

Huawei 50 kW On-Grid Inverter Comparison

SUN2000-50KTL-M3 vs SUN2000-50K-MC0, matched with LONGi Hi-MO X10 Anti-Glare LR8-66HVD-650M (650 Wp, bifacial)

Summary

- The **50K-MC0** is Huawei's newer successor to the 50KTL-M3 (datasheet dated Oct 2025). Note the model name ends in MC0 (zero).
- At a 400 V grid both have the **same peak efficiency (98.5%)**; the MC0 is slightly better on European (weighted) efficiency: **98.2% vs 98.0%**.
- The bigger difference is **input current**: the MC0 accepts 23 A per input and up to 33 A / 44 A on MPPT 2 and 3, which suits large bifacial panels such as the LONGi 650 W anti-glare module.
- Both inverters accept **16 to 20 panels per string**. The MC0 is the better match; the M3 is acceptable on rooftops with slight clipping on MPPTs carrying two strings.

1. Inverter specification comparison

Specification	SUN2000-50KTL-M3	SUN2000-50K-MC0
Max. efficiency	98.5%	98.5% @400 V (98.7% @480 V)
European efficiency	98.0%	98.2%
Start voltage	200 V	180 V
MPPT operating range	200 - 1,000 V	180 - 1,000 V
Max. DC input voltage	1,100 V	1,100 V
Max. current per input	20 A	23 A
Max. current per MPPT	30 A (all four)	30 / 33 / 33 / 30 A
Max. short-circuit current per MPPT	40 A	40 / 44 / 44 / 40 A
Inputs / MPP trackers	8 / 4	8 / 4
Rated / max. AC power	50 kW / 55 kVA	50 kW / 55 kVA
Rated AC voltage	400 / 480 Vac	380 / 400 / 480 Vac
Rated output current @400 V	72.2 A	72.2 A
Protections	AFCI, PID recovery, RCMU, Type II SPD (DC & AC)	AFCI, PID recovery, RCMU, Type II SPD (DC & AC)

What it means in practice

- **Efficiency**: the 0.2-point European-efficiency gain gives an estimated ~150-170 kWh/year more on a ~60 kWp array in Chiang Rai (about 700 THB/year). Real, but small.
- **Input current**: the main reason to choose the MC0 with modern 600 W+ bifacial panels, where rear-side gain pushes string current above 20 A.
- **Lower start voltage**: slightly earlier wake-up and later shutdown, a little better on cloudy mornings.
- **380 Vac rating**: officially covers sites where the PEA voltage runs low.

2. Panel data: LONGi Hi-MO X10 LR8-66HVD-650M (Anti-Glare)

Parameter (STC)	Value	Parameter	Value
Pmax	650 W	Voc	49.72 V
Vmp	40.98 V	Isc	16.54 A
Imp	15.86 A	Module efficiency	up to 24.6%
Temp. coeff. Voc	-0.20 %/°C	Temp. coeff. Isc	+0.05 %/°C
Temp. coeff. Pmax	-0.26 %/°C	Max. system voltage	1,500 V
Cells / glass	132, dual glass, bifacial	Glass feature	Anti-glare, low reflection

Design assumptions (Chiang Rai): coldest cell temperature 0 °C at dawn; hottest cell temperature 70 °C; Vmp temperature coefficient taken as -0.25 %/°C; bifacial rear-side gain +10% on a normal roof and +20% on a carport or light-coloured ground. Rear-gain values are design assumptions; confirm bifaciality with the LONGi datasheet.

3. String voltage check (same for both inverters)

Panels per string	Voc @0 °C (limit 1,100 V)	Vmp @70 °C (MPPT min 200 / 180 V)	Vmp @25 °C	Result
16	835 V	582 V	656 V	OK
18	940 V	655 V	738 V	OK
20	1,044 V	727 V	820 V	OK
21	1,096 V	—	—	Too tight, avoid

Use 16 to 20 panels per string. All strings are far above both start voltages, so the MC0's 180 V start gives no practical advantage with this panel.

4. String current check (where the models differ)

Case	Value with this panel	50KTL-M3	50K-MC0
1 string per input, design Isc (roof / carport)	18.6 A / 20.3 A	Limit 20 A: OK roof / marginal carport	Limit 23 A: OK both
2 strings per MPPT, Isc (roof / carport)	37.2 A / 40.6 A	Limit 40 A: OK roof / exceeds carport	MPPT 2 & 3, limit 44 A: OK both
2 strings per MPPT, operating current (STC / +10% rear)	31.7 A / 34.9 A	Limit 30 A: clips even at STC	MPPT 2 & 3, limit 33 A: slight clipping with rear gain

Design Isc = Isc × rear-side gain × hot-temperature factor (+2.25% at 70 °C). On the M3, two-string MPPTs lose a small amount of yield to current limiting (estimated under ~1%/year on those MPPTs); this is a yield issue, not a safety issue. On carports and high-albedo ground mounts the M3 can exceed its 40 A short-circuit limit, so use one string per MPPT there.

5. Recommended layouts

Option	Panels	DC power	DC/AC ratio	Strings on MPPT 1 / 2 / 3 / 4	Suitable for
A – Balanced	96 (6 × 16)	62.4 kWp	1.25	1 / 2 / 2 / 1	MC0: all sites. M3: rooftop
B – Extra morning/evening yield	108 (6 × 18)	70.2 kWp	1.40	1 / 2 / 2 / 1	MC0: all sites. M3: rooftop (more clipping)
C – M3 on carport / ground	80 (4 × 20)	52.0 kWp	1.04	1 / 1 / 1 / 1	M3 where rear gain is high

On the MC0, place the two-string MPPTs on MPPT 2 and 3 (33 A / 44 A).

6. Recommendation

For new projects with the LONGi LR8-66HVD-650M anti-glare panel, **choose the SUN2000-50K-MC0** if our supplier can deliver it at a similar price, especially for carports and ground mounts. The **SUN2000-50KTL-M3** remains a sound choice for rooftop jobs if it is noticeably cheaper or already in stock, accepting slight clipping on two-string MPPTs.

Before quoting the MC0: confirm it is on PEA's approved grid-connected inverter list. As a new model, it may not be listed yet, which would delay the grid-connection application.

Sources

- Huawei - SUN2000-50KTL-M3 technical specification (solar.huawei.com/th/products/SUN2000-50KTL-M3/specs)
- Huawei - SUN2000-50K-MC0 datasheet, version 01-202510
- LONGi LR8-66HVD-650M specifications (sun.store product listing); anti-glare feature (HomePro Thailand listing)

Figures are based on manufacturer datasheets and the design assumptions stated above. Final string design should be confirmed against site conditions and the latest datasheets.