

Instructions and guidelines for mounting the a-Si plus series of solar modules for loads of up to 2400 Pa

The solar modules are an essential part of a photovoltaic system and when in situ they are exposed to various types of stress. The latter consists of distributed loads which act vertically to the plane, such as wind and snow or even live loads; in the case of horizontal and inclined solar modules there is also a dead weight factor that must be absorbed and redirected through the mounting/supporting system.

Bearing this in mind, the a-Si plus series of modules must be installed by trained specialists according to the acknowledged rules of technology and in conformance with the valid standards and specifications.

German standard DIN 1055 “Actions on Structures” contains basic rules for the structural design of buildings including their foundations which must be adhered to in the dimensioning and design of mounting/supporting systems. Among other things, IEC 61646 regulates the mechanical load-bearing capacity of solar modules. The bearing strength of solar modules at a load of 2400 Pa according to IEC 61646 is only given when the following general instructions and guidelines for permanent and secure mounting of solar modules are observed:

1. The solar modules must be mounted up right, i.e. laser lines vertical.
2. The solar modules must be mounted with clamps of at least 200 mm in length on the longitudinal side in the given clamping zones (Fig. 1). Alternatively, the clamps may be lengthened so that the solar modules are supported on two sides (Fig. 2). However, a minimum support length of 200 mm must be provided for both wind suction and pressure loads. This must be ensured with sections of adequate strength and the corresponding mechanical attachment.
3. The supporting substructure must be robustly designed according to structural analysis and adapted to local conditions so that a maximum permissible deflection or deformation under a load of $L/100$ is not exceeded. In addition, distortion over the module diagonal in excess of 30 mm must be precluded.
4. The solar modules must be secured in a permanently elastic foundation with no play. The glass/solar module may not be in direct contact with metallic parts of the substructure. In addition, permanent glass/glass contact is to be avoided. The deflection of a solar module under a 2400 Pa load is in excess of 40 mm. To avoid direct contact between the solar modules and supporting structure or underframe, a permanently elastic support must be installed. The permanently elastic foundation and supports must be made of weather- and ozone-resistant, UV-stable material.
5. The glass mounting on the clamps may not exceed 15 mm; in view of the load, mounting and positional tolerances it should be no less than 8 mm.
6. When installed at a slant the solar modules must be appropriately secured against slipping.
7. The solar modules must be mounted stress- and torsion-free under all operating conditions.

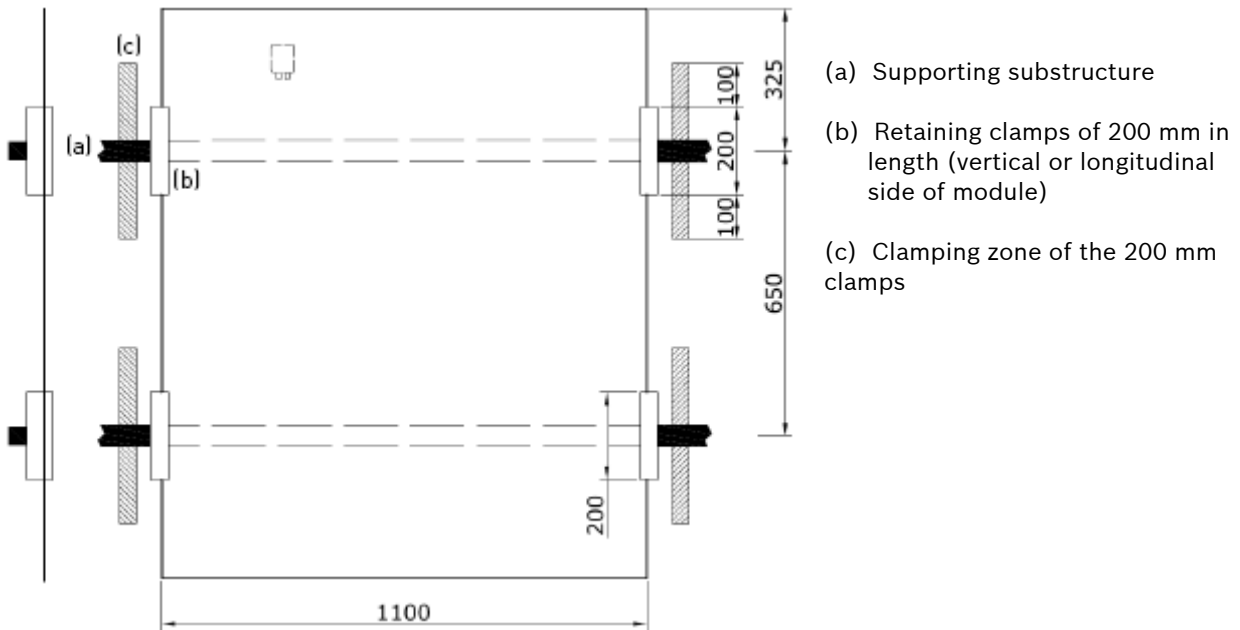


Fig. 1: Diagram showing mounting with 200 mm clamps (front and left-hand view, not to scale)

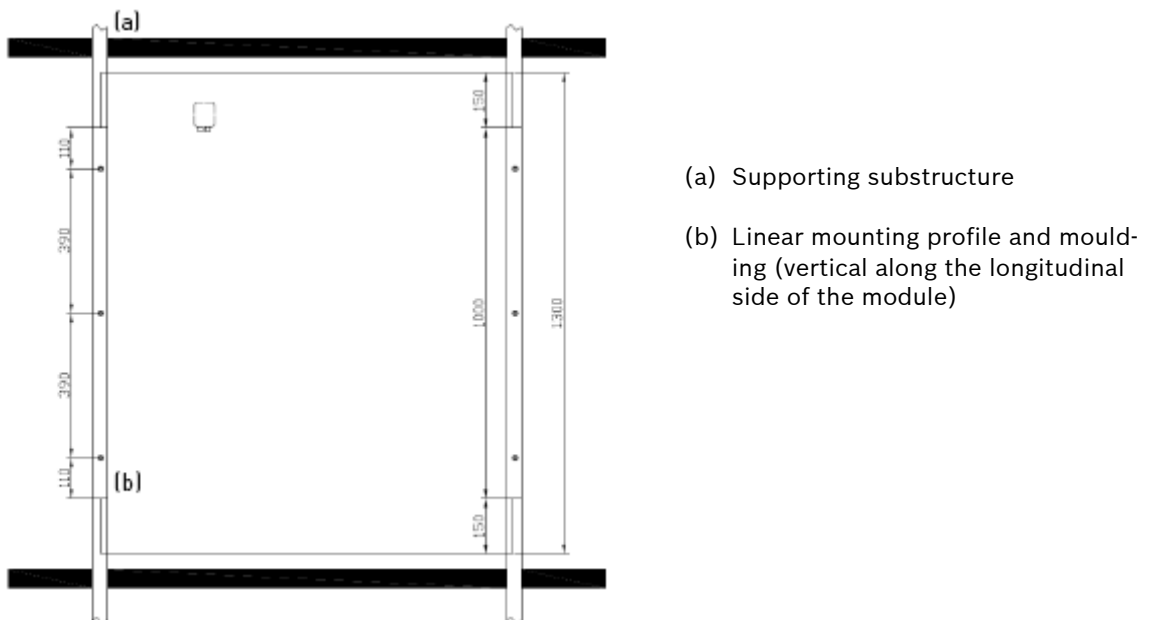


Fig. 2: Diagram showing linear mounting on both sides (front view, not to scale)

8. Moisture build-up on the solar modules is not permissible; moisture must be able to drain reliably. Standing water due to precipitation or condensation results in corrosion both on the glass surfaces and bonded joints (PVB foil between front and rear glass) and can lead to tarnishing of the glass or weakening of bonded joints (delamination).
9. The solar modules must be inclined at an angle of at least 7 degrees. Smaller angles of inclination result in a higher degree of soiling. Corrosion and leaching of the glass surface have a negative effect on the mechanical strength and performance of the solar modules. At an angle of inclination of less than 7 degrees, suitable steps (regular cleaning) must be taken to avoid adverse effects on the solar modules.
10. The underframe must be selected and dimensioned in consideration of the different temperature expansion coefficients of the materials used. The temperature expansion coefficient of glass is significantly lower than that of metals, causing material-related stress.
11. The given spacing of the anchorage points for the vertical and horizontal retaining clamps must be observed (see Fig. 1). Screw torques are specified in the instructions supplied by the mounting system manufacturer to ensure permanently elastic support of the solar modules without undue play.
12. Direct contact between sealing compounds (silicon, butyls, etc.) and the foil between the glass panes (PVB foil, EVA foil) must be avoided.

The Bosch Solar Energy AG warranty conditions for the a-Si plus series of solar modules shall only be valid if the mounting instructions have been adhered to.

This documentation is based on the current level of technology. Subject to modifications without prior notice in the interests of technical progress.