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

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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 construction modifications.
- Permissible roofing material: Bitumen, plastic sheeting, gravel, green roofs (metal sheets and others must be individually inspected)
- Building heights of up to 25 m
- Fields of application:
  Max. pressure load of 3.8 kN/m²**
  With Alpin supports max. pressure load of 5.4 kN/m²**
  Wind load zones 1 to 3
  (at least 3 km from the coast)
  Max. peak velocity pressure up to 1,400 N/m²
- 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 permissible 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 (largest 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
- Separation due to linear thermal expansion:
  A gap is necessary after a max. row length of 14.5 m (north-south orientation), with the ends of the PV modules separated by a distance of min. 0.5 m and max. 1.3 m. For larger distances, separate fields must be assumed when calculating ballast loads.
  No gap is necessary between rows (east-west orientation).
- 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 surface area of 2.17 m² 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 ballast, and pressure loads. A contact area of 0.28 m² 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 m²).
- Overbuilding the ridge is only permitted when the modules 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 system must also be secured during the installation process, especially prior to mounting the modules.
- Always ensure the modules are correctly interlocked.
- If it is necessary to disassemble the system, we recommend following the procedure described in our disassembly 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

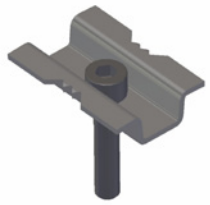
iFIX EW sheet

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

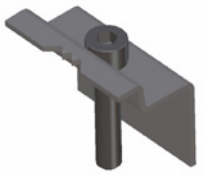
with pre-fixed Allen screw



End clamp

2 pieces per row end

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

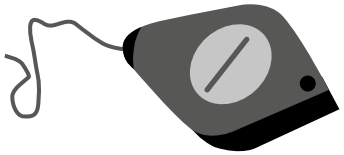


Building protection mat with aluminium lamination

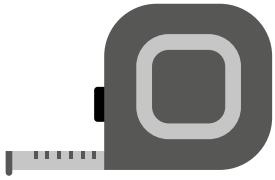
Optional: 1 piece per iFIX EW steel sheet

REQUIRED TOOLS (NOT INCLUDED)

Snap line

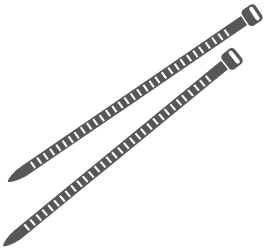


Measuring tape



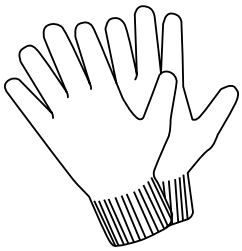
Cable binders

UV-resistant



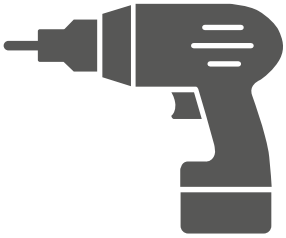
Protective gloves

EN388 – Minimum protection class 4431



Torque controlled screwdriver

Allen key: 8 mm



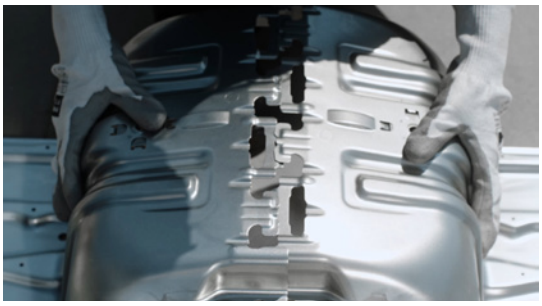
INSTALLATION STEPS

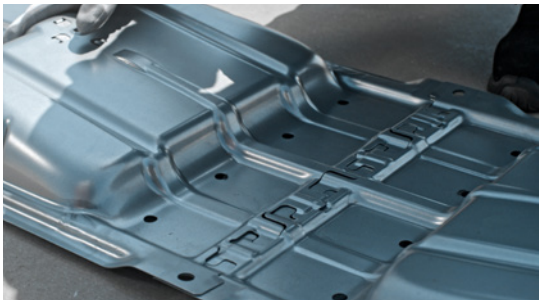
STEP 1

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

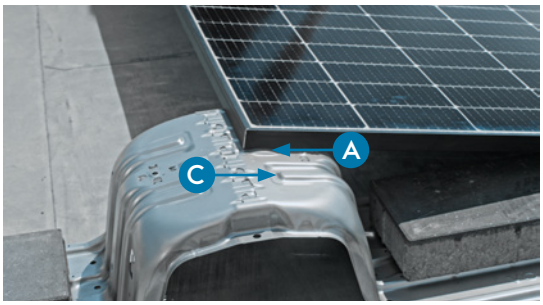
Mounting the PV modules

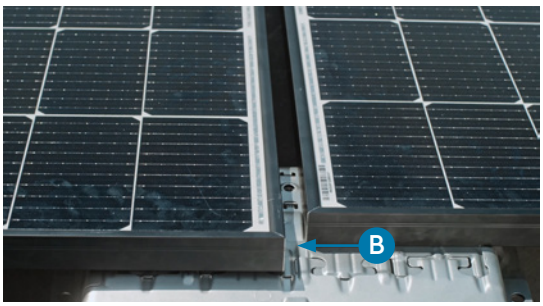
Place the PV modules on the top and bottom positioning aids (A and B), and push them with the top frame against the stop (C). Connect the cables and cover the entire surface with the PV module. Positioning aids (A and B) aid in the spacing of the PV modules.

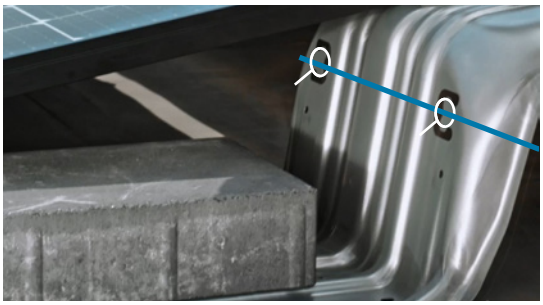
Material: PV-Modules, cable binder

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).





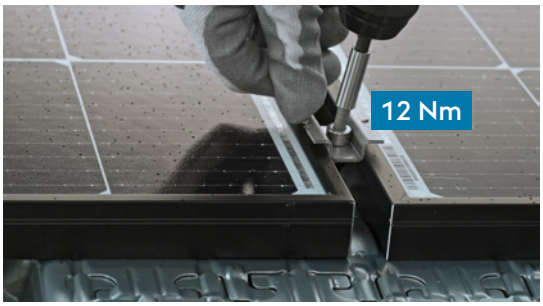


STEP 5

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 mechanical safety of the PV installation must be examined annually by an on-site inspection. The PV modules must be lifted by hand to check that they remain firmly attached to the mounting system. Loose PV modules should be immediately secured. Any dirt which has collected should be removed and soiled areas washed down with water to maintain the corrosion resistance of the mounting system. The specifications of the PV module manufacturer and the electrician must be observed during maintenance of the PV modules and the electrical cabling.

WARRANTY

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

ACCESSORIES

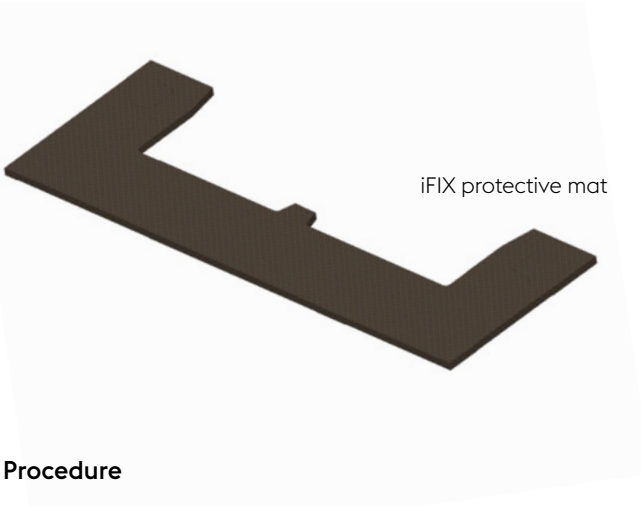
Fasten the iFIX Base Protect

Place a structure protection mat under each iFIX EW sheet. Bend the four flaps up over the sheet at the marks on the sheet edges.

Material: Structure protection mats

iFIX Protector

Recommended additional protective mat for the last iFIX sheet mounted in each row

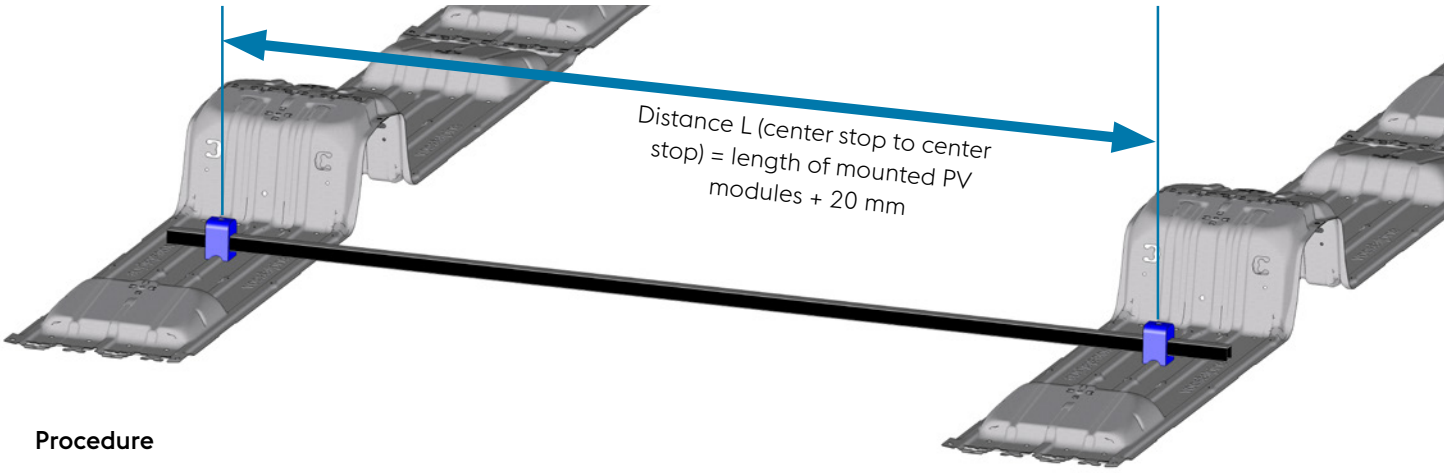


Procedure

1. Slide the protective mat under the iFIX sheet on the unconnected side of the last iFIX sheet.
2. Bend the flaps of the mat up over the sheet. Inspect the position of the rounded area of the sheet and ensure that the mat is positioned completely under the click device.

iFIX Spacer

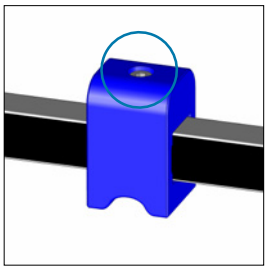
Spacing gauge for simplified and correct alignment of iFIX mounting plates.



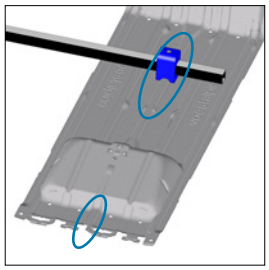
Procedure

1. Determine the distance of the spacer stops = length of the PV modules to be mounted + 20 mm (see above).
2. Set the two stops on the spacer tube to this distance. The notch at the stops can also be used for this purpose (see below).
3. Lay out the first row of iFIX sheets and roughly align them.
4. Lay out the second row of iFIX sheets and align them with the set spacer. Always place the spacer to the middle bead of the iFIX sheet. Check the correct distance at several positions on the iFIX rows.

Tension screw used to fasten the two spacer stops on the aluminum profile

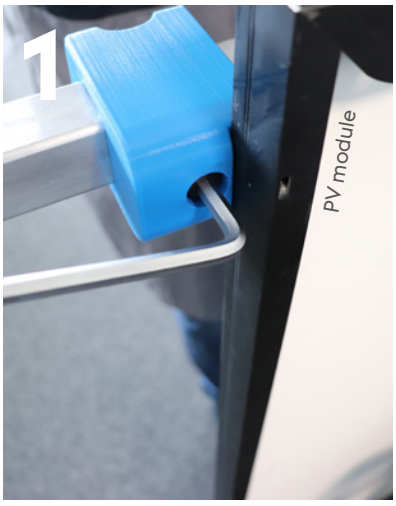


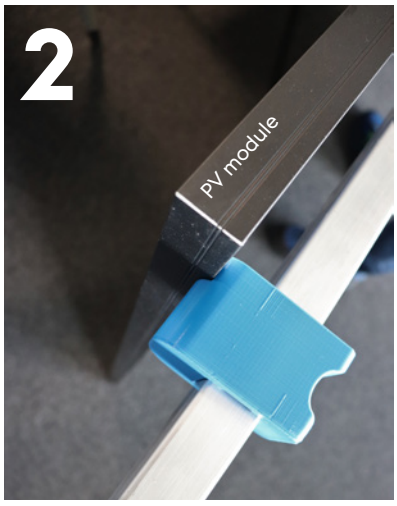
Place spacer stop on the respective center bead.



Determine the correct distance

1. Prepare the PV module for mounting.
2. Loosen the screws of the blue blocks on the iFIX spacer (see Figure 1).
3. Move the blocks such that the two notches rest against the edges of the module (see Fig. 2).
4. Retighten the block screws.





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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