



SP PRO FRONIUS Managed AC Coupling

INTRODUCTION

The SP PRO FRONIUS Managed AC Coupling provides a method of linking the Single phase Fronius Primo range of grid tie inverters to the SP PRO via the AC Load supply so that regardless of whether the grid or a generator is connected, the SP PRO can manage and control the Fronius grid tie inverters.

Each SP PRO can manage a maximum of five Fronius grid tie inverters by commanding each one to output the required amount of power to simultaneously supply the load, export to the grid and charge the battery bank as required at any particular point in time. This is done via a communications link between the SP PRO and the Fronius Primo.

This document details the additional steps needed to install the managed system. The SP PRO and Fronius inverters must be installed as per their individual installation instructions with the additional allowance of communications cables linking all of the inverters together.

Note: *This document needs to be read in conjunction with the SP PRO Instruction Manual and the Fronius Primo Instruction Manual.*

Important information

Only make adjustments to the Fronius configuration as indicated in this document.

Series 2 SPPRO : Single and Multi Phase compatible.

Series 1 SPPRO : Single Phase Only!

ADDITIONAL INFORMATION

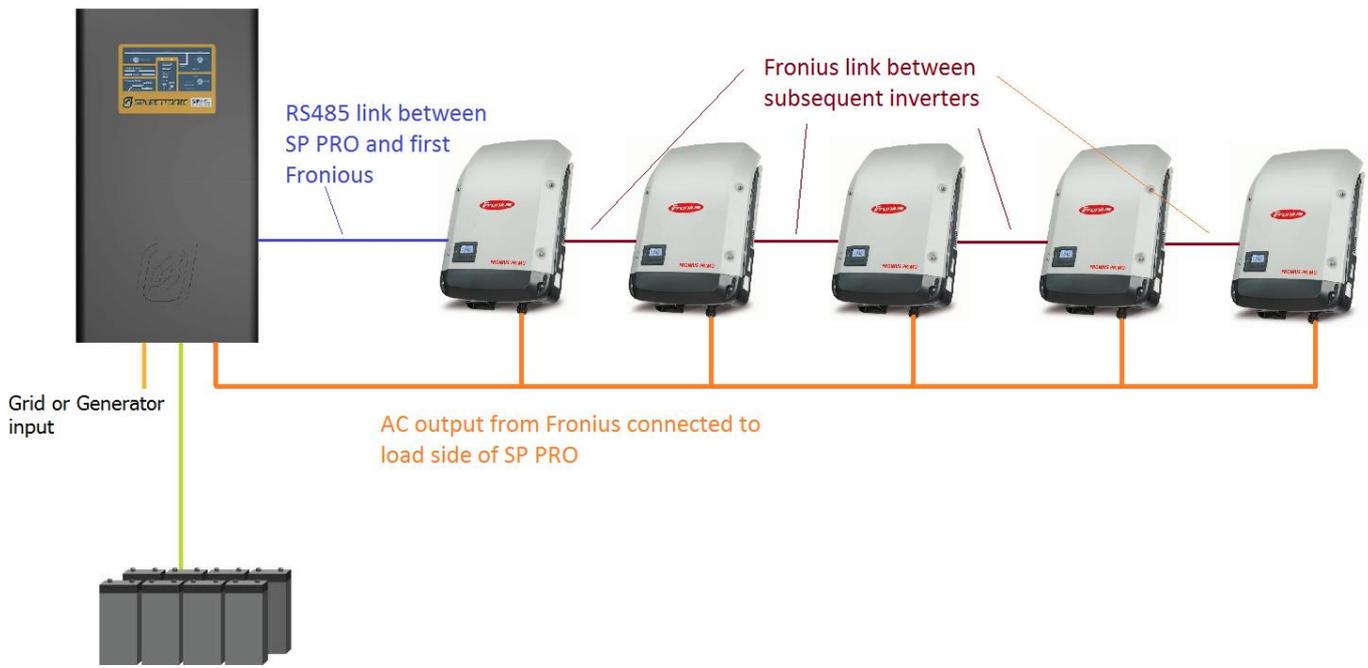
Selectronic web site – <http://www.selectronic.com.au> or contact the Selectronic Sales Team.

SP PRO Fronius Managed AC Coupling Installation Notes



OVERVIEW – SERIES 2

The diagram below shows a managed AC coupled system with five FRONIUS inverters.



SYSTEM REQUIREMENTS

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

- This installation document is applicable to SP PRO series II inverters only. To install an AC coupled system using a Series I SP PRO inverter an additional AC coupling adaptor (stock code 005077) is required.
- Combined maximum AC output of all the connected Fronius inverters must not exceed twice the continuous SP PRO output power rating.
- Battery bank must be sized to suit the SP PRO model and the combined maximum AC Output power of the Fronius inverters (Page 4 – 6).
- The SP PRO must have firmware 9.09 or higher to supports Fronius.
- The Fronius Primo must be Selectronic Certified.
- Maximum of five Fronius inverters per SP PRO.

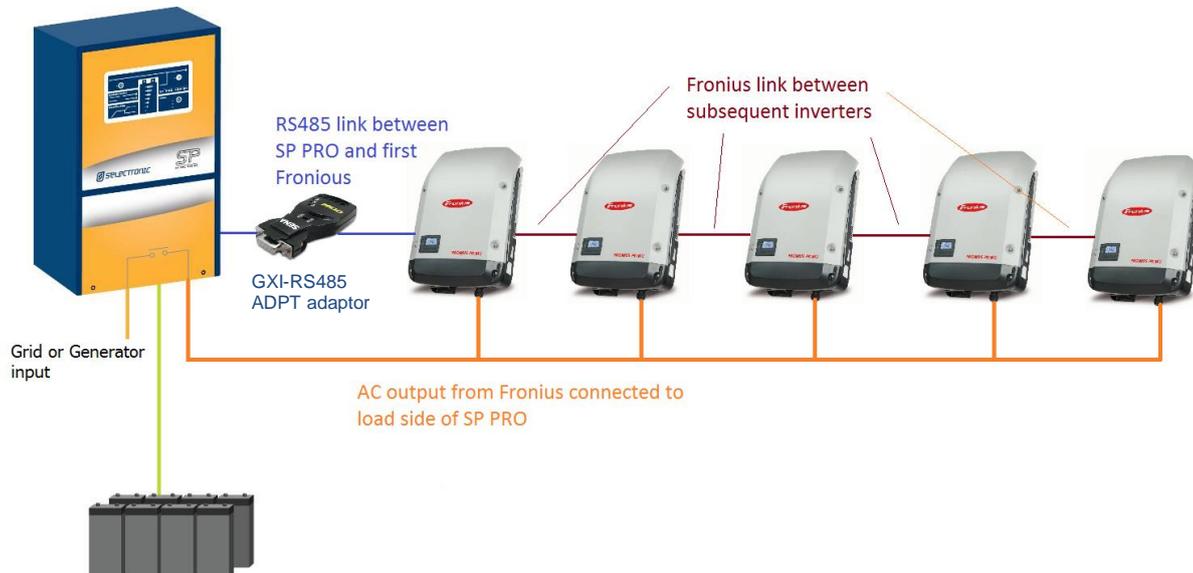
SP PRO Fronius Managed AC Coupling Installation Notes



OVERVIEW – SERIES 1

SUITABLE FOR SINGLE PHASE SYSTEMS ONLY

The diagram below shows a managed AC coupled system with five FRONIUS inverters.



SYSTEM REQUIREMENTS

To successfully install a SP PRO Series I - Fronius managed system, there are particular system requirements that need to be met.

- This installation document is applicable to SP PRO series I inverters only.
- Combined maximum AC output of all the connected Fronius inverters must not exceed twice the continuous SP PRO output power rating.
- Battery bank must be sized to suit the SP PRO model and the combined maximum AC Output power of the Fronius inverters.
- SP PRO inverters must have firmware version 9.09 or higher installed.
- The Fronius Primo must be Selectronic Certified.
- Maximum of five Fronius inverters per SP PRO

SP PRO Fronius Managed AC Coupling Installation Notes



SP PRO MODEL AND MINIMUM BATTERY CAPACITY FOR SOLAR HYBRID SYSTEMS

For a Solar Hybrid (grid connected) system, the minimum battery capacity that must be connected to the SP PRO inverter varies depending on SP PRO model only. The following table defines the minimum battery capacity for each SP PRO model.

When the system is islanded (e.g. during a grid outage) the SP PRO will limit the output of the AC coupled solar based on the actual installed battery size (see table 3 in Appendix I)

Minimum Battery Capacity for Solar Hybrid Systems (@C10)^{1,2} Lead acid battery in Blue, Lithium battery in Red

Combined max. Fronius AC Output	SP PRO Model Family							
	SPMC240	SPMC241	SPMC481	SPMC482	SPMC1201	SPLC1200	SPLC1202	SPLC1201 Series 1
1-15 kW	180 Ah (4.3kWh) 1.5kWh	180 Ah (4.3kWh) 1.5kWh	180 Ah (8.6kWh) 3.0kWh	180 Ah (8.6kWh) 3.0kWh	100 Ah (12kWh) 4.0kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
16-30kW	Not valid	Not valid	Not valid	Not valid	Not valid	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
35 kW	Not valid	Not valid	Not valid	Not valid	Not valid	Not valid	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
40 kW	Not valid	Not valid	Not valid	Not valid	Not valid	Not valid	250 Ah (30kWh) 10kWh	Not valid

Table 1: Solar Hybrid: Minimum Battery capacity for each SP PRO model and AC solar

Notes:

1. Battery capacity is C10 rating.
2. 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 Fronius Managed AC Coupling Installation Notes



SP PRO MODEL AND MINIMUM BATTERY CAPACITY FOR OFF GRID SYSTEM

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

Minimum Battery Capacity for Off Grid (@C10)^{1,2} Lead acid battery in **Blue**, Lithium battery in **Red**

Combined max. Fronius AC Output	SP PRO Model							
	SPMC240	SPMC241	SPMC481	SPMC482	SPMC1201	SPLC1200	SPLC1202	SPLC1201 Series 1
2 kW	180 Ah (4.3kWh) 2.6kWh	180 Ah (4.3kWh) 2.6kWh	180 Ah (8.6kWh) 3.0kWh	180 Ah (8.6kWh) 3.0kWh	100 Ah (12kWh) 4.0kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
3 kW	240 Ah (6kWh) 4.0kWh	240 Ah (6kWh) 4.0kWh	180 Ah (8.6kWh) 4.0kWh	180 Ah (8.6kWh) 4.0kWh	100 Ah (12kWh) 4.0kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
4 kW	320 Ah (8kWh) 5.3kWh	320 Ah (8kWh) 5.3kWh	180 Ah (8kWh) 5.3kWh	180 Ah (8kWh) 5.3kWh	100 Ah (12kWh) 5.3kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
5 kW	400 Ah (10kWh) 6.6kWh	400 Ah (10kWh) 6.6kWh	200 Ah (10kWh) 6.6kWh	200 Ah (10kWh) 6.6kWh	100 Ah (12kWh) 6.6kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
6 kW	480 Ah (12kWh) 8.0kWh	480 Ah (12kWh) 8.0kWh	240 Ah (12kWh) 8.0kWh	240 Ah (12kWh) 8.0kWh	100 Ah (12kWh) 8.0kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
7 kW	Not valid	560 Ah (14kWh) 9.3kWh	280 Ah (14kWh) 9.3kWh	280 Ah (14kWh) 9.3kWh	112 Ah (14kWh) 9.3kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh	250 Ah (30kWh) 10kWh
8 kW	Not valid	640 Ah (16kWh) 10.6kWh	320 Ah (16kWh) 10.6kWh	320 Ah (16kWh) 10.6kWh	128 Ah (16kWh) 10.6kWh	250 Ah (30kWh) 10.6kWh	250 Ah (30kWh) 10.6kWh	250 Ah (30kWh) 10.6kWh
9 kW	Not valid	720 Ah (18kWh) 12.0kWh	360 Ah (18kWh) 12.0kWh	360 Ah (18kWh) 12.0kWh	144 Ah (18kWh) 12.0kWh	250 Ah (30kWh) 12.0kWh	250 Ah (30kWh) 12.0kWh	250 Ah (30kWh) 12.0kWh
10 kW	Not valid	Not valid	400 Ah (20kWh) 13.3kWh	400 Ah (20kWh) 13.3kWh	160 Ah (20kWh) 13.3kWh	250 Ah (30kWh) 13.3kWh	250 Ah (30kWh) 13.3kWh	250 Ah (30kWh) 13.3kWh

Table 2a: Off Grid: Minimum battery capacity for each SP PRO model and AC solar

....continued next page

SP PRO Fronius Managed AC Coupling Installation Notes



Minimum Battery Capacity for Off Grid (@C10)^{1,2} Lead acid battery in Blue, Lithium battery in Red

Combined max. Fronius AC Output	SP PRO Model							
	SPMC240	SPMC241	SPMC481	SPMC482	SPMC1201	SPLC1200	SPLC1202	SPLC1201 Series 1
11 kW	Not valid	Not valid	Not valid	440 Ah (22kWh) 14.6kWh	176 Ah (22kWh) 14.6kWh	250 Ah (30kWh) 14.6kWh	250 Ah (30kWh) 14.6kWh	250 Ah (30kWh) 14.6kWh
12 kW	Not valid	Not valid	Not valid	480 Ah (24kWh) 16.0kWh	192 Ah (24kWh) 16.0kWh	250 Ah (30kWh) 16.0kWh	250 Ah (30kWh) 16.0kWh	250 Ah (30kWh) 16.0kWh
13 kW	Not valid	Not valid	Not valid	520 Ah (26kWh) 17.3kWh	208 Ah (26kWh) 17.3kWh	250 Ah (30kWh) 17.3kWh	250 Ah (30kWh) 17.3kWh	250 Ah (30kWh) 17.3kWh
14 kW	Not valid	Not valid	Not valid	560 Ah (28kWh) 18.6kWh	224 Ah (28kWh) 18.6kWh	250 Ah (30kWh) 18.6kWh	250 Ah (30kWh) 18.6kWh	250 Ah (30kWh) 18.6kWh
15 kW	Not valid	Not valid	Not valid	600 Ah (30kWh) 20.0kWh	250 Ah (30kWh) 20.0kWh	250 Ah (30kWh) 20.0kWh	250 Ah (30kWh) 20.0kWh	250 Ah (30kWh) 20.0kWh
20 kW	Not valid	Not valid	Not valid	Not valid	Not valid	320 Ah (40kWh) 26.6kWh	320 Ah (40kWh) 26.6kWh	320 Ah (40kWh) 26.6kWh
25 kW	Not valid	Not valid	Not valid	Not valid	Not valid	400 Ah (50kWh) 33.3kWh	400 Ah (50kWh) 33.3kWh	400 Ah (50kWh) 33.3kWh
30 kW	Not valid	Not valid	Not valid	Not valid	Not valid	500 Ah (60kWh) 40.0kWh	500 Ah (60kWh) 40.0kWh	500 Ah (60kWh) 40.0kWh
35 kW	Not valid	Not valid	Not valid	Not valid	Not valid	Not valid	570 Ah (70kWh) 46.6kWh	570 Ah (70kWh) 46.6kWh
40 kW	Not valid	Not valid	Not valid	Not valid	Not valid	Not valid	650 Ah (80kWh) 53.3kWh	Not valid

Table 2b: Off Grid: Minimum battery capacity for each SP PRO model and AC solar

Notes:

1. Battery capacity is C10 rating.
2. 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 Fronius Managed AC Coupling Installation Notes



SP PRO FIRMWARE REQUIREMENTS

1. SP PRO Software Version 9.09 or higher is required. To check software revision run SP LINK, connect to the SP PRO and go to Data View – Technical Data – “SP PRO Revision” and “Software Version”.
- Older revisions of firmware must be updated to firmware revision 9.09 or higher.
 - Do **NOT** change any configuration settings until firmware is updated.

Inverter	
SP PRO Model	Control PCA Serial
SPMC482-AU	121331
SP PRO Ratings	Control PCA Revision
48V DC, 7.5kW, 240V AC	22
SP PRO Serial Number	Control PCA Mod Status
125055	
SP PRO Revision	Power PCA 1 Serial
21	115531
SP PRO Mod Status	Power PCA 1 Revision
	3
Software Version	Power PCA 1 Mod Status
9.09.6	
String Inverters Supported	Power PCA 2 Serial
ABB Solar, Fronius	115755
Grid Connect SW Version	Power PCA 2 Revision
2.00	3
SP PRO Total Run Time	Power PCA 2 Mod Status
30233.0 h	

Data View – Technical Data screen

Note: Selectronic web site – <http://www.selectronic.com.au> for latest SP LINK software with the SP PRO firmware included.

FRONIUS PRIMO MUST BE SELECTRONIC CERTIFIED

The Fronius Primo inverter must be Selectronic Certified. Other Fronius Primo inverters will not operate correctly with the SP PRO in a managed AC coupled configuration.



SP PRO Fronius Managed AC Coupling Installation Notes



INSTALLATION

The SP PRO and Fronius inverters must be installed as per their respective installation instructions. Particular instructions directly related to Managed AC Coupling are listed below.

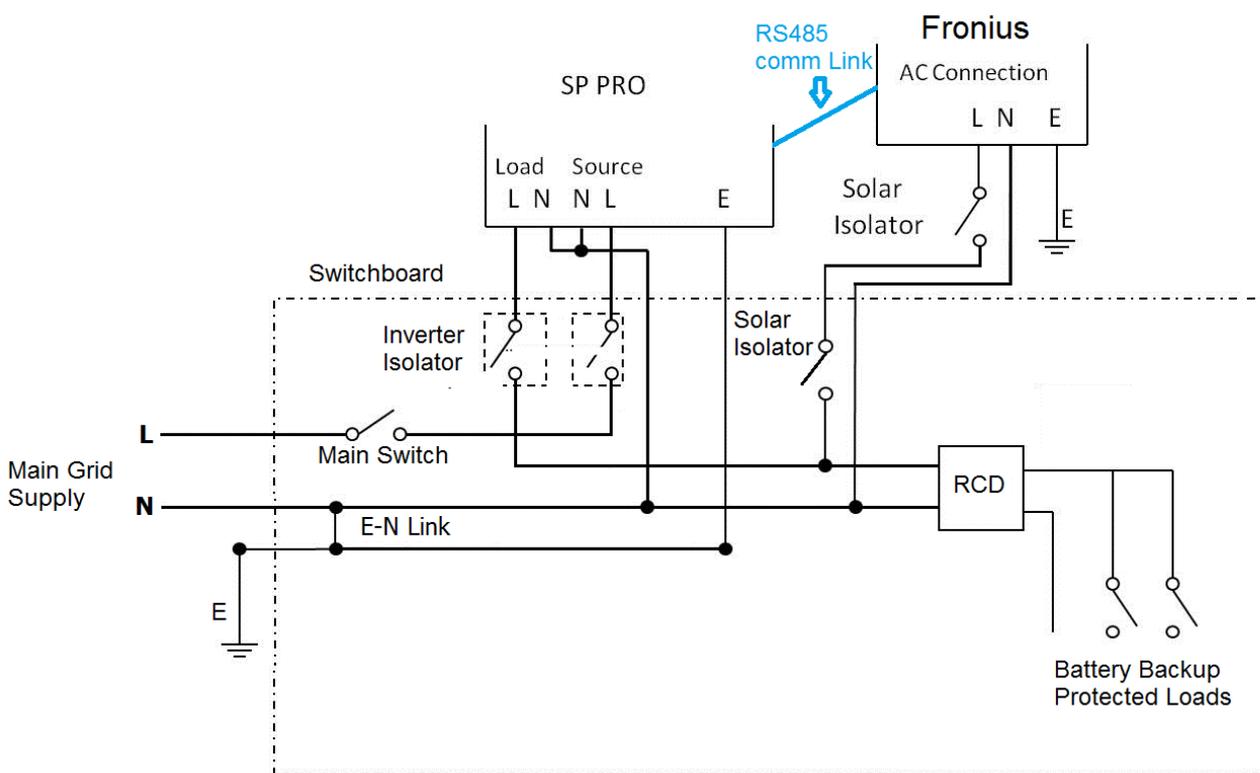
It is good practice to number each Fronius inverter from 1 up to 5 so that each inverter can be easily referenced within SP LINK.

Series 2 Only – In a three phase AC coupled system label each Fronius inverter L1-1 to L1-5 for the Fronius inverters connected to SP PRO L1, L2-1 to L2-5 for those connected to L2 and so on.

This number 1 to 5 is used for the Communications Link addressing. See Configuration section.

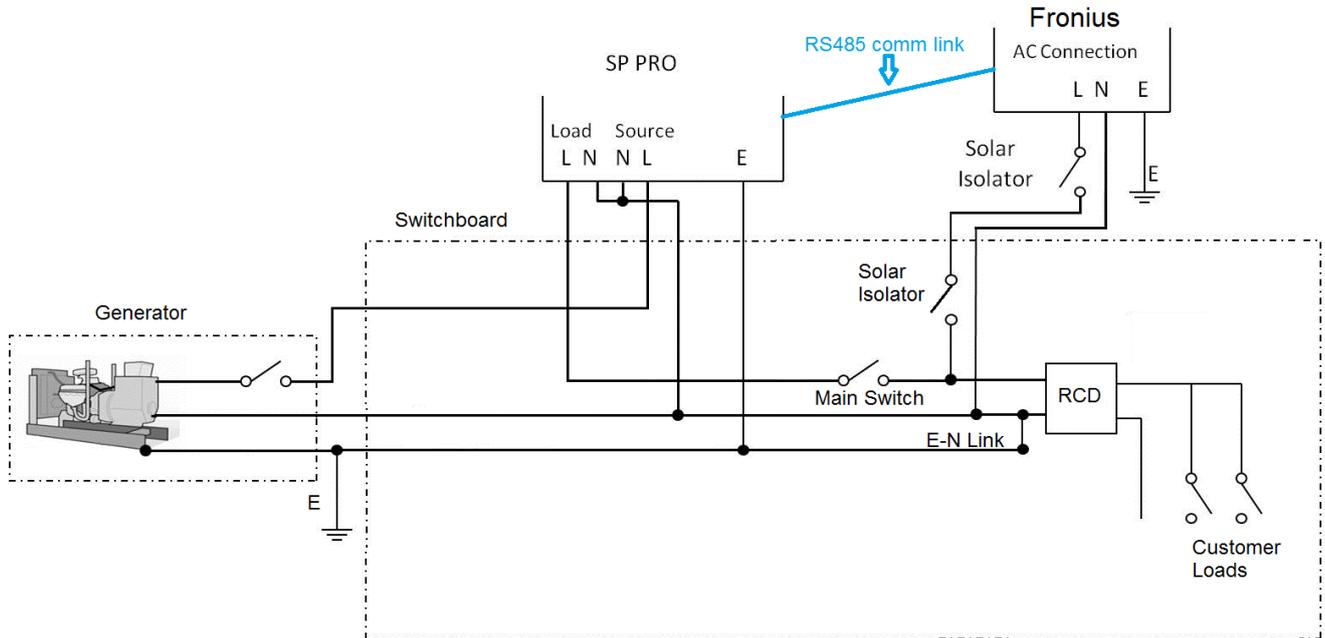
FRONIUS AC WIRING

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



Fronius AC Wiring guide for Grid connected installation

SP PRO Fronius Managed AC Coupling Installation Notes



Fronius AC Wiring guide for Off Grid connected installation

Note: The system will NOT function correctly if the Fronius inverters are installed on the AC Source side of the SP PRO.

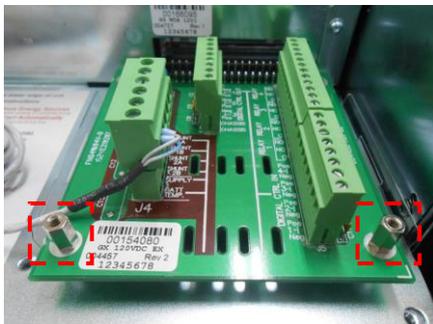
SP PRO Fronius Managed AC Coupling Installation Notes



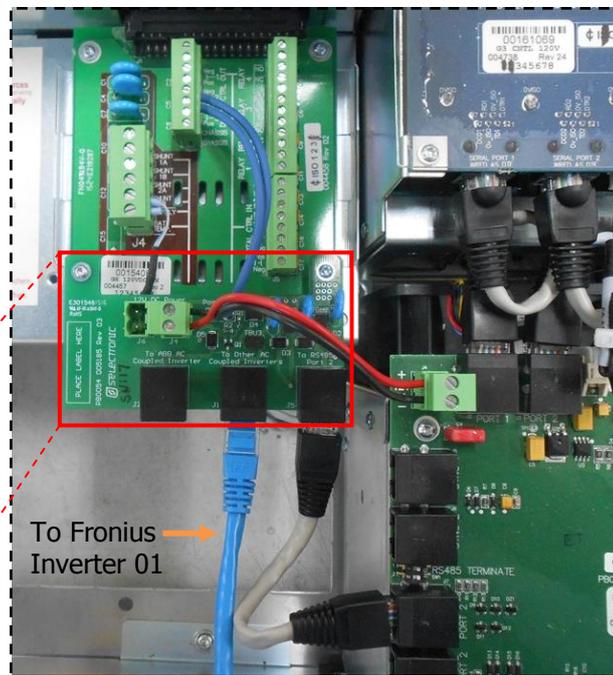
COMMUNICATIONS LINK (RS485)

The communication link always starts at the SP PRO and links to the "AC Coupled Interface PCA", then connects to the first Fronius Inverter (Master). The Fronius link is used to connect subsequent Fronius inverters ON the same phase as the SP PRO. Do Not Connect Fronius inverters on different phases together.

To install the AC Coupled Interface PCA, remove the bottom two screws from the Expansion Card and replace them with the provided 2x stand offs. Then mount the AC Coupled Interface PCA to the Expansion Card inside the SP PRO close to the Serial Communication PCA as illustrated.



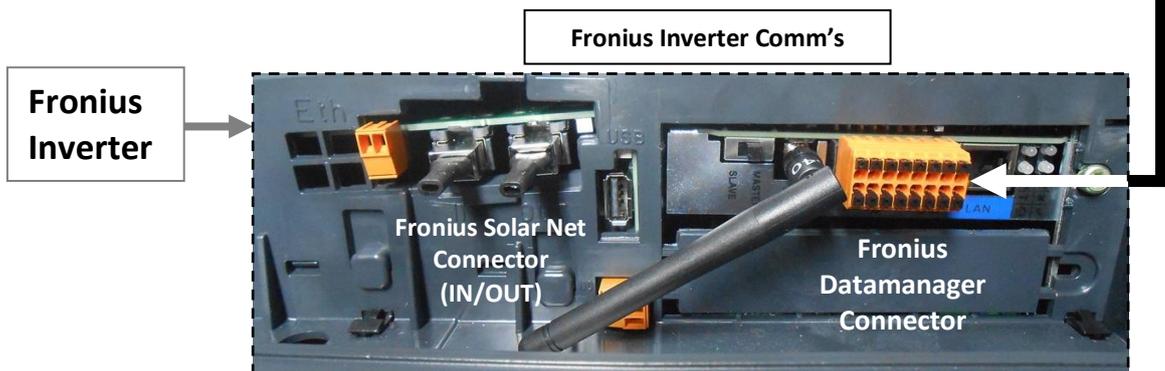
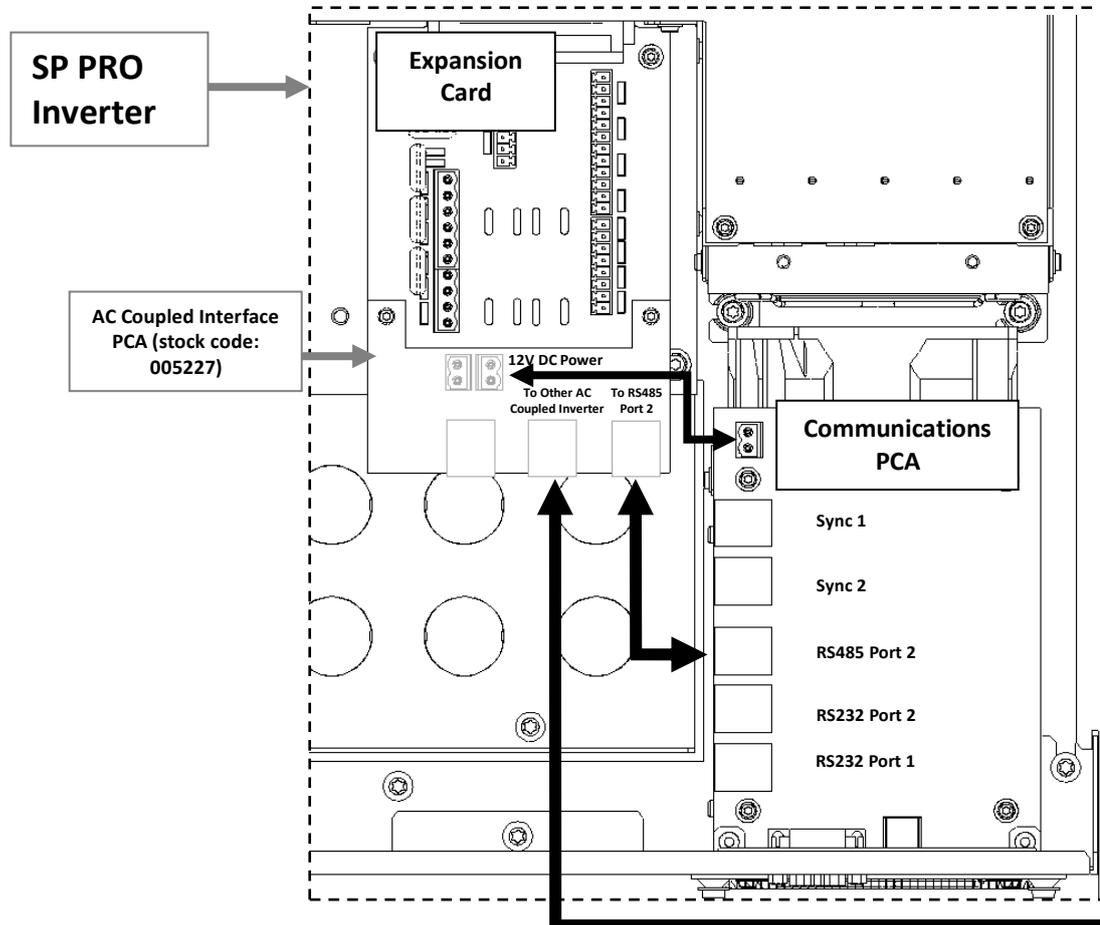
Expansion Card bottom screws replaced with stand offs.



- Connect the RJ45 Connector lead from the AC Coupled Interface PCA "To RS485 Port 2" to the SP PRO Serial Communication PCA **RS485 Port 2**.
- Connect the second RJ45 lead from the AC Coupled Interface PCA "To Other AC Coupled Inverters" to Fronius Inverter 01 (Master), Fronius Datamanger connector (see section "Fronius RS485 Connection to Inverter 01 (Master)" Page 12).
- Connect the AC Coupled Interface PCA power loom (12V) from AC Coupled Interface PCA "12V DC Power J4" to the SP PRO Serial Communication PCA 12V connector.

Note: Do not connect any RJ45 leads to the AC Coupled Interface PCA "To ABB AC Coupled Inverter" connector as the pin out is different to the Fronius Inverter connection.

SP PRO Fronius Managed AC Coupling Installation Notes



SP PRO Connections (inside unit) – RS485 Port 2 RJ45 connector to AC Coupled Interface PCA and to Fronius Datamanager connector

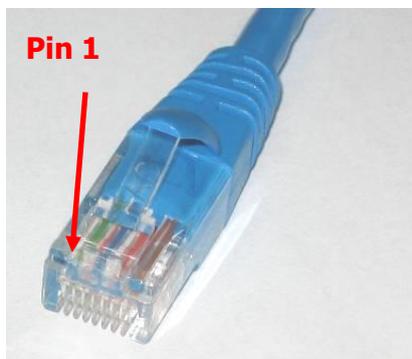
SP PRO Fronius Managed AC Coupling Installation Notes



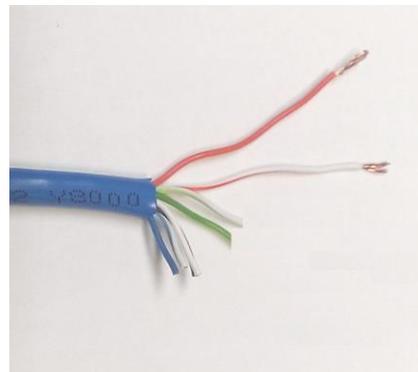
FRONIUS RS485 CONNECTION TO INVERTER 01 (MASTER)

Using the supplied 'CAT5' network cable connect one end to the AC Coupled Interface PCA "To Other AC Coupled Inverters" on the SP PRO. At Fronius Inverter 01 (Master), **cut off the non-connected RJ45 connector**, expose and crimp the wires using wire crimps or alternatively use a longer cable as required (not supplied) as outlined in the table below.

PLEASE NOTE: There are two different colour coding for RJ45 plugs, **T568A** and **T568B**, it is common that either colour code is used. To ensure correct connections please check that the "RS485 RJ45 Adaptor pin #" corresponds to the "Fronius RS485 Connector" connection by buzzing out the lead before connecting it to the Fronius or the SP PRO inverter.



RS485 RJ45 Adaptor Pin 1 designation



Cut off one RJ45 Connector

RS485 RJ45 Adaptor pin #	Signal	T568A colour code	T568B colour code	Fronius RS485 Connector
1	GND	Green/White	Orange/White	
2	GND	Green	Orange	- (minus)
3	RS485 - B	Orange/White	Green/White	D+ (RS485)
4	GND	Blue	Blue	
5	GND	Blue/White	Blue/White	
6	RS485 - A	Orange	Green	D- (RS485)
7	GND	Brown/White	Brown/White	
8	GND	Brown	Brown	

RS485 adaptor to Fronius connections and wire colours

Note: Only the wires connected to Pins 2, 3 and 6 (on the RJ45) are used.

Continue from Fronius Connection page 15

SP PRO Fronius Managed AC Coupling Installation Notes



COMMUNICATIONS LINK (RS485) – SERIES 1

The communication link always starts at the SP PRO end (Sena LTC100 adaptor) and then connects to the first Fronius inverter (Master). The Fronius link is used to connect subsequent Fronius inverters ON the same phase as the SP PRO. Do Not Connect Fronius inverters on different phases together.



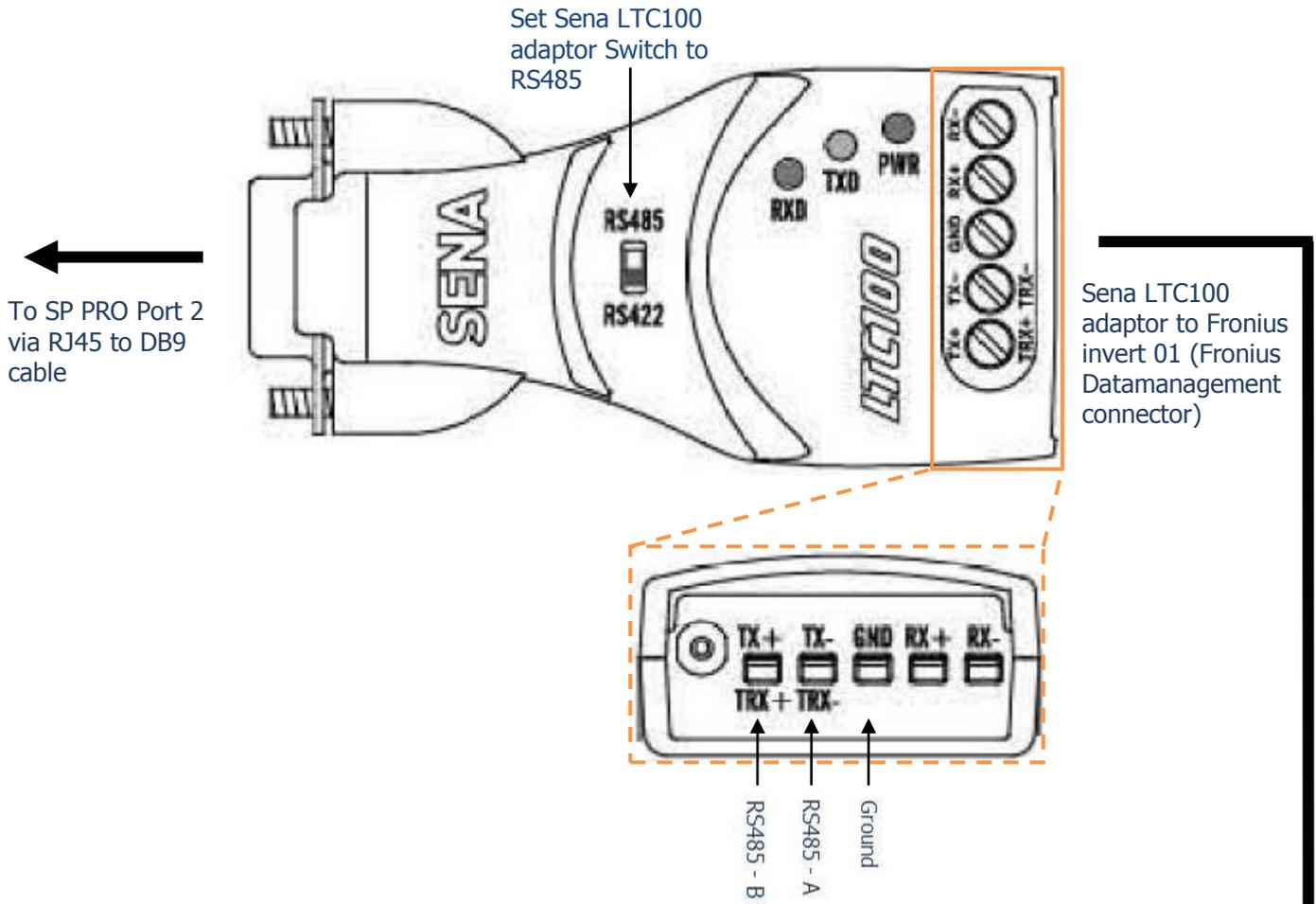
To install the Sena LTC100 adaptor, use the RJ45 to DB9 lead and connect the Sena LTC100 adaptor to the SP PRO Series I **Serial Port 2**. Then using 'CAT5' network cable or similar make, connect the Sena LTC100 adaptor to Fronius inverter 01 (Master) as per Table 1, Fronius Datamanager connector.

Note: Ensure that the Sena LTC100 adaptor switch is set to RS485.

Sena LTC100 connections	Signal	Typical Wire Colour (May vary with different CAT5 leads)	Fronius RS485 Connector
RX-	Not Used		
RX+	Not Used		
GND	Ground	Green	- (minus)
TX- / TRX-	RS485 - A	Orange	RS485 D-
TX+ / TRX+	RS485 - B	Orange/White	RS485 D+

Table 1: Sena LTC100 adaptor to Fronius connections and wire colours

SP PRO Fronius Managed AC Coupling Installation Notes



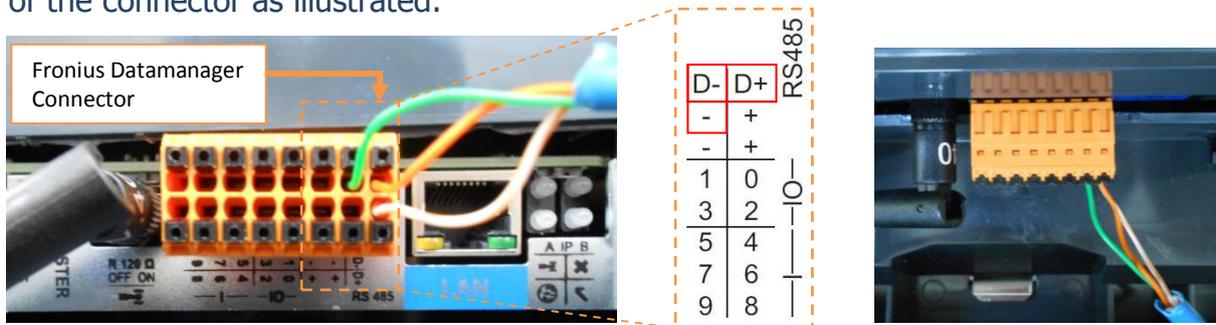
SP PRO Port 2 RJ45 connector to Sena LTC100 and to Fronius Datamanagement connector

SP PRO Fronius Managed AC Coupling Installation Notes



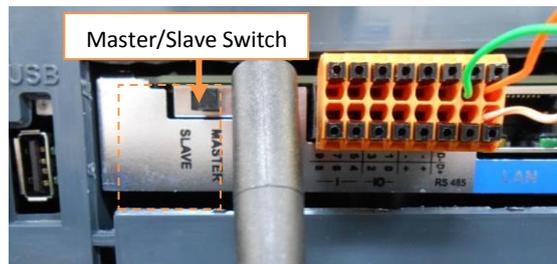
FRONIUS CONNECTION

Connect the three wires from the CAT5 network cable to the Fronius Datamanager connector, D+ (RS485), D- (RS485) and "-" (GND). The RS485 terminals are located on the right hand side edge of the connector as illustrated.



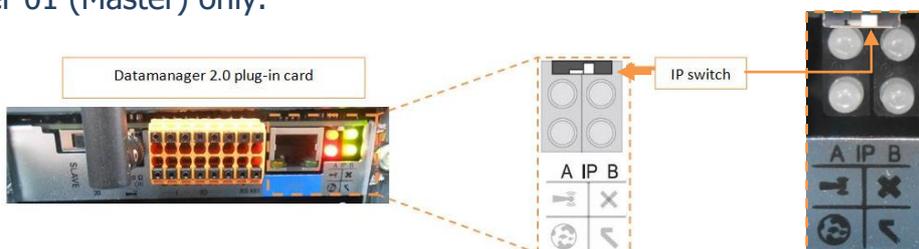
Connection of AC Coupled Interface PCA "To Other AC Coupled Inverters" to Fronius Datamanager connector, colour code T568A is shown above

For Fronius inverter 01 only, set the Master/Slave switch (located on the left hand side of the orange connector) to "MASTER" as illustrated.



Master/Slave switch set to "MASTER" for Fronius inverter 01

Make sure that the Datamanager 2.0 plug-in card – IP switch is set to position B for Fronius inverter 01 (Master) only.



The Datamanager 2.0 plug-in card – IP switch is set to position B

Note: Make sure that the "X" LED is Green for Fronius inverter 01. If the LED is Red then make sure that the Fronius Solar Net Connector IN/OUT are connected correctly to all inverters (e.g. Fronius Inverter 01 OUT connected to Fronius Inverter 02 IN...etc), or **termination connectors are not fitted**, or connectors are not plugged in correctly



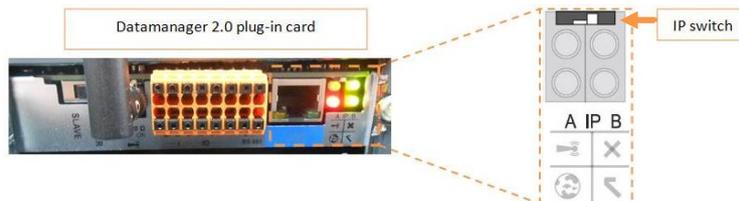
SP PRO Fronius Managed AC Coupling Installation Notes



CONNECTING FRONIUS LINK BETWEEN INVERTERS 02 TO 05

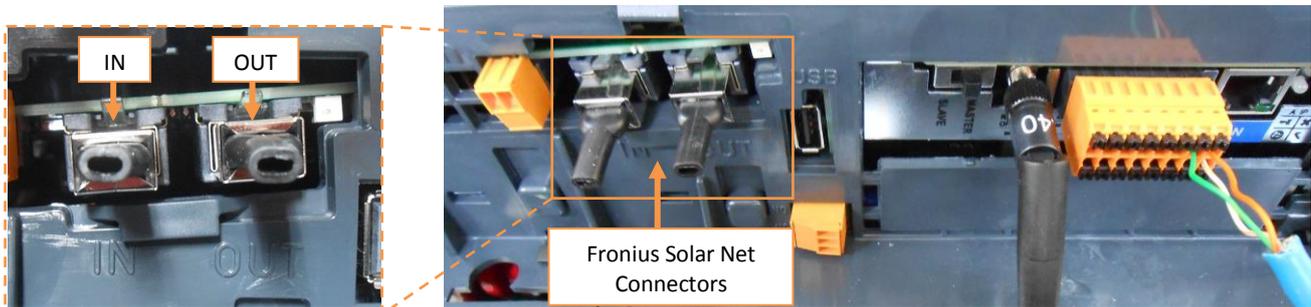
The following configuration outlines the connection for multiple Fronius Inverters to the Master Fronius Inverter (Fronius Inverter 01). **Skip to the next step if only a single Fronius Inverter is installed.**

Note: When connecting multiple Fronius inverters together it is important that the IP Switch must be set to position B for Fronius inverters 01 to 05.



The Datamanager 2.0 plug-in card – IP switch is set to position B

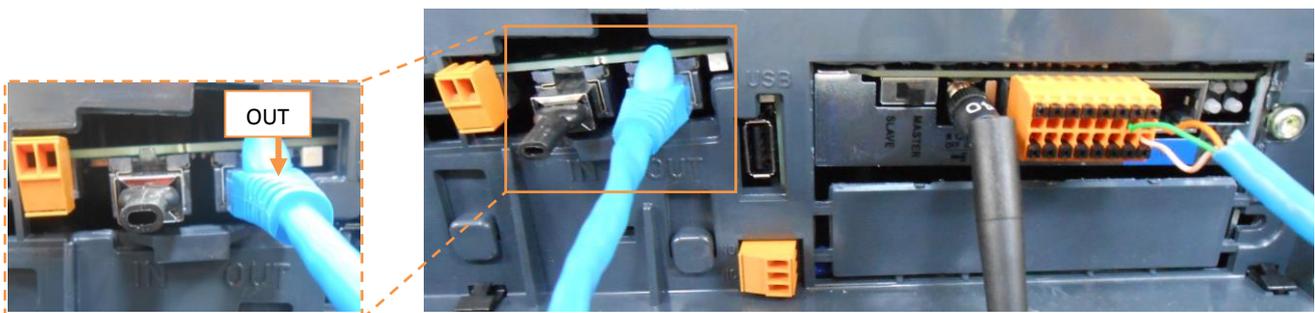
Inside the Fronius Inverter there are two RJ45 connectors (Fronius Solar Net Connector) with termination connectors installed. The Fronius Solar Net connectors are designed to interface with multiple Fronius inverters in a daisy chain arrangement via the input "IN" and output "OUT" connectors.



Fronius Solar Net Connectors with termination: "IN" located on LHS & "OUT" located on RHS

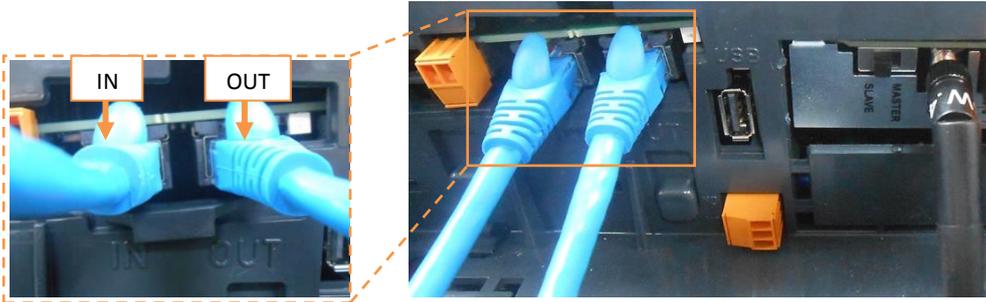
NOTE: The Fronius Solar Net Connector MUST be fitted to any unused connectors otherwise the SP PRO will not communicate to any Fronius inverters in the system.

Using a network patch lead connect the "OUT" (Fronius Solar Net) from Fronius Inverter 01 (Master) to the "IN" of Fronius Inverter 02.



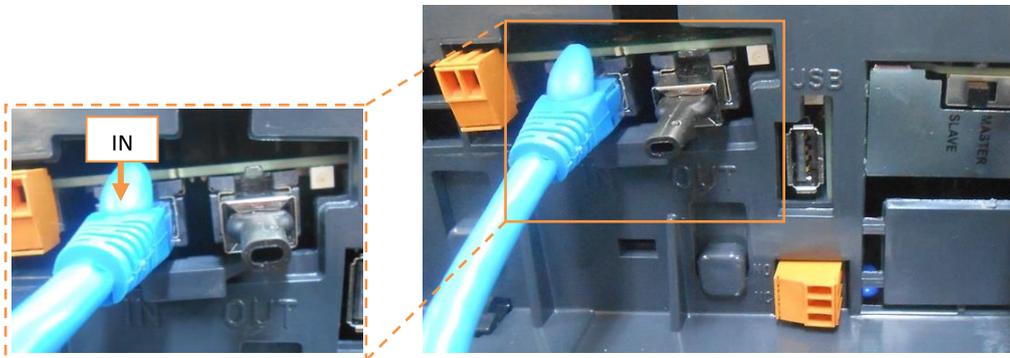
Fronius link - Fronius Inverter 01 "OUT"

SP PRO Fronius Managed AC Coupling Installation Notes



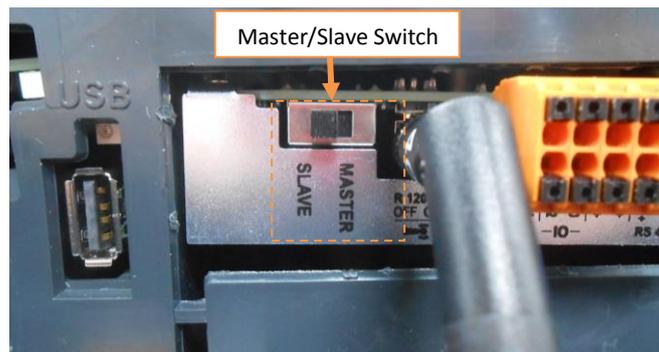
Fronius link - Fronius Inverter 02 "IN" & Fronius Inverter "OUT"
(Fronius connection on intermediate inverters)

Using another patch lead, connect the "OUT" from inverter 02 (above) to the "IN" of inverter 03 and so on until all inverters in the system are connected.



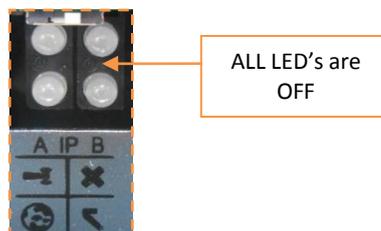
Fronius link - Last Fronius Inverter on communication link ("IN")

For all the inverters numbered 02 and above, set the Master/Slave switch (located on the left hand side of the orange connector) to "SLAVE" as illustrated.



Fronius Inverters 02 to 05: Master/Slave switch set to "SLAVE"

Note: When Master/Slave switch is set to "SLAVE", the LED's on the Datamanager 2.0 plug-in card will be OFF.



SP PRO Fronius Managed AC Coupling Installation Notes



CONFIGURATION – ADDITIONAL SETTINGS

It is recommended that the Site Configuration wizard (in SP LINK 9.1 or higher) be used to configure the SP PRO settings. Using the wizard will ensure all the SP PRO settings are compatible with the managed AC coupled system.

The settings detailed below will be set when the Site Configuration Wizard is used to configure the SP PRO. Only the settings required to enable Fronius Managed AC Coupling are shown. The remainder of systems settings will be set by the Site Configuration Wizard.

The SP PRO **must** be configured **before** any of the Fronius inverters are energised.

The Fronius inverters are configured to Solar Net as default and the Inverter Number must be set sequentially from 01. (See "Programming the Fronius" section).

Make sure in the SP LINK tab CONFIGURATION SETTINGS > SYSTEM the follow settings are set.

- Set **String Inverter** to **Fronius**.
- **Number of Devices** is set to the number of Fronius inverters installed in the system.

Managed AC Coupled Solar	
String Inverter Fronius	Fallback Power Disabled
Number of Devices [1 - 5] 2	Islanding Power Limit [0.1 - 15.0 kW] 5.0 kW
Grid Export Limit Monitor	
Over Export Trip Time [0 - 1000 s] 20	
Over Export Trip Limit [0.0 - 250.0kW] 50.00 kW	

SP LINK - Configuration Settings – System tab

Note: Port 2 Communication settings will not be available once Fronius has been enabled. This is normal operation.

In the example used above, only two Fronius inverters are connected to the SP PRO.

SP PRO Fronius Managed AC Coupling Installation Notes



PROGRAMING THE FRONIUS

The settings listed below are required to be configured in each Fronius inverter in order for the system to operate correctly.

1. Isolate the DC solar from the Fronius inverter(s) (via the appropriate DC circuit breaker).
Note: **DO NOT** connect the PV solar until system is configured.
2. Ensuring that the SP PRO AC Load supply is present at the Fronius Inverter, switch ON the AC supply to the Fronius inverter.
3. When the Fronius inverter is powered for the first time, select the "language" for the inverter and press the **ENTER** (↵) key.



Then to set the Country, scroll to **AU-Australia** (↓) and press the **ENTER** (↵) key.



Set the "Date" for the inverter and press the **ENTER** (↵) key. Use the '**UP**' (+) and '**DOWN**' (-) keys to shift the numerical values in an ascending/ descending order.

*Note: "Date" will flash after the first **ENTER** (↵) key press, a second **ENTER** (↵) is required to proceed to the next step.*



SP PRO Fronius Managed AC Coupling Installation Notes



Set the "Time" for the inverter and press the **ENTER** (↵) key. Use the '**UP**' (+) and '**DOWN**' (-) keys to shift the numerical values in an ascending/ descending order.

*Note: "Time" will flash after the first **ENTER** (↵) key press, a second **ENTER** (↵) is required to proceed to the next step.*



Set the "MPP Tracker 2" for the inverter to "ON" if required otherwise set to "OFF" and press the **ENTER** (↵) key



Note: When the Fronius inverter is powered without the DC and the "MPP Tracker 2" is "ON", "INFO STATE 523 LOW PV VOLTAGE" will be displayed on the screen.

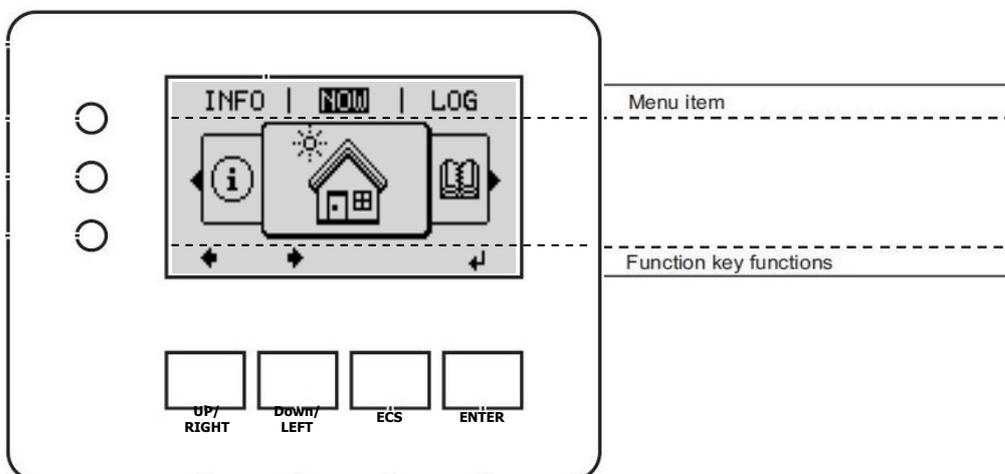


SP PRO Fronius Managed AC Coupling Installation Notes

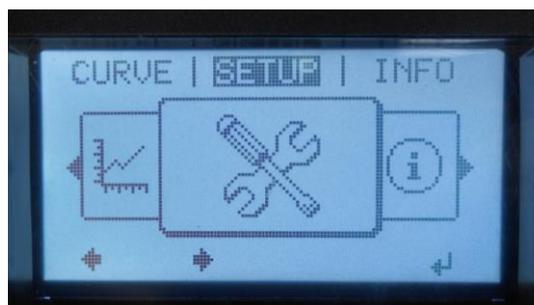


- Once the display is active on the Fronius inverter, access the main menu. To enter the main menu, press the **ESC** (↵) key once, then using the **LEFT** (←) or **RIGHT** (→) keys to scroll through the main menu. To access any of the menu items, press the **ENTER** (↵) key on the selected item. The **ESC** (↵) key is also used to return back to the previous menu or to edit previous digits.

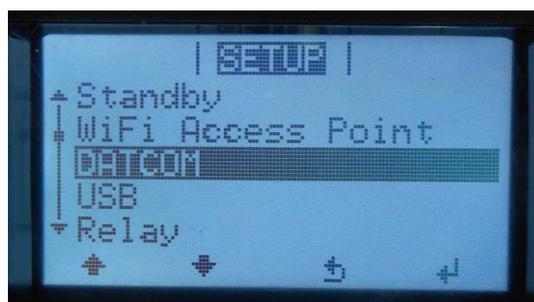
The menu is continuous, when the end is reached the display automatically returns to the first menu item. The **'UP'** (↑) and **'DOWN'** (↓) keys are used to scroll through menu options or to shift numerical scales in ascending/ descending order, they are mainly used in submenus to scroll through the various menu items.



To access the **SETUP** menu, scroll once to the left and press the **ENTER** (↵) key. The **ENTER** (↵) key is used to confirm an action or to access submenus.



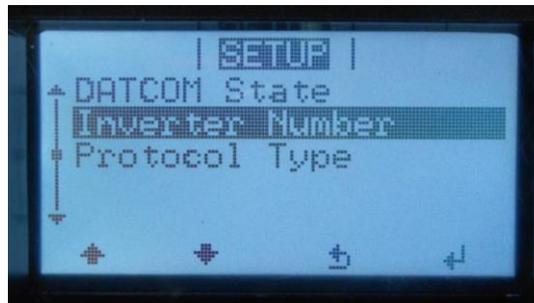
- Scroll to **DATAKOM** (↓) and press **ENTER** (↵).



SP PRO Fronius Managed AC Coupling Installation Notes



6. Scroll to **Inverter Number** (↓) and press **ENTER** (↵).



- If only one Fronius inverter is installed then the address must be set to 01.
- If more than one Fronius inverter is installed then the address must be allocated sequentially starting from 01 (i.e. first Fronius = 01, second Fronius = 02, third Fronius = 03 etc).
- Once the "Inverter Number" is selected, press the **ENTER** (↵) key to configure and return to the "DATACOM" menu.



Note:

- The Fronius inverter address starts from 01 to 05, where inverter 1 in SP Link is connected to Fronius inverter Address 01, i.e. Fronius inverter 01 address 01 = inverter 1 SP Link, Fronius inverter 02 address 02 = inverter 02 SP Link, Fronius inverter 03 address 03 = inverter 03 SP Link etc.*
- Do Not skip any address numbers in the sequence when using multiple Fronius inverters.*

SP PRO Fronius Managed AC Coupling Installation Notes



7. Scroll to **Display Setting** (↓) and press **ENTER** (↵).



8. Scroll to **Night Mode** (↓) and press **ENTER** (↵).



- a. Set the Fronius inverter "Night Mode" to "ON", this will allow the Fronius inverter to control the display operation during the night.

Note: Setting the "Night Mode" will allow communications between the SP PRO and Fronius inverter to stay awake at all times.

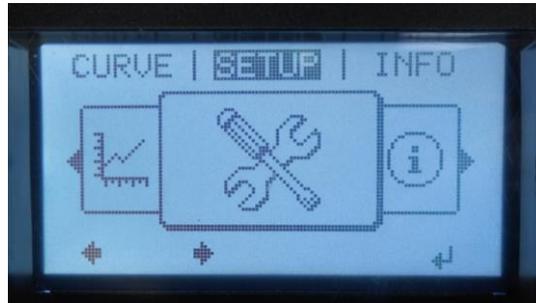
- b. Once the "Night Mode" is set to set, press the **ENTER** key to configure and return to the "Display Setting" menu.



SP PRO Fronius Managed AC Coupling Installation Notes

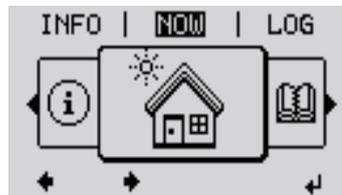


9. Press the **ESC** (↵) key twice to return to the main menu.



10. If there are multiple Fronius inverters installed, repeat for all others.

11. When all is configured, the Fronius inverter display screen will cycle through the amount of energy currently fed automatically when no key is pressed for 2 minutes or by selecting the "Now" menu.



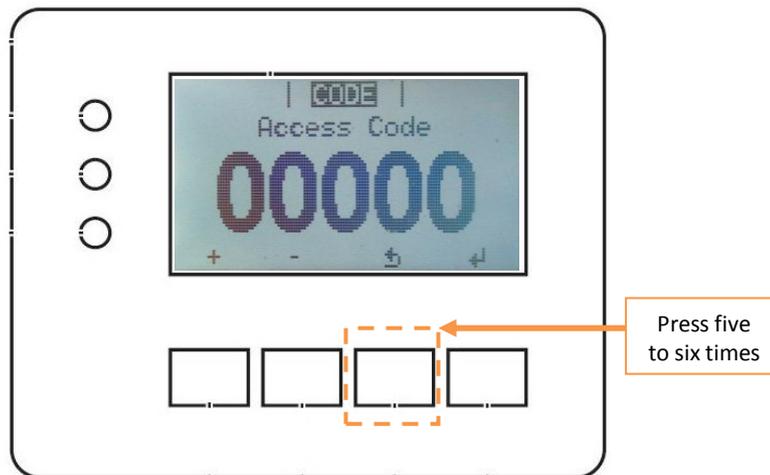
SP PRO Fronius Managed AC Coupling Installation Notes



OFF GRID COUNTRY SETUP

If installing and setting up an Off Grid system, make sure the country setting is configured to MG50 as show below.

1. From the main menu press the third button form the left five to six times until "00000" is displayed on the screen.



2. Enter the "Access Code" 73887 and press **ENTER** (↵). The "Access Code" will flash after the first **ENTER** (↵) key press, a second **ENTER** (↵) is required to proceed to the next step.



3. Scroll to **MG50-Microgrid 50Hz** (↓) and press **ENTER** (↵).



4. The Fronius inverter will perform an automatic reset to configure the changes made and return to the main menu.

SP PRO Fronius Managed AC Coupling Installation Notes



MODBUS COMMUNICATION & FALL BACK FUNCTION SETTING

The settings listed below are all that is required to configure the Modbus communication and Fall back function. The settings are ONLY carried out for Fronius inverter 01 (Master).

Note:

- a. *This section needs to be read in conjunction with the Fronius Datamanager 2.0 manual.*
- b. *Fronius Solar Net termination connectors must be inserted into each empty IN or OUT Solar Net connector socket of the last inverter.*

This section contains two options to configure the Fronius inverter:

**LAN Connection – NO Internet (page 27-33) and
WLAN Connection (page 34-42)**

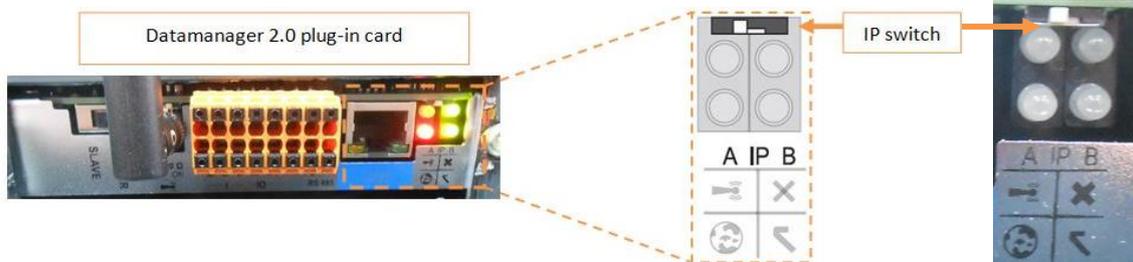
NOTE: Either One of the above options must be selected to configure only Fronius inverter 01 (Master).

SP PRO Fronius Managed AC Coupling Installation Notes



LAN Connection – NO Internet

1. Set the IP switch on the Datamanager 2.0 plug-in card to **position A** on **only** Fronius inverter 01 (Master).



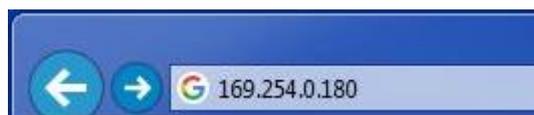
Note: Make sure to set the IP switch back to position B when the “Modbus Communication & Fall Back Function Setting” section is complete otherwise the Fronius inverter will not communicate to the SP PRO inverter.

2. Connect a network cable from the LAN connector located on the Fronius inverter to an end device (e.g. computer or laptop).

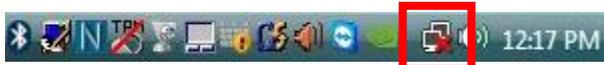


To end device (e.g. computer or laptop)

3. Open an internet web browser and type the appropriate address for the appropriate connection:
 - IP address for LAN connection: 169.254.0.180



Note: Make sure that the computer is **NOT** connected to the internet.

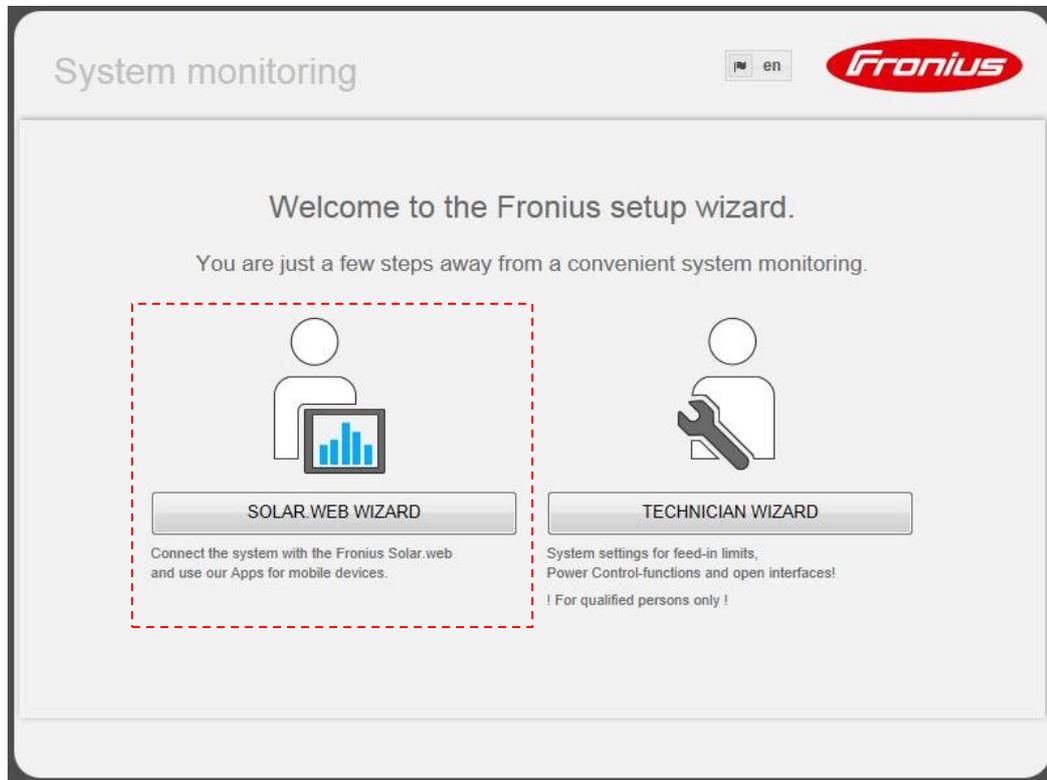


SP PRO Fronius Managed AC Coupling Installation Notes



- The IP address for the WLAN is linked directly to the start page of the Commissioning Wizard, select the "SOLAR.WEB WIZARD".

Note: Read in conjunction with the Fronius Datamanager 2.0 manual.



SP PRO Fronius Managed AC Coupling Installation Notes



5. Complete the "General" section with the appropriate information and select "Forward".

System monitoring en

General Inverter Network setup

System name * .

Yield

Feed-in tariff 0.01 \$ (AUD) /kWh

Grid supply tariff 0.01 /kWh

System time

Date / time * 07/28/2017 08 : 14 AM

Time zone settings

Time zone * Australia Melbourne

Back Forward

6. Complete the "Inverter" section, the PV[Wp] and "Device name" are required to be completed, select "Forward".

System monitoring en

General Inverter Network setup

System name * .

Set all

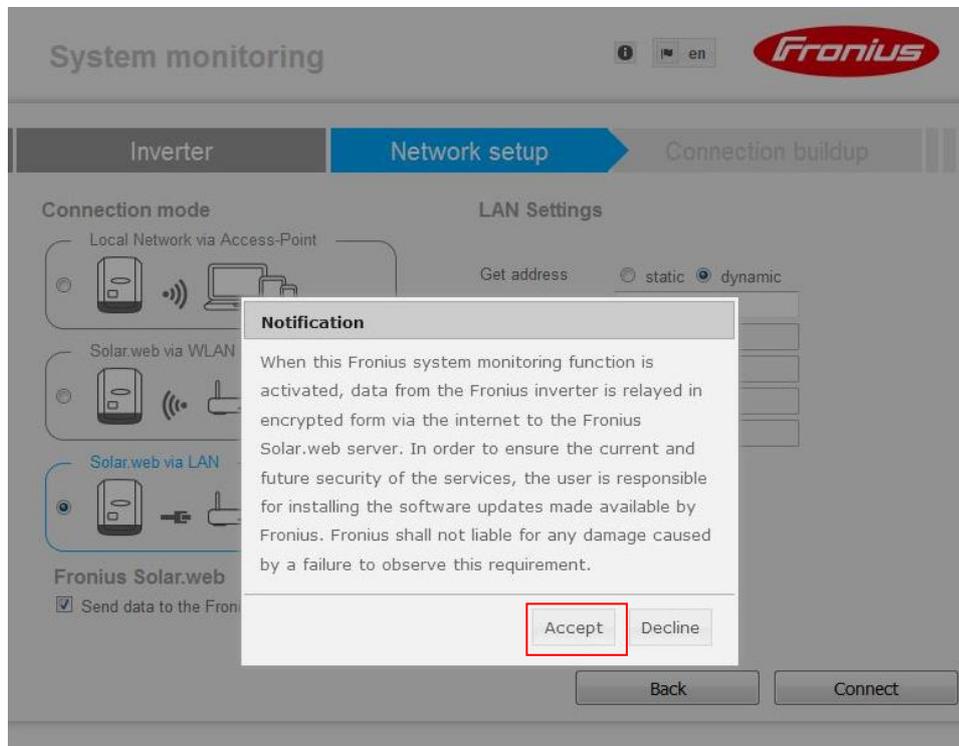
No	visible	Device type	Device name	PV[Wp]
3	<input checked="" type="checkbox"/>	Primo 3.0-1	* Primo 3.0-1 (3)	*

Back Forward

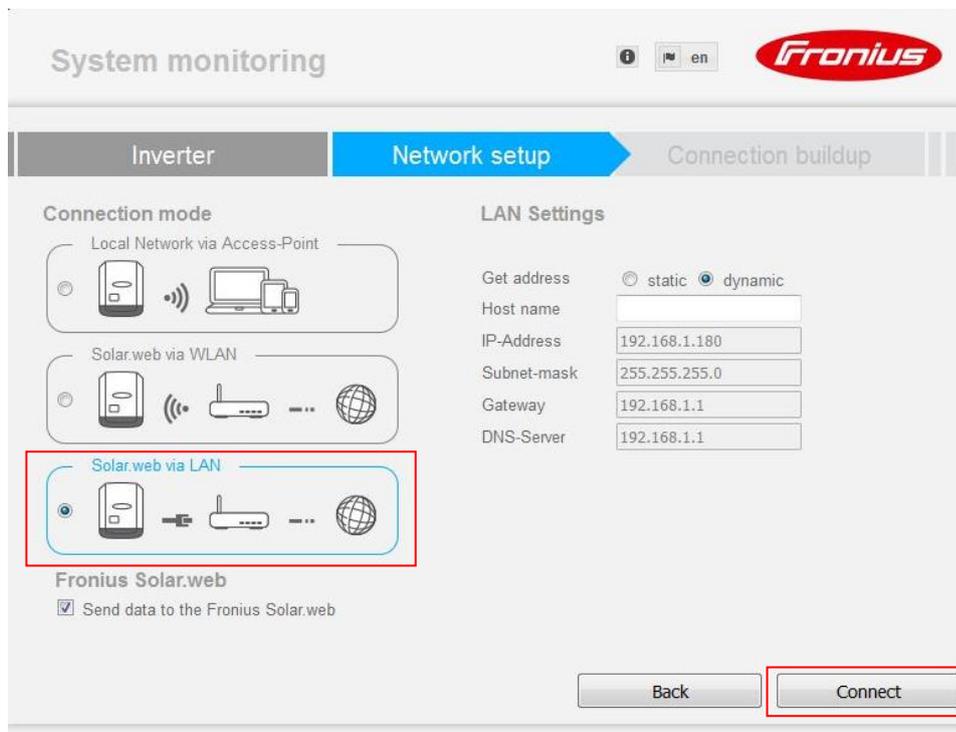
SP PRO Fronius Managed AC Coupling Installation Notes



7. A notification box will appear before the next section. It is required to select the "Accept" button to proceed to the next section.



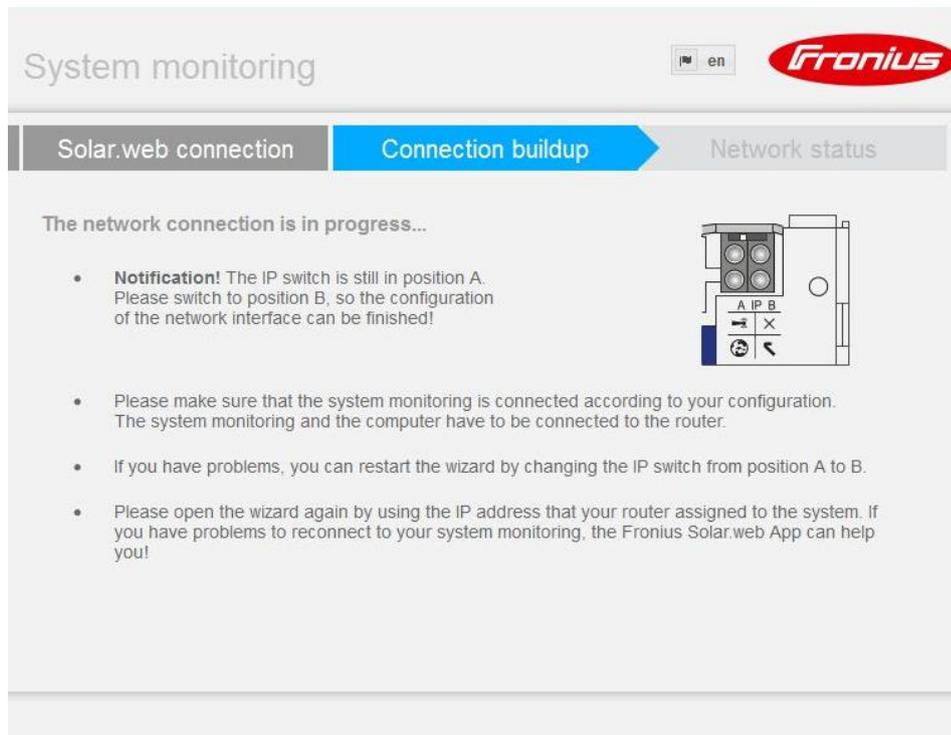
8. Select "Solar web via LAN" and then select "Connect".



SP PRO Fronius Managed AC Coupling Installation Notes



9. When "Connect" is selected, "Connection buildup" will be displayed.



- Set the **IP Switch** to **position B** and then refresh the webpage.
- Wait for one second.
- Then set the **IP Switch** back to **position A** and then refresh the webpage.

Note: When the Fronius inverter is reconnected to the end device (e.g. computer or laptop) the wizard will automatically proceed to the next section.

SP PRO Fronius Managed AC Coupling Installation Notes



10. The "Network status" outlines the network detail, select "Forward".

System monitoring

en

Fronius

Connection buildup | **Network status** | Passwords

System monitoring LAN | Internet

IP-Address:	--	available:	No
Network mask:		Name server:	
MAC address:	00:03:AC:0A:B2:6E	Gateway:	

i You are in configured network of the monitoring system. You can continue the wizard now.

Back Forward

11. A password is required to be setup, create a password that is easy to remember and contains both letters and numbers and select "Finish".

System monitoring

en

Fronius

Network status | **Passwords** | Finish

Please set an administrator password to protect your system from unauthorized changes!

User name: admin

Password *: [masked] acceptable

Repeat password *: [masked] identical

Protect your system monitoring from unauthorized read access.

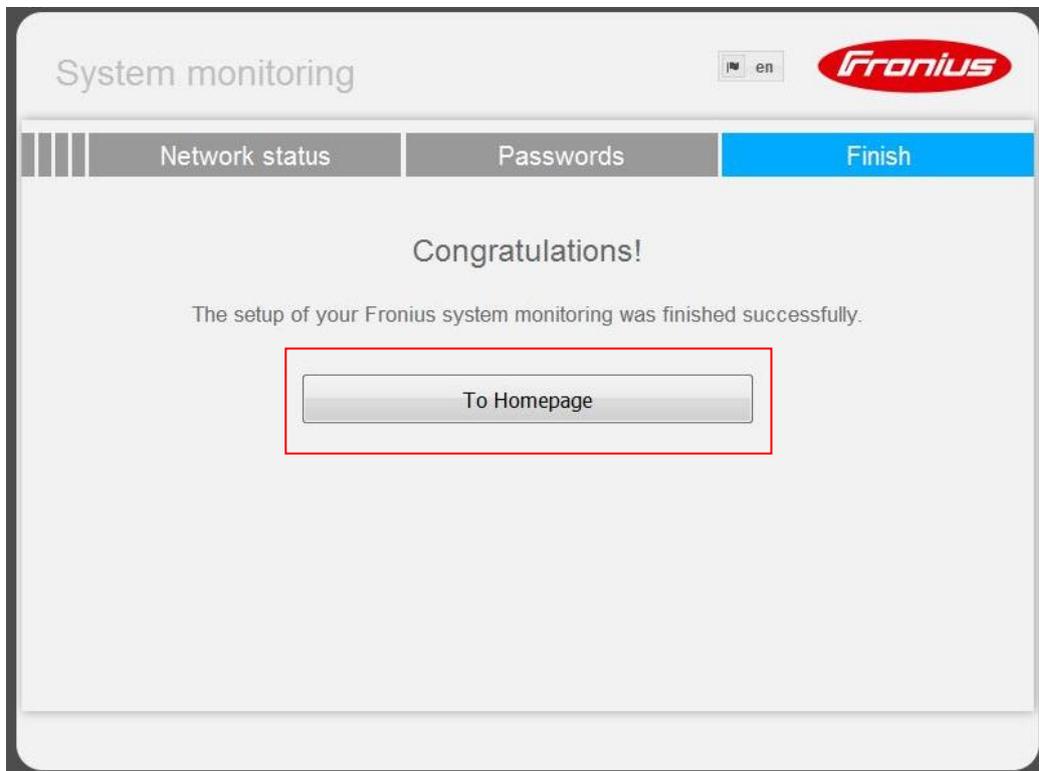
Back Finish

Notification! The password should include numbers and special characters.

SP PRO Fronius Managed AC Coupling Installation Notes



12. The Commissioning Wizard is complete, select "To Homepage".



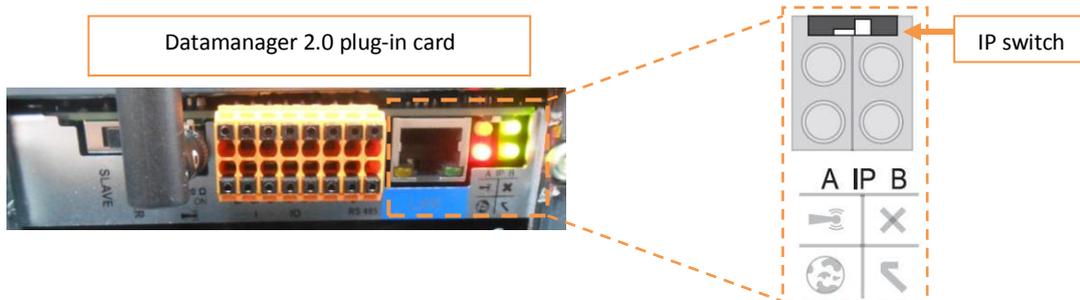
Continue from page 43

SP PRO Fronius Managed AC Coupling Installation Notes



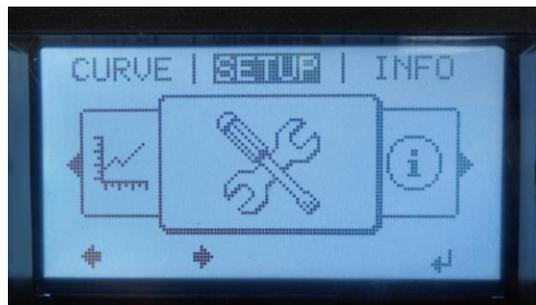
WLAN Connection

1. Make sure the IP switch on the Datamanager 2.0 plug-in card is **set to position B** on **only** Fronius inverter 01 (Master).

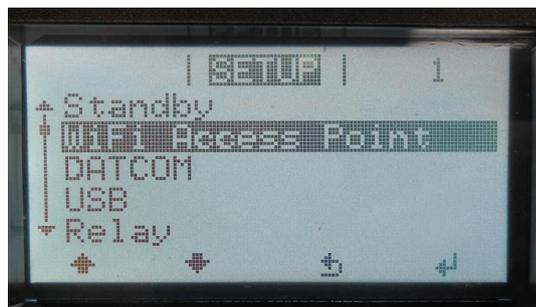


This allows the Fronius Datamanager 2.0 plug-in card to connect via WLAN to the PC.

2. From the main menu, scroll to **SETUP** and press the **ENTER** (↵) key.

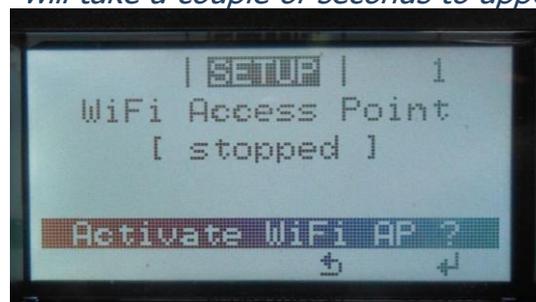


3. Scroll to **WiFi Access Point** (↓) and press **ENTER** (↵).



4. Select "Activate WiFi AP ?" and press **ENTER** (↵).

Note: "Activate WiFi AP ?" will take a couple of seconds to appear on the screen.



SP PRO Fronius Managed AC Coupling Installation Notes



- The "WiFi Access Point" will activate automatically "active" and the Network Name "SS" and Password "PW" will be displayed on the screen.



Notes:

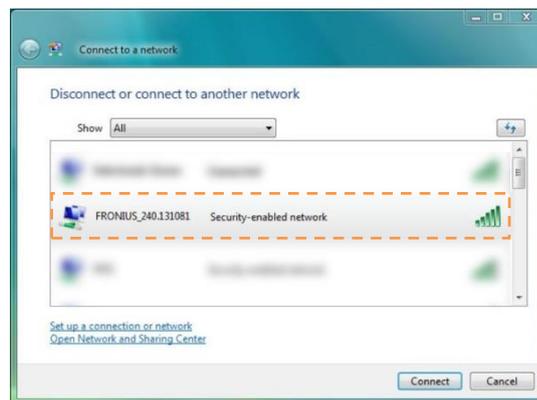
- DO NOT select "Deactivate WiFi AP?", the WiFi signal will be lost.
- The WLAN WiFi signal stays open for one hour.
- If "[active read only]", check IP switch position is set to "B".

- Connection to the Fronius inverter can be established via an end device (e.g. PC, tablet).

Note: If using a Tablet, download the **Fronius Solar.web App** from Google play or App Store.

- From the end device, search for the Network Name displayed on the Fronius inverter and establish a connection to the network. The password network is displayed on the LCD display of the inverter (Default PW: 12345678).

Note: The Fronius inverter establishes a direct WiFi connection between the end device and itself. No internet is required.



- Open an internet web browser and type the appropriate address for the appropriate connection:
 - IP address for WLAN connection: 192.168.250.181



Note: If using a Tablet, Run the Fronius Solar.web App.

SP PRO Fronius Managed AC Coupling Installation Notes

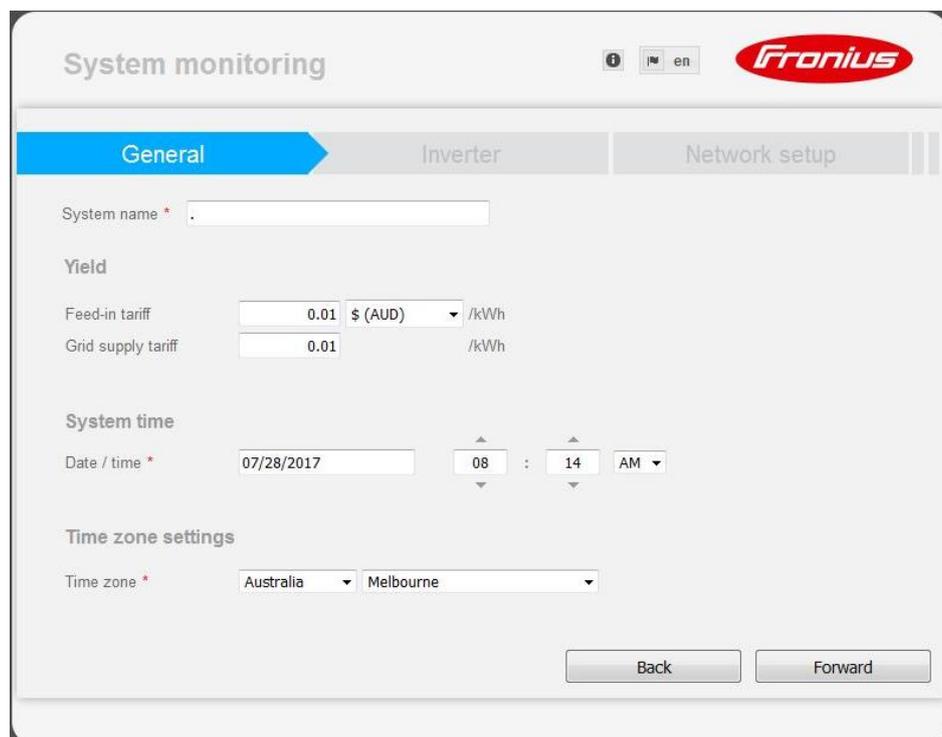


- The IP address for the WLAN is linked directly to the start page of the Commissioning Wizard, select the "SOLAR.WEB WIZARD".

Note: Read in conjunction with the Fronius Datamanager 2.0 manual.



- Complete the "General" section with the appropriate information and select "Forward".



SP PRO Fronius Managed AC Coupling Installation Notes



9. Complete the "Inverter" section, the "System name", PV[Wp] and "Device name" are required to be completed, select "Forward".

The screenshot shows the 'System monitoring' interface with the 'Inverter' tab selected. The 'System name' field is empty. Below it is a table with the following data:

No	visible	Device type	Device name	PV[Wp]
3	<input checked="" type="checkbox"/>	Primo 3.0-1	* Primo 3.0-1 (3)	*

Buttons for 'Set all', 'Back', and 'Forward' are visible.

10. A notification box will appear before the next section. It is required to select the "Accept" button to proceed to the next section.

The screenshot shows the 'System monitoring' interface with the 'Network setup' tab selected. A notification box is overlaid on the screen, containing the following text:

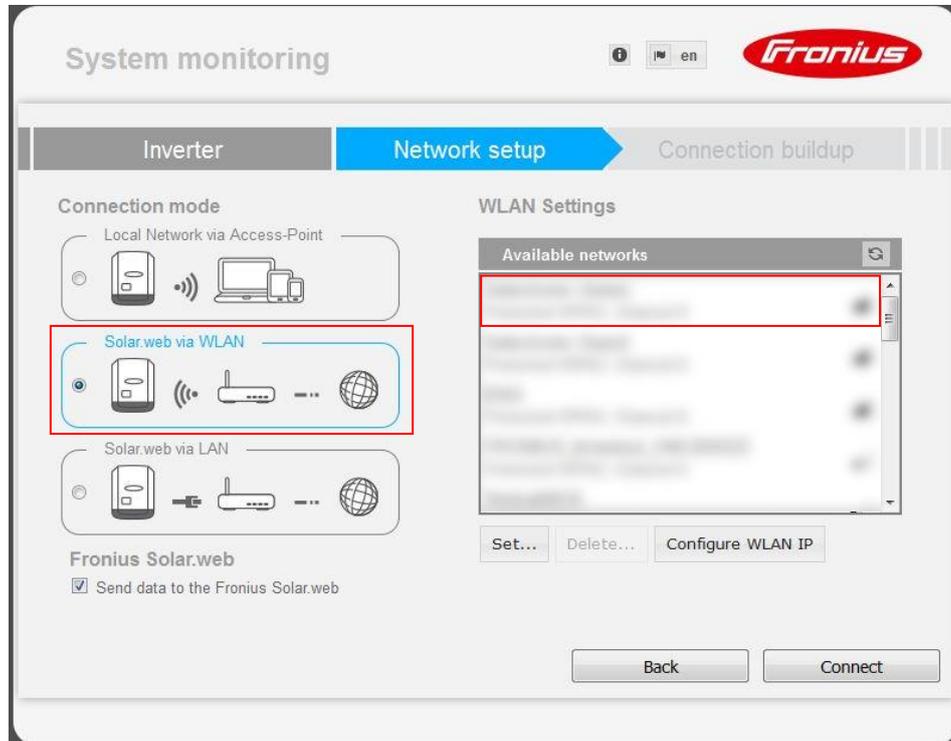
Notification
When this Fronius system monitoring function is activated, data from the Fronius inverter is relayed in encrypted form via the internet to the Fronius Solar.web server. In order to ensure the current and future security of the services, the user is responsible for installing the software updates made available by Fronius. Fronius shall not be liable for any damage caused by a failure to observe this requirement.

Buttons for 'Accept' (highlighted with a red box), 'Decline', 'Back', and 'Connect' are visible.

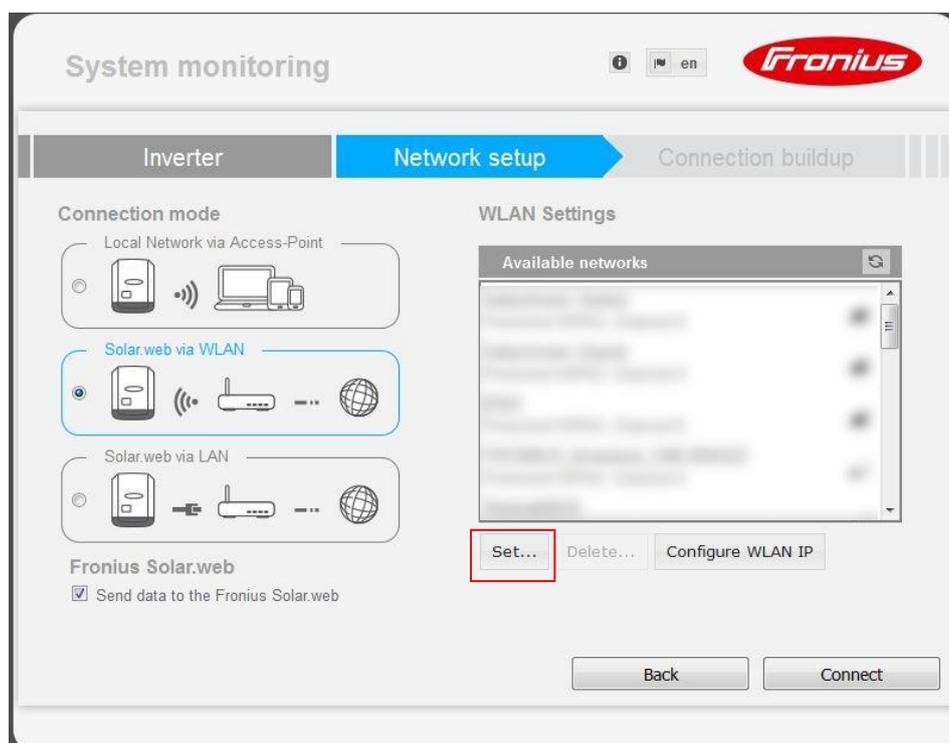
SP PRO Fronius Managed AC Coupling Installation Notes



11. Select "Solar.web via WLAN" and then select the appropriate available WLAN network to connect the Fronius inverter.



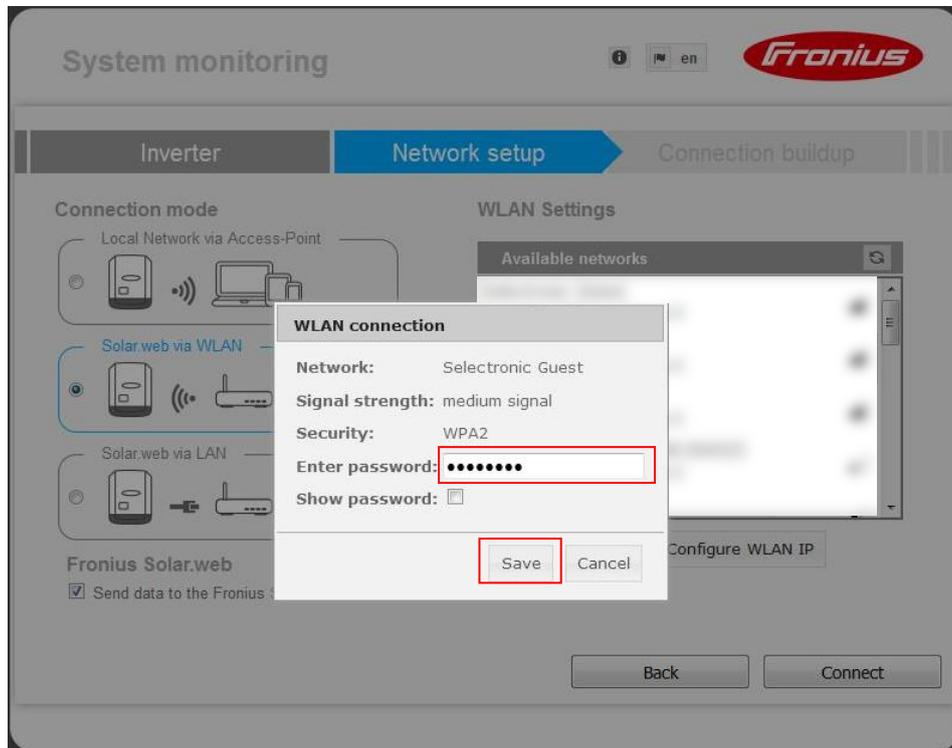
12. Select "Set...".



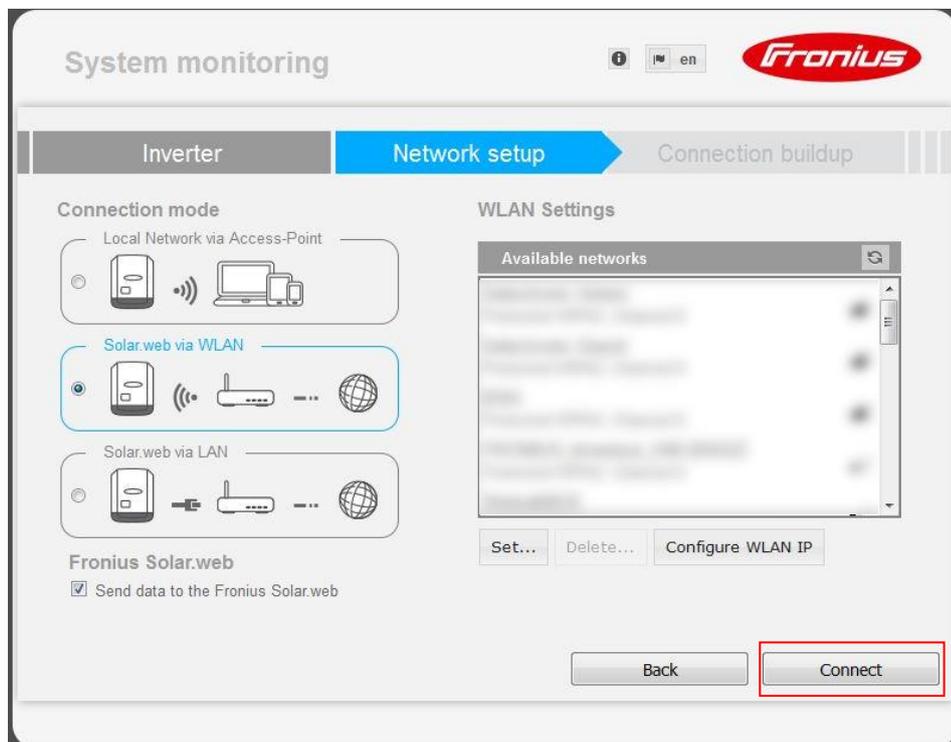
SP PRO Fronius Managed AC Coupling Installation Notes



13. Enter the WLAN password and select "Save".



14. Select "Connect".

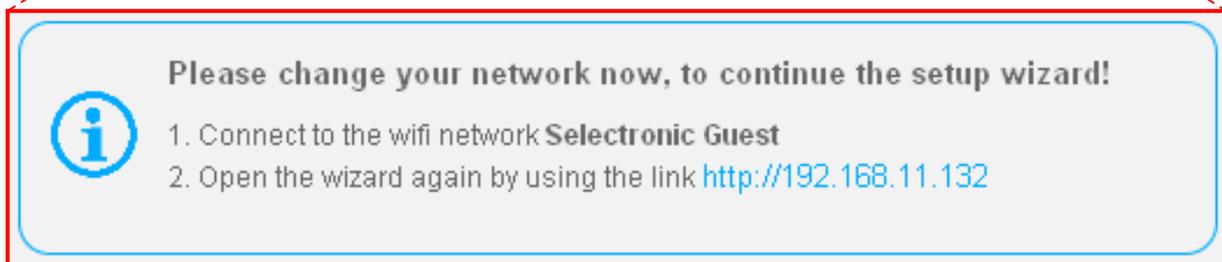
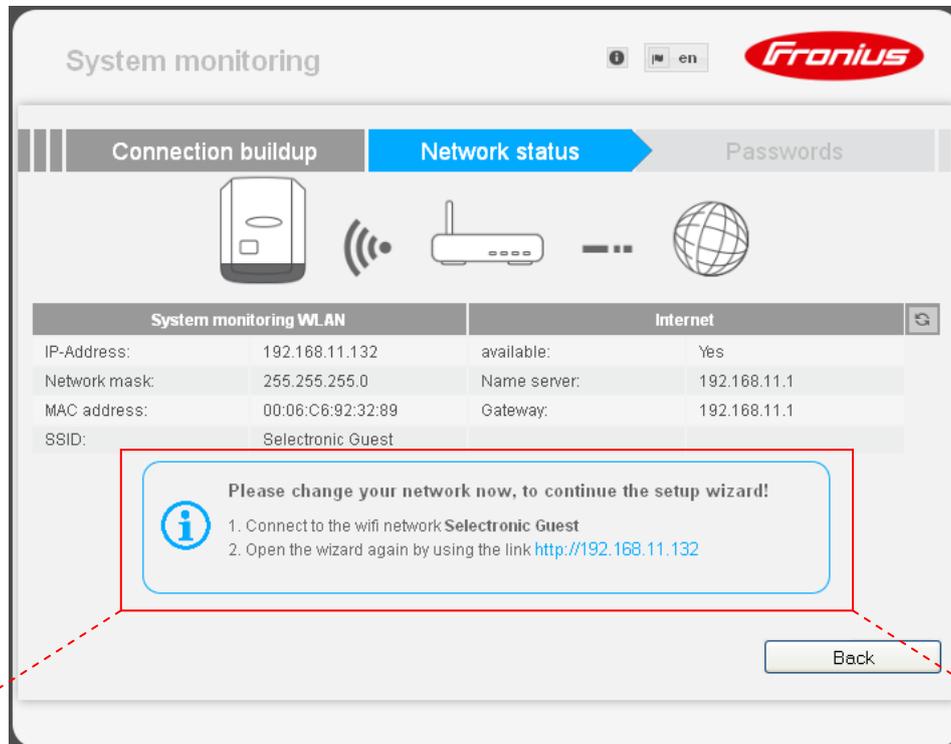


SP PRO Fronius Managed AC Coupling Installation Notes



15. The "Network status" outlines the selected network information.

A message will appear at the bottom of the page asking to connect the end device (e.g. PC, tablet) to the selected network in the Wizard.



Note: DO NOT CLOSE THE WEBPAGE

Once connected to the selected network, click on the link "<http://192.168.11.132>" to proceed to the next step.

SP PRO Fronius Managed AC Coupling Installation Notes



16. When the forward button appears, the connection to the selected network was successful, select "Forward".

The screenshot shows the 'System monitoring' web interface. At the top, there is a navigation bar with 'Connection buildup', 'Network status' (highlighted in blue), and 'Passwords'. Below this, there are icons for a device, Wi-Fi, a router, and a globe. A table displays network information:

System monitoring WLAN		Internet	
IP-Address:		available:	Yes
Network mask:		Name server:	
MAC address:		Gateway:	
SSID:			

Below the table, a message box states: "You are in configured network of the monitoring system. You can continue the wizard now." At the bottom, there are two buttons: 'Back' and 'Forward' (highlighted with a red box).

17. A password is required to be setup, create a password that is easy to remember and contains both letters and numbers and select "Finish".

The screenshot shows the 'System monitoring' web interface at the 'Passwords' step. The navigation bar shows 'Network status', 'Passwords' (highlighted in blue), and 'Finish'. The main content area contains the following text and form elements:

Please set an administrator password to protect your system from unauthorized changes!

User name:

Password *: acceptable

Repeat password *: identical

Protect your system monitoring from unauthorized read access.

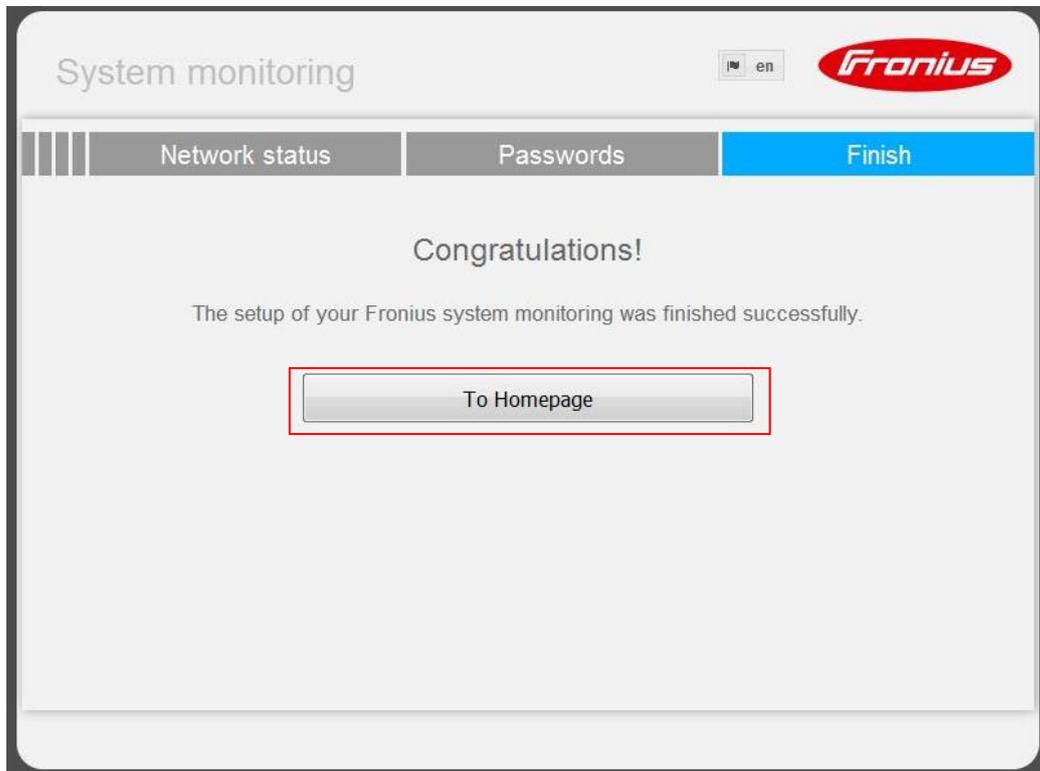
At the bottom, there are two buttons: 'Back' and 'Finish'.

Notification! The password should include numbers and special characters.

SP PRO Fronius Managed AC Coupling Installation Notes



18. The Commissioning Wizard is complete, select "To Homepage"

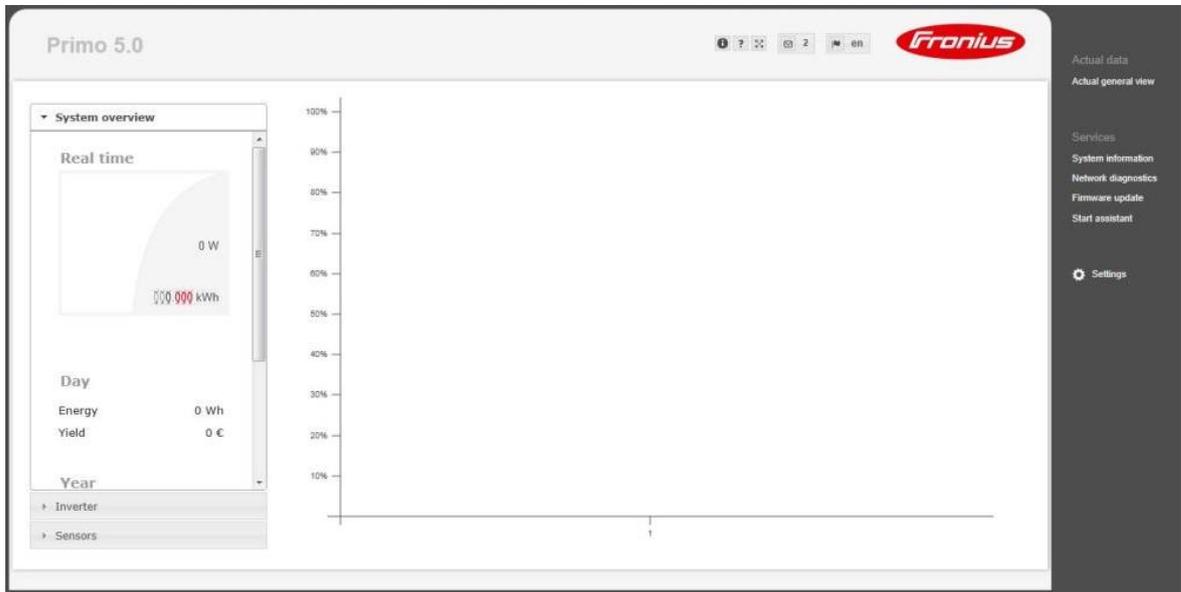


Continue from page 43

SP PRO Fronius Managed AC Coupling Installation Notes

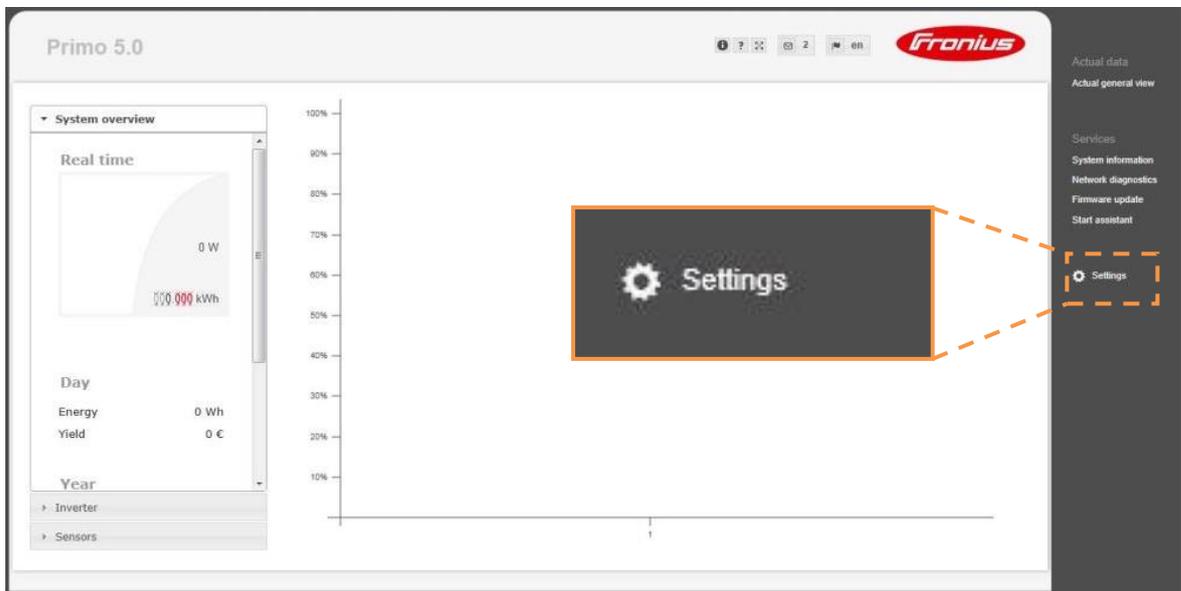


When "To Homepage" is selected, the Fronius Datamanager 2.0 website start page appears.



Note: The image is used as an example only, settings may differ.

- a. On the Datamanager 2.0 website, select "Settings".



Note: The image is used as an example only, settings may differ.

SP PRO Fronius Managed AC Coupling Installation Notes



b. Select the "PASSWORDS" tab.

The screenshot shows the 'Settings' page for a Fronius system. The 'PASSWORDS' tab is selected in the left sidebar. The main content area is titled 'Passwords' and contains two user profiles. The 'admin' profile has a checked status. The 'service' profile has a checked status and is highlighted with a dashed orange box. A callout box labeled 'PASSWORDS' points to the password fields for the 'service' user. Below the profiles, there is a checkbox for 'Protect your system monitoring from unauthorized read access. The Service password protects the system settings from unauthorized changes.'

c. Under "User name service", create a password that is easy to remember and contains both letters and numbers.

Note: The service password is required to access the "DNO EDITOR" tab

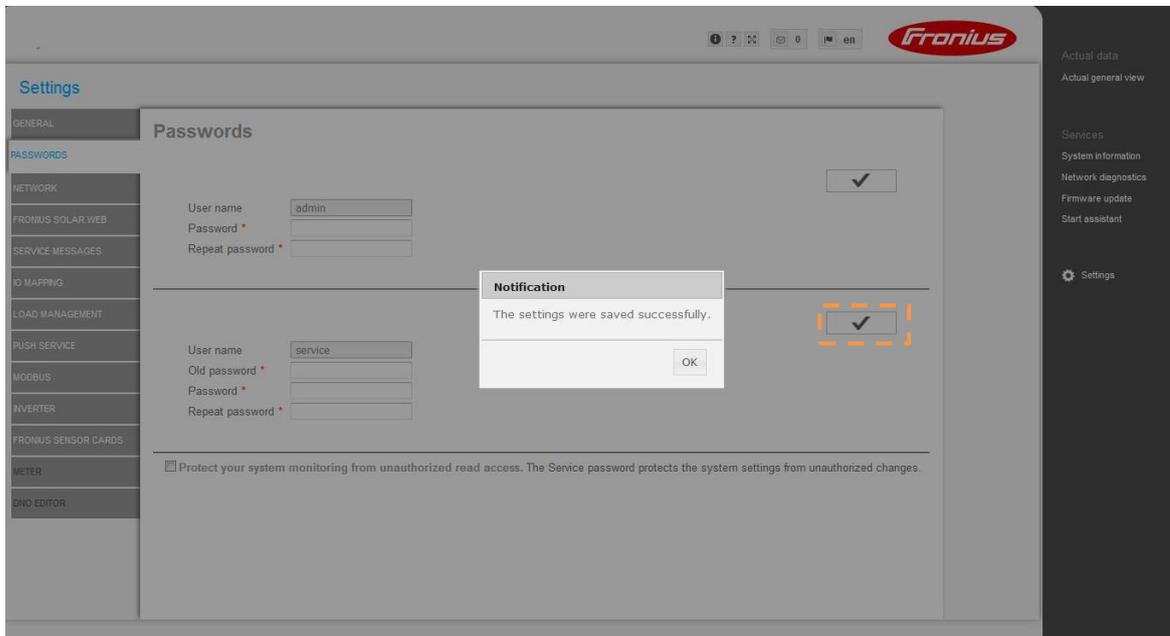
The screenshot shows the 'Settings' page for a Fronius system. The 'PASSWORDS' tab is selected in the left sidebar. The main content area is titled 'Passwords' and contains two user profiles: 'admin' and 'service'. The 'service' user profile is highlighted with a dashed orange box, and a callout box labeled 'PASSWORDS' points to the password fields for this user. Below the profiles, there is a checkbox for 'Protect your system monitoring from unauthorized read access. The Service password protects the system settings from unauthorized changes.'

Note: The image is used as an example only, settings may differ.

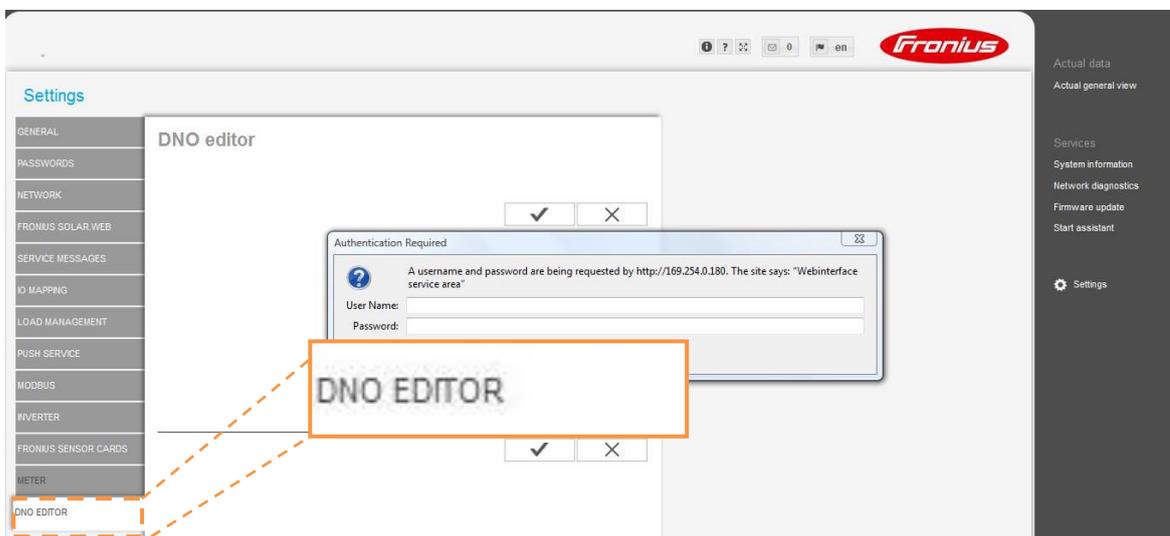
SP PRO Fronius Managed AC Coupling Installation Notes



- d. Save the changes made in "PASSWORDS" by selecting the tick (✓) in the top right hand corner of the page. A popup message will appear to indicate the changes made were saved.



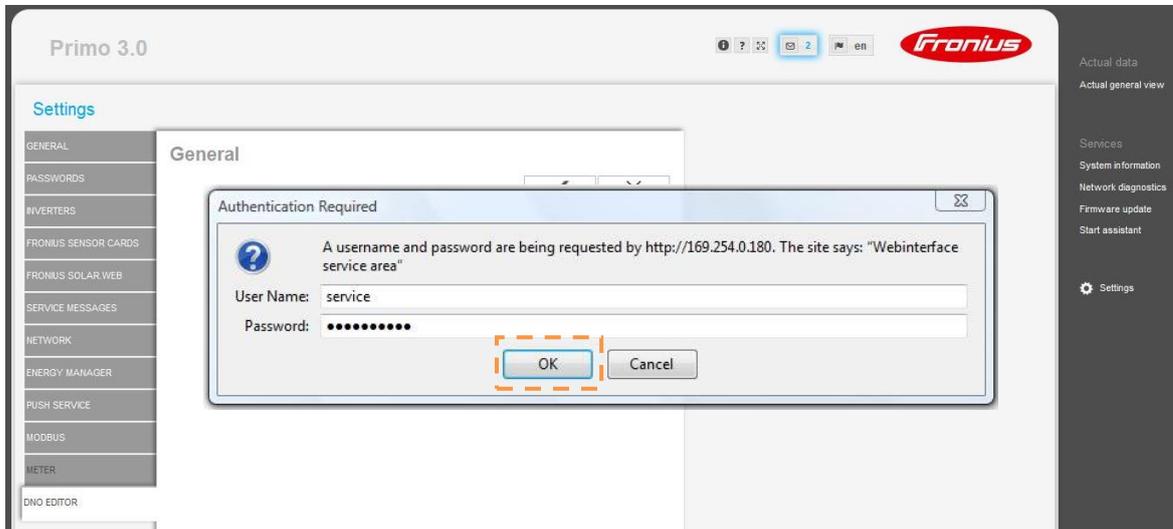
- e. Select the "DNO EDITOR" tab.



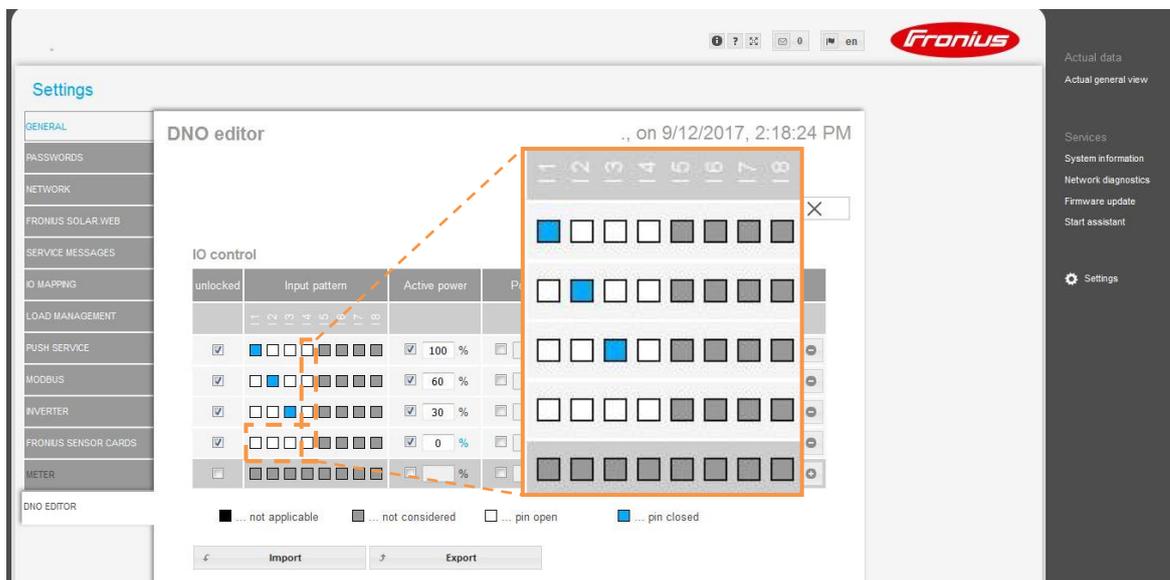
SP PRO Fronius Managed AC Coupling Installation Notes



- f. A user name and password are required to access the "DNO EDITOR" tab. Enter the service username and password created in step s, select "OK".



- g. In the "IO Control" table, toggle the boxes in "I4" column and the forth row to white.



SP PRO Fronius Managed AC Coupling Installation Notes



h. Make sure that the "Active power" for the fourth row is 0%.

unlocked	Input pattern	Active power	Power factor cosφ	UC output	excluded inverter(s)
<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8	100 %	1 ind @ cap	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8	60 %	1 ind @ cap	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8	30 %	1 ind @ cap	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	1 2 3 4 5 6 7 8	0 %	1 ind @ cap	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	1 2 3 4 5 6 7 8	%	ind @ cap	<input type="checkbox"/>	

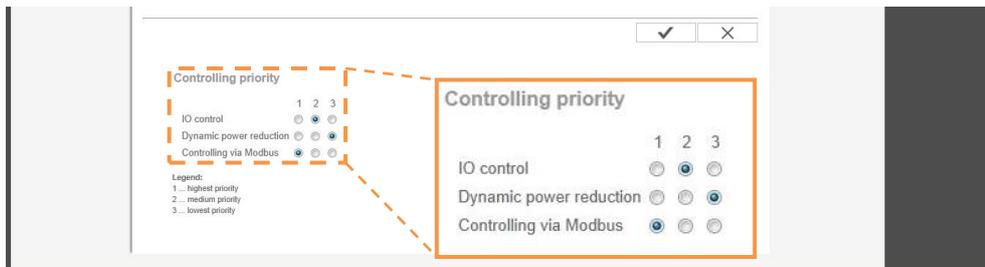
i. Save the changes made in "DNO EDITOR" by selecting the tick (✓) in the top right hand corner of the page. A popup message will appear to indicate the changes made were saved "The settings were saved successfully".

Notification
The settings were saved successfully.
OK

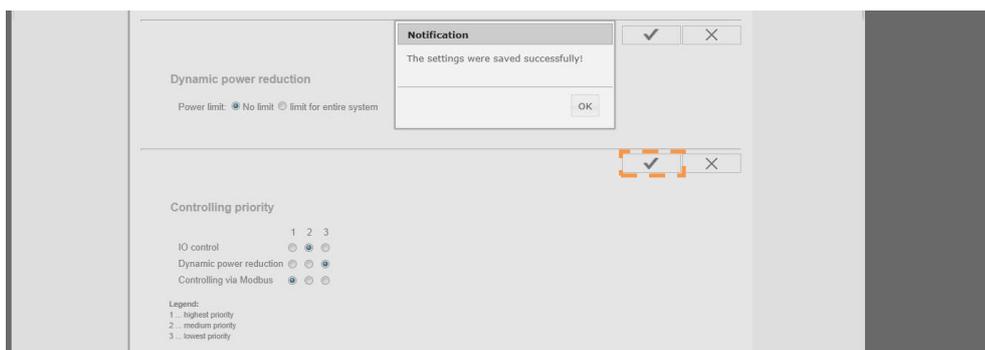
SP PRO Fronius Managed AC Coupling Installation Notes



- j. In "DNO EDITOR" tab, scroll down to "Controlling Priority" and set:
 - i. "IO control" to 2
 - ii. "Dynamic power reduction" to 3
 - iii. "Controlling via Modbus" to 1



- k. Save the changes made in "DNO EDITOR" by selecting the tick (✓) in the top right hand corner of the page. A popup message will appear to indicate the changes made were saved "The settings were saved successfully".



- l. Carry out the System Commissioning in the following section (Page 49).

Fronius configuration is now complete

NOTE:

For ONLY LAN Connection – NO Internet

Make sure to set the IP switch back to position B for Fronius inverter 01 (Master) at this point, otherwise the Fronius inverter will not communicate to the SP PRO inverter.

SP PRO Fronius Managed AC Coupling Installation Notes



SYSTEM COMMISSIONING – ADDITIONAL TESTS

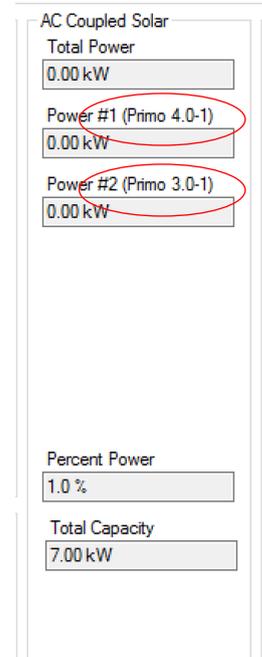
In addition to the normal system testing that would be performed, the following additional tests must be performed as detailed below.

COMMUNICATIONS LINK VERIFICATION

The correct operation of the Fronius Managed AC Coupling relies on the Communications Link. It is vital that the communications link connection has been setup correctly before operating the AC coupled system.

1. Check that all the communication cables have been connected correctly.
2. Connect AC to the Fronius inverters. DO NOT connect the PV until commissioning is complete.
3. Using SP LINK, connect to the SP PRO inverter. In the Data View > Now tab there should be a model number displayed for each of the installed inverters.

Make sure to reset the SP PRO inverter and the Fronius inverters after configurations and wiring of both the SP PRO and Fronius are complete

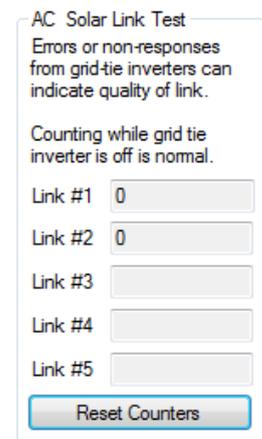


The communication link may be further tested using the AC Solar Link Test found in SP LINK under the Service Settings tab.

1. In the Service Settings tab click the "Reset Counters" button

Wait 2 minutes and check that the error count remains at zero for all the connected Fronius inverters. (An error count of 3 or less per minute is acceptable but in this case it is good practice to check the wiring and that the termination resistors are set correctly in the SP PRO and Fronius Inverters.

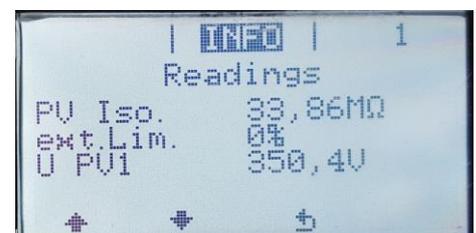
Once the Communications link has been verified for each Fronius inverter, the DC feeds to each inverter can be switch on and full system testing and verification can be performed.



VERIFICATION OF FALLBACK MODE:

When the Fronius inverter loses communications with the SP PRO, the output of the all the Fronius inverters will drop to zero power after 10 seconds.

To verify this function, disconnect the communications lead between the SP PRO and Fronius inverter, wait 10 seconds. Go to INFO > Readings menu on the front display of the first Fronius inverter and check that the external limit (ext. Lim.) drops to 0%.



SP PRO Fronius Managed AC Coupling Installation Notes



Appendix I : Islanding power limit vs battery capacity

Islanded power limit (kW) with Lead Acid batteries

Battery Capacity Ah (C10)	SP PRO Model						
	SPMC240	SPMC241	SPMC481	SPMC482	SPMC1201	SPLC1200	SPLC1202
100	Not valid	Not valid	Not valid	Not valid	6.3kW	Not valid	Not valid
180	2.3kW	2.3kW	4.5kW	4.5kW	11.3kW	Not valid	Not valid
250	3.1kW	3.1kW	6.3kW	6.3kW	15.0kW	15.6kW	15.6kW
300	3.8kW	3.8kW	7.5kW	7.5kW	15.0kW	18.8kW	18.8kW
400	5.0kW	5.0kW	10.0kW	10.0kW	15.0kW	25.0kW	25.0kW
500	6.0kW	6.3kW	10.0kW	12.5kW	15.0kW	30.0kW	31.3kW
600	6.0kW	7.5kW	10.0kW	15.0kW	15.0kW	30.0kW	37.5kW
650+	6.0kW	8.8kW	10.0kW	15.0kW	15.0kW	30.0kW	40.0kW

Table 3: Limit of AC coupled solar during islanding vs battery capacity for lead acid batteries.

Islanded power limit (kW) with Lithium batteries

Battery Capacity kWh	SP PRO Model						
	SPMC240	SPMC241	SPMC481	SPMC482	SPMC1201	SPLC1200	SPLC1202
1.5	1.1kW	1.1kW	Not valid				
2.0	1.5kW	1.5kW	Not valid				
3.0	2.3kW	2.3kW	2.3kW	2.3kW	2.3kW	Not valid	Not valid
4.0	3.0kW	3.0kW	3.0kW	3.0kW	3.0kW	Not valid	Not valid
5.0	3.7kW	3.7kW	3.7kW	3.7kW	3.7kW	Not valid	Not valid
6.0	4.5kW	4.5kW	4.5kW	4.5kW	4.5kW	Not valid	Not valid
7.0	5.2kW	5.2kW	5.2kW	5.2kW	5.2kW	Not valid	Not valid
8.0	6.0kW	6.0kW	6.0kW	6.0kW	6.0kW	Not valid	Not valid
10	6.0kW	7.5kW	7.5kW	7.5kW	7.5kW	7.5kW	7.5kW
12	6.0kW	9.0kW	9.0kW	9.0kW	9.0kW	9.0kW	9.0kW
14	6.0kW	9.0kW	10.0kW	10.5kW	10.5kW	10.5kW	10.5kW
20	6.0kW	9.0kW	10.0kW	15.0kW	15.0kW	15.0kW	15.0kW
30	6.0kW	8.8kW	10.0kW	15.0kW	15.0kW	22.5kW	22.5kW
40	6.0kW	8.8kW	10.0kW	15.0kW	15.0kW	30.0kW	30.0kW
50	6.0kW	8.8kW	10.0kW	15.0kW	15.0kW	30.0kW	37.5kW
55+	6.0kW	8.8kW	10.0kW	15.0kW	15.0kW	30.0kW	40.0kW

Table 4: Limit of AC coupled solar during islanding vs battery capacity for lithium batteries.