



SOLAR

PREFORMED LINE PRODUCTS

SOLAR ROOFTOP MOUNTING SYSTEMS





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PLP specializes in engineering, designing, and manufacturing a wide array of photovoltaic racking systems and equipment enclosures for residential, commercial, and utility-scale industrial applications.

Mounting Kits

PLP's mounting kits products offer improved strength, longer life and are easy to install. We offer field-proven solutions for securing any solar module in a variety of applications for utility scale, commercial, residential, government and industrial markets. Installers from the Asia-Pacific region rely on the strength and hassle-free quick assembly of our PV mounting structures.

High-Strength and Durable Design:

- ▶ Engineered rail profile for maximum strength to weight ratio
- ▶ High strength structural aluminum rail construction
- ▶ All fastening hardware is made of durable stainless steel

Reduced Installation Time and Costs:

- ▶ Top-Clamping System design for fast installation and easier access
- ▶ Tighter module spacing offers higher density
- ▶ Greater span lengths reduce roof penetrations and mounting components
- ▶ Mounting Kits offer all hardware components in a single part number

Since 1993, PLP has provided reliable, field-proven racking systems for pole mount, roof top and ground mount applications. Our mounting systems are tested to withstand the harshest environments and are the preferred choice for PV solar applications on stadiums, airports, retail stores, schools, universities and commercial buildings worldwide.

In addition, PLP Solar provides consultation on system design and installation. It delivers added value to its customers through expertise and unparalleled customer support. PLP Solar can provide an effective solution, making the choice for solar energy a worthwhile investment.



ROOF MOUNT SYSTEMS



CRS Mounts (CRS-G2)

- Non-penetrating, 5" or 10" tilted mount commercial flat roof system
- Wind tunnel tested and qualified – low ballast weight
- Secure bolt-together construction - no field drilling, cutting or measuring
- EPDM rubber base (included) protects roof surfaces
- Integrated grounding tested to UL standards
- Ballast pans accept standard concrete "cap" blocks



Ballasted POWER RAIL™ Mounts (BPRM)

- Non-penetrating, flush mount commercial flat roof system
- POWER RAIL™ top-clamping system with Lock-in-Place RAD™ Bolts (patented)
- High density, high energy output per square foot
- EPDM rubber (included) protects roof surfaces
- Wind tunnel tested – low ballast weight



Ballasted Roof Mounts (BRM)

- Non-penetrating, ballasted, flat roof system
- Module tilt angles up to 45° – Adjustable tilt legs
- POWER RAIL™ top-clamping system with Lock-in-Place RAD™ Bolts
- Ballast pans accept standard concrete "cap" blocks
- EPDM rubber base (included) protects roof surfaces



POWER RAIL™ Mounting System (PRM)

- P-Series, R-Series, LD and MD rail options for optimal span-to-cost ratio
- High strength, top-clamping mounting system with Lock-in-Place RAD™ Bolts
- Parallel to roof or tilted mount applications
- Single tool assembly
- Attachment options for any style roof application
- Integrated grounding using Burndy WEEBS



POWER RAIL™ KTS Mounts (KTS)

- Landscape tilted commercial mounting system
- 5°-25° tilt options to maximize energy production
- Ideal for East/West pitching roofs or structures
- Mounts directly to metal roof attachment hardware, structure or roof substrate
- POWER RAIL™ top-clamping system with Lock-in-Place RAD™ Bolts

GROUND MOUNT SYSTEMS

POWER PEAK™

- Designed for large scale applications featuring fewer components
- Install over pile driven standard I-Beams
- Mounting structures optimized to specific site requirements
- Both single strongback and double strongback design are available
- Field adjustable – fast installation
- Features Lock-in-Place RAD™ Bolts
- Integrated grounding



Multi-Pole Mounts (MPM-G2)

- Designed to mount on 3" or 4" SCH 40/80 pipe pipe (installer supplied)
- Fewer ground penetrations than traditional ground mount systems, saving labor and materials
- Optional ground clearance – ideal for shade structures or car ports
- POWER RAIL™ top-clamping system with Lock-in-Place RAD™ Bolts (patented)
- Seasonal elevation adjustments – positive locking brackets



Large Ground Mounts (LGM)

- Fixed tilt, easy to assemble pipe structures
- Designed to specific site requirements
- POWER RAIL™ top-clamping system
- TIG-welded, high strength aluminum fittings
- Schedule 40 pipe supplied by installer



Top-of-Pole Mounts (TPM)

- Heavy gauge steel and aluminum construction
- Securely mount 1 to 24 modules on a single pole
- Module-specific design reduces parts and assembly time
- Preset holes eliminate measuring and drilling
- Seasonal elevation adjustments from 15° to 65°
- Mounts on standard schedule 40 or 80 rigid steel pipe

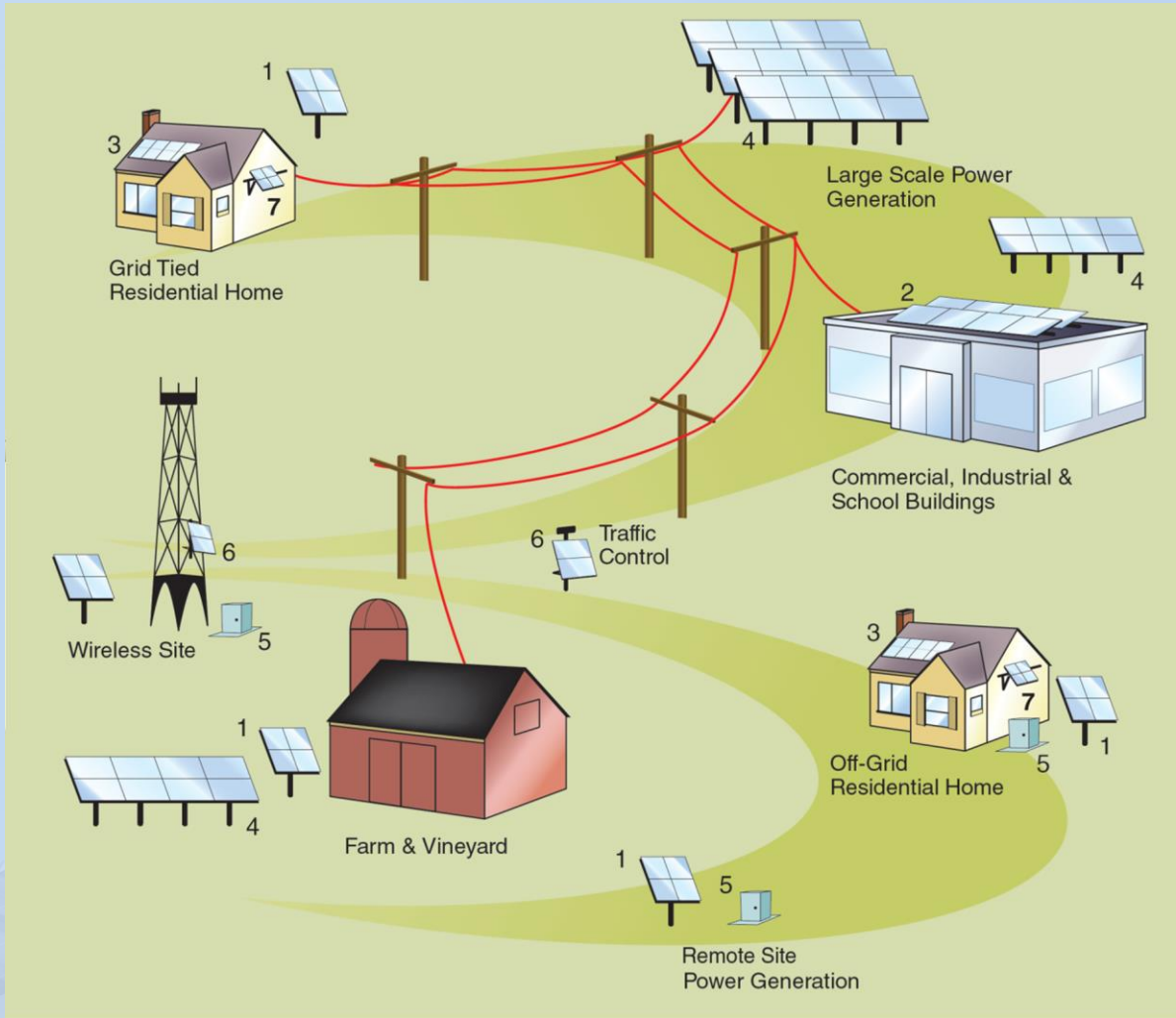


Side-of-Pole Mounts (SPM)

- Available in painted steel or mill-finish aluminum construction
- Mounting options include band clamps, u-bolts or through bolts
- Adjustable tilt angle
- Heavy duty stainless steel mounting hardware
- Tower mounting options available



SOLUTIONS FROM PLP



Solutions Key



1. Top-of-Pole Mounts



2. Ballasted Roof Mounts
 – POWER-FAB® CRS
 – Ballasted Power Rail



3. Power Rail™ Mounts



4. Ground Mounts
 – Power Peak™
 – Multi-Pole Mounts
 – Large Ground Mounts



5. Power Box™ Enclosures



6. Side-of-Pole Mounts

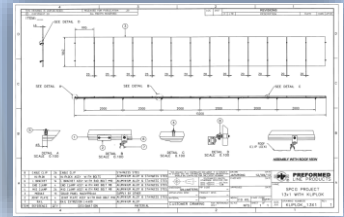


7. Power Rail™ Awning Mounts

TECHNICAL SUPPORT

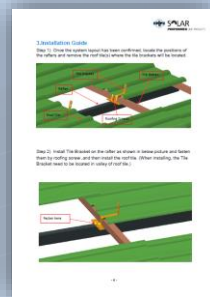
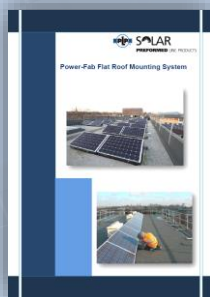
PLP Thailand provides team support to make sure that all product designs and solutions meet customer requirements:

- ▶ Local sales team
- ▶ Local engineering team
- ▶ Technical support team
- ▶ On-site survey
- ▶ System solution drawing



Standard documentation are well prepared to cover customer needs:

- ▶ Product brochure
- ▶ Product catalogue
- ▶ Design calculation report
- ▶ Step-by-step installation manual
- ▶ Product test report
- ▶ Site test report



Various demonstration sets are ready for presentation:

- ▶ Compact standard demo sets
- ▶ Mobile demo for tile roof
- ▶ Mobile demo for metal sheet roof
- ▶ By request

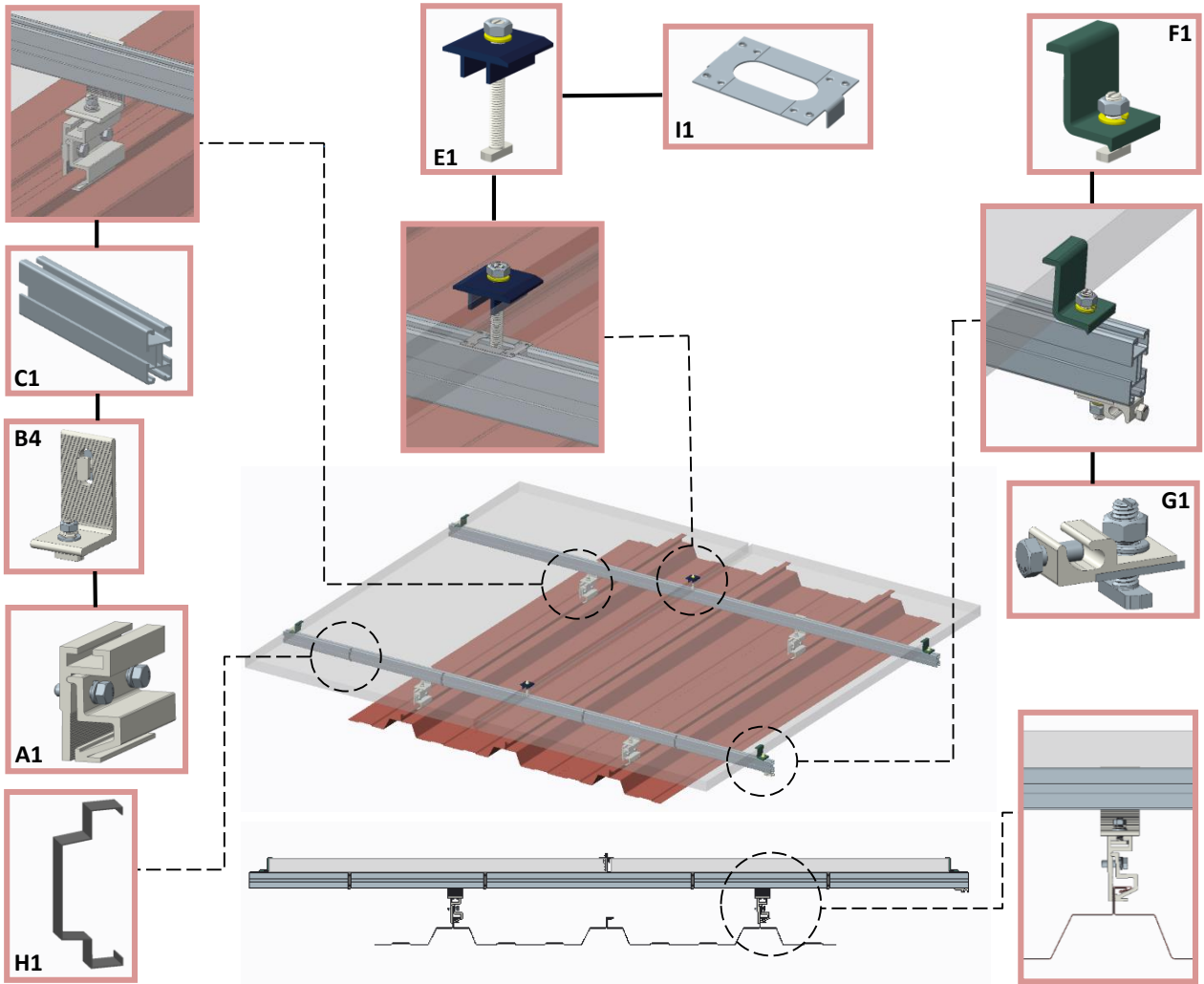


We have standard in-house Testing Facilities to fulfill prototype testing, product testing, solution verification, and customized testing as customer requests:

- ▶ 1,000kN Vertical tensile machine
- ▶ 400kN Horizontal tensile machine
 - ▶ Tensile testing
 - ▶ Slip testing
 - ▶ Destructive testing
- ▶ Hardness testing
- ▶ Resistance verification
- ▶ Galvanized verification



SEAM Roof : Kliplok S-5



A1 : Kliplok S-5

B4 : L-Bracket Assembly with RAD™ Bolt M8 and M10

C1 : Power Rail™ R5

E1 : Mid Clamp

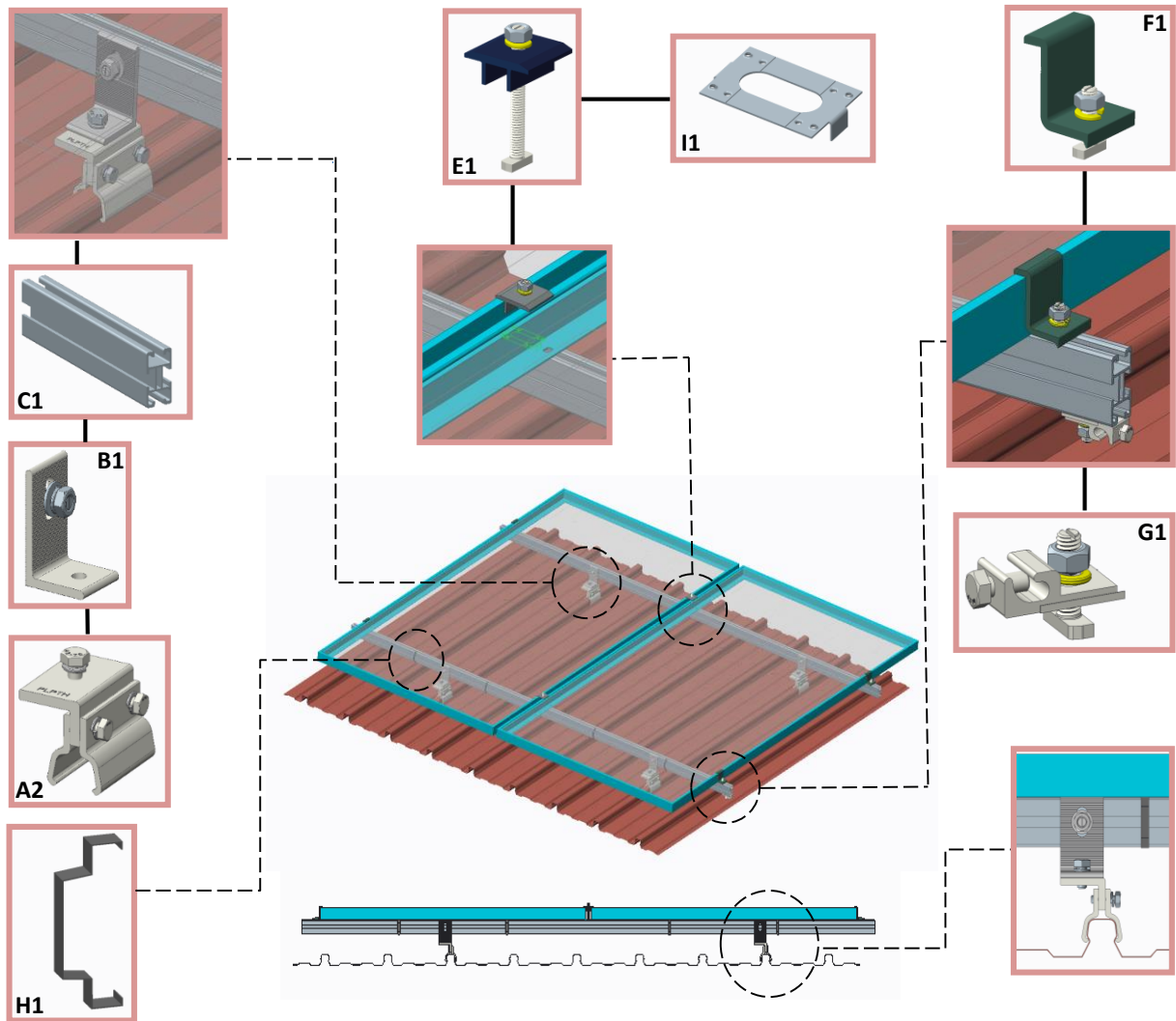
F1 : End Clamp

G1 : Grounding Lug

H1 : Cable Clip

I1 : Grounding Plate

Kliplok 700 Roof : Kliplok 700



A2 : Kliplok 700

B1 : L-Bracket with RAD™ Bolt M10, Hole Ø 11 mm.

C1 : Power Rail™ R5

E1 : Mid Clamp

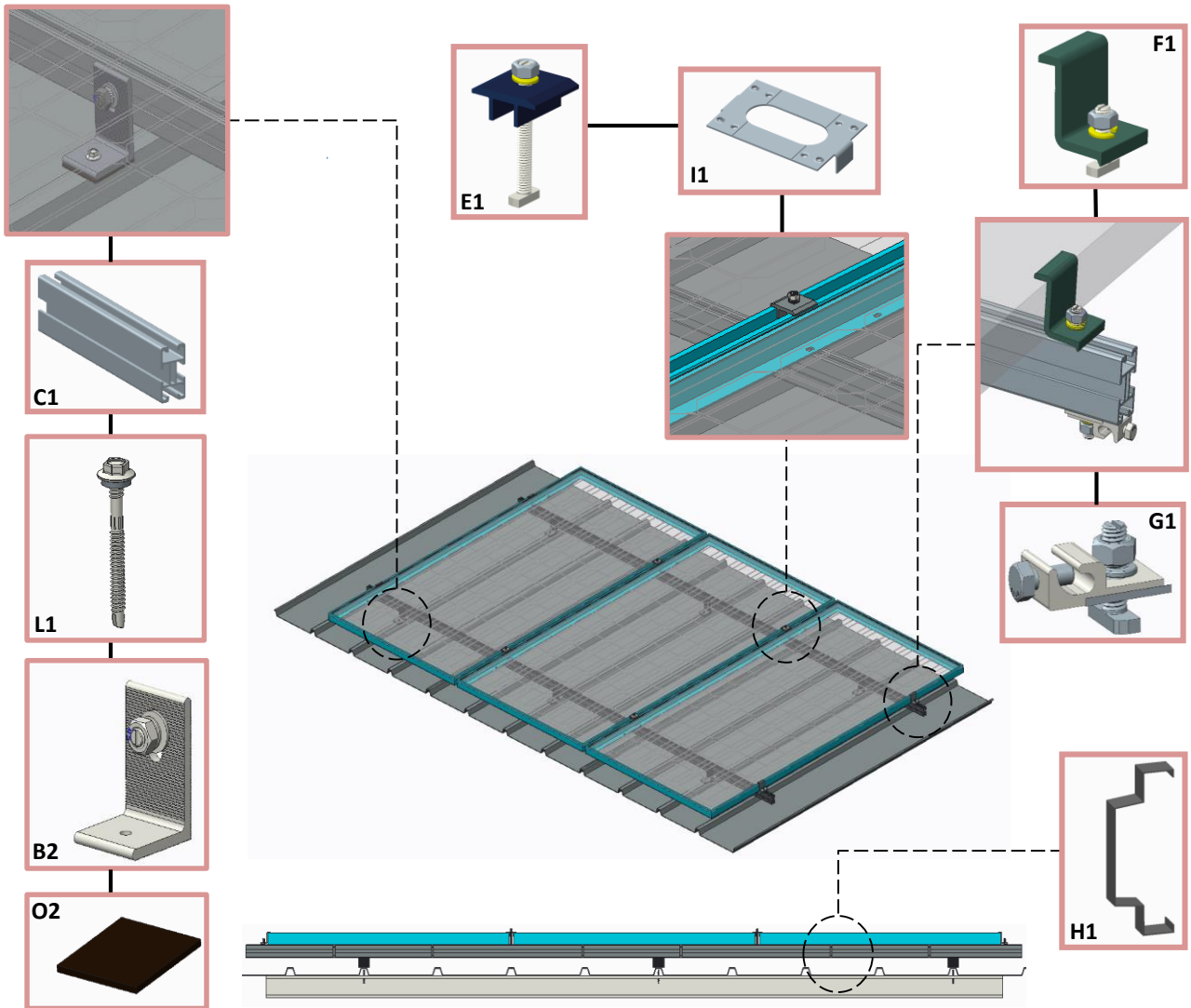
F1 : End Clamp

G1 : Grounding Lug

H1 : Cable Clip

I1 : Grounding Plate

Trapezoidal Roof : L-Bracket



B2 : L-Bracket with RAD™ Bolt M10, Hole Ø 7 mm.

C1 : Power Rail™ R5

E1 : Mid Clamp

F1 : End Clamp

G1 : Grounding Lug

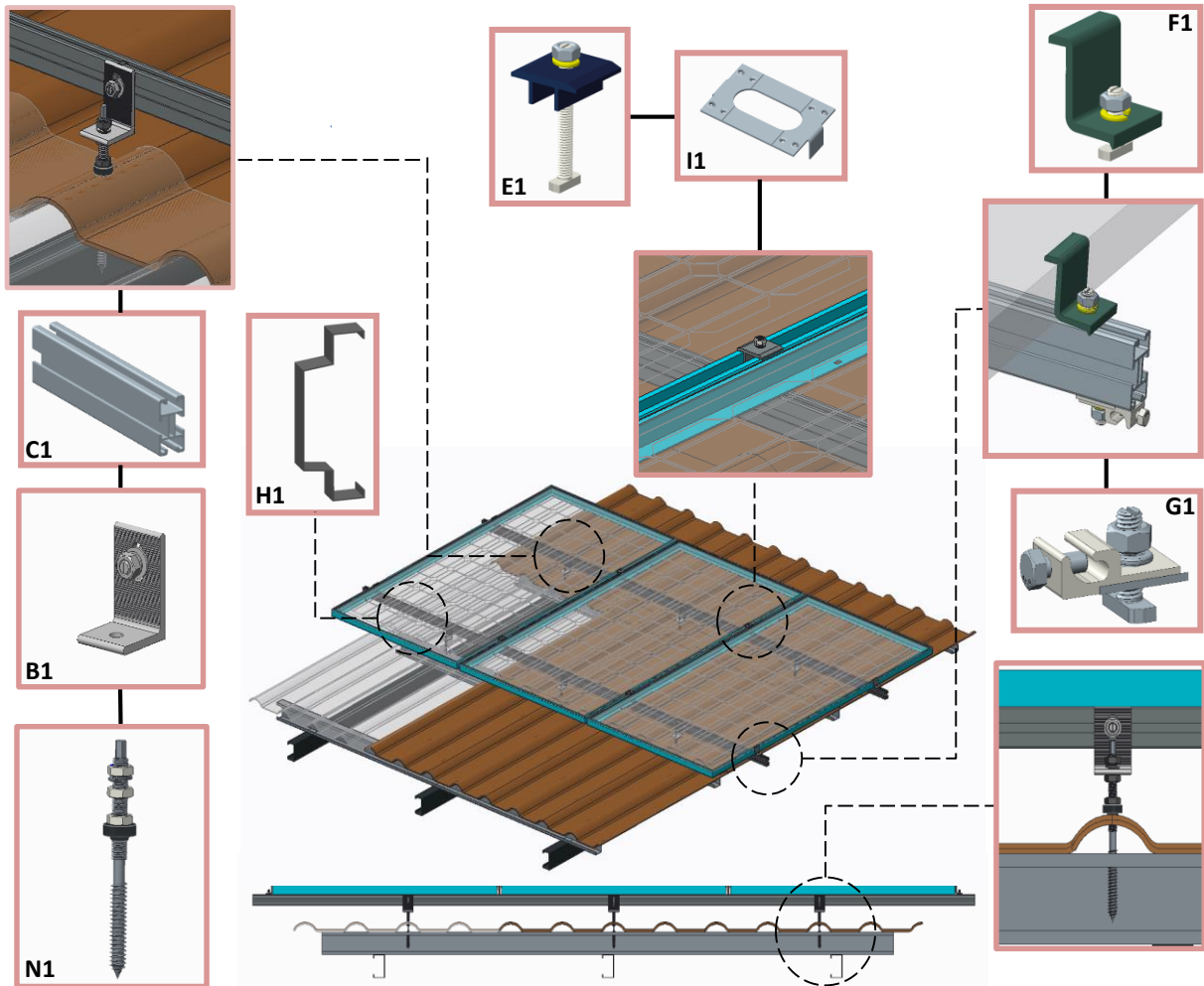
H1 : Cable Clip

I1 : Grounding Plate

L1 : Self Drilling Screw

O2 : EPDM Rubber for Tile Roof

Roman Tile Roof : Hanger Bolts



B1 : L-Bracket with RAD™ Bolt M10, Hole Ø 11 mm.

C1 : Power Rail™ R5

E1 : Mid Clamp

F1 : End Clamp

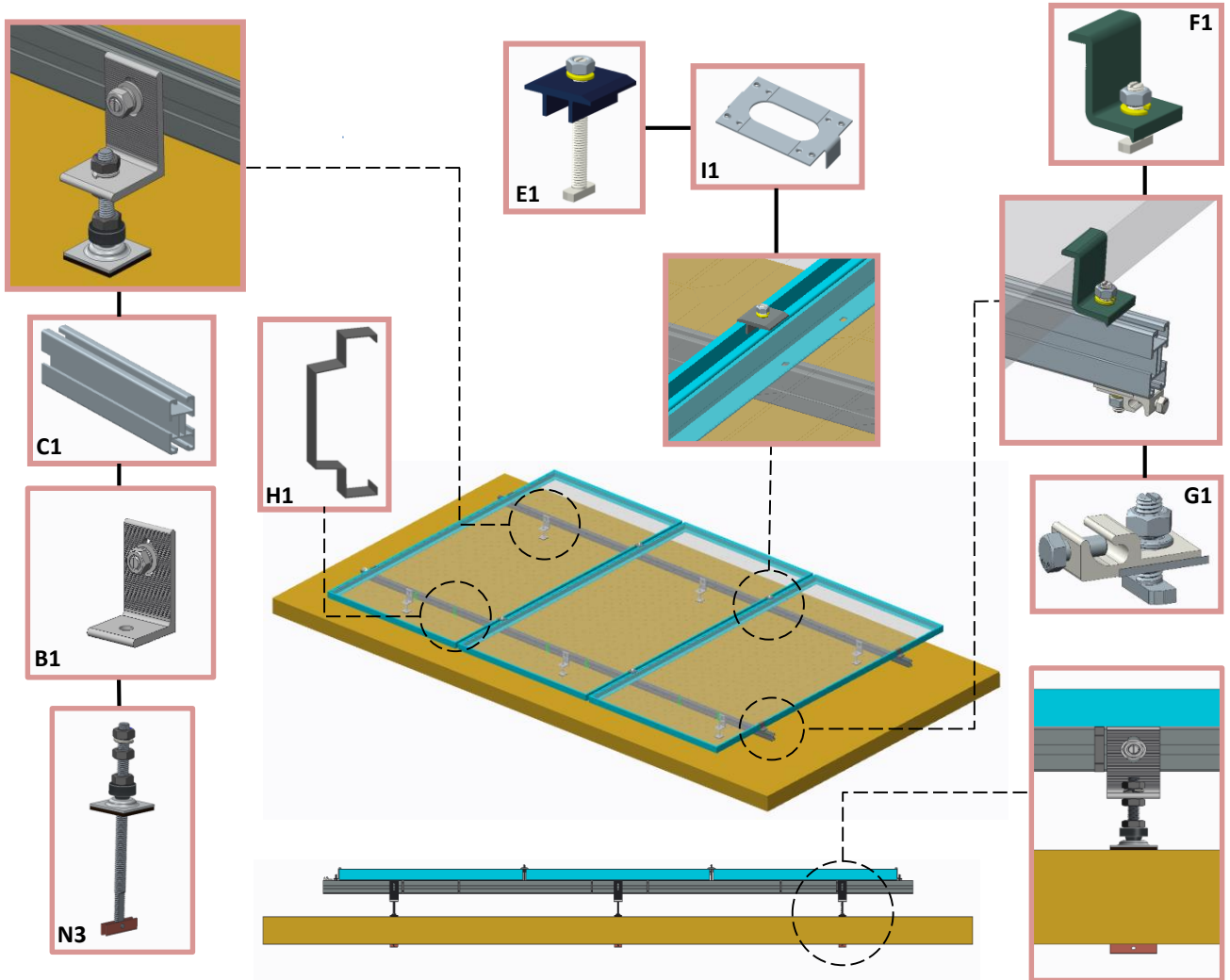
G1 : Grounding Lug

H1 : Cable Clip

I1 : Grounding Plate

N1 : Hanger Bolt

Flat Roof : Self-locking Hanger Bolt



B1 : L-Bracket with RAD™ Bolt M10, Hole Ø 11 mm.

C1 : Power Rail™ R5

E1 : Mid Clamp

F1 : End Clamp

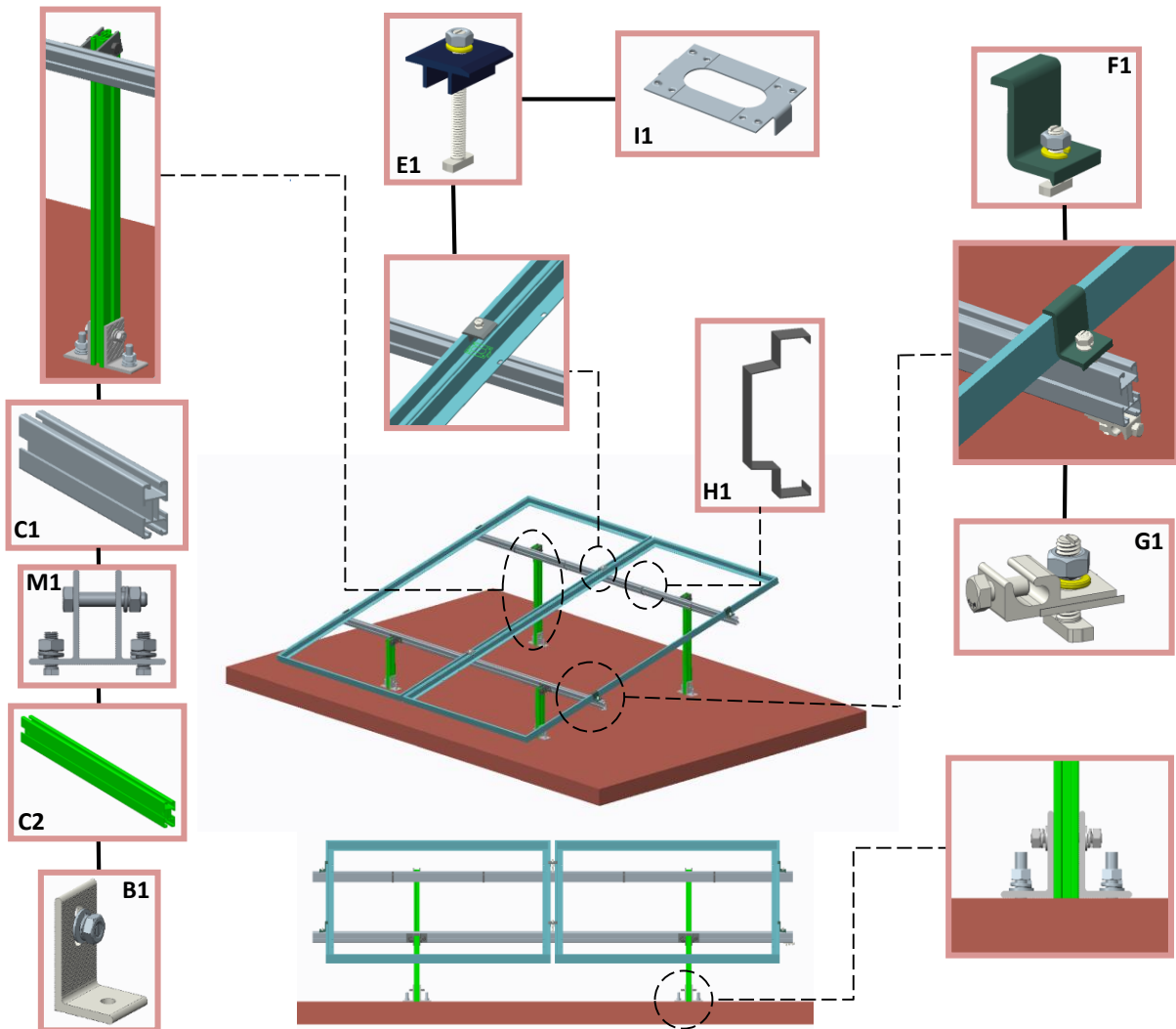
G1 : Grounding Lug

H1 : Cable Clip

I1 : Grounding Plate

N3 : Self Lock Hanger Bolt Set

Concrete Slab Fixed Tilt : L-Bracket & Anchor Bolt



B1 : L-Bracket with RAD™ Bolt M10, Hole Ø 11 mm.

C1 : Power Rail™ R5

C2 : Power Rail™ R5 Pole

E1 : Mid Clamp

F1 : End Clamp

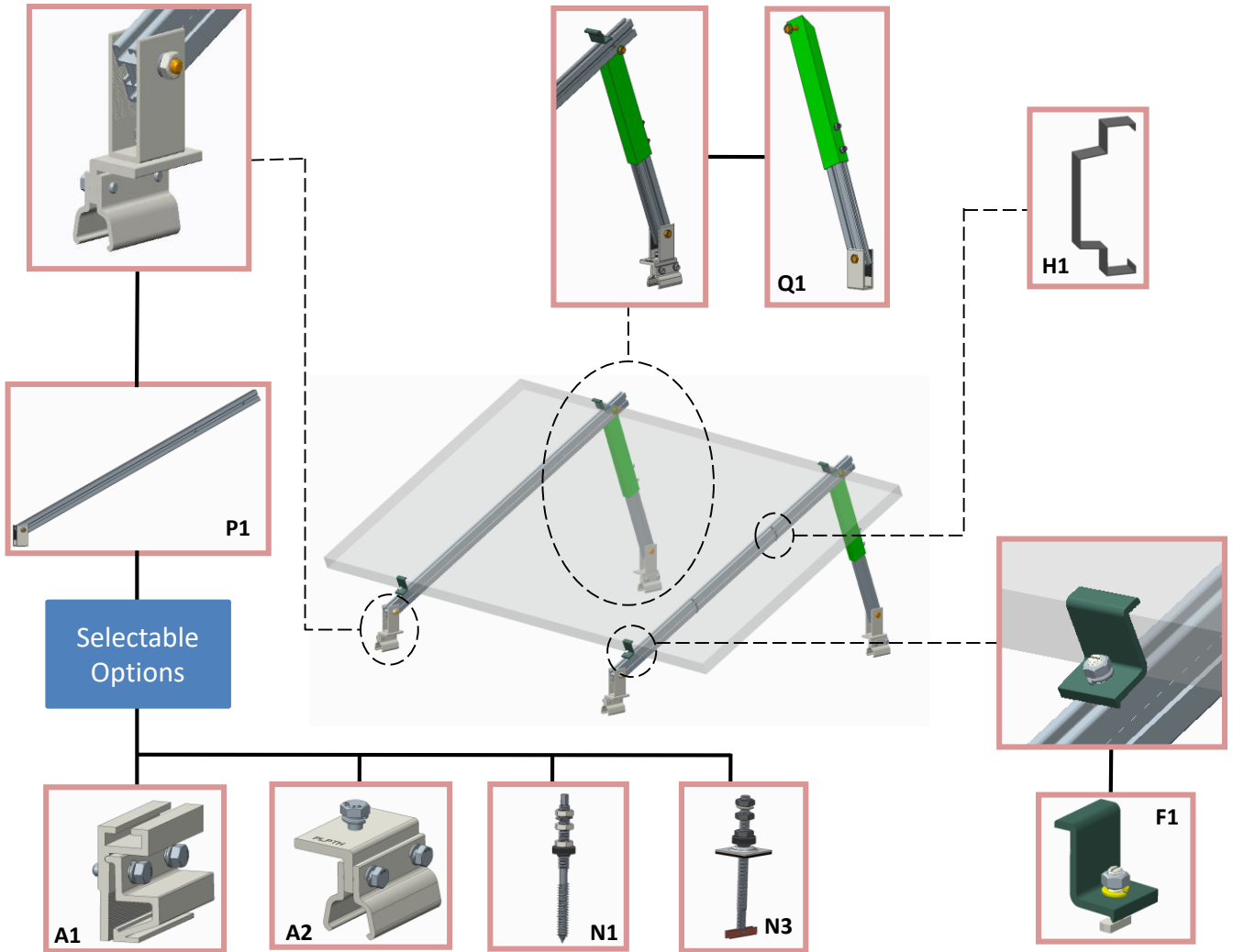
G1 : Grounding Lug

H1 : Cable Clip

I1 : Grounding Plate

M1 : T-Support-Power Rail™ R5

Adjustable Tilt : Selectable options (5-45 Degree)

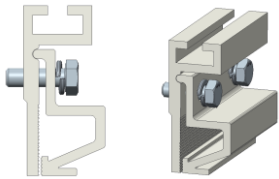


A1 : Kliplok S-5
 A2 : Kliplok 700
 F1 : End Clamp
 H1 : Cable Clip

N1 : Hanger Bolt
 N3 : Self Lock Hanger Bolt
 P1 : Adjustable Strongback
 Q1 : Adjustable Leg

COMPONENTS

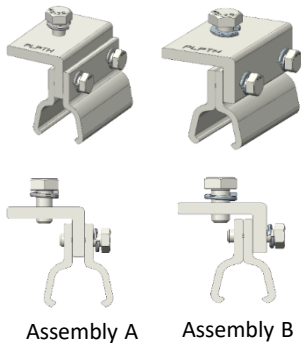
A1) Kliplik S-5



Provides for SEAM Roof S-5. Made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P07301-000	Kliplik for S-5 roof

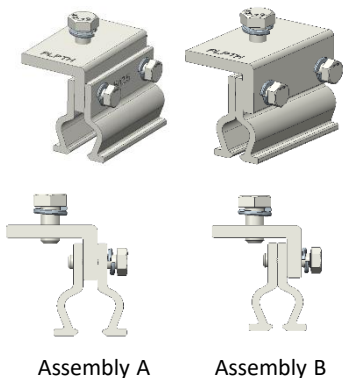
A2) Kliplik 700



Provides the flexibility to clamp on different types of metal sheet roof providing a reliable holding system; the bracket is made of high quality corrosion resistant aluminum. No need to drill the roof. Two assembly options available for adapting to different roof types. Made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P06595-000	Kliplik for Solar roof 20.2/27.7 mm.

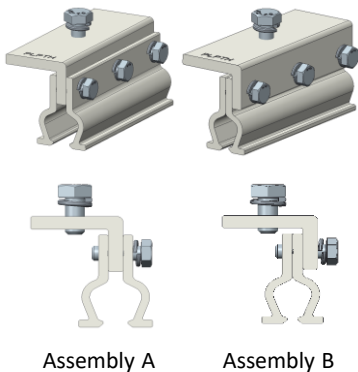
A3) Kliplik V750



Provides the flexibility to clamp on different types of metal sheet roof providing a reliable holding system; the bracket is made of high quality corrosion resistant aluminum. No need to drill the roof. Two assembly options available for adapting to different roof types. Made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P06601-000	Kliplik assembly with Bolt for solar roof 5/12.5

A4) Kliplik V750 3 bolt



Provides the flexibility to clamp on different types of metal sheet roof providing a reliable holding system; the bracket is made of high quality corrosion resistant aluminum. No need to drill the roof. Two assembly options available for adapting to different roof types. Made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P06706-000	Kliplik assembly for V750 TYPE III (12.5/5)

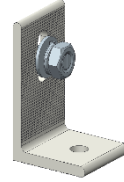
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COMPONENTS

B1) L-Bracket Hole 11 mm.

L-Brackets are fabricated from high strength aluminum and designed for mounting on various types of surfaces. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P06592-000	L-Bracket with RAD™ Bolt M10, Hole \varnothing 11 mm.



B2) L-Bracket Hole 7 mm.

L-Brackets are fabricated from high strength aluminum and designed for mounting on various types of surfaces. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P06590-000	L-Bracket with RAD™ bolt M10, Hole \varnothing 7 mm.



B3) L-Bracket Hole 13 mm.

L-Brackets are fabricated from high strength aluminum and designed for mounting on various types of surfaces. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

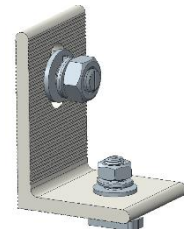
Part No.	Description
P07679-000	L-Bracket with RAD™ bolt M10, Hole \varnothing 13 mm.



B4) L-Bracket

L-Brackets are fabricated from high strength aluminum and designed for mounting on various types of surfaces. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P07829-000	L-Bracket with RAD™ bolt M8 and M10



B5) L-Bracket with stud bolt

L-Brackets are fabricated from high strength aluminum and designed for mounting on various types of surfaces. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P07669-000	L-Bracket assembly with stud bolt M12 length 100 mm. set

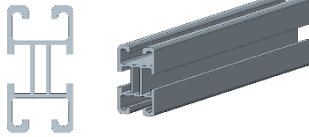


COMPONENTS

C1) POWER RAIL™ R5

POWER RAIL™ is an engineered profile extrusion made from Series 6005-T5 structural aluminum. POWER RAIL™ R5 is designed for standard span range.

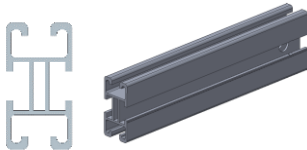
Part No.	Description
P05406-000	Aluminum rail length 2120 mm.
P05407-000	Aluminum rail length 3160 mm.
P05408-000	Aluminum rail length 4160 mm.
P05409-000	Aluminum rail length 5190 mm.



C2) POWER RAIL™ R5 Pole

POWER RAIL™ is an engineered profile extrusion made from Series 6005-T5 structural aluminum. POWER RAIL™ R5 is designed for standard span range.

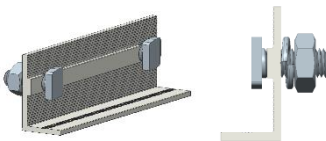
Part No.	Description
P07807-000	Aluminum rail length 150 mm.
P07797-000	Aluminum rail length 185 mm.
P07817-000	Aluminum rail length 272 mm.
P07818-000	Aluminum rail length 290 mm.
P07819-000	Aluminum rail length 360 mm.
P07820-000	Aluminum rail length 390 mm.
P07821-000	Aluminum rail length 442 mm.
P07822-000	Aluminum rail length 449 mm.
P07823-000	Aluminum rail length 490 mm.
P07824-000	Aluminum rail length 516 mm.
P07825-000	Aluminum rail length 550 mm.
P07826-000	Aluminum rail length 586 mm.



D1) Rail Joiner-POWER RAIL™ R5

Provides the flexibility to clamp on different types of metal sheet roof providing a reliable holding system; the bracket is made of high quality corrosion resistant aluminum. No need to drill the roof. Two assembly options available for adapting to different roof types. Profile extrusion made from Aluminum grade 6005-T5 and 304 stainless steel fastening hardware.

Part No.	Description
P03228-000	Rail Joiner for Rail R5



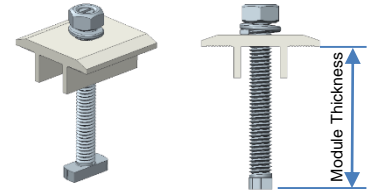
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COMPONENTS

E1) Mid Clamp

Aluminum grade 6005-T5 for strength and durability with 304 stainless steel fastening hardware. The low profile design and slim 20 mm. gap between modules provide a professional appearance and higher density. This part is designed for R5 rail.

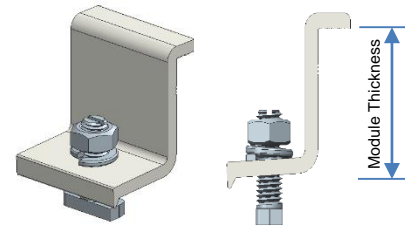
Part No.	Description
P07207-000	Mid Clamp for Panel thickness 30 mm.
P06554-000	Mid Clamp for Panel thickness 35 mm.
P06555-000	Mid Clamp for Panel thickness 40 mm.
P06556-000	Mid Clamp for Panel thickness 45 and 46 mm.
P06557-000	Mid Clamp for Panel thickness 50 mm.



F1) End Clamp

Aluminum grade 6005-T5 for strength and durability with 304 stainless steel fastening hardware. Universal patent pending design allows any solar module to be mounted securely. This allows a single kit component list to cater for any project. A range of locking bolts provides installation preset positioning of module alignment and can handle panels from 22 mm. to 52 mm. This part is designed for R5 rail.

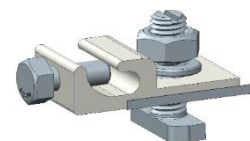
Part No.	Description
P06558-000	End Clamp with RAD™ Bolt , panel thickness range 25.00-27.99 mm.
P07203-000	End Clamp with RAD™ Bolt , panel thickness range 28.00-30.99 mm.
P06559-000	End Clamp with RAD™ Bolt , panel thickness range 31.00-33.99 mm.
P06560-000	End Clamp with RAD™ Bolt , panel thickness range 34.00-36.99 mm.
P06561-000	End Clamp with RAD™ Bolt , panel thickness range 37.00-39.24 mm.
P06562-000	End Clamp with RAD™ Bolt , panel thickness range 39.25-40.74 mm.
P07205-000	End Clamp with RAD™ Bolt , panel thickness range 40.75-42.99 mm.
P06563-000	End Clamp with RAD™ Bolt , panel thickness range 43.00-45.24 mm.
P06565-000	End Clamp with RAD™ Bolt , panel thickness range 45.25-46.74 mm.
P06566-000	End Clamp with RAD™ Bolt , panel thickness range 46.75-48.99 mm.
P06567-000	End Clamp with RAD™ Bolt , panel thickness range 49.00-51.99 mm.



G1) Grounding Lug

Profile extrusion made from Aluminum grade 6005-T5 with 304 stainless steel Provides for hold grounding cable.

Part No.	Description
P06505-000	Grounding lug



COMPONENTS

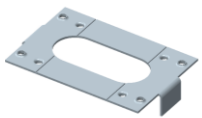


H1) Cable Clip

Cable clip 304 stainless steel will secure cable properly in the side of Rail R5.

Part No.	Description
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P03099-000	Cable Clip for Cable Management for Rail R5
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I1) Grounding Plate

Creates electrical grounding 304 stainless steel between rail and solar panel.

Part No.	Description
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P06523-000	Grounding Plate
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J1) Mounting Bridge

Assembles with L-Bracket to reduce compression load on the drill point in roof deck. Profile extrusion made from Aluminum grade 6005-T5.

Part No.	Description
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P02349-000	Mounting Bridge for Trapezoidal Roof Height = 20 mm.
P02352-000	Mounting Bridge for Trapezoidal Roof Height = 30 mm.
P02354-000	Mounting Bridge for Trapezoidal Roof Height = 40 mm.



K2) Adjustable Tile Bracket

Adjustable roof tile mounting bracket provides flexibility to secure the mounting rails in different style roof tiles. Made from 304 stainless steel.

Part No.	Description
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P02728-000	Adjustable Tile Bracket size 40-62 mm. with RAD™ Bolt M10
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L1) Self Drilling Screw

Fastener for direct drilling into Metal Purlin.

Part No.	Description
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P02406-000	Self Drilling Screw 12-14x50 with Rubber
P07330-000	Self Drilling Screw 12-14x65 stainless steel with Rubber
P02540-000	Self Drilling Screw 12-14x65 with Rubber
P02651-000	Self Drilling Screw 12-14x100 with Rubber
P08380-000	Self Drilling Screw 12-14x40 stainless steel



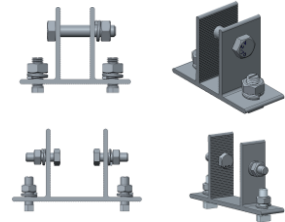
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COMPONENTS

M1) T-Support-POWER RAIL™ R5

T-Support to lock both sides of the Rail R5 and uses for Tilt application. Profile extrusion made from Aluminum grade 6005-T5 with fastener 304 stainless steel.

Part No.	Description
P03221-000	T-Support for Rail R5, Width 24.5 mm.
P03215-000	T-Support for Rail R5, Width 46.8 mm.



N1) Hanger Bolt

Fastener 304 stainless steel for direct drilling into Wooden and Metal Purlin for Roman Tile Roofs.

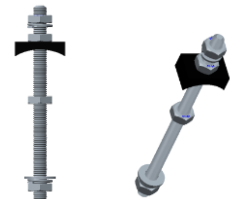
Part No.	Description
P08378-000	Hanger Bolt M10-200 mm. for Steel and Wooden purlin



N2) Stud M10

Bolt and Nut 304 stainless steel assembly for Roman Tile Roof.

Part No.	Description
P02495-000	Stud M10 with Fastener and Rubber for Roman Tile Roofs, 200 mm.
P03685-000	Stud M10 with Fastener and Rubber for Roman Tile Roofs, 260 mm.



N3) Self Lock Hanger Bolt

Easy for direct hanging into Metal Purlin made from 304 stainless steel grade.

Part No.	Description
P07672-000	Self Lock Hanger Both M10



COMPONENTS

O1) Circular EPDM Rubber



High quality insert to shield drilled hole and avoid water leakage.
Suitable for Roman-Tile roof.

Part No.	Description
P08374-000	Seal Rubber for hanger bolt.

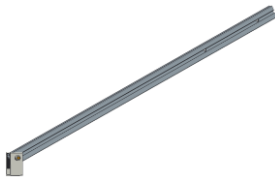
O2) Rectangle EPDM Rubber



High quality insert to shield drilled hole and avoid water leakage.

Part No.	Description
P02351-000	EPDM Rubber for Tile Roof 28x50x3 mm.
P02525-000	EPDM Rubber for Tile Roof 45x51x3 mm. (with adhesive tape)
978486-000	EPDM Rubber for Tile Roof 45x51x3 mm.
P02429-000	BUTYL Rubber size 45x51x3 mm.

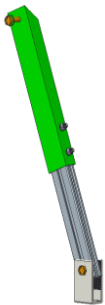
P1) Adjustable Strongback



Adjustable tilt by 6005-T5 aluminum profile extrusion and 304 stainless steel fastening hardware.

Part No.	Description
P08410-000	Adjustable Strongback Power Rail™ R5

Q1) Adjustable Leg



High strength and durability by 6005-T5 aluminum profile extrusion and 304 stainless steel fastening hardware.

Part No.	Description
P08408-000	Adjustable Leg 5-25 degree
P08427-000	Adjustable Leg 26-45 degree

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PLP Thailand

PLP Thailand is a wholly-owned subsidiary of Preformed Line Products Co. which is headquartered in Cleveland, Ohio. PLP Thailand is ISO 9001 & ISO 14000 version 2015 certified and is located in the tax free zone of Lardkrabang Industrial Estate approximately 15 km from Bangkok's Suvarnabhumi International Airport.

PLP Thailand has more than 43 years of experience in the industry and has approximately 300 employees serving the Power Transmission, Power Distribution, Substation, Communication, Alternative Energy (Solar), and System Enclosure markets. The direct market coverage includes Thailand, Vietnam, Laos, Cambodia, Myanmar, India, Sri Lanka, Pakistan, Bangladesh, Nepal, Taiwan, and part of Japan.

PLP Thailand's product lines include line hardware fittings and accessories for the following:

- ▶ Power Transmission Networks
- ▶ Power Distribution Networks
- ▶ Substations
- ▶ Rail Networks
- ▶ Communication Networks
- ▶ System Enclosures
- ▶ Alternative Energy
- ▶ Solar Hardware Fittings and Structures

Capabilities Include:

- ▶ Wire Forming
- ▶ Forging
- ▶ Aluminum and Steel Welding (Including robotics)
- ▶ Aluminum Casting: Gravity and Pressure Die Cast (PDC)
- ▶ Earth Rods and Accessories (Copper and Steel Rods)
- ▶ Assembly
- ▶ PVC Extrusion
- ▶ Plastic Injection
- ▶ Plate Cutting
- ▶ Hardware machining
- ▶ Testing
- ▶ Tool Design and Manufacturing



PLP Thailand's Self Consumption Solar System

In 2017, PLP Thailand implemented a project to install a self-consumption solar power system at the company's Bangkok facility. This model system aligns with PLP's objective to help reduce carbon dioxide emissions into the atmosphere while also promoting renewable energy. The 773-kW rooftop system helps reduce PLP's carbon footprint while also reducing the cost of electricity usage for the facility.

This self-consumption system also highlights the many different solar mounting solutions and hardware products that PLP offers and helps to demonstrate how they are installed, maintained, and utilized. In addition, PLP was also able to introduce a monitoring system to integrate data received from the inverters and smart loggers, including data from a Power Quality Meter (PQM). This allows users to monitor data output, historical trends, system performance and energy savings, environmental data, system status, and other related data in real time.



**Carports
(Welding type)**



**Thin Film with
L-Brackets**



Canopy



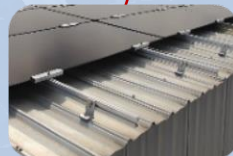
Carports Roof



**PV Module
with Kliplok Clamp**



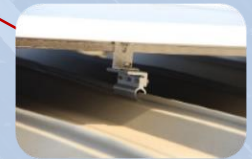
**Carports
(Attachment type)**



**Thin Film with
L-Brackets**



Walkway



**Metal Sheet Roof
with Kliplok clamps**



PREFORMED
LINE PRODUCTS

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