Sezibwa rooftop solar: panel layout and installer brief

For: the Green Volta installers and the NFE site team. **Owner:** Aaron Tushabe. **Last reviewed:** 21 Oct 2026. **Status:** proposed. The layout was worked out from satellite imagery, so do the site checks below before drilling.

The plan

- **What:** 8 × Golden Sun GS600N-144M (600 W, 2278 × 1134 mm, 30 kg each), 4.8 kWp in total, from the Muden quote.
- **Where:** the long north-west-facing face of the house at about **0.36236, 32.53602** (Nansana). The pin 0.36245, 32.53592 lands on the neighbour's roof about 15 m to the north-west.
- **How:** one row in portrait (long side up the slope), split into **two groups of 4 with a 1.5 m gap** around a vent or flue. The top edge sits about 0.4 m below the ridge. Flush-mounted at the roof pitch.
- **Wiring:** all 8 panels in **one series string into PV1** of the SRNE ASP48120SH3. PV2 stays free.

Satellite layout: 8 panels on the NW roof face

Rails, clamps and string wiring drawing

Why this roof face

At 0.36° N the sun is close to overhead all year, so the direction a face points makes little difference:

Roof face	kWh per year	Worst month (kWh/day)
North-west (chosen)	**6,780**	**16.8 (Nov)**
South-west	6,770	
South-east	6,660	15.7 (Jun)
North-east	6,640	

PVGIS (SARAH3 data, 2005 to 2023), 20° pitch, 14% system losses, no tree shade.

The trees decide it. Tall trees stand against the north, north-east and east sides of the house, and big trees to the south and south-west. The north-west face looks away from most of them. All 8 panels are on one string, so shade on one panel pulls down all 8. The north-west face also gives the steadiest output through the year.

Site checks before drilling

Roof words used in the site checks

Words used in these checks

Word	What it means	How to check it on site
Ridge	The top line of the roof, where the two roof faces meet.	
Eave	The bottom edge of the roof, where the gutter is.	
Roof face	One sloping side of the roof. Ours is the side facing the alley (north-west).	
Pitch	How steep the roof is, in degrees.	Lay a phone level app on the sheet, pointing up the slope. Or use a 1 m level and the table in picture 4.
Face depth	The distance from the eave to the ridge, measured along the sheet (following the slope, not on the ground).	Run a tape up one rib from the gutter edge to the ridge. It must be at least 3.0 m.
Purlin	Wooden strips under the iron sheets, running the same way as the ridge. The sheets are nailed to them, and the L-feet must screw into them.	Each straight row of roofing nails across the roof is a purlin. Measure the gap between rows (picture 2).
Rafter	The sloping timbers under the purlins, running from eave to ridge.	Look inside the roof space if you can, and check for rot or termite damage.
Crest and valley	The high ribs and the low channels of the corrugated sheet.	Drill only through a crest. Rain runs down the valleys (picture 3).

☐ **Vent or flue.** Satellite shows two dark marks about halfway along the face, roughly 8.7 m from the north-east end. If nothing is there, close the gap between the groups to about 0.3 m (keep the two rail pairs separate) and centre all 8 panels on the face.

☐ **Pitch.** Measure it and write it on this page. Anything from 10° to 25° is fine.

☐ **Face depth.** Eave to ridge along the slope must be at least 3.0 m (2.28 m panel, 0.4 m at the ridge, margin at the gutter). The satellite estimate is about 4.7 m.

☐ **Purlins.** Find their positions and spacing. Each rail has to sit on a purlin line.

☐ **Shade.**
- Stand at the array position at about 8 am, noon and 4 pm, or use a sun-path app.
- Trim the trees on the north, north-east and east sides and on the south and south-west sides to below ridge height.
- Check that the neighbour's roof (north-west, across the alley) is not higher than our ridge.

☐ **Roof condition.** Replace rusty or loose sheets and rotten timber under the array first.

☐ **Cable route.** Measure from the drop point to the inverter so the 6 mm² cable can be ordered.

Mounting

The hardware on the Muden quote matches this layout exactly: two 5.1 m rails per group of 4 portrait panels.

Item	Per group	Total	On the quote
Rail, 5100 mm	2	4	4
End clamp	4	8	8
Inter clamp	6	12	12
L-foot	6	12	12

- **Rail position:** rails run parallel to the ridge, about a quarter of the panel length (about 570 mm) in from the top and bottom edges, so about 1.14 m apart.
  - The panel datasheet does not give the clamping zone, so check Golden Sun's installation manual.
  - Move the rails within that zone so they land on purlins.
- **L-feet:** 3 per 5.1 m rail gives spans of about 2.25 m. Check the rail's span table. 4 per rail (about 1.5 m spans) is safer: that's 4 more L-feet, about 48,000 UGX at the quoted price.
- **Fixing:** fix the L-feet into the purlins, not just the iron sheet. Go through the crest of the corrugation, with EPDM washers and sealant.
- **Airflow:** leave about 100 mm under the panels. Cooler panels produce more.
- **Load:** about 240 kg of panels plus rails, spread over about 21 m².

Wiring: one string of 8 into PV1

	String of 8	SRNE ASP48120SH3, per PV input	OK
Open-circuit voltage	422 V at 25 °C, about 440 V on a cold morning	800 V max	✓

	String of 8	SRNE ASP48120SH3, per PV input	OK
Max-power voltage	359 V, about 310 V on a hot afternoon	200 to 650 V tracking range	✓
Current	13.4 A at max power, 14.0 A short-circuit	22 A max	✓
Power	4.8 kW	9 kW max	✓

The hot and cold figures assume typical n-type temperature coefficients (open-circuit voltage −0.27 %/°C, max-power voltage −0.30 %/°C), because the panel datasheet does not give them.

- **Two strings of 4 will not work.** They would run at about 155 to 180 V, below the inverter's 200 V minimum. The 4 + 4 split is physical only.
- **Panel to panel:** panels 1 to 4 connect directly with their 300 mm leads. A short jumper crosses the gap to panel 5, then panels 5 to 8 connect directly.
- **Return lead:** the string's + leaves panel 1 and its − leaves panel 8, so one lead runs back along the row (about 11 m).
  - Tie it under the panels along the lower rail.
  - Drop both leads at whichever end is nearer the inverter.
  - Keep + and − together all the way to the inverter. A small loop picks up less lightning surge.
- **Cable:** 6 mm² UV-rated PV cable (the 4 mm² was out of stock). Voltage loss over a 30 m run is under 1%.
- **MC4 connectors:** crimp them with the proper tool and mate only with compatible connectors.
- **At the inverter:**
  - The 32 A 4-pole DC isolator, wired to its diagram for 500 V+ DC (usually two poles in series on each polarity).
  - Then the 1000 V DC surge protector, with a short lead to earth.
  - The inverter is IP20, so it must be indoors.
- **Earthing:** bond every rail and panel frame to the site earth with at least 6 mm² copper.

Not on the Muden quote: bring these

- 6 mm² PV cable for the return lead (about 11 m), the jumper and the run to the inverter. Measure first; 30 to 40 m was budgeted.
- Earthing conductor, lugs or bonding clips, and the connection to the earth rod.
- Roof sealant, EPDM washers, UV-rated cable ties or clips.
- Optional: 4 extra L-feet.

Commissioning

☐ **Before closing the isolator:** check polarity and measure the string's open-circuit voltage.
  - Expect about 370 to 425 V in daylight. It reads lower when the panels are hot.
  - About 50 V low means a panel is left out of the string.
  - About 100 V low means one panel is connected backwards.

☐ **Insulation test:** if a tester is available, test + and − to earth.

☐ **Close the isolator.** Check PV1 voltage, current and power on the inverter display and in OpenEMS.

☐ **Photos:** the panel labels and serial numbers (for the warranty), the finished array, the isolator and the surge protector.

☐ **Update this page** with the as-built positions, the measured pitch and the voltage reading.

Commissioning log

Date and time (EAT)	Check	Result
26 Oct 2026, about 16:45	String open-circuit voltage at the bottom of the 6 mm² drop cable, isolator open (INGCO DM360011 meter, 600 V DC range)	379 V, positive on the red probe. All 8 panels are in series, none reversed, and the drop cable is continuous.

String open-circuit voltage, 26 Oct 2026: 379 V

Expected output

Average kWh per day by month, unshaded, north-west face at 20° (PVGIS):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
18.6	20.0	20.4	19.7	18.7	18.5	19.1	18.2	18.2	17.7	16.8	17.2

That is about 6,780 kWh a year. It agrees with the 5.2 peak-sun-hour assumption in the sizing re-run (about 19.5 kWh/day). Single days swing a lot with the weather. A month that comes in well below these figures points to shade or a wiring fault.

Assumptions

- Roof dimensions come from Google and Esri satellite imagery, scaled from the Google Maps scale bar, and are good to about ±0.5 m. The pitch is assumed to be 20°.
- The PVGIS figures include no tree shading.

- Sources: Golden Sun GS600N-144M datasheet; SRNE ASP 8 to 12 kW three-phase datasheet V1.0.

Related pages

- Sezibwa solar purchase: final Muden quote (19 Oct 2026)
- Solar Sizing Re-run, Sept 2026 (600 Wp panels)
- SRNE ASP48120SH3 Safe Settings Write: design, registers, and commissioning
- Microgrid Cabinet Line Diagram

As built, 26 Oct 2026

- All 8 panels in **one row** on two continuous rail lines; the unused vent was removed (landlord agreed), so no gap.
- Clamps: the one-row layout needs 14 inter + 4 end clamps; 12 + 8 were supplied, so the 4 spare end clamps were used back to back at one joint.
- 6 mm² PV cable (negative 25 m, positive 15 m; ~0.4% drop). FMPV32 4-pole DC isolator, manual layout 4B; 1000 V DC surge protector across +/−; inverter **PV1** (PV2 unused).
- Readings: 379 V open circuit at 16:45 EAT; inverter PV1 152 V at sunset (18:39).
- Open: **earthing** (no earth point on site) for the surge protector and rails; possible **tree shading** at one end of the array.
- Operating plan and commissioning log: Sezibwa Solar + Battery Operating Plan.

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