



(Issued date)

## หมายเลขรายงาน: CSSC/BOS/003

(Report no.)		(Iss
ผู้ขอรับบริการ	SolaX Power Network Technology (Zhejiang) Co., Ltd.	
(APPLICANT) :	No.288, Shizhu Road, Tonglu Economic Development Zone, Tonglu Cit	y,
	Zhejiang Province, 310000 P. R. CHINA	
ผู้รับรายงาน	ตามที่อยู่ผู้ขอรับบริการ	
(SUBMITTED TO) :	(Same as above)	
ผลิตภัณฑ์	PV grid-connected inverter	
(PRODUCT) :		
ยี่ห้อ	SOLAX	
(BRAND) :		
รุ่น	X1-MINI-3.0K-G4	
(MODEL) :		

#### ขอบข่ายการประเมิน (Scope) :

รายงานฉบับนี้เป็นการให้ความคิดเห็นต่อความเป็นไปตามข้อกำหนดของผลิตภัณฑ์ ตามมาตรฐาน / ระเบียบ ที่ระบุในส่วนต่อไป วัตถุประสงค์ของการประเมินความเป็นไปตามข้อกำหนดในรายงานฉบับนี้ เพื่อระบุ ความเป็นไปตามข้อกำหนดตามมาตรฐานหรือระเบียบที่เกี่ยวข้องของการไฟฟ้าฝ่ายจำหน่าย สำหรับประกอบการ พิจารณาอนุมัติการขนานเข้าระบบ ความคิดเห็นในรายงานฉบับนี้เป็นการประเมินจากหลักฐานทางเทคนิคซึ่งจัดส่งให้ ศูนย์ๆโดยผู้ขอรับบริการและ/หรือผู้ผลิตอุปกรณ์

#### มาตรฐาน / ระเบียบ (Standards/regulations) :

ระเบียบการไฟฟ้านครหลวงว่าด้วย ข้อกำหนดการเชื่อมต่อระบบโครงข่ายไฟฟ้า พ.ศ. 2558

#### หลักฐานทางเทคนิค (Technical evidence) :

รายงานผลการทดสอบ, ข้อกำหนดคุณลักษณะเฉพาะของผลิตภัณฑ์ และเอกสารที่เกี่ยวข้องอื่น ๆ ซึ่งจัดหาให้โดยผู้ขอรับ บริการ

> นายสิทธิชัย มังกรฤทธิ์ วิศวกรทดสอบ ผู้เตรียม (Prepared by)

นายบัลลังก์ หมื่นพินิจ หัวหน้าหน่วยทดสอบอุปกรณ์ประกอบระบบ ผ**ู้ทบทวน (Reviewed by)** 

ดร. มานิตย์ สีแป้น ผู้จัดการฝ่ายทดสอบ ผู้ทบทวน (Reviewed by) (รศ.ดร. อนวัช แสงสว่าง) รองผู้อำนวยการ สายงานวิชาการ ผ**ู้อนุมัติ (Approved by)** 

รายงานฉบับนี้ใช้ลายเซ็นดิจิทัลเฉพาะหน้าแรกโดยมีผลครอบคลุมทั้งฉบับ





หมายเลขรายงาน: CSSC/BOS/003

## วันที่ออกรายงาน: February 13, 2023

คำอธิบายผลิตภัณฑ์							
(Product descripti							
	ยี่ห้อ:	SOLAX					
	(Brand)						
	รุ่น: (Model)	X1-MINI-	3.0K-G4				
ข้อกำหนดคุณลักษ							
9		utput			Input		
Voltage		, 30/240V		Max. voltage	550V		
Frequency	50/60	Hz nom.		Voltage range	40 – 550V MPPT		
Current	13.1A	nom.		Current	16Amax.		
Power	3000V	V nom.		Power	6000W max.		
หมายเหตุ ข้อกำหนดค	าุณลักษณะดั	ึ่งระบุใน ภา	คผนวก ข.	-	· · · · · · · · · · · · · · · · · · ·		
พลการประเมิน (Con	npliance c	ase verdi	cts)				
ผ่าน:			ผลการทดสอบเป็น	ไปตามข้อกำหนด			
(Complied)				plied with the requireme	ent.)		
ไม่ผ่าน:			ผลการทดสอบไม่เป็นไปตามข้อกำหนด				
(Does not comply)			(Submitted result does not comply with the requirement.) ผลการทดสอบหรือข้อมูลที่เกี่ยวข้องไม่เพียงพอสำหรับการประเมิน				
ไม่ครบถ้วน:			ผลการทดสอบหรอขอมูลทเกยวของเมเพยงพอสาหรบการบระเมน (The test results are not sufficient for evaluation.)				
(Undeterminec สมายเหตุ (General			(The test results are n	ot sufficient for evaluatio	n.)		
		้องไปอองกำเ	 ซ้ำนางส่วน โดยไม่ได้	รับความยินของอาจ	<i>ร</i> ูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์		
	ณ์ เป็นอายอัง ค. เป็นอายอัง	เองเมถูกทาง	ขาบ เงลวน เตยเมเต ยกเว้นได้ทำซ้ำเต็มฉา	รา เกม เ เชอ ชอดช ภ แม่	ารถานเห็นราชานเวลีเหตุยุรุนเมยุธุการกุกเวยย		
					Solar Cells Testing Center (CSSC) )		
(2) รายงานผ	ลทดสอบฉบิ	ับอิเล็กทรอ	นิกส์ฉบับนี้ต้องได้รับ	การลงลายมือชื่อที่ได้	รับการยืนยันความถูกต้องจากเจ้าหน้าที่ของศูน		
เท่านั้น					ູ່		
	rized CSSC staf	f signature thre	ough electronic means s	hall have the same validi	ty as a manually executed signature to the fullest exter		
	sed report issue						
รายงานฉบับนี้	ประกอบด้วย	แอกสารดังต	ก่อไปนี้:				
	จสอบความ	เป็นไปตามช่	ข้อกำหนดของผลการ	ทดสอบ			
			านการทดสอบอินเวอ	าร์เตอร์ที่ใช้ในระบบผ	ลิตไฟฟ้าประเภทเชื่อมต่อกับโครงข่ายของ กฟน		
		รับรองรายงา					
- แบบตร			f documents from	n TÜV Rheinland (!	Shanghai) Co., Ltd.		
- แบบตร - ภาคผน	วจสอบและร	List o	f documents from Grid Code Compli		Shanghai) Co., Ltd.		
- แบบตร - ภาคผน - ภาคผน	วจสอบและร่ วก ก1. –	List o MEA (		ance Table.	Shanghai) Co., Ltd.		
- แบบตร - ภาคผน - ภาคผน - ภาคผน	วจสอบและร่ วก ก1. – วก ก2. –	List o MEA ( X1 Se	Grid Code Compli eries User Manual	ance Table.			





หมายเลขรายงาน: CSSC/BOS/003

## วันที่ออกรายงาน: February 13, 2023

(Report r	.)		(Issued date)					
	รายละเอียดผลการพิจารณาอินเวอร์เตอร์ ยี่ห้อ <i>SOLAX</i> รุ่น <i>X1-MINI-3.0K-G4</i> รายงานผลการทดสอบ หมายเลข <i>CN23GLMZ 001</i> ลงวันที่ : <i>13.01.2023</i> จากสถาบันทดสอบ TÜV Rheinland (Shanghai) Co., Ltd ตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ชี้ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับโครงข่ายของ กฟน. (Test Compliance Validation)							
ลำดับ	หัวข้อ	ผลการพิจารณา	รายละเอียด					
1	กระแสฮาร์มอนิก (Harmonics Current)	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.1 การทดสอบกระแสฮาร์มอนิก หน้า 5-6					
2	แรงดันกระเพื่อม (Voltage Fluctuation)	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.2 การทดสอบแรงดันกระเพื่อม หน้า 6					
3	การจ่ายไฟฟ้ากระแสตรง (Direct Current)	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.3 การทดสอบการจ่ายไฟฟ้ากระแสตรง หน้า 6					
4	ช่วงความถี่ทำงาน (Operating Frequency Range )	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.4 การทดสอบช่วงความถี่ทำงาน หน้า 7					
5	ช่วงแรงดันทำงาน (Operating Voltage Range )	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.5 การทดสอบช่วงแรงดันทำงาน หน้า 7					
6	การป้องกันสภาวะไอส์แลนดิ่ง <sup>(Islanding test)</sup>	<ul> <li>☑ ผ่าน (Complied)     <li>☐ ไม่ผ่าน (Does not comply)     <li>☐ ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.6 การทดสอบการป้องกันสภาวะไอส์แลน ดิ่ง หน้า 8					
7	การเชื่อมต่อหลังไฟฟ้ากลับคืน (Power Recovery Response)	<ul> <li>ผ่าน (Complied)     <li>ไม่ผ่าน (Does not comply)     <li>ไม่ครบถ้วน (Undetermined)     </li> </li></li></ul>	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.7 การทดสอบการเชื่อมต่อหลังไฟฟ้า กลับคืน หน้า 9					
8	อื่นๆ (other)	⊠ <u>ครบถ้วน</u> (Complied) □ ไม่ครบถ้วน (Undetermined)	<ol> <li>พบ Firmware version ในรายงานผลการทดสอบ</li> <li>ผ่านการทดสอบจากห้องปฏิบัติการทดสอบที่ได้รับการ</li> <li>รับรอง ISO/IEC 17025:2005 ในขอบข่ายการทดสอบ</li> <li>อินเวอร์เตอร์ ตาม Laboratory Accreditation Certificate</li> <li>Number CNAS L3038</li> </ol>					

ความคิดเห็นของการประเมินความเป็นไปตามข้อกำหนดตามผลการทดสอบ/ข้อมูลจากห้องปฏิบัติการทดสอบที่ได้รับการรับรองตาม ISO/IEC17025 ซึ่งผู้ขอรับบริการ / ผู้ผลิตจัดส่งให้ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ รายละเอียดห้องปฏิบัติการทดสอบดัง ภาคผนวก ง.





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(Report no.)

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แบบตรวจสอบและรับรองรายงานผลการทดสอบ

## อินเวอร์เตอร์ที่ใช้ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวง

#### สวนที่ 1 การรับรองรายงานผลการทดสอบอินเวอร์เตอร์

1.1 รายละเอียดอินเวอร์เตอร์	
ยี่ห้อ	SOLAX
รุ่น	X1-MINI-3.0K-G4
Firmware Version	Master:1.00,Manager:1.00
พิกัดทางไฟฟ้า	3000W
1.2 รายละเอียดของรายงานผลการทดสล	อบ
หมายเลขรายงานผลการทดสอบ	CN23GLMZ 001
ออกเมื่อวันที่	13.01.2023
ชื่อสถาบันหรือหน่วยงานที่ออก รายงานผลการทดสอบอินเวอร์เตอร์	TÜV Rheinland (Shanghai) Co., Ltd.
ที่อยู่สถาบันหรือหน่วยงานที่ออก	No. 177, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, 200072
รายงานผลการทดสอบอินเวอร์เตอร์	P.R. China
1.3 การรับรองรายงานผลการทดสอบ	
ข้าพเจ้าขอรับรองว่าข้อมูลที่กรอกในเอกสารฉบ	บับนี้มีความถูกต้องเป็นจริง และได้ตรวจสอบพบว่าผลการทดสอบอินเวอร์เตอร์ตามรายงานในข้อ 1.2
ข้าพเจ้าขอรับรองว่าข้อมูลที่กรอกในเอกสารฉบ เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ไ ชื่อหน่วยตรวจสอบและรับรองผลการ	ในระบบผลิต <sup>์</sup> ไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ -
เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ใ	บับนี้มีความถูกต้องเป็นจริง และได้ตรวจสอบพบว่าผลการทดสอบอินเวอร์เตอร์ตามรายงานในข้อ 1.2 ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC) สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ
เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ไ ชื่อหน่วยตรวจสอบและรับรองผลการ	ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC)
เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ไ ชื่อหน่วยตรวจสอบและรับรองผลการ	ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC) สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ
เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ไ ชื่อหน่วยตรวจสอบและรับรองผลการ ทดสอบอินเวอร์เตอร์	ในระบบผลิต <sup>ี</sup> ไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC) สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี
เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ใ ชื่อหน่วยตรวจสอบและรับรองผลการ ทดสอบอินเวอร์เตอร์ ที่อยู่หน่วยตรวจสอบและรับรองผล	ในระบบผลิต <sup>ิ</sup> ไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC) สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี 49 ซอยเทียนทะเล 25, ถนนบางขุนเทียน-ชายทะเล แขวงท่าข้าม
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เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ไ ชื่อหน่วยตรวจสอบและรับรองผลการ ทดสอบอินเวอร์เตอร์ ที่อยู่หน่วยตรวจสอบและรับรองผล การทดสอบอินเวอร์เตอร์ วันที่ออกเอกสาร ตรวจสอบและรับรองข้อมูลโดย	ในระบบผลิต <sup>ี</sup> ไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC) สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี 49 ซอยเทียนทะเล 25, ถนนบางขุนเทียน-ชายทะเล แขวงท่าข้าม บางขุนเทียน กรุงเทพมหานคร 10150 โทร.: +662 470 7445 - 49 โทรสาร: +662 470 7445 13 กุมภาพันธ์ 2566 อนุมัติโดย ลงชื่อ

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(Issued date)

## หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ส่วนที่ 2) รายละเอียดผลการทดสอบอินเวอร์เตอร์

## 2.1 การทดสอบฮาร์มอนิก (Harmonics Current)

Order				100 % of out		Limit			
	Measured	% of	Measured	% of	Measured	% of	( % of	Result	
	In Amp*	output	In Amp*	output	In Amp*	output	Output	confirmation	
nd		current*		current*		current*	current)		
2 <sup>nd</sup>	0.01	0.08 %	0.01	0.08 %	0.03	0.23 %	≤ 1 %	🛛 Pass 🔲 Fail	
3 <sup>rd</sup>	0.04	0.31 %	0.08	0.61 %	0.15	1.15 %	≤ 4 %	🛛 Pass 🔲 Fail	
4 <sup>th</sup>	0.01	0.08 %	0.00	0.00 %	0.00	0.00 %	≤ 1 %	🛛 Pass 🗌 Fail	
5 <sup>th</sup>	0.09	0.69 %	0.12	0.92 %	0.21	1.61 %	≤ 4 %	🛛 Pass 🗌 Fail	
6 <sup>th</sup>	0.01	0.08 %	0.00	0.00 %	0.00	0.00 %	≤ 1 %	🛛 Pass 🗌 Fail	
7 <sup>th</sup>	0.04	0.31 %	0.09	0.69 %	0.15	1.15 %	≤ 4 %	🗙 Pass 🔲 Fail	
8 <sup>th</sup>	0.01	0.08 %	0.00	0.00 %	0.00	0.00 %	≤ 1 %	🛛 Pass 🔲 Fail	
9 <sup>th</sup>	0.01	0.08 %	0.03	0.23 %	0.09	0.69 %	≤ 4 %	🛛 Pass 🔲 Fail	
10 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 1 %	🛛 Pass 🔲 Fail	
11 <sup>th</sup>	0.01	0.08 %	0.01	0.08 %	0.06	0.46 %	≤ 2 %	🛛 Pass 🗌 Fail	
12 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.5 %	🛛 Pass 🔲 Fail	
13 <sup>th</sup>	0.01	0.08 %	0.01	0.08 %	0.03	0.23 %	≤ 2 %	🛛 Pass 🔲 Fail	
14 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.5 %	🛛 Pass 🔲 Fail	
15 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 2 %	🛛 Pass 🗌 Fail	
16 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.5 %	🛛 Pass 🗌 Fail	
$17^{th}$	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 1.5 %	🛛 Pass 🗌 Fail	
18 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	🛛 Pass 🔲 Fail	
19 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 1.5 %	🛛 Pass 🗌 Fail	
20 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	🛛 Pass 🗌 Fail	
21 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 1.5 %	🛛 Pass 🗌 Fail	
22 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	🛛 Pass 🔲 Fail	
23 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 0.6 %	Pass Fail	
24 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	Pass 🗌 Fail	
25 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 0.6 %	Pass Fail	
26 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	Pass 🗌 Fail	
27 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.01	0.08 %	≤ 0.6 %	Pass 🗌 Fail	
28 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	Pass Fail	
29 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.6 %	Pass 🗌 Fail	
30 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 1 %	Pass Fail	
31 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.6 %	Pass Fail	

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Order 33 % of output current 66% of			66% of ou	utput current	100 % of ou	utput current	Limit	
	Measured	% of	Measured	% of	Measured	% of	( % of	Result
	In Amp*	output	In Amp*	output	In Amp*	output	Output	confirmation
		current*		current*		current*	current)	
32 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	<i>≤ 0.15 %</i>	🛛 Pass 🗌 Fail
33 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.6 %	🛛 Pass 🔲 Fail
34 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	<i>≤ 0.15 %</i>	🛛 Pass 🗌 Fail
35 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.3 %	🛛 Pass 🔲 Fail
36 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	<i>≤ 0.075 %</i>	🛛 Pass 🗌 Fail
37 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.3 %	🛛 Pass 🗌 Fail
38 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	<i>≤ 0.075 %</i>	🛛 Pass 🗌 Fail
39 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.3 %	🛛 Pass 🗌 Fail
40 <sup>th</sup>	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	<i>≤ 0.075%</i>	🛛 Pass 🗌 Fail
TRDi		1.23 <b>%</b>		1.42 <b>%</b>		1.24 <b>%</b>	≤ 5%	🛛 Pass 🔲 Fail
		เกระเพื่อม (Vol		เงสุดที่ได้จากแต่ล ation)				
				Pst			Plt	
_imit				≤ 1.0			≤ 0.6	5
est results				0.01			0.01	1
Result	ult confirmation			Pass	Fail		🛛 Pass	🗌 Fail
ว้างอิงจ <sup>.</sup>	ากรายงานผลก′	ารทดสอบตามข้อ	) 1.2 หน้า <b>:</b>	TÜV Rheinlan	d's Report No:	: CN23GLMZ 00	)1., Page 12	
2.3 การ	เทดสอบการจ่า	ยไฟฟ้ากระแสต	<b>s</b> গ (Direct C	urrent)				
	Test	level		33 % of 1	rated	66 % of	rated	100 % of rated
				output cu		output ci		output current
		utput current)		≤ 0.59		≤ 0.5°		≤ 0.5%
		ate Output cu	rrent)	0.339	_	0.359		0.38%
	confirmation			🗙 Pass	Fail	🗙 Pass	Fail	🛛 Pass 🔛 Fail
				TÜV Rheinland เงสุดที่ได้แต่ละเฟ	-	: CN23GLMZ 00	01., Page 13.	and 126.

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(Report no.)							(Issued date)
2.4 การทดสอบช่วงความ	ถี่ทำงาน (Operating	Frequency Ra	nge)				
	Actual Trip S	etting	Te	st Result	Limit		Result
	Frequency	Trip Time	Tr	Trip Time*		Delay	confirmation
	(Hz)	(sec)		(sec)	(s	ec)	
Underfrequency	46.9	0.070		0.086	≤	0.1	🄀 Pass 📃 Fail
Overfrequency	52.1	0.070		0.079	≥	0.1	🛛 Pass 🗌 Fail
อ้างอิงจากรายงานผลการทดสอ	บตามข้อ 1.2 หน้า: <i>TÜV</i>	/ Rheinland's Re	port No:	CN23GLM	Z 001., Page	16 and 47	7-56.
หมายเหตุ: * ให้ระบุค่าสูงสุดที่ไ	ด้จากการทดสอบ						
2.5 การทดสอบช่วงแรงดั	นการทำงาน (Operat	ing Voltage Ra	inge)				
Grid-connected inverter v	which connected to grid a	at low voltage (230	/400) <sup>(1)</sup>				
		Actual Setting			Result	Limit	Result
	VL-N setting (2)	VL-L setti	(2) ng	Time	Time	Time	confirmation
	(V)	(V)		Delay	Delay (3)	Delay	
				(sec)	( sec )	( sec )	
Undervoltage level 2 <sup>(4)</sup>	🔀 114 or 🗌	198 or	]	0.090	0.076	≤ 0.1	🛛 Pass 🔲 Fail
Undervoltage level 1	199	345		1.900	1.987	≤ 2	🛛 Pass 🔲 Fail
Overvoltage level 1	241	417		1.900	1.978	≤ 2	🏹 Pass 🔲 Fail
Overvoltage level 2 <sup>(4)</sup>	🗌 311 or 🔀 271	539 or	]	0.040	0.036	≤ 0.05	🛛 Pass 🔲 Fail
Grid-connected inverte	er which connected to t	the grid at voltage	e ≥ 12kV	, (1)			
		Actual Setting			Result	Limit	Result
	Vs	setting		Time	Time	Time	confirmation
	(% of rate c	output voltage )		Delay	Delay <sup>(3)</sup>	Delay	
				(sec)	( sec )	(sec)	
Undervoltage level 2 <sup>(4)</sup>	135%	o or 🔲%				≤ 0.1	🗌 Pass 🔲 Fail
Undervoltage level 1	1	10%				≤ 2	🗌 Pass 🔲 Fail
Overvoltage level 1	8	35%				≤ 2	🗌 Pass 🔲 Fail
Overvoltage level 2 <sup>(4)</sup>	50%	or 🗌%				≤ 0.05	🗌 Pass 🔲 Fail
อ้างอิงจากรายงานผลการทดสอ	บตามข้อ 1.2 หน้า: <i>TÜ</i>	V Rheinland's R	eport No	: CN23GLN	ΛΖ 001., Page	e 14-15 an	d Page 27-46.
(3) Insert maximum value re	itral or line – line voltage test	t based on the actual			onnected Inverte	r regulation, i	t shall be adjusted the

overvoltage or undervoltage trip setting to the maximum and/or minimum voltage that inverter can to be set.

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## CES SOLAR CELLS TESTING CENTER วันที่ออกรายงาน: February 13, 2023

#### หมายเลขรายงาน: CSSC/BOS/003

#### (Issued date) 2.6 การทดสอบการป้องกันสภาวะไอส์แลนดิ่ง (Islanding Protection) Test Condition C Test Condition B Test Condition A Item $\mathsf{Q}_{\mathsf{AC}}$ $\mathsf{P}_{\mathsf{AC}}$ Run on $\mathsf{P}_{\mathsf{AC}}$ Run on $\mathsf{P}_{\mathsf{AC}}$ Run on $Q_{AC}$ $\mathsf{Q}_{\mathsf{AC}}$ (% of (% of (% of Time (sec) (% of (% of Time (sec) (% of Time (sec) nominal) nominal) (Limit ≤2 nominal) nominal) (Limit ≤2 nominal) nominal) (Limit ≤2 Sec) Sec) Sec) 1 0 0 <u>0.425</u> 0 0 0.920 0 0 0.262 2 0 -5 0 -5 -10 -10 0.100 0.150 0.074 3 0 -4 0 -4 -10 -5 0.120 0.168 0.120 4 0 -3 0 -3 -10 0 0.314 0.386 0.206 5 0 -2 0 -2 -10 +5 0.250 0.375 0.378 6 0 -1 0 -1 -10 +10 0.119 0.340 0.392 7 -5 -10 0.093 0 1 0 1 0.250 0.260 8 0 2 0 2 -5 -5 0.135 0.240 0.216 9 3 3 -5 0 0 0 0.660 0.244 0.150 10 0 4 0 4 -5 +5 0.310 0.216 0.330 +10 11 0 5 0 5 -5 0.101 0.234 0.084 12 0 -10 0.085 13 0 -5 0.106 14 0 +5 0.236 0 15 +10 0.120 16 +5 -10 0.088 +5 -5 0.114 17 0.415 18 +5 0 19 +5 +5 0.218 20 +5 +10 0.108 21 +10 -10 0.117 22 +10 -5 0.104 0.254 23 +10 0 +5 0.234 24 +10 25 +10 +10 0.117 Result 🛛 Pass 🗌 Fail 🛛 Pass 🗌 Fail 🛛 Pass 🗌 Fail confirmation อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: TÜV Rheinland's Report No: CN23GLMZ 001., Page 18-24. and Page 57-106.

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## หมายเลขรายงาน: CSSC/BOS/003

## วันที่ออกรายงาน: February 13, 2023

Report no.)					(Issued dat
2.7 การทดสอบการเชื่อ	เมต่อหลังไฟฟ้าก	าลับคืน (Power	Recovery Respons	se)	
	Actual	Test Result	Compliance with	Compliance with	
	Setting	(sec)	Clause 5.10.2(c) of	Clause 5.10.2(g) of	Result confirmation
	(sec)	(Limit ≥120)	IEEE std 1547.1-	IEEE std 1547.1-	
	100	1010	2005 (1)	2005 (2)	
Underfrequency	120	126.8	Yes 🗌 No	Yes No	Pass 🗌 Fail
Overfrequency	120	127.0	Yes 🗌 No	Yes No	🛛 Pass 🗌 Fail
Undervoltage level 2	120	127.4	Yes 🗌 No	Yes 🗌 No	🛛 Pass 🗌 Fail
Undervoltage level 1	120	127.2	🛛 Yes 🗌 No	🛛 Yes 🗌 No	🛛 Pass 🔲 Fail
Overvoltage level 1	120	127.0	🛛 Yes 🗌 No	🛛 Yes 🗌 No	🛛 Pass 🔲 Fail
Overvoltage level 2	120	127.1	Yes 🗌 No	Yes 🗌 No	🛛 Pass 🔲 Fail
อ้างอิงจากรายงานผลการทด	เสอบตามข้อ 1.2 ห	น้ำ: <i>TÜV Rhe</i>	einland's Report No: (	CN23GLMZ 001., Page	25 and Page 107-124.
voltage step down to rea for the trip operating vo	o change event t connect, step to time setting plus oltage. The unit d range for the s	hat is introduced voltage to a valu s twice the manu shall restart is rec specified reconne	during the reconnect ue 5% outside of the m facturer's stated timer connect timer and not ect time.	nanufacture's specified accuracy, and then ret reconnect until the gri	ile the unit is counting normal operating voltage
2.0 1110/10 0 0010 0 0010	06/100/16 004	รายละเอียด			Result confirmation
<ul> <li>อินเวอร์เตอร์ผ่านการ ห้องปฏิบัติการทดสอ ว่าด้วยการรับรองระร</li> <li>อินเวอร์เตอร์ผ่านการ ห้องปฏิบัติการทดสอ เทียบเคียงกันกับ สำร ความร่วมมือระหว่าง Cooperation, ILAC</li> </ul>	Pass 🗌 Fail				

หมายเลขอ้างอิง.....





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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

List of documents from TÜV Rheinland (Shanghai) Co., Ltd. ภาคผนวก ก1.

> 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: CN23GLMZ 001.pdf CNAS L3038 certificate-EN.pdf 3. Laboratory accreditation: 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.

Allen Hu **Project Engineer** Solar & Commercial Products

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OMA30.105.11SHG 7.1 Format of Notification of Test Result (Documentation in complete) / Revision date: 2008-05-14





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ภาคมนวก ก2. MEA Grid Code Compliance Table.



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

			MEA Grid code compliance table		
Item	Description	MEA requirement	Test results /Comment	Refer to Test report(or document) page	Complied/ Does not comply
1	Harno nics	Refer to MEA code	Total harmonic distortion $\%$ TRD (max) =1.42% Current harmonics are in the limit according to MEA code	Refer to the name plate of product in report CN23GLMZ 001 / Page 9-11.	Complied
2	Voltage fluctuation	Refer to IEC	Pst value: Pst(max)= 0.01 Pit value: Pit(max)= 0.01	Refer to Test report CN23GLMZ 001 / Page 12.	Complied
3	DC injection	Refer to IEC	DC injection value (max): 0.383% of rated current	Refer to Test report CN23GLMZ 001 / Page 13 and 126.	Complied
9	Under and Over frequency protection	Disconnect time of MEA requirement f < 47 Hz = 0.1 Sec f > 52 Hz = 0.1 Sec	Under and Over frequency trip time value (max): f < 47 Hz = 0.086 Sec f > 52 Hz = 0.079 Sec	Refer to Test report CN23GLMZ 001 / Page 16 and 47-56.	Complied
8	Under and Over voltage protection	Disconnect time of MEA requirement V < 114V = 0.1 Sec	Under and Over voltage trip time value (max): V < 114V = 0.076 Sec V < 199V = 1.987 Sec	Refer to Test report CN23GLMZ 001 / Page 14-15 and 27-46.	Complied





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ภาคผนวก ก2. MEA Grid Code Compliance Table. (ต่อ)

		$V \le 199V = 2$ Sec	$V \ge 241V - 1.984$ Sec		
		V > 241V = 2 Sec	V > 271V =0.036 Sec		
		V > 271 V =0.05 Sec			
10	Anti-Islanding	Disconnecttime of IEC 62116	Trip time value (max):	Refer to Test report	Complied
		requirement 2 Sec Max	PEUT100%, PR0%, Qc0%, 0.262 Sec	CN23GLMZ 001 / Page	
			$P_{\text{FUT}66\%_0}$ , $P_{\text{R}}0\%_0$ , $Q_{\text{C}}0\%_0$ , = 0.920 Sec	18-24 and 57-106.	
			$P_{\rm EUT} 33\%, \ P_{\rm R} 0\%, \ Q_{\rm C} 0\%, = 0.425$ Sec		
11	Reconnection	Reconnection time of MEA	Reconnection time value:	Refer to Test report	Complied
	to utility	requirement > 120s	After back to specified recovery voltage range	CN23GLMZ 001 / Page	
	recovery		V = 200V =127.2 Sec	26-27 and 107-124.	
			V = 240V = 127.0 Sec		
			After back to specified frequency voltage range		
			f = 47.0Hz =126.8 Sec		
			f 52.0Hz 127.0 Sec		





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#### หมายเลขรายงาน: CSSC/BOS/003

#### (Report no.)

ภาคผนวก ข. X1 Series User Manual 0.6kW - 3.3kW.







(Issued date)

#### หมายเลขรายงาน: CSSC/BOS/003

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ภาคผนวก ข. X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)



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## หมายเลขรายงาน: CSSC/BOS/003

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ภาคผนวก ข. X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

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\* Warranty registration form

Notes on this Manual

03

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#### 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. The following types of safety instructions and general information appear in this document as described below:



"Note" provides tips that are valuable for the optimal operation of your product.





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ภาคผนวก ข.

Safety

X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

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 ground.

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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Safety

## WARNING!

Authorized service personnel must disconnect both AC and DC power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter.

- · Prior to the application, please read this section carefully to ensure correct
- and safe application. Please keep the user manual properly.

  Use only recommended attachments. Otherwise may result in a risk of fire,
- electric shock, or injury to person. Make sure that existing wiring is in good condition and that wire is not
- undersized. Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the inverter yourself
- substance
- may result in a risk of electric shock or fire and will void your warranty. Keep away from flammable, explosive materials to avoid fire disaster. The installation place should be away from humid or corrosive substance Authorized service personnel must use insulated tools when installing or
- working with this equipment. PV modules shall have an IEC 61730 class A rating. Avoid touching the PV connecting device in case of electric shock. After the MAINS and PV supply has been disconnected, the capacitor of the unit still contains hazardous voltage for up to 5 minutes, please don't
- touch during this period. Hazardous voltage will present for up to 5 minutes after disconnection from
- power supply.
  CAUTION-RISK of electric shock from energy stored in capacitor. Never operate on the solar inverter couplers, the MAINS cables, PV cables or the PV generator when power is applied. After switching off the PV and Mains, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you unplug DC and MAINS couplers.
  When accessing the internal circuit of solar inverter, it is very important to
- wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device beforehand
- Since the capacitors require time to sufficiently discharge! Measure the voltage between terminals UDC+ and UDC- with a multi-meter (impedance at least 1 Mohm) to ensure that the device has totally discharged.





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Safety

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ภาคผนวก ข.

Safety

X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

 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 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.

# WARNING!

High leakage current!
Earth connection is essential before connecting power supply.

	gives an explanation of all the symbols shown on the inverse type label.
Symbol	Explanation
$\mathbb{Z}$	When the blue light is on, it indicates the inverter is working normally.
	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.
UK	Compliant with UKCA standards.
	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!
	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.
A C:	Danger to life due to high voltage. There is residual voltage in the inverter which needs 5 min to discharge.





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Introduction

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Safety

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#### 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.

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 61000-6-3; EN IEC 61000-6-4; 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 comples 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.
- Advanced anti-islanding solution
  Class I protection level.
- Max. efficiency up to 98%. EU efficiency up to 96.5%.
- THD<3%.

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Introduction

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J. X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

# S.2 Terminals of the Inverter Image: Comparison of the Inverter </tr

 A
 DC switch

 B
 DC input terminal

 C
 Dorgle

 D
 COM/CT

 E
 AC output terminal

 F
 Ground terminal

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





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Technical Data

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X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

#### Technical Data

#### 4. Technical Data

#### 4.1 DC Input

Model	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
Max. PV array input power (Wp)	1200	1400	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	360	360	360	360	360	360	260
MPP tracker voltage range [V]	40-450	40-450	40-450	40-450	40-450	40-550	40-550	40-550
No. of MPP trackers/Strings per MPP tracker	1/1							
Max. input current (A)	16 A							
Max. abort circuit current [A]	22 A							

#### 4.2 AC Output

Model	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
Nominal AC output power (W)	600	700	1100	1500	2000	2500	3000	3200
Nominal AC output current (A)	2.6	3.1	4.8	6.5	8.7	10.9	13.1	34.4
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	12.5	15	15
Nominal AC votage [V]	220/230/240							
Nominal grid frequency (H2)	50/60							
Displacement power factor	0. Bleading-0.8lagging							
THDi (rated power) (%)	4							

3.0K-G4	X1-MINI -3.3K-G					
98	98					
98.5	95.5					
95 95 95.5 96 96.5 96.5 96.5 96.5 96.5 9						
-30-70						
290x208x120						
5.5	5.5					
Nature cooling						
WFiLANI4G Dongle (optional) BUSB,RS485/CT/DI/DO						
YES						
YES						
YES						
YES						
YES						
YES						
YES						
YES						
YES						
Type II (Optional)						
1011						
-	11 FR					





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Installation

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ภาคผนวก ข.

Installation

#### X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

#### 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

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



L

Object	Quantity	Description	
А	1	Inverter	
В	2	Female DC unit*1, Male DC unit *1	
с	2	DC pin contact positive*1 DC pin contact negative*1	
D	2	Expansion tube	
E	2	Self-tapping screw	
F	1	Earth terminal	
G	1	AC connector	
н	1	Dongle (optional)	
ĩ	T	Documentation	
J	1	Bracket	
к	1	M5*L8 screw	
L	1	RJ45 terminal	

	Δ.
	/!\
L	

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

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#### X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

Installation Installation 5.3 Installation Precaution Available Space Size The inverter is designed for outdoor installation (IP 66). >300 mm Make sure the installation site meets the following conditions: Avoid exposure to glare. Avoid placing in areas where highly flammable materials are stored. Avoid placing in potential explosive areas. Avoid placing near the television antenna or antenna cable. Avoid placing in an altitude of higher than 4000 m above sea level. Avoid placing in environment of precipitation or humidity (100%). 2300 mm Be sure the ventilation is good enough. The ambient temperature in the range of -30°C to +70°C. The slope of the wall should be within  $\pm 5^{\circ}$ . Table2 Available Space Size The wall hanging the inverter should meet conditions below: Position Min.size 1) Solid brick/concrete, or strength equivalent mounting surface; Left 300 mm 2) Inverter must be supported or strengthened if the wall's strength isn't Right 300 mm enough (such as wooden wall, the wall covered by thick layer of decoration) Тор 300 mm Bottom 300 mm Please avoid direct sunlight, rain exposure, snow laying up during installing and operating. Front 300 mm NOTE! Ŵ Avoid installing in the confined space!



Ed

Еп

#### รายงานฉบับนี้ใช้ลายเซ็นดิจิทัลเฉพาะหน้าแรกโดยมีผลครอบคลุมทั้งฉบับ





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a) Use the wall bracket as a template to mark the position of the 2 holes on the wall.







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> 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.



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



In order to save cable and reduce the DC loss, we suggest installing the inverter near PV modules.





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h) Remove the blue protective cover of the PV +&- interface at the bottom of the inverter, and insert the completed PV terminals according to the positive and negative correspondence.



NOTE! Keep the DC switch of the inverter OFF during connection.

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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> Grid Connection The inverter is designed for single phase grid. Voltage range is 220/ 230/ 240 V, frequency is 50/ 60 Hz. Other technical requests should comply with the requirement of the local public grid.



Micro-breaker should be installed between inverter and grid, any loads should not be connected with inverter directly.



#### Incorrect Connection between Load and Inverter

Impedance of the Inverter AC connecting dot should be less than 2  $\Omega$ . To ensure reliable anti-Islanding function, PV cable should be used to ensure wire loss < 1% than normal power. Moreover, length between AC side and grid connecting dot should be less than 150 m. The following chart is the cable length, section area and wire loss.



This product has a professional IP67AC waterproof connector (after connection). You have to wire AC by yourself. Please see the figure above.

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  $6\mathrm{mm}$  of insulation from all wire ends as below.



d) The AC connector provided in the packing list includes 2 parts (A and B).



Separate H Into two components

- Then the AC connector is finally classified into 3 components for use (as shown below).



Component 2

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Installation Installation e) Slide the component 1 and component 2 onto the cable. I) Connect the AC plug to the inverter. 1 瑁 f) Insert the stripped end of each three wires into the appropriate hole in the component 3, and then tight each screw (to tight each wire in place). (Allen wrench. Torque:  $0.5\pm0.1N\cdot m)$ > Earth Connection 25 Screw the ground screw with cross screwdriver shown as follow. e la 個 (torque: 1.5± 0.2N.m) g) Insert component 3 into component 2. **Man**tt 1 WARNING! Be sure the ground wire must be connected! h) Screw down the component 1 tightly. (torque:  $3\pm0.3N\cdot m$ )

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#### 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.



#### Upgrade

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



WARNING! Make sure the input voltage is more than 100 V dc (in good illumination condition), otherwise it may result in failing during updating.

#### Upgrade Steps:

3) 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



WARNING! Make sure the directory is in accordance with above form strictly! Do not modify the program file name! Otherwise it may

cause the inverter not to work anymore!





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Ŕ	NOTE! The format of U-disk system shall be FAT32.	
	USB flash drive with update program into the DONGLE por m of the inverter. Turn on DC switch or connect the PV con	



Short press up and down key to select the one that you want to update and long press down key to confirm.



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 workflower inverter.

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
Waiting	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".
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. Meanwhile feedback energy to grid (if condition permits), LCD displays present output power.

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



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 K $\Omega$ . 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! R Once settings are selected at commissioning they are locked to view only.

NOTE!

Password should not be readily available - if you need 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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Note: When the inverter is in "Waiting" and "Checking" status, the blue light "B" is flashing; when in "Normal" status, the blue light "B" is always on.

User can see the U, I & F of the grid. (U,I,F,Pout,Pgrid) level 2 level 3 >Status >Grid 0.0V >U 0.0V >U1 0.0V >Solar 0.0V English German \*User can also see the U, I & P of the >Language PV. (U1,I1,P1) >2000-01-01 00:00 >Date&Time >Safety Export Control \*\*Go to next page >Settings 0000 Total Import: 0.0kWh >Meter Energy Total Export: 0.0kWh 1:xxYxxxDxxH Error1 >Error Logs \*\*\*Only six latest errors were kept >About Register SN: XXXXXXXXXXX Master: x.xx Manager: x.xx Internal Code: A:x.xx D:x.xx





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# Operation Method

### > LCD Display

#### · Level 1

Power 0W Pgrid OW Today 0.0kWh Total 0.0kWh Normal Normal No 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.

Status >Grid Sola

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. Grid

0.0V 0.0A



2) Solar

1) Grid

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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2) Export Control

With this function the inverter can control energy exported to the grid. Whether having this function is based on user's wishes.

Choose "Disable" means the function will be shut off. 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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# and grid tied standards. There are several standards for choice (May change without notice). In addition, the user has an "UserDefined" option

1) Safety

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

The user can set the safety standard here according to different countries





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3) DRM Function

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







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0.0 6) New Password The user can set the new password here. We need to increase or

decrease the word by pressing "Up" or "Down" button. Long press "Down" to confirm and alternate to next word. After word is confirmed, long press "Down" to reset the password.

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Mode Select

>0ff<





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pendion Kethod	Openation Method
10) Reset Energy The user can clear the power energy of CT and meter by this function (if the user uses meters) 	ExchargerEnable Mode Select > Enable/Disable <
>YESNO<	15) Adapter Box G2 The user can connect the adapter box by this function
11) Resot Motor	
The user can clear the meter and CT energy by this function. Press "Up"	Adapter Box
or "Down" button to select and long press "Down" to confirm. (The user	Mode Select
can select "Yes" to reset meter if the user uses meters)	> Enable/Disable <
Ranet Meter	
>Rest >YES/NC+	17) Earth Detect The user can enable or disable the Earth Detect by this function.
12) Reset Enoring The user can clear the errorings by this function. Press "Up" or "Down" button to select and long press "Down" to confirm.	Mode Select
Read Enuity	> E nable/Disable <
> Remot	
>YEB/NO<	18) Dry Contact The user can use the Dry Contact to connect heat pump by this function
13) Reset WIFI	(require SG Ready).
The user can restart the WIFI by this function.	
Rest WFI	SG
> Read	Ready
>YEBNO<	Smort Hort Range
	_
14) Machine Type The user can check the Machine Type by this function.	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 selected the user can control the external relay to remain close or open manually. "Smart Save" mode can set the values of the heat pump's on/off time and conditions, operating modes.
Machine Type	If the user uses the inverter dry contacts to control heat pump through Adapter
> Madhine Type X1 MINI 3.3K G4	box, please refer to the Adapter Box Quick Installation Guide to set the parameters here.

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

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ration Method	Operation Metho
> Mode Select       > Load Management         > Load Management       > Load Management         > Load Management       > Load Management         > Back       DisabloManual/Smart Save         19) General Control       Under the Australia safety regulations, general control will show as meter control.         > General Control       > Soft Limit         > Mode Select       > User Value         > General Control       > Soft Limit         > Mode Select       > User Value         > Mode Select       > User Value         > Mode Select       > User Value         > Meter Energy       • Meter Energy	> P(u) Fundion > Pu_GdidV1/2/3/4 > Pu_Ratio 1/2/3/4 > Pu_Ratio 1/2/3/4 > Qu_Ratio 1/2/3/4 > Qu_Ratio 1/2/3/4 > Qu_Ratio 1/2/3/4 > Qu_Ratio 1/2/3/4 > Qu_Ratio 1/2/3/4
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.	> QvRatio1/2/3/4
Total Import: 0.0kWh	<ul> <li>Level 3 Long press the "Enter" button to enter the third-level interface.</li> <li>a) Status: The user can see the U/I/P parameters of the grid and the PV,</li> </ul>
Error Logs The Error log contains error information happened. It can record six items at most. Press "Up" and "Down" button to review parameter. Long press "up" to return to the main interface.     Error Logs     No error <	<ul> <li>such as the Ugrid, Igrid, P and F of the grid, and the Usolar, Isolar and Psolar of the PV.</li> <li>b) Language: This inverter provides several languages for customer to choose.</li> <li>c) Settings: Entering the installer password, the information of the LCD interface is shown in the previous page.</li> <li>(1) Safety: The user can set the right safety standard here.</li> <li>(2) Grid: Usually end user do not need to set the grid parameters.</li> </ul>
About This interface shows information of the inverter, including "Product SN",	If you need to reset, any changes should comply with the requirement of local grid.
"Register SN", "Master", "Manager" and "Internal Code". About Product SN: XXXXXXXXXXXXXX	





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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/low 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

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(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	Comment	
Off		
Under excited Over excited	PF Value	
	PF Value	
	PowerFactor1	
	PowerFactor2	
	PowerFactor3	
PF(p)	PowerFactor4	
	PowerRatio1	
	PowerRatio2	
	PowerRatio3	
	PowerRatio4	
	EntryVolt	
	ExitVolt	
	QPowerLockEn	
	QuLockIn	
	QuLockOut	
Q(u)	QuGridV1/2/3/4	
	QuRatio1/2/3/4	
Fixed Q Power	Q Power	

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







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#### 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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ode	Faults	Diagnosis and solution	Code	Faults	Diagnosis and solution
2:00001	TzFault	Over Current Fault. -Wall for about 10 seconds to check if the inverter is back to normal. -Discontex the DC extich and restart the inverter. -Or consult us for solutions.	IE:00029	LowTempFault	Low Temperature Fault. -Check if the ambient temperature is too low. -Or consult us for solutions.
E:00002	GridLostFeult	Grid Lost Fault. -Check II be mains cable is loose. -Walt for a while and the system will reconnect when the utility is back to normal. -Or consult us for solutions.	IE:00036	InternalComFault	Internal Communication Fault. -Restart the Invarier to check If It is back to normal. -Update the ARM software or reburn the program.
E:00003 E:00004 E:00005	GridVoltFault	Grid Voltage Out of Range. -Ohext If the mains calls is also e. -Walk 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 wining and reconnect. -Or consult us for solutions.
E:00006 E:00007 E:00008	GridFreqFault	Gold Frequency Out of Pange. -Well 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 Inverter. -Ucdist the ARM additiverse or return the program.
E:00009	PVVoltFault	PV Voltage Fault -Check whether the PV is overvoltage. -Or consult us for solutions.	IE:00041 IE:00042 IE:00043	PVConnDirFault	-Or consult us for solutions.  PV Direction Poult.  -Check if the PV+/-sides are connected correctlyOr consult us for solutions.
E:00010 E:00051 E:00052	<b>BusVoltFault</b>	DC Bus Voltage Out of Normal Range. -Check If the FV input voltage is within the operating range of the inverter. -Disconned FV wining and reconnect. -Or consult us for solutions.	IE:00044 IE:00039 IE:00056	GridRelayFault	Relay Fault. -Chack the grid connection. -Retark the Inverter. -Or consult us for selucions.
:00012	GridVolt10MFault	Grid Overveitage 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 us for solutions. ARM EEPROM Fault. -Disconnect PV and grid, then reconnect. -Or consult us for solutions.
E:00013	DcinjOCP	DCI Overcurrent Protection Fault. -Wait for a while to check if the inventer is back to normal. -Or consult us for colutions.	ME:00105	Meter Fault	Meter Fault. -Chack the connection of the meter. -Chack if the meter is in working order. -Or consult us for solutions.
E:00034	HardLimitFault	Hard Limit Fault (in Australian standard). -Wait for a while to check if the inverter 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	Overcurrent Protection Fault. -Check the connections of the Inverter. -Wat for a while to check if the inverter is back to normal. -Or constat us for isolations.	ME00104	Mgr Comm Fault	Mgr Inter-Com Fault -Shut down photovotale, battery and grid, reconnect. -Or eak for help from the installer if it can not return to norm
E:00020	isoFault	Isolation Fault. -Check the connections of the inverter. -Cr consult us for solutions.	IE:00016	SW OCP Fault	Software Overcurrent Protection Fault. -Weil for a while to check if the invertior is back to normal. -Oliconnect FV and grid, then reconnect. -Or consult us for solutions.
E:00021	OverTempFault	Over Temperature Fault. -Check If the inverter and the ambient temperature exceeds the operating range. -Or consult us for solutions.			
E:00055	EarthFault	Earth Fault. -Check If the earth is connected property			





(Issued date)

Decommissioning

## หมายเลขรายงาน: CSSC/BOS/003

#### (Report no.)

ภาคผนวก ข.

Troubleshooting

X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

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.

 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  $^\circ$ C - +60  $^\circ$ 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.





(Issued date)

Commissioning

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#### (Report no.)

ภาคผนวก ข.

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X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

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.

 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

#### 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.Duties, 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.





# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ข. X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)

# วันที่ออกรายงาน: February 13, 2023

(Issued date)

Foi	r Customer (Compulsory)
Name	Country
Phone Number	Email
Address	
State	Zip Code
Product Serial Number	
Date of Commissioning	
Installation Company Name	
	Electrician License No.
	ForInstaller
Module Size(W) Number of String Battery ( If Any ) Battery Type Brand	Number of Panel Per String
	1
Date of Delivery	Signature
to complete the online wa scan the QR code to regis	website: https://www.solaxcloud.com/#/warranty_ rranty registration or use your mobile phone to ster. ms, please visit SolaX official website: <u>www.solaxpower.com</u>





# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ข. X1 Series User Manual 0.6kW - 3.3kW . (ต่อ)



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







(Issued date)

# หมายเลขรายงาน: CSSC/BOS/003

### (Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001.

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	<b>TÜV</b> Rheinland <sup>®</sup> MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Issue Date:	13.01.2023	Project Engineer:	Allen Hu
Lab Target:	TÜV Rheinland (Shanghai) Co., Ltd	Signature:	Allen Hu

Testing Loca	tion:
Name:	TÜV Rheinland (Shanghai) Co., Ltd
Address:	No. 177, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, 200072 P.R.China

Rated Input:	See appende	d rating label		
Rated Output:	See appende	d 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 II		
Overvoltage Category (OVC):	Ovci	OVC II (PV) OVC III (Mains)		
Pollution degree (PD):	D PD 1	PD2 (Inside) PD3 (Outside)		
Max. operating temperature:	See appende	d rating label		

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

Used equipment No.:	See equipment list for details	Sample No.:	N/A	
Finished date:		Tested by:	51.	
Review date:		Reviewed by:		
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TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-append	lix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product: Grid-Connected PV Inverte		
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation: X1-MINI-3.0K-G4		
Content				Page No
Rating label of I	EUT			3
General require	ments and information for the tests			4
Requirements t	to the Measurement Precision of the	Measuring Devices		7
Test results		1 Police -		9
Ha	armonics			9
Ve	oltage Fluctuation			12
Di	rect Current Injection			13
Operating Voltage Range				
O	perating Frequency Range			16
Isl	anding Protection			18
R	esponse to Utility Recovery			25
Attachment 1: \	Wave result			27
0	ver voltage test			27
Ur	nder voltage test			37
0	ver frequency test			47
Ur	nder frequency test			52
Isl	anding Protection test			57
Re	esponse to Utility Recovery test			107
Remark for wave diagram				
D	C injection trend line			126
Attachment 2:	Test equipment list			127
Attachment 3: I	EUTphoto			128

Used equipment No.: See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinlar	a <b>ta / Tes</b> nd (Shanghai)	Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulati lectricity Authority	V 402 0 112 W 21 K 1 A	Report No:	CN23GLMZ 001
Order No. :	244466490		Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Technology (2	Network Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Copy of marki	ng plate:	-		1
			menter SN	
		Max. PV Votage MVPT Votage Bange	550 d.s. V 40-550 d.s. V	
		Max. PV Current	184a.A	
		Norminal AC Voltage, Frequency Rominal AC Voltage, Frequency Reed Output Current	22 d.s. A 220/235/240 e.s. V 50/40 Hi 13.14.c. A	
		Max, Output Continuous Current	15 a.c. A.	
		Bated Output Apparent Power	3000 VA 3300 VA	
		Max. Output Apparent Power Power Factor Range	0.8Leading- 0.8Legging	
		OTHERS		
		Operating Ambievet Terrgrenature R	Drobe or Drots Ingen	
		Angenes Evolución	1764	
		Productive Class		
		Overvollage Category	BL(MARIS, N EC)	
		Inventer Topollogy Safety	RCHN 62109-1/-2	
		DIC	ENSTROL THEODO-8-L/J/14	

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

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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Clause		Test description	Remark	Result
M	3	Technical Specifications	See below for detail.	Pass
	3.1	Power Quality Control	See below for detail.	Pass
	3.1.1	Harmonics	See clause 4.3.1.	Pass
-	⊠ 3.1.2	Voltage Fluctuation	See clause 4.3.2.	Pass
	3.1.3	Direct Current Injection	See clause 4.3.3.	Pass
	3.2	Response to Electrical System	See below for detail.	Pass
	3.2.1	Operating Voltage Range	See clause 4.3.4.	Pass
	3.2.2	Operating Frequency Range	See clause 4.3.5.	Pass
	3.2.3	Islanding Protection	See clause 4.3.6.	Pass
3.2.4 Response to Utility		Response to Utility Recovery	See clause 4.3.7.	Pass
⊠ 4		Testing Methodology	See below for detail.	Pass
⊠ 4,1		Testing Institute or Organization	All tests are conducted in the organization with ISO/IEC 17025 certified laboratory.	Pass
	<b>4</b> .2	Type of the Test	See below for detail.	Pass
	3 4.2.1	Design Test	All tests are performed on single representative of inverter for each model.	Pass
A.3 Test Procedure and Assessment		Test Procedure and Assessment	All tests are performed according to the procedures specified in MEA regulation 2015 version.	Pass
	☑ 4.3.1	Harmonics Test	See appended table 4.3.1.	Pass
	☑ 4.3.2	Voltage Fluctuation Test	See appended table 4.3.2.	Pass
	⊠ 4.3.3	Direct Current Injection Test	See appended table 4.3.3.	Pass
-	☑ 4.3.4	Operating Voltage Range Test	See appended table 4.3.4.	Pass

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

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Review date:

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

이 일정이 있었다. 영양이 여름		<b>/ Test Plan</b> anghai) Co., Ltd.	Doc	cument No.:	MS-0025001-append	
Grid-connected (Metropolitan El		r Regulation y Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244	466490		Product:	Grid-Connected PV I	nverter
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation: X1-I		X1-MINI-3.0K-G4		
Clause		Test description		2	Remark	Result
A.3.5 Operating Frequency Rang		ge Test	Fest See appended table 4.3.5.		Pass	
4.3.6 Islanding Protection Test			See appended table 4.3.6.		Pass	
A.3.7 Response to Utility Recovery		ery Test	See append	ded table 4.3.7.	Pass	

Revision History:

Remark:

Date YYYY-MM-DD	Contents of modification (latest on top)	Prepared by	Approved by
2016-05-31	Original Test Plan	Tobias Yang	Li Weichun

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

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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-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:		Tested by:	51
Review date:		Reviewed by:	

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이 아파 아파 아파 아파	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	<b>TÜV</b> Rheinland <sup>®</sup> MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-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 $\phi$		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		
Relative humidity	30 % to 95 % RH	±6% RH		

Used equipment No.:

Sample No.: N/A

Finished date:

Tested by:

Review date:

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See equipment list for details





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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co.,	Model designation:	X1-MINI-3.0K-G4

Measured Variable	Frequency Range	Measuring Precision relative to the Measuring Range
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:		Tested by:	
Review date:		Reviewed by:	
	Base 8 of 120		

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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

#### 4.3.1. Harmonics Test

#### PROCEDURE

Test method complies with standard IEEE 1547.1-2005, clause 5.11.1.

#### Limits see following table:

Odd Order	Current limit (%)	Even Order	Current limit (%)
3-9	4.0	2 - 10	1.0
11 - 15	2.0	12 - 16	0.5
17 - 21	1.5	18 - 22	0.375
23 - 33	0.6	24 - 34	0.15
≥ 35	0.3	2 36	0.075

#### RESULTS Pass/ Fail

4.3.1	TABLE:	Harmonic a	nd waveform	n distortion	<u>.</u>				
Mains vol	tage: 230V								
P/P	Pn[%]	100	D%	66	%	33	%	1.14	
Ordinal number		Measurement						Limit	
Ordina	inumber	[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
to	otal	12.985	99.58	8.585	65.84	4.287	32.88	-	-
	1	12.984	99.57	8.583	65.82	4.284	32.85	-	1
	2	0.03	0.23	0.01	0.08	0.01	0.08	0.13	1.0
	3	0.15	1.15	0.08	0.61	0.04	0.31	0.52	4.0
	4	0.00	0.00	0.00	0.00	0.01	0.08	0.13	1.0
	5	0.21	1.61	0.12	0.92	0.09	0.69	0.52	4.0
	6	0.00	0.00	0.00	0.00	0.01	0.08	0.13	1.0

Used equipment No.:

See equipment list for details

Sample No .: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Grid-connected	Rep	ort No:	CN23GLMZ 0	D1				
(Metropolitan Electricity Authority 2015) Order No. : 244466490			Pr	aduct:	Grid-Connecte	d PV Inve	rter	
Client Name :						G4		
7	0.15	1.15	0.09	0.69	0.04	0.31	0.52	4.0
8	0.00	0.00	0.00	0.00	0.01	L 0.08	0.13	1.0
9	0.09	0.69	0.03	0.23	0.01	L 0.08	0.52	4.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.13	1.0
11	0.06	0.46	0.01	0.08	0.01	0.08	0.26	2.0
12	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.5
13	0.03	0.23	0.01	0.08	0.01	L 0.08	0.26	2.0
14	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.5
15	0.01	0.08	0.00	0.00	0.00	0.00	0.26	2.0
16	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.5
17	0.01	0.08	0.00	0.00	0.00	0.00	0.20	1.5
18	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.375
19	0.01	0.08	0.00	0.00	0.00	0.00	0.20	1.5
20	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.375
21	0.01	0.08	0.00	0.00	0.00	0.00	0.20	1.5
22	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.375
23	0.01	0.08	0.00	0.00	0.00	0.00	0.08	0.6
24	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
25	0.01	0.08	0.00	0.00	0.00	0.00	0.08	0.6
26	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
27	0.01	0.08	0.00	0.00	0.00	0.00	0.08	0.6
28	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
29	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.6
30	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
31	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.6

Used equipment No.:

See equipment list for details

Sample No.: N/A Tested by:

Finished date:

Reviewed by:

Review date:

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# หมายเลขรายงาน: CSSC/BOS/003

วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)				Repo	Report No: CN23GLMZ 001			
Order No. :	244466490			Pr	oduct:	Grid-Connecte	ed PV Inve	ter
Client Name :		SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation:		X1-MINI-3.0K-	G4	
32	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
33	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.6
34	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.15
35	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
36	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.075
37	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
38	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.075
39	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.3
40	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.075
TRD	1.	24		1.42		1.23		5

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

#### 4.3.2. Voltage Fluctuation Test

PROCEDURE

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

#### RESULTS Pass/ Fail

4.3.2	TABLE: Flicker	TABLE: Flicker							
Mains	s voltage: 230V	68							
Refer	rence Impedance Ztest used:	L=0.15+0.1	5j, N=0.1+0.1j						
		Plt	0.01						
- U	Measurement	Limit	-3 0007 M	0.65	St				
- 1	measurement	Pst	dc(%)	dmax(%)	d(t) (ms)				
		Limit= 1.0	Limit= 3.3	Limit= 4.0	Limit= 500				
	1	0.01	0.00	0.51	0.00				
	2	0.01	0.00	0.51	0.00				
- [	3	0.01	0.00	0.51	0.00				
e A	4	0.01	0.00	0.51	0.00				
Phase	5	0.01	0.00	0.51	0.00				
2	6	0.01	0.00	0.51	0.00				
	7	0.01	0.00	0.51	0.00				
1	8	0.01	0.00	0.51	0.00				
	9	0.01	0.00	0.51	0.00				
	10	0.01	0.00	0.51	0.00				
	11	0.01	0.00	0.51	0.00				
1	12	0.01	0.00	0.51	0.00				

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.					
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001			
Order No. :	244466490	Product:	Grid-Connected PV Inverter			
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4			

#### 4.3.3. Direct Current Injection Test

PROCEDURE

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

RESULTS Pass/ Fail

4.3.3	TABLE: DC Injection									
Mains volta	age: 230V									
PowerP/Pr	n[%]		0%	222						
1		Measu	irement	8		1.				
P	hase A	Pha	se B	Phase C		Limit				
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]			
0.050	0.383	-	-	-		0.065	0.5			
PowerP/Pr	n[%]		-	66	5%					
6		Measu	irement			1.11	2			
P	hase A	Pha	se B	Pha	se C	Limit				
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]			
0.045	0.345	-	-	-		0.065	0.5			
PowerP/Pr	n[%]			33	3%					
		Measu	irement			Lin				
P	hase A	Pha	se B	Pha	se C		m			
[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]			
0.043	0.329	-	-	-		0.065	0.5			

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.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.				
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001		
Order No. :	244466490	Product:	Grid-Connected PV Inverter		
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4		

#### 4.3.4. Operating Voltage Range Test PROCEDURE

Test method complies with standard Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2013), clause 4.3.4.

RESULTS Pass/ Fail

4.3.4	TABLE: Over/Under vol	TABLE: Over/Under voltage									
	Rated voltage Un: 230V	Rated voltage Un: 230V									
Setting	value	172	0.622								
Voltage detection accuracy [V]		±1	Voltag	e detection	cycle Td[ms]	20					
Magnitu	ude Vo1 [V]	241	delay	time To1 (m	s]		1900				
Magnitu	ude Vo2 [V]	271	delay	delay time To2 [ms]			40				
Magnitu	ude Vu1 [V]	199	delay	delay time Tu1 [ms]			1900				
Magnitude Vu2 [V]		114	delay	delay time Tu2 [ms]			90				
		Measurement [ms]				Limit	Remark				
	Over voltage level 1	L1	L2	L3	L123	[ms]					
	1	1973.1	1973.1 -		-	2000	Mains voltage				
	2	1975.0	-	-	-	2000	From: 230 V				
	3	1953.5	8	-	-	2000	Jump to: 242 V				
	4	1977.7	-	-	-	2000	]				
5		1953.5	-	-	-	2000	]				
	20000200020020	02	Measure	ment [ms]	24	Limit [ms]	Remark				
	Over voltage level 2	L1	L2	L3	L123						

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.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Tes</b> nd (Shanghai)	17-11-12-12-12-12-12-12-12-12-12-12-12-12-	De	ocument No.:	MS-0025		Rheinland® andix 13
	Inverter Regulati lectricity Authority			Report No: CN23GLMZ 001			
Order No. :	244466490			Product:	Grid-Con	nected P	V Inverter
Client Name :	ame : SolaX Power Network Technology (Zhejiang) Co., Ltd.			l designation:	X1-MINI-	3.0K-G4	
	1	35.9	-	-	-	50	Mains voltage
	2	35.4	4	-	-	50	From: 230 V
	3	34.1	2			50	Jump to: 272 \
	4	32.8	-	-	-	50	1
5		30.7	-	·	-	50	1
		1	Measurement [ms]				
Under vol	tage level 1	L1	L2	L3	L123	[ms]	
	1	1987.2	-	-		2000	Mains voltage From: 230 V
	2	1963.5	-	-	-	2000	
	3	1977.4			-	2000	Jump to: 198 \
	4	1976.7	-	-	-	2000	]
	5	1973.4		-		2000	1
( Induced		1	Measurement [ms]			Limit	Remark
Under vol	tage level 2	L1	L2	L3	L123	[ms]	
	1	59.0	-	-	-	100	Mains voltage
	2	76.1	-	-	-	100	From: 230V
	3	74.0	-	-		100	Jump to: 113V
	4	72.4	#	-	-	100	]
	5	72.0	2		-	100	1

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:

Tested by:

Review date:

Reviewed by:

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# หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.: MS-0025001-appendix 13			
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001		
Order No. :	244466490	Product:	Grid-Connected PV Inverter		
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4		

#### 4.3.5. Operating Frequency Range

PROCEDURE

Test method complies with standard Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2013), clause 4.3.5

#### RESULTS Pass/ Fail

4.3.5	TABLE: Over/Under frequency								
	Rated voltage frequency:	50Hz							
Setting	value								
Frequer [Hz]	ncy detection accuracy	±0.1	Frequency detect	tion cycle Td [ms]	20				
Magnitu	ide Fo [Hz]	52.1	Fo delay time To	(ms)	70				
Magnitu	ide Fu (Hz)	46.9	Fu delay time Tu	(ms)	70				
	Over frequency	Meas	surement (ms)	Limit [ms]	Remark				
1		68.8		100	Mains voltage frequency From: 50Hz				
2		66.2		100					
	3	68.1		100	Jump to: 52.2H				
1	4	77.9		100					
	5	79.3		100	1				
l	Under frequency	Measurement [ms]		Limit (ms)	Remark				
-	1	78.6		100	Mains voltage frequency From: 50Hz				
	2	85.7		100					
	3		85.8	100	Jump to: 46.8Hz				
1	4	84.7		100					
	5	65.5		100					

Used equipment No.:

ment No.: See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

이 같은 것이 같은 것이 같아.	ata / Test Plan d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation ectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Tu= Delayed time for under frequency tripping

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	11
Review date:		Reviewed by:	

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

이 아이지 않는 것 같아. ^^	t Data / Test Plan 🔬 TÜVRha Rheinland (Shanghai) Co., Ltd. Document No.: MS-0025001-appendi				
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001		
Order No. :	244466490	Product:	Grid-Connected PV Inverter		
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4		

#### 4.3.6 Islanding Protection

PROCEDURE

Test method complies with standard IEC 62116. Qr = v(QL)\* v(Qc)/Pw

RESULTS Pass/ Fail

4.3.6	TAB	LE: Isla	anding Pr	otection	n						
	Mair	is voltage: 230V									
						Pow	ver 100%				
Condi	tions	P	w[W]	0	[Var]	0	c [Var]	Qr	Trip time [ms]	Limitation [ms	
280.033	80	L1:	2561	L1:	3000	L1:	3296	1.15			
PR: -10 Qc: +10		L2:	_	L2:	-	L2:	-	-	119ms	2000	
		L3:		L3:		L3:					
9		L1:	2561	L1:	3000	L1:	3146	1.12	250ms		
PR: -10 Qc: +59	5.7. I	L2:	-	L2:	-	L2:	77			2000	
		L3:	-	L3:	-	L3:	-				
		L1:	2561	L1:	3000	L1:	2996	1.09	314ms		
PR: -10 Qc: 0%	5.5.	L2:	3 <u>60</u> N	L2:	-	L2:	-	2		2000	
40.070		L3:	357	L3:		L3:	-				
		L1:	2561	L1:	3000	L1:	2846	1.07			
PR: -10 Qc: -5%		L2:	1	L2:	-	L2:	-		120ms	2000	
		L3:	-	L3:	-	L3:	-	-		1	
		L1:	2561	L1:	3000	L1:	2696	1.04			
Pr: -10 Qc: -10		L2:	-	L2:	_	L2:	-	-	100ms	2000	
		L3:	-	L3:		L3:	-	-			
Pr: -59	6	L1:	2703	L1:	3000	L1:	3296	1.10	101ms	-	

Used equipment No.:

See equipment list for details

Sample No.: N/A Tested by:

Finished date:

Review date:

Reviewed by:

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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheir Grid-connec (Metropolitation	ted In	verter Regu		15)		Re	port No:	CN23GLMZ 001	
Order No. :	n Elec	244466490		(15)			Product:	Grid-Connected PV I	menter
Client Name	a (	SolaX Pov Technolog	ver Net		Ltd.	Model designation: X1-MINI-3.0K-G4			Inverter
Qc: +10%	L2		L2:		L2:	-	-		2000
	L3		L3:		L3:	-			
1	L1	2703	L1:	3000	L1:	2696	0.98		
Pr: -5% Qc: -10%	L2	- :	L2:	-	L2:	-	-	93ms	2000
W.91 - 1970	L3	-	L3:		L3:	-			
ar 192	L1	2845	L1:	3000	L1:	3296	1.04		
Pr: 0% Qc: +10%	L2	-	L2:		L2:			120ms	2000
	L3		L3:	-	L3:	-			
D 501	L1	2703	L1:	3000	L1:	3146	1.07		
Pr: -5% Dc: +5%	L2	-	L2:	-	L2:	-	-	310ms	2000
	L3	-	L3:	-	L3:	-	-		
Pr: -5%	L1	2703	L1:	3000	L1:	2996	1.04		
Qc: 0%	L2	-	L2:	-	L2:	-		660ms	2000
05176.031765 9	L3	-	L3:	-	L3:	-	-		
Pr: -5%	L1		L1:	3000	L1:	2846	1.01		
Qc: -5%	L2		L2:	-	L2:	-	-	135ms	2000
	L3		L3:	-	L3:	-	-		
PR: 0%	L1		L1:	3000	L1:	3146	1.02	the second second	
Qc: +5%	L2	0	L2:	-	L2:	-	10	236ms	2000
	L3		L3:	-	L3:				
Pr: 0%	L1		L1:	3000	L1:	2996	0.99		
Qc: 0%	L2		L2:	-	L2:	-	-	262ms	2000
	L3	: -	L3:	-	L3:	-	-		
PR: 0%	L1	2845	L1:	3000	L1:	2846	0.97	106ms	

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rhein Grid-connect (Metropolitar	ted In	verter Regu	lation			Re	port No:	CN23GLMZ 001	
Order No. :		244466490	-	10)			Product:	Grid-Connected PV	nverter
Client Name	;	SolaX Pov Technolog	ver Net		Ltd.			X1-MINI-3.0K-G4	
Qc: -5%	L2	: -	L2:		L2:	-	-	1 1	2000
	L3	: –	L3:	-	L3:	-			
	L1	2987	L1:	3000	L1:	3146	0.97		
Pr: +5% Qc: +5%	L2	: -	L2:	-	L2:	-		218ms	2000
wo. To N	L3		L3:		L3:	-	-		
	L1	: 2987	L1:	3000	L1:	2996	0.95		5
Pr: +5% Qc: 0%	L2	:	L2:		L2:	~		415ms	2000
	L3		L3:	-	L3:	-			
D	L1	: 2987	L1:	3000	L1:	2846	0.92		j.
Pr: +5% Qc: -5%	L2	:	L2:		L2:	-			2000
	L3	: -	L3:	-	L3:	-			
	L1	: 2845	L1:	3000	L1:	2696	0.94		
Pr: 0% Qc: -10%	L2	: -	L2:	-	L2:			85ms	2000
	L3	: -	L3:	-	L3:	-	-		
D F0/	L1	: 2987	L1:	3000	L1:	3296	1.00		j –
Pr: +5% Qc: +10%	L2	: 34	L2:	-	L2:	-	22	108ms	2000
	L3	: -	L3:		L3:	-			
D 1501	L1	: 2987	L1:	3000	L1:	2696	0.90		
Pr: +5% Qc: -10%	L2	: -	L2:	-	L2:	7		88ms	2000
20.98430.3938388 	L3		L3:	-	L3:	-	÷.		
Pr: +10%	L1	: 3130	L1:	3000	L1:	3296	0.95		1
Qc: +10%	L2	: ····	L2:		L2:	-	-	117ms	2000
	L3	: -	L3:	-	L3:	-			
PR: +10%	L1	: 3130	L1:	3000	L1:	3146	0.93	234ms	
Qc: +5%	L2		L2:	0.000	L2:		±5.	Lonio	2000

Used equipment No.:

5.: See equipment list for details

Is Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Grid-connect (Metropolitan				15)		Report No: CN		CN23GLMZ 001	
Order No. :		244466490		10/			Product:	Grid-Connected PV	Inverter
Client Name : SolaX Pow Technology				Ltd,	Model des	ignation:	X1-MINI-3.0K-G4		
ð	L3	: -	L3:	-	L3:	-	-	1	
	L1	: 3130	L1:	3000	L1:	2996	0.91		
Pr: +10% Qc: 0%	L2	9 ÷	L2:		L2:	-		254ms	2000
40.070	L3	- :	L3:	-	L3:	-			]
22 8248	L1	: 3130	L1:	3000	L1:	2846	0.88		
Pr: +10% Qc: -5%	L2	. –	L2:	. <del></del> .	L2:	-		104ms	2000
uc. 010	L3	: -	L3:		L3:				
	L1	: 3130	L1:	3000	L1:	2696	0.86		
PR: +10% Qc: -10%	L2	-	L2:	-	L2:	-	-	117ms	2000
	L3	:	L3:		L3:	-			<u>]</u>
		~	12		Po	wer 66%			
Conditions		Pw[W]	C	L[VA]	0	Qc[VA]	Qr	Trip time [ms]	Limitation [ms
	L1	; 1880	L1:	1980	L1:	1883	0.96	1.2	
Pr: 0% Qc: -5%	L2	. –	L2:	-	L2:			74ms	2000
	L3	, <del>.</del>	L3:	-	L3:	-	<b>1</b>		]
B 000	L1	: 1880	L1:	1980	L1:	1903	0.96		0
Pr: 0% Qc: -4%	L2	-	L2:	-	L2:	-		120ms	2000
	L3	: -	L3:	-	L3:	-		22	
D 00/	L1	: 1880	L1:	1980	L1:	1923	0.97		
Pr: 0% Qc: -3%	L2		L2:		L2:	7	Ť	206ms	2000
	L3	s (#	L3:		L3:	-			
D 00/	L1	: 1880	L1:	1980	L1:	1943	0.98		
Pr: 0% Qc: -2%	L2	-	L2:	-	L2:	-	-	378ms	2000
	L3	£	L3:		L3:	-	22		
PR: 0%	L1	1880	L1:	1980	L1:	1963	0.98	392ms	12

Used equipment No.:

No.: See equipment list for details

s Sample No.: N/A

Finished date:

Tested by: Reviewed by:

Review date:

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### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	_	(Shangha		., Lta.		Docum	nent No.:	MS-0025001-apper	
Grid-connect (Metropolitan		· · · · · · · · · · · · · · · · · · ·		15)		Re	port No:	CN23GLMZ 001	
Order No. :		244466490	2				Product:	Grid-Connected PV	Inverter
Client Name	8	SolaX Pov Technolog			Ltd,	Model designation: X1-		X1-MINI-3.0K-G4	
Qc: -1%	L2		L2:	-	L2:	-	-	1	2000
	L3	. –	L3:	-	L3:	-			
	L1	: 1880	L1:	1980	L1:	1983	0.99		
Pr: 0% Qc: 0%	L2		L2:		L2:	-	-	920ms	2000
40.070	L3		L3:		L3:	-	2		
	L1	; 1880	L1:	1980	L1:	2002	0.99		
Pr: 0% Qc: +1%	L2	- :	L2:		L2:			250ms	2000
ac	L3		L3:		L3:	-			1
	L1	; 1880	L1:	1980	L1:	2022	1.00		
Pr: 0% Qc: +2%	L2	: -	L2:	-	L2:	-	-	216ms	2000
	L3		L3:	-	L3:	-	-		
10000	L1	; 1880	L1:	1980	L1:	2042	1.00		
PR: 0% Qc: +3%	L2		L2:		L2:			244ms	2000
	L3	- 3	L3:	-	L3:	-	-		
D 001	L1	; 1880	L1:	1980	L1:	2062	1.00		j
Pr: 0% Qc: +4%	L2	-	L2:	-	L2:	-		330ms	2000
	L3		L3:	-	L3:	-	-		
0001	L1	: 1880	L1:	1980	L1:	2082	1.00		-
Pr: 0% Qc: +5%	L2		L2:	-	L2:		77	234ms	2000
0.0402030303	L3	-	L3:		L3:	- 75 - 1	5		Ĵ.
	_				Po	wer 33%	_		
Conditions		Pw[w]	C	L[VA]	0	2c[VA]	Qr	Trip time [ms]	Limitation [ms
Pr: 0%	L1	971	L1:	990	L1:	935	0.92		
Qc: -5%	L2		L2:	-	L2:	-	-	150ms	2000
	L3		L3:		L3:	- 1			2

Finished date:

Tested by:

Review date:

Reviewed by:

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### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Grid-conne		· · · · · · · · · · · · · · · · · · ·		15		Re	port No:	CN23GLMZ 001		
(Metropolita	an Ele	24446649	-	15)				0.10	Grid-Connected PV Inverter	
Order No. :		Z4446649 SolaX Pov	<u> </u>				Product:		nverter	
Client Nam	e;	Technolog			, Ltd,	Model designation: X1-I		X1-MINI-3.0K-G4	-MINI-3.UK-G4	
-	L1	: 971	L1:	990	L1:	945	0.93			
Pr: 0% Qc: -4%	L2		L2:	-	L2:	-		168ms	2000	
QC470	L3		L3:	-	L3:	-	-			
-	L1	971	L1:	990	L1:	955	0.94			
Pr: 0% Qc: -3%	L2		L2:	-	L2:	<u> </u>	-	386ms	2000	
	L3		L3:	-	L3:	-				
	L1	: 971	L1:	990	L1:	965	0.94			
Pr: 0% Qc: -2%	L2	:	L2:		L2:	-		375ms	2000	
	L3		L3:	-	L3:	-	-			
	L1	: 971	L1:	990	L1:	975	0.94		(	
Pr: 0% Qc: -1%	L2	: -	L2:	-	L2:	-	-	340ms	2000	
	L3	: -	L3:	-	L3:	<u> </u>	2			
-	L1	: 971	L1:	990	L1:	985	0.96			
Pr: 0% Qc: 0%	L2		L2:	-	L2:			425ms	2000	
17.793 (T.183) 	L3		L3:	-	L3:	-				
D- 001	L1	971	L1:	990	L1:	995	0.96			
Pr: 0% Qc: +1%	L2		L2:	-	L2:			260ms	2000	
	L3	: -	L3:	-	L3:	-				
D	L1	: 971	L1:	990	L1:	1005	0.96			
Pr: 0% Qc: +2%	L2	: -	L2:	-	L2:	5	77.	240ms	2000	
	L3	- :	L3:	-	L3:	-	÷			
D 00/	L1	971	L1:	990	L1:	1015	0.97			
Pr: 0% Qc: +3%	L2	-	L2:		L2:	-		150ms	2000	
	L3		L3:	-	L3:	-				
PR: 0%	L1	: 971	L1:	990	L1:	1024	0.97	216ms		

Used equipment No.:

ent No.: See equipment list for details

s Sample No.: N/A

Finished date:

Tested by: Reviewed by:

Review date:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rhei	nland	(Shangh	ai) Co	., Ltd.		Docum	ent No.:	MS-0025001-appen	dix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)						Report No: CN23GLMZ 001			
Order No.: 244466490					Product: Grid-Conne		Grid-Connected PV	Inverter	
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.				Model designation:		X1-MINI-3.0K-G4			
Qc: +4%	L2		L2:		L2:	-			2000
	L3		L3:	-	L3:	-			
	L1	971	L1:	990	L1:	1034	0.98		1
Pr: 0% Qc: +5%	L2		L2:		L2:	-	-	84ms	2000
	L3		L3:	-	L3:	<u></u>	2		

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	1
Review date:		Reviewed by:	

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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

이 같은 것이 같은 것이 같이 같이 같이 같이 같이 같이 했다.	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

#### 4.3.7 Response to Utility Recovery

PROCEDURE

Test method complies with standard IEEE 1547.1-2005, clause 5.10.

RESULTS Pass/ Fail

4.3.7	TABLE: Response to Utility Recovery									
	Rated voltage Un: 230V	,		Rated frequency Fn: 50Hz						
Setting	value			·						
Voltage	detection accuracy [V]	±1	Freque	ncy detection accuracy [Hz]	±0.1					
Specifie	d recover voltage range	200-240V	Specified recover frequency range		47-52Hz					
Recover time [s]		120								

Conditions <sup>2)</sup>	UM" back to 242V	UM back to 238V	Uw back to 198V	UM back to 202V
Reconnection	Yes/ No	Yes/ No	Yes/ 🛛 No	Yes/ No
Recover time [s]	N/A	127.0	N/A	127.2
Conditions <sup>30</sup>	FM <sup>1)</sup> back to 52.2Hz	F <sub>M</sub> back to 51.8Hz	Fu back to 46.8Hz	Fu back to 47.2Hz
Reconnection	Yes/ No	Yes/ No	Yes/ X No	Yes/ No
Recover time [s]	N/A	127.0	N/A	126.8
Conditions <sup>4)</sup>	UM" back to 242V	UM back to 238V	UM back to 198V	UM back to 202V
Reconnection	Yes/ No	Yes/ No	Yes/ X No	Yes/ No
Recover time [s]	N/A	127.1	N/A	127.4
Conditions <sup>5)</sup>	U <sub>M</sub> back to 238V	U <sub>M</sub> back to 202V	Fu back to 51.8Hz	F <sub>M</sub> back to 47.2H
Reconnection	Yes/ No	Yes/ No	Yes/ No	Yes/ No
Recover time [s]	127.6	127.1	127.4	127.6
Conditions <sup>6)</sup>	U <sub>M</sub> back to 238V	U <sub>M</sub> back to 202V		
Reconnection	Yes/ No	Yes/ No		
Recover time [s]	126.7	127.7		

Used equipment No.:

See equipment list for details

Sample No.: N/A

Finished date:

Tested by:

Review date:

Reviewed by:

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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Remark: 1) Uw =Mains votage; F<sub>M</sub>=Mains frequency. 2) After mains votage tripped the over/under votage level 1 limit. 3) After mains votage frequency tripped the over/under frequency limit. 4) After mains votage tripped the over/under votage level 2 limit. 5) Retest with an abnormal 1<sup>st</sup> level votage/frequency change event that is introduced during the reconnect countdow n parted period. 6) Retest with an abnormal 2<sup>nd</sup> level 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:	ξ <sub>1</sub>
Review date:		Reviewed by:	

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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	Document No.:	TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	MS-0025001-appendix 13 CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

ture No.:	1	Clause:	4.3.4	
st: st description:	Secondary U Secondary U Secondary U Under Frequ Under Frequ	over Voltage Magnitud over Voltage Trip Time Inder Voltage Magnitu Inder Voltage Trip Time ency Magnitude ency Trip Time	e X First Ove First Und de First Und e Over Free Over Free	r Voltage Magnitude r Voltage Trip Time er Voltage Magnitude er Voltage Trip Time quency Magnitude quency Trip Time e to Utility Recovery pred to 242 0V
st description:	approximately, t	rip time 1973.1ms. Th	e wave No.1 were the grid	voltages; The wave
*2	No.2 were the ot	uput currents of invent	er; The wave No. was orde	red from top to end.
				241.747
- 100 Miles				PHE V
- Personal Property of	Were and the	and some second second	and the second sec	<ul> <li>1965 (199-54)</li> </ul>
				163.826
M 2		*****		An EHR
1				• 1. Nevel 2312 1920-24
100				50.000
1				
		>>		
eile	6.0.0	C exist	nga () agan	10.00
#160 (A)	C111-049803	0154.8230064	LOTALON	NA B
#ALLALU(RemoteRode) (	() H23642	178.060	408.404	242,1765
AI LIL((DemoteNode) (A)		-0.489580	-19-32299	13.5763
Augusta Mini G4 [Hz]     Augusta Mini G4 [Hz]	50.03002 -1.20024	-49,99974	-6.696279	49,99970
		-5.201340	3.4964-3	5,203894

Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
I TOSTING PROVIDENT			
Attachm Picture No.:	2 Clause:	1	4.3.4
Test:	Islanding Protection		First Over Voltage Magnitude
Test:	Secondary Over Voltage N Secondary Over Voltage T	Magnitude Dirip Time	First Over Voltage Trip Time First Under Voltage Magnitude
Test:	Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage	Magnitude Frip Time [ Magnitude [ Trip Time [	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude
Test:	Secondary Over Voltage	Magnitude Frip Time [ Magnitude ] Trip Time ] Ide ]	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time

				50.0	000
1				丙时道	Hz
911.00	211.00	>>	0.24.00	3	
#168 (s)	A 0:12.322820	B 0:14.297801	101404 3.07404		44 SH 00.
Al 1/V1@[RemoteNode] [V]	340,5090	-43.39576	-383.90	47	242,4428
Al 1/11(P(RemoteNode) (A)	18.426.56	-0.223601	-18.649		12.53444
F_fund@X1-MINI-G4 [Hz]	50.03068	49.99985	-0.0308		49.99970
•Al 1/U4@(RemoteNode) [V]	-5-202294	-5.203009	-7.153e		5.201159
sed equipment No.:	See equipment I	ist for details	Sample No.:	N/A	
inished date:	22		Tested by:		
leview date:			Reviewed by:		

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13
			CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

3	Clause:		4.3.4	
Secondary ( Secondary ( Secondary ( Secondary ( Secondary ( Under Frequence)	Over Voltage Ma Over Voltage Trip Jnder Voltage M Jnder Voltage Tr Jency Magnitude	o Time lagnitude ip Time	First Ov First Un Over Fr Over Fr	er Voltage Magnitude er Voltage Trip Time der Voltage Magnitud der Voltage Trip Time equency Magnitude equency Trip Time se to Utility Recovery
During the first I approximately,	evel over voltage trip time 1953.5r	ns. The wave N	id voltage was ju lo.1 were the gri	Imped to 242.0V d voltages; The wave
KARAGAGAR	ANABARARA	0.0000000	KARANDAA	242.059
				KUK USO NIN
0.000000000000	chanologic characteristic			SPS/J/X1-MINI-G4
				.63.144
				Am
				Kalading Mininga
			• 5	50.000
			2.92	
8.14.00	0.000		812-99	0 04.00
	1 01	8	1.95349	41 (31 HL
0:12.2653				
012,055 de) [V] -343,676 le1 [A] -12,6727		3.87541	148,8011 8,35,3901	343.3405
	Islanding Pro Secondary C Secondary C Secondary U Secondary U Under Frequ Under Frequ Under Frequ Under Frequ	Islanding Protection Secondary Over Voltage Ma Secondary Over Voltage Trip Secondary Under Voltage M Secondary Under Voltage Tri Under Frequency Magnitude Under Frequency Trip Time During the first level over voltage approximately, trip time 1953.5r No.2 were the output currents o	Islanding Protection Secondary Over Voltage Magnitude Secondary Under Voltage Trip Time Secondary Under Voltage Magnitude Secondary Under Voltage Trip Time Under Frequency Magnitude Under Frequency Trip Time During the first level over voltage test, the L1 gr approximately, trip time 1953.5ms. The wave N No.2 were the output currents of inverter; The w	Islanding Protection       First Ov         Secondary Over Voltage Magnitude       First Ov         Secondary Over Voltage Trip Time       First Un         Secondary Under Voltage Trip Time       Over Fri         Under Frequency Magnitude       Over Fri         During the first level over voltage test, the L1 grid voltage was ju       approximately, trip time 1953.5ms. The wave No.1 were the grid No.2 were the output currents of inverter; The wave No. was or

Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	S2	Tested by:	2. JA
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		🛕 TÜVRheinland®	
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
Attachm				
Picture No.: Test:	4 Clause: Islanding Protection Secondary Over Voltage Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit	Magnitude Trip Time e Magnitude e Trip Time ude	4.3.4 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	
Test description		age test, the L1 grid vol	Response to Utility Recovery tage was jumped to 242.0V	

The second s				
n n n n n n n n n n n n n n n n n n n	lebetee bebelebebelebelebe	SENTERAS DE CON	and the state of the second	
STRATES AND DEPENDENT OF STREET, STREE	Res and the restaut	NEEDE TALKEY	24	12.059
	A REAL PROPERTY AND A REAL PROPERTY A REAL PRO	THE PERSON AND ADDRESS OF	STIL	V
			******	
			· LIRMS	
				2 402
			16	3.482
			美时间	Am
				SCAMMER
			5	0.000
				0.000
			( 天时道	174
		>>		
0.12.00	0.13	00 0.0	.00	018.00 C
	A		****	有效值
19月1日 [1]	0.12.396083	0:14.373779	1.977096	
@Al 1/U1@[RemoteNode] [V]	341.6283	275.4615	-66.35658	242.2835
Al 1/11@(RemoteNode) [A]	18.42040	-0.133049	-18.55345	12.50533
F fund@X1-MINI-G4 (Hz)	50.03152	49.99258	-0.038940	49.99962
AI 1/U4(0(RemoteNode) [V]	-5.197764	-5.196333	1.431#-3	5.196420

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.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.:	MS-0025001-appendix 13
		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	81 18	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

ÜV Rheinlan	d (Shang	ghai) Co.,	Ltd.	Docum	ent No.:	MS-002500	1-appendix 13
Frid-connected Metropolitan El		· · · · · · · · · · · · · · · · · · ·	5)	Report	No:	CN23GLMZ	001
Order No. :	244466	490		Product	t:	Grid-Conne	cted PV Inverter
Client Name :		ower Netwo ogy (Zhejia	ork ng) Co., Ltd.	Model o	designation:	X1-MINI-3.0	K-G4
Attachm	ent :						
Picture No.:	_	6	Clause:			4.3.4	
		Secondary ( Secondary ( Secondary ( Jnder Frequ Jnder Frequ	Over Voltage N Over Voltage 1 Jnder Voltage Jnder Voltage Jency Magnitu Jency Trip Tim	Trip Time Magnitud Trip Time ude		First Over V First Under First Under Over Frequ Over Frequ Response t	Voltage Magnitude Voltage Trip Time Voltage Magnitude Voltage Trip Time ency Magnitude ency Trip Time o Utility Recovery
est description	appr	oximately,	trip time 35.9r	ns. The w		the grid volta	imped to 272.0V ges; The wave No. n top to end.
	$\langle / \rangle / \rangle$	(/)/)	/ / / /	M	$\mathbb{V}/\mathbb{V}/\mathbb{V}$	271.	723
	VV ~~~	VV\ ~~~	//// ~~~	VV	VVV	• (_10%51) 271.7 • (_10%51) 183. x814	
Tanta o India	V V \	///\ ~~~	//// ~~~	V V ~~-	VVV	183. x#/#	546 mA
American Strength and Strength	V V \	///\ ^^^	/ / / / ~~~~	V V ~~	VVV	183. xtf@ • f_herd(x)	546 mA 000
Tentorial and the second secon		V V \ ~~~		V V ~	VVV	183. xeia • *_foredgets 50. xeia	546 mA 000 Hz
American and a final firm of the second seco		V V \ ~~~			V.V.V 	183. xeia • f_fundgot 50. xeia	546 mA 000
		A 0:12,74793	50	0 0:12.7838507	0,0350	183. xeia 50. xeia sur	546 mA 0000 Hz fr效值
British B (od be "Billion" 4 - Willions Steel (18)		A	50	0		183. xera • f_fundgots 500. xera • 50. xera • 50.	546 mA 0000 Hz
Bill (1)         0 122.000           Bill (1)         0 120.00	oteNode  [A] IINI-G4 [Hz]	A 0:12.34793 18.3174	50 8 3	6 0:12.7838507 -363.4096	-341.7 -341.7 -13.53 -6.218	183. x et a • f_fund(0) 50. 50. 50. 50. 50. 50. 50. 50.	546 mA 0000 Hz 1000 Fixta 27%2555 11.27%2 4%.95%60
10 10 10 10 10 10 10 10 10 10 10 10 10 1	oteNode  [A] IINI-G4 [Hz]	A 0112.74793 18.3174 0.39514 50.1059	50 8 3	6 0.12.7838507 -363.4086 -13.14451 49.88701	-341.7 -13.53	183. x et a • f_fund(0) 50. 50. 50. 50. 50. 50. 50. 50.	546 mA 0000 Hz fr&th 27%2365 11.27%2
Image: State of the	ooteNode] [A] IINI-G4 [Ha] moteNode] [V]	A 012.34790 18.3174 0.39534 50.1059 -5.20058	50 8 3	6 012.7838507 -363,4086 -13,14451 49,88701 -5,203724	-341.7 -341.7 -13.53 -6.218	183. xef@ 50. 50. xef@ e3	546 mA 0000 Hz 1000 Fixta 27%2555 11.27%2 4%.95%60
•         •	ooteNode] [A] IINI-G4 [Ha] moteNode] [V]	A 012.34790 18.3174 0.39534 50.1059 -5.20058	50 6 9 6 5	6 012.7838507 -363,4086 -13,14451 49,88701 -5,203724	0,0350 -361,7 -13,53 -6,218 2,365	183. x 6/ 4 • 7, Aurol (22) 50. 50. 50. 50. 50. 50. 50. 50.	546 mA 0000 Hz 1900 F3285 11.27062 49.99660

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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland®
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

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	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	8	Clause:	4.3.4	
est:	Secondary Over	Voltage Magnitude Voltage Trip Time er Voltage Magnitude er Voltage Trip Time y Magnitude	First Ov First Un First Un Over Fr Over Fr	er Voltage Magnitude er Voltage Trip Time ider Voltage Magnitud ider Voltage Trip Time equency Magnitude equency Trip Time ise to Utility Recovery
est description:	During the second le approximately, trip t	evel over voltage test, ime 34.1ms. The wav rents of inverter; The w	the L1 grid voltage wa a No.1 were the grid v	as jumped to 272.0V voltages; The wave No
	VVVVV	VVVVV		71.721
				183.572
64 [wi] 94				
IN 1 Junit				50.000
Clover July			<u> </u>	50.000 Hz
82	0.12.300	>>	8.12 708	0.17.000
#1/8 Lo	A 012.0057314	B 032.6396373	PIE	科绘画
Al 1/U1@(RemoteN     Al 1/11@(RemoteNs     F_fund@X1 MINI G	He][A] 2.773607	-362,6508 0.060361 45,66032	-457.0992 -2.713347 -0.220173	273.3050 30.92637 49.99603
AI 1/U40/(RemoteN	ode1 [V] -6.202771	-5.001103	1.669+-3	5.200987

Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	8. 12	Tested by:	2
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		🛕 TÜVRheinland®
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	22	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland	
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	8	Tested by:	
Review date:		Reviewed by:	
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ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

001
ted PV Inverter
-G4

əst:	Sec Sec Sec Sec Unc	condary Over condary Unde condary Unde	r Voltage Magnitude r Voltage Trip Time er Voltage Magnitude er Voltage Trip Time cy Magnitude	☐ First C Ø First U Ø First U ☐ Over F ☐ Over F	over Voltage Magnitud over Voltage Trip Time Inder Voltage Magnitu Inder Voltage Trip Tim Frequency Magnitude Frequency Trip Time nse to Utility Recover
est description:	During approx	the first level imately, trip	funder voltage test, t time 1987.2ms. The	he L1 grid voltage wa wave No.1 were the g	
					97.801
	<u> </u>	<u>a</u> <u>a</u> a	- <u> </u>	A. A. A. A.	v
a second second			the sector of the sector	• 1 LRA	451NI-G4
- MUR				1.	33.558
N N N N N N N N N N N N N N N N N N N					mA
(In the second s	****			e F_fun	diNF-64
All and a second					50.000
- 100 L				医时间	Hz
1 11 10 10 10 10 10 10 10 10 10 10 10 10	0.3.4	0 ***	>>		0.00
at all ini		A 011.55464	8 013.54205	1.08723	44 Str 60
AI 1/U1@(Remote AI 1/11@)[Remote BF_fund@X3_MINI	Node] [A]	273.5582 18.12943 49.89581	-125.2295 0.179409 80.00298	-396.7787 17.05097 0.103368	198.1802 15.24435 40.00975
AI 1/V4@ Bemake		8.197764	5.398479	7.1536-4	5.536706

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	22 12	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	December 1	TÜVRheinland <sup>®</sup>
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

ctu	re No.:		4026	12	Clause:			4.3.4		
st:	1		Sec Sec Sec Und Und	ondary Or ondary Ur ondary Ur ler Freque ler Freque	ver Voltage N ver Voltage Inder Voltage Inder Voltage Incy Magnitu Incy Trip Tim	ge Magnitude       First Over Voltage Magnitude         ge Trip Time       First Over Voltage Trip Time         age Magnitude       First Under Voltage Magnitude         age Magnitude       First Under Voltage Trip Time         age Trip Time       Over Frequency Magnitude         age Trip Time       Over Frequency Magnitude         nitude       Over Frequency Trip Time			Time gnitude tude me covery	
sto	descript	ion;	approxi	mately, tri	ip time 1963	.5ms. The	wave No.1	were the grid No. was orde	voltages; The	wave
Miner Hent							NAMA NA	19	7.803	
- MI								(R1110)	V	_
	-	*****	Sector Sector	*****			NAME OF TAXABLE PARTY O	I_tRMS	INI-GA	
No.								13	3.802	
N N								sona	mA	
1								● F_fun	diNI-G4	
									50.000	
ŧ.								301 (H	Hz	
		0.00	0.11.00			>>	0.1	0.38.00	0.34.00	
	REFE (4)	all a sta		A 01214801	2000 - 100 -	8		FERE	作效的	
	1.	RemoteN	ode] [V]	-104.9173		-278.0278		-178.1105	198,2468	
	Al 1/11@	RemoteNo	del (A)	7,454980		-21.33743		-13.88245	15.28481	
		KI-MINI-GA		49,90022		49.99960		0.099560	49.99976	
	A 1/040	PillemoteN	ode) (V)	-5.203000		-5.200863		2.146e-3	5.201017	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

ÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13 CN23GLMZ 001		
rid-connected Inverter Regulation fetropolitan Electricity Authority 2015)					
Order No. :	244466490	o	Product:	Grid-	Connected PV Inverter
Client Name :		ver Network y (Zhejiang) Co.,	Ltd. Model designation:	X1-M	INI-3.0K-G4
Attachm	nent:1				
Picture No.: Test:		13 Cla nding Protection	ause:		3.4 Over Voltage Magnitude
Test descriptio	Sec Sec Unc	condary Under Vo der Frequency M der Frequency Tr	tage Trip Time oltage Magnitude oltage Trip Time agnitude	First First Over Resp	Over Voltage Trip Time Under Voltage Magnitude Under Voltage Trip Time Frequency Magnitude Frequency Trip Time onse to Utility Recovery as jumped to 198.0V
	appion	intately, the time	1977.4ms. The wave No.1	were the	gnd voitages; the wave
Miner John Strange			rrents of inverter; The wave		
Million March (March (M					ordered from top to end.
• Milwer-Jaular					and the second s
Milwallytin * Mike - alpedation					133.255
<ul> <li>Milwa-lanta * Mete-anges</li> <li>Mont</li> <li>Mont</li> </ul>					133.255
• Milwer Jautre					133.255
<ul> <li>Milwa-lanta * Mete-anges</li> <li>Mont</li> <li>Mont</li> </ul>			irrents of inverter; The wave	No. was	refered from top to end.     197,802,000     133.255     KP10     F_fundRNI-G4     50.000     KP10     Hz
Milwer Jahru (Mele Taine) (Milwer Jahru (Mele Taine)		A	arrents of inverter; The wave		197,802     133.255     KB10     F_fundNN-Ge     50.000
Milena. Ignita - Aget	0.2 w	ere the output cu	Prents of inverter; The wave	No. was	ordered from top to end. 197,802 197,802 133.255 Ката тор 5,0000 Ката на тор тор тор тор тор тор тор тор
	essteMode] [M]	A	create of inverter: The wave	No. was	Contract from top to end.     Land and a second from top to end.     Land a second from top to end.

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

Tested by:

Review date:

Reviewed by:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

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ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland		
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	A TÜVRheinland		
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland		
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	14
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

## Attachment: 1



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

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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	8. 12	Tested by:	
Review date:		Reviewed by:	
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Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.;	N/A	
Finished date:	21 D2	Tested by:		10
Review date:		Reviewed by:		
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

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TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S:	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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Test Da	ata / Test Plan		🛕 TÜVRheinland®
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		🛕 TÜVRheinland®
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	82	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		🛕 TÜVRheinland®
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	Si 13	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinlan	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

cture No.:	28	Clause:	4.3.5	
est:	Secondary Over V Secondary Under	/oltage Magnitude	First Over	Voltage Magnitude Voltage Trip Time er Voltage Magnitude er Voltage Trip Time quency Magnitude
	Under Frequency	Magnitude	Over Free	uency Trip Time to Utility Recovery
est description:	During under frequen time 85.8ms. The wa	cy test, the grid voltage ave No. 1 were the grid v he wave No. was orden	was jumped to 46.8 oltages; The wave 1	Hz approximately, tri
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Table - Table ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (				mē. 5.800 rīc
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2 Mile Table 1 Mile Annual State	0.15 700 A 0.12.013682	*H-Q> 012.10419		He
1 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	A 013.013683 del (V) 131.9020	0 012.104519 168.0119	0.45 256 9.63 256 9.65 256 9.65 256 9.65 256	Hz 作政道 228-7117
An United Transformer	A 012.0134482 de) (V) 131.9020 de) (A) 6.274713	0 012.104519	0.4.3ml 0.4.5ml 9.4.5ml 9.4.5ml	गंद ना के क्ष

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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	ata / Test Plan		<b>TÜV</b> Rheinland <sup>®</sup>
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

## Attachment : 1



Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	(Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inv (Metropolitan Elect	verter Regulation tricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
onora reanto :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Test description:	Islanding Protection  Secondary Over Vol  Secondary Under Vol  Secondary Under Vol  Under Frequency M  Under Frequency Tr  During under frequency	tage Magnitude tage Trip Time oltage Magnitude oltage Trip Time agnitude ip Time	First Over First Unde First Unde Over Freq Over Freq Response	Voltage Magnitude Voltage Trip Time er Voltage Magnitude er Voltage Trip Time uency Magnitude uency Trip Time to Utility Recovery To Utility Recovery
resi description:	time 65.5ms. The wave currents of inverter; The	No. 1 were the grid w	oltages; The wave N	
		MMMMM		9.773 46.311
I BUILDE			• f_fund	6.800
e-lippi			医射道	Ha
0 10 2N	0.11.900	>>		518.000
and all line	A 0:12.660820	0 0:12.726306	PETRS 0.065496	Pi 50 01
■ Al 1/U1@(BennoteN ● Al 1/11@(BennoteN ● F_form@X1 MINI C ● Al 1/U4@(BennoteS	ode) (A) 9.536758 A (Ha) 45.95247	251.0980 34.91586 46.80209 -5.204078	102 5830 5.379105 3.159379 -2.340e-3	279.6166 13.33240 47.65697 3.203946

Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	8. 12	Tested by:	2. 10
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

(Metropolitan El Order No. :	Inverter Regulation	Description of Allery	
Order No. : Client Name :	eculary Additionary 2015)	Report No:	CN23GLMZ 001
Client Name :	244466490	Product:	Grid-Connected PV Inverter
	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1		4.3.6
Test:	Islanding Protection     Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magnitt     Under Frequency Trip Tin	Magnitude C Trip Time C e Magnitude C e Trip Time C ude C	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
	regarded as the trip signal with top to end.	hile the grid was switche	s flowing through to the grid, also doff. The wave No. was orded fro 2842: Tue Nov 29 15:44:15 2022
		70.00ms/ -2.392s	iRth            * 21(2)         -2.3920000000000           *1(2)         -2.3920000000000           *2(7)         -2.2730000000000           *2(7)         -2.2730000000000           *2(7)         -2.27300000000000           *2(7)         -2.27300000000000000000000000000000000000
保存到文件 = acc 中 保存業年 Used equipmen	1 🛛 🖾 🗮 🕹 🕹	details Sample No	.: N/A

Review date:

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TUV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation ectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
Attachm				
Picture No.: Test:	32 Clause:		4.3.6	
lest.	Islanding Protection	descente de	First Over Voltage Magnitude	
	Secondary Over Voltage N		First Over Voltage Trip Time	
	Secondary Over Voltage		First Under Voltage Magnitude First Under Voltage Trip Time	
	Secondary Under Voltage		_	
	Under Frequency Magnitu		Over Frequency Magnitude Over Frequency Trip Time	
	Under Frequency Trip Tim		Response to Utility Recovery	
Test description		5%, the trip time of prote		
Test description	100% load, PR: -10%, QC: +			
Test description	100% load, PR: -10%, QC: + output currents of the inverter	; CH2 were the currents	s flowing through to the grid, also	
	<ul> <li>100% load, PR: -10%, QC: + output currents of the inverter regarded as the trip signal wh top to end.</li> </ul>	; CH2 were the currents	s flowing through to the grid, also	
Test description	<ul> <li>100% load, PR: -10%, QC: + output currents of the inverter regarded as the trip signal wh top to end.</li> </ul>	; CH2 were the currents ille the grid was switche	s flowing through to the grid, also	
KEYSIGH	<ul> <li>100% load, PR: -10%, QC: + output currents of the inverter regarded as the trip signal wh top to end.</li> </ul>	; CH2 were the currents ille the grid was switche	s flowing through to the grid, also doff. The wave No. was orded fro	
	<ul> <li>100% load, PR: -10%, QC: +1 output currents of the inverter regarded as the trip signal wh top to end.</li> <li>DS0-X 3024T, M</li> </ul>	; CH2 were the currents ille the grid was switche r60104203, 07.31.202001	s flowing through to the grid, also doff. The wave No. was orded fro	
	<ul> <li>100% load, PR: -10%, QC: +1 output currents of the inverter regarded as the trip signal wh top to end.</li> <li>DS0-X 3024T, M</li> </ul>	; CH2 were the currents ille the grid was switche r60104203, 07.31.202001	s flowing through to the grid, also ed off. The wave No. was orded fro	
	<ul> <li>100% load, PR: -10%, QC: +1 output currents of the inverter regarded as the trip signal wh top to end.</li> <li>DS0-X 3024T, M</li> </ul>	; CH2 were the currents ille the grid was switche r60104203, 07.31.202001	s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 15:42:39 2022 初時 一百一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一	
	<ul> <li>100% load, PR: -10%, QC: +1 output currents of the inverter regarded as the trip signal wh top to end.</li> <li>DS0-X 3024T, M</li> </ul>	; CH2 were the currents ille the grid was switche r60104203, 07.31.202001	s flowing through to the grid, also ed off. The wave No. was orded fro 2842: Tue Nov 29 15:42:39 2022 488 0 100 100 100 100 100 100 100 100 100 1	
	<ul> <li>100% load, PR: -10%, QC: +1 output currents of the inverter regarded as the trip signal wh top to end.</li> <li>DS0-X 3024T, M</li> </ul>	; CH2 were the currents ille the grid was switche r60104203, 07.31.202001	s flowing through to the grid, also ed off. The wave No. was orded fro	

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	I Inverter Regulation Electricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
	nent:1		4.3.6
est:	Islanding Protection Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Secondary Under Voltag Under Frequency Magnit Under Frequency Trip Tir	Magnitude [ Trip Time [ e Magnitude [ e Trip Time [ tude [ 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
KEYSIG	output currents of the inverte regarded as the trip signal w top to end.	r; CH2 were the currents	ection was 120.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
	2 20.0 $3 50$	50.00ms/ -2.472	◆2 ・ 光林 ■ ギ島 ×1(2) -2 506000000000 ×2(7) -2 3960000000000
			ΔΧ: 120.000000000ms 1/ΔΧ: 8.3333Hz Y1(2): 52.7500A Y2(2) 1.41200kA ΔΥ: 1.35925kA ΔΥ/ΔΧ: 11.3271kA/s

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	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm			
Picture No.: Test:	35 Clause: Slanding Protection	,	4.3.6 First Over Voltage Magnitude
	Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magnite     Under Frequency Trip Tin	Trip Time [ e Magnitude [ e 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	output currents of the inverter	r; CH2 were the currents	tection was 100.0ms. CH1 were th s flowing through to the grid, also ed off. The wave No. was orded fro
			10040 T New 00 15-00-55 0000
	HT D50-X 3024T, M	Y60104203, 07.31.20200: 50.00ms/ -2.235	

.35925kA 13.5925kA/s 保存到文件 = scope\_173 保存菜单 回调菜单 电子邮件 禁省/標時 ٠ 披下保存 Sample No.: N/A Used equipment No.: See equipment list for details Finished date: Tested by: Review date: Reviewed by:

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TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
	ent:1	1	4.3.6
Test:	Islanding Protection     Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Secondary Under Voltage	Trip Time Magnitude	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude



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

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Grid-connected	d (Shanghai) Co., Lt Inverter Regulation ectricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490		Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)	2.1	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1			
Picture No.: Test:	37	Clause:		4.3.6
	Secondary Ow Secondary Ow Secondary Und Secondary Und	er Voltage Tri der Voltage N	p Time Nagnitude	First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude
	Under Frequen	ncy Trip Time	[	Over Frequency Trip Time     Response to Utility Recovery
Test description	Under Frequent 100% load, PR: -5 output currents of regarded as the tri top to end,	bcy Trip Time 5%, QC: -10% the inverter; ( ip signal while	( 6, the trip time of prote CH2 were the current: e the grid was switche	Response to Utility Recovery ection was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
Test description	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end.	bcy Trip Time 5%, QC: -10% the inverter; ( ip signal while	( 6, the trip time of prote CH2 were the current: e the grid was switche	Response to Utility Recovery ection was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12942: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end.	the inverter; C ip signal while	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery ection was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end.	the inverter; C ip signal while	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery ection was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end.	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12942: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022 Response to Utility Recovery rest and the grid, also rest a
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022 Tue Nov 29 14:47:47:47 2022 Tue Nov 29 14:47:47 10 753Hz
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery           action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro           12842: Tue Nov 29 14:47:34 2022           485           12842: Tue Nov 29 14:47:34 2022           485           29000000000           20000000000           20000000000           20000000000           20000000000           4x           93.0000000000           4x           93.0000000000000           4x           93.000000000000000000000000000000000000
	Under Frequen 100% load, PR: -5 output currents of regarded as the tri top to end. T DS0- 2 20.04/ 3 51	ncy Trip Time 5%, QC: -10% the inverter; C ip signal while 	6, the trip time of prote CH2 were the currents e the grid was switche 0104203, 07.31.20200	Response to Utility Recovery action was 93.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022 Response to Utility Recovery 12842: Tue Nov 29 14:47:34 2022 Response to Utility Recovery Response to Utility Recovery ed off. The wave No. was orded fro 12842: Tue Nov 29 14:47:34 2022 Response to Utility Recovery Response to Utility Recovery

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co.,	Ltd. Model designation:	X1-MINI-3.0K-G4
		use:	4.3.6
Test:	Islanding Protection     Secondary Over Volt     Secondary Over Volt     Secondary Under Volt	age Magnitude [ age Trip Time [	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time



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Test Da	ata / Test Plan		🛕 TÜVRheinland
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm Picture No.:	nent:1		4.3.6
Test: Islanding Protection Secondary Over Voltage N Secondary Over Voltage T Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitut Under Frequency Trip Tim		Trip Time Magnitude Trip Time	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:	output currents	s of the inverter;	CH2 were the curre	otection was 310.0ms. CH1 were i ints flowing through to the grid, als ched off. The wave No. was orded
KEYSIGHT TECHNOLOGIES	2 20.0A/ 3	D50-X 3024T, MY6	3 15 1 26 1 3 1	0012842: Tue Nov 29 14:37:02 202
				%            412         445         310           412         310         0000000000           42         310         0000000000           42         310         0000000000           42         310         0000000000           42         310         0000000000           42         310         0000000000           42         310         0000000000           42         3258Hz         1/42           42         1.41200kA         4/2           438468kAvs         4/48468kAvs
保存對文件 = scope_ 保存变单	150 回夜荣华	电子邮件	<b>禁省/探除</b>	披下保存

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Finished date: Review date:

Tested		
Reviewed	by:	

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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

## Attachment: 1

Picture No.:	40 Clause:	4.3.6
est:	Islanding Protection Secondary Over Voltage Magnitude Secondary Over Voltage Trip Time Secondary Under Voltage Magnitude Secondary Under Voltage Trip Time Under Frequency Magnitude Under Frequency Trip Time	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:	100% load, PR: -5%, QC: 0%, the trip time of prot output currents of the inverter; CH2 were the curre regarded as the trip signal while the grid was swite top to end.	nts flowing through to the grid, also
KEYSIC TECHNOL	GHT Optima D50-X 3024T, Mr60104203, 07.31.202001	2842: Tue Nov 29 14:41:53 2022
00 1	2 20.0A/ 3 5.0A/ 4 300.0ms/ -2.988s	
	nen en	4.43 X1(2), -3.14000000000 -2.40000000000 -2.400000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.4000000000000 -2.40000000000000 -2.40000000000000 -2.40000000000000 -2.40000000000000 -2.4000000000000000000000 -2.40000000000000000 -2.4000000000000000000000000000000000000
		1.41200kA ΔΥ: 1.35925kA ΔΥ/ΔΧ 2.05947kA/b
00.77 V0.97 (B	acope_159 原数 研试原始 电子邮件 经省/期期	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	8	Tested by:	2. JA
Review date:		Reviewed by:	
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Test Data / Test Plan			🛕 TÜVRheinland	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001	
				Order No. :
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

## Attachment : 1

Picture No.:	41	Clause:	4.3.6
est:	Secondary	otection Over Voltage Magnitude Over Voltage Trip Time Jnder Voltage Magnitud Jnder Voltage Trip Time Jency Magnitude Jency Trip Time	de First Under Voltage Magnitud
est description:	100% load, PR output currents	-5%, QC: -5%, the trip of the inverter; CH2 we	time of protection was 135.0ms. CH1 were the the currents flowing through to the grid, also d was switched off. The wave No. was orded f
KEYSIGHT	2 20.0A/ 3		07.31.2020012842: Tue Nov 29 14:44:11 2022
uu .	2 20.04	5.0~ //	(100ms/ -3.011s 110 110 110 110 110 110 110 110 110
			# 25
			X1(2) -3.045000000006 X2(2) -2.910000000006 AX
* * * * * *		4 V V V V V V V V V	135.00000000ms 1/ax 7.4074Hz V1(7)
1111111			52 7500A Y2(2)
	ለለለለለለለ	M	1.41200kA
TTTTT		r T	ΔY. 1.35925kA
			10.0685kA/s
保存到文件 = scope 保存取集	_160 	0.7450	P 4/ 1514
and the second			IS T WITH

Used equipment No.:	See equipment list for details	Sample No.;	N/A
Finished date:	23 D2	Tested by:	
Review date:		Reviewed by:	
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	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation:	X1-MINI-3.0K-G4



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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co.,	Ltd. Model designation:	X1-MINI-3.0K-G4
		ause:	4.3.6
Test:	Islanding Protection     Secondary Over Vo     Secondary Over Vo     Secondary Under V	tage Magnitude [ tage Trip Time [	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time



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Test Data / Test Plan           TÜV Rheinland (Shanghai) Co., Ltd.         Document No.:			TÜVRheinland®
Grid-connected	Ind (Shanghai) Co., Ltd. Inverter Regulation lectricity Authority 2015)	Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

## Attachment: 1

Picture No.:	44	Clause:	4.3.6
Test:	Secondary ( Secondary ( Secondary ( Under Frequ Under Frequ	Over Voltage Magnitude Over Voltage Trip Time Jnder Voltage Magnitude Jnder Voltage Trip Time Jency Magnitude Jency Trip Time	Over Frequency Magnitude     Over Frequency Trip Time     Response to Utility Recovery
Test description:		current 0.130A. See the	of grid current of phase L1 was 0.018A, less than screenshot of the power analyzer for detail. (1*

	相1		三相总和	
U_tRMS	230.07	V	230.07	V
I_tRMS	491.34	mA	491.34	mA
P_t	3.5063	w	3.5063	W
Q_t	112.96	var	112.96	var
S_t	113.04	VA	113.04	VA
PF_t	0.0310		0.0310	
F_fund			50.000	Hz
U_fundRMS	230.07	v	230.07	V
I_fundRMS	18.408	mA	18.408	mA
P_fund	3.4760	w	3.4760	W
Q_fund	-364.66	mvar	-364.66	mvar
S_fund	4.2352	VA	4.2352	VA

Used equipment No .:

See equipment list for details

Sample No.: N/A Tested by:

Finished date: Review date:

Reviewed by:

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Test Da	t Data / Test Plan 🛕 TÜVRho			
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

# Attachment: 1



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S <sup>2</sup>	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4



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TÜV Rheinlar	d (Shanghai) Co., Ltd.		Document No.:	MS-002500	1-appendix 13
	Inverter Regulation ectricity Authority 2015)		Report No:	CN23GLM2	2001
Order No. :	244466490		Product:	Grid-Conne	cted PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) C		Model designation:	X1-MINI-3.0	0K-G4
Attachm	ent:1				
Picture No.: Test:	47 Islanding Protect	Clause:		4.3.6	Voltage Magnitude
Test descriptior	Secondary Under Secondary Under Under Frequency Under Frequency Under Frequency 100% load, PR: +5% output currents of the regarded as the trip s top to end.	r Voltage T Magnitud Trip Time QC: 0%, e inverter; 0	rip Time [ e [ the trip time of protec CH2 were the currents	Over Frequ Over Frequ Response tion was 415. s flowing throu	igh to the grid, also
KEYSIG		DODAT MYS	0104203, 07.31.20200	12942 · Tuo Mor	29 15:01:01 2022
E	2 20.0A/ 3 5.0A/		200.0ms/ -2.662		福助 へい
				(12	1 光标 🗉 🔳
					+ 25 X1(2): -2 760000000000 -2 345000000000 ΔX 415.000000000ms 1/ΔX 2.4096Hz Y1(2): 52.7500A Y2(2): 1.41200kA

 HTMLXIXIT
 BURRAL
 BUTMAN
 BUTMAN

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

 Finished date:
 Tested by:

 Review date:
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	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

#### Allaciment Picture No .: 48 Clause: 4.3.6 Islanding Protection Secondary Over Voltage Magnitude Secondary Over Voltage Trip Time Secondary Under Voltage Trip Time Secondary Under Voltage Trip Time Test: First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Under Frequency Magnitude Over Frequency Trip Time Under Frequency Trip Time Response to Utility Recovery 100% load, PR: +5%, QC: -5%, the trip time of protection was 114.0ms. CH1 were the Test description: output currents of the inverter; CH2 were the currents flowing through to the grid, also regarded as the trip signal while the grid was switched off. The wave No. was orded from top to end. KEYSIGHT D50-X 3024T, MY60104203, 07.31.2020012842: Tue Nov 29 14:53:24 2022 渡劫 光标 114.000000000m 8.7719Hz 52.7500A .41200kA .35925kA 11.9232kAVs 保存到文件 = scope\_163 保存菜单 回调荣单 禁省/探除 电子邮件 ٠ 披下保存 Sample No.: N/A Used equipment No.: See equipment list for details Finished date: Tested by:

Review date:

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	ata / Test Plan Id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
			MI 1 10 10 011 0 1
	SolaX Power Network Technology (Zhejiang) Co., I	Model designation: td.	X1-MINI-3.0K-G4
Client Name : Attachm Picture No.:	Technology (Zhejiang) Co., I	ld.	4.3.6



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

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 Tested by:

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TUV Rheinlar	nd (Shanghai) Co., L	_td.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	)	Report No:	CN23GLMZ 001
Order No. :	244466490		Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Networ Technology (Zhejiang		Model designation:	X1-MINI-3.0K-G4
Attachm				
Picture No.: Test:	50 Salanding Prot	Clause:		4.3.6 First Over Voltage Magnitude
	Secondary Ov Secondary Ov Secondary Ur Secondary Ur Under Freque	ver Voltage T nder Voltage nder Voltage ency Magnitu	irip Time [ Magnitude [ Trip Time [ de [	First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
	n; 100% load, PR: 4 output currents o regarded as the t top to end.	+5%, QC: +1 f the inverter;	0%, the trip time of prot CH2 were the currents	ection was 108.0ms. CH1 were th s flowing through to the grid, also ed off. The wave No. was orded fro
Test description	n: 100% load, PR: 4 output currents o regarded as the t top to end.	+5%, QC: +1 If the inverter, rip signal wh	0%, the trip time of pro CH2 were the currents ile the grid was switche	tection was 108.0ms. CH1 were th s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 15:04:35 2022

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

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TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1		
Picture No.: Test:	51 Clause:		4.3.6
T	Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnitu Under Frequency Trip Tim Under Frequency Trip Tim	Magnitude [ Trip Time [ ude [ ne [	First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery ection was 88.0ms. CH1 were the
Test description	output currents of the inverter regarded as the trip signal wh top to end.	; CH2 were the current:	ection was 88.0ms. CHT were the s flowing through to the grid, also ed off. The wave No. was orded fro
KEYSIG	4T D50-X 3024T, M 2 20.0A/ 3 5.0A/ 4	r60104203, 07.31.20200 60.00ms/ -2.857	12842: Tue Nov 29 14:51:17 2022
			※ 光林 1 回 手幼 X1(2)

1.41200kA .35925kA 15.4460kA/s 保存到文件 = scope\_162 保存菜单 回调菜单 电子邮件 禁省/標時 ٠ 执下保存 Used equipment No.: Sample No.: N/A See equipment list for details Finished date: Tested by: Review date: Reviewed by:

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TÜV Rheinland	I (Shanghai) (	Co., Ltd.	Document No.:	MS-002500	1-appendix 13
Grid-connected Ir (Metropolitan Ele	Contraction of the Contraction		Report No:	CN23GLMZ	001
Order No. :	244466490		Product:	Grid-Conne	cted PV Inverter
Client Name :	SolaX Power N Technology (2)	letwork hejiang) Co., Ltd.	Model designation:	X1-MINI-3.0	K-G4
Attachme					
Picture No.: Test:	52	Glause: g Protection		4.3.6	oltage Magnitude
	Second Second Second Under F	ary Over Voltage ary Over Voltage ary Under Voltage ary Under Voltage requency Magnit requency Trip Tin	Trip Time e Magnitude e Trip Time ude ne	First Under First Under Over Frequ Response t	Voltage Trip Time Voltage Magnitude Voltage Trip Time ency Magnitude ency Trip Time o Utility Recovery
Test description:	output curre	ents of the inverte	+10%, the trip time of p r, CH2 were the currer	nts flowing throug	gh to the grid, also
10000	top to end.	s the trip signal w	hile the grid was switc	ned oil. The wave	e No. was orded from
	top to end.		hile the grid was switc 1/60104203, 07.31.2020 50.00ms/ -2.3	012842: Tue Nov	29 15:17:47 2022 液动 N 光标 III
	top to end.	D50-X 3024T, M	fv60104203, 07.31.2020	012842: Tue Nov	29 15:17:47 2022 限約 🔊
	2 20.04/		fr60104203, 07.31.2020 50.00ms/ -2.3	012842: Tue Nov	29 15:17:47 2022 凍約 へく 米林 ■ 手助 X1(2) -2 344000000000 -2 3270000000000 -2 2270000000000 AX, 117.000000000ms 1/ΔX: 8.5470Hz Y1(2) 52 7500A Y2(2) 1.41200kA ΔY: 1.35925kA ΔY/ΔX:
	top to end.		tr60104203, 07.31.2020 50.00ms/ -2.3	012842: Tue Nov	29 15:17:47 2022 凍約 へく 米林 ■ ■ 千約 ×1(2) -2 344000000000 ×1(2) -2 227000000000 AX 117.000000000ms 1/ΔX: 8.5470Hz Y1(2) 52 7500A Y2(2) 1.41200kA ΔY: 1.35925kA ΔY/ΔX 11.6175kA/s
HRRMXH = Jeon	top to end.		tr/60104203, 07.31.2020 50.00ms/ -2.3	012842: Tue Nov	29 15:17:47 2022 凍む へく 米林 日 日 千劫 X1(2) -2 344000000000 -2 227000000000 AX 117:000000000ms 1/ΔX: 8:5470Hz Y1(2) 52 7500A Y2(2) 1.41200kA ムY: 1.35925kA ムY/ΔX: 11.6175kAVs
	top to end.		tr60104203, 07.31.2020 50.00ms/ -2.3	012842: Tue Nov	29 15:17:47 2022 凍む へく 米林市 ■ 手助 X1(2) -2 344000000000 A2(2) -2 227000000000 AX 117 000000000ms 1/ΔX: 8:5470Hz Y1(2) 52 7500A Y2(2) 1.41200kA ΔY: 1.35925kA ΔY/ΔX 11.6175kA/s

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TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1		
Picture No.: Test:	53 Clause:		4.3.6
Test descriptior	output currents of the inverter regarded as the trip signal wi	Trip Time [ a Magnitude [ b Trip Time [ ude [ he [ f5%, the trip time of prot r, CH2 were the currents	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 rection was 234.0ms. CH1 were the flowing through to the grid, also ad off, The wave No. was orded free
	top to end. HT D50-X 3024T, M	Y60104203, 07.31.20200	12842: Tue Nov 29 15:15:14 2022
(E) t	2 20.0A/ 3 5.0A/ 4	90.00ms/ -2.290	8 液动 🗸
		nini	(12) 光林 日 手袋 X1(2) -2.368000000000 2年(2)

 224.00000000ms

 1/ΔX:

 4.2735Hz

 Y1(2)

 52.7500A

 Y2(2)

 1.41200kA

 ΔY

 1.35925kA

 ΔY/ΔX:

 5.80876kA/s

 #77552.41

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

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TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
	54 Clause	2 <b>.</b>	4.3.6
Picture No.: Test:	Islanding Protection		First Over Voltage Magnitude
	04 01000	Magnitude	First Over Voltage Magnitude First Over Voltage Trip Time
	Islanding Protection     Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage	Magnitude [ Trip Time [ e Magnitude [	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time
	Islanding Protection     Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Secondary Under Voltage	Magnitude [ Trip Time [ Je Magnitude ] Je Trip Time [	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude
	Islanding Protection     Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magni	Magnitude [ Trip Time [ e Magnitude [ e Trip Time [ tude [	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
Picture No.: Test: Test description	Islanding Protection     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magni     Under Frequency Trip Ti     100% load, PR: +10%, QC:     output currents of the invertor	Magnitude [ Trip Time [ te Magnitude [ tude [ me 0%, the trip time of prote er; CH2 were the currents	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude
Test:	Islanding Protection     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magni     Under Frequency Trip Ti     100% load, PR: +10%, QC:     output currents of the invertoregarded as the trip signal v     top to end.	Magnitude [ Trip Time [ te Magnitude [ tude [ tude [ me 0%, the trip time of prote er; CH2 were the currents thile the grid was switche	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery ction was 254,0ms. CH1 were the s flowing through to the grid, also



Used equipment No.: See equipment list for details Sample No.: N/A
Finished date: Tested by:
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TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13 CN23GLMZ 001
	Inverter Regulation lectricity Authority 2015)	Report No:	
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1	ar I	4.3.6
Test:	Islanding Protection  Secondary Over Voltage  Secondary Under Voltage  Secondary Under Voltage  Under Frequency Magn Under Frequency Trip T	e Magnitude [ e Trip Time [ ge Magnitude [ ge Trip Time [ itude [	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
		-5%, the trip time of prot	ection was 104.0ms. CH1 were the
Test description	output currents of the invert		s flowing through to the grid, also ed off. The wave No. was orded from
Test description	output currents of the invert regarded as the trip signal v top to end.	while the grid was switche	ed off. The wave No. was orded from 12842: Tue Nov 29 15:23:09 2022

 Image: scope\_170
 Image: scope\_170

 Image: scope\_170

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104.00000000mm

9.6154Hz

.35925kA





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TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
	Inverter Regulation lectricity Authority 2015)		
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1		
Picture No.: Test:	56 Clause:		4.3.6 First Over Voltage Magnitude
Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltage     Secondary Under Voltage     Under Frequency Magni     Under Frequency Trip Ti		Magnitude [ Trip Time [ ude [ ne [	First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery
Test descriptior	output currents of the inverter regarded as the trip signal wh top to end.	; CH2 were the currents	otection was 117.0ms. CH1 were the s flowing through to the grid, also ad off. The wave No. was orded fro
KEYSIGH TECHNOLOG	HT D50-X 3024T, M1 2 20.0A/ 3 5.0A/ 4	r60104203, 07.31.20200 60.00ms/ -2.441	12842: Tue Nov 29 15:29:20 2022
		٨٨٨	代目: 光林 (日本)     「「「「「「」」」     「「「」」     「「」」     「「」」     「     「」     「」     「     「」     「」     「     「」     「」     「」     「」     「     「」     「     「     「     「」     「     「     「     「     「     「     「     「     「      「

52.7500A 1.41200kA 35925kA 保存到文件 = scope\_172 保存菜单 回调菜单 电子邮件 装着/擦除 ٠ 执下保存 Used equipment No.: Sample No.: N/A See equipment list for details Finished date: Tested by: Review date: Reviewed by:

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	ata / Test Plan nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., L	Model designation: td.	X1-MINI-3.0K-G4
	ent:1	se.	4.3.6
Test:	Islanding Protection     Secondary Over Volta     Secondary Under Volta     Secondary Under Volta     Secondary Under Volta	ge Magnitude ge Trip Time age Magnitude	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude First Under Voltage Trip Time



Review date:

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TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
Attachm			10.0	
Picture No.: Test:	58 Clause:	1	4.3.6	
lest.	Islanding Protection		First Over Voltage Magnitude	
	Secondary Over Voltage Magnitude		<ul> <li>First Over Voltage Trip Time</li> <li>First Under Voltage Magnitude</li> </ul>	
		Secondary Over Voltage Trip Time		
	Secondary Under Voltage		First Under Voltage Trip Time	
	Secondary Under Voltage		Over Frequency Magnitude     Over Frequency Trip Time     Response to Utility Recovery	
	Under Frequency Magnitu			
	Under Frequency Trip Tim			
Test description			on was 120.0ms. CH1 were the s flowing through to the grid, also	
		nile the grid was switche	ed off. The wave No. was orded fro	
KEYSIG	regarded as the trip signal wh top to end.		2842: Tue Nov 29 16:23:54 2022	
KEYSIG	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	2842: Tue Nov 29 16:23:54 2022	
KEYSIG	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	· 液动 ♪* ***********************************	
	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	2842: Tue Nov 29 16:23:54 2022 振动 光标 手助	
KEYSIG	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	12842: Tue Nov 29 16:23:54 2022 禄助	
	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	12842: Tue Nov 29 16:23:54 2022 4度約 202 第約 202 第約 第約 1(2) -2 632000000009	
	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	12842: Tue Nov 29 16:23:54 2022 4花却	
	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	12842: Tue Nov 29 16:23:54 2022	
	regarded as the trip signal with top to end.	Y60104203, 07.31.202001	2842: Tue Nov 29 16:23:54 2022 48:50 18:50 18:50 18:50 18:50 18:50 18:50 18:50 19:50	

11.3271kA/s 保存到文件 = scope\_179 保存菜单 回调菜单 电子邮件 装着/擦除 执下保存

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

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8,3333H 52.7500A

35925kA





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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

rov Rheiniar	d (Shanghai) Co., Ltd.	Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
	Inverter Regulation ectricity Authority 2015)		
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm			
Picture No.: Test:	59 Clause		4.3.6 First Over Voltage Magnitude
	Secondary Over Voltage     Secondary Over Voltage     Secondary Under Voltage     Secondary Under Voltag     Secondary Under Voltag     Under Frequency Magnit     Under Frequency Trip Tir	Trip Time [ e Magnitude [ e Trip Time [ tude [ 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	output currents of the inverte	r; CH2 were the currents	on was 206.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
rest description	top to end.		Sector and the sector of the s
KEYSIG	top to end.		12842: Tue Nov 29 16:27:24 2022

					4.8544Hz
with a should a		444444			Y1(2): 52,7500A
- hhiddadadadah	alahhhhhhh	WWWWW			Y2(2): 1.41200kA
法在在法主人们来去主人的	व र के के के की के के क				ΔY: 1.35925kA
					ΔΥ/ΔΧ 6.59830kA/s
保存到文件 = @cope_101		[X1]	[X2]		
• ####	國運業单	电子邮件	終音/相除		根下保存
Ised equipment No.:	See equipn	nent list for details	Sample No	b.: N/A	
inished date:		13	Tested b	y:	

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206.00000000m





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TUV Rheinlar	id (Shanghai) Co., Lt	d.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)			Report No:	CN23GLMZ 001	
Order No. :	244466490		Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang)	21	Model designation:	X1-MINI-3.0K-G4	
Attachm	ent:1				
Picture No.: Test:	60	Clause:		4.3.6	
Secondary Over Voltage Secondary Under Voltage Secondary Under Voltage Under Frequency Magnit Under Frequency Trip Tir		der Voltage cy Magnitu cy Trip Tim	TripTime [ de [ e [	First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery on was 378.0ms, CH1 were the	
Test description				flowing through to the grid, also	
Test descriptior	output currents of t regarded as the tri top to end.				
Test description	output currents of t regarded as the tri top to end.	p signal whi	le the grid was switche	doff. The wave No. was orded fro	

▲ AX: 378.000000000ms 1/AX: 2.6455Hz Y1(2): 52.750DA Y2(2): 1.41200kA AY: 1.35925kA AY: 1.359590kAVs 採存別文件 = pcope\_102 ● 採存業単 回境業単 电子邮件 幹省/部种 接行部件

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

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	nd (Shanghai) Co.	, Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 201	15)	Report No:	CN23GLMZ 001
Order No. :	244466490	244466490		Grid-Connected PV Inverter
Client Name :	SolaX Power Netw Technology (Zhejia		Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1			
Picture No.: Test:	61 Slanding P	Clause:		4.3.6 First Over Voltage Magnitude
	Secondary Secondary Secondary Under Freq Under Freq	Under Voltage Under Voltage uency Magnitu uency 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	output currents regarded as the	s of the inverter;	CH2 were the current	on was 392.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
	HT E	50-X 3024T. My	60104203, 07,31,20200	12842: Tue Nov 29 16:32:20 2022
E 1	2 20.0A/ 3	2.0A/ 4	200.0ms/ -2.406	is 液动
(E) t	2 20.0A/ 3	2.0A/	200.0ms/ -2.406	is 课动 💉
	2 20.0A/ 3	2.04/	200.0ms/ -2.406	is 课动 💉 光林 📋 手助
	2 20.0A/ 3	2.04/	200.0ms/ -2.406	is (12) 光标 手約 X1(2) -2.510000000005
	2 20.0A/ 3	2.04/	200.0ms/ -2.406	is 课题 《 · · · · · · · · · · · · · · · · · ·
	2 20.0A/ 3	2.0AV	200.0ms/ -2.406	is
	2 20.0A/ 3		200.0ms/ -2.406	is
	2 20.0A/ 3	2.04/	200.0ms/ -2.406	is i表的 小 (2 光标 1 回 手約 X1(2) -2.510000000005 X2(2) -2.119000000005 AX 392.000000000ms 1/AX 2.5510Hz
	2 20.04/ 3	2.04/	200.0ms/ -2.406	is i表的 小 (注 光标 i 回 手約 X1(2) -2.510000000005 X2(2) -2.118000000005 392.00000000ms 1/ΔX:
	2 20.04/ 3		200.0ms/ -2.406	is
	2 20.04/ 3		200.0ms/ -2.406	is
	2 20.04/ 3		200.0ms/ -2.406	is 1表的 小 1表的 小 1.159000000000 2.1190000000000 2.1190000000000 2.11900000000000 2.11900000000000000000000000000000000000
	2 20.04/ 3		200.0ms/ -2.406	is
	2 20.0A/ 3	2.04/	200.0ms/ -2.406	is 1表的 小 1表的 小 1.159000000000 2.1190000000000 2.1190000000000 2.11900000000000 2.11900000000000000000000000000000000000
() (	rope_183			is
	rope_183		200 0ms/ -2.406	は
() (	rope_103 章			is         if #50         if           Y12         */6#         Image: State of the stat
2 <sub>0</sub> + 保存到文件 = [86 ● ● ● ●	nt No.: See equip			is         it #85         it #85           1 90000000000         it #85         it #85           1 90000000000         it #85         it #85           1 190000000000         it #85         it #85           2 1190000000000         it #85         it #85           1 1000         it #85         it #85           1 1000         it #85         it #85           1 1000         it #1200         it #1200           1 1 100         it #1200         it #1200           1 1 1 100         it #1200         it #1200
#存到文件 - Me ・ 単不要 Used equipme	nt No.: See equip		etails Sample N	is         if #50         if #50           ¥##         if #50         if #50           ¥1(2)         2.51000000000000000000000000000000000000

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TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13		
	Inverter Regulation ectricity Authority 2015)	Report No:	CN23GLMZ 001		
Order No. :	244466490				
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	X1-MINI-3.0K-G4			
	ent:1	1	4.3.6		
Test:	Islanding Protection  Secondary Over Voltage  Secondary Over Voltage  Secondary Under Voltage  Secondary Under Voltage  Under Frequency Magnit	Magnitude Trip Time e Magnitude e Trip Time	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		
	Under Frequency Trip Tin 66% load, PR: 0%, QC: 0%, output currents of the inverte regarded as the trip signal w top to end	ne the trip time of protectio r; CH2 were the currents	Response to Utility Recovery on was 920.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro		
Test description	Under Frequency Trip Tin 66% load, PR: 0%, QC: 0%, output currents of the inverte regarded as the trip signal w top to end	ne ( the trip time of protection r; CH2 were the current hile the grid was switche	Response to Utility Recovery on was 920.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 16:17:35 2022		
KEYSIGH TECHNOLOGI	Under Frequency Trip Tin 66% load, PR: 0%, QC: 0%, output currents of the inverte regarded as the trip signal w top to end.	ne ( the trip time of protection r; CH2 were the currents hile the grid was switcher fr60104203, 07.31.20200 400 0ms/ -2.300	Response to Utility Recovery on was 920.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 16:17:35 2022 The wave No. 20 16:17 200 The wave No. 20 16:17 20		
KEYSIGH TECHNOLOGI	Under Frequency Trip Tin 66% load, PR: 0%, QC: 0%, output currents of the inverter regarded as the trip signal without top to end. BS0-X 3024T, M 2 20 04/ 2 2 04/	ne ( the trip time of protection r; CH2 were the currents hile the grid was switcher fr60104203, 07.31.20200 400 0ms/ -2.300	Response to Utility Recovery on was 920.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 16:17:35 2022 Response to Utility Recovery of the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 16:17:35 2022 Response to Utility Recovery response to the grid, also response to the grid response		

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland	
TÜV Rheinlar	d (Shanghai) Co., Ltd.	Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
	Inverter Regulation lectricity Authority 2015)		
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

## Attachment : 1

Picture No.:	63	Clause:	4.3.6	
Test:	Islanding Protection  Secondary Over Voltage Magnitude  Secondary Over Voltage Trip Time  Secondary Under Voltage Magnitude  Secondary Under Voltage Trip Time  Under Frequency Magnitude  Under Frequency Trip Time		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, the fundamental magnitude of grid current of phase L1 was 0.039A, less than 1% of the rated current 0.130A. See the screenshot of the power analyzer for detail. (1st order harmonic current)			

	相1		三相总和	
U_tRMS	230.34	v	230.34	V
I_tRMS	369.82	mA	369.82	mA
P_t	-8.3205	w	-8.3205	W
Q_t	84.748	var	84.748	var
S_t	85.184	VA	85.184	VA
PF_t	-0.0978		-0.0978	
F_fund			49.999	Hz
U_fundRMS	230.34	v	230.34	v
I_fundRMS	38.966	mA	38.966	mA
P_fund	-8.3094	w	-8.3094	W
Q_fund	-3.0124	var	-3.0124	var
S_fund	8.9757	VA	8.9757	VA

Used equipment No.:

See equipment list for details

Sample No.: N/A Tested by:

Finished date: Review date:

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Test Da	ata / Test Plan	🛕 TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

# Attachment : 1



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	81	Tested by:	
Review date:		Reviewed by:	
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### วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	Order No.: 244466490		Grid-Connected PV Inverter	
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation:	X1-MINI-3.0K-G4	

### Attachment : 1



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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	



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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		A TÜVRheinland®
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.:	MS-0025001-appendix 13
		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., I	Model designation: td.	X1-MINI-3.0K-G4
Picture No.:	67 Clau	JSE:	4.3.6
Test:	Islanding Protection  Secondary Over Volts  Secondary Under Volts  Secondary Under Vol  Secondary Under Vol  Under Frequency Ma  Under Frequency Trip	ge Trip Time tage Magnitude tage Trip Time gnitude	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	<ol> <li>66% load, PR: 0%, QC: output currents of the inv</li> </ol>	Order Frequency Wagnitude     Under Frequency Trip Time     66% load, PR: 0%, QC: +4%, the trip time of prote     output currents of the inverter; CH2 were the curre     regarded as the trip signal while the grid was switc     top to end.	

Finished date:

Review date:

Tested by:

Reviewed by:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
		, ,	436	
Test:	Islanding Protection	l Magnitude [	First Over Voltage Magnitude	
	Secondary Over Voltage		First Under Voltage Magnitude	



Review date:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		A TÜVRheinland	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13	
			CN23GLMZ 001	
Order No.: 244466490		Product:	Grid-Connected PV Inverter	
Client Name : SolaX Power Network Technology (Zhejiang) Co., Ltd.		Model designation:	X1-MINI-3.0K-G4	

### Attachment : 1



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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
Attachm Picture No.:	ent:1 70 Clause:		4.3.6	
Test:	Islanding Protection  Secondary Over Voltage  Secondary Over Voltage  Secondary Under Voltage  Secondary Under Voltage  Under Frequency Magnit  Under Frequency Trip Tin	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	output currents of the inverte	r; CH2 were the currents	on was 168.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro	
	T DSD-X 3024T, M	W60104203, 07.31.20200	12842: Tue Nov 29 18:20:31 2022	
KEYSIGI				

*****	-2.42400000000 X2(7) -2.25600000000
	ΔX. 168 00000000mr
	1/ΔX: 5.9524H
	Y1(2): 26.3700/
	Y2(2). 1.41200k/
A MANAGEMENT AND A MANAGEMENT	ΔY: 1.38563k/
	ΔΥ/ΔΧ: 8.24780kA/
X1   X2   存到文件 = [scope_193	
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Used equipment No.: See equipment list for details Sample No.: N/A
Finished date: Tested by:
Review date: Reviewed by:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

UV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Model designation: Technology (Zhejiang) Co., Ltd.		X1-MINI-3.0K-G4	
Attachm				
Picture No.: Test:	71 Clause:		4.3.6 First Over Voltage Magnitude	
	Secondary Over Voltage Tr     Secondary Under Voltage T     Secondary Under Voltage T     Under Frequency Magnitude	Magnitude [ Trip Time [	First Under Voltage Magnitude First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time	
Test description	Under Frequency Trip Time 1: 33% load, PR: 0%, QC: -3%, t	he trip time of protection	Response to Utility Recovery on was 386.0ms. CH1 were the	
Test description	Under Frequency Trip Time     33% load, PR: 0%, QC: -3%, ti     output currents of the inverter;     regarded as the trip signal whil     top to end.	he trip time of protection CH2 were the currents le the grid was switche	Response to Utility Recovery on was 386.0ms. CH1 were the flowing through to the grid, also ad off. The wave No. was orded fro 2842: Tue Nov 29 18:19:28 2022	
	Under Frequency Trip Time     33% load, PR: 0%, QC: -3%, ti     output currents of the inverter;     regarded as the trip signal whil     top to end.	he trip time of protection CH2 were the currents le the grid was switche 50104203, 07.31.202001	Response to Utility Recovery on was 386.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 2842: Tue Nov 29 18:19:28 2022	
	Under Frequency Trip Time     33% load, PR: 0%, QC: -3%, ti     output currents of the inverter;     regarded as the trip signal whil     top to end.	he trip time of protection CH2 were the currents le the grid was switche 50104203, 07.31.202001	Response to Utility Recovery on was 386.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 2842: Tue Nov 29 18:19:28 2022	

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Review date:

วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	Document No.:	MS-0025001-appendix 13
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., I	Model designation	X1-MINI-3.0K-G4
Attachm Picture No.:		use:	4.3.6
Test:	Islanding Protection  Secondary Over Volta  Secondary Under Volta  Secondary Under Vo  Secondary Under Vo  Under Frequency Ma  Under Frequency Trip	age Magnitude age Trip Time Itage Magnitude Itage Trip Time gnitude	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	<ul> <li>33% load, PR: 0%, QC: output currents of the inv</li> </ul>	-2%, the trip time of prote erter; CH2 were the curre	ction was 375.0ms. CH1 were the ints flowing through to the grid, also

KEYSIGHT TECHNOLOGIES			4203, 07.31.202001284	2: Tue No	
(ii)	2 10.0A/ 3	2.0A/ 4	200.0ms/ -2.410s		(液动) 📣
					+K+F         Ε           +F,55         X1(2);           -2.480000000000;         -2           -2.10500000000;         -2           -2.10500000000;         -2           -2.10500000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.10500000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.1050000000;         -2           -2.105000;         -2           -2.10500;         -2           -2.10500;         -2           -2.10500;         -2           -2.10500;         -2           -2.10500;         -2           -2
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lsed equipment No	.: See equipm	ent list for details	s Sample No.:	N/A	
inished date:			Tested by:		
minarina a add.			reared by.		

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Reviewed by:





วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinlan	d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Lto	Model designation: d.	X1-MINI-3.0K-G4	
Picture No.: Test:	73 Claus	se:	4.3.6 First Over Voltage Magnitude	
Attachm		220222		
lest:		. Manualturda		
	Secondary Over Voltag		First Over Voltage Trip Time First Under Voltage Magnitude	
	Secondary Under Voltag		First Under Voltage Trip Time	
	Secondary Under Volta		Over Frequency Magnitude	
	Under Frequency Mag		Over Frequency Trip Time	
	Under Frequency Trip		Response to Utility Recovery	
Test description			on was 340.0ms. CH1 were the	
			s flowing through to the grid, also	
		while the grid was switche	ed off. The wave No. was orded fro	
	top to end.	terreter and the second se		
A KEYSIGH	IT			
	es DSO-X 3024T,	The second s	12842: Tue Nov 29 18:15:26 2022	
	HT D50-X 3024T, 2 10.0A/ 3 2.0A/ 4	Mr60104203, 07.31.20200 200.0ms/ -2.316	। इ.स. 🗸	
KEYSIGH TECHNOLOG	es DSO-X 3024T,	The second s		
	es DSO-X 3024T,	The second s	। इ.स. 🗸	

 Stripping
 2.435000000005

 Stripping
 2.096000000005

 Stripping
 340.000000000ms

 T/AX
 2.9412Hz

 Y1(2)
 2.63700A

 Y2(2)
 1.41200kA

 AY
 1.39563kA

 AY/AX
 4.07538kA/s

 AY/AX
 4.07538kA/s

 MRTR#
 B/DR#

 Ward equipment No.:
 See equipment list for details
 Sample No.:

Used equipment No.: See equipment list for details Finished date:

Review date:

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Tested by	
Tested by:	

Reviewed by:

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025	001-appendix 13	
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLM	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Conr	nected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd	Model designatio	on: X1-MINI-3	.0K-G4	
Attachm	ent:1				
Picture No.:	74 Clause	9:	4.3.6	r Voltage Magnitude	
est description	Secondary Under Voltage Secondary Under Voltage Under Frequency Magn Under Frequency Trip Ti 33% load, PR: 0%, QC: 0%	ge Trip Time itude ime	Over Free Over Free Response	er Voltage Trip Time quency Magnitude quency Trip Time e to Utility Recovery ms. CH1 were the	
KEYSIGI	output currents of the invert regarded as the trip signal v top to end.		itched off. The wa	ough to the grid, also ave No. was orded fro	
	Tregarded as the trip signal v top to end.	while the grid was swi Mr60104203, 07.31.20	itched off. The wa	bugh to the grid, also ave No. was orded fro w 29 18:13:49 2022 環想 の 29 18:13:49 2022 環想 の 年間 10 10 10 10 10 10 10 10 10 10	
	regarded as the trip signal v top to end.	while the grid was swi Mr60104203, 07.31.20	itched off. The wa	bugh to the grid, also ave No. was orded fro v 29 18:13:49 2022	
	regarded as the trip signal v top to end.	while the grid was swi Mr60104203, 07.31.20 300.0ms/ 5	itched off. The wa	bugh to the grid, also ave No. was orded fro w 29 18:13:49 2022	
¥ KEYSIG TECHNOLOG	regarded as the trip signal v top to end.	while the grid was swi Mr60104203, 07.31.20 300.0ms/ 5	itched off. The wa	bugh to the grid, also ave No. was orded fro           ov 29 18:13:49 2022           (#25)           (#25)           (#27)           (#28)           (#27)           (#28)           (#27)           (#28)           (#27)           (#28)           (#27)           (#26)           (#27)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,000000000000)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#28,0)           (#27,0)	
株EYSIG           TECHNOLOG           1           2           #研究到文件 = [as:           #研究到文件 = [as:           #研究到文件 = [as:	regarded as the trip signal v top to end.	while the grid was switched with the grid was switched was switched with the grid was switched with th	itched off. The wa	bugh to the grid, also ave No. was orded fro           ov 29 18:13:49 2022           (#25)           (#25)           (#27)           (#28)           (#27)           (#28)           (#27)           (#28)           (#27)           (#28)           (#27)           (#26)           (#27)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,0000000000)           (#25,000000000000)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#27,0)           (#28,0)           (#27,0)	





วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan	🛕 TÜVRheinland®	
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	75	Clause:		4.3.6	
lest:	Secondary ( Secondary ( Secondary ( Under Frequ	otection Over Voltage Magnitude Over Voltage Trip Time Jnder Voltage Magnitude Jnder Voltage Trip Time Jency Magnitude Jency Trip Time		First Over Voltage Ma First Over Voltage Tri First Under Voltage N First Under Voltage T Over Frequency Mag Over Frequency Trip Response to Utility R	p Time lagnitud rip Time nitude Time
Test description:	33% load, the ft 1% of the rated order harmonic	undamental magnitude of g current 0.130A. See the so		t of phase L1 was 0.015/	A, less th
■10 X1-Mini	-G4				
		相1		三相总和	
U_tRMS		230.40	v	230.40	v
I_tRMS		290.56	mA	290.56	mA
P_t		648.50	mW	648.50	mW
777					

1				
Q_t	66.928	var	66.928	var
S_t	66.946	VA	66.946	VA
PF_t	0.0095		0.0095	
F_fund			49.999	Hz
U_fundRMS	230.40	v	230.40	V
I_fundRMS	15.271	mA	15.271	mA
P_fund	657.64	mW	657.64	mW
Q_fund	-3.1863	var	-3.1863	var
S_fund	3.5183	VA	3.5183	VA

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S*D	Tested by:	a
Review date:		Reviewed by:	
	Page 101 of 130		





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Used equipment No.:

Finished date:

Review date:

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回调菜单

วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	nd (Shanghai) Co., Ltd.	Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No.	CIN23GEMIZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm	ent:1		
Picture No.:	76 Clause:		4.3.6
	<ul> <li>Secondary Under Voltage</li> <li>Secondary Under Voltage</li> <li>Under Frequency Magnitude</li> </ul>	Trip Time [ ude [	First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time
Test description	Under Frequency Trip Tim 33% load, PR: 0%, QC: +1% output currents of the inverter	, the trip time of protecti ; CH2 were the currents	Response to Utility Recovery on was 260.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
Test description	Under Frequency Trip Tim     33% load, PR: 0%, QC: +1%     output currents of the inverter     regarded as the trip signal wh     top to end.	, the trip time of protecti ; CH2 were the currents ille the grid was switche v60104203, 07.31.202001	on was 260.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro
	<ul> <li>Under Frequency Trip Tim</li> <li>33% load, PR: 0%, QC: +1%</li> <li>output currents of the inverter regarded as the trip signal wh top to end.</li> </ul>	, the trip time of protecti ; CH2 were the currents ille the grid was switche	on was 260.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro 12842: Tue Nov 29 18:23:14 2022

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电子邮件

See equipment list for details

禁省/標時

Sample No.: N/A

Tested by:

Reviewed by:

26.3700A 1.41200kA 38563kA 5 32935kA/s

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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test P nd (Shanghai) Co.,	20010	Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	244466490		Grid-Connected PV Inverter
Client Name :	o ondo en o montratino	SolaX Power Network Technology (Zhejiang) Co., Ltd.		X1-MINI-3.0K-G4
Picture No.:	77	Clause:	1	4.3.6
Attachm	ent. I			
Picture No.: Test:	Islanding Pro		   /agnitude [	4.3.6 First Over Voltage Magnitude First Over Voltage Trip Time
	Islanding Pro     Secondary C     Secondary C     Secondary U     Secondary U     Secondary U     Under Freque     Under Freque     S3% load, PR: 0     output currents o     regarded as the	otection Over Voltage N Over Voltage T Jnder Voltage Jnder Voltage ency Magnitu ency Trip Tim 1%, QC: +2%, of the inverter;	rip Time [ Magnitude ] Trip Time [ de [ e [ the trip time of protecti c CH2 were the currents	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery on was 240.0ms. CH1 were the s flowing through to the grid, also
Test:	Islanding Pro     Secondary C     Secondary U     Secondary U     Secondary U     Under Freque     Under Freque     Under Kreque     output currents of     regarded as the     top to end.	otection Over Voltage N Dver Voltage T Jnder Voltage Jnder Voltage ency Magnitu ency Trip Tim 19%, QC: +2%, of the inverter; trip signal whi	rip Time [ Magnitude [ Trip Time [ de [ e [ the trip time of protecti c CH2 were the currents ile the grid was switche	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Trip Time Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery on was 240.0ms. CH1 were the

- ////////////////////////////////////			WM	X1(2) -2 332000000000 X2(2) -2 092000000000 4X 240 000000000ms
				1/4X 4 1667Hz Y1(2) 26 3700A Y2(2)
anara dalar				1.41200kA ΔΥ 1.38563kA ΔΥ/ΔΧ 5.77346kA/s
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Finished date:

Review date:

Tested by:

Reviewed by:

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Used equipment No.:

Finished date:

Review date:

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回调菜单

วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001	
	lectricity Authority 2015)			
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	
Attachm	ent:1			
Picture No.:	78 Clause:		4.3.6	
Test description	output currents of the inverter regarded as the trip signal wh top to end.	ude [ ne [ , the trip time of protecti ; CH2 were the currents	Over Frequency Magnitude Over Frequency Trip Time Response to Utility Recovery on was 150.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fre	
Test description	Under Frequency Magnitu     Under Frequency Trip Tim     33% load, PR: 0%, QC: +3%     output currents of the inverter     regarded as the trip signal w     top to end.	ide [ the contraction of protection the trip time of t	Over Frequency Trip Time Response to Utility Recovery on was 150.0ms. CH1 were the s flowing through to the grid, also ed off. The wave No. was orded fro	

Page 104 of 130

电子邮件

See equipment list for details

装着/擦除

Sample No.: N/A

Tested by:

Reviewed by:

26.3700A 1.41200kA 38563kA 9.23753kA/s

执下保存





วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
Attachm Picture No.:	ent:1		4.3.6
Test:	Secondary Over Voltage	Magnitude	First Over Voltage Magnitude First Over Voltage Trip Time



Review date:

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	<b>ata / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4
	ent:1	1	4.3.6
Test:	Secondary Over Voltage	Trip Time	First Over Voltage Magnitude First Over Voltage Trip Time First Under Voltage Magnitude



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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Picture No.:	81	Clause:	1000	4.3.7	
Test:	Islanding Protection	1	First Ow	er Voltage Magnitude	
	Secondary Over Vo	Itage Magnitude	First Ow	er Voltage Trip Time	
	Secondary Over Vo	Itage Trip Time	First Un	der Voltage Magnitude	
	Secondary Under V	oltage Magnitude	First Un	der Voltage Trip Time	
	Secondary Under V	oltage Trip Time	Over Fre	equency Magnitude	
	Under Frequency Magnitude		Over Frequency Trip Time		
	Under Frequency Trip Time		X Respons	se to Utility Recovery	
Test description:	level over voltage prote	ction was tripped; V	Vave No. 1 is th	ained over 240V after the firs e grid voltage; Wave No. 2 is while grid voltage changed.	
				242.056	
				I_DRMSINF-64	
				164.352	
				ana ma	
				F. fundation Minit Git	
				50.000	
				APPE Die	
		>>			
entra la	A			628	
R & Strict Branch Rode (N) W Strip (Branch Rode (A) W Strip (Branch Rode (A) W Standing Black Bill Co (No)	000,7000 0,104/19 01,004/19	341.000 400013	100.4707 A.14005 A.14005	342.000 8.0470	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S*D	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	Document No.:	MS-0025001-appendix 13	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Picture No.:	82	Clause:	4.3	.7
est:	Islanding Protection	1000 IN 1100	First Over Voltage	Magnitude
	Secondary Over Voltage	Magnitude	First Over Voltage	Trip Time
	Secondary Over Voltage	Trip Time	First Under Voltage	e Magnitude
	Secondary Under Voltag		First Under Voltage	2 C C C C C T L L C S C C S C C C C C C C C C C C C C
	Secondary Under Voltag	ge Trip Time	Over Frequency M	agnitude
	Under Frequency Magn	itude	Over Frequency Tr	ip Time
	Under Frequency Trip Ti	me	Response to Utility	Recovery
	No. 2 is the output current of changed.			
				S
Ten Transition				
energy (1997)				S
			2	S
			2	38.412 V
en constante de la constante d			2	38.412
Concernent of an and a second se			2	38.412 V
The second secon			2 5=18 • L.U	38.412 V
THE COLOR OF A DECEMBER OF A D			2 5=18 • L.U	38.412 38.412 12.728

Charles and the second	*	•	PRES	有效的
时间回	0.34.6529	2125-6224	2106.9695	
AL 1/U1(P[BemateNode][V]	241.0080	305.4418	551.4357	238.0547
Al 1/11(P[BernolteNode]  A]	0.35440	-0.750079	-0.014020	0.549904
F And GX1-MINI-64 (Ha)	48.89972	45,33991	2.670+4	40.39074
# Al 1/U40 (RemoteNode) [V]	-3.185604	-5.19.5809	-6.198e-3	5.292496

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		A TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.:	MS-0025001-appendix 13 CN23GLMZ 001	
		Report No:		
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

# Attachment : 1

Picture No.:	83	Clause:	2016	4.3.7
lest:	Islanding Protection	on	First Over	Voltage Magnitude
	Secondary Over V	oltage Magnitude		Voltage Trip Time
	Secondary Over V			Voltage Magnitude
		Voltage Magnitude		Voltage Trip Time
		· · · · · · · · · · · · · · · · · · ·		
		Voltage Trip Time		ency Magnitude
		Under Frequency Magnitude		ency Trip Time
	Under Frequency			to Utility Recovery
Test description:	level under voltage pr	otection was tripped;	Wave No.1 is the	ed under 200V after the f grid voltage; Wave No. 3 ille grid voltage changed.
	- M			198.103
				P210
			and a second as a second as	
				<ul> <li>1_eBMSINI-G4</li> </ul>
				134.333
E				zug mA
				0.018 0100
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				50.000
1				Characterization and the second se
	146	>>	*10	
			FIS	6.IZB
#ALLUER Browste Sade [ W]	0.17.15.18	446.2230	4.36.4952	110,0007
	-044,0447			
Al 1.11(F) (Records Node) (A)	-04.0447 -0.09557 -0.0967	6.15746A	0.314045	6.194374

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
	Base 100 of 120		

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> Id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Picture No.:	84	Clause:	1000	4.3.7	
Test:	Islanding Protection		First Over \	Voltage Magnitude	
	Secondary Over Volt	age Magnitude	First Over Voltage Trip Time		
	Secondary Over Volt	· · · · · · · · · · · · · · · · · · ·			
	Secondary Under Vo			Voltage Trip Time	
	Secondary Under Voltage Trip Time			ency Magnitude	
	Under Frequency Ma			ency Trip Time	
	Under Frequency Tri	•		to Utility Recovery	
Test description:	Inverter reconnect to grid	A second s			
	No. 3 is the output current changed.	nt of inverter; Wave	No. 4 is the trip s		
				20	
				202.514	
				202.014	
				U LUMS	
				15.091	
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				50.000	
				2412 B 164	
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6 +b	100		0 in	0.28	
104014	015.7658	220,9425	201,287		
	246,3101	-Dis MOX	-001.0418	31,000	
WALLARD Residence (N	a comba	1.41909	-0.4294813	d Tanana -	
W.AC.LUCKERNSCH.Work: [10] AU.LUCKERNSCH.WORK: [A] BT_Nook[10] WING G4 [Hz]	5.2075M	1.819398	L (2001) 4.534-5	A 2 minute all appendix	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S*D	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		<b>TÜV</b> Rheinland®
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	85	Clause:	1000	4.3.7
Test:	Islanding Protect	ion	First Over Vo	Itage Magnitude
		Voltage Magnitude		Itage Trip Time
	Secondary Over	· · · · · · · · · · · · · · · · · · ·		oltage Magnitude
			First Under V	
	Secondary Under			
		r Voltage Trip Time	Over Frequer	
	Under Frequency		Over Frequer	
	Under Frequency	Trip Time	Response to	Utility Recovery
Test description:	Inverter won't reconn	ect to grid while the gri	id voltage frequency	remained above 52Hz
	after the over frequer	ncy protection was tripp	bed; Wave No.1 is t	he grid voltage; Wave N
	2 is the output currer	nt of inverter; Wave No.	4 is the trip signal v	vhile grid voltage chang
1. 1.	1			
2 <b>2</b>				Lower Lower Law
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2				
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				LERRES
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			100	162:429
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				162:429
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		»)	10	162.429 m mA todg. Mitt 64 52.199
	* ++1,00	4,44,307	10 10 10 10	162.429 ma mA 5.040g MIII 64 52.199 ma to
			10	162.429 ma mA 1 funditi
R R L(VLp)Result Nub(19)	A estum contra	4,44,107 -996,200	100 E	162.429 mA foodpmA 52.199 ma foodpma foodfma foodpma f

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S*D	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	86	Clause:	1000	4.3.7	
fest:	Islanding Protectio	n	First Over	Voltage Magnitud	le
	Secondary Over Vo			Voltage Trip Time	
	Secondary Over V			r Voltage Magnitu	
	Secondary Under	Voltage Magnitude	First Unde	r Voltage Trip Tim	e
	Secondary Under	Voltage Trip Time	Over Freq	uency Magnitude	
	Under Frequency I			uency Trip Time	
				to Utility Recover	22
est description:	Under Frequency				·
	52Hz after the over fre Wave No.3 is the outp changed.				
P				Non-construction of the local division of the	
				230.129	
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		\$ Mr.		51.800	
ан 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6.00 6.00 6.12 Aett	>>> >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	erer Lott and	51.800	
FT # 10	4 0.12.649 -307.7020	B B B 19.4447 200.7967	1156 2-07-3002 340-3477	51.800	
PER DO	A 0.12.649	B 210.Met	1158 2107-0000	51.800	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21 Di	Tested by:	
Review date:		Reviewed by:	
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	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

icture No.:	87	Clause:	035702	4.3.7
est:	Islanding Protection	n	First Over Vo	Itage Magnitude
	Secondary Over Vo			Itage Trip Time
				· · · · · · · · · · · · · · · · · · ·
	Secondary Over Vo		First Under V	oltage Magnitude
	Secondary Under V	oltage Magnitude	First Under V	oltage Trip Time
	Secondary Under V	oltage Trip Time	Over Frequer	ncy Magnitude
	Under Frequency M		Over Frequer	
			Response to	
	Under Frequency T			
est description:	Inverter won't reconner after the under frequen No. 2 is the output curr	cy protection was tri	ipped; Wave No.1 is	s the grid voltage; \
	changed.	on ormonon, rran	. Ho. Ho his his hip oig	nur mine grei rene
				229 768
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PTHT (c)	812,3465	441.000	430.5945	
W.W.1/ULQ(RemoteNode)[V]	301,8454	-121.3464 -0.38/952	-425.0418	225.7354 0.145738
	86,79960	46.70041	Little-f	46.79975
BT Sand(142 MINI C4 (%z) BALL/V40(BrandsNode   N	0.208417	-1.198956	2.041=3	5.300344

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	88	Clause:	1.5325	1	4.3.7	
est:	Islanding Protecti	ion	First O	ver Volta	ge Magnitud	le
		Voltage Magnitude			ge Trip Time	
	Secondary Over				age Magnitu	
			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		승규가 잘 좋아 많이 가지 않는 것 않는	
	Secondary Under	r Voltage Magnitude	First Ur	nder Volt	age Trip Tim	e
	Secondary Under	r Voltage Trip Time	Over Fr	requency	/ Magnitude	
	Under Frequency	Magnitude	Over Fr	requency	Trip Time	
	Under Frequency	· · · · · · · · · · · · · · · · · · ·			ility Recover	у
est description:	47Hz after the under Wave No. 2 is the ou voltage changed.		was tripped; V	Vave No.	1 is the grid	volt
						_
in the second second				2	30 130	
				2	30.130	
				2	30.130	
				*****	30.130 v	
				2	30.130 V	
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				(#34) B	13.207 ^	
				(#34) B	13.207 A	
				(##)#	13.207 ^	
				(#34) B	13.207 A	
				(##)#	13.207 A	
		200 200 200	144	(##)#	13.207 A 47.200	
0	×		-	(23) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	13.207 A 47.200	
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rtet sa	A 013.4642	8 220,2580	HR. 200.7927	(23) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	13.207 A 47.200 10 8 8	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	8 12	Tested by:	2
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Da	ata / Test Plan		A TÜVRheinland®
TÜV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

icture No.:	89	Clause:	1000	4.3.7	
est:	Islanding Protection	n	First Over Vo	Itage Magnitude	
	Secondary Over Vo			Itage Trip Time	
	Secondary Over Vo	· · · · · · · · · · · · · · · · · · ·		oltage Magnitud	
	Secondary Under V	· · · · · · · · · · · · · · · · · · ·		oltage Trip Time	
	Secondary Under V			ncy Magnitude	
	Under Frequency N	Aagnitude		ncy Trip Time	
	Under Frequency 1	rip Time	Response to	Utility Recovery	
est description:	second level 2 over vol	tage protection was i	grid voltage remained over 240V after th s tripped; Wave No.1 is the grid voltage /e No.4 is the trip signal while grid voltag		
	- M.			Letter and d	
				242 064	
				212.001	
			160	10 V	
				LIRMS. JNI-GA	
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21 Di	Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	u	<b>TÜV</b> Rheinland <sup>®</sup>
TUV Rheinlar	nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	1000	90	Clause:	533	4.3.7	
est:	Islanding	Protection		First Over Voltage Magnitude Magnitude First Over Voltage Trip Time		
		ry Over Voltage	Magnitude			
		ry Over Voltage			er Voltage Magnitu	
			18 19 19 19 19 19 19 19 19 19 19 19 19 19	-		
		ry Under Voltage			er Voltage Trip Tim	
		ry Under Voltag			uency Magnitude	
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	the second	equency Trip Tir			e to Utility Recover ge remained below	· · · · · · · · · · · · · · · · · · ·
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					000 410	
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	82	Tested by:	
Review date:		Reviewed by:	
	Page 116 of 130		





วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

icture No.:	91	Clause:	1000 C	4.3.7
est:	Islanding Protect	ion	First Over Volta	age Magnitude
		Voltage Magnitude	First Over Volta	
	Secondary Over			tage Magnitude
	Secondary Under	r Voltage Magnitude	First Under Vol	tage Trip Time
	Secondary Under	Voltage Trip Time	Over Frequence	v Magnitude
	Under Frequency	Magnitude	Over Frequenc	v Trip Time
	Under Frequency	· · · · · · · · · · · · · · · · · · ·	Response to U	
est description			rid voltage remained u	
	Wave No. 2 is the ou voltage changed.	tput current of inverte	as tripped; Wave No.1 r; Wave No.4 is the tri	p signal while grid
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21 Di	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

# Attachment : 1

Picture No.:	92	Clause:	111 H	4.3.7
Test:	Islanding Protection	on	First Over	Voltage Magnitude
	Secondary Over V	oltage Magnitude	First Over	Voltage Trip Time
	Secondary Over V	· · · · · · · · · · · · · · · · · · ·		er Voltage Magnitude
	_			이 사망이 안 가지? 김 것이 안 가지? 것이 같은 것이 같이 많이 했다.
		Voltage Magnitude		er Voltage Trip Time
	Secondary Under			uency Magnitude
	Under Frequency			uency Trip Time
	Under Frequency	Trip Time	X Response	to Utility Recovery
Test description:	the level 2 under volta	grid with 127.4s delay ge protection was tripp of inverter; Wave No.4	ed; Wave No.1	is the grid voltage; W
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North Contraction				202.0643 0.549.058

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:		Tested by:	
Review date:		Reviewed by:	
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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	93	Clause:	4.3.7	
fest:	Islanding Protection	on	First Over Voltage Magnitude	
	Secondary Over V		First Over Voltage Trip Time	
	Secondary Over V		First Under Voltage Magnitude	
		7		
	Secondary Under		First Under Voltage Trip Time	
	Secondary Under	Voltage Trip Time	Over Frequency Magnitude	
	Under Frequency	Magnitude	Over Frequency Trip Time	
	Under Frequency	Trip Time	Response to Utility Recovery	
	while grid voltage cha	nged.		8
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			238.397	
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S*D	Tested by:	
Review date:		Reviewed by:	
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วันที่ออกรายงาน: February 13, 2023 (Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan		<b>TÜV</b> Rheinland®
TÜV Rheinlar	id (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	94	Clause:	4.3.7	
Test:	Islanding Protection	1	First Over Voltage Magnitude	
	Secondary Over Vo		First Over Voltage Trip Time	
	Secondary Over Vo		First Under Voltage Magnitud	e
	Secondary Under V		First Under Voltage Trip Time	
		· · · · · · · · · · · · · · · · · · ·		
	Secondary Under V		Over Frequency Magnitude	
	Under Frequency M	•	Over Frequency Trip Time	
	Under Frequency T	rip Time	Response to Utility Recovery	
	while grid voltage chan	ged.		-
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		100 C	NG ARE	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	22 D2	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan	Document No.:	MS-0025001-appendix 13
	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

licture No.:	95	Clause:	10000	4.3.7
est:	Islanding Protection	1	First Over Volta	age Magnitude
	Secondary Over Vol	Itage Magnitude	First Over Volta	age Trip Time
	Secondary Over Vol	Itage Trip Time	First Under Vol	tage Magnitude
	Secondary Under V	oltage Magnitude	First Under Vol	tage Trip Time
	Secondary Under V		Over Frequenc	· · · · · · · · · · · · · · · · · · ·
	Under Frequency M		Over Frequenc	
	Under Frequency Tr	ripTime	Response to U	tility Recovery
	after the under frequence No. 2 is the output current			
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	changed.			13.210
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TIN 11 BAC VOLDBERGERING (M) BAC VOLDBERGERING (M)				13.210

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	S1	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	ata / Test Plan d (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13
Grid-connected	Inverter Regulation lectricity Authority 2015)	Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

Picture No.:	96	Clause:	4.3.7	
fest:	Islanding Protection	1	First Over Voltage Magnitu	de
	Secondary Over Vo	Itage Magnitude	First Over Voltage Trip Time	е
	Secondary Over Vo	· · · · · · · · · · · · · · · · · · ·	First Under Voltage Magnit	
	Secondary Under V		First Under Voltage Trip Tin	
	Secondary Under V		Over Frequency Magnitude	
	Under Frequency M		Over Frequency Trip Time	5
	Under Frequency T		Response to Utility Recove	n.
Test description:			while grid voltage frequency remains	1. A. C
	changed.	ute at a		
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The state of the s			13.205 3118 13.205 3118 47.200 3118 47.200	

Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21 DX	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan           TÜV Rheinland (Shanghai) Co., Ltd.         Document No.			MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001
Order No. :	244466490	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4

victure No.:	97	Clause:	200	4.3.7
est:	Islanding Protection	2n	First Over \	/oltage Magnitude
	Secondary Over V		and the second se	/oltage Trip Time
	Secondary Over V	oltage Trip Time	First Under	Voltage Magnitude
	Secondary Under	Voltage Magnitude	First Under	Voltage Trip Time
				· · · · · · · · · · · · · · · · · · ·
	Secondary Under			ency Magnitude
	Under Frequency	Magnitude	Over Frequ	ency Trip Time
	Under Frequency		X Response t	to Utility Recovery
	the grid voltage; Wave while grid voltage cha	er voltage level 2 again No. 2 is the output cu nged.	rrent of inverter;	Wave No.4 is the trip
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	8. 12	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

	a <b>ta / Test Plan</b> nd (Shanghai) Co., Ltd.	Document No.:	MS-0025001-appendix 13	
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN23GLMZ 001	
Order No. :	244466490	Product:	Grid-Connected PV Inverter	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

Picture No.:	98	Clause:	1000	4.3.7	
est:	Islanding Protection	on	First Over V	oltage Magnit	ude
	Secondary Over V			oltage Trip Tin	
	Secondary Over V			Voltage Magn	
	Secondary Under	Voltage Magnitude	First Under \	Voltage Trip Ti	me
	Secondary Under	Voltage Trip Time	Over Freque	ency Magnitud	le
	Under Frequency			ency Trip Time	
			X Response to		
est description:	Under Frequency Inverter reconnect to				
	grid voltage tripped un is the grid voltage; Wa signal while grid voltage	ave No. 2 is the outpu			
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Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21 Di	Tested by:	
Review date:		Reviewed by:	
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(Report no.)

ภาคผนวก ค.

TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland®	
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13 CN23GLMZ 001	
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4	

# Attachment : 1

Re	mark: Trip sig	ynal of each test
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:	21 13	Tested by:		
Review date:		Reviewed by:		

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Test Data / Test Plan			🛕 TÜVRheinland		
TÜV Rheinland (Shanghai) Co., Ltd. Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Document No.: Report No:	MS-0025001-appendix 13		
			CN23GLMZ 001		
Order No. :	244466490	Product:	Grid-Connected PV Inverter		
Client Name :	SolaX Power Network Technology (Zhejiang) Co., Ltd.	Model designation:	X1-MINI-3.0K-G4		



Used equipment No.:	See equipment list for details	Sample No.:	N/A
Finished date:	21	Tested by:	
Review date:		Reviewed by:	
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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค. TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

TÜV Rheinland (Shanghai) Co. Ltd. QMA 30.041.01SHG\_7.14

Measurement and Test Equipment List Used MTE

#### Attachment: 2

Report No.: CN23GLMZ 001



Revision: 20 July, 2007/G.Luebken

#### 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	<b>QUNLING Energy Resources</b>
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:	ele R0	Tested by:	
Review date:		Reviewed by:	
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(Issued date)

#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

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. TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Attachment 3: Report Number: Model: Photo Documents CN23GLMZ001 X1-MINI-3.0K-G4





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#### หมายเลขรายงาน: CSSC/BOS/003

(Report no.)

ภาคผนวก ค. TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Attachment 3: Report Number: Model:

Photo Documents CN23GLMZ001 X1-MINI-3.0K-G4





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#### หมายเลขรายงาน: CSSC/BOS/003

(Issued date)

(Report no.)

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TÜV Rheinland's Report No: CN23GLMZ 001. (ต่อ)

Attachment 3: Report Number: Model: Photo Documents CN23GLMZ001 X1-MINI-3.0K-G4





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#### หมายเลขรายงาน: CSSC/BOS/003

(Issued date)

(Report no.) ภาคผนวก ง.

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.) <u>1/F. of No.10, No.153/165/177/178/179/182/189/192/198, Lane 777,</u> 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.