



## SP PRO Generic AC Coupling installation notes

### Introduction

A generic grid tie inverter is any grid tie inverter that is not managed by the SP PRO through the SP PRO communications link.

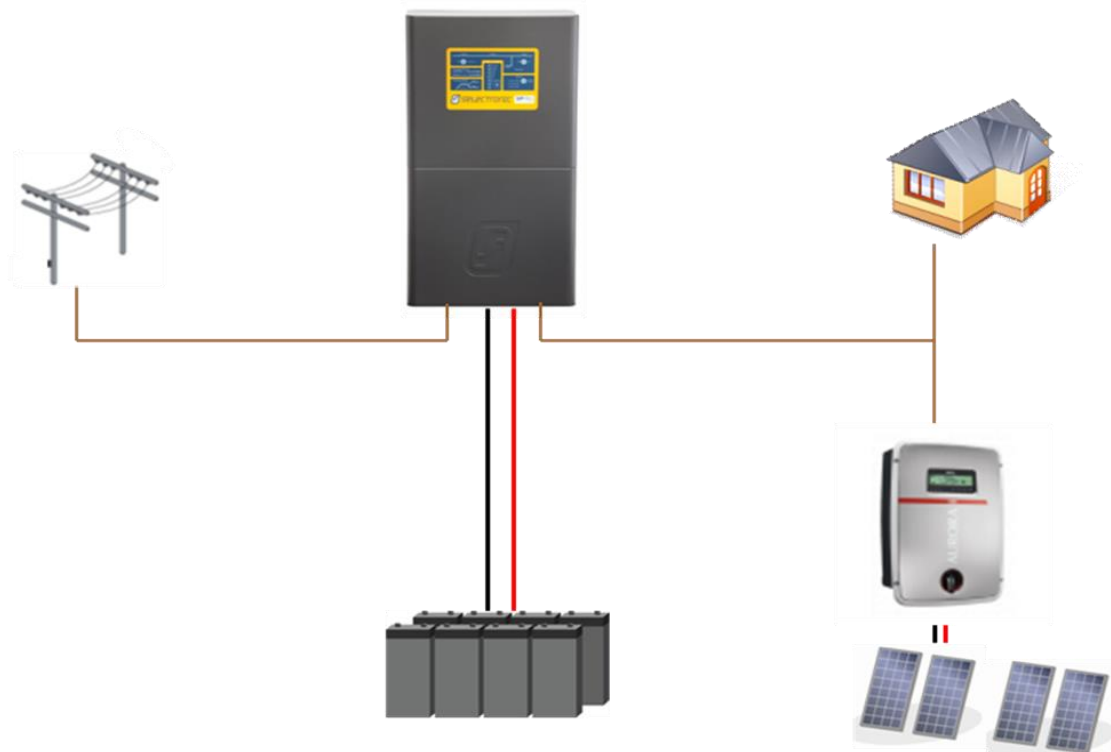
The SP PRO Generic AC Coupling provides a method of linking generic grid tie inverters to the SP PRO AU via the AC Load supply allowing the PV Solar to be available during a grid outage. This configuration is only suitable for Solar Hybrid (grid connected) power systems where grid export limit is not required. For off grid systems or where full control of the PV solar is required (including grid export limit) use SP PRO Managed AC coupling.

This document details the additional steps needed to install the generic system. The SP PRO and generic inverters can be installed as per their individual installation instructions.

*Note: This document needs to be read in conjunction with the SP PRO Instruction Manual and the appropriate generic inverter Instruction Manual.*

### Overview

The following is an overview of the connections which form part of the AC Coupled installation of a generic grid inverter and SP PRO.



*Note: Maximum Grid inverter AC output current to be not more than SP PRO rating.*

# SP PRO Generic AC Coupling Installation Notes



## System Requirements

To successfully install a SP PRO generic system, there are particular system requirements that need to be met.

- This installation document is applicable to SP PRO series I and II.
- Combined maximum AC output of all the connected generic inverters must not exceed the continuous SP PRO output power rating (see table 1 below).
- Battery bank must be sized to suit the SP PRO model and the combined maximum AC Output power of the generic inverters (see table 2).
- SP PRO must have appropriate firmware version installed (Rev 7.0 and above).
- SP PRO generic AC coupling is only suitable for grid connected systems.
- SP PRO generic AC coupling cannot control any grid export limits.
- The Grid Disconnect function in the Solar Hybrid Control should not be used.

## SP PRO MODEL AND TOTAL GENERIC AC OUTPUT

The total AC output of the Generic inverters must not be greater than the nominal capacity of the SP PRO.

| SP PRO Model | Combined maximum KACO AC Output power |
|--------------|---------------------------------------|
| SPMC240      | 3 kW                                  |
| SPMC241      | 4.5 kW                                |
| SPMC481      | 5 kW                                  |
| SPMC482      | 7.5 kW                                |
| SPMC1201     | 7.5 kW                                |
| SPLC1200     | 15 kW                                 |
| SPLC1202     | 20 kW                                 |

Table 1: Maximum Generic AC output per SP PRO model

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## SP PRO MODEL AND MINIMUM BATTERY CAPACITY

The minimum battery capacity that must be connected to the SP PRO varies depending on SP PRO model, an overriding minimum battery capacity and the combined maximum generic AC Output. The following table defines the minimum battery capacity for each SP PRO model.

It is assumed that the maximum short term (10 seconds) battery charge current is C5. If the battery bank can take a higher short term charge current then a lower battery capacity may be used. To use a battery size that is less than the table below please use the "Site Configuration Wizard" found in SP LINK to determine a suitable battery size.

| Minimum Battery Capacity at C10 for Generic AC coupling |              |         |         |         |          |          |          |
|---|--------------|---------|---------|---------|----------|----------|----------|
| Combined max. generic AC Output                         | SP PRO Model |         |         |         |          |          |          |
|   | SPMC240      | SPMC241 | SPMC481 | SPMC482 | SPMC1201 | SPLC1200 | SPLC1202 |
| 1 kW  | 200 Ah       | 200 Ah  | 180 Ah  | 180 Ah  | 100 Ah   | 250 Ah   | 250 Ah   |
| 2 kW  | 400 Ah       | 400 Ah  | 200 Ah  | 200 Ah  | 100 Ah   | 250 Ah   | 250 Ah   |
| 3 kW  | 600 Ah       | 600 Ah  | 300 Ah  | 300 Ah  | 120 Ah   | 250 Ah   | 250 Ah   |
| 4 kW  |              | 800 Ah  | 400 Ah  | 400 Ah  | 160 Ah   | 250 Ah   | 250 Ah   |
| 5 kW  |              | 1000 Ah | 500 Ah  | 500 Ah  | 200 Ah   | 250 Ah   | 250 Ah   |
| 6 kW  |              |         |         | 600 Ah  | 240 Ah   | 250 Ah   | 250 Ah   |
| 7 kW  | -            |         |         | 700 Ah  | 280 Ah   | 280 Ah   | 280 Ah   |
| 8 kW  | -            |         |         |         |          | 320 Ah   | 320 Ah   |
| 9 kW  | -            |         |         |         |          | 360 Ah   | 360 Ah   |
| 10 kW   | -            | -       |         |         |          | 400 Ah   | 400 Ah   |
| 11 kW   | -            | -       | -       |         |          | 440 Ah   | 440 Ah   |
| 12 kW   | -            | -       | -       |         |          | 480 Ah   | 480 Ah   |
| 13 kW   | -            | -       | -       |         |          | 520 Ah   | 520 Ah   |
| 14 kW   | -            | -       | -       |         |          | 560 Ah   | 560 Ah   |
| 15 kW   | -            | -       | -       |         |          | 600 Ah   | 600 Ah   |
| 16 kW   | -            | -       | -       | -       | -        |          | 640 Ah   |
| 17 kW   | -            | -       | -       | -       | -        |          | 680 Ah   |
| 18 kW   | -            | -       | -       | -       | -        |          | 720 Ah   |
| 19 kW   | -            | -       | -       | -       | -        |          | 760 Ah   |
| 20 kW   | -            | -       | -       | -       | -        |          | 800 Ah   |

Table 2: Minimum battery capacity per SP PRO model and Total generic AC power

*Note 1: Shaded cells = minimum battery capacity regardless.*

*Note 2: – = n/a, maximum power exceeded for that SP PRO model.*

*Note 3: Battery capacity is C10 rating.*

*Note 4: Round battery capacity up as appropriate to available battery sizes.*

Ensure that the system meets these minimum battery capacity requirements. Any battery combinations larger than the minimum are suitable.

# SP PRO Generic AC Coupling Installation Notes



## SP PRO Firmware Requirements

The SP PRO units' Firmware Version 7.0 or later is required

SP PRO Firmware Version 7.0 or later is required. To check firmware revision run SP LINK, connect to the SP PRO and go to Data View – Technical Data – “SP PRO Revision” and “Firmware Version”

- Older revisions of firmware must be updated to firmware revision 7.00 or later.
- Do **NOT** change any configuration settings until firmware is updated.

| Now                       | Today                        | DC History | AC History | Technical Data | E |
|---------------------------|------------------------------|------------|------------|----------------|---|
| Inverter                  |                              |            |            |                |   |
| SP PRO Model              | Power Module 1 Serial Number |            |            |                |   |
| SPMC481-AU                | 90044                        |            |            |                |   |
| SP PRO Ratings            | Power Module 1 Revision      |            |            |                |   |
| 48V DC, 5kW, 240V AC      | 3                            |            |            |                |   |
| SP PRO Serial Number      | Power Module 1 Mod Status    |            |            |                |   |
| 94129                     |                              |            |            |                |   |
| SP PRO Revision           | Power Module 2 Serial Number |            |            |                |   |
| 20                        | 90040                        |            |            |                |   |
| SP PRO Mod Status         | Power Module 2 Revision      |            |            |                |   |
|                           | 3                            |            |            |                |   |
| Software Version          | Power Module 2 Mod Status    |            |            |                |   |
| 7.00                      |                              |            |            |                |   |
| Control PCA Serial Number | SP PRO Total Run Time        |            |            |                |   |
| 88900                     | 21184.0 h                    |            |            |                |   |
| Control PCA Revision      | Grid Connect SW Version      |            |            |                |   |
| 6                         | 2.00                         |            |            |                |   |
| Control PCA Mod Status    |                              |            |            |                |   |
| 6                         |                              |            |            |                |   |

Note: Selectronic web site – <http://www.selectronic.com.au> for latest SP PRO firmware and Tech Note 34 SP PRO Firmware Update Procedure.

# SP PRO Generic AC Coupling Installation Notes

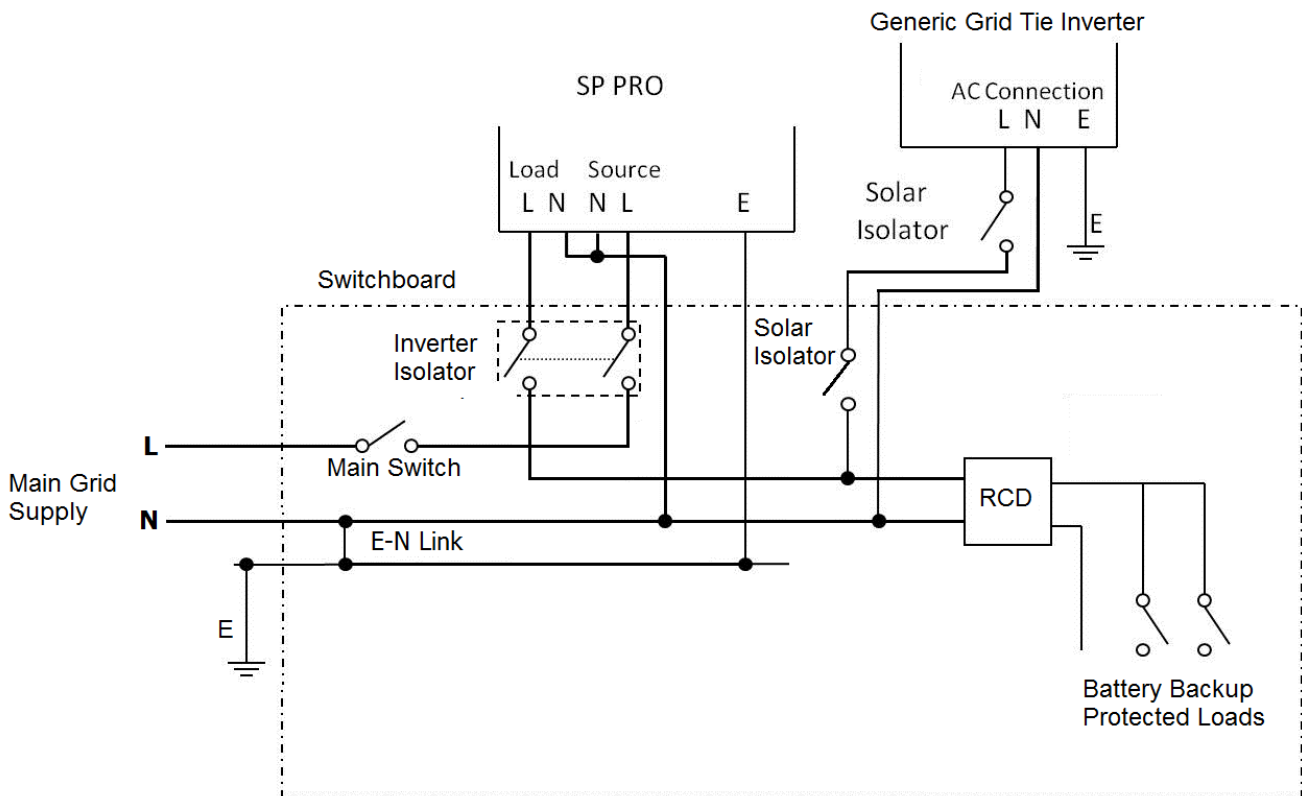


## Installation

The SP PRO and generic inverters should be installed as per their respective installation instructions.

## GENERIC AC WIRING

The generic AC output wiring must be connected to the AC Load terminals of the SP PRO in accordance with local wiring rules for correct operation.



Generic AC Wiring guide for Grid connected installation

*Note: This is only suitable for use with the grid supply.*

# SP PRO Generic AC Coupling Installation Notes



## CONFIGURATION – ADDITIONAL SETTINGS

To configure the SP PRO for Generic AC coupling use the “Site Configuration Wizard” in SP LINK.

Detailed below are the additional settings that will be set when Generic AC Coupling is selected in the wizard. The remainder of systems settings that will be set are not covered in this document.

The SP PRO **must** be configured **before** any of the generic inverters are energised. The AC coupled failsafe system in the SP PRO is only enabled when the correct configuration has been programmed into the SP PRO.

## SP LINK – CONFIGURATION SETTINGS – SYSTEM

The additional system settings are detailed and shown below.

- **Enable Generic AC Coupling**

The screenshot shows the 'System' tab configuration settings in SP LINK. On the left, under 'Communication', there are four dropdown menus: 'Port 1 Baud Rate' (57600), 'Port 1 DTR/DCD' (Enabled), 'Port 2 Baud Rate' (9600), and 'Port 2 DTR/DCD' (Enabled). On the right, under 'Enable KACO Link', there is a 'KACO Com Port' dropdown (Disabled) and a 'Number of KACO inverters connected [1-5]' spinner (0). Below that, under 'Generic AC Coupling', the 'Generic AC Coupling' dropdown is circled in red and set to 'Enabled'.

SP LINK - Configuration Settings – System tab

- **Grid Export Limit and AC source Power settings**

The wizard will set the AC Source Power (in Configuration Settings – Quick Start) to a value that is higher than the total maximum power output of the connected generic grid tie inverters

If any of the Solar Hybrid Control - Priority (in Configuration Settings) Schedules are Enabled then ensure that ALL of the used Grid Export Limit settings have been set to a value that is higher than the total maximum power output of the connected generic grid tie inverters.

Additionally all of the Grid Disconnect settings are set to Disabled (default setting).

The SP PRO cannot control the output power of the generic AC grid tie inverters therefore cannot control these functions.

# SP PRO Generic AC Coupling Installation Notes



Site Information Configuration Settings QuickView Data View Service Settings

Configuration File C:\Data downloads\Display inverter\Display inverter Config1.SPLC

**Quick Start**

**Unit Application** Off Grid **Battery Type** Sealed **AC Source Power** [0.1 - 50.0kW] 2.5 kW **SoC Control** Disabled

Inverter Battery Charger AC Source Solar Hybrid Control System Inputs / Outputs Shunts Expansion Card Wiring Diagram

Priority 1 Priority 2 Priority 3 Priority 4 Priority 5 Priority 6 Priority 7 Priority 8

Activation

**Enable Date Time Activation** Enabled

Active Dates

**Begin Date** [1 Jan - 31 Dec] 01 Jan

**End Date** [1 Jan - 31 Dec] 31 Dec

Active Time

**Day** All

**Start Time** [00:00 - 23:59] 15:00

**Stop Time** [00:00 - 23:59] 17:00

Digital Control

**Activation Input** None

**Activation Input Edge** Rising

**Active Output** None

AC Source

**Grid Input Limit** [0 - 50 kW] 2.5 kW

**Grid Export Limit** [0 - 50 kW] 2.5 kW

**Grid Disconnect** Disabled

SP LINK - Configuration Settings – Solar Hybrid Control and Quick Start – AC Source Power

## SYSTEM COMMISSIONING – ADDITIONAL TESTS

In addition to the normal system testing that would be performed, the following additional tests must be performed as detailed below.

### Verify ac coupled fail safe.

1. Switch off grid supply (AC Source input to SP PRO)
2. Switch Off all AC Loads whilst keeping Generic Inverter running
3. Monitor battery voltage for increase above battery charge voltage
  - a. SP PRO will increase frequency (up to 55 Hz as required) of AC Load forcing generic inverter to switch off due to grid frequency
4. Verify generic inverter switches off due to frequency increase

## Operation

The SP PRO will operate normally, exporting and charging as set and required.

The AC Load readings including AC Load kWh accumulations will be inaccurate during generic AC coupling inverter operation. This is due to the generic inverter directly feeding the AC load which the SP PRO can only detect as a reduction in load. This is normal operation.

## Additional Information

Selectronic web site – <http://www.selectronic.com.au> or contact the Selectronic Sales Team.