



iFIX

One Part – One Click

Photovoltaic flat roof installation system for east-west orientation

Installation instructions | Status 05/2022

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

**The smart substructure
for photovoltaic installations**

* Version 2022, available from 10/2022





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iFIX OW INSTALLATION UNIT



SPECIAL FEATURES OF THE iFIX OW

- » Unique one click connection removes need for tools to connect the rows
- » Fixation points to lay concealed cabling beneath the PV modules
- » Uniform middle clamp and appropriate end clamps with pre-fixed Allen screws for all PV module frame heights
- » Suitable building protection mat can be attached to the steel sheet
- » No thermal separation between the rows necessary
- » Large contact area permits use even on soft roof insulation material

IMPORTANT PLANNING INFORMATION

- » iFIX OW can currently be used for buildings with closed facades. Other buildings must be examined on an individual basis.
- » iFIX OW is suitable for installation on all standard flat roofs with a roof pitch of 0 to 3° and which are free of standing water. Up to 5° with special dimensions.
- » Permissible roofing material: Bitumen, plastic sheeting, gravel, green roofs (metal sheets and others where individually inspected)
- » Building heights of up to 25 m
- » Fields of application: Snow loads up to 3.8 kN/m²
Wind load zones 1 to 3
(at least 3 km from the coast)
Max. peak velocity pressure
1,400 N/m²
- » Minimum distance between main iFIX OW steel sheet and roof edge 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 OW installation units per row: number of PV modules + 1
- » Calculating the row length (east-west): Calculating the row length (largest PV module length + 20 mm) x number of PV modules in the row + 380 mm
- » Calculating the length of the array (north-south): 1,185 mm (1,210 mm)* x number of rows + 20 mm
- » Separation due to linear thermal expansion:
A gap is necessary after max. 7 PV modules in the row (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: max. 2,100 x 1,135 mm (x 1,145 mm)*
Frame height: Frame 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 OW steel sheet should be examined to ensure the long-term protection of the roof (see installation guidelines). Building protection mats can also be fixed to the underside of the iFIX OW 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 OW steel sheet.
From Version 10/2022* onwards, iFIX OW steel sheets will also be available with pre-mounted building protection mats (contact area 0.084 m²).
- » System weight for 5 PV modules (length 1,770 mm) per row, without PV and ballast, incl. building protection mat, 1.40 kg/m²
- » Installation over a roof ridge is only permissible where the knuckle line coincides with the area in which the steel sheets interlock.
- » The system must be secured against lifting and shifting, respective of building location, wind and snow loads, and building height. Weights to hold the installation in place must be positioned in areas determined in the ballast plan drawn up by a system provider for that installation.
- » iFIX OW steel sheets are currently delivered in packing units of 200 pieces.
- » Further accessories can be supplied as required.

* Version 2022, available from 10/2022

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 OW systems with respect to horizontal and vertical loads. The requirements for the Eurocode 3 (DIN EN 1993) standard must be observed. 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 drawn up by trained personnel. A program is available for calculating the ballast and is based on a wind load certificate and the system statics provided by a government-approved structural engineer.

Where the substructure for a PV installation has been planned by the customer 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 undertaken according to the standards of current structural engineering practice.

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:
- BGVA 1 General accident prevention regulations
 - BGVA 3 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 OW 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 OW must be checked in order to avoid long-term damage. No protection mat is needed under iFIX OW steel sheets on gravel roofs where the iFIX OW steel sheet is installed directly on

the gravel. iFIX OW steel sheets fitted with building protection mats should be used on roofs waterproofed with bitumen. iFIX OW 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 OW 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.

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

Cables must be laid so 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 substructure 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 substructure to be connected to the lightning protection system, although here the partial lightning currents will be prevented from entering the electrical equipment. In this case the internal equipotential bonding of the substructure 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 |

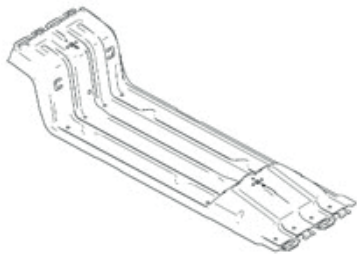
Please read all the instruction steps prior to installation to ensure safe and proper installation of the system. The necessary material is listed for each step.



NECESSARY COMPONENTS

iFIX OW sheet

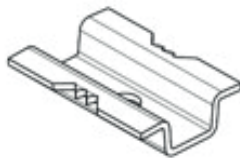
Dimensions: 1,218 x 376 x 227 mm
Weight: 3.236 kg
Material: corrosion-resistant zinc-magnesium coated steel plate



Central clamp

2 per PV module

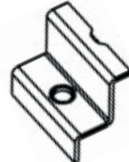
with pre-fixed Allen screw



End clamp

2 per row end

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



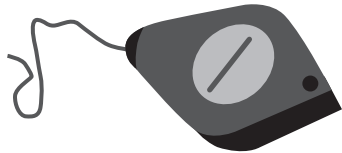
Building protection mat with aluminium lamination

Optional: 1 piece per iFIX OW steel sheet

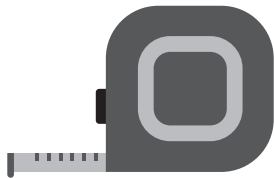


REQUIRED TOOLS (NOT INCLUDED)

Snap line

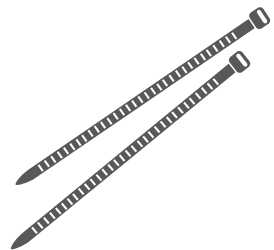


Measuring tape



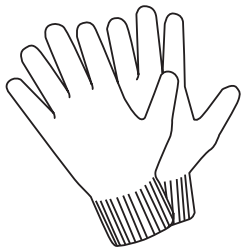
Cable binders

UV-resistant



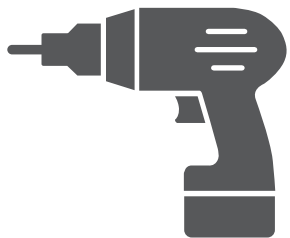
Protective gloves

EN388 – Minimum protection class 4431



Torque controlled screwdriver

Allen key: 8 mm



INSTALLATION STEPS

STEP 1

First row of iFIX OW steel sheets

Start at the preset distance from the southern and western edges of the roof. Start by placing the steel sheets but without connecting them!

Material: measuring tape, snap line, iFIX OW steel sheet



STEP 2

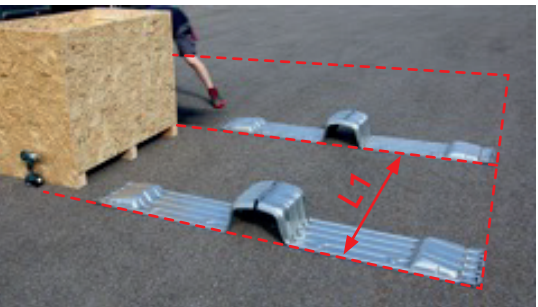
Second and subsequent rows of iFIX OW steel sheets

Place parallel to the first row.

Sheet edge to sheet edge:

L1 = PV module length

Material: measuring tape, snap line, iFIX OW steel sheet

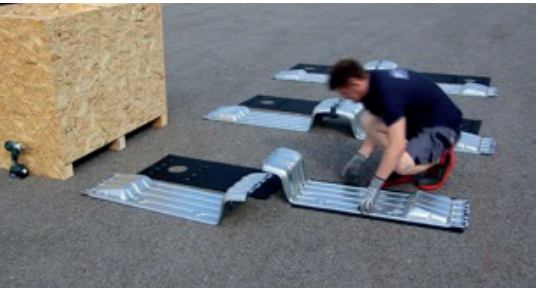


STEP 3

Attach building protection mat, connect iFIX OW steel sheets, and adjust rows

Place one building protection mat next to each iFIX OW steel sheet. Connect each building protection mat to the corresponding iFIX OW steel sheet with 4 clips.

Material: Building protection mat



STEP 4

Laying cables

The supply and return cables needed for each row of modules can be laid prior to installation of the PV modules themselves and attached to the provided C-clips with cable binders. Tip: Pull the cable binders tight! Additional material such as cable trays and housing (UV resistant!) can also be laid.

Material: Cable binders (UV-resistant), etc.



STEP 5

Place ballast

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

Material: measuring tape, snap line, iFIX OW steel sheet

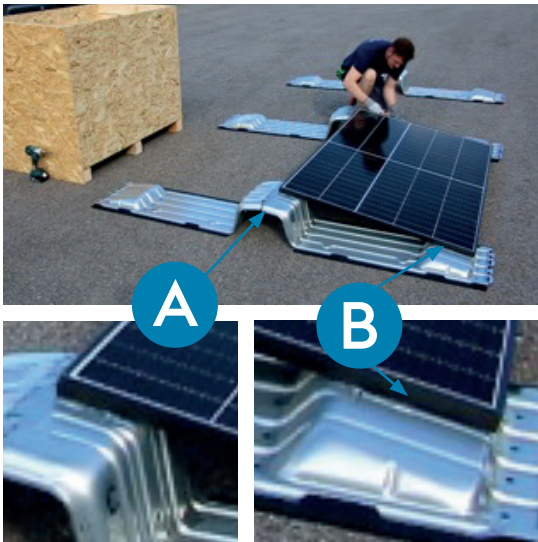


STEP 6

Mounting the first row of PV modules

Place PV module on upper positioning aid A, attach cable, use cable binder to fix cable to the C-shaped cutout provided on the steel sheet, and lay the PV module on the substructure.

A and B are positioning aids for distancing the PV modules.



STEP 7

Place ballast on substructure

Place ballast only on first iFIX OW steel sheet in a row.



STEP 8

Attach clamps

Always attach clamps immediately after placing each individual PV module on the substructure using the torque controlled screwdriver (14 Nm tightening torque), and then make necessary minor adjustments to the orientation of the iFIX OW steel sheet rows

Material: PV module, end clamp, middle clamps



STEP 9

Ballast under the first row of PV modules

Only now should the ballast blocks be positioned on the iFIX OW steel sheets under the PV modules



STEP 10

Ballast under the second row of PV modules

For every second row (completing a “double row”), the ballast blocks must be laid immediately after laying each individual module as they can no longer be positioned once all PV modules in the row are in place.

Repeat steps 7 and 8 for all other rows of PV modules



MAINTENANCE

The mechanical safety of the PV installation must be examined annually by means of an on-site inspection. The PV modules must be lifted by hand to check that they remain firmly attached to the substructure. 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 substructure. 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.

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 together existing operations to create new value: four sites 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, this 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 OW is a perfect example of one such patented system solution.



All information specified in this brochure is according to the current status of our knowledge and experience. As printed materials cannot be updated, please refer to our website for the most recent version. Subject to technical changes, printing, and typesetting errors.

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



Sales:



