APPLICATION GUIDE

FRONIUS Primo/Symo GEN24 & GEN24 Plus series
PV Point and PV Point Advanced setup (Australia & NZ Only)

Contents

CHANGE LOG

DATE	VERSION	COMMENTS	AUTHOR
13/05/2023	1.0	Initial Release	Fronius Australia
06/05/2024	2.0	Added PV Point Advanced	Geordie Zaphiris
25/11/2024	3.0	Updated document format	Geordie Zaphiris

SCOPE

This document provides technical information relating to the installation and operation of the GEN24 PV Point backup function.
NOTE: This document should only be used for installations in Australia & NZ and is a recommendation only. The installer should consult AS/NZS 3000 to ensure they meet all wiring requirements.

The following inverter series are relevant to this document:

- **Fronius GEN24 Primo**
- **Fronius GEN24 Primo Plus**
- **Fronius GEN24 Symo**
- **Fronius GEN24 Symo Plus**

This document contains various application diagrams and methods for PV Point and PV Point Advanced (e.g. with a GPO, with a bypass switch). This has been done to provide flexibility of design for your installation.

GENERAL

1.1 PV Point:

The Fronius GEN24 PV Point / Opportunity Power (OP) function is a separate AC power output on the inverter that can provide single phase power during a grid outage. PV Point can source this power from the present solar power or stored power in the PV battery (a battery unit is not necessary for the operation of PV Point).

The PV Point is only active / live when the grid is not present at the inverter's grid interactive terminals. i.e. The PV Point is NOT live or active when the grid is present as it is designed to be an "emergency power source".

Note: The PV Point terminals cannot be connected to the grid directly or other inverter's backup/PV Point circuits under any circumstances, this is strictly an independent emergency power source.

The functional diagram of the PV Point is shown in Figure 1:

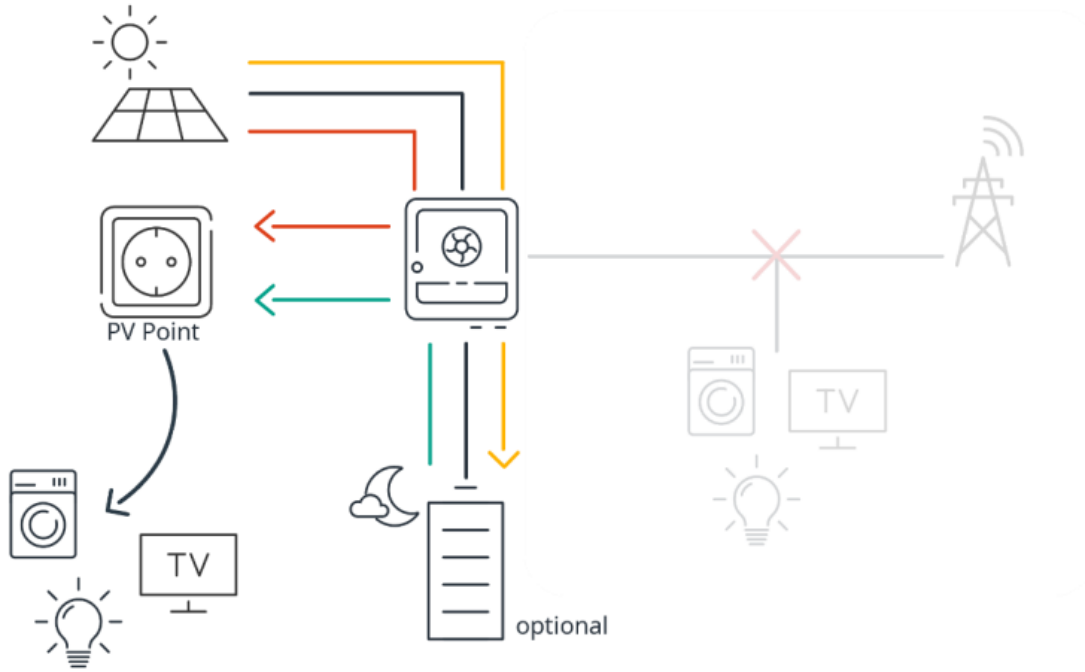


Figure 1: Schematic of the basic PV Point power supply of the Fronius GEN24 & GEN24 Plus series

1.2 PV Point Advanced:

The "PV Point Advanced" solution uses the existing PV Point function with a 3rd party changeover relay allowing backup loads to be powered by the grid until a blackout occurs. The outcome is that the desired load(s) are automatically switched to PV Point for emergency power, then when the grid returns the loads are automatically switched back to the grid. The installation guidance in this document must be followed carefully to achieve this outcome. This is an application of the existing PV Point feature, no changes are made to the inverter, settings and PV point directly, apart from adding an external relay. Hence this application still maintains PV Points technical restrictions when in backup mode.

1.3 Technical characteristics for PV Point / PV Point Advanced:

Caution must be exercised when selecting electrical loads as some devices have high starting currents such as fridges, freezers, AC pumps and etc. An overload capacity of 35% is possible for a duration of 5 seconds, depending on the capacity of the solar modules and/or the battery at that moment in time. PV Point and PV Point Advanced is NOT a UPS type backup source.

PV Point output specifications:

- Output Voltage: 220/230/240Vac (selected during commissioning. Default is 230Vac)
- Max. Current: 13A
- Max. continuous power: 3000VA
- Overload capacity: 35% for 5 sec

Operational Information:

- PV Point takes ~17-20 seconds to activate after a blackout occurs. (this duration may be faster or slower depending on the firmware version on the GEN24) To achieve the fastest operation please ensure that the GEN24 firmware up to date.
- In the event of multiple overloads (overload settings are present on the local UI of the inverter) a notification must be accepted to proceed re-initializing PV Point. **This notification can be accepted via the local UI of the inverter or by holding your finger over the touch sensor for 3-6 seconds.**
- Special care to be exercised when connecting loads with potential for larger surge capacities such as AC pumps/AC motors.
- For PV Point Advanced, take note of the number of neutral and earth connections required for your setup as well as the cable sizes you are using for the change over relay.
- Examples will not introduce a new MEN connection in the switchboard as this should not be done.

System Components

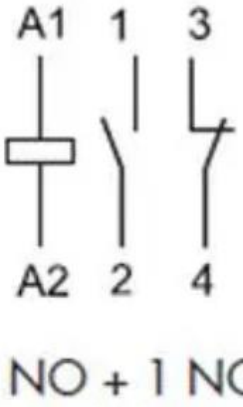
The following component groups are **required** as part of the system:

For **PV Point** you only require a **Fronius inverter:**

- Fronius Primo/Symo GEN24 or GEN24 Plus

IMPORTANT: Remember to update your inverter with the latest firmware available prior to operating this feature.

For **PV Point Advanced** an additional component below is required:

Device	1x Finder Modular Contactor – 240Vac Coil, 2-pole (1NO+1NC) 25A.
Manufacturer. Part No.	22.32.0.230.4520
Image	 

For the PV Point Advanced application Fronius does not approve any other device for use in this application currently. Please note that other relays of the same/similar specification have been tested but not approved for use in this application. If you wish to use a different brand/model change-over device, please contact our technical support team for further information.
It is also possible to include a 3rd party SPDT manual bypass switch that can be used to bypass the relay in the event it is defective to ensure constant power is delivered to the critical loads. Designs including this are provided in this guide.
The typical pricing of the changeover relay to achieve PV Point Advanced operation is ~$85 AUD inc GST. Custom made PV Point Advanced switchboards can be quoted by Zeco Energy: https://www.zecoenergy.com.au/

Installation:

2.1 GEN24 preparation:

The installation of the PV Point requires a modification to the basic shell. Four predefined outputs are marked on the underside of the inverter which can be used for the PV Point installation. The underside of the GEN24 series with the outputs is shown in Figure 2:

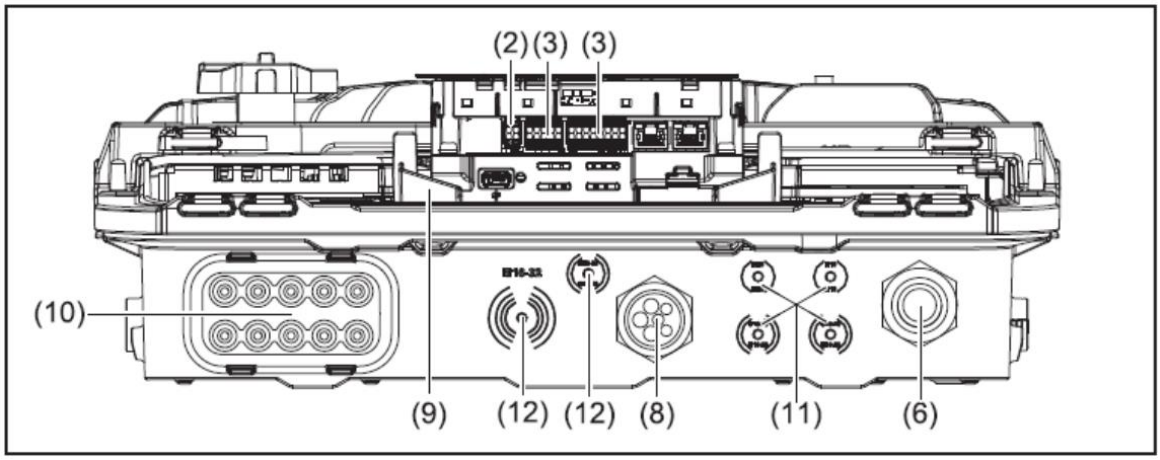


Figure 2: Inverter underside of the Fronius GEN24 & GEN24 Plus series with the four predefined outputs (11).

The first step is to drill a hole through one of the four outlets on the base shell. We recommend using a step drill (M16 / 16 mm diameter) for this.:

Figure 3: Drilling through the base shell and PG screw fitting inserted at the drilled-through point

2.2 PV Point:

In the GEN24 & GEN24 Plus series, a separate output / push-in spring-loaded terminal is provided for the PV Point on the AC side, which is shown in Figure 4 below:

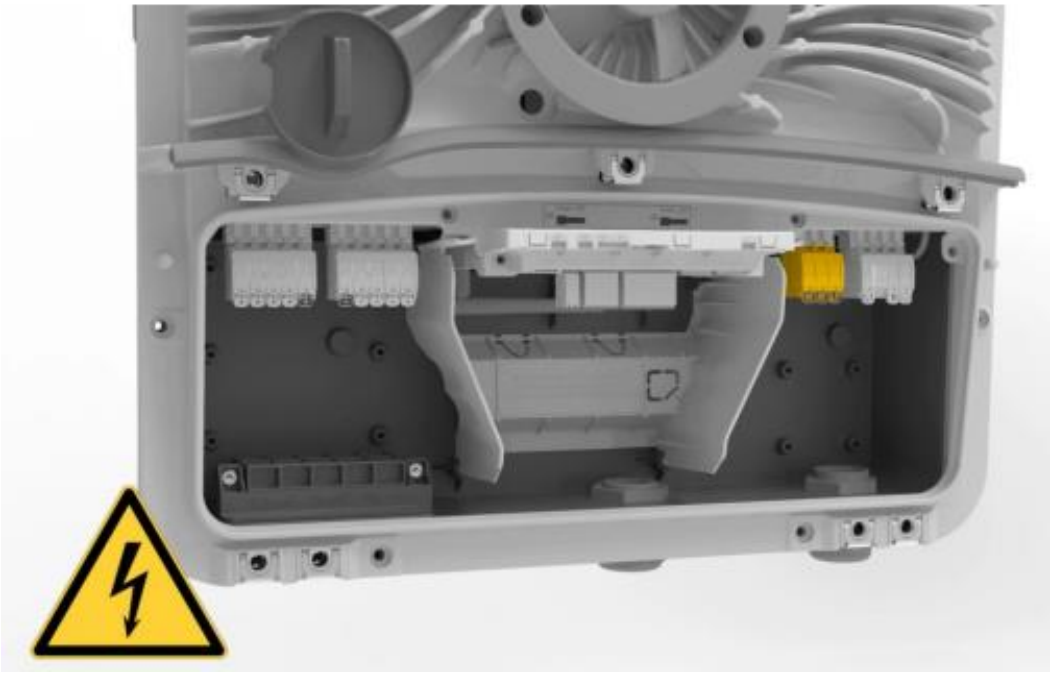


Figure 4: Connection area of the Fronius GEN24 & GEN24 Plus with PV Point Push-in spring clamp. See orange coloured terminal block.

No special tools are required to install the PV Point and no ferrules need to be fitted to the cables. Fronius recommends the use of a copper cable with a cable cross-section of min. 1.5 mm² to max. 10 mm² for direct connection. Figure 5 shows the requirements for the cable

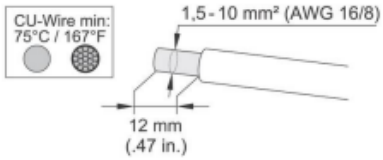


Figure 5: Push-in spring clamp and cable requirements for installing the PV Point

2.3 Wiring Examples (PV Point and PV Point Advanced):

Figure 6 shows a technical application of **PV point** powering a GPO.

PV Point Concept Diagram:

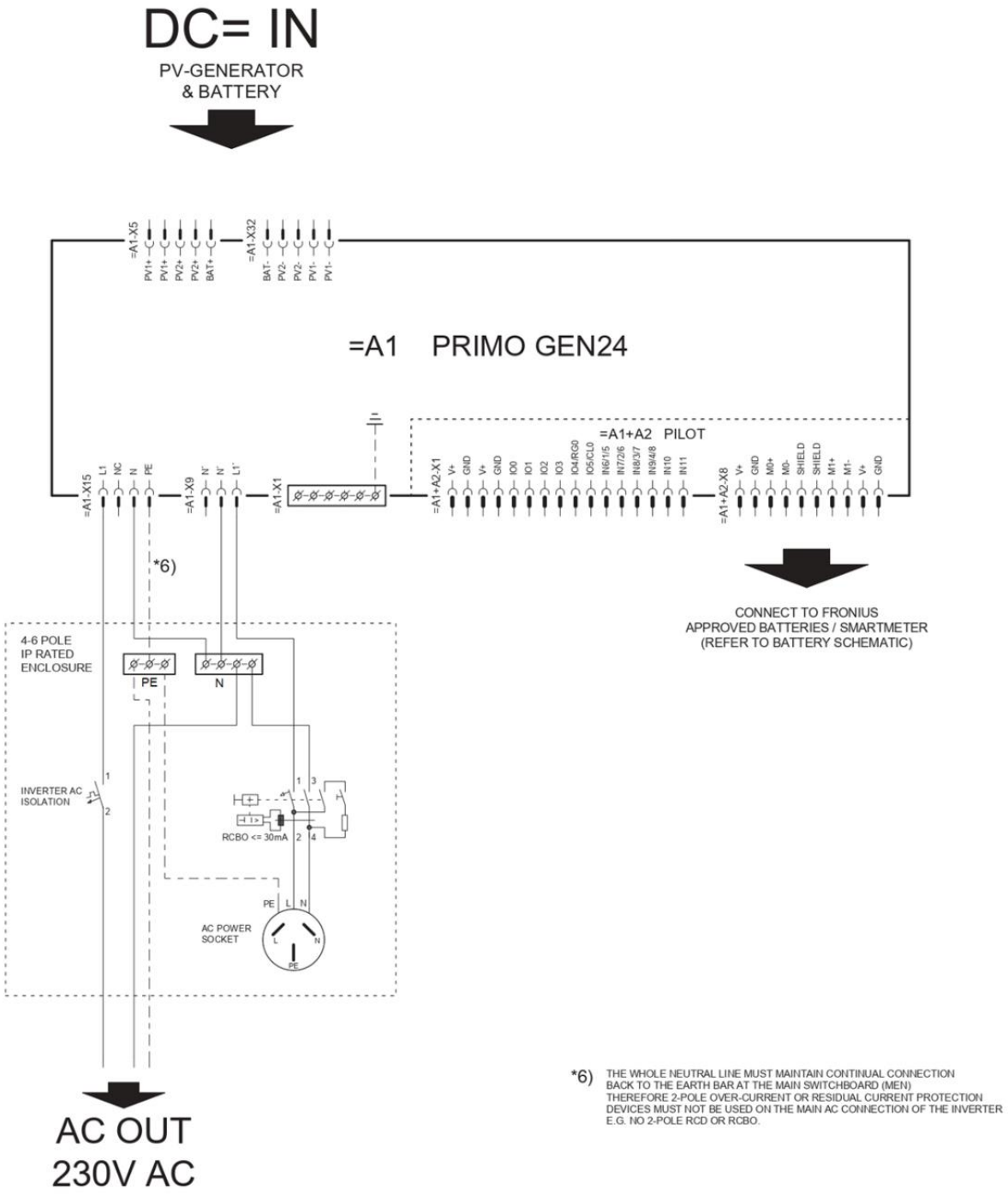


Figure 6: Technical diagram of PV Point

Note: Devices shown in this diagram are for orientation only. Local site conditions and constraints are to be considered by qualified personnel designing and/or installing the equipment.

2.4 Installation Notes (PV Point and PV Point Advanced):

- PV Point/PV Point Advanced is to be wired as an 'Alternative Supply' in accordance with AS4777.1:2024. PV Point/PV Point Advanced is not a 'Substitute Supply'.
- Application of PV Point may require enclosures containing an Earth bar & a Neutral bar. These are necessary to combine all the earth connections and combine all the Neutral connections. An MEN point shall NOT be made within this enclosure. i.e. joining of Neutral & Earth together within the enclosure.
- The "backup load switch" must be an RCBO in an installation where the loads are directly connected to it, for example:
    - Where a backup GPO is installed in the switchboard shown below and connected directly to the backup load switch.
- Where a breaker is larger than the breaker in the MSB, discrimination is not required in circuits ≤ 80A (AS/NZS 3000 cl 2.5.7.2.3 A (A1)).
- AS/NZS 3000 requires continuity of the neutral conductor to ensure correct operation of RCDs. The following wiring & enclosure recommendations assist in fulfilling this requirement when installing the PV Point.
- AS/NZS 3000 shall be followed for protection and cable sizing.
- For correct labelling practices please refer to AS/NZS 4777.1

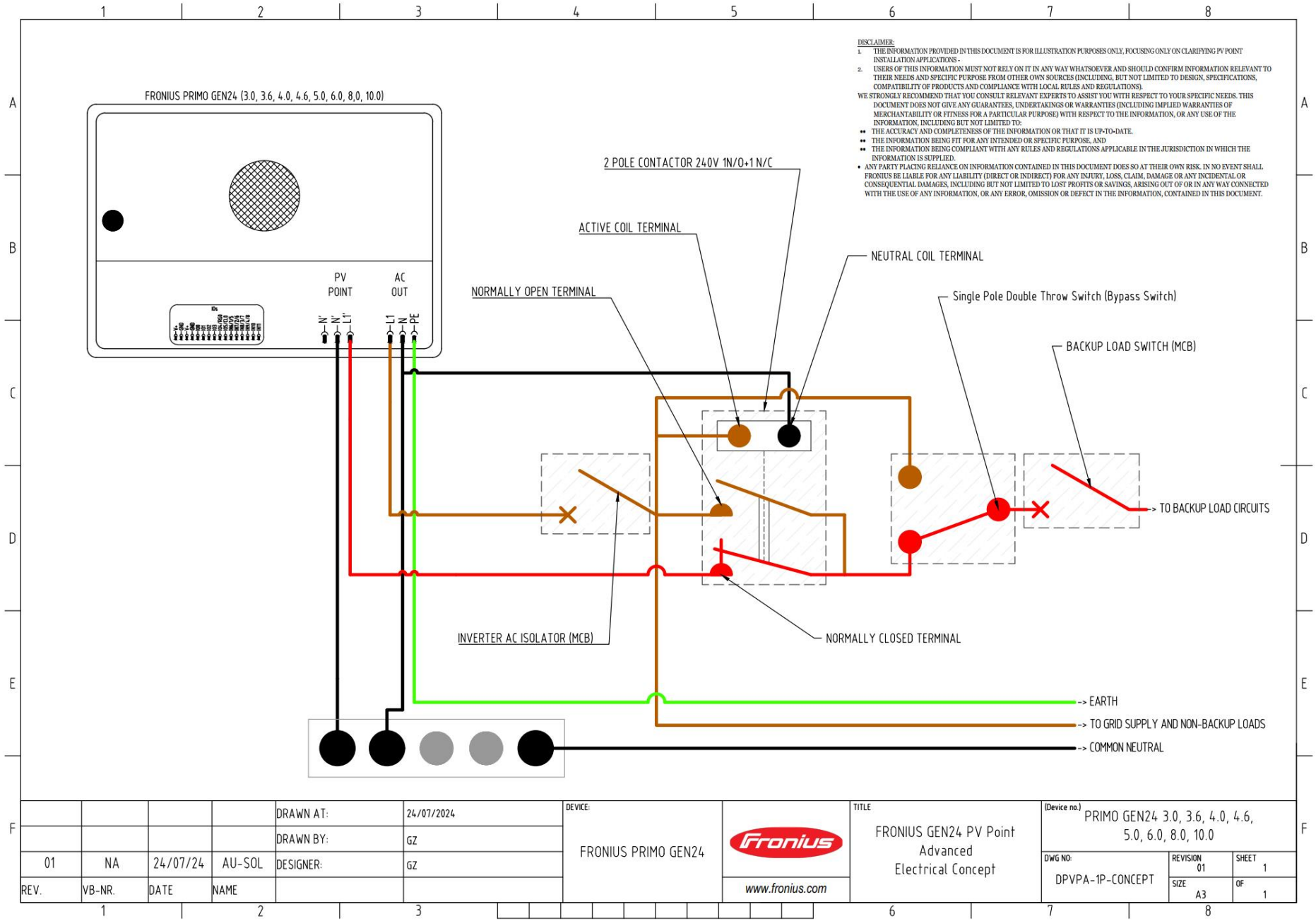
2.5 Installer Notes specific to PV Point Advanced:

- A higher passthrough current (>13A) is possible as the changeover relay is rated at 25A. Please note your cable sizes and the limitations of PV Point in backup mode.
- The contact terminal size of the specified Finder relay fits a max of 6mm^2 and 4mm^2 for the coil terminals. Please note your cable sizes as the power for the active coil terminal is tapped off the normally open terminal of the relay.
    - 2 Modular Unit (2 din spaces wide/2 MU) relays with larger terminals are not provided in these examples, if this is required for a specific application, please let our technical team know. Only the 1 MU units have been tested and are approved for this application.

Further notes can be found at the end of this guide. **All drawings in this guide are available for download on our website.**

PV Point Advanced Concept Diagram:
The drawing on the next page shows a conceptual drawing of PV Point Advanced using a relay and manual changeover switch.
Note: Drawing colours are just for illustrative purposes, red is used as the colour for backup power in examples

1.1.1 PV Point Advanced Concept Diagram:



1.1.2 Table of wiring examples for PV Point or PV Point Advanced:

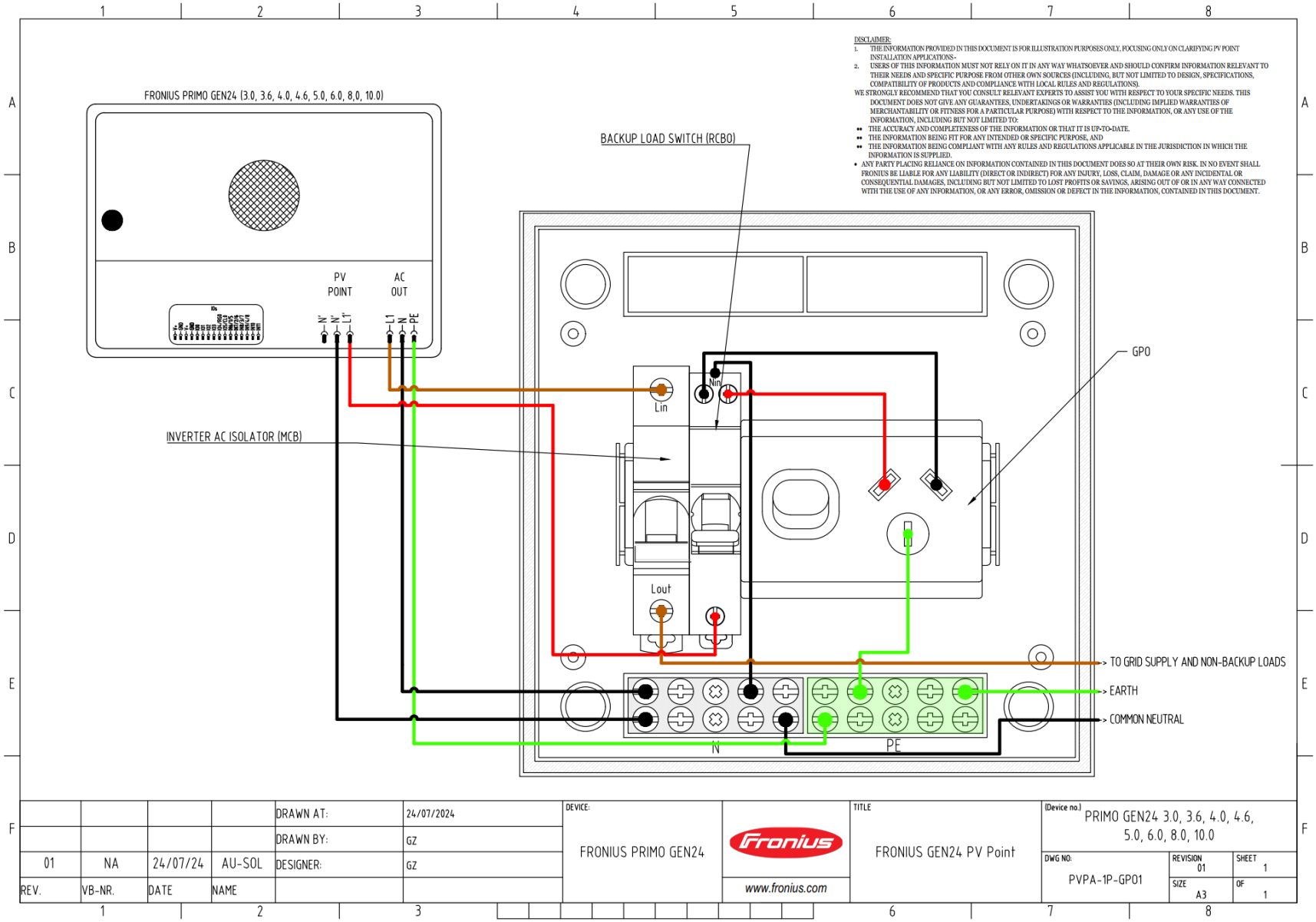
Example No.	Installation Type	1Φ/3Φ Example[1]	Manual Bypass switch [2]	GPO[3]
1	PV Point	1Φ	Not Applicable	Y
2	PV Point with Manual Changeover	1Φ	Y	N
3	PV Point Advanced (Automatic Changeover)	1Φ	Y	N
4	PV Point Advanced (Automatic Changeover)	1Φ	N	Y
5	PV Point Advanced (Automatic Changeover)	1Φ	N	N
6	PV Point Advanced (Automatic Changeover)	3Φ	Y	N
7	PV Point Advanced (Automatic Changeover)	3Φ	N	Y
8	PV Point Advanced (Automatic Changeover)	3Φ	N	N

1Examples provided in this guide are for the Primo and Symo Inverters. Please note that the method and application is identical apart from using a single-phase/three-phase breaker for the inverter. Hence 1Φ examples can be adapted to 3Φ by changing the breaker over.

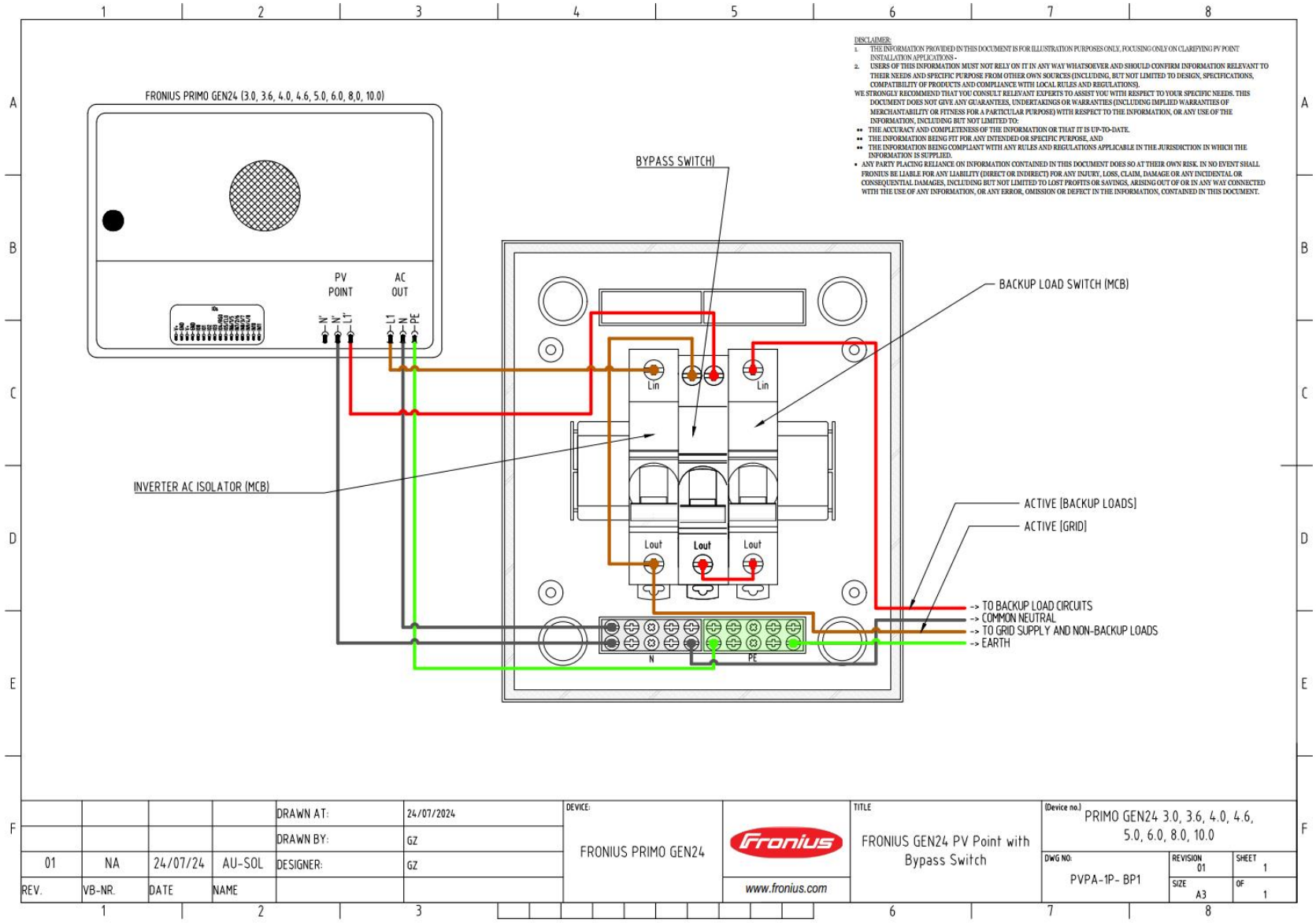
2The manual bypass switch is an additional switch which can divert grid power directly to the backup loads, bypassing the changeover relay. This is useful if the changeover relay is defective which may prevent backup loads from receiving power from the grid. In cases where a GPO is present, the load power connection can be relocated so no examples are provided using a manual bypass switch and GPO.

3Some drawings contain a backup circuit connected to a GPO, while others are backing up a load switch which is connected back to a main switchboard load circuit that the user wishes to backup. For PV Point Advanced, an example with a manual bypass switch and GPO is not presented as the user can simply unplug/run an extension cord to the load in the event of the relay failing.

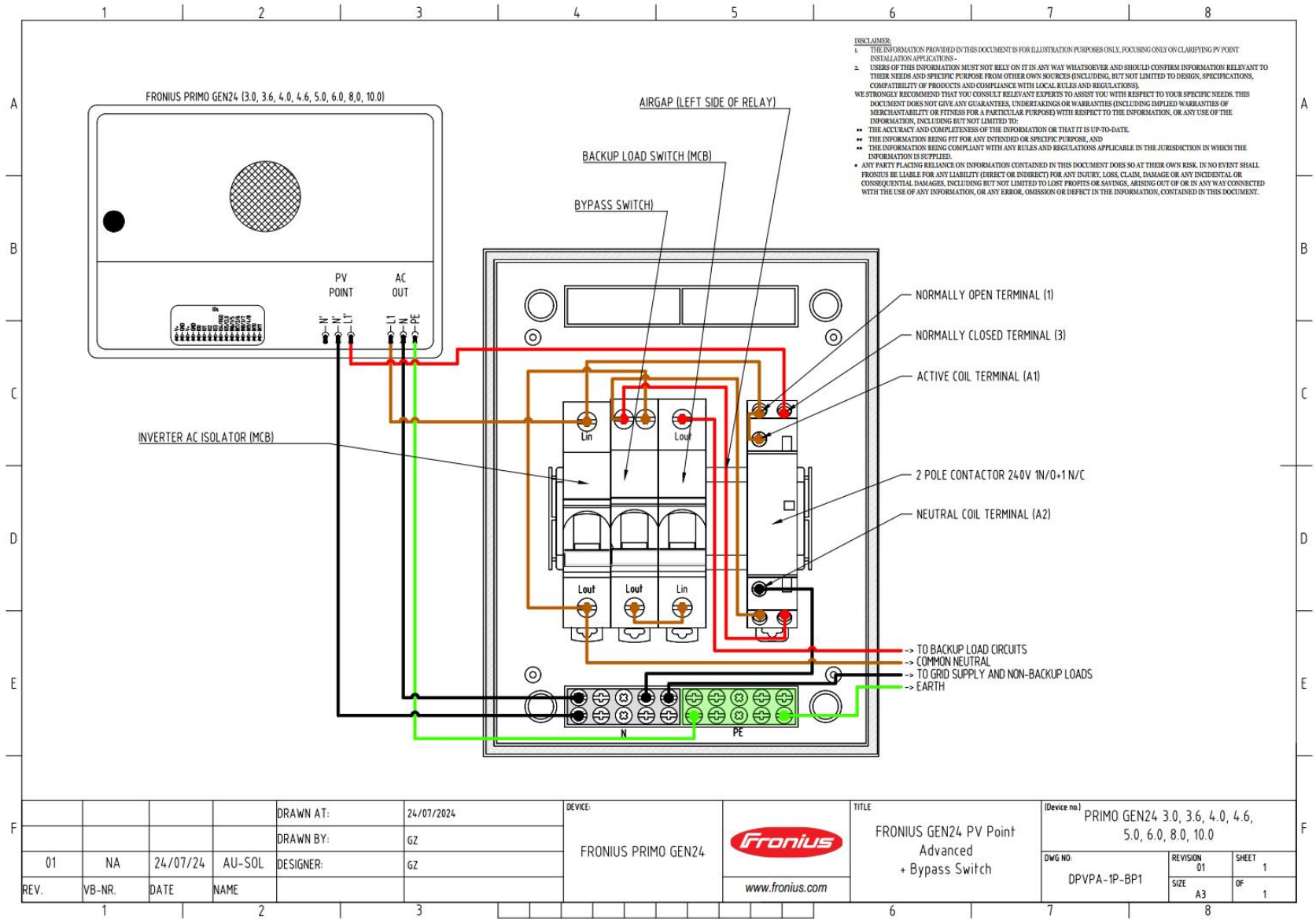
1.1.3 Example 1: PV Point with a GPO (Primo)



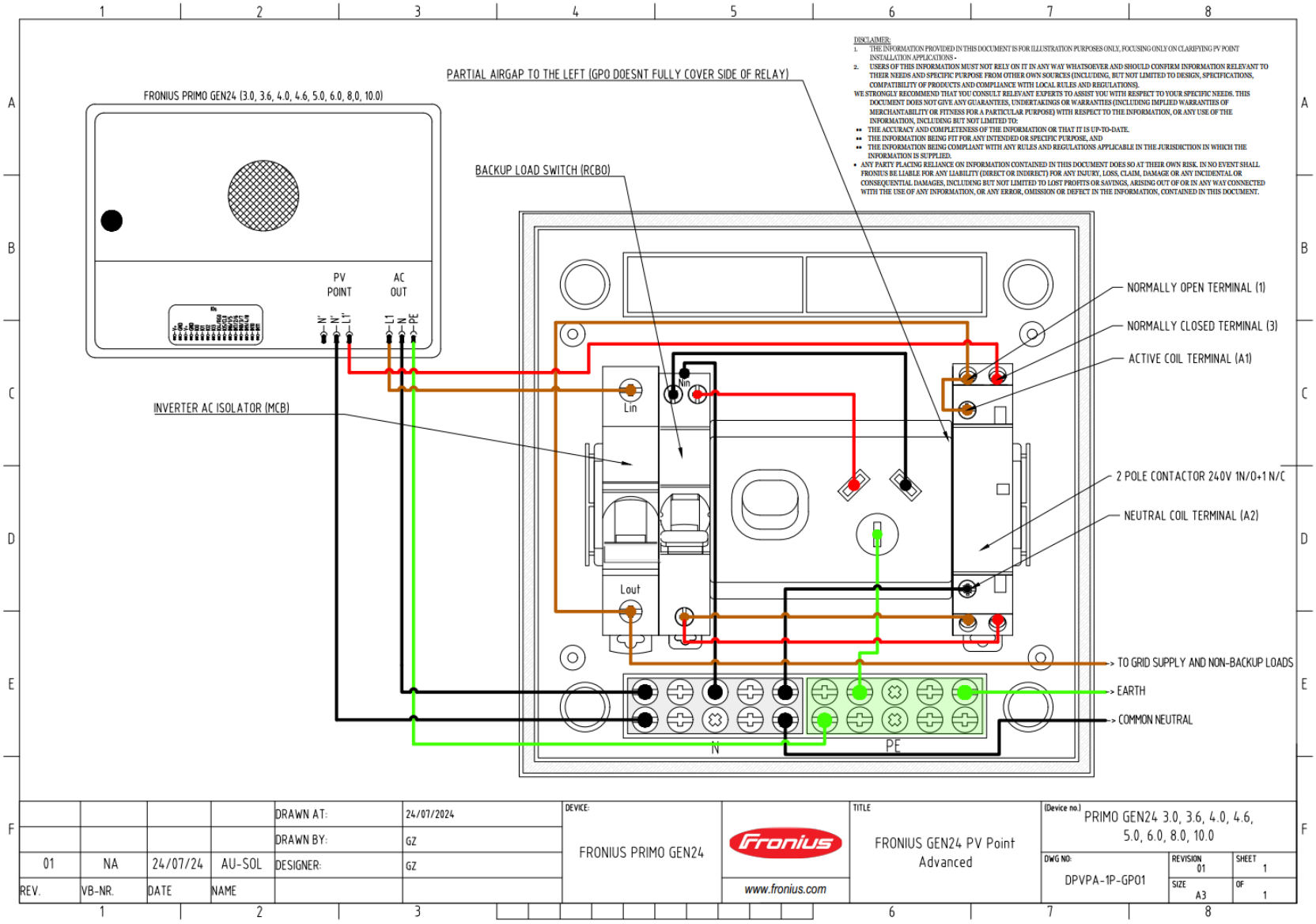
1.1.4 Example 2: PV Point with Manual Changeover (Primo)



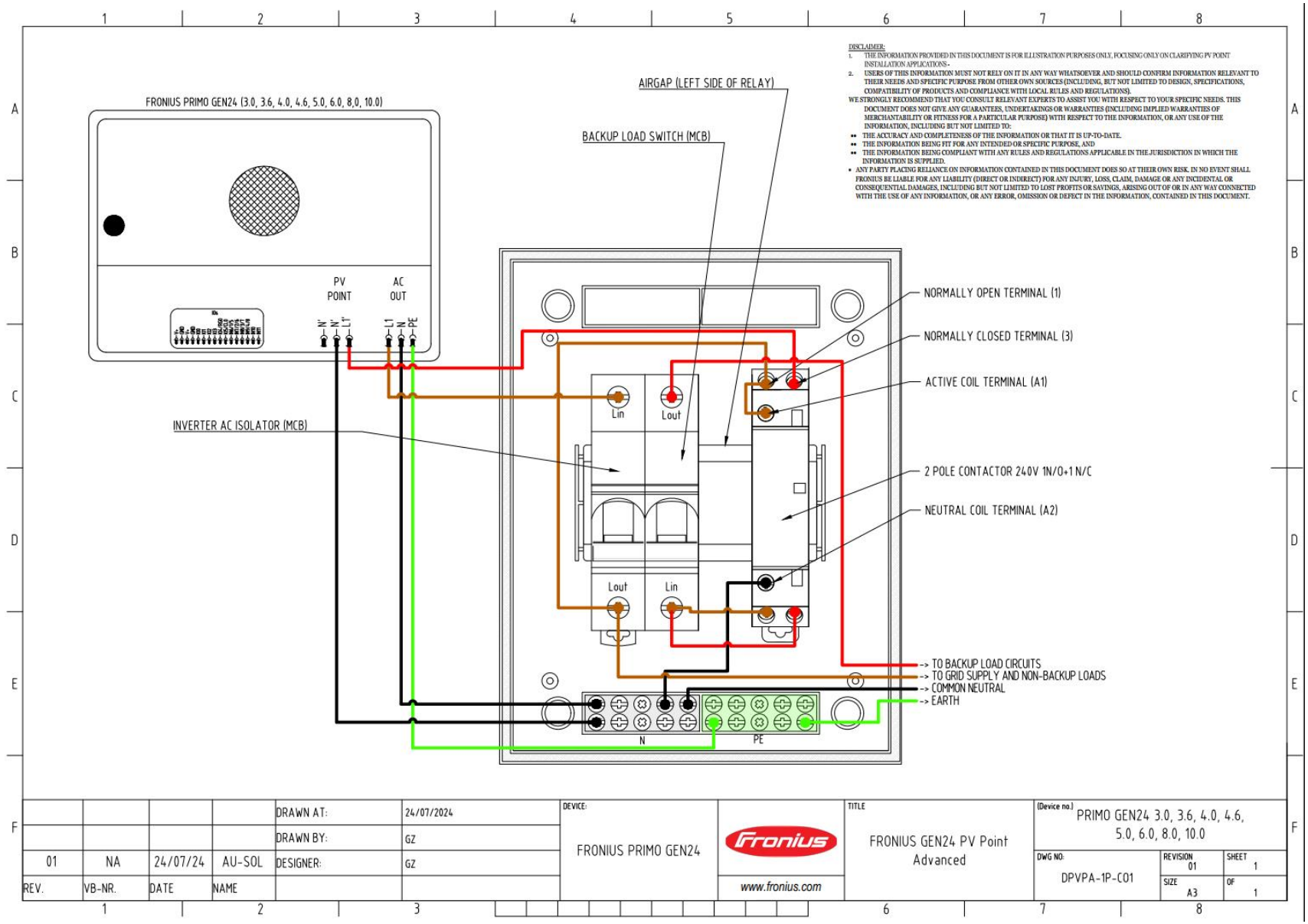
1.1.5 Example 3: PV Point Advanced (Automatic Changeover) with Bypass Switch (Primo)



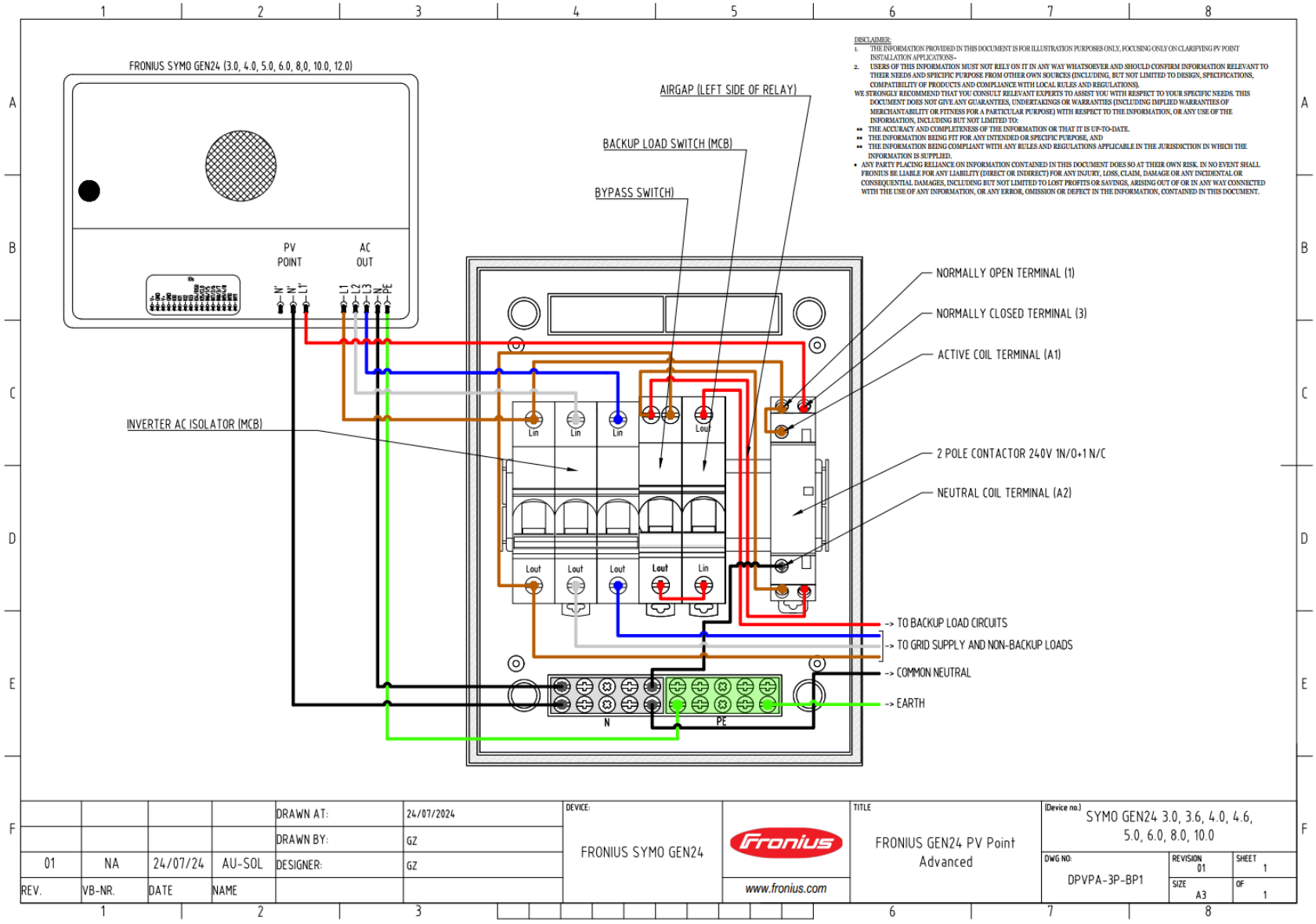
1.1.6 Example 4: PV Point Advanced (Automatic Changeover) with GPO without Bypass (Primo)



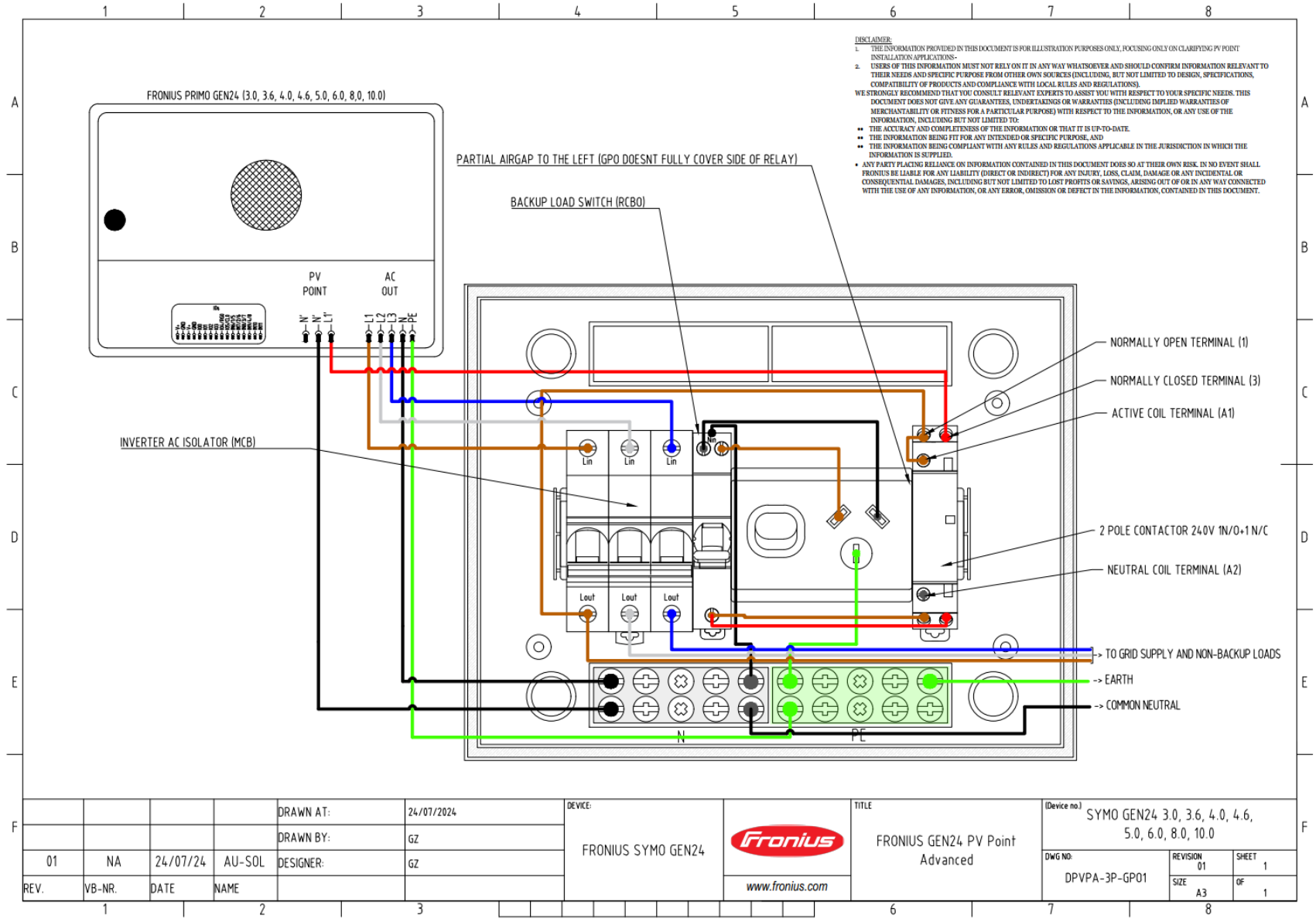
1.1.7 Example 5: PV Point Advanced (Automatic Changeover) without GPO/Bypass (Primo)



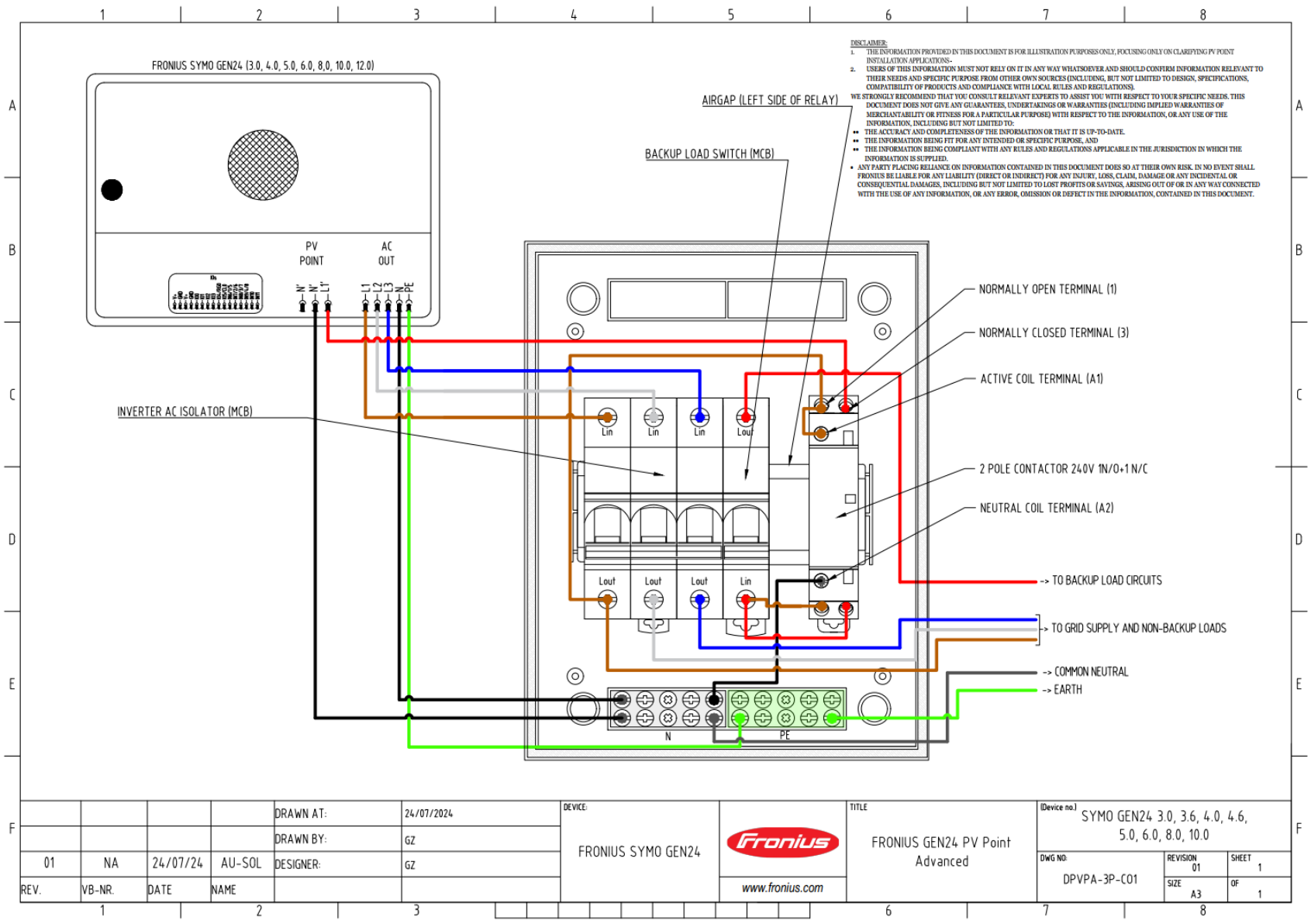
1.1.8 Example 6: PV Point Advanced (Automatic Changeover) with Bypass Switch (Symo)



1.1.9 Example 7: PV Point Advanced (Automatic Changeover) with GPO without Bypass (Symo)



1.1.10 Example 8: PV Point Advanced (Automatic Changeover) without GPO/Bypass (Symo)



Commissioning

The PV Point is commissioned via the web interface of the inverter either during initial commissioning or as a retrofit. Fronius recommends carrying out commissioning with the "Fronius Solar.start" app, which is available on Android and iOS. The Fronius Solar.start app is identified by the following icon (Figure 8):

Figure 7: Icon of the Fronius Solar.start app

Tap on the sensor at the front of the device to open its local network. You can connect any smart device (mobile, laptop, etc...) to this network to access the local web interface. Figure 9 shows the LED communication interface with its functions:

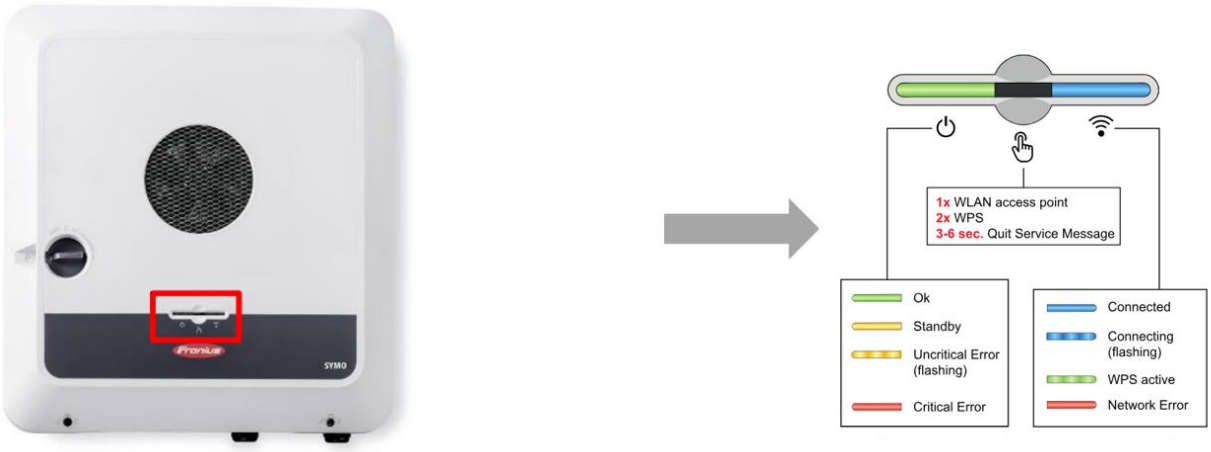


Figure 8: Opening the local network (Wifi access point) of the Fronius GEN24 or GEN24 Plus inverter series and description of the functions of the LED patterns

The communication light will flash blue and the connection to the inverter (via app or WLAN/LAN) can be established. The network can be recognized (with a WLAN connection) by the following:
Name: *FRONIUS_Pilot serial number*
Password for devices with production date before 08/2023: *12345678*
Password for devices with production date from 08/2023: *visible on the nameplate*

Opening a web browser (Fronius recommendation: Google Chrome) and entering the IP address 192.168.250.181 opens the installation wizard. In a LAN connection, the required IP address is 169.254.0.180.

3.1 Activation of PV Point during initial commissioning:

The PV Point can be activated during initial commissioning in the commissioning wizard under the "Product Wizard" in the "Functions and I/Os" menu item. Here it is important to activate the basic backup power function and the "PV Point" mode. This selection applies to both PV Point and PV Point Advanced. Figure 10 shows the photo gallery of the most important steps and settings

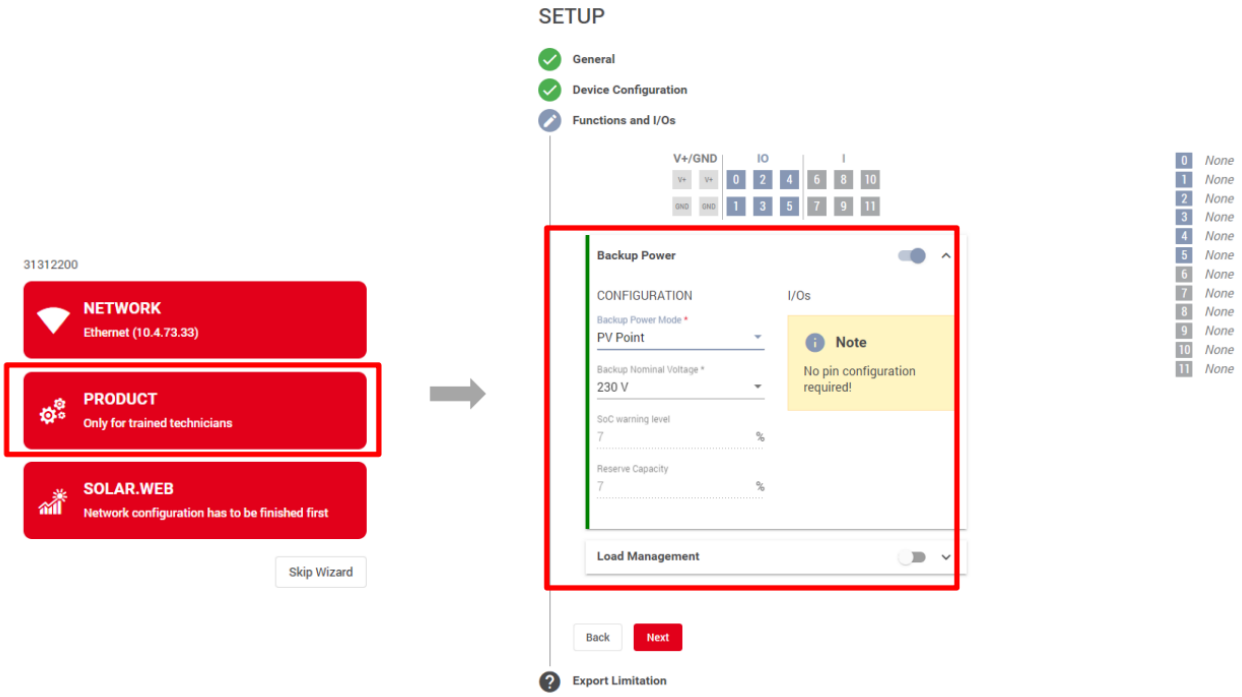


Figure 9: Activation of the PV Point in the commissioning wizard during initial commissioning of the GEN24 & GEN24 Plus inverter

3.2 Activation of the PV Point at a later date:

The PV Point can also be installed and activated retrospectively. In this case, it is also necessary to connect to the web interface of the inverter after installation. To activate, navigate to the "Device configuration" menu item and then to "Functions and I/Os", where you can set the basic backup power function and the "PV Point" mode. Figure 10 shows a screenshot of the important steps and settings:

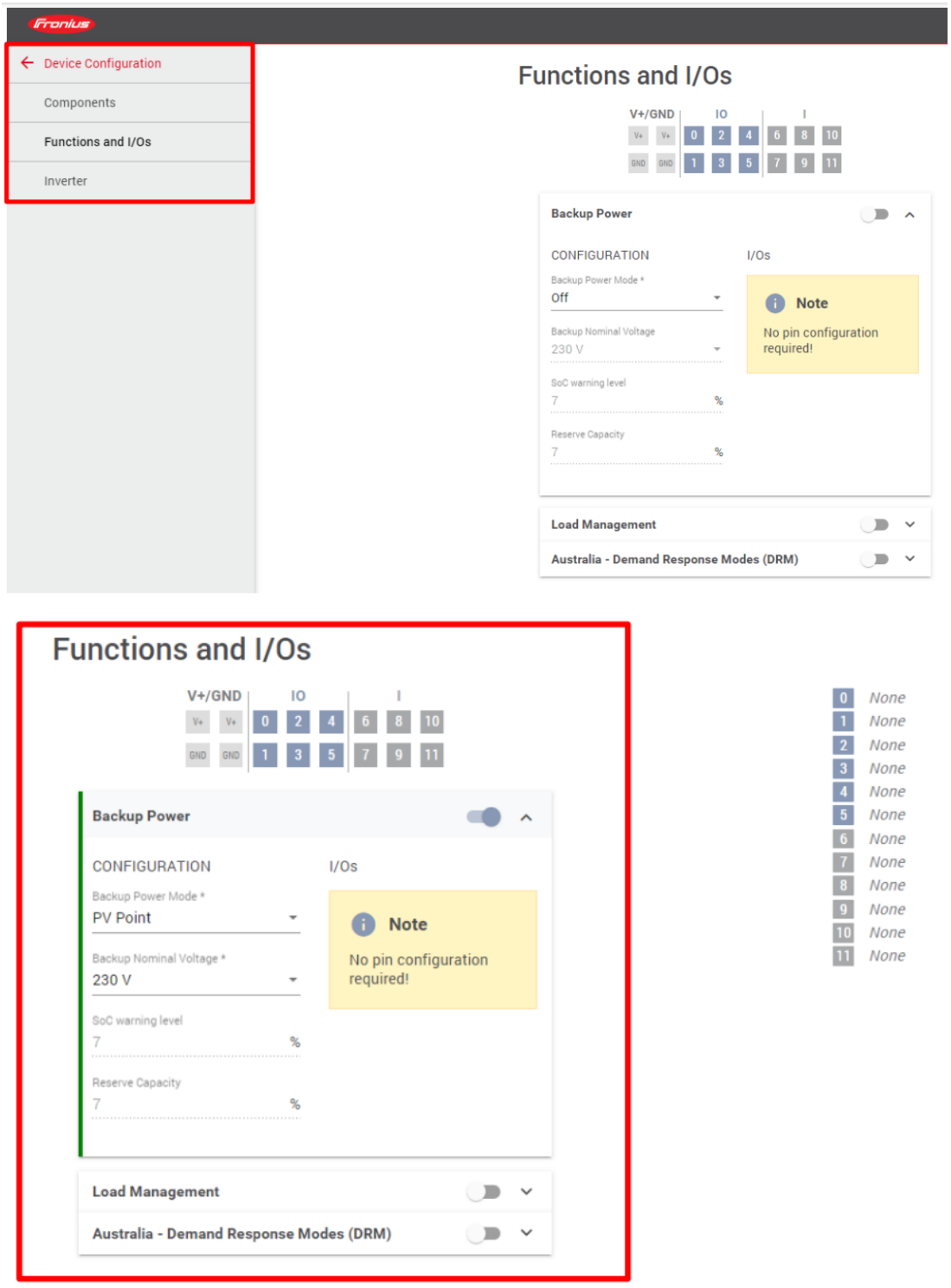


Figure 10: Activation of the PV Point in the web interface retrospectivley.

After successful installation and commissioning, Fronius recommends a functional test of the PV Point/ PV Point Advanced, The switching time is less than 23 seconds.

Appendix

2.5.1 Additional Notes related to installation:

- Any specific current ratings that are seen in example photos should be ignored as they must be selected in accordance with your specific installation requirements.
- Please note that PV Point loads being switched by the changeover relay back to the grid would cause phase jumping for the load. If done frequently this could prematurely wear certain electrical loads.
- The coil must be powered by the grid, not PV Point, follow the guidance in the drawing examples to achieve this.
    - While the coil is powered by the grid:
        - The relay LED is illuminated for to indicate to service workers that the source is still active after turning off the breakers in the distribution board. You must turn off the upstream breaker to the distribution board and the GEN24 (follow inverter shutdown procedure) to de-energise the system.
        - The specified relay will be used in the active state for prolonged periods of time, so all drawings specify the relay to be put to the right-hand side of the switchboard so it has an airgap on its right at the edge of the din rail, and with a din space to its left or a GPO which acts as a partial air gap. This will preserve the devices lifespan provided the expected life of the entire PV system.
        - It is suggested by Finder to allow an air gap of 9 mm between adjacent relays in where for example the ambient temp is >40 ^{0}C, the coil is operated for prolonged periods of time or contacts are loaded with >20A.
    - Do not power the coil by PV point as the following issues will arise:
        - During a blackout any loss of generation (e.g. caused by cloud coverage) will cause the voltage to collapse causing the coil of the relay to release disconnecting the load. Then the voltage will immediately rise again as the load has disappeared causing the relay to repeatedly open and close in a loop. To resolve this, it may be possible to use a lower voltage coil on the relay and a din mount DC power supply to act as a buffer with a wider voltage input range. However, this will not be a guaranteed solution and will be more expensive than leaving an airgap and keeping the coil powered by the grid. Do not power the coil by PV Point, please only follow the drawing examples below.

2.5.2 Installation Examples (referenced to above wiring drawings):

Example 1: PV Point with a GPO (Primo)

Example 1.1: PV Point with a GPO (outside the DB) (Primo)

In this example the GPO is located outside & adjacent to the Inverter AC Isolator and RCBO for the GPO.

Example 5: PV Point Advanced (Automatic Changeover) without GPO/Bypass (Primo)

Example 7: PV Point Advanced (Automatic Changeover) with GPO without Bypass (Symo)

Please note disclaimer to provided drawings and installation photos:

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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 here.