Technical data

8.0/10.0 kW

			Primo GEN24/GEN24 Plus					
			8.0			10.0		
Input data	Number of MPP trackers		2			2		
	DC input voltage range (Udc min - Udc max)	V	65 - 600			65 - 600		
	Rated input voltage (Udc,r)	V	400			400		
	Feed-in start-up input voltage (Udc start)	V	80			80		
	Usable MPP voltage range	V	65 - 480			65 - 480		
	MPP voltage range (at rated power) (Umpp min - Umpp max)	V	260 - 480			260 - 480		
			MPPT1	MPPT2		MPPT1	MPPT2	
	Max. usable input current (Idc max)	A	22	22		22	22	
	Max. array short circuit current (Isc pv) [1]	A	41.25	41.25		41.25	41.25	
	Number of DC connections		2	2		2	2	
			MPPT1	MPPT2	Total	MPPT1	MPPT2	Total
	Max. usable DC power	W	8,260	8,260	8,260	10,360	10,360	10,360
	Max. PV generator output	Wpeak	10,000	10,000	12,000	12,500	12,500	15,000

Output data	AC rated power (Pac,r)	W	8,000		9,999	
	Apparent power	VA	8,000		9,999	
	Max. output power	VA	8,000		9,999	
			220 Vac	230 Vac	220 Vac	230 Vac
	Rated AC output current	A	36.4	34.8	45.5	43.5
	Grid connection (Uac,r)	V	1~ NPE 220/230 (+20 %/-30 %)			
	Frequency (frequency range fmin - fmax)	Hz	50/60 (45 - 65)			
	Total harmonic distortion	%	< 3		< 3	
	Power factor (cos φac,r)		0,8 - 1 ind. / cap.			

Output data PV Point	Rated output power PV Point	VA	3,000	3,000
	Grid connection PV Point	V	1~ NPE 220/230	
	Switching time	sec.	~20	~20

Full Backup power and battery function only available with GEN24 Plus

			Primo GEN24 Plus	
			8.0	10.0
Output data Full Backup [2]	Rated output power Full Backup	VA	8,000	9,999
	Grid connection Full Backup	V	1~ NPE 220/230	
	Switching time	sec.	~10	~10

Battery connection	Number of DC inputs		1	1
	Max. input current (Idc max)	A	22	22
	DC input voltage range (Udc min - Udc max) [3]	V	150 - 455	150 - 455
	DC battery connection technology		1x BATT+ and 1x BATT- push-in spring terminals 2.5 - 10 mm²	
	Max. DC input/output power [4]	W	8,260	10,360
	Max. charging power for AC coupling4 [4]	W	8,000	9,999
	Compatible batteries [5]		Fronius Reserva & BYD Battery-Box Premium HVS/HVM	

[1] *Isc pv = Isc max >= Isc (STC) x 1,25 according to e.g. IEC 60364-7-712, NEC 2020, AS/NZS 5033:2021.*

[2] *The Full Backup option is available for the Primo GEN24 3.0–10.0 Plus. Additional external components for grid switchover are required for the Full Backup. See the Operating Instructions for further details.*

[3] *AC power derating of the inverter occurs with a DC battery input voltage of 419.7 V and higher*

[4] *Depending on connected battery*

[5] *Compatibility with the Fronius GEN24 Plus varies depending on the battery storage type and capacity class, country-specific certification and availability. More information: www.fronius.com/battery-overview*

			Primo GEN24/GEN24 Plus	
			8.0	10.0
General data	Dimensions (height × width × depth)	mm	595 x 529 x 180	
	Weight (inverter/with packaging)	kg	21 / 26	21 / 26
	Protection class		IP 66	IP 66
	Safety class		1	1
	Night consumption	W	<10	<10
	Overvoltage category (DC/AC) [6]		2/3	2/3
	Cooling		Active Cooling technology	
	Installation		Indoor and outdoor installation	
	Ambient temperature range	°C	-40 to +60	-40 to +60
	Permissible humidity	%	0 - 100	0 - 100
	Noise emissions	dB (A)	< 51	< 51
	Max. altitude above sea level	m	4,000	4,000
	DC connection technology PV		4x DC+ and 4x DC- push-in spring terminals 2.5 - 10 mm²	
	AC connection technology		3-pin AC push-in spring terminals 2.5 - 10 mm² 3-pin backup power push-in spring terminals 1.5 - 10 mm² 2x PE screw terminals 2.5–16 mm² and 3x 2.5 - 10 mm²	
	Certificates and compliance with standards [7]		IEC 62109, IEC 62909, AS/NZS 4777.2, IEC 62116, IEC 61727 ABNT BNR 16149 und 16150, IEC 62116, IEC 61727	
	Backup power functions [8]		PV Point or Full Backup	
	Country of manufacture		Austria	
	Life cycle analysis		In accordance with ÖNORM EN ISO 14040 and 14044 (checked by employees from Fraunhofer IZM)	
Efficiency	Max. efficiency	%	97.3	97.3
	Euro. efficiency (ηEU)	%	96.9	97.0
	MPP adaptation efficiency	%	> 99.9	> 99.9
Protection devices	DC isolation measurement		Integrated	
	DC disconnector		Integrated	
	Reverse polarity protection		Integrated	
	AFCI - Arc Fault Detection (Arc Guard)		Integrated	
Interfaces	WLAN/2 × Ethernet LAN		Fronius Solar.web, Modbus TCP SunSpec, Fronius Solar API (JSON)	
	6 digital inputs 6 digital inputs/outputs		Connection to ripple control receiver, energy management	
	Emergency shut-off (WSD)		Integrated	
	Datalogger and web server		Integrated	
	2 × RS485		Modbus RTU SunSpec (third-party provider)/Fronius Smart Meter, battery (GEN24 Plus), Fronius Ohmpilot	

[6] *In line with IEC 62109-1. Option to retrofit surge protection device DC SPD type 1+2 for 2 MPP trackers available under the following item number: 4,240,313,CK*

[7] *You can find the current certificates under www.fronius.com/primo-gen24-plus-cert*

[8] *Full Backup power and battery function only available with GEN24 Plus*

For further information on the availability of the inverters in your country, please visit www.fronius.com.

Letter of Conformity for Grid Support Interactive Inverter

UL Standard No. 1741-Third Edition Supplement SA And SB

Certificate: 80034168 **Master Contract:** 203213

Project: 80228053 **Date Issued:** November 28, 2024

Issued To: **Fronius International GmbH**
Guenter Fronius Strasse 1
Wels-Thalheim, Upper Austria, 4600
Austria

Attention: Josef Feichtinger

The products listed below have been found to comply with the applicable requirements of UL 1741-3rd Edition (Rev. May 19, 2023) Supplement SA8 to SA 15 and SA17 to SA18, SB4.2 and SB4.3- Grid Support Utility Interactive Inverters And Converters.
The Products also comply with Power Control Systems UL3141 except BBOC, FCOC, BCOC and single source pcs control functions not implemented.

Issued by: *PeterLim*
Peter Lim

PRODUCTS

CLASS - C531109 - POWER SUPPLIES Distributed Generation Power Systems Equipment
CLASS - C531189 - POWER SUPPLIES - Distributed Generation Power Systems Equipment - Certified to U.S. Standards

Transformerless Special Purpose Grid Support Interactive Inverter, Primo GEN24 3.8 208-240; Primo GEN24 3.8 208-240 Plus; Primo GEN24 5.0 208-240; Primo GEN24 5.0 208-240 Plus; Primo GEN24 6.0 208-240, Primo GEN24 6.0 208-240 Plus; Primo GEN24 7.7 208-240; Primo GEN24 7.7 208-240 Plus; Primo

7.7 is now labeld as 8.0

GEN24 10.0 208-240 and Primo GEN24 10.0 208-240 Plus permanently connected.

For details related to rating and notes, reference should be made to the CSA Certification Record, the Descriptive Report or Annex A Ratings.

APPLICABLE REQUIREMENTS

Standards Used	Description
CSA C22.2 No. 107.1:16 (R2021)	Power Conversion Equipment
CSA C22.2 No. 330:23	Photovoltaic Rapid Shutdown Systems
CSA C22.2 No. 290:19	Photovoltaic combiners and recombiners
CSA C22.3 No. 9:20 (Second edition)	Interconnection of distributed energy resources and electricity supply systems
UL 1741:2021 - Third Edition - Including revisions through May 19, 2023	UL Standard for Safety Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
UL Std No. 1741 CRD (April 01, 2023)	Non-Isolated EPS Interactive PV Inverters Rated Less Than 30kVA.
UL 1699B (First Edition; Reprint with revisions through and including July 9, 2024)	UL Standard for safety Photovoltaic (PV) DC Arc-Fault Circuit Protection
UL 3141 Issue 2 (Dated October 9, 2024)	Outline Investigation for Power Control Systems

*Note:

1. In accordance with UL 1741 (Third Edition, dated May 19, 2023), compliance requires meeting the specifications detailed in UL 1741 Supplement SA and SB, along with the Smart Inverter Requirements outlined in the Source Requirement Document (SRD). In addition, the product has been verified according to UL 1741 Supplement SB and IEEE 1547.1-2020, ensuring alignment with the SRD specified in IEEE 1547-2018, IEEE 1547a-2020, IEEE 1547:2018 Errata, and the SRD established by:
    a. California Electric Rule 21.
    b. The Hawaiian Electric Code with required URP (SRD-V2.0, dated 11/18/2022).
    c. Technical Interconnection Requirements NEPR-MI-2019-0009 (May 19, 2022)
    d. Default IEEE 1547-2018 Setting Requirements for ISO-NE (December 13, 2022)
    e. New Mexico (EPE, PNM, and Xcel Energy (SPS) TIIR's) (June 30, 2023, The assessment of the grid support function is conducted in accordance with IEEE 1547.1-2020, and the interoperability is confirmed through verification against the IEEE 2030.5-2018 communication protocol.

2. The products have also been verified for functional safety under Class B for CSA C22.2 No. 0.8 related to the PVRSE and related Inverter Shutdown and Remote Shutdown functions and UL1998 Software Class 1 for all safety functions.
3. Meeting UL1741 CRDs include compliance with PV combiner, ground fault (or IMI isolation) detection and PCS reference to UL3141 Issue 2 Outline of Investigation for Power Control Systems.
4. Grid support Utility Interactive inverter, Fronius inverter is evaluated with reactive power priority Volt/Var Mode (Q(V)) Test.

Additional Notes:

1) Conformity to UL 1741-Third Edition includes compliance with applicable requirements of UL1741 PVRSE and Supplement SA8 to SA15, SA17, SA18 - GRID SUPPORT UTILITY INTERACTIVE INVERTERS AND CONVERTERS, California Rule 21(SRDs), IEEE 1547-2003, IEEE1547a-2014, IEEE 1547.1-2005 and IEEE 1547.1a-2015. Meeting UL1741 CRD includes compliance with PV combiner.
2) To fulfill the rapid shutdown requirements of the NEC Article 690.12 and CEC Sec 64- 218 Photovoltaic system rapid shutdown with the Primo GEN24 series models, the inverter can be used together with a suitable rapid shutdown device, or the inverter must be mounted within the boundary values given in the NEC and CEC Article. The PV input of the inverter complies with the requirements of following standards to ensure the PV conductors are within the controlled limits of 30Vdc, 15Vac and 8A within the 30s:
   a. UL1741 3rd Edition
   b. CAN/CSA C22.2 No. 330-23
3) The integrated combiner unit is also evaluated to reference standards covering UL1741 CRD and CSA-C22.2 No.290:19 (2nd Edition) for Photovoltaic combiners and recombiners. The evaluation includes reference standard C62.41-1991 for Surge Voltages in Low Voltage AC Power Circuits.
4) Conformity to UL3141 PCS covering Power Export Limit (PEL) at the Point of Common Coupling (PCC), Export limiting from Energy Storage Systems, Import limiting to Energy Storage Systems with the ESS operating modes a) Unrestricted, b) Export only Mode, C) Import only Mode and d) No Exchange Mode. UL1341 Issue 2 section 7 PCS safety analysis for functional safety: Compliance with user protection through the application of passive protective elements. No safety critical system failures investigated.

Certificate: 80034168 **Master Contract:** 203213
Project: 80228053 **Date Issued: November 28, 2024**

HISTORY

Edition 1: (Project 80034168)
Tests were performed on representative model Primo GEN24 6.0 208-240 Plus, at Fronius International GmbH, Guenter Fronius Strasse 1, Wels-Thalheim, 4600 Austria under the CSA SMTC program approved by CSA certifier with acceptable results.

Certificate: 80034168 Project: 80034168 Master Contract: 203213 Date Issued: May 28, 2020
DQD 507 Rev 2020-03-16 © 2018 CSA Group. All rights reserved. Page 3

Utility interactive evaluations were conducted with the following firmware: Software Version	Control Devises	Models: Primo GEN24 3.8 208-240 and Primo GEN24 3.8 208-240 Plus Primo GEN24 5.0 208-240 and Primo GEN24 5.0 208-240 Plus Primo GEN24 6.0 208-240 and Primo GEN24 6.0 208-240 Plus
ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	V2.10.2 (release date 24/01/2020)
KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	V2.16.2 (release date 24/01/2020)
Check-Sum ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	0x57a62a64 (release date 24/01/2020)
Check-Sum KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	0xbab5e48f (release date 24/01/2020)

The following tests were performed with the requirements of UL 1741-2nd Edition as per the SUPPLEMENT - GRID SUPPORT UTILITY INTERACTIVE INVERTERS AND CONVERTERS (Rev. February 15, 2018) with acceptable results.

UL1741 – SA	Applicable Requirement/Topic	Comment
UL1741 - SA8	Anti-islanding Protection - Unintentional Islanding with Grid Support Functions Enabled	PASS
UL1741 - SA9	L/HVRT Low and High Voltage Ride-Through	PASS
UL1741 - SA10	L/HFRT Low and High Frequency Ride-Through	PASS
UL1741 - SA11	RR – Normal Ramp Rate and SS – Soft-Start Ramp Rate	PASS
UL1741 - SA12	SPF – Specified Power Factor	PASS
UL1741 - SA13	Volt/VAr Mode (Q(V)	PASS
UL1741 - SA14	Frequency-Watt (FW)	PASS
UL1741 - SA15	Volt-Watt (VW)	PASS

Edition:2: (Project 80179059)

Update report 80034168 to amend applicable standard from UL1741 2nd edition to UL1741 3rd Edition and evaluate additional alternate components. Also change manufacturer Silicon Lab to Skyworks Solutions Inc. for opto coupler(U13) – same specifications. Added missing critical component list for PWB PILOT2 (4,071,817). Construction review was conducted for the UL 1741 3rd edition standard. Also, corrected the typo errors for max array short and backfeed current in the specification. The alternate T9 has the identical construction and UL approved EIS, also the alternate enclosure materials met the original construction and material properties requirements.

No additional testing is deemed necessary based on the differences as compared to UL1741 2nd edition against the third edition (refer to checklist attached). All alternate components added are within the specifications of the original outlined and meeting form, fit and functions.

Edition: 3 (Project 80203034)

Tests were performed on models Primo GEN24 7.7 208-240, Primo GEN24 10.0 208-240 and Primo GEN24 6.0 208-240, at Fronius International GmbH, Guenter Fronius Strasse 1, Wels-Thalheim, 4600 Austria under the CSA SMTC program approved by CSA certifier with acceptable results.

Certificate: 80034168 Project: 80203034 Master Contract: 203213 Date Issued: Jun 10, 2020

Utility interactive evaluations were conducted with the following firmware:

Software Version	Control Devises	Primo GEN24 3.8 208-240 Primo GEN24 3.8 208-240 Plus	Primo GEN24 5.0 208-240 Primo GEN24 5.0 208-240 Plus	Primo GEN24 6.0 208-240 Primo GEN24 6.0 208-240 Plus	Primo GEN24 7.7 208-240 Primo GEN24 7.7 208-240 Plus	Primo GEN24 10.0 208-240 Primo GEN24 10.0 208-240 Plus
ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	V2.10.2 (release date 24/01/2020) V2.28.5 (release date 23/02/2024)			V2.28.5 (release date 23/02/2024)	
KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	V2.16.2 (release date 24/01/2020) V2.36.6 (release date 23/02/2024)			V2.36.6 (release date 23/02/2024)	
Check-Sum ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	0x57a62a64 (release date 24/01/2020) 0xe5b98a5d (release date 23/02/2024)			0xe5b98a5d (release date 23/02/2024)	
Check-Sum KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	0xbab5e48f (release date 24/01/2020) 0x95013193 (release date 23/02/2024)			0x95013193 (release date 23/02/2024)	

Grid Tied Requirements		
UL1741 SUPPLEMENT SB – GRID SUPPORT UTILITY-INTERACTIVE INVERTERS AND CONVERTERS BASED UPON IEEE, 1547-2018 and IEEE 1547.1-2020		
SB4.2	Grid support utility interconnection performance	Meeting Requirements
SB4.2A	Performance Categories.	Cat III B. Meeting Requirements
SB4.3	Additional requirements for testing according to IEEE 1547.1-2020.	Meeting Requirements

Edition: 4 (Project 80228053)

Update report 80034168(80203034) according to UL1741 CRD for PCS which reference to UL3141 and minor software upgrade. Add missing applicable stand CSA C22.2 No. 290 for the combiner. A few Specifications in the rating table in page 2 were updated due to entry and calculation errors. Instruction manuals were updated to include PIL and PEL safety instruction requirements as outlined in UL3141 Sec 11 and 12. Update Critical Component list to include equivalent of alternate component S1- DC switch, Capacitors C72 /C241 and Processor U1 with similar form, fit factors.

Based on the above Software upgrade, additional alternative Processor and the requirements of UL3141 outlines, additional tests were deemed necessary (refer to descriptive and Test reports for details).

Utility interactive evaluations and PCS were conducted with the following firmware:

Software Version	Control Devises	Primo GEN24 3.8 208-240 Primo GEN24 3.8 208-240 Plus	Primo GEN24 5.0 208-240 Primo GEN24 5.0 208-240 Plus	Primo GEN24 6.0 208-240 Primo GEN24 6.0 208-240 Plus	Primo GEN24 7.7 208-240 Primo GEN24 7.7 208-240 Plus	Primo GEN24 10.0 208-240 Primo GEN24 10.0 208-240 Plus
ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	V2.10.2 (release date 24/01/2020) V2.28.5 (release date 23/02/2024) V3.0.5 (release date 21/08/2024)			V2.28.5 (release date 23/02/2024) V3.0.5 (release date 21/08/2024)	
KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	V2.16.2 (release date 24/01/2020) V2.36.6 (release date 23/02/2024) V3.1.5 (release date 21/08/2024)			V2.36.6 (release date 23/02/2024) V3.1.5 (release date 21/08/2024)	
Check-Sum ZEUS	ST Microelectronics / STM32F765NGH7 (U20)	0x57a62a64 (release date 24/01/2020) 0xe5b98a5d (release date 23/02/2024) 0x1ec9961e (release date 21/08/2024)			0xe5b98a5d (release date 23/02/2024) 0x1ec9961e (release date 21/08/2024)	
Check-Sum KRONOS	ST Microelectronics / STM32F765NGH7 (U1)	0xbab5e48f (release date 24/01/2020) 0x95013193 (release date 23/02/2024) 0xbacc2d79 (release date 21/08/2024)			0x95013193 (release date 23/02/2024) 0xbacc2d79 (release date 21/08/2024)	

Grid Tied Requirements		
UL1741 SUPPLEMENT SB – GRID SUPPORT UTILITY-INTERACTIVE INVERTERS AND CONVERTERS BASED UPON IEEE, 1547-2018 and IEEE 1547.1-2020		
SB4.2	Grid support utility interconnection performance	Meeting Requirements
SB4.2A	Performance Categories.	Cat III B. Meeting Requirements
SB4.3	Additional requirements for testing according to IEEE 1547.1-2020.	Meeting Requirements

General Overview of UL 1741 PCS CRD Evaluations: - Reference to UL3141		
UL3141	Applicable Requirement/Topic	Comment
Sec 8.3	Step Change in Load Test for Multisource PCS	These tests are performed as part of the sequence in 8.8.3 and 8.8.4
Sec 8.4	Step Change in Generation Test for Multisource PCS	These tests are performed as part of the sequence in 8.8.3 and 8.8.4
Sec 8.5	Normal Operating Tests for Single Source PCS (SSOC)	BBOC, FCOC, BCOC and Single Source PCS control functions not implemented.

General Overview of UL 1741 PCS CRD Evaluations: - Reference to UL3141		
UL3141	Applicable Requirement/Topic	Comment
Sec 8.6.2	Export limiting from all sources (PEL)	The PCS consists only of one inverter with PV and Battery input. No other exporting sources allowed within the PCS. Therefore, the tests are covered with the ESS tests (See Sec 8.8.3)
Sec 8.6.3	Power Import Limiting (PIL) at the Point of Common Coupling (PCC)	No implemented. PIL not include in this evaluation.
Sec 8.7	Loss of Control Circuit Abnormal Tests	See test data
Sec 8.8.3	Export limiting from Energy Storage Systems	See test data
Se 8.8.4	Import limiting to Energy Storage Systems	See test data

Supplement to Certificate of Compliance

Certificate: 80034168 **Master Contract:** 203213

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
80228053	2024-11-28	Update report 80034168(80203034) according to UL1741 CRD for PCS which reference to UL3141 and minor software upgrade.
80203034	2024-06-12	Update report 80034168 (80179059) to include UL1741 SB testing and additional two new models Series for Fronius models Primo GEN24 7.7 208-240, Primo GEN24 7.7 208-240 Plus and Fronius Primo GEN24 10.0 208-240 and Primo GEN24 10.0 208-240 Plus.
80179059	2023-10-17	Update report 80034168 to revise applicable standard from UL1741 2nd edition to UL1741 3rd Edition and evaluate additional alternate components.
80034168	2020-05-21	Original model certification new model Primo GEN24 (C/US) Product CLASS 5311- 09 and CLASS 5311 89. -Include CEC efficiency attestation.