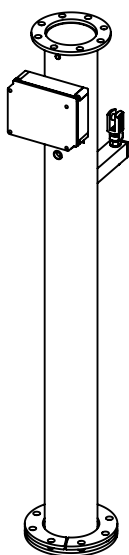
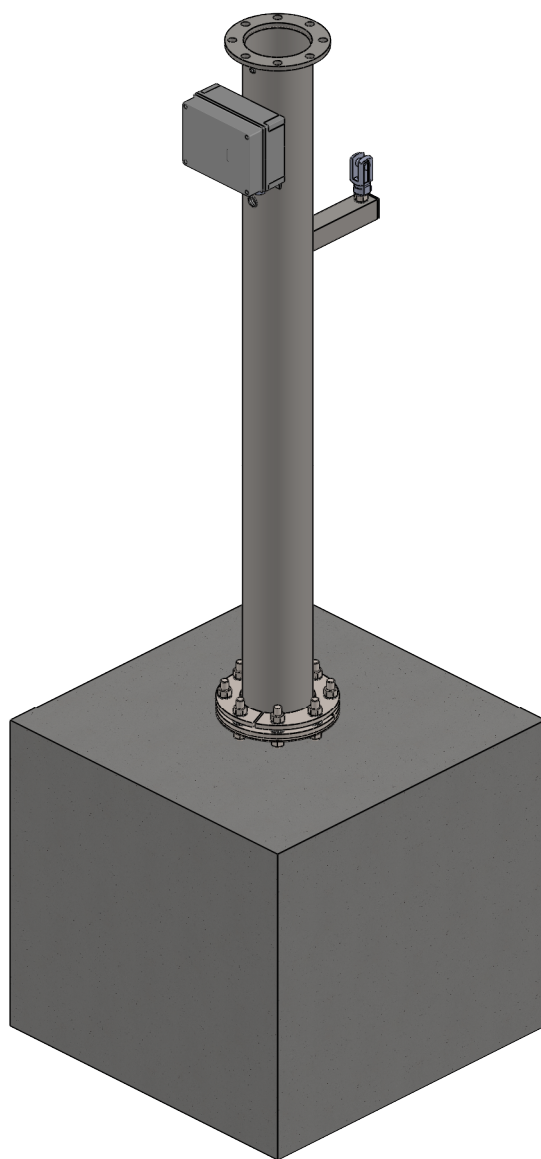


# HELIOMOTION

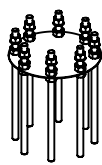
## QUICK ASSEMBLY GUIDE PV-4



# PART I - FOUNDATION



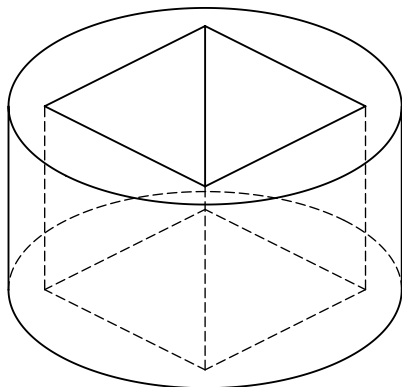
1x



1x

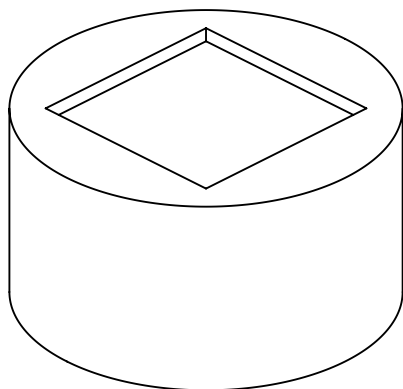
# Soil foundation

1



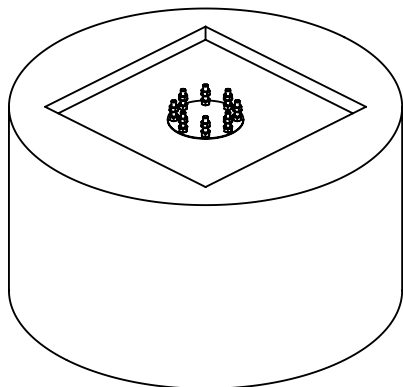
Make a hole for the concrete at your chosen location. The hole for a PV-4 should be at least 70x70 cm, 80 cm deep (~400 liter).

2



Fill the hole with concrete up to a few centimeters below ground level.

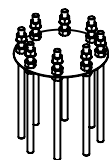
3



Push the rod unit into center of the concrete and let the flange rest on top of the concrete. Use a spirit level to align the flange horizontally.

Allow the concrete time to harden before assembling the remainder of the power plant. The concrete can be covered with sand after it has cured for 2 weeks.

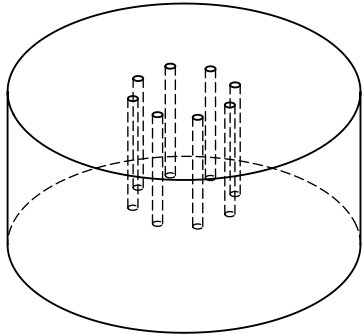
Rod unit



1x

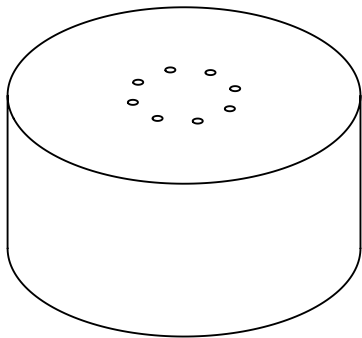
# Bedrock foundation

1



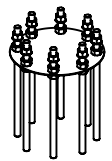
Drill eight holes vertically into the bedrock using the rod unit as a template. Make the holes 20 mm wide and 250 mm deep. Use compressed air to remove any debris and water from the holes to ensure a clean bonding surface.

2

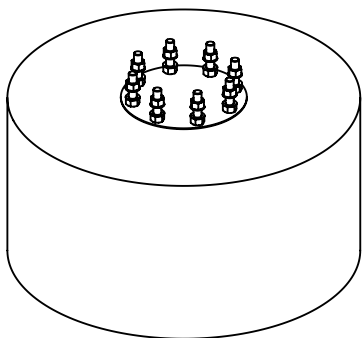


Make sure the rod unit fits well into the holes.

Rod unit



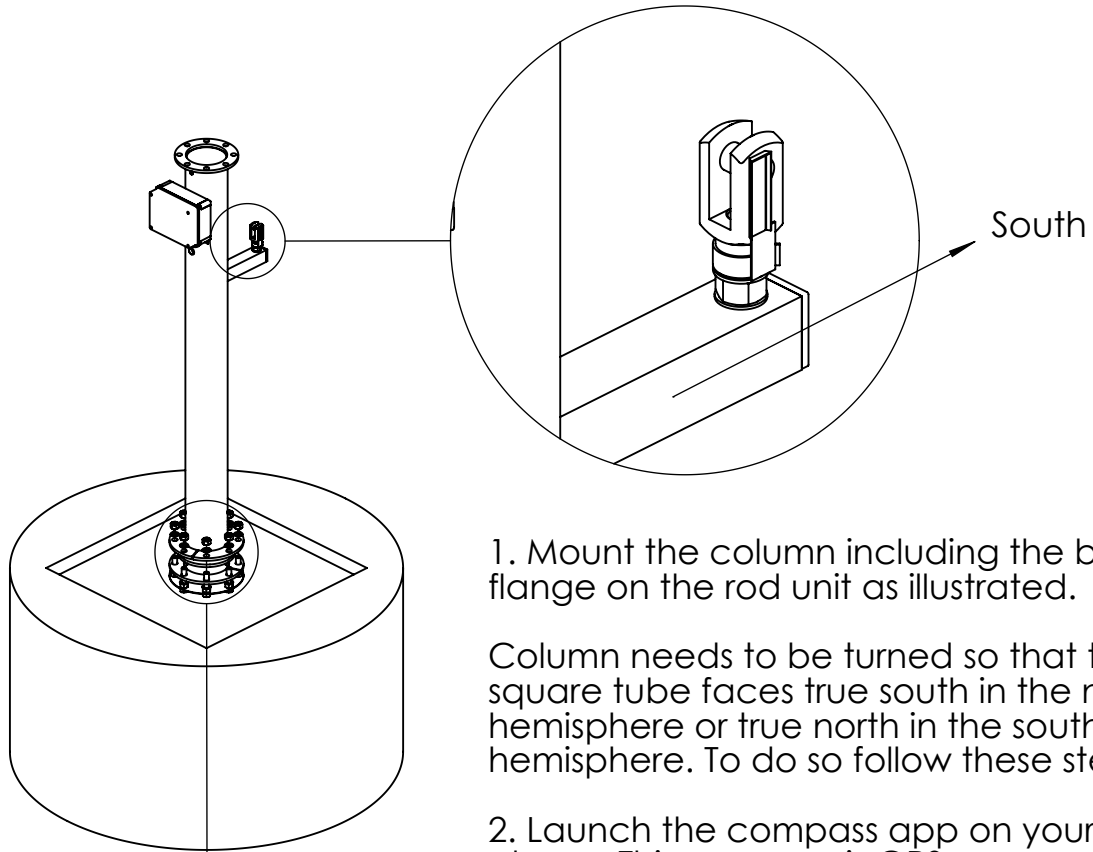
3



Fill the holes 2/3 full with chemical anchor adhesive (400-500 ml). Push the rod unit into the holes and give the adhesive time to cure before continuing the assembly.



# 4



1. Mount the column including the bottom flange on the rod unit as illustrated.

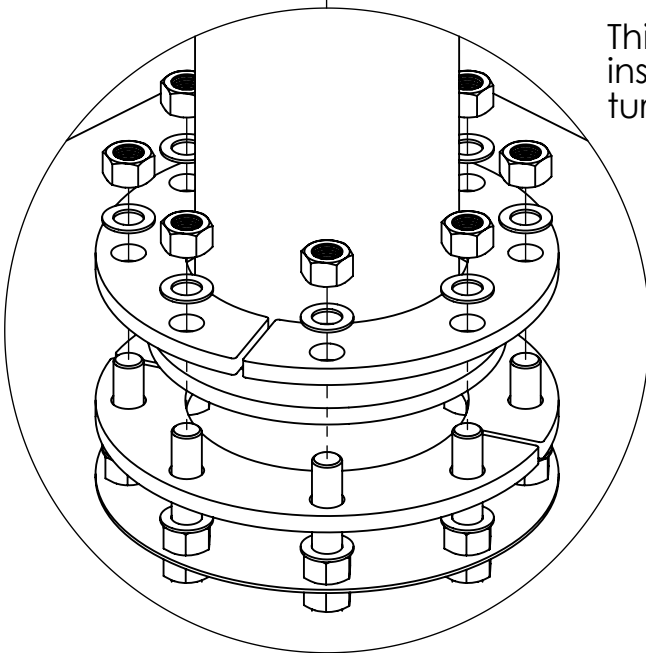
Column needs to be turned so that the square tube faces true south in the northern hemisphere or true north in the southern hemisphere. To do so follow these steps:

2. Launch the compass app on your smart phone. This compass is GPS compensated, making it more accurate than a regular compass.

3. Align the phone to true south (or north) according to the compass.

4. Rotate the column so that the edge of the tube lines up with the edge of the phone. Make sure the compass is not distorted by being too close to any metal objects.

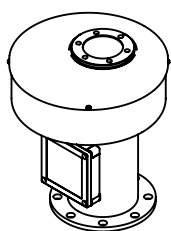
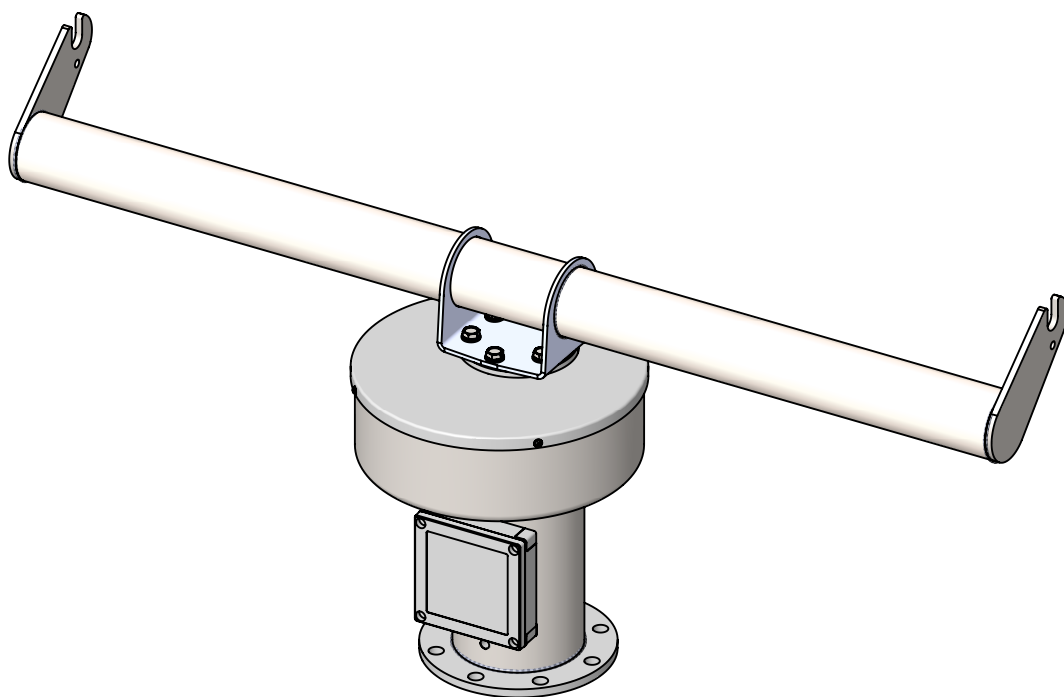
This alignment can be fine-tuned after the installation is complete and the tracker has turned towards the sun.



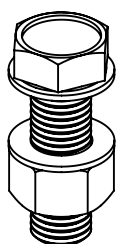
5. Adjust bottom nuts to horizontally align the column's upper flange using a spirit level.

6. Tighten top nuts and then bottom nuts to secure the column.

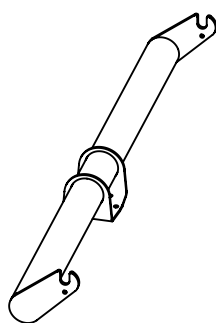
## PART II - TRACKER



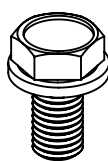
1x



4x

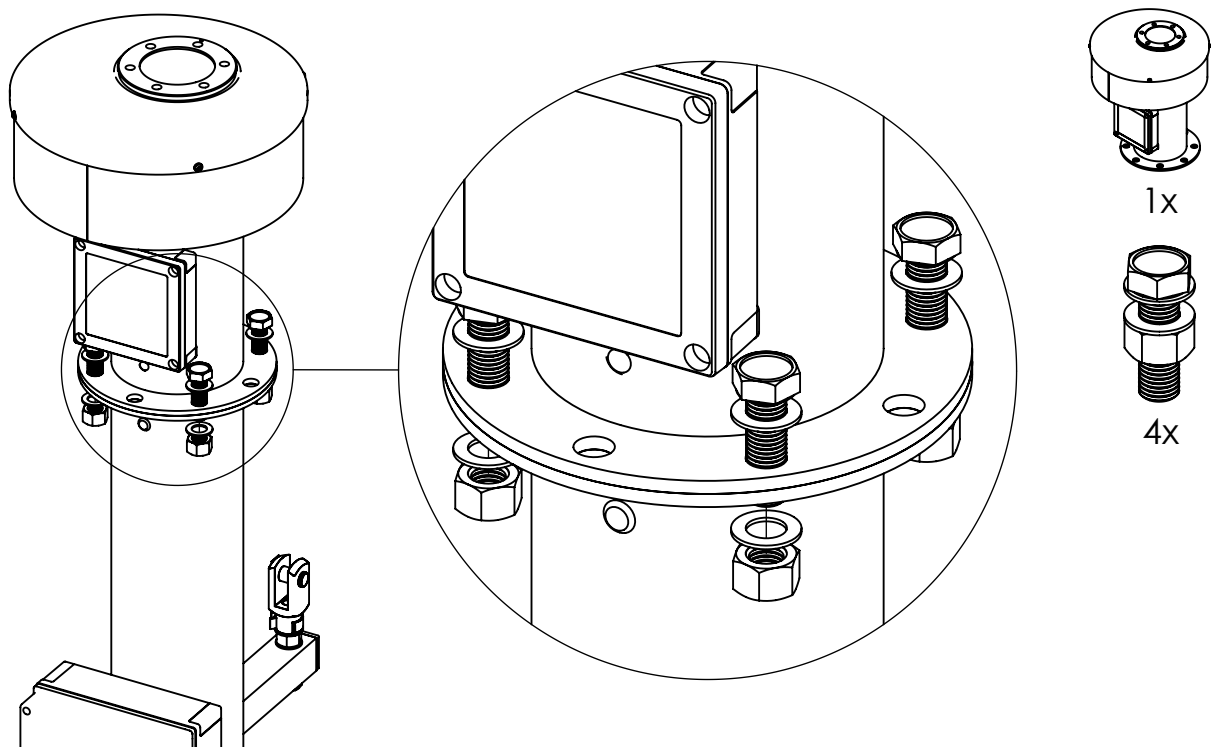


1x

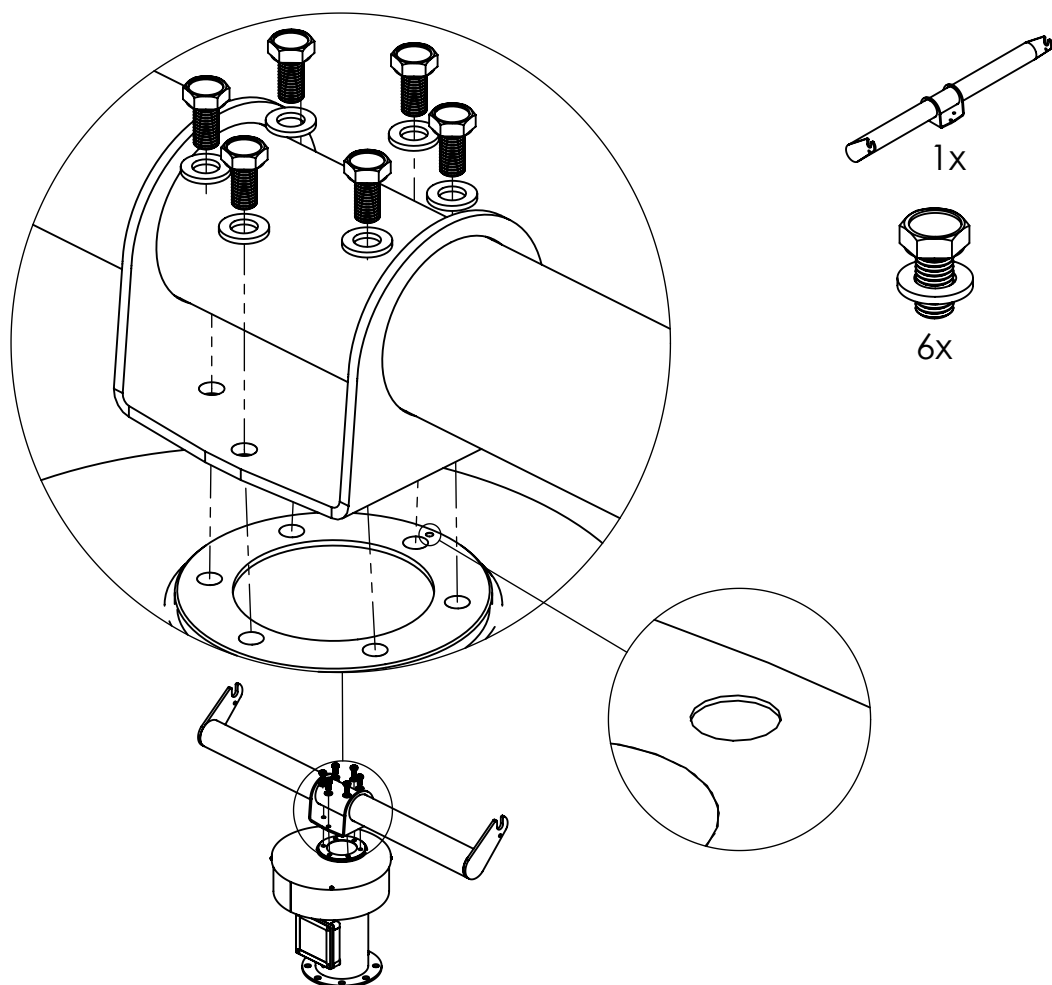


6x

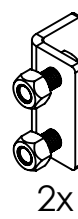
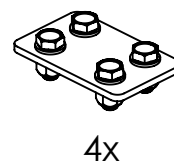
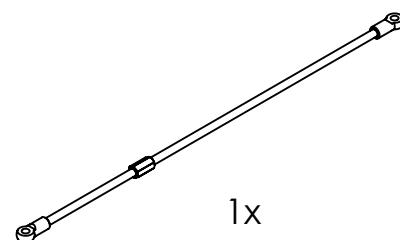
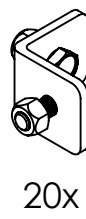
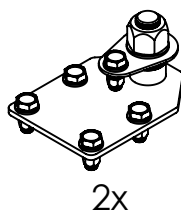
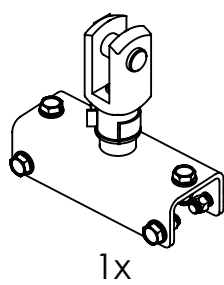
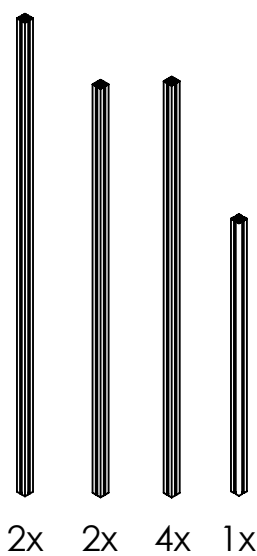
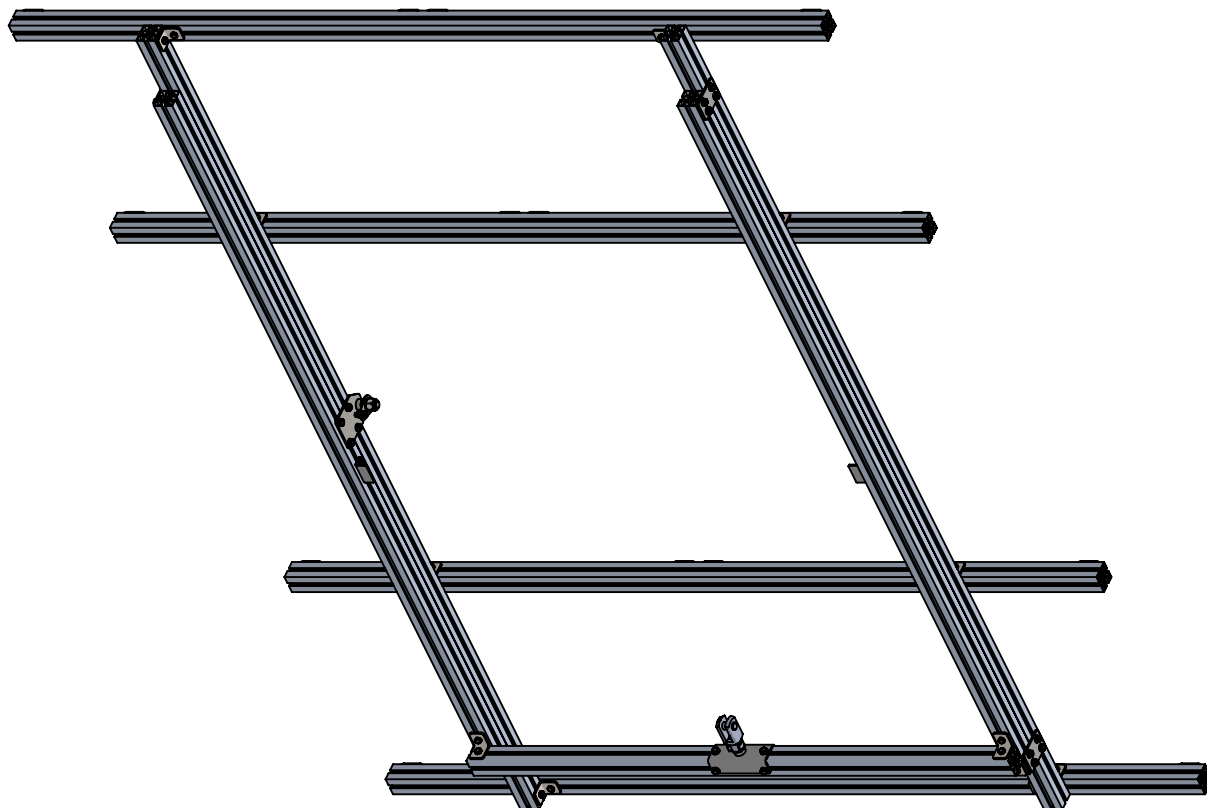
1



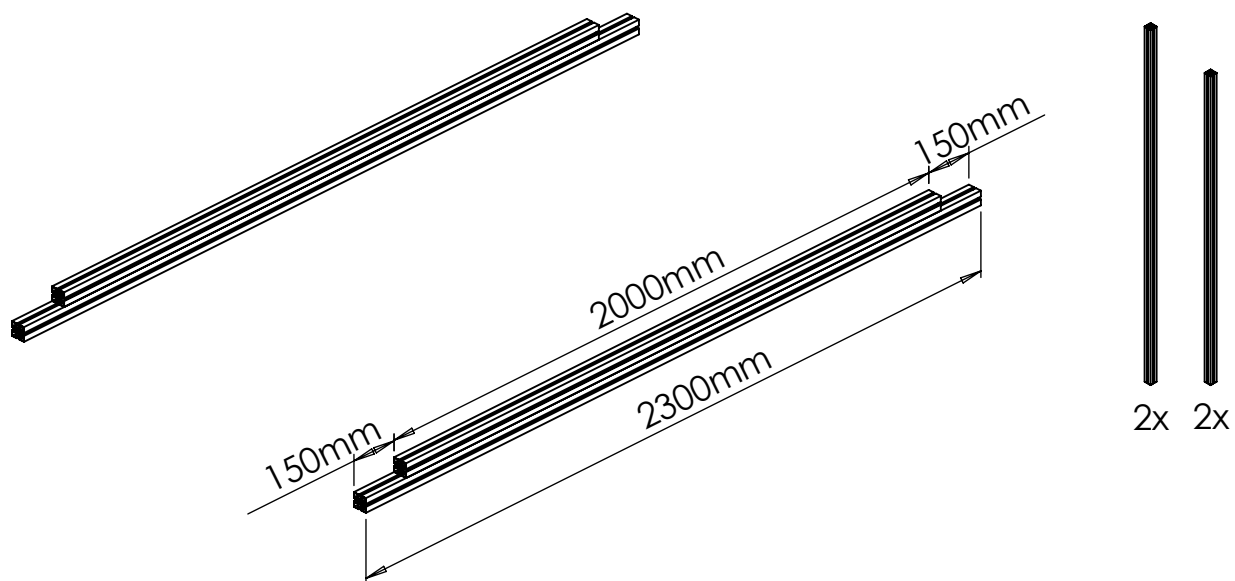
2



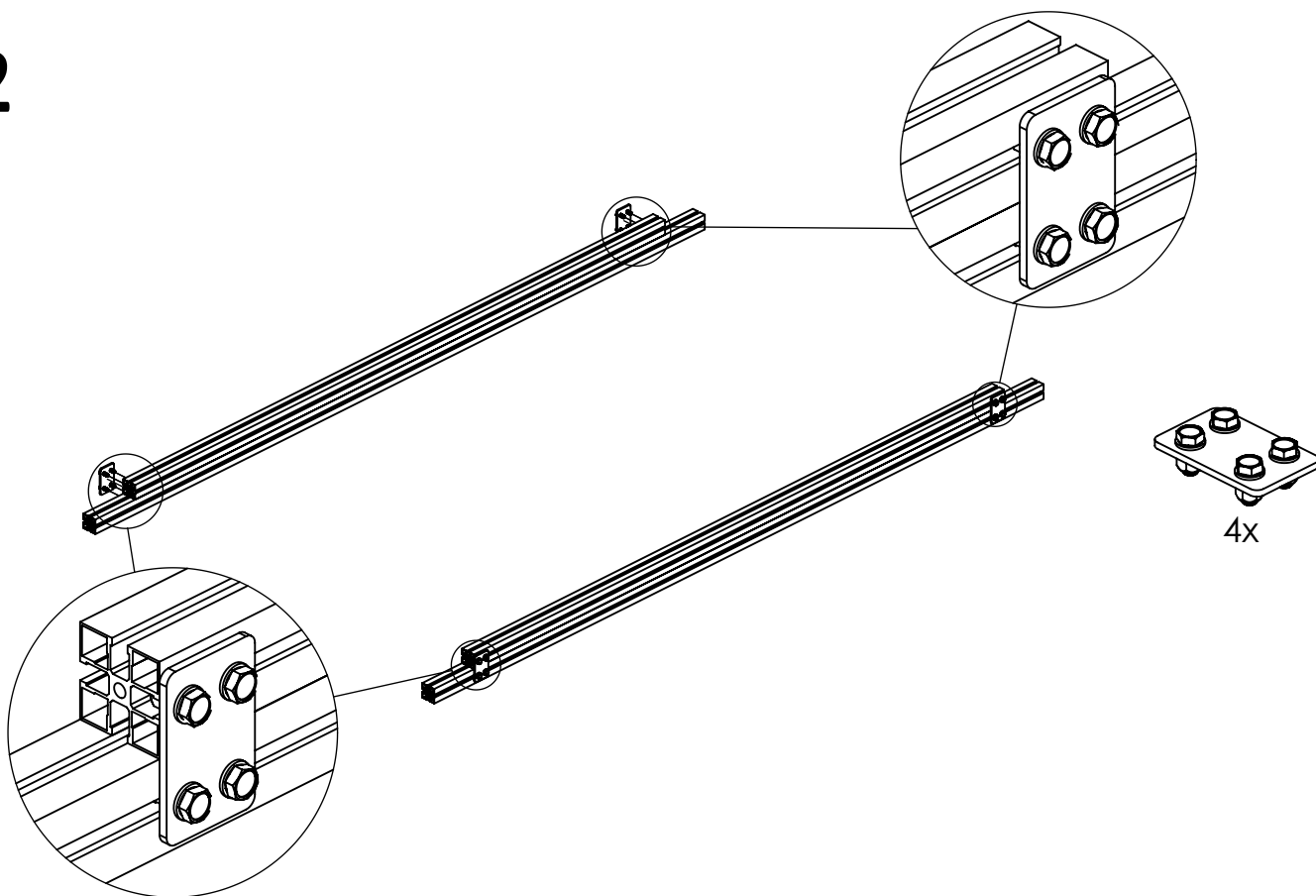
# PART III - FRAMEWORK



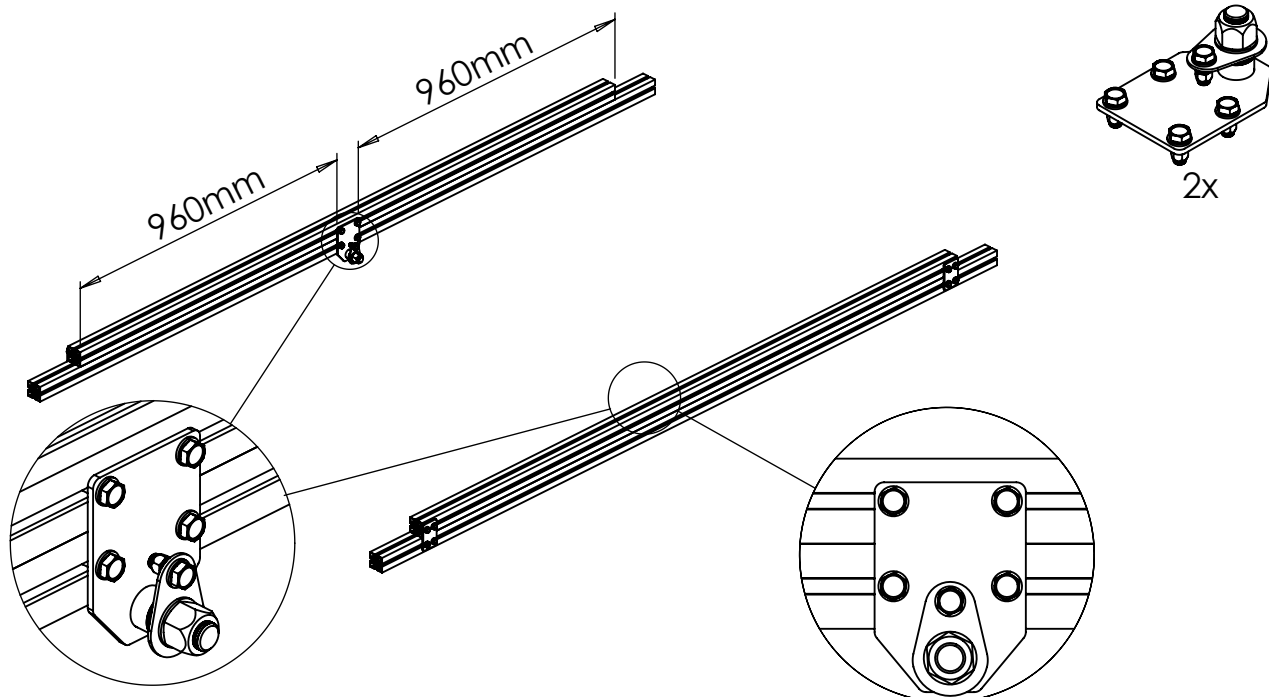
1



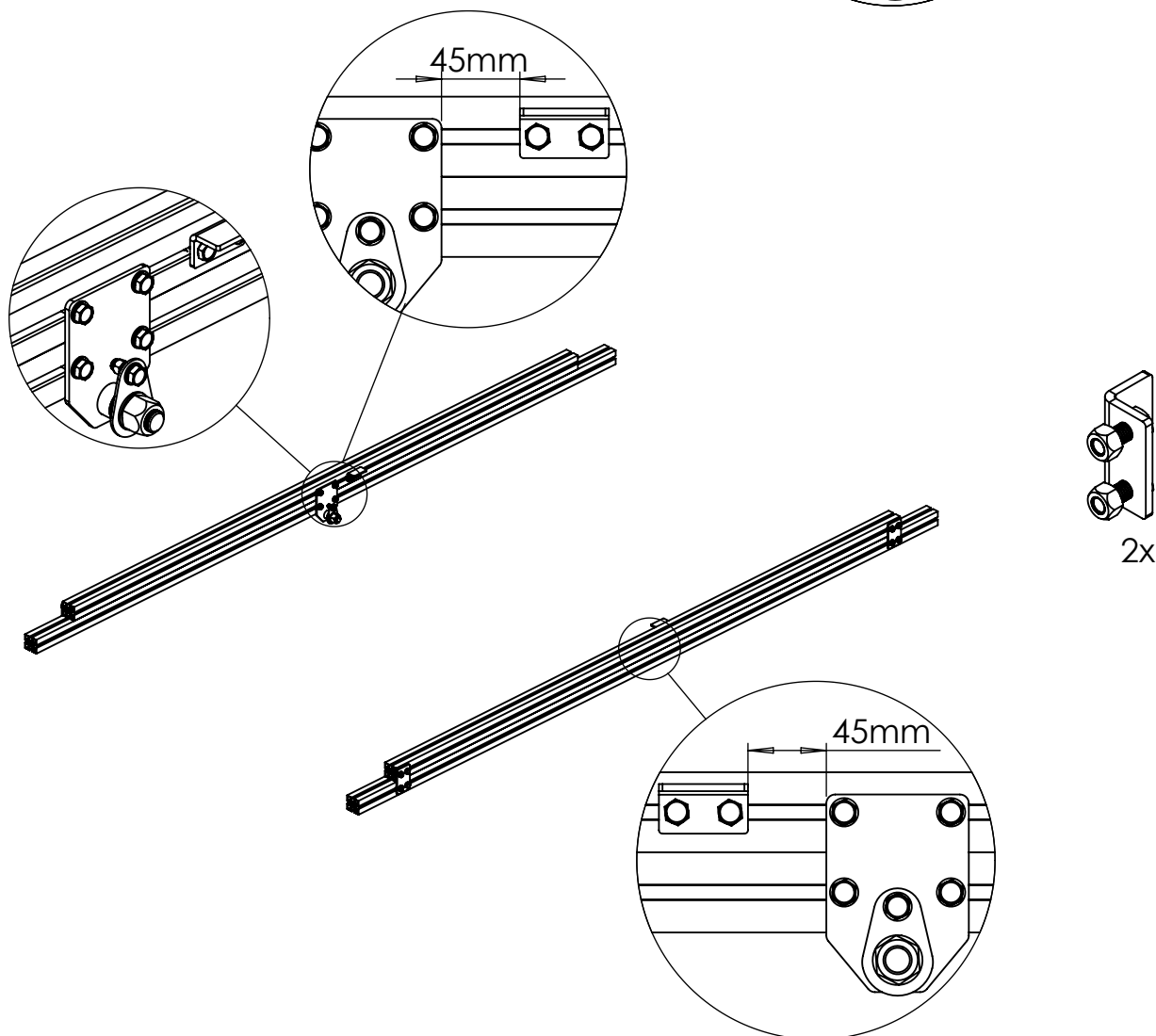
2



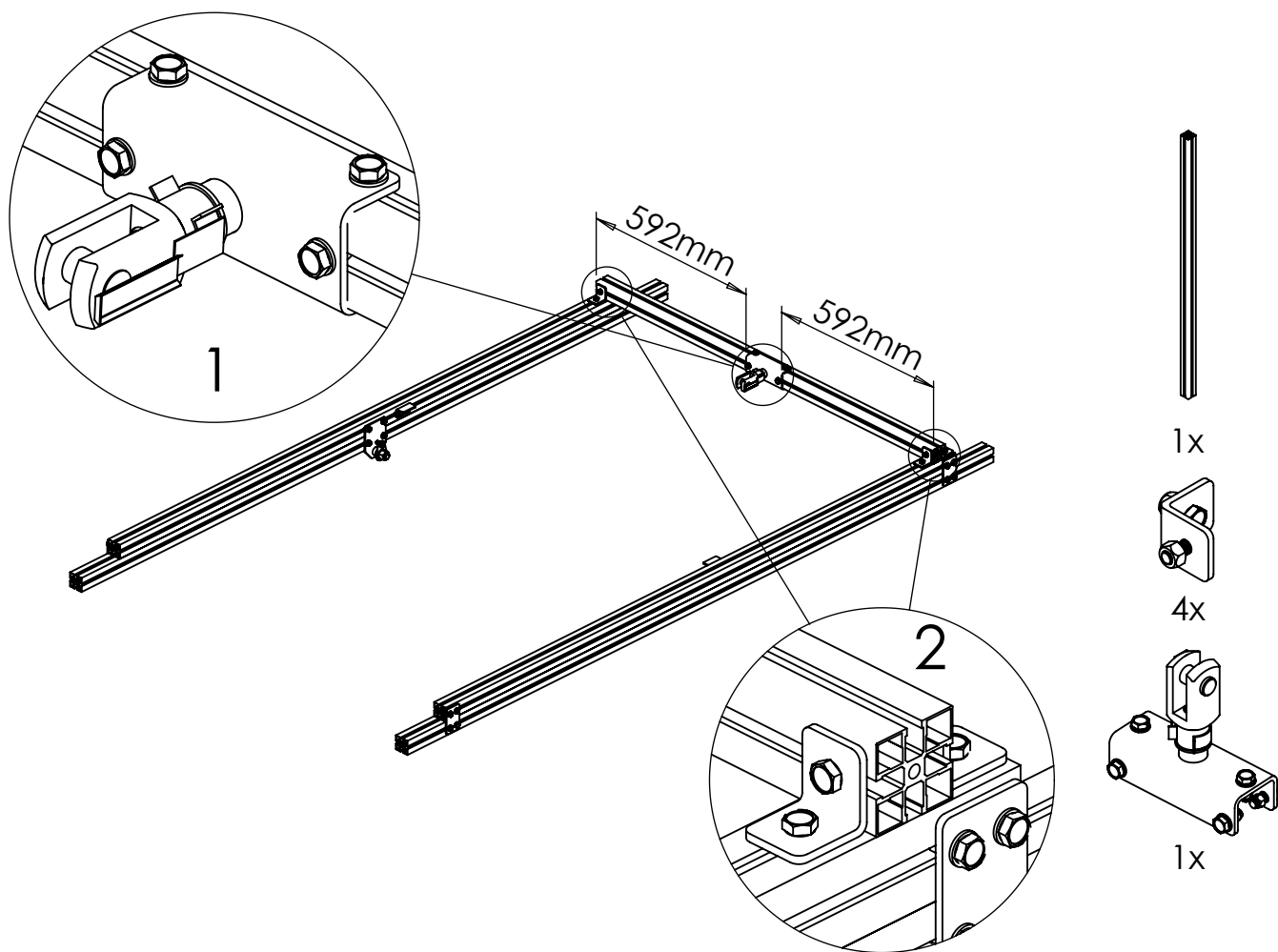
3



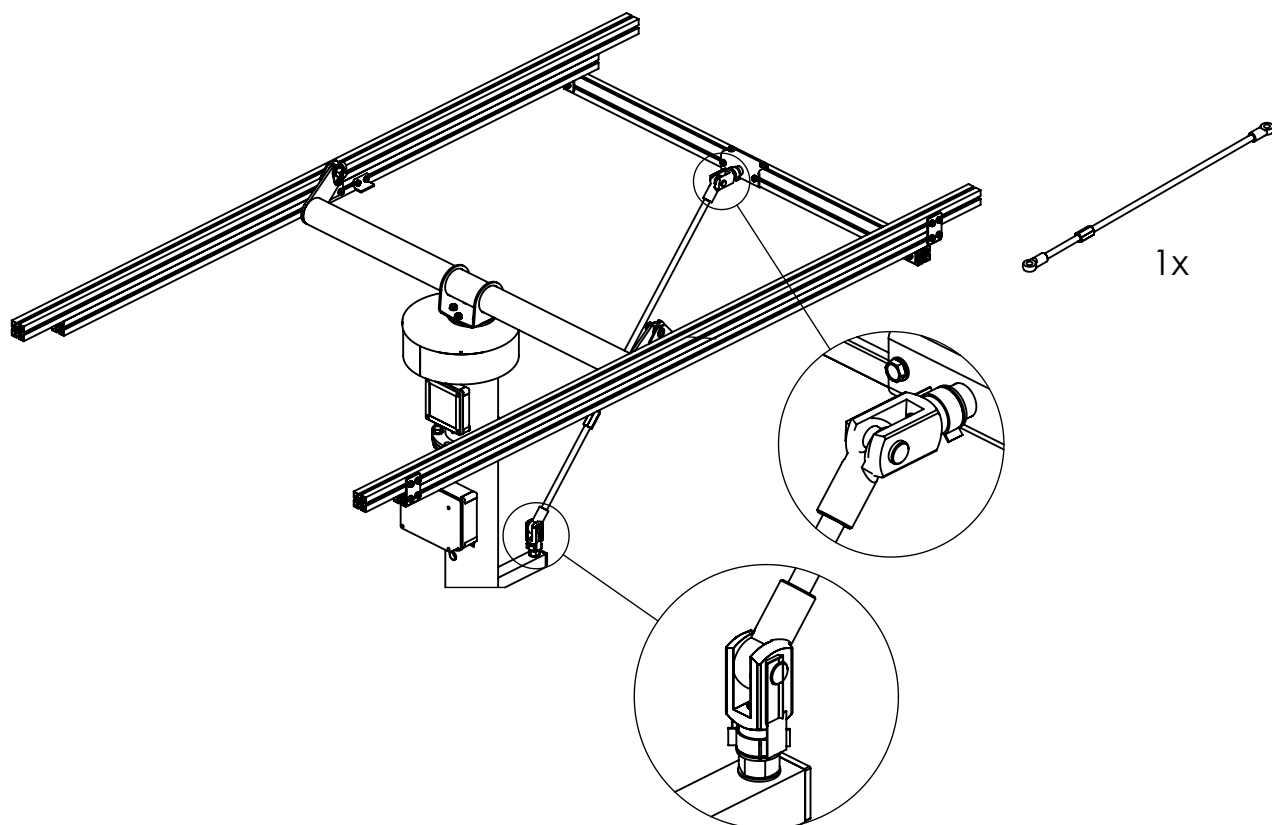
4



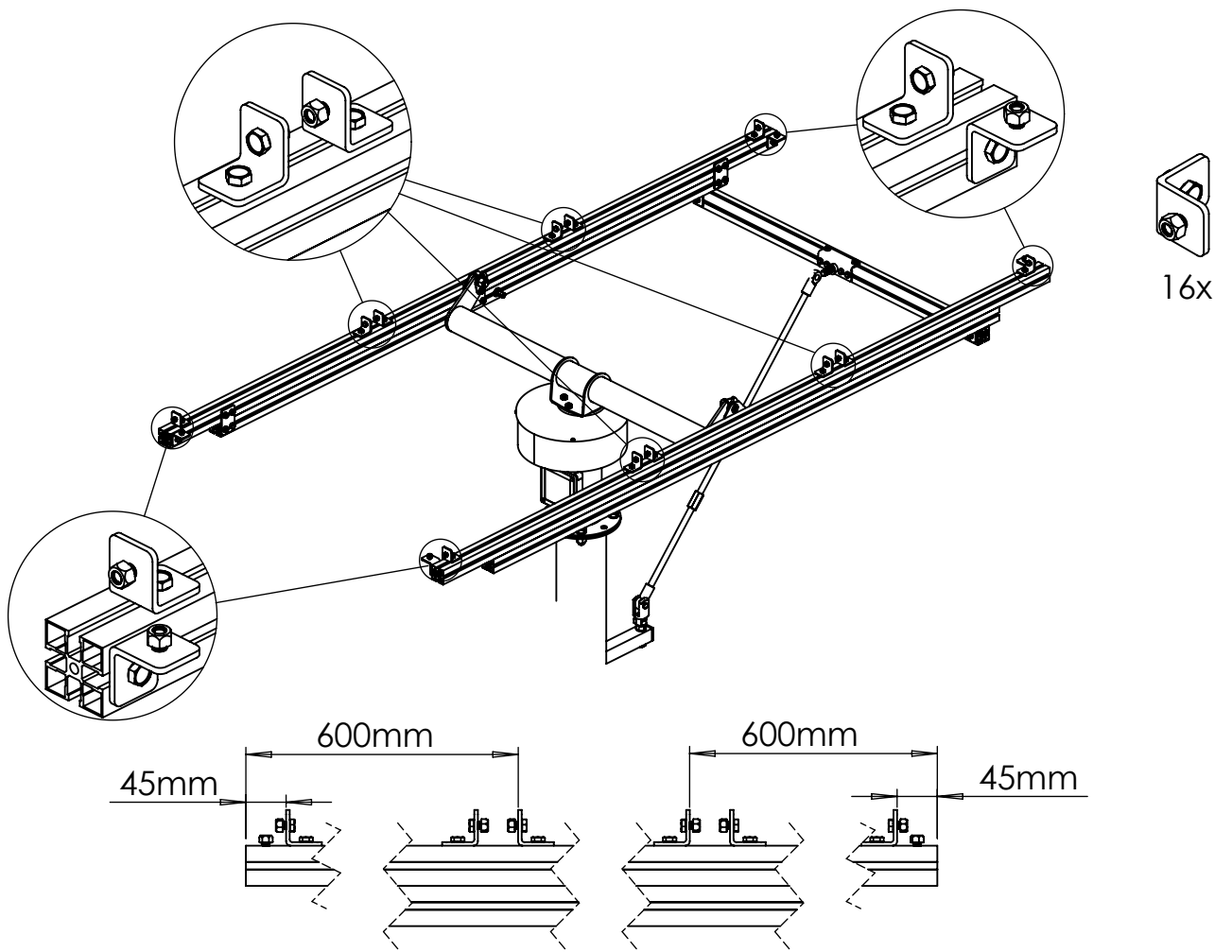
5



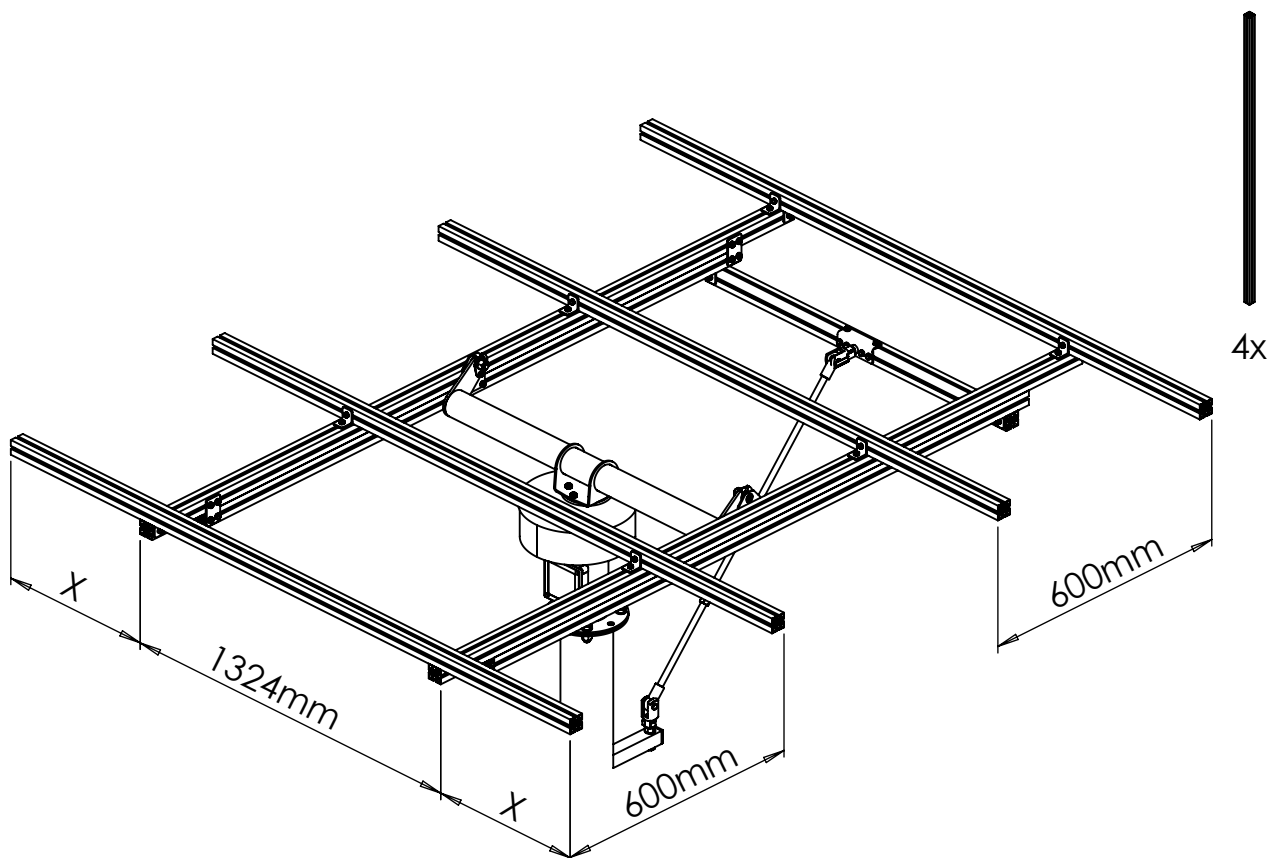
6



7



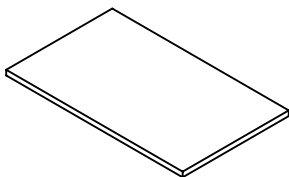
8



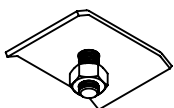
$$X = (\text{Panel width} * 2 - 1324) / 2$$



# PART IV - PANELS



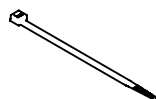
4x



16x

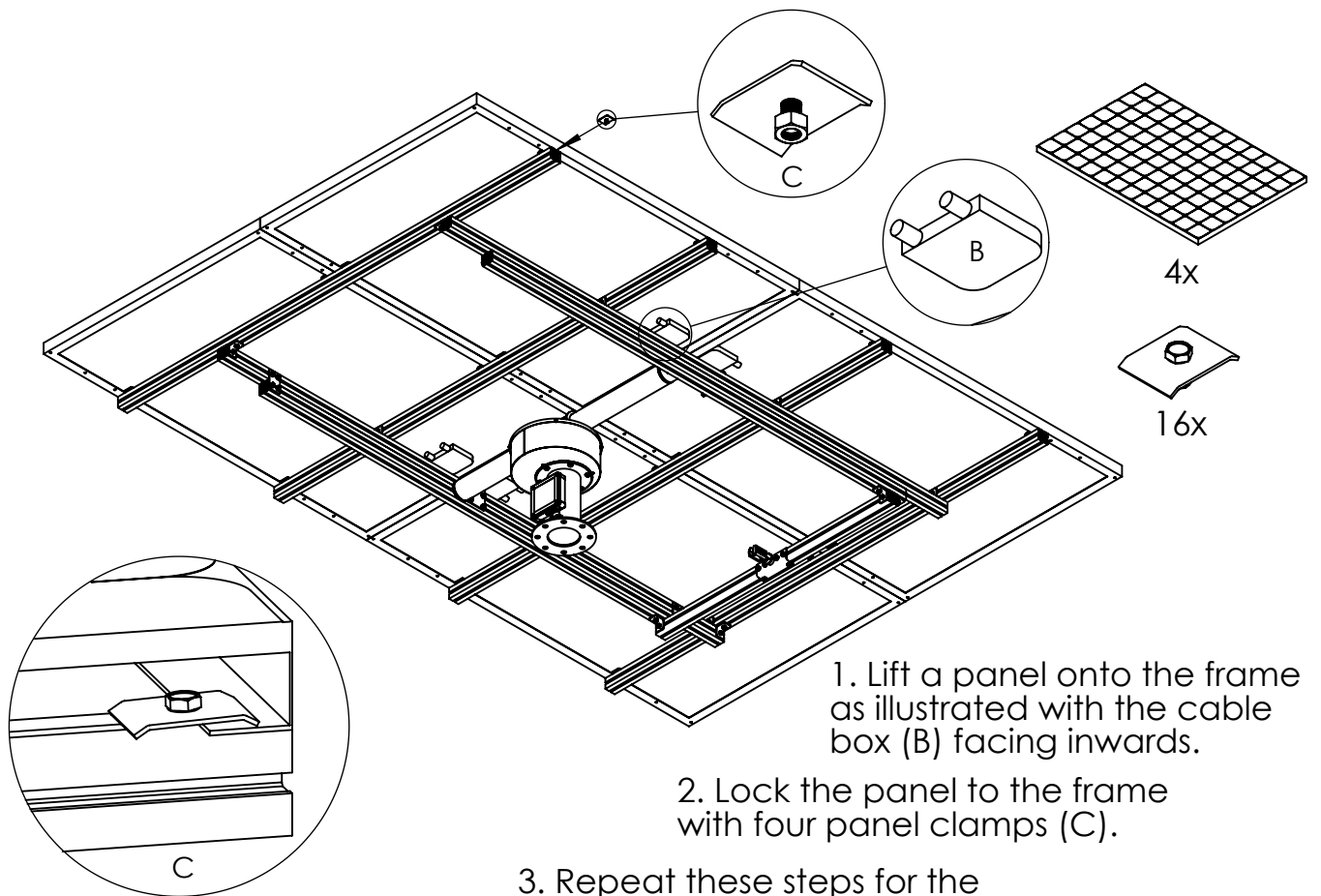


10x

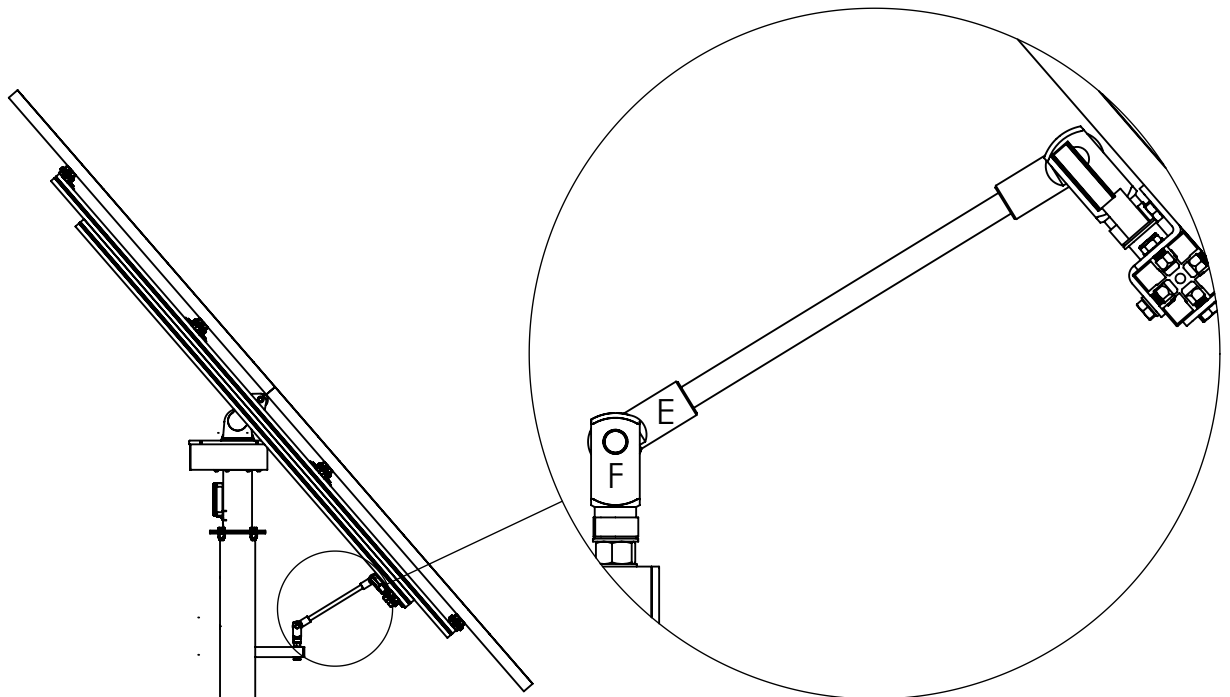


10x

# 1



# 2



Remove the extension rod and attach only the black angle rod. Make sure to prevent the panels from swinging downwards when changing the rod.

Leave both fork joints (F) and one of the clevis eye mating pieces (E) unscrewed half a turn to allow for full range of movement.

Make sure to bend both retaining pins so that the fork joint bolts are held in place.

# 3

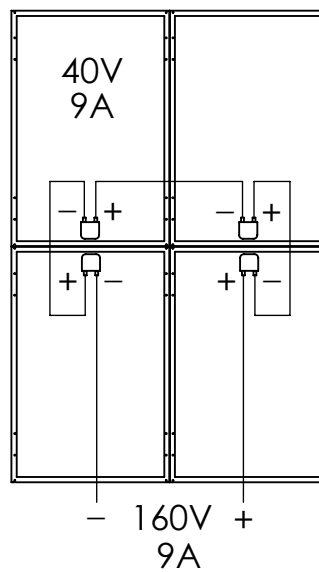
1. Attach PV cables to the frame using cable ties and self-adhesive clip anchors.

2. Have the electrician connect the PV cables together according to application. Standard applications are listed below.

## String inverter

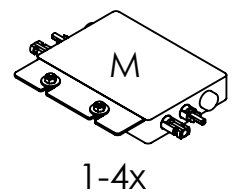
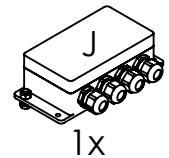
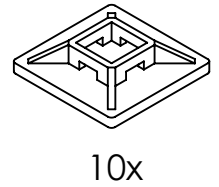
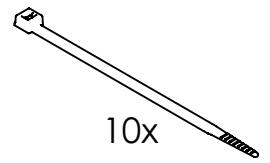
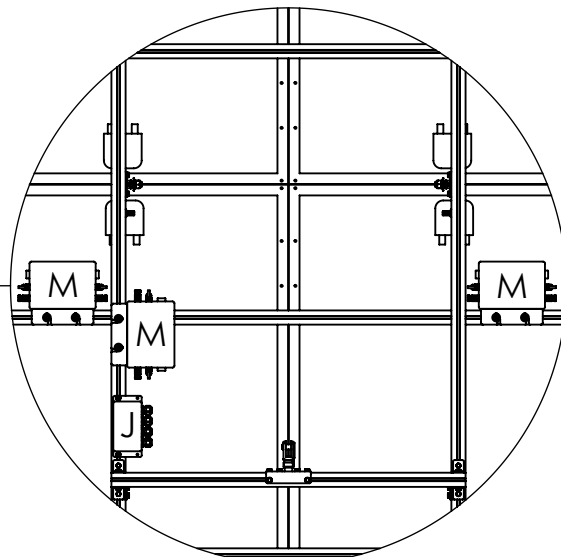
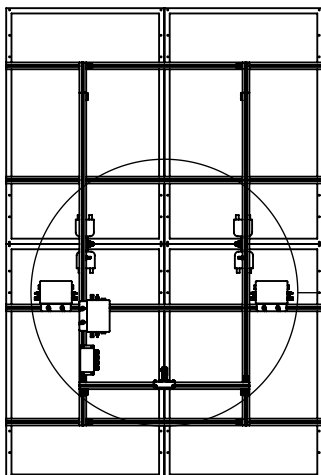
Grid-tied string inverters generally supports a high voltage PV input. Therefore, all 4 panels are typically connected in series when using a string inverter.

### Series

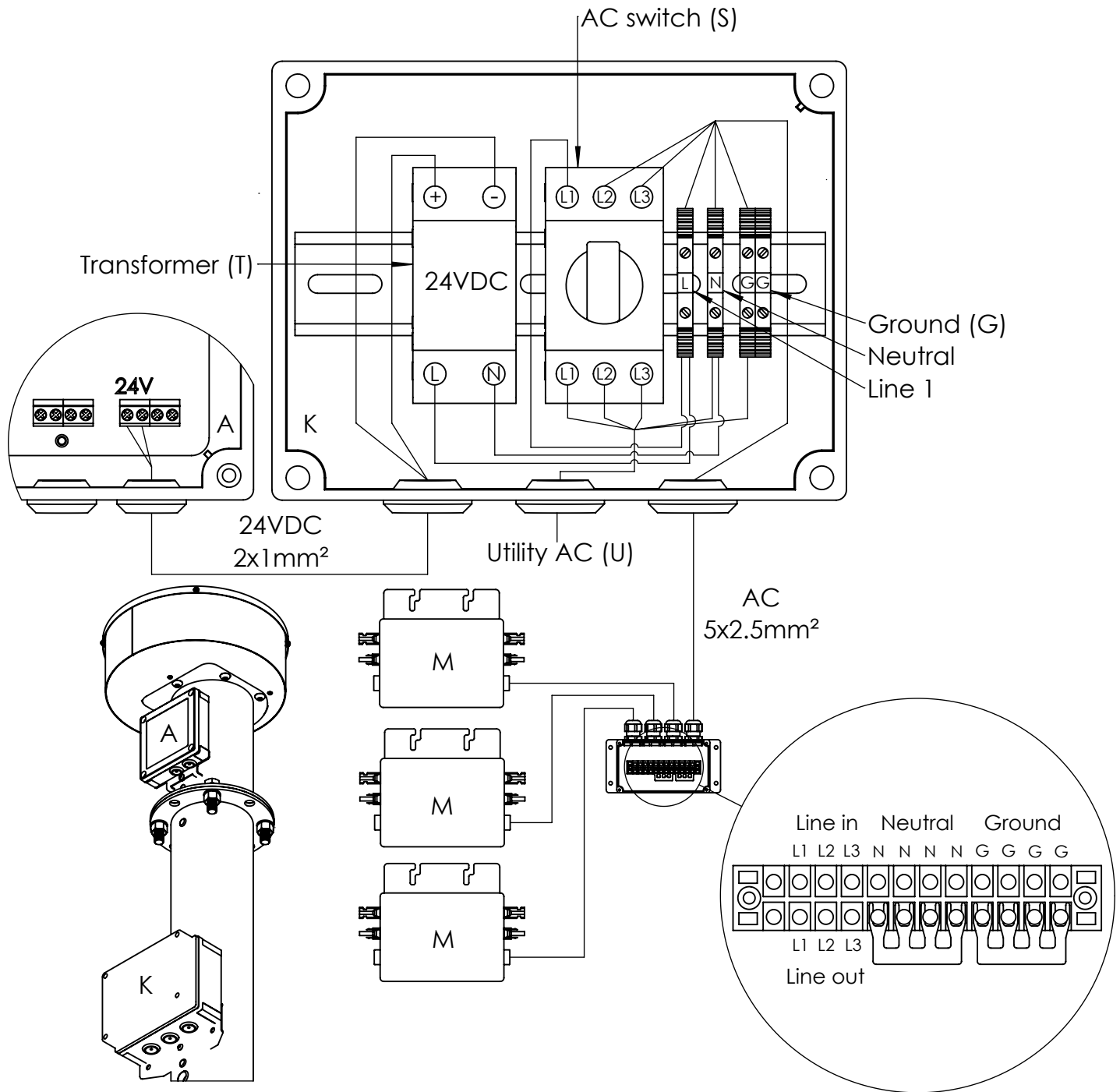


## Microinverter

Grid-tied microinverters typically have 1, 2 or 4 PV inputs. Mount the microinverters (M) and a junction box (J) similar to the illustration below, so that they are easy to connect to the panels.



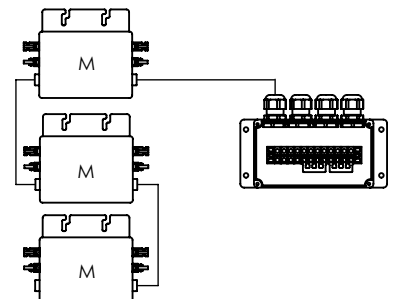
# Grid-tied system with microinverters



The PV solar panels, microinverter (M) and utility AC (U) must be connected by a certified electrician. However, preparation work may be done by a layman as long as local code requirements are followed.

AC wires must be at least 1.5mm<sup>2</sup> thick and use an outdoor cable. Be mindful of the AC labels and wire colors: Neutral (N) is blue, Phase 1 (L1) brown, Phase 2 (L2) black, Phase 3 (L3) gray and ground (G) green-yellow.

If using a 1-phase system the electrical wiring can be simplified by connecting the microinverters together as illustrated here.



# Grid-tied system with microinverters

1. Acquire an outdoor underground cable long enough to reach from the junction box (K) on the column to the nearest fuse box inside the house. A 1-phase system needs a cable with two wires plus a surrounding shield (1-phase cable), whereas a 3-phase system needs a cable with four wires plus the shield (3-phase cable). The thickness of the wires should be at least 2.5mm<sup>2</sup> for cable lengths up to 40 meter or 6mm<sup>2</sup> for cable runs up to 100 meter. Indoor cable sections can use an indoor cable of the same size and with the same number of conductors. Please consult your electrician for the exact cable to use according to local code requirements.

2. Wire the cable from the junction box (K) to the fuse box. A strong string can be used to pull the cable up through the bottom of the column and out of the hole beneath the junction box. It is recommended to pull underground sections through a cable duct. The duct needs to be buried so that the top of the duct is 35 cm below ground. If the cable runs over bed-rock it needs to be protected by a strong hose (or a metal U-profile).

3. Make sure that all cable sections above ground are properly attached and protected so the cable cannot be accidentally moved or damaged. Sections coming out of the ground need to be protected by for example a metal U-profile.

4. Fill out and attach the included self adhesive warning labels. These labels need to be provided near the solar installation, the fuse box, and the utility meter, to indicate the presence of on-site generation and the placement of the AC switch (S).

Contact a certified electrician and have them inspect the installation and carry out the remaining tasks.

1. Make the electrical connections as illustrated on the previous page.

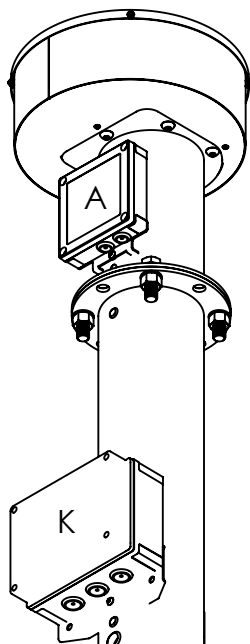
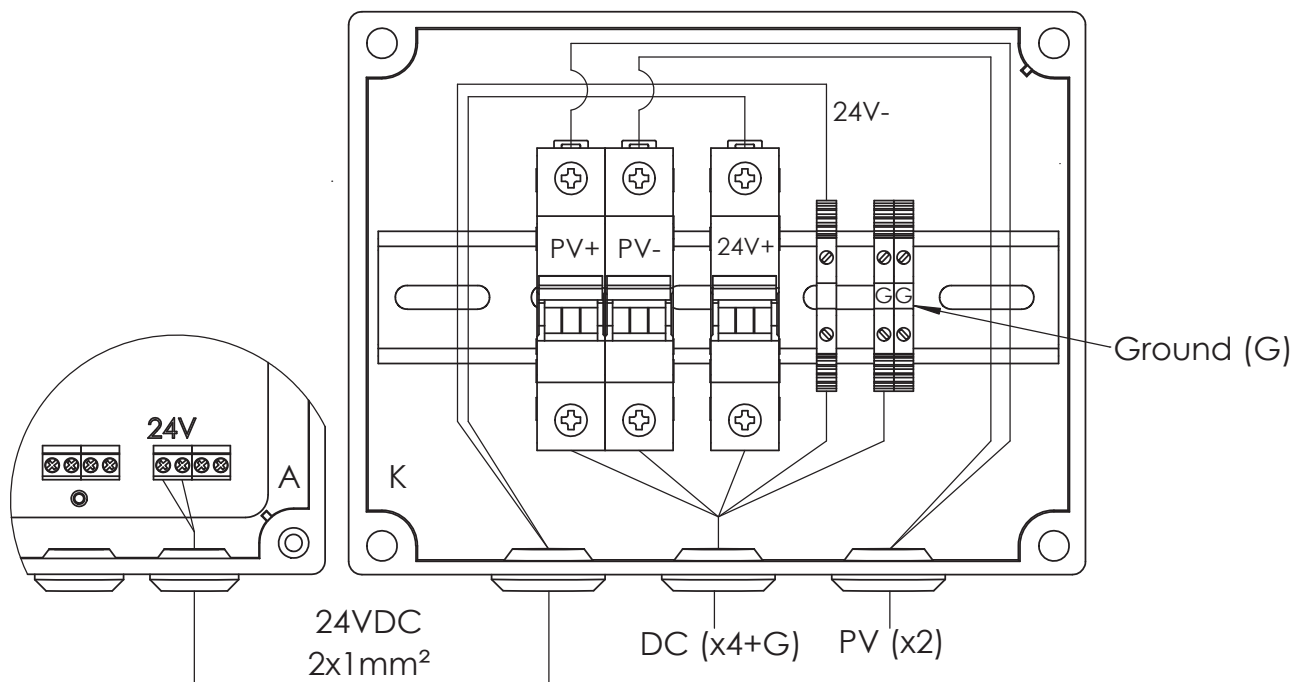
2. Connect the AC cable to the selected phase(s) through fuse(s) in the fuse box.

3. Connect the solar panels to the PV input terminals of the microinverters.

4. Turn on the AC switch (S) in the junction box to power the inverter(s) and solar tracker. It takes a few minutes for the tracker to find a GPS signal before it start to track the sun.

5. Check the status lights on the inverter(s). When a solar panel is connected its LED becomes red. When the AC side is connected and powered the LED starts blinking red. Grid feed-in starts after about 30 seconds during sunshine indicated by the LED either blinking green (optimizing output) or being continuously green (output optimized).

# Grid-tied system with string inverter



If the string inverter and 24VDC transformer is placed away from the solar installation the junction box (K) can be wired as shown above.

If the string inverter is placed on the column of the solar installation the 24VDC transformer can be added to the outdoor junction box (K) along with AC breakers.