Steca Elektronik

INVERTER / CHARGER WITH MPPT: SOLARIX PLI

INVERTER SYSTEMS

SOLARIX PLI 5000-48

- Inverter / Charger with MPPT charge controller
- All-in-one:
  - 5 kW / 5 kVA pure sine wave inverter (10 kW / 10 kVA up to 5 s)
  - 80 A MPPT charge controller (max. 145 Voc)
  - 60 A charger from AC source (grid or generator)
  - *Additionally only fuses and surge protector are required in most systems*
- Usable off-grid and on-grid (no grid injection)
- Usable with generator (automatic generator start)
- Solar or grid / generator priority selectable
- Synchronised to grid and fast UPS switching (10 ms)
- Overload bypass to grid selectable
- Very light: 11.5 kg

INVERTER SYSTEMS

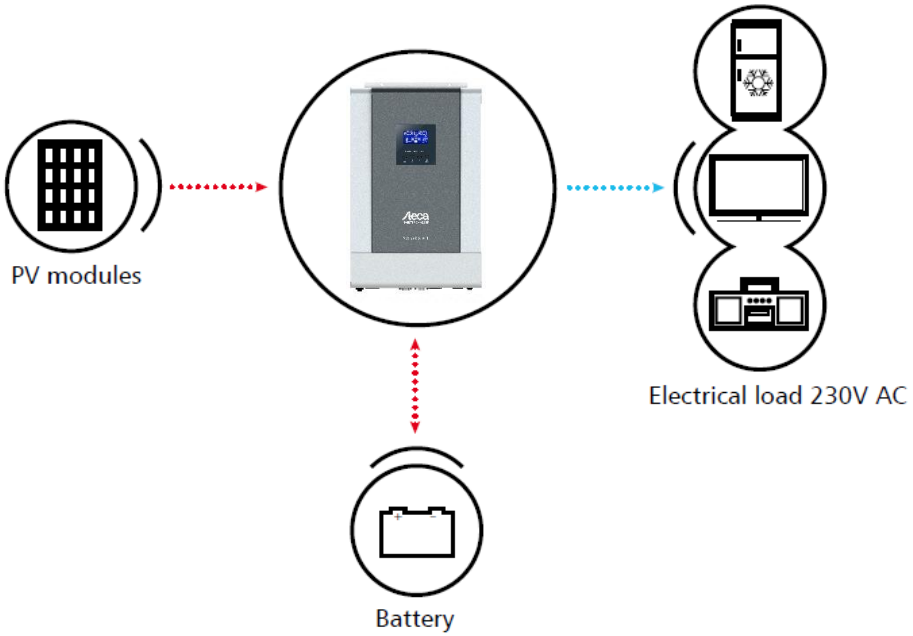
SOLARIX PLI 2400-24

- Inverter / Charger with MPPT charge controller
- All-in-one:
  - 2.4 kW / 3.0 kVA pure sine wave inverter (4.8 kW / 6.0 kVA up to 5 s)
  - 40 A MPPT charge controller (max. 100 Voc)
  - 60 A charger from AC source (grid or generator)
  - *Additionally only fuses and surge protector are required in most systems*
- Usable off-grid and on-grid (no grid injection)
- Usable with generator (automatic generator start)
- Solar or grid / generator priority selectable
- Synchronised to grid and fast UPS switching (10 ms)
- Overload bypass to grid selectable
- Very light: 7.6 kg

INVERTER SYSTEMS

SOLARIX PLI

Example: off-grid system



- Pure off-grid system (no AC input)
- PV as only energy source

INVERTER SYSTEMS

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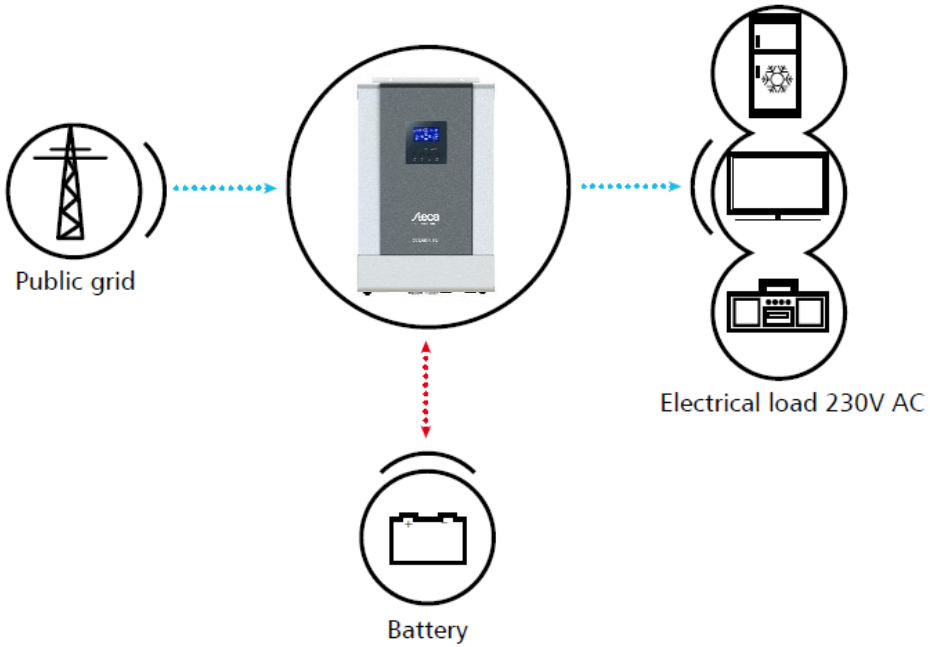
Example: uninterruptible power supply



- Pure on-grid system
- No PV as only energy source, only grid
- Battery is charged from the grid whenever the grid is available
- Useful when grid fails as backup (10 ms switchover time)

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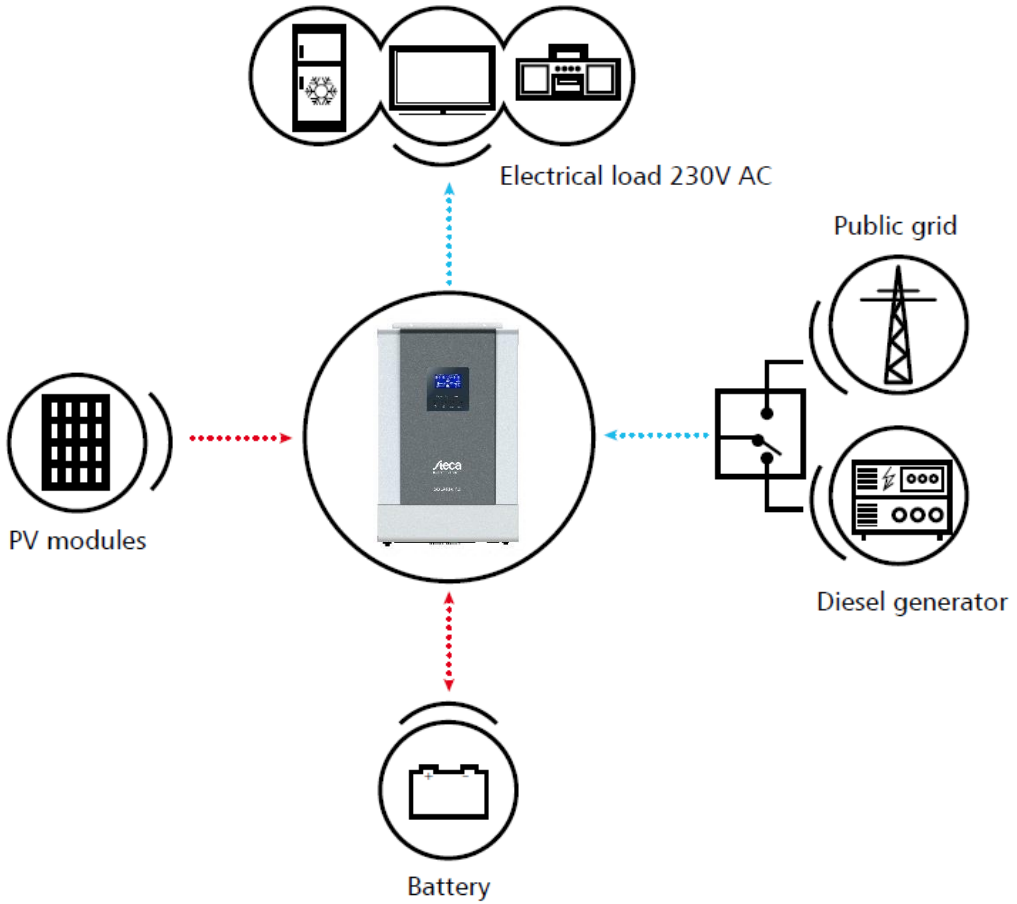
Example: solar priority with grid connection



- Grid-connected system or off-grid with AC generator (external source selector required if both are used)
- PV is priority, alternatively grid / generator can be selected as priority
- Optional charging from the grid / generator

INVERTER SYSTEMS

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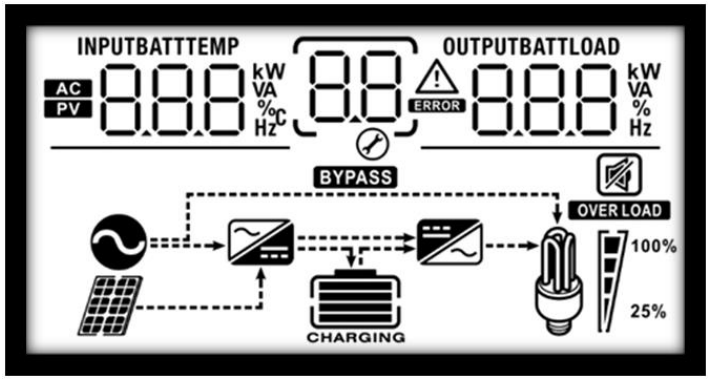
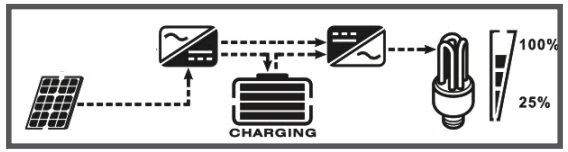
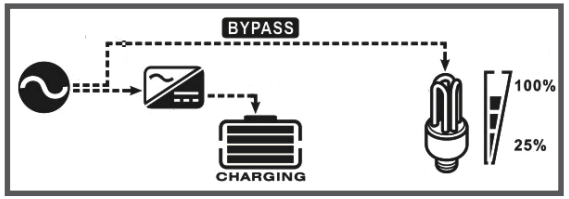
Shown values:

- AC input / output voltage (default view)
- AC input / output frequency
- PV voltage
- Charging / discharging current
- Charging power
- Battery voltage
- Load VA / Watt / % of nominal inverter power (with overload icon)
- Battery diagram for sate-of-charge approximation and charging status
- Settings menu
- Warning / fault codes
- Alarm muted
- Energy path diagram examples:





PV charging with inverter on



Grid charging with by-pass mode active

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Energy source priorities

- **Solar → Battery → AC input / utility (SBU)**

1. PV supplies the loads first
2. If PV power is insufficient, the battery supplies the remaining energy
3. When the battery reaches its programmable lower battery limit (not the same as low-voltage disconnect), the AC input is used to supply the loads entirely

Use-case:

- Maximum reduction of grid power consumption by utilising PV and the battery capacity to their fullest extent.

- **AC input first (utility grid)**

1. Whenever a valid AC input source is present, it is used first
2. When no valid AC input source is available, power to the loads is supplied by PV and the battery

Use-case:

- Classic uninterruptible power supply: use the AC input / grid when possible. When the grid fails, supply the loads from PV and battery.

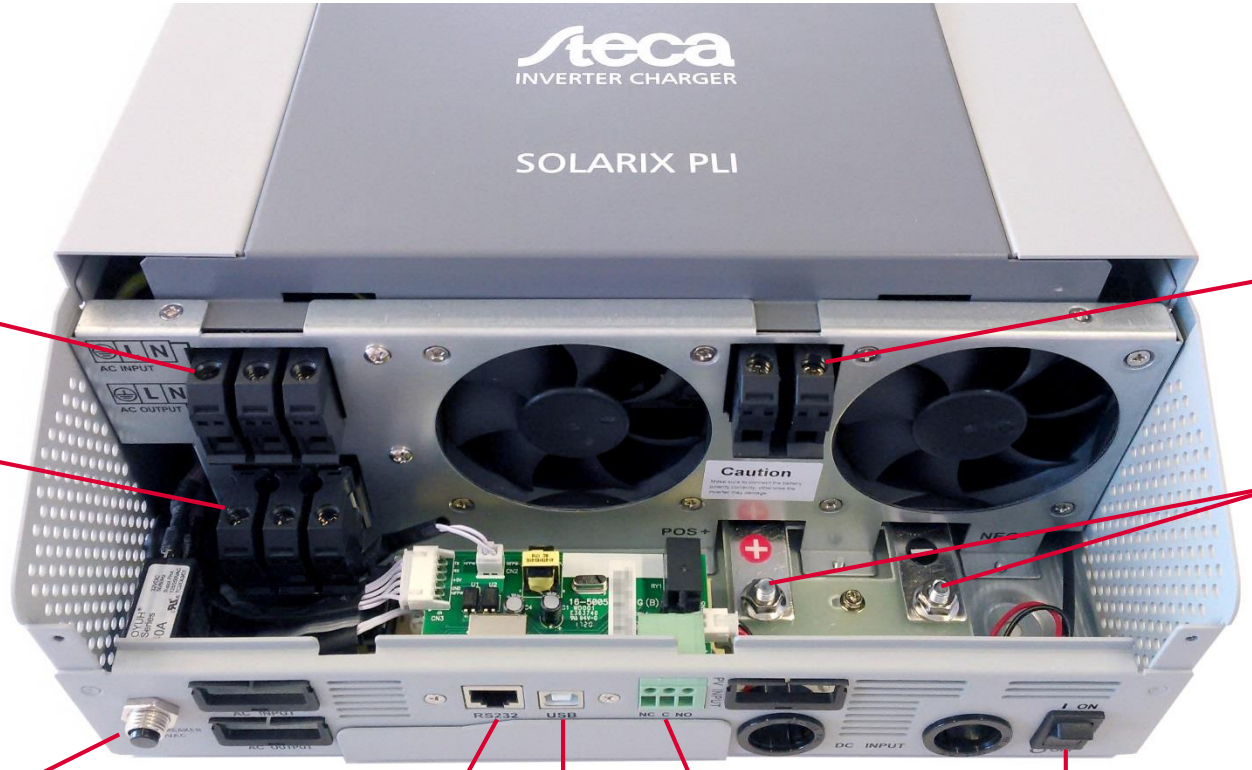
- **Solar first**

1. PV supplies the loads first
2. If PV power is insufficient (but available), the battery supplies the remaining energy
3. When the battery reaches its programmable lower battery limit (not the same as low-voltage disconnect) **or** when there is no PV energy available (0 Watts), the AC input is used to supply the loads entirely

Use-case:

- Reduction of grid power consumption by utilising PV to its fullest extent, but limiting battery cycling. During the night, when no PV power is available, the Solarix PLI will only supply loads from the AC input (unless the AC input / grid fails, then the battery will supply the loads).

INVERTER SYSTEMS
SOLARIX PLI 5000-48



AC input

AC output

AC input breaker

PV input

Battery connection
(ring terminals incl.)

RS-232

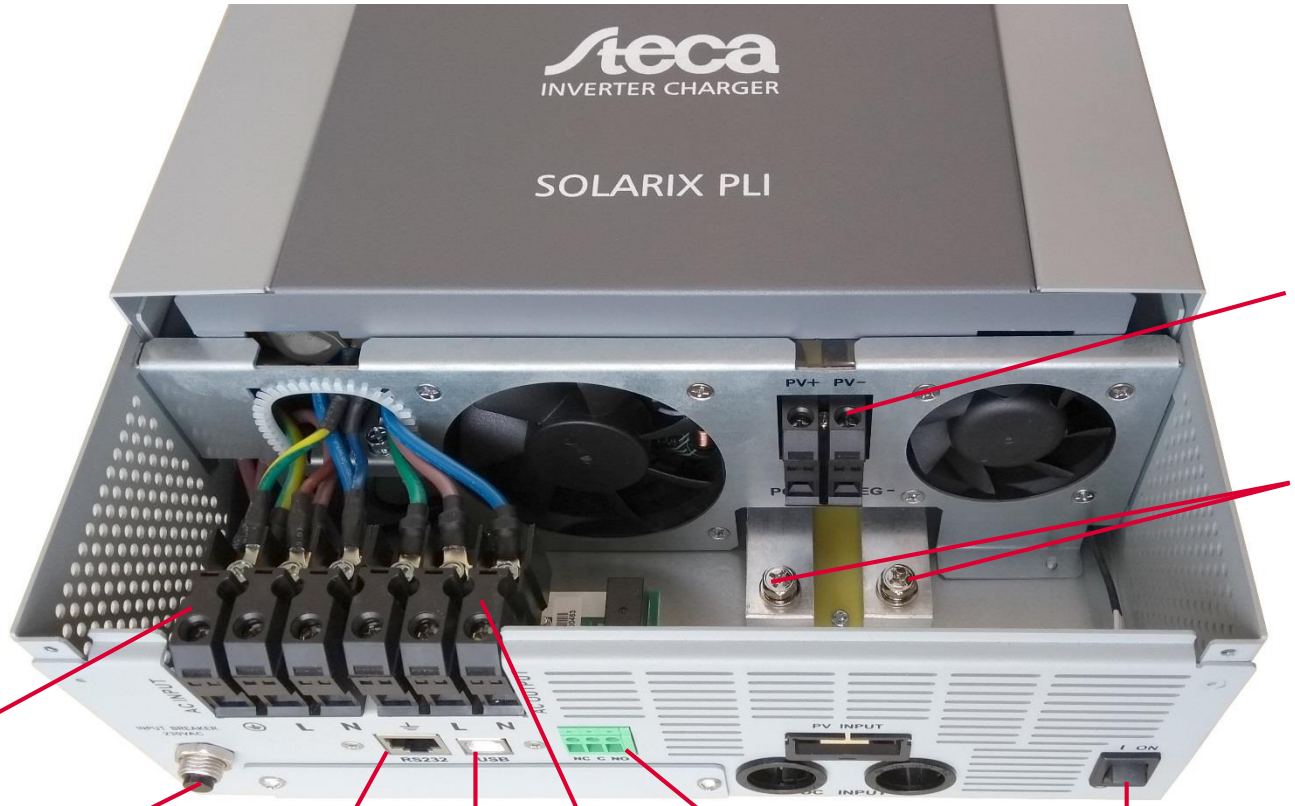
USB

Dry-Contact

Inverter On/Off

Note: MPPT charge controller always remains on, regardless of switch position

INVERTER SYSTEMS
SOLARIX PLI 2400-24

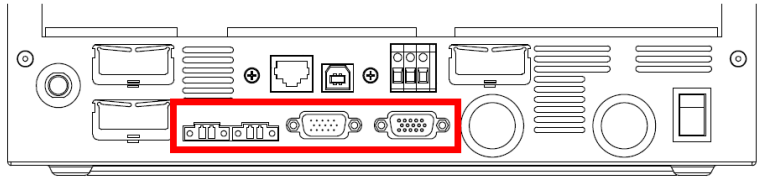


Note: MPPT charge controller always remains on, regardless of switch position

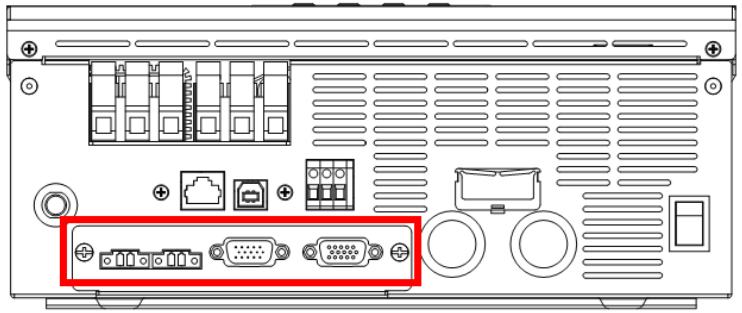
INVERTER SYSTEMS
SOLARIX PLI

Parallel / 3-phase kit

- Parallel Kit to extend Solarix PLI systems: **one kit is required for each connected Solarix PLI**
- Up to 9 Solarix PLI can be connected together:
  - Maximum 45 kW (9 x 5 kW) = 9 pcs. Solarix PLI 5000-48 per system
    Maximum 21.6 kW (9 x 2.4 kW) = 9 pcs. Solarix PLI 2400-24 per system
  - Maximum 9 pcs. Solarix PLI on one phase

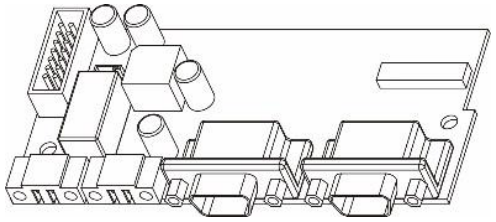


Installed Parallel Board (PLI 5000-48)

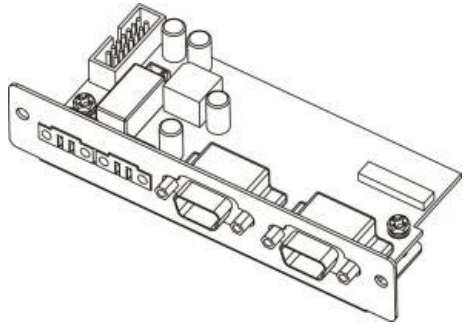


Installed Parallel Board (PLI 2400-24)

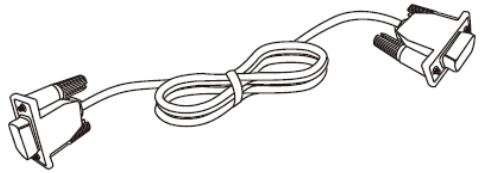
Parallel Kit contents:



Parallel Board PLI 5000-48 **or**



Parallel Board PLI 2400-24



Communication Cable

Current Sharing Cable

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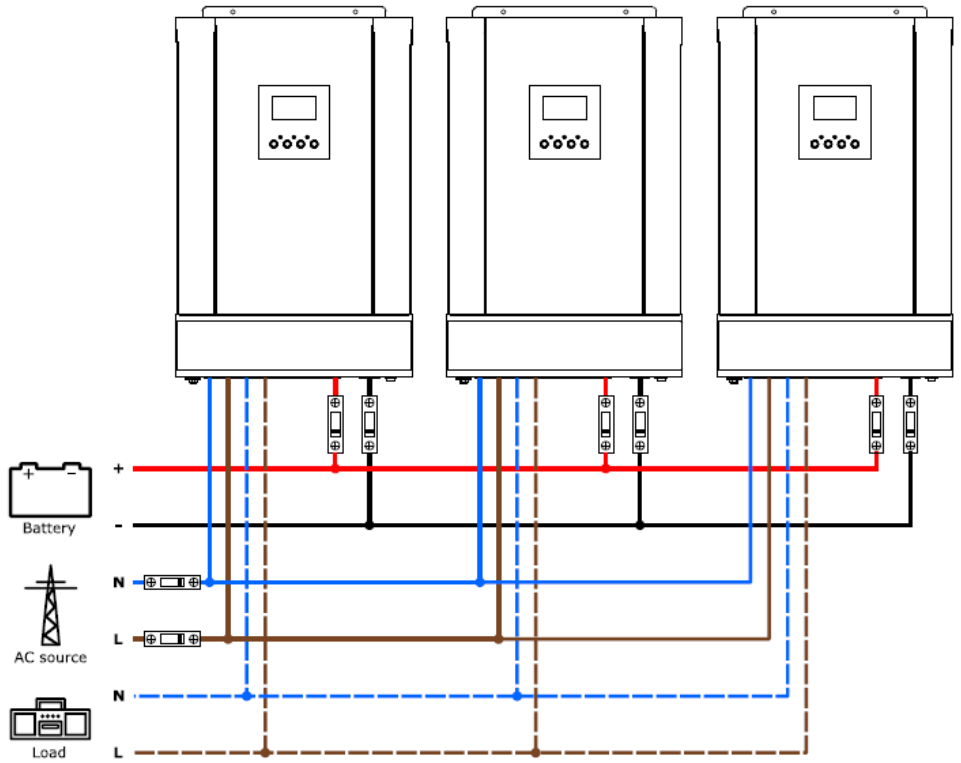
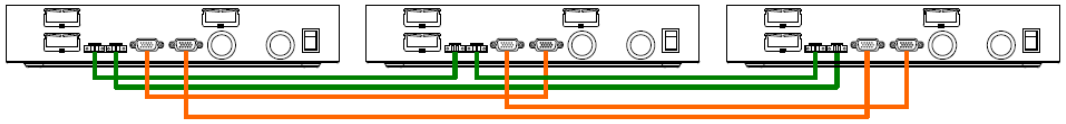
Parallel connection

- Example: 3x Solarix PLI on one phase
- Up to 9x PLI on one phase possible



Communication and Current Sharing Cables (included in kit):



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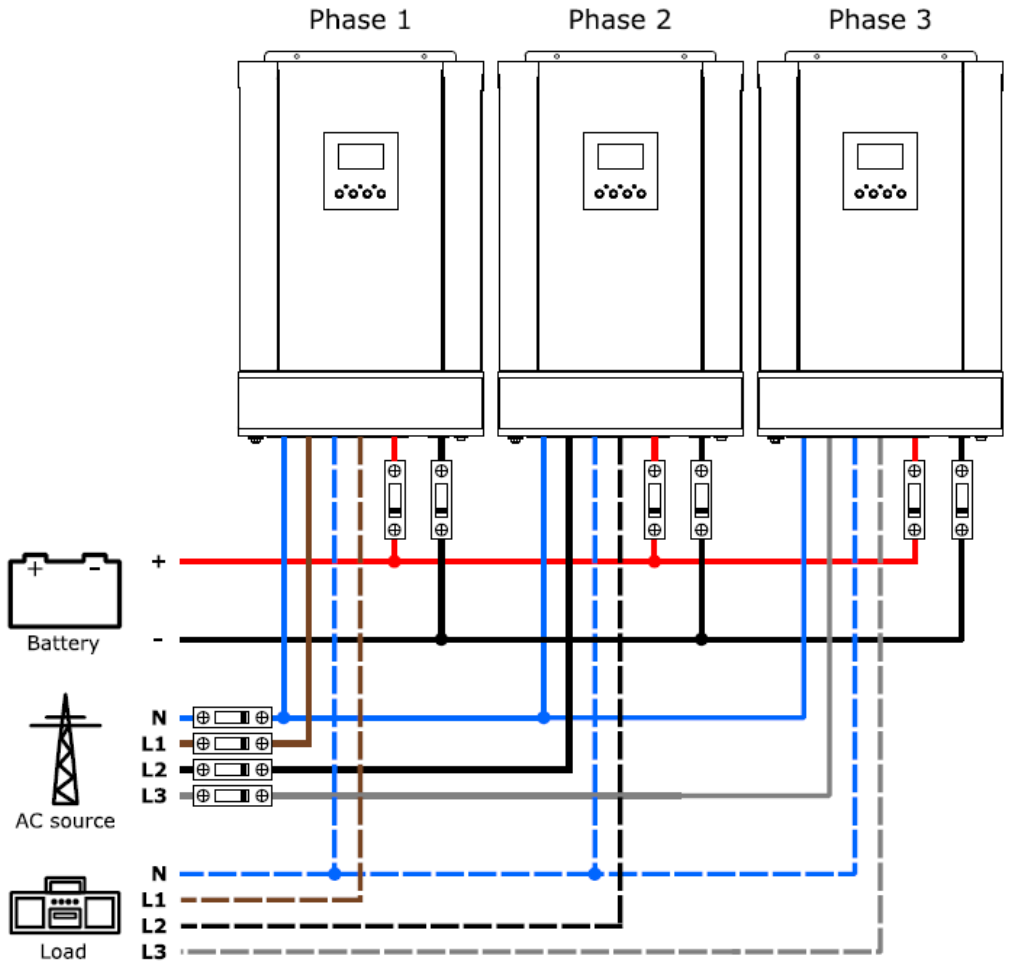
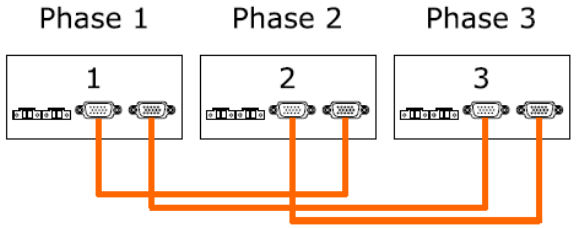
3-phase connection

- Example: 3x Solarix PLI, one on each phase
- At least on PLI per phase, up to 7x PLI on one phase possible



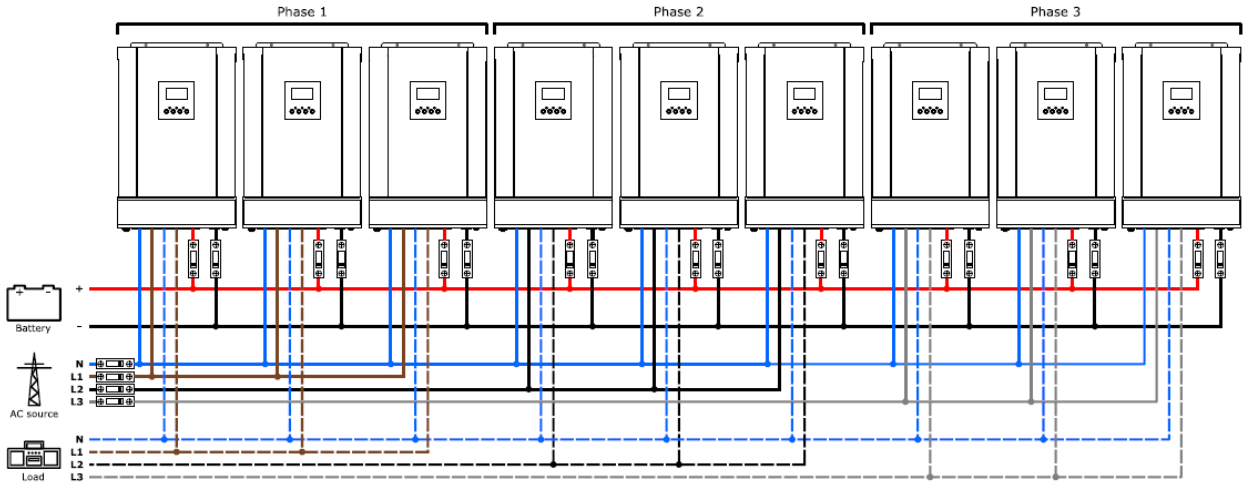
Communication and Current Sharing Cables:



INVERTER SYSTEMS

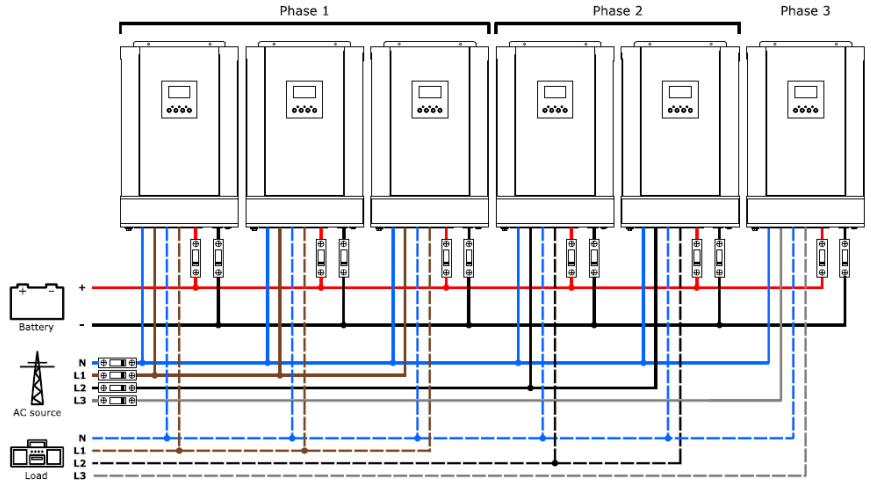
SOLARIX PLI

3-phase connection



← Example: 3x PLI per phase

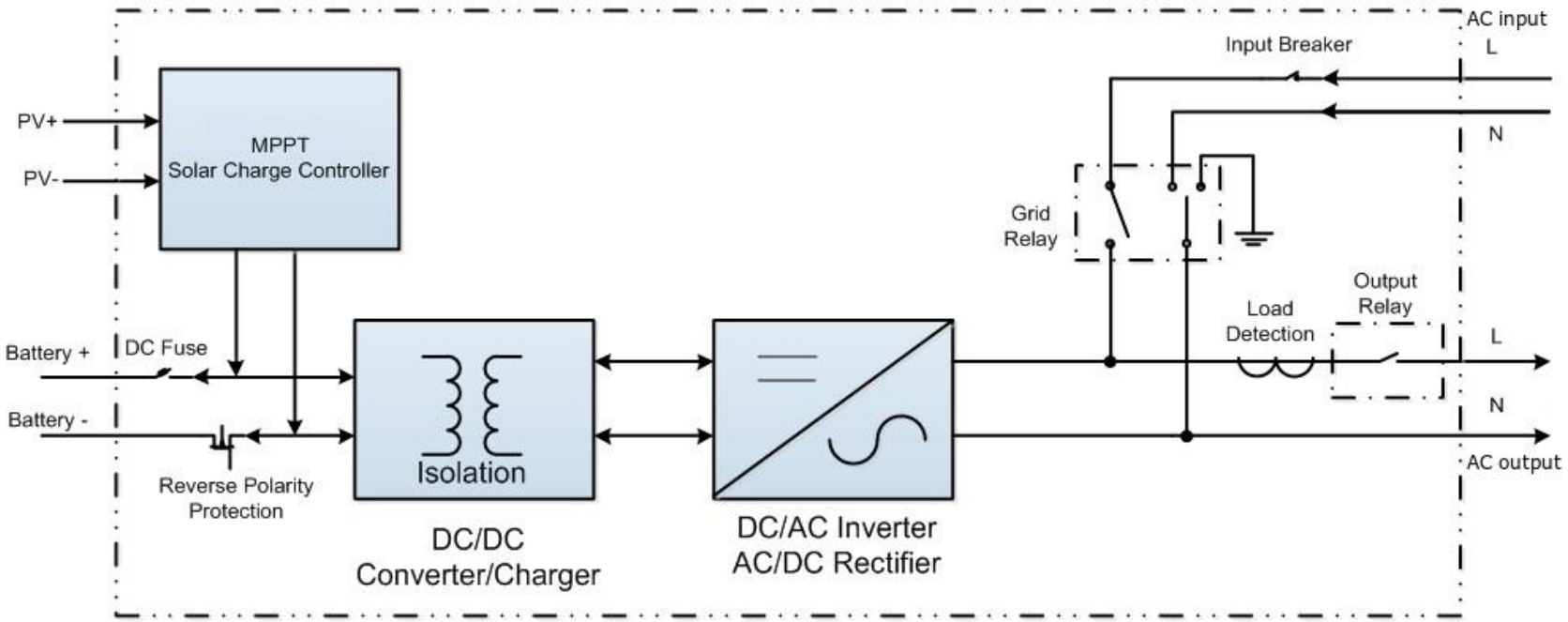
Example: 3x PLI on L1 + 2x PLI on L2 + 1x PLI on L3 →



INVERTER SYSTEMS

SOLARIX PLI

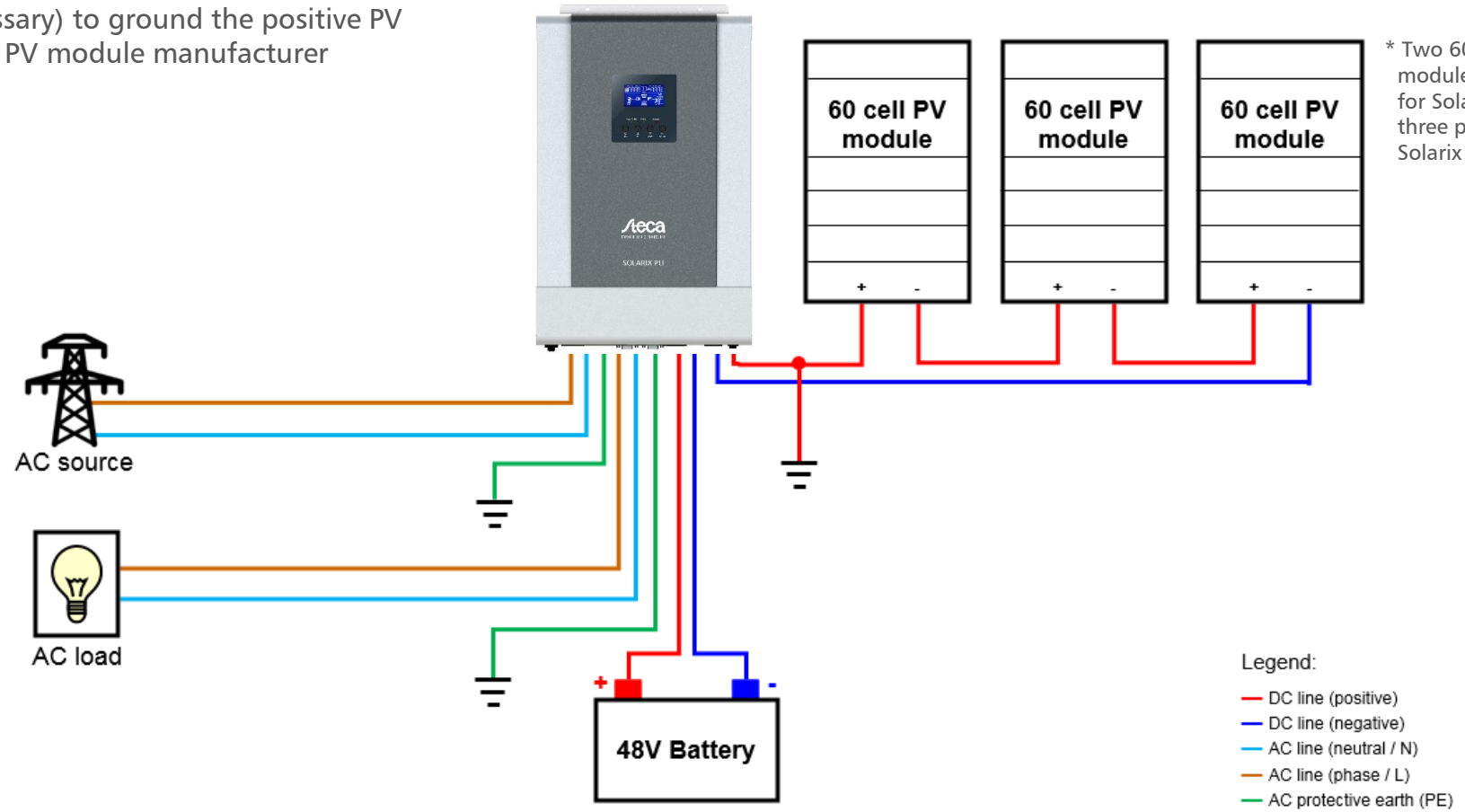
Block diagram



SOLARIX PLI

PV grounding

- It is possible (but not necessary) to ground the positive PV cable, if so required by the PV module manufacturer

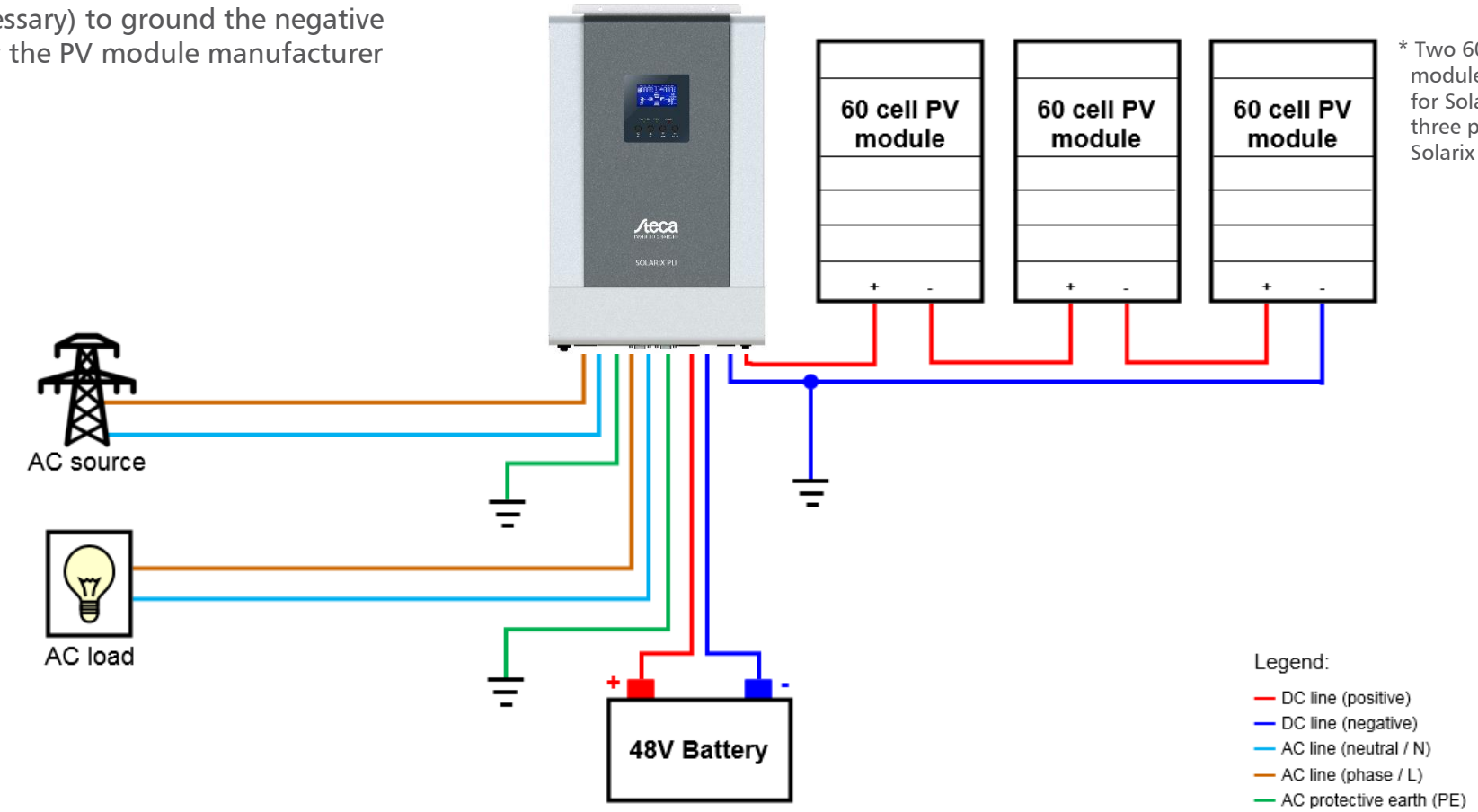


* Two 60-cell PV modules per string for Solarix PLI 2400-24, three per string for Solarix PLI 5000-48

SOLARIX PLI

PV grounding

- It is possible (but not necessary) to ground the negative PV cable, if so required by the PV module manufacturer

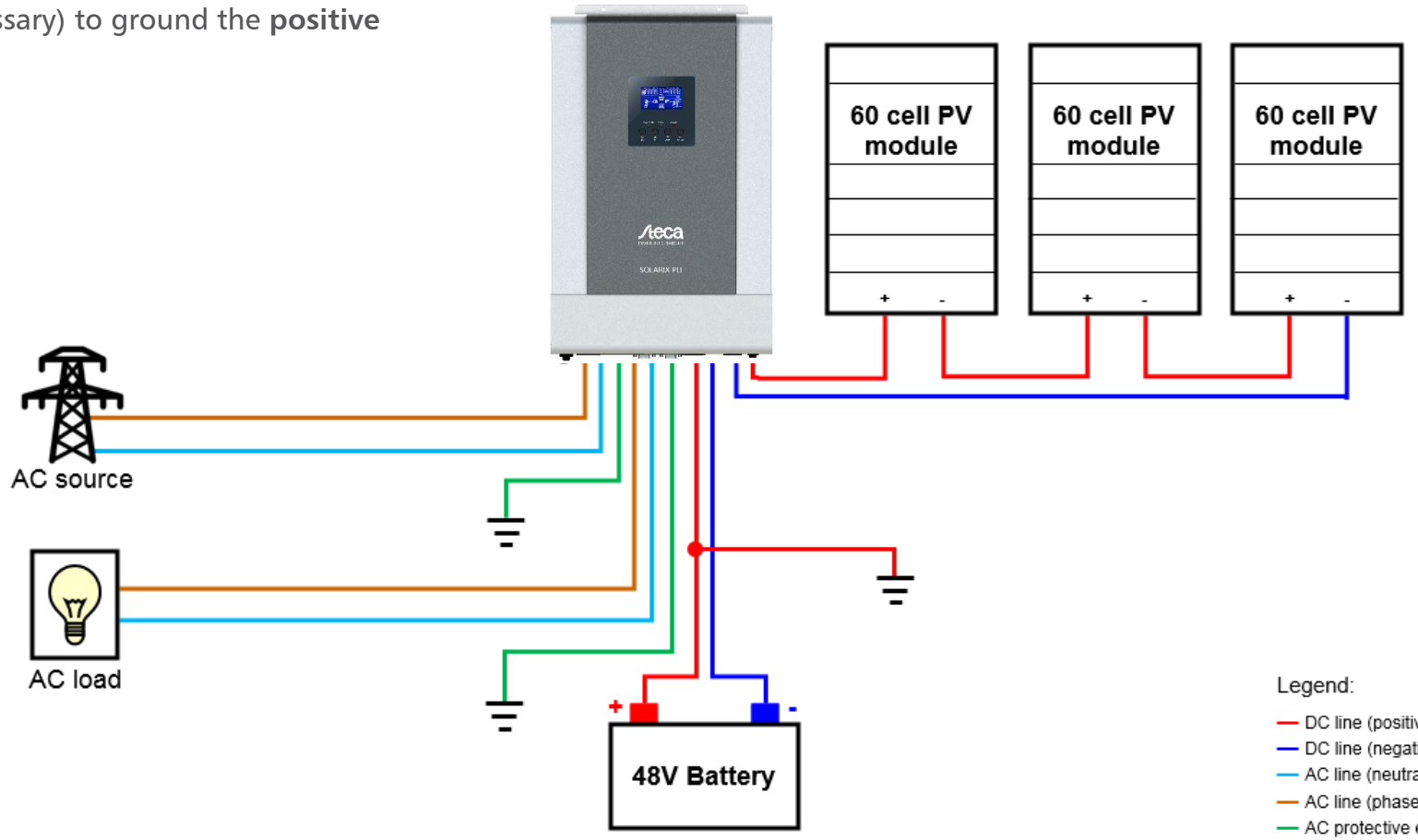


* Two 60-cell PV modules per string for Solarix PLI 2400-24, three per string for Solarix PLI 5000-48

SOLARIX PLI

Battery grounding

- It is possible (but not necessary) to ground the **positive** terminal of the battery

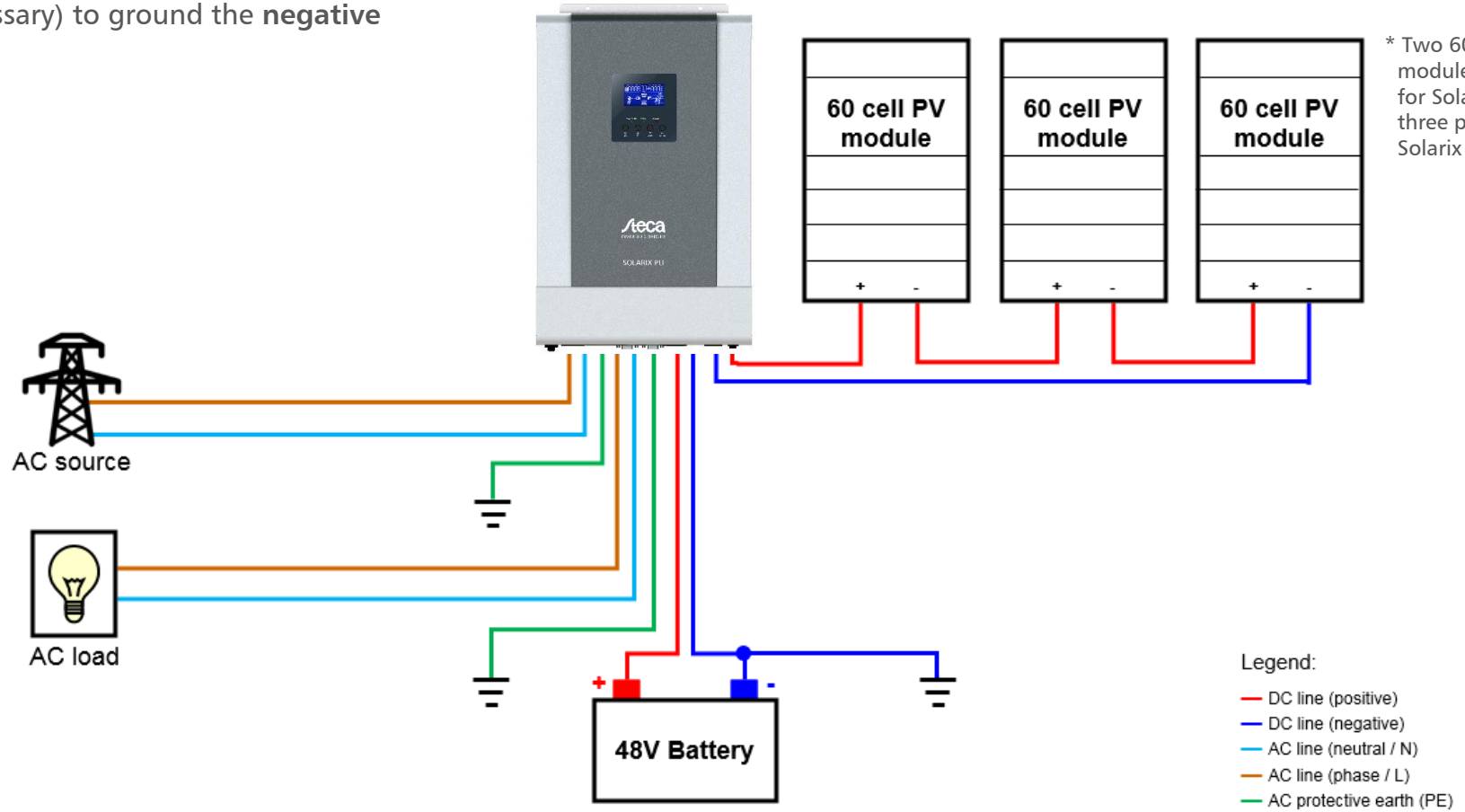


* Two 60-cell PV modules per string for Solarix PLI 2400-24, three per string for Solarix PLI 5000-48

SOLARIX PLI

Battery grounding

- It is possible (but not necessary) to ground the **negative** terminal of the battery

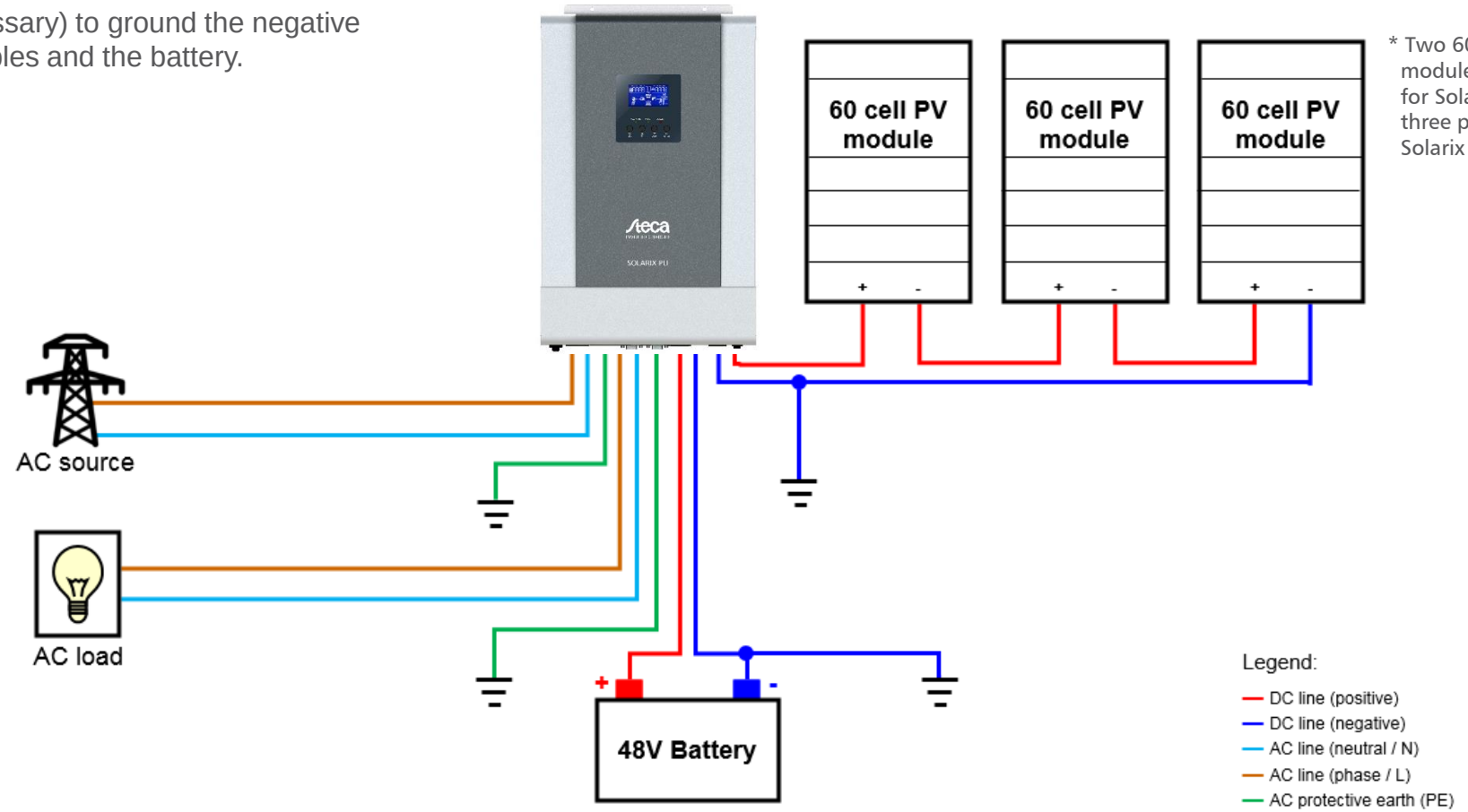


* Two 60-cell PV modules per string for Solarix PLI 2400-24, three per string for Solarix PLI 5000-48

SOLARIX PLI

Battery and PV grounding

- It is possible (but not necessary) to ground the negative terminal of both the PV cables and the battery.



* Two 60-cell PV modules per string for Solarix PLI 2400-24, three per string for Solarix PLI 5000-48

Battery and PV grounding

What type of battery / PV grounding is not possible?

- It is **not** permitted to ground a PV cable and the opposite polarity of the battery terminal at the same time
- It is **not** permitted to ground the positive PV cable and the positive battery terminal at the same time

SOLARIX PLI

AC grounding & operator protection

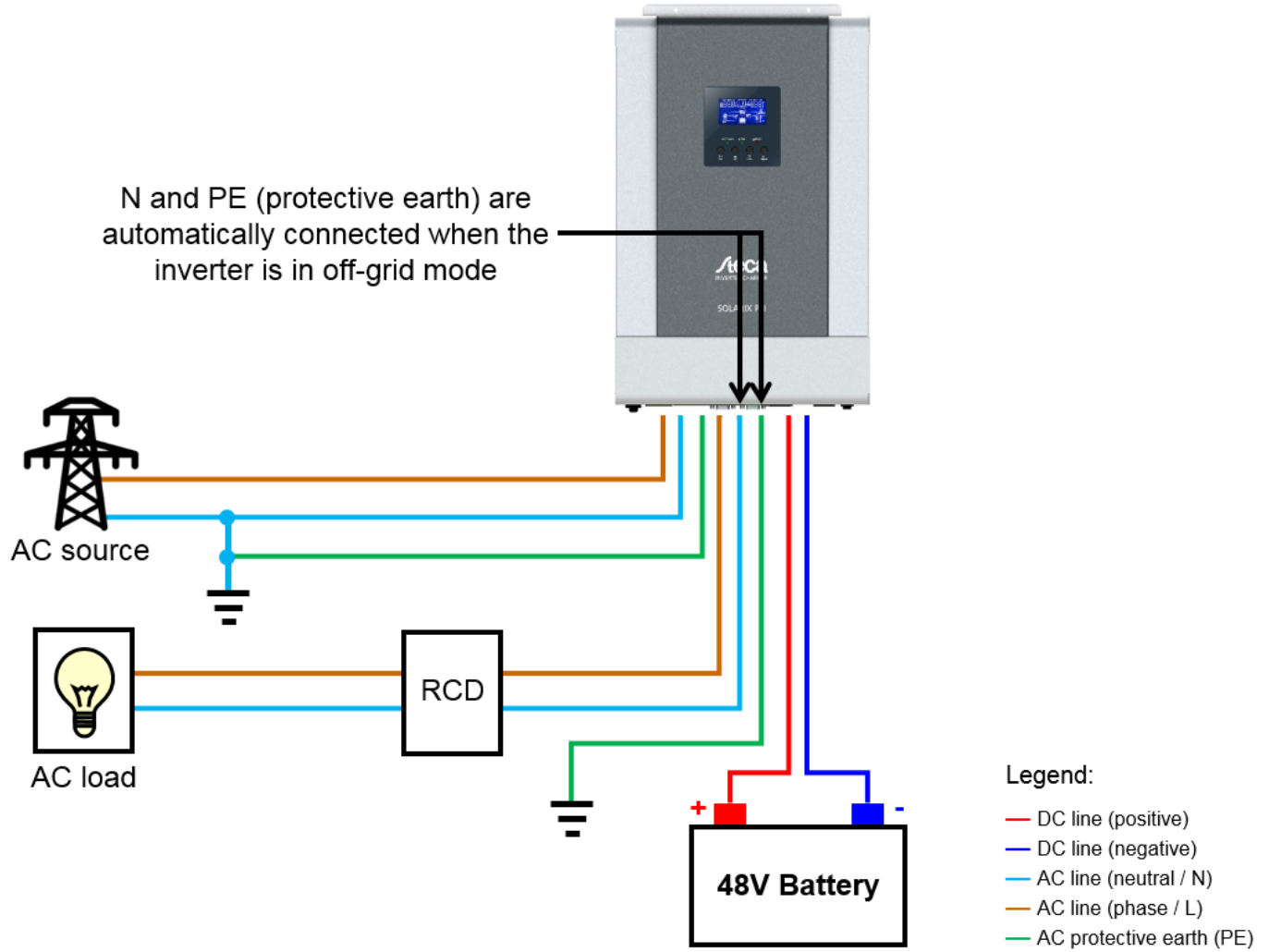
- It is necessary to ground the PE (protective earth) terminals of the AC input and AC output of the Solarix PLI
- When the Solarix PLI is running in inverter / battery mode (disconnected from the AC input), neutral (N) is automatically tied to PE, therefore a residual current device (RCD) will function between the AC output and the loads in this mode
- Take advantage of the automatic N to PE bridging of the inverter, allowing the use of a low-cost RCD

INVERTER SYSTEMS

SOLARIX PLI

AC grounding & operator protection: automatic N to PE bridging

- N and PE (protective earth) are automatically bridged when the inverter operates in off-grid mode so that an RCD will function between the inverter and the AC loads
- Reliable protection with comparatively cheap RCD



INVERTER SYSTEMS

SOLARIX PLI 5000-48

PV sizing example for Solarix PLI 5000-48

Relevant PV module information:

- Total power of PV modules (in Wp)
- Voltage of PV modules (Umpp and Uoc)

SOLARIX PLI

PV sizing example

- The minimum voltages:
  - For Solarix PLI 5000-48 systems the PV voltage should be 68 Vmpp or higher
  - For Solarix PLI 2400-24 systems the PV voltage should be 34 Vmpp or higher

- The absolute maximum voltages under all temperature conditions
  (check the temperature coefficient of your PV modules) :
  - 145 Voc (115 Vmpp) for the Solarix PLI 5000-48
  - 100 Voc (80 Vmpp) for the Solarix PLI 2400-24

- Recommendations:
  - For 36-cell crystalline modules use **5** modules in series per string for Solarix PLI 5000-48
    For 36-cell crystalline modules use **3** modules in series per string for Solarix PLI 2400-24
  - For 60-cell crystalline modules use **3** modules in series per string for Solarix PLI 5000-48
    For 60-cell crystalline modules use **2** modules in series per string for Solarix PLI 2400-24
  - For 72-cell crystalline modules use **2** modules in series per string for Solarix PLI 5000-48
    For 72-cell crystalline modules use **1** module in series per string for Solarix PLI 2400-24

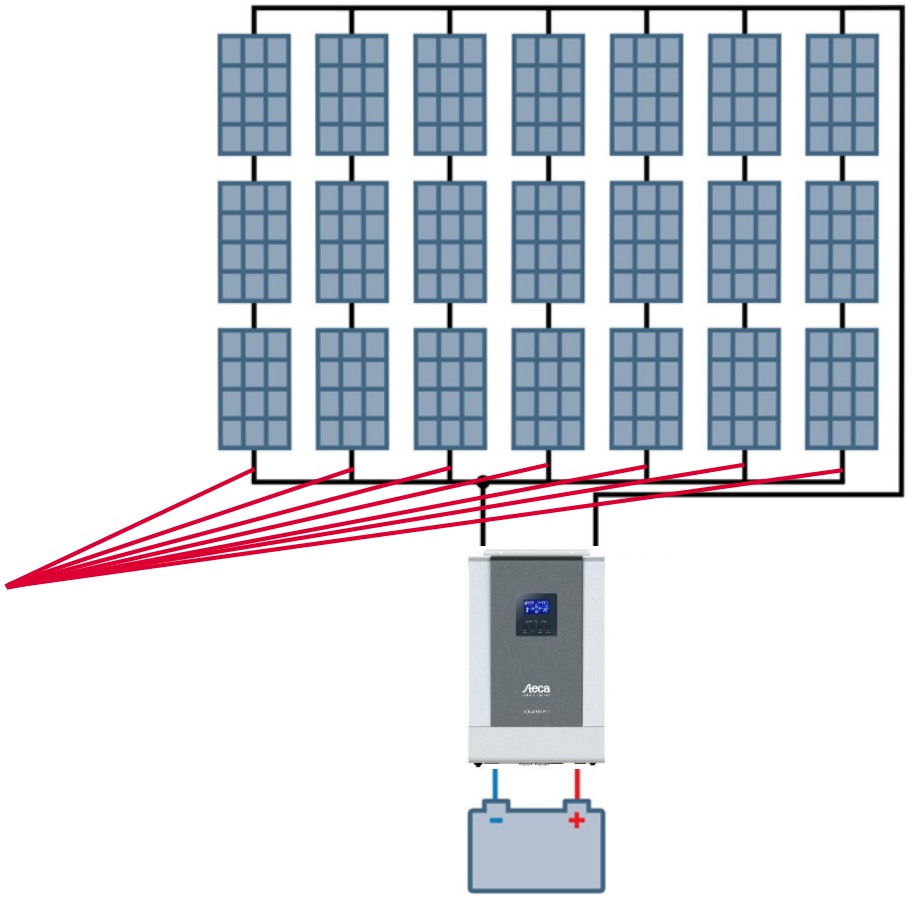
  Note: 72-cell crystalline modules are **not recommended** for the Solarix PLI 2400-24 in many climates

INVERTER SYSTEMS

SOLARIX PLI 5000-48

PV sizing example for Solarix PLI 5000-48

- PV module specifications:
  - 250 Wp modules (60 cells)
  - Umpp = 31.2V
  - Uoc = 37.6V
  - Isc = 8.5A
- Battery voltage 48 V,
  therefore maximum usable power
  4800 W
- String fuses are likely required when using more than 2 strings in parallel



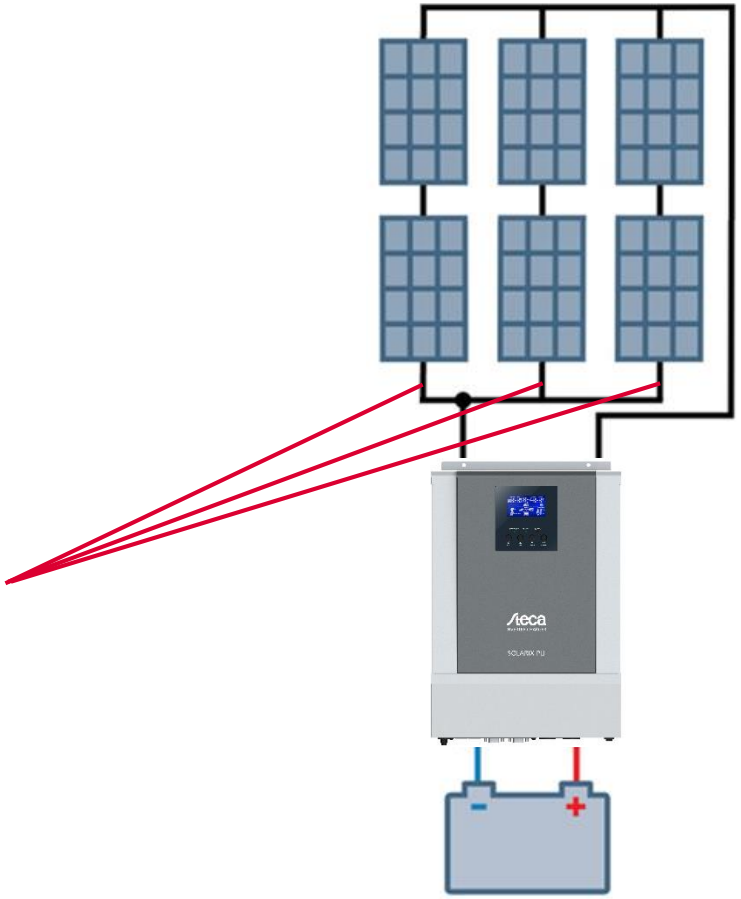
INVERTER SYSTEMS

SOLARIX PLI 2400-24

PV sizing example for Solarix PLI 2400-24

- PV module specifications:
  - 250 Wp modules (60 cells)
  - Umpp = 31.2V
  - Uoc = 37.6V
  - Isc = 8.5A
- Battery voltage 24 V,
  therefore maximum usable power
  1168 W
- String fuses are likely required when using more than 2 strings in parallel

1.5 kWp



SOLARIX PLI

Further considerations

- Ensure a sufficient battery capacity, especially when using an inverter on the same battery.
  Minimum battery size:
  - *(Nominal AC Power * 5h) / Battery voltage = Min. capacity in Ah*

  Feature: the Solarix has an integrated soft-start function so no high currents will flow when first connecting it to a battery.

- Use of a surge protector (SPD) at the PV input (if used) is strongly recommended!

  Example: Citel DS240S-110DC for Solarix PLI 5000-48
  - The clamping voltage must be lower than 160 Vdc
  - The maximum DC operating voltage must be higher than the maximum open-circuit voltage of your PV modules under all temperature conditions

  Example: Citel DS240S-75DC for Solarix PLI 2400-24
  - The clamping voltage must be lower than 110 Vdc
  - The maximum DC operating voltage must be higher than the maximum open-circuit voltage of your PV modules under all temperature conditions

- Use of a surge protector (SPD) at the AC input (if used) is strongly recommended! The clamping voltage must be lower than 300 Vac.

- As with any electronics: keep as cool as possible

Steca
CONTACT DATA

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