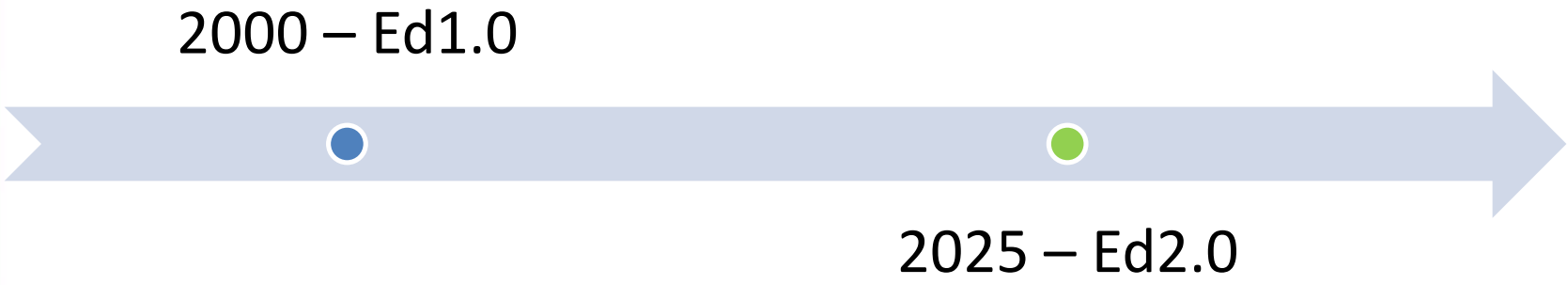
IEC 61000-4-29 -4-11 -4-34

Electromagnetic compatibility (EMC) - Part 4-11, 4-34, 4-29
Testing and measurement techniques
Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase, more than 16 A per phase, on DC input power port

SINCE 1922 VOLTA® S.p.A.

Competenza
ed entusiasmo per
soluzioni tecniche

Timeline -4-29



Campo di applicazione

- Requisiti di immunità e metodi di prova per componenti elettronici soggetti a buchi e cadute di tensione su alimentazione DC

Il fenomeno

- Buchi ed interruzioni su circuiti DC sono legate a guasti del sistema di alimentazione o a commutazioni di carichi importanti
- Durante una breve interruzione, si possono verificare condizioni di alta impedenza (commutazione di carico) o bassa impedenza (risoluzione di guasto)

Livelli di prova

- Buchi: 40 % e 70 % da 0.01 s a 1 s
- Brevi interruzioni: ad alta o bassa impedenza da 0.001 s a 1 s
  - Alta impedenza: verifica assorbimento di corrente di inrush dal carico
  - Bassa impedenza: blocco di corrente inversa dal carico
- Variazioni di tensione: 80 %, 85 % e 120 % da 0.1 s a 10 s

Caratteristiche

- Strumento pari a quello utilizzato per buchi AC
  - Rise time e fall time tra 1 μs e 50 μs
  - Inrush di 50 A a 24 Vdc, 100 A a 48 Vdc e 220 A a 110 Vdc

Schemi di prova

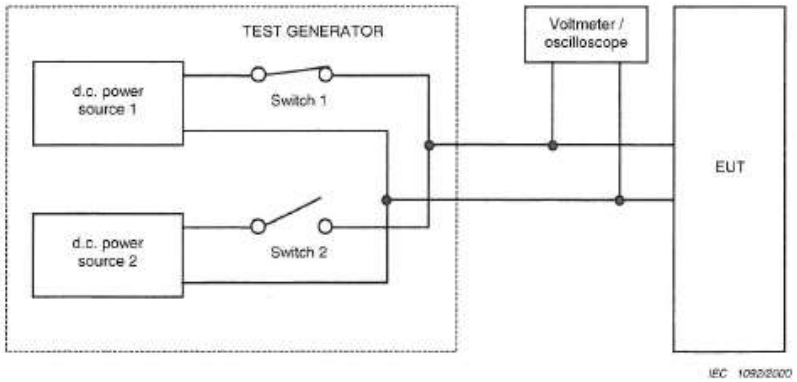


Figure A.1 – Example of test generator based on two power sources with internal switching

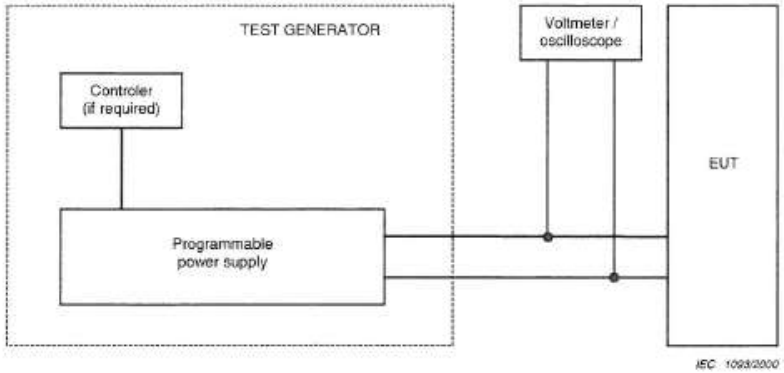


Figure A.2 – Example of test generator based on a programmable power supply

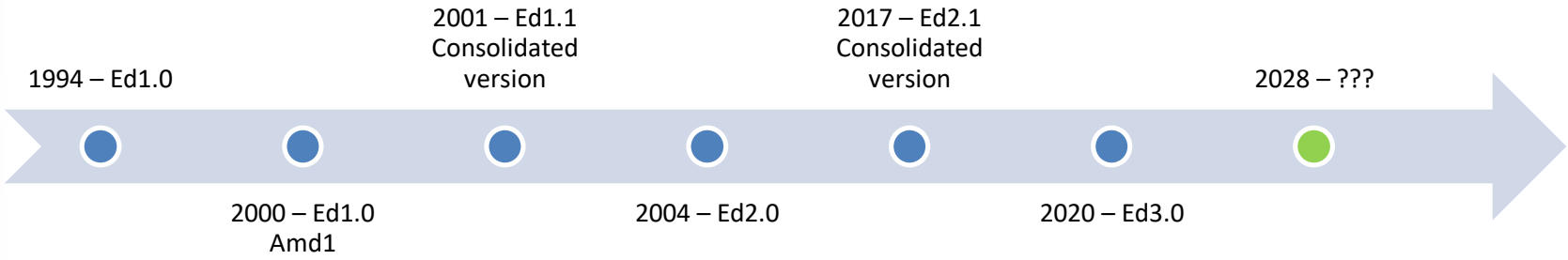
Novità

- Probabili novità:
  - Necessità di descrivere l'ambiente di alimentazione DC (stazione di carica, batteria, fotovoltaico, idrogeno…) e quindi definizione del sistema completo di alimentazione (non più solo esterna)
  - Prova a tensione minima del range
  - Un componente non fornito con AC/DC converter, deve essere provato con alimentazione DC fornita dal laboratorio

Novità

- Probabili novità:
  - Riferimento a IEC SRD 63317 Ed.1: LVDC industry applications
  - La rete è limitata ad un immobile
    - Uno o più convertitori da rete o alimentatore
    - Una o più sorgenti (e.g. fotovoltaico)
    - La rete può contenere batterie di buffer

Timeline -4-11



Campo di applicazione

- Requisiti di immunità e metodi di prova per componenti elettronici soggetti a buchi e cadute di tensione su rete LV a 50 Hz o 60 Hz e con correnti inferiori a 16 A per fase
- Non si applica a reti a 400 Hz

Definizioni

- 3.2 – Voltage dip
  - Sudden reduction of the voltage of a particular point of an electricity supply system below a specific dip threshold follwed by its recovery after a brief interval
  - Typically associated with the occurrence and termination of a short circuit.
  - Two dimensional E/M disturbance determined by voltage and time

Definizioni

- 3.6 – Calibration
  - Method to prove that the measurement equipment is in compliance with its specifications
  - Note 1: for the purposes of this document, calibration is applied to the test generator

Definizioni

- 3.7 - Verification
  - Set of operations used to check the test equipment system (e.g. the generator and the interconnecting cables) to demonstrate that the test system is functioning within the specifications given in Clause 6
  - Note 1: the methods used for verification can be different from those used for calibration

Definizioni

- 3.7 - Verification
  - Note 2: the verification procedure of 6.1.3 is meant as a guide to ensure the correct operation of the test generator and other items making up the test set-up so that the intended waveform is delivered to the EUT

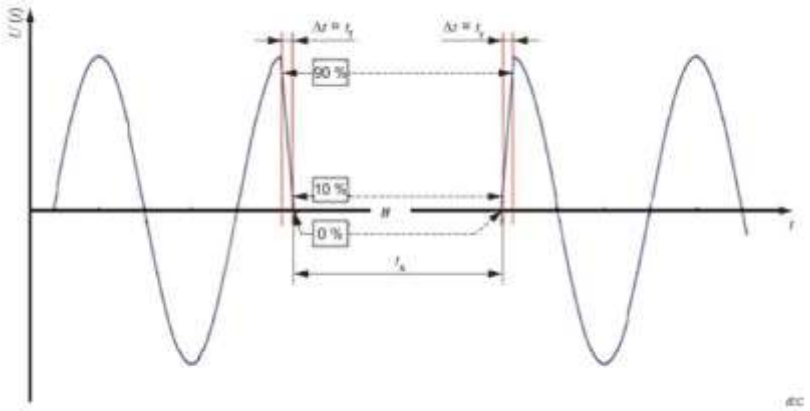
Il fenomeno

- Buchi ed interruzioni di rete pubbliche e non pubbliche dovuti a cambi improvvisi di carichi
- Variazioni di tensione di rete sono dovute a carichi variabili sulla rete

Livelli di prova

- Buchi:
  - 0 %: ½ ciclo e 1 ciclo
  - 40 %: 10 .. 12 cicli
  - 70 %: 25 .. 30 cicli
  - 80 %: 250 .. 300 cicli
- Variazioni di tensione:
  - 70 % per 1 ciclo e salita di 25 .. 30 cicli

Il fenomeno



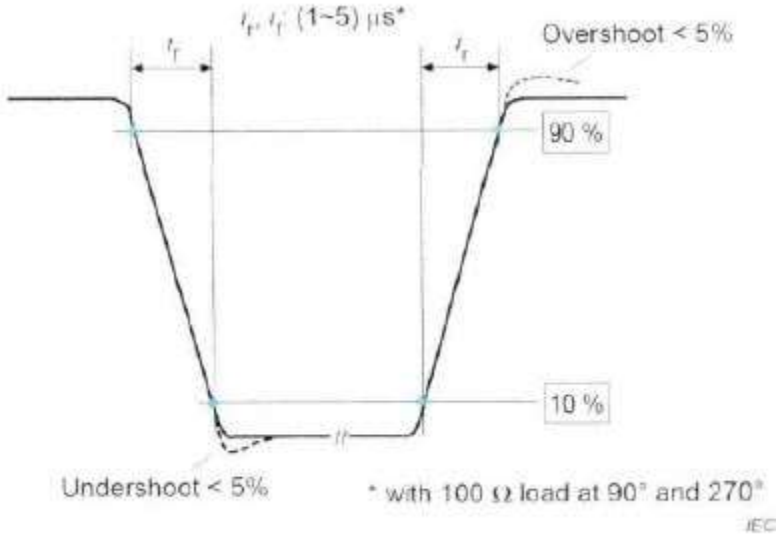


Figure 3 – Detailed view of rise and fall time

Caratteristiche

- 6.1.2 – Characteristics and performance of the generator
- Table 4 – Generator specifications

Caratteristiche Tab.4

- Voltage change < 5 % U_T
- Output current capability:
  - 100 % U_T, 16 A
  - 80 % U_T, 20 A, 5 s
  - 70 % U_T, 23 A, 3 s
  - 40 % U_T, 40 A, 3 s
- Peak under- and over-shoot during abrupt change over 100 Ω resistive load < 5 % U_T

Caratteristiche Tab.4

- Peak inrush current capability:
  - 200 V .. 240 V: 500 A
    250 V .. 600 V: 1000 A
- Voltage rise- and fall-time during abrupt change over 100 Ω resistive load between 1 μs and 5 μs

Calibration

- Inrush current: a 90 ° e 270 °
- Rise- e fall-time:
  - Su carico da 100 Ω resistivi di adeguata potenza
  - A 90 ° e 270 °
  - Da 0 % a 100 %, da 100 % a 80 %, da 100 % a 70 %, da 100 % a 40 % e da 100 % a 0 %

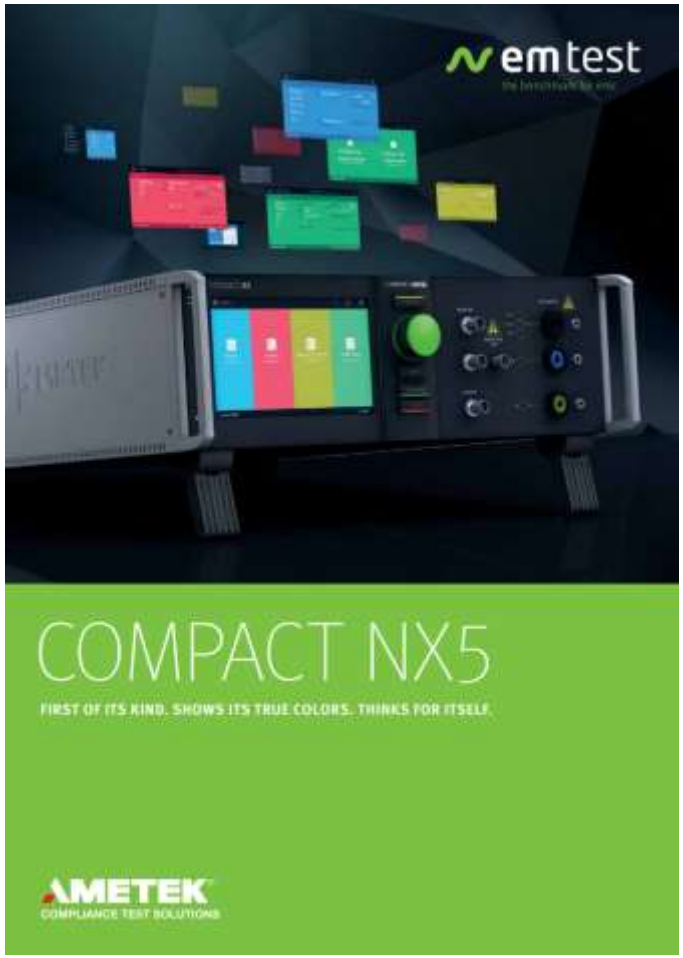
Definizioni

- 3.2 – Voltage dip
  - Sudden reduction of the voltage of a particular point of an electricity supply system below a specific dip threshold follwed by its recovery after a brief interval
  - Typically associated with the occurrence and termination of a short circuit.
  - Two dimensional E/M disturbance determined by voltage and time

Definizioni

- 3.6 – Calibration
  - Method to prove that the measurement equipment is in compliance with its specifications
  - Note 1: for the purposes of this document, calibration is applied to the test generator

Certificato di taratura SCS



Schweizerischer Kalibrierdienst
Service Suisse d'étalonnage
Servizio svizzero di taratura
Swiss Calibration Service

AMETEK
COMPLIANCE TEST SOLUTIONS

Accreditation No. SCS 0114 DIN EN ISO / IEC 17025

Calibration Laboratory accredited by the Swiss Accreditation Service
The Swiss Accreditation Service is one of the signatories to the EA - Multilateral Agreement for the recognition of calibration certificates

CERTIFICATE OF CALIBRATION

AMETEK CTS GmbH, Sternenhofstrasse 15, CH- 4153 Reinach, www.ametek-cts.com

Certificate No	SCS-P2408284632-SLO-CH316525-compactNX5tsp-1-300-16		CR001185C
Order No	SLO-CH316525		
Operator	A. Meier	Date of Calibration	26.02.2024
Customer	Volta S.p.A. Bolzano, Italy		
Object	compact NX Generator		
Type	compact NX5 tsp-1-300-16		
Serial No	P2408284632	Inventory No	---
Firmware Number	001521	Version	V 6.5.11
Manufacturer	AMETEK CTS	Brand	emtest
Remarks			

The instrument has been fully tested and calibrated. It complies with the following standards and with the manufacturer specification.

- IEC 61000-4-4 : Edition 3.0 – 2012 – 04
- IEC 61000-4-5 : Edition 3.1 – 2017 – 08
- IEC 61000-4-11 : Edition 3.0 – 2020 – 01
- IEC 61000-4-34 : Edition 1.0 – 2005 – 07 / Amd 1 – 2009
  -34 is only valid for equipment with EUT current >16 A
- IEC 61000-4-29 : Edition 1.0 – 2000 – 08

Calibration Results
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
The measurement uncertainty is not taken in account for determining compliance with the specifications.
Traceability
The calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages and are part of the certificate. The document CHAMB0001EVO and the type of equipment are used as base for the calibration procedure.
Calibration Intervals of the Calibrated Equipment
The equipment should be re-calibrated at appropriate intervals.
Calibration Intervals of the Measuring Equipment
According to our management system all used measuring equipment is calibrated in cycles of two years.
Copies of the Certificate
This calibration certificate shall not be reproduced except in full, without written approval of the laboratory management.
Certificates are not valid without signature of the laboratory management.

Date of Issue Management of the Laboratory E.Engin ppa. S.Schäuble

26.02.2024

Certificato di taratura SCS

Certificate No: SCS-P2408284632-SLO-CH316525-compactNXSbsp-1-300-16

AMETEK

Ambient Environment

Temperature	23 °C ± 4 °C
Humidity	20 % - 65 %

Calibration test setup

Used Measuring Equipment

Type	Model	Serial No	Manufacturer	Cal Date	Cal No	Cal By	Traceable To
Oscilloscope			LeCroy				
Differential Voltage Probe			AMETEK CTS				
Voltage Probe			LeCroy				
Attenuator PWF 50			AMETEK CTS				
Attenuator PWF 1000			AMETEK CTS				
Adapter PWF Fix 3HV (m) to mem. banana			AMETEK CTS				
Current Probe 0.1mA			Pearson Electronics				
Current Probe 0.01mA			Pearson Electronics				
DMM 6.5 Digit			Keithley				
Adjustable Load			Fluke				
Inrush Current Network 1700uF Resistor 150R			AMETEK CTS				

Measuring Uncertainties

Phenomenon	Parameter	Short	MU
Surge	Peak Voltage	V	4.39 %
Surge	Rise time	tr	365 µs
Surge	Duration	td	4791 µs
Surge	Frequency Oscilloscope	f	1.052 %
Power Fail	Phase		1.78 °
Power Fail	voltage AC 1mV-750V/1MHz	V	1.187 %
Power Fail	Current AC	I	0.93 %
Power Fail	Inrush Current		4.06 %
Power Fail	Rise / Fall time	tr / tf	17.85 ns
Power Fail	Duration	td	48640 µs
Surge Current	Peak Current	I	4.40 %
Surge Current	Front & Rise time	% / t	3/2440 µs
Surge Current	Duration	/ td	1/26320 µs
Surge Frequency	Frequency Oscilloscope	f	0.502 %
Surge Voltage	Peak Voltage	V	0.83 %
Surge Voltage	Front & Rise time	% / tr	1/1038 µs
Surge Voltage	Duration	/ td	1/40000 µs

		Factor for coupling from line to ground is 1.5/1.
Power fail		
Rise time	tr	Measured from 10 % to 90 %
Fall time	tf	Measured from 90 % to 10 %
Pulse duration	td	Measured from 50 % to 50 %
Time parameters		Some parameters of the Power Fail Module are influenced by the impedance of the mains supply. See the remarks under the tables.
Max mains voltage	UT	Independent of the max EUT voltage of the generator, all measurements are taken at UTmax 230 V, which is defined in IEC 61000-4-11. The power fail module of the generator can be used up to the max specified EUT voltage, but there is no specification in IEC 61000-4-11 for EUT mains voltages >230 V.
IEC 61000-4-29		This certificate shows no measuring results for IEC 61000-4-29 because all time parameters are measured with faster rise- and fall time for IEC 61000-4-11.
IEC 61000-4-34		This certificate shows no measuring results for IEC 61000-4-34 because IEC 61000-4-11 and IEC 61000-4-34 do not differ with regard to the rise and fall time in the current range up to 50 A.
General		

Certificato di taratura SCS

AMETEK

Specification Power Fail

Power Fail — According to IEC 61000-4-11

Parameters	Mode	Nominal Value	Tolerance
Power Fail at 230 V	ΔV	Short Interruption	± 5 %
Power Fail 40 / 70 / 80 %	ΔV	Voltage Dip	± 5 %
Over Current Protection		> 500 A measured with pulse 8/20 µs	---
Inrush Current		> 500 A measured on 1700 µF	---
Voltage Variation	80 %	230 V to 184 V	---
Voltage Variation	70 %	230 V to 161 V	---
Voltage Variation	40 %	230 V to 92 V	---
Voltage Variation	0 %	230 V to 0 V	---
Rise Time	ΔV	1 µs - 5 µs on 100 Ω non inductive load	---
Fall Time	ΔV	1 µs - 5 µs on 100 Ω non inductive load	---
Under / Overshoot	L-N	At 354 V Peak (250 V RMS)	± 5 %
Phase angle		PF1 / PF2 / ΔV	± 10°

AMETEK

Verification Power Fail

Power Fail Calibration — According to IEC 61000-4-11

Parameters	Mode	Nominal Value	Passed
Power Fail at 230 V	ΔV	Short Interruption	✓
Power Fail 40 / 70 / 80 %	ΔV	Voltage Dip	✓
Voltage Measuring	RMS	230 V → Value of LCD	230 V
Current Measuring	DC	10 A → Value of LCD	10.2 A
Trigger Output	PFS	Functional Test	✓
Over Current Protection		> 500 A measured with pulse 8/20 µs	890 A
Voltage Variation	80 %	230 V to 184 V	✓
Voltage Variation	70 %	230 V to 161 V	✓
Voltage Variation	40 %	230 V to 92 V	✓
Voltage Variation	0 %	230 V to 0 V	✓

PFS, DC Control Voltage for external Motorvariac

Level (%)	Voltage Setting (V)	DC Control Voltage Output (Nom) (V)	DC Control Voltage Output (V)
100	230	9.20	9.20
80	184	7.36	7.36
70	161	6.44	6.43
40	92	3.68	3.68
0	0	0.00	0.19

Remark: The control voltage depends on generator setting "Umax" for the external voltage source. For calibration the generator setting of Umax is set to 200 V.

PFS, Voltage Drop, PF1, PF2, 230 V — Loaded

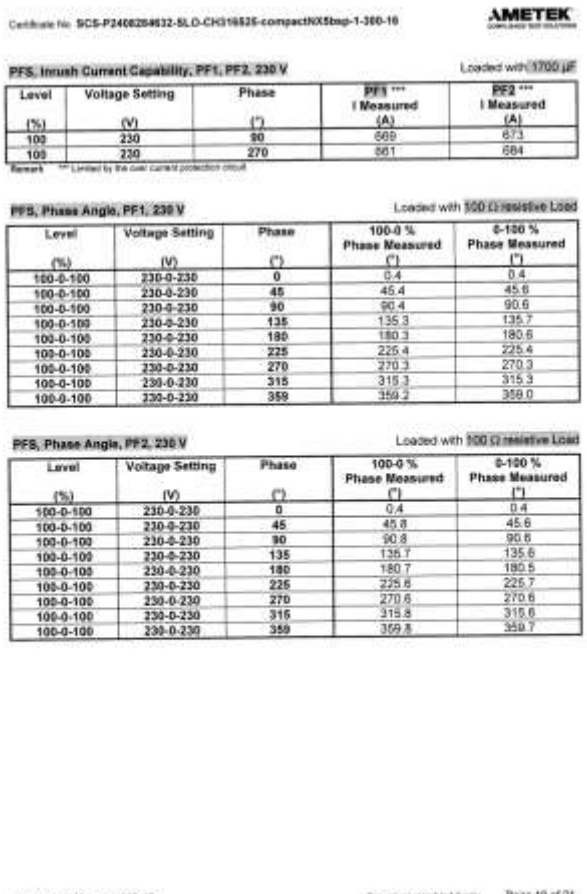
Level (%)	Voltage Setting (V)	Load Current adjusted to (A)	PF1 ΔV Measured (V)	PF2 ΔV Measured (V)
100	230	16	3.81	3.80
80	184	20	3.81	3.78
70	161	23	3.94	3.92
40	92	40	4.71	4.67

PFS, Output Current Capability, PF1, PF2, 230 V — Loaded

Level (%)	Voltage Setting (V)	Load Current adjusted to (A)	Time (s)	PF1 *** Output Capability (passed)	PF2 *** Output Capability (passed)
100	230	16	10	ok	ok
80	184	20	5	ok	ok
70	161	23	3	ok	ok
40	92	40	3	ok	ok

Remark: *** "passed" means that the switch is capable to run the "load current" during the defined "time"

Certificato di taratura SCS



Certificate No: SCS-P2408284632-SLO-CH316525-compactNX5bep-1-300-16 AMETEK

PFS, Inrush Current Capability, PF1, PF2, 230 V — Loaded with 1700 µF

Level (%)	Voltage Setting (V)	Phase (°)	PF1 *** I Measured (A)	PF2 *** I Measured (A)
100	230	90	669	673
100	230	270	661	684

Remark: *** Limited by the over current protection circuit

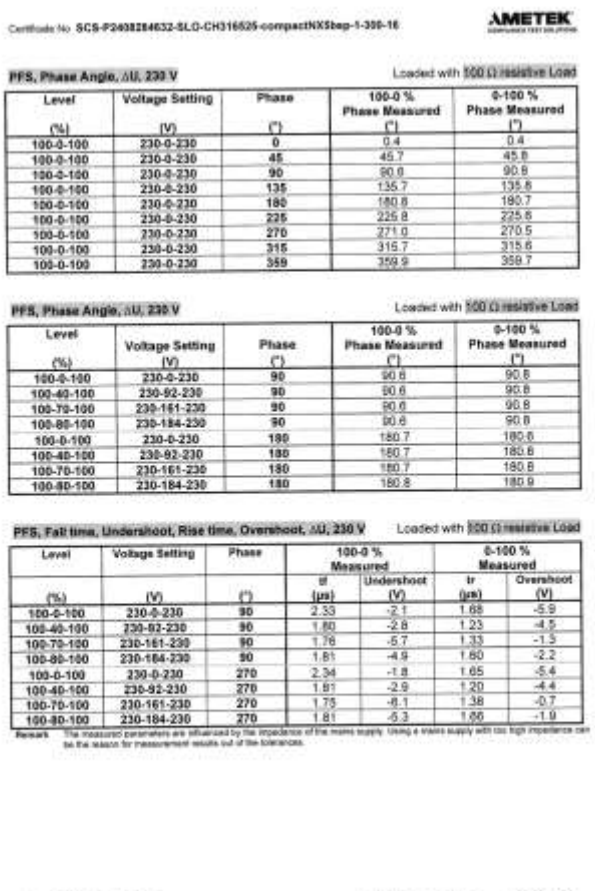
PFS, Phase Angle, PF1, 230 V — Loaded with 100 Ω resistive Load

Level (%)	Voltage Setting (V)	Phase (°)	100-0 % Phase Measured (°)	0-100 % Phase Measured (°)
100-0-100	230-0-230	0	0.4	0.4
100-0-100	230-0-230	45	45.4	45.6
100-0-100	230-0-230	90	90.4	90.6
100-0-100	230-0-230	135	135.3	135.7
100-0-100	230-0-230	180	180.3	180.6
100-0-100	230-0-230	225	225.4	225.4
100-0-100	230-0-230	270	270.3	270.3
100-0-100	230-0-230	315	315.3	315.3
100-0-100	230-0-230	359	359.2	359.0

PFS, Phase Angle, PF2, 230 V — Loaded with 100 Ω resistive Load

Level (%)	Voltage Setting (V)	Phase (°)	100-0 % Phase Measured (°)	0-100 % Phase Measured (°)
100-0-100	230-0-230	0	0.4	0.4
100-0-100	230-0-230	45	45.8	45.6
100-0-100	230-0-230	90	90.8	90.6
100-0-100	230-0-230	135	135.7	135.6
100-0-100	230-0-230	180	180.7	180.5
100-0-100	230-0-230	225	225.6	225.7
100-0-100	230-0-230	270	270.6	270.6
100-0-100	230-0-230	315	315.8	315.6
100-0-100	230-0-230	359	359.8	359.7

compact NX5 bep-1-300-16 — Reproduce report in full only — Page 19 of 21



Certificate No: SCS-P2408284632-SLO-CH316525-compactNX5bep-1-300-16 AMETEK

PFS, Phase Angle, ΔU, 230 V — Loaded with 100 Ω resistive Load

Level (%)	Voltage Setting (V)	Phase (°)	100-0 % Phase Measured (°)	0-100 % Phase Measured (°)
100-0-100	230-0-230	0	0.4	0.4
100-0-100	230-0-230	45	45.7	45.8
100-0-100	230-0-230	90	90.8	90.8
100-0-100	230-0-230	135	135.7	135.8
100-0-100	230-0-230	180	180.8	180.7
100-0-100	230-0-230	225	225.8	225.8
100-0-100	230-0-230	270	271.0	270.5
100-0-100	230-0-230	315	315.7	315.6
100-0-100	230-0-230	359	359.9	359.7

PFS, Phase Angle, ΔU, 230 V — Loaded with 100 Ω resistive Load

Level (%)	Voltage Setting (V)	Phase (°)	100-0 % Phase Measured (°)	0-100 % Phase Measured (°)
100-0-100	230-0-230	90	90.8	90.8
100-40-100	230-92-230	90	90.8	90.8
100-70-100	230-161-230	90	90.8	90.8
100-80-100	230-184-230	90	90.8	90.8
100-0-100	230-0-230	180	180.7	180.6
100-40-100	230-92-230	180	180.7	180.8
100-70-100	230-161-230	180	180.7	180.8
100-80-100	230-184-230	180	180.8	180.9

PFS, Fall time, Undershoot, Rise time, Overshoot, ΔU, 230 V — Loaded with 100 Ω resistive Load

Level (%)	Voltage Setting (V)	Phase (°)	100-0 % Measured tf (µs)	100-0 % Measured Undershoot (V)	0-100 % Measured tr (µs)	0-100 % Measured Overshoot (V)
100-0-100	230-0-230	90	2.33	-2.1	1.68	-5.9
100-40-100	230-92-230	90	1.80	-2.8	1.23	-4.5
100-70-100	230-161-230	90	1.76	-5.7	1.33	-1.5
100-80-100	230-184-230	90	1.81	-4.9	1.60	-2.2
100-0-100	230-0-230	270	2.34	-1.8	1.65	-5.4
100-40-100	230-92-230	270	1.91	-2.9	1.20	-4.4
100-70-100	230-161-230	270	1.75	-6.1	1.38	-0.7
100-80-100	230-184-230	270	1.81	-5.3	1.66	-1.9

Remark: The measured parameters are influenced by the impedance of the mains supply. Using a mains supply with too high impedance can be the reason for measurement results out of the tolerances.

compact NX5 bep-1-300-16 — Reproduce report in full only — Page 20 of 21

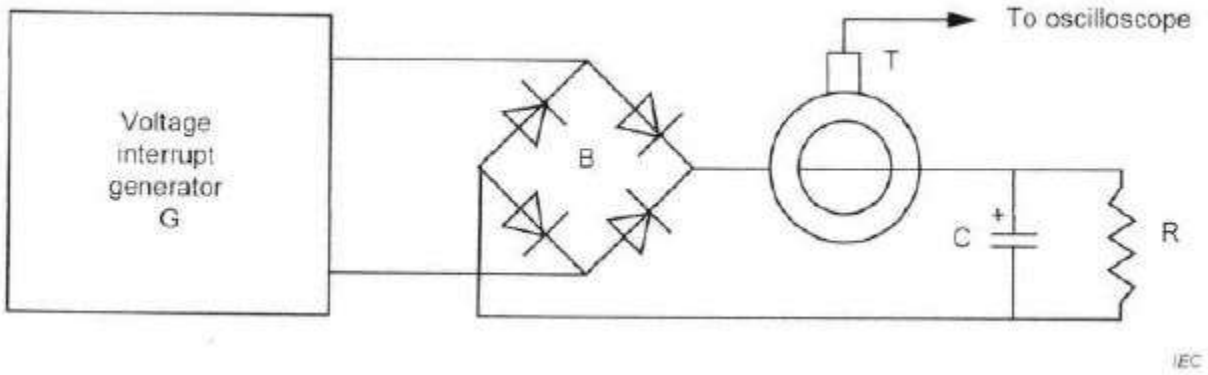
Power source

- 6.2 Power source
  - The frequency of the test voltage shall be within ±2 % of rated frequency

Annex A (normativo) Inrush current

- Misura di inrush current
  - Circuito come da Fig. A.1
  - Quattro misure di picco
    - Power off per 5 minuti, on a 90 ° - Peak
    - Power off per 5 minuti, on a 270 ° - Peak
    - Power on per almeno 1 minuto, off per 5 minuti, on a 90 ° - Peak
    - Power on per almeno 1 minuto, off per 5 minuti, on a 270 ° - Peak

Annex A (normativo)
Inrush current



Components

G voltage interrupt generator, switched on at 90° and 270°

T current probe, with monitoring output to oscilloscope

B rectifier bridge

R bleeder resistor, not over 10 000 Ω or less than 100 Ω

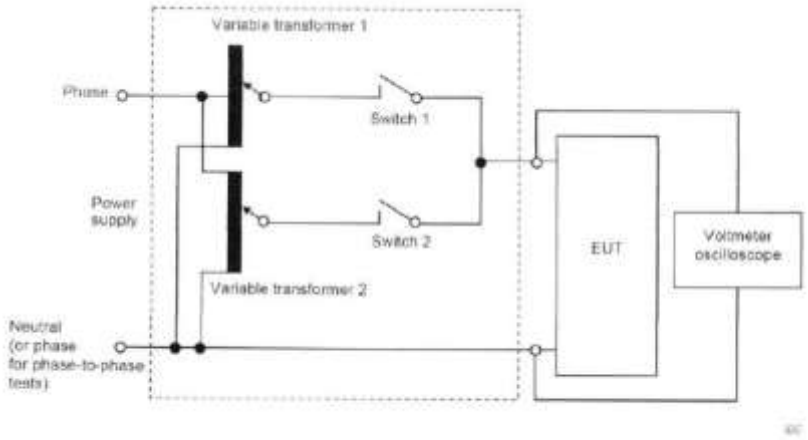
C 1 700 µF ± 20 % electrolytic capacitor

Figure A.1 – Circuit for determining the inrush current drive capability of the short interruptions generator

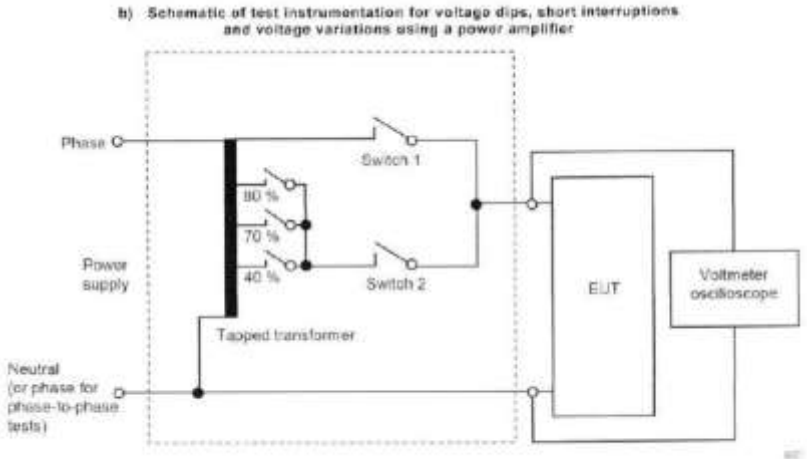
Annex A (normativo) Inrush current

- Per potere svolgere la prova con un generatore con inrush current non adeguata su uno specifico EUT, la corrente di inrush misurata dell'EUT deve essere inferiore al 70 % della corrente di inrush misurata massima del generatore

Annex C (informativo) Strumentazione



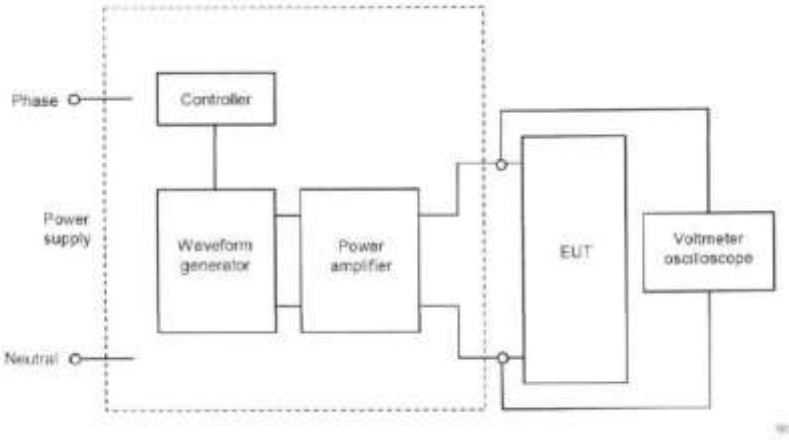
a) Schematic of test instrumentation for voltage dips, short interruptions and voltage variations using variable transformers and switches



b) Schematic of test instrumentation for voltage dips, short interruptions and voltage variations using a power amplifier

c) Schematic of test instrumentation for voltage dips, short interruptions and voltage variations using a tapped transformer and switches

Annex C (informativo) Strumentazione



b) Schematic of test instrumentation for voltage dips, short interruptions and voltage variations using a power amplifier

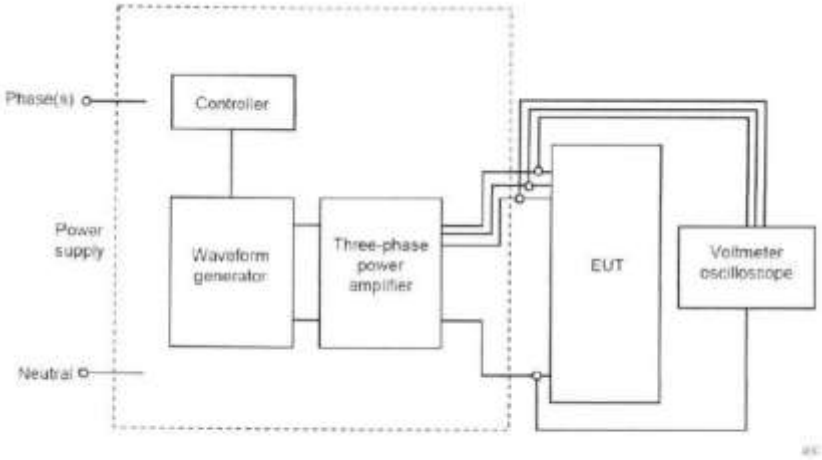


Figure C.2 – Schematic of test instrumentation for three-phase voltage dips, short interruptions and voltage variations using a power amplifier

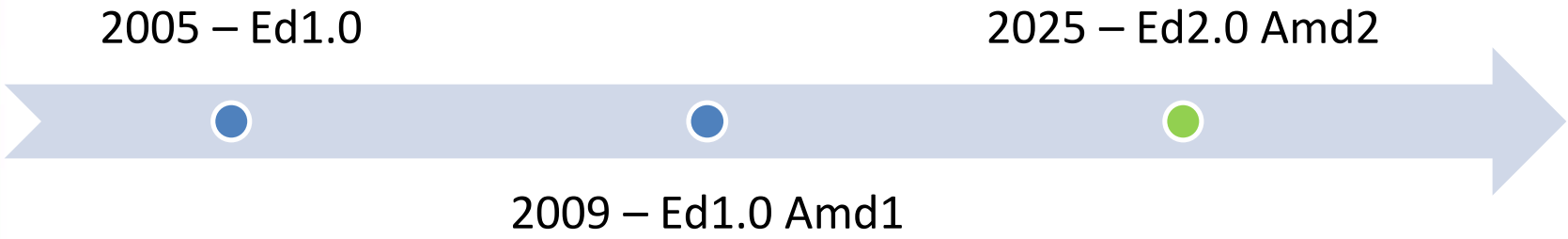
Annex D (informativo) Rationale

- Rise- e fall-time nella realtà possono avvicinarsi a durate del μs
- La verifica deve essere svolta su carico resistivo da 100 Ohm
- Per pre-compliace, si può valutare un rise- e fall-time inferiore a 200 μs
- Per full compliance, si applica Tab.4

Annex D (informativo) Rationale

- Inrush current è implicita in un buco ed è necessario tollerarla e che il generatore non la limiti
- Un corto reale su rete pubblica su impedenza di 796 μH (IEC TR 60725) avrà una inrush di 15 A a 20 A ma, nelle vicinanze, si avvicina a quanto da Tab. 4

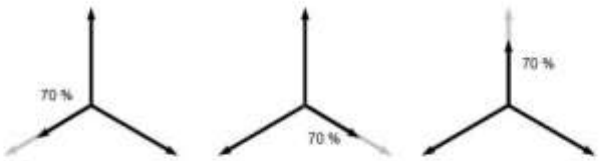
Timeline -4-34



Campo di applicazione

- Requisiti di immunità e metodi di prova per componenti elettronici soggetti a buchi e cadute di tensione su rete LV a 50 Hz o 60 Hz e con correnti superiori a 16 A per fase
- Non esiste limite superiore
- Non si applica a reti a 400 Hz

Criteri di accettabilità



NOTE Phase-to-neutral testing on three-phase systems is performed one phase at a time.

Figure 3a – Phase-to-neutral testing on three-phase systems

NOTE Phase-to-phase testing on three-phase systems is also performed one phase at a time

Figure 3b – Phase-to-phase testing on three-phase systems – Acceptable Method 1 phase shift

Criteri di accettabilità

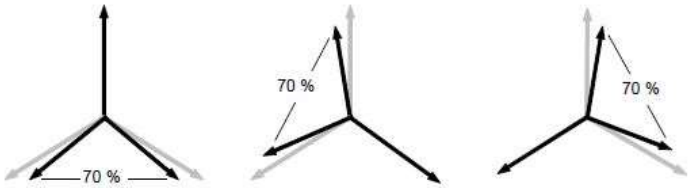


Figure 3c – Phase-to-phase testing on three-phase systems – Acceptable Method 2 phase shift

Figure 3d – Not acceptable – phase-to-phase testing without phase shift

Figure 3 – Testing on three-phase systems

Annex C (informativo) Vettori per prove trifase

- In Annex vengono specificati gli angoli necessari per potere ottenere il tipo di buco richiesto.

Table C.1 – Vector values for phase-to-neutral dips

	$U_{L1\text{-}L2}$	$U_{L2\text{-}L3}$	$U_{L3\text{-}L1}$	$U_{L1\text{-}N}$	$U_{L2\text{-}N}$	$U_{L3\text{-}N}$
100 % (no dip)	100 % 150°	100 % 270°	100 % 30°	100 % 0°	100 % 120°	100 % 240°
80 % dip L1-N	90 % 146°	100 % 270°	90 % 34°	80 % 0°	100 % 120°	100 % 240°
80 % dip L2-N	90 % 154°	90 % 266°	100 % 30°	100 % 0°	80 % 120°	100 % 240°
80 % dip L3-N	100 % 150°	90 % 274°	90 % 26°	100 % 0°	100 % 120°	80 % 240°
70 % dip L1-N	85 % 144°	100 % 270°	85 % 36°	70 % 0°	100 % 120°	100 % 240°
70 % dip L2-N	85 % 156°	85 % 264°	100 % 30°	100 % 0°	70 % 120°	100 % 240°
70 % dip L3-N	100 % 150°	85 % 276°	85 % 24°	100 % 0°	100 % 120°	70 % 240°
40 % dip L1-N	72 % 136°	100 % 270°	72 % 44°	40 % 0°	100 % 120°	100 % 240°
40 % dip L2-N	72 % 164°	72 % 256°	100 % 30°	100 % 0°	40 % 120°	100 % 240°
40 % dip L3-N	100 % 150°	72 % 284°	72 % 16°	100 % 0°	100 % 120°	40 % 240°

NOTE "100 %" represents the voltage when no dip is present. For phase-to-phase voltages, this value will be higher than the 100 % phase-to-neutral value by a factor of $\sqrt{3}$.

Annex D (informativo) Strumentazione

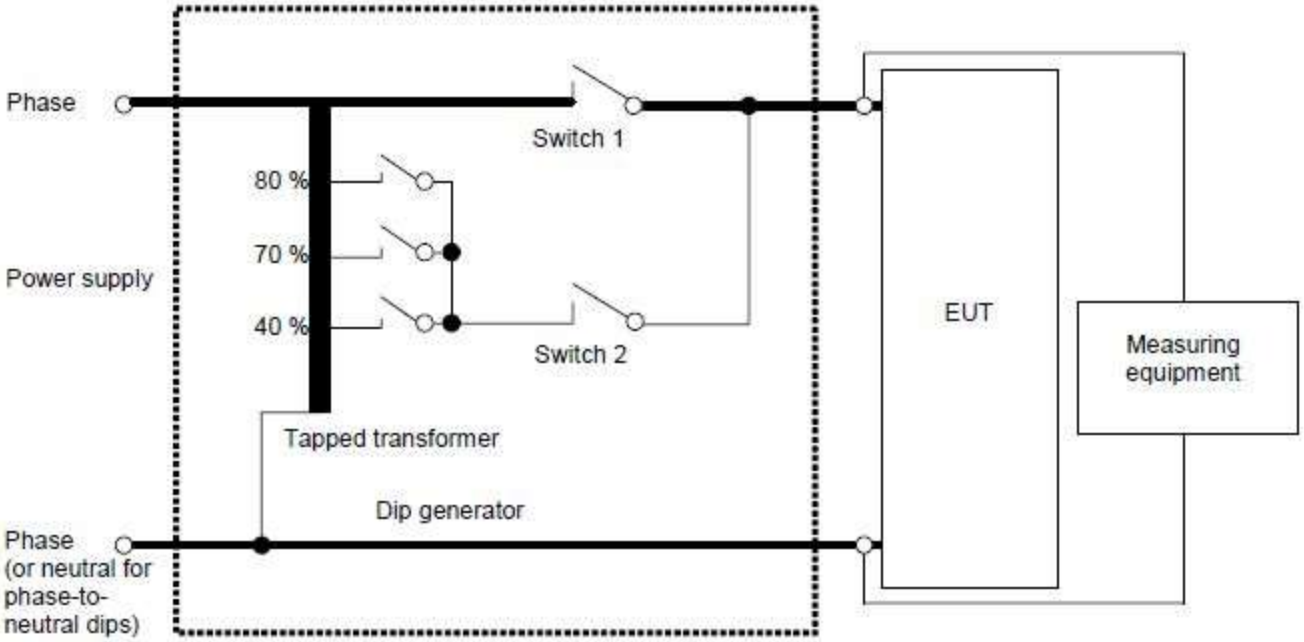
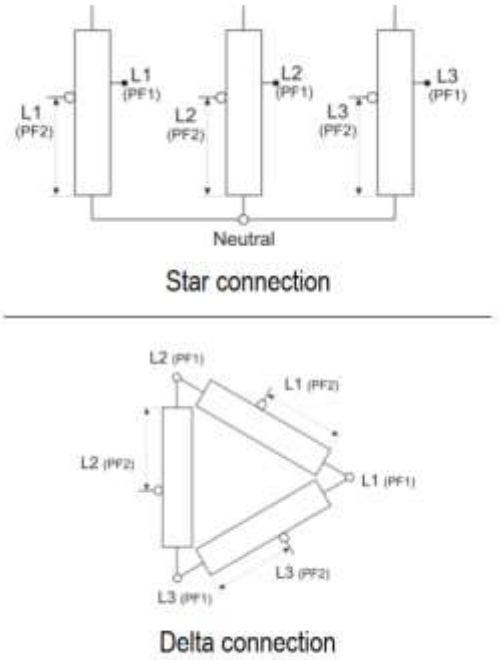


Figure D.1 – Schematic of example test instrumentation for voltage dips and short interruptions using tapped transformer and switches

Buchi trifase conformi

- Lo strumento **PFS 503N**, usato con il motor variac **MV 3P 40xx DS** (trifase, 400 V, con corrente massima xx) è la soluzione conforme per ottenere lo sfasamento richiesto dalla norma.



Annex D (informativo) Strumentazione

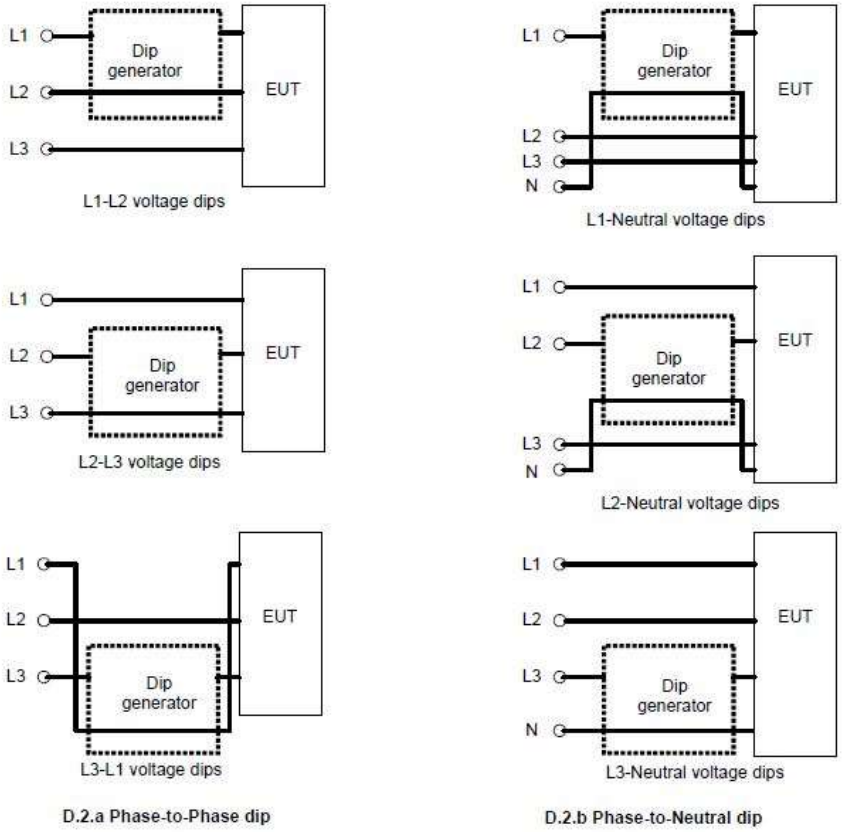


Figure D.2 – Applying the example test instrumentation of Figure D.1 to create the Acceptable Method 1 vectors of Figures C.1, C.2, 3b and 3c

Annex D (informativo) Strumentazione

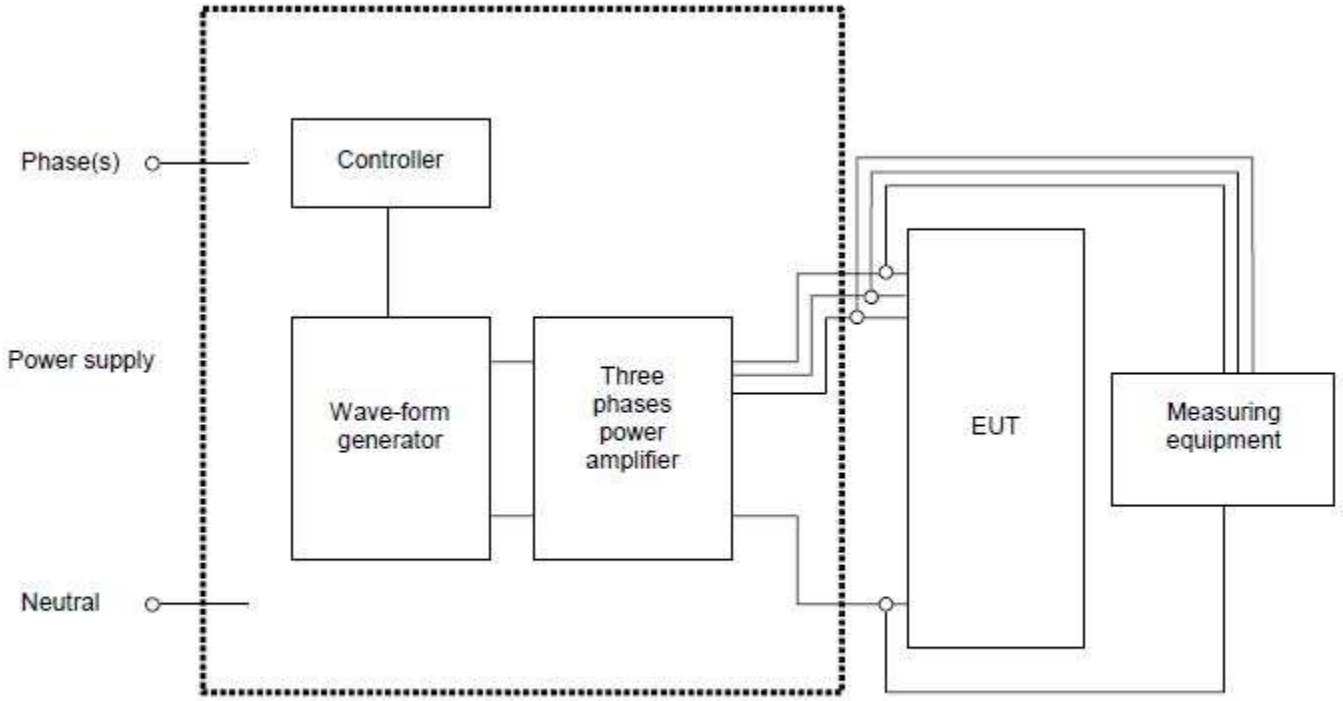


Figure D.3 – Schematic of example test instrumentation for three-phase voltage dips, short interruptions and voltage variations using power amplifier

Novità

- Probabili novità:
- Annex informativo che riprende ISH1 di IEC 61000-4-11 del 2010
  - Tab. 4 non si applica a prova su EUT ma definisce la struttura del generatore di buchi
  - Non ci sono specifiche di rise- e fall-time quando si prova EUT
  - Tab. 4 si applica su carico resistivo

Alessandro Corniani
aco@volta.it

VOLTA S.p.A.
Competenza ed entusiasmo per soluzioni tecniche
Bolzano · Bozen
www.volta.it