Photovoltaic flat roof installation system for east-west orientation

Installation instructions | Status ~~04~~/2025

INSTALLATION INSTRUCTIONS
iFIX EAST-WEST
VERSION 2022 (VERSION 2021)

The smart mounting system
for photovoltaic installations

voestalpine Automotive Components Schwäbisch Gmünd
www.voestalpine.com/iFIX

voestalpine
ONE STEP AHEAD.

CONTENTS

iFIX EW INSTALLATION UNIT

SPECIAL FEATURES OF THE iFIX EW

» Unique one click connection eliminates the need for tools to connect the rows

» Fixation points to lay concealed wiring beneath the PV modules

» Uniform middle clamps and suitable end clamps with pre-fixed Allen screws for all PV module frame heights

» Suitable building protection mats can be attached to the steel sheet

» No thermal separation between the rows necessary

» Large contact area allows use even on soft roof insulation material

IMPORTANT PLANNING INFORMATION

» iFIX EW can currently be used for buildings with closed facades. Other buildings must be examined individually.

» iFIX EW is suitable for installation on all standard flat roofs with a roof pitch of 0 to 3° which are free of standing water. Up to 5° with special construc- tion modifications.

» Permissible roofing material: Bitumen, plastic sheeting, gravel, green roofs (metal sheets and others must be indi- vidually inspected)

» Building heights of up to 25 m

» Fields of application:
Max. pressure load of 3.8 kN/m^2**
With Alpin supports max. pressure load of 5.4 kN/m^2**
Wind load zones 1 to 3, environmental conditions up to C3

Max. peak velocity pressure up to 1,400 N/m^2

» Minimum distance between main iFIX EW steel sheet and roof edge must be 0.50 m.

» The PV modules should be installed on the roof in blocks of 4 units, i.e., 2 double rows, each with 2 PV modules. Where roof structures disrupt the layout, it is also permis- sible to occasionally have fewer PV modules side by side.

» Calculating the necessary number of iFIX EW installation units per row: number of PV modules +1

» Calculating the row length (north-south): Row length (larg- est PV module length + 20 mm) x number of PV modules in the row + 380 mm

» Calculating the length of the array (east-west):
1,210 mm (1,185 mm)* x number of rows + 20 mm

» Field separation due to thermal length changes : After a maximum of 15 m in the row (north-south direction), the array must be separated.
This should be at least 0.5 and max. 1.3 m between the PV module ends. If the distance is greater, separate fields must be assumed in the ballast calculation.
Field separation between rows (east-west direction) is required after max. 30 m. When using equipotential bonding or lightning protection accessories, regular visual inspections for thermally induced displacements must also be carried out. The scope of maintenance depends on the observed displacement:
With unchanged or only slight displacement up to 1 cm, an annual check is sufficient. Up to approx. 2 cm, a specific check during the next inspection is advisable. In the case of a displacement of 2-3 cm, an intermediate inspection is required after six months. If this reveals further movement of ≥ 1.5 cm, the system must be mechanically secured.

Note: Insufficient securing or lack of maintenance can lead to damage to the roof cladding, pipes and structural connections. No liability is accepted for any resulting consequential damage.

Suitable PV module sizes:
Minimum: 1,640 x 990 mm
Maximum: 2,100 x 1,145 mm (x 1,135 mm)*
Frame height: 30-40 mm
The PV module dimensions may not exceed a sur- face area of 2.17 m^2 and a width of 1,145 mm.

» The compatibility of the roofing material and the iFIX EW steel sheet should be examined to ensure the long-term protection of the roof (see installation guidelines). Building protection mats can also be attached to the underside of the iFIX EW steel sheet.

» During planning, it should be determined whether the roof insulation material can bear the additional pressure resulting from the weight of the PV installation, the bal- last, and pressure loads. A contact area of 0.28 m^2 should be calculated for each PV module and iFIX EW steel sheet. For version 2022, iFIX EW steel sheets are available with pre-mounted building protection mats (contact area 0.084 m^2).

» Overbuilding the ridge is only permitted when the mod- ules interlock along the crease line.

» Modules must not be installed over depressions in the roof surface. Here, there must be a gap.

» The system must be secured against lifting and shifting, respective of building location, wind and snow loads, as well as building height. Weights to hold the installation in place must be positioned in areas determined in the ballast plan developed by a system provider for that installation.

» The ballasting values calculated from the "iFIX-Tool" soft- ware are always made up of the weight of the substruc- ture, the stones, the modules and wind pressure. Added to this is the mutual composite effect that only exists in the assembled state. In the semi-finished state, the in- staller must adequately secure the system against lifting by wind, taking into account the local weather condi- tions.

» Always ensure the modules are correctly interlocked.

» If it is necessary to disassemble the system, we recom- mend following the procedure described in our disas- sembly video.

» Further accessories can be supplied as required.

* Version 2021
** depending on module surface area

GENERAL INSTALLATION AND SAFETY GUIDELINES

STATICS

Prior to installation, the customer must check whether the building and roof are able to withstand the additional static requirements of the iFIX EW systems with respect to horizontal and vertical loads. The requirements for the Eurocode 3 (DIN EN 1993) standard must be met. The ballast for placement on the roof is specified in the ballast plan drawn up by the system provider. The ballast plan may only be developed by trained personnel. For calculating the ballast a program is available which is based on a wind load certificate and the system statics. It is provided by a state-approved structural engineer.

Where the mounting system for a PV installation has been planned by the customers themselves, the assembly and layout as well as the structural stability must meet the following standards:
EN 1991-1-3 snow loads (Eurocode 1)
EN 1991-1-4 wind loads (Eurocode 1)

The calculations must be executed according to the standards of current structural engineering practice.

Furthermore, the adherence to national and local construction regulations, standards and environmental regulations must be guaranteed.

SAFETY

Occupational safety and accident prevention regulations, as well as the relevant standards and regulations of the employers' liability insurance association, must be complied with.

These are:

BGV A1	General accident prevention regulations
BGV A3	Electrical systems and equipment
BGV C22	Accident prevention regulations – construction work
DIN 18338	Roofing work
DIN 18451	Scaffolding work

The following should be noted in particular:

- Safety clothing must be worn (in particular a protective helmet, safety boots, and gloves)
- Regulations on working on roofs must be observed during roof work (e.g., the use of: fall protection, equipment with fall arresting device for eaves at heights of over 3 m, etc.)
- Two persons must be present during the entire process of installation to ensure that help can be provided quickly in the event of an accident.
- Any necessary work to the roof itself must be undertaken by a roofing contractor.
- AC/DC cabling must be laid by an electrician. Here the following must be taken into account:
  DIN VDE 0100 Part 712 – Installation of low voltage systems.

INSTALLATION

PV systems may only be installed and commissioned by persons whose professional competence (e.g., training or work) or experience guarantees that the installation will be carried out properly.

At least one copy of the installation instructions must be present at the construction site and referred to during the entire installation period.

iFIX EW is being constantly developed. Consequently, steps in the installation process may change. Therefore, please refer to the most recent version of the installation instructions.

The latest documents are available at
www.voestalpine.com/iFIX

Prior to installing the PV system, it should be confirmed that the roof is waterproofed according to DIN 18531 standards. The compatibility of the roof surface with iFIX EW must be checked in order to avoid long-term damage. No protection mat is needed under iFIX EW steel sheets on gravel roofs where the iFIX EW steel sheet is installed directly on

the gravel. iFIX EW steel sheets fitted with building protection mats should be used on roofs waterproofed with bitumen. iFIX EW steel sheets with aluminium-laminated protection mats must be used on roofs covered with plastic sheeting to prevent embrittlement of the roofing material. The sheeting manufacturer must confirm that the sheeting is compatible with the protection mat. Fleece matting may not be used as underlay and constitutes a danger! Localized depressions in the roofing material which lead to puddle formation must be leveled by laying material compatible with the roofing material in order to create a flat surface.

Where iFIX EW steel sheets are freshly cut at the installation site, care must be taken that this does not impair their stability, and that sharp corners and edges on the cut edges cannot injure persons or the roofing material.

It must be adhered to the PV module manufacturer's installation instructions, so that the PV module clamps are only applied in the areas authorized by the PV module manufacturer.

Cables must be laid in a way that no cable loops are formed under the PV modules.

The following standards must also be complied with:

VDS 2023	Electrical systems in building structures with predominantly combustible materials – guidelines on damage prevention
DIN 4102	Fire behavior of building materials and parts
DIN 1860	Drainage systems for buildings and property

voestalpine Automotive Components Schwäbisch Gmünd GmbH & Co. KG is exempt from liability where our installation instructions and safety guidelines have been ignored, or where parts made by competitors have been added or installed.

The system is de-installed by following the installation steps in the reverse order.

GROUNDING / EQUIPOTENTIAL BONDING

The PV system must be connected with the building's equipotential bonding prior to commissioning. The module clamps are linked so that all the components within a row of modules are conductively connected. One connection per row (up to 40 modules) is sufficient. Depending on the situation on the roof, parts of the system may need to be connected with the external lightning arrester.

LIGHTNING CURRENT CARRYING CAPACITY

A lightning protection specialist must plan the PV system's lightning current carrying capacity and that of the underlying building. The term "lightning current carrying capacity" is used for connections, clamps, etc. which must actively conduct lightning current as part of the lightning protection system. Each of these components must be subject to separate testing and certification. The lightning current carrying capacity of a supporting system is generally not relevant as the mounting system is not used as a conductor or lightning rod as part of the external lightning protection system. Normally, the lightning protection system is planned completely independently of the PV system. As a rule, the PV system and the lightning protection system must be separated by a specified distance.

In some cases, it is permissible for the mounting system to be connected to the lightning protection system. However, this prevents the partial lightning currents from entering the electrical equipment. In this case the internal equipotential bonding of the mounting system is correspondingly low-resistance and connected with a sufficiently large cross section. See separate "Information on equipotential bonding and lightning protection".

The relevant standards for planning and installing lightning protection, grounding, and equipotential bonding:

DIN EN 62305	Lightning protection
DIN VDE 0185 Part 1–4	Lightning protection (in particular Part 3 Supplement 5)
DIN VDE 0100 Part 410	Grounding
DIN VDE 0105	Operation of electrical installations
DIN VDE 0298	Electrical wiring

Please read all the instruction steps prior to installation to ensure a safe and proper installation of the system. The necessary material is listed for each step.

REQUIRED COMPONENTS

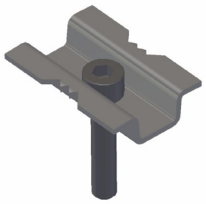
iFIX EW sheet

Dimensions: 1,218 x 376 x 227 mm
Weight: 3.236 kg
Material: corrosion-resistant
zinc-magnesium coated steel plate

Central clamp

2 pieces per PV module

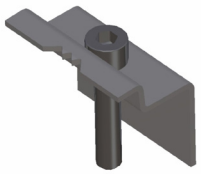
with pre-fixed Allen screw



End clamp

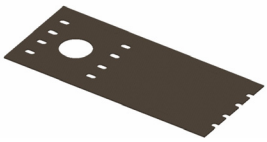
2 pieces per row end

with pre-fixed Allen screw suitable for the height of the PV module frame



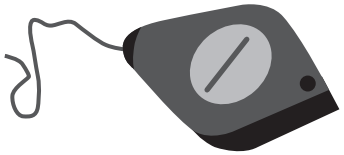
Building protection mat with aluminium lamination

Optional: 1 piece per iFIX EW steel sheet

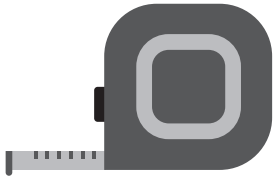


REQUIRED TOOLS (NOT INCLUDED)

Snap line

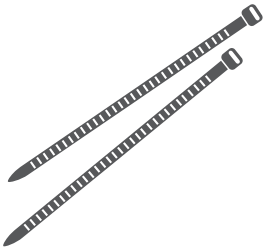


Measuring tape



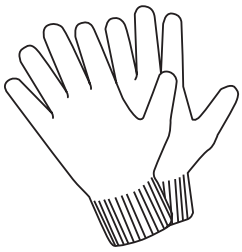
Cable binders

UV-resistant



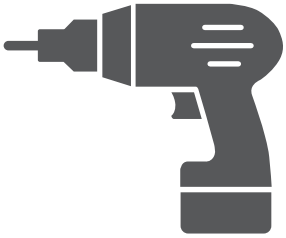
Protective gloves

EN388 – Minimum protection class 4431



Torque controlled screwdriver

Allen key: 8 mm



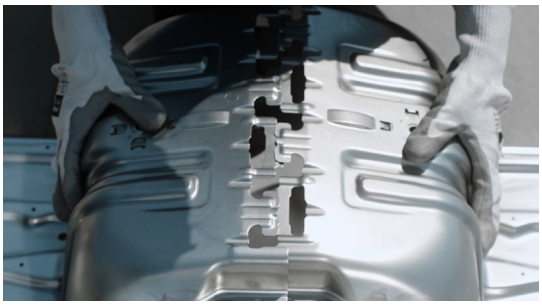
INSTALLATION STEPS

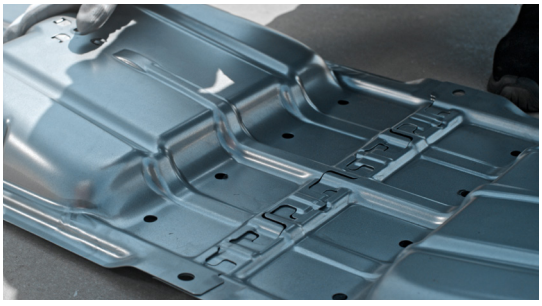
STEP 1

First iFIX EW sheet rows

At the specified distance from the roof edge and beginning from the roof edges in the south and west, lay the sheets and connect them at the high and low sections.
Material: Tape measure, snap line, iFIX EW sheet

Practical tip: When using iFIX EW Base Protect, mount the structure protection mat simultaneously (see Page 14).





STEP 2

Second and following iFIX EW sheet rows

Position next to the first row.
Sheet edge to sheet edge:
L1 = PV module length + 20 mm

Material: Tape measure, snap line, iFIX EW sheet
Accessories: Installation simplified by the iFIX Spacer

Practical tip: When using iFIX EW Base Protect, mount the structure protection mat simultaneously (see Page 14).

STEP 3

Spread ballast

Spread the ballast once the sheet rows have been placed at the correct distance from each other. Always place the ballast near the higher sheet section.

Material: Ballast

Practical tip: Any lightning-current-carrying connections must be installed before the PV modules are mounted.

STEP 4

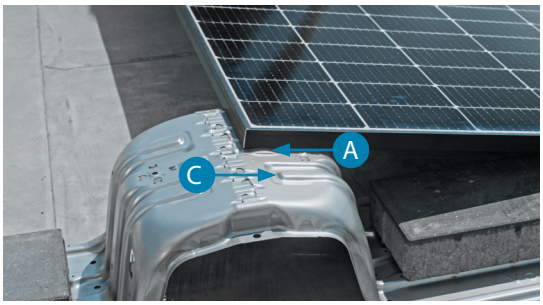
Mounting the PV modules

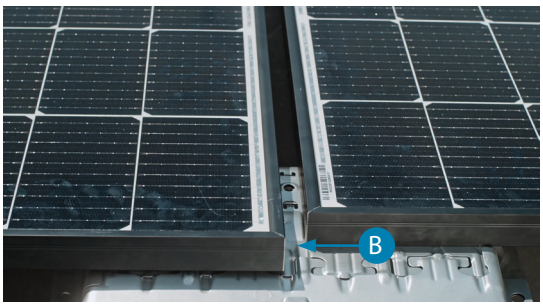
Place the PV modules on the top and bottom positioning aids (A and B), and push them with the top frame against the stop (C). Connect the cables and cover the entire surface with the PV module. Positioning aids (A and B) aid in the spacing of the PV modules.

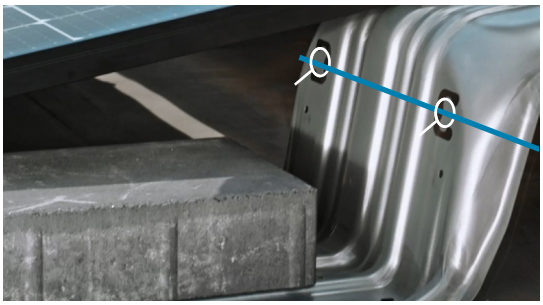
Material: PV-Modules, cable binder

Practical tip 1: Cables can be fastened using cable ties at the C-shaped cutouts provided for this purpose on the steel sheets.

Practical tip 2: Should supports (iFIX Alpin) be required for heavy snow loads, mount them now with the PV modules (see mounting instructions for iFIX Alpin).





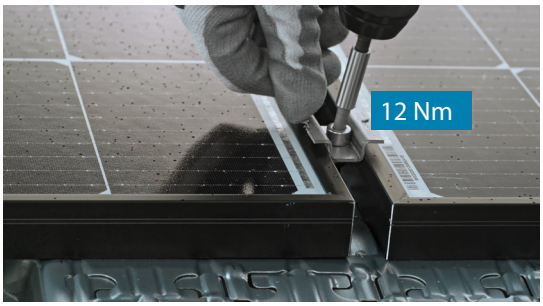


STEP 5

Set clamps

Using a torque-controlled screwdriver (12 Nm tightening torque), always set the terminals immediately after mounting each PV module. This ensures fine alignment of the iFIX EW sheet rows.

Material: PV modules, end clamps, middle clamps



MAINTENANCE

The PV system must be checked for mechanical safety at least once a year as part of a visual and functional inspection. Particular attention must be paid to the tight fit of the PV modules - this can be done by lifting them slightly by hand. Loose modules must be secured immediately to prevent damage to the system and the roof.
In addition to the direct fastening of the modules, attention must also be paid to possible thermally induced changes in the length of the system. Temperature changes can lead to the slow displacement of entire rows of modules over time. These movements affect the mechanical stability of the system as well as the roof cladding and structural connections. For this reason, a regular check of the system offset is part of the maintenance. The required scope of maintenance depends on the degree of displacement detected and is described in detail in the chapter “Important planning information”.
In order to maintain permanent corrosion protection, dirt should also be removed and coarse impurities removed with water. Finally, the specific specifications of the PV module manufacturer and the instructions of the installer carrying out the work, particularly with regard to the electrical components, must be observed for all maintenance work.

WARRANTY

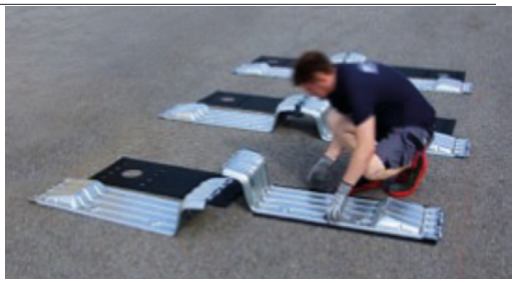
The “General Warranty Conditions for iFIX” and the terms of sale of voestalpine Automotive Compo-nents Schwäbisch Gmünd GmbH & Co. KG as issued at the time of sale apply, both of which are available separately.

ACCESSORIES

Fastening the iFIX Base Protect
Place a building protection mat under each iFIX Base sheet. Raise the four tabs over the sheet at the marking on the edge of the sheet.

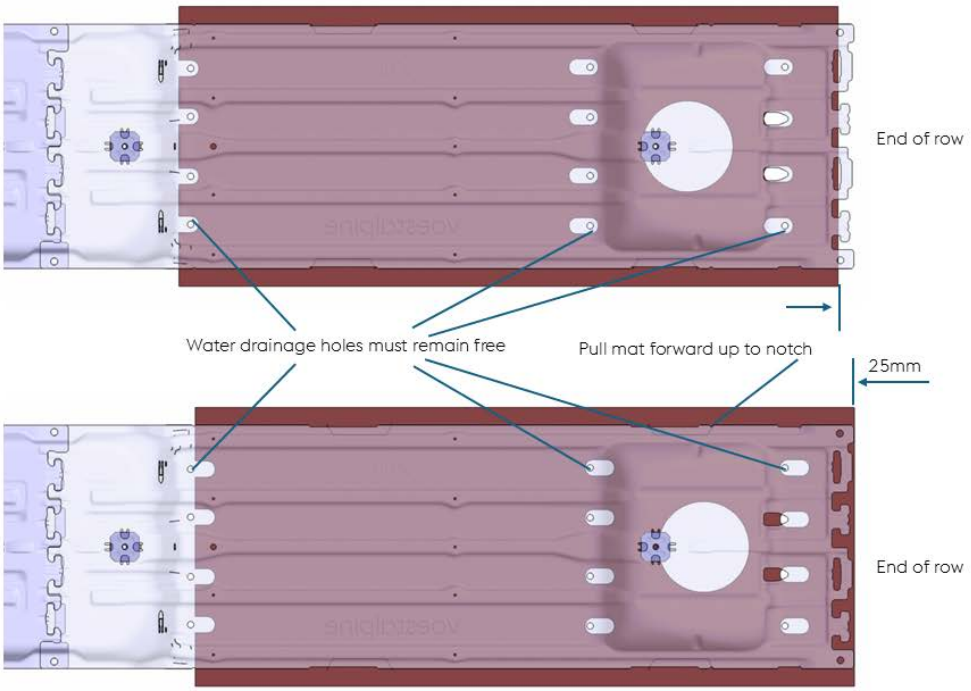
Material: iFIX Base Protect

Hint: Take note of the orientation of the mat: A round hole in the low area of the iFIX Base plate. The mat must not cover the water drainage holes.



iFIX Protector

Additional protective mat recommended for the last iFIX sheets in the assembly line



ACCESSORIES

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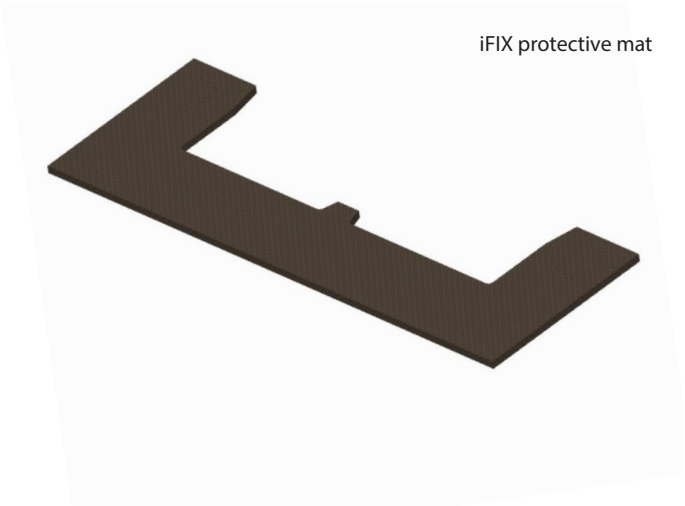


iFIX protective mat

Procedure

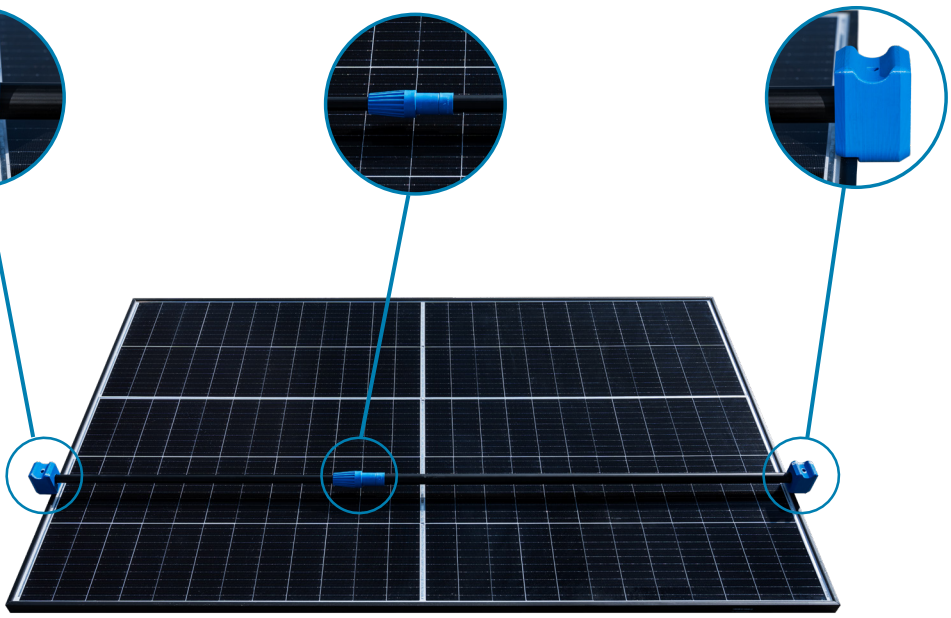
1. Always slide the protective mat under the iFIX plate on the unconnected side of the last iFIX plate.
2. Fold the tabs of the mat upwards over the sheet metal. Ensure that the mat is positioned in the area of the sheet metal rounding and that the mat completely underlays the click area.

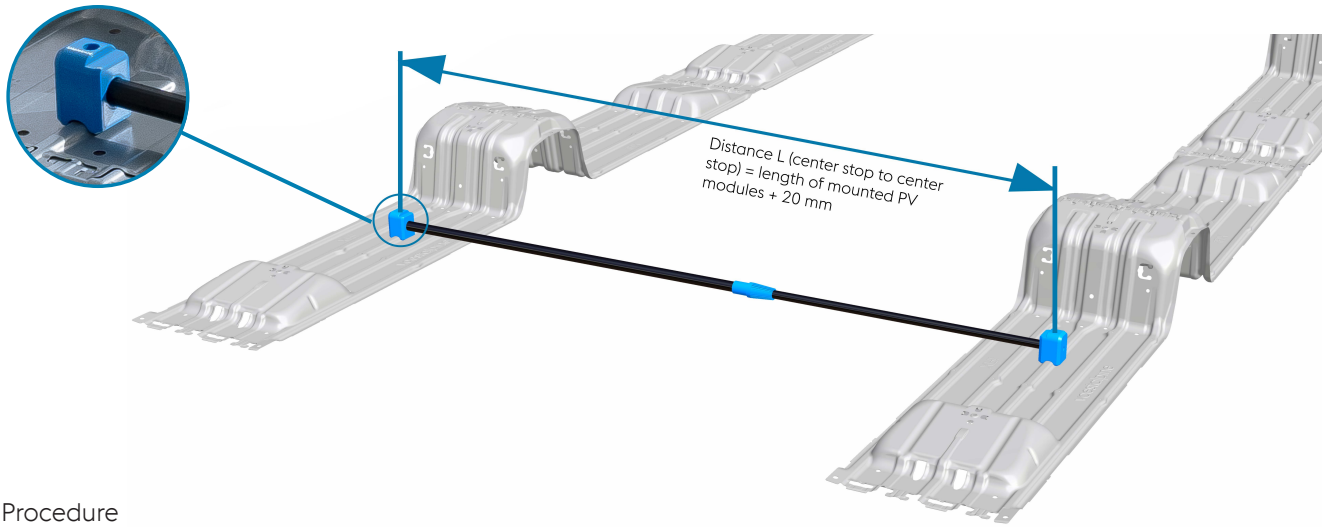
Important note:
The iFIX plate has to rest on the roof in the area of the protector. The protector must not hang in the air. It is recommended to move the ballast on the iFIX plate towards the protector.

iFIX Spacer

Spacing gauge for simplified and correct alignment of the iFIX mounting plates

Length adjustment with twist lock





Procedure

1. Adjust the spacer to the PV module length. Either use the stops on the blue moulded parts or follow the calculation. Release and lock the telescopic rod by turning the blue lock.
2. The two blue moulded parts of the spacer should always be positioned on the middle bead of the iFIX plate. Ensure the correct spacing at several positions on the iFIX rows.

THE COMPANY

Based on competence
For decades, Automotive Components Schwäbisch Gmünd GmbH & Co. KG has been recognized for quality and service in pressing technology. As a supplier to the automotive industry, we have developed powerful technical innovations which we now apply in the solar industry.

Working together
We bring existing operations together to create new value: Four units in Germany and the Netherlands. And above all, the experience of our more than 1,500 employees. When our design, technology, development and production experts pool their know-how, it gives rise to pioneering solutions for our customers.

With system
We develop system solutions for photovoltaics incorporating a broad range of products which are perfectly coordinated, seamlessly integrated, and can be adapted to meet various requirements. iFIX EW is a perfect example of such a patented system solution.

Find out more about the iFIX EAST-WEST and go to www.voestalpine.com/iFIX

Sales:

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