- Ethernet POWERLINK is a trademark of B&R Industrial Automation GmbH.
- EtherCAT® is a registered trademark of Beckhoff Automation GmbH & Co. KG

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