

Assembly- and Manual of Construction crystalline PV modules of the asola GmbH



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Please read this guide completely before installing, using or transporting the PV modules! The manual instruction contains important guaranty and safety information. The warranty will be voided if you fail to follow the instructions in this manual when using the PV modules..

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1. Regarded Module Types

The assembly/manual instruction is defined for all those module types, which followed.
The assembly/manual instruction only does only apply by using following modules.

Module Types:

asola XXYW/60-156SP2BB
asola XXYW/60-156SP2BB/2
asola XXZW/54-156SP2BB
asola ZZZW/48-156SP2BB/2
asola XXXW/40-156SP2BB

asola XXYW/60-156QP2BB
asola XXYW/60-156QP2BB/2
asola XXZW/54-156QP2BB
asola ZZZW/48-156QP2BB/2
asola XXXW/40-156QP2BB

asola XXYW/60-156EM3BB
asola XXYW/60-156EM3BB/2
asola XXZW/54-156EM3BB
asola ZZZW/48-156EM3BB/2
asola XXXW/40-156EM3BB

asola XXYW/60-156AP2BB
asola XXYW/60-156AP2BB/2
asola XXZW/54-156AP2BB
asola ZZZW/48-156AP2BB/2
asola ZZZW/40-156AP2BB

asola YYYW/72-156JM3BB
asola XXYW/60-156JM3BB
asola XXYW/60-156JM3BB/2
asola XXZW/54-156JM3BB
asola ZZZW/48-156JM3BB/2
asola XXXW/40-156JM3BB

asola YYYW/72-156SM3BB
asola XXYW/60-156SM3BB
asola ZZZW/60-156SM3BB/2
asola XXXW/54-156SM3BB
asola XXXW/48-156SM3BB/2
asola XXXW/40-156SM3BB

2 . General Safety

The electrical installation and commissioning can only be carried out by an electric specialist. Errors in the execution or commissioning could damage modules and can be hazardous to life and health. Please use appropriate safety arrangements on the roof for working with the solar generator. For your own safety and to ensure proper protection of your solar modules, please observe the following instructions:

For proper installation and maintenance of solar modules, the regulations and safety instructions valid for the installation of electrical components and electrical systems as well as the rules and regulations of the grid operator must be observed.

Only persons, who are qualified professionally with the handling and installation of such systems are allowed to do the planning of the manual, the manual and the startup procedure of the solar modules,

Please caution to people, who stay in the near of the house or in the area of risk.

Keep out children from the area of risk.

Unauthorized persons are not allowed to mount on the roof.

Before you install the solar module, you have to proof the mechanical intactness.

When working with the PV modules, it is important to make sure that the modules are either completely covered up or disconnected by means of an isolating device from the consumer unit due to the fact that electric arcs can easily be produced while performing tasks on direct current conductors.

If the PV modules are connected in series, the voltages of the individual modules will add up to a voltage above the safety low voltage of 120 V_{DC} !

The total open-circuit voltage of the modules must be taken into account even at minimum illumination.

The PV module must be treated like a glass product and is not suitable to be walked on.

To integrate the PV modules in a lightning protection system, you have to regard and comply with the national instructions.

Never leave a PV module unsupported or unsecured. Do not drop a PV module. Do not use or install broken or damaged modules to avoid the hazard of fire, electric shock and injury.

The PV modules have to be disconnected from the mains before attempting to install or work on it, to avoid the hazard of electric arcs of direct current conductors.

The allowed maximum system voltage of the PV modules must not be exceeded , this also applies for low temperatures (see data sheet and module type plate)

Do not disconnect or connect terminals under load current conditions!

During the transport and installation protect the PV cables of mechanical load
Never lift PV modules at the cables!

Inspect of damages before installation the junction box, cable and plug connectors.

Install the cable system, without the hazard of persons and the risk of damage.

Unauthorized persons should not open the cover of the junction box to avoid the hazard of electric shock.

Never drop something on the PV modules.

Protect the plug system of soiling.

Do not plug any contact when it is soiled.

To avoid the hazard of electric shock, work only in dry conditions, with dry PV modules and dry tools.

3. Installation Guide

In order to achieve the highest possible yield per year, we recommend the following module set-up:

Always set up the front side of the solar module directed toward the position of the sun at noontime (in the northern hemisphere directed toward the south and in the southern hemisphere directed toward the north).

Choose the inclination angle of Germany appropriate the local and structural conditions ($30^\circ \pm 15^\circ$). Special information of installation you will get on request or you look up in specialist literature.

To ensure sufficient self-cleaning the inclination angle has to be not less than 20° .

All PV modules of one PV generator have to be installed in the same inclination angle (vertical and horizontal). If there are differences in the inclination angle you have to use a separate inverter.

The PV module must be set up so that any form of shading is avoided.

Make sure that the rear side of the module is well ventilated.

Do not focus the sunlight on any part of the module using reflectors or lenses or by any other means!

Mount the PV module on suitable base structures for permanent installation recommended by the specialized trade. It must be guaranteed that there will no mechanical tensions lead into the modules from the substructure e.g. the roof timbers.

To avoid an increased mechanical load of the PV modules, make sure that a gap is made to the edge of the building.

Assemble the PV module in order to ensure proper temperature expansion compensation, with a gap of at least 20mm to the next module on either side.

To assemble the module use only the existing holes in the PV module frame. Do not drill holes into the module frame, and do not nail or weld it.

Only use non-corroding screws to assemble the modules.

Only use a torque wrench to assemble the modules!

Never lift PV modules at the cable!

When connecting the PV modules, the correct polarity must be observed. Incorrect polarity will result in destruction of the protective diodes.

Especially in exposed areas, sufficient lightning protection must be provided. Integration with existing lightning protection equipment must be carried out in compliance with valid official rules and regulations.

Make sure that vent holes of the module frame are open. The PV module may not stand in water.

Install modules with the junction unit facing downwards. Make sure that no rain water condensation water can run, esp. on the cable surface, into the cable glands.

The kind of the earth construction like clamping, riveting, bolted or screw connections or something else are not allowed to use for mechanical protection of the whole systems on the frame or supporting surfaces.

The installation of the earth ground wiring is only allowed on a marked position of the PV module frame with the help of a non-corrosion material.

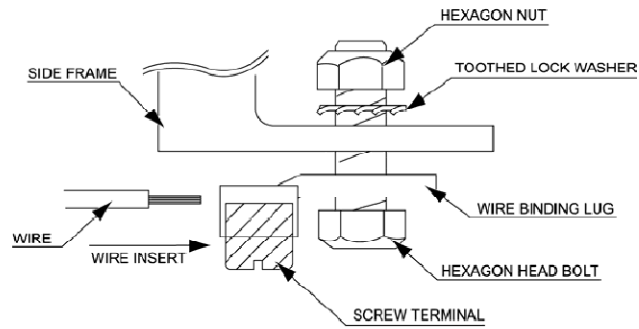
The earth ground wiring must not be disconnected or not damaged during the regular maintenance.

The kind of the earth construction shall conform to IEC61730-1. The asola PV modules are earth grounded with the help of a M5 screw, listed of in the IEC 61730 table 2.

3.1 Grounding

Detail of Grounding

SIDE FRAME	RAHMEN
WIRE	KABEL
WIRE INSERT	KABELEINSATZ
HEXAGON NUT	SECHSKANTMUTTER
TOOTHED LOCK WASHER	ZAHNUNTERLEGSCHLEIBE
WIRE BINDING LUG	ERDUNGSÖSE
HEXAGON HEAD BOLT	SECHSKANTSCHRAUBE
SCREW TERMINAL	SCHRAUBKLEMME



Point of grounding in detail



Grounding sign in detail

4. Manual Instruction

Manual references are not manual instructions, they don't describe the installation of a whole solar power plant.

Additionally, local conditions for example: local climate, lightning protection areas, snow load areas, wind load areas, special statically requirements of the sub construction or other specifics are very important for the installation. You must consider that separately during the installation of the PV modules.

The installation can only be carried out by qualified licensed professionals.

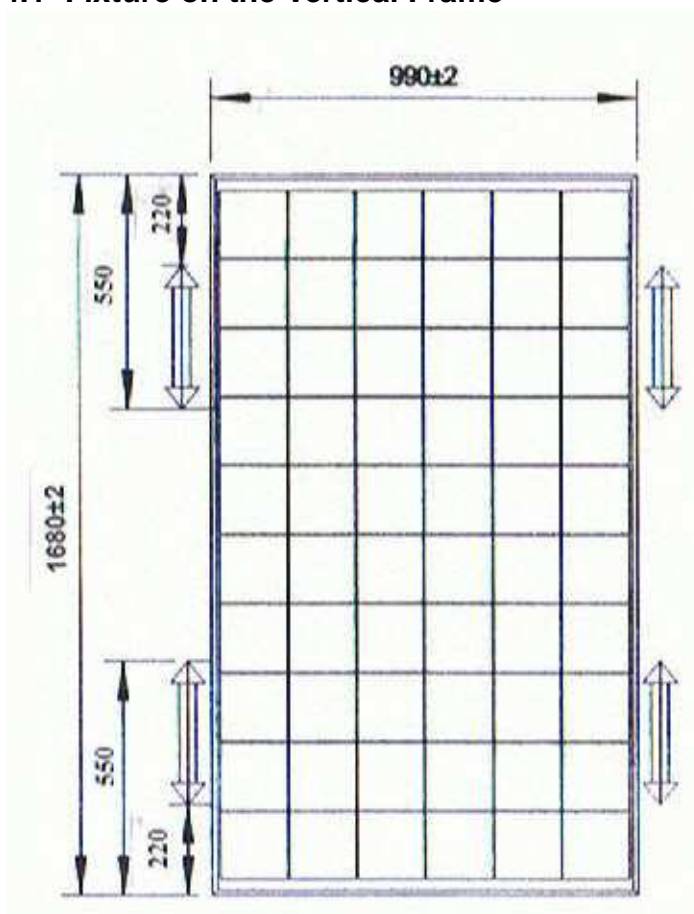
This installation guide applies only for the asola standard PV modules.

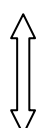
Die Montagehinweise gelten ausschließlich für die Asola Standardmodule.

Asola does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of, or in any way connected with the installation, operation, use or maintenance by using this manual.

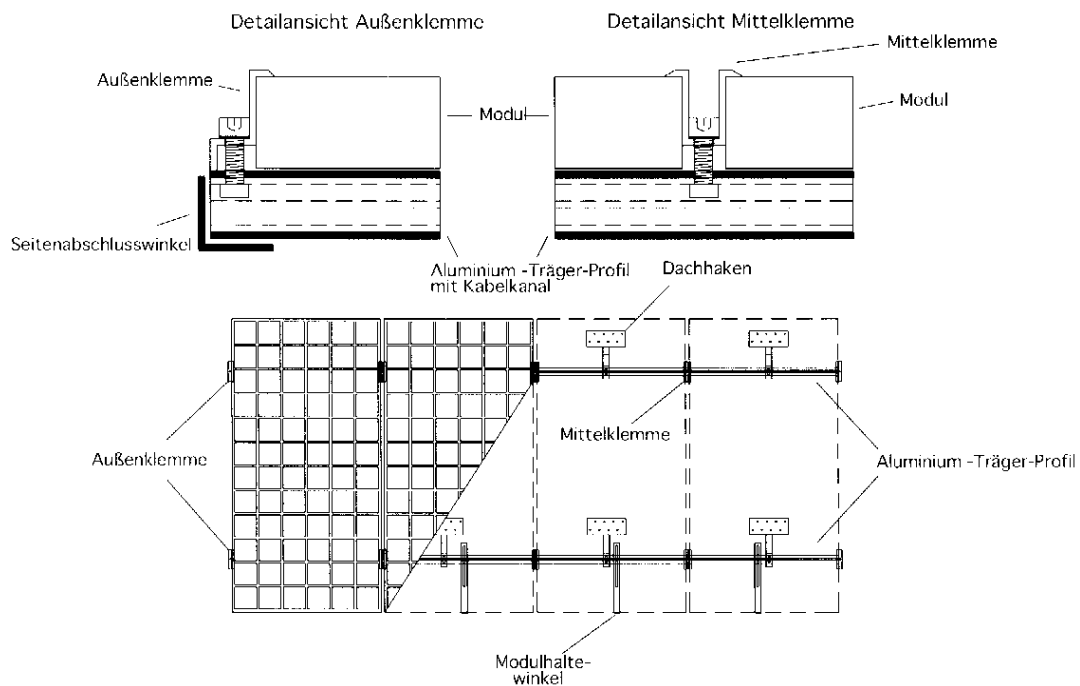
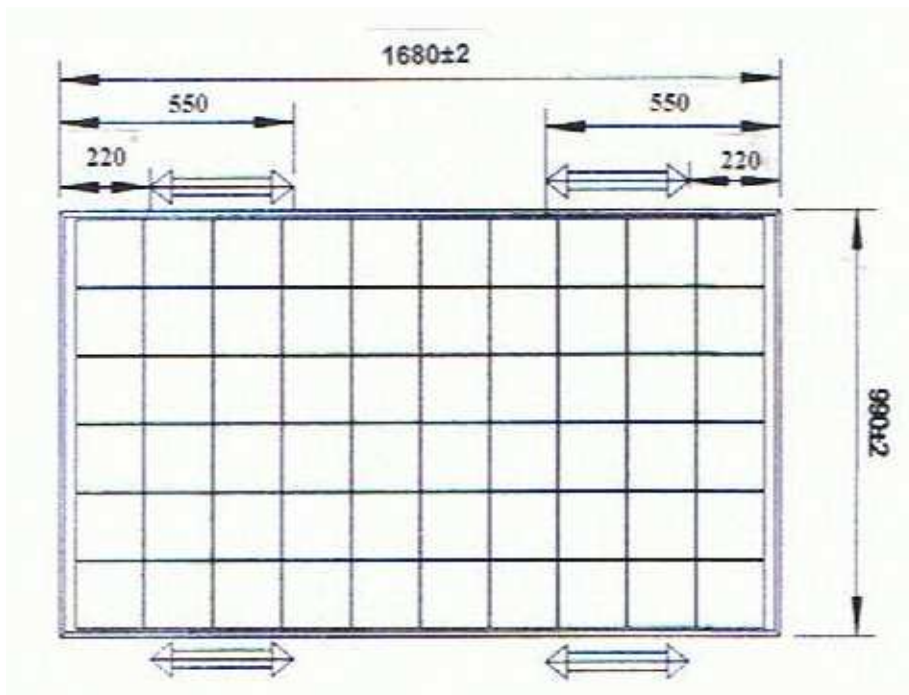
Manual reference – example: Standard module XXYW/60-156m and XXYW/60-156p

4.1 Fixture on the Vertical Frame




 variable clamping area

4.2 Fixture on the Horizontal Frame

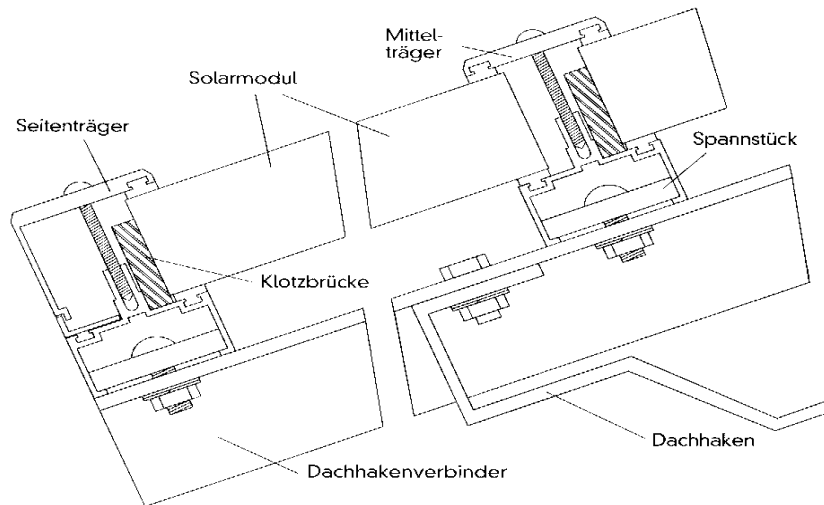


The right and left fixture must be installed in one line.

Concerning differences of the given measurements of the fixture gaps, the asola does not assume responsibility and disclaims liability.

4.3 Fixture on the Carrier System

Schnittzeichnung

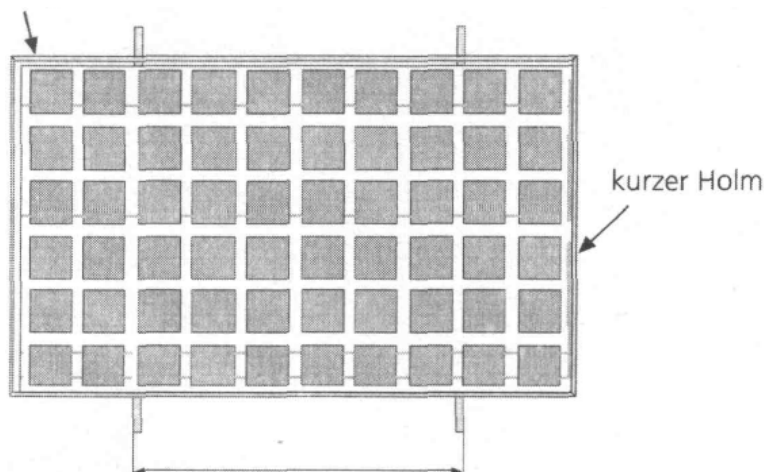


The installation of the PV modules on the short side of the waling is only allowed with this system
Accountable of the special standards is only the producer of that system.

Manual reference

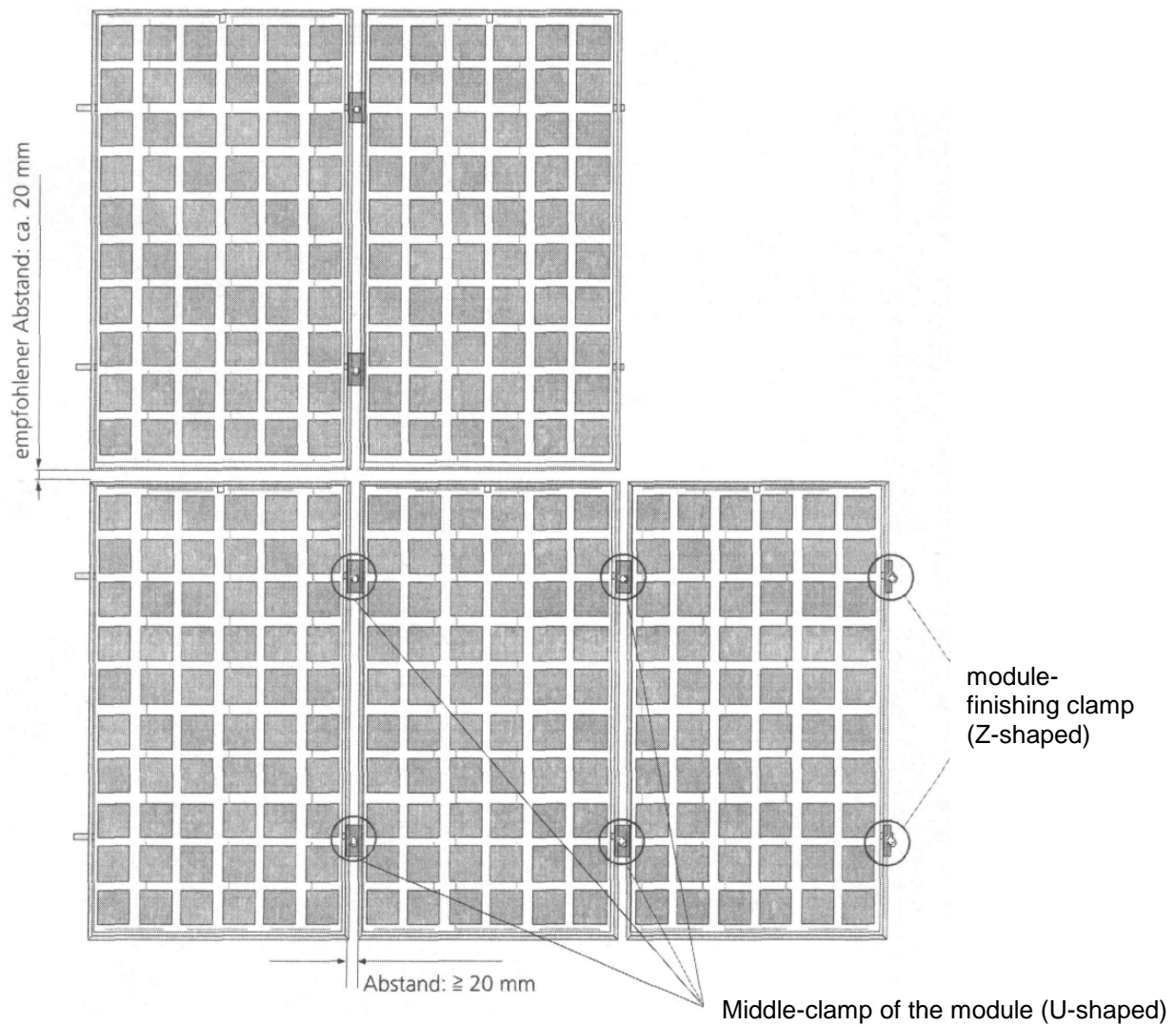
The lining and fixture of the PV modules take place on the long waling.

long waling



a (gap of the cantilever-profile)

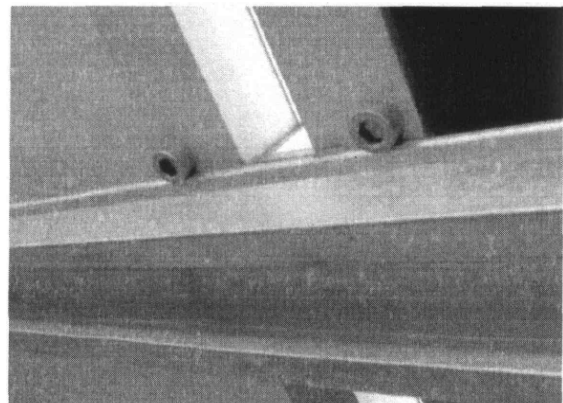
Attention! The lining or fixture on the short waling is not allowed!



Slip off protection

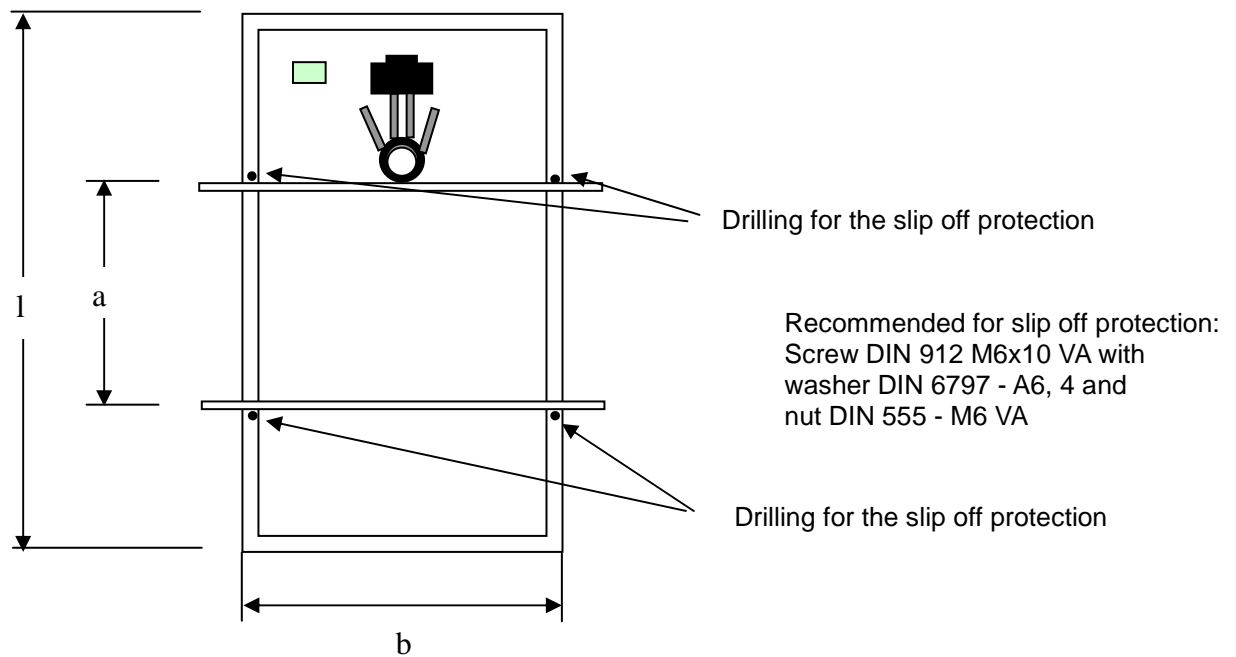
To avoid the slip off, during the installation of the modules on an oblique plan, special screws must affix on the right position of the long waling.

The protections of the screws take place of washers and nuts or with the help of self protection nuts.



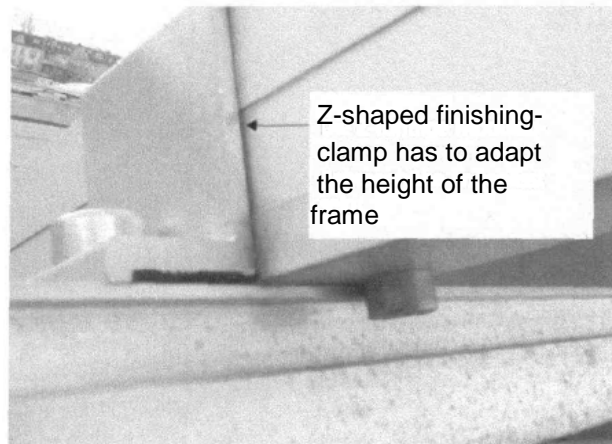
4.4 Module and Manual Measures

Rear of a PV module with drilling for the slip off protection



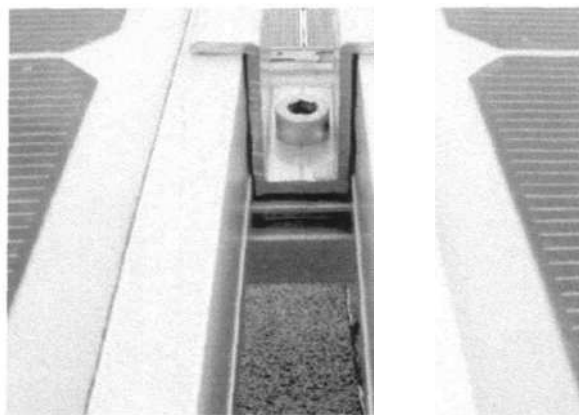
Standard Module	l [mm]	b [mm]	a [mm]
asola YYY	1979	990	1229
asola XXY	1680	990	1030
asola XXY/2	1660	990	1030
asola XXZ	1501	990	989
asola ZZZ	1343	990	693
asola XXX	1652	667	826

The modules must be fixed on the outer edge of the system on the long waling with the help of Z-shaped finishing-clamps on the mounting bar of the construction beam.



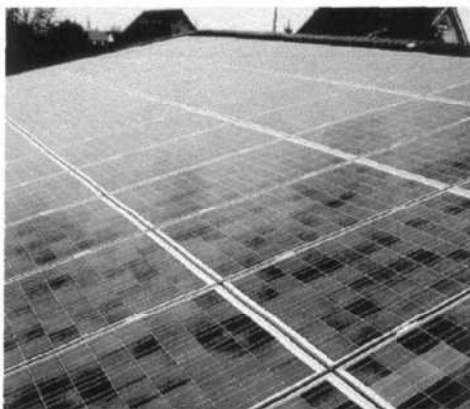
Slip off protection with Z-shaped module finishing clamp on the outer edge

For the installation use U-shaped module-middle-clamps between the PV modules.
To affix the clamps in amount of the slip off protection use Allen screws, locking rings and square nuts.
Dependent of the height of the frame use the proper Z- and U-shaped module clamps



view on modules with U-shaped installed clamps

Between the PV modules it should be a gap of a least 20mm to the next module on either side.



View on module area
– horizontal module gaps



view on module area
- vertical module gaps

4.5 General Information

It is not allowed to load the PV module connection cable mechanical. Do not carry a module by its wires or junction box, to avoid the hazard of electric shock, injury or damage to the module. PV modules generate DC electrical energy when exposed to sunlight or other light source. To avoid the hazard of electric shock and injury, cover the entire front surface of the module with a dense, opaque material, during the installation and handling of the module.

To transport the PV module safely, two or more people should carry it by its frame and wear non-slip gloves to avoid injury by a slipping module, to a foot, or cuts by the edge of a frame.

Attention:

It is necessary to ascertain the requirements of the lightning- and overvoltage protection, which are adapted to the local conditions, the applied technology and the current guideline (Euronorm IEC 62305).

These facts have to comply to regulations strictly.

It is assumed that the installation will be carried out by using the state of the art (observance of the guidelines DIN and VDE)

To avoid the hazard of damage modules (frost damages etc.), it is very important that the modules don't stand in water and additionally that rainwater can drain off every time.

It is possible, that variations concerning the manual references will arise, when using special sub constructions or fixture systems.

If there are upcoming questions please contact your contractual partner directly or refer to an authorized structural engineer.

Asola reserves the right to make changes to the product, specifications or manual without prior notice.

The manual references considered only in context with the asola data sheets, the general terms and conditions of trade and the warrant- and efficiency bond of the asola GmbH in its current version.

5. Interconnect, Electrical Connection

The PV modules are measured for using in application class A:

Dangerous voltage (IEC 61730: more than 50V DC; EN 61730 more than 120V DC);

Systems of dangerous capacity, where general contact access is anticipated. Modules qualified for safety through this part of IEC 61730-1 and IEC 61730-2 and within this application class are considered to meet the requirements for Safety Class II.

The PV modules are designed for use in grid-connected solar generators. If they are used for any other purpose, note the different technical conditions. The solar modules may only be installed by qualified specialist companies. During installation, the relevant standards and regulations for PV systems such as VDE regulations, DIN standards, VDEW guidelines, the technical connection conditions of your network operator and all applicable industrial safety requirements must be observed.

PV modules generate DC electrical energy when exposed to sunlight or other light sources. Concerning safety reasons cover the entire front surface of the PV module with a dense, opaque material.

The shock hazard increases as modules are connected in parallel, producing higher current, and as modules are connected in series, producing higher voltage.

System Voltage of 30V and more represent a hazard at a touch.

The shock hazard increases as more than two modules are connected in series, producing perilous voltage. High Voltage!

Only modules of the same type, the same specifications and the same performance class are allowed to connect them in series.

The junction boxes with pre-connected cables may not be opened for electrical wiring.

Only use suitable cables when wiring the module strings for outdoor installation (UV and ozone resistant).

The cables must have a minimum cross-section of 4mm² and the isolation must be compatible with the maximum open-circuit voltage of the system (1000V). Shield the cables from damage.

Do not clean the connection boxes and cables with substances containing oil, grease or alcohol. During installation, make sure the module connection cable has sufficient strain relief. The connection cables are fitted with a heavy duty plug connector system for the PV modules. Either the plugs are labeled with their specific polarity or the connection cables are colored. For additional cables for example string-cable only use connection cables of the PV industry. Be sure to note the polarity when connecting the solar modules to the inverter. Reverse polarity will result in the destruction of important technical components such as the inverter.

The plugs are signed of the polarity. The minus-pole is note by minus and the plus-pole is note by plus. Never disconnect or connect the plug contacts under load! You may disconnect or connect the plugs while energized, i.e.,the inverter must be disconnected from the DC mains grid.

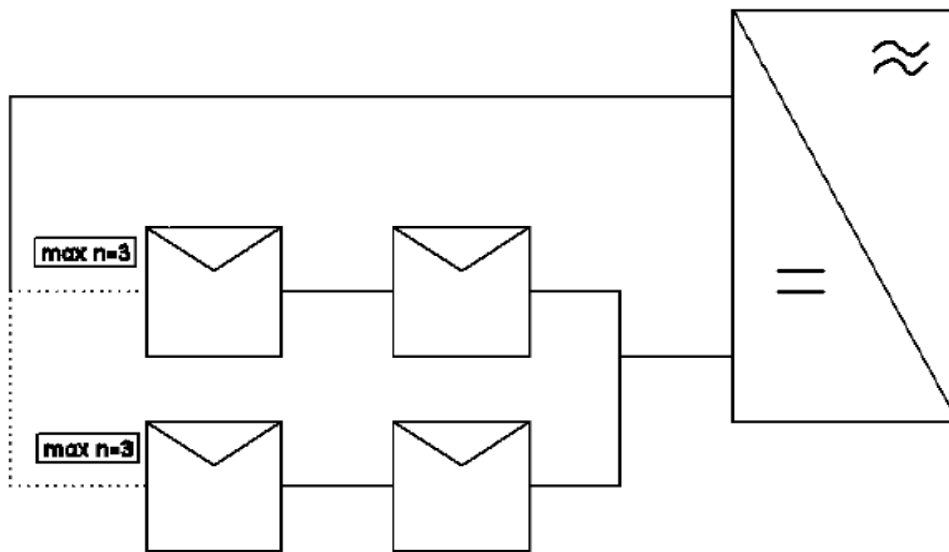
On disregard of that warning danger to life exist!

To avoid the risk of electric shock, all of the solar module frames and support structure for equipotential bonding must be properly grounded. We recommend establishing a ground connection outside of the building. When doing so, observe all legal regulations applicable in your region and the recommendations of the inverter manufacturer and your insurance company.

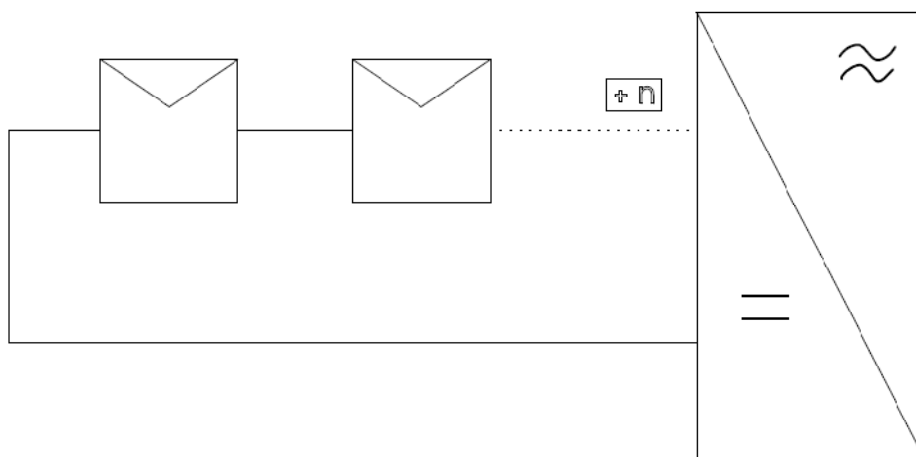
Under normal conditions a PV module can generate in relation under expected conditions a higher current and/or a higher voltage as it is stated under standardized test conditions. On reason to calculate the voltage measurements of conductors, the quantity of fuses and calculations of steering, which are connected on the output of PV modules, the values of I_{sc} and U_{oc} which are shown on the label of the module should multiplied by 1.25.

Parallel Connection of PV modules

When installing the modules, keep attention that max. 3 modules are allowed to connect parallel. In additional there is a max. current load of 22A acceptable.



Serial Connection of PV modules



The maximum permitted system voltage of serial connected PV modules must never be exceeded (see data sheet and module label)!
Additionally the open circuit voltage of the connected modules in sum doesn't reach more than 1000V!

The maximal measurement of the over current protection is analog maximal current load and does not reach more than 22A.

6. Maintenance

Asola PV modules only require a less of maintenances because they are conceived for a long period of time. Generally suffice it that rainfall is cleaning the surface of the module.

Dirt build-up on the front glass surface reduces the performance of the solar module.

If there is such a considerable amount of dirt, we recommend cleaning the glass surface of the module with eater that has the same temperature as the module and a soft brush. Do not use aggressive cleaning agents or metal objects for cleaning the surface of the module. In the case of plan installed PV modules (0° inclination angle), the modules should clean up regularly because of the less self cleaning effect.

Check the electrical lines at regular intervals for any form of damage or corrosion and for firm fit of cable connection.

