APPLICATION GUIDE
EMERGENCY BACKSTOP MECHANISM – DRM SETUP WITH TMAC GSD

THIS DOCUMENT AIMS TO PROVIDE EASY-TO-FOLLOW INSTRUCTIONS ON HOW TO INSTALL A GSD WITH A FRONIUS SNAP AND GEN24/TAURO INVERTER

Application Guide
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Contents

1. CHANGE LOG

Date	Version	Comments	Author
05/01/23	1.0	Initial release	Fronius Australia
16/05/23	2.0	• Added fallback mechanism in SolarNet loop application • Added GSD troubleshooting guide • Minor text improvements/updates	Fronius Australia
12/07/23	2.1	• Added Tauro specific instructions regarding SPD trigger	Fronius Australia

2. GENERAL

The emergency backstop mechanism is a system designed to curtail rooftop PV generation by remote command from the utility. This control allows the utility to maintain stability of the grid in events where the grid is under stress from high rooftop PV.

The system will be implemented by installing an external device called a Generation Signalling Device (GSD) which will be capable of communicating with the utility and the onsite solar generation for curtailment. The utility communication is being done through the Audio Frequency Load Control (AFLC) system which done over the power lines. The inverter communication is done through Demand Response Mode (DRM) ports which allow the inverter to receive control signals to ramp power up/down and switch off/on remotely.

This mechanism is being mandated in particular IES connections and will be enforced in Queensland as of the 6th of February 2023.

3. SITE REQUIREMENTS

There are multiple factors outlined by Ergon Energy/Energex to determine whether a GSD is required as part of the installation. Below are the current IES connections that must install a device (as seen at the time of publishing this document).

Connection Category	Total Inverter Capacity	Types of Inverter Connections	Required to Install a GSD	Exclusions	Requirement for Inverters to be GSD capable and have GSD installed
Low voltage	Less than 10kVA	Initial connection	No	N/A	N/A
Low voltage	Less than 10kVA	Increase inverter capacity	No	N/A	N/A
Low voltage	Less than 10kVA	Replace inverter (no increase of supply) – not a warranty replacement	No	N/A	N/A
Low voltage	10kVA or higher	Initial connection	Yes Including hybrid inverters	Not required where inverter solely supplied by energy storage system (AC coupled batteries) Not required in non AFLC areas Not required for warranty 'like for like' replacement	All inverters
Low voltage	10kVA or higher	Increase inverter capacity	Yes Including hybrid inverters	Not required where inverter solely supplied by energy storage system (AC coupled batteries) Not required in non AFLC areas Not required for warranty 'like for like' replacement	All new inverters only
Low voltage	10kVA or higher	Replace inverter (no increase of supply) – not a warranty replacement	Yes Including hybrid inverters	Not required where inverter solely supplied by energy storage system (AC coupled batteries) Not required in non AFLC areas Not required for warranty 'like for like' replacement	All new inverters only
Low voltage	Any	Replace inverter (no increase of supply) – warranty replacement	No	N/A	N/A
High voltage	Any	Any	No	N/A	N/A

Some areas are also not serviced by the AFLC system so please check the NMI in the search function found on Ergon Energy/Energex's website.

For the most current information regarding requirements for the Emergency Backstop Mechanism please visit Ergon Energy / Energex's website:
Ergon: https://www.energex.com.au/home/our-services/connections/low-voltage-generation/emergency-backstop-mechanism
Energex: https://www.ergon.com.au/network/connections/low-voltage-generation/emergency-backstop-mechanism

4. TECHNICAL INFORMATION AND SETUP

Once the IES connection has been assessed and a GSD is required, the next step is installing the GSD with the Fronius inverter. All current Fronius inverters (Fronius Snap and GEN24/Tauro) are capable of demand response management hence are compatible with GSD's. Please see below setup information, **note that the process is different between the Snap and GEN24/Tauro**,

4.1 Generation Signalling Device

Currently approved GSD's:
https://www.energex.com.au/__data/assets/pdf_file/0020/1035623/Approved-Generation-Signalling-Devices.pdf

Currently there is only one approved GSD which is from TMAC, the cost is dependant upon the distributor but typically <$100 for the device.
TMAC Install Manual: https://www.tmacgroup.com.au/wp-content/uploads/2022/10/TM-UI-036-GSD-Installer-Manual.pdf

Figure 4.1: GSD and RJ45 adaptor:

Image source: https://www.tmacgroup.com.au/product/generation-signalling-device-gsd-aflc/

4.2 Installing a GSD with a Fronius SnapINverter

4.2.1 Equipment:

1. Laptop/smart device

For every Solar Net Loop/Master Datamanager card
1. 1x GSD
2. 1x DRM Interface Card
3. 1x Datamanager Card

4.2.2 Steps Overview

1. Commission Inverter
2. Connect DRM Interface Card to inverter
3. Set I/O Mapping
4. Connect GSD to DRM interface Card

Figure 4.2: Fronius SnapINverter

Step 1. Commission Inverter:

The inverter is to be commissioned prior to the next GSD install steps. After commissioning is complete, please proceed to the next step. This document does not cover setup and commissioning and assumes that you are aware of how to do this, please visit our website for resources on how to do this.

Step 2. Install DRM Interface Card:

Important Notes:
- The DRM interface card is an optional extra that must be purchased and retrofitted to the inverter.
- This is only required on SnapINverters not GEN24/Tauro.
- The DRM interface card can only be installed on inverters that contain a datamanager card. That datamanager must also be operating as a master.
- You only require one GSD and DRM Interface card per Solar Net loop/Master datamanager card.
- Slave devices in the Solar Net loop must have their fallback mechanism activated.

Below displays what the DRM interface Card looks like when installed. When the card is purchased, it will also come with a pre-wired orange terminal block (to connect to the datamanager card as seen below), 1x screw, instructions and a sticker.
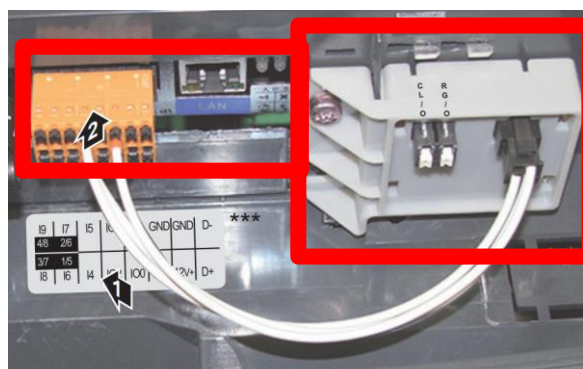
Figure 4.3: Datamanager card (LEFT)
DRM Interface card (RIGHT)

How to install the DRM Interface Card:

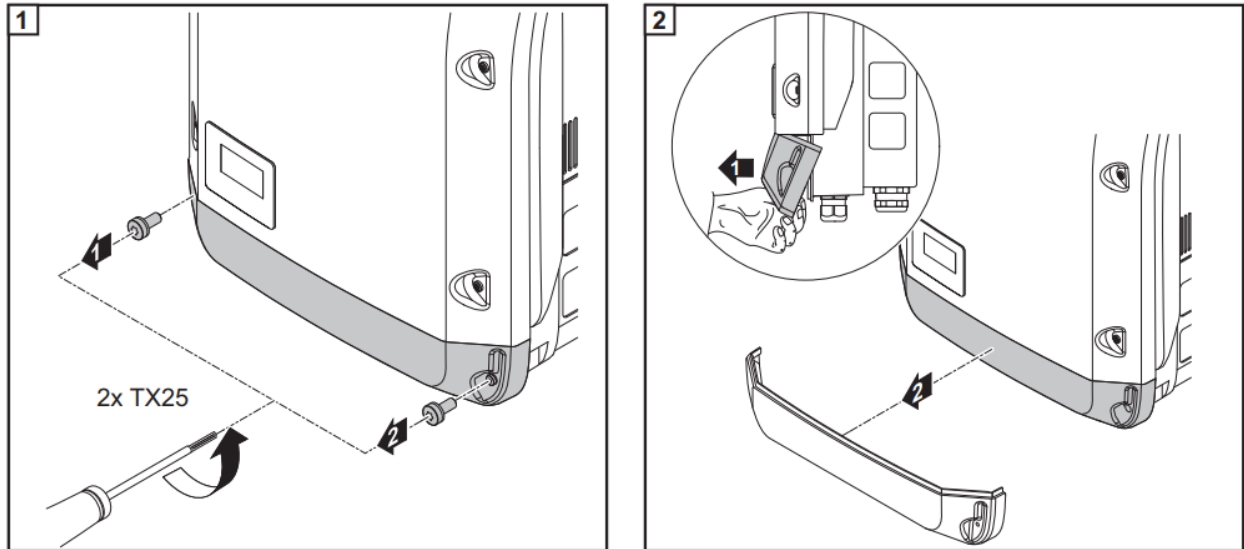**Figure 4.4: Remove Cable Cover**

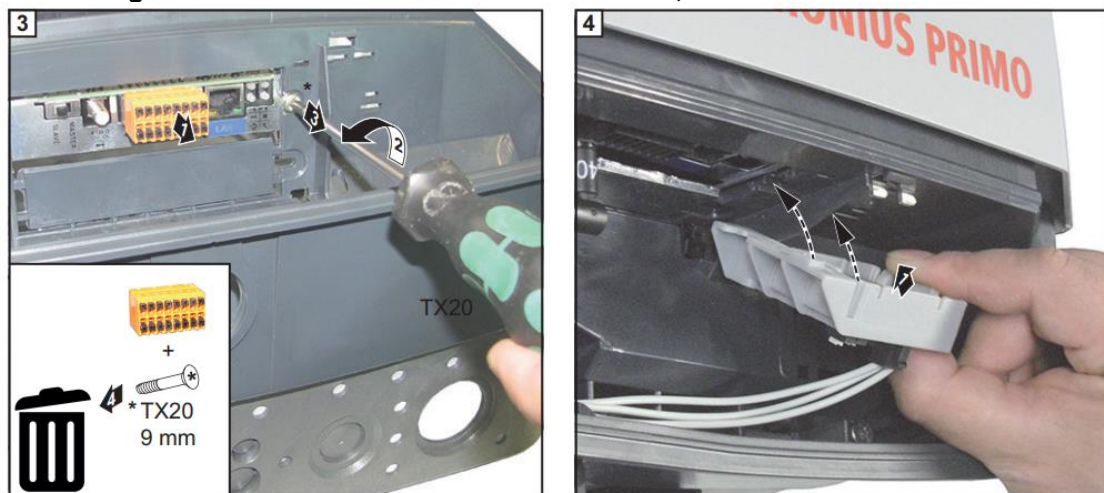**Figure 4.5: Remove screw and terminal block, insert DRM interface card**

Figure 4.6: Insert new screw and pre wired terminal block. Place sticker.
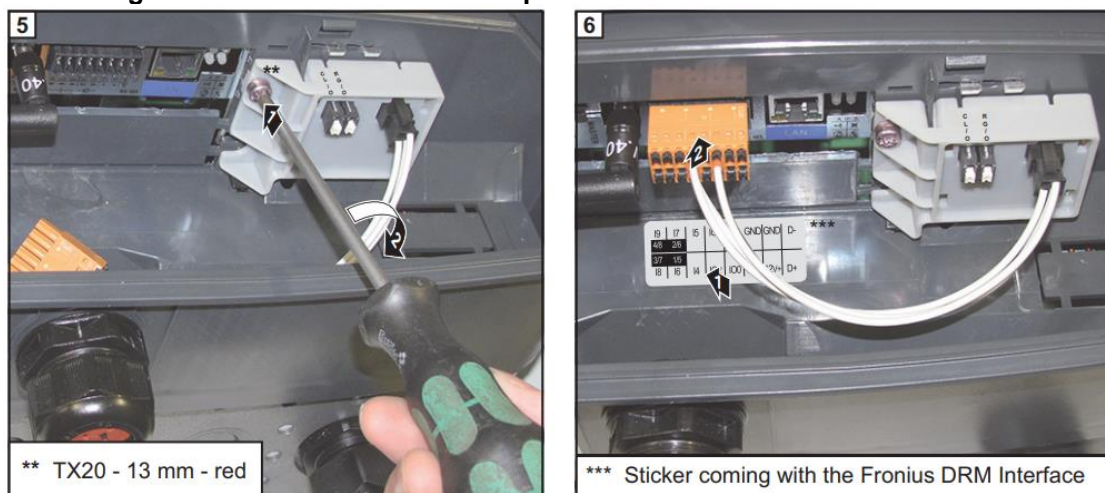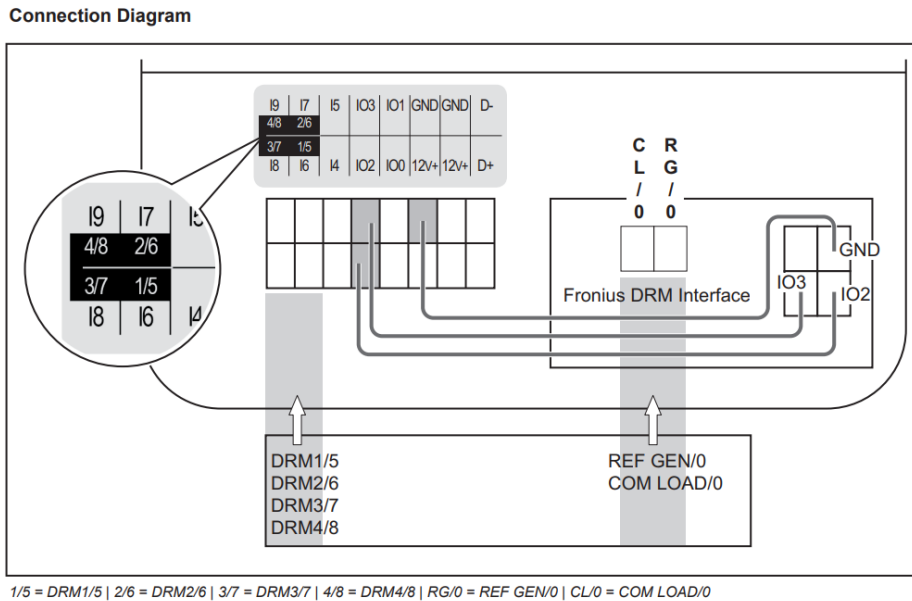
**Figure 4.7: Take note of the REF GEN/0 and COM LOAD/0 port on the card. These will be used in the GSD setup.**

Step 3. Set I/O Mapping:

The I/O settings can be adjusted via the Datamanager website (webserver is built-in) by following these steps:

1. Activate the Wi-Fi hotspot on the Datamanager card (inverter) or Datamanager Box V2
2. Connect your computer/tablet/smartphone to the Datamanager's WLAN hotspot*. Or connect a LAN cable to the computer.
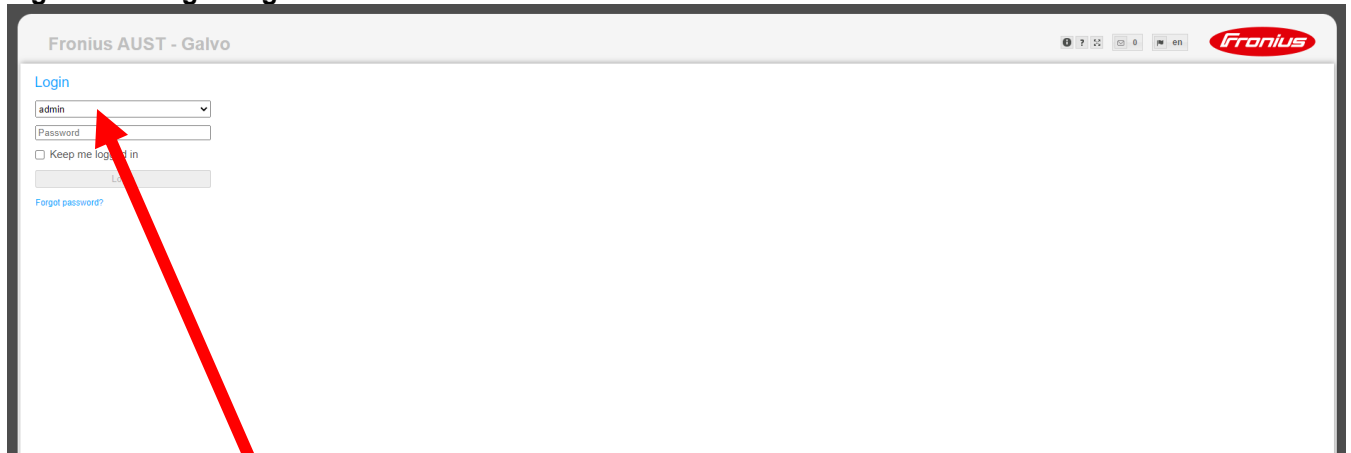3. Open a web browser and go to http://192.168.250.181

Once the local server is open, you will see the server displayed as below:
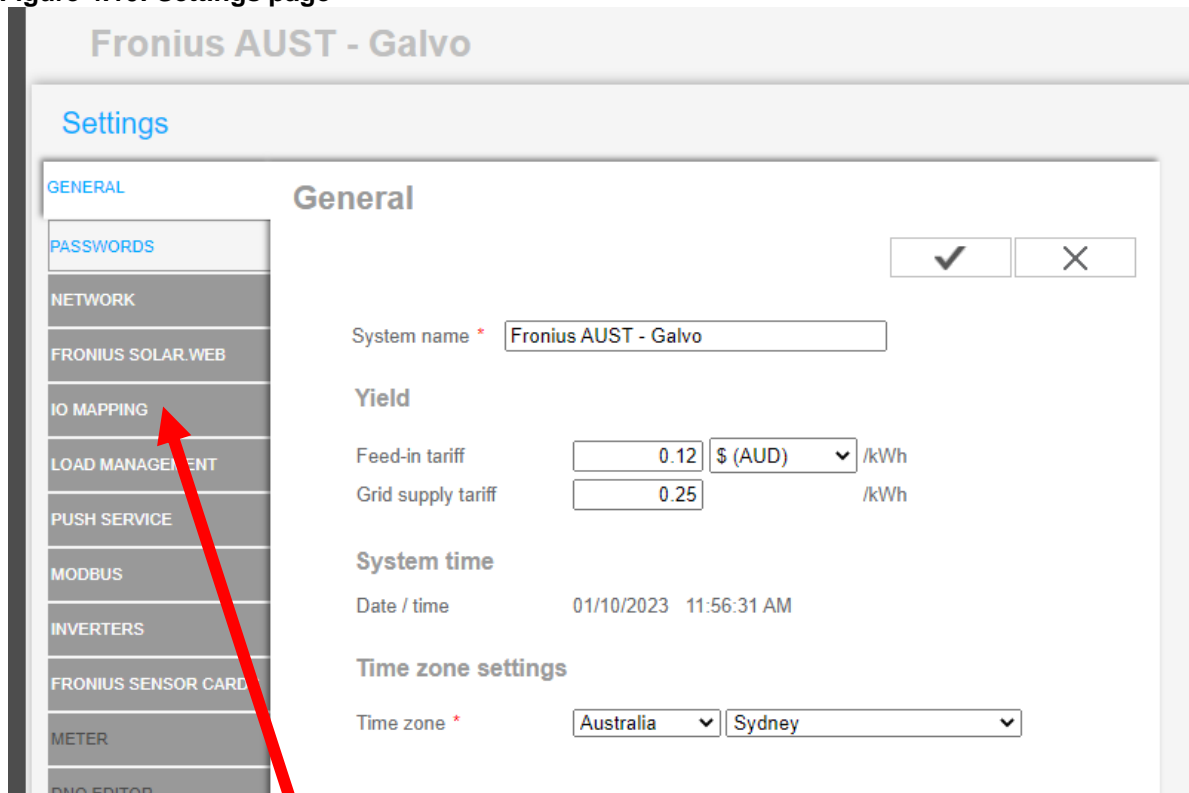
Figure 4.8: Local Server of SnapINverter
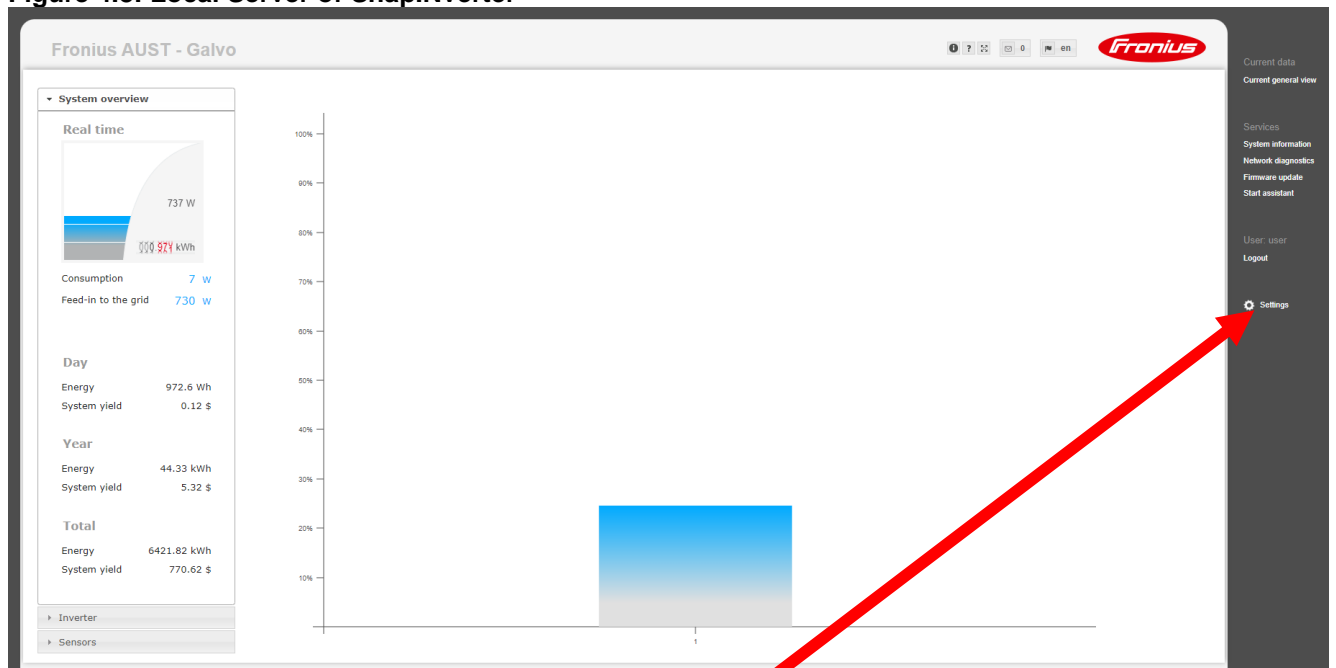
4. Press on the Settings button to get to the next page

Figure 4.9: Login Page

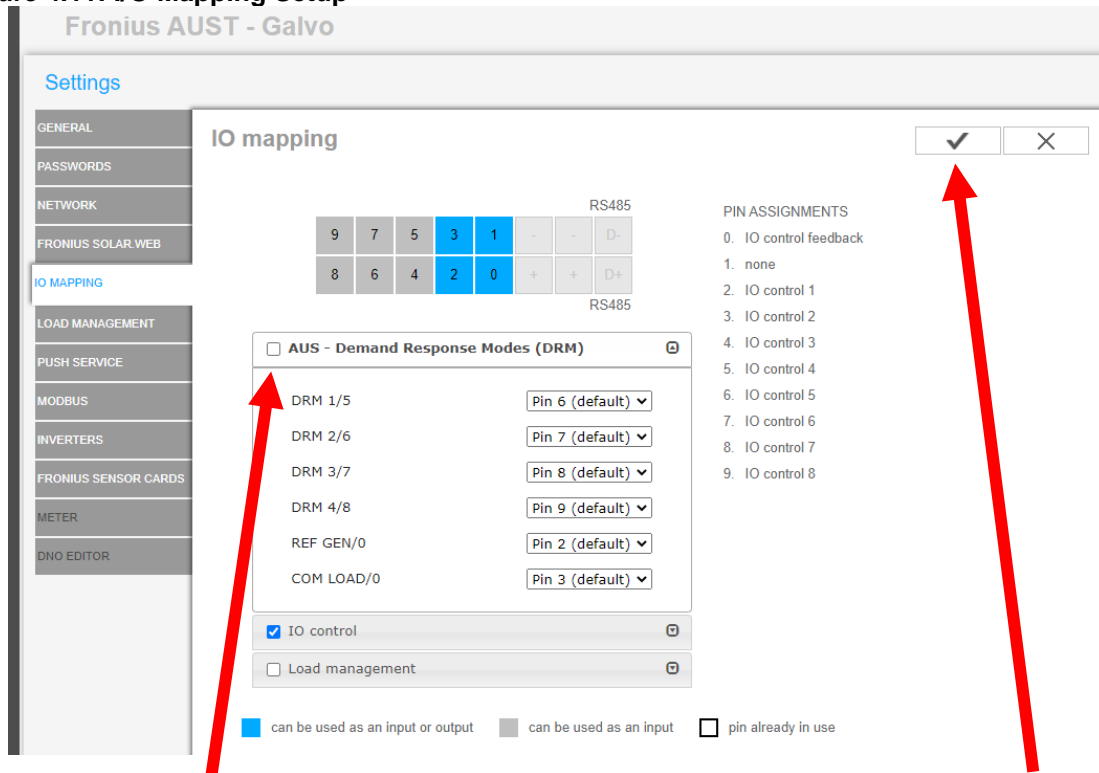5. Login as a "service" user to obtain access to the required settings.

Figure 4.10: Settings page

6. Click on I/O Mapping to proceed

Figure 4.11: I/O Mapping Setup

7. Click the tickbox for "AUS – Demand Response Modes (DRM)". Then click on the tick to save the settings. (Note: Turn "OFF" IO Control if it isn't being used as it may interfere with saving the DRM settings)

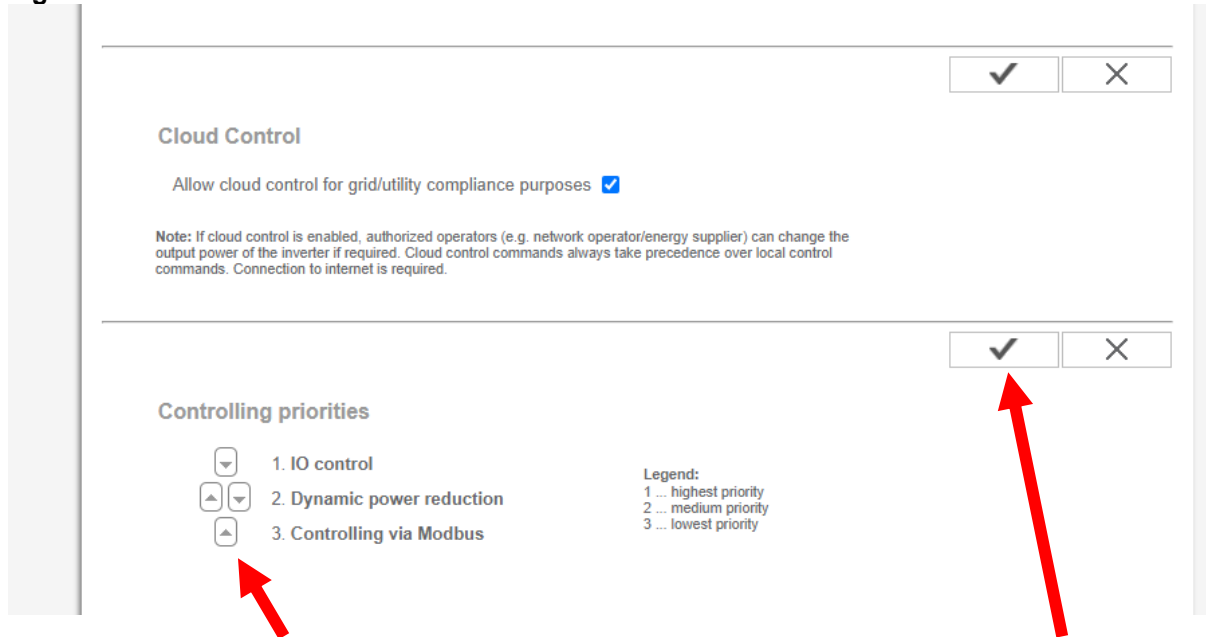This will automatically allocate the DRM pins to the I/O on the orange terminal block of the inverter.

Step 4. Setup the Control priorities of the inverter:

Figure 4.12: DNO Editor
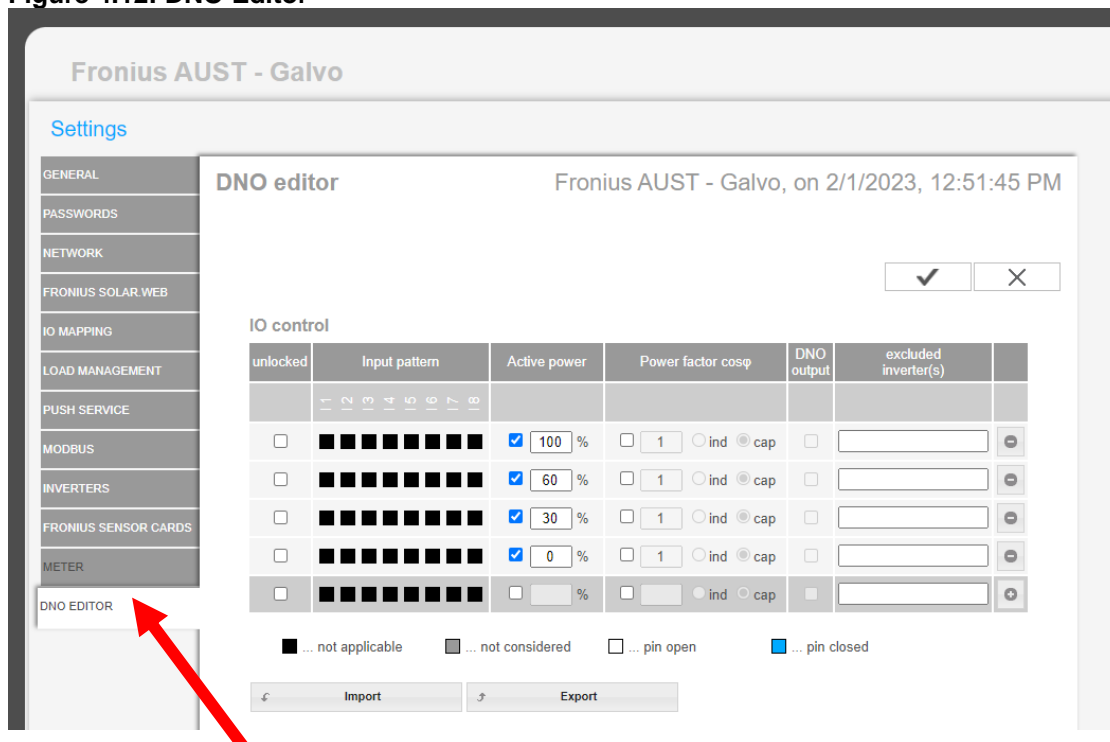
1. Click on DNO Editor (any IO control found on this page can be left as default)
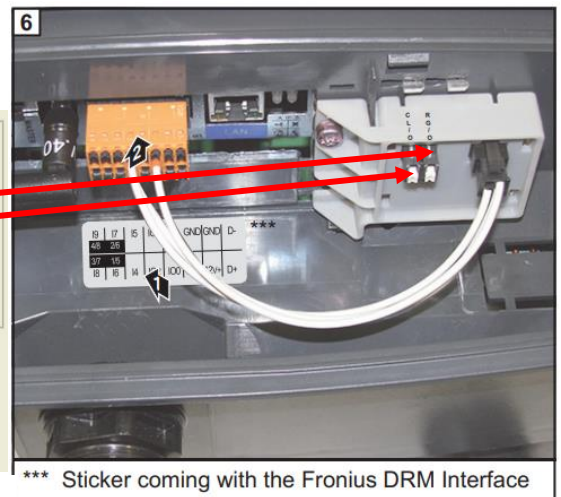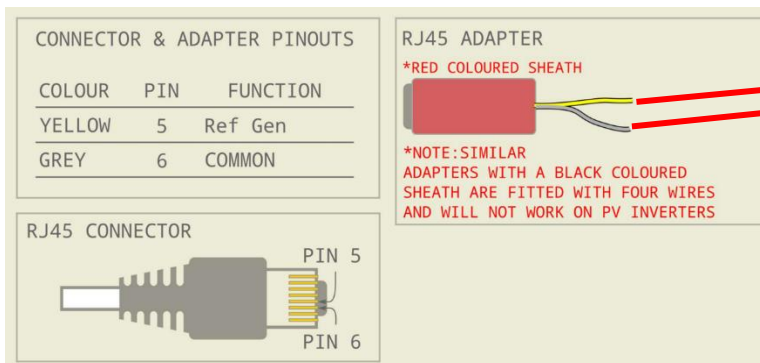
Figure 4.13: Control Priorities

2. Click on the arrows to shift IO control to the highest priority level. Then click the tick to save.

In all circumstances when using DRM control, the IO control must be the highest priority. If export control is being used, this can be the second priority.

Step 5. Connect GSD to DRM interface Card:

Now that the Inverter is commissioned, DRM Interface has been installed and the DRM has been activated the GSD can be installed.

1. Connect the RJ45 adaptor to the RJ45 on the TMAC GSD
2. Connect **YELLOW** wire to **RG/0**
3. Connect **GREY** wire to **CL/0**

Figure 4.15: TMAC Wiring Diagram:
**https://www.tmacgroup.com.au/wp-content/uploads/2022/10/TM-UI-036-GSD-Installer-Manual.pdf**

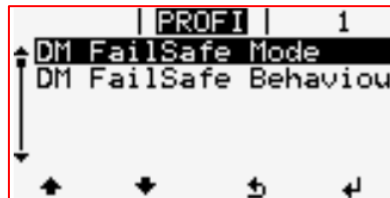**Figure 4.14: Where to connect GSD to DRM Interface**

IMPORTANT NOTE: Whenever using a configuration where you are using the DRM function over the SolarNet loop you must include the failsafe mechanism for the slave units in the chain.

To activate Fail-Safe:

Access the PROFI menu (please contact our support team for the access code)
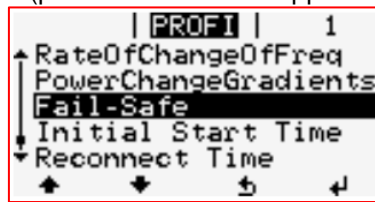
Scroll down and click on Fail-Safe.

Then click on DM FailSafe Mode -> Permanent

Finally, DM FailSafe Behaviour -> Disconn (this is set by default)

Congratulations - Now all SnapINverters connected in the existing Solarnet loop can be controlled via the GSD device and the Emergency Backstop Mechanism installation with the Fronius inverter is complete. If there are any separate SnapINverters not connected in the same Solarnet loop they will require a separate GSD.

4.3 Installing a GSD with a Fronius GEN24/Tauro Inverter

4.3.1 Equipment
1. Laptop/smart device
2. 1x GSD per Inverter

4.3.2 Steps Overview
1. Commission Inverter
2. Set I/O Mapping
3. Connect GSD to DRM ports

Figure 4.16: Fronius GEN24 Inverter

Step 1. Commission Inverter:

The inverter is to be commissioned prior to the next GSD install steps. After commissioning is complete, please proceed to the next step. This document does not cover setup and commissioning and assumes that you are aware of how to do this, please visit our website for resources on how to do this.

Step 2. Set I/O Mapping:

The I/O settings can be adjusted via the inverter's local server (webserver is built-in) by following these steps with a smart device.
1. Please connect the inverter to your smart device either via Ethernet or Wi-Fi, see steps for either connection below.
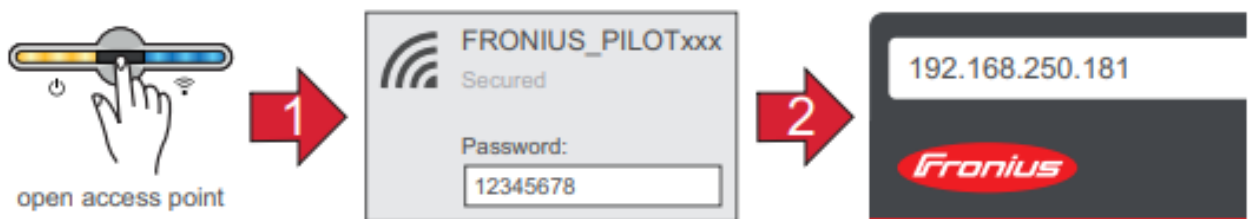
WLAN:

Figure 4.17: WLAN Connection process

1. Open the access point by touching the sensor once → Communication LED should now flash blue.
2. Establish the connection to the inverter in the network settings (the inverter is displayed with the name "FRONIUS_PILOT" and the serial number of the device).
3. Password: enter 12345678 and confirm.
   IMPORTANT!
   To enter the password on a Windows 10 operating system, the link "Connect using a security key instead" must first be activated to establish a connection with the password: 12345678.
4. In the browser address bar, enter and confirm the IP address 192.168.250.181. The local server should now be displayed.
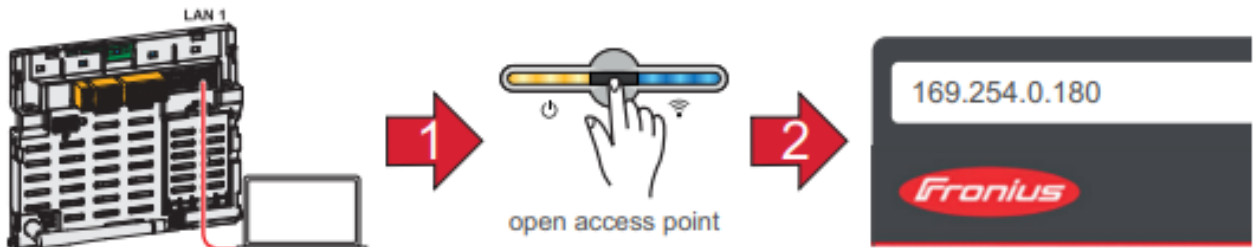
Ethernet:

Figure 4.18: Ethernet Connection Process

1. Establish a connection to the inverter (LAN1) with a network cable (CAT5 STP or higher).
2. Open the access point by touching the sensor once → Communication LED: flashes blue.
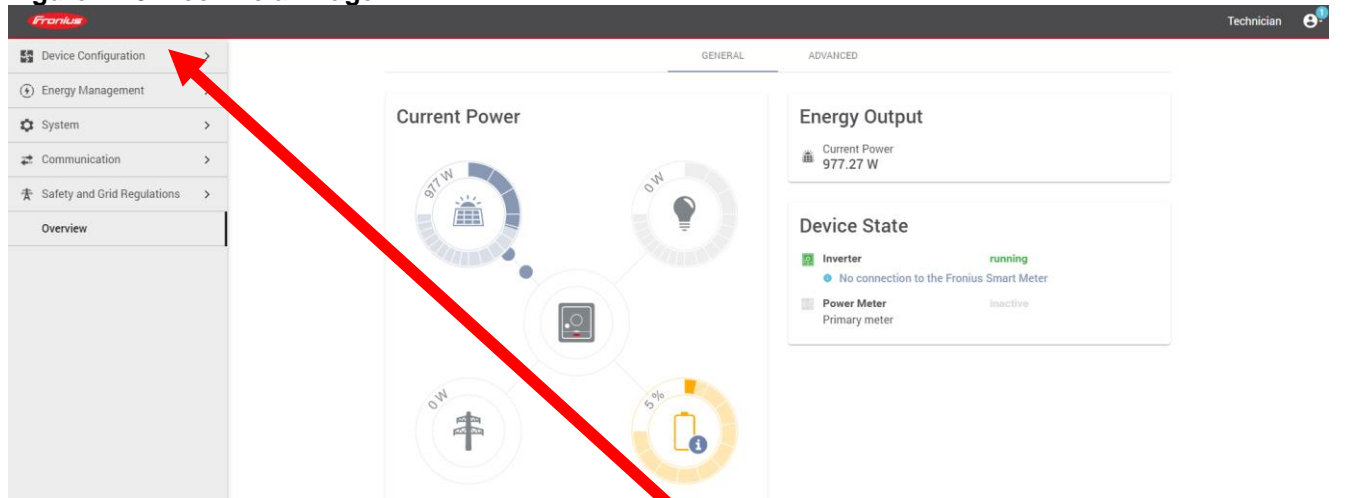3. In the browser address bar, enter and confirm IP address 169.254.0.180. The installation wizard is opened

Once the local server is open, you will see the server displayed as below:

Figure 4.19: Local Sever of GEN24/TAURO
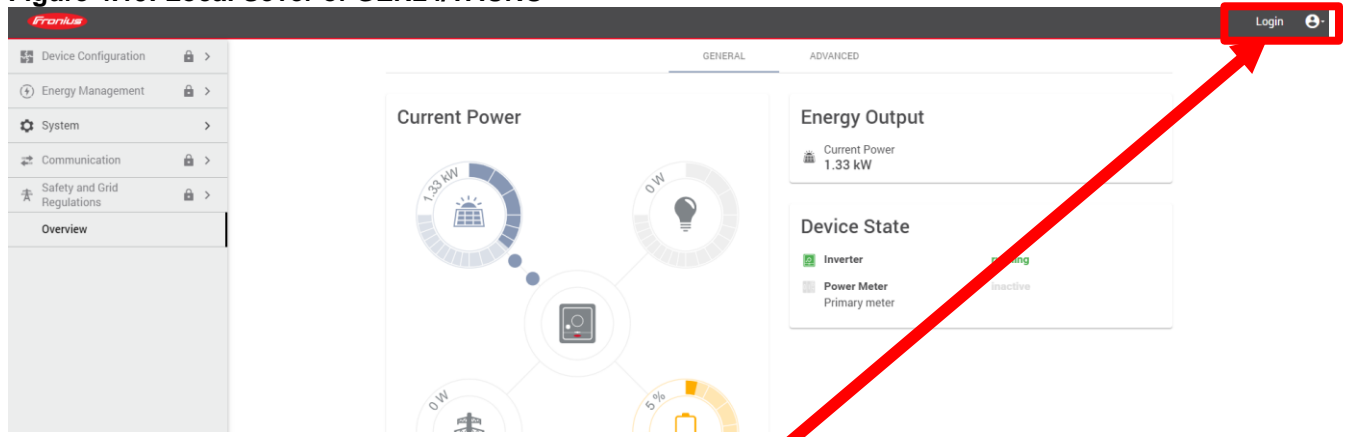
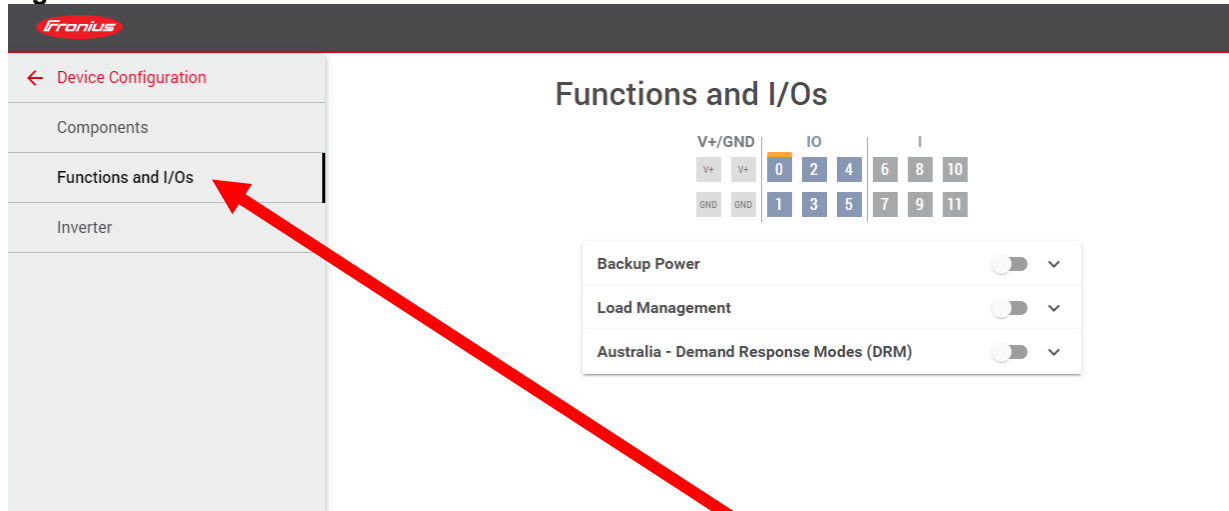   2. Press on the Login button and login as a Technician.

Figure 4.20: Technician Page

    3. Once Logged in as a Technician click on "Device Configuration" to proceed to the next page.

Figure 4.21: Functions and I/O's

4. From The Device configuration page click on "Functions and I/Os"
5. **Click on the toggle switch to turn Australia – Demand Response Modes (DRM) to ON. If using a Tauro inverter, change DRM 3/7 from the default "Pin 8" to a free pin such as "Pin 10" to avoid clashing with the SPD trigger prewired to the terminal block. If this is not done it will cause the Tauro to ramp down its power while the GSD is connected when it should not. If using a Gen24 this is not necessary.**
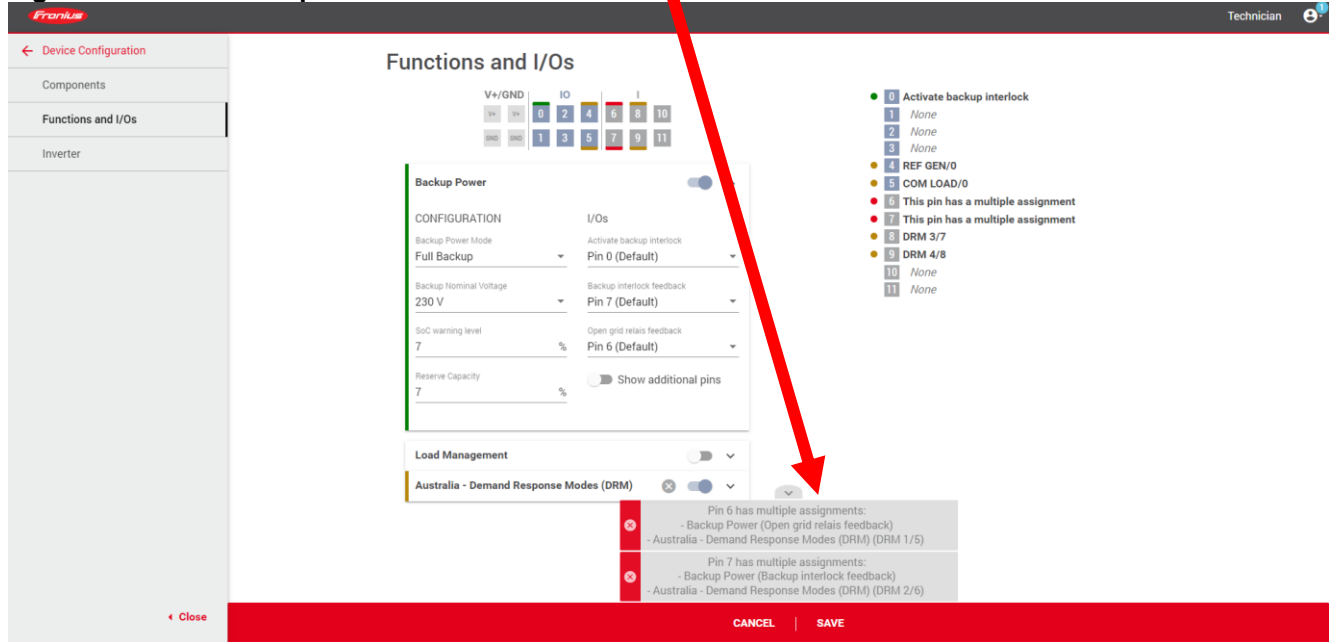
Figure 4.22: DRM Page
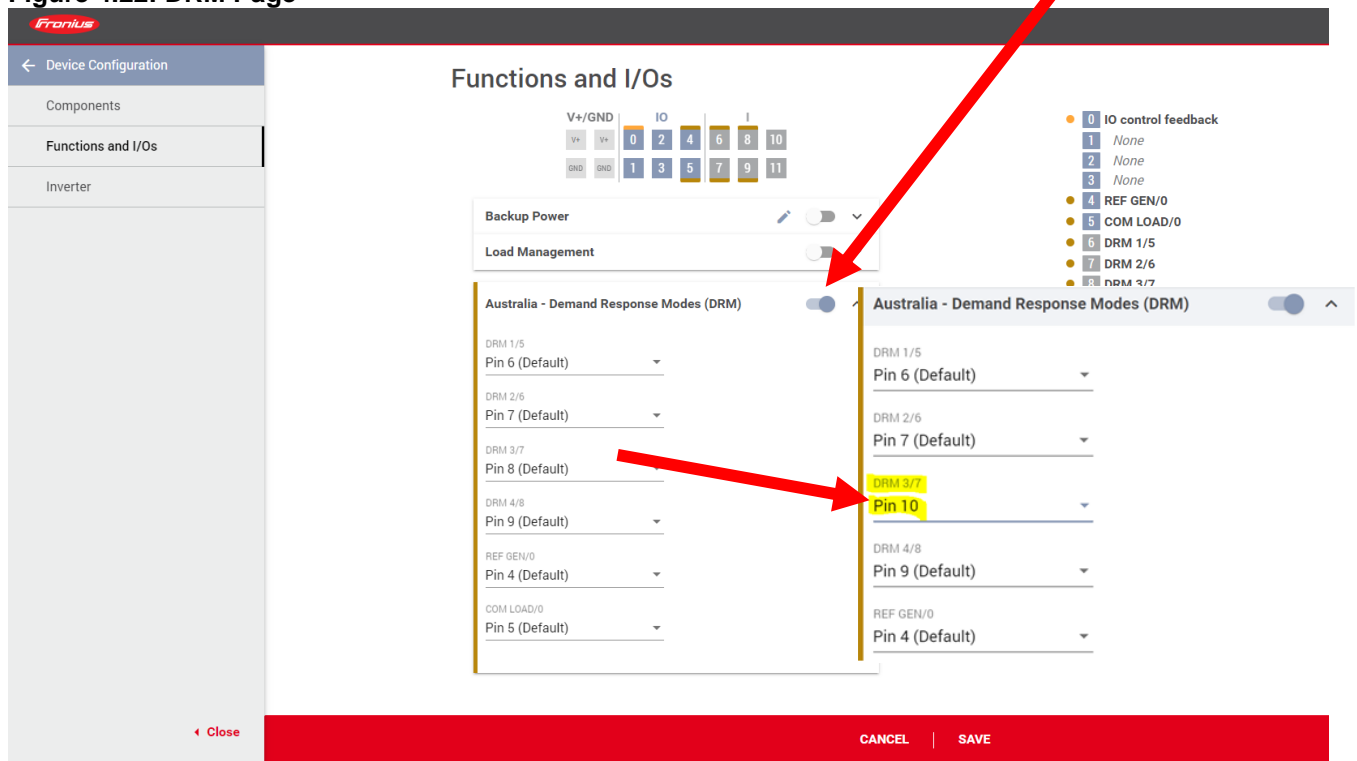
6. Click the Save button to save this setting.

If the site has "Full Backup" or any I/O pins are being used for other purposes there may be some pin clashes. Please see the next steps to resolve this, otherwise skip to (10.).
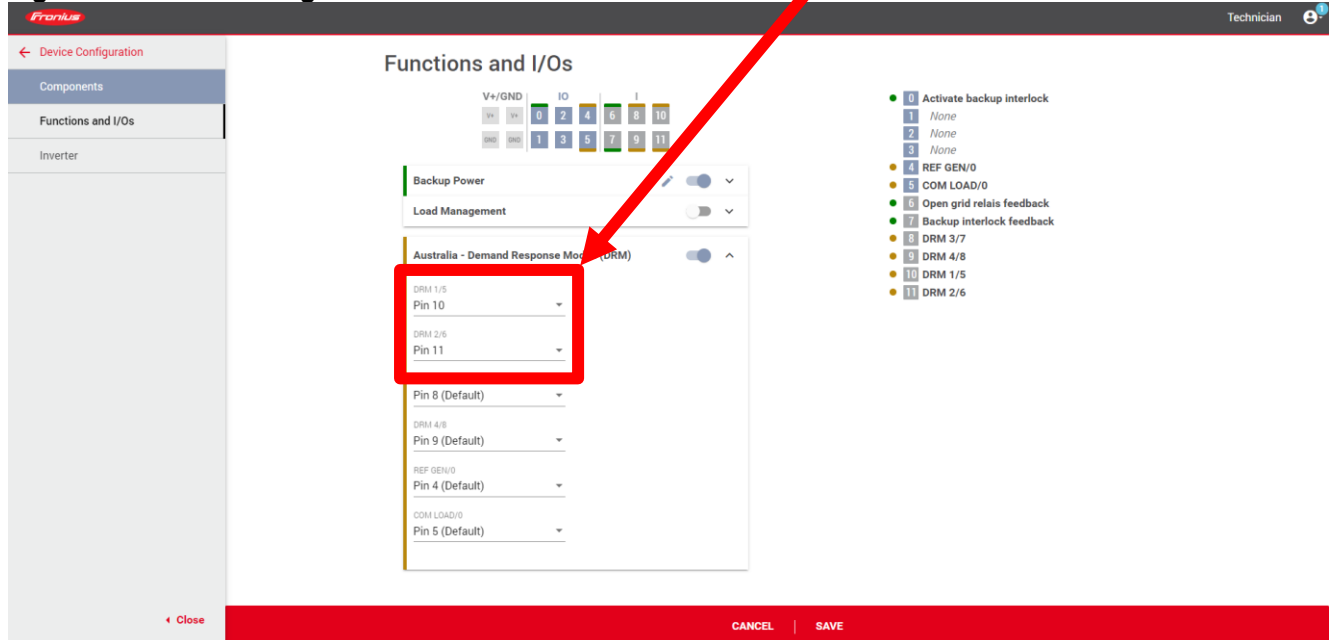
7. If Full Backup is activated, please note that Pin 6 and Pin 7 will clash as per the below notice.

Figure 4.23: Full Backup Clash

8. In the event of this happening please change DRM 1/5 and DRM 2/6 to Pin 10 and Pin 11 respectively to prevent the clash from occurring. Then click the save button to save the changes.

**Figure 4.24: Pin re-assignment**

9. If a clash is still present you will be required to alter the pin layout to avoid these clashes.

Further steps in this material will be using the default pins for REF GEN/0 and COM LOAD/0. If DRM connections other than these are changed/moved this will not affect GSD connection points or any installation requirements for the Emergency Backstop Mechanism.
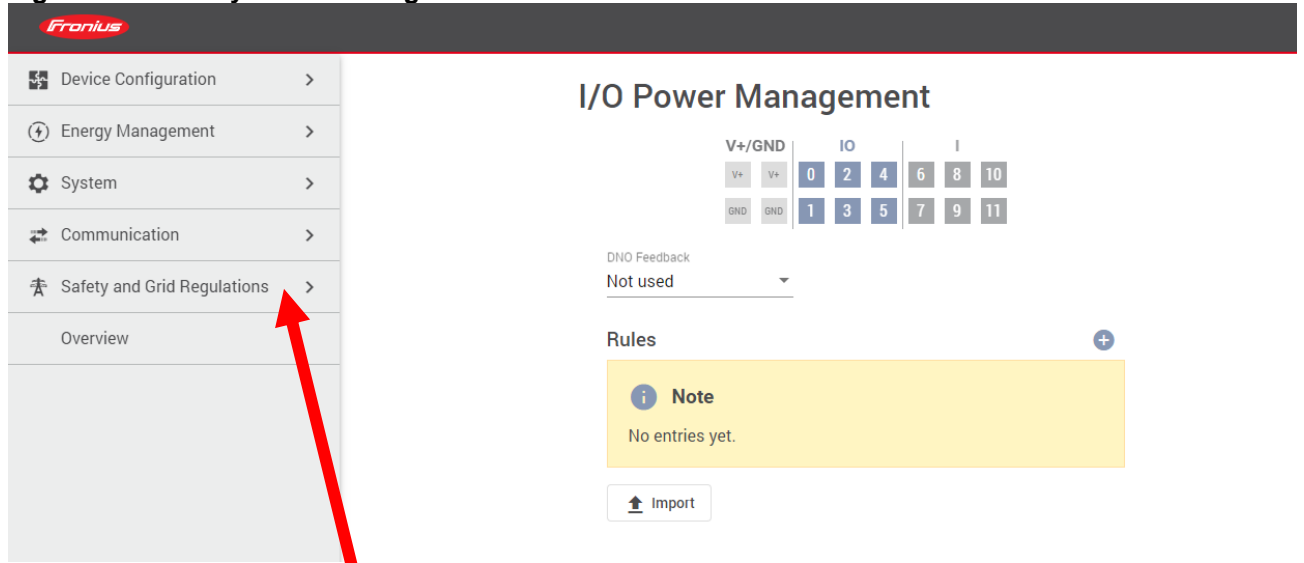
If either or both REF GEN/0 and COM LOAD/0 pins need to be changed from default, please note the pin assignment to ensure the correct pins are used in subsequent steps.
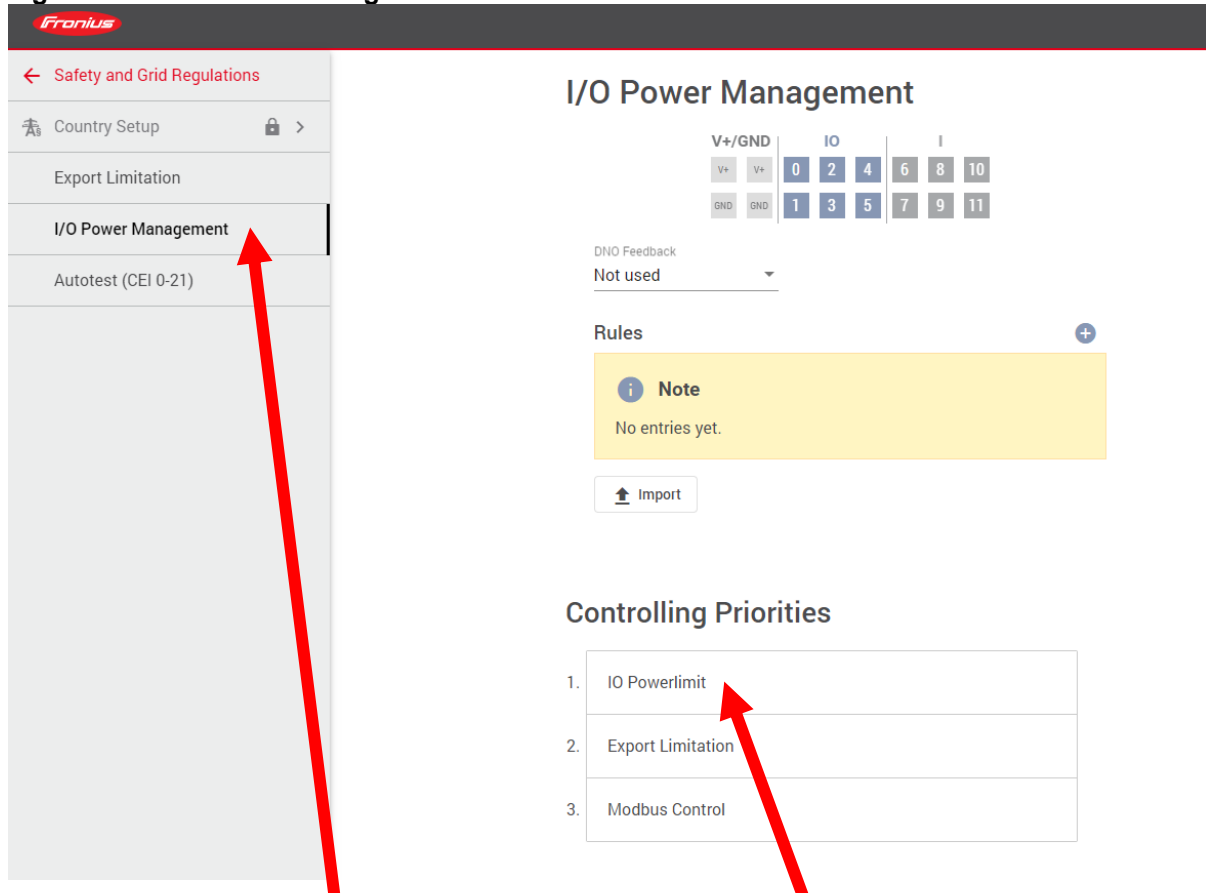
Figure 4.25: Back to Device Configuration
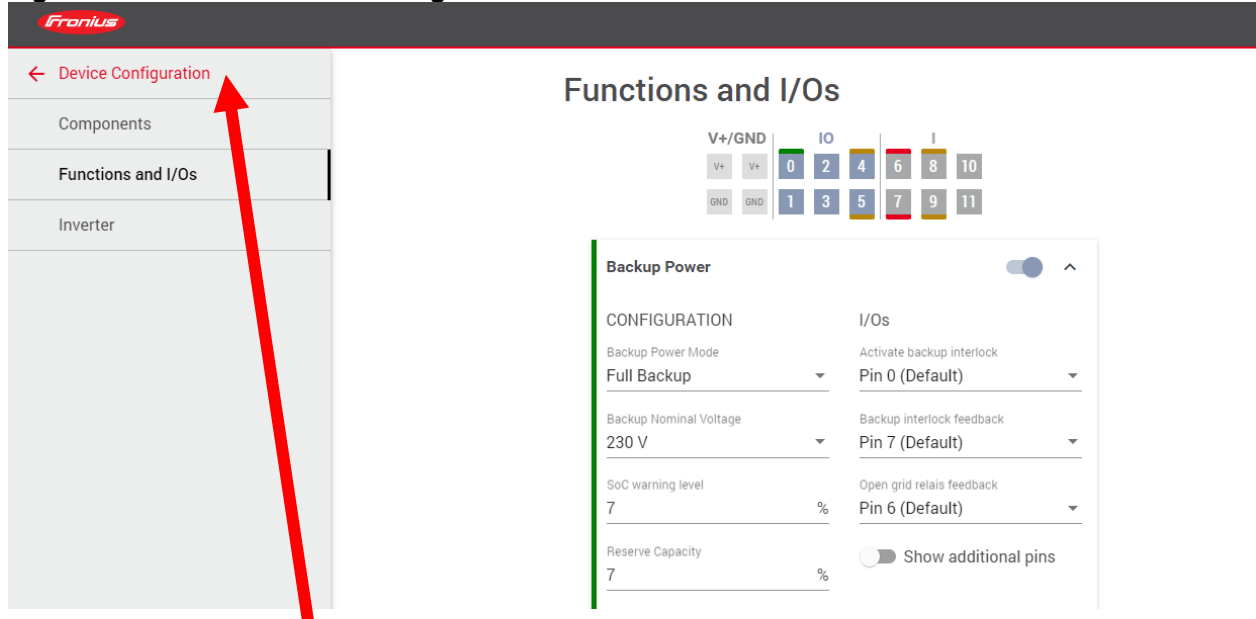
10. Click on "Device Configuration" to return to the main menu.

Figure 4.26: Safety and Grid Regulations

11. Click on "Safety and Grid Regulations"

Figure 4.27: I/O Power Management Menu

12. Click on "I/O Power Management" and alter the Control Priorities (click and drag) to ensure that IO Power limit is the top priority (1.).
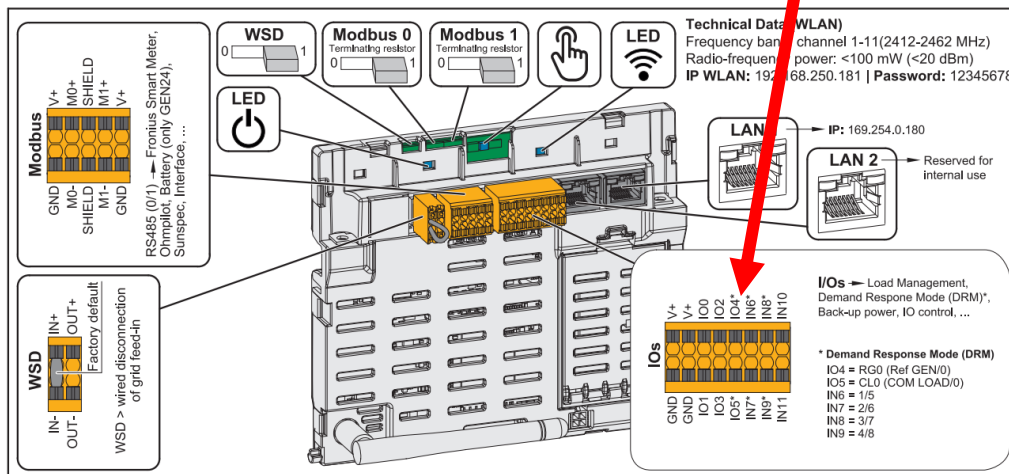
Now the DRM I/O's are activated and ready for use with the GSD.

Step 4. Connect GSD to DRM interface Card:

Now that the Inverter is commissioned, and the DRM has been activated the GSD can be installed.
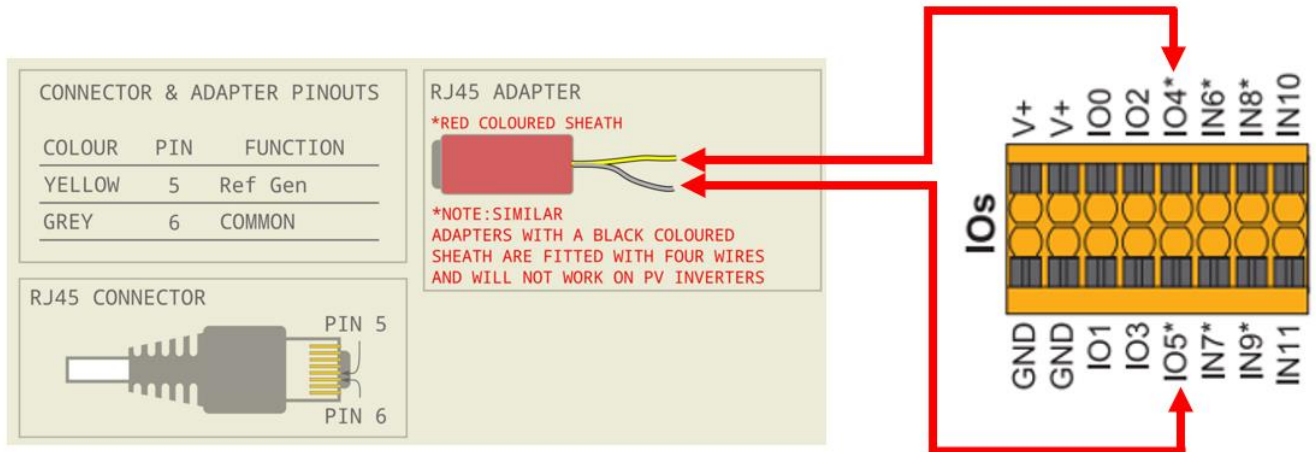
Locate the data communication board within the inverter. Find the I/O terminal block.

Figure 4.28: Data Communication Board

1. Connect RJ45 adapter with RJ45 connector on GSD
2. Connect **YELLOW** wire to **IO4**
3. Connect **GREY** wire to **IO5**

Figure 4.29: Wiring TMAC to IO board: https://www.tmacgroup.com.au/wp-content/uploads/2022/10/TM-UI-036-GSD-Installer-Manual.pdf

Congratulations - Now your GEN24/Tauro inverter is connected and can be controlled via the GSD device and the Emergency Backstop Mechanism installation with the Fronius inverter is complete. Keep in mind that if there are multiple GEN24/Tauro's onsite this process must be repeated for each inverter.
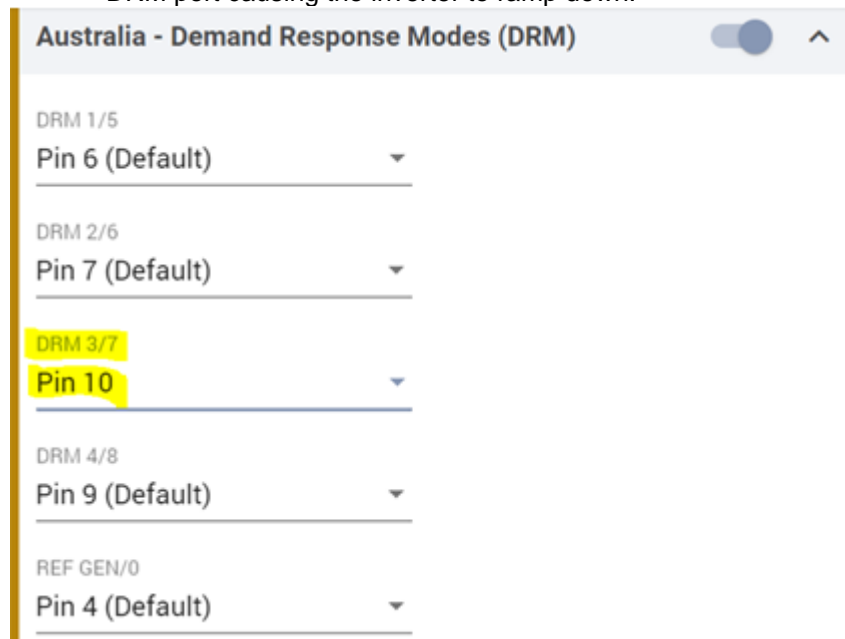
5. TROUBLESHOOTING GSD

5.1 GSD and wiring checks

In an event where the inverter is unexpectedly shutting down due to DRM during installation, please check the following:

1. Disconnect the GSD from the inverter by disconnecting the yellow and grey cable from the inverter terminal block. Please check the impedance between the yellow and grey cable on the RJ45 adaptor while the GSD is still powered "ON" and connected to the GSD.

RJ45 ADAPTER
*RED COLOURED SHEATH
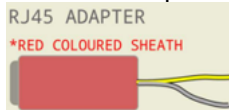
a. Whether the GSD is powered "ON" or "OFF", internally the GSD has normally open contact in parallel with a 15K resistor (between RefGen and Common).
   The condition between the yellow and grey cables should only be one of 3:
   - Short Circuit – GSD telling Inverter to disconnect from the grid in this condition:
     o In this condition the GSD is activating DRM 0 in an emergency disconnection event. Please refer to Ergon/Energex documentation for contact information as to whether an event has occurred.
   - Open Circuit – GSD telling Inverter to disconnect from the grid in this condition:
     o This condition indicates that it is likely a cabling issue between the GSD and the measuring point.
   - ~15kOhm – GSD telling Inverter to run normally:
     o In this condition the inverter should run normally, if it is not please check the terminal connections that the inverter and GSD are connected to. Then check the inverter settings.

2. While the GSD is disconnected from the inverter, turn DRM "OFF" on the inverter settings and check if the Inverter begins to generate.
   a. If it does not then check the error logs the inverter may be tripping due to a different issue.

3. If the inverter is a Tauro, ensure that DRM 3/7 is changed to a free pin e.g., below. (as advised in Step 2 part 5 of I/O mapping). This is because the Tauro comes with a pre-wired SPD trigger wired to pin 8 of the terminal block. As this will cause a live trigger to be sent to a DRM port causing the inverter to ramp down.

Australia - Demand Response Modes (DRM)

DRM 1/5
Pin 6 (Default)

DRM 2/6
Pin 7 (Default)

DRM 3/7
Pin 10

DRM 4/8
Pin 9 (Default)

REF GEN/0
Pin 4 (Default)

END OF DOCUMENT

Fronius Australia Technical Support
Email: PV-Support-Australia@fronius.com
Phone: 03 8340 2910

For more detailed information see the operation manual available on the product specific page on http://www.fronius.com/en-au/australia