RAULI

WALL

INSTALLATION MANUAL 2023

EASY SLIDE - ALL BLACK - MADE IN FINLAND - QUICK INSTALL - 30 YEARS WARRANTY - EU CERTIFICATE

TABLE OF CONTENTS

RAULI APP

Our App is ready to help you in all your projects by calculating accurate project-specific component quantities and system dimensions -> app.raulibrackets.fi

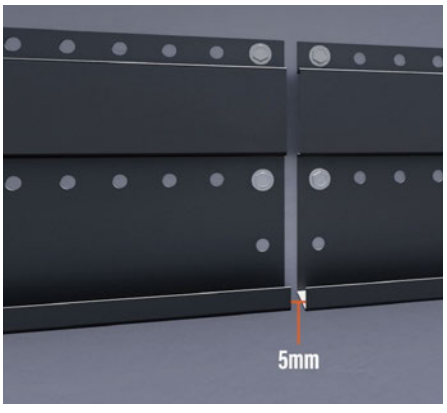
1. GENERAL ABOUT INSTALLATION

1.1 Mounting the Rails

Solar panels are installed either vertically or horizontally. The rail system is always installed horizontally. Vertical installation is the recommended method of installation. More rail is used for horizontal panel installation, which also directly affects the installation speed.

If, however, panels need to be installed horizontally, for example, due to the available space or wall structure, this must be taken into account as increased rail and fastener consumption.

1.2 General about Fastening



The rail system is fastened to the wall material with a suitable screw. A 7x40mm xylan screw is universal screw, which is suitable as a fastener for most installations. The ends of the rails are fastened with two screws. The recommended screw attachment interval after the ends is 300-500mm in such a way that every other screw into the top hole of the rail, every other screw into the bottom Use adhesive and sealant mass or EPDM sealing tape to seal the fastening holes.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

The end profile is attached to the upper rail with two screws. EJOT 5,5x25
and to the lower rail with two screws. EJOT 5,5x25

A stainless steel grounding plate is installed between the panels at the intermediate bracket location.

The intermediate bracket is fastened with one screw. EJOT 5,5x25

1.3 The size of the Solar Panels

The RAULI Wall standard components are suitable for solar panels that are 30-35mm thick.
The End List should be chosen to match the thickness of the solar panel.
If the solar panels are larger than 2.1m2 in area, it must be ensured whether additional fastening is required.
Determine the local wind load and terrain category.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

2. FIXING THE RAIL SYSTEM TO THE WALL

Always ensure the durability of the wall structure to which the RAULI WALL system is installed. Improve the fastening of the wall structure if necessary.

When installing the rail, a 7x40mm xylan screw is used as a universal screw, which is suitable as a fastener for most installations. However, the method of fastening the rail system must always be planned on a site-specific basis. Also, the structures behind exceptional wall materials such as Siporex, glass facades, plastered walls, and minerit must be examined.

The number, type, and installation location of the fasteners must be determined based on the wind conditions of the site, the installation height, and the type of wall structure. If the characteristics of the structure are not known, the structure must be tested with a pull test. Ensure the durability of the facade and improve the fastening of the wall structure if necessary.

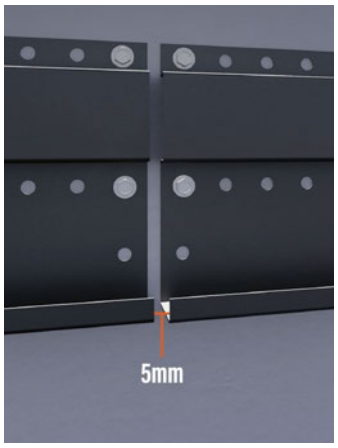
The own weight of the Rauli Wall system is 5,3kg per 1 installed meter. With a 22 kg panel, the system weight is approximately 27,3 kg per installed meter.

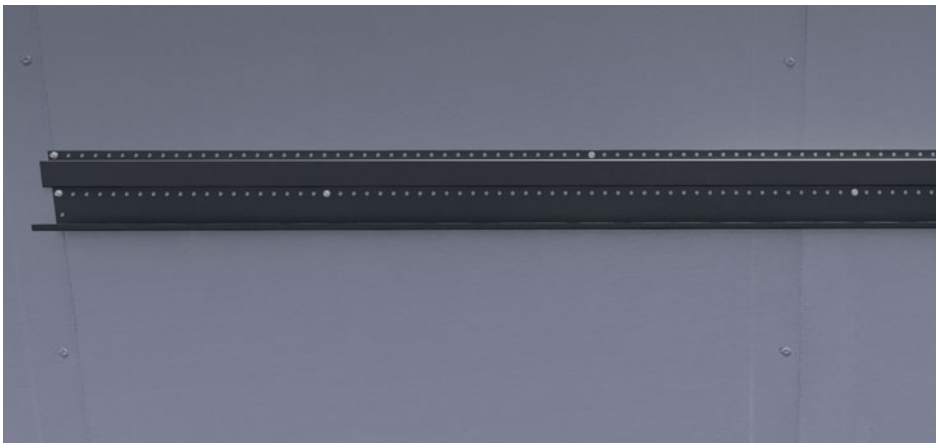
2.1 General Fixing Guidelines:

The general guidelines apply to single-family homes, barns, conventional industrial halls, and storage buildings.

Ensure the durability of the attachment method in the following cases: Windy places, high buildings, large solar panels. Other wall structures (minerit, log walls, siporex, etc.)

The ends of the rails are fastened with two screws. The recommended screw attachment interval after the ends is 300-500mm in such a way that every other screw into the top hole of the rail, every other screw into the bottom hole of the rail. Use sealing tape, or adhesive and sealant mass to seal the fastening holes.





Wooden wall:	Xylan LVI 7x40mm	c/c 400 mm
Concrete wall:	6x50mm Stainless Steel Concrete screw	c/c 500 mm
Sandwich:	Xylan LVI 7x40mm	c/c 300 mm
Metal wall:	Xylan LVI 7x40mm	c/c 300 mm

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

2.2 Planning the attachment

1. Determining the wind load.
2. Choose the correct fixing method for the site if the standard attachment screw is not suitable.
3. Determining the spacing of the wall attachment screws of the profile, based on wind load calculation.
4. Check if the end bracket and the intermediate bracket can withstand the wind loads of the site, one attachment screw can withstand 2.21kN of perpendicular pull, this does not include any additional factors.

2.3 Load values for standard components according to general guidance

The fastening interval for the rail system according to the installation instructions is c/c 300-500, so the determining factors are the fastening of the profiles to the wall and the number of middle clamps and end lists.

With standard components, when the fastening interval is c/c 1500mm, the profiles of the system can withstand a wind suction of 1.5kN/m2 in the middle of the assembly and 3.0kN/m2 at the edges of the assembly, without permanent deformations.

A single fastening screw for the end list and intermediate bracket can withstand a perpendicular pull of 2.21kN.

According to the universal end bracket's installation guide, the attachment can withstand a perpendicular force of 4.42kN

One middle bracket can withstand a perpendicular pull of 2.21kN.

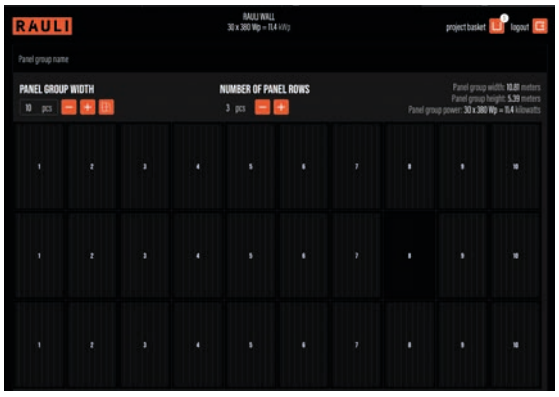
Wall attachment must be planned site-specifically. If the diameter of the fastener's (screw's) is over 8 mm, the profiles are ordered as special, then manufactured with larger perforations.

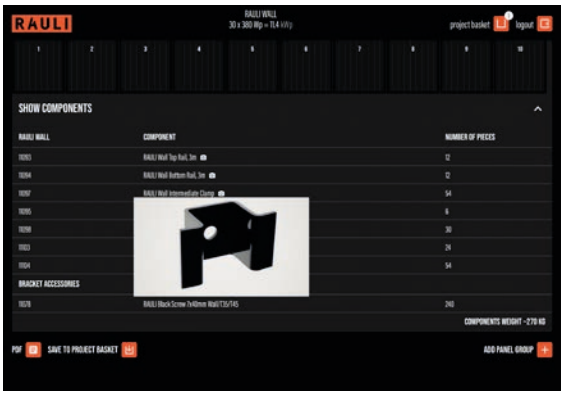
These load calculations are based on test results. No extra safety factors have been added.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

3. SIZING THE RAULI WALL SYSTEM

Use the RAULI APP for sizing. -> app.raulibrackets.com

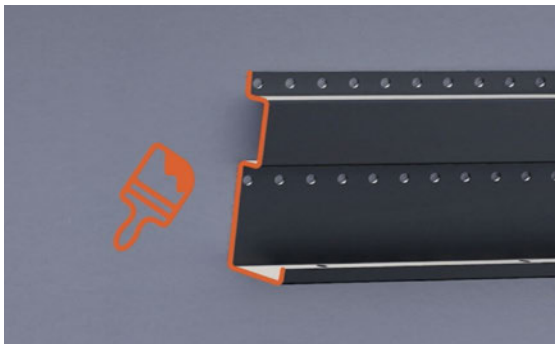




Based on the required width of the panel row, the required lengths and number of rails can be determined. A gap of 4-5mm must be left between the ends of the rails for thermal expansion.
The width of the panel row is calculated as follows:

Panel width x number of panels + width of intermediate bracket x number of gaps + width of end rails x 2
Example calculation: 99 x 10 + 3 x 9 + 5 x 2 = 1027cm
NOTE! Check the dimensions of the panel and brackets before calculation!

The rail system for a 10m 27cm long row would be 4x3m upper and lower rails, one of which upper and one lower rail will have to be shortened to the appropriate length. The cut-off point is painted to prevent rusting.

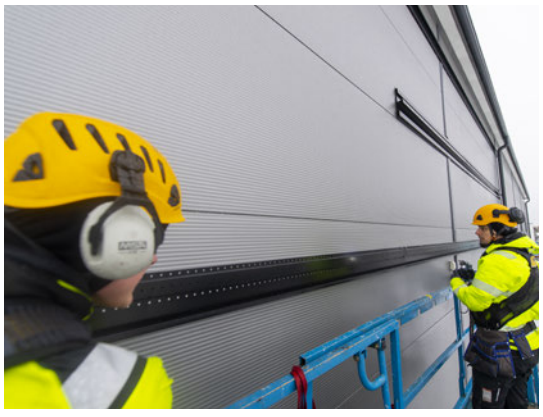


In the dimensioning between the lower and upper rail, a measuring stick or end list is used.
The length of the measuring stick is the length of the side of the panel + 17mm.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

4. INSTALLATION

4.1 Rail System



The installation requires 2 people. When the location of the panel field is clear, the installation of the rail system can begin from the left or right edge of the bottom row. First, the lower rail is fixed in place. The rail should be placed as straight as possible horizontally, for example, using a laser or spirit level. The lower rail is attached from the ends and the middle. A gap of 4-5mm must be left between the ends of the RAULI WALL rails for thermal expansion.

After this, the upper rail is installed. The end profiles of the rows (or the measuring stick) are placed on the already attached lower rail and the upper rail is lifted on top of them. If you have a universal end bracket, use a measuring stick to install the upper rail. The length of the measuring stick is the side length of the panel + 17mm. The upper rail is aligned laterally and screwed from the ends to the wall. After this, both the upper and lower rails are finally fixed in place with the appropriate accessories and fastening interval according to the instructions. This is how you proceed to the end of the row.

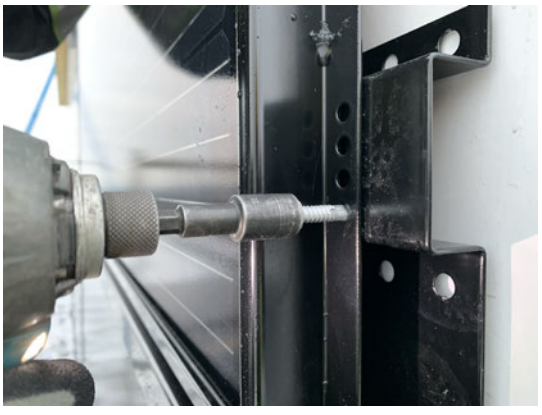
Next, the lower rail of the next row is installed, directly on top of the upper rail of the lower row. After this, the upper rail of the second row is again installed using the end profiles as a guide. This is how you proceed to the end of the row.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

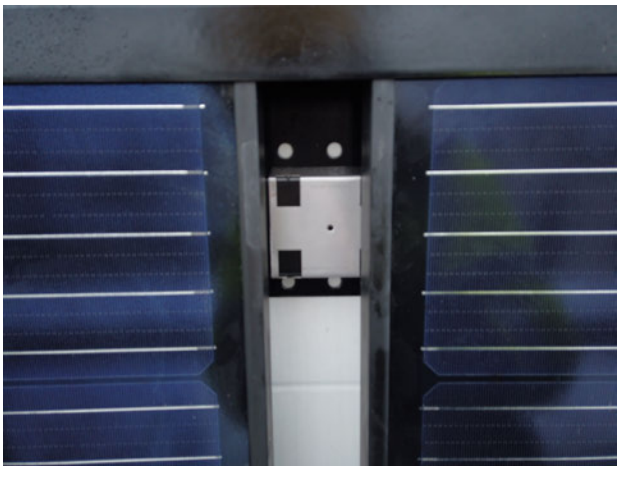
4.2 Panels

When the rail system is ready, the solar and grounding cables are brought to the field, the grounding is built, and the panels are attached. Cables can be attached to the rail system using the RAULI Cable Clip or traditional drillable cable brackets.

Panels are attached by lifting the upper end of the panel inside the "lip" of the upper rail, then placing the lower end inside the "lip" of the lower rail and lowering the panel to rest on top of the lower rail. At this stage, the panel stays in place without holding it.



The first panel of the row is placed laterally in the appropriate place and fixed by putting the end list in place and screwing it in with the screws according to the instructions.



The next panel is lifted into place, a stainless steel grounding plate is placed under the panel at the location of the intermediate bracket, and then the panel is attached to the first panel/rail system with an intermediate bracket. This is how you proceed until the row is complete. Fix the last panel in place with the end list.

Congratulations! The installation is now complete!

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

5. SANDWICH ELEMENTS

Installation of Rauli Wall frame onto sandwich elements

The fixation of the sandwich elements under the panel field must be examined. Add more fastening screws to the elements if necessary.

If the protective sheeting of the vertical seams of the sandwich panels needs to be removed, attach a vapor-permeable tape to the seam. The tape prevents water from seeping into the seam while allowing moisture to escape from it.

Use Rauli EPDM sealing tape between the Rauli Wall mounting profile and the sandwich element or use adhesive and sealant between the screw and the wall.

The fixing screws must be suitable for thin plate fastening, RAULI Black Screw 7x40mm and Ejofast 2,5x25mm Stainless Steel screw has been tested and is suitable for external suspensions onto sandwich elements.

Ensure that the element structure and fixings can withstand the hanging of the Rauli Wall system on the surface of the sandwich element. The core structures of the element and surface profiling are different, so the load endurance varies. The load usually comes from the structure's own weight, wind pressure and suction. Variable loads can be snow and ice accumulating on the structure. In addition to loads, movements caused by variations in temperature and humidity of the structures must be taken into account, always ensure the implementation of thermal expansion gaps according to the installation instructions.

The own weight of the Rauli Wall system is 5,3kg per 1 installed meter. With a 22 kg panel, the system weight is approximately 27,3 kg per installed meter.

Plan the fixing interval of the Rauli Wall profiles to the sandwich element, you will get the necessary information for planning the fixing interval from the element manufacturer's design manual.

Maximum load of the fixing screw, when the fixing interval is over 120 mm c/c: Tension 250N, shear 500N. The values apply to all element types and thicknesses of the element surface plate 0.5, 0.6 and 0.7 mm. In some countries, the values may differ from those given. If the screws are less than 120 mm apart, their combined maximum load is the load of one screw.

If the panel size or wind loads of the site are large, the mounting profiles may transmit too high compression, shear, or tensile load to the element. In this case, a Rauli intermediate fixing rail must be used on the centerline of the solar panel, or the system must be installed with the help of Rauli Wall vertical beams, with which the loads can be distributed over a larger surface area.

If the sandwich element of the site cannot withstand the hanging of the Rauli Wall system on its surface, the installation can be done by attaching the vertical rails to load-bearing structures. In this case, EPDM sealing tape should be used at the fixing points of the vertical rail.

Sizing examples can be found in the design guidelines provided by the element manufacturers.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

6. SHEET METAL FACADES

Ensure that the fastening of the facade structure can withstand the loads of the Rauli Wall system, add more fixings if necessary. If the Rauli mounting rails cannot be attached to the facade structure, attach the rails using mounting sleeves directly to the load-bearing frame.

When attaching to the facade, ensure whether the facade is watertight, if so, use sealing tape, sealant rubber rings, or adhesive and sealant in the installation. The seal is installed between the facade and the Rauli rail.

Choose a fixing screw that corresponds to the corrosion resistance of the facade, Ejofast 2,5x25mm Stainless Steel screw is suitable for most walls, also to aluminum facades. Ensure that the thermal expansion of the facade system is not prevented during the Rauli Wall installation. The mounting rails have oval fixing holes that also allow for lateral movement.

7. WOODEN FACADES

Ensure that the fastening of the facade structure can withstand the loads of the Rauli Wall system, add more fixings if necessary. If the Rauli mounting rails cannot be attached to the facade structure, attach the rails directly to the load-bearing frame.

When attaching to the facade, ensure whether the facade is watertight, if so, use sealing tape, sealant rubber rings, or adhesive and sealant in the installation. The seal is installed between the facade and the Rauli rail.

In settling wall structures (log walls), installation must be done with separate mounting rails that allow for settling.

8. CONCRETE FACADES

Install Rauli Wall rails off the concrete facade using Rauli sealing tape or sealing rubbers.

When attaching to concrete, Stainless Steel fixings must be used.

Choose the appropriate fixing length for the concrete wall, check the minimum fixing distance from the edge of the concrete and from the neighboring fixing according to the instructions of the fastener. If the distance of the fixing from the edge of the fixing base or from another fixing is too small, the concrete may crack, and the fixing may fail.

Drill a suitable hole for the fixing and clean it, install the fixing. If the structure needs to be watertight, use sealing tape or sealant rubber rings.

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihimäki, Suomi/Finland
info@raulibrackets.fi
+358 19 278 3303

RAULI

raulibrackets.fi
app.raulibrackets.fi
Käpälämäenkatu 10-12
11710 Riihmäki
Suomi/Finland

info@raulibrackets.fi
+358 19 278 3303