

Attachment I

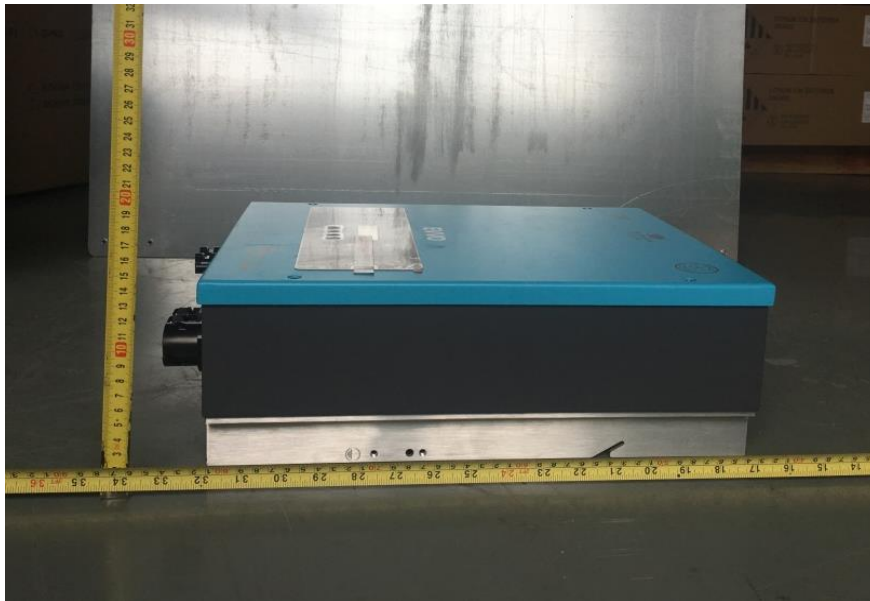
(Pictures of the EUT and Electrical Schemes)

1 PICTURES

Front



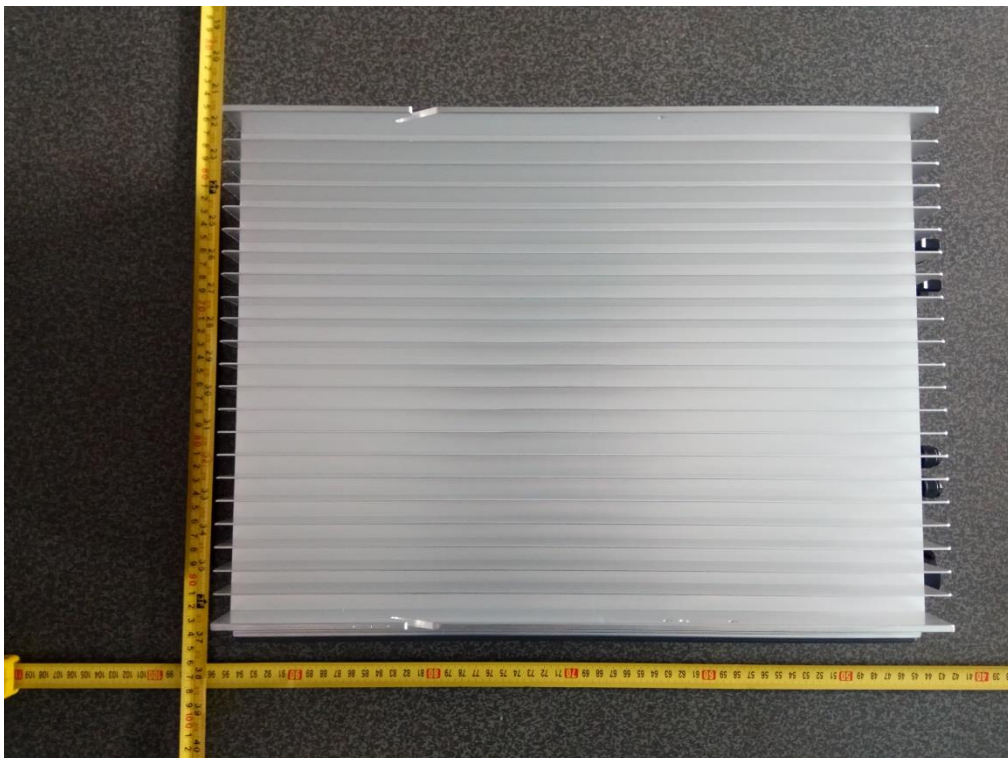
Side



Connection interface

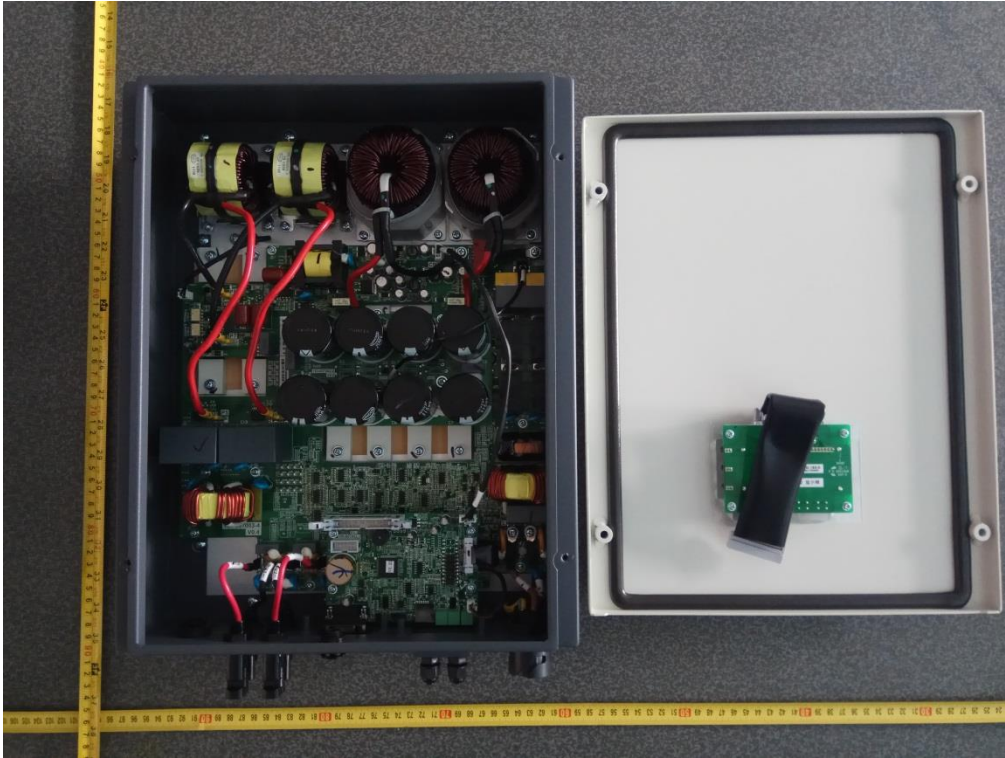


Back Side



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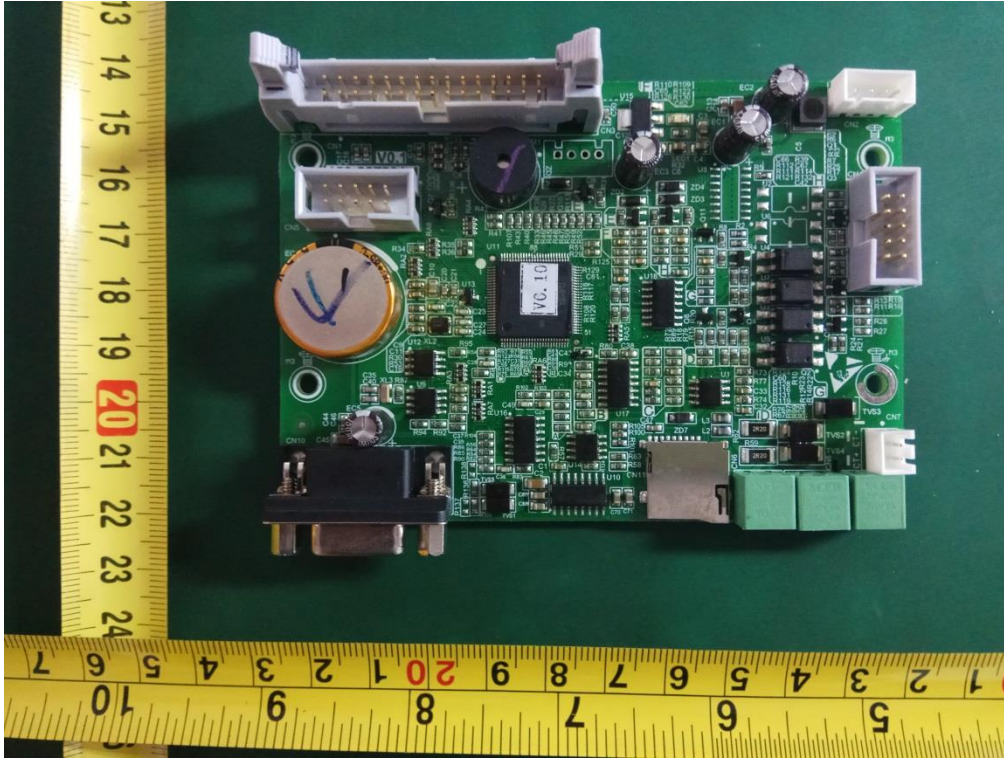
Internal



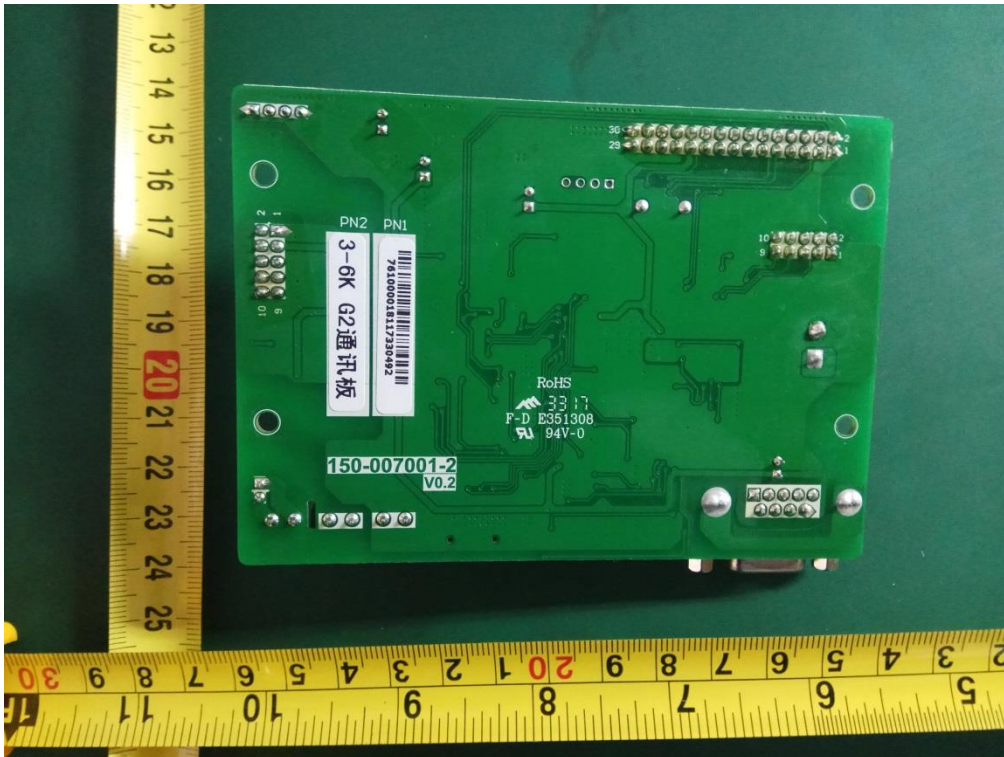
Internal



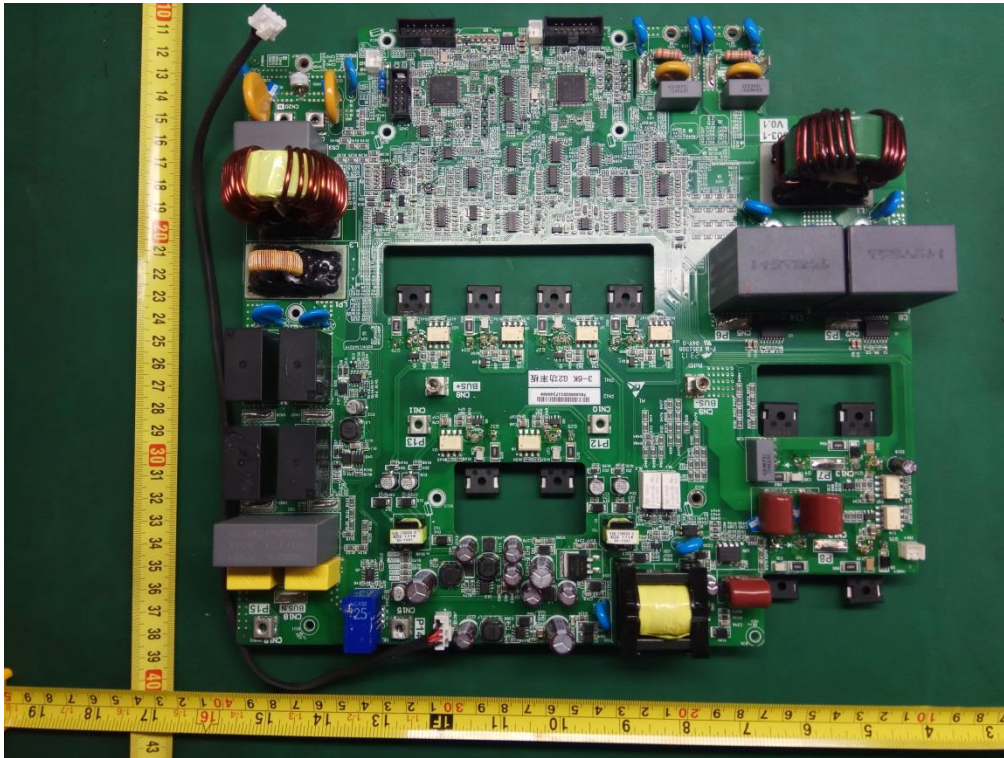
Front side of communication board



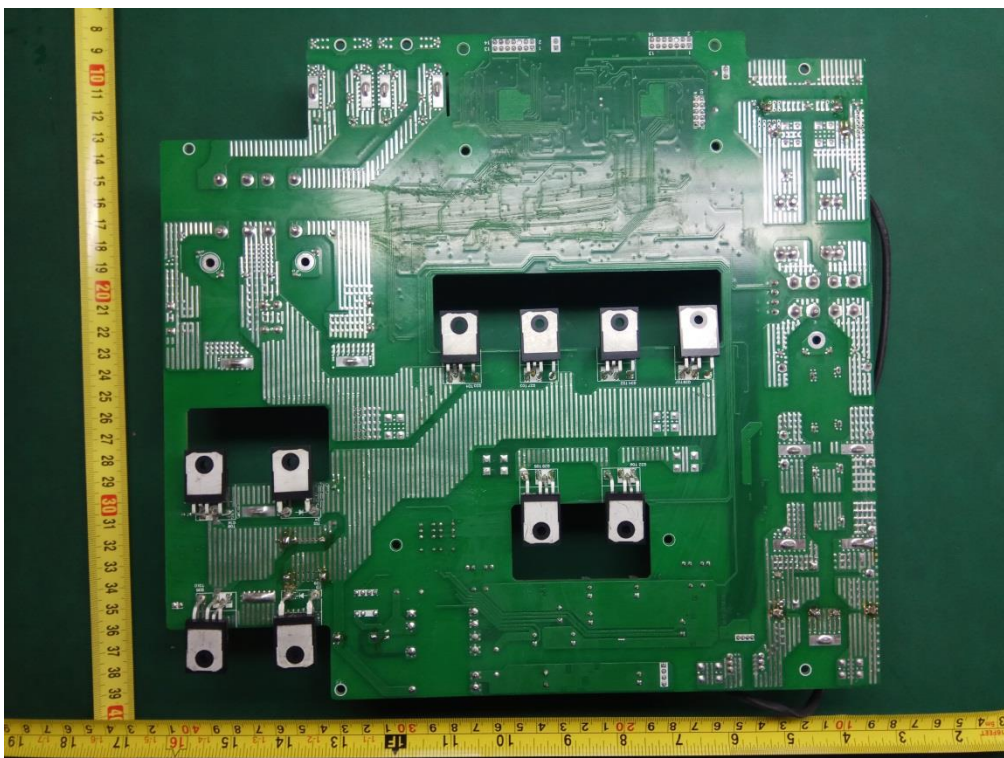
Back side of communication board



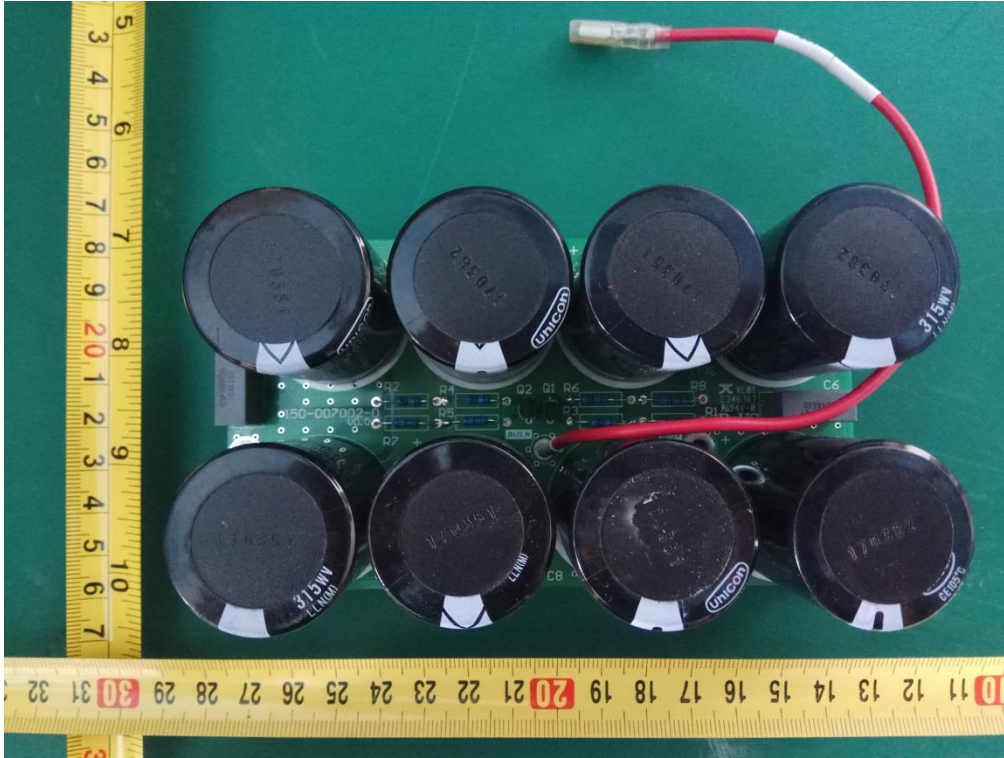
Front side of Main board



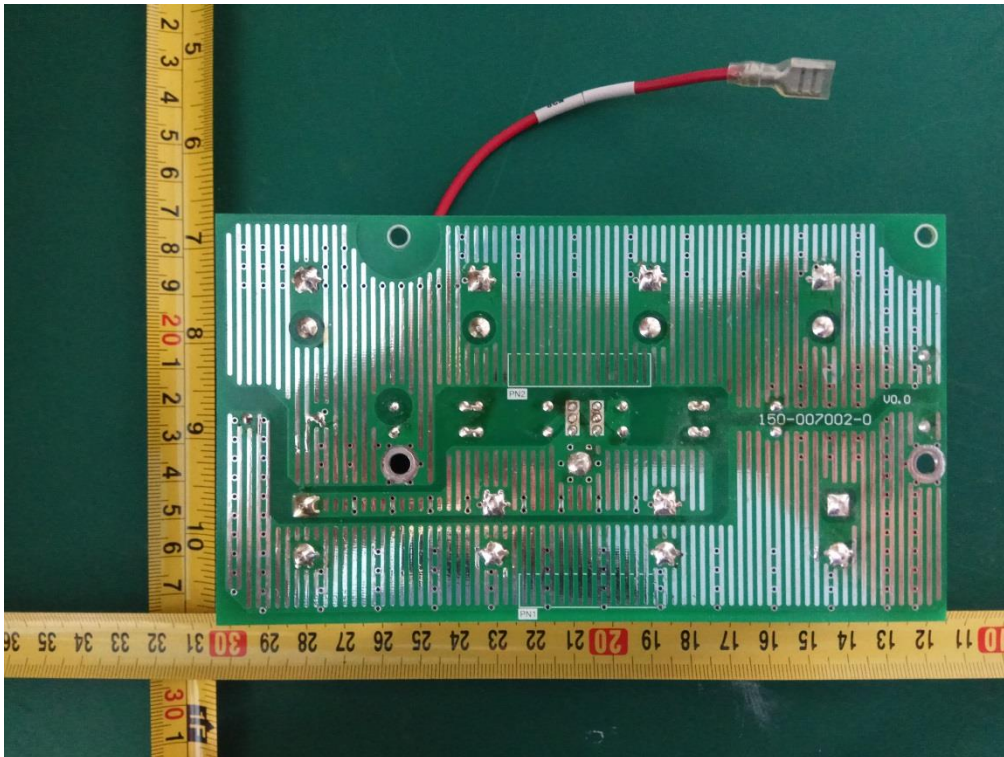
Front side of Main board



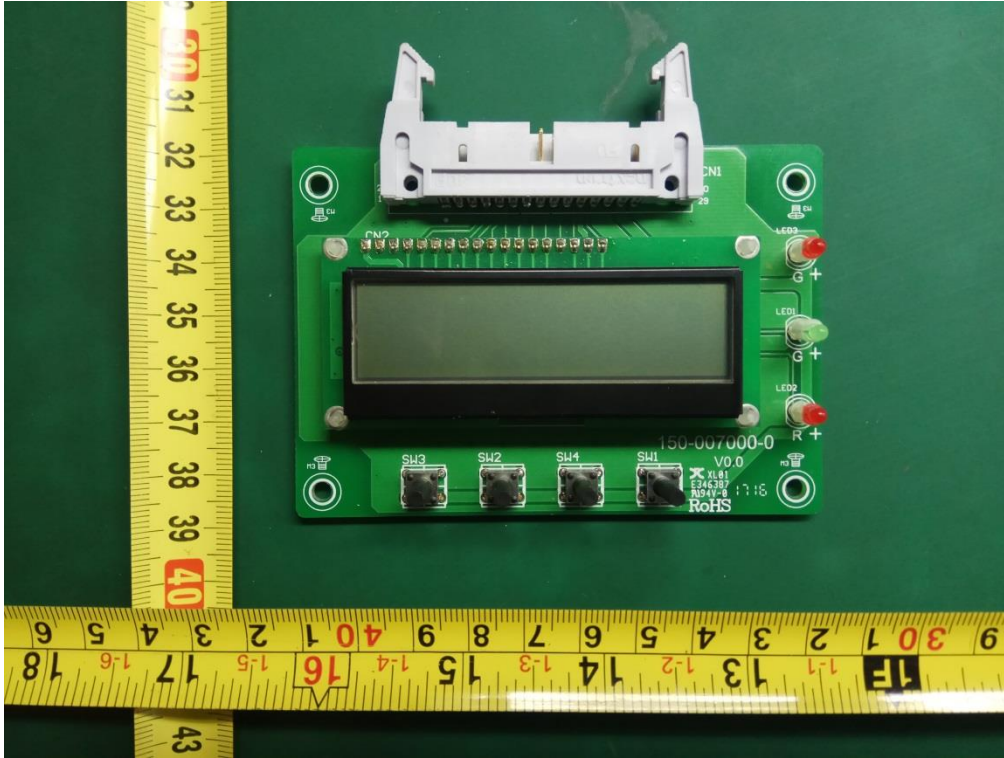
Front side of Bus capacitors board



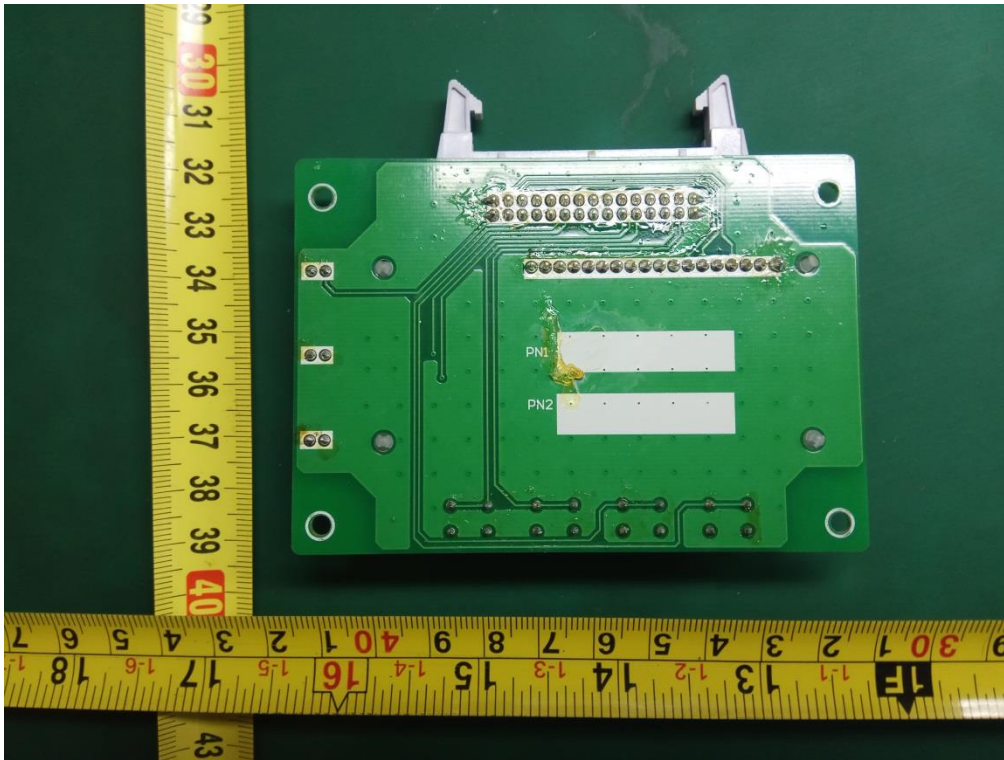
Back side of Bus capacitors board



Front side of display board

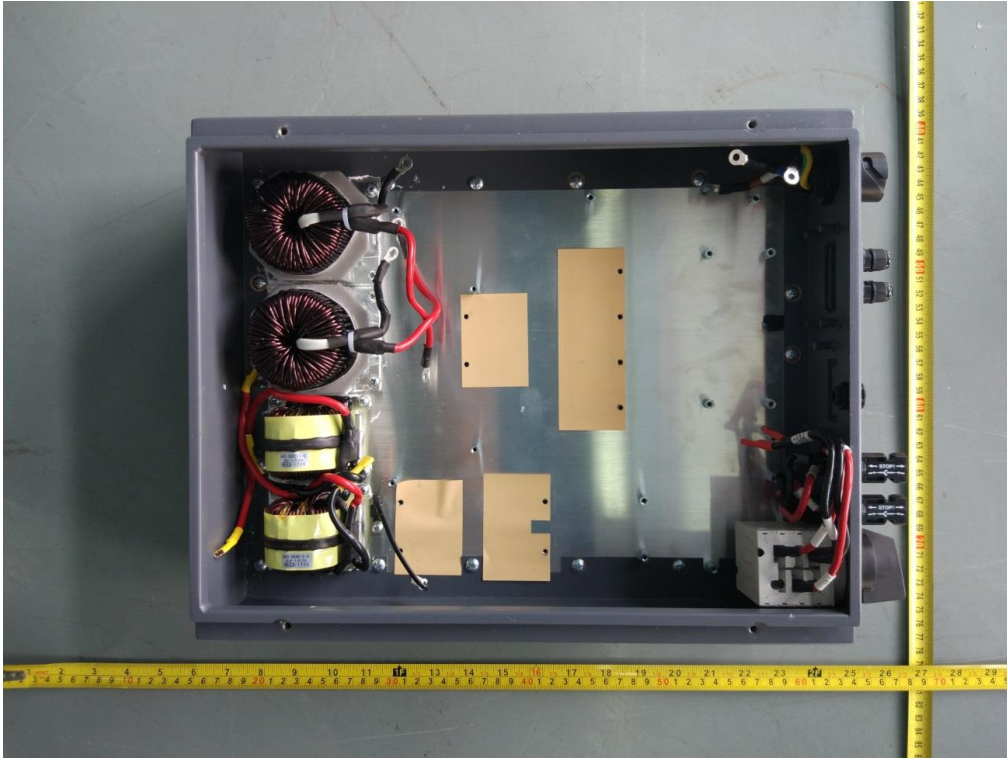


Back side of display board

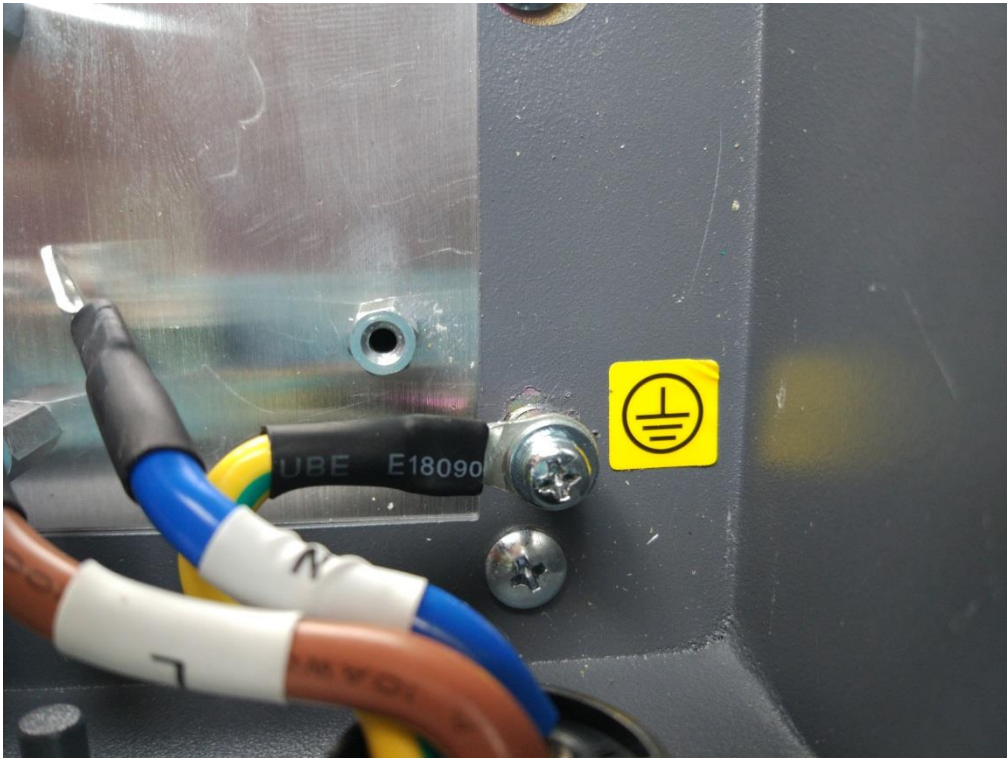


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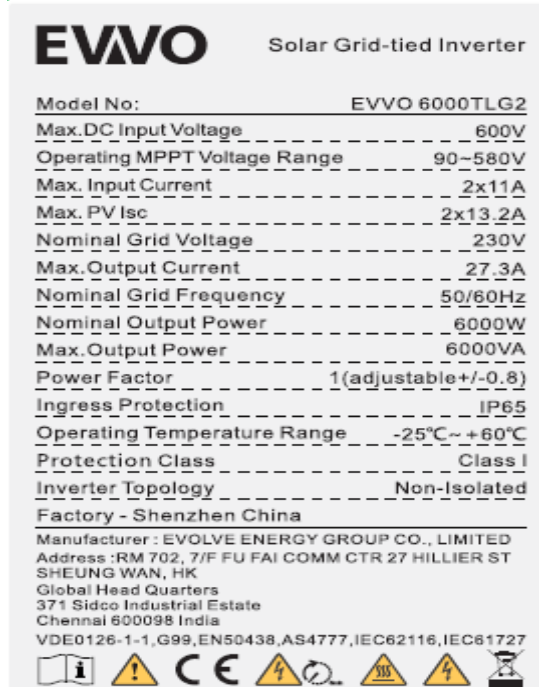
Removed all PCBAs



Cover



Labels

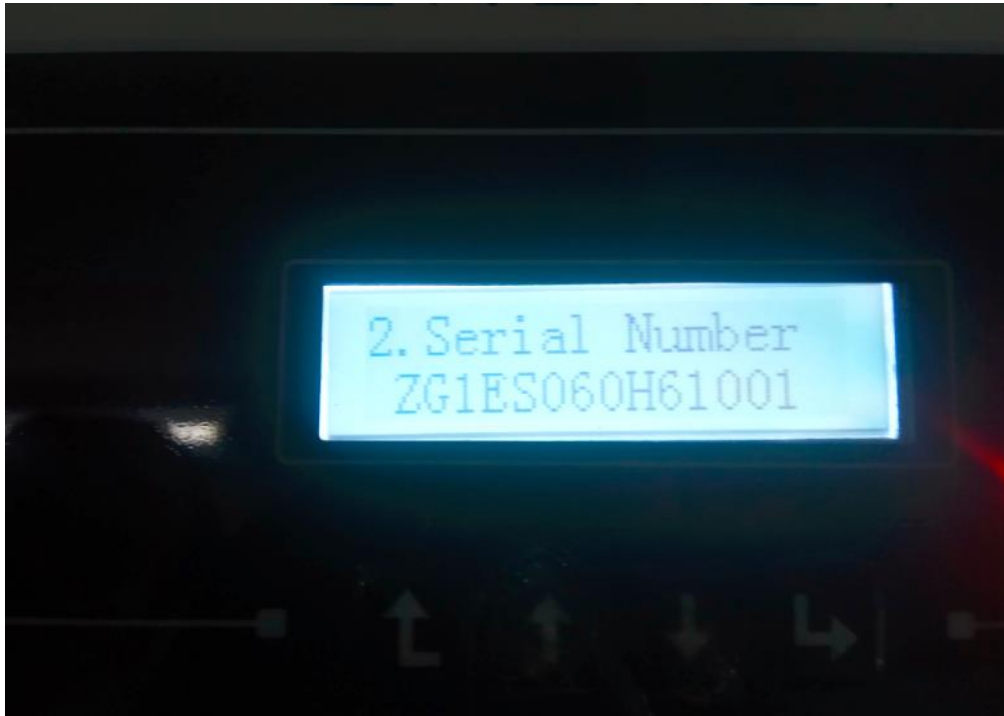


Software Version

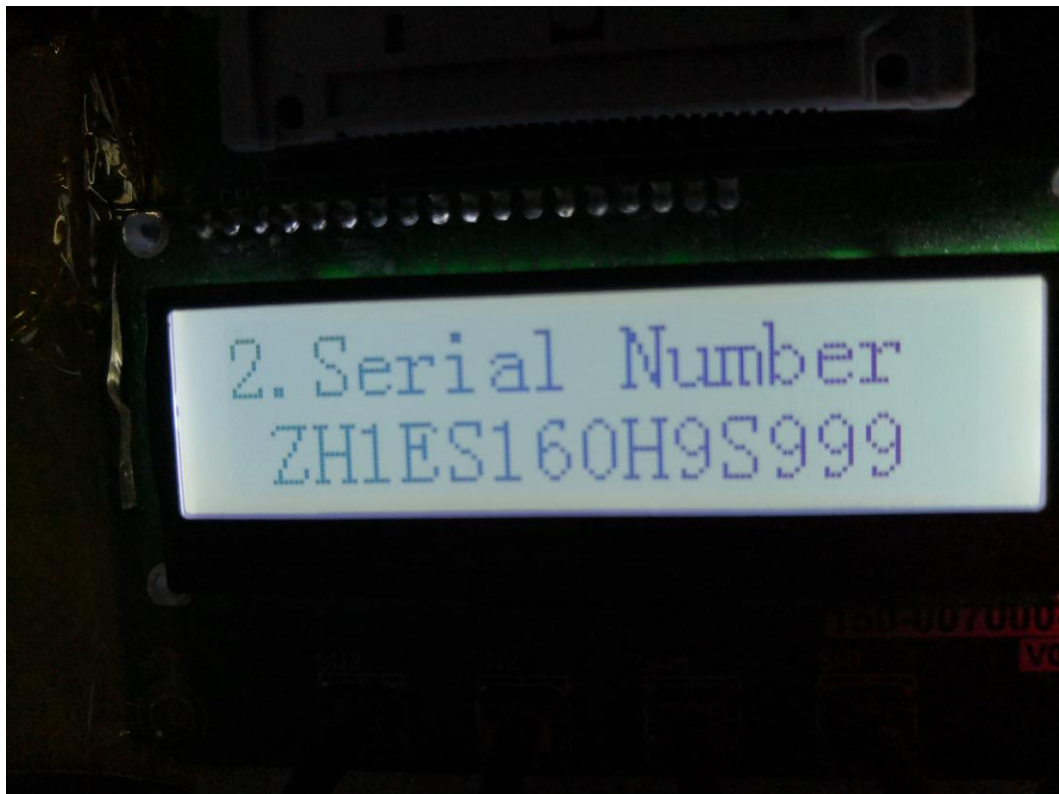


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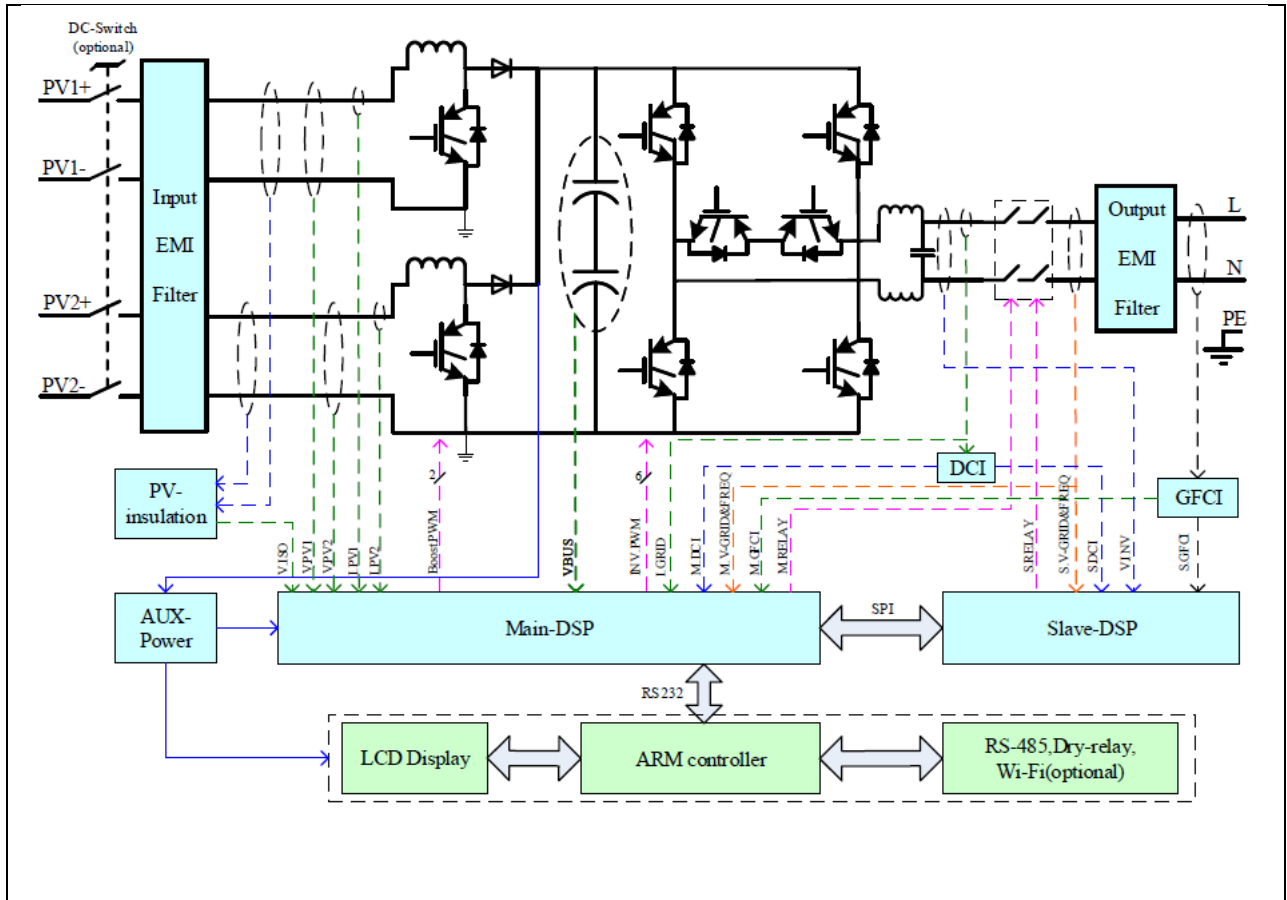
Serial Number of the EUT



Serial Number of the EUT for spot-check test



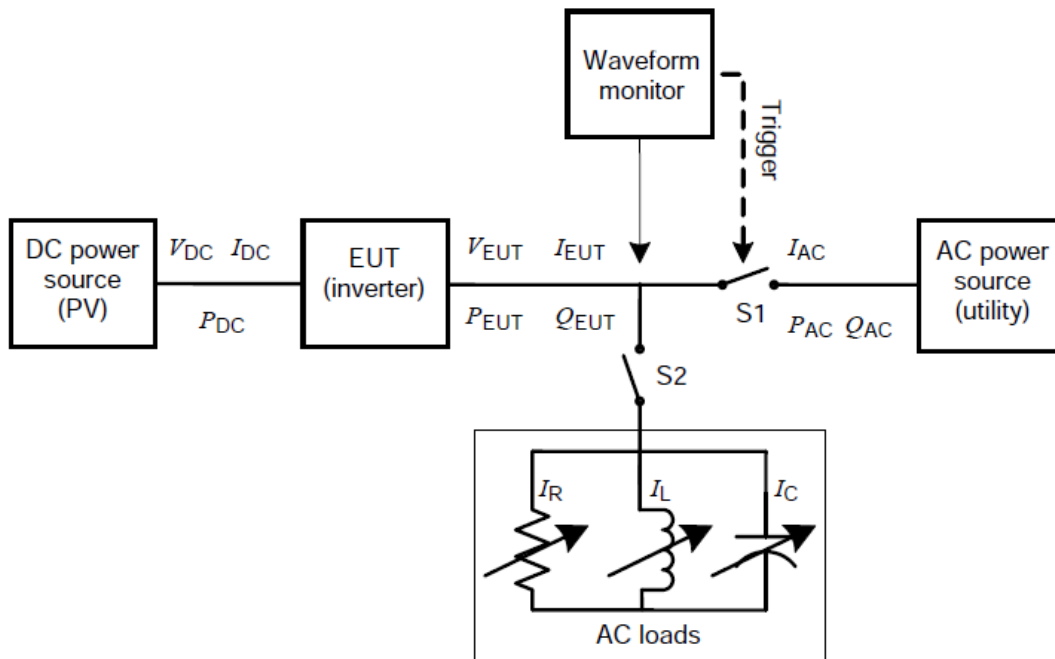
2 ELECTRICAL SCHEMES



Attachment II

(Testing information)

1 TESTING CIRCUIT



Current and voltage clamps have been connected to the inverter input/output for all the tests.
 All the tests and checks have been performed in accordance with the reference standard under testing.

2 TESTING EQUIPMENT

No.	Equipment Name	MARK/Model No.	Equipment No.	Equipment calibration due date
1	AC source	Chroma / 61860	--	--
2	PV array simulator	Chroma / 62150H-1000S	--	--
3	Current clamp	FLUKE / i1000s	30413441	2018-02-15
4	Differential probe	Sanhua / SI-9110	111134	2018-02-15
5	Temperature & Humidity meter	VICTOR / VC230A	WS01	2018-09-03
6	Power analyzer	YOKOGAWA / WT 3000	EP-011	2018-08-05
7	Digital oscilloscope	YOKOGAWA/DL 850	EP-001	2018-10-22

Equipment for spot-check test

From	No.	Equipment Name	MARK/Model No.	Equipment No.	Equipment calibration due date
Sofar Solar	1	AC source	Chroma / 61860	--	--
	2	PV array simulator	Chroma / 62150H-1000S	--	--
	3	Current clamp	FLUKE / i1000s	29503223	2020-02-12
	4	Differential probe	Sanhua / SI-9110	111541	2020-02-12
	5	Temperature & Humidity meter	Anymeters / TH101B	201030245220	2020-02-12
	6	Power analyzer	YOKOGAWA / WT 3000	91N610888	2020-02-12
	7	Digital oscilloscope	Agilent / DS05014A	MY50070266	2020-02-12
SGS	8	True RMS Multimeter	Fluke / 289C	GZE012-53	2020/01/24

Items	Specifications
1) PV array simulator	
a) Voltage range	0 – 1000Vdc (0.01V step)
b) Current range	0 – 40A (0.01A step)
2) AC power source	
a) Output wiring	Three phase
b) Output capacity	100KVA
c) Output voltage	10-300Vrms
d) Output frequency	45-65Hz
e) Voltage stability	± 100ppm/°C
f) Output voltage distortion	0.05% max.
3) Digital meter	
a) Voltage range	0 – 1000Vdc, 0 – 600Vrms
b) Current range	0 – 30A
c) Frequency range (accuracy)	0.2%
d) Measurement items	Voltage (V) Current (A) Active power (W) Reactive power (Var) Volt-ampere (VA) Power factor (PF) Frequency (Hz) Electric energy (Wh)
4) Waveform recorder	
a) Sampling speed	1M/s
b) Recording device	Memory record and USB reading
c) Time accuracy	± 500ppm
5) AC load	
a) Resistive load	Maximum voltage: 300Vrms Current range: 0 – 100A Capacity: 100KW
b) Inductive load	Maximum voltage: 300Vrms Current range: 0 – 100A Capacity: 100KVA
c) Capacitive load	Maximum voltage: 300Vrms Current range: 0 – 100A Capacity: 100KVA

3 MEASUREMENT UNCERTAINTY

Voltage measurement uncertainty	$\pm 0.05 \%$
Current measurement uncertainty	$\pm 0.05 \%$
Frequency measurement uncertainty	$\pm 0.001 \text{ Hz}$
Time measurement uncertainty	$\pm 0.001 \text{ s}$
Power measurement uncertainty	$\pm 0.5 \%$
Phase Angle	$\pm 0.1^\circ$
Cos ϕ	$\pm 0.01\%$

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.

Attachment III

(GRAPHS AND SCREENSHORTS OF TEST RESULTS)

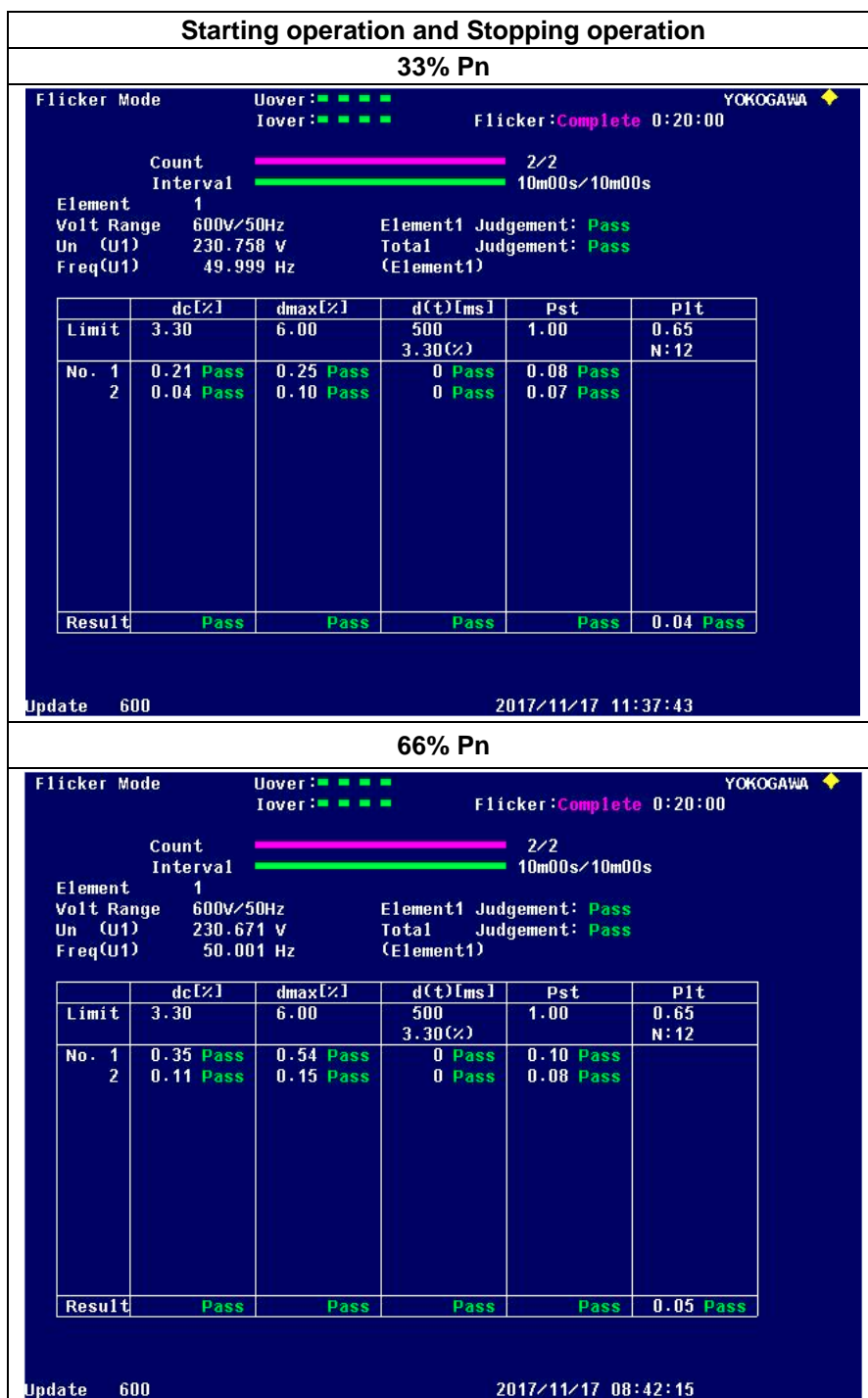
Flickers

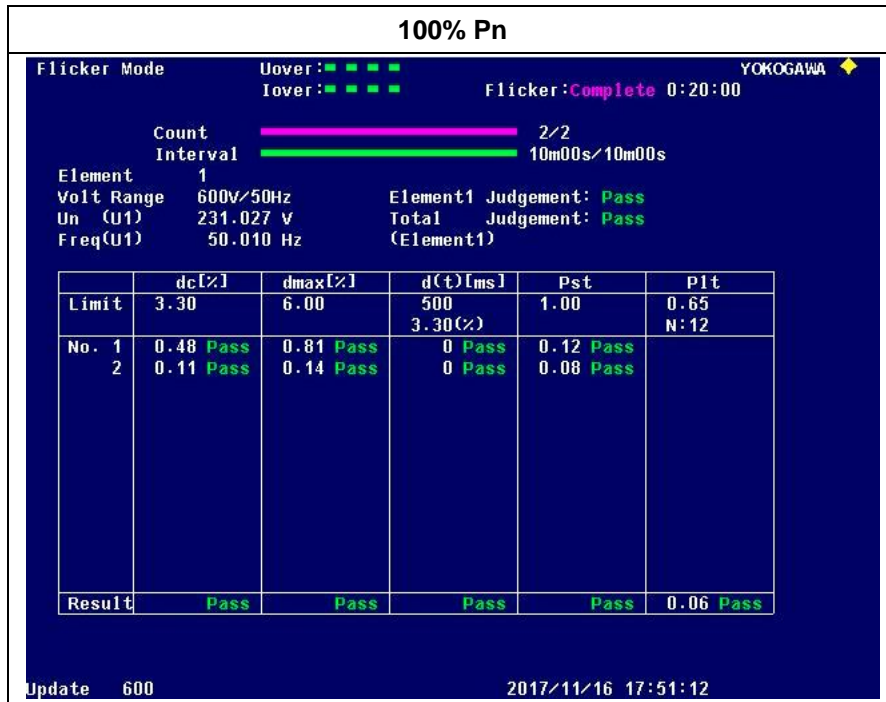
The measurements of voltage fluctuations have been measured at 33 %, 66% and 100 % of the nominal power value of the inverter.

As it can be seen in the next screenshots, this test has two steps:

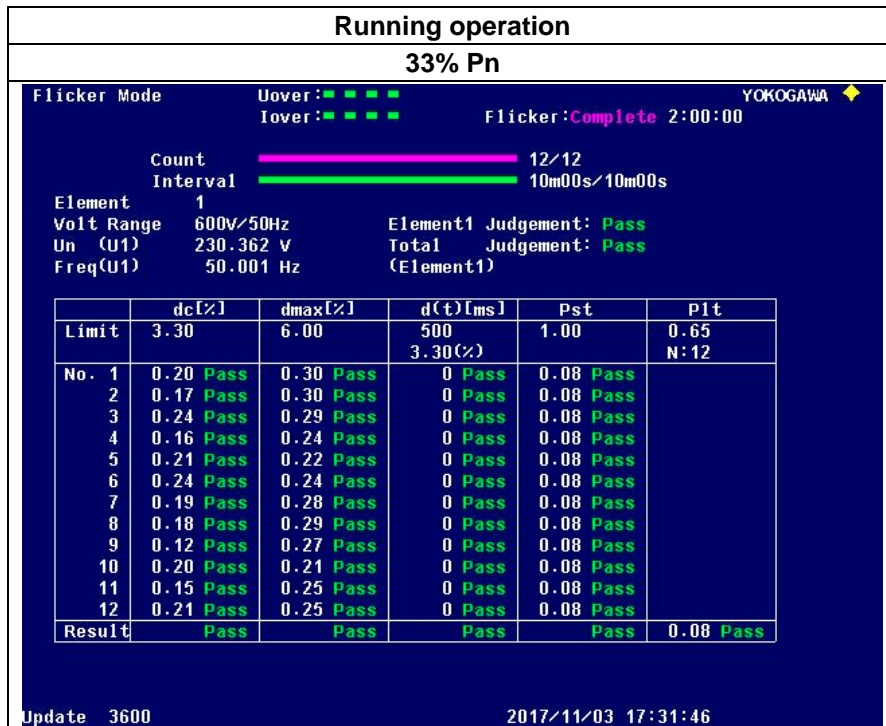
- 1.Starting operation
- 2.Stopping operation

The values took of Pst and Plt are the most unfavorable of the two steps.





As it can be seen in the next screenshots is running operation. The values took of Pst and Plt are the most unfavorable of the twelve steps.



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66% Pn

Flicker Mode Uover: ■■■■ YOKOGAWA ◆
 Iover: ■■■■ Flicker: **Complete** 2:00:00

Count 12/12
 Interval 10m00s/10m00s

Element 1
 Volt Range 600V/50Hz Element1 Judgement: **Pass**
 Un (U1) 230.688 V Total Judgement: **Pass**
 Freq(U1) 50.000 Hz (Element1)

	dc[%]	dmax[%]	d(t)[ms]	Pst	P1t
Limit	3.30	6.00	500 3.30(%)	1.00	0.65 N:12
No. 1	0.35 Pass	0.54 Pass	0 Pass	0.10 Pass	
2	0.34 Pass	0.57 Pass	0 Pass	0.10 Pass	
3	0.35 Pass	0.52 Pass	0 Pass	0.10 Pass	
4	0.39 Pass	0.53 Pass	0 Pass	0.10 Pass	
5	0.41 Pass	0.58 Pass	0 Pass	0.10 Pass	
6	0.34 Pass	0.57 Pass	0 Pass	0.10 Pass	
7	0.42 Pass	0.56 Pass	0 Pass	0.11 Pass	
8	0.13 Pass	0.16 Pass	0 Pass	0.08 Pass	
9	0.44 Pass	0.60 Pass	0 Pass	0.10 Pass	
10	0.42 Pass	0.48 Pass	0 Pass	0.10 Pass	
11	0.35 Pass	0.50 Pass	0 Pass	0.10 Pass	
12	0.41 Pass	0.52 Pass	0 Pass	0.10 Pass	
Result	Pass	Pass	Pass	Pass	0.10 Pass

Update 3600 2017/11/03 15:23:28

100% Pn

Flicker Mode Uover: ■■■■ YOKOGAWA ◆
 Iover: ■■■■ Flicker: **Complete** 2:00:00

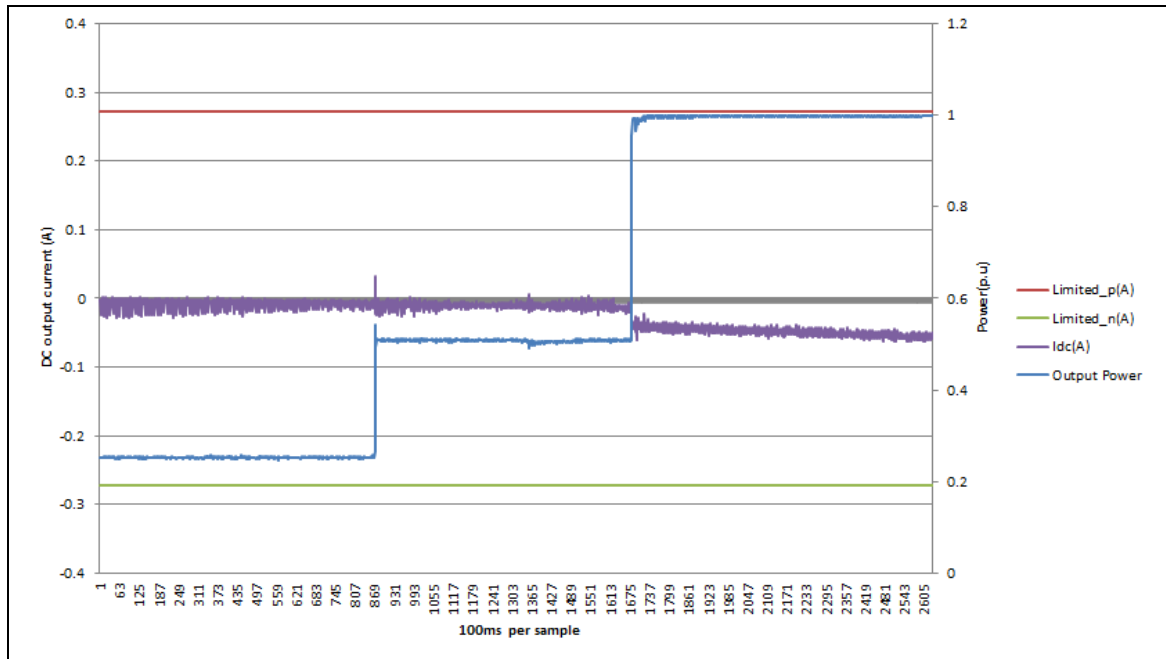
Count 12/12
 Interval 10m00s/10m00s

Element 1
 Volt Range 600V/50Hz Element1 Judgement: **Pass**
 Un (U1) 231.977 V Total Judgement: **Pass**
 Freq(U1) 49.998 Hz (Element1)

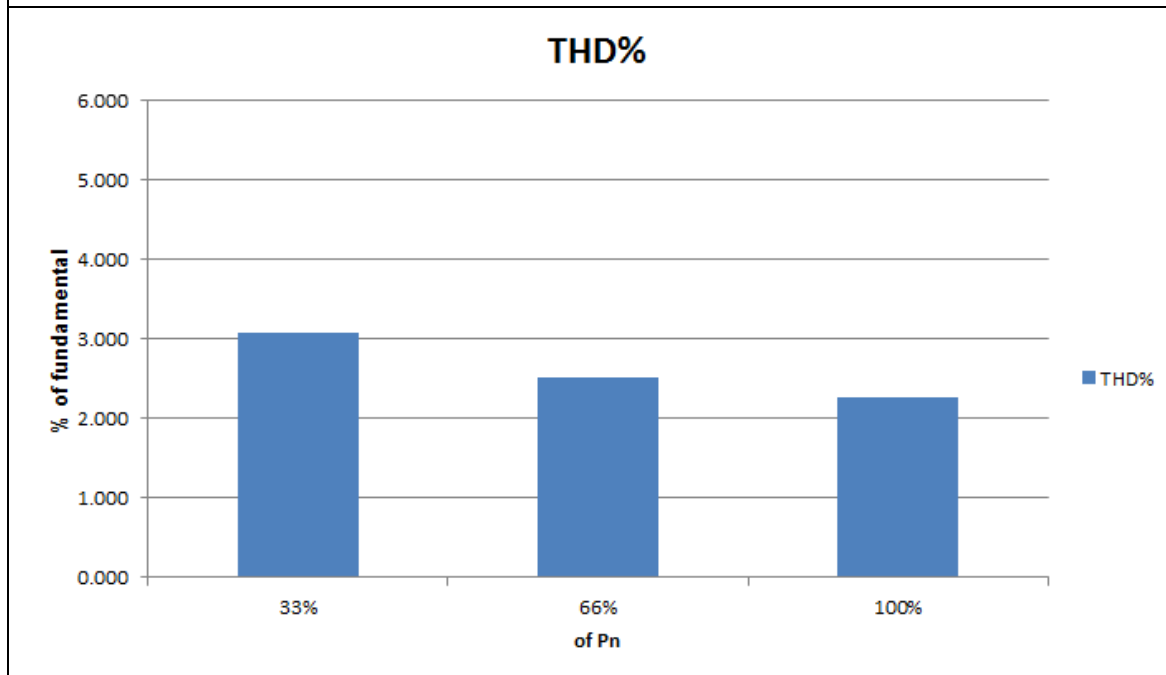
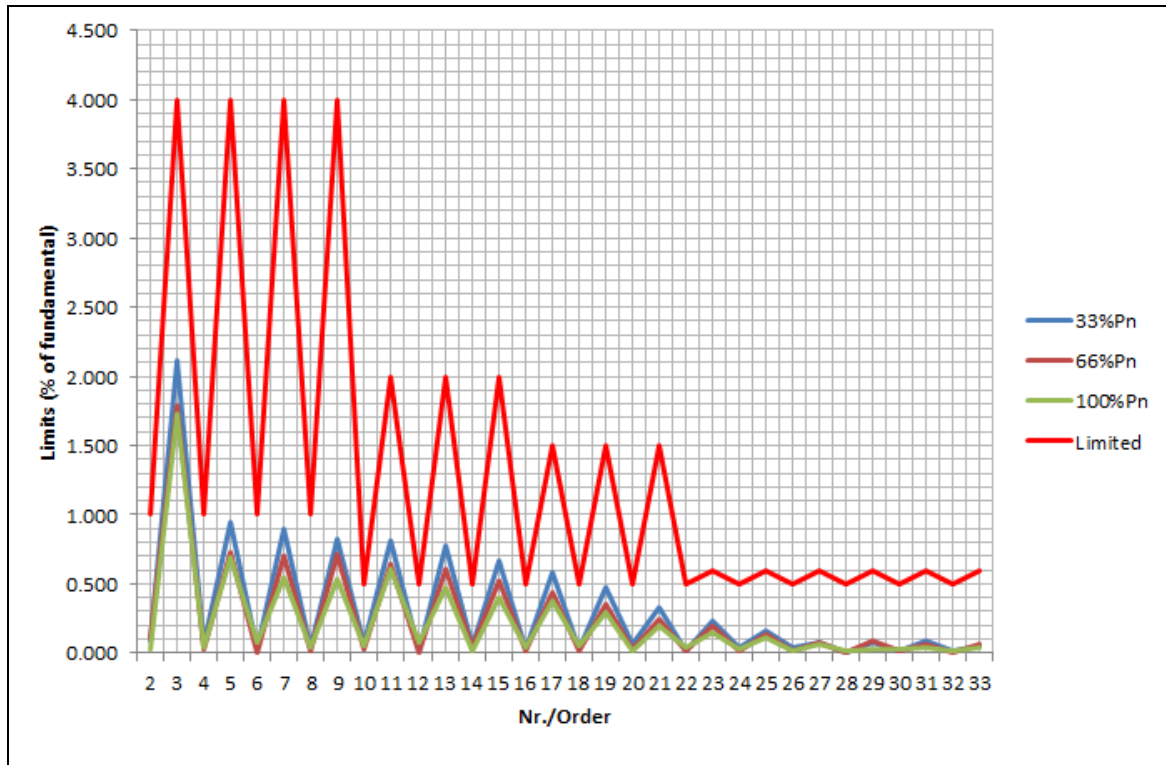
	dc[%]	dmax[%]	d(t)[ms]	Pst	P1t
Limit	3.30	6.00	500 3.30(%)	1.00	0.65 N:12
No. 1	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
2	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
3	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
4	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
5	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
6	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
7	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
8	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
9	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
10	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
11	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
12	0.00 Pass	0.00 Pass	0 Pass	0.07 Pass	
Result	Pass	Pass	Pass	Pass	0.07 Pass

Update 3600 2017/11/08 12:55:05

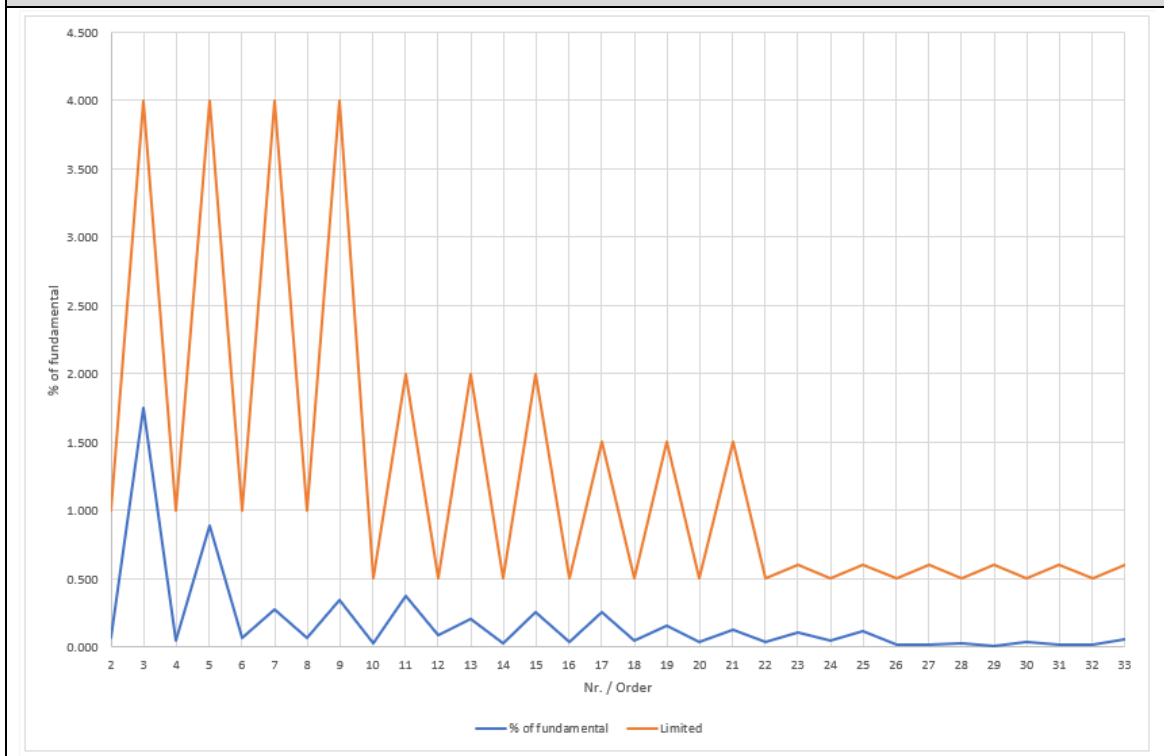
Direct current injection



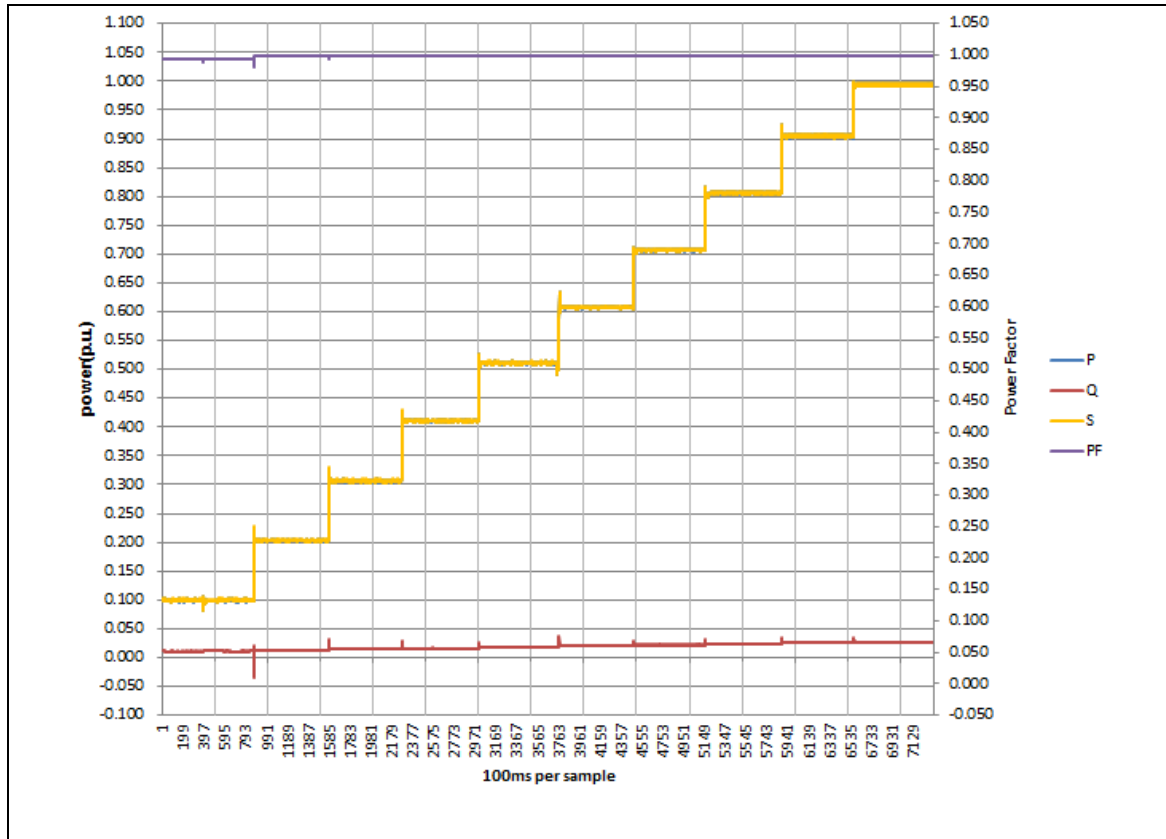
Harmonics and waveform distortion



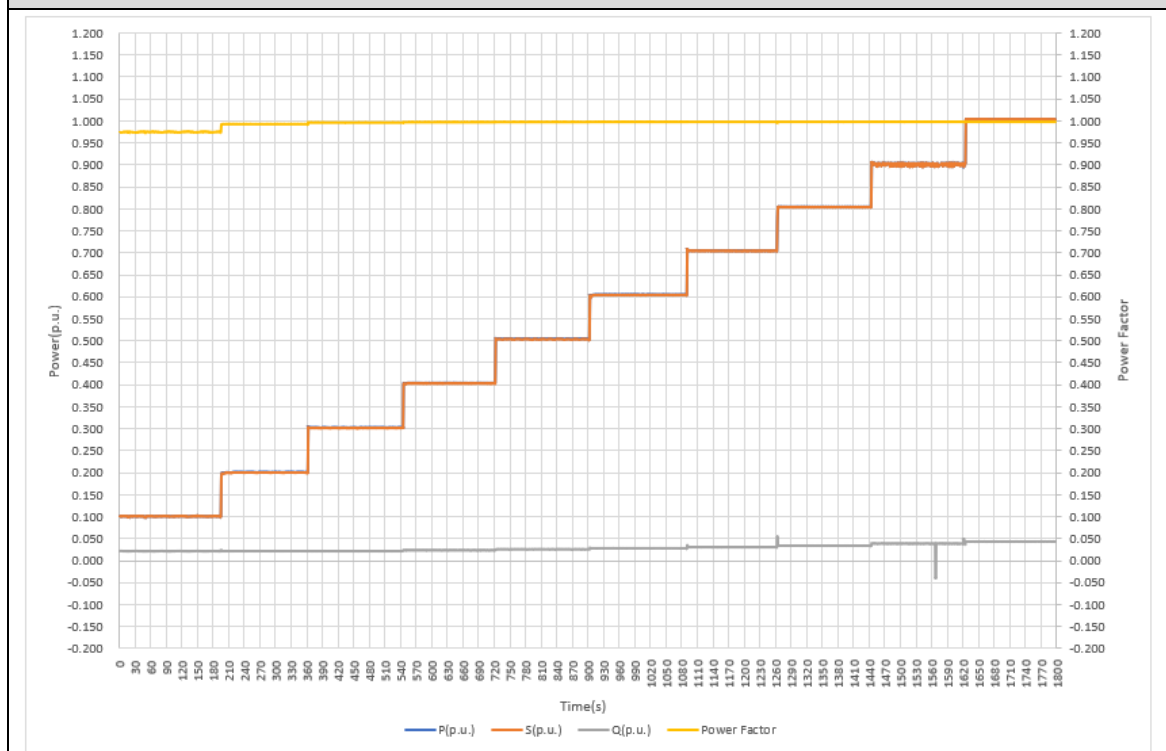
Sopt-check test result



Power factor

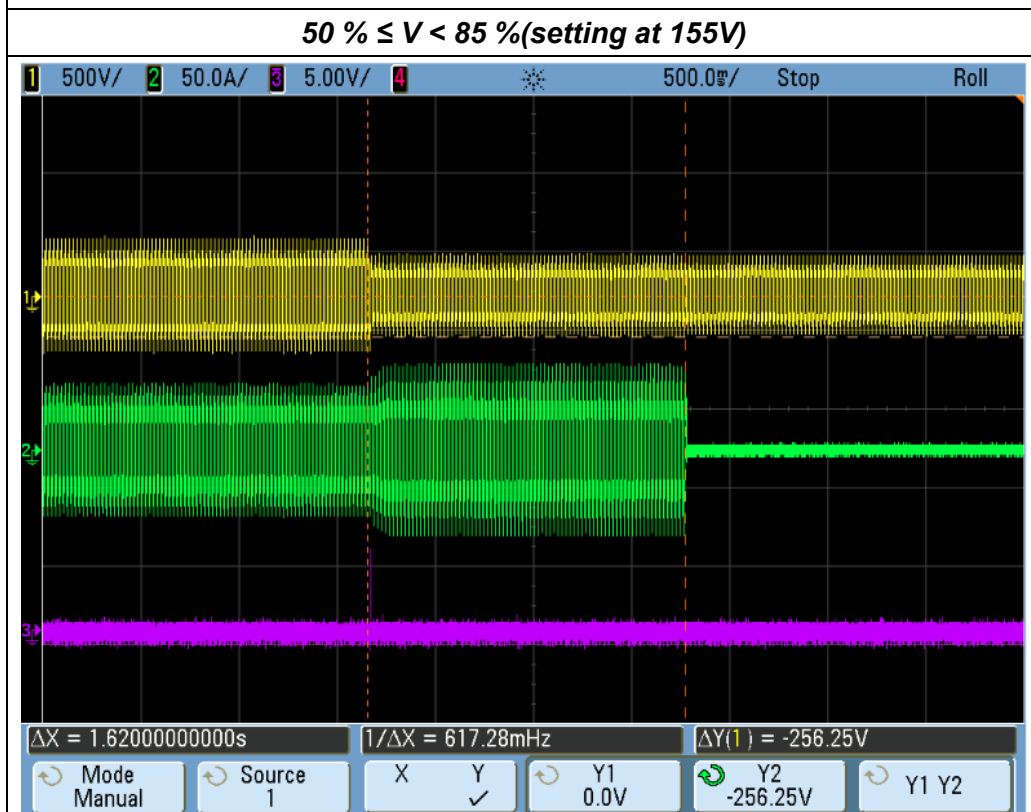
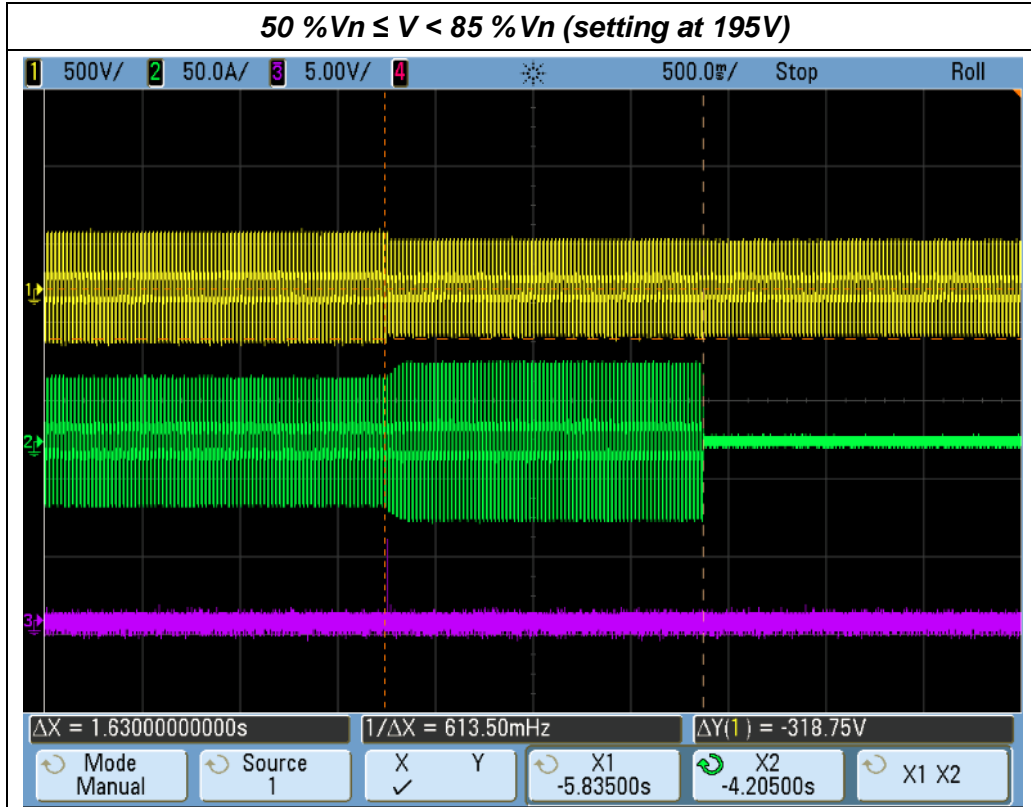


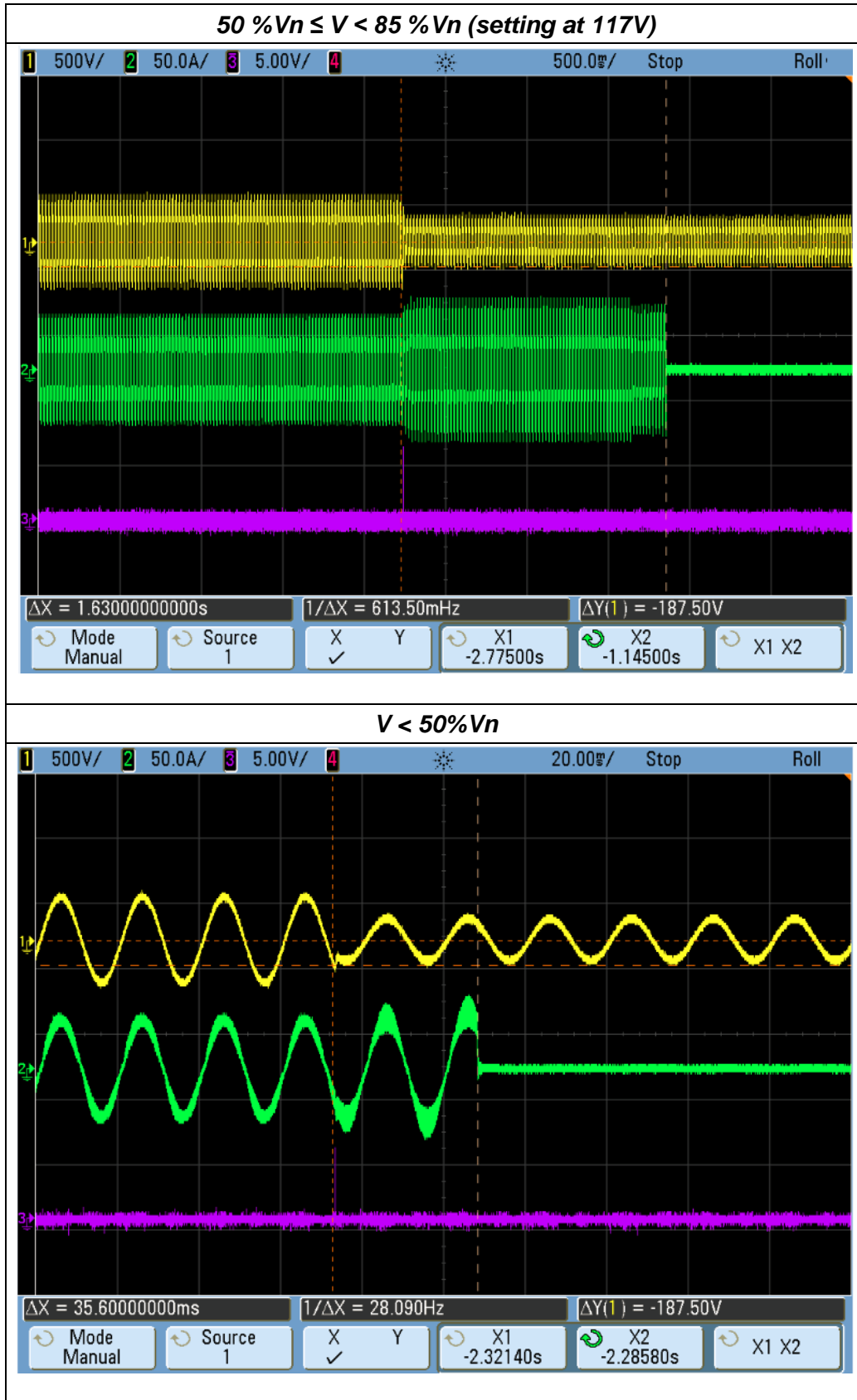
Sopt-check test result

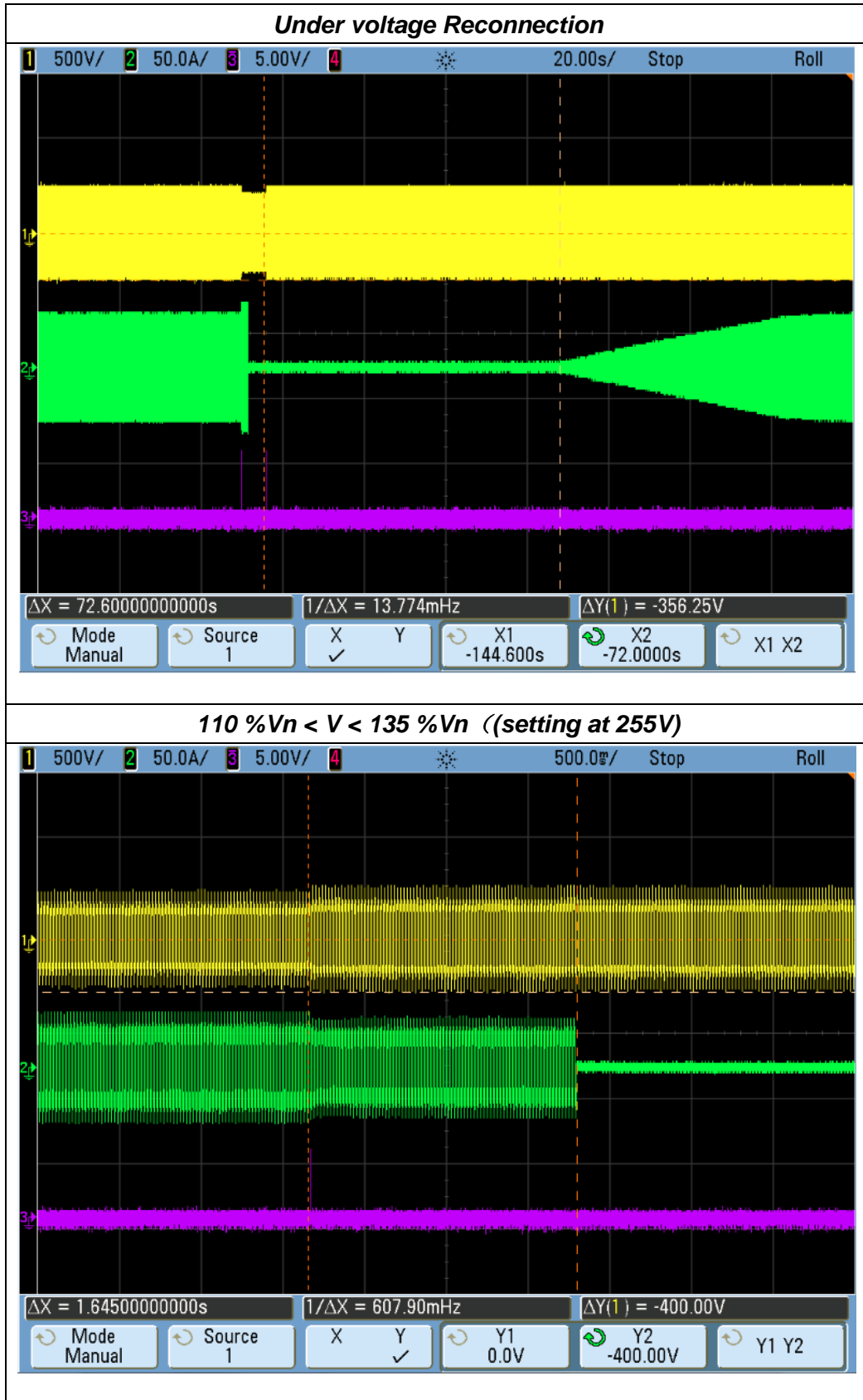


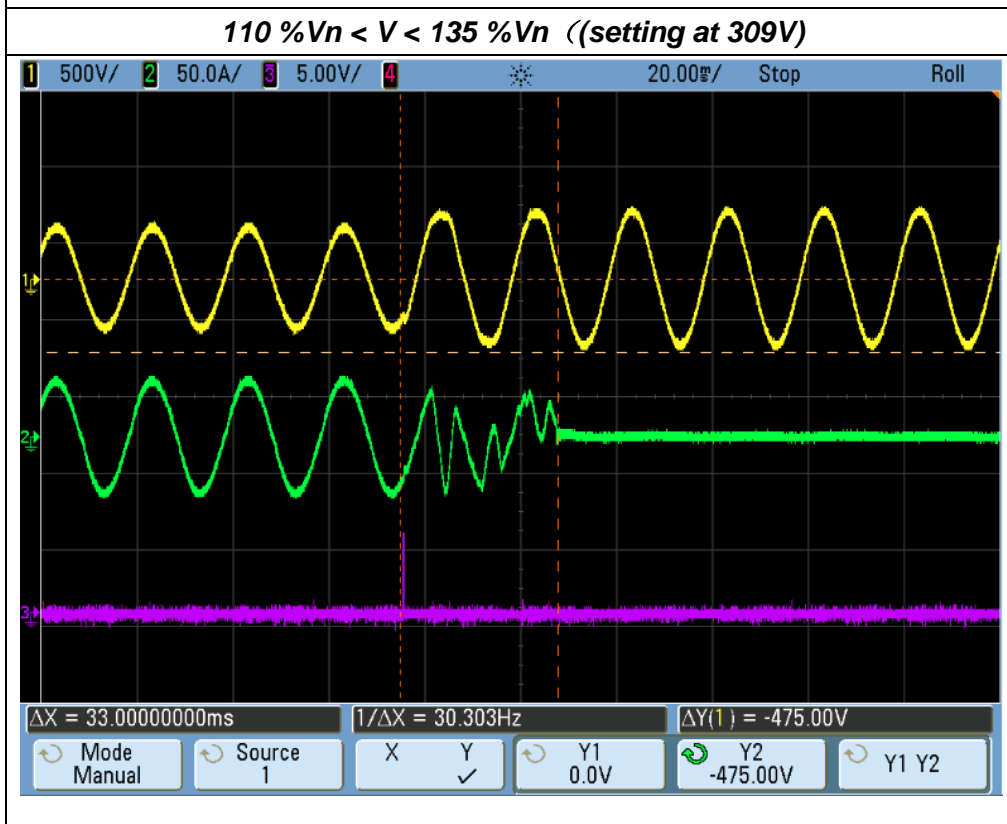
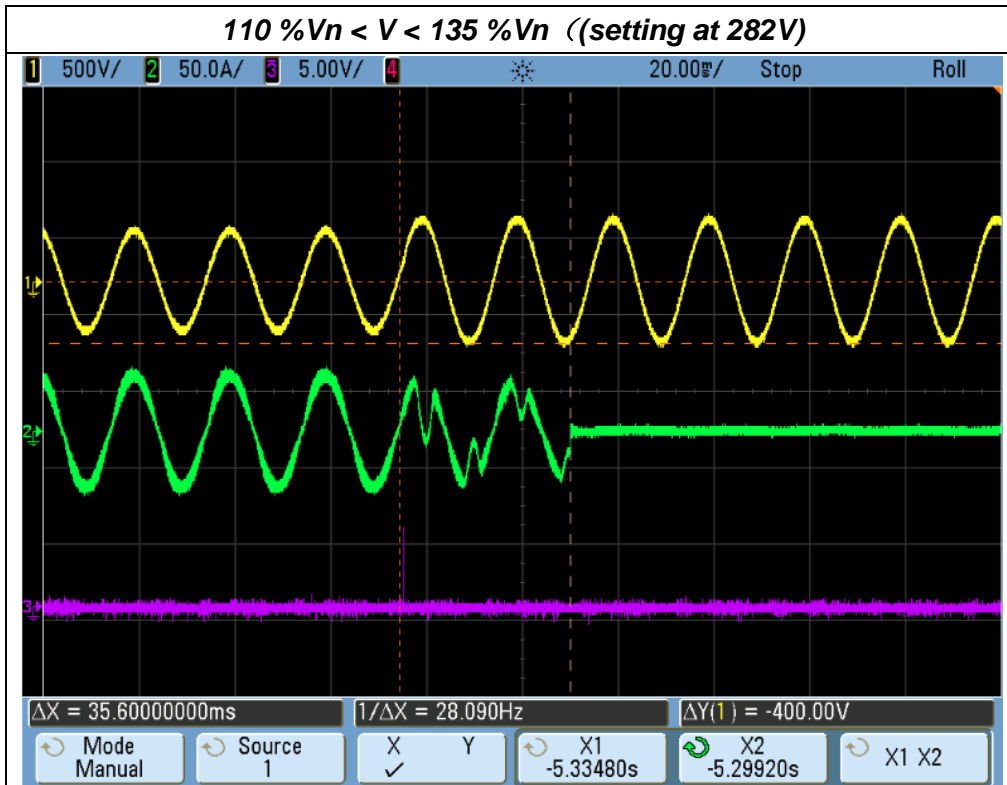
Under-and over-voltage trip settings and reconnection test

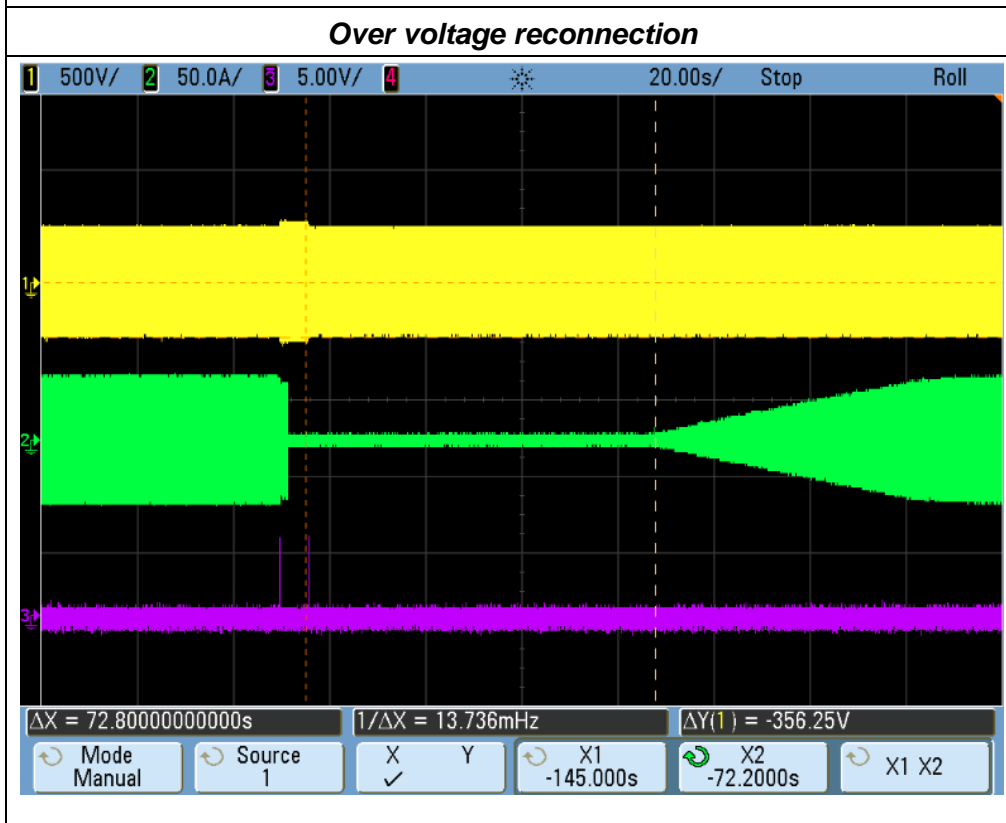
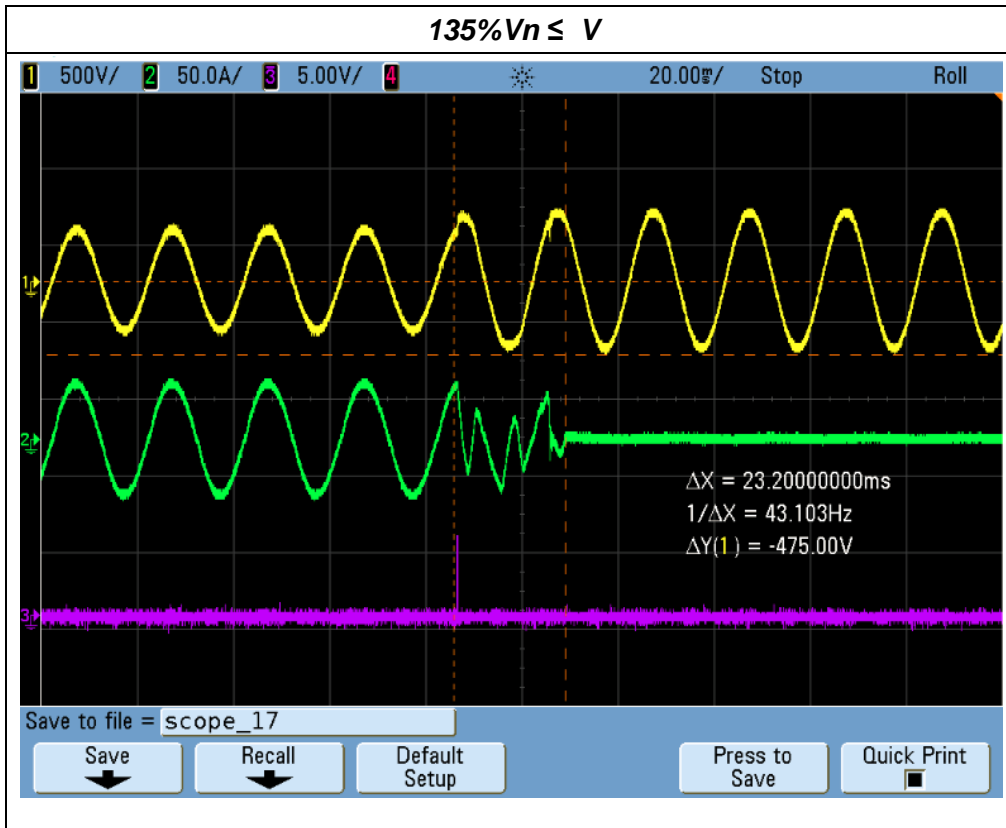
Ch1: Output Voltage Ch2: Output Current Ch3: Trip signal











Over/under frequency trip settings and reconnection test

Ch1: Output Voltage Ch2: Output Current Ch3: Trip signal

