1. Stiffener for stiffening elevation triangles
   Ref.: SFS-101EX

2. Center clamp for framed modules, 33–51 mm
   Ref.: SFS-102EX

3. End clamp for framed modules, 33–51 mm
   Ref.: SFS-103EX

4. Mounting rail, 60x37 or 70x44 for fastening modules
   for fastening elevation triangles
   Ref.: SFS-104EX

5. Cross rail joiner for fast rail fastening
   Ref.: SFS-105EX

6. Elevation triangle adjustable in 5° steps
   Ref.: SFS-106EX

7. Adapter angle bracket for M10 and M12 thread
   Ref.: SFS-107EX

8. WSF solar fasteners for wooden and steel purlins
   Ref.: SFS-108-1EX
   Stud screws
   Ref.: SFS-108-2EX

9. Hammer-head screw, M8x45, and self-locking nut, M8
   for fastening elevation triangles
   Ref.: SFS-109EX

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SYSTEM OVERVIEW OF ELEVATION SYSTEM
SINGLE ROWS WITH LATERAL BASE RAILS

1. Stiffener
   for stiffening elevation triangles
   Ref.: SFS-101EX

2. Center clamp
   for framed modules, 33–51 mm
   Ref.: SFS-102EX

3. End clamp
   for framed modules, 33–51 mm
   Ref.: SFS-103EX

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   for fastening modules
   for fastening elevation triangles
   Ref.: SFS-104EX

5. Cross rail joiner
   for fast rail fastening
   Ref.: SFS-105EX

6. Elevation triangle
   adjustable in 5° steps
   Ref.: SFS-106EX

7. Adapter angle bracket
   for M10 and M12 thread
   Ref.: SFS-107EX

8. WSF solar fasteners
   for wooden and steel purlins
   Ref.: SFS-108-1EX
   Stud screws
   Ref.: SFS-108-2EX
FLAT ROOF
Elevation triangle aluminum
Adjustable in 5° steps
Completely preassembled
→ The triangle can be fastened on the roof without further preparations.

<table>
<thead>
<tr>
<th>Possible elevation angle</th>
<th>Preset angle</th>
<th>Reference</th>
<th>P. Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/15°</td>
<td>10°</td>
<td>SFS-201EX</td>
<td>4/40</td>
</tr>
<tr>
<td>20°/25°/30°</td>
<td>20°</td>
<td>SFS-202EX</td>
<td>4/40</td>
</tr>
<tr>
<td>35°/40°/45°</td>
<td>35°</td>
<td>SFS-203EX</td>
<td>4/40</td>
</tr>
</tbody>
</table>

Important note: As individual special features must be taken into account for each roof, an expert clarification must be carried out beforehand. The fastening of an elevated photovoltaic system must be selected and statically calculated based on the project in accordance with the location, the roof design and the building statics. The residual load-bearing capacity of the building must be evaluated for each system beforehand by a structural engineer.

VARIOUS MOUNTING OPTIONS FOR MODULES

| Framed modules in upright position | Frame modules crosswise | Frameless modules crosswise |

STIFFENING OF ELEVATION TRIANGLE
For additional stiffening of the elevation triangles, depending on the static calculation. Aluminum

NOTE:
Two hammerhead screws, M8x25, stainless steel A2 (Ref.: SFS-024EX) and two M8 self-locking nuts, stainless steel A2 (Ref.: SFS-025EX) are required for fastening each piece of square flat material

<table>
<thead>
<tr>
<th>Dimensions LxWxH in mm</th>
<th>Reference</th>
<th>P. Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.900 x 40 x 4</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>
As individual special features must be taken into account for each roof, an expert clarification must be carried out beforehand. The fastening of an elevated photovoltaic system must be selected and adjusted project-based in accordance with the location and the roof structure. The residual load-bearing capacity of the building must be evaluated for each system beforehand by a structural engineer.

With flat roof elevation, a distinction can mainly be made between the following roof connections:

- **ELEVATION ON TILE ROOFS**
  With tile roofs, fastening is carried out with roof hooks and mounting rails. Then the elevation triangles can be fastened to the mounting rails. The roof hooks and mounting rails are mounted in accordance with Point 1 “Roofing with Pantiles”. The elevation triangles are fastened in accordance with Point 6.2.

- **ELEVATION WITH CORRUGATED OR TRAPEZOIDAL PROFILES AND SANDWICH ELEMENTS**
  With these roofing types, fastening is carried out with stud screws or WSF solar fasteners. Should the fastening points on the roof substructure be optimally positioned when taking the statically calculated spacing into account, then the triangles can be mounted directly on the stud screws (without or with adapter angle brackets). This then eliminates the need for an additional rail substructure. See Point 6.2.

- **ELEVATION WITHOUT ROOF PENETRATION**
  Should it not be possible to penetrate the roof, then the elevation triangles can be fastened with attached weights. The residual load-bearing capacity of the building must be checked by a structural engineer beforehand for this purpose. Fastening must then be determined based on the project. Please contact Würth in this case.

These installation instructions can only describe the most frequent fastening options. Please contact Würth directly in special cases.

### MOUNTING FOR GROUPS OF ROWS WITH LONGITUDINAL BASE RAILS

**STEP 1**
Define the position of the stud screws or WSF solar fasteners in accordance with project-based planning. The screws are then mounted in the roof substructure in accordance with the notes on mounting under Point 2.1 “Fastening with stud screws or WSF solar fasteners”.

**STEP 2**
Then the adapter angle brackets are fastened between the prefabricated nuts on the stud screws. For screws with an M10 thread, the tightening torque is 30-40 Nm, and 50-60 Nm for an M12 thread.

**STEP 3**
Fasten the mounting rail on the adapter angel brackets using the premounted fastening materials. For this purpose, screw the hammerhead screw into the side rail channel and fasten it with the detent-edged disk and nut (tightening torque: 13-15 Nm).

**Note:**
Ensure proper mounting of the hammerhead screws! Their short side must lie flush on the inside of the rail after turning them in the tightening direction.

**To check:**
The notch at the end of the thread of the hammerhead screw must be vertical. The jib of the mounting rail may be a maximum of 40 cm long.
**STEP 4**
To connect several mounting rails to each other in series, insert rail joiners half-way into the already mounted mounting rail. Then slide the next mounting rail onto the rail joiner. Finally, press the two mounting rails together until flush. No additional screwing is necessary.

**STEP 5**
When all mounting rails have been fastened, the elevation triangles are mounted on them. The elevation triangles are fastened directly on the mounting rails with two each M8x45 hammerhead screws, stainless steel A2. The fastening holes, each on the end of the horizontal triangular profile, must be produced for this purpose with a 9 mm dia. by the customer. Then screw the two hammerhead screws into the upper channel of the mounting rail and fasten the mounted elevation triangle with M8 self-locking nuts, stainless steel A2ZZ (tightening torque: 13-15 Nm).

**Note:**
Ensure proper mounting of the hammerhead screws! Their short side must lie flush on the inside of the rail after turning them in the tightening direction.

**To check:**
The notch at the end of the thread of the hammerhead screw may not be inclined.

**STEP 6**
The elevation angle of the triangles can now be adjusted in 5° steps. For this purpose, remove the pan head screw and nut from the vertical triangular profile and adjust the desired angle. Then lock the selected elevation angle in the existing fastening holes again using the pan head screw and nut with a tightening torque of 13-15 Nm.
**STEP 7**
When all elevation triangles have been mounted, four cross rail joiners are clicked on loosely per triangle.

**STEP 8**
Position the mounting rail on the elevation triangles and hook the cross rail joiners into the side rail mounts. Then align the mounting rails straight relative to each other using a marking line. To connect several mounting rails to each other in series, use the rail joiners in accordance with Step 4. After the mounting rails have been correctly aligned, tighten the screws of the cross rail joiners (tightening torque: 13-15 Nm).

**Note:**
The installation instructions of the module manufacturer must be observed for the spacing of the mounting rails to each other. To compensate the different length expansions between the glass modules and the aluminum frame, the module field should be interrupted after approx. 12 m. It is advisable to already position the end holders during rail mounting.

**STEP 9**
When all mounting rails have been mounted on the elevation triangles, the cross struts are attached. These must be mounted on the end of each closed row and at least every 12 m. The cross struts are fastened on the vertical triangular profiles at each end with an M8x25 hammerhead screw, stainless steel A2 and an M8 selflocking nut, stainless steel A2 on the rear of the triangle. The square material must be cut to the respective length for this purpose and predrilled with a 9 mm dia. at the end in each case.

**STEP 10**
Provide the modules with a slip protection device prior to module mounting. For this purpose, fasten M6x20 hexagon bolts, stainless steel A2 with M6 nuts, stainless steel A2 in the bottom fastening holes on the rear of the module. When mounting large modules, M8x20 hexagon bolts must be used. Then lay the first module on the mounting rail until the hexagon bolts strike the bottom mounting rail.
**STEP 11**
Slide the end clamp onto the mounting rail up to the module until flush. Adjust the end clamp to the module frame height by turning the Allen screw to the left and then fix in place (tightening torque: 9-10 Nm).

**STEP 12**
Click the center clamp onto the mounting rail and slide up to the module until flush. In the process, the center clamp must completely engage on both sides of the mounting rail.

**STEP 13**
Slide the next module onto the center clamp until flush and adjust it to the module frame height. Then fix the center clamp in place with the Allen screw (tightening torque: 13-15 Nm).

**STEP 14**
On the last module of a row, slide another end clamp onto the mounting rail up to the module until flush. Adjust the end clamp to the module frame height by turning the Allen screw to the left and then fix in place (tightening torque: 9-10 Nm).
MOUNTING FOR SINGLE ROWS WITH LATERAL BASE RAILS

STEP 1
Define the position of the stud screws or WSF solar fasteners in accordance with project-based planning. The screws are then mounted in the roof substructure in accordance with the notes on mounting under Point 2.1 “Fastening with stud screws or WSF solar fasteners”.

STEP 8
Next the adapter angle brackets are fastened between the prefabricated nuts on the stud screws or WSF solar fasteners. For screws with an M10 thread, the tightening torque is 30-40 Nm, and 50-60 Nm for an M12 thread. The adapter angle bracket must not be directed toward the eaves.

Alternative type of fastening:
Should the fastening points on the roof substructure be optimally positioned when taking the statically calculated spacing into account, then the triangles can be mounted directly on the adapter angle brackets. For this purpose, screw the prefabricated hammerhead screw of the adapter angle bracket into the side rail channel of the triangle and fix it in place with the nut (tightening torque: 13-15 Nm).

Note:
Ensure proper mounting of the hammerhead screws! Their short side must lie flush on the inside of the rail after turning them in the tightening direction.

To check:
The notch at the end of the thread of the hammerhead screw may not be inclined.

STEP 2.2 ALTERNATIVE
Instead of fastening the elevation triangles on the adapter angle brackets, they can also be fastened directly on the stud screws or WSF solar fasteners. The fastening holes, each on the end of the lower triangular profile, must be produced for this purpose by the customer.
For screws with an M10 thread, the drilling diameter is 11 mm, and 13 mm for M12 threads. Then mount the elevation triangles on the stud screws or WSF solar fasteners through the holes and fasten the triangle with the prefabricated nuts. For screws with an M10 thread, the tightening torque is 30-40 Nm and 50-60 Nm for M12 threads. Should direct triangle mounting (with or without adapter angle brackets) be possible, then mounting can continue with the steps 6-14 under Point 6.1. If not, follow these instructions.
**STEP 3**

Fasten the mounting rail on the adapter angel brackets using the premounted fastening materials. For this purpose, screw the hammerhead screw into the side rail channel and fasten it with the detent-edged disk and nut (tightening torque: 13-15 Nm).

**Note:**

Ensure proper mounting of the hammerhead screws! Their short side must lie flush on the inside of the rail after turning them in the tightening direction.

**To check:**

The notch at the end of the thread of the hammerhead screw must be vertical. The jib of the mounting rail may be a maximum of 40 cm long.

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**STEP 4**

To connect several mounting rails to each other in series, insert rail joiners half-way into the already mounted mounting rail. Then slide the next mounting rail onto the rail joiner. Finally, press the two mounting rails together until flush. No additional screwing is necessary.

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**STEP 14**

When all mounting rails have been fastened, the elevation triangles are mounted on them. For this purpose, loosely click two cross rail joiners onto the mounting rail per intersection point of the elevation triangle/ mounting rail. Then hook the cross rail joiners into the side rail channel of triangle in each case and tighten the screw (tightening torque: 13-15 Nm). Further mounting is then carried out in accordance with the steps 6 -14 under Point 6.1 or Point 6.3 for frameless modules.
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