Product Service

TEST REPORT

Standard VDE-AR-N 4105:2018

TUV SUD Test Report for Technical requirements for the connection of generator to and parallel operation with low-voltage distribution networks

Report No.:	50.409.22.0078.02-00
Date of issue:	2023-03-02
Project handler:	Xin Xu, Jianyong Li
Test laboratory:	TÜV SÜD New Energy Vehicle Testing (Jiangsu) Co., Ltd.
Address:	Building A, No.15 Factory, Jintong International Industrial Park, No.8 Xihu Road, Wujin National Hi-tech Industrial Development Zone, Changzhou City, Jiangsu Province, P.R. China
Testing Location	Same as above
Client:	Suzhou Stealth Energy Technology Co., Ltd.
Client number:	111812
Address:	8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.
Contact person:	Mr. Jiaxian Ge
Standard:	This TUV SUD test report form is based on the following requirements: VDE-AR-N 4105:2018, and DIN VDE V 0124-100 (VDE V 0124-100):2020
TRF number and revision*:*	TRF VDE-AR-N 4105:2018 rev.0/2018-11
TRF originated by:	TUV SUD Product Service, Mr. Billy Qiu
Copyright blank test report:	This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TUV SUD Product Service. TUV SUD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.
General disclaimer:	This test report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.
Scheme:	☐ TUV Mark ☐ NRTL Mark ☐ EU-Directive ☐ GS Mark ☒ ESY Certificate
Non-standard test method:	☒ No ☐ Yes, see details under Summary of testing
National deviations:	N/A
Number of pages *(Report)*:	282
Number of pages *(Attachments)*:	See page 4
Compiled by:	*Xin Xu, Jianyong Li* *(Printed Name and Signature)*
Approved by:	*Kai Zhao* *(Printed Name and Signature)*

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Test sample:	Engineering prototype
Type of test object:	Grid-Connected Hybrid Inverter
Trademark:	STEALTH ENERGY
Model and/or type reference:	ST-INV-T5.0, ST-INV-T6.0, ST-INV-T8.0, ST-INV-T10.0
Rating(s):	See rating lables
Manufacturer:	Suzhou Stealth Energy Technology Co., Ltd.
Manufacturer number:	111812
Address:	8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA
Sub-contractors/ tests (clause):	N/A
Name:	N/A
Order description:	☒ Complete test according to TRF
	☐ Partial test according to manufacturer's specifications
	☐ Preliminary test
	☐ Spot check
	☐ Others:
Date of order:	2022-10-12
Date of receipt of test item:	2022-10-12
Date(s) of performance of test:	2022-10-12 to 2023-03-02

Test item particulars:

See section “Characteristic data”

Purpose of the product (Description of intended use):

These devices are transformer-less grid-connected Hybird Inverter which convert direct current optimized by DC conditioner to alternating current, and they are intended to be connected in parallel with the LV distribution grid directly to supply common load.

They are intended for professional incorporation into PV array and battery system and they are assessed on a component test basis.

The installation of the unit shall comply with local code and regulation.

Model differences:

Basic model: ST-INV-T10.0

Other models:

Same family design products, same control electronics and same construction as basic model, except for the power electronics, filters and transducers sized on different voltage and/or current rating, output current and power controlled by software are different from basic model.

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Characteristic data *(Extracted from the marking plate)*:

Model	ST-INV-T5.0	ST-INV-T6.0	ST-INV-T8.0	ST-INV-T10.0
PV input				
Max. input power	7500 W	9500 W	12000 W	15000 W
Absolute max. voltage	1000 Vd.c.			
MPPT voltage range	200-850 Vd.c			
Nominal operating voltage	620 Vd.c			
Max. input current	16/16 Ad.c.			
Max. short circuit current	21.2/21.2 Ad.c.			
AC output				
Rated voltage	3/N/PE~ 400/230 V			
Nominal frequency	50 Hz			
Max. continuous current	8.5 Aa.c.	10.5 Aa.c.	13.5 Aa.c.	15.9 Aa.c.
Max. continuous apparent power	5000 VA	6000 VA	8000 VA	10000 VA
Power factor	0.8leading...0.8lagging			

Attachments:

Item	Description	Certificate No	Issue by	Mondel	Pages
1	CE-LVD certificate	N8A 111812 0016 Rev.00	TÜV SÜD	ST-INV-T5.0, ST-INV-T6.0, ST-INV-T8.0, ST-INV-T10.0	3
2	CE-EMC certificate	E8A 111812 0014 Rev.00	TÜV SÜD	ST-INV-T5.0, ST-INV-T6.0, ST-INV-T8.0, ST-INV-T10.0	1

General remarks:

"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
*Throughout this report **a point** is used as the decimal separator.*
The test results presented in this report relate only to the object tested.

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Summary of testing:

The product was tested on:
Firmware /software version: V1.1
Full tests were conducted on ST-INV-T10.0 against VDE-AR-N 4105:2018, and test method is based on standard DIN VDE V 0124-100 (VDE V 0124-100):2020 as a reference, test voltage is on nominal voltage 3/N/PE~ 230/400Va.c, and nominal frequency 50Hz.
Certified on representative model ST-INV-T10.0 of family design products, results of the measurement of ST-INV-T10.0 can be transferred to other models based on transferability rule of measurements in standard DIN VDE V 0124-100 (VDE V 0124-100):2020.

Test items below according to standard DIN VDE V 0124-100 (VDE V 0124-100):2020 in details:
See Appendix Tables of this test report

Clause	Test items	Samples for testing in details
5.2.3	Flicker	ST-INV-T10.0
5.2.4	Harmonics and inter-harmonics	ST-INV-T10.0
5.2.6	Direct currents feed-in	ST-INV-T10.0
5.3.2	Calculation of the asymmetry of three-phase inverters	ST-INV-T10.0
5.4.2	Measurement of the active and reactive power range	ST-INV-T10.0
5.4.3	Active power reduction by setpoint specification	ST-INV-T10.0
5.4.4	Active power feed of PGU at overfrequency	ST-INV-T10.0
5.4.6	Active power supply for PGU at underfrequency	ST-INV-T10.0
5.4.8.2	Tests of Reactive power / displacement factor adjustment accuracy	ST-INV-T10.0
5.4.8.3	Test the displacement factor / active power characteristic curve cos $\varphi(P)$	ST-INV-T10.0
5.4.8.4	Testing the reactive power-voltage characteristic curve Q(U)	ST-INV-T10.0
5.5.4	Integrated NS-Protection	ST-INV-T10.0
5.5.6.3	Integrated interface switch	ST-INV-T10.0
5.5.7.2	Adjustment of the setting values	ST-INV-T10.0
5.5.7.4	Voltage monitoring und frequency monitoring NS protection	ST-INV-T10.0
5.5.7.5	Reading the fault messages	ST-INV-T10.0
5.5.9	Structural features of NS-Protection	ST-INV-T10.0
5.5.10	Islanding detection	ST-INV-T10.0
5.6	Connection conditions and synchronisation	ST-INV-T10.0
5.8	Test of dynamic network support	ST-INV-T10.0

☐ deviation(s) found

☒ no deviations found

Copy of marking plate:

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STEALTH ENERGY

Grid-Connected Hybrid Inverter

Model: ST-INV-T5.0

PV Input	Max. input power	7500 W
	Absolute max. voltage	1000 Vd.c.
	MPPT voltage range	200-850 Vd.c.
	Nominal operating voltage	620 Vd.c.
	Max. input current	16/16 Ad.c.
	Max. short circuit current	21.2/21.2 Ad.c.
Battery	Battery type	Lithium
	Battery voltage range	180-600 Vd.c.
	Max. charge/discharge current	25 Ad.c.
AC Input	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. input current	15.2 Aa.c.
	Max. input power	10000 VA
AC Output	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	8.5 Aa.c.
	Max. continuous apparent power	5000 VA
EPS	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	7.2 Aa.c.
	Max. continuous apparent power	5000 VA
Others	Ingress protection	IP65
	Operation temperature range	-25...60 ℃
	Overvoltage category	DC II AC III
	Protective class	I
	Inverter topology	Non-isolated
	Power factor	0.8leading...0.8lagging
Safety EMC Grid Regulation	IEC 62109-1/-2 EN 61000-6-1/EN 61000-6-2/EN 61000-6-3 VDE-AR-N 4105 /AS4777/EN 50549-1/CEI 0-21	

DRM0	DRM1	DRM2	DRM3	DRM4	DRM5	DRM6	DRM7	DRM8
☒	☐	☐	☐	☐	☐	☐	☐	☐

S/N

Suzhou Stealth Energy Technology Co., Ltd. Made in China

STEALTH ENERGY

Grid-Connected Hybrid Inverter

Model: ST-INV-T6.0

PV Input	Max. input power	9500 W
	Absolute max. voltage	1000 Vd.c.
	MPPT voltage range	200-850 Vd.c.
	Nominal operating voltage	620 Vd.c.
	Max. input current	16/16 Ad.c.
	Max. short circuit current	21.2/21.2 Ad.c.
Battery	Battery type	Lithium
	Battery voltage range	180-600 Vd.c.
	Max. charge/discharge current	25 Ad.c.
AC Input	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. input current	19.7 Aa.c.
	Max. input power	13000 VA
AC Output	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	10.5 Aa.c.
	Max. continuous apparent power	6000 VA
EPS	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	8.7 Aa.c.
	Max. continuous apparent power	6000 VA
Others	Ingress protection	IP65
	Operation temperature range	-25...60 ℃
	Overvoltage category	DC II AC III
	Protective class	I
	Inverter topology	Non-isolated
	Power factor	0.8leading...0.8lagging
Safety EMC Grid Regulation	IEC 62109-1/-2 EN 61000-6-1/EN 61000-6-2/EN 61000-6-3 VDE-AR-N 4105 /AS4777/EN 50549-1/CEI 0-21	

DRM0	DRM1	DRM2	DRM3	DRM4	DRM5	DRM6	DRM7	DRM8
☒	☐	☐	☐	☐	☐	☐	☐	☐

S/N

Suzhou Stealth Energy Technology Co., Ltd. Made in China

STEALTH ENERGY

Grid-Connected Hybrid Inverter

Model: ST-INV-T8.0

PV Input	Max. input power	12000 W
	Absolute max. voltage	1000 Vd.c.
	MPPT voltage range	200-850 Vd.c.
	Nominal operating voltage	620 Vd.c.
	Max. input current	16/16 Ad.c.
	Max. short circuit current	21.2/21.2 Ad.c.
Battery	Battery type	Lithium
	Battery voltage range	180-600 Vd.c.
	Max. charge/discharge current	25 Ad.c.
AC Input	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. input current	22.7 Aa.c.
	Max. input power	15000 VA
AC Output	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	13.5 Aa.c.
	Max. continuous apparent power	8000 VA
EPS	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	116 Aa.c.
	Max. continuous apparent power	8000 VA
Others	Ingress protection	IP65
	Operation temperature range	-25...60 ℃
	Overvoltage category	DC II AC III
	Protective class	I
	Inverter topology	Non-isolated
	Power factor	0.8leading...0.8lagging
Safety EMC Grid Regulation	IEC 62109-1/-2 EN 61000-6-1/EN 61000-6-2/EN 61000-6-3 VDE-AR-N 4105 /AS4777/EN 50549-1/CEI 0-21	

DRM0	DRM1	DRM2	DRM3	DRM4	DRM5	DRM6	DRM7	DRM8
☒	☐	☐	☐	☐	☐	☐	☐	☐

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Suzhou Stealth Energy Technology Co., Ltd. Made in China

STEALTH ENERGY

Grid-Connected Hybrid Inverter

Model: ST-INV-T10.0

PV Input	Max. input power	15000 W
	Absolute max. voltage	1000 Vd.c.
	MPPT voltage range	200-850 Vd.c.
	Nominal operating voltage	620 Vd.c.
	Max. input current	16/16 Ad.c.
	Max. short circuit current	21.2/21.2 Ad.c.
Battery	Battery type	Lithium
	Battery voltage range	180-600 Vd.c.
	Max. charge/discharge current	25 Ad.c.
AC Input	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. input current	22.7 Aa.c.
	Max. input power	15000 VA
AC Output	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	15.9 Aa.c.
	Max. continuous apparent power	10000 VA
EPS	Rated voltage	3/N/PE 400/380 Va.c.
	Nominal frequency	50/60 Hz
	Max. continuous current	14.5 Aa.c.
	Max. continuous apparent power	10000 VA
Others	Ingress protection	IP65
	Operation temperature range	-25...60 ℃
	Overvoltage category	DC II AC III
	Protective class	I
	Inverter topology	Non-isolated
	Power factor	0.8leading...0.8lagging
Safety EMC Grid Regulation	IEC 62109-1/-2 EN 61000-6-1/EN 61000-6-2/EN 61000-6-3 VDE-AR-N 4105 /AS4777/EN 50549-1/CEI 0-21	

DRM0	DRM1	DRM2	DRM3	DRM4	DRM5	DRM6	DRM7	DRM8
☒	☐	☐	☐	☐	☐	☐	☐	☐

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An additional PET film provided to cover label.

Interface protection has been tested and evaluated on basis of rated grid voltage 3/N/PE~, 400 V, 50Hz according to the grid code on page 1;
Interface protection settings is limited to authorized installer, password and seal provided to protect these from unpermitted interference.
Inverters with multi-voltage and/or frequency ratings are available in difference versions based on output voltages and frequencies, the ratings on which the testing has been based was identified on paper tag and control panel.

Picture of the product:

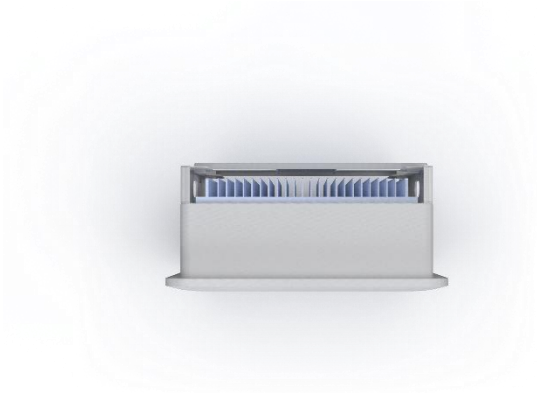
Representative model: ST-INV-T10.0

Front veiw

Rear veiw

Bottom veiw

Top veiw



Name and address of factory (ies) *(only if certification is provided)*:

Suzhou Stealth Energy Technology Co., Ltd
8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.

Note: Type verification of conformity, no FI required.

Possible test case verdicts:

test case does not apply to the test object: N/A (not applicable / not included in the order)

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test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)

Possible suffixes to the verdicts:

suffix for detailed information for the client:	C (Comment)
suffix for important information for factory inspection:	M (Manufacturing)

Abbreviations used in the report:

Active power (P),
Reactive power (Q),
Apparent power (S),
Maximum apparent power of a power generation system (SAmax),
Maximum apparent power of a power generation unit (S_{EmaX}),
Maximum active power of a power generation system (P_{AmaX}),
Maximum active power of a power generation unit (P_{EMaX}),
Network short-circuit power (S_{kV}),
Point of common coupling (PCC),
Displacement factor (cos φ),
Power factor (λ),
Network impedance angle (ψ_k),
Short-term flicker strength (P_{st}),
Long-term flicker strength (P_{lt}),
Automatic reclosing (AR; geman: Automatische Widereinschaltung, AWE),
Power generation system (PGS; german: Erzeugungsanlage, EZA),
Power generation unit (PGU; german: Erzeugungseinheit, EZE),
Network and system protection (NS protection; german Netz- und Anlagenshutz, NA-Shutz),
Maximum switching current factor (K_{imax}).

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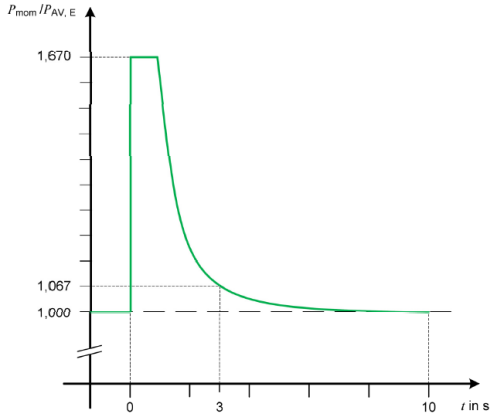
Clause	Requirement + Test	result – Remark	Verdict
5	Grid connection		P
5.1	Principles for determining the grid connection point	Determined in final installation	N/A
5.2	Rating of network equipment	See ratings of PGU	P
5.3	Permissible voltage change	See appendix table for PGU test	P
	For the undisturbed operation of the network, the level of slow voltage change caused by all power generation systems and storage units with a network connection point in a low-voltage network shall at none of the PCCs in this network exceed a value of 3 % as compared with the voltage without power generation systems and storage units:	Should be verified on system level with grid impedence	N/A
5.4	Network interactions	See appendix table for PGU test	P
	For power generation systems and storage units, the permissible limits for network interactions are also described in VDE-AR-N 4100, 5.4. For the connection evaluation of power generation systems and storage units, the connection owner provides the completed forms E.2 to E.5 to the network operator.		P
5.5	Connection criteria		P
5.5.1	General		P
5.5.2	$P_{AV,E}$ monitoring (feed-in limitation)		N/A
	The measurement of the feed-in limit described in this subsection must be carried out at the central meter panel according to VDE-AR-N 4100, 7.2		N/A
	If exceeding the $P_{AV,E}$, the power of generation system and/or energy storage must be reduced within blue curve with specified time response according to Fig-1.  Figure 1 – Active power limit curve for power generation systems		N/A

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<table>
<tr><th>Clause</th><th>Requirement + Test</th><th>result – Remark</th><th>Verdict</th></tr>
<tr><td>5.5.3</td><td>Power generation system ready for connection</td><td></td><td>P</td></tr>
<tr><td>5.6</td><td>Three-phase inverter system</td><td></td><td>P</td></tr>
<tr><td></td><td>For three-phase power generation systems feeding into the network via inverters, the power feed-in into the three line conductors shall be three-phase balanced. The inverter circuit shall preferably be set up as a three phase current unit. The positive sequence system of the terminal voltages, even if they are unbalanced, is to be used as the reference quantity for the currents.</td><td></td><td>P</td></tr>
<tr><td>5.7</td><td>Behaviour of the power generation system at the network</td><td></td><td>P</td></tr>
<tr><td>5.7.1</td><td>General</td><td></td><td>P</td></tr>
<tr><td></td><td>For frequencies between 47.5 Hz and 51.5 Hz, automatic disconnection from the network due to a frequency deviation is not permitted. The actual operating principle and the associated exceptions are detailed in 5.7.4.3. Frequency-dependent active power control is implemented in the open-loop control of the power generation units.</td><td></td><td>P</td></tr>
<tr><td></td><td>In the frequency range of 47.5 Hz to 51.5 Hz, power generation systems shall be capable of network parallel operation in compliance with the time-related minimum requirements given in Table 1.
Table 1 – Frequency/time ranges for the proper operation of power generation systems
<table>
<tr><th>Frequency range</th><th>Operating period</th></tr>
<tr><td>47,5 Hz to 49,0 Hz</td><td>≥ 30 min</td></tr>
<tr><td>49,0 Hz to 51,0 Hz</td><td>unlimited</td></tr>
<tr><td>51,0 Hz to 51,5 Hz</td><td>≥ 30 min</td></tr>
</table></td><td></td><td>P</td></tr>
<tr><td></td><td>Power generation units shall be able to ride through rapid frequency changes without disconnection from the network. This requirement applies provided the following averaged rates of change of frequency (RoCoF) are not exceeded:
+/- 2.0Hz/s for moving time solt of 0.5s;
+/- 1.5Hz/s for moving time solt of 1s or
+/-1.25Hz/s for moving time solt of 2s</td><td></td><td>P</td></tr>
<tr><td>5.7.2</td><td>Steady-state voltage stability/reactive power supply</td><td></td><td>P</td></tr>
<tr><td>5.7.2.1</td><td>General boundary conditions</td><td></td><td>P</td></tr>
<tr><td></td><td>Steady-state voltage stability means the reactive power supply provided by a power generation system and/or a storage unit when energy is supplied for the purpose of</td><td></td><td>P</td></tr>
</table>

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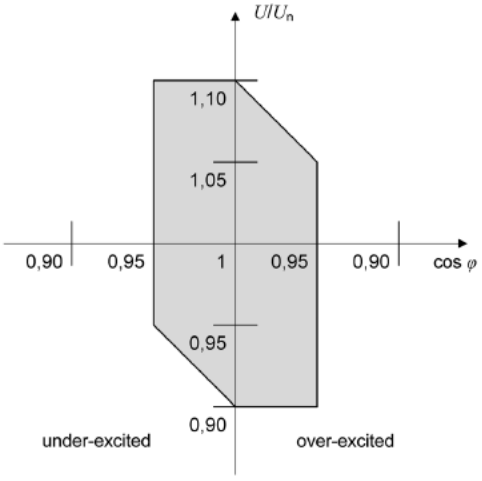
Clause	Requirement + Test	result – Remark	Verdict
	voltage stability in the distribution network. The steady-state voltage stability is intended to keep slow (steady-state) voltage changes in the distribution network within acceptable limits.		
	In case of three-phase feed-in, the reactive power supply associated with all three methods described in 5.7.2.4 a) to c) refers to the positive sequence system components of the current and voltage fundamental component. In a passive sign convention system (see A.8), this means the operation of the power generation system in Quadrant II (under-excited) or Quadrant III (over-excited).		P
	If a storage unit consumes energy from the network, the reactive power exchange at the network connection point shall comply with the contractual agreements regarding the network connection for customer installations for consumption (see VDE-AR-N 4100).	DC coupled inverter considered as type 2 generation unit and doesn't consume energy from the network by design.	N/A
5.7.2.2	Reactive power supply at S_{Emax}	See appendix table for PGU test	P
	For type 2 system with only converter, the output displacement factor should cover the area described in Fig-2 or Fig-3  **Figure 2 – Requirements for power generation units regarding the reactive power supply at the generator terminals ($\sum S_{Emax} \leq 4{,}6$ kVA)**	Cos φ setpoint range: 0.8 lagging … 0.8 leading	P

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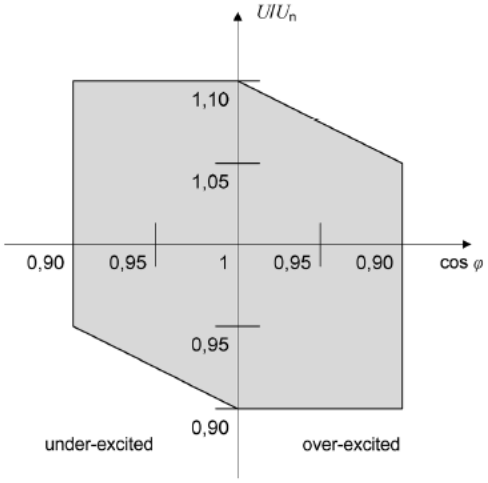
Clause	Requirement + Test	result – Remark	Verdict
	 **Figure 3 – Requirements for power generation units regarding the reactive power supply at the generator terminals** ($\sum S_{Emax} > 4,6$ kVA)		
5.7.2.3	Reactive power supply smaller than P_{Emax}		P
	In addition to the requirements for reactive power supply at the operating point P_{Emax} of the power generation unit ($P_{mom} = P_{Emax}$), requirements also apply to operation with an instantaneous active power P_{mom} smaller than P_{Emax}.		P
	The minimum reactive power control area shoul cover the red triangle P/Q diagram in Fig-5 or Fig-6. In the free operation area, a reduction of active power to facilitate reactive power is permitted.	See appendix table for PGU test	P

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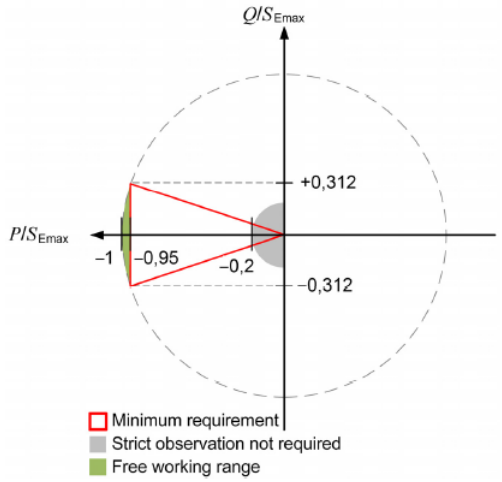
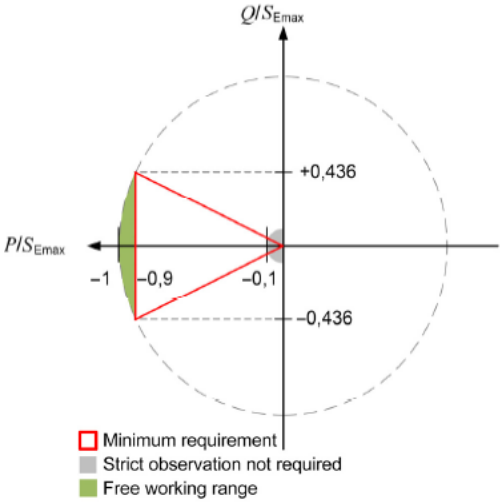
Clause	Requirement + Test	result – Remark	Verdict
	 **Figure 5 – *P*/*Q* diagram for type 2 $\sum S_{Emax} \leq 4{,}6$ kVA and type 1, stirling generator, fuel cell $\sum S_{Emax} > 4{,}6$ kVA at the generator terminals in the passive sign convention system**  **Figure 6 – *P*/*Q* diagram for type 2 (inverters only) $\sum S_{Emax} > 4{,}6$ kVA at the generator terminals in the passive sign convention system**		
	The maximal deviation between setting value and actual value of the controlled reactive power should be 4.0% of S_{Emax}. In range of $0<P_{mom}/S_{Emax}<0.2$(or 0.1), the reactive power should be less than 10% of S_{Emax}.		P
5.7.2.4	Method for reactive power supply		P
	The static voltage supporting with reactive power control should not imfluence dynamic grid supporting. The generation system should control the reactive power within		P

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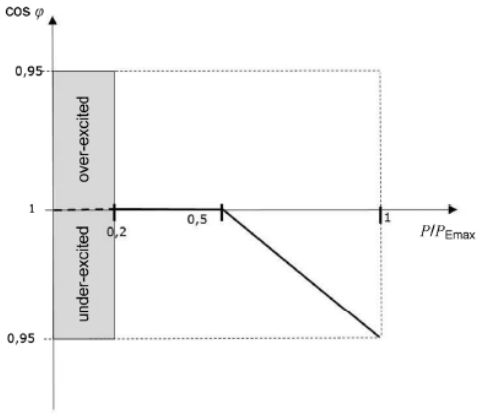
Clause	Requirement + Test	result – Remark	Verdict
	range described in Fig-5 or Fig-6 using one of below process of controlling reactive power. The selection of process is informed during plan of grid connection		
	a) reactive power voltage characteristic curve *Q*(*U*);	See appendix table for PGU test	P
	The reference voltage U_{Q0} is 400V/1,732. The arithmetic mean of the r.m.s. values (optionally of the positive sequence system) of the three measured line-to-neutral voltages at the generator terminals of the power generation unit is the target value for the reactive power to be fed in on all line conductors. Voltage measurement shall not exceed a maximum measurement error of 1 % in relation to the nominal value.		P
	The Q(U) control is only applicable to 3 phase generation unit and the requirement is performed on generation unit terminals		P
	b) displacement factor/active power characteristic curve cos φ (*P*);	See appendix table for PGU test	P
	The displacement power factor is dependent on the actual active power output according to Fig-8 and Fig-9  **Figure 8 – Characteristic curve for type 2 $\sum S_{Emax} \leq 4{,}6$ kVA and type 1, stirling generator, fuel cell $\sum S_{Emax} > 4{,}6$ kVA**		P

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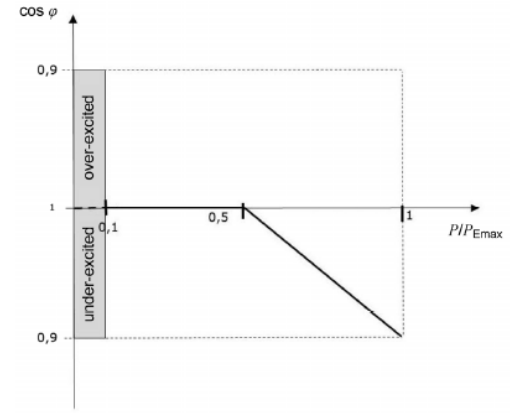
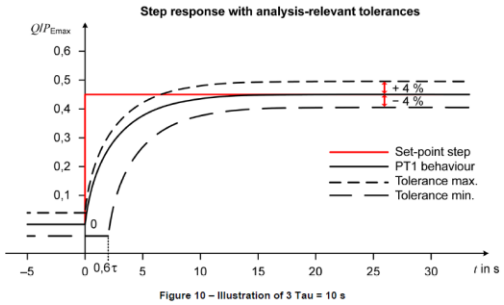
Clause	Requirement + Test	result – Remark	Verdict
	 **Figure 9 – Standard characteristic curve for type 2 (inverters only)** $\sum S_{Emax} > 4{,}6$ kVA		
	c) fixed displacement factor cos φ.	See appendix table for PGU test	P
	For this purpose, the target value is defined with a minimum increment of Δ cos φ = 0,01. The maximum permissible error tolerance of the reactive power feed-in is calculated using the error tolerance given in 5.7.2.3 of ± 4 % in relation to P_{Emax}.		P
5.7.2.5	Requirements for reactive power methods of type 2 systems (inverters only) and type 1 systems		P
	The control process of reactive power (process a, b and c) during setting value adjustment should follow PT-1 process of Fig-10. The PT-1 proecess 3 Tau should be settable between 6s and 60s for Type 2 system with default setting as 10s.  Figure 10 – Illustration of 3 Tau = 10 s		P
5.7.2.6	Special aspects regarding the extension of power generation systems	Determined in final installation	N/A
5.7.3	Dynamic network stability	See appendix table for PGU test	P
5.7.3.1	General		P
	A grid fault start if the voltage at generation unit terminals is under 0.85 Un or over 1.15Un.		P

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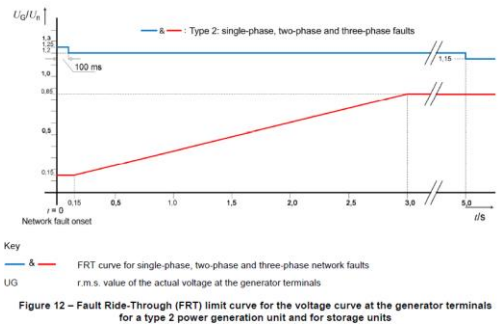
Clause	Requirement + Test	result – Remark	Verdict
	The grid fault ends when one of below two things happen in earlier: The voltage of generation unit recover to range -15% Un to +10% Un or 5s after the start of the fault		P
	Power generation units in the “energy supply” mode and storage units in the “energy consumption and supply” modes shall contribute to the dynamic network stability.		P
	During grid fault, the generation unit and energy storage should fulfil below requirements in both balanced and unbalanced grid fault:		P
	- No disconnection from the grid		P
	- Overvoltage up to 1.2Un for period of 5s		P
	- Type 2 unit and energy storage should not feed-in active or reactive current into grid during fault.		P
	- Generation unit and energy storage should endure multiple grid faults followed		P
	The FRT-Limit-Curve according to Fig-12 is applicable to 1-, 2- and 3-phases fault  Figure 12 – Fault Ride-Through (FRT) limit curve for the voltage curve at the generator terminals for a type 2 power generation unit and for storage units		P
5.7.3.2	Dynamic grid supporting for Type 1 unit		N/A
5.7.3.3	Dynamic grid supporting for Type 2 unit and energy storage	See appendix table for PGU test	P
	The output current at all terminals should be limited less than 20% of rated current in 60ms and 10% of rated current in 100ms		P
	Behavior after end of fault: Active current should recover back to normal value before fault within 1s after end of fault		P
5.7.4	Active power output	See appendix table for PGU test	P

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Clause	Requirement + Test	result – Remark	Verdict
5.7.4.1	During active power remote control required by grid security management, the change should fulfil power gradient requirement. The adjustment of power gradient direct on generation unit or energy storage is sufficient to fulfil the requirement: Not faster than 0.66% P_{Amax}/s; Not slower than 0.33% P_{Amax}/s. For genertation system not slower than 4% P_{Amax}/minute		P
	The generation system and energy storage shoul have a logic interface to receive active power order within 5s after sending by grid operator.		P
5.7.4.2	Network security management		P
5.7.4.2.1	Generation system and energy storage		P
	For PV system less than 30kWp, the certified technical control limited to 70% of installed module power of grid connection point or PV system is equiped with remote active power control for limitation	PGU can meet this application	P
	For PV system large than 30kWp and less than 100kWp, it should be equipped with remote active power control for limitation	PGU can meet this application	P
	For PV system large than 100kWp, it should be equipped with remote active power control for limitation and report feed-in power in real time.	PGU can meet this application	P
	For Energy storage used in EEG or KWK-G system, if the PAmax>100kW, it should be equipped with remote active power control for limitation and report feed-in power in real time.	not this type	N/A
5.7.4.2.2	Implementation of network security management	System solution	N/A
	The generation system and energy storage should control its active power without grid disconnection to 100%/60%/30%/0% of P_{Amax}.		N/A
5.7.4.3	Active power adjustment during over and under frequency	See appendix table for PGU test	P
	If the network frequency falls out of tolerance band of +/-200mHz from rated frequency of 50.0Hz, all generation unit and energy storage connected to the grid shall support grid stability by frequency regulation.		P

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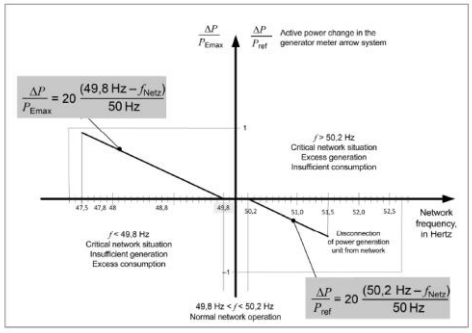
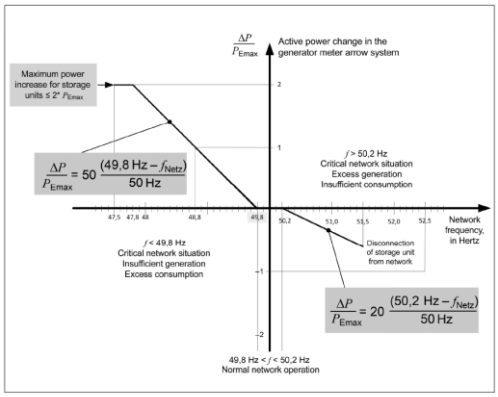
Clause	Requirement + Test	result – Remark	Verdict
	The accuracy of frequency measurement must be <10mHz.		P
	For DC-coupled energy storage unit, type-2 unit is regarded.		P
	During frequency change, the active power output should fulfil Fig-14 and/or Fig-15  Key P_{Emax} highest active power of a power generation unit (10 min mean value) P_{ref} equals P_{Emax} for type 1 power generation units or P_{mom} for type 2 power generation units at the moment when 50,2 Hz is exceeded. ΔP power change f network frequency **Figure 14 – Active power adjustment for type 1 and type 2 power generation units at over-frequency and under-frequency with a static value of 5 % and frequency limit values of 49,8 Hz and 50,2 Hz for starting the adjustment**  Key P_{Emax} highest active power of a power generation unit (10 min mean value) ΔP power change f network frequency **Figure 15 – Active power adjustment for storage units at an over-frequency with a static value of 5 % and an under-frequency with a static value of 2 % and frequency limit values of 49,8 Hz and 50,2 Hz for starting the adjustment**		P
5.7.4.4	Voltage-dependent active power reductionVoltage-dependent active power reduction is not required in this technical requirement		N/A
5.7.5	Short circuit contribution		P
6	Construction of the power generation system/network and system protection (NS protection)		P
6.1	General requirements	The PGU include integrated interface switch and NS protection, is type-tested against EN 62109-1 and EN 62109-2, CE-LVD certificate No. N8A 111812 0016 Rev.00	P

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Clause	Requirement + Test	result – Remark	Verdict
6.2	Central NS protection		N/A
6.3	Integrated NS protection		P
6.4	Interface switch		P
6.4.1	The disconnection switch is used for NS protection can can be used as switch device in single generation unit (integratged interface switch)		P
	The interface switch must be designed and rated for the conditional short-circuit current and taking into account the protective devices required by 6.5. The switching ability of the interface switch is to be measured according to the higher value from the rated current of the upstream fuse and maximum initial short-circuit current contribution of the generation plant. The function control of the interface switch is to be realized according to a) or b) or (c):		P
	a) Using a interface switch, that switch-on with control voltage and can automatic switch-off without voltage supply. The switch on-off state can be monitored		N/A
	b) Minimum once daily check of on-off switch with the NS protection and monitoring of normal functions of interface switch		N/A
	c) Using integrated interface switch and integrated NS protection for PV and ESS inverter according to DIN EN 62109	Type-tested against EN 62109-1 and EN 62109-2, CE-LVD certificate No. N8A 111812 0016 Rev.00	P
	If a defect is detected, the generation system should not feed-in grid and not reconnect to grid		P
	The interface switch should switch all line conductors. In TT system, all pole disconnection should be realized. In this condition, the interface switch as grid disconnection device during islanding operation, it should comply with VDE-AR-E 2510-2	VDE-AR-E 2510-2 should be considered in final installation	P
6.4.2	Central interface switch		N/A
6.4.3	Integrated interface switch		P
6.5	Protective devices and protection settings		P
6.5.1	General		P
	The specification given in 6.5.2 do not refer to the short-circuit protection, overload		P

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Clause	Requirement + Test	result – Remark	Verdict
	protection, electric shock protection and all-phase separator. The protection function may have to be extended by the connection owner if applicable		
	The protection function shall be implemented as follows: Voltage drop protection U< Rise-in-voltage protection U> Rise-in-voltage protection U>> Frequency decrease protection f< Frequency increase protection f> Islanding detection.	See appendix table for PGU test	P
	Voltage protection devices should utilize the r.m.s value of 50Hz.		P
	The rise-in voltage protection U> shall be designed as 10 minute mean value as required in DIN EN 50160 (power quality). The formation of a new 10 minute mean value shall be at least every 3s.		P
	For PGS up to 30kVA, the voltage protection shall be measured between line and neutral		N/A
	For PGS more than 30kVA, the voltage protection shall be measured between line and neutral. The line to line voltage shall be determined or measured.		P
	Frequency protection may be designed as single-phase equipment		P
	The setting value of protection function and the last five dated failure report shall be readable at the NS protection. Interruption of supply shall not lead to loss of any failure report. Read-out shall be possible for central protection without any additional aid. For integrated NS protection read-out may use a data interface.		P
6.5.2	The protection function setting should follow Table 2	See appendix table for PGU test	P
	The rise-in-voltage protection U> can be 1.1 to 1.15 Un, if used for up to 30kVA with only integrated NS protection, 1.1Un setting shall not be changed.		P
	The tolerance of the setting value and trip value of voltage shall be maximum +/-1% and frequency +/-0.1%		P
6.5.3	Islanding detection	See appendix table for PGU test	P

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Clause	Requirement + Test	result – Remark	Verdict
	The testing method is according to DIN EN 62116. Detection of an isolated network and disconnection of PGS shall be within 2s.		P
6.6	Other requirements for generation system		N/A
6.6.1	Ability to provide primary control power is not required in the technical requirement. If this function is included, reference to VDE-AR-N 4120, 10.5.3		N/A
6.6.2	Ability to provide secondary control and minute reserve is not required in the technical requirement. If this function is included, reference to VDE-AR-N 4120, 10.5.4		N/A
7	Metering for billing purpose		N/A
8	Operation of the system		P
8.1	General		P
8.2	Special aspects of the management of the network operator's network		N/A
8.3	Connection conditions and synchronisation		P
8.4	Special aspects regarding the planning, installation and operation of power generation systems and storage units each with *P*Amax ≥ 135 kW		N/A
9	Verification of electrical properties		P
Annex A	Explanation (informative)		N/A
Annex B	Measurement concepts (informative)		N/A
Annex C	Examples of meter panel configurations (informative)		N/A
Annex D	Example of connection assessment of generation plants – connection of a 20 kW photovoltaic plant (informative)		N/A
Annex E	Form (Normative)		P

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Following appendix table is based on the requirements of standard DIN VDE V 0124-100 (VDE V 0124-100):2020:

5.2.3	TABLE: Flicker	P
MODEL	ST-INV-T10.0	

Testing method:

a) Power generation units and storage units (single devices) with a rated current ≤ 75 A:

The following standards must be used in accordance with VDE-AR-N 4100: 2019-04, 5.4.2.1:

– DIN EN 61000-3-3 (VDE 0838-3) for equipment with rated current ≤ 16 A

– DIN EN 61000-3-11 (VDE 0838-11) for equipment with rated current >16 A and ≤ 75

☑ Z_{ref}: R_A = 0.24+0.15j, R_N = 0.16+0.10j	☐ Z_{test}: R_A = 0.15+0.15j, R_N = 0.10+0.10j Z_{test} can be Z_{ref}
☑ Three Phase	Test according to DIN EN 61000-3-3

Test no.	Phase	P_{st}	d(t) - 500ms [%]	dc [%]	dmax [%]
Limit		1.0	3.3%	3.3%	4%
1	L1-/L2-/L3	0.015/0.013/0.020	0.00/0.00/0.00	0.001/0.076/0.167	0.253/0.253/0.321
2	L1-/L2-/L3	0.015/0.014/0.019	0.00/0.00/0.00	0/0.076/0.142	0.252/0.253/0.299
3	L1-/L2-/L3	0.013/0.014/0.013	0.00/0.00/0.00	0.001/0.074/0.138	0.252/0.252/0.289
4	L1-/L2-/L3	0.012/0.013/0.012	0.00/0.00/0.00	0/0.085/0.121	0.252/0.253/0.269
5	L1-/L2-/L3	0.044/0.048/0.046	0.00/0.00/0.00	0.001/0.086/0.106	0.252/0.252/0.267
6	L1-/L2-/L3	0.012/0.012/0.012	0.00/0.00/0.00	0/0.085/0.099	0.251/0.252/0.259
7	L1-/L2-/L3	0.012/0.012/0.012	0.00/0.00/0.00	0/0.085/0.099	0.251/0.252/0.261
8	L1-/L2-/L3	0.012/0.012/0.012	0.00/0.00/0.00	0/0.086/0.099	0.252/0.253/0.262
9	L1-/L2-/L3	0.012/0.013/0.013	0.00/0.00/0.00	0/0.086/0.098	0.252/0.253/0.262
10	L1-/L2-/L3	0.012/0.013/0.014	0.00/0.00/0.00	0/0.085/0.091	0.252/0.253/0.256
11	L1-/L2-/L3	0.013/0.014/0.014	0.00/0.00/0.00	0/0.085/0.098	0.251/0.253/0.264
12	L1-/L2-/L3	0.013/0.015/0.017	0.00/0.00/0.00	0/0.085/0.103	0.251/0.252/0.261

$P_{lt\ measured}$	0.044/0.0248/0.046	$P_{lt\ limit}$	0.65
	d(t) - 500ms [%]	dc [%]	dmax [%]
Start	0/0.073/0.106	0/0/0	0.101/0.252/0.270
Stop	0.005/0.076/0.110	0/0/0	0.252/0.252/0.267
Limit	3.3%	3.3%	4%

5.2.4	TABLE: Harmonics	P
MODEL	ST-INV-T10.0	

Testing method:

a) Power generation units and storage units (single devices) with a rated current ≤ 75 A:

– for single devices with a rated current ≤ 16 A per conductor according to DIN EN 61000-3-2 (VDE 838-2);

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– for single devices with a rated current > 16 A and ≤ 75 A per conductor according to DIN EN 61000-3-12:2012-06 (VDE 0838-12).

b) Power generation units and storage units (single devices) with a rated current > 75 A:
Power generation units and storage units (single units) with a rated current > 75 A are to be evaluated according to Table 1 in VDE AR-N 4100: 2019-04, Chapter 5.4.2.2.2.

The harmonic currents must be measured in accordance with DIN EN 61000-4-7 (VDE 0847-4-7).

The interharmonics currents up to 2 kHz are to be measured according to DIN EN 61000-4-7 (VDE 0847-4-7): 2009-12, Annex A.(type 1) The measurement of the hgiher harmonic between 2 kHz and 9 kHz must be performed in accordance with DIN EN 61000-4-7 (VDE 0847-4-7): 2009-12, Annex B.

The measurement may be performed on a test voltage source of any impedance.

The harmonic currents, the interharmonic currents and the higher harmonic currents are determined for each 10% active power bin.

Harmonics (IEC 61000-3-2 (≤ 16A))												
Power P/Pn[%]	0-5	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	A	A	A	A	A	A	A	A	A	A	A	A
2	0.104	0.172	0.128	0.124	0.124	0.128	0.135	0.142	0.147	0.154	0.160	1.080
3	0.078	0.043	0.094	0.106	0.124	0.149	0.179	0.212	0.250	0.289	0.328	2.300
4	0.066	0.114	0.105	0.099	0.098	0.101	0.103	0.107	0.114	0.119	0.127	0.430
5	0.069	0.046	0.049	0.030	0.023	0.025	0.031	0.036	0.042	0.049	0.061	1.140
6	0.040	0.035	0.058	0.053	0.049	0.047	0.044	0.041	0.039	0.038	0.036	0.300
7	0.045	0.062	0.031	0.017	0.020	0.025	0.028	0.034	0.040	0.047	0.054	0.770
8	0.038	0.038	0.035	0.041	0.042	0.042	0.045	0.046	0.046	0.048	0.052	0.230
9	0.009	0.056	0.031	0.012	0.014	0.018	0.020	0.022	0.024	0.027	0.030	0.400
10	0.025	0.052	0.015	0.026	0.029	0.031	0.031	0.033	0.033	0.035	0.038	0.184
11	0.010	0.036	0.033	0.012	0.010	0.014	0.018	0.021	0.023	0.025	0.029	0.330
12	0.013	0.044	0.016	0.017	0.019	0.018	0.015	0.013	0.012	0.012	0.012	0.153
13	0.011	0.015	0.026	0.014	0.006	0.010	0.013	0.015	0.017	0.018	0.021	0.210
14	0.009	0.042	0.022	0.023	0.021	0.017	0.016	0.017	0.020	0.022	0.024	0.131
15	0.008	0.019	0.019	0.015	0.007	0.007	0.009	0.011	0.013	0.014	0.014	0.150

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16	0.010	0.036	0.014	0.020	0.021	0.019	0.017	0.017	0.018	0.020	0.023	0.115
17	0.004	0.022	0.015	0.017	0.006	0.006	0.008	0.011	0.013	0.016	0.018	0.132
18	0.007	0.022	0.013	0.012	0.014	0.013	0.012	0.010	0.009	0.009	0.008	0.102
19	0.005	0.022	0.009	0.014	0.008	0.004	0.007	0.009	0.009	0.010	0.012	0.118
20	0.007	0.018	0.021	0.006	0.009	0.012	0.013	0.014	0.013	0.015	0.016	0.092
21	0.006	0.019	0.008	0.012	0.009	0.005	0.006	0.008	0.008	0.008	0.009	0.107
22	0.005	0.017	0.018	0.007	0.007	0.009	0.011	0.010	0.010	0.012	0.013	0.084
23	0.006	0.021	0.007	0.011	0.009	0.005	0.007	0.008	0.010	0.011	0.012	0.098
24	0.005	0.014	0.015	0.008	0.010	0.011	0.008	0.005	0.004	0.004	0.004	0.077
25	0.005	0.022	0.009	0.008	0.009	0.004	0.004	0.006	0.007	0.009	0.009	0.090
26	0.008	0.015	0.018	0.008	0.016	0.017	0.016	0.015	0.013	0.012	0.014	0.071
27	0.004	0.020	0.010	0.006	0.009	0.005	0.005	0.006	0.007	0.007	0.008	0.083
28	0.006	0.010	0.018	0.005	0.012	0.014	0.013	0.011	0.010	0.010	0.011	0.066
29	0.004	0.017	0.010	0.005	0.008	0.005	0.005	0.007	0.007	0.007	0.008	0.078
30	0.003	0.013	0.016	0.007	0.008	0.010	0.010	0.010	0.009	0.008	0.008	0.061
31	0.004	0.012	0.011	0.006	0.007	0.006	0.007	0.009	0.009	0.008	0.008	0.073
32	0.004	0.012	0.013	0.010	0.008	0.008	0.007	0.007	0.009	0.011	0.013	0.058
33	0.004	0.010	0.011	0.006	0.007	0.007	0.006	0.006	0.008	0.009	0.011	0.068
34	0.003	0.008	0.012	0.008	0.006	0.007	0.006	0.005	0.005	0.008	0.010	0.054
35	0.003	0.012	0.011	0.006	0.006	0.005	0.004	0.004	0.006	0.007	0.008	0.064
36	0.003	0.011	0.012	0.007	0.005	0.008	0.008	0.006	0.005	0.006	0.006	0.051
37	0.003	0.010	0.009	0.007	0.005	0.005	0.004	0.004	0.004	0.005	0.007	0.061
38	0.004	0.009	0.011	0.008	0.004	0.009	0.010	0.008	0.008	0.008	0.009	0.048
39	0.002	0.008	0.008	0.007	0.004	0.004	0.003	0.004	0.005	0.006	0.007	0.058
40	0.004	0.006	0.007	0.008	0.003	0.008	0.009	0.008	0.007	0.006	0.006	0.046
Max. value of three phase are recorded for harmonics												

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5.2.6	Table: DC current feed-into network	P
MODEL	ST-INV-T10.0	

Testing method:

The inverter is operated within the control range of the PGU in the following operating points, whereby for each operating point after reaching a stable operating temperature for at least 5 minutes, the DC components of the grid currents are recorded in all external conductors. According to VDE-AR-N 4100:2019-04, the measurement of direct currents is based on DIN EN 61000-4-7 (VDE 0847-4-7) over 10 fundamental periods

Operating points:

I) between 30 % S_{Emax} and 40 % S_{Emax}
II) between 60 % S_{Emax} and 70 % S_{Emax}
III) > 95 % S_{Emax}

Test conditions	Voltage [V]	Current [A]	DC current		Limit [mA]
			L1/L2/L3		
	L1/L2/L3	L1/L2/L3	mA	%Ir	
Between 30 % S_{Emax} and 40 % S_{Emax}	230.1/229.0/230.0	5.2/5.3/5.2	10.3/4.9/6.6	0.07/0.03/0.05	72.5
Between 60 % S_{Emax} and 70 % S_{Emax}	230.2/230.0/230.1	9.6/9.6/9.5	9.5/5.2/7.2	0.07/0.04/0.05	72.5
> 95 % S_{Emax}	230.3/230.1/230.2	14.5/14.6/14.5	8.4/4.4/7.3	0.06/0.03/0.05	72.5

Remark: Ir=10000/3/230=14.49 A

5.3.2	TABLE: Symmetry behavior of three-phase inverter units	P
MODEL	ST-INV-T10.0	

Testing method:

The asymmetry is measured in terms of unbalanced load and is to be calculated for an operating point characterized by power and *cos* φ. For each of the 5 measurements (1-min mean values) at the respective operating point, the absolute maximum deviation between the apparent powers of the three phases is determined. From these 5 values, the maximum value is determined again. This maximum value must be stated for the following operating points:

a) 100 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 1$;
b) 100 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 0.8$ max. over excited;
c) 100 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 0.8$ max. under-excited;
d) 50 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 1$;
e) 50 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 0.8$ max. over excited;
f) 50 % Rated power $\pm$ 5 % P_{Emax}, *cos* $\varphi = 0.8$ max. under-excited.

The maximum unbalance under all condition: 23 VA					Limit:	4.6kVA
a)	Number	1	2	3	4	5
	L1 [VA]	3334	3333	3331	3331	3333
	L2 [VA]	3357	3354	3354	3353	3355

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	L3 [VA]	3339	3336	3336	3334	3336
	Calculation					
	|L1-L2| [VA]	23	21	23	22	22
	|L2-L3| [VA]	18	18	18	19	19
	|L3-L1| [VA]	5	3	5	3	3
	Asymmetry [VA]	23	21	23	22	22
	Maximum asymmetry [VA]		23			
b)	Number	1	2	3	4	5
	L1 [VA]	3316	3312	3314	3315	3310
	L2 [VA]	3333	3329	3329	3330	3326
	L3 [VA]	3316	3314	3313	3314	3310
	Calculation					
	|L1-L2| [VA]	17	17	15	15	16
	|L2-L3| [VA]	17	15	16	16	16
	|L3-L1| [VA]	0	2	1	1	0
	Asymmetry [VA]	17	17	16	16	16
	Maximum asymmetry [VA]		17			
c)	Number	1	2	3	4	5
	L1 [VA]	3344	3332	3332	3347	3346
	L2 [VA]	3359	3347	3347	3360	3360
	L3 [VA]	3352	3340	3339	3353	3353
	Calculation					
	|L1-L2| [VA]	15	15	15	13	14
	|L2-L3| [VA]	7	7	8	7	7
	|L3-L1| [VA]	8	8	7	6	7
	Asymmetry [VA]	15	15	15	13	14
	Maximum asymmetry [VA]		15			
d)	Number	1	2	3	4	5
	L1 [VA]	1694	1691	1694	1691	1689
	L2 [VA]	1704	1701	1705	1701	1700
	L3 [VA]	1697	1695	1697	1694	1692
	Calculation					
	|L1-L2| [VA]	10	10	11	10	11
	|L2-L3| [VA]	7	6	8	7	8

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	|L3-L1| [VA]	3	4	3	3	3
	Asymmetry [VA]	10	10	11	10	11
	Maximum asymmetry [VA]		11			
e)	Number	1	2	3	4	5
	L1 [VA]	2072	2069	2072	2074	2076
	L2 [VA]	2081	2079	2081	2084	2086
	L3 [VA]	2072	2070	2073	2075	2077
	Calculation					
	|L1-L2| [VA]	9	10	9	10	10
	|L2-L3| [VA]	9	9	8	9	9
	|L3-L1| [VA]	0	1	1	1	1
	Asymmetry [VA]	9	10	9	10	10
	Maximum asymmetry [VA]		10			
f)	Number	1	2	3	4	5
	L1 [VA]	2174	2169	2159	2160	2169
	L2 [VA]	2181	2174	2166	2167	2176
	L3 [VA]	2178	2173	2164	2165	2174
	Calculation					
	|L1-L2| [VA]	7	5	7	7	7
	|L2-L3| [VA]	3	1	2	2	2
	|L3-L1| [VA]	4	4	5	5	5
	Asymmetry [VA]	7	5	7	7	7
	Maximum asymmetry [VA]		7			
Supplementary information:						

5.4.2	**TABLE: Measurement of the active and reactive power range**	**P**
MODEL	**ST-INV-T10.0**	

Test method:

The PGU is operated at all of the following operating points, with each operating point to be maintained for at least 10 minutes after the transient has subsided. During sub-measurements a) to c) below, no power limitation may occur due to the primary energy source. The measurements a) to c) are to be performed at 0.9 U_n, 0.95 U_n, U_n, 1.05 U_n and 1.09 U_n with a tolerance of ± 2% U_n.

a) With $cos\ \varphi$ = 1, the maximum avalaible active power at this operating point is adjusted.
b) At maximum under-excited operation, the maximum active power at this operating point is adjusted.
c) At maximum over-excited operation, the maximum avalaible active power at this operating point is adjusted.

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S_{Emax} and P_{Emax} are determined by the largest measured value:

$$S_{Emax} = \max (S_{Emax\ a)}, S_{Emax\ b)}, S_{Emax\ c)})$$

$$P_{Emax} = \max (P_{Emax\ a)}, P_{Emax\ b)}, P_{Emax\ c)})$$

	Test conditions	Output									
		Voltage [V]			Current [A]			Active Power [W]	Apparent power [VA]	Cos φ	Cos φ limit
		L1	L2	L3	L1	L2	L3				
Test a)-1	V=90%*Vn; Cos φ set=1	207.1	207.1	207.2	15.89	15.85	15.92	9867	9873	0.999	--
Test a)-2	V=95%*Vn; Cos φ set=1	218.6	218.5	218.7	15.06	15.01	15.09	9864	9870	0.999	--
Test a)-3	V=100%*Vn; Cos φ set=1	230.1	230.0	230.2	14.30	14.26	14.33	9859	9866	0.999	--
Test a)-4	V=105%*Vn; Cos φ set=1	241.5	241.4	241.7	13.62	13.58	13.65	9858	9867	0.999	--
Test a)-5	V=109%*Vn; Cos φ set=1	250.7	250.6	250.9	13.13	13.09	13.15	9860	9870	0.999	--
Test b)-1	V=90%*Vn; Cos φ set=0.8 under-excited	207.0	206.9	207.1	16.59	16.51	16.6	8238	10190	0.801	≤ 0.9
Test b)-2	V=95%*Vn; Cos φ set=0.8 under-excited	218.5	218.4	218.6	15.67	15.6	15.69	8212	10161	0.800	≤ 0.9
Test b)-3	V=100%*Vn; Cos φ set=0.8 under-excited	230.0	229.9	230.1	14.92	14.86	14.94	8231	10185	0.800	≤ 0.9
Test b)-4	V=105%*Vn; Cos φ set=0.8 under-excited	241.5	241.3	241.6	14.2	14.14	14.21	8221	10175	0.800	≤ 0.9
Test b)-5	V=109%*Vn; Cos φ set=0.8 under-excited	250.6	250.5	250.8	13.69	13.64	13.71	8227	10187	0.800	≤ 0.9
Test c)-1	V=90%*Vn; Cos φ set=0.8 over -excited	207.1	207	207.2	16.13	16.07	16.14	7961	10008	0.796	≤ 0.9
Test c)-2	V=95%*Vn; Cos φ set=0.8 over-excited	218.6	218.5	218.6	15.28	15.23	15.3	7965	10012	0.796	≤ 0.9
Test c)-3	V=100%*Vn; Cos φ set=0.8 over-excited	230.1	229.9	230.1	14.53	14.48	14.55	7971	10019	0.796	≤ 0.9
Test c)-4	V=105%*Vn; Cos φ set=0.8 over-excited	241.6	241.4	241.6	13.83	13.79	13.85	7972	10016	0.796	≤ 0.9

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Test c)-5	V=109%*Vn; Cos φ set=0.8 over-excited	250.7	250.6	250.9	13.35	13.31	13.36	7986	10034	0.796	≤ 0.9
P_{Emax}		9867 W			S_{Emax}			10190 VA			

5.4.3	**TABLE: Active power reduction by setpoint specification**	**P**
MODEL	**ST-INV-T10.0**	

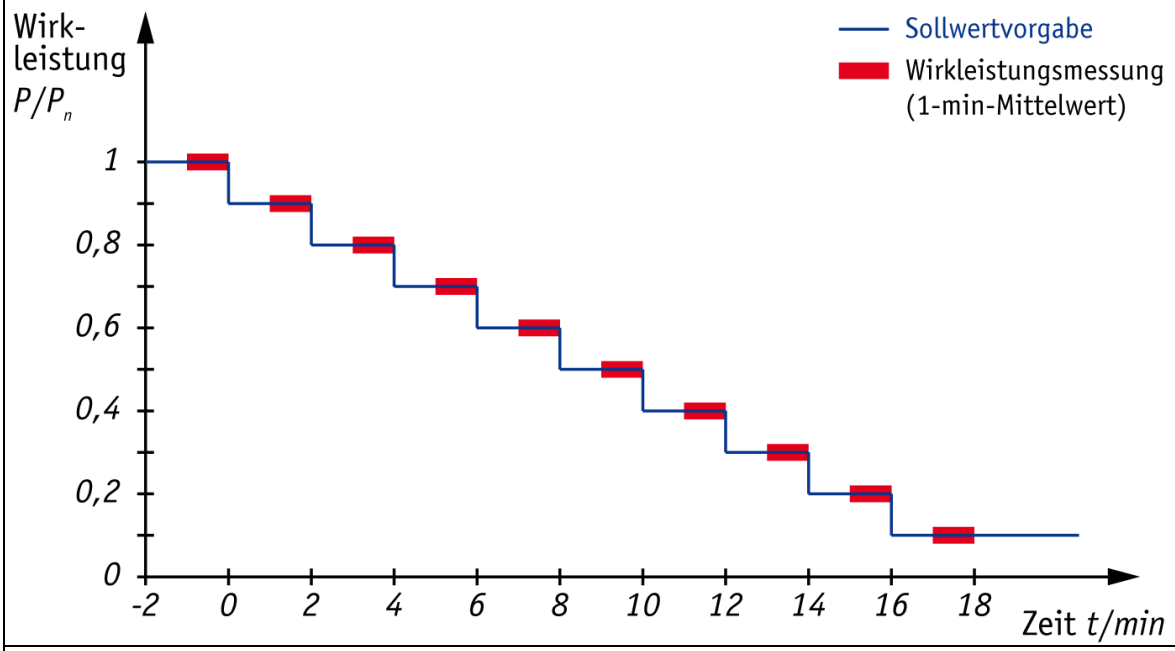
Test method:

For this test, the setpoint signal is reduced from 100% P_{rE} to 10% P_{rE} according to the following procedure:

a) For controllable PGU in steps of 10% PrE as per Fig. 3: After each change in the specified required value, wait 1 min so the PGU can adjust to the new setpoint. The active power of PGU must then be measured as 1-min-mean value.

b) For all other PGU in accordance with their adjustable levels. After each change in the setpoint, wait 1 min so the PGU can adjust to the new setpoint. The active power of PGU must then be measured as 1-min-mean value.

The test of the setpoint control of the active power must be performed according to the following procedure:



☒ **Testing on unit basis: S_{Emax} (10000 VA), P_{Emax} (10000 W)**

a) Active power reduction by setpoint specification

Power Setting P/Pn	Measured Active Power P [W]	Δ P/ Pn [%]	Limit of Δ P/ Pn [%]
100%	10043	0.43	± 5%
90%	9120	1.20	± 5%
80%	8110	1.10	± 5%
70%	7102	1.02	± 5%

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60%	6078	0.78	± 5%
50%	5071	0.71	± 5%
40%	4057	0.57	± 5%
30%	3060	0.60	± 5%
20%	2049	0.49	± 5%
10%	1040	0.40	± 5%
PGU disconnect from network?			☐ Yes ☒ No

b) Measurement of the power gradient

Test sequence	Max. Power gradient as calculated from the difference of the 10 s mean value at time t1 and at time t1 + 10 s [%Pn/s]	Limit of power gradient [%Pn/s]
100%P_n to 5% P_n	0.54	≥ 0.33 and ≤ 0.66
5%P_n to 100% P_n	0.53	≥ 0.33 and ≤ 0.66
PGU disconnect from network?		☐ Yes ☒ No

c) Ceasing active power by remote control ☒ remote cease active power: simulate external command

Measured ceasing active power to zero: 0.890 s

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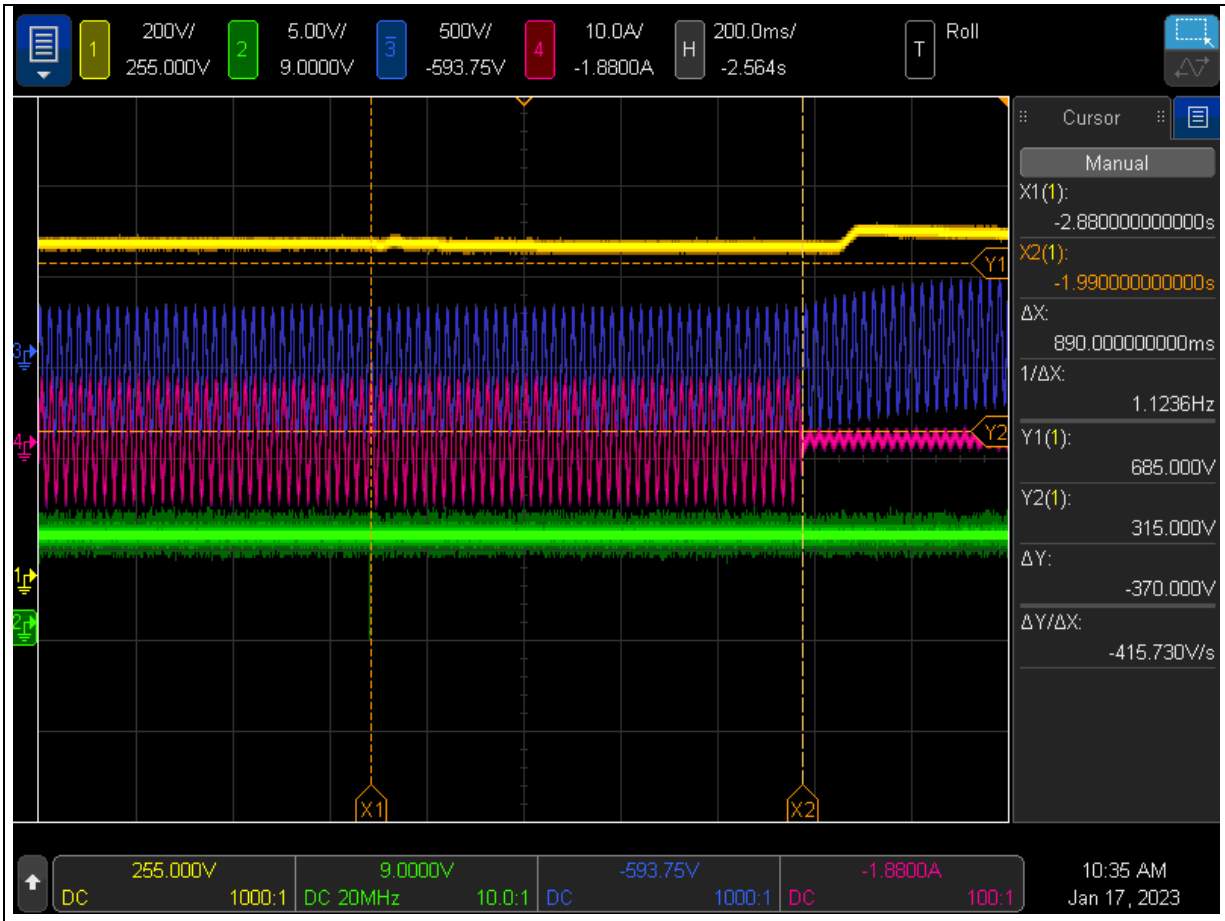

Remark: inverter only with one interface, the interface priority test is omitted.

5.4.4	TABLE: Active power feed of PGU at overfrequency	P
MODEL	ST-INV-T10.0	

Test method:

The test is performed in two test runs, with the respectively specified adjustment parameters of the PGU:

In both tests, the following measuring points a) to j) must be approached with an accuracy of ± 10 mHz. The measuring points a) to h) and j) are to be approached at least for 60 s or until the maximum power has been reached after a shutdown. The measuring point i) must be started for at least 10 min. The specified initial active power must be maintained with a tolerance of ± 5% P_{Emax}. The deviation must be taken into account during the evaluation.

Table 3 – Test sequence for test 1 of the active power supply of PGU at overfrequency

Test 1 Setting parameters of the PGU: P = 100 % P_{Emax} Start of power reduction at 50,2 Hz s = 5 % (40% $P_{ref/ Hz}$)	Frequency [Hz]	Expected active power output [% P_{Emax}]
a)	50.00	100
b)	50.25	98
c)	50.70	80

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d)	51.40	52
e)	50.70	80
f)	50.25	98
g)	50.00	100
h)	51.65	0
i)	50.15	0
j)	50.00	100

Table 4 – Test procedure for test 2 of the active power supply of PGU at overfrequency

Test 2 Setting parameters of the PGU: P = 60 % P_{Emax} (The reduction of the primary energy supply to limit the active power output or the limiting setting of the active power output shall be abolished from the measurement point c) Note: If the minimum technical line is above 60% P_{Emax}, this should be taken into account accordingly. In the case of non-controllable PGU, the examination will be dropped. Start of power reduction at 50.5 Hz s = 12 % (16.67 % $P_{ref / Hz}$)	Frequency [Hz]	Expected active power output (for Type 2 PGU) [% P_{Emax}]
a)	50.00	60
b)	50.40	60
c)	50.70	58
d)	51.40	51
e)	50.70	58
f)	50.10	60-100
g)	50.00	100

The application of the alternative test method by adjusting the limit values must result in the same frequency deviations.

During the tests, the frequency applied and / or simulated at the PGU and the active power must be recorded as 200 ms moving average values. The active power available during the test must be proven.

At the measuring point j) of the first test, the power gradient (dP/dt) of the PGU must be determined continuously. To determine the power gradient, a moving 1-min mean value of the active power is calculated, wherein the 1-min mean value must be recalculated at least every second from the previous data. From the 1-min mean values, the active power gradient is calculated from the difference of the 1-min mean value at time t1 and at time t1 + 1 min as follows:

$$(\Delta P / 1\text{min}) = (P_{t\,=\,t_1+1\text{min}} - P_{t\,=\,t_1}) / 1\text{min}$$

Here, t1 is the time from the beginning of the active power supply of the PGU after reconnection until the end of the power limitation. The averaging starts at t1 - 1 min.

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a) Test 1								
No.	Frequency [Hz]	Measured active output power [W]	As percentage of P_{Emax} [%]	Expected active power output [% P_{Emax}]	Deviation ΔP/ P_{Emax} [%]	Initial time delay T_V [s]	Response time [s]	Settling time [s]
Limit:		--	--	--	≤ ± 10	≤ 2	≤ 2	≤ 20
a)	50.00	10050	100.5	100	0.5	-	-	-
b)	50.25	9883	98.8	98	0.8	0	☒ Yes ☐ No	☒ Yes ☐ No
c)	50.70	8020	80.2	80	0.2	0	☒ Yes ☐ No	☒ Yes ☐ No
d)	51.40	5217	52.2	52	0.2	0	☒ Yes ☐ No	☒ Yes ☐ No
e)	50.70	8003	80.0	80	0.0	0	☒ Yes ☐ No	☒ Yes ☐ No
f)	50.25	9820	98.2	98	0.2	0	☒ Yes ☐ No	☒ Yes ☐ No
g)	50.00	10048	100.5	100	0.5	0	☒ Yes ☐ No	☒ Yes ☐ No
h)	51.65	0	0.0	0	0.0	-	-	-
i)	50.15	0	0.0	0	0.0	-	-	-
j)	50.00	10051	100.5	100	0.5	-	-	-
Reconnection time after j)		69.2 s	Limit: ≥ 60s	Power gradient after j)			9.22 % $P_{Emax/min}$	Limit: ≤ 10% $P_{Emax/min}$
f(P) VS (t) Diagram								

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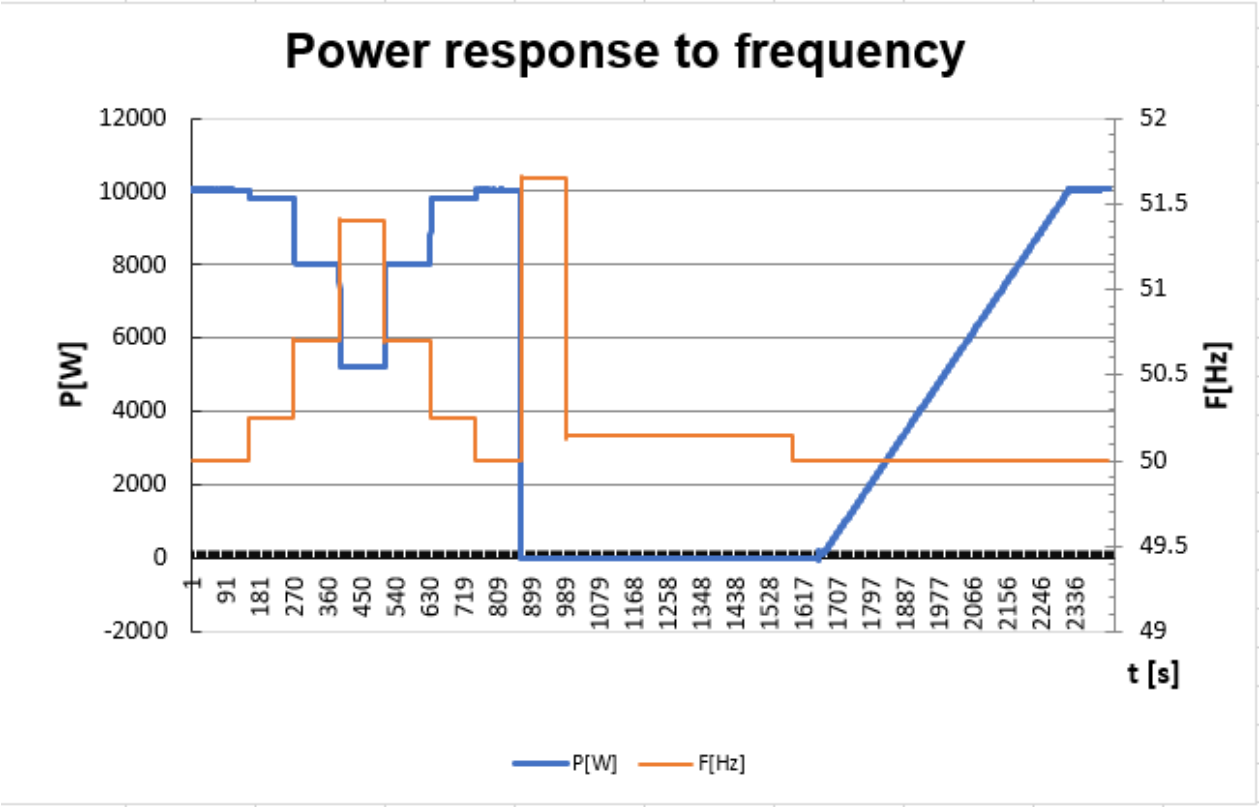
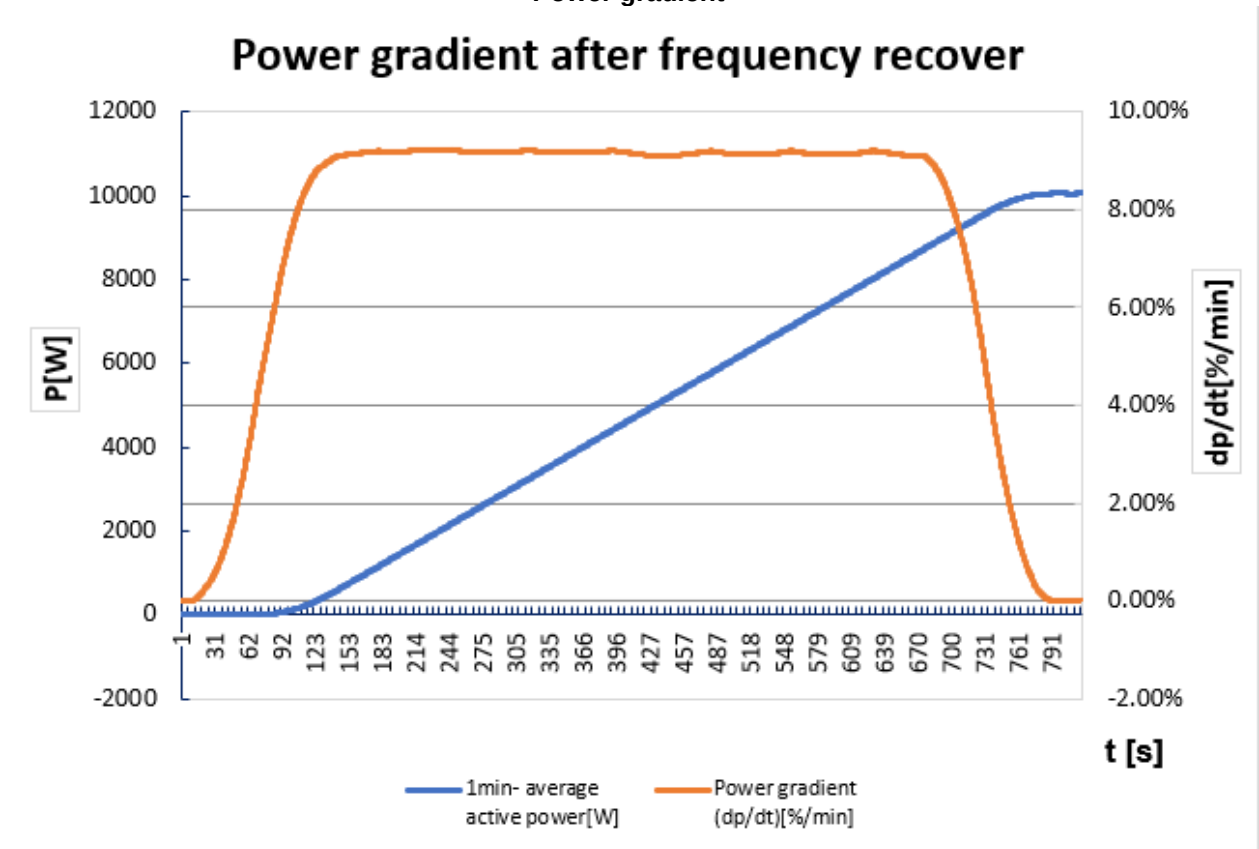


Power gradient



b) Test 2

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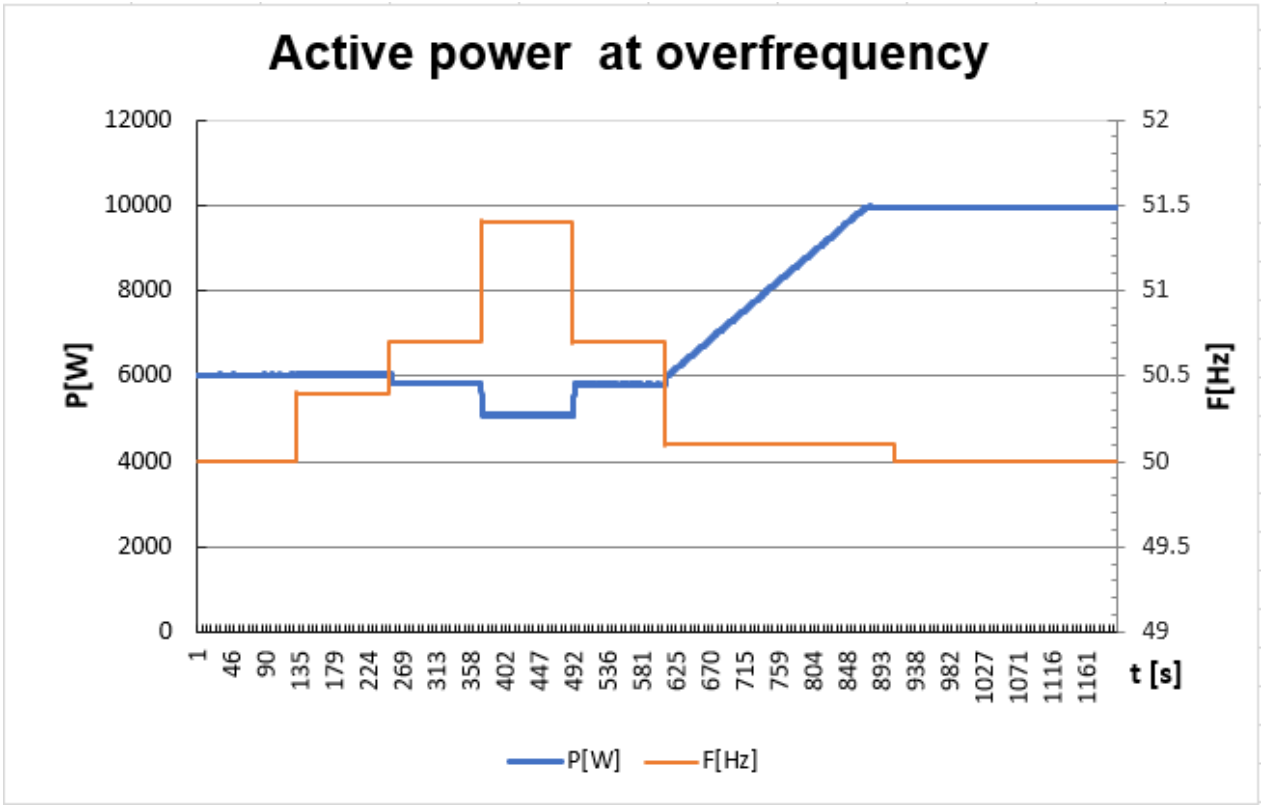
No.	Frequency [Hz]	Measured active output power [W]	As percentage of P_{Emax} [%]	Expected active power output [% P_{Emax}]	Deviation ΔP/ P_{Emax} [%]	Initial time delay T_V [s]	Response time [s]	Settling time [s]
Limit:		--	--	--	≤ ± 10	≤ 2	≤ 2	≤ 20
a)	50.00	6032	60.3	60	0.3	-	-	-
b)	50.40	6033	60.3	60	0.3	-	-	-
c)	50.70	5845	58.5	58	0.5	0	☒ Yes ☐ No	☒ Yes ☐ No
The reduction of the primary energy supply to limit the active power output or the limiting setting of the active power output shall be abolished from the measurement point c)								
d)	51.40	5158	51.6	51	0.6	0	☒ Yes ☐ No	☒ Yes ☐ No
e)	50.70	5738	57.4	58	-0.6	0	☒ Yes ☐ No	☒ Yes ☐ No
f)	50.10	9894	98.9	60 - 100	-	-	-	-
g)	50.00	9957	99.6	100	-0.4	-	-	-
Power gradient after g)		9.31 % $P_{Emax/min}$		Limit:		≤ 10% $P_{Emax/min}$		

f(P) VS (t) Diagram



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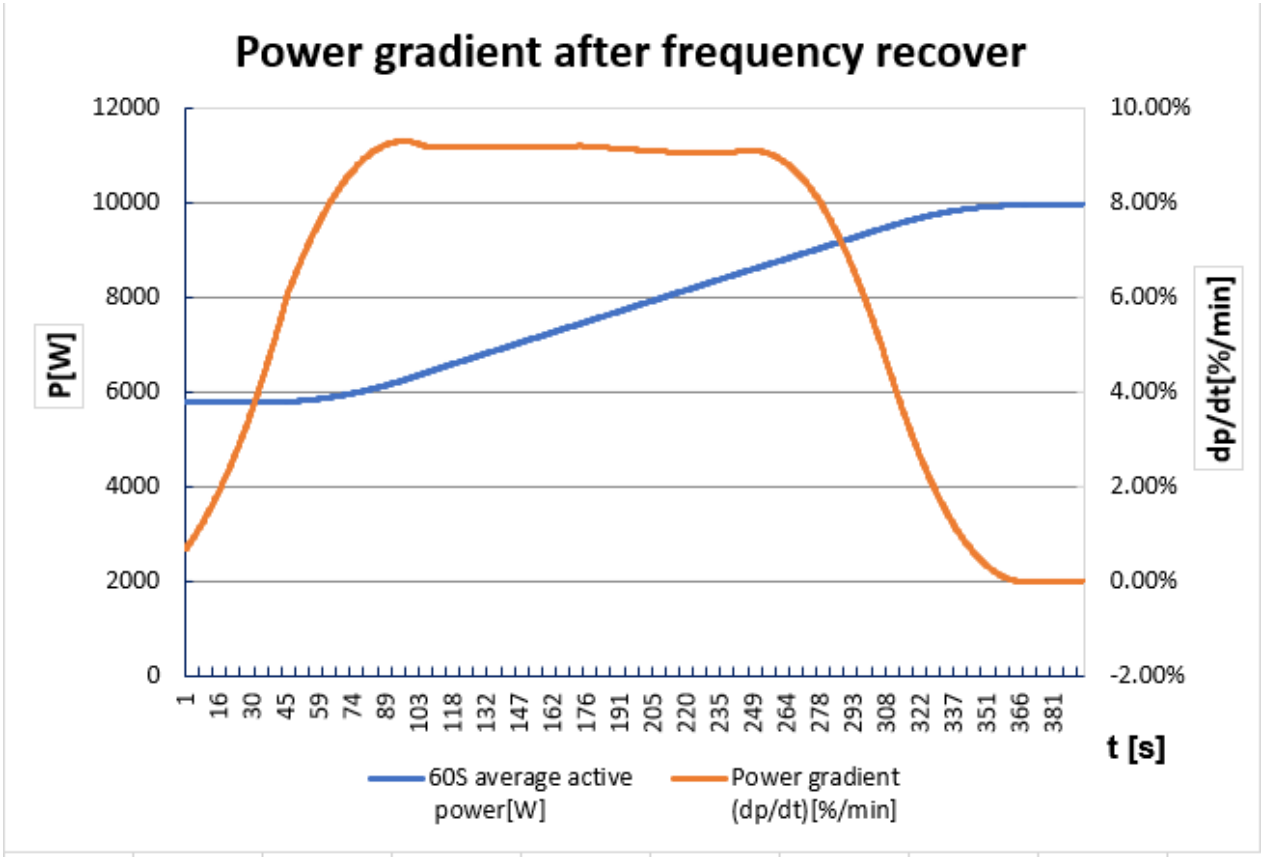
Power gradient



5.4.6	TABLE: Active power supply for PGU at underfrequency	P
MODEL	ST-INV-T10.0	

Test method:

The test is performed in 2 test runs, with the specified active power output (before the frequency change) of the PGU.

NOTE The beginning of the active power increase is given as 49.8Hz and the statics as s = 2% (100% P_{Emax} / Hz). The active power consumption (charging mode) is displayed as negative active power output.

In both tests, the following measuring points a) to j) must be approached with an accuracy of ± 10 mHz. The measuring points a) to h) and j) are to be approached for at least 60 s or until the maximum power is reached after a disconnection. The measuring point i) must be started for at least 10 min. The specified initial active power must be maintained with a tolerance of ± 5% P_{Emax}. The deviation must be taken into account in the evaluation.

Table 7 – Test sequence for test 1 of the active power supply of PGU at underfrequency

Test 1 Setting parameters of PGU: P = 10% P_{Emax} Note: Testing is only valid for controllable PGU	Frequency [Hz]	Expected active power output [% P_{Emax}]
a)	50.00	10
b)	49.75	12
c)	48.80	50

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d)	47.60	98
e)	48.80	50
f)	49.75	12
g)	50.00	10
h)	47.35	0
i)	47.45	0
j)	50.00	10

Table 8 – Test sequence for test 2 of the active power supply of PGU at underfrequency

Test 2 Setting parameters of PGU: P = 60% P_{Emax} Note:If the minimum technical power is above 60% P_{Emax}, this must be taken into account accordingly. In the case of non-controllable PGU, the test does not apply.	Frequency [Hz]	Expected active power output [% P_{Emax}]
a)	50.00	60
b)	49,75	62
c)	48,80	100
d)	47,60	100
e)	48,80	100
f)	49,85	60
g)	50,00	60

The application of the alternative test method by adjusting the limit values must result in the same frequency deviations.

During the tests, the frequency applied and / or simulated at the PGU and the active power must be recorded as 200ms moving averages. The available active power output during the test must be demonstrated.

At the measuring point j) of the first test, the power gradient (dP/dt) of the PGU must be determined continuously. To determine the power gradient, a moving 1-min mean value of the active power is calculated, whereby the 1-min mean value must be recalculated at least every second from the previous data. From the 1-min mean values, the active power gradient is calculated from the difference of the 1-min mean value at operating point t_1 and at operating point t_1 + 1 min as follows:

$$(\Delta P/1\text{min}) = (P_{t\,=\,t_1+1\text{min}} - P_{t\,=\,t_1})/1\text{min}$$

Here, t_1 is the time from the beginning of the active power supply of the PGU after reconnection until the end of the power limitation. The averaging starts at t_1 - 1 min.

a) Test 1

No.	Frequency [Hz]	Measured active output power [W]	As percentage of P_{Emax} [%]	Expected active power	Deviation ΔP/ P_{Emax} [%]	Initial time delay T_V [s]	Response time [s]	Settling time [s]

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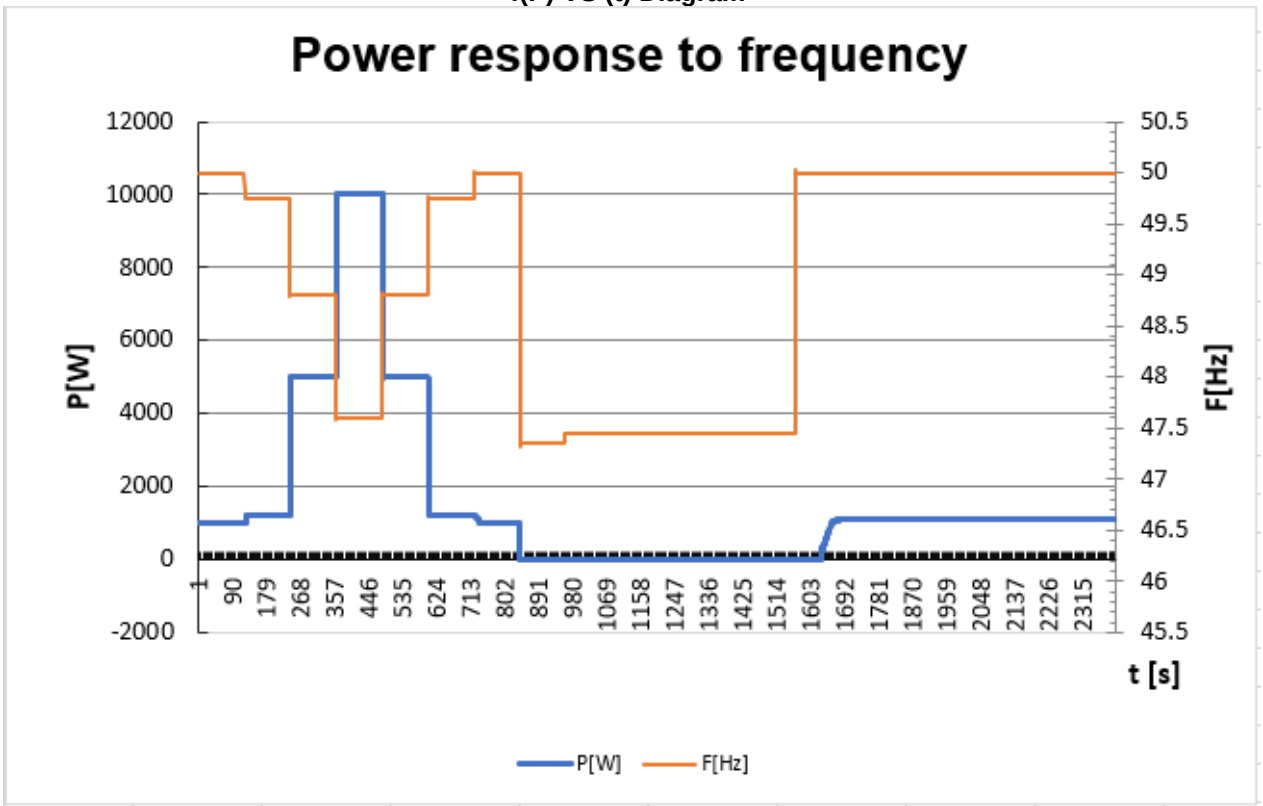
				output [% P_{Emax}]				
Limit:		--	--	--	≤ ± 10	≤ 2	≤ 2	≤ 20
a)	50.00	1003	10.03	10	0.03	-	-	-
b)	49.75	1217	12.17	12	0.17	0	☒ Yes ☐ No	☒ Yes ☐ No
c)	48.80	5026	50.26	50	0.26	0	☒ Yes ☐ No	☒ Yes ☐ No
d)	47.60	10028	100.28	98	2.28	0	☒ Yes ☐ No	☒ Yes ☐ No
e)	48.80	5021	50.21	50	0.21	0	☒ Yes ☐ No	☒ Yes ☐ No
f)	49.75	1216	12.16	12	0.16	0	☒ Yes ☐ No	☒ Yes ☐ No
g)	50.00	1003	10.03	10	0.03	-	-	-
h)	47.35	0	0	0	-	-	-	-
i)	47.45	0	0	0	-	-	-	-
j)	50.00	1085	10.85	10	0.85	-	-	-

Reconnection time after j)	69.2 s	Limit: ≥ 60s	Power gradient after j)	*9.48 %* $P_{Emax/min}$	Limit: ≤ 10% $P_{Emax/min}$

f(P) VS (t) Diagram



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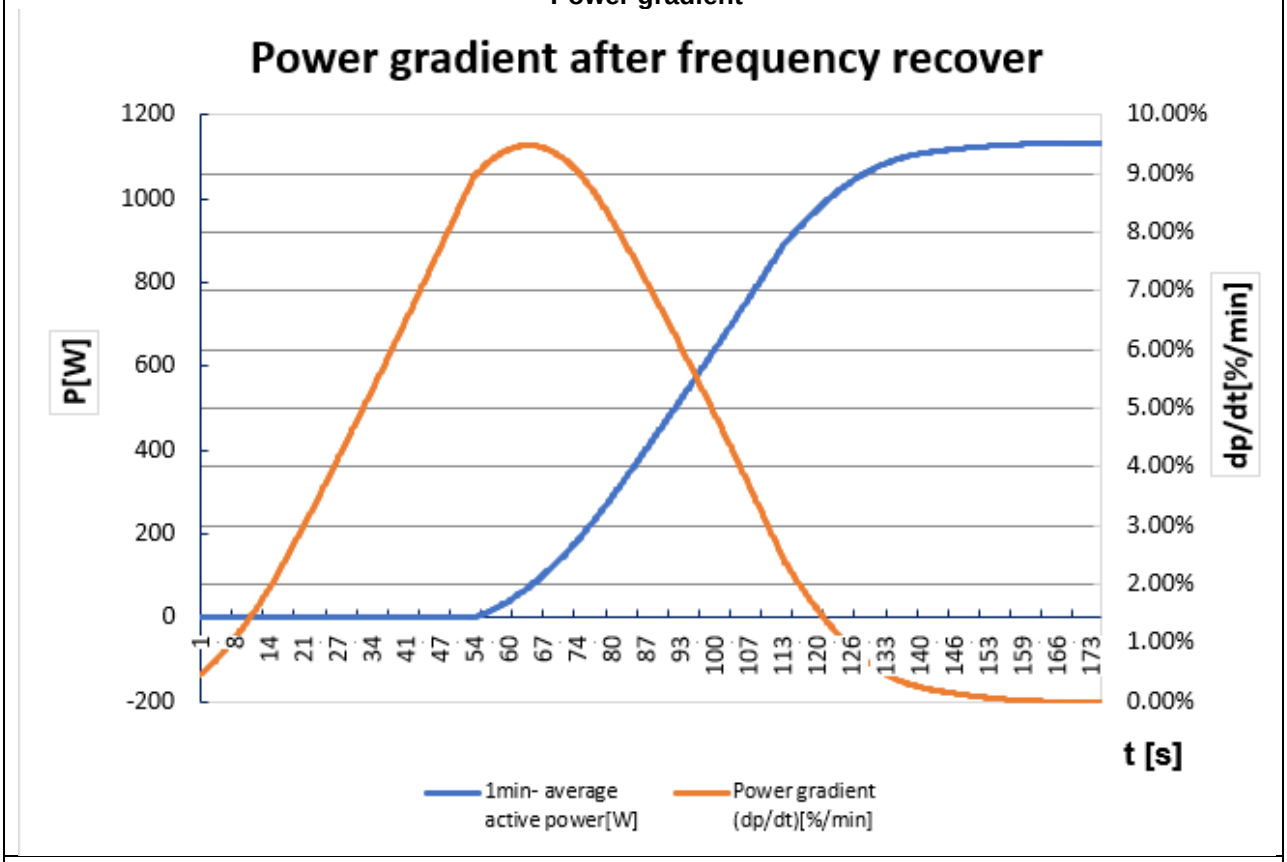
Power gradient



b) Test 2

No.	Frequency [Hz]	Measured active output power [W]	As percentage of P_{Emax} [%]	Expected active power output [% P_{Emax}]	Deviation ΔP/ P_{Emax} [%]	Initial time delay T_V [s]	Response time [s]	Settling time [s]
Limit:		--	--	--	≤ ± 10	≤ 2	≤ 2	≤ 20
a)	50.00	6022	60.22	60	0.22	-	-	-
b)	49.75	6210	62.10	62	0.10	0	☒ Yes ☐ No	☒ Yes ☐ No
c)	48.80	10025	100.25	100	0.25	0	☒ Yes ☐ No	☒ Yes ☐ No
d)	47.60	10023	100.23	100	0.23	0	☒ Yes ☐ No	☒ Yes ☐ No
e)	48.80	10021	100.21	100	0.21	0	☒ Yes ☐ No	☒ Yes ☐ No
f)	49.85	6011	60.11	60	0.11	-	-	-
g)	50.00	6021	60.21	60	0.21	-	-	-

Power gradient after g)	-	Limit:	≤ 10% $P_{Emax/min}$

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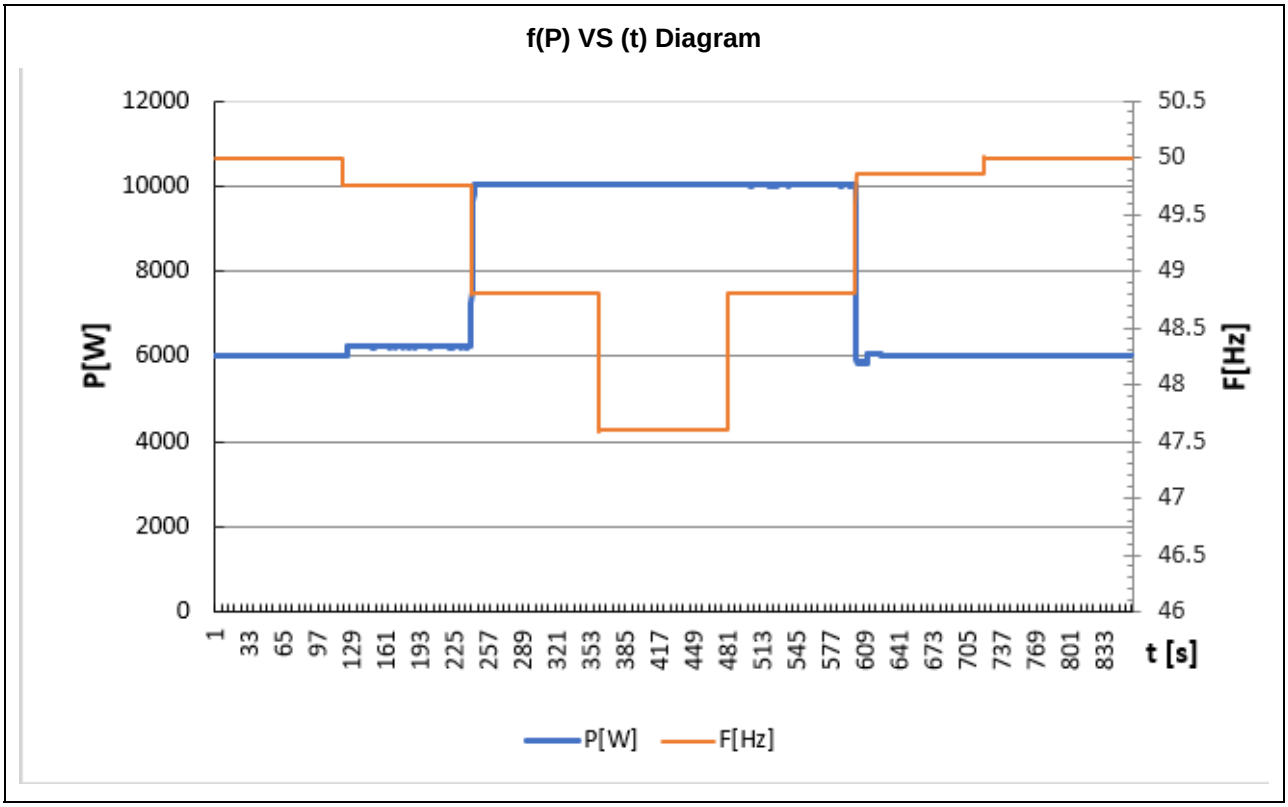

5.4.8	TABLE: Static voltage support / reactive power supply	P
MODEL	ST-INV-T10.0	

5.4.8.2 Tests of Reactive power / displacement factor adjustment accuracy

Test method:

The PGU is operated at all of the following operating points, whereby for each operating point after the transient effect has ceased, the active power is recorded with 60 s averaging. During the following partial measurements a) to h), no power limitation may occur due to the primary energy source. The measurements shall be carried out at 0,9 U_n, U_n and 1,1 U_n with a tolerance of ± 2% U_n.

The restrictions of the voltage-dependent reactive power control ranges according to VDE-AR-N 4105: 2018-11, Figure 2 - 4, must be taken into account.

For each of the measurements at different voltages, a different value between 40% P_{Emax} and 60% P_{Emax} is to be approached

For PGU type 2 - only inverter $\Sigma S_{Emax} \leq 4.6$ kVA applies:

a) at $cos\ \varphi = 0.95$ overexcited and a second time at $cos\ \varphi = 0.98$ overexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at P_{Emax}

b) at $cos\ \varphi = 0.95$ underexcited and a second time at $cos\ \varphi = 0.98$ underexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at P_{Emax}

For PGU Type 2 – only inverter $\Sigma S_{Emax} > 4,6$ kVA applies:

c) at $cos\ \varphi = 0.90$ overexcited and a second time at $cos\ \varphi = 0.95$ overexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at P_{Emax}

d) at $cos\ \varphi = 0.90$ underexcited and a second time at $cos\ \varphi = 0.95$ underexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at P_{Emax}

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For PGU Type 1 and for Type 2 system - Stirling generators and fuel cells - with $\Sigma S_{Emax} \leq$ 4.6 kVA:

e) Without specification of the $cos\ \varphi$ is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and S_{Emax}.

For PGU Type 1 as well as for Type 2 system with Stirling generators and fuel cells ΣS_{Emax} > 4,6 kVA gilt:

f) at cos $cos\ \varphi$ = 0.95 overexcited and a second time at $cos\ \varphi =$ 0.98 overexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at S_{Emax}.

g) at under-excited at $cos\ \varphi =$ 0.95 and a second time at $cos\ \varphi =$ 0.98 underexcited is measured at an active power value between 40% P_{Emax} and 60% P_{Emax} and at S_{Emax}.

For PGU type 2 - asynchronous generators, applies:

h) Without specification of the $cos\ \varphi$ is measured at S_{Emax}. This test is only to be carried out at U_n.

For clarity, the requirements of the tests are shown in Table 27. If it is not possible to start up the aforementioned active power values due to the design, the potential active power values are to be approached and measured.

The measured datas are recorded as 200 ms averages.

Table 27 – Overview of the requirements of 5.4.8.2

	Type 2 – only inverter		**Type 2 – Asynchronous generators**	**Type 1 as well as type 2 synchronous generators, fuel cells and Stirling generators**	
ΣS_{Emax}	≤ 4,6 kVA	> 4,6 kVA	All	≤ 4,6 kVA	> 4,6 kVA
P [kW]	40 % to 60 % P_{Emax} and S_{Emax}	40 % to 60 % P_{Emax} and S_{Emax}	S_{Emax}	40 % to 60 % P_{Emax} and S_{Emax}	40 % to 60 % P_{Emax} and S_{Emax}
$cos\ \varphi$	$cos\ \varphi$ 0,95 over-excited and under-excited $cos\ \varphi$ 0,98 over-excited and under-excited	$cos\ \varphi$ 0,90 over-excited and under-excited $cos\ \varphi$ 0,95 over-excited and under-excited	$cos\ \varphi$ 0,95 under-excited	*between* $cos\ \varphi$ 0,95 over-excited and $cos\ \varphi$ 0,95 under-excited	$cos\ \varphi$ 0,95 over-excited and under-excited $cos\ \varphi$ 0,98 over-excited and under-excited
Tolerance $cos\ \varphi$	–		± 0,02	-	–
Tolerance Q [kVAR]	± 4%P_{Emax}		–		± 4%P_{Emax}

Min. possible step of cos φ setpoint: ±0.01

Test based on 0.9 lagging … 09 leading. Cos φ setpoint range: 0.8 lagging … 0.8 leading

5.4.8.2-1) testeted @0.9Un

Available power	Default cosφ	Voltage [V]	P [W]		S [VA]	Cos φ			Limit of

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P/P_{Emax} [%]		L1-N	L2-N	L3-N		Q [VAr]			$Q\__{theoretical}$ [VAr]	$\Delta Q/P_{E\,max}$ [%]	$\Delta Q/P_{E\,max}$ [%]
a) 40% - 60% (test at 55%)	cosφ = 0.90 under-excited	206.9	206.8	207.0	4934	-2433	5502	0.897	-2422	-0.12	± 4%
	cosφ = 0.95 under-excited	206.9	206.8	207.0	4945	-1688	5226	0.946	-1643	-0.45	± 4%
	cosφ = 0.90 over-excited	207.0	206.9	207.1	4953	2407	5507	0.899	2422	-0.15	± 4%
	cosφ = 0.95 over-excited	206.9	206.9	207.0	4959	1625	5218	0.950	1643	-0.18	± 4%
b) 100%	cosφ = 0.90 under-excited	207.1	206.9	207.1	9244	-4525	10192	0.898	-4304	-2.21	± 4%
	cosφ = 0.95 under-excited	207.1	207.0	207.2	9680	-3260	10114	0.948	-3083	-1.77	± 4%
	cosφ = 0.90 over-excited	207.1	207.0	207.2	9015	4394	10029	0.899	4304	0.09	± 4%
	cosφ = 0.95 over-excited	207.1	207.0	207.2	9544	3135	10046	0.950	3083	0.52	± 4%
Remark:Imax=15.9A											

5.4.8.2-2) testeted @1.0Un

Available power P/P_{Emax} [%]	Default cosφ	Voltage [V]			P [W]	Q [VAr]	S [VA]	Cos φ	$Q\__{theoretical}$ [VAr]	$\Delta Q/P_{E\,max}$ [%]	Limit of $\Delta Q/P_{E\,max}$ [%]
		L1-N	L2-N	L3-N							
a) 40% - 60% (test at 50%)	cosφ = 0.90 under-excited	229.9	229.8	230.0	4940	-2451	5514	0.896	-2422	-0.29	± 4%
	cosφ = 0.95 under-excited	229.9	229.8	230.0	4944	-1707	5231	0.945	-1644	-0.64	± 4%
	cosφ = 0.90 over-excited	229.9	229.8	230.0	4941	2399	5492	0.900	2422	-0.23	± 4%
	cosφ = 0.95 over-excited	229.9	229.8	230.0	4935	1618	5193	0.950	1644	-0.25	± 4%
b) 100%	cosφ = 0.90 under-excited	230.0	229.9	230.1	9228	-4527	10178	0.898	-4359	-1.68	± 4%
	cosφ = 0.95 under-excited	230.0	229.9	230.1	9654	-3262	10190	0.947	-3122	-1.4	± 4%

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	cosφ = 0.90 over-excited	230.0	229.9	230.1	9009	4381	10018	0.899	4359	0.22	± 4%
	cosφ = 0.95 over-excited	230.0	229.9	230.1	9545	3127	10044	0.950	3122	0.05	± 4%

5.4.8.2-3) testeted @1.1Un

Available power P/P_{Emax} [%]	Default cosφ	Voltage [V]			P [W]	Q [VAr]	S [VA]	Cos φ	$Q_{\_theoretical}$ [VAr]	$\Delta Q/P_{E\,max}$ [%]	Limit of $\Delta Q/P_{E\,max}$ [%]
		L1-N	L2-N	L3-N							
a) 40% - 60% (test at 50%)	cosφ = 0.90 under-excited	252.9	252.8	253.0	4930	-2460	5510	0.895	-2422	-0.38	± 4%
	cosφ = 0.95 under-excited	252.9	252.8	253.1	4935	-1719	5226	0.944	-1644	-0.76	± 4%
	cosφ = 0.90 over-excited	253.0	252.8	253.0	4932	2395	5483	0.900	2422	-0.27	± 4%
	cosφ = 0.95 over-excited	252.9	252.8	253.0	4940	1624	5200	0.950	1644	-0.19	± 4%
b) 100%	cosφ = 0.90 under-excited	253.0	252.9	253.1	9230	-4539	10186	0.897	-4359	-1.8	± 4%
	cosφ = 0.95 under-excited	253.0	252.9	253.1	9675	-3283	10117	0.947	-3122	-1.61	± 4%
	cosφ = 0.90 over-excited	253.1	252.9	253.1	9037	4392	10048	0.899	4359	0.33	± 4%
	cosφ = 0.95 over-excited	253.0	252.9	253.1	9554	3130	10053	0.950	3122	0.08	± 4%

The product software will limit the output when the power or current which reaches the maximum limit value first.

5.4.8.3 Test the displacement factor / active power characteristic curve cos φ (*P*)

Test method:

a) Test steps for guided PGU accuracy (characteristic curve)

a) Adjust working point P ≤ 20 % P_{rE} or minimum technical power with activated cos φ (P) control.

b) Start measurement.

c) Set the active power setpoint to 100% P_{rE}, wait until the stationary end values for P and Q are set.

d) Set active power setpoint to P ≤ 20 % P_{rE} or minimum technical power, wait until the stationary end values for P and Q are set.

e) Stop measurement.

b) Test steps for guided PGU – dynamic

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An examination of the PT_1 behavior in transition dynamics defined in VDE-AR-N 4105: 2018-11 is not necessary because of the required limits of the active power gradient.

c) Test steps for supply-dependent PGU accuracy (characteristic)

a) Adjust operating point P ≥ 99 % PrE with activated cos φ (P) control. Start measurement

b) Decrease DC power or primary energy in steps of ≤ 30% PrE / min from ≥ 99% PrE to ≤20% PrE, wait until the steady state end values for P and Q are reached

c) Increase DC power or primary energy in steps of ≤30% PrE / min from ≤20% PrE to ≥ 99% PrE, wait until the steady state end values for P and Q are reached

d) Stop measurement.

d) Test steps for supply-dependent PGU dynamics

a) Adjust operating point P ≥ 99% PrE with activated cos φ (P) control

b) Start measurement.

c) After 60 s of DC power or primary energy, suddenly jump from ≥ 99% PrE to ≤ 50% PrE, wait until the steady state end values for P and Q are reached.

d) After 60 s increase DC power or primary energy suddenly jump from ≤ 50% PrE to ≥ 99% PrE, wait until the steady state end values for P and Q are reached.

e) After 60 s of DC power or primary energy, suddenly jump from ≥ 99% PrE to ≤ 75% ± 5% PrE, wait until the steady state end values for P and Q are reached.

f) Stop measurement after 60 s.

5.4.8.3-1) Accuracy test

Available power P/P_{Emax} [%]	Active Power [W]	Reactive Power [VAr]	Reactive $Power_{\_theoretical}$ [VAr]	Cos φ	$\Delta Q/P_{Emax}$ [%]	Limit of $\Delta Q/P_{Emax}$ [%]
100%	9358	-4136	-4359	0.915	2.23	≤ ±4
80%	7889	-2801	-2904	0.942	1.03	≤ ±4
60%	5917	-1193	-1218	0.980	0.25	≤ ±4
40%	3923	-302	0	0.997	-3.02	≤ ±4
20%	1914	-306	0	0.986	-3.06	≤ ±4
40%	3918	-305	0	0.997	-3.05	≤ ±4
60%	5924	-1200	-1218	0.980	0.18	≤ ±4
80%	7889	-2803	-2904	0.942	1.01	≤ ±4
100%	9390	-4172	-4359	0.914	1.87	≤ ±4

5.4.8.3-2) Dynamics test

Available power P/P_{Emax} [%]	Active Power [W]	Reactive Power [Var]	Reactive Power calculated [Var]	Cos φ	PT1 response comply
100%	9341	-4070	-4359	0.913	--

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50%	4921	-140	0	0.999	☒ Yes ☐ No
100%	9347	-4073	-4359	0.913	☒ Yes ☐ No
75%	7516	-2420	-2465	0.949	☒ Yes ☐ No

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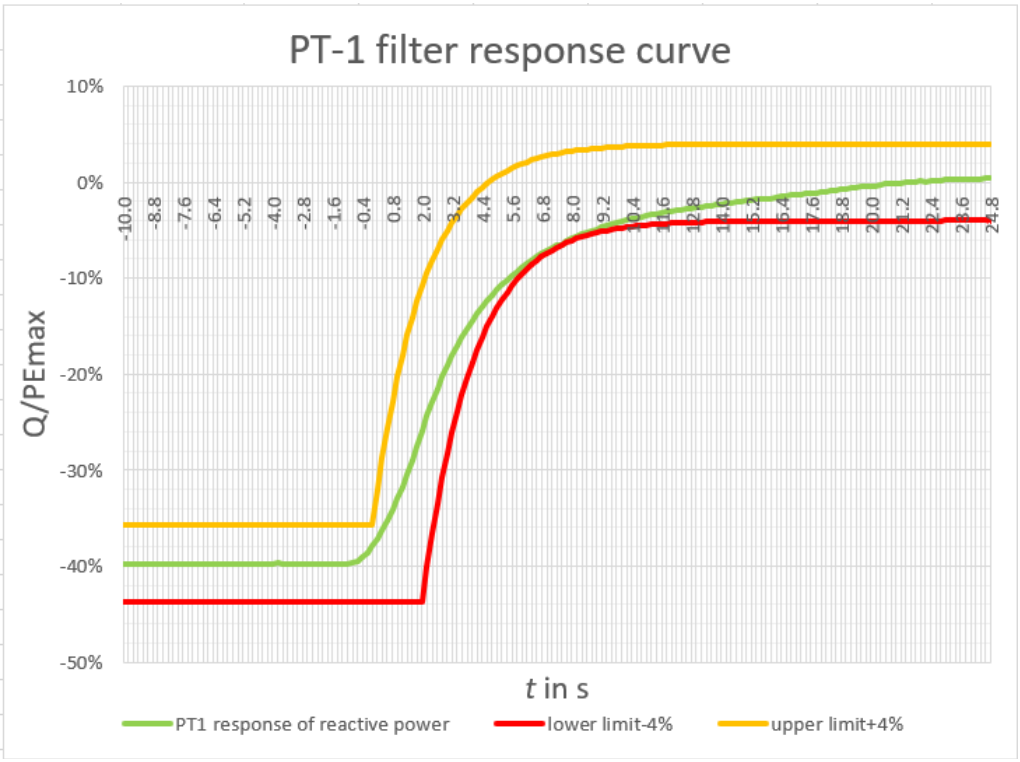

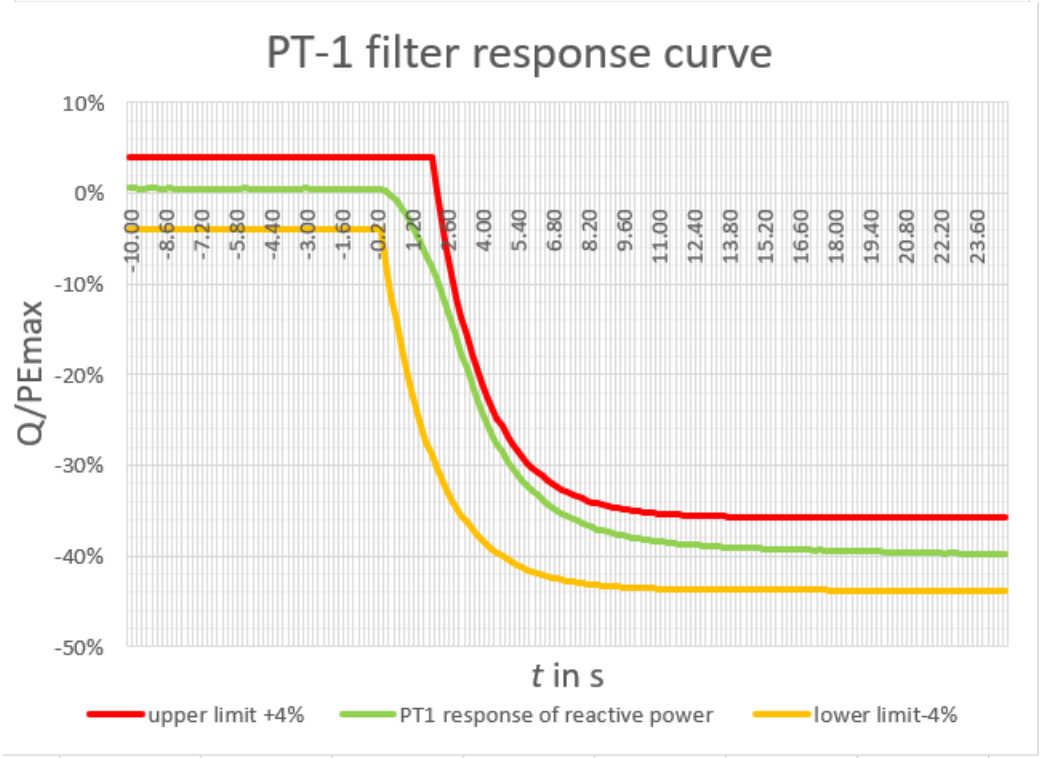

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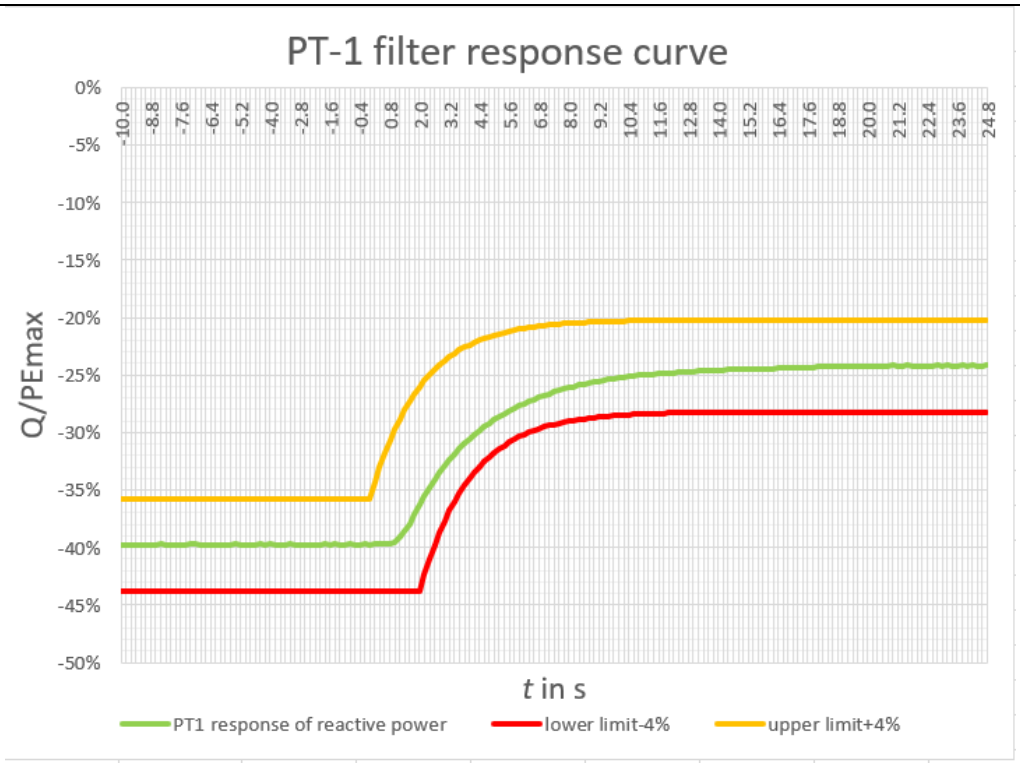

5.4.8.4 Testing the reactive power-voltage characteristic curve Q(U)

Test method:

5.4.8.4-1) Test of the accuracy of the Q (U) control:

The test of the accuracy of the Q (U) control using the reactive power-voltage characteristic curve shown in VDE-AR-N 4105: 2018-11, 5.7.2.4, Figure 7 is achieved by a slow variation of the system voltage U_n in the range 90% U_n to 110 % U_n. To carry out changes of voltage symmetrically on all phases:

1) The permissible voltage range is to be stepped through. Each voltage must be applied to the PGU for at least 2 min. The test should be carried out with a step size of 1% U_N, but no more than 2% U_N. First, the voltage range from 100% of the nominal voltage U_N in the low voltage range to 90% Un to go through. Afterwards, the voltage range from 90% U_N to 110% U_N must be passed through into the overvoltage. Finally, the voltage of 110% U_N is brought back to 100% of the nominal voltage Un. The procedure is analogous to Figure 3 in Section 5.4.3.2.

The voltage U_{PGU} applied to the PGU and the reactive power Q_{PGU} provided by it in the positive sequence system are recorded as being correct in the form of 200ms average values. The voltages are to be set with a maximum deviation of ± 0.25% U_n. As an alternative to the use of a controllable voltage source, the variation of the voltage can also be predetermined by a differential, controller-side manipulation of the measured voltage. For this purpose, the boundary conditions in 5.4.8.3.2 b) must be observed.

5.4.8.4-2) Test of the dynamics of the Q (U) control:

To test the dynamic behavior required in VDE-AR-N 4105: 2018-11, 5.7.2.5, the closed loop of the PGU, including the feedback over the network impedance, must be considered. This is required because the feedback can lead to a change in the dynamic behavior and thus to a deviation from the required behavior of a PT1 filter. It is therefore not enough to look at the open loop.

Decisive for a safe and stable behavior at the network is the overall gain of the control loop consisting of the Q (U) characteristic curve, the strength of the feedback in the form of the net replacement reactance X_{Netz} as well as any additional control loop gain (fixed to K = 1). It is assumed that the standard Q (U) characteristic curve from VDE-AR-N 4105: 2018-11, 5.7.2.4, Figure 7 is used. To maintain constant test conditions for all PGUs, the network replacement reactance X_{Netz} should be selected according to the apparent power of the PGU under test according to the following formula:

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$$X_{netz} = \frac{0.0218 \cdot 3 \cdot U_{N,Y}{}^2}{0.85 \cdot |Q_{max}|} \text{ respectively } S_K = \frac{0.85 \cdot |Q_{max}|}{0.0218}$$

The maximum reactive power Q_{max} is calculated from the minimum displacement factors from Table A.2(0,90 or 0,95) of VDE-AR-N 4105: 2018-11. The voltage $U_{N,Y}$ describes the rated star voltage. The ratio of resistance to reactance should be set to R / X ≤ 2.5.

In order to keep the test for all classes identical to PGU and not to influence the evaluation, the computationally determined grid replacement reactance Xnet must not be deviated too much. The reactance of the test set-up may be at most 33% smaller and at most 55% greater than the value calculated by the above-mentioned formula. The following figure shows the described quantities. The use of a grid simulator with a sufficiently accurate simulation of the grid impedance is permitted.

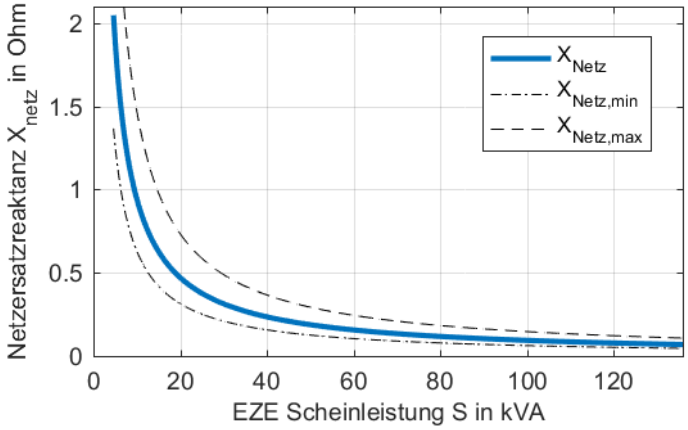

Figure 4 –Network replacement reactance X_{Netz} with tolerances

The parameters described take into account both the stability of the individual PGUs and those of a combined operation in the form of an PGS. The required active power supply to reach the reactive power setpoint according to the associated PQ diagram from VDE-AR-N 4105:2018-11, 5.7.2.3 must be guaranteed.

Initial state: The Q (U) control of the PGU must be parameterized with the smallest possible response time according to VDE-AR-N 4105: 2018-11, Chapter 5.7.2.5. The voltage source must be set so that the positive sequence corresponds to the voltage 100% U_n applied to the PGU. If none adjustable voltage source can be used, the voltage at point 1 must be symmetrical (unbalance tolerance: 0.5%) and constant (tolerance ± 1% U_n over 1 min before the measurement) and the voltage must be constant throughout the measurement at the PGU (point 2) within the Q (U) deadband of 97% to 103% $U_{n,y}$.

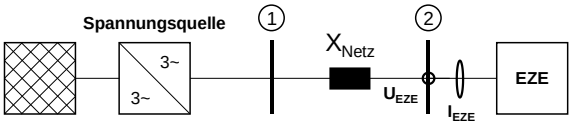

Figure 5 – Schematic laboratory setup

To demonstrate the required dynamics (PT1 behavior), a reactive power setpoint of 85% Qmax or - 85% Qmax must be set by means of a step-like voltage excitation. For this purpose, the following two options a) and b) are permissible, which are carried out three times per sign direction, starting from the initial state defined above. The measuring duration is 1 min each from the voltage excitation. It is necessary to start the measurement at least 10 s before the voltage excitation. Table 12 outlines the examination procedure.

a) The voltage of the controllable voltage source is symmetrical and jump to increase the voltage difference $\Delta U_{ind,Y}$ or to decrease $\Delta U_{kap,Y}$ below according to the formula. The timing of the excitation must be recorded by measurement
b) alternatively to the use of a controllable voltage source, a simulation of the voltage change by a controller-side manipulation is permitted. However, it must be ensured that the manipulation occurs as a differential connection of ΔU directly after the actual voltage measurement (RMS or positive sequence formation) and thus the smallest possible influence on the control dynamics takes place. A

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voltage shift of the Q (U) characteristic curve does not correspond - depending on the structure of the control loop - to a manipulation of the voltage input and is therefore not permitted. In addition, only the voltage input of the superimposed Q (U) control, but not the input variables of the current and power controller should be manipulated. The feedback via the network impedance must not be interrupted or in other words: none of the mains voltage must be completely emulated by a third party device. The voltage input must be manipulatively raised by $\Delta U_{ind,Y}$ or lowered by $\Delta U_{kap,Y}$ according to the formula below. The time of the manipulation must be recorded metrologically.

$$\Delta U_{ind,Y} = 1.03\ U_{N,Y} - U_{EZE,Y} + \left(\frac{X_{Netz}}{3 \cdot U_{N,Y}} + \frac{1}{k_{QU}}\right) \cdot 0{,}85 \quad \cdot |Q_{max}|$$

$$\Delta U_{kap,Y} = 0.97\ U_{N,Y} - U_{EZE,Y} - \left(\frac{X_{Netz}}{3 \cdot U_{N,Y}} + \frac{1}{k_{QU}}\right) \cdot 0{,}85 \cdot |Q_{max}|$$

The amplification factor k_{QU} for the mapping of the Q (U) characteristic results according to VDE-AR-N 4105: 2018-11, 5.7.2.4

$$k_{QU} = \frac{|Q_{max}|}{0.04 \cdot U_{N,Y}}.$$

Table 30 – Individual steps to test the dynamics of Q (U) control

Test	expected PGU behavior	Change of voltage (Measurement duration: at least 10s pre-excitation, at least 1 min after excitation)
Approaching the initial state, $Q_{PGU} = 0$		
1a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
1b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$
2a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
2b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$
3a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
3b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$
4a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
4b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$
5a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
5b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$
6a	Inductive ΔQ	voltage change around $\Delta U_{ind,Y}$
6b	Capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$

In order to avoid possible overlapping of the grid sizes by means of electromechanical compensation processes, the procedure b) is to be preferred for type 1 system.

If the described test of the reactive power voltage characteristic Q (U) at the PGU to be tested has already been carried out using a steeply rising characteristic curve with a larger k_{QU}, the measured data generated there can be used for the further evaluation.

The voltage U_{PGU} applied to the PGU as well as the reactive power provided by it in the positive sequence system Q_{PGU} are output with correct sign in the form of 200ms average values. The voltages are to be set with a maximum deviation of ±0.25% U_n.

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5.4.8.4-1) Accuracy test						
Active power setting for test: 10 kW (100%Pn)						
Steps	Setting value [V]	Measured terminal voltage of PGU_pos [V]	Reactive Power target of PGU_pos [VAr]	Reactive Power measured of PGU_pos [VAr]	$\Delta Q/P_{Emax}$ [%]	Limit of $\Delta Q/P_{Emax}$ [%] ± $(0.01*U_{N,Y}*k_{QU} +0.04P_{Emax})$
1	1.00Un	230.0	0	386	3.86	± 14.9
2	0.99Un	227.7	0	381	3.81	± 14.9
3	0.98Un	225.4	0	375	3.75	± 14.9
4	0.97Un	223.1	0	368	3.68	± 14.9
5	0.96Un	220.9	1411	-352	-3.52	± 14.9
6	0.95Un	218.7	1990	116	1.16	± 14.9
7	0.94Un	216.5	3122	65	0.65	± 14.9
8	0.93Un	214.2	4359	-74	-0.74	± 14.9
9	0.92Un	211.9	4359	58	0.58	± 14.9
10	0.91Un	209.6	4359	59	0.59	± 14.9
11	0.90Un	207.4	4359	60	0.6	± 14.9
12	0.91Un	209.6	4359	57	0.57	± 14.9
13	0.92Un	211.9	4359	56	0.56	± 14.9
14	0.93Un	214.2	4359	-71	-0.71	± 14.9
15	0.94Un	216.5	3122	67	0.67	± 14.9
16	0.95Un	218.7	1990	110	1.1	± 14.9
17	0.96Un	220.9	1411	-358	-3.58	± 14.9
18	0.97Un	223.2	0	-372	-3.72	± 14.9
19	0.98Un	225.4	0	-378	-3.78	± 14.9
20	0.99Un	227.7	0	-385	-3.85	± 14.9
21	1.00Un	230.0	0	-391	-3.91	± 14.9
22	1.01Un	232.3	0	-397	-3.97	± 14.9

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23	1.02Un	234.6	0	-404	-4.04	± 14.9
24	1.03Un	236.9	0	-412	-4.12	± 14.9
25	1.04Un	239.1	-1411	191	1.91	± 14.9
26	1.05Un	241.3	-1990	-285	-2.85	± 14.9
27	1.06Un	243.6	-3122	-226	-2.26	± 14.9
28	1.07Un	245.8	-4359	-56	-0.56	± 14.9
29	1.08Un	248.1	-4359	-212	-2.12	± 14.9
30	1.09Un	250.4	-4359	-213	-2.13	± 14.9
31	1.10Un	252.7	-4359	-214	-2.14	± 14.9
32	1.09Un	250.4	-4359	-215	-2.15	± 14.9
33	1.08Un	248.1	-4359	-213	-2.13	± 14.9
34	1.07Un	245.8	-4359	-60	-0.6	± 14.9
35	1.06Un	243.6	-3122	-224	-2.24	± 14.9
36	1.05Un	241.3	-1990	-283	-2.83	± 14.9
37	1.04Un	239.1	-1411	190	1.9	± 14.9
38	1.03Un	236.9	0	-411	-4.11	± 14.9
39	1.02Un	234.6	0	-404	-4.04	± 14.9
40	1.01Un	232.3	0	-399	-3.99	± 14.9
41	1.00Un	230.0	0	-386	-3.86	± 14.9

5.4.8.4-2) Dynamic test

Xnet = 0.0218*3*UN,Y2/(0.85*Qmax)

Initial state for testing:

Active power setting for test:	10 kW	**Smallest response time setting for PT1:**	6 s
Positive sequence voltage at PGU:	100%Un		

Step	Testing voltage of PGU	Measured terminal voltage of PGU_pos [V]	Reactive Power target of PGU_pos [VAr]	Reactive Power measured of PGU_pos [VAr]	Response time measured [s]	Comply with the PT1 response tolerance

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1a	Inductive ΔQ	voltage change at $\Delta U_{ind,Y}$	-85% Q_{max}	-3726	6	☒ Yes ☐ No
1b	capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$	0	-292	7	☒ Yes ☐ No
2a	Inductive ΔQ	voltage change at $\Delta U_{ind,Y}$	-85% Q_{max}	-3728	6	☒ Yes ☐ No
2b	capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$	0	-291	7	☒ Yes ☐ No
3a	Inductive ΔQ	voltage change at $\Delta U_{ind,Y}$	-85% Q_{max}	-3730	7	☒ Yes ☐ No
3b	capacitive ΔQ	Withdraw the voltage boost $\Delta U_{ind,Y}$	0	-290	7	☒ Yes ☐ No
4a	capacitive ΔQ	voltage change at $\Delta U_{kap,Y}$	85% Q_{max}	3729	7	☒ Yes ☐ No
4b	Inductive ΔQ	Withdraw the voltage boost $\Delta U_{kap,Y}$	0	-292	7	☒ Yes ☐ No
5a	capacitive ΔQ	voltage change at $\Delta U_{kap,Y}$	85% Q_{max}	3725	7	☒ Yes ☐ No
5b	Inductive ΔQ	Withdraw the voltage boost $\Delta U_{kap,Y}$	0	-292	7	☒ Yes ☐ No
6a	capacitive ΔQ	voltage change at $\Delta U_{kap,Y}$	85% Q_{max}	3733	7	☒ Yes ☐ No
6b	Inductive ΔQ	Withdraw the voltage boost $\Delta U_{kap,Y}$	0	-292	7	☒ Yes ☐ No
1) Diagram of PT1 for inductive reactive power within tolerance						

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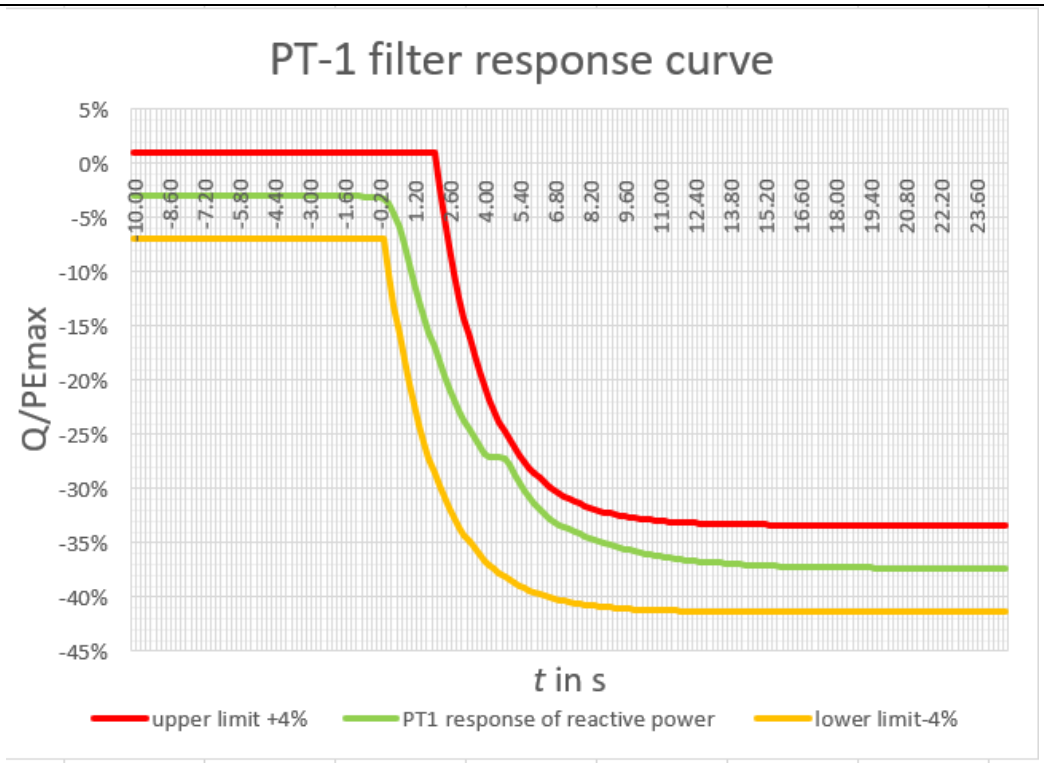

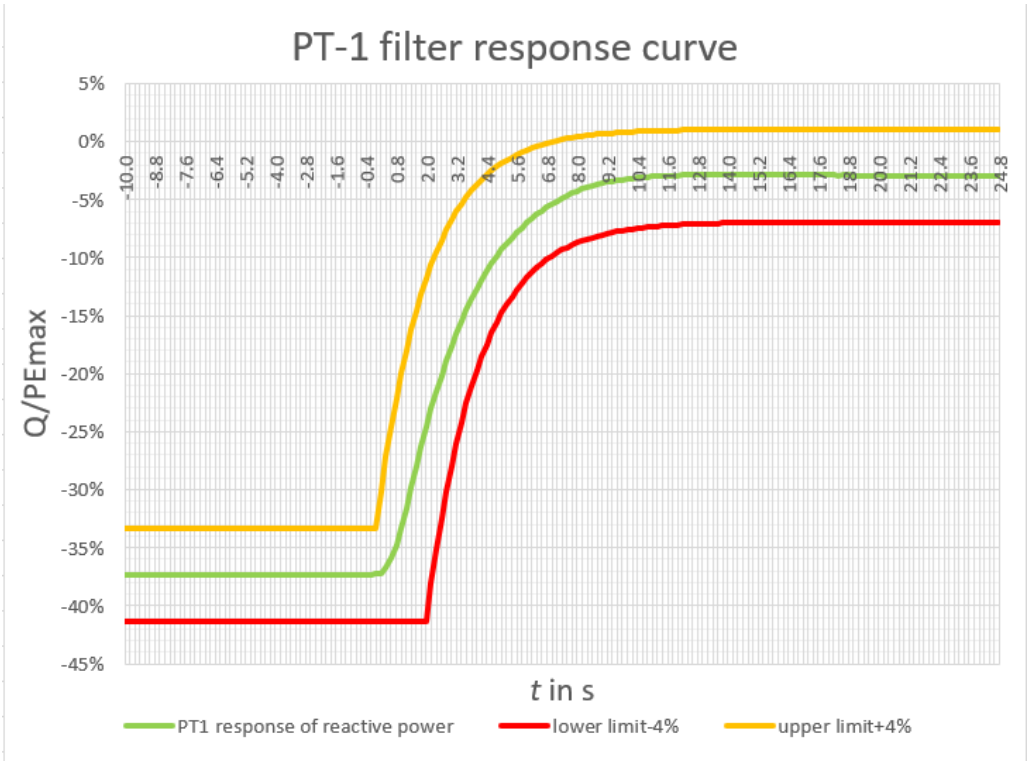

2) Diagram of PT1 for capacitive reactive power within tolerance

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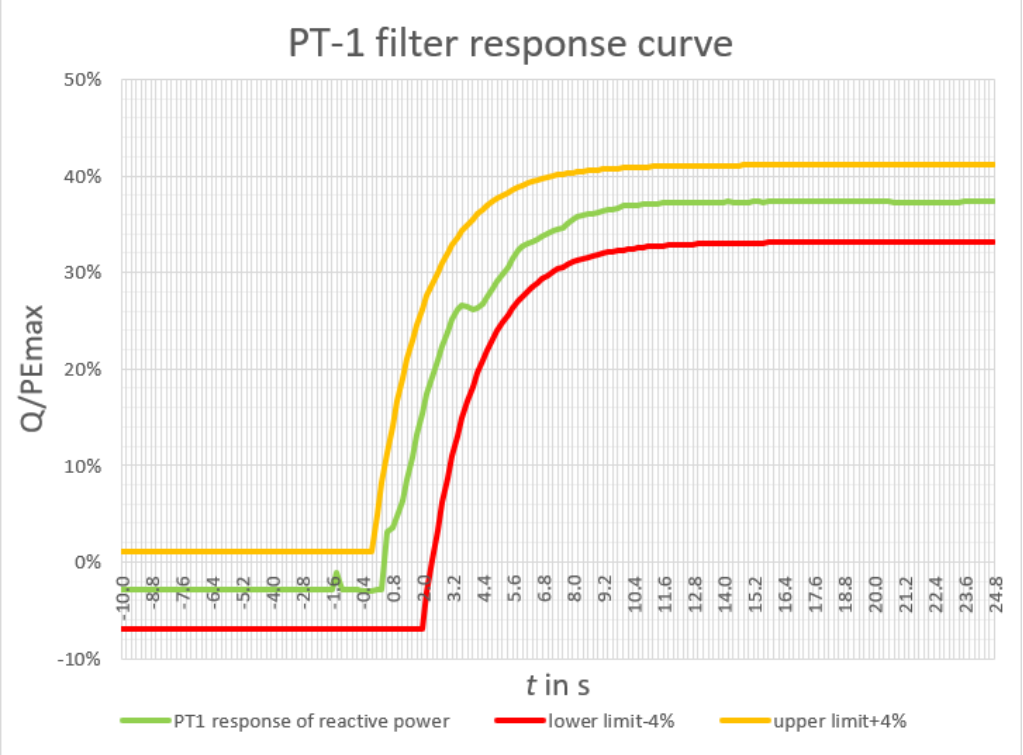

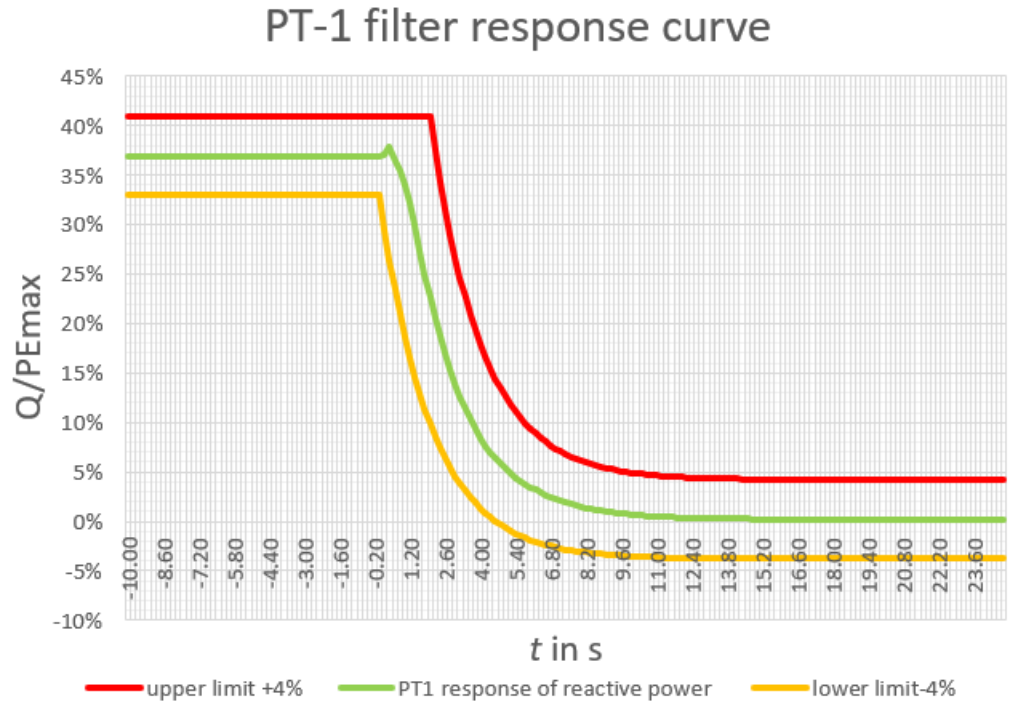

5.5.4	**TABLE: NS protection**	**P**
MODEL	**ST-INV-T10.0**	
Test method:		

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It must be tested that a single fault does not lead to the loss of the protective function of the NS protection.

It is the possible device combinations with the possible fault sources test.

Sources of fault are at least:

- faulty configuration
- Incorrect devices in the communication connection
- Line interruption / loss of connection
- Unsuccessful connection establishment

The tests must be documented with the device combination.

The combinations with passed tests are to be shown.

For PGU, which demonstrably fulfill the requirements of DIN EN 62109 (VDE 0126-14), the tests do not have to be carried out. Proof must be provided in the form of a test report from an accredited testing laboratory or a component certificate.

NOTE Typical fault include: AD converter failure, freezing of a microprocessor, error in the detection of the measured value, fusion of the contacts, reference voltage failure, supply voltage failure, supply voltage overvoltage, line break, semiconductor failure.

a) **Central NS-Protection**

The following tests are to be performed one after another in the series:

– The auxiliary voltage of the NS protection is switched off.
– The test device on the NS protection is activated.

b) **Integrated NS protection**

The test of the integrated NS protection takes place in chapter 5.5.7 and in connection with the testing of the overall NS protection - interface switch.

☐ **Central NS protection** ☒ **Integrated NS protection**

☒ **PGU comply with EN 62109-1 and EN 62109-2, certificate No. N8A 111812 0016 Rev.00 as an alternative of repeated test.**

5.5.4		**Single fault test**						**P**
No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	Result	
1	Grid voltage monitoring R708	Open-circuit	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	Inverter shut down immediately. Display “Grid voltage fault”. No components damage, no hazard.	
2	Main MCU U25	Failure	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			Inverter shut down immediately. Display “Waiting…”. Q100 break down. No other components damage, no hazard.	
3	Inverter Frequency detect U21	Failure	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			Inverter shut down immediately. Display “Grid Frequency fault”. No components damage, no hazard.	
4	Inverter drive IC U77	Over voltage failure	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			Inverter shut down immediately. Display “OCP fault”. No components damage, no hazard.	
5	Relay drive R1611	Open-circuit	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			Inverter shut down immediately. Display “Grid Relay fault”. No components damage, no hazard.	

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5	Auxpower-R33	Open-circuit	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			Inverter shut down immediately. Display “Waiting…”. No components damage, no hazard.
7	INV Circuit detect R1116	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter stop operation. LCD Show “ OCP Fault and “Hardware trip” No damage, no hazard
8	PV1 current detect R517	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down after 1 sec. Show ”SW OCP” and ”Hardware Trip” .No components damage, no hazard.
9	INV current detect R906	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down after 1 sec. Show ”SW OCP” and ”Hardware Trip” .No components damage, no hazard.
10	Battery current detect R607	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down after 1 sec. Show ”SW OCP” and ”Hardware Trip” .No components damage, no hazard.
11	Master grid voltage detect, R714	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down, Show “ Grid Volt Fault”. No components damage, no hazard.
12	Slave grid voltage detect, R847	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter works normally. No components damage, no hazard.
13	Slave MCU frequency detect R869	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down, monitoring circuit have no power. No components damage, no hazard.
14	BUS voltage U15- Pin7	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			The inverter shut down immediately. Show “ BUS volt fault ” No components damage, no hazard.
15	PV array insulation monitoring, D324	Short	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter could not start. Show ”ISO Fault” . No components damage, no hazard.
16	PV array insulation monitoring, R274 on U200	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	PCE could not start. Show ”ISO Fault” . No components damage, no hazard.
17	RCD detect U801 Pin14	Short	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter not start. Show “GFCI Fault”. No components damage, no hazard.
18	Relay drive Q1202, D-S	Short	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			The inverter not start. Show “Grid Relay Fault”. No components damage, no hazard.
19	DSP failure(main DSP U25）	Short +3.3V power	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	PCE shut down, No output power feedback into grid. Show “ Waiting…”. No components damage, no hazard.
20	Slave MCU U4 Pin25	Short	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min			PCE shut down, No output power feedback into grid. Show “ SCI Fault”. No components damage, no hazard.

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21	RCD slave MCU detect D403	Short before start-up	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter works normally. No components damage, no hazard.
22	ARM U37	Short +3.3V power	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down, No output power feedback into grid. Show " Waiting…". No components damage, no hazard.
23	Communication IC U3 Pin6	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down, No output power feedback into grid. Show " Waiting…". No components damage, no hazard.
24	BMS IC U26 pin4	Open	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter works normally. No components damage, no hazard. Show " BMS fault"
25	Power detect IC U27 Pin7	Short to Ground	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter shut down, No output power feedback into grid. Show " Meter fault". No components damage, no hazard.
26	Temperature detect U10 pin7	Short to 3.3V	Grid: 230Vac PV:500Vdc Bat:400Vdc	10min	-	-	The inverter works normally but derating power No components damage, no hazard. Show " Over temp".
Supplementary information:							

5.5.6	**TABLE: Interface switch**	**P**
MODEL	**ST-INV-T10.0**	

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Test method:

a) Central interface switch

The design of a central interface switch requires some information from the PGU. The documentation of the manufacturer of the PGU must therefore contain the following information:

– maximum initial short circuit current;
– maximum backup fuse;
– Circuit diagram / connection diagram (PGU, NS protection, interface switch) contains the required control and feedback signals.

b) Integrated interface switch

Make a visual check to see if there is a galvanic switching device.

NOTE The requirement for the switching device is defined in VDE AR-N 4105: 2018-11 A.6.

The documentation of the manufacturer specifying the proper time of the integrated interface switch must be checked.

With the combination of the integrated interface switch and integrated NS protection, the entire functional chain has to be checked.

a) 1. The control voltage of the interface switch is interrupted.
2. It is necessary to simulate a fault during normal operation and disconnection of the interface switch.
3. The NS protection is triggered. In this case, a malfunction of the interface switch is simulated.

Note: The test is carried out with grid-interactive PGU. Failure of the interface switch with simultaneous protection release can lead to the return service due to the concept.

4. The NS protection is triggered. The disconnection time of the entire functional chain is determined.

b) 1. It is in the daily on and off function of the interface switch to simulate a fault.
2. The NS protection is triggered. In this case, a malfunction of the interface switch is simulated. The switching capacity of the interface switch must be checked by means of manufacturer documentation.

c) No further testing is required for integrated interface switches of PV and battery inverters according to DIN EN 62109 (VDE 0126-14).

☐ **Central NS protection** ☒ **Integrated NS protection**

☒ **PGU comply with EN 62109-1 and EN 62109-2, certificate No. N8A 111812 0016 Rev.00 as an alternative of repeated test.**

Necessary information checked with manufacturer:

The max. initial short-circuit current Ik": 15.9 A

Interface switch type: Series-connected relays for both the neutral conductor and the line conductor; Power relay type: PEDS150(R)-HM32-3	manufacturer: Panasonic Co., Ltd.
Switching capacity of the interface switch: 33 A	Release time: Max. 10 ms Operate time: Max. 20 ms
The disconnection time of the entire functional chain:	≤ 100 ms

5.5.7.2	**TABLE: Voltage monitoring (integrated protection and interface switch)-setting check**	**P**

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MODEL	ST-INV-T10.0				
Description	Parameter name	Setting value in pu	Setting value L- N	Setting value L- L	Check match (yes or not)
Excitation threshold U>>	AU>>	1.25	287.5 V	500V	yes
Delay time U>>	tU>>	–	50 ms	50 ms	yes
Excitation threshold U>	AU>	1.10	253 V	440V	yes
Delay time U>	tU>	–	50 ms	50 ms	yes
Excitation threshold U<	AU<	0.8	184 V	320V	yes
Delay time U<.	tU<	–	3 s	3 s	yes
Excitation threshold U<<	AU<<	0.45	103.5 V	180V	yes
Delay time U<<	tU<<	–	300 ms	300 ms	yes
Excitation threshold f>	Af>	–	51.5 Hz	–	yes
Delay time f>	tf>	–	50 ms	50 ms	yes
Excitation threshold f<	Af<	–	47.5 Hz	–	yes
Delay time ss<	tf<	–	50 ms	50 ms	yes
Supplementary information:					

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5.5.7.4	TABLE: Voltage monitoring und frequency monitoring NS protection	P
MODEL	ST-INV-T10.0	

Test method:

For a single-phase EZE, only the feed-in phase needs to be checked. The test steps for U<< are not to be carried out for Stirling generators, fuel cells and synchronous or asynchronous generators ≤ 50 kW.
Before each test step, the EZE must be operated symmetrically at nominal voltage and nominal frequency for at least 10 s during feed-in operation. With external NA protection, the nominal voltage and nominal frequency must be applied symmetrically for at least 10 s. For the test steps for U>, the NA protection must be operated with the starting voltage for at least 600 s before each test step, see Figure 10.
At EZE the test f> and f< can be affected by the P (f) function. This is especially the case with the random overfrequency shutdown of non-controllable EZE. In these cases the P (f) function must be deactivated.
The following tests must be carried out:

Table 39 - Checking voltage monitoring and frequency monitoring

Test step	Parameter	Ramp, jump	Used on	Start	End	Jump height ΔU, Δf	Step length Δt
1.1	U>>	Rampe	U_{L1-N}, U_{L2-N}, U_{L3-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	< 1,15 V	> 400 ms
1.2 [a]	U>>	Rampe	U_{L1-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	< 1,15 V	> 400 ms
1.3 [a]	U>>	Rampe	U_{L2-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	< 1,15 V	> 400 ms
1.4 [a]	U>>	Rampe	U_{L3-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	< 1,15 V	> 400 ms
1.5 [b]	U>>	Rampe	U_{L1-L2} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	< 2,0 V	> 400 ms
1.6 [b]	U>>	Rampe	U_{L2-L3} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	< 2,0 V	> 400 ms
1.7 [b]	U>>	Rampe	U_{L3-L1} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	< 2,0 V	> 400 ms
2.1	U>>	Jump	U_{L1-N}, U_{L2-N}, U_{L3-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	> 9,2 V	> 400 ms
2.2 [a]	U>>	Jump	U_{L1-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	> 9,2 V	> 400 ms
2.3 [a]	U>>	Jump	U_{L2-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	> 9,2 V	> 400 ms
2.4 [a]	U>>	Jump	U_{L3-N} [c]	< 282,9 V < 259,9 V	> 292,1 V > 269,1 V	> 9,2 V	> 400 ms
2.5 [b]	U>>	Jump	U_{L1-L2} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	> 16,0 V	> 400 ms

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2.6 [b]	$U>>$	Jump	U_{L2-L3} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	> 16,0 V	> 400 ms
2.7 [b]	$U>>$	Jump	U_{L3-L1} [c]	< 492,0 V < 452,0 V	> 508,0 V > 468,0 V	> 16,0 V	> 400 ms
3.1	$U>$	Jump	U_{L1-N}, U_{L2-N}, U_{L3-N}	230 V	257,6 V	27,6 V	> 600,2 s
3.2	$U>$	Jump	U_{L1-N}, U_{L2-N}, U_{L3-N}	230 V	248,4 V	18,4 V	> 600,2 s
3.3 [a]	$U>$	Jump	U_{L1-N} or U_{L2-N} or U_{L3-N}	243,8 V	262,2 V	18,4 V	> 600,2 s
4.1	$U<$	Ramp	U_{L1-N}, U_{L2-N}, U_{L3-N}	>188,6 V	< 179,4 V	< 1,15 V	> 3,2 s
4.2 [a]	$U<$	Ramp	U_{L1-N}	>188,6 V	< 179,4 V	< 1,15 V	> 3,2 s
4.3 [a]	$U<$	Ramp	U_{L2-N}	>188,6 V	< 179,4 V	< 1,15 V	> 3,2 s
4.4 [a]	$U<$	Ramp	U_{L3-N}	>188,6 V	< 179,4 V	< 1,15 V	> 3,2 s
4.5 [b]	$U<$	Ramp	U_{L1-L2}	>328,0	< 312,0	< 1,15 V	> 3,2 s
4.6 [b]	$U<$	Ramp	U_{L2-L3}	>328,0	< 312,0	< 1,15 V	> 3,2 s
4.7 [b]	$U<$	Ramp	U_{L3-L1}	>328,0	< 312,0	< 1,15 V	> 3,2 s
5.1	$U<$	Jump	U_{L1-N}, U_{L2-N}, U_{L3-N}	>200,1 V	< 179,4 V	> 9,2 V	> 3,2 s
5.2 [a]	$U<$	Jump	U_{L1-N}	>200,1 V	< 179,4 V	> 9,2 V	> 3,2 s
5.3 [a]	$U<$	Jump	U_{L2-N}	>200,1 V	< 179,4 V	> 9,2 V	> 3,2 s
5.4 [a]	$U<$	Jump	U_{L3-N}	>200,1 V	< 179,4 V	> 9,2 V	> 3,2 s
5.5 [b]	$U<$	Jump	U_{L1-L2}	>348,0	< 312,0	> 16,0 V	> 3,2 s
5.6 [b]	$U<$	Jump	U_{L2-L3}	>348,0	< 312,0	> 16,0 V	> 3,2 s
5.7 [b]	$U<$	Jump	U_{L3-L1}	>348,0	< 312,0	> 16,0 V	> 3,2 s
6.1	$U<<$	Ramp	U_{L1-N}, U_{L2-N}, U_{L3-N}	>108,1 V	< 98,9 V	< 1,15 V	> 500 ms
6.2 [a]	$U<<$	Ramp	U_{L1-N}	>108,1 V	< 98,9 V	< 1,15 V	> 500 ms
6.3 [a]	$U<<$	Ramp	U_{L2-N}	>108,1 V	< 98,9 V	< 1,15 V	> 500 ms

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6.4 [a]	$U<<$	Ramp	U_{L3-N}	>108,1 V	< 98,9 V	< 1,15 V	> 500 ms
6.5 [b]	$U<<$	Ramp	U_{L1-L2}	> 188,0 V	< 172,0 V	< 1,15 V	> 500 ms
6.6 [b]	$U<<$	Ramp	U_{L2-L3}	> 188,0 V	< 172,0 V	< 1,15 V	> 500 ms
6.7 [b]	$U<<$	Ramp	U_{L3-L1}	> 188,0 V	< 172,0 V	< 1,15 V	> 500 ms
7.1	$U<<$	Jump	U_{L1-N}, U_{L2-N}, U_{L3-N}	>108,1 V	< 98,9 V	> 9,2 V	> 500 ms
7.2 [a]	$U<<$	Jump	U_{L1-N}	>108,1 V	< 98,9 V	> 9,2 V	> 500 ms
7.3 [a]	$U<<$	Jump	U_{L2-N}	>108,1 V	< 98,9 V	> 9,2 V	> 500 ms
7.4 [a]	$U<<$	Jump	U_{L3-N}	>108,1 V	< 98,9 V	> 9,2 V	> 500 ms
7.5 [b]	$U<<$	Jump	U_{L1-L2}	> 188,0 V	< 172,0 V	> 16,0 V	> 500 ms
7.6 [b]	$U<<$	Jump	U_{L2-L3}	> 188,0 V	< 172,0 V	> 16,0 V	> 500 ms
7.7 [b]	$U<<$	Jump	U_{L3-L1}	> 188,0 V	< 172,0 V	> 16,0 V	> 500 ms
8.1	$f>$	Ramp	f_{Netz}	< 51,4 Hz	> 51,6 Hz	< 25 mHz	> 400 ms
9.1	$f>$	Jump	f_{Netz}	< 51,4 Hz	> 51,6 Hz	> 0,2 mHz	> 400 ms
10.1	$f<$	Ramp	f_{Netz}	> 47,6 Hz	< 47,4 Hz	< 25 mHz	> 400 ms
11.1	$f<$	Jump	f_{Netz}	< 47,6 Hz	< 47,4 Hz	> 0,2 mHz	> 400 ms

a It must be ensured that no voltage other than the voltage to be tested exceeds one of the set and active limit values. For these test steps a voltage system free of zero sequence may be used according to FRT Fault Type D as shown in Figure A.1.
b These test steps are only to be carried out for EZE > 30 kVA and for central NA protective devices. If the outer conductor voltages are monitored for an EZE < 30 kVA, these test steps must also be applied. It must be ensured that no voltage other than the voltage to be tested exceeds one of the set and active limit values. For these test steps a voltage system free of zero sequence may be used according to FRT Fault Type C as shown in Figure A.1.
c The lower voltages apply to Stirling generators, fuel cells and synchronous or asynchronous generators ≤ 50 kW.

1) Test of voltage rise protection U>>

1.25Un

Test setp	parameter	Test on	Target value [V]	Actual value [V]	Deviation [%]	Permissible tolerances [%]	Break time [ms]	Break time limit
1.1	$U>>$	U_{L1-N}, U_{L2-N}, U_{L3-N}	1.25Un	286.8 286.5	-0.30 -0.43	± 1%	-	-

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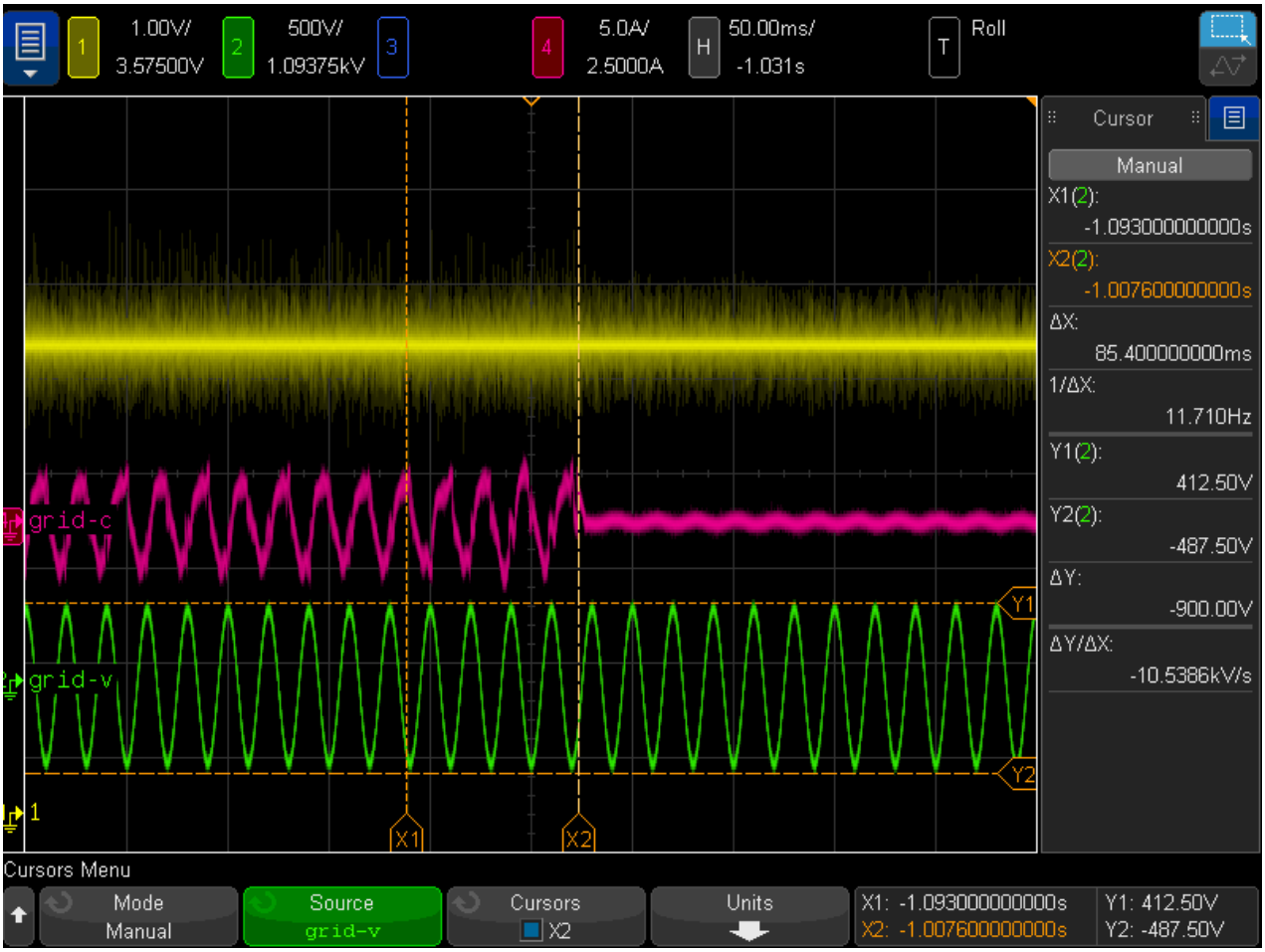
				286.9	-0.26			
1.2	U>>	U_{L1-N}	1.25Un	288.7	0.52	± 1%	-	-
1.3	U>>	U_{L2-N}	1.25Un	286.6	-0.39	± 1%	-	-
1.4	U>>	U_{L3-N}	1.25Un	286.9	-0.26	± 1%	-	-
1.5	U>>	U_{L1-L2}	1.25Un	498.3	0.09	± 1%	-	-
1.6	U>>	U_{L2-L3}	1.25Un	495.9	-0.51	± 1%	-	-
1.7	U>>	U_{L3-L1}	1.25Un	496.6	-0.34	± 1%	-	-
2.1	U>>	U_{L1-N}, U_{L2-N}, U_{L3-N}	1.25Un	-	-	-	85.40	≤ 200ms



2.2	U>>	U_{L1-N}	1.25Un	-	-	-	92.00	≤ 200ms

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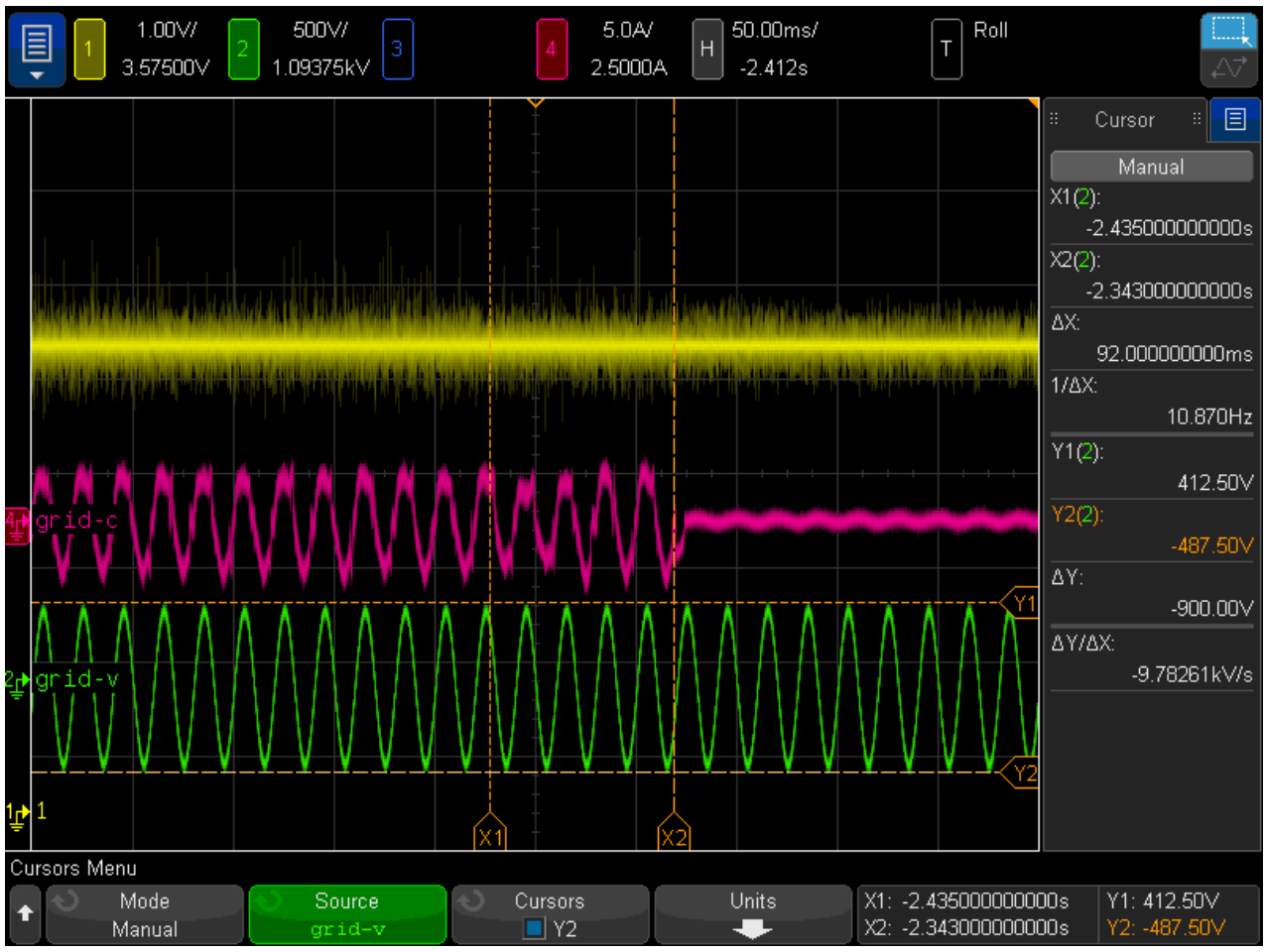

2.3	*U*>>	U_{L2-N}	1.25Un	-	-	-	82.40	≤ 200ms

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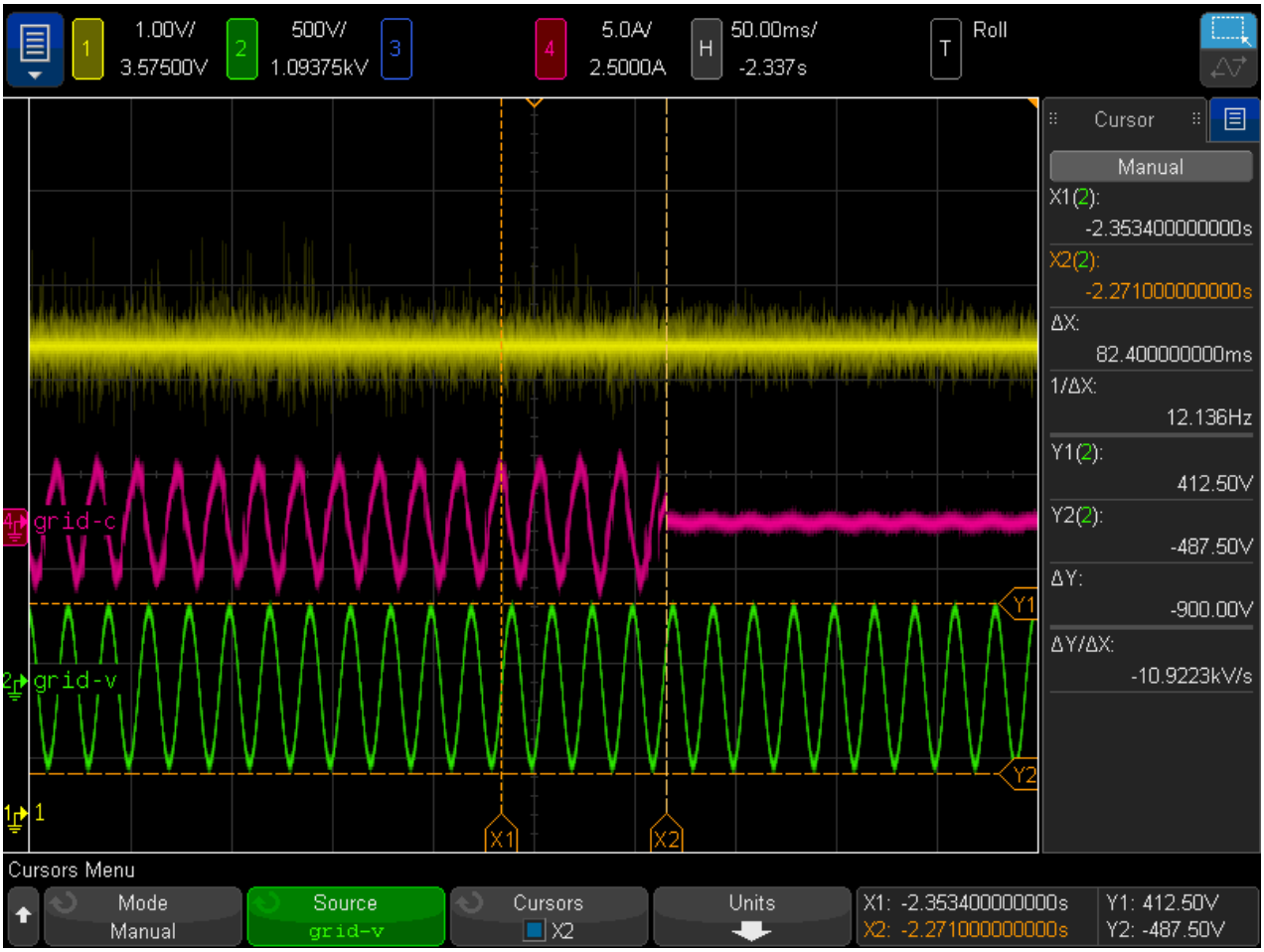

2.4	*U*>>	$U_{L3\text{-}N}$	1.25Un	-	-	-	97.20	≤ 200ms

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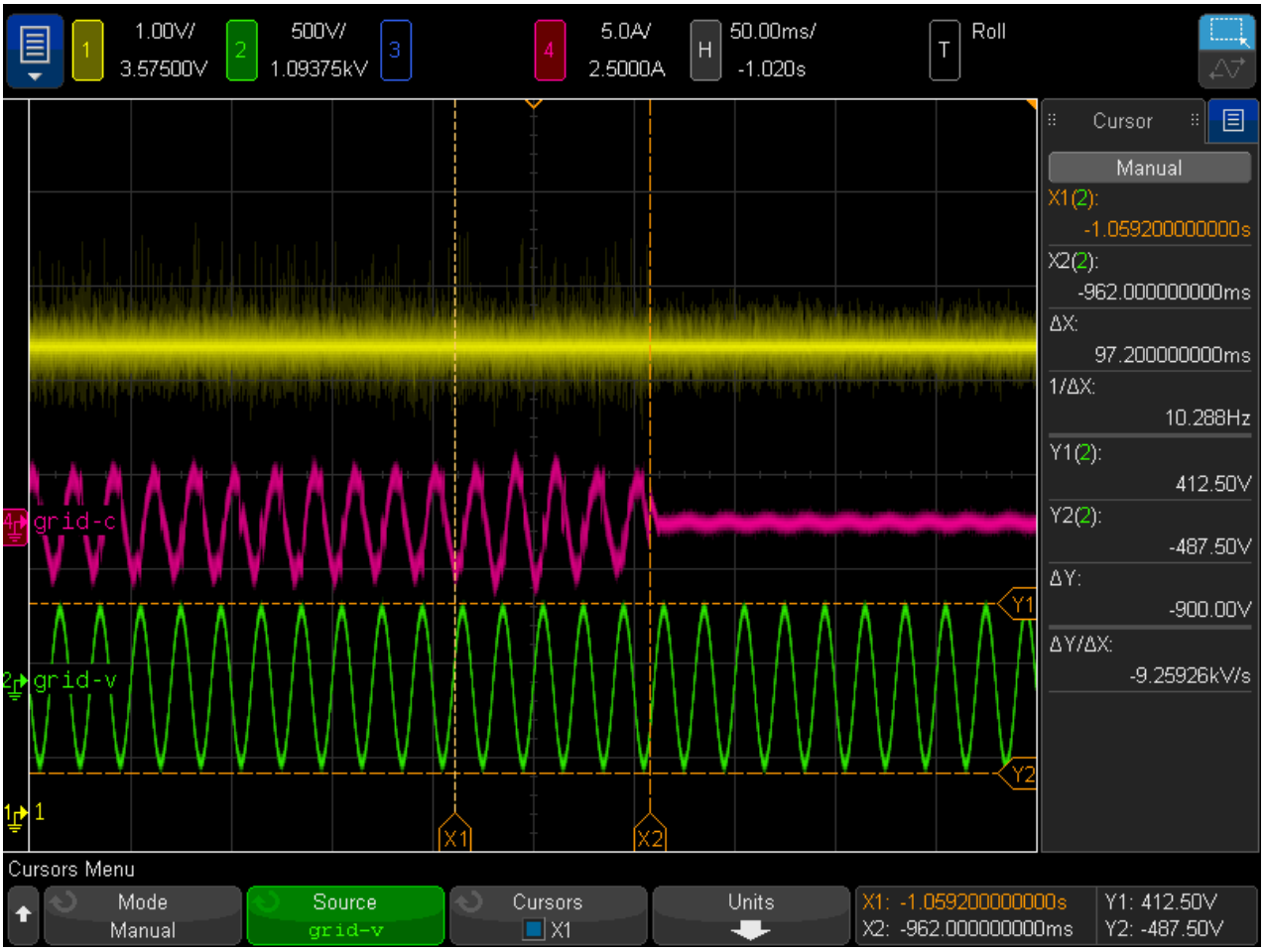

2.5	*U*>>	U_{L1-L2}	1.25Un	-	-	-	76.00	≤ 200ms

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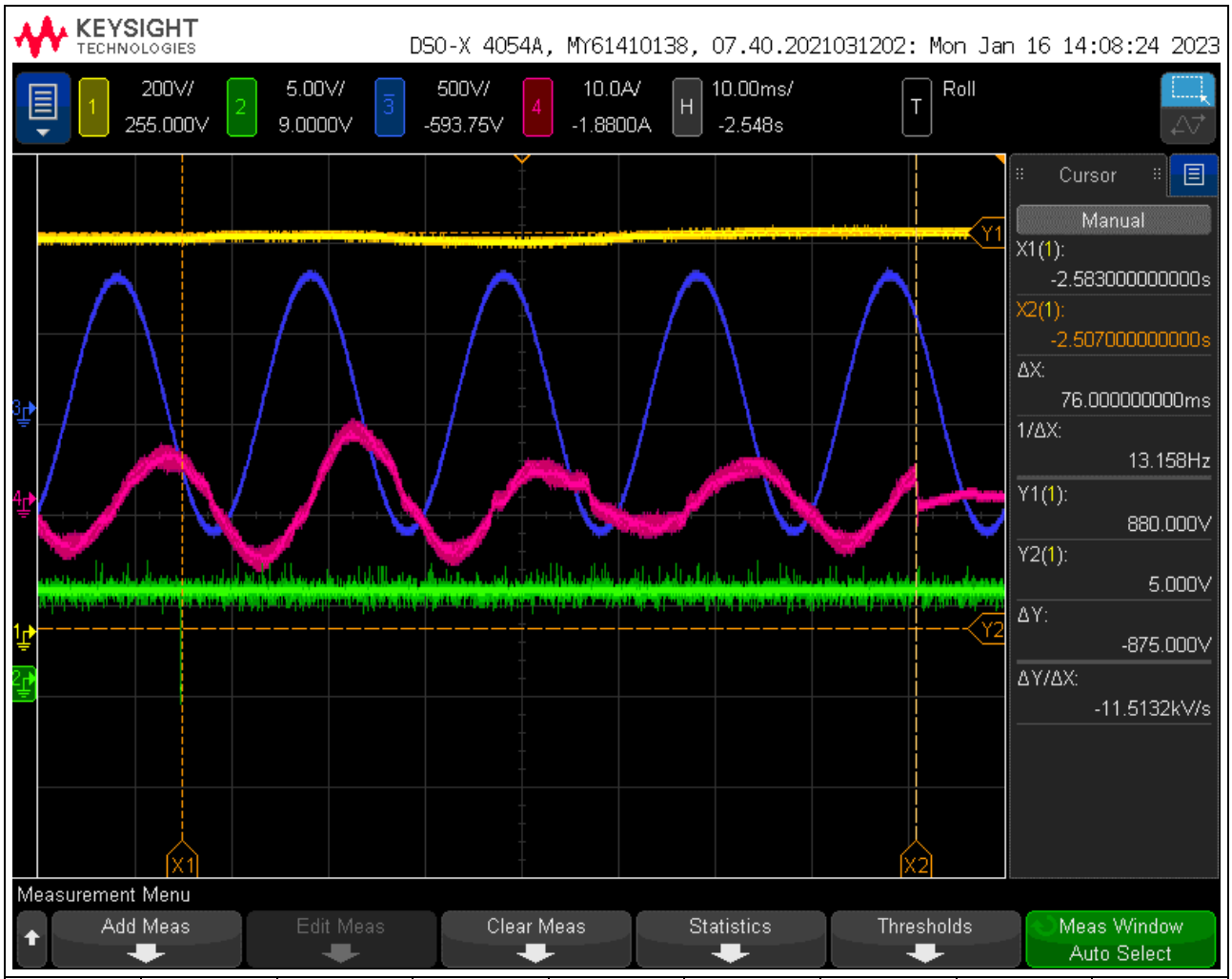

2.6	*U*>>	$U_{L2\text{-}L3}$	1.25Un	-	-	-	65.00	≤ 200ms

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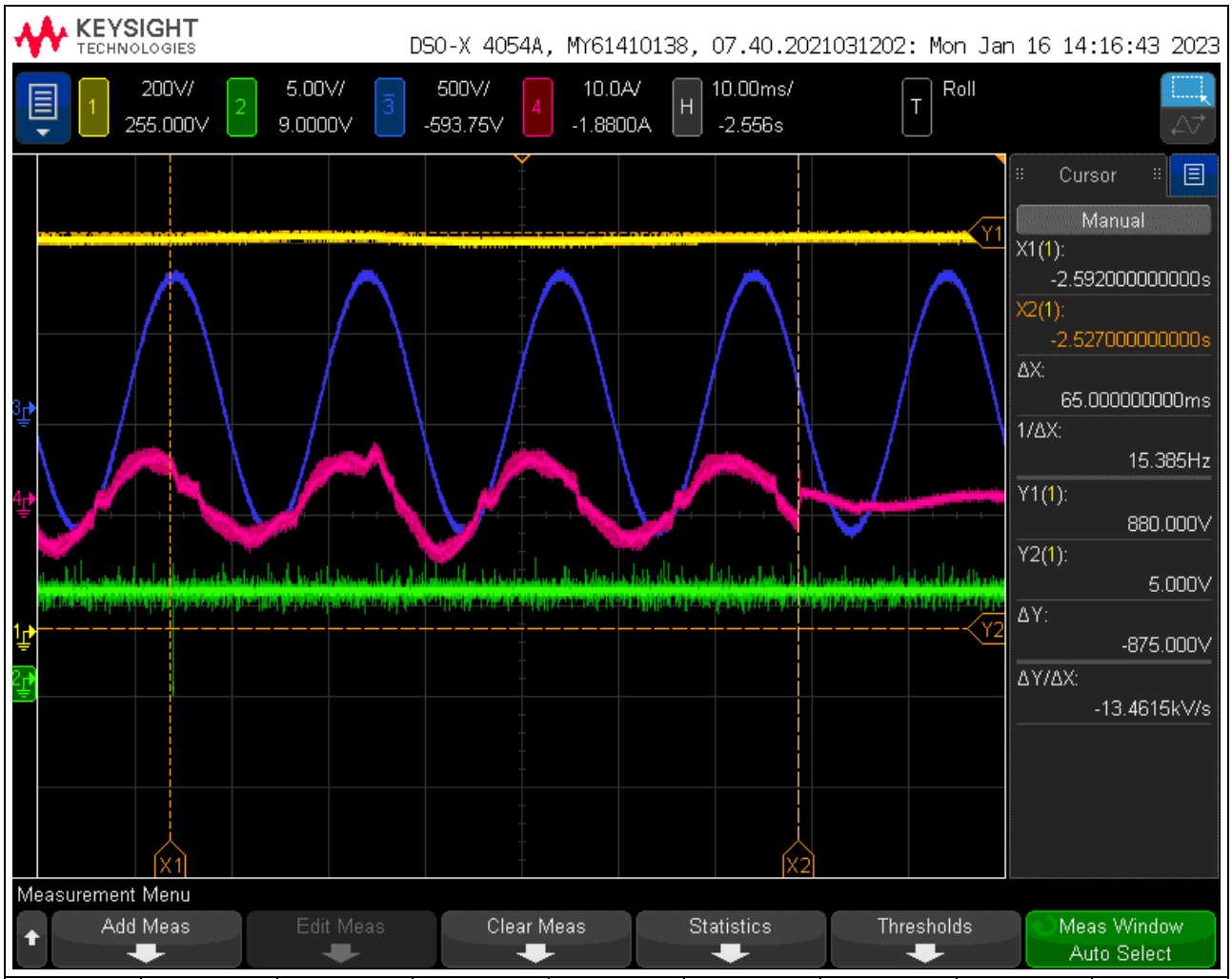

2.7	*U*>>	$U_{L3\text{-}L1}$	1.25Un	-	-	-	71.40	≤ 200ms

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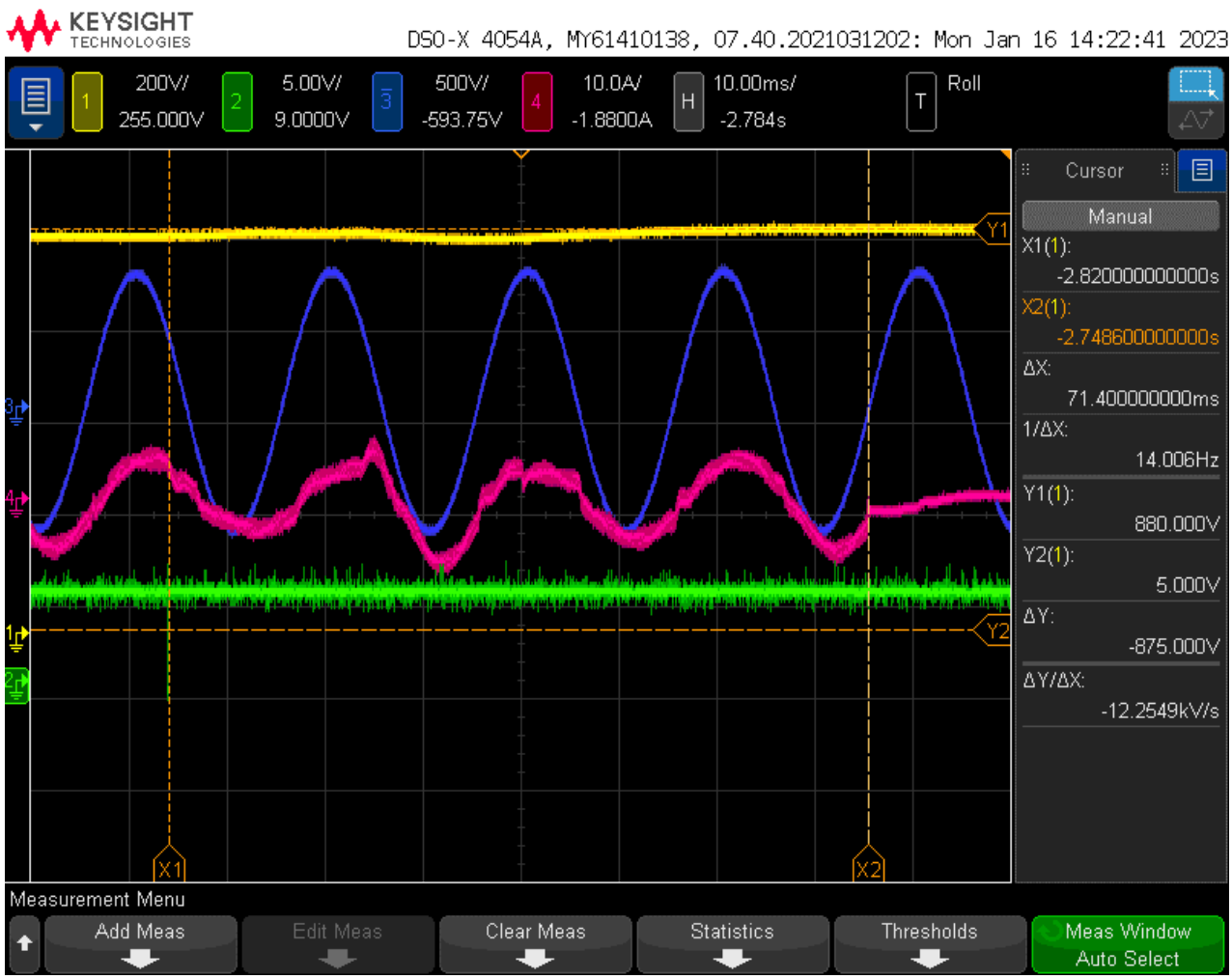

2) Test of voltage rise protection U>

2-1) test condition: Un → 1.12Un until disconnection

U>	Trip value setting [V]	Trip delay seting [ms]	Test value [V]	Disconnection time [s]	Disconnection time limit [s]
L1-N	1.10Un	≤ 100	1.12Un	489.0	≥ 450 and ≤ 550

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L2-N	1.10Un	≤ 100	1.12Un	476.5	≥ 450 and ≤ 550

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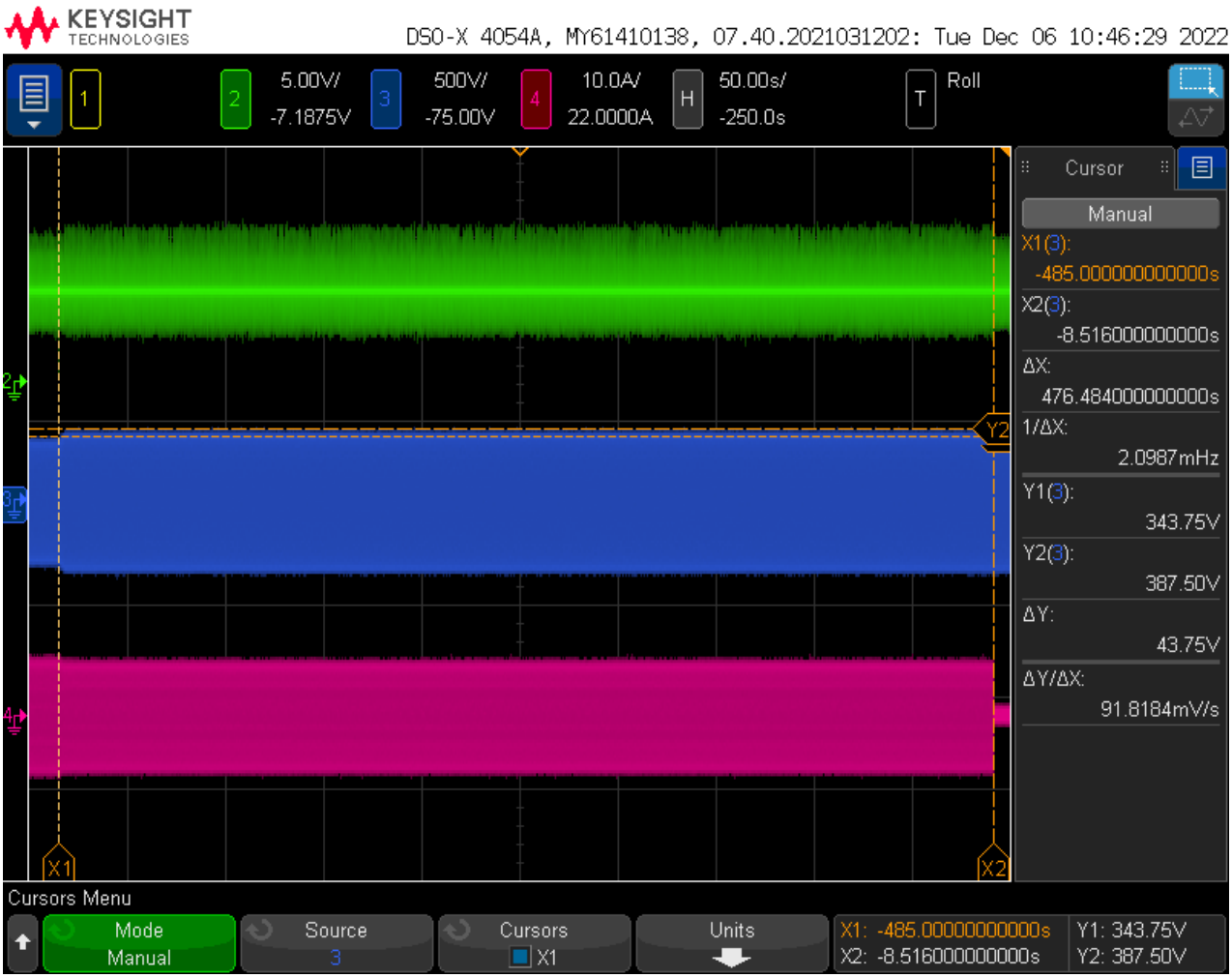

L3-N	1.10Un	≤ 100	1.12Un	497.0	≥ 450 and ≤ 550

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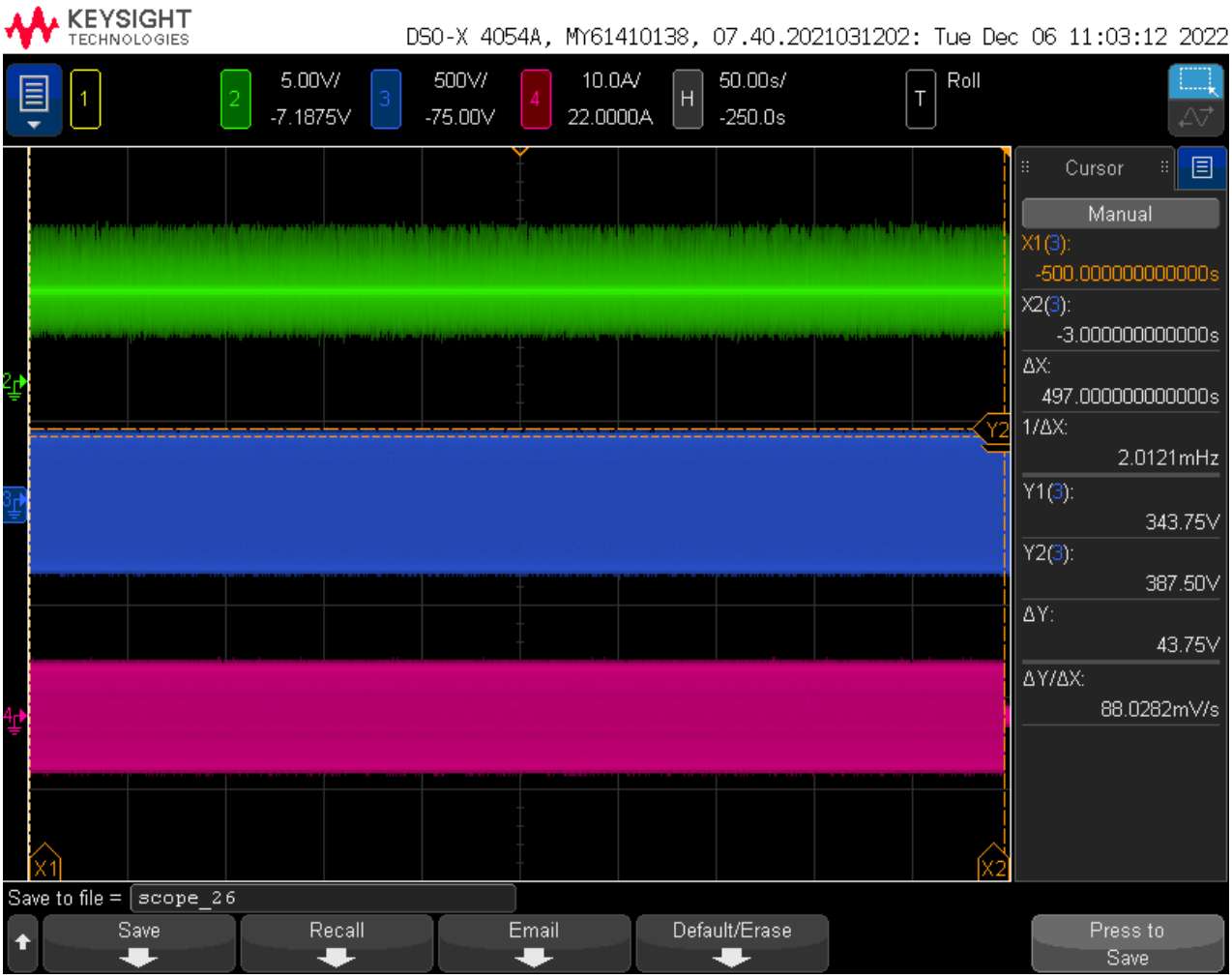

2-2) test condition: Un → 1.08Un

U>	Trip value setting [V]	Trip delay seting [ms]	Test value [V]	Disconnection time [s]	Disconnection time limit [s]
U_{L1-N}, U_{L2-N}, U_{L3-N}	1.10Un	≤ 100	1.08Un	No disconnection	No disconnection

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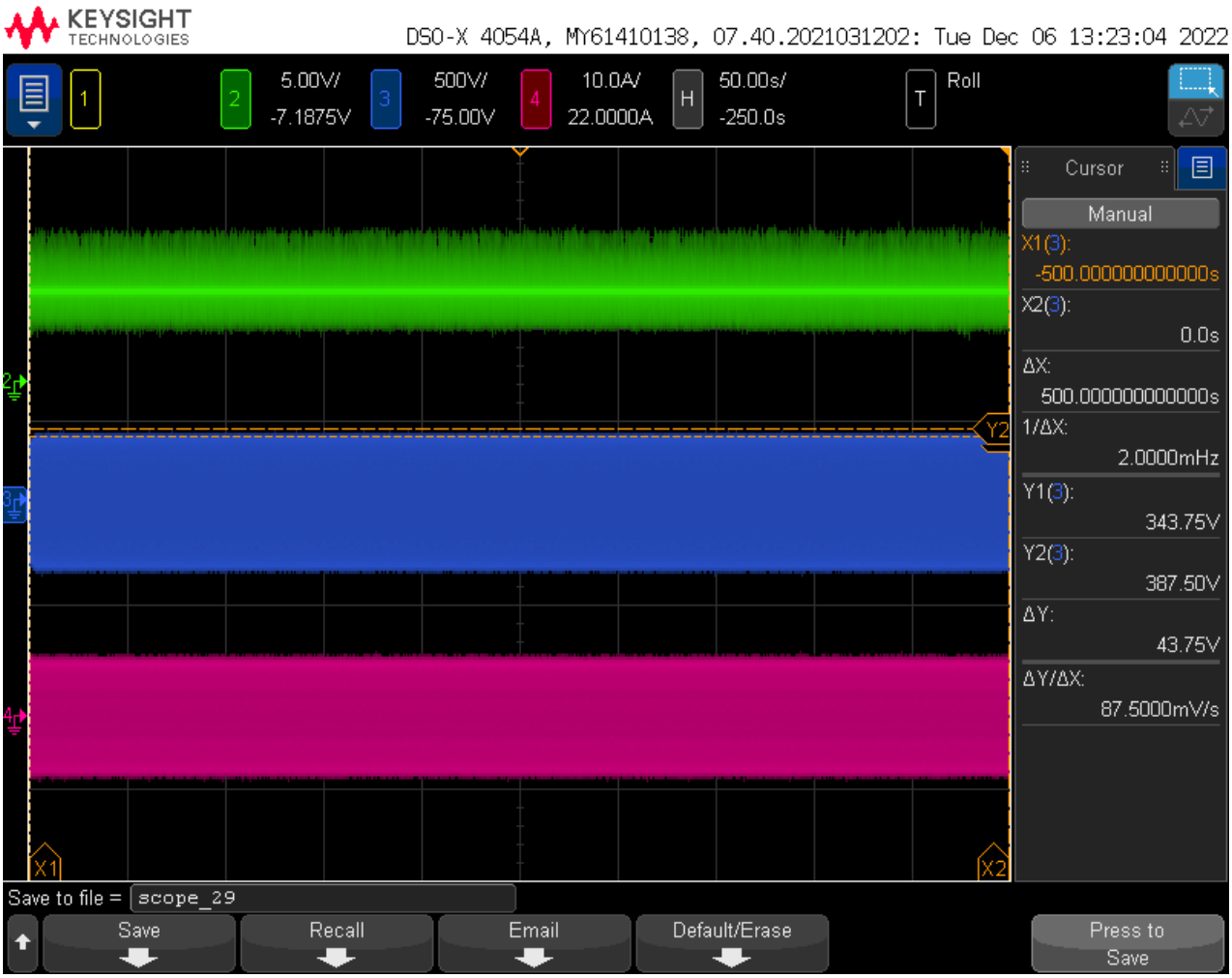

2-3) test condition: 1.06Un → 1.14Un until disconnection

U>	Trip value setting [V]	Trip delay seting [ms]	Test value [V]	Disconnection time [s]	Disconnection time limit [s]
L1-N	1.10Un	≤ 100	1.14Un	289.0	≥ 225 and ≤ 375

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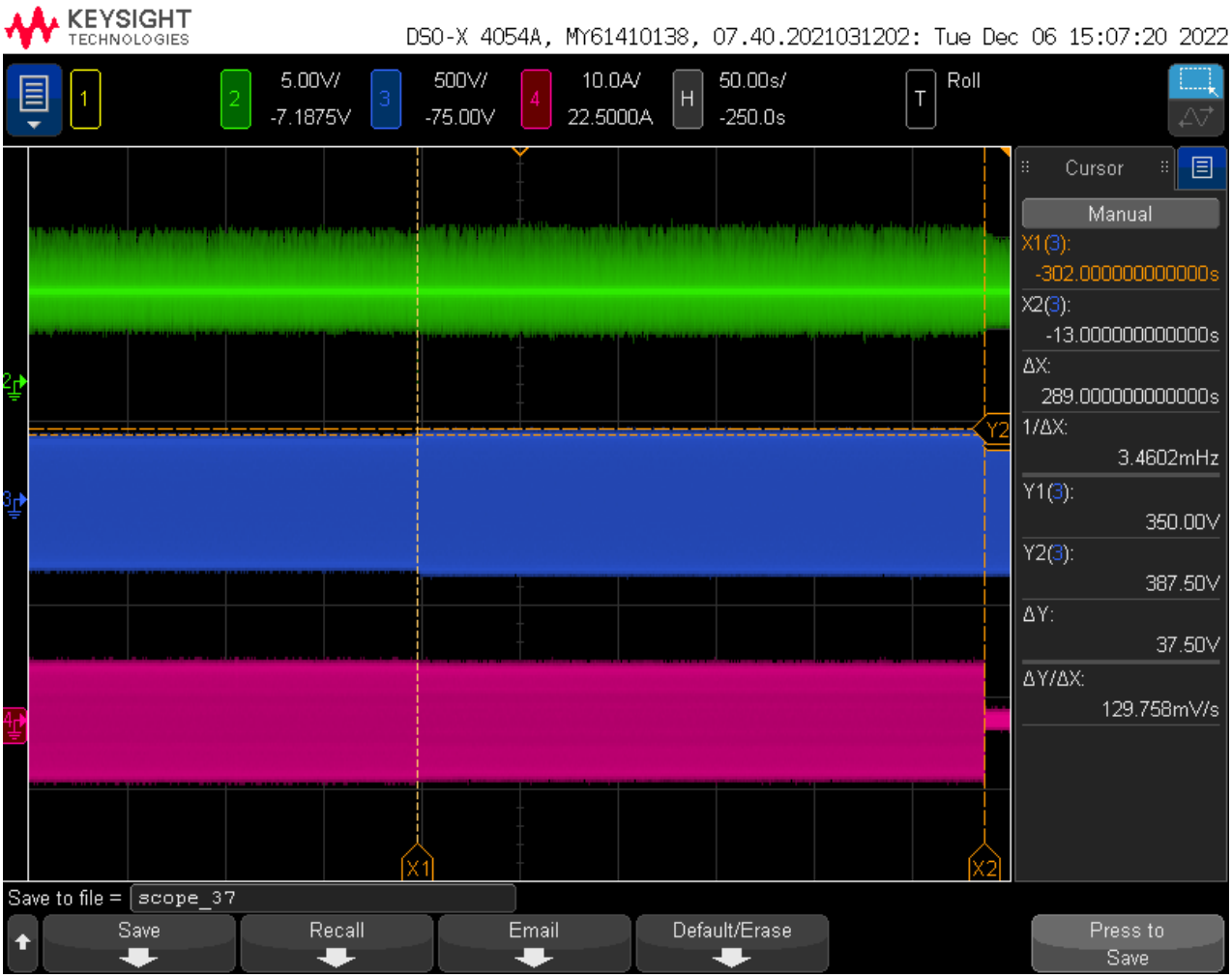

L2-N	1.10Un	≤ 100	1.14Un	359.2	≥ 225 and ≤ 375

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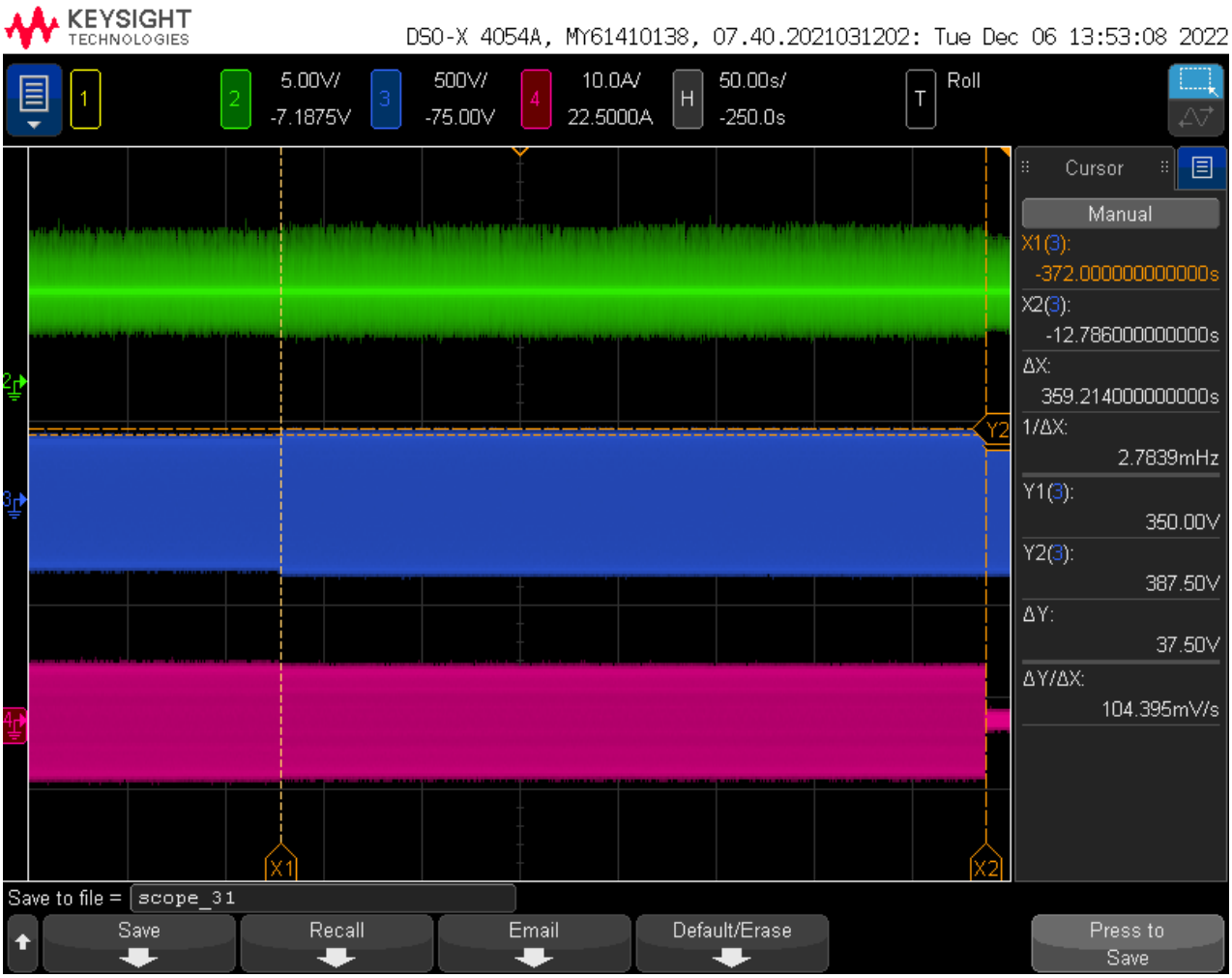

L3-N	1.10Un	≤ 100	1.14Un	306.3	≥ 225 and ≤ 375

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3) Test of voltage rise protection U<

0.8Un

Test setp	parameter	Test on	Target value [V]	Actual value [V]	Deviation [%]	Permissible tolerances [%]	Break time [ms]	Break time limit
4.1	U<	U_{L1-N}, U_{L2-N}, U_{L3-N}	0.8Un	183.9 183.7 184.0	-0.04 -0.13 0	± 1%	-	-
4.2	U<	U_{L1-N}	0.8Un	183.9	-0.04	± 1%	-	-
4.3	U<	U_{L2-N}	0.8Un	183.1	-0.39	± 1%	-	-
4.4	U<	U_{L3-N}	0.8Un	183.0	-0.44	± 1%	-	-
4.5	U<	U_{L1-L2}	0.8Un	318.3	-0.10	± 1%	-	-
4.6	U<	U_{L2-L3}	0.8Un	317.8	-0.22	± 1%	-	-

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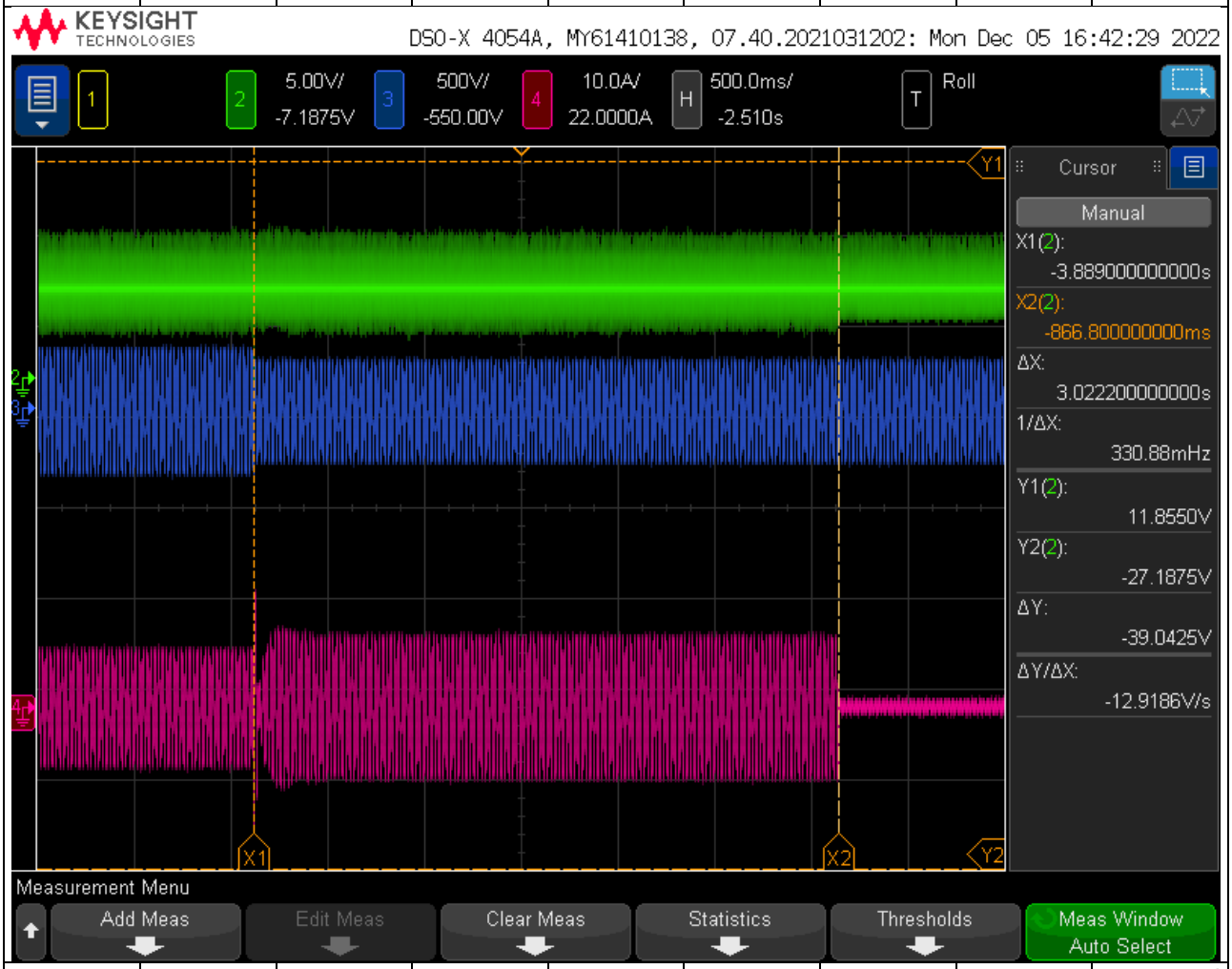
4.7	$U<$	$U_{L3\text{-}L1}$	0.8Un	318.3	-0.10	± 1%	-	-
5.1	$U<$	$U_{L1\text{-}N}$, $U_{L2\text{-}N}$, $U_{L3\text{-}N}$	0.8Un	-	-	-	3022	>3.0s and < 3.1s



5.2	$U<$	$U_{L1\text{-}N}$	0.8Un	-	-	-	3021	>3.0s and < 3.1s

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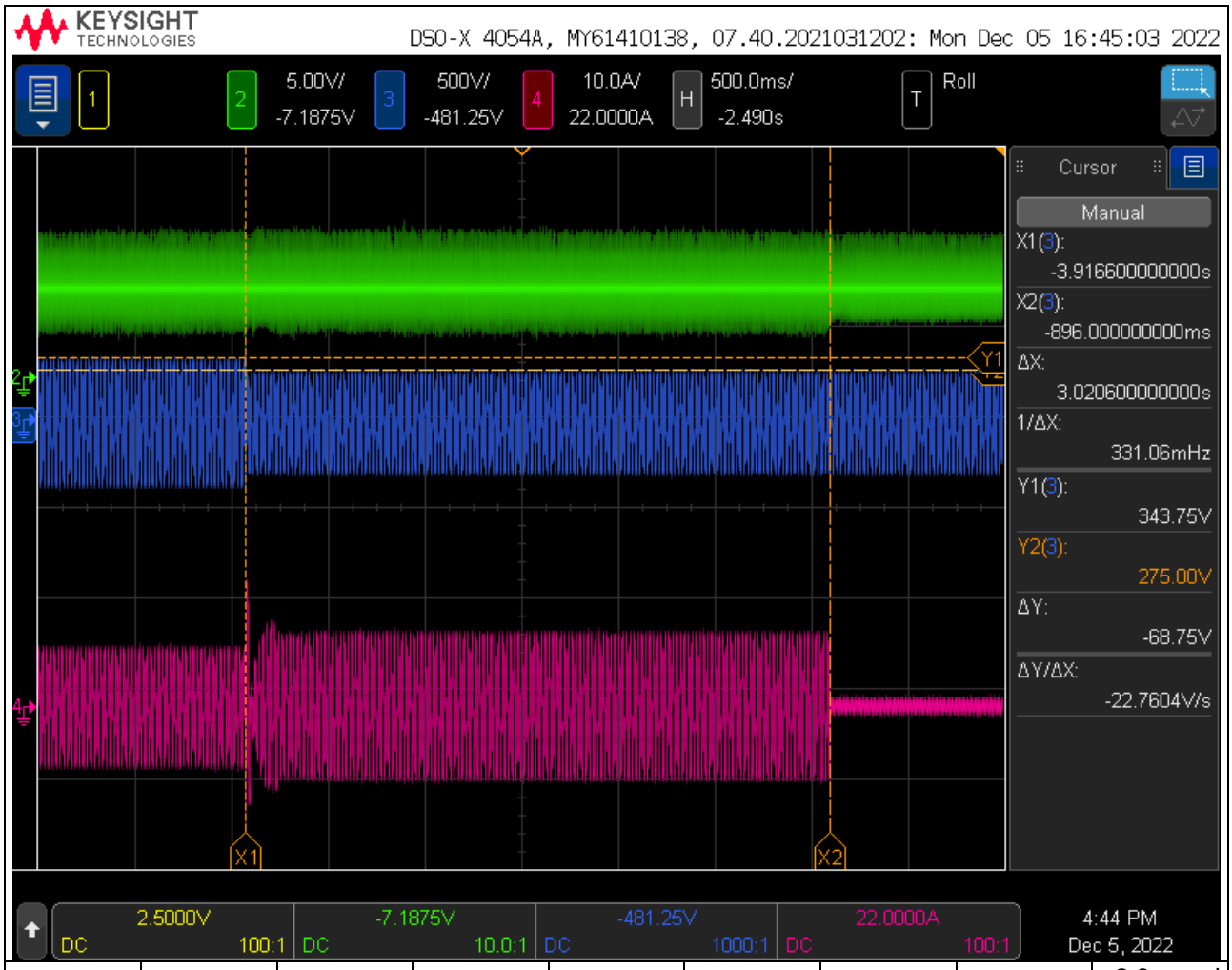

5.3	$U<$	$U_{L2\text{-}N}$	0.8Un	-	-	-	3008	>3.0s and < 3.1s

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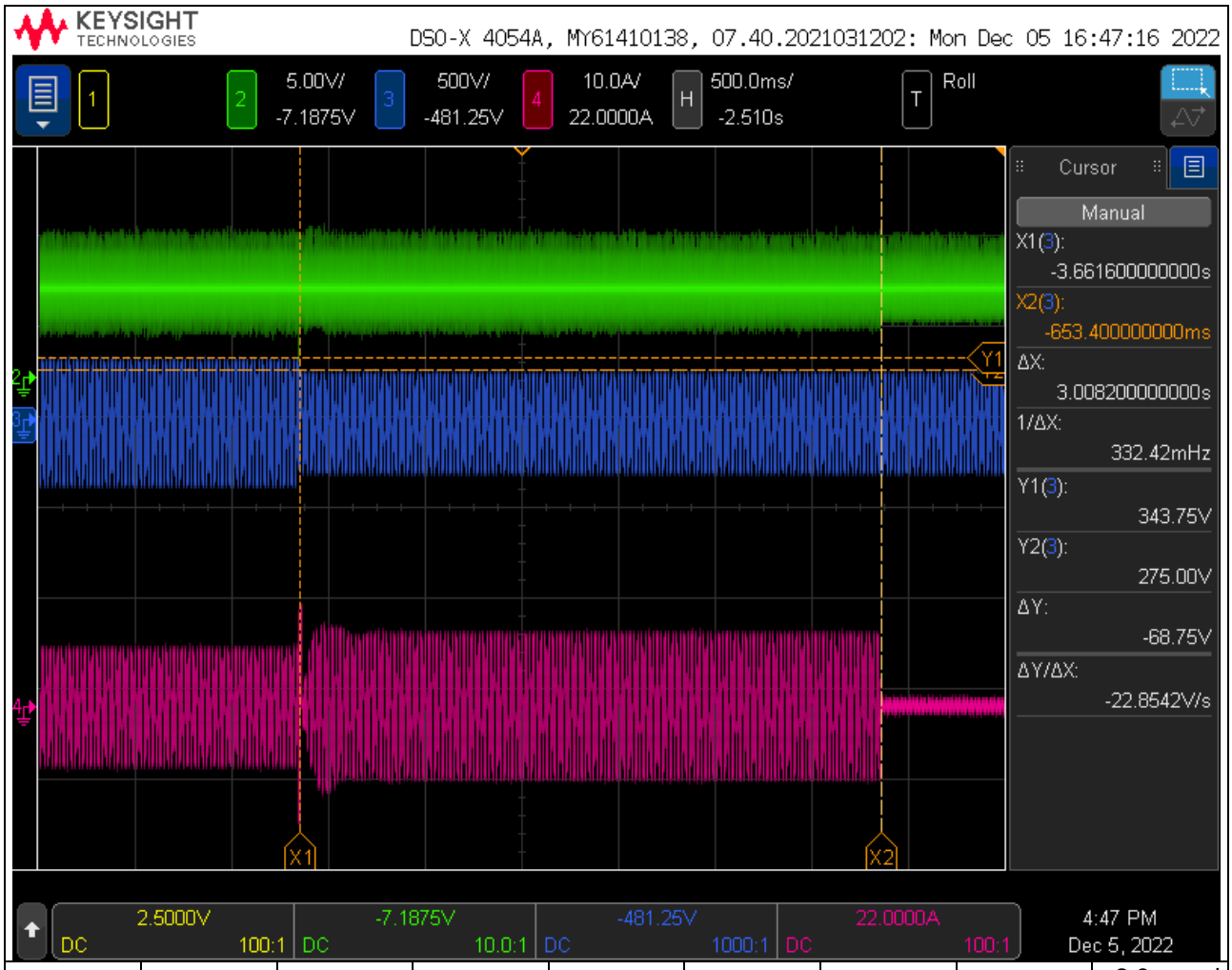

5.4	$U<$	$U_{L3\text{-}N}$	0.8Un	-	-	-	3017	>3.0s and < 3.1s

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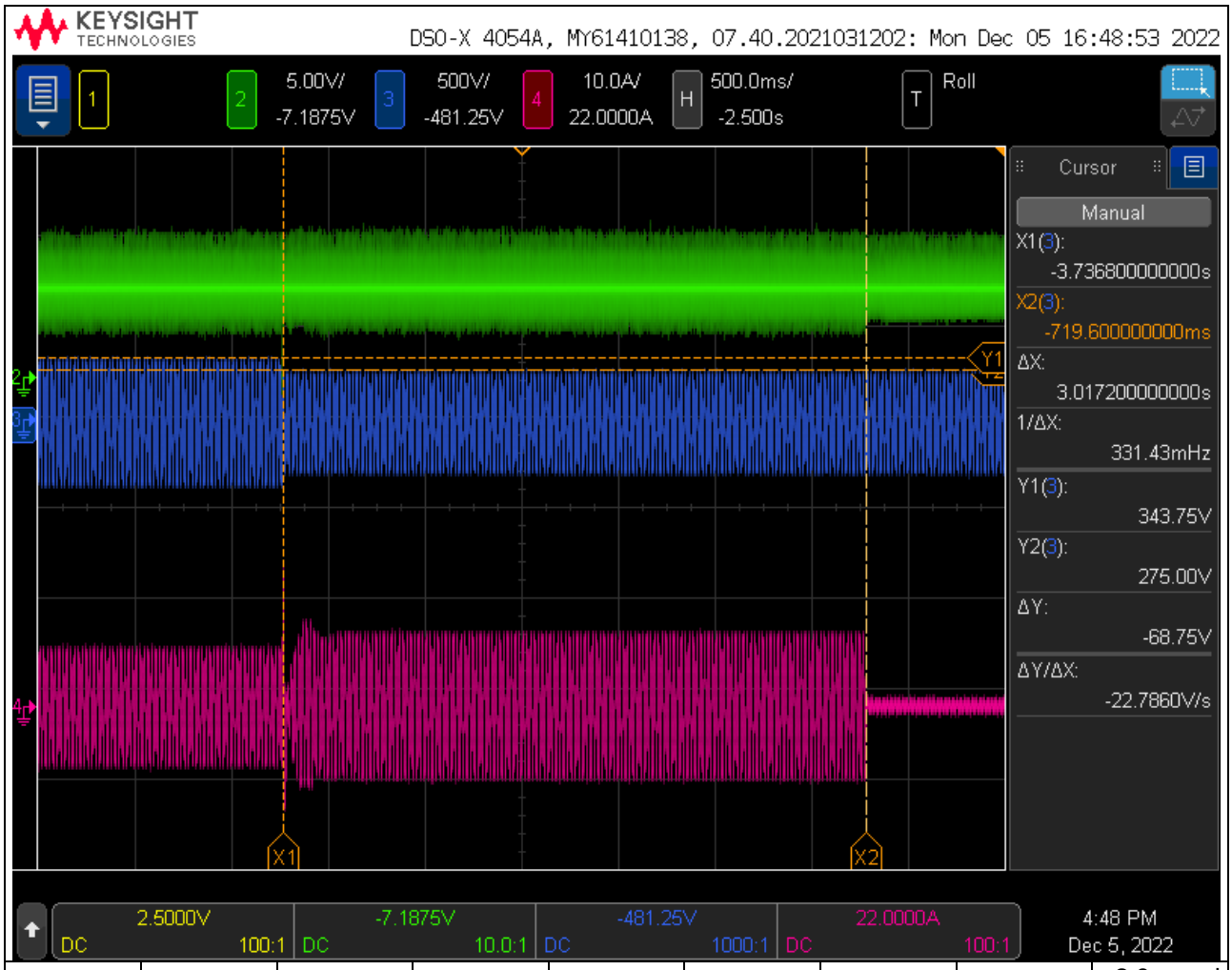

5.5	$U<$	$U_{L1\text{-}L2}$	0.8Un	-	-	-	3009	>3.0s and < 3.1s

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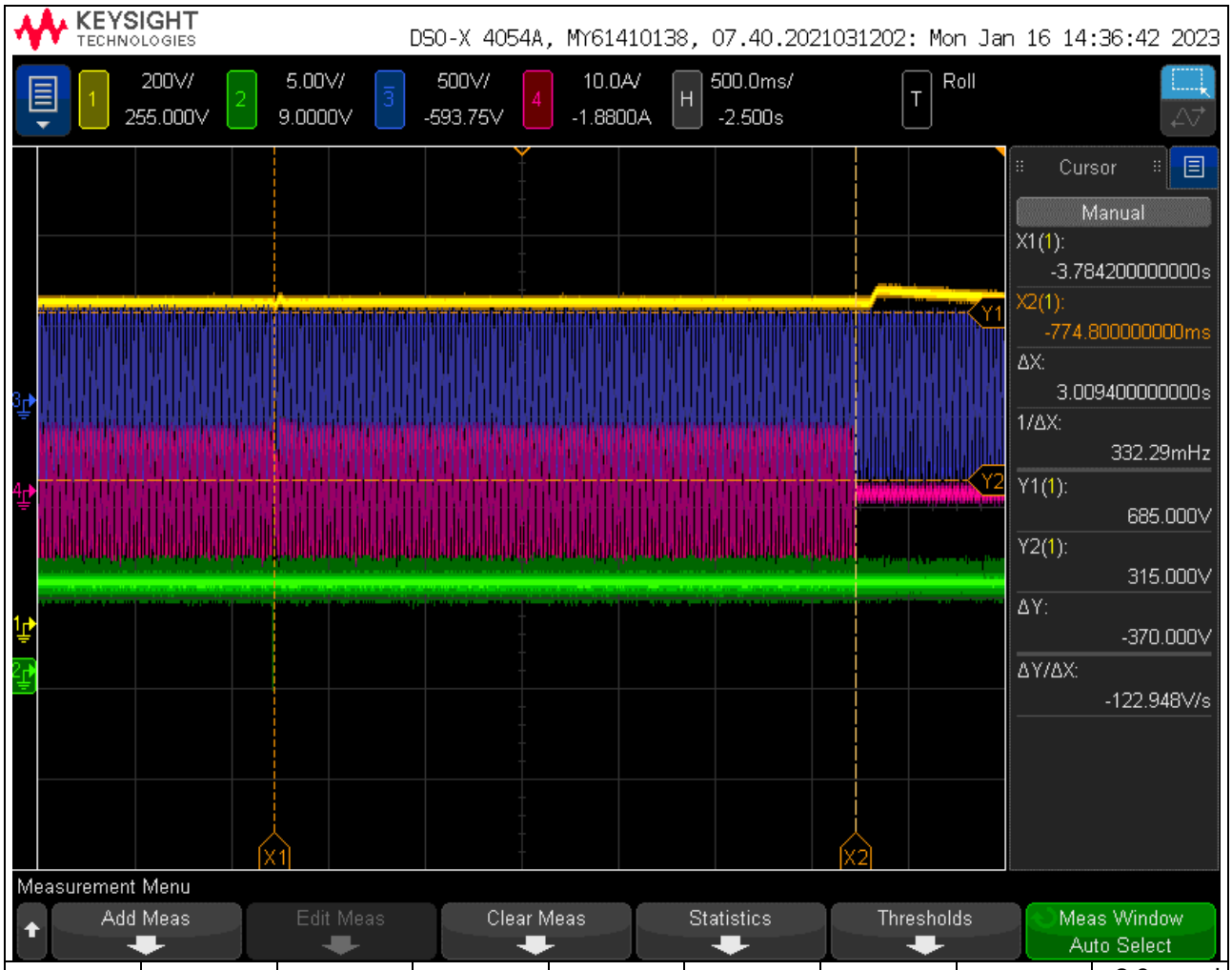

5.6	$U<$	$U_{L2\text{-}L3}$	0.8Un	-	-	-	3010	>3.0s and < 3.1s

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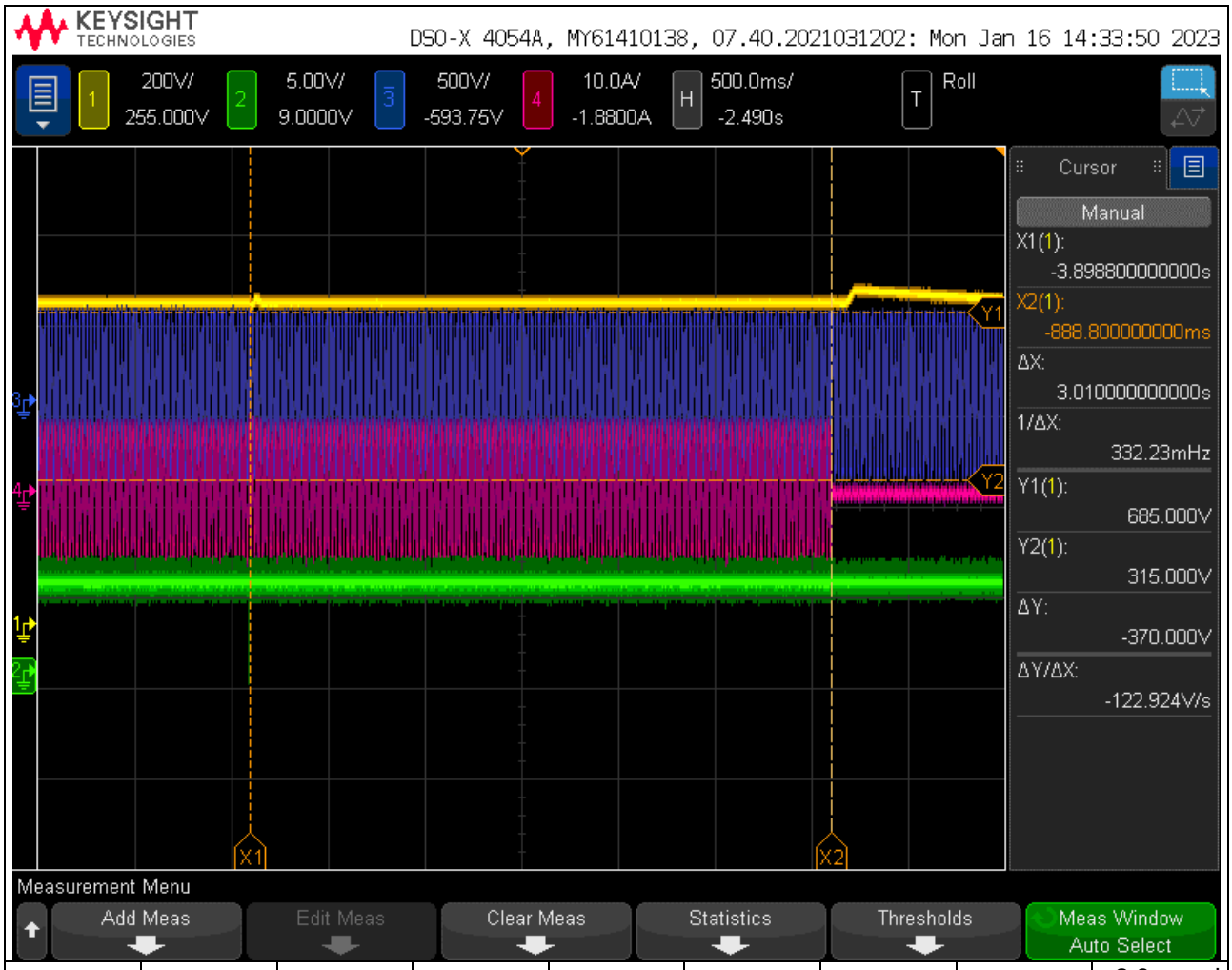

5.7	$U<$	$U_{L3\text{-}L1}$	0.8Un	-	-	-	3010	>3.0s and < 3.1s

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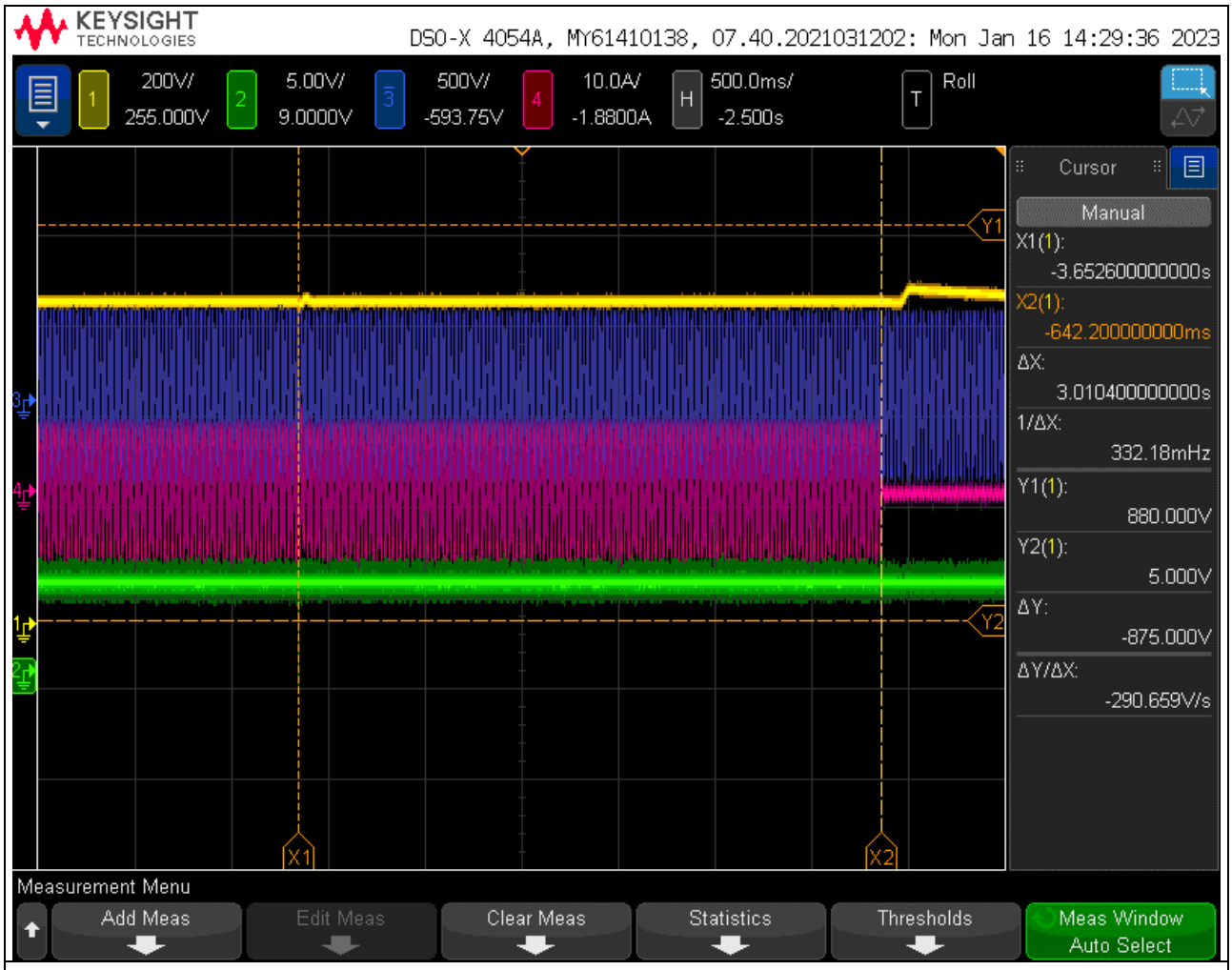

4) Test of voltage rise protection U<<

0.45Un

Test setp	parameter	Test on	Target value [V]	Actual value [V]	Deviation [%]	Permissible tolerances [%]	Break time [ms]	Break time limit
6.1	*U*<<	U_{L1-N}, U_{L2-N}, U_{L3-N}	0.45Un	102.7 102.5 102.9	-0.35 -0.43 -0.26	± 1%	-	-
6.2	*U*<<	U_{L1-N}	0.45Un	102.9	-0.26	± 1%	-	-
6.3	*U*<<	U_{L2-N}	0.45Un	102.6	-0.39	± 1%	-	-
6.4	*U*<<	U_{L3-N}	0.45Un	103.0	-0.22	± 1%	-	-
6.5	*U*<<	U_{L1-L2}	0.45Un	178.0	-0.50	± 1%	-	-
6.6	*U*<<	U_{L2-L3}	0.45Un	177.7	-0.57	± 1%	-	-

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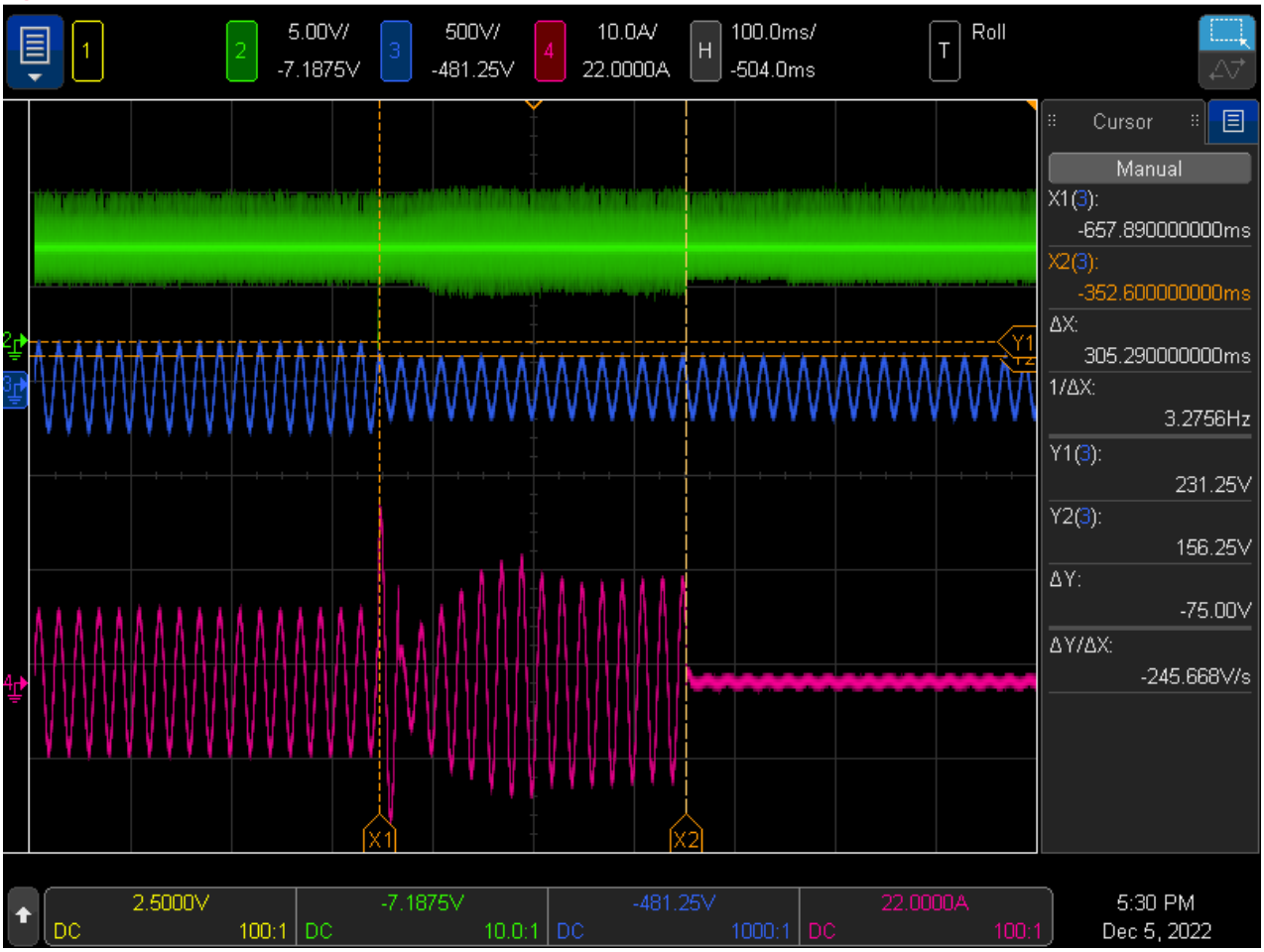
6.7	$U<<$	$U_{L3\text{-}L1}$	0.45Un	178.0	-0.50	± 1%	-	-
7.1	$U<<$	$U_{L1\text{-}N}$, $U_{L2\text{-}N}$, $U_{L3\text{-}N}$	0.45Un	-	-	-	305	≥300ms and ≤400ms



7.2	$U<<$	$U_{L1\text{-}N}$	0.45Un	-	-	-	333	≥300ms and ≤400ms

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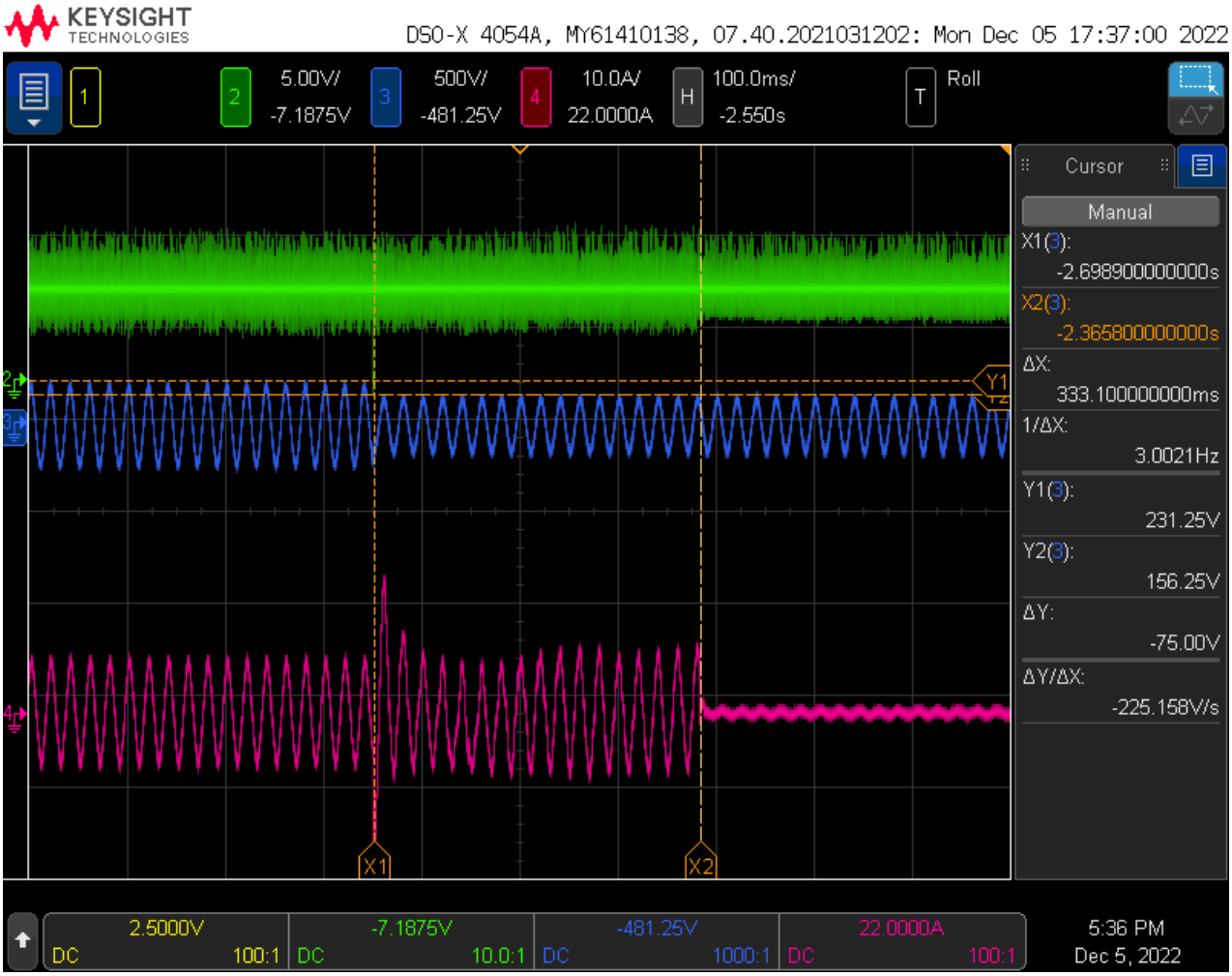

7.3	*U*<<	U_{L2-N}	0.45Un	-	-	-	311	≥300ms and ≤400ms

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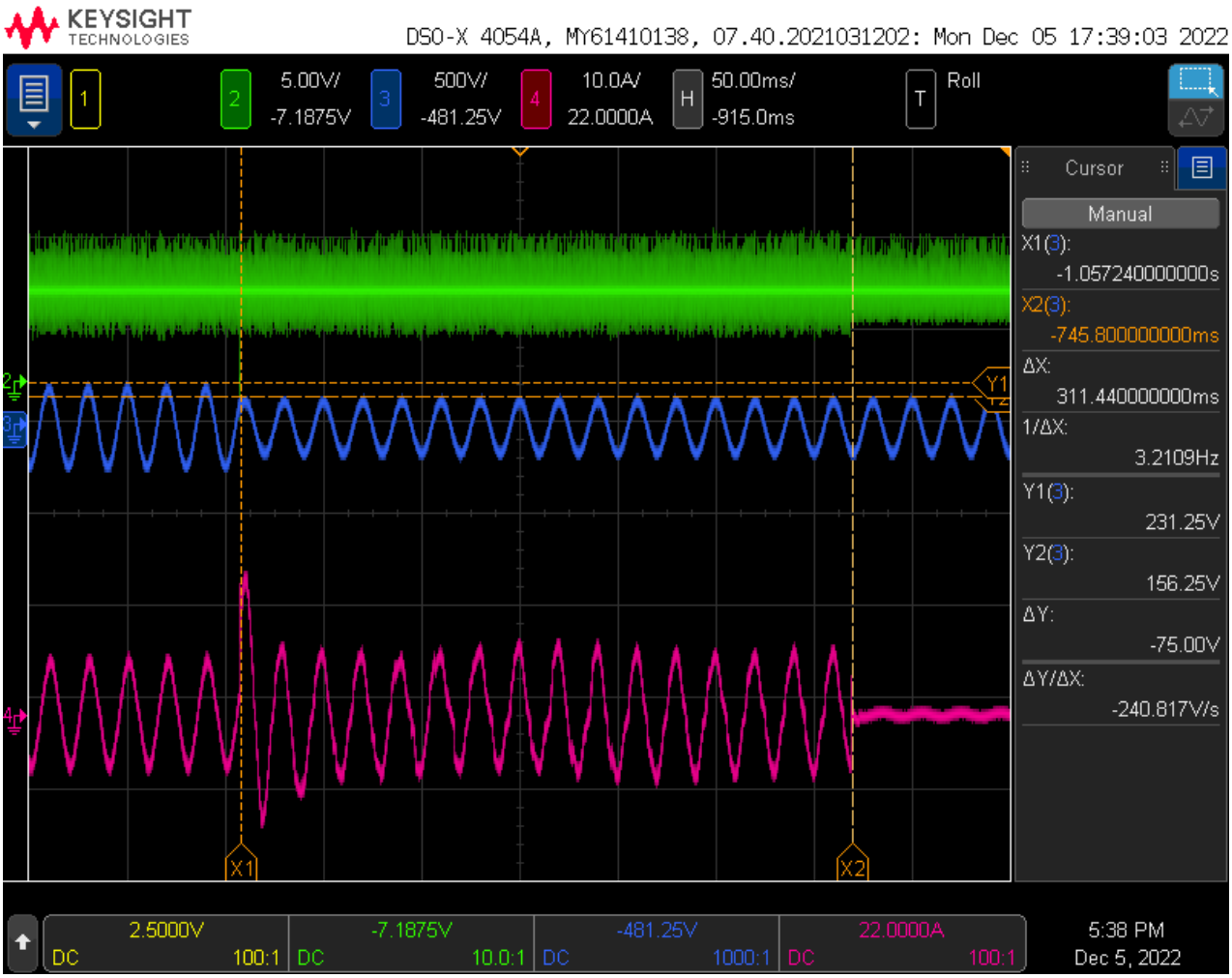

7.4	$U<<$	$U_{L3\text{-}N}$	0.45Un	-	-	-	311	≥300ms and ≤400ms

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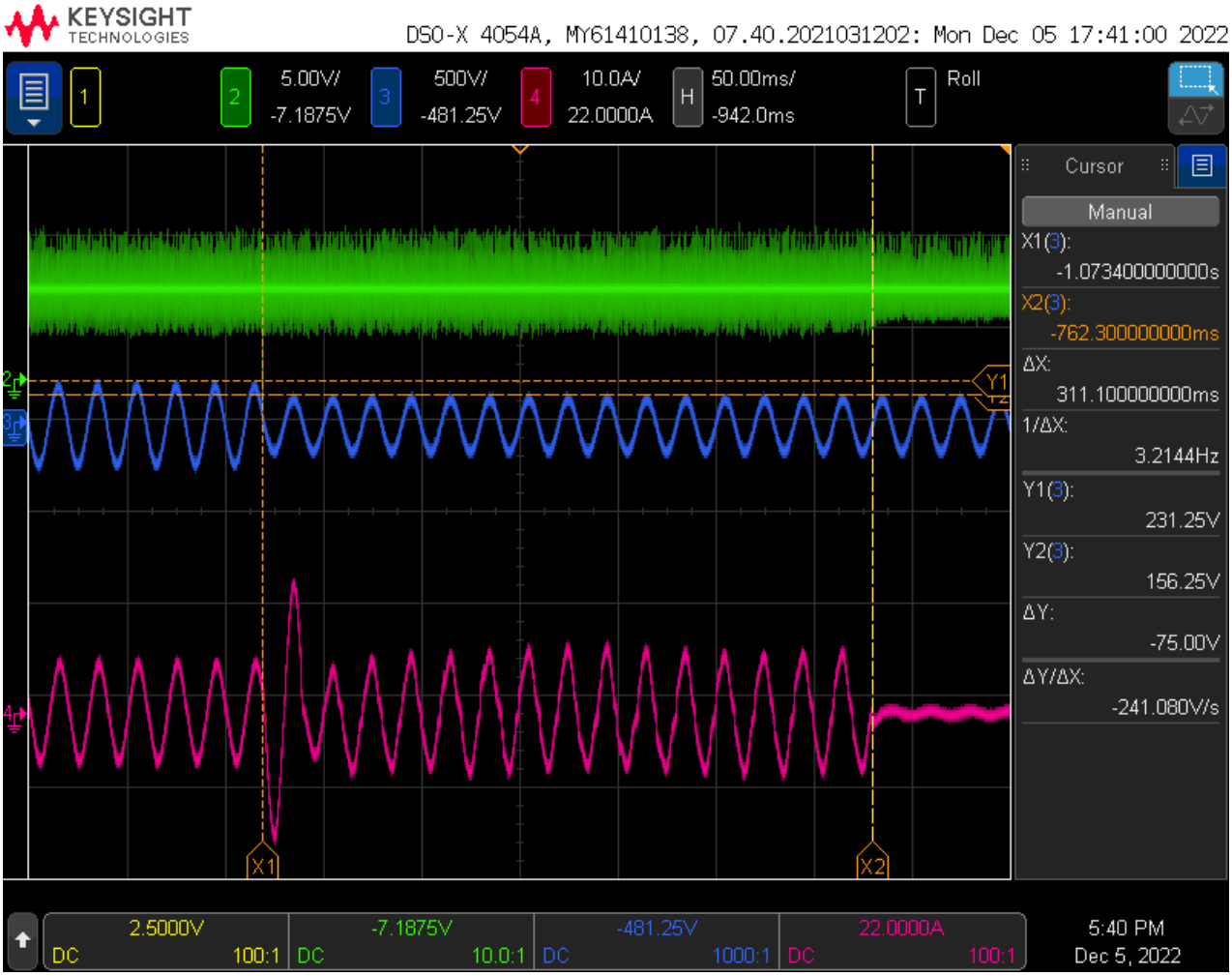

7.5	*U*<<	$U_{L1\text{-}L2}$	0.45Un	-	-	-	313.0	≥300ms and ≤400ms

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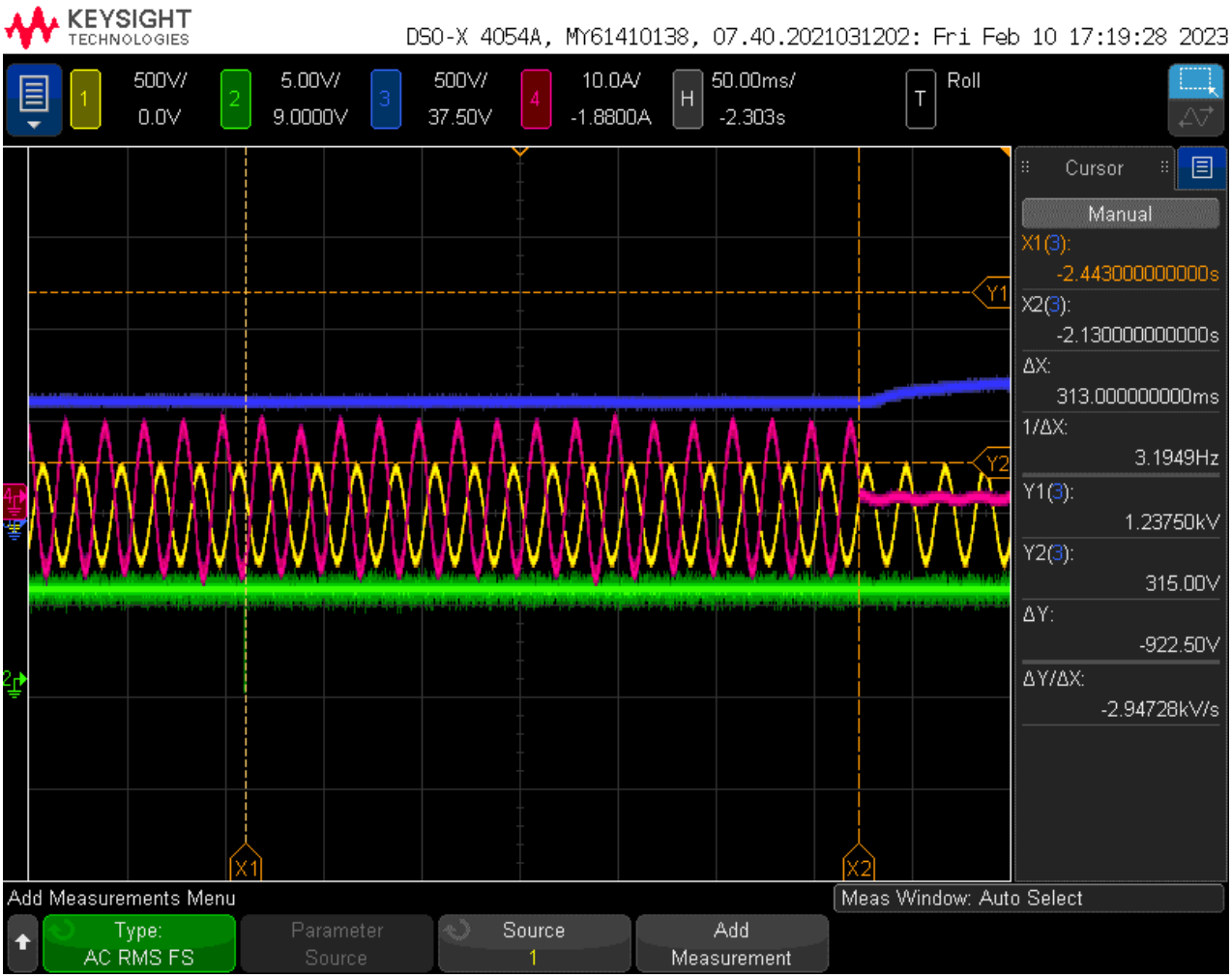

7.6	*U*<<	$U_{L2\text{-}L3}$	0.45Un	-	-	-	314.0	≥300ms and ≤400ms

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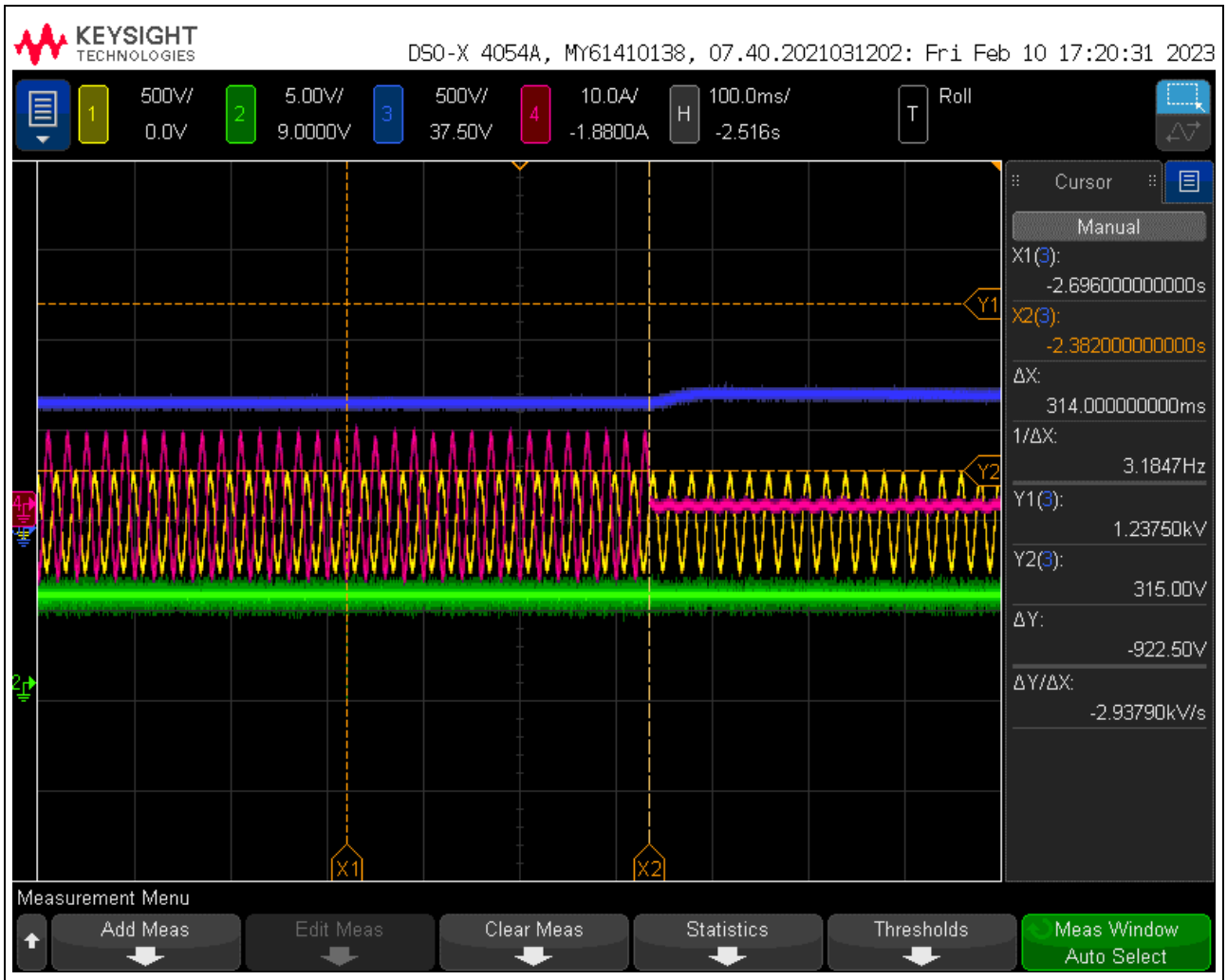

7.7	*U*<<	$U_{L3\text{-}L1}$	0.45Un	-	-	-	322.0	≥300ms and ≤400ms

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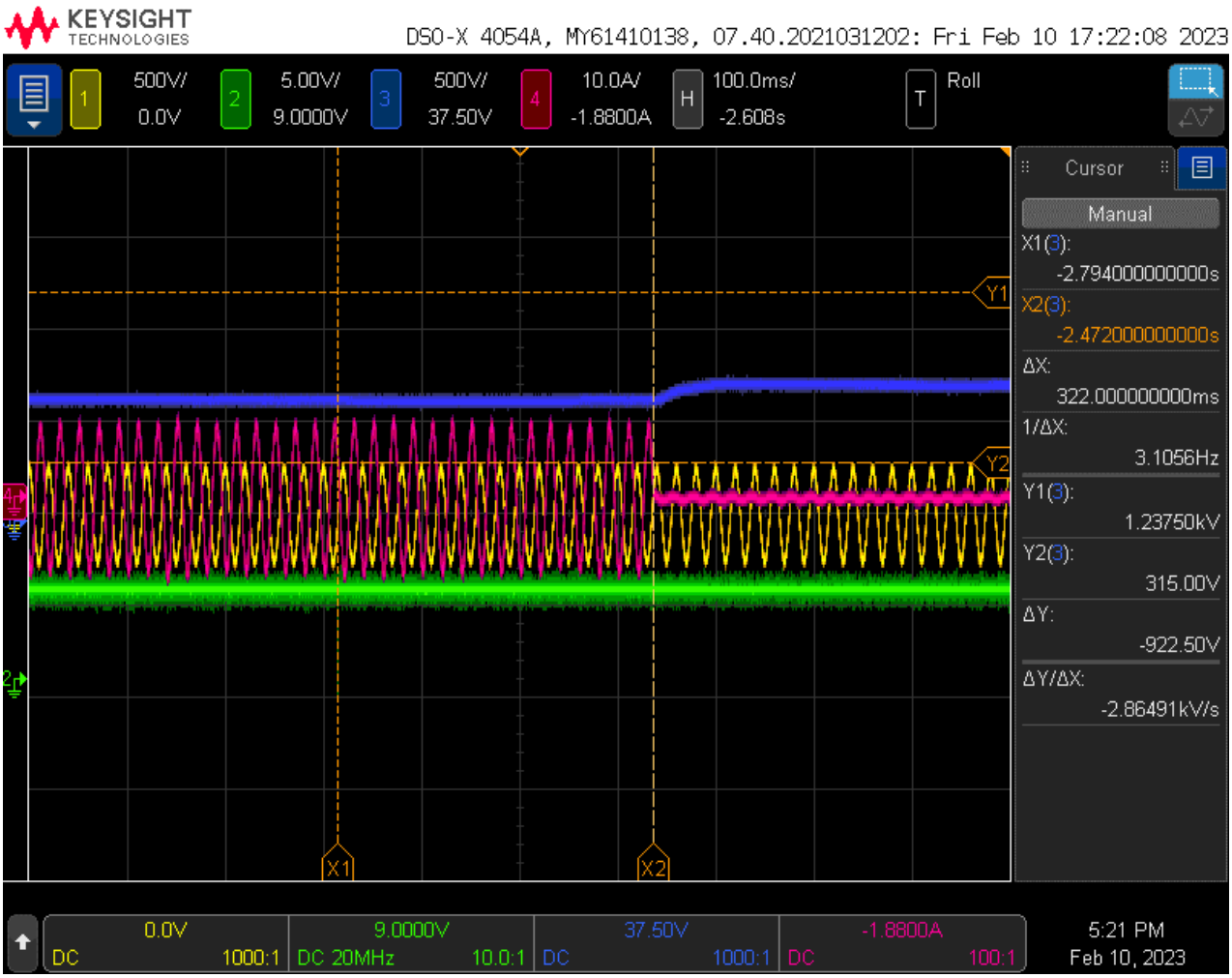

5) Test of frequency increase protection f>

51.5Hz

Test step	parameter	Test on	Target value [Hz]	Actual value [Hz]	Deviation [%]	Permissible tolerances [%]	Break time [ms]	Break time limit
8.1	*f*>	*f*Netz	51.5Hz	51.50	0	± 0.1%	-	-
9.1	*f*>	*f*Netz	51.5Hz	-	-	-	56.6	≤ 200

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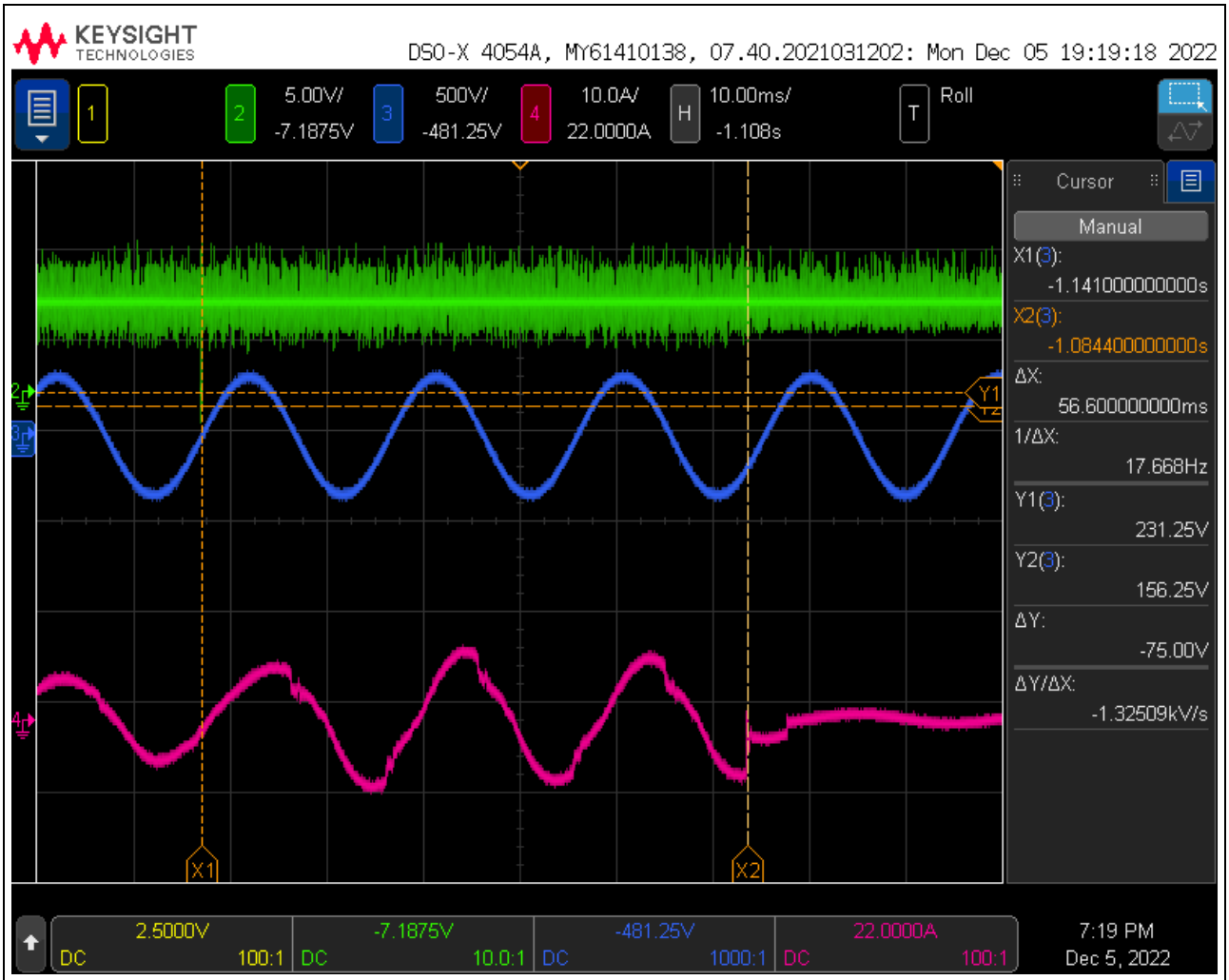

6) Test of frequency increase protection f<

47,5Hz

Test step	parameter	Test on	Target value [Hz]	Actual value [Hz]	Deviation [%]	Permissible tolerances [%]	Break time [ms]	Break time limit
10.1	*f*<	f_{Netz}	47.5Hz	47.49	-0.02	± 0.1%	-	-
11.1	*f*<	f_{Netz}	47.5Hz	-	-	-	71.8	≤ 200

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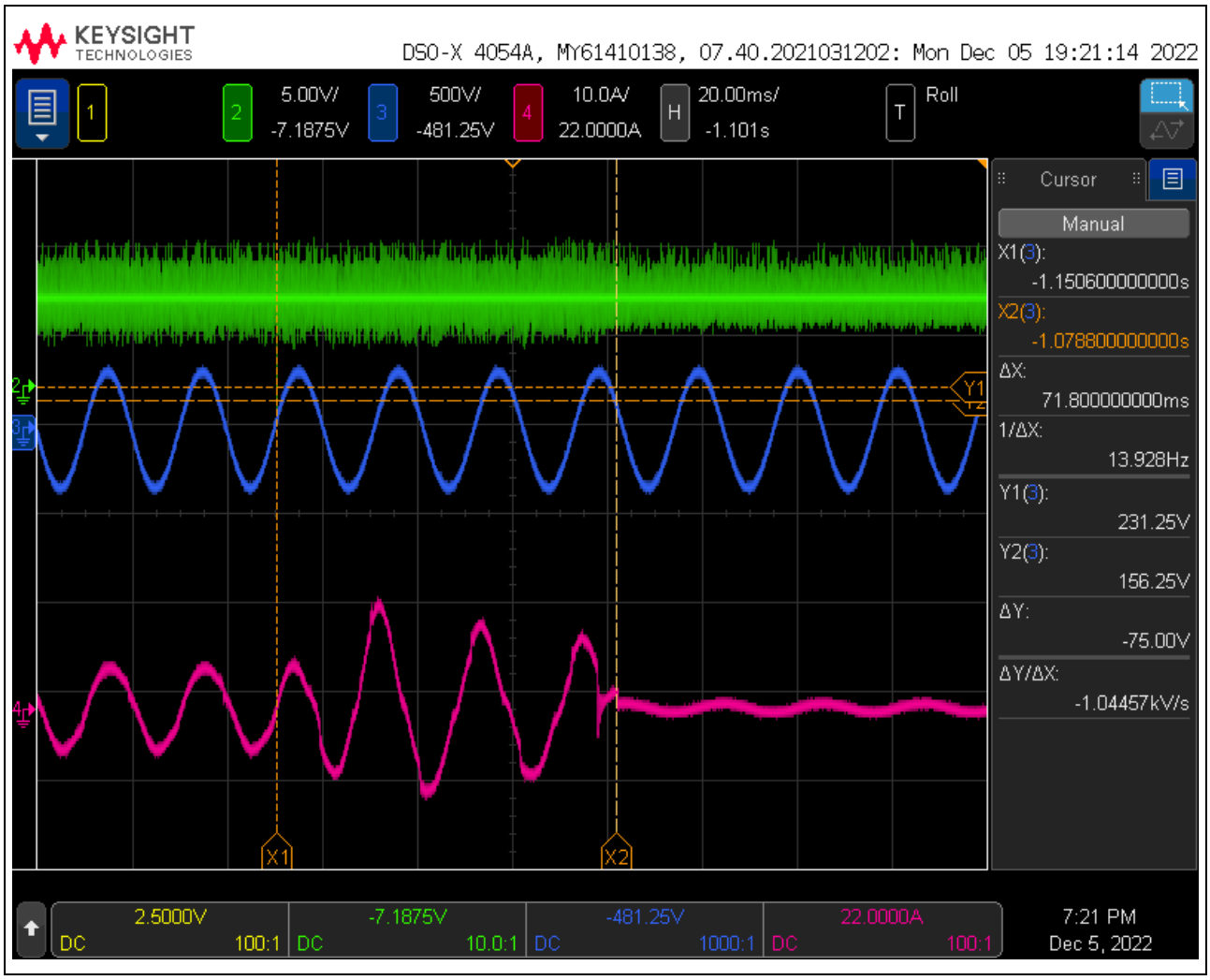

5.5.7.5	**TABLE: Reading the fault messages**	**P**
MODEL	**ST-INV-T10.0**	

Test method:

It is to be determined by visual inspection that the last 5 dated fault messages are readable on the NS protection.

It must be checked that an interruption of the supply voltage ⩽ 3 s does not lead to the loss of the fault messages.

It has to be verified that with an integrated NS protection the setting values of the protection function and the fault messages are to be read out via a data interface, as far as they are not directly readable.

Setting values of NS protection and last 5 dated fault messages can be readable from	☐ PGU directly	☒ via an interface; LCD display

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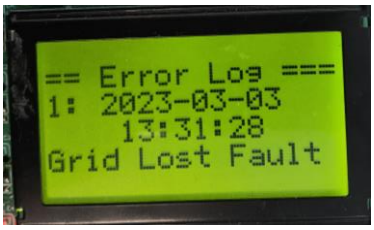
Step a)	The last 5 dated fault messages:
	1. 
	2. 
	3. 
	4. 
	5. 
Step b)	The last 5 dated fault messages after interruption the supply voltage ≤ 3 s:

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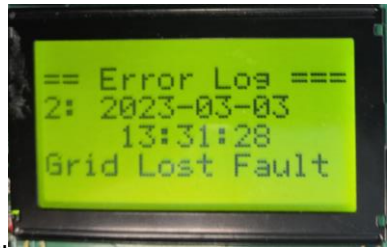
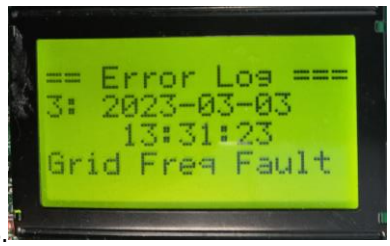
	1. 
	2. 
	3. 
	4. 
	5. 

5.5.9	TABLE: Structural features of NS-protection	P
MODEL	ST-INV-T10.0	

Test method:

It has to be tested whether the NS protection is protected against unauthorized access, for example:

– NS protection sealable: by visual inspection, or
– NS protection password protected: testing, based on the manufacturer's instructions, or
– other appropriate measure.

It has to be tested that U> and the time delays for U < and U << are adjustable. It must be tested whether all other protective functions described in VDE-AR-N 4105:2018-11, clause 6.5 are either fixed or protected

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against unauthorized access by additional, separate protection.				
Type and form of protection against unauthorized access	☐ NS protection sealable	☒ NS protection password protected	☐ other appropriate measure	
If NS protection password protected	Testing based on the manufacturer's instructions		☒ Pass ☐ Fail	
NS protection functions setting value	Trip value		Trip time	
Rise-in-voltage protection *U* >>	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected
Rise-in-voltage protection *U* >>	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected
Voltage drop protection *U* <	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected
Voltage drop protection *U* <<	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected
Frequency decrease protection *f* <	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected
Frequency increase protection *f* >	☐ fixed in software	☒ adjustable and protected	☐ fixed in software	☒ adjustable and protected

5.5.10	**TABLE: Islanding detection**	**P**
MODEL	**ST-INV-T10.0**	

Test method:

1) passive methods
The passive method is realized by the voltage increase and the voltage decrease protection of the NS protection.
2) Active methods
The active method is tested according to DIN EN 62116 (VDE 0126-2)

Limit:
☐ Test with FRT function enabled, the disconnection time shall be within 9 s.
☒ Test with FRT function disabled, the disconnection time shall be within 2 s.

No.	P_{EUT} (% of EUT rating)	Reactive load (% of normial)	P_{AC}	Q_{AC}	Run-on time(ms)	P_{EUT} (KW)	Actual Q_f (Var)	V_{DC}	Which load is selected to be adjusted (C or L)
Test condition A									
1	100	100	0	0	130.5	10	1.001	680	/
2	100	100	-5	-5	118.5	10	--	680	L
3	100	100	-5	0	128.0	10	--	680	L
4	100	100	-5	5	129.0	10	--	680	L
5	100	100	0	-5	94.0	10	--	680	L
6	100	100	0	5	121.0	10	--	680	L
7	100	100	5	-5	125.5	10	--	680	L
8	100	100	5	0	126.0	10	--	680	L
9	100	100	5	5	125.5	10	--	680	L
Test condition B									
10	66	66	0	0	209.0	6.6	1.000	500	/

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11	66	66	0	-5	126.0	6.6	--	500	L
12	66	66	0	-4	139.5	6.6	--	500	L
13	66	66	0	-3	149.0	6.6	--	500	L
14	66	66	0	-2	158.5	6.6	--	500	L
15	66	66	0	-1	199.5	6.6	--	500	L
16	66	66	0	1	208.5	6.6	--	500	L
17	66	66	0	2	191.0	6.6	--	500	L
18	66	66	0	3	155.0	6.6	--	500	L
19	66	66	0	4	139.0	6.6	--	500	L
20	66	66	0	5	136.5	6.6	--	500	L
Test condition C									
21	33	33	0	0	192.5	3.3	1.000	300	/
22	33	33	0	-5	119.5	3.3	--	300	L
23	33	33	0	-4	138.0	3.3	--	300	L
24	33	33	0	-3	150.5	3.3	--	300	L
25	33	33	0	-2	158.5	3.3	--	300	L
26	33	33	0	-1	185.5	3.3	--	300	L
27	33	33	0	1	186.0	3.3	--	300	L
28	33	33	0	2	161.0	3.3	--	300	L
29	33	33	0	3	152.0	3.3	--	300	L
30	33	33	0	4	148.0	3.3	--	300	L
31	33	33	0	5	133.0	3.3	--	300	L
Remark:									

5.6	**TABLE: Connection condition and synchronization**	**P**
MODEL	**ST-INV-T10.0**	

Test method:

a) $f_{ist} < 47.45$ Hz: reconnection is not permitted;
b) switch to $f_{ist} \geq 47.55$ Hz: reconnection is permitted;
c) $f_{ist} > 50.15$ Hz: reconnection is not permitted;
d) switch to $f_{ist} \leq 50.05$ Hz: reconnection is permitted;
e) $U_{ist} < 84\ \% U_n$: reconnection is not permitted;
f) $U_{ist} \geq 86\ \% U_n$: reconnection is permitted;
g) $U_{ist} > 111\ \% U_n$: reconnection is not permitted;
h) $U_{ist} \leq 109\ \% U_n$: reconnection is permitted.

the time of reconnection is specified by the manufacturer.

Test sequence after trip	**Reconnection**	**Reconnection allowed**	**Reconnection time ≥ 60s**	**Power gradient after reconnection**
Step a) – f_{ac}@47.45 Hz (f_{ac} < 47.45 Hz)	No	No	N/A	N/A
Step b) – f_{ac}@47.55 Hz	Yes	Yes	Yes	≤ 10%P_{Emax} per minute

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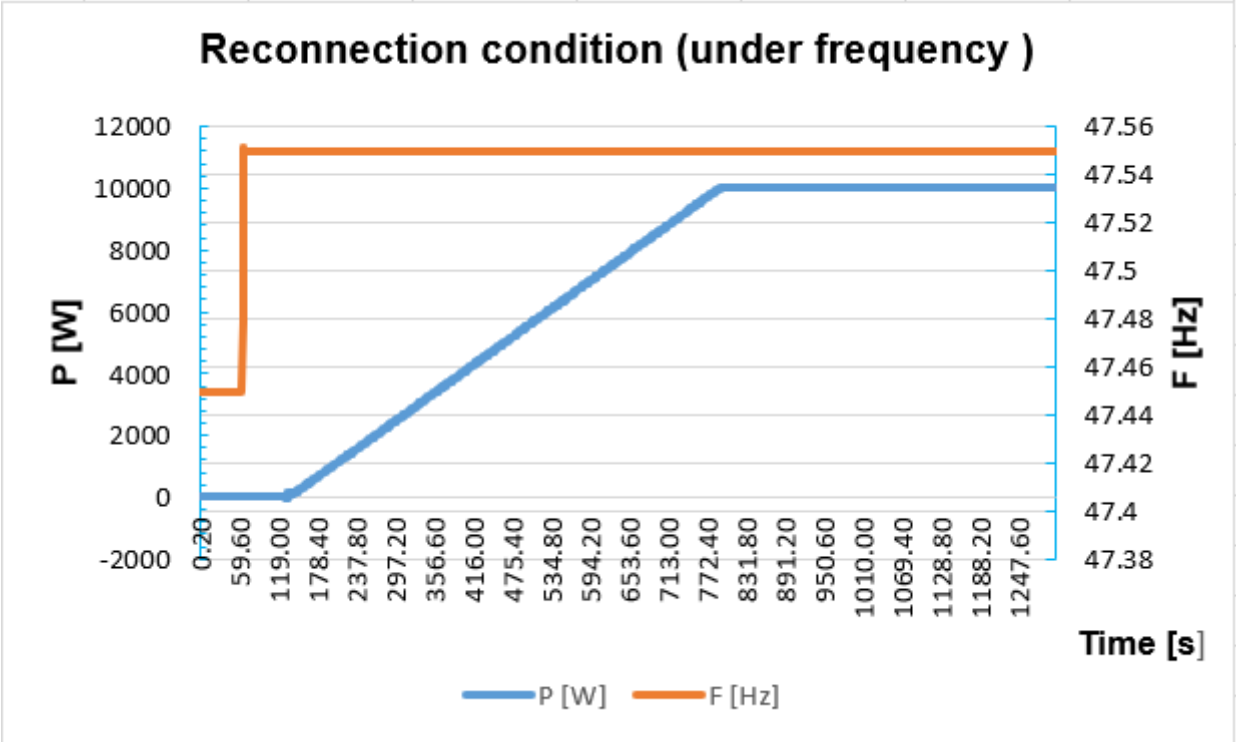
(f_{ac} ≥ 47.55 Hz)				
Step c) – f_{ac}@50.15 Hz (f_{ac} > 50.15 Hz)	No	No	N/A	N/A
Step d) – f_{ac}@50.05 Hz (f_{ac} ≤ 50.05 Hz)	Yes	Yes	Yes	≤ 10%P_{Emax} per minute
Step e) – U_{ac}@0.84 Un (U_{ac} < 0.84 U_n)	No	No	N/A	N/A
Step f) – U_{ac}@0.86 Un (U_{ac} ⩾ 0.86 U_n)	Yes	Yes	Yes	≤10%P_{Emax} per minute
Step g) – U_{ac}@1.11 Un (U_{ac} > 1.11 U_n)	No	No	N/A	N/A
Step h) – U_{ac}@1.09 Un (U_{ac} ⩽ 1.09 U_n)	Yes	Yes	Yes	≤10%P_{Emax} per minute
Underfrequency				
Oscilloscope recorded waveforms				

a) f_{ac} @ 47.45 Hz – no reconnection

b) f_{ac} @ 47.55 Hz – reconnection after 69.2 s



Max. power gradient during recovery 9.19 P_{Emax}/min

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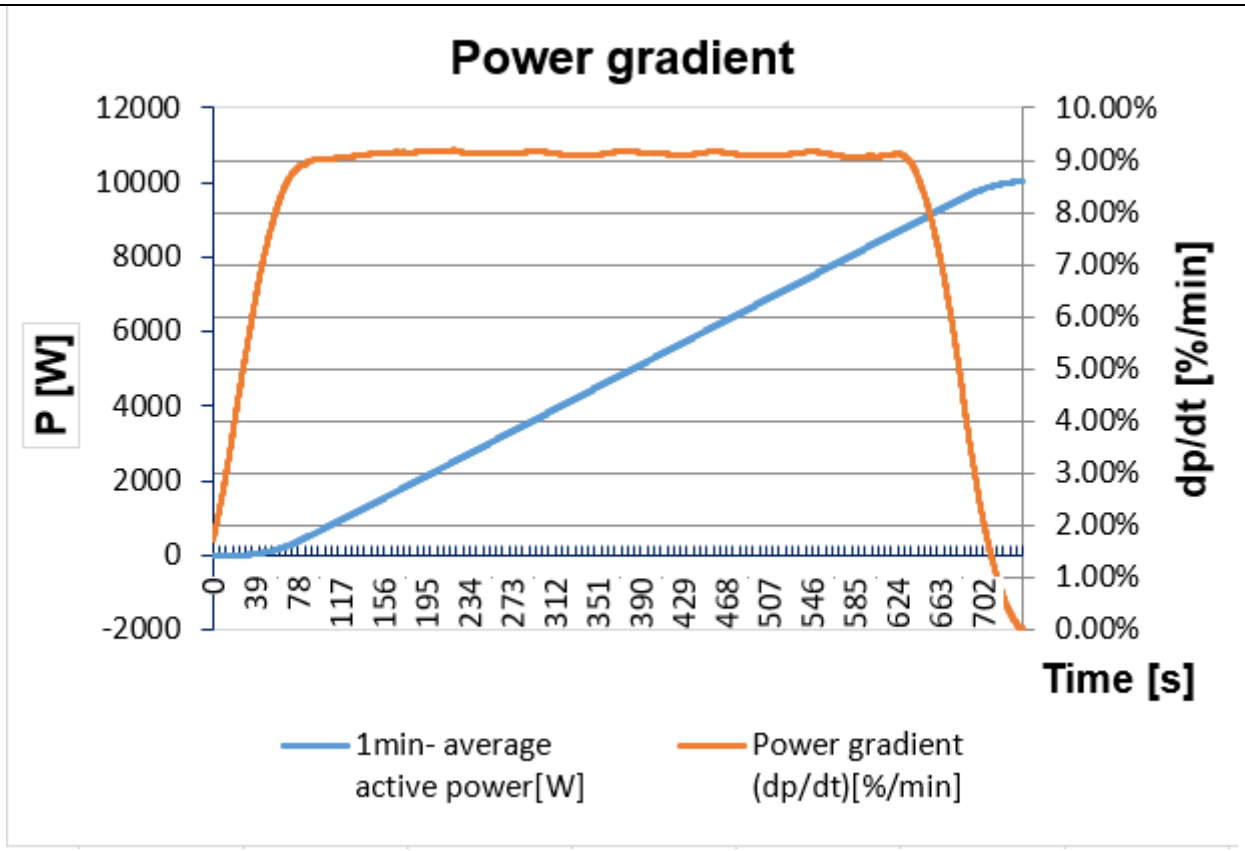

Overfrequency

Oscilloscope recorded waveforms

c) f_{ac} @50.15 Hz – no reconnection

d) f_{ac} @50.05 Hz – reconnection after 72.6 s

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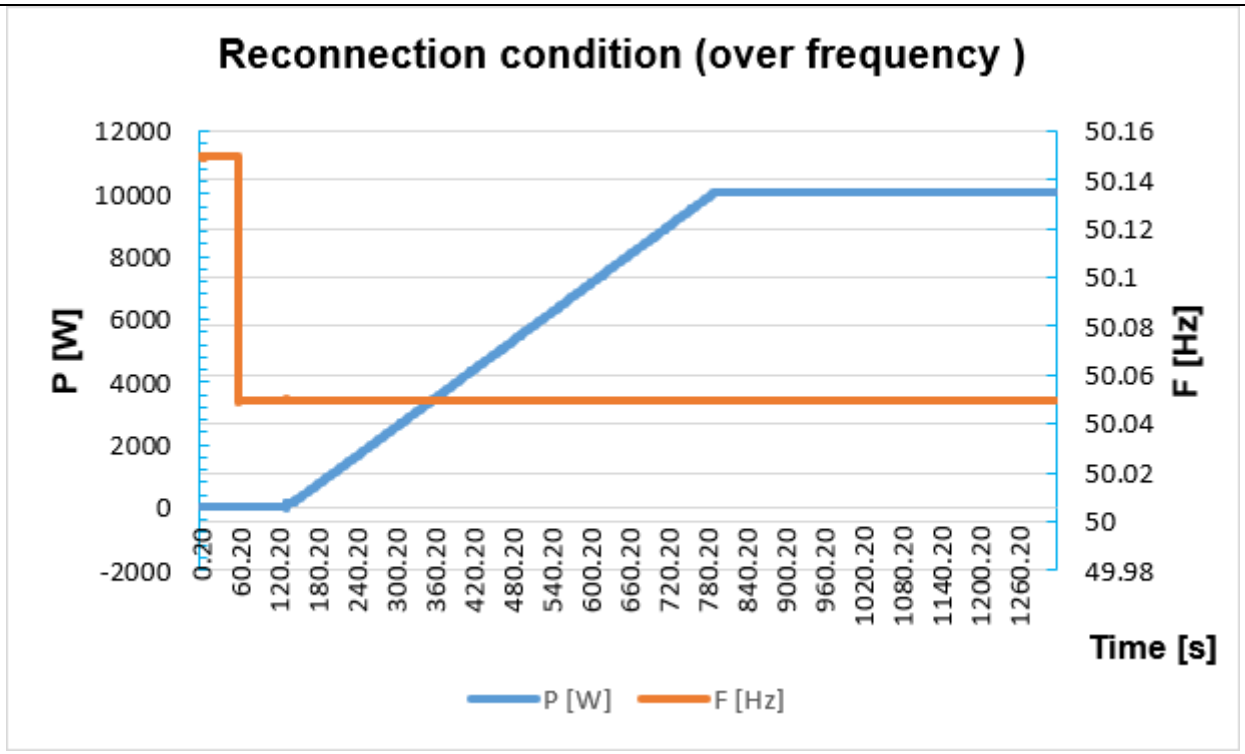
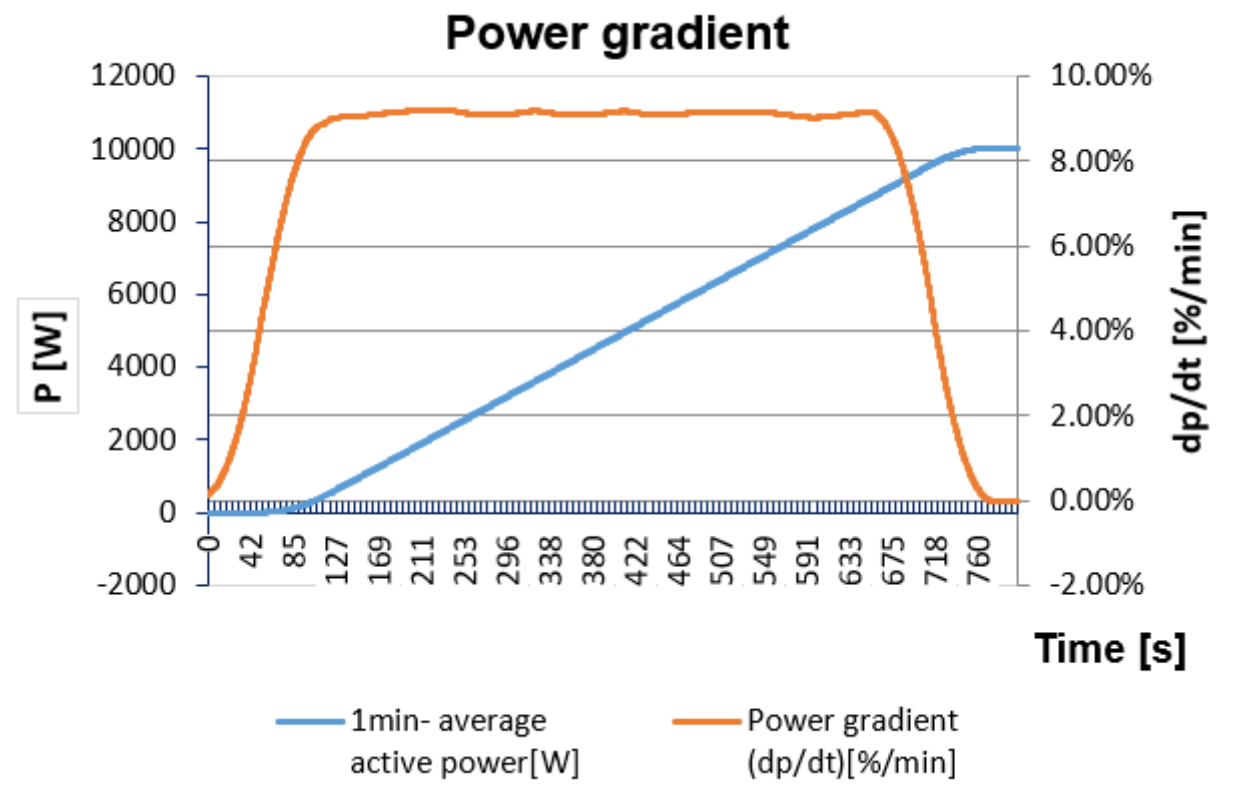


Max. power gradient during recovery 9.20 % P_{Emax}/min



Overvoltage

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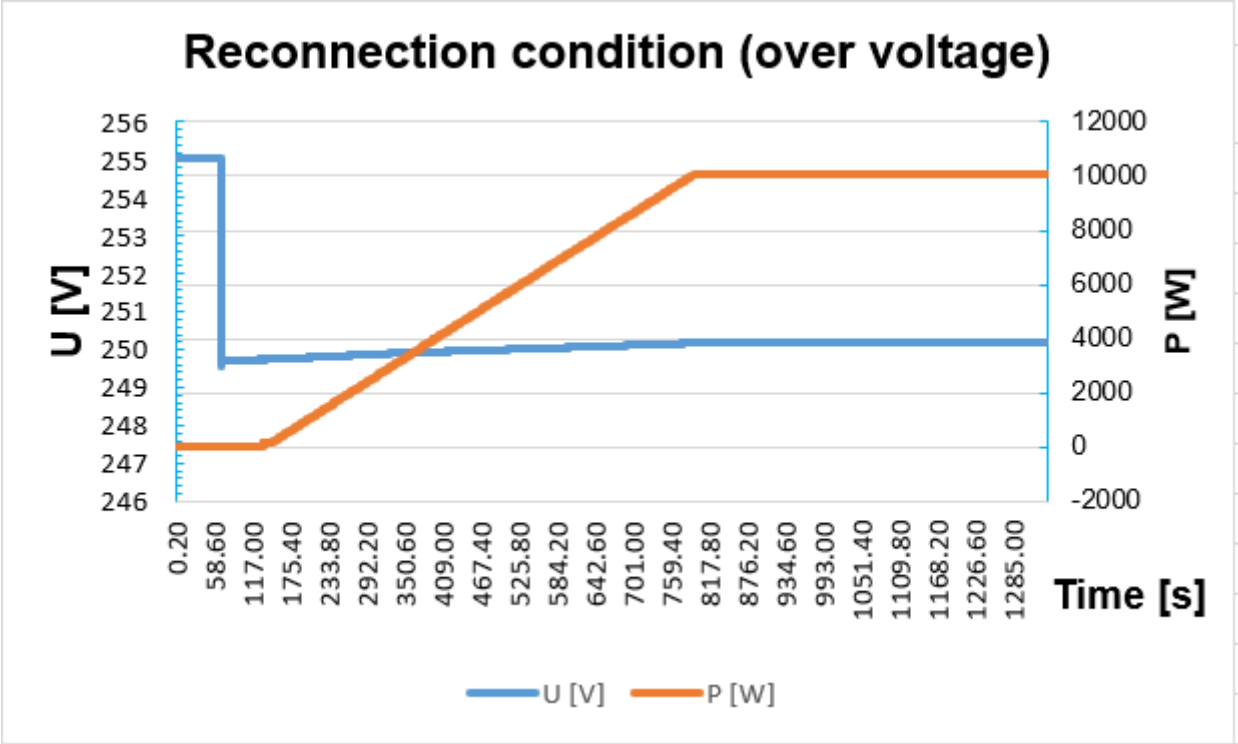
Oscilloscope recorded waveforms

e) U_{ac} @1.11 U_n – no reconnection

f) U_{ac} @1.09 U_n – reconnection after 64.0 s



Max. power gradient during recovery 9.20% P_{Emax}/min

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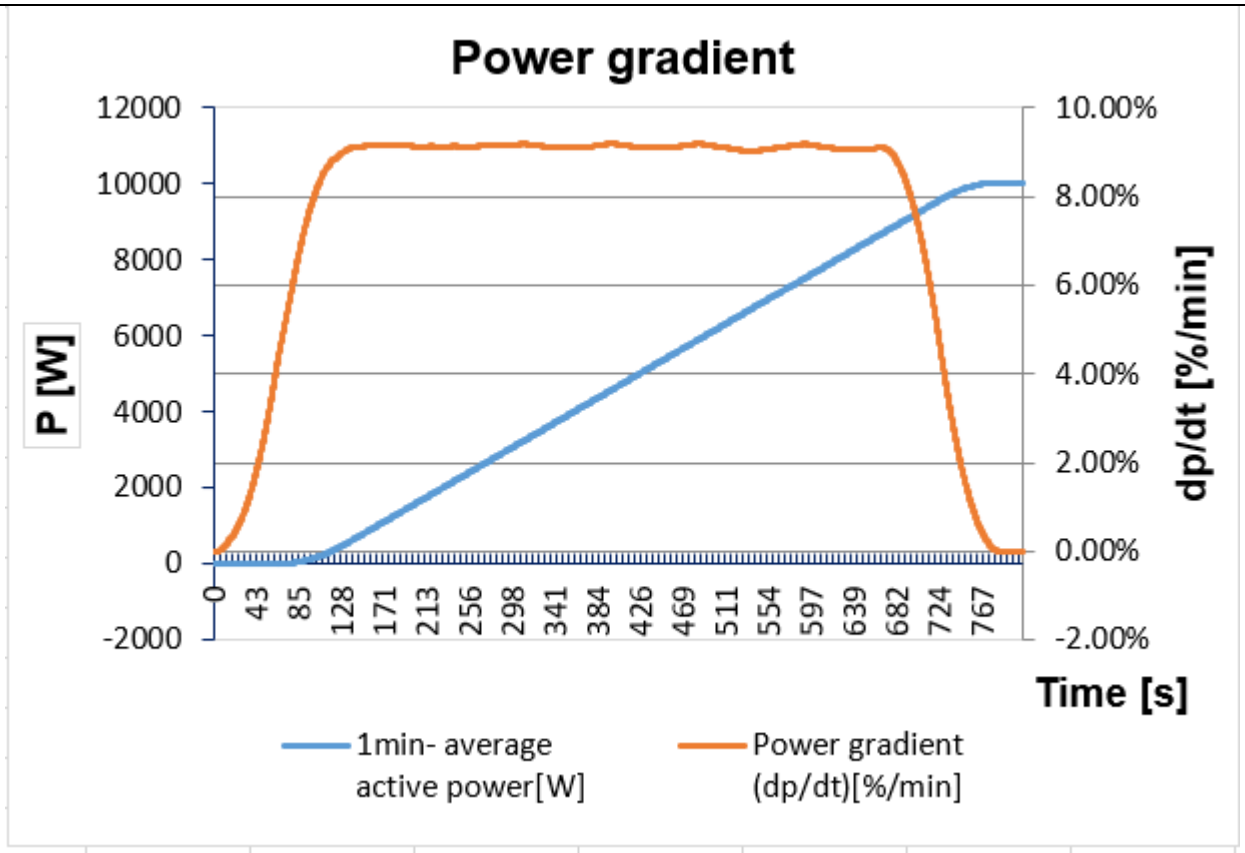

undervoltage

Oscilloscope recorded waveforms

g) U_{ac} @0.84 U_n – no reconnection

h) U_{ac} @0.86 U_n – reconnection after 64.2 s

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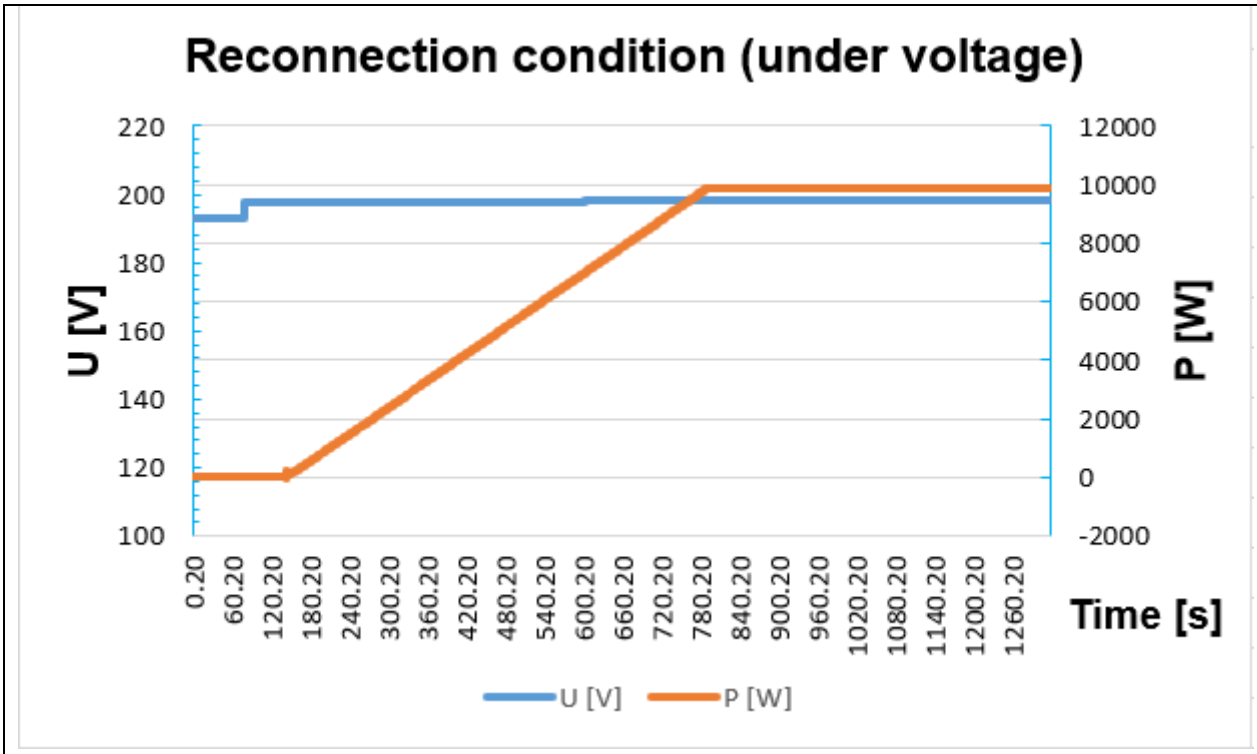
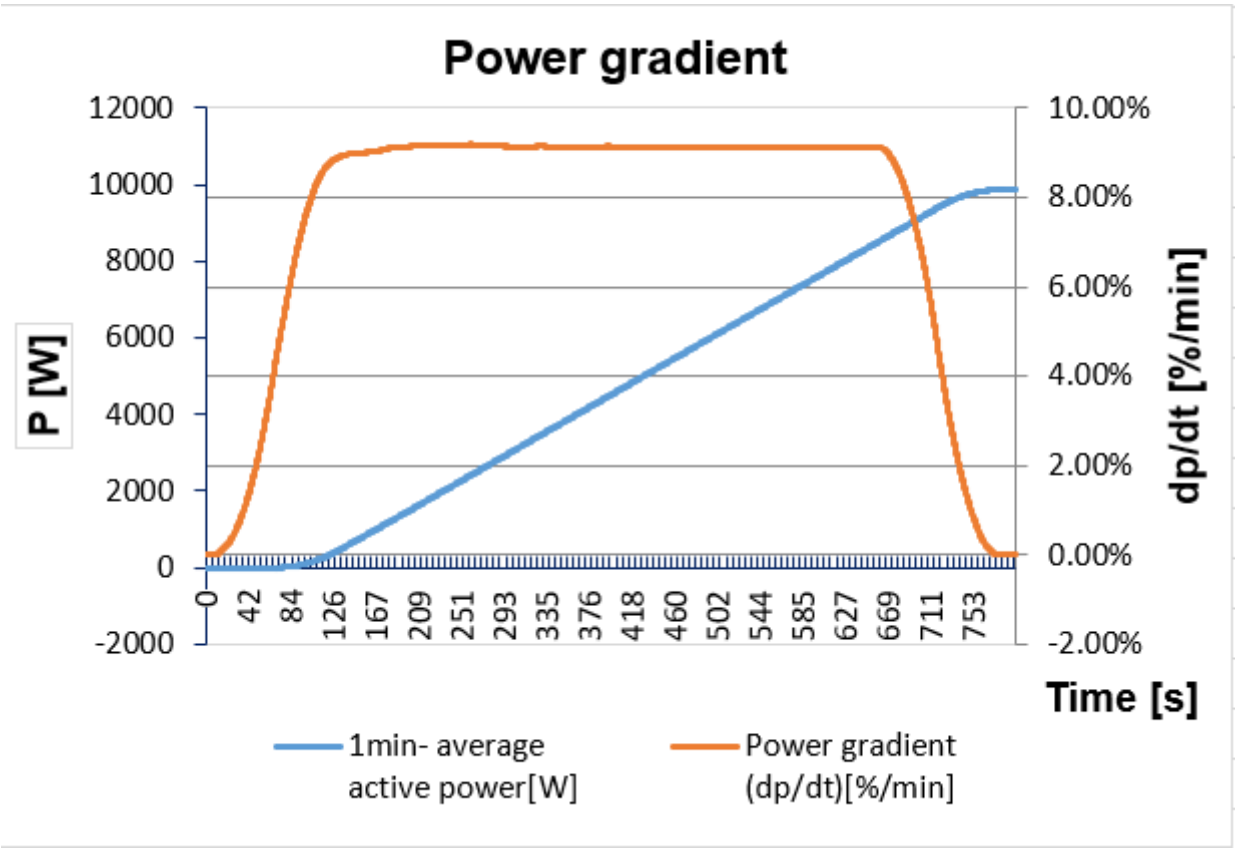


Max. power gradient during recovery 9.19 % P_{Emax}/min



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5.8	Table: Test of dynamic network support	P
MODEL	ST-INV-T10.0	

Test method:

The test object is connected to a network with a downstream test facility (or a network simulator with downstream network simulation). This test equipment shall be capable of reproducing the corresponding voltage dips / overshoot on the device under test as described in the following procedure. All requirements for the test equipment are listed in Annex A.

The correct parameterization of the test device in order to obtain the respective voltage dips / rises according to Table 17 and Table 18 must be tested for each test by an no load test (each separately symmetrical, asymmetrical). The value to be set in each case is for voltage drops the respective resulting, based on the nominal value, smallest line-neutral voltage. For voltage incease, the value to be set is the respective resulting maximum nominal line-to-neutral voltage.

The tests are to be started at a voltage in the range of U_n ± 5% U_n.

The reference point for the dynamic grid support of the PGU or the storage system are the line-side terminals of the test object.

It must be tested at full load (P_{rE} ± 2% P_{rE}) and in the partial load range of 0.2 P_{rE} to 0.6 P_{rE}. The reference value is the measured active power as a 10-s average value immediately before the voltage dips / rises.

All tests 1 to 6 from Table 17 and the tests 1 to 7 from Table 18 must be carried out both symmetrically (fault type image A) and asymmetrically (according to fault type image D) (according to Bollen, see Annex).

Note: In the asymmetrical tests, fault type D can be obtained on the low-voltage side with respect to the phase-neutral voltages. This fault type results from asymmetrical network faults (within the superimposed voltage level (s)) using the frequently used Dy5 transformer switch group for the connection of the PGU to the grid. These are not generator-side single-pole earth faults.

The FRT tests are performed with normal terminal assignment according to Table X27a. In addition, in the case of asymmetrical tests, the lowest voltage drops and the highest voltage rises at full load must be tested again with cyclically exchanged terminal assignment in accordance with Table X27b.

Single-phase PGU are connected to terminals W and N for fault type D1. For fault type D2, the connection is made to terminals V and N.

Table X27a – Normal connection assignment (fault type D1)
for testing dynamic network support

	test equipment	Test object
Connection terminals	U	L1
	V	L2
	W	L3

Table X27b – Cyclically exchanged terminal assignment (fault type D2)
for testing dynamic network support

	test equipment	Test object
Connection terminals	U	L3
	V	L1
	W	L2

The recording must begin at least 10 s before the fault occurs. After a fault clearance (voltage in the range 0.85 $U_n \leqslant U_n \leqslant$ 1.1 U_n), the recording must continue for at least another 60 s.

For two consecutive test runs per test, the network fault must be fully traversed for the test to pass.

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A direct temporal relationship between test and test repetition is not normatively required if the accredited testing laboratory ensures and confirms that the PGU has not been changed between test and test repetition either in hardware or in software.

Table 18 – Dynamic network support test for Type 2 PGU and storage unit

Test	Voltage depth in [p.u.]	Fault type	Fault duration in [ms]	Load	Reactive power before Test Q/P_{rE} [%]	Test-number
1	0,15 … 0,25	A	at 0,15pu ≥150 at 0,25pu ≥557	Full load	0 to ±10%	1.1
				Partial load		1.2
		D1		Full load		1.3
				Partial load		1.4
		D2		Full load		1.5
2	0,50 … 0,60	A	at 0,5pu ≥1575 at 0,6pu ≥2000	Full load	maximum overexcited	2.1
				Partial load		2.2
		D1		Full load		2.3
				Partial load		2.4
3	0,50 … 0,60	A	at 0,5pu ≥1575 at 0,6pu ≥2000	Full load	maximum underexcited	3.1
				Partial load		3.2
		D1		Full load		3.3
				Partial load		3.4
4	0,85 … 0,90	A	≥60000	Full load	0 to ±10%	4.1
				Partial load		4.2
		D1		Full load		4.3
				Partial load		4.4
5	1,20 … 1,25	A	≥100	Full load	0 to ±10%	5.1
				Partial load		5.2
		D1		Full load		5.3
				Partial load		5.4
		D2		Full load		5.5
6	1,15 … 1,20	A	≥5000	Full load	0 to ±10%	6.1
				Partial load		6.2
		D1		Full load		6.3
				Partial load		6.4
7	1,10 … 1,15	A	≥60000	Full load	0 to ±10%	7.1
				Partial load		7.2
		D1		Full load		7.3
				Partial load		7.4

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:40:26 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.433	[s]
	7	Time point of fault clearance (t2)	Total	–	12.593	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.150	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.150	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.148	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.972	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.976	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.973	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.973	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.973	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.020	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.149	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.147	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.148	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.147	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.003	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.003	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.972	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.972	[p.u.]
	45	Active power rising time	Total	-	0.385	[s]
	46		Positive sequence	-	0.385	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	–	[s]
	50		Positive sequence	–	–	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:49:03 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.368	[s]
	7	Time point of fault clearance (t2)	Total	–	12.528	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.147	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.148	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.147	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.973	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.974	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.974	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.020	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.147	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.147	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.148	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.147	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.003	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.003	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.972	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.972	[p.u.]
	45	Active power rising time	Total	-	0.384	[s]
	46		Positive sequence	-	0.384	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:56:03 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.132	[s]
	7	Time point of fault clearance (t2)	Total	–	13.292	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.150	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.149	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.004	[p.u.]
	32		Phase L2	t_1+60 ms	0.003	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.003	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.368	[s]
	46		Positive sequence	-	0.368	[s]
	47	Reactive power	Total	t_2+10 s	0.017	[p.u.]
	48		Positive sequence	t_2+10 s	-0.012	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:59:19 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.628	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	12.788	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.150	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.203	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.204	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.204	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.149	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.004	[p.u.]
	32		Phase L2	t_1+60 ms	0.003	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.003	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.000	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.205	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.205	[p.u.]
	45	Active power rising time	Total	-	0.287	[s]
	46		Positive sequence	-	0.287	[s]
	47	Reactive power	Total	t_2+10 s	0.014	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:03:15 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.971	[s]
	7	Time point of fault clearance (t2)	Total	–	13.130	[s]
	8	Fault duration in no load test	Total	–	159	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.150	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.867	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.867	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.571	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.974	[p.u.]

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TÜV SÜD New Energy Vehicle Testing (Jiangsu) Co., Ltd.,
TÜV SÜD Group
Building A, No.15 Factory, Jintong International Industrial Park, No.8 Xihu Road, Wujin National Hi-tech Industrial Development Zone, Changzhou City, Jiangsu Province, P.R. China

	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.974	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.020	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.149	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.866	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.867	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.571	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.034	[p.u.]
	33		Phase L3	t_1+60 ms	0.032	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.034	[p.u.]
	36		Phase L3	t_1 +100 ms	0.032	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.974	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.974	[p.u.]
	45	Active power rising time	Total	-	0.374	[s]
	46		Positive sequence	-	0.374	[s]
	47	Reactive power	Total	t_2+10 s	0.019	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:08:22 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.081	[s]
	7	Time point of fault clearance (t2)	Total	–	12.239	[s]
	8	Fault duration in no load test	Total	–	158	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.867	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.867	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.571	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.970	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.968	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.972	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.972	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.149	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.866	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.867	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.571	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.034	[p.u.]
	33		Phase L3	t_1+60 ms	0.032	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.034	[p.u.]
	36		Phase L3	t_1 +100 ms	0.032	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.971	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.971	[p.u.]
	45	Active power rising time	Total	-	0.378	[s]
	46		Positive sequence	-	0.378	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.014	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:13:50 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.323	[s]
	7	Time point of fault clearance (t2)	Total	–	13.483	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.868	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.869	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.586	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.014	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.149	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.868	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.869	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.576	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.034	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.205	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.205	[p.u.]
	45	Active power rising time	Total	-	0.269	[s]
	46		Positive sequence	-	0.269	[s]
	47	Reactive power	Total	t_2+10 s	0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:16:44 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.642	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	13.801	[s]
	8	Fault duration in no load test	Total	–	159	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.149	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.868	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.869	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.586	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.204	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.204	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.149	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.868	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.869	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.586	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.003	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.034	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.003	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.268	[s]
	46		Positive sequence	-	0.268	[s]
	47	Reactive power	Total	t_2+10 s	0.018	[p.u.]
	48		Positive sequence	t_2+10 s	-0.014	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.5-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:58:52 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.267	[s]
	7	Time point of fault clearance (t2)	Total	–	14.427	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.865	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.867	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.152	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.571	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.977	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.973	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.973	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.020	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.866	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.867	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.571	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.034	[p.u.]
	32		Phase L2	t_1+60 ms	0.034	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.034	[p.u.]
	35		Phase L2	t_1 +100 ms	0.034	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.973	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.973	[p.u.]
	45	Active power rising time	Total	-	0.378	[s]
	46		Positive sequence	-	0.378	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.014	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	1.5-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:02:02 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.15	[p.u.]
	5	Drop duration setpoint	–	–	160	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.736	[s]
	7	Time point of fault clearance (t2)	Total	–	12.896	[s]
	8	Fault duration in no load test	Total	–	160	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.865	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.866	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.151	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.571	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.972	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.977	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.973	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.972	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.972	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.866	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.867	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.150	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.571	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.034	[p.u.]
	32		Phase L2	t_1+60 ms	0.034	[p.u.]
	33		Phase L3	t_1+60 ms	0.003	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.034	[p.u.]
	35		Phase L2	t_1 +100 ms	0.034	[p.u.]
	36		Phase L3	t_1 +100 ms	0.003	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.971	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.971	[p.u.]
	45	Active power rising time	Total	-	0.378	[s]
	46		Positive sequence	-	0.378	[s]
	47	Reactive power	Total	t_2+10 s	0.021	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	09:31:07 AM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.552	[s]
	7	Time point of fault clearance (t2)	Total	–	14.132	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.499	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.500	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.001	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.002	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.002	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.989	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.983	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.785	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.592	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.789	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.789	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.593	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.592	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.800	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.499	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.499	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.499	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.497	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.018	[p.u.]
	32		Phase L2	t_1+60 ms	0.017	[p.u.]
	33		Phase L3	t_1+60 ms	0.016	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.018	[p.u.]
	35		Phase L2	t_1 +100 ms	0.017	[p.u.]
	36		Phase L3	t_1 +100 ms	0.016	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.002	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.866	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.866	[p.u.]
	45	Active power rising time	Total	-	0.362	[s]
	46		Positive sequence	-	0.362	[s]
	47	Reactive power	Total	t_2+10 s	0.573	[p.u.]
	48		Positive sequence	t_2+10 s	0.572	[p.u.]
	49	Reactive power rising time	Total	–	9.609	[s]
	50		Positive sequence	–	9.609	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	13:11:07 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.552	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	14.132	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.001	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.002	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.002	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.985	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.995	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.989	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.792	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.592	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.789	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.789	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.593	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.592	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.800	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.017	[p.u.]
	33		Phase L3	t_1+60 ms	0.016	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.018	[p.u.]
	35		Phase L2	t_1 +100 ms	0.017	[p.u.]
	36		Phase L3	t_1 +100 ms	0.016	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.002	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.871	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.871	[p.u.]
	45	Active power rising time	Total	-	0.362	[s]
	46		Positive sequence	-	0.362	[s]
	47	Reactive power	Total	t_2+10 s	0.583	[p.u.]
	48		Positive sequence	t_2+10 s	0.582	[p.u.]
	49	Reactive power rising time	Total	–	9.314	[s]
	50		Positive sequence	–	9.315	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	16:11:07 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.648	[s]
	7	Time point of fault clearance (t2)	Total	–	14.228	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.257	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.263	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.258	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.210	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.150	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.210	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.210	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.151	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.151	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.813	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.498	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.019	[p.u.]
	32		Phase L2	t_1+60 ms	0.018	[p.u.]
	33		Phase L3	t_1+60 ms	0.017	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.019	[p.u.]
	35		Phase L2	t_1 +100 ms	0.018	[p.u.]
	36		Phase L3	t_1 +100 ms	0.017	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.209	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.209	[p.u.]
	45	Active power rising time	Total	-	0.335	[s]
	46		Positive sequence	-	0.335	[s]
	47	Reactive power	Total	t_2+10 s	0.136	[p.u.]
	48		Positive sequence	t_2+10 s	0.135	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	10.032	[s]
	50		Positive sequence	–	10.039	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	16:27:59 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.198	[s]
	7	Time point of fault clearance (t2)	Total	–	13.778	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.257	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.264	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.258	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.211	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.151	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.210	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.210	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.152	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.151	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.812	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.498	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.019	[p.u.]
	32		Phase L2	t_1+60 ms	0.018	[p.u.]
	33		Phase L3	t_1+60 ms	0.017	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.019	[p.u.]
	35		Phase L2	t_1 +100 ms	0.018	[p.u.]
	36		Phase L3	t_1 +100 ms	0.017	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.209	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.209	[p.u.]
	45	Active power rising time	Total	-	0.337	[s]
	46		Positive sequence	-	0.337	[s]
	47	Reactive power	Total	t_2+10 s	0.135	[p.u.]
	48		Positive sequence	t_2+10 s	0.134	[p.u.]
	49	Reactive power rising time	Total	–	12.842	[s]
	50		Positive sequence	–	13.082	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	16:49:18 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.384	[s]
	7	Time point of fault clearance (t2)	Total	–	15.965	[s]
	8	Fault duration in no load test	Total	–	1581	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.898	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.743	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.001	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.002	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.002	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.987	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.983	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.784	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.591	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.791	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.791	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.594	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.593	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.800	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.898	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.743	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.034	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.017	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.002	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.878	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.878	[p.u.]
	45	Active power rising time	Total	-	0.328	[s]
	46		Positive sequence	-	0.328	[s]
	47	Reactive power	Total	t_2+10 s	0.582	[p.u.]
	48		Positive sequence	t_2+10 s	0.581	[p.u.]
	49	Reactive power rising time	Total	–	8.611	[s]
	50		Positive sequence	–	8.612	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	16:59:18 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.007	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	14.587	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.898	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	1.002	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.743	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.001	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.002	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.002	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.981	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.991	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.985	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.788	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.592	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.792	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.792	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.594	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.593	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.800	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.898	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.743	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.034	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.018	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.002	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.877	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.877	[p.u.]
	45	Active power rising time	Total	-	0.328	[s]
	46		Positive sequence	-	0.328	[s]
	47	Reactive power	Total	t_2+10 s	0.582	[p.u.]
	48		Positive sequence	t_2+10 s	0.581	[p.u.]
	49	Reactive power rising time	Total	–	8.655	[s]
	50		Positive sequence	–	8.655	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:08:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.224	[s]
	7	Time point of fault clearance (t2)	Total	–	14.804	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.900	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.744	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.256	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.263	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.257	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.210	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.150	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.210	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.210	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.151	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.150	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.813	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.900	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.744	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.042	[p.u.]
	32		Phase L2	t_1+60 ms	0.067	[p.u.]
	33		Phase L3	t_1+60 ms	0.061	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.033	[p.u.]
	35		Phase L2	t_1 +100 ms	0.056	[p.u.]
	36		Phase L3	t_1 +100 ms	0.044	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.209	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.209	[p.u.]
	45	Active power rising time	Total	-	0.303	[s]
	46		Positive sequence	-	0.303	[s]
	47	Reactive power	Total	t_2+10 s	0.135	[p.u.]
	48		Positive sequence	t_2+10 s	0.134	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	8.240	[s]
	50		Positive sequence	–	8.244	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	2.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	17:19:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.150	[s]
	7	Time point of fault clearance (t2)	Total	–	13.731	[s]
	8	Fault duration in no load test	Total	–	1581	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.900	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.744	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.257	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.263	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.258	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.210	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	0.150	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.210	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.210	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.152	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	0.151	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.812	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.900	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.744	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.029	[p.u.]
	32		Phase L2	t_1+60 ms	0.059	[p.u.]
	33		Phase L3	t_1+60 ms	0.052	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.020	[p.u.]
	35		Phase L2	t_1 +100 ms	0.050	[p.u.]
	36		Phase L3	t_1 +100 ms	0.038	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.209	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.209	[p.u.]
	45	Active power rising time	Total	-	0.345	[s]
	46		Positive sequence	-	0.345	[s]
	47	Reactive power	Total	t_2+10 s	0.137	[p.u.]
	48		Positive sequence	t_2+10 s	0.135	[p.u.]
	49	Reactive power rising time	Total	–	8.239	[s]
	50		Positive sequence	–	8.242	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:38:24 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.552	[s]
	7	Time point of fault clearance (t2)	Total	–	14.132	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	1.002	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	1.012	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	1.002	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.802	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.603	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.798	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.798	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.602	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.600	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.799	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.017	[p.u.]
	33		Phase L3	t_1+60 ms	0.016	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.018	[p.u.]
	35		Phase L2	t_1 +100 ms	0.017	[p.u.]
	36		Phase L3	t_1 +100 ms	0.016	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.874	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.874	[p.u.]
	45	Active power rising time	Total	-	0.352	[s]
	46		Positive sequence	-	0.352	[s]
	47	Reactive power	Total	t_2+10 s	-0.589	[p.u.]
	48		Positive sequence	t_2+10 s	-0.587	[p.u.]
	49	Reactive power rising time	Total	–	8.580	[s]
	50		Positive sequence	–	8.583	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:41:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.552	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	14.132	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	1.016	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	1.027	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	1.016	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.812	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.614	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.812	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.812	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.615	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.613	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.798	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.017	[p.u.]
	33		Phase L3	t_1+60 ms	0.016	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.017	[p.u.]
	35		Phase L2	t_1 +100 ms	0.017	[p.u.]
	36		Phase L3	t_1 +100 ms	0.016	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.880	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.880	[p.u.]
	45	Active power rising time	Total	-	0.361	[s]
	46		Positive sequence	-	0.361	[s]
	47	Reactive power	Total	t_2+10 s	-0.592	[p.u.]
	48		Positive sequence	t_2+10 s	-0.590	[p.u.]
	49	Reactive power rising time	Total	–	8.994	[s]
	50		Positive sequence	–	9.032	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:52:47 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.366	[s]
	7	Time point of fault clearance (t2)	Total	–	13.946	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.254	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.261	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.256	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.199	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.160	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.201	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.201	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.162	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.160	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.782	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.498	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.019	[p.u.]
	32		Phase L2	t_1+60 ms	0.018	[p.u.]
	33		Phase L3	t_1+60 ms	0.017	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.019	[p.u.]
	35		Phase L2	t_1 +100 ms	0.018	[p.u.]
	36		Phase L3	t_1 +100 ms	0.017	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.998	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.203	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.203	[p.u.]
	45	Active power rising time	Total	-	0.326	[s]
	46		Positive sequence	-	0.326	[s]
	47	Reactive power	Total	t_2+10 s	-0.149	[p.u.]
	48		Positive sequence	t_2+10 s	-0.147	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	11.969	[s]
	50		Positive sequence	–	12.090	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	19:54:23 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.50	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.011	[s]
	7	Time point of fault clearance (t2)	Total	–	14.591	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.498	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.495	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.256	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.263	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.257	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.201	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.161	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.202	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.202	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.163	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.161	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.782	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.498	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.495	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.019	[p.u.]
	32		Phase L2	t_1+60 ms	0.018	[p.u.]
	33		Phase L3	t_1+60 ms	0.017	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.019	[p.u.]
	35		Phase L2	t_1 +100 ms	0.018	[p.u.]
	36		Phase L3	t_1 +100 ms	0.017	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.998	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.203	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.203	[p.u.]
	45	Active power rising time	Total	-	0.334	[s]
	46		Positive sequence	-	0.334	[s]
	47	Reactive power	Total	t_2+10 s	-0.148	[p.u.]
	48		Positive sequence	t_2+10 s	-0.146	[p.u.]
	49	Reactive power rising time	Total	–	12.107	[s]
	50		Positive sequence	–	12.107	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:00:17 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.073	[s]
	7	Time point of fault clearance (t2)	Total	–	13.653	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.898	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.743	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.998	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	1.007	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.997	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.797	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.603	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.800	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.800	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.610	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.608	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.796	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.898	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.743	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.033	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.017	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.878	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.878	[p.u.]
	45	Active power rising time	Total	-	0.333	[s]
	46		Positive sequence	-	0.333	[s]
	47	Reactive power	Total	t_2+10 s	-0.592	[p.u.]
	48		Positive sequence	t_2+10 s	-0.589	[p.u.]
	49	Reactive power rising time	Total	–	8.732	[s]
	50		Positive sequence	–	8.735	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:11:17 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.161	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	13.742	[s]
	8	Fault duration in no load test	Total	–	1581	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.496	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.898	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.743	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	1.015	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	1.026	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	1.016	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.814	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.611	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.809	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.809	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.610	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.608	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.799	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.496	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.898	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.743	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.017	[p.u.]
	32		Phase L2	t_1+60 ms	0.035	[p.u.]
	33		Phase L3	t_1+60 ms	0.033	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.017	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.034	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.889	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.889	[p.u.]
	45	Active power rising time	Total	-	0.332	[s]
	46		Positive sequence	-	0.332	[s]
	47	Reactive power	Total	t_2+10 s	-0.597	[p.u.]
	48		Positive sequence	t_2+10 s	-0.595	[p.u.]
	49	Reactive power rising time	Total	–	7.735	[s]
	50		Positive sequence	–	7.737	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:19:17 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	11.952	[s]
	7	Time point of fault clearance (t2)	Total	–	13.532	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.744	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.257	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.264	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.257	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.202	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.160	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.202	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.202	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.162	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.160	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.783	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.900	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.744	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.105	[p.u.]
	32		Phase L2	t_1+60 ms	0.090	[p.u.]
	33		Phase L3	t_1+60 ms	0.105	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.052	[p.u.]
	35		Phase L2	t_1 +100 ms	0.039	[p.u.]
	36		Phase L3	t_1 +100 ms	0.052	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.998	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.203	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.203	[p.u.]
	45	Active power rising time	Total	-	0.299	[s]
	46		Positive sequence	-	0.299	[s]
	47	Reactive power	Total	t_2+10 s	-0.149	[p.u.]
	48		Positive sequence	t_2+10 s	-0.146	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	8.239	[s]
	50		Positive sequence	–	7.894	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	3.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:21:17 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.5	[p.u.]
	5	Drop duration setpoint	–	–	1580	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.181	[s]
	7	Time point of fault clearance (t2)	Total	–	13.761	[s]
	8	Fault duration in no load test	Total	–	1580	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.497	[p.u.]
				t_1-10 s to t1	0.998	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.899	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.744	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.998	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.256	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.263	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.258	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.202	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.160	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.202	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.202	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.162	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.160	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.783	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.497	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.899	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.900	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.744	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.040	[p.u.]
	32		Phase L2	t_1+60 ms	0.037	[p.u.]
	33		Phase L3	t_1+60 ms	0.036	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.017	[p.u.]
	35		Phase L2	t_1 +100 ms	0.013	[p.u.]
	36		Phase L3	t_1 +100 ms	0.013	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.014	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.015	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.998	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.203	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.203	[p.u.]
	45	Active power rising time	Total	-	0.300	[s]
	46		Positive sequence	-	0.300	[s]
	47	Reactive power	Total	t_2+10 s	-0.148	[p.u.]
	48		Positive sequence	t_2+10 s	-0.146	[p.u.]
	49	Reactive power rising time	Total	–	9.239	[s]
	50		Positive sequence	–	9.066	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:33:14 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.441	[s]
	7	Time point of fault clearance (t2)	Total	–	73.461	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.850	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.851	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.851	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.847	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.972	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.977	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.973	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.974	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.974	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.850	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.851	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.851	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.847	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	1.111	[p.u.]
	32		Phase L2	t_1+60 ms	1.114	[p.u.]
	33		Phase L3	t_1+60 ms	1.112	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	1.132	[p.u.]
	35		Phase L2	t_1 +100 ms	1.136	[p.u.]
	36		Phase L3	t_1 +100 ms	1.132	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.961	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.961	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.974	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.974	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.019	[p.u.]
	48		Positive sequence	t_2+10 s	-0.013	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:36:14 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.466	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	73.486	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.851	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.851	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.847	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.980	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.976	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.975	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.975	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.851	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.851	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.847	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	1.112	[p.u.]
	32		Phase L2	t_1+60 ms	1.114	[p.u.]
	33		Phase L3	t_1+60 ms	1.112	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	1.133	[p.u.]
	35		Phase L2	t_1 +100 ms	1.132	[p.u.]
	36		Phase L3	t_1 +100 ms	1.131	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.961	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.961	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.971	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.971	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.021	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:38:32 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.036	[s]
	7	Time point of fault clearance (t2)	Total	–	74.056	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.850	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.850	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.846	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.850	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.850	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.846	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.458	[p.u.]
	32		Phase L2	t_1+60 ms	0.466	[p.u.]
	33		Phase L3	t_1+60 ms	0.454	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.243	[p.u.]
	35		Phase L2	t_1 +100 ms	0.230	[p.u.]
	36		Phase L3	t_1 +100 ms	0.243	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.205	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.205	[p.u.]
	45	Active power rising time	Total	-	0.021	[s]
	46		Positive sequence	-	0.021	[s]
	47	Reactive power	Total	t_2+10 s	0.014	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:42:32 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.089	[s]
	7	Time point of fault clearance (t2)	Total	–	73.109	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.850	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.850	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.846	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.207	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.850	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.850	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.846	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.467	[p.u.]
	32		Phase L2	t_1+60 ms	0.464	[p.u.]
	33		Phase L3	t_1+60 ms	0.459	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.236	[p.u.]
	35		Phase L2	t_1 +100 ms	0.230	[p.u.]
	36		Phase L3	t_1 +100 ms	0.234	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.207	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.207	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.021	[s]
	46		Positive sequence	-	0.021	[s]
	47	Reactive power	Total	t_2+10 s	0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:55:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.944	[s]
	7	Time point of fault clearance (t2)	Total	–	74.963	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.964	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.963	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	0.920	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.979	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.972	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.975	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.975	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.964	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.963	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.920	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	1.033	[p.u.]
	32		Phase L2	t_1+60 ms	1.038	[p.u.]
	33		Phase L3	t_1+60 ms	1.036	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	1.039	[p.u.]
	35		Phase L2	t_1 +100 ms	1.038	[p.u.]
	36		Phase L3	t_1 +100 ms	1.037	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.834	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.836	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.974	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.974	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.049	[p.u.]
	48		Positive sequence	t_2+10 s	-0.021	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:58:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.614	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	72.634	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.964	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.964	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.920	[p.u.]
				t_1-10 s to t1	0.996	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.000	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.996	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.973	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.977	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.973	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.973	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.964	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.964	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.920	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	1.033	[p.u.]
	32		Phase L2	t_1+60 ms	1.038	[p.u.]
	33		Phase L3	t_1+60 ms	1.036	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	1.034	[p.u.]
	35		Phase L2	t_1 +100 ms	1.038	[p.u.]
	36		Phase L3	t_1 +100 ms	1.036	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.966	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.969	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.968	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.968	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.046	[p.u.]
	48		Positive sequence	t_2+10 s	-0.016	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:46:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.451	[s]
	7	Time point of fault clearance (t2)	Total	–	72.470	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.964	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.965	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.921	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.964	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.965	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.921	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.125	[p.u.]
	32		Phase L2	t_1+60 ms	0.344	[p.u.]
	33		Phase L3	t_1+60 ms	0.188	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.214	[p.u.]
	35		Phase L2	t_1 +100 ms	0.309	[p.u.]
	36		Phase L3	t_1 +100 ms	0.188	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.032	[s]
	46		Positive sequence	-	0.032	[s]
	47	Reactive power	Total	t_2+10 s	0.014	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	4.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	18:49:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	0.85	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.879	[s]
	7	Time point of fault clearance (t2)	Total	–	74.899	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	0.849	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	0.964	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	0.965	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	0.921	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.014	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	0.849	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	0.964	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	0.965	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	0.921	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.163	[p.u.]
	32		Phase L2	t_1+60 ms	0.351	[p.u.]
	33		Phase L3	t_1+60 ms	0.162	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.217	[p.u.]
	35		Phase L2	t_1 +100 ms	0.338	[p.u.]
	36		Phase L3	t_1 +100 ms	0.206	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.206	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.031	[s]
	46		Positive sequence	-	0.031	[s]
	47	Reactive power	Total	t_2+10 s	0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	13:25:25 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	100	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.889	[s]
	7	Time point of fault clearance (t2)	Total	–	12.989	[s]
	8	Fault duration in no load test	Total	–	100	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.250	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.227	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.239	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.232	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.972	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.977	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.973	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.972	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.972	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.251	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.249	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.251	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.245	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.053	[p.u.]
	32		Phase L2	t_1+60 ms	0.053	[p.u.]
	33		Phase L3	t_1+60 ms	0.051	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.051	[p.u.]
	35		Phase L2	t_1 +100 ms	0.062	[p.u.]
	36		Phase L3	t_1 +100 ms	0.061	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.004	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.004	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.973	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.973	[p.u.]
	45	Active power rising time	Total	-	0.376	[s]
	46		Positive sequence	-	0.376	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	13:27:34 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	100	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.609	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	12.709	[s]
	8	Fault duration in no load test	Total	–	100	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.246	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.211	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.234	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.223	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.967	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.970	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.970	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.251	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.247	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.251	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.244	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.055	[p.u.]
	32		Phase L2	t_1+60 ms	0.053	[p.u.]
	33		Phase L3	t_1+60 ms	0.052	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.052	[p.u.]
	35		Phase L2	t_1 +100 ms	0.062	[p.u.]
	36		Phase L3	t_1 +100 ms	0.061	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.003	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.969	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.969	[p.u.]
	45	Active power rising time	Total	-	0.376	[s]
	46		Positive sequence	-	0.376	[s]
	47	Reactive power	Total	t_2+10 s	0.020	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:21:25 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	100	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.618	[s]
	7	Time point of fault clearance (t2)	Total	–	12.718	[s]
	8	Fault duration in no load test	Total	–	100	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.251	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.228	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.240	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.233	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.204	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.204	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.252	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.250	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.252	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.246	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.053	[p.u.]
	32		Phase L2	t_1+60 ms	0.052	[p.u.]
	33		Phase L3	t_1+60 ms	0.051	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.052	[p.u.]
	35		Phase L2	t_1 +100 ms	0.063	[p.u.]
	36		Phase L3	t_1 +100 ms	0.061	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.007	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.007	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.297	[s]
	46		Positive sequence	-	0.297	[s]
	47	Reactive power	Total	t_2+10 s	0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:25:11 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	100	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.701	[s]
	7	Time point of fault clearance (t2)	Total	–	13.801	[s]
	8	Fault duration in no load test	Total	–	100	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.251	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.223	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.238	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.231	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.252	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.250	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.252	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.246	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.055	[p.u.]
	32		Phase L2	t_1+60 ms	0.054	[p.u.]
	33		Phase L3	t_1+60 ms	0.052	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.053	[p.u.]
	35		Phase L2	t_1 +100 ms	0.063	[p.u.]
	36		Phase L3	t_1 +100 ms	0.062	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.004	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.004	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.205	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.205	[p.u.]
	45	Active power rising time	Total	-	0.372	[s]
	46		Positive sequence	-	0.372	[s]
	47	Reactive power	Total	t_2+10 s	0.017	[p.u.]
	48		Positive sequence	t_2+10 s	-0.012	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	15:02:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.995	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.998	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.97	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.968	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.007	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.968	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.968	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.007	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.007	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.063	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.242	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.062	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.114	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.032	[p.u.]
	32		Phase L2	t_1+60 ms	0.043	[p.u.]
	33		Phase L3	t_1+60 ms	0.031	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.032	[p.u.]
	35		Phase L2	t_1 +100 ms	0.039	[p.u.]
	36		Phase L3	t_1 +100 ms	0.031	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.970	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.970	[p.u.]
	45	Active power rising time	Total	-	0.353	[s]
	46		Positive sequence	-	0.353	[s]
	47	Reactive power	Total	t_2+10 s	-0.008	[p.u.]
	48		Positive sequence	t_2+10 s	-0.008	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	15:05:32 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.995	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.998	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.97	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.968	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.007	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.968	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.968	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.007	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.007	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.063	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.242	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.062	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.114	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.031	[p.u.]
	32		Phase L2	t_1+60 ms	0.041	[p.u.]
	33		Phase L3	t_1+60 ms	0.031	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.031	[p.u.]
	35		Phase L2	t_1 +100 ms	0.038	[p.u.]
	36		Phase L3	t_1 +100 ms	0.035	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.972	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.971	[p.u.]
	45	Active power rising time	Total	-	0.355	[s]
	46		Positive sequence	-	0.355	[s]
	47	Reactive power	Total	t_2+10 s	0.000	[p.u.]
	48		Positive sequence	t_2+10 s	0.000	[p.u.]
	49	Reactive power rising time	Total	–	0.000	[s]
	50		Positive sequence	–	0.267	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	15:57:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.211	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.253	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.071	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.070	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.123	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.063	[p.u.]
	32		Phase L2	t_1+60 ms	0.044	[p.u.]
	33		Phase L3	t_1+60 ms	0.043	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.057	[p.u.]
	35		Phase L2	t_1 +100 ms	0.044	[p.u.]
	36		Phase L3	t_1 +100 ms	0.043	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.345	[s]
	46		Positive sequence	-	0.345	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	15:59:51 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[s]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.204	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.209	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.253	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.071	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.070	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.123	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.062	[p.u.]
	32		Phase L2	t_1+60 ms	0.044	[p.u.]
	33		Phase L3	t_1+60 ms	0.043	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.057	[p.u.]
	35		Phase L2	t_1 +100 ms	0.044	[p.u.]
	36		Phase L3	t_1 +100 ms	0.043	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.205	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.205	[p.u.]
	45	Active power rising time	Total	-	0.337	[s]
	46		Positive sequence	-	0.337	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.5-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:07:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.998	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.997	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.998	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.998	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.996	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.991	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.007	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.976	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.976	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.001	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.063	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.064	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.241	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.117	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.032	[p.u.]
	32		Phase L2	t_1+60 ms	0.032	[p.u.]
	33		Phase L3	t_1+60 ms	0.043	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.032	[p.u.]
	35		Phase L2	t_1 +100 ms	0.032	[p.u.]
	36		Phase L3	t_1 +100 ms	0.039	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.970	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.970	[p.u.]
	45	Active power rising time	Total	-	0.350	[s]
	46		Positive sequence	-	0.350	[s]
	47	Reactive power	Total	t_2+10 s	-0.009	[p.u.]
	48		Positive sequence	t_2+10 s	-0.001	[p.u.]
	49	Reactive power rising time	Total	–	–	[s]
	50		Positive sequence	–	–	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	5.5-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:10:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.25	[p.u.]
	5	Drop duration setpoint	–	–	120	[ms]
	6	Time point of fault occurrence (t1)	Total	–	21.001	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	21.120	[s]
	8	Fault duration in no load test	Total	–	119	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.249	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.067	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.068	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.124	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.997	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.998	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.998	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.997	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.991	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.007	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.976	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.976	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.001	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.061	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.064	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.242	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.118	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.032	[p.u.]
	32		Phase L2	t_1+60 ms	0.031	[p.u.]
	33		Phase L3	t_1+60 ms	0.043	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.032	[p.u.]
	35		Phase L2	t_1 +100 ms	0.035	[p.u.]
	36		Phase L3	t_1 +100 ms	0.039	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.002	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.970	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.970	[p.u.]
	45	Active power rising time	Total	-	0.350	[s]
	46		Positive sequence	-	0.350	[s]
	47	Reactive power	Total	t_2+10 s	-0.009	[p.u.]
	48		Positive sequence	t_2+10 s	-0.001	[p.u.]
	49	Reactive power rising time	Total	–	–	[s]
	50		Positive sequence	–	–	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:52:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5000	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.935	[s]
	7	Time point of fault clearance (t2)	Total	–	18.935	[s]
	8	Fault duration in no load test	Total	–	5000	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.201	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.203	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.197	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.971	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.976	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.972	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.973	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.973	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.201	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.203	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.197	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.050	[p.u.]
	32		Phase L2	t_1+60 ms	0.049	[p.u.]
	33		Phase L3	t_1+60 ms	0.047	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.050	[p.u.]
	35		Phase L2	t_1 +100 ms	0.049	[p.u.]
	36		Phase L3	t_1 +100 ms	0.047	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.972	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.972	[p.u.]
	45	Active power rising time	Total	-	0.336	[s]
	46		Positive sequence	-	0.336	[s]
	47	Reactive power	Total	t_2+10 s	0.018	[p.u.]
	48		Positive sequence	t_2+10 s	-0.013	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	20:56:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5000	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.510	[s]
	7	Time point of fault clearance (t2)	Total	–	18.510	[s]
	8	Fault duration in no load test	Total	–	5000	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.201	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.203	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.197	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.970	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.974	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.967	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.970	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.970	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.970	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.019	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.014	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.201	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.203	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.197	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.051	[p.u.]
	32		Phase L2	t_1+60 ms	0.050	[p.u.]
	33		Phase L3	t_1+60 ms	0.048	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.050	[p.u.]
	35		Phase L2	t_1 +100 ms	0.049	[p.u.]
	36		Phase L3	t_1 +100 ms	0.048	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.970	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.970	[p.u.]
	45	Active power rising time	Total	-	0.337	[s]
	46		Positive sequence	-	0.337	[s]
	47	Reactive power	Total	t_2+10 s	0.019	[p.u.]
	48		Positive sequence	t_2+10 s	-0.014	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:02:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5000	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.838	[s]
	7	Time point of fault clearance (t2)	Total	–	17.838	[s]
	8	Fault duration in no load test	Total	–	5000	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.203	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.204	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.198	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.208	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.203	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.204	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.198	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.053	[p.u.]
	32		Phase L2	t_1+60 ms	0.052	[p.u.]
	33		Phase L3	t_1+60 ms	0.050	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.051	[p.u.]
	35		Phase L2	t_1 +100 ms	0.050	[p.u.]
	36		Phase L3	t_1 +100 ms	0.049	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.340	[s]
	46		Positive sequence	-	0.340	[s]
	47	Reactive power	Total	t_2+10 s	0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:12:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5000	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.375	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	18.375	[s]
	8	Fault duration in no load test	Total	–	5000	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.203	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.204	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.198	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.207	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.204	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.204	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.015	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.203	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.204	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.198	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.053	[p.u.]
	32		Phase L2	t_1+60 ms	0.051	[p.u.]
	33		Phase L3	t_1+60 ms	0.049	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.051	[p.u.]
	35		Phase L2	t_1 +100 ms	0.050	[p.u.]
	36		Phase L3	t_1 +100 ms	0.049	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.204	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.204	[p.u.]
	45	Active power rising time	Total	-	0.333	[s]
	46		Positive sequence	-	0.333	[s]
	47	Reactive power	Total	t_2+10 s	0.017	[p.u.]
	48		Positive sequence	t_2+10 s	-0.012	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:13:04 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	11.991	[s]
	7	Time point of fault clearance (t2)	Total	–	17.011	[s]
	8	Fault duration in no load test	Total	–	5020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.055	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.056	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.098	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.997	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.998	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.997	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.980	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.975	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.978	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.004	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.972	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.972	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.005	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.005	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.232	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.042	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.099	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.031	[p.u.]
	32		Phase L2	t_1+60 ms	0.033	[p.u.]
	33		Phase L3	t_1+60 ms	0.031	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.033	[p.u.]
	35		Phase L2	t_1 +100 ms	0.039	[p.u.]
	36		Phase L3	t_1 +100 ms	0.033	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.001	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.001	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.973	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.973	[p.u.]
	45	Active power rising time	Total	-	0.494	[s]
	46		Positive sequence	-	0.494	[s]
	47	Reactive power	Total	t_2+10 s	-0.005	[p.u.]
	48		Positive sequence	t_2+10 s	-0.005	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:15:04 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	11.991	[s]
	7	Time point of fault clearance (t2)	Total	–	17.011	[s]
	8	Fault duration in no load test	Total	–	5020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.055	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.056	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.098	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.999	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.999	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.980	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.979	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.979	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.979	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.004	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.973	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.973	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.005	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.005	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.232	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.042	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.099	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.031	[p.u.]
	32		Phase L2	t_1+60 ms	0.033	[p.u.]
	33		Phase L3	t_1+60 ms	0.031	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.033	[p.u.]
	35		Phase L2	t_1 +100 ms	0.039	[p.u.]
	36		Phase L3	t_1 +100 ms	0.033	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	-0.001	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	-0.001	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.996	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.974	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.974	[p.u.]
	45	Active power rising time	Total	-	0.495	[s]
	46		Positive sequence	-	0.495	[s]
	47	Reactive power	Total	t_2+10 s	-0.005	[p.u.]
	48		Positive sequence	t_2+10 s	-0.005	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:20:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	11.991	[s]
	7	Time point of fault clearance (t2)	Total	–	17.011	[s]
	8	Fault duration in no load test	Total	–	5020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.055	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.056	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.098	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.211	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.055	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.056	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.098	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.063	[p.u.]
	32		Phase L2	t_1+60 ms	0.043	[p.u.]
	33		Phase L3	t_1+60 ms	0.042	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.050	[p.u.]
	35		Phase L2	t_1 +100 ms	0.044	[p.u.]
	36		Phase L3	t_1 +100 ms	0.042	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.345	[s]
	46		Positive sequence	-	0.345	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	6.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	21:25:01 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.20	[p.u.]
	5	Drop duration setpoint	–	–	5020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	12.029	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	17.049	[s]
	8	Fault duration in no load test	Total	–	5020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.202	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.055	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.056	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.098	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.205	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.211	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.202	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.055	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.056	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.098	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.062	[p.u.]
	32		Phase L2	t_1+60 ms	0.044	[p.u.]
	33		Phase L3	t_1+60 ms	0.042	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.050	[p.u.]
	35		Phase L2	t_1 +100 ms	0.044	[p.u.]
	36		Phase L3	t_1 +100 ms	0.042	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.347	[s]
	46		Positive sequence	-	0.347	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.1-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	12:42:47 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.008	[s]
	7	Time point of fault clearance (t2)	Total	–	74.027	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.152	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.153	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.147	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.987	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.995	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.987	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.989	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.013	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.990	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	0.990	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.040	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.152	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.153	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.147	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.049	[p.u.]
	32		Phase L2	t_1+60 ms	0.048	[p.u.]
	33		Phase L3	t_1+60 ms	0.047	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.047	[p.u.]
	35		Phase L2	t_1 +100 ms	0.047	[p.u.]
	36		Phase L3	t_1 +100 ms	0.045	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.991	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.991	[p.u.]
	45	Active power rising time	Total	-	0.341	[s]
	46		Positive sequence	-	0.341	[s]
	47	Reactive power	Total	t_2+10 s	0.040	[p.u.]
	48		Positive sequence	t_2+10 s	-0.013	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.1-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	12:48:47 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.843	[s]
	7	Time point of fault clearance (t2)	Total	–	73.862	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.152	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.153	[p.u.]
				t_1-10 s to t1	1.001	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.147	[p.u.]
				t_1-10 s to t1	0.997	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	1.000	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	1.001	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.001	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.997	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.986	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	0.994	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.985	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.988	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.014	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.988	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.988	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.040	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.013	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.152	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.153	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.147	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.049	[p.u.]
	32		Phase L2	t_1+60 ms	0.048	[p.u.]
	33		Phase L3	t_1+60 ms	0.047	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.047	[p.u.]
	35		Phase L2	t_1 +100 ms	0.047	[p.u.]
	36		Phase L3	t_1 +100 ms	0.045	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.006	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.006	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.001	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.997	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.987	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.987	[p.u.]
	45	Active power rising time	Total	-	0.318	[s]
	46		Positive sequence	-	0.318	[s]
	47	Reactive power	Total	t_2+10 s	0.039	[p.u.]
	48		Positive sequence	t_2+10 s	-0.013	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.2-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	13:01:47 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	13.064	[s]
	7	Time point of fault clearance (t2)	Total	–	73.083	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.150	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.146	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.209	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.204	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.205	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.205	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.150	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.146	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.049	[p.u.]
	32		Phase L2	t_1+60 ms	0.048	[p.u.]
	33		Phase L3	t_1+60 ms	0.047	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.048	[p.u.]
	35		Phase L2	t_1 +100 ms	0.048	[p.u.]
	36		Phase L3	t_1 +100 ms	0.046	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.338	[s]
	46		Positive sequence	-	0.338	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.010	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.2-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	13:09:41 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Three-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	19.653	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	79.672	[s]
	8	Fault duration in no load test	Total	–	60019	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.150	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.146	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.211	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.010	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.150	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.146	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.049	[p.u.]
	32		Phase L2	t_1+60 ms	0.048	[p.u.]
	33		Phase L3	t_1+60 ms	0.047	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.048	[p.u.]
	35		Phase L2	t_1 +100 ms	0.048	[p.u.]
	36		Phase L3	t_1 +100 ms	0.046	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.005	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.329	[s]
	46		Positive sequence	-	0.329	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.3-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:02:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.385	[s]
	7	Time point of fault clearance (t2)	Total	–	74.405	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.073	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.995	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.995	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.994	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.991	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	1.017	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	1.016	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	1.011	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	1.015	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.011	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	1.009	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	23		Positive sequence	t_1-10 s to t_1	1.009	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.010	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.035	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.145	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.034	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.065	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.706	[p.u.]
	32		Phase L2	t_1+60 ms	0.658	[p.u.]
	33		Phase L3	t_1+60 ms	0.638	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.694	[p.u.]
	35		Phase L2	t_1 +100 ms	0.644	[p.u.]
	36		Phase L3	t_1 +100 ms	0.625	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	1.001	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	1.001	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	0.996	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.998	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	1.001	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	1.001	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	-0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.3-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:05:39 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.385	[s]
	7	Time point of fault clearance (t2)	Total	–	74.405	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.073	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.997	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	0.998	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.998	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	1.005	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	18		L2	t_1-500 ms to t_1-100 ms	1.005	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	1.001	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	1.001	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.015	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	1.009	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	1.009	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	-0.010	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.010	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	1.000	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.035	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.145	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.034	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.065	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.706	[p.u.]
	32		Phase L2	t_1+60 ms	0.658	[p.u.]
	33		Phase L3	t_1+60 ms	0.638	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.694	[p.u.]
	35		Phase L2	t_1 +100 ms	0.644	[p.u.]
	36		Phase L3	t_1 +100 ms	0.625	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	1.001	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	1.001	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	0.996	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	42		Positive sequence	t_2+1 s to t_2+10 s	0.998	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	1.001	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	1.001	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	-0.015	[p.u.]
	48		Positive sequence	t_2+10 s	-0.015	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.4-1	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:12:19 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.385	[s]
	7	Time point of fault clearance (t2)	Total	–	74.405	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	12		Positive sequence	t_1+100 ms to t2	1.073	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.210	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.073	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.911	[p.u.]
	32		Phase L2	t_1+60 ms	0.910	[p.u.]
	33		Phase L3	t_1+60 ms	0.959	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.948	[p.u.]
	35		Phase L2	t_1 +100 ms	0.995	[p.u.]
	36		Phase L3	t_1 +100 ms	0.981	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.204	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.204	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

	No.	Parameter	Phase reference	Reference period	Value	Unit
General information	0	Test nummer	–	–	7.4-2	-
	1	Date	–	–	12/11/2022	[dd.mm.yyyy]
	2	Time (Start of tests)	–	–	14:15:31 PM	[hh:mm:ss.f]
	3	Fault type (phases)	–	–	Two-phases	-
	4	Drop depth setpoint	Phase - phase	–	1.15	[p.u.]
	5	Drop duration setpoint	–	–	60020	[ms]
	6	Time point of fault occurrence (t1)	Total	–	14.385	[s]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	7	Time point of fault clearance (t2)	Total	–	74.405	[s]
	8	Fault duration in no load test	Total	–	60020	[ms]
	9	Voltage drop depth or voltage increase in no load test	L1-N	t_1+100 ms to t2	1.151	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	10		L2-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	0.999	[p.u.]
	11		L3-N	t_1+100 ms to t2	1.043	[p.u.]
				t_1-10 s to t1	1.000	[p.u.]
	12		Positive sequence	t_1+100 ms to t2	1.073	[p.u.]
				t_1-10 s to t1	0.995	[p.u.]
Before drop <t1	13	Voltage	L1-N voltage	t_1-10 s to t1	0.999	[p.u.]
	14		L2-N voltage	t_1-10 s to t1	0.999	[p.u.]
	15		L3-N voltage	t_1-10 s to t1	1.000	[p.u.]
	16		Positive sequence	t_1-10 s to t1	0.995	[p.u.]
	17	Current	L1	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	18		L2	t_1-500 ms to t_1-100 ms	0.210	[p.u.]
	19		L3	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	20		Positive sequence_active component	t_1-500 ms to t_1-100 ms	0.206	[p.u.]
	21		Positive sequence_reactive component	t_1-500 ms to t_1-100 ms	-0.009	[p.u.]
	22	Active power	Total	t_1-10 s to t_1	0.206	[p.u.]
	23		Positive sequence	t_1-10 s to t_1	0.206	[p.u.]
	24	Reactive power	Total	t_1-10 s to t_1	0.022	[p.u.]
	25		Positive sequence	t_1-10 s to t_1	-0.009	[p.u.]
	26	cos φ	-	t_1-10 s to t_1	0.999	[p.u.]
During drop t1 to t2	27	voltage	L1-N voltage	t_1+100 to t_2-20 ms	1.151	[p.u.]
	28		L2-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]

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	No.	Parameter	Phase reference	Reference period	Value	Unit
	29		L3-N voltage	t_1+100 to t_2-20 ms	1.043	[p.u.]
	30		Positive sequence	t_1+100 to t_2-20 ms	1.073	[p.u.]
	31	Phase current	Phase L1	t_1+60 ms	0.911	[p.u.]
	32		Phase L2	t_1+60 ms	0.910	[p.u.]
	33		Phase L3	t_1+60 ms	0.959	[p.u.]
	34	Phase current	Phase L1	t_1 +100 ms	0.948	[p.u.]
	35		Phase L2	t_1 +100 ms	0.995	[p.u.]
	36		Phase L3	t_1 +100 ms	0.981	[p.u.]
	37	Active power	Total	t_1+100 ms to t_2-20 ms	0.204	[p.u.]
	38		Positive sequence	t_1+100 ms to t_2-20 ms	0.204	[p.u.]
After drop >t2	39	Voltage	L1-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	40		L2-N voltage	t_2+1 s to t_2+10 s	0.999	[p.u.]
	41		L3-N voltage	t_2+1 s to t_2+10 s	1.000	[p.u.]
	42		Positive sequence	t_2+1 s to t_2+10 s	0.995	[p.u.]
	43	Active power	Total	t_2+1 s to t_2+10 s	0.206	[p.u.]
	44		Positive sequence	t_2+1 s to t_2+10 s	0.206	[p.u.]
	45	Active power rising time	Total	-	0.000	[s]
	46		Positive sequence	-	0.000	[s]
	47	Reactive power	Total	t_2+10 s	0.022	[p.u.]
	48		Positive sequence	t_2+10 s	-0.009	[p.u.]
	49	Reactive power rising time	Total	–	-	[s]
	50		Positive sequence	–	-	[s]
	51	PGU does not disconnected from the grid till 60 s after the end of the fault	–	t_2 to t_2+60s	yes	yes / no

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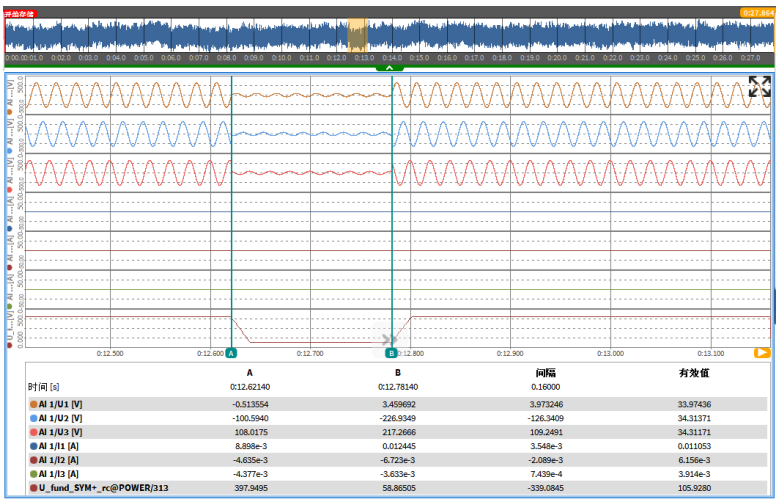
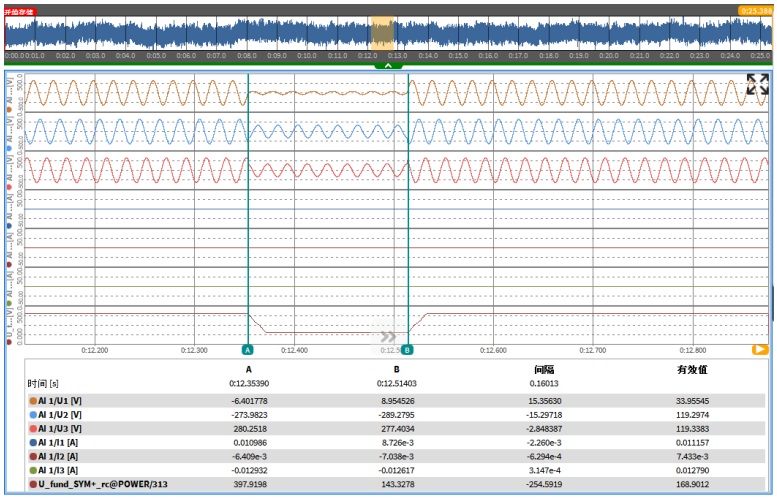
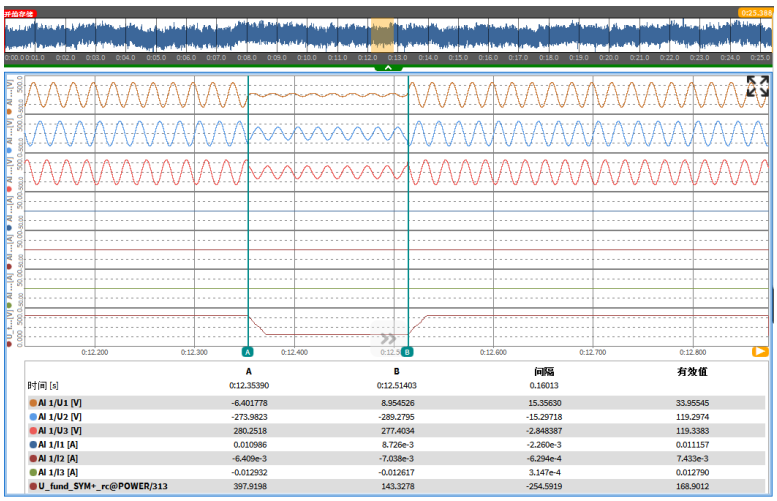
Oscillogram of no-load condition

Group	Phase fault	EUT output conditions	Oscillogram	Test No.
1	Three-phase	No-load		1.1 and 1.2
	Two-phase	No-load		1.3 and 1.4
		No-load		1.5

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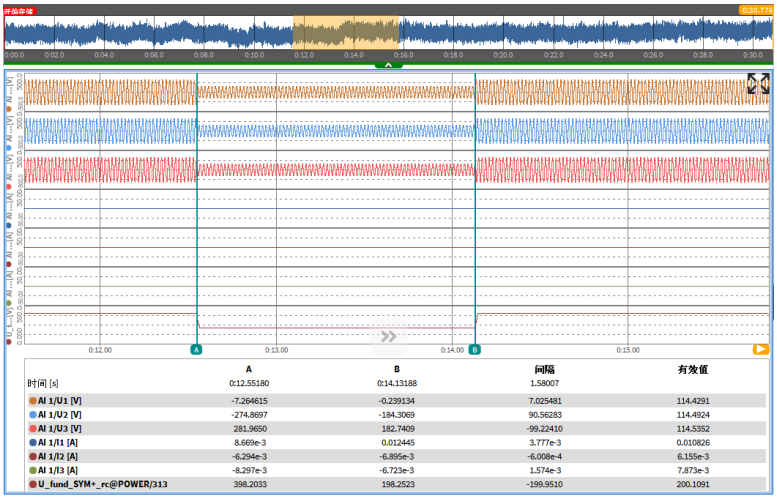
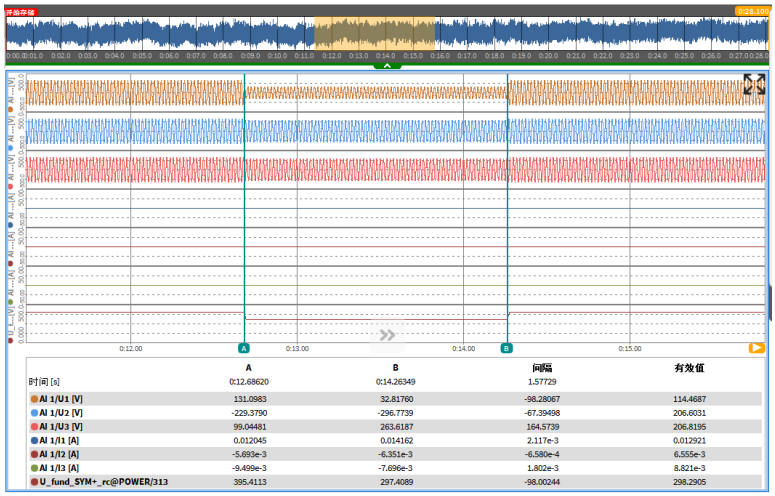
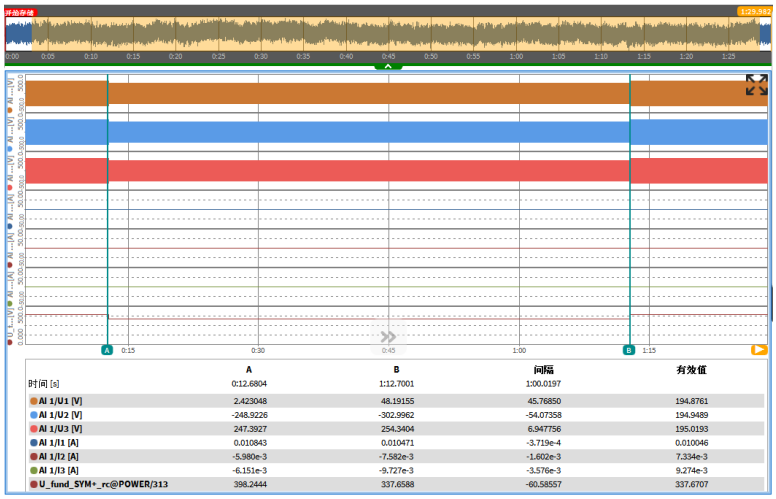
2 and 3	Three-phase	No-load		2.1, 2.2, 3.1 and 3.2
	Two-phase	No-load		2.3, 2.4, 3.3 and 3.4
4	Three-phase	No-load		4.1 and 4.2

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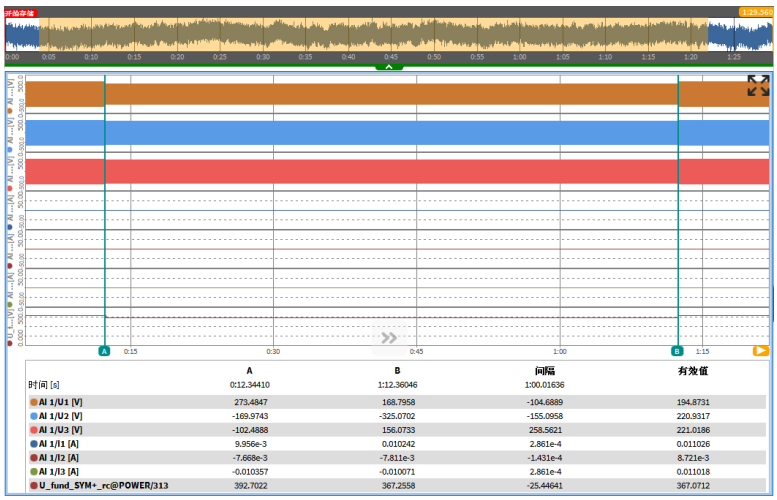
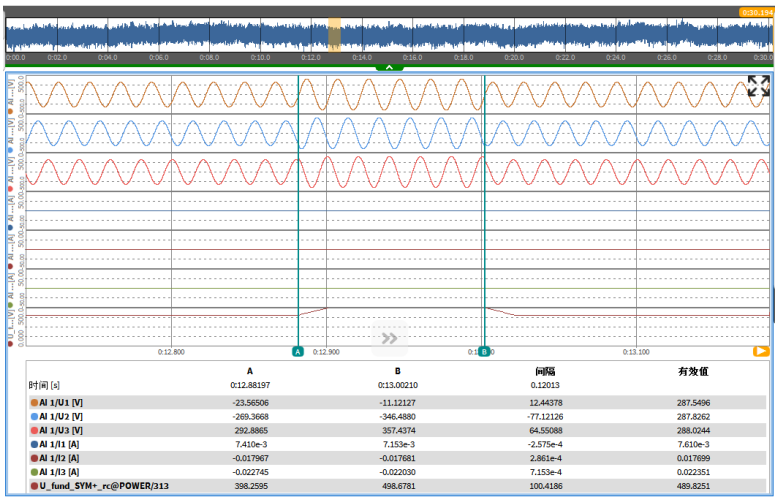
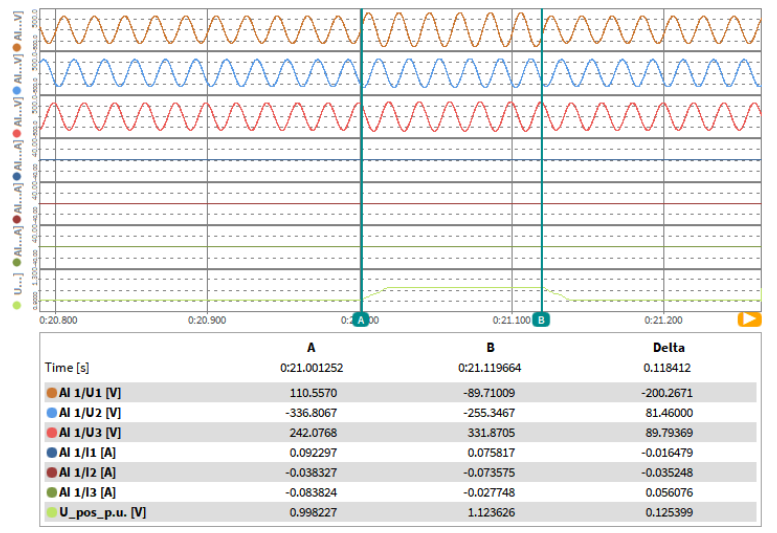
	Two-phase	No-load	 A 0:12.34410 B 1:12.36046 间隔 1:00.01636 有效值 AI 1/U1 [V] 273.4847 168.7958 -104.6889 194.8731 AI 1/U2 [V] -169.9743 -325.0702 -155.0958 220.9317 AI 1/U3 [V] -102.4888 156.0733 258.5621 221.0186 AI 1/I1 [A] 9.956e-3 0.010242 2.861e-4 0.011026 AI 1/I2 [A] -7.668e-3 -7.811e-3 -1.431e-4 8.721e-3 AI 1/I3 [A] -0.010357 -0.010071 2.861e-4 0.011018 U_fund_SYM+_rc@POWER/313 392.7022 367.2558 -25.44641 367.0712	4.3 and 4.4
5	Three-phase	No-load	 A 0:12.88197 B 0:13.00210 间隔 0.12013 有效值 AI 1/U1 [V] -23.56506 -11.12127 12.44378 287.5496 AI 1/U2 [V] -269.3668 -346.4880 -77.12126 287.8262 AI 1/U3 [V] 292.8865 357.4374 64.55088 288.0244 AI 1/I1 [A] 7.410e-3 7.153e-3 -2.575e-4 7.610e-3 AI 1/I2 [A] -0.017967 -0.017681 2.861e-4 0.017699 AI 1/I3 [A] -0.022745 -0.022030 7.153e-4 0.022351 U_fund_SYM+_rc@POWER/313 398.2595 498.6781 100.4186 489.8251	5.1 and 5.2
	Two-phase	No-load	 Time [s] A 0:21.001252 B 0:21.119664 Delta 0.118412 AI 1/U1 [V] 110.5570 -89.71009 -200.2671 AI 1/U2 [V] -336.8067 -255.3467 81.46000 AI 1/U3 [V] 242.0768 331.8705 89.79369 AI 1/I1 [A] 0.092297 0.075817 -0.016479 AI 1/I2 [A] -0.038327 -0.073575 -0.035248 AI 1/I3 [A] -0.083824 -0.027748 0.056076 U_pos_p.u. [V] 0.998227 1.123626 0.125399	5.3,5.4 and 5.5

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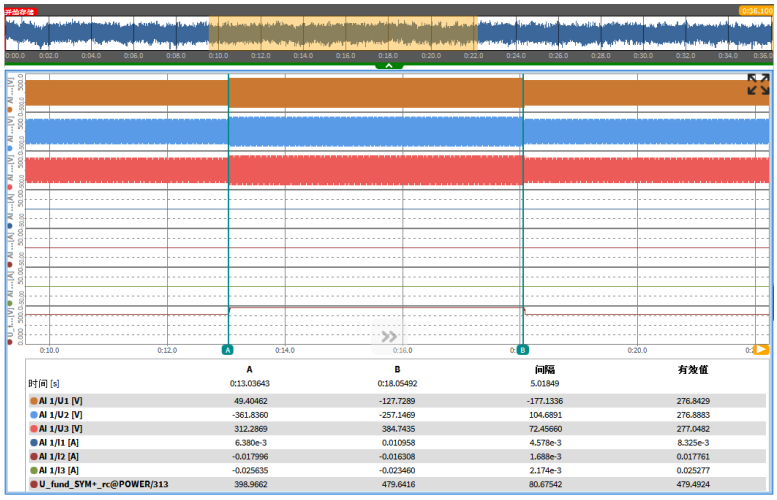
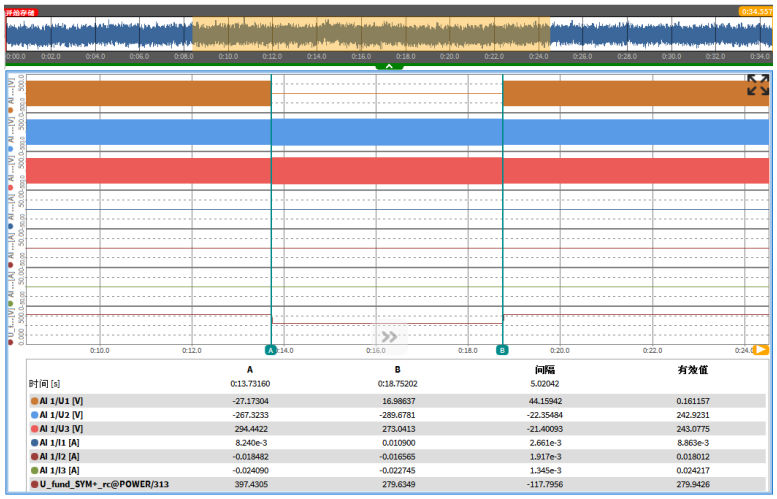
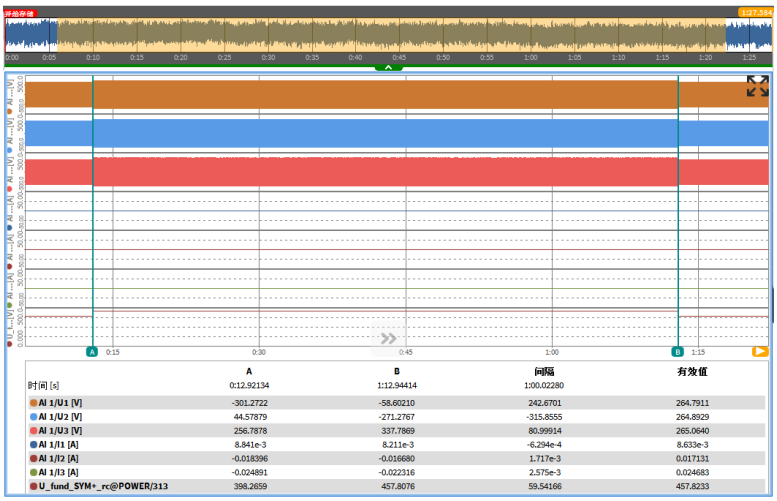
6	Three-phase	No-load		6.1 and 6.2
	Two-phase	No-load		6.3 and 6.4
7	Three-phase	No-load		7.1 and 7.2

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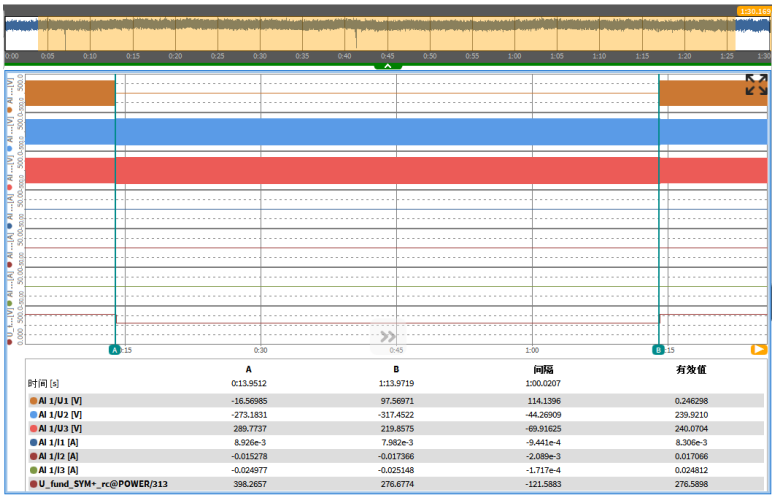
	Two-phase	No-load		7.3 and 7.4

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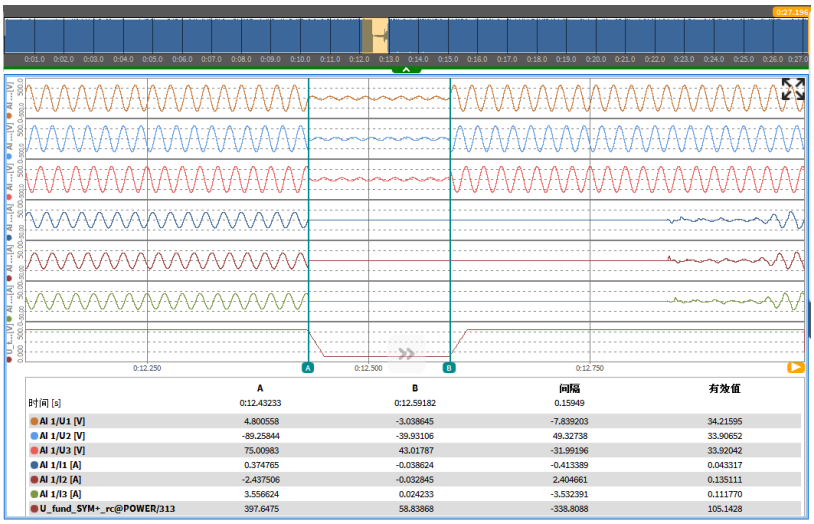
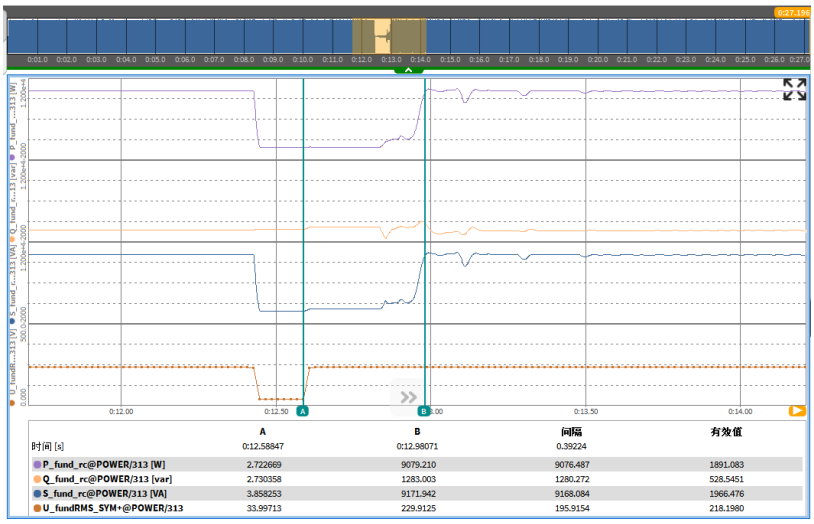
Oscillogram of test load condition

<table>
<tr><th>Group</th><th>Phase fault</th><th>EUT output conditions</th><th>Oscillogram</th><th>Test No.</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Three-phase</td><td>Full load(100%Pn)</td><td>a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)
 
b) Active power recovery time after the end of the fault
  </td><td>1.1-1</td></tr>
<tr><td>Full load(100%Pn)</td><td>a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)</td><td>1.1-2</td></tr>
</table>

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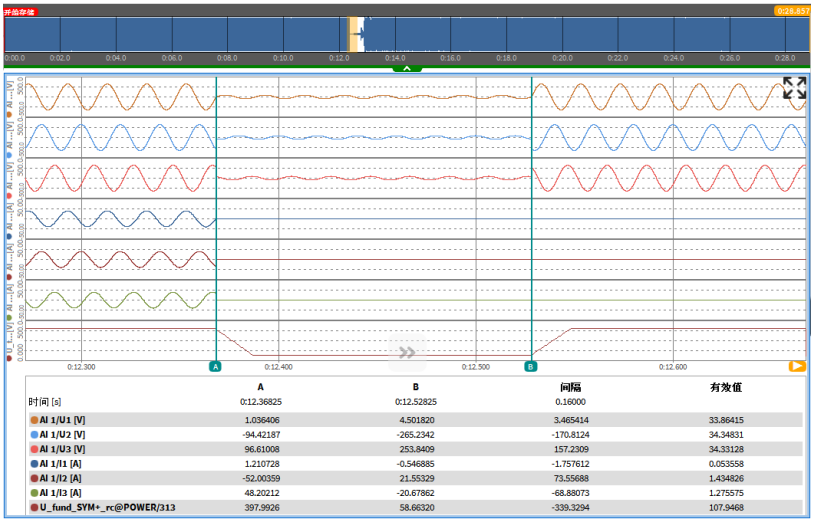
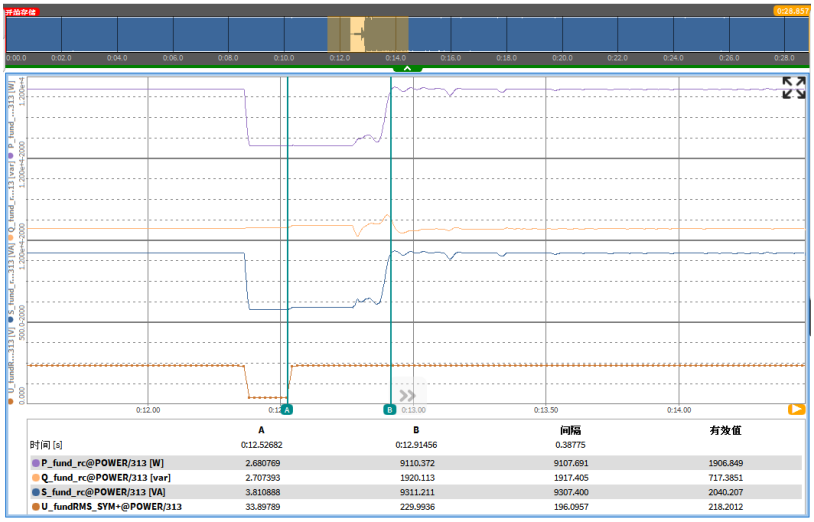
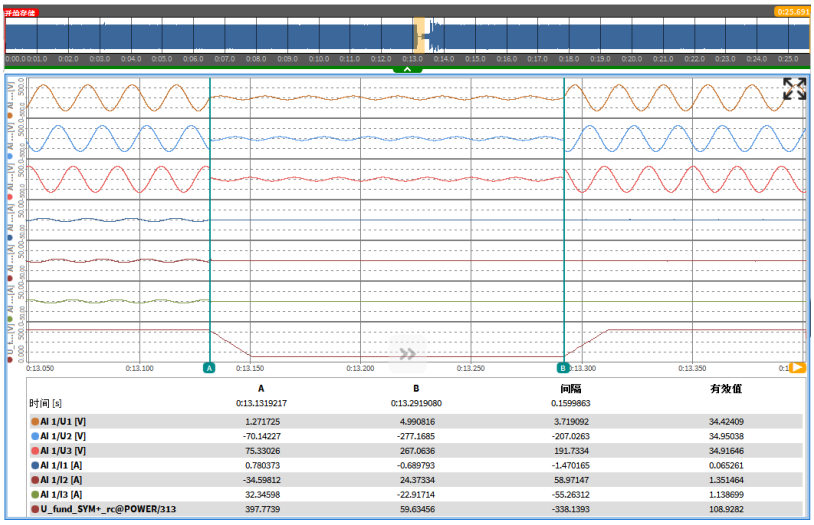
			 b) Active power recovery time after the end of the fault  a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Partial load(50%Pn)	 b) Active power recovery time after the end of the fault	1.2-1

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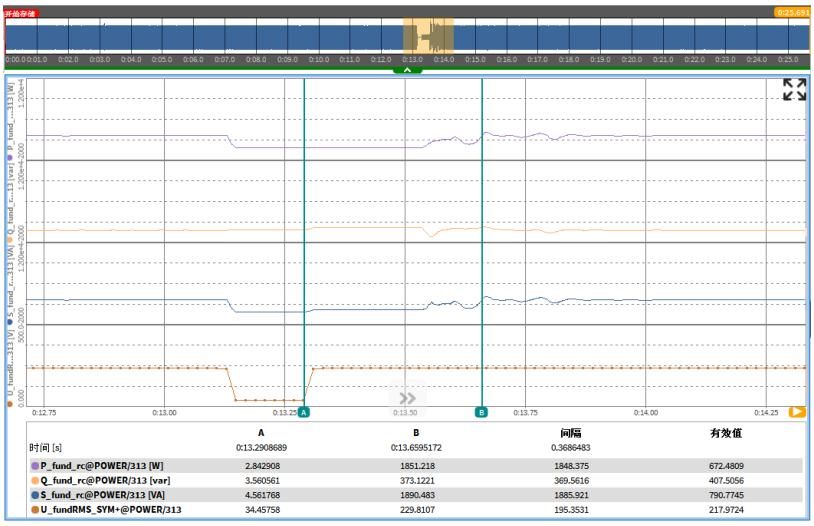
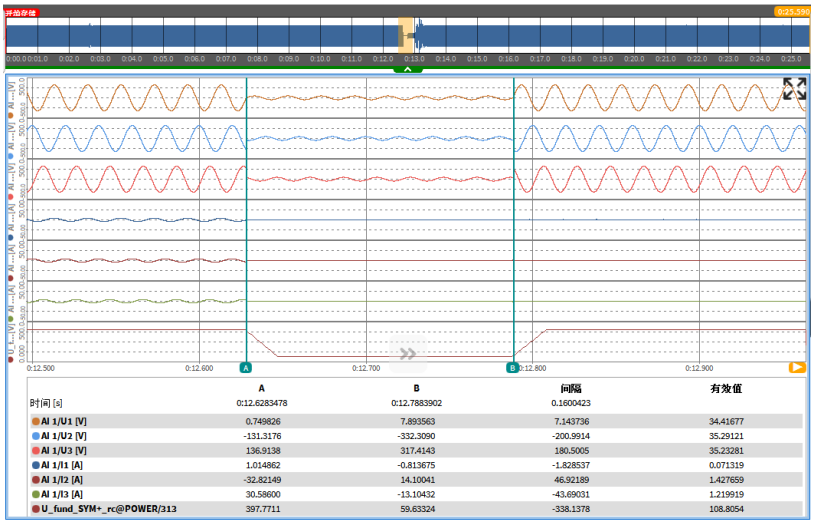
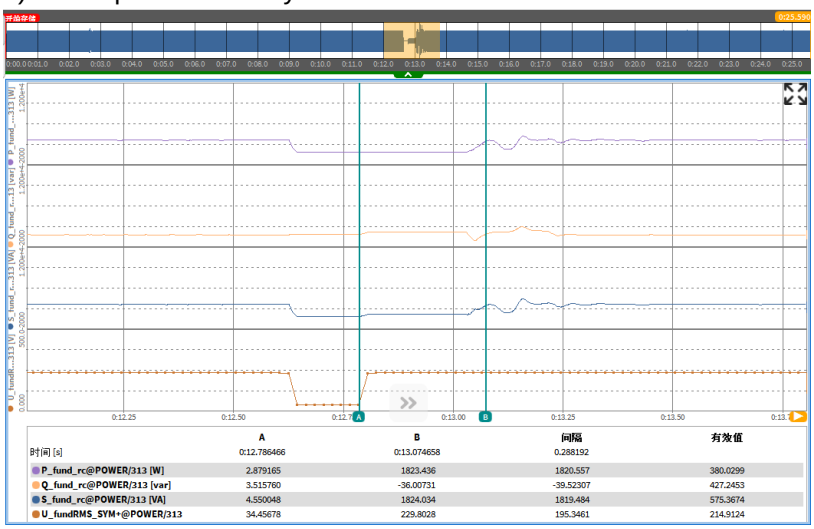
				
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	1.2-2
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	1.3-1

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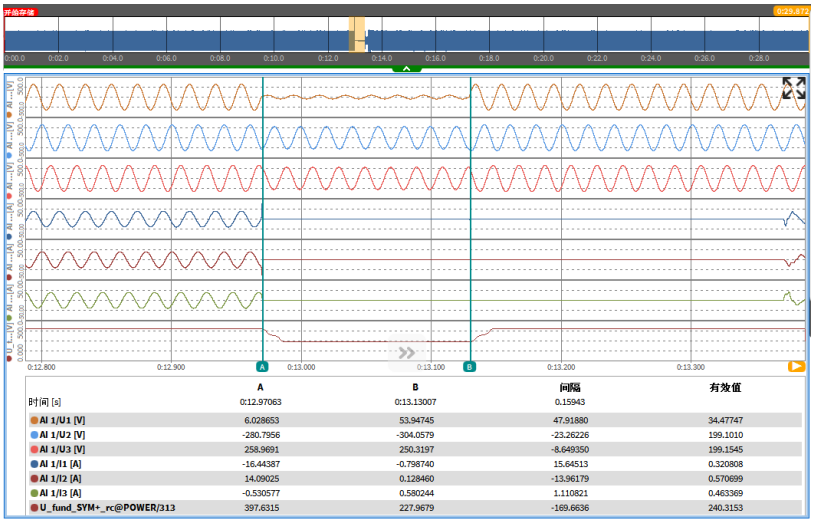
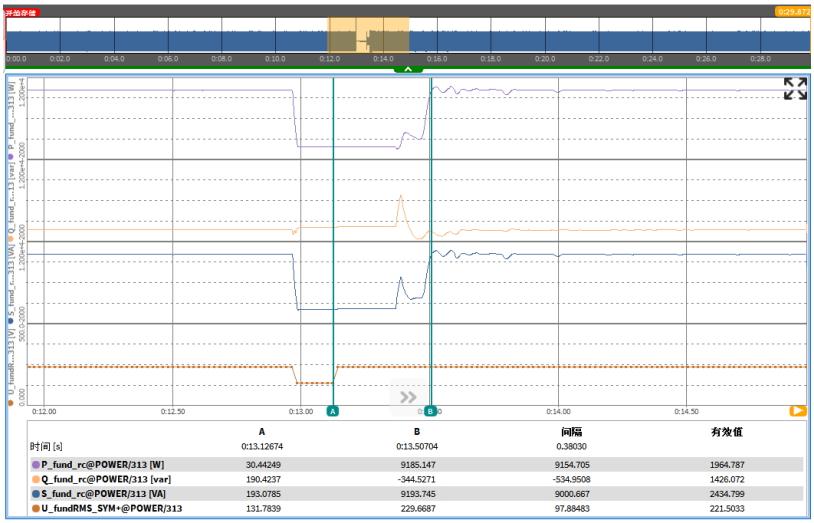
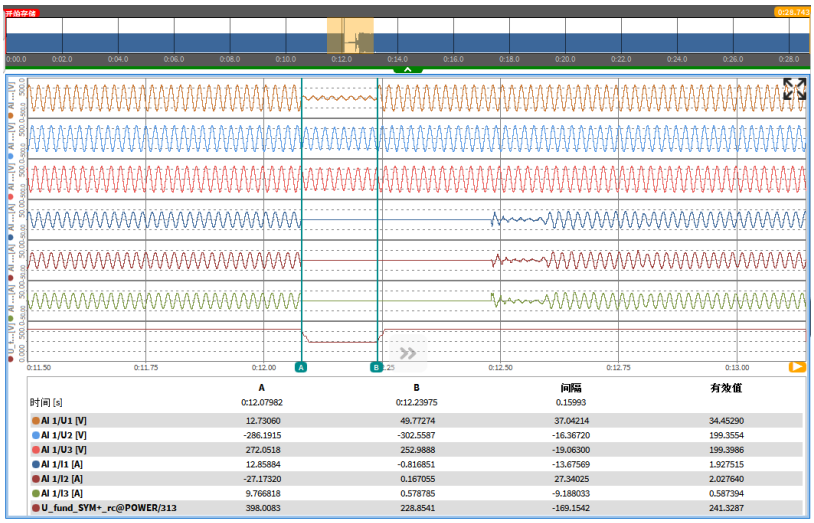
			 b) Active power recovery time after the end of the fault	
			 a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Full load(100%Pn)	 b) Active power recovery time after the end of the fault	1.3-2

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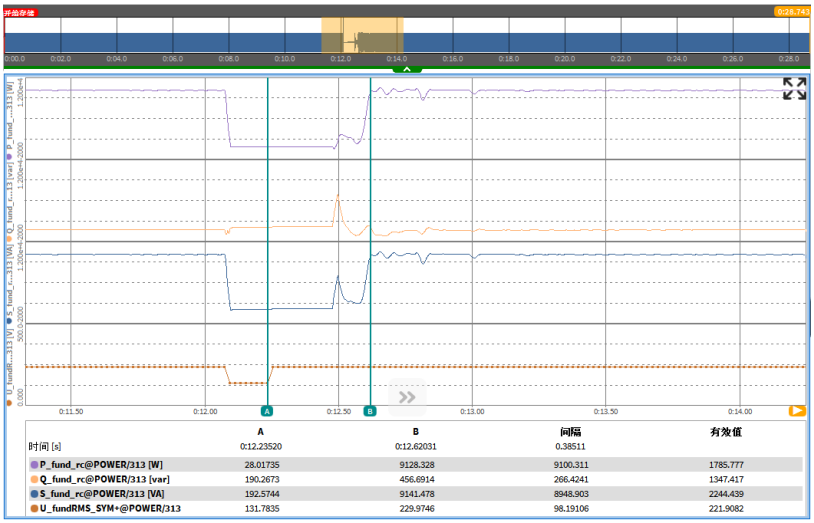
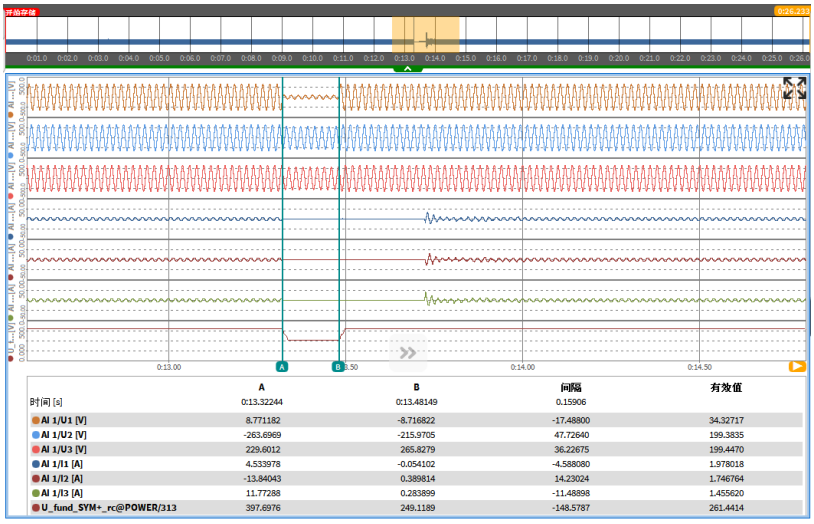
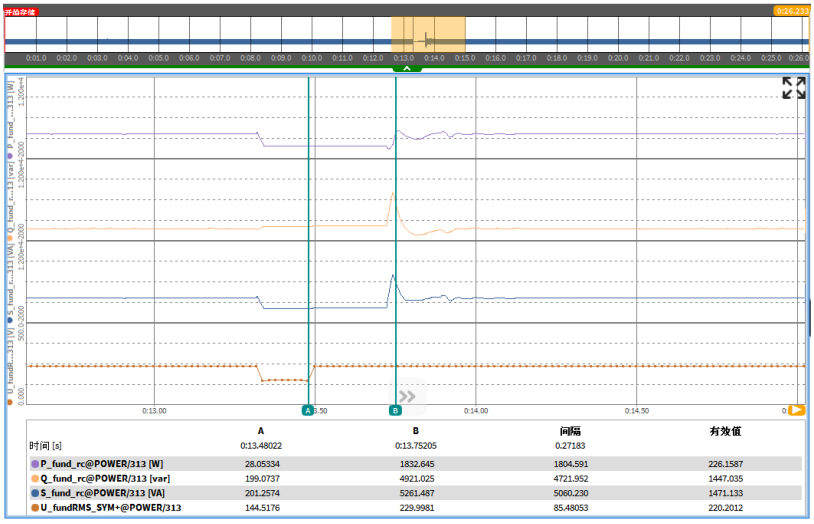
			 a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Partial load(50%Pn)	 b) Active power recovery time after the end of the fault 	1.4-1
		Partial	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	1.4-2

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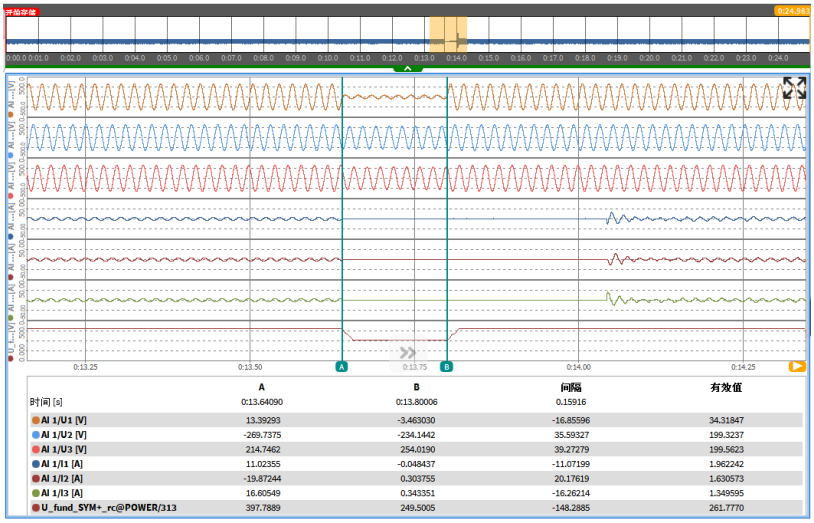
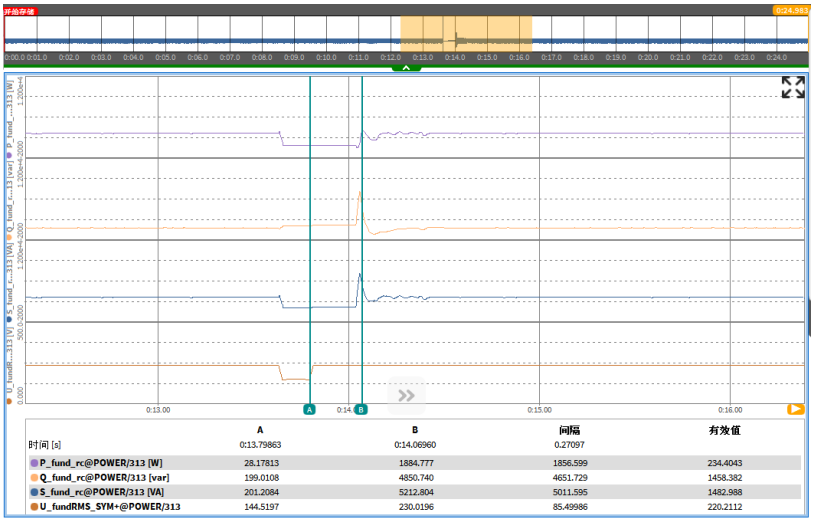
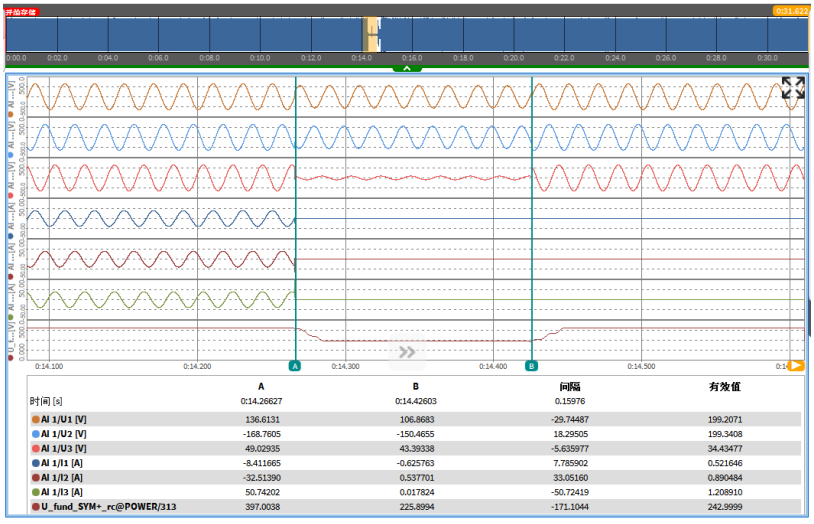
		load(50%Pn)	 b) Active power recovery time after the end of the fault  a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Full load(100%Pn)	 b) Active power recovery time after the end of the fault	1.5-1

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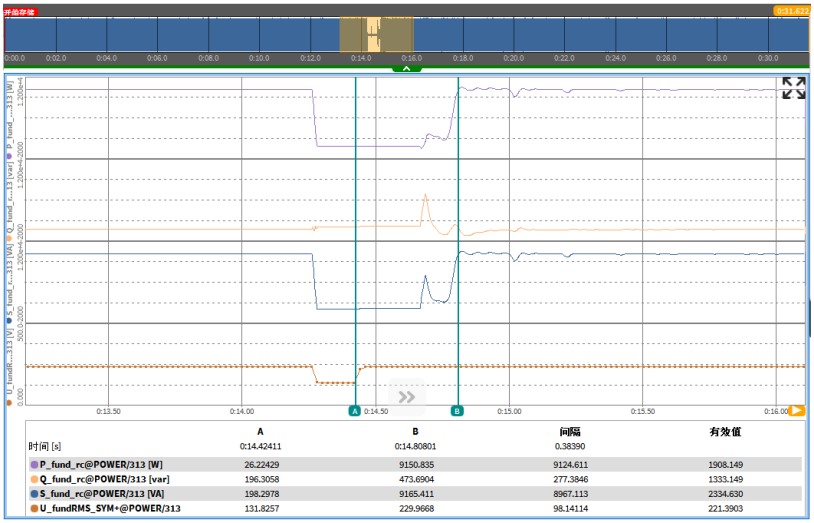
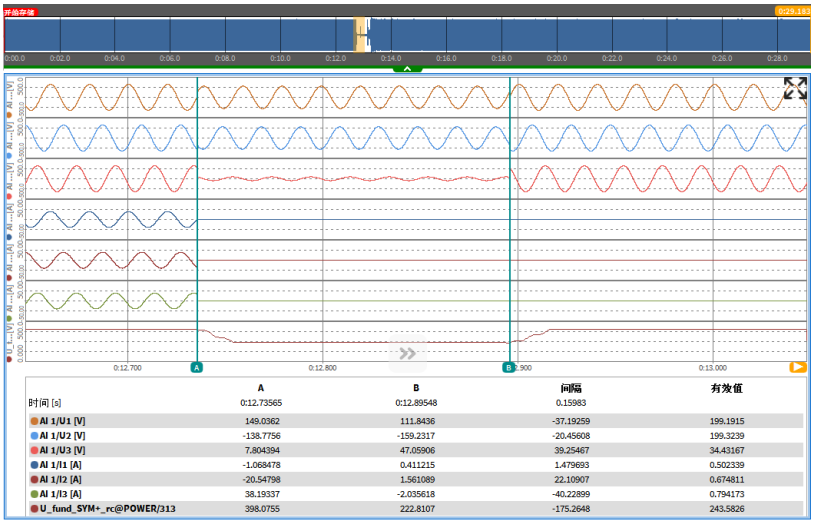
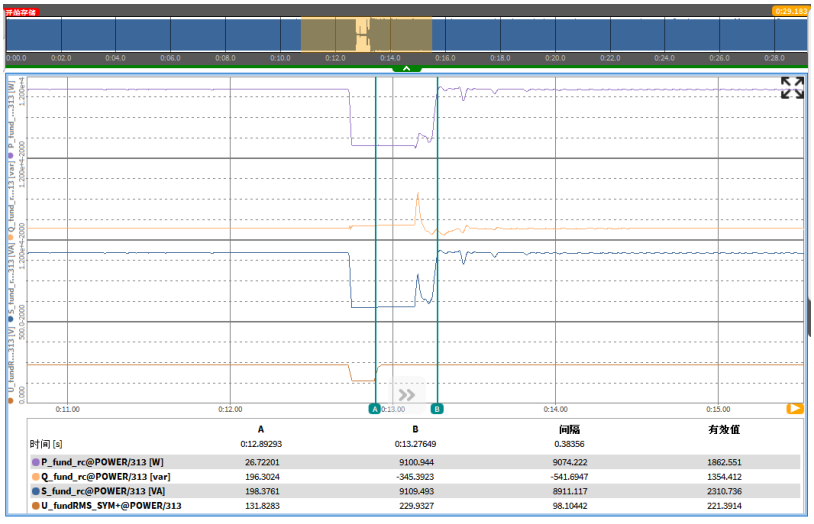
			 a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	
		Full load(100%Pn)		1.5-2
2	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	2.1-1

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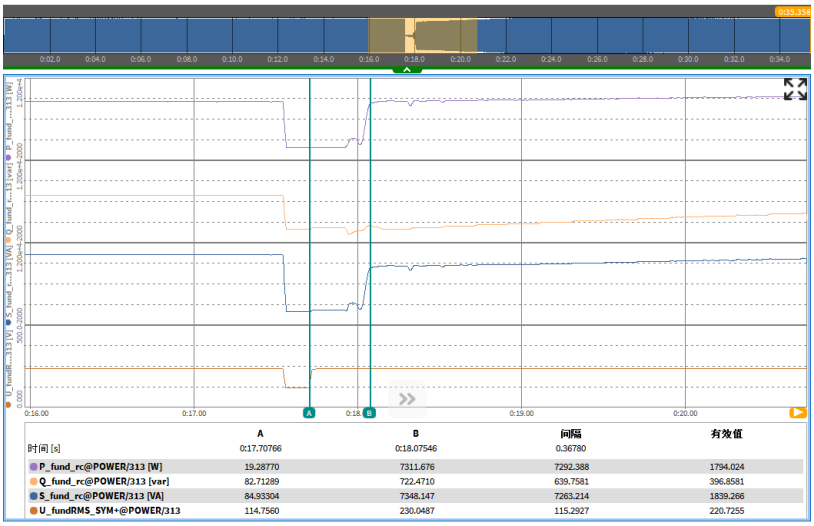
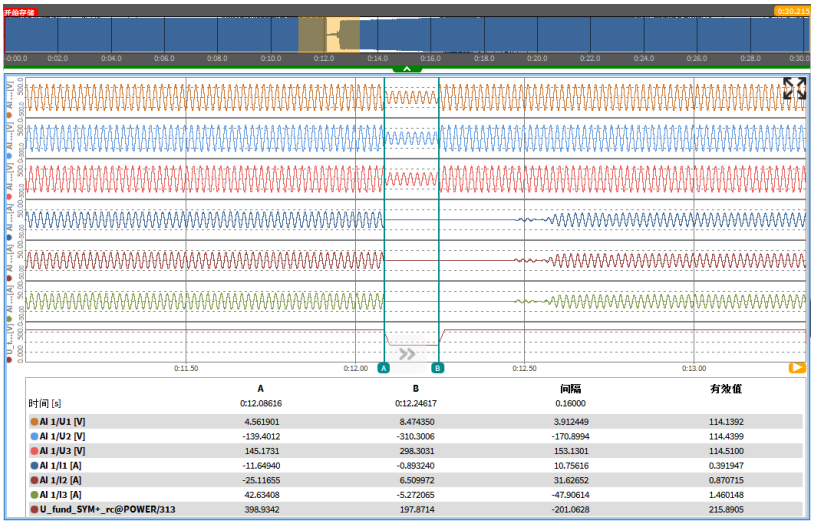
			 b) Active power recovery time after the end of the fault  a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Full load(100%Pn)	 b) Active power recovery time after the end of the fault	2.1-2

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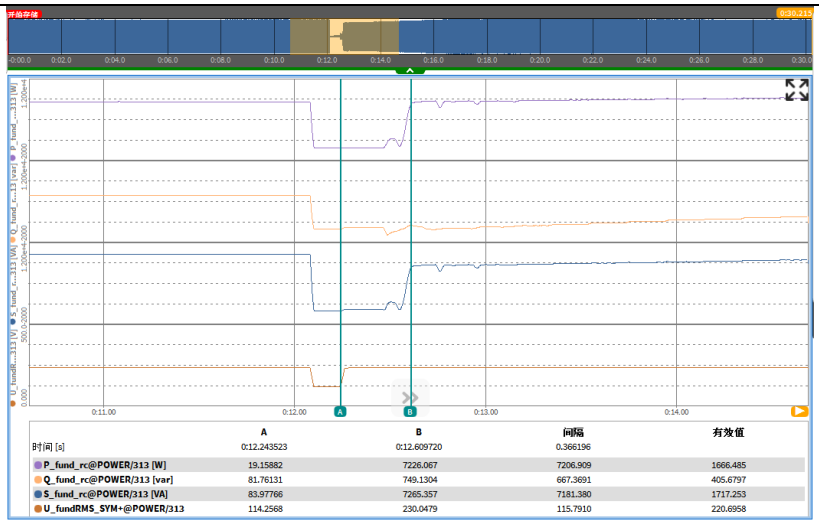
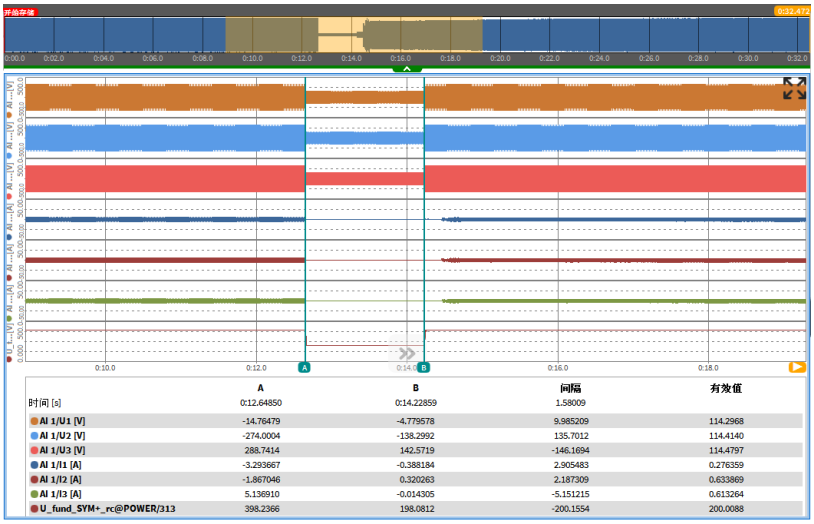
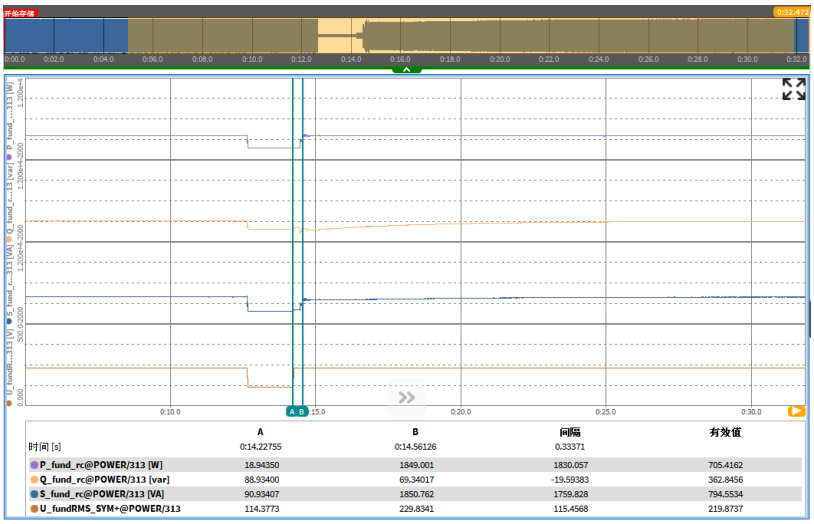
			 a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	
		Partial load(50%Pn)	 b) Active power recovery time after the end of the fault 	2.2-1

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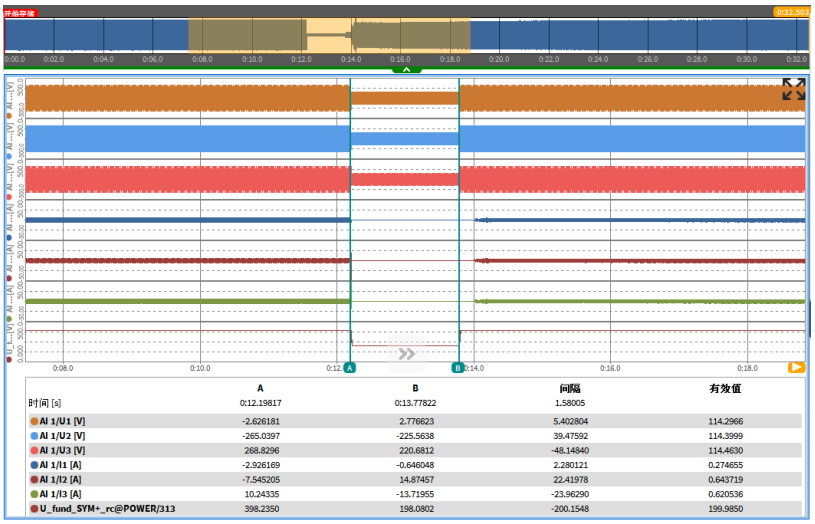
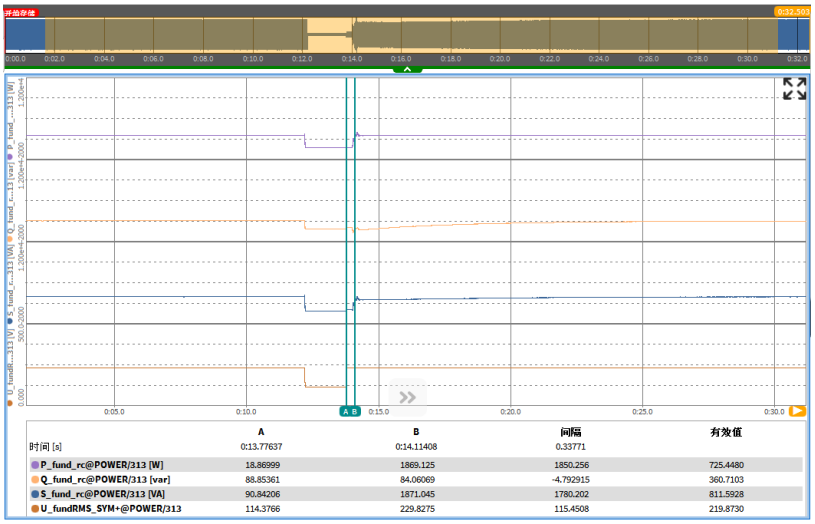
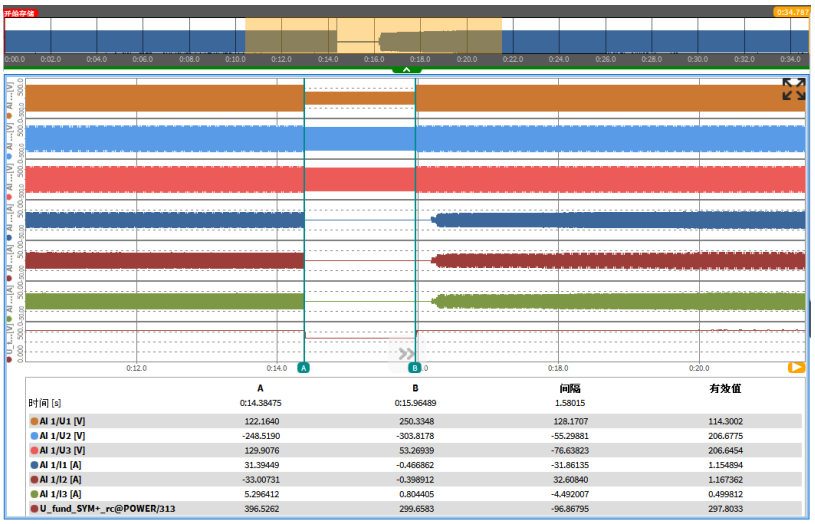
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	2.2-2
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	2.3-1

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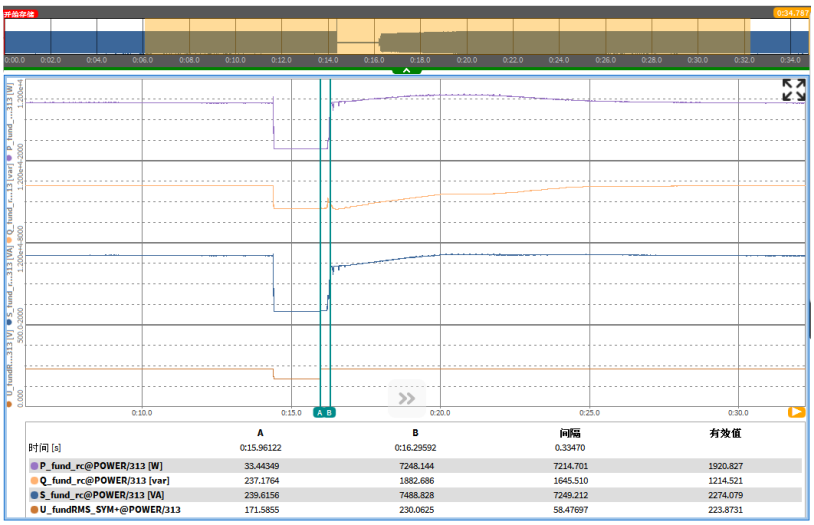
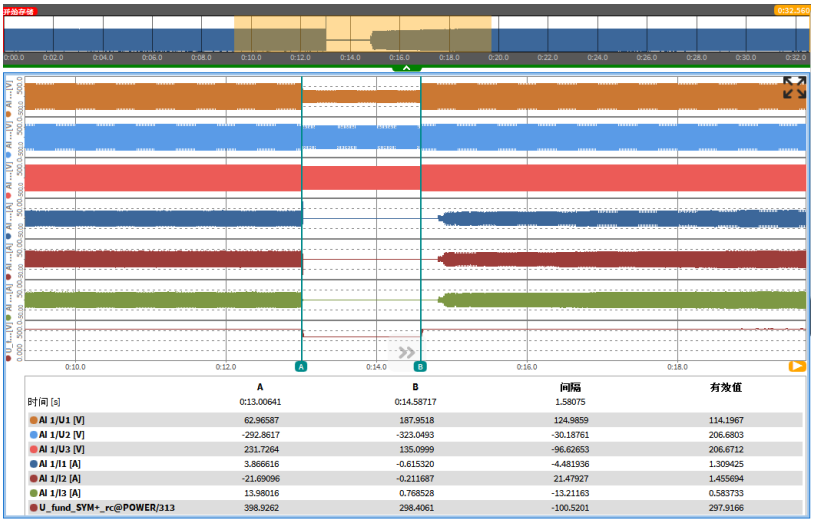
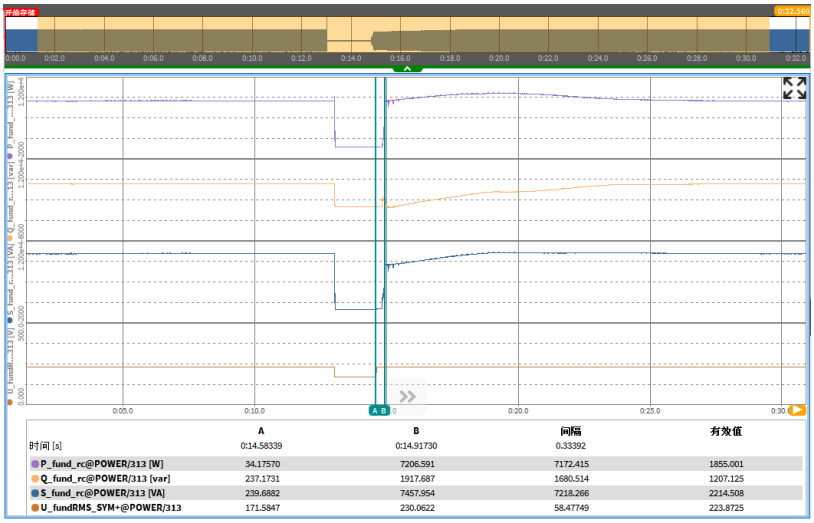
			b) Active power recovery time after the end of the fault 	
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	2.3-2

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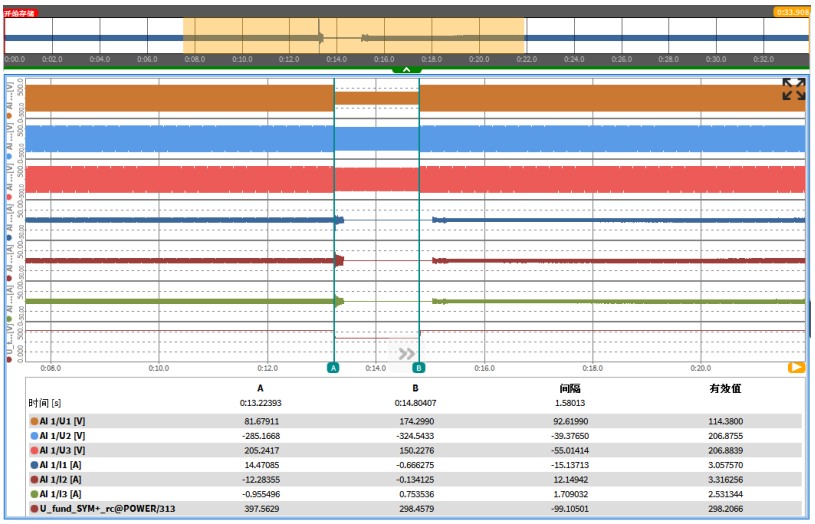
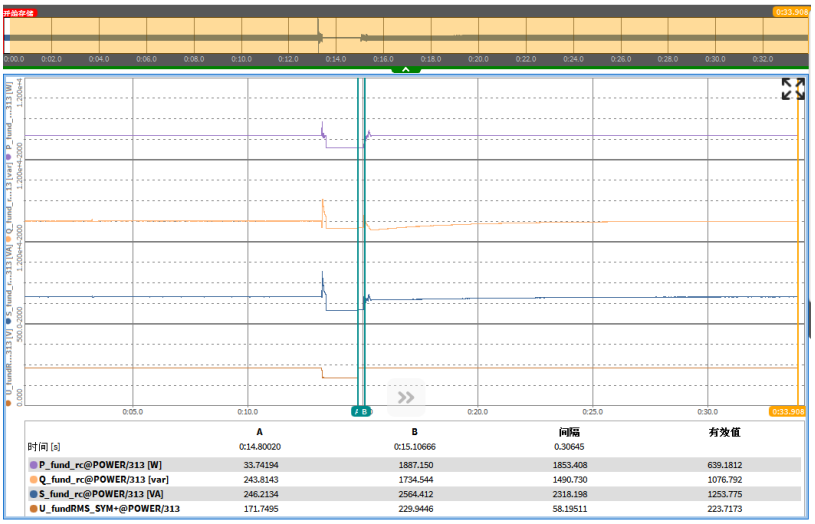
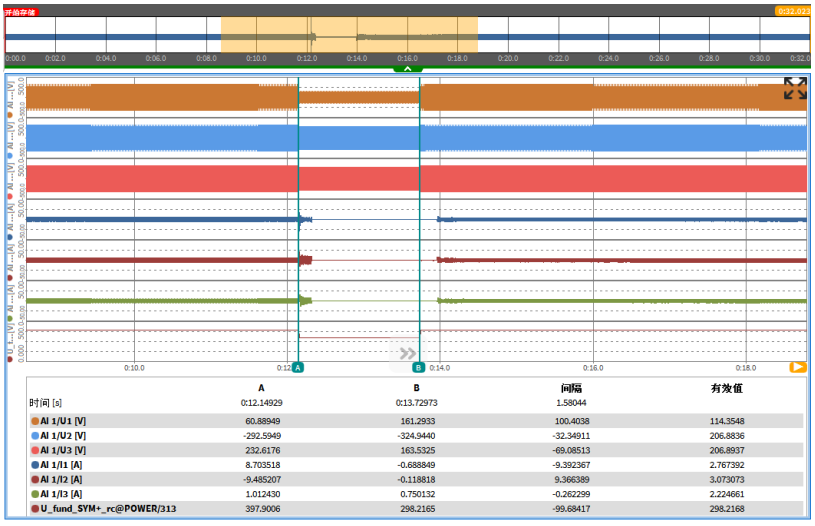
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	2.4-1
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	2.4-2

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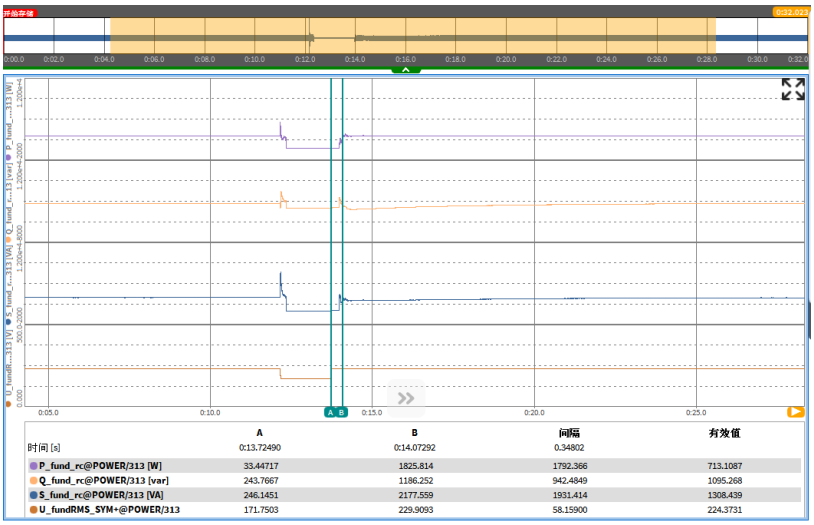
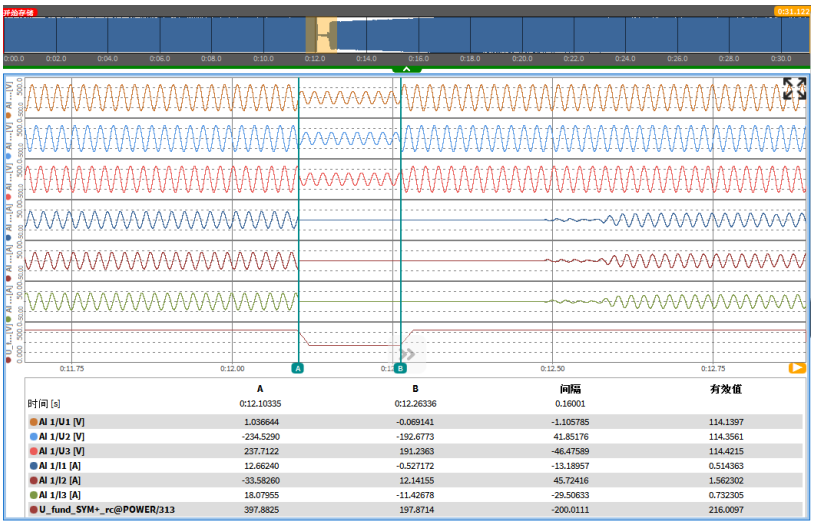
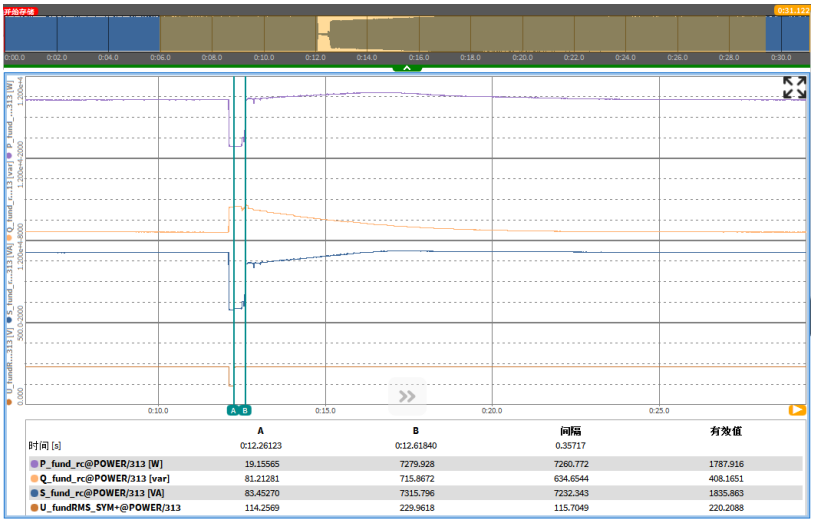
			b) Active power recovery time after the end of the fault  A 0:13.72490 B 0:14.07292 间隔 0.34802 P_fund_rc@POWER/313 [W] 33.44717 1825.814 1792.366 713.1087 Q_fund_rc@POWER/313 [var] 243.7667 1186.252 942.4849 1095.268 S_fund_rc@POWER/313 [VA] 246.1451 2177.559 1931.414 1308.439 U_fundRMS_SYM+@POWER/313 171.7503 229.9093 58.15900 224.3731	
3	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:12.10335 B 0:12.26336 间隔 0.16001 AI 1/U1 [V] 1.036644 -0.069141 -1.105785 114.1397 AI 1/U2 [V] -234.5290 -192.6773 41.85176 114.3561 AI 1/U3 [V] 237.7122 191.2363 -46.47589 114.4215 AI 1/I1 [A] 12.66240 -0.527172 -13.18957 0.514363 AI 1/I2 [A] -33.58260 12.14155 45.72416 1.562302 AI 1/I3 [A] 18.07955 -11.42678 -29.50633 0.732305 U_fund_SYM+_rc@POWER/313 397.8825 197.8714 -200.0111 216.0097 b) Active power recovery time after the end of the fault  A 0:12.26123 B 0:12.61840 间隔 0.35717 P_fund_rc@POWER/313 [W] 19.15565 7279.928 7260.772 1787.916 Q_fund_rc@POWER/313 [var] 81.21281 715.8672 634.6544 408.1651 S_fund_rc@POWER/313 [VA] 83.45270 7315.796 7232.343 1835.863 U_fundRMS_SYM+@POWER/313 114.2569 229.9618 115.7049 220.2088	3.1-1

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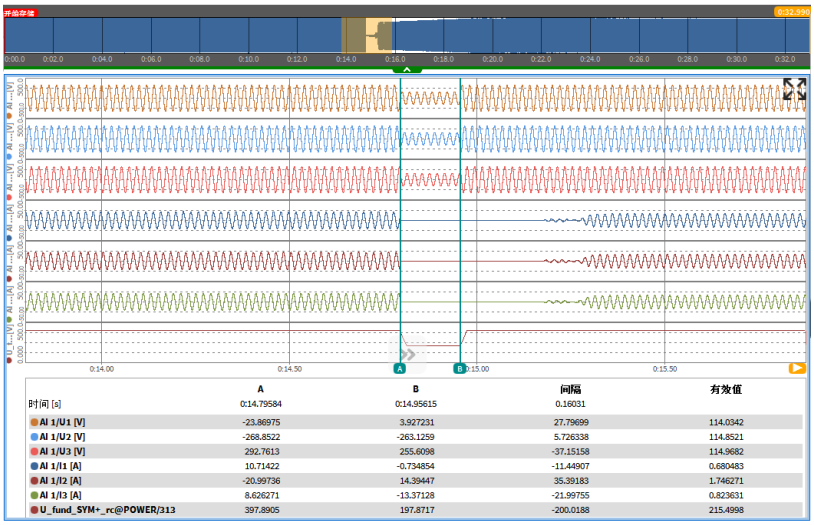
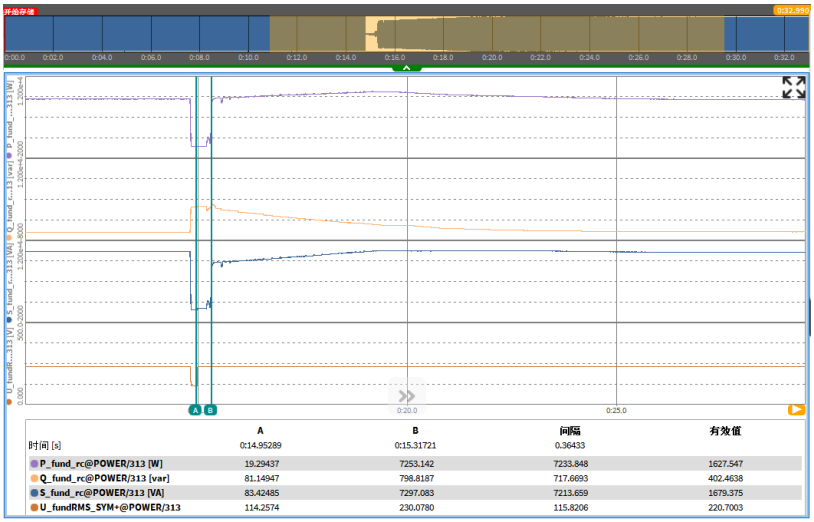
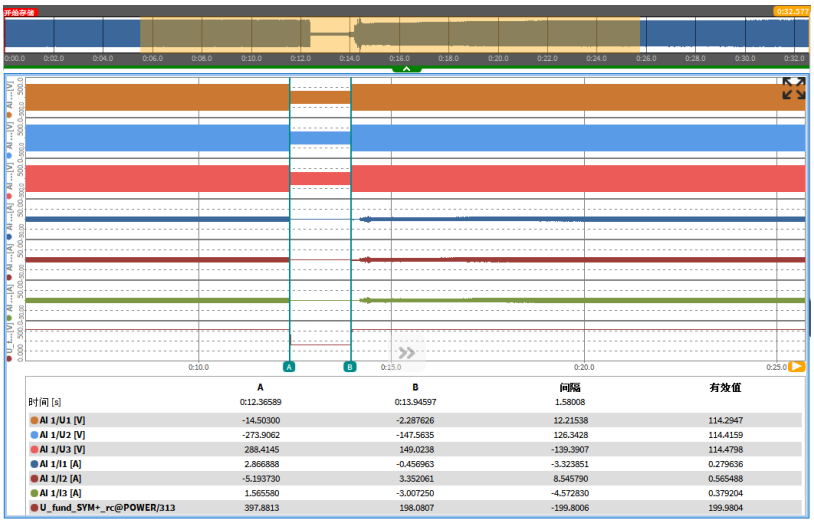
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	3.1-2
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	3.2-1

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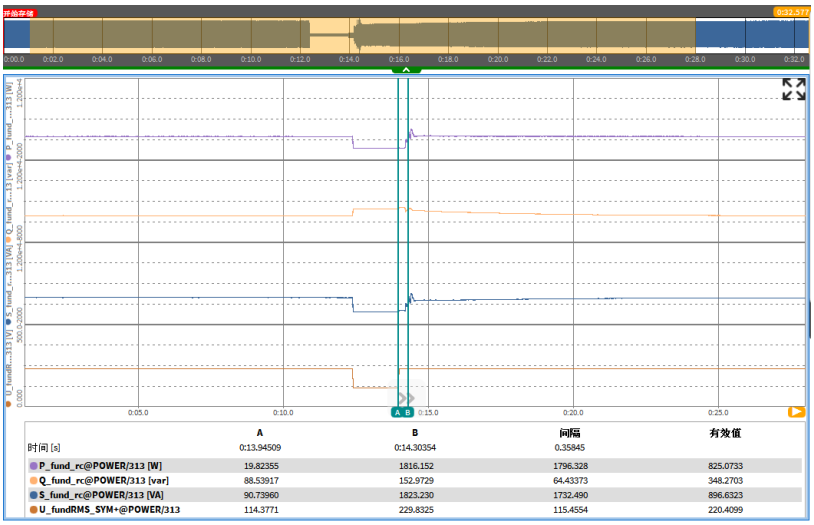
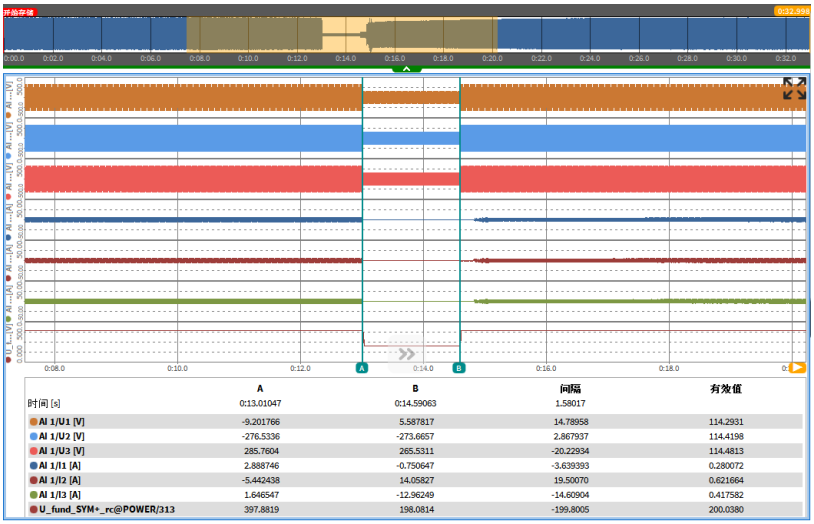
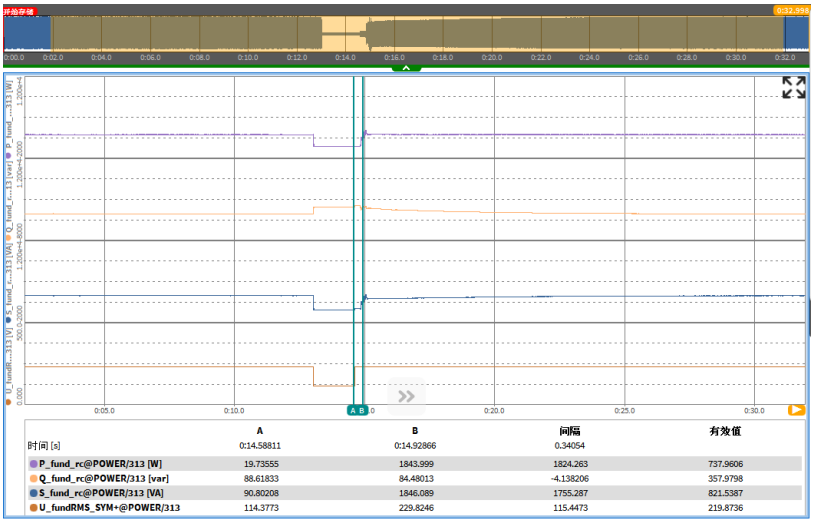
			b) Active power recovery time after the end of the fault  A 0:13.94509 B 0:14.30354 间隔 0.35845 P_fund_rc@POWER/313 [W] 19.82355 1816.152 1796.328 825.0733 Q_fund_rc@POWER/313 [var] 88.53917 152.9729 64.43373 348.2703 S_fund_rc@POWER/313 [VA] 90.73960 1823.230 1732.490 896.6323 U_fundRMS_SYM+@POWER/313 114.3771 229.8325 115.4554 220.4099	
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:13.01047 B 0:14.59063 间隔 1.58017 AI 1/U1 [V] -9.201766 5.587817 14.78958 114.2931 AI 1/U2 [V] -276.5336 -273.6657 2.867937 114.4198 AI 1/U3 [V] 285.7604 265.5311 -20.22934 114.4813 AI 1/I1 [A] 2.888746 -0.750647 -3.639393 0.280072 AI 1/I2 [A] -5.442438 14.05827 19.50070 0.621664 AI 1/I3 [A] 1.646547 -12.96249 -14.60904 0.417582 U_fund_SYM+_rc@POWER/313 397.8819 198.0814 -199.8005 200.0380 b) Active power recovery time after the end of the fault  A 0:14.58811 B 0:14.92866 间隔 0.34054 P_fund_rc@POWER/313 [W] 19.73555 1843.999 1824.263 737.9606 Q_fund_rc@POWER/313 [var] 88.61833 84.48013 -4.138206 357.9798 S_fund_rc@POWER/313 [VA] 90.80208 1846.089 1755.287 821.5387 U_fundRMS_SYM+@POWER/313 114.3773 229.8246 115.4473 219.8736	3.2-2

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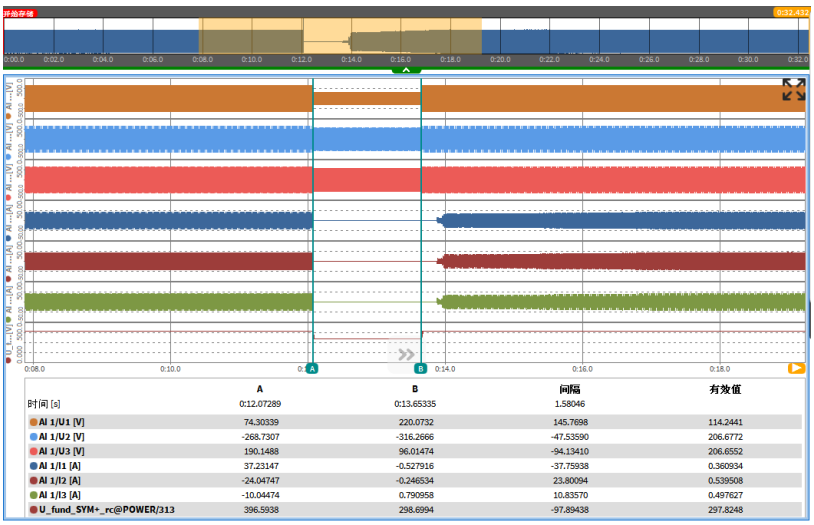
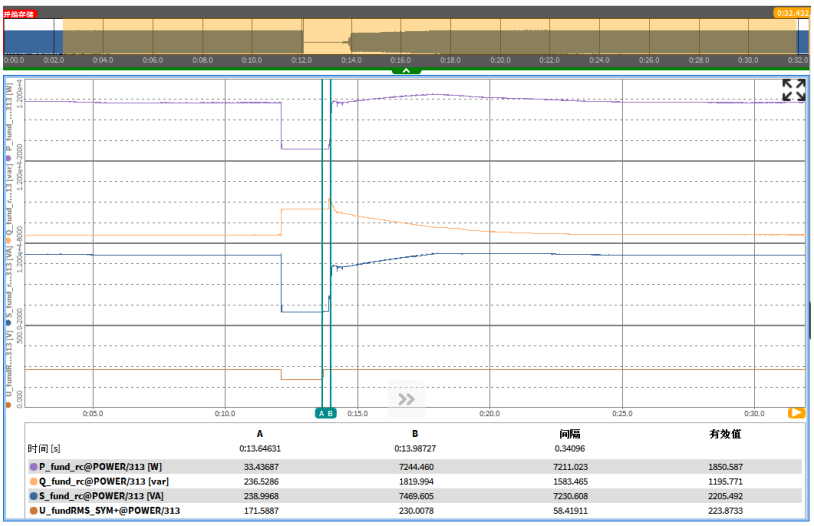
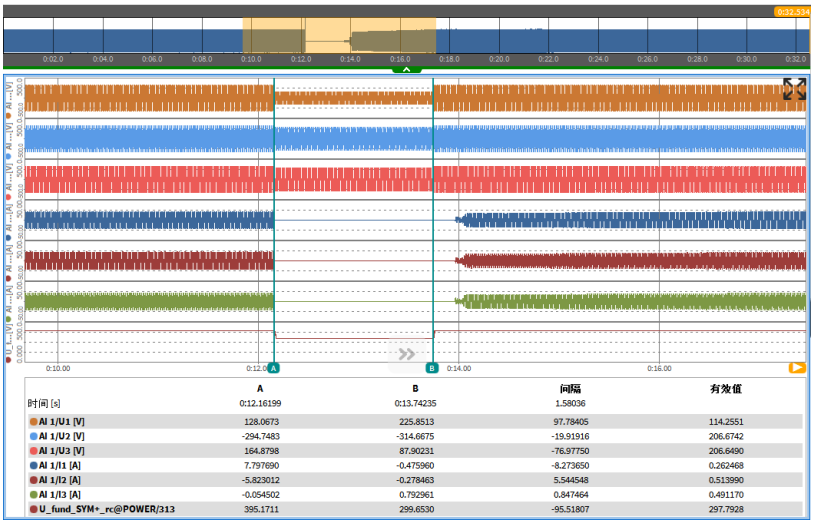
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	3.3-1
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	3.3-2

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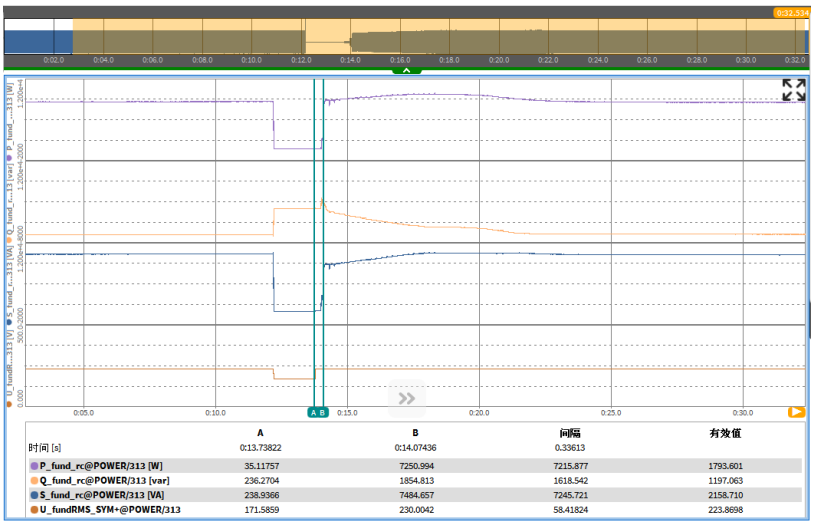
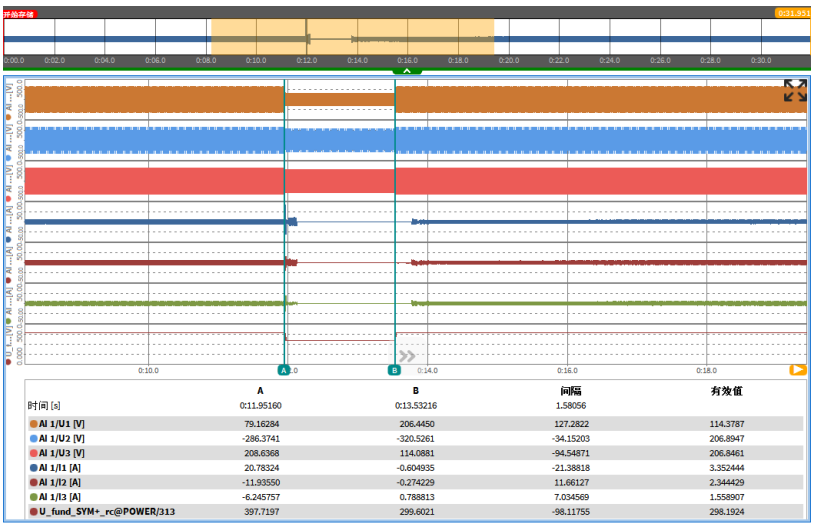
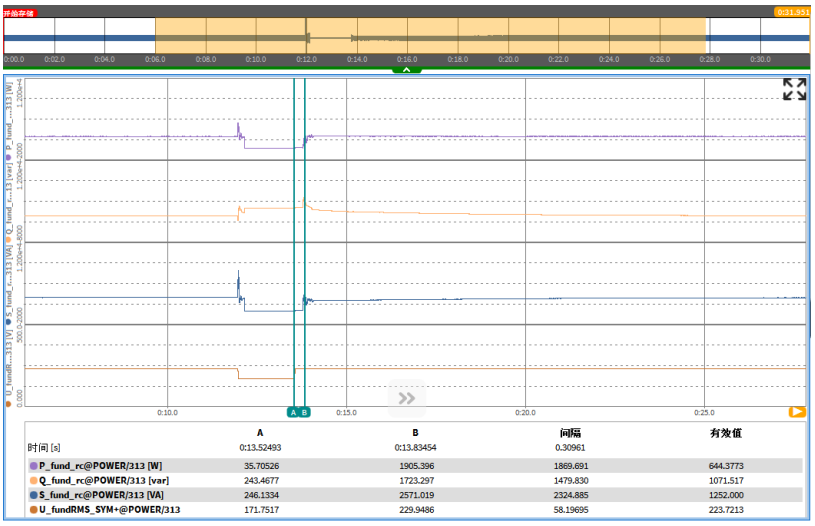
			b) Active power recovery time after the end of the fault  A 0:13.73822 B 0:14.07436 间隔 0.33613 有效值 时间 [s] P_fund_rc@POWER/313 [W] 35.11757 7250.994 7215.877 1793.601 Q_fund_rc@POWER/313 [var] 236.2704 1854.813 1618.542 1197.063 S_fund_rc@POWER/313 [VA] 238.9366 7484.657 7245.721 2158.710 U_fundRMS_SYM+@POWER/313 171.5859 230.0042 58.41824 223.8698	
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:11.95160 B 0:13.53216 间隔 1.58056 有效值 时间 [s] AI 1/U1 [V] 79.16284 206.4450 127.2822 114.3787 AI 1/U2 [V] -286.3741 -320.5261 -34.15203 206.8947 AI 1/U3 [V] 208.6368 114.0881 -94.54871 206.8461 AI 1/I1 [A] 20.78324 -0.604935 -21.38818 3.352444 AI 1/I2 [A] -11.93550 -0.274229 11.66127 2.344429 AI 1/I3 [A] -6.245757 0.788813 7.034569 1.558907 U_fund_SYM+_rc@POWER/313 397.7197 299.6021 -98.11755 298.1924 b) Active power recovery time after the end of the fault  A 0:13.52493 B 0:13.83454 间隔 0.30961 有效值 时间 [s] P_fund_rc@POWER/313 [W] 35.70526 1905.396 1869.691 644.3773 Q_fund_rc@POWER/313 [var] 243.4677 1723.297 1479.830 1071.517 S_fund_rc@POWER/313 [VA] 246.1334 2571.019 2324.885 1252.000 U_fundRMS_SYM+@POWER/313 171.7517 229.9486 58.19695 223.7213	3.4-1

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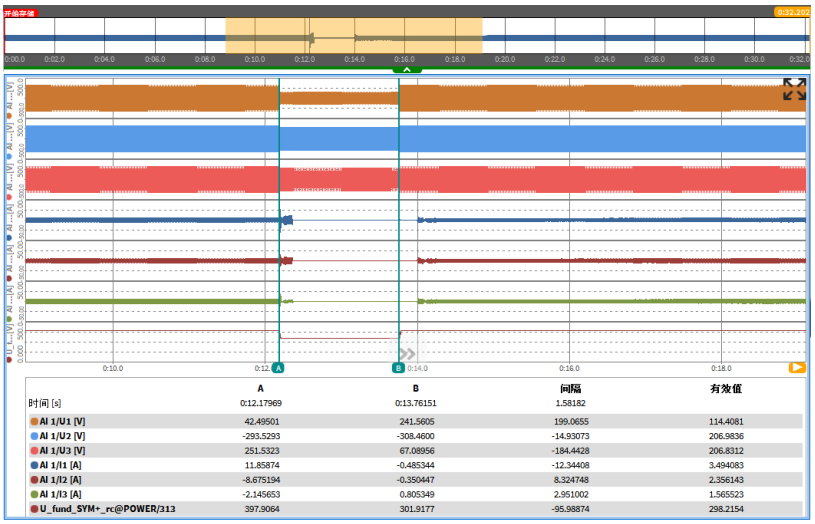
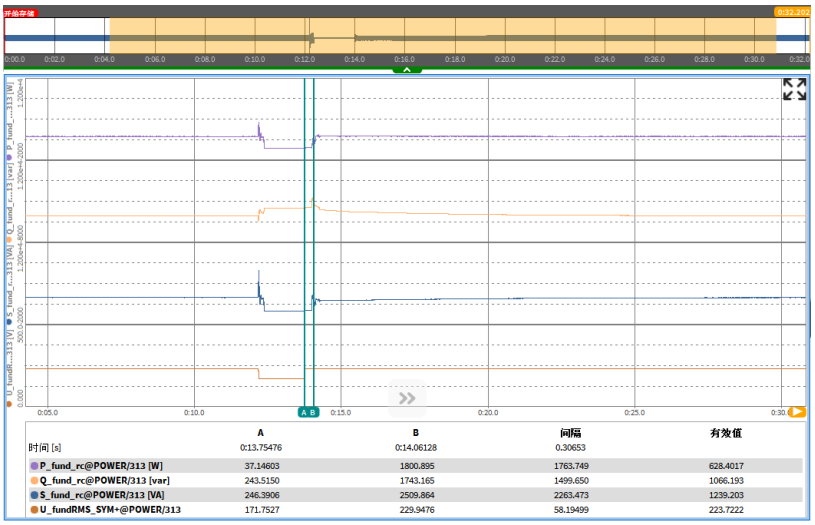
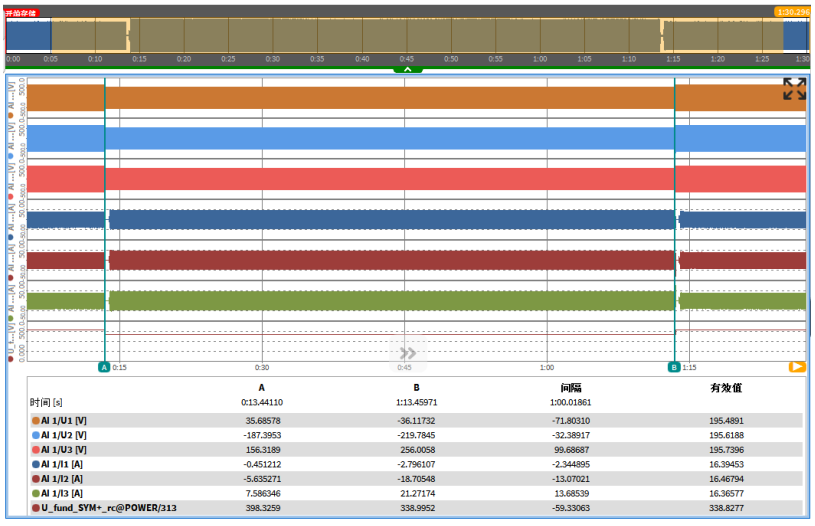
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	3.4-2
4	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	4.1-1

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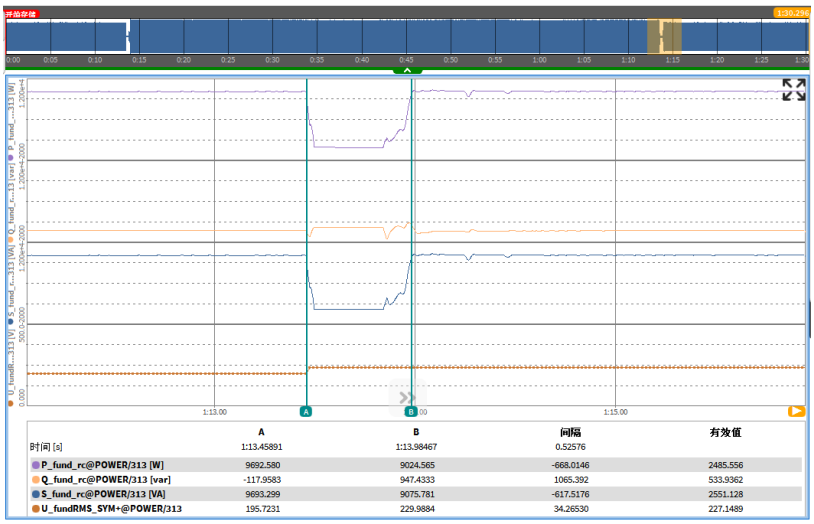
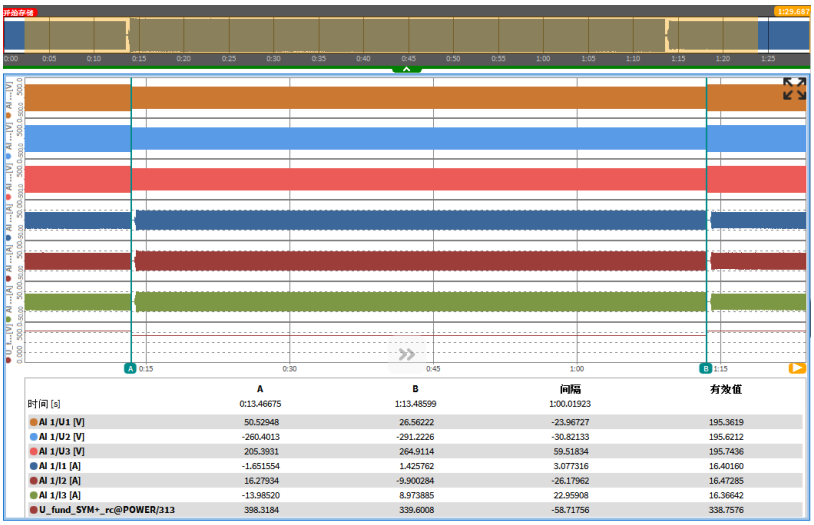
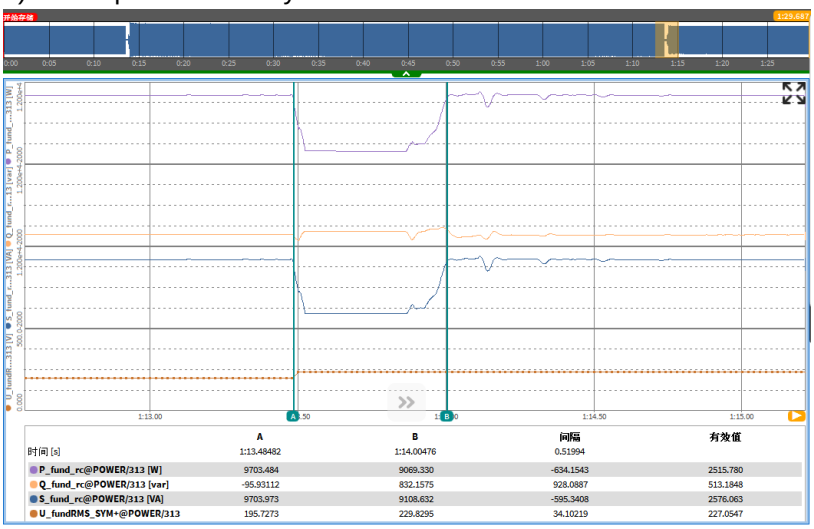
			b) Active power recovery time after the end of the fault  A / B / 间隔 / 有效值 时间 [s]: 1:13.45891 / 1:13.98467 / 0.52576 P_fund_rc@POWER/313 [W]: 9692.580 / 9024.565 / -668.0146 / 2485.556 Q_fund_rc@POWER/313 [var]: -117.9583 / 947.4333 / 1065.392 / 533.9362 S_fund_rc@POWER/313 [VA]: 9693.299 / 9075.781 / -617.5176 / 2551.128 U_fundRMS_SYM+@POWER/313: 195.7231 / 229.9884 / 34.26530 / 227.1489	
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A / B / 间隔 / 有效值 时间 [s]: 0:13.46675 / 1:13.48599 / 1:00.01923 AI 1/U1 [V]: 50.52948 / 26.56222 / -23.96727 / 195.3619 AI 1/U2 [V]: -260.4013 / -291.2226 / -30.82133 / 195.6212 AI 1/U3 [V]: 205.3931 / 264.9114 / 59.51834 / 195.7436 AI 1/I1 [A]: -1.651554 / 1.425762 / 3.077316 / 16.40160 AI 1/I2 [A]: 16.27934 / -9.900284 / -26.17962 / 16.47285 AI 1/I3 [A]: -13.98520 / 8.973885 / 22.95908 / 16.36642 U_fund_SYM+_rc@POWER/313: 398.3184 / 339.6008 / -58.71756 / 338.7576 b) Active power recovery time after the end of the fault  A / B / 间隔 / 有效值 时间 [s]: 1:13.48482 / 1:14.00476 / 0.51994 P_fund_rc@POWER/313 [W]: 9703.484 / 9069.330 / -634.1543 / 2515.780 Q_fund_rc@POWER/313 [var]: -95.93112 / 832.1575 / 928.0887 / 513.1848 S_fund_rc@POWER/313 [VA]: 9703.973 / 9108.632 / -595.3408 / 2576.063 U_fundRMS_SYM+@POWER/313: 195.7273 / 229.8295 / 34.10219 / 227.0547	4.1-2

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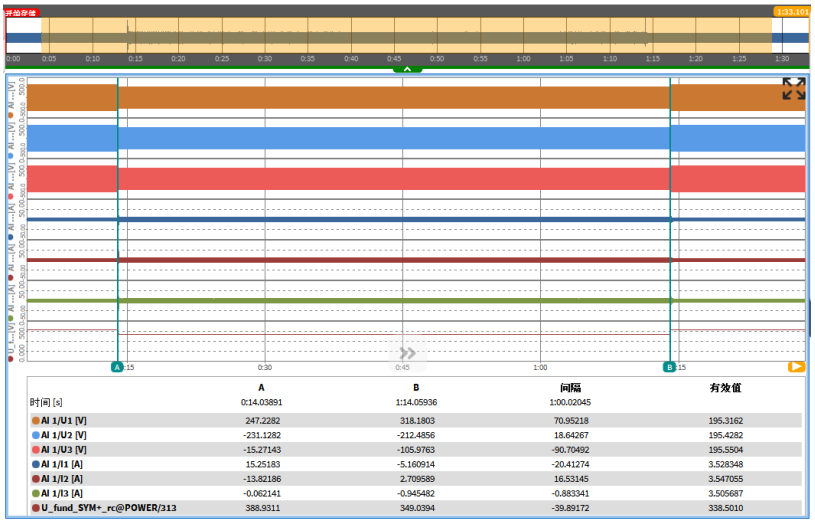
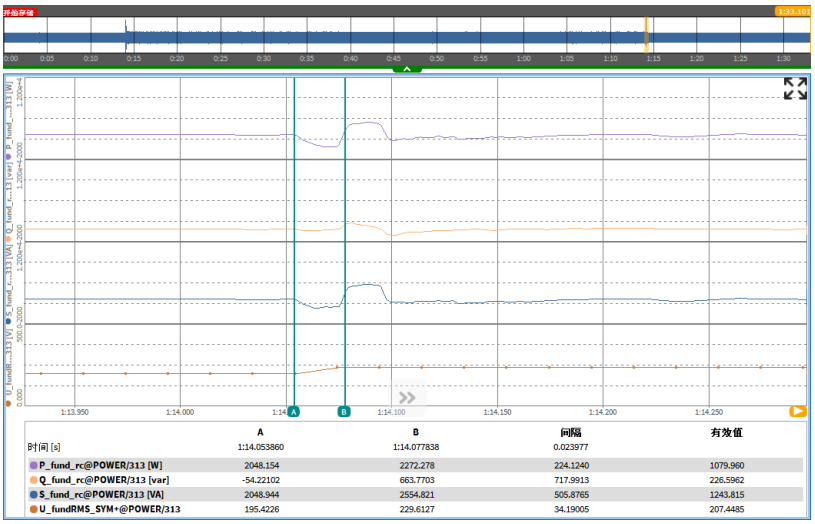
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	4.2-1
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	4.2-2

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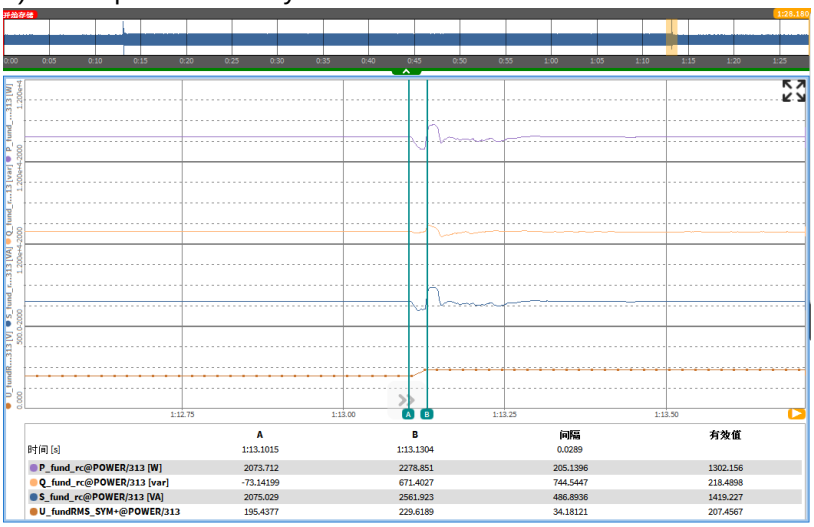
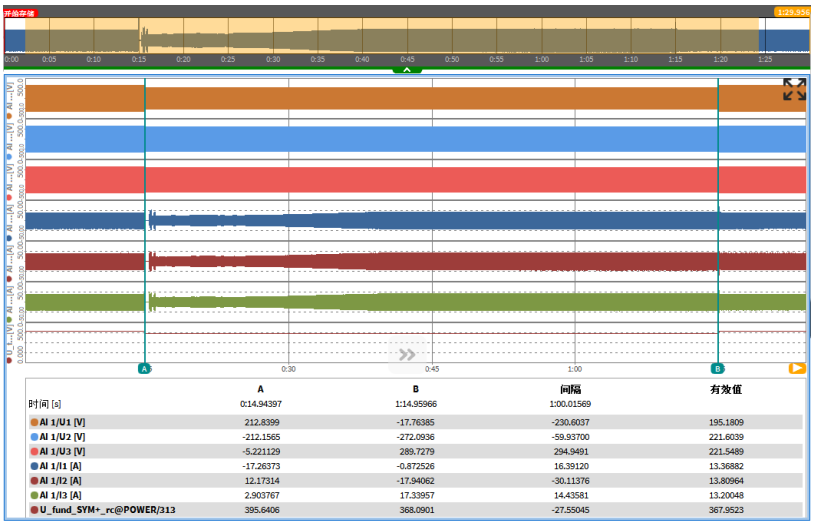
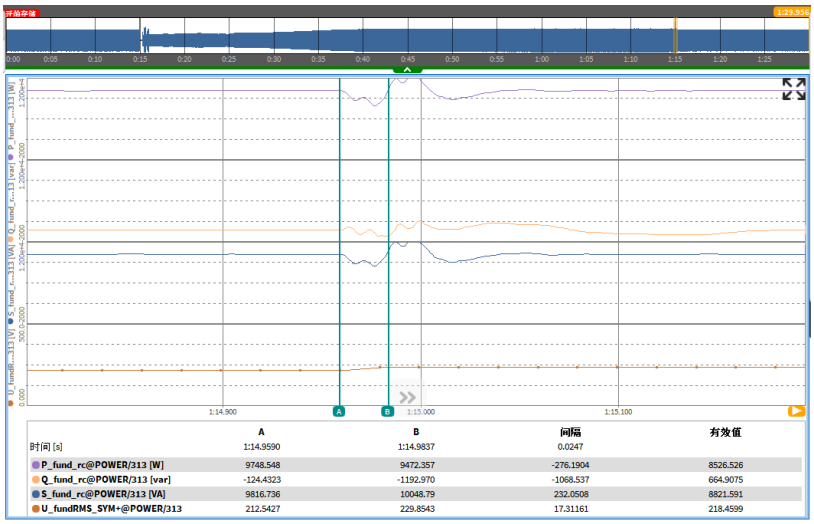
			b) Active power recovery time after the end of the fault  A: 1:13.1015 B: 1:13.1304 间隔: 0.0289 P_fund_rc@POWER/313 [W]: 2073.712 / 2278.851 / 205.1396 / 1302.156 Q_fund_rc@POWER/313 [var]: -73.14199 / 671.4027 / 744.5447 / 218.4898 S_fund_rc@POWER/313 [VA]: 2075.029 / 2561.923 / 486.8936 / 1419.227 U_fundRMS_SYM+@POWER/313: 195.4377 / 229.6189 / 34.18121 / 207.4567	
Two-phase	Full load(100%Pn)		a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A: 0:14.94397 B: 1:14.95966 间隔: 1:00.01569 AI 1/U1 [V]: 212.8399 / -17.76385 / -230.6037 / 195.1809 AI 1/U2 [V]: -212.1565 / -272.0936 / -59.93700 / 221.6039 AI 1/U3 [V]: -5.221129 / 289.7279 / 294.9491 / 221.5489 AI 1/I1 [A]: -17.26373 / -0.872526 / 16.39120 / 13.36882 AI 1/I2 [A]: 12.17314 / -17.94062 / -30.11376 / 13.80964 AI 1/I3 [A]: 2.903767 / 17.33957 / 14.43581 / 13.20048 U_fund_SYM+_rc@POWER/313: 395.6406 / 368.0901 / -27.55045 / 367.9523 b) Active power recovery time after the end of the fault  A: 1:14.9590 B: 1:14.9837 间隔: 0.0247 P_fund_rc@POWER/313 [W]: 9748.548 / 9472.357 / -276.1904 / 8526.526 Q_fund_rc@POWER/313 [var]: -124.4323 / -1192.970 / -1068.537 / 664.9075 S_fund_rc@POWER/313 [VA]: 9816.736 / 10048.79 / 232.0508 / 8821.591 U_fundRMS_SYM+@POWER/313: 212.5427 / 229.8543 / 17.31161 / 218.4599	4.3-1

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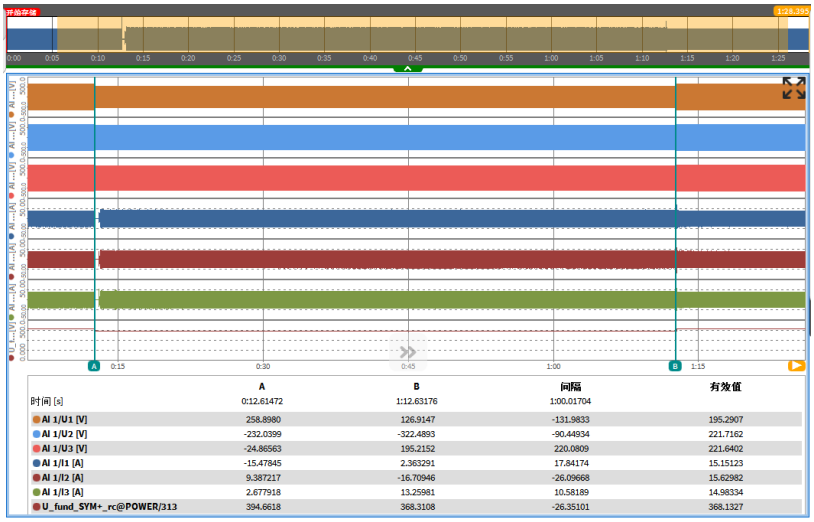
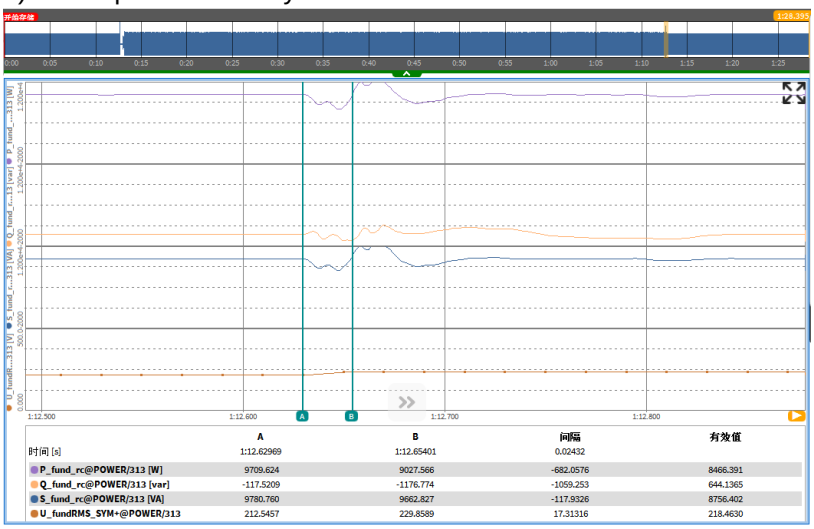
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	4.3-2
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	4.4-1

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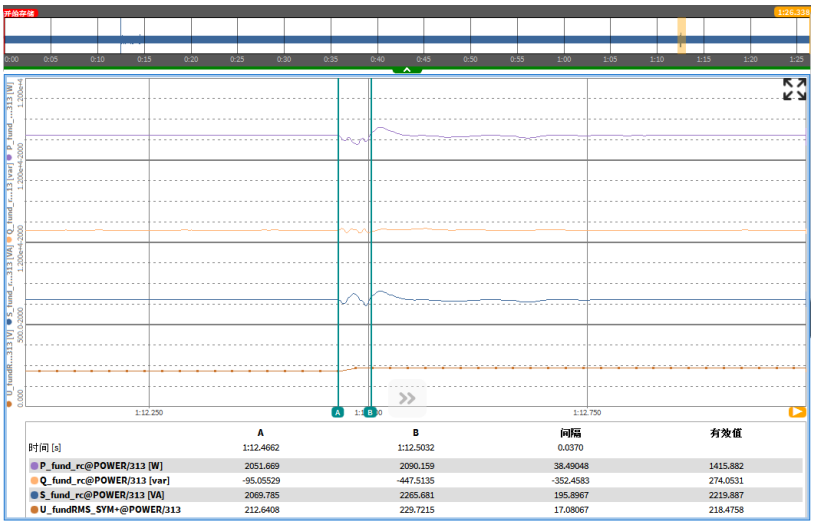
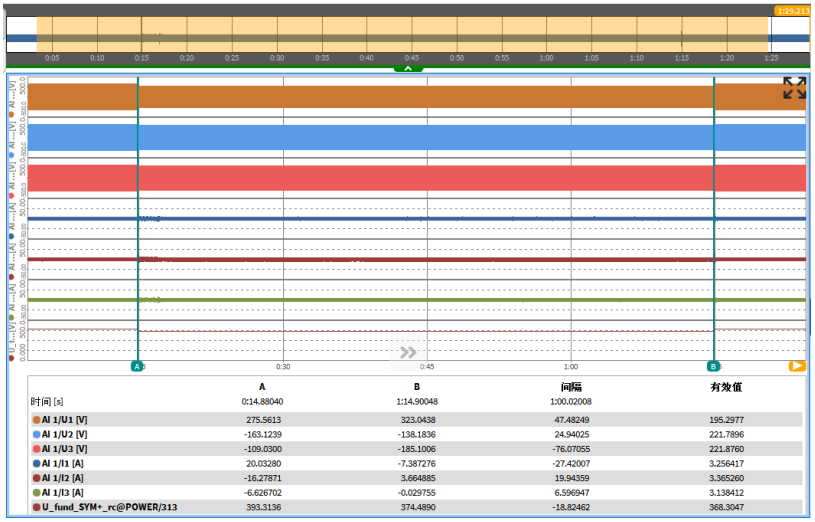
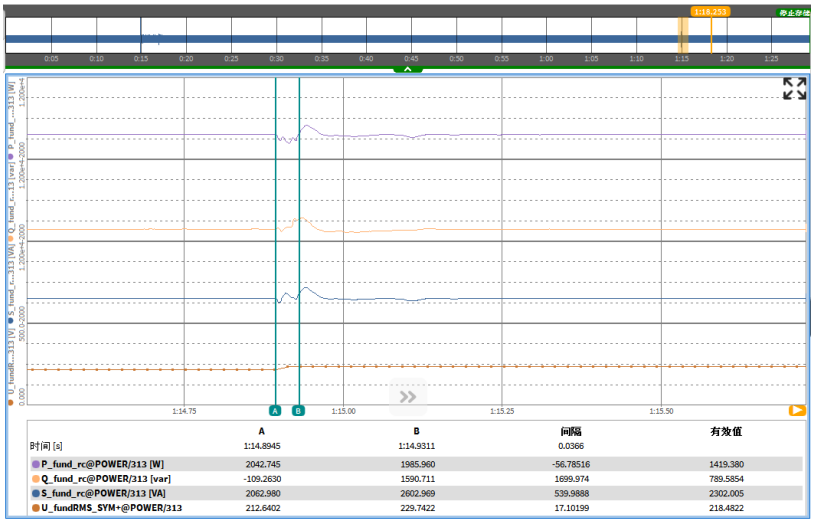
			b) Active power recovery time after the end of the fault  A 1:12.4662 B 1:12.5032 间隔 0.0370 有效值 P_fund_rc@POWER/313 [W] 2051.669 2090.159 38.49048 1415.882 Q_fund_rc@POWER/313 [var] -95.05529 -447.5135 -352.4583 274.0531 S_fund_rc@POWER/313 [VA] 2069.785 2265.681 195.8967 2219.887 U_fundRMS_SYM+@POWER/313 212.6408 229.7215 17.08067 218.4758	
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:14.88040 B 1:14.90048 间隔 1:00.02008 有效值 AI 1/U1 [V] 275.5613 323.0438 47.48249 195.2977 AI 1/U2 [V] -163.1239 -138.1836 24.94025 221.7896 AI 1/U3 [V] -109.0300 -185.1006 -76.07055 221.8760 AI 1/I1 [A] 20.03280 -7.387276 -27.42007 3.256417 AI 1/I2 [A] -16.27871 3.664885 19.94359 3.365260 AI 1/I3 [A] -6.626702 -0.029755 6.596947 3.138412 U_fund_SYM+_rc@POWER/313 393.3136 374.4890 -18.82462 368.3047 b) Active power recovery time after the end of the fault  A 1:14.8945 B 1:14.9311 间隔 0.0366 有效值 P_fund_rc@POWER/313 [W] 2042.745 1985.960 -56.78516 1419.380 Q_fund_rc@POWER/313 [var] -109.2630 1590.711 1699.974 789.5854 S_fund_rc@POWER/313 [VA] 2062.980 2602.969 539.9888 2302.005 U_fundRMS_SYM+@POWER/313 212.6402 229.7422 17.10199 218.4822	4.4-2

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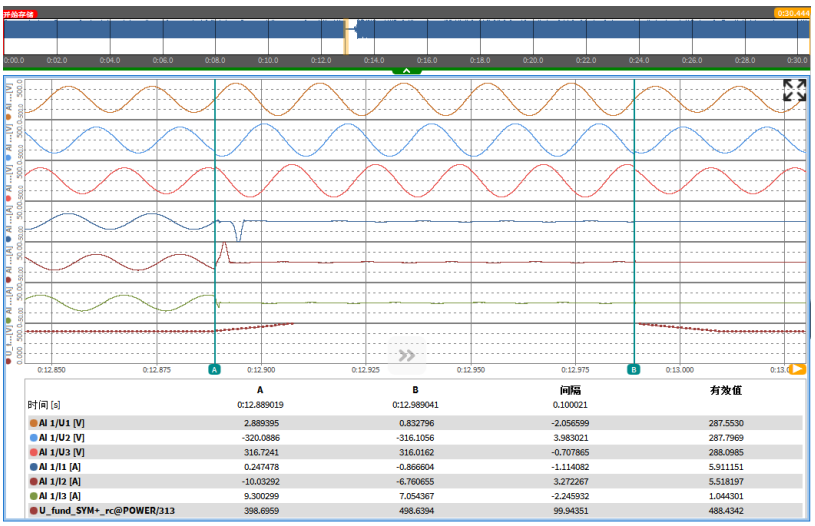
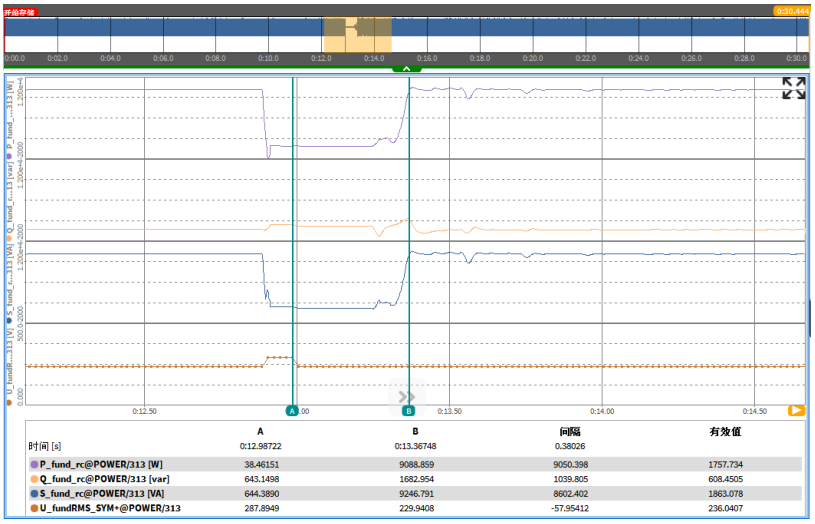
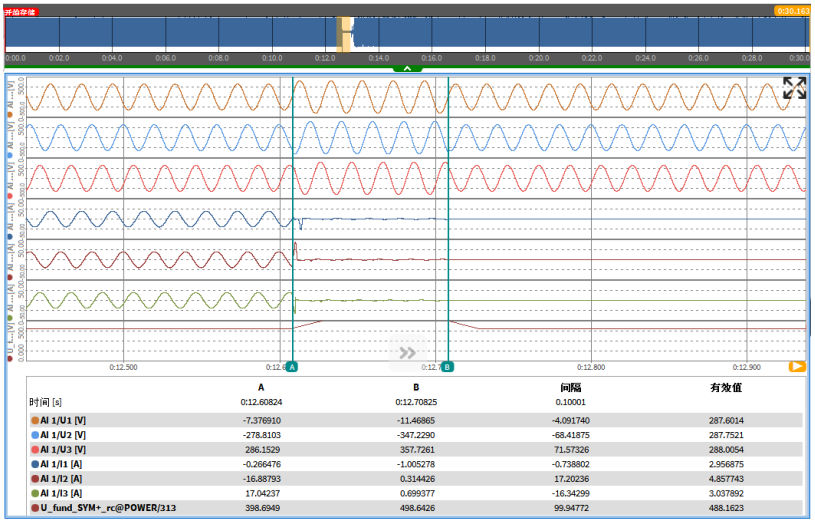
5	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	5.1-1
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	5.1-2

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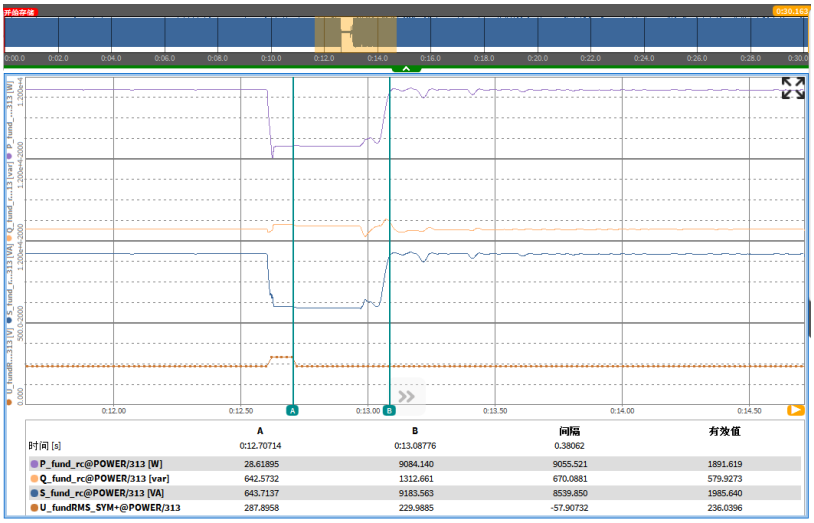
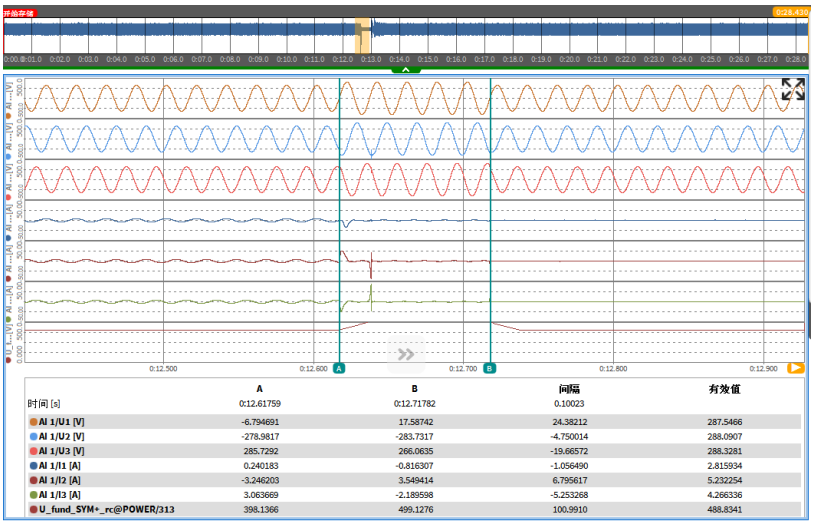
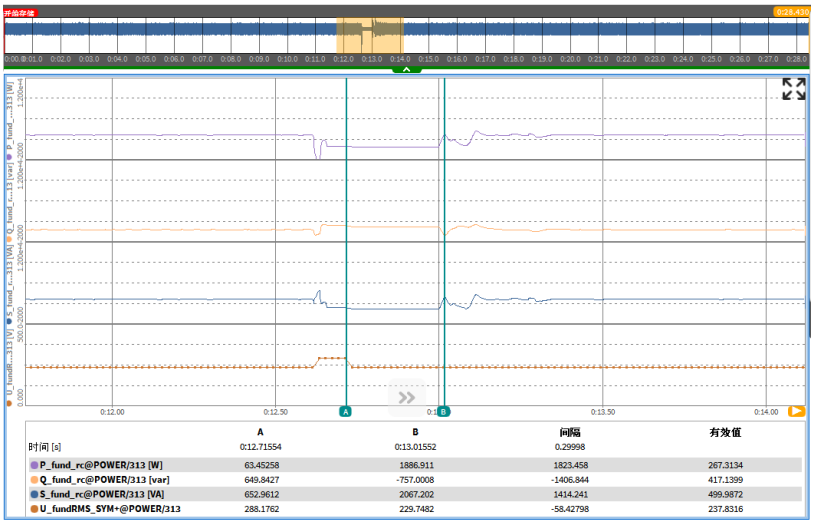
			b) Active power recovery time after the end of the fault  A 0:12.70714 B 0:13.08776 间隔 0.38062 P_fund_rc@POWER/313 [W] 28.61895 9084.140 9055.521 1891.619 Q_fund_rc@POWER/313 [var] 642.5732 1312.661 670.0881 579.9273 S_fund_rc@POWER/313 [VA] 643.7137 9183.563 8539.850 1985.640 U_fundRMS_SYM+@POWER/313 287.8958 229.9885 -57.90732 236.0396	
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:12.61759 B 0:12.71782 间隔 0.10023 AI 1/U1 [V] -6.794691 17.58742 24.38212 287.5466 AI 1/U2 [V] -278.9817 -283.7317 -4.750014 288.0907 AI 1/U3 [V] 285.7292 266.0635 -19.66572 288.3281 AI 1/I1 [A] 0.240183 -0.816307 -1.056490 2.815934 AI 1/I2 [A] -3.246203 3.549414 6.795617 5.232254 AI 1/I3 [A] 3.063669 -2.189598 -5.253268 4.266336 U_fund_SYM+_rc@POWER/313 398.1366 499.1276 100.9910 488.8341 b) Active power recovery time after the end of the fault  A 0:12.71554 B 0:13.01552 间隔 0.29998 P_fund_rc@POWER/313 [W] 63.45258 1886.911 1823.458 267.3134 Q_fund_rc@POWER/313 [var] 649.8427 -757.0008 -1406.844 417.1399 S_fund_rc@POWER/313 [VA] 652.9612 2067.202 1414.241 499.9872 U_fundRMS_SYM+@POWER/313 288.1762 229.7482 -58.42798 237.8316	5.2-1

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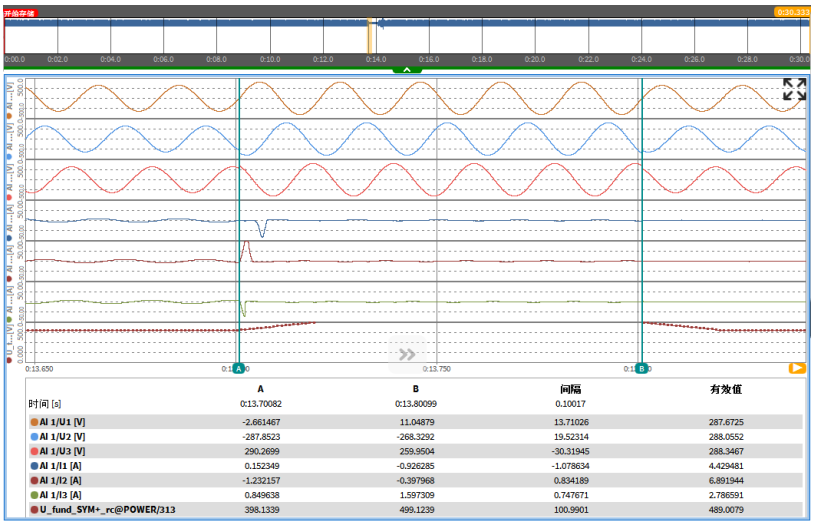
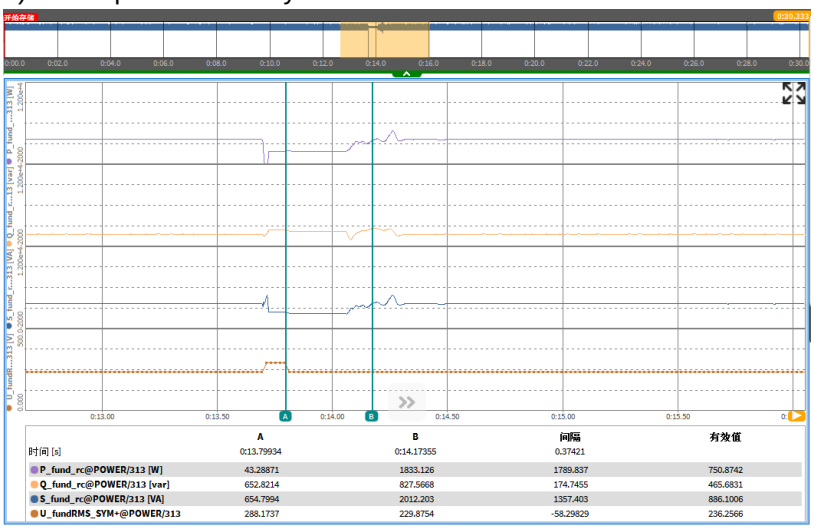
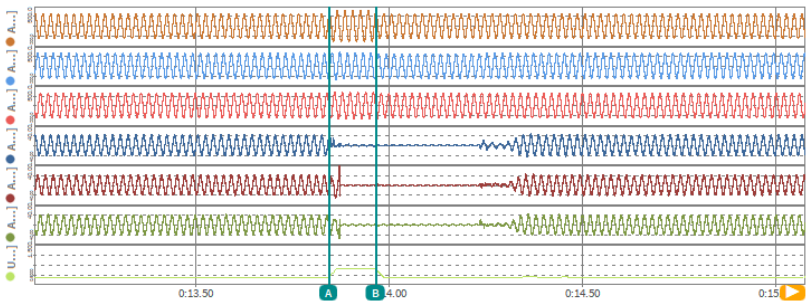
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	5.2-2
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	5.3-1

	A	B	Delta
Time [s]	0:13.846178	0:13.967376	0.121198
AI 1/U1 [V]	283.5159	255.7804	-27.73547
AI 1/U2 [V]	-2.884766	124.1385	127.0232
AI 1/U3 [V]	-280.7323	-342.1437	-61.41138
AI 1/I1 [A]	17.71588	1.396551	-16.31933
AI 1/I2 [A]	-0.163182	-1.359061	-1.195879
AI 1/I3 [A]	-17.17718	0.247425	17.42460
U_pos_p.u. [V]	0.996904	1.121113	0.124209

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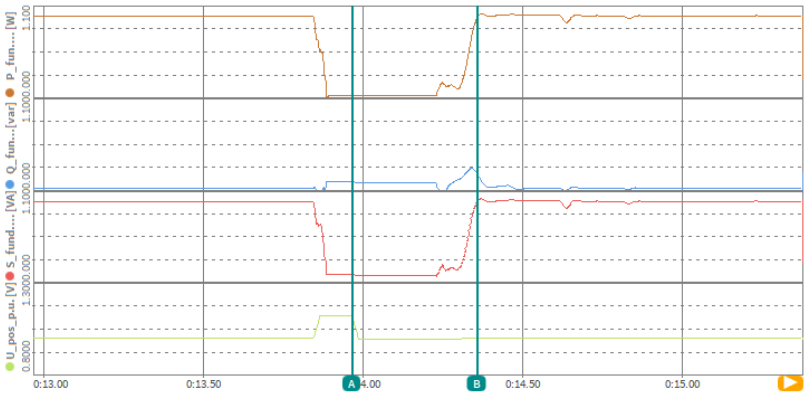
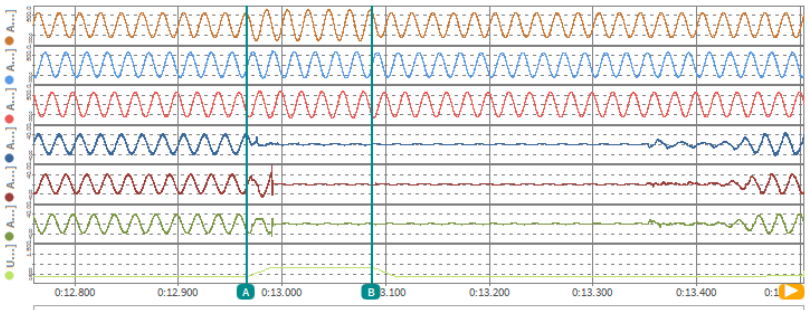
			b) Active power recovery time after the end of the fault  A B Delta Time [s] 0:13.966645 0:14.357711 0.391066 P_fund_p.u. [W] -3.273e-3 0.919188 0.922461 Q_fund_p.u. [var] 0.082633 0.203696 0.121062 S_fund_p.u. [VA] 0.082786 0.941812 0.859026 U_pos_p.u. [V] 1.121113 0.997327 -0.123786	
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A B Delta Time [s] 0:12.9662117 0:13.0867943 0.1205825 AI 1/U1 [V] 308.0332 358.6518 50.61865 AI 1/U2 [V] -74.26682 -14.13812 60.12869 AI 1/U3 [V] -240.8813 -293.3310 -52.44971 AI 1/I1 [A] 18.23356 0.760374 -17.47318 AI 1/I2 [A] -5.426406 -1.327275 4.099131 AI 1/I3 [A] -14.45386 0.704101 15.15796 U_pos_p.u. [V] 0.996931 1.121123 0.124193 b) Active power recovery time after the end of the fault	5.3-2

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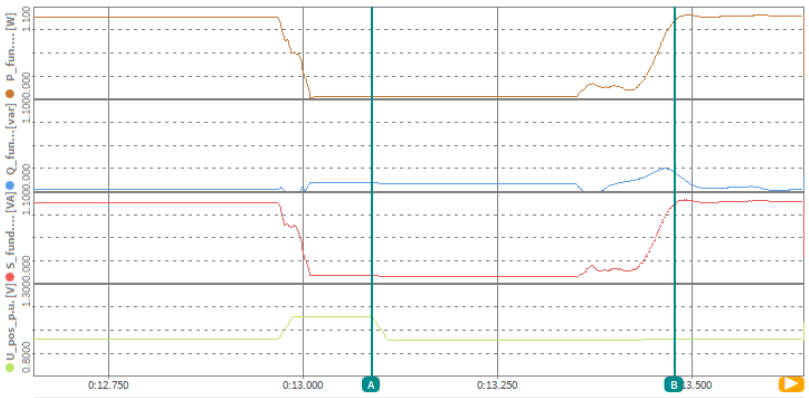
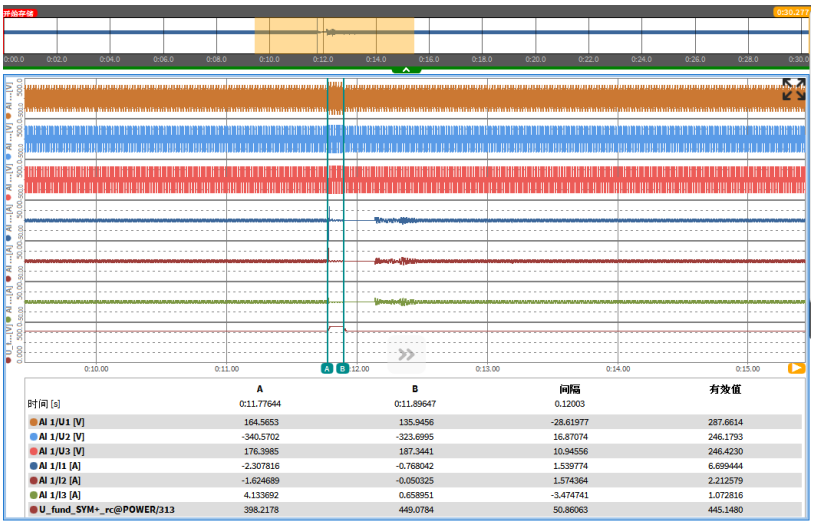


	A	B	Delta
Time [s]	0:13.088363	0:13.476704	0.388341
P_fund_p.u. [W]	-3.248e-3	0.905888	0.909136
Q_fund_p.u. [var]	0.082624	0.220193	0.137569
S_fund_p.u. [VA]	0.082776	0.932595	0.849819
U_pos_p.u. [V]	1.121124	0.997351	-0.123773

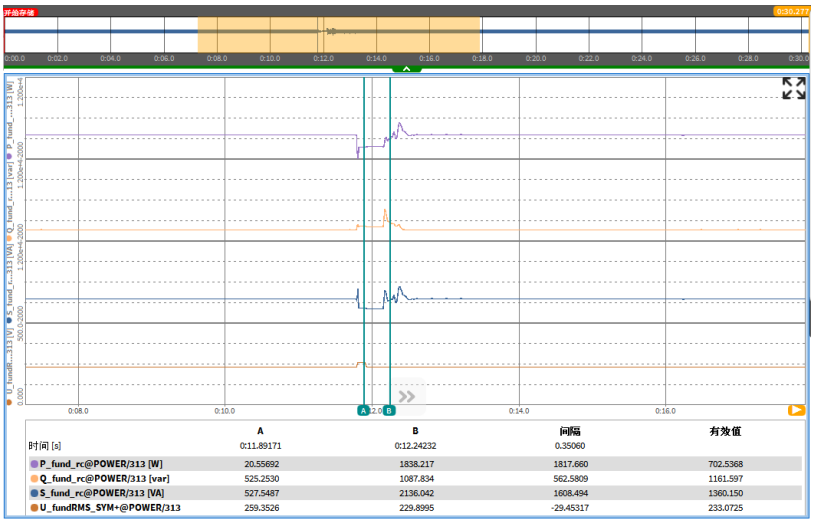
Partial load(50%Pn)

a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)



	A	B	间隔	有效值
时间 [s]	0:11.77644	0:11.89647	0.12003	
AI 1/U1 [V]	164.5653	135.9456	-28.61977	287.6614
AI 1/U2 [V]	-340.5702	-323.6995	16.87074	246.1793
AI 1/U3 [V]	176.3985	187.3441	10.94556	246.4230
AI 1/I1 [A]	-2.307816	-0.768042	1.539774	6.699444
AI 1/I2 [A]	-1.624689	-0.050325	1.574364	2.212579
AI 1/I3 [A]	4.133692	0.658951	-3.474741	1.072816
U_fund_SYM+_rc@POWER/313	398.2178	449.0784	50.86063	445.1480

b) Active power recovery time after the end of the fault



	A	B	间隔	有效值
时间 [s]	0:11.89171	0:12.24232	0.35060	
P_fund_rc@POWER/313 [W]	20.55692	1838.217	1817.660	702.5368
Q_fund_rc@POWER/313 [var]	525.2530	1087.834	562.5809	1161.597
S_fund_rc@POWER/313 [VA]	527.5487	2136.042	1608.494	1360.150
U_fundRMS_SYM+@POWER/313	259.3526	229.8995	-29.45317	233.0725

5.4-1

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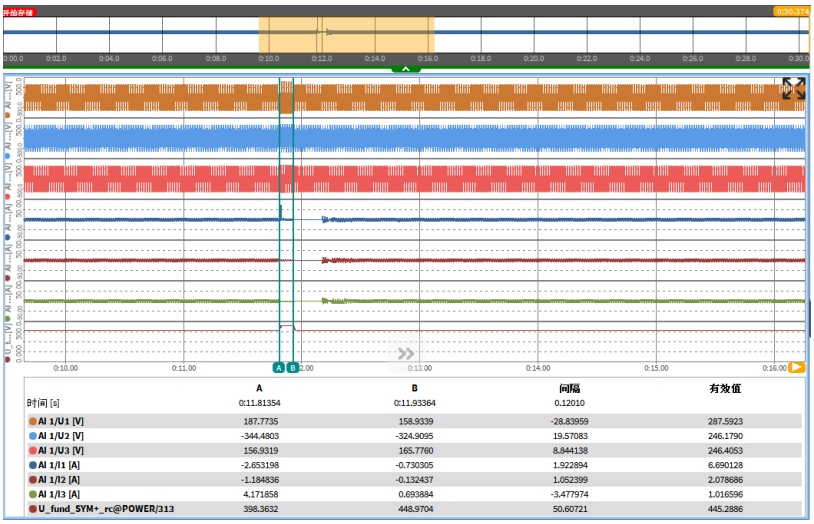
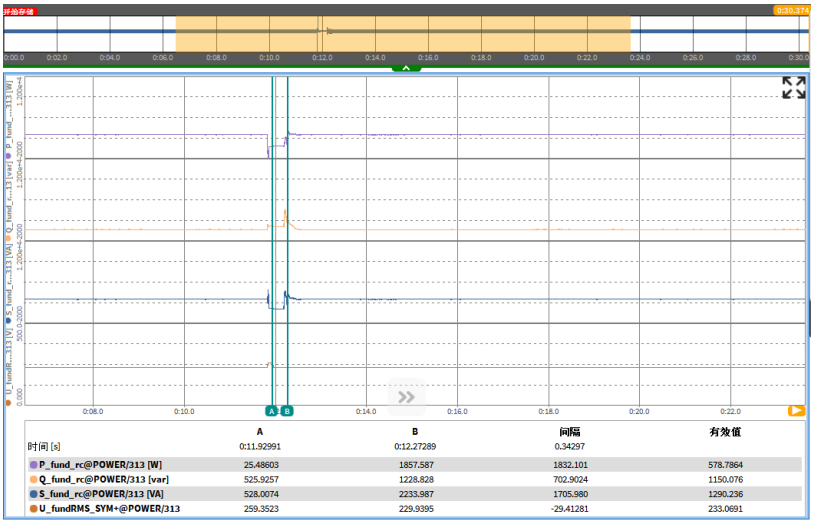
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	5.4-2
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	5.5-1

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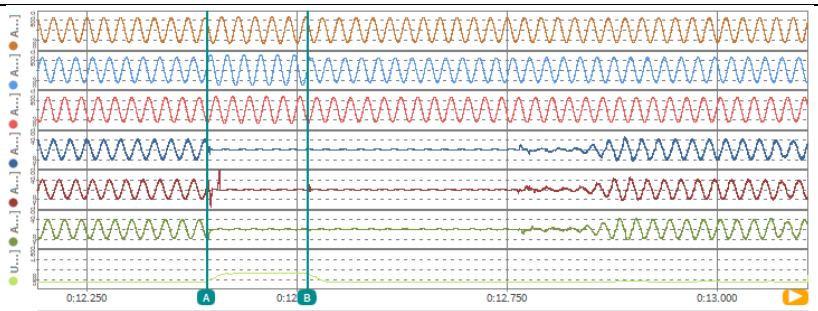
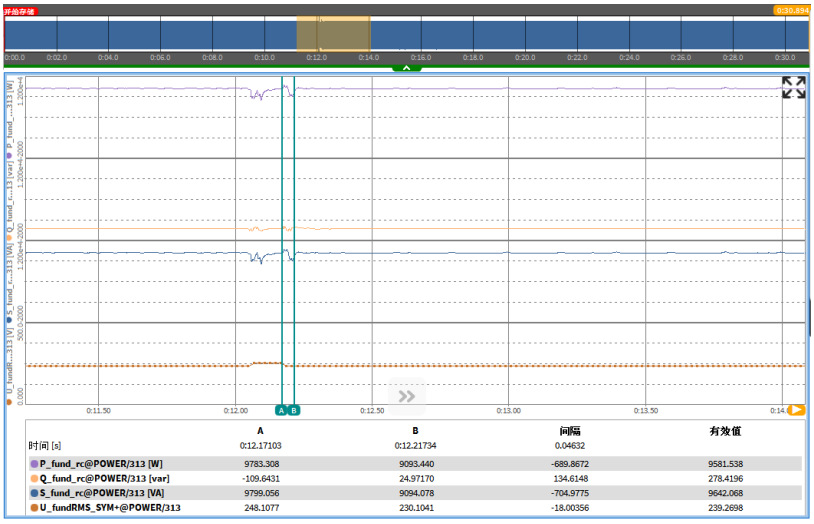


	A	B	Delta
Time [s]	0:12.392862	0:12.512562	0.119700
AI 1/U1 [V]	197.4789	233.3173	35.83837
AI 1/U2 [V]	131.4715	123.0241	-8.447409
AI 1/U3 [V]	-321.0632	-338.8690	-17.80582
AI 1/I1 [A]	13.14097	1.056433	-12.08453
AI 1/I2 [A]	7.995312	-1.543483	-9.538794
AI 1/I3 [A]	-18.58492	0.279096	18.86401
U_pos_p.u. [V]	0.996922	1.121153	0.124231

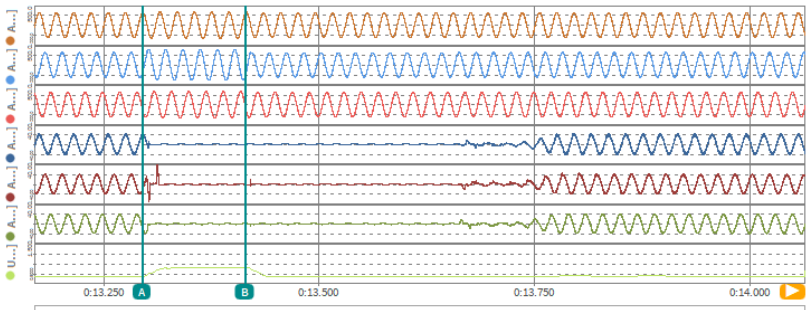
b) Active power recovery time after the end of the fault



	A	B	间隔	有效值
时间 [s]	0:12.17103	0:12.21734	0.04632	
P_fund_rc@POWER/313 [W]	9783.308	9093.440	-689.8672	9581.538
Q_fund_rc@POWER/313 [var]	-109.6431	24.97170	134.6148	278.4196
S_fund_rc@POWER/313 [VA]	9799.056	9094.078	-704.9775	9642.068
U_fundRMS_SYM+@POWER/313	248.1077	230.1041	-18.00356	239.2698

a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)

Full load(100%Pn)



	A	B	Delta
Time [s]	0:13.295826	0:13.415012	0.119186
AI 1/U1 [V]	326.5216	334.1588	7.637263
AI 1/U2 [V]	-165.0237	-288.6032	-123.5795
AI 1/U3 [V]	-159.0184	-87.36765	71.65075
AI 1/I1 [A]	20.42396	-0.530634	-20.95459
AI 1/I2 [A]	-10.45179	-1.249112	9.202681
AI 1/I3 [A]	-10.07363	1.391004	11.46463
U_pos_p.u. [V]	0.996937	1.121157	0.124220

b) Active power recovery time after the end of the fault

5.5-2

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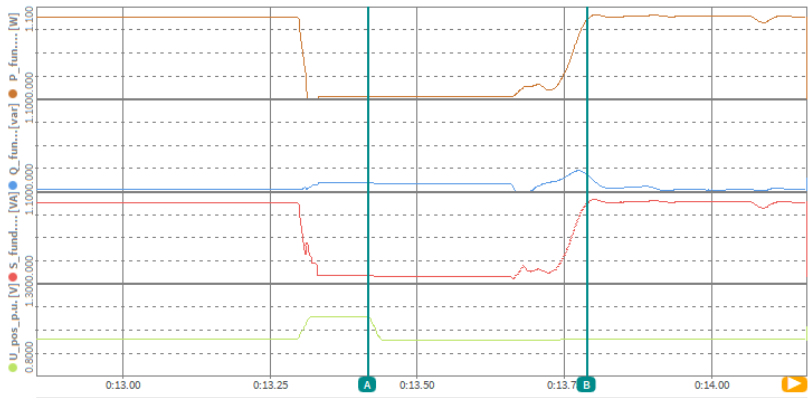
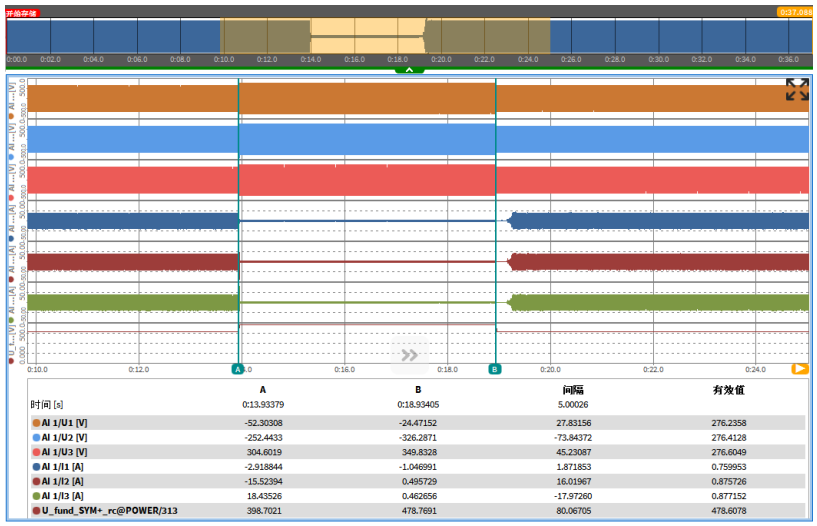
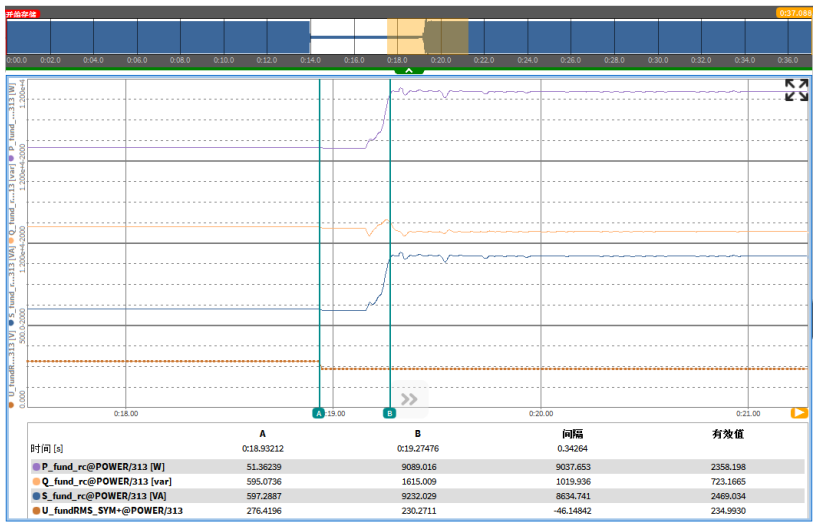
			 **Time [s]** A: 0:13.416843, B: 0:13.788605, Delta: 0.371762 **P_fund_p.u. [W]** A: -4.318e-3, B: 0.918075, Delta: 0.922393 **Q_fund_p.u. [var]** A: 0.082544, B: 0.194426, Delta: 0.111882 **S_fund_p.u. [VA]** A: 0.082812, B: 0.938557, Delta: 0.855745 **U_pos_p.u. [V]** A: 1.121156, B: 0.997328, Delta: -0.123827	
6	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  **时间 [s]** A: 0:13.93379, B: 0:18.93405, 间隔: 5.00026 **AI 1/U1 [V]** A: -52.30308, B: -24.47152, 间隔: 27.83156, 有效值: 276.2358 **AI 1/U2 [V]** A: -252.4433, B: -326.2871, 间隔: -73.84372, 有效值: 276.4128 **AI 1/U3 [V]** A: 304.6019, B: 349.8328, 间隔: 45.23087, 有效值: 276.6049 **AI 1/I1 [A]** A: -2.918844, B: -1.046991, 间隔: 1.871853, 有效值: 0.759953 **AI 1/I2 [A]** A: -15.52394, B: 0.495729, 间隔: 16.01967, 有效值: 0.875726 **AI 1/I3 [A]** A: 18.43526, B: 0.462656, 间隔: -17.97260, 有效值: 0.877152 **U_fund_SYM+_rc@POWER/313** A: 398.7021, B: 478.7691, 间隔: 80.06705, 有效值: 478.6078 b) Active power recovery time after the end of the fault  **时间 [s]** A: 0:18.93212, B: 0:19.27476, 间隔: 0.34264 **P_fund_rc@POWER/313 [W]** A: 51.36239, B: 9089.016, 间隔: 9037.653, 有效值: 2358.198 **Q_fund_rc@POWER/313 [var]** A: 595.0736, B: 1615.009, 间隔: 1019.936, 有效值: 723.1665 **S_fund_rc@POWER/313 [VA]** A: 597.2887, B: 9232.029, 间隔: 8634.741, 有效值: 2469.034 **U_fundRMS_SYM+@POWER/313** A: 276.4196, B: 230.2711, 间隔: -46.14842, 有效值: 234.9930	6.1-1

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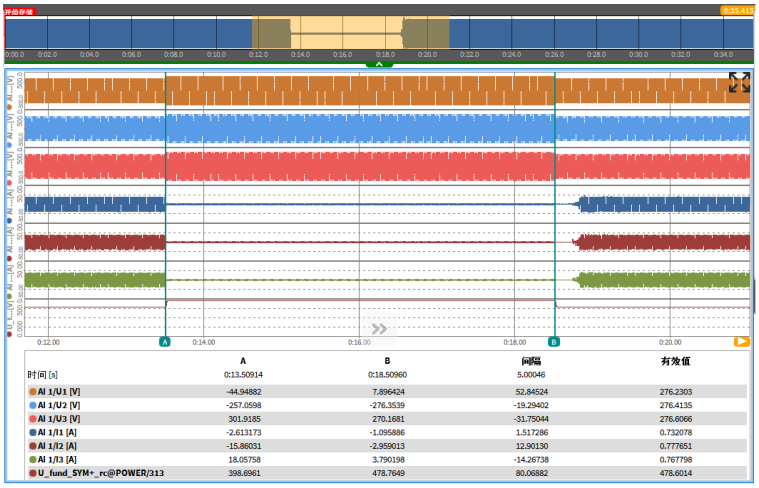
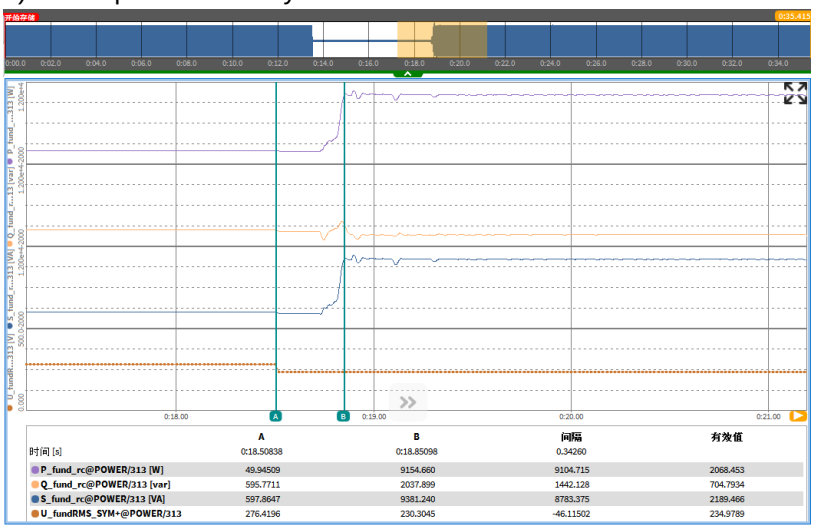
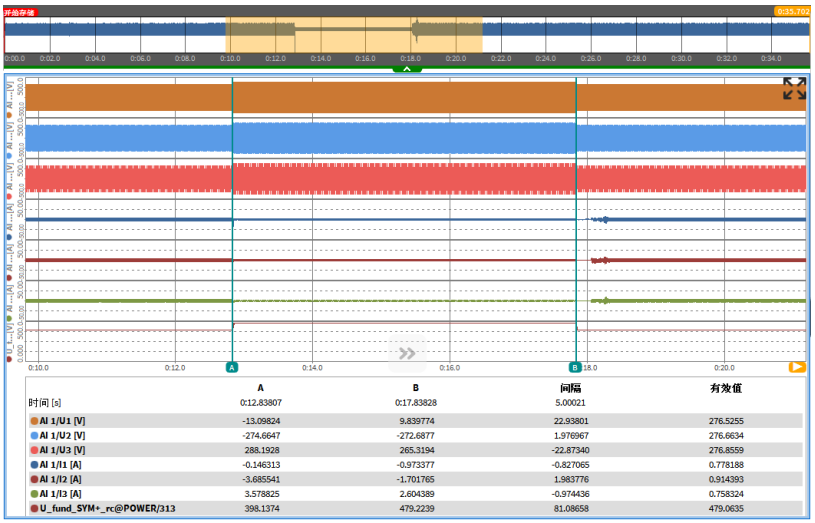
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	6.1-2
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault	6.2-1

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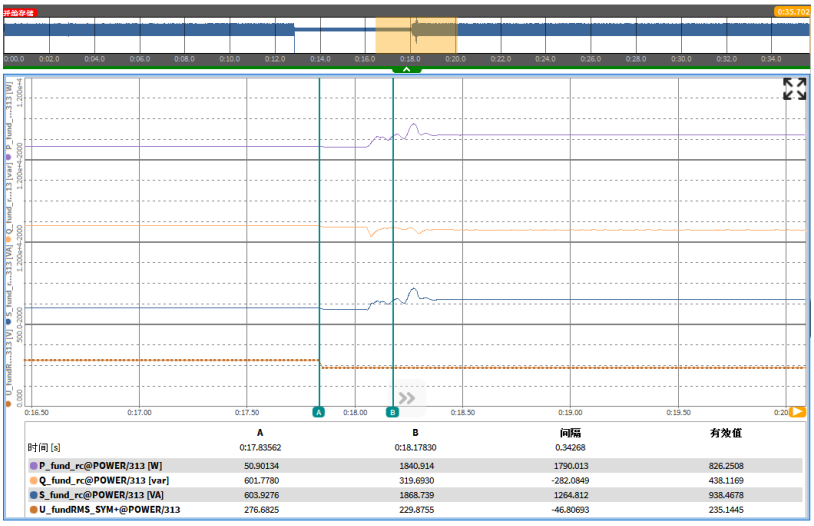
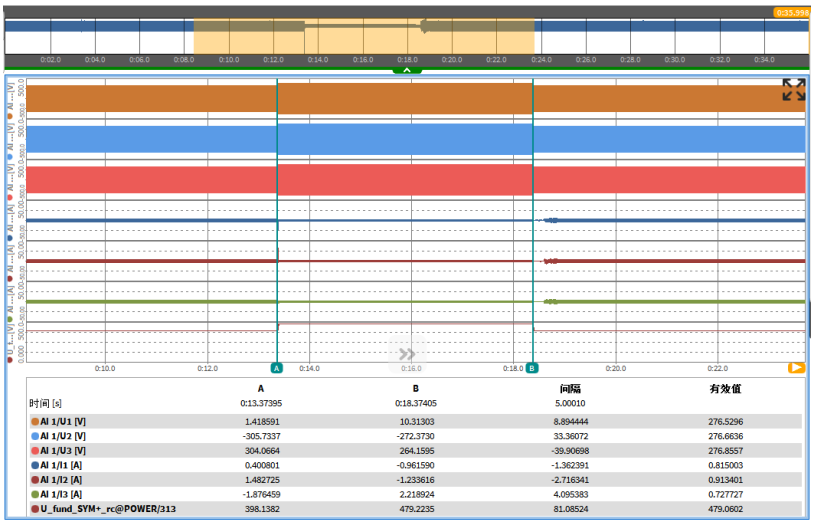
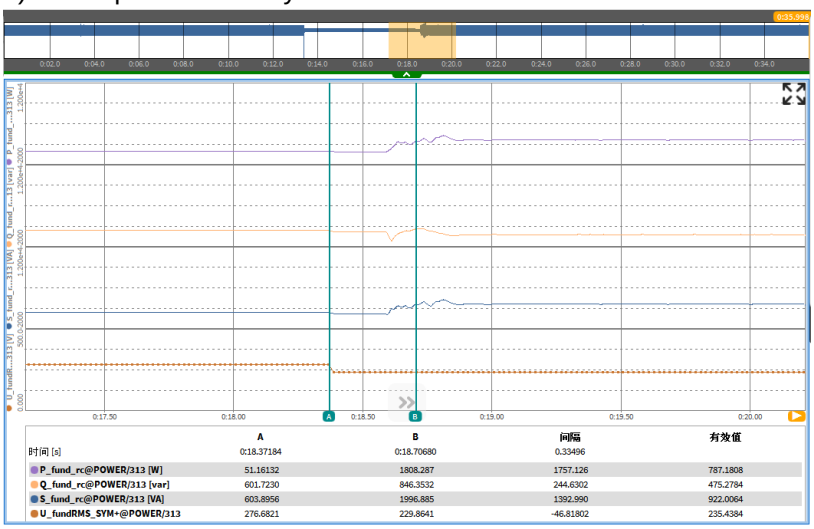
				
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  b) Active power recovery time after the end of the fault 	6.2-2
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	6.3-1

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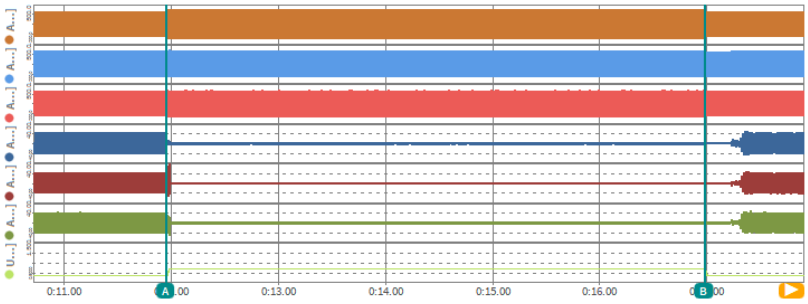
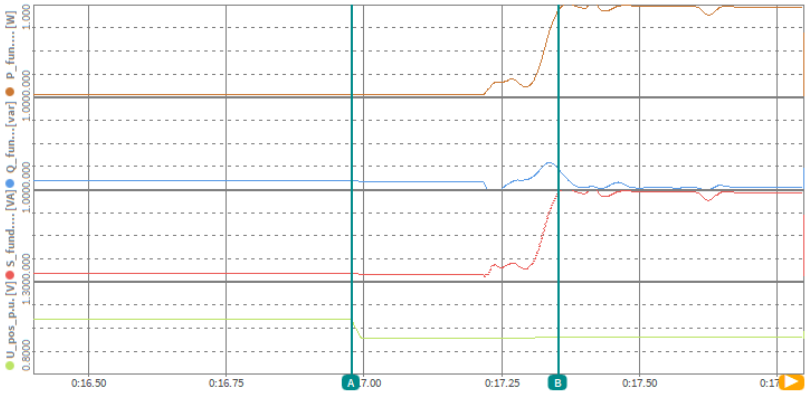


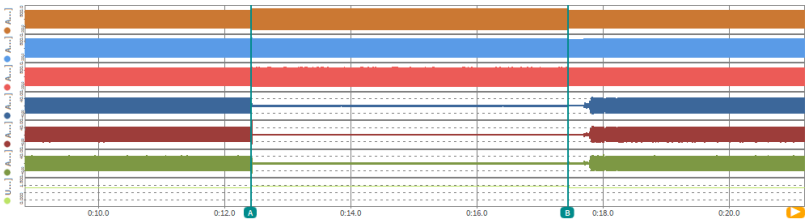
	A	B	Delta
Time [s]	0:11.95587	0:16.97890	5.02303
AI 1/U1 [V]	192.8596	-101.6730	-294.5326
AI 1/U2 [V]	125.1703	317.6938	192.5235
AI 1/U3 [V]	-326.1350	-216.5965	109.5386
AI 1/I1 [A]	11.54829	1.221514	-10.32678
AI 1/I2 [A]	6.516191	-0.388259	-6.904450
AI 1/I3 [A]	-19.04677	-1.029621	18.01715
U_pos_p.u. [V]	0.996917	1.094489	0.097572

b) Active power recovery time after the end of the fault



	A	B	Delta
Time [s]	0:16.97797	0:17.35313	0.37516
P_fund_p.u. [W]	-1.008e-4	0.911726	0.911827
Q_fund_p.u. [var]	0.078960	0.228418	0.149458
S_fund_p.u. [VA]	0.078960	0.940703	0.861743
U_pos_p.u. [V]	1.095075	0.997336	-0.097739

a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)

Full load(100%Pn)			6.3-2

	A	B	Delta
Time [s]	0:12.41632	0:17.43647	5.02015
AI 1/U1 [V]	342.7421	295.6962	-47.04595
AI 1/U2 [V]	-290.5406	-262.7875	27.75312
AI 1/U3 [V]	-19.00278	-32.68205	-13.67927
AI 1/I1 [A]	-0.950546	-0.544023	0.406523
AI 1/I2 [A]	-17.78726	-0.755700	17.03156
AI 1/I3 [A]	-2.278744	1.338648	3.617392
U_pos_p.u. [V]	1.059795	1.081457	0.021662

b) Active power recovery time after the end of the fault

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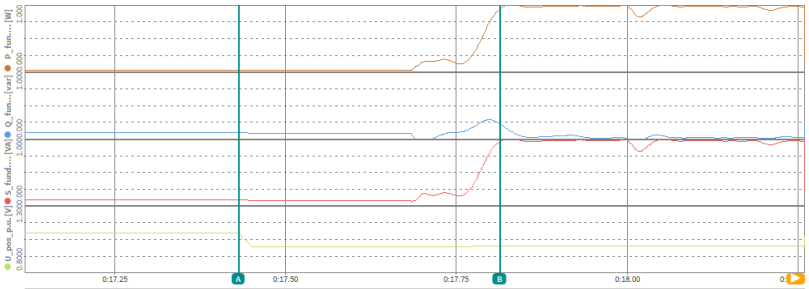
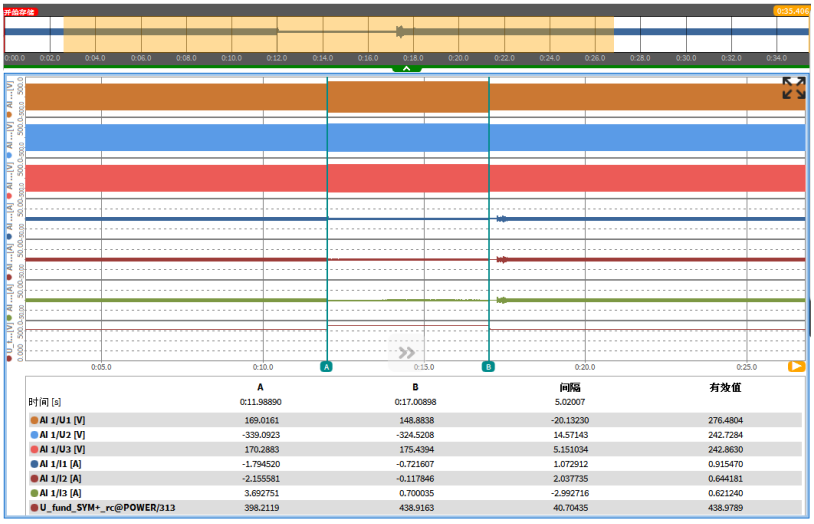
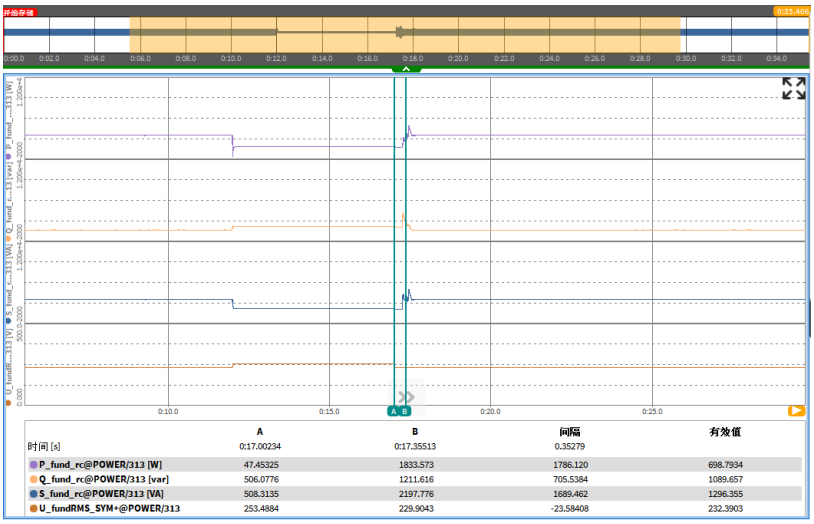
			 A: Time [s] 0:17.43218; P_fund_p.u. [W] -9.723e-5; Q_fund_p.u. [var] 0.078962; S_fund_p.u. [VA] 0.078962; U_pos_p.u. [V] 1.095001 B: Time [s] 0:17.81396; P_fund_p.u. [W] 0.914736; Q_fund_p.u. [var] 0.222662; S_fund_p.u. [VA] 0.941572; U_pos_p.u. [V] 0.997370 Delta: Time [s] 0.38178; P_fund_p.u. [W] 0.914833; Q_fund_p.u. [var] 0.143700; S_fund_p.u. [VA] 0.862610; U_pos_p.u. [V] -0.097631	
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A: 时间 [s] 0:11.98890; AI 1/U1 [V] 169.0161; AI 1/U2 [V] -339.0923; AI 1/U3 [V] 170.2883; AI 1/I1 [A] -1.794520; AI 1/I2 [A] -2.155581; AI 1/I3 [A] 3.692751; U_fund_SYM+_rc@POWER/313 398.2119 B: 时间 [s] 0:17.00898; AI 1/U1 [V] 148.8838; AI 1/U2 [V] -324.5208; AI 1/U3 [V] 175.4394; AI 1/I1 [A] -0.721607; AI 1/I2 [A] -0.117846; AI 1/I3 [A] 0.700035; U_fund_SYM+_rc@POWER/313 438.9163 间隔: 时间 [s] 5.02007; AI 1/U1 [V] -20.13230; AI 1/U2 [V] 14.57143; AI 1/U3 [V] 5.151034; AI 1/I1 [A] 1.072912; AI 1/I2 [A] 2.037735; AI 1/I3 [A] -2.992716; U_fund_SYM+_rc@POWER/313 40.70435 有效值: AI 1/U1 [V] 276.4804; AI 1/U2 [V] 242.7284; AI 1/U3 [V] 242.8630; AI 1/I1 [A] 0.915470; AI 1/I2 [A] 0.644181; AI 1/I3 [A] 0.621240; U_fund_SYM+_rc@POWER/313 438.9789 b) Active power recovery time after the end of the fault  A: 时间 [s] 0:17.00234; P_fund_rc@POWER/313 [W] 47.45325; Q_fund_rc@POWER/313 [var] 506.0776; S_fund_rc@POWER/313 [VA] 508.3135; U_fundRMS_SYM+@POWER/313 253.4884 B: 时间 [s] 0:17.35513; P_fund_rc@POWER/313 [W] 1833.573; Q_fund_rc@POWER/313 [var] 1211.616; S_fund_rc@POWER/313 [VA] 2197.776; U_fundRMS_SYM+@POWER/313 229.9043 间隔: 时间 [s] 0.35279; P_fund_rc@POWER/313 [W] 1786.120; Q_fund_rc@POWER/313 [var] 705.5384; S_fund_rc@POWER/313 [VA] 1689.462; U_fundRMS_SYM+@POWER/313 -23.58408 有效值: P_fund_rc@POWER/313 [W] 698.7934; Q_fund_rc@POWER/313 [var] 1089.657; S_fund_rc@POWER/313 [VA] 1296.355; U_fundRMS_SYM+@POWER/313 232.3903	6.4-1
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	6.4-2

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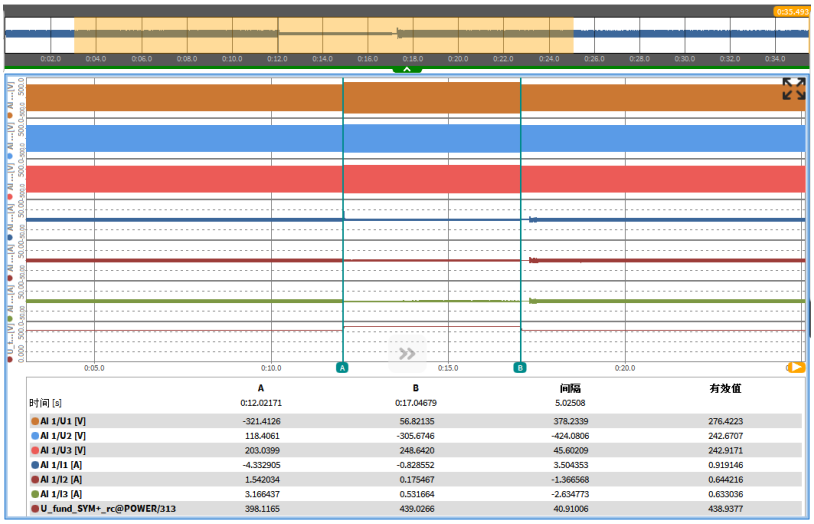
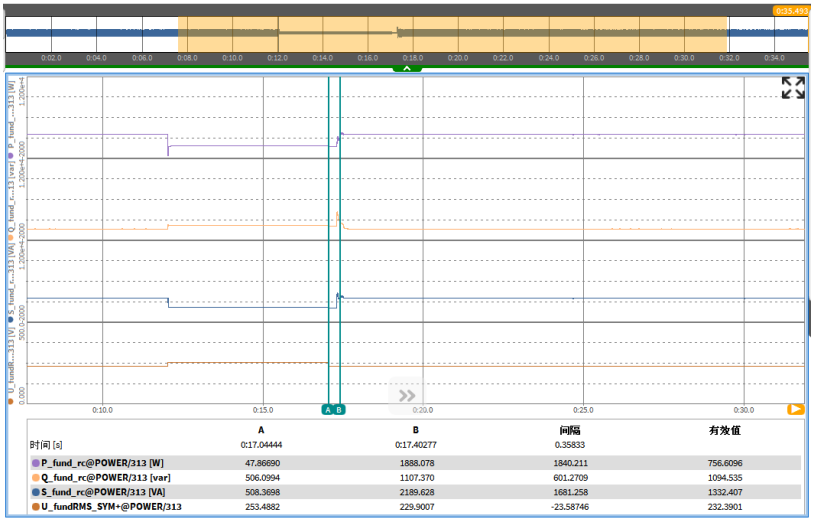
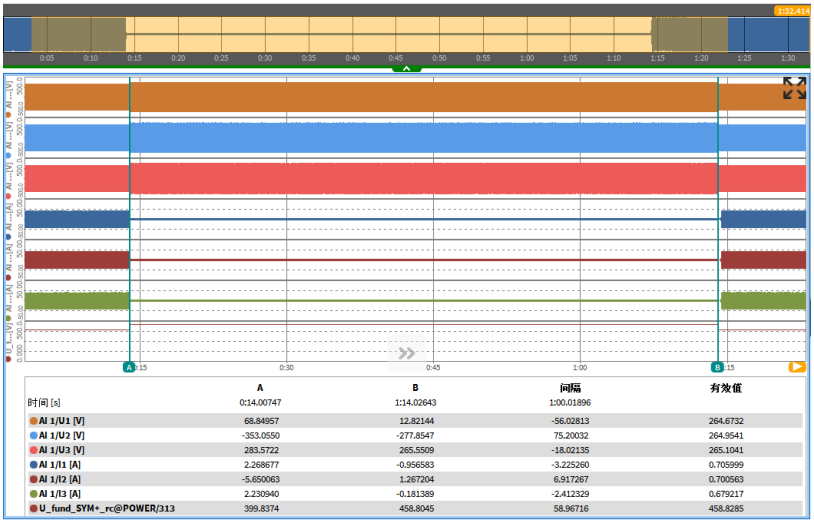
			 b) Active power recovery time after the end of the fault 	
7	Three-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	7.1-1

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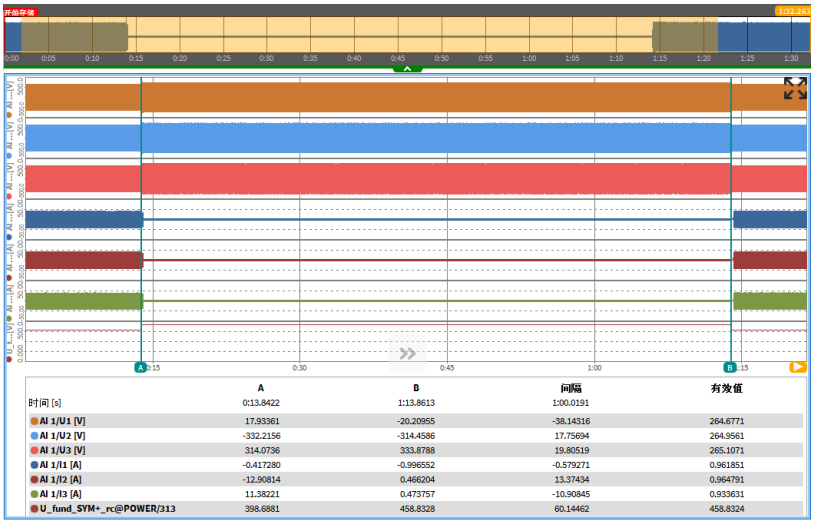
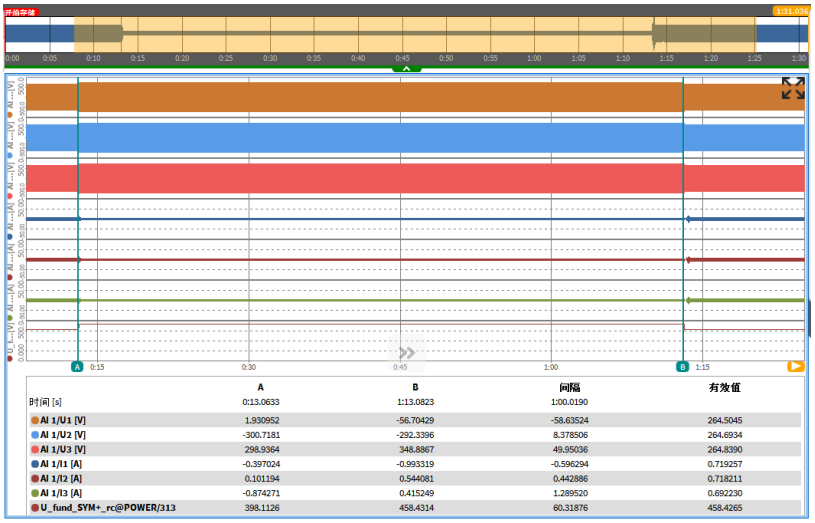
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:15 0:30 0:45 1:00 B 1:15 时间 [s] A 0:13.8422 B 1:13.8613 间隔 1:00.0191 有效值 AI 1/U1 [V] 17.93361 -20.20955 -38.14316 264.6771 AI 1/U2 [V] -332.2156 -314.4586 17.75694 264.9561 AI 1/U3 [V] 314.0736 333.8788 19.80519 265.1071 AI 1/I1 [A] -0.417280 -0.996552 -0.579271 0.961851 AI 1/I2 [A] -12.90814 0.466204 13.37434 0.964791 AI 1/I3 [A] 11.38221 0.473757 -10.90845 0.933631 U_fund_SYM+_rc@POWER/313 398.6881 458.8328 60.14462 458.8324	7.1-2
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:15 0:30 0:45 1:00 B 1:15 时间 [s] A 0:13.0633 B 1:13.0823 间隔 1:00.0190 有效值 AI 1/U1 [V] 1.930952 -56.70429 -58.63524 264.5045 AI 1/U2 [V] -300.7181 -292.3396 8.378506 264.6934 AI 1/U3 [V] 298.9364 348.8867 49.95036 264.8390 AI 1/I1 [A] -0.397024 -0.993319 -0.596294 0.719257 AI 1/I2 [A] 0.101194 0.544081 0.442886 0.718211 AI 1/I3 [A] -0.874271 0.415249 1.289520 0.692230 U_fund_SYM+_rc@POWER/313 398.1126 458.4314 60.31876 458.4265	7.2-1
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	7.2-2

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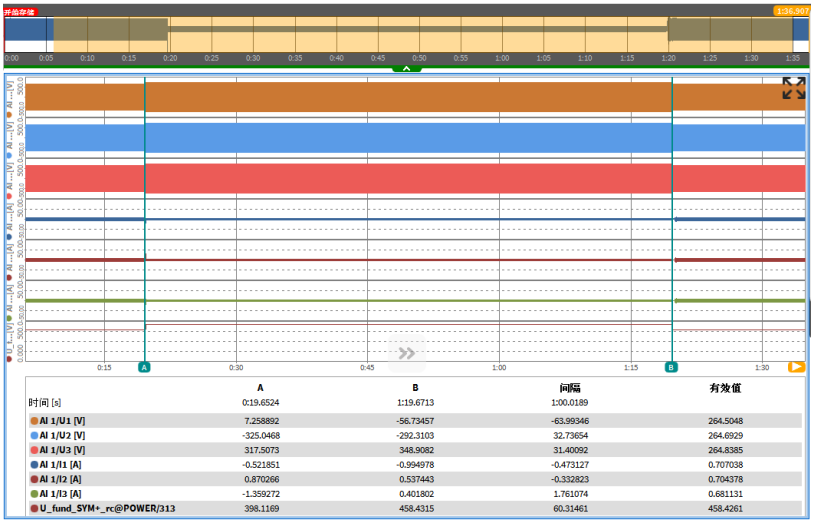
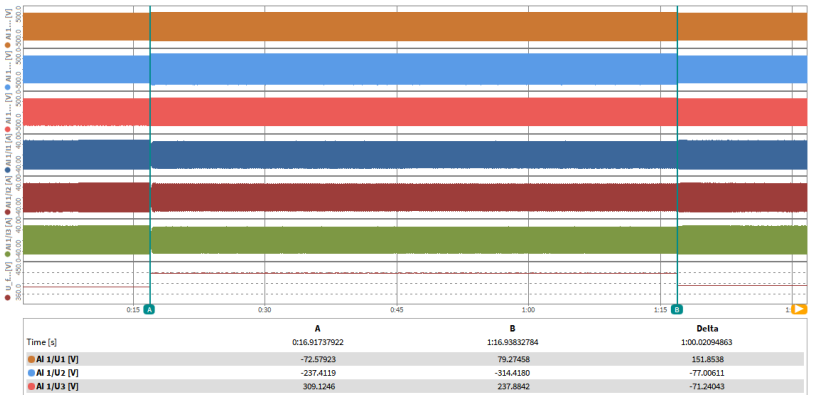
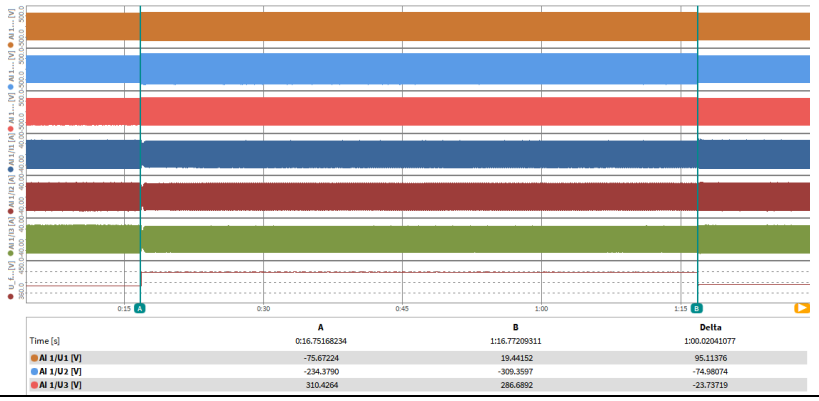
			 A 0:19.6524 B 1:19.6713 间隔 1:00.0189 AI 1/U1 [V] 7.258892 -56.73457 -63.99346 264.5048 AI 1/U2 [V] -325.0468 -292.3103 32.73654 264.6929 AI 1/U3 [V] 317.5073 348.9082 31.40092 264.8385 AI 1/I1 [A] -0.521851 -0.994978 -0.473127 0.707038 AI 1/I2 [A] 0.870266 0.537443 -0.332823 0.704378 AI 1/I3 [A] -1.359272 0.401802 1.761074 0.681131 U_fund_SYM+_rc@POWER/313 398.1169 458.4315 60.31461 458.4261	
	Two-phase	Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:16.91737922 B 1:16.93832784 Delta 1:00.0209486 AI 1/U1 [V] -72.57923 79.27458 151.8538 AI 1/U2 [V] -237.4119 -314.4180 -77.00611 AI 1/U3 [V] 309.1246 237.8842 -71.24043	7.3-1
		Full load(100%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)  A 0:16.75168234 B 1:16.77209311 Delta 1:00.02041077 AI 1/U1 [V] -75.67224 19.44152 95.11376 AI 1/U2 [V] -234.3790 -309.3597 -74.98074 AI 1/U3 [V] 310.4264 286.6892 -23.73719	7.3-2
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms)	7.4-1

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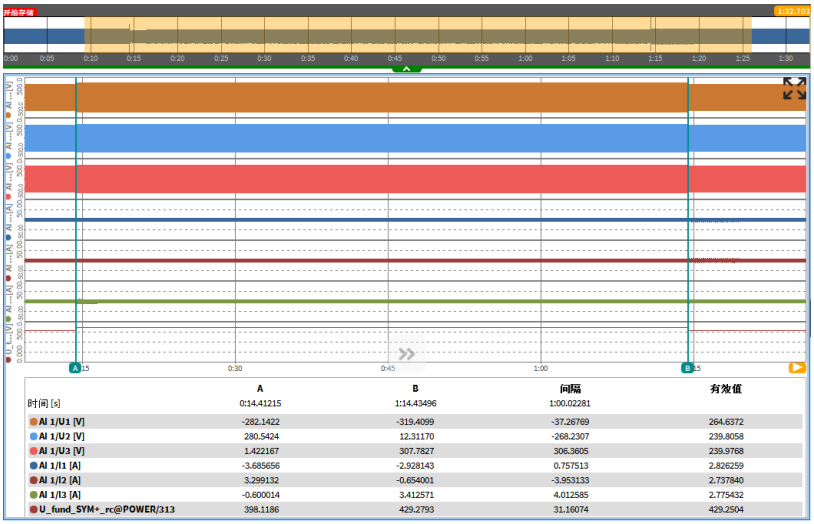
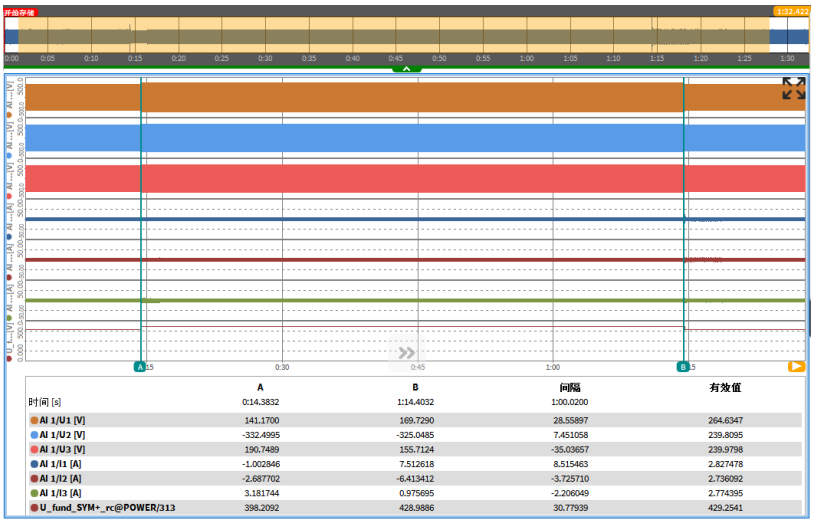
				
		Partial load(50%Pn)	a) Three phase voltage (phase-to-neutral) and three phase current (waveforms) 	7.4-2

时间 [s]	A 0:14.41215	B 1:14.43496	间隔 1:00.02281	有效值
AI 1/U1 [V]	-282.1422	-319.4099	-37.26769	264.6372
AI 1/U2 [V]	280.5424	12.31170	-268.2307	239.8058
AI 1/U3 [V]	1.422167	307.7827	306.3605	239.9768
AI 1/I1 [A]	-3.685656	-2.928143	0.757513	2.826259
AI 1/I2 [A]	3.299132	-0.654001	-3.953133	2.737840
AI 1/I3 [A]	-0.600014	3.412571	4.012585	2.775432
U_fund_SYM+_rc@POWER/313	398.1186	429.2793	31.16074	429.2504

时间 [s]	A 0:14.3832	B 1:14.4032	间隔 1:00.0200	有效值
AI 1/U1 [V]	141.1700	169.7290	28.55897	264.6347
AI 1/U2 [V]	-332.4995	-325.0485	7.451058	239.8095
AI 1/U3 [V]	190.7489	155.7124	-35.03657	239.9798
AI 1/I1 [A]	-1.002846	7.512618	8.515463	2.827478
AI 1/I2 [A]	-2.687702	-6.413412	-3.725710	2.736092
AI 1/I3 [A]	3.181744	0.975695	-2.206049	2.774395
U_fund_SYM+_rc@POWER/313	398.2092	428.9886	30.77939	429.2541

Channel and symbols description for all above oscillograms

For oscillogram a):

AI 1/U1 [V] to AI 1/U3 [V]: waveform of inverter output voltage signal
AI 1/I1 [A] to AI 1/I3 [A]: waveform of inverter output current signal
U_fund_SYM+_rc@POWER/AC [V]: fundamental component of positive sequence system with recalculation rate of 1/ms

For oscillogram b): all values below is peridic value with recalcution rate of 1/ms

U_fund_SYM+_rc@POWER/AC [V]: fundamental component of positive sequence system with recalculation rate of 1/ms
P_t_rc@POWER/AC [W]: active power
Q_t_rc@POWER/AC [var]: reactive power
S_t_rc@POWER/AC [VA]: apparent power

--**End of test report**--

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