

MAXIMUM PV INPUT DESIGN

Huawei SUN2000-50K-MC0 with LONGi Hi-MO X10 LR8-66HVD-650M Anti-Glare (650 Wp, bifacial)

Result. The hardware maximum is **160 panels = 104.0 kWp** (8 strings × 20 panels) on a roof or normal ground, or **120 panels = 78.0 kWp** on a carport or light-coloured ground. The recommended design is **128 panels = 83.2 kWp** (8 strings × 16 panels, DC/AC 1.66). It captures most of the extra energy for an estimated clipping loss under 2% and keeps a wide margin on the 1,100 V limit.

1. Inverter and panel data

Huawei SUN2000-50K-MC0	Value	LONGi LR8-66HVD-650M (STC)	Value
Rated / max. AC power	50 kW / 55 kW	Pmax	650 W
Max. DC input voltage	1,100 V	Voc / Vmp	49.72 V / 40.98 V
MPPT range / start voltage	180–1,000 V / 180 V	Isc / Imp	16.54 A / 15.86 A
MPPTs / inputs	4 / 8 (2 per MPPT)	Temp. coeff. Voc / Isc	−0.20 / +0.05 %/°C
Max. current per input	23 A	Temp. coeff. Pmax	−0.26 %/°C
Max. current per MPPT (1/2/3/4)	30 / 33 / 33 / 30 A	Glass / type	Anti-glare, dual glass, bifacial
Max. short-circuit current per MPPT	40 / 44 / 44 / 40 A	Max. system voltage	1,500 V

Design conditions (Chiang Rai): coldest cell temperature 0 °C, hottest 70 °C; Vmp coefficient −0.25 %/°C; bifacial rear-side gain +10% on a roof or normal ground, +20% on a carport or light-coloured ground (assumed; confirm bifaciality on the LONGi datasheet).

2. Limits that set the maximum

Limit	Inverter rating	With this panel	Result
String voltage, 20 panels	Max. 1,100 V	Voc at 0 °C = 20 × 52.21 = 1,044 V	OK: max. 20 panels (21 = 1,096 V, too tight)
MPPT window, 20 panels	180–1,000 V	Vmp 727 V (70 °C) to 871 V (0 °C)	OK
Number of strings	8 inputs, 2 per MPPT	8 strings	Max. 8 strings
Current per input	23 A	Design Isc 18.6 A (roof) / 20.3 A (carport)	OK
MPPT 2 and 3, two strings	33 A / Isc 44 A	Operating 31.7 A / Isc 37.2–40.6 A	OK
MPPT 1 and 4, two strings	30 A / Isc 40 A	Operating 31.7 A / Isc 37.2 A (roof), 40.6 A (carport)	Roof: slight current clipping · Carport: 1 string only

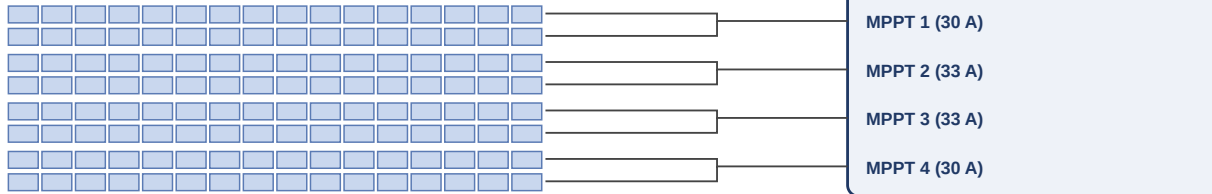
3. Maximum configurations

Installation	Strings on MPPT 1 / 2 / 3 / 4	Panels	DC power	DC/AC (50 kW)
Roof or normal ground (hardware maximum)	2 / 2 / 2 / 2 strings of 20	160	104.0 kWp	2.08
Carport or light-coloured ground (maximum)	1 / 2 / 2 / 1 strings of 20	120	78.0 kWp	1.56
Recommended (roof or normal ground)	2 / 2 / 2 / 2 strings of 16	128	83.2 kWp	1.66

Recommended: 8 strings × 16 panels = 128 × 650 W = 83.2 kWp

Each string: Voc 835 V at 0 °C · Vmp 582–697 V · Imp 15.86 A

For the 160-panel maximum, each string has 20 panels (Voc 1,044 V at 0 °C)



Each pair of strings joins at the inverter's own two inputs per MPPT (no external combiner or Y-connector needed).

Figure 1 — String layout for the recommended 128-panel design.

4. Energy and clipping by array size

Strings × panels	Panels	kWp	DC/AC	Est. energy / year	Clipping loss	Yield of each added kWp
6 × 18 (earlier Option B)	108	70.2	1.40	~100,300 kWh	~0.1%	—
8 × 16 (recommended)	128	83.2	1.66	~116,900 kWh	~1.7%	~1,270 kWh
8 × 18	144	93.6	1.87	~127,900 kWh	~4.5%	~1,060 kWh
8 × 20 (hardware maximum)	160	104.0	2.08	~136,800 kWh	~8%	~860 kWh

Estimated with a simplified model of Chiang Rai sunshine (about 1,430 kWh/kWp/year before clipping) and the 55 kW AC limit, not with site weather data; use the figures as guidance. "Yield of each added kWp" is the extra yearly energy from each kWp added over the row above. Clipping only happens around midday in clear weather, so a site that uses most of its energy in the morning and late afternoon gains more from a larger array.

5. Recommendation and checks

- **Use 8 strings × 16 panels = 128 panels (83.2 kWp)**, two strings on every MPPT. It gives most of the extra energy for under 2% clipping, and 835 V at 0 °C leaves a large margin below 1,100 V.
- Go to 144 or 160 panels only if panels are cheap compared with the value of the extra energy, or the load is high in the morning and late afternoon.
- On a carport or light-coloured ground, use no more than 120 panels (MPPT 1 and 4 with one string each).
- **Before committing:** the MC0 datasheet does not state a maximum DC/AC ratio, so ask our supplier to confirm that Huawei's warranty covers the chosen ratio (1.66, or up to 2.08). For a grid-connected system, also check PEA's acceptance of DC oversizing.
- Cabling: H1Z2Z2-K solar cable rated 1.5 kV DC, DC connectors matching the inverter inputs (Amphenol H4 type), DC SPD at the inverter; fuses are not required with at most 2 strings per MPPT.

Sources: Huawei SUN2000-50K-MC0 datasheet, version 01-202510; LONGi LR8-66HVD-650M specifications. Figures are based on manufacturer datasheets and the stated design assumptions; confirm the final string design against the latest datasheets and site conditions.