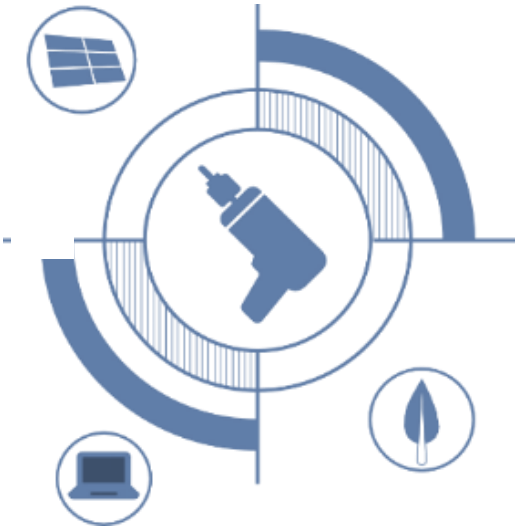
Trinasolar

AMENDMENT TO INSTALLATION USER MANUAL



This document is intended to add mounting options in addition to the existing and described methods in Trina Solar User Manual.

In order to achieve the best use of installation of systems, mounting system shall be designed or selected according to the project requirements. Fixation (including bolts, clamps, hooks, etc.) used in a system shall not have failure (malfunctioned to cause loose or any other issues which may damage the PV modules) in any circumstance.

Please refer to the official User Manual for the requirements of installation and the relevant exemption clauses.

Chapter 1: Clamp requirements for test load

The testing load in following chapters are based on the test with clamp A, clamp B, and clamp C. The description and schematic diagram of the clamps are provided below.

- **Clamp A** : A-surface matching clamp 50 mm (1.97 inch) length with thickness ≥4 mm;
- **Clamp B**: 50 mm (1.97 inch) length Clamp with thickness ≥4 mm (0.16 inch);
- **Clamp C**: 40 mm (1.57 inch) length Clamp with thickness ≥4 mm (0.16 inch);

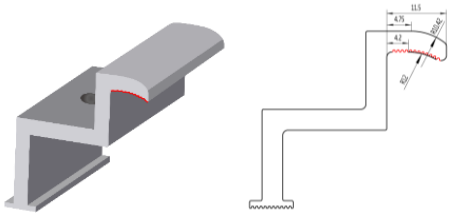


Figure 1 A surface matching clamp

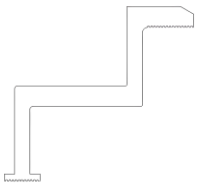


Figure 2 Demonstration Clamp B and Clamp C

Chapter 2：Test load and clamp range for different mounting options

Option 1: Short side clamping with 4 clamps and only punctual support underneath module frame

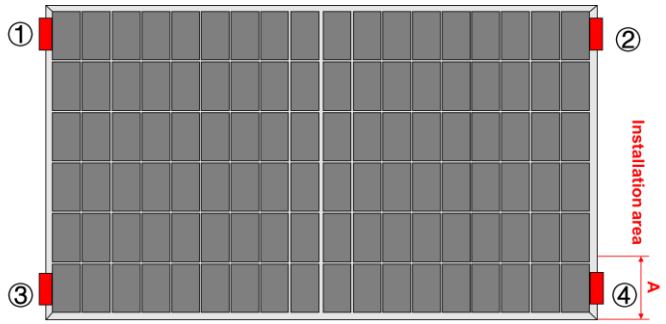
Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 1) for all 4 clamps attached to the module short side, clamping range can be asymmetrical, clamp 1&2 can have a different position from the module edge compared to clamp 3 & 4.
Legend	
	Module clamp which has to fulfill Trina’s minimum requirements in terms of grip length and grip depth.

Table 1: Maximum mechanical test loads and clamping ranges for option 1

Clamp A:

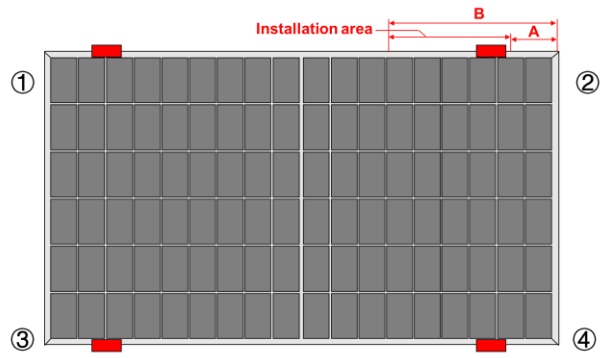
Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
DE09R.B0 / DE09R.B5 / DE09R.B8 DE09R / DE09R.05 / DE09R.08	+2400Pa	-1800Pa	0-200mm
NEG9R.28/ NEG9R.25/ NEG9R.20/ NEG9RC.27/ NEG9RC.20	+2400Pa	-1800Pa	0-200mm

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
DE09R.B0/DE09R.B5/DE09R.B8	+2200Pa	-1600Pa	0-200mm
DE09R/DE09R.05/DE09R.08	+2200Pa	-1600Pa	0-100mm
DE19 / DEG19C.20	+1000Pa	-800Pa	0-200mm
DE20 / DEG20C.20	+1000Pa	-800Pa	0-200mm
DE21 / DEG21C.20	+1000Pa	-800Pa	0-200mm
NED19RC.20	+1300Pa	-1000Pa	0-200mm

Option 2: Long side clamping and only punctual support underneath module frame

Long side clamping with 4 clamps

Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 2) for all 4 clamps attached to the module long side; the clamps 1 & 3 can have a different distance to the edge than the clamps 2 & 4 (asymmetrical clamping).

Legend

	Module clamp which has to fulfill Trina's minimum requirements in terms of grip length and grip depth.

Table 2: Maximum mechanical test loads and clamping ranges for Long side clamping with 4 clamps.

Clamp A:

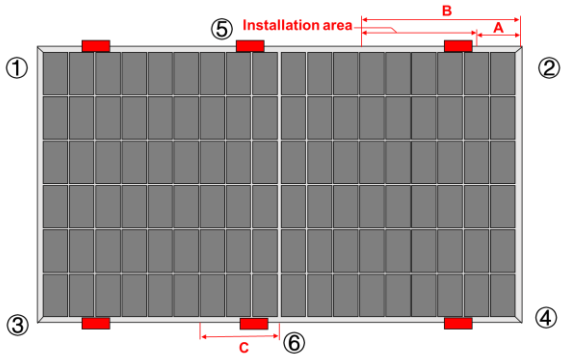
Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping Range A-B (mm)
DE09R.B0/DE09R.B5/DE09R.B8 DE09R/DE09R.05/DE09R.08	+2400	-2000	100-200
	+3600	-3000	200-290
	+3000	-2400	290-370
	+2400	-2000	370-550

NEG9R.28/NEG9R.25/ NEG9R.20/ NEG9RC.27/ NEG9RC.20	+2400	-2000	100-200
	+2400	-2000	200-290
	+3000	-2400	290-370
	+2400	-2000	370-550

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A-B (mm)
DE09R DE09R.05 DE09R.08	+2400Pa	-2400Pa	130-199
	+3600Pa	-3000Pa	200-330
	+2400Pa	-2400Pa	331-381
	+2200Pa	-2200Pa	382-600
NEG9R.28/NEG9R.25/NEG9R.20 NEG9RC.27/NEG9RC.20	+2000Pa	-2000Pa	130-289
	+3000Pa	-2400Pa	290-370
	+2000Pa	-2000Pa	371-431
NEG18R.28/NEG18R.20	+2400Pa	-1600Pa	400-600
DE19R	+1800Pa	-1100Pa	442-742
DEG19RC.20 NEG19RC.20	+2400Pa	-2200Pa	442-642
	+2000Pa	-1800Pa	643-742
DE19	+1200Pa	-1000Pa	100-439
	+1500Pa	-1500Pa	440-540
	+1200Pa	-1000Pa	541-600
DE20	+1200Pa	-1000Pa	100-600
DE21	+1000Pa	-800Pa	100-600

Long side clamping with 6 clamps

Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 3) for all 6 clamps attached to the module long side; the clamps 1 & 3 can have a different distance to the edge than the clamps 2 & 4 (asymmetrical clamping); the clamp 5 can have a different distance to the center than the clamp 6.

Legend	
	Module clamp which has to fulfill Trina' s minimum requirements in terms of grip length and grip depth.

Table 3: Maximum mechanical test loads and clamping ranges for Long side clamping with 6 clamps.

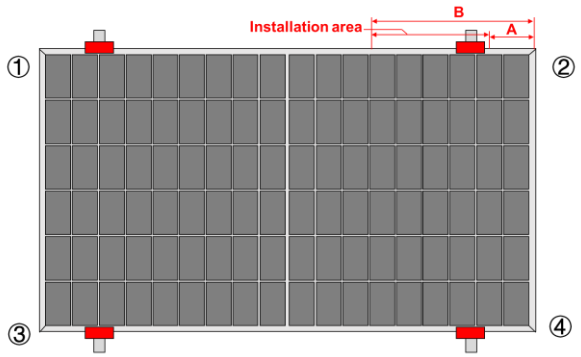
Clamp A:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping Range(mm)	
			A-B	C
DE09R.B0/DE09R.B5 DE09R.B8/DE09R DE09R.05/DE09R.08	+3600	-2400	0-200	0-200
	+3000	-2400	200-380	0-200
	+2400	-2000	380-550	0-200
NEG9R.28/NEG9R.20 NEG9R.25NEG9RC.27 NEG9RC.20	+3000	-2400	0-200	0-200
	+3000	-2400	200-380	0-200
	+2400	-2000	380-550	0-200

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range(mm)	
			A-B	C
DE09R/DE09R.05 DE09R.08	+3600Pa	-2400Pa	0-200	0-200
	+3000Pa	-2400Pa	201-381	0-200
NEG9R.28/NEG9R.20 NEG9R.25 NEG9RC.27/NEG9RC.20	+3000Pa	-2400Pa	0-200	0-200
	+2000Pa	-2000Pa	201-381	0-200
DE19	+2000Pa	-2000Pa	0-200	0-200
DE19R	+2400Pa	-1500Pa	442-742	0-250
DEG19RC.20 NEG19RC.20	+2600Pa	-2400Pa	442-742	0-250

Option 3: Long side clamping with crossbeam

Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 4) for all 4 clamps attached to the module long side; the clamps 1 & 3 can have a different distance to the edge than the clamps 2 & 4 (asymmetrical clamping).

Legend	
	Module clamp, which has to fulfill Trina's minimum requirements in terms of grip length and grip depth. Higher load as per Installation Manual.

Table 4: Maximum mechanical test loads and clamping ranges for option 3.

Clamp A:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A-B (mm)
DE09R.B0/DE09R.B5/DE09R.B8 DE09R/DE09R.05/DE09R.08	+6000Pa	-4000Pa	250-330
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+3600Pa	-3000Pa	100-300
			350-600
	+5400Pa	-4000Pa	300-350
NE09RH.05	+5400Pa	-5400Pa	250-330

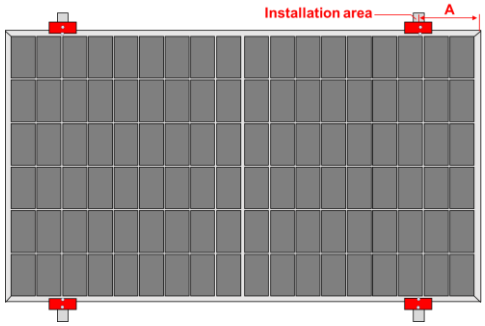
Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A-B(mm)
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+5400Pa	-4000Pa	270-370
DEG19RC.20 / NEG19RC.20	+5400Pa	-2400Pa	440-540
DE09R DE09R.05 DE09R.08	+3200Pa	-2400Pa	200-249
	+6000Pa	-4000Pa	250-330
	+3000Pa	-2400Pa	331-600
NEG18R.28/NEG18R.20	+3000Pa	-2400Pa	200-305
	+5400Pa	-1800Pa	405-500
DE19R	+1700Pa	-1100Pa	200-600
DE19RC.20 / DE19R	+1800Pa	-1200Pa	200-600
DE18M(II)	+1800pa	-1800pa	200-600

Clamp C:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A-B(mm)
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+5400Pa	-2400Pa	290-370
	+3000Pa	-2400Pa	231-556
	+2400Pa	-1800Pa	100-600
DEG19RC.20 / NEG19RC.20	+5400Pa	-2400Pa	440-540

Long side clamping with 2 crossbeams

Graphic view	Description
	Positions of 2 crossbeams, 4 screws and 4 clamps (check **Structure** column in Table 5 for details) are consistent with the positions of the indicated 4 bolt holes on the original module. The exact clamping positions are also listed on Table 5.

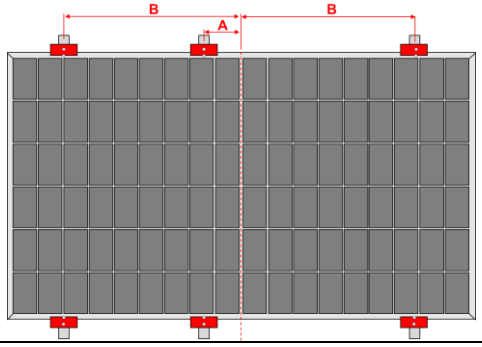
Legend	
	Module clamp, which has to fulfill Trina's minimum requirements in terms of grip length and grip depth. Higher load as per Installation Manual.

Table 5: Maximum mechanical test loads and clamping ranges for Long side clamping with 2 crossbeams.

Clamp B:

Product Code	Structure	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping Position A (mm)
NED19RC.20	2 crossbeams + 4 screws + 4 clamps	+7000Pa	-5000Pa	491
NE09RH.05	2 crossbeams + 4 screws + 4 clamps	+7000Pa	-6000Pa	331

Long side clamping with 3 crossbeams

Graphic view	Description
	Positions of 3 crossbeams, 6 screws and 6 clamps (check **Structure** column in Table 5 for details) are consistent with the positions of the indicated 6 bolt holes on the original module. The exact clamping positions are also listed on Table 6. *Note: The position of A could be left or right to the module center line.*

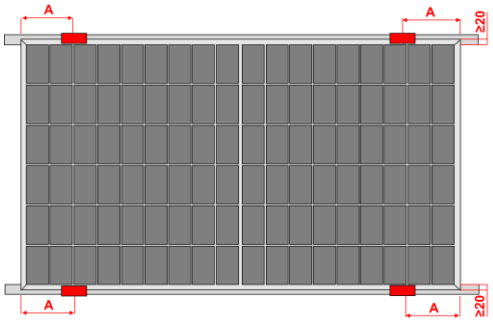
Legend	
	Module clamp which has to fulfill Trina's minimum requirements in terms of grip length and grip depth.

Table 6: Maximum mechanical test loads and clamping ranges for Long side clamping with 3 crossbeams.

Clamp B:

Product Code	Structure	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping Position (mm)	
				A	B
NEG19RC.20 DEG19RC.20	3 crossbeams + 6 screws + 6 clamps	+5400Pa	-4000Pa	200	700
DE18M(II)	3 crossbeams + 6 screws + 6 clamps	+5400Pa	-3600Pa	200	700
DEG21C.20 NEG21C.20	3 crossbeams + 6 screws + 6 clamps	+5400Pa	-3600Pa	200	700
DE21	3 crossbeams + 6 screws + 6 clamps	+5400Pa	-3300Pa	200	700
DEG21C.20 NEG21C.20	3 crossbeams + 6 screws + 0 clamps	+5400Pa	-2800Pa	200	700
NED19RC.20	3 crossbeams + 6 screws + 6 clamps	+7000Pa	-5400Pa	200	700

Option 4: Long side clamping with shared rail underneath

Graphic view	Description
	Use 4 clamps on the long side. Mounting rails run perpendicular to the short side frame. Overlapping length (perpendicular to the long side direction) of mounting rails and short side of module no less than 20 mm clamping range refers to Table 7

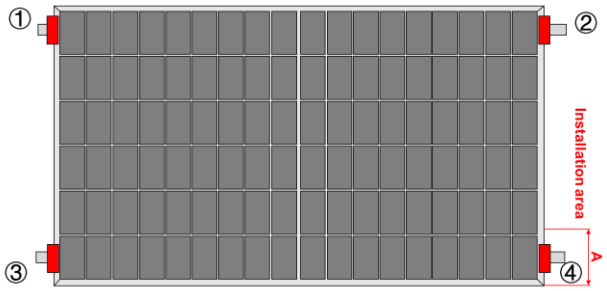
Legend	
	Module clamp which has to fulfill Trina’s minimum requirements in terms of grip length and grip depth.

Table 7: Maximum mechanical test loads and clamping ranges for Option 4.

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
NEG18R.28/NEG18R.20	+3000Pa	-2400Pa	305-450

Option 5: Clamping on short side with crossbeam

Graphic view	Description
	Clamp position can be within the range 0 – xxx mm (clamping range refers to Table 8) for all 4 clamps attached to the module short side, clamping range can be asymmetrical, clamp 1&2 can have a different position from the module edge compared to clamp 3 & 4. The crossbeam underneath shall avoid the position of junction box.

Legend	
	Module clamp which has to fulfill Trina's minimum requirements in terms of grip length and grip depth.

Table 8: Maximum mechanical test loads and clamping ranges for Option 5.

Clamp A:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
DE09R.B0/DE09R.B5/DE09R.B8 DE09R/DE09R.05/DE09R.08	+2400Pa	-2400Pa	0-100
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+2800Pa	-2400Pa	0-100

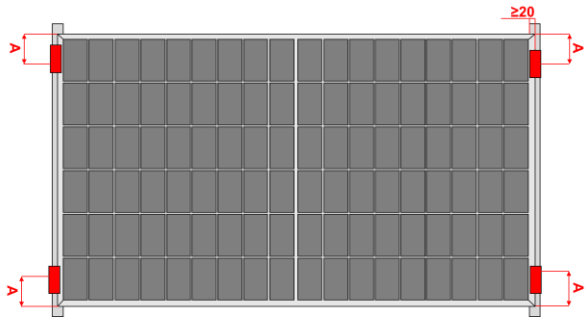
Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
NEG18R.28/NEG18R.20	+2400Pa	-1000Pa	50-100
	+2400Pa	-800Pa	100-250

Clamp C:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+2800Pa	-1600Pa	0-100
DEG19RC.20/NEG19RC.20	+2400Pa	-700Pa	0-100

Option 6: Clamping on the short side with shared rail underneath

Graphic view	Description
	Use 4 clamps on the short side. Mounting rails run perpendicular to the long side frame. Overlapping length (perpendicular to the short side direction) of mounting rails and short side of module no less than 20 mm clamping range refers to Table 9

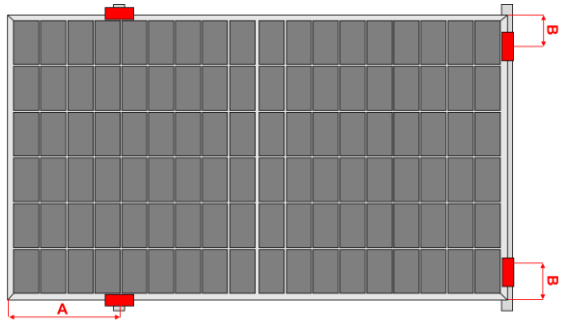
Legend	
	Module clamp which has to fulfill Trina's minimum requirements in terms of grip length and grip depth.

Table 9: Maximum mechanical test loads and clamping ranges for Option 6.

Clamp A:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range A (mm)
DE09R.B0/DE09R.B5/DE09R.B8 DE09R/DE09R.05/DE09R.08	+2400Pa	-1800Pa	0-200
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+2400Pa	-1800Pa	0-200

Option 7: Clamping on short side and long side with rail perpendicular to long side

Graphic view	Description
	Use 2 clamps on the short side and 2 clamps on the long side. Mounting rails run perpendicular to the long side frame clamping range refers to Table 10

Legend	
	Module clamp which has to fulfill Trina's minimum requirements in terms of grip length and grip depth.

Table 10: Maximum mechanical test loads and clamping ranges for Option 7.

Clamp A:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range (mm)	
			A	B
DE09R.B0/DE09R.B5/DE09R.B8 DE09R/DE09R.05/DE09R.08	+2400Pa	-1800Pa	250-450	250
NEG9R.28/NEG9R.20/NEG9R.25 NEG9RC.27/NEG9RC.20	+2400Pa	-1800Pa	250-450	250

Option 8: Slide-in/insertion installation method

This methods can vary and depend on the mounting structures. The installer needs to follow the mounting guidelines recommended by the mounting system supplier. Each module must be securely maintained through all its length on two opposite sides.

1. The module frame shall be fully inserted into the slide rail, with no relative displacement or sliding between the slide rail and module upon installation, and the adequate strength of slide rail must be ensured.
2. Damage to the module frame profile shall be avoided during the installation of the slide rail.
3. The upper edge of slide rail shall be overlapped with A-side of the module frame by at least 10 mm.
4. The lower edge of slide rail shall have minimum length of 24mm.
5. The inner height of the slide rail shall match the module frame height under any circumstance.

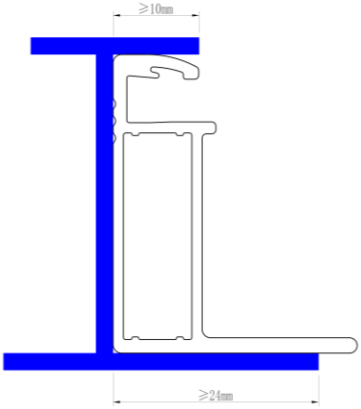


Figure 3. slide-in mounting concept and required dimensions

Long side slide-in

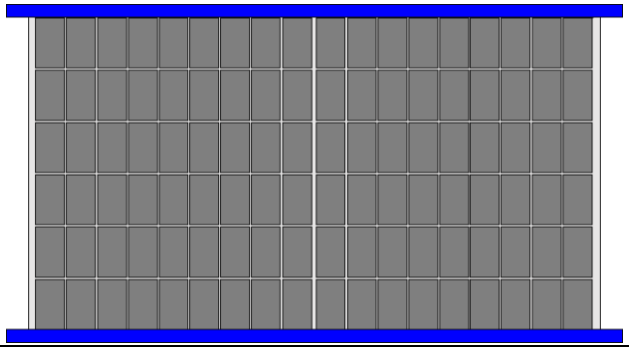
Graphic view	Description
	Solid mounting rail supporting the module frame from underneath and from the top (C-shape type of rail) in which the module frame is held, no clamp needed. Module long sides are inserted into slide-in rails completely. Test loads refer to Table 11

Table 11: Maximum mechanical test loads for Option 8

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)
NEG18R.20/NEG18R.28	+3000Pa	-2400Pa

Option 9: Long side clamping on Japan Typical shell roof

- The following installation conditions and loads are only applied to tyhpical shell roof in Japan. The pitch distance is 500mm as shown in figure 4.
- All clamps used to install module shall be fixed to the seam of shell roof directly or through a clamp supporter;
- The tolerance of all clamp position in this mounting option is ±50mm

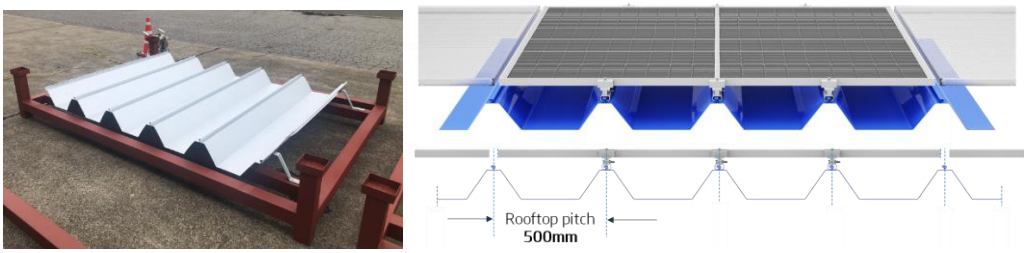


Figure 4: Typical Shell roof of Japan instalation

Long side clamping with 4 clamps

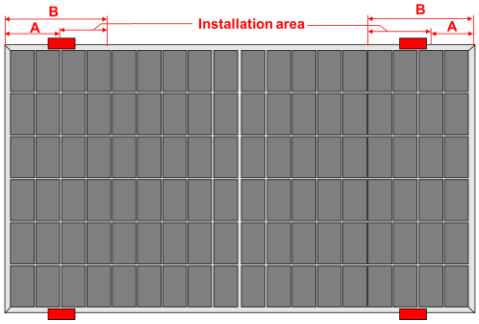
Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 12) for all 4 clamps attached to the module long side.

Table 12: Maximum mechanical test loads for Option 9 with 4 clamps

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range(mm) A-B
NEG9R.28/NEG9R.20 NEG9R.25/NEG9RC.27 NEG9RC.20	+5400Pa	-2400Pa	131-131
NEG18R.28/NEG18R.20	+4500Pa	-2000Pa	231-231
NE19R	+5400Pa	-2400Pa	441-441
NEG19RC.20	+5400Pa	-2000Pa	441-441

Long side clamping with 6 clamps

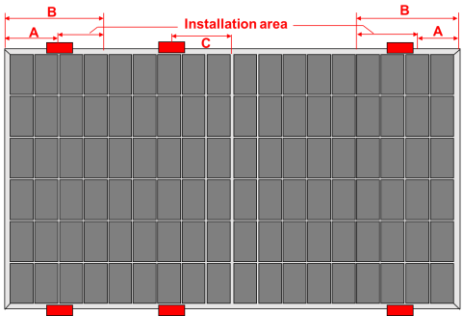
Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 13) for all 6 clamps attached to the module long side.

Table 13: Maximum mechanical test loads for Option 9 with 6 clamps

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range(mm)	
			A-B	C
NEG9R.28/NEG9R.20 NEG9R.25/NEG9RC.27 NEG9RC.20	+6000Pa	-2800Pa	131-131	250
NEG18R.28/NEG18R.20	+4500Pa	-2400Pa	231-231	250
NE19R	+6000Pa	-2800Pa	441-441	250
NEG19RC.20	+6000Pa	-2800Pa	441-441	250

Long side clamping with 8 clamps

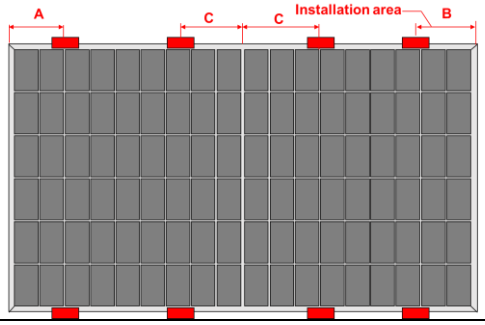
Graphic view	Description
	Clamp position can be within the range (clamping range refers to Table 14 for all 8 clamps attached to the module long side.

Table 14: Maximum mechanical test loads for Option 9 with 8 clamps

Clamp B:

Product Code	Maximum Test Load (Front side +)	Maximum Test Load (Back side -)	Clamping range(mm)	
			A-B	C
NEG9R.28/NEG9R.20 NEG9R.25/NEG9RC.27 NEG9RC.20	+6400Pa	-3200Pa	131-131	250
NEG18R.28/NEG18R.20	+6400Pa	-2800Pa	231-231	250
NE19R	+6400Pa	-3200Pa	441-441	250
NEG19RC.20	+5400Pa	-3200Pa	441-441	250

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