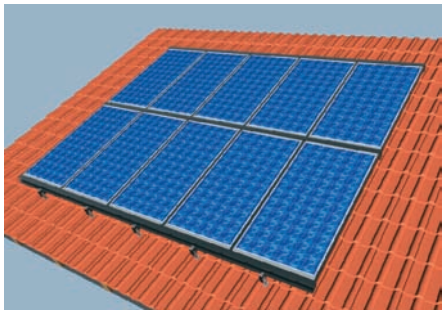
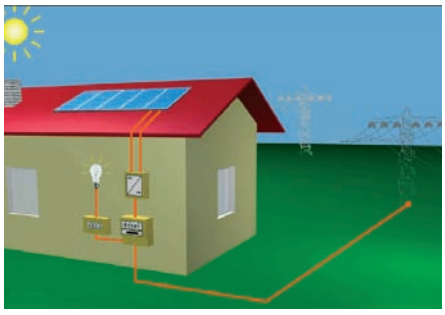
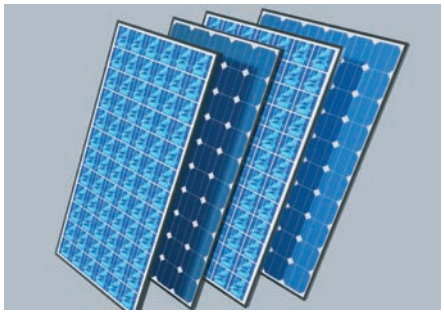
INFORMATION ON ELECTRICAL INSTALLATION WORK AND PUTTING THE SYSTEM INTO OPERATION

Please note: Before beginning the installation work, please contact your appropriate energy supplier to find out the technical connection requirements (TCR) applicable in your area. Deviations from these may be possible in individual cases.
When installing a photovoltaic system and the GermanSolar AG products described below, the following DIN / VDE standards in particular must be observed: DIN VDE 0100 Part 712 “Solar photovoltaic (PV) power supply systems”, DIN VDE 0100 “Erection of power installations with rated voltages below 1000 V”, and especially IEC 364-4-41/ VDE 0100 Part 410 “Protection against direct and indirect contact (DC voltage > 120 V, < 1000 V)”, and DIN V VDE V 0185 Parts 1 – 4 “Requirements for planning and constructing lightning protection systems”. In addition, the German trade association regulations pertaining to health and safety in the work place (BG regulations), especially those relating to “Electrical installations and equipment” as set out in BGV A3, and the generally accepted regulations of technology and the latest technological developments must also be followed.

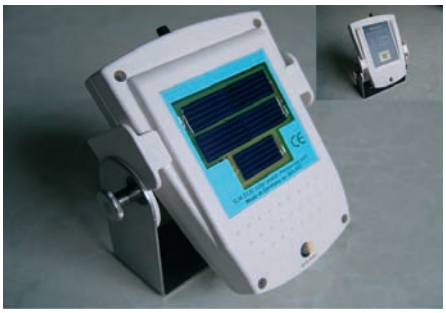






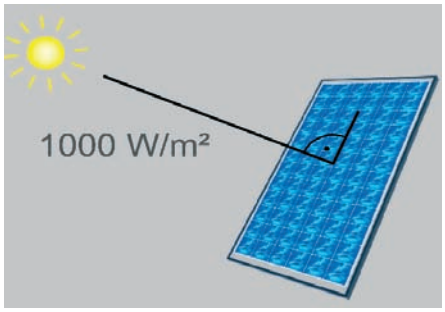
PV systems fitted to buildings have been a familiar sight in our surroundings for several years and the high-quality products from GermanSolar AG are no exception to this, defining the rooftops of houses in many regions. In this information sheet, we would like to share with you information on erecting and starting up a photovoltaic system and help you avoid typical installation mistakes. GermanSolar AG panels are available as both monocrystalline and polycrystalline modules, and each module is made up of 50, 60 or 72 cells, which are either 5 inches (125 x 125 mm) or +6 inches (156 x 156 mm) in size.

The modules are produced in accordance with high quality standards and fulfill the requirements set out in IEC 61215 and IEC 61730. We do recommend, however, that a few checks are made before beginning the installation work.

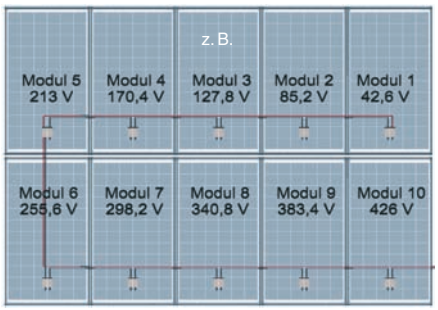


When checking the open-circuit voltages of the modules, the minimal light intensity must not be lower than 300 W/m2. The small and inexpensive measuring device MacSolar can be used to check this.

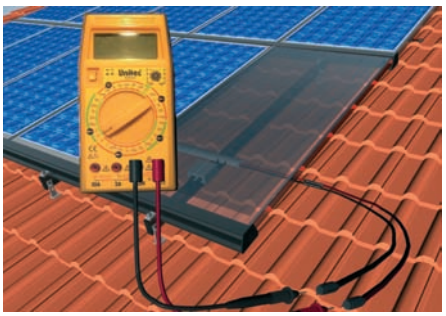
Depending on the type of module to be installed, the voltages measured should be in line with the following range of open-circuit voltages (Uoc) (slight deviations permissible):
50-cell + 6-inch > 28 V- but < 31 V-;
60-cell + 6-inch > 34 V- but < 38 V-;
72-cell + 5-inch > 41 V- but < 45 V-.



The highest open-circuit voltage (Uoc) is only possible with a light intensity of 1000 W/m2 and vertical insolation on the module surface. The data on the name plate is therefore only valid under standard test conditions (STC) of 1000 W/m², 25°C, and at air mass 1.5.



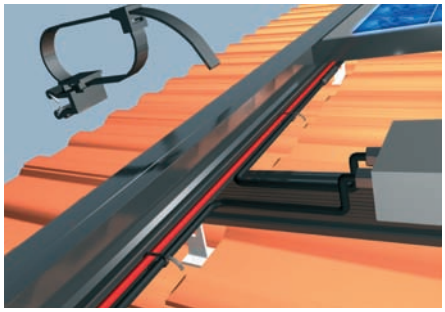
Under these light conditions, the string voltage of a module arrangement must therefore be equal to multiples of the values shown in the table. Negative deviations in the magnitude of the module voltage are a clear indication that an error has occurred.



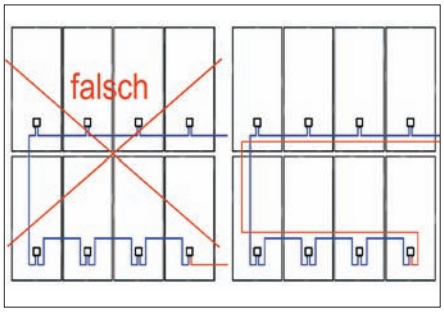
As today’s most common PV generator designs mainly connect 7-15 modules in a string, the string voltage they produce is usually >120 V. This places particular demands on the system components.

When planning and dimensioning the DC string cables, calculate the total length (outgoing and return lines) in a way which ensures that transmission losses do not exceed >/= 1%.

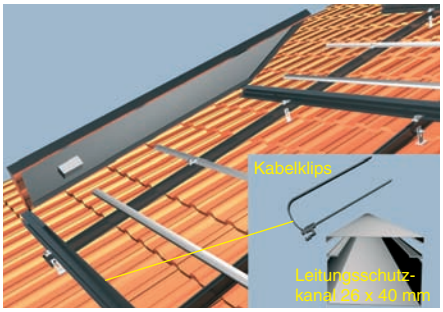
Caution! On the DC side of your PV generator, only use materials which meet the protection class II equipment requirements. This means using double-insulated PV cables, which predominantly have single cores and cross sections between 4 and 10 mm2, characteristics which are clearly marked and easy to identify. If you do not wish to use string fuses, the cables used must be short-circuit proof and offer earth leakage protection, and must be able to carry the maximum possible short-circuit current. Make sure that the system voltages indicated on the name plate of each module type (e.g. 450 V, 750 V, 1000 V) is taken into consideration when creating the module string and is not exceeded under any circumstances. Example: When forming a string of 12 modules of the same type with 72 cells per module which produce an open-circuit voltage of 516 V, a module type with a system voltage of 450 V must not be used. This is particularly the case in the event of negative outside temperatures, as the absolute level of the open-circuit voltage could rise even further due to the negative temperature coefficient.



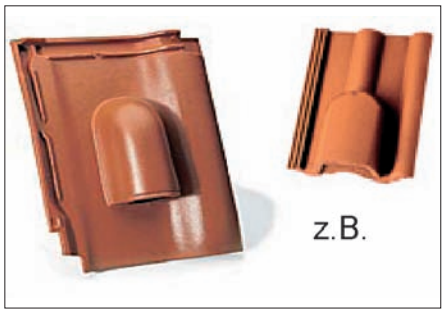
Always lay the string cables of a PV string so that in the area between the PV generator and inverter both cables (plus/minus) are parallel to each other and are positioned as closely together as possible. Avoid large conductor loops, which in the event of near or overhead lightning induce very high voltages in the conductor loops.



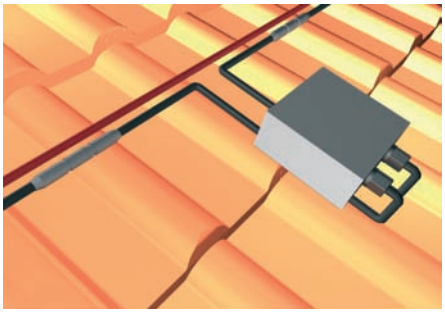
Failure of or damage to downstream devices (e.g. inverters) or continuous drops in the performance of the PV modules could be the result of incorrect installation. Failure of the bypass diodes in the module junction boxes is also possible.



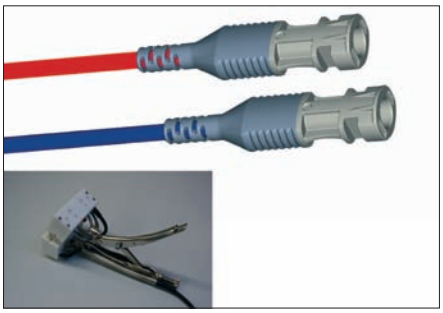
Make sure that the PV cables are attached to the installed system properly. Any mechanical friction of the cables against the roof covering or formation of ice under the installed system can cause damage and result in the early failure of the system.



In terms of roof penetration, make sure the cables are routed correctly, provide additional mechanical protection and fit sufficient bending radius for each set of PV cables (minimum of 6 times the exterior cable diameter). Integrating water-draining recesses into the roof prevents water penetrating the roof covering.

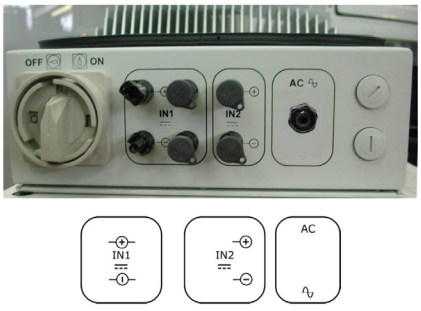


To link the modules together in a string, use the non-interchangeable and shock-proof plug connectors (plus/minus) which are provided with the modules. Connect the neighbouring modules to each other using the plus and minus plugs. Connect the remaining unattached module cables at the start and end of the string using the cable connecting kit provided, taking note of the individual assembly instructions included.

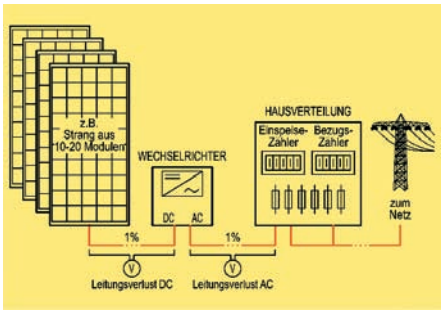


To help you distinguish between the poles, the PV connection cables and connecting fittings are colour coded. The outer layer of the cable joints can be protected using heat-shrink tubing or, in the case of certain cables, by using vulcanisation.

If you do not want to use the connecting kit recommended by the manufacturer, and prefer to use tools to crimp the cables directly, it must be ensured that the plugs and sockets used correspond exactly to the counter pieces that come with the modules. Using similar models (imitations) can lead to the penetration of moisture, which increases the contact resistance and often causes the cables to be set on fire or results in a reduction in the output of the affected string. The components used in incorrectly assembled installations are no longer covered by their guarantees.



Before fitting the string cables to the inverter, make sure that the polarity of the plus and minus string cables corresponds to the inverter's input polarity. In the event of the polarity being mixed up the inverter's display screen remains blank and no values are shown.
As with the generator, connecting kits are provided for the connections.



A class C circuit breaker (slow-trip) must be used in each inverter's AC connection cable. Choose the breaking capacity (16 A, 20 A or 25 A) by looking in the inverter manual. The permissible output loss between the inverter and the main distribution board should also not exceed 1%. Cable cross-sections which are too narrow could result in the inverter becoming disconnected when it nears its rated output (optimal level of insolation).

Once the installation work is complete and the PV generator circuit has been checked several times, the entire system can be started up in collaboration with the local grid operator. The settings of the inverter components do not need to be changed and the system is automatically connected.

The inverter's in-built display or the Power One - Service Tool software, which requires installation onto a notebook, can be used to show all the power, voltage and output parameters or to produce them in PDF format for use as a commissioning report. It is possible to password protect the parameter settings. To avoid compatibility problems, we provide a converter (RS 485 on a USB) which connects your laptop to the inverter.

GermanSolar™

GermanSolar AG | Am Seegraben 9-10 | D-03051 Cottbus

fon: +49 (0)1805 – 4949430 * | fax: +49 (0)1805 – 4949431 * | info@germansolar.com | www.germansolar.com

*14 ct/min a. d. dt. Festnetz, max. 42 ct./min. a. d. dt. Mobilfunknetzen, AktivCall GmbH