

Flat solar panels

NEO 2.1 / SUN 211



Installation, User and Service Manual

Roof-Surface
Installation
Terrace mounting

Contents

1	Introduction	4
	1.1 Used symbols	4
	1.2 General	4
	1.2.1 Manufacturer's liability	4
	1.2.2 Installer's liability	5
2	Safety instructions and recommendations	6
	2.1 Safety instructions	6
	2.2 Recommendations	6
3	Description	8
	3.1 Operating principle	8
	3.2 Technical characteristics	8
4	Installation	9
	4.1 Regulations governing installation	9
	4.1.1 All installation system	9
	4.1.2 Roof-Surface Installation	9
	4.1.3 Terrace mounting	10
	4.2 Package list	11
	4.2.1 Package for an assembly on the roof	11
	4.2.2 Anchorage fittings for roof mounting	12
	4.2.3 Terrace assembly kit	13
	4.3 Main dimensions	14
	4.4 Installation diagrams	15
	4.5 Assembling the solar collectors	17
	4.5.1 Warning	17
	4.5.2 Tools required	18
	4.5.3 Dimensions	18
	4.5.4 Fitting the hooks	20
	4.5.5 Vertical assembly, juxtaposed	23
	4.5.6 Horizontal assembly, superposed (only on roof)	29

- 4.6 Solar collector temperature sensor35**
- 4.7 Passing Pipes and Cable through the Roof36**
- 4.8 Hydraulic connections37**
 - 4.8.1 Connection dimensions37
 - 4.8.2 Connecting37
 - 4.8.3 Pipe insulation38
- 4.9 Filling the system38**

- 5 Commissioning40**
 - 5.1 Check points before commissioning40**
 - 5.2 Commissioning40**

- 6 Checking and maintenance41**
 - 6.1 General instructions41**

- 7 Warranty42**
 - 7.1 General42**
 - 7.2 Warranty terms42**

1 Introduction

1.1 Used symbols

In these instructions, various danger levels are employed to draw the user's attention to particular information. In so doing, we wish to safeguard the user's safety, obviate hazards and guarantee correct operation of the appliance.



DANGER

Risk of a dangerous situation causing serious physical injury.



WARNING

Risk of a dangerous situation causing slight physical injury.



CAUTION

Risk of material damage.



Signals important information.



Signals a referral to other instructions or other pages in the instructions.

Caution: Risk of being burnt.



Zone susceptible to snow.



Zone susceptible to windy conditions.

1.2 General

1.2.1. Manufacturer's liability

Our products are manufactured in compliance with the essential requirements of the various Directives applicable. They are therefore delivered with **CE** marking and all relevant documentation.

In the interest of customers, we are continuously endeavouring to make improvements in product quality. All the specifications stated in this document are therefore subject to change without notice.

Our liability as the manufacturer may not be invoked in the following cases:

- ▶ Incorrect use of the appliance.
- ▶ Faulty or insufficient maintenance of the appliance.
- ▶ Incorrect installation of the appliance.

1.2.2. Installer's liability

The installer is responsible for the installation and initial start up of the appliance. The installer must respect the following instructions:

- ▶ Read and follow the instructions given in the manuals provided with the appliance.
- ▶ Carry out installation in compliance with the prevailing legislation and standards.
- ▶ Perform the initial start up and carry out any checks necessary.
- ▶ Explain the installation to the user.
- ▶ Warn the user of the obligation to check the appliance and maintain it in good working order.
- ▶ Give all the instruction manuals to the user.

2 Safety instructions and recommendations

2.1 Safety instructions



DANGER

The permissible roof load of the building must not at any time be exceeded. If necessary, a structural engineer should be consulted before commencing work.



WARNING

All electrical work must be carried out by a qualified electrician and must conform to the applicable standards, specifications, safety regulations and the requirements of the local electricity supplier.



CAUTION

Do not neglect to service the appliance. Contact a qualified professional or take out a maintenance contract for the annual servicing of the appliance.

2.2 Recommendations



WARNING

- ▶ Any operation on the installation must be performed by a qualified technician respecting professional regulations and in accordance with this document.
 - ▶ When making the connections, it is imperative that the standards and corresponding local directives are respected.
-
- ▶ The flat solar panels and fittings should be handled carefully during transportation and storage. If the packing has nevertheless been damaged during transit, the damage must be reported immediately to and claimed against the carrier.
 - ▶ The contents of the assembly kit must be checked before installation against the list which accompanies each kit.
 - ▶ When installing the panels, take note of the safety instructions in this document.
 - ▶ The packing material should be properly disposed of after installation.
 - ▶ Insulate the pipes in rooms that are not heated (cellars and lofts).
 - ▶ Check regularly that the installation contains water and is pressurised.

- ▶ Service the appliance regularly to ensure that it operates correctly.

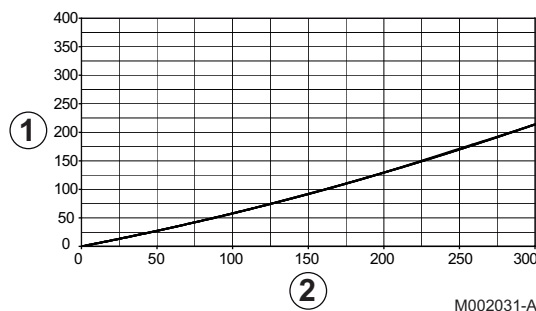
3 Description

3.1 Operating principle

The short-wave solar radiation (sunlight) striking the solar panel is converted into heat by the selective coating on the absorber. From there it is transferred by heat conduction to the absorber pipe and carried by the heat-transporting fluid to the calorifier. The solar-panel fluid heats the calorifier by means of the energy absorbed from the sun and cools down itself in the process.. The cooled heat-transporting fluid then flows back to the solar panel in order to collect more solar energy. An intelligent control system ensures that the circulation system is only active when there is sufficient solar radiation, thus optimising the collection of solar energy.

3.2 Technical characteristics

Length	mm	1960
Width	mm	1060
Height	mm	70
Weight	kg	34.45
Gross collector area A_G	m^2	2,1
Inlet surface A_a	m^2	1,88
Absorber surface A_A	m^2	1,90
Water content	litres	1,2
Maximum operating pressure	bar	10
Testing pressure	bar	15
Optical efficiency η_o		0,773
Loss rating a_1	$W/m^2.K$	3,676
Loss rating a_2	$W/m^2.K$	0,0143
Stagnation temperature	$^{\circ}C$	180
Hydraulic connections	mm	12
Pressure drop	mbar	See below
Fitted tilt angle minimum/maximum	$^{\circ}$	20 to 65



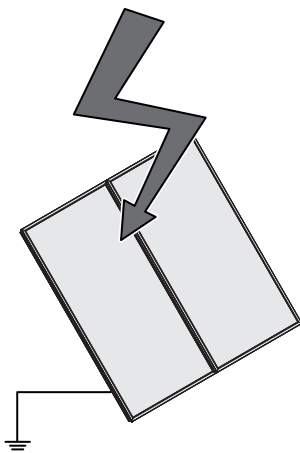
Load loss curve

- ① Pressure drop (mbar)
- ② Mass flow (Kg/h)

4 Installation

4.1 Regulations governing installation

4.1.1. All installation system

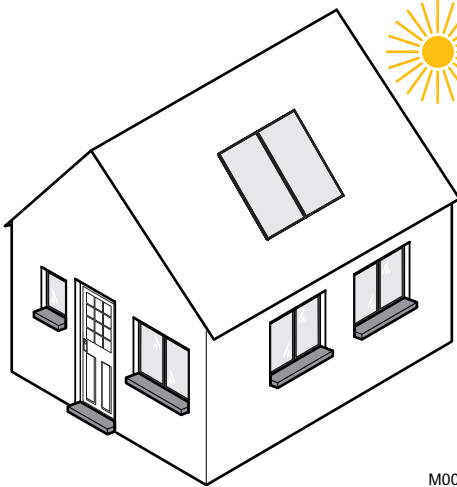


M001788-A



CAUTION

- ▶ The installation and maintenance of the appliance must be carried out by a qualified professional in compliance with the statutory texts of the codes of conduct in force.
- ▶ Solar installations must be earthed to protect them against lightning.
- ▶ Protection of the environment: Place a container of sufficient volume under the drain pipe and the valve discharge pipe.



M001707-A

- ▶ The installation should therefore not be flushed or filled when the collectors are hot (in strong sunshine).
- ▶ The solar system must at all times be filled with : heat transporting fluidTyfocor L or LS.

4.1.2. Roof-Surface Installation



CAUTION

Before installation, make sure that the framework is solid and strong enough to comply with the static requirements.

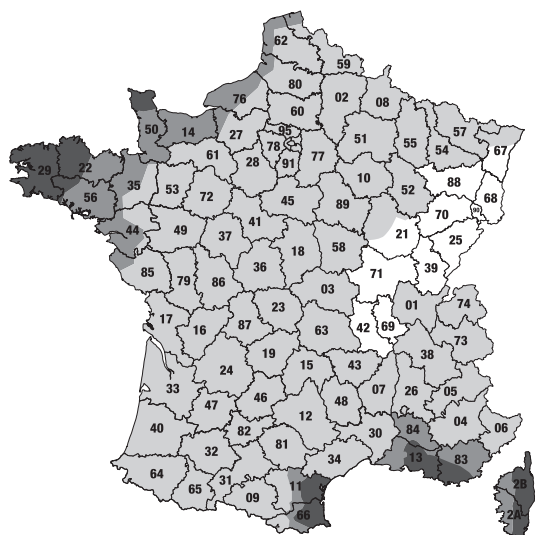
- ▶ The roof-integral installation set is designed specifically as a mounting system for the NEO 2.1 / SUN 211 flat solar panels and may only be used in accordance with their building regulations approval.

- ▶ The installation set is designed for rooves with standard roof tiles. If the roof in which the panels are to be fitted has particularly high roof tiles, please consult your specialist advisor.

4.1.3. Terrace mounting

■ Ballast per solar panel (kg)

Rules NV65 (DTU P06-002, April 2000): Calculation rules defining the effects of snow and wind on buildings.



1
 2
 3
 4

M001772-A



CAUTION

If the assembly's supporting frame is not screwed to the building, it must be weighted down according to the technical guidance. Kerb stones (100 x 250 x 080), for example, are suitable for weighting down. Stones must be slid in and set in between the T frames. Position the ballast stones before the finally attaching the inner screws and the cross.

At no time should the maximum authorised load be exceeded. If necessary, a structural engineer should be consulted before commencing work.

Building height (m)	Ballast per solar panel (kg)				
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
< 10	140	170	210	255	340
10 to 20	170	200	250	300	405
20 to 30	190	230	285	340	455
30 to 40	205	245	310	370	495
Increase coefficient for exposed sites (shoreline, hilltops, narrow valleys, etc.)	1.35	1.3	1.25	1.2	1.2



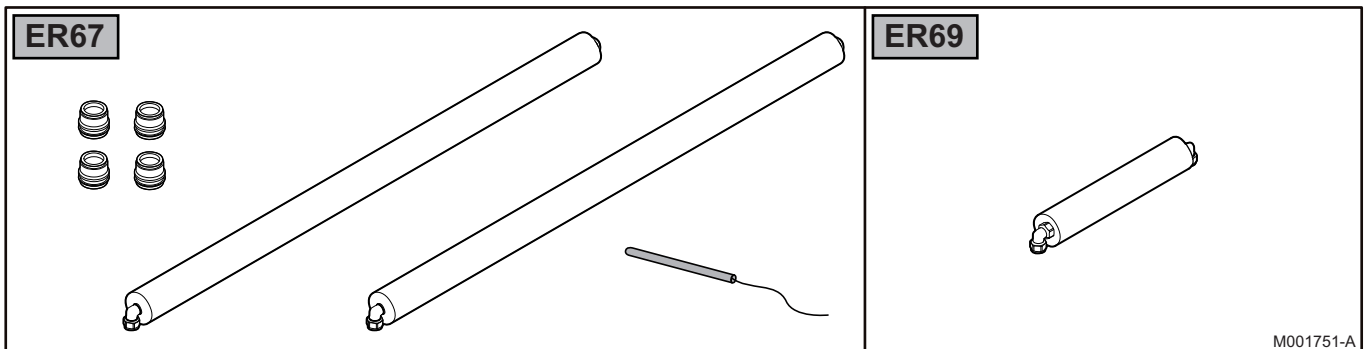
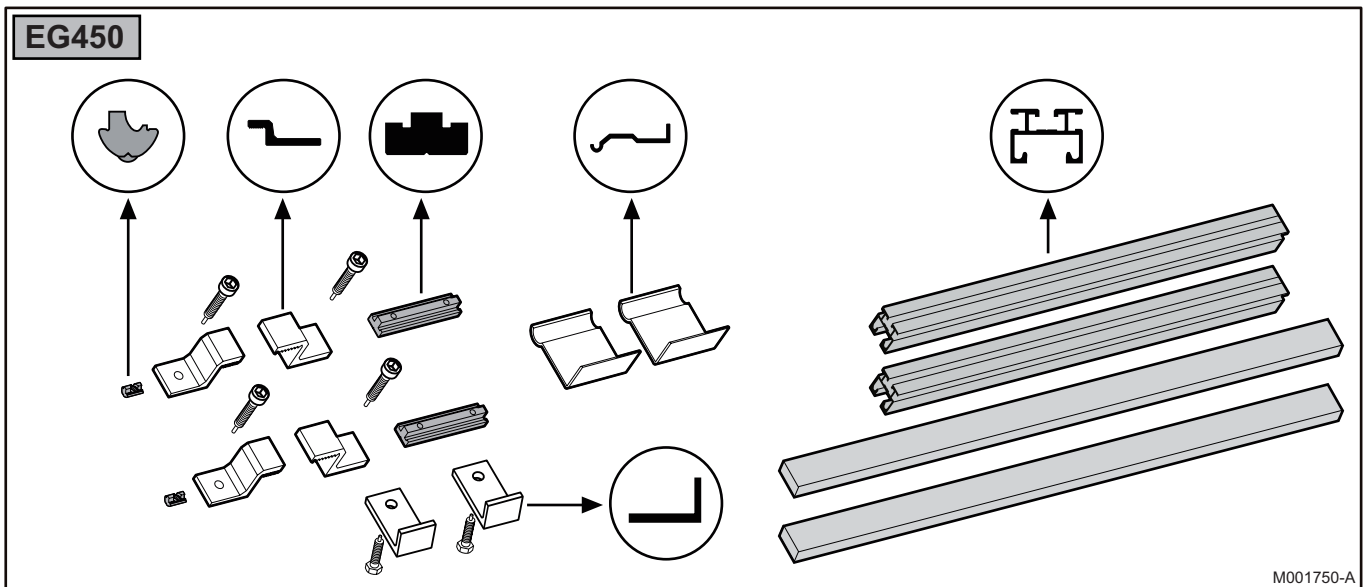
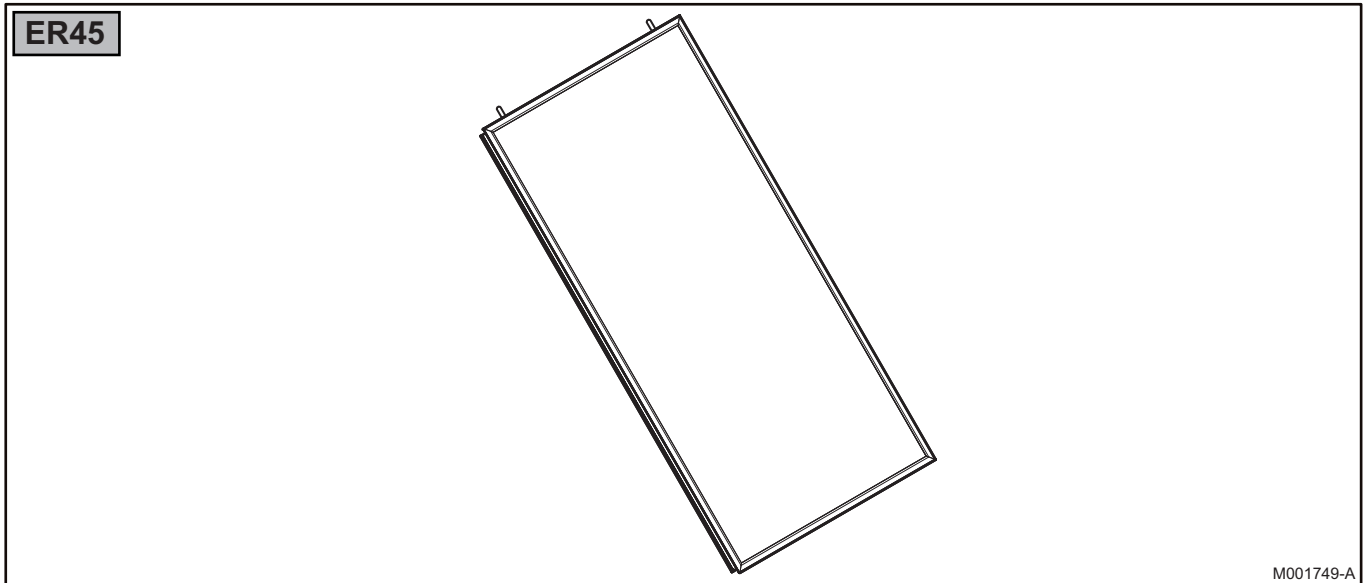
The values indicated in the "Zone 5" column in the table are valid for the Outre-Mer regions.

■ Pull-out resistance of the screws holding the supports in place

Building height (m)	Panel holding resistance in terms of panel slope (N/m ²)	
	60°	45°
< 10	4400	3400
10 to 20	5200	4300
20 to 30	5900	4800
30 to 40	6400	5200

4.2 Package list

4.2.1. Package for an assembly on the roof



4.2.2. Anchorage fittings for roof mounting



The roof anchors are not included in the roof-surface installation set and must be ordered separately.



CAUTION

Before installation, make sure that the framework is solid and strong enough to comply with the static requirements.

There are different types of roof anchor available:

- ▶ Aluminium roof anchors for assembly independent of the chevrons.
- ▶ Rafter-mounted anchors.
- ▶ Hooks to be fitted to the roof covering.

In the first case, additional mounting battens have to be added to the roof structure. In order to fit the mounting battens to the framework of a finished roof, the roof tiles covering the entire length of the mounting battens have to be moved out of the way. The roof anchors are then located on the battens and fixed.

With the rafter-mounted type, only individual tiles above the fixing points on the rafters have to be removed. The roof anchors are screwed to the rafters thus exposed. Afterwards, the tiles are replaced and the roof is immediately waterproof again. The installation of the panel-mounting system can start.

If installing on metal rooves, the roof anchors must be ordered from the manufacturer of the roof system concerned.

The hoses of the solar-panel connection sets can be passed through the roof by feeding them through a vented roof tile.

■ Aluminium roof anchor for long-stringed gutter tile

EG 311 (4 pieces)

EG 312 (6 pieces)

On tiled rooves, additional mounting battens are added to the roof substructure.

Characteristics of the assembly plates:

- ▶ Cross section: 30 x 90 mm
- ▶ Length: Width of the bank of solar collectors
- ▶ The ends must rest on a chevron

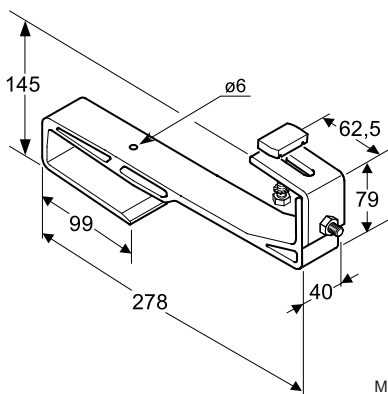
The roof anchors are fixed to these assembly planks (**assembly independent of the chevrons**).

■ Stainless steel roof anchor for long-stringed gutter tile

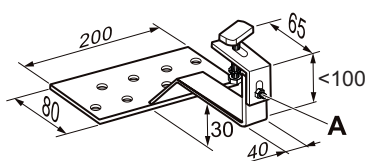
EG 313 (4 pieces)

EG 314 (6 pieces)

These roof anchors are attached directly to the roof rafters (**rafter-mounted anchors**).

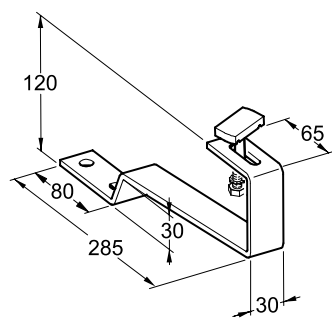


M001741-A



M001742-A

■ Stainless steel roof anchor for flat tiles



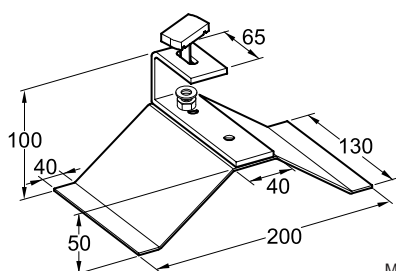
M001743-A

EG 315 (4 pieces)

EG 316 (6 pieces)

These roof anchors are attached directly to the roof rafters (**rafter-mounted** anchors). Their slim design normally allows two roof anchors to be fixed to one rafter.

■ Stainless steel roof anchor for corrugated rooves



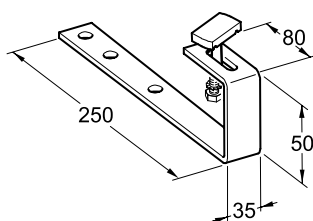
M001744-A

EG 317 (4 pieces)

EG 318 (6 pieces)

On corrugated rooves (fibrecement, asbestos, etc.) these roof anchors are screwed to the roof rafters through the corrugated sheets (**rafter-mounted** anchors). They are fixed by coach bolts (not supplied with the roof anchors as they vary depending on the roofing manufacturer).

■ Stainless steel roof anchor for slate



M001745-A

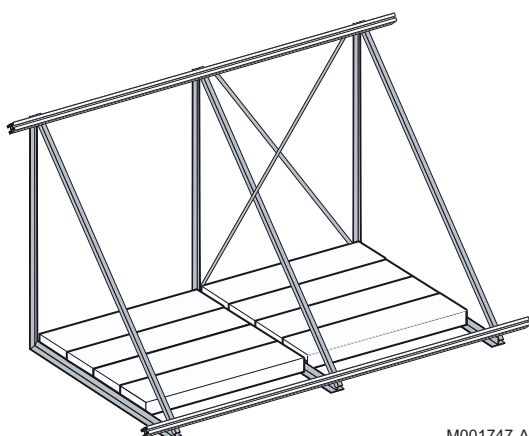
EG 319 (4 pieces)

EG 320 (6 pieces)

These roof anchors are screwed to the rafters through the boarding (**rafter-mounted** anchors). The roof anchor then has to be covered in the normal way.

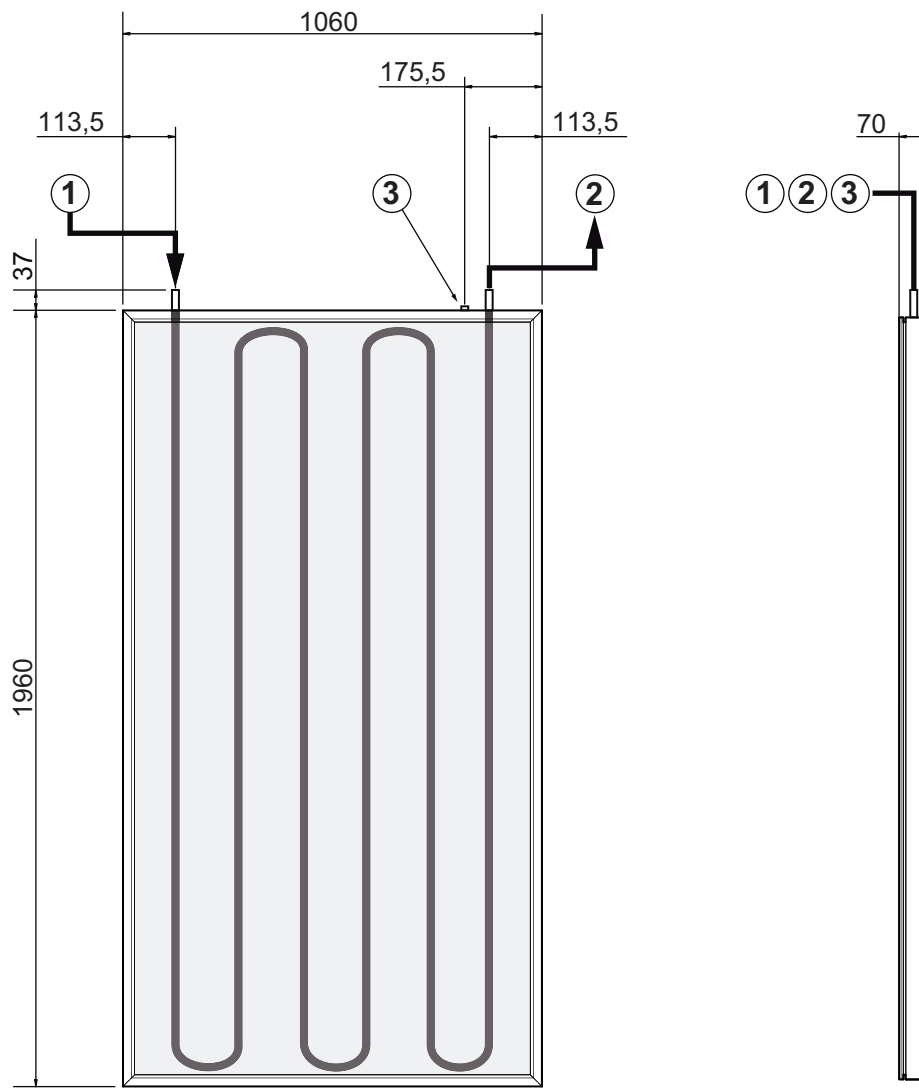
4.2.3. Terrace assembly kit

For terrace assembly, specific kits are available: EG 358, EG 359. Refer to the instructions delivered with the package.



M001747-A

4.3 Main dimensions



- ① Solar collector inlet
- ② Solar collector outlet
- ③ Solar sensor probe

M001740-A

4.4 Installation diagrams

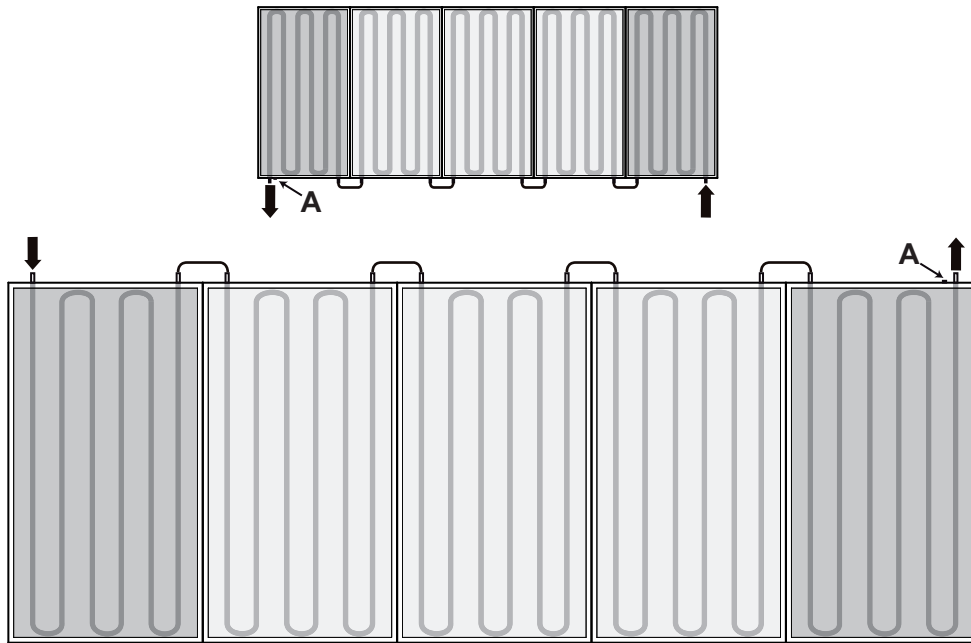
- ▶ Vertical assembly, juxtaposed.
Connection for 2 to 5 collectors.



CAUTION

Place the collector sensor on the flow side of the solar circuit (flow from the hottest collector).

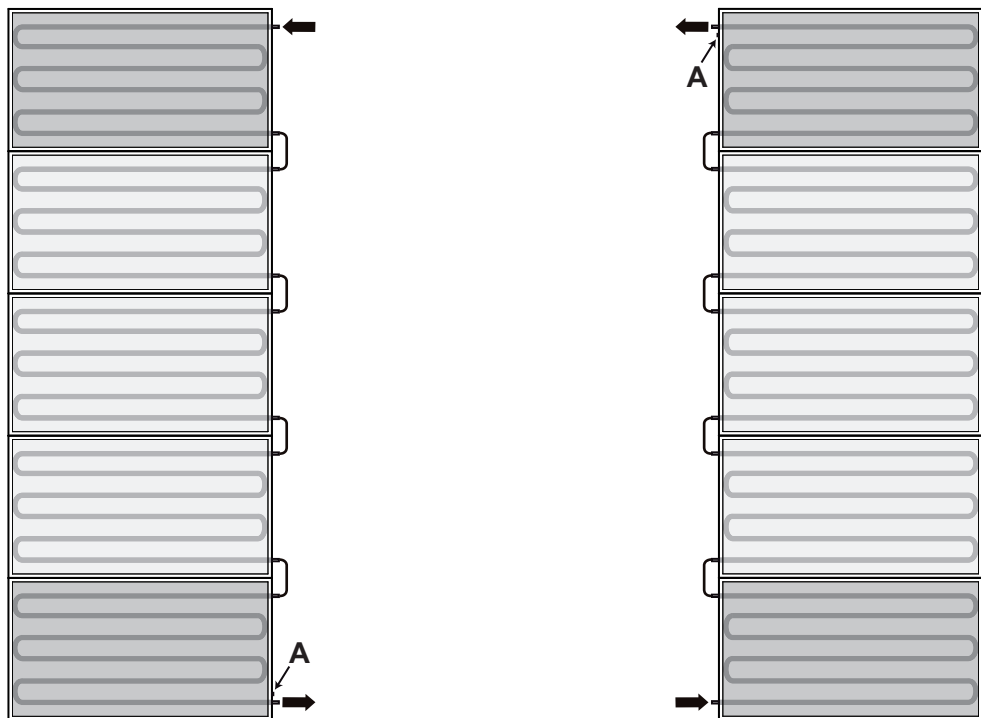
A: Solar sensor probe.



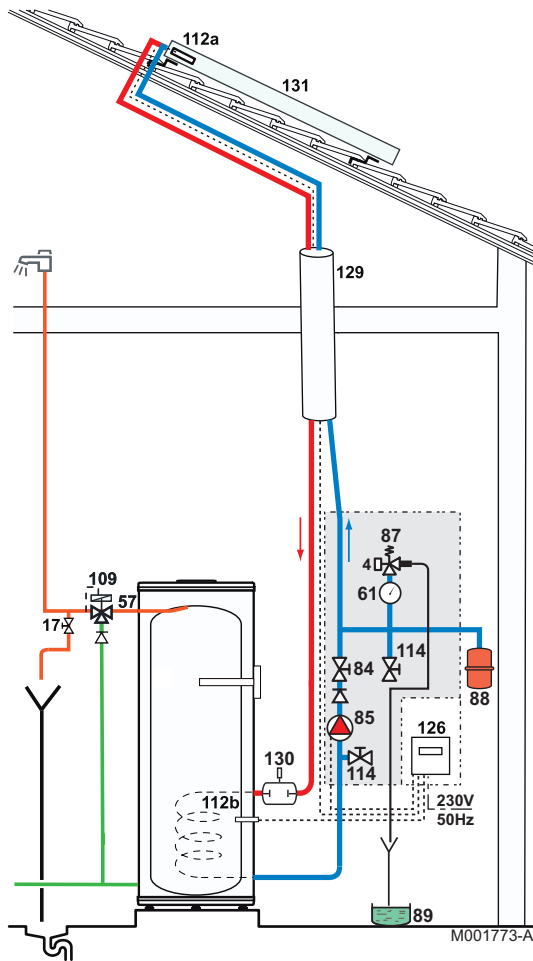
M001775-B

M001754-B

- ▶ Horizontal assembly, superposed (only on roof).
Connection for 2 to 5 collectors.



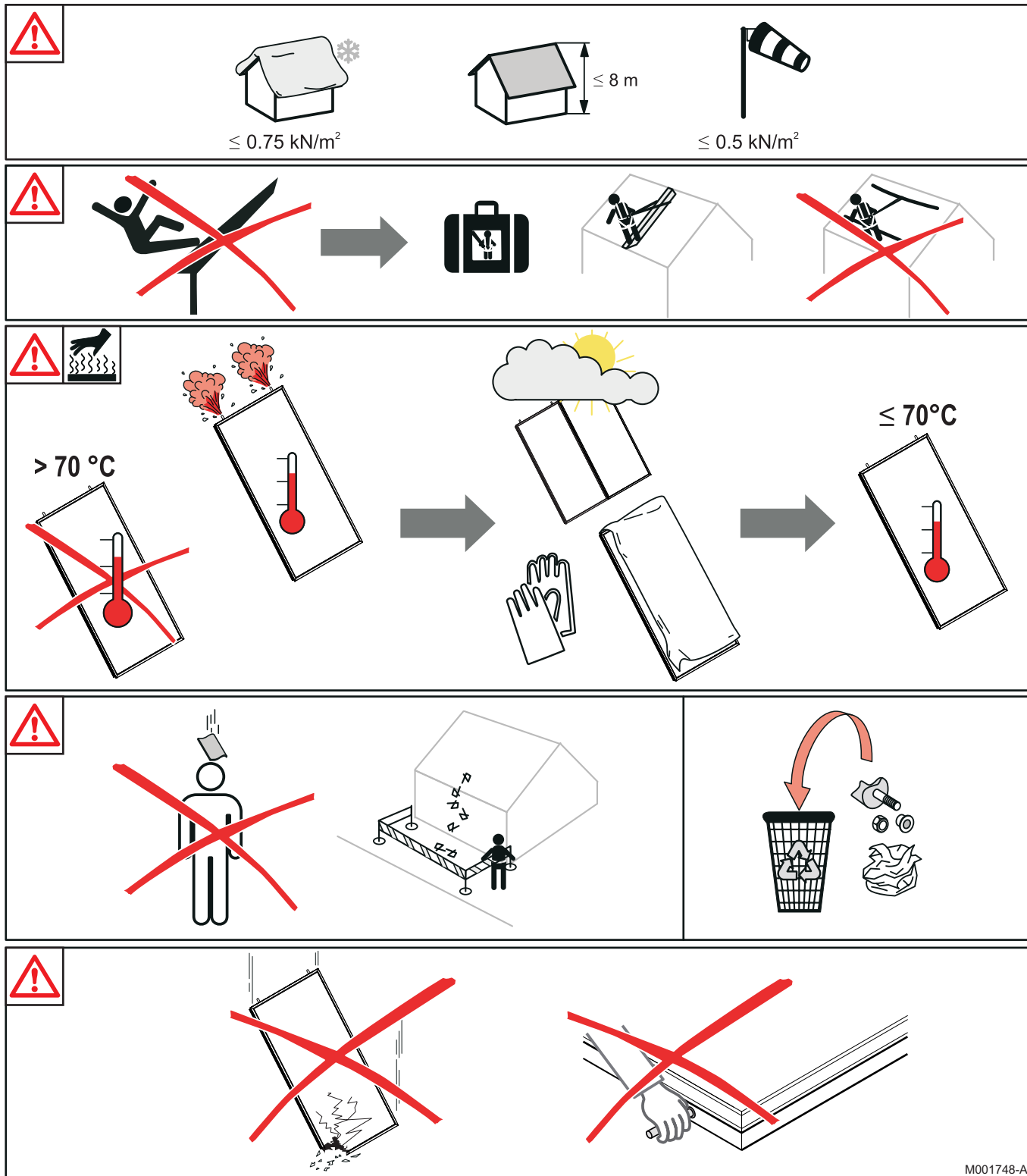
► Example of an installation



- 4** Pressure gauge
- 9** Isolating valve
- 17** Drain cock
- 56** Domestic hot water circulation loop return
- 57** Domestic hot water outlet
- 61** Thermometer
- 84** Stop valve with lockable nonreturn valve
- 85** Primary solar circuit pump
- 87** 6-bar calibrated and sealed safety valve (primary solar)
- 88** Expansion vessel
- 89** Heat transfer fluid container
- 109** Domestic hot water thermostatic mixing valve
- 112a** Solar sensor probe
- 112b** Domestic hot water sensor
- 114** Solar circuit drainage valve
- 126** Solar regulator
- 129** Duo-Tube
- 130** Manual bleed degasser
- 131** Flat or tubular solar panel

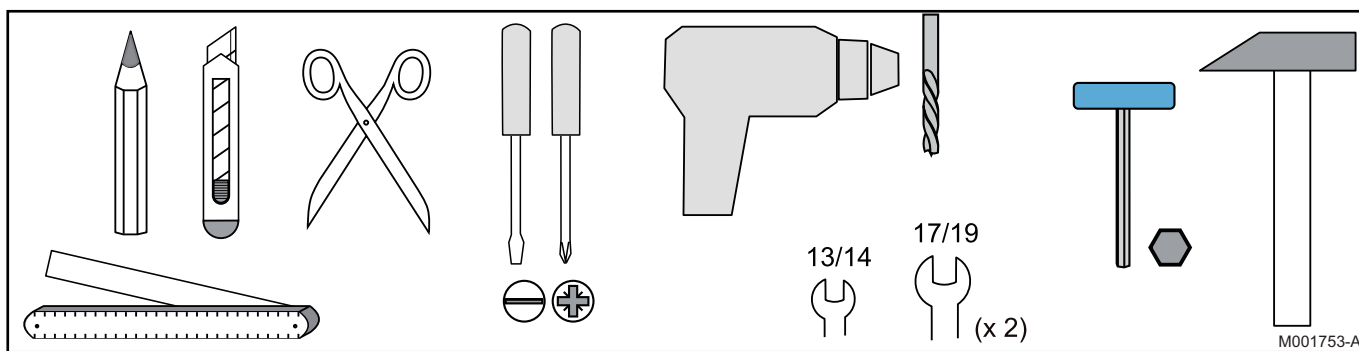
4.5 Assembling the solar collectors

4.5.1. Warning

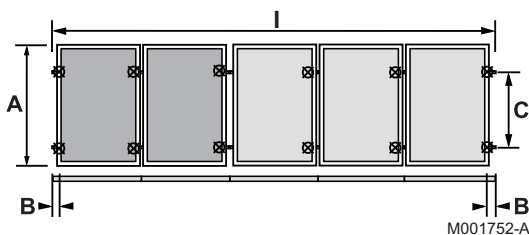
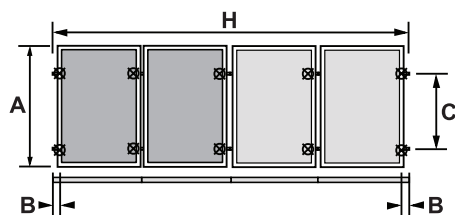
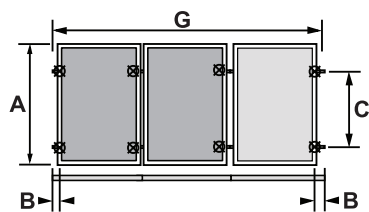
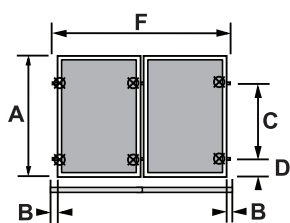
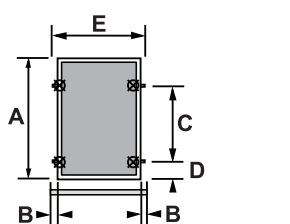


M001748-A

4.5.2. Tools required



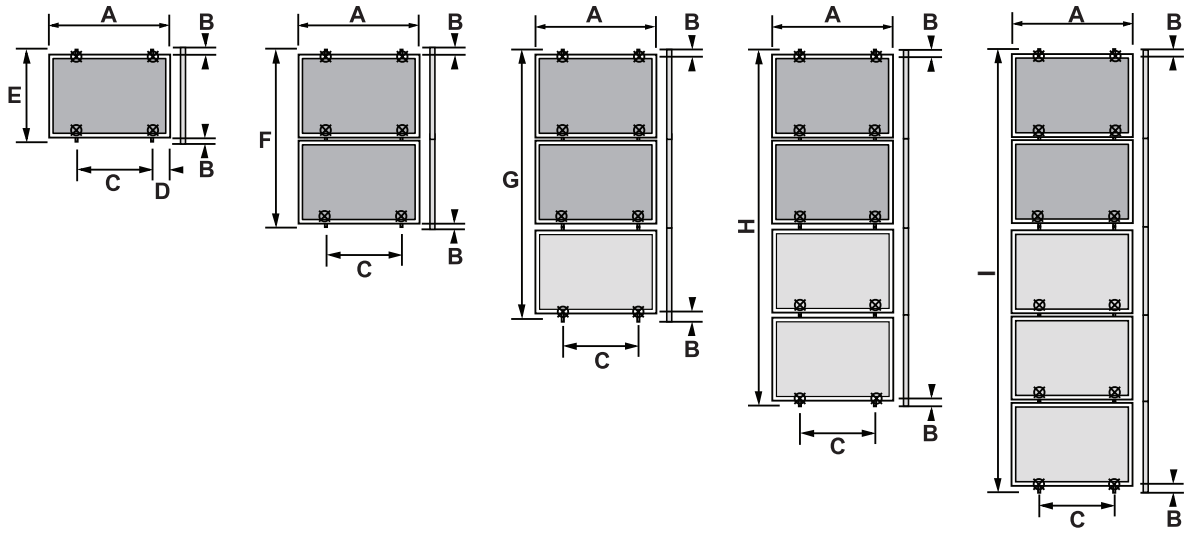
4.5.3. Dimensions



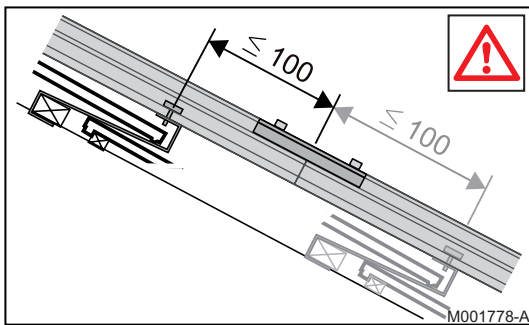
Side	A	B	C	D	E ⁽¹⁾	F ⁽¹⁾	G ⁽¹⁾	H ⁽¹⁾	I ⁽¹⁾
Dimensions (mm)	1960	< 250	1400 to 1700	60	1100	2204	3306	4408	5510

(1) Minimum length of the mounting rails

- ▶ To install a large number of solar collectors, it is sufficient to place side-by-side or to superimpose the configurations described in this chapter.
- ▶ You will need 4 hooks (adapted to the roof covering) to fit the first battery sensor and 2 hooks for each additional sensor.
- ▶ Fitting on hooks: If the gap between the chevrons makes it impossible to respect dimension **B** at both extremities of the bank of solar collectors, 2 additional roof anchors are required.

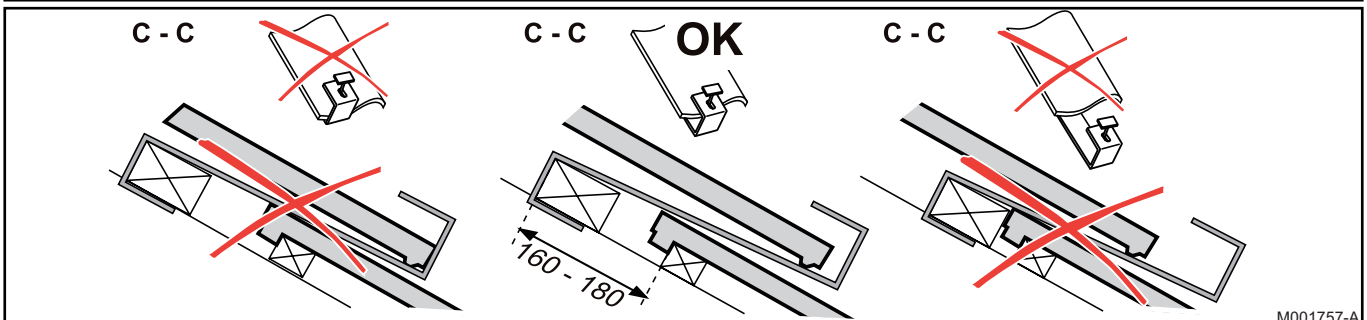
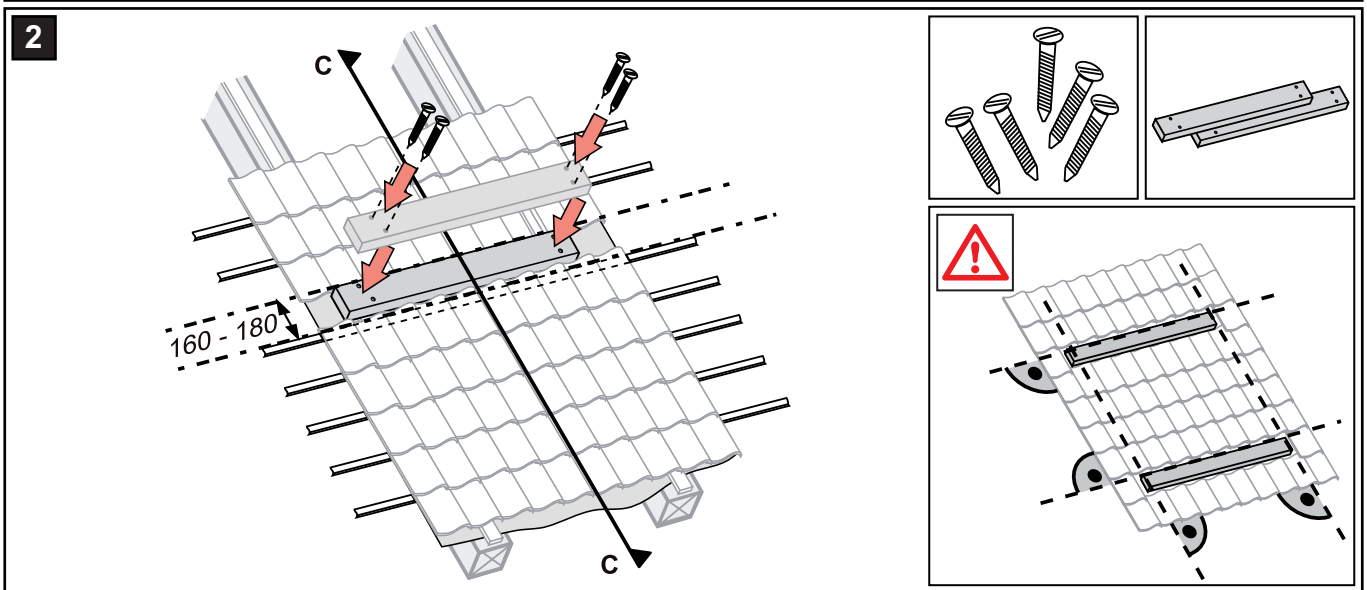
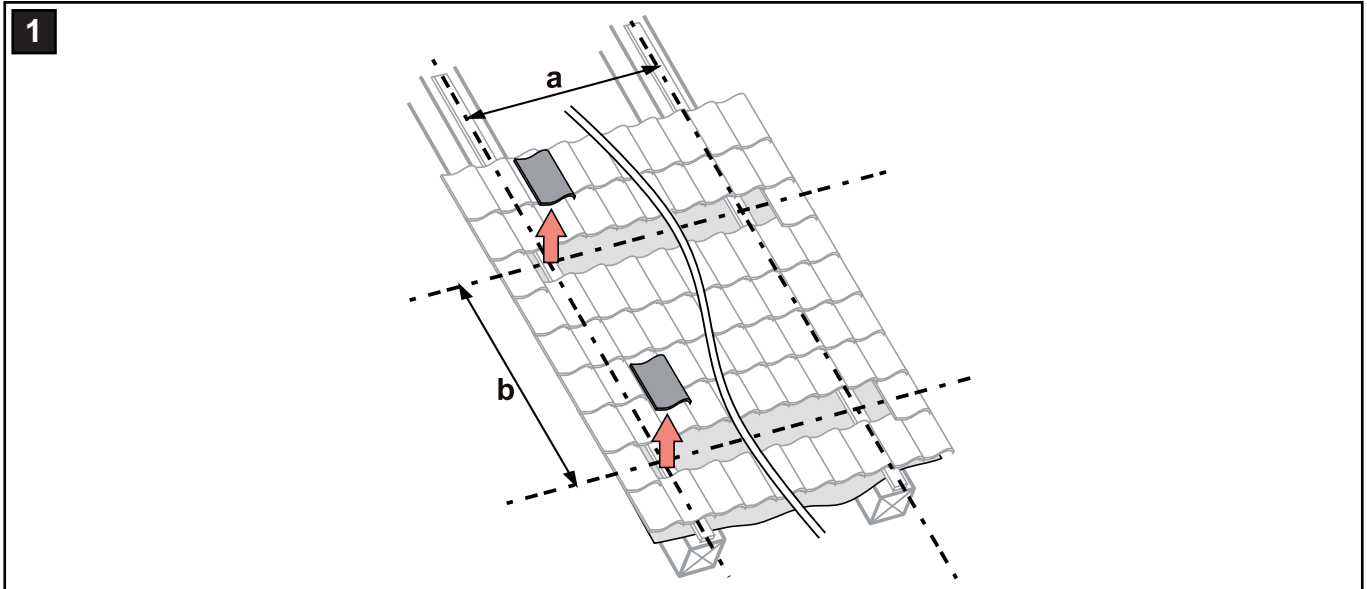


M001777-A

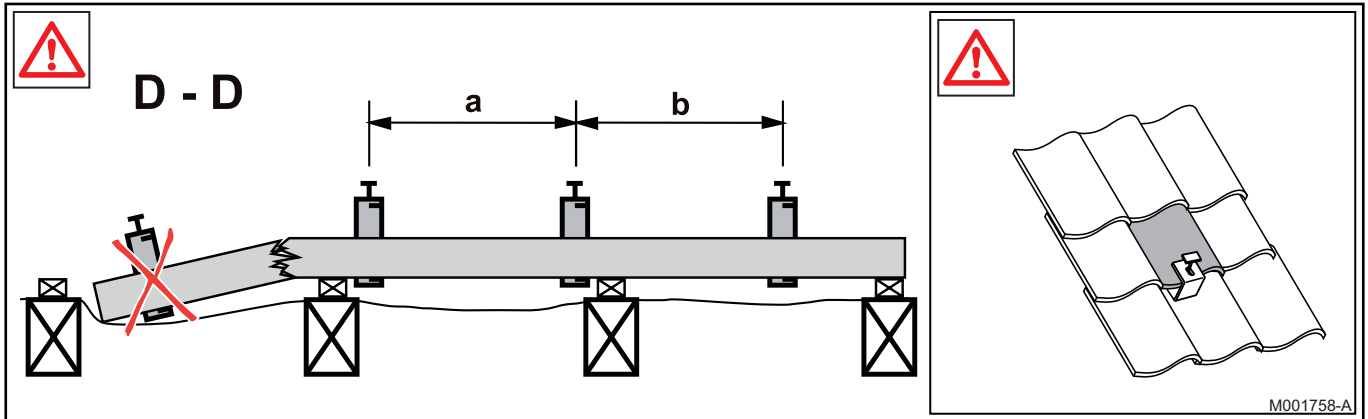
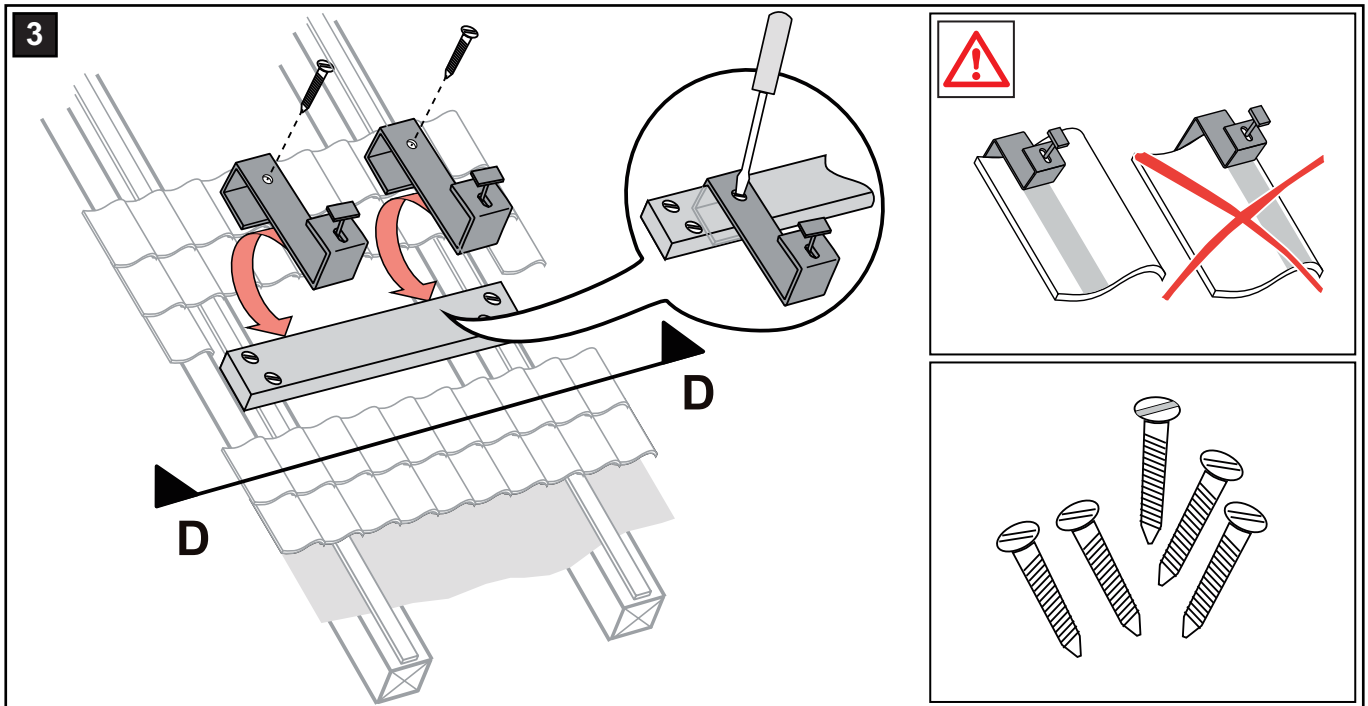


4.5.4. Fitting the hooks

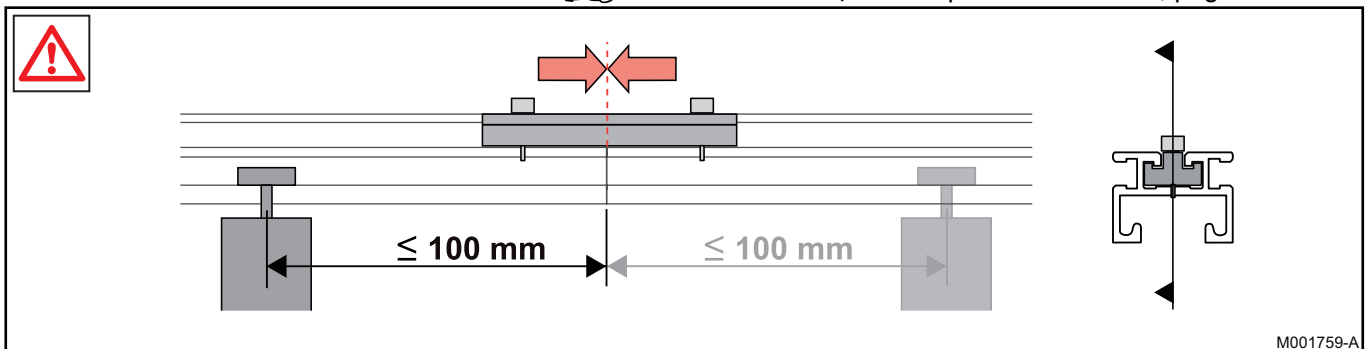
- Assembly of the roof anchors independently of the chevrons



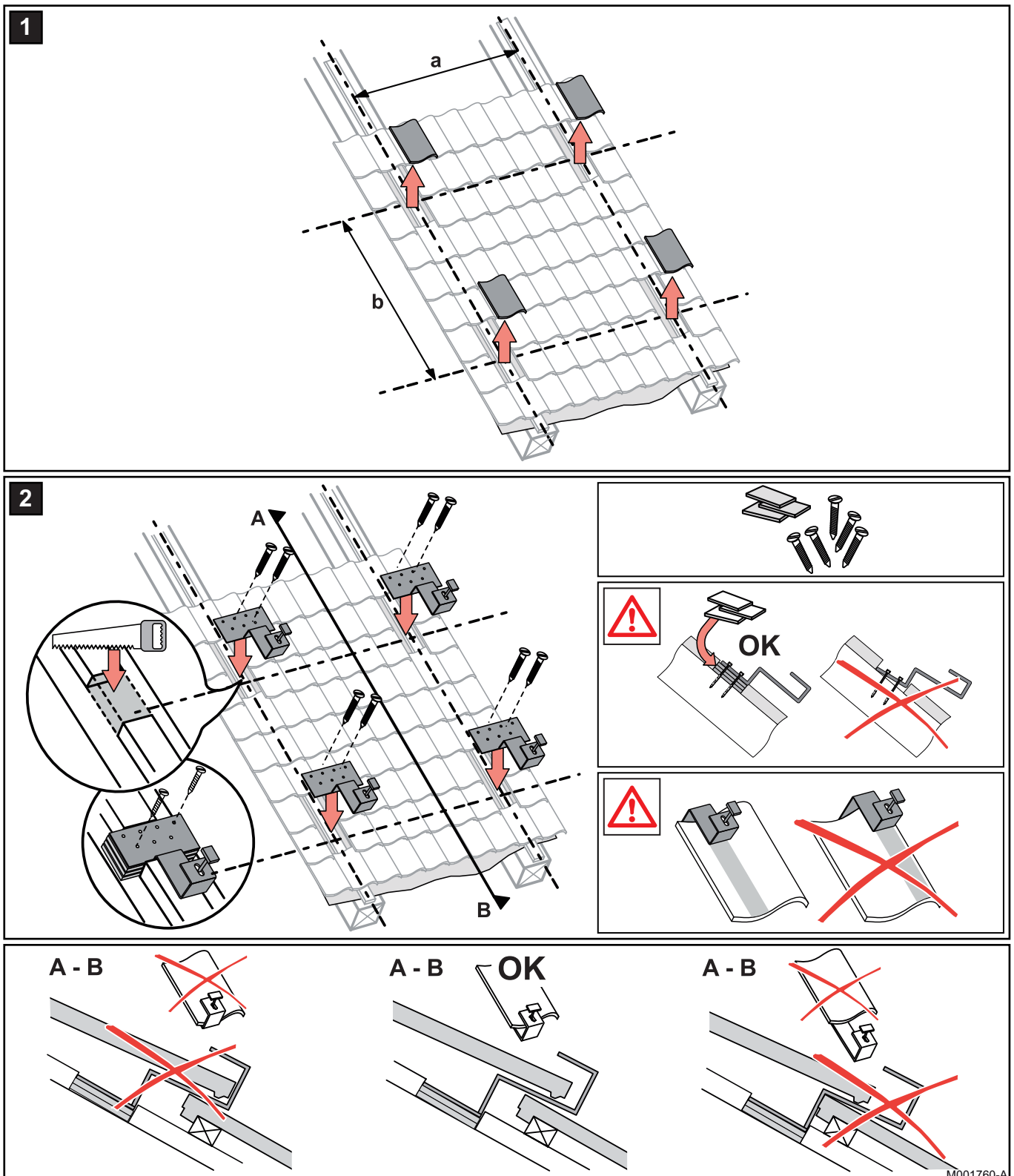
M001757-A



Dimensions a - b, see chapter "Dimensions", page 18



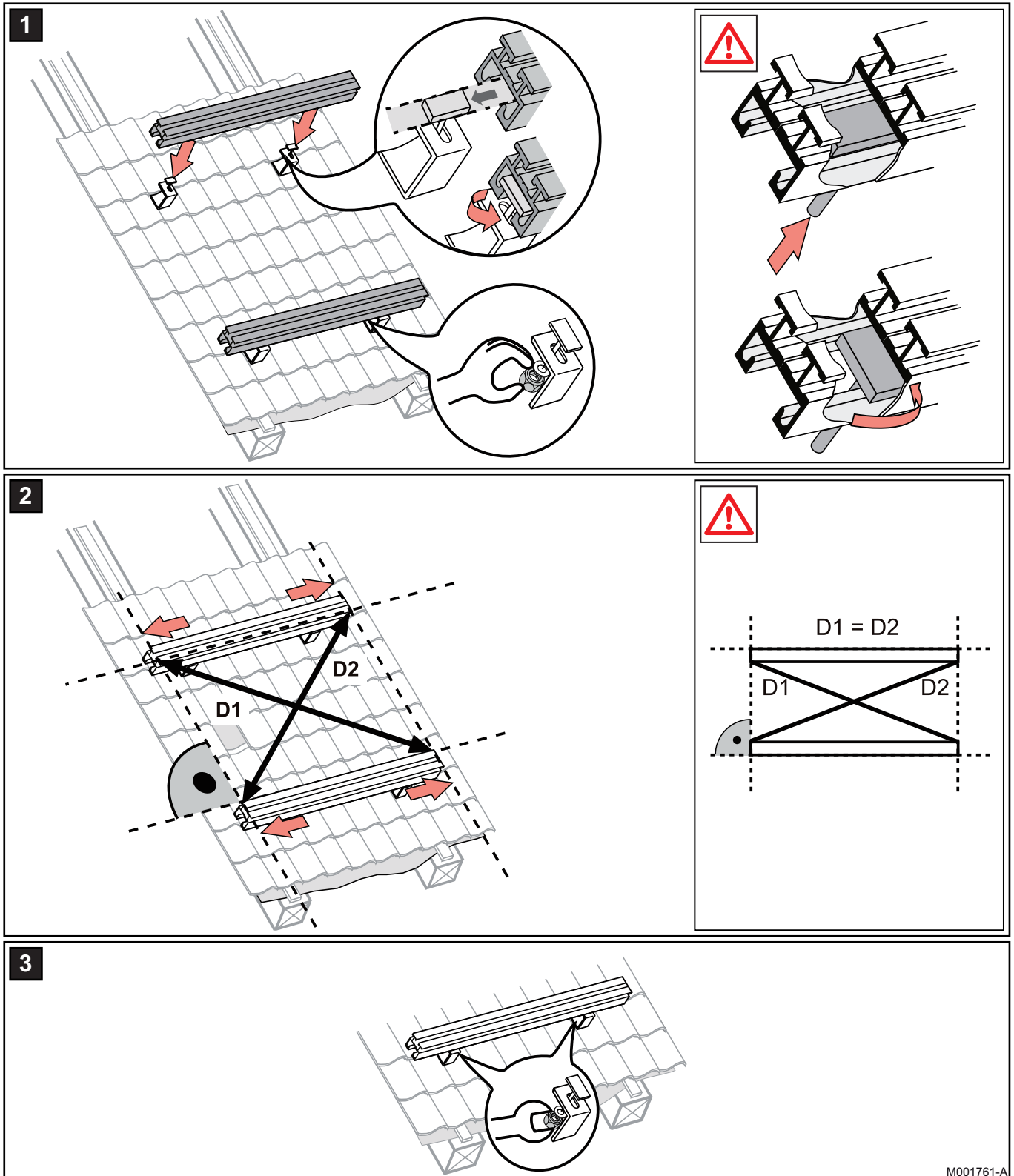
■ Fitting the hooks to the chevrons



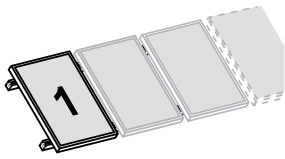
☞ Dimensions a - b, see chapter "Dimensions", page 18

4.5.5. Vertical assembly, juxtaposed

■ Fitting the rails

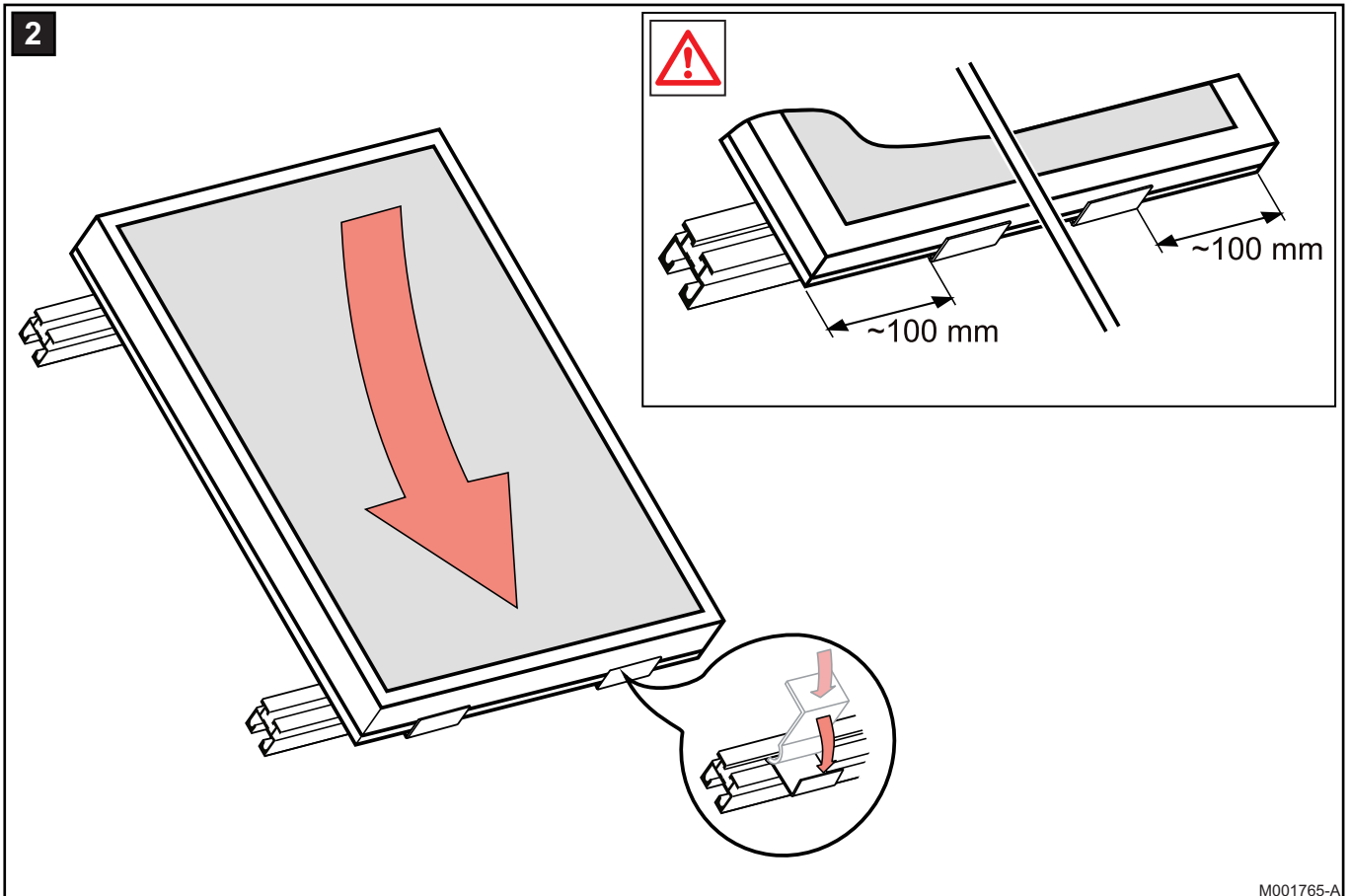
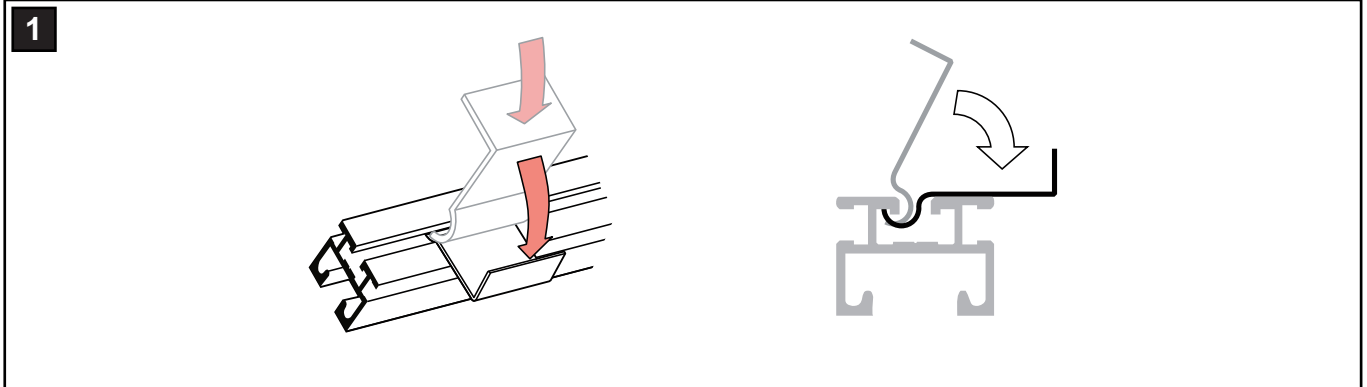


■ Installation of the first solar panel

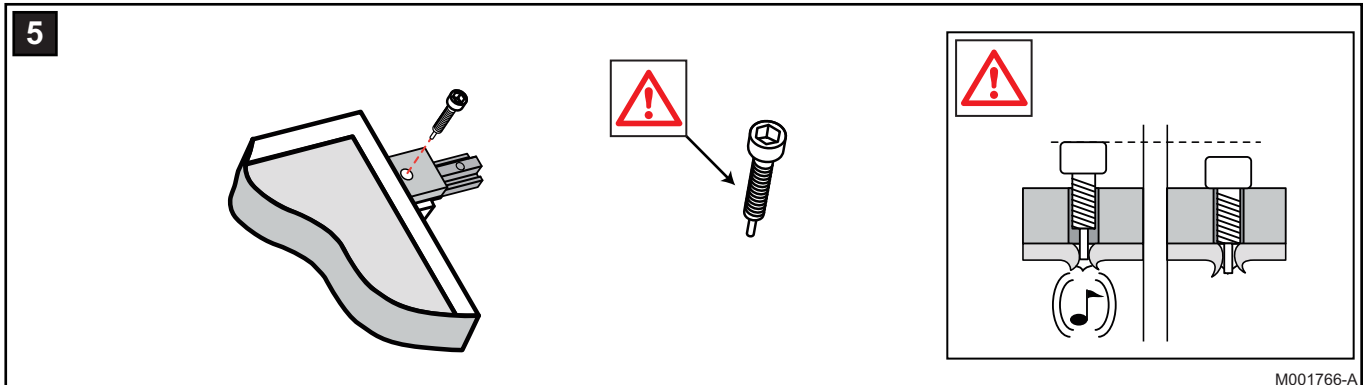
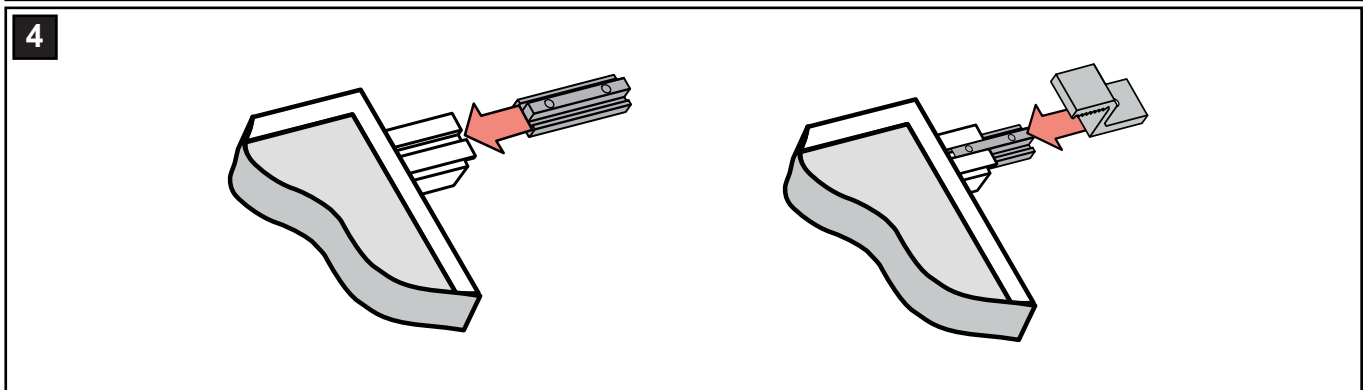
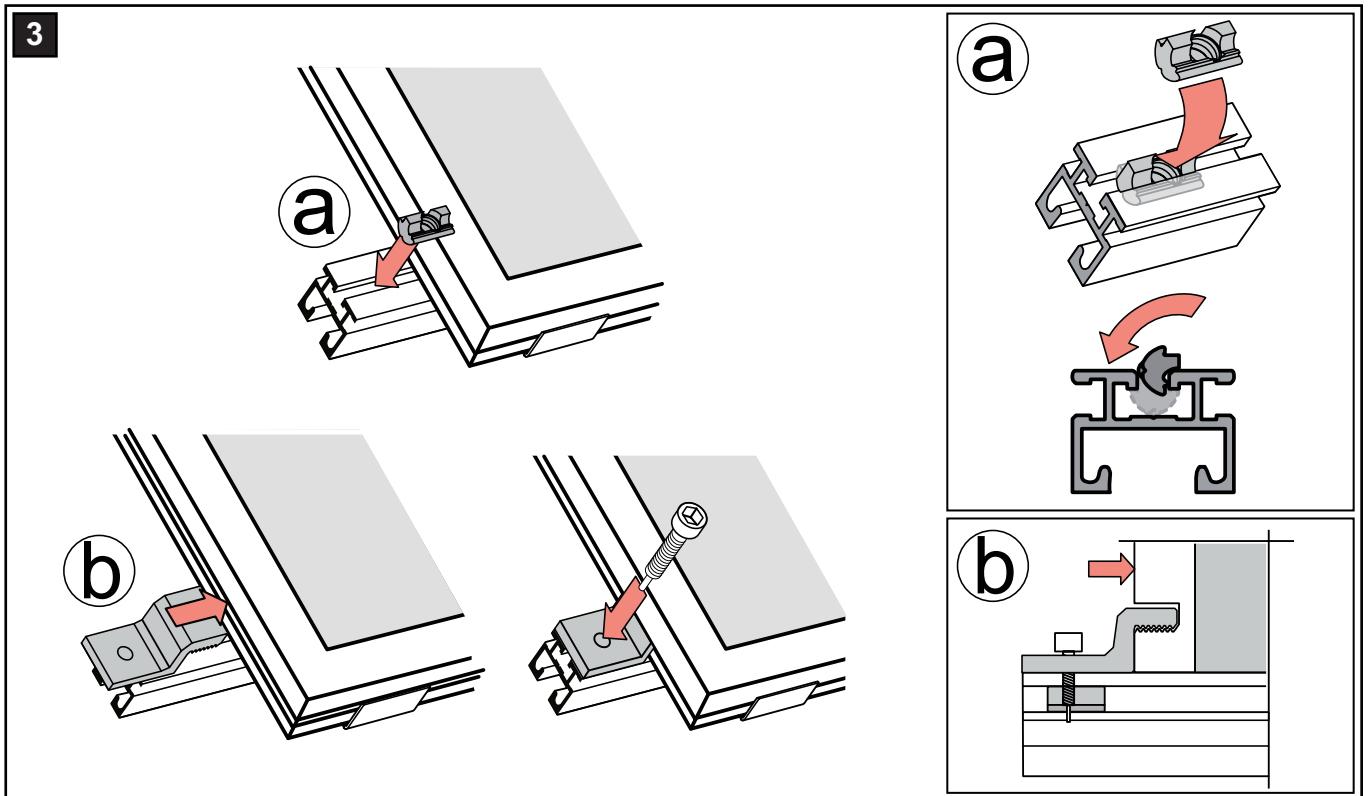


M001762-A

The solar panels should only be installed shortly before the solar-heating system is to be commissioned. This will minimise the time that the solar panels are exposed to heat while not filled with heat-transporting fluid.



M001765-A

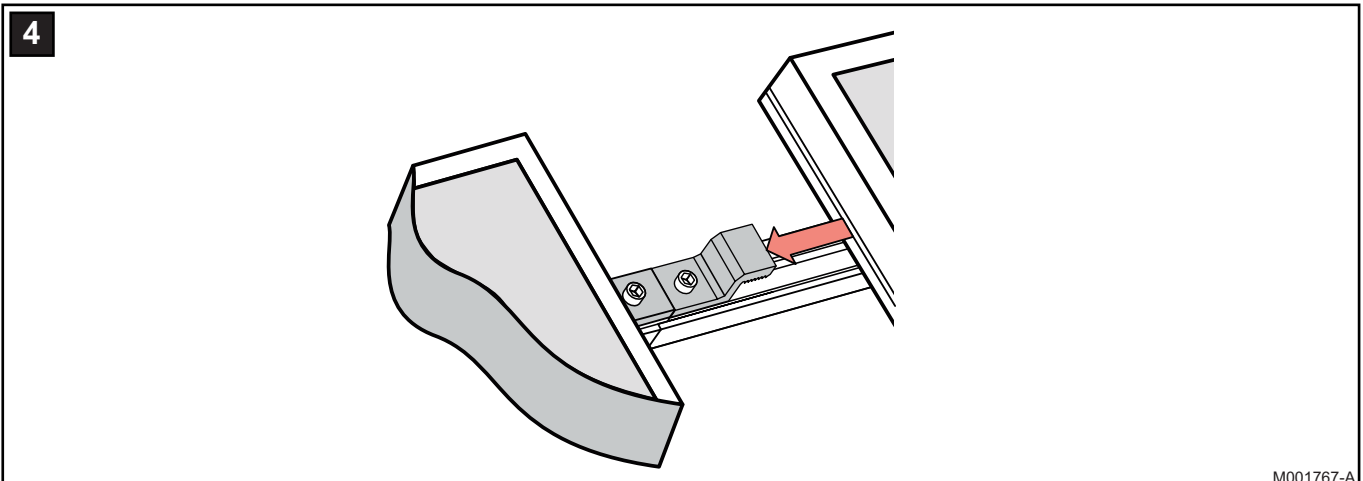
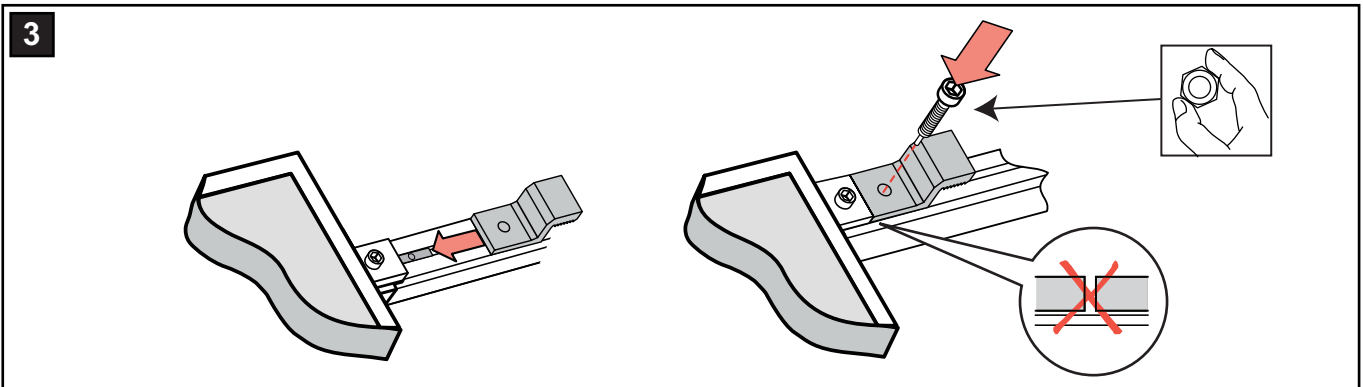
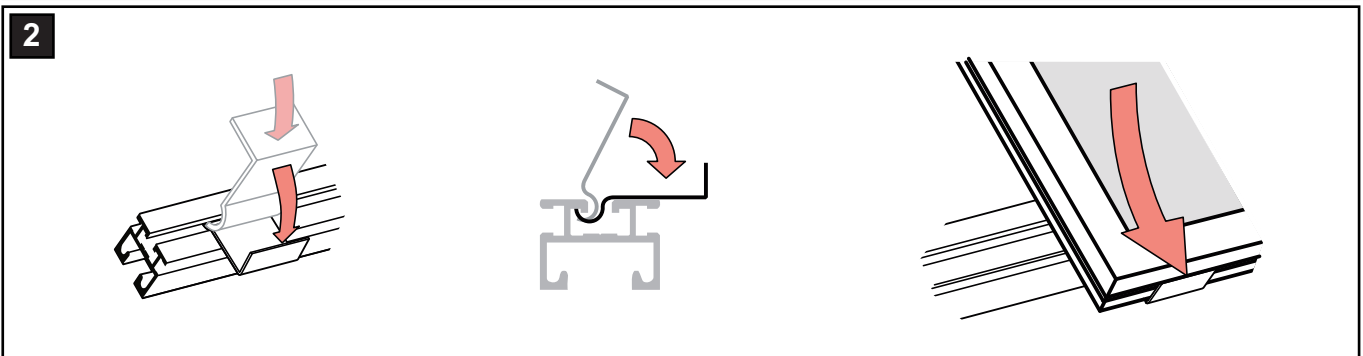
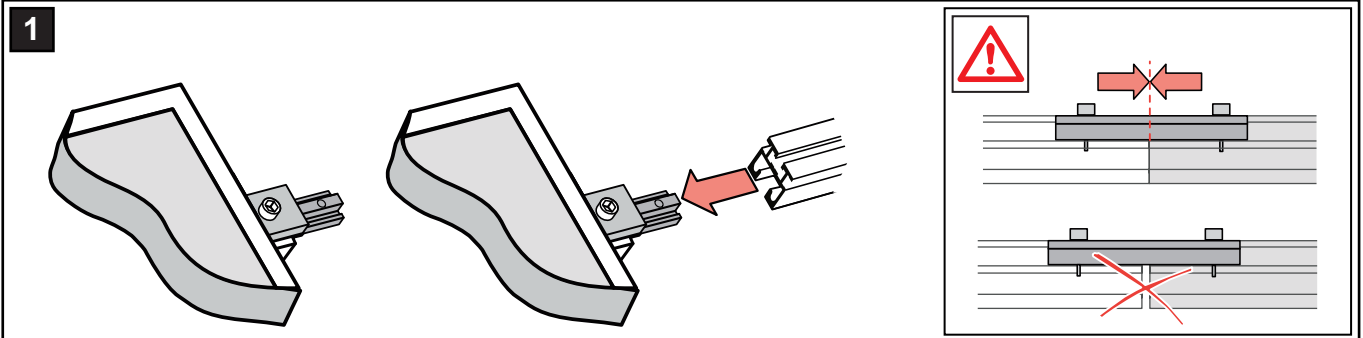


M001766-A

■ Installation of the other solar panels



M001763-A



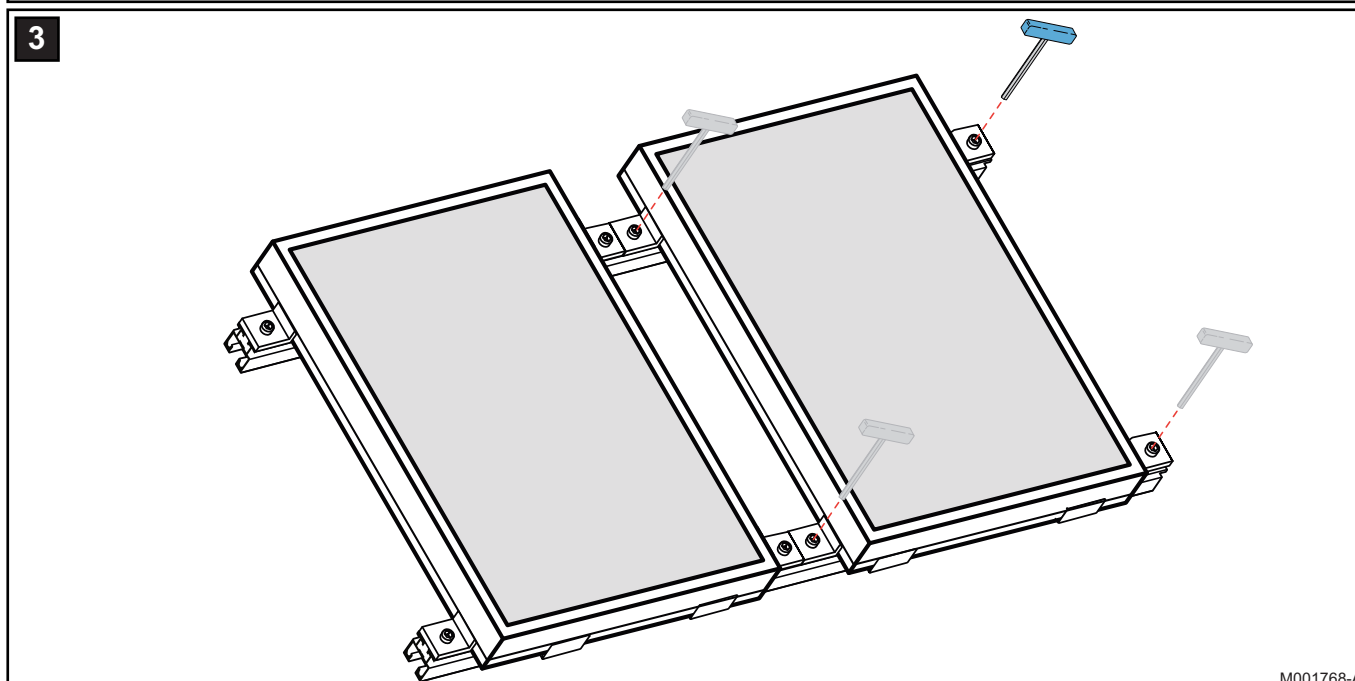
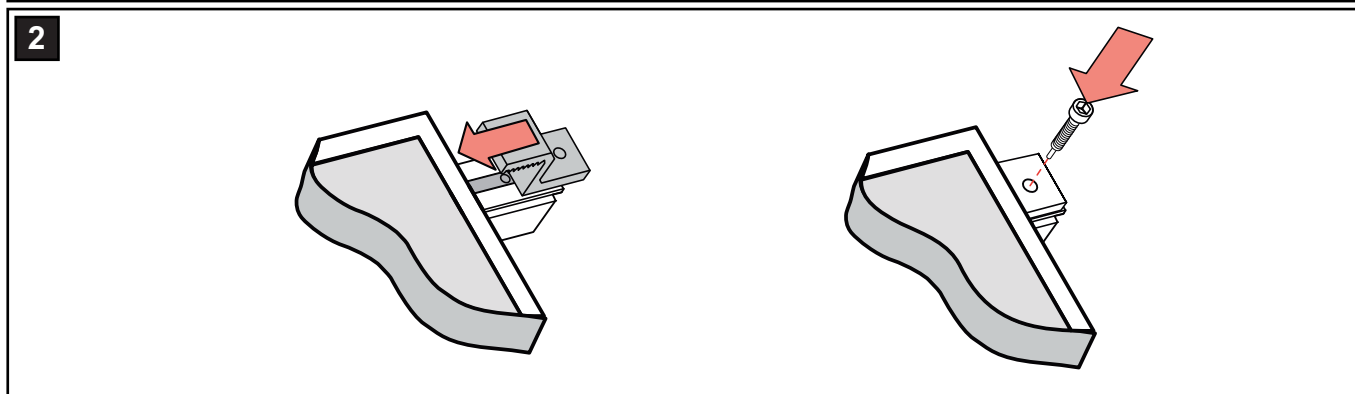
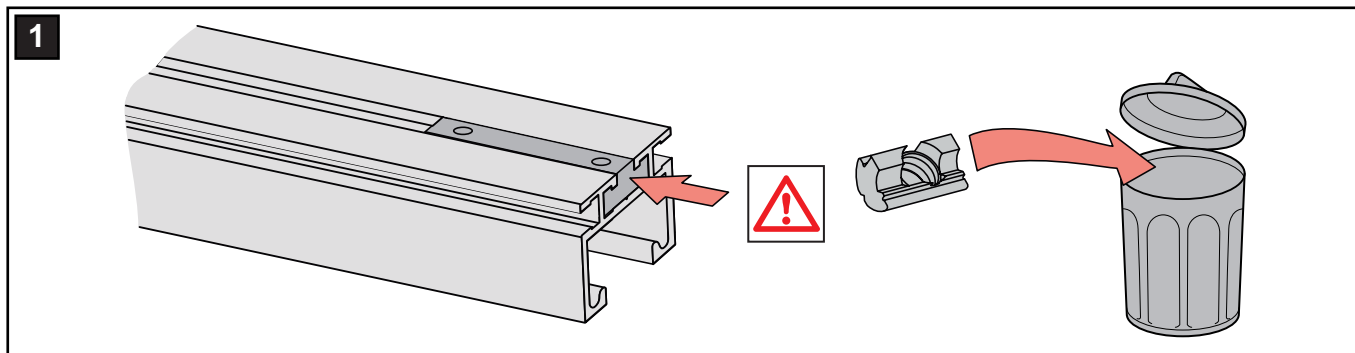
M001767-A

■ Installation of the last solar panel



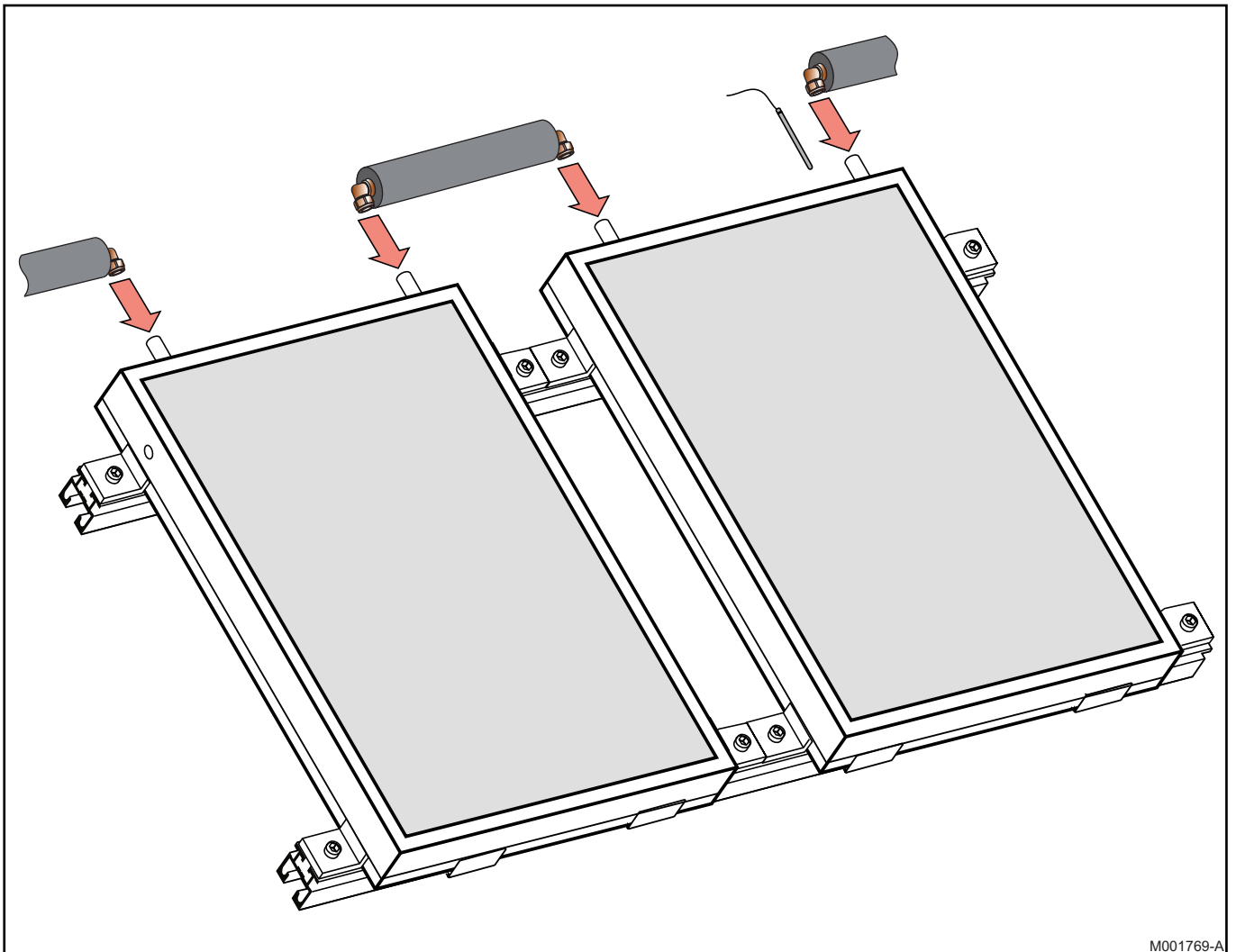
M001764-A

At the end of the bank of solar panels, insert a coupling rail and secure it in such a way as to align it with the edge of the roof anchor (or use a slide block).



M001768-A

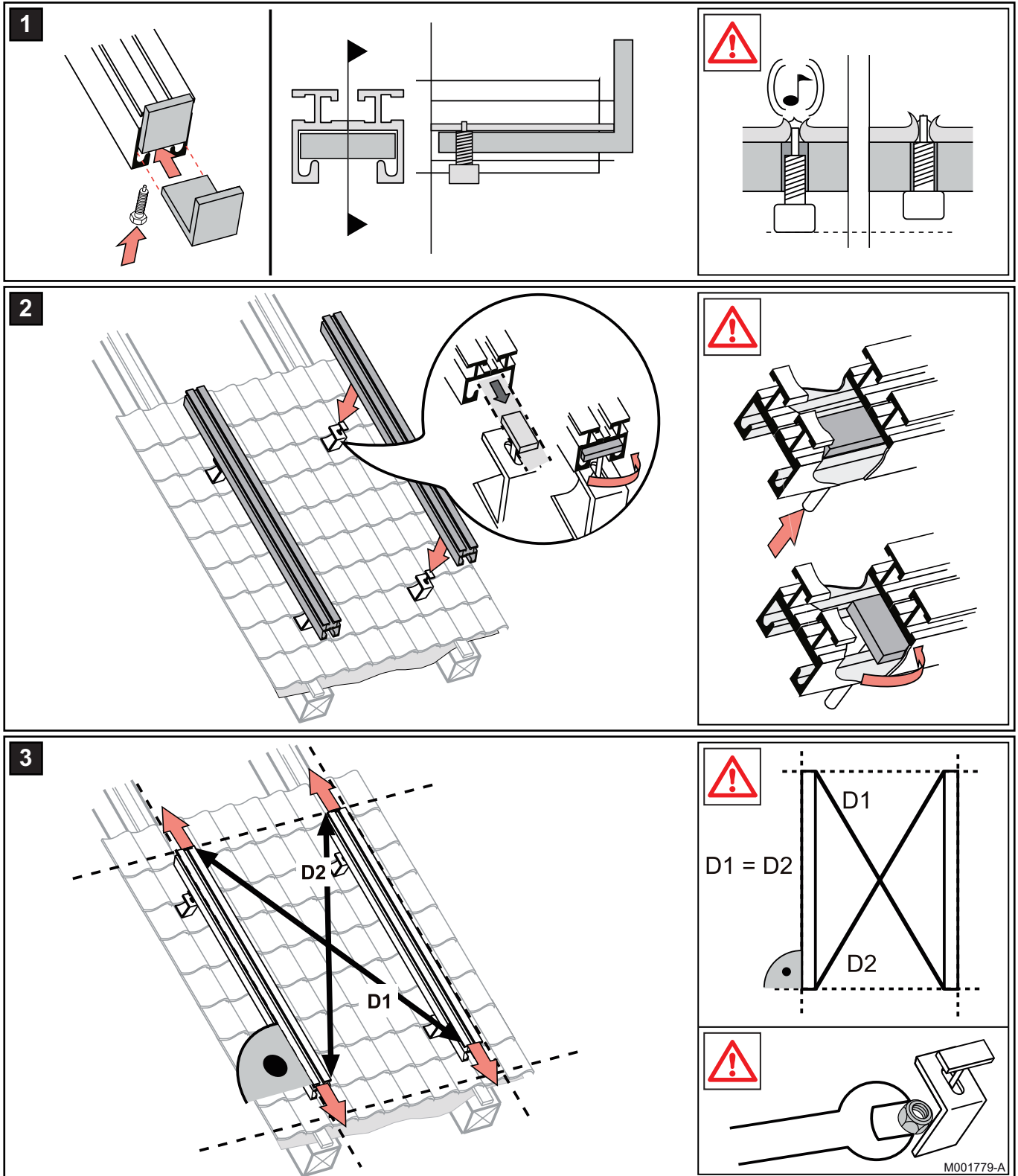
■ Solar Panel Connection



M001769-A

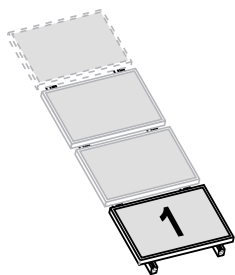
4.5.6. Horizontal assembly, superposed (only on roof)

■ Fitting the rails

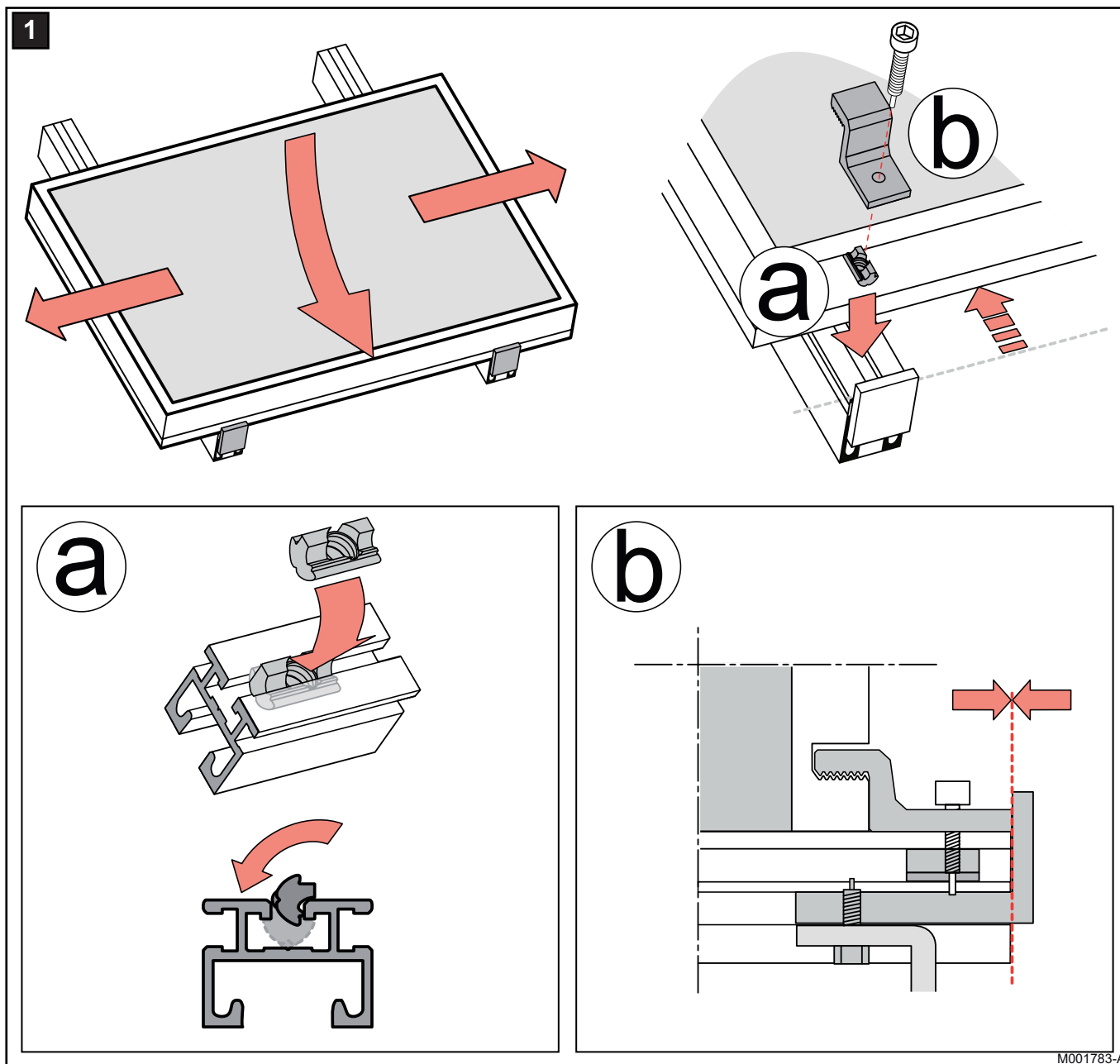


■ Installation of the first solar panel

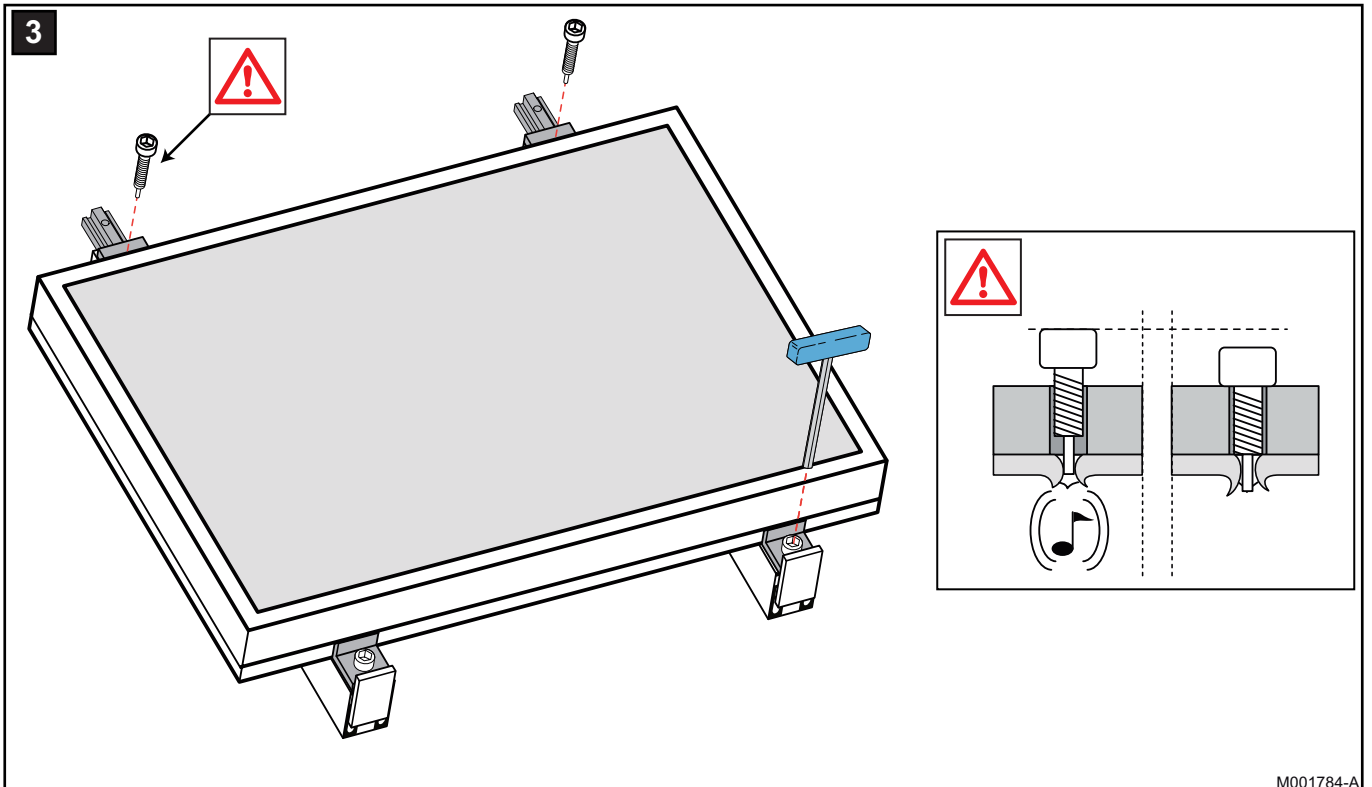
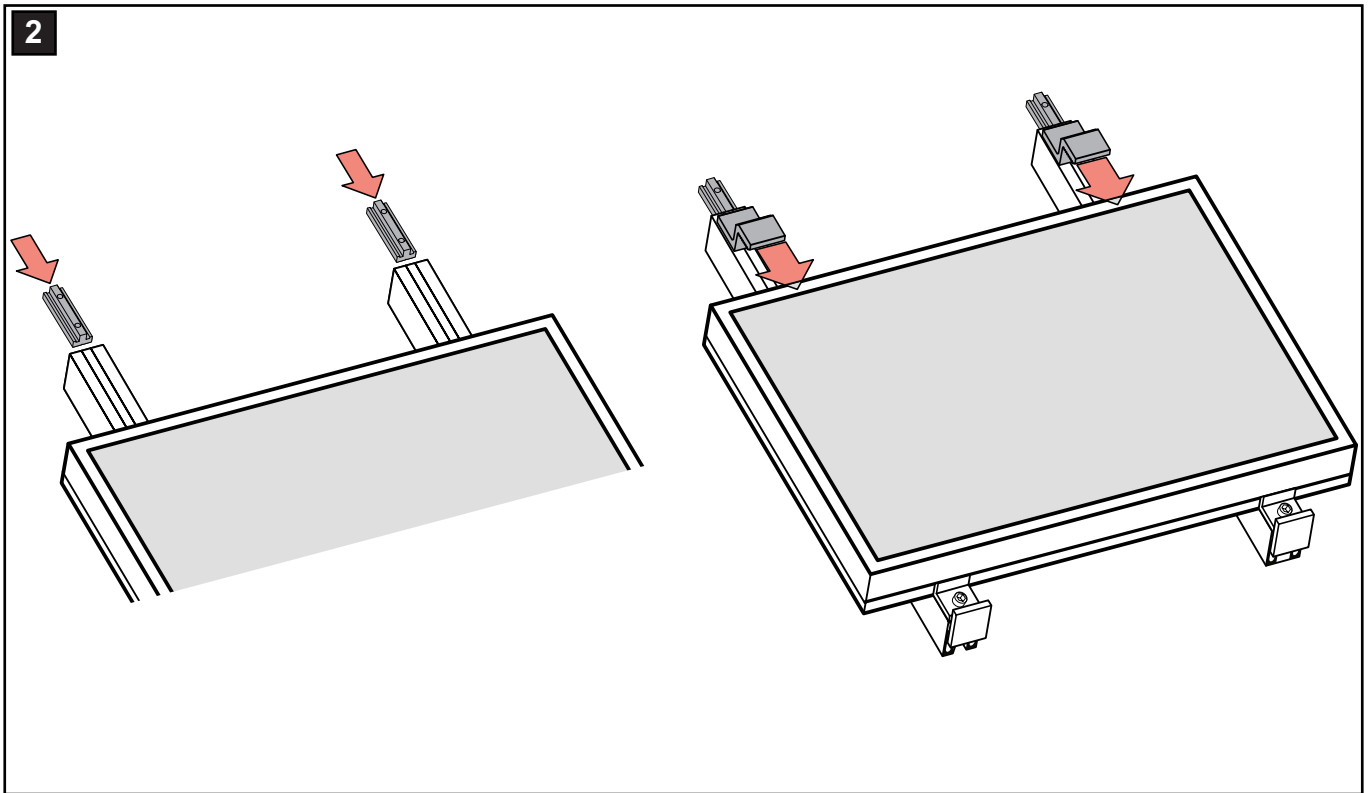
The solar panels should only be installed shortly before the solar-heating system is to be commissioned. This will minimise the time that the solar panels are exposed to heat while not filled with heat-transporting fluid.



M001780-A

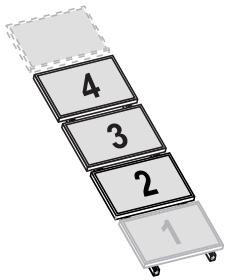


M001783-A

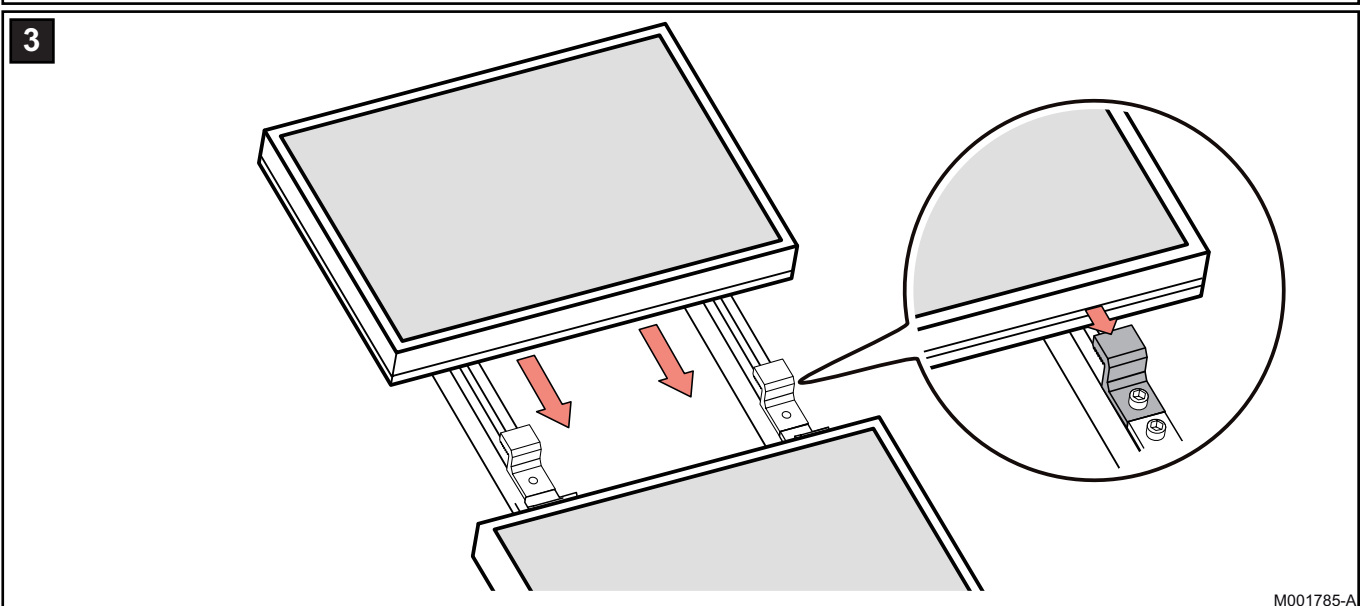
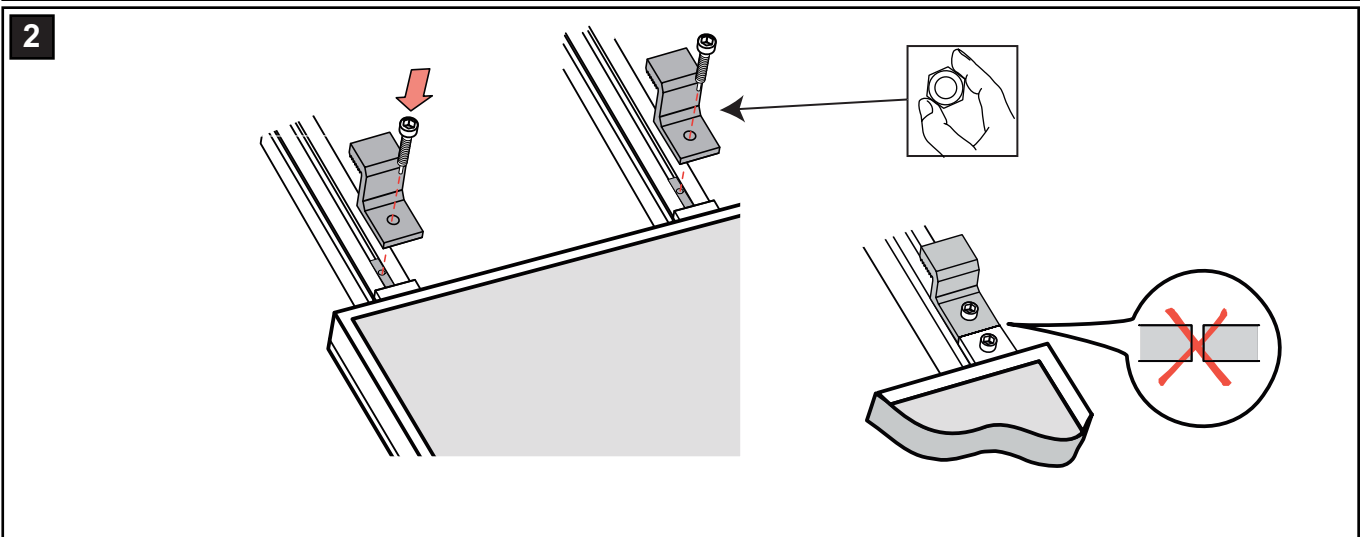
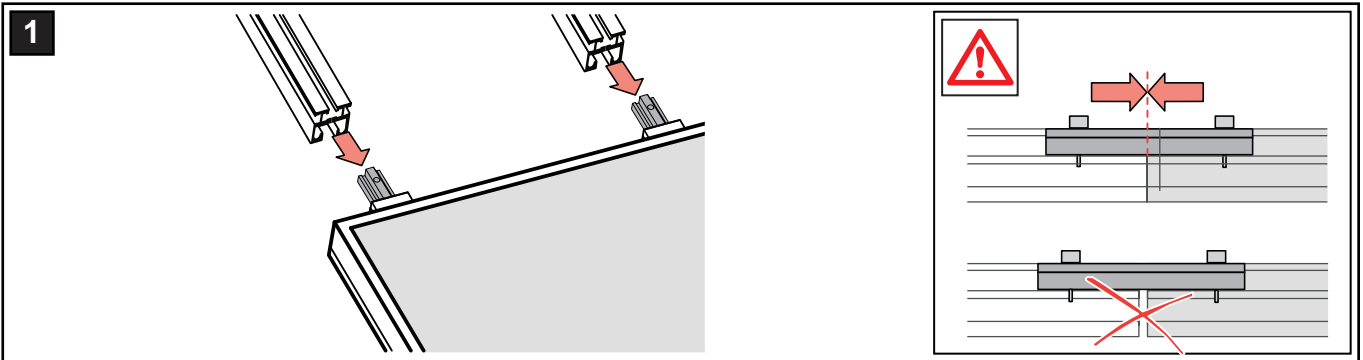


M001784-A

■ Installation of the other solar panels



M001781-A



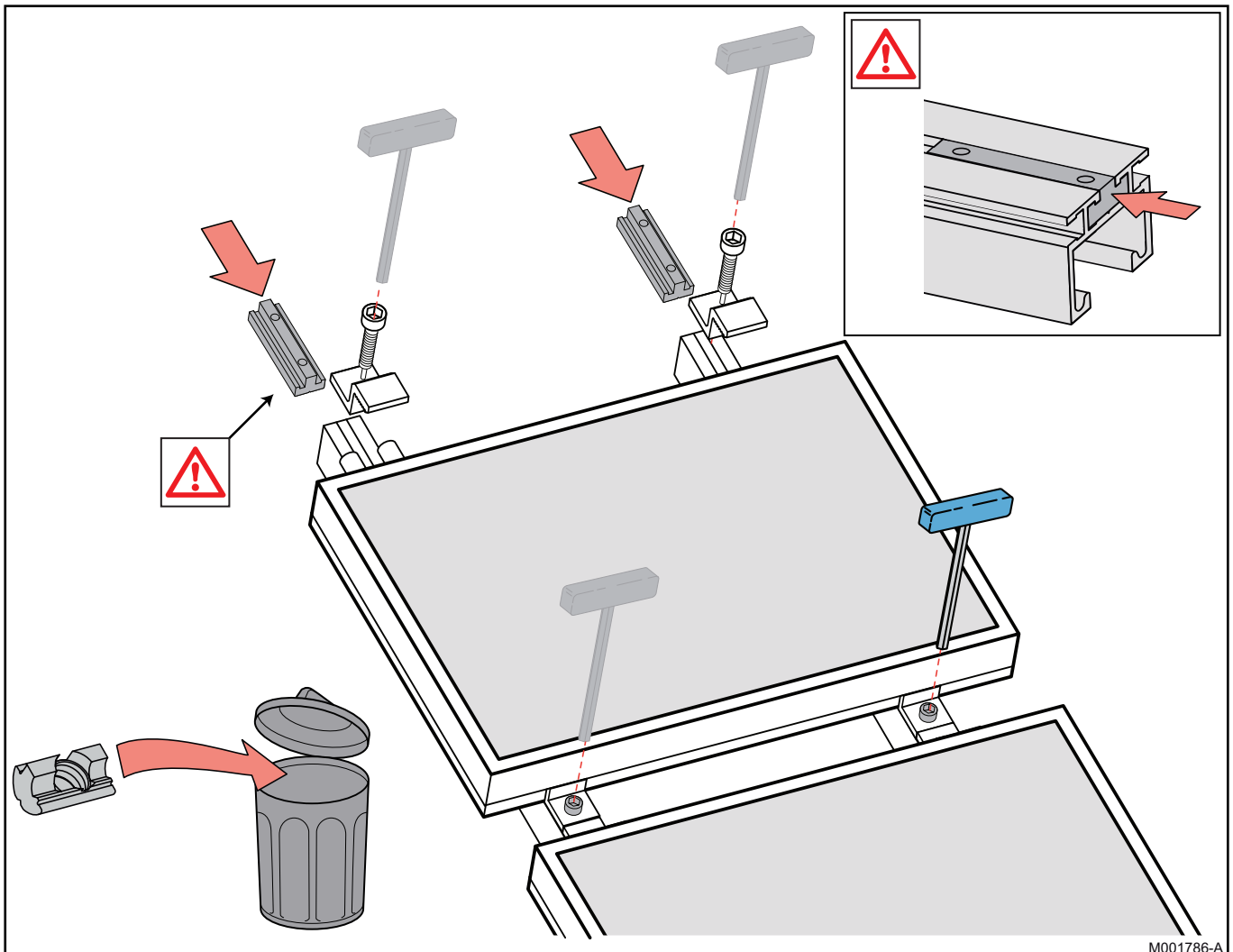
M001785-A

■ Installation of the last solar panel

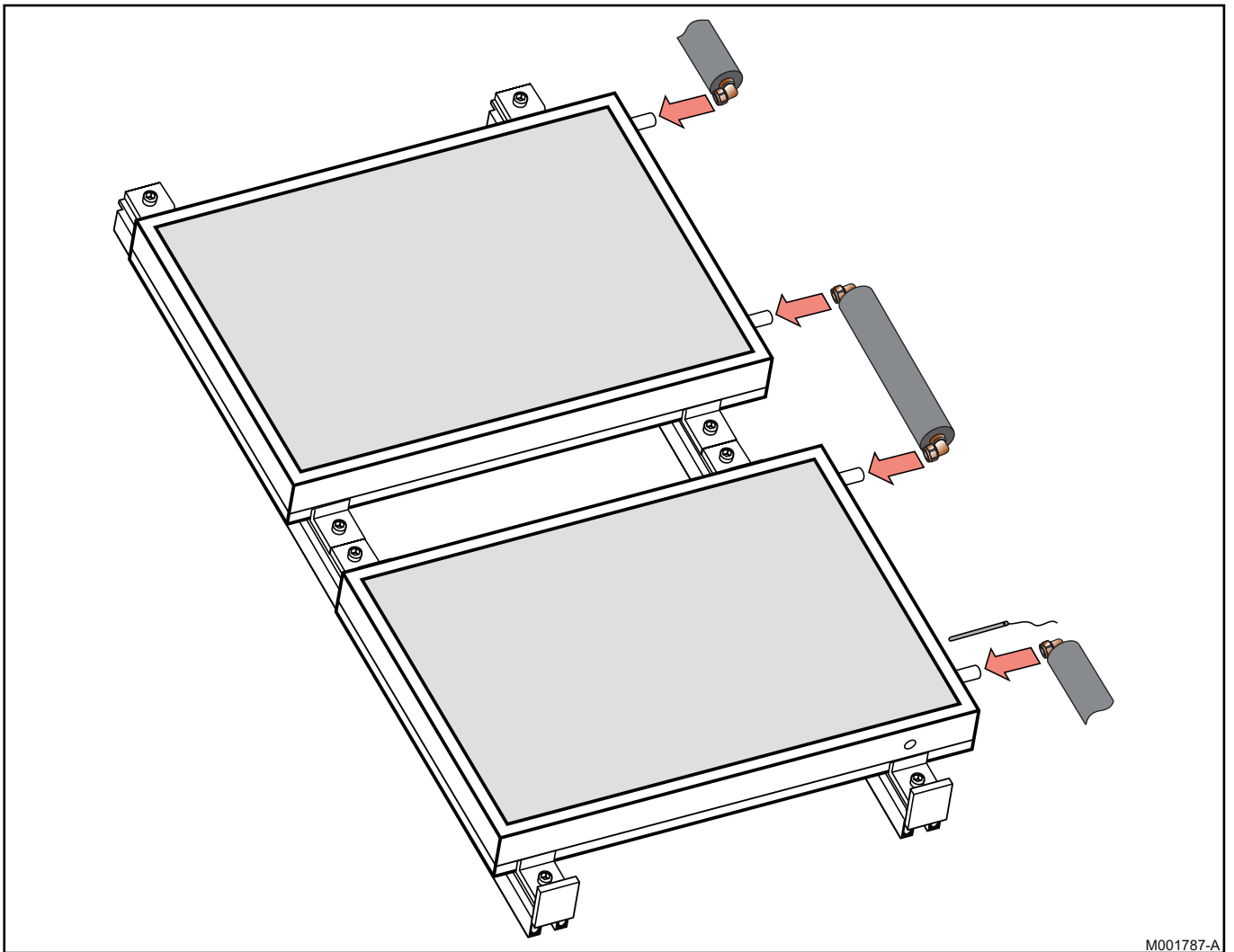
At the end of the bank of solar panels, insert a coupling rail and secure it in such a way as to align it with the edge of the roof anchor (or use a slide block).



M001782-A



■ Solar Panel Connection



M001787-A

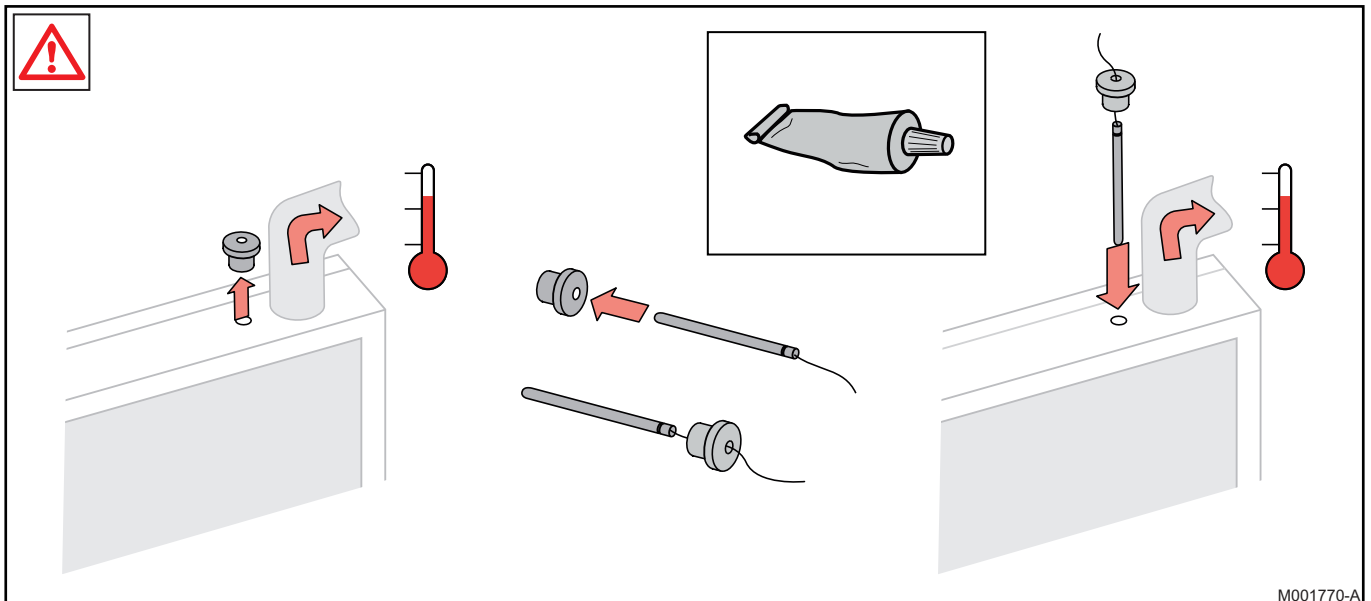
4.6 Solar collector temperature sensor



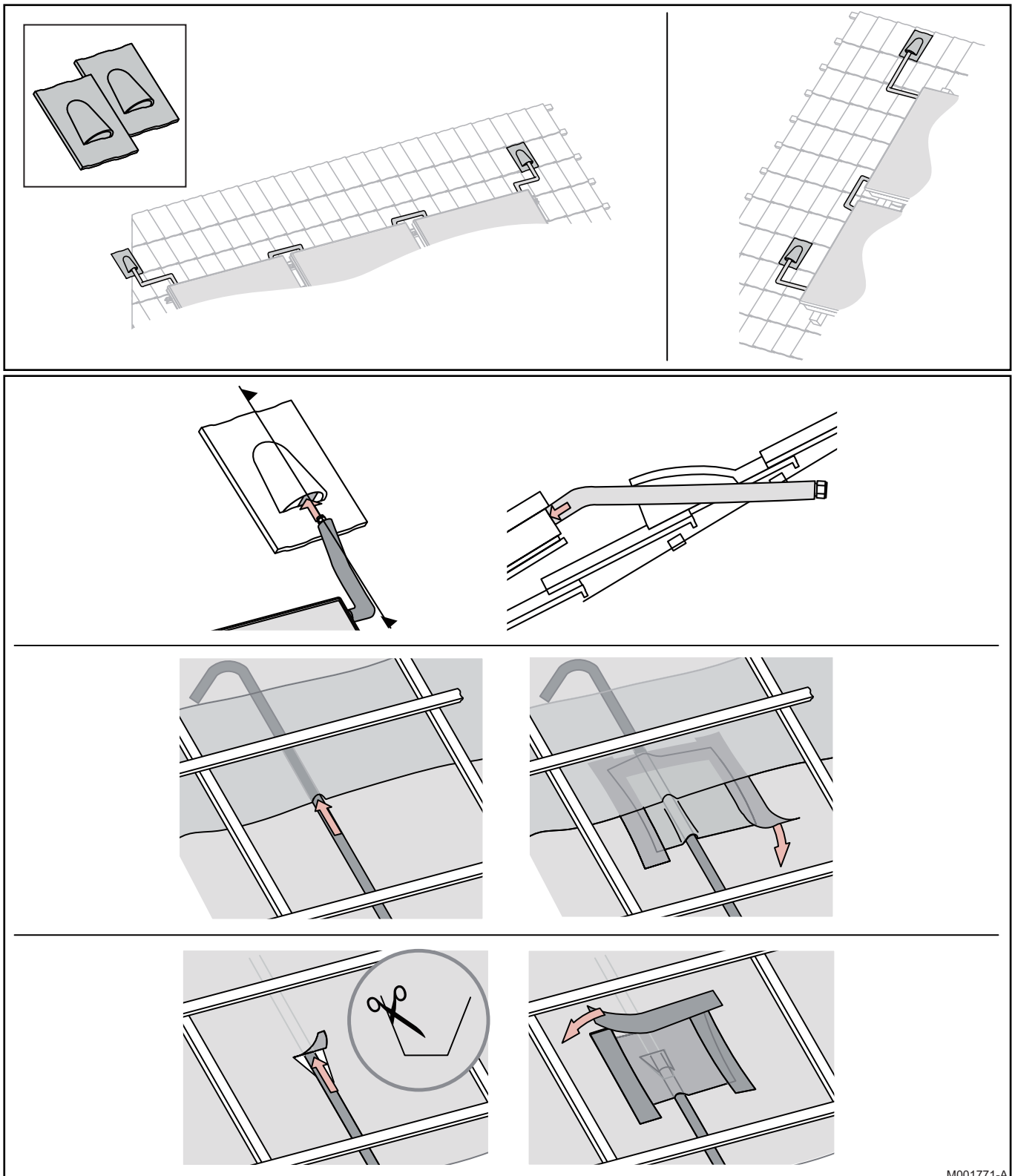
CAUTION

Install the temperature sensor in the sensor tube on the solar collector, at the flow end of the bank of collectors.

- The transfer of heat between the sensor socket and the temperature sensor can be improved by the use of heat-conducting paste.



4.7 Passing Pipes and Cable through the Roof



M001771-A

4.8 Hydraulic connections

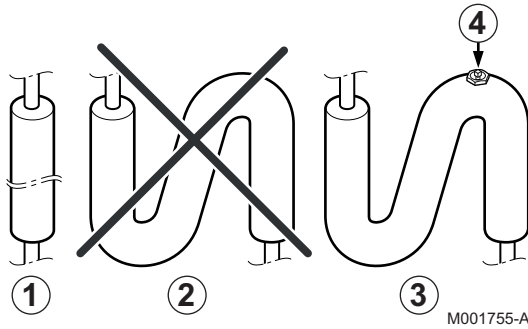
4.8.1. Connection dimensions

Number of panels	Size (mm)	Maximum length (Outlet + Return)
2	14-15	40 m
3	14-15	40 m
4	16-18	40 m
5	16-18	40 m

To be able to have pipework without degassers or bleed valves at high points, the solar fluid flow rate must not fall below 0,4 m/s during the degassing procedure.

The pipes must be as short as possible and always sloping downwards between the collectors and the connection to the solar tank.

If the installation criteria for good degassing cannot be met, a manual bleed degasser ④ must always be installed at the high point(s) of the solar equipment.



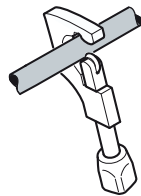
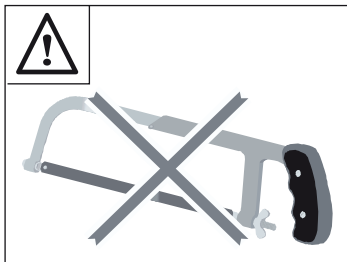
- ① Ideal
- ② Incorrect (high point with no air vent)
- ③ Correct (high point with air vent)
- ④ Location of manual bleed valve degasser

4.8.2. Connecting



CAUTION

Soft soldering are not authorized.
The use of flux promotes corrosion conditions in systems operating with propylene glycol as heat transfer fluid. In all cases the inside of the pipes must be flushed.



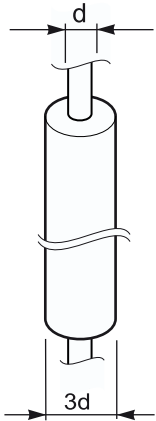
- ▶ Use of a hacksaw is prohibited.
- ▶ Pipe connections by compression unions.
- ▶ Hard soldering: Hard soldering: hard soldering filler metal without flux in accordance with DIN EN 1044, e.g. L-Ag2P or L-CuP6.
- ▶ Pipe unions: can only be used if they are resistant to glycol, pressure (6 bar) depending on version) and temperature (-30 °C, 180 °C) (manufacturer's data).
- ▶ Sealing material: Hemp.
- ▶ Press fitting (6 bar, 140 °C).

4.8.3. Pipe insulation



CAUTION

To protect the insulation against mechanical damage, bird pecking and UV light, add extra protection for the heat insulation sleeves in the roof area by using an aluminium sheet sleeve or aluminium adhesive tape. This additional protection must be sealed with silicone.



M001704-A

- ▶ Prefabricated for "Duo-Tube" (Option).
If different copper pipes are used, the insulation must be:
 - Resistant to constant temperatures up to 150 °C in the collector zone and the hot outlet and also down to -30 °C.
 - Insulation preferably waterproof and continuous.
 - with a thickness equal to the tube diameter and with a K coefficient of 0.04 W/mK.



50 % reduction of the insulation is permitted when passing through the roof and walls.

- ▶ Recommended materials for temperatures up to 150_°C:
 - Duo-Tube De Dietrich
 - De Dietrich DuoFlex
 - Armaflex HT
 - mineral wool
 - glass fibre

4.9 Filling the system



CAUTION

- ▶ Do not fill / rinse a hot solar collector. Risk of being burnt.
- ▶ Before the filling of the installation, to check the preload of the expansion vessel according to the static height (**Preload** = static Height/10 + 0.3 bar).
- ▶ check the connection to the series of collectors and the collector sensor connection.
- ▶ Since propylene glycol leaks much more easily than water, check all connections and gaskets for leaks after a few hours of operation at working pressure.

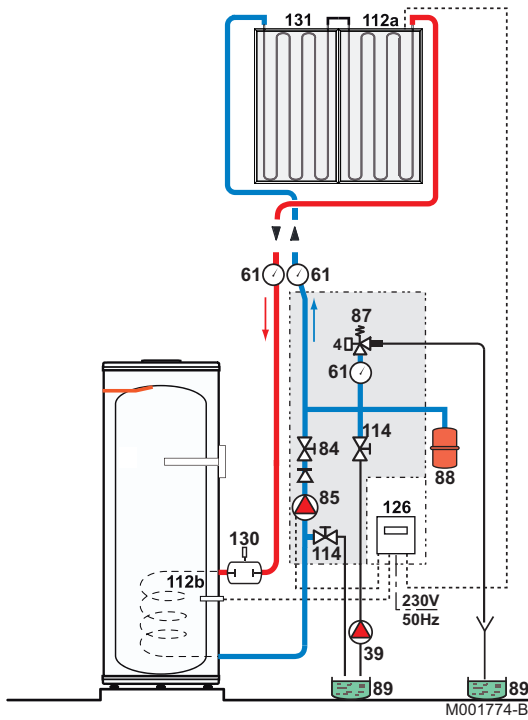
Following installation of the solar panels and hydraulic connection of the panels and piping, the system can undergo pressure tests and be filled. When doing so, the thermal conditions and the particular features of the installation must be taken into account. For that reason, the system may only be filled, commissioned and maintained by a **suitably authorised technician**.

Bring the pressure in the primary solar circuit up to the 2 bar working pressure by topping up if necessary with heat transfer fluid.

To prevent damage to the collectors and their connections by frost and corrosion, it is essential that a high quality heat transporting fluid be used to fill the solar installation. If the recommended ready-mixed fluid is used (Tyfocor L / LS) the system will be adequately protected at temperatures down to approx. -24 °C.

To prevent any damage of the system, **pressure tests** should only be carried out with the **heat-transporting fluid** used later on.

- ▶ Testing pressure: 4 bar
- ▶ Test time: **minimum 1 hour**



- 4** Pressure gauge
- 39** Filling pump
- 61** Thermometer
- 84** Stop valve with lockable nonreturn valve
- 85** Primary solar circuit pump
- 87** Sealed safety valve calibrated at 6 bar
- 88** Solar expansion vessel
- 89** Heat transfer fluid container
- 112b** Domestic hot water sensor
- 114** Primary solar circuit filling and draining device (Δ propylene glycol)
- 126** Solar regulator
- 130** Manual bleed degasser
- 131** Array of collectors
- 132** Solar station complete with DIEMASOL solar regulation

5 Commissioning

5.1 Check points before commissioning

- ▶ Check the solar collectors and their fastenings.
- ▶ Fill the installation with water and check hydraulic tightness.
- ▶ Check the pressure of the installation.
- ▶ Check the electrical connections, particularly the earth.
- ▶ Check that the sensors are correctly positioned.
- ▶ Check that the sensors are operating correctly.
- ▶ Check and ensure that the sensor and 230 V cables are separated.

5.2 Commissioning

Regarding the start-up of the solar circuit, refer to the respective instructions for the solar DHW tank or the control system.

6 Checking and maintenance

6.1 General instructions



CAUTION

- ▶ Maintenance operations must be done by a qualified professional.
- ▶ An annual inspection is compulsory.
- ▶ Only original spare parts must be used.
- ▶ Protection of the environment: Place a container of sufficient volume under the drain pipe and the valve discharge pipe.

- ▶ Check the solar collectors and their fastenings.
- ▶ Check that the hydraulic connections are leak tight.
- ▶ The hydraulic pressure must be a minimum of 2 bars
- ▶ Check that the sensors are operating correctly.
- ▶ Check the safety devices (particularly the valve or safety unit), referring to the instructions provided with these components.
- ▶ Check the antifreeze power of the heat transporting fluid (Minimum -20 °C).
- ▶ Check the pH of the heat transporting fluid; it should be between 7 and 8.
- ▶ Clean the surface of the solar collectors using a soft, damp cloth.
- ▶ Check that the gaskets and connections are in good condition.
- ▶ Check that the insulation is in good condition (no mechanical deterioration or damage caused by the pecking of birds or UV).

7 Warranty

7.1 General

You have just purchased one of our appliances and we thank you for the trust you have placed in our products.

Please note that your appliance will provide good service for a longer period of time if it is regularly checked and maintained.

Your fitter and our customer support network are at your disposal at all times.

7.2 Warranty terms

Starting from the purchase date shown on the original fitter's invoice, your appliance has a contractual guarantee against any manufacturing defect.

.

.

The warranty shall not apply to the replacement or repair of parts damaged by normal wear and tear, negligence, repairs by unqualified parties, faulty or insufficient monitoring and maintenance, faulty power supply or the use of unsuitable fuel.

Sub-assemblies such as motors, pumps, electric valves etc. are guaranteed only if they have never been dismantled.

The legislation laid down by european directive 99/44/EEC, transposed by legislative decree No. 24 of 2 February 2002 published in O.J. No. 57 of 8 March 2002, continues to apply.

© Copyright

All technical and technological information contained in these technical instructions, as well as any drawings and technical descriptions supplied, remain our property and shall not be multiplied without our prior consent in writing.

05/10/09



300020210-001-B

DE DIETRICH THERMIQUE
57, rue de la Gare - BP 30
F- 67580 MERTZWILLER
www.dedietrich-heating.com