

# ASSEMBLY INSTRUCTIONS FOR A SINGLE-SUPPORT FREE-STANDING STRUCTURE SINGLE VERTICALLY ORIENTED MODULE



The mounting system described below is used to fix photovoltaic modules in a vertical orientation with a tilt angle of 25 degrees. The structure is compatible with modules with a maximum height of 2465 mm.

Every effort has been made during production to ensure that you receive a product of the highest quality that is also easy to assemble. These instructions are a set of rules for the correct assembly of mounting structure components, however, they are not a blueprint or a substitute for it. The fitter performing the assembly must be suitably trained and qualified for the job. Overall responsibility for correct assembly rests with the fitter, who should determine the correct type of construction.

1. In order to assemble the structure by driving, it is necessary to have suitable equipment, e.g. a pile driver or an excavator with a suitable adapter with a cross-section of the load-bearing profile – Fig. 1.



FIG.1. Cross-section of the driven-in support

2. Arrange the layout of the modules in such a way as to minimise or exclude the presence of shadow on the modules, especially so that, in the case of multiple tables, the preceding row does not cast a shadow on the subsequent row – calculate the required spacing between rows and bear in mind that even the shadow cast by trees or buildings can limit the output of the modules. When assembling the system in summer, be aware that the shadow cast by trees, neighbouring buildings and the subsequent rows will reach much further in winter.

v1.1



Page 2 of 16 WWW.B2B.KENO-ENERGY.COM

**3.** The length of one table can be calculated according to the formula, bearing in mind that the maximum length of a single table is **20m**:

TABLE LENGTH = QUANTITY OF MODULES \* (MODULE WIDTH +20mm) + 60mm



FIG.2. Table length



v1.1

Page 3 of 16

WWW.B2B.KENO-ENERGY.COM

**4.** Assembly of the structure should begin by marking out points on the ground into which the main supports will be driven. A single table consists of one row of supports. The spacing between these supports can be **no more than 2000mm**.



FIG.3. Support spacing

v1.1



WWW.B2B.KENO-ENERGY.COM

WWW.KENO-ENERGY.COM

Page 4 of 16

5. The supports must be driven to a depth of MIN 1300mm. When driving the supports, a spacer should be used, preferably in the form of a dedicated adapter suitable for its cross-section – Fig. 1, direct contact with the component to be driven is prohibited. This will prevent mechanical damage and the stripping of the anti-corrosion coating from the supports. Check the vertical position of the supports during driving.



FIG.4. Support driven into the ground



v1.1

Page 5 of 16

WWW.B2B.KENO-ENERGY.COM

**6.** After all the supports have been firmly and properly driven into the ground, proceed to mount the K-22-S-15 rafters to the individual supports. Insert a K-28 hexagonal bolt, together with a K-51 washer, into the upper hole of the K-22-S-15 rafter, and pre-tighten from the opposite side to the K-22-S-13 support with a K-21 nut.



FIG..5. Mounting the rafter to the support



v1.1

Page 6 of 16

WWW.B2B.KENO-ENERGY.COM

7. Once the rafter has been correctly mounted to the support, proceed to bolt together the two parts of the K-22-S-18 arms (Fig.7) using the prepared holes. To connect the two identical parts of the arm, use two K-28 hexagonal bolts, two K-51 washers and two K-21 nuts.



FIG.6. Arm assembly



v1.1

Page 7 of 16 WWW.B2B.KENO-ENERGY.COM

8. In the next step, attach the previously assembled two parts of the K-22-S-18 arm to the K-22-S-15 rafter and the K-22-S-13 support. Use two K-28 hexagonal bolts, two K-51 washers and two K-21 nuts for proper assembly. Pass the hexagon bolts and washers through the prepared holes, and then fasten them with the nut on the opposite side. NOTE: The frame should always be fitted to the lowest hole in the support and the top hole in the rafter.



FIG.7. Mounting the longer arm to the rafter and support (view I)



v1.1

Page 8 of 16

WWW.B2B.KENO-ENERGY.COM



FIG.8. Mounting the longer arm to the rafter and support (view II)

9. Tighten the prepared structure to a torque of 30 Nm.



v1.1

Page 9 of 16 WWW.B2B.KENO-ENERGY.COM

10. Prepare the aluminium mounting profiles. Connect them in a quantity corresponding to the length of the entire structure. Leave a few centimetres of space for potential adjustments. To maintain continuity of the profiles, use the K-02 connector at the joints by placing it over the ends of two adjacent profiles. Fasten the connector using the two K-19 "T" bolts (Fig. 9). The profiles can be cut to the required length.

NOTE The minimum useful length of the profiles in the structure is 500 mm.



FIG. 9. Mounting the K-02 connector to the K-25 profile

**11.**The K-02 connectors must not be mounted in a straight line.



FIG.10. Incorrect mounting of the K-02 connectors





12.03.2025

v1.1



Page 10 of 16

WWW.B2B.KENO-ENERGY.COM

**12.** In the next step, the pre-assembled K-25 profiles should be bolted to the K-22-S-15 rafters using the K-19 "T" bolts and the K-21 nuts (Figs.12-13).





WWW.B2B.KENO-ENERGY.COM

**13.**The spacing between the consecutive load-bearing profiles must be within the mounting zones of the respective module (see module mounting manual). Select the appropriate holes, aligning the rows of profiles on the rafter beam.



FIG.14. Spacing of the K-25 profiles

# 14. Tighten the prepared structure to a torque of 30 Nm.



v1.1

Page 12 of 16 WWW.B2B.KENO-ENERGY.COM

**15.**Mount the K-04 insert in the specially designed channel. It can be mounted in any freely selected place.



FIG.15. Mounting the K-04 insert to the K-25 profiles

v1.1



Page 13 of 16 WWW.B2B.KENO-ENERGY.COM

16. Next, insert the K-06 end clamps into the first beam along with the K-18 Allen bolts. The first and last clamp will always be the end clamp, stabilising the edge of the first and last row of modules. The middle clamps will stabilise the sides of two modules. A properly selected end clamp will have a height equal to the thickness of the module, and the Allen bolts will be 10 mm shorter than the thickness of the module. The middle clamps are universal and fit any module thickness.

NOTE: Ensure the weight of the modules is evenly distributed across the entire structure.



FIG.16. Mounting the modules and the K-05 and K-06 clamps

# 17. Tighten the clamps with a torque of 18Nm.



v1.1

Page 14 of 16 WWW.B2B.KENO-ENERGY.COM

# 18. Mounting braces

Optionally, one can mount braces in the form of the K-01 profile to the rear of the structure in the specially prepared openings, with one brace in the lower and one in the upper part of the support, using the T-bolt K-19 mounted in the profile's designated channel and a K-21 nut. Braces should always be placed on both the left and right side of the table (Fig.20).

Note: Cut off the excess, leaving 10 mm of the profile extending beyond the support.



FIG.17. View of braces mounted to the K-22-S-13 supports



FIG.18. Mounting the K-01 profiles (view I)



FIG.19. Mounting the K-01 profiles (view II)



v1.1

Page **15** of **16** 



FIG.20. Overview of the assembled structure

# Thank you for choosing a KENO Sp. z o.o. product



v1.1

Page **16** of **16** 

WWW.B2B.KENO-ENERGY.COM