

APPLICATION GUIDE SETTING UP FULL BATTERY BACKUP WITH FRONIUS PRIMO GEN24 PLUS

THIS DOCUMENT AIMS TO PROVIDE EASY-TO-FOLLOW INSTRUCTIONS ON HOW TO BEST DEPLOY THE BATTERY BACKUP FUNCTION OF FRONIUS PRIMO GEN24 PLUS INVERTER SYSTEM

Application Guide
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Version 5.0/2022

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1. CHANGE LOG

Date	Version	Comments	Author		
23/12/22	5.0	K3 wiring diagram + Table data updates	Fronius Australia		
18/03/22	4.0	Minor SLD changes (IO0 + UPS integration) Fronius			
08/09/21	3.0	Multiple major changes	Fronius Australia		
16/11/20	2.0	Minor wording changes	Fronius Australia		
11/11/20	1.0	Initial release Fronius Austr			

2. GENERAL

Fronius Primo GEN24 Plus offer the opportunity to supply select electrical loads or possibly entire household during grid outages. This functionality is referred to as Full Backup function.

This solution works in combination with an energy storage system and supplies electrical loads whenever sufficient energy is available.

Key features are:

- ✓ Supply electrical loads in grid outage (1-phase loads),
- ✓ Automatic switch to backup power in the event of grid failure,
- ✓ Efficient energy flows due to the Multi-Flow Technology, even in backup power situation.
 - This means even in backup mode PV is operational and could charge the battery.

3. REQUIREMENTS

Basic requirements for using the full backup functionality are correctly installed and configured:

- ✓ Fronius Smart Meter,
- ✓ Compatible BYD battery,
- ✓ External backup control and switchover components.

Having PV installed is optional but recommended because it could charge the battery in backup mode during sun hours (if sufficient power is available) which makes this solution self-sustainable.

Additionally, for successful integration please make sure following items are ticked:

- ✓ Inverter is Fronius Primo GEN24 3.0/3.6/4.0/4.6/5.0/6.0 Plus, ✓ Suitable battery installed.
- Suitable battery installed,
 Inverter+Battery capacity suitable for the backup loads connected,
- ✓ Fronius Smart Meter correctly installed (feed-in point),
- ✓ Correct Hardware applied,
- ✓ Correct Software Settings applied,
- ✓ Warning notice Backup Power Supply installed, see appendix A,
- ✓ Backup power checklist completed, see appendix B.



4. TECHNICAL INFORMATION

4.1 Battery compatibility

Compatible batteries are listed below.

Table 4.1.a: Primo GEN24 Plus compatible BYD batteries

BYD Battery-Box Premium HVS / HVM	Primo GEN24 Plus
HVS 5.1	✓
HVS 7.7	✓
HVM 11.0	✓
HVM 13.8	✓
HVM 16.6	✓
HVM 19.3	✓

4.2 BYD Battery-Box Premium information

Key relevant specifications of the BYD Battery-Box Premium batteries are shown below. For more information visit BYD's online documentation available here.

Table 4.2.a: BYD Battery-Box HVS/HVM Premium specifications

BYD BATTERY-BOX PREMIUM*	HVS 5.1	HVS 7.7	HVM 11.0	HVM 13.8	HVM 16.6	HVM 19.3
Usable capacity of the battery [kWh]	5.1	7.7	11.0	13.8	16.6	19.3
Nominal voltage of thebattery [V]	204	307	204	256	307	358
Battery operating voltage [V]	160 - 240	240 - 360	160 - 240	200 - 300	240 - 360	280 - 420
Max. charge/discharge current Primo/Symo GEN24 Plus [A]			2	2		
Max. charge/discharg current Symo Hybrid (A)			1	6		

^{*} Values according to BYD.

Table 4.2.b: Charging/discharging power capability of Fronius Primo GEN24 Plus inverters and BYD HVM/HVS

MAXIMUM CHARGING AND DISCHARGING POWER WITH GEN24 PLUS (KW)	HVS 5.1	HVS 7.7	HVM 11.0	HVM 13.8	HVM 16.6	HVM 19.3
Primo GEN24 3.0 Plus	3.2	3.2	3.2	3.2	3.2	3.2
Primo GEN24 3.6 Plus	3.9	3.9	3.9	3.9	3.9	3.9
Primo GEN24 4.0 Plus	4.2	4.2	4.2	4.2	4.2	4.2
Primo GEN24 4.6 Plus	4.5	4.9	4.5	4.9	4.9	4.9
Primo GEN24 5.0 Plus	4.5	5.3	4.5	5.3	5.3	5.3
Primo GEN24 6.0 Plus	4.5	6.3	4.5	5.6	6.3	6.3

It is possible to combine multiple BYD batteries to increase energy storage capacity, with key information show below. Compatibility confirmation is available here.

Table 4.2.c: Energy capacity of paralleled BYD HVM/HVS batteries

rabic	7 4.2.0. Energy capacity c	BYD BATTERY-BOX PREMIUM					
	2x / 3x HVS 5.1	2x / 3x HVS 7.7	2x / 3x HVM 11.0				
Capacity [kWh]	10.24 / 15.36	15.36 / 23.04	22.08 / 33.12	27.60 / 41.40	33.12 / 49.68	38.64 / 57.96	
Primo GEN24 Plus	✓		✓	V	✓	1	

^{*} Follow BYD's installation manual on correct installation/configuration instructions when paralleling multiple batteries.

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4.3 Primo GEN24 Plus information

Inverter's backup and battery technical details are shown below:

Table 4.3.a: Primo GEN24 Plus technical details

	Table 4.	J.a. FII	IIIO GENZA PIUS IECI	iriicai uetaiis			
				Primo GEN24 Plus			
			3.0	3.6	4.0		
lata p¹	Nom. output power Full Backup	VA	3000	3600	4000		
tput dal FULL Backup¹	Grid connection Full Backup	V		1~ NPE 220/230			
Output data FULL Backup¹	Switching time	sec.		< 90			
=	Number of DC inputs		1	1	1		
tio	Max. input current (I _{dc max})	Α	22	22	22		
Battery connection	DC input voltage range (Udc min - Udc max)	V	150 - 455	150 - 455	150 - 455		
00 /	DC battery connection technology		1x BATT+ and 1x	BATT- push-in spring term	inals 2.5 - 10 mm²		
er)	Max. DC input/output power²	W	3110	3810	4140		
att	Max. charging power for AC coupling ²	W	3000	3680	4000		
	Compatible batteries		BYD	Battery-Box Premium HVS/	'HVM³		
		_					
			Primo GEN24 Plus				
			4.6	5.0	6.0		
Output data FULL Backup¹	Nom. output power Full Backup	VA	4600	5000	6000		
utput da FULL Backup¹	Grid connection Full Backup	V	1~ NPE 220/230				
Out	Switching time	sec.		< 90			
_	Number of DC inputs		1	1	1		
tion	Max. input current (I _{dc max})	Α	22	22	22		
Battery connection	DC input voltage range (Udc min - Udc max)	V	150 - 455	150 - 455	150 - 455		
8	DC battery connection technology		1x BATT+ and 1x	BATT- push-in spring termi	nals 2.5 - 10 mm²		
ery	Max. DC input/output power²	W	4750	5170	6200		
att	Max. charging power for AC coupling ²	W	4600	5000	6000		
<u>m</u>	Compatible batteries		BYD Battery-Box Premium HVS/HVM³				

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4.4 Backup Capability - Nominal and Overload

Continuous and overload capability¹ of the inverters are listed below.

Table 4.4.a: AC output capability for Primo GEN24 Plus

Power Class	3.0	3.6	4.0	4.6	5.0	6.0
Continuous [VA]	3000	3600	4000	4600	5000	6000
Continuous [A] @ 230Vac	13	15.6	17.3	20	21.7	26
Overload (5sec) [VA]			6200 (27.9A	@ 230Vac)		

Any active power demand imposed to the inverter from the loads will be met with energy coming from the battery and PV, if available.

Any reactive power demand imposed to the inverter from the loads will be met without discharging the battery or without using energy from PV, if available.

4.4.1 System Capacity Limitations - Examples

To better explain the continuous capacity constraints of the whole system comprised of batteries and inverter, an example with different load configurations is shown below.

Example 1: Primo GEN24 6.0 Plus + BYD HVM 11

- Max battery discharge: 4.5 kW,
- ✓ Max inverter capacity (total): 6 kVA.

Table 4.4.1.a: Example 1 System and loads capacity considerations

	Load	Comment
Example 1	3 kW / 3 kVA	Ok
Example 2	4 kW / 6 kVA	Ok
Example 3	5 kW / 5 kVA	Battery capacity surpassed

The key takeaway is to understand the capacity limitations of the whole system comprised of a battery and an inverter.

As PV might be present during the backup operation, it will top up the battery capacity if available and if needed. However, as PV by nature is not a reliable energy source this can't be guaranteed.

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¹Note 1: Battery size/capacity may limit this further, refer to table 4.2.2.b



5. OPERATIONAL MODES

There are two main operational modes, *Grid* and *Backup* as well as one informational *Energy Saving* mode, discussed in detail below.

5.1 GRID MODE

This mode denotes that the inverter is AC coupled with the local grid, backup control logic is turned off and backup loads supplied from the grid.

5.1.1 GRID-TO-BACKUP TRANSITION

Successful transition to backup mode requires the following conditions to be met:

- 1) Grid (via the AC port of the inverter) is monitored by the inverter's internal protection unit and Fronius Smart Meter.
- Grid fails (blackout).
- 3) The inverter carries out measurement according to country standard and then shuts down.
- 4) The inverter starts Backup mode after a short time window.
- 5) Backup control logic is switched on and loads connected to the backup power circuit are supplied by the inverter.

5.2 BACKUP MODE

Operation in Backup mode usually means the grid is not available and the inverter is supplying backup loads. The interlocking mechanism from the backup control components is on/activated.

In backup mode inverter's AC output acts as a voltage source with AC voltage set at 230 Vac (L-N) and AC frequency set at **53 Hz**. AC frequency is purposely increased with the intention of disconnecting other inverters connected to the backup circuit if any.

5.2.1 BACKUP-TO-GRID TRANSITION

Successful transition to grid mode requires the following conditions to be met:

- 1) Inverter operating in backup power mode.
- 2) The grid is back and stable.
- 3) Fronius Smart Meter monitors grid voltage values and passes this information to the inverter.
- 4) Inverter checks if the grid voltage is within the correct range.
- 5) Inverter ends backup power mode.
- 6) Backup control logic is turned off and AC loads are reconnected to the grid.
- 7) The inverter checks if the grid is within specified parameters (relevant standard) and if successful starts producing energy.

5.3 ENERGY SAVING MODE

Energy Saving mode usually means that the battery is running at or below the minimum state of charge and there is no sufficient power to charge (PV or grid).

The inverter enters this mode if either of the following is true:

- The battery is discharged to the minimum state of charge and no energy is coming from the PV modules.
- 2) The inverter/battery is set to Energy Saving mode (standby mode).

If battery and inverter are in Energy Saving mode, the system could be reactivated by one of the following:

- 1) Enough energy is available from the solar PV modules.
- 2) Grid is functioning again.
- 3) The battery is switched off and on.



6. HARDWARE SETUP

6.1 Required Components – Backup Control

For successful battery backup interfacing, external components **K1 (main)** and **K3 (interface)** are required, and not supplied with the unit. They will need to be <u>purchased separately</u> from your electrical wholesaler or electrical supplier.

Compatible options for K1 are shown below. Options two and four require two devices *main* and *auxiliary* component, while options one and three require *main* component only.

Table 6.1.a: Options for K1 – Main

	Table 6.1.a. Options for IXT – Main					
Option	1	2	2	3	4	1
Manufacturer	Noark	Schn	eider	IMO	IM	0
Туре	Ex9CH63 11	A9C20862	A9C15914	HC63-11230	HC63-20230	HCA11
Component description	Main	Main	Auxiliary	Main	Main	Auxiliary
Control Coil Rated Voltage	230 Vac @ 50 Hz	230 Vac @ 50 Hz	230 Vac @ 50 Hz	230 Vac @ 50 Hz	230 Vac @ 50 Hz	Mechanical interlock
Control Coil Power Consumption	5.10 VA	4.6 VA	n/a	5-7 VA	5-7 VA	n/a
Pole Configuration	1 NO + 1 NC	2 NO	1 NO + 1 NC	1 NO + 1 NC	2 NO	1 NO + 1 NC
Rated Voltage	230 Vac @ 50 Hz	230 Vac @ 50 Hz	as main module	230 Vac @ 50 Hz	230 Vac @ 50 Hz	as main module
Rated Current	63 A	63 A	2 A	63 A	63 A	3 A
lmage	Property of the state of the st		No.	A CONTRACTOR OF THE CONTRACTOR		

Compatible devices for K3 are shown in the table below. Unfortunately, only one option is available at the moment. If you have an alternative that matches the requirements feel free to contact us directly at the email supplied at the end of the document.

Table 6.1.b: Options for K3 – Interface

Option	1	2		
Manufacturer	Finder	IMO		
Туре	22.23.9.012.4000	HME-2 1-PN/12DC		
Control Coil Rated Voltage	12 Vdc	12 Vdc		
Control Coil Power Consumption	1.25 W	0.53 W		
Pole configuration	1 NO + 1 NC	1 NO + 1 NC		
Rated Voltage	230 Vac @ 50 Hz	250 Vac @ 50 Hz		
Rated Output	20 A	8 A		
Image				



6.2 Control Wiring

The figure below shows a typical wiring diagram of the backup control interface with necessary backup control components. Also shown in Appendix D for better clarity.

MPGRIANT NOTES:

1 FOR DIAGRAMMATICAL PURPOSES OILLY, SYSTEM INCLUSIVE OF DE BATTERY AND PV MODULES SHALL BE NOTAL "TA SEPTE TITIER PANIL ATTURYER'S SYSTEM INC." IN STALL AND MANUALS THIS DOCUMENT FOLKERS ON Y OF RITHER CALE PHYSING LLAGGE INTERBATION MEN PLAGFERS THAT OF SOME YEAR OF THE STALL PROPERTY SYSTEM WITH BELLOW TAKEN INTO ACCOUNT.

2. AS SHOWN SYSTEMS IN SIZE PLAYER MUST BE 3-PH FROMUS SHART METER SUCH AS FEM SAN-3 OR WITH-SOME AVERBUL MINI-LESS.

2. AS INC. SALL PROPERTY FURD AND INVIPITITY, ALL ACTIVE CONDUCTIONS SHALL BE INTERRUPTED.

3. BOCKUP CAPACITY (COLD BE LIMITED BY CONDUCTION BETWEEN CHECK WITH BY DIS.

3. CONTINUOUS SAME WITH INVIENTEEP POWER BY ATTION, EXAMPLE PRIMO GENZA PLUS 5.0 -> 5-VA.

3. OVERLOAD ISSEC ALL POWER PLANCES IS 6200 VA.

4. WERN ZING BACKUP LODGE CONTINUOUS NOW OVER DOOD CAPACITIES OF BOTH LODGE AND THE TAKEN IN CACCOUNT. HIS PROLUCES OF THINDUOUS AND WITH CAPACITY CONSTRAINTS OF MERITER/BATTERY SHALL BE TAKEN INTO ACCOUNT. HIS PROLUCES CONTINUOUS NOW OVER DOOD CAPACITIES OF BOTH LODGE AND THE FRCNIUS PRIMO GEN24 PLUS (3.0, 3.6, 4.0, 4.6, 5.0, 6.0) ACCOUNT, THIS INCLUDES CONTINUOUS AND OVERLOAD CAPABILITIES OF BOTH LOADS AND THE INVERTIGATION.

SPECIAL CARE TO BE EXERCISED WHEN CONNECTING LOADS WITH POTENTIAL FOR LARGER SURGE. I SPECIAL CARE TO BE DECRE SED WHIS CONDICTING LODGS MITH POTENTIAL FOR LARGER SURRE CAPACILIS SCEN AS REPORCES, AND OIGHS.

DEPEIDING ON AC SUPPLY FROMUS SMART METER CAN BE.

1-14 SUPPLY FOR MASH-TAMBLE CORRENT) OR SMAZ-VALUAWITH CORRENT TRANSFORMERS.

2-3-14 SUPPLY FOR MASH-3 WHILE CORRENT) OR SMAZ-VALUAWITH CORRENT TRANSFORMERS.

AS SPORMINT IS SCHOULTER ACCORDER, ACT SONL, AS IS FINDER 2223-3022-00.

FERT OF A PELLATION VOTE ON OTHER OPPIONS SUCH AS FIOR PIO OR NOARK.

IF THE SITE HAS UPS BEACHE CONFIGURED AND IS CONNECTED AS ESSENTIAL (BACKED UP) LOAD MAKE SURE THE FULLWARDS SOME FOR WITH ALL SUPPLY FROM STEAM OF THE INVESTER IS ANY OTHER AC LOAD!

2-5 MIN THE NATIVALED DIVINSTITIEAM OF THE INVESTER IS ANK AS ANY OTHER AC LOAD!

2-5 CAN FUNCTION WITH AC SUPPLY FROM JENCY UP TO 3-922 (COMPRIMITH LPS MANUFACTURER). GEN24 IC PLUG CABLE 1 - GEN24 CAB F 2 - BACKUP CONTROL EXISTING SITE MSB 230Vac 50Hz "-PH TO PE BAR CABLE 3 - K1 COII CONTROL 6A . K3 S K1 SEE Note 6 EXISTING SIT EXISTING NOTE 6 EXISTING SITE MAIN
REVENUE METER ISOLATOR MSB 230Vac 50Hz 1-PH 1 SMART METER 0.0 CB1 TO EXISTING MATCH SIZE SEE NOTE 7 TO EXISTIN CABLE 3 CONTROL FULL BATTERY BACKUP WITH LOAD SPLIT NOTE 6 0 0 _(B1 CABLING SCHEDULE (RECOMPENDATIONS ONLY, ASYNZS 3000 SHALL 3E USED FOR CORRECT CABLE SELECTION AND PROTECTION SIZING).

1. CAB = 1 - CTN2x AC SUPPLY 1 - CINZA AC SUPPLY EXPECTED LOAD: 230Vac 58Hz/53Hz BACKUPJ, CURREN - DEPENDS ON INVERTER POWER CLASS CHECKTIVERTER DATASHEET ON MAX NOMINAL AC OUTPUT CURRENT SUGGESTED CABLE: 1C 2c+e V90-HT 90°C 450/750V (CORE SIZE TO MATCH INVERTER OUTPUT EXAMPLE 4-10mm²). CAB_E 2 - BACKUP CONTROL EXPECTED LOAD: 12Vdc UP TO 0.2A. SUGGESTED CABLE: IC 6c V75 100Vol. (CORE SIZE NO MORE THAN 1mm² EXAMPLE ELECTRA EAST206). CABLE 3 - K1 COIL CONTROL. MATCH S ZE EXPECTED LOAD: 230Vac 50Hz UP TO 2A. SUGGESTED CABLE: 1C 2c+e V90-HT 90°C 450/750V (CORE SIZE 1mm²) FRONIJS PRIMO GEN24 PLJS - FULL BACKUP FUL_BATTERY BACKUP W/O LOAD SPLIT

Figure 6.2.a: Backup control wiring diagram (K1 matching option 2)

Important notes to consider:

Scale: 11

- Components K1 and K3 need to be <u>purchased separately</u> from relevant electrical suppliers.
- When selecting/installing K1 ensure connected load capacity is lower than the capacity of the contactor. Special considerations must be in place for sites that have only backup loads and/or other inverter in backup circuit.



K3 Options

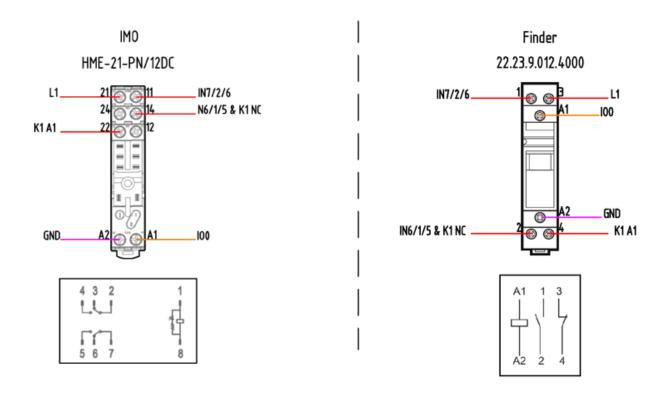


Figure 6.2.b: Backup control wiring diagram (K3 wiring labels)

6.2.1 Control Wiring - Correct Device Positioning

When following the Control Wiring it's important to understand correct device positioning is crucial to ensure correct operation of the full backup functionality.

Important points relevant to correct device positioning are as follows:

- 1) Fronius Smart Meter installed at the feed-in point.
- 2) K1 main contacts:
 - a. 3xNO installed at:
 - i. Load side of Fronius Smart Meter and,
 - ii. Supply side of Backup loads/GEN24 Inverter.
 - 1xNC installed at:
 - i. Supply side of K3 NC coil and,
 - ii. Load site of V+ terminals.
- K1 control coil installed at load side Fronius Smart Meter (L1/Red phase) and supply side of K1 main contacts.
- 4) Backup loads & GEN24 inverter installed at *load side* of K1 main contacts (3xNO).
- 5) Non-backup loads (if present) installed at load side of Fronius Smart Meter and supply side of K1.

Additional PV inverters – Grid only (AS/NZS 4777 compliant) can be installed in the backup power circuit. As operational frequency in backup mode is 53 Hz they will not produce power.

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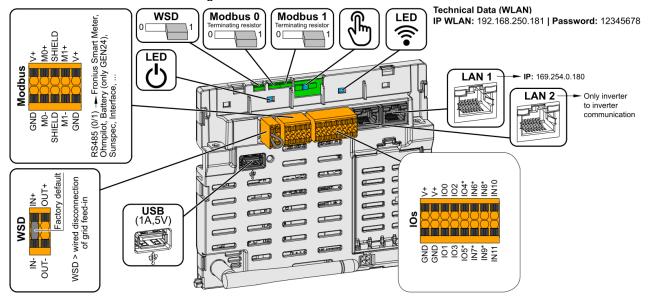
6.2.2 GEN24 Pilot - Connection Area

Figure 6.2.2.a: Backup control wiring connection area (GEN24 Pilot)





Figure 6.2.2.b: GEN24 Pilot connection area





7. SOFTWARE SETUP

The following assumes standard commissioning process for the battery and inverter (including Fronius Smart Meter) have been completed.

Primo GEN24 installation instructions → <u>GEN24 Operation manual</u>, GEN24 commissioning → <u>Fronius Solar.Start</u> from your phone/tablet/pc.

When ready to set the full backup mode, follow the steps below:

- 1) From the WebUI, log in as Technician
- 2) Go to Device Configuration → Functions and I/Os

Load Management

3) Select Backup Power and set Backup Power Mode to Full Backup, refer to below.

Figure 7.a: Battery backup setup – functions and I/Os GEN24 Technician 8 ← Device Configuration Functions and I/Os Components Activate backup interlock V+ V+ **0 2 4 6 8 10** 1 None Functions and I/Os 2 None GND GND 1 3 5 7 9 11 3 None Inverter 4 None Backup Power 5 None Open grid relais feedback Backup interlock feedback CONFIGURATION I/Os 8 None 9 None Full Backup Pin 0 (Default) 10 None 11 None Pin 6 (Default) Show additional pins Note Attention: Continuing the configuration of the back-up feature will deactivate trigger of Rapid Shutdown by loss of AC. If you want to use the Rapid Shutdown feature, we recommend using the Wired Shutdown Pins (WSD) on the pilot. Further information can be found in the Operating **←** Close



8. TESTING & TROUBLESHOOTING

8.1 Testing

Test backup mode functionality when the system is installed and commissioned for the first time. The battery should have a state of charge of at least 30% when performing the test.

Furthermore, we have developed a checklist that clearly shows steps to be followed for successful integration, shown in Appendix B (click on the image for the actual document).

Upon successful commissioning, Fronius Battery Warning Notice, shown in Appendix A, could be used to denote Backup presence at premises.

8.2 Troubleshooting

The table below summarises states of important control parameters which could be used for troubleshooting or assessing faulty components. For example, when Grid mode is active K1 is Engaged, IO0 is OFF, etc.

Table 8.2.a: Input/output states as a function of main operational modes

Mode	Grid	100	DI6	DI7	КЗ	K1	Backup loads	Non- backup loads
Grid	ON	OFF	OFF	OFF	DISENGAGED	ENGAGED	ON	ON
Backup	OFF	ON	ON	ON	ENGAGED	DISENGAGED	ON	OFF

Additional clarification of the control logic and used contacts with their accompanying actions is shown below.

Table 8.2.b: Backup control functions and relevant contacts

Function	Contact	Purpose & clarification
Activate feedback	K3 COIL/IO0	When the inverter wants to turn on Backup Mode IO0 is energized (12Vdc), which in turn engages K3 -> disengages K1
Grid Isolation	K3 NC	Supplies 230Vac to K1 coil which in turn connect or disconnect backup loads and inverter to the grid
Backup interlock feedback	K3 NO	Signals the state of the backup mechanism
Open grid relay feedback	K1 NC	Signals the state of the grid to the inverter



9. APPENDIX A – WARNING NOTICE BACKUP POWER

/ Perfect Welding / Solar Energy / Perfect Charging



CAUTION ATTENTION



ACHTUNG ATTENZIONE

This house is being supplied with backup power.

Dieses Haus wird mit Notstrom versorgt. Cette maison utilise une alimentation de secours.

Questa abitazione dispone di una alimentazione di emergenza



TO DOLO CE



10. APPENDIX B - BACKUP INSTALLATION CHECKLIST

/ Perfect Welding / Solar Energy / Perfect Charging



CHECKLIST - BACKUP POWER

Once installation, configuration, and commissioning have been successfully completed, this checklist must be worked through to ensure the backup power changeover function and backup power mode are operating correctly.

TASK	TEST	CONFIRMATION	
The inverter, battery, and all other necessary components have been installed and assembled correctly.			
The backup power changeover unit has been installed and commissioned in accordance with the country-specific installation guidelines and as outlined in the documentation.			
The software settings have been carried out in accordance with the "Backup power configuration" chapter in the documentation.			
A warning notice has been put on the switch cabinet to warn that a backup power supply has been installed.			
Start the inverter in grid power feed operation.	Check whether the inverter starts in grid power feed operation and a power shift takes place. (Test duration 6 minutes).		
Disconnect the PV system from the public grid. This can be effected using a disconnecting device in the upstream AC path or the disconnecting devices (e.g. NH fuse) of the building connection. The disconnection must occur before the Smart Meter (grid side).	Check whether the inverter starts in stand-alone opera- tion. The changeover can take more than 1 minute.		
Measure the voltage/frequency in the established stand- alone operation.	Set value: 230 V / ± 10 % / 53 Hz USA: 120 V / ± 10 % / 63 Hz		
Reconnect the PV system to the public grid.	The time taken from the end of stand-alone operation until the subsequent connection of the contactors in the backup power changeover unit must be at least 10 seconds. The changeover can take more than 1 minute. Only then may the inverter resume grid power feed operation. This must be checked by the inverter (test duration 6 minutes).		
hereby confirm that the backup power changeover function and backup power mode are operating correctly.			
ace, date	Signature		

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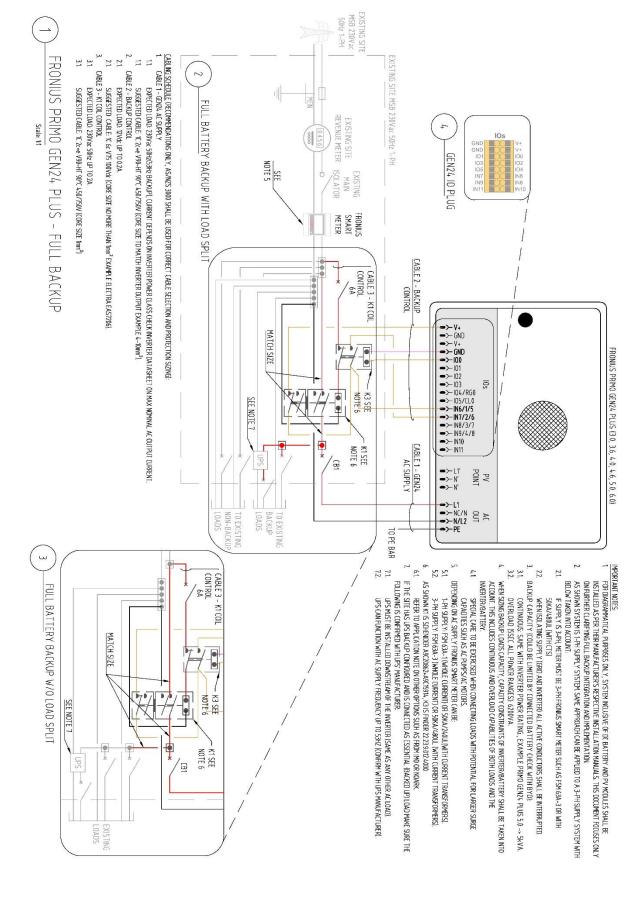
11. APPENDIX C - BACKUP CONTROL K1 AND K3 REQUIREMENTS

Table C.1: Backup control components – operational requirements

	K1 – main	K3 – interface
Main Contacts		
Main pole configuration	1 NO + 1 NC	1 NO + 1 NC
Rated Operational Voltage	230 Vac	230 Vac / 12 Vdc
Rated Operational Current	at least 63 A	at least 10 A
Rated Operational Frequency	50 Hz	50 Hz / DC
Control Coil		
Rated Operational Voltage	230 Vac	12 Vdc
Rated Operational Frequency	50 Hz	n/a (DC)
Rated Inrush Power	below 100 VA	below 3 W



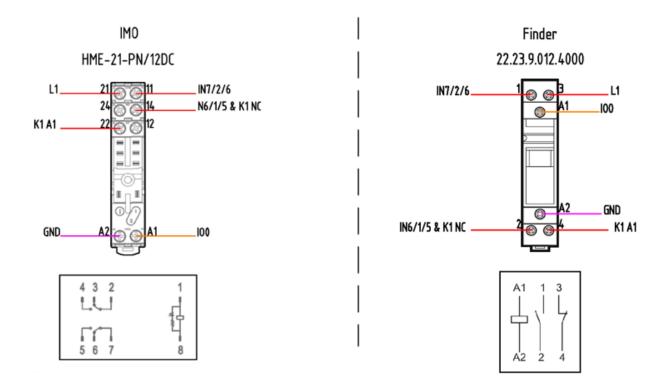
12. APPENDIX D - CONTROL WIRING





13. APPENDIX E - K3 WIRING

K3 Options



END OF DOCUMENT

Fronius Australia Technical Support Email: <u>PV-Support-Australia@fronius.com</u>

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