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## Advantages of SL Rack Ground Mount Systems

- » Easiest and fastest systems to assemble
- » Static and economic optimization through various profile heights
- » Module orientation in portrait or landscape
- » Simple and flexible module clamping on the short or long side
- » Fewer piles due to large spans
- » Only one tool required for clamping (Torx 40), ease of installation
- » Universal module clamping, combined clamping possible with Duo clamps
- » Choice of corrosion protection
- » Possibility of short delivery times
- » High adaptability to terrain contours and conditions
- » Design according to local and international building codes
- » Sturdy top structure, steel piles
- » Detailed installation manual and videos
- » Quick and easy consultation and design- even for challenging terrain and difficult ground conditions

## SL Rack in numbers:

- 26**..... Years of experience
- 30**..... GW installed worldwide
- 15**..... Product specialists are happy to support you!
- EU**..... Almost exclusively manufactured in Germany and Europe
- 100%** ..... Aluminum and stainless steel- **extremely durable**



Visit our  
website:  
[www.sl-rack.com](http://www.sl-rack.com)



Check out our  
YouTube-channel:  
[Installation videos >](#)

\*Our warranty conditions apply. They are available at [www.sl-rack.com](http://www.sl-rack.com)



## System Overview

### Dual-Post System

Available as 2V, 3V, 4V



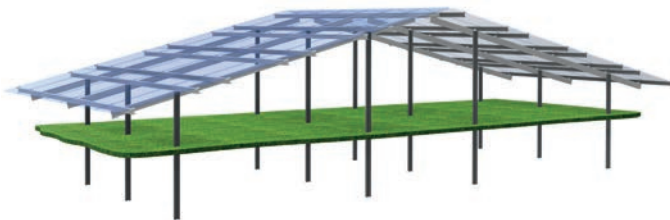
### Agrivoltaic System

Available as 2V, 3V, 4V (4H, 5H, 6H-> Rafter)  
Especially high ground clearance



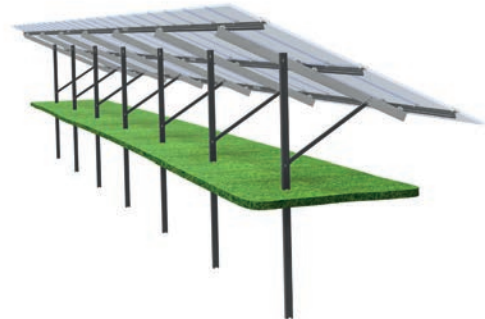
### East-West-System

Available as 4V (6H-> Rafter)



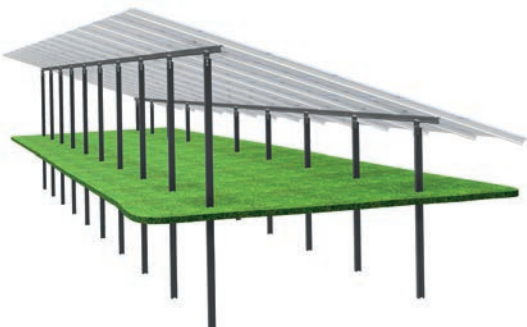
### Single-Post System

Available as 1V and 2V



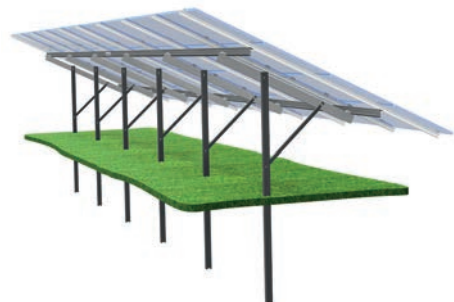
### Dual-Post Rafter System

Available as 4H, 5H and 6H



### Single-Post Rafter System

Available as 2H and 3H





## Geology and Statics

Not only do we offer verifiable structural calculations for your ground mount system, but we can also determine the required embedment depth of the piles. In addition, we provide you with a professional assessment of atmospheric corrosion and an informative analysis with detailed information on soil aggressiveness. These will help you decide on the most suitable foundation solution.

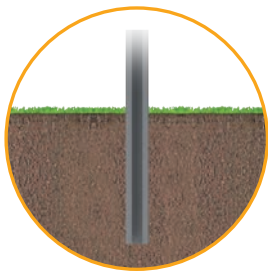
**Our team is happy to provide further information on the topics of geology and statics. Please contact us.**

 [Geologie@sl-rack.de](mailto:Geologie@sl-rack.de)



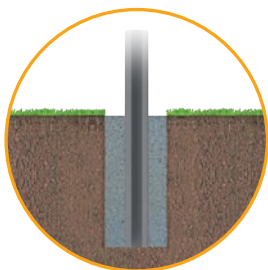
## Types of Foundation

Normally, racking is installed on driven piles. The piles are driven into the ground with the help of a hydraulic pile driver. To ensure the stability of the system, the embedment depth is determined individually for each site on the basis of a geological report. In regions where the soil is not suitable for pile-driving (e.g. rocky subsoil and/or aggressive soils), the piles can also be anchored securely in the ground with concrete. For this purpose, holes are pre-drilled in the ground and the piles are set in concrete. However, it is also possible to install concrete foundations above ground. In this case, the piles are connected to the concrete foundations via so-called foundation shoes. This method is intended for soils in which pile driving or drilling is not possible. Additional special solutions are offered through various helical pile foundations.



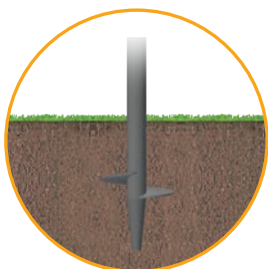
### Pile-Driven Foundation

Piles are driven into the ground with the help of a hydraulic pile driver. Based on a geotechnical report the embedment depth can be calculated in advance. Extremely boggy, sandy or stony soils as well as very steep slopes can make pile-driven foundations difficult.



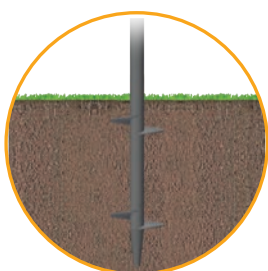
### Cast-In-Place Foundation

If numerous obstructions in the soil require pre-drilling, the hole can be filled with concrete, either dry or at a consistency that matches the maximum moisture content of the earth. Another option is to fill the hole with a concrete-gravel mix. Then the pile can be installed using conventional methods



### Helical Pile Foundation | Custom Solution

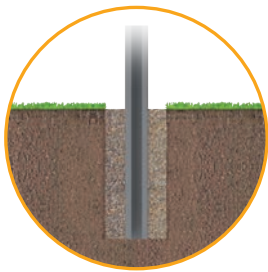
In case of extremely boggy, stony or sandy soils, helical piles can be used as an alternative. Helical piles allow a more shallow embedment depths, which can be particularly useful on landfills.



### Double-Helical Pile Foundation | Custom Solution

For a more stable design or for better support in extremely boggy, stony or sandy soils, double helical piles can be used as an alternative foundation method.





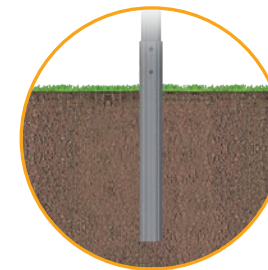
### Compacted Special Grain Foundation

If backfilling with concrete has not been approved due to special official regulations or environmental conditions, or if a cost-effective alternative is needed, a sand-gravel mixture (grading curve 0-8) can be used for backfilling. After the backfill has been compacted, the pile can be driven into the ground using conventional methods.



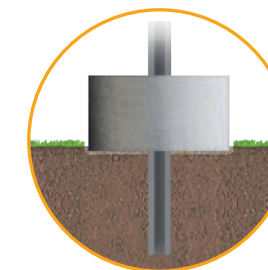
### Concrete Foundation ( Strip Foundation)

If it is not possible to ram piles into the ground or use helical piles, concrete foundations can be used as an alternative. Depending on the situation, pre-cast concrete blocks can be placed on the leveled surface or the concrete foundation can be cast at site. The SL Rack ground mount system is then attached to the concrete foundation.



### Pile-Driven Foundation made of Special Plastic Material

Highly corrosive soils have special material requirements. The pile-driven foundation made of special plastic is UV-resistant and ensures a high durability due to the special plastic used for production. This component is particularly suitable for bogs and the likes. Use this advantage for your project.

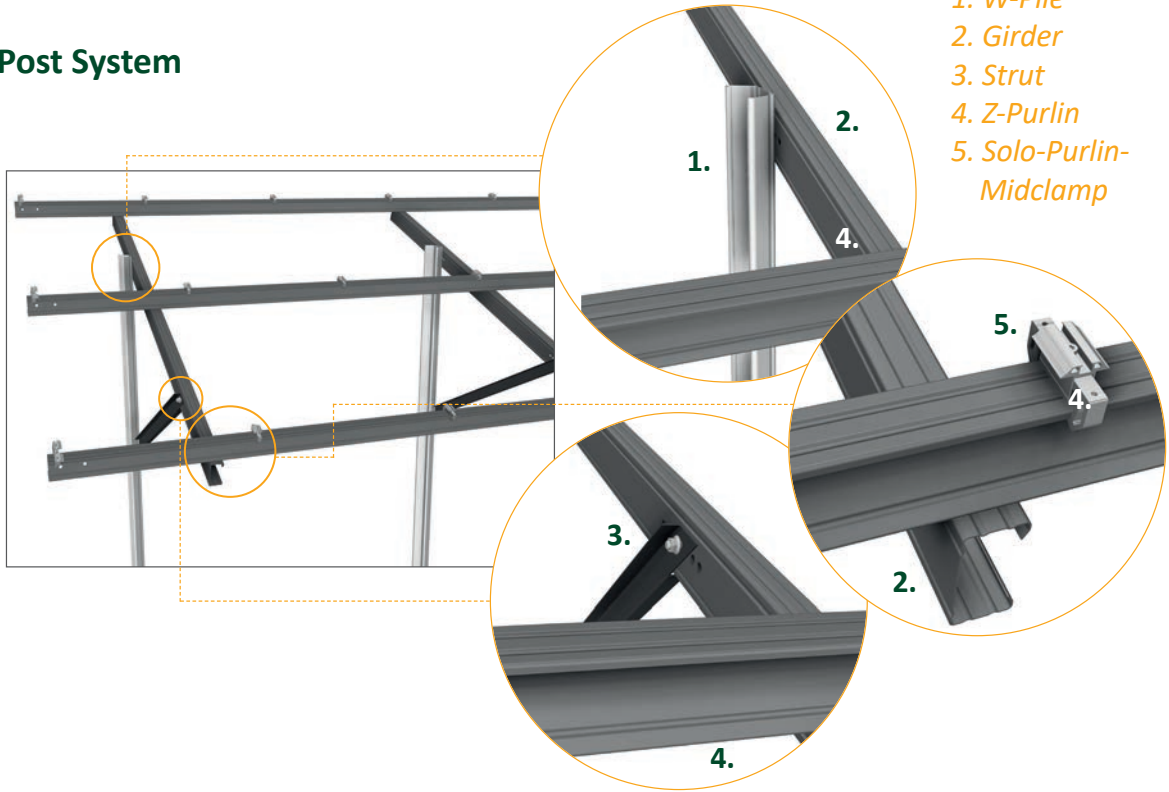


### Combined Ballasted/Pile-Driven Foundation

In case of problematic soil conditions - such as pile-driving obstacles, very aggressive soils, general prohibition to use concrete below the surface or in case of landfills, where only a shallow embedment depth is permitted - pile-driving up to a depth of 40 cm in combination with concrete ballast in the appropriate dimensions can be chosen as an alternative. While SL Rack will perform the calculations, the foundation itself has to be provided by the customer.

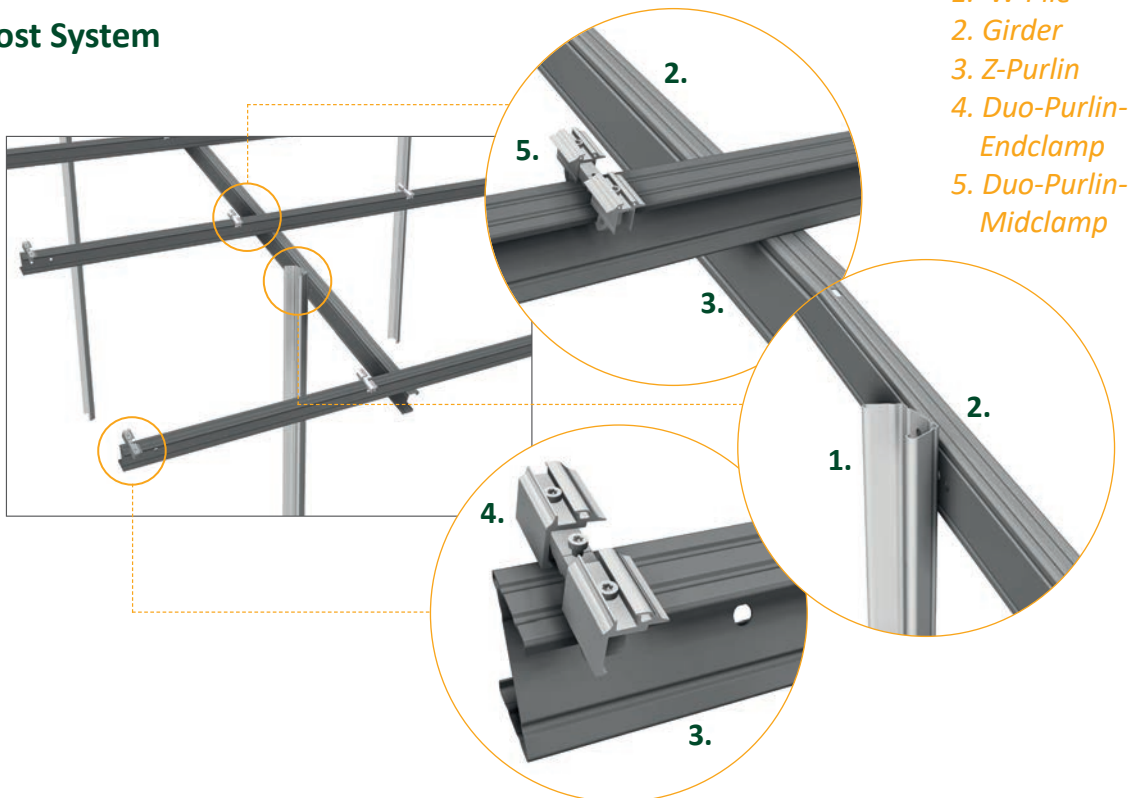
## Module Bearing Parts

### Single-Post System



- 1. W-Pile
- 2. Girder
- 3. Strut
- 4. Z-Purlin
- 5. Solo-Purlin-Midclamp

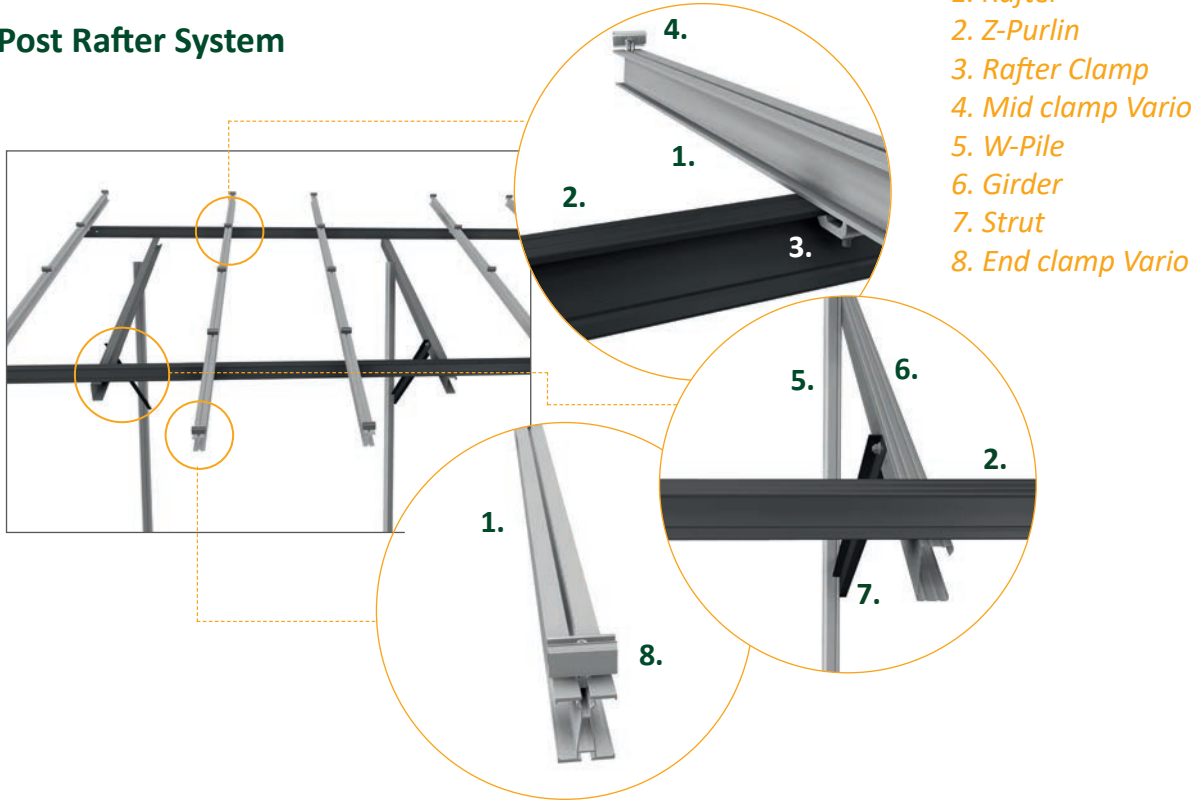
### Dual-Post System



- 1. W-Pile
- 2. Girder
- 3. Z-Purlin
- 4. Duo-Purlin-Endclamp
- 5. Duo-Purlin-Midclamp

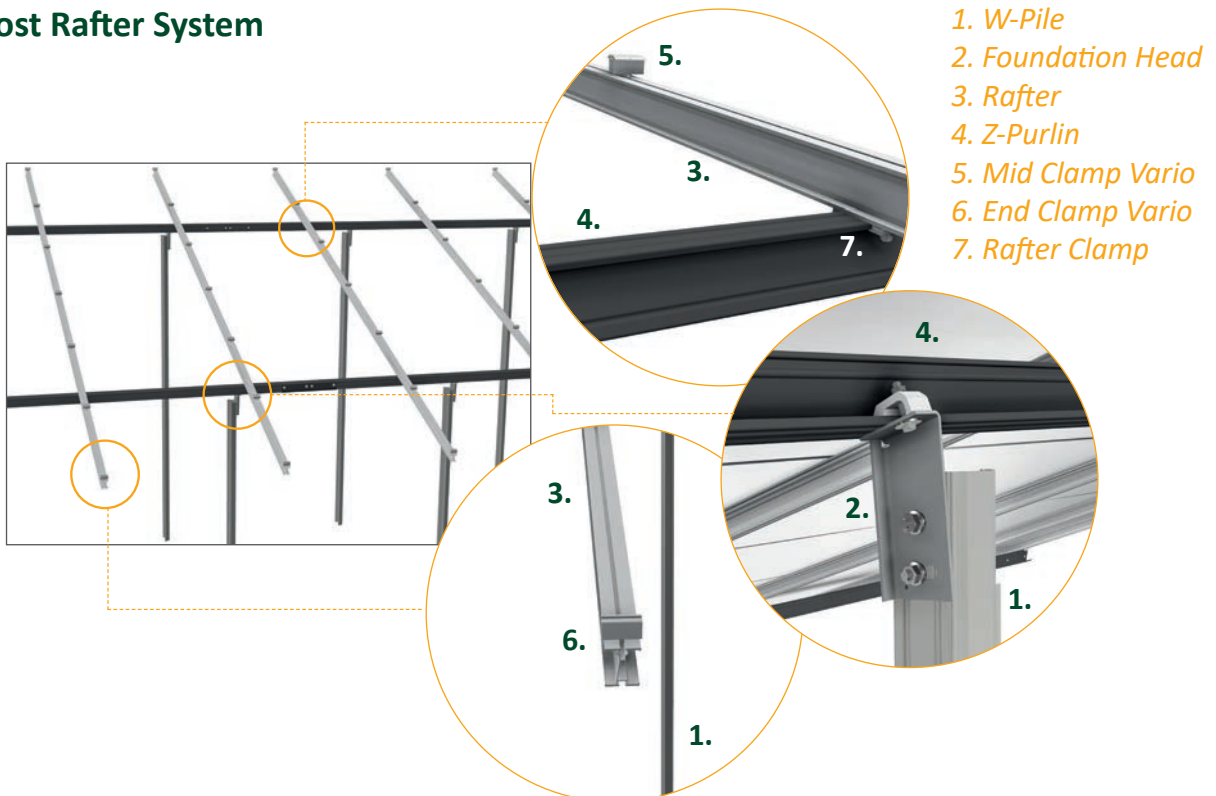


**Single-Post Rafter System**



- 1. Rafter
- 2. Z-Purlin
- 3. Rafter Clamp
- 4. Mid clamp Vario
- 5. W-Pile
- 6. Girder
- 7. Strut
- 8. End clamp Vario

**Dual-Post Rafter System**



- 1. W-Pile
- 2. Foundation Head
- 3. Rafter
- 4. Z-Purlin
- 5. Mid Clamp Vario
- 6. End Clamp Vario
- 7. Rafter Clamp

## Appropriate corrosion protection





Steel is a versatile building material, but it corrodes in the atmosphere, in water and in soil. Corrosion processes (also due to insufficient or poor surface preparation) cause considerable economic damage. Costs incurred as a result can be prevented with suitable corrosion protection. Suitable surface finishes delay the formation of rust enormously. Aggressive air pollutants, high humidity (> 80 % RH) or condensation, precipitation and salt water are thus kept away in the most efficient way. Therefore, steel surfaces should be covered with suitable protective coatings of zinc, zinc-magnesium or organic coatings, if necessary in several layers and in sufficient thickness, depending on the respective ambient conditions and the corrosion loads they are exposed to.

## EN ISO 1461 Hot-Dip Galvanization

The standard for piece galvanizing is DIN EN ISO 1461: „Zinc coatings applied to steel by hot-dip galvanizing (piece galvanizing)- requirements and testing.

- » This standard has also worldwide significance
- » Defines the tests required for hot-dip galvanizing of manufactured components in a discontinuous process
- » Standard specifies requirements for zinc coatings and establishes procedures to demonstrate compliance of hot-dip galvanizing with this standard
- » Defines services to be performed by the hot-dip galvanizing provider, but does not automatically apply to subsequent partial services
- » Defines the repair of defects (ungalvanized areas)

## Corrosion Protection Design of SL Rack Steel Racking

| Parts           |   | Corrosivity Categories                        |                     |          |        |
|-----------------|---|---|---------------------|----------|--------|
|                 |   | C2  | C3                  | C4       | C5     |
| Purlins         |  | ≥ Z 600<br>≥ ZM 310                           | ≥ Z 600<br>≥ ZM 310 | ≥ ZM 430 | ZM 620 |
| Girders         |  | ≥ Z 600<br>≥ ZM 310                           | ≥ Z 600<br>≥ ZM 310 | ≥ ZM 430 |        |
| Piles           |  | ≥ ZM 430                                      |                     |          |        |
|                 |   | Piece-galvanized according to DIN EN ISO 1461 |                     |          |        |
| W-Piles         |  | ZM 430  |                     |          |        |
| Bolts           |   | Stainless Steel                               |                     |          |        |
| Aluminium Parts |   | EN AW 6063 T66                                |                     |          |        |

The values in the table above for the galvanizing thicknesses/methods, depending on the corrosivity category, are based on DIN 55928-8 („Corrosion protection of steel structures by coatings and overlays; Part 8: Corrosion protection of load-bearing thin-walled components“) and are at least at the level of the standard. **The information is a non-binding recommendation of SL Rack GmbH and is subject to a case-by-case examination within the scope of project design.**



## Contact Corrosion

The risk of contact corrosion between two metals is low and considered unproblematic for the SL Rack ground mount system. Should a system be installed near the coast or salt water, protective measures can be checked and initiated. To illustrate: Depending on the metal pairing (aluminium- zinc- hot-dip galvanized steel, for example Z purlins- rafters and/or module frames), there is a difference in electrical potential of varying degrees. The greater the difference in this potential, the higher the corrosivity.

| Metal Pairing                       | Atmosphere |          |       | Water       |            |
|-------------------------------------|------------|----------|-------|-------------|------------|
|                                     | City       | Industry | Ocean | Fresh Water | Salt Water |
| Aluminum - Zinc                     | 0          | 0 - 1    | 0 - 1 | 1           | 1 - 2      |
| Aluminum - Hot-Dip Galvanized Steel | 0          | 0 - 1    | 0 - 1 | 1           | 1 - 2      |

### Legend:

0 = no significant corrosion of the metal pairing

1 = slightly increased corrosion, but no protective measures recommended

2 = increased corrosion, insulating protective measures recommended

3 = severe contact corrosion, avoid metal pairing

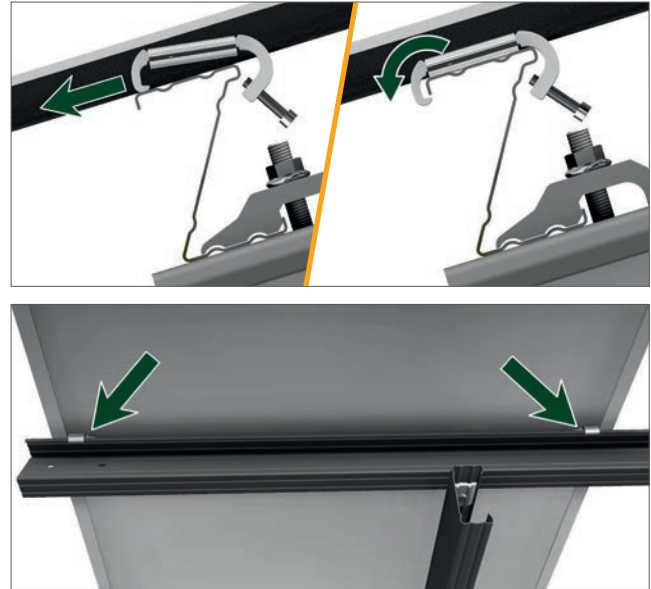
## Corrosion Categories according to DIN EN ISO 12944-2 (with Exposure)

| Corrosiveness categories<br>Corrosion stresses | Corrosivity  | Examples of typical surroundings   | Thickness reduction after 1st year of installation |                          |
|--|--|--|--|--------------------------|
|  |  |  | Carbon steel                                       | Zinc                     |
| <b>C1</b><br>Insignificant                     | Very low<br>Slightly aggressive<br>Interior        | Only heated indoor spaces, insulated buildings ( $\leq 60\%$ r. h.)  | $\leq 1,3 \mu\text{m}$                             | $\leq 0,1 \mu\text{m}$   |
| <b>C2</b><br>Low                               | Low<br>Moderately aggressive<br>Exterior/interior  | Unheated buildings, low-polluted atmosphere, dry climate. Mainly rural areas.  | $>1,3 - 25 \mu\text{m}$                            | $>0,1 - 0,7 \mu\text{m}$ |
| <b>C3</b><br>Moderate                          | Moderate<br>Little aggressive<br>Exterior/interior | Rooms with high humidity and low air pollution. Urban and industrial atmosphere with moderate $\text{SO}_2$ pollution or temperate climate.              | $>25 - 50 \mu\text{m}$                             | $>0,7 - 2,1 \mu\text{m}$ |
| <b>C4</b><br>Strong                            | High<br>Moderately aggressive<br>Exterior/interior | Swimming pools. Industrial atmosphere and coastal atmosphere with moderate salt load.  | $>50 - 80 \mu\text{m}$                             | $>2,1 - 4,2 \mu\text{m}$ |
| <b>C5</b><br>Very strong                       | Very high<br>Aggressive<br>Exterior/interior       | Environments with almost constant condensation and heavy air contamination. Industrial atmosphere with high relative humidity and aggressive atmosphere. | $>80 - 200 \mu\text{m}$                            | $>4,2 - 8,4 \mu\text{m}$ |

# Clamping Variations of the SL Rack Ground Mount System

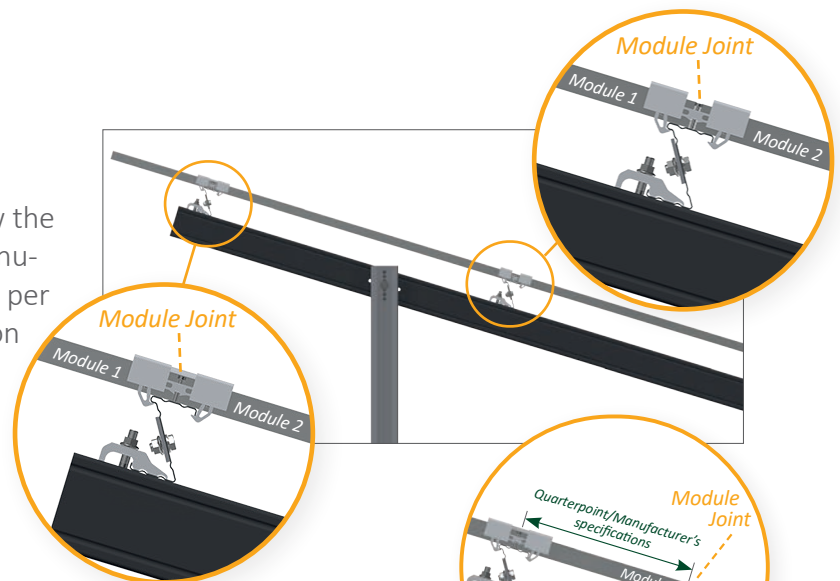
## Bottom Clamping

This pre-assembled clamp enables a simple, safe and quick installation of solar modules on ground mount systems by sliding it onto the Z-purlin from below and fixing it with Torx 40. The distance between the modules is only 5 mm, which optimises the use of space. It is suitable for vertical and horizontal module mounting and supports potential equalisation with an integrated grounding pin.



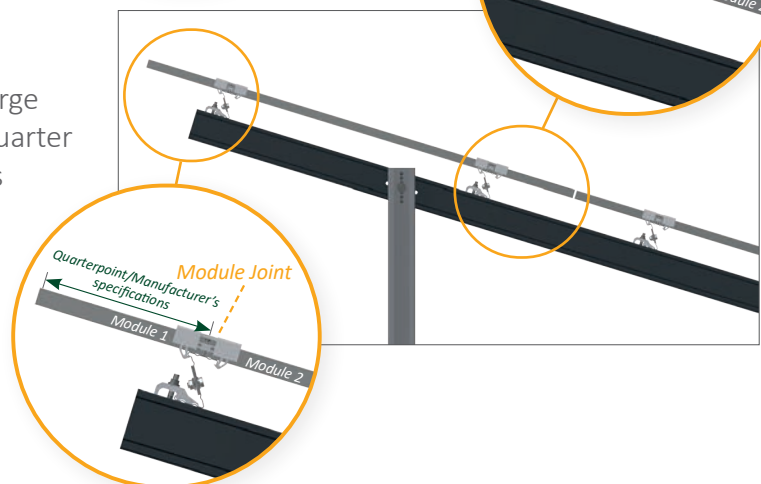
## Combined Clamping

With this type of clamping, you need to follow the clamping positions according to the panel manufacturer's specifications. Four clamping points per module ensure optimum clamping. A reduction in material might be an advantage of this clamping method.



## Quarter-Point Clamping

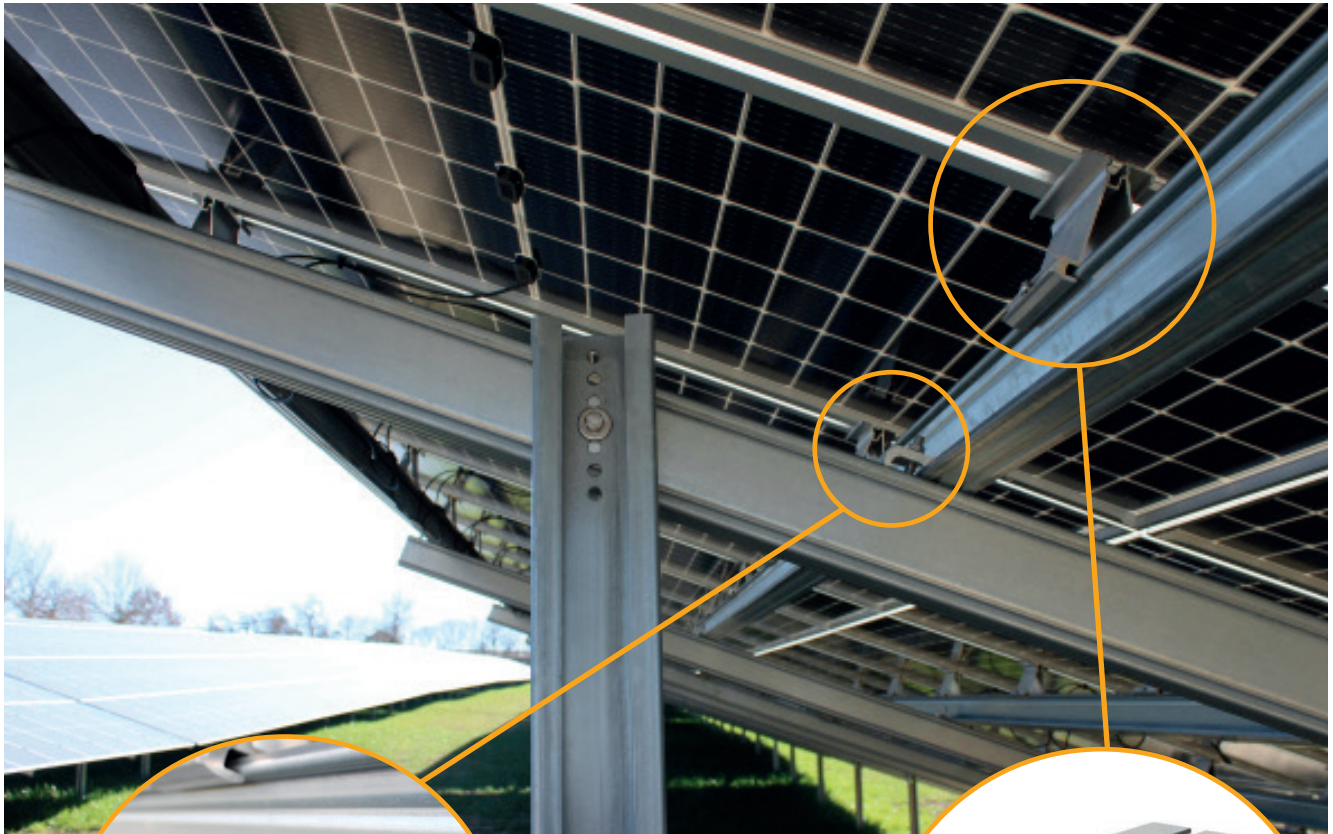
This type of clamping is recommended for large modules. The modules are clamped at the quarter point range, according to the manufacturer's specification. With quarter point clamping, the system requires an additional purlin, which leads to better resistance to higher snow and wind loads.





## Proven Designs Optimized - also for ground mount systems!

Our innovative Z purlin clamp makes it possible to connect girders and Z purlins with just one person. No drilling required, full flexibility at the construction site.



*Steel purlin clamp with cap*



*Module holder for bifacial modules ensures minimal backside shading. Only one tool required: Torx 40*

## Few components - huge time-savings

Only a few steps are necessary to assemble our ground mount system, consisting of very few components, especially small parts. This makes the SL Rack ground mount system one of the easiest-to-assemble systems on the market. This saves a lot of time and effort.

### W-pile special plastic



*Connection with W-pile*

### W-pile steel, optimized





**Girder,  
galvanized steel**



**Strut,  
galvanized steel**



*Strut, connecting girder  
and pile*

**Z-Purlin,  
galvanized steel**



**Rafter,  
aluminum**



*Rafter 80*

*Rafter 100*



*Rafter clamp for connecting  
rafter to Z-Purlin*

**Purlin Clamps**



*Solo-purlin mid clamp*



*Solo-purlin mid clamp with  
grounding*



*Duo-purlin mid clamp*



*Duo-purlin mid clamp  
with grounding*

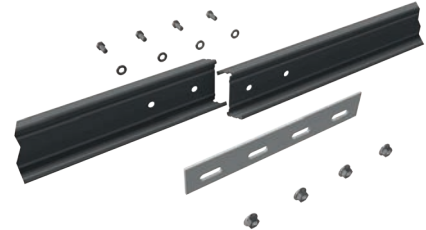


*Duo-purlin end clamp  
30-40 mm*



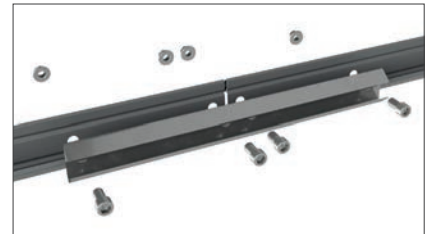
*Duo-purlin end clamp  
41-50 mm*

**Z-Purlin Connector,  
galvanized steel (stainless steel bolts)**



*Connection of 2 steel purlins*

**Steel Purlin Connector SPFV 80 - 600 mm,  
galvanized steel (stainless steel bolts)**



*Connection of two steel purlins with  
hexagon socket head screws*

**Steel Purlin Connector SPFV 100/130/170 - 600 mm,  
galvanized steel (stainless steel bolts)**



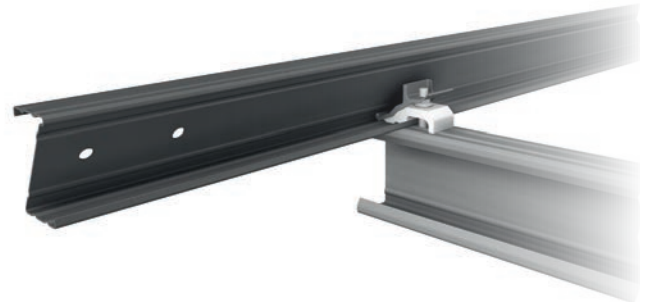
*Connection of two steel purlins with  
hexagon socket head screws*

**Z-Purlin Clamp,  
aluminum (stainless steel bolts)**





**Cap for Z-Purlin Clamp for cable protection,  
plastic**



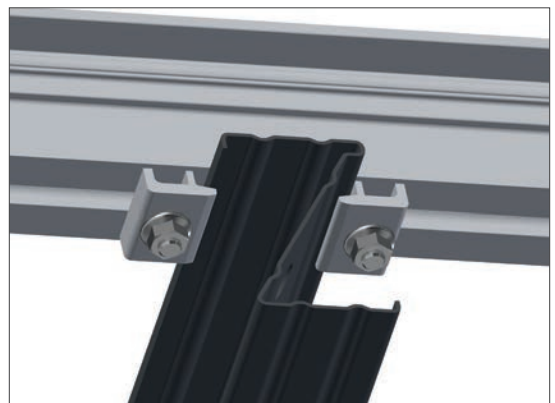
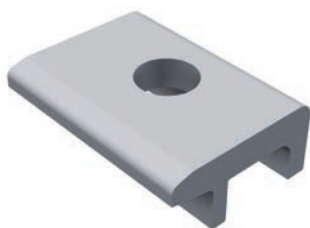
**Z-Purlin-Girder-Joint,  
aluminum**



*Tension-free installation for challenging terrain with slopes*



**Rafter Clamp**



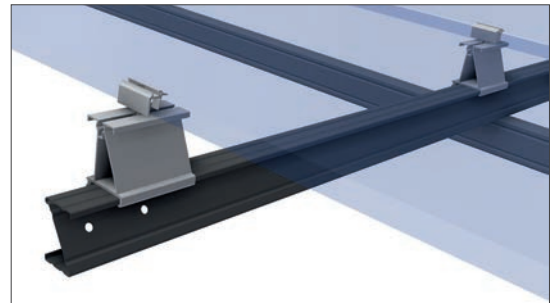
*Rafter clamp, connecting rafter with Z-purlin*

### Foundation Head



*Foundation head, connecting pile to Z-purlin*

### Module Holder for bifacial modules



### Bottom Clamp



*Clamp connecting solar panel to Z-purlin*



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