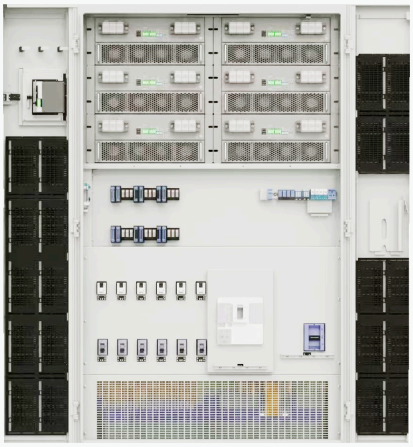
MODULAR POWER CONVERSION SYSTEM

MPS PCS Cabinet

2 – 8 PCS modules · 200 – 1,000 kW · 600 – 1500 Vdc · grid-forming, on/off-grid hybrid



MPS PCS CABINET · DOORS CLOSED



SIX-MODULE BUILD · DOORS OPEN

A modular power conversion system in which two to eight PCS modules share one cabinet and one EMS, scaling from 200 kW to 1,000 kW in 100 kW and 125 kW steps. Each module carries its own DC channel and its own battery cluster, so the cabinet is built as a 1 MPPT : 1 PCS module : 1 battery cluster architecture rather than a single aggregated DC bus. The wide-voltage module covers 600–1500 Vdc and is released for sodium-ion batteries as well as LFP, and every cabinet supports grid-tied, off-grid and hybrid operation with diesel genset integration.

CABINET POWER RANGE

Module type	Modules per cabinet	Cabinet range	Standard steps	DC window
125 kW module	2 – 8	**250 – 1,000 kW**	375 · 500 · 750 · 1,000 kW	600 – 1500 Vdc
100 kW module	2 – 8	**200 – 800 kW**	400 · 600 · 800 kW	680 – 950 Vdc
Mixed (HFL)	4	**425 kW**	3 × 100 kW + 1 × 125 kW	Mixed — see section 04

Minimum configuration is two modules. Module count sets both the AC output and the number of independent DC channels (one per module).

01 — CONFIGURATIONS

Cabinet configurations

Cabinet rating is simply the module count multiplied by module rating, with the 425 kW HFL combination as the one mixed build. AC current in the table is the sum of the published per-module rated currents at 400 V, three-phase — it is the figure to use for switchgear, cable and protection sizing at the cabinet terminals, not for the individual module feeds.

CABINET CONFIGURATIONS · ONE DC CHANNEL AND ONE BATTERY CLUSTER PER MODULE

Cabinet rating	Modules	Rated AC current	DC channels	Typical duty
125 KW MODULE — 600 – 1500 VDC, SODIUM-ION CAPABLE				
375 kW	3 × 125 kW	543 A	3	Small C&I, single MV block
500 kW	4 × 125 kW	724 A	4	C&I peak shaving
750 kW	6 × 125 kW	1,086 A	6	Utility-scale block
1,000 kW	8 × 125 kW	**1,448 A**	8	Full cabinet, utility scale
100 KW MODULE — 680 – 950 VDC				
400 kW	4 × 100 kW	580 A	4	C&I base build
600 kW	6 × 100 kW	870 A	6	Industrial self-consumption
800 kW	8 × 100 kW	**1,160 A**	8	Full cabinet, 1000 V DC bus
SPECIAL COMBINATION — HIGH FAULT LEVEL (HFL)				
425 kW	3 × 100 kW + 1 × 125 kW	616 A	4	HFL grid connection

Module comparison

PCS MODULE TECHNICAL COMPARISON

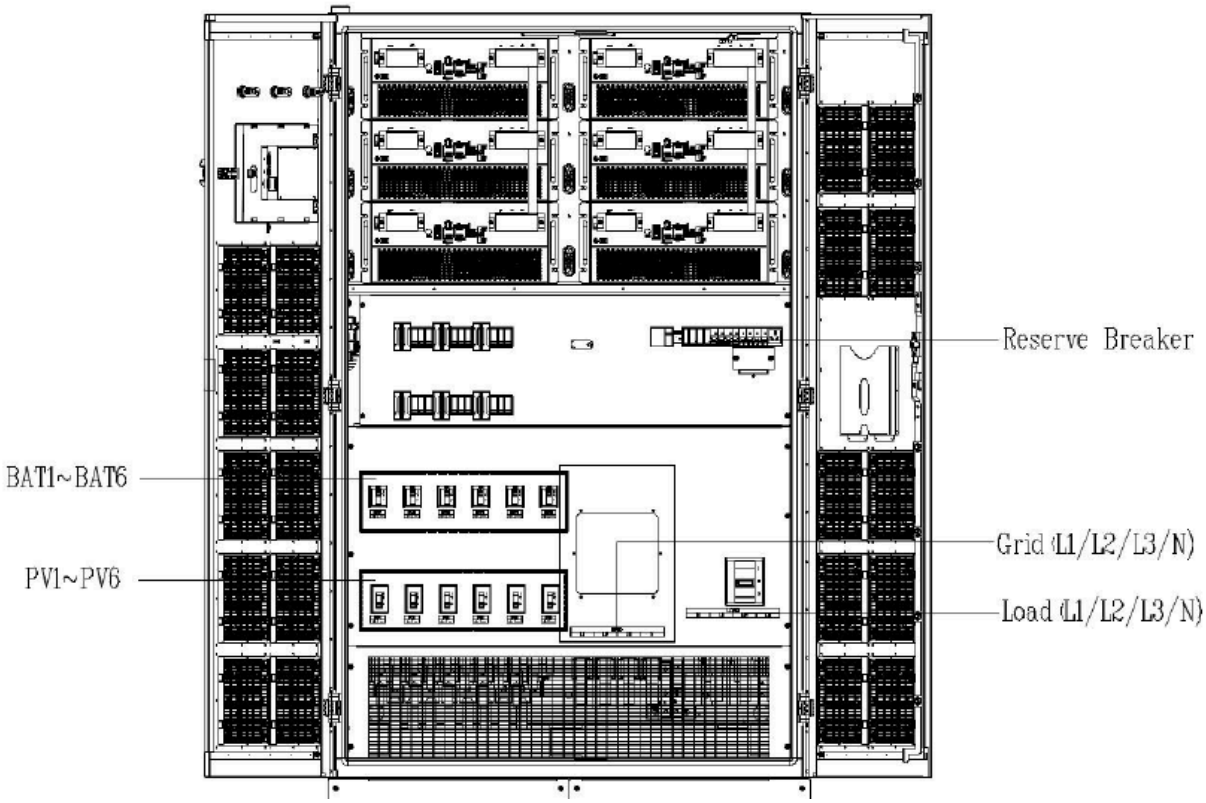
Parameter	100 kW module SP100HCPS	125 kW module SP125HCPS	125 kW wide-voltage Sodium-ion
DC SIDE			
DC operating window	680 – 950 V	680 – 950 V	**600 – 1500 Vdc**
Rated DC voltage	680 – 900 V	680 – 900 V	1,200 V
Maximum DC current	150 A	200 A	225 A
Maximum DC power	—	—	154 kW
Battery chemistry	LFP	LFP	**Sodium-ion / LFP**
AC SIDE			
Rated power, grid / off-grid	100 kVA	125 kVA	125 kW
Maximum output power	110 kVA	137.5 kVA	150 kW
AC current, rated / max	145 / 160 A	**181 / 200 A**	180 / 216 A
Wiring	3-phase 4-wire	3-phase 4-wire	3-phase 3-wire + PE
Power factor	−1 to 1	−1 to 1	> 0.99 (−1 to 1)
Maximum efficiency	98.5%	98.5%	98.5%
Overload capability	1.1× continuous / 1.25× 60 s / 1.35× 100 ms (< 35 °C)		110% 10 min / 120% 1 min

Common to all three modules: 400 V / 230 V three-phase output, 50 / 60 Hz, current THD < 3%, power factor −1 to +1, maximum efficiency 98.5%. Full module data in section 03; blank cells are not specified on the source datasheet.

02 — CABINET LAYOUT

General arrangement and DC/AC distribution

The layout is drawn around the module bay rather than around a single power block. Six modules sit in a 3 × 2 plug-in bay at the top of the cabinet; below them are the DC and AC distribution compartments, with separate battery and PV breaker groups per module and separate grid and load AC terminals.



GENERAL ARRANGEMENT — SIX-MODULE BUILD, FRONT VIEW

ELEMENT	FUNCTION
PCS module bay	Six plug-in PCS modules (3 rows × 2 columns) in the build shown. Each module is an independent AC/DC conversion channel and is withdrawable without isolating the other five.
BATT1 – BATT6 · PV1 – PV6	One battery breaker and one PV breaker per module. Each conversion channel therefore has a dedicated PV input beside its battery input, so the cabinet takes PV and battery on the same channel rather than through a separate PV inverter. Breaker count follows module count.
Grid L1/L2/L3/N	Grid-side AC terminals with main incoming breaker — feeds the grid-tied (PQ) path and the transfer arrangement.
Load L1/L2/L3/N	Load-side AC terminals — the supply to the site load, carried through the off-grid / backup path when the grid is absent.
Reserve breaker	Spare outgoing way for a future circuit, so the cabinet can be extended without re-terminating the existing distribution.

What the layout confirms. Every module has both a PV and a battery breaker — so each conversion channel is a two-input DC channel (PV plus battery) feeding one AC output, and the cabinet provides grid and load terminals separately on the AC side. That is the physical basis for the on-grid / off-grid / hybrid operating modes in section 04: grid-tied and backup paths share the same converters instead of needing a second inverter.

Arrangement taken from the cabinet general arrangement drawing for the six-module build: six PCS modules in a 3 × 2 bay, six battery and six PV breakers, separate grid and load AC terminals, one reserve way. Breaker quantities scale with module count — confirm the 2-, 4- and 8-module arrangements, and the cabinet dimensions and weight, on the project mechanical drawing issued with the order.

03 — TECHNICAL DATA

Technical specifications

Cabinet

Configuration	2 – 8 PCS modules, front-access hot-swap drawers
Cabinet rating	200 – 1,000 kW (see section 01 for available steps)
DC architecture	1 MPPT : 1 PCS module : 1 battery cluster — one independent DC channel per module
AC output	400 V three-phase, 50 / 60 Hz
Operating modes	Grid-tied (PQ) · off-grid (V/f, grid-forming) · hybrid with automatic transfer
Genset integration	Ready for diesel genset integration — diesel hybrid mode for genset support and fuel saving
Control	Single cabinet EMS supervising every module and battery cluster
Cooling	Intelligent forced air cooling, isolated air duct per module
Degree of protection	IP20 (indoor cabinet; module faceplate IP20)
Cabinet dimensions / weight	Set by module count — mechanical drawing issued with the order
Max. altitude	4,000 m (de-rating above 2,000 m)

Module — 100 kW and 125 kW (680 – 950 Vdc)

Models	SP100HCPS · SP125HCPS
Battery voltage	680 – 950 V operating · 680 – 900 V rated · 950 V maximum
Maximum battery current	150 A (100 kW) · 200 A (125 kW)
Grid voltage tolerance	−20% to +15%
Frequency range	50 Hz (47 – 52 Hz) or 60 Hz (57 – 62 Hz)
Off-grid voltage THD	< 3% · unbalance capability 100%
Standby / no-load consumption	< 15 W / < 200 W
Mounting	Plug-in drawer (插框)
Dimensions (W×L×H)	440 × 720 × 200 mm
Weight	< 50 kg
Operating temperature	−30 to +60 °C (de-rating above 45 °C)
Relative humidity	5 – 95%

Module — 125 kW wide voltage (600 – 1500 Vdc)

Model	HNESPSG125-44M0N
DC operating voltage	600 – 1500 Vdc · rated 1,200 V
Maximum DC power / current	154 kW · 225 A · overvoltage class II
Rated / maximum output	125 kW / 150 kW
AC voltage tolerance	400 Vac, −15% to +15%
Frequency tolerance	50 Hz, −10% to +10%
DC current component	< 0.5% of rated output current
Operating temperature	−40 to +60 °C (de-rating above 45 °C) · storage −40 to +70 °C
Relative humidity	0 – 100%, non-condensing
Noise	< 70 dB
Protection	AC over-current, AC over-voltage, AC short-circuit, arc-fault, DC reverse polarity
Dimensions (W×D×H)	800 × 800 × 235 mm, drawer type, horizontal or side mounting
Weight	94 kg
Protection class	Control section IP6X · power section IP20
Communication	Monitoring RS485 / Ethernet · BMS RS485 / CAN Protocols: Modbus RTU · Modbus TCP · IEC 104 · CAN
Display	LED, Bluetooth optional

Why the wide-voltage module

600 – 1500 Vdc window

One module spans low- and high-voltage DC architectures, so a cabinet can be specified before the battery DC voltage is frozen, and the same module serves 1000 V and 1500 V systems.

Sodium-ion ready

Released for sodium-ion cells as well as LFP — sodium-ion's flatter, wider voltage excursion is accommodated without re-rating the module, and the DC input is protected against reverse polarity and DC arc.

154 kW DC input

DC-side headroom above the 125 kW AC rating lets the module ride through voltage sag and take full charge power at the low end of the window.

Cold-start and high cycling

Operation from −40 °C and a 110% / 10 min duty pattern suit high-frequency cycling duty in sodium-ion and hybrid deployments.

Ambient operating limits: −40 to +60 °C with de-rating above +45 °C; storage −40 to +70 °C; humidity 0–100% non-condensing; altitude 4,000 m with de-rating above 2,000 m.

04 — ARCHITECTURE AND OPTIONS

System architecture, hybrid operation and options

1 MPPT : 1 PCS module : 1 battery cluster

Each module in the cabinet owns one DC channel, one MPPT and one battery cluster. There is no aggregated DC bus inside the cabinet, so a single cluster can be taken out of service, replaced or expanded without interrupting the rest of the cabinet, and mismatched cluster states never propagate across the plant.

LAYER	FUNCTION
Battery cluster	One cluster per DC channel — independent string current, independent protection, sized to the module's DC window.
MPPT / DC channel	One tracker per module, so each cluster is optimised on its own operating point rather than on a plant-wide average.
PCS module	100 kW or 125 kW bidirectional converter, drawer-mounted, hot-swappable. Module count sets the cabinet rating.
Cabinet EMS	Supervises all modules and clusters as one plant; dispatches power, manages SOC balance across clusters, and reports to plant SCADA.

Why one-to-one matters. On a conventional cabinet with a shared DC bus, one weak cluster drags the whole block and a single module fault can take the full rating offline. Here the granularity is the module: a 1,000 kW cabinet is eight independent 125 kW conversion paths under one EMS, so availability and cluster-level SOC control scale with module count.

On-grid, off-grid and diesel

Grid-tied (PQ)

Current-controlled operation for peak shaving, load shifting, PV self-consumption and grid services, with power factor fully adjustable from −1 to +1.

Off-grid, grid-forming (V/f)

Voltage and frequency source for islanded microgrids, with 100% unbalance capability and 1.35× short-time overload for motor starting.

Hybrid with automatic transfer

Seamless transition between grid-tied and islanded operation — the converter supports both grid-forming and grid-following modes and switches on grid loss.

Diesel genset integration

Diesel hybrid mode for genset-supported sites: the cabinet absorbs load steps and transient demand so the genset runs at stable, efficient load, cutting fuel and running hours.

Optional isolating transformer

An isolating transformer can be specified with the cabinet for galvanic isolation between the DC-side battery system and the AC network, tighter voltage regulation at the point of connection, and improved safety for operation and maintenance. It also allows the cabinet's 400 V output to be stepped to the site distribution voltage. The transformer is a cabinet-level option and is rated to the selected module count.

Ordering notes

- State the cabinet rating and module mix: 375 / 500 / 750 / 1,000 kW on 125 kW modules, 400 / 600 / 800 kW on 100 kW modules, or the 425 kW HFL combination (3 × 100 kW + 1 × 125 kW). Two modules is the minimum build.
- **Voltage window in mixed builds:** the 100 kW module is published at 680–950 Vdc while the wide-voltage 125 kW module covers 600–1500 Vdc. In the 425 kW HFL cabinet the shared DC bus must therefore be held inside **680–950 V** unless a wide-voltage 100 kW module is specified — confirm the battery cluster voltage with Eternity Renewable before ordering a mixed build.
- Cabinet dimensions, weight and terminal arrangement follow the module count and are issued as a project mechanical drawing. Modbus RTU, Modbus TCP, IEC 104 and CAN are supported for plant integration.
- Specifications are as published for the SP100HCPS / SP125HCPS and HNESPSG125-44M0N modules and are subject to change without notice. **Confirm final values with Eternity Renewable before specifying or ordering.**