Welcome to Schletter Auto calculator

You have no time to give away! To reduce the mounting time on the roof to a minimum you have chosen the modular **Schletter PV-Mounting System**. Our auto calculator is a very efficient tool to help you with project planning, calculation and preparation of an offer. Within seconds you choose your module type and set your plant configuration. You get the price of the complete mounting system right away together with a list of the necessary components containing even accessories like screws. The effects of changes (such as different distances of roof hooks or the use of adjustable consoles "VarioTop" instead of usual flat roof consoles) can be calculated within seconds. Of course you can integrate the auto calculator into your internal planning software as it is a simple excel file.

1 Short instructions

- Open the auto calculator (You have to accept macros!)
- Define your **language**
- Enter general dates and your rebate rate (the rebate is considered in all calculations)
- Choose your module type (consider on end- or cross-mounting)
- Choose the arrangements of the modules (number of modules and rows)
- Choose the basic configuration:
  - ***System choice*** (standard, free area, etc)
  - Choice of the components (roof hooks, mounting rails, consoles…)
- If necessary, define special configurations (e.g. free area system PvMax2) in the respective fields
- If necessary, adjust the price list manually (add items, change numbers of components ...)
- Now the calculation is finished – You can print the configuration sheet containing the final price
- You can see the system details and price in the **results field**
- If you want, you can generate a list of items with the button "**list**" and print it
- If you want, you can generate a list of items without prices with the button "**list-o**" and print it
- If you want, you can print a schematic sketch of you plant with the button "**sketch**" (in preparation)
- With the ***export*** function you can generate an order file (in preparation)
- Save the file with a new file name or leave the programme without saving

Attention: Wood screws for roof rafters are not calculated automatically.
Please order them separately!

2 What you should know – How it works

- You define your plant on the configuration sheet and give all important information
- After you have chosen component types and numbers, they are automatically entered into the price list
- The system price is calculated in the price list and then entered into the configuration sheet under "results". You can also make manual changes or additions in the price list. You will immediately see the effect of your changes on the configuration sheet.
- On the basis of the price list you can generate a component list by pressing the **list** button or a component list without prices (to hand it to the customer) by pressing the **list-o** button. This list does only include changes that you made to this moment. After changing something you have to generate a new list.
- In the language menu (top line) you can choose between different languages.

3 What's new in version 6

- The modules are now listed by producer.
- You can choose the clamp type freely; the distances between the modules and with it the lengths of the crossbeams are adapted to the clamp type.
- There are new pictures in the comment.
- Now you can choose any special profile (e.g. special profiles with a bigger span) as crossbeam because we have changed our profile lengths from 5.5m to 6.0m.
- Now you can choose between four languages.
- Now you can **export** an order file (in preparation).
- A component list without prices can be generated with the "**list-o**" function.
- Special systems are now generally configured on the right side. This makes the calculation even clearer.
- **Transport charges** for delivery in Germany are calculated right away.

4 Important hints

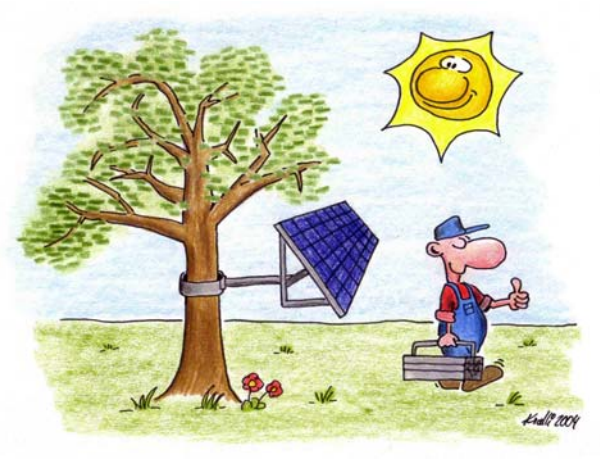
- Always use the auto calculator as a **read only** file or in a read only folder. To allow flexible modifications most parts of the programme are not protected against changes. So avoid changing the file by saving your own calculations with a different file name every time.
  If you don't follow this hint, the calculator might not work properly!

- **The auto calculator does not check the statics of your plant!**
  The auto calculator gives you the price and component list of selected configurations according to your information. **But the static features of your plant have to be checked separately with the static tables!**

- In the price list you can change the suggested numbers of the single components or add other items as desired (for example you can change the number of roof hooks to 42 instead of the calculated 38 or add screws for the roof hooks to your order).

- The auto calculator was also tested and optimised for many combinations and special cases. But please note that all results are without guarantee and have to be checked carefully by the customer.

With this hints you can make your first tries with the auto calculator. We hope that you are content with the our calculation tool and that it helps you save precious time in the planning process. In the following paragraphs you find a detailed description of the single modules.



5 Configuration of standard systems

Step 1: Project details (yellow)
Enter the customer's name, your rebate rate and the plant name.
The rebate is considered in all calculations.

Step 2: module choice (yellow)
The modules are sorted by producers. If you can't find your module in the list, choose the producer "AAMuster" and enter in the measures manually. Distinguish between on end- or cross-mounting.

Step 3: module arrangement (yellow)
Here you have to choose your module arrangement (number of modules and rows). Only rectangular fields can be calculated. If you have a more complicated arrangement, please subdivide it into rectangular parts and calculate each separately. The support distance is the distance between two roof hooks, consoles, special fastenings etc. Choose a suitable distance according to the nature and condition of the roof and the static features of the single components (information for that purpose can be found in the static documentations). If you already know the support distance (existing support construction) enter it here. The static tables tell you what distances are possible in the single case.

Note again:
The auto calculator does not suggest statically correct support distances!

Step 4: basic configuration (yellow)

- The **system choice** defines the fundamental assembly:
  Use **standard** for common pitched roofs and standard flat roof erections (modules on top of two rails).
  Standard plus GridTop (or similar) stands for systems that use usual crossbeam arrangements plus additional components.
  Different product names stand for special systems.

- **Supporting frame**
  Choose a girder profile.

- **Clamp type**
  Choose a clamp type from the list.

- **Roof hooks**
  Choose a roof hook from the list. The welded Eco hook is the most inexpensive choice for pitched roofs.

- **Special fastenings**
  How do you want to fasten your plant? Choose from the list. Special fastenings can also be combined, for example with consoles.

- **Consoles**
  Choose a console type from the list. You can also choose combinations (e.g. flat roof console Profi with gravel bed tub). Our consoles can be used in combination with special fastenings, too (e.g. if you want to combine consoles and the stock screw kit 300 you have to add two stock screw kits per console to the price list). Manually change numbers of pieces in the price list to change or choose further combinations. For special console designs the additional expenditure is entered in the respective field. This entry has no influence on other prices. Example: If you want the Profi Kompakt console, choose the basic design – e.g. Profi or light – and enter the respective additional expenditure (typically 20 to 25%).

6 Basic component calculation

In the basic window (green) crossbeams, fastening elements, clamps etc for standard arrangements (pitched roofs or erections with crossbeams) are calculated. The rail lengths are added up and divided into standard lengths. All clamps and suitable reserves are considered. If you are not content with the result you can overwrite the white fields (in this case don't save the file!):

Example 1: If you don't want rail lengths of 6 metres, overwrite the number of 6m rails with zero. The programme will then calculate the corresponding number of 4m rails. If you want to handle that this way every time, you can save the file in this condition and use it again this way.
Example 2: If a 4m rail and a very short cutting are calculated, you can set the number of 4m rails to zero and you will get one cutting of a 6m rail.
(Note: We will change our standard rail length from 5,5m to 6m in the middle of 2005.)

Note: the auto calculator considers that the maximum distance between rail end and last roof hook/console is 0.4m.

Important hint concerning the statics:

The field **"fastening points (per m²)"** shows how many fastening points per square meter are the result of **the information you entered**. You can then compare this number with the minimum number (per m²) of different fastening elements (e.g. roof hooks or plate folding clamps) in the system statics.

7 Result: plant details

In the result window **plant details** (green) the most important facts of the standard configuration or also the special cases (next paragraphs) are summarized. If you made manual changes in the price list (e.g. additional screws for roof hooks, etc), this is also considered in this window.
Thus you have a overall view of the total price, the price per kW, the total weight etc.

Transport charges within Germany (incl. BAB toll) are calculated by means of the total weight. The costs are divided into a fixed costs share and a weight share. Thus you can calculate the delivery charges for more than on plant part by adding up the weight costs shares and add them to the fixed costs (of course you have to pay those only once per order).

In the result window **additional technical information** (green) you can find information about the thermal expansion of the aluminium construction. By considering this information you can decide if the rows should be separated or for example be connected with suitable connectors.

8 Special module GridTop (please also note our corresponding product sheet)

The special module GridTop configures a system with vertical T rails in addition to the usual crossbeams. The vertical rail distance has to be entered into the field “vertical girders: maximum horizontal distance”. The total of module heights and spaces between the modules gives the length of the vertical rails. In this system the fastening points (roof hooks, corrugated sheet roofs fasteners kits, …) are located under the vertical girders. The number of fastening elements is calculated by the means of your entry in “**fastening points: vertical distance**”. The auto calculator chooses the crossbeam GridTop that is similar to the crossbeam Profi.

The field **“fastening points (per m²)”** shows how many fastening points per square meter are the result of **your information**. You can then compare this number with the minimum number (per m²) of different fastening elements (e.g. roof hooks or plate folding clamps) in the system statics.

If you are not content with the results you can overwrite the white fields (don’t save the file then!).

Note: the auto calculator takes into consideration that the maximum distance between rail end and last roof hook/console is 0.4m.

9 Special module PvMax2 (please also note our corresponding product sheet)

The free area erection PvMax2 is planned for a two row arrangement of modules on three or four crossbeams (depending of module size, snow load, wind forces etc). It is necessary to choose the console size according to the project planning instructions and the number of crossbeams (three or four) suitable for the maximum snow load. There are complete static programs for that. We would be glad to help you with the project planning.

A standard system consists of units of 18 meters with 2 module rows on top of each other. Each 18 meters unit is fastened to consoles or foundations and is stiffened with diagonal stayings. You can find all parts in the price and component lists.

Adapt the number of modules per row until the result is a row length of just under 18m. Then you can change the number of module rows until you reach the total number or power you wish. If you want to build a plant with a certain row length, it has to be divided into 18m units (and a shorter unit if necessary).

Note: You get the best price if you use us many 18m units as possible. Using shorter or longer units leads to a higher specific price.

Note: As long as there are no further specifications the auto calculator always chooses console kit #1.

Note: Module arrangements with three rows are also possible. The calculation for that to be adjusted manually. We would be glad to help you with that.

10 Special module PrimaTop (please also note our corresponding product sheet)

In this module the module measures, cross- or on end-mounting, etc have no influence on the calculation. Only the number of necessary consoles and clamps is calculated. Please note that PrimaTop can only be used with modules that are suited for this kind of fastening.

11 Special module GridNorm (please also note our corresponding product sheet)

This special module is working analogously to the special module GridTop, with one exception: it works with standard rails. It uses Solo profiles for vertical girders, for horizontal girders you can choose between different profiles, for example Solo or Profi. Please note that cuttings for vertical and horizontal girders are added in the price list if you use Solo profiles for both.
The usual rail connector is the crossbeam connector “plate”.

12 Special module Plandach5 (please also note our corresponding product sheet)

The system Plandach5 consists of vertical girders on which the modules are fastened. The rails are fixed on the roof without connectors. The needed number of wood screws to fasten the rails is calculated right away. To prevent laminated modules from touching each other, distance profiles (yard goods) are also considered.

The modules are fastened to the rails with single clamps (clamps for framed modules, special clamps for laminated modules). For fastening the modules to the left and right end rails, end clamps are also considered in the calculation. This end clamps are unnecessary, if a continuous connection to the roof is fastened directly to the end rails. In this case delete the clamps from your order.

13 Special module KompaktVario (please also note our corresponding product sheet)

The special module KompaktVario is a special system for erections on roofs with a crosswise running supporting construction. As bridge girders in north/south direction usually double groove profiles are used. This girders are fastened to the supporting construction. Please note that for these constructions there is a complete project planning programme.
On top of the double groove profile movable slanting support angles are fastened. The usual crossbeam arrangement is then fastened to these angles.

The following input is needed:

- ***Type of lengthwise running girders*** (in most cases DN1 or DN2)
- ***Total necessary length***
  Please don’t forget to consider the distance of the roofplates. Maybe the girders have to be longer then the module field to reach the existing roofplates.
- ***Type of console top***
  Just like for a usual flat roof erection, choose a console type (for example light for smaller modules or cross erection or Profi for on end erection etc).
- Please enter the statically tolerable maximum distance in the field “**vertical distance of fastening points**”. Hint: note that the number of fastening points per girder is calculated according to this entry. This number has to correspond with the actual number of roofplates. Of course you can also correct the calculated number manually.
- The distance of the bridge girders has to be chosen according to the statics of the crossbeam profiles. It has to be entered into the field **distance of supports** (step 3). The calculation of the crossbeams is done in the basic window.

Hint: Note that the fastening elements are made to measure for your roof according to your information. For the exact adjustment you have to fill out a check list. For the auto calculator calculation we defined price steps.

14 Special module Fix3Q (please also note our corresponding product sheet)

Fix3Q is a special system for the erection of modules on trapezoidal sheet metal and sandwich roofs. It is preferably used for cross-mounting.

(This system is in preparation)

15 Special module Fix3H (please also note our corresponding product sheet)

Fix3H is a special system for the erection of modules on trapezoidal sheet metal and sandwich roofs. It is preferably used for on end-mounting.

(This system is in preparation)

16-20 empty

21 Table sheet price list

The price list that you can find in the auto calculator on the table sheet „price list" is binding. It is the basis for all printed price lists.

At the same time this price list is also used for all calculations. For that purpose the results are entered into the last column that contains the numbers of the single components. Your rebate rate is considered as is the rebate that you get for ordering larger numbers (from 50 pieces, from 100 pieces) in the price calculation.

If you want to change the entries in the list, you can enter additional parts into the column "parts", delete some or overwrite fields.
Example: Add additional wood screws for roof rafters.

Please note that in hidden fields the article names can also be seen in other languages.

22 Table sheets list and list-o

After finishing your calculation you can generate a component list of the necessary parts with the button “list”. If you made manual changes in the price list this is taken over.
The table sheet „list-o“ also contains all components but no price information. This makes it suitable to give it to the end customer.

23 Table sheet sketch (in preparation)

On this table sheet the information about your plant is being shown clearly arranged in a schematic sketch. This system sketch with auxiliary information is supposed to show the configuration so well that a third person can mount the system without further CAD editing.

24 Additional internal table sheets

On the table sheet **modules** you can find further information about the modules. We try to always be up to date with the shown details. Nevertheless we cannot guarantee the correctness of this information.!

The table sheet data is there for our internal evaluation.

On the table sheet **languages** you can find all entries and names in the different languages. Please note that the multilingual article names can be found in the price list (hidden columns)!

The auto calculator software has been tested with all kinds of plant types. Nevertheless we cannot guarantee a 100% correctness. Only the up-to-date printouts of the price lists or order confirmations are binding. If you find any mistakes we you like you to inform us about it.

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