

Instructions and guidelines for mounting the a-Si series of 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 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 and maximum permissible deformation of solar modules at a load of 2400 Pa according to IEC 61646 are 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 upright, i.e. laser lines vertical.
2. The solar modules must be fastened along two sides over the longitudinal side. In addition, a vertical centre support is required to prevent undue sagging of the solar modules in the event of distributed loads acting vertically to the plane (snow, wind pressure). The horizontal line of retaining clamps, fastened to the centre support, is necessary to secure the solar modules against wind suction.
3. The retaining system and underframe must be robustly designed and adapted to local conditions so that a maximum permissible deflection or deformation under a load of $L/100$ (13 mm or 11 mm respectively) related to the edge length of the solar module 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. To avoid direct contact between the solar modules and centre rail, the latter must have a permanently elastic support on the contact side. The permanently elastic foundation 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. The solar modules must be mounted stress- and torsion-free under all operating conditions.
7. 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).

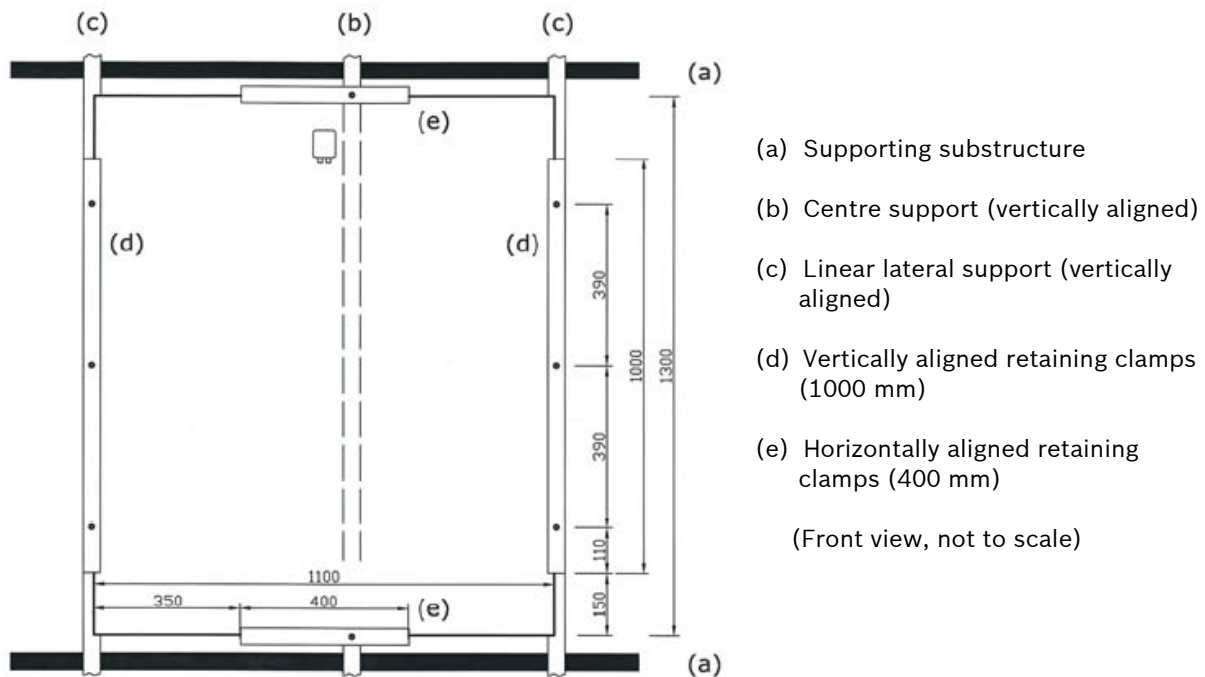


Figure 1: – Diagram showing linear mounting on both sides with centre support and clamps for loads of up to 2400 Pa

8. The solar modules must be inclined at an angle of at least 7 degrees. Smaller angles result in corrosion and leaching of the glass surface and have a negative effect on the mechanical strength and optical attributes of the solar modules. At an angle of inclination of less than 7 degrees, suitable steps must be taken to avoid adverse effects on the solar modules.
9. 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.
10. 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.
11. 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 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.

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