Compliance Evaluation Report

หมายเลขรายงาน: CSSC/BOS/007 (Report no.)

วันที่ออกรายงาน: July 28, 2021 (Issued date)

ผู้ขอรับบริการ (APPLICANT) :	SolaX Power Network Technology (Zhe Jiang) Co., Ltd. No.288, Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province 310000, P.R. CHINA
ผู้รับรายงาน (SUBMITTED TO) :	ตามที่อยู่ผู้ขอรับบริการ (Same as above)
ผลิตภัณฑ์ (PRODUCT) :	PV grid-connected inverter
ยี่ห้อ (BRAND) :	SolaX
รุ่น (MODEL) :	X3-Hybrid-15.0

ขอบข่ายการประเมิน (Scope) :

รายงานฉบับนี้เป็นการให้ความคิดเห็นต่อความเป็นไปตามข้อกำหนดของผลิตภัณฑ์ ตามมาตรฐาน / ระเบียบที่ระบุในส่วนต่อไป วัตถุประสงค์ของการประเมินความเป็นไปตามข้อกำหนดในรายงานฉบับนี้ เพื่อระบุความเป็นไปตามข้อกำหนดตามมาตรฐานหรือระเบียบที่เกี่ยวข้องของการไฟฟ้าฝ่ายจำหน่าย สำหรับประกอบการพิจารณาอนุมัติการขนานเข้าระบบ ความคิดเห็นในรายงานฉบับนี้เป็นการประเมินจากหลักฐานทางเทคนิคซึ่งจัดส่งให้ศูนย์ฯโดยผู้ขอรับบริการและ/หรือผู้ผลิตอุปกรณ์

มาตรฐาน / ระเบียบ (Standards/regulations) :

ระเบียบการไฟฟ้านครหลวงว่าด้วย ข้อกำหนดการเชื่อมต่อระบบโครงข่ายไฟฟ้า พ.ศ. 2558

หลักฐานทางเทคนิค (Technical evidence) :

รายงานผลการทดสอบ, ข้อกำหนดคุณลักษณะเฉพาะของผลิตภัณฑ์ และเอกสารที่เกี่ยวข้องอื่น ๆ ซึ่งจัดหาให้โดยผู้ขอรับบริการ

นายสิทธิชัย มังกรฤทธิ์ วิศวกรทดสอบ **ผู้เตรียม (Prepared by)**	นายบัลลังก์ หมื่นพินิจ หัวหน้าหน่วยทดสอบอุปกรณ์ประกอบระบบ **ผู้ทบทวน (Reviewed by)**
นายชำนาญ ลิ้มสกุล ผู้จัดการฝ่ายทดสอบ **ผู้ทบทวน (Reviewed by)**	(ผศ.ดร. อนวัช แสงสว่าง) รองผู้อำนวยการ สายงานวิชาการ **ผู้อนุมัติ (Approved by)**

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

CES Solar Cells Testing Center (CSSC)
King Mongkut's University of Technology Thonburi (Bang Khun Thian)
49 Soi Thian Thale 25, Bang Khun Thian Chai Thale Road, Tha Kham,
BangKhun Thian, Bangkok 10150,
Tel. (66)-2470-7446, Fax (66)-2470-7445

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คำอธิบายผลิตภัณฑ์ (Product description)	
ยี่ห้อ: (Brand)	SolaX
รุ่น: (Model)	X3-Hybrid-15.0

ข้อกำหนดคุณลักษณะเฉพาะ:

Output		Input	
Voltage	415/240, 400/230, 380/220	Max. voltage	1000V
Frequency	50/60Hz nom.	Voltage range	180 – 950V MPPT
Current	24.1A max.	Current	26/14A max.
Power	15000W nom.	Power	A11000W/B7000W max.

หมายเหตุ ข้อกำหนดคุณลักษณะดังระบุใน ภาคผนวก ข.

ผลการประเมิน (Compliance case verdicts)

ผ่าน: (Complied)	ผลการทดสอบเป็นไปตามข้อกำหนด (Submitted result complied with the requirement.)
ไม่ผ่าน: (Does not comply)	ผลการทดสอบไม่เป็นไปตามข้อกำหนด (Submitted result does not comply with the requirement.)
ไม่ครบถ้วน: (Undetermined)	ผลการทดสอบหรือข้อมูลที่เกี่ยวข้องไม่เพียงพอสำหรับการประเมิน (The test results are not sufficient for evaluation.)

หมายเหตุ (General remark)

(1) รายงานการทดสอบนี้ต้องไม่ถูกทำซ้ำบางส่วน โดยไม่ได้รับความยินยอมจากศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ เป็นลายลักษณ์อักษร ยกเว้นได้ทำซ้ำเต็มฉบับ

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รายงานฉบับนี้ประกอบด้วยเอกสารดังต่อไปนี้:

- การตรวจสอบความเป็นไปตามข้อกำหนดของผลการทดสอบ
- แบบตรวจสอบและรับรองรายงานการทดสอบอินเวอร์เตอร์ที่ใช้ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับโครงข่ายของ กฟน.
- ภาคผนวก ก1. – List of documents from TÜV Rheinland (Shanghai) Co., Ltd.
- ภาคผนวก ก2. – MEA Grid Code Compliance Table.
- ภาคผนวก ข. – Technical Specification.
- ภาคผนวก ค. – TÜV Rheinland's Report No: CN21EDK2 001.
- ภาคผนวก ง. – Laboratory Accreditation Certificate No. CNAS L3038.

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รายละเอียดผลการพิจารณาอินเวอร์เตอร์ ยี่ห้อ SolaX **รุ่น** *X3-Hybrid-15.0*
รายงานผลการทดสอบ หมายเลข CN21EDK2 001 ลงวันที่ : 2021.07.27
จากสถาบันทดสอบ TÜV Rheinland (Shanghai) Co., Ltd
ตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ขีในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับโครงข่ายของ กฟน.
(Test Compliance Validation)

ลำดับ	หัวข้อ	ผลการพิจารณา	รายละเอียด
1	กระแสฮาร์มอนิก (Harmonics Current)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.1 การทดสอบกระแสฮาร์มอนิก หน้า 5-6
2	แรงดันกระเพื่อม (Voltage Fluctuation)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.2 การทดสอบแรงดันกระเพื่อม หน้า 6
3	การจ่ายไฟฟ้ากระแสตรง (Direct Current)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.3 การทดสอบการจ่ายไฟฟ้ากระแสตรง หน้า 6
4	ช่วงความถี่ทำงาน (Operating Frequency Range)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.4 การทดสอบช่วงความถี่ทำงาน หน้า 7
5	ช่วงแรงดันทำงาน (Operating Voltage Range)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.5 การทดสอบช่วงแรงดันทำงาน หน้า 7
6	การป้องกันสภาวะไอส์แลนดิ่ง (Islanding test)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.6 การทดสอบการป้องกันสภาวะไอส์แลนดิ่ง หน้า 8
7	การเชื่อมต่อหลังไฟฟ้ากลับคืน (Power Recovery Response)	☒ **ผ่าน** (Complied) ☐ ไม่ผ่าน (Does not comply) ☐ ไม่ครบถ้วน (Undetermined)	ตามแบบตรวจสอบและรับรองรายงานการทดสอบ อินเวอร์เตอร์ 2.6 การทดสอบการเชื่อมต่อหลังไฟฟ้ากลับคืน หน้า 9
8	อื่นๆ (other)	☒ **ครบถ้วน** (Complied) ☐ ไม่ครบถ้วน (Undetermined)	1. พบ Firmware version ในรายงานผลการทดสอบ 2. ผ่านการทดสอบจากห้องปฏิบัติการทดสอบที่ได้รับการรับรอง ISO/IEC 17025:2005 ในขอบข่ายการทดสอบอินเวอร์เตอร์ ตาม Laboratory Accreditation Certificate Number CNAS L3038

ความคิดเห็นของการประเมินความเป็นไปตามข้อกำหนดตามผลการทดสอบ/ข้อมูลจากห้องปฏิบัติการทดสอบที่ได้รับการรับรองตาม ISO/IEC17025 ซึ่งผู้ขอรับบริการ / ผู้ผลิตจัดส่งให้ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ รายละเอียดห้องปฏิบัติการทดสอบดังภาคผนวก จ.

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แบบตรวจสอบและรับรองรายงานผลการทดสอบ

อินเวอร์เตอร์ที่ใช้ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวง

สวนที่ 1 การรับรองรายงานผลการทดสอบอินเวอร์เตอร์

1.1 รายละเอียดอินเวอร์เตอร์	
ยี่ห้อ	SolaX
รุ่น	*X3-Hybrid-15.0*
Firmware Version	*DSP1:2.07, DSP2:2.01, ARM:2.03*
พิกัดทางไฟฟ้า	*15000W*
1.2 รายละเอียดของรายงานผลการทดสอบ	
หมายเลขรายงานผลการทดสอบ	*CN21EDK2 001*
ออกเมื่อวันที่	*2021.07.27*
ชื่อสถาบันหรือหน่วยงานที่ออกรายงานผลการทดสอบอินเวอร์เตอร์	*TÜV Rheinland (Shanghai) Co., Ltd*
ที่อยู่สถาบันหรือหน่วยงานที่ออกรายงานผลการทดสอบอินเวอร์เตอร์	*No. 177, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, 200072 P.R.China*
1.3 การรับรองรายงานผลการทดสอบ	
ข้าพเจ้าขอรับรองว่าข้อมูลที่กรอกในเอกสารฉบับนี้มีความถูกต้องเป็นจริง และได้ตรวจสอบพบว่าผลการทดสอบอินเวอร์เตอร์ตามรายงานในข้อ 1.2 เป็นไปตามข้อกำหนดสำหรับอินเวอร์เตอร์ที่ใช้ในระบบผลิตไฟฟ้าประเภทเชื่อมต่อกับระบบโครงข่ายไฟฟ้าของการไฟฟ้านครหลวงทุกประการ	
ชื่อหน่วยตรวจสอบและรับรองผลการทดสอบอินเวอร์เตอร์	*ศูนย์พัฒนามาตรฐานและทดสอบระบบเซลล์แสงอาทิตย์ (CSSC)* *สถาบันพัฒนาและฝึกอบรมโรงงานต้นแบบ* *มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี*
ที่อยู่หน่วยตรวจสอบและรับรองผลการทดสอบอินเวอร์เตอร์	*49 ซอยเทียนทะเล 25, ถนนบางขุนเทียน-ชายทะเล แขวงท่าข้าม* *บางขุนเทียน กรุงเทพมหานคร 10150* *โทร.: +662 470 7445 - 49* *โทรสาร: +662 470 7445*
วันที่ออกเอกสาร	*28 กรกฎาคม 2564*

ตรวจสอบและรับรองข้อมูลโดย	อนุมัติโดย
ลงชื่อ ..... (นายชำนาญ ลิ้มสกุล) ตำแหน่ง ผู้จัดการฝ่ายทดสอบ	ลงชื่อ ..... (ผศ.ดร. อนวัช แสงสว่าง) ตำแหน่ง รองผู้อำนวยการ สายงานวิชาการ **หมายเหตุ**: ผู้อนุมัติต้องเป็นหัวหน้าสูงสุดของหน่วยตรวจสอบและรับรองผลการทดสอบ หรือผู้ที่ได้รับมอบหมายให้ปฏิบัติงานแทน

หมายเลขอ้างอิง.....

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CSSC
CES SOLAR CELLS TESTING CENTER

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ส่วนที่ 2) รายละเอียดผลการทดสอบอินเวอร์เตอร์

2.1 การทดสอบฮาร์มอนิก (Harmonics Current)

Order	33 % of output current		66% of output current		100 % of output current		Limit (% of Output current)	Result confirmation
	Measured In Amp*	% of output current*	Measured In Amp*	% of output current*	Measured In Amp*	% of output current*		
2nd	0.08	0.37 %	0.11	0.51 %	0.14	0.64 %	≤ 1 %	☒ Pass ☐ Fail
3rd	0.03	0.14 %	0.05	0.23 %	0.05	0.23 %	≤ 4 %	☒ Pass ☐ Fail
4th	0.01	0.05 %	0.04	0.18 %	0.03	0.14 %	≤ 1 %	☒ Pass ☐ Fail
5th	0.18	0.83 %	0.31	1.43 %	0.56	2.58 %	≤ 4 %	☒ Pass ☐ Fail
6th	0.00	0.00 %	0.02	0.09 %	0.02	0.09 %	≤ 1 %	☒ Pass ☐ Fail
7th	0.11	0.51 %	0.22	1.01 %	0.34	1.56 %	≤ 4 %	☒ Pass ☐ Fail
8th	0.00	0.00 %	0.01	0.05 %	0.01	0.05 %	≤ 1 %	☒ Pass ☐ Fail
9th	0.01	0.05 %	0.02	0.09 %	0.02	0.09 %	≤ 4 %	☒ Pass ☐ Fail
10th	0.00	0.00 %	0.01	0.05 %	0.01	0.05 %	≤ 1 %	☒ Pass ☐ Fail
11th	0.04	0.18 %	0.10	0.46 %	0.17	0.78 %	≤ 2 %	☒ Pass ☐ Fail
12th	0.00	0.00 %	0.01	0.05 %	0.01	0.05 %	≤ 0.5 %	☒ Pass ☐ Fail
13th	0.03	0.14 %	0.07	0.32 %	0.10	0.46 %	≤ 2 %	☒ Pass ☐ Fail
14th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.5 %	☒ Pass ☐ Fail
15th	0.01	0.05 %	0.01	0.05 %	0.01	0.05 %	≤ 2 %	☒ Pass ☐ Fail
16th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.5 %	☒ Pass ☐ Fail
17th	0.01	0.05 %	0.03	0.14 %	0.04	0.18 %	≤ 1.5 %	☒ Pass ☐ Fail
18th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	☒ Pass ☐ Fail
19th	0.01	0.05 %	0.03	0.14 %	0.04	0.18 %	≤ 1.5 %	☒ Pass ☐ Fail
20th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	☒ Pass ☐ Fail
21th	0.00	0.00 %	0.01	0.05 %	0.01	0.05 %	≤ 1.5 %	☒ Pass ☐ Fail
22th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.375 %	☒ Pass ☐ Fail
23th	0.01	0.05 %	0.02	0.09 %	0.03	0.14 %	≤ 0.6 %	☒ Pass ☐ Fail
24th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	☒ Pass ☐ Fail
25th	0.01	0.05 %	0.01	0.05 %	0.03	0.14 %	≤ 0.6 %	☒ Pass ☐ Fail
26th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	☒ Pass ☐ Fail
27th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.6 %	☒ Pass ☐ Fail
28th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 0.15 %	☒ Pass ☐ Fail
29th	0.01	0.05 %	0.01	0.05 %	0.02	0.09 %	≤ 1 %	☒ Pass ☐ Fail
30th	0.00	0.00 %	0.00	0.00 %	0.00	0.00 %	≤ 4 %	☒ Pass ☐ Fail
31th	0.00	0.00 %	0.01	0.05 %	0.02	0.09 %	≤ 1 %	☒ Pass ☐ Fail

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Order	33 % of output current		66% of output current		100 % of output current		Limit (% of Output current)	Result confirmation
	Measured In Amp*	% of output current*	Measured In Amp*	% of output current*	Measured In Amp*	% of output current*		
32th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.15 %	☒ Pass ☐ Fail
33th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.6 %	☒ Pass ☐ Fail
34th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.15 %	☒ Pass ☐ Fail
35th	*0.01*	*0.05 %*	*0.01*	*0.05 %*	*0.02*	*0.09 %*	≤ 0.3 %	☒ Pass ☐ Fail
36th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.075 %	☒ Pass ☐ Fail
37th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.02*	*0.09 %*	≤ 0.3 %	☒ Pass ☐ Fail
38th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.075 %	☒ Pass ☐ Fail
39th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.01*	*0.05 %*	≤ 0.3 %	☒ Pass ☐ Fail
40th	*0.00*	*0.00 %*	*0.00*	*0.00 %*	*0.00*	*0.00 %*	≤ 0.075%	☒ Pass ☐ Fail
TRDi		***1.39 %***		***2.98 %***		***3.46 %***	≤ 5%	☒ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: *TÜV Rheinland's Report No: CN21EDK2 001., Page 9– 15,*

หมายเหตุ: * กรณีอินเวอร์เตอร์ชนิด 3 เฟส ให้ระบุค่าสูงสุดที่ได้จากแต่ละเฟส

2.2 การทดสอบแรงดันกระเพื่อม (Voltage Fluctuation)

	Pst	Plt
Limit	≤ 1.0	≤ 0.65
Test results	***0.30***	***0.15***
Result confirmation	☒ Pass ☐ Fail	☒ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: *TÜV Rheinland's Report No: CN21EDK2 001., Page 16-17*

2.3 การทดสอบการจ่ายไฟฟ้ากระแสตรง (Direct Current)

Test level	33 % of rated output current	66 % of rated output current	100 % of rated output current
Limit (% of rated Output current)	≤ 0.5%	≤ 0.5%	≤ 0.5%
Test results* (% of rate Output current)	***0.033 %***	***0.037 %***	***0.026 %***
Result confirmation	☒ Pass ☐ Fail	☒ Pass ☐ Fail	☒ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: *TÜV Rheinland's Report No: CN21EDK2 001., Page 18. and 196.*

หมายเหตุ: * กรณีอินเวอร์เตอร์ชนิด 3 เฟส ให้ระบุค่าสูงสุดที่ได้แต่ละเฟส

หมายเลขรายงาน: CSSC/BOS/007 (Report no.)

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2.4 การทดสอบช่วงความถี่ทำงาน (Operating Frequency Range)

	Actual Trip Setting		Test Result	Limit	Result confirmation
	Frequency (Hz)	Trip Time (sec)	Trip Time* (sec)	Time Delay (sec)	
Underfrequency	46.9	*0.070*	***0.096***	≤ 0.1	☒ Pass ☐ Fail
Overfrequency	52.1	*0.070*	***0.093***	≤ 0.1	☒ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: ***TÜV Rheinland's Report No: CN21EDK2 001., Page 21 and 111-120.***

หมายเหตุ: * ให้ระบุค่าสูงสุดที่ได้จากการทดสอบ

2.5 การทดสอบช่วงแรงดันการทำงาน (Operating Voltage Range)

☒ Grid-connected inverter which connected to grid at low voltage (230/400) [1]

	Actual Setting			Result	Limit	Result confirmation
	☒ $V_{L-N\ setting}$ [2] (V)	☐ $V_{L-L\ setting}$ [2] (V)	Time Delay (sec)	Time Delay [3] (sec)	Time Delay (sec)	
Undervoltage level 2 [4]	☒ 114 or ☐	☐ 198 or ☐	*0.090*	***0.092***	≤ 0.1	☒ Pass ☐ Fail
Undervoltage level 1	199	345	*1.900*	***1.942***	≤ 2	☒ Pass ☐ Fail
Overvoltage level 1	241	417	*1.900*	***1.980***	≤ 2	☒ Pass ☐ Fail
Overvoltage level 2 [4]	☐ 311 or ☒ 271	☐ 539 or ☐	*0.040*	***0.049***	≤ 0.05	☒ Pass ☐ Fail

☐ Grid-connected inverter which connected to the grid at voltage ≥ 12kV [1]

	Actual Setting		Result	Limit	Result confirmation
	V setting (% of rate output voltage)	Time Delay (sec)	Time Delay [3] (sec)	Time Delay (sec)	
Undervoltage level 2 [4]	☐ 135% or ☐ .....%			≤ 0.1	☐ Pass ☐ Fail
Undervoltage level 1	110%			≤ 2	☐ Pass ☐ Fail
Overvoltage level 1	85%			≤ 2	☐ Pass ☐ Fail
Overvoltage level 2 [4]	☐ 50% or ☐ .....%			≤ 0.05	☐ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: ***TÜV Rheinland's Report No: CN21EDK2 001., Page 19-20 and Page 31-110.***

Note: (1) Select MEA's voltage level where grid – connected inverter connected to.

(2) Select between line-neutral or line – line voltage test based on the actual operation of inverter.

(3) Insert maximum value recorded during test.

(4) If inverter cannot be adjusted for overvoltage and/or undervoltage trip setting as per MEA' grid – connected Inverter regulation, it shall be adjusted the overvoltage or undervoltage trip setting to the maximum and/or minimum voltage that inverter can to be set.

หมายเลขอ้างอิง.....

ตรวจสอบและรับรองข้อมูลโดย.....

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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2.6 การทดสอบการป้องกันสภาวะไอส์แลนดิ่ง (Islanding Protection)

Item	Test Condition C			Test Condition B			Test Condition A		
	P_{AC} (% of nominal)	Q_{AC} (% of nominal)	Run on Time (sec) (Limit ≤2 Sec)	P_{AC} (% of nominal)	Q_{AC} (% of nominal)	Run on Time (sec) (Limit ≤2 Sec)	P_{AC} (% of nominal)	Q_{AC} (% of nominal)	Run on Time (sec) (Limit ≤2 Sec)
1	0	0	***0.256***	0	0	***0.321***	0	0	***0.256***
2	0	-5	*0.121*	0	-5	*0.124*	-10	-10	*0.111*
3	0	-4	*0.143*	0	-4	*0.141*	-10	-5	*0.109*
4	0	-3	*0.154*	0	-3	*0.156*	-10	0	*0.107*
5	0	-2	*0.229*	0	-2	*0.180*	-10	+5	*0.104*
6	0	-1	*0.251*	0	-1	*0.237*	-10	+10	*0.103*
7	0	1	*0.237*	0	1	*0.230*	-5	-10	*0.113*
8	0	2	*0.170*	0	2	*0.195*	-5	-5	*0.205*
9	0	3	*0.163*	0	3	*0.160*	-5	0	*0.197*
10	0	4	*0.131*	0	4	*0.148*	-5	+5	*0.140*
11	0	5	*0.129*	0	5	*0.140*	-5	+10	*0.112*
12							0	-10	*0.112*
13							0	-5	*0.230*
14							0	+5	*0.237*
15							0	+10	*0.115*
16							+5	-10	*0.105*
17							+5	-5	*0.121*
18							+5	0	*0.156*
19							+5	+5	*0.208*
20							+5	+10	*0.108*
21							+10	-10	*0.080*
22							+10	-5	*0.084*
23							+10	0	*0.091*
24							+10	+5	*0.093*
25							+10	+10	*0.102*
Result confirmation	☒ Pass ☐ Fail			☒ Pass ☐ Fail			☒ Pass ☐ Fail		

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: *TÜV Rheinland's Report No: CN21EDK2 001., Page 22-28. and Page 121-176.*

หมายเลขอ้างอิง..... ตรวจสอบและรับรองข้อมูลโดย.....

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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2.7 การทดสอบการเชื่อมต่อหลังไฟฟ้ากลับคืน (Power Recovery Response)

	Actual Setting (sec)	Test Result (sec) (Limit ≥120)	Compliance with Clause 5.10.2(c) of IEEE std 1547.1-2005 (1)	Compliance with Clause 5.10.2(g) of IEEE std 1547.1-2005 (2)	Result confirmation
Underfrequency	*120*	***124.95***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail
Overfrequency	*120*	***125.55***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail
Undervoltage level 2	*120*	***121.20***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail
Undervoltage level 1	*120*	***120.75***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail
Overvoltage level 1	*120*	***121.05***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail
Overvoltage level 2	*120*	***124.80***	☒ Yes ☐ No	☒ Yes ☐ No	☒ Pass ☐ Fail

อ้างอิงจากรายงานผลการทดสอบตามข้อ 1.2 หน้า: ***TÜV Rheinland's Report No: CN21EDK2 001., Page 29 and Page 177-194.***

Note: (1) Adjust the voltage so that it beyond the reconnect voltage by twice the manufacture's stated tolerance. The Simulated area EPS voltage source shall maintain the abnormal voltage for two times the reconnect time delay. Verify that the EUT does not reenergize the simulated area EPS.

(2) To verify that the timer resets for additional voltage excursions within the reconnect, retest with an abnormal voltage step change event that is introduced during the reconnect countdown period. While the unit is counting down to reconnect, step to voltage to a value 5% outside of the manufacture's specified normal operating voltage for the trip time setting plus twice the manufacturer's stated timer accuracy, and then return to the normal operating voltage. The unit shall restart is reconnect timer and not reconnect until the grid voltage has been within the specified range for the specified reconnect time.

2.8 การตรวจสอบสถาบันหรือหน่วยงานที่ออกรายงานผลการทดสอบอินเวอร์เตอร์

รายละเอียด	Result confirmation
☐ อินเวอร์เตอร์ผ่านการทดสอบจากสถาบันหรือหน่วยงานทดสอบที่เป็นกลางภายในประเทศ ซึ่งได้รับการรับรองห้องปฏิบัติการทดสอบตามมาตรฐาน มอก. 17025 (สำหรับอินเวอร์เตอร์) จากสำนักงานคณะกรรมการแห่งชาติว่าด้วยการรับรองระบบงาน หรือได้รับการตรวจสอบและยอมรับจากการไฟฟ้านครหลวง	☒ Pass ☐ Fail
☒ อินเวอร์เตอร์ผ่านการทดสอบจากสถาบันหรือหน่วยงานทดสอบที่เป็นกลางในต่างประเทศ ซึ่งได้รับการรับรองห้องปฏิบัติการทดสอบตามมาตรฐาน ISO/IEC 17025 (สำหรับอินเวอร์เตอร์) จากหน่วยงานระดับชาติที่มีหน้าที่เทียบเคียงกันกับ สำนักงานคณะกรรมการแห่งชาติว่าด้วยการรับรองระบบงาน และอยู่ในทะเบียนขององค์กรความร่วมมือระหว่างประเทศว่าด้วยการ รับรองห้องปฏิบัติการ (International Laboratory Accreditation Cooperation, ILAC)	

หมายเลขอ้างอิง..... ตรวจสอบและรับรองข้อมูลโดย.....

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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

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

TÜVRheinland®
Precisely Right.

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: CN21EDK2 001.pdf
3. Laboratory accreditation: CNAS L3038 certificate-EN.pdf
4. Table of compliance: Comply table.pdf
5. Documentation list: Confirmation letter.pdf

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

With kind regards.

TÜV Rheinland (Shanghai) Co., Ltd.

Allen Hu
Project Engineer
Solar & Commercial Products

Allen Hu

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ภาคผนวก 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	Harmonics	Refer to MEA code	Total harmonic distortion %THD (max) =3.32% Current harmonics are in the limit according to MEA code	Refer to the name plate of product in report CN21EDK2 001 / Page 9-11.	Complied
2	Voltage fluctuation	Refer to IEC	Pst value: Pst(max)= 0.30 Plt value: Plt(max)= 0.15	Refer to Test report CN21EDK2 001 / Page 12-13.	Complied
3	DC injection	Refer to IEC	DC injection value(max): 0.037 % of rated current	Refer to Test report CN21EDK2 001 / Page 14 and 192.	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 = 0.096 Sec f > 52 Hz = 0.093 Sec	Refer to Test report CN21EDK2 001 / Page 17 and 107-116.	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 = 0.092 Sec V < 199V = 1.942 Sec	Refer to Test report CN21EDK2 001 / Page 15-16 and 27-106.	Complied

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

		V < 199V = 2 Sec V > 241V = 2 Sec V > 271V =0.05 Sec	V > 241V = 1.941 Sec V > 271V =0.0480 Sec		
10	Anti-Islanding	Disconnect time of IEC 62116 requirement = 2 Sec Max.	Trip time value (max.): P_{EUT}100%, P_R0%, Q_C0%, = 0.256 Sec P_{EUT}66%, P_R0%, Q_C0%, = 0.321 Sec P_{EUT}33%, P_R0%, Q_C0%, = 0.256 Sec	Refer to Test report CN21EDK2 001 / Page 18-24 and 117-172.	Complied
11	Reconnection to utility recovery	Reconnection time of MEA requirement > 120s	Reconnection time value: After back to specified recovery voltage range V = 200V =123.30 Sec V = 240V =125.40 Sec After back to specified frequency voltage range f = 47.0Hz =124.95 Sec f = 52.0Hz =125.55 Sec	Refer to Test report CN21EDK2 001 / Page 25-26 and 173-190.	Complied

Allen Hu

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ภาคผนวก ข. Technical Specification.

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ภาคผนวก ข. Technical Specification (ต่อ).

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ภาคผนวก ข. Technical Specification (ต่อ).

Contents

02

Notes on this Manual

1 Notes on this Manual

1.1 Scope of Validity

This manual is an integral part of X3-Hybrid G4. It describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

X3-Hybrid-5.0	X3-Hybrid-10.0
X3-Hybrid-6.0	X3-Hybrid-12.0
X3-Hybrid-8.0	X3-Hybrid-15.0

Note: "X3-Hybrid G4" Series refers to the energy storage inverter that supports photovoltaic grid-connected.

"5.0" means 5.0kW.

"D" version contains **"DC switch"**, **"M"** version can be connected to **X3-Matebox**, X3-Matebox has built-in DC switch, BAT circuit breaker, AC and EPS(Off-grid) circuit breaker, which can reduce the cost of accessories for customers. And pre-installed wiring cables and equipment can get rid of complex wiring work. Keep this manual available at any time.

1.2 Target Group

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

1.3 Symbols Used

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

Danger!
"Danger" refers to a dangerous situation that, if not avoided, will result in a high level of risk such as serious injury or even death.

Warning!
"Warning" indicates a dangerous situation, which, if not avoided, may result in serious injury or death.

Caution!
"Caution" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

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

03

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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ภาคผนวก ข. Technical Specification (ต่อ).

1.3.1Important Safety Instructions

Danger!

Danger to life due to high voltages in the inverter!
The personnel responsible for the installation, electrical connection, debugging, maintenance and fault handling operation of this product need to be trained, master the correct operation method, have the corresponding electrician qualification and safety operation knowledge.

Caution!

When the inverter is working, it is strictly forbidden to touch the shell. The temperature of the shell is high and there is a risk of scalding.

Caution!

Radiation may be harmful to health!
Do not stay for a long time and keep at least 20 cm away from the inverter.

Note!

Ground PV system.
Finish PV modules and photovoltaic system grounding in accordance with local requirements to achieve optimal protection of systems and personnel.

Warning!

Ensure that the input DC voltage is below the inverter limit. Excessive DC voltage and current may cause permanent damage or other losses to the inverter, which is not covered by the warranty.

Warning!

Before performing maintenance, cleaning or operation on the circuit connected to the inverter, authorized maintenance personnel must first disconnect the AC and DC power supplies of the inverter.

Warning!
The inverter can not be operated when it is running.

Warning!
Risk of electric shock!

Strictly follow relevant safety specifications for product installation and testing. During installation, operation or maintenance, please read carefully and follow the instructions and precautions on the inverter or user manual. If the operation is incorrect, it may cause personal and property losses. Please keep the user manual properly after use.

This inverter can only use the accessories sold and recommended by SolaX, otherwise it may cause fire, electric shock or casualties.
Without the authorization of our company, you may not open the inverter cover or replace the inverter parts, otherwise the warranty promise of the inverter will be invalid.

The use and operation of the inverter must be carried out in accordance with the instructions in this manual, otherwise this protection will fail and the warranty of the inverter will also fail.
During working, the inverter surface temperature may exceed 60°C, please make sure the inverter cools down before touching, and make sure children can not touch.

When exposed to sunlight, photovoltaic arrays generate dangerous high DC voltages. Please follow our instructions, otherwise it will be life-threatening.

All DC and AC power sources must be disconnected from the inverter for at least 5 minutes before any wiring or electrical operation is performed on the inverter to ensure complete isolation of the inverter and avoid electric shock.

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ภาคผนวก ข. Technical Specification (ต่อ).

A photovoltaic module used on the inverter must have a IEC61730A rating, and the total open circuit voltage of the photovoltaic string / array is lower than the maximum rated DC input voltage of the inverter. Any damage caused by photovoltaic over voltage is not covered by warranty.

Installation position should be away from wet environment and corrosive substances.

After the inverter and power grid cut off the PV power supply, there will be a certain amount of residual current in a short time, be cautious or it may lead to serious personal injury and even high risk of death. Use a multimeter (impedance at least1 MΩ) to measure the voltage between the UDC and the UDC- to ensure that the inverter port is discharged below the safe voltage before starting operation (35VDC).

➢ Surge protection devices (SPDs) for PV installation

Warning!
Over-voltage protection with surge arresters should be provided when the PV power system is installed.
The grid connected inverter is fitted with SPDs in both PV input side and MAINS side.

Direct or indirect lightning strikes can cause failures. Surge is the main cause of lightning damage to most devices. Surge voltage may occur at photovoltaic input or AC output, especially in remote mountain areas where long distance cable is supplied.

Please consult professionals before installing SPDs.

The external lightning protection device can reduce the influence of direct lightning strike, and the lightning protection device can release surge current to the earth.

If the building installed with external light protection device is far away from the inverter location, in order to protect the inverter from electrical and mechanical damage, the inverter should also install an external lightning protection equipment.

In order to protect DC system, two-stage surge protection equipment is needed between DC cable of inverter and photovoltaic equipment module.

In order to protect the AC system, the level 2 surge protection equipment should be installed at the AC output, located between the inverter and the grid. Installation requirements must comply with IEC61643-21 standard.

All DC cables shall be installed in a distance as short as possible, and the positive and negative cables of the same input need to be bundled together to avoid causing loops in the system. Minimum distance installation and binding requirements also apply to auxiliary grounding and shielding grounding conductors.

➢ **Anti-islanding Effect**

The islanding effect means that when the power grid is cut off, the grid-connected power generation system fails to detect the power outage and still supplies power to the power grid. This is very dangerous for the maintenance personnel and the power grid on the transmission line.

XS-Hybrid G4 series inverter use active frequency offset method to prevent islanding effect.

➢ **PE Connection and Leakage Current**

• All inverter's incorporate a certified internal Residual Current Monitoring (RCM) in order to protect against possible electrocution and fire hazard in case of a malfunction in the PV array, cables or inverter. There are 2 trip thresholds for the RCM as required for certification (IEC 62109-2:2011). The default value for electrocution protection is 30mA, and for slow rising current is 300mA.

• The inverter, with built-in RCM, will exclude possibility of DC residual current to 6mA,thus in the system an external RCD (type A) can be used (≥ 30mA).

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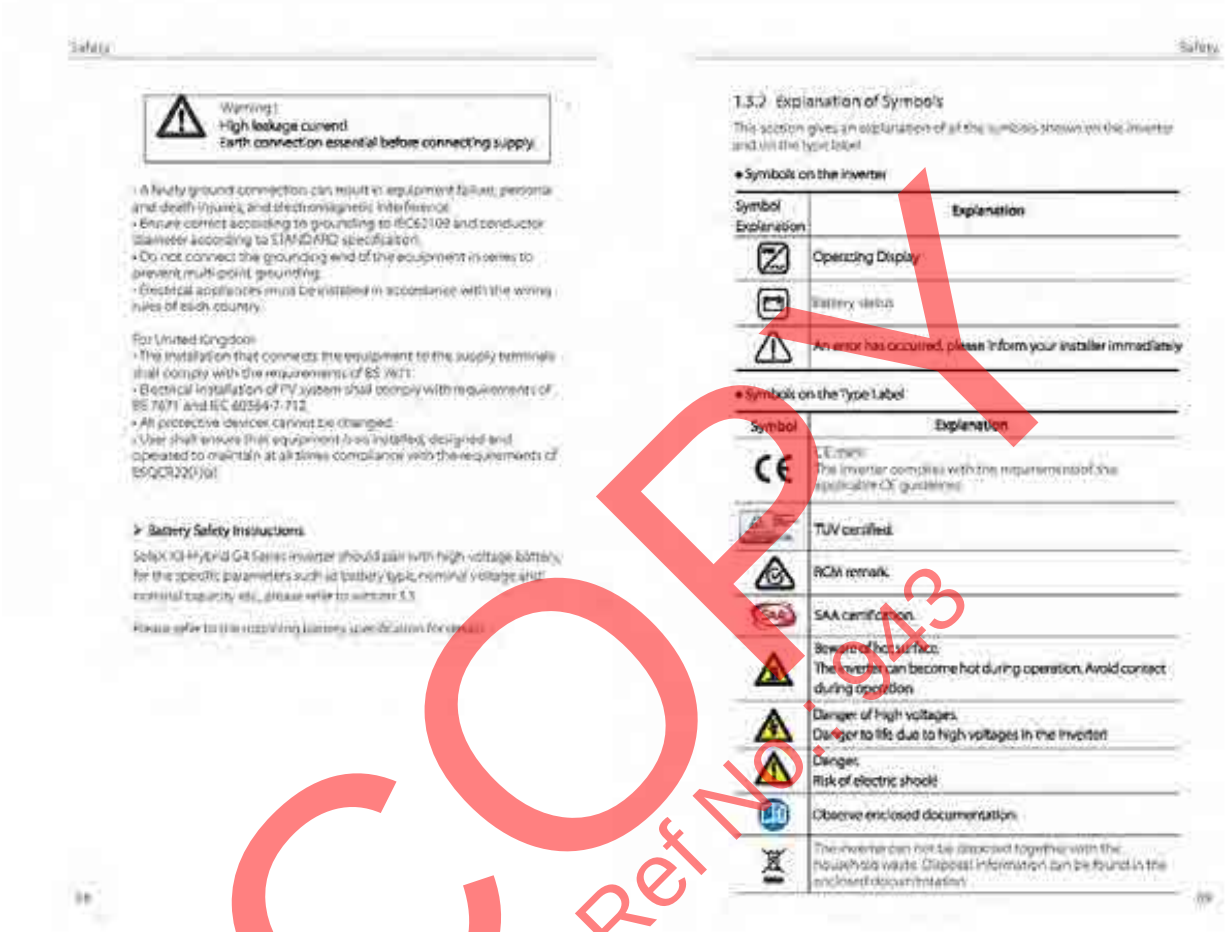

Safety

Warning!
High leakage current!
Earth connection essential before connecting supply.

- A faulty ground connection can result in equipment failure, personal and death injuries, and electromagnetic interference.
- Ensure correct according to grounding to IEC62109 and conductor diameter according to STANDARD specification.
- Do not connect the grounding end of the equipment in series to prevent multi-point grounding.
- Electrical appliances must be installed in accordance with the wiring rules of each country.

For United Kingdom
- The installation that connects the equipment to the supply terminals shall comply with the requirements of BS 7671.
- Electrical installation of PV system shall comply with requirements of BS 7671 and IEC 60364-7-712.
- All protective devices cannot be changed.
- User shall ensure that equipment is so installed, designed and operated to maintain at all times compliance with the requirements of ESQCR22(1)(a).

➢ Battery Safety Instructions

Solax X3-Hybrid G4 Series inverter should pair with high voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to section 5.3.

Please refer to the matching battery specification for details.

Safety

5.3.2 Explanation of Symbols

This section gives an explanation of all the symbols shown on the inverter and on the type label.

• Symbols on the inverter

Symbol	Explanation
	Operating Display
	Battery status
	An error has occurred, please inform your installer immediately

• Symbols on the Type Label

Symbol	Explanation
CE	CE mark The inverter complies with the requirements of the applicable CE guidelines.
	TUV certified.
	RCM remark.
	SAA 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.
	The inverter can not be disposed together with the household waste. Disposal information can be found in the enclosed documentation.

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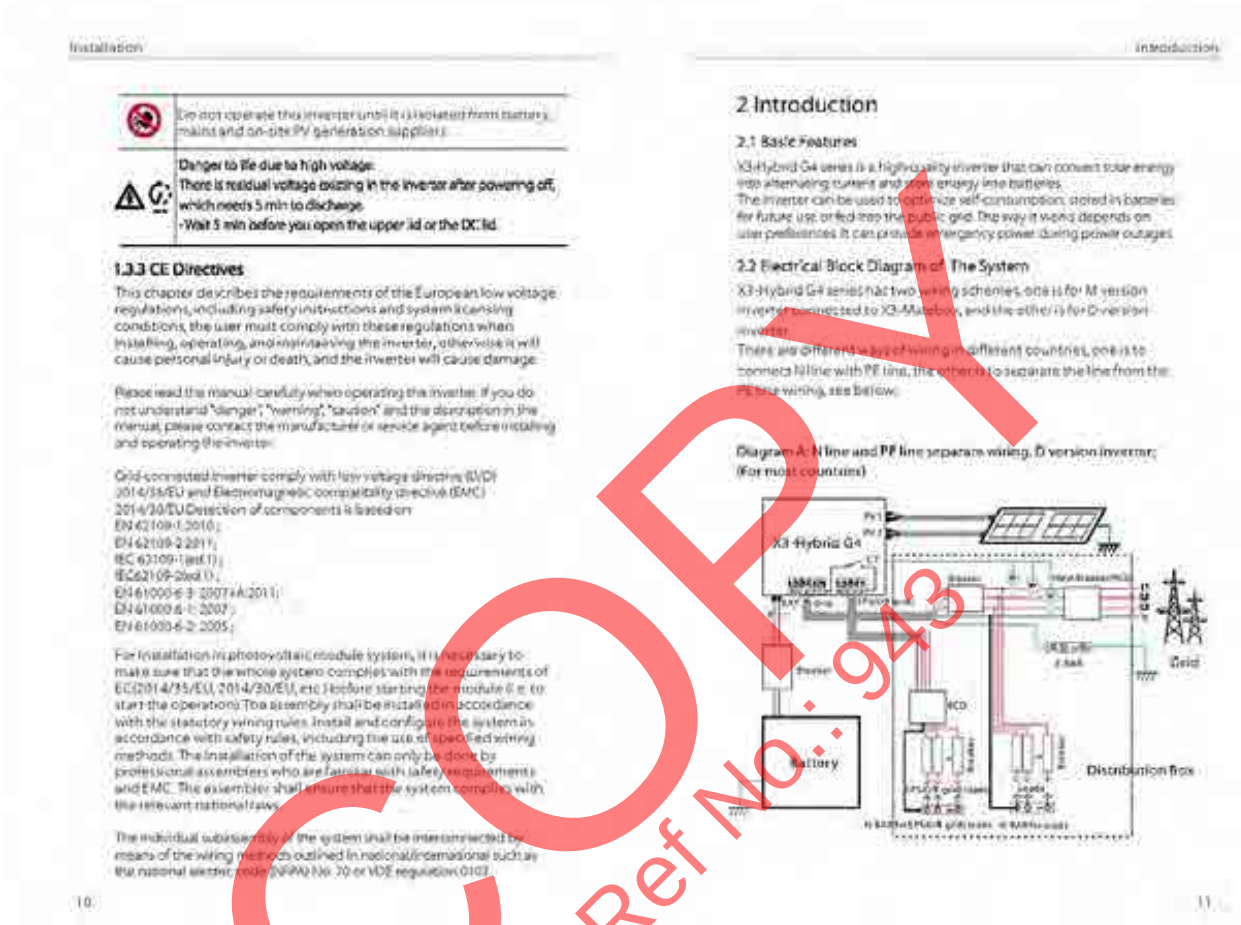

Installation

Do not operate the inverter until it is isolated from battery, mains and on-site PV generation supplies.

Danger to life due to high voltage:
There is residual voltage existing in the inverter after powering off, which needs 5 min to discharge.
• Wait 5 min before you open the upper lid or the DC lid.

1.3.3 CE Directives

This chapter 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 it will cause personal injury or death, and the inverter will cause damage.

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.

Grid-connected inverter comply with low voltage directive (LVD) 2014/35/EU and Electromagnetic compatibility directive (EMC) 2014/30/EU.Detection of components is based on:
EN 62109-1:2010;
EN 62109-2:2011;
IEC 62109-1(ed.1);
IEC62109-2(ed.1);
EN 61000-6-3: 2007+A:2011;
EN 61000-6-1: 2007;
EN 61000-6-2: 2005;

For installation in photovoltaic module system, it is necessary to 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).The assembly shall be installed in accordance with the statutory wiring rules. Install and configure the system in accordance with safety rules, including the use of specified wiring methods. The installation of the system can only be done by professional assemblers who are familiar with safety requirements and EMC. The assembler shall ensure that the system complies with the relevant national laws.

The individual subassembly of the system shall be interconnected by means of the wiring methods outlined in national/international such as the national electric code (NFPA) No. 70 or VDE regulation 0100.

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Introduction

2 Introduction

2.1 Basic Features

X3-Hybrid G4 series is a high-quality inverter that can convert solar energy into alternating current and store energy into batteries.
The inverter can be used to optimize self-consumption, stored in batteries for future use, or fed into the public grid. The way it works depends on user preferences. It can provide emergency power during power outages.

2.2 Electrical Block Diagram of The System

X3-Hybrid G4 series has two wiring schemes, one is for M version inverter connected to X3-Matebox, and the other is for D version inverter.
There are different ways of wiring in different countries, one is to connect N line with PE line, the other is to separate the line from the PE line wiring, see below.

Diagram A: N line and PE line separate wiring, D version inverter; (For most countries)

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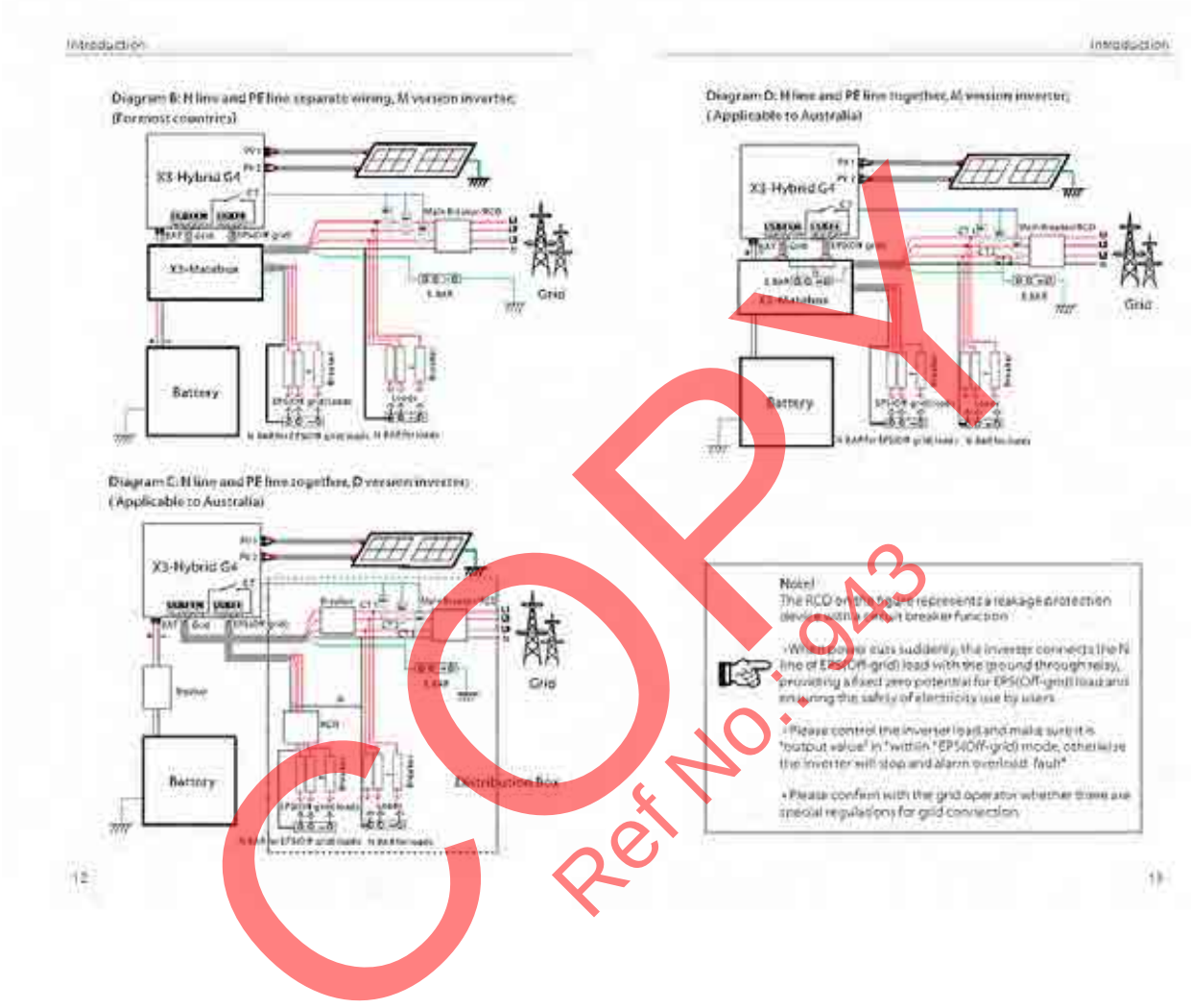

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2.3 Work Modes

Self Use

Feed-in priority

Backup mode

EPS(Off-grid) mode

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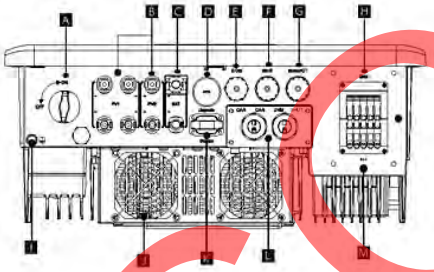
2.4 Dimension

2.5 Terminals of Inverter



Object	Description
A	DC switch
B	PV connection port
C	Battery connection port
D	USB port for upgrading
E	Ethernet port
F	Battery communication
G	Meter/CT Port
H	Grid connection port
I	Ground connection port
J	Fans(only for X3-Hybrid-12.0 and X3-Hybrid-15.0)
K	External monitoring connection port
L	CAN are reserved ports / SHUT is a reserved port/ DRM Port(only for Australia)
M	EPS(Off-grid) Output(main load connection port)

Warning !
Qualified electrician required for the installation.

3 Technical Data

3.1 DC Input

Model	X3-Hybrid-5.0	X3-Hybrid-6.0	X3-Hybrid-8.0	X3-Hybrid-10.0	X3-Hybrid-12.0	X3-Hybrid-15.0
Max. recommended DC power [W]	A:4000/B:4000	A:5000/B:5000	A:7000/B:5000	A:9000/B:6000	A:11000/B:7000	A:11000/B:7000
Max. DC voltage [V]	1000	1000	1000	1000	1000	1000
Nominal DC operating voltage [V]	640	640	640	640	640	640
Operating voltage typical [V]	180-950	180-950	180-950	180-950	180-950	180-950
Max. input current [A]	14/14	14/14	26/14	26/14	26/14	26/14
Max. short circuit current [A]	16/16	16/16	30/16	30/16	30/16	30/16
Start output voltage [V]	200	200	200	200	200	200
No. of MPP trackers	2	2	2	2	2	2
Strings per MPP tracker	A:1/B:1	A:1/B:1	A:2/B:1	A:2/B:1	A:2/B:1	A:2/B:1

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3.2 AC Output/Input

Model						
AC Output						
Nominal AC power [W]	5000	6000	8000	10000	12000	15000
Max. apparent AC power [VA]	5500	6600	8800	11000	13200	15000
Rated AC voltage [V]	415/240, 400/230, 380/220					
Rated grid frequency [Hz]	50/60					
Max. AC current [A]	8.1	9.7	12.9	16.1	19.3	24.1
Displacement power factor	1 (0.8 leading, 0.8 lagging)					
Total harmonic distortion (THD)	< 3%					
AC Input						
Rated AC power [W]	10000	12000	16000	20000	20000	20000
Rated grid voltage(range) [V]	415/240/400/230/380/220					
Rated grid frequency [Hz]	50/60					
Max. AC current [A]	16.1	19.3	25.8	32.0	32.0	32.0

3.3 Battery

Model						
Battery type	Lithium-batteries					
Battery Full Voltage [V]	180-650					
Maximum charge/discharge flow [A]	30A					
Communication interface	CAN/RS485					
Reverse connection protection	Yes					

3.4 EPS(Off-grid) Output

Model						
EPS(Off-grid) rated power [VA]	5000	6000	8000	10000	12000	15000
EPS(Off-grid) rated voltage [V]	415/230VAC					
Frequency [Hz]	50/60					
EPS(Off-grid) rated current [A]	7.2	8.7	11.6	14.5	17.5	21.8
EPS(Off-grid) Peak Power [VA]	7500,60s	9000, 60S	12000,60S	15000, 60S	18000, 60S	16500, 60S
Switching time [s]	<10ms					
Total harmonic distortion (THD)	<3 %					

3.5 Efficiency, Safety and Protection

Model						
MPPT efficiency	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
European efficiency	97.7%	97.7%	97.7%	97.7%	97.7%	97.7%
Maximum efficiency	98.2%	98.2%	98.2%	98.2%	98.2%	98.2%
Max. battery charge efficiency (PV to BAT)(@ full load)	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%
Max. battery discharge efficiency (BAT to AC)(@ full load)	97.5%	97.5%	97.5%	97.5%	97.5%	97.5%
Security & Protection						
DC SPD Protection	Integrated Type(II)					
AC SPD Protection	Integrated Type(II)					
Over/under-voltage protection	YES					
Grid protection	YES					
DC injection monitoring	YES					
Back feed current monitoring	YES					
Residual current protection	YES					
Anti-islanding protection	YES					
Over load protection	YES					
Over heat protection	YES					
Array insulation resistance detection	YES					

3.6 Generic Data

Model						
Dimensions (W/H/D)[mm]	503*503*199					
Dimensions of Packing (W/H/D)[mm]	560*525*322					
Net weight [kg]	30	30	30	30	30	30
Gross weight [kg]	34	34	34	34	34	34
Heat dissipation treatment	Natural Cooling				Forced airflow	
Noise emission(typical) [dB]	<40				<45	
Storage temperature range [°C]	-40~+70					
Operating temperature range [°C]	-35~+60 (derating at +45)					
Humidity [%]	0%~100%					
Altitude [m]	<3000					
Ingress Protection	IP65					
Protective Class	I					
Cold standby consumption	<5W					
Over voltage category	II(MAIN/GRID); III(PV, Battery)					
Pollution Degree	II					
Installation mode	Wall mounted					
Inverter Topology	Non-isolated					
Communication interface	Meter/CT, external control RS485, Pocket series (optional), DRM/LISB					

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4 Installation

4.1 Check for Transport Damage

Ensure that the inverter is in good condition via transportation. If there is any visible damage such as cracks, please contact the dealer immediately.

4.2 Packing List

Open the package and check the materials and accessories according to the following list.

Number	Quantity	Description
A	1	X3-Hybrid G4 series inverter
B	1	Bracket
C*	1	Waterproof connector
D*	6	PV terminal (positive*3 , negative*3)
E*	6	PV pin angle(positive*3 , negative*3)
F*	13	10AWG European terminals
G*	1	OT terminal(inverter grounding)
H	5	Expansion bolt (Gasket Self-tapping Bolt)
I*	1	M5 inner hexagon bolt
J*	3	Communication line adapter [illegible]
K*	2	Battery connection terminal(positive*1 , negative*1)
L	5	RJ 45 terminals
M**	1	Manual
N	1	Quick Installation Guide
O	1	Warranty Card
P	1	Pocket WiFi(optional)
Q	1	Meter(optional)
R	1	CT(optional)

Note: The M version inverter in the accessory package does not include the "C" "D" "E" "I" "J" "K" and "Q" accessories. The M version inverter must be used with X3 Matebox.
** [illegible]

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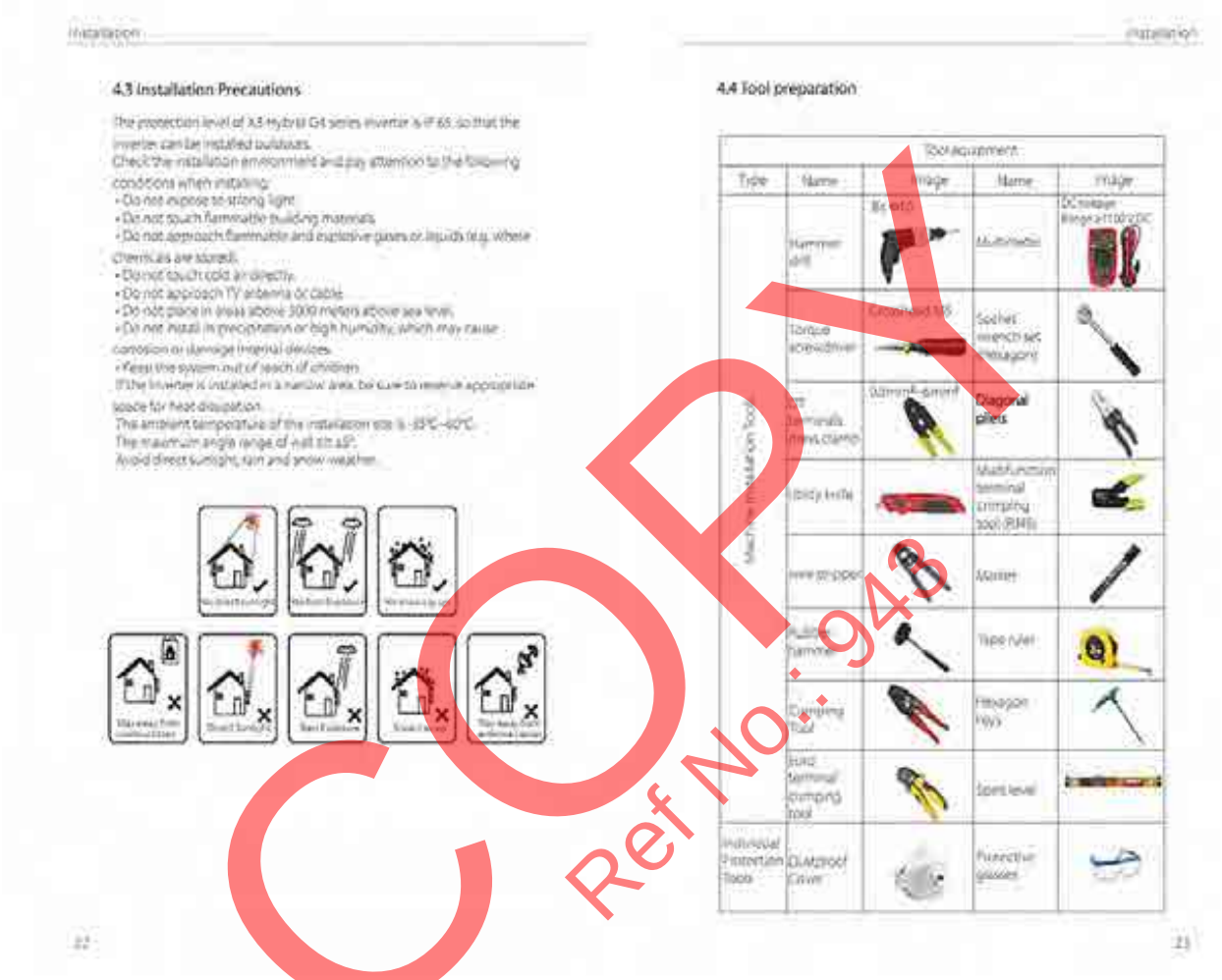

Installation

4.3 Installation Precautions

The protection level of X3 Hybrid G4 series inverter is IP 65, so that the inverter can be installed outdoors.
Check the installation environment and pay attention to the following conditions when installing:
- Do not expose to strong light.
- Do not touch flammable building materials.
- Do not approach flammable and explosive gases or liquids (e.g. where chemicals are stored).
- Do not touch cold air directly.
- Do not approach TV antenna or cable.
- Do not place in areas above 3000 meters above sea level.
- Do not install in precipitation or high humidity, which may cause corrosion or damage internal devices.
- Keep the system out of reach of children.

If the inverter is installed in a narrow area, be sure to reserve appropriate space for heat dissipation.
The ambient temperature of the installation site is -25℃~60℃.
The maximum angle range of wall tilt ±5°.
Avoid direct sunlight, rain and snow weather.

Installation

4.4 Tool preparation

Tool equipment				
Type	Name	Image	Name	Image
Electric installation tool	Hammer drill		Multimeter	
	Torque screwdriver		Socket wrench set (Hexagon)	
	Wire cutter		Diagonal pliers	
	Utility knife		Multifunction terminal crimping tool (RJ45)	
	Wire stripper		Marker	
	Rubber hammer		Tape ruler	
	Crimping tool		Hexagon key	
	Dust terminal crimping tool		Spirit level	
Individual Protection Tools	Dustproof Cover		Protective glasses	

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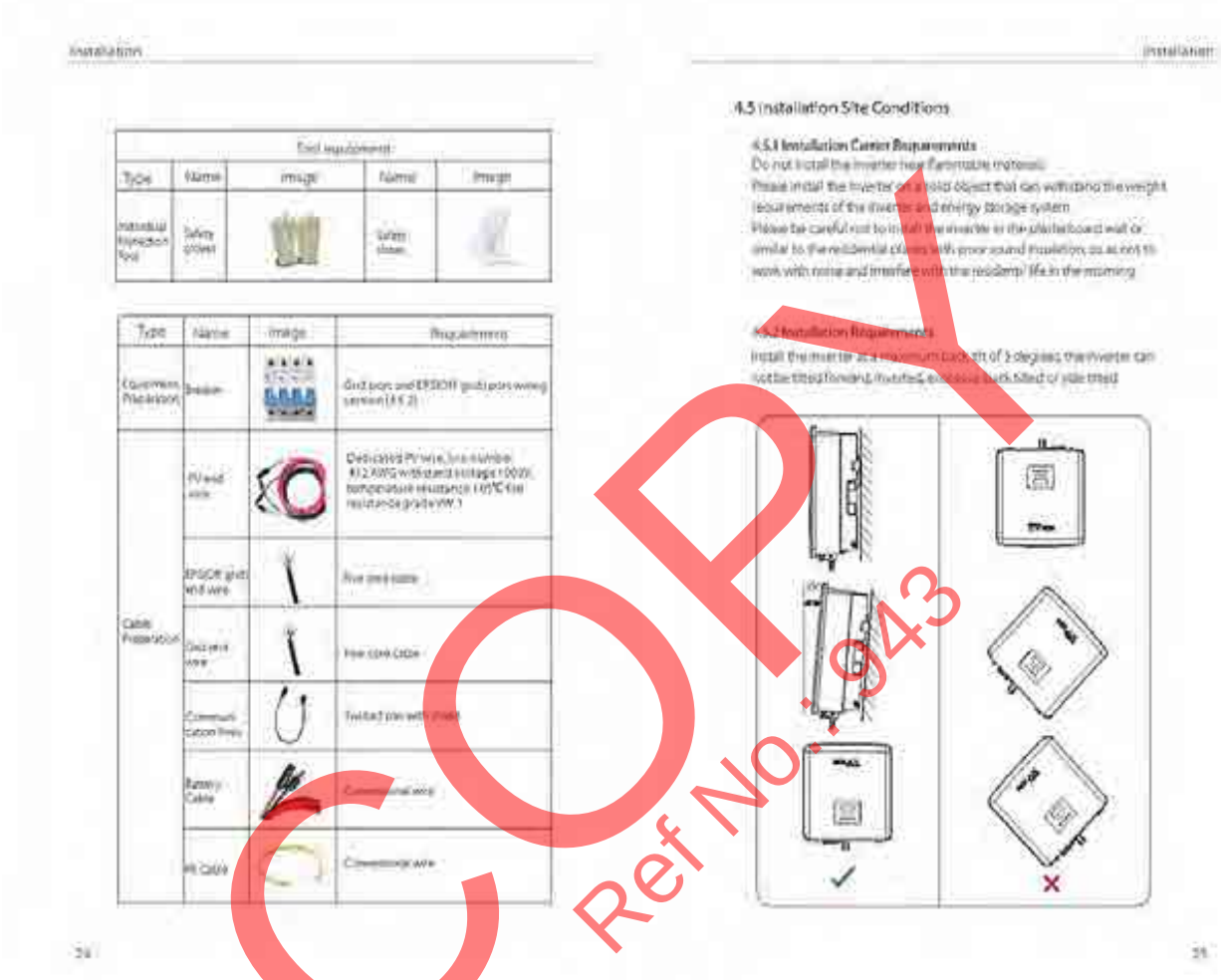

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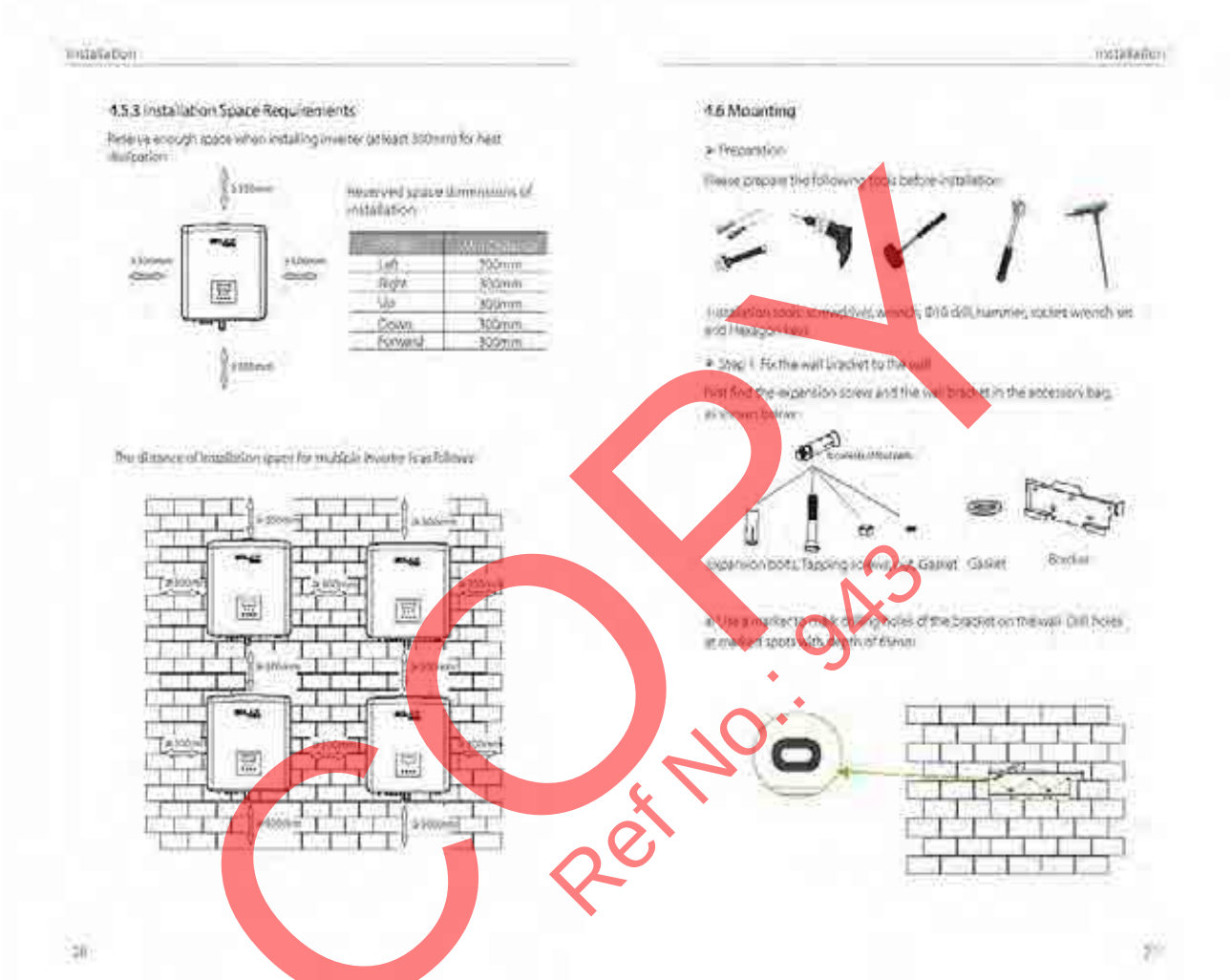

Installation

4.5.3 Installation Space Requirements

Reserve enough space when installing inverter (at least 300mm) for heat dissipation

Reserved space dimensions of installation

Left	300mm
Right	300mm
Up	300mm
Down	300mm
Forward	300mm

The distance of installation space for multiple inverter is as follows:

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Installation

4.6 Mounting

➢ Preparation

Please prepare the following tools before installation:

Installation tools: screwdriver, wrench, Φ10 drill, hammer, socket wrench set and Hexagon key.

➢ Step 1 Fix the wall bracket to the wall

First find the expansion screw and the wall bracket in the accessory bag, as shown below:

Expansion bolt Gasket Gasket Bracket

a) Use a marker to mark the holes of the bracket on the wall. Drill holes at marked spots with a depth of 65mm.

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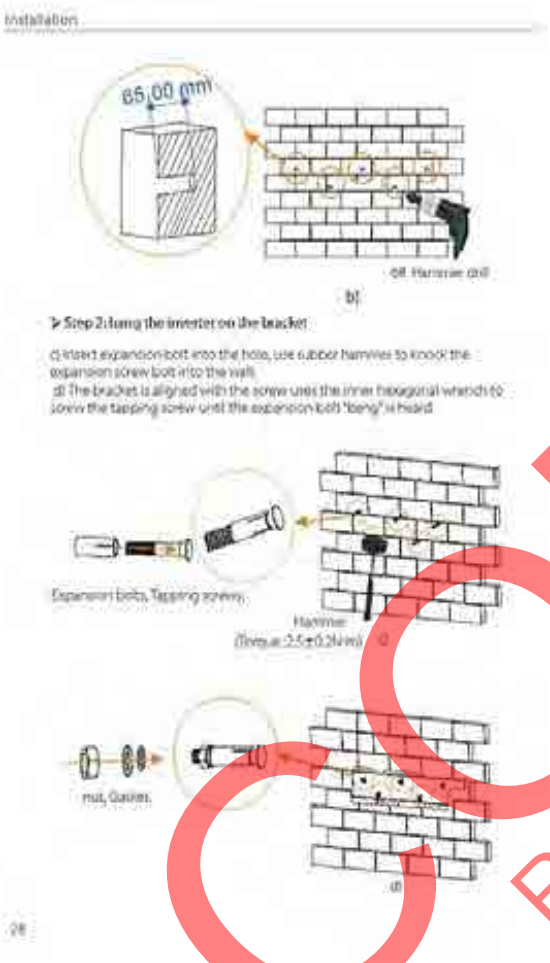

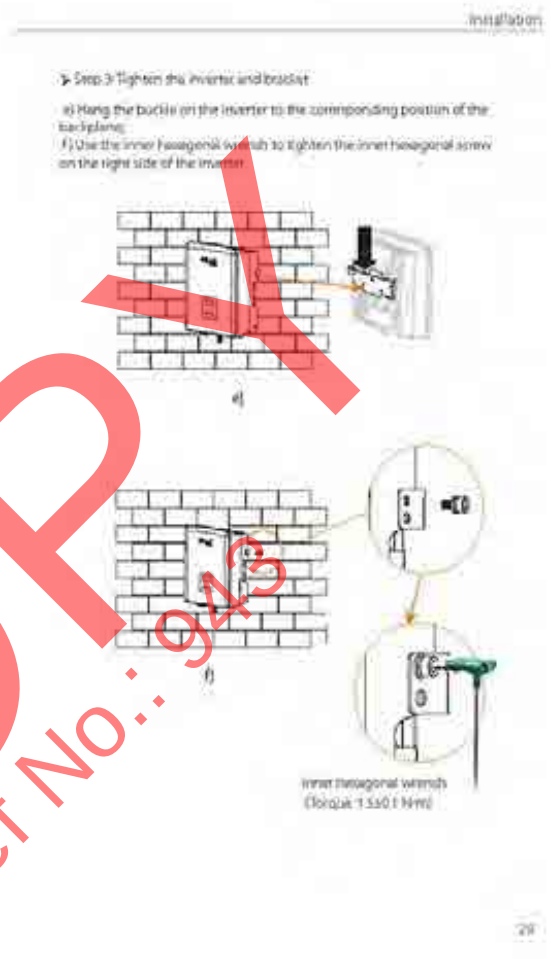

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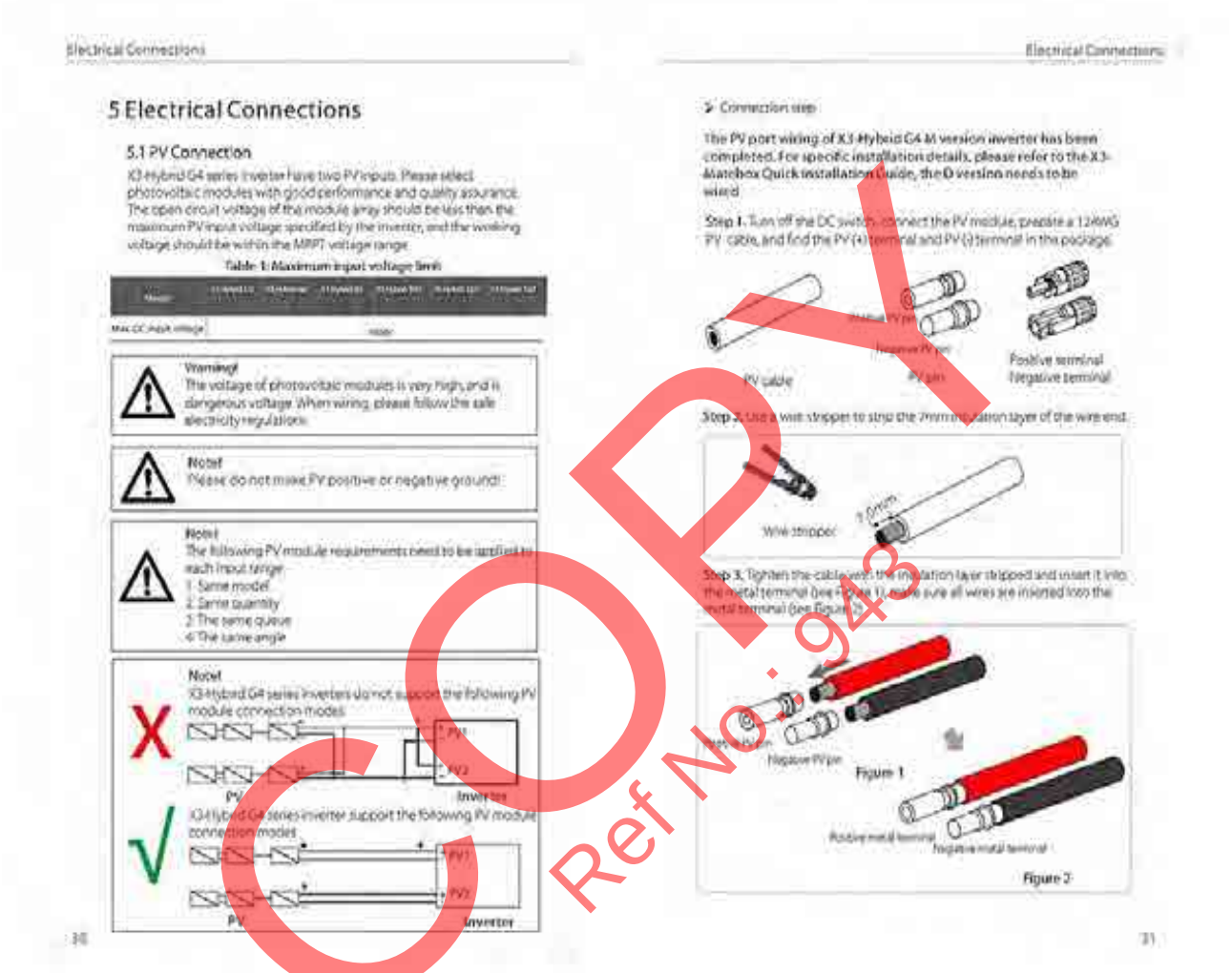

Electrical Connections

5 Electrical Connections

5.1 PV Connection

X3-Hybrid G4 series inverter have two PV inputs. Please select photovoltaic modules with good performance and quality assurance. The open circuit voltage of the module array should be less than the maximum PV input voltage specified by the inverter, and the working voltage should be within the MPPT voltage range.

Table 1 Maximum input voltage limit

Model	Max DC input voltage

Warning!
The voltage of photovoltaic modules is very high, and is dangerous voltage. When wiring, please follow the safe electricity regulations.

Note!
Please do not make PV positive or negative ground!

Note!
The following PV module requirements need to be applied to each input range:
1. Same model
2. Same quantity
3. The same queue
4. The same angle

Note!
X3-Hybrid G4 series inverters do not support the following PV module connection modes:

X3-Hybrid G4 series inverter support the following PV module connection modes:

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Electrical Connections

➢ Connection step

The PV port wiring of X3-Hybrid G4 M version inverter has been completed. For specific installation details, please refer to the X3-Matchbox Quick Installation Guide, the D version needs to be wired.

Step 1. Turn off the DC switch, connect the PV module, prepare a 12AWG PV cable, and find the PV (+) terminal and PV (-) terminal in the package.

Step 2. Use a wire stripper to strip the 7mm insulation layer of the wire end.

Step 3. Tighten the cable with the insulation layer stripped and insert it into the metal terminal (see Figure 1), make sure all wires are inserted into the metal terminal (see figure 2).

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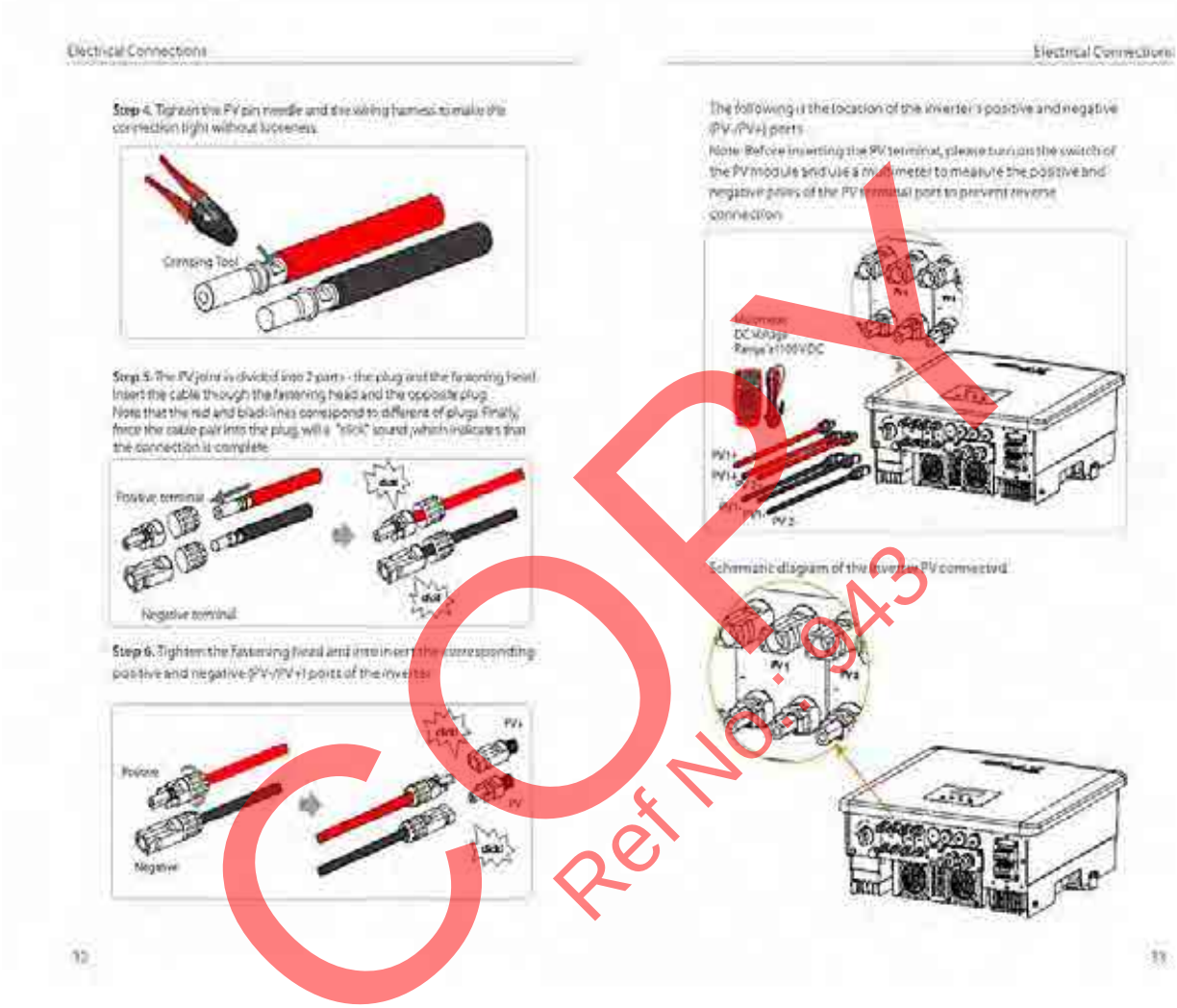

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5.2 Grid Port and EPS(Off-grid) Output Connection

X3-Hybrid G4 series inverter are three-phase inverter Suitable for rated voltage 380/400/415V, frequency 50/60Hz. Other technical requests should comply with the requirement of the local public grid.

➢ Grid port connection

Grid Cable and Micro-breaker recommended:

Model						
Cable size (mm²)	4~6(mm²)	4~6(mm²)	4~6(mm²)	5~10(mm²)	5~16(mm²)	5~16(mm²)
Micro-breaker	20A	20A	32A	40A	40A	40A

EPS(Off-grid) Cable and Micro-breaker recommended:

Model						
Cable size(mm²)	4~6(mm²)	4~6(mm²)	4~6(mm²)	4~6(mm²)	4~6(mm²)	4~6(mm²)
Micro-breaker	16A	16A	32A	35A	63A	40A

The load should not be directly connected to the inverter.

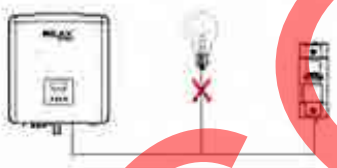


Figure: Wiring connection of load and inverter

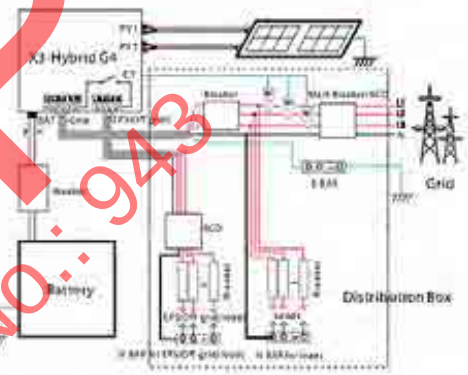
5.3 EPS(Off-grid) Bolck Diagram

X3-Hybrid G4 series inverter has an EPS(Off-grid) function. When the grid is connected, the inverter outputs go through the Grid port, and when the grid is disconnected, the inverter outputs go through the EPS(Off-grid) port.
The EPS(Off-grid) function can be connected to part of the load. Please refer to the following diagram for the wiring.
If you want to save installation time, you will need an accessory. If you need a solution, please contact our sales staff.

➢ EPS(Off-grid) wiring diagram

For to different local wiring rules, please refer to the diagram below. Please select the appropriate wiring method according to local wiring rules.

Diagram A: N line and PE line separate wiring, D version inverters: (For most countries)



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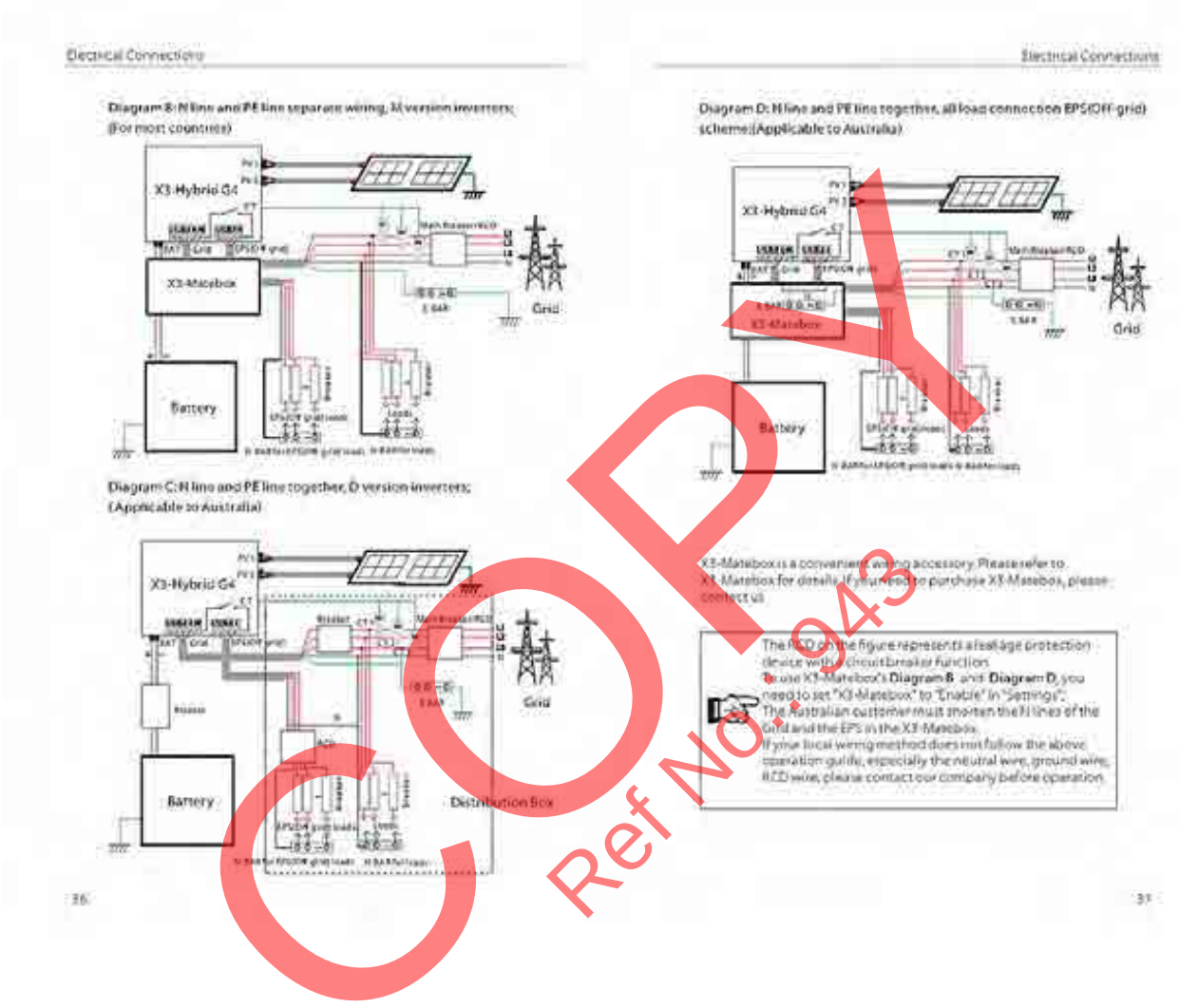

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ภาคผนวก ข. Technical Specification (ต่อ).

➢ EPS(Off-grid) load requirements

Warning!
Ensure that the EPS(Off-grid) load rated power is within the EPS(Off-grid) rated output power range, otherwise, the inverter will report an "overload" warning.

When "overload" occurs, adjust the load power to make sure it is within the EPS(Off-grid) rated output power range, and the inverter will automatically return to normal.

For non-linear loads, ensure that the inrush current power is within the EPS(Off-grid) rated output power range.
When the configuration current is less than the maximum DC input current, the capacity and voltage of lithium and lead acid will decrease linearly.

The following table shows some common loads for your reference.

Note: Please check with the manufacturer for high-power inductive loads.

Content	Power		Common equipment	Instance		
	Start	Rated		Equipment	Start	Rated
Resistive load	X 1	X 1	Incandescent lamp	100W Incandescent lamp	100VA (W)	100VA (W)
Inductive load	X 3~5	X 2	Fan / Fridge	150W Fridge	450-750VA (W)	300VA (W)

➢ Grid and EPS(Off-grid) connection

• Connection requirements

Note: Check the grid voltage and compare the voltage range (see technical data).
Disconnect the circuit board from all power sources to prevent electric shock.

The Grid and the EPS(Off-grid) ports of X3-Hybrid G4 M version inverter have been connected, for specific installation details, please refer to the X3-Matebox Quick Installation Guide. And the D version needs to be wired according to the following steps.

Step 1. Prepare a Grid cable (five-core wire) and an EPS(Off-grid) cable (four-core wire), and then find the European terminal and waterproof cover in the accessory bag.

10AWG Grid(Five-Core Cable)

10AWG EPS(Off-grid)(Four-Core Cable)

10AWG Euro Terminal*10

Waterproof cover

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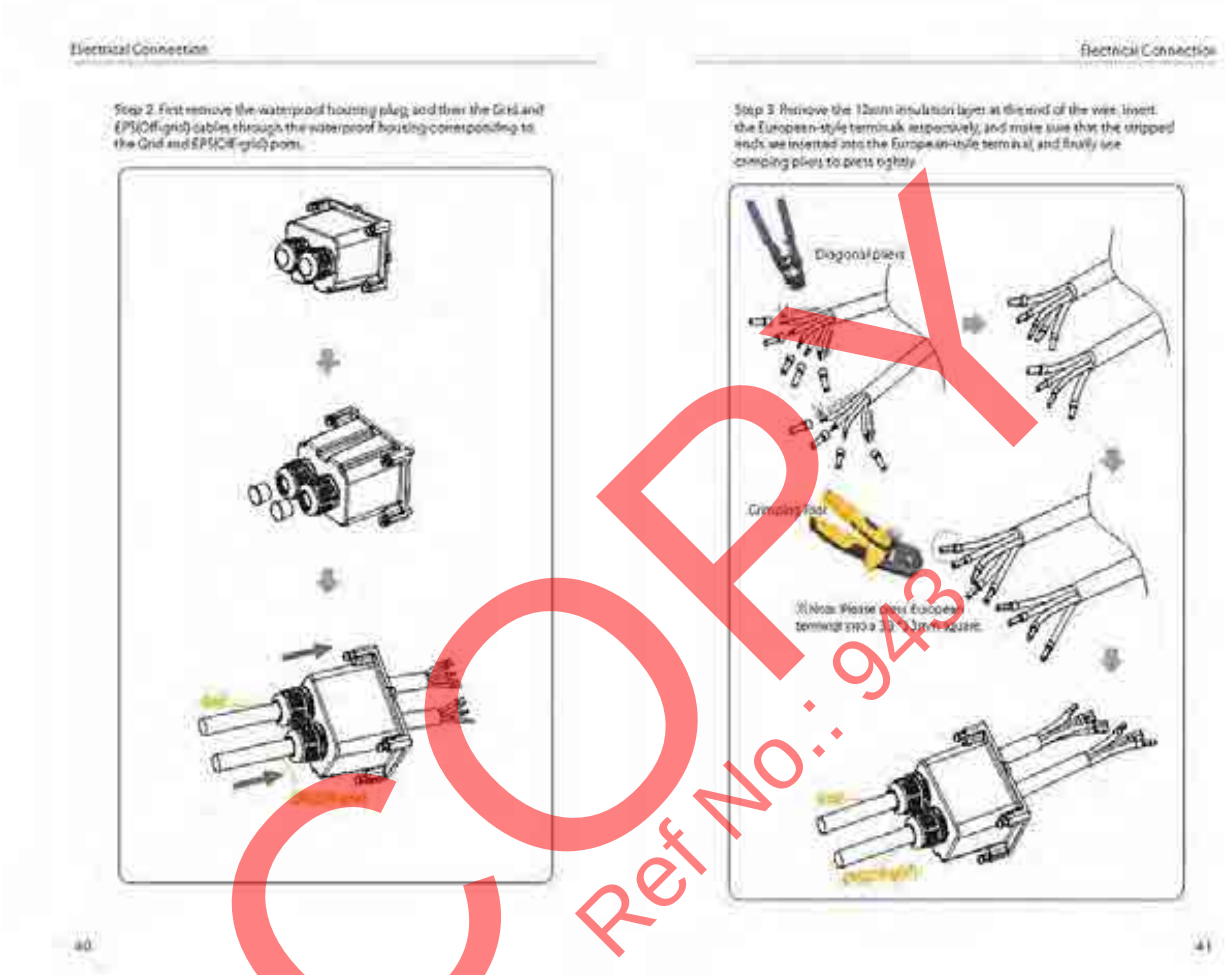

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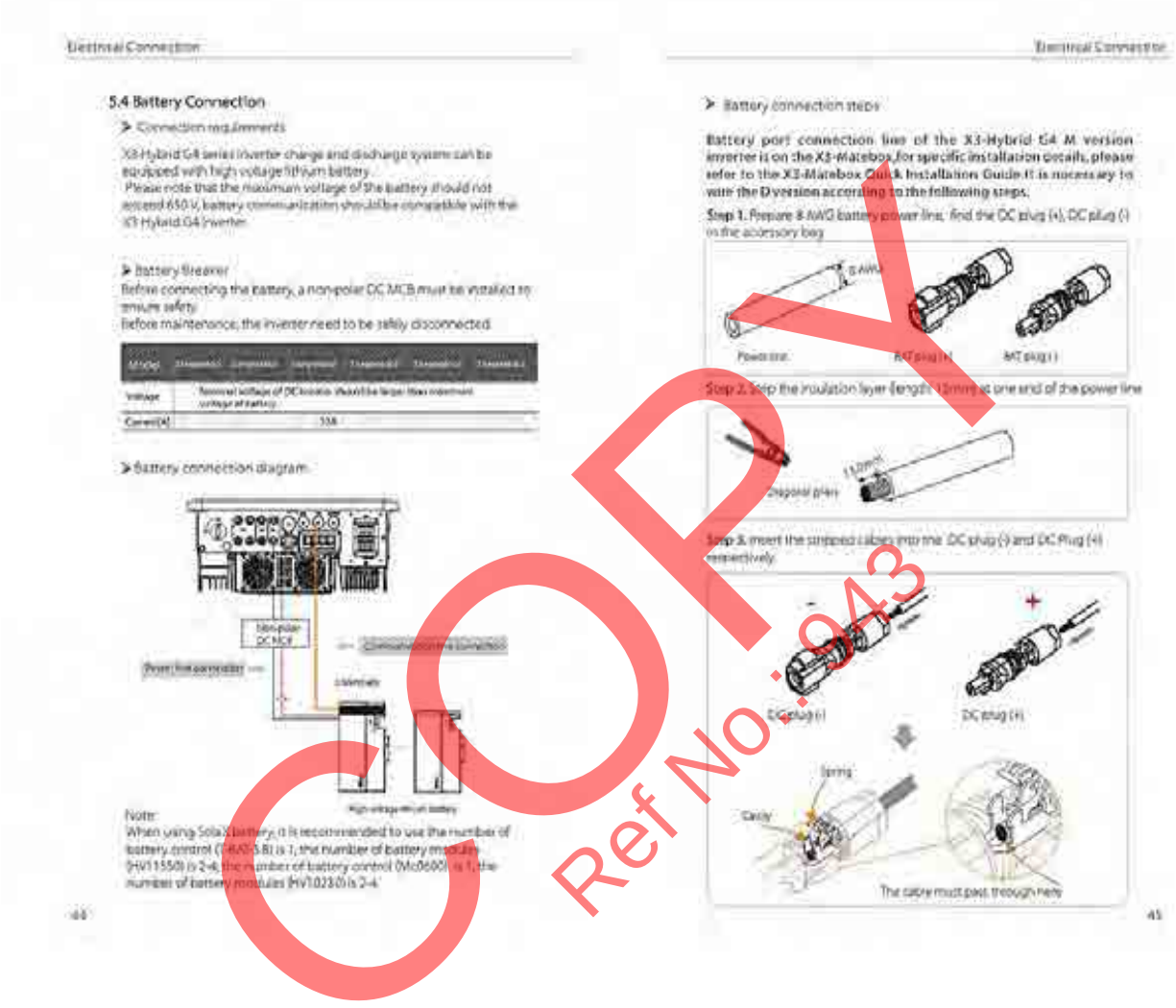

Electrical Connection

5.4 Battery Connection

➢ Connection requirements

X3-Hybrid G4 series inverter charge and discharge system can be equipped with high voltage lithium battery.
Please note that the maximum voltage of the battery should not exceed 650 V, battery communication should be compatible with the X3 Hybrid G4 inverter.

➢ Battery Breaker

Before connecting the battery, a non-polar DC MCB must be installed to ensure safety.
Before maintenance, the inverter need to be safely disconnected.

Model	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
Voltage	Nominal voltage of DC breaker should be larger than maximum voltage of battery					
Current [A]	50A					

➢ Battery connection diagram

Note:
When using Sola X battery, it is recommended to use the number of battery control (HV1550) is 1, the number of battery modules (HV11550) is 2-4, the number of battery control (MC0600) is 1, the number of battery modules (HV10230) is 2-4.

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Electrical Connection

➢ Battery connection steps

Battery port connection line of the X3-Hybrid G4 M version inverter is on the X3-Matebox, for specific installation details, please refer to the X3-Matebox Quick Installation Guide. It is necessary to wire the D version according to the following steps.

Step 1. Prepare 8 AWG battery power line, find the DC plug (+), DC plug (-) in the accessory bag.

Step 2. Strip the insulation layer (length: 12mm) at one end of the power line.

Step 3. Insert the stripped cables into the DC plug (-) and DC Plug (+) respectively.

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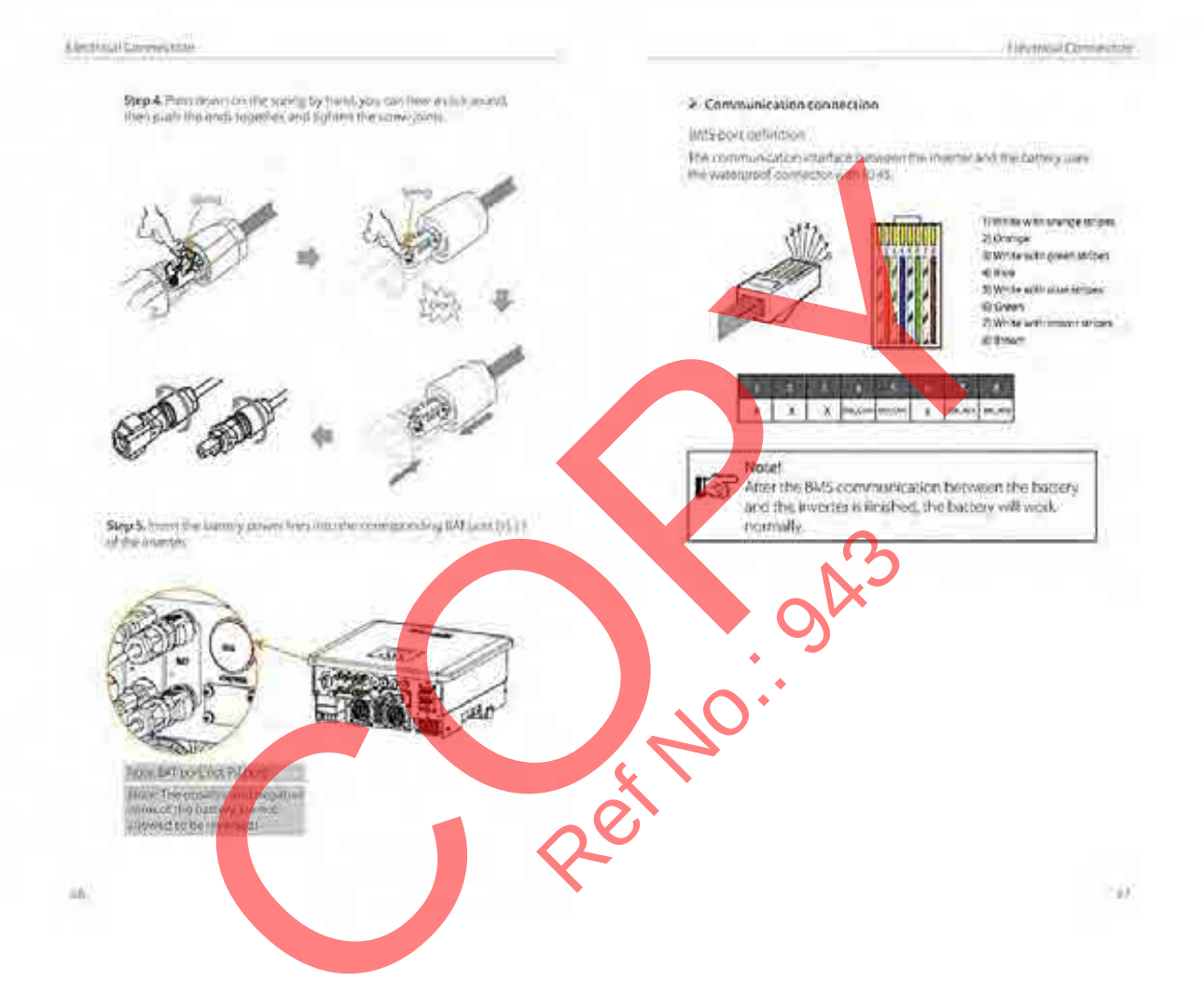


2、Communication connection

Note!
After the BMS communication between the battery and the inverter is finished, the battery will work normally.

ภาคผนวก ข. Technical Specification (ต่อ).

5.5 Communication Connection

5.5.1 Introduction to DRM communication (AS4777 regulatory requirements)

DRM requirements:

Mode	Requirement
DRM0	Operation disconnect device
DRM1	Do not consume power
DRM2	Do not consume more than 50% of rated power
DRM3	Do not consume more than 75% of rated power AND Source reactive power if capable
DRM4	Increase power consumption (subject to constraints from other active DRMs)
DRM5	Do not generate power
DRM6	Do not generate more than 50% of rated power
DRM7	Do not generate more than 75% of rated power AND Sink reactive power if capable
DRM8	Increase power generation (subject to constraints from other active DRMs)

1	2	3	4	5	6	7	8
DRM1/5	DRM2/6	DRM3/7	DRM4/8	+3.3V	DRM0	GND	GND

Remarks:
Currently only PIN6 (DRM0) and PIN1 (DRM1/5) are functional, other PIN functions are under development.

5.5.2 Introduction to meter/CT Communication

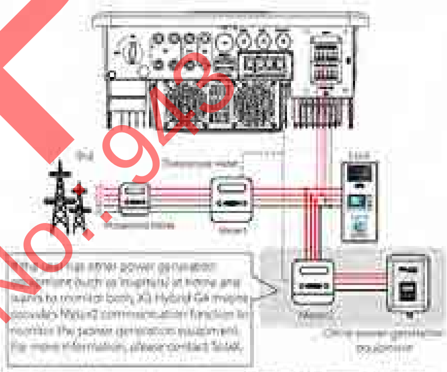
X3-Hybrid G4 inverter should work with an electric meter or current sensor (CT for short) to monitor household electricity usage. The electricity meter or CT can transmit the relevant electricity data to the inverter or platform, which is convenient for users to read at anytime.

Users can choose to use electric meters or CTs according to their needs.

Please note that the meter/CT brand required by SolaX must be used.

> **Note!**
> The meter or CT must be connected to the inverter, otherwise the inverter will shut down and alarm SolaX "meter failure" alarm. Smart meters must be authorized by SolaX, third party or other companies. Unauthorized meter may be incompatible with the inverter.
>
> SolaX will not be responsible for the impact caused by the use of other appliances.

➢ Electric meter connection diagram



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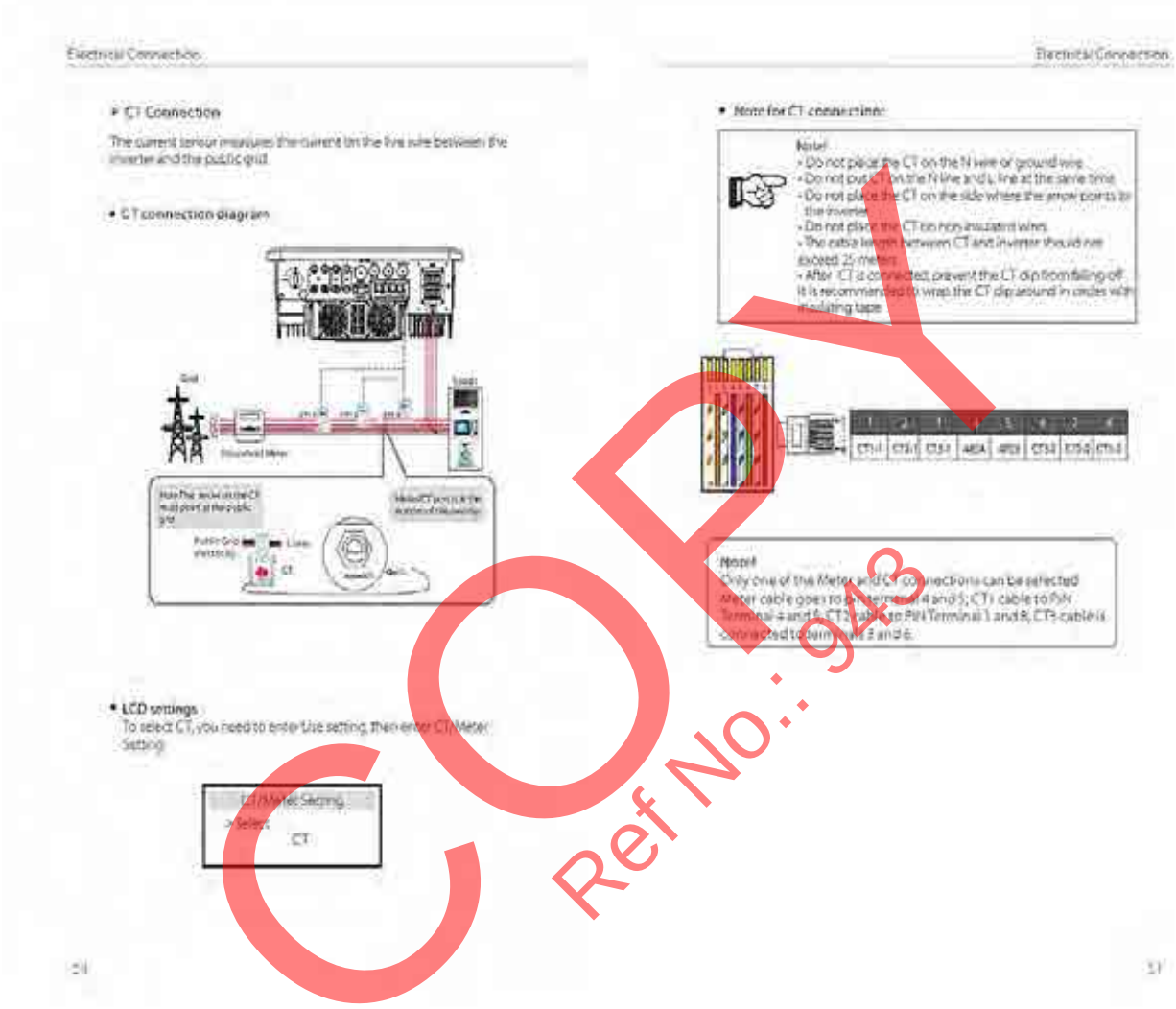

Electrical Connection

• CT Connection

The current sensor measures the current on the live wire between the inverter and the public grid.

• CT connection diagram

Electrical Connection

• Note for CT connection:

Note!
- Do not place the CT on the N wire or ground wire.
- Do not put CT on the N line and L line at the same time.
- Do not place the CT on the side where the arrow points to the inverter.
- Do not place the CT on non-insulated wire.
- The cable length between CT and inverter should not exceed 25 meters.
- After CT is connected, prevent the CT clip from falling off. It is recommended to wrap the CT clip around in circles with insulating tape.

Note!
Only one of the Meter and CT connections can be selected.
Meter cable goes to pin terminal 4 and 5; CT1 cable to PIN Terminal 4 and 6, CT2 cable to PIN Terminal 1 and 8, CT3 cable is connected to pin terminals 2 and 6.

• LCD settings

To select CT, you need to enter Use setting, then enter CT/Meter Setting.

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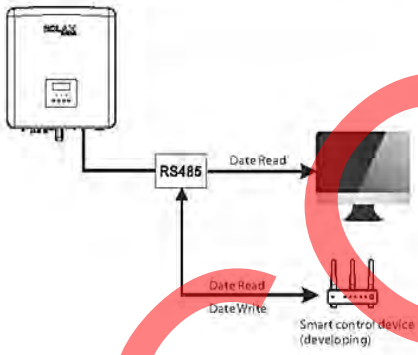
5.5.3 COM Communication

COM communication interface is mainly provided to the customer to do the second step of development use. Use communication to control external equipment or external equipment to control the use of the inverter.
For example: the inverter adjusts the working mode of the heat pump and so on

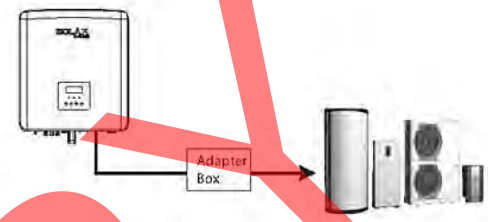
➢ Application occasion

COM is a standard communication interface, through which the monitoring data of the inverter can be directly obtained. Also, external communication devices can be connected to carry out the secondary development of the inverter. For specific technical docking, please contact SolaX.

External communication equipment controls the inverter:



Inverter communication control external equipment:



➢ COM PIN Definition

Note!
The communication port on COM must be consistent with the definitions of pins 1, 2, 3, 4, 5, 6, 7, and 8 above; the connection PIN angle of the inverter is 4, 5 for the external communication equipment, and the inverter communication controls the external equipment The pin angles are 3, 6, 7, and 8, for example, the pin angles of the inverter communication control heat pump dry contact are 3, 6, 7, and 8.

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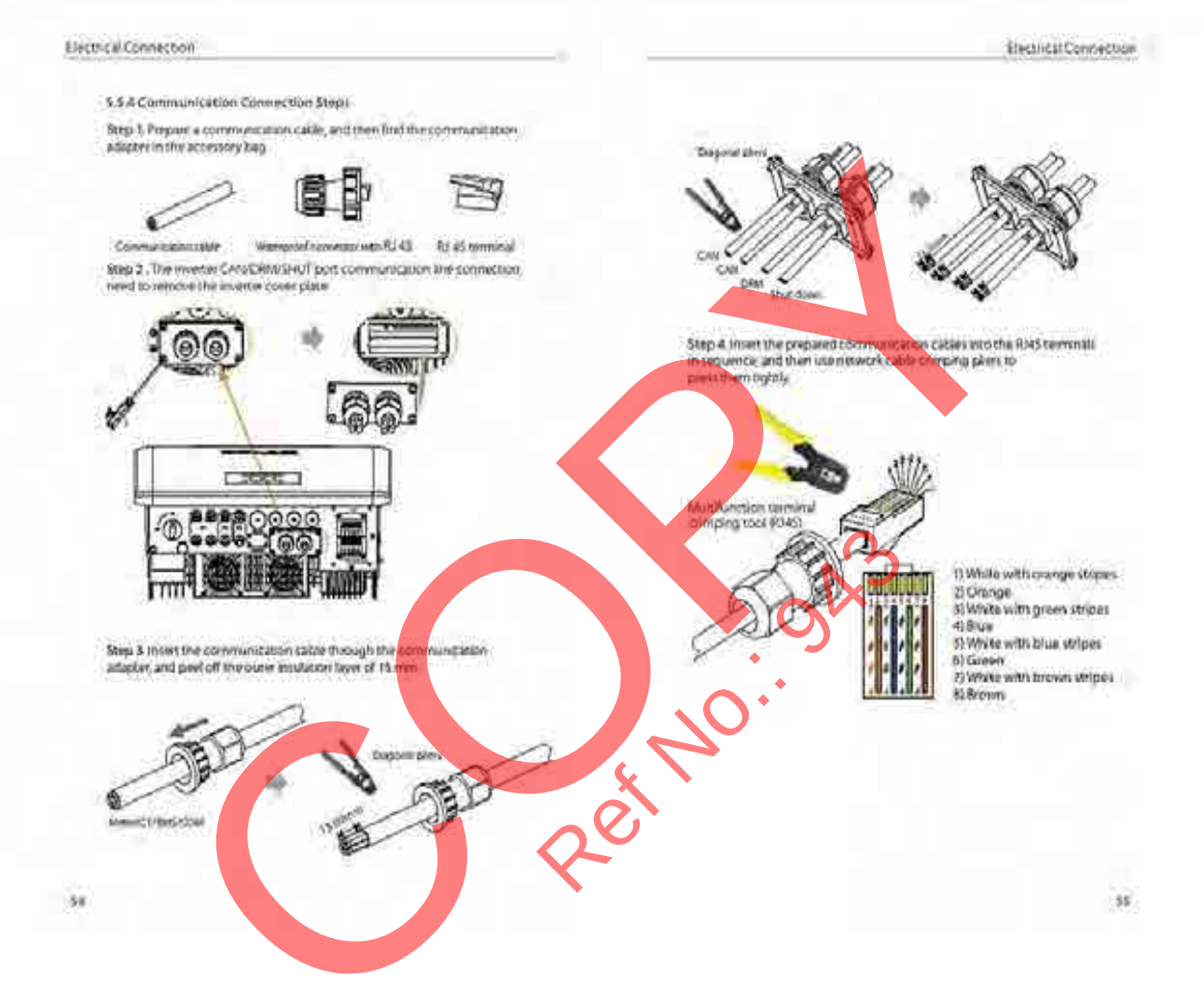

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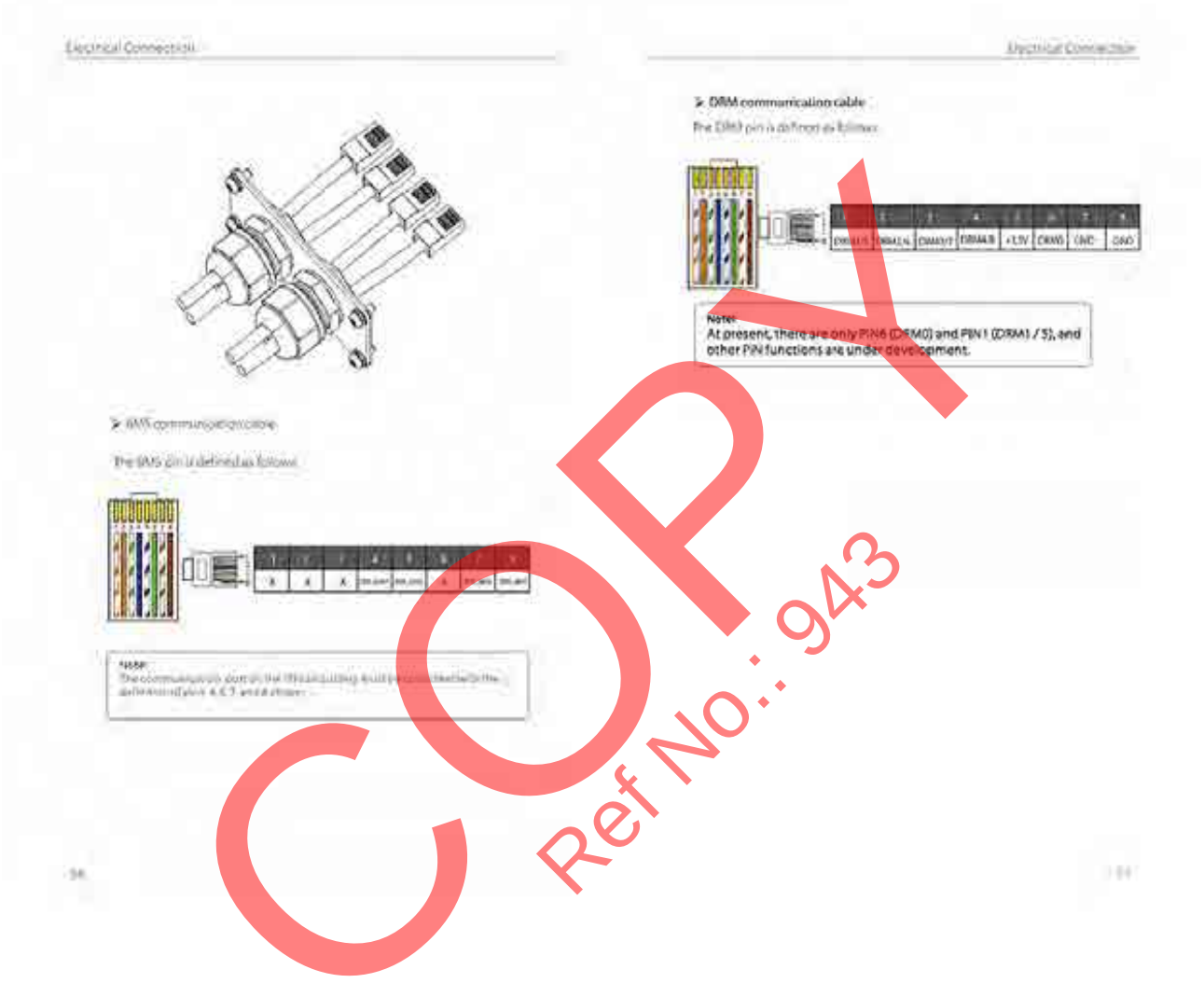

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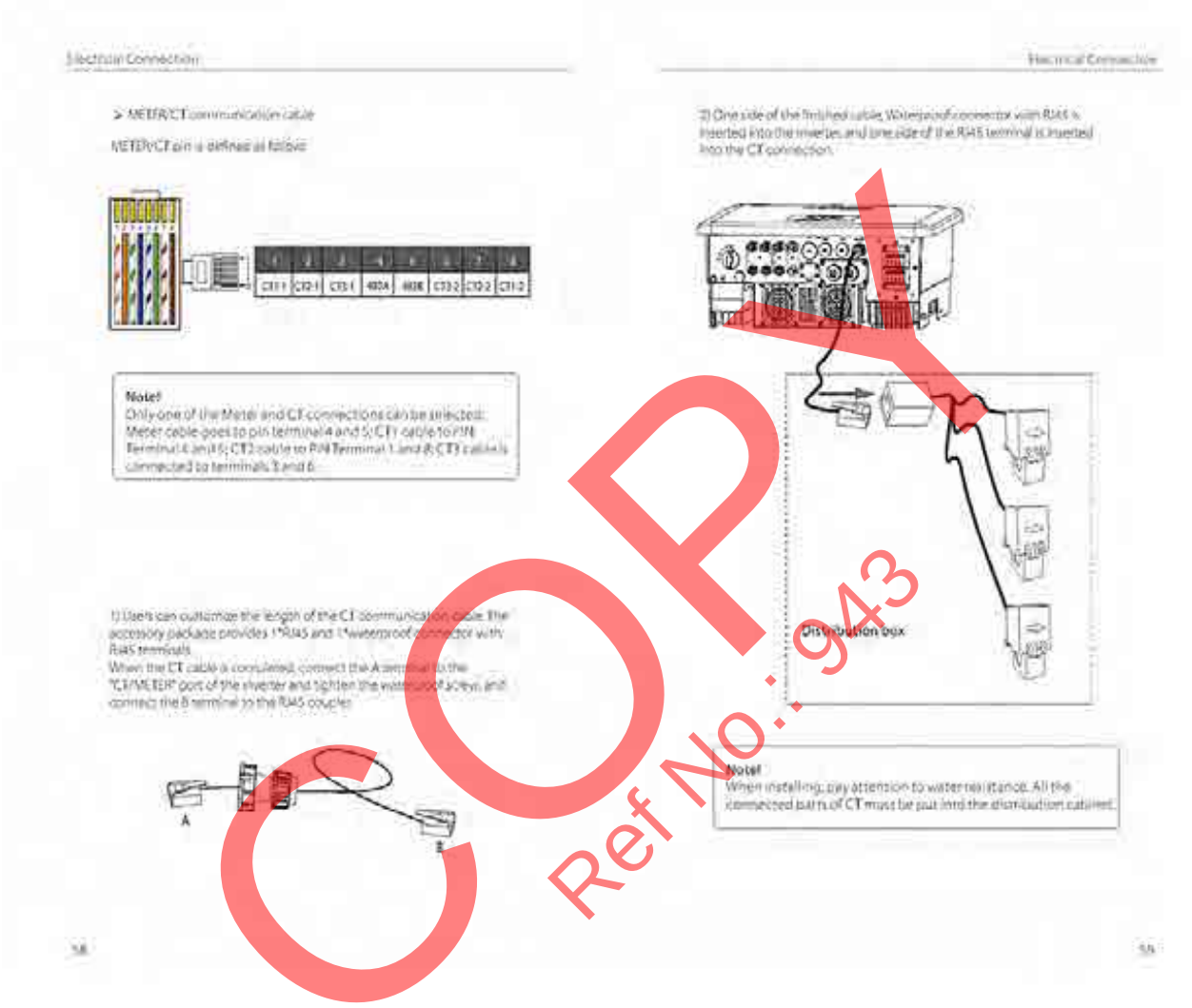

Electrical Connection

> METER/CT communication cable

METER/CT pin is defined as follow:

Note!
Only one of the Meter and CT connections can be selected.
Meter cable goes to pin terminal 4 and 5; CT1 cable to PIN Terminal 4 and 5; CT2 cable to PIN Terminal 1 and 2; CT3 cable is connected to terminals 3 and 6.

1) Users can customize the length of the CT communication cable. The accessory package provides 1*RJ45 and 1*waterproof connector with RJ45 terminals.
When the CT cable is completed, connect the A terminal to the "CT/METER" port of the inverter and tighten the waterproof screw, and connect the B terminal to the RJ45 coupler.

Electrical Connection

2) One side of the finished cable, Waterproof connector with RJ45 is inserted into the inverter, and one side of the RJ45 terminal is inserted into the CT connection.

Note!
When installing, pay attention to water resistance. All the connected parts of CT must be put into the distribution cabinet.

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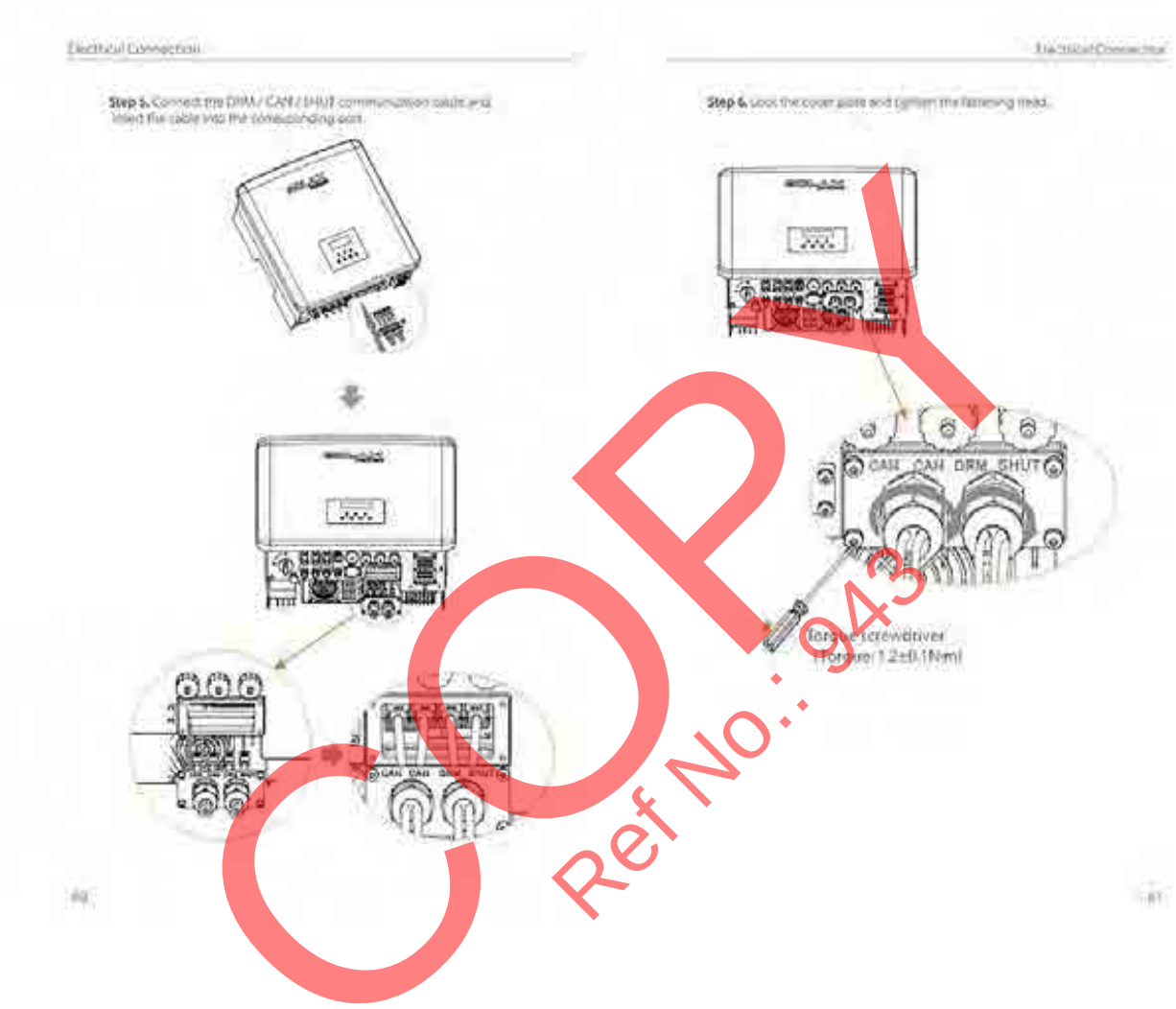

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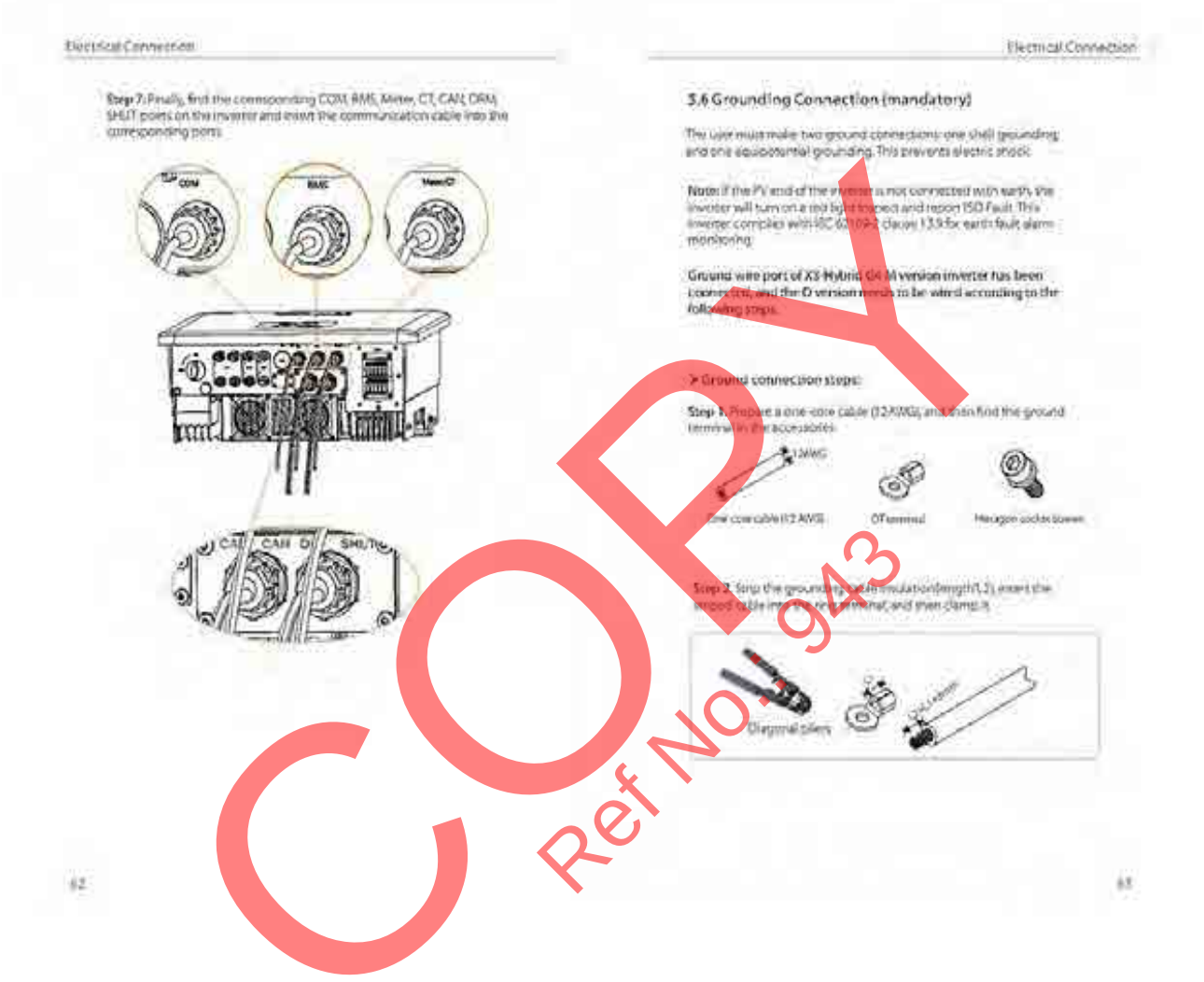

Electrical Connection

Step 7: Finally, find the corresponding COM, BMS, Meter, CT, CAN, DRM, SHUT ports on the inverter and insert the communication cable into the corresponding ports.

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Electrical Connection

3.6 Grounding Connection (mandatory)

The user must make two ground connections: one shell grounding and one equipotential grounding. This prevents electric shock.

Note: If the PV end of the inverter is not connected with earth, the inverter will turn on a red light in fault and report ISO Fault. This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring.

Ground wire port of XS Hybrid G4 M version inverter has been connected, and the D version needs to be wired according to the following steps.

➢ Ground connection steps:

Step 1: Prepare a one-core cable (12AWG), and then find the ground terminal in the accessories.

Step 2: Strip the ground wire insulation(length 12), insert the stripped cable into the ring terminal, and then clamp it.

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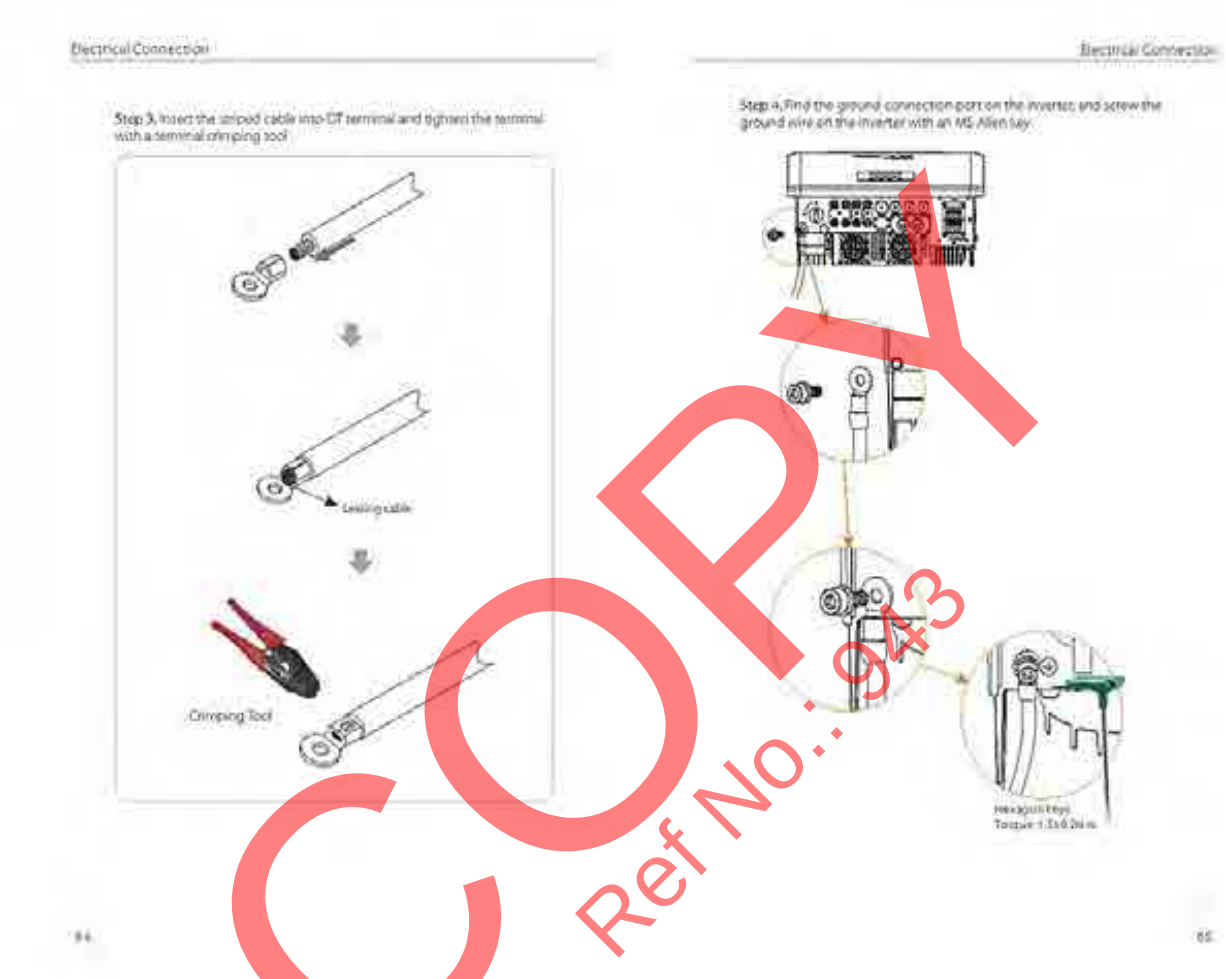

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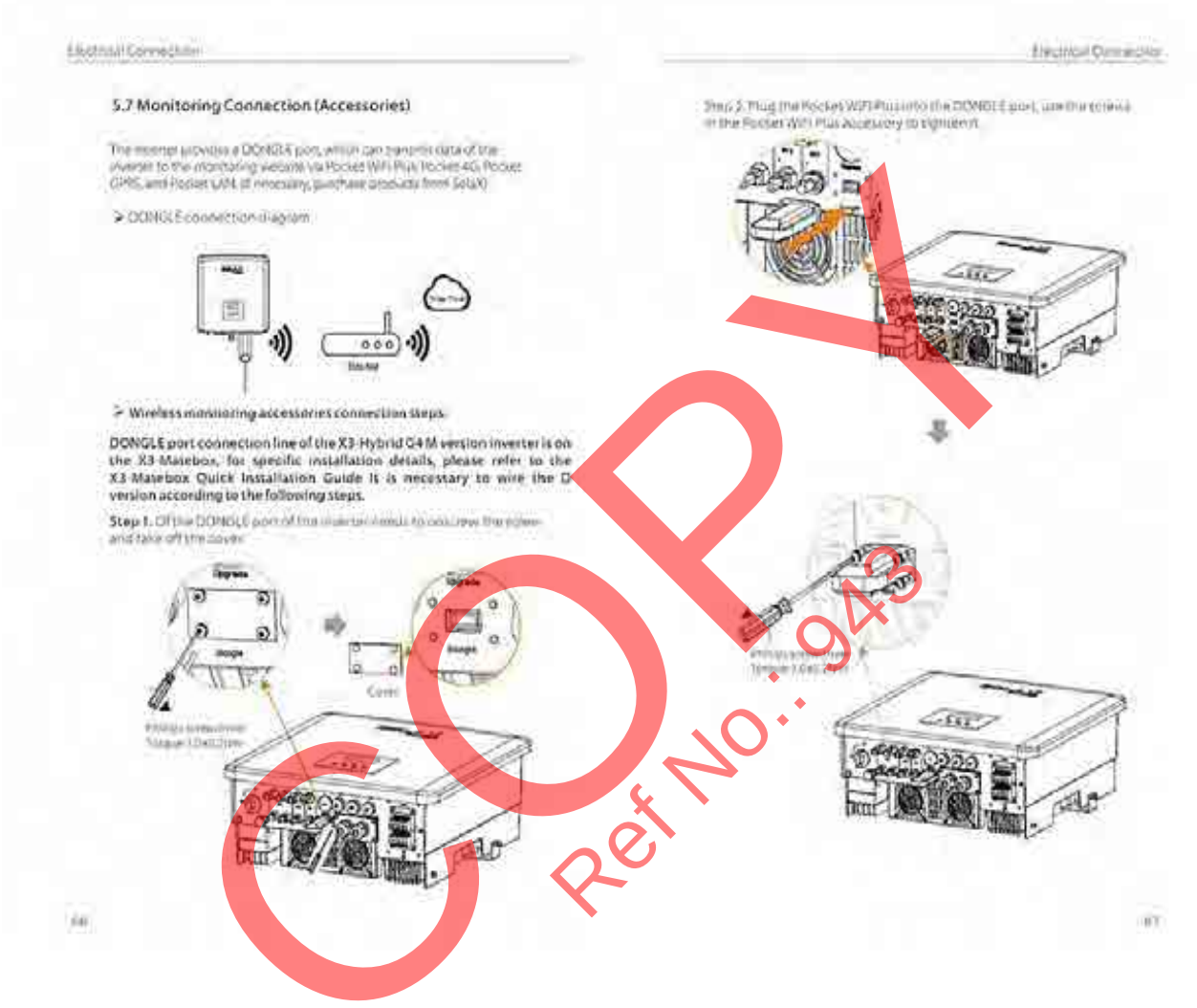

5.7 Monitoring Connection (Accessories)

The inverter provides a DONGLE port, which can transmit data of the inverter to the monitoring website via Pocket WiFi Plus, Pocket 4G, Pocket GPRS, and Pocket LAN. (If necessary, purchase products from SolaX)

➢ DONGLE connection diagram

➢ Wireless monitoring accessories connection steps

DONGLE port connection line of the X3-Hybrid G4 M version inverter is on the X3-Matebox, for specific installation details, please refer to the X3-Matebox Quick Installation Guide. It is necessary to wire the D version according to the following steps.

Step 1. Of the DONGLE port of the inverter, use a screwdriver to unscrew the screw and take off the cover.

Step 2. Plug the Pocket WiFi Plus into the DONGLE port, use the screws in the Pocket WiFi Plus Accessory to tighten it.

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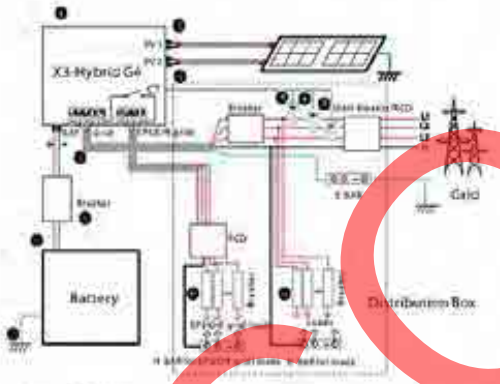
5.8 Check All Below Steps Before Starting Inverter

➢ After the inverter is checked, the conduct the following steps:

1. Make sure that the inverter is fixed on the wall.
2. Ensure that all ground wires are grounded.
3. Confirm that all DC lines and AC lines are connected.
4. Make sure the CT are connected.
5. Make sure the battery is well connected.
6. Turn on the load switch and BP5608 grid switch.
7. Turn on the battery switch.

Long press the 'Enter' key for 5 seconds to exit the Off mode. (The mode is factory defaulted as Off Mode)



Note: The RCD on the figure represents a leakage protection device with a circuit breaker function.

5.9 Inverter Operation

➢ Before operation, check the inverter according to the following steps:

a) Check that the inverter is well fixed on the wall.
b) Ensure that all ground wires are well tightened.
c) Ensure that all DC and AC circuit breakers are disconnected.
d) Ensure that all ground wires are well tightened.
e) The AC output terminal is correctly connected to the mains.
f) Ensure that all photovoltaic panels and inverters are properly connected. Unused DC connectors should be blocked with caps.

➢ Start the inverter.

- Steps to start the inverter:
  - Turn on the AC switch between the X3-Hybrid G4 and the power grid.
  - (Optional) Remove the locking screw from the DC switch.
  - Turn on the DC switch between the PV string and the X3-Hybrid G4 if there is any.
  - Turn on the DC switch at the bottom of the X3-Hybrid G4.
- When the photovoltaic panel generates enough power, the inverter will start automatically.
  - If the battery port of the X3-Hybrid G4 is connected to a battery, turn on the auxiliary power switch of the battery and then the battery switch.
- Check the status of the LED and LCD screen; the LED is blue, and the LCD displays the main interface.

If the LED is not blue, please check the following:
- All connections are correct.
- All external disconnecting devices are closed.
- The DC switch of the inverter is set to the "ON" position.

The following are 3 different states of inverter operation, which means that the inverter starts successfully.

Waiting: When the DC output voltage of the photovoltaic panel is higher than 100V (lowest starting voltage) and lower than 150V (lowest working voltage), the inverter waits for checking.

Checking: The inverter will automatically detect the DC input. When the DC input voltage of the photovoltaic panel is higher than 200V and the photovoltaic panel has enough energy to start the inverter, the inverter will enter the checking state.

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Normal: When the inverter is working normally, the green light is always on. At the same time, the power is fed back to the grid, and the LCD displays the output power.

If it is the first time to boot, please follow the prompts to enter the setting interface.

Warning!
The input terminal of the inverter can be opened only when all the installation work of the inverter has been completed. All electrical connections must be performed by professionals in accordance with local regulations.

Note!
If it is the first time to operate the inverter, the system will automatically display setup guide. Please follow the setup guide to complete the basic inverter settings.

6 Firmware Upgrade

➢ **Upgrade notes**

Please read the following precautions before upgrading.

Warning!
- In order to upgrade the firmware smoothly, if the DSP and ARM firmware need to be upgraded, please note that ARM firmware must be upgraded first, then DSP firmware!
- Please make sure that the category format is correct, do not modify the firmware file name, Otherwise, the inverter may not work!

Warning!
- For X3-Hybrid G4, ensure that the PV input voltage is greater than 180V (upgrade on sunny days), please ensure that the battery SOC is greater than 20% or the battery input voltage is greater than 180V. Otherwise, it may cause serious failure during the upgrade process!

Caution!
- If the ARM firmware upgrade fails or stops, please do not unplug the U disk, power off the inverter and restart it. Then repeat the upgrade steps.

Caution!
- If the DSP firmware upgrade fails or stops, please check whether the power is off. If it is normal, plug in the U disk again and repeat the upgrade.

➢ **Upgrade preparation**

1) Please check the inverter version and prepare a U disk (USB 2.0/3.0) and personal computer before upgrading.

Caution!
- Please make sure that the size of the U disk is smaller than 32G, and the format is FAT 16 or FAT 32.

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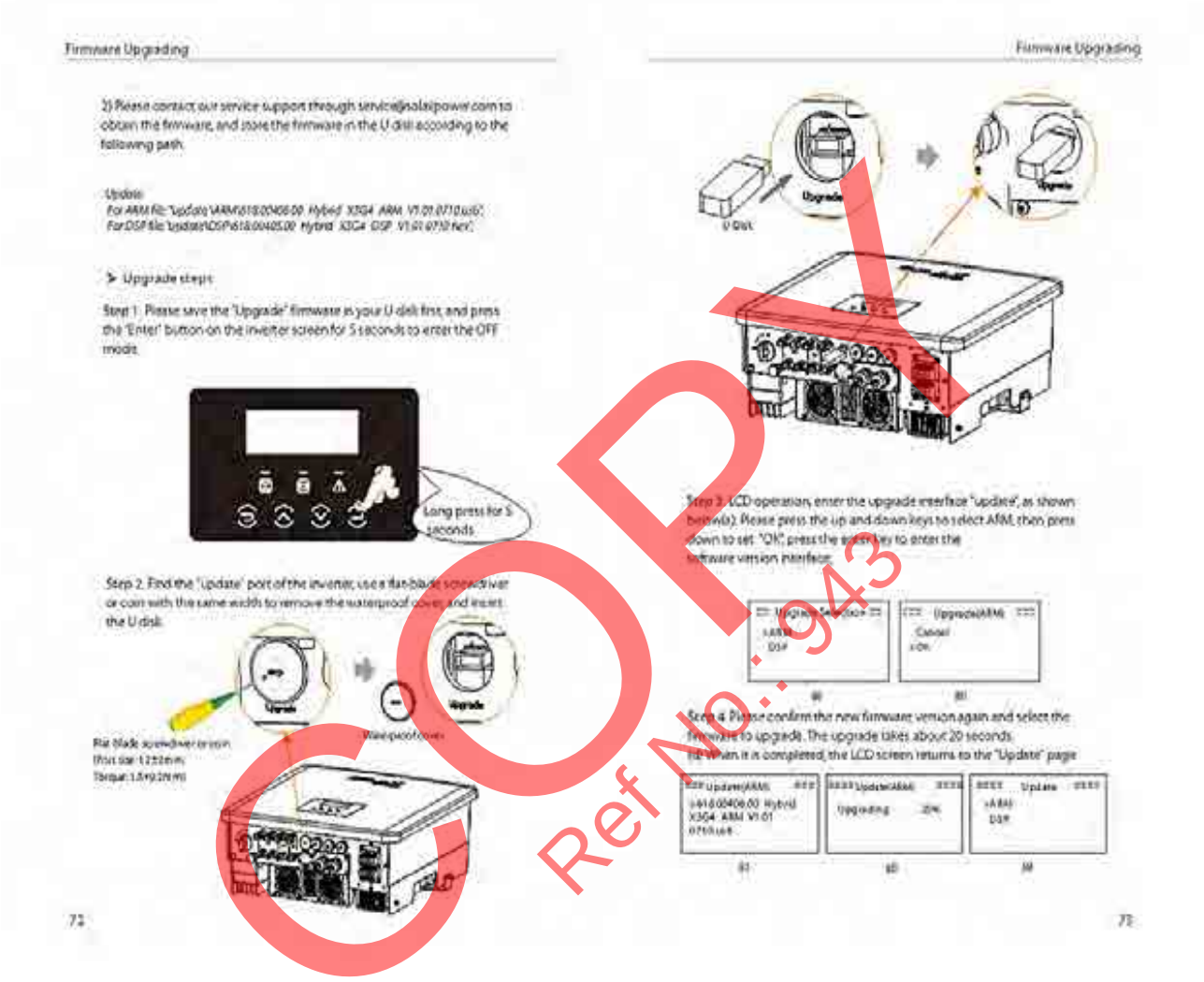

Firmware Upgrading

2) Please contact our service support through service@solaxpower.com to obtain the firmware, and store the firmware in the U disk according to the following path.

Update
For ARM file: "update\ARM\618.00406.00_Hybrid_X3G4_ARM_V1.01.0710.usb";
For DSP file: "update\DSP\618.00405.00_Hybrid_X3G4_DSP_V1.01.0710.hex";

➤ Upgrade steps:

Step 1: Please save the "Upgrade" firmware in your U disk first, and press the "Enter" button on the inverter screen for 5 seconds to enter the OFF mode.

Long press for 5 seconds

Step 2: Find the "Update" port of the inverter, use a flat-blade screwdriver or coin with the same width to remove the waterproof cover, and insert the U disk.

Upgrade

Waterproof cover

Flat blade screwdriver or coin
(Port size: 3.5×0.6mm)
Torque: 1.8 N·m (16 in-lb)

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Firmware Upgrading

U Disk

Upgrade

Step 3: LCD operation, enter the upgrade interface "update", as shown below(a). Please press the up and down keys to select ARM, then press down to set "OK", press the enter key to enter the software version interface.

(a) (b)

Step 4: Please confirm the new firmware version again and select the firmware to upgrade. The upgrade takes about 20 seconds. The screen will return to the "Update" page when it is completed, the LCD screen returns to the "Update" page.

(c) (d) (e)

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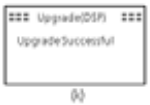
Step 5. For DSP: Please wait for 10 seconds. When "Update" page shown as below, press down to select "DSP" and then press Enter. Please confirm the firmware version again and press Enter to upgrade. The upgrade takes about 2 minutes.

(f) (g) (h) (i) (j)

Step 6. After the upgrade is completed, the LCD screen displays" Upgrade Successful".



(k)

Step 7. Plug off the U disk, press "Esc" to return to the main interface, and long press the enter key to exit the mode.

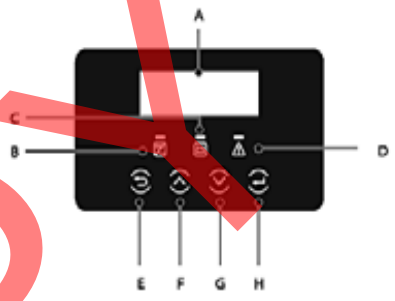
Caution!

- Please strictly follow each step from step 1-6, don't miss it.
- Please confirm the ARM/DSP firmware version on the USB flash drive.

Tip: If the display screen is stuck on "X3-Hybrid G4" after the upgrade, please turn off the photovoltaic power supply and restart, and the inverter will restart and return to normal. If not, please contact our service@solaxpower.com for help.

7 Setting

7.1 Control Panel



Object	Name	Description
A	LCD Screen	Display inverter information on the LCD display.
B	LED Indicator light	Blue light: The inverter is in normal state or EPS(Off-grid) mode. Blue flashing: The inverter is in the waiting, checking state or the system switch is off. Off: The inverter is in a fault state.
C		Green: The battery communication is normal but the battery MCB is disconnected, and the battery communication is normal and working normally. Green flashing: The battery communication is normal and in an idle state. Off: The battery does not communicate with the inverter.
D		Red light on: The inverter is in a fault state. Off: The inverter has no error.
E	Key Function	ESC button: Return from the current interface or function.
F		Up button: Move the cursor to the upper part or increase the value.
G		Down button: Move the cursor down or decrease the value.
H		Enter button: Confirm selection.

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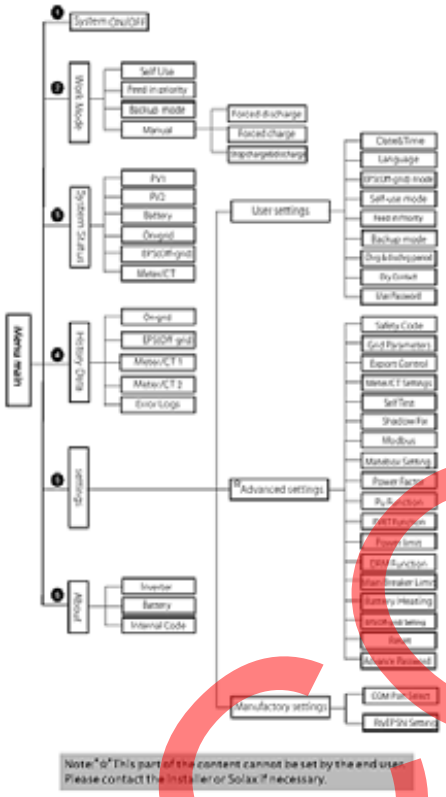
7.2 Screen Menu Structure

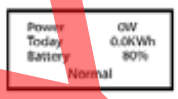


Note: "0" This part of the content cannot be set by the end user. Please contact the installer or Solax if necessary.

7.3 LCD Operation

The main interface is the default interface, the inverter will automatically return to this interface when the system started up successfully or not operated for a period of time.

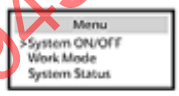
The information of the interface is as below. "Power" means the instant output power; "Today" means the power generated within the day. "Battery" means the left capacity of battery energy.



➢ Menu interface

The menu interface is another interface for users to change settings or obtain information.

- When the LCD displays the main interface, click "OK" to enter this interface.
- The user can select up and down the menu, and press the "OK" key to confirm.



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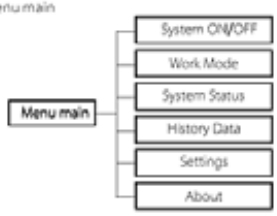
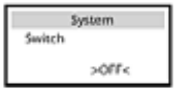
➢ Menu main



➢ System ON/OFF

"ON" means the inverter is in working state, and the inverter is in the default state.

"OFF" means that the inverter stops running and only the LCD screen is on.



➢ Mode Selection

Mode selection, there are 4 working modes to choose from.

Name	Description
Self Use	The self use mode is suitable for areas with low feed in subsidies and high electricity prices. ① When the power of PV is sufficient Active Charging or Discharge time period: PV will power the loads firstly, and surplus power will charge to the battery ,if the battery is fully charged, then sell the surplus power to the grid. (The inverter will limit the output if feed-in limit or zero feed-in is needed.) **(PV > Load, PV → Load→Battery → Grid)** ② When the power of PV is insufficient Active Charging time period: PV will power the loads firstly ,the remaining power will be taken from the grid , the battery will not discharge at this time. **(PV < Load, PV + Grid → Load)** Active Discharge time period: PV+BAT will power the loads together, if the power is still not enough, the remaining power will be taken from the grid. **(PV < Load, PV + Battery + Grid → Load)** ③ Without PV power Active Charging time period: The grid supplies the loads and also can charge the battery. **(PV=0 , Grid → Load + Battery)** Active Discharge time period: The battery will power the home loads firstly, if the battery power is not enough ,the remaining power will be taken from the grid. The inverter will enter into the standby state. **(PV=0 , Battery+Grid → Load)** Battery min SOC can be set 10%-100%
Feed-in priority	The Feed-in priority mode is suitable for areas with high feed-in subsidies, but has feed-in power limitation. ① When the power of PV is sufficient Active Charging time period: PV will power the loads firstly, and surplus power will feed-in to the grid. If the feed-in power has been limited, the surplus power can charge the battery. **(PV>Load , PV → Load → Grid → Battery)** Active Discharge time period: PV will power the loads firstly, and surplus power will feed-in to the grid. **(PV<Load, PV → Load → Grid)**

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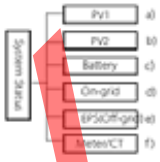
Feed-in priority	②When the power of PV is insufficient Active Charging time period: PV will power the loads firstly, the remaining power will be taken from the grid. The battery will not discharge. **(PV<Load , PV + Grid → Load)** Discharge time period: PV+BAT will power the loads together. If the power is still not enough, the remaining power will be taken from the grid. **(PV<Load, PV + Battery + Grid → Load)** ③ Without PV power Active Charging time period: The grid will power the home loads and also charge the battery; **(PV=0, Grid → Load + Battery)** Active Discharge time period: The battery will power the home loads firstly, If the battery power is not enough, the remaining power will be taken from the grid. The inverter will enter into the standby state. **(PV=0, Battery+Grid → Load)** Battery min SOC can be set:10%-100%.
Backup mode	The back-up mode is suitable for areas with frequent power outages. Same working logic with "Self-use" mode. This mode will maintain the battery capacity at a relatively high level. (Users' setting) to ensure that the emergency loads can be used when the grid is off. Customers no need to worry about the battery capacity. Battery min SOC can be set:30%-100%. Backup mode SOC adjustment range: 30%-100%; In Backup mode, SOC<min under EPS(Off-grid) condition is 10%, which cannot be modified.
EPS (Off-grid)	The EPS(Off-grid) mode is used when the power grid is off. System will provides emergency power through PV and batteries to supply power to the household loads. (Battery is necessary) ①When the power of PV is sufficient PV will power the loads firstly, and surplus power will charge to the battery.**(PV> Load , PV → Load → Battery)** ②When the power of PV is insufficient The remaining power will be taken from the battery. **(PV< Load, PV+ Battery → Load → Battery)** ③ Without PV power The battery will power the emergency loads until the battery reached the min SOC, then the inverter will enter into the idle mode. **(PV=0 , Battery → Load)**

Note: In the case of grid connection, all working modes work normally when the battery SOC >5%. When the battery charge rate is below 5%, the PV or Grid will first charge the battery SOC 11%, and then return to the working mode selected by the

- Manual mode (manual mode), there are three options to choose from: forced charging, forced discharge, stop charging and discharging (grid-connected 0 power).

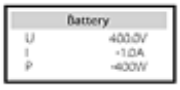
➢ System Status



System status contains six content:PV1/PV2/Battery/On-grid (energy feed into or buy from the grid)and EPS(Off-grid) and so on. Press up and down to select, press "Enter" to confirm the selection, and press "ESC" to return to the menu.

a/b) PV1 , PV2
Here you can see the voltage, current and power of the pv1 and Pv2. Photovoltaic panels respectively;

c) Battery
This status shows the battery condition of the system. Including battery voltage and battery current, Battery power, battery capacity, battery temperature, BMS connection status. The meaning of the sign of battery current and power: "+" means charging; "-" means discharging.



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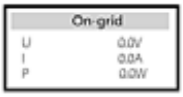
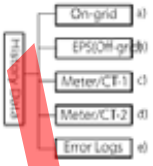
d) On-grid
Here you can see the voltage, current, frequency, and power of the grid.



e) EPS(Off-grid)
Here you can see the inverter of voltage, current, frequency and power when EPS(Off-grid).

f) Meter/CT
Here you can see the data showing the meter or the CT.

➢ History Yield

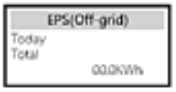


The history data contains five pieces of information: on-grid power of the inverter, EPS(Off-grid) power generation, power of the meter /CT and error Error logs.

Press up and down to select, press Enter to confirm selection, and press ESC to return to the menu.

a) On-grid
Here is a record of the power capacity of the inverter connected to the grid today and the total.

b) EPS(Off-grid)
Here you can see the EPS(Off-grid) output of the inverter today and the total output.



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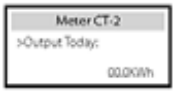
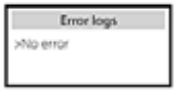
c) Meter /CT-1
Here you can see the inverter's electricity sold, total electricity sold, electricity bought from the grid and total electricity bought on that day.

d) Meter /CT-2
Here you can see the total power output of the inverter for the day.

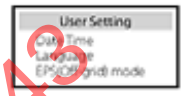


e) Error Logs
Here you can see the most recent six error messages.



➢ Settings

Here you can set the inverter time, language, working mode SOC, charging and discharging time period and user password.



a) Date time
This interface is for users to set the system date and time.

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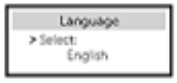
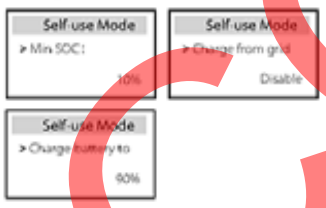
b) Language
This inverter provides multiple languages for customers to choose.

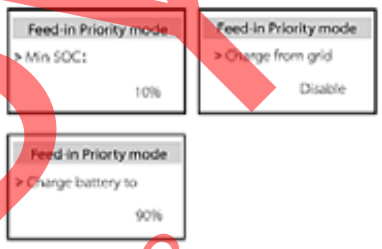


c) EPS(Off-grid) Mute
Here you can choose whether the buzzer is turned on when the inverter is running in EPS(Off-grid) mode. Select Yes, the buzzer mutes, select NO, EPS(Off-grid) mode, the buzzer will sound once every 4s when the battery is fully charged, the closer the battery is to the empty state, the higher the buzzer will sound, to remind users to avoid battery loss .

d) Self-use mode
In this mode, you can set the power reserve percentage of the minimum battery state, set whether the power can be taken from the mains side to charge the battery, and set the amount of power to charge the battery.
For example: set the reserved minimum SOC of the battery capacity to "10%", which means that when the battery has been discharged to 10% of the battery capacity, the battery is not allowed to continue to discharge;
When Charge from grid is set to "Enable", the utility power is allowed to charge the battery; when set to "Disable", the utility power is not allowed to charge the battery;
Charge battery to is set to 90%, indicating that the mains is allowed to charge the battery at 90%.



e)Feed-in Priority mode
In this mode, you can set the power reserve percentage of the minimum battery state, set whether the power can be taken from the mains side to charge the battery, and set the amount of power to charge the battery.
For example: set the reserved minimum SOC of the battery capacity to "10%", which means that when the battery has been discharged to 10% of the battery capacity, the battery is not allowed to continue to discharge;
When Charge from grid is set to "Enable", the utility power is allowed to charge the battery; when set to "Disable", the utility power is not allowed to charge the battery;
Charge battery to is set to 90%, indicating that the mains is allowed to charge the battery at 90%.



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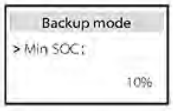
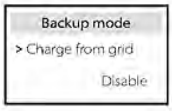
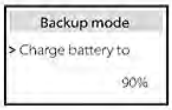
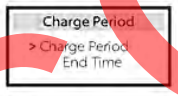
f) Backup mode
In this mode, you can set the power reserve percentage of the minimum battery state, set whether the power can be taken from the mains side to charge the battery, and set the amount of power to charge the battery.
For example: set the reserved minimum SOC of the battery capacity to "10%", which means that when the battery has been discharged to 10% of the battery capacity, the battery is not allowed to continue to discharge;
When Charge from grid is set to "Enable", the utility power is allowed to charge the battery; when set to "Disable", the utility power is not allowed to charge the battery;
Charge battery to is set to 90%, indicating that the mains is allowed to charge the battery at 90%.

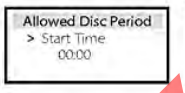


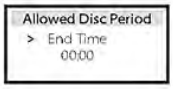


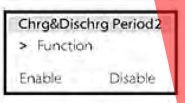


g) Charge and discharge time
Here you can set the charge and discharge time period.
If two charging and discharging periods are needed, turn on the charging and discharging period 2 and set the period.

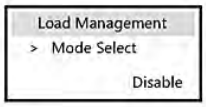




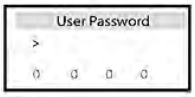




h) Dry Contact
When the user uses the inverter communication control external device function, you can enter here to set the parameters of the external response control. For the setting method, please refer to the user manual of the compatible external device.



i) User Password
The default password for the end user is "0000", where you can reset the new password and press the up/down key to increase or decrease the value. Press "Enter" to confirm the value and jump to the next digit. When all passwords have been entered and confirmed, press "OK" to set the password successfully.



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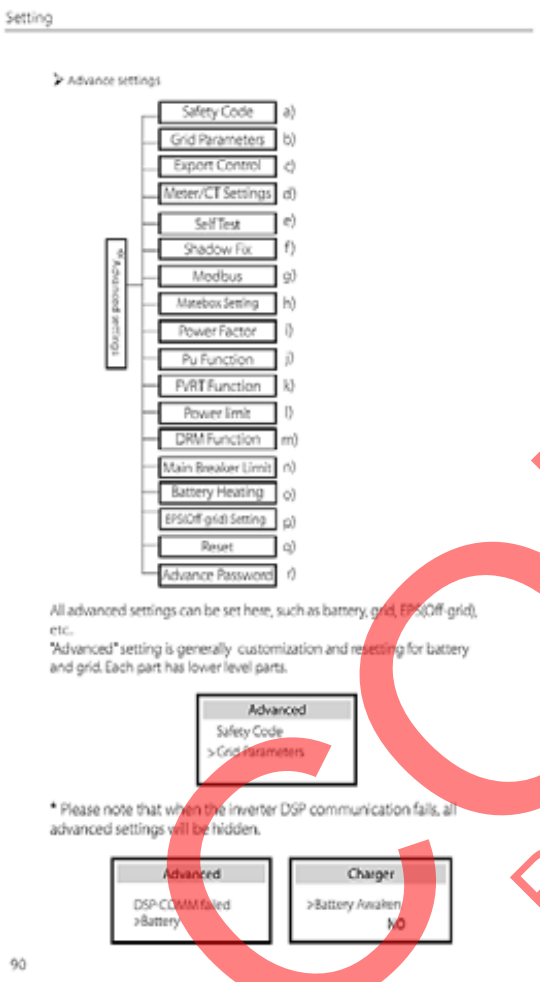

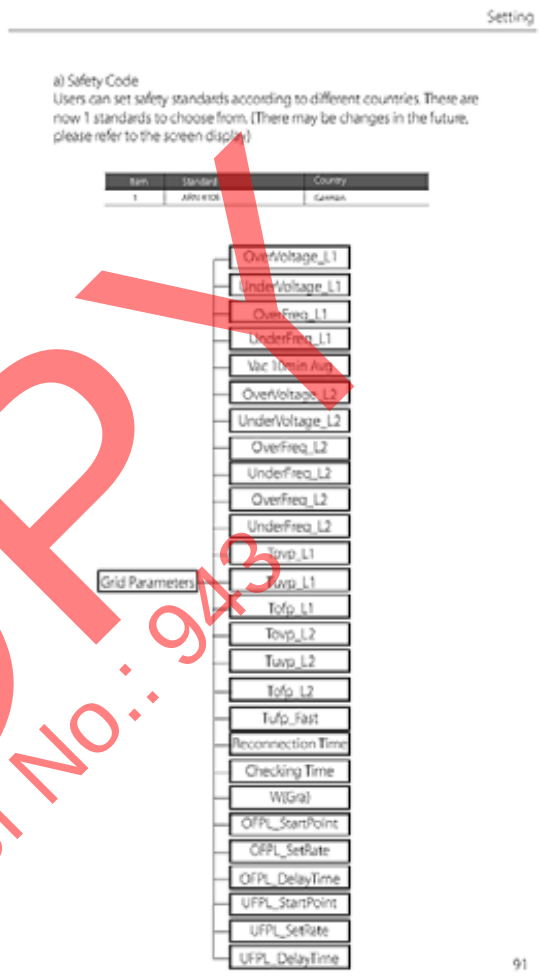

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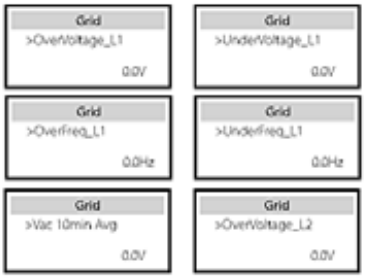
b) Grid Parameters

Here you can set the protection value of grid voltage and frequency. The default value is the specified value under the current safety regulations, and the user cannot change it.

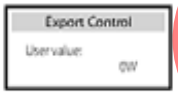
The display content will be displayed according to the requirements of local laws and regulations, which are constantly increasing. Please refer to the contents displayed on the inverter screen.



c) Export Control

This feature allows the inverter to control the amount of electricity output to the grid.

The factory value is the default and can be changed by the user. The user value set by setup must be less than the maximum. If the user does not want to supply power to the grid, set it to 0.



d) Meter/CT Settings

The user needs to select the CT or electricity meter to connect the inverter here. Select the address of the meter. CT does not need to select the address.

e) Self Test (only for CEI 0-21)

The self test function allows users to test the following items. "Full test", "Ovp(59.S2) test"27, "Uvp (s1) test", "Uvp (27. s2) test", "Ofp (81> .S1) test", "Ufp (81 <S1) test", "Ufp (81> .S2) test", "Ufp (81 <S2) test", "Ovp10 (59. s1) test".

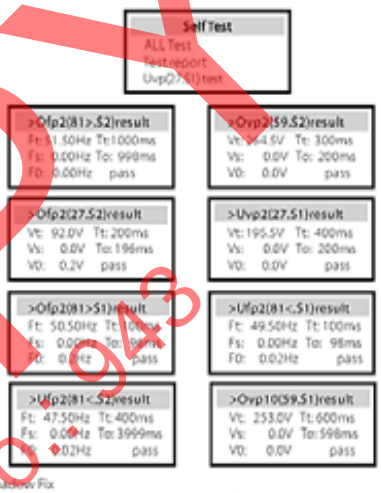
In the self-test interface, the user can select "all tests" or a single test item for testing.

Before testing, make sure that the inverter is connected to the grid.

All tests take about 6 minutes. And it will display "Success" and then "Delivery".

For a single test item, it takes about a few seconds or minutes.

Click "Test Report" to view the test results of all items.



f) Shadow Fix

Here you can set the shadow tracking with four options, which are off, low, medium, and high.

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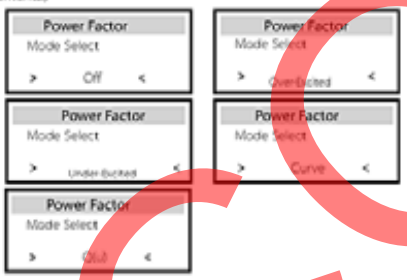
g) Modbus
Here you select the baud rate of the external communication protocol, the default location of 19200 and 485 addresses.

h) Matebox Setting
If you want MateBox installed, you need to turn this feature on here.

i) Power Factor (applicable to specific countries, please refer to local grid requirements.)



Mode	Comment
Off	-
Over-Excited	PF value
Under-Excited	PF value
Curve	P1_PF (EU50549 only)
	P2_PF (EU50549 only)
	P3_PF (EU50549 only)
	P4_PF (EU50549 only)
	Power 1
	Power 2
	Power 3
	Power 4
	PFLockInPoint (EU50549 only)
	PFLockOutPoint (EU50549 only)
	TTau
Q(U)	VoltRATIO 3 (AS4777.2 only)
	VoltRATIO 4 (AS4777.2 only)
	QURESPONSEV1 (EU50549 only)
	QURESPONSEV2 (EU50549 only)
	QURESPONSEV3 (EU50549 only)
	QURESPONSEV4 (EU50549 only)
	KValue (CEI 0-21 only)
	TTau
	QuDelayTimer
Fixed Q Power	Q Power

j) PU Function (applicable to specific countries, please refer to local grid requirements)

The PU function is a volt-watt response mode required by certain national standards such as AS4777.2. This function can control the active power of the inverter according to the grid voltage.
Selecting "Enable" means that this function is turned on and is the default value.
Select "Disable" to deactivate the function.

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Setting

PU Function	PU Function
Response V3	Response V4
250.0V	265.0V

PU Function
3Tau
5-180S

k) FVRT Function(apply to50549)
Here you can set the high and low enable or disable.

FVRT Function	
Function Control	
Disable	Enable

l) Power limit
Power limit function, the maximum power of the AC port can be set by percentage.

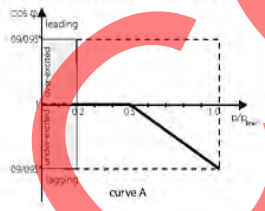
Power Limit
>Proportion
1.00

- Reactive power control, reactive power standard curve cos φ = f(P)

For VDE ARN 4105, the curve cos = f(P) should refer to curve B. The set default value is shown in curve B.

For e8001, the curve cos = f(P) should be curve A. The set default value is shown in curve A.

For CEI 0-21, the default value of PFLockInPoint is 1.05. When Vac> 1.05Vn, Pac> 0.2 Pn, curve cos cp = f(P) corresponds to curve B.



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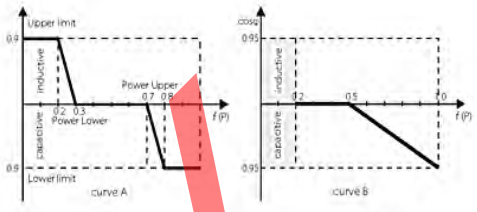
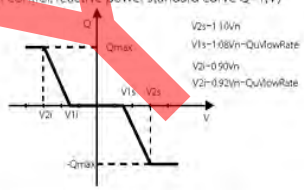
Setting



- Reactive power control, reactive power standard curve Q= f(V)



m) DRM function (applied to NZS4777.2)
The DRM function is a demand response method required by the NZS4777.2 standard and is only applicable to NZS4777.2.
The default value is "enable". Select "Disable" to disable this function.

DRM Function
>Function Control
Enable

n)Main Breaker Limit
Here you can set an open minimum current here.

Main Breaker Limit
>Current
40A

97

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(c)Battery Heating

If the user needs the battery heating function, you can set it to turn on here, and set the time period that needs to be heated, and the two time periods can be set. (Only for batteries with heating function)

Battery Heating	Battery Heating	Battery Heating
>Func Select: Enable Disable	>Heating Period 1 Start Time 00:00	>Heating Period 1 End Time 00:00
Battery Heating	**Battery Heating**	
>Heating Period 2 Start Time 00:00	>Heating Period 2 End Time 00:00	

(d)EPS(Off-grid) Setting

User can set the frequency selection in the EPS(Off-grid) mode here, and set the minimum capacity reserved for battery discharge.

EPS(Off-grid) Setting	EPS(Off-grid) Setting	EPS(Off-grid) Setting
> Frequency 50Hz	>Frequency 60Hz	> Min SoC 10%

e) Reset

Users can reset the reset error log, meter power ,inverter power, and restore factory settings here.

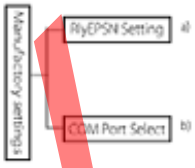
Reset Error Log	Reset Meter/CT_1	Reset Meter/CT_2
>Reset Yes	>Reset Yes	>Reset Yes
Reset INV Energy	**Factory Reset**	
>Reset Yes	>Reset Yes	

f)Advance Password

Here you can reset the advanced password. "Set OK!" is displayed on success, and "Setup failed" Will also displayed on failure.

Advance Password	Advance Password
Set OK!	Setup failed

➢ Manufactory Setting



a) RlyEPSN Setting

The user needs to set whether the inverter is installed in Australia or Europe. When the inverter is off the grid, the N line and PE line of the circuit in Australia need to be connected; the N line and PE line of the European circuit need to be separated.

RlyEPSN Setting	RlyEPSN Setting
>function Control Europe	>function Control Australia

b) COM Port Select

Here external communication protocol or external indoor screen of the inverter can be set. When it is used for external communication protocol, it can choose RS485 or MOBUS.

RS485/MODUS
➢ RS485 MOBUS

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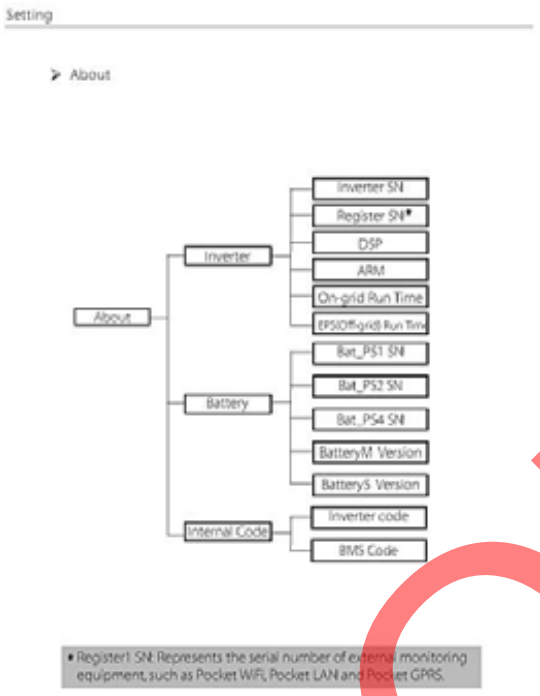

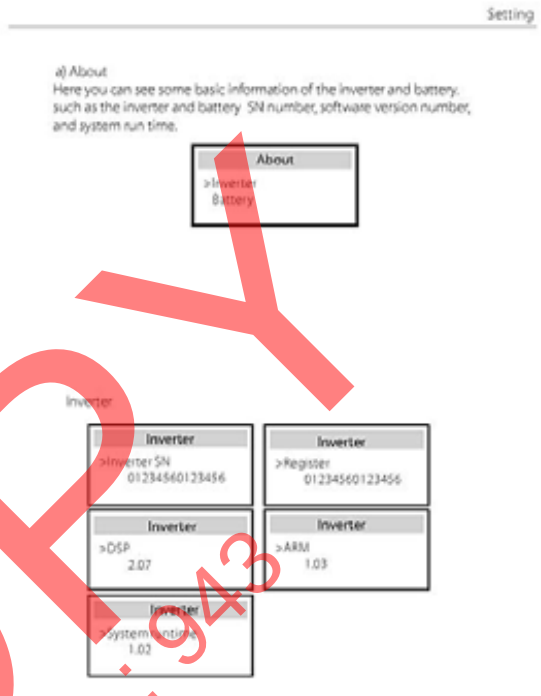

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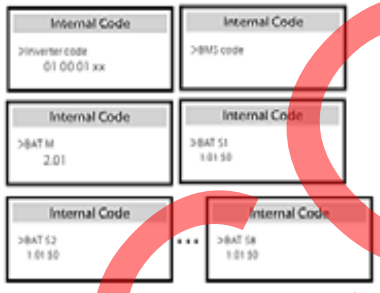
Battery

Internal Code



8 Troubleshooting

8.1 Troubleshooting

This section contains information and procedures for resolving possible problems with X3-Hybird G4, and provides you with troubleshooting tips to identify and solve most problems that may occur in X3-Hybrid G4. This section will help you narrow down the source of any problems you may encounter. Please read the troubleshooting steps below.
Check the warning or fault information on the system control panel or the fault code on the inverter information panel. If a message is displayed, log it before doing anything further.
Try the solutions indicated in the table below.

Number	Faults	Diagnosis and solution
	TZ Protect Fault	Overcurrent fault • Wait for a while to check if you've back to normal. • Disconnect PV+, PV- and batteries, reconnect. • Or ask for help from the installer if it can not return to normal.
	Grid Lost Fult	• Check battery input voltage if it's within normal range • Or ask the installer for help.
	Grid Volt Fault	Power grid voltage overrun • Wait a moment, if the utility returns to normal, the system will reconnect. • Please check if the grid voltage is within normal range. • Or ask the installer for help.
	Grid Freq Fault	Electricity frequency beyond range • If the utility returns to normal, the system reconnects. • Or ask the installer for help.
	PV Volt Fault	PV voltage out of range • Check the output voltage of the PV panel. • Or ask the installer for help.
	Bus Volt Fault	• press the "ESC" key to restart the inverter. • Check that the PV input open circuit voltage is in the normal range. • Or ask the installer for help.
	Bat Volt Fault	Battery voltage fault • Check battery input voltage if it's within normal range • Or ask the installer for help.
	AC10MVolt Fault	• The grid voltage was out of range in the last 10 minutes. • The system will return to normal if the grid returns to normal. • Or ask the installer for help.

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Number	Faults	Diagnosis and solution
IE 009	DCI OCP Fault	DCI overcurrent protection fault. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 010	DCV OVP Fault	DCV EPSOff grid overvoltage protection failure. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 011	SW OCP Fault	**Software Detection of Overcurrent Fault.** **• Wait for a while to check if it's back to normal.** **• Shut down photovoltaic, battery and grid connections.** **• Or ask the installer for help.**
IE 012	HCOCP Fault	Overcurrent protection fault. • Check the impedance of DC input and AC output. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 013	Isolation Fault	Insulation Fault. • Please check the wire insulation for damage. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 014	Temp Over Fault	Temperature beyond limit. • Check if ambient temperature exceeds the limit. • Or ask the installer for help.
IE 015	Bat Con Dir Fault	EPSOff grid) mode current is too strong. • Ensure that the load power is within the EPSOff grid) power range. • Check for any non-linear load connections on the EPSOff grid). • Move this load to check for recovery. • Or ask for help from the installer if it can not return to normal.
IE 016	EPSOff grid) Overload Fault	EPSOff grid) over load fault. • Shutdown the high power device and press the "ESC" key to restart the inverter. •Or ask for help from the installer if it can not return to normal.
IE 017	Over Load Fault	On-grid mode over load. • Shutdown the high power device and press the "ESC" key to restart the inverter. •Or ask for help from the installer if it can not return to normal.
IE 018	Bat Power Low	**• Close the high-power device and press the "ESC" key to restart the inverter.** **• Please charge the battery to a level higher than the protection capacity or protection voltage.**
IE 019	BMS Lost	Battery communication loss. • Check that the communication lines between the battery and the inverter are properly connected. • Or ask for help from the installer if it can not return to normal.
IE 020	Fan Fault	Fan Fault. • Check for any foreign matter that may have caused the fan not to function properly. • Or ask for help from the installer if it can not return to normal.
IE 021	Low Temp	Low temperature fault. • Check if the ambient temperature is too low. • Or ask for help from the installer if it can not return to normal.

Number	Faults	Diagnosis and solution
IE 022	ARM Unmatched	ARM software version mismatch Fault. • update the software and press the ESC" key to restart the inverter. •Or ask for help from the installer if it can not return to normal.
IE 023	Other Device Fault	Other device Fault. • update the software and press the ESC" key to restart the inverter. •Or ask for help from the installer if it can not return to normal.
IE 025	InterComms Error	Mgr InterCom Fault. • Shut down photovoltaic, battery and grid, reconnect. •Or ask for help from the installer if it can not return to normal.
IE 025	InterComms Error	• Internal communication errors. • Shut down photovoltaic, battery and grid connections. •Or ask for help from the installer if it can not return to normal.
IE 026	Inv EEPROM Fault	**Inverter EEPROM Fault.** **• Shut down photovoltaic, battery and grid, reconnect.** **•Or ask for help from the installer if it can not return to normal.**
IE 027	RCD Fault	Fault of Residual Current Device. •Check the impedance of DC input and AC output. •Disconnect PV + PV and batteries, reconnect. •Or ask for help from the installer if it can not return to normal.
IE 028	Grid Relay Fault	Electrical relay failure. •Disconnect PV+ PV, grid and batteries and reconnect. •Or ask for help from the installer if it can not return to normal.
IE 029	EPS(Off-grid) Relay Fault	EPSOff grid) relay failure. •Disconnect PV+ PV , grid and batteries and reconnect. •Or ask for help from the installer if it can not return to normal.
IE 030	PV Conn Dir Fault	Protection fault. • Check if the PV input lines are connected in the opposite direction. •Or ask for help from the installer if it can not return to normal.
IE 031	Charge Relay Fault	Charge relay fault. • Press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 032	Earth Relay Fault	EPSOff grid) earth relay fault. • Press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 101	Power Type Fault	Power type fault. • Upgrade the software and press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 102	Port OC Warning	EPSOff grid) port over current fault. • Check that the EPSOff grid) load does not exceed the system requirements, and press the ESC" key to restart the inverter. •Or ask for help from the installer if it can not return to normal.

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Number	Faults	Diagnosis and solution
IE 103	Mgr EEPROM Fault	Manager EEEPROM Fault • Shut down photovoltaic ,battery and grid ,reconnect. • Or seek help from the installer if it can not return to normal.
IE 104	DSPunmatched	**DSP version error** **• Check that the DSP1 version matches.** **• Or seek help from the installer if it can not return to normal.**
IE 105	NTC Sample Invalid	NTC invalid •Make sure the NTC is properly connected and the NTC is in good condition. •Please confirm that the installation environment is normal. • Or ask for help from the installer,if it can not return to normal.
IE 106	Bat Temp Low	Battery temp low • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer,if it can not return to normal.
IE 107	Bat Temp High	Battery temp high • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer,if it can not return to normal.
IE 109	Meter Fault	Meter error •Please check that the instrument is working properly • Or seek help from the installer if it can not return to normal.
IE 110	BypassRelayFault	Bypass relay fault •Press the ESC key to restart the inverter . • Or ask for help from the installer if it can not return to normal.
BE 001	BMS_External_Err	Battery Error External Communication Fault •Please contact the battery supplier.
BE 002	BMS_Internal_Err	Battery Error Internal Communication Fault •Please contact the battery supplier.
BE 003	BMS_OverVoltage	Over voltage in battery system • Please contact the battery supplier.
BE 004	BMS_LowerVoltage	Low voltage in battery system •Please contact the battery supplier.
BE 005	BMS_ChargeOCP	Battery fault over charge fault •Please contact the battery supplier.
BE 006	BMS_DischargeOCP	Battery fault discharge over current fault • Please contact the battery supplier.
BE 007	BMS_TemHigh	Over temperature in battery system •Please contact the battery supplier.
BE 008	BMS_TempSensor Fault	Battery temperature sensor malfunction •Please contact the battery supplier.

Number	Faults	Diagnosis and solution
BE 009	BMS_Celimbalance	Battery Unbalanced Failure •Please contact the battery supplier.
BE 010	BMS_Hardware Protect	Battery hardware protection failure •Please contact the battery supplier.
BE 011	BMS_Circuit_Fault	Battery circuit failure •Restart the battery . •Please contact the battery supplier.
BE 012	BMS_ISO_Fault	Battery insulation failure •Check that the battery is properly grounded and restart the battery. •Please contact the battery supplier.
BE 013	BMS_VolGen_Fault	Battery voltage sensor fault •Please contact the battery supplier.
BE 014	BMS_TemppSen_Fault	Temperature sensor failure •Restart the battery . •Please contact the battery supplier.
BE 015	BMS_CurSensor Fault	Battery current sensor fault • Please contact the battery supplier.
BE 016	BMS_Relay Fault	Battery relay failure •Please contact the battery supplier.
BE 017	BMS_Type_Unmatch	Battery type failure •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 018	BMS_Ver_ Unmatch	Battery version mismatch failure •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 019	BMS_MFR_Unmatch	Battery manufacturer did not match the fault •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 020	BMS_SW_Unmatch	Battery hardware and software mismatch failure •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 021	BMS_MBS_Unmatch	Battery master slave control mismatches •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 022	BMS_CR_NORespond	Battery charging request does not respond to a fault •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 023	BMS_SW_Protect	Battery slave software protection failure •Upgrade the battery BMS software. •Please contact the battery supplier.
BE 024	BMS_SW_Fault	Battery fault discharge over current fault • Please contact the battery supplier.
BE 025	BMS_SelfcheckErr	Over temperature in battery system •Please contact the battery supplier.

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Number	Faults	Diagnosis and solution
026	BMS_TempDiffErr	Battery temperature sensor malfunction •Please contact the battery supplier
027	BMS_BreakFault	Battery Unbalanced Failure •Please contact the battery supplier
028	BMS_Flash_Fault	Battery hardware protection failure •Please contact the battery supplier
029	BMS_Precharge_Fault	Battery precharge failure •Please contact the battery supplier
030	BMS_AirSwitch_Fault	Battery air switch failure •Check that the battery breaker is off. •Please contact the battery supplier

• If the information panel of your inverter does not show the fault light, check the following list to ensure the current installation status, correct operation.

------ Is the inverter located in a clean, dry and well-ventilated place?
------ Is the DC input circuit breaker open?
------ Is the specification and length of the cable adequate?
------ Are the input and output connections and wiring in good condition?
------ Is the configuration set correct for your particular installation?

please contact SolaX customer service for further assistance. Please be prepared to describe the details of your system installation and provide the inverter serial number.

8.2 Routine Maintenance

Inverter do not require any maintenance or correction in most cases, but if the inverter often loses power due to overheating, this can be attributed to the following reason:

• heat sink behind the inverter is covered with dirt.

If necessary, clean the cooling heat sink with a soft dry cloth or brush. Only trained and authorized professionals familiar with safety requirements can perform maintenance and maintenance work.

➢ Safety inspections

Safety checks should be conducted at least every 12 months, please contact the manufacturer to arrange for appropriate training, expertise, and practical experience in performing these tests. (Please note that this action is not covered by warranty). These data should be recorded in the device log. If the equipment is not running properly or any test fails, the equipment must be repaired for details of safety inspections, refer to section 2 of this manual for safety instructions and europe commission instructions.

➢ Regular maintenance

Only qualified people can do the following work.

In the process of using the frequency converter, the manager should check and maintain the machine regularly. The specific operation is as follows.

1.check whether the heat sink is covered with dirt, clean the machine and absorb dust if necessary. This work should be performed from time to time.

2.check whether the frequency converter indicator is normal, check whether the frequency converter button is normal, check whether the frequency converter display is normal. This inspection should be conducted at least every 6 months.

3.check the input and output lines for damage or aging. This inspection should be conducted at least every 6 months.

4.Cleaning and safety inspection of PV modules should be carried out at least once every 6 months.

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ภาคผนวก ข. Technical Specification (ต่อ).

9 Decommissioning

9.1 Disassemble the Inverter

- Remove DC input line and AC output line of inverter.
- Wait for at least 5 minutes to power off.
- Remove all cable connections from the inverter.
- Remove inverter from finger support the bracket.
- Remove the bracket if necessary.

9.2 Packing

Load the inverter into the original package if possible.

- If the original package can not be found, you can also use the following requirements of the carton packaging:
  Bearing capacity of more than 30 kg.
  Easy to carry.
  Can completely seal the cover.

9.3 Storage and Transportation

Store the inverter in a dry, temperature -40℃~70℃ environment.
Pay attention to less than four machines on each stack board during storage and transportation.

9.4 Waste Disposal

If it is necessary to scrap the inverter or other related parts, be sure to send the waste inverter and packaging materials to the designated location for recycling by the relevant department.

10 Disclaimer

The X3-Hybrid G4 series hybrid inverters are transported, used and operated under limited condition, such as environmental, electrical etc. SolaX shall not be liable to provide the service, technical support or compensation under conditions listed below, including but not limited to :

- Inverter is damaged or broken by force majeure (such as earthquake, flooding, thunderstorm, lightning, fire hazard, volcanic eruption etc).
- Inverter's warranty is expired and doesn't buy extended warranty.
- Can't provide the inverter's SN, warranty card or invoice.
- Inverter is damaged by man-made cause. Inverter is used or operated against any items in local policy.
- Inverter's installation, configuration, commissioning doesn't follow the requirements mentioned in this manual.
- Inverter is installed, refitted or operated in improper ways mentioned in this manual without authority from SolaX.
- Inverter is installed, operated under improper environment or electrical condition mentioned in this manual without authority from SolaX.
- Inverter is changed, updated or disassembled on hardware or software without authority from SolaX.
- Obtain the communication protocol from other illegal channels.
- Build monitoring control system without authority from SolaX.
- Connect to other brands batteries without authority from SolaX.

SolaX will keep right to explain all the contents in this user manual.

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Test Data / Test Plan

TÜVRheinland®

TÜV Rheinland (Shanghai) Co., Ltd. Document No.: MS-0025001-appendix 13

Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Issue Date:	2021.07.27	Project Engineer:	Allen Hu
Lab Target:	2021.07.27	Signature:	Allen Hu

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

Electrical rating of the equipment:	
Rated Input:	See appended rating label
Rated Output:	See appended rating label for more detail.
Firmware version:	DSP1:2.07,DSP2:2.01,ARM:2.03
Phase:	☐ Single-phase ☒ Three-phase
Protection class:	☐ Class 0 ☒ Class I ☐ Class II ☐ Class III
Overvoltage Category(OVC):	☐ OVC I ☒ OVC II (PV) ☒ OVC III (Mains) ☐ OVC IV
Pollution degree (PD):	☐ PD 1 ☒ PD 2 (Inside) ☒ PD 3 (Outside)
Max. operating temperature:	See appended rating label

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

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

Finished date: Tested by:

Review date: Reviewed by:

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Test Data / Test Plan

TÜVRheinland®

TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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

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Test Data / Test Plan

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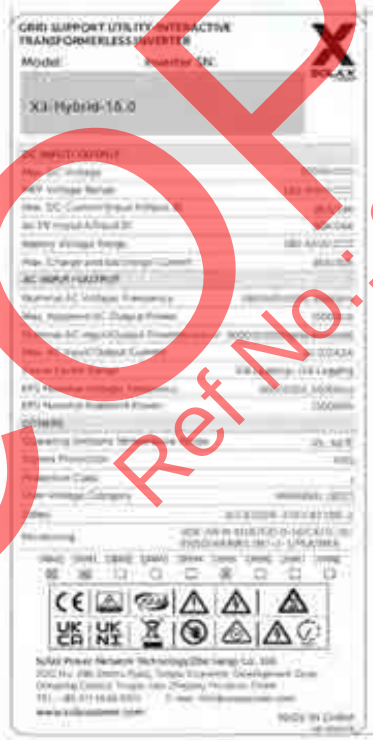
TÜV Rheinland (Shanghai) Co., Ltd. Document No.: MS-0025001-appendix 13

Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co .,Ltd	Model designation:	X3-Hybrid-15.0

Copy of marking plate:



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

Finished date: Tested by:

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(Report no.) (Issued date)

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Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Clause	Test description	Remark	Result
☒ 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 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
☒ 4.2	Type of the Test	See below for detail.	Pass
☒ 4.2.1	Design Test	All tests are performed on single representative of inverter for each model.	Pass
☒ 4.3	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: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Clause	Test description	Remark	Result
☒ 4.3.5	Operating Frequency Range Test	See appended table 4.3.5	Pass
☒ 4.3.6	Islanding Protection Test	See appended table 4.3.6	Pass
☒ 4.3.7	Response to Utility Recovery Test	See appended table 4.3.7	Pass
Remark:			

Revision History:

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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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:	
Review date:		Reviewed by:	

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Requirements to the Measurement Precision of the Measuring Devices

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

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

Finished date: Tested by:

Review date: Reviewed by:

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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:	

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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	16 - 22	0.375
23 - 33	0.6	24 - 34	0.15
≥ 35	0.3	≥ 36	0.075
Total harmonic current distortion (THD) 5.0 %			

RESULTS ☒Pass / ☐Fail

4.3.1 TABLE: Harmonic and waveform distortion

Mains voltage: 3/N/PE 400V

P/Pn[%]	100%		100%		100%		Limit	
Ordinal number	Measurement							
	[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
Total	21.767	100.13	21.791	100.23	21.840	100.46	-	-
1	21.755	100.07	21.778	100.18	21.828	100.40	-	-
2	0.13	0.60	0.14	0.64	0.13	0.60	0.87	1.0
3	0.05	0.23	0.03	0.14	0.03	0.14	3.48	4.0
4	0.02	0.09	0.03	0.14	0.01	0.05	0.87	1.0
5	0.56	2.58	0.55	2.53	0.55	2.53	3.48	4.0
6	0.01	0.05	0.01	0.05	0.02	0.09	0.87	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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Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

7	0.34	1.56	0.34	1.56	0.34	1.56	3.48	4.0
8	0.01	0.05	0.01	0.05	0.01	0.05	0.87	1.0
9	0.01	0.05	0.02	0.09	0.01	0.05	3.48	4.0
10	0.01	0.05	0.01	0.05	0.00	0.00	0.87	1.0
11	0.17	0.78	0.17	0.78	0.16	0.74	1.74	2.0
12	0.00	0.00	0.01	0.05	0.01	0.05	0.44	0.5
13	0.10	0.46	0.10	0.46	0.10	0.46	1.74	2.0
14	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
15	0.01	0.05	0.01	0.05	0.00	0.00	1.74	2.0
16	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
17	0.04	0.18	0.04	0.18	0.04	0.18	1.31	1.5
18	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
19	0.04	0.18	0.04	0.18	0.04	0.18	1.31	1.5
20	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
21	0.00	0.00	0.01	0.05	0.01	0.05	1.31	1.5
22	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
23	0.03	0.14	0.03	0.14	0.03	0.14	0.52	0.6
24	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
25	0.02	0.09	0.02	0.09	0.03	0.14	0.52	0.6
26	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
27	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
28	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
29	0.02	0.09	0.02	0.09	0.02	0.09	0.52	0.6
30	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
31	0.02	0.09	0.01	0.05	0.02	0.09	0.52	0.6

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

32	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
33	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
34	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
35	0.02	0.09	0.01	0.05	0.02	0.09	0.26	0.3
36	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
37	0.02	0.09	0.02	0.09	0.02	0.09	0.26	0.3
38	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
39	0.01	0.05	0.01	0.05	0.00	0.00	0.26	0.3
40	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
TRDi	3.32		3.46		3.33			

Remark:

I_{rated} =21.74 A

$I_h\% = I_h / I_{rated} * 100\%$

$TRDi = \frac{\sqrt{\sum_{h=2}^{40} I_h^2}}{I_{rated}} \times 100\%$

4.3.1	TABLE: Harmonic and waveform distortion							
Mains voltage: 3/N/PE 400V								
P/Pn[%]	66		66		66		Limit	
Ordinal number	Measurement							
	[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
Total	14.913	68.60	14.942	68.73	14.974	68.88	-	-
1	14.899	68.53	14.930	68.67	14.961	68.82	-	-
2	0.10	0.46	0.11	0.51	0.11	0.51	0.87	1.0
3	0.05	0.23	0.04	0.18	0.05	0.23	3.48	4.0

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

Finished date: Tested by:

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Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

4	0.04	0.18	0.03	0.14	0.03	0.14	0.87	1.0
5	0.31	1.43	0.31	1.43	0.31	1.43	3.48	4.0
6	0.02	0.09	0.01	0.05	0.02	0.09	0.87	1.0
7	0.22	1.01	0.21	0.97	0.22	1.01	3.48	4.0
8	0.01	0.05	0.01	0.05	0.01	0.05	0.87	1.0
9	0.01	0.05	0.02	0.09	0.01	0.05	3.48	4.0
10	0.01	0.05	0.01	0.05	0.01	0.05	0.87	1.0
11	0.10	0.46	0.09	0.41	0.09	0.41	1.74	2.0
12	0.00	0.00	0.01	0.05	0.00	0.00	0.44	0.5
13	0.07	0.32	0.07	0.32	0.06	0.28	1.74	2.0
14	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
15	0.01	0.05	0.01	0.05	0.00	0.00	1.74	2.0
16	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
17	0.03	0.14	0.03	0.14	0.03	0.14	1.31	1.5
18	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
19	0.03	0.14	0.03	0.14	0.03	0.14	1.31	1.5
20	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
21	0.00	0.00	0.01	0.05	0.00	0.00	1.31	1.5
22	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
23	0.02	0.09	0.02	0.09	0.02	0.09	0.52	0.6
24	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
25	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
26	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
27	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
28	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15

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

Finished date: Tested by:

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Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

29	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
30	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
31	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
32	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
33	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
34	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
35	0.01	0.05	0.01	0.05	0.01	0.05	0.26	0.3
36	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
37	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.3
38	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
39	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.3
40	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
THDi	2.96		2.82		2.89		5	

Remark:

I_{rated} =21.74 A

$I_h = I_h / I_{rated} * 100$

$THDi = \frac{\sqrt{I_2^2 + \cdots + I_{40}^2}}{I_{rated}} \times 100\%$

4.3.1	TABLE: Harmonic and waveform distortion							
Mains voltage: 3/N/PE 400V								
P/Pn[%]	33		33		33		Limit	
Ordinal number	Measurement							
	[A]	[%]	[A]	[%]	[A]	[%]	[A]	[%]
Total	7.397	34.02	7.424	34.15	7.442	34.23	-	-
1	7.393	34.00	7.418	34.12	7.437	34.21	-	-

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

Finished date: Tested by:

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Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

2	0.07	0.32	0.08	0.37	0.08	0.37	0.87	1.0
3	0.02	0.09	0.03	0.14	0.03	0.14	3.48	4.0
4	0.00	0.00	0.01	0.05	0.01	0.05	0.87	1.0
5	0.17	0.78	0.18	0.83	0.17	0.78	3.48	4.0
6	0.00	0.00	0.00	0.00	0.00	0.00	0.87	1.0
7	0.11	0.51	0.10	0.46	0.11	0.51	3.48	4.0
8	0.00	0.00	0.00	0.00	0.00	0.00	0.87	1.0
9	0.00	0.00	0.01	0.05	0.00	0.00	3.48	4.0
10	0.00	0.00	0.00	0.00	0.00	0.00	0.87	1.0
11	0.04	0.18	0.02	0.09	0.04	0.18	1.74	2.0
12	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
13	0.02	0.09	0.03	0.14	0.02	0.09	1.74	2.0
14	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
15	0.00	0.00	0.01	0.05	0.00	0.00	1.74	2.0
16	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.5
17	0.00	0.00	0.01	0.05	0.00	0.00	1.31	1.5
18	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
19	0.01	0.05	0.01	0.05	0.01	0.05	1.31	1.5
20	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
21	0.00	0.00	0.00	0.00	0.00	0.00	1.31	1.5
22	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.375
23	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
24	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
25	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
26	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15

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

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TÜV Rheinland (Shanghai) Co., Ltd. Document No.: MS-0025001-appendix 13

Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

27	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
28	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
29	0.01	0.05	0.01	0.05	0.01	0.05	0.52	0.6
30	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
31	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
32	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
33	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.6
34	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.15
35	0.00	0.00	0.01	0.05	0.00	0.00	0.26	0.3
36	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
37	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.3
38	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
39	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.3
40	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.075
THDi	1.12		1.39		1.16		5	

Remark:

I_{rated} =21.74 A

$I_h = I_h / I_{rated} * 100$

$THDi = \frac{\sqrt{I_{max}^2 + \dots}}{I_{rated}} \times 100\%$

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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				
Mains voltage: 3/N/PE 400V					
Reference Impedance Zref used:		L=0.15+0.15j, N=0.1+0.1j			
Phase A	Measurement	Plt		0.15	
		Limit		0.65	
		Pst	dc()	dmax()	d(t) (ms)
		Limit= 1.0	Limit= 3.3	Limit= 4.0	Limit= 500
	1	0.12	0.25	0.33	0.00
	2	0.12	0.24	0.35	0.00
	3	0.12	0.28	0.39	0.00
	4	0.12	0.25	0.38	0.00
	5	0.12	0.26	0.37	0.00
	6	0.12	0.26	0.37	0.00
	7	0.13	0.27	0.72	0.00
	8	0.12	0.25	0.38	0.00
	9	0.12	0.26	0.41	0.00
	10	0.13	0.23	0.47	0.00
	11	0.28	0.25	2.29	0.00
	12	0.12	0.20	0.38	0.00

Phase B	Measurement	Plt		0.14	
		Limit		0.65	
		Pst	dc()	dmax()	d(t) (ms)
		Limit= 1.0	Limit= 3.3	Limit= 4.0	Limit= 500
	1	0.10	0.00	0.00	0.00
	2	0.10	0.00	0.00	0.00
	3	0.10	0.00	0.00	0.00

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

	4	0.10	0.00	0.00	0.00
	5	0.10	0.00	0.00	0.00
	6	0.10	0.21	0.26	0.00
	7	0.10	0.08	0.40	0.00
	8	0.10	0.21	0.22	0.00
	9	0.10	0.21	0.22	0.00
	10	0.11	0.21	0.44	0.00
	11	0.28	0.31	2.92	0.00
	12	0.10	0.17	0.25	0.00
Phase C	Measurement	Pit		0.15	
		Limit		0.65	
		Pst	dc()	dmax()	d(t) (ms)
		Limit= 1.0	Limit= 3.3	Limit= 4.0	Limit= 500
	1	0.10	0.19	0.20	0.00
	2	0.10	0.00	0.00	0.00
	3	0.10	0.00	0.00	0.00
	4	0.10	0.00	0.00	0.00
	5	0.10	0.00	0.00	0.00
	6	0.10	0.00	0.00	0.00
	7	0.11	0.05	0.26	0.00
	8	0.10	0.00	0.00	0.00
	9	0.10	0.00	0.00	0.00
	10	0.11	0.00	0.28	0.00
	11	0.30	0.32	2.11	0.00
	12	0.10	0.10	0.19	0.00

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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 voltage: 3/N/PE 400V								
PowerP/Pn[%]	100							
Measurement							Limit	
Phase A		Phase B		Phase C				
[A]	[%]	[A]	[%]	[A]	[%]		[A]	[%]
0.006	0.026	0.005	0.022	0.006	0.026		0.109	0.5
PowerP/Pn[%]	66							
Measurement							Limit	
Phase A		Phase B		Phase C				
[A]	[%]	[A]	[%]	[A]	[%]		[A]	[%]
0.006	0.026	0.005	0.022	0.008	0.037		0.109	0.5
PowerP/Pn[%]	33							
Measurement							Limit	
Phase A		Phase B		Phase C				
[A]	[%]	[A]	[%]	[A]	[%]		[A]	[%]
0.007	0.033	0.004	0.020	0.005	0.021		0.109	0.5

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

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Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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 voltage						
	Rated voltage Un: 230V						
Setting value							
Voltage detection accuracy [V]	±1		Voltage detection cycle Td[ms]		20		
Magnitude Vo1 [V]	241		delay time To1 [ms]		1900		
Magnitude Vo2 [V]	271		delay time To2 [ms]		40		
Magnitude Vu1 [V]	199		delay time Tu1 [ms]		1900		
Magnitude Vu2 [V]	114		delay time Tu2 [ms]		90		
Over voltage level 1	Measurement [ms]				Limit [ms]	Remark	
	L1	L2	L3	L123			
1	1980.0	1929.0	1941.0	1920.0	2000	Mains voltage From: 230 V Jump to: 242 V	
2	1922.0	1936.0	1938.0	1915.5	2000		
3	1926.0	1925.0	1936.0	1924.0	2000		
4	1929.0	1934.0	1933.5	1913.0	2000		
5	1925.0	1934.0	1936.0	1929.0	2000		
Over voltage level 2	Measurement [ms]				Limit [ms]	Remark	
	L1	L2	L3	L123			
1	41.0	46.0	35.5	44.0	50	Mains voltage From: 230 V Jump to: 272 V	
2	46.0	32.5	38.5	28.0	50		
3	43.0	49.0	38.0	28.5	50		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

4	42.5	48.0	37.0	27.0	50	
5	42.0	47.5	36.5	45.0	50	
Under voltage level 1	Measurement [ms]				Limit [ms]	Remark
	L1	L2	L3	L123		
1	1937.0	1939.0	1928.0	1917.0	2000	Mains voltage From: 230 V Jump to: 198 V
2	1938.0	1940.0	1931.0	1925.0	2000	
3	1933.0	1940.0	1930.0	1920.0	2000	
4	1942.0	1930.0	1935.0	1921.5	2000	
5	1940.0	1924.0	1927.0	1925.0	2000	
Under voltage level 2	Measurement [ms]				Limit [ms]	Remark
	L1	L2	L3	L123		
1	84.0	88.0	92.0	80.0	100	Mains voltage From: 230V Jump to: 113V
2	91.0	77.0	91.0	74.0	100	
3	87.0	89.0	79.0	86.0	100	
4	87.0	76.0	80.0	77.0	100	
5	87.0	84.0	81.0	68.0	100	

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

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Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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				
Frequency detection accuracy [Hz]	±0.1	Frequency detection cycle Td [ms]	20	
Magnitude Fo [Hz]	52.1	Fo delay time To [ms]	70	
Magnitude Fu [Hz]	46.9	Fu delay time Tu [ms]	70	
Over frequency	Measurement [ms]	Limit [ms]	Remark	
1	88.0	100	Mains voltage frequency From: 50Hz Jump to: 52.2Hz	
2	88.0	100		
3	78.0	100		
4	93.0	100		
5	86.0	100		
Under frequency	Measurement [ms]	Limit [ms]	Remark	
1	87.0	100	Mains voltage frequency From: 50Hz Jump to: 46.8Hz	
2	85.0	100		
3	79.0	100		
4	96.0	100		
5	89.0	100		
Remark:				

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

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Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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

4.3.6 Islanding Protection

PROCEDURE
Test method complies with standard IEC 62116. $Q_f = \sqrt{(Q_1)^2 + \sqrt{(Q_1)^2 P_W}}$

RESULTS ☒Pass / ☐Fail

4.3.6 TABLE: Islanding Protection

Mains voltage: 230V

Power 100

Conditions	P_W[W]	Q_1[Var]	Q_C[Var]	Q_f	Trip time [ms]	Limitation [ms]
PR: -10 Qc: +10	L1: 4.60	L1: 5.70	L1: 5.09	1.17	102.5	
	L2: 4.55	L2: 5.56	L2: 5.10	1.17		2000
	L3: 4.58	L3: 5.59	L3: 5.10	1.17		
PR: -10 Qc: +5	L1: 4.60	L1: 5.44	L1: 5.09	1.14	104.0	
	L2: 4.55	L2: 5.31	L2: 5.10	1.14		2000
	L3: 4.58	L3: 5.33	L3: 5.10	1.14		
PR: -10 Qc: 0	L1: 4.60	L1: 5.18	L1: 5.09	1.11	107.0	
	L2: 4.55	L2: 5.06	L2: 5.10	1.12		2000
	L3: 4.58	L3: 5.08	L3: 5.10	1.11		
PR: -10 Qc: -5	L1: 4.60	L1: 4.92	L1: 5.09	1.09	109.0	
	L2: 4.55	L2: 4.80	L2: 5.10	1.09		2000
	L3: 4.58	L3: 4.82	L3: 5.10	1.08		
PR: -10 Qc: -10	L1: 4.60	L1: 4.66	L1: 5.09	1.06	111.0	
	L2: 4.55	L2: 4.55	L2: 5.10	1.06		2000

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

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Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

	L3:	4.58	L3:	4.57	L3:	5.10	1.05				
PR: -5 Qc: +10	L1:	4.86	L1:	5.70	L1:	5.09	1.11		111.5		
	L2:	4.80	L2:	5.56	L2:	5.10	1.11				2000
	L3:	4.83	L3:	5.59	L3:	5.10	1.10				
PR: -5 Qc: -10	L1:	4.86	L1:	4.66	L1:	5.09	1.00		113.0		
	L2:	4.80	L2:	4.55	L2:	5.10	1.00				2000
	L3:	4.83	L3:	4.57	L3:	5.10	1.00				
PR: 0 Qc: +10	L1:	5.12	L1:	5.70	L1:	5.09	1.05		114.5		
	L2:	5.06	L2:	5.56	L2:	5.10	1.05				2000
	L3:	5.09	L3:	5.59	L3:	5.10	1.05				
PR: -5 Qc: +5	L1:	4.86	L1:	5.44	L1:	5.09	1.08		140.0		
	L2:	4.80	L2:	5.31	L2:	5.10	1.08				2000
	L3:	4.83	L3:	5.33	L3:	5.10	1.08				
PR: -5 Qc: 0	L1:	4.86	L1:	5.18	L1:	5.09	1.06		197.0		
	L2:	4.80	L2:	5.06	L2:	5.10	1.06				2000
	L3:	4.83	L3:	5.08	L3:	5.10	1.05				
PR: -5 Qc: -5	L1:	4.86	L1:	4.92	L1:	5.09	1.03		205.0		
	L2:	4.80	L2:	4.80	L2:	5.10	1.03				2000
	L3:	4.83	L3:	4.82	L3:	5.10	1.03				
PR: 0 Qc: +5	L1:	5.12	L1:	5.44	L1:	5.09	1.03		236.5		
	L2:	5.06	L2:	5.31	L2:	5.10	1.03				2000
	L3:	5.09	L3:	5.33	L3:	5.10	1.03				
PR: 0 Qc: 0	L1:	5.12	L1:	5.18	L1:	5.09	1.00		256.0		
	L2:	5.06	L2:	5.06	L2:	5.10	1.00				2000

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

	L3: 5.09	L3: 5.08	L3: 5.10	1.00		
PR: 0 Qc: -5	L1: 5.12	L1: 4.92	L1: 5.09	0.98	229.5	2000
	L2: 5.06	L2: 4.80	L2: 5.10	0.98		
	L3: 5.09	L3: 4.82	L3: 5.10	0.98		
PR: +5 Qc: +5	L1: 5.37	L1: 5.44	L1: 5.09	0.96	208.0	2000
	L2: 5.31	L2: 5.31	L2: 5.10	0.98		
	L3: 5.34	L3: 5.33	L3: 5.10	0.98		
PR: +5 Qc: 0	L1: 5.37	L1: 5.18	L1: 5.09	0.96	156.0	2000
	L2: 5.31	L2: 5.06	L2: 5.10	0.96		
	L3: 5.34	L3: 5.08	L3: 5.10	0.95		
PR: +5 Qc: -5	L1: 5.37	L1: 4.92	L1: 5.09	0.93	121.0	2000
	L2: 5.31	L2: 4.80	L2: 5.10	0.93		
	L3: 5.34	L3: 4.82	L3: 5.10	0.93		
PR: 0 Qc: -10	L1: 5.12	L1: 4.66	L1: 5.09	0.95	112.0	2000
	L2: 5.06	L2: 4.55	L2: 5.10	0.95		
	L3: 5.09	L3: 4.57	L3: 5.10	0.95		
PR: +5 Qc: +10	L1: 5.37	L1: 5.70	L1: 5.09	1.00	108.0	2000
	L2: 5.31	L2: 5.56	L2: 5.10	1.00		
	L3: 5.34	L3: 5.59	L3: 5.10	1.00		
PR: +5 Qc: -10	L1: 5.37	L1: 4.66	L1: 5.09	0.91	105.0	2000
	L2: 5.31	L2: 4.55	L2: 5.10	0.91		
	L3: 5.34	L3: 4.57	L3: 5.10	0.90		
PR: +10 Qc: +10	L1: 5.63	L1: 5.70	L1: 5.09	0.96	102.0	2000
	L2: 5.56	L2: 5.56	L2: 5.10	0.96		
	L3: 5.59	L3: 5.59	L3: 5.10	0.95		

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

Finished date: Tested by:

Review date: Reviewed by:

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Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

P_R: +10 Q_C: +5	L1: 5.63	L1: 5.44	L1: 5.09	0.93	92.5	2000	
	L2: 5.56	L2: 5.31	L2: 5.10	0.94			
	L3: 5.59	L3: 5.33	L3: 5.10	0.93			
P_R: +10 Q_C: 0	L1: 5.63	L1: 5.18	L1: 5.09	0.91	91.0	2000	
	L2: 5.56	L2: 5.06	L2: 5.10	0.91			
	L3: 5.59	L3: 5.08	L3: 5.10	0.91			
P_R: +10 Q_C: -5	L1: 5.63	L1: 4.92	L1: 5.09	0.89	84.0	2000	
	L2: 5.56	L2: 4.80	L2: 5.10	0.89			
	L3: 5.59	L3: 4.82	L3: 5.10	0.89			
P_R: +10 Q_C: -10	L1: 5.63	L1: 4.66	L1: 5.09	0.87	80.0	2000	
	L2: 5.56	L2: 4.55	L2: 5.10	0.87			
	L3: 5.59	L3: 4.57	L3: 5.10	0.86			

Power 66

Conditions	P_W[W]	Q_L[VA]	Q_C[VA]	Q_I	Trip time [ms]	Limitation [ms]
P_R: 0 Q_C: -5	L1: 3.52	L1: 3.36	L1: 3.55	0.98	124.0	2000
	L2: 3.50	L2: 3.37	L2: 3.54	0.99		
	L3: 3.52	L3: 3.37	L3: 3.56	0.98		
P_R: 0 Q_C: -4	L1: 3.52	L1: 3.39	L1: 3.55	0.99	141.0	2000
	L2: 3.50	L2: 3.40	L2: 3.54	0.99		
	L3: 3.52	L3: 3.41	L3: 3.56	0.99		
P_R: 0 Q_C: -3	L1: 3.52	L1: 3.43	L1: 3.55	0.99	156.0	2000
	L2: 3.50	L2: 3.44	L2: 3.54	1.00		
	L3: 3.52	L3: 3.44	L3: 3.56	0.99		
P_R: 0 Q_C: -2	L1: 3.52	L1: 3.46	L1: 3.55	1.00	180.0	2000
	L2: 3.50	L2: 3.47	L2: 3.54	1.00		

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

Finished date: Tested by:

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TÜV Rheinland (Shanghai) Co., Ltd. Document No.: MS-0025001-appendix 13

Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

	L3: 3.52	L3: 3.48	L3: 3.56	1.00		
PR: 0 Qc: -1	L1: 3.52	L1: 3.50	L1: 3.55	1.00	237.0	2000
	L2: 3.50	L2: 3.51	L2: 3.54	1.01		
	L3: 3.52	L3: 3.51	L3: 3.56	1.00		
PR: 0 Qc: 0	L1: 3.52	L1: 3.53	L1: 3.55	1.01	321.0	2000
	L2: 3.50	L2: 3.54	L2: 3.54	1.01		
	L3: 3.52	L3: 3.55	L3: 3.56	1.01		
PR: 0 Qc: +1	L1: 3.52	L1: 3.57	L1: 3.55	1.01	230.0	2000
	L2: 3.50	L2: 3.58	L2: 3.54	1.02		
	L3: 3.52	L3: 3.59	L3: 3.56	1.01		
PR: 0 Qc: +2	L1: 3.52	L1: 3.60	L1: 3.55	1.02	195.0	2000
	L2: 3.50	L2: 3.61	L2: 3.54	1.02		
	L3: 3.52	L3: 3.62	L3: 3.56	1.02		
PR: 0 Qc: +3	L1: 3.52	L1: 3.64	L1: 3.55	1.02	160.0	2000
	L2: 3.50	L2: 3.65	L2: 3.54	1.03		
	L3: 3.52	L3: 3.66	L3: 3.56	1.02		
PR: 0 Qc: +4	L1: 3.52	L1: 3.67	L1: 3.55	1.03	148.0	2000
	L2: 3.50	L2: 3.68	L2: 3.54	1.03		
	L3: 3.52	L3: 3.69	L3: 3.56	1.03		
PR: 0 Qc: +5	L1: 3.52	L1: 3.71	L1: 3.55	1.03	140.0	2000
	L2: 3.50	L2: 3.72	L2: 3.54	1.04		
	L3: 3.52	L3: 3.73	L3: 3.56	1.03		
Power 33						
Conditions	P_W[w]	Q_L[VA]	Q_C[VA]	Q_F	Trip time [ms]	Limitation [ms]
PR: 0	L1: 1.75	L1: 1.65	L1: 1.75	0.97	121.0	

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

Finished date: Tested by:

Review date: Reviewed by:

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Qc: -5	L2:	1.74	L2:	1.66	L2:	1.76	0.98				2000
	L3:	1.76	L3:	1.66	L3:	1.75	0.97				
PR: 0 Qc: -4	L1:	1.75	L1:	1.67	L1:	1.75	0.98				
	L2:	1.74	L2:	1.68	L2:	1.76	0.98		143.0		2000
	L3:	1.76	L3:	1.68	L3:	1.75	0.98				
PR: 0 Qc: -3	L1:	1.75	L1:	1.69	L1:	1.75	0.98				
	L2:	1.74	L2:	1.70	L2:	1.76	0.99		154.0		2000
	L3:	1.76	L3:	1.70	L3:	1.75	0.98				
PR: 0 Qc: -2	L1:	1.75	L1:	1.70	L1:	1.75	0.99				
	L2:	1.74	L2:	1.71	L2:	1.76	0.99		229.0		2000
	L3:	1.76	L3:	1.72	L3:	1.75	0.99				
PR: 0 Qc: -1	L1:	1.75	L1:	1.72	L1:	1.75	0.99				
	L2:	1.74	L2:	1.73	L2:	1.76	1.00		251.0		2000
	L3:	1.76	L3:	1.73	L3:	1.75	0.99				
PR: 0 Qc: 0	L1:	1.75	L1:	1.74	L1:	1.75	1.00				
	L2:	1.74	L2:	1.75	L2:	1.76	1.00		256.0		2000
	L3:	1.76	L3:	1.75	L3:	1.75	1.00				
PR: 0 Qc: +1	L1:	1.75	L1:	1.76	L1:	1.75	1.00				
	L2:	1.74	L2:	1.77	L2:	1.76	1.01		237.0		2000
	L3:	1.76	L3:	1.77	L3:	1.75	1.00				
PR: 0 Qc: +2	L1:	1.75	L1:	1.77	L1:	1.75	1.01				
	L2:	1.74	L2:	1.78	L2:	1.76	1.01		170.0		2000
	L3:	1.76	L3:	1.79	L3:	1.75	1.01				
PR: 0 Qc: +3	L1:	1.75	L1:	1.79	L1:	1.75	1.01		163.0		
	L2:	1.74	L2:	1.80	L2:	1.76	1.02				2000

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

	L3: 1.76	L3: 1.80	L3: 1.75	1.01		
PR: 0 Qc: +4	L1: 1.75	L1: 1.81	L1: 1.75	1.02	131.0	
	L2: 1.74	L2: 1.82	L2: 1.76	1.02		2000
	L3: 1.76	L3: 1.82	L3: 1.75	1.02		
PR: 0 Qc: +5	L1: 1.75	L1: 1.82	L1: 1.75	1.02		
	L2: 1.74	L2: 1.84	L2: 1.76	1.03	129.0	2000
	L3: 1.76	L3: 1.84	L3: 1.75	1.02		
Remark:						

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

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	Frequency detection accuracy [Hz]	±0.1	
Specified recover voltage range	200-240V	Specified recover frequency range	47-52Hz	
Recover time [s]	120			

Conditions[2]	U_M back to 242V	U_M back to 238V	U_M back to 198V	U_M back to 202V
Reconnection	☐ Yes/ ☒ No	☒ Yes/ ☐ No	☐ Yes/ ☒ No	☒ Yes/ ☐ No
Recover time [s]	N/A	121.05	N/A	120.75
Conditions[3]	F_M back to 52.2Hz	F_M back to 51.8Hz	F_M back to 46.8Hz	F_M back to 47.2Hz
Reconnection	☐ Yes/ ☒ No	☒ Yes/ ☐ No	☐ Yes/ ☒ No	☒ Yes/ ☐ No
Recover time [s]	N/A	125.55	N/A	124.95
Conditions[4]	U_M back to 242V	U_M back to 238V	U_M back to 198V	U_M back to 202V
Reconnection	☐ Yes/ ☒ No	☒ Yes/ ☐ No	☐ Yes/ ☒ No	☒ Yes/ ☐ No
Recover time [s]	N/A	124.80	N/A	121.20
Conditions[5]	U_M back to 238V	U_M back to 202V	F_M back to 51.8Hz	F_M back to 47.2Hz
Reconnection	☒ Yes/ ☐ No	☒ Yes/ ☐ No	☒ Yes/ ☐ No	☒ Yes/ ☐ No
Recover time [s]	123.00	123.30	124.50	124.80
Conditions[6]	U_M back to 238V	U_M back to 202V		
Reconnection	☒ Yes/ ☐ No	☒ Yes/ ☐ No		
Recover time [s]	125.40	121.50		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Remark:
1) U_M =Mains voltage; F_M=Mains frequency
2) After mains voltage tripped the over/under voltage level 1 limit
3) After mains voltage frequency tripped the over/under frequency limit
4) After mains voltage tripped the over/under voltage level 2 limit
5) Retest with an abnormal 1st level voltage/frequency change event that is introduced during the reconnect countdown period
6) Retest with an abnormal 2nd 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:	
Review date:		Reviewed by:	

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	1	Clause:	4.3.4
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:	During the first level over voltage test, the L1 grid voltage was jumped to 242V approximately, trip time 1980.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	2	Clause:	4.3.4
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:	During the first level over voltage test, the L1 grid voltage was jumped to 242V approximately, trip time 1922.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	3	Clause:	4.3.4
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:	During the first level over voltage test, the L1 grid voltage was jumped to 242V approximately, trip time 1926.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	4	Clause:	4.3.4
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:	During the first level over voltage test, the L1 grid voltage was jumped to 242V approximately, trip time 1929.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	5	Clause:	4.3.4
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:	During the first level over voltage test, the L1 grid voltage was jumped to 242V approximately, trip time 1925.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	6	Clause:	4.3.4
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:	During the first level over voltage test, the L2 grid voltage was jumped to 242V approximately, trip time 1929.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	7	Clause:	4.3.4
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:	During the first level over voltage test, the L2 grid voltage was jumped to 242V approximately, trip time 1936.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	8	Clause:	4.3.4
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:	During the first level over voltage test, the L2 grid voltage was jumped to 242V approximately, trip time 1925.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	9	Clause:	4.3.4
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:	During the first level over voltage test, the L2 grid voltage was jumped to 242V approximately, trip time 1934.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	10	Clause:	4.3.4
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:	During the first level over voltage test, the L2 grid voltage was jumped to 242V approximately, trip time 1934.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	11	Clause:	4.3.4
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:	During the first level over voltage test, the L3 grid voltage was jumped to 242V approximately, trip time 1941.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	12	Clause:	4.3.4
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:	During the first level over voltage test, the L3 grid voltage was jumped to 242V approximately, trip time 1938.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	13	Clause:	4.3.4
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:	During the first level over voltage test, the L3 grid voltage was jumped to 242V approximately, trip time 1936.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 (Report no.) **วันที่ออกรายงาน: July 28, 2021** (Issued date)

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	14	Clause:	4.3.4
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:	During the first level over voltage test, the L3 grid voltage was jumped to 242V approximately, trip time 1933.5ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	15	Clause:	4.3.4
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:	During the first level over voltage test, the L3 grid voltage was jumped to 242V approximately, trip time 1936.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	16	Clause:	4.3.4
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:	During the first level over voltage test, the L123 grid voltage was jumped to 242V approximately, trip time 1920.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	17	Clause:	4.3.4
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:	During the first level over voltage test, the L123 grid voltage was jumped to 242V approximately, trip time 1915.5ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	18	Clause:	4.3.4
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:	During the first level over voltage test, the L123 grid voltage was jumped to 242V approximately, trip time 1924.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	19	Clause:	4.3.4
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:	During the first level over voltage test, the L123 grid voltage was jumped to 242V approximately, trip time 1913.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	20	Clause:	4.3.4
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:	During the first level over voltage test, the L123 grid voltage was jumped to 242V approximately, trip time 1929.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	21	Clause:	4.3.4
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:	During the second level over voltage test, the L1 grid voltage was jumped to 272V approximately, trip time 41.0ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter. Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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(Report no.) (Issued date)

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	22	Clause:	4.3.4
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:	During the second level over voltage test, the L1 grid voltage was jumped to 272V approximately, trip time 46.0ms. The wave No.1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	23	Clause:	4.3.4
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:	During the second level over voltage test, the L1 grid voltage was jumped to 272V approximately, trip time 43.0ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter. Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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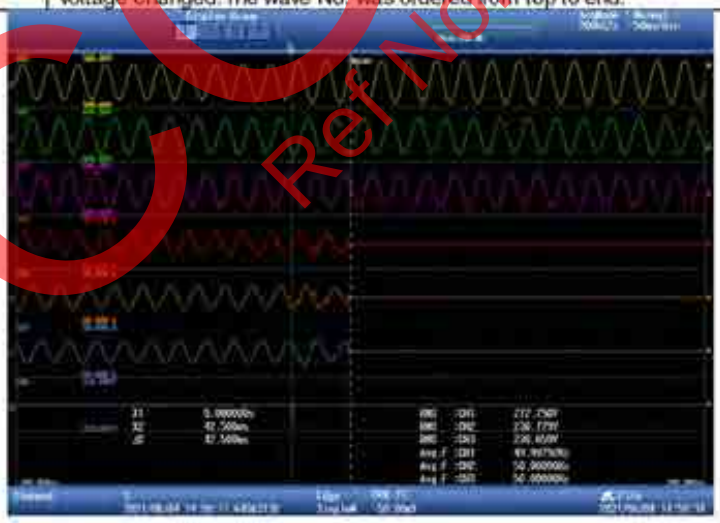
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	24	Clause:	4.3.4
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:	During the second level over voltage test, the L1 grid voltage was jumped to 272V approximately, trip time 42.5ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	25	Clause:	4.3.4
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:	During the second level over voltage test, the L1 grid voltage was jumped to 272V approximately, trip time 42.0ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter. Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	26	Clause:	4.3.4
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:	During the second level over voltage test, the L2 grid voltage was jumped to 272V approximately, trip time 46.0 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	27	Clause:	4.3.4
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:	During the second level over voltage test, the L2 grid voltage was jumped to 272V approximately, trip time 32.5 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter; Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	28	Clause:	4.3.4
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:	During the second level over voltage test, the L2 grid voltage was jumped to 272V approximately, trip time 49.0 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter, Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	29	Clause:	4.3.4
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:	During the second level over voltage test, the L2 grid voltage was jumped to 272V approximately, trip time 48.0 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter; Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	30	Clause:	4.3.4
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:	During the second level over voltage test, the L2 grid voltage was jumped to 272V approximately, trip time 47.5 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter, Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	31	Clause:	4.3.4
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:	During the second level over voltage test, the L3 grid voltage was jumped to 272V approximately, trip time 35.5 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter; Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	32	Clause:	4.3.4
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:	During the second level over voltage test, the L3 grid voltage was jumped to 272V approximately, trip time 38.5 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed.The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	33	Clause:	4.3.4
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:	During the second level over voltage test, the L3 grid voltage was jumped to 272V approximately, trip time 38.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	34	Clause:	4.3.4
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:	During the second level over voltage test, the L3 grid voltage was jumped to 272V approximately, trip time 37.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	35	Clause:	4.3.4
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:	During the second level over voltage test, the L3 grid voltage was jumped to 272V approximately, trip time 36.5 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	36	Clause:	4.3.4
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:	During the second level over voltage test, the L123 grid voltage was jumped to 272V approximately, trip time 44.0 ms The wave No.1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	37	Clause:	4.3.4
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:	During the second level over voltage test, the L123 grid voltage was jumped to 272V approximately, trip time 28.0 ms The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter, Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	38	Clause:	4.3.4
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:	During the second level over voltage test, the L123 grid voltage was jumped to 272V approximately, trip time 28.5 ms The wave No.1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter,Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	39	Clause:	4.3.4
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:	During the second level over voltage test, the L123 grid voltage was jumped to 272V approximately, trip time 27.0 ms The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter. Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	40	Clause:	4.3.4
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:	During the second level over voltage test, the L123 grid voltage was jumped to 272V approximately, trip time 45.0 ms. The wave No. 1/2/3 were the grid voltages; The wave No. 5/6/7 were the output currents of inverter, Wave No.8 was the trip signal while the grid voltage changed. The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	41	Clause:	4.3.4
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:	During the first level under voltage test, the L1 grid voltage was jumped to 198V approximately, trip time 1937.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	42	Clause:	4.3.4
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:	During the first level under voltage test, the L1 grid voltage was jumped to 198V approximately, trip time 1938.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	43	Clause:	4.3.4
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:	During the first level under voltage test, the L1 grid voltage was jumped to 198V approximately, trip time 1933.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	44	Clause:	4.3.4
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:	During the first level under voltage test, the L1 grid voltage was jumped to 198V approximately, trip time 1942.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	45	Clause:	4.3.4
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:	During the first level under voltage test, the L1 grid voltage was jumped to 198V approximately, trip time 1940.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	46	Clause:	4.3.4
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:	During the first level under voltage test, the L2 grid voltage was jumped to 198V approximately, trip time 1939.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	47	Clause:	4.3.4
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:	During the first level under voltage test, the L2 grid voltage was jumped to 198V approximately, trip time 1940.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	48	Clause:	4.3.4
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:	During the first level under voltage test, the L2 grid voltage was jumped to 198V approximately, trip time 1940.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	49	Clause:	4.3.4
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:	During the first level under voltage test, the L2 grid voltage was jumped to 198V approximately, trip time 1930.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	50	Clause:	4.3.4
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:	During the first level under voltage test, the L2 grid voltage was jumped to 198V approximately, trip time 1924.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	51	Clause:	4.3.4
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:	During the first level under voltage test, the L3 grid voltage was jumped to 198V approximately, trip time 1928.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	52	Clause:	4.3.4
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:	During the first level under voltage test, the L3 grid voltage was jumped to 198V approximately, trip time 1931.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	53	Clause:	4.3.4
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:	During the first level under voltage test, the L3 grid voltage was jumped to 198V approximately, trip time 1930.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed. The wave No. was ordered 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: July 28, 2021 (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

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TÜV Rheinland

TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	54	Clause:	4.3.4
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:	During the first level under voltage test, the L3 grid voltage was jumped to 198V approximately, trip time 1935.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	55	Clause:	4.3.4
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:	During the first level under voltage test, the L3 grid voltage was jumped to 198V approximately, trip time 1927.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	56	Clause:	4.3.4
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:	During the first level under voltage test, the L123 grid voltage was jumped to 198V approximately, trip time 1917.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 (Report no.) **วันที่ออกรายงาน: July 28, 2021** (Issued date)

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	57	Clause:	4.3.4
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:	During the first level under voltage test, the L123 grid voltage was jumped to 198V approximately, trip time 1925.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	58	Clause:	4.3.4
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:	During the first level under voltage test, the L123 grid voltage was jumped to 198V approximately, trip time 1920.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	59	Clause:	4.3.4
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:	During the first level under voltage test, the L123 grid voltage was jumped to 198V approximately, trip time 1921.5 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	60	Clause:	4.3.4
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:	During the first level under voltage test, the L123 grid voltage was jumped to 198V approximately, trip time 1925.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	61	Clause:	4.3.4
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:	During the second level under voltage test, the L1 grid voltage was jumped to 113V approximately, trip time 84.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	62	Clause:	4.3.4
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:	During the second level under voltage test, the L1 grid voltage was jumped to 113V approximately, trip time 91.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	63	Clause:	4.3.4
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:	During the second level under voltage test, the L1 grid voltage was jumped to 113V approximately, trip time 87.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	64	Clause:	4.3.4
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:	During the second level under voltage test, the L1 grid voltage was jumped to 113V approximately, trip time 87.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	65	Clause:	4.3.4
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:	During the second level under voltage test, the L1 grid voltage was jumped to 113V approximately, trip time 87.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	66	Clause:	4.3.4
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:	During the second level under voltage test, the L2 grid voltage was jumped to 113V approximately, trip time 88.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	67	Clause:	4.3.4
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:	During the second level under voltage test, the L2 grid voltage was jumped to 113V approximately, trip time 77.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	68	Clause:	4.3.4
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:	During the second level under voltage test, the L2 grid voltage was jumped to 113V approximately, trip time 89.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	69	Clause:	4.3.4
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:	During the second level under voltage test, the L2 grid voltage was jumped to 113V approximately, trip time 76.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	70	Clause:	4.3.4
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:	During the second level under voltage test, the L2 grid voltage was jumped to 113V approximately, trip time 84.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	71	Clause:	4.3.4
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:	During the second level under voltage test, the L3 grid voltage was jumped to 113V approximately, trip time 92.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	72	Clause:	4.3.4
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:	During the second level under voltage test, the L3 grid voltage was jumped to 113V approximately, trip time 91.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	73	Clause:	4.3.4
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:	During the second level under voltage test, the L3 grid voltage was jumped to 113V approximately, trip time 79.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3- Hybrid-15.0

Attachment : 1

Picture No.:	74	Clause:	4.3.4
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:	During the second level under voltage test, the L3 grid voltage was jumped to 113V approximately, trip time 80.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	75	Clause:	4.3.4
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:	During the second level under voltage test, the L3 grid voltage was jumped to 113V approximately, trip time 81.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	76	Clause:	4.3.4
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:	During the second level under voltage test, the L123 grid voltage was jumped to 113V approximately, trip time 80.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	77	Clause:	4.3.4
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:	During the second level under voltage test, the L123 grid voltage was jumped to 113V approximately, trip time 74.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	78	Clause:	4.3.4
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:	During the second level under voltage test, the L123 grid voltage was jumped to 113V approximately, trip time 86.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	79	Clause:	4.3.4
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:	During the second level under voltage test, the L123 grid voltage was jumped to 113V approximately, trip time 77.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	80	Clause:	4.3.4
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:	During the second level under voltage test, the L123 grid voltage was jumped to 113V approximately, trip time 68.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	81	Clause:	4.3.5
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:	During over frequency test, the grid voltage was jumped to 52.2Hz approximately, trip time 88.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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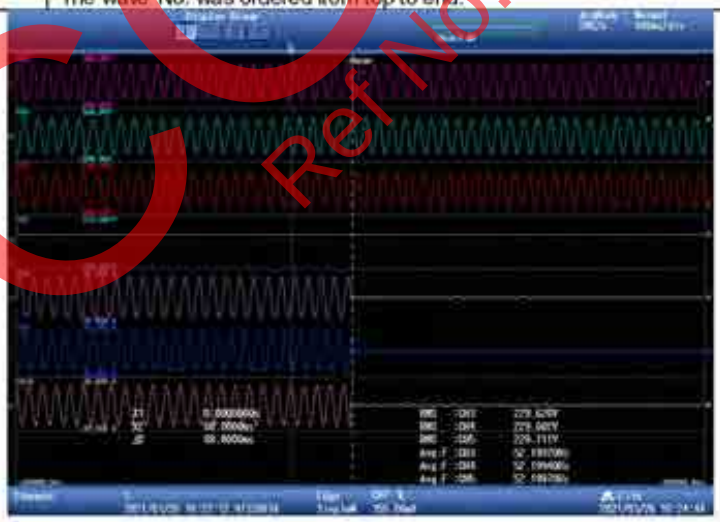
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	82	Clause:	4.3.5
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:	During over frequency test, the grid voltage was jumped to 52.2Hz approximately, trip time 88.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	83	Clause:	4.3.5
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:	During over frequency test, the grid voltage was jumped to 52.2Hz approximately, trip time 78.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	84	Clause:	4.3.5
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:	During over frequency test, the grid voltage was jumped to 52.2Hz approximately, trip time 93.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	85	Clause:	4.3.5
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:	During over frequency test, the grid voltage was jumped to 52.2Hz approximately, trip time 86.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered from top to end.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	86	Clause:	4.3.5
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:	During under frequency test, the grid voltage was jumped to 46.8Hz approximately, trip time 87.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	87	Clause:	4.3.5
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:	During under frequency test, the grid voltage was jumped to 46.8Hz approximately, trip time 85.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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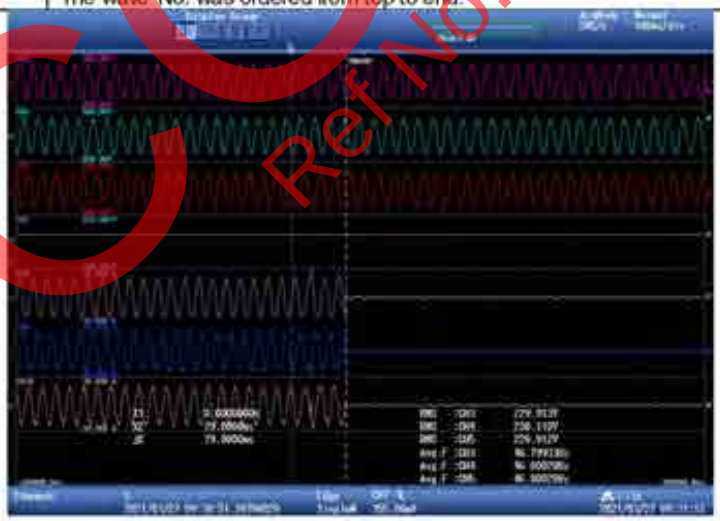
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	88	Clause:	4.3.5
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:	During under frequency test, the grid voltage was jumped to 46.8Hz approximately, trip time 79.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter, Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	89	Clause:	4.3.5
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:	During under frequency test, the grid voltage was jumped to 46.8Hz approximately, trip time 96.0 ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	90	Clause:	4.3.5
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:	During under frequency test, the grid voltage was jumped to 46.8Hz approximately, trip time 89.0ms. The wave No. 3/4/5 were the grid voltages; The wave No. 8/9/10 were the output currents of inverter,Wave No.7 was the trip signal while the grid voltage changed.; The wave No. was ordered 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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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	91	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:	100 load, PR: -10, QL: +10, the trip time of protection was 102. 5 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	92	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:	100 load, PR: -10, QL: +5, the trip time of protection was 104. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	93	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:	100 load, PR: -10, QL: 0, the trip time of protection was 107. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	94	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:	100 load, PR: -10, QL: -5, the trip time of protection was 109. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	95	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:	100 load, PR: -10, QL: -10, the trip time of protection was 111. 0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	96	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:	100 load, PR: -5, QL: +10, the trip time of protection was 111.5 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	97	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:	100 load, PR: -5, QL: -10, the trip time of protection was 113.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	98	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:	100 load, PR: 0, QL: +10, the trip time of protection was 114. 5 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	99	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:	100 load, PR: -5, QL: +5, the trip time of protection was 140. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	100	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:	100 load, PR: -5, QL: 0, the trip time of protection was 197.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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 (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	101	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:	100 load, PR: -5, QL: -5, the trip time of protection was 205. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	102	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:	100 load, PR: 0, QL: +5, the trip time of protection was 236. 5ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	103	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:	100 load, PR: 0, QL: 0, the trip time of protection was 256.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	104	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:	100 load, the fundamental magnitude of grid current of phase L1 was 0.082A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	105	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:	100 load, the fundamental magnitude of grid current of phase L2 was 0.061A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	106	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:	100 load, the fundamental magnitude of grid current of phase L3 was 0.086A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	107	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:	100 load, PR: 0, QL: -5, the trip time of protection was 229. 5 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	108	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:	100 load, PR: +5, QL: +5, the trip time of protection was 208. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	109	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:	100 load, PR: +5, QL: 0, the trip time of protection was 156. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	110	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:	100 load, PR: +5, QL: -5, the trip time of protection was 121. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	111	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:	100 load, PR: 0, QL: -10, the trip time of protection was 112.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	112	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:	100 load, PR: +5, QL: +10, the trip time of protection was 108.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	113	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:	100 load, PR: +5, QL: -10, the trip time of protection was 105.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	114	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:	100 load, PR: +10, QL: +10, the trip time of protection was 102.0 ms. CH1/2/7 were the output currents of the inverter, CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	115	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:	100 load, PR: +10, QL: +5, the trip time of protection was 92.5 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	116	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:	100 load, PR: +10, QL: 0, the trip time of protection was 91.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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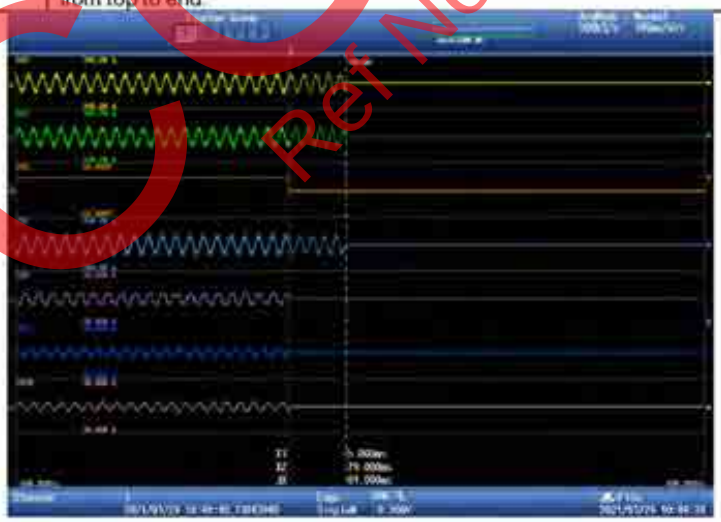
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	117	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:	100 load, PR: +10, QL: -5, the trip time of protection was 84.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		



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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Test Data / Test Plan

TÜVRheinland®

TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	118	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:	100 load, PR: +10, QL: -10, the trip time of protection was 80.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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 (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	119	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, PR: 0, QL: -5, the trip time of protection was 124. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	120	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, PR: 0, QL: -4, the trip time of protection was 141.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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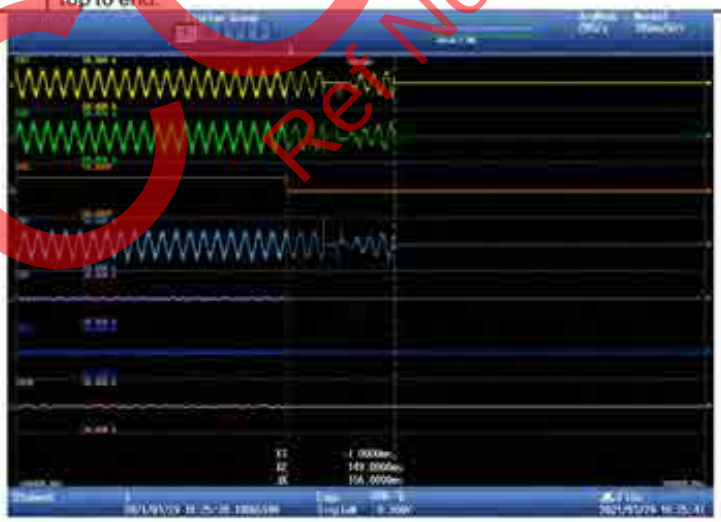
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	121	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, PR: 0, QL: -3, the trip time of protection was 156.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		



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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	122	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, PR: 0, QL: -2, the trip time of protection was 180.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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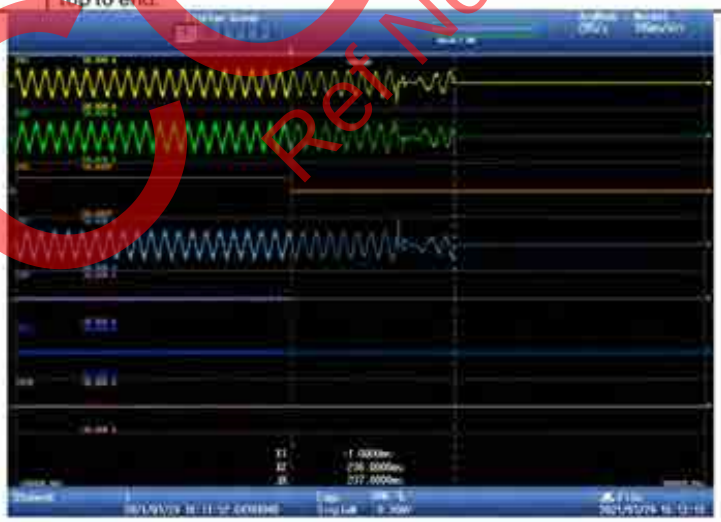
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	123	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, PR: 0, QL: -1, the trip time of protection was 237.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		



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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	124	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, PR: 0, QL: 0, the trip time of protection was 321.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	125	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 0.092A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	126	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 L2 was 0.078A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	127	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 L3 was 0.052 A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	128	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, PR: 0, QL: +1, the trip time of protection was 230.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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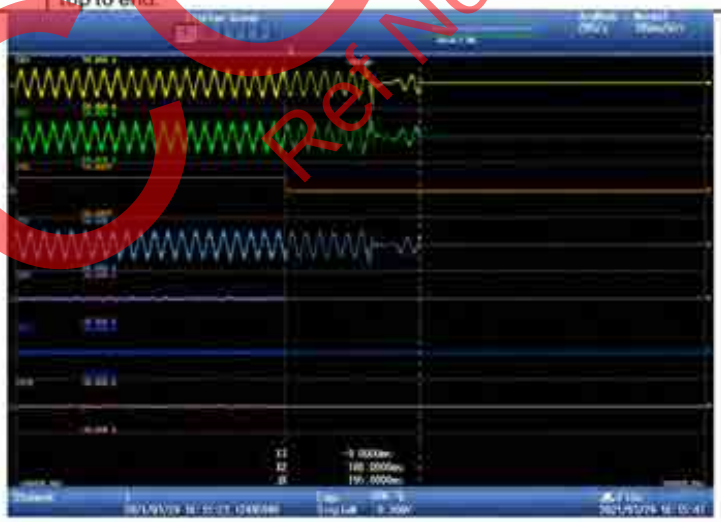
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	129	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, PR: 0, QL: +2, the trip time of protection was 195.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		



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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	130	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, PR: 0, QL: +3, the trip time of protection was 160.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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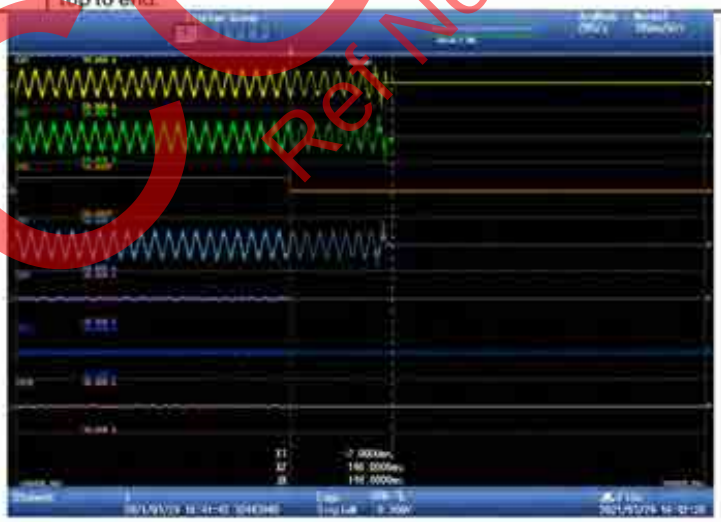
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	131	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, PR: 0, QL: +4, the trip time of protection was 148.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		



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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	132	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, PR: 0, QL: +5, the trip time of protection was 140.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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 (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	133	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:	33 load, PR: 0, QL: -5, the trip time of protection was 121. 0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	134	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:	33 load, PR: 0, QL: -4, the trip time of protection was 143.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	135	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:	33 load, PR: 0, QL: -3, the trip time of protection was 154.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	136	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:	33 load, PR: 0, QL: -2, the trip time of protection was 229.0ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	137	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:	33 load, PR: 0, QL: -1, the trip time of protection was 251.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	138	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:	33 load, PR: 0, QL: 0, the trip time of protection was 256.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	139	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:	33 load, the fundamental magnitude of grid current of phase L1 was 0.043A, less than 1 % of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No.:	244313300	Product:	Grid-Connected PV Inverter
Client Name:	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	140	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:	33 load, the fundamental magnitude of grid current of phase L2 was 0.025A, less than 1 of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	141	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:	33 load, the fundamental magnitude of grid current of phase L3 was 0.038A, less than 1 of the rated current 0.217 A. See the screenshot of the power analyzer for detail. (1st order harmonic current)		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	142	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:	33 load, PR: 0, QL: +1, the trip time of protection was 237.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	143	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:	33 load, PR: 0, QL: +2, the trip time of protection was 170.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	144	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:	33 load, PR: 0, QL: +3, the trip time of protection was 163.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	145	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:	33 load, PR: 0, QL: +4, the trip time of protection was 131.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	146	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:	33 load, PR: 0, QL: +5, the trip time of protection was 129.0 ms. CH1/2/7 were the output currents of the inverter; CH8/9/10 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.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	147	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage remained over 240V after the first level over voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	148	Clause:	4.3.7
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:	Inverter reconnect to grid with 121.05 delay while grid voltage remained below 240V after the first level over voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	149	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage remained under 200V after the first level under voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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 (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	150	Clause:	4.3.7
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:	Inverter reconnect to grid with 120.75s delay while grid voltage remained above 200V after the first level under voltage protection was tripped Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

หมายเลขรายงาน: CSSC/BOS/007 (Report no.) **วันที่ออกรายงาน: July 28, 2021** (Issued date)

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	151	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage frequency remained above 52Hz after the over frequency protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	152	Clause:	4.3.7
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:	Inverter reconnect to grid with 125.55 s delay while grid voltage frequency remained below 52Hz after the over frequency protection was tripped Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	153	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage frequency remained below 47Hz after the under frequency protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	154	Clause:	4.3.7
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:	Inverter reconnect to grid with 124.95 s delay while grid voltage frequency remained over 49Hz after the under frequency protection was tripped Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	155	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage remained over 240V after the second level 2 over voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	156	Clause:	4.3.7
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:	Inverter reconnect to grid with 124.80 s delay while grid voltage remained below 240V after the level 2 over voltage protection was tripped Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	157	Clause:	4.3.7
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:	Inverter won't reconnect to grid while the grid voltage remained under 200V after the second level 2 under voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	158	Clause:	4.3.7
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:	Inverter reconnect to grid with 121.2 s delay while grid voltage remained above 200V after the level 2 under voltage protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	159	Clause:	4.3.7
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:	Inverter reconnect to grid with 123.0 s delay while grid voltage remained below 240V. The grid voltage tripped over voltage level 1 again during the countdown period; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	160	Clause:	4.3.7
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:	Inverter reconnect to grid with 125.40 s delay while grid voltage remained below 240V. The grid voltage tripped over voltage level 2 again during the countdown period. Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	161	Clause:	4.3.7
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:	Inverter reconnect to grid with 123.30 s delay while grid voltage remained above 200V. The grid voltage tripped under voltage level 1 again during the countdown period .Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	162	Clause:	4.3.7
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:	Inverter reconnect to grid with 121.05 s delay while grid voltage remained above 200V. The grid voltage tripped under voltage level 2 again during the countdown period; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

Review date: Reviewed by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	163	Clause:	4.3.7
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:	Inverter reconnect to grid with 124.5 s delay while grid voltage frequency remained below 52Hz. The grid voltage frequency jumped over 52Hz again during the countdown period after the under frequency protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: Tested by:

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Picture No.:	164	Clause:	4.3.7
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:	Inverter reconnect to grid with 124.8 s delay while grid voltage frequency remained above 47Hz. The grid voltage frequency jumped below 47Hz again during the countdown period after the under frequency protection was tripped; Wave No.3/4/5 is the grid voltage; Wave No. 8/9/10 is the output current of inverter; Wave No.7 is the trip signal while grid voltage changed.		

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

Finished date: _____ Tested by: _____

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Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

Remark: Trip signal 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:		Tested by:	
Review date:		Reviewed by:	

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(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Test Data / Test Plan

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TÜV Rheinland (Shanghai) Co., Ltd.		Document No.:	MS-0025001-appendix 13
Grid-connected Inverter Regulation (Metropolitan Electricity Authority 2015)		Report No:	CN21EDK2 001
Order No. :	244313300	Product:	Grid-Connected PV Inverter
Client Name :	SolaX Power Network Technology (Zhejiang)Co.,Ltd	Model designation:	X3-Hybrid-15.0

Attachment : 1

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

Finished date: Tested by:

Review date: Reviewed by:

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(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

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

TÜVRheinland

Measurement and Test Equipment List
Used MTE

Revision: 20July, 2007 G.Luebken

Attachment: 2

Report No.: CN21EDK2 001 **Order No.: 244313300**

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-PLVHA/STD	JAPAN, Yokogawa
G1819268	Anti-islanding test detection devices	ACLT-4830H	QUNLING Energy Resources
G1815269	Harmonic impedance analog flicker system	ACLT-6150	QUNLING Energy Resources
G1819277	PV array simulator	62150H-1000S	Chroma Co.
G1819278	PV array simulator	62150H-1000S	Chroma Co.
G1819279	PV array simulator	62150H-1000S	Chroma Co.
G1819280	PV array simulator	62150H-1000S	Chroma Co.

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

Finished date: Tested by:

Review date: Reviewed by:

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(Report no.) (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Attachment 3: **Photo Documents**
Report Number: CN21EDK2 001
Model: X3-Hybrid-15.0

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หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Attachment 3: **Photo Documents**
Report Number: CN21EDK2 001
Model: X3-Hybrid-15.0

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หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

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ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Attachment 3: **Photo Documents**
Report Number: CN21EDK2 001
Model: X3-Hybrid-15.0

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หมายเลขรายงาน: CSSC/BOS/007 (Report no.)

วันที่ออกรายงาน: July 28, 2021 (Issued date)

ภาคผนวก ค. TÜV Rheinland's Report No: CN21EDK2 001 (ต่อ).

Attachment 3: **Photo Documents**
Report Number: CN21EDK2 001
Model: X3-Hybrid-15.0

TÜVRheinland

หมายเลขรายงาน: CSSC/BOS/007 **วันที่ออกรายงาน: July 28, 2021**

(Report no.) (Issued date)

ภาคผนวก ง. Laboratory Accreditation Certificate No. CNAS L3038.

ilac-MRA CNAS

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L3038)

TUV Rheinland (Shanghai) Co., Ltd.

(Legal Entity: TUV Rheinland (Shanghai) Co., Ltd.)

1/F. of No.10, No.153/165/177/178/179/182/189/192/198, Lane 777, Guangzhong West Road, Jing'an District, Shanghai, China

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

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

Effective Date: 2019-10-30

Expiry Date: 2023-11-18

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA).

The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml.