TESTING FOR THE VERIFICATION OF COMPLIANCE OF PV INVERTER WITH:

UL STANDARD FOR SAFETY FOR PHOTOVOLTAIC (PV) DC ARC-FAULT CIRCUIT PROTECTION, UL 1699B

REVISION, DATED MAY 18, 2021

DC ARC FAULT PROTECTION FOR PHOTOVOLTAIC APPLICATIONS, CSA C22.2 NO. 292-18

DATED JANUARY 2018

Test Report Number ..... :	**GZES250400749901**
Trademark ..... :	EPEVER
Tested Model ..... :	**ELD12K**
Variant Models ..... :	ELD6K, ELD8K, ELD10K, ELD15K

APPLICANT

Name ..... :	Huizhou Epever Technology Co., Ltd.
Address ..... :	No. 6 Laowu Road, Start-up Area of China-Korea (Huizhou) Industrial Park, Zhongkai District, Huizhou, Guangdong, China

TESTING LABORATORY

Name ..... :	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Address ..... :	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Conducted (tested) by ..... :	Sunny Lin (Project Engineer)
Reviewed & Approved by ..... :	Roger Hu (Technical Reviewer)
Date of issue ..... :	2025-01-15
Number of pages ..... :	47

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Test Report Historical Revision:

Test Report Version	Date	Resume
GZES250400749901	2025-01-15	First issuance

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1 SCOPE

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch has been contract by Huizhou Epever Technology Co., Ltd. in order to perform the testing according to following standards:

- Clause 25, 27.2, 27.3, 28, 29, 30, 31, 35, 42, 55, and 56 of UL Standard for Safety for Photovoltaic (PV) DC Arc-Fault Circuit Protection, UL 1699B, Revision, Dated May 18, 2021
- Dc Arc Fault Protection For Photovoltaic Applications, CSA C22.2 No. 292-18, Dated January 2018

2 GENERAL INFORMATION

2.1 Testing Period and Climatic conditions

The necessary testing has been performed between the 30th Jul. 2025 and the 17th Nov. 2025.
All the tests and checks have been performed in accordance with the reference Standard (the tests are done at 25 ± 5ºC, 96 kPa ± 10 kPa and 65% RH ± 10% RH).

SITE TEST

Name .....:	Dongguan BALUN Testing Technology Co., Ltd.
Address.....:	Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong, China

2.2 Equipment under Testing

Apparatus type/ Installation .....:	On-Grid Hybrid Inverter / Fixed installation
Manufacturer/ Supplier/ Installer.....:	Huizhou Epever Technology Co., Ltd. Fixed (permanent connection)
Trademark.....:	EPEVER
Model/ Type .....:	ELD12K
Serial Number.....:	071603714523DIC2-00010
Software Version.....:	V1.000
Rated Characteristics .....:	**ELD12K** Max PV input voltage: 500Vdc Rang of mppt operating voltage: 90-450Vdc Max PV input current: 20Adc*4 Battery input/output voltage range: 40-60Vdc Battery max charging/discharging current: 275Adc/275Adc Rated AC on-grid output/input voltage: 120/240Vac (Split phase), 120/208Vac (2/3 phase) Rated AC on-grid output active power: 12000W Rate AC on-grid output apparent power: 12000VA Max AC on-grid output current: 50Aac Max AC on-grid input current: 80Aac Rated AC on-grid output/input frequency: 50/60Hz AC on-grid power factor: >0.99 (0.8leading-0.8lagging) Rated AC off-grid output voltage: 120/240Vac (Split phase), 120/208Vac (2/3 phase) Rated AC off-grid output active power: 12000W Rate AC off-grid output apparent power: 12000VA Max AC off-grid output current: 50Aac Rated AC off-grid output frequency: 50/60Hz Rated generator input voltage: 120/240Vac (Split phase) Rated generator input current: 50Aac Rated generator input apparent power: 12000VA Rated generator input frequency: 50/60Hz

Date of manufacturing: 2025

Test item particulars

Input ..... DC

Output ..... AC

Class of protection against electric shock ..... Class I

Cooling group..... Fan

Modular ..... No

Internal Transformer ..... Transformer less

Copy of marking plate (representative):

EPEVER® On-Grid Hybrid Inverter	
Model:	**ELD15K**
Display:	☑LED ☐LCD
PV	
Pmax.PV	22500W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	275A
Max.Discharging Current	275A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	62.5A
Max.Current From Utility	80A
Rated Power To Utility	15000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	62.5A
Rated Power	15000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	62.5A
Rated Power	15000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25℃ ... +60℃
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	

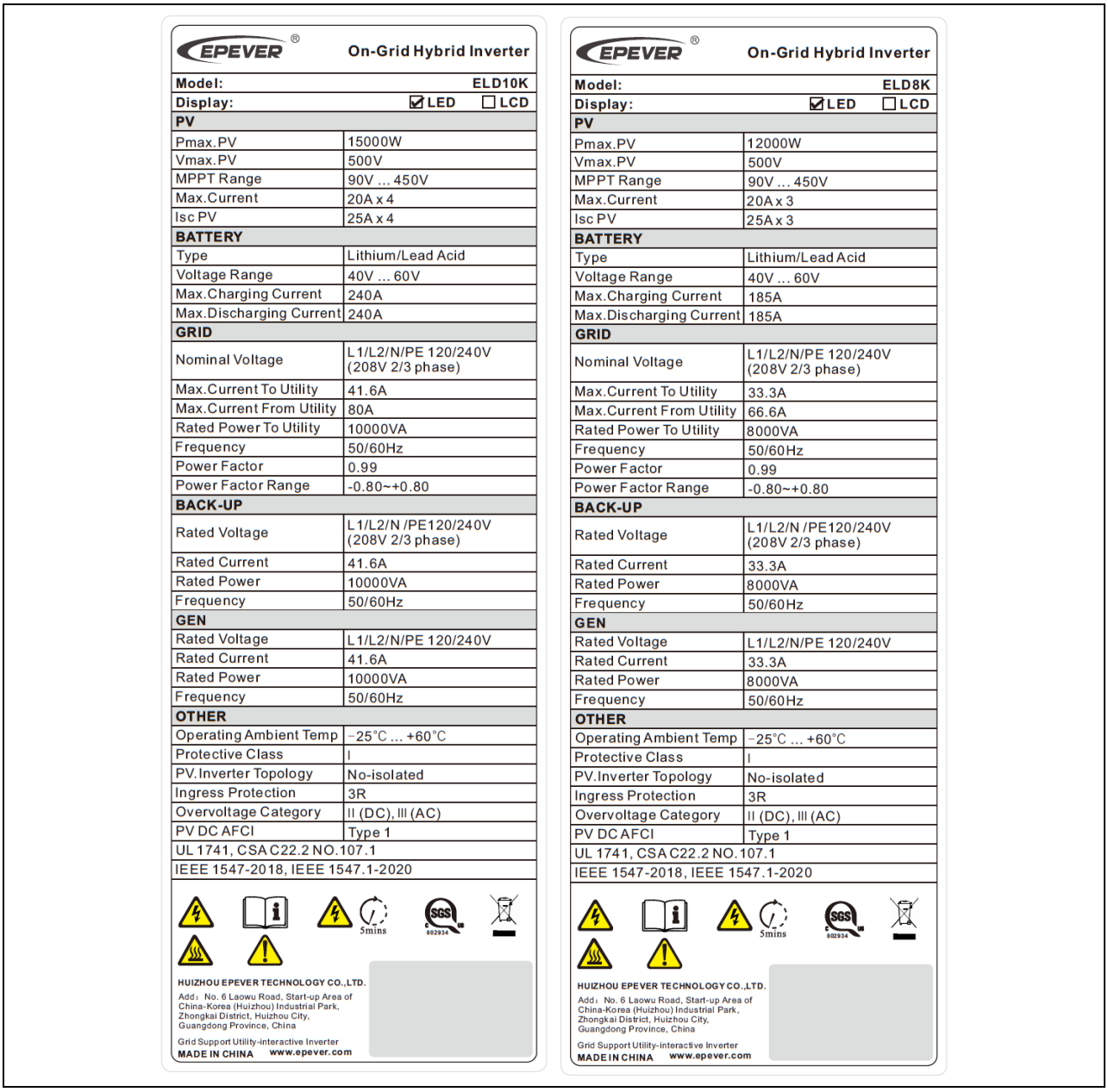


HUIZHOU EPEVER TECHNOLOGY CO.,LTD.
Add：No. 6 Laowu Road, Start-up Area of China-Korea (Huizhou) Industrial Park, Zhongkai District, Huizhou City, Guangdong Province, China
Grid Support Utility-interactive Inverter
MADE IN CHINA www.epever.com

EPEVER® On-Grid Hybrid Inverter	
Model:	**ELD12K**
Display:	☑LED ☐LCD
PV	
Pmax.PV	18000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	275A
Max.Discharging Current	275A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	50A
Max.Current From Utility	80A
Rated Power To Utility	12000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25℃ ... +60℃
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	



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EPEVER® On-Grid Hybrid Inverter

Model:	ELD10K
Display:	☑LED ☐LCD
PV	
Pmax.PV	15000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	240A
Max.Discharging Current	240A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	41.6A
Max.Current From Utility	80A
Rated Power To Utility	10000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	41.6A
Rated Power	10000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	41.6A
Rated Power	10000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	

5mins

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EPEVER® On-Grid Hybrid Inverter

Model:	ELD8K
Display:	☑LED ☐LCD
PV	
Pmax.PV	12000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 3
Isc PV	25A x 3
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	185A
Max.Discharging Current	185A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	33.3A
Max.Current From Utility	66.6A
Rated Power To Utility	8000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	33.3A
Rated Power	8000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	33.3A
Rated Power	8000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	

5mins

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EPEVER® On-Grid Hybrid Inverter	
Model:	**ELD6K**
Display:	☑LED ☐LCD
PV	
Pmax.PV	9000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 2
Isc PV	25A x 2
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	140A
Max.Discharging Current	140A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	25A
Max.Current From Utility	50A
Rated Power To Utility	6000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	25A
Rated Power	6000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	25A
Rated Power	6000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
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IEEE 1547-2018, IEEE 1547.1-2020	

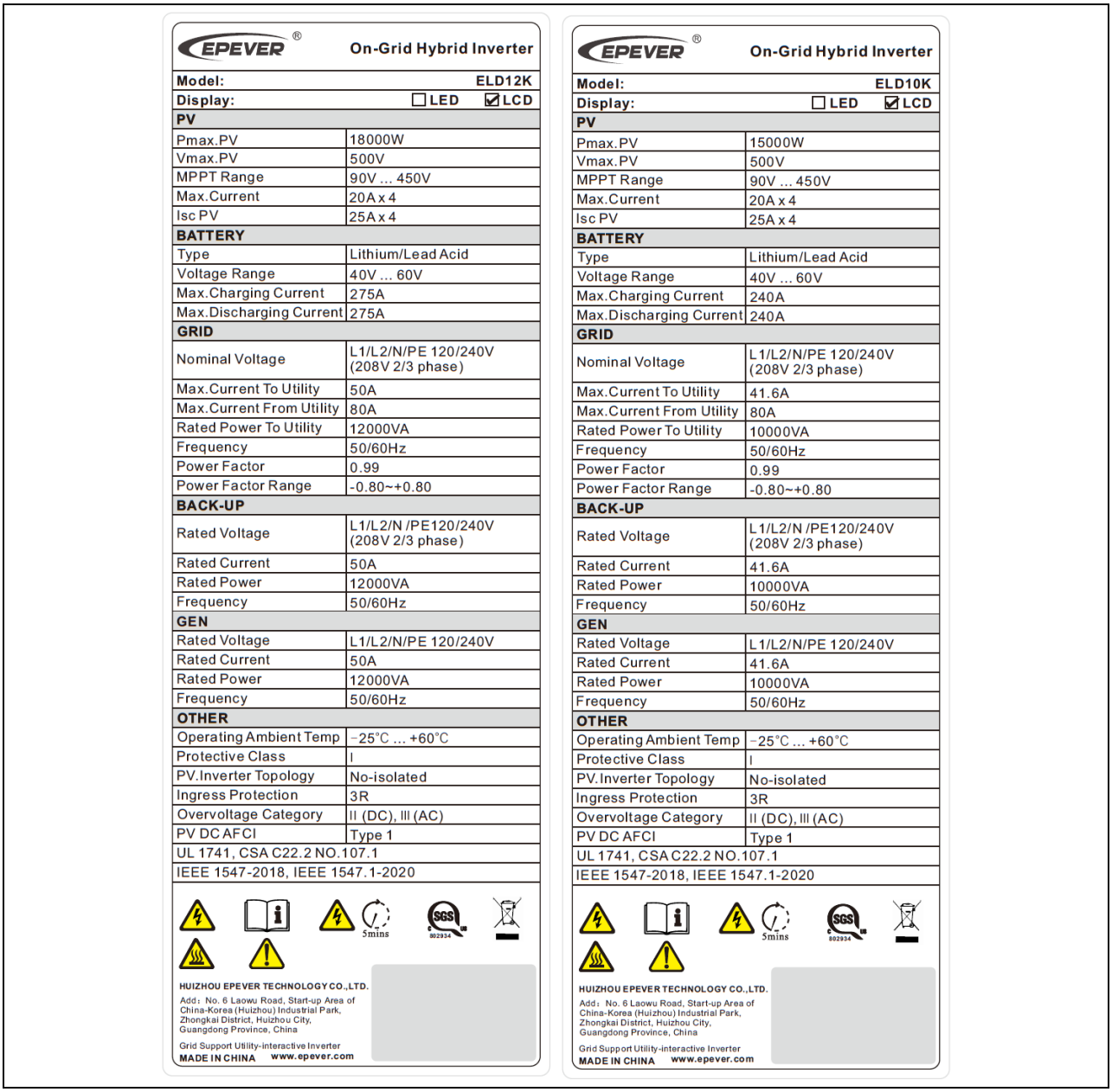


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Grid Support Utility-interactive Inverter
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EPEVER® On-Grid Hybrid Inverter	
Model:	**ELD15K**
Display:	☐LED ☑LCD
PV	
Pmax.PV	22500W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	275A
Max.Discharging Current	275A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	62.5A
Max.Current From Utility	80A
Rated Power To Utility	15000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	62.5A
Rated Power	15000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	62.5A
Rated Power	15000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	



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EPEVER® On-Grid Hybrid Inverter

Model:	ELD12K
Display:	☐LED ☑LCD
PV	
Pmax.PV	18000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	275A
Max.Discharging Current	275A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	50A
Max.Current From Utility	80A
Rated Power To Utility	12000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
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IEEE 1547-2018, IEEE 1547.1-2020	

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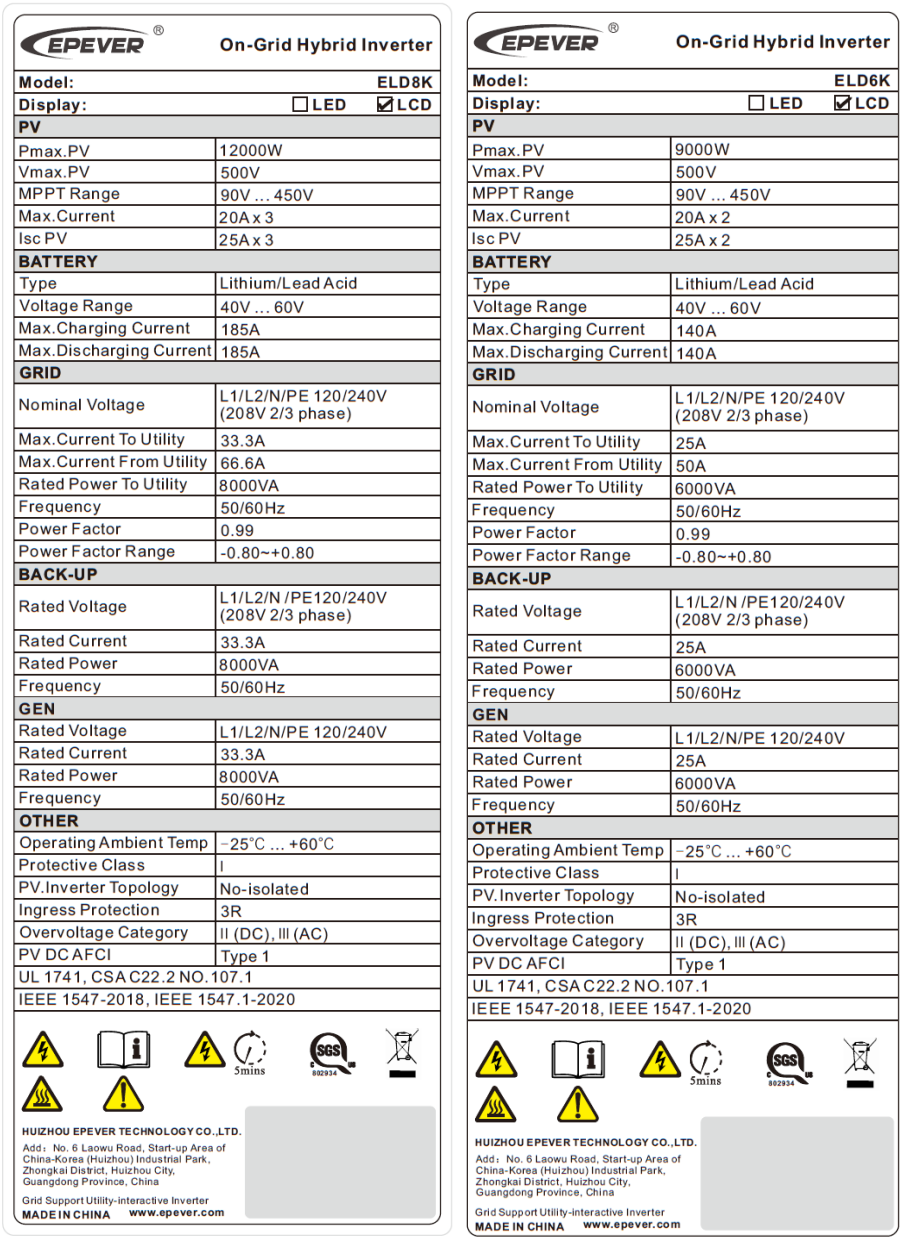
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EPEVER® On-Grid Hybrid Inverter

Model:	ELD10K
Display:	☐LED ☑LCD
PV	
Pmax.PV	15000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 4
Isc PV	25A x 4
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	240A
Max.Discharging Current	240A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	41.6A
Max.Current From Utility	80A
Rated Power To Utility	10000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	41.6A
Rated Power	10000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	41.6A
Rated Power	10000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
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IEEE 1547-2018, IEEE 1547.1-2020	

5mins

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EPEVER ® On-Grid Hybrid Inverter	
Model:	ELD8K
Display:	☐LED ☑LCD
PV	
Pmax.PV	12000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 3
Isc PV	25A x 3
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	185A
Max.Discharging Current	185A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	33.3A
Max.Current From Utility	66.6A
Rated Power To Utility	8000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	33.3A
Rated Power	8000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	33.3A
Rated Power	8000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
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EPEVER ® On-Grid Hybrid Inverter	
Model:	ELD6K
Display:	☐LED ☑LCD
PV	
Pmax.PV	9000W
Vmax.PV	500V
MPPT Range	90V ... 450V
Max.Current	20A x 2
Isc PV	25A x 2
BATTERY	
Type	Lithium/Lead Acid
Voltage Range	40V ... 60V
Max.Charging Current	140A
Max.Discharging Current	140A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	25A
Max.Current From Utility	50A
Rated Power To Utility	6000VA
Frequency	50/60Hz
Power Factor	0.99
Power Factor Range	-0.80~+0.80
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	25A
Rated Power	6000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	25A
Rated Power	6000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
PV DC AFCI	Type 1
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Note:

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation
3. SGS NA Listed Mark shall be at least 5 mm high. Other letters shall be at least 2.4 mm high.
4. “CAUTION” shall be at lease 3.2mm high, the remaining letters shall not be less tan 1.6mm high
5. The S/N number should be pasted on every end product, every S/N number denotes the date code or other dating of manufacture.

Equipment under testing (*):

- **ELD12K**

Variant Models:

- ELD6K,
- ELD8K,
- ELD10K,
- ELD15K

- *(*) Full tests according to all points of the standards have been conducted on model ELD12K.*

Following table shows the full ratings of the all models referenced in this report, marked in **bold letters** the ones subjected to testing:

According to Table 65.1 of UL 1741 (Third Edition, Dated September 28, 2021)		
Model:	ELD6K	ELD8K
PV INPUT RATINGS:		
Maximum input voltage	500 V dc	
Range of mppt input operating voltage	90 V dc to 450 V dc	
Maximum input current (dc)	20A	
Number of inputs	2	3
INPUT/OUTPUT RATINGS (Grid terminal, Bi-directional):		
Output power factor rating	default >0.99 (-0.8~+0.8 adjustable)	
Number of phases	Split phase or 2/3 phase	
Nominal output voltage (ac)	120/240V or 120/208V	
Nominal output frequency	50/60 Hz	
Maximum continuous output current (ac)	25A	33.3A
Maximum continuous output power (ac)	6000W	8000W
Maximum continuous output apparent power (ac)	6000VA	8000VA
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle	
Maximum Input Current (ac)	50A	66.6A
OUTPUT RATINGS (Backup):		
Number of phases	Split phase or 2/3 phase	
Nominal output voltage (ac)	120/240V or 120/208V	
Nominal output frequency	50/60 Hz	
Maximum continuous output power (ac)	6000W	8000W
Maximum continuous output apparent power (ac)	6000VA	8000VA
Maximum continuous output current (ac)	25A	33.3A
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle	
BATTERY INPUT:		
Battery type	Lithium/Lead Acid	
Battery Voltage Range (V)	40-60Vdc (Rated 48Vdc)	
Max. Continuous Charging/DischargingCurrent (A）	140A	185A
GENERATOR INPUT:		
Nominal input voltage (ac)	120/240V	
Nominal input frequency	50/60 Hz	
Maximum continuous input power (ac)	6000W	8000W
Maximum continuous input current (ac)	25A	33.3A
Others:		
Normal operation temperature range	-25ºC to 60ºC (>45ºC derating)	
Enclosure Rating Type	Type 3R	

According to Table 65.1 of UL 1741 (Third Edition, Dated September 28, 2021)		
Model:	ELD6K	ELD8K
Weigh (kg)	53kg	
Dimension (WxHxD mm)	513×840×283	

According to Table 65.1 of UL 1741 (Third Edition, Dated September 28, 2021)		
Model:	ELD10K	ELD12K
PV INPUT RATINGS:		
Maximum input voltage	500 V dc	
Range of mppt input operating voltage	90 V dc to 450 V dc	
Maximum input current (dc)	20A	
Number of inputs	4	
INPUT/OUTPUT RATINGS (Grid terminal, Bi-directional):		
Output power factor rating	default >0.99 (-0.8~+0.8 adjustable)	
Number of phases	Split phase or 2/3 phase	
Nominal output voltage (ac)	120/240V or 120/208V	
Nominal output frequency	50/60 Hz	
Maximum continuous output current (ac)	41.6A	50A
Maximum continuous output power (ac)	10000W	12000W
Maximum continuous output apparent power (ac)	10000VA	12000VA
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle	
Maximum Input Current (ac)	80A	80A
OUTPUT RATINGS (Backup):		
Number of phases	Split phase or 2/3 phase	
Nominal output voltage (ac)	120/240V or 120/208V	
Nominal output frequency	50/60 Hz	
Maximum continuous output power (ac)	10000W	12000W
Maximum continuous output apparent power (ac)	10000VA	12000VA
Maximum continuous output current (ac)	41.6A	50A
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle	
BATTERY INPUT:		
Battery type	Lithium/Lead Acid	
Battery Voltage Range (V)	40-60Vdc (Rated 48Vdc)	
Max. Continuous Charging/DischargingCurrent (A）	240A	275A
GENERATOR INPUT:		
Nominal input voltage (ac)	120/240V	
Nominal input frequency	50/60 Hz	
Maximum continuous input power (ac)	10000W	12000W
Maximum continuous input current (ac)	41.6A	50A
Others:		
Normal operation temperature range	-25ºC to 60ºC (>45ºC derating)	
Enclosure Rating Type	Type 3R	
Weigh (kg)	53kg	
Dimension (WxHxD mm)	513×840×283	

According to Table 65.1 of UL 1741 (Third Edition, Dated September 28, 2021)	
Model:	ELD15K
PV INPUT RATINGS:	
Maximum input voltage	500 V dc
Range of mppt input operating voltage	90 V dc to 450 V dc
Maximum input current (dc)	20A
Number of inputs	4
INPUT/OUTPUT RATINGS (Grid terminal, Bi-directional):	

According to Table 65.1 of UL 1741 (Third Edition, Dated September 28, 2021)	
Model:	ELD15K
Output power factor rating	default >0.99 (-0.8~+0.8 adjustable)
Number of phases	Split phase or 2/3 phase
Nominal output voltage (ac)	120/240V or 120/208V
Nominal output frequency	50/60 Hz
Maximum continuous output current (ac)	62.5A
Maximum continuous output power (ac)	15000W
Maximum continuous output apparent power (ac)	15000VA
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle
Maximum Input Current (ac)	80A
OUTPUT RATINGS (Backup):	
Number of phases	Split phase or 2/3 phase
Nominal output voltage (ac)	120/240V or 120/208V
Nominal output frequency	50/60 Hz
Maximum continuous output power (ac)	15000W
Maximum continuous output apparent power (ac)	15000VA
Maximum continuous output current (ac)	62.5A
Maximum output fault current (ac) and duration	273Apk, 116.6Arms, 103ms; 104.5 Arms@1cycle; 117.8 Arms@3cycle;122.9 Arms@5cycle
BATTERY INPUT:	
Battery type	Lithium/Lead Acid
Battery Voltage Range (V)	40-60Vdc (Rated 48Vdc)
Max. Continuous Charging/DischargingCurrent (A）	275A
GENERATOR INPUT:	
Nominal input voltage (ac)	120/240V
Nominal input frequency	50/60 Hz
Maximum continuous input power (ac)	15000W
Maximum continuous input current (ac)	62.5A
Others:	
Normal operation temperature range	-25ºC to 60ºC (>45ºC derating)
Enclosure Rating Type	Type 3R
Weigh (kg)	53kg
Dimension (WxHxD mm)	513×840×283

The results obtained apply only to the particular sample tested that is the subject of the present test report. The most unfavorable result values of the verifications and tests performed are contained herein. Throughout this report a point (~~comma~~) is used as the decimal separator.

2.3 SGS Test Equipment List

	No.	Equipment Name	MARK/Model No.	Equipment No.	Equipment calibration due date
BALUN	1	Oscilloscope	Tektronix/MS04054B	BZ-DGD-L064	2025/01/06 to 2026/01/05
	2	Differential probe	Tektronix / TPP0500	BZ-DGD-L028-1	2025/01/06 to 2026/01/05
	3	Temperature Chamber	OK-Ts-6000	BZ-DGB-L028	2025/01/10 to 2026/01/09
	4	Temperature recorder	Agilent / 34970A	BZ-DGD-L331	2025/01/10 to 2026/01/09
	5	Temperature & Humidity meter	CEM/DT-322	BZ-DGD-L005	2025/01/14 to 2026/01/13
	6	ESD Test System	SCHLODER/ SESD 30000	--	--
	7	Anechoic Chamber	YIHENG ELECTRONIC/ 12.0m*7.0m*7.5m	--	--
	8	Signal Generator	Agilent/ N5181A	BZ-DGE-L001	2025/01/06 to 2026/01/05
	9	Power Amplifier	rflight/ NTWPA-00810200E	BZ-DGE-L019	2025/01/06 to 2026/01/05
	10	Power Amplifier	rflight/ NTWPA-1060100E	BZ-DGE-L020	2025/01/06 to 2026/01/05
	11	Power Meter	Agilent/ E4417A	BZ-DGE-L002	2025/01/06 to 2026/01/05
	12	Feld Strength Meter	Narda/EP601	BZ-DGE-L050	2025/02/07 to 2026/02/06
	13	EFT Test System	HTEC/ HEFT 51	BZ-DGE-L033	2025/01/06 to 2026/01/05
	14	EFT coupling network	HTEC/ HV3P30	BZ-DGE-L032	2025/01/06 to 2026/01/05
	15	SURGE Generator (AC/DC Ports)	HTEC/ HCWG 70	BZ-DGE-L036	2025/01/06 to 2026/01/05
	16	SURGE coupling network (AC/DC Ports)	HTEC/SCDN303P7	BZ-DGE-L035	2025/01/06 to 2026/01/05
	17	Voltage withstand instrument	Chroma/ 19032	BZ-DGD-L066	2025/01/06 to 2026/01/05
SGS	18	True RMS Multimeter	FLUKE / 15B+	GZE012-67	2025/02/21 to 2026/02/20

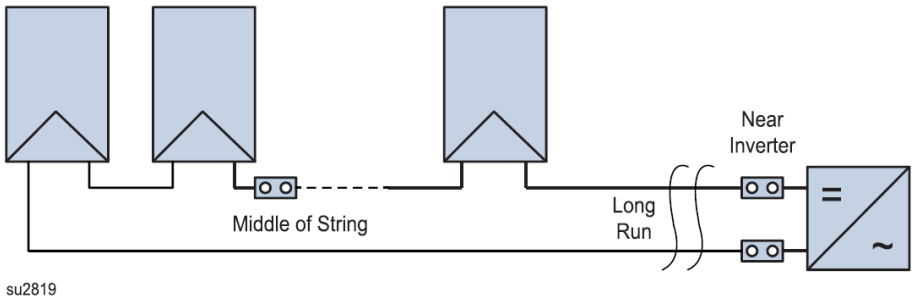
2.4 Measurement Uncertainly

Associated uncertainties through measurements showed in this this report are the maximum allowable uncertainties.

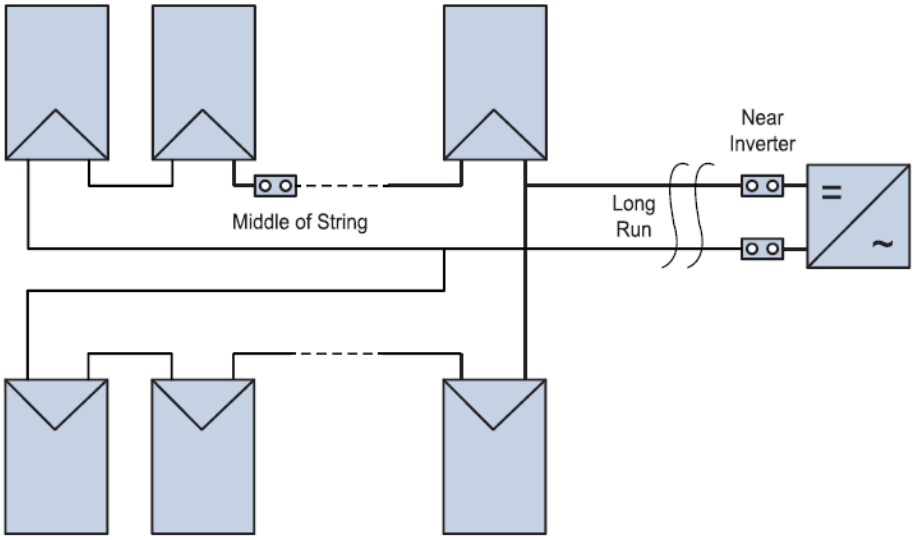
Magnitude	Uncertainty
Voltage measurement	±0.05 %
Current measurement	±0.05 %
Frequency measurement	±0.001 Hz
Time measurement	±0.001s
Power measurement	±0.5 %
Phase Angle	±0.1º
Temperature	±3º C
Note1: Measurements uncertainties showed in this table are maximum allowable uncertainties. The measurement uncertainties associated with other parameters measured during the tests are in the laboratory at disposal of the solicitant.	

2.5 Test set up.

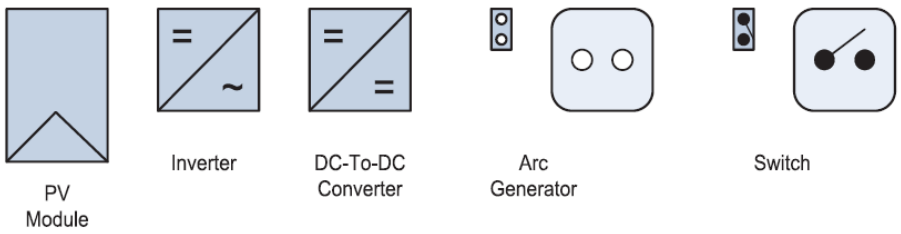
Below is the simplified construction of the test set up.



One string, one MPPT



Two strings combined, one MPPT



Legend

Different equipment has been used to take measures as it shows in chapter 2.3. Current and voltage clamps have been connected to the inverter input / output for all the tests.

All the tests described in the following pages have used this specified test setup.

The test bench used includes:

EQUIPMENT	MARK / MODEL	RATED CHARACTERISTICS	OWNER / ID.CODE
AC source	Chroma / WPLA-330 200KVA	5-325Vac/ 5-650Vac/ 45-65Hz 0-320A/ 0-160A	--
DC source	WPLA-150KW	50 – 1500 Vdc; 0 – 200 A	--
RLC load	Qunlin / ACLT38160H	563.3kW, 563.3 kVAr	--
Arc Generator	B.R. SOLAR	--	--

2.6 Definitions

In	Nominal Current	P	Power
p.u.	Per unit	I	Current
Pn	Nominal Power	PV	Photovoltica
Sn	Apparent Power	f	Frequency
PGU	Power Generation Unit	W	Watt
S/C	Short Circuit	V	Volt
O/C	Open Circuit	A	Ampere
ms	Millisecond	Un	Nominal Voltage
AFCI	Arc-Fault Circuit-Interrupters	EUT	Equipment under test
Hz	Hertz		

3 RESUME OF TEST RESULTS

INTERPRETATION KEYS

Test object does meet the requirement ..... **P** Pass

Test object does not meet the requirement ..... **F** Fails

Test case does not apply to the test object ..... **N/A** Not applicable

To make a reference to a table or an annex. ..... See additional sheet

To indicate that the test has not been realized ..... **N/R** Not realized

REPORT CLAUSE	STANDARD CLAUSE	STANDARD REQUIREMENTS UL 1699B: Revision, Dated May 18, 2021 CSA C22.2 NO. 292-18, Dated January 2018		RESULTS
		TEST	REMARKS	
4.1	25/6.2	Humidity conditioning		P
4.2	27/6.4	Voltage surge test		P
4.2.1	27.2/6.4.2	Unwanted tripping test (Ring wave)		P
4.2.2	27.3/6.4.3	Unwanted tripping test (Combination wave)		P
4.3.1	28	Environmental test sequence		P
4.3.2	29/6.7&6.9	Arc fault detection tests		P
4.4	30	Unwanted tripping tests/ Nuisance tripping tests		P
4.4.1	30.2	Loading condition i – inverters, converters, and charge controllers		P
4.4.2	30.3	Loading condition ii – dc switch operation		P
4.4.3	30.4	Loading condition iii – irradiance step changes		P
4.5	31/6.12	Normal temperature test		P
4.6	35/6.10	Dielectric voltage-withstand test		P
4.7	42/6.11	Resistance to environmental noise test/ Immunity to RF disturbances		P
4.8	55	Voltage surge test		P
4.9	56/6.13&6.14 &6.15&6.16& 6.17	Overvoltage, overload, endurance, abnormal operations, and short circuit tests		P

Note: Decision rule of the declaration of conformity evaluated according to the ILAC G8: 09/2019 & IEC 115 Guidelines (Proc. 2 “Accuracy Method” based on OD-5014).
Decision rule used: Binary with simple acceptance. (Safety Zone with respect to the limit w = 0).
Specific risk: Probability of False Acceptance or Rejection less than 50%, (PFA / PFR <50%). For more information see ILAC Guide G8 / 09.

4 TEST RESULTS

4.1 HUMIDITY CONDITIONING

The verification of Humidity Conditioning has been measured according to the chapter 25 of the standard UL1699B and the chapter 6.2 of the standard CSA C22.2 NO. 292-18.

A representative device is to be exposed for 168 hours to air at a relative humidity of 93 ±2 percent at a temperature of 32.0 ±2.0°C (89.6 ±3.6°F). The device is to be exposed to ambient air at a temperatura of at least 30°C (86°F) until thermal equilibrium is attained before being placed in the test chamber.

Following the conditioning, while still in the chamber or within 60 s after removal from the chamber, the representative device shall be connected to an appropriate source of power. Operation of the representative device shall be verified by actuating the test circuit.

Test result: PASS

	Temperature(°C)	Humidity(%)	Result
Test Condition	32	93	EUT works normally

4.2 VOLTAGE SURGE TEST

The verification of Humidity Conditioning has been measured according to the chapter 27 of the standard UL1699B and the chapter 6.4 of the standard CSA C22.2 NO. 292-18.

Devices deriving their power from a photovoltaic DC source shall be subjected to the tests described in 27.2 and 27.3 with the surges applied to the PV DC input of the device

4.2.1 UNWANTED TRIPPING TEST (RING WAVE)

All devices shall still be functional following the application of the ring wave surges. Functionality of a device shall be verified by connecting it to an appropriate power source and actuating the test circuit.

Test result: PASS

Positive to Negative(1500V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	870	870	870	870	870	870	870	880	870	870
I (A)	570	570	570	570	570	580	580	580	580	580
Positive to Ground (3000V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	2820	2830	2830	2830	2820	2810	2810	2810	2810	2810
I (A)	140	140	140	140	140	170	170	170	170	170
Negative to Ground (3000V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	2800	2800	2800	2800	2800	2830	2830	2830	2830	2830
I (A)	160	160	160	160	160	150	150	150	150	150

Result: No damages, Arc Fault “Self-Test” OK

4.2.2 SURGE IMMUNITY TEST (COMBINATION WAVE)

Following the application of the Surge Immunity (Combination Wave) surges, the device shall be in a condition to continue the test sequence in Table 24.1. Functionality of the device shall be verified by connecting it to an appropriate power source and actuating the supervisory circuit.

Table 27.1
PV input surge requirements

Surge type	Surge/impulse voltage	Surge test resistance	Number of impulses per polarity	Surge polarity for each test point
Combination wave (1.2/50 µsec)	Table 27.2	12 ohms	10	Negative
			10	Positive

Table 27.2
Surge values

Maximum dc input rating of equipment	Test Surge/impulse voltage
71 Vdc	500 V
141 Vdc	800 V
213 Vdc	1500 V
424 Vdc	2500 V
849 Vdc	4000 V
1500 Vdc	6000 V
Note: Interpolation is permitted	

Test result: PASS

Positive to Negative(1400V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	810	810	810	810	810	810	810	810	810	810
I (A)	520	520	520	520	520	540	540	540	540	540
Positive to Ground (2800V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	2630	2630	2640	2630	2630	2620	2620	2620	2620	2620
I (A)	130	130	130	130	130	150	150	150	150	150
Negative to Ground (2800V): 60 seconds between pulses										
Polarity	Positive Pulses					Negative Pulses				
Pulse	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**	**Pulse 1**	**Pulse 2**	**Pulse 3**	**Pulse 4**	**Pulse 5**
U(V)	2610	2610	2610	2610	2610	2640	2640	2640	2640	2640
I (A)	150	150	150	150	150	130	130	130	130	130

4.3 ENVIRONMENTAL TEST SEQUENCE AND ARC FAULT DETECTION TESTS

4.3.1 ENVIRONMENTAL TEST SEQUENCE

The verification of Environmental Test Sequence has been measured according to the chapter 28 of the standard UL1699B.

A device that has been conditioned by humidity, leakage current (when required), and voltage surge, shall comply with all of the applicable tests in Arc Fault Detection Tests, Section 29, while operating in ambient air at 25°C (77°F). The same representative device shall also respond to the presence of an arcing fault when subjected to a repeated Series Connection Arc Test, while in ambient air at 65°C (149°F), −35°C (−31°F), and 25°C (77°F) by following the sequence shown in Table 28.1.

Table 28.1
Environmental test sequence for arc fault detection tests

	Ambient air temperature[a]	Operating parameters	Remarks
1.	25.0 ±5.0°C (77.0 ±9.0°F)	No voltage applied	Establish thermal equilibrium with at least two hours of exposure. Do not test.
2.	25.0 ±2.0°C (77.0 ±3.6°F)	Rated voltage	Test per 29.1 as soon as possible to minimize self-heating.
3.[b]	65.0 ±2.0°C (149.0 ±3.6°F)	Rated voltage and current	Establish thermal equilibrium with at least two hours of exposure. Do not test.
4.[b]	65.0 ±2.0°C (149.0 ±3.6°F)	Rated voltage	Test per 29.1.
5.[c]	40.0 ±2.0°C (104.0 ±3.6°F)	Rated voltage and current	Establish thermal equilibrium with at least two hours of exposure. Do not test.
6.[c]	40.0 ±2.0°C (104.0 ±3.6°F)	Rated voltage	Test per 29.1.
7.	25.0 ±5.0°C (77.0 ±9.0°F)	No voltage applied	Establish thermal equilibrium with at least two hours of exposure. Do not test.
8.[d]	−35.0 ±2.0°C (−31 ±3.6°F)	No voltage applied	Establish thermal equilibrium with at least two hours of exposure. Do not test.
9.[d]	−35.0 ±2.0°C (−31 ±3.6°F)	Rated voltage	Tests per 29.1 as soon as possible to minimize self-heating
10.	25.0 ±5.0°C (77.0 ±9.0°F)	Rated voltage and current	Establish thermal equilibrium with at least two hours of exposure. Do not test.
11.	25.0 ±5.0°C (77.0 ±9.0°F)	Rated voltage	Test per 29.1.

[a] The ambient air temperature is to be changed to each value shown without intentional delay.

[b] For devices specified for use in higher ambient air conditions, such as devices for mounting directly to some modules or some rooftops, the device shall be tested at the maximum specified temperature extreme. In the event that a device is self-protecting such that it trips or functions at this ambient temperature, lower values of load current are to be employed, until the device just continues to operate, if possible.

[c] This test is not to be performed if steps 3 and 4 have been performed employing rated current.

[d] For devices specified for use in lower ambient air conditions, the device shall be tested at the minimum specified temperature extreme.

4.3.2 ARC FAULT DETECTION TESTS

The verification of Arc Fault Detection Tests has been measured according to the chapter 28, 29.1, 29.2 and 29.3 of the standard UL1699B and the chapter 6.7, 6.9 of the standard CSA C22.2 NO. 292-18.

Arcing test conditions:

Table 29.2
Arcing test conditions

Test no.	Minimum I_{arc} (A)[a]	Impp (A)	Sep. rate (mm/s)	Vmpp (V)[b]	Voc (V)[b]	R_{tot}(ohms)[b]	Gap (mm)
1	2.5	3.0	2.5	312.0	480.0	56.0	0.8
2	7.0	8.0	5.0	318.0	490.0	21.0	0.8
3[c]	14.0	16.0	5.0	318.0	490.0	11.0	1.1
4	7.0	8.5	5.0	607.0	810.0	24.0	2.5
Single module							
5	2.5	3.0	2.5	31.2	48.0	5.6	0.8
6	7.0	8.0	5.0	31.8	49.0	2.1	0.8

[a] I_{arc} values in Table 29.2 are representative of realistic arc events with one or two strings at full and low irradiance. It is expected that the AFCI shall meet compliance criteria below at intermediate current levels also.

[b] These values are approximate.

[c] Required for arcs in series with two parallel strings.

Test Result: PASS, one string, one MPPT

Tem. (C)	Test No.	Location	Attempt	Varc (V)	Iarc (A)	Parc (W)	Trip Time measured(s)	Trip Time limited(s)	Pass /Fail
25°C	1	A (Start of String)	1	26.17	2.71	70.92	0.255	2.5	Pass
			2	21.32	2.52	53.73	0.308	2.5	Pass
			3	22.03	2.51	55.30	0.412	2.5	Pass
			4	22.81	2.51	57.25	0.277	2.5	Pass
			5	17.81	2.79	49.69	0.291	2.5	Pass
		B (End of String)	1	21.38	2.89	61.79	0.215	2.5	Pass
			2	20.16	2.66	53.63	0.281	2.5	Pass
			3	16.92	2.51	42.47	0.437	2.5	Pass
			4	18.71	2.75	51.45	0.287	2.5	Pass
			5	18.41	2.76	50.81	0.339	2.5	Pass
		C (Middle of String)	1	25.22	2.87	72.38	0.265	2.5	Pass
			2	20.37	2.51	51.13	0.258	2.5	Pass
			3	18.90	2.54	48.01	0.481	2.5	Pass
			4	18.19	2.77	50.39	0.289	2.5	Pass
			5	17.92	2.89	51.79	0.352	2.5	Pass
	2	A (Start of String)	1	20.50	7.19	147.40	0.276	2.5	Pass
			2	20.18	7.52	151.75	0.285	2.5	Pass
			3	21.17	7.87	166.61	0.292	2.5	Pass
			4	19.00	7.72	146.68	0.262	2.5	Pass
			5	16.87	7.20	121.46	0.354	2.5	Pass
		B (End of String)	1	22.65	7.26	164.44	0.336	2.5	Pass
			2	20.26	7.65	154.99	0.294	2.5	Pass
			3	20.89	7.29	152.29	0.250	2.5	Pass
			4	22.56	7.55	170.33	0.319	2.5	Pass

			5	20.26	7.58	153.54	0.229	2.5	Pass
		C (Middle of String)	1	20.39	7.44	151.70	0.254	2.5	Pass
			2	17.97	7.70	138.37	0.251	2.5	Pass
			3	20.68	7.50	155.10	0.312	2.5	Pass
			4	19.54	7.77	151.83	0.276	2.5	Pass
			5	19.02	7.75	147.43	0.317	2.5	Pass
	3	A (Start of String)	1	17.73	14.13	250.52	0.343	2.5	Pass
			2	17.74	15.37	272.66	0.306	2.5	Pass
			3	17.96	15.34	275.51	0.297	2.5	Pass
			4	19.02	15.09	287.01	0.386	2.5	Pass
			5	19.17	14.98	287.17	0.329	2.5	Pass
		B (End of String)	1	19.22	15.07	289.65	0.271	2.5	Pass
			2	19.35	14.86	287.54	0.394	2.5	Pass
			3	19.83	14.77	292.89	0.302	2.5	Pass
			4	18.72	14.18	265.45	0.293	2.5	Pass
			5	19.17	14.02	268.76	0.267	2.5	Pass
		C (Middle of String)	1	19.50	14.52	283.14	0.279	2.5	Pass
			2	19.56	14.89	291.25	0.360	2.5	Pass
			3	21.25	14.72	312.80	0.294	2.5	Pass
			4	19.22	15.22	292.53	0.247	2.5	Pass
			5	16.94	15.58	263.93	0.328	2.5	Pass
	4	A (Start of String)	1	19.83	7.54	149.52	0.336	2.5	Pass
			2	21.14	8.12	171.66	0.322	2.5	Pass
			3	18.07	7.11	128.48	0.342	2.5	Pass
			4	20.92	8.03	167.99	0.293	2.5	Pass
			5	21.53	7.86	169.23	0.253	2.5	Pass
		B (End of String)	1	21.29	8.02	170.75	0.234	2.5	Pass
			2	21.84	7.23	157.90	0.340	2.5	Pass
			3	20.56	7.09	145.77	0.254	2.5	Pass
			4	22.25	7.64	169.99	0.264	2.5	Pass
			5	18.51	7.50	138.83	0.228	2.5	Pass
		C (Middle of String)	1	20.55	8.06	165.63	0.272	2.5	Pass
			2	20.01	8.10	162.08	0.266	2.5	Pass
			3	19.25	7.26	139.76	0.261	2.5	Pass
			4	19.04	7.93	150.99	0.317	2.5	Pass
			5	19.65	7.31	143.64	0.284	2.5	Pass

Note:
1. After evaluation, when C4=150nF, the test conditions are the worst.

Tem. (C)	Test No.	Location	Attempt	V_{arc} (V)	I_{arc} (A)	P_{arc} (W)	Trip Time measured(s)	Trip Time limited(s)	Pass /Fail
-25°C	1	A (Start of String)	1	31.92	2.76	88.10	0.270	2.5	Pass
			2	22.15	2.83	62.68	0.218	2.5	Pass
			3	26.57	2.95	78.38	0.264	2.5	Pass
			4	20.58	2.53	52.07	0.307	2.5	Pass
			5	22.96	2.60	59.70	0.379	2.5	Pass
		B (End of String)	1	31.91	2.85	90.94	0.269	2.5	Pass
			2	24.14	2.96	71.45	0.266	2.5	Pass
			3	21.00	2.52	52.92	0.263	2.5	Pass
			4	22.52	2.53	56.98	0.361	2.5	Pass
			5	21.87	2.51	54.89	0.348	2.5	Pass
		C (Middle of String)	1	36.73	2.86	105.05	0.257	2.5	Pass
			2	26.49	2.88	76.29	0.289	2.5	Pass
			3	21.65	2.60	56.29	0.309	2.5	Pass
			4	20.83	2.58	53.74	0.271	2.5	Pass
			5	20.05	2.51	50.33	0.241	2.5	Pass
	2	A (Start of String)	1	20.36	7.45	151.68	0.242	2.5	Pass
			2	23.81	7.18	170.96	0.292	2.5	Pass
			3	20.21	7.73	156.22	0.312	2.5	Pass
			4	19.66	7.60	149.42	0.276	2.5	Pass
			5	21.70	7.78	168.83	0.300	2.5	Pass
		B (End of String)	1	21.38	7.69	164.41	0.292	2.5	Pass
			2	16.87	7.72	130.24	0.255	2.5	Pass
			3	20.25	7.54	152.69	0.287	2.5	Pass
			4	20.78	7.99	166.03	0.267	2.5	Pass
			5	22.35	7.15	159.80	0.293	2.5	Pass
		C (Middle of String)	1	21.39	7.06	151.01	0.312	2.5	Pass
			2	21.05	7.67	161.45	0.271	2.5	Pass
			3	19.64	7.81	153.39	0.296	2.5	Pass
			4	22.58	7.20	162.58	0.291	2.5	Pass
			5	20.40	7.36	150.14	0.301	2.5	Pass
	3	A (Start of String)	1	18.58	14.55	270.34	0.310	2.5	Pass
			2	17.89	14.34	256.54	0.305	2.5	Pass
			3	19.00	15.13	287.47	0.339	2.5	Pass
			4	19.65	14.35	281.98	0.257	2.5	Pass
			5	23.16	15.93	368.94	0.299	2.5	Pass
		B (End of String)	1	17.87	14.99	267.85	0.255	2.5	Pass
			2	18.38	14.02	257.69	0.359	2.5	Pass
			3	19.39	14.86	288.04	0.338	2.5	Pass
			4	20.97	14.03	294.21	0.267	2.5	Pass
			5	19.94	14.45	288.13	0.283	2.5	Pass
		C (Middle of String)	1	17.91	15.70	281.19	0.318	2.5	Pass
			2	18.41	15.23	280.38	0.345	2.5	Pass
			3	19.58	15.58	305.06	0.343	2.5	Pass
			4	17.49	14.10	246.61	0.309	2.5	Pass
			5	17.49	14.32	250.46	0.307	2.5	Pass

	4	A (Start of String)	1	21.62	7.85	169.72	0.329	2.5	Pass
			2	16.97	7.14	121.17	0.295	2.5	Pass
			3	20.60	8.40	173.04	0.322	2.5	Pass
			4	18.86	7.47	140.88	0.295	2.5	Pass
			5	17.98	7.73	138.99	0.319	2.5	Pass
		B (End of String)	1	18.88	8.18	154.44	0.288	2.5	Pass
			2	20.19	7.12	143.75	0.291	2.5	Pass
			3	21.90	7.59	166.22	0.312	2.5	Pass
			4	17.85	7.29	130.13	0.317	2.5	Pass
			5	19.23	7.96	153.07	0.306	2.5	Pass
		C (Middle of String)	1	19.33	7.55	145.94	0.294	2.5	Pass
			2	18.22	7.15	130.27	0.287	2.5	Pass
			3	21.70	7.87	170.78	0.299	2.5	Pass
			4	18.88	7.75	146.32	0.293	2.5	Pass
			5	19.43	8.47	164.57	0.287	2.5	Pass
Note: 1. After evaluation, when C4=150nF, the test conditions are the worst.									

Tem. (C)	Test No.	Location	Attempt	Varc (V)	Iarc (A)	Parc (W)	Trip Time measured(s)	Trip Time limited(s)	Pass /Fail
60℃	1	A (Start of String)	1	9.49	2.51	23.82	0.272	2.5	Pass
			2	20.09	2.51	50.43	0.318	2.5	Pass
			3	17.83	2.55	45.47	0.383	2.5	Pass
			4	18.34	2.91	53.37	0.350	2.5	Pass
			5	18.99	2.74	52.03	0.421	2.5	Pass
		B (End of String)	1	24.95	2.55	63.62	0.318	2.5	Pass
			2	18.29	2.79	51.03	0.423	2.5	Pass
			3	18.58	2.91	54.07	0.327	2.5	Pass
			4	17.79	2.78	49.46	0.275	2.5	Pass
			5	19.35	2.76	53.41	0.329	2.5	Pass
		C (Middle of String)	1	22.98	2.59	59.52	0.298	2.5	Pass
			2	16.95	2.51	42.54	0.386	2.5	Pass
			3	18.61	2.90	53.97	0.280	2.5	Pass
			4	20.05	2.74	54.94	0.326	2.5	Pass
			5	17.42	2.52	43.90	0.406	2.5	Pass
	2	A (Start of String)	1	22.03	7.57	166.77	0.299	2.5	Pass
			2	20.26	7.15	144.86	0.270	2.5	Pass
			3	20.94	7.34	153.70	0.249	2.5	Pass
			4	19.51	7.34	143.20	0.261	2.5	Pass
			5	20.97	7.96	166.92	0.303	2.5	Pass
		B (End of String)	1	18.92	7.46	141.14	0.294	2.5	Pass
			2	19.56	7.12	139.27	0.233	2.5	Pass
			3	20.77	7.37	153.07	0.299	2.5	Pass
			4	20.05	7.53	150.98	0.275	2.5	Pass
			5	19.06	7.22	137.61	0.277	2.5	Pass
		C (Middle of String)	1	21.29	7.84	166.91	0.270	2.5	Pass
			2	20.10	7.51	150.95	0.231	2.5	Pass
			3	21.97	7.38	162.14	0.281	2.5	Pass
			4	21.70	7.72	167.52	0.265	2.5	Pass

			5	20.48	7.16	146.64	0.304	2.5	Pass
	3	A (Start of String)	1	20.33	14.25	289.70	0.238	2.5	Pass
			2	15.13	14.34	216.96	0.292	2.5	Pass
			3	16.68	14.74	245.86	0.287	2.5	Pass
			4	19.56	14.08	275.40	0.333	2.5	Pass
			5	23.24	14.56	338.37	0.270	2.5	Pass
		B (End of String)	1	18.76	15.06	282.53	0.260	2.5	Pass
			2	18.63	14.54	270.88	0.282	2.5	Pass
			3	19.65	14.17	278.44	0.254	2.5	Pass
			4	20.73	14.34	297.27	0.377	2.5	Pass
			5	21.01	14.50	304.65	0.341	2.5	Pass
		C (Middle of String)	1	23.38	15.00	350.70	0.343	2.5	Pass
			2	22.69	14.99	340.12	0.324	2.5	Pass
			3	24.39	15.88	387.31	0.303	2.5	Pass
			4	18.39	14.48	266.29	0.311	2.5	Pass
			5	20.17	15.61	314.85	0.306	2.5	Pass
	4	A (Start of String)	1	19.69	7.60	149.64	0.291	2.5	Pass
			2	20.02	7.12	142.54	0.319	2.5	Pass
			3	21.02	7.61	159.96	0.283	2.5	Pass
			4	17.36	7.41	128.64	0.277	2.5	Pass
			5	19.18	7.68	147.30	0.277	2.5	Pass
		B (End of String)	1	21.66	8.25	178.70	0.329	2.5	Pass
			2	20.86	8.40	175.22	0.331	2.5	Pass
			3	20.16	7.60	153.22	0.288	2.5	Pass
			4	20.56	7.87	161.81	0.287	2.5	Pass
			5	20.33	8.10	164.67	0.270	2.5	Pass
		C (Middle of String)	1	22.13	8.48	187.66	0.324	2.5	Pass
			2	21.87	8.26	180.65	0.326	2.5	Pass
			3	21.99	8.42	185.16	0.249	2.5	Pass
			4	22.35	7.89	176.34	0.275	2.5	Pass
			5	22.32	7.59	169.41	0.265	2.5	Pass

Note:
1. After evaluation, when C4=150nF, the test conditions are the worst.

Tem. (C)	Test No.	Location	Attempt	Varc (V)	Iarc (A)	Parc (W)	Trip Time measured(s)	Trip Time limited(s)	Pass /Fail
25°C	1	A (Start of String)	1	20.32	2.65	53.85	0.297	2.5	Pass
			2	19.71	2.73	2.73	0.260	2.5	Pass
			3	18.46	2.67	49.29	0.339	2.5	Pass
			4	18.97	2.87	54.44	0.306	2.5	Pass
			5	19.39	2.71	52.55	0.257	2.5	Pass
		B (End of String)	1	24.70	2.98	73.61	0.238	2.5	Pass
			2	18.85	2.55	48.07	0.376	2.5	Pass
			3	18.30	2.64	48.31	0.288	2.5	Pass
			4	19.86	2.69	53.42	0.255	2.5	Pass
			5	20.12	2.90	58.35	0.322	2.5	Pass
		C (Middle of String)	1	20.07	2.55	51.18	0.246	2.5	Pass
			2	20.24	2.50	50.60	0.411	2.5	Pass
			3	18.46	2.74	50.58	0.274	2.5	Pass

			4	18.86	2.73	51.49	0.422	2.5	Pass
			5	18.96	2.80	53.09	0.307	2.5	Pass
	2	A (Start of String)	1	20.93	7.56	158.23	0.274	2.5	Pass
			2	21.06	7.63	160.69	0.275	2.5	Pass
			3	21.81	7.81	170.34	0.333	2.5	Pass
			4	21.44	7.80	167.23	0.335	2.5	Pass
			5	22.40	7.10	159.04	0.270	2.5	Pass
		B (End of String)	1	20.49	7.91	162.08	0.251	2.5	Pass
			2	22.39	7.25	162.33	0.334	2.5	Pass
			3	21.78	7.56	164.66	0.337	2.5	Pass
			4	20.51	7.06	144.80	0.251	2.5	Pass
			5	22.79	7.01	159.76	0.337	2.5	Pass
		C (Middle of String)	1	21.77	7.89	171.77	0.298	2.5	Pass
			2	21.55	7.81	168.31	0.300	2.5	Pass
			3	22.19	7.86	174.41	0.357	2.5	Pass
			4	22.41	7.48	167.63	0.356	2.5	Pass
			5	17.50	7.12	124.60	0.168	2.5	Pass
	3	A (Start of String)	1	20.95	15.90	333.11	0.252	2.5	Pass
			2	21.90	14.91	326.53	0.245	2.5	Pass
			3	21.02	14.25	299.54	0.333	2.5	Pass
			4	22.05	15.06	332.07	0.300	2.5	Pass
			5	22.19	14.22	315.54	0.296	2.5	Pass
		B (End of String)	1	22.84	14.51	331.41	0.320	2.5	Pass
			2	21.23	14.71	312.29	0.275	2.5	Pass
			3	21.02	15.01	315.51	0.279	2.5	Pass
			4	20.87	14.18	295.94	0.303	2.5	Pass
			5	20.56	14.24	292.77	0.343	2.5	Pass
		C (Middle of String)	1	23.03	14.92	343.61	0.226	2.5	Pass
			2	20.84	14.86	309.68	0.382	2.5	Pass
			3	22.40	14.90	333.76	0.284	2.5	Pass
			4	23.52	14.62	343.86	0.286	2.5	Pass
			5	23.23	14.79	343.57	0.350	2.5	Pass
	4	A (Start of String)	1	20.01	8.36	167.28	0.283	2.5	Pass
			2	20.68	7.26	150.14	0.255	2.5	Pass
			3	19.49	7.41	144.42	0.300	2.5	Pass
			4	16.96	7.41	125.67	0.290	2.5	Pass
			5	23.03	7.56	174.11	0.292	2.5	Pass
		B (End of String)	1	20.10	8.09	162.61	0.252	2.5	Pass
			2	18.87	7.17	135.30	0.278	2.5	Pass
			3	20.73	7.19	149.05	0.256	2.5	Pass
			4	19.28	7.07	136.31	0.287	2.5	Pass
			5	22.92	7.72	176.99	0.322	2.5	Pass
		C (Middle of String)	1	18.11	7.06	127.86	0.190	2.5	Pass
			2	23.25	7.66	178.10	0.306	2.5	Pass
			3	21.85	7.05	154.04	0.279	2.5	Pass
			4	19.25	7.11	136.87	0.267	2.5	Pass
			5	22.52	8.33	187.59	0.341	2.5	Pass

Note:
1. After evaluation, when C4=150nF, the test conditions are the worst.

4.4 UNWANTED TRIPPING TESTS

The verification of Resistance to Environmental Noise Test has been measured according to the chapter 30 of the standard UL1699B and the chapter 6.8 of the standard CSA C22.2 NO. 292-18.

A representative device shall be tested in accordance with Figures 30.1 – 30.5, using the values in Table 30.1 and the legend in Figure 29.1. The device shall not trip after being tested under each of the loading and sourcing conditions as described in this Section. When tripping occurs, an additional five representative devices of the rating under test shall be tested and shall not trip.

4.4.1 LOADING CONDITION I – INVERTERS, CONVERTERS, AND CHARGE CONTROLLERS

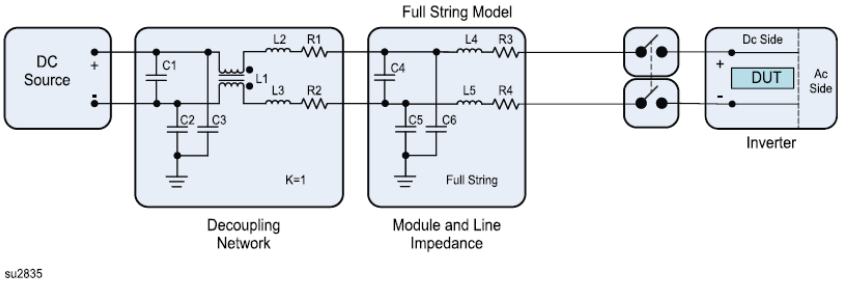
The DUT shall be installed 0.6 m (2.0 ft) from the load device. With a PV power source operating at rated power and when agreed upon by all concerned parties, with one MPP-voltage from Table29.2 representative of the unit under test, the load device shall be turned on for five minutes minimum and off for five minutes minimum. This sequence shall be repeated for a total of three operations.

The DUT shall NOT indicate an arc fault.

Model Type:

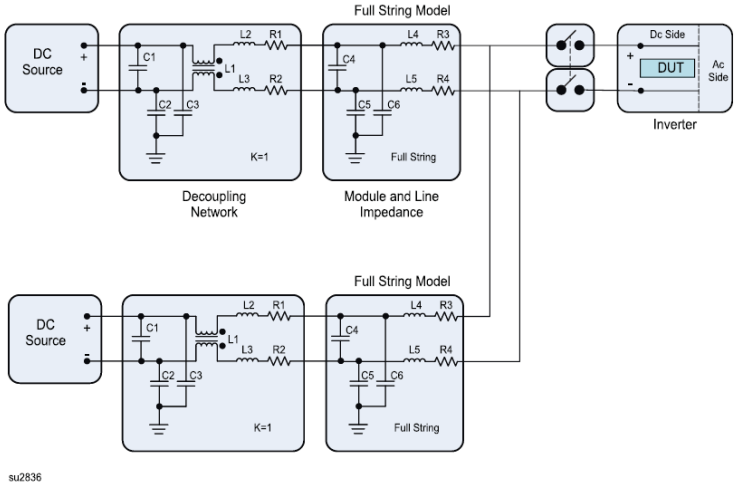
1) Figure 30.1: Unwanted tripping circuit, one string, one MPPT Location: Close to DUT

Figure 30.1
Unwanted tripping circuit, one string, one MPPT



2) Figure 30.2: Unwanted tripping circuit, two strings combined, one MPPT Location: Close to DUT

Figure 30.2
Unwanted tripping circuit, two strings combined, one MPPT



Test Result: PASS

Test Condition	Cap.(C4) (nF)	Attempts	Result:
one string, one MPPT	C4=150nF	1	Not indicate an arc fault
		2	Not indicate an arc fault
		3	Not indicate an arc fault
		4	Not indicate an arc fault
		5	Not indicate an arc fault

4.4.2 LOADING CONDITION II – DC SWITCH OPERATION

The DUT shall be installed in a test circuit with a PV power source and an inverter, converter, or charge controller. A disconnect switch external to the inverter shall be installed two feet from the device under test. With the PV power source set up to supply the rated power of the device under test, the disconnect switch shall be operated “on” and then after the inverter has been exporting power for 30 seconds, moved to the “off” position. This sequence shall be repeated three times, with five minutes “off” time between each sequence.

The DUT shall NOT indicate an arc fault.

Test Result: PASS

Test Condition	Cap.(C4) (nF)	Attempts	Result:
one string, one MPPT	C4=150nF	1	Not indicate an arc fault
		2	Not indicate an arc fault
		3	Not indicate an arc fault
		4	Not indicate an arc fault
		5	Not indicate an arc fault

4.4.3 LOADING CONDITION III – IRRADIANCE STEP CHANGES

The DUT shall be installed in a test circuit with a PV power source and an inverter as shown in Figures 30.6A and 30.6B. A mechanical disconnect switch shall be installed on one half of the PV strings connected to the inverter. With the PV power source operating in a manner to supply the rated power of the device under test, the disconnect switch attached to half the PV source circuits shall be operated “on” and then after 30 seconds, “off”. This sequence shall be repeated three times, with five minutes “off” time between each sequence. If a single power source is used this test must be performed by rapidly decreasing the supplied current to at least ½ of the test current in less than 5 seconds. After 30 seconds return to full initial current in less than 5 seconds. If using a module or array this may be achieved with a cover over the array or module. See Figure 30.1.

The DUT shall NOT indicate an arc fault.

Test Result: PASS

Test Condition	Attempts	Result:
one string, one MPPT	1	Not indicate an arc fault
	2	Not indicate an arc fault
	3	Not indicate an arc fault
	4	Not indicate an arc fault
	5	Not indicate an arc fault

4.5 NORMAL TEMPERATURE TEST

The verification of Resistance to Environmental Noise Test has been measured according to the chapter 31 of the standard UL1699B and the chapter 6.12 of the standard CSA C22.2 NO. 292-18.

When carrying rated current and with rated voltage applied, a device shall not attain a temperatura at any point that is sufficiently high to:
a) Constitute an increased risk of fire;
b) Affect injuriously any materials used in the device; or
c) Exhibit greater rises in temperature at specific points than indicated in Table 31.1, based on an assumed average ambient temperature in normal service of 25°C (77°F).

Coil or winding temperatures are to be measured by thermocouples unless access cannot be gained for mounting a thermocouple (for example, a coil enclosed in sealing compound) or unless the coil wrap includes thermal insulation or more than two layers (0.8 mm or 1/32 inch maximum) of cotton, paper, rayon, or the like. At a point on the surface of a coil where the temperature is affected by an external source of heat, the temperature rise measured by means of a thermocouple may be 10°C (18°F) more than the indicated maximum, provided that the temperature rise of the coil, as measured by the resistance method is no more than that specified in Table 31.1.

Ambient air is to be at any convenient temperature within the range of 20 – 30°C (68 – 86°F).

Table 31.1
Maximum acceptable temperature rises

Material and components	°C	(°F)
Wire insulation or insulating tubing	35	(63)
Electrical tape	55	(99)
Varnish-cloth insulation	60	(108)
Fiber employed as electrical insulation	65	(117)
Phenolic composition or melamine[a]	125	(198)
Urea composition[a]	75	(108)
Other insulating materials[a]	–	–
[a] The acceptability of insulating materials shall be determined with respect to properties – such as flammability, arc resistance, relative or generic temperature indices, and the like – based on the temperature rise plus 25°C (45°F).		

Test Result: PASS

THERMOCOUPLE LOCATION		TC. #	MEASURED TEMPERATURE	MAXIMUM ALLOWED TEMPERATURE (°C)
On power board				
1	The radiator is located near NTC2	CH0002	75.6	90
2	Q13	CH0004	75.7	175
3	Q18	CH0005	79.5	175
4	Q20	CH0006	85.3	175
5	Q15	CH0010	90.8	175
6	Q26	CH0101	81.8	175
7	Q1	CH0102	93	175
8	Q4	CH0103	91.8	175

THERMOCOUPLE LOCATION		TC. #	MEASURED TEMPERATURE	MAXIMUM ALLOWED TEMPERATURE (°C)
9	Q6	CH0201	79.6	175
10	Q31	CH0202	75.9	175
11	Q32	CH0203	72.6	175
12	Q29	CH0204	74.2	175
13	Q35	CH0205	81.6	175
14	Q38	CH0206	72.8	175
15	Q40	CH0207	72.8	175
16	Q30	CH0208	73.2	175
17	Q44	CH0209	80.9	175
18	TX2	CH0302	80.4	130
19	TX1	CH0303	72.5	130
20	C44	CH0304	76.8	105
21	C107	CH0305	73.1	105
22	C129	CH0306	73.5	105
23	RY2	CH0307	68.6	85
24	C15	CH0308	75.5	105
25	HL1	CH0309	78.3	105
26	C47	CH0310	84.6	105
27	PCB close to CN10	CH0405	91.6	130
On AC-EMI board				
28	HL5	CH0505	69.6	105
29	U1	CH0506	75.2	110
30	L3	CH0507	71.4	130
31	RL1	CH0508	71.4	85
32	RL2	CH0509	69	85
33	RL5	CH0510	68.7	85
34	L4	CH0601	69.9	130
35	HL7	CH0602	69.2	105
36	C53	CH0603	66.3	125
37	HL10	CH0604	69.9	105
38	BR1	CH0606	69.7	150
39	RL8	CH0607	69.2	85
40	R154	CH0608	69.2	125
41	BR2	CH0609	70.6	150
42	NTC1	CH0701	69.8	170
43	L15	CH0702	71.4	130
44	TX1 coil	CH0703	74.5	130
45	TX1 core	CH0704	76	130
46	D52	CH0705	74.6	150
47	EC15	CH0706	71.6	105
48	T1 coil	CH0707	71.4	130
49	T2 coil	CH0708	74	130
50	Q25	CH0709	70	150
51	BR3	CH0710	69	150
52	Q30	CH0801	71.5	150
53	Q27	CH0802	89.6	150
DC-EMI Board				
54	L1	CH0803	72.8	130

THERMOCOUPLE LOCATION		TC. #	MEASURED TEMPERATURE	MAXIMUM ALLOWED TEMPERATURE (°C)
55	HL2	CH0804	82.2	105
CAP Board				
56	77.6	77.6	77.6	105
57	75.6	75.6	75.6	105
CNTL Board				
58	U1	CH0807	71	125
59	U57	CH0808	76.1	125
60	U6	CH0809	68.8	125
COMM Board				
61	U1	CH0901	69.1	125
AC-X2 Board				
62	RL1	106 (C)	69.90	85
63	SPD2	107 (C)	72.11	85
64	CY3	108 (C)	71.67	105
65	C3	109 (C)	70.25	105
66	MOV7	110 (C)	69.24	125
General				
67	AC Terminal	111 (C)	72.05	120
68	AC Cable	112 (C)	73.66	105
69	Battery Terminal	113 (C)	77.61	120
70	Battery Copper Bar	114 (C)	77.02	120
71	Battery Switch	115 (C)	83.29	85
72	Load Terminal	116 (C)	73.30	85
73	Load Cable	117 (C)	74.09	120
74	PV Terminal	118 (C)	64.85	105
75	PV Cable	119 (C)	69.22	105
76	PV Switch	120 (C)	69.80	105
77	Display Screen	201 (C)	47.85	85
78	Key/Push Button	202 (C)	45.52	70
79	Side Face/Side Panel	203 (C)	56.20	70
80	Back Face/Back Panel	204 (C)	52.50	70
81	Handle	205 (C)	51.53	70
82	Internal Ambient Temperature	207 (C)	68.78	/
83	External Ambient Temperature	208 (C)	45.38	/
84	INV1 Coil	212 (C)	77.31	150
85	INV2 Coil	213 (C)	73.77	150
86	BOOST1 Coil	214 (C)	77.93	150
87	BOOST2 Coil	215 (C)	85.22	150
88	BOOST4 Coil	216 (C)	77.92	150
89	BOOST4 Coil	217 (C)	85.21	150
90	BL Coil	218 (C)	89.41	150
91	AC Terminal	219 (C)	89.77	150
92	AC Cable	220 (C)	87.94	150
Note: Considering the maximum operating temperature of the inverter, this test is carried out at 60°C				

4.6 DIELECTRIC VOLTAGE-WITHSTAND TEST

The verification of Resistance to Environmental Noise Test has been measured according to the chapter 35 of the standard UL1699B and the chapter 6.10 of the standard CSA C22.2 NO. 292-18.

The insulation and spacings shall withstand the application of a test voltage equal to two times the maximum rated voltage plus 1000 V between:

a) Line and load with the device open for a device that includes a circuit interrupting contact;
b) Line and load with the device tripped for a device that includes a circuit interrupting contact;
c) Live parts and parts that are grounded, including a ground terminal;
d) Live parts and accessible metal parts including an enclosure of insulating material wrapped in metal foil. See 35.7.

For a device deriving power from a commercial light or power source, the test voltage shall also be applied between the ac circuit and dc circuits, and between the ac circuit and parts that are grounded.

For a device deriving power from a commercial light or power source, the test voltage shall also be applied between the ac circuit and dc circuits, and between the ac circuit and parts that are grounded.

In order to determine compliance with the provisions of 35.1, the insulation and spacings are to be subjected to application of a test potential increased from zero to the values specified and maintained for a period of one minute. The increase in the applied potential is to be at a substantially uniform rate and as rapid as is consistent with the value of the applied potential being correctly indicated by the voltmeter. The source of this test voltage shall be in accordance with (a) or (b) as follows:

a) For ac circuits, a 60 hertz essentially sinusoidal potential;
b) For a dc circuit, or between ac and dc circuits, a direct-current potential. It shall be permissible to use an alternating-current potential for these circuits. The ac RMS potential value is to be the required dc dielectric potential divided by 1.414.

Test Result: PASS

TEST LOCATION	APPLIED VOLTAGE	PASS / FAIL
PV input to PE	2000Vac/2828Vdc	PASS
AC output (on-grid and off-grid) to PE	1480Vac/2100Vdc	PASS
PV input to Communication port& SELV port	2000Vac/2828Vdc	PASS
AC output (on-grid and off-grid) to Communication port& SELV port	1480Vac/2100Vdc	PASS
PV input to battery terminal	2000Vac/2828Vdc	PASS
AC output (on-grid and off-grid) to battery terminal	1480Vac/2100Vdc	PASS
Communication port& SELV port to PE	500Vac/707Vdc	PASS
battery terminal to PE	500Vac/707Vdc	PASS

4.7 RESISTANCE TO ENVIRONMENTAL NOISE TEST

The verification of Resistance to Environmental Noise Test has been measured according to the chapter 42 of the standard UL1699B and the chapter 6.11 of the standard CSA C22.2 NO. 292-18.

The same representative device shall be tested for all of the applicable tests as tabulated in Table 24.1 and described in 42.2 – 42.7.

Except as indicated in 42.1.4, the device shall not trip as a result of the electromagnetic event.

It shall be permissible for a device to trip as a result of any electromagnetic event, providing all of the following conditions are met:

a) The device automatically restores power after conducting an acceptable self-test;
b) The self-test system that allows restoration of power after an electromagnetic event also prevents the device from resetting automatically after tripping as a result of an arc fault; and
c) If the self-test system employs a programmable circuit component such as a microprocessor, it shall be included in the investigation required by Section 13, Programmable Circuit Components.

It shall be permissible for a device to trip during the Voltage dips, short interruptions and voltage variations immunity test if the device complies with 42.1.4 or 42.7.2.

Test Record:

Item	Content	Verdict (Yes or No)
a	The device automatically restores power after conducting an acceptable self-test;	Yes
b	The self-test system that allows restoration of power after an electromagnetic event also prevents the device from resetting automatically after tripping as a result of an arc fault	Yes
c	If the self-test system employs a programmable circuit component such as a microprocessor, it shall be included in the investigation required by Section 13.	Yes

After all of the tests involving the electromagnetic events, the representative device shall be tested in accordance with 29.1 using any two of the test conditions specified in Table 29.2, and shall trip as required.

Test Result: PASS

One string, one mppt:

Tem.℃)	Test No.	Location	Attempt.	Varc (V)	Iarc (A)	Parc (W)	Trip Time measured(s)	Trip Time limited(s)	Pass/ Fail
25°C	2	A	1	21.81	7.84	170.99	0.285	2.5	Pass
			2	21.08	7.61	160.42	0.231	2.5	Pass
			3	23.11	7.54	174.25	0.354	2.5	Pass
			4	23.15	7.76	179.64	0.303	2.5	Pass
			5	21.10	7.49	158.04	0.240	2.5	Pass
		B	1	22.74	7.73	175.78	0.311	2.5	Pass
			2	23.22	7.55	175.31	0.282	2.5	Pass
			3	23.24	7.18	166.86	0.304	2.5	Pass
			4	21.53	7.41	159.54	0.284	2.5	Pass
			5	22.28	7.35	163.76	0.257	2.5	Pass
		C	1	21.92	7.32	160.45	0.277	2.5	Pass
			2	23.03	7.49	172.49	0.309	2.5	Pass
			3	22.38	7.23	161.81	0.298	2.5	Pass
			4	22.67	7.35	166.62	0.362	2.5	Pass
			5	21.59	7.81	168.62	0.259	2.5	Pass
	3	A	1	22.09	14.71	324.94	0.358	2.5	Pass
			2	24.19	14.78	357.53	0.269	2.5	Pass
			3	20.99	15.63	328.07	0.315	2.5	Pass
			4	22.63	15.04	340.36	0.303	2.5	Pass
			5	21.64	15.33	331.74	0.299	2.5	Pass
		B	1	22.27	15.18	338.06	0.309	2.5	Pass
			2	17.26	14.48	249.92	0.284	2.5	Pass
			3	21.40	14.17	303.24	0.299	2.5	Pass
			4	22.86	15.09	344.96	0.287	2.5	Pass
			5	19.24	14.15	272.25	0.300	2.5	Pass
		C	1	19.51	14.53	283.48	0.270	2.5	Pass
			2	22.27	14.32	318.91	0.320	2.5	Pass
			3	21.26	14.47	307.63	0.258	2.5	Pass
			4	20.31	14.15	287.39	0.231	2.5	Pass
			5	20.31	14.19	288.20	0.252	2.5	Pass

Note:
1. After evaluation, when C4=150nF, the test conditions are the worst.

4.8 VOLTAGE SURGE TEST

Devices deriving their power from a photovoltaic DC source and intended for use in stand-alone (not grid-connected) power systems shall be subjected to the tests of 27.2 and 27.3 with the surges applied to the PV DC input of the device.

Devices deriving their power from a commercial light or power source and utility-interactive equipment shall be subjected to the surge tests described in the Standard for Interconnecting Distributed Resources With Electric Power Systems, IEEE 1547. The surges shall be applied to the AC input of the device.

In addition to the test of 55.2, devices deriving their power from a commercial light or power source and utility-interactive equipment shall also be subjected to the tests of 27.2 and 27.3 with the surges applied to the PV DC input of the device.

Test Result: PASS

For Inverter: See report: GZES250400749902 of IEEE 1547

4.9 OVERVOLTAGE, OVERLOAD, ENDURANCE, ABNORMAL OPERATIONS, AND SHORT CIRCUIT TESTS

The verification of Resistance to Environmental Noise Test has been measured according to the chapter 56 of the standard UL1699B and the chapter 6.13, 6.14, 6.15, 6.16, 6.17, of the standard CSA C22.2 NO. 292-18.

Switching devices in the power conversion circuits of inverters, converters, and charge controllersthat are subjected to the Abnormal Tests, as applicable, of the Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741, or the Standard for Power Converters for Use in Photovoltaic Power Systems – Part 1: General Requirements, UL 62109-1, need not be subjected to the Overvoltage, Overload, Endurance, Abnormal Operations , and Short Circuit Tests from Table 54.1, provided that after the Abnormal Tests of UL 1741
or UL 62109-1, each representative device complies with 14.2.1 and the applicable tests of Section 29, Arc Fault Detection Tests. See 56.2.

When applying the requirements of 56.1, the applicable tests of Section 29, Arc Fault Detection Tests, shall not be conducted after an Abnormal Test if all of the following conditions are met:

a) The sample is no longer functional, that is, has no inverter output; and
b) The sample provides an indication to the user that it has failed.

When conducting the applicable tests of Section 29, Arc Fault Detection Tests, the device shall interrupt the arcing as described in Table 29.2 for the conditions of Test No. 2 and 3 at room ambient.

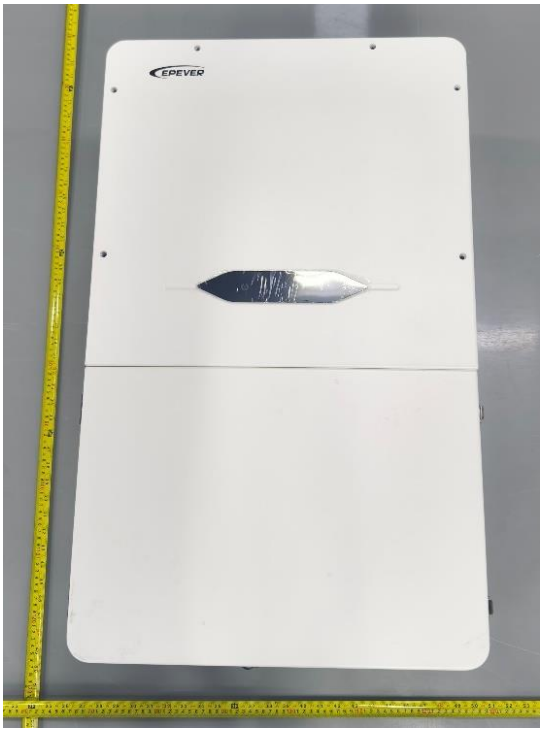
Redundant interrupting or shunting contact devices that supplement power conversion circuits o inverters, converters, and charge controllers that do not operate as part of the power conversión electronics shall be subjected to the Overvoltage, Overload, Endurance, and Short Circuit tests from Table 54.1.

Test Result: The inverter has completed the certification test of UL1741:2021. Check after abnormal test: PASS, one string, one MPPT

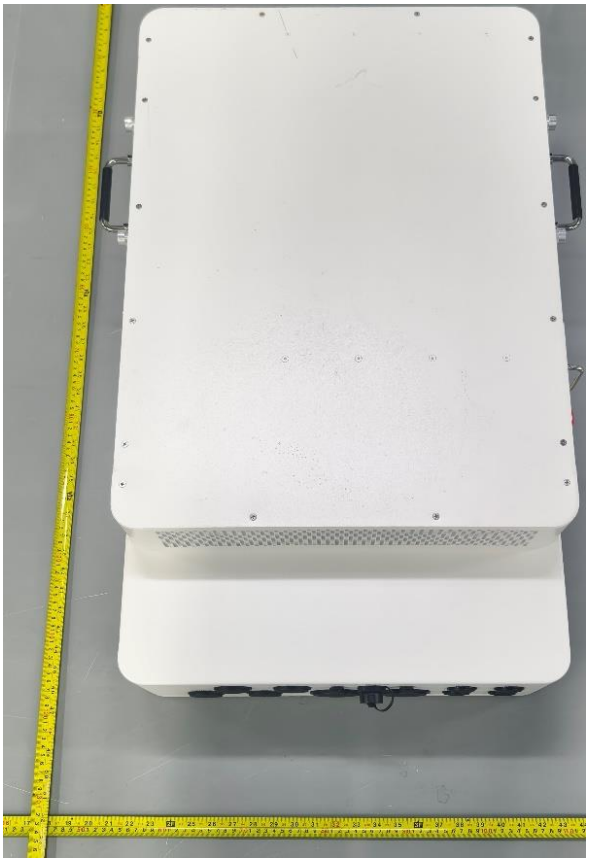
Tem.℃)	Test No.	Location	Attempt.	Varc (V)	Iarc (A)	Parc (W)	Trip Time measured(s)	Trip Time limited(s)	Pass/ Fail
25°C	2	A	1	22.02	7.37	162.29	0.342	2.5	Pass
			2	21.97	7.73	169.83	0.295	2.5	Pass
			3	19.10	7.05	134.66	0.150	2.5	Pass
			4	24.34	7.05	171.60	0.296	2.5	Pass
			5	27.16	7.14	193.92	0.262	2.5	Pass
		B	1	22.08	7.80	172.22	0.296	2.5	Pass
			2	22.47	7.67	172.34	0.303	2.5	Pass
			3	22.46	7.32	164.41	0.302	2.5	Pass
			4	17.38	7.07	122.88	0.155	2.5	Pass
			5	22.19	7.73	171.53	0.256	2.5	Pass
		C	1	22.57	7.72	174.24	0.272	2.5	Pass
			2	22.51	7.08	159.37	0.244	2.5	Pass
			3	22.80	7.67	174.88	0.347	2.5	Pass
			4	23.61	7.75	182.98	0.303	2.5	Pass
			5	15.72	7.00	110.04	0.097	2.5	Pass
	3	A	1	23.27	14.31	332.99	0.337	2.5	Pass
			2	22.15	14.15	313.42	0.258	2.5	Pass
			3	19.17	15.14	290.23	0.288	2.5	Pass
			4	22.59	14.91	336.82	0.266	2.5	Pass
			5	23.44	14.51	340.11	0.353	2.5	Pass
		B	1	23.21	14.93	346.53	0.335	2.5	Pass
			2	23.46	14.80	347.21	0.321	2.5	Pass
			3	23.34	15.28	356.64	0.300	2.5	Pass
			4	23.15	14.42	333.82	0.374	2.5	Pass
			5	23.02	14.82	341.16	0.318	2.5	Pass
		C	1	22.85	14.90	340.47	0.285	2.5	Pass
			2	22.54	15.07	339.68	0.299	2.5	Pass
			3	20.69	14.87	307.66	0.329	2.5	Pass
			4	26.34	15.64	411.96	0.253	2.5	Pass
			5	22.44	14.14	317.30	0.360	2.5	Pass

Note:
1. After evaluation, when C4=150nF, the test conditions are the worst.

5 PICTURES

Front view of the Unit (On-Grid Hybrid Inverter, ELD12K, LED version)

Front view of the Unit (On-Grid Hybrid Inverter, ELD12K, LCD version)

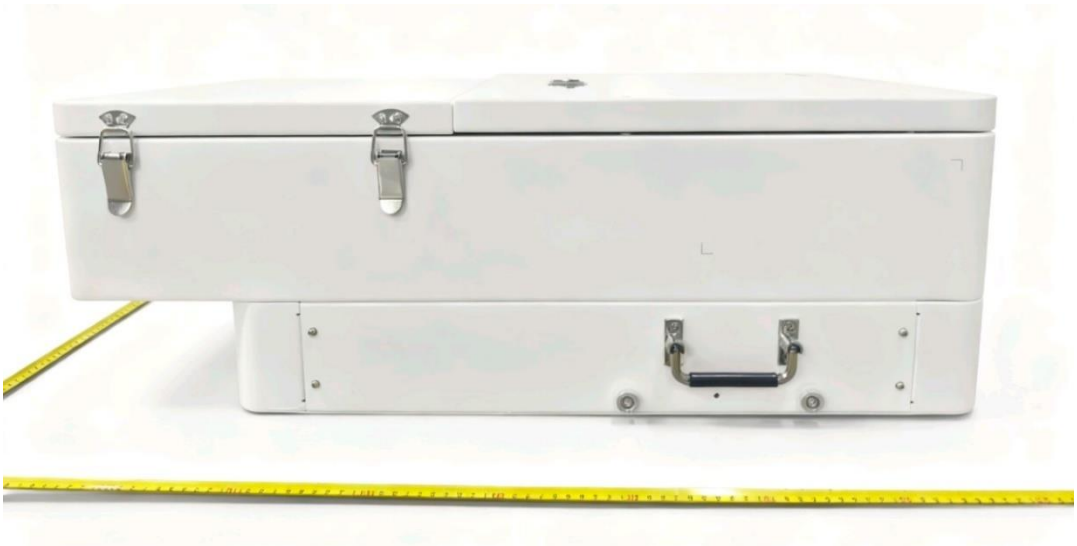

Rear View (On-Grid Hybrid Inverter, ELD12K)

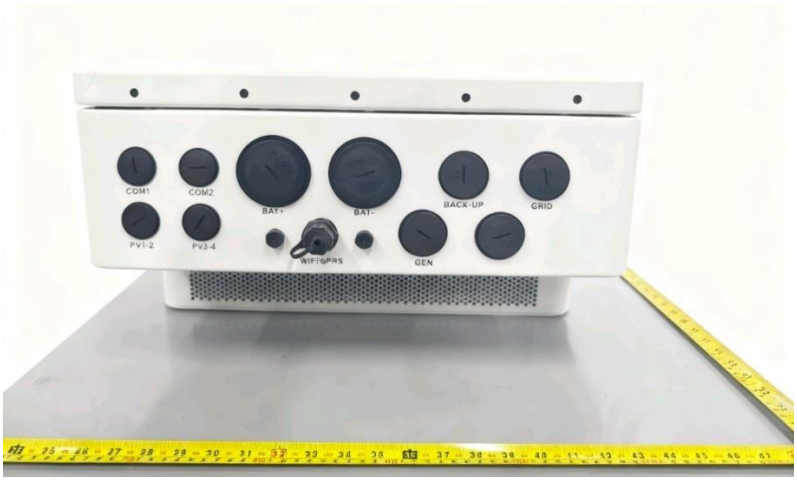
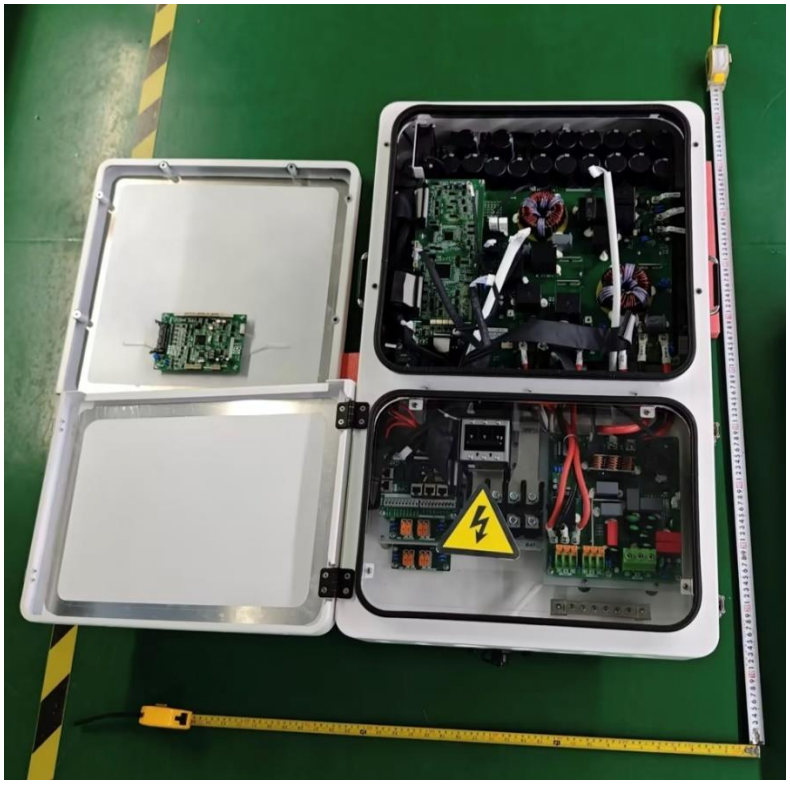


Top view of the Unit (On-Grid Hybrid Inverter, ELD12K)



Left side view of the Unit (On-Grid Hybrid Inverter, ELD12K)

Right side view of the Unit (On-Grid Hybrid Inverter, ELD12K)


Bottom view of the Unit (On-Grid Hybrid Inverter, ELD12K)

Internal view of the Unit (On-Grid Hybrid Inverter, ELD12K, LED version)


Internal view of the Unit (On-Grid Hybrid Inverter, ELD12K, LED version)

Internal view of the Unit (On-Grid Hybrid Inverter, ELD12K, LCD version)


----------END OF REPORT----------