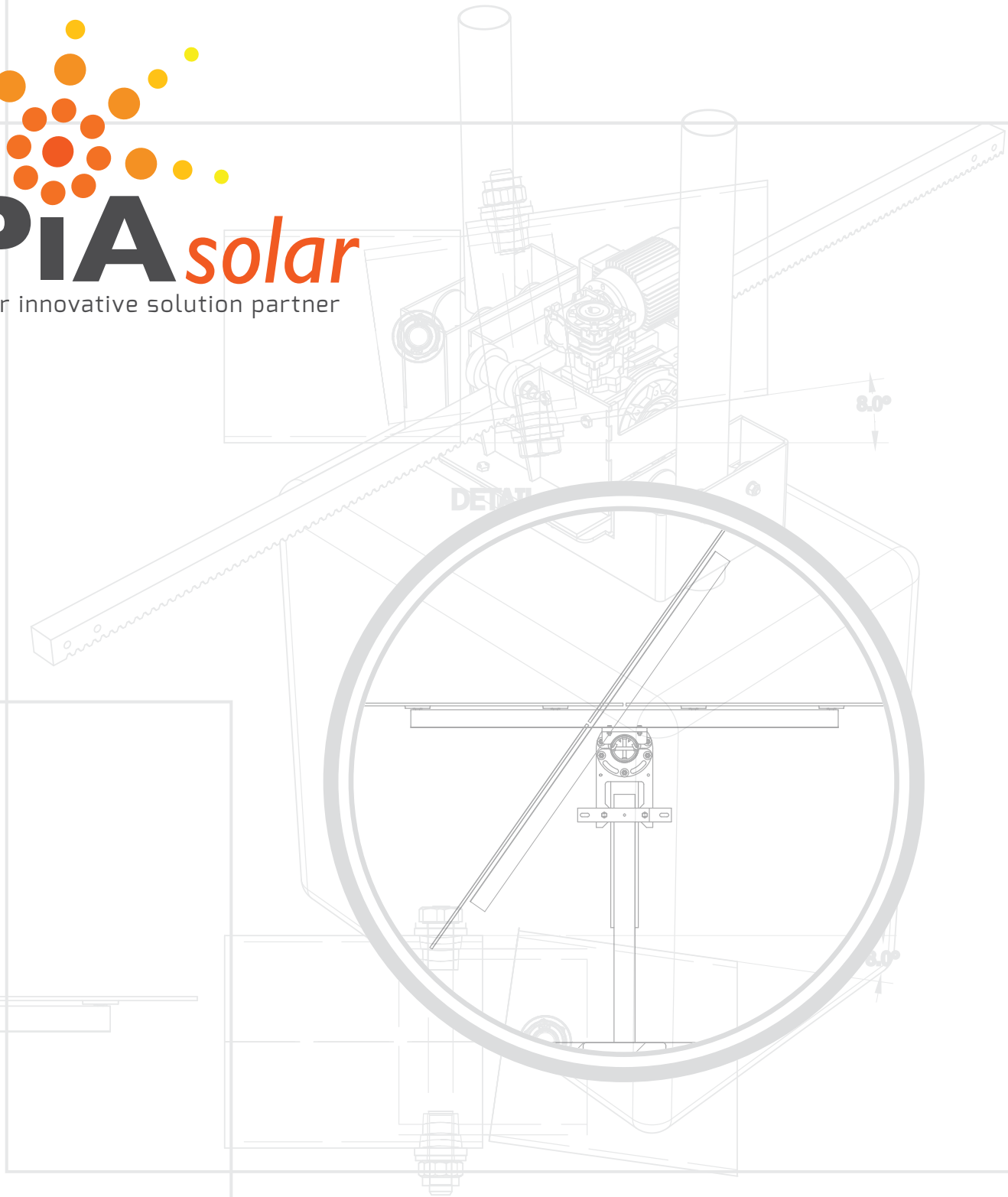


PIA *solar*
your innovative solution partner



Product Catalogue

Solar Mounting Hardware

Trusted with the installation of more than 1 million PV modules.

Introduction

PiA Solar has been trusted with the installation of over 460MW of ground mounted systems as of October 2016 and is currently growing to be one of the largest suppliers of rooftop structures and hardware, with more than 26 MW secured for 2016. PiA Solar's success is based on the dedicated supply of quality products to the solar industry. PiA Solar's installation success is based on ZERO COMPROMISE TO SAFETY, teamwork and our ISO 9001:2008 quality principals. This product brochure introduces the full range of mounting hardware offered by PiA Solar, with in-house product development and a design team providing standard and non-standard solutions to suit a clients project budget. PiA Solar's product is designed and certified in accordance to SANS 10160-1-3.


- PIA VISION -
Be the partner of choice for Sustainable Energy Solutions in Africa.










- PIA VALUES STATEMENT -
The Company is built upon the following foundational values which dictate the manner in which we deal with all Stakeholders:

INTEGRITY RESPECT HAPPINESS TRUST TEAMWORK

- PIA MISSION -
In dealing with our Stakeholders, the Company will:

- Provide a safe, challenging and rewarding environment for our employees.
 - Treat all with Integrity & Respect.
- Delight customers through innovation and consistent, on time delivery of high quality products and services.
 - Develop and execute a profitable and sustainable business model.





ISO 9001:2008 Certified



Level 1 BBBEE Certificate
valid until June 2017

DETAIL B



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RACKING



TRACKING



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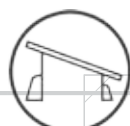
CARPORT



ROOFTOP



ELECTRICAL

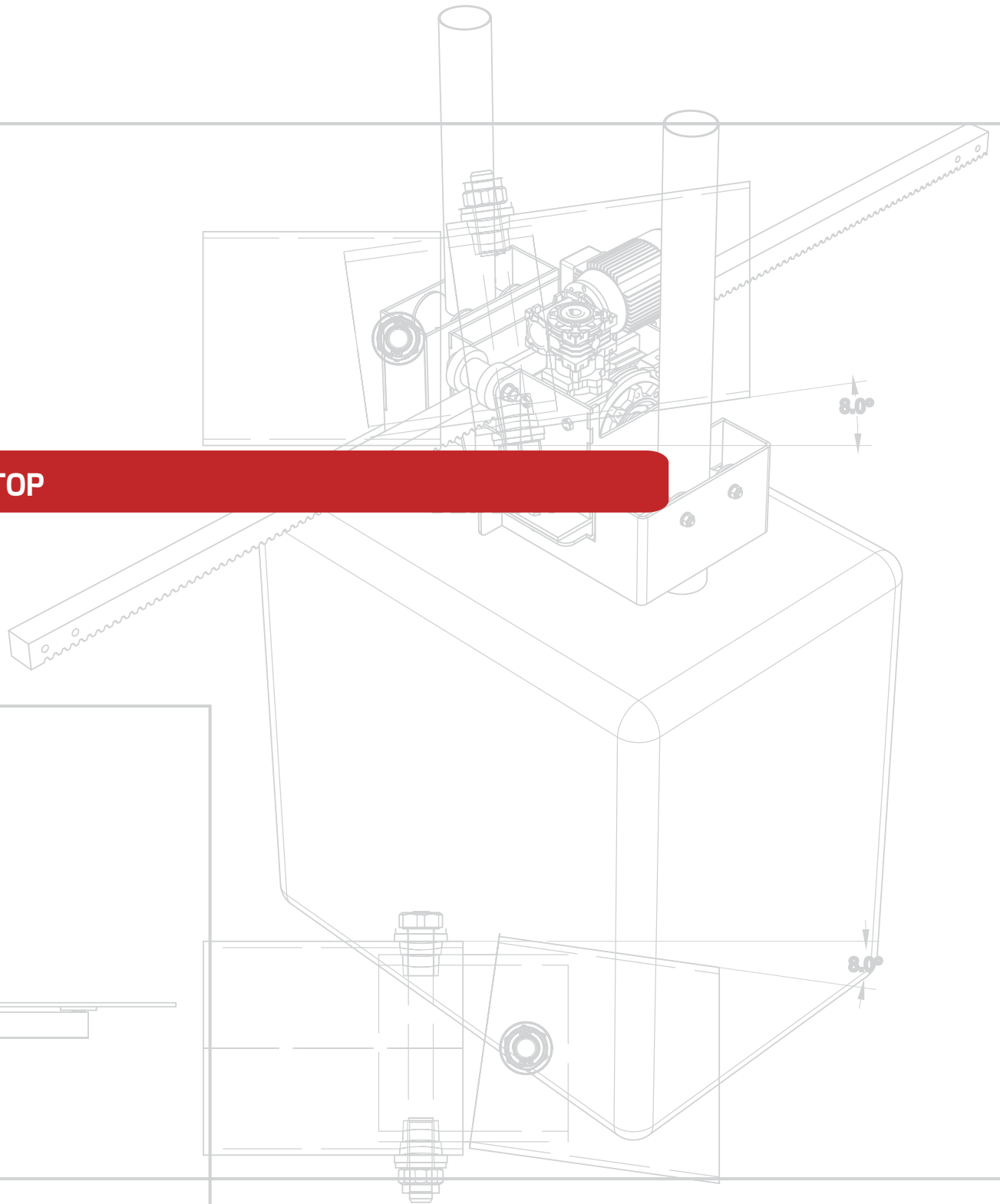


BALLAST



SAFETY

1. ROOFTOP



DETAIL B

1.1 KLIPLOCK CLAMPS

The PiA Solar KlipLock Clamp, provides a cost effective solution for mounting solar structures and general hardware onto KlipLock Roof Sheeting. For solar installations, the KlipLock Klamp is designed to suit both purlin and purlinless installations. The PiA ClipLock Clamp, clamps to the roof sheet using an M10 caphead which locks it to the other side of the roof sheet. The KlipLock Clamp can be ordered for three different mounting op-

tions. **1.** M6 is suitable for purlinless installations. **2.** M8 is suitable for trunking and equipment installations. **3.** Dual M8 is suitable for the PiA Top Hat Purlin installations. The clamp is designed to have a minimum contact surface to the roof to protect against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for your roof and recommended by SAMCRA (South African Metal Cladding and Roof Association).

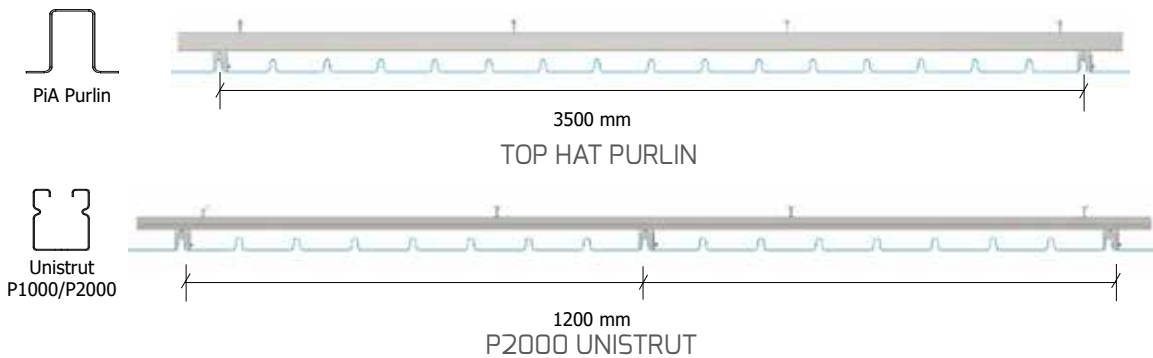


Mounting Specifications	
Vertical Pull off certified to 120 kg per clamp	
ClipLock Clamp torque for M10= 3 Nm	
Coating: HDG 55µm	
Material: ISQ230 3mm thick material	

Roof loading to be determined by project certification.

	Options	Description	PiA part No.	Torque
			HDG	
1	M6	Purlinless for Module clamp	PIA120006A	5.5 Nm
2	M8	M8 Unistrut/Hardware	PIA120007A	13 Nm
3	Dual M8	Top Hat Purlin/Hardware	PIA120008A	13 Nm

PURLIN MOUNTING LENGTHS (MAX DISTANCE BETWEEN CLAMPS)



TOP HAT PURLIN



P2000 UNISTRUT



PURLINLESS

TYPICAL INSTALLATION OPTIONS



PURLIN

TERRACED

PURLINLESS

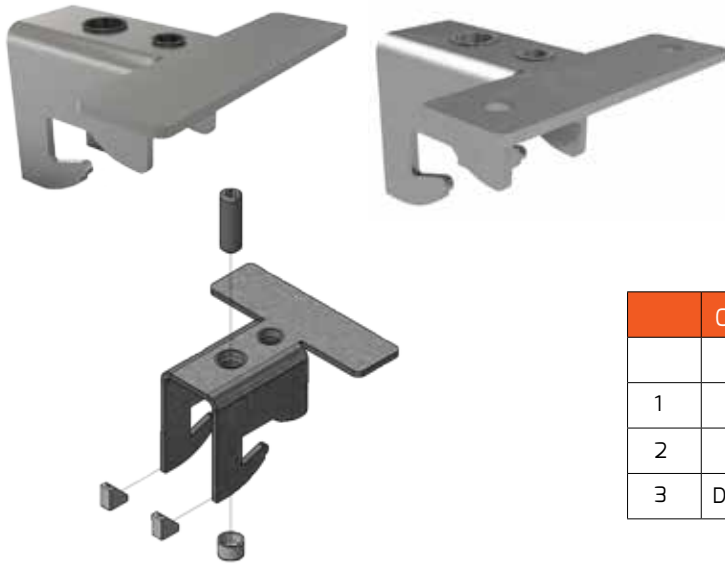
TRUNKING AND HARDWARE

IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. The Clip is only tested for vertical uplift and suitable to use on roof installations of up to 25° Tilt. Refer to the sheet on corrosion for installation guidelines.

1.2 CRAFTLOCK CLAMPS

The PiA Solar CraftLock Clamp provides a cost effective solution for mounting solar structures and general hardware onto CraftLock Roof Sheeting. For solar installations, the CraftLock Clamp is designed to suit both purlin and purlinless installations. The PiA CraftLock clamp, clamps to the roof sheet using an M10 caphead which locks it to the other side of the roof sheet. The CraftLock Clamp can be ordered for three different mounting

configurations. **1.** M6 for purlinless installations. **2.** M8 for trunking and equipment installations. **3.** Dual M8 for the PiA Top Hat Purin installations. The clamp is designed to specifically protect the roof against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for you roof and recommended by SAMCRA (South African Metal Cladding and Roof Association).

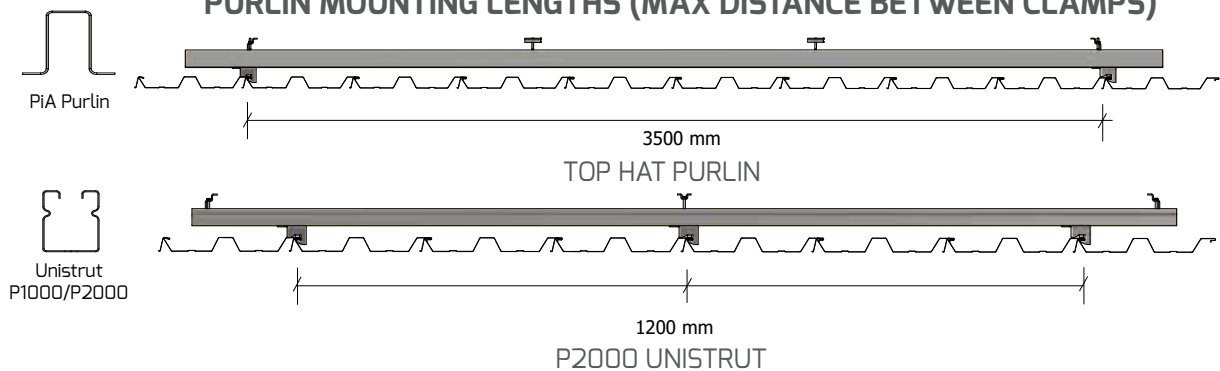


Mounting Specifications	
Pull off certified to 150 kg per clamp	
CraftLock Clamp torque for M10 = 3 Nm	
Coating: HDG 55µm	
Material: ISQ230 3mm thick material	

Roof loading to be determined by project certification.

	Options	Description	PiA part No.	Torque
			HDG	
1	M6	Purlinless for Module clamp	PIA125025A	5.5 Nm
2	M8	M8 Unistrut/Hardware	PIA125016A	13 Nm
3	Dual M8	Top Hat Purlin/Hardware	PIA125029A	13 Nm

PURLIN MOUNTING LENGTHS (MAX DISTANCE BETWEEN CLAMPS)



TOP HAT PURLIN

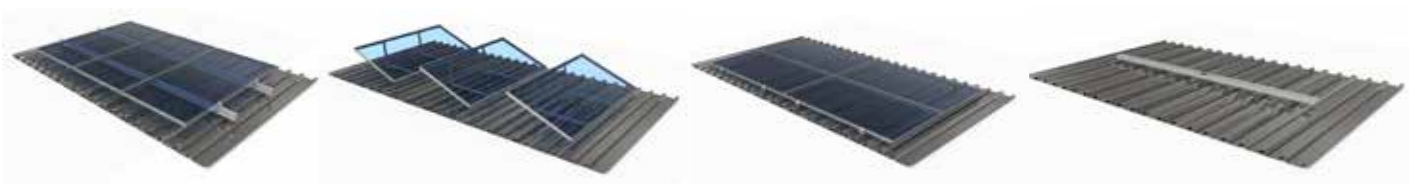


P2000 UNISTRUT



PURLINLESS

TYPICAL INSTALLATION OPTIONS



PURLIN

TERRACED

PURLINLESS

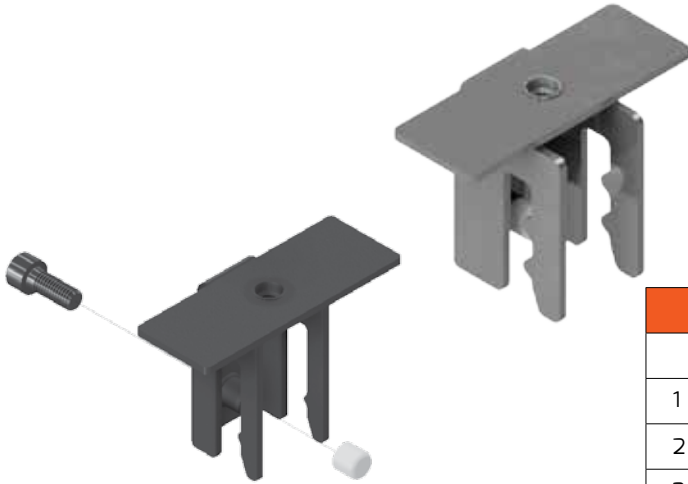
TRUNKING AND HARDWARE

IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. The Clip is only tested for vertical uplift and suitable to use on roof installations of up to 25° Tilt. Refer to the sheet on corrosion for installation guidelines.

1.3 BROWN BUILT CLAMPS

The PiA Solar Brown Built Clamp, provides a cost effective solution for mounting solar structures and general hardware onto Brown Built Roof Sheeting. For solar installations, the Brown Built Clamp is designed to suit both purlin and purlinless installation. The PiA Brown Built Clamp, clamps to the roof sheet using an M10 caphead which locks it to the other side of the roof sheet. The Brown Built Clamp can be ordered for three different mounting options. **1.** M6 is suitable for purlinless installations.

2. M8 is suitable for trunking and equipment installations. **3.** Dual M8 is suitable for the PiA Top Hat Purlin installations. The clamp is designed to have a minimum contact surface to the roof to protect against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for your roof and recommended by SAMCRA (South African Metal Cladding and Roof Association).



Mounting Specifications

Vertical Pull off certified to 120 kg per clamp

Brown Built Clamp bolt torque for M10= 3 Nm

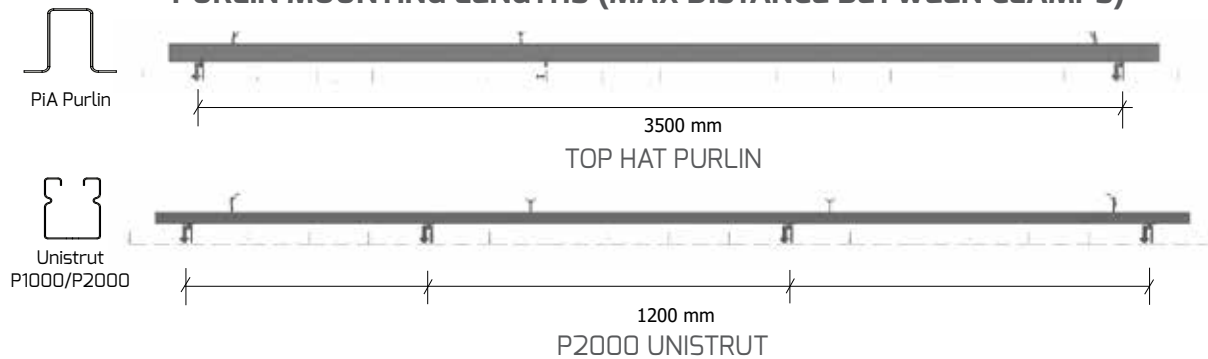
Coating: HDG 55µm

Material: ISQ230 3mm thick material

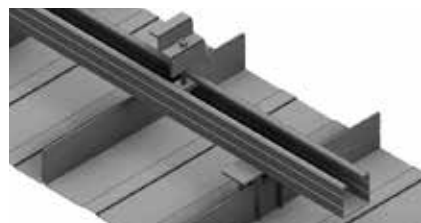
Roof loading to be determined by project certification.

	Options	Description	PiA part No.	Torque
			HDG	
1	M6	Purlinless for Module clamp	PIA127002C	5.5 Nm
2	M8	M8 Unistrut/Hardware	PIA127003B	13 Nm
3	Dual M8	Top Hat Purlin/Hardware	PIA127014B	13 Nm

PURLIN MOUNTING LENGTHS (MAX DISTANCE BETWEEN CLAMPS)



TOP HAT PURLIN



P2000 UNISTRUT



PURLINLESS

TYPICAL INSTALLATION OPTIONS



PURLIN



TERRACED



PURLINLESS



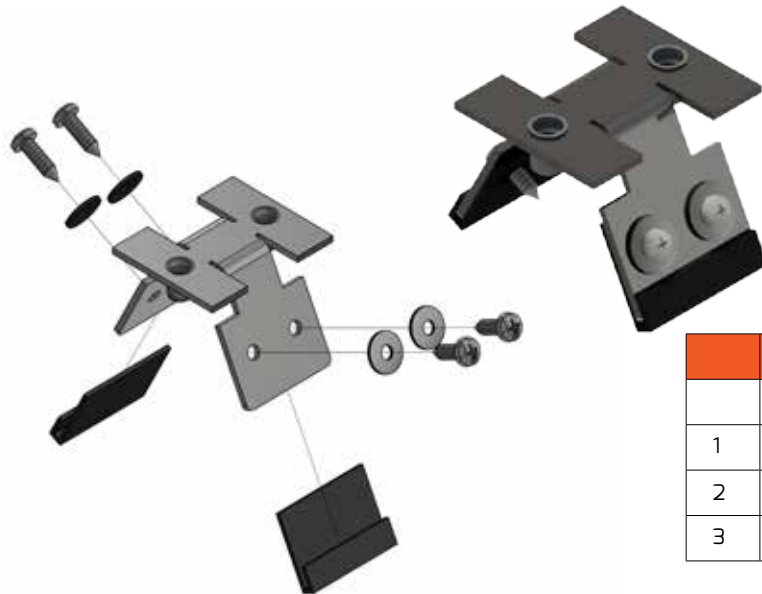
TRUNKING AND HARDWARE

IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. The Clip is only tested for vertical uplift and suitable to use on roof installations of up to 25° Tilt. Refer to the sheet on corrosion for installation guidelines.

1.4 IBR CLAMPS

The PiA Solar IBR Clamps provides a cost effective solution for mounting solar structures and general hardware onto IBR Roof Sheeting. A IBR roof requires penetration of the roof to secure structures, as does corrugated sheeting. For solar installations, the IBR Mounting Hardware is designed to suit both purlin and purlinless installations. The PiA 4xM6 self tapping screw, screws the fitting to the sheet through the insulating HDPE rubber provided. The clamp comes with mounting options **1.** M6 is suitable

for purlinless installations. **2.** M8 is suitable for trunking and equipment installations. **3.** Dual M8 is suitable for the PiA Top Hat Purlin installations. The clamp is designed to have a minimum contact surface to the roof to protect against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for you roof and recommended by SAMCRA (South African Metal Cladding and Roof association).

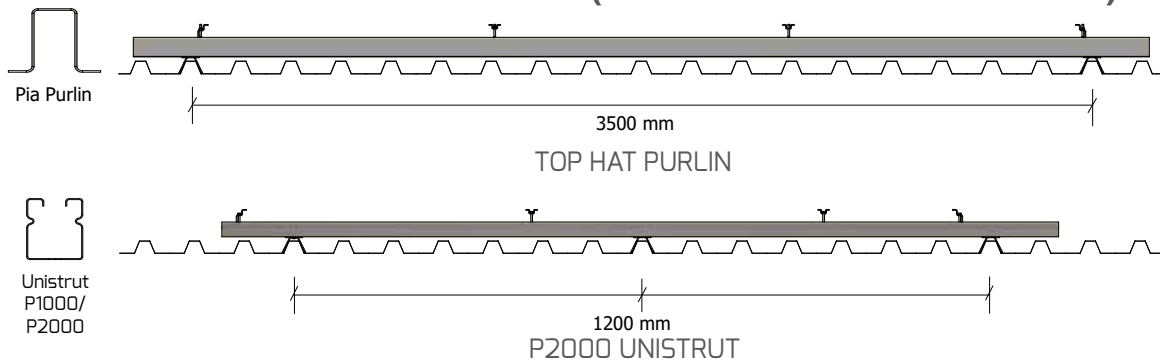


Mounting Specifications	
Pull off certified to 120 kg per clamp point	
IBR Self Drilling Screw	
Coating: HDG 55µm	
Material: ISQ230 3mm thick material	

Note: Self tapping screws to be tightened until rubber is compressed
 Roof loading to be determined by project certification.

	Options	Description	PiA part No.	Torque
			HDG	
1	M6	Purlinless for Module clamp	PIA110011A	5.5 Nm
2	M8	M8 Unistrut/Hardware	PIA110010A	13 Nm
3	Dual M8	Top Hat Purlin/Hardware	PIA110022A	13 Nm

PURLIN MOUNTING LENGTHS (MAX DISTANCE BETWEEN CLAMPS)



TOP HAT PURLIN

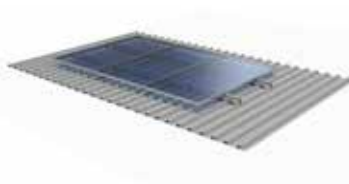


P2000 UNISTRUT

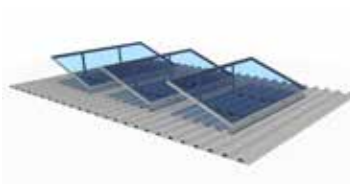


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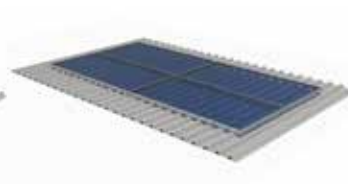
TYPICAL INSTALLATION OPTIONS



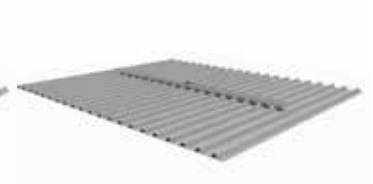
PURLIN



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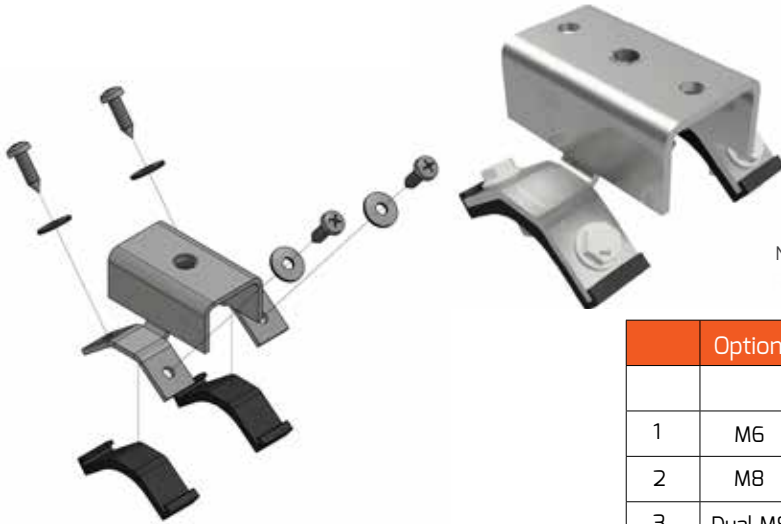
TRUNKING AND HARDWARE

IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification.
 The Clip is only tested for vertical uplift and suitable to use on roof installations of up to 25° Tilt.
 Refer to the sheet on corrosion for installation guidelines.

1.5 CORRUGATED CLAMPS

A corrugated iron roof requires penetration of the roof to secure structures, as does IBR sheeting. For solar installations the corrugated clamp is designed to suit both purlin/purlinless installations. The PiA Solar corrugated clamp offers two mounting options, 1) which is mounted directly onto the roof purlin or 2) anywhere on the roof sheet using 4 x M6 self tapping caphead, therefore producing two solutions in one innovative clamp. The clamp is supplied with a sealing rubber. The clamp comes with

mounting options **1.** M6 is suitable for purlinless installations. **2.** M8 is suitable for trunking and equipment installations. **3.** Dual M8 is suitable for the PiA Top Hat Purlin installations. The clamp is designed to have a minimum contact surface to the roof to protect against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for you roof and recommended by SAMCRA (South African Metal Cladding and Roof Association).

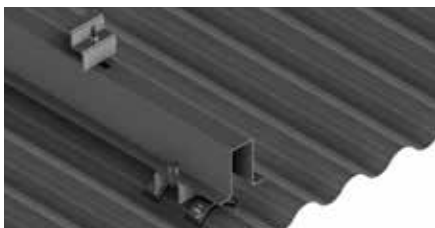
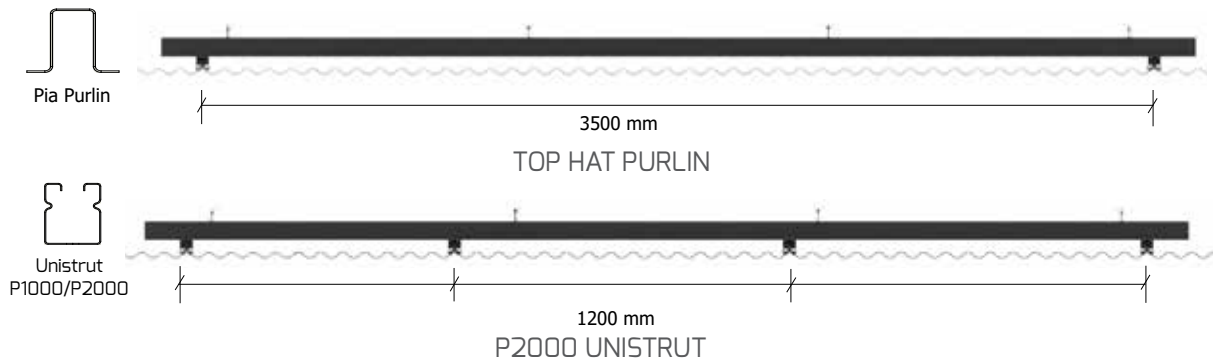


Mounting Specifications	
Pull off certified to 120 kg per clamp point	
Corrugated Roof Clamp bolt hand finished	
Coating: HDG 55µm	
Material: ISQ230 3mm thick material	

Note: Self tapping screws to be tightened until rubber is compressed
 Roof loading to be determined by project certification.

	Options	Description	PiA part No.	Torque
			HDG	
1	M6	Purlinless for Module clamp	PIA126001C	5.5 Nm
2	M8	M8 Unistrut/Hardware	PIA126003C	13 Nm
3	Dual M8	Top Hat Purlin/Hardware	PIA126014A	13 Nm

PURLIN MOUNTING LENGTHS (MAX DISTANCE BETWEEN CLAMPS)



TOP HAT PURLIN

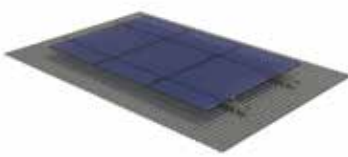


P2000 UNISTRUT

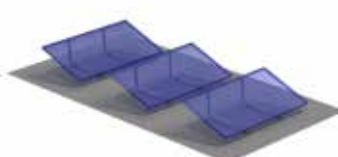


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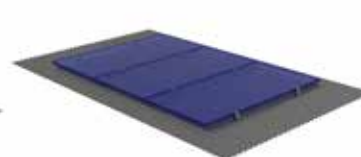
TYPICAL INSTALLATION OPTIONS



PURLIN



TERRACED



PURLINLESS



TRUNKING

IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. The Clip is only tested for vertical uplift and suitable to use on roof installations of up to 25° Tilt. Refer to the sheet on corrosion for installation guidelines.

1.6 TILED ROOF MOUNTING HARDWARE

The tiled roof bracket is designed for simple and fast installation, yet provides a client with a secure and safe mounting system. The brackets are made of HDG steel to ISO 1461 minimal 55µmm. The brackets are designed to mount with both, the PiA Solar top hat purlins and unistrut. The top hat provides up to a 3m span between mounting points at an angle of up to 30° of tilt, while the unistrut P1000/2000, requires a mounting bracket

every 1,2m. A client needs to ensure certification for the roof is obtained specifying the forces to determine the correct mounting spaces. The clamp is designed to have a minimum contact surface to the roof to protect against crevice corrosion. Also remember that galvanised clamps are the only long term solutions for you roof and recommended by SAMCRA (South African Metal Cladding and Roof association).

Options	Description	PiA Part No.
1	Short Tiled Roof Bracket HDG P2000	PIA100002A
2	Short Tiled Roof Bracket HDG PiA Top Hat	PIA100003A

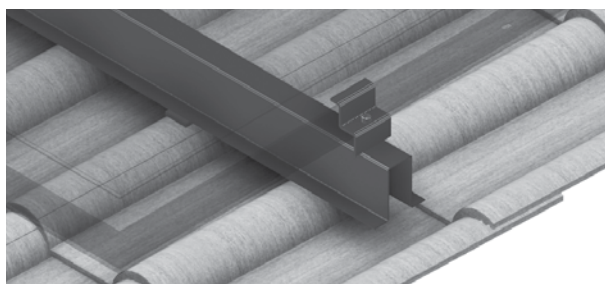
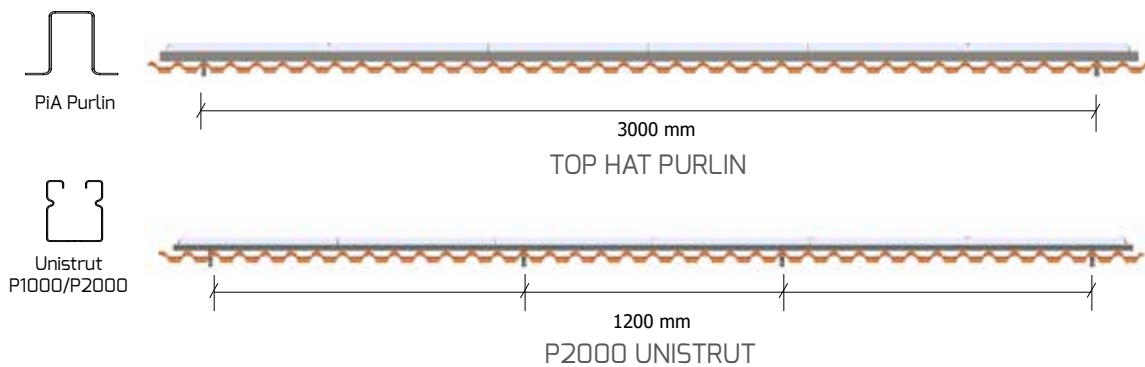


PIA TOP HAT PURLIN

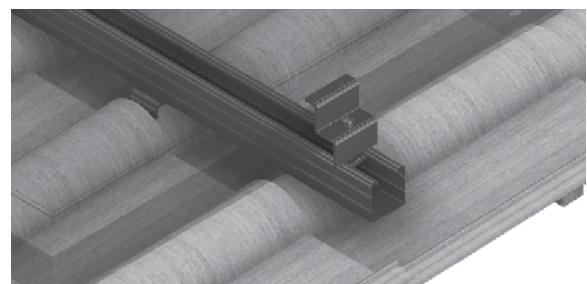


PIA UNISTRUT

PURLIN MOUNTING LENGTHS (DISTANCE BETWEEN CLAMPS)

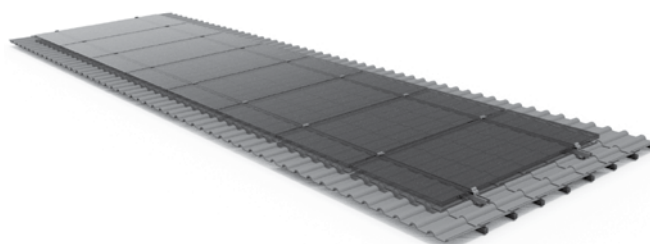


TOP HAT PURLIN



P2000 UNISTRUT

TYPICAL INSTALLATION OPTION

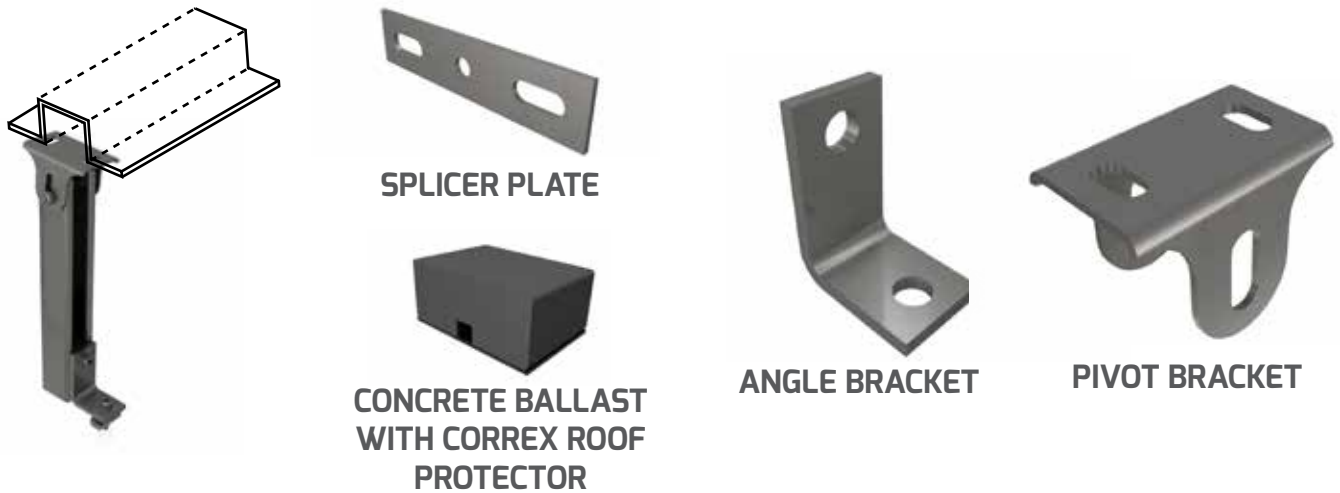


IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. Refer to the sheet on corrosion for installation guidelines.

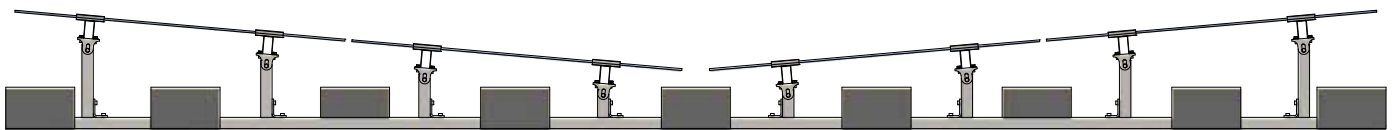
1.7 BALLAST ROOF MOUNTING HARDWARE

The ballast roof mounting system offered by PiA Solar is of a modular design. The tilt brackets allow, the module angle to vary from 0° to 30°. The system is supplied as a kit, which can be tailored to suit a client's project and will be ready to install on site. Each of the concrete ballasts have a weight of ±27kg, making it easy to handle. The system is designed to work with the PiA Solar top hat purlin, which allows for less trusses required in a client's project. To protect the roof and the structure, PiA Solar supplies a correx board which fits under the purlin and concrete

block. Apart from protecting the roof, the correx board lifts the bottom rail off the ground to ensure drainage that prevents, dirt and moisture from building up and eliminating the risk of corrosion. PiA Solar Structure can be supplied with either, HDG (Hot Dipped Galvanized) or Pre-Galvanized. Also remember that galvanized clamps are the only long term solutions for you roof and recommended by SAMCRA (South African Metal Cladding and Roof association).

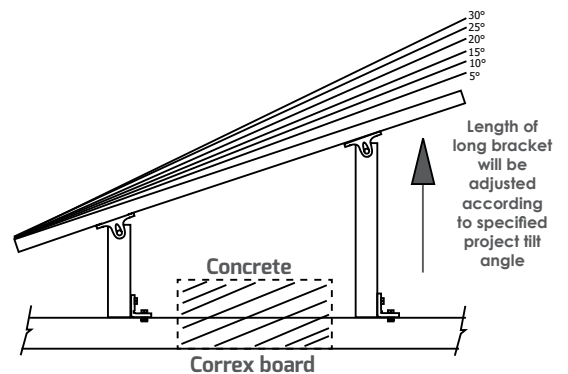


BALLAST MOUNTING AND CROSS-SECTION



LANDSCAPE TERRACED MOUNTING BRACKET

Description	Material	PiA Part No.
		HDG
Concrete Ballast 27kg	Concrete 25MPa	PIA145003A
Pivot U-Bracket	ISQ 230/CQ	PIA131001D
Ballast Angle Bracket	ISQ 230/CQ	PIA131002C
Ballast Splicer Plate	ISQ 230/CQ	PIA135004B
Ballast Correx Plate	Correx Board	PIA151003A
Unistrut P2000	S550	Z275/HDG as per project requirement
PiA Top Hat Purlin	S350	Z275/HDG as per project requirement

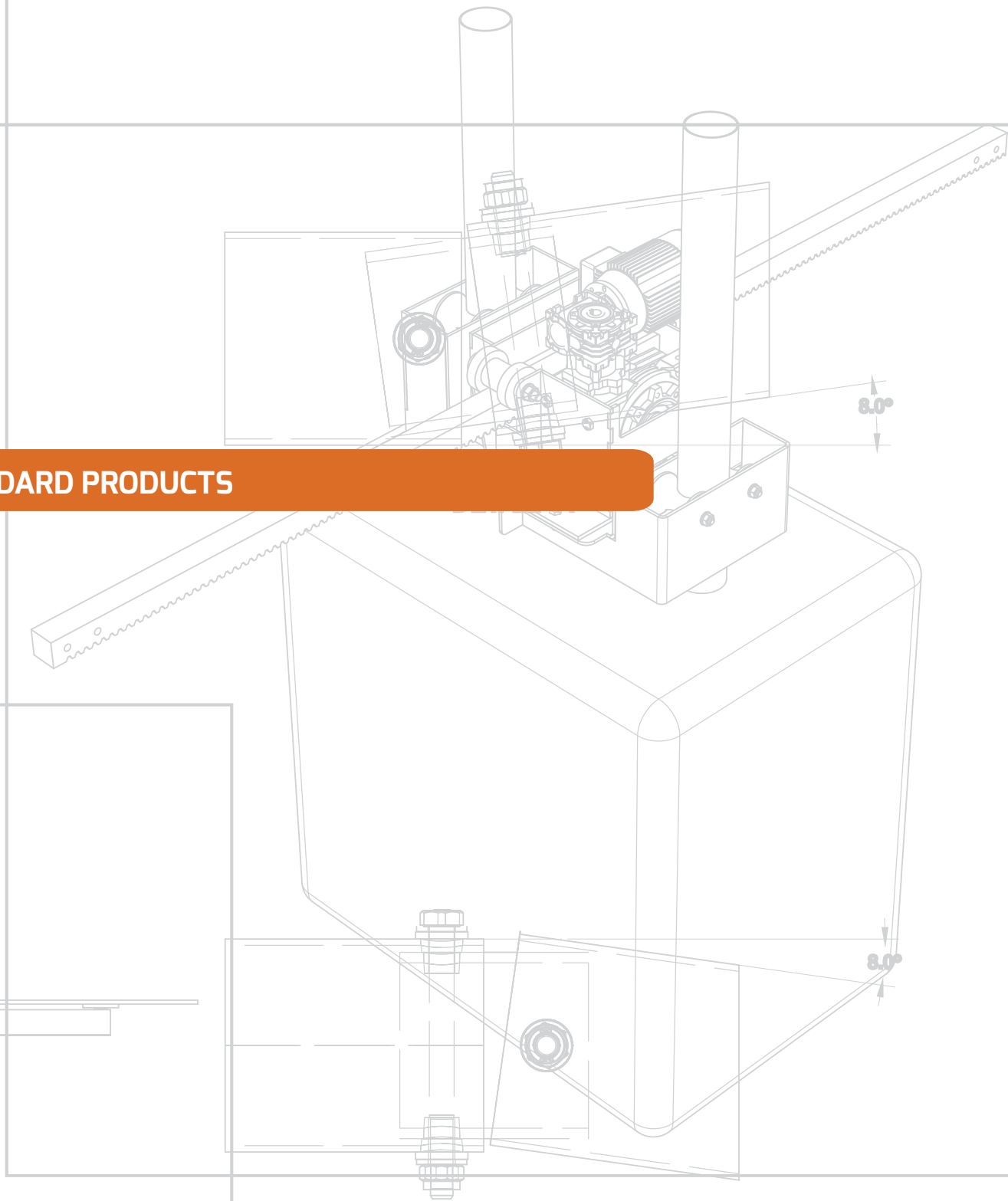


TYPICAL INSTALLATION OPTIONS



IMPORTANT: The quantity of clamps utilized must meet the requirement of the roof installation certification. Refer to the sheet on corrosion for installation guidelines.

2. STANDARD PRODUCTS



DETAIL B

2.1 ANCHORING SOLUTIONS

PiA Solar manufactures, a wide range of anchors for the solar industry. PiA Solar now boasting installation experience, of well over ±500 000 PiA Solar Anchoring Solutions which are designed for different ground types and can guarantee anchoring whether in soft sand or rock. PiA Solar's Patented Rock Anchor, installs in under 2 minutes and can be used in soil with a high rock density. The anchors PiA Solar offer are as follows.

All of the Anchoring Solutions can be supplied as standard components, for installing in concrete foundations. A wide range of mounting hole configuration, can be used with PiA Solar Anchoring Solutions, to suit a client with a full range of tube clamps, which can be used for a client's mounting hardware. Designs are tailored in-house for a project, at a client's request.



2.1.1. 2013/05566 PIA SOLAR ROCK PATENT ANCHOR'S FOR ROCK AND DENSE SOIL TYPES

Supplied with a Concrete Activator and requires percussion drilling(activated with percussion, without rotation using the PiA Solar ramming adapter) which is a single process.

Anchor Diameter	Length	Material Grade	Material Thickness	Part Number	Depth	Pull out resistance
Ø63,5mm	1,5 - 4.0m	SAE1008	2,5mm	PiA185000A	1.2m	800 kg +
Ø76,2mm	1,5 - 4.0m	S355 JR	2,5mm	PiA185001A	1.2m	1200 kg +
Ø76,2mm	1,5 - 4.0m	S355 JR	3,5mm	PiA185002A	1.2m	1200 kg +



2.1.2 PIA SOLAR EARTH ANCHOR'S FOR SOFT SAND

Screwed in using a rotation hydraulic head, (Bobcat, TLB or screwing machine), using a linear beam installer will improve accuracy.

Anchor Diameter	Length	Material Grade	Material Thickness	Part Number	Depth	Pull out resistance
Ø48 & Ø63,5mm / Ø111mm	1,0 - 3,0m	SAE1008	2,5mm	PiA200005A	1.0m	700kg
Ø48 & Ø63,5mm / Ø111mm	1,0 - 4,0m	SAE1008	2,5mm	PiA200006A	1.0m	1500kg
Ø48 & Ø63,5mm / Ø111mm	1,0 - 4,0m	SAE1008	2,5mm	PiA200002A	1.0m	2000kg



2.1.3 PIA SOLAR RAMMING ANCHOR'S FOR DENSE SOIL

Installation with a recognized linear boom ramming machine.

Anchor Diameter	Length	Material Grade	Part Number	Depth	Pull out resistance
76x38 CH	1,0 - 3,0m	SANS EN50025-S355	PiA184001A	1,0m to 1,5m	700kg
100xx55 IPE	1,0 - 4,0m	SANS EN50025-S355	PiA184002A	1,0m to 2m	1500kg
120x64 IPE	1,0 - 4,0m	SANS EN50025-S355	PiA184003A	1,0m to 2,5m	2000kg



IMPORTANT: Ensure that proper ground tests are done before making your choice of anchor. PiA Solar can provide guidance or conduct pull out tests or do the installation for our clients.



2.2 PURLINS AND UNISTRUT

PiA Solar provides a variety of purlins for use with ground, roof or ballast mountings. PiA Solar Purlins are designed with S350 material to ensure, a lightweight, yet strong solution.

Purlins can be made to suit a clients project or design, with required mounting holes and slots.

2.2.1 PIA TOP HAT PURLIN

PiA Solars Top Hat Purlin, has been trusted on large and small projects. The top hat purlin, can be mounted both top and bottom, making it perfect for carrying a long span up to 3,15m or as a tracker spreader beam. PiA Solars Top Hat purlin further offers stability on steep tiled roofs and structures.

Top Hat Purlin	Material	Coating	Length	PiA Part No.
65 x 35 x 24 x 1,6/2mm	S350	Z275 / HDG	1m to 10m	PIA182...Range



2.2.2 UNISTRUT P1000/2000

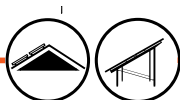
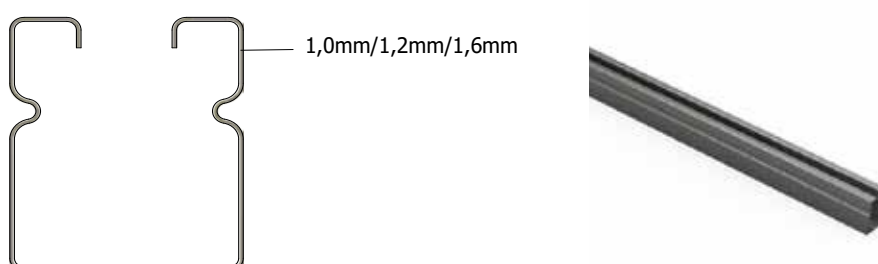
PiA Solar Unistrut P1000/2000, provides two options, a slotted unistrut allows for an easy installation, as the slots in the bottom allow for easy mounting, to suit a clients needs. Unistrut is supplied in P2000 1mm-1,6mm of high strength ISQ 550 material Z275 plated. The standard P2000 unistruts, are a cost effective solution, where drilling needs to be done on site. PiA Solar can tailor in-house the unistrut, to suit a clients requirements as well as supply, all the mounting hardware required.

SLOTTED P 1000/2000 PURLIN

2000 Purlin	Material	Treatment	Length	PiA Part No.
P1000/P2000 41 x 41 x 2,5m	ISQ 550	Z275/HDG	1m-6m	PIA181008A
P1000/P2000 41 x 41 x 1,0m	ISQ 550	Z275/HDG	1m-6m	PIA181009A
P1000/P2000 41 x 41 x 1,6m	ISQ 550	Z275/HDG	1m-6m	PIA181010A

STANDARD P 1000/2000 PURLIN

2000 Purlin	Material	Treatment	Length	PiA Part No.
P1000/P2000 41 x 41 x 2,5m	ISQ 550	Z275/HDG	1m-6m	PIA181011A
P1000/P2000 41 x 41 x 1,0m	ISQ 550	Z275/HDG	1m-6m	PIA181012A
P1000/P2000 41 x 41 x 1,6m	ISQ 550	Z275/HDG	1m-6m	PIA181013A



2.3 MODULE CLAMPS

PIA Solar offers a full range of module clamps for Standard, Thin Film, Glass-Glass products and First Solar, series 4 module clamps.

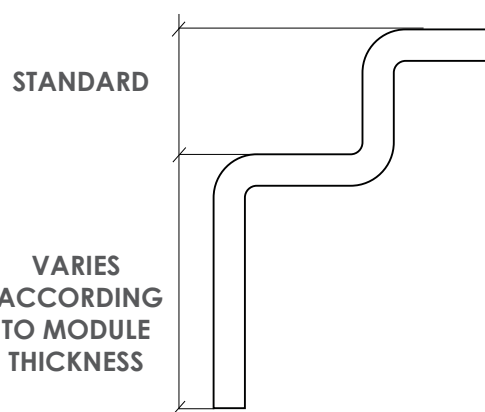
STANDARD PV MOUNTING HARDWARE

2.3.1 ZETA END CLAMP

Material Grade	Size	Module Thickness	Treatment	PIA Part No.
ISQ230	3mm x 55 mm	35mm	HDG 55	PIA171009A
ISQ230	3mm x 55 mm	40mm	HDG 55	PIA171004A
ISQ230	3mm x 55 mm	45mm	HDG 55	PIA171005A
ISQ230	3mm x 55 mm	50mm	HDG 55	PIA171002A



ZETA END CLAMP

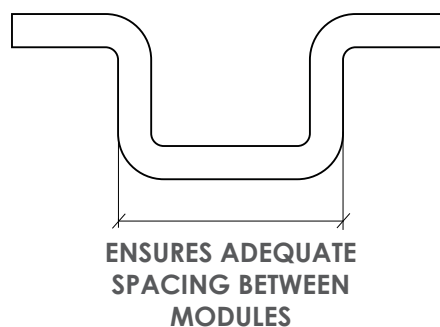


2.3.2. OMEGA MID CLAMP

Material Grade	Size	Module Thickness	Treatment	PIA Part No.
ISQ230	3mm x 55 mm	35mm to 50mm	HDG	PIA170001A



OMEGA MID CLAMP



6,5mm square hole is used to accept round head square cup bolt.

2.4 THIN FILM CLAMPS

2.4.1 FIRST SOLAR THIN FILM MOUNTING HARDWARE

Thin Film	Material	Width	Module Thickness	PIA Part No.
Zeta (end)	WB 230BK1000	80mm	6,8mm	PIA160015A
Omega (mid)	WB 230BK1000	80mm	6,8mm	PIA160008A

Technical Specifications
UL 95 Flame deterrence
Meets first Solar resistivity requirements
Purlin M6 bolt torque 5nm
Coating: HDG 55µm 3mm thick material
Material: 30% fiber re-reinforced

Material Specifications
WB 230BK1000
PP, 30% Glass Fibre reinforced
Heat & UV stabilizer ME0073UV
Natural

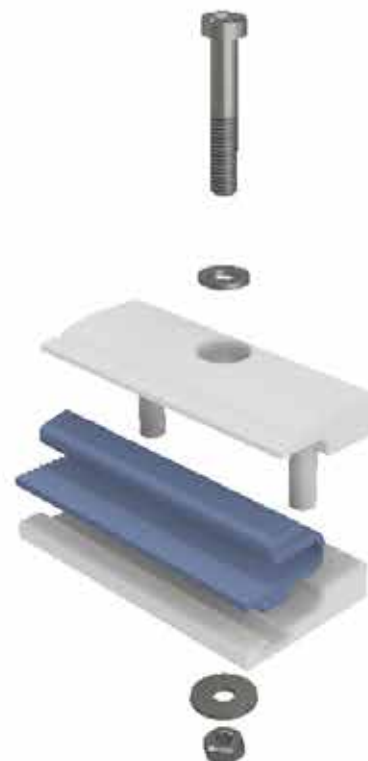
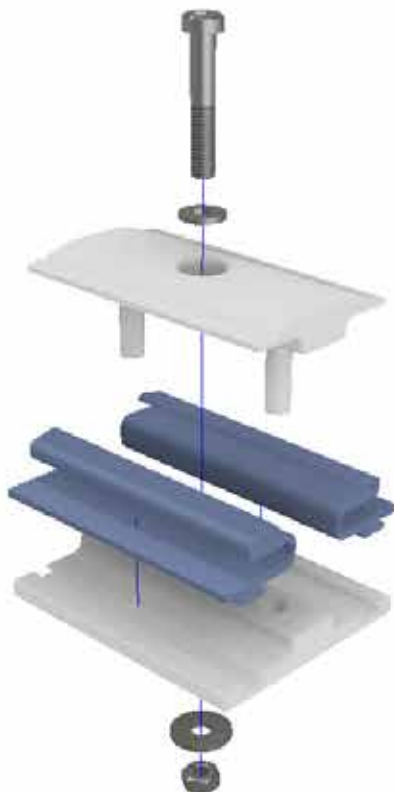
THE CLAMP COMPLIES WITH FIRST SOLAR'S RESISTIVITY REQUIREMENTS



OMEGA (MID)



ZETA (END)



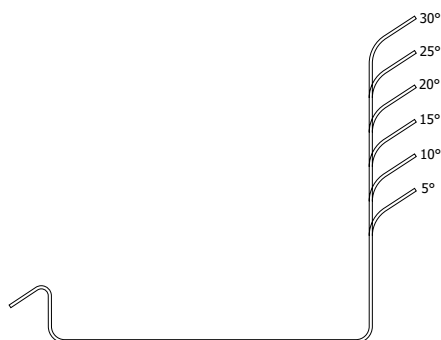
2.5 TERRACED MOUNTING HARDWARE

PiA Solar offers a wide range of Terraced Mounting Hardware and concrete Ballast Systems, designed for roof top applications. A wide range of tilt angle (5° to 30 °) for both portrait and landscape mounting are available.

For steel roof tops, PiA Solar has designed ,a purlinless landscape option and for portrait, offer a combination without PiA Solar Top Hat Purlin, to ensure a cost effective solution.

2.5.1 LANDSCAPE TERRACED MOUNTING BRACKET (CLAMPED TO ROOF)

Material	Treatment	Material Width	Angle	Module Width	PIA Part No.
S355	HDG	50x5mm	5°	890mm - 1000mm	PiA111003A
S355	HDG	50x5mm	10°	890mm - 1000mm	PiA111004A
S355	HDG	50x5mm	15°	890mm - 1000mm	PiA111000A
S355	HDG	50x5mm	20°	890mm - 1000mm	PiA111001A/02A
S355	HDG	50x5mm	25°	890mm - 1000mm	PiA111005A



CROSS SECTION



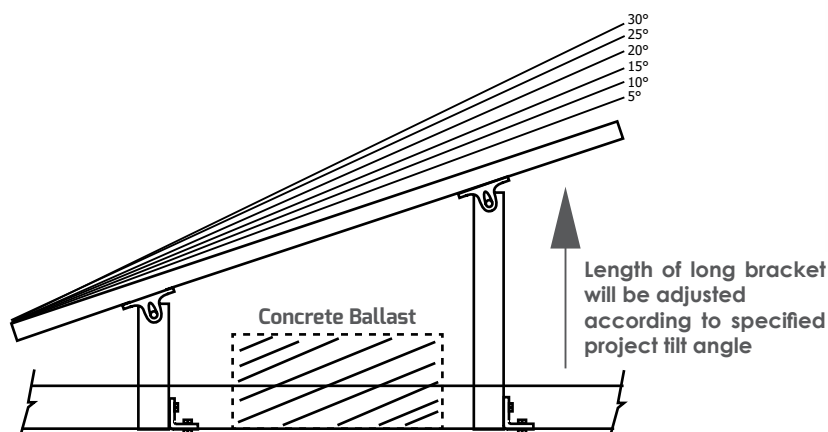
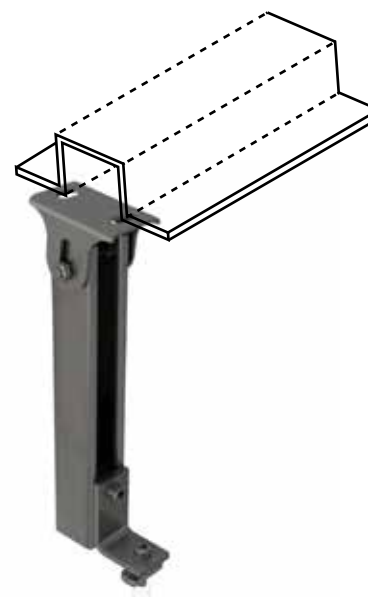
PURLINLESS LANDSCAPE

2.5.2 LANDSCAPE/PORTRAIT TERRACED MOUNTING BRACKET (BALLAST FOR CONCRETE ROOF)

Portrait and ballast systems are constructed using our 1,6mm P2000 unistrut, angle and swivel mounting brackets. Roof sheet mounting is done with the relevant roof clip, while a Ballast

System uses the PiA Solar 27kg concrete ballast. This system can be quoted, as a Kit or purchased as a separate component.

Description	Material	Treatment	PIA Part No.
Pivot U-Bracket	ISQ 230/CQ	HDG	PIA131001D
Ballast Angle Bracket	ISQ 230/CQ	HDG	PIA131002C
Ballast Splicer Plate	ISQ 230/CQ	HDG	PIA135004B
Ballast Correx Plate	Correx Board	HDG	PIA151003A
Unistrut P1000/P2000	ISQ550	Z275/HDG	as per project requirement
PiA Top Hat Purlin	S350	Z275/HDG	as per project requirement
Concrete Ballast 27kg	Concrete 25Mpa	HDG	PIA145003A



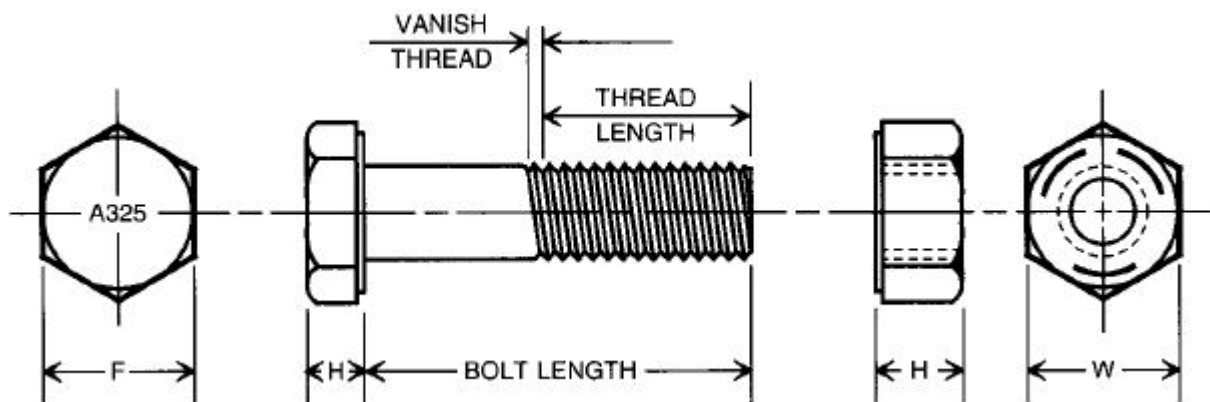
2.6 FASTENERS



PiA Solar provides a full range of fasteners (Bolts, Screws, Washers, Nuts and Special Fasteners) for all Rooftop, Ground Mounted and Carport requirements.

The minimum coating requirement, for all fasteners to be Electrolytic Zinc Plated, followed by a clear passivation treatment. This finish contains a Trivalent Passivation, similarly used in the Automotive Industry.

- The thickness is 13 μ m (micron) minimum, limited to the basic thread size (Tolerances ISO-6h or ISO-6H) after coating.
- The Clear Passivation treatment may contain an integral torque control lubricant.
- Colour is silver.
- Corrosion is minimum 120hrs salt spray for Zinc corrosion and minimum 500hrs salt spray for ferrous corrosion.
- Service temperature 120°C maximum.
- Torque specification are in line with each Fastener DIN Spec.
- Special requirements, alternative to Electrolytic Zinc Plating, PiA Solar offers a fastener with Hot Dipped Galvanized Treatment (HDG) or Delta tone.



2.7 SAFETY SYSTEMS

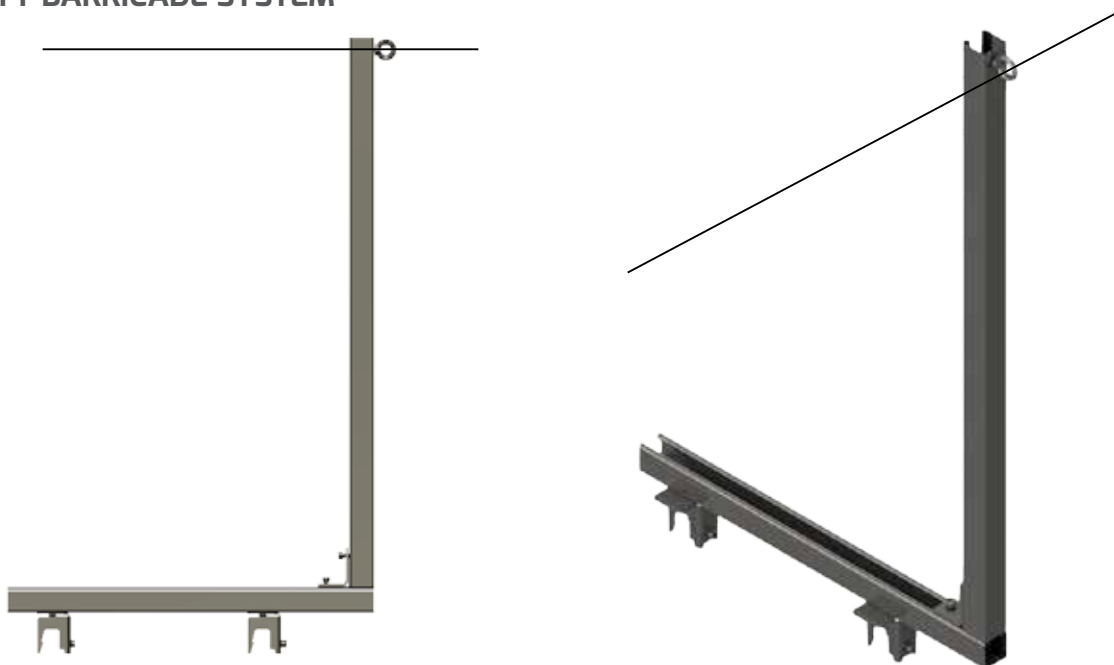
PiA Solar ensures that safety remains our number one priority on the agenda, for all projects. PiA Solar can work with all roof top clamp types, as well as with the PiA Solar Ballast Mounting solution, creating either a barricade or mounting for a zip line.

PiA Solar systems work with all industry supplied clip on safety harnesses. The PiA Solar safety products consist of the following: Clamps and Ballasts quoted separately.

Description	Material	PiA Part No.
Barricade Upright Kit	P2000x1,6	PIA112001A
Safety Line per m	6mm steel rope	PIA112002A
Eye Nut	M8	PIA112003A
Eye Bolt	6mm cable	PIA112004A
Crosby Clamp	M8	PIA112005A
Spring Nut	M8	PIA053012A

CLAMPS AND BALLAST SYSTEMS QUOTED SEPARATELY

2.7.1 PIA SAFETY BARRICADE SYSTEM



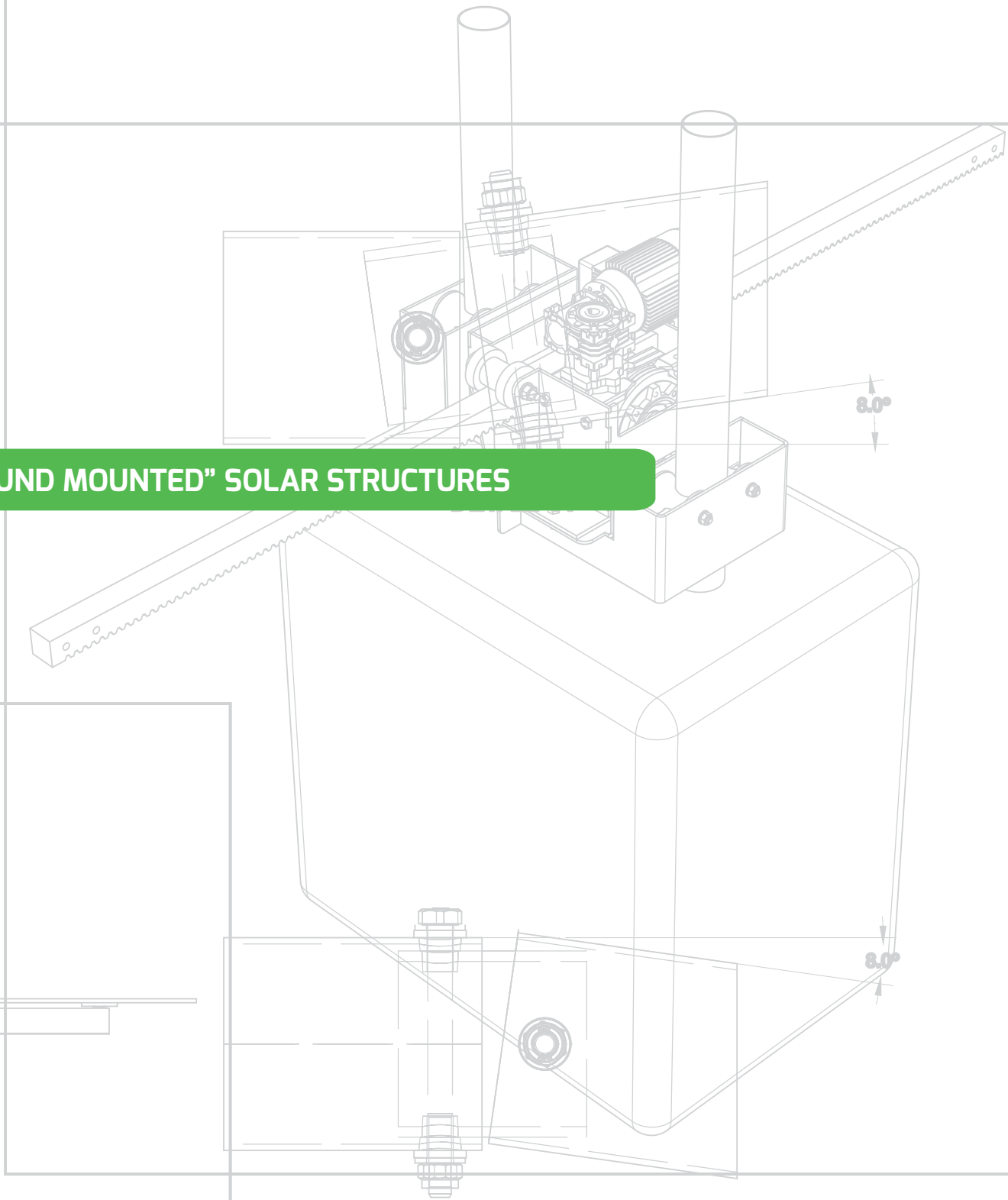
2.7.2 PIA KICK PLATE SAFETY SYSTEM



Note: Clamping solution will be fitted in line with Roof profile



3. "GROUND MOUNTED" SOLAR STRUCTURES



DETAIL B

3. GROUND MOUNTED SOLAR STRUCTURES

PiA Solar design and manufacture, a wide range of ground mounted steel structures, for the installation of PV Modules. All structures are offered with either HDG or Z275 Pre-galvanized coatings. Structures can be seamlessly joined together, to create longer and more cost effective rows of up

to 200m. The Connection splicer joint, between the tables offers both expansion and contour following. The ContourR+ products mount on the proven PiA Solar Anchor range and have been entrusted in over 400MW of solar installations in Africa.

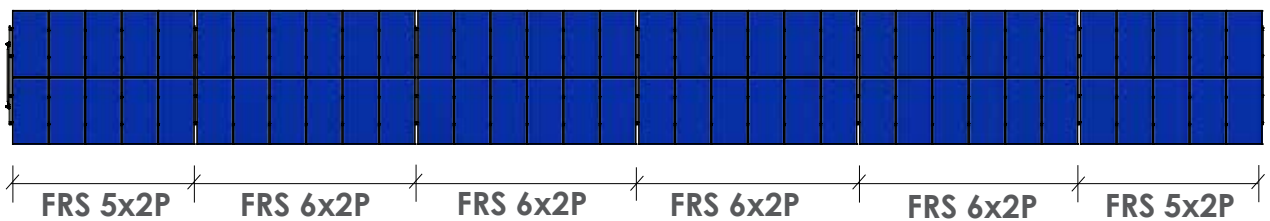
3.1.1 CONTOUR+ FIXED TILT STRUCTURES



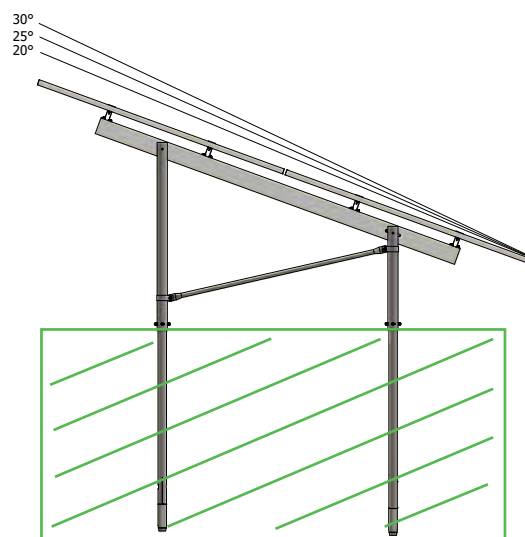
FRS 5x2P (2 PORTRAIT)



FRS 6x2P (2 PORTRAIT)



For construction always begin and end a row with at least one 5x2P Table. Purlin spacing will depend on your module size and standard mounting points, therefore the PV Module technical data sheet needs to be provided/specified when ordering.



SIDE VIEW SHOWING TILT ANGLE OPTIONS

3.1 CONTOUR+ FIXED TILT STRUCTURES

PiA Solar design and manufacture, a wide range of structures for the installation of PV Modules. All Structures are offered with other HDG or Z275 Galvanized coatings. Structures can seamlessly join together, to create longer and more cost

effective rows of up to 200m. The connection point between the tables offer both expansion and contour following. The Contour+ products mount onto the proven PiA Solar anchor range.

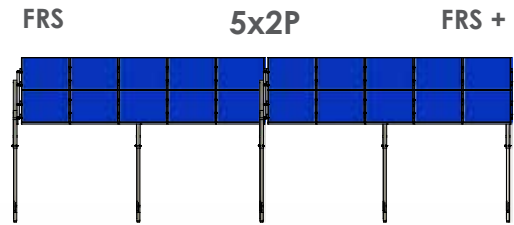
Type	Module Type	Tilt	Pre -Galv Z275
FRS 5x2P	72 Cell	15°	PIA302000A
FRS 5x2P+	72 Cell	15°	PIA302001A
FRS 5x2P	72 Cell	20°	PIA302002A
FRS 5x2P+	72 Cell	20°	PIA302003A
FRS 5x2P	72 Cell	25°	PIA302004A
FRS 5x2P+	72 Cell	25°	PIA302005A
FRS 5x2P	72 Cell	30°	PIA302006A
FRS 5x2P+	72 Cell	30°	PIA302007A
FRS 6x2P	72 Cell	15°	PIA302008A
FRS 6x2P+	72 Cell	15°	PIA302009A
FRS 6x2P	72 Cell	20°	PIA302010A
FRS 6x2P+	72 Cell	20°	PIA302011A
FRS 6x2P	72 Cell	25°	PIA302002A
FRS 6x2P+	72 Cell	25°	PIA302013A
FRS 6x2P	72 Cell	30°	PIA302014A
FRS 6x2P+	72 Cell	30°	PIA302015A
FRS 6x2P	60 Cell	15°	PIA302024A
FRS 6x2P+	60 Cell	15°	PIA302025A
FRS 6x2P	60 Cell	20°	PIA302026A
FRS 6x2P+	60 Cell	20°	PIA302027A
FRS 6x2P	60 Cell	25°	PIA302028A
FRS 6x2P+	60 Cell	25°	PIA302029A
FRS 6x2P	60 Cell	30°	PIA30203A
FRS 6x2P+	60 Cell	30°	PIA302031A
Leveling Jig	72 Cell		PIA302032A
Leveling Jig	60 Cell		PIA302033A
Module Installation Kit			PIA302033A

FRS...: The kit consists of 3 short posts, 3 long posts, 3 rafters, 4 purlins, 3 braces, 6 brace clamps, 8 splicer plates, 8 zeta clamps, 12-16 omega clamps and all fasteners.

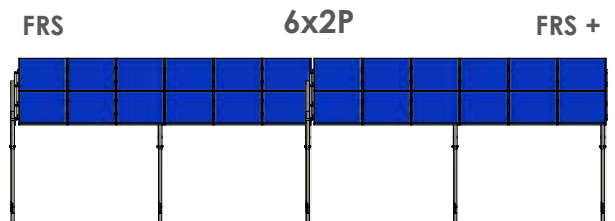
FRS...+: The kit consists of 2 short posts, 2 long posts, 2 rafters, 6 purlins, 1 braces, 4 brace clamps, 8 splicer plates, 8 zeta clamps, 12-16 omega clamps and all fasteners.

NOTE: Anchors must be ordered separately to suit ground conditions.

3.1.1. POLY/MONO CRYSTALLINE 5M TABLE (2 PORTRAIT)



3.1.2. POLY/MONO CRYSTALLINE 6M TABLE (2 PORTRAIT)



For construction always begin and end a row with at least one 5m table. Purlin spacing will depend on your module size and standard mounting points, therefore the PV Module technical data sheet needs to be provided/specified when ordering.



3.1.3 FIRST SOLAR STRUCTURE

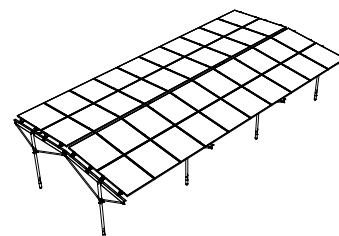
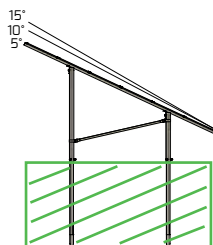
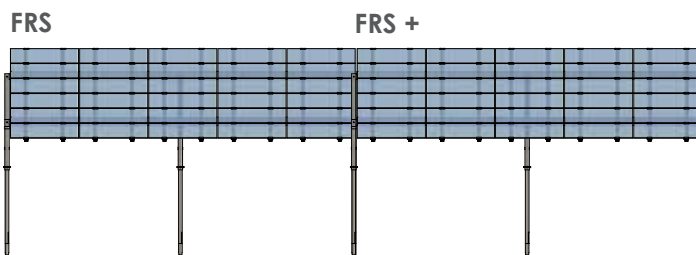
Module Type	Angle	Pre -Galv
FRS 6x5L	5°	PiA303000A
FRS 6x5L+	5°	PiA303001A
FRS 6x5L	10°	PiA303002A
FRS 6x5L+	10°	PiA303003A
FRS 6x5L	15°	PiA303004A
FRS 6x5L+	15°	PiA303005A
EW 4x10P	5°	PiA303006A
Leveling Kit		PiA303007A

FRS 6x5L: The kit consists of 4 short posts, 4 long posts, 4 rafters, 4 purlins, 4 braces, 8 brace clamps, 8 splicer plates, 8 zeta clamps, 36 omega clamps and all fasteners.

FRS 6x5L+: The kit consists of 3 short posts, 3 long posts, 6 rafters, 3 purlins, 3 braces, 3 brace clamps, 8 splicer plates, 8 zeta clamps, 38 omega clamps and all fasteners.

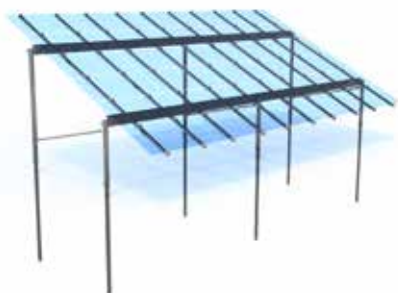
FRS 4x10P EW: The kit consists of 8 posts, 8 rafters, 8 purlins, 16 braces, 8 brace clamps, 16 splicer plates, 16 zeta clamps, 72 omega clamps and all fasteners.

FRS 4x10P EW+: The kit consists of 10 posts, 2 rafters, 4 purlins, 8 braces, 8 brace clamps, 16 zeta clamps, 72 omega clamps and all fasteners.



E/W 4x10P

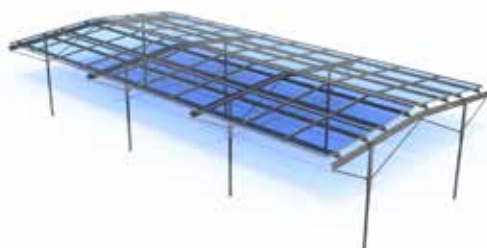
FIRST SOLAR STRUCTURES ARE SUPPLIED WITH FIRST SOLAR APPROVED MODULE CLAMPS. THROUGH PiA SOLARS IN-HOUSE DESIGN TEAM, TAILORED DESIGN AND SUPPLY OF SOLAR STRUCTURES TO SUIT A CLIENTS NEEDS.



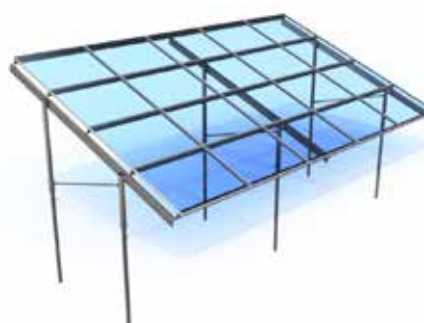
TF 5x6L



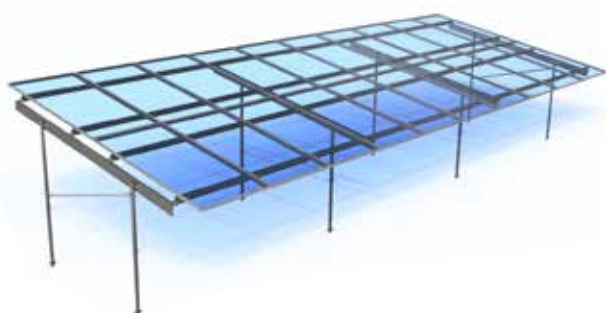
PV 3x2P



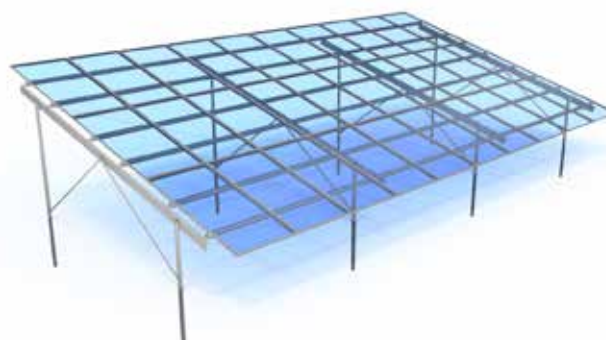
PV 4x10P EW



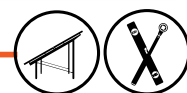
PV 5x4P



PV 10x2P



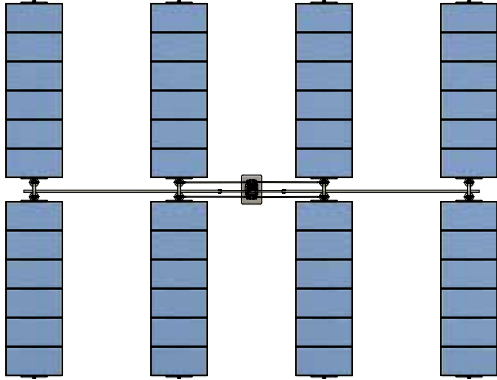
structures can be made to suit your own needs



3.2 CONTOUR+ TRACKER

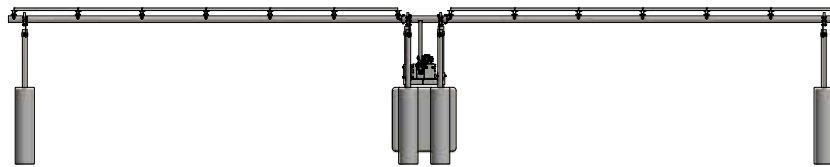
The PiA Solar Contour+ Tracker, has been designed for large scale installations, but the modular design allows it to be used for most sized projects and a basic installation can grow over-time to suit the clients needs. The tracker offers better yield and is ideally suited for off-grid mounting solutions as the tracker

provides a longer and stable power output suited for off-grid VSD and pumping solutions. Installation is simplified due to the built in unique contour following and adjustment capabilities. Trackers for small projects can be ordered and expanded as per the kits offered below.



Description	HDG
Tracker Starter Kit (4Rows: 2 Tables 6x1P per row)	PiA304000A
Tracker Row Extension Kit (1Row: 2 Tables 6x1P)	PiA304001A
Tracker 5 Module Table Extension Kit (1 Table 6x1P)	PiA304004A
Tracker 6 Module Table Extension Kit (1 Table 6x1P)	PiA304002A
Tracker 7 Module Table Extension Kit (1 Table 8x1P)	PiA304003A

3.2.1 TRACKER STARTER KIT

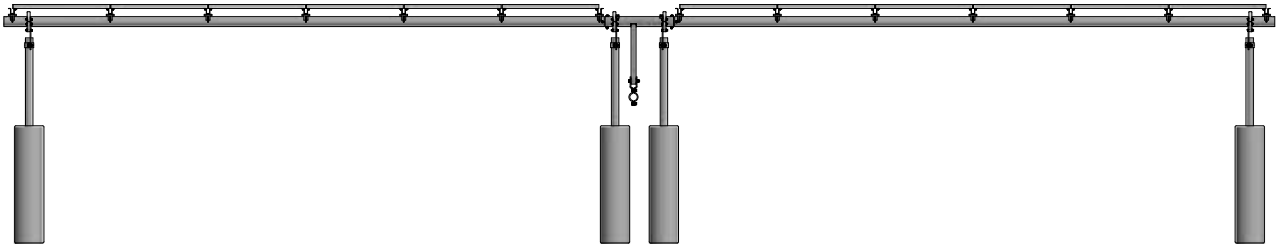


Note: Maximum of 40 modules per row. 16 Rows on 1 drive and 32 rows on 2 drives (also required for contour following).

Item	PIA Part No.	Qty	Description
1	PIA205001A	8	Bearing Plate Half
2	PIA152005D	16	Bearing
3	PIA136003B	18	Post Brace Clamp Ø76,2mm
4	PIA145001A	8	Concrete for Ø76,2 Post
5	PIA142004B	8	Anchor Post Ø76,20 - Standard
6	PIA203002C	1	Drive Arm - Welded Assembly
7	PIA204007A	2	Drive Beam Adapter Plate
8	PIA143001B	6	Universal Bearing Tube Ø88.9x5.0x90
9	PIA202002A	24	Bearer Taper Lock
10	PIA206015A	4	7 Module Bearer Beam
11	PIA206001A	2	6 Module Bearer Beam
12	PIA216000A	46	Clamping Rod (replaces M8-J-Bolt)
13	PIA182007A	46	Purlin Module Clamp
14	PIA152017E	46	Module Clamp Adapter
15	PIA136013B	2	Spring Bracket- M10 U-Bolt(Round Tube Ø101.6)
16	72 Cell Module	40	1956x992x40
17	PIA139000A-	8	Earth Strap
18	PIA152019A	8	Plastic Cap (Ø76.2 Standard Post)
19	PIA152022A	2	Plastic Cap (Ø101.6 Bearer Beam)
20	PIA136006J	2	Spring Bracket



TRACKER ROW EXTENSION KIT



Item	PiA Part No.	Qty	Description
1	PiA216000A	14	Clamping Rod (replaces M8-J-Bolt)
2	PiA206001A	2	5 Module Bearer Beam
3	PiA205001A	4	Bearing Plate Half
4	PiA202002A	4	Bearer Taper Lock
5	PiA182007A	14	Purlin Module Clamp
6	PiA152005D	8	Bearing
7	PiA152017E	14	Module Clamp Adapter
8	PiA145001A	4	Concrete for Ø76,2 Post
9	PiA143001B	2	Universal Bearing Tube Ø88.9x5.0x90
10	PiA142004B	4	Anchor Post Ø76,20 - Standard
11	PiA136003B	8	Post Brace Clamp Ø76,2mm
12	72 Cell Module	12	1956x992x40

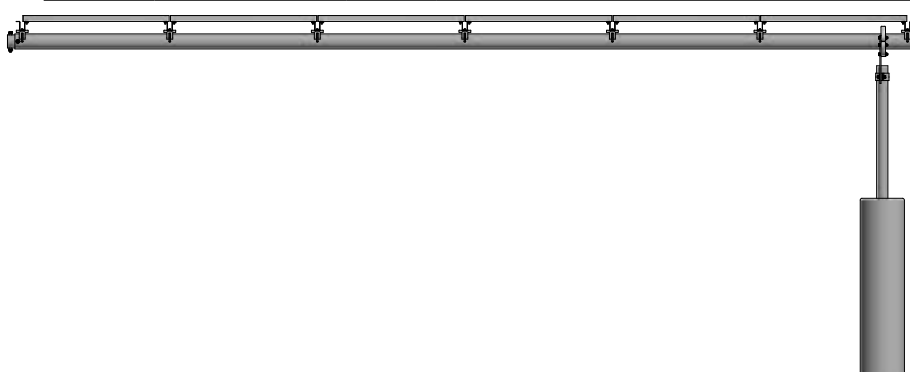
TRACKER 5 MODULE TABLE EXTENSION KIT

Item	PiA Part No.	Qty	Description
1	PiA216000A	6	Clamping Rod (replaces M8-J-Bolt)
2	PiA206001A	1	5 Module Bearer Beam
3	PiA205001A	2	Bearing Plate Half
4	PiA202002A	2	Bearer Taper Lock
5	PiA182007A	6	Purlin Module Clamp
6	PiA152005D	4	Bearing
7	PiA152017E	6	Module Clamp Adapter
8	PiA145001A	2	Concrete for Ø76,2 Post
9	PiA143001B	1	Universal Bearing Tube Ø88.9x5.0x90
10	PiA142004B	2	Anchor Post Ø76,20 - Standard
11	PiA136003B	4	Post Brace Clamp Ø76,2mm
12	72 Cell Module	5	1956x992x40



TRACKER 6 MODULE TABLE EXTENSION KIT

Item	PiA Part No.	Qty	Description
1	PiA216000A	7	Clamping Rod (replaces M8-J-Bolt)
2	PiA206001A	1	6 Module Bearer Beam
3	PiA205001A	2	Bearing Plate Half
4	PiA202002A	2	Bearer Taper Lock
5	PiA182007A	7	Purlin Module Clamp
6	PiA152005D	4	Bearing
7	PiA152017E	7	Module Clamp Adapter
8	PiA145001A	2	Concrete for Ø76,2 Post
9	PiA143001B	1	Universal Bearing Tube Ø88.9x5.0x90
10	PiA142004B	2	Anchor Post Ø76,20 - Standard
11	PiA136003B	4	Post Brace Clamp Ø76,2mm
12	72 Cell Module	6	1956x992x40



TRACKER 7 MODULE TABLE EXTENSION KIT

Item	PiA Part No.	Qty	Description
1	PiA216000A	8	Clamping Rod (replaces M8-J-Bolt)
2	PiA206001A	1	7 Module Bearer Beam
3	PiA205001A	2	Bearing Plate Half
4	PiA202002A	2	Bearer Taper Lock
5	PiA182007A	8	Purlin Module Clamp
6	PiA152005D	4	Bearing
7	PiA152017E	8	Module Clamp Adapter
8	PiA145001A	2	Concrete for Ø76,2 Post
9	PiA143001B	1	Universal Bearing Tube Ø88.9x5.0x90
10	PiA142004B	2	Anchor Post Ø76,20 - Standard
11	PiA136003B	4	Post Brace Clamp Ø76,2mm
12	72 Cell Module	7	1956x992x40





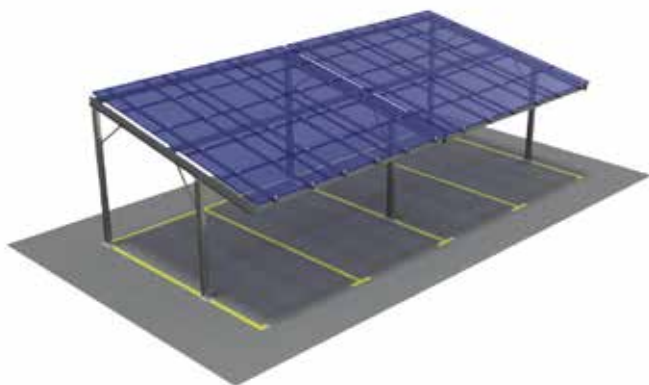
4. CARPORT SOLAR STRUCTURES

DETAIL B

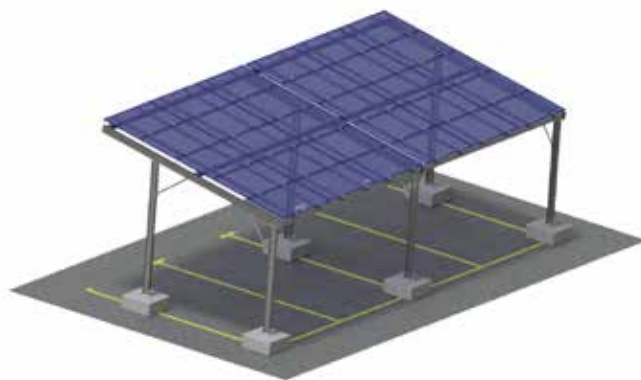
4. CARPORT SOLAR STRUCTURE

4.1.1 SINGLE CARPORT STRUCTURE

The PiA Solar carport system has been designed to be a light weight and cost effective solution.



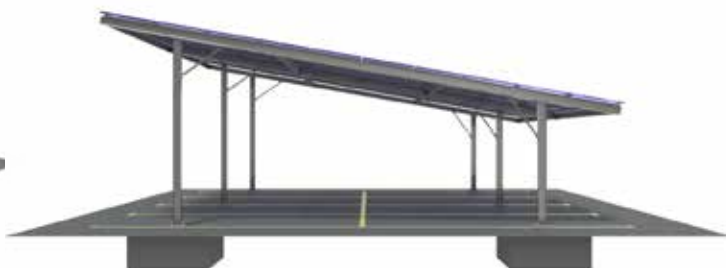
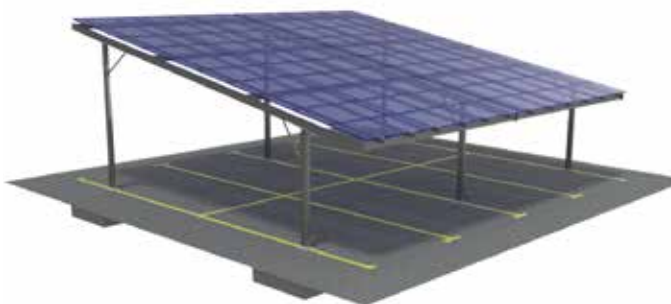
North Facing/North Entry



North Facing/South Entry

The single carport can be supplied for north facing north entry or north facing south entry. Single carports accommodate 2 vehicles between posts.

4.1.2 DOUBLE CARPORT STRUCTURE



Both the single and double carports can accommodate modules directly mounted to the structure or for use with roof sheets. All structures are supplied with a HDG (hot dipped galvanizing) finish. The carports are certified for a 5-10 degree tilt angle and 5m width between posts suits all vehicles. Vehicles entry heights.

Carport	PiA Part No.
5m North Entry Single Carport Assy	PIA600011A
5m North Entry Single Carport Assy Extension	PIA600012A
5m South Entry Single Carport Assy	PIA600013A
5m South Entry Single Carport Assy Extension	PIA600014A
5m Double Carport Assy	PIA600015A
5m Double Carport Assy Extension	PIA600016A
Supply includes brackets and fasteners	
Concrete foundations excluded	



A technical line drawing of a mechanical assembly, possibly a pump or motor, mounted on a rectangular base. The drawing includes various components like a motor, gears, and shafts. A blue banner with the text "5. CORROSION" is overlaid on the drawing. Two callouts, each labeled "8.0°", indicate specific angles or dimensions. The drawing is set against a grid background.

5. CORROSION

DETAIL B

5. SOLAR ROOFTOP INSTALLATION GUIDELINES ON CORROSION

STEEL ROOFING SYSTEMS ARE AVAILABLE WITH THREE MAIN CATEGORIES OF PROTECTIVE COATING.

1. Galvanized
2. 55% Aluminium/zinc coated.
3. Colour coated derivatives of 1 & 2 above

The durability of a metallic coating in a given environment is proportional to its thickness whereas that of a paint coating is determined by its thickness and formulation. However, not all coatings have the same corrosion resistant properties in a given environment. It is therefore vitally important to establish the durability of a coating in an environment. Important to verify your coating before starting. Ensure all roof surfaces are painted before starting your planning. Never install a system on a uncoated roof surface.

COATINGS

1. Galvanized - Z275= Zinc 275g/m²
2. Chromadek - Z275= 19µm Galvanized, 24µm of paint
3. Allu-Zinc - AZ150= 19µm “less grams but same thickness due to aluminium being lighter than Zinc” which can also be painted.

ROOF SHEET DESIGN LIFE

Roof sheeting is effected mainly by the environment such as high corrosive coastal areas and industrial areas due to industrial fall out, traffic fumes and general contaminates dust. The wear and tear due to traffic on the roof during installations is also a main factor in the design life on a roof, roof sheets typically have a design life of 15 years, this period can be prolonged with proper maintenance and painting the roof. It is generally recognised that any product used for the mounting of your solar system would generally outlast the roof sheet, so it is more important to carefully consider your roof life during your planning.

IMPORTANT CONSIDERATIONS

Once your solar system is installed on your roof, it will restrict access to do roof maintenance and therefore it is critically that your solar systems would have minimal impact on the long term life of your roof sheet. In reality while installing the solar system you are putting unusual wear and tear on your roof and its corrosion protection system. Also the roof can be left with general dents and scratches, each one of those will have a long term impact on the life of the roof. Care should be taken during your installation as to minimize damage of any kind.

GENERAL WEAR AND TEAR

General walking on the roof will wear down the coating on the corners of the profile where it is already reduced due to the bending process.

1. Dents caused by your installation could lead to the build-up of dirt and water which could cause extreme crevice corrosion problems, which is when water, dust and run off molecule particles are trapped between two surfaces that are permanently fixed together. This will cause corrosion between any materials, however the use of dissimilar metals (zinc-aluminium) will cause a galvanic reaction. These are both very aggressive stimulator of corrosion and must be taken seriously.
2. Scratches can also catch microscopic harmful elements which could lead to faster corrosion in those areas.

MOUNTING SYSTEM TYPES

1. Galvanized (HDG 55µm)
2. Aluminium

On the galvanic chart HDG (Zinc) is one of the most sacrificial materials on the chart and will always sacrifice itself for aluminium or your roof sheet. Aluminium being higher on the chart will not sacrifice itself for Zinc (Galvanizing) and therefore place your roof at risk.

INSTALLATION EXAMPLE

A galvanized roof clamp, clamps on a roof sheet and damages the surface of the roof sheet. The zinc of the clamp will sacrifice itself to heal the roof sheets and as the clamp has 55µm of zinc versus 19µm it will be a good long term partner for your roof.

An aluminium clamp on a zinc roof will cause the roof to sacrifice itself for the aluminium clamp. As the aluminium is much thicker than the roof the self-sacrificing zinc of the roof will be depleted leading to accelerated corrosion. This is definitely not recommend.

RUN-OFF CORROSION

As material slowly deteriorates over time the microscopic particles that are freed from aluminium roof clamps, rails and module clamps could through rain and wind be deposited onto the roof sheet. These deposits can be caught in exposed areas, crevices, dents or scratches on the roof and long term exposure would lead to the roof sacrificing itself to this contaminated run-off material. Run-off corrosion is something that is not usually considered when planning the installation of solar systems but plays a major role in the deteriorating the life expectancy of your roof sheeting.

GENERAL RULE

HDG(zinc) can run-off onto aluminium as the zinc would sacrifice itself to the roof sheet but aluminium should never be placed anywhere on a roof where the particles could run onto any coated roof type. This is to ensure the maximum life of your roof. This is a very important factor as you only get one chance of getting it right and making the wrong decisions will reduce the life of the roof especially due to the fact that minimal maintenance can be done under the solar structures once your solar installation is completed.

RECOMMENDED SOLUTIONS

The safest and recommended solution is using galvanized/zinc roof clamps, rails and module clamp products for your installations. Care and must also be taken for your earthing and trunking systems. Aluminium or copper earth cable must be lagged to ensure that there is no contact or run-off onto your roof sheet. Prevention is better than cure.

This document is intended as a guideline to maximising the life of your roof and has been done in consultation with Mr Dennis White of SAMCRA. SAMCRA can be contacted should you require any information regarding the extension of your roof life for solar installations on the details below.

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Colin Muller
CEO - PiA Solar SA



NOTES



RACKING



TRACKING



ANCHORING



INSTALLATIONS



CARPORT



ROOFTOP



ELECTRICAL



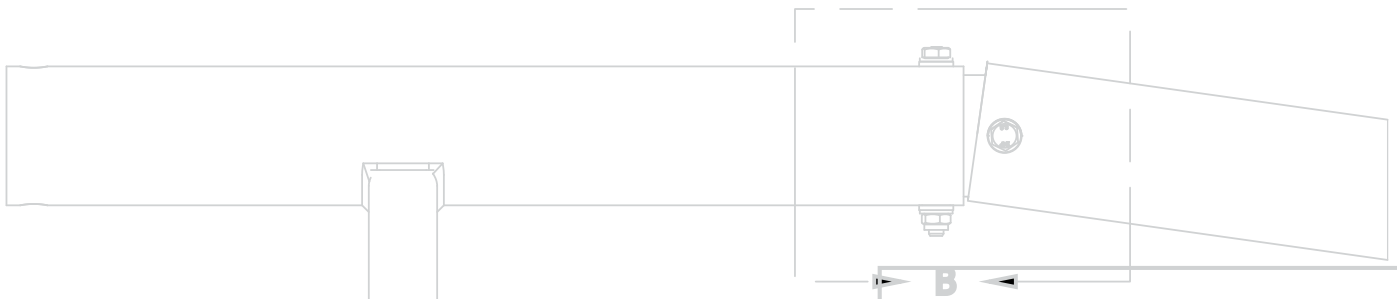
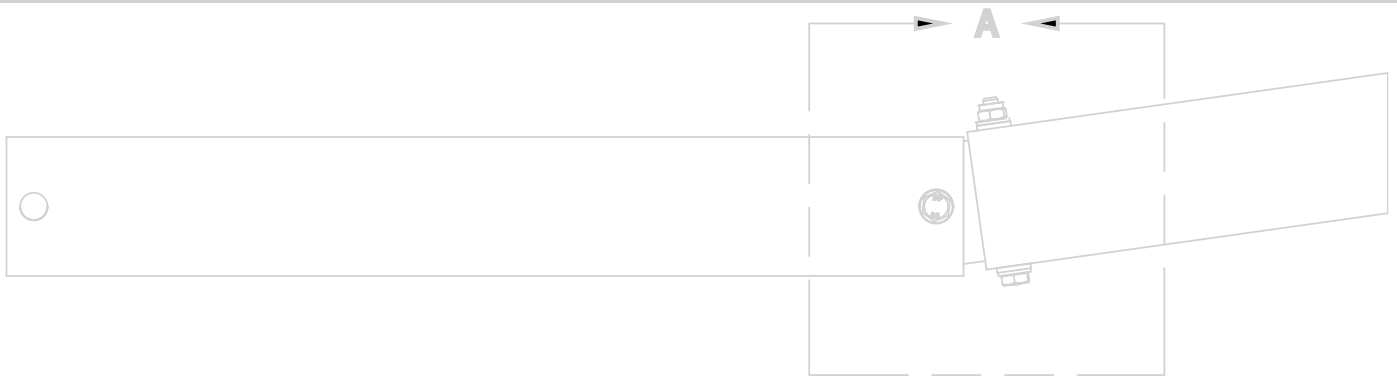
BALLAST



SAFETY

PIA SOLAR INSTALLATIONS





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