



REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPLICANT :	SolaX Power Network Technology (Zhejiang) Co., Ltd.
	No.288, Shizhu Road, Tonglu Economic Development Zone,
	Tonglu City, Zhejiang Province, 310000 P. R. CHINA
SUBMIITED TO :	Same as above
PRODUCT :	PV grid-connected inverter
BRAND :	SOLAX
MODEL :	X1-MINI-1.5K-G4
C	

Scope :

This report provides opinions for equipment compliance with the applicable standards/regulations stated in the following section. The purpose of compliance evaluation is to manifest that custom-made or imported equipment complies with the requirements of relevant standards/regulations in terms of necessary functions and settings. Local utility normally requires these opinions as a prerequisite for the first synchronization approval.

The opinions are based on CSSC's evaluation of the technical evidence provided by the applicant and equipment manufacturer.

Standards/regulations :

Provincial Electricity Authority's Regulation on the Power Network System Interconnection Code B.E.2559 (2016)

Technical evidence :

Test results, product specifications and other related documents provided by the applicant

(Mr. SITTICHAI	MUNGGONRIT)
TEST EN	NGINEER

(Mr. BALLANG MUENPINIJ) HEAD of BOS TESTING UNIT

(Assoc. Prof. Dr. ANAWACH SANGSWANG) DEPUTY DIRECTOR of ACADEMIC AFFAIRS

(Dr. MANIT SEAPAN)

TESTING DEPARTMENT MANAGER

REMARK: 1. The authorized CSSC staff signature through electronic means shall have the same validity as a manually executed signature to the fullest extent of a paper-based report issued by CSSC.





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Product description

Brand: SOLAX Model: X1-MINI-1.5K-G4

Technical specifications:

	Output	Input		
Voltage 220/230/240V		Max. voltage	450V	
Frequency	50/60Hz nom.	Voltage range	40 – 450V MPPT	
Current	6.5A nom.	Current	16Amax.	
Power	1500W nom.	Power	3000W max.	

Remark: Referred to APPENDIX B.

Compliance case verdicts

Complied:	Submitted result complies with the requirement.
Does not comply:	Submitted result does not comply with the requirement.
N/A:	Not Applicable

General remarks

This report shall not be reproduced, except in full, without the written approval of CES Solar Cells Testing Center (CSSC)

This report consists of the following documents:

- Test Compliance Validation Report
- APPENDIX A1. List of documents from the TÜV Rheinland (Shanghai) Co., Ltd.
- APPENDIX A2. PEA Grid Code Compliance Table.
- APPENDIX B. X1 Series User Manual 0.6kW 3.3kW
- APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001.
- APPENDIX D. Laboratory Accreditation Certificate No. CNAS L3038

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Compliance Evaluation Report



	Test Compliance Validation					
		Technical Consideration Criteria	Submitted result - Remark	Compliance verdict / Technical comment		
1	Active power control (Topic No. 12.1).	A connect requestor must design an Active Power Control System to help maintaining a specified voltage level. The system must be able to decrease the electric power from 100% to 0% on a 10% per minute manner.	The inverter is able to decrease the active power from 100% to 0% of nominal active power as well as be able to 10% step decrease. The interval time of decreasing the active power from 100% to 0% is 596s . See APPENDIX C. page 94, 12. Active power control and page 169	Complied ⁽¹⁾		



Compliance Evaluation Report



			Test Compliar	nce Validation		
		Technical Consideration	n Criteria		Submitted result - Remark	Compliance verdict / Technical comment
2	Reactive Power control (Topic No. 8.1.2).	For a system with a converter as demonstrated in the table Power Factor Adjustment ar Converter	below.		Generation Capacity ≤ 500 kW 1. A fixed displacement factor cos θ 1.1 The inverter is adjustable and controllable at 0.95 lagging power	Complied ⁽¹⁾
		Voltage Level at the Interconnection Point	Ability to adjust the Power Factor at rated power input	Reactive Power Control Methods	factor. - 10% Pn : 150.6W and -51.7VAr	
		 Low Voltage Medium or High Voltage (Generation Capacity ≤ 500 kW) 	0.95 lagging - 0.95 leading or better	At least one method: A fixed displacement factor cos θ	 - 100% Pn : 1528.7W and -503.7VAr 1.2 The inverter is adjustable and controllable at 0.95 leading power 	
		3) Medium to High Voltage (Generation Capacity >500 kW)	0.90 lagging to 0.90 leading or better	 At least two methods: 1) A fixed displacement factor cos θ 2) A variable reactive power depending on the 	factor. - 10% Pn : 155.7W and 41.4VAr - 100% Pn : 1528.7W and 507.8VAr	
				voltage Q(U)	See APPENDIX C. page 76 - 78, 6.1. A fixed displacement factor cosØ.	



Compliance Evaluation Report



	Test Compliance Vali	dation	
	Technical Consideration Criteria	Submitted result - Remark	Compliance verdict / Technical comment
2 Reactive Power control (Topic No. 8.1.2).	(Cont.)	Generation Capacity > 500 kW 1. A fixed displacement factor cos θ 1.1 The inverter is adjustable and controllable at 0.90 lagging power factor. - 1.2 The inverter is adjustable and controllable at 0.90 leading power factor. - 1.2 The inverter is adjustable and controllable at 0.90 leading power factor.	N/A



Compliance Evaluation Report



		Test Compliance Validation		
		Technical Consideration Criteria	Submitted result - Remark	Compliance verdict / Technical comment
2	Reactive Power control (Topic No. 8.1.2).	(Cont.)	Generation Capacity > 500 kW 2. A variable reactive power depending on the voltage Q(U) 2.1 Voltage set point 0.93Vn - 0.90Vn - 2.2 Voltage set point 1.07Vn - 1.10Vn -	N/A
3	Under/Over frequency protection (Topic No. 8.2).	In case that the frequency at the interconnection point is not between 47.00 Hz – 52.00 Hz, the converter system must disconnect from the power system within 100 ms.	Maximum trip time : f < 47Hz = 0.061s f > 52Hz = 0.063s See APPENDIX C. page 93, 11. Over/Under frequency and page 165 – 166.	Complied ⁽¹⁾



Compliance Evaluation Report



			Test Compl	iance Validation		
		Technical Consideration Crite	Submitted result - Remark	Compliance verdict / Technical comment		
4	Voltage Fluctuation (Topic No. 8.3).	A connection requester must design that will not cause voltage fluctuatie excess of the levels acceptable to I Regulation for Business and Industri Fluctuation Regulation could be reversed prec/PGQ-02/1998. The limits for the follow: Short-Term severity Values (Pst) not Long-Term severity Values (Plt) not the severity Values (Pl	n, install, and regul ion at the point of PEA, as specified in al Customers show viewed and re-cons e utility voltage at ot exceed 1.0 ot exceed 0.8 ตารางที่ 6-1 จึดจำกัดสำหรับ	common coupling (PCC) that the Voltage Fluctuation m in Attachment 3. The Volta idered from time to time. PCC less than 115kV are as	ner Test procedure referred to is IEC 61000-3-11 Pst (max) = 0.01	Complied ⁽¹⁾
		มากกว่า 115 kV	0.8	0.6		



Compliance Evaluation Report



	Test Compliance Validation Technical Consideration Criteria Submitted result - Remark					
Harmonics (Topic No. 8.4).	A connection requester must design, install, and control his equipment in the manner that will not cause frequency and current distortion at the point of common coupling (PCC) that is excess of the levels acceptable to PEA, as specified in the Harmonic Regulation for business and Industrial Customers shown in Attachment 4. The Harmonic Regulation may be reviewed from time to time.	Test procedure referred to IEC61000-3-12 %THDi (max) = 1.91% %THDv (max) = 0.05% (at rated output power) $2^{nd} - 33^{rd}$ Current harmonics are in limit in accordance with IEC61727.	Complied ⁽¹⁾			



Compliance Evaluation Report



			Test Co	ompliance V	alidation			
		Technical Consider	ration Criteria			Submitted	result - Remark	Compliance verdict / Technical comment
5	Harmonics	(Cont.)				Current harmonics	results according to IEC	61727:2004.
	(Topic No. 8.4).		ตารางที่ 5 -1			Odd	Limits (%)	Maximum value (%)
	(ขีดจำ	กัดกระแสฮาร์มอนิกสำหรับผู้ใช้ไฟท้	lารายใดๆที่จุดต่อร่ ^ะ	ານ *	3 – 9	< 4.0	order 3, 1.15
		ระดับแรงดันไฟฟ้า	อันดับฮาร์มอนิกและ			11 – 15	< 2.0	order 11, 0.14
		ที่จุดต่อร่วม (kV) 2 0.400 48		10 11 12 13 7 19 6 16	14 15 16 17 18 19 5 5 5 6 4 6	17 – 21	< 1.5	order 17, 0.14
		11 and 12 13		3 7 2 6	2 2 2 2 1 1	23 - 33	< 0.6	order 23, 0.00
		22, 24 and 33 11	7 5 9 4 6 3 2	2 6 2 5	2 1 1 2 1 1			
			5.9 4.3 7.3 3.3 4.9 2.3 1.6			Even	Limits (%)	Maximum value (%)
		115 and above 5	4 3 4 2 3 1 1 ตารางที่ 5-2	1 3 1 3	1 1 1 1 1 1	2 – 8	< 1.0	order 2, 0.29
		ขีดจำกัด	ความเพี้ยนฮาร์มอนิกของแรงดันสำหรับ	มผู้ใช้ไฟฟ้ารายใดๆที่จุ	ดต่อร่วม	10 - 32	< 0.5	order 10, 0.00
			(รวมทั้งระดับความเพี้ยนที่	มีอยู่เดิม)				
		ระดับแรงดันไฟฟ้า ค่าความเพี้ยนฮาร์มอนิกรวม ค่าความเพี้ยนฮาร์มอนิกงองแรงดัน		Voltage harmoni	cs results.			
		ที่จุดต่อร่วม (kV)	ของแรงคัน (%)	แต่ถะอ่	วันดับ (%)	Odd	Limits (%)	Maximum value (%)
				อันดับกี่	อันคับกู่	3 – 33	< 4.0	order 7, 0.03
		0.400	5	4	2			
		11, 12, 22 and 2 33	3	3	1.75	Even	Limits (%)	Maximum value (%)
		69	2.45	1.63	0.82	2 - 32	< 2.0	order 2, 0.01
		115 and above	1.5	1	0.5			
				•		See APPENDIX (
						10. Harmonic a	nd waveform distort	ion



Compliance Evaluation Report



Test Compliance Validation					
	Technical Consideration Criteria Submitted result - Remark				
6 DC injection (Topic No. 8.5).	A connection requester possessing a converter system must design a protection system so that the direct current dispatched to the power network system at the interconnection point will not exceed 0.5% of the rated current of the converter.	Test procedure referred to IEEE1547.1-2005 clause 5.6 Maximum DC current injection is 0.001A (0.015 % of 6.8A) See APPENDIX C. page 75, 5. DC Injection and page 168.	Complied ⁽¹⁾		



Compliance Evaluation Report



		Test Cor	npliance Validation		
		Technical Consideration Criteria		Submitted result - Remark	Compliance verdict / Technical comment
7	Low voltage fault ride through (Topic No. 12.2).	When encountering low voltage fault, a connection immediately disconnect itself from its power netw			N/A
	(TOPIC NO. 12.2).	certain period of time. The voltage level at the intermaintained as follows: The Period at which a Generator Must Stay Com System during a Temporary Low Voltage Fault	Generation Capacity > 500 kW -	N/A	
		Voltage Level at the Connecting Point	Time Duration (Second)		
		1) Low-voltage 2) Medium or High Voltage (Generation Capacity ≤ 500 kW)	Not Required		
		3) Medium to High Voltage (Generation	Required		
		Capacity >500 kW)	(see below graph)		
		0.50 0.00 0.00 0.00 0.15 Low Voltage Fault Ride Through) Capability		



Compliance Evaluation Report



	Tecl	nnical Consideration Criteria			Submitted result - Remark	Compliance verdict / Technical comment
Inder/Over voltage protection Fopic No. 12.3).	its power level as o	its power network system if the level on Line to Neutral voltage is out of the specified V level as detailed in the following table: 5				Complied ⁽¹⁾
		Voltage Level at the Connecting Point	Disconnecting Period (Second)		V ≥ 120% = 0.029s	
		V < 50%	0.3		See APPENDIX C., page 87 – 88,	
		50% ≤ V < 90%	2.0		9. Over/Under voltage and page	
		$90\% \le V \le 110\%$	Stay connected		157 - 164.	
		110% < V < 120%	1.0			
		V ≥ 120%	0.16			



Compliance Evaluation Report



		Test Compliance Validation			
		Technical Consideration Criteria	Submitted result - Remark	Compliance verdict / Technical comment	
9	Anti-Islanding (Topic No. 12.4).	Technical Consideration Criteria To prevent islanding while there is no power supply at the power network system, a connection requester's generator must be capable to disconnect from the power network system within one second (1s).	Submitted result - RemarkTest procedure referred toIEC62116 with voltage level 220V(phase to neutral voltage)Maximum run-on time:1. Power 100% of rating, P_R +5%, Q_C 0% is 0.422s2. Power 66% of rating, P_R 0%, Qc +2% is 0.368s3. Power 33% of rating, P_R 0%, Qc +1% is 0.478sSee APPENDIX C., page 79 – 85,7. Islanding Protection and page95 – 144.		



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		Test Compliance Validation		
		Technical Consideration Criteria	Submitted result - Remark	Compliance verdict / Technical comment
10	Response to utility recovery (Topic No. 12.5).	After the disconnection, if the power network system resumes to its normal state, the connection requester's generator must be able to wait about 20 seconds to 5 minutes before re-connecting to the power network system.	Test procedure referred to IEEE1547.1-2005 Clause 5.10 Reconnecting time: 50% < V < 90% = 126.9s 110% < V < 120% = 127.9s and f < 47Hz = 127.1s f > 52Hz = 127.1s See APPENDIX C., page 86, 8. Response to Utility Recovery and page 145-156.	Complied ⁽¹⁾

(1) The test results/information from an accredited third-party laboratory and are submitted to CSSC by the manufacturer/applicant. Compliance comments are provided based on the submitted values and relevant details. Details of the accredited laboratory as APPENDIX D.





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APPENDIX A1. List of documents from the TÜV Rheinland (Shanghai) Co., Ltd.

TÜV Rheinland (Shanghai) Co., Ltd. Member of TÜV Rheinland Group



Dear Whom it may concerns,

For compliance test report evaluation, we herewith submit following documentations to CSSC: 1. Technical specification of product : Manual.pdf

2. Test report:	CN23Y4BO 001.pdf
3. Laboratory accreditation:	CNAS L3038 certificate-EN.pdf
4. Table of compliance:	Comply table.pdf
5. Documentation list:	Confirmation letter.pdf

We appreciate your valued support and would like to offer any help and varied services in the future.

With kind regards,

TÜV Rheinland (Shanghai) Co., Ltd.

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QMA30.105.11SHG_7.1 Format of Notification of Test Result (Documentation in complete) / Revision date: 2008-05-14





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APPENDIX A2. PEA Grid Code Compliance Table.



SolaX Power Network Technology (ZheJiang) Co., Ltd.

-			PEA Grid code compliance table			
Item	Description	PEA requirement	Test results /Comment	Refer to Test report(or	Complied/ Does	
				document)/page	not comply	
1	Voltage and	High voltage:115k∛ and 69k∛	Rated voltage:220/230/240V,	Refer to the name plate of	Complied	
	Frequency	Medium voltage:33kV and22kV	Rated frequency: 50/60Hz	product in report		
		Low voltage: 220V, 1 phase.	The product only applied to the low voltage	CN23Y4BO 001 / Page 4.		
		380V, 3 phase	level grid.			
		Frequency: 50Hz				
2	Harmonics	Refer to IEC	Total harmonic distortion:%THD (max)=1.91%	Refer to Test report	Complied	
			Current harmonics are in the limit according to	CN23Y4BO 001 /Page		
			IEC61727	25-28		
3	Voltage	Refer to IEC	Pst value: Pst(max)= 0.01	Refer to Test report	Complied	
	fluctuation		Plt value: Plt(max)= 0.01	CN23Y4BO 001 /Page10		
4	DC injection	Not more than 0.5% of inverter	DC injection value (max): 0.001A of 6.818A=	Refer to Test report	Complied	
		rating current	0.015% of rated current	CN23Y4BO 001 /Page11		
				and 104		
5	Reactive power	InstallationPower More than	Installation power less than 500kW :	Refer to Test report	Complied	
	control	500kW 0.9 Lag to 0.9 Lead	fixed displacement factor(max):	CN23Y4BO 001 /Page		
		1) Fixed displacement factor	Lagging: 0.95, Leading: 0.95	12-14		
		2) Variable reactive power depend				
		on voltage				





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APPENDIX A2. PEA Grid Code Compliance Table. (Cont.)

ltem	Description	PEA requirement	Test results /Comment	Refer to Test report(or document)/ page	Complied/ Does not comply
6	Active Power control	Adjustable power 10% each step trom 100-0%	Adjustable power 10% each step from $100\text{-}0\%$ results within $10\text{min}.$	Refer to Test report CN23Y4BO 001 /Page 30 and 105	Complied
7	Low voltage fault Ride through	Installation Power More than 500kW, Capability with PEA wave form	Less than 500kW, no requirements.	Not applicable	Not applicable
8	Under and Over voltage protection	Disconnect time of PEA requirement $V \le 50^{9}_{0} = 0.3$ Sec $50^{9}_{0} \le V \le 90^{9}_{0} = 2.0$ Sec $110^{9}_{0} \le V \le 120^{9}_{0} = 1.0$ Sec $V \ge 120 = 0.16$ Sec	$\begin{array}{llllllllllllllllllllllllllllllllllll$	Refer to Test report CN23Y4BO 001 /Page 23-24 and 93-102	Complied
9	Under and Over frequency protection	Disconnect time of PEA requirement f < 47 Hz = 0.1 Sec f > 52 Hz = 0.1 Sec	Under and Over frequency trip time value (max): f < 48 Hz = 0.0607 Sec f > 51 Hz = 0.0627 Sec	Refer to Test report CN23Y4BO 001 /Page 29 and 101-102	Complied
10	Anti-Islanding	Disconnect time of PEA requirement = 1 See Max	$ \begin{array}{l} Trip time \ value \ (max): \\ P_{EUT}100\%, \ P_{R}(\%_{0}, \ Qc(\%_{0}, = 0.302 \ Sec \\ P_{EUT}66\%, \ P_{R}(\%_{0}, \ Qc(\%_{0}, = 0.348 \ Sec \\ P_{FUT}33\%, \ P_{R}(\%_{0}, \ Qc(\%_{0}, = 0.342 \ Sec \\ \end{array} $	Refer to Test report CN23Y4BO 001 /Page 15-21 and 28-77	Complied





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APPENDIX A2. PEA Grid Code Compliance Table. (Cont.)

Item	Description	PEA requirement	Test results /Comment	Refer to Test report(or document)/ page	Complied/ Does not comply
11	Reconnection to utility recovery	Reconnection time of PEA requirement = 20s to 5 mins	Reconnection time value: After back to specified recovery voltage range V = 90% = 126.9 Sec V = 110% = 127.9 Sec After back to specified frequency voltage range f = 48.0Hz = 127.1 Sec f = 51.0Hz = 127.1 Sec	Refer to Test report CN23Y4BO 001 /Page 22 and 81-92	Complied

Allen Hu





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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)





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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

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Notes on this Manual

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* Warranty registration form

1.1 Scope of Validity 1 Notes on this Manual This manual is an integral part of X1 Series. It describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

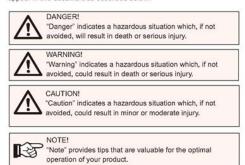
X1-MINI-0.6K-G4 X1-MINI-0.7K-G4 X1-MINI-1.1K-G4 X1-MINI-1.5K-G4 X1-MINI-2.0K-G4 X1-MINI-2.5K-G4 X1-MINI-3.0K-G4 X1-MINI-3.3K-G4

Note: ***X1**[®] means single phase; **"MINI**[®] means MINI series; ***K**^{*} means kW; **"G4**[®] means 4th generation. Keep this manual at where is accessible all the time.

1.2 Target Group 1.3 Symbols Used

This manual is for qualified electricians. The tasks described in this manual can only be performed by qualified electricians.

manual can only be performed by qualified electricians. The following types of safety instructions and general information appear in this document as described below:







Safety

05

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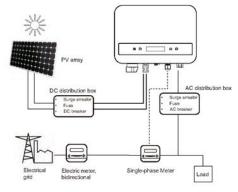
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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

Safety

2 Safety

2.1 Appropriate Usage This series inverter are PV inverters which can convert the DC current of the PV generator into AC current and feed it into the public grid.



Lightning will cause a damage either from a direct strike or from surges due to a nearby strike.

Induced surges are the most likely cause of lightning damage in most situations or installations, especially in rural areas where electricity is usually provided by long overhead lines. Surge may be included on both the PV array conduction and the AC cables leading to the building.

Specialists in lightning protection should be consulted during the end use application. Using appropriate external lightning protection, the effect of a direct lightning strike into a building can be mitigated in a controlled way, and the lightning current can be discharged into the around.

All DC cables should be installed to as short as possible, and positive and negative cables of the string or main DC supply should be bundled together. Avoid creating loops in the system. This requirement for short runs and bundling includes any associated earth bundling conductors.

Spark gap devices are not suitable to be used in DC circuits once conducting, they won't stop conducting until the voltage passes through their terminals typically less than 30 volts.

> Anti-Islanding Effect

Islanding effect is a special phenomenon that grid-connected PV system still supply power to the nearby grid when the voltage loss is happened in the power system. It is dangerous for maintenance personnel and the public.

This series inverter provides Active Frequency Drift (AFD) to prevent islanding effect.





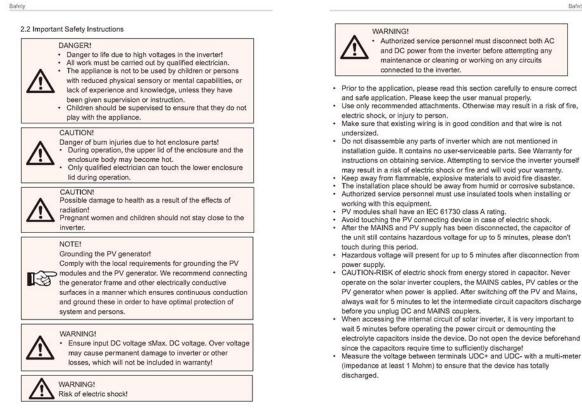
Safety

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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)



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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

Safety

- 2.3 PE Connection and Leakage Current
 The inverter incorporates a certified internal Residual Current Device (RCD) in order to protect against possible electrocution and fire hazard in case of a malfunction in the cables or the inverter. There are two trip thresholds for the RCD as required for certification (IEC 62109-2: 2011). The default value for electrocution protection is 30 mA, and for slow rising current is 300 mA.
 If an external RCD is required by local regulations, check which type of
- If an external RCD is required by local regulations, check which type of RCD is required for relevant electric code. It recommends using a type-A RCD. The recommended RCD values is 300 mA unless a lower value is required by the specific local electric codes.

The device is intended to connect to a PV generator with a capacitance limit of approx 700 nf.



	tion of Symbols
 Symbols 	on the Inverter
This section and on the	n gives an explanation of all the symbols shown on the inverte type label.
Symbol	Explanation
\square	When the blue light is on, it indicates the inverter is working normally.
1	When the red light is on, it indicates an error has occurred.
 Symbols o 	n the Type Label
Symbol	Explanation
CE	CE mark. The inverter complies with the requirements of the applicable CE guidelines.
ĽÅ	Compliant with UKCA standards.
\triangle	RCM remark.
	TUV certification.
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Danger of high voltages. Danger to life due to high voltages in the inverter!
Δ	Danger. Risk of electric shock!
	Observe enclosed documentation.
X	The inverter can not be disposed together with the household waste. Disposal information can be found in the enclosed documentation.
	Do not operate this inverter until it is isolated from mains and on-site PV generation suppliers.
ΨĞ	Danger to life due to high voltage. There is residual voltage in the inverter which needs 5 min to discharge. • Wait 5 min before you open the upper lid or the DC lid.





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Safety

2.4 CE Directives

This section describes the requirements of the European low voltage regulations, including safety instructions and system licensing conditions, the user must comply with these regulations when installing, operating, and maintaining the inverter, otherwise personal injury or death may occur,

and the inverter will be damaged. Please read the manual carefully when operating the inverter. If you do not understand "Danger", "Warning", "Caution" and the description in the manual, please contact the manufacturer or service agent before installing and operating the inverter.

Make sure that the whole system complies with the requirements of EC (2014/35/EU, 2014/30/EU, etc.) before starting the module (i.e. to start the operation).

Standard of 2014/35/EU (LVD) EN IEC 62109-1; EN IEC 62109-2 EN 62477-1 Standard of 2014/30/EU (EMC) EN IEC 61000-6-1; EN IEC 61000-6-2; EN IEC 61000-3-2; EN 61000-3-3; EN IEC 61000-3-2; EN 61000-3-3; EN IEC 61000-3-11; EN 61000-3-12 EN 55011

The assembly shall be installed in accordance with the statutory wiring rules. Install and configure the system in accordance with safety rules, including the use of specified wiring methods. The installation of the system can only be done by professional assemblers who are familiar with safety requirements and EMC. The assembler shall ensure that the system complies with the relevant national laws. The individual subassembly of the system shall be interconnected by means of the wiring methods outlined in national/international such as the national electric code (NFPA) No. 70 or VDE regulation 4105.

3 Introduction

3.1 Basic Features

Thanks for purchasing our inverter. The inverter incorporates advanced technology, high reliability, and convenient control features.

· Advanced DSP control technology.

- · Utilize the latest high-efficiency power component.
- · Optimal MPPT technology.
- · One MPP Tracking.
- Wide MPPT input range.
 Advanced anti-islanding solutions.
- Class I protection level. Max. efficiency up to 98%. EU efficiency up to 96.5%.

• THD<3%.

Introduction





Introduction

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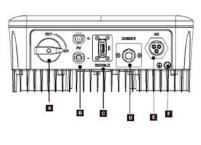
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Introduction

3.2 Terminals of the Inverter





Note: CT and meter is opptional. If necessary, please consult us in detail.



3.3 Dimension Dimension

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Technical Data

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Technical Data

4. Technical Data

4.1 DC Input

Model	X1-MINI -0.8K-G4	X1-MINI -0.7K-G4	X1-MINI -1.1K-G4	X1-MINI -1.5K-G4	X1-MINI -2.0K-G4	X1-MINI -2.5K-G4	X1-MINI -3.0K-G4	X1-MINI -3.3K-G4
Max. PV array input power (Wp)	1200	5400	2200	3000	4000	5000	6000	6600
Max: PV input voltage (V)	450	450	450	450	450	550	. 550	\$50
Startup voltage (V)	50	50	50	50	50	50	50	50
Nominal input voltage (V)	360	260	380	360	360	260	260	260
MPP tracker voltage range [V]	40-450	40-450	40-450	40-450	40-450	40-560	40-550	40-550
No. of MPP trackers/Strings per MPP tracker				12	1/1			
Max. input oursent (A)		16.A						
Max. short oircuit current (A)					22 A			

4.2 AC Output

Model	X1-MINI -0.8K-G4	X1-MINI -0.7K-G4	X1-MINI -1,1K-G4	X1-MIN -1.5K-G4	X1-MINI -2.0K-G4	X1-MINI -2.5K-G4	X1-MINI -3.0K-G4	3.3K-G4
Nominal AG output power (W)	600	700	1100	1500	2000	2500	2000	3300
Nominal AC-output current (A)	2.6	3.1	4.8	6.5	8.7	10.8	13.1	14.4
Max. AC output apparent power (VA)	600	770	1210	1650	2200	2750	3300	3300
Max. AC output current (A)	3	3.5	5.5	7.5	10	25	.15	15
Nominal AC soltage (V)				220/2	20/24)			
Nominal grid lequency (Hz)	5040							
Displacement power factor	0.8kading-0.8lagging							
THO: (rated power) [%]	d							

10000	1000000	and the second					ana ana	
Model	X1-MINI -0.6K-G4	X1-MINI -0.7K-G4	X1-MINI -1,3K-G4	X1-MINI -1.5K-G4	X1-MINI -2.0K-G4	X1-MINI -2.5K-G4	X1-MNI -3.0K-G4	X1-MINI -3.3K-G4
Max efficiency (%)	98	98.	98	58	98	98	98	98
Euro. efficiency (%)	95	95	35.5	96	98.5	96.5	98.5	96.5
Standty consumption [W] @Night	et							
Ingress protection	IP68							
Protection class	Classi							
Over voltage category	II (DQ)III (AC)							
Operating temperature range (°C)	-25-00							
Max. operation atitude (m)	<4000							
Humidity [%]	0-100							
Typical noise emission (dB)	2							
Storage temperature (TC)	-20-70							
Dimenaiona(W+H+D) (nm)	290x206x120							
Weight (kg)	5.2	52	52	5.2	5.2	5.5	5.5	55
Cooling concept	Nature cooling							
Communication interfaces	WF/LAN4G Dongle (optional) &US8JR5485/CT/DIDO							
Protection								
Overlunder sollage protection	YES							
DC axiation protection	YEB							
Monitoring ground lauit protection	YES							
Grid menillering	YES							
DC injection monitoring	YES							
Back feed current monitoring	YES							
Readual curvent detection	YES							
Anti-alanding protection	YES							
Overtemperature protection	YES							
SPO (PVIAC)	Type 3 (Optional)							
AFQI				00	tional			
Standard	-							
Safety	EN/E082109-1/2							
EMC	EN61000-6-1/2/3H; EN61000-3-2/3/11/12; EN55011							





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Installation

5. Installation

5.1 Check for Transport Damage Make sure the inverter is intact during transportation. If there are some visible damages, such as cracks, please contact your dealer immediately.

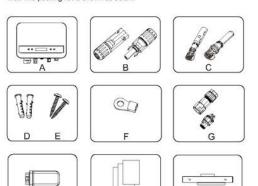
5.2 Packing Lists

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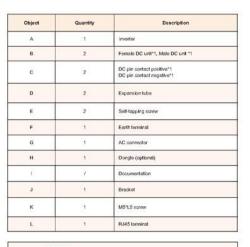
K

Open the package and fetch out the product, check the accessories at first. The packing list is shown as below.



2

J





NOTE! For the optional accessories, please be subject to the actual delivery.

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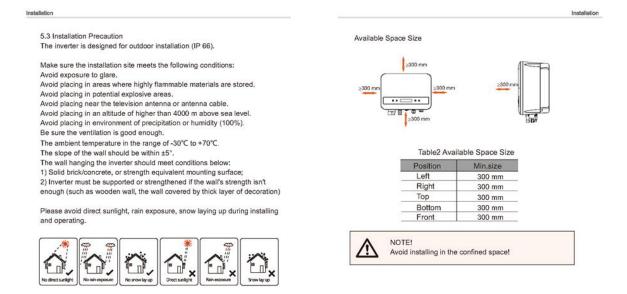


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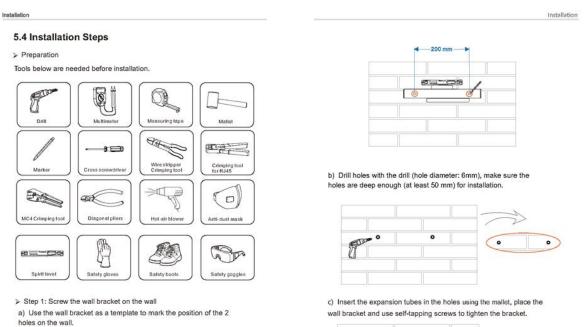


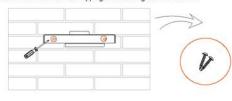


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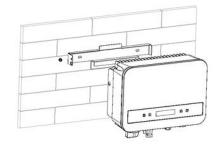
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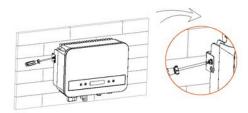
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Installation

> Step 2: Match the inverter with wall bracket
 d) Hang the inverter over the bracket, move the inverter close to it, slightly lay down the inverter, and make sure the mounting bar on the back are fixed well with the groove on the bracket.



e) Screw down the M5*L8 screw on the left side of the inverter.



Installation 5.5 Connections of the Inverter 5.5.1 The Main Steps to Connect to the Inverter > PV String Connection The inverter has one-string PV connector. Please select PV modules with excellent function and reliable quality. Open circuit voltage of module array connected should be < Max. DC (table as follows) input voltage, and operating voltage should be within the MPPT voltage range. Table3 Max. DC Voltage Limitation X1-MINI-0.6K/0.7K/1.1K/1.5K/2.0K-G4 X1-MINI-2.5/3.0/3.3K-G4 Model Max DC Voltage (V) 450 550 DANGER! Danger to life due to high voltages on DC conductors. • When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.Cover the PV modules.Do not touch the DC conductors. WARNING! PV module voltage is very high which belongs to dangerous voltage range, please comply with the electric safety rules when connecting. WARNING! Please do not ground the PV positive or negative! Please follow the requirements of PV modules as below: • Same type; Same quantity; Identical alignment; Identical 1 tilt. In order to save cable and reduce the DC loss, we sugge installing the inverter near PV modules.

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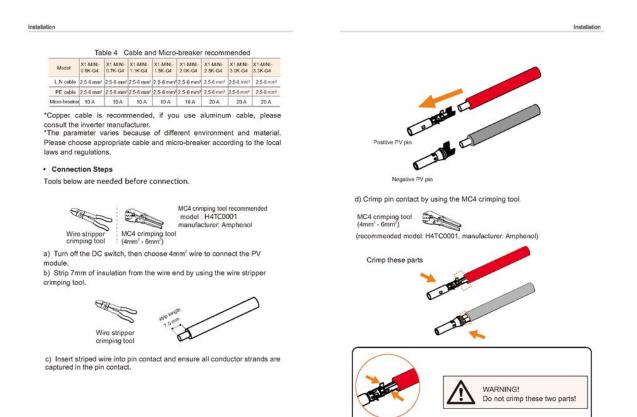


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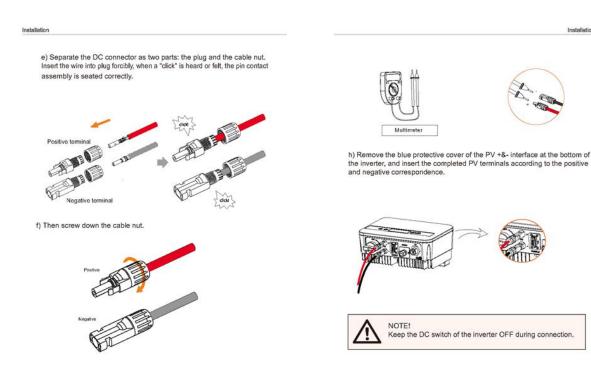
Installation

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g) Use a multimeter to measure the open circuit voltage of the positive pole and negative pole of the PV cable, and make sure the open circuit voltage less than the permissive max input voltage;

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tion	Instalia
Grid Connection he inverter is designed for single phase grid. Voltage range is 220/ 30/ 240 V, frequency is 50/ 60 Hz. Other technical requests should omply with the requirement of the local public grid. NOTE! Inverters should not be used in multiple phase combinations.	 Connection Steps a) Check the grid voltage and compare with the permissive voltage range (refer to technical data). b) Disconnect the circuit-breaker from all the phases and secure against re-connection. c) Strip the wires: Strip L and N wires to 52.5mm and the PE wire to 55mm. Use the crimping pliers to strip 6mm of insulation from all wire ends as below.
Incorrect Connection between Load and Inverter mpedance of the Inverter AC connecting dot should be less than 2 Ω. To nsure reliable anti-islanding function, PV cable should be used to ensure dire loss < 1% than normal power. Moreover, length between AC side and rid connecting dot should be less than 150 m. The following chart is the able length, section area and wire loss.	d) The AC connector provided in the packing list includes 2 parts (A and B).
Sector 1.20% 2.0 feet 8.0 feet 100 mm ² 1.00% 4.0 feet 8.0 feet 100 mm ² 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 100% 100% 110% This product has a professional IP67 AC waterproof connector (after connection).	- Separate A into 2 components.
You have to wire AC by yourself. Please see the figure above.	Then the AC connector is finally classified into 3 components for use (as shown below).

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帽

Component

nponent 2 Component 3

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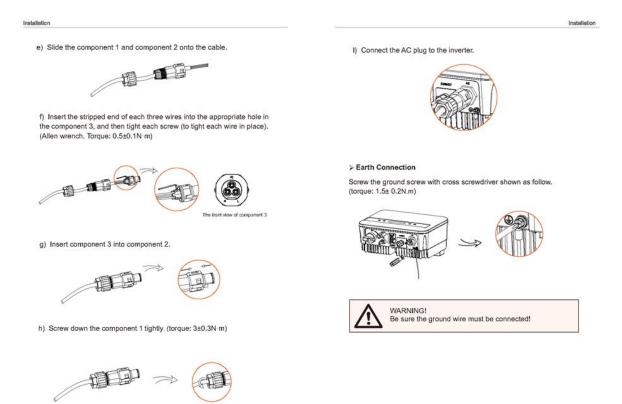


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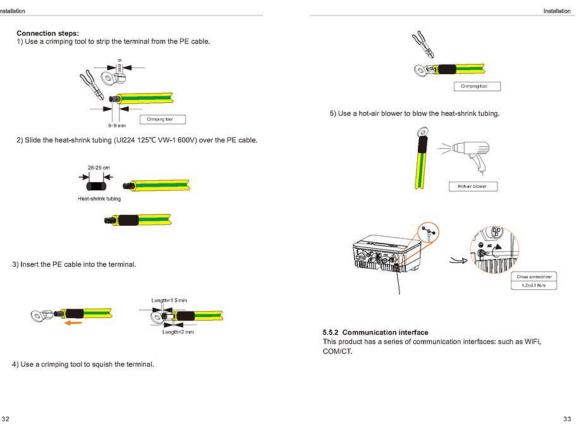




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installation

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Installation

and USB for upgrading for human and machine communication. Operating information like output voltage, current, frequency, faulty information, etc. can be delivered to PC or other monitoring equipment via these interfaces

① DONGLE Port

This inverter provides a DONGLE port which can collect information from inverter including status, performance and updating information to monitoring website via connecting Wi-Fi dongle (optional, purchase the product from supplier if needed)

Connection steps: 1. Plug the WiFi Dongle (optional) into "DONGLE" port at the bottom of inverter.

2. Connect the WiFi with router.

 Scan below QR code or search for the keyword "Monitoring Cloud" in APP Store to download the corresponding APP for setting up the monitoring.

Follow the steps to create a new account, set up internet connections and check the inverter status.

(For more details of the monitoring configuration, please refer to the WiFi/LAN/GPRS/4G Dongle user manual in the box.)

Monitoring RS485

@ COM/CT Port

a. RS485 connection



RS485 is one standard communication interface which can transmit the real-time data from inverter to PC or other monitoring equipment.

The PIN definition of RS485 interface is shown as below

 $=_{5}^{4}$

PIN	1	2	3	4	5	6	7	8
Definition	x	x	х	485_A	485_B	x	×	x

> RS485 Connection Steps: 1) Firstly unscrew the screw from the COM/CT port. (PH1 cross

screwdriver. Torque: 1.0±0.1N.m)

 Prepare a communication cable and strip the insulation from it.
 Let the communication cable pass though the waterproof connector, then insert it into the connector following the PIN definition rule.

Hand tighten. Torque:1.2±0.1N.m







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Installation installation > CT Connection: b. Meter (optional) connection The current sensor measures the current on the phase wire that runs between the inverter and the grid. With this single phase meter working together with the inverter, you can: (1) Monitor the energy to grid and from grid through the whole day. CT connection diagram (2) Achieve the export control function with a higher accuracy. 0:0 verte Į.... 30 () 금말.... Elect Electri ø ate Single Phase Mete CTÉ ū! The PIN definition of Meter interface is shown as below 0 IT: The arrows direction on the CT Int to the public grid side. COM/CT port on the bottom of inverter $=_{5}^{4}$ CC - CO-Public grid electricity PIN 2 3 4 5 6 7 8 4 CT 4 Definition х х x 485_A 485_8 × х x CT PIN Definition > Meter Connection Steps When connecting the RJ45 connector with the wire of the CT, please Please see the Quick Guide and User Manual for Single Phase Meter Installation for details. follow the sequence below: --- 8 Note! Note! It is recommended to connect our Smart meter to inverter. If there is no smart meter installed, please disable the "Export Control" function in the inverter setting otherwise the inventer will stop and report a "Meder fault" alert. The "Export Control" is disabled by default, if an error occurs, please check if it is disabled. The smart meter must be purchased from and authorized by us, any third party or non-authorized meter may not match with the inverter. We will not take the responsibility if the meter is unavailable or incompatible in this case. PIN 1 2 3 4 6 6 7 8 CT_I+ CT_I-Definition x х х х х х





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NOTEI Do not place the CT on the N Wire or the earth wire. Do not place the CT on the N and L wire simultaneously. Do not place the CT with the arrow pointing to the inverter side Do not place the CT on the non-insulated wires. Do not use the wire over 25m.	response DRM fund	modes	by giving used for	contro remote	I sign shut-c	als as off) . Th	below (he <mark>us</mark> er	everal demand (For other cou should follow ipment when t	ntrie the
CT structural decomposition RJ45 connector CT elamo								_	
esta fit.	PIN	1 X	2 DRM0	3 X	4 X	5 X	6 X	7 +3.3V_COM	8
Screw cap communication line 1. Insert the RJ45 connector of CT into the "RS485" port on the inverter, and screw down the screw cap tightly. 2. Make sure the current sensor is installed in the right direction: The arrow on the current sensor must point to the public grid. 3. Clip the CT clamp on L line from the home main meter box side. 4. Use electrical tape to prevent CT from falling off.		onnectio ons.	on steps	of the [ORM, U	user ca		ommunicatior	
1. Insert the RJ45 connector of CT into the "RS485" port on the inverter, and screw down the screw cap tightly. 2. Make sure the current sensor is installed in the right direction: The arrow on the current sensor must point to the public grid. 3. Clip the CT clamp on L line from the home main meter box side.	For the co	onnectio ons.	e!	of the [ORM, U	user ca			

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Adapter		provide	d to control					f switches by Adapter Box	
4				ĩ					>Settings >DryContact Meter Energy
	⇒î ⊞i]" 	+ 	oter Bo	x	2.2) There are 3 modes for selection after you enter the DryContac interface: Load Management, SmartSave and Genrator. Choose SmartSave and then select Enable in the Schedule interfa ⇒Mode Select Load Management
The PIN	definitio	n of he	at pump is a	s belo	w:				>Mode Select >Schedule SmartSave Enable
					_	7.			>Mode Select Generator
	1	2	3	4	5	8	7	в	3) Set the time intervals for opening and closing the heat pump.
PIN	×	x	GND_COM	×	×	RY_OUT	×	×	
PIN Definition									Start Time 1 End Time 1
	0.80								
	o Conn	ection S	Steps:						> 00:00 > 23:59
Definition	RY_OL	IT to the	Steps: e positive po e pole of the				ad and	connect	> 00:00 > 23:59 Start Time 2 End Time 2

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> Model Select





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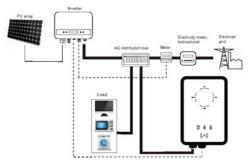
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Installation

5.6 EV-Charger Function

The inverter can communicate with the smart EV-Charger to form an intelligent photovoltaic, storage and EV charging energy system, thus maximizing the utilization of photovoltaic energy.

Diagram: Intelligent Photovoltaic, Storage and EV Charging Energy System



Wiring operation

a) Plug one terminal of the communication cable to the right pin of the EV-Charger and the other terminal to PIN 4 & 5 of the "COM/CT" port of the inverter.

b) Connect the meter to PIN 4 & 5 of the "COM/CT" port of the inverter.

Setting

Turn on the power of the entire system, enter the "Settings" page of the inverters on the LCD screen. a) Enter the "Export Control" page and chose "CT" or "Meter".

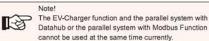


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b) Select "EvChargerEnable" and then enter "Mode Select". Ensure the interface shows "Enable" under "Mode Select", which indicates the EV-Charger function started successfully.

>EvChargerEnable	>Mode Select
Adapter Box	Enable

For the installation and settings of the EV-Charger, please refer to the user manual of the EV-Charger for details.



Datahub or the parallel system with Modbus Function cannot be used at the same time currently.

Upgrade

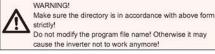
User can update the inverter system through the USB flash dirver.



Upgrade Steps:
 Please contact our service support to get the update file, and extract it into your USB flash dirver as the following file path:

"Update\ARM\323101023800_X1_MINI_G4_ARM_VXXX.XX_XXXXXXX.bin"; "Update\DSP\323101023700_X1_MINI_G4_DSP_VXXX.XX_XXXXXXX.bin"

Note: Vx.xx is version number, xxxxxxxx is file completion date







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NOTE! The format of U-disk system shall be FAT32. 2) Insert USB flash drive with update program into the DONGLE port on the bottom of the inverter. Turn on DC switch or connect the PV connector. **a** 5 S.F. 10 C 0 3) Short press up and down key to select the one that you want to update and long press down key to confirm. Cancel → Update(ARM) ---- → C--- Update(ARM) ---->323101023800...... → Updating----25% ARM DSP ⇒ Update(DSP) ---->323101023700 □ □ □ Update(DSP) ----Updating----25% ARM >DSP

4) After the upgrade is completed, please pull off the U-disk.



5.6 Run the Inverter

> Start inverter after checking all below steps:

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a) Check that device is fixed well on the wall.
b) Make sure the DC breaker and AC breaker are disconnected.
c) AC cable is connected to grid correctly.
d) The DC cable is properly and reliably connected;
e) The ground cable is properly and reliably connected;
f) The communication cable is properly and reliably connected.
g) All PV panels are connected to inverter correctly.
h) No foreign items, such as tools, are left on the top of the machine or in the inverter is the junction box (if there is). i)Turn on the external DC and then AC connectors. j) Turn on the DC switch to the "ON" position. > Start the inverter a) Inverter will start automatically when PV panels generate enough energy. b) Check the status of LED indication and LCD screen, the LED indication should be blue and the LCD screen should display the main interface. c) If the LED indication is not blue, please check the following conditions: - All the connections are correct. - All the external disconnect switches are closed. - The DC switch of the inverter is in the "ON" position > The following is the three status when operating, which means inverter starting up successfully. Status Description Inverter is waiting to check when DC input voltage from panels is greater than 40 V (start-up voltage) but less than 50 V (lowest operating voltage). When the inverter with auxiliary power supply lacks PV, the screen also shows Waiting

	"waiting".
Checking	Inverter will check DC input environment automatically when DC input voltage from the PV panels exceeds 50 V and PV panels have enough energy to start inverter.
Normal	Inverter begins to operate normally when the blue light is constantly on. Mearwhile feedback energy to grid (if condition permits), LCD displays present output power.





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Installation

Enter the setting interface to follow the instructions when it is first time to start up.

WARNING! Power to the unit must be turned on only after installation work has been completed. All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned.

NOTE!

Please set the inverter according to local requirements.

Isolation Fault Alarm

The isolation fault alarm installed into the inverter, is the standard configuration, as required by AS 4777_2020 and New Zealand, it will give a visual alarm once the isolation impedance of the PV arrays is less than

20 KΩ. The error indicator light will be in red and the control panel will display isofault.

Commissioning Please select Australia Region A, B, C for power quality response modes and grid protection settings during commissioning.

· You can adjust setpoints for power quality response modes and grid protection settings if required.

After commissioning, you can view the following settings through the LCD of the inverter after commissioning:

. Firmware version

- Region settings (and setpoints) for grid protection settings
 Region settings (and setpoints) for power quality response modes.
- NOTE!

13 Once settings are selected at commissioning they are locked to view only.

NOTE!

Password should not be readily available - if you need 13 that, you can find the password that either in a separate maintenance/service manual or available from manufacturer/importer upon request

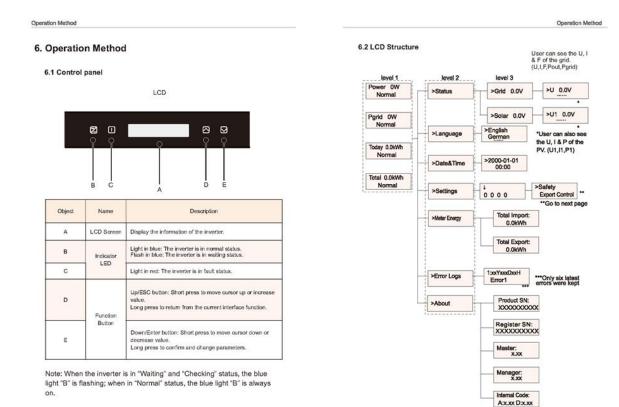




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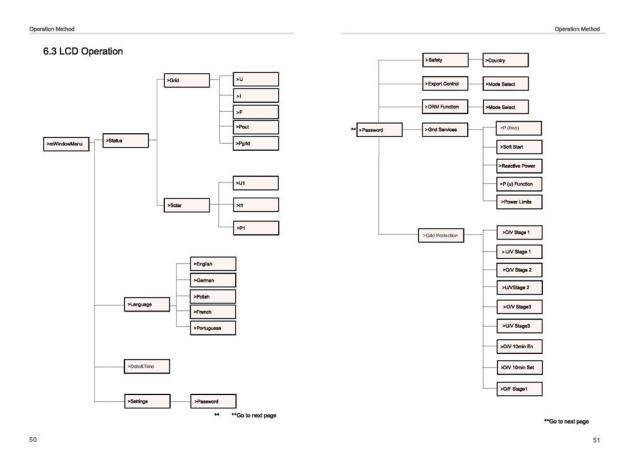




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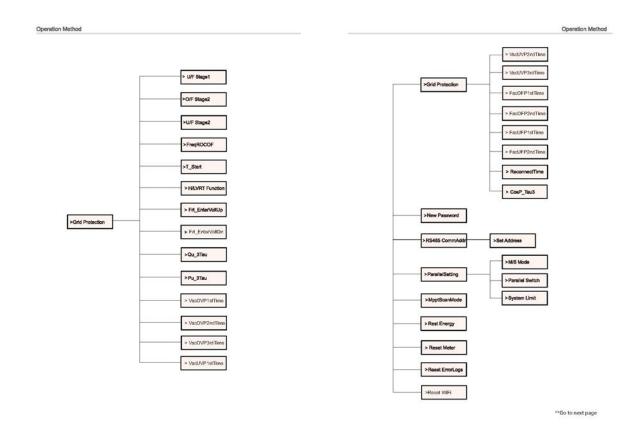


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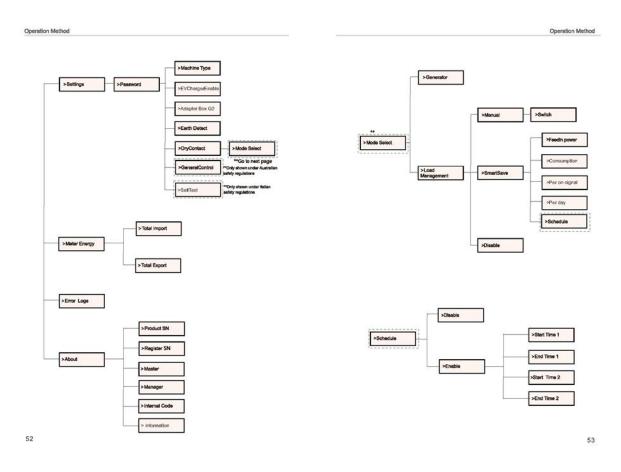




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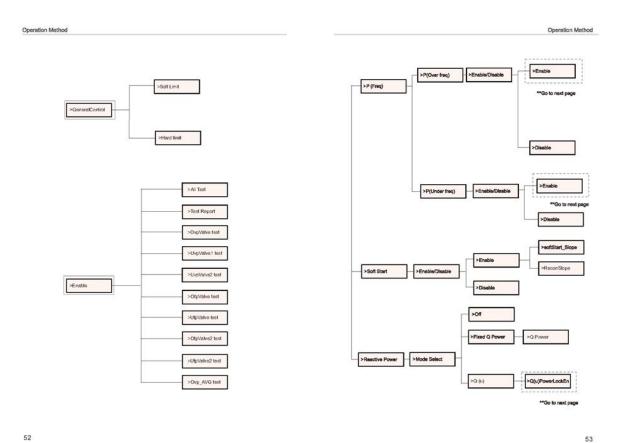




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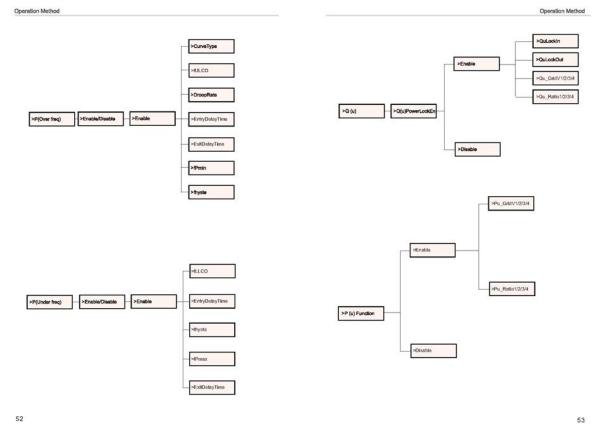




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Operation Method

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Operation Method

> LCD Display · Level 1

Power 0W	Pgrid 0W	Today 0.0kWh	Total 0.0kWh
Normal	Normal	Normal	Normal

1) The first line displays the parameters(Power, Pgrid, Today and Total) and

Parameter	Meaning
Power	The output power of inverter.
Pgrid	The power export to or import from the grid; (Positive value means the energy feeds into grid, negative value means the energy used from the grid).
Today	The power generated within the day.
Total	The power generated in total

2) The second line shows the running status.

"Normal" means the running status of the inverter.

· Level 2

Long press the "Enter" button to enter the second-level interface. User can see parameters, such as the Status, Language, Date Time, Settings (need password), Meter energy (including Total Import, Total Export), Error Logs (of the inverter), and About (the user can browse the information of the inverter, including product serial number, machine type, register sn, master, slave, manager and internal code).

Menu
>Status Language

a) Status

The status function contains two aspects: the grid and the solar. Press "Up" and "Down" to select and long press "down" to confirm the selection, long press "Up" to return to Menu.

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1) Grid This status shows the current condition of the AC output port of the inverter, such as voltage, current, output power and grid power. This status includes 5 parameters: U, I, F, Pout, Pgrid. Press "Up" and "Down" to select and long press "down" to confirm the selection, long press "Up" to return.



2) Solar

This status shows the real time PV condition of the system, such as input voltage, current and power situation of each PV input. This status includes 6 parameters: U1, I1,P1.

Press "Up" and "Down" to select and long press "down" to confirm the selection, long press "Up" to return



b) Language Users can select a language from English, German, Polish, French, Portuguese, Chinese, Spanish, Italian and Dutch by this function.



c) Date Time

This interface is for the user to set the system date and time. Increase or decrease the word by pressing "Up" or "Down" button. Long press "Down"





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change without notice). In addition, the user has an "UserDefined" option

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which allows the user to customize relevant parameters within a wider range.

to confirm and alternate to next parameter. After all the numbers are						
confirmed. Long press "Down" to enter the date and time.			s	afety		
····· Date&Time ······		ſ	2012/01/07	30		
			>Countr	5		
>2000-01-01			VDE4	105		
00:00		1				
d) Settings		NOTE				
This function is used for setting the inverter.		NOTE!				
This function is used for setting the inverter.		The grid sta	indard nee	ds to be se	et as diffe	rent regions
······ Settings ······	ES .	according to	local requ	irements.	If there is	any doubt,
		please cons				
4		piedoe cona	un our soi	rice teenin	oluno ioi	dotano.
1000	191					
	The default	settings for di	fferent rea	ions are st	nown as fe	ollows:
		.				CC0.CAL9000
* Password	Region	Australia A	Australia B	Australia C	New Zealand	
	Standard Code OV-G-V	A\$4777_2020_A 286V	A\$4777_2020_6 265V	A\$4777_2020_C	New Zesland 265V	Setting Range 230-300V
The default password is "2014" for the installer, which only allows the	OV-OV1-T	1.55	1.58	1.58	1.58	230-3004
installer to review and modify necessary settings complying to the local	OV-G-V2	275V	275V	275V	276V	230-300V
	OV-GV2-T	0.18	0.18	0.15	0.18	
rules and regulations. If further advanced setting is required, please	UN-G-V1	180V	180V	180V	1807	40-230V
contact the distributor or us for assistance. We need to increase or	UNGV1-T UN-G-V2	10S 70V	105 70V	108 70V	108 70V	40-230V
designs the read by second and a dama by the last second and and	UNGV2-T	1.68	1.65	1.65	1.55	
decrease the word by pressing up or down button. Long press "Down" to	OV-G-F1	52Hz	52Hz	56Hz	65Hz	50-55Hz
confirm and alternate to the next number.	OVGF1-T	0.15	0.15	0.15	0.18	
	OV-0-F2 OVGF2-T	52Hz 0.1S	52Hz 0.1S	55Hz 0.15	65Hz 0.15	50-55Hz
	UN-G-F1	0.15 47Hz	0.15 47Hz	0.15 45Hz	0.15 45Hz	45-50Hz
Settings			1.55	55	1.55	
Settings	UNGF1-T	1.55			45Hz	45-50Hz
4	UNGF1-T UN-G-F2	47Hz	47Hz	45Hz		
Settings	UNGF1-T UN-G-F2 UNGF2-T	47Hz 1.58	1.58	55	1.58	
4	UNGF1-T UN-G-F2 UNGF2-T Startup-T	47Hz 1.58 605	1.58 605	55 605	1.58 608	15-10005
⁴ 1 0 0 0	UNGF1-T UN-G-F2 UNGF2-T	47Hz 1.58	1.58	55	1.58	15-10005 15-6005
After inputting the password, the information of the LCD interface is shown	UNGF1-7 UNGF2-7 UNGF2-T Santa-T Resource-T Resource-V/H Resource-V/H	47Hz 1.55 605 605 253V 205V	1.59 605 605 253V 205V	55 605 605 253V 205V	1.58 606 608 253V 198V	
⁴ 1 0 0 0	UNGF1-T UNGF2-T Sartup-T Restore-T Recover-VL Recover-VL Recover-FH	47Hz 1.59 605 605 253V 206V 50.15Hz	1.58 605 805 253V 205V 50.15Hz	55 605 605 253V 205V 50.15Hz	1.58 605 605 253V 198V 50.15Hz	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-7 UNGF2 Startup-T Restore-T Rescove-VH Rescove-FH Rescove-FH	47Hz 1.58 605 605 283V 205V 50.15Hz 47.5Hz	1.58 605 253V 205V 50.15Hz 47.5Hz	55 605 253V 205V 50.15Hz 47.5Hz	1.58 605 253V 198V 50.15Hz 47.5Hz	
After inputting the password, the information of the LCD interface is shown	UNGF1-T UNGF2-T Santus-T Reatus-T Recover-V1 Recover-P1 Recover-P1 Sant-V1	47Hz 1.58 605 263V 206V 50.15Hz 47.5Hz 253V	1.58 605 605 253V 205V 50.15Hz 47.5Hz 253V	55 605 605 253V 205V 50.15Hz 47.5Hz 253V	1.58 606 253V 198V 50.15Hz 47.5Hz 253V	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-7 UNGF2 Startup-T Restore-T Rescove-VH Rescove-FH Rescove-FH	47Hz 1.58 605 605 283V 205V 50.15Hz 47.5Hz	1.58 605 253V 205V 50.15Hz 47.5Hz	55 605 253V 205V 50.15Hz 47.5Hz	1.58 605 253V 198V 50.15Hz 47.5Hz	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-7 UNGF2-7 UNGF2-7 Bastus-T Readow-T Readow-YH Readow-YH Readow-FH Bastwi-H Sant-VH Sant-VH	477Hz 1.58 605 605 253V 205V 50.16Hz 47.5Hz 253V 255V 205V	1.58 605 605 253V 205V 50.15Hz 47.5Hz 253V 205V	55 605 605 263V 205V 50.15Hz 47.5Hz 47.5Hz 253V 206V	1.58 606 253V 198V 50.15Hz 47.5Hz 253V 198V	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-F UNG-F2 UNGF2-T Battur-T Battur-T Battur-T Battur-F Battur-K Battur-K Battur-K Battur-K Battur-K Battur-K Battur-K	47Hz 1.58 605 605 285V 205V 50.15Hz 47.5Hz 205V 205V 205V 205V 205V 205V 47.5Hz 47.5Hz	1.53 605 605 253V 205V 50.15Hz 47.5Hz 253V 253V 253V 255V 50.15Hz	53 605 605 263V 205V 50.15Hz 47.5Hz 253V 253V 253V 255V 206V 50.15Hz	1.58 605 253V 198V 50.15Hz 47.5Hz 253V 198V 50.15Hz	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-T UNG-F2 UNGF2-T Barta-T Recover-V1 Recover-V1 Recover-V1 Recover-F1 Bart-V1 Bart-V1 Bart-V1	47Hz 1.58 605 605 285V 205V 50.15Hz 47.5Hz 205V 205V 205V 205V 205V 205V 47.5Hz 47.5Hz	1.53 605 605 253V 205V 50.15Hz 47.5Hz 253V 253V 253V 255V 50.15Hz	53 605 605 263V 205V 50.15Hz 47.5Hz 253V 253V 253V 255V 206V 50.15Hz	1.58 605 253V 198V 50.15Hz 47.5Hz 253V 198V 50.15Hz	
After inputting the password, the information of the LCD interface is shown as below.	UNGF1-F UNG-F2 UNGF2-T Battur-T Battur-T Battur-T Battur-F Battur-K Battur-K Battur-K Battur-K Battur-K Battur-K Battur-K	4774z 1.58 605 005 255V 200V 50.16Hz 47.54z 255V 200V 50.16Hz 47.54z 47.54z 100V 50.16Hz 47.54z 100V 50.16Hz 100V 100V 50.16Hz 100V	1.58 605 805 265V 205V 50.15Hz 47.5Hz 253V 205V 205V 50.15Hz 47.5Hz	55 605 55 205V 205V 205V 50,15Hz 47.5Hz 253V 205V 205V 205V 205V 205V 205V 205V 205	1.58 605 253V 198V 50.15Hz 47.5Hz 253V 198V 50.15Hz 47.5Hz 47.5Hz	18-4008

The user value set by installer must be within the range of 0 kW to 60 kW. Press "Up" and "Down" button to select and long press "Down" to confirm.



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Compliance Evaluation Report



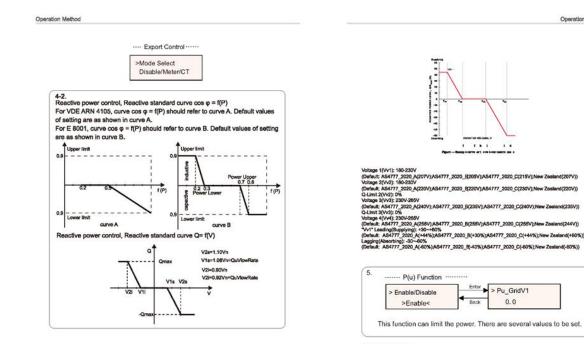
Operation Method

(24450)

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3) DRM Function

Installer can choose "Enable" to control the inverter's power off through the external communication.

-- DRM Function ->DRM Function Enable/Disable





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Grid Services	4-1.	
sually end user do not need to set the grid parameters. All default value	Reactive Power	
ve been set before leaving factory according to safety rules.	> Mode Select	If reset is needed, any changes
	>Off <	should be made according to the
eset is needed, any changes should be made according to the		requirements of local grid.
quirements of local grid.		
Grid Service		In second contracted
	Mode Select	Comment
>P (freq) Soft Start	Orr Over-Excited	- PF value
Soft Start	Under-Excited	PF value
3	Under-Excited	PowerFactor 1/2/3/4
		PowerRatio 1/2/3/4
	PF(P)	EntryVolt
P(freq)		ExitVolt
> P(Overfreg) If reset is needed, any changes		Q(u) PowerLockEn
P(Underfreq) should be made according to the		Q(u) Lockin
requirements of local grid.	Q(u)	Q(u) LockOut
		Q(u) GridV1/V2/V3/V4
	Fix Q Power	QuRatio1/2/3/4 Q Power
Soft Start	Fix Q Power	Q Power
If reset is needed, any changes		
> Enable/Disable should be made according to the		
>Disable < requirements of local grid.		
	NOTE!	
	The terms sh	own in the interface depend on the local
	safety regulat	
	salety legular	1015.
Soft Start_Slope If set as shown, 9 percent of the		





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Operation Method
7) RS485 CommAddr If "Enable" is selected, the inverter will communicate with the computer, through which the operating status of the inverter can be monitored. When multiple inverters are monitored by one computer, RS485 communication addresses of different inverters need to be set. RS485 function will only be effective when the address is identical. The default address is '1".
8) ParallelSetting When the user wants to use the parallel system with Modbus Function, enable this function and complete the settings following the instructions in section "Parallel Connection". If not needed, disable this function. ParallelSetting > ParallelSetting
S) Mppt Scan Mode There are 4 modes for selection: "Off", "LowFreqScan", "MidFreqScan", "HighFreqScan". It shows the frequency of PV panel scan. If "LowFreqScan" is selected, the inverter will scan the PV panel by low frequency. Time for LowFreqScan: 4h; for MidFreqScan: 3h; for HighFreqScan: 1h

"Down" to reset the password.





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Son Method	Operation Meth
10) Reset Energy The user can clear the power energy of CT and meter by this function (if the user uses meters)	EvChargerEnable
Rest Energy	> Enable/Disable <
	15) Adapter Box G2 The user can connect the adapter box by this function
I) Reset Meter The user can clear the meter and CT energy by this function. Press "Up"	Adapter Bax
pr Down' button to select and long press "Down' to confirm. (The user	radjul bax
can select "Yes" to reset meter if the user uses meters)	Mode Select
can select these to reset in the task interests	> Enable/Disable <
Read	
>YES/NO4	
	17) Earth Detect The user can enable or disable the Earth Detect by this function.
	The user can enable of disable the Earth Detect by this function.
2) Reset Emotog	Earth Detect
The user can clear the errorlogs by this function. Press "Up" or "Down" button to select and long press "Down" to confirm.	
	Made Select
Real Enably	> E nable/Disable <
>Rnmet	
>YEB/NO<	18) Dry Contact
	The user can use the Dry Contact to connect heat pump by this function
3) Reset WFI	(require SG Ready).
The user can restart the WIFI by this function.	
Bent WE	SG
	Ready
>Pleast >YEB(NO<	Smart Houry
	There are three functions(Disable/Manual/Smart Save) which can be selected for
	Load Management. "Disable" means the heat pump is off. When "Manual" is
14) Machine Type	selected the user can control the external relay to remain close or open manually
The user can check the Machine Type by this function.	"Smart Save" mode can set the values of the heat pump's on/off time and
Machine Type	conditions, operating modes.
>Machine Type	If the user uses the inverter dry contacts to control heat pump through Adapter
s machine (She	box, please refer to the Adapter Box Quick Installation Guide to set the
X1 MINI 33K G4	parameters here.

15) EvChargerEnable The user can turn on EvCharger function by select "Enable".





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ration Method	Operation Methods
Dry Contact Load Management > Mode Select > Load Management >Load Management > Load Management	> P(u) Fundion > P(u) GetV1/2/1/4
19) General Control Under the Australia safety regulations, general control will show as meter control.	>About >irformation
>General Control >Soft Limit Hard Limit = >Mode Select Enable = 60000 W	> QPowerLockEn > QLockin
Meter Energy	> QuGridV1/2/3/4
The user can check the import and export energy by this function. There are four parameters: "Total Import", "Total Export". Press "Up" and "Down" to browse the values.	> Qu_Ratio1/2/2/4
Total Import: 0.0kWh	Level 3 Long press the "Enter" button to enter the third-level interface.
Error Logs	a) Status: The user can see the U/I/P parameters of the grid and the PV, such as the Ugrid, Igrid, P and F of the grid, and the Usolar, Isolar and Psolar of the PV.
The Error log contains error information happened. It can record six items at most. Press "Up" and "Down" button to review parameter. Long press	 b) Language: This inverter provides several languages for customer to choose.
"up" to return to the main interface.	 c) Settings: Entering the installer password, the information of the LCD interface is shown in the previous page. (1) Safety: The user can set the right safety standard here.
> No error <	(1) Safety. The user can set the fight safety station line.(2) Grid: Usually end user do not need to set the grid parameters.
About	If you need to reset, any changes should comply with the requirement of local grid.
This interface shows information of the inverter, including "Product SN", "Register SN", "Master", "Manager" and "Internal Code".	
Product SN: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	





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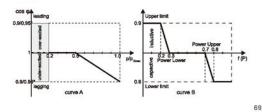
Parameter	Comment
Para	
O/V Stage1	Slow overvoltage point
U/V Stage1	Slow undervoltage point
O/V Stage2	Rapid overvoltage point
U/V Stage2	Rapid undervoltage point
O/V Stage3	Stage-3 rapid overvoltage point
U/V Stage3	Stage-3 rapid undervoltage point
O/V 10min En	10 min average overvoltage enabled
O/V 10min Set	10 min average overvoltage setting value
O/F Stage1	Slow overfrequency point
U/F Stage1	Slow underfrequency point
O/F Stage2	Rapid overfrequency point
U/F Stage1	Rapid underfrequency point
FreqROCOF	Rate of frequency change
T_Start	Self-test time
H/LVRT Function	High/iow voltage ride enabled
Frt_EnterVoltDn	Entry value of low voltage ride through
Qu_3Tau	Reactive step response time constant
Pu_3Tau	Active step response time constant
VacOVP1stTime	Stage-1 overvoltage protection time
VacOVP2ndTime	Stage-2 overvoltage protection time
VacOVP3rdTime	Stage-3 overvoltage protection time
VacUVP1stTime	Stage-1 undervoltage protection time
VacUVP2ndTime	Stage-2 undervoltage protection time
VacUVP3rdTime	Stage-3 undervoltage protection time
FacOFP1stTime	Stage-1 overfrequency protection time
FacOFP2ndTime	Stage-2 overfrequency protection time
FacUFP1stTime	Stage-1 underfrequency protection time
FacUFP2ndTime	Stage-2 underfrequency protection time
ReConnectTime	Reconnect time
CosP_Tau3	Power factor step response time constant
Frt EnterVoltUp	Entry value of high voltage ride through

(3) Power Factor: (For specific country if required by the local grid.) There are 6 modes for selecting: Off, Under-Excited, Over-Excited, PF (p), Q (u). All parameters are shown below. Mode Off Comment PF Value Under excited PF Value PowerFactor Over excited PowerFactor2 PowerFactor3 PowerFactor4 PowerRatio1 PF(p) PowerRatio2 PowerRatio3 PowerRatio4 EntryVolt ExitVolt QPowerLockEn QuLockIn QuLockOut QuGridV1/2/3/4 QuRatio1/2/3/4 Q(u)

For VDE 4105, curve cos ϕ = f(P) should refer to curve A. The default setting values are as shown in curve A. For TOR, curve cos ϕ = f(P) should refer to curve B. default values of setting are as shown in curve B.

Q Power

Fixed Q Power







Operation Method

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Operation Method

7 Troubleshooting

7.1 Troubleshooting This section contains information and procedures for solving possible problems with the inverters, and provides you with troubleshooting tips to identify and solve most problems that could occur with the inverters. This section will help you narrow down the source of any problems you may encounter. Please read the following troubleshooting steps. Check warnings or fault messages on System Control Panel or Fault codes on the inverter information panel. If a message is displayed, record it before doing anything further. Attempt the solution indicated in troubleshooting lists.

If your inverter's information panel is not displaying a Fault light, check the following list to make sure that the present state of the installation allows proper operation of the unit.

- Is the inverter located in a clean, dry, adequately ventilated place?

- Have the DC input breakers been opened?
- Are the cables adequately sized and short enough?
- Are the input and output connections and wiring in good condition?
- Are the configurations settings correct for your particular installation?
- Are the display panel and the communications cable properly connected and undamaged?

Contact our Customer Service for further assistance. Please be prepared to describe details of your system installation and provide model and serial number of the unit.





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ada	Enults	Dispessis and selection	Code	Faults	Diagnosis and solution
kode E:00001	Faults TzFeult	Diagnosis and solution Over Current Faut. -Well for about 10 eccode to check if the invester is back to normal. -Obscormed the DC exitts and restart the invester. -Or consult on the solutions.	IE:00029	LowTempFault	Diagnosis and solution Low Temperature Fault, -Chock If the ambient temperature is too lowOr consult us for solutions.
E:00002	GridLostFault	Orid Loat Fault. -Onexit Fibe make coble is loose. -Well for a while and the system will incorrect when the utility is back to normal. -Or consult us for existions.	IE:00036	InternalComFault	Internal Communication Fault. -Reaturt the Invester to check If it is back to normal. -Update the ARMs offeners or redum the program.
E:00003 E:00004 E:00005	GridVoltFault	Grid Voltage Out of Range. -Onext If he mains cable is loose. -Wat for a while and the system will reconnect when the utility is back to normal. -Or consult us for solutions.	IE:00037	EepromFault	-Or consult us for solutions. DSP EEPROM Fault. -Disconnect PV wiring and reconnect. -Or consult so freed/cons.
E:00008 E:00007 E:00008	GridFreqFault	Grid Prequency Out of Range. -Wat for a while and the system will reconnect when the utility is back to normal. -Or consult us for solutions.	IE:00038	RcDeviceFault	Residual Current Device Fault. -Restart the Inventor. -Update the ARM andheams or reburn the program. -Or consult us for solutions.
IE:00009	PvVoltFault	PV Voltage Fault. -Chack whether the PV is overrotage. -Or consult us for solutions.	IE:00041 IE:00042 IE:00043	PVConnDirFault	PV Direction Fault. -Check if the PV-H issee are connected correctly. -Drocential us for solutions.
IE:00010 IE:00051 IE:00052	BusVoltFault	DC Bus Voltage Out of Normal Ranga. -Chack If the FV input voltage is within the openating range of the inverter. -Disconnect FV wings and reconnect. -Or consult us for solutions.	IE:00044 IE:00039 IE:00056	GridRelayFault	Relay Fault. -Chack the grid connection. -Retart the Inverter. -Ch consellue for enkloses.
E:00012	GridVolt10MFault	Getd Overvaliage for Ten Minutes Fault. -The system will reconnect when the utility is back to normal. -Or consult us for solutions.	ME:00103	Mgr EEPROM Fault	-Or consult of for selections. ARM EEPROM FaultDisconned PV and grid, then reconnectOr consult is for selections.
IE:00013	DoinjOCP	DCI Overourset Protection Fault, -Veals for a while to check if the Invester is back to normal. -Or consult us for solutions.	ME:00105	Motor Fault	Meter Fault. -Check the connection of the meter. -Check if the meter is in working order. -Or consult us for exclusions.
IE:00034	HardLimkFault	Hard Limit Fault (in Australian standard). -Wat for a while to check if the investor is back to normal. -Or consult us for solutions.	ME:00101	PowerTypeFault	Power Type Fault. -Check the version of ARM and DSP. -Check the product SN number. -Or consult us for solutions.
E:00018 E:00019	ResidualOCP	Overcument Protection Fault. -Check the occreations of the Inverter. -Vitet for a while to check if the inverter is back to normal. -Or concet to do rocations.	ME00104	Mgr Comm Fault	Mgr Inter-Com Fault -Shut down photovoltale, battery and prid, reconnect. -Or eak for help from the inetailier if it can not return to norm
IE:00020	IsoFault	Isolation Fault. -Check the connections of the Inverter. -Or connect us for solutions.	IE:00016	SW OCP Fault	Software Overcurrent Protection Fault. -Weil for a while to check if the invertier is back to normal. -Discormed PV and grid, then reconnect. -Or consult in for soutions.
E:00021	OverTempFault	Over Temperature Fault. -Check If the invertice and the ambient temperature exceeds the operating renge. -Or consult us for solutions.	<u>.</u>		
E:00055	EarthFault	Earth Feult. -Check If the earth is connected property -Ch consult us for existions.			

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Decommissioning

REPORT No.: CSSC/BOS/005

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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

Troubleshooting

7.2 Routine Maintenance

Inverters do not need any maintenance or correction in most condition, but if the inverter often loses power due to overheating, this can be the following reason:

The cooling fins on the rear of house are covered by dirt. Clean the cooling fins with a soft dry cloth or brush if necessary. Only trained and authorized professional personnel who are familiar with the requirements of safety were allowed to perform servicing and maintenance work.

Safety checks

Safety checks should be performed at least every 12 months by manufacturer's qualified person who has adequate training, knowledge, and practical experience to perform these tests. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of test, the device has to be repaired. For safety check details, refer to this manual, section 2 Safety instruction and EC Directives.

Maintain periodically

Only qualified person may perform the following works. During the process of using the inverter, the manage person shall examine and maintain the machine regularly. The concrete operations are as follows.

1) Check that if the cooling fins on the rear of house are covered by dirts, and the machine should be cleaned and absorbed dust when necessary. This work shall be check time to time.

2) Check that if the indicators of the inverter are in normal state, check if the keys of the inverter are in normal state, check if the display of the inverter is normal. This check should be performed at least every 6 months.

3) Check that if the input and output wires are damaged or aged. This

check should be performed at least every 6 months. 4) You should get the inverter panels cleaned and their security checked at least every 6 months.

8 Decommissioning 8.1 Dismantling the Inverter

- Disconnect the inverter from DC Input and AC output,
 Wait for 5 minutes for de-energizing,
 Remove the inverter from the bracket,
 Remove the bracket if necessary.

WARNING!

Before dismantling the inverter, please be sure to disconnect the DC switch, and then unplug the PV and AC cables, otherwise it will lead to an electric shock hazard. Do not touch any inner live parts until for at least 10 minutes after disconnecting the inverter from the utility grid and the PV input.

8.2 Packaging

If possible, please pack the inverter with the original packaging. If it is no longer available, you can also use an equivalent carton that meets the following requirements.

- Suitable for loads more than 30 kg.
- With handle.
 Can be fully closed.

8.3 Storage and Transportation

Store the inverter in dry place where ambient temperatures are always between -25 °C - +60 °C. Take care of the inverter during the storage and transportation, keep less than 4 cartons in one stack.

When the inverter or other related components need to be disposed. Have it carried out according to local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to certain site, which can assist relevant department to dispose and recycle.





Commissioning

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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

Disclaimer

9 Disclaimer

This limited warranty applies to products sold after date of 1st Jan 2022, and sold through our company or authorized resellers. The defective parts or units replaced under a warranty claim become our properties, and must be returned to us or Authorized Cooperated Partners (distributors) for inspection with the original or equivalent packaging. The product is not covered by warranty in the following cases:

A.The product is out of the warranty period;

B.Product failure is not reported to us within one month of appearance;

C.Failed to comply with our installation manual or maintenance instructions for the inverter or accessory;

D.Failed to comply with the safety rules and regulations in respect of the inverter or accessory;

E. The inverter or accessory is damaged during transportation but the claimant has signed the delivery receipt (which requests the claimant to double check the outside & inside of the package and take pictures as evidence before signing the delivery receipt);

F.The replaced products have not been returned to us or cooperated partners (distributors) within 30 days;

G.The defect is caused by improper usage of the product or failure to comply with the usage of the product for purposes other than those for which the product was designed or intended;

H.The product is moved for any reason after it has been installed (regardless of whether it has been reinstalled subsequently or moved back to the same location) unless it is reinstalled at the same address by a qualified installer who has provided a test report to our company.

I. The damage or defect is caused by lightning, flood, fire, power surge, corrosion, pest damage, actions of a third-party, or any other force majeure factors;

J.The damage or defect is caused by embedded or external software or hardware (eg. the devices to control the inverters or the devices to control battery charging or discharging) from third

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parties without authorization (agreement in writing) from our company;

K.The product is modified or altered (including the cases in which the product series number or product label is altered, removed, or defaced);

L.Flaws (eg. any external scratch or stain, or nature material wearing which does not represent a defect) that do not adversely affect the proper functioning of the inverter or accessory

M.Normal wear or tear;

N.Travel and subsistence expenses as well as on-site installation, modification and normal maintenance costs;

O.Dutles, import/export fees or costs and other general administrative costs;

The substitute inverter or accessory with technical improvement may not be entirely compatible with the remaining components of the photovoltaic system. The costs incurred as a consequence will not be covered by the warranty or extended warranty.

Furthermore, all other costs including but not limited to compensation from direct or indirect damages arising from the defective device or other facilities of the PV system, or loss of power generated during the product downtime are not covered by this warranty. In any other case, whether in contract, tort, or otherwise, the maximum compensation for customer losses caused by its faults shall not exceed the amount paid by the customer for the purchase of the equipment.





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APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)

For Cu	stomer (Compulsory)
	Country
	Email
Address	
	Zip Code
Product Serial Number	
	Electrician License No.
	For Installer
	Formstaller
Module (If Any)	
Module Brand	
Module Size(W)	
Number of String	Number of Panel Per String
Battery (If Any)	
11999999999999999999999999999999999999	
Date of Delivery	Signature
	ite: https://www.solaxcloud.com/#/warranty
to complete the online warrant scan the QR code to register.	y registration or use your mobile phone to
For more detailed warranty terms, p to check it.	please visit SolaX official website: <u>www.solaxpower.com</u>

This report is digitally signed only on the first page and does not need to be signed on all pages.

X





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX B. X1 Series User Manual 0.6kW - 3.3kW. (Cont.)



PLEASE REGISTER THE WARRANTY IMMEDIATELY AFTER INSTALLATION! GET YOUR WARRANTY CERTIFICATE FROM SOLAX! KEEP YOUR INVERTER ONLINE & WIN SOLAX POINTS!







REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001.

	ata / Test Plan	Document No.:	TÜVRheinland®
	Control requirements for PEA rter based Generation Systems.	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Issue Date:	24.02.2023	Project Engineer:	Allen Hu
Lab Target:	TÜV Rheinland (Shanghai) Co., Ltd	Signature:	Allen Hu

Rated Input:	See appende	See appended rating label			
Rated Output:	See appended rating label for more detail.				
Firmware version:	Master:1.00,Manager:1.00				
Phase:	Single-phase 🗆 Three-phase				
Protection class:	Class 0	Class I	Class II	Class III	
Overvoltage Category (OVC):	□ ovcı	OVCII (PV)	Xovc III (M	ains) OVC IV	
Pollution degree (PD):	D PD 1	PD 2 (Inside)	PD 3 (Out	side)	
Max. operating temperature:	See appende	d rating label			

Doc	uments attached:	Remark	
Ø	Rating label	See following page.	
×	Product photo	See attachment 3.	
	Test equipment list	See attachment 2.	
×	Wave diagram in test	See attachment 1.	

Used	equipment	No.:	See

ee equipment list for details

Sample No.: N/A

Finished date: Review date:

	-
Reviewed	łw/
1 YOTHOTTOU	~ 7

Tested by:

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	
Content				Page No.
Rating label of E	EUT			4
General require	ments and information for the tests			5
Requirements t	o the Measurement Precision of the	Measuring Devices		8
Test results	Test results			10
Fli	cker			10
DC	C injection			11
Reactive Power Control			12	
A Fixed Displacement Factor cosØ				13
Isl	anding Protection			15
Re	esponse to utility recovery			22
0	ver/Under voltage			23
Ha	irmonic and waveform distortion			25
0	er/Under Frequency			29
Ac	tive power control			30
Attachment 1: V	Wave result			31
Isl	anding Protection			31
Re	esponse to utility recovery			81
0	er Voltage Protection			93
Un	nder Voltage Protection			97
0	er Frequency Protection			101
Un	der Frequency Protection			102
Re	emark for wave diagram			103
DC	Current Trend Line			104

Used equipment No.:

Sample No.: N/A

Finished date:

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See equipment list for details





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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	TÜVRh	onnaria
Protection and	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Ir	werter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	
Content				Page No.
Active power control trend line				105
Attachment 2: Test equipment list			106	
Attachment 3: EUT photo			107	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	10. D	Tested by:	
Review date:		Reviewed by:	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PE/ rter based Generation Systemetry	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co	, Ltd. Model designation:	X1-MINI-1.5K-G4
	ized by the respective NCB's GRID-CO PHOTOV Model: X Mar. PV VO MODEL: X Model: X Mar. PV VO MODEL: X Model: X M	that own these marks" NICTED TAC INVERTER TAD 158-64 Prevents SP P P P P P P P P P P P P	of certification marks on a product

Review date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		TÜV Rheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Document No.:	TD-0189
		Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

Clause Test description		Remark	Result	
⊠ 1.	Voltage and Frequency	Rating Voltage: AC 220/230V Rating Frequency: 50/60Hz	Pass	
2.	Normal Voltage Operating Range	The EUT ¹⁾ can run normally within voltage range ±5% Un.	Pass	
3.	Normal Frequency Operating Range	The EUT ¹⁾ can run normally within frequency range ± 0.5Hz.	Pass	
4 .	Flicker	See appended table 4 for details.	Pass	
5.	DC Injection	See appended table 5 for details.	Pass	
6.	Reactive Power Control	See appended table 6 for details.	Pass	
6.1	A Fixed Displacement Factor cosØ	See appended table 6.1 for details.	Pass	
27.	Islanding Protection	See appended table 7 for details.	Pass	
8.	Response to utility recovery	See appended table 8 for details.	Pass	
2 9,	Over/Under voltage	See appended table 9 for details.	Pass	
⊠ 10.	Harmonic and waveform distortion	See appended table 10 for details.	Pass	
M 11.	Over/Under Frequency	See appended table 11 for details.		
⊠ 12.	Active Power Control	See appended table 12 for details.	Pass	
⊠ 15.	Earthing	Protective equipotential bonding conductors are installed, where they are parallel to and in close contact with d.c. cables and a.c. cables and accessories.	Pass	
⊠ 16.	Short circuit	Circuit breakers should be installed at the connection to the designated distribution board of the electrical installation to protect the PV a.c.	Pass	

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		TÜV Rheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Document No.: Report No:	TD-0189
			CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

			supply cable from short circuit.	n the effects of	
	17.	Isolating and switching	Switch disconner are provided on t a.c. side of the P respectively.		Pass
18. Inverter Testing Pro		Inverter Testing Procedure/Method	complied.	below table are all	Pass
			Rees	Testag Incodere Netlant	
			Remark and warehow detertion.	ECG20-5-5 EC020-5-0	
			filier	EC CORD I-S (EC 40406-54) (EC 40406-6-5)	
			Scienting	C(/labergs	
			Boe, these role of	nt/Gloop	
			they there impacty	EC/14-detp	
			Liberday Avantasi	85.82128	
			Testanter to all the excession	EC/Ledesp	
			Tesser Tartur Control	EC/Le-exe	

Revision History:

Date YYYY-MM-DD	Contents of modification	Prepared by	Approved by
2016-03-31	Original Test Plan	Tobias Yang	Li Weichun
2016-08-01	Modified Test Plan	Tobias Yang	Li Weichun

Used equipment No.:

See equipment list for details

. Finished date: Sample No.: N/A Tested by:

Reviewed by:

Review date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Data / Test Plan TÜV Rheinland (Shanghai) Co., Ltd. Document No.:			TÜVRheinland®	
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

Special notice to test engineer

Please contact and communicate with project engineer immediately when any of the following conditions occurred:

- Unclear of the test operating conditions and test items,
- Uncertain of the test requirements or possible typing errors found in the test plan,
- Unusual operating conditions of the EUT (unusual noises, unstable operation, ...etc), any unusual
 phenomenon of the operation that attracts your attention,
- Receive different model/type name of samples that does not match to the test plan,
- Short of the test samples,
- Unusual high temperatures observed during testing,
- Enclosure distortion, cracks, or loosening of any enclosure parts observed during testing, and
- Fire occurred within the EUT during testing

Handling of test samples after completed all tests:

Store in warehouse and wait for further notice

Return to project engineer

Dispose test samples according to current lab procedures

Return to the client

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	in in	Tested by:	
Review date:		Reviewed by:	
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Test Da	ata / Test Plan		TÜV Rheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Document No.:	TD-0189
		Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

Requirements to the Measurement Precision of the Measuring Devices

The used measuring devices must fulfill at least the following measuring precisions.

Measured Variable	Frequency Range	Measuring Precision relative to the Measuring Range	
Voltage up to 1 000 V	50 Hz	±0.1 %	
	DC to 1 kHz (except for 50 Hz)	± 1.0 %	
	1 kHz to < 5 kHz	± 1.5 %	
	5 kHz to < 20 kHz	±2.5 %	
	≥ 20 kHz	± 5.0 %	
Current < 5A	50 Hz	±0.5%	
	DC to < 60 Hz (except for 50 Hz)	± 1.0 %	
	60 Hz to < 5 kHz	±1.5 %	
	5 kHz to < 20 kHz	±2.5 %	
Current > 5A	50 Hz	±0.5 %	
	≥ 20 kHz (except for 50 Hz)	± 5.0 %	
	DC to < 5 kHz	± 1.5 %	
	5 kHz to < 20 kHz	± 3.5 %	
	≥ 20 kHz	± 5.0 %	
Frequency	DC to < 60 Hz	± 0.01 Hz	
	60 Hz to 5 kHz	±0.2 %	
	5 kHz to < 20 kHz	± 0.5 %	
	≥ 20 kHz	±1%	
Displacement Factor $\cos \varphi$		0.001	
Time	10 ms to < 200 ms	± 5 % of the measured value	
	200 ms to <1 s	± 10 ms	
	≥1 s	± 1 % of the measured value	
Temperature	> -35°C to 100°C	±2°C	

Used equipment No.:

Sample No.: N/A

Tested by:

Finished date:

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See equipment list for details





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	ata / Test Plan		A TÜVRheinland	
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation:	X1-MINI-1.5K-G4	

Mea sured Variable	Frequency Range	Measuring Precision relative to the Measuring Range		
Relative humidity	30 % to 95 % RH	±6 % RH		
Barometric air pressure		± 10 kPa		

The selected measuring range must not be bigger than 150% of the nominal value of the signal to be measured.

Source: CTL Decision Sheet DHS251B / 2009, modified

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	in an	Tested by:	
Review date:		Reviewed by:	
	Base 0 of 100		

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Test Da	ata / Test Plan		TÜV Rheinland [®]	
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

4. Flicker

PROCEDURE

Test method complies with standard IEC 61000-3-3 or IEC 61000-3-11.

RESULTS Pass/ Fail

4	TABLE: Flicker	TABLE: Flicker							
Main	s voltage: 220V								
Refe	rence Impedance used:	L=0.25+0.25j, N	=0.1+0.1j						
		Plt		0.01					
- 1	Measurement	Limit	100000 V.	0.65	s NORMA CS				
- 1	weasurement	Pst	dc(%)	dmax(%)	d(t) (ms)				
- 1		Limit= 1.0	Limit= 3.3	Limit= 4.0	Limit= 500				
1	1	0.01	0.00	0.49	0.00				
- 1	2	0.01	0.00	0.49	0.00				
< [3	0.01	0.00	0.49	0.00				
21	4	0.01	0.00	0.49	0.00				
Phase	5	0.01	0.00	0.49	0.00				
ā	6	0.01	0.00	0.49	0.00				
T	7	0.01	0.00	0.49	0.00				
1	8	0.01	0.00	0.49	0.00				
t	9	0.01	0.00	0.49	0.00				
1	10	0.01	0.00	0.49	0.00				
- 1	11	0.01	0.00	0.49	0.00				
- 1	12	0.01	0.00	0.49	0.00				

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		A TÜVRheinland®	
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

5. DC Injection

PROCEDURE

The test methods complies with standard IEEE 1547.1-2005 clause 5.6

RESULTS Pass/DFail

5	TABLE: DC Inje	ection					
Mains voltag	e:220 V						
PowerP/Pn[9	%]			10	0%		
		Measu	rement			14	4
Pha	ise A	Pha	se B	Pha	se C	- Lin	nit
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
0.001	0.015	-	-	-	-	0.034	0.5
PowerP/Pn[%]			66	5%	28	
		Measu	irement				
Pha	seA	Pha	se B	Phase C		Limit	
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
0.001	0.015	-	-		-	0.034	0.5
PowerP/Pn[%]			33	3%		÷
		Measu	rement				
Phase A		Pha	se B	Phase C		– Limit	
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
0.001	0.015	_	-	-		0.034	0.5

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date: Review date: Tested by: _____ Reviewed by:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		TÜV Rheinland®	
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

6. Reactive Power Control

PROCEDURE

The test methods complies with standard Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08

RESULTS BPass/DFail

6.	TABLE: Power Factor Control									
Mains voltage: 220V										
P Set value	P [W]	Cosø Max. lagging	Q [Var]	P Set value	P [W]	Cosø Max. leading	Q [Var			
0%	54.9	0.109	-502.1	0%	65.8	0.132	492.7			
10%	155.2	0.301	-501.9	10%	155.3	0.300	493.5			
20%	307.0	0.522	-501.6	20%	308.8	0.530	494.2			
30%	448.2	0.666	-501.5	30%	451.7	0.674	494.5			
40%	624.2	0.780	-501.2	40%	636.6	0.785	494.9			
50%	766.4	0.837	-500.8	50%	766.4	0.840	495.2			
60%	942.1	0.883	-500.5	60%	942.2	0.885	495.8			
70%	1080.2	0.907	-500.3	70%	1220.3	0.926	495.9			
80%	1220.1	0.925	-500.0	80%	1184.5	0.922	495.9			
90%	1358.1	0.938	-500.1	90%	1358.0	0.939	496.2			
100%	1528.1	0.950	-500.0	100%	1529.9	0.950	496.5			

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by: -Reviewed by:

Review date:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		TÜV Rheinland®	
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

6.1. A fixed displacement factor cosØ

PROCEDURE

The test methods complies with standard Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08

6.1	TABLE: Power Factor Control									
Mains volta	age: 220V									
P Set value	Cosø Set value	P [W]	Q [Var]	Cosø	Cosø Set value	P [W]	Q [Var]	Cosợ		
0%	0.95 lagging	72.8	-29.2	0.919	0.95 leading	60.6	16.2	0.966		
10%	0.95 lagging	150.6	-51.7	0.946	0.95 leading	155.7	41.4	0.950		
20%	0.95 lagging	312.0	-101.7	0.946	0.95 leading	311.8	99.5	0.950		
30%	0.95 lagging	454.8	-152.7	0.949	0.95 leading	452.4	147.4	0.949		
40%	0.95 lagging	631.4	-209.9	0.949	0.95 leading	628.0	206.1	0.950		
50%	0.95 lagging	772.1	-255.7	0.949	0.95 leading	767.3	252.6	0.950		
60%	0.95 lagging	942.3	-311.2	0.950	0.95 leading	944.3	312.0	0.950		
70%	0.95 lagging	1081.3	-356.6	0.950	0.95 leading	1081.7	358.0	0.950		
80%	0.95 lagging	1219.8	-402.0	0.950	0.95 leading	1219.8	404.3	0.949		
90%	0.95 lagging	1358.7	-447.3	0.950	0.95 leading	1357.4	450.4	0.949		
100%	0.95 lagging	1528.7	-503.7	0.950	0.95 leading	1528.7	507.8	0.949		

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Reviewed by:

Review date:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland (Shanghai) Co., Ltd.						D	cument No.:	TD-0189		
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08					Report No:			CN23Y4BO 001		
Order No. :	į.	244466	6490			Product: Grid-Con		nnected i	PV Inverter	
Client Nam	e :		Power Netw ology (Zhejia			Mode	I designation:	X1-MINI-1.5K-G4		
P Set value		cosφ t value	P (W)	Q [Var]	Co	osq				
0%	1	1.00	71.4	-12.9	0.986					
10%) 8	1.00	150.5	-11.4	0.9	996	Q			
20%	1	1.00	311.8	-10.5	0.9	999				
30%		1.00	453.0	-10.8	0.9	999				
40%	- 1	1.00	628.2	-9.5	0.5	999		3		
50%	1	1.00	768.2	-8.9	0.9	999				
60%	1	1.00	942.8	-8.6	0.9	999			12	
70%	1	1.00	1082.0	-8.1	0.9	999		1		
80%	1	1.00	1220.8	-7.8	0.9	999	ĺ.			
90%	1	1.00	1359.2	-7.5	0.9	999				
100%	1	1.00	1531.0	-7.2	0.9	999				

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	(

Reviewed by:

Review date:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan		TÜV Rheinland [®]
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

7. Islanding Protection

PROCEDURE

Test methods complies with standard IEC 62116.

RESULTS Pass/DFail

7	TAB	LE: Isla	anding Pr	otection	n					
	Main	ns volta	ge: 220V							
				131		Pow	ver 100%	~	10	
Condit	ions	Pw[W]		Q _L [Var]		Qc [Var]		Qr	Trip time [ms]	Limitation [ms]
		L1:	1279	L1:	1500	L1:	1664	1.15		· · · · · · · · · · · · · · · · · · ·
Pr: -10 ⁴ Qc: +10		L2:	-	L2:	-	L2:	-		292ms	1000
G0. 110	70	L3:	-	L3:	-	L3:	-	-		
	. 1	L1:	1279	L1:	1500	L1:	1589	1.12		
PR: -109 Qc: +5%		L2:	2	L2:	-	L2:	-	- 2	202ms	1000
		L3:	-	L3:	-	L3:	-	-		
		L1:	1279	L1:	1500	L1:	1513	1.09		1
Pr: -109 Qc: 0%	6	L2:	-	L2:	-	L2:	-	-	228ms	1000
401010		L3:	-	L3:	-	L3:	-	-).
		L1:	1279	L1:	1500	L1:	1437	1.06)
PR: -109 Qc: -5%		L2:	-	L2:	-	L2:	-		94ms	1000
Geo070		L3:	-	L3:	-	L3:	-	-		
2 24	2 ^{- 2}	L1:	1279	L1:	1500	L1:	1362	1.04		
Pr: -109 Qc: -109		L2:		L2:	-	L2:	-	-	76ms	1000
Geo, -10,	1	L3:	-	L3:		L3:	-	-		1

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by: Reviewed by:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheir						-		TD-0189		
Protection a Interface of I 2016.08					ns	Re	port No:	CN23Y4BO 001		
Order No. :		24446649	D			Product: Grid		Grid-Connected PV	Inverter	
Client Name	:	SolaX Pov Technolog			, Ltd.	Model des	ignation:	X1-MINI-1.5K-G4		
	L1	: 1350	L1:	1500	L1:	1664	1.09			
Pr: -5% Qc:+10%	L2	: -	L2:	-	L2:	-	-	100ms	1000	
GC. + 1070	L3	3: -	L3:	-	L3:	-	-	4.013*1041.0.084		
-	L1	: 1350	L1:	1500	L1:	1362	0.98			
Pr: -5% Qc: -10%	L2	: -	L2:	-	L2:	-		84ms	1000	
	L3	3: -	L3:	*	L3:	-	-			
	L1	: 1421	L1:	1500	L1:	1664	1.03			
Pr: 0% Qc:+10%	L2	2: -	L2:	-	L2:	-	-	114ms	1000	
	L3	3: -	L3:	-	L3:	-	-			
Pr: -5%	L1	: 1350	L1:	1500	L1:	1589	1.07			
PR: -5% Qc: +5%	L2	- 1	L2:	-	L2:	-	-	124ms	1000	
	L3	3: -	L3:	*	L3:	-	-			
D 6%	L1	: 1350	L1:	1500	L1:	1513	1.04			
Pr: -5% Qc: 0%	L2		L2:	-	L2:	-	-	370ms	1000	
NY 115 15	L3		L3:	-	L3:	-	-			
Pr: -5%	L1	10.000	L1:	1500	L1:	1437	1.01	1000		
Qc: -5%	L2		L2:	-	L2:	-	-	110ms	1000	
	L3		L3:	-	L3:	-	-			
PR: 0%	L1		L1:	1500	L1:	1589	1.01			
Qc:+5%	L2		L2:	-	L2:	-	-	186ms	1000	
	L3		L3:	-	L3:	-	-			
PR: 0%	LI	23 00000	L1:	1500	L1:	1513	0.99	1		
Qc: 0%	L2		L2:		L2:	-	-	302ms	1000	
	L3	3: -	L3:	-	L3:	-	-			

Used equipment No.:

Sample No.: N/A

Finished date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheir		- <u>-</u>						TD-0189		
Protection a Interface of I 2016.08					ns	Re	port No:	CN23Y4BO 001		
Order No. :		24446649	D				Product:	Grid-Connected PV Inverter		
Client Name	:	SolaX Pov Technolog			, Ltd.	Model des	Model designation: X1-MINI-1.5K-G4			
145 045 (200	L1	: 1421	L1:	1500	L1:	1437	0.97			
Pr: 0% Qc: -5%	L2	: -	L2:	-	L2:	-	-	98ms	1000	
Web 0 /0	L3	3: -	L3:	-	L3:		-	12400000140240		
	L1	: 1492	L1:	1500	L1:	1589	0.97			
Pr: +5% Oc: +5%	L2	2: -	L2:	-	L2:	-	-	138ms	1000	
	L3	3: -	L3:	-	L3:	-	-			
	L1	: 1492	L1:	1500	L1:	1513	0.95			
Pr: +5% Oc: 0%	L2	2: -	L2:	-	L2:	-	-	422ms	1000	
	L3	3: -	L3:	-	L3:	-	-			
D	L1	: 1492	L1:	1500	L1:	1437	0.92	and the second second	1	
Pr: +5% Qc: -5%	L2	t -	L2:	-	L2:	-	-	114ms	1000	
000000000	L3	3: -	L3:	-	L3:	-	-			
D 0%	L1	: 1421	L1:	1500	L1:	1362	0.94	é		
Pr: 0% Qc: -10%	L2	: -	L2:	1	L2:	-	4	102ms	1000	
	L3	3: -	L3:	-	L3:	-	-			
D 504	L1	: 1492	L1:	1500	L1:	1664	0,99		8	
Pr: +5% Qc: +10%	L2	: -	L2:	-	L2:	-	-	118ms	1000	
	L3	3: -	L3:	-	L3:		-			
D 50/	L1	: 1492	L1:	1500	L1:	1362	0.90		-0	
Pr: +5% Qc:-10%	L2	: -	L2:	-	L2:	-	-	90ms	1000	
	L3	3: -	L3:	-	L3:	-	-			
D	L1	: 1563	L1:	1500	L1:	1664	0.95		9	
Pr: +10% Qc: +10%	L2	: -	L2:	-	L2:	-		114ms	1000	
	L3	3: -	L3:		L3:	-			<u> </u>	

Used equipment No.:

Sample No.: N/A

Finished date:

Tested by: Reviewed by:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rhein							nent No.:	TD-0189		
Protection an Interface of In 2016.08					ns	Re	port No:	CN23Y4BO 001		
Order No. :		244466490)				Product:	Grid-Connected PV	nnected PV Inverter	
Client Name	:	SolaX Pov Technolog			Ltd.	Model des	ignation:	X1-MINI-1.5K-G4		
	L1	: 1563	L1:	1500	L1:	1589	0.92			
Pr: +10% Qc: +5%	L2	- :	L2:		L2:	-	-	210ms	1000	
401.1010	L3	k –	L3:	-	L3:		-			
D	L1	: 1563	L1:	1500	L1:	1513	0.90			
Pr: +10% Qc: 0%	L2	: -	L2:	-	L2:		-	314ms	1000	
	L3	i: -	L3:	-	L3:	-	-			
D 400	L1	: 1563	L1:	1500	L1:	1437	0.88		Ĵ.	
Pr: 10% Oc: -5%	L2		L2:		L2:	-	-	88ms	1000	
	L3	k -	L3:	-	L3:	-	-			
Pr: +10%	L1	: 1563	L1:	1500	L1:	1362	0.86	6		
Qc: -10%	L2	12	L2:	-	L2:	-	-	78ms	1000	
	L3	i: -	L3:	-	L3:	-	-			
	_		_		Po	wer 66%				
Conditions		Pw[W]	0	⊾[VA]	0	Dc [VA]	Qr	Trip time [ms]	Limitation [ms]	
Ps: 0%	L1	: 932	L1:	990	L1:	953	0.96			
Qc: -5%	L2		L2:		L2:		-	132ms	1000	
	L3		L3:	-	L3:	-	-			
Pr: 0%	L1		L1:	990	L1:	963	0.97			
Qc: -4%	L2		L2:	-	L2:		-	146ms	1000	
	L3		L3:	-	L3:	-	-			
Ps: 0%	L1		L1:	990	L1:	973	0.97			
Qc:-3%	L2	0.675	L2:	100	L2:	100		286ms	1000	
	L3		L3:	-	L3:	-	-			
PR: 0%	L1	932	L1:	990	L1:	983	0.98	138ms		

Used equipment No.:

See equipment list for details Sample No.: N/A

Finished date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

		(Shangh						TD-0189			
Protection a Interface of 2016.08					ns	Re	port No:	CN23Y4BO 001			
Order No. :		24446649	0				Product:	Grid-Connected PV	Connected PV Inverter		
Client Name	e:	SolaX Power Network Technology (Zhejiang) Co., Ltd.			Model des	ignation:	X1-MINI-1.5K-G4				
Qc: -2%	L2		L2:	-	L2:	-	-		1000		
	L3		L3:		L3:	-	-				
25. 2001	L1	: 932	L1:	990	L1:	993	0.99				
Pr:0% Qc:-1%	L2		L2:		L2:	-	-	212ms	1000		
	L3		L3:	-	L3:	-	-		i.		
D 0%	L1	932	L1:	990	L1:	1004	0.99	k j			
PR:0% Qc:0%	L2	-	L2:	-	L2:	-	-	348ms	1000		
	L3	-	L3:		L3:	-	-				
Ps: 0%	L1	932	L1:	990	L1:	1014	1.00				
Qc:+1%	L2		L2:	-	L2:	-		294ms	1000		
0.576/1010/20	L3		L3:	-	L3:	-	-				
PR: 0%	L1		L1:	990	L1:	1024	1.00				
Qc: +2%	L2	-	L2:	-	L2:	-	-	368ms	1000		
	L3		L3:	-	L3:	-		-	2		
Pr: 0%	L1	2428030	L1:	990	L1:	1034	1.00	juna an			
Qc:+3%	L2		L2:	-	L2:	-		262ms	1000		
	L3		L3:	-	L3:	-	-				
PR: 0%	L1		L1:	990	L1:	1044	1.01	<u></u>			
Qc:+4%	L2		L2:	-	L2:	-	-	340ms	1000		
	L3		L3:	-	L3:	-	-				
Ps: 0%	L1		L1:	990	L1:	1054	1.01				
Qc:+5%	L2	0.00	L2:		L2:	170		252ms	1000		
	L3		L3:	-	L3:	-					

Used equipment No.:

See equipment list for details

Sample No.: N/A Tested by:

Finished date: Review date:

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	land (Shanghai) C nd Control requirement					-		TD-0189			
Protection an Interface of In 2016.08						Re	port No:	CN23Y4BO 001	423Y4BO 001		
Order No. :		24446649	0			Product: Gri		Grid-Connected P\	/ Inverter		
Client Name	ne : SolaX Po Technolo				, Ltd.	Model des	ignation:	X1-MINI-1.5K-G4			
Conditions	T	Pw[kw]	Q	[kVA]	0	c[kVA]	Qr	Trip time [ms]	Limitation [ms]		
47 - 19633	L1	438	L1:	500	L1:	482	1.02				
Pr: 0% Qc: -5%	L2	-	L2:	-	L2:	-	-	308ms	1000		
40. 40 /0	L3		L3:	-	L3:	-	-				
	L1	438	L1:	500	L1:	487	1.02				
Pr:0% Oc:-4%	L2	-	L2:	-	L2:	-	-	310ms	1000		
	L3	2	L3:	-	L3:	-	-				
27 100	L1	438	L1:	500	L1:	492	1.03				
Pr: 0% Qc: -3%	L2	-	L2:	-	L2:	-	-	148ms	1000		
	L3		L3:		L3:	-	-				
	L1	438	L1:	500	L1:	497	1.03				
Pr: 0% Qc: -2%	L2	-	L2:	-	L2:	-	-	138ms	1000		
	L3	4	L3:	-	L3:	-					
D 0%	L1	438	L1:	500	L1:	502	1.03				
Pr: 0% Qc: -1%	L2	-	L2:	-	L2:	-	-	146ms	1000		
1992-9992-9	L3	-	L3:		L3:	-	-				
Dev. 097	L1	438	L1:	500	L1:	508	1.05				
Pr: 0% Qc: 0%	L2	-	L2:	-	L2:	-	-	342ms	1000		
	L3	-	L3:	-	L3:	-	-				
De: 0%	L1	438	L1:	500	L1:	513	1.05				
Pr: 0% Qc: +1%	L2	-	L2:	-	L2:	-	-	478ms	1000		
393 133	L3		L3:		L3:	170					
PR: 0%	L1	438	L1:	500	L1:	518	1.05				
Qc:+2%	L2	-	L2:		L2:	-	-	000115	1000		

Used equipment No.:

Sample No.: N/A

Finished date:

Tested by: Reviewed by:

Review date:

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See equipment list for details





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TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.) APPENDIX C.

TUV Rhei	nland	(Shangh	ai) Co	, Ltd.		Docum	nent No.:	TD-0189			
Protection a Interface of 2016.08						R	Report No: CN23Y4BO 001				
Order No. :		24446649	0			Product: Grid-Connected PV Inve			Inverter		
Client Nam	e:	SolaX Pov Technolog			, Ltd.	Model des	ignation:	X1-MINI-1.5K-G4	-MINI-1.5K-G4		
	L3	. <u>.</u>	L3:	-	L3:	-	- 4		1		
PR: 0% L1 Oc: +3% L2	: 438	L1:	500	L1:	523	1.06	8				
	L2		L2:	-	L2:	-	-	358ms	1000		
40.000	L3		L3:	-	L3:	-	-				
	L1	438	L1:	500	L1:	528	1.06		1		
Pr: 0% Oc: +4%	L2		L2:	-	L2:	-	-	360ms	1000		
	L3		L3:	-	L3:	-					
57 958	L1	: 438	L1:	500	L1:	533	1.07	· · · · · ·			
Do: 00/	R: 0%		L2;		L2:	-	-	352ms	1000		
Oc: +5%	14			1.456		0.000		10.000 h 20.000			

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	100 000	Tested by:	
Review date:		Reviewed by:	

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Test Da	ata / Test Plan		TÜV Rheinland®
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

8. Response to Utility Recovery

PROCEDURE

4.3.7	TABLE: Re	sponse to Util	ity Recove	əry							
	Rated volta	ge Un: 220V			Rated frequency Fn: 50Hz						
Voltage	oltage detection accuracy [V] ± 1		(Frequency de	tection accuracy [Hz]	±0.1					
Specifie	I recover voltage range 198-242		42V	Specified reco	47-52Hz						
Recover	ecover time [s]			120							
Cor	nditions ²	UM ¹⁰ back t	o 244V	Um ba	ack to 240V	UM back to 196V	UM back to 200V				
Rec	onnection	Yes/ X No		N N	Yes/ No	Yes/ No	Yes/ No				
Reco	wer time [s]	N/A	1		127.9	N/A	126.9				
Co	nditions ³⁾	FM ¹⁾ back to	o 52.2Hz	FM back to 51.8 Hz		F _M back to 46.8Hz	F _M back to 47.2Hz				
Rec	onnection	Ves/	No No		Yes/ 🗌 No	Yes/ No	Yes/ No				
Reco	wer time [s]	N/A	1		127.1	N/A	127.1				
Co	nditions4)	U _M back t	o 240V	U _M b	ack to 200V	F _M back to 51.8Hz	F _M back to 47.2Hz				
Rec	onnection	Yes/	No No	N	Yes/ No	Yes/ No	Yes/ No				
Reco	wer time [s]	127.	5	-	127.3	127.4	127.4				

4) Retest with an abnormal voltage/frequency change event that is introduced during the reconnect countdown period.

Used equipment No.:

See equipment list for details Sample No.: N/A

Finished date:

-Tested by:

Review date:

Reviewed by:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan		TÜV Rheinland®	
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189	
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001	
Order No. : 244466490		Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

9. Over/Under voltage

PROCEDURE

Test methods complies with standard Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08.

RESULTS D	Pass/DFail
-----------	------------

9	TABLE: Over/Under vol	tage				
	Mains voltage: 220V					
Settin	ng value					
Voltag	ge detection accuracy [V]	± 1V	Voltage d	etection cycle Td[ms]	20	
Magnitude Vo1 [V]		243	delay time	e To1 (ms)	160	
Magnitude Vo2 [V]		264	delay time To2 [ms]		160	
Magnitude Vu1 [V]		197	delay time Tu1 (ms)		2000	
Magnitude Vu2 [V]		109	delay time Tu2 [ms]		240	
Over voltage level 1		Measurement [ms]	Limit (ms)	R	emark	
	1	127.5	4000	Mains voltage from 218.7 V jump to 267.3 V		
	2	124.8	1000			
Over voltage level 2		Measurement [ms]	Limit [ms]	R	emark	
	1	28.7	100			
2		27.6	160	Mains voltage from 237.6V jump to 290.4V		

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by: Reviewed by:

Review date:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan Id (Shanghai) Co., Ltd.	TD-0189		
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001	
Order No. : 244466490 Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Product:	Grid-Connected PV Inverter	
		Model designation:	X1-MINI-1.5K-G4	

Under voltage level 1	Measurement [ms]	Limit [ms]	Remark			
1	1964.4 200		Maine - Hanne from 246 Th // 1- 477 2			
2	1963.5	2000	Mains voltage from 216.7V jump to 177.3			
Under voltage level 2	Measurement [ms]	Limit [ms]	Remark			
1	269.8					
2	266.9	300	Mains voltage from 119.9V jump to 98.1V			

Remark:

Vo1= First level over voltage magnitude, Vo2= Second level over voltage magnitude,

Vu1= First level under voltage magnitude, Vu2= Second level under voltage magnitude

To1= Delayed time for first level over voltage tripping, To2= Delayed time for second level over voltage tripping Tu1= Delayed time for first level under voltage tripping, Tu2= Delayed time for second level under voltage tripping

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	0	Tested by:	
Review date:		Reviewed by:	

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan	Document No.:	TÜVRheinland	
TÜV Rheinland (Shanghai) Co., Ltd. Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

10. Harmonic and waveform distortion

PROCEDURE

Test methods complies with standard IEC 61000-3-12.

Limit see following table:

Table 2	. Current distortion limits			
Odd Harmonic	THD; in each harmonic order (%)			
3 - 9	4.0			
11 - 15	2.0			
17 - 21	1.5			
23 - 33	0.6			
Even Harmonic	THD, in each harmonic order (%)			
2-8	1.0			
10 - 32	0.5			

RESULTS Pass/DFail

10	TABLE:	Harmonic ar	nd waveform	distortion								
	Mains vo	Mains voltage: 220V										
Р	/Pn[%]	10	0%	66	5%	33	1%	Limit				
Out-	alaumhar	Measurement						Limit				
Ordinal number		[A]	[%]	[A]	[%]	[A]	[%]	[%]				
	1	6.98	100	4.54	100	2.29	100	-				
	2	0.02	0.29	0.02	0.29	0.02	0.29	1.0				
	3	0.08	1.15	0.04	0.57	0.02	0.29	4.0				
	4	0.01	0.14	0.01	0.14	0.01	0.14	1.0				
	5	0.08	1.15	0.06	0.86	0.05	0.72	4.0				
	6	0.00	0.00	0.01	0.14	0.01	0.14	1.0				

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Review date:

Tested by:

Reviewed by:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland (Shanghai) Co., Ltd. Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08					Document No.: Report No:						
Order No. :	244466490			Product:			Grid-C	onnected PV	Inverter		
Client Name :	SolaX Power 1 Technology (Z		Ltd.	Mod	Model designation:			X1-MINI-1.5K-G4			
7	0.06	0.86	0.0	4	0.57	(0.03	0.43	4.0		
8	0.00	0.00	0.0	0	0.00	(0.00	0.00	1.0		
9	0.02	0.29	0.0	2	0.29	(0.01	0.14	4.0		
10	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
11	0.01	0.14	0.0	1	0.14	(0.01	0.14	2.0		
12	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
13	0.01	0.14	0.0	1	0.14	(0.01	0.14	2.0		
14	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
15	0.01	0.14	0.0	1	0.14	(0.00	0.00	2.0		
16	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
17	0.01	0.14	0,0	1	0.14	(00.0	0.00	1.5		
18	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
19	0.00	0.00	0.0	0	0.00	(0.00	0.00	1.5		
20	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
21	0.00	0.00	0.0	0	0.00		0.00	0.00	1.5		
22	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
23	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.6		
24	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
25	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.6		
26	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		
27	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.6		
28	0.00	0.00	0.0	0	0.00	0	0.00	0.00	0.5		
29	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.6		
30	0.00	0.00	0.0	0	0.00	(0.00	0.00	0.5		

Used equipment No.:

See equipment list for details Sample No.: N/A

Finished date:

Tested by: Reviewed by:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

D I I I I O				<u> </u>			-		
Protection and C Interface of Invert 2016.08					Report	No:	CN23	Y4BO 001	
Order No. :	244466490			Product: Grid-Connected P					Inverter
Client Name :	SolaX Power Technology (2		o., Ltd.	Mo	del designa	tion:	X1-MI	NI-1.5K-G4	
31	0.00	0.00	0.0	0	0.00		0.00	0.00	0.6
32	0.00	0.00	0.0	0	0.00	0	0.00	0.00	0.5
33	0.00	0.00	0.0	0	0.00	0	00.0	0.00	0.6
THD	1	.91		1.	30		0.98		5
P/Pn[%]	10	00%		66	5%		33%		Limit
Ordinal number	M	[%]	Me	asur	ement [%]	D	vi T	[%]	[%]
1	220.15	100	220.0	07	100		0.01	100	-
2	0.01	0.00	0.01	Ň.	0.00	0.01		0.00	2
3	0.02	0.01	0.03	8	0.01	0.03		0.01	4
4	0.00	0.00	0.00		0.00	0.	00	0.00	2
5	0.04	0.02	0.04		0.02	0.	04	0.02	4
6	0.01	0.00	0.01	12 - E	0.00	0.	01	0.00	2
7	0.07	0.03	0.07		0.03	0.	08	0.04	4
8	0.00	0.00	0.00		0.00	0,	01	0.00	2
9	0.00	0.00	0.01		0.00	0.	01	0.00	4
10	0.01	0.00	0.01	Ú.	0.00	0.	01	0.00	2
11	0.03	0.01	0.04		0.02	0.	04	0.02	4
12	0.01	0.00	0.01	12. L	0.00	0.	01	0.00	2
13	0.00	0.00	0.01		0.00	0.	01	0.00	4
14	0.01	0.00	0.01		0.00	0.	01	0.00	2
15	0.03	0.01	0.03	3	0.01	0.	03	0.01	4
16	0.01	0.00	0.01		0.00	0.	01	0.00	2
17	0.00	0.00	0.01		0.00	0.	01	0.00	4
18	0.01	0.00	0.01	la l'	0.00	0.	01	0.00	2

Used equipment No.:

Sample No.: N/A

Finished date:

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See equipment list for details





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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TOV Rheiman	id (Shanghai)	Co., Ltd.		Document	140	TD-018	39		
Protection and Interface of Inve 2016.08	Report No:		CN231	(4BO 001					
Order No. :	244466490			Pro	duct:	Grid-C	onnected PV	Inverter	
Client Name :		SolaX Power Network Technology (Zhejiang) Co., Ltd.			ation:	X1-MI	X1-MINI-1.5K-G4		
19	0.01	0.00	0.01	0.00	0	.01	0.00	4	
20	0.01	0.00	0.01	0.00	0	.01	0.00	2	
21	0.01	0.00	0.00	0.00	0	.00	0.00	4	
22	0.01	0.00	0.01	0.00	0	.01	0.00	2	
23	0.02	0.01	0.02	0.01	0	.02	0.01	4	
24	0.01	0.00	0.01	0.00	0	.01	0.00	2	
25	0.00	0.00	0.01	0.00	0	.01	0.00	4	
26	0.01	0.00	0.00	0.00	0	.00	0.00	2	
27	0.00	0.00	0.01	0.00	0	.01	0.00	4	
28	0.00	0.00	0.00	0.00	0	.01	0.00	2	
29	0.01	0.00	0.01	0.00	0	.00	0.00	4	
30	0.01	0.00	0.01	0.00	0	.01	0.00	2	
31	0.01	0.00	0.01	0.00	0	.01	0.00	4	
32	0.01	0.00	0.01	0.00	0	.01	0.00	2	
33	0.00	0.00	0.01	0.00	0	.01	0.00	4	
THD	0.	05		0.05		0.05 5			

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Reviewed by:

Review date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan	D	TÜVRheinland®
TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

11. Over/Under Frequency

PROCEDURE

Test method complies with standard Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08.

11	TABLE: Over/Under freque	ency			
1000	Rated voltage frequency:	50Hz			
Setting	y value				
Freque	ency detection accuracy [Hz]	±0.1	Frequency detect	ion cycle Td [ms]	20
Magnit	ude Fo [Hz]	52.1	Fo delay time To	[ms]	100
Magnit	ude Fu (Hz)	46.9	Fu delay time Tu	ms]	100
	Over frequency	Measurement [ms]	Limit (ms)	Rei	nark
	1	62.7	100	Mains voltage fr From: 51.6Hz J	Contraction of the second
	Under frequency	Measurement [ms]	Limit (ms)	Rei	nark
	1	60.7	100	Mains voltage fi From: 47.4Hz J	

Fo= Over frequency magnitude, Fu= Under frequency magnitude, To= Delayed time for over frequency tripping Tu= Delayed time for under frequency tripping

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Reviewed by:

Review date:

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan		TÜV Rheinland®
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

12. Active power control

PROCEDURE

The test methods complies with standard Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08.

RESULTS Pass/DFail

12	TABLE: Ac	tive powe	er control									Ρ
Rating	power P (W)	1500										
Set Poi	nt	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
		1521	1359	1220	1080	942	768	628	453	311	151	65
Output	Power P (W)	Lim	itation of	ſΔP				± 5%	6 Pn		а	
Automati	an time a fab	-	0.2	0.2	0.6	0.6	0.6	0.2	0.2	0.2	0.2	0.6
Aajusu	ng time (s)	Lim	nitation o	of Δt				6	0			
Total D	uration (s)	1		0	0		596					

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	in in	Tested by:	
Review date:		Reviewed by:	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.: Test:	1 Clause:		7
399000	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tim	Trip Time e Magnitude e Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			Wave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	h60104203, 07.31.2020	012842: Mon Dec 12 15:18:44 2022
由	2 20.0AV 3 5.0AV 4	200.0ms/ -2.71	01 液动 🔨
	0. 0100V/A (100 ± 1)		FE3 X1(2) -2.83600000000 X2(2) 2.544500000000 ΔX 292.000000000ms 1/ΔX 3.4247Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39598kA ΔY/ΔX 4.74615kA/s
		dataile Samola N	ło.: N/A
Used equipmen	nt No.: See equipment list for c		
Used equipmer Finished date:	It No.: See equipment list for c	Tested	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	ontrol requirements for PEA er based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	2 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description:	inverter; Wave No. 2 was the the grid was switched off.		Vave No. 1 was the output current o id, also regarded as trip signal while
	T DSO-X 3024T, M	160104203, 07.31.2020	012842: Mon Dec 12 15:17:11 2022
E T	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.91	01 液动 🗸
			12 光格 🛛 🔁
•			2 9±48 F55 X1(2) 2 916000000006 X2(2) -2 716000000006 AX 202 0000000000ms AX 4 9605Hz Y1(2) 53 7500A Y2(2) 1.43963kA AY 1.38588kA AY/AX 6
⁸ //////			FE3 X1(2) -2.918000000000 X2(2) -2.716000000000 ΔX 202.000000000mms 1/ΔX 4.9605Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39588kA ΔY/ΔX
⁸ //////	······		7-53 X1(2) -2.916000000000 X2(2) -2.716000000000 ΔX 202.000000000mms 1/ΔX 4.9605Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.38588kA ΔY/ΔX
	0.0100V/4 (100 := 1) 可能为 0.0100V/A	×2	7153 X1(2) 2.916000000000 X2(2) 2.716000000000 AX 202.000000000000 AX 202.0000000000000 AX 4.9505Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 1.39598kA AY/AX 6.86077kA/s 52.01674425
唐道 2 15-52年。 单位 安档	0.0100V/4 (100 := 1) 可能为 0.0100V/A	×2	Т 5 3 X1(2) -2 9100000000 X2(2) -2 71600000000ms X2(2) -2 71600000000ms X2(2) -2 71600000000ms X2(2) -3 7500A 4 4 9605Hz Y1(2) 53 7500A Y2(2) -1.43963kA 4 Y -1.38588kA 4 Y -1.38588kA 6 86077kA/s 6 86077kA/s

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	3 Clause	:	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tri	Trip Time e Magnitude e Trip Time lude me	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	inverter; Wave No. 2 was the the grid was switched off.		ave No. 1 was the output current of id, also regarded as trip signal while
	T DS0-X 3024T, M	m60104203, 07.31.2020	012842: Mon Dec 12 15:15:53 2022
田 t	2 20.0AV 3 5.0AV 4	100.0ms/ -2.90	
* *******		///////	μ χετη μ F=51 X1(2) -2 9200000000000000000000000000000000000
B			# 53 X1(2) 2 9200000000000000000000000000000000000
B			#43 X1(2) -2 920000000000 X2(2) -2 8920000000000 ΔX 228 0000000000ms 1/ΔX 4 3860Hz Y1(2) 53 7500A
² ₩₩₩	·······		F-5 X1(2) -2 9200000000000000000000000000000000000
	0.0100V/A (100 ± 1) RX 0.0100V/A	0 Os	# 52 X1(2) -2 920000000000 X2(2) -2 8920000000000000 4X 228 900000000000000000000000000000000000
· · · · · · · · · · · · · · · · · · ·	0.0100V/A (100 ± 1) RX 0.0100V/A	0 Os	#43 X1(2) 2 9200000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	4 Clause:		7
20000	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time Ide	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			we No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	(T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 15:14:16 2022
	2 20.0AV 3 5.0AV 4	100.0ms/ -2.69	49 课动 20
s• ₩₩₩₩₩		100.0ms/ -2.69	41 (₹25) ∧7 755 X1(2) 2 650000000005 X2(2) 2 556000000005 40 94 000000000ms 1/4X 10.638Hz Y1(2) 53.7500A Y2(2)
•		100.0ms/ -2.69	44 (₹25) A7 12 7£48 (1) 12 7£48 (1) 12 6000000000000000000000000000000000000
•		100.0ms/ -2.69	41 (₹2) ∧ ₹2 7648 (2) ₹50 ×1(2) -2 55500000000 40 94 000000000ms 1/ΔX 10.638Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39558kA ΔY
Csed equipment	0. 0)00V/4. (100 ± 1) FEX 0.0100V/A.	etails Sample N	44 IEAD √ 44 IEAD √ 1 HHR IEAD 1 HHR HHR 1 HHR
	0. 0)00V/4. (100 ± 1) FEX 0.0100V/A.	N X2 U Ds	44 (₹2) 1 1 1 1 2 5000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	5 Clause:		7
193000	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	inverter; Wave No. 2 was the the grid was switched off.	10%, trip time 76ms. V current through the gr	Vave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	(T		
	cs DSO-X 3024T, M	r60104203, 07.31.20200	012842: Mon Dec 12 15:12:35 2022
	cs D50-X 3024T, M 2 20.0A/ 3 5.0A/	r60104203, 07.31.2020 100.0ms/ -274	
	ES DOU-A 30241, M		01 液动 🕂
	2 20.0W 3 50.W	100.0ms/ -2.74	0s (₹4) ∧ (2 3.448 (2) 2.70500000000s 2.263000000000s 3.2(2) 4.2 63000000000s 1/ΔX 13.158Hz Y1(2) 53.7500A Y2(2) 1.39598kA ΔY/ΔX 18.2952kA/s
			0s ₩24)
	0. 0100V/4 (100 ± 3) FX 0.0100V/4 (100 ± 3)	100 0ms/ -2.74	Os IEA I 12 ### III FS1 X1(2) -270800000000000000000000000000000000000
	0. 0100V/4 (100 ± 3) FX 0.0100V/4 (100 ± 3)	100 0ms/ -2.74	0s 1820 √ 1820 9.448 19 1821 2.705000000005 22(2) 2.850000000005 22(2) 2.850000000005 24(2) 2.850000000005 1/42X 13.158Hz 1/42X 13.158Hz 1/42X 13.158Hz 1/42X 13.158Hz 1/42X 13.158Hz 1/42X 13.158Hz 11/42X 13.159Hz 11/42X 13.9598kA 4Y/42X 18.2352kA/s 52.7167.412.5

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and 0 Interface of Inver 2016.08	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	6 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	: 100% load, PR: -5%, QC: +1	0%, trip time 100ms. \	Wave No. 1 was the output current o id, also regarded as trip signal while
KEMOUCH			
KEYSIGH	T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 15:21:14 2022
TECHNOLOGI	IT DS0-X 3024T, M 2 20.0W 3 5.0W	r60104203, 07.31.2020 100.0ms/ -2.91	2s 课动 _√
	CE DSJ-X 3024T, M 2 20.0V 3 5.0V 4	100.0ms/ -2.91	26 课题 🔨
TECHNOLOGIU	2 20.0V 3 5.0V 4 2 20.0V 3 5.0V 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100 0ms/ -2.91	28 (₹2)
TECHNOLOGI	2 20.0V 3 5.0V 4 2 20.0V 3 5.0V 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100 0ms/ -2.91	28 1850 ∧ 100 2948000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinian	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	7 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description	: 100% load, PR: -5%, QC: -1	0%, trip time 84ms. W	ave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	160104203, 07.31.2020	012842: Mon Dec 12 15:29:26 2022
· 田· T	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.64	49 液动 _/プ
		وببعد ويعملها	12 光标 🗐
50			2 #48 E ¥1(2) -2 564000000000000000000000000000000000000
	0.0100V/A (100 ± 1)		√2 : 3648 E √2 : 3648 E √448 √448 √448 √2(2) √2(2) √2(2) √2(2) √4x 11.905Hz √1/4x 11.905Hz √1(2) 53.7500A Y2(2) 1.43963kA AY 1.38588kA
	0.0100V/A (100 ± 1) FF L 0.0100V/A	0.0s	1 #48 1 F43 X1(2) 2.66400000000000000000000000000000000000
	0.0100V/A (100 ± 1) FF L 0.0100V/A	0.0s	СС 3.848 F53 X1(2) 2.68400000005 X2(2) 2.59400000000 X2(2) 2.59400000000 X2(2) 2.5000000000 X4 11.905Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 4.9965kA/s 16.4985kA/s 50.1175411.5 N/A
第三 1 日本市	0.0100V/A (100 ± 1) FF L 0.0100V/A	0.0s letails Sample N	Image: State of the s

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	8 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			Vave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	IT		
	es DSO-X 3024T, M	r60104203, 07.31.2020	012842: Mon Dec 12 14:43:53 2022
	es D50-X 30241, M 2 20.0A/ 3 5.0A/ 4	160104203, 07.31.2020 100.0ms/ -5.83	2s 课动 _√
			26 禄劫 🗸
	2 20.0AV 3 5.0AV 4	100.0ms/ -5.83	28 (₹2) √ 72 (±48) 75 (±57) 75
			28 (₹4) (72 76%) 74% (1) 75% (7) 75% (7)
日本 の の の の の の の の の の の の の	2 20.0AV 3 5.0AV 4	100.0ms/ -5.83	28 it the second se
	2 20.0AV 3 5.0AV 4	100.0ms/ -5.83	28 (₹2) 128 (₹2) 121 9.448 121 5.794000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	9 Clause:		7
	Islanding Protection Secondary Over Voltage N Secondary Over Voltage T Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time Ide	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	inverter; Wave No. 2 was the the grid was switched off.		lave No. 1 was the output current of id, also regarded as trip signal while
	T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 15:23:17 2022
田 T	2 20.0AV 3 5.0AV 4	100.0ms/ -2.85	8s (#25
		100.01119 32.00	81 禄劫 八7
			VC ##8 Ε X1(2) -2.924000000000 V2(2) -2.800000000000 AX 124.000000000mms 1/ΔX 8.0645Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY -1.43963kA
² ///////			*##8 • ¥1(2) *2 924000000005 *2 924000000005 *2(2) *2 800000000005 *2(2) *2 800000000005 *2(2) *2 800000000005 *4 *124 00000000005 *5 *1/40X 8.0645Hz *1(2) 53.7500A *12(2) 1.43963kA
² ///////		0.0s	VC #48 Π F43 X1(2) -2.92400000000000000000000000000000000000
	0.0100V/A (100 ± 1) FR L 0.0100V/A	95.# 0.0s	Image: State
通道 1 F2大平集: 単位 実績	0.0100V/A (100 ± 1) FR L 0.0100V/A	95.# 0.0s	Image: Second

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TOV Rheiman	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	10 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tim	Trip Time e Magnitude e Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description			we No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T D50-X 3024T, M	h60104203, 07.31.2020	012842: Mon Dec 12 15:25:25 2022
曲	2 20.04/ 3 5.04/ 4	200.0ms/ -2.81	4s 混动 🔿
			<12 北林 1 日
·····································			 ★KR ★KR ¥21 3.0320000000000000000000000000000000000
			7-53 X1(2): -3.02200000000 X2(2): -2.55200000000 ΔX: 370.00000000 MX: 2.7027Hz Y1(2): 53.7500A Y2(2): 1.43963kA ΔY: 1.38588kA ΔY/ΔX:
■ ■ 単 定) 定 ・ 単 位 ・ 受 婚 Used equipment	0.0100V/A(100 : 1) 联大 0.0100V/A	0.0s details Sample N	#43 X1(2) 3.022000000000 X2(2) 2.652000000000 AX 370.000000000ms V/AX Y1(2) 53.7500A Y1(2) 53.7500A Y2(2) 1.43963kA AY 3.74561kA/s SCUTFARES
通道 1 探头演集: 单位	0.0100V/A(100 : 1) 联大 0.0100V/A	0 0s	F43 X1(2) 3.0200000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	11 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time 9 Magnitude 9 Trip Time ude 19	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description			ave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	N60104203 07.31.2020	012842: Mon Dec 12 15:27:15 2022
			CIECTE: TONT DOG IE ISTETTES EVER
	2 20.04/ 3 5.04/ 4	100.0ms/ -2.79	
			28 课动 🗸
•			28 (₹5) ∧7 ★#8 (1) 75000000005 ×2(2) 2 580000000005 ×2(2) 2 580000000005 ×2(2) 2 580000000005 ×2(2) 110 0000000005 ×2(2) 53 7500A Y1(2) 53 7500A Y1(2) 1.43963kA ΔY 1.38588kA ΔY/ΔX
•			28 (₹2) √ 1850 √ 1850 √ 1950 0000000 10000000000000000000000000000
	2 20.0AV 3 5.0AV 4	100.0ms/ -2.79	28 i#30 ∧7 12 #48 III 750 2.7900000000 2(2) 2.800000000 2(2) 2.600000000 10000000000ms 1/0X 9.0909Hz Y1(2) 53.7500A Y2(2) 1.3998kA 6Y/0X 12.5989kA/s 12.5989kA/s
	2 20.0AV 3 5.0AV 4	100.0ms/ -2.79	24 (₹2)

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	12 Clause:		7
	Secondary Over Voltage M Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description			we No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T		
TECHNOLOGI	DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 14:37:17 2022
TECHNOLOGI	DS0-X 3024T, M	(60104203, 07.31.2020) 1000ms/ 4838	49
			48 滚动 🗸
			44 (₹2) 1/45 (₹2) 44 (₹2) 44 (₹2) 44 (₹2) 44 (₹2) 45 (16000000000 45 (16000000000000000000000000000000000000
	2 20.0AV 3 5.0AV 4		44 (₹2) (72) 748 (2) 749 (7) 75 (7) 75 (7) 75 (7) 75 (7) 75 (7) 75 (7) 75 (7) 76 (7) 7
	2 20.0W 3 5.0W 4	100.0ms/ -6.35	44 it th it th 12 ### III FS1 X1(2) 6 40200000000000000000000000000000000000
	2 20.0W 3 5.0W 4	100.0ms/ -6.35	44 (₹2)

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	13 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description			ve No. 1 was the output current of id, also regarded as trip signal while
KEVSIGH			
KEYSIGH			012842: Mon Dec 12 14:48:22 2022
TECHNOLOGI	1T D50-X 3024T, M 2 20.0AV 3 5.0AV 4	160104203, 07.31.2020 200.0ms/ -2.45	
			हत जिस्के 🗸
	2 20.04/ 3 5.04/ 4	200.0ms/ -2.45	64 (₹25) ∧7
			64 (#23) Λ 1 #48 () 1 #48 () 1 #48 () 1 #48 () 1 #55 1/42 302 000000000ms 1/42 3 3113Hz Y1(2) 53 5000A Y2(2) 1.43963kA 4Y 1.38613kA ΔY/ΔX
	2 20.04/ 3 5.04/ 4	200 0ms/ -2.45	64 (₹2) ↓ 1 ★ (1) 2 50400000000000000000000000000000000000
	2 20.04/ 3 5.04/ 4	200 0ms/ -2.45	64 ₩£8 ↓ 8 ₩K8 ₩ ¥K8 ₩ ¥53 × ×1(2) 2.5045000000000 ×2(2) 2.504500000000000000 4X 3.3113Hz Y1(2) 53.5000A Y2(2) 1.43963kA 4Y 1.38613kA 4Y10AX 4.589802kA/s 52.000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlar	d (Shanghai) Co., Ltd.	Locum	ent No.:	TD-0189	
	Control requirements for PEA rter based Generation Systems	Re	port No:	CN23Y4BO 001	V6111000225
Order No. :	244466490	66490 Product:		Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Model designation Technology (Zhejiang) Co., Ltd.		gnation:	X1-MINI-1.5K-G4	
ttachm	ent:1				
Picture No.:	14 Clause:	1		7	
0.014A(1 st harmonic), less th		e Magnitude e Trip Time ude ne 00% load, the fundame		First Under Voltage Magnitu First Under Voltage Trip Tim Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery rental magnitude of grid current wa urrent 0.068A, See the screenshol	
fest description	 At the balance condition of 10 0.014A(1st harmonic), less that 	0% load, the		ental magnitude of grid cur	rent was
Test description	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	0% load, the		ental magnitude of grid cur	rent was
=10 X1-Min	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	0% load, the		ental magnitude of grid cur	rent was
	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	00% load, the an 1% of the		ntal magnitude of grid cur rrent 0.068A, See the scre	rent was
U_tRMS	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	20% load, the an 1% of the 出上	rating cu	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和	rent was enshot o
U_tRMS I_tRMS P_t	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	20% load, the an 1% of the <u>相</u> 1 220.04	rating cu V	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04	rent was enshot o v
U_tRMS L_tRMS P_t Q_t	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	00% load, the an 1% of the 出し 220.04 153.71 -704.83 33.543	V W MA WW Var	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543	v v v v mA mW var
U_tRMS I_tRMS P_t Q_t S_t	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	0% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.822	V W MA mW	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822	v v mA mW
U_tRMS I_tRMS P_t Q_t S_t PF_t	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	00% load, the an 1% of the 出し 220.04 153.71 -704.83 33.543	V W MA WW Var	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822 -0.0299	v v mA mW var VA
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	0% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.822 -0.0299	V MA mW Var VA	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822 -0.0299 50.000	v mA war V war VA Hz
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	0% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.822 -0.0299 220.04	V mA mW var VA V	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822 -0.0299 50.000 220.04	v mA mW var VA Hz V
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS L_fundRMS	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	20% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.543 33.822 -0.0299 220.04 14.705	V MA mW var VA V MA	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822 -0.0299 50.000 220.04 14.705	v v mA mW var VA Hz V mA
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS I_fundRMS P_fund	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	20% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.543 33.822 -0.0299 220.04 14.705 -720.97	V MA mW var VA V MA mW	ntal magnitude of grid cur rent 0.068A, See the scre 三相啟和 220.04 153.71 -704.83 33.543 33.822 -0.0299 50.000 220.04 14.705 -720.97	v wmshot o mA mW var VA Hz V mA mW
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS L_fundRMS	 At the balance condition of 10 0.014A(1[#] harmonic), less the power analyzer for detail. 	20% load, the an 1% of the 220.04 153.71 -704.83 33.543 33.543 33.822 -0.0299 220.04 14.705	V MA mW var VA V MA	ntal magnitude of grid cur rent 0.068A, See the scre 三相总和 220.04 153.71 -704.83 33.543 33.822 -0.0299 50.000 220.04 14.705	v wmshot o mA mW var VA Hz V mA mW

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	13: 13:	Tested by:	
Review date:		Reviewed by:	
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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	15 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	(T DSO-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 14:50:03 2022
曲 T	2 20.0AV 3 5.0AV 4	100.0ms/ -3.15	61 液动 🔿
			1
*****			VZ 364% III F23 71(2) 314000000000000000000000000000000000000
*****		PT:# 0.0s	VZ #48 Ξ ¥12(2) 314000000000000000000000000000000000000
	0.0100V/A (100 ± 1) FRX 0.0100V/A	0.0s letails Sample N	V2 ±±4% E F±3 ×1(2) 314000000000000000000000000000000000000
▲ 1 F六平集: ★ 单位 安塔	0.0100V/A (100 ± 1) FRX 0.0100V/A	0.0s	Image: Second

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	16 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			vave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH			
TECHNOLOGI	IT DS0-X 3024T, M	v60104203, 07.31.2020	012842: Mon Dec 12 14:59:58 2022
TECHNOLOGI	TT D50-X 3024T, M 2 20.0W 3 5.0W 4	r60104203, 07.31.2020 100.0ms/ -2.26	
	LOU-A 30241, M		01 液动 🔨
			0s i₹20 Λ 12 7648 I 138 00000000ms 1/ΔX 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39638kA ΔY 1.39638kA
			0s i₹4) ∧ 12 #4# E FE X1(2) -2.2000000000 X2(2) -2.14200000000ms 128 000000000ms 126X 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39638kA ΔY 1.39698kA
	0.0000V/4 (100 ± 1) FX 0.0100V/A (100 ± 1)	100.0ms/ -2.26	Os it ±h I 12 ### III FS1 X1(2) -2 3500000000+ 22(2) -2 1420000000+ 22(2) -2 1420000000+ 128 000000000+ 128 00000000+ 1/dX 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43963kA 4Y 1.39598kA ΔY/ΔX 10.0426kA/s #EXTRAction 53.7500A
	0.0000V/4 (100 ± 1) FX 0.0100V/A (100 ± 1)	100.0ms/ -2.26	0s it #40 It 1 it #48 It it #51 it #51 x1(2) it 23000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	17 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description			Vave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	(T D50-X 3024T, M	r60104203, 07.31.20200	012842: Mon Dec 12 14:58:54 2022
E t	2 20.0A/ 3 5.0A/ 4	200.0ms/ -2.50	01 液动 ♪√
-			425 X1(2) -2.452000000005 X2(2) -2.040000000005 422.000000000mms 1/4K 2.3697Hz
101001010000000			Υ1(2) 53 7500A Y2(2) 1.43963kA ΔY 1.39598kA ΔY/ΔX 3.28406kA/s
·····································	0.0100V/& (100 ± 1)		53 7500A Y2(2) 1.43963kA ΔY 1.38588kA ΔY/ΔX:
		R2	53,7500A Y2(2) 1,43963kA 4Y 1,39908kA 8Y/4X
	0. 0100V/A (100 ± 1) FFA 0.0100V/A	0.0s	537500A Y2(2) 1.43963kA ΔY 1.39588kA ΔY/ΔX 3.26406kA/s 3.26406kA/s
本 単 立 定 ・ 単 位 支 塔 し 安福 Used equipment	0.0100V/A (100 ± 1) FFA 0.0100V/A	0.0s	53,7600A Y2(2) 1,43963kA ΔY: 1,3998kA ΔY/ΔX 3,28406kA/s 3,28406kA/s
唐王 1 F六平集: + 单位 安福	0.0100V/A (100 ± 1) FFA 0.0100V/A	etails Sample N	537500A Y2(2) 1.43963kA ΔY: 1.30568kA ΔY: 3.28406kA/s SUTFA12.5 ko.: N/A

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland	I (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and Conterface of Inverte 2016.08	ontrol requirements for PEA er based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachme	ent:1		
Picture No.:	18 Clause:		7
	Secondary Over Voltage M Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time Ide	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description:	inverter; Wave No. 2 was the the grid was switched off.		ave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGHT	T DSO-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 14:55:31 2022
(田) 1			
	2 20.0A/ 3 5.0A/ 4	100.0ms/ -3.34	2s 課題 47 12 光梯 🔳
2		100.0ms/ -3.34	
·····································			VE #48 E F53 X1(2) 3 31200000000000000000000000000000000000
••••••		100.0ms/ -3.34	VE ±448 E F≤a X1(2) 3 31200000000000000000000000000000000000
Bit 2 FARA:	0, 0100V/A (100 ± 1)		● まま 手名 X1(2) 3 312000000000 X2(2) 3 1990000000000 AX 114.9000000000ms 1/AX B 7719Hz Y1(2) 53.5000A Y2(2) 1.43963kA ムY 1.39613kA ムY 1.39613kA ムY 1.21590kA/s
▲ 1 好大平年: ● 单位 安培	0, 0100V/A (100 ± 1)		• #4% • • #53 ×1(2) • 3 3120000000000000000000000000000000000

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	19 Clause:		7
	Secondary Over Voltage N Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Time	rip Time Magnitude Trip Time de e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description	inverter; Wave No. 2 was the o the grid was switched off.		ave No. 1 was the output current of id, also regarded as trip signal while
	T DS0-X 3024T, Mr	60104203, 07.31.2020	012842: Mon Dec 12 14:52:09 2022
State of the local division of the local div			120421 FMT 000 12 14.02.000 2022
	2 20.0A/ 3 5.0A/ 4	100.0ms/ -3.04	
		100.0ms/ -3.04	54 #23 A
		100.0ms/ -3.04	54 ₩220 AV 1 #248 E 54 512000000000000000000000000000000000000
		100.0ms/ -3.04	Si It 20 It 20 It 30 It 30 V1(2) 3.09400000000000000000000000000000000000
	0.0100V/4 (100 ± 1)	Ptet 0.0s	Si Item Si Item X1(2) 3 19400000000 X1(2) 3 19400000000 X2(2) 2 99200000000 X2(2) 2 99200000000 Ax 102 000000000 1/AX 9 8039Hz Y1(2) 53 5000A Y2(2) 1.43963kA AY 1.38613kA AY/AX 13 5995kA/s SERTFAILES
唐道 2 序头平盘: 单位 安塔	0.0100V/4 (100 ± 1)	Ptet 0.0s	Si #245 A #245 #246 #1 #102 999000000000 AX 102<00000000mm

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

FÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	20 Clause:		7
1925/00/	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description			Wave No. 1 was the output current o id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	y60104203, 07.31.2020	012842: Mon Dec 12 15:01:31 2022
曲 1	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.38	81 凍劫 📣
			1 光标 🛛 🖽
			Κ ±H8 Ξ FS1 X1(2) -2 39000000000000000000000000000000000000
	0. 0100V/A (100 ± 1)		F-23 X1(2) -2.39000000000000000000000000000000000000
*****	······································		F-23 X1(2) -2.39000000000000000000000000000000000000
	0.0100V/A (100 ± 1) FRH 0.0100V/A	0.0s	# 51 X1(2) -2.38000000000 12(2) -2.28000000000 4X 118.000000000ms 1/4X 8.4746Hz Y1(2) 53.7500A Y2(2) 1.43963kA 4Y 1.38568kA 4Y/4X 11.7447kA/g 52.01674125
直道 1 F:六平集: 单位 安福	0.0100V/A (100 ± 1) FRH 0.0100V/A	0.0s	F-51 X1(2) -2.38000000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and nterface of Inve 2016.08	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	21 Clause	:	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltag Under Frequency Magnit Under Frequency Trip Tir	Trip Time e Magnitude e Trip Time lude me	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description	1: 100% load, PR: +5%, QC: -	10%, trip time 90ms. W	lave No. 1 was the output current of id, also regarded as trip signal while
			(1) 光标 (1) 图
		M	VC 3.0400000000000000000000000000000000000
² /////		×2 ₩1# 0.0s	F-23 X1(2) -3.24200000000000000000000000000000000000
	0.0100V/A (100 : 1)	Ptia∓ 0.0s	7-53 X1(2) 3.24200000000000000000000000000000000000

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	22 Clause:		7
400.000 XXXI	Secondary Over Voltage N Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Time	Trip Time Magnitude Trip Time de e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description	of inverter; Wave No. 2 was th while the grid was switched of	e current through the	Wave No. 1 was the output current grid, also regarded as trip signal
KEYSIGH	(T		
	cs DS0-X 3024T, Mi	60104203, 07.31.2020	12842: Mon Dec 12 15:03:47 2022
	isi D50-X 3024T, Mi 2 20.0A/ 3 5.0A/	60104203, 07.31.2020 100.0ms/ -249	
	ES 00-7 30241, MI		(現动)
			N N V2 ±±% ■ ×1(2) -2.472000000000 ×2(2) ×2(2) -2.356000000000 ×2(2) ×114.000000000mms 1/40X B.7719Hz Y1(2) 53.7500A Y2(2) ×1.43963kA ΔY 1.39959kA ΔY/ΔX ΔY/ΔX 1.39598kA
Used equipmer	0.0100V/4 (100 : 1)	100.0ms/ -2.48	N N 12 ### ■ FS1 ×1(2) -2 472000000005 > 22(2) -2 358000000000000000000000000000000000000
	0.0100V/4 (100 : 1)	100.0ms/ -2.48	Image: state

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and C Interface of Inver 1016.08	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	23 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	 100% load, PR: +10%, QC: + inverter; Wave No. 2 was the the grid was switched off. 	5%, trip time 210ms. current through the gr	Wave No. 1 was the output current o id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	160104203, 07.31.2020	012842: Mon Dec 12 15:04:59 2022
in the second se	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.50	01 液动 📣
		ويبعد المريحات	(12) 光林 (12)
•			√2 # ###
•			√2 # ###
	0.0100V/A (100 ± 1) REX 0.0100V/A	0.0s	СС #.448
唐成 2 探头穿盘: 梁塔	0.0100V/A (100 ± 1) REX 0.0100V/A	0.0s	***** ***** ***** ***** ***** ****** ****** ************************************

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	I (Shanghai) Co., Ltd.	Document No.:	TD-0189
	ontrol requirements for PEA er based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachme	ent:1		
Picture No.:	24 Clause:	1	7
	Islanding Protection Secondary Over Voltage N Secondary Over Voltage T Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description:			lave No. 1 was the output current of id, also regarded as trip signal while
KEYSIGHT	DS0-X 3024T, M	60104203, 07.31.20200	012842: Mon Dec 12 15:06:21 2022
(田) 1	2 20.0AV 3 5.0AV 4	100.0ms/ -2.54	
			《2 光梯 图
			3448 F-51 X1(2) -2 6260000000005 -2.3140000000005 2/2(2) -2.3140000000005 3/4 0/4 3 1847Hz Y1(2) 53 7500A Y2(2) 1.43963kA 0/1 1.39588kA 0/4X 4.41361kA/s
······	WWWWWW		F43 X1(2) -2.62800000000s X2(2) -2.31400000000ms ΔX 314.00000000ms 1/dX 3.1847Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY ΔY/ΔX
······	www.		F43 X1(2) -2.62800000000s X2(2) -2.31400000000ms ΔX 314.00000000ms 1/dX 3.1847Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY ΔY/ΔX
	X1 X1 0.0100V/A (100 ± 1) R\$ R\$ 0.0100V/A	0.0s	#43 X1(2) -2.62800000000s X2(2) -2.31400000000ms AX 314.000000000ms 1/4X 3.1847Hz Y1(2) 53.7500A Y2(2) 1.43963kA 4Y 397/624 31.13658kA 4Y1 33998kA 4Y/0X 4.41361kA/s 55.016744L5
	X1 X1 0.0100V/A (100 ± 1) R\$ R\$ 0.0100V/A	0.0s	F43 X1(2) -2.6280000000000 X2(2) -2.314000000000ms AX 314.000000000ms V/AX 31847Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 1.39598kA AY/AX 4.41361kA/s SEUTIFIANCE

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	ontrol requirements for PEA ler based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	25 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description:			ve No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T. M		
		160104203, 07.31.2020	012842: Mon Dec 12 15:09:19 2022
i i	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.57	
≈ ₩₩₩₩			81 #th 🗸
			8s (₹2) ∧
≈ ₩₩₩₩	2 20.0× 3 5.0× 4	100.0ms/ -2.57	8± #£b ∧√ ### ■ #50 X1(2) 2 50400000000 X2(2) 2 50400000000ms 1/ΔX 11.364Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.38588kA ΔY/ΔX
	2 20.0AV 3 5.0AV 4	100 0ms/ -2.57	81 If the image of the im
	2 20.0AV 3 5.0AV 4	100 0ms/ -2.57	8s it #th it #th it #th

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	26 Clause:		7
	Secondary Over Voltage M Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	irip Time Magnitude Trip Time de e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	inverter; Wave No. 2 was the of the grid was switched off.		Vave No. 1 was the output current o id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, Mr	60104203, 07.31.2020	012842: Mon Dec 12 15:10:40 2022
	2 20.0A/ 3 5.0A/ 4	100.0ms/ -2.82	
•		100.0ms/ -2.82	81 अस्थ 🗸
≈ ₩₩₩₩		100.0ms/ -2.82	8± IR50 A7 IR50 A7
	0. 0100V/4. (100 ± 1) FEX 0.0100V/A.	¥2	88 液動 八丁 1 光粉 回 1 光粉 回 1 光粉 回 1 光射 2 日本的0000000 2 日本的0000000ms 1/2X 1 2 821Hz 1/2X 1 2 821Hz 1/2 53 7500A 1/2X 1 3958kA ムY 1.3958kA ムY 1.3958kA ムY 1.77676kA/s
	0. 0100V/4. (100 ± 1) FEX 0.0100V/A.	¥2	Bit #£8 ↓ #£8 #£8 ■ #£8 #£8 ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #£8 ■ ■ #2015 #275000000000 ■ #2015 #2750000000000000 ■ #2015 #275000000000000000000000000000000000000

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

I UV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	27 Clause:		7
30000 1930	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time 9 Magnitude 9 Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	n60104203, 07.31.2020	012842: Mon Dec 12 16:19:06 2022
(#) 1	2 20.0AV 3 2.0AV 4	100.0ms/ -2.88	
		100.0057 -2.00	61 禄劫 🗸 1 光梯 🛛 🗒
₽ ₩₩₩₩			
₽ ₩₩₩₩₩			V2 3±48 E F53 X1(2) -2.904000000000 22(2) -2.7720000000000 AX 132.000000000mms 1/ΔK 7.5758Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39588kA ΔY/ΔX 4.39588kA
	0. 0100V/A (100 ± 1) FEX 0.0100V/A	etails Sample N	V2 3648 1 F53 X1(2) 2.994000000000 X2(2) 2.7720000000000 AX 1.32.000000000000 AX 1.32.00000000000000000000000000000000000
· · · · · · · · · · · · · ·	0. 0100V/A (100 ± 1) FEX 0.0100V/A		УСВ 3648 1 F-51 X1(2) 2.90400000000000000000000000000000000000

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

I UV Rheinian	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	28 Clause:		7
22,000 3000	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tim	Trip Time 9 Magnitude 9 Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	n60104203, 07.31.2020	012842: Mon Dec 12 16:21:37 2022
(E) T			
	2 20.0A/ 3 2.0A/ 4	100.0ms/ -2.71	49 读动 🗸
			V2 #48 Ε F43 X1(2) -2.7480000000000 -2.748000000000000000000000000000000000000
			V2 #48 Ε ¥43 ¥43 ¥43 X1(2) 2.748000000000000000000000000000000000000
			€21 #48 E F43 X1(2) -2.74000000000 X2(2) -2.6000000000ms 145.000000000ms 146 000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000000000ms 146 000000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 0000000000ms 146 000000000000000000000000000000000000
		betails Sample N	V2 3648 1 F51 X1(2) 2.7480000000000 X2(2) 2.500000000000 AX 146 000000000000 AX 6.8493Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 1.39938kA AY 9.49229kA/s SUTFARES X/A
			VI 3648 F-51 X1(2) -2.748000000000 X2(2) -2.602000000000 AX 146.000000000mms 1/dX 53.7500A Y2(2) 1.43963kA AY 1.39958kA AY/2 4.71 1.39958kA AY/2 1.43963kA AY 1.39958kA AY/2 1.43963kA AY 1.39958kA AY/2 1.43963kA AY 1.39958kA AY/AX 9.49229kA/s

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland	I (Shanghai) Co., Ltd.	Document No.:	TD-0189
	ontrol requirements for PEA er based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachme	ent:1		
icture No.:	29 Clause:		7
	Islanding Protection Secondary Over Voltage I Secondary Over Voltage Secondary Under Voltage Under Voltage Under Frequency Magnitt Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Trip Time First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description:			No. 1 was the output current of id, also regarded as trip signal while
KEYSIGHT	DSO-X 3024T, M	r60104203, 07.31.2020	012842: Mon Dec 12 16:24:08 2022
ED T	2 20.0AV 3 2.0AV 4	200.0ms/ -2.84	0. (B254) A #
		200.01112 12.04	61 课物 💉
			√2 1 3648 √2 √2 1 3648 √45 √2 √2 √2 √2 √2 √2 √2 √2 √2 √2 √2 √2 √2 √
·····································	0.0100V/A (100 ± 1) R\$		СС #.448
· · · · · · · · · · · · · · · · · · ·	0.0100V/A (100 ± 1) R\$	NATION OF THE OLD STATE	Image: Second

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
icture No.:	30 Clause:	1	7
	Islanding Protection Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	inverter; Wave No. 2 was the the grid was switched off.		e No. 1 was the output current of id, also regarded as trip signal while
	T D50-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 16:30:39 2022
田 T	2 20.0A/ 3 2.0A/ 4	100.0ms/ -2.71	
******			3648 168 763 2786000000000 22 6480000000000 264800000000000 4X 138 0000000000000 4X 138 0000000000000 4X 138 0000000000000 4X 138 000000000000000000000000000000000000
通道 3 探头现象:	0.0100%/A (100 ± 1)		F-53 X1(2) -2.756000000000 X2(2) -2.645000000000 ΔX 138.000000000ms 1/ΔX 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY ΔY/ΔX:
		Brim O Os	¥-53 X1(2) -2.76600000000000000000000000000000000000
	0.0100V/A (100 ± 1) FF X 0.0100V/A	C2 85,# 0.0s	#£3 X1(2) -2.766000000000 X2(2) -2.648000000000ms AX 139.00000000ms 1/4X 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43963kA 4Y 4.39988kA 4Y/DX 10.0426kA/s 55.016744L5
■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	0.0100V/A (100 ± 1) FF X 0.0100V/A	C2 85,# 0.0s	Т 53 X1(2) 2.76600000006 32(2) 2.64600000000ms 1/0X 138.00000000ms 1/0X 7.2464Hz Y1(2) 53.7500A Y2(2) 1.43658kA 4Y 1.38588kA 4Y 1.38588kA 4Y 1.38588kA 4Y 1.38588kA 4Y 1.38588kA 4Y 1.38588kA 4Y 1.0426kA/s

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TOV INICIAL	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	31 Clause:		7
	Islanding Protection Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tir	Trip Time e Magnitude e Trip Time ude ne	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	n60104203, 07.31.2020	012842: Mon Dec 12 16:38:35 2022
· 由· ī	2 20.0A/ 3 2.0A/	200.0ms/ -2.81	28 滚动 八
	0.01007/4. (100 ± 2)		F£3 X1(2) -2
Used equipmer	0.01007//4 (100 ± 1) 序头 0.01007//A	etails Sample N	ХЗ(2) -2 50000000005 X2(2) -2 600000000ms 1/ΔX 4.7170Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39968kA ΔY 1.39968kA ΔY 5.3715kA/s 5.3715kA/s
 单位 安培 	0.01007//4 (100 ± 1) 序头 0.01007//A	0 0s	Х1(2) 2 88000000006 X2(2) 2 88000000006 4× 212 00000000ms 1/4× 4 7170Hz Y1(2) 53 7500A Y2(2) 1.43963kA 4Y 1.38589kA 4Y 1.38589kA 6 53715kA/s 527175A425
単位 安培 Used equipmen	0.01007//4 (100 ± 1) 序头 0.01007//A	0.0s details Sample N	X1(2) 2 8800000000 X2(2) 2 8800000000 AX 212 00000000ms 1/AX 4 7170Hz Y1(2) 53 7500A Y2(2) 1 43963kA AY 1 39598kA AY 1 39598kA AY 1 39598kA AY 53715kA/s 6 53715kA/s EUTRALLE

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	(Shanghai) Co., Ltd.	Document No.:	TD-0189
2016.08	trol requirements for PEA based Generation Systems	Report No:	CN23Y4BO 001
Order No.: 2	244466490	Product:	Grid-Connected PV Inverter
and the restrict of the second s	SolaX Power Network Fechnology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachme	nt : 1		
Picture No.:	32 Clause:	1	7
	Secondary Over Voltage M Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ide e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description:	66% load, PR: 0%, QC: 0%, t	riptime 348ms. Wave	No. 1 was the output current of id, also regarded as trip signal while
KEYSIGHT	D50-X 3024T, Mr	60104203, 07.31.20200	012842: Mon Dec 12 16:40:33 2022
t t	2 20.0A/ 3 2.0A/ 4	200.0ms/ -2.96	61 滚动 ♪√
			F±3 X1(2) 3 0600000000000000000000000000000000000
			ΔΥ: <u>1.38588kA</u> <u>ΔΥ/ΔΧ</u> <u>3.98240kA/s</u>
通道 2 探头骑桨: 0.0		K2	1.38589kA ΔΥ/ΔΧ
清潔 () 厅大原菜; 0.0 单位 安塔	(100 (100) (10) (1	¥2	1.38589kA ΔΥ/ΔΧ
单位	() () () () () () () () () ()	0.0s	1.39588kA 6Y/dX 3.98240kA/s 3.98240kA/s
 单位 安培 	() () () () () () () () () ()	0.0s	1.39588kA <u><u>ay/ax</u> 3.96240kA/s Statis A <u>b.5</u> N/A</u>

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	d (Shanghai) Co., Ltd.				
	Control requirements for PEA rter based Generation Systems	Rep	ort No:	CN23Y4BO 001	
Order No. :	244466490	P	roduct:	Grid-Connected PV Inve	rter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model desig	gnation:	X1-MINI-1.5K-G4	
ttachm	ent:1				
Picture No.:	33 Clause:			7	
	Secondary Under Voltage Under Frequency Magnitum Under Frequency Tria	de		Over Frequency Magn	īme
est description	harmonic) was 0.009A, less th	% load, the fu			nt(1ª
est description	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu		tal magnitude of grid curre	nt(1ª
	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu		tal magnitude of grid curre	nt(1ª
	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu an 1% of rati		tal magnitude of grid curre nt 0.068A. See screenshol	nt(1ª
III X1-Min	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu an 1% of rati 祖山	ng curre	tal magnitude of grid curre nt 0.068A. See screenshol 三相总和	nt(1" t of pow
U_tRMS	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu an 1% of rati <u>祖</u> 1 220.09	ng curre V	tal magnitude of grid curre nt 0.068A. See screenshol 三相总和 220.09	nt(1 ^{sr} t of pow
U_tRMS	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu an 1% of rati <u>推1</u> 220.09 156.04	ng curre V mA	tal magnitude of grid curre nt 0.068A. See screenshol 三相总和 220.09 156.04	nt(1 ^{sr} t of pow V mA
U_tRMS I_tRMS P_t Q_t S_t	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	後 load, the fu an 1% of rati 220.09 156.04 1.2685 34.112 34.342	v v mA W	tal magnitude of grid curre nt 0.068A. See screenshol <u>三相总和</u> 220.09 156.04 1.2685 34.112 34.342	v mA W
U_tRMS I_tRMS P_t Q_t S_t PF_t	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	% load, the fu an 1% of rati 220.09 156.04 1.2685 34.112	v v mA var	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303	v v mA w var var
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	※ load, the fu an 1% of rational 220.09 156.04 1.2685 34.112 34.342 0.0303	V MA W Var VA	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303 50.000	V mA W var VA Hz
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	※ load, the fu an 1% of rational fields 220.09 156.04 1.2685 34.112 34.342 0.0303 220.09	v mA w var vA	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303 50.000 220.09	v mA w var VA Hz v
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS L_fundRMS	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	※ load, the fu an 1% of rational fields 220.09 156.04 1.2685 34.112 34.342 0.0303 220.09 9.0957	v mA w var vA vA	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303 50.000 220.09 9.0957	v mA w var VA Hz v mA
U_tRMS I_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS I_fundRMS P_fund	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	※ load, the fu an 1% of rational fields 1% of rational fields	v mA w var vA var vA w w	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303 50.000 220.09 9.0957 1.2529	V mA V var VA Hz V mA W
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS L_fundRMS	 At the balance condition of 66° harmonic) was 0.009A, less th analyzer for detail. 	※ load, the fu an 1% of rational fields 220.09 156.04 1.2685 34.112 34.342 0.0303 220.09 9.0957	v mA w var vA vA	tal magnitude of grid curre nt 0.068A. See screenshol 220.09 156.04 1.2685 34.112 34.342 0.0303 50.000 220.09 9.0957	v mA w var VA Hz v mA

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	34 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	inverter; Wave No. 2 was the the grid was switched off.		e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	IT DS0-X 3024T, M	r60104203, 07.31.2020	012842: Mon Dec 12 16:42:59 2022
CE T	2 20.0A/ 3 2.0A/ 4	200.0ms/ -3.03	2s 液动 📣
			1 光棉 🛛 🗒
	0. 01007/4. (100 ± 1)		 ★#8 ★#8
单位 安培	日本 日本 日本 日本 日本 日本 日本 日本 日本 日本		#£3 X1(2) 3.154000000000 X2(2) 2.05000000000ms AX 294.00000000ms 1/AX 3.4014Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 1.39998kA AY/AX 4.71386kA/s X216744L3
・ 使用 Used equipment	日本 日本 日本 日本 日本 日本 日本 日本 日本 日本	00s letails Sample N	F£3 X1(2) 3.15400000000 X2(2) 2.86000000000ms X4014Hz Y1(2) 53.7500A Y2(2) 1.43658kA XY/2X 4.71386kA/s
单位	日本 日本 日本 日本 日本 日本 日本 日本 日本 日本	0.0s	FE3 X1(2) 3.154000000000 X2(2) 294.00000000000 Ax 294.00000000000 Ax 294.000000000000 Ax 3.4014Hz Y1(2) 53.7500A Y2(2) 1.39598kA AY/AX 4.71386kA/s EUTERATES

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	35 Clause:	1	7
55.001	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH			012842: Mon Dec 12 16:44:30 2022
No.	2 20.0AV 3 2.0AV 4	200.0ms/ -2.70	61 滚动 小
	0. D100V/A (100 ± 1)		
单位 安培	0.0100V/4 (100 ± 1) F 2大 0.0100V/4	₩1.# 0.0s	1 #48 1 F43 X1(2) 2.814000000000000000000000000000000000000
・ 登場 Used equipmen	0.0100V/4 (100 ± 1) F 2大 0.0100V/4	etails Sample N	Image: Second
单位	0.0100V/4 (100 ± 1) F 2大 0.0100V/4	₩1.# 0.0s	КОЗ #446 III FE3 X1(2) 2.01400000000000000000000000000000000000

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	36 Clause	:	7
	Islanding Protection Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tir	Trip Time e Magnitude e Trip Time lude me	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	 66% load, PR: 0%, QC: +3% inverter; Wave No. 2 was the the grid was switched off. 	6, trip time 262ms. Wav	e No. 1 was the output current of id, also regarded as trip signal while
	T D50-X 3024T, M	m60104203, 07.31.2020	012842: Mon Dec 12 16:46:33 2022
till T	2 20.0A/ 3 2.0A/ 4	200.0ms/ -2.54	4s 滚动 🔿
·····································			F±1 X1(2) 2 800000000000 X2(2) 2.4180000000000 ΔX 262 900000000mms 1/ΔX 3.8168Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39998kA ΔY/ΔX 5 28960kA/s
通道 3 历天观年:	0.0100V/A (100 ± 1) 825 0.0100V/A	0.0s	手名 X1(2) 2,68000000000 X2(2) 2,418000000000 AX 262,000000000mms 1/AX 3,8166Hz Y1(2) 53,7500A Y2(2) 1,43963kA AY 2(2) 1,43963kA AY 1,39588kA AY 2,29960kA/s
通道 1 F+-平均: ● 单位 安塔	0.0100V/A (100 ± 1) 825 0.0100V/A	0.0s	F.5 X1(2) 2.60000000000 X2(2) 2.418000000000 Ax 3.6166Hz Y1(2) 53.7500A Y2(2) 1.43963kA AY 1.39598kA AY/AX 5.29960kA/s 5.29960kA/s

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	37 Clause:		7
	Islanding Protection Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tim	Trip Time 9 Magnitude 9 Trip Time ude ne	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	n60104203, 07.31.2020	012842: Mon Dec 12 16:48:03 2022
EB 1	2 20.0A/ 3 2.0A/	200.0ms/ -2.73	01 液动 八
			7.55 ×17(2) −2 806000000000;
			2(2) 2.46600000000 4X 340.00000000ms 1/4X 2.9412Hz Y1(2) 53.7500A Y2(2)
			2.45600000000 ΔX: 340.000000000ms 1/ΔX 2.9412Hz Y1(2)
	0.0100V/A (100 ± 3) 探头		2.4560000000 ΔX 340.000000000ms 1/ΔX 2.9412Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39588kA ΔY/ΔX
唐度 3 野头現年: ● ● ● ● ●	0, 0100V/A (100 : 3) 保头 0.0100V/A	0.0s	2.4550000000ня ΔX 340.00000000ms 1/ΔX 2.9412Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.39588kA ΔY/ΔX 4.07610kA/s 35.3767.0kA/s
· · · · · · · · · · · · · · · · · · ·	0, 0100V/A (100 : 3) 保头 0.0100V/A	0 0s	2.4560000000 4X 340.00000000ms 1/2X 2.9412Hz Y1(2) 53.7500A Y2(2) 1.43963kA 4Y 1.38958kA 4Y 4.07610kA/s Э.311634128 К.Л. БАНСЯ
まて) 伊大写集 ・ ・ ・ ・ 、 単位 支持 Used equipment	0, 0100V/A (100 ± 3) 保大 0.0100V/A	0.0s details Sample N	-2.4500000000ms ΔX 340.00000000ms 1/ΔX 2.9412Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY 1.30558kA ΔY/ΔX Δ07610kA/s EUTFALLS

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	id (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and 0 Interface of Inver 2016.08	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	38 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tin	Trip Time Magnitude Trip Time ude ne	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	inverter; Wave No. 2 was the the grid was switched off.		e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	HT D50-X 3024T, M	v60104203, 07.31.2020	012842: Mon Dec 12 16:50:14 2022
ED T	2 20.0A/ 3 2.0A/ 4	200.0ms/ -2.77	2: 混动 🔿
1			
-			
			√2 ### ■ ### X1(2) -2 87200000000 ×2(2) 2 62000000000
			√2 1 3±45 √2 1 √2 √2 1 √2 1 √2 √2 1 √2 √2 √2 1 √2 √ √
			VI ### Ε X1(2) -2.872000000000 -2.8720000000000 A 252.0000000000ms 1/ΔX 3.9683Hz Y1(2) 53.7500A Y2(2) 1.43963kA ΔY
			СС 1 жня С FEb X3(2) -2.87200000000 2.872000000000 4× 252.000000000ms 1/ΔX 3.9683Hz Y1(2) 53.7500A Y2(2) 1.43963kA
			2 3±45 E FE3 X1(2) -2 872000000000000000000000000000000000000
单位	0.0100V/A(100 ÷ 1) 成長 0.0100V/A	Pji# 0.0s	Image: State
 单位 安培 	0.0100V/A(100 : 1)	Pji# 0.0s	СС 3 HKR 1 753 2.0720000000000000000000000000000000000

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	ontrol requirements for PEA er based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachme	ent:1		
Picture No.:	39 Clause:	1	7
2277 2270	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description:	inverter; Wave No. 2 was the the grid was switched off.		e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 17:24:33 2022
1 1	2 10.0AV 3 2.0AV 4	200.0ms/ -2.69	01 液动 🔿
			🔨 : ±48 🛛 🖪
			√2 #### ■ #£8 X1(2) 2.776000000000 2.4700000000000 4.X 308 000000000ms 1/4X 3.2468Hz Y1(2) 56 6600A
			7F ±3 X1(2) -2.77800000000000000000000000000000000000
	uannaandraannaa	Ptin 0.0s	7-53 X1(2) -2.7780000000000 22(2) -2.4700000000000 ΔX 308 0000000000ms 1/ΔX 3.2468Hz Y1(2) 56 6500A Y2(2) 26 8700A ΔY -29 9800A ΔY/ΔX
通道 2 好头菜菜: 单位	0.0100V/A (100 :: 1) FFX 0.0100V/A	81# 0.0s	#E3 X1(2) -2.778000000000 X2(2) -2.470000000000ms AX 308.00000000ms 1/AX 3.2468Hz Y1(2) 56.8600A Y2(2) 26.8700A AY -29.9800A AY/AX -97.3377A/s X216744128
黄道 3 <u>好头菜</u> 菜: ● 单位 安培	0.0100V/A (100 :: 1) FFX 0.0100V/A	81# 0.0s	FE3 X1(2) -2.77800000000 X2(3) -2.47000000000 AX 308.00000000ms I/AX 32468Hz Y1(2) 56.8500A Y2(2) 26.8700A AY: -29.9800A AY/AX -37.3377A/s

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	40 Clause:	1	7
	Secondary Over Voltage M Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
lest description			No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 17:22:35 2022
(E) 1	2 10.0A/ 3 2.0A/ 4	200.0	
		200.0ms/ -2.50	01 禄劫 八7
		2000mi/220	
	0.0100V/A (100 ± 1) F54 0.0100V/A	XUUmi/ 420	√2 1 36.48 2 √2 √2 1 36.48 2 √ √ √2 √
通道 2 原先現象: ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・	0.0100V/A (100 : 1) FEX 0.0100V/A		Image: State of the s
 通道 1 (F) 大阪泉() 通道 1 (F) 大阪泉() 	0.0100V/A (100 : 1) FEX 0.0100V/A		Image: Second

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Kneinian	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Lt	Model designation: td.	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	41 Clau	se:	7
	Secondary Over Volta Secondary Over Volta Secondary Under Volta Secondary Under Volta Under Frequency Mag	ge Trip Time age Magnitude age Trip Time nitude Time	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	: 33% load, PR: 0%, QC: -	3%, trip time 148ms. Wave	e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	(T D50-X 3024T	, Mr60104203, 07.31.2020	012842: Mon Dec 12 17:21:27 2022
田	2 10.0A/ 3 2.0A/ 4	100.0ms/ -2.44	
			 光梯 目
œ₩₩₩₩ **		WW .	71-53 X1(2) -2.478000000000000000000000000000000000000
			71 ± 3 X1(2) -2.478000000000 3230000000000 48000000000ms 1/6X 6.7569Hz Y1(2) 56.8500A Y2(2) 26.8700A 6Y -29.9800A
	0. 0100V/& (100 ± 1)		71-53 X1(2) -2.478000000000000000000000000000000000000
			71-53 X1(2) -2.478000000000000000000000000000000000000
5.*	0. 0100V/A (100 ± 1) R3 0.0100V/A	X2 Bi# 0.0s	下き X1(2) -2.47600000000 X2(2) -2.33000000000ms X2(2) -2.33000000000ms 145 000000000ms 145 000000000ms 145 000000000ms 145 000000000ms 145 0000000000ms 145 00000000000ms 145 000000000000000000000000000000000000
a 本 で ・ 本 な の 、 、 、 、 、 、 、 、 、 、 、 、 、	0. 0100V/A (100 ± 1) R3 0.0100V/A	er details Sample N	F£3 X1(2) 2.47000000005 X2(2) 2.330000000000 Ax 148.00000000ms 1/AX 6.7568Hz Y1(2) 56.8500A AY: -29.9800A AY: -29.9800A AY/AX -202.568A/s
	0. 0100V/A (100 ± 1) R3 0.0100V/A	X2 Bi# 0.0s	FE3 X1(2) -2.478000000000 X2(2) -2.330000000000 AX 148.000000000ms 1/AX 5.7568Hz Y1(2) 56.8600A Y2(2) 26.8700A AY: -29.9800A AY: -202.568A/s EUTIFEALLE

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and 0 nterface of Inver 2016.08	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	42 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	 33% load, PR: 0%, QC: -2%, 	trip time 138ms. Wave	No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	160104203, 07.31.2020	012842: Mon Dec 12 17:19:41 2022
	2 10.04/ 3 2.04/ 4	100.0ms/ -2.41	
	0. 0100V/A (100 ± 1)	100.0ms/ -2.41	2s 渡劫 🗸
	0. 0100V/4 (100 ± 1) FEX 0.0100V/A	100.0ms/ -2.41	2s ### ^> />*
	0. 0100V/4 (100 ± 1) FEX 0.0100V/A	100.0ms/ -2.41	2s ### ^> ^> ### ^> ^> ### ### ### ### ### ### ### ###

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

I UV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	43 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description	 33% load, PR: 0%, QC: -1%, 	trip time 146ms. Wave	e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 17:18:05 2022
E I	2 10.0A/ 3 2.0A/	200.0ms/ -2.40	
			《2》 光梯 [] 图】
	0.0100Y/4. (100 ± 1)		 3 9648 3 9648 3 2 360000000000000000000000000000000000
	0. 0100V/A (100 ± 1) FF: 0.0100V/A (100 ± 1)		#45 X1(2) -2.36000000000000000000000000000000000000
・ 単位 変統 Used equipment	様大 0.0100V/A	0.0s letails Sample N	F£3 X1(2) 2.30000000000 X2(2) 2.21400000000ms 146.00000000ms 146.000000000ms 146.000000000ms 146.000000000ms 146.000000000ms 146.000000000ms 146.0000000000ms 146.0000000000000ms 146.000000000000000000000000000000000000
单位	様大 0.0100V/A	0.0s	FE3 X1(2) -2.360000000000 X2(2) -2.21.4000000000 AX 145.000000000ms 1/4X 56.86300A AY -2.39.9800A AY -2.39.9800A AY -2.39.5342AVs SCUT FRAMES

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Secondary Over Voltage Trip Time First Under Voltage Magnitude Secondary Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Under Frequency Magnitude Over Frequency Trip Time Response to Utility Recown 33% load, PR: 0%, CC: 0%, trip time 342ms. Wave No. 1 was the output current inverter; Wave No. 2 was the current through the grid, also regarded as trip signal the grid was switched off.	TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Zient Name : SolaX Power Network Technology (Zhejiang) Co., Ltd. Model designation: X1-MINI-1.5K-G4 Attachment : 1 Picture No.: 44 Clause: 7 First Over Voltage Magnitude First Over Voltage Magnitude First Over Voltage Magnitude First Under Voltage Magnitude Secondary Over Voltage Trip Time Secondary Under Voltage Trip Time Over Frequency Magnitude Over Frequency Magnitude Secondary Under Voltage Trip Time Over Frequency Magnitude Over Frequency Magnitude Over Frequency Magnitude Secondary Under Voltage Trip Time Under Frequency Trip Time Over Frequency Magnitude Over Frequency Magnitude Bescription: 385 load, PR: 0%, QC: 0%, ftip time 342ms. Wave No. 1 was the output current inverter; Wave No. 2 was the current through the grid, also regarded as trip signal the grid was switched off. Metersonal DS0-X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 Metersonal DS0-X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 Metersonal Secondary Context and the grid was switched off. Metersonal Secondary Context and the grid was switched off. Metersonal DS0-X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 Metersonal Secondary Context and the grid was switched off.	nterface of Inver		Report No:	CN23Y4BO 001
Technology (Zhejiang) Co., Ltd. Model Googlastick Formation of the second and your Voltage Magnitude Picture No.: 44 Clause: 7 Fest: Islanding Protection First Over Voltage Magnitude First Over Voltage Magnitude Secondary Over Voltage Trip Time Secondary Under Voltage Trip Time First Under Voltage Magnitude Secondary Under Voltage Trip Time Over Frequency Trip Time Over Frequency Trip Time Bescond Prequency Magnitude Over Frequency Trip Time Over Frequency Trip Time Bescond Preguency Trip Time Response to Utility Recow Technology (Zhejiang) 2004 2004 2004 Over Second Preguency Trip Time Response to Utility Recow Technology Preguency Trip Time Response to Utility Recow Technology 2004 2004 2000 Magnitude Second Preguency Trip Time Bescond Preguency Trip Time Response to Utility Recow Technology 2004 2004 2000 Magnitude Second Preguency Technology 2004 2004 2000 Second Preguency Second Preguency Magnitude	Order No. :	244466490	Product:	Grid-Connected PV Inverter
Picture No.: 44 Clause: 7 est: Secondary Over Voltage Magnitude First Over Voltage Magnitude Secondary Over Voltage Trip Time First Over Voltage Magnitude Secondary Over Voltage Trip Time First Under Voltage Magnitude Secondary Under Voltage Trip Time First Under Voltage Magnitude Under Frequency Magnitude First Under Voltage Trip Time Under Frequency Magnitude Over Frequency Magnitude Under Frequency Trip Time Response to Utility Recov est description: 33% load, PR: 0%, QC: 0%, triptime 342ms. Wave No. 1 was the output current or inverter; Wave No. 2 was the current through the grid, also regarded as trip signal the grid was switched off. V KEYSIGHT DS0-X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 V Totov 2000 ms/ 22003 #33 V Yuder Voltage Trip Time Secondary Voltage Trip Time 10:0 - X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 2 V Totov/X 1000 1000 V Yuder Voltage Trip Time Secondary Voltage Trip Time 10:0 - X 3024T, Mr60104203, 07.31.2020012842; Mon Dec 12 17:16:27 2 14383 V Totov/X 1000 <t< td=""><td>lient Name :</td><td></td><td>Model designation:</td><td>X1-MINI-1.5K-G4</td></t<>	lient Name :		Model designation:	X1-MINI-1.5K-G4
est: Islanding Protection First Over Voltage Magnitude Best: Secondary Over Voltage Magnitude First Over Voltage Trip Time Bescondary Over Voltage Trip Time First Under Voltage Trip Time Bescondary Under Voltage Trip Time First Under Voltage Trip Time Bescondary Under Voltage Trip Time Over Frequency Magnitude Under Frequency Magnitude Over Frequency Magnitude Under Frequency Trip Time Over Frequency Trip Time Bescondary Over Voltage Trip Time Over Frequency Magnitude Under Frequency Trip Time Response to Utility Recov Bescondary Magnitude Over Frequency Trip Time Bescondary Over Voltage Trip Time Response to Utility Recov Bescondary Magnitude Over Frequency Trip Time Bescondary Magnitude Over Magnitude Bescondary Magnitude Over Magnitude Secondary Magnitude Secondary Magnitude Bescondary Magnitude Secondary Magnitude Secondary Magnitude Secondary Magnitude <	ttachm	ent:1		
Secondary Over Voltage Magnitude Secondary Under Voltage Trip Time Secondary Under Voltage Trip Time Secondary Under Voltage Trip Time Secondary Under Voltage Trip Time Under Frequency Magnitude Under Frequency Trip Time Cover Frequency Magnitude Under Frequency Trip Time Secondary Under Voltage Trip Time Cover Frequency Magnitude Under Frequency Trip Time Secondary Under Voltage Trip Time Cover Frequency Magnitude Dover Frequency Magnitude Secondary Under Voltage Trip Time Secondary U	Picture No.:	44 Clause:	1	7
inverter; Wave No. 2 was the current through the grid, also regarded as trip signal the grid was switched off. DS0-X 3024T, Mr60104203, 07.31.2020012842: Mon Dec 12 17:16:27 2 2 20.04 3 20.47 20.0m/ 22.908 7823 72(3) 2.654400000 2(3) 2.6544000000 1/4x 2:9240 1/4x 2:9240		Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tin	Trip Time Magnitude Trip Time ude ne	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
2 20.0V 2.0V 2000ms/ 2908s #85 3 #28 #85 1	est description	inverter; Wave No. 2 was the		
348 348 1 1 2 96000000 V2(2) 2 2 96000000 V2(2) 2 2 96000000 V2(2) 2 1 348 1 1	KEYSIGH	T DS0-X 3024T, M	Y60104203, 07.31.2020	012842: Mon Dec 12 17:16:27 2022
342 00000000 342 00000000 342 00000000 1/4x 342 0000000 1/4x 1/4x 1/4x 1/4x 1/4x 1/4x 1/4x </td <td>E I</td> <td>2 20.0A/ 3 2.0A/ 4</td> <td>200.0ms/ -2.90</td> <td></td>	E I	2 20.0A/ 3 2.0A/ 4	200.0ms/ -2.90	
1/2 次 2.5240 1/2 次 2.5240 1/2 次 1/2 パ 1/2				753 X1(2) -2 96600000006 X2(2) -2 644000000006
1.43963 ム ム ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・				2 9240Hz Y1(2) 53 7500A
				1.43963kA ΔΥ: 1.38588kA
#12 R54 D Million ETIFALIZE Used equipment No.: See equipment list for details Sample No.: N/A			<u>[x2]</u>	
Used equipment No.: See equipment list for details Sample No.: N/A	单位	R 头		无准存头检查
	Used equipmer	nt No.: See equipment list for d	letails Sample N	lo.: N/A
Review date: Reviewed by:	Devlaw datas	3		

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Docume	nt No.:	TD-0189		
Protection and C	Control requirements for PEA ter based Generation Systems	Rep	ort No:	CN23Y4BO 001		
Order No. :	244466490	P	roduct:	Grid-Connected PV Inver	ter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model desig	nation:	X1-MINI-1.5K-G4		
ttachm	ent:1					
Picture No.:	45 Clause:	1		7		
	Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnite	Magnitude Trip Time		First Under Voltage Ma First Under Voltage Tri Over Frequency Magni Over Frequency Trip Ti	p Time itude	
lest description	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu		Response to Utility Re tal magnitude of grid currer	covery nt(1 st	
Test description	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate		Response to Utility Re tal magnitude of grid currer at 0.068A. See screenshot	covery nt(1 st	
=10 X1-Min	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate 相上	d currer	C Response to Utility Rental magnitude of grid current 0.068A. See screenshot	covery ht(1 st of powe	
U_tRMS	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	he 3% load, the fu han 1% of rate <u>相1</u> 220.06	d currer v	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot o 三相总和 220.06	covery nt(1 st of powe	
U_tRMS	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate <u>相</u> 1 220.06 120.02	d currer V mA	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot o <u>三相总和</u> 220.06 120.02	overy nt(1 st of powe V mA	
U_tRMS L_tRMS P_t	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate <u>相日</u> 220.06 120.02 1.0739	v v mA W	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot of <u>三相总和</u> 220.06 120.02 1.0739	v mA v	
U_tRMS L_tRMS P_t Q_t	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate <u>相日</u> 220.06 120.02 1.0739 26.217	v v mA w var	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217	v nt(1 ^{sr} of powe w mA w var	
U_tRMS L_tRMS P_t Q_t S_t	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate <u>相日</u> 220.06 120.02 1.0739 26.217 26.411	v v mA W	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217 26.411	v mA v	
U_tRMS L_tRMS P_t Q_t S_t PF_t	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate <u>相日</u> 220.06 120.02 1.0739 26.217	v v mA w var	☐ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相总和 220.06 120.02 1.0739 26.217 26.411 0.0398	v mt(1 st of powe mA w var VA	
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate 120.06 120.02 1.0739 26.217 26.411 0.0398	V MA W Var VA	□ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217 26.411 0.0398 50.000	v mA w var VA Hz	
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate 120.06 120.02 1.0739 26.217 26.411 0.0398 220.06	V MA W Var VA	□ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217 26.411 0.0398 50.000 220.06	v mA v w var vA Hz v	
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS L_fundRMS	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate 120.06 120.02 1.0739 26.217 26.411 0.0398 220.06 11.755	v mA w var vA v w	□ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217 26.411 0.0398 50.000 220.06 11.755	v mA v w var vA Hz v mA	
U_tRMS L_tRMS P_t Q_t S_t PF_t F_fund U_fundRMS	Under Frequency Trip Tim At the balance condition of 33 harmonic) was 0.011A, less t analyzer for detail.	ne 3% load, the fu han 1% of rate 120.06 120.02 1.0739 26.217 26.411 0.0398 220.06	V MA W Var VA	□ Response to Utility Rental magnitude of grid current 0.068A. See screenshot 0 三相意和 220.06 120.02 1.0739 26.217 26.411 0.0398 50.000 220.06	v mA v w var vA Hz v	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
	Page 75 of 109		,, , , , , , , , , , , , , , , ,





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlan	d (Shanghai) Co	., Ltd.	Document No.:	TD-0189
	Control requirement rter based Generati		Report No:	CN23Y4BO 001
Order No. :	244466490		Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Net Technology (Zhe	Contraction of the second s	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1			
Picture No.:	46	Clause:		7
	Secondar Secondar Secondar Under Fre	y Over Voltage N y Over Voltage T y Under Voltage y Under Voltage quency Magnitu quency Trip Tim	Trip Time Magnitude Trip Time Ide	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Trip Time First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	 33% load, PF inverter; Wav the grid was s 	2:0%, QC:+1%, e No. 2 was the	trip time 478ms. Way	e No. 1 was the output current of id, also regarded as trip signal while
	(T cs	D50-X 3024T, M	60104203, 07.31.2020	012842: Mon Dec 12 17:26:10 2022
(III) T	2 10.0A/ 3	2.0A/ 4	200.0ms/ -2.67	81 滚动 🗸
			فتحد وازع	12 光标 🛛 🔳
单位	0,0300V/4 (100 ± 1) 段大		ki Ma	F±1 X1(2) 2894000000000000000000000000000000000000
単位 安晴 Used equipmen	0,0300V/4 (100 ± 1) 段大 0.0100V/A	aipment list for d	etails Sample N	F± X1(2) 2.894000000000 X2(2) 2.456000000000 AX 478.000000000mms 1/AX 2.0921Hz Y1(2) 56.8500A AY: -29.9800A AY: -29.9800A AY/AX #62.7197A/s
 单位 安培 	0,0300V/4 (100 ± 1) 段大 0.0100V/A		NA U Os	F±1 X1(2) 2.994000000000 X2(2) 2.4050000000000 AX: 478.000000000000000 AX: 478.000000000000000000000000000000000000

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

I UV Kneinian	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	47 Clause:		7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time a Magnitude a Trip Time ude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH	T DS0-X 3024T, M	m60104203, 07.31.2020	012842: Mon Dec 12 17:27:13 2022
in i	2 10.0A/ 3 2.0A/ 4	200.0ms/ -2.62	
			 光梯 目
	0.0100V/4 (100 ± 1)		* 9€46 • ¥£3 X1(2) -2.8550000000000 *2(2) -2.4550000000000000000000 4X 388.00000000000000000000000000000000000
 单位 安培 	校大 0.0100V/A		下生3 X1(2) -2.05400000000 X2(2) -2.456000000000 AX 358 000000000mms 1/AX 2.5773Hz Y1(2) 56 6600A Y2(2) 26 8700A AY -29 9800A AY -29 9800A
単位 安培 Used equipmen	校大 0.0100V/A	etails Sample N	F-51 X1(2) 2.954000000000 X2(2) 2.4560000000000 AX 368.0000000000000 AX 368.000000000000000000000000000000000000
 单位 安培 	校大 0.0100V/A	0.0s	F-51 X1(2) 2.954000000000 X2(2) 2.455000000000 AX 358.000000000mms 1/AX 2.5773Hz Y1(2) 56.8600A Y2(2) 26.8700A AY .29.9800A AY .29.9800A AY .29.9800A AY .29.9800A XY/AX .77.2680A/s EUTIFICATE N/A

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA ter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Lt	d. Model designation:	X1-MINI-1.5K-G4
Attachm	ent:1		
Picture No.:	48 Clau	se:	7
	Secondary Over Volta Secondary Over Volta Secondary Under Volta Secondary Under Volt Under Frequency Mag Under Frequency Trip	ge Trip Time age Magnitude age Trip Time nitude Time	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test description	 33% load, PR: 0%, QC: + inverter; Wave No. 2 was the grid was switched off. 	3%, trip time 358ms. Wav	e No. 1 was the output current of id, also regarded as trip signal while
	T DS0-X 3024T	, Mr60104203, 07.31.2020	012842: Mon Dec 12 17:28:26 2022
tel t	2 10.0A/ 3 2.0A/ 4	200.0ms/ -2.83	36 液动 _/プ
			81
单位	0. 0100V/A (100 ± 1)		
単位 安晴 Used equipmen	反 0.0100V/A	or details Sample N	• 368 000000000000000000000000000000000000
 单位 安培 	反 0.0100V/A	bjæ 0.0s	• 368 •

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TUV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
lient Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
icture No.:	49 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
est description			e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH			012842: Mon Dec 12 17:29:57 2022
由 t	2 10.0A/ 3 2.0A/ 4	200.0ms/ -2.93	
		200.01110 12.55	61 禄劫 🗸
		₩	
 <	0.01009//4 (100 : 1) 序大 0.01009//4 (100 : 1)	₩	V2 3.10200000000 3.102000000000 3.22(2) 2.742000000000 360.000000000mms ΔX 360.000000000mms 1/ΔX 2.7778Hz Y1(2) 56.6500A Y2(2) 26.8700A ΔY -29.9800A ΔY/ΔX -29.9800A
また 生生 安培 Used equipmen	0.0100V/A(100 :: 1) 序大 0.0100V/A	etails Sample N	Image: Second
单位	0.0100V/A(100 :: 1) 序大 0.0100V/A		V2 3448 1 F51 3102000000000 X2(2) 2.743000000000 AX 360 000000000mms 1/AX 2.7778Hz Y1(2) 56 6500A Y2(2) 26 8700A AY -29 9800A AY/AX -83 2778A/s SUTFARES N/A

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	TD-0189
Protection and Control requirements for PEA Interface of Inverter based Generation Systems 2016.08		Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4
ttachm	ent:1		
Picture No.:	50 Clause:	1	7
	Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim	Trip Time Magnitude Trip Time ude e	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
fest description	 33% load, PR: 0%, QC: +5%, 	, trip time 352ms. Wav	e No. 1 was the output current of id, also regarded as trip signal while
KEYSIGH			012842: Mon Dec 12 17:31:02 2022
(E) T			
	2 10.0A/ 3 2.0A/ 4	200.0ms/ -2.59	81 液动 🔨
			√2 ### ■ ¥48 ■ ¥48 ■ ¥49 ■ ¥1(2) •2.7200000000000000000000000000000000000
			2 #48 E ¥1(2) -2.7200000000000000000000000000000000000
·····································	0.0100V/A(100:1) 医共 0.0100V/A		1 #48 1 F43 X1(2) -2.7200000000000000000000000000000000000
通道 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	0.0100V/A(100:1) 医共 0.0100V/A		V2 9648 F53 X1(2) -2.720000000005 X2(2) -2.8000000000 X2(2) -2.8000000000 AX -352.000000000mms 1/AX -2.8409Hz Y1(2) -56.6500A Y2(2) -26.8700A AY -29.9800A AY/AX -365.1705A/s -29.9800A -50.1765A/s -20.1705A/s

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

rotection and	nd (Shanghai) Co., L	td. Do	cument No.:	TD-0189	
	Control requirements for rter based Generation \$		Report No:	CN23Y4BO 001	
Order No. :	244466490		Product:	Grid-Connected PV Inverte	er
Client Name :	SolaX Power Network Technology (Zhejiang		designation:	X1-MINI-1.5K-G4	den de re
ttachm	ent:1				
Picture No.:	51	Claus	e:	8	
	Secondary Ov		de Firs de Firs e Ove	t Over Voltage Trip Time t Under Voltage Magnitude t Under Voltage Trip Time r Frequency Magnitude r Frequency Trip Time ponse to Utility Recovery	
lest description	voltage protection	was tripped; Wave N	No.1 was the g	remained over 242V after th rid voltage; Wave No.2 was nal while the grid voltage ch	the
		1	1		
				 	
				244.201 Xittili V	
				and the second se	1
				149.443	
				REFE (mk)	
		>>		末日日 mA ・ (Lood Noted - 50,0000 来町市 - 100	
	1.00	200	3.00		
B(H)(s) @AIX/UX@(Remote	A 0.11.5277 Node] [V] 297.5938	2.00 B 4.64.8540 -382,0934	#15. 4:30.0267 -480.587		
8(#1);; 0 Al 1/01@(Remote 0 Al 1/12@(Remote)	A 011.5277 Node] [V] 297.5038 Node] [A] 0.007530	200 B #344.8540 -382,9934 0.178402	#15 4:30.926 -450.537 0.060872		
B(H)(s) @AIX/UX@(Remote	A 011.0.9277 Node] (V) 297.5038 Node] (A) 0.07530 G4 [Hz] 40.90079	2.00 B 4.64.8540 -382,0934	#15. 4:30.0267 -480.587		
81 #1 s 8 Al 3/U1@(Remote Al 1/11@(Remote F_fund@X1 MINI-	A 0:13.0277 Node: [V] 297,038 Node: [V] 297,038 G4 [Hz] 40,0079 Node: [V] -5.20428	2.00 8 40.44.8540 -382,99844 0.179402 45.59990	430.036 -480.587 0.08087 1.306-4		
D(H) (s) © Al 1/U1⊕(Remote © Al 1/13⊕(Remote © F, facel@03 MINI © Al 1/U4⊕(Remote	A 0:11.9277 Node: [V] 297.5938 Node: [V] 297.5938 G4 [Hz] 20.9979 Node: [V] 5.19429 mt No.: See equipm	2.00 B 4.44.8540 -382,9934 0.179402 45,99990 -5,196572	415 430.000 -450.587 0.00047 1.305e4 -2.140e1		
81 #1 s 8 Al 3/U1@(Remote Al 1/11@(Remote F_fund@X1 MINI-	A 011.0.9277 Node] (V) 297.5038 Node] (A) 0.07530 G4 [Hz] 40.90079	2.00 8 40.44.8540 -382,99844 0.179402 45.59990	430.036 -480.587 0.08087 1.306-4		





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shan	ghai) Co., L	td.	Docum	ent No.;	TD-018	9	
rotection and 0 terface of Inve 016.08				Re	port No:	CN23Y	4BO 001	
rder No. :	244466	490		1	Product:	Grid-Co	onnected PV Inverte	er
lient Name :		Power Network logy (Zhejiang		Model des	ignation:	X1-MIN	I-1.5K-G4	
ttachm	ent :	1						
icture No.:	1	52		Clause:	1		8	
		Secondary Ow Secondary Ow Secondary Un Secondary Un Jnder Frequer Jnder Frequer	er Voltage T der Voltage der Voltage hcy Magnitu	rip Time Magnitude Trip Time de		rst Under rst Under ver Frequ ver Frequ	Voltage Trip Time Voltage Magnitud Voltage Trip Time Jency Magnitude Jency Trip Time to Utility Recovery	e
est description	the	ter reconnect	to grid with rotection wa	127.9s dela s tripped; W	ave No.1	was the	e remained below 2 grid voltage; Wave I	No.2 w
			of inverter; \	Wave No.4 w	as the trip	p signal v	while the grid voltag	e
N ¹		output current nged.	of inverter; \	Wave No.4 w	as the trip	p signal v	while the grid voltag	e
1 1 1 1 1 1			of inverter; \	Wave No.4 w	as the trip	p signal v	while the grid voltag	e
made []20 % 10 million and []20 % 10 million and []20 % 10 % 10 % 10 % 10 % 10 % 10 % 10 %			of inverter; \	Wave No.4 w	as the trip	p signal v	240.389	e
ALL TO AL			of inverter; \	Wave No. 4 v	as the trip	p signal v	240.389	e
Constraint and Constr			of inverter; \	Wave No. 4 v	as the trip	p signal v	240.389	e
ALL TRUE AND TO ALL TRUE AND T			of inverter; \	Wave No. 4 v	as the trip	p signal v	• :	e
name of the state			of inverter; \	Wave No. 4 v	as the trip	p signal v	240.389	
The second			of inverter; \	Wave No. 4 v	2 me	p signal v	•	
		ngèd.	of inverter; \			1	Contraction 240.389 SPT® Contraction 6.406 Attra A Solution Solution	
		nged.	of inverter; \	>> 221.5696 ->>.30.3666	22	FISE 07.86730 000.0044	240.389 240.389 2016 000 6.406 2018 A	
ere Jahon no Kilver Jahon no K	o tea	100 E	of inverter; \	>>> >>> >>> >>>>>>>>>>>>>>>>>>>>>>>>>>	7 MB	RTE 07.0479	240.389 240.389 2718 V 6.406 2418 A 50.000 5978 50.000 5978 6388 240.35478	
ever - Matchine - Marken - M Marken - Marken - M	o te moteNode][N] moteNode][A]	nged.	of inverter; \	>> 221.5696 ->>.30.3666	7.00 7.00 22 30	FISE 07.86730 000.0044	240.389 240.389 2016 000 6.406 2018 A	
THE REPORT OF TH	oteleNode][N]	100 C		>>> 5 5 5 5 5 5 5 5 5 5 5 5 5	7.00 7.00 22 30 4.4	67.4670 67.4670 5.67402 1235-4 2202-3	240.389 240.389 240.389 2016 400 50 6.406 701 5000 5000 500 6.406 701 5000 500 500 6.406 701 5000 500 500 500 500 500 500 500	
The first of the f	oteleNode][N]	100 000 000 000 000 000 000 000 000 000		>>> 5 5 5 5 5 5 5 5 5 5 5 5 5	22 23 4 4	PIE 07.4670 05.87402 1293-4 1293-4 1293-4 1293-4 1293-4 1293-4	240.389 240.389 240.389 2016 400 50 6.406 701 5000 5000 500 6.406 701 5000 500 500 6.406 701 5000 500 500 500 500 500 500 500	

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

V Rheinlar	nd (Shang	hai) Co., Ltd	40 C	Documen	it No.:	TD-018	59	
		uirements for Pl Generation Sys		Repo	ort No:	CN231	(4BO 001	
ler No. :	2444664	190		Pro	oduct:	Grid-C	onnected PV	/ Inverter
ent Name :		ower Network ogy (Zhejiang) (Model design	nation:	X1-MIN	II-1.5K-G4	
tachm	nent:	1						
ture No.:		53		Clause:			8	
		econdary Over econdary Over econdary Unde econdary Unde nder Frequency nder Frequency	Voltage Trip er Voltage M er Voltage Tr v Magnitude	Time agnitude ip Time	Firs Firs Ove Ove	t Unde t Unde r Frequ r Frequ	Voltage Trip r Voltage Ma r Vltage Trip uency Magni uency Trip Tir to Utility Rec	gnitude Time tude me
t descriptio		er won't reconi r voltage protect						ave No.2 was
	the o	utput current of	finverter; Wa	ave No.4 was	the trip	signal	while the grid	voltage
		utput current of	finverter; Wa	ave No.4 was	the trip	signal	while the grid	Ivoltage
	the o	utput current of	finverter; Wa	ave No. 4 was	the trip	signal	while the grid	I voltage
	the o	utput current of	finverter; Wa	ave No.4 was	the trip	signal		i voltage
	the o	utput current of	finverter; Wa	ave No. 4 was	the trip	signal	• 1,000	
	the o	utput current of	finverter; Wa	ave No. 4 was	the trip	signal		
	the o	utput current of	finverter; Wa	ave No. 4 was	the trip		196.156	
	the o	utput current of	finverter; Wa	ave No.4 was	the trip		196.156	
	the o	utput current of	finverter; Wa	ave No.4 was	the trip		196.150 2010 126.681	
	the o	utput current of	finverter; Wa	ave No.4 was	the trip		196.150 2010 126.681	
	the o	utput current of	finverter; Wa	ave No.4 was	the trip		•	
	the o	utput current of ged.		ave No.4 was			196.156 #Hill 126.681 126.681 ************************************	
19月1日	the o chan	utput current of ged.	ан.ос	5 MI	115		196.150 #196.150 #126.681 126.681	
DI HI (s) DA 1/U1@(Remot A 1/U1@(Remot	the o chan	atput current of ged.		350 96			196.156 #Hill 126.681 126.681 ************************************	
DT AT IN D AT 1/U1@(Remo	the o chan	etput current of ged.		35 55	HS 430.907 90.0132		196.156 2010 196.156 2010 196.156 196.6681 126.6681 126.681 50.000 2010 196 106.156	
AI 1/11@(Bernot	the o chan	201 201 201 201 201 201 201 201 201 201		35 Million (1997)	#654 +20.0927 96.0333 0.330002 2.20005		• 196.156 ##r# 126.681 126.681 • 126.681 • 126.681 • 126.984 • 126.984	
II III (s) ■ N 1/U1@(Remot ■ N 1/U1@(Remot ■ F_head@X1 HiN ■ N 1/U4@(Remot	the o chan	10 10 10 10 10 10 10 10 10 10		3 Sa	#152 4-50-9527 96-0533 2-386-5 5-5326-4		• 196.156 ##r# 126.681 126.681 • 126.681 • 126.681 • 126.984 • 126.984	





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	(Shan	ghai) Co., Ltd	Le la	Docum	ent No.:	TD-0189			
		uirements for Pl Generation Sys		Re	port No:	CN23Y4	BO 001		
order No. :	244466	6490		F	Product:	Grid-Con	nected	PV Inverter	g nieses
lient Name :		Power Network logy (Zhejiang) (Model desi	gnation:	X1-MINI-	1.5K-G	4	*******
ttachme	ent :	1							
icture No.:	1	54		Clause:	1		8		
		Secondary Over Secondary Over Secondary Unde Secondary Unde Under Frequency Under Frequency	Voltage Trij er Voltage N er Voltage T y Magnitud	p Time lagnitude rip Time		st Over Vo st Under V st Under V er Freque er Freque sponse to	oltage l oltage ncy Mag ncy Trip	Magnitude Trip Time gnitude Time	
est description:	the was	rter reconnect to under voltage pro the output curre	otection wa	s tripped; V	Vave No.1	was the g	rid volta	age; Wave N	No.2
	Chai	nged.		-					
	Chai	nged.					• Qenigna		
100	cna	nged.				in and	200.		
	j cha	nged.				in and	200.		
		nged.				in harrist	200.	360	
		nged.					200.	360	
		nged.				(A)	200.	360 79 ^79	
		nged.				(A)	200.	360 79 2000	
			3.30			2.00	200. 7.5 7.5 50.0	360 779 ^ 0000 m	
		2.00 2.00 0.13.5707	2.30 2.20.4	1963	1450 206.02	2.10	200.	360 79 79 000 m	
		2.00 2.00 A A SLASTOT -2.54.4472	1.10 0 2/20.4 295.2	9963 1962	7450 2:06-92 392,07	2.10	200.	360 779 A 0000 rel 38 th natus	
	E E E E E E E E E E E E E E E E E E E	2.00 2.00 0.13.5707	2.30 2.20.4	1963 1962 1953 1968	1450 206.02	2.10 2.10 56 78 12 12	200.	360 79 79 000 m	
THE IN THE IN	Eedet W) Eedet W) Eedet M) Eedet W) Eedet W)	2 IN 2 IN 4 03.15707 -356.5472 -3.12000 45.99990 -3.203155	110 2204 2353 1.511 49.99 5.201	1963 1962 1953 1968 1967	115 206.50 362.07 1.6734 -1.905 4.0536	2.10 56 56 58 58	200.	360 779 A 000 00 38 m h1815 39664	
THR IS HAUDE THE CONTRACT OF	Eedet W) Eedet W) Eedet M) Eedet W) Eedet W)	Dot Dot A 01.5707 -156-3472 -0.162060 -0.599990	110 2204 2353 1.511 49.99 5.201	1963 1962 1953 1968 1967	HS 206.92 392,07 1.6754 -1.90%	2.10 2.10 2.10 2.10 2.10 2.10 2.10 2.10	200.	360 779 A 000 00 38 m h1815 39664	
THE IS THE IS	Eedet W) Eedet W) Eedet M) Eedet W) Eedet W)	2 IN 2 IN 4 03.15707 -356.5472 -3.12000 45.99990 -3.203155	110 2204 2353 1.511 49.99 5.201	960 382 383 968 182 182 182 182 182 182 182 182 182 18	405.00 902.07 1.4750 4.0550 6.0550 6.0550 6.0550	2.00 2.00 54 55 53 50.: N/A	200.	360 779 A 000 00 38 m h1815 39664	

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

JV Rheinla	nd (Shar	nghai) Co., L	td.	Docum	nent No.:	TD-0189		
		quirements for d Generation S		Re	eport No:	CN23Y4BC	001	00000000
der No. :	24446	6490			Product:	Grid-Conne	ected PV Inverte	er
ient Name :		Power Network ology (Zhejiang		Model des	ignation:	X1-MINI-1.	5K-G4	Presidentes T
ttachm	nent	: 1						
cture No.:		55		Clause:	1		8 age Magnitude	
		Secondary Ow Secondary Ow Secondary Un Secondary Un Under Frequer Under Frequer	er Voltage T der Voltage der Voltage ncy Magnitu ncy Trip Tim	rip Time Magnitude Trip Time de e	Firs	st Under Vol st Under Vol er Frequenc er Frequenc sponse to U	tility Recovery	
st descriptio	afte No	er the over frequence over frequence over the over the over the output the output the output the output the over frequence over the over t	uency protection	ction was trij	pped; Waw	e No.1 was i	remained above the grid voltage; ignal while the	Wave
	vol	age changed.			are 140.4 ft	as the tip s	agnai while the j	gna
	vol	age changed.	-		ave 110.4 m	as the trip a	ignal while the	I
	vol	age changed.		•		-	20.092	Jing
		age changed.				22	20.092	
		age changed.				2:	20.092	
		age changed.				22 2810	20.092 V	
		age changed.				22 2810	20.092	
		age changed.				25 2310 2310 2310 2310 2310 2310 2310 2310	20.092	
	10v			•		2: 2:10 	20.092	
Diff (c)		013.6020	2000 X	> * *	100 FF F F F F F F F F F F F F F F F F F	22 23 24 24 25 25 25 25 25 25 25 25 25 25	20.092	
	1.00 Lefkinder] [M]	0133-0010	200 10 10 10 10 10 10 10 10	×	1.000	25 2314 (100 (24) (24) (24) (24) (24) (24) (24) (24)	20.092 20.092 47.037 тед 52.000 тед тед	
THE G	terNode (V) Node (V) (A) (G (H4)	013.4010 213.1402 -0.117.187	2000	5 6 4.0754 8.8767 77782	8-300 F-300	22 2310 2410 2410 2410 2410 2410 2410 2410 24	47.037 mA 52.000 m fishin 725.0954	
Effici A 1212/Benn A 1212/Benn A 1212/Benn A 1204/Benn Seed equipme	ErNode (W) ErNode (W) ENODE (A) ErNode (V) Smt No.:	A 013.4010 212.3422 	1000	© ALGT24 SLA	500 FIL 450.47 -3449 6.349 6.349 5.349 Sample Ne	2: 2:2:10 2:10	47.037 47.037 52.000 41310 726.0938 61.40943 52.000	
Diff (c) M 101@(Bened M 101@(Bened M 101@(Bened M 101@(Bened) M 104@(Bened)	ErNode (W) ErNode (W) ENODE (A) ErNode (V) Smt No.:	A 013.6010 212.5429 -0.117397 84.90048 -0.201837	1000	Autra Autor	1.30 1.30 1.30 1.30 1.30 1.30 1.30 1.30	22 23 24 24 25 25 25 25 25 25 25 25 25 25	47.037 47.037 52.000 41310 726.0938 61.40943 52.000	





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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	(Shanghai) Co., Ltd	. Doc	ument No.:	TD-0189	
	ntrol requirements for P r based Generation Sys		Report No:	CN23Y4BO 001	
order No.:	244466490		Product:	Grid-Connected PV I	nverter
norm realizer 1	SolaX Power Network Technology (Zhejiang)		lesignation:	X1-MINI-1.5K-G4	
ttachme	nt : 1				
icture No.:	56	Claus	e:	8	
	Secondary Over Secondary Over Secondary Unde Secondary Unde Under Frequenc: Under Frequenc:	er Voltage Magnitud er Voltage Trip Time y Magnitude	E Fir	st Over Voltage Trip Til st Under Voltage Magr st Under Voltage Trip T er Frequency Magnitu er Frequency Trip Tim- sponse to Utility Reco	nitude fime de e
st description:	52Hz after the over 1	requency protectio output current of in	n was tripped	d voltage frequency re l; Wave No. 1 was the g No.4 was the trip signa	prid voltage;
				220.314	
				220.314 51 g v	
				220.314	
				220.314 TT II V	
				6.982	
				6.982	
				6.982 24 a 4 4 51.800	
		1.0 200		6.982 2118 4 1,000 0,000	
00000000000000000000000000000000000000	1:00 (1:12)			1,000,000 000 000 000 000 000 000 000 00	
	Litte A 0.12.5406 del[V] -263.3720 del[V] -263.3720 b)[A] -4.125534 [V] -3.2.34093	L 10 22000E	2:07.0 536.0	6.982 51.800 51.800 51.800 51.800 51.800 0.1658 0.1658 0.16588	
BTHE BTHE	1.00 A 0.12.5466 del [V] -263.3720 b) [A] -0.12554 PHJ 52.34003 del [V] -5.29154	1.00 2-00 2.00 2-00	2:07.0 536.0 0,354 -0.390	6.982 2.1 (1) A 6.982 2.1 (1) A 6.982 6	
81 Hi (c) 8 Al 1/U10/RemoteNod Al 1/10/RemoteNod 97. fund@X1.MINI-64 (1.00 A 0.12.5466 del [V] -263.3720 b) [A] -0.12554 PHJ 52.34003 del [V] -5.29154	1.00 2-00 0 213.6045 0.228490 5.379966 -5.20396	2:07.0 535.0 0,354 -0.390 -1.190	1 (1997) (1998) (1998) (1998) (1998) 1 (1997) (1998) (19	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	d (Shanghai) Co., Lto	d. D	ocument No .:	TD-0189	
	ontrol requirements for P ler based Generation Sy		Report No:	CN23Y4BO 00	1
Order No. :	244466490		Product:	Grid-Connecte	d PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)		designation:	X1-MINI-1.5K-0	34
ttachme	ent:1				
Picture No.:	57	Cla	use:	8	
	Secondary Over Secondary Over Secondary Unde Secondary Unde Under Frequenc	r Voltage Trip Time er Voltage Magnit er Voltage Trip Tin sy Magnitude	e	st Over Voltage st Under Voltage st Under Voltage er Frequency M er Frequency Tr sponse to Utility	e Magnitude e Trip Time agnitude ip Time
	after the under freque No.2 was the output				
100	voltage changed.		r, wave No.4 v	vas the thp signa	al while the grid
T Y			r; wave No.4 v	vas the thp sign	
00,000		Content of Invente	r; wave no.4 v	•	
T Y			r; wave no.4 v		1
T Y			r; wave no.4 v		0.085 V
			r; wave No.4 v	•).085 V 290
			r; wave no.4 v	• comp 220 221 221 221 221 221 221 221 221 221).085 V 290
	voltage changed.	~		• слетр 220 жена 127. жена 46 хана	290 mA 800
				•	290 mA
	voltage changed.	>>		• слитр 220 дата 127. Пата 53318 435 435	 a = 10 0.085 √ 290 mA 800 50 100
0000 1000 1000 1000 1000 1000 1000 100	voltage changed.	>>> ==================================		•	
19900 199000 199000 19900 19900 19900 19900 19900 19900 19900	voltage changed.	>> ===================================		сонер 220 дени 220 дени 127. Тени 46 хана 46 хана	
PIN C	voltage changed.	>>> 6 4.12,6007 -366,4535 0.0591303 44,79965	F F F F F F F F F F F F F F F F F F F	сонце 220 Ятна 127. Тоца 127. Ятна	
00000 00000 00000 </td <td>voltage changed.</td> <td>>></td> <td>1.0000 2.0007 2.0007 2.0007 2.0007</td> <td>•</td> <td></td>	voltage changed.	>>	1.0000 2.0007 2.0007 2.0007 2.0007	•	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	(Shanghai) Co., Ltd.	Doc	ument No.:	TD-0189	
nterface of Inverter 016.08	trol requirements for PE/ based Generation System		Report No:	CN23Y4E	30 001
Order No. :	244466490		Product:	Grid-Con	nected PV Inverter
Such the test of the second se	SolaX Power Network Technology (Zhejiang) Co		lesignation:	X1-MINI-1	.5K-G4
Attachme	nt : 1				
Picture No.:	58	Claus	e:		8
	Secondary Over V Secondary Over V Secondary Under Secondary Under Under Frequency Under Frequency	oltage Trip Time Voltage Magnitud Voltage Trip Time Magnitude		st Under Vo st Under Vo er Frequen er Frequen	Itage Trip Time oltage Magnitude oltage Trip Time icy Magnitude icy Trip Time Utility Recovery
Test description:	Inverter reconnect to 47Hz after the over fre Wave No.2 was the or grid voltage changed.	quency protectio	n was tripped	; Wave No.	.1 was the grid voltag
2014 2014 2014 2014 2014 2014 2014 2014					220.297
				Rei	6.975
		+			47.200
877	5 1.86	>>	2.00		*
0 23	A 0.12.4903	8 219.4170	207.11		有效值
		-266.1112	-101.13	187 195	220.0818 0.154191 47.19977
FT H [s] # N 1/01@(RemoteNode # J/10@(RemoteNode # J/10@(RemoteNode # N 1/04@(RemoteNode)	47.59963	47.39962 -5.382995	1.907		5.201227
FT HE [s] @ Al 1/U1@(RemoteNod @ F_fund(X1 MNR G4 [p @ N 1/U4@(RemoteNod	47,59963 e1 (V) -5.204439	-5.392995	0.0114		
DI Al (s) B Al 1/UL@(RemoteNode Al 1/L1@(RemoteNode B F_fund@X1 MINI 64 (P	47,59963 e1 (V) -5.204439	-5.392995		••• o.: <u>N/A</u>	

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	d (Shanghai) Co., Ltd.	Do	cument No.:	TD-0189		
	Control requirements for PE ter based Generation Sys		Report No:	CN23Y4	BO 001	
Order No. :	244466490		Product:	Grid-Cor	nected PV	Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) C		designation:	X1-MINI-	1.5K-G4	8-1100-1255-6868-55
Attachm	ent:1					
Picture No.:	59	Clau	se:		8	
	Secondary Over Secondary Over Secondary Under Secondary Under Under Frequency Under Frequency Under Frequency	Voltage Trip Time r Voltage Magnitu r Voltage Trip Tim r Magnitude	de	st Under V st Under V er Freque er Freque	oltage Trip T /oltage Mag /oltage Trip ncy Magnitu ncy Trip Tim Utility Reco	nitude Time ude ne
	protection was tripped current of inverter; W			ile the gric	l voltage cha	
100				ile the gric		
				ile the gric	240.274	
				ile the gric	240.274	
				ile the gric	4 voltage cha	
	current of inverter; W	/ave No. 4 was the	e trip signal wh	23 23 23 23 23 23 23 24 24 24 24 24 24 24 24 24 24 24 24 24	4 voltage cha	anged.
	current of inverter; W	/ave No. 4 was the	trip signal wh	E the grid	40.274	anged.
	Current of inverter; W	Vave No. 4 was the	200	2:0 C	4 voltage cha 240.274	anged.
	Current of inverter; W	/ave No. 4 was the	2 100 2010 2 100 2000 2 100 20000000000	2:0 C	4 voltage cha 240.274	anged.
1910/114 0100	Live A Control of inverter; W	Vave No. 4 was the	2017.33 2018	2:0 C	4001299 cha 400.274 1 V 400.274 6.388 50.000 10.5538 6.388 1 A 50.000 10.5538 1 A 10.5555 10.555 10.55555 10.5555 10.5555 10.5555 10.55555 10.55555 10.55	anged.
1910/1014 INITE IN	Live A Control of inverter; W	Vave No. 4 was the	207333 23% 20733 23% 20733 25% 20733 25% 20733 25% 25% 25% 25% 25% 25% 25% 25% 25% 25%	231 231 231 231 231 231 231 231 231 231	4001299 cha 400.274 1 V 400.274 6.388 50.000 10.5538 6.388 1 A 50.000 10.5538 1 A 10.5555 10.555 10.55555 10.5555 10.5555 10.5555 10.55555 10.55555 10.55	anged.
1000000 0000000 0000000 0000000 000000000000000000000000000000000000	Live A Control of inverter; W	Vave No. 4 was the	2015 Sample N	230 231 231 231 231 231 231 231 231 231 231	4001299 cha 400.274 1 V 400.274 6.388 50.000 10.5538 6.388 1 A 50.000 10.5538 1 A 10.5555 10.555 10.55555 10.5555 10.5555 10.5555 10.55555 10.55555 10.55	anged.

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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shangh	ai) Co., L	td.	Docu	ument No.:	TD-0189		
rotection and C iterface of Inver 016.08					Report No:	CN23Y4E	30 001	
order No. :	24446649	0			Product:	Grid-Con	nected PV I	nverter
lient Name :		wer Network ty (Zhejiang		Model d	esignation:	X1-MINI-1	.5K-G4	
ttachm	ent:1	1						
icture No.:		60		Clause	9:		8	
	Sec Sec Unc	condary Ow condary Un condary Un der Frequer	er Voltage N er Voltage T der Voltage der Voltage ncy Magnitu ncy Trip Tim	rip Time Magnitude Trip Time de	E Fir	st Under Vo st Under Vo er Frequen er Frequen	Itage Trip Ti oltage Magi oltage Trip " icy Magnitu icy Trip Tim Utility Reco	nitude Time ide e
	protect		below 198V oped; Wave					
	curren	t of inverter;	Wave No.4					
	curren	t of inverter;				ile the grid		
	curren	t of inverter;				ile the grid	voltage cha	
	current	t of inverter;				ile the grid	voltage cha	
	curren	t of inverter;				ile the grid	00.348	
		t of inverter;				ile the grid	00.348	
		t of inverter;				2 Sarg	00.348	
		t of inverter;				2 Fill	00.348 7.576 50.000	
				was the ti	ip signal wh	2 Range Rang Rang Rang Rang Range Rang Ran	00.348	
	• current	7.40	Wave No.4	was the ti		2 Range Rang Rang Rang Rang Range Rang Ran	00.348	
		140	Wave No. 4	vas the ti	210 200 200 200	A	voltage cha 00.348	
Fifi 12 Millio (Brendeh	6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1.00 A 625.0042 -282.0042 -282.0042	Wave No. 4	2000 0 1700 0 0 0 0 0 0 0 0 0 0 0 0	200 U	2 511 511 511 511 511 511 511 511 511 51	voltage cha 00.348 v 7.576 50.000 a 50.000 a 50.000	
	6 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1.00 1.00 1.00 1.00	Wave No. 4	vas the ti	210 2015 2015 2015	2 2 2 3 4 4	voltage cha	
PIR IN PIR IN	6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1.00 A 0.25.0044 -0.007910 -8.09003 -5.190173	Wave No. 4	vas the ti	210 210 200 200 200 200 200 200 200 200	2 2 2 3 3 4 4 4 3	voltage cha 00.348 v 7.576 50.000 8 6.51997 4.99975	
PIR IN PIR IN	6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1.00 A 0.25.0044 -0.007910 -8.09003 -5.190173	2258 	vas the ti	210 200 200 200 200 401 200 401 200 401 200 401 200 401 200 401 200 401 200 401 200 401 200 401 200 401 401 401 401 401 401 401 401 401 4	A A A A A A A A A A A A A A A A A A A	voltage cha 00.348 v 7.576 50.000 8 6.51997 4.99975	
PIAI (s) PIAI (6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1.00 A 0.25.0044 -0.007910 -8.09003 -5.190173	2258 	vas the ti	200 200 207.541 207.541 207.541 207.541 205.542 4.5542 4.5542 Sample N	A A A A A A A A A A A A A A A A A A A	voltage cha 00.348 v 7.576 50.000 8 6.51997 4.99975	





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APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shanghai) Co., L	td.	Document No.:	TD-0189	
	control requirements for ter based Generation S		Report No:	CN23Y4B	0 001
Order No. :	244466490		Product:	Grid-Conn	ected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang		Model designation:	X1-MINI-1	.5K-G4
ttachm	ent:1				
Picture No.:	61	Clause:		8	
	Secondary Ow Secondary Ow Secondary Un Secondary Un Under Frequer	er Voltage Trip der Voltage M der Voltage Tr ncy Magnitude	o Time ☐ Fii lagnitude ☐ Fii ip Time ☐ O e ☐ O	st Under Vo st Under Vo er Frequen er Frequen	tage Trip Time oltage Magnitude oltage Trip Time cy Magnitude cy Trip Time Jililty Recovery
est description	52Hz. The grid vol	tage frequenc		again durin	equency remained belo of the countdown perio
-					signal while the grid
	No.3 was the outp			was the trip	
	No.3 was the outp			was the trip	signal while the grid
	No.3 was the outp			was the trip	signal while the grid
	No.3 was the outp			was the trip	signal while the grid
	No.3 was the outp			was the trip	signal while the grid
	No.3 was the outp			vas the trip 22 Feral	signal while the grid
	No.3 was the outp			was the trip	signal while the grid
	No.3 was the outp			vas the trip 22 Feral	signal while the grid
	No.3 was the outp			Avas the trip	6.985 51,800
	No.3 was the outp			vas the trip 22 Feral	6.985 51,800
	No.3 was the outp			Avas the trip	51.800
	No.3 was the outp voltage changed.	but current of ir	nverter; Wave No.4	Avas the trip	51.800
PERFECT	No.3 was the outp voltage changed.	Dut current of ir	nverter; Wave No. 4 4	vas the trip	51.800
	No.3 was the outp voltage changed.	out current of in	nverter; Wave No. 4 1	vas the trip	51.800
ETHIO	No.3 was the outp voltage changed.	Sut current of in	nverter; Wave No. 4 (vas the trip 22 جعرية جعرية حمرة حمرية حمرة حمرة حمرة حمرة حمرة حمرة حمرة حمر	51.800 6.985 6
ETHIC CONTRACTOR CONTR	No.3 was the outp voltage changed.	235.05	nverter; Wave No. 4 (vas the trip 222 المعانية مالمانيا معانيا معانيمانيا معاني معانيمانيما معاني معانيمانيمماتما معاماماليمامماماليمامماماليمامماماليماممامال	signal while the grid
Total III	No.3 was the outp voltage changed.	235.000 States States States States States	nverter; Wave No. 4 (vas the trip	51.800 6.985 6
ETHIN ET	No.3 was the outp voltage changed.	235.000 States States States States States	nverter; Wave No. 4 (vas the trip	51.800 6.985 6

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinland	(Shanghai) Co., Ltd.	Do	cument No.:	TD-0189	
	ontrol requirements for PE er based Generation Syste		Report No:	CN23Y4BO 001	000000 - 1140 - 1000 - 50 - 50 1
Order No. :	244466490		Product:	Grid-Connected	PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co		designation:	X1-MINI-1.5K-G	4
ttachme	ent:1				
Picture No.:	62	Clau	se:	8	
	Secondary Over V Secondary Over V Secondary Under Secondary Under Under Frequency Under Frequency Under Frequency	oltage Trip Time Voltage Magnitu Voltage Trip Tim Magnitude	de Erin e Ov	st Over Voltage T st Under Voltage st Under Voltage er Frequency Ma er Frequency Trip sponse to Utility I	Magnitude Trip Time gnitude o Time
	47Hz. The grid voltage after the under frequer No.2 was the output c	ncy protection w	as tripped; Wa	ave No.1 was the	grid voltage; Waw
100 March 100 Ma	voltage changed.		; wave No.4 v	vas tne tnp signal	while the grid
			; vvave ivo.4 v	220.30	
HALF AREA			, vvave No.4 v		
THE COLOR			, wave No.4 v	220.30	
1000 - Dial of the second seco			, wave No. 4 v	220.30	
THE COLOR			, wave No. 4 v	220.30 2019	
1000 - Dial of the second seco			, wave No. 4 v	220.30 391% • 19958 - 46.5 3391% • 7946	59
			, wave No. 4 v	220.3(= 27/9 • 00058.40 5.27/9 • 7.04 • 7.04 • 7.47	978
	voltage changed.			220.30 = 00058.40 = 00058.40	09 V 2000 1.00
	voltage changed.		2.00	220.3(32)(3	978
	voltage changed.	1,0 3,0 1,0 3,0 3,0 3,0 3,0 3,0 3,0 3,0 3	200 FEE 2014	220.3(33) 30) 30) 30) 40) 40) 40) 40) 40) 40) 40) 4	200 200 200 10 10 10 10 10 10 10 10 10
	voltage changed.	1.0 201100 1.0 201100 201100	200	220.3(= 27/9 = 00058.40 (20058.40) (20058	
Reference and a second	voltage changed.	1.0 2.03.159 2	200. 200. 200. 200.4 200	220.3(32) 32) 52) 52) 52) 52) 52) 52) 52) 52) 52) 5	09 V 10 10 10 10 10 10 10 10 10 10
	voltage changed.	1.0 2.03.159 2	200 200 200 200 200 200 200 200 200 200	220.3(221) 	09 V 109 V 109 109 109 109 109 109 109 109
Used equipment	voltage changed.	1.0 2.03.159 2	200. 200. 200. 200.4 200	220.3(= 00058.40 = 00058.40	09 V 200 No No No No No No No No No No

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

UV Rheinland otection and C	i (Shan	dnan Co L			ument No.:	TD-0189		
					ument No.;	10-0109		
tenace of Invent 16.08		uirements for Generation S			Report No:	CN23Y4	30 001	
rder No. :	244466	490			Product:	Grid-Con	nected PV Inver	ter
ient Name :		Power Network logy (Zhejiang			designation:	X1-MINI-1.5K-G4		1010490396379
ttachme	ent :	1						
cture No.:	1	63	Clause	e		9		
		Islanding Prot Secondary Ov Secondary Un Secondary Un Secondary Un Under Freque Under Freque	ver Voltage ver Voltage nder Voltag nder Voltag ncy Magni	e Trip Time ge Magnitu ge Trip Time tude	de	First O First U First U Over F Over F	ver Voltage Mag ver Voltage Trip nder Voltage Ma nder Voltage Tri requency Magni requency Trip Ti nse to Utility Re	Time Ignitude p Time tude me
st description:	jum	ped to 267.3V	/ approxim	ately. Waw	e No.1 was th	ne grid volta	ms , the grid volt age; Wave No.2 the grid voltage	was the
		······	WWW				267.363	
		*******	*****				156.556	
							136.336 雨	
101 100 1	((********)))))			*****			****	
							• 50.000	
	0.07.00		0.07.28	>>			0.07.75	
PERFECT.		A 7.374667		B 7.502409		127522	有效值	
OA 1/U1@(Beend		263,9960		114.8732		8.42274	203.6874	
Al 1/11@(Remote F_fund@X1-MIP		4.274004 56.12227		0.393885		880120	5.131731 49.99698	
	deNode] [V]	-5.296717		-5.201578		1863e-3	5.203843	
• Al 1/0-40/06east								
	t No +	See equier	ant liet for	dataile	Sample M			
Jsed equipmen	t No.:	See equipm	nent list for	details	Sample N Tested	1999 <u>- 1993) -</u> 1		

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

		phai) Co., Ltd.	Docun	nent No.:	TD-0189		
		uirements for PEA Generation Systems		eport No:	CN23Y4E	30 001	
Order No. :	2444664	190		Product:	Grid-Con	nected PV Inverte	r
Client Nam		ower Network ogy (Zhejiang) Co., L	td. Model des	signation:	n: X1-MINI-1.5K-G4		
Attach	ment :	1					
Picture No.		64 Clau	se:		9		
Test descri		econdary Over Volta econdary Over Volta econdary Under Volt econdary Under Volt Inder Frequency Mag Inder Frequency Trip ng the first level over	ge Trip Time lage Magnitude lage Trip Time gnitude Time		First Ur	ver Voltage Trip T nder Voltage Mag nder Voltage Trip requency Magnitu requency Trip Tim nse to Utility Reco ms, the grid voltag	nitude Time ude ne wery
	jump	ed to 267.3V approx ut current of inverter;	imately. Wave N	lo.1 was th	ne grid volta	ge; Wave No.2 w	as the
Ensertier Ensertier Storage						267,361	
_	206.77	o los	0 0:100	0.07.50		1.94 5.54 A 35 (8)	
81 MR (14)		A 7.289646	7.424400		0.124822	20080500	
	1@(RemoteNode) [V] 1@(RemoteNode) [A]	243.3779 6.978348	304.5805		6.713581	270.8006	
- AL 1/1	d(RE-MINI-G4 (Hz) 4(P(RemoteNode) (V)	50.12244	45.99942		0.123020	43.39096	
		of the second	all the second to be a		9.537e-4	5.202456	

Used equipment No.: See equipment list for details Sample No.: N/A
Finished date: Tested by:
Review date: Reviewed by:

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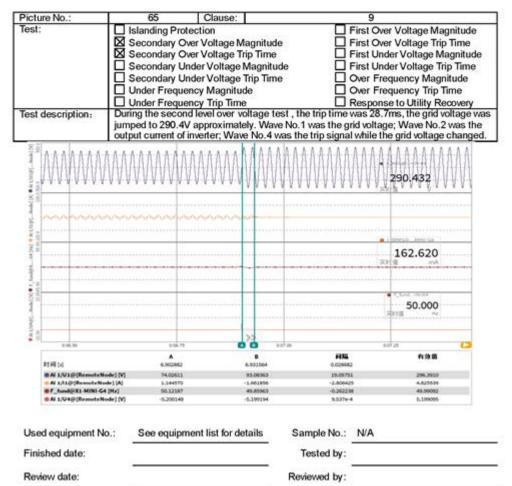
REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan	Document No.:	▲ TÜVRheinland® ™-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

Attachment : 1



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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

		Test Pla	2.50 M	1/225/5	0.875322273	-	TÜVR		and
UV Rheinlan	d (Shan	ghai) Co., Lt	d.	Doc	ument No.;	TD-018	9		
		uirements for F Generation Sy			Report No:	CN23Y	4BO 001	26-11-621	
rder No. :	244466	490			Product:	Grid-Co	onnected PV	Inverte	er
ient Name :		Power Network logy (Zhejiang)	Co., Ltd.	Model	lesignation:	X1-MIN	I-1.5K-G4	22-1100-1	
ttachm	ent :	1							
cture No.:		66	Clause:	1		9	9		
		slanding Prote Secondary Ove Secondary Ove Secondary Und Secondary Und Under Frequen Under Frequen	er Voltage N er Voltage T der Voltage der Voltage cy Magnitu	rip Time Magnitus Trip Time Ide	le	First First Over	Over Voltage Over Voltage Under Voltage Frequency 1 Frequency 1 onse to Utilit	e Trip T ge Mag ge Trip Magnit Trip Tin	līme gnitude Time ude ne
st description	i: Duri jum	ing the second ped to 290.4V out current of in	level over v approximat	oltage te ely. Wave	No.1 was th	me was 2 ne grid vo	27.6ms, the g Itage; Wave	prid vol No.2 v	tage wa vas the
	\mathcal{M}	MM	\mathbb{N}	VV	\mathbb{N}	ŴŴ	290,43	3	A
							162.9	71	
							美村県	mA	
The second							• (564.783	-	
						•••••	50.0 Earth	00	
0.04.29		0.06.920	0.0440	>>	6.900	0.05.400		08.700	
101 HA [14]		A 6.4399200		8	0	FIRE 0276462	fi	熟讀	
		\$95.7298		194.9422		0.22148		L0147	
 Al 1/1@(Rem F_fund@K1-M 		1.871412 50.12139		-2.095968		1967381		86402	
• Al 1/04@(Res		-5.200625		-5.204439		1.815e-3		00290	
sed equipme	nt No.:	See equipme	ent list for d	etails	Sample N	lo.: N/A			
inished date:				<u></u>	Tested	by:			
				-					
teview date:					Reviewed	by:			

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ŪV F	Rheinland	d (Shangha	i) Co., Ltd.		Doc	ument No.:	TD-0189	
	ce of Invert		ments for PEA neration Syste			Report No:	CN23Y4B	0 001
Order N	No. :	244466490				Product:	Grid-Conr	ected PV Inverter
Client I	Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.		., Ltd.	Model o	designation:	X1-MINI-1.5K-G4	
\tta	chm	ent:1						
Picture			67 0	Clause:			9	
		Secular Secula	ondary Over Vo ondary Over Vo ondary Under Vo ondary Under Vo er Frequency I er Frequency	oltage Tr Voltage I Voltage Magnitud	rip Time Magnituo Trip Time de	de	First Un	er Voltage Trip Time ider Voltage Magnitud ider Voltage Trip Time equency Magnitude equency Trip Time se to Utility Recovery
		Dunna t		nder volt:	teet and	The trip tin		ame the and voltages
10M Dillema	escription	jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	he grid volta ignal while t	4ms, the grid voltage v ge; Wave No.2 was th he grid voltage change
2.000 2.000 2.000 0.000		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	he grid volta signal while t	ge; Wave No.2 was th he grid voltage change
2006 2 0110-2007 3a) 19996-34210/5 Nr • [6] 19996-		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	he grid volta signal while t	ge; Wave No.2 was th he grid voltage change 177:441
2000, 2000, 2000, 200 Dollowing - 100 toth to the Dollowing - 100 toth to		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	ihe grid volta	ge; Wave No.2 was th he grid voltage change 177:441
-Gel [wi] * ML[PH]_Muhl[M] * ML[M][C. Nohl][P] Th (0.000)		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	ihe grid volta lignal while t	ge; Wave No.2 was th he grid voltage change 177,441
2000 - de Judi - de Judi - persona - juli de la Villa - de Judi -		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	ihe grid volta lignal while t	ge; Wave No.2 was the he grid voltage change 177.441
Dots		jumped	to 177.3V app	proximate	ely. Wave	e No.1 was t as the trip s	ihe grid volta lignal while t	ge; Wave No.2 was th he grid voltage change 177,441
0.02/04/05/10/06/05/04/06/06/06/06/06/06/06/06/06/06/06/06/06/		jumped	to 177.3V app current of invert	proximate	elý. Wave e No.4 v	e No.1 was t as the trip s	ihe grid volta ignal while t	ge; Wave No.2 was th he grid voltage change 1777.441
2000 - 2000 - 2 (analytic - 64 (ad.) = 20 (2000 - 2		jumped	to 177.3V app current of invert	proximate	elý. Wave e No.4 v	e No.1 was t as the trip s	ihe grid volta ignal while t	ge; Wave No.2 was th he grid voltage change 1777.441 1177.441 116.285 116.285
a constant and a set of the set		jumped	to 177.3V app current of invert	proximate	elý. Wave e No.4 v	e No. 1 was t vas the trip s	ihe grid volta ignal while t	ge; Wave No.2 was th he grid voltage change 1777.441
2 του. Del person - Statutoria (La Statutoria) - Statutoria (La Statutoria) - Statutoria (La Statutoria) - Statutoria Del person - Statutoria (La Statutoria) - Statutoria (La Statutoria) - Statutoria (La Statutoria) - Statutoria	00.00 10	jumped output o	ess.co	proximate	elý. Wave e No.4 vi	e No. 1 was t vas the trip s	ihe grid volta ignal while t ignal while t isotopic to the second isotopic	ge; Wave No.2 was th he grid voltage change 1777.441 1777.441 116.285 116.285 50.000 Fitta min 177.488
9 00 00 00 00 00 00 00 00 00 00 00 00 00		jumped output c	elic.to	proximate	s subjective sub	e No. 1 was t vas the trip s	ess of ess of ess	ge; Wave No.2 was th he grid voltage change 1777,441 1177,441 116.285 116.285 116.285 116.285

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	de etc.	Tested by:	
Review date:		Reviewed by:	

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

V Rheinlan	d (Shangha	ai) Co., Ltd.	D	ocument No.:	TD-0189	
		ements for PEA eneration System	15	Report No:	CN23Y4BO 00	D1
ler No. :	244466490)		Product:	Grid-Connecte	ed PV Inverter
ent Name :	Technology (Zhejiang) Co., Ltd.			Model designation: X1-MINI-1.5K-G4		G4
tachm	ent:1					
ture No.:		68 Cla	ause:		9	
	Sec Sec Und Und	condary Over Voll condary Over Voll condary Under Vol condary Under Vol ler Frequency Ma ler Frequency Tri	tage Trip Tim bltage Magnit bltage Trip Tin agnitude ip Time	e ude ne	First Under V First Under V Over Freque Over Freque	oltage Trip Time Voltage Magnitude Voltage Trip Time ency Magnitude ency Trip Time o Utility Recovery
t description	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V	, the grid voltage w Wave No.2 was the rid voltage change
1000	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr	Nave No.2 was the
1000 0000 0000 0000 0000 0000 0000 000	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr 17	Wave No.2 was the rid voltage change
000 000 000 000 000 000 000 000 000 00	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr 17	Wave No.2 was the rid voltage change
1000 0000 0000 0000 0000 0000 0000 000	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr 17 2019	Wave No.2 was the rid voltage change
200 000 000 000 000 000 000 000 000 000	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr 17 xma 1	Vave No. 2 was the rid voltage change
11 00/01/2 0000 0000 0000 0000 0000 0000	jumped	to 177.3V appro	ximately. Wa	we No.1 was th	ne grid voltage; V gnal while the gr 17 xma 1	Vave No. 2 was the rid voltage change 7.443 v
10.00 0000000 0000000 0000000 0000000 00000	jumped	I to 177.3V appro current of inverter	ximatelý. Wa r; Wave No.4	we No.1 was the trip si	e grid voltage; V gnal while the gr 17 Earra 1 Earra 2010	Vave No. 2 was the rid voltage change
	jumped	to 177.3V appro current of inverter	ximatelý. Wa r; Wave No.4	we No.1 was the trip si	e grid voltage; V gnal while the gr 17 Earra Parta Earra Earra Earra	Nave No. 2 was the rid voltage change 7,443 20 16,419 16,419 16,419 16,419 16,419 16,419 16,419 16,419 16,419 16,419 16,419 16,419
10.00 0000000 0000000 0000000 0000000 00000	jumped	I to 177.3V appro current of inverter	ximatelý. Wa r; Wave No.4	ve No.1 was th was the trip si	ne grid voltage; V gnal while the gr 17 Earra 1 Earra 2010	Vave No. 2 was the rid voltage change
	jumped output o	I to 177.3V appro current of inverter	ximately. Wa r; Wave No.4	ve No.1 was th was the trip si	ne grid voltage; V gnal while the gr 17 2010 1 2010 2	Vave No. 2 was the rid voltage change 7,443 V 16,419 rnk 50.000
000 0000 00000 00000 00000 00000 00000 0000	jumped output of occo	I to 177.3V appro current of inverter over	ximatelý. Wa r; Wave No.4	ve No.1 was th was the trip si	e grid voltage; V gnal while the gr 17 Extra 1 Extra E	Vave No. 2 was the rid voltage change 7,443 7,443 16,419 16,419 50,000 10,000 10,000 10,000 10,000

Used equipment No.: See equipment list for details Sample No.: N/A
Finished date: Tested by:
Review date: Reviewed by:

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ÜV Rheinlan	d (Shangh	nai) Co., Ltd.	Doci	ument No.:	TD-0189	
		irements for PEA Seneration Systems		Report No:	CN23Y4BO 00	1
Order No. :	24446649	90		Product:	Grid-Connecte	d PV Inverter
Client Name :		wer Network gy (Zhejiang) Co., L		esignation:	X1-MINI-1.5K-G4	
Attachm	ent: 1	1				
Picture No.:		67 Clau	se:		9	
	Se Se Se Un Un	acondary Over Volta acondary Over Volta acondary Under Volta acondary Under Volta acondary Under Volta ader Frequency Mag ader Frequency Trip	ge Trip Time age Magnitud age Trip Time mitude Time	e	First Under V First Under V Over Freque Over Freque Response to	Vitage Trip Time 'oltage Magnitude 'oltage Trip Time ncy Magnitude ncy Trip Time Utility Recovery
Test description	was ju	g the second level u umped to 98.1V app utput current of inver ged.	roximately. W	ave No.1 wa	s the grid voltage	; Wave No.2 was
1 INABAAA	202020202					
	///////////////////////////////////////	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		www		WWWWW
	·····		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~		**************************************
	~~~~~			~~~~	20 2010	V
The second secon				~~~	20 2010	x.323 v 7.112 mil
				~~~	2210 2210 2210 2210	V
Indegr di pol 1 wi 1040 - and 104 wi 10 ministra mini				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2010 2010 2010 2010 2010 2010	V
			× ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧ ∧		2010 2010 2010 2010 2010 2010 2010 2010	V 7.112 max 50.000
торота торот	exoteNede][V]	COTTOR A 1200729 18.44159	20000000000000000000000000000000000000		2010 2010 2010 2010 2010 2010 2010 2010	V
11 N • 01 N • 0 10 N · 0 · 0 · 0 · 0 · 0 · 0 · 0 · 0 · 0	moleNode][V] noteNode][V] Nillsi Ge [I4]	0011.00 A 1.000729 18.46194 1.10023 49.8036	cat 20 2.47051 4.160006 0.143045 1.43055 1.430555 1.430555 1.430555 1.430555 1.430555 1.430555 1.430555 1.43		- 1900 2010 2010 2010 2010 2010 2000 2000	V
Him Wilson Hall In Body - Alar	moleNode][V] noteNode][V] Nillsi Ge [I4]	0.01100 A 1.000739 LE-ME194 LE-M	Bet20 Be			V
The offer start and the of	moteNode] [V] noteNode] [A] imoteNode] [V]	0011.00 A 1.000729 18.46194 1.10023 49.8036	50720 50720 50720 50720 507055 5070000 5199920	Sample N		V Meter (m 7.112 mak 50.000 res fish fi 9638372 820833 820833
100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 100000 000000 1000000 000000 1000000 0000000 0000000 0000000 0000000 0000000 0000000 0000000 0000000 0000000 000000000000000000000000000000000000	moteNode] [V] noteNode] [A] imoteNode] [V]	Corrae 7.200729 18.48194 1.10023 ety.8046 4.201578	50720 50720 50720 50720 507055 5070000 5199920			V Meter (m 7.112 mak 50.000 res fish fi 9638372 820833 820833
The file of the fi	moteNode] [V] noteNode] [A] imoteNode] [V]	Corrae 7.200729 18.48194 1.10023 ety.8046 4.201578	50720 50720 50720 50720 507055 5070000 5199920	Sample N		V Meter (m 7.112 mak 50.000 res fish fi 9638372 820833 40.0952





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

ΰV	Rheinlan	d (Shang	ghai) Co., Ltd.	Doc	ument No.:	TD-0189)	
	ace of Inver		uirements for PEA Generation Systems		Report No:	CN23Y4	IBO 001	14210003208
Order	No. :	244466	490		Product:	Grid-Co	nnected PV In	verter
Client	Name :		Power Network logy (Zhejiang) Co., Li		lesignation:	X1-MINI	-1.5K-G4	be can be done
tta	achm	ent :	1					
Pictur Test:	re No.:		68 Clau	ise:		9		
			Secondary Over Volta Secondary Over Volta Secondary Under Volt Secondary Under Volt Jnder Frequency Mag Jnder Frequency Trip	ge Trip Time lage Magnitud lage Trip Time gnitude	le	First U	Over Voltage To Jnder Voltage I Jnder Voltage Frequency Mag Frequency Trip onse to Utility F	Magnitude Trip Time gnitude Time
lest d	description	was the o	ng the second level un jumped to 98.1V app output current of inver nged.	roximately. W	/ave No.1 wa	is the grid	voltage; Wave	No.2 was
make [[4] • ALTING	WWWW	www.		MMMMMM	wwwww	www	98.324	www
womet-	www.www	www.	******	manan	MW			
 	www.www	*****			<u></u>		66.553	7
Annight OA (be) @ AL (10.04)		~~~~			·····		66.553	
· AUTOR		*****					66.553	
Analys - Or (ref. * ALTER)-				>>	·····		66.553	
Analys - on (nel * w.01096	000.25	0.000	0.0L75 X		MWY 		66.553	.71
Analys - OA (NU * ALUER)-							66.553 1000 mm	
Analys - on (nel * w.01096	时间(s) ●AI1/U1@(Rea ●AI1/U1@(Rea	moteNode] [V] soteNode] [A]	A 0.937308 83.85060 6.432885		8	FIEL 1.266893 88.34318 1.275559	66.553 2010 50.0000 50.00000 50.00000 50.00000 50.00000 50.00000 50.00000 50.000000 50.000000000 50.0000000000	1.79 (2)
Analys - on (nel * w.01096	HR [s]	moteNode) (V) soteNode) (A) KINI-G4 (Hz)	A 0.857308 81.85969			FIGE 1,266893 88,34329	66.553 10000 10000 10000 10000 1000000 1000000 1000000 1000000 1000000 10000000 1000000 10000000 100000000	1.79 C2
At 3 (see by) _ and a () () = 1, (see by) = - (st 2)(st 2) = 0.12(st 2)(-12)(st 2) = 0.12(st 2)(-12)(st 2) = 0.12(st 2)(-12)(st 2) = 0.12(st 2)(-12)(st 2)(st 2)(-12)(st 2)(-12)(st 2)(st 2)(s	H H (s) O AI 1/V10/Rev O AI 1/110/Rev O F_food@X1-5	moteNode] [V] sofeNode] [A] HINI-G4 [Hz] moteNode] [V]	A 0.937308 83.85969 6.42385 49.86338	DEL.M C.157326 A.156656		FIE 1206493 98,34329 6275559 83,35201 2,623e-3	66.553 1000 000 1000 0000 1000 000 1000 0000 1000 1000 10000 1000 1000 1000 10000 1000 1000	1.79 C2
Table 20 and a second and a sec	时间(1) ●A1J/U1@(Rev ●A1J/U1@(Rev ●F_5ond()X1.5 ●A1J/U4@(Rev	moteNode] [V] sofeNode] [A] HINI-G4 [Hz] moteNode] [V]	A 0.937208 83.85909 6.432885 48.84538 49.84538 -5.198479	DEL.M C.157326 A.156656		HE 1206993 86.34339 86.34339 86.34339 82.34329 82.343339 82.34339 82.34339 82.34339	66.553 1000 000 1000 0000 1000 000 1000 0000 1000 1000 10000 1000 1000 1000 10000 1000 1000	1.79 C2
Tatuta Independent and Tatuta Ularger Jakota U	HT HE (c) A A J/USE (Rec A I J/USE (Rec F, Society R.) A I J/USE (Rec A I J/USE (Rec d equipmen	moteNode] [V] sofeNode] [A] HINI-G4 [Hz] moteNode] [V]	A 0.937208 83.85909 6.432885 48.84538 49.84538 -5.198479	DEL.M C.157326 A.156656	Sample N	ADE L256203 86.54329 6.275559 82.36208 2.4229=3 ko.: N/A by:	66.553 1000 000 1000 0000 1000 000 1000 0000 1000 1000 10000 1000 1000 1000 10000 1000 1000	279 C2 L L

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ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

JV Rheinlar	nd (Shan	ghai) Co., Ltd.	8	Document No.:	TD-018	~	
		uirements for PE Generation Sys		Report No:	CN23Y	′4BO 001	
rder No. :	244466	490		Product:	Grid-C	onnected PV Inverter	r
lient Name :		Power Network logy (Zhejiang) C		Model designation:	X1-MIN	1-MINI-1.5K-G4	
ttachm	ent:	1					
icture No.:		69	Clause:		1	10	
st description		Secondary Over Secondary Over Secondary Under Secondary Under Jnder Frequency Under Frequency	Voltage Trip r Voltage M r Voltage Tr / Magnitude / Trip Time	Time agnitude ip Time	First First	Over Voltage Trip Til Under Voltage Magr Under Voltage Trip 1 Frequency Magnitu Frequency Trip Tim Joonse to Utility Record a grid voltage frequen	nitude fime de e very
81	jum was	ped to 52.6Hz ap	promixately	. The wave No.1 w	as the gri	id votage; The wave I the trip signal while the	No.2
	AAA	A A A A	AAAA	A A A A	n n n		. 1
	MM	MMM	MW	WWW	WV	219.836	U I
	WW		<u>AW</u>		WW		V I
	WW		/////		VVV		
	WW				WW	148-208	
	WW		<u>A</u>		VVV		
	WW				VW		
	WWA				WW	**************************************	
			0100	e uz ext		*7.5ml mile 52.600	
	noteNode) (A) KINI-G4 (Hz)		0100 0125 284 011 525	etilen soss sossss sosssss soss soss soss soss soss		**/504_3000 52.600 23198 ec	
21 m ² 1 m ²	nsteNode] [A] EINE-G4 [Hz] moteNode] [V]	A 012.505236 36.54617 0.566508 51.63111 5.196095	0 10 012.5 384 0.1 52.5 53.5	e tí en extens extense ex	052748 65.3604 412541 988350 384e-4	*7,504,3054 *7,504,3054 52,600 2017.00 00 00 00 00 00 00 00 00 00	
	noteNode) [A] miti-Ga (Hz) moteNode) [V] ent No.:	A 012.505236 36.54027 0.564008 51.41111	0 : 0 12.5 394 0.1 52.5 (5.15	e tí en extens extense ex	ALC 002748 452643 3980350 3980-4 No.: <u>N/</u>	*7,504,3054 *7,504,3054 52,600 2017.00 00 00 00 00 00 00 00 00 00	





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

V Rheinlan	d (Shan	ghai) Co., Ltd.	U	cument No.:	TD-0189		
		uirements for PEA Generation Systen	ns	Report No:	CN23Y4B	O 001	
der No. :	244466	490		Product:	Grid-Conn	ected PV Inver	ter
ent Name :		Power Network logy (Zhejiang) Co.,		l designation:	X1-MINI-1.5K-G4		
tachm	ent:	1					
ture No.:		70 Cl	ause:		10		
st description		slanding Protection Secondary Over Vol Secondary Over Vol Secondary Under Vol Secondary Under Vol Jnder Frequency M Jnder Frequency Tr ng the under freque	Itage Magnitu Itage Trip Time oltage Magnit oltage Trip Tin lagnitude rip Time	e ude ne	First Ov First Un First Un Over Fr Over Fr Respon	er Voltage Mag er Voltage Trip der Voltage Ma der Voltage Tri equency Magn equency Trip T se to Utility Re grid voltage frec	Time agnitude p Time itude ime covery
	was	ped to 46.4Hz appro the output current of					
5 I A-A-A-A	volta	age changed.	1. A. A. A. A. A. A. A.		. A. A. A. A. A. A		1.1.1
		ige changed.	www.	WWW	WW	220,140	M
		ige changed.		WWW	WW	220.140	M
		ige changed.		WWW	WWN <u>;</u> [220.140	
		ige changed.		WWW			M
		ige changed.		WWW			M
		eLID				• 1.4 1000	
					FEEL 000779	• 1	
		DIL/73	0:11.935420 -285.8920	0	PEE .000739 173.5466	01120 mA 0 Long States 01120 mA 01120 mA 0	
	011.30	DULT DULT DULT DULT DULT DULT DULT DULT	0:11.931420 -285.8920 -6.925707 46.39970	0 4 4	FEE .00719 73.5496 3.23479 .3090790	ettill mik * And Andre #46,400 2012 * State * St	
	011.30		0:11.931420 -285.8920 -6.925707	0 4 4	FRE 000739 7335346 3325479	* 1.000 million millio	•
	Dil 30 Dil 30 Di	DULT DULT DULT DULT DULT DULT DULT DULT	0111.931420 -285.8920 -8.925707 -86.39970 -6.199671	0 4 4	FRE 000719 1735496 1228479 1228479 1228479 1228479	ettill mik * And Andre #46,400 2012 * State * St	
	Dil 30 Dil 30 Di	931.75 A A A A A A A A A A A A A	0111.931420 -285.8920 -8.925707 -86.39970 -6.199671	0 4 4 4		ettill mik * And Andre #46,400 2012 * State * St	





REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.: TD-0189		
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4	

Attachment : 1

1.	Under/over frequency test	The trip signal on the wave diagram was given by the AC source. For each operation on AC source a voltage signal would be given out. (from high level change to low level or from low level change to high level). In this test, we push the button on interface of AC source to change the simulated grid voltage frequency while a trip signal was given out to Oscilloscope automatically.
2	Response to Utility Recovery	The trip signal on the wave diagram was given by the AC source. For each operation on AC source a voltage signal would be given out. (from high level change to low level or from low level change to high level). In this test, we push the button on interface of AC source to change the simulated grid voltage or voltage frequency while a trip signal was given out to Oscilloscope automatically.
3	Islanding protection	In this test the trip signal was the current flowing to the grid. When the grid were not disconnected yet, a little current remained even in 100% balance condition, in which case the fundamental current is close to zero, but harmonic component still remains. While the grid is disconnected the gird current would disappeared thoroughly. So it's easy to find the moment while the grid is disconnected by the wave of grid current. The grid current as well as the inverter output current may appear impulses after the switch S2 released or the inverter cease to energize. It was caused not by the real current, but by the electromagnetic noise which may impact the current transducer appearing very small pulse signal while there is no real current flowing through it.

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	6
Review date:		Reviewed by:	
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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	TD-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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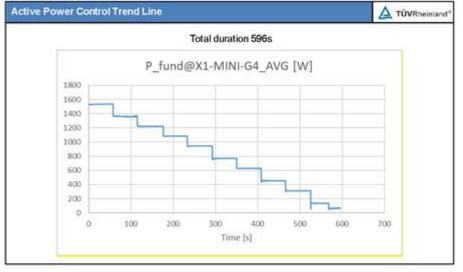
REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

	ata / Test Plan Id (Shanghai) Co., Ltd.	Document No.:	▲ TÜVRheinland® ™-0189
	Control requirements for PEA rter based Generation Systems	Report No:	CN23Y4BO 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-1.5K-G4

Attachment : 1



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

TÜV Rheinland (Shanghai) Co. Ltd. QMA 30.041.01SHG_7.14



Measurement and Test Equipment List Used MTE

Revision: 20 July, 2007/G.Luebken

Attachment: 2

Report No.: CN23Y4BO 001

Order No.: 244466490

Equip.	Description	Model	Manufacturer
9017073	Power Analyser(DEWETRON)	DEWE2-PA7	Austria, DEWETRON
9017074	Current Sensor(For WT3000)	IT 200-S	LEM
9017075	Current Sensor(For WT3000)	IT 200-S	LEM
9017076	Current Sensor(For WT3000)	IT 200-S	LEM
9017077	Current Sensor(For WT3000)	IT 200-S	LEM
9017078	Programmable AC Source(61860)	61860	Chroma ATE INC.
9017080	Oscilloscope	MDO3024	Tektronix
G1819265	ScopeCoder	DL850	JAPAN, Yokogawa
G1819266	Power Analyser(WT3000)	WT3000	JAPAN, Yokogawa
G1819267	T-Power Software	TP100-P-LVHA/STP	JAPAN, Yokogawa
G1819268	Anti-islanding test detection devices	ACLT-4830H	QUNLING Energy Resources
G1819269	Harmonic impedance analog flicker system	ACLT-6150	QUNLING Energy Resources
G1819277	PV array simulator	62150H-1000S	Chroma Co.
G1819278	PV array simulator	62150H-1000S	Chroma Co.
G1819279	PV array simulator	62150H-1000S	Chroma Co.
G1819280	PV array simulator	62150H-1000S	Chroma Co.

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	

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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Attachment 3: Report Number: Model: Photo Documents CN23Y4BO 001 X1-MINI-1.5K-G4





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REPORT No.: CSSC/BOS/005

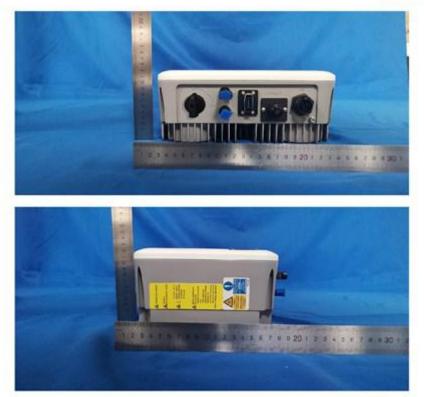
ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Attachment 3:	
Report Number:	
Model:	

Photo Documents CN23Y4BO 001 X1-MINI-1.5K-G4





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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX C. TÜV Rheinland's Report No: CN23Y4BO 001. (Cont.)

Attachment 3: Report Number: Model: Photo Documents CN23Y4BO 001 X1-MINI-1.5K-G4





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REPORT No.: CSSC/BOS/005

ISSUED DATE: March 9, 2023

APPENDIX D. Laboratory Accreditation Certificate No. CNAS L3038.



China National Accreditation Service for Conformity Assessment LABORATORY ACCREDITATION CERTIFICATE (Registration No. CNAS L3038)

TUV Rheinland (Shanghai) Co., Ltd.

(Legal Entity: TUV Rheinland (Shanghai) Co., Ltd.) 1/F. of No.10, No.153/165/177/178/179/182/189/192/198, Lane 777,

Guangzhong West Road, Jing'an District, Shanghai, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date: 2019-10-30 Expiry Date: 2023-11-18

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the international Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA). The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml