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TEST REPORT

Product Name : Uninterruptible Power System --
Modular UPS
NTRM100/50X, NTRM200/50X,
NTRM300/50X, NTRM400/50X,
Model Number : NTRM500/50X, NTRM80/40X,
NTRM160/40X, NTRM240/40X,
Module: NTPM50X, NTPM40X

Prepared for : NETCON ENTERPRISE PVT LTD
Address : Industrial Estate, Kathirvedu, Puzhal, Chennai Tamil
Nandu, India- 600066.

Prepared by : EMTEK (SHENZHEN) CO., LTD.
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Report Number : ENS2407180144P00101R



TEST REPORT IEC 62040-3 Uninterruptible power systems -- Modular UPS Part 3: Method of specifying the performance and test requirements	
Report Number.:	ENS2407180144P00101R
Date of issue.....:	2024-07-18
Total number of pages.....:	71 pages
Name of Testing Laboratory preparing the Report	EMTEK (SHENZHEN) CO., LTD. Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
Applicant's name.....:	NETCON ENTERPRISE PVT LTD
Address	Industrial Estate, Kathirvedu, Puzhal, Chennai Tamil Nandu, India-600066.
Test specification:	
Standard.....:	IEC 62040-3:2011; EN 62040-3:2011
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.:	IEC62040_3C
Test Report Form(s) Originator	Eurofins Electrosuisse Product Testing AG
Master TRF	Dated 2018-08-09
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Test item description	Uninterruptible Power System -- Modular UPS	
Trade Mark.....		
Manufacturer	Same as applicant	
Model/Type reference	NTRM100/50X, NTRM200/50X, NTRM300/50X, NTRM400/50X, NTRM500/50X, NTRM80/40X, NTRM160/40X, NTRM240/40X, Module: NTPM50X, NTPM40X	
Ratings	See copy of marking plate	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ Testing Laboratory:	EMTEK (SHENZHEN) CO., LTD.	
Testing location/ address.....	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China	
Tested by (name, function, signature)	Alan Zhang / Engineer 	
Approved by (name, function, signature)...	William Guo / Manager 	
		
☐ Testing procedure: CTF Stage 1:		
Testing location/ address.....		
Tested by (name, function, signature)		
Approved by (name, function, signature)...		
☐ Testing procedure: CTF Stage 2:		
Testing location/ address.....		
Tested by (name + signature).....		
Witnessed by (name, function, signature)..		
Approved by (name, function, signature)...		
☐ Testing procedure: CTF Stage 3:		
☐ Testing procedure: CTF Stage 4:		
Testing location/ address.....		
Tested by (name, function, signature)		
Witnessed by (name, function, signature)..		
Approved by (name, function, signature)...		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

Attachment No. 1: 2 pages of photograph.

Summary of testing:
Tests performed (name of test and test clause):

The submitted samples were found to comply with the requirements of:
IEC 62040-3:2011; EN 62040-3:2011
Unless otherwise all tests were performed on model:
NTRM300/50X to represent other models.

Testing location:

EMTEK (SHENZHEN) CO., LTD.
Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

N/A

- ☒ The product fulfils the requirements of IEC 62040-3:2011
- ☒ The product fulfils the requirements of EN 62040-3:2011

Copy of marking plate:
The artwork below may be only a draft.

NETCON NTRM100/50X	
UPS 100KVA 3Ø+N+PE	
RETE 1 - MAINS1 - NETZ 1	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	144*
Frequenza-Frequency-Frequenz	50-60Hz
RETE 2- MAINS 2 - NETZ 2	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	152*
Frequenza-Frequency-Frequenz	50-60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
Uout (Vac)	380/400/415
Iout (A)	152*
Frequenza-Frequency-Frequenz	50-60Hz
Potenza - Power rating - Leistung	100KVA/80KW (*: @380V)
Icw	10 KA
BATTERIA - BATTERY - BATTERIE	
Udc (Vdc)	+/- 240
I dc (A)	200
N° Serie - Serial Number - Seriennummer	
Year of construction	2016
CE Made in China	! 210 Kg
	

NETCON NTRM200/50X	
UPS 200KVA 3Ø+N+PE	
RETE 1 - MAINS1 - NETZ 1	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	288*
Frequenza-Frequency-Frequenz	50-60Hz
RETE 2- MAINS 2 - NETZ 2	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	303*
Frequenza-Frequency-Frequenz	50-60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
Uout (Vac)	380/400/415
Iout (A)	303*
Frequenza-Frequency-Frequenz	50-60Hz
Potenza - Power rating - Leistung	200KVA/180KW (*: @380V)
Icw	10 KA
BATTERIA - BATTERY - BATTERIE	
Udc (Vdc)	+/- 240
I dc (A)	400
N° Serie - Serial Number - Seriennummer	
CE Made in China	! 350 Kg
	

NETCON | NTRM300/50X

UPS 300KVA 3Ø+N+PE

RETE 1 - MAINS1 - NETZ 1 3Ø+N
U_{in} (Vac) 380/400/415
I_{in} (A) 432*
Frequenza-Frequency-Frequenz 50-60Hz

RETE 2 - MAINS 2 - NETZ 2 3Ø+N
U_{in} (Vac) 380/400/415
I_{in} (A) 456*
Frequenza-Frequency-Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
U_{out} (Vac) 380/400/415
I_{out} (A) 456*
Frequenza-Frequency-Frequenz 50-60Hz
Potenza - Power rating - Leistung 300KVA/270KW
(*: @380V)

I_{cw} 10 KA

BATTERIA - BATTERY - BATTERIE
U_{dc} (Vdc) +/- 240
I_{dc} (A) 600

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016



Made in
China



490 Kg



NETCON | NTRM400/50X

UPS 400KVA 3Ø+N+PE

RETE 1 - MAINS1 - NETZ 1 3Ø+N
U_{in} (Vac) 380/400/415
I_{in} (A) 576*
Frequenza-Frequency-Frequenz 50-60Hz

RETE 2 - MAINS 2 - NETZ 2 3Ø+N
U_{in} (Vac) 380/400/415
I_{in} (A) 606*
Frequenza-Frequency-Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
U_{out} (Vac) 380/400/415
I_{out} (A) 606*
Frequenza-Frequency-Frequenz 50-60Hz
Potenza - Power rating - Leistung 400KVA/360kW
(*: @380V)

I_{cw} 13kA

BATTERIA - BATTERY - BATTERIE
U_{dc} (Vac) +/-240
I_{dc} (A) 800

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016



Made in
China



900 Kg



NETCON | NTRM500/50X

UPS 500KVA 3Ø+N+PE

RETE 1 - MAINS1 - NETZ 1 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 720*
Frequenza-Frequency-Frequenz 50-60Hz

RETE 2- MAINS 2 - NETZ 2 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 760*
Frequenza-Frequency-Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
Uout (Vac) 380/400/415
Iout (A) 760*
Frequenza-Frequency-Frequenz 50-60Hz
Potenza - Power rating - Leistung 500KVA/450KW
(*: @380V)

Icw 10 KA

BATTERIA - BATTERY - BATTERIE
Udc (Vdc) +/- 240
Idc (A) 1000

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016

CE Made in China



900 Kg



NETCON | NTRM080/40X

UPS 80kVA 3Ø+N+PE

RETE 1 - MAINS 1 - NETZ 1 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 115*
Frequenza - Frequency - Frequenz 50-60Hz

RETE 2 - MAINS 2 - NETZ 2 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 122*
Frequenza - Frequency - Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
Uout (Vac) 380/400/415
Iout (A) 122*
Frequenza - Frequency - Frequenz 50-60Hz
Potenza - Power rating - Leistung 80kVA/80kW
(*: @380V)

Icw 10 kA

BATTERIA - BATTERY - BATTERIE
Udc (Vdc) +/- 240
Idc (A) 160

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016

CE Made in China



210 kg



NETCON | NTRM160/40X

UPS 160kVA 3Ø+N+PE

RETE 1 - MAINS 1 - NETZ 1 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 230*
Frequenza - Frequency - Frequenz 50-60Hz

RETE 2 - MAINS 2 - NETZ 2 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 242*
Frequenza - Frequency - Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
Uout (Vac) 380/400/415
Iout (A) 242*
Frequenza - Frequency - Frequenz 50-60Hz
Potenza - Power rating - Leistung 160kVA/160kW
(*@380V)

Icw 10 kA

BATTERIA - BATTERY - BATTERIE
Udc (Vdc) +/- 240
Idc (A) 320

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016



Made in
China



350 kg



NETCON | NTRM240/40X

UPS 240kVA 3Ø+N+PE

RETE 1 - MAINS 1 - NETZ 1 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 346*
Frequenza - Frequency - Frequenz 50-60Hz

RETE 2 - MAINS 2 - NETZ 2 3Ø+N
Uin (Vac) 380/400/415
Iin (A) 364*
Frequenza - Frequency - Frequenz 50-60Hz

USCITA - OUTPUT - AUSGANG 3Ø+N
Uout (Vac) 380/400/415
Iout (A) 364*
Frequenza - Frequency - Frequenz 50-60Hz
Potenza - Power rating - Leistung 240kVA/240kW
(*@380V)

Icw 10 kA

BATTERIA - BATTERY - BATTERIE
Udc (Vdc) +/- 240
Idc (A) 480

N° Serie - Serial
Number -
Seriennummer

Year of construction 2016



Made in
China



490 kg



Manufacturer: NETCON ENTERPRISE
PVT LTD.

Address: Industrial Estate, Kathirvedu,
Puzhal, Chennai Tamil Nadu, India-
600066.

Importer: XXXXXX

Address: XXXXXX

Warning label on outer enclosures

WARNING

CHARGED CAPACITORS
DISCHARGE TIME 5 MINUTES AFTER DISCONNECTION OF UPS AND BATTERY

CAUTION

OPERATION INSTRUCTION

HIGH LEAKAGE CURRENT, EARTH CONNECTION ESSENTIAL BEFORE CONNECTING UPS.

DO NOT REMOVE COVERS. THIS SYSTEM IS TO BE SERVICED BY QUALIFIED
SERVICE PERSONNEL ONLY.

HAZARDOUS LIVE PARTS INSIDE THIS UPS ARE ENERGIZED FROM THE BATTERY SUPPLY EVEN WHEN THE AC
INPUT POWER IS DISCONNECTED.

SEE USER MANUAL FOR INSTALLATION.

OPERATING AND MAINTENANCE INSTRUCTION

DANGER

RISK OF ELECTRIC SHOCK.

DO NOT TOUCH UNINSULATED BATTERY TERMINAL.
TEST BEFORE TOUCHING.
DISCONNECTION OF THE EXTERNAL AC & DC SWITCHES IS REQUIRED FOR COMPLETE LOAD POWER OFF OR MAINTENANCE.

OPERATION INSTRUCTION

BATTERY VOLTAGE&CONNECTION MUST COMPLY WITH UPS SPECIFICATION.
MANUAL BATTERY DISCHARGE RECOMMENDED FOR EVERY 3 MONTHS
CONTINUOUS OPERATION WITHOUT ANY BATTERY DISCHARGE.
WARRANTY VOID IF SERIAL NO.PLATE IS DAMAGED.

WARNING: BACKFEED PROTECTION

This system has a control signal available for use with an automatic device, externally located, to protect against backfeeding voltage through the mains Static Bypass circuit. If this protection is not used with the switchgear that is used to isolate the bypass circuit, a label must be added to the switchgear to advise service personnel that the circuit is connected to a UPS system.



Test item particulars	Uninterruptible Power System -- Modular UPS
Classification of installation and use	Class I and indoor used.
Supply Connection.....	Permanent connection
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	N/A
Date (s) of performance of tests	N/A
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☐ comma / ☒ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60060-02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ie s)	Same as applicant

General product information and other remarks:

This report is amended from previous report ENS2111100050S00101R, issued by EMTEK (SHENZHEN) CO., LTD on November 30, 2021, due to below amendments:

- Updated the Applicant, Manufacturer, Factory name to NETCON ENTERPRISE PVT LTD
- Updated the Applicant, Manufacturer, Factory address to No: Industrial Estate, Kathirvedu, Puzhal, Chennai Tamil Nadu, India- 600066.
- Updated the model to NTRM100/50X, NTRM200/50X, NTRM300/50X, NTRM500/50X, NTPM50X
- Updated Trade Mark
- Updated the product Overview of picture.

The original model and new model have the similar constructions, circuit diagram and PCB layout except model name

No any tests need be considered. 1. The equipment is an on-line type of uninterruptible power supply for general use with information technology equipment.

2. The UPS is designed as primary, therefore, clearances, creepage distances and distances through insulation from input, output, battery, control circuits to the RS232 of the PC interface are dimensioned for reinforced insulation and suitable distance through insulation. The test samples are pre-production without any serial number.

3. Model difference description:

All models are designed with same control logic, constructions, PCB Layout except for UPS module, model name and ratings.

4. This series of UPS generally uses the same circuit diagrams, therefore, input tests were conducted on all model with different Input/output ratings. Unless otherwise specified, other tests are conducted on model NTRM300/50X, considered the worst condition.

IEC 62040-3			
Clause	Requirement + Test		Verdict
5	ELECTRICAL SERVICE CONDITIONS AND PERFORMANCE		--
5.1	General		P
5.1.1	UPS configuration		P
	- quantity of UPS units and their topology	Max 6 units for parallel setup, redundancy configuration, Online double conversion UPS	P
	- redundancy configuration as applicable	Redundancy configuration is available for parallel setup.	P
	- any mayor UPS switch	Input switch, bypass switch, maintenance switch and output switch and battery switch are optional parts.	P
	- operator access or restricted access classification in accordance with IEC 62040-1	See appended safety report.	P
5.1.2	Markings and Instructions		P
	Marked and supplied with adequate instruction for the installation and operation of the UPS and its controls and indications, or	All required markings are affixed on labels located on the enclosure of UPS.	P
	Markings and instructions in accordance with sub-clause 4.7 of IEC 62040-1	See appended safety report.	P
5.1.3	Safety complies with the safety requirements of UPS prescribed in IEC 62040-1	See appended safety report.	P
5.1.4	Electromagnetic compatibility complies with the requirements of IEC 62040-2	Emission and immunity comply with IEC 62040-2 C3, see separate report	P
5.2	UPS input specification		P
5.2.1	Conditions for normal mode operation		P
	a) rated voltage	380/400/415Vac	P
	b) r.m.s. voltage variation	176Vac to 276Vac at 100% load	P
	c) rated frequency	50Hz/60Hz	P
	d) frequency variation	40-70Hz	P
	e) for three phases input, voltage unbalance with an unbalance ratio of 5%	(see appended table)	P
	f) total harmonics distortion (THD) of voltage, according to IEC 61000-2-2	THDu<1% from linear load; THDu<5% from non-linear load	P
	g) transient voltage; within the electromagnetic immunity levels prescribed in IEC 62040-2	See separate EMC report	P
5.2.2	Characteristics to be declared by the manufacturer		P
	a) number of phases	3 phases	P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
	b) neutral requirements	With neutral	P
	d) power factor at rated current	0.99pF at 100% load	P
	e) inrush current characteristics	≤120% of rated current for ≤1 cycles.	P
	f) maximum continuous current at the worst-case condition	558A	P
	g) overload current	558A	P
	h) total harmonic distortion (THD) of current	THDi <3% with full linear load, THDi < 5% with full non-linear load)	P
	i) minimum short current power capacity; in compliance with: - IEC 61000-3-2 (UPS ≤16A) - IEC 61000-3-12 (16A < UPS ≤75A) - IEC 61000-3-4 (UPS > 75A)		N/A
	j) earth leakage current characteristics	See separate safety report.	P
	k) a.c. power distribution system compatibility TN, TT or IT):	TN, TN-S, TN-C, TN-C-S, TT (Three-phase, four-wire + PE).	P
5.2.3	Characteristics and conditions to be identified by the purchaser		P
	a) pre-existing harmonic voltage distortion when of 75% of IEC 61000-2-2 compatibility level at the intended point of coupling of the UPS	Provided	P
	b) requirements for compatibility with the characteristics of protective devices of the UPS input supply	Input switch, input fuse, bypass switch, bypass fuse, maintenance switch and output switch and battery switch are optional parts.	P
	c) requirements for all-pole isolation		P
	d) stand-by generator characteristics	Compatible with generator of rating typically >1.5x UPS KVA.	P
5.3	UPS output specification		P
5.3.1	Conditions for the UPS to supply a load		P
	- the input conditions of 5.2.1 being satisfied, or		P
	- the energy storage system being available		P
5.3.2	Characteristics to be declared by the manufacturer		P
	a) performance classification in accordance with 5.3.4		P
	b) rated voltage and steady state variation	AC380/400/415V, ±1%	P
	c) rated frequency and free running variation	Synchronization status, tracking bypass input (normal mode), 50Hz / 60Hz ± 0.05% (stored energy mode)	P
	d) maximum frequency range	40Hz-70Hz	P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
	e) rate of change of frequency when synchronizing	$\pm 5\text{Hz}$	P
	f) number of phases available	3 phases	P
	g) neutral availability	With neutral	P
	h) a.c. power distribution system compatibility:	TN, TN-S, TN-C, TN-C-S, TT (Three-phase, four-wire + PE).	P
	i) total harmonic distortion (THD) of voltage (at linear and non-linear load as specified in annex E):		P
	- in normal mode	THDu $\leq 1\%$ with linear load, THDu $\leq 5.5\%$ with non-linear load	P
	- in stored energy mode	THDu $\leq 1\%$ with linear load, THDu $\leq 5.5\%$ with non-linear load	P
	j) output voltage transient deviation	Vrms L-L or L-N <5% transient overshoot, 20ms recovery time	P
	k) rated active and apparent output power and rated current	380/400/415Vac, 409.1A; 300kVA/270kW	P
	l) overload capability	100–110% load 60 minutes, 110–125% load 10 minute, 125–150% load 1 minute, >150% load 200ms	P
	m) current limit identification	409.1A	P
	n) fault clearing capability	Through upstream breaker or fusing for BYPASS. Through fusing and breaker for Rectifier.	P
	o) rated load power factor	1.0	P
	p) permissible displacement power factor range of the load (cos. Φ)	0.8 lagging to 0.9 leading with de-rating.	P
	q) voltage unbalance and phase angle displacement	< 3%, <1 deg	P
	e) UPS efficiency at 25%, 50%, 75% and 100% reference test load	Max 95.0% @50% load	P
5.3.3	Characteristics and conditions to be identified by the purchaser		P
	a) loads generating harmonic currents (max. levels permitted in IEC 61000-3-2, /-12/ -4)	Provided	P
	b) asymmetric loads requiring circulation of a d.c. current	Provided	P
	c) independent earth of the neutral required	Provided	P
	d) load distribution facilities	Provided	P
	e) requirements of all-pole isolation	Provided	P
	f) requirements for coordination with characteristics of protective devices	Provided	P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
	g) future extension/expansion requirements	Provided	P
	h) stand-by generator characteristics	Compatible with generator of rating typically >1,5x UPS KVA.	P
	i) functional availability and degree of redundancy	Provided	P
	j) output overvoltage protection	Provided	P
5.3.4	Performance classification		P
	UPS complying with this standard in accordance with the coding: AAA BB CCC		P
	AAA = Input dependency characteristic	VFI	P
	BB = Voltage waveform characteristic	SS	P
	CCC = Dynamic output performance	111	P
5.4	Stored energy specification		P
5.4.1	General	See technical specification	P
5.4.2	Battery		P
5.4.2.1	Requirements for all batteries	See separate safety report.	P
5.4.2.2	Characteristic to be declared by the manufacturer		P
	a) life	5 or 10 years(depends)	P
	b) quantity of blocks or cells and of paralleled strings	40 blocks, 240 cells per battery string.	P
	c) nominal voltage of total battery	± 240V	P
	d) battery technology	Lead-acid	P
	e) nominal capacity of total battery	Depend on battery size.	N/A
	f) stored energy time	Depend on battery size.	N/A
	g) restored energy time	Depend on battery size.	N/A
	h) ambient reference temperature	Battery (installed separately): -15 to +50°C without reducing battery life.	P
	i) earth condition of d.c. link/isolation		P
	j) r.m.s. ripple current during normal mode	Not limited	N/A
	k) nominal discharge current during stored energy mode		N/A
	l) d.c. fault current rating		N/A
	m) cable voltage drop recommendation	<1% of nominal DC voltage at rated battery current.	P
	n) protection requirements	DC input breaker or fuse.	P
	o) charging regime		N/A
	p) charging voltage and tolerance band		P
	q) end of discharge voltage	1.60V/cell-1.75V/cell	P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
	r) charging current limit or range	(0.05-0.15) Capacity	P
5.4.2.3	Characteristics and conditions to be identified by the purchaser		P
5.5	UPS switch specification	REC input switch, bypass input switch, maintenance switch and output switch and battery switch are optional parts.	P
5.6	Communication circuits		P
6	UPS tests		--
6.1	Summary		P
6.1.1	Venue, instrumentation and load		P
6.1.1.1	Test venue		P
	A UPS shall generally be tested at the manufacturer's premises and in accordance with Table 3		P
6.1.1.2	Test instrumentation		P
6.1.1.3	Test load		P
	Test load are performed as prescribed in the relevant test clause, with		P
	- reference linear load		P
	- reference non-linear load		P
6.1.2	Routine test	Decided by manufacture and purchaser	P
6.1.3	Site test		N/A
6.1.4	Witness test	Decided by manufacture and purchaser	P
6.1.5	Type test		P
6.1.6	Schedule of tests		N/A
	Tests shall be performed in accordance with Table 3		N/A
6.2	Routine test procedure		P
6.2.2	Electrical		P
6.2.2.1	Insulation and dielectric	See separate safety report.	P
6.2.2.2	Cable and interconnection check		P
	All a.c. and d.c. supply terminals are connected to the a.c. input supply, to the stored energy source and to the load		P
	Any communication circuit is connected as required		P
6.2.2.3	Light load and functional test		P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
	a) all control switches and other means to activate UPS operation		P
	b) protective devices		P
	c) auxiliary devices, such as contactors, fans, outlets, annunciators and communication devices		P
	d) supervisory, monitoring and remote signalling devices		P
	e) auto transfer to stored energy mode and back to normal mode by failing and subsequently restoring the a.c. input voltage		P
	f) auto transfer to bypass or isolation of the inverter from a common a.c. output bus and back to normal mode by failing and subsequently restoring the inverter a.c. output voltage		P
	g) manual transfer to bypass or isolation of the inverter from a common a.c. output bus and back to normal mode by operating appropriate switches and/or controls		P
6.2.2.4	No load		P
6.2.2.5	Full load		P
6.2.2.6	Synchronisation		P
6.2.2.7	AC input failure		P
6.2.2.8	AC input return	(see appended table)	P
6.2.2.9	Transfer to bypass		P
6.3	Site test procedure		N/A
	Site test shall preferably occur under conditions representing those of actual service and shall use the load available on site.		N/A
	The load shall not exceed the rated continuous load of the complete UPS as configured on site, or		N/A
	Test performed with reference test load as defined in 3.3.5		N/A
6.4	Type test procedure (electrical)		P
6.4.1	Input – a.c. supply compatibility	(see appended table)	P
6.4.1.1	Steady-state input voltage tolerance	(see appended table)	P
6.4.1.2	Input frequency tolerance	(see appended table)	P
6.4.1.3	Inrush current	(see appended table)	P
6.4.1.4	Harmonic distortion of input current	(see appended table)	P
6.4.1.5	Power factor	(see appended table)	P
6.4.1.6	Efficiency	(see appended table)	P
6.4.1.7	Backfeed protection	See separate report.	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.1.8	Residual earth current	See separate report.	P
6.4.1.9	Stand-by generator compatibility test		P
6.4.1.10	Electromagnetic compatibility	See separate report.	P
6.4.2	Output-Linear load	(see appended table)	P
6.4.2.1	Normal mode- No load	(see appended table)	P
6.4.2.2	Normal mode – Full load	(see appended table)	P
6.4.2.3	Stored energy mode – No load	(see appended table)	P
6.4.2.4	Stored energy mode – Full load	(see appended table)	P
6.4.2.5	3-phase unbalance	(see appended table)	P
6.4.2.6	DC component		P
6.4.2.7	Load sharing test	Provided	P
6.4.2.8	Output overvoltage test	(see appended table)	P
6.4.2.9	Periodic output voltage variation test	(see appended table)	P
6.4.2.10	Overload and fault clearing capability		P
6.4.2.10.1	Overload – Normal mode	(see appended table)	P
6.4.2.10.2	Overload – Stored energy mode	(see appended table)	P
6.4.2.10.3	Fault clearing capability – Normal mode	(see appended table)	P
6.4.2.10.4	Fault clearing capability – Stored energy mode	(see appended table)	P
6.4.2.11	Dynamic performance		P
6.4.2.11.1	Normal to stored energy mode	(see appended table)	P
6.4.2.11.2	Stored energy to normal mode	(see appended table)	P
6.4.2.11.3	Normal to bypass mode - Overload	(see appended table)	P
6.4.2.11.4	Step load – Normal mode	(see appended table)	P
6.4.2.11.5	Step load – Stored energy mode	(see appended table)	P
6.4.2.11.6	Test method – linear load	(see appended table)	P
6.4.2.12	Simulation of parallel redundant UPS fault	(see appended table)	P
6.4.3	Output – Non-linear load		P
	Tests performed with non-linear load as defined in annex E	(see appended table)	P
6.4.3.1	Normal mode – Full load	(see appended table)	P
6.4.3.2	Stored energy mode – Full load	(see appended table)	P
6.4.3.3	Dynamic performance		P
6.4.3.3.1	Normal to stored energy mode	(see appended table)	P
6.4.3.3.2	Stored energy to normal mode	(see appended table)	P
6.4.3.3.3	Load step – Normal mode		P
	a) UPS $\leq$ 4.0 kVA rating	(see appended table)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	b) UPS > 4.0kVA rating	(see appended table)	P
6.4.3.3.4	Load step –stored energy mode	(see appended table)	P
6.4.4	Stored and restored energy		P
6.4.4.1	Stored energy time		N/A
6.4.4.2	Restored energy time (to 90% capacity)		N/A
6.4.4.3	Battery ripple current measurement		N/A
6.4.4.4	Restart test		P
6.5	Type test procedure (environment)		P
6.5.1	Environment and transportation test methods		P
6.5.2	Transportation		P
6.5.2.1	Shock test		N/A
	a) initial measurement		N/A
	b) mode of operation		N/A
	c) Tests		N/A
	d) final requirements		N/A
	e) final measurements		N/A
6.5.2.2	Free fall test	(see appended table)	P
	a) initial measurement		P
	b) mode of operation		P
	c) test		P
	d) measurements during testing		P
	e) final requirements		P
	f) final measurements		P
6.5.3	Storage	(see appended table)	P
	a) initial measurement		P
	b) mode of operation		P
	c) tests		P
	d) measurements during test		P
	e) Final requirements		P
	f) Final measurements		P
6.5.4	Operation	(see appended table)	P
	a) initial measurement		P
	b) mode of operation		P
	c) test		P
	d) measurements during testing		P
	e) final measurements		P

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Clause	Requirement + Test	Result - Remark	Verdict
	f) final requirements		P
6.5.5	Acoustic noise		P
	Measured when UPS operates at rated steady-state linear load under the following conditions:		P
	- normal mode	(see appended table)	P
	- stored energy mode	(see appended table)	P
6.6	UPS functional unit tests (where not tested as a complete UPS)		N/A
6.6.1	UPS rectifier test		N/A
6.6.2	UPS inverter tests		N/A
6.6.3	UPS switch tests		N/A
6.6.4	Stored energy / battery tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

6.4.1.1	TABLE: Steady-state input voltage tolerance	P	
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Description of test conditions / test construction:

- The steady-state input voltage tolerance test (see 6.4.1.1) shall be repeated with the input frequency adjusted to the limits specified by the manufacturer in conjunction with the input voltage variations
- The r.m.s. voltage variation is 176Vac to 275Vac at 100% load.

Measured graph:

1. Measured minimum input voltage at 50Hz with 100% load: 176.65V/176.63V/176.75V

Normal Mode		Peak Over 11 12 13 14 15 16	Scaling AVG	Line Filter FREQ Filter	Time	Integ: Reset -----:---:---	YOKOGAWA PLL: 49.978 Hz
		CF: 3					
		Σ A(3P4W)					
		U1 300V/AUTO					
		I1 E 1V/AUTO					
		Sync Src: [U4]					
		U2 300V/AUTO					
		I2 E 1V/AUTO					
		Sync Src: [U4]					
		U3 300V/AUTO					
		I3 E 1V/AUTO					
		Sync Src: [U4]					
		Σ B(3P4W)					
		U4 300V/AUTO					
		I4 E 500mV/AUTO					
		Sync Src: [U4]					
		U5 300V/AUTO					
		I5 E 500mV/AUTO					
		Sync Src: [U4]					
		U6 300V/AUTO					
		I6 E 500mV/AUTO					
		Sync Src: [U4]					

2. Measured maximum input voltage at 50Hz with 100% load: 276.38V/276.55V/276.49V.

Normal Mode		Peak Over 11 12 13 14 15 16	Scaling AVG	Line Filter FREQ Filter	Time	Integ: Reset -----:---:---	YOKOGAWA PLL: 49.977 Hz
		CF: 3					
		Σ A(3P4W)					
		U1 300V/AUTO					
		I1 E 500mV/AUTO					
		Sync Src: [U4]					
		U2 300V/AUTO					
		I2 E 500mV/AUTO					
		Sync Src: [U4]					
		U3 300V/AUTO					
		I3 E 500mV/AUTO					
		Sync Src: [U4]					
		Σ B(3P4W)					
		U4 300V/AUTO					
		I4 E 500mV/AUTO					
		Sync Src: [U4]					
		U5 300V/AUTO					
		I5 E 500mV/AUTO					
		Sync Src: [U4]					
		U6 300V/AUTO					
		I6 E 500mV/AUTO					
		Sync Src: [U4]					

3. Measured minimum input voltage at 60Hz with 100% load: 176.75V/176.83V/176.76V.

Clause	Requirement + Test	Result - Remark	Verdict
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6.4.1.2	TABLE: Input frequency tolerance	P
Description of test conditions / test construction: 1. Where the UPS output frequency is synchronized with the input frequency (47-63Hz), the range of synchronization shall be checked. 2. Where the total input frequency range exceeds the stated range of synchronization, the UPS output normally reverts to free running operation. The free running frequency shall be recorded for nonsynchronous conditions (47-63Hz). 3. The frequency variation is 47-63Hz.		

Clause	Requirement + Test	Result - Remark	Verdict
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Normal Mode

Peak Over
[1] [2] [3] [4] [5] [6]
[1] [2] [3] [4] [5] [6]

Scaling
AVG

Line Filter
Freq Filter

Time

Integ: Reset

PLL: [U4] 49.991 Hz

CF: 3

Σ A(3P4W)

1 U1 300V AUTO
11 E500mV AUTO
Sync Src:[U4]

2 U2 300V AUTO
12 E500mV AUTO
Sync Src:[U4]

3 U3 300V AUTO
13 E500mV AUTO
Sync Src:[U4]

4 Σ B(3P4W)

5 U4 300V AUTO
14 E500mV AUTO
Sync Src:[U4]

6 U5 300V AUTO
15 E500mV AUTO
Sync Src:[U4]

7 U6 300V AUTO
16 E500mV AUTO
Sync Src:[U4]

Voltage Current	Element1 A 300V A 500mV	Element2 A 300V A 500mV	Element3 A 300V A 500mV	Σ A(3P4W) A 300V A 500mV	Element4 A 300V A 500mV	Element5 A 300V A 500mV	Element6 A 300V A 500mV	Σ B(3P4W) A 300V A 500mV
Urms [V]	220.71	220.81	223.33	221.62	220.14	220.05	220.10	220.09
Irms [A]	433.56	435.23	434.24	434.34	412.50	411.84	411.83	412.05
P [W]	95.63k	96.04k	96.92k	288.59k	90.80k	90.62k	90.64k	272.07k
S [VA]	95.69k	96.10k	96.98k	288.77k	90.81k	90.62k	90.64k	272.07k
Q [var]	-3.35k	-3.42k	-3.42k	-10.19k	-0.55k	-0.54k	-0.62k	-1.71k
λ [-]	0.9994	0.9994	0.9994	0.9994	1.0000	1.0000	1.0000	1.0000
φ [°]	02.01	02.04	02.02	2.02	00.35	00.34	00.39	0.36
fU [Hz]	46.980	46.977	46.979		49.991	49.994	49.993	
fI [Hz]	46.981	46.980	46.978		49.991	49.993	49.995	
Uthd [%]	6.644	6.461	10.534		0.805	0.821	0.804	
Ithd [%]	6.678	6.558	10.551		0.775	0.780	0.764	
Pthd [%]	0.439	0.419	1.108		0.006	0.006	0.006	
Uthf [%]	2.070	2.007	3.684		0.615	0.627	0.619	
Ithf [%]	2.007	2.015	3.792		0.522	0.532	0.524	
Utif [-]	79.380	76.743	139.721		23.732	24.208	23.918	
Itif [-]	75.678	76.081	144.004		19.887	20.277	19.969	
hv f [%]	4.140	4.035	6.300		0.338	0.344	0.336	
hc f [%]	4.171	4.054	6.304		0.332	0.333	0.325	

Normal Mode		Peak Over [1] [2] [3] [4] [5] [6] [1] [2] [3] [4] [5] [6]				Scaling AVG		Line Filter ■ Freq Filter ■		Time		Integ: Reset		YOKOGAWA ◆ PLL : U4 59.991 Hz	
														CF: 3	
														Σ A(3P4W)	
Voltage Current	Element1 A 300V A 500mV	Element2 A 300V A 500mV	Element3 A 300V A 500mV	Σ A(3P4W)		Element4 A 300V A 500mV	Element5 A 300V A 500mV	Element6 A 300V A 500mV	Σ B(3P4W)						
Urms [V]	220.96	221.08	223.60	221.88	219.92	219.90	219.87	219.90							
I rms [A]	433.00	433.96	432.41	433.12	411.88	411.42	411.30	411.53							
P [W]	95.58k	95.84k	96.59k	288.01k	90.58k	90.47k	90.43k	271.48k							
S [VA]	95.68k	95.94k	96.63k	288.30k	90.58k	90.47k	90.43k	271.49k							
Q [var]	-4.29k	-4.30k	-4.28k	-12.87k	-0.67k	-0.66k	-0.75k	-2.09k							
λ []	0.9990	0.9990	0.9990	0.9990	1.0000	1.0000	1.0000	1.0000							
φ [°]	02.57	02.57	02.54	2.56	00.42	00.42	00.48	0.44							
fU [Hz]	62.972	62.980	62.974		59.991	59.993	59.991								
fI [Hz]	62.980	62.977	62.973		59.992	59.992	59.993								
Uthd [%]	6.871	4.755	9.407		0.889	0.892	0.879								
I thd [%]	6.744	5.046	9.375		0.841	0.832	0.827								
P thd [%]	0.462	0.238	0.881		0.007	0.007	0.007								
U thf [%]	2.603	1.269	3.646		0.779	0.785	0.782								
I thf [%]	2.398	1.267	3.730		0.653	0.660	0.663								
U t f []	103.505	49.977	144.643		31.064	31.233	31.197								
I t f []	95.234	50.203	148.133		25.482	25.844	25.909								
hwf [%]	4.253	3.104	5.708		0.374	0.372	0.365								
hc f [%]	4.200	3.250	5.662		0.362	0.356	0.351								

5.2.1.e 5.3.2.q 6.4.2.5	TABLE: - 3-phase input, voltage unbalance	P
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Clause	Requirement + Test	Result - Remark	Verdict

Description of test conditions / test construction:

- 1) Start the UPS in normal mode at nominal input voltage and frequency (220V/50Hz), apply balance full linear load and unbalance linear load.
- 2) Voltage unbalance ratio is defined as:

$$Y_v = \sqrt{\frac{U_{ab}^2 + U_{ca}^2 - 2 * U_{ab} * U_{ca} * \cos(\frac{\pi}{3} - \arccos \frac{U_{ab}^2 + U_{ca}^2 - U_{bc}^2}{2 * U_{ab} * U_{ca}})}{U_{ab}^2 + U_{ca}^2 - 2 * U_{ab} * U_{ca} * \cos(\frac{\pi}{3} + \arccos \frac{U_{ab}^2 + U_{ca}^2 - U_{bc}^2}{2 * U_{ab} * U_{ca}})}} \times 100\%$$

- 3) Angle deviation is defined as:

$$\Delta_{AB} = \frac{1}{\pi} \times \arccos \frac{U_{an}^2 + U_{bn}^2 - U_{ab}^2}{2 * U_{an} * U_{bn}} \times 180^\circ - 120^\circ$$

$$\Delta_{BC} = \frac{1}{\pi} \times \arccos \frac{U_{bn}^2 + U_{cn}^2 - U_{bc}^2}{2 * U_{bn} * U_{cn}} \times 180^\circ - 120^\circ$$

$$\Delta_{CA} = \frac{1}{\pi} \times \arccos \frac{U_{cn}^2 + U_{an}^2 - U_{ca}^2}{2 * U_{cn} * U_{an}} \times 180^\circ - 120^\circ$$

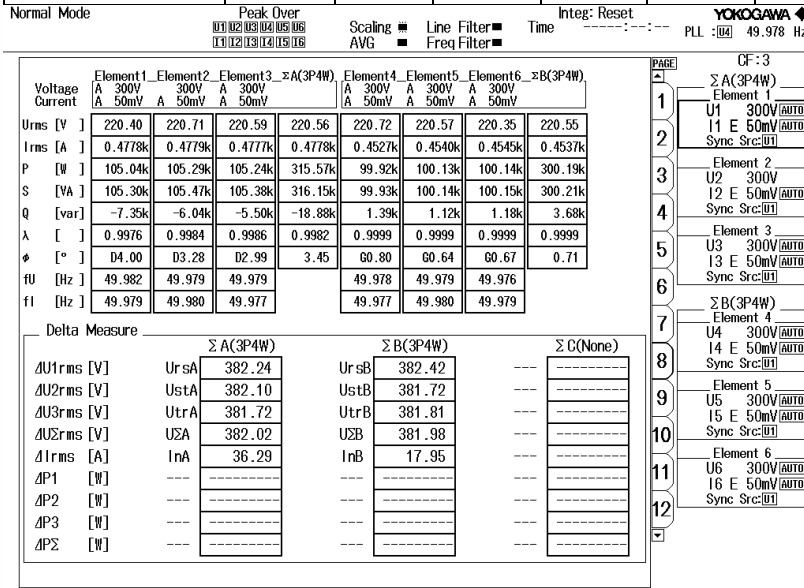
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Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph:

1. Input voltage unbalance at Balance load.

Balance load	Va	Vb	Vc	Vab	Vbc	Vac	Yv(%) <3%	< 2 degree		
								Δab	Δbc	Δca
Ph. a=b=c 100% Linear load	220.7 2	220.5 7	220.3 5	382.4 2	381.7 2	381.8 1	0.12	0.01	0.01	0.01



Update 20 (500msec)

2. Input voltage unbalance at Unbalance load, Ph. a=0, b=c=100% linear load.

Unbalance load	Va	Vb	Vc	Vab	Vbc	Vac	Yv(%) <3%	< 2 degree		
								Δab	Δbc	Δca
Ph. a=0,b=c=100 % linear load	221.89	220.45	220.25	383.00	381.71	382.90	0.22	0.01	0.01	0.01

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Clause	Requirement + Test	Result - Remark	Verdict
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Normal Mode Peak Over U1 U2 U3 U4 U5 U6 Scaling Line Filter Time Integ: Reset YOKOGAWA PLL : 49.964 Hz											
Element1 Element2 Element3 ΣA(3P4W) Element4 Element5 Element6 ΣB(3P4W) U1 U2 U3 U4 U5 U6											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											

Update 238 (500msec)

3. Input voltage unbalance at Unbalance load, Ph. b=0,a=c=100% linear load.

Unbalance load	Va	Vb	Vc	Vab	Vbc	Vac	Yv(%) <3%	< 2 degree		
								Δ ab	Δ bc	Δ ca
Ph. b=0,a=c=100 % linear load	220.57	221.75	220.29	383.57	382.27	381.80	0.28	0.01	0.01	0.01

Normal Mode Peak Over U1 U2 U3 U4 U5 U6 Scaling Line Filter Time Integ: Reset YOKOGAWA PLL : 49.978 Hz											
Element1 Element2 Element3 ΣA(3P4W) Element4 Element5 Element6 ΣB(3P4W) U1 U2 U3 U4 U5 U6											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											
U1rms [V] U2rms [V] U3rms [V] U4rms [V] U5rms [V] U6rms [V] U1rms [A] U2rms [A] U3rms [A] U4rms [A] U5rms [A] U6rms [A]											

Update 281 (500msec)

4. Input voltage unbalance at Unbalance load, Ph. c=0,a=b=100% linear load

Unbalance load	Va	Vb	Vc	Vab	Vbc	Vac	Yv(%) <3%	< 2 degree		
								Δ ab	Δ bc	Δ ca

IEC 62040-3																																																																																																																																																																																		
Clause	Requirement + Test					Result - Remark			Verdict																																																																																																																																																																									
Ph. c=0,a=b=100 % linear load	220.30	220.38	221.56	382.19	382.79	382.03	0.12	0.01	0.01	0.01																																																																																																																																																																								
Normal Mode Peak Over U1U2U3U4U5U6 U1U2U3U4U5U6 Scaling Line Filter Time Integ: Reset YOKOGAWA PLL :U4 49.978 Hz <table><thead><tr><th rowspan="2">Voltage Current</th><th colspan="4">Element1_Element2_Element3_ΣA(3P4W)</th><th colspan="4">Element4_Element5_Element6_ΣB(3P4W)</th></tr><tr><th>A 300V A 50mV</th><th>300V A 50mV</th><th>A 300V A 50mV</th><th>ΣA(3P4W) A 50mV</th><th>A 300V A 50mV</th><th>300V A 50mV</th><th>A 300V A 50mV</th><th>ΣB(3P4W) A 50mV</th></tr></thead><tbody><tr><td>Urms [V]</td><td>220.46</td><td>220.64</td><td>220.64</td><td>220.58</td><td>220.30</td><td>220.38</td><td>221.56</td><td>220.75</td></tr><tr><td>Irms [A]</td><td>0.3164k</td><td>0.3149k</td><td>0.3140k</td><td>0.3151k</td><td>0.4432k</td><td>0.4502k</td><td>0.0041k</td><td>0.2992k</td></tr><tr><td>P [W]</td><td>69.25k</td><td>69.09k</td><td>68.98k</td><td>207.33k</td><td>97.64k</td><td>99.20k</td><td>0.04k</td><td>196.87k</td></tr><tr><td>S [VA]</td><td>69.75k</td><td>69.48k</td><td>69.29k</td><td>208.51k</td><td>97.64k</td><td>99.20k</td><td>0.90k</td><td>197.75k</td></tr><tr><td>Q [var]</td><td>-8.32k</td><td>-7.27k</td><td>-6.53k</td><td>-22.12k</td><td>1.32k</td><td>1.09k</td><td>0.90k</td><td>3.32k</td></tr><tr><td>λ []</td><td>0.9929</td><td>0.9945</td><td>0.9956</td><td>0.9943</td><td>0.9999</td><td>0.9999</td><td>0.0446</td><td>0.9956</td></tr><tr><td>φ [°]</td><td>06.85</td><td>06.01</td><td>05.41</td><td>6.12</td><td>00.78</td><td>00.63</td><td>087.44</td><td>5.40</td></tr><tr><td>fU [Hz]</td><td>49.979</td><td>49.981</td><td>49.978</td><td></td><td>49.978</td><td>49.977</td><td>49.976</td><td></td></tr><tr><td>fI [Hz]</td><td>49.980</td><td>49.979</td><td>49.977</td><td></td><td>49.977</td><td>49.978</td><td>Error</td><td></td></tr></tbody></table> Delta Measure <table><thead><tr><th></th><th colspan="2">Σ A(3P4W)</th><th colspan="2">Σ B(3P4W)</th><th colspan="2">Σ C(None)</th></tr></thead><tbody><tr><td>ΔU1rms [V]</td><td>UrsA</td><td>382.29</td><td>UrsB</td><td>382.19</td><td>---</td><td>-----</td></tr><tr><td>ΔU2rms [V]</td><td>UstA</td><td>382.16</td><td>UstB</td><td>382.79</td><td>---</td><td>-----</td></tr><tr><td>ΔU3rms [V]</td><td>UtrA</td><td>381.69</td><td>UtrB</td><td>382.03</td><td>---</td><td>-----</td></tr><tr><td>ΔUΣrms [V]</td><td>UΣA</td><td>382.05</td><td>UΣB</td><td>382.34</td><td>---</td><td>-----</td></tr><tr><td>ΔIrms [A]</td><td>InA</td><td>32.80</td><td>InB</td><td>442.41</td><td>---</td><td>-----</td></tr><tr><td>ΔP1 [W]</td><td>---</td><td>-----</td><td>---</td><td>-----</td><td>---</td><td>-----</td></tr><tr><td>ΔP2 [W]</td><td>---</td><td>-----</td><td>---</td><td>-----</td><td>---</td><td>-----</td></tr><tr><td>ΔP3 [W]</td><td>---</td><td>-----</td><td>---</td><td>-----</td><td>---</td><td>-----</td></tr><tr><td>ΔPΣ [W]</td><td>---</td><td>-----</td><td>---</td><td>-----</td><td>---</td><td>-----</td></tr></tbody></table> PAGE CF:3 Σ A(3P4W) Element 1 U1 300V(AUTO) 11 E 50mV(AUTO) Sync Src:U1 Element 2 U2 300V 12 E 50mV(AUTO) Sync Src:U1 Element 3 U3 300V(AUTO) 13 E 50mV(AUTO) Sync Src:U1 Σ B(3P4W) Element 4 U4 300V(AUTO) 14 E 50mV(AUTO) Sync Src:U1 Element 5 U5 300V(AUTO) 15 E 50mV(AUTO) Sync Src:U1 Element 6 U6 300V(AUTO) 16 E 50mV(AUTO) Sync Src:U1											Voltage Current	Element1_Element2_Element3_ΣA(3P4W)				Element4_Element5_Element6_ΣB(3P4W)				A 300V A 50mV	300V A 50mV	A 300V A 50mV	ΣA(3P4W) A 50mV	A 300V A 50mV	300V A 50mV	A 300V A 50mV	ΣB(3P4W) A 50mV	Urms [V]	220.46	220.64	220.64	220.58	220.30	220.38	221.56	220.75	Irms [A]	0.3164k	0.3149k	0.3140k	0.3151k	0.4432k	0.4502k	0.0041k	0.2992k	P [W]	69.25k	69.09k	68.98k	207.33k	97.64k	99.20k	0.04k	196.87k	S [VA]	69.75k	69.48k	69.29k	208.51k	97.64k	99.20k	0.90k	197.75k	Q [var]	-8.32k	-7.27k	-6.53k	-22.12k	1.32k	1.09k	0.90k	3.32k	λ []	0.9929	0.9945	0.9956	0.9943	0.9999	0.9999	0.0446	0.9956	φ [°]	06.85	06.01	05.41	6.12	00.78	00.63	087.44	5.40	fU [Hz]	49.979	49.981	49.978		49.978	49.977	49.976		fI [Hz]	49.980	49.979	49.977		49.977	49.978	Error			Σ A(3P4W)		Σ B(3P4W)		Σ C(None)		ΔU1rms [V]	UrsA	382.29	UrsB	382.19	---	-----	ΔU2rms [V]	UstA	382.16	UstB	382.79	---	-----	ΔU3rms [V]	UtrA	381.69	UtrB	382.03	---	-----	ΔUΣrms [V]	UΣA	382.05	UΣB	382.34	---	-----	ΔIrms [A]	InA	32.80	InB	442.41	---	-----	ΔP1 [W]	---	-----	---	-----	---	-----	ΔP2 [W]	---	-----	---	-----	---	-----	ΔP3 [W]	---	-----	---	-----	---	-----	ΔPΣ [W]	---	-----	---	-----	---	-----
Voltage Current	Element1_Element2_Element3_ΣA(3P4W)				Element4_Element5_Element6_ΣB(3P4W)																																																																																																																																																																													
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Update 317 (500msec)																																																																																																																																																																																		
6.2.2.8 6.4.1.3 6.4.2.11.2	TABLE: - AC input return - Inrush current - Change of operating mode – Stored energy to normal mode								P																																																																																																																																																																									

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

Description of test conditions / test construction:

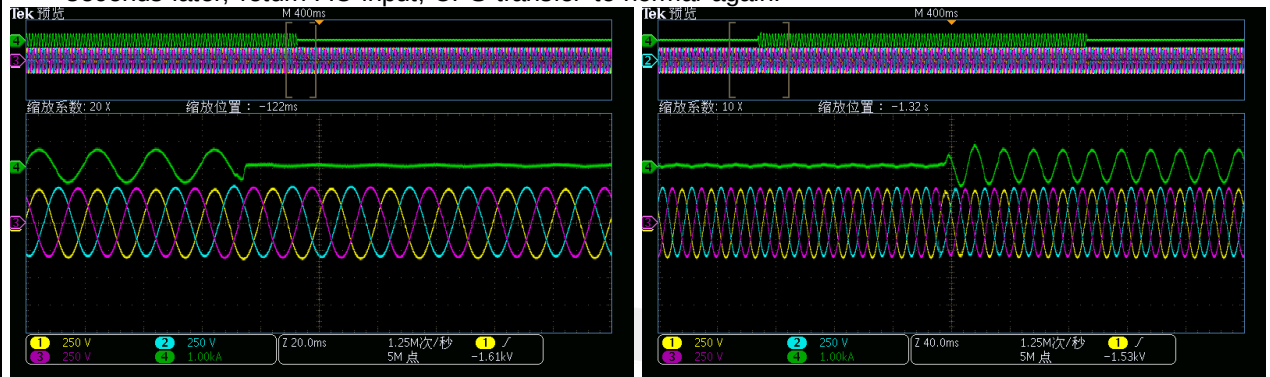
1. AC input return
 - 1) UPS run in normal mode, applying 100% linear load. Then cut off input, UPS transfer to battery. A few seconds later, return AC input, UPS transfer to normal again.
 - 2) UPS run in normal mode, applying 100% linear load. Then cut off input, UPS transfer to battery. A few seconds later, return AC input with improper phase rotation, UPS can't transfer to normal and alarm "Rectifier Phase".
 - 3) Then cut off input, and return AC input with proper phase rotation, UPS transfer to normal again.
2. Inrush current
 - 1) Input &bypass supply at 176V/220V/280V 50Hz and battery off. analysis the inrush input current for the following cases:
 - 2) When Vbus didn't drop, turn on common line &bypass and battery at the moment that the input voltage is 0V first and Vmax, record the inrush current, and then turn on the system, record the inrush current again.
 - 3) Test results: inrush current $\leq 120\%$ of rated current for ≤ 2 cycles.

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

Measured graph:

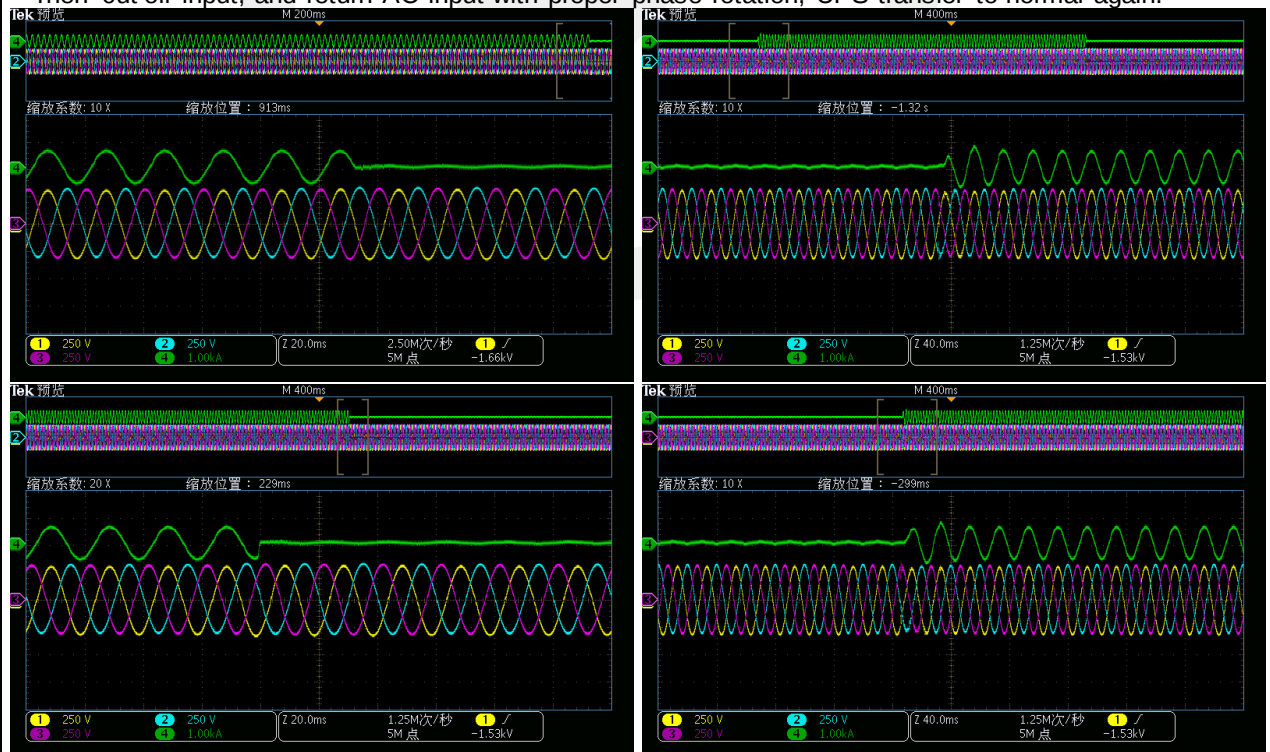
1 AC input return

- 1) UPS run in normal mode, applying 100% linear load. Then cut off input, UPS transfer to battery. A few seconds later, return AC input, UPS transfer to normal again.



- 2) UPS run in normal mode, applying 100% linear load. Then cut off input, UPS transfer to battery. A few seconds later, return AC input with improper phase rotation, UPS can't transfer to normal and alarm "Inverter abnormal".

Then cut off input, and return AC input with proper phase rotation, UPS transfer to normal again.

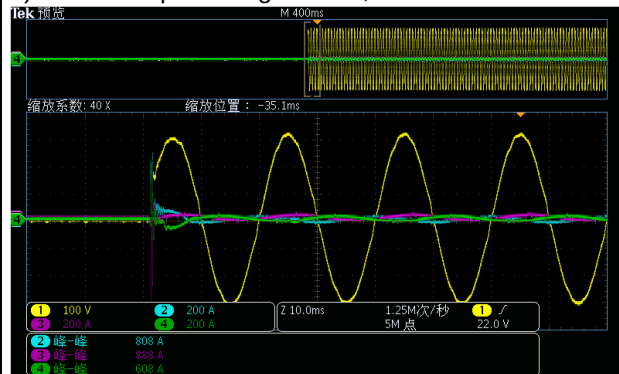


IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

Channel 4 - Input Current_A

2. Inrush current < 2.5X

1) Vbus=0 input voltage=176V, Inrush current =444A



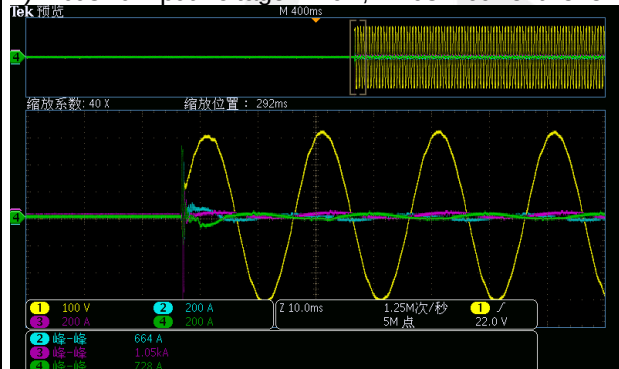
Channel 1 - Input Voltage_A

Channel 2 - Input Current_A

Channel 3 - Input Current_B

Channel 4 - Input Current_C

2) Vbus=0 input voltage=276V, Inrush current=525A



Channel 1 - Input Voltage_A

Channel 2 - Input Current_A

Channel 3 - Input Current_B

Channel 4 - Input Current_C

6.4.1.4	TABLE: -Harmonic distortion of input current	P
---------	--	---

Description of test conditions / test construction:

- 1) The harmonic distortion of the input current is tested at reference test load.
- 2) Test result THDi <3% with full linear load.
- 3) Test result THDi < 5% with full non-linear load

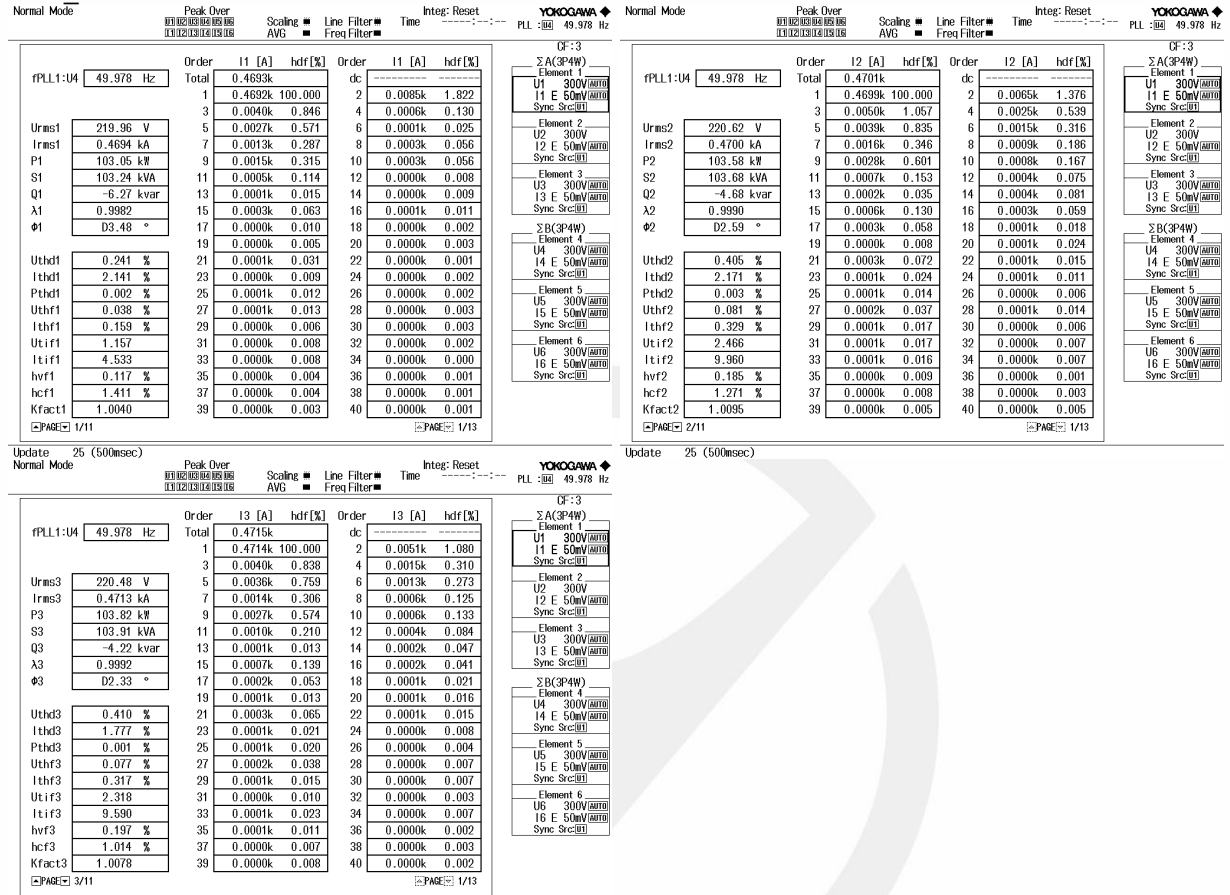
Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
----------	--------------	-------------	-------------	-------------	----

IEC 62040-3					
Clause	Requirement + Test		Result - Remark		Verdict
100%	3	0.846	1.057	0.838	--
100%	5	0.571	0.835	0.759	--
100%	7	0.287	0.346	0.306	--
100%	9	0.315	0.601	0.574	--
THD	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--
see formula to THD below	2.141%	2.171%	1.777%	< 3%	--
$THD = 100 \cdot \sqrt{\left(\frac{3^\circ}{10^{20}}\right)^2 + \left(\frac{5^\circ}{10^{20}}\right)^2 + \left(\frac{7^\circ}{10^{20}}\right)^2 + \left(\frac{9^\circ}{10^{20}}\right)^2} =$					

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph:
THDi_100% linear load



3) Test result THDi < 5% with full non-linear load

Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
100%	3	1.481	1.454	1.924	--
100%	5	0.816	0.713	0.736	--
100%	7	1.059	0.821	0.733	--
100%	9	1.778	1.630	1.620	--

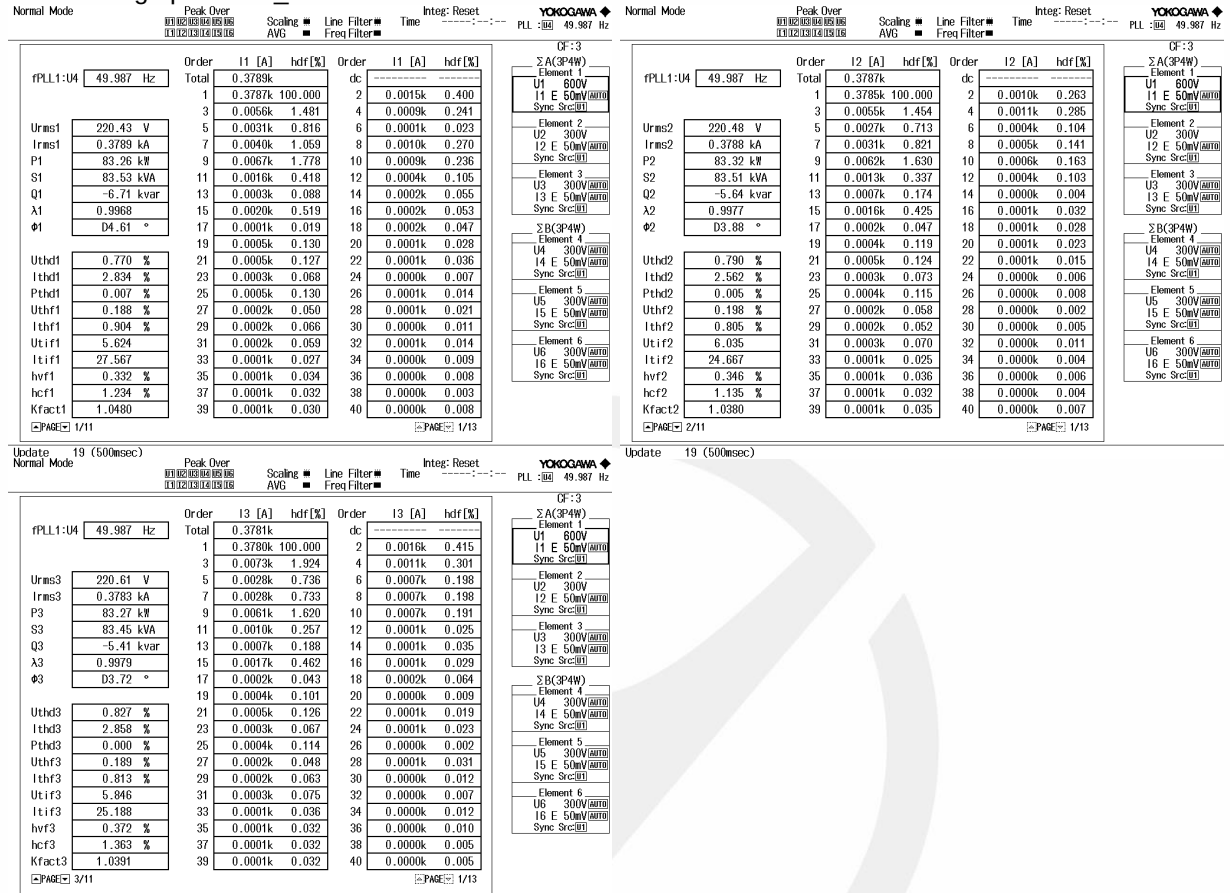
THDi	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--
see formula to THD below	2.834%	2.562%	2.858%	< 5%	--

$$THD = 100 \cdot \sqrt{\left(\frac{3\%}{10^{20}}\right)^2 + \left(\frac{5\%}{10^{20}}\right)^2 + \left(\frac{7\%}{10^{20}}\right)^2 + \left(\frac{9\%}{10^{20}}\right)^2}$$

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph: THDi_100% non-linear load



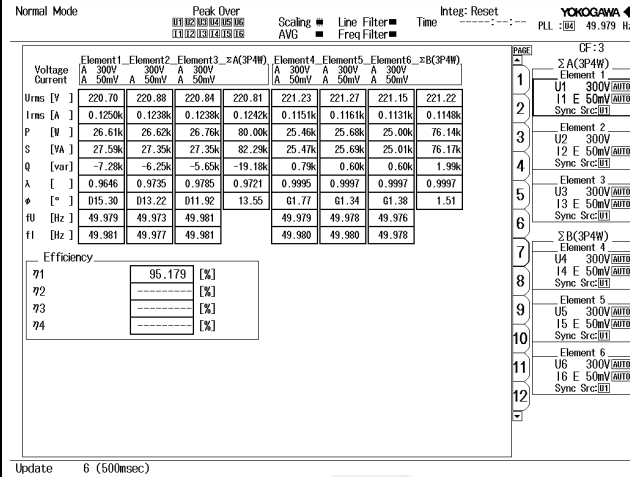
6.4.1.5 & 6.4.1.6	TABLE: - Input power factor - Efficiency	P
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Description of test conditions / test construction:
1) UPS run in normal mode, charge off. The UPS efficiency shall be measured at 25 %, 50 %, 75 % and 100 % reference load. Input power factor = 1.0

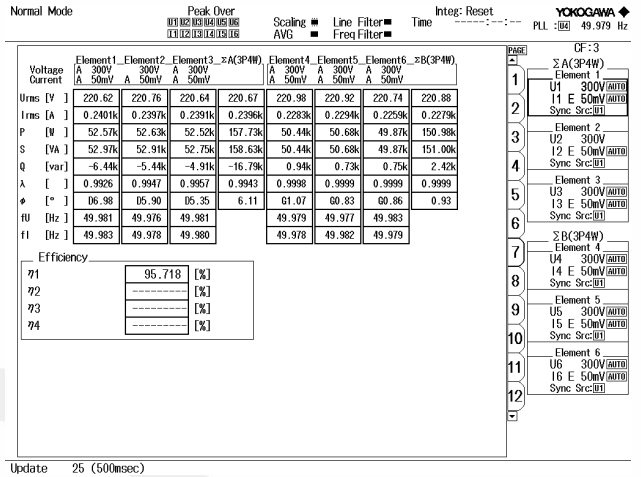
Load (%)	Efficiency (%)	Input power (kW)	Output power (kW)	Expected value due to the specification of the manufacturer	Verdict
25	95.179	80.00	76.14	95.0%	P
50	95.718	157.73	150.98	95.0%	P
75	95.365	236.00	225.06	95.0%	P
100	95.126	315.57	300.19	95.0%	P

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

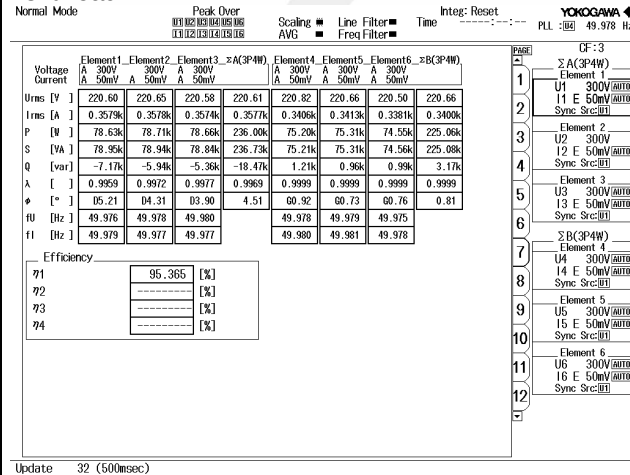
Measured graph: 25% load



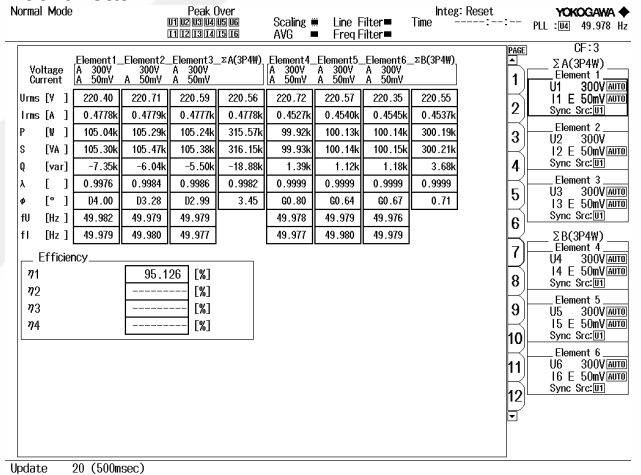
50% load



75% load



100% load



6.4.2.1	TABLE: - Output – Linear load: Normal mode – No load - Harmonic components measurement	P
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Description of test conditions / test construction:

1) With the UPS operating in normal mode of operation at no load and nominal input voltage and frequency, measure the r.m.s. output voltage and its fundamental and harmonic components.

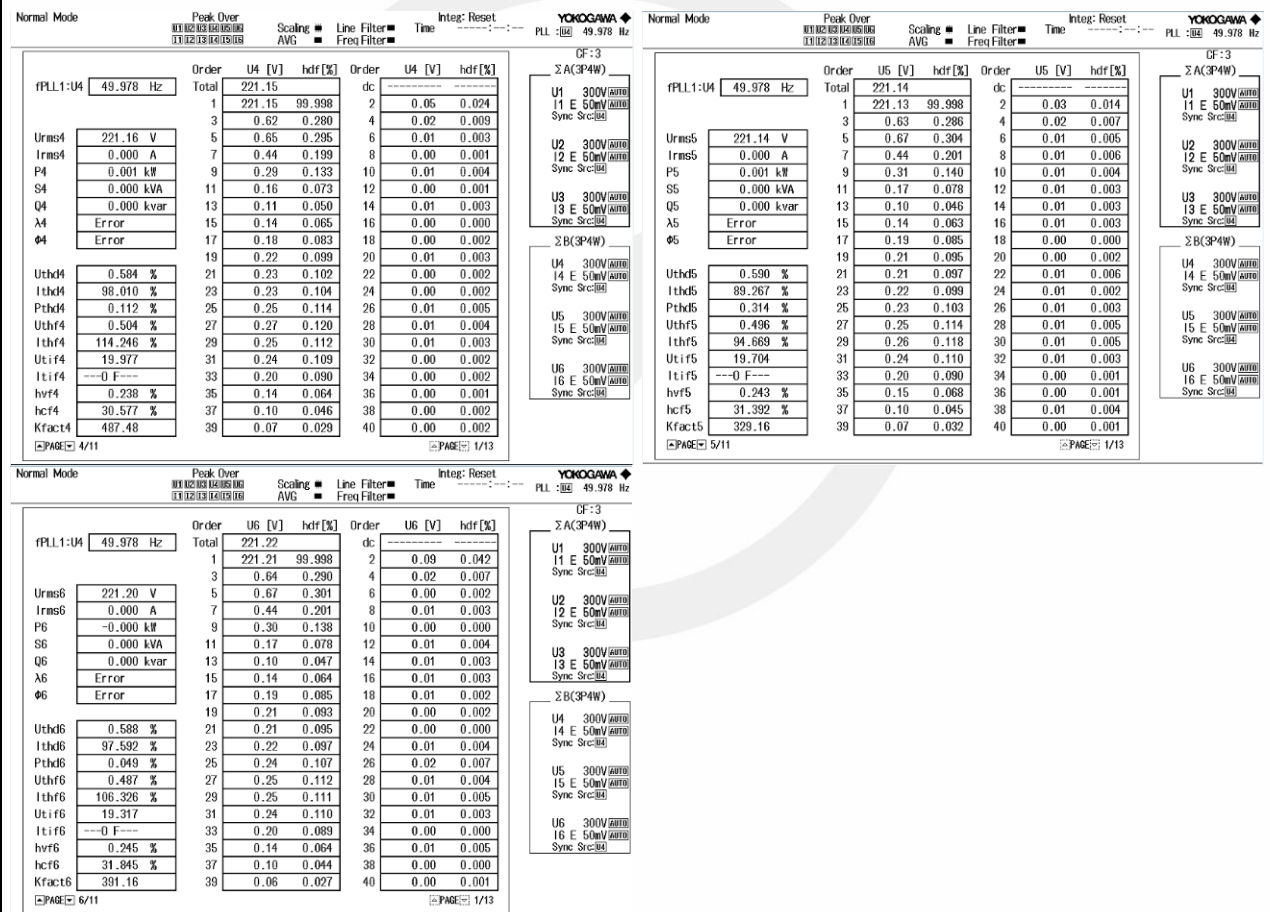
Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
0	3	0.280	0.286	0.290	--
0	5	0.295	0.304	0.301	--
0	7	0.199	0.201	0.201	--
0	9	0.133	0.140	0.138	--

IEC 62040-3					
Clause	Requirement + Test			Result - Remark	Verdict

THD	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--
see formula to THD below	0.584%	0.590%	0.588%	< 1%	--

$$THD = 100 \cdot \sqrt{\left(\frac{3^\circ}{10^{20}}\right)^2 + \left(\frac{5^\circ}{10^{20}}\right)^2 + \left(\frac{7^\circ}{10^{20}}\right)^2 + \left(\frac{9^\circ}{10^{20}}\right)^2} =$$

Measured graph: THD u



6.4.2.2	TABLE: - Output – Linear load: Normal mode – Full load Harmonic components measurement	P
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Description of test conditions / test construction:

1) UPS runs in normal mode, applying 100 % reference test load to the UPS output, then measure output voltage and its fundamental and harmonic components.

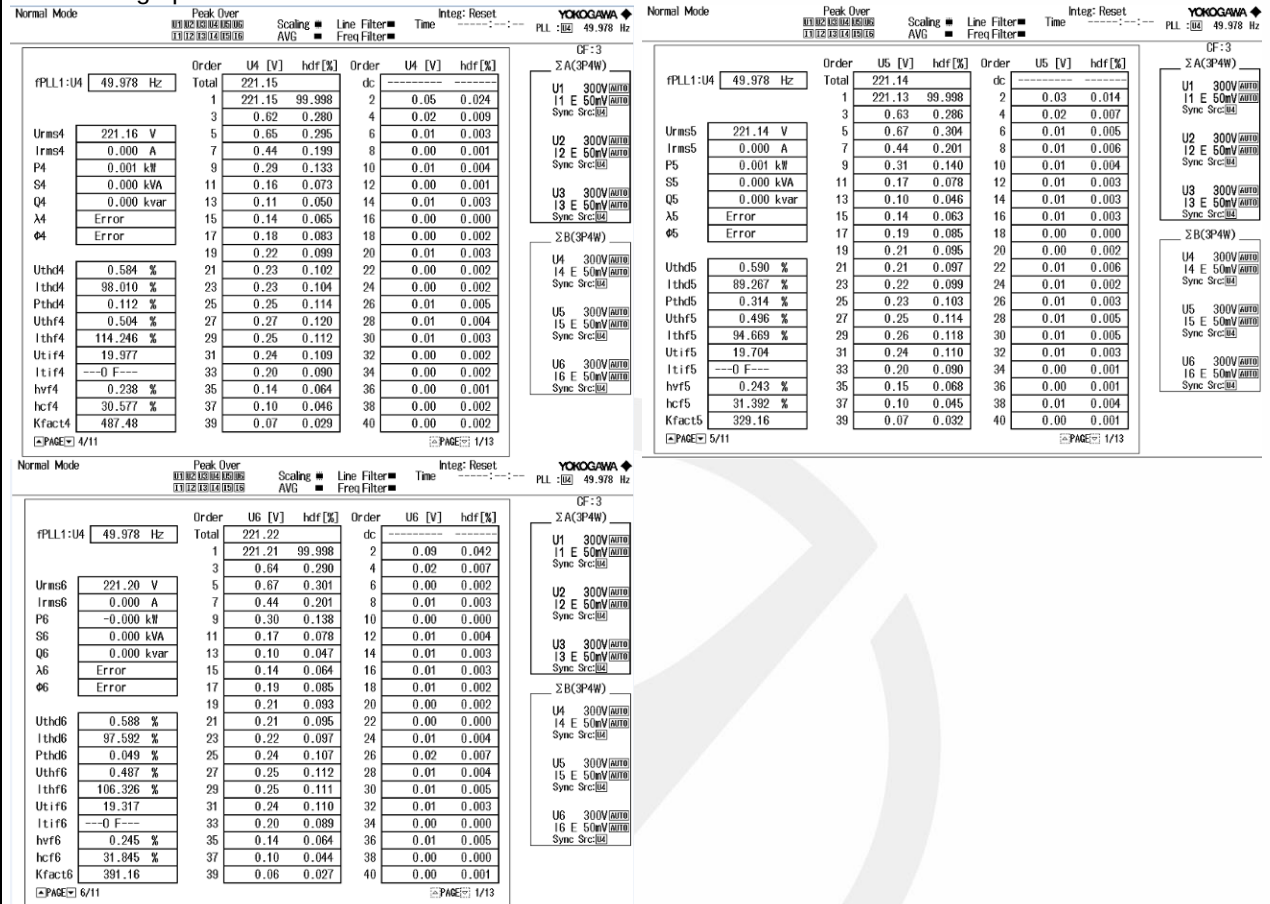
IEC 62040-3					
Clause	Requirement + Test		Result - Remark		Verdict
Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
100	3	0.702	0.734	0.722	--
100	5	0.461	0.453	0.470	--
100	7	0.349	0.346	0.357	--
100	9	0.288	0.280	0.295	--
THD	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--
see formula to THD below	1.119%	1.062%	1.138%	< 2%	--
$THD = 100 \cdot \sqrt{\left(10^{\frac{3^\circ}{20}}\right)^2 + \left(10^{\frac{5^\circ}{20}}\right)^2 + \left(10^{\frac{7^\circ}{20}}\right)^2 + \left(10^{\frac{9^\circ}{20}}\right)^2} =$					
Measured graph: THDu					
Normal Mode Peak Over Scaling Line Filter Time Integ: Reset YOKOGAWA PLL: 49.978 Hz Normal Mode Peak Over Scaling Line Filter Time Integ: Reset YOKOGAWA PLL: 49.979 Hz Order U4 [V] hdf[%] Order U4 [V] hdf[%] Order U5 [V] hdf[%] Order U5 [V] hdf[%] rPLL1:U4 49.978 Hz Total 220.73 100.000 1 220.72 100.000 2 0.24 0.110 3 1.55 0.702 4 0.09 0.041 5 1.02 0.461 6 0.02 0.011 7 0.77 0.349 8 0.03 0.013 9 0.63 0.288 10 0.03 0.015 11 0.58 0.265 12 0.02 0.010 13 0.51 0.230 14 0.01 0.004 15 0.46 0.206 16 0.01 0.003 17 0.41 0.185 18 0.02 0.009 19 0.39 0.177 20 0.03 0.013 21 0.35 0.157 22 0.03 0.011 23 0.32 0.145 24 0.00 0.001 25 0.28 0.129 26 0.01 0.003 27 0.23 0.106 28 0.03 0.012 29 0.20 0.090 30 0.02 0.008 31 0.17 0.076 32 0.01 0.004 33 0.14 0.061 34 0.02 0.009 35 0.08 0.037 36 0.04 0.019 37 0.08 0.036 38 0.03 0.014 39 0.08 0.038 40 0.02 0.007 ΣA(3P4W) Element 1 U1 300V 11 E 50mV Sync Src(0) Element 2 U2 300V 12 E 50mV Sync Src(0) Element 3 U3 300V 13 E 50mV Sync Src(0) Element 4 U4 300V 14 E 50mV Sync Src(0) Element 5 U5 300V 15 E 50mV Sync Src(0) Element 6 U6 300V 16 E 50mV Sync Src(0) ΣB(3P4W) Element 1 U1 300V 11 E 50mV Sync Src(0) Element 2 U2 300V 12 E 50mV Sync Src(0) Element 3 U3 300V 13 E 50mV Sync Src(0) Element 4 U4 300V 14 E 50mV Sync Src(0) Element 5 U5 300V 15 E 50mV Sync Src(0) Element 6 U6 300V 16 E 50mV Sync Src(0) Urms4 220.72 V Irms4 0.4527 kA P4 99.92 kW S4 99.93 kVA Q4 1.39 kvar λ4 0.9999 φ4 60.80 ° Uthd4 1.119 % Ithd4 1.150 % Pthd4 0.013 % Uthf4 0.643 % Ithf4 0.655 % Utrf4 23.636 Itrf4 24.169 hvr4 0.511 % hcf4 0.524 % Kfact4 1.0140 Urms5 220.92 V Irms5 0.2294 kA P5 50.68 kW S5 50.68 kVA Q5 0.73 kvar λ5 0.9999 φ5 60.83 ° Uthd5 1.062 % Ithd5 1.094 % Pthd5 0.011 % Uthf5 0.413 % Ithf5 0.453 % Utrf5 14.405 Itrf5 16.416 hvr5 0.512 % hcf5 0.520 % Kfact5 1.0082 Urms6 220.35 V Irms6 0.4545 kA P6 100.14 kW S6 100.15 kVA Q6 1.18 kvar λ6 0.9999 φ6 60.67 ° Uthd6 1.138 % Ithd6 1.188 % Pthd6 0.013 % Uthf6 0.666 % Ithf6 0.731 % Utrf6 24.695 Itrf6 27.036 hvr6 0.517 % hcf6 0.529 % Kfact6 1.0169 ΣA(3P4W) Element 1 U1 300V 11 E 50mV Sync Src(0) Element 2 U2 300V 12 E 50mV Sync Src(0) Element 3 U3 300V 13 E 50mV Sync Src(0) Element 4 U4 300V 14 E 50mV Sync Src(0) Element 5 U5 300V 15 E 50mV Sync Src(0) Element 6 U6 300V 16 E 50mV Sync Src(0) ΣB(3P4W) Element 1 U1 300V 11 E 50mV Sync Src(0) Element 2 U2 300V 12 E 50mV Sync Src(0) Element 3 U3 300V 13 E 50mV Sync Src(0) Element 4 U4 300V 14 E 50mV Sync Src(0) Element 5 U5 300V 15 E 50mV Sync Src(0) Element 6 U6 300V 16 E 50mV Sync Src(0) Urms6 220.35 V Irms6 0.4545 kA P6 100.14 kW S6 100.15 kVA Q6 1.18 kvar λ6 0.9999 φ6 60.67 ° Uthd6 1.138 % Ithd6 1.188 % Pthd6 0.013 % Uthf6 0.666 % Ithf6 0.731 % Utrf6 24.695 Itrf6 27.036 hvr6 0.517 % hcf6 0.529 % Kfact6 1.0169 Update 20 (500msec) Normal Mode Peak Over Scaling Line Filter Time Integ: Reset YOKOGAWA PLL: 49.978 Hz Update 25 (500msec) Normal Mode Peak Over Scaling Line Filter Time Integ: Reset YOKOGAWA PLL: 49.978 Hz Update 20 (500msec) Normal Mode Peak Over Scaling Line Filter Time Integ: Reset YOKOGAWA PLL: 49.978 Hz					

IEC 62040-3						
Clause	Requirement + Test			Result - Remark	Verdict	
6.4.2.3	TABLE: - Output – Linear load: Stored energy mode – No load - Harmonic components measurement				P	
Description of test conditions / test construction: 1). With the UPS operating in battery mode of operation at no load, measure the r.m.s. output voltage and its fundamental and harmonic components.						
Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--	
100	3	0.280	0.286	0.290	--	
100	5	0.295	0.304	0.301	--	
100	7	0.199	0.201	0.201	--	
100	9	0.133	0.140	0.138	--	
THD		Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--
see formula to THD below		0.584%	0.590%	0.588%	< 1%	--
$THD = 100 \bullet \sqrt{\left(10^{\frac{3^{\circ}}{20}}\right)^2 + \left(10^{\frac{5^{\circ}}{20}}\right)^2 + \left(10^{\frac{7^{\circ}}{20}}\right)^2 + \left(10^{\frac{9^{\circ}}{20}}\right)^2} =$						

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph: THD u



6.4.2.4	TABLE: - Output – Linear load: Stored energy mode – Full load Harmonic components measurement	P
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Description of test conditions / test construction:
Description of test conditions / test construction:
1) UPS runs in battery mode, applying 100 % reference test load to the UPS output, then measure output voltage and its fundamental and harmonic components.

Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
100	3	0.626	0.639	0.632	--
100	5	0.487	0.483	0.477	--
100	7	0.354	0.352	0.364	--
100	9	0.305	0.305	0.305	--
THD	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--

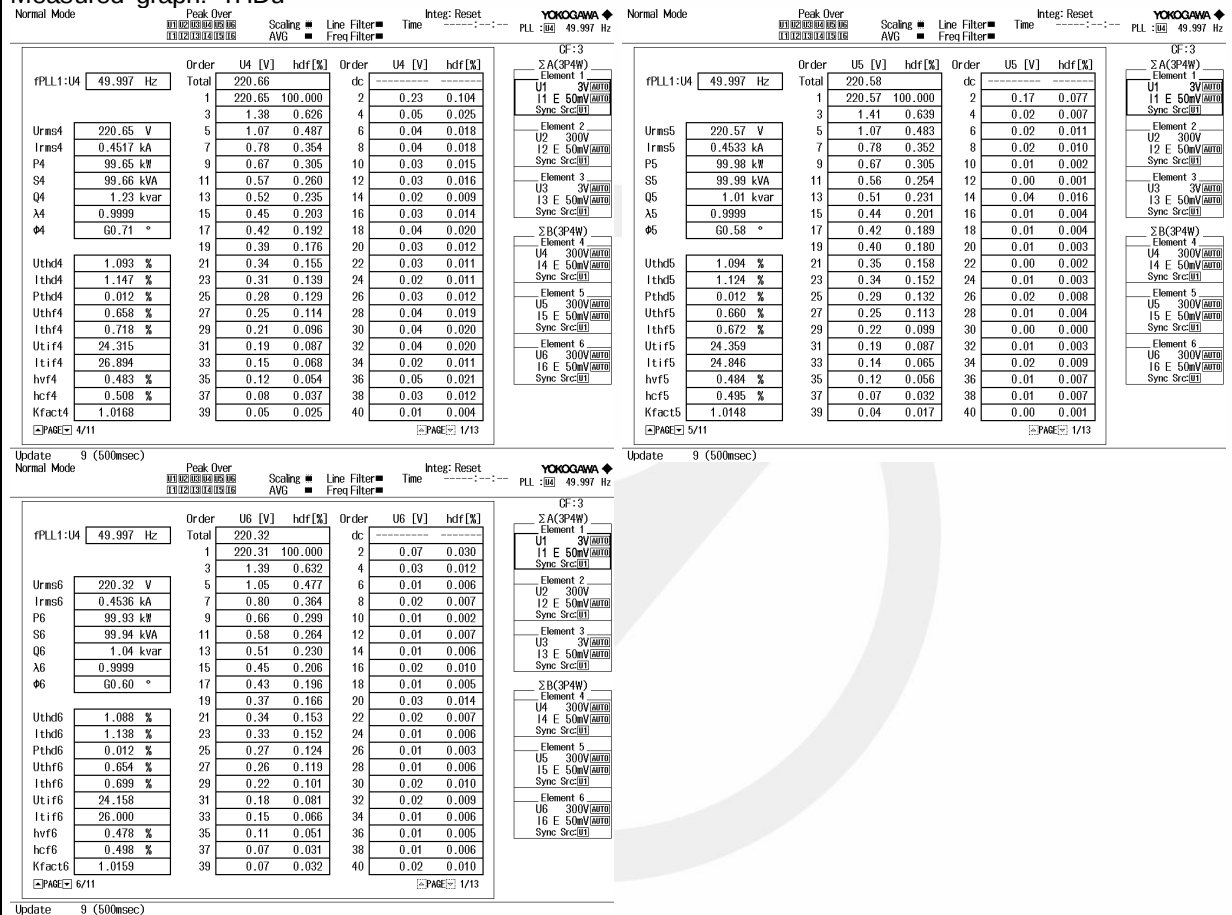
IEC 62040-3

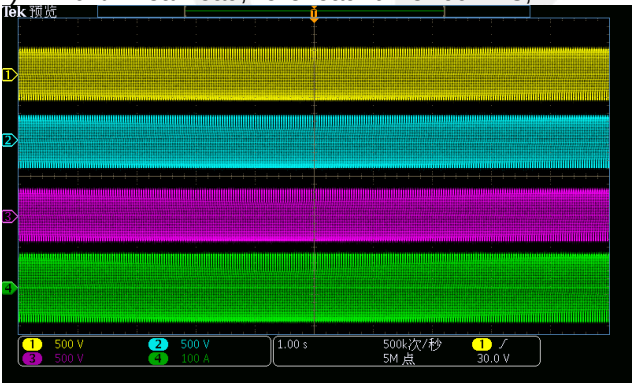
Clause	Requirement + Test	Result - Remark	Verdict
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see formula to THD below	1.093%	1.094%	1.088%	< 2%	--
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$$THD = 100 \cdot \sqrt{\left(10^{\frac{3^\circ}{20}}\right)^2 + \left(10^{\frac{5^\circ}{20}}\right)^2 + \left(10^{\frac{7^\circ}{20}}\right)^2 + \left(10^{\frac{9^\circ}{20}}\right)^2} =$$

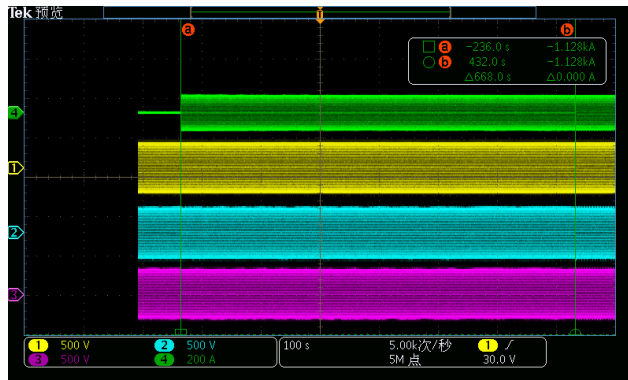
Measured graph: THDu



IEC 62040-3															
Clause	Requirement + Test			Result - Remark		Verdict									
6.4.2.10.1	TABLE: Overload capability test – Normal mode					P									
Description of test conditions / test construction: 1) UPS in normal mode, apply below loads respectively to the output, check UPS performance and alarms. 2) Measure the overload time duration, check UPS transfer to bypass and transfer back to normal mode automatically if removing overload.															
<table><tr><th>Condition</th><th>Specs</th></tr><tr><td rowspan="4">Overload</td><td>30℃ ambient, 1000m, nominal Uin</td></tr><tr><td>105–110% load, 60 minutes</td></tr><tr><td>110–125% load, 10 minutes</td></tr><tr><td>126–150% load, 1 minute</td></tr><tr><td></td><td>>150% load, 200 ms</td></tr></table>							Condition	Specs	Overload	30℃ ambient, 1000m, nominal Uin	105–110% load, 60 minutes	110–125% load, 10 minutes	126–150% load, 1 minute		>150% load, 200 ms
Condition	Specs														
Overload	30℃ ambient, 1000m, nominal Uin														
	105–110% load, 60 minutes														
	110–125% load, 10 minutes														
	126–150% load, 1 minute														
	>150% load, 200 ms														
Load (%)	Input voltage (V)	Input power (kVA) (kW)	Output voltage (V)	Output power (kVA) (kW)	Specified time interval (s)	Verdict									
110	--	--	--	--	60 minutes	P									
125	--	--	--	--	10 minutes	P									
150	--	--	--	--	1 minute	P									
>150	--	--	--	--	200 ms	P									
Measured graph: 1) 110% linear load, overload time>60mins;															
 Channel 1 - Output Voltage_A Channel 2 - Output Voltage_B Channel 3 - Output Voltage_C Channel 4 - Output Current_A															
2) 125% linear load, overload time>10mins;															

IEC 62040-3

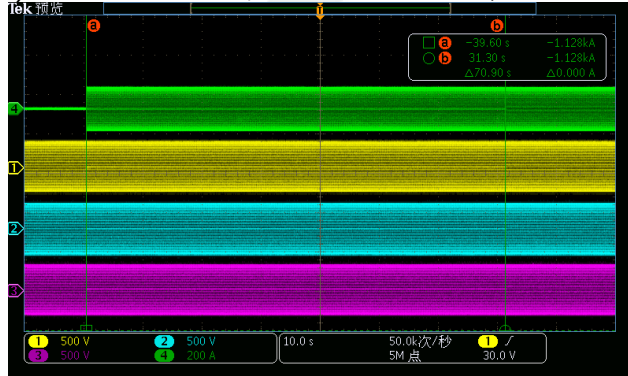
Clause	Requirement + Test	Result - Remark	Verdict
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Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

Channel 3 - Output Voltage_C
Channel 4 - Output Current_A

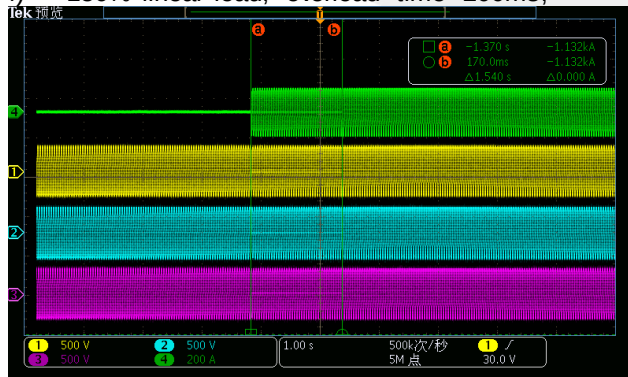
3) 150% linear load, overload time>60s;



Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

Channel 3 - Output Voltage_C
Channel 4 - Output Current_A

4) >150% linear load, overload time>200ms;



Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

Channel 3 - Output Voltage_C
Channel 4 - Output Current_A

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

6.4.2.10.2	TABLE: Overload capability test – Stored energy mode		P
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Description of test conditions / test construction:

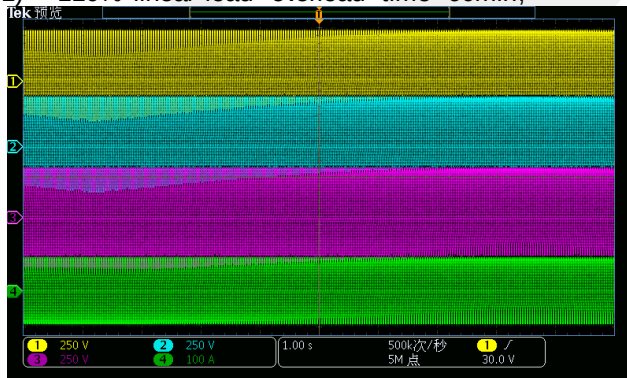
- 1) UPS in battery mode, apply below loads respectively to the output, check UPS performance and alarms.
- 2) Measure the overload time duration, check UPS transfer to bypass and transfer back to battery mode automatically if removing overload.

Condition	Specs
	30°C ambient, 1000m, nominal Uin
	105–110% load, 60 minutes
	110–125% load, 10 minutes
	126–150% load, 1 minute
	>150% load, 200 ms

Load (%)	Input voltage (V)	Input power (kVA) (kW)	Output voltage (V)	Output power (kVA) (kW)	Specified time interval (s)	Verdict
110	--	--	--	--	60 minutes	P
125	--	--	--	--	10 minutes	P
150	--	--	--	--	1 minute	P
>150	--	--	--	--	200 ms	P

Measured graph:

- 1) 110% linear load overload time=60min;



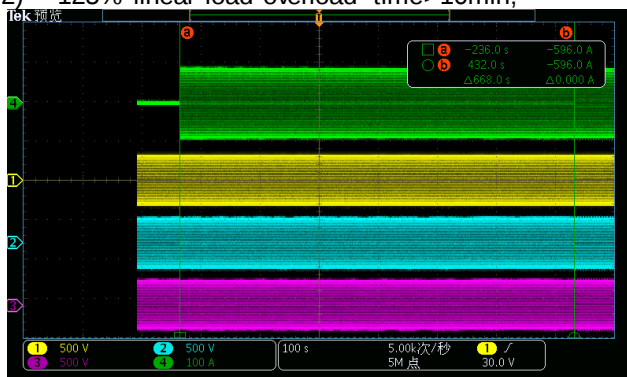
Channel 1 - Output Voltage_A

Channel 3 - Output Voltage_C

Channel 2 - Output Voltage_B

Channel 4 - Output Current_A

- 2) 125% linear load overload time>10min;



IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

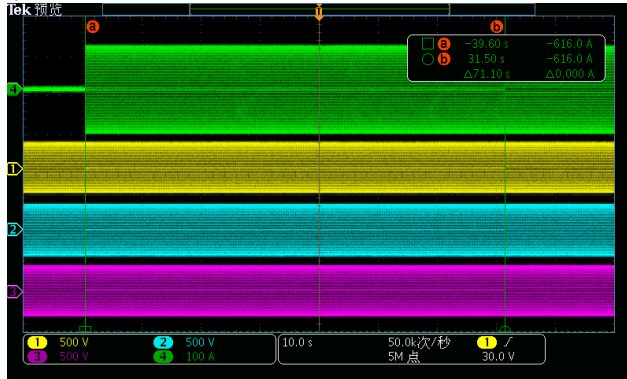
Channel 1 - Output Voltage_A

Channel 3 - Output Voltage_C

Channel 2 - Output Voltage_B

Channel 4 - Output Current_A

3) <150% linear load overload time>60s;



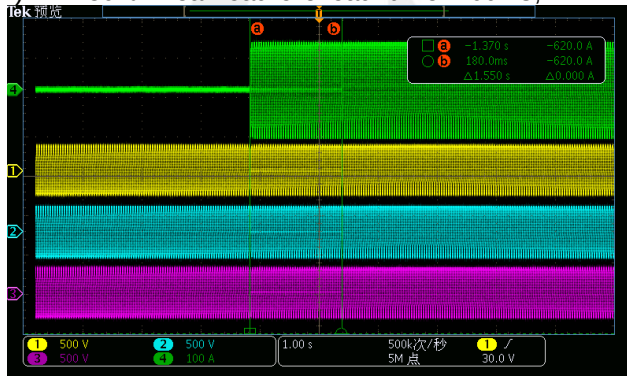
Channel 1 - Output Voltage_A

Channel 3 - Output Voltage_C

Channel 2 - Output Voltage_B

Channel 4 - Output Current_A

4) >150% linear load overload time>200ms;

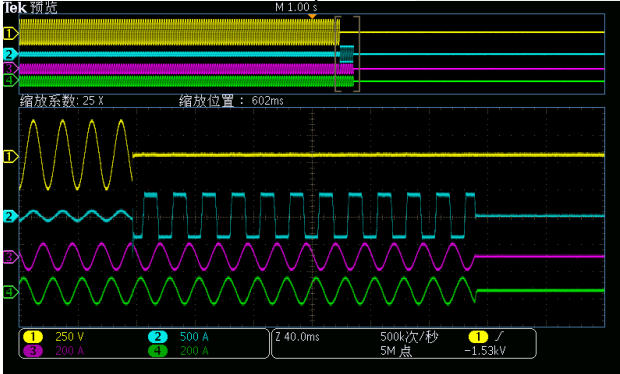
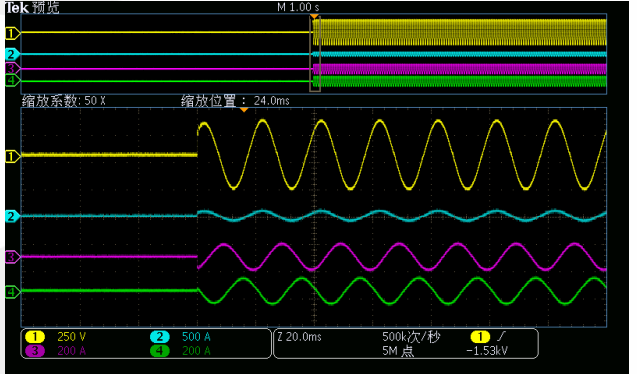


Channel 1 - Output Voltage_A

Channel 3 - Output Voltage_C

Channel 2 - Output Voltage_B

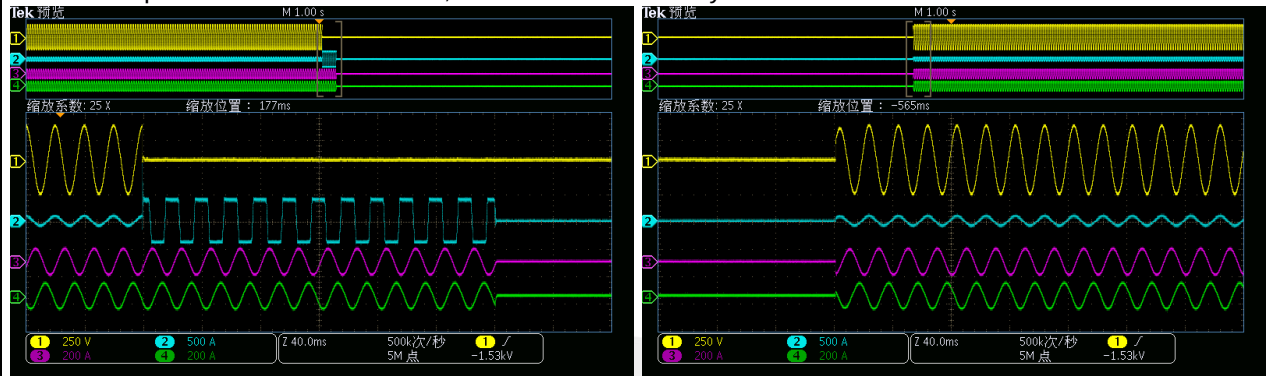
Channel 4 - Output Current_A

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
6.4.2.10.3	TABLE: - Fault clearing capability – Normal mode - Short circuit test		P
Description of test conditions / test construction: 1) UPS operating in normal mode, Without Bypass input, applying 50% linear load. Input and output both are 220V/50Hz. 2) Then make output shorted, check UPS response. UPS should shut down and alarm "Output Short Circuit" 3) Then remove the shorted circuit; Reset alarms, "Output Short Circuit " will be cleared. 4) Turn UPS on, UPS run in normal mode again.			
Measured graph: 1) Output shorted, UPS shut down and alarm " Output Short Circuit ", remove shorted circuit and reset alarm, alarm " Output Short Circuit " cleared, turn on UPS to normal mode   Channel 1 - Output Voltage_A Channel 2 -Output Current_A Channel 3 - Output Current_B Channel 4 -Output Current_C			
6.4.2.10.4	TABLE: - Fault clearing capability – Stored energy mode - Short circuit test		P
Description of test conditions / test construction: 1) UPS operating in battery mode, Without Bypass input, applying 50% linear load. Output is 220V/50Hz. 2) Then make output shorted, check UPS response. UPS should shut down and alarm "Output Short Circuit ". 3) Then remove the shorted circuit; Reset alarms, Output Short Circuit "will be cleared. 4) Turn UPS on, UPS run in battery mode again.			

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

Measured graph:

Output shorted, UPS shut down and alarm " Output Short Circuit ", remove shorted circuit and reset alarm, alarm " Output Short Circuit " cleared, turn on UPS to battery mode.



Channel 1 - Output Voltage_A

Channel 3 - Output Current_B

Channel 2 - Output Current_A

Channel 4 - Output Current_C

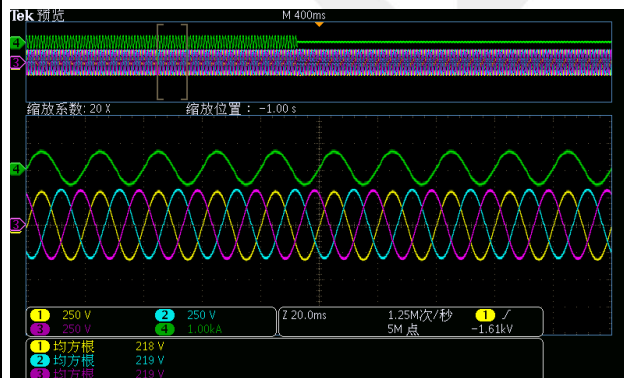
6.4.2.11.1	TABLE: - Change of operating mode – Normal to stored energy mode - AC input failure test		P
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Description of test conditions / test construction:

- 1) UPS initially operating at full linear load in normal mode, the input supply shall be interrupted, then UPS transfers to battery mode.
- 2) Check the system when the utility failure normal operation. Measure the transient output voltage deviation.

Measured graph:

Before waveform



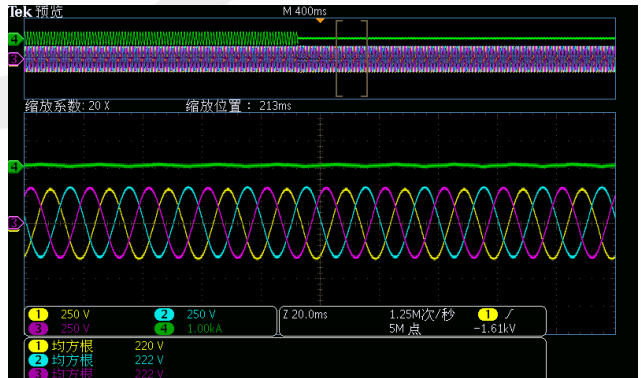
Channel 1 - Output Voltage_A

Channel 3 - Output Voltage_C

Channel 2 - Output Voltage_B

Channel 4 - Input Current_A

After waveform



Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation	Deviation	Deviation

IEC 62040-3										
Clause	Requirement + Test						Result - Remark		Verdict	
								Phase A	Phase B	Phase C
220V/ 50Hz	Normal to Battery	218.0	219.0	219.0	220.0	222.0	222.0	0.92%	1.37%	1.37%



IEC 62040-3										
Clause		Requirement + Test					Result - Remark			Verdict
6.4.2.11.3		TABLE: - Change of operating mode – Normal to bypass mode - Overload test								P
Description of test conditions / test construction: 1) UPS has a bypass mode of operation which is automatic in operation under conditions of output overload. 2) The input and output voltage waveforms shall be observed during transitions normal to bypass mode.										
Measured graph: Before Waveform										
Channel 1 - Output Voltage_A Channel 2 - Output Voltage_B Channel 3 - Output Voltage_C Channel 4 - Input Current_A										
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/ 50Hz	Normal to Battery	215.0	216.0	216.0	215.0	218.0	217.0	0	0.93%	0.46%
6.4.2.11.4		TABLE: - Step load –Normal mode								P
Description of test conditions / test construction: 1) Impact linear load as defined 20 %=> 100 %=> 20% nominal load with 220V/50Hz in normal mode. 2) Check the transient response										

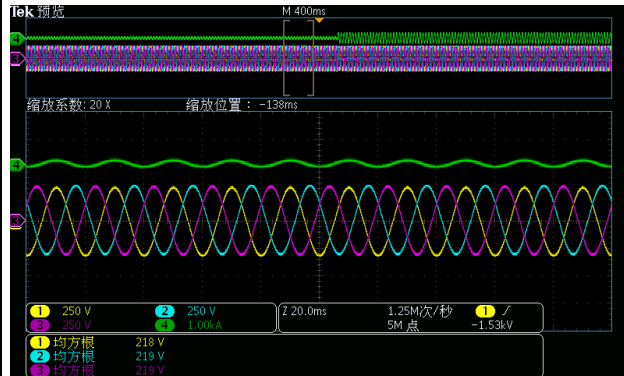
IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph:

1) Step load from 20% unto 100% linear load.

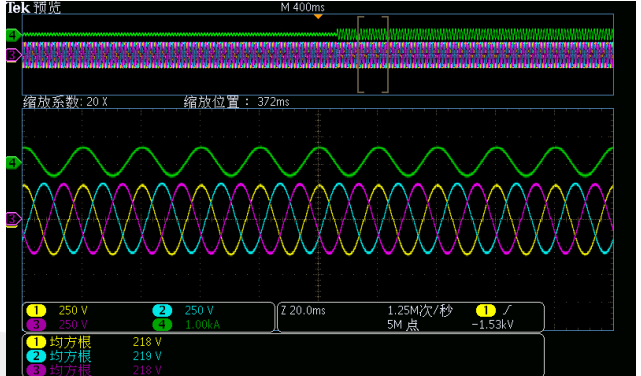
Before Waveform



Channel 1 - Output Voltage_A

Channel 2 - Output Voltage_B

After Waveform



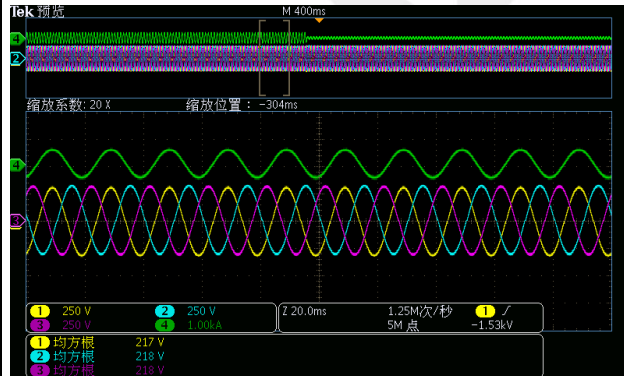
Channel 3 - Output Voltage_C

Channel 4 - Output Current _A

Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	20% to 100% load	218.0	219.0	219.0	218.0	219.0	218.0	0	0	0.46%

2) Step load from 100% down to 20% linear load.

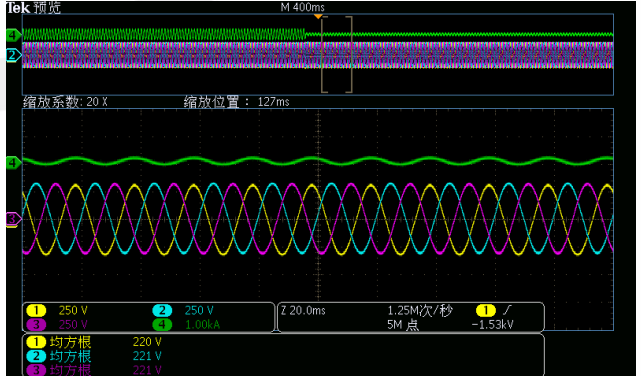
Before Waveform



Channel 1 - Output Voltage_A

Channel 2 - Output Voltage_B

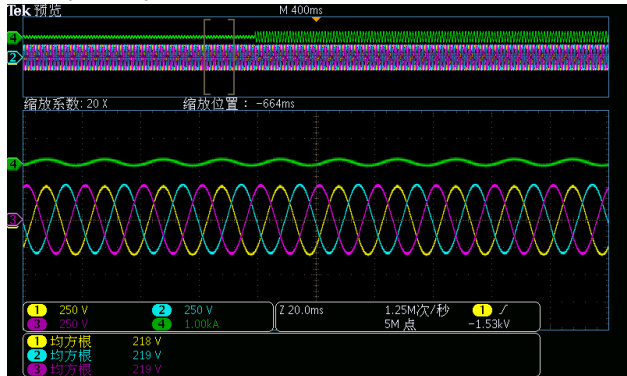
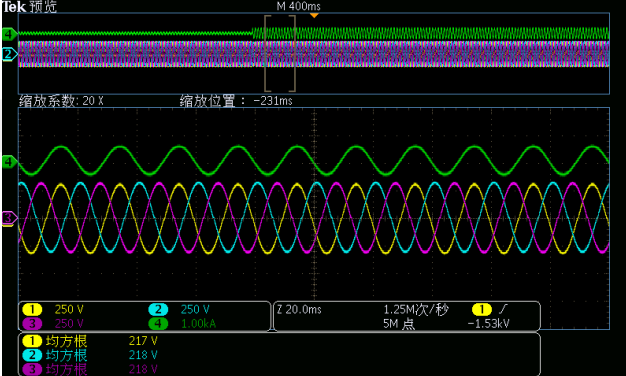
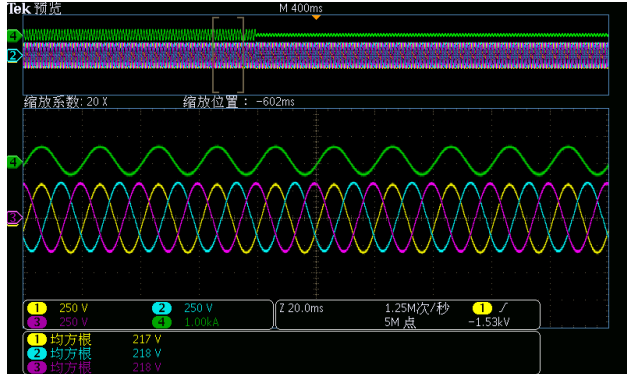
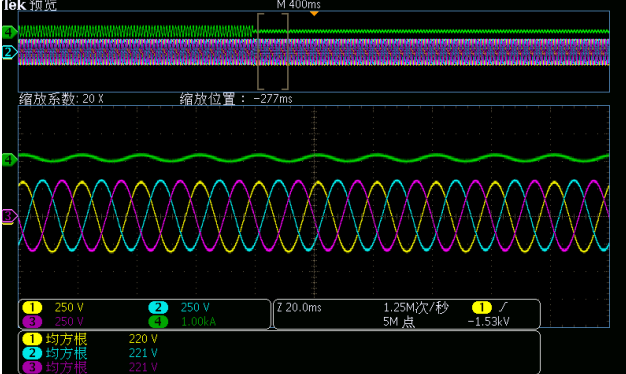
After Waveform



Channel 3 - Output Voltage_C

Channel 4 - Output Current _A

Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	100% to 20%	217.0	218.0	218.0	220.0	221.0	221.0	1.38%	1.38%	1.38%

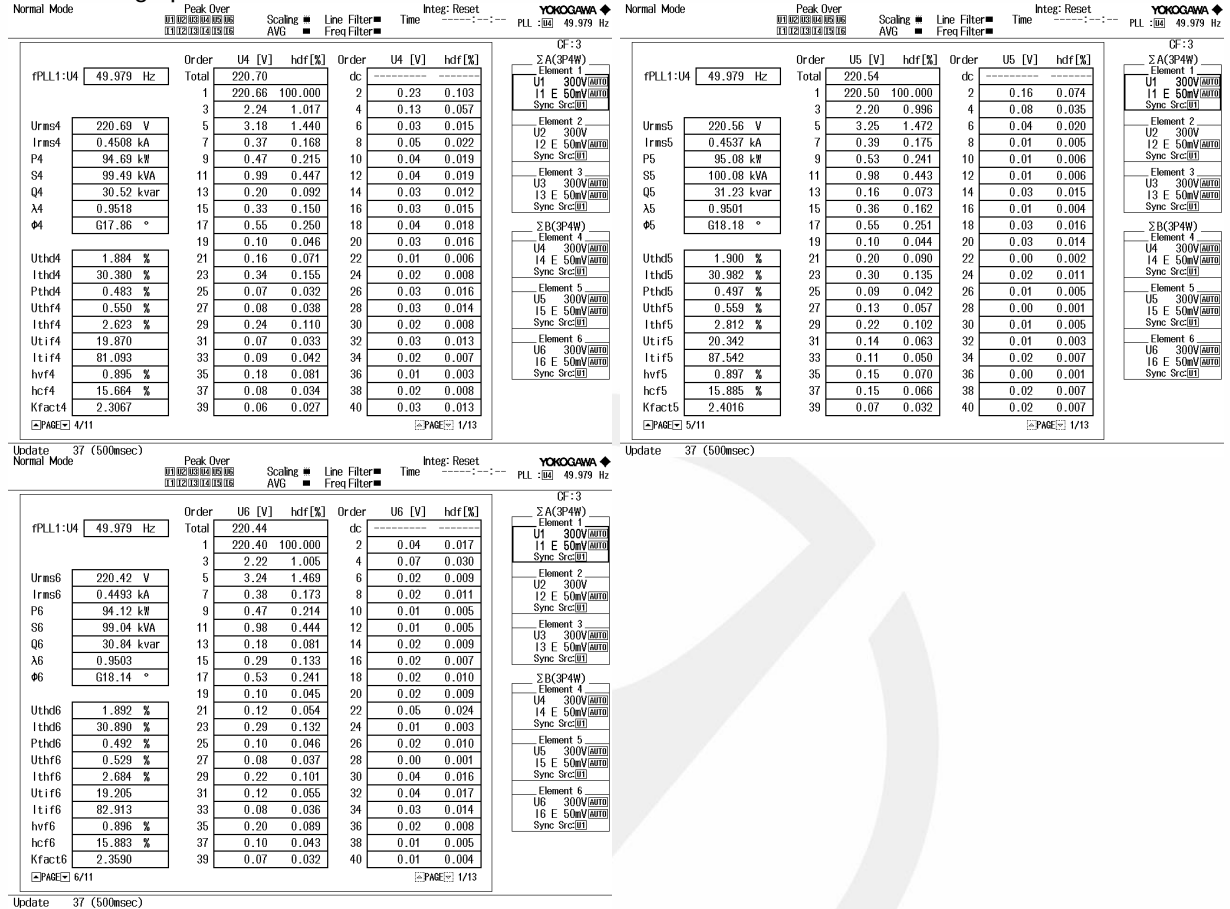
IEC 62040-3										
Clause		Requirement + Test					Result - Remark			Verdict
		load								
6.4.2.11.5		TABLE: - Step load – Stored energy mode								P
Description of test conditions / test construction: 1) Impact linear load as defined 20 %=> 100 %=> 20% nominal load with 220V/50Hz in battery mode. 2) Check the transient response										
Measured graph: 1) Step load from 20% unto 100% linear load.										
 										
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/ 50Hz	20% to 100% load	218.0	219.0	219.0	217.0	218.0	218.0	0.46%	0.46%	0.46%
2) Step load from 100% down to 20% linear load										
Before Waveform  After Waveform 										
Channel 1 - Output Voltage_A Channel 2 - Output Voltage_B					Channel 3 - Output Voltage_C Channel 4 - Output Current_A					

IEC 62040-3										
Clause		Requirement + Test						Result - Remark		Verdict
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	100% to 20% load	217	218	218	220	221	221	1.38%	1.38%	1.38%
6.4.3.1		TABLE: - - Output – Non-linear load: Normal mode – Full load - Harmonic components measurement								P
Description of test conditions / test construction: UPS runs in normal mode, applying 100 % non-linear load to the UPS output, then measure output voltage and its fundamental and harmonic components.										
Load (%)	Harmonic No.	Phase 1 (%)			Phase 2 (%)		Phase 2 (%)	--		
100	3	1.017			0.996		1.005	--		
100	5	1.440			1.472		1.469	--		
100	7	0.168			0.175		0.173	--		
100	9	0.215			0.241		0.214	--		
THD	Distortion at phase 1		Distortion at phase 2		Distortion at phase 3		Expected value due to the specification of the manufacturer		--	
see formula to THD below	1.884%		1.900%		1.892%		< 5.5%		--	
$THD = 100 \bullet \sqrt{\left(10^{\frac{3^{\circ}}{20}}\right)^2 + \left(10^{\frac{5^{\circ}}{20}}\right)^2 + \left(10^{\frac{7^{\circ}}{20}}\right)^2 + \left(10^{\frac{9^{\circ}}{20}}\right)^2} =$										

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Measured graph:



6.4.3.2	TABLE: - - Output – Non-linear load: Stored energy mode – Full load - Harmonic components measurement	P
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Description of test conditions / test construction:

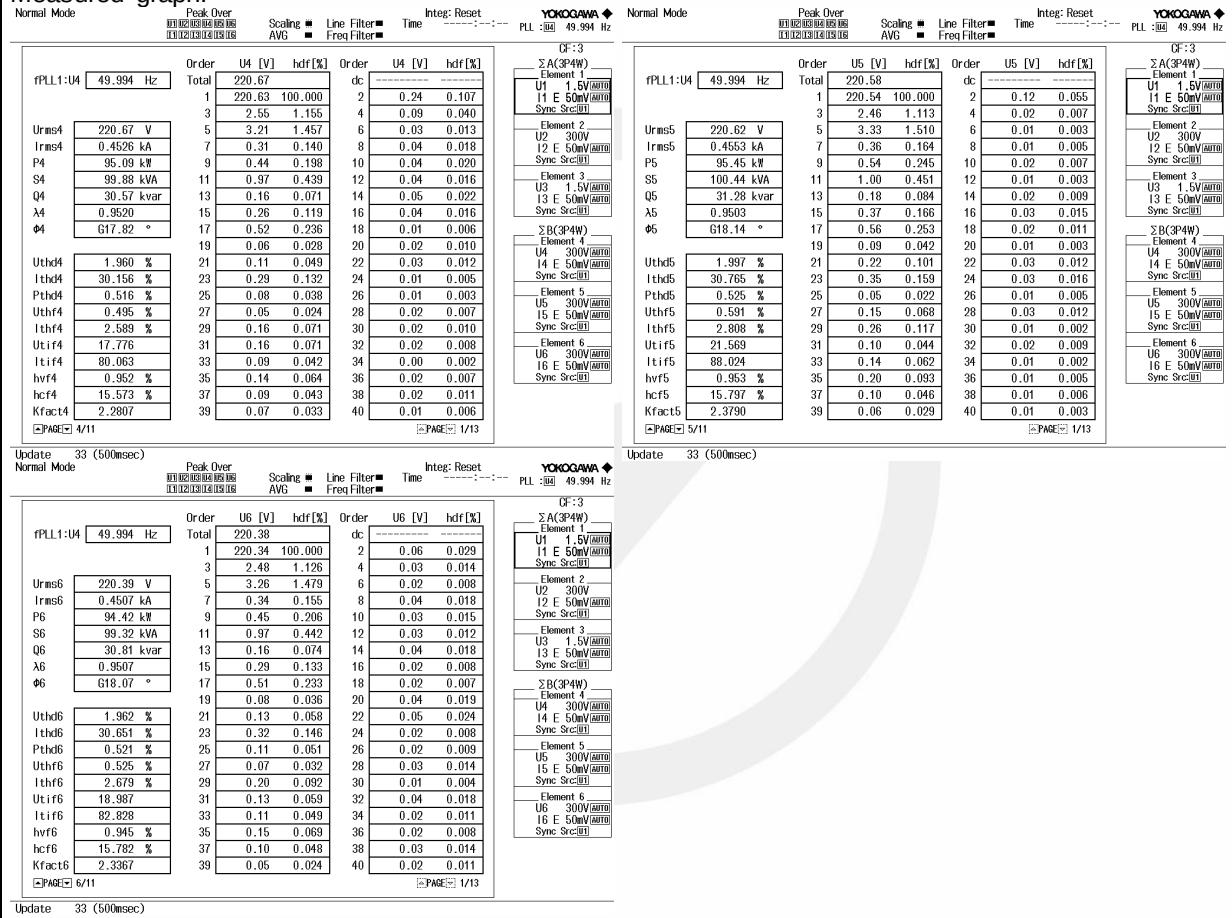
UPS runs in battery mode, applying 100 % non-linear load to the UPS output, then measure output voltage and its fundamental and harmonic components.

Load (%)	Harmonic No.	Phase 1 (%)	Phase 2 (%)	Phase 3 (%)	--
100	3	1.155	1.113	1.126	--
100	5	1.457	1.510	1.479	--
100	7	0.140	0.164	0.155	--
100	9	0.198	0.245	0.206	--
THD	Distortion at phase 1	Distortion at phase 2	Distortion at phase 3	Expected value due to the specification of the manufacturer	--

IEC 62040-3					
Clause	Requirement + Test			Result - Remark	Verdict
see formula to THD below	1.960%	1.997%	1.962%	< 5.5%	--

$$THD = 100 \cdot \sqrt{\left(10^{\frac{3^\circ}{20}}\right)^2 + \left(10^{\frac{5^\circ}{20}}\right)^2 + \left(10^{\frac{7^\circ}{20}}\right)^2 + \left(10^{\frac{9^\circ}{20}}\right)^2} =$$

Measured graph:



IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict

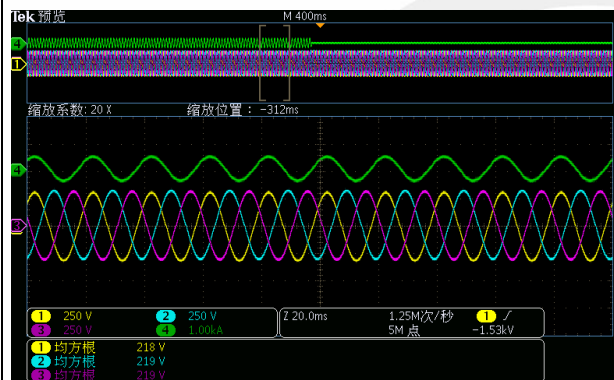
6.4.3.3.1	TABLE: - Reference non-linear load – Normal to stored energy mode - AC input failure test		P
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Description of test conditions / test construction:

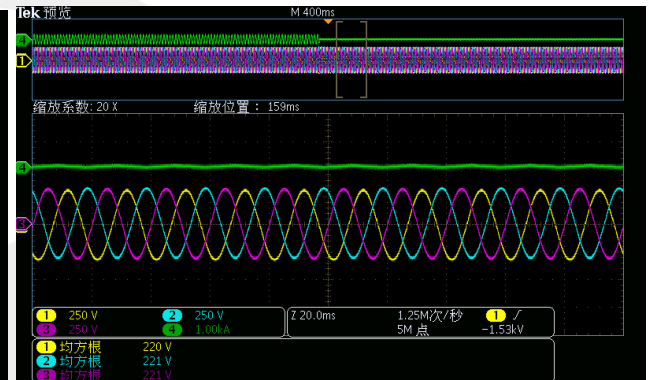
- 1) UPS initially operating at full non-linear load in normal mode, the input supply shall be interrupted, then UPS transfers to battery mode;
- 2) Check the system when the utility failure normal operation. Measure the transient output voltage deviation.

Measured graph:

Before waveform



After waveform



Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

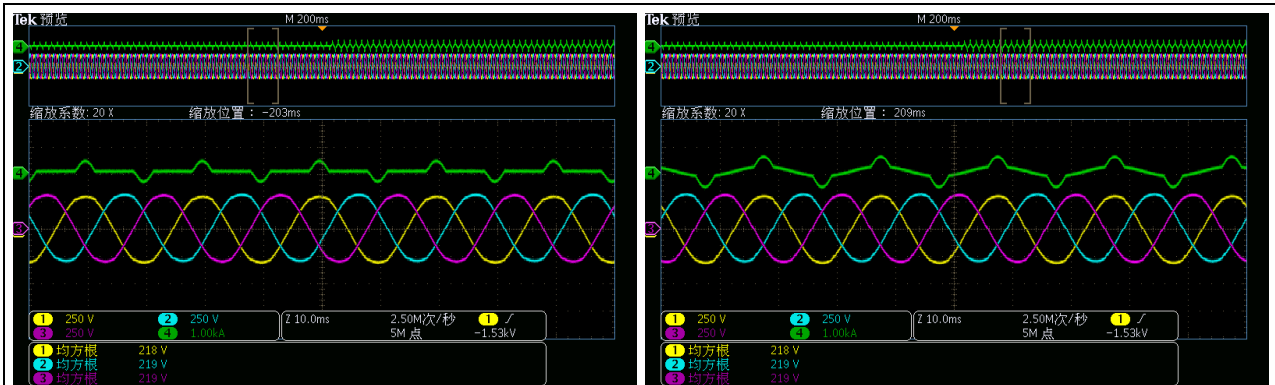
Channel 3 - Output Voltage_C
Channel 4 - Input Current_A

Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50 Hz	Normal to Battery	218.0	219.0	219.0	220.0	221.0	221.0	0.92%	0.91%	0.91%

IEC 62040-3										
Clause		Requirement + Test						Result - Remark		Verdict
6.4.3.3.2		TABLE: - Reference non-linear load – Stored energy to normal mode -								P
Description of test conditions / test construction: 1) UPS initially operating at full non-linear load in battery mode, the input supply shall be recovery, then UPS transfers to normal mode. 2) Check the system when the utility response normal operation. Measure the transient output voltage deviation.										
Measured graph: Before waveform										
Channel 1 - Output Voltage_A Channel 2 - Output Voltage_B Channel 3 - Output Voltage Phase C Channel 4 - Input Current Phase A										
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	deviation Phase A	deviation Phase B	deviation Phase C
220V/50 Hz	Battery to Normal	218.0	219.0	219.0	218.0	219.0	219.0	0	0	0
6.4.3.3.3.a		TABLE: - Reference non-linear load steps – Normal mode ≤ 4.0 kVA rating								N/A
Description of test conditions / test construction:										
Measured graph:										
6.4.3.3.3.b		TABLE: - Reference non-linear load steps – Normal mode > 4.0 kVA rating								P
Description of test conditions / test construction: 1) Impact linear load as defined 33 %=> 66%=100 %=> 66 %=> 33% non-linear load with 220V/50Hz in normal mode. 2) Check the transient response.										
Measured graph: 1) Step load from 33% up to 66% non-linear load										
Before waveform										
After waveform										

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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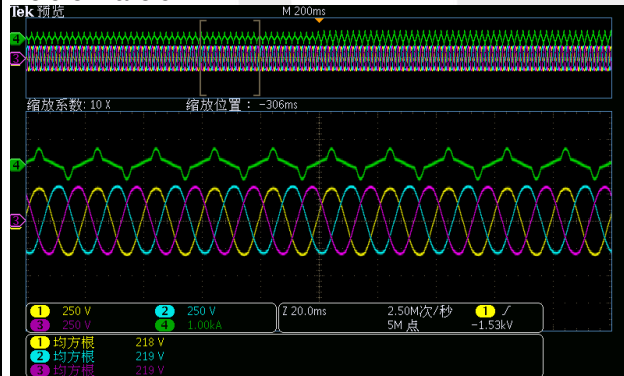
Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

Channel 3 - Output Voltage_C
Channel 4 - Output Current_A

Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	33% to 66% load	218.0	219.0	219.0	218.0	219.0	219.0	0	0	0

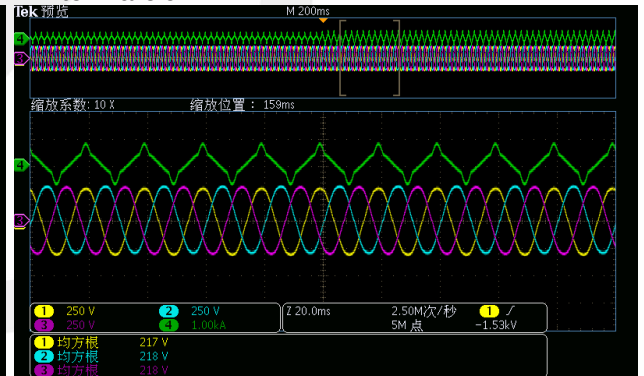
2) Step load from 66% up to 100% non-linear load

Before waveform



Channel 1 - Output Voltage_A
Channel 2 - Output Voltage_B

After waveform



Channel 3 - Output Voltage_C
Channel 4 - Output Current_A

Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	66% to 100% load	218.0	219.0	219.0	217.0	218.0	218.0	0.46%	0.46%	0.46%

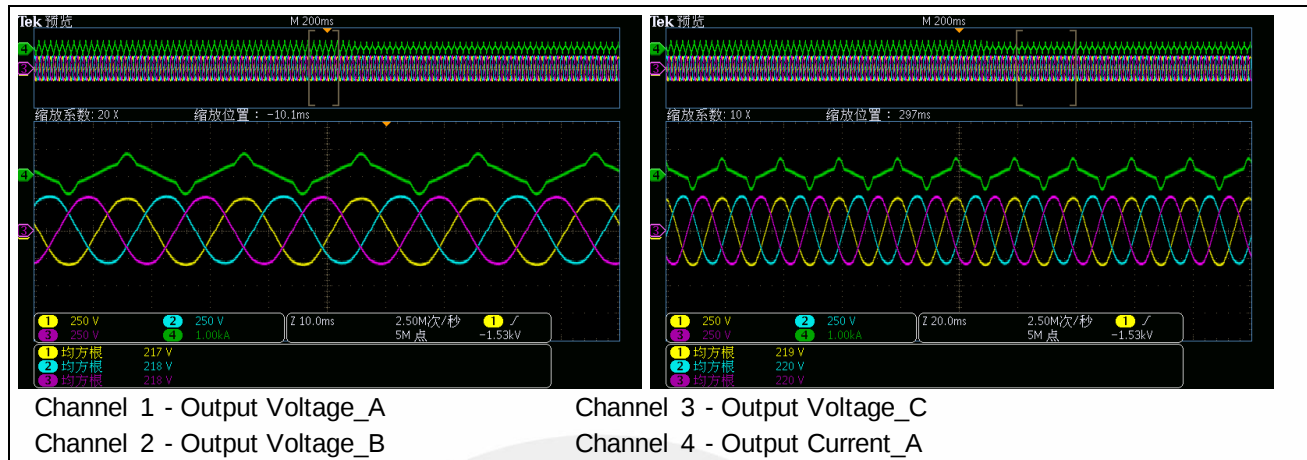
3) Step load from 100% down to 66% non-linear load

Before waveform

After waveform

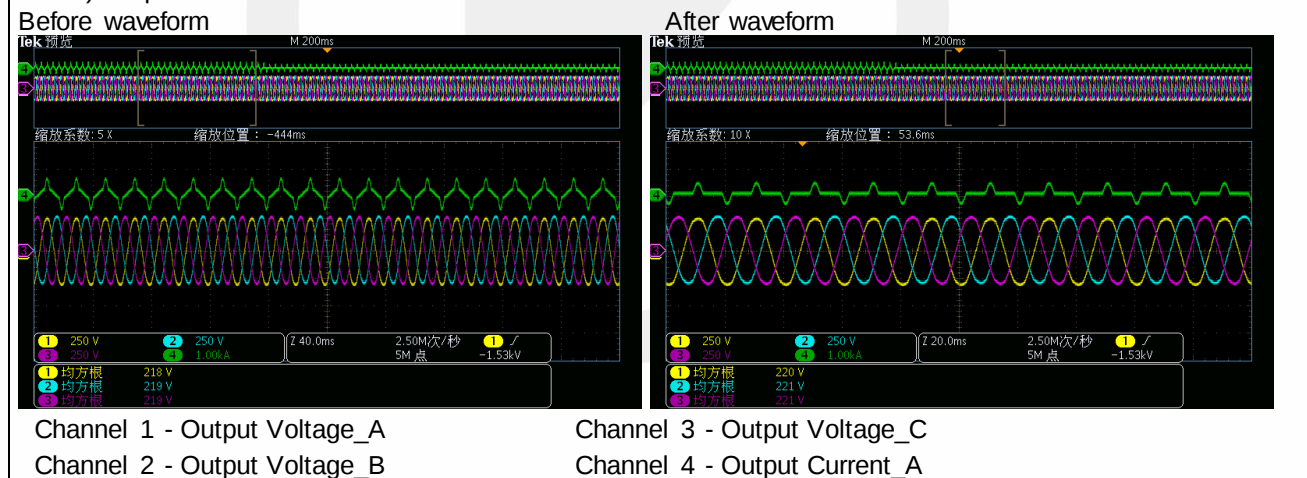
IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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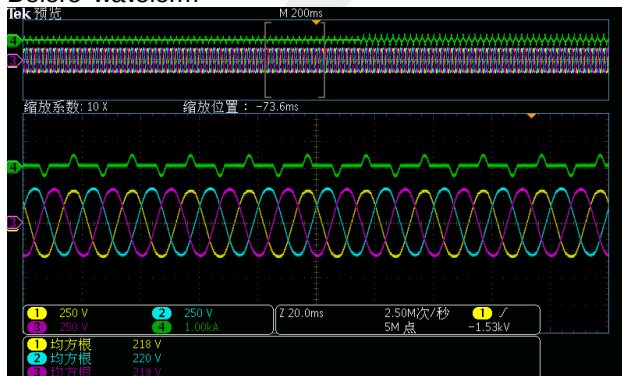
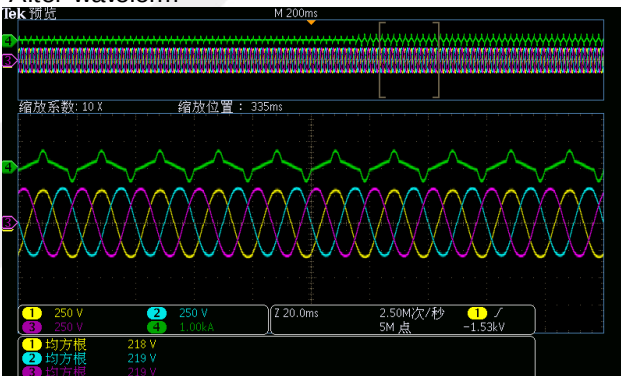
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50Hz	100% to 66% load	217.0	218.0	218.0	219.0	220.0	220.0	0.92%	0.92%	0.92%

4) Step load from 66% down to 33% non-linear load



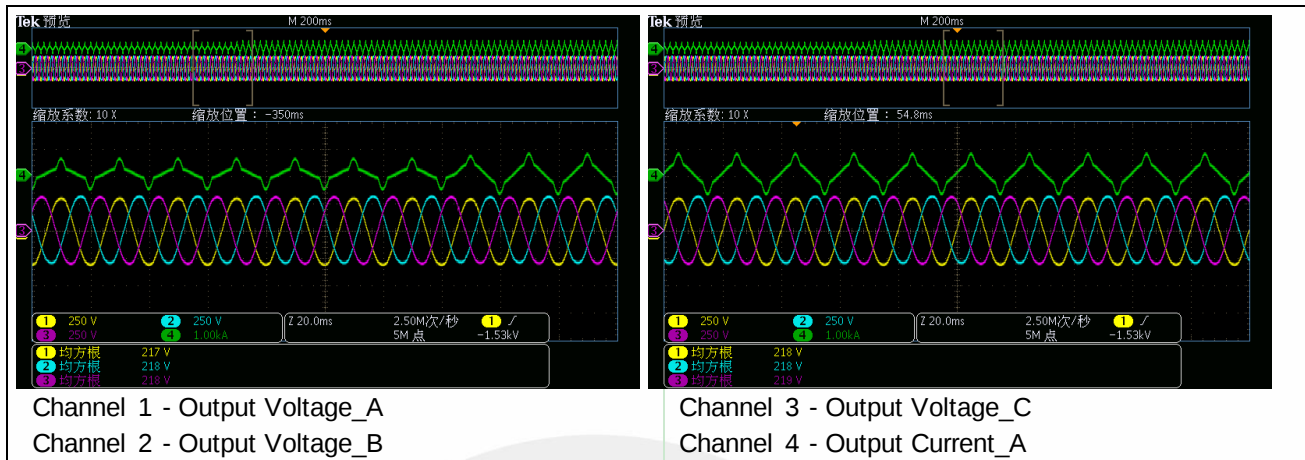
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50 Hz	66% to 33% load	218.0	219.0	219.0	220.0	221.0	221.0	0.92%	0.91%	0.91%

6.4.3.3.4	TABLE: - Reference non-linear load steps – Stored energy mode ≤ 4.0 kVA rating								N/A
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IEC 62040-3										
Clause		Requirement + Test					Result - Remark			Verdict
Description of test conditions / test construction: test repeated according to sub-clause 6.4.3.3.a										
Measured graph:										
6.4.3.3.4		TABLE: - Reference non-linear load steps – Stored energy mode > 4.0 kVA rating							P	
Description of test conditions / test construction: test repeated according to sub-clause 6.4.3.3.b										
1) Impact linear load as defined 33 %=> 66%=100 %=> 66 %=> 33% non-linear load with 220V/50Hz in battery mode.										
2) Check the transient response										
Measured graph:										
1) Step load from 33% up to 66% non-linear load										
Before waveform					After waveform					
										
Channel 1 - Output Voltage_A Channel 2 - Output Voltage_B					Channel 3 - Output Voltage_C Channel 4 - Output Current_A					
Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50 Hz	33% to 66% load	218.0	220.0	219.0	218.0	219.0	219.0	0	0.45%	0
2)Step load from 66% up to 100% non-linear load										
Before waveform					After waveform					

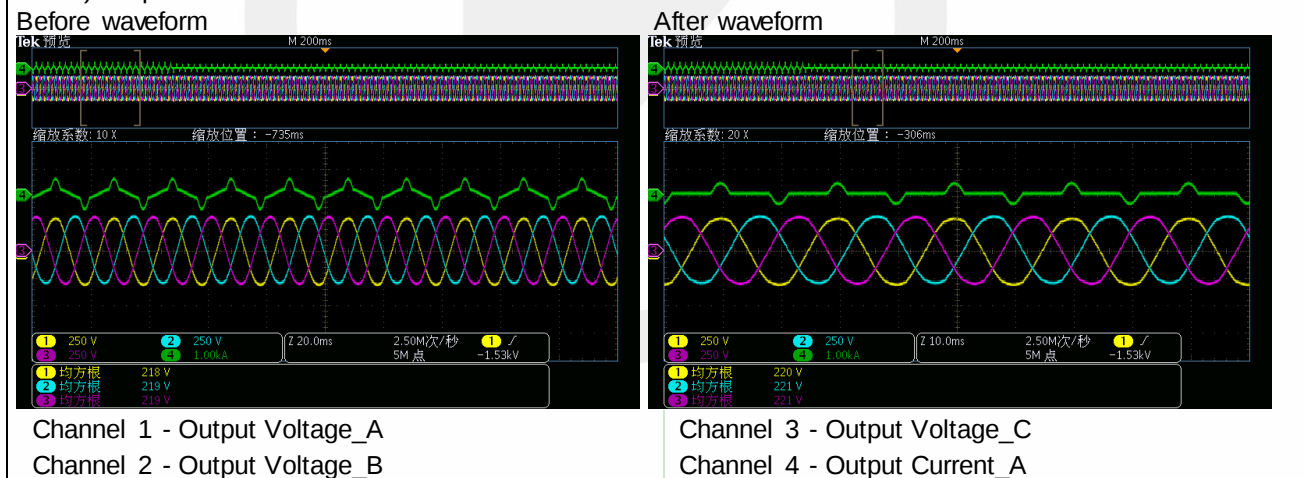
IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
230V/50 Hz	100% to 66% load	217.0	218.0	218.0	219.0	220.0	220.0	0.92%	0.92%	0.92%

4) Step load from 66% down to 33% non-linear load



Power Type	Response procedure	Before (V)			After (V)			Deviation < 5%		
		A	B	C	A	B	C	Deviation Phase A	Deviation Phase B	Deviation Phase C
220V/50 Hz	66% to 33% load	218.0	219.0	219.0	220.0	221.0	221.0	0.92%	0.91%	0.91%

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
6.4.2.12	TABLE: Simulation of parallel redundant UPS fault test		N/A
Description of test conditions / test construction:			
Measured graph:			

6.5.2.2	TABLE: Free fall test	P
Description of test conditions / test construction: test repeated according to sub-clause 6.5.2.2. 1) The method of test shall be as in IEC 60068-2-31. 2) The UPS is non-operational during the test and packed in its normal shipping state for transportation. 3) After the test, perform light load and functional test routine test		
Measured graph:		
Test results:		
Free fall No.	Height of fall (mm)	Observations
1	25	No damage. UPS function is normal.
2	25	No damage. UPS function is normal.

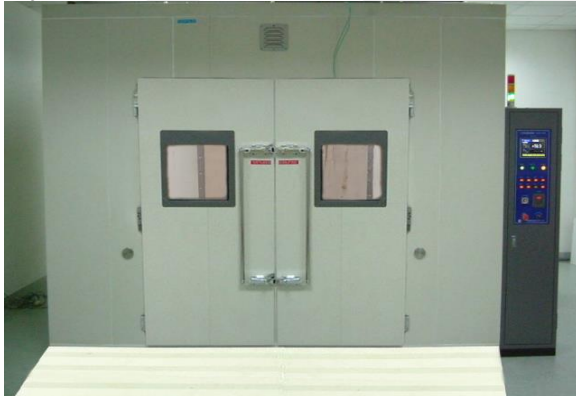
6.5.3	TABLE: Storage	P
Description of test conditions / test construction: test repeated according to sub-clause 6.5.3. 1) The UPS is not operational, but packed in its normal shipping state for transportation and storage with controls set in shipping state. 2) Dry heat as per the normal environmental conditions: +70 °C±2 °C for a duration of 16 h using the test method Bb of IEC 60068-2-2. 3) Damp heat as per the normal environmental conditions: +40 °C±2 °C at a humidity of 90 % to 95 % for a duration of 96 h using IEC 60068-2-78. 4) Cold as per the normal environmental conditions: -40 °C±3 °C for a duration of 16 h where practicable using test method Ab of IEC 60068-2-1. 5) Damp heat repeated. 6) After the test, perform light load and functional test routine test		
Measured graph:		
1) Before Testing		

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict



2) Testing

Dry heat as normal environmental conditions: +70 °C



3) Damp heat as per the normal environmental conditions: +40 °C at a humidity of 95 %

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
			
4)	Cold as per the normal environmental conditions: -40 °C		
5)	Damp heat as per the normal environmental conditions: +40 °C at a humidity of 95 %		
6)	After the test, perform light load and functional test, routine test, all pass.		

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict



6.5.4	TABLE: Operation	P
Description of test conditions / test construction: test repeated according to sub-clause 6.5.4. 1) The UPS works in normal mode of operation at rated input voltage and rated output apparent power. 2) Dry heat as per the normal environmental conditions or as per the manufacturer's state maximum temperature: +40 °C±2 °C for a duration of 16 h using the test method Bb of IEC 60068-2-2. 3) Damp heat as per the normal environmental conditions: +30 °C±2 °C at a humidity of 90 % to 95 % for a duration of 96 h using IEC 60068-2-78. 4) Cold as per the normal environmental conditions or as per the manufacturer's state minimum temperature: 0 °C±3 °C for a duration of 2 h where practicable using test method Ab of IEC 60068-2-1. 5) Damp heat repeated. 6) After the tests, the UPS shall work in accordance with the light load and functional test routine test (see 6.2.2.3) and meet applicable constructional safety requirements.		
Measured graph: 1) Dry heat as normal environmental conditions, temperature: +40 °C		

IEC 62040-3			
Clause	Requirement + Test	Result - Remark	Verdict
			
	2) Damp heat as normal environmental conditions, temperature: +40 °C at a humidity of 95%		
			
3)	Cold as normal environmental conditions, temperature: 0 °C		

IEC 62040-3

Clause	Requirement + Test	Result - Remark	Verdict
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- 4) Damp heat as normal environmental conditions, temperature: +40 °C at a humidity of 95%



Mode	Before testing	After testing
Normal mode	Input voltage: 220.1V Input frequency: 49.98Hz Output power: 300kVA	Input voltage: 220.5V Input frequency: 49.97Hz Output power: 300kVA
Stored energy mode	Output power: 300kVA	Output power: 300kVA
Bypass mode	Input voltage: 220.1V Input frequency: 49.98Hz Output power: 300kVA	Input voltage: 220.3V Input frequency: 49.98Hz Output power: 300kVA

6.5.5	TABLE: Acoustic noise	P
Description of test conditions / test construction: test repeated according to sub-clause 6.5.5.		
1) The acoustic noise level that shall be measured in accordance with the method of measurement specified in ISO 7779 and governed by the normal positioning expected in use.		
2) The UPS works in normal mode of operation at rated input voltage and rated output apparent		

IEC 62040-3					
Clause	Requirement + Test			Result - Remark	Verdict
	power.				
3)	The acoustic noise level shall be referred to the 1 m distance and stated in dBA (dB referenced to acoustic weighing scale A obtained from a sound level meter complying with IEC 61672-1).				
4)	Acoustic noise < 80dB				
Measured graph:					
					
Test point	1	2	3	4	Expected value due to the specification of the manufacturer
Acoustic noise (dB)	69.2	70.1	71.5	69.5	<72 dB

IEC 62040-3					
Clause	Requirement + Test		Result - Remark		Verdict
	TABLE: List of critical components				P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ^{1.}
Whole unit					
Enclosure	Various	Various	Steel/Alumi nium	--	--
AC fan	EBMPAPST	R2E225BD9209	AC230V, 0.6A, 135W	--	CE
Insulation sheet	FORMEX	Formex GK-10	--	--	UL: E256266/E1218 55
SCR	SEMIKRON	SKKT570_16E	570A 1600V	--	--
wire	Various	Various	---	---	UL: E314168
ON ASY01_PS1203_DR6					
X2 capacitor (C29, C30, C31, C32)	Faratronic	C42P2474K9SC0 00	0.47µF,275V AC	--	UL: E186600 VDE: 40000358
Transformer (T1, T2, T3)	SIDNA	UMS33P1T2	Class B	--	Test with appliance
Optocouplers (U2, U3)	NEC	PS2561L-1-V-F3- A-L	--	--	UL:E72422,
Relay (RLY1, RLY2)	SONGCHUAN	894H-2AH1 F-C	12V 12A	--\	UL: E88991 VDE: 40007827
FUSE (F1, F2, F3)	Hollyland	65NM070H	7A/250VAC	--	UL: E156471
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_DR9					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_KY1					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_MN1					
Y2 capacitor (C143)	TDK	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	UL: E37861 VDE: 124321
Transformer (T1)	Boulder	UMX33MN1T1	CLASS B	--	Test with appliance
FUSE (F1)	Hollyland	50CF F630mAH 250V	630mAH 250V	--	UL: E156471

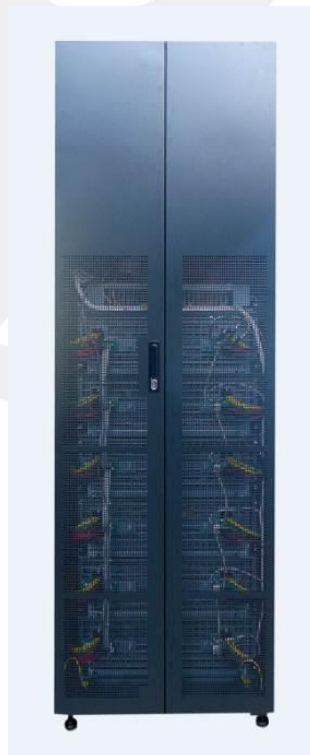
IEC 62040-3					
Clause	Requirement + Test		Result - Remark		Verdict
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_PW3					
DC capacitor (C7,C8)	Jianghai	CD293-220UF	450V, 820uF, 85°C	--	UL
X2 capacitor (C1,C2)	Faratronic	C42P2474K9S C000	0.47μF,275VAC	--	UL:E186600 VDE:40000358
Y2 capacitor (C11,C12,C61)	TDK	CS11-E2GA222MYN S	250VAC/ 2200pF	IEC 60384-14	UL:E37861 VDE:124321
Y1 capacitor (C3,C4,C5,C6, C59,C60)	TDK	CD16-E2GA472MYG S	4.7Nf,400Vac	--	UL:E37861 VDE:124321
Transformer (T1)	SIDNA	UMS33P1T2	Class B	--	Test with appliance
Transformer (T3)	Boulder	UMXPS3T1	CLASS B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_TF2					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_TF3					
Optocouplers (U6,U7,U8,U9, U10,U11,U12, U13,U19)	NEC	PS2561L-1-V-F3-A-L	--	--	UL: E72422,
Optocouplers (U20)	AVAGO	HCNR201	--	--	UL: E55361
Relay (RLY1,RLY2,RLY3,RLY4)	SONGCHUAN	892-1CC-C-24VDC	24V 3A	--\	UL: E88991 VDE: 40006318
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_TF4					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_TF6					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1503_TF1					
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1503_TF2					

IEC 62040-3					
Clause	Requirement + Test			Result - Remark	Verdict
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1507_EM2					
Y2 capacitor (C8,C9,C10)	TDK	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	UL: E37861 VDE: 124321
X2 capacitor (C11,C12,C13, C14,C15,C16)	Faratronic	C42P2565- BSC000	250VAC/ 5.6μF	--	UL:E186600 VDE: 40000358
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1507_EM3					
FUSE (F1,F2,F3)	BUSSMANN	BK-GBH- V030A6FR	30A/500VAC	--	UL: E56412
PCB	Various	Various	V-0, 130°C	--	UL
ON SNT_DL_3320_FR_01					
X2 capacitor (C1,C2,C3,C4)	Faratronic	C43Q1224MB 0C450	250VAC/ 0.22μF	--	UL:E186600 VDE: 40000358
Y2 capacitor (C5,C6,C7,C8, C9,C10,C11,C 12,C13,C14)	TDK	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	UL:E37861 VDE: 124321
PCB	Various	Various	V-0, 130°C	--	UL
1) an asterisk indicates a mark which assures the agreed level of surveillance.					

Attachment: Photos



External view



External view

Attachment: Photos



External view

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- 2 . This report shall not be copied partly without authorization.
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- 4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
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