

# PR2-EN - With Sheetmetal

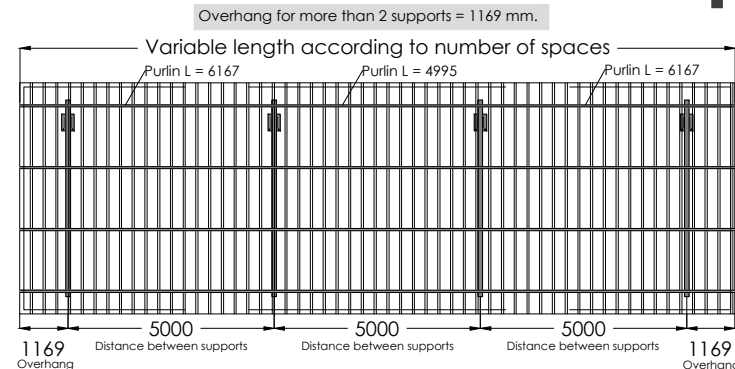
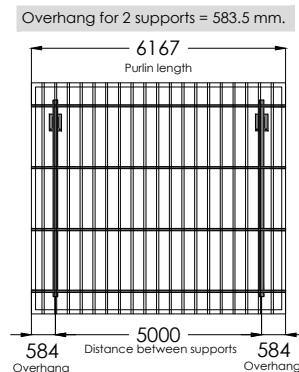
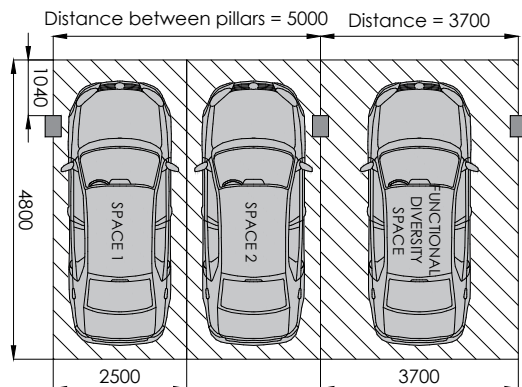
## Assembly Plans



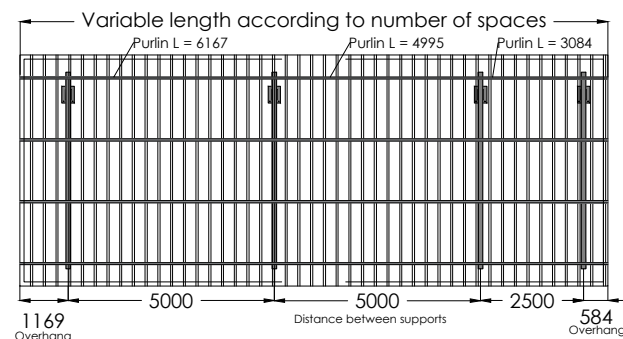
## CANOPIES WITH EVEN NUMBER OF SPACES

# PR2-EN

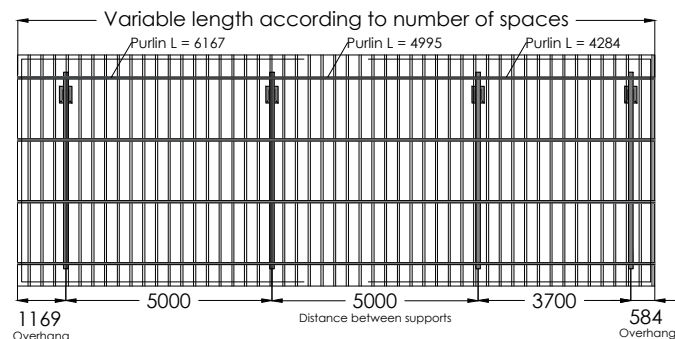
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## CANOPIES WITH ODD NUMBER OF SPACES



## CANOPIES WITH ODD NUMBER OF SPACES INCLUDING FUNCTIONAL DIVERSITY SPACES



- Parking space dimensions: 2.50x4.80 m
- Functional diversity parking space dimensions: 3.70x4.80 m
- PV panels have horizontal or vertical orientation
- Standard pitch of 5°
- Minimum interior clearance 2.265 m

### Materials:

Pillars, beams and purlins are hot-dip galvanised according to UNE-EN ISO 1461.

S275 structural steel.

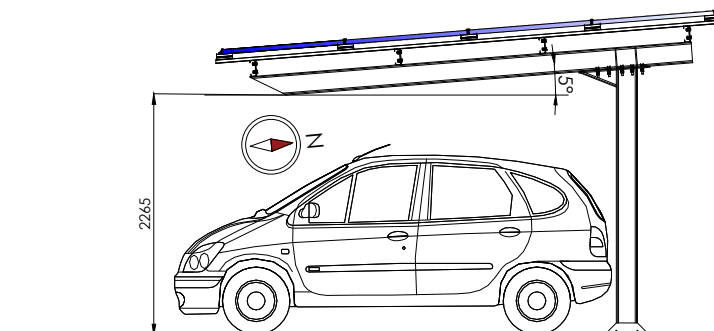
Aluminum bars are EN AW 6005A T6.

Fasteners are A2-70 stainless steel.

### Finishes:

Steel pillars, beams and purlins have a hot-dip galvanised finish.

Sheetmetal roof covering is prefinished in Pyrenean White



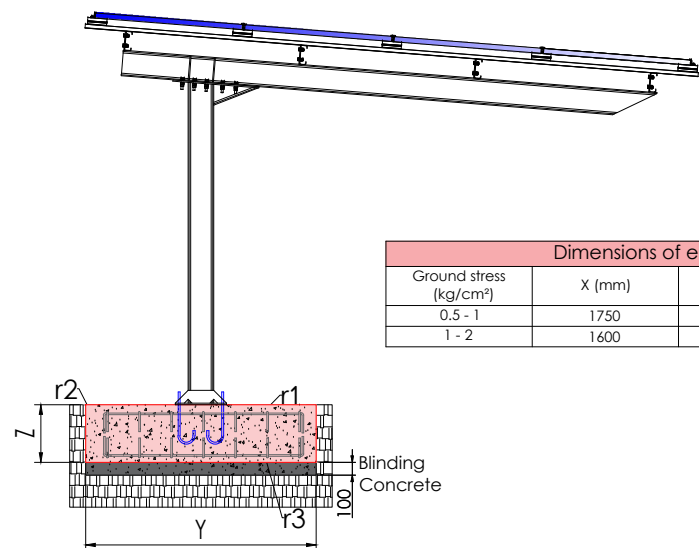
The foundation will need to be prepared before installing the parking canopy. Anchoring fasteners are not included.

**It is recommended** to carry out a geotechnical investigation.

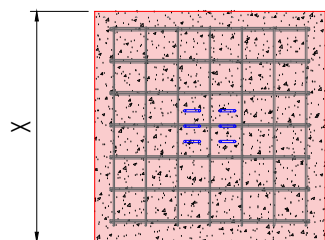
PARKING CANOPY



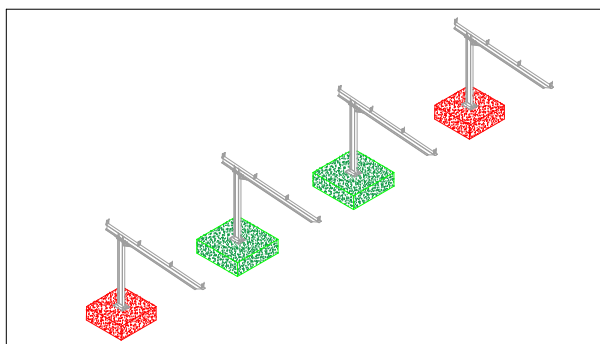
# END FOOTINGS



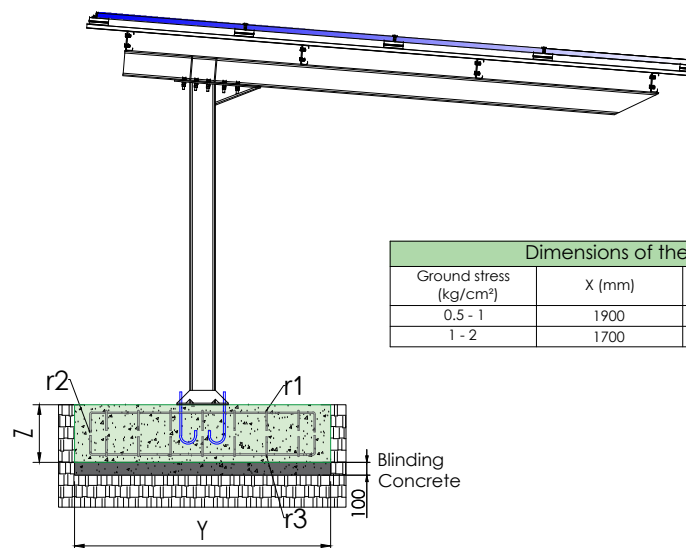
| Dimensions of end footings |        |        |        |
|----------------------------|--------|--------|--------|
| Ground stress (kg/cm²)     | X (mm) | Y (mm) | Z (mm) |
| 0.5 - 1                    | 1750   | 1750   | 400    |
| 1 - 2                      | 1600   | 1600   | 400    |



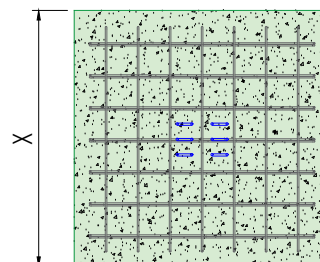
| Reinforcement of end footings |                       |                       |                       |                       |
|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ground stress (kg/cm²)        | Lower reinforcement X | Lower reinforcement Y | Upper reinforcement X | Upper reinforcement Y |
| 0.5 - 1                       | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    |
| 1 - 2                         | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    |



# CENTRE FOOTINGS



| Dimensions of the central footings |        |        |        |
|------------------------------------|--------|--------|--------|
| Ground stress (kg/cm²)             | X (mm) | Y (mm) | Z (mm) |
| 0.5 - 1                            | 1900   | 1900   | 400    |
| 1 - 2                              | 1700   | 1700   | 400    |



| Reinforcement of central footings |                       |                       |                       |                       |
|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ground stress (kg/cm²)            | Lower reinforcement X | Lower reinforcement Y | Upper reinforcement X | Upper reinforcement Y |
| 0.5 - 1                           | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    |
| 1 - 2                             | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    |

r1 From upper face of the element 30 mm  
 r2 From soil (when cemented against it) 80 mm  
 r3 From the surface of the blinding concrete 30 mm

# PR2-EN

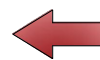
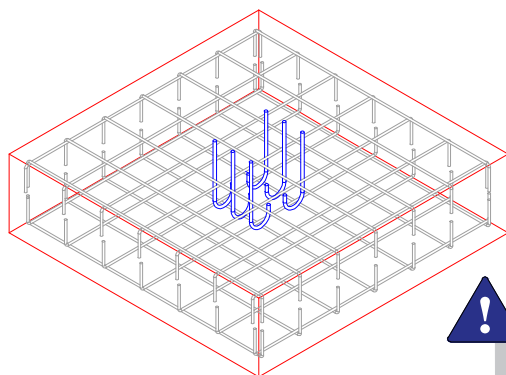
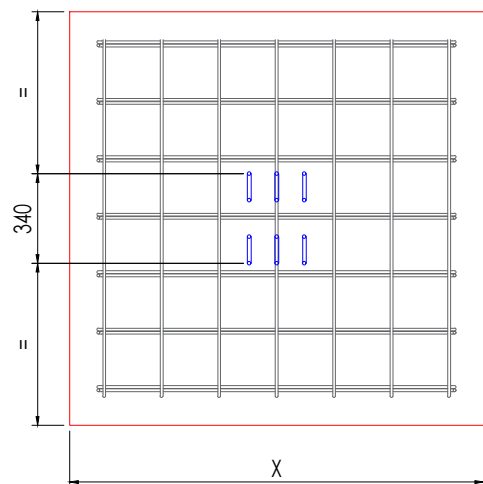
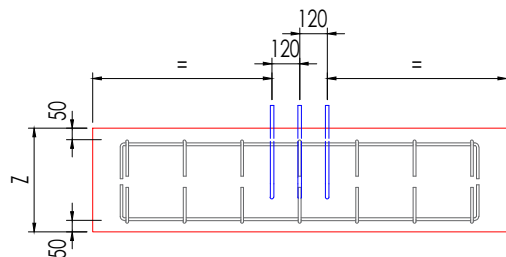
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FOUNDATIONS

PARKING CANOPY



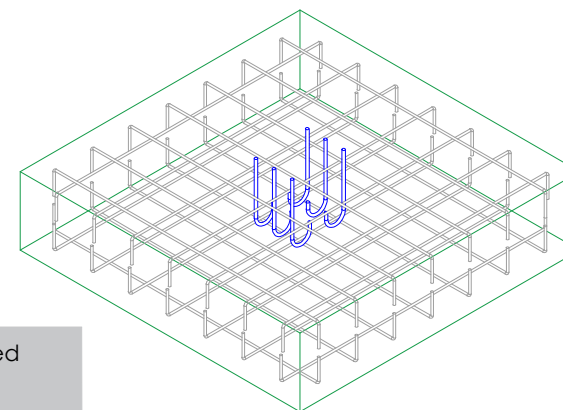
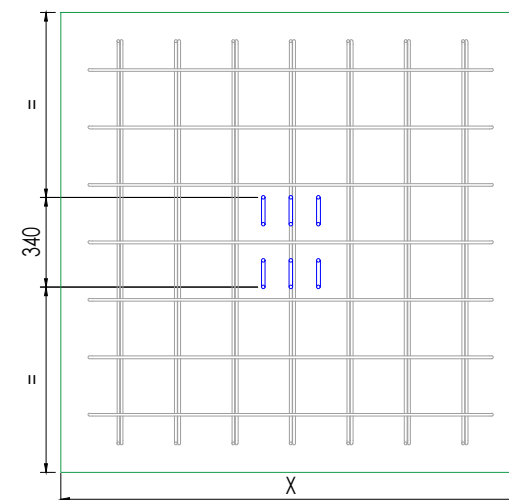
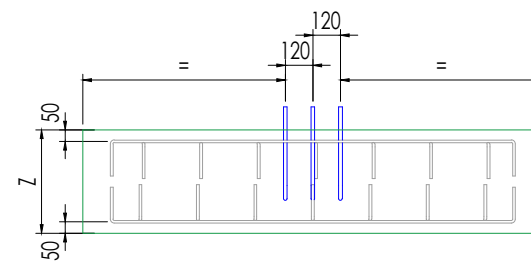
## END FOOTINGS



The upper reinforcement/rebar must be located as to not intersect with the anchors. The anchors must remain centered in the footing.



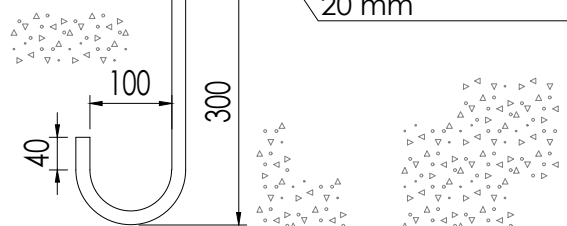
## CENTRE FOOTINGS



Anchoring screws M16 (NOT included)

Baseplate

Leveling mortar: 20 mm



Concrete: HA-25,  $Y_c=1.5$

Orient the J-anchors (not included) toward the center of the footing



**Anchor type:** M16 Steel J-bolts, 300mm length embedded and 100mm exposed  
If the bolt is zinc-plated, it must be of a minimum property class 8.8  
If the bolt is stainless, it must be of alloy A2-70.  
\*Consider thickness of leveling mortar and baseplate

# PR2-EN

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ANCHORS

PARKING CANOPY



## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 150 km/h

Snow: 65 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.026  | 0.002  | 0.309  | -0.002  | -0.390  | 0.000   |
| V2         | -0.027 | -0.002 | -0.328 | 0.002   | 0.413   | 0.000   |
| V3         | 0.038  | 0.003  | 0.455  | -0.003  | -0.574  | 0.000   |
| V4         | -0.015 | -0.001 | -0.182 | 0.001   | 0.230   | 0.000   |
| V5         | 0.012  | 0.001  | 0.146  | -0.001  | -0.184  | 0.000   |
| V6         | -0.047 | -0.004 | -0.564 | 0.003   | 0.712   | 0.000   |
| N1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.767  | -0.004  | -1.130  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 150 km/h

Snow: 80 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.035  | 0.000  | 0.406  | 0.000   | -0.508  | 0.000   |
| V2         | -0.037 | 0.000  | -0.430 | 0.000   | 0.538   | 0.000   |
| V3         | 0.052  | 0.000  | 0.598  | 0.000   | -0.747  | 0.000   |
| V4         | -0.021 | 0.000  | -0.239 | 0.000   | 0.299   | 0.000   |
| V5         | 0.017  | 0.000  | 0.191  | 0.000   | -0.239  | 0.000   |
| V6         | -0.064 | 0.000  | -0.741 | 0.000   | 0.926   | 0.000   |
| N1         | 0.000  | 0.000  | 1.008  | 0.000   | -1.478  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m<sup>2</sup>\*
- Max allowable bearing stress of soil = 2 Kg/cm<sup>2</sup>

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc = 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys = 1.15

### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.

## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 130 km/h

Snow: 70 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.021  | 0.002  | 0.255  | -0.002  | -0.321  | 0.000   |
| V2         | -0.021 | -0.002 | -0.255 | 0.001   | 0.321   | 0.000   |
| V3         | 0.029  | 0.002  | 0.346  | -0.002  | -0.436  | 0.000   |
| V4         | -0.012 | -0.001 | -0.146 | 0.001   | 0.184   | 0.000   |
| V5         | 0.011  | 0.001  | 0.127  | -0.001  | -0.161  | 0.000   |
| V6         | -0.036 | -0.003 | -0.437 | 0.002   | 0.551   | 0.000   |
| N1         | -0.002 | 0.005  | 0.822  | -0.005  | -1.211  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 130 km/h

Snow: 70 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.029  | 0.000  | 0.335  | 0.000   | -0.418  | 0.000   |
| V2         | -0.029 | 0.000  | -0.335 | 0.000   | 0.418   | 0.000   |
| V3         | 0.040  | 0.000  | 0.454  | 0.000   | -0.567  | 0.000   |
| V4         | -0.017 | 0.000  | -0.191 | 0.000   | 0.239   | 0.000   |
| V5         | 0.015  | 0.000  | 0.167  | 0.000   | -0.209  | 0.000   |
| V6         | -0.050 | 0.000  | -0.574 | 0.000   | 0.717   | 0.000   |
| N1         | 0.000  | 0.000  | 1.080  | 0.000   | -1.584  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m<sup>2</sup>\*
- Max allowable bearing stress of soil = 2 Kg/cm<sup>2</sup>

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc= 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys= 1.15

### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.

## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 110 km/h

Snow: 80 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.015  | 0.001  | 0.182  | -0.001  | -0.230  | 0.000   |
| V2         | -0.014 | -0.001 | -0.164 | 0.001   | 0.207   | 0.000   |
| V3         | 0.020  | 0.002  | 0.237  | -0.001  | -0.298  | 0.000   |
| V4         | -0.008 | -0.001 | -0.091 | 0.001   | 0.115   | 0.000   |
| V5         | 0.005  | 0.000  | 0.055  | 0.000   | -0.069  | 0.000   |
| V6         | -0.026 | -0.002 | -0.309 | 0.002   | 0.390   | 0.000   |
| N1         | -0.002 | 0.006  | 0.931  | -0.005  | -1.372  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 110 km/h

Snow: 80 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.021  | 0.000  | 0.239  | 0.000   | -0.299  | 0.000   |
| V2         | -0.019 | 0.000  | -0.215 | 0.000   | 0.269   | 0.000   |
| V3         | 0.027  | 0.000  | 0.311  | 0.000   | -0.388  | 0.000   |
| V4         | -0.010 | 0.000  | -0.120 | 0.000   | 0.149   | 0.000   |
| V5         | 0.006  | 0.000  | 0.072  | 0.000   | -0.090  | 0.000   |
| V6         | -0.035 | 0.000  | -0.406 | 0.000   | 0.508   | 0.000   |
| N1         | 0.000  | 0.000  | 1.224  | 0.000   | -1.795  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m<sup>2</sup>\*
- Max allowable bearing stress of soil = 2 Kg/cm<sup>2</sup>

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

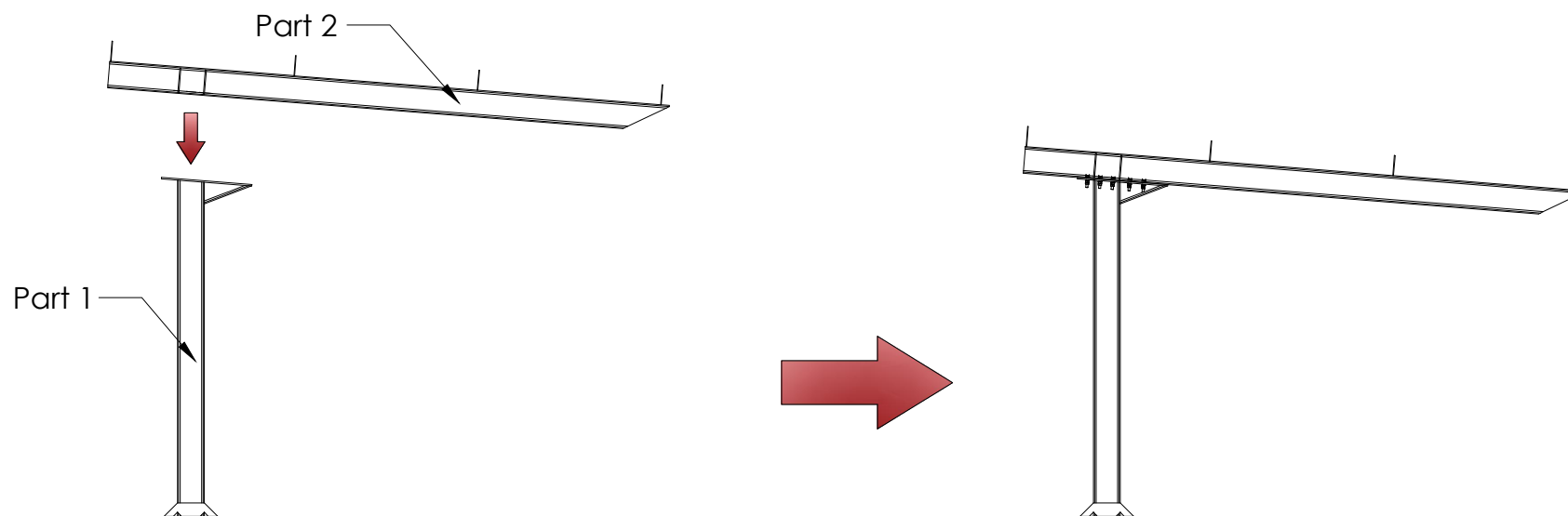
- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc= 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys= 1.15

### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

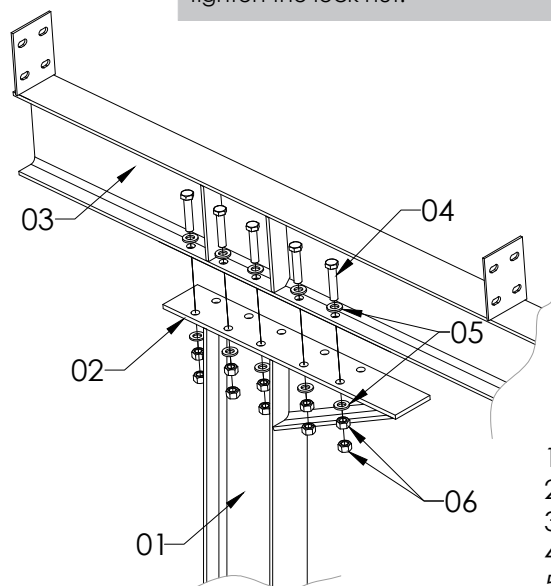
SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.



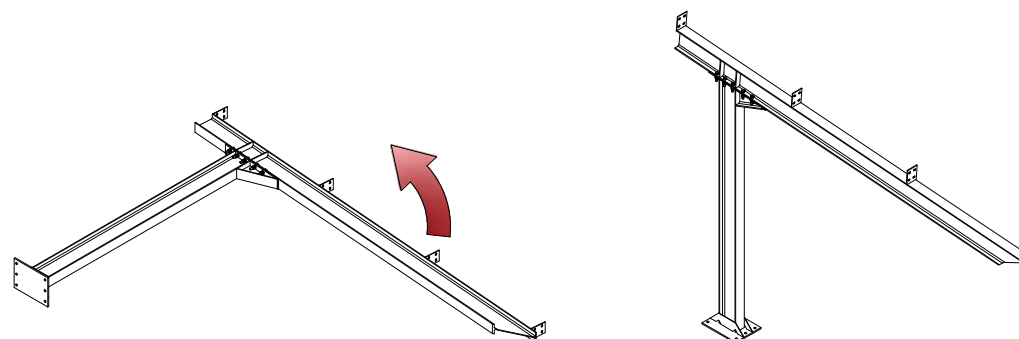
**STEP 1:** The PR2-EN car park supports are supplied in two parts. Both parts are connected by means of connecting plates with 10 bolts, 5 on each side of the beam.



First tighten the nut to the marked torque and then tighten the lock nut.



1. IPE Pillar 200
2. Connecting plate pillar-beam
3. Beam IPE 200
4. Hexagonal screw M16x60 (x10)
5. Flat Washer M16 (x20)
6. Hexagonal nut M16 (x20)



To facilitate assembly, it is recommended that this step is carried out on the ground and, once the connection has been made, lift the completed support.

| Tightening torque:   |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

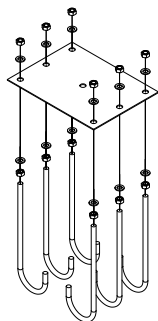
SUPPORT ASSEMBLY

PARKING CANOPY

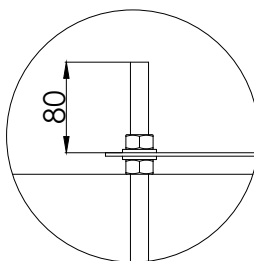




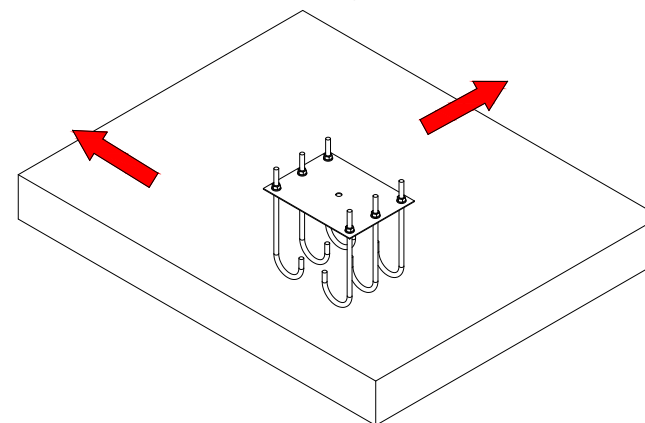
1. Use 1 nut and 1 washer beneath each side to position the bolts on the plate prior to concreting.



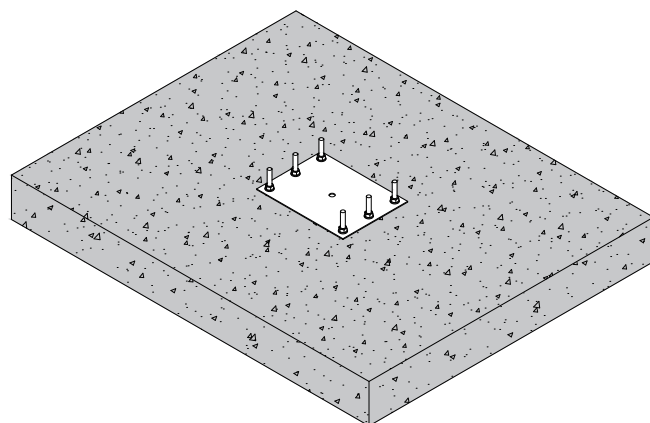
2. Leave 80 mm of rod protruding from the plate.



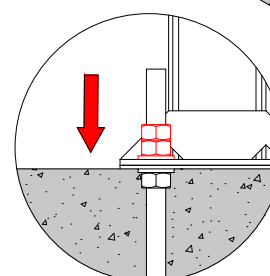
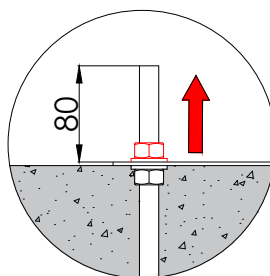
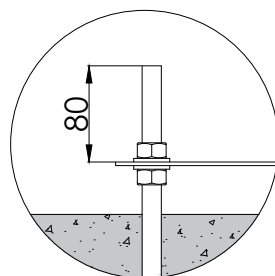
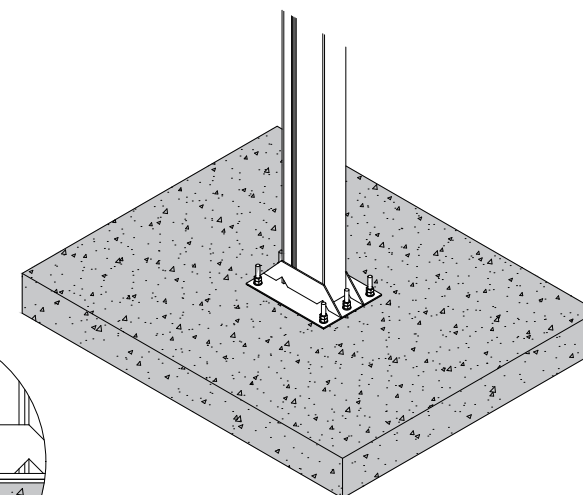
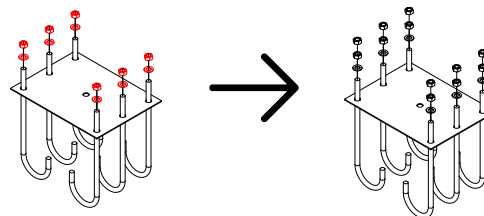
3. Level the plate with it in place. Make certain that it is level about both axes to ensure correct installation. Do not use screws for leveling.



4. Once concrete is poured, plate will be fixed in place.



5. Remove the nuts and washers from the exposed side (Red) and place the pillar with the correct fasteners.

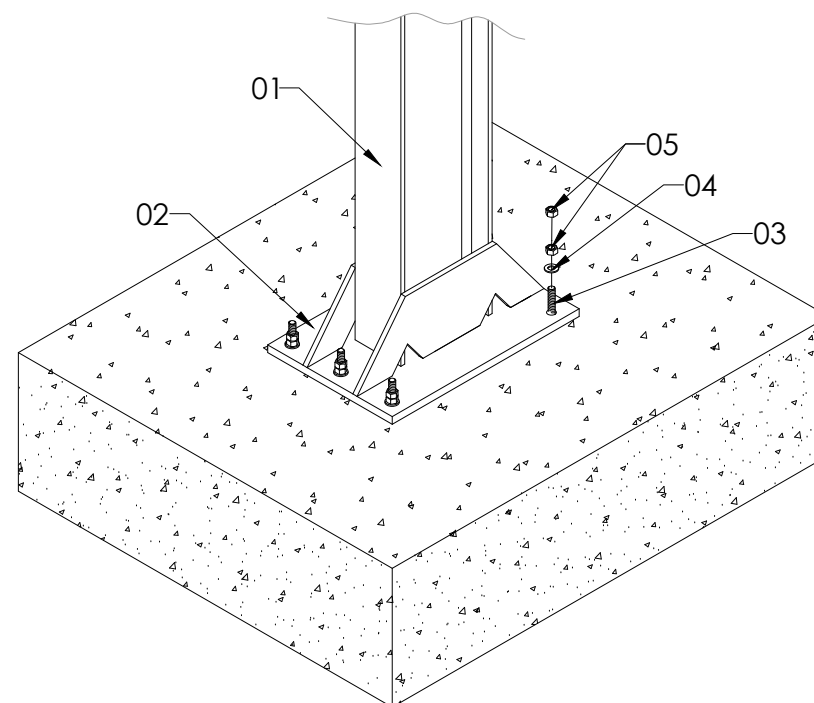
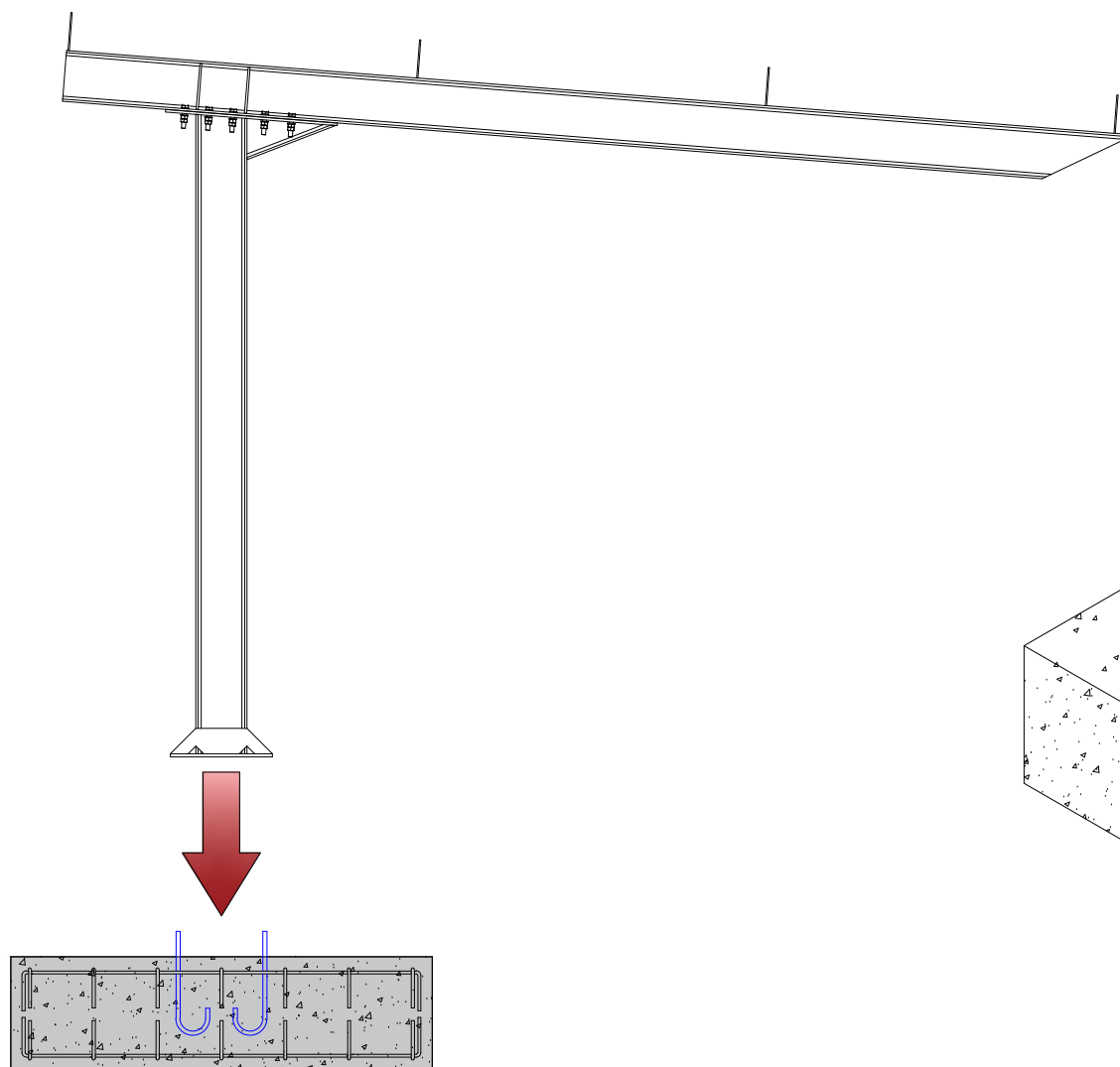


**NOT INCLUDED**

CP1 ANCHOR ASSEMBLY

PARKING CANOPY



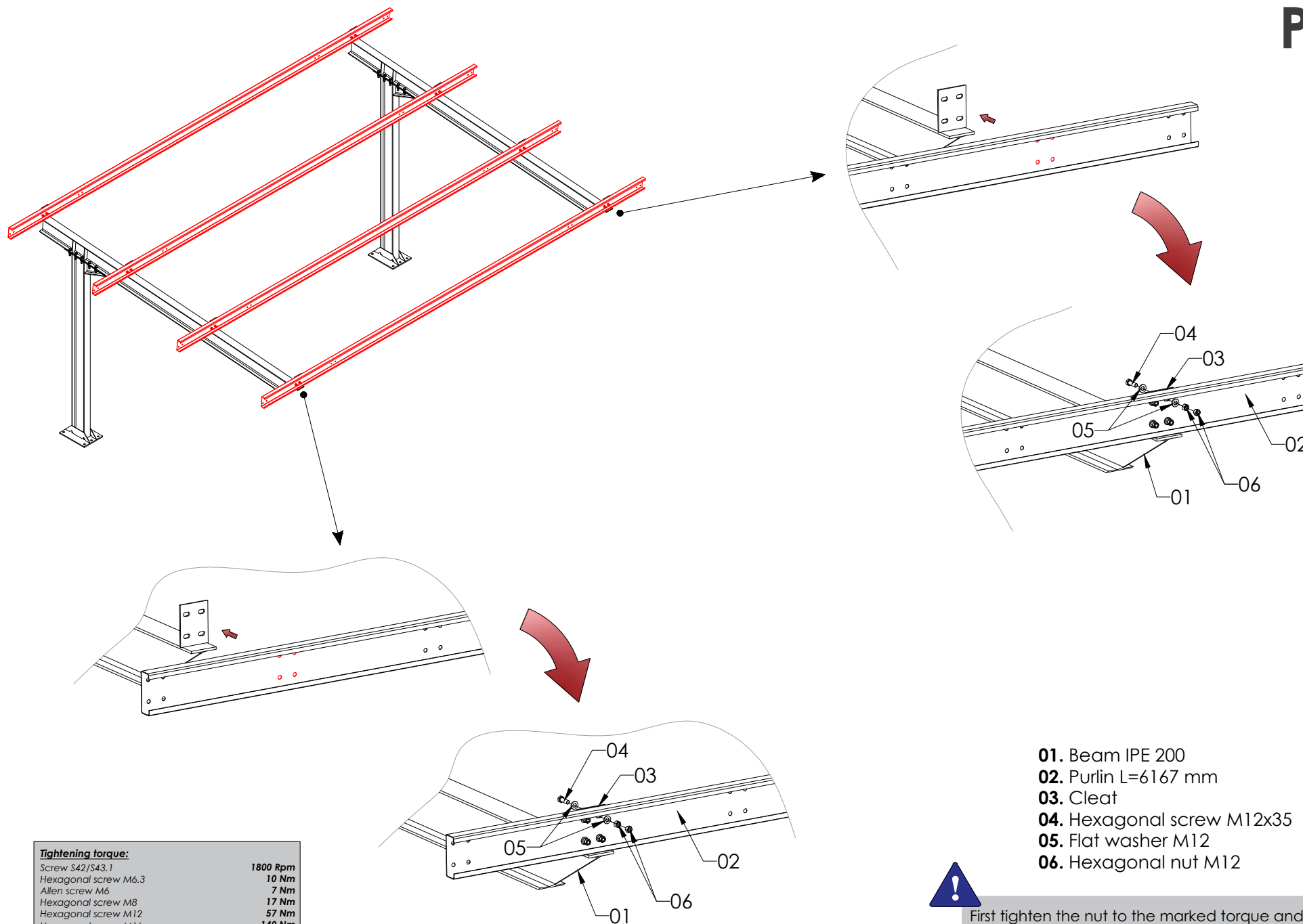


1. Pillar IPE 200
2. Base plate (400x300x12)
3. Anchor bolts M16 (NOT INCLUDED)
4. Flat washer M16 (NOT INCLUDED)
5. Nut M16 (NOT INCLUDED)

Tighten the nut first to the marked torque and then tighten the lock nut.

**STEP 2:** Connect the base plate to the pillar by matching the holes with the anchor bolts. Then insert the washers and nuts into the anchorage hook.





## Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

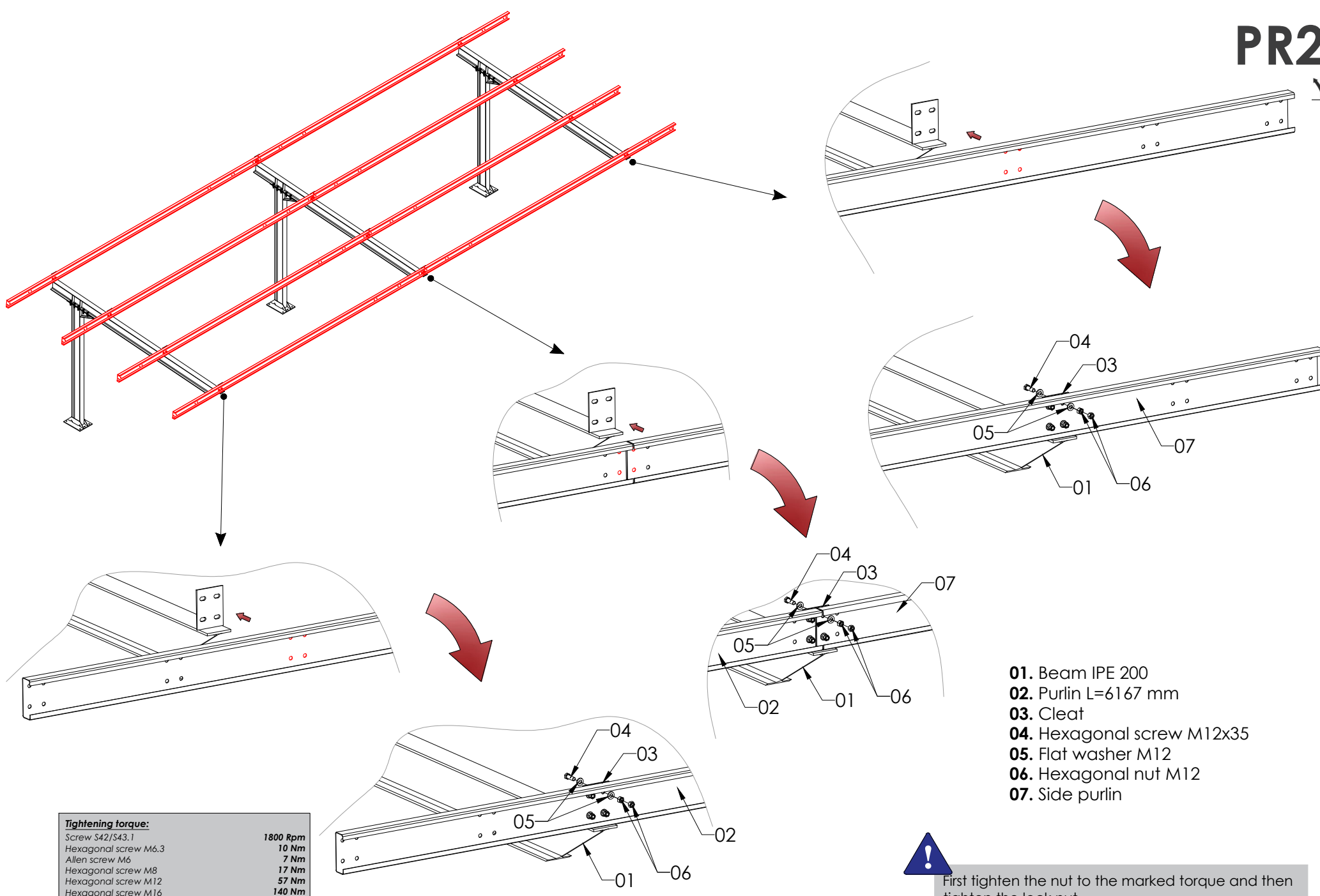
- 01. Beam IPE 200
- 02. Purlin L=6167 mm
- 03. Cleat
- 04. Hexagonal screw M12x35
- 05. Flat washer M12
- 06. Hexagonal nut M12



First tighten the nut to the marked torque and then tighten the lock nut.

**STEP 3:** Place the purlin on the beams and match the red coloured holes of the purlin with the holes of the cleat. Screw the connection with 4 screws for each cleat.





## Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

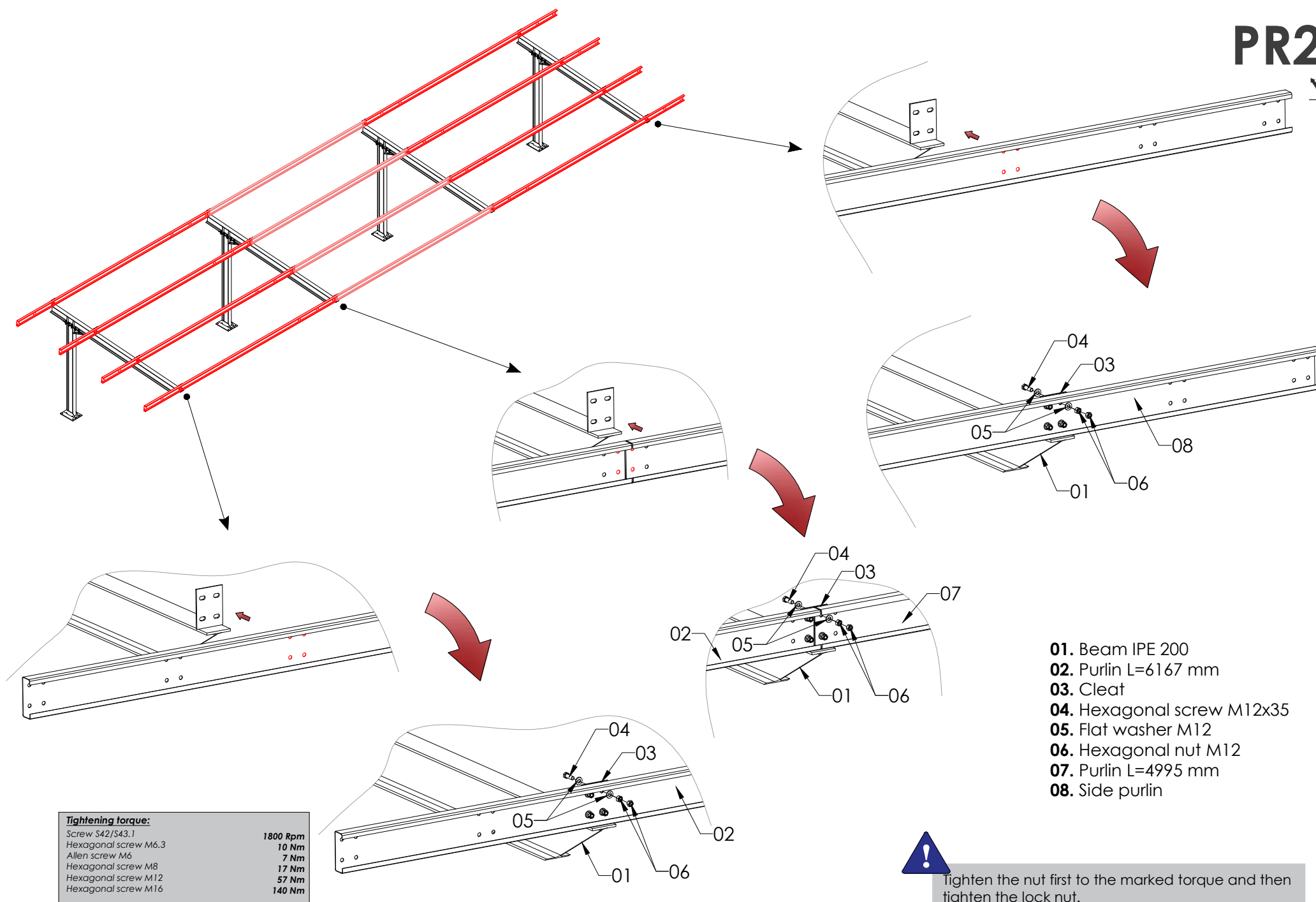
- 01. Beam IPE 200
- 02. Purlin L=6167 mm
- 03. Cleat
- 04. Hexagonal screw M12x35
- 05. Flat washer M12
- 06. Hexagonal nut M12
- 07. Side purlin



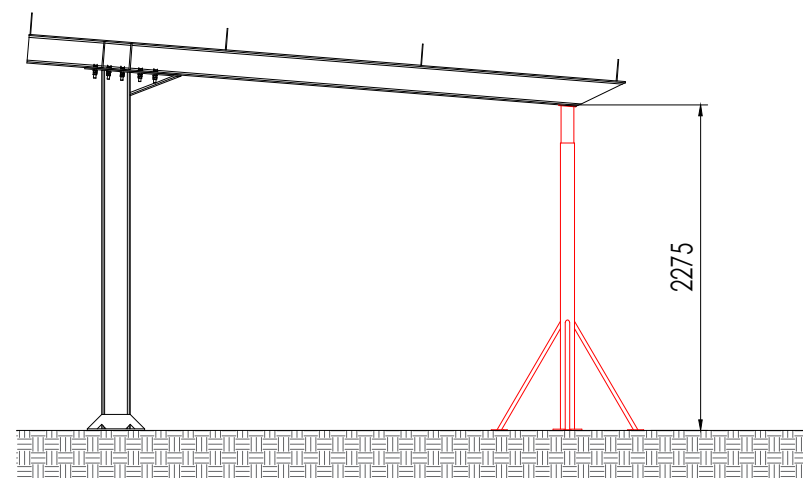
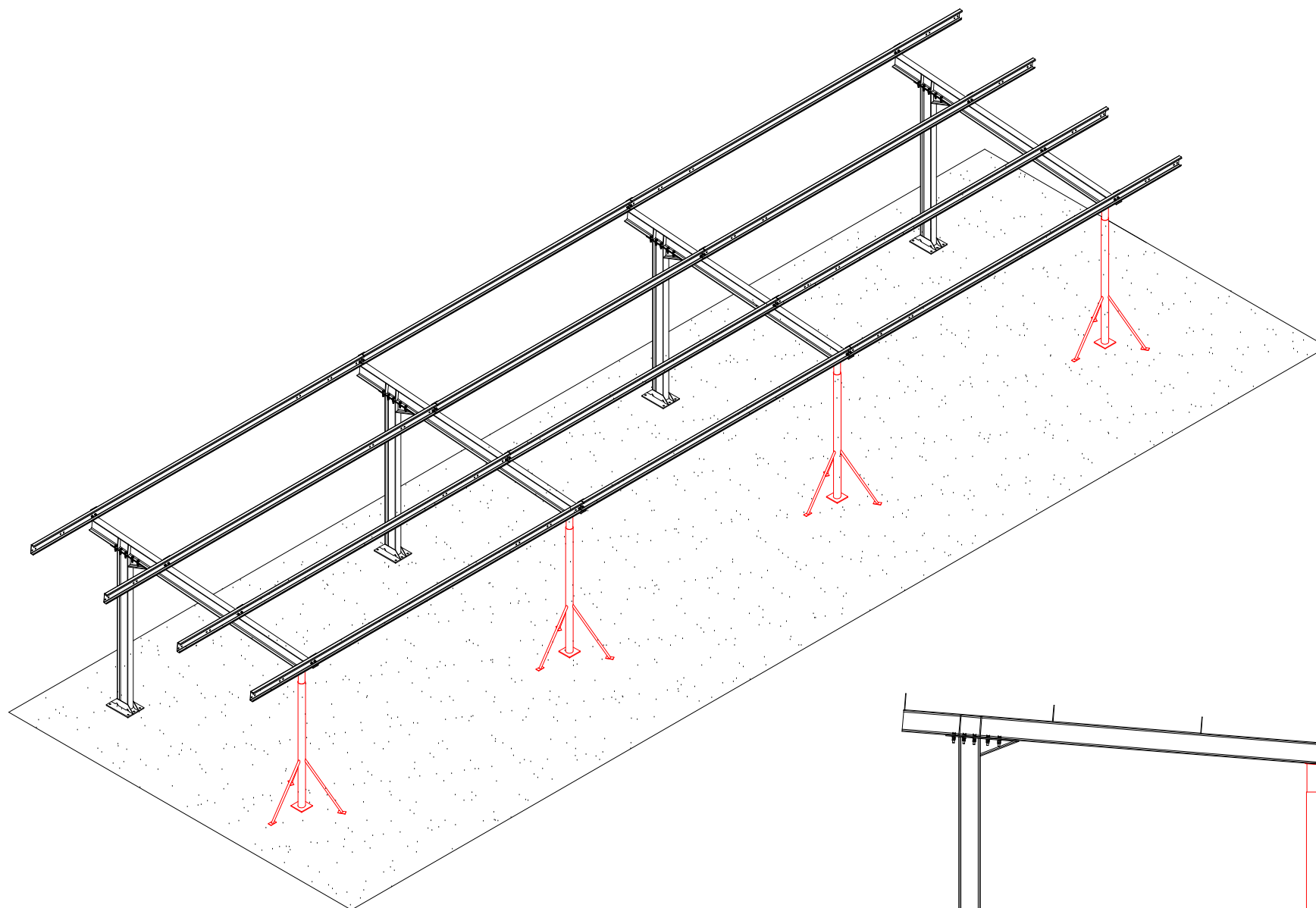
First tighten the nut to the marked torque and then tighten the lock nut.

**STEP 3:** Place the purlin on the beams and match the red coloured holes of the purlin with the holes of the cleat. Screw the connection with 4 screws for each cleat.



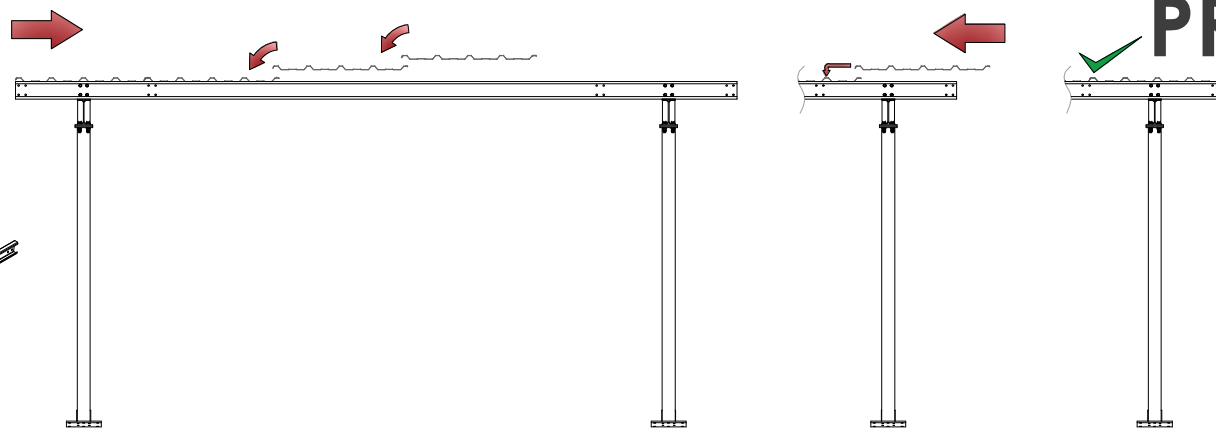
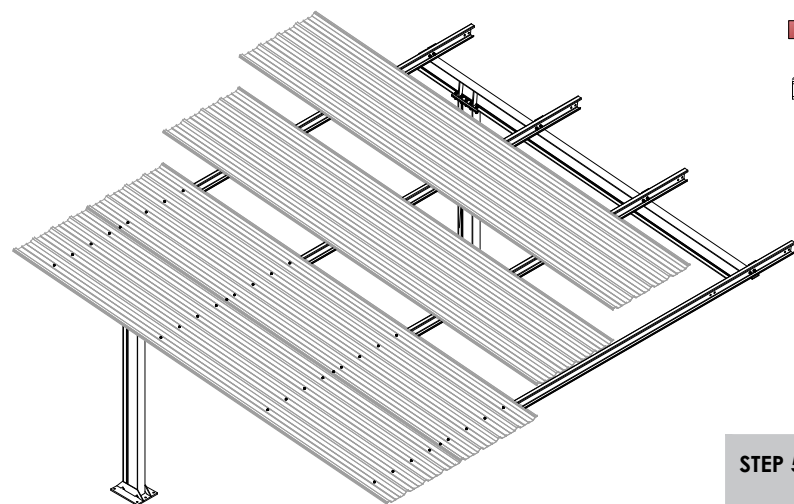


**STEP 3:** Place the purlin on the beams and match the red coloured holes in the purlin with the holes in the cleat. Screw the connection with 4 screws per cleat.

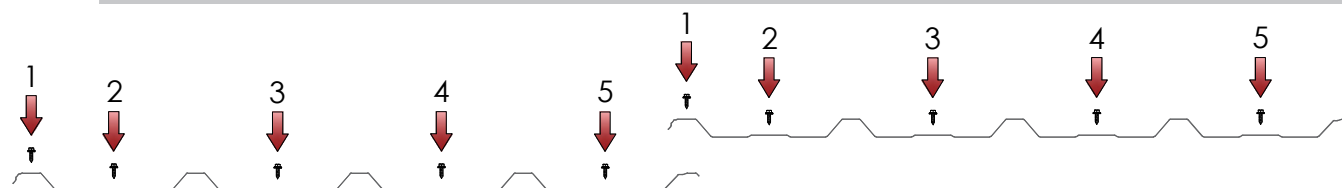


**STEP 4:** Once the purlins have been assembled, brace the supports to prevent movement in any direction during the assembly of the rest of the car park.



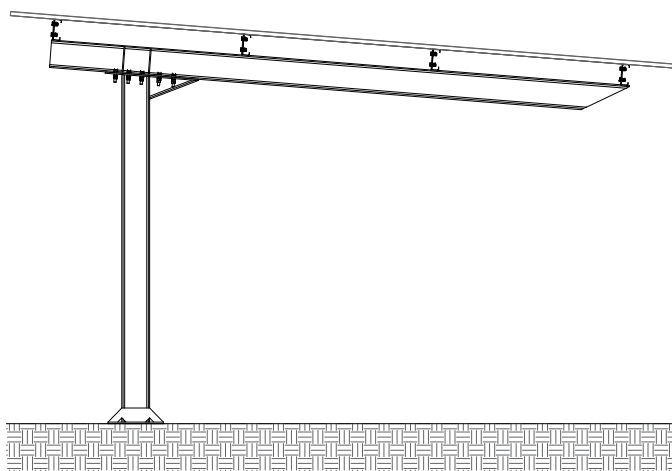
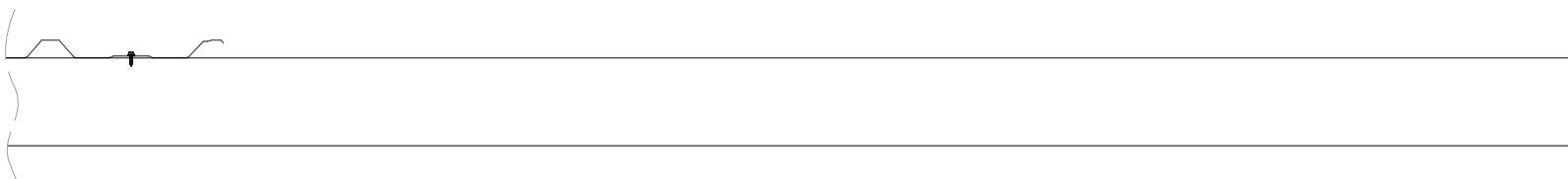


**STEP 5:** Start placing the sheets at one end of the purlin until you reach the opposite end. The last sheet shall overlap with the previous sheet so that it is as close as possible to the end of the purlin.



#### Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |



Screws for fixing sheets.  
According to selection  
Bimetallic Galvanised



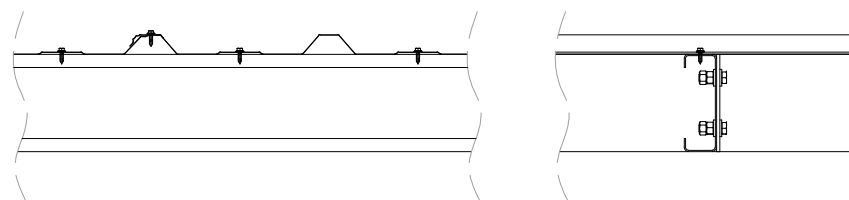
S43.1  
See report with the screws  
defined for the project



S42



In accordance with OHS regulations, it is not permitted to step on the sheet metal inappropriately during the assembly process or afterwards.



**STEP 6:** Each sheet needs 20 self-drilling screws to fix it to the 4 purlins, i.e. 5 screws per purlin. Screw 1 is used to connect the sheets and the rest are for fastening to the purlin.

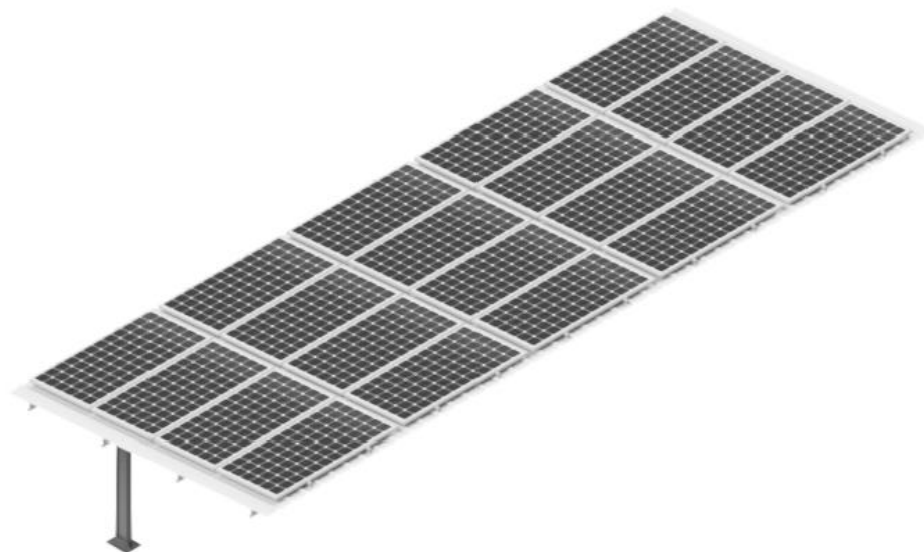


**STEP 7:** Install the panels according to the layout and fixings indicated in the appropriate manual.

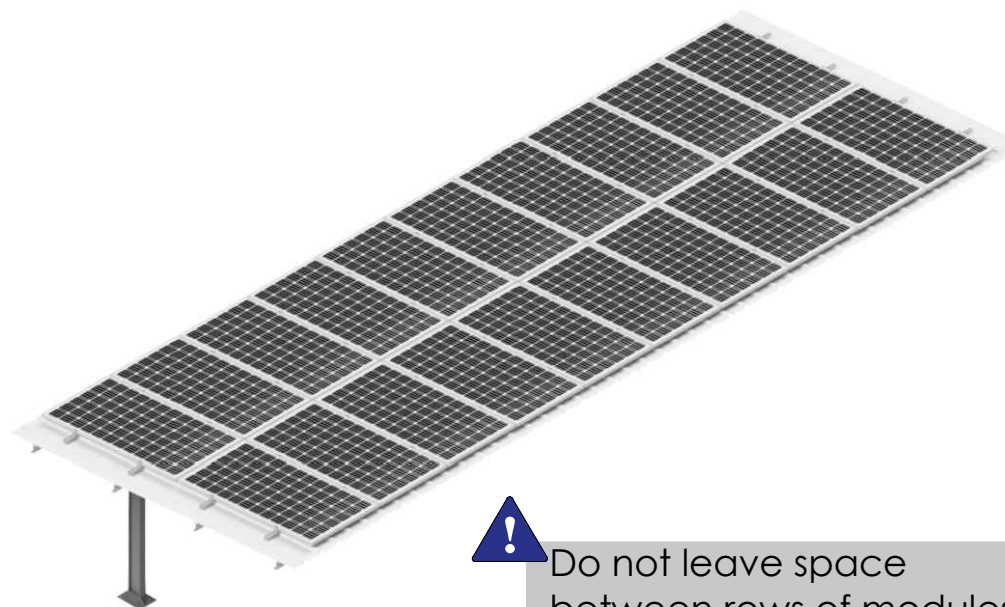
# PR2-EN

 **SUNFER**

Arrangement of the modules horizontally



Arrangement of the modules vertically



Do not leave space  
between rows of modules



61H-EN



05V-EN



05.1V-EN



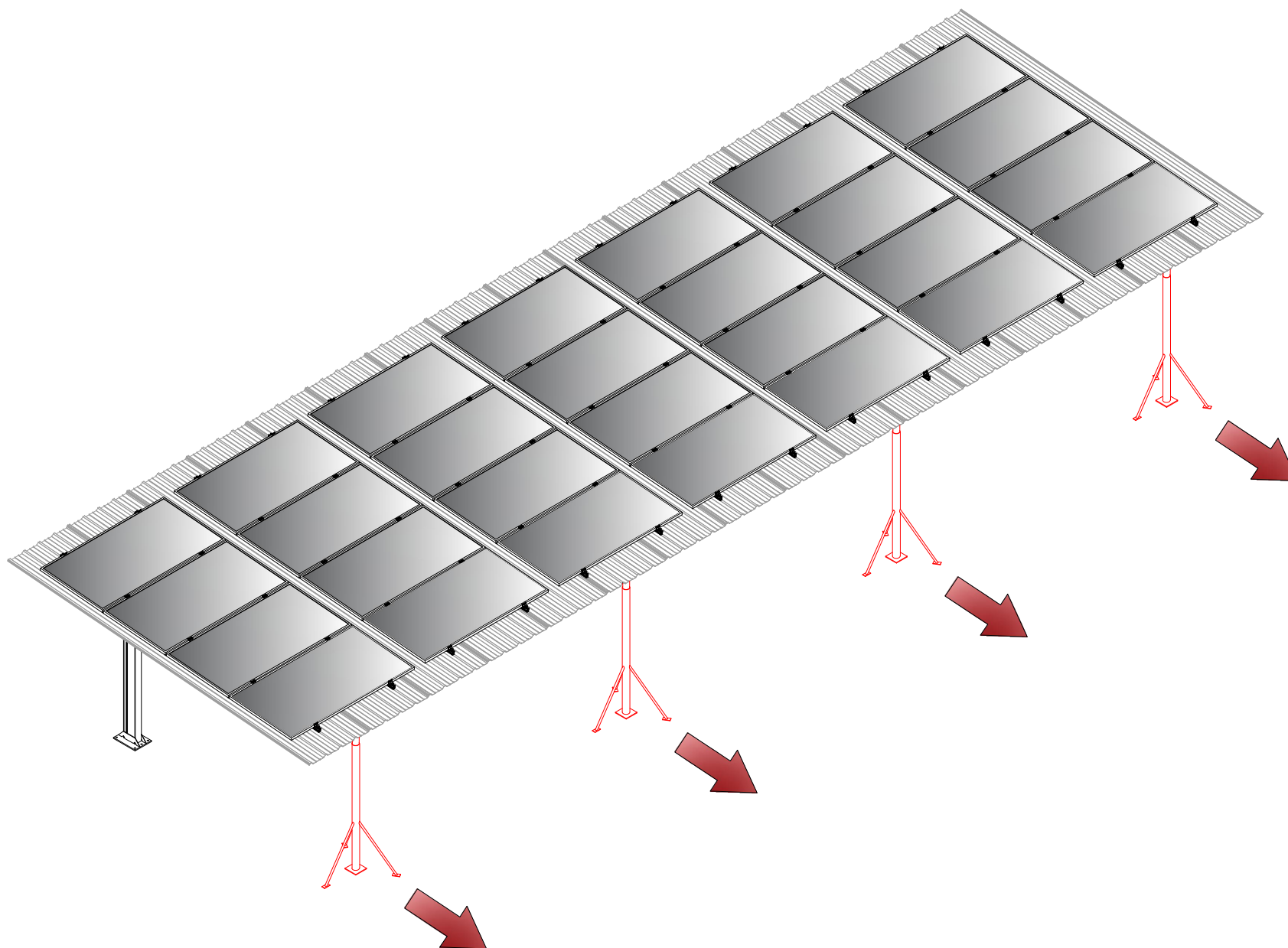
62V-EN

PANELS ASSEMBLY

PARKING CANOPY





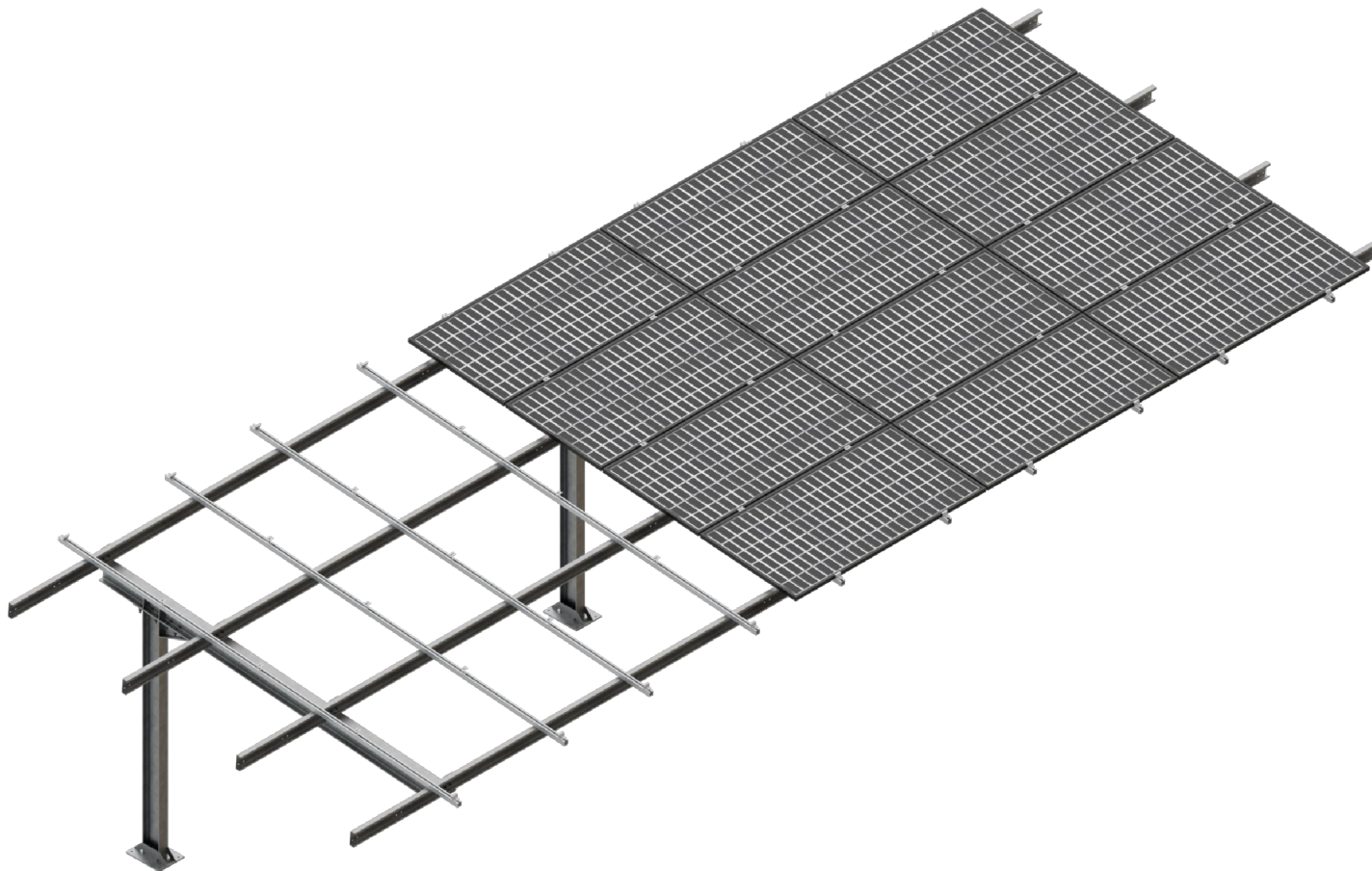


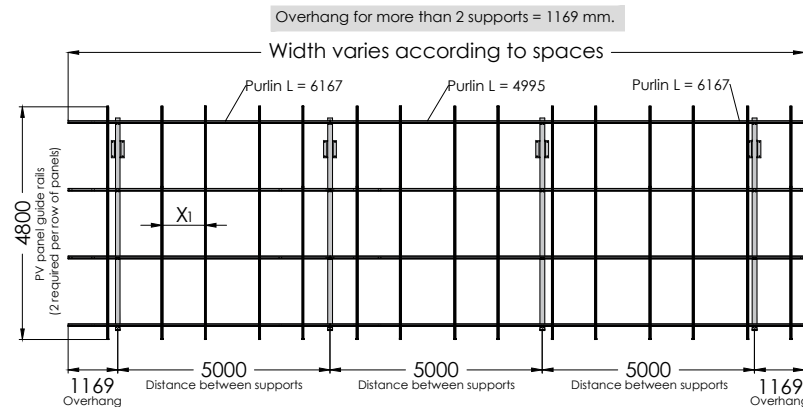
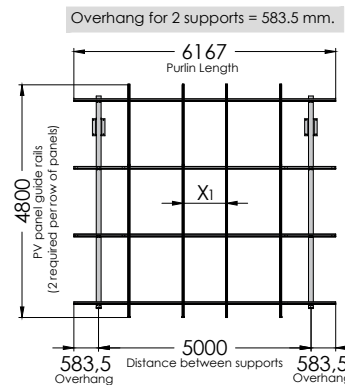
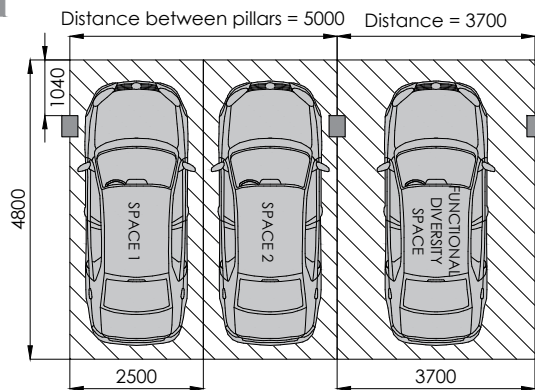
**STEP 8:** Loosen the supports and remove them.



# PR2-EN - Without Sheetmetal

## Assembly Plans





# PR2-EN

SUNFER

$X_i$  - The distance between guide rails may be determined by PV panels

- Parking space dimensions: 2.50x4.80 m
- Functional diversity parking space dimensions: 3.70x4.80 m
- PV panels have horizontal orientation
- Standard pitch of 5°
- Minimum interior clearance 2.265 m

#### Materials:

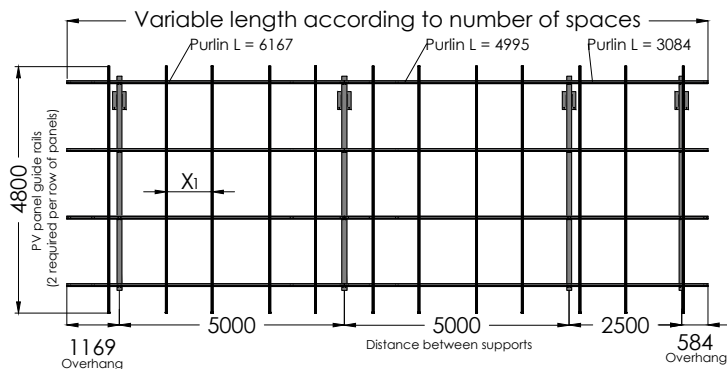
Pillars, beams and purlins are hot-dip galvanised according to UNE-EN ISO 1461.

S275 structural steel. Aluminum bars are EN AW 6005A T6. Fasteners are A2-70 stainless steel.

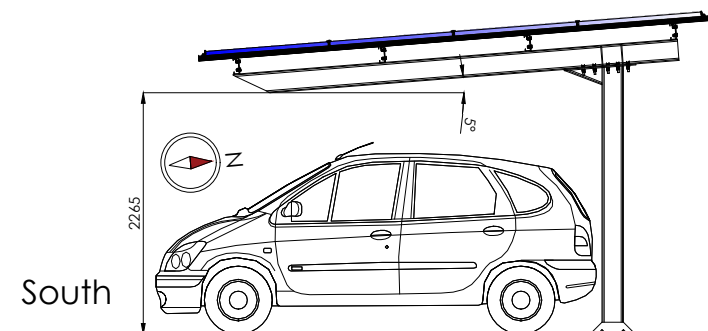
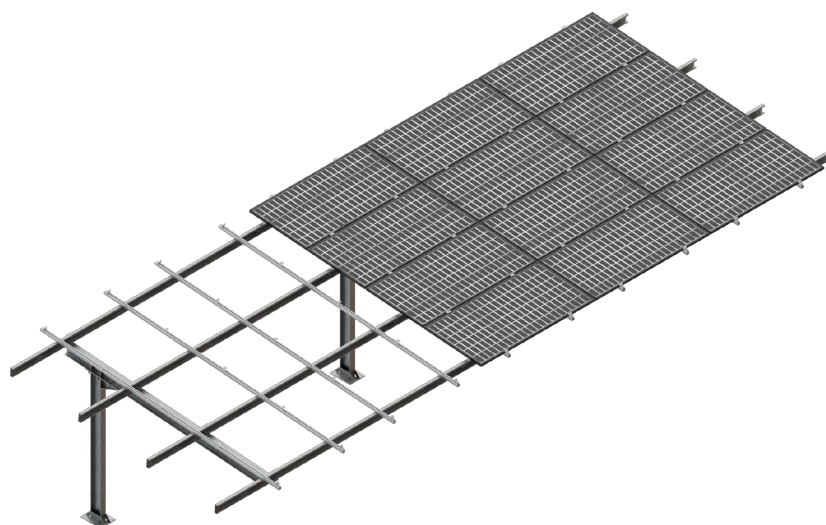
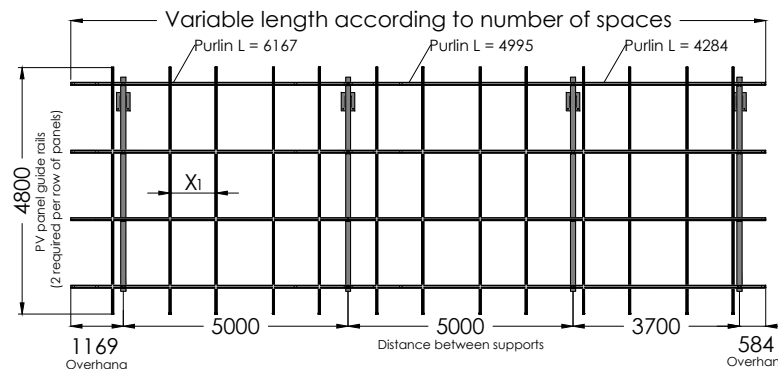
#### Finishes:

Steel pillars, beams and purlins have a hot-dip galvanised finish.

## CANOPIES WITH ODD NUMBER OF SPACES



## CANOPIES WITH ODD NUMBER OF SPACES INCLUDING FUNCTIONAL DIVERSITY SPACES



The foundation will need to be prepared before installing the parking canopy. Anchoring fasteners are not included.

**It is recommended** to carry out a geotechnical investigation.

PARKING CANOPY

24

19

17

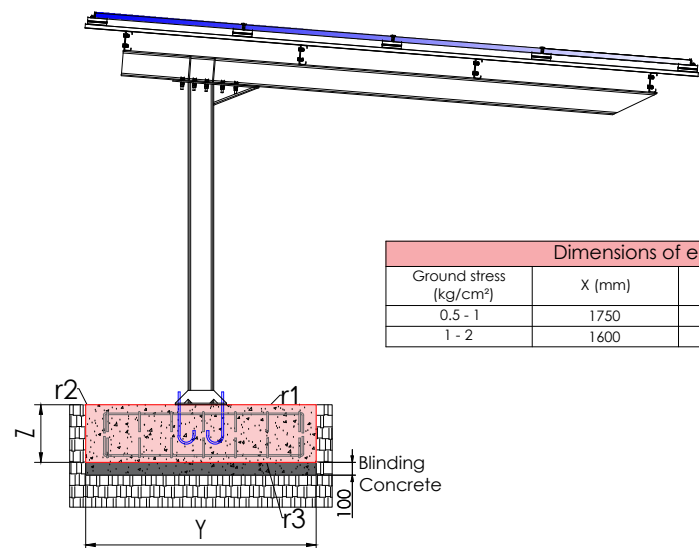
13

5

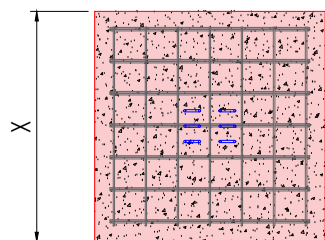
5

5

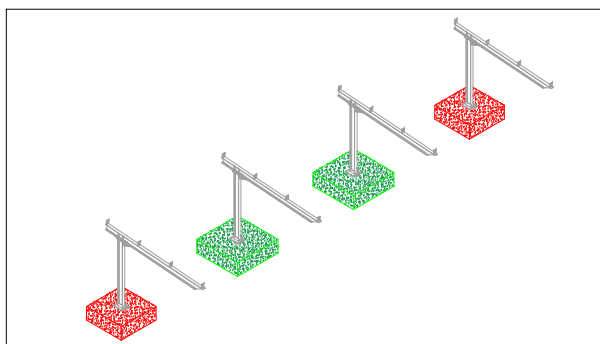
# END FOOTINGS



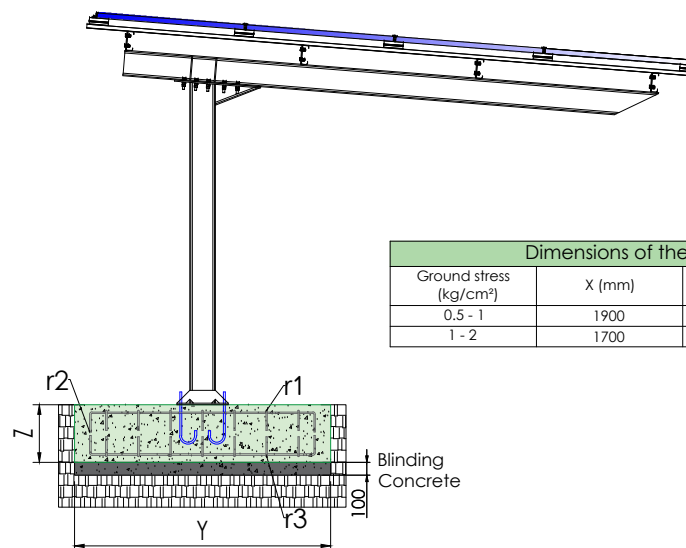
| Dimensions of end footings          |        |        |        |
|-------------------------------------|--------|--------|--------|
| Ground stress (kg/cm <sup>2</sup> ) | X (mm) | Y (mm) | Z (mm) |
| 0.5 - 1                             | 1750   | 1750   | 400    |
| 1 - 2                               | 1600   | 1600   | 400    |



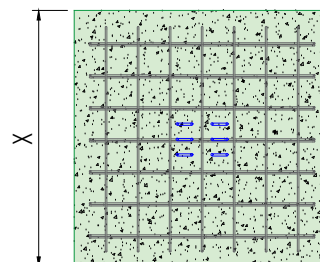
| Reinforcement of end footings       |                       |                       |                       |                       |
|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ground stress (kg/cm <sup>2</sup> ) | Lower reinforcement X | Lower reinforcement Y | Upper reinforcement X | Upper reinforcement Y |
| 0.5 - 1                             | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    |
| 1 - 2                               | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    | 7 Ø12 every 220 mm    |



# CENTRE FOOTINGS



| Dimensions of the central footings  |        |        |        |
|-------------------------------------|--------|--------|--------|
| Ground stress (kg/cm <sup>2</sup> ) | X (mm) | Y (mm) | Z (mm) |
| 0.5 - 1                             | 1900   | 1900   | 400    |
| 1 - 2                               | 1700   | 1700   | 400    |



| Reinforcement of central footings   |                       |                       |                       |                       |
|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ground stress (kg/cm <sup>2</sup> ) | Lower reinforcement X | Lower reinforcement Y | Upper reinforcement X | Upper reinforcement Y |
| 0.5 - 1                             | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    | 9 Ø12 every 220 mm    |
| 1 - 2                               | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    | 8 Ø12 every 220 mm    |

r1 From upper face of the element 30 mm  
 r2 From soil (when cemented against it) 80 mm  
 r3 From the surface of the blinding concrete 30 mm

PR2-EN

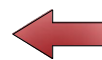
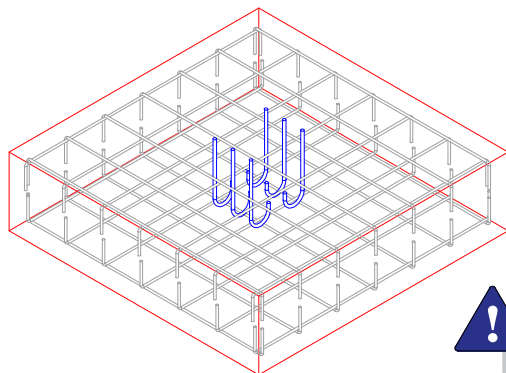
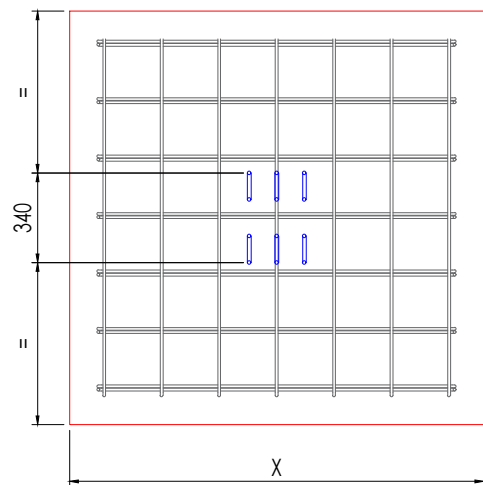
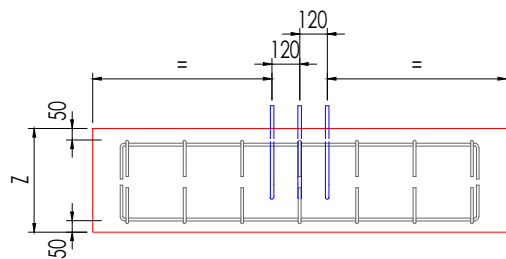
SUNFER

FOUNDATIONS

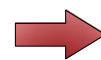
PARKING CANOPY



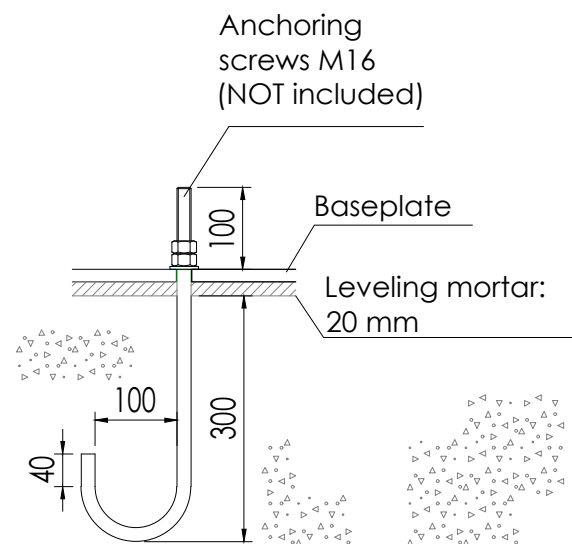
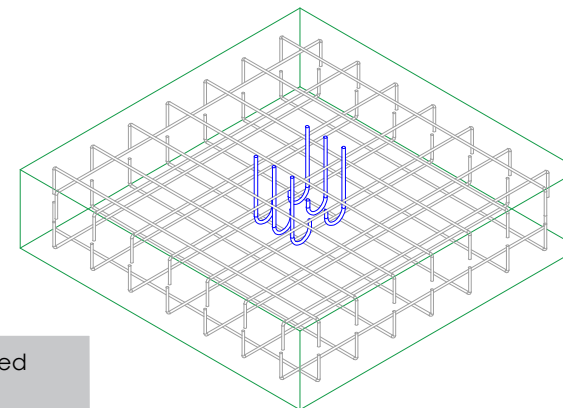
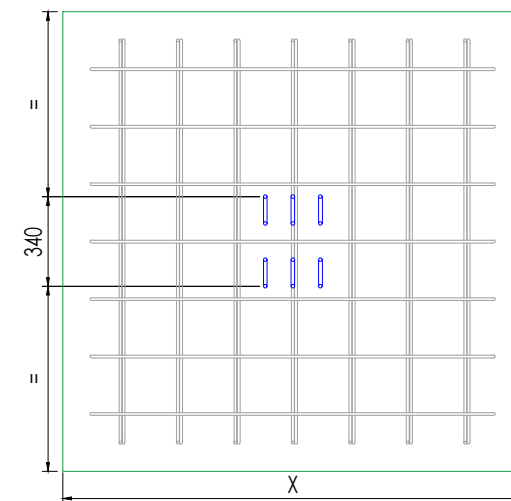
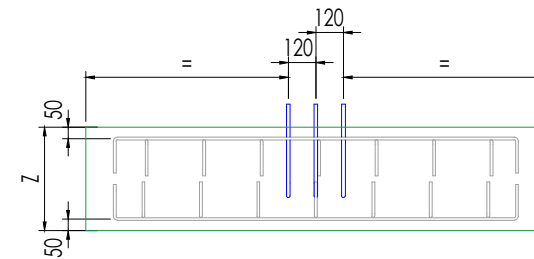
## END FOOTINGS



The upper reinforcement/rebar must be located as to not intersect with the anchors. The anchors must remain centered in the footing.



## CENTRE FOOTINGS



Concrete: HA-25, Yc=1.5

Orient the J-anchors (not included) toward the center of the footing



**Anchor type:** M16 Steel J-bolts, 300mm length embedded and 100mm exposed  
If the bolt is zinc-plated, it must be of a minimum property class 8.8  
If the bolt is stainless, it must be of alloy A2-70.

\*Consider thickness of leveling mortar and baseplate

# PR2-EN

Ψ SUNFER

ANCHORS

PARKING CANOPY



## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 150 km/h

Snow: 65 kg/m²

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.026  | 0.002  | 0.309  | -0.002  | -0.390  | 0.000   |
| V2         | -0.027 | -0.002 | -0.328 | 0.002   | 0.413   | 0.000   |
| V3         | 0.038  | 0.003  | 0.455  | -0.003  | -0.574  | 0.000   |
| V4         | -0.015 | -0.001 | -0.182 | 0.001   | 0.230   | 0.000   |
| V5         | 0.012  | 0.001  | 0.146  | -0.001  | -0.184  | 0.000   |
| V6         | -0.047 | -0.004 | -0.564 | 0.003   | 0.712   | 0.000   |
| N1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.767  | -0.004  | -1.130  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 150 km/h

Snow: 65 kg/m²

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.035  | 0.000  | 0.406  | 0.000   | -0.508  | 0.000   |
| V2         | -0.037 | 0.000  | -0.430 | 0.000   | 0.538   | 0.000   |
| V3         | 0.052  | 0.000  | 0.598  | 0.000   | -0.747  | 0.000   |
| V4         | -0.021 | 0.000  | -0.239 | 0.000   | 0.299   | 0.000   |
| V5         | 0.017  | 0.000  | 0.191  | 0.000   | -0.239  | 0.000   |
| V6         | -0.064 | 0.000  | -0.741 | 0.000   | 0.926   | 0.000   |
| N1         | 0.000  | 0.000  | 1.008  | 0.000   | -1.478  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m²\*
- Max allowable bearing stress of soil = 2 Kg/cm²

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc = 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys = 1.15

### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.



## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 130 km/h

Snow: 70 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.021  | 0.002  | 0.255  | -0.002  | -0.321  | 0.000   |
| V2         | -0.021 | -0.002 | -0.255 | 0.001   | 0.321   | 0.000   |
| V3         | 0.029  | 0.002  | 0.346  | -0.002  | -0.436  | 0.000   |
| V4         | -0.012 | -0.001 | -0.146 | 0.001   | 0.184   | 0.000   |
| V5         | 0.011  | 0.001  | 0.127  | -0.001  | -0.161  | 0.000   |
| V6         | -0.036 | -0.003 | -0.437 | 0.002   | 0.551   | 0.000   |
| N1         | -0.002 | 0.005  | 0.822  | -0.005  | -1.211  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 130 km/h

Snow: 70 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.029  | 0.000  | 0.335  | 0.000   | -0.418  | 0.000   |
| V2         | -0.029 | 0.000  | -0.335 | 0.000   | 0.418   | 0.000   |
| V3         | 0.040  | 0.000  | 0.454  | 0.000   | -0.567  | 0.000   |
| V4         | -0.017 | 0.000  | -0.191 | 0.000   | 0.239   | 0.000   |
| V5         | 0.015  | 0.000  | 0.167  | 0.000   | -0.209  | 0.000   |
| V6         | -0.050 | 0.000  | -0.574 | 0.000   | 0.717   | 0.000   |
| N1         | 0.000  | 0.000  | 1.080  | 0.000   | -1.584  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m<sup>2</sup>\*
- Max allowable bearing stress of soil = 2 Kg/cm<sup>2</sup>

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc= 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys= 1.15

### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.

## END FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 110 km/h

Snow: 80 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | -0.001 | 0.002  | 0.530  | -0.002  | -0.693  | 0.000   |
| V1         | 0.015  | 0.001  | 0.182  | -0.001  | -0.230  | 0.000   |
| V2         | -0.014 | -0.001 | -0.164 | 0.001   | 0.207   | 0.000   |
| V3         | 0.020  | 0.002  | 0.237  | -0.001  | -0.298  | 0.000   |
| V4         | -0.008 | -0.001 | -0.091 | 0.001   | 0.115   | 0.000   |
| V5         | 0.005  | 0.000  | 0.055  | 0.000   | -0.069  | 0.000   |
| V6         | -0.026 | -0.002 | -0.309 | 0.002   | 0.390   | 0.000   |
| N1         | -0.002 | 0.006  | 0.931  | -0.005  | -1.372  | 0.000   |
| Q1         | -0.002 | 0.005  | 0.731  | -0.004  | -1.076  | 0.000   |

## CENTRE FOOTINGS

### REACTIONS

As-calculated,  
No increase

Wind: 110 km/h

Snow: 80 kg/m<sup>2</sup>

| Hypothesis | Rx (t) | Ry (t) | Rz (t) | Mx (tm) | My (tm) | Mz (tm) |
|------------|--------|--------|--------|---------|---------|---------|
| PP         | 0.000  | 0.000  | 0.648  | 0.000   | -0.865  | 0.000   |
| V1         | 0.021  | 0.000  | 0.239  | 0.000   | -0.299  | 0.000   |
| V2         | -0.019 | 0.000  | -0.215 | 0.000   | 0.269   | 0.000   |
| V3         | 0.027  | 0.000  | 0.311  | 0.000   | -0.388  | 0.000   |
| V4         | -0.010 | 0.000  | -0.120 | 0.000   | 0.149   | 0.000   |
| V5         | 0.006  | 0.000  | 0.072  | 0.000   | -0.090  | 0.000   |
| V6         | -0.035 | 0.000  | -0.406 | 0.000   | 0.508   | 0.000   |
| N1         | 0.000  | 0.000  | 1.224  | 0.000   | -1.795  | 0.000   |
| Q1         | 0.000  | 0.000  | 0.960  | 0.000   | -1.408  | 0.000   |

### CALCULATION CHARACTERISTICS:

- Overload = 40 Kg/m<sup>2</sup>\*
- Max allowable bearing stress of soil = 2 Kg/cm<sup>2</sup>

*The CTE dictates that Project Management must conduct a study to check that the soil's allowable bearing stress is equal to or greater than that of the design*

\*Overload not concurrent

### REINFORCED CONCRETE CHARACTERISTICS:

- Class of concrete = C25/30
- Consistency = Class S2 (5-9 cm)
- Max mesh of aggregate = 30mm
- Designation of environment type = XC2
- Calculation coefficient Yc= 1.5
- Reinforcement = B400S Steel rebar
- Steel elastic limit Ys= 1.15

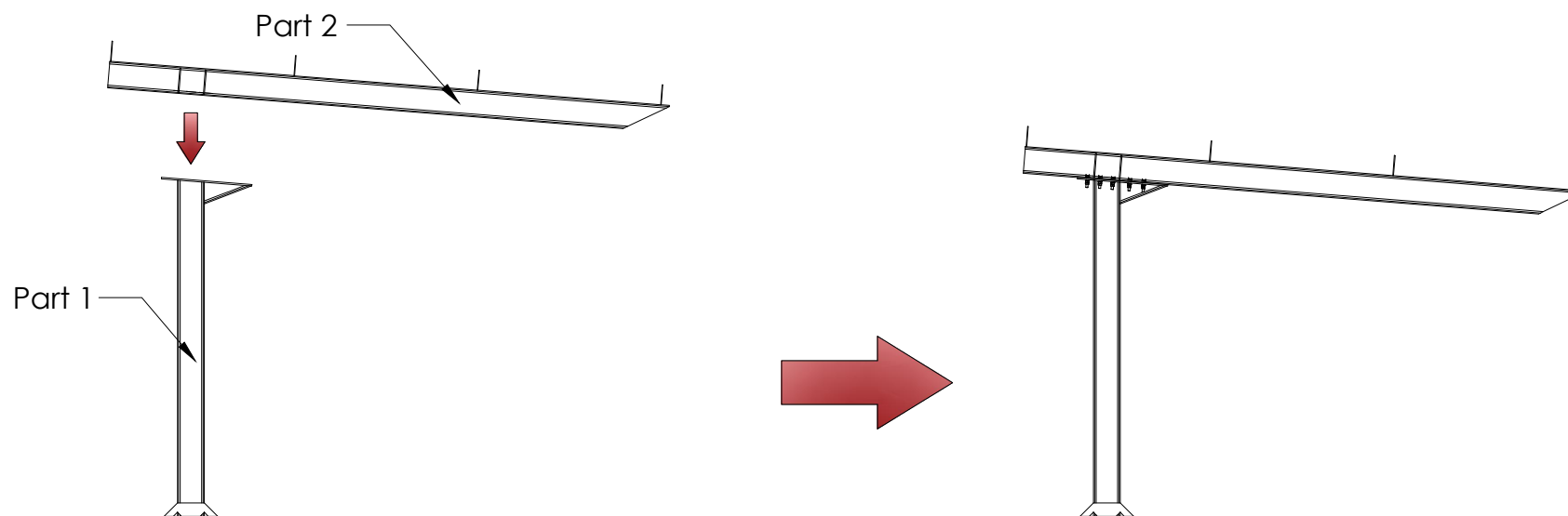
### NECESSARY CHECKS:

- Stresses on the soil
- Sinking of the footing
- Bending in the footing
- Shear in the footing
- Oblique compression in the footing
- Minimum depth
- Minimum rebar:concrete ratio
- Minimum rebar:concrete ratio for bending
- Minimum rebar diameter
- Maximum separation between rebar
- Minimum separation between rebar
- Anchor length

*Calculations carried out using Cype 3D, accounting for integral metal structure, loads and allowable bearing stress of soil.*

SUNFER certifies that that the PR2-EN foundation meets or exceeds all criteria for the ground conditions, materials, dimensions, and reactions mentioned in this document.

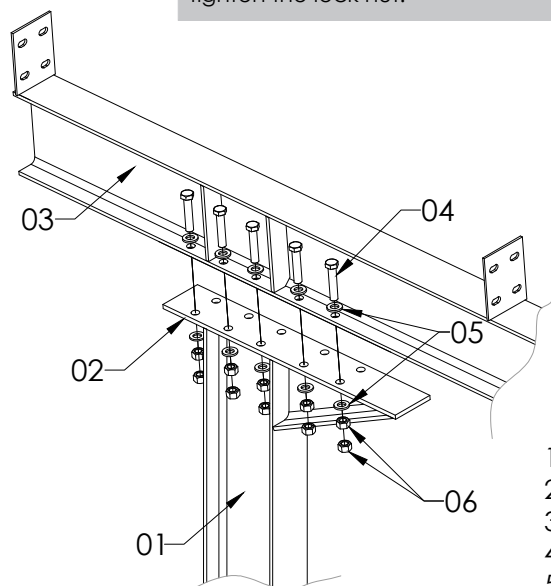




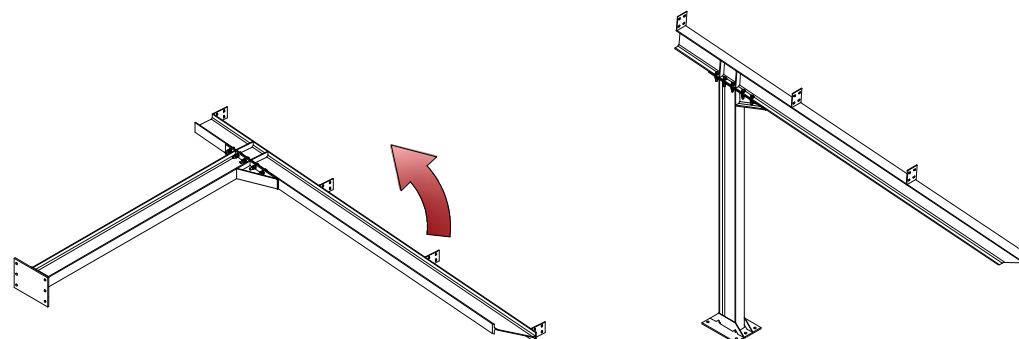
**STEP 1:** The PR2-EN car park supports are supplied in two parts. Both parts are connected by means of connecting plates with 10 bolts, 5 on each side of the beam.



First tighten the nut to the marked torque and then tighten the lock nut.



1. IPE Pillar 200
2. Connecting plate pillar-beam
3. Beam IPE 200
4. Hexagonal screw M16x60 (x10)
5. Flat Washer M16 (x20)
6. Hexagonal nut M16 (x20)



To facilitate assembly, it is recommended that this step is carried out on the ground and, once the connection has been made, lift the completed support.

#### Tightening torque:

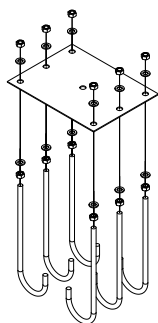
|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

SUPPORT ASSEMBLY

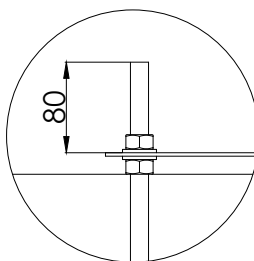
PARKING CANOPY



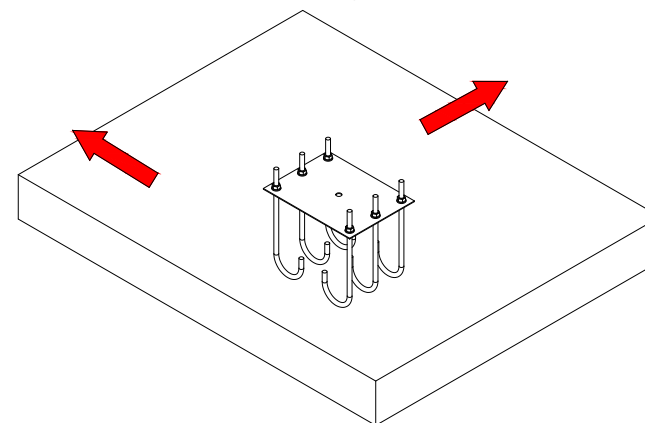
1. Use 1 nut and 1 washer beneath each side to position the bolts on the plate prior to concreting.



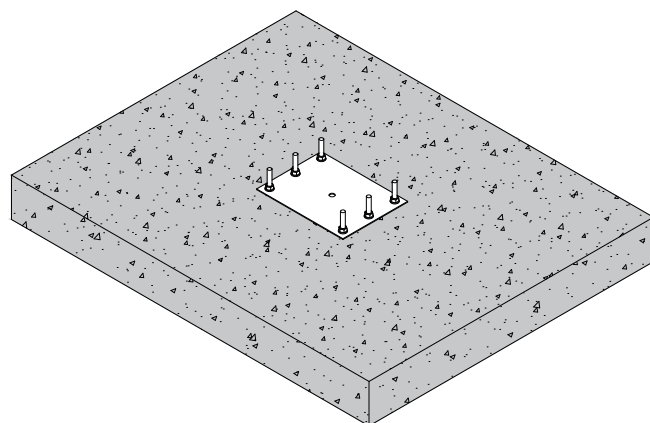
2. Leave 80 mm of rod protruding from the plate.



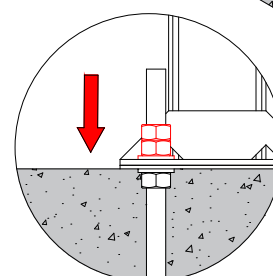
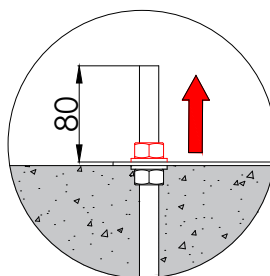
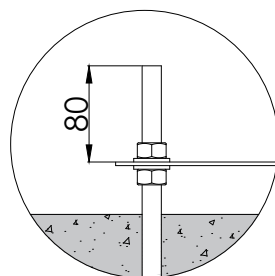
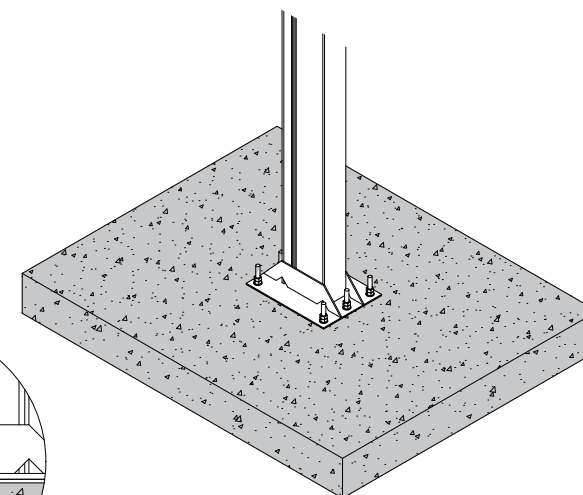
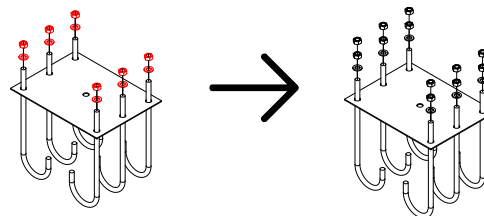
3. Level the plate with it in place. Make certain that it is level about both axes to ensure correct installation. Do not use screws for leveling.



4. Once concrete is poured, plate will be fixed in place.



5. Remove the nuts and washers from the exposed side (Red) and place the pillar with the correct fasteners.

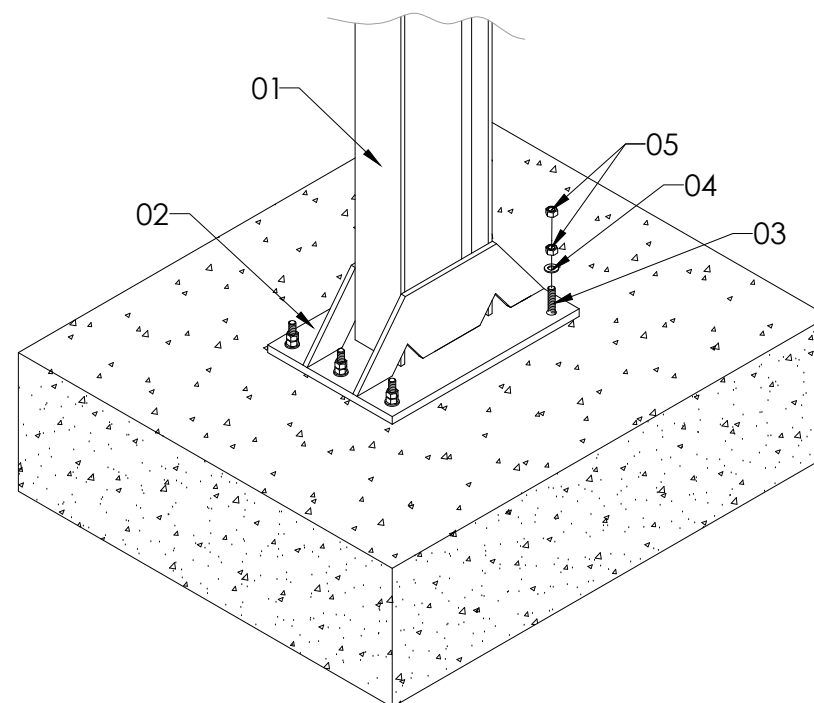
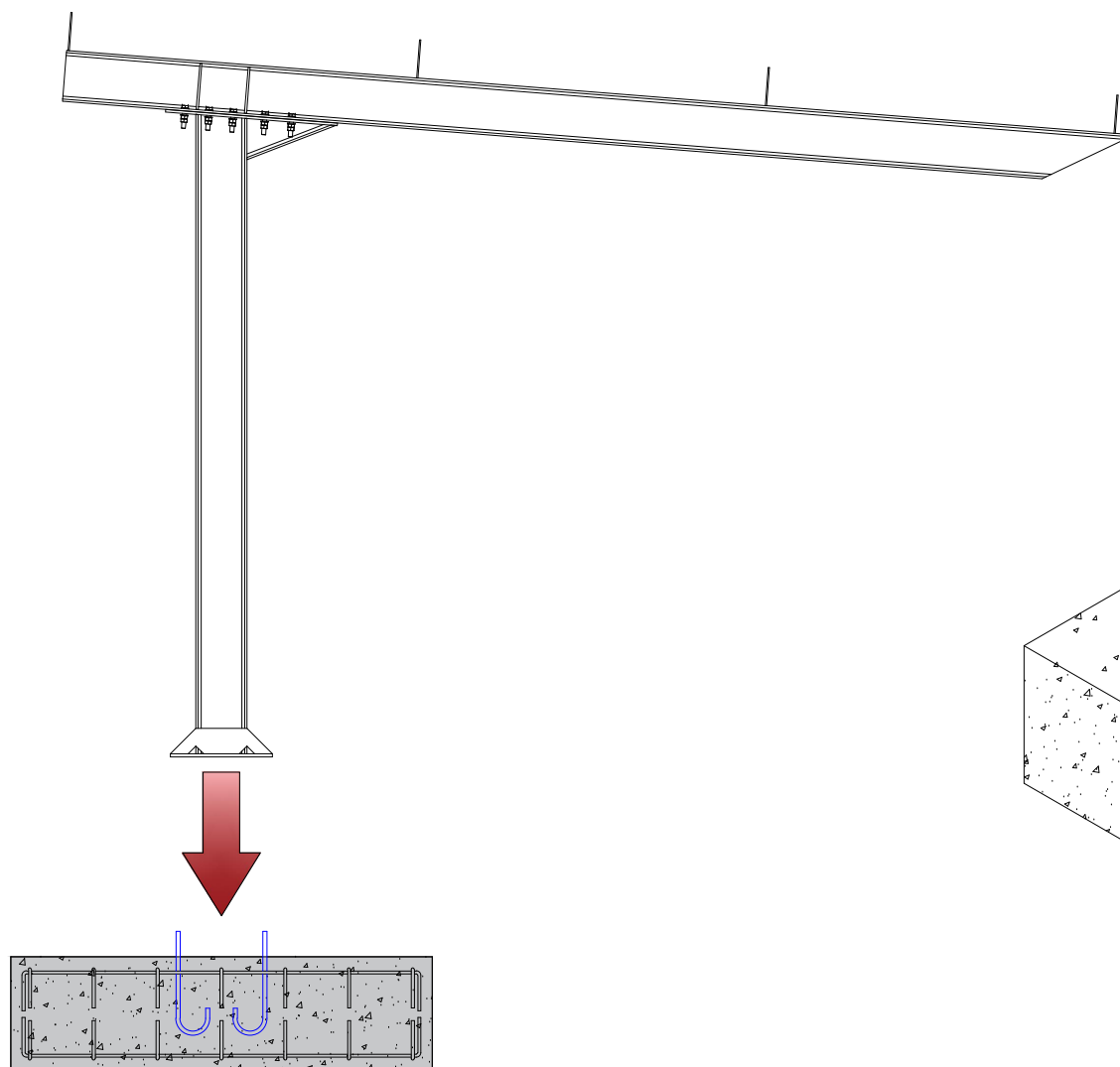


**NOT INCLUDED**

CP1 ANCHOR ASSEMBLY

PARKING CANOPY





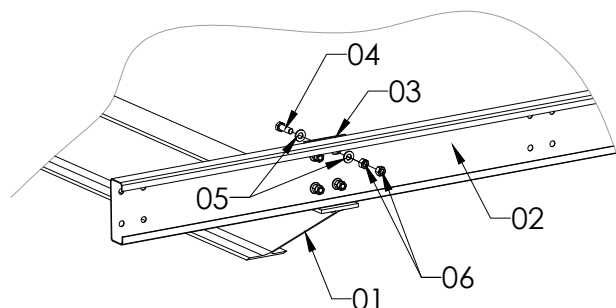
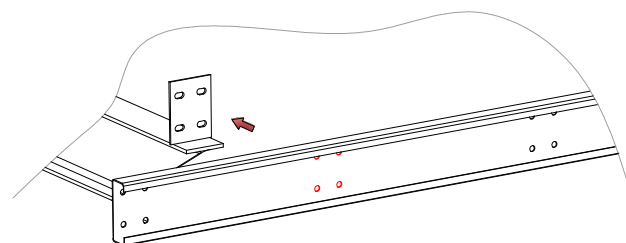
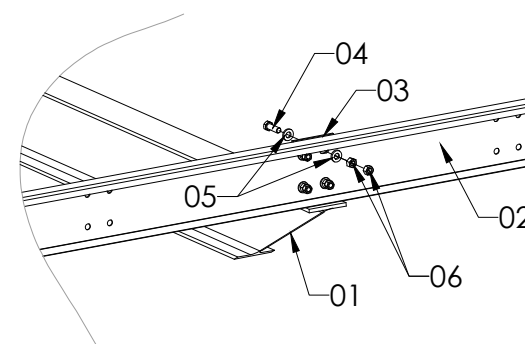
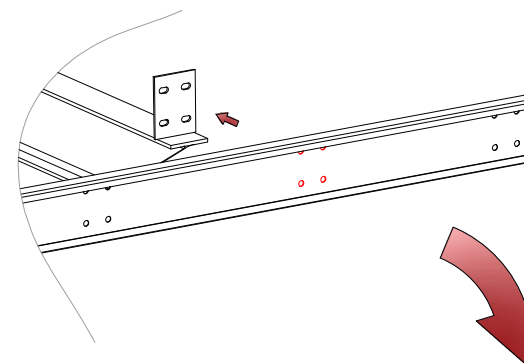
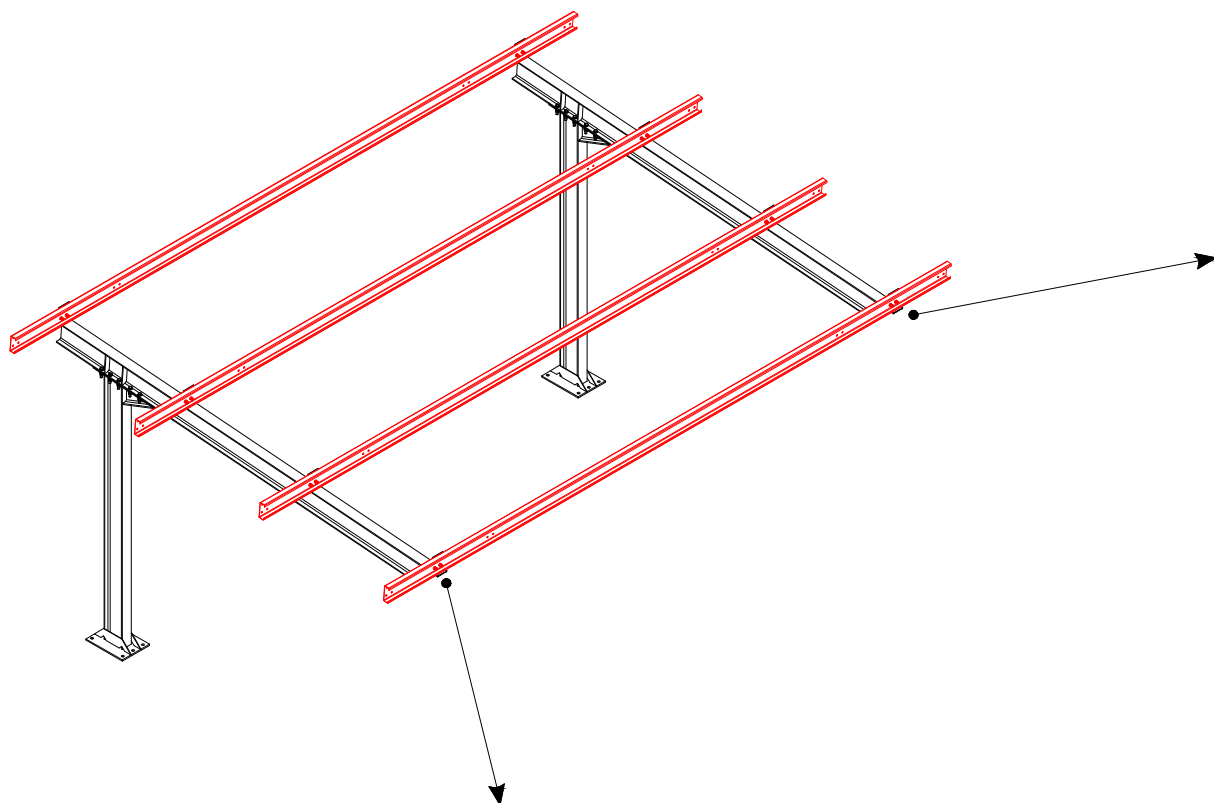
1. Pillar IPE 200
2. Base plate (400x300x12)
3. Anchor bolts M16 (NOT INCLUDED)
4. Flat washer M16 (NOT INCLUDED)
5. Nut M16 (NOT INCLUDED)



Tighten the nut first to the marked torque and then tighten the lock nut.

**STEP 2:** Connect the base plate to the pillar by matching the holes with the anchor bolts. Then insert the washers and nuts into the anchorage hook.





## Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

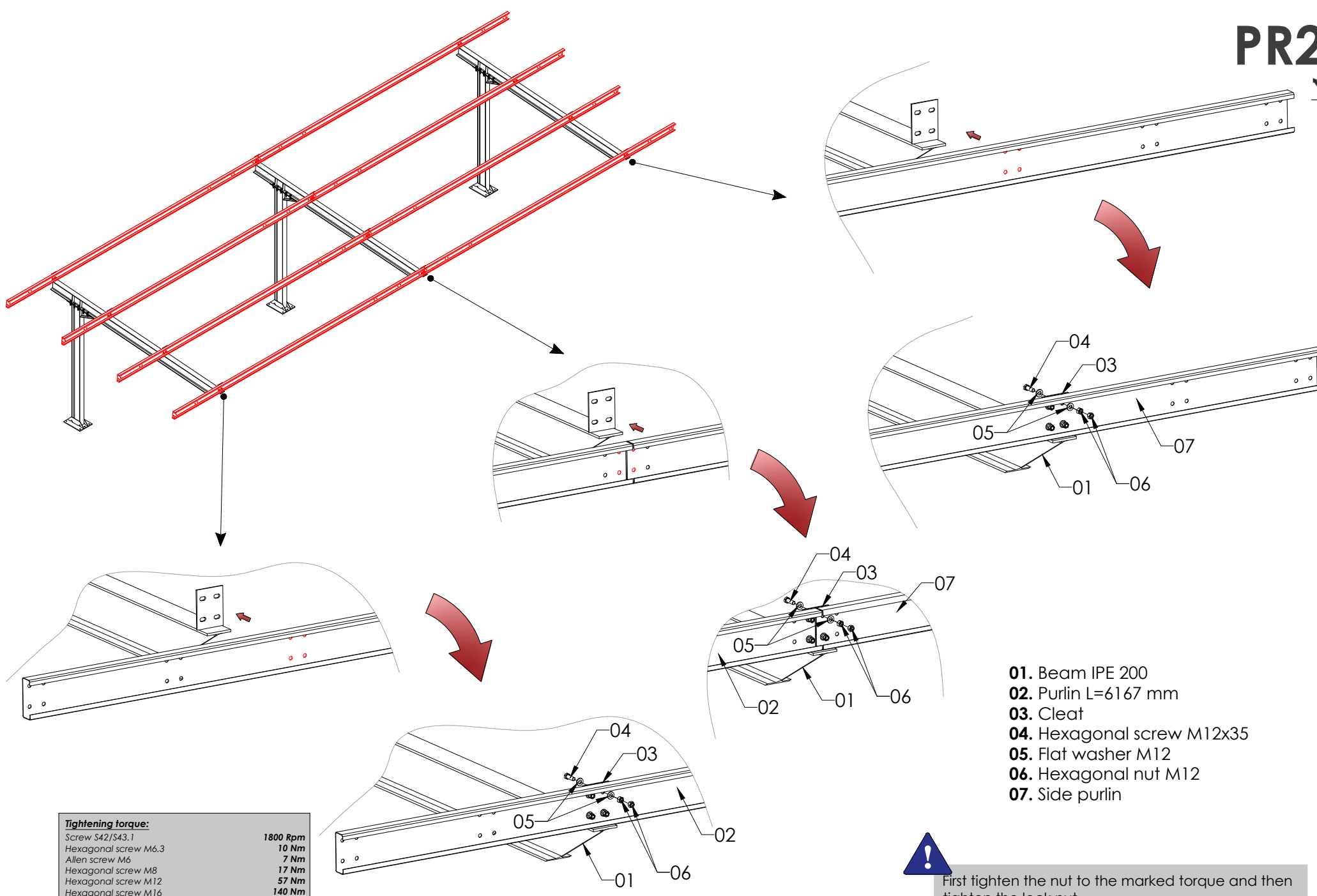
- 01. Beam IPE 200
- 02. Purlin L=6167 mm
- 03. Cleat
- 04. Hexagonal screw M12x35
- 05. Flat washer M12
- 06. Hexagonal nut M12



First tighten the nut to the marked torque and then tighten the lock nut.

**STEP 3:** Place the purlin on the beams and match the red coloured holes of the purlin with the holes of the cleat. Screw the connection with 4 screws for each cleat.





## Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

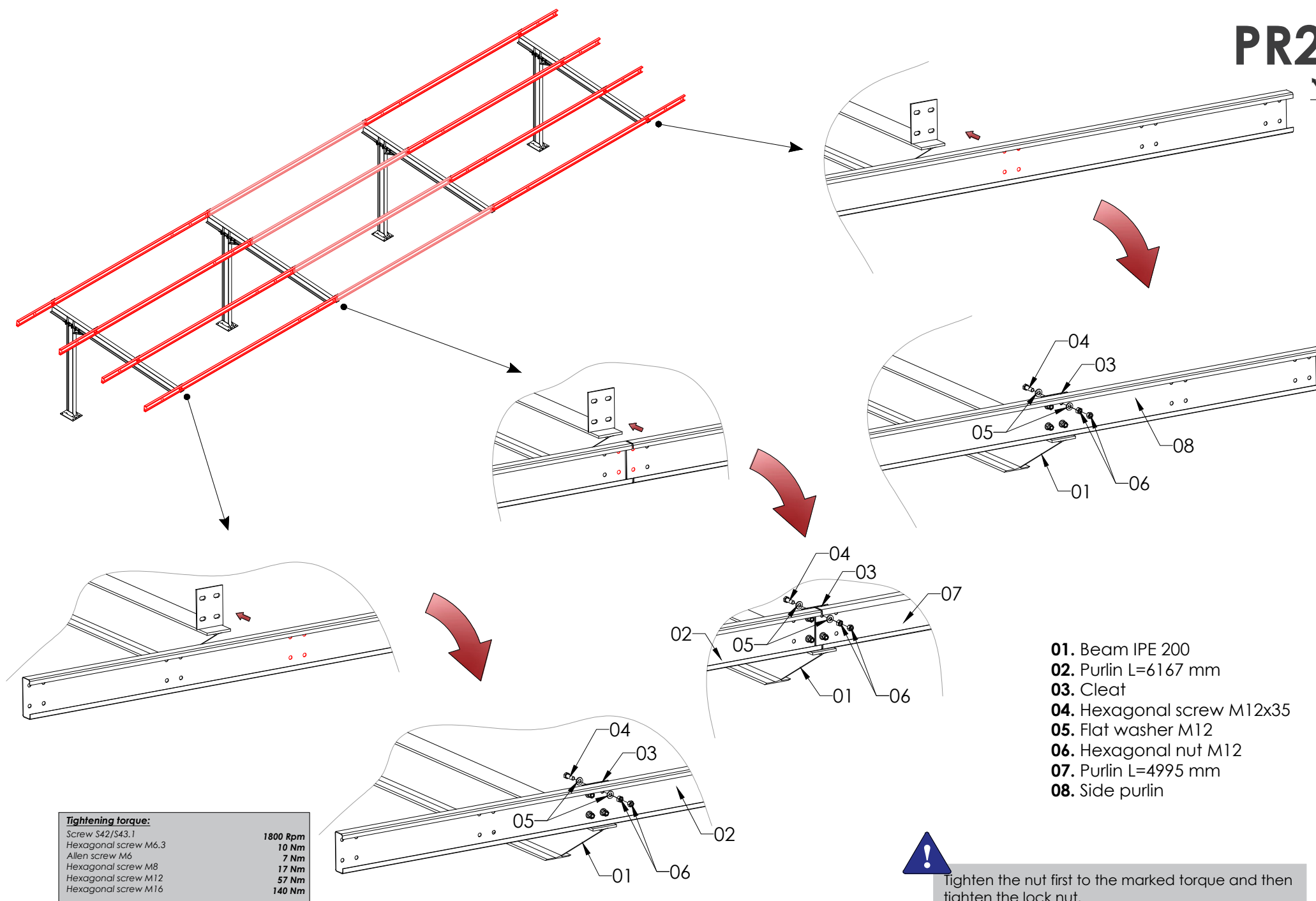
- 01. Beam IPE 200
- 02. Purlin L=6167 mm
- 03. Cleat
- 04. Hexagonal screw M12x35
- 05. Flat washer M12
- 06. Hexagonal nut M12
- 07. Side purlin



First tighten the nut to the marked torque and then tighten the lock nut.

**STEP 3:** Place the purlin on the beams and match the red coloured holes of the purlin with the holes of the cleat. Screw the connection with 4 screws for each cleat.





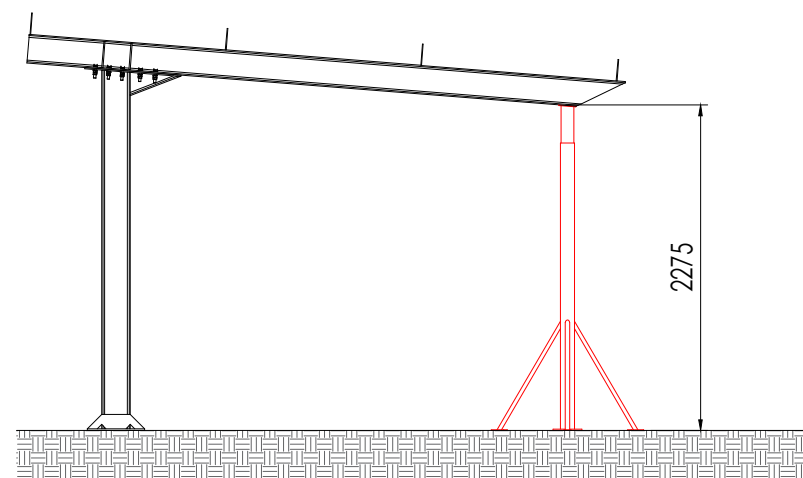
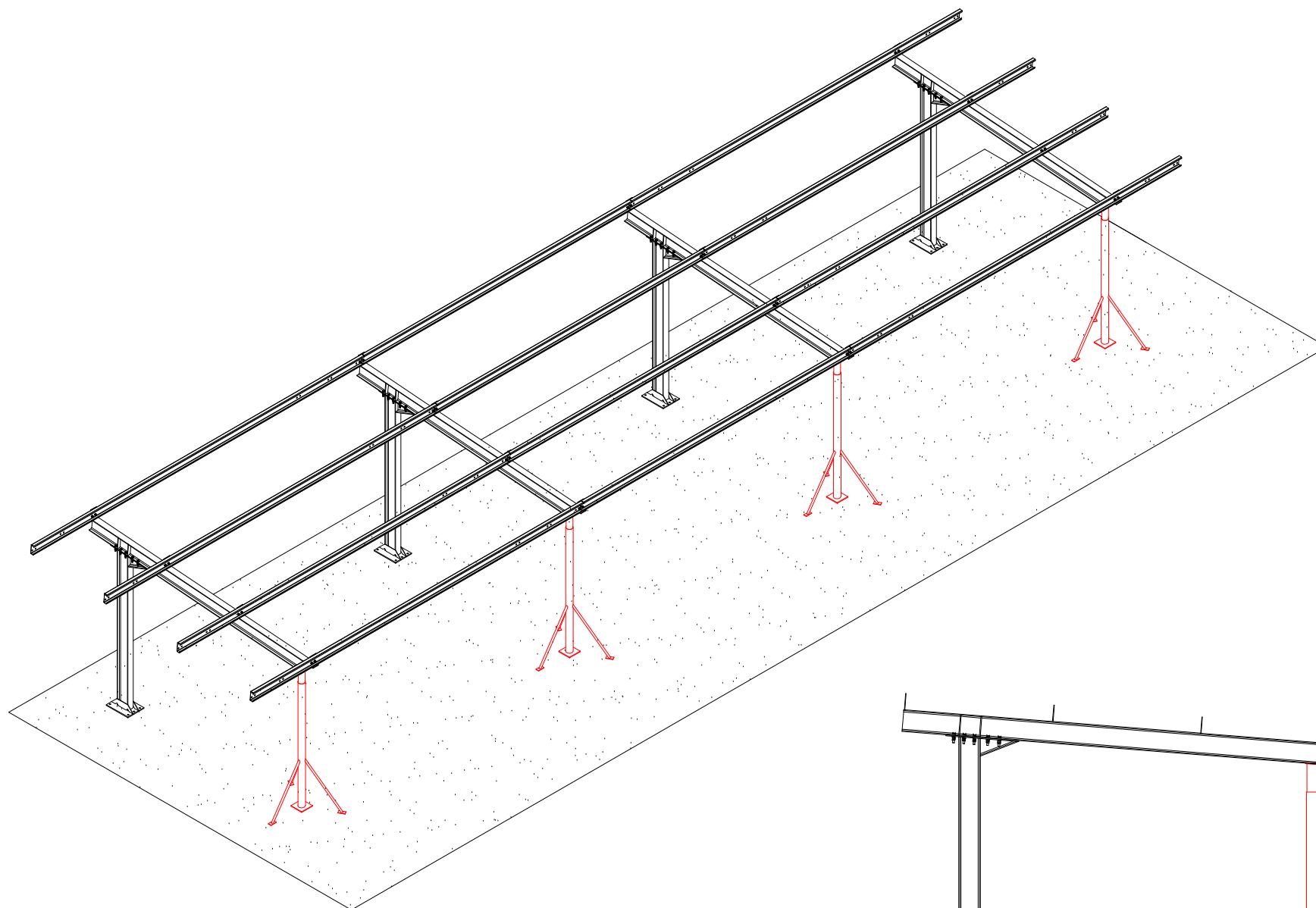
## Tightening torque:

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |



Tighten the nut first to the marked torque and then tighten the lock nut.

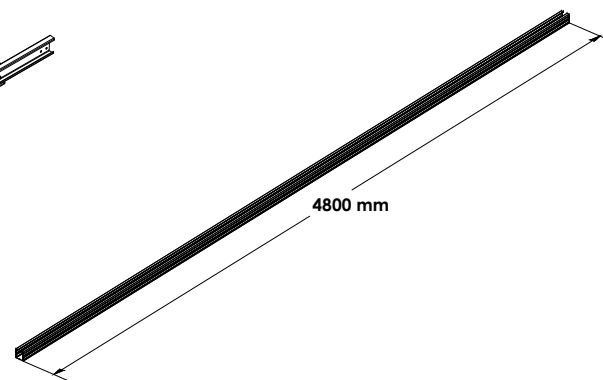
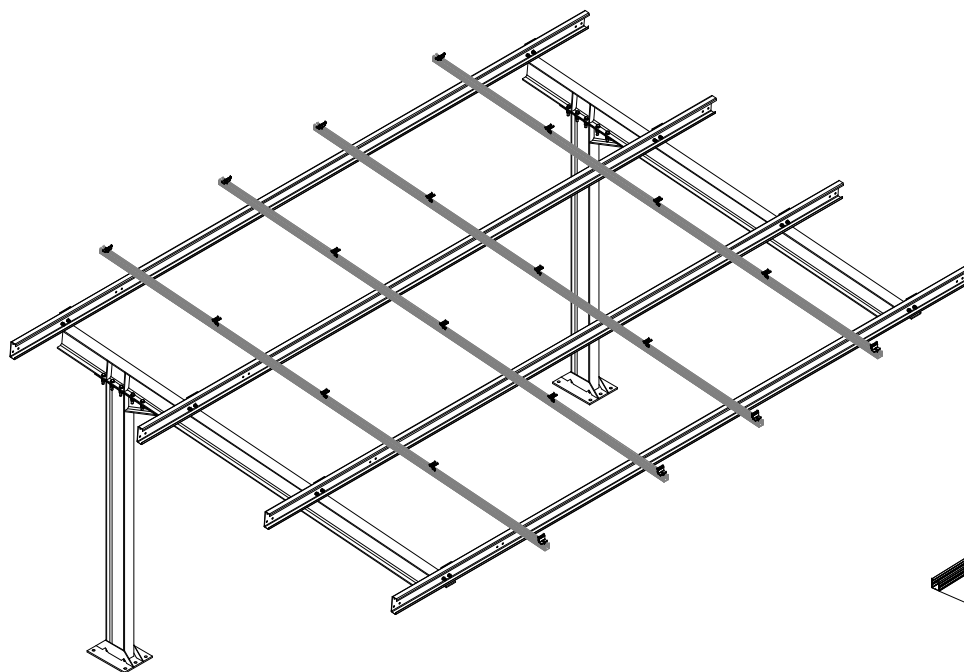
**STEP 3:** Place the purlin on the beams and match the red coloured holes in the purlin with the holes in the cleat. Screw the connection with 4 screws per cleat.



**STEP 4:** Once the purlins have been assembled, brace the supports to prevent movement in any direction during the assembly of the rest of the car park.

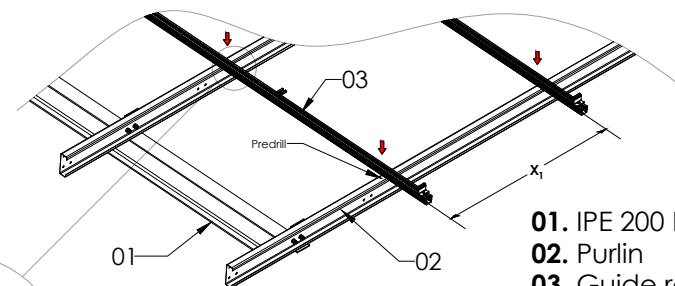
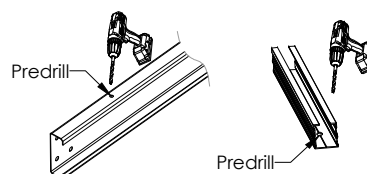
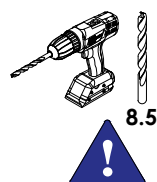




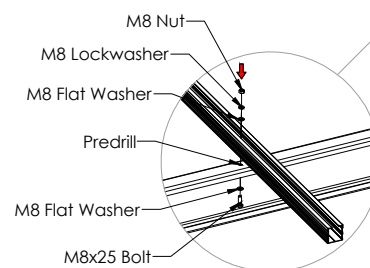


**Tightening torque:**

|                      |          |
|----------------------|----------|
| Screw S42/S43.1      | 1800 Rpm |
| Hexagonal screw M6.3 | 10 Nm    |
| Allen screw M6       | 7 Nm     |
| Hexagonal screw M8   | 17 Nm    |
| Hexagonal screw M12  | 57 Nm    |
| Hexagonal screw M16  | 140 Nm   |

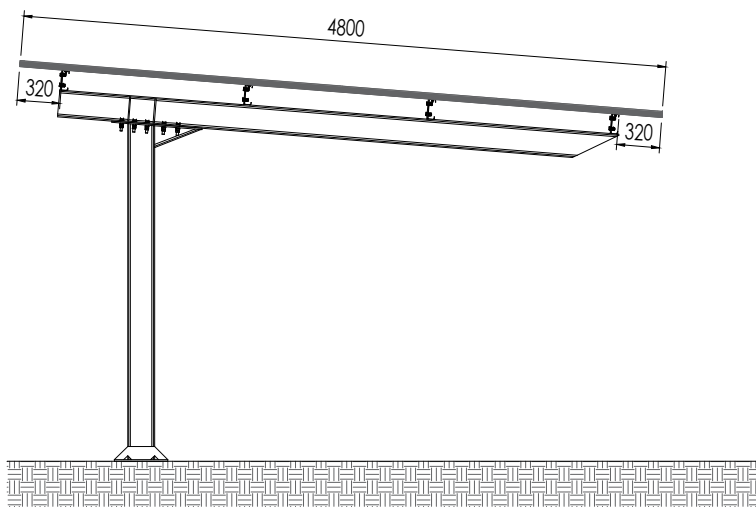


- 01. IPE 200 Beam
- 02. Purlin
- 03. Guide rail

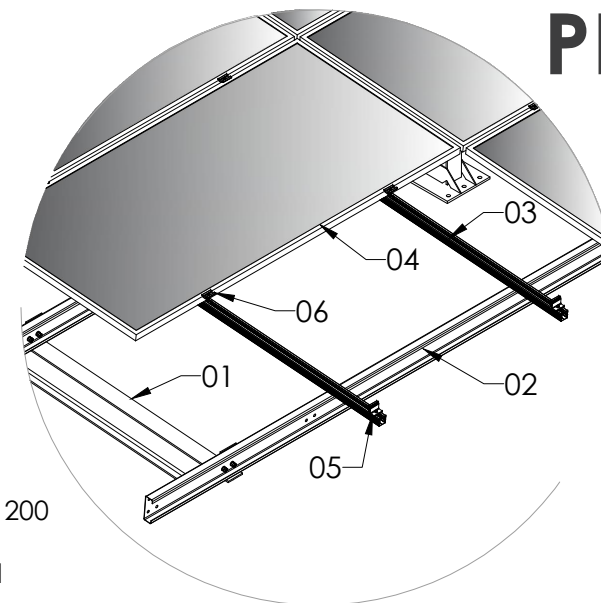
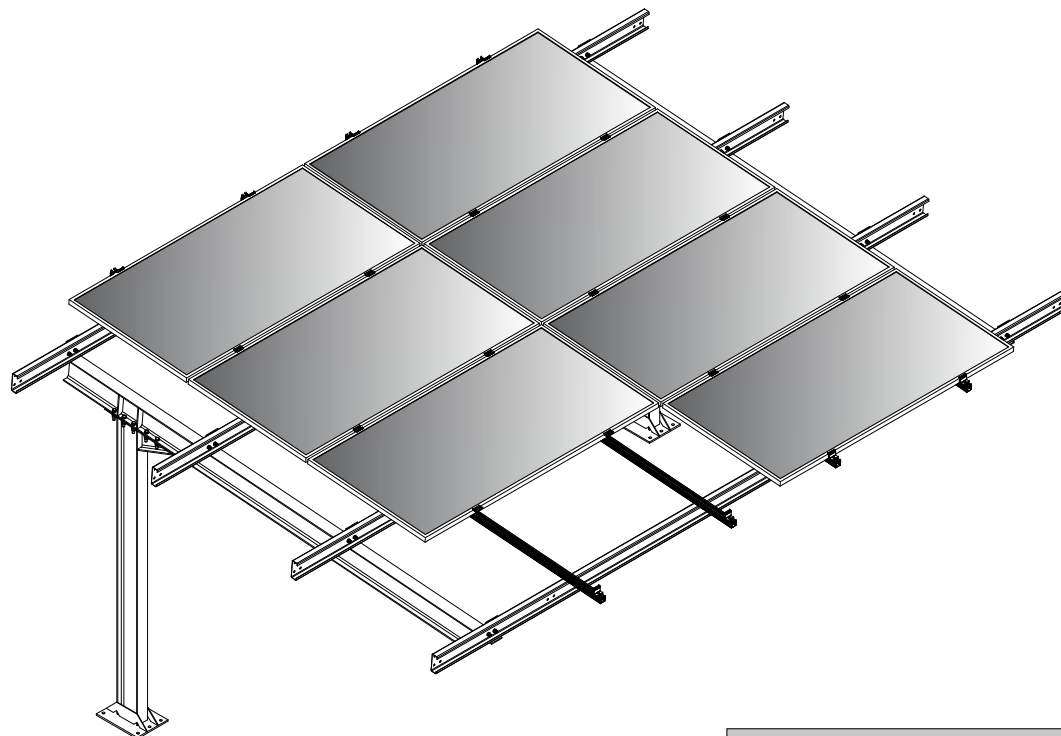


$X_1$  - The distance between guide profiles will be determined by the type of panel

**STEP 5:** To assemble the guide rails to the purlins, drill a pre-drilled hole in both surfaces (profile and purlin) with an 8.5mm drill bit. The connection will be made by means of M8x25 screws.





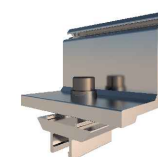


- 01. Beam IPE 200
- 02. Purlin
- 03. Guide rail
- 04. panel
- 05. S10.1-EN Side clamp
- 06. S11.1-EN Mid clamp

|                           |          |
|---------------------------|----------|
| <b>Tightening torque:</b> |          |
| Screw S42/S43.1           | 1800 Rpm |
| Hexagonal screw M6.3      | 10 Nm    |
| Allen screw M6            | 7 Nm     |
| Hexagonal screw M8        | 17 Nm    |
| Hexagonal screw M12       | 57 Nm    |
| Hexagonal screw M16       | 140 Nm   |

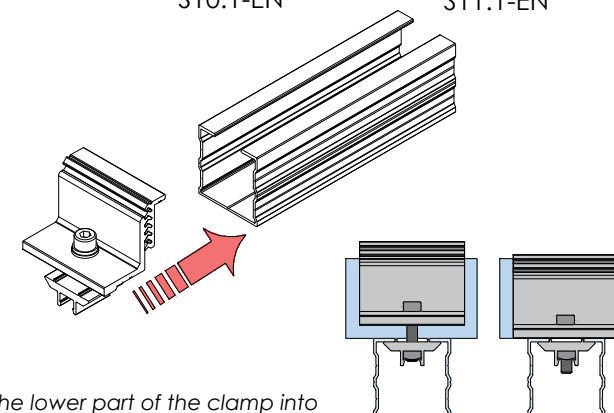
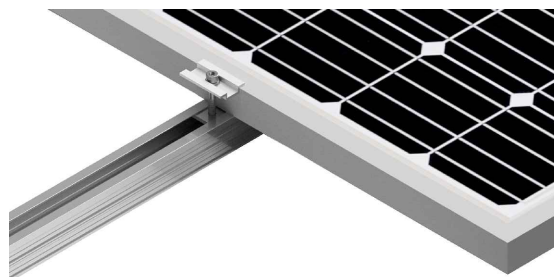
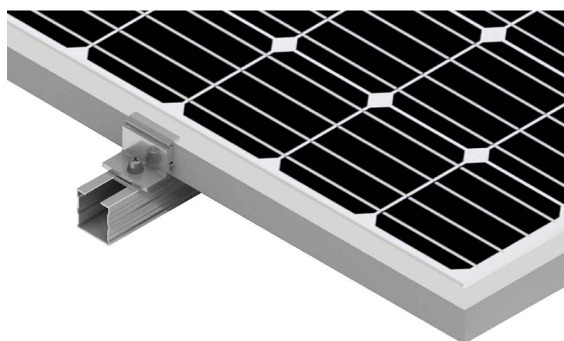
**STEP 6:** Place the panels and fix them with the S10.1-EN clamps on the sides and the S11.1-EN clamps in the central areas. The distance between the anchoring points of the panel will depend on the size of the panel. Consult the technical data sheet of the panel to be installed.

Clamps that are compatible with G3-EN profile:



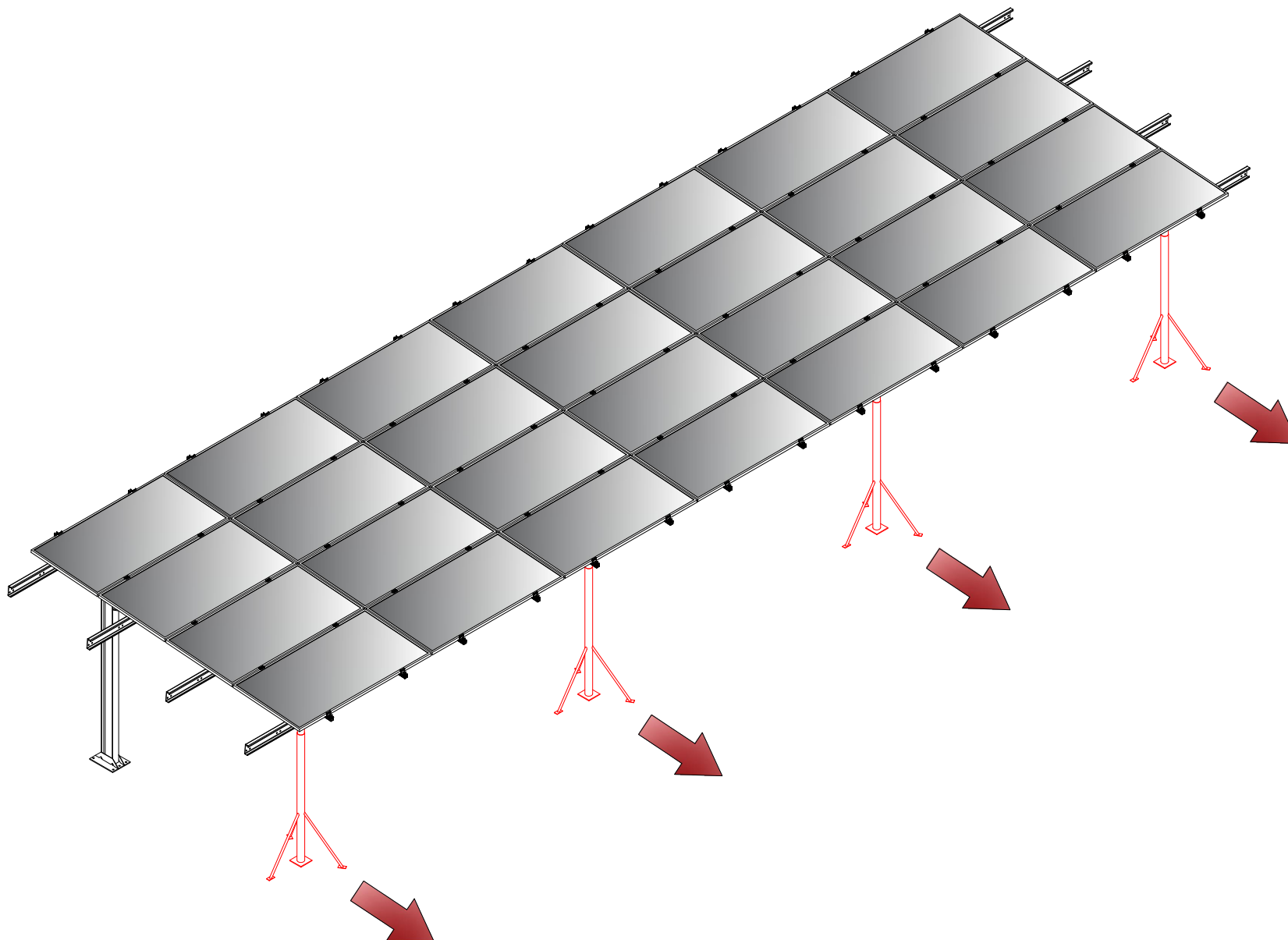
S10.1-EN

S11.1-EN



Insert the lower part of the clamp into the G3-EN profile and align the tongue-and-groove assembly.





**STEP 7:** Loosen the supports and remove them.

