

SOLTOP Energie Ltd.

Montagesystem för solcellspaneler på industriella tak
med ballast

soltop
energie



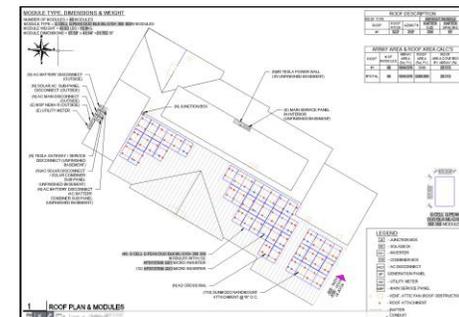
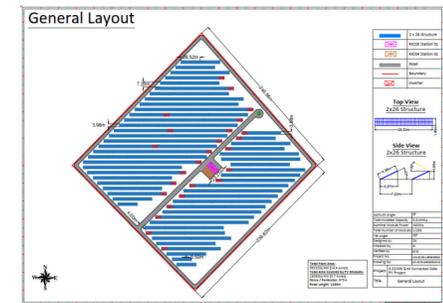
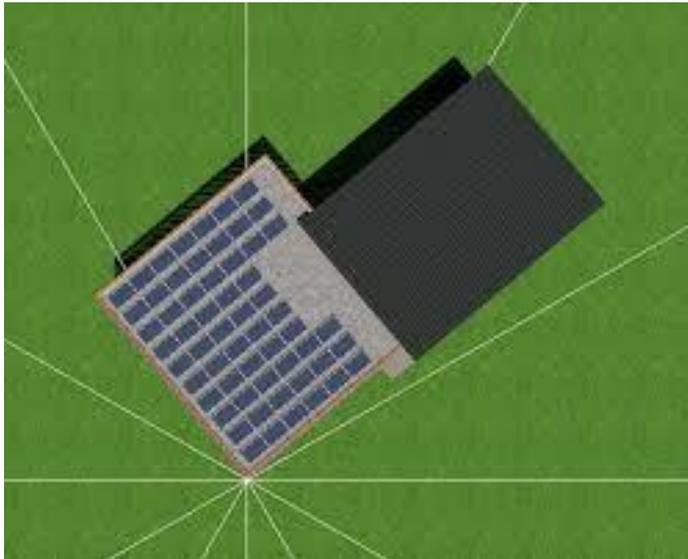
Elingenjör, eltekniker, VVS tekniker, byggingenjör, byggtekniker, ventilationstekniker.



Vilka krav ställs det på en solcellssäljare?

Projektör, teknisk design, val av system/lösning/produkter för utförande.

Obs, ej elinstallation, endast sälj och design av system.



Kompatibilitet och olika förutsättningar

inter
solar
connecting solar business

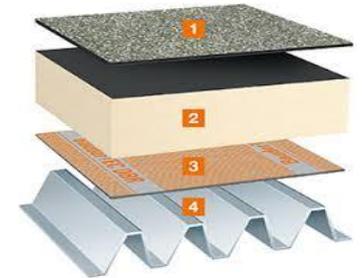
Takkonstruktion villa/landbruk:

Lerpannor, betongpannor, enkupig, tvåkupig, råspont, masonit, duk, pannplåt, falsad plåt (alu, koppar), korrugerad plåt, eternit, cembonit.



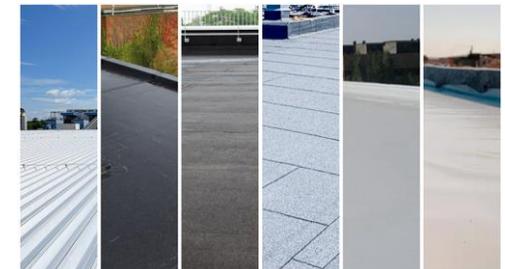
Takkonstruktion industri:

Självbärande plåt, siporex, råspont, isoleringens densitet, isoleringens tjocklek, takduk, PVC, papp, epdm, sedum.



Andra faktorer:

Taklutning, orientering, omgivning (terängkategori), snözon, vindhastighet, takhinder, vindturbulens, sarg, takets skick, ålder på pannor, takduk, läkt osv.



”inga problem”

Bedömning på plats och teknisk design:
Industriområde (TCIII) taklutning nästan 0°, inga hinder, perfekt.



Efter en tid:

Med solcellssystemets egen vikt, ballast, vindlast och snölast så finns det risk för deformation av isoleringen.

Orsak:

Isoleringen är ej avsedd för punktlast och ett montagesystem som är avsett för ett stumt tak.



Andra risker:



Tätskiktsgarantier



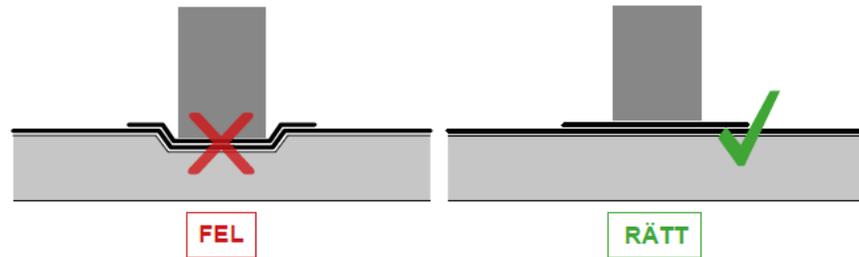
Januari 2024

6.13 Solpaneler på tak – ballasterat

Vid ballasterade lösningar ska konstruktör göra beräkning av takkonstruktionen så att stöd för solpanelerna inte sjunker ner och bildar gropar i tätskiktet. Underlaget ska alltså vara stumt (max tillåten deformation = 5 mm) och tåla belastningen över tid.

Glid- och skyddsskikt av tätskiktsremsa SEP 5500 TKY-A ska läggas mellan stöd och tätskikt som skydd för tätskiktet.

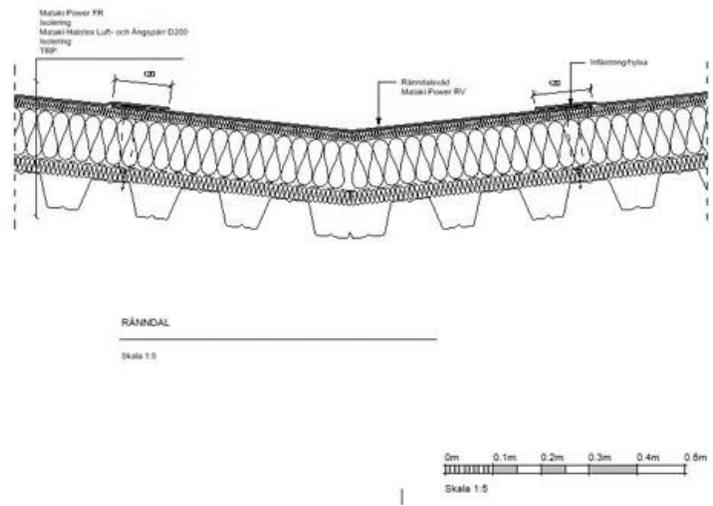
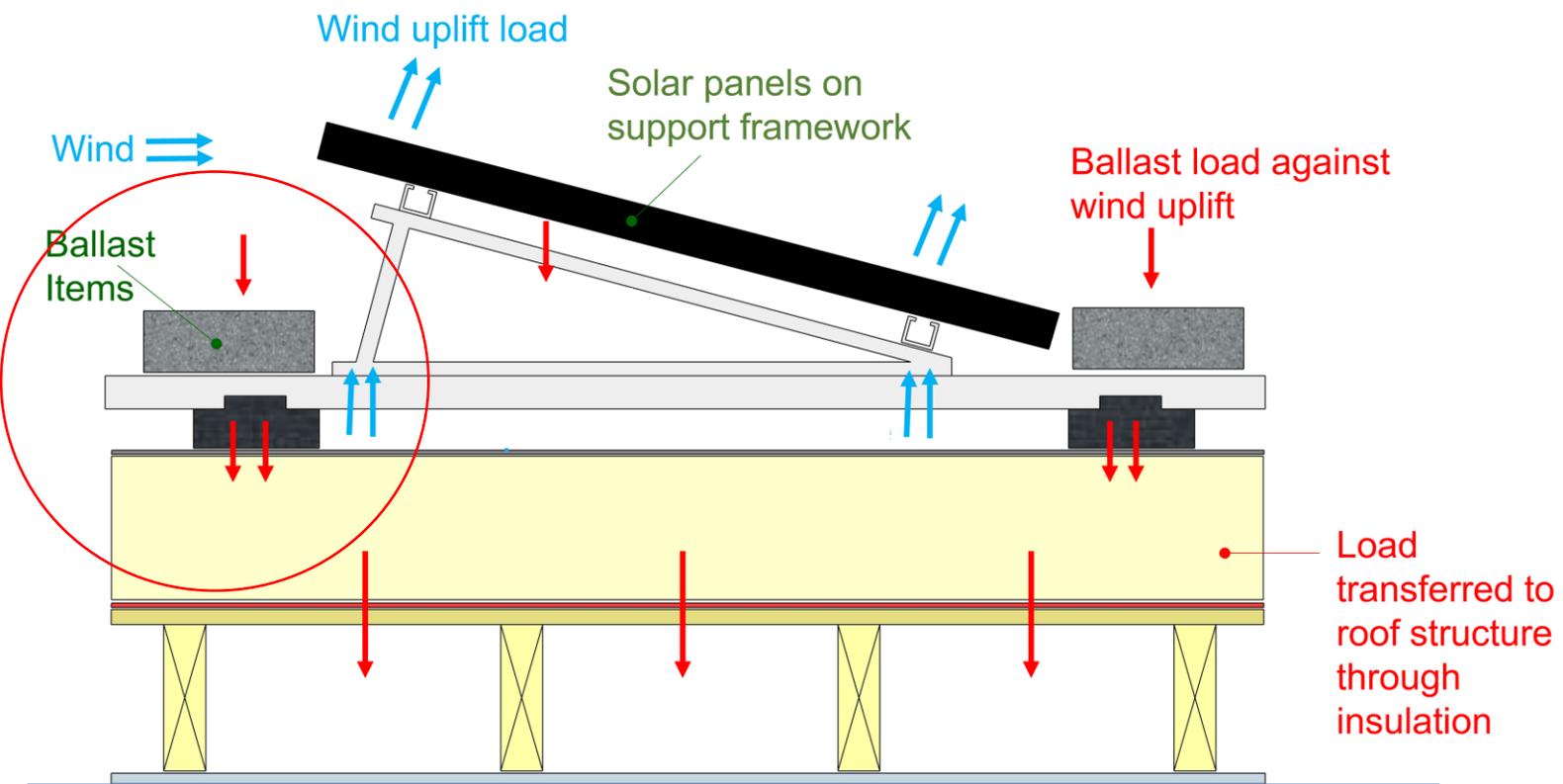
OBS! Beakta resultat från separat lastutredning avseende laster från tillkommande installationer som ställs/läggs på tätskiktet (solpaneler, aggregat, tralldäck på terrasser och dylikt) vid val av bärande isolering på låglutande tak. Jämför anvisningar i DIN 4108-10. (RA Hus IBG.2)



Glid- och skyddsskikt

Mellan tätskikt och stöd/skenor för solpaneler ska glid- och skyddsskikt läggas. Glid- och skyddsskikt ska vara kompatibelt med tätskiktet.

Ballast och konsekvenser med punktlast



Vad kan Soltop erbjuda?

- *På svenska solcellsmarknaden sedan 2011*
- *Extra bred skena och kraftig skyddsduk mellan skenorna och takduken.*
- *Support, utbildningar, besiktningar, gemensamma platsbesök.*
- *Vi hjälper er från säljets start till färdig installation.*



Soltops sortiment



Duraklick

ECO

Flatroof Mounting-System ECO

Duraklick
A brand of SOLTOP Energie GmbH

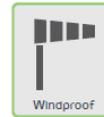
With the Duraklick-Eco 10°, 15° and 20° system, we offer a particularly economical and inexpensive alternative to our SR system. This flat roof mounting system consists of the same high-quality components as our proven SR system - but without side spoilers and without rear wind plates.

It is manufactured in a lightweight aluminium construction, is self-supporting and is installed without roof penetration. However, compared to the aerodynamically outstanding SR system, it requires a higher ballasting. For higher buildings and/or wind loads, we recom-

approved by
German Institute
for Building
Technologies



Non roof penetration



Windproof



For flatroofs



Fast assembled

Convincing Features:

- Available in three different inclination angles
- Cost-effective and easy to assemble
- Best load distribution due to 230 mm wide floor profile
- High-quality aluminium and stainless steel
- Approved by the German Institute of Building Technologies Nr. Z 14.4-691
- Compatible with the certified, non-roof-penetrating fall protection system Duraklick HSS
- Made in Germany

The Duraklick-Eco is available in three versions:

ECO 10°

Step size 1,35 m to 1,75 m



Technical specifications

Inclination 10°
Rail length 0,7 - 6,0 m
Modul width 900 - 1.100 mm
Surface load ca. 10,7 kg/m² *
Line load ca. 18,1 kg/m *
Material aluminium / stainless steel

* assuming a module weight of 19 kg and a step size of 1,5m

ECO 15°

Step size 1,50 m to 2,00 m



Technical specifications

Inclination 15°
Rail length 0,7 - 6,0 m
Modul width 900 - 1.100 mm
Surface load ca. 9,3 kg/m² *
Line load ca. 12,5 kg/m *
Material aluminium / stainless steel

* assuming a module weight of 19 kg and a step size of 1,75 m

ECO 20°

Step size 1,80 m to 2,50 m



Technical specifications

Inclination 20°
Rail length 0,7 - 6,0 m
Modul width 700 - 1.150
Surface load ab ca. 7,0 kg/m² *
Line load ca. 16,8 kg/m *
Material aluminium / stainless steel

* assuming a module weight of 19 kg and a step size of 2,0 m



Duraklick

ECO 0°

Roofparallel Mounting-System ECO 0°



Non roof
penetration



Windproof



Also for
flatroofs



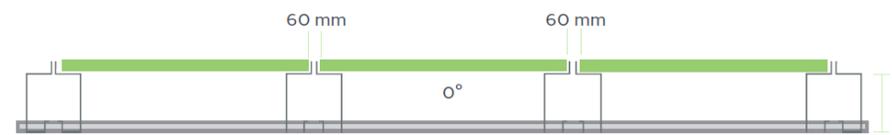
Fast assembled

Convincing Features:

- simple and safe
- approved up to wind zone IV
- corrosion-resistant and statically tested
- Made in Germany

ECO 0°

Suitable for photovoltaic-modules with a width of 800 - 1200 mm
0° mounting is possible on the short or long side.



Technical specifications

Inclination	0°
Rail length	0,3 - 6,0 m
Modul width	800 - 1200 mm
Surface load	ca. 13,1 kg/m ² *
Line load	ca. 21,6 kg/m *
Material	aluminium /stainless steel
	* assuming a module weight of 19 kg

Soltops sortiment



Duraklick

Flatroof Mounting-System east west

Duraklick
A brand of SOLTOP Energie GmbH

The Duraklick-EW mounting system was developed for maximum yields with maximum utilization of space. It ensures significantly more even yields on flat roofs and impresses with a first-class price-performance ratio.

The outstanding system properties such as simple installation, the click system, the lightweight aluminum composite construction and the excellent load distribution due to the 230 mm wide base profile are, of course, also features of this system. With a module inclination of 10°, it is ideal for roofs with foil or bitumen surfaces, because it is installed without roof penetration and requires no or only a slight load.

approved by
German Institute
for Building
Technologies



Non roof penetration



Windproof



For flatroofs



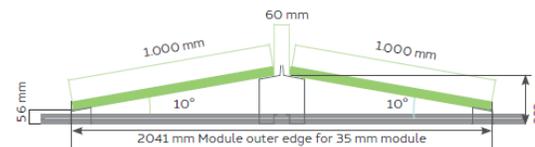
Fast assembled

Convincing features:

- Simple and safe
- Tested and approved up to windzone IV
- Corrosion resistant and statically tested
- Tested by the „Deutsches Institut für Bautechnik“ and approved by the building authorities under the number Z 14.4-691 since 2015
- Compatible with the height safety system Duraklick HSS
- Made in Germany

For PV modules with a width of 850 - 1200 mm and 10° inclination

EW 10°



Technical specifications

Inclination	10°
Rail length	0,3 - 6,0 m
Module width	850 - 1200 mm
Surface load	ca. 13,1 kg/m ² *
Line load	ca. 21,6 kg/m *
Material	aluminium / stainless steel

* With a module weight of 19 kg and a skip of 2.35 m without additional ballast

Soltops sortiment



Duraklick

Green roof Mounting-System GR

Duraklick
A brand of SOLTOP Energie GmbH

The Duraklick - GR is available in 10°, 15° and 20°. These systems can be mounted in south or in east-west configuration. The elevated module position makes it ideal for all types of green roofs as well as for open land. This also opens up green roofs for economic use by photovoltaics. Due to the lower ambient temperature they have a higher efficiency.

Due to the special construction of the module support, this system is also suitable for high wind and snow loads. The outstanding system characteristics such as easy assembly, by clicking in the module supports, the excellent load distribution due to the 230 mm wide floor profile, as well as the light aluminium

approved by
German Institute
for Building
Technologies



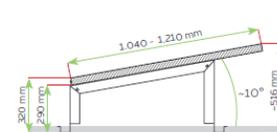
Convincing Features:

- Simple and safe
- Module height ~30cm above roof cladding
- For legal promotion
- Also mountable in east west configuration
- Corrosion resistant material and statically tested
- Made in Germany

The Duraklick-GR is available in three versions:

GR 10°

Module width 1134 / 30 mm

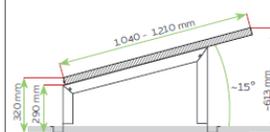


Technical specifications

Inclination 10°
Rail length 0,3 - 6,0 m
Modul width 1.040 - 1.210 mm
Surface load ca. 10,9 kg/m² *
Line load ca. 18 kg/m *
Material aluminium / stainless steel
* assuming a module weight of 19 kg

GR 15°

Module width 1134 / 30 mm

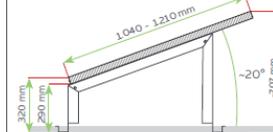


Technical specifications

Inclination 15°
Rail length 0,3 - 6,0 m
Modul width 1.040 - 1.210 mm
Surface load ca. 10,3 kg/m² *
Line load ca. 17,4 kg/m *
Material aluminium / stainless steel
* assuming a module weight of 19 kg

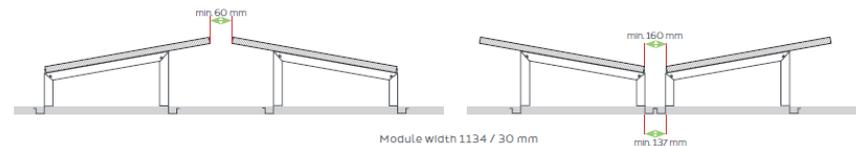
GR 20°

Module width 1134 / 30 mm



Technical specifications

Inclination 20°
Rail length 0,3 - 6,0 m
Modul width 1.040 - 1.210 mm
Surface load ca. 9,8 kg/m² *
Line load ca. 16,8 kg/m *
Material aluminium / stainless steel
* assuming a module weight of 19 kg



The GR 10° / 15° / 20° mounting system can also be installed in an east-west configuration.

Soltops sortiment



Duraklick

Flatroof Mounting-System GE

The new Duraklick GE is a economical and inexpensive alternative to mount panels on extensiv and also intensive vegetated roofs (green roofs). This mounting-system for flat roofs consists of the same high-quality components as our established SR and EW systems. Due to the elevated panel position, shading by vegetation is prevented. Often green roofs have a lower ambient temperature than membrane roofs. That results in a higher PV-panel efficiency, this is also increasing the system's profitability. It is lightweight.

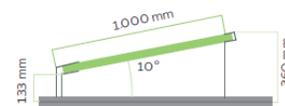


Convincing Features:

- Inexpensive and easy to assemble
- Elevated panel position (> 14 cm panel bottom edge)
- Best load-distribution due to our 230 mm wide floor-rails
- Corrosion-resistant materials

The Duraklick-GE mounting system is available in two versions:

GE 10°



Technical specifications

Inclination	10°
Rail length	0,7 - 6,0 m
Modul width	flexible
Surface load	plus ca. 10,7 kg/m ² *
Line load	ca. 18,1 kg/m *
Material	aluminium / stainless steel

* assuming a module weight of 19 kg

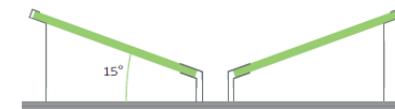
GE 15°



Technical specifications

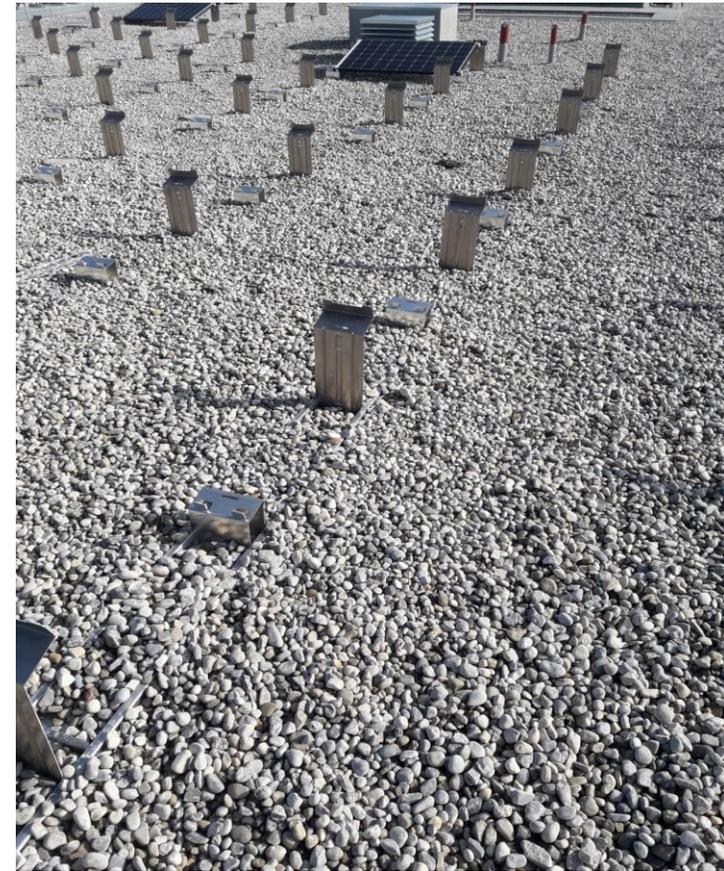
Inclination	15°
Rail length	0,7 - 6,0 m
Modul width	flexible
Surface load	plus ca. 10,0 kg/m ² *
Line load	ca. 16,8 kg/m *
Material	aluminium / stainless steel

* assuming a module weight of 19 kg



The mounting systems GE 10° and alternatively GE 15° are also available in an east west configuration.

Duraklick GE, GR för markmontage (deponier, flygfält)



Soltops sortiment

Duraklick

A brand of SOLTOP Energie GmbH

HSS

Height safety system Duraklick - HSS:

The certified height safety system is a flexible and economical fall protection system that was specially developed for photovoltaic systems with Duraklick substructures. Suitable for all Duraklick and KNUBIX systems, existing installations can also be retrofitted with it.

For more safety and efficiency when working on roofs!



Height safety system Duraklick - HSS:

The Duraklick - HSS was developed to provide an efficient, flexible and economical solution for fall protection on flat roofs. It is integrated into our PV mounting system without roof penetration and eliminates the need to place securants or other roof safety devices. Up to 4 persons may be secured at the same time and enjoy great freedom of movement.

The system is approved as a restraint system in the EU and corresponds to the current state of the art in Switzerland.

Convincing features:

- Retrofittable to all Duraklick & KNUBIX roof systems
- Can be mounted without roof penetration
- Optimal utilisation of the roof area
- Greatest possible freedom of movement on the roof
- Following system, prevention of pendulum falls
- No shading of the modules
- DEKRA certified according to DIN 795-2012 Type D and E
- EU approved and corresponds to the current state of the art in Switzerland and Norway
- Economic price

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energie

Duraklick

Each HSS includes 2 PPE equipment sets. Each bag contains the equipment necessary for securing one person.



Safetyharness



Fall protection-
runner



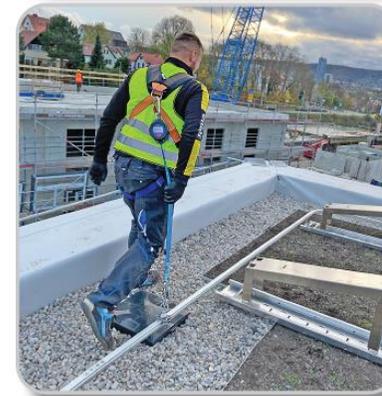
foldable Fall
protection-
runner



Fall arrester



optional:
Travelling fall arrester
+ belt fall arrester



TPL-lager i Tibro, LGT



- *Paketering, leveransadress, kontaktperson vid ankomst, leveransdag och klockslag om det finns en krabil som väntar.*
- *Lagret alltid öppet mellan 07:00 och 16:00.*
- *Leverans inom 5 arbetsdagar*



Checklista och nödvändig information

Checklista Duraklick Sida 1 av 2

Objektnummer:

Observera: Ofullständiga förfrågningar (checklistor) kan inte behandlas

Kunddata

Ert kundnummer hos oss: Installatör eller Projektör/systemdesigner

*Företag:

*Kontaktperson:

*Gata / Nr: Telefon:

*Postnummer / Ort: Mobil:

*Land: *e-post:

Projektinformation

Kundens namn: *Projektets namn:

*Gata / Nr: Ditt projektnummer:

*Postnummer / Ort: *Årbygd: Ja Nej

*Land: Planerad byggstart:

Byggnadsdata

Befintligt tak Byggnadsår: Renoverat tak Nybyggnad

*Takmätt: Längd nord-syd = m Bredd öst-väst = m

*Byggnadshöjd: m *Taktutning: ° Lastreserv: kg/m² Azimut: °

Takets lutning: på längden eller på tvären till våra golvskenor

Isoleringsens tryckhållfasthet: kN/m²

*Sarg: ja = höjd: m bredd: m nej

***Detaljer om takytan:**

Tak av plastfolie! Tak av PVC-folie! Bitumen! EPDM!

*Tillverkare (om känd):

Grönt tak → med substrat med sedum med annat

Extensiva gröna tak Intensiva gröna tak

Grusat tak → Grushöjd: cm Typ av grus:



JA SOLAR DEEPBLUE 4.0
455W

n-type Bifacial Double Class High Efficiency Mono Module JAMS4041 LB
430-455

Monteringssystem Duraklick (Information finns på www.soltop-energie.eu)

Monteringssystem	*Sydlig konfiguration	*Öst-västlig konfiguration	*Radavstånd
ECO 0° (planlätt tak)	<input type="checkbox"/>	<input type="checkbox"/>	m
ECO 10° + EW 10°	<input type="checkbox"/>	<input type="checkbox"/>	m
ECO 15°	<input type="checkbox"/>	<input type="checkbox"/>	m
ECO 20°	<input type="checkbox"/>	<input type="checkbox"/>	m
GE 10° (upphöjt system)	<input type="checkbox"/>	<input type="checkbox"/>	m
GE 15° (upphöjt system)	<input type="checkbox"/>	<input type="checkbox"/>	m
GR 10° (Grönt tak)	<input type="checkbox"/>	<input type="checkbox"/>	m
GR 15° (Grönt tak)	<input type="checkbox"/>	<input type="checkbox"/>	m
GR 20° (Grönt tak)	<input type="checkbox"/>	<input type="checkbox"/>	m
SR 10°	<input type="checkbox"/>	<input type="checkbox"/>	m
SR 20°	<input type="checkbox"/>	<input type="checkbox"/>	m

Fallskyddssystem för höjd (HSS)

Ja = Vänligen fyll i den separata checklistan (HSS) Nej

***Data solcellsmodul**

Tillverkare: Benämning:

Effekt: Wp Modulens mått (LxBxH): mm

Modulvikt: kg Totalt antal moduler:

Ramfärg: Silver Svart

Öbligatoriska dokument (bilagor)

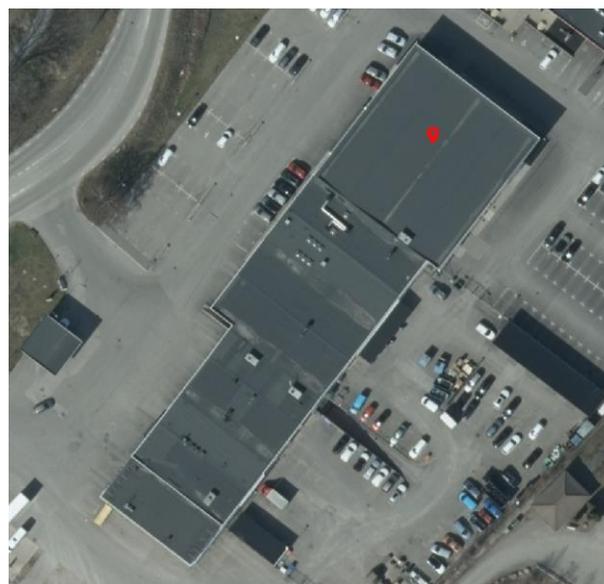
*Dimensionerad takplan med modulplacering och nord-sydlig riktning (CAD- eller PDF-fil)

*Datablad för modul

*Foton av tak, plats och omgivning

*Jag bekräftar härmed att de uppgifter jag har lämnat är korrekta.

*Plats, datum: *Namnunderskrift:



Tre skenor för extra snölast och enligt paneltillverkarens garantivillkor



Shanghai JA Solar PV Technology Co., Ltd.
 No. 35, Jiang Chang San Rd
 Zhabei, Shanghai 200436
 P. R. China
 Tel: +86 (21) 6095 6791
 Fax: +86 (21) 6095 9669

High snow loads are no problem. A third support with floor rail can be installed on an duraklick system.

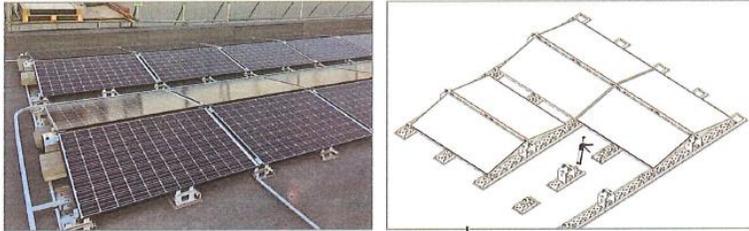


Figure 2 the clamps and rail position of Duraklick 3.Schiene EW 6-Punkt

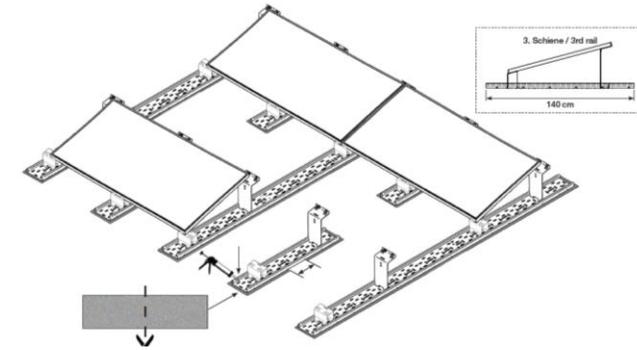
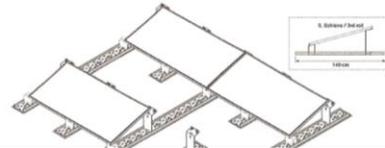
Statement of Compatibility:

JA Solar Photovoltaic Modules and mounting Systems

Date: 20/02/2024
 To: Whom it may concern
 Subject: PV Modules – Mounting Systems Acceptance

This letter shall serve as a statement of compatibility between JA Solar photovoltaic framed modules and the mounting systems Duraklick 3.Schiene EW 6-Punkt and Duraklick 3.Schiene Süd 6-Punkt from SOLTOP. This letter is provided as a supplement to the installation and safety manual provided with the modules at the time of sale.

JA Solar confirms that the module to be used with Duraklick 3.Schiene EW 6-Punkt and Duraklick 3.Schiene Süd 6-Punkt from SOLTOP, which Figure 1 and Figure 2 indicate the clamp and rail positions, do not violate the product warranty of JA Solar's single glass framed modules of the series JAMS4530/MR, JAMS4530/GR, JAMS4530/LR, JAMS4531/MR, JAMS4531/GR, and JAMS4531/LR, if the maximum (test) loads in Figure 3 are not exceeded in portrait or landscape installation.

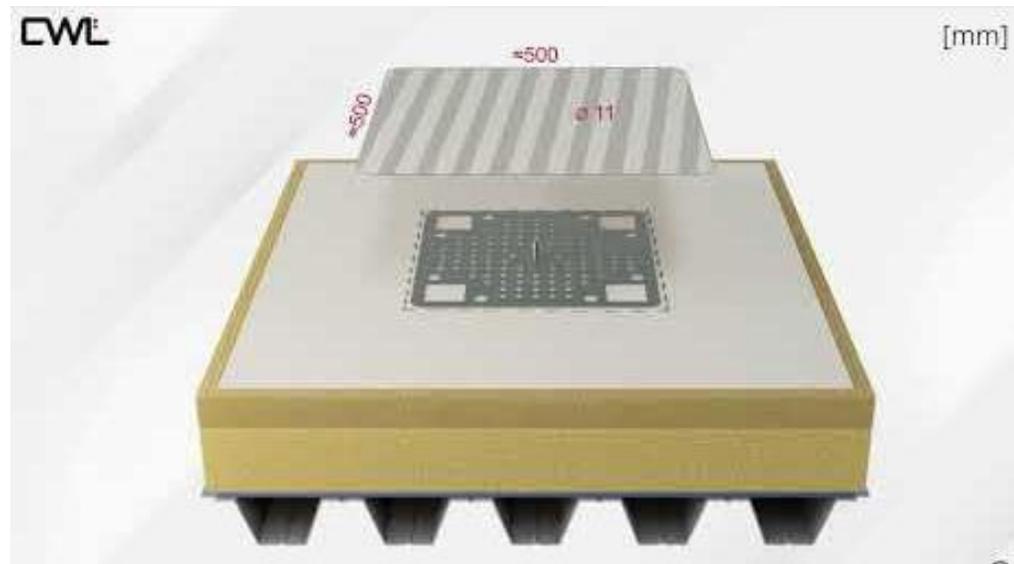
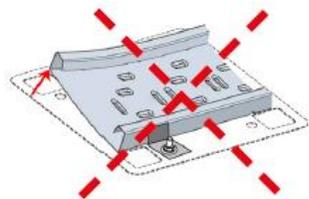
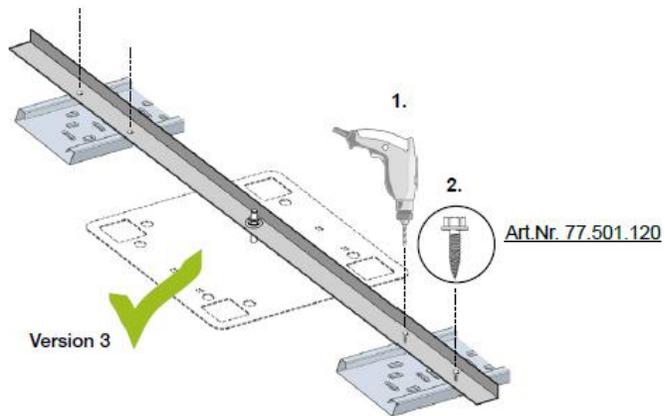
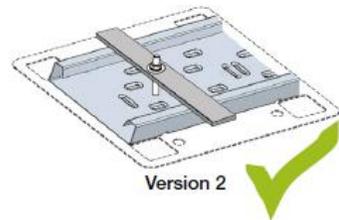
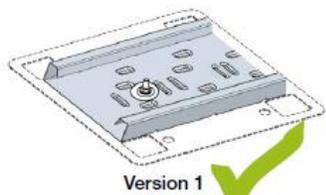


Installation Method	Mounting Diagram	Clamps Installation Position	JAMS4530 MR/GR/LR	JAMS4531 MR/GR/LR
Mounted by 4 clamps on the short sides of the frames and 2 clamps on the long sides of the frames, no mounting rails		$0 \leq D \leq 1/SW$	+3600 -1800	+3600 -1800
		$1/SW \leq D \leq (1/4W-50)$	+3600 -2000	+3600 -2000
		$(1/4W-50) \leq D \leq (1/4W+50)$	+3600 -2400	+3600 -2400
Mounted by 4 clamps on the short sides of the frames and 2 blocks on the long sides of the frames to bear the load of the modules, no mounting rails		$0 \leq D \leq 1/SW$	+3600 -1600	+3600 -1600
		$1/SW \leq D \leq (1/4W-50)$	+3600 -1600	+3600 -1600
		$(1/4W-50) \leq D \leq (1/4W+50)$	+3600 -1600	+3600 -1600
Mounted by 6 clamps on the long sides, and no mounting rails		$0 \leq D \leq 1/5L$	+3600 -2400	+3600 -2400

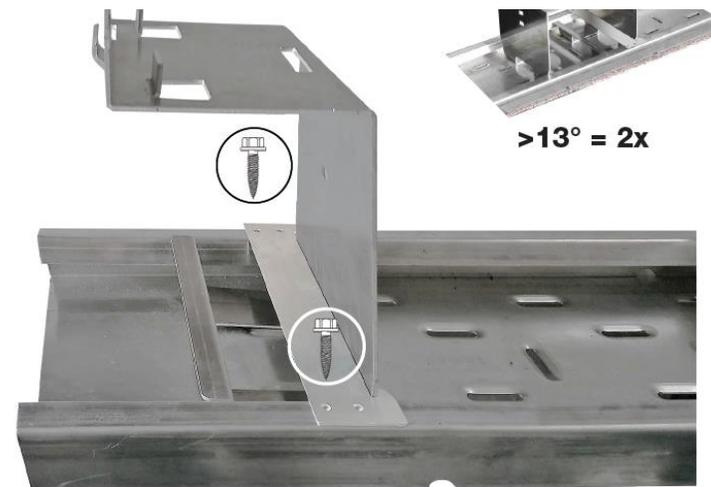
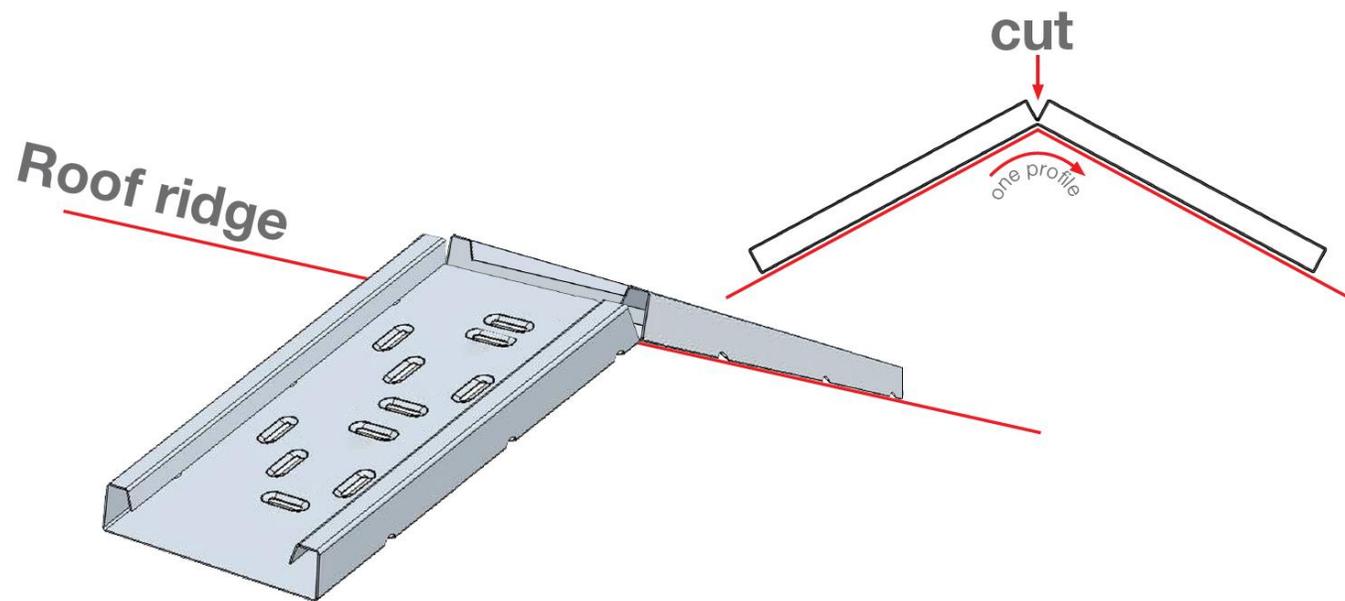
Figure 3 Maximum (test) Loads. Units: Pa (Pascal)



Ersätta ballast?

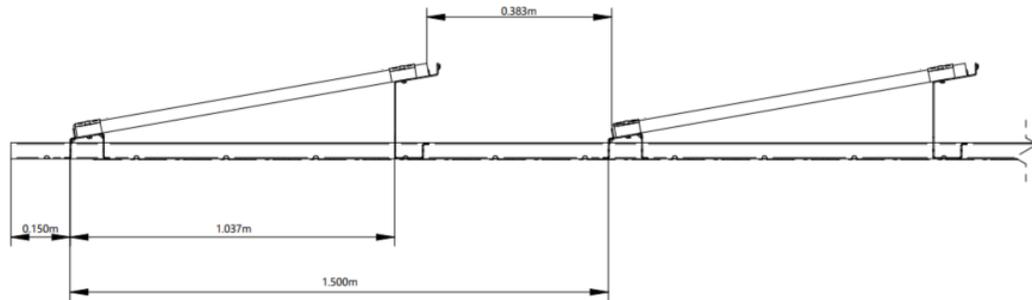


Lutning över 5°?

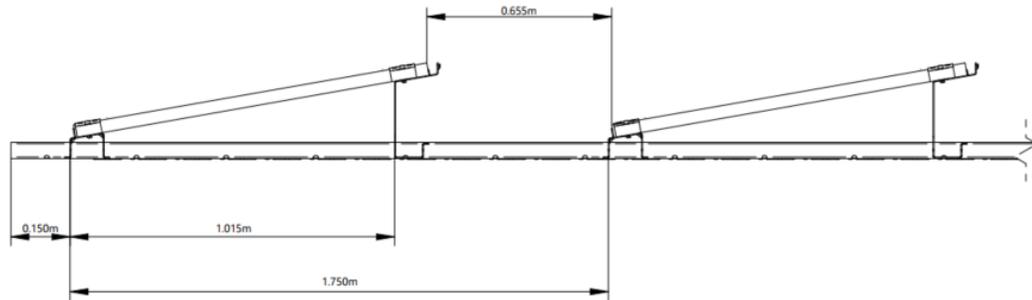


Hög flexibilitet ställbara avstånd och olika lutningar

Duraklick ECO 10°
South ECO10



Duraklick ECO 15°
North ECO15



Installationstid (4-5ggr snabbare än många andra system på marknaden)

- Soltop instruerar rekommenderade installationsmetoder på plats vid ert första montage.
- Planera lyft och placering av material och **ballast** på taket för snabbare montage



Installationstid:

20min per kW per montör för endast underkonstruktion.

- **100kW/ vecka och per montör (40h/vecka)**
- **500kW/ vecka för 6 montörer**

Vad är mest fördelaktigt för kund?

Kr/W eller pris/kWh under systemets livslängd?

Solcellpark?

Ett initialt dyrare system är en bättre investering om det producerar fler kWh under sin livslängd.

Pris per installerad watt vid köptillfället (kr/W) eller pris per producerad kWh (LCOE) under systemets totala livslängd?

Vattenläcka, skador och produktionsbortfall resulterar i ett högre kWh pris under systemets livslängd.

Initial investering, kapitalkostnad, kostnad för drift och underhåll dividerat med systemets totala energiproduktion.

Tack för er uppmärksamhet



Duraklick

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