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LAB N° 0192

CEI 0-21

Fascicolo prove

/ Tests report file

Rapporto di prova n° CEI0-21 01 25304-130115 */Test report No.*

Prodotto in prova */Product under test*	Inverter eolico */Wind inverter*
Costruttore */Manufacturer*	Shangai Ghrepower Green Energy Co., Ltd No. 1281 Ronghua Road Shangai 201611 - China
Tipo - Modello */Type - Model*	GNW60K3G

EMC, Electrical Safety and Renewable Energies Testing Laboratory
Accredited by ACCREDIA
In compliance with UNI CEI EN ISO/IEC 17025
Accreditation number: 0192

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Laboratorio di prova */Testing laboratory*	Eurotest Laboratori Srl Via Marconi, 23 – 35020 BRUGINE (PD) ITALY
Cliente */Customer*	Shangai Ghrepower Green Energy Co., Ltd No. 1281 Ronghua Road Shangai 201611 - China
Conferma d'ordine n° */Order confirmation no.*	25304-130115
Data conferma d'ordine */Order confirmation date*	28/03/2013
Data ricevimento campioni */Date of receipt of test item(s)*	10/05/2013
Periodo esecuzione prove */Testing period*	16/05/13 - 21/06/2013

Il presente rapporto di prova si riferisce esclusivamente al campione sottoposto a prova.

E' vietata ogni riproduzione parziale del Rapporto di Prova senza autorizzazione di Eurotest Laboratori Srl.

/The test results contained in this test report relate to the tested samples only.

It is forbidden to partially reproduce the test report without Eurotest Laboratory Srl authorization.

Norme di riferimento */Reference standards*	**Prove su specifica CEI 0-21** */Tests based on CEI 0-21 Standard*	

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.

The standard refers to the following standards:

CEI EN 60068-2-2:2008-11
Prove ambientali
Parte 2-2: Prove - Prova B: Caldo secco
/Environmental testing - Part 2-2: Tests - Test B: Dry heat

CEI EN 60068-2-78:2002:03
Prove ambientali
Parte 2-78: Prove - Prova Cab: Caldo umido, regime stazionario
/Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state

CEI EN 60068-2-1:2007:11
Prove ambientali
Parte 2-1: Prove - Prova A: Freddo
/Environmental testing - Part 2-1: Tests - Test A: Cold

CEI EN 60068-2-14:2010
Prove ambientali
Parte 2-14: Prove - Prova N: Cambio di temperatura
/Environmental testing - Part 2-14: Tests - Test N: Change of temperature

CEI EN 60255-5:2001-11

Parte 5: Coordinamento dell'isolamento per i relè di misura e per i dispositivi di protezione

Prescrizioni e prove

/Electrical Relays - Part 5: Insulation coordination for measuring relays and protection equipment - Requirements and tests

CEI EN 61000-3-2:2007-04 + CEI EN 61000-3-2/A1/A2:2011-09

Compatibilità elettromagnetica (EMC)

Parte 3-2: Limiti - Limiti per le emissioni di corrente armonica (apparecchiature con corrente di ingresso <= 16 A per fase)

/Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)

CEI EN 61000-3-12:2012-11

Compatibilità elettromagnetica (EMC)

Parte 3-12: Limiti - Limiti per le correnti armoniche prodotte da apparecchiature collegate alla rete pubblica a bassa tensione aventi correnti di ingresso > 16 A e <= 75 A per fase

/Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase

CEI EN 61000-3-3:2009-09

Compatibilità elettromagnetica (EMC)

Parte 3-3: Limiti - Limitazione delle variazioni di tensioni, fluttuazioni di tensione e del flicker in sistemi di alimentazione in bassa tensione per apparecchiature con corrente nominale <= 16 A per fase e non soggette ad allacciamento su condizione

/Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection

CEI EN 61000-3-11:2001-08

Compatibilità elettromagnetica (EMC)

Parte 3-11: Limiti

Limitazione delle variazioni di tensione, delle fluttuazioni di tensione e del flicker in sistemi di alimentazione pubblici a bassa tensione - Apparecchiature con correnti nominali < 75 A e soggetti ad allacciamento su condizione

/Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection

Le prove sono state richieste dal cliente.

/Tests have been required by applicant.

Campione verificato */Equipment under test (EUT)*	Campione 01 Rev.02 */sample 01 Rev.02*
Modello */Type*	GNW60K3G
N° di serie o Codice d'identificazione */Serial no. or Identification code*	GNW60K3G130002
Costruttore */Manufacturer*	Shangai Ghrepower Green Energy Co., Ltd No. 1281 Ronghua Road Shangai 201611 - China
Rappresentante del cliente durante le prove */Applicant's representative during tests*	Ing. Yusheng Ye
Luogo di prova */Test site*	**EUROTEST Laboratori Srl**
Risultato globale delle prove eseguite ***/Overall performed tests results***	**SUPERATE */Nota Generale** ***/PASS */General Remark***

Operatore */Technician*	*Digitally signed by* Alberto Crocco

Resp. Tecnico del Laboratorio */Technical Laboratory Manager*	*Digitally signed by* Filippo Roveggio

Brugine, 19/0/2013

Note */Remarks*
*Nota Generale: Il risultato globale dei test si riferisce alle sole prove eseguite. */General Remark: Overall test result refers only to performed tests.*

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1 E.U.T.: condizioni operative e set up di prova

/E.U.T. configuration and test conditions

Type of system: WT inverter	Manufacturer's data
System manufacturer: Shangai Ghrepower Green Energy Co., Ltd No. 1281 Ronghua Road Shangai 201611 - China	Type of system: WT
	Active Power: 60kW
	Rated Voltage: 400 V

TIPOLOGIA APPARATO		
DISPOSITIVO DI INTERFACCIA	PROTEZIONE DI INTERFACCIA	DISPOSITIVO DI CONVERSIONE STATICA
---	---	X

Campione 01 Rev.02 (Si veda test report EMC01 25304-130115)

/sample 01 Rev.02 (See test report EMC01 25304-130115)

Descrizione */Description*: Inverter eolico
/wind inverter

Costruttore */Manufacturer*: Shangai Ghrepower Green Energy Co., Ltd No. 1281
Ronghua Road Shangai 201611 - China

Modello */Model*: GNW60K3G

N°serie */Serial no.*: GNW60K3G130002

Ingresso PV /*Input PV voltage*: Max 680 VDC;
Range MPPT 380 - 680 VDC;

Connesione rete */Grid connection*: 400 Vac; 87 A; 50 Hz

Potenza nominale */Nominal power output*: 60000 W

Versione software */Release Software*: 1d05

Caratteristiche costruttive: */Construction characteristics:*

L'inverter è del tipo con trasformatore di isolamento interno.

/The inverter is with internal insulation transformer

Elenco componenti critici

/List of critical components

Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
Heat Shrinkable Tube	SHENZHEN Wore HEAT-SHRINKABLE MATERIAL CO. LTD.	RSFR-H (UL E203950)	600V, 125℃. VW-1.	IEC/EN 62109
Sleeving	SUZHOU BESTQ ELECTRIC CO LTD	SGS (UL E353872)	VW-1 whiter color	IEC/EN 62109
Enclosure	Shang hai Xiang ming	ZY9.043.124CG Cold-rolled steel SPCC	sheet metal, Min. thickness: 2mm; total size:600*800*1600mm cover: 350*530*52mm, bottom: 350*500*105mm; terminal box, cover: 345*195*52mm; bottom: 345*48*52mm	IEC/EN 62109
Heatsink	Shanghai WTL Heat Pipe technology Co., Ltd	ZY9.043.111CG	Aluminum,2400W, △T=30kMax Size=390mm(L)*325 mm(W)*238.6(H) mm	IEC/EN 62109
Auxiliary transformer (see photo of transformer2)	ShanghaiHexin Transformer Co.,Ltd.	ZY9.043.136CG	Input:AC400V Output 220Vac:200Vac, 260W-50Hz Installation size: 130mm(L)*96 mm(W), Φ5, Class F Basic insulation	IEC/EN 62109
mainTransformer (see photo of transformer1)	Powerel Enterprise Co.,Ltd.	ZY9.043.113CG	AC240Vac:400Vac, 60kVA-50Hz, 350mm*220mm(550 mm*590mm), Class H Basic insulation	IEC/EN 62109
Inductor	NingxiaYinli Electric Manufactory Co.,Ltd.	YL.DG-160-0.2	200uH-160A, Class H 190mm*240mm*280 mm;	IEC/EN 62109

Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
IGBT	INFINEON TECHNOLOGIES AG	FF300R12KT4	300A/1200V, Cr: 23mm, CTI>400, -40℃ to 125℃	IEC/EN 62109
Busbar capacitor	BHC Capacitance	ALS32A103Q7L450	10000uF/450V, 40000hrs, -40℃ to 85℃	IEC/EN 62109
Contactor1 AC out put	EATON INDUSTRIES GMBH	DILM115C	AC-3,500V,50Hz, 145A, -25℃ to 80℃, Insulated enclosures: CI43E-200	IEC 60947
Contactor 2 AC out put	EATON INDUSTRIES GMBH	DILM12-10	AC-3,500V,50Hz, 10A, -25℃to 80℃, IP20, Insulated enclosures: CI-K2-145-TS	IEC 60947
Output Circuit breaker	EATON INDUSTRIES GMBH	NZMB1	AC-3:690V/50Hz/60Hz 100A, -25℃ to 85℃, IP20	IEC 60947
Auxiliary power breaker	EATON INDUSTRIES GMBH	PL9-20C/2	AC-3:690V/50Hz/60Hz Ir=160A, 3 pole, -25℃ to 85℃ IP20	IEC/EN 62109
Arrester	Shenzhen Haipengxin Electronics Co.,Ltd.	M1L385-40II	Umax=385V(L-N)/255V(N-PE),In=20kA(L-N; N-PE), Imax=40kA(L-N; N-PE),94V-0,IP20, -40℃ to 70℃	IEC/EN 62109
Lamp	Shanghai Tianyi Electric Co., Ltd.	AD17-22/DC12VR	Vdc=12V,R=Red D=Φ20	EN60947-5-1
Lamp	Shanghai Tianyi Electric Co., Ltd.	AD17-22/DC12VG	Vdc=12V, G=Green D=Φ20	EN60947-5-1
Emergency stop button	Shanghai Tianyi Electric Co., Ltd.	LA42J-2/R	R=Red -25℃ to +60℃	EN60947-5-1
EMC Filter	Chang Zhou Duoji EMC Technical CO,.LTD	NF342B100/05	AC400 50/60HZ -25℃ to105℃, Rins>1500MΩ	IEC/EN 62109

Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
AC Fan	Sanju Electric Machinery Co.,Ltd.	SJ1238HA2BAL/T (UL E314698)	120*120*38mm, 240V/60Hz, UL94 V-0, Rins>100MΩ(500Vdc),-20℃ to 85℃,IP44	IEC/EN 62109
AC Fan	Sanju Electric Machinery Co.,Ltd.	SJ1751HA2BAL (UL E314698)	172*150*51mm,240V /60Hz, UL94 V-0, Rins>100MΩ(500Vdc),-20℃ to 85℃,IP44	IEC/EN 62109
Temperature switch	Changzhou Jinhe Electronic Co., Ltd.	KSD-6F (UL E325851)	50℃, NO, AC250V/15A, 1500V/1min, Rins>100MΩ	IEC/EN 62109
Temperature sensor	FELONG METERS	PT100	-50℃ to 200℃, 2500V/60s, Rins>100MΩ	IEC/EN 62109
Terminal	PHOENIX CONTACT GMBH & CO KG	UK6N (UL E192998)	-20°C to 85°C, 600V ,50A	IEC/EN 62109
Terminal	PHOENIX CONTACT GMBH & CO KG	UK35 (UL E192998)	-20°C to 85°C, 600V 150A	IEC/EN 62109
Terminal	PHOENIX CONTACT GMBH & CO KG	UK2.5 (UL E192998)	-20°C to 85°C, 600V 20A	IEC/EN 62109
PCB	KUNSHAN HUAXIN CIRCUIT BOARD CO LTD	HS-3 (UL E227809)	V-0, 130℃ 1.6 or 2mm	IEC/EN 62109
Capacitor (C67, C106,C107,C108, C109, C110)	ULTRA TECH XIPHI ENTERPRISE CO LTD	HQX2-4.7nF	4.7nF, 275VAC, -55°C to 85°C	IEC60384-14
Optocoupler (U40, U44, U46)	Avago Technologies Ltd	HCNR200 (UL E55361)	Viso:5000Vrms CL:9.6mm, CR:10.0mm, -55°C to 100°C	EN60747-5-2
Optocoupler (U31, U34)	Avago Technologies Ltd	6N137 (UL E55361)	Viso:5000Vrms CL:7.1mm, CR:7.4mm, -40to 85°C	EN60747-5-2

Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
Optocoupler (U29)	TOSHIBA CORP	TLP621-2	Viso:5000Vrms, CL:6.4mm, CR:6.4mm, -55°C to 100°C	VDE0884
Optocoupler (U15, U16, U17, U18, U19, U20, U21, U22, U23, U24, U25, U26, U27, U28, U30, U32)	SHARP	PC817 (UL E64380)	Viso:5000Vrms Cr/Cl >7.6MM -30°C to 100°C	VDE0884
Socket (JPA)	ASTRON ELECTRONICS CO LTD	PC104\1150020-035-R	2*10, UL94-V0, -55°C to 105°C;	IEC/EN 62109
Socket (JPA)	ASTRON ELECTRONICS CO LTD	PC104\1150040-035-R	2*20, UL94-V0, -55°C to 105°C;	IEC/EN 62109
Socket (JPB, JPC)	Nextron	R-230-010-026-X03	2*13,Gap=2.54mm, 500V, -44°C to 125°C	IEC/EN 62109
Terminal (JP5,JP8, JP9, JP10, JP12)	PHOENIX CONTACT GMBH & CO KG	MSTBV 2.5/4-GF-5.08, MVSTBW 2.5/4-STF-5.08 (UL E60425)	Gap=5.08mm, 300V, -20 to 85°C	IEC/EN 62109
Terminal (JP3)	PHOENIX CONTACT GMBH & CO KG	MSTBV 2.5/8-GF-5.08, MVSTBW 2.5/8-STF-5.08 (UL E60425)	Gap=5.08mm, 300V, -20 to 85°C	IEC/EN 62109
Terminal (JP2, JP4, JP6)	PHOENIX CONTACT GMBH & CO KG	MSTBV 2.5/10-GF-5.08, MVSTBW 2.5/10-STF-5.08 (UL E60425)	Gap=5.08mm, 300V, -20 to 85°C	IEC/EN 62109
Relay (JK1, JK2, JK3, JK4, JK5)	Good Sky Electric Co.,Ltd Goodsky	RW-SH-112D (UL E141060)	12V, 1000VAC, -30°C to 105°C	EN 60255-1-00 EN 60255-23
DSP (U1)	Texas Instruments Incorporated TI	TMS320LF2407APGEA	40MIPS, -40°C to 85°C, 64kB, 3.3V	IEC/EN 62109
SRAM (U2)	BDS Electronics inc.	CY7C1021CV33-12ZC	12ns, 231kb, -40°C to 85°C	IEC/EN 62109
CPLD (U3)	Altera International Limited	EPM240T100C5	Tpd 4.7ns Fcnt 304MHz 8192 bite 2.5V~3.3V, -40°C to 85°C	IEC/EN 62109

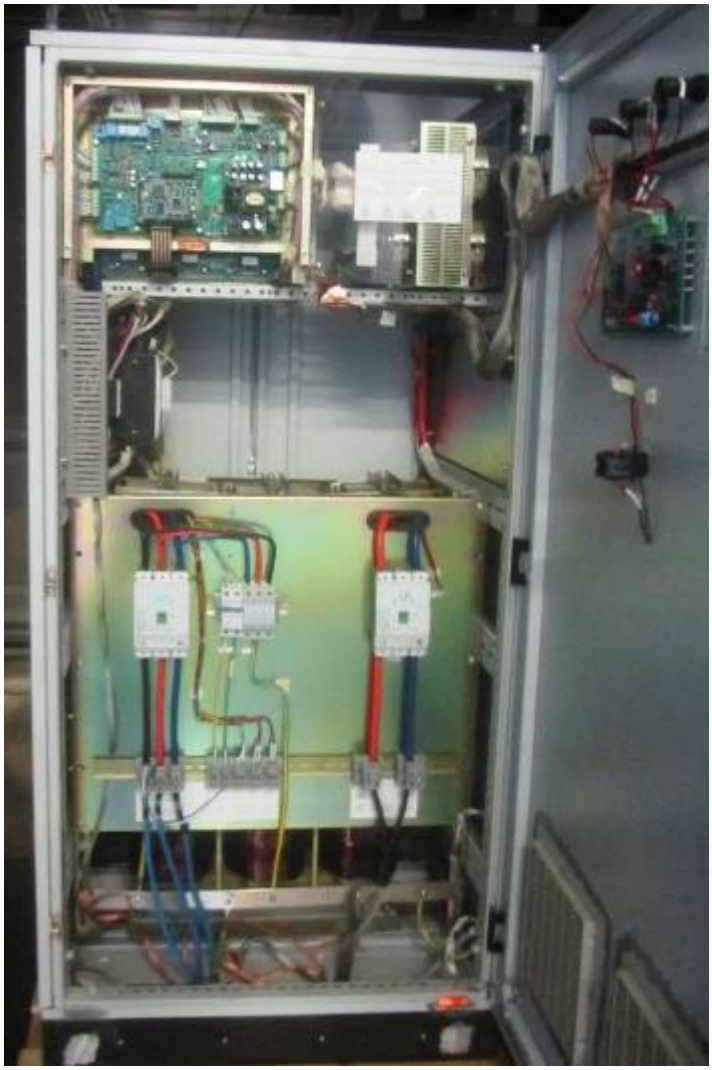
Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
Auxiliary transformer (TRS1) Transformer3(see photo of transformer3)	PINGHU HUANENG ELECTRONICS CO.LTD	EI40-GNW	EI40,40W,Viso2500V ac/1min,-40□~105□	IEC/EN 62109
Capacitor (C14, C24)	Ultra Tech Xiphi Enterprise Co.,Ltd (UTX□	HQX-4.7nF (UL E183780)	4.7nF, AC250V, -55°C to 105°C	IEC60384-14
MOSFET (M1)	IXYS Corporation (IXYS)	IXBH9N160G	Vces=1600V,Ic25=9 A,-55°C~150°C	IEC/EN 62109
Optocoupler (ISO1)	SHARP	PC817 (UL E64380)	Viso:5000Vrms Cr/Cl >7.6MM -30°C to 100°C	VDE0884
Optocoupler (U3, U4, U5)	SHARP	PC817 (UL E64380)	Viso:5000Vrms Cr/Cl >7.6MM -30°C to 100°C	VDE0884
CPU (U1)	ATMEL	ATmega64-16Ai	64A, TQFP, 4.5~5.5V, –40°C to 85°C	IEC/EN 62109
LCD (U7)	DaWei, Taiwan	DV320240GB (8806)	320*240, SIZE=160*109*12	IEC/EN 62109
Optocoupler (U3, U4, U9, U10, U11)	SHARP	PC817 (UL E64380)	Viso:5000Vrms Cr/Cl >7.6MM -30°C to 100°C	VDE0884
Driver module (U1, U2, U6)	CONCEPT	2SD106AI-17	Viso: 4000V; Operating voltage1200V-1700V,Cr.7mm RI, partial discharge extinction volt >1700 -40 to 85□	IEC/EN 62109
Marking material	WUXI ZHENG FENG SPECIAL PRINTING CO LTD	ZF/02	outdoor use, -40°C to 150°C	IEC/EN 62109
Cable 1AWG	SHANGHAI ECHU WIRE & CABLE CO LTD	AWM1015 1AWG (UL E312831)	1AWG VW-1 105□ FT1 600V	IEC/EN 62109

Object/part No.	Manufacturer/ Trademark	Type/model	Technical data	Standard
Cable 3AWG	SHANGHAI ECHU WIRE & CABLE CO LTD	3AWG AWM1015 (UL E312831)	VW-1 105□ FT1 600V	IEC/EN 62109
Cable 5AWG	SHANGHAI ECHU WIRE & CABLE CO LTD	5AWG AWM1015 (UL E312831)	VW-1 105□ FT1 600V	IEC/EN 62109
Cable 13AWG	SHANGHAI ECHU WIRE & CABLE CO LTD	13AWG AWM1015 (UL E312831)	VW-1 105□ FT1 600V	IEC/EN 62109
Copper bar	Shanghai Minhang rich machinery plant	ZY7.725.218	Minimum thickness: 2mm; Size 706mm*25mm The surface of nickel,150A	IEC/EN 62109
Ground wire	Shanghai Hai jie su Industrial Co., Ltd.	1mm*16mm	Size 1*16 80A Soft copper braided wire	IEC/EN 62109

Foto EUT

/EUT photos












DLAQI
NF342B100/06


GHREPOWER
Grid-Tied Inverter
S/N: C W60K3G130002
Mc GNW60K3G
DC Input Voltage 380–680Vdc
Min. Start Voltage 380Vdc
Max. Input Current 140A
Power Factor >0.99
AC Voltage Range 340–460Vac
AC Frequency Range 47–53Hz
Nominal Output Voltage 400Vac/3Ø
Normal frequency 50Hz
Normal Output Power 60kW
Normal Output Current 87A
Auxiliary Power Voltage 400Vac±15%
Auxiliary Power Frequency 50Hz
Operating temperature range -20℃ to +55℃
(Higher than 40℃, derating output)
Protective class class I
Ingress protection IP20
Shanghai Ghrepower Green Energy Co., Ltd.
www.ghrepower.com

Campione 10 (documentazione):

/sample 10 (documentation):

Descrizione: manuale utente

/description: user manual

Versione: V1.02

/Version: V1.02

Data emissione: 04/2013

/date of issue: 04/2013

Nome file: GNW60k3G Grid-tied Wind Inverter User Manual V1.02-5.27.pdf

/file name: GNW60k3G Grid-tied Wind Inverter User Manual V1.02-5.27.pdf

Campione 11 (documentazione):

/sample 11 (documentation):

Descrizione: schema elettrico

/description: electirc scheme

Il campione 11 contiene i seguenti schemi elettrici:

/sample 11 contains the following electric schemes:

- Descrizione: schema elettrico driver IGBT

  /description: IGBT driver electric scheme

  - Numero documento: ZY7.820.027DSN

    /document number: ZY7.820.027DSN

  - Revisione: V1.01

    /revision: V1.01

  - Nome file: GNW60k3G IGBT Driver SCH.pdf

    /file name: GNW60k3G IGBT Driver SCH.pdf

- Descrizione: schema elettrico scheda di controllo

  /description: electric scheme of control board

  - Numero documento: ZY7.820.019DSN

    /document number: ZY7.820.019DSN

  - Revisione: 1.02

    /revision: 1.02

  - Nome file: GNW60k3G Control SCH.pdf

    /file name: GNW60k3G Control SCH.pdf

- Descrizione: schema elettrico DSP
  /description: DSP electric scheme
  - Numero documento: ZY7.820.088DSN
    /document number: ZY7.820.088DSN
  - Revisione: 1.00
    /revision: 1.00
  - Nome file: GNW60k3G DSP Demo SCH.pdf
    /file name: GNW60k3G DSP Demo SCH.pdf

- Descrizione: schema elettrico display e tastiera
  /description: keyboard and display electric scheme
  - Numero documento: SY7.820.222DSN
    /document number: SY7.820.222DSN
  - Revisione: 1.03
    /revision: 1.03
  - Nome file: GNW60k3G LCD&Key SCH.pdf
    /file name: GNW60k3G LCD&Key SCH.pdf

- Descrizione: schema elettrico scheda di potenza
  /description: power board electric scheme
  - Numero documento: ZY7.820.016DSN
    /document number: ZY7.820.016DSN
  - Revisione: 1.02
    /revision: 1.02
  - Nome file: GNW60k3G Power SCH.pdf
    /file name: GNW60k3G Power SCH.pdf

Campione 12 (documentazione):

/sample 12 (documentation):

Descrizione: test report sicurezza elettrica contente la lista componenti completa

/description: electrical safety test report which inculed list of components

Nome file: IEC62109 Test Report_GNW60K3G_130200698SHA-001.pdf

/file name: IEC62109 Test Report_GNW60K3G_130200698SHA-001.pdf

Data emissione: 07/05/2013

/date of issue: 07/05/2013

Setup di prova durante i test

/Test set-up

Per la corretta esecuzione delle prove, l'EUT è stato posto in posizione verticale con setup da pavimento, permettendo così il suo normale funzionamento.

/For the proper performance of the tests the EUT was placed in vertical position with floor standing setup, allowing normal operation.

Il cablaggio dell'inverter è stato eseguito seguendo il manuale utente allegato alla documentazione e il materiale fornito dal costruttore.

/The wiring of the inverter was performed following the user manual attached to the documents and material provided by the manufacturer.

- Cavi ingresso: n°2 cavi 10 m x 35 mm^2

  /Input cables: no. 2 cables 10 m x 35 mm^2
- Cavo uscita: 3P+N+PE 10 m x 35 mm^2

  /Output cables: 3P+N+PE 10 m x 35 mm^2

I segnali di alimentazione sono stati forniti rispettando le caratteristiche tecniche del convertitore statico:

/The power supplies were provided within the technical characteristics of the inverter:

- Alimentazione ingresso: 640 V_{DC} con TopCon Regatron Quadro

  /Input supply: 640 V_{DC} with TopCon Regatron Quadro
- Alimentazione uscita: 230 V – 50 Hz

  /Output supply: 230 V – 50 Hz

Per ridurre o aumentare la potenza d'uscita dell'inverter si variava il valore limite di potenza dell'inverter.

/Power of inverter is varied to reduce or increase the power output of the inverter.

2 Elenco delle prove effettuate e risultati

/List of performed tests and results

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12

Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica

/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.

Prova */Test*	**Prodotto verificato** */Verified product*	**Esito** */Result*
CEI 0-21 Annex B. CEI EN 61000-3-12	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. CEI EN 61000-3-11	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.1.1 Verification of the connection and re-connection conditions	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.1.2 Verification of the gradual stepping of the active power supply	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.2.2 Verification of the construction requirements: capability to supply reactive power - testing and recording methods	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.2.3 Supply of reactive power according to a predefined level	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.2.4 Response time to a step variation in the set level	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*

Prova */Test*	**Prodotto verificato** */Verified product*	**Esito** */Result*
CEI 0-21 Annex B. B.1.2.5 Automatic reactive power supply according to a cos(φ)=ƒ(P) characteristic curve	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.2.6 Automatic reactive power supply according to the characteristic curve Q=ƒ(V)	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.3.1 Regulation of active power in the presence of transients on the distribution grid	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.3.2 Active power limit as a result of an external command sent by the Distributor	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*
CEI 0-21 Annex B. B.1.4.1 Verification of release of direct component	Nota 1 */Remark 1*	NON APPLICABILE */NOT APPLICABLE*
CEI 0-21 Annex B B.1.4.2 Verification of protection against the release of d.c. current	Nota 1 */Remark 1*	NON APPLICABILE */NOT APPLICABLE*

Nota 1: prove non applicabili poichè il campione è connesso alla rete di distribuzione utilizzando un trasformatore di isolamento

/Remark 1: tests not applicable because the sample is connected to the distribution grid using an insulation transformer

Prova */Test*	**Prodotto verificato** */Verified product*	**Esito** */Result*
CEI 0-21 Annex B. B.1.5 Verification of insensitivity to voltage dips (LVFRT capability)	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS* Nota 2 */Remark 2*
CEI 0-21 Annex B. B.1.6 Verification of insensitivity to automatic re-closing in phase discordance	Campione 01 Rev. 02 */sample 01 Rev.02*	SUPERATA */PASS*

Nota 2: Per la prova a 100%Pn, si veda il test report n. 131906LP rilasciato da CreiVen S.c.a.r.l. numero Accredia: 0259

/Remark 2: for test at 10%Pn, see test report n.131906LP released by CreiVen S.c.a.r.l. numero Accredia: 0259

3 Prove

/Tests

3.1 Prove funzionali

/Functional tests

3.2 CEI 0-21 Annex B.

Corrente armonica

/Harmonic current

Norme di riferimento */Reference standards*

CEI EN 61000-3-12:2006-08
EN 61000-3-12:2005-04
IEC 61000-3-12:2004-11

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Adattatore di interfaccia */Interface adaptor*	Eurotest	ADTROG01
Analizzatore di armoniche */Harmonic analyzer*	EM Test DPA503	HRMFLK01
Camera climatica */Climatic chamber*	☐ VC 4033	CLTCHR02
	☐ Fitoclima 8000	CLTCHCT4
	☒ Polithermo	CLTCHR10
Generatore in corrente alternata variabile in tensione e frequenza */Test power supply*	☐ Elettrotest TPS 22kW	TPS22K01
	☒ Elettrotest TPS 90kW	TPS90K01

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Sonde di corrente */Probe current*	☐ Lem	SONDCOR4 SONDCOR5 SONDCOR6
	☒ Rogowski	SONDCOR7 SONDCOR8 SONDCOR9
	☐ Universal Technic M1.U	SNDCOR10 SNDCOR11 SNDCOR12

Incertezza di misura */Measure uncertainty*	5%
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLHRM01
Procedura e allestimento della prova conformi alla normativa CEI EN 61000-3-12 */Procedure and set up comply with CEI EN 61000-3-12*	

Luogo di prova */Test site*		Camera climatica */Climatic chamber*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.3°C	Umidità relativa */Relative humidity*	66.2%

Risultati – Corrente armonica

/Results – Harmonic current

	Dichiarato dal costruttore */Declared by manufacturer*	Misurato */Measured*
Potenza attiva massima [W] */Maximum active power [W]*	60000	59235.35
Corrente massima [A] */Maximum current [A]*	87	86.382

Classificazione dell'apparecchiatura */Classification of equipment*	Classe A /Class A
Tipo di comportamento dell'apparecchiatura */Type of equipment behaviour*	Quasi stazionario /Quasi stationery
Periodo di osservazione [s] */Observation period [s]*	150

Tabelle delle misure – Corrente armonica in condizioni di riferimento

/Table of measures – Harmonic current in reference conditions

Potenza di uscita: 100%Pn

/output power: 100%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	86.366	99.981		
2	946.248E-3	1.095	8.00	PASS
3	339.565E-3	0.393		PASS
4	217.092E-3	0.251	4.00	PASS
5	1.259	1.457	10.70	PASS
6	103.276E-3	0.120	2.67	PASS
7	514.728E-3	0.596	7.20	PASS
8	92.315E-3	0.107	2.00	PASS
9	56.375E-3	0.065		PASS
10	51.549E-3	0.060	1.60	PASS
11	156.334E-3	0.181	3.10	PASS
12	41.479E-3	0.048	1.33	PASS
13	100.466E-3	0.116	2.00	PASS
14	39.232E-3	0.045		PASS
15	35.131E-3	0.041		PASS
16	29.799E-3	0.034		PASS
17	35.426E-3	0.041		PASS
18	32.401E-3	0.038		PASS
19	48.196E-3	0.056		PASS
20	30.497E-3	0.035		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	28.690E-3	0.033		PASS
22	30.567E-3	0.035		PASS
23	65.770E-3	0.076		PASS
24	25.232E-3	0.029		PASS
25	68.237E-3	0.079		PASS
26	23.170E-3	0.027		PASS
27	23.869E-3	0.028		PASS
28	21.108E-3	0.024		PASS
29	58.155E-3	0.067		PASS
30	23.791E-3	0.028		PASS
31	54.187E-3	0.063		PASS
32	21.968E-3	0.025		PASS
33	22.458E-3	0.026		PASS
34	18.762E-3	0.022		PASS
35	49.818E-3	0.058		PASS
36	17.820E-3	0.021		PASS
37	40.137E-3	0.046		PASS
38	19.508E-3	0.023		PASS
39	19.524E-3	0.023		PASS
40	17.502E-3	0.020		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	85.856	100.034		
2	383.000E-3	0.446	8.00	PASS
3	141.915E-3	0.165		PASS
4	232.394E-3	0.271	4.00	PASS
5	1.217	1.418	10.70	PASS
6	168.102E-3	0.196	2.67	PASS
7	551.911E-3	0.643	7.20	PASS
8	86.534E-3	0.101	2.00	PASS
9	50.737E-3	0.059		PASS
10	49.765E-3	0.058	1.60	PASS
11	166.172E-3	0.194	3.10	PASS
12	46.378E-3	0.054	1.33	PASS
13	95.178E-3	0.111	2.00	PASS
14	32.580E-3	0.038		PASS
15	32.049E-3	0.037		PASS
16	30.082E-3	0.035		PASS
17	31.846E-3	0.037		PASS
18	29.144E-3	0.034		PASS
19	47.239E-3	0.055		PASS
20	23.486E-3	0.027		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	25.515E-3	0.030		PASS
22	23.503E-3	0.027		PASS
23	59.050E-3	0.069		PASS
24	36.612E-3	0.043		PASS
25	68.942E-3	0.080		PASS
26	35.689E-3	0.042		PASS
27	25.933E-3	0.030		PASS
28	25.617E-3	0.030		PASS
29	40.873E-3	0.048		PASS
30	36.092E-3	0.042		PASS
31	49.897E-3	0.058		PASS
32	26.385E-3	0.031		PASS
33	20.085E-3	0.023		PASS
34	22.529E-3	0.026		PASS
35	38.103E-3	0.044		PASS
36	26.700E-3	0.031		PASS
37	33.503E-3	0.039		PASS
38	23.511E-3	0.027		PASS
39	17.657E-3	0.021		PASS
40	16.051E-3	0.019		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	85.258	99.908		
2	853.913E-3	1.001	8.00	PASS
3	486.300E-3	0.570		PASS
4	398.207E-3	0.467	4.00	PASS
5	1.322	1.549	10.70	PASS
6	135.956E-3	0.159	2.67	PASS
7	589.099E-3	0.690	7.20	PASS
8	94.972E-3	0.111	2.00	PASS
9	70.730E-3	0.083		PASS
10	60.952E-3	0.071	1.60	PASS
11	191.253E-3	0.224	3.10	PASS
12	59.330E-3	0.070	1.33	PASS
13	129.711E-3	0.152	2.00	PASS
14	50.540E-3	0.059		PASS
15	45.763E-3	0.054		PASS
16	41.275E-3	0.048		PASS
17	51.895E-3	0.061		PASS
18	44.545E-3	0.052		PASS
19	41.464E-3	0.049		PASS
20	36.380E-3	0.043		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	31.763E-3	0.037		PASS
22	42.130E-3	0.049		PASS
23	54.803E-3	0.064		PASS
24	39.773E-3	0.047		PASS
25	60.758E-3	0.071		PASS
26	37.155E-3	0.044		PASS
27	28.150E-3	0.033		PASS
28	40.462E-3	0.047		PASS
29	56.751E-3	0.067		PASS
30	34.321E-3	0.040		PASS
31	48.339E-3	0.057		PASS
32	36.077E-3	0.042		PASS
33	24.540E-3	0.029		PASS
34	35.265E-3	0.041		PASS
35	41.475E-3	0.049		PASS
36	30.631E-3	0.036		PASS
37	47.996E-3	0.056		PASS
38	26.315E-3	0.031		PASS
39	24.003E-3	0.028		PASS
40	19.865E-3	0.023		PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	57.363	99.770		
2	995.655E-3	1.732	8.00	PASS
3	282.685E-3	0.492		PASS
4	252.749E-3	0.440	4.00	PASS
5	932.698E-3	1.622	10.70	PASS
6	107.994E-3	0.188	2.67	PASS
7	295.792E-3	0.514	7.20	PASS
8	101.585E-3	0.177	2.00	PASS
9	61.498E-3	0.107		PASS
10	54.300E-3	0.094	1.60	PASS
11	48.226E-3	0.084	3.10	PASS
12	44.740E-3	0.078	1.33	PASS
13	76.155E-3	0.132	2.00	PASS
14	39.021E-3	0.068		PASS
15	35.278E-3	0.061		PASS
16	33.791E-3	0.059		PASS
17	104.446E-3	0.182		PASS
18	38.643E-3	0.067		PASS
19	112.526E-3	0.196		PASS
20	34.217E-3	0.060		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	29.312E-3	0.051		PASS
22	28.063E-3	0.049		PASS
23	80.542E-3	0.140		PASS
24	28.261E-3	0.049		PASS
25	63.631E-3	0.111		PASS
26	24.149E-3	0.042		PASS
27	22.105E-3	0.038		PASS
28	21.870E-3	0.038		PASS
29	21.500E-3	0.037		PASS
30	22.073E-3	0.038		PASS
31	21.955E-3	0.038		PASS
32	23.775E-3	0.041		PASS
33	20.812E-3	0.036		PASS
34	26.361E-3	0.046		PASS
35	42.129E-3	0.073		PASS
36	25.031E-3	0.044		PASS
37	44.696E-3	0.078		PASS
38	24.618E-3	0.043		PASS
39	19.866E-3	0.035		PASS
40	26.997E-3	0.047		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	56.931	99.893		
2	500.208E-3	0.878	8.00	PASS
3	159.326E-3	0.280		PASS
4	227.888E-3	0.400	4.00	PASS
5	871.538E-3	1.529	10.70	PASS
6	161.295E-3	0.283	2.67	PASS
7	321.427E-3	0.564	7.20	PASS
8	84.260E-3	0.148	2.00	PASS
9	58.860E-3	0.103		PASS
10	56.906E-3	0.100	1.60	PASS
11	62.700E-3	0.110	3.10	PASS
12	44.295E-3	0.078	1.33	PASS
13	62.293E-3	0.109	2.00	PASS
14	42.937E-3	0.075		PASS
15	37.786E-3	0.066		PASS
16	38.978E-3	0.068		PASS
17	83.949E-3	0.147		PASS
18	57.013E-3	0.100		PASS
19	104.642E-3	0.184		PASS
20	41.875E-3	0.073		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	28.615E-3	0.050		PASS
22	35.281E-3	0.062		PASS
23	68.301E-3	0.120		PASS
24	45.805E-3	0.080		PASS
25	58.948E-3	0.103		PASS
26	38.626E-3	0.068		PASS
27	21.333E-3	0.037		PASS
28	22.629E-3	0.040		PASS
29	22.094E-3	0.039		PASS
30	21.856E-3	0.038		PASS
31	22.314E-3	0.039		PASS
32	20.733E-3	0.036		PASS
33	25.136E-3	0.044		PASS
34	23.227E-3	0.041		PASS
35	26.235E-3	0.046		PASS
36	38.256E-3	0.067		PASS
37	36.897E-3	0.065		PASS
38	32.091E-3	0.056		PASS
39	29.605E-3	0.052		PASS
40	25.329E-3	0.044		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	55.819	99.588		
2	756.133E-3	1.349	8.00	PASS
3	379.491E-3	0.677		PASS
4	414.482E-3	0.739	4.00	PASS
5	956.982E-3	1.707	10.70	PASS
6	150.447E-3	0.268	2.67	PASS
7	355.308E-3	0.634	7.20	PASS
8	96.640E-3	0.172	2.00	PASS
9	77.447E-3	0.138		PASS
10	66.960E-3	0.119	1.60	PASS
11	65.476E-3	0.117	3.10	PASS
12	60.864E-3	0.109	1.33	PASS
13	66.798E-3	0.119	2.00	PASS
14	59.193E-3	0.106		PASS
15	47.364E-3	0.085		PASS
16	56.838E-3	0.101		PASS
17	89.862E-3	0.160		PASS
18	59.418E-3	0.106		PASS
19	103.510E-3	0.185		PASS
20	56.478E-3	0.101		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	36.394E-3	0.065		PASS
22	55.756E-3	0.099		PASS
23	72.294E-3	0.129		PASS
24	47.751E-3	0.085		PASS
25	62.397E-3	0.111		PASS
26	44.632E-3	0.080		PASS
27	29.644E-3	0.053		PASS
28	28.947E-3	0.052		PASS
29	29.454E-3	0.053		PASS
30	29.560E-3	0.053		PASS
31	27.374E-3	0.049		PASS
32	26.357E-3	0.047		PASS
33	27.004E-3	0.048		PASS
34	27.577E-3	0.049		PASS
35	29.963E-3	0.053		PASS
36	29.619E-3	0.053		PASS
37	40.569E-3	0.072		PASS
38	29.936E-3	0.053		PASS
39	32.221E-3	0.057		PASS
40	37.220E-3	0.066		PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.598	98.418		
2	855.789E-3	2.945	8.00	PASS
3	293.457E-3	1.010		PASS
4	245.463E-3	0.845	4.00	PASS
5	274.057E-3	0.943	10.70	PASS
6	129.026E-3	0.444	2.67	PASS
7	185.854E-3	0.640	7.20	PASS
8	95.189E-3	0.328	2.00	PASS
9	76.531E-3	0.263		PASS
10	74.658E-3	0.257	1.60	PASS
11	227.888E-3	0.784	3.10	PASS
12	81.217E-3	0.280	1.33	PASS
13	161.726E-3	0.557	2.00	PASS
14	50.815E-3	0.175		PASS
15	50.170E-3	0.173		PASS
16	50.232E-3	0.173		PASS
17	47.304E-3	0.163		PASS
18	41.052E-3	0.141		PASS
19	57.441E-3	0.198		PASS
20	37.561E-3	0.129		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	35.473E-3	0.122		PASS
22	40.730E-3	0.140		PASS
23	86.735E-3	0.298		PASS
24	38.384E-3	0.132		PASS
25	59.872E-3	0.206		PASS
26	37.546E-3	0.129		PASS
27	28.081E-3	0.097		PASS
28	33.620E-3	0.116		PASS
29	38.239E-3	0.132		PASS
30	30.140E-3	0.104		PASS
31	41.033E-3	0.141		PASS
32	26.303E-3	0.091		PASS
33	26.491E-3	0.091		PASS
34	27.336E-3	0.094		PASS
35	45.636E-3	0.157		PASS
36	30.956E-3	0.107		PASS
37	32.166E-3	0.111		PASS
38	25.336E-3	0.087		PASS
39	25.026E-3	0.086		PASS
40	33.025E-3	0.114		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.297	98.885		
2	665.177E-3	2.325	8.00	PASS
3	213.447E-3	0.746		PASS
4	253.430E-3	0.886	4.00	PASS
5	249.092E-3	0.870	10.70	PASS
6	114.809E-3	0.401	2.67	PASS
7	171.177E-3	0.598	7.20	PASS
8	90.694E-3	0.317	2.00	PASS
9	75.237E-3	0.263		PASS
10	67.120E-3	0.235	1.60	PASS
11	216.063E-3	0.755	3.10	PASS
12	89.973E-3	0.314	1.33	PASS
13	151.238E-3	0.529	2.00	PASS
14	58.057E-3	0.203		PASS
15	38.627E-3	0.135		PASS
16	42.291E-3	0.148		PASS
17	43.440E-3	0.152		PASS
18	37.050E-3	0.129		PASS
19	53.991E-3	0.189		PASS
20	42.853E-3	0.150		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	42.636E-3	0.149		PASS
22	45.292E-3	0.158		PASS
23	60.299E-3	0.211		PASS
24	56.422E-3	0.197		PASS
25	56.780E-3	0.198		PASS
26	40.357E-3	0.141		PASS
27	28.983E-3	0.101		PASS
28	38.100E-3	0.133		PASS
29	33.908E-3	0.118		PASS
30	31.081E-3	0.109		PASS
31	32.948E-3	0.115		PASS
32	28.867E-3	0.101		PASS
33	31.749E-3	0.111		PASS
34	27.566E-3	0.096		PASS
35	31.842E-3	0.111		PASS
36	37.709E-3	0.132		PASS
37	23.845E-3	0.083		PASS
38	31.203E-3	0.109		PASS
39	24.651E-3	0.086		PASS
40	27.753E-3	0.097		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	26.934	97.560		
2	656.172E-3	2.377	8.00	PASS
3	346.784E-3	1.256		PASS
4	352.750E-3	1.278	4.00	PASS
5	300.226E-3	1.087	10.70	PASS
6	135.252E-3	0.490	2.67	PASS
7	149.434E-3	0.541	7.20	PASS
8	98.274E-3	0.356	2.00	PASS
9	87.658E-3	0.318		PASS
10	110.643E-3	0.401	1.60	PASS
11	194.412E-3	0.704	3.10	PASS
12	97.383E-3	0.353	1.33	PASS
13	169.955E-3	0.616	2.00	PASS
14	81.330E-3	0.295		PASS
15	49.888E-3	0.181		PASS
16	54.470E-3	0.197		PASS
17	52.067E-3	0.189		PASS
18	43.500E-3	0.158		PASS
19	52.556E-3	0.190		PASS
20	40.606E-3	0.147		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	42.414E-3	0.154		PASS
22	48.801E-3	0.177		PASS
23	54.779E-3	0.198		PASS
24	45.026E-3	0.163		PASS
25	65.908E-3	0.239		PASS
26	54.729E-3	0.198		PASS
27	35.054E-3	0.127		PASS
28	37.712E-3	0.137		PASS
29	30.336E-3	0.110		PASS
30	32.050E-3	0.116		PASS
31	33.682E-3	0.122		PASS
32	30.298E-3	0.110		PASS
33	33.337E-3	0.121		PASS
34	34.740E-3	0.126		PASS
35	33.578E-3	0.122		PASS
36	34.173E-3	0.124		PASS
37	28.471E-3	0.103		PASS
38	37.295E-3	0.135		PASS
39	27.983E-3	0.101		PASS
40	29.903E-3	0.108		PASS

Tabelle delle misure – Corrente armonica in condizioni limite

/Table of measures – Harmonic current at limit conditions

Prova B: Caldo secco 55°C */Test B: Dry heat 55°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	43.929	99.586		
2	1.117	2.533	8.00	PASS
3	210.317E-3	0.477		PASS
4	261.462E-3	0.593	4.00	PASS
5	557.104E-3	1.263	10.70	PASS
6	69.092E-3	0.157	2.67	PASS
7	121.282E-3	0.275	7.20	PASS
8	69.939E-3	0.159	2.00	PASS
9	54.758E-3	0.124		PASS
10	50.644E-3	0.115	1.60	PASS
11	121.912E-3	0.276	3.10	PASS
12	38.268E-3	0.087	1.33	PASS
13	139.834E-3	0.317	2.00	PASS
14	32.107E-3	0.073		PASS
15	32.561E-3	0.074		PASS
16	32.845E-3	0.074		PASS
17	112.717E-3	0.256		PASS
18	29.235E-3	0.066		PASS
19	81.567E-3	0.185		PASS
20	34.295E-3	0.078		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	23.939E-3	0.054		PASS
22	27.177E-3	0.062		PASS
23	23.100E-3	0.052		PASS
24	26.199E-3	0.059		PASS
25	25.418E-3	0.058		PASS
26	19.581E-3	0.044		PASS
27	19.817E-3	0.045		PASS
28	28.457E-3	0.065		PASS
29	58.624E-3	0.133		PASS
30	23.680E-3	0.054		PASS
31	46.777E-3	0.106		PASS
32	27.937E-3	0.063		PASS
33	17.275E-3	0.039		PASS
34	17.537E-3	0.040		PASS
35	34.599E-3	0.078		PASS
36	23.579E-3	0.053		PASS
37	29.304E-3	0.066		PASS
38	21.534E-3	0.049		PASS
39	22.094E-3	0.050		PASS
40	25.981E-3	0.059		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	42.649	99.819		
2	541.465E-3	1.267	8.00	PASS
3	144.220E-3	0.338		PASS
4	185.227E-3	0.434	4.00	PASS
5	496.370E-3	1.162	10.70	PASS
6	111.636E-3	0.261	2.67	PASS
7	112.900E-3	0.264	7.20	PASS
8	57.333E-3	0.134	2.00	PASS
9	51.794E-3	0.121		PASS
10	43.293E-3	0.101	1.60	PASS
11	105.565E-3	0.247	3.10	PASS
12	49.251E-3	0.115	1.33	PASS
13	119.950E-3	0.281	2.00	PASS
14	53.593E-3	0.125		PASS
15	34.048E-3	0.080		PASS
16	39.110E-3	0.092		PASS
17	83.265E-3	0.195		PASS
18	54.952E-3	0.129		PASS
19	73.972E-3	0.173		PASS
20	31.667E-3	0.074		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	20.202E-3	0.047		PASS
22	25.280E-3	0.059		PASS
23	23.592E-3	0.055		PASS
24	18.088E-3	0.042		PASS
25	21.311E-3	0.050		PASS
26	17.935E-3	0.042		PASS
27	25.874E-3	0.061		PASS
28	23.799E-3	0.056		PASS
29	28.959E-3	0.068		PASS
30	45.594E-3	0.107		PASS
31	33.181E-3	0.078		PASS
32	42.971E-3	0.101		PASS
33	29.825E-3	0.070		PASS
34	23.568E-3	0.055		PASS
35	17.064E-3	0.040		PASS
36	36.349E-3	0.085		PASS
37	22.148E-3	0.052		PASS
38	27.227E-3	0.064		PASS
39	15.397E-3	0.036		PASS
40	22.363E-3	0.052		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	43.475	99.520		
2	802.111E-3	1.836	8.00	PASS
3	195.843E-3	0.448		PASS
4	413.614E-3	0.947	4.00	PASS
5	540.130E-3	1.236	10.70	PASS
6	114.824E-3	0.263	2.67	PASS
7	155.780E-3	0.357	7.20	PASS
8	57.685E-3	0.132	2.00	PASS
9	56.503E-3	0.129		PASS
10	79.084E-3	0.181	1.60	PASS
11	87.352E-3	0.200	3.10	PASS
12	57.891E-3	0.133	1.33	PASS
13	119.020E-3	0.272	2.00	PASS
14	60.606E-3	0.139		PASS
15	37.619E-3	0.086		PASS
16	47.143E-3	0.108		PASS
17	95.687E-3	0.219		PASS
18	54.380E-3	0.124		PASS
19	75.289E-3	0.172		PASS
20	52.666E-3	0.121		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	28.273E-3	0.065		PASS
22	33.190E-3	0.076		PASS
23	32.431E-3	0.074		PASS
24	25.894E-3	0.059		PASS
25	24.204E-3	0.055		PASS
26	21.014E-3	0.048		PASS
27	28.055E-3	0.064		PASS
28	35.125E-3	0.080		PASS
29	33.712E-3	0.077		PASS
30	30.804E-3	0.071		PASS
31	39.023E-3	0.089		PASS
32	31.407E-3	0.072		PASS
33	35.338E-3	0.081		PASS
34	26.038E-3	0.060		PASS
35	32.065E-3	0.073		PASS
36	35.592E-3	0.081		PASS
37	21.579E-3	0.049		PASS
38	30.341E-3	0.069		PASS
39	19.782E-3	0.045		PASS
40	17.377E-3	0.040		PASS

Note */Remarks*

La prova è stata eseguita alla massima potenza erogabile a 55°C (pari a 30kW) in accordo alle specifiche del cliente.

/test has been performed maximum allowable power at 55°C (equal to 30kW) according to manufacturer specifications

Potenza di uscita: 66%Pn

/output power: 66%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.942	98.909		
2	992.725E-3	3.393	8.00	PASS
3	181.320E-3	0.620		PASS
4	309.433E-3	1.057	4.00	PASS
5	194.960E-3	0.666	10.70	PASS
6	79.829E-3	0.273	2.67	PASS
7	129.601E-3	0.443	7.20	PASS
8	79.036E-3	0.270	2.00	PASS
9	60.293E-3	0.206		PASS
10	56.994E-3	0.195	1.60	PASS
11	187.105E-3	0.639	3.10	PASS
12	36.544E-3	0.125	1.33	PASS
13	139.006E-3	0.475	2.00	PASS
14	38.523E-3	0.132		PASS
15	34.704E-3	0.119		PASS
16	35.307E-3	0.121		PASS
17	36.492E-3	0.125		PASS
18	35.894E-3	0.123		PASS
19	32.190E-3	0.110		PASS
20	27.441E-3	0.094		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	24.530E-3	0.084		PASS
22	35.212E-3	0.120		PASS
23	81.011E-3	0.277		PASS
24	22.022E-3	0.075		PASS
25	60.077E-3	0.205		PASS
26	44.401E-3	0.152		PASS
27	20.385E-3	0.070		PASS
28	28.241E-3	0.097		PASS
29	21.248E-3	0.073		PASS
30	27.143E-3	0.093		PASS
31	23.014E-3	0.079		PASS
32	24.130E-3	0.082		PASS
33	25.667E-3	0.088		PASS
34	24.930E-3	0.085		PASS
35	56.111E-3	0.192		PASS
36	31.405E-3	0.107		PASS
37	38.067E-3	0.130		PASS
38	25.952E-3	0.089		PASS
39	23.026E-3	0.079		PASS
40	29.755E-3	0.102		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.139	99.422		
2	588.131E-3	2.078	8.00	PASS
3	138.238E-3	0.488		PASS
4	137.219E-3	0.485	4.00	PASS
5	183.253E-3	0.647	10.70	PASS
6	78.541E-3	0.278	2.67	PASS
7	131.037E-3	0.463	7.20	PASS
8	83.830E-3	0.296	2.00	PASS
9	60.972E-3	0.215		PASS
10	57.788E-3	0.204	1.60	PASS
11	160.728E-3	0.568	3.10	PASS
12	68.566E-3	0.242	1.33	PASS
13	131.572E-3	0.465	2.00	PASS
14	58.419E-3	0.206		PASS
15	31.379E-3	0.111		PASS
16	34.202E-3	0.121		PASS
17	34.275E-3	0.121		PASS
18	23.880E-3	0.084		PASS
19	27.633E-3	0.098		PASS
20	29.403E-3	0.104		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	34.203E-3	0.121		PASS
22	26.467E-3	0.094		PASS
23	47.943E-3	0.169		PASS
24	56.409E-3	0.199		PASS
25	52.633E-3	0.186		PASS
26	42.568E-3	0.150		PASS
27	31.863E-3	0.113		PASS
28	32.647E-3	0.115		PASS
29	17.626E-3	0.062		PASS
30	16.906E-3	0.060		PASS
31	24.892E-3	0.088		PASS
32	16.245E-3	0.057		PASS
33	28.774E-3	0.102		PASS
34	18.208E-3	0.064		PASS
35	33.168E-3	0.117		PASS
36	39.025E-3	0.138		PASS
37	20.367E-3	0.072		PASS
38	33.776E-3	0.119		PASS
39	40.628E-3	0.144		PASS
40	21.984E-3	0.078		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.718	98.738		
2	645.260E-3	2.219	8.00	PASS
3	181.382E-3	0.624		PASS
4	392.539E-3	1.350	4.00	PASS
5	204.424E-3	0.703	10.70	PASS
6	105.201E-3	0.362	2.67	PASS
7	124.093E-3	0.427	7.20	PASS
8	82.074E-3	0.282	2.00	PASS
9	65.086E-3	0.224		PASS
10	111.551E-3	0.384	1.60	PASS
11	140.188E-3	0.482	3.10	PASS
12	91.570E-3	0.315	1.33	PASS
13	130.136E-3	0.447	2.00	PASS
14	75.380E-3	0.259		PASS
15	32.377E-3	0.111		PASS
16	36.878E-3	0.127		PASS
17	35.776E-3	0.123		PASS
18	34.568E-3	0.119		PASS
19	30.219E-3	0.104		PASS
20	31.426E-3	0.108		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	38.055E-3	0.131		PASS
22	39.462E-3	0.136		PASS
23	36.164E-3	0.124		PASS
24	46.919E-3	0.161		PASS
25	45.573E-3	0.157		PASS
26	56.140E-3	0.193		PASS
27	29.986E-3	0.103		PASS
28	29.569E-3	0.102		PASS
29	20.178E-3	0.069		PASS
30	29.025E-3	0.100		PASS
31	25.764E-3	0.089		PASS
32	21.576E-3	0.074		PASS
33	25.790E-3	0.089		PASS
34	30.908E-3	0.106		PASS
35	36.391E-3	0.125		PASS
36	27.819E-3	0.096		PASS
37	22.890E-3	0.079		PASS
38	52.942E-3	0.182		PASS
39	34.459E-3	0.118		PASS
40	30.976E-3	0.107		PASS

Note */Remarks*

La prova è stata eseguita al 66% della massima potenza erogabile a 55°C in accordo alle specifiche del cliente.

/test has been performed at 66% of maximum allowable power at 55°C according to manufacturer specifications.

Potenza di uscita: 33%Pn

/output power: 33%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	14.343	95.455		
2	832.525E-3	5.541	8.00	PASS
3	159.618E-3	1.062		PASS
4	305.453E-3	2.033	4.00	PASS
5	245.492E-3	1.634	10.70	PASS
6	79.294E-3	0.528	2.67	PASS
7	252.223E-3	1.679	7.20	PASS
8	69.784E-3	0.464	2.00	PASS
9	57.531E-3	0.383		PASS
10	54.487E-3	0.363	1.60	PASS
11	74.499E-3	0.496	3.10	PASS
12	54.344E-3	0.362	1.33	PASS
13	39.893E-3	0.265	2.00	PASS
14	36.120E-3	0.240		PASS
15	32.820E-3	0.218		PASS
16	54.980E-3	0.366		PASS
17	69.776E-3	0.464		PASS
18	28.878E-3	0.192		PASS
19	34.107E-3	0.227		PASS
20	44.393E-3	0.295		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	26.697E-3	0.178		PASS
22	42.784E-3	0.285		PASS
23	54.341E-3	0.362		PASS
24	31.914E-3	0.212		PASS
25	53.799E-3	0.358		PASS
26	43.084E-3	0.287		PASS
27	21.095E-3	0.140		PASS
28	43.725E-3	0.291		PASS
29	30.255E-3	0.201		PASS
30	33.101E-3	0.220		PASS
31	37.479E-3	0.249		PASS
32	27.604E-3	0.184		PASS
33	30.596E-3	0.204		PASS
34	19.037E-3	0.127		PASS
35	22.010E-3	0.146		PASS
36	29.326E-3	0.195		PASS
37	27.584E-3	0.184		PASS
38	34.611E-3	0.230		PASS
39	31.501E-3	0.210		PASS
40	34.637E-3	0.231		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	14.046	97.374		
2	628.591E-3	4.358	8.00	PASS
3	117.252E-3	0.813		PASS
4	227.989E-3	1.581	4.00	PASS
5	233.069E-3	1.616	10.70	PASS
6	73.880E-3	0.512	2.67	PASS
7	239.131E-3	1.658	7.20	PASS
8	81.538E-3	0.565	2.00	PASS
9	48.610E-3	0.337		PASS
10	48.878E-3	0.339	1.60	PASS
11	74.973E-3	0.520	3.10	PASS
12	37.114E-3	0.257	1.33	PASS
13	48.507E-3	0.336	2.00	PASS
14	30.179E-3	0.209		PASS
15	39.126E-3	0.271		PASS
16	29.267E-3	0.203		PASS
17	56.723E-3	0.393		PASS
18	55.379E-3	0.384		PASS
19	32.541E-3	0.226		PASS
20	29.861E-3	0.207		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	27.830E-3	0.193		PASS
22	24.242E-3	0.168		PASS
23	43.540E-3	0.302		PASS
24	49.925E-3	0.346		PASS
25	42.041E-3	0.291		PASS
26	43.620E-3	0.302		PASS
27	24.355E-3	0.169		PASS
28	32.612E-3	0.226		PASS
29	29.174E-3	0.202		PASS
30	28.767E-3	0.199		PASS
31	33.765E-3	0.234		PASS
32	24.987E-3	0.173		PASS
33	50.074E-3	0.347		PASS
34	29.959E-3	0.208		PASS
35	34.779E-3	0.241		PASS
36	16.476E-3	0.114		PASS
37	36.016E-3	0.250		PASS
38	18.097E-3	0.125		PASS
39	25.729E-3	0.178		PASS
40	36.070E-3	0.250		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	14.355	94.911		
2	587.882E-3	3.887	8.00	PASS
3	200.435E-3	1.325		PASS
4	373.862E-3	2.472	4.00	PASS
5	179.891E-3	1.189	10.70	PASS
6	107.193E-3	0.709	2.67	PASS
7	232.381E-3	1.536	7.20	PASS
8	124.375E-3	0.822	2.00	PASS
9	56.771E-3	0.375		PASS
10	85.156E-3	0.563	1.60	PASS
11	80.933E-3	0.535	3.10	PASS
12	52.645E-3	0.348	1.33	PASS
13	40.038E-3	0.265	2.00	PASS
14	38.803E-3	0.257		PASS
15	46.972E-3	0.311		PASS
16	58.024E-3	0.384		PASS
17	36.379E-3	0.241		PASS
18	47.368E-3	0.313		PASS
19	33.318E-3	0.220		PASS
20	54.768E-3	0.362		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	28.575E-3	0.189		PASS
22	38.372E-3	0.254		PASS
23	29.266E-3	0.193		PASS
24	46.993E-3	0.311		PASS
25	40.696E-3	0.269		PASS
26	59.131E-3	0.391		PASS
27	30.615E-3	0.202		PASS
28	42.838E-3	0.283		PASS
29	22.001E-3	0.145		PASS
30	39.905E-3	0.264		PASS
31	29.225E-3	0.193		PASS
32	21.417E-3	0.142		PASS
33	31.259E-3	0.207		PASS
34	26.480E-3	0.175		PASS
35	32.549E-3	0.215		PASS
36	36.733E-3	0.243		PASS
37	20.857E-3	0.138		PASS
38	35.662E-3	0.236		PASS
39	17.932E-3	0.119		PASS
40	22.641E-3	0.150		PASS

Note */Remarks*

La prova è stata eseguita al 33% della massima potenza erogabile a 55°C in accordo alle specifiche del cliente.

/test has been performed at 33% of maximum allowable power at 55°C according to manufacturer specifications.

Prova B: Caldo secco 40°C */Test B: Dry heat 40°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	87.442	99.981		
2	1.173	1.342	8.00	PASS
3	182.308E-3	0.208		PASS
4	273.256E-3	0.312	4.00	PASS
5	1.071	1.224	10.70	PASS
6	92.114E-3	0.105	2.67	PASS
7	473.375E-3	0.541	7.20	PASS
8	62.609E-3	0.072	2.00	PASS
9	49.706E-3	0.057		PASS
10	56.301E-3	0.064	1.60	PASS
11	176.486E-3	0.202	3.10	PASS
12	42.588E-3	0.049	1.33	PASS
13	91.938E-3	0.105	2.00	PASS
14	38.881E-3	0.044		PASS
15	32.133E-3	0.037		PASS
16	31.535E-3	0.036		PASS
17	35.441E-3	0.041		PASS
18	28.575E-3	0.033		PASS
19	36.005E-3	0.041		PASS
20	24.554E-3	0.028		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	27.114E-3	0.031		PASS
22	23.350E-3	0.027		PASS
23	56.395E-3	0.064		PASS
24	31.413E-3	0.036		PASS
25	52.476E-3	0.060		PASS
26	21.429E-3	0.025		PASS
27	24.533E-3	0.028		PASS
28	22.719E-3	0.026		PASS
29	49.060E-3	0.056		PASS
30	32.467E-3	0.037		PASS
31	44.715E-3	0.051		PASS
32	27.332E-3	0.031		PASS
33	22.294E-3	0.025		PASS
34	24.739E-3	0.028		PASS
35	46.112E-3	0.053		PASS
36	22.020E-3	0.025		PASS
37	48.907E-3	0.056		PASS
38	16.428E-3	0.019		PASS
39	16.718E-3	0.019		PASS
40	17.119E-3	0.020		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	85.796	100.046		
2	530.608E-3	0.619	8.00	PASS
3	156.623E-3	0.183		PASS
4	249.821E-3	0.291	4.00	PASS
5	1.005	1.172	10.70	PASS
6	205.950E-3	0.240	2.67	PASS
7	438.285E-3	0.511	7.20	PASS
8	78.215E-3	0.091	2.00	PASS
9	48.928E-3	0.057		PASS
10	48.584E-3	0.057	1.60	PASS
11	201.627E-3	0.235	3.10	PASS
12	47.851E-3	0.056	1.33	PASS
13	79.241E-3	0.092	2.00	PASS
14	29.842E-3	0.035		PASS
15	31.264E-3	0.036		PASS
16	30.029E-3	0.035		PASS
17	30.052E-3	0.035		PASS
18	23.580E-3	0.027		PASS
19	35.379E-3	0.041		PASS
20	21.805E-3	0.025		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	22.043E-3	0.026		PASS
22	22.680E-3	0.026		PASS
23	40.146E-3	0.047		PASS
24	32.640E-3	0.038		PASS
25	50.934E-3	0.059		PASS
26	22.394E-3	0.026		PASS
27	19.344E-3	0.023		PASS
28	27.830E-3	0.032		PASS
29	37.701E-3	0.044		PASS
30	34.818E-3	0.041		PASS
31	45.343E-3	0.053		PASS
32	26.815E-3	0.031		PASS
33	15.478E-3	0.018		PASS
34	16.692E-3	0.019		PASS
35	43.022E-3	0.050		PASS
36	26.547E-3	0.031		PASS
37	39.208E-3	0.046		PASS
38	22.913E-3	0.027		PASS
39	16.707E-3	0.019		PASS
40	16.329E-3	0.019		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	86.308	99.965		
2	839.122E-3	0.972	8.00	PASS
3	194.910E-3	0.226		PASS
4	428.277E-3	0.496	4.00	PASS
5	979.588E-3	1.135	10.70	PASS
6	150.053E-3	0.174	2.67	PASS
7	490.474E-3	0.568	7.20	PASS
8	68.504E-3	0.079	2.00	PASS
9	60.611E-3	0.070		PASS
10	60.466E-3	0.070	1.60	PASS
11	205.972E-3	0.239	3.10	PASS
12	42.957E-3	0.050	1.33	PASS
13	102.614E-3	0.119	2.00	PASS
14	35.726E-3	0.041		PASS
15	34.870E-3	0.040		PASS
16	30.575E-3	0.035		PASS
17	31.297E-3	0.036		PASS
18	31.264E-3	0.036		PASS
19	38.819E-3	0.045		PASS
20	29.459E-3	0.034		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	27.275E-3	0.032		PASS
22	33.033E-3	0.038		PASS
23	55.848E-3	0.065		PASS
24	27.650E-3	0.032		PASS
25	55.630E-3	0.064		PASS
26	32.250E-3	0.037		PASS
27	20.589E-3	0.024		PASS
28	31.532E-3	0.037		PASS
29	45.750E-3	0.053		PASS
30	22.069E-3	0.026		PASS
31	46.478E-3	0.054		PASS
32	25.101E-3	0.029		PASS
33	18.955E-3	0.022		PASS
34	27.163E-3	0.031		PASS
35	41.318E-3	0.048		PASS
36	22.391E-3	0.026		PASS
37	49.381E-3	0.057		PASS
38	25.753E-3	0.030		PASS
39	17.481E-3	0.020		PASS
40	18.794E-3	0.022		PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	57.608	99.800		
2	1.143	1.981	8.00	PASS
3	205.536E-3	0.356		PASS
4	251.232E-3	0.435	4.00	PASS
5	817.014E-3	1.415	10.70	PASS
6	69.951E-3	0.121	2.67	PASS
7	271.865E-3	0.471	7.20	PASS
8	71.345E-3	0.124	2.00	PASS
9	53.263E-3	0.092		PASS
10	46.800E-3	0.081	1.60	PASS
11	51.182E-3	0.089	3.10	PASS
12	39.684E-3	0.069	1.33	PASS
13	72.076E-3	0.125	2.00	PASS
14	35.403E-3	0.061		PASS
15	35.616E-3	0.062		PASS
16	32.913E-3	0.057		PASS
17	106.847E-3	0.185		PASS
18	30.561E-3	0.053		PASS
19	95.919E-3	0.166		PASS
20	29.770E-3	0.052		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	26.710E-3	0.046		PASS
22	23.332E-3	0.040		PASS
23	73.449E-3	0.127		PASS
24	24.974E-3	0.043		PASS
25	54.326E-3	0.094		PASS
26	24.542E-3	0.043		PASS
27	22.545E-3	0.039		PASS
28	22.312E-3	0.039		PASS
29	23.539E-3	0.041		PASS
30	19.263E-3	0.033		PASS
31	17.953E-3	0.031		PASS
32	24.651E-3	0.043		PASS
33	18.964E-3	0.033		PASS
34	30.807E-3	0.053		PASS
35	35.069E-3	0.061		PASS
36	22.026E-3	0.038		PASS
37	32.648E-3	0.057		PASS
38	23.206E-3	0.040		PASS
39	17.538E-3	0.030		PASS
40	27.671E-3	0.048		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	56.739	99.948		
2	518.159E-3	0.913	8.00	PASS
3	139.514E-3	0.246		PASS
4	205.996E-3	0.363	4.00	PASS
5	755.149E-3	1.330	10.70	PASS
6	147.763E-3	0.260	2.67	PASS
7	273.857E-3	0.482	7.20	PASS
8	54.783E-3	0.097	2.00	PASS
9	53.094E-3	0.094		PASS
10	53.927E-3	0.095	1.60	PASS
11	47.821E-3	0.084	3.10	PASS
12	33.554E-3	0.059	1.33	PASS
13	60.402E-3	0.106	2.00	PASS
14	42.688E-3	0.075		PASS
15	34.612E-3	0.061		PASS
16	29.831E-3	0.053		PASS
17	88.162E-3	0.155		PASS
18	50.004E-3	0.088		PASS
19	89.517E-3	0.158		PASS
20	33.336E-3	0.059		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	26.463E-3	0.047		PASS
22	33.960E-3	0.060		PASS
23	48.274E-3	0.085		PASS
24	44.713E-3	0.079		PASS
25	49.538E-3	0.087		PASS
26	32.538E-3	0.057		PASS
27	18.023E-3	0.032		PASS
28	21.781E-3	0.038		PASS
29	16.366E-3	0.029		PASS
30	18.287E-3	0.032		PASS
31	16.022E-3	0.028		PASS
32	18.396E-3	0.032		PASS
33	22.572E-3	0.040		PASS
34	15.737E-3	0.028		PASS
35	24.764E-3	0.044		PASS
36	33.384E-3	0.059		PASS
37	25.342E-3	0.045		PASS
38	28.575E-3	0.050		PASS
39	25.663E-3	0.045		PASS
40	17.500E-3	0.031		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	56.985	99.760		
2	858.422E-3	1.503	8.00	PASS
3	208.524E-3	0.365		PASS
4	406.099E-3	0.711	4.00	PASS
5	779.101E-3	1.364	10.70	PASS
6	133.755E-3	0.234	2.67	PASS
7	315.347E-3	0.552	7.20	PASS
8	59.376E-3	0.104	2.00	PASS
9	57.840E-3	0.101		PASS
10	68.568E-3	0.120	1.60	PASS
11	71.403E-3	0.125	3.10	PASS
12	39.692E-3	0.069	1.33	PASS
13	53.623E-3	0.094	2.00	PASS
14	49.042E-3	0.086		PASS
15	33.605E-3	0.059		PASS
16	44.470E-3	0.078		PASS
17	76.129E-3	0.133		PASS
18	49.086E-3	0.086		PASS
19	87.605E-3	0.153		PASS
20	48.719E-3	0.085		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	32.125E-3	0.056		PASS
22	50.473E-3	0.088		PASS
23	63.107E-3	0.110		PASS
24	41.200E-3	0.072		PASS
25	50.624E-3	0.089		PASS
26	43.102E-3	0.075		PASS
27	23.535E-3	0.041		PASS
28	24.054E-3	0.042		PASS
29	30.019E-3	0.053		PASS
30	25.773E-3	0.045		PASS
31	19.622E-3	0.034		PASS
32	26.307E-3	0.046		PASS
33	23.486E-3	0.041		PASS
34	27.385E-3	0.048		PASS
35	21.590E-3	0.038		PASS
36	21.220E-3	0.037		PASS
37	32.880E-3	0.058		PASS
38	21.980E-3	0.038		PASS
39	30.830E-3	0.054		PASS
40	32.205E-3	0.056		PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.837	98.874		
2	982.136E-3	3.367	8.00	PASS
3	204.232E-3	0.700		PASS
4	259.935E-3	0.891	4.00	PASS
5	200.251E-3	0.687	10.70	PASS
6	79.574E-3	0.273	2.67	PASS
7	153.863E-3	0.528	7.20	PASS
8	63.398E-3	0.217	2.00	PASS
9	60.256E-3	0.207		PASS
10	56.848E-3	0.195	1.60	PASS
11	175.739E-3	0.603	3.10	PASS
12	43.504E-3	0.149	1.33	PASS
13	132.116E-3	0.453	2.00	PASS
14	41.490E-3	0.142		PASS
15	31.475E-3	0.108		PASS
16	31.263E-3	0.107		PASS
17	35.312E-3	0.121		PASS
18	38.690E-3	0.133		PASS
19	33.312E-3	0.114		PASS
20	30.573E-3	0.105		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	25.550E-3	0.088		PASS
22	35.573E-3	0.122		PASS
23	76.173E-3	0.261		PASS
24	22.256E-3	0.076		PASS
25	59.818E-3	0.205		PASS
26	38.574E-3	0.132		PASS
27	18.937E-3	0.065		PASS
28	30.422E-3	0.104		PASS
29	27.729E-3	0.095		PASS
30	34.941E-3	0.120		PASS
31	29.473E-3	0.101		PASS
32	18.208E-3	0.062		PASS
33	26.492E-3	0.091		PASS
34	18.529E-3	0.064		PASS
35	52.891E-3	0.181		PASS
36	19.263E-3	0.066		PASS
37	26.960E-3	0.092		PASS
38	24.428E-3	0.084		PASS
39	16.527E-3	0.057		PASS
40	18.822E-3	0.065		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.200	99.413		
2	538.803E-3	1.899	8.00	PASS
3	136.666E-3	0.482		PASS
4	156.232E-3	0.551	4.00	PASS
5	185.720E-3	0.655	10.70	PASS
6	63.499E-3	0.224	2.67	PASS
7	149.968E-3	0.529	7.20	PASS
8	62.711E-3	0.221	2.00	PASS
9	52.571E-3	0.185		PASS
10	55.785E-3	0.197	1.60	PASS
11	165.636E-3	0.584	3.10	PASS
12	58.621E-3	0.207	1.33	PASS
13	121.453E-3	0.428	2.00	PASS
14	52.906E-3	0.187		PASS
15	28.019E-3	0.099		PASS
16	27.534E-3	0.097		PASS
17	32.033E-3	0.113		PASS
18	25.198E-3	0.089		PASS
19	32.034E-3	0.113		PASS
20	29.623E-3	0.104		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	32.113E-3	0.113		PASS
22	28.434E-3	0.100		PASS
23	48.105E-3	0.170		PASS
24	49.125E-3	0.173		PASS
25	52.568E-3	0.185		PASS
26	43.891E-3	0.155		PASS
27	31.941E-3	0.113		PASS
28	31.839E-3	0.112		PASS
29	20.285E-3	0.072		PASS
30	23.308E-3	0.082		PASS
31	28.041E-3	0.099		PASS
32	17.054E-3	0.060		PASS
33	35.178E-3	0.124		PASS
34	24.682E-3	0.087		PASS
35	44.814E-3	0.158		PASS
36	26.373E-3	0.093		PASS
37	17.320E-3	0.061		PASS
38	30.129E-3	0.106		PASS
39	33.830E-3	0.119		PASS
40	15.150E-3	0.053		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.600	98.719		
2	694.568E-3	2.397	8.00	PASS
3	272.615E-3	0.941		PASS
4	379.499E-3	1.310	4.00	PASS
5	226.733E-3	0.783	10.70	PASS
6	105.662E-3	0.365	2.67	PASS
7	137.362E-3	0.474	7.20	PASS
8	74.632E-3	0.258	2.00	PASS
9	65.013E-3	0.224		PASS
10	100.053E-3	0.345	1.60	PASS
11	129.005E-3	0.445	3.10	PASS
12	98.826E-3	0.341	1.33	PASS
13	118.764E-3	0.410	2.00	PASS
14	74.515E-3	0.257		PASS
15	37.668E-3	0.130		PASS
16	33.812E-3	0.117		PASS
17	42.771E-3	0.148		PASS
18	33.590E-3	0.116		PASS
19	34.042E-3	0.118		PASS
20	29.172E-3	0.101		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	36.736E-3	0.127		PASS
22	40.743E-3	0.141		PASS
23	32.937E-3	0.114		PASS
24	53.062E-3	0.183		PASS
25	43.190E-3	0.149		PASS
26	53.778E-3	0.186		PASS
27	35.301E-3	0.122		PASS
28	30.283E-3	0.105		PASS
29	20.412E-3	0.070		PASS
30	25.622E-3	0.088		PASS
31	29.343E-3	0.101		PASS
32	19.167E-3	0.066		PASS
33	25.776E-3	0.089		PASS
34	33.237E-3	0.115		PASS
35	27.351E-3	0.094		PASS
36	33.676E-3	0.116		PASS
37	30.146E-3	0.104		PASS
38	24.956E-3	0.086		PASS
39	34.699E-3	0.120		PASS
40	19.200E-3	0.066		PASS

Prova A: Freddo -10°C */Results – Test A: Cold -10°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	86.545	99.987		
2	741.258E-3	0.856	8.00	PASS
3	292.247E-3	0.338		PASS
4	132.676E-3	0.153	4.00	PASS
5	1.283	1.482	10.70	PASS
6	80.666E-3	0.093	2.67	PASS
7	513.592E-3	0.593	7.20	PASS
8	78.237E-3	0.090	2.00	PASS
9	52.599E-3	0.061		PASS
10	50.353E-3	0.058	1.60	PASS
11	157.928E-3	0.182	3.10	PASS
12	37.463E-3	0.043	1.33	PASS
13	86.012E-3	0.099	2.00	PASS
14	34.389E-3	0.040		PASS
15	32.591E-3	0.038		PASS
16	31.712E-3	0.037		PASS
17	31.303E-3	0.036		PASS
18	28.025E-3	0.032		PASS
19	59.619E-3	0.069		PASS
20	32.210E-3	0.037		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	23.381E-3	0.027		PASS
22	28.372E-3	0.033		PASS
23	69.614E-3	0.080		PASS
24	21.624E-3	0.025		PASS
25	77.454E-3	0.089		PASS
26	26.302E-3	0.030		PASS
27	20.547E-3	0.024		PASS
28	23.355E-3	0.027		PASS
29	58.247E-3	0.067		PASS
30	19.231E-3	0.022		PASS
31	62.631E-3	0.072		PASS
32	23.441E-3	0.027		PASS
33	19.112E-3	0.022		PASS
34	19.326E-3	0.022		PASS
35	45.784E-3	0.053		PASS
36	16.809E-3	0.019		PASS
37	37.890E-3	0.044		PASS
38	20.283E-3	0.023		PASS
39	18.180E-3	0.021		PASS
40	16.551E-3	0.019		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	85.317	100.032		
2	371.149E-3	0.435	8.00	PASS
3	189.069E-3	0.222		PASS
4	218.272E-3	0.256	4.00	PASS
5	1.292	1.515	10.70	PASS
6	125.558E-3	0.147	2.67	PASS
7	586.599E-3	0.688	7.20	PASS
8	77.817E-3	0.091	2.00	PASS
9	51.349E-3	0.060		PASS
10	47.355E-3	0.056	1.60	PASS
11	168.335E-3	0.197	3.10	PASS
12	41.392E-3	0.049	1.33	PASS
13	91.753E-3	0.108	2.00	PASS
14	31.798E-3	0.037		PASS
15	31.551E-3	0.037		PASS
16	30.699E-3	0.036		PASS
17	27.545E-3	0.032		PASS
18	27.596E-3	0.032		PASS
19	46.482E-3	0.054		PASS
20	23.339E-3	0.027		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	25.623E-3	0.030		PASS
22	23.088E-3	0.027		PASS
23	60.561E-3	0.071		PASS
24	33.483E-3	0.039		PASS
25	70.588E-3	0.083		PASS
26	32.023E-3	0.038		PASS
27	23.865E-3	0.028		PASS
28	22.707E-3	0.027		PASS
29	46.084E-3	0.054		PASS
30	32.520E-3	0.038		PASS
31	56.316E-3	0.066		PASS
32	24.202E-3	0.028		PASS
33	19.481E-3	0.023		PASS
34	22.119E-3	0.026		PASS
35	38.845E-3	0.046		PASS
36	24.930E-3	0.029		PASS
37	38.374E-3	0.045		PASS
38	21.020E-3	0.025		PASS
39	16.710E-3	0.020		PASS
40	15.631E-3	0.018		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	85.104	99.905		
2	811.690E-3	0.953	8.00	PASS
3	481.711E-3	0.565		PASS
4	317.240E-3	0.372	4.00	PASS
5	1.337	1.570	10.70	PASS
6	142.334E-3	0.167	2.67	PASS
7	588.517E-3	0.691	7.20	PASS
8	85.841E-3	0.101	2.00	PASS
9	75.582E-3	0.089		PASS
10	61.172E-3	0.072	1.60	PASS
11	191.329E-3	0.225	3.10	PASS
12	56.462E-3	0.066	1.33	PASS
13	121.254E-3	0.142	2.00	PASS
14	48.369E-3	0.057		PASS
15	49.970E-3	0.059		PASS
16	40.179E-3	0.047		PASS
17	48.687E-3	0.057		PASS
18	40.966E-3	0.048		PASS
19	45.529E-3	0.053		PASS
20	37.802E-3	0.044		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	35.163E-3	0.041		PASS
22	37.152E-3	0.044		PASS
23	60.970E-3	0.072		PASS
24	40.514E-3	0.048		PASS
25	62.171E-3	0.073		PASS
26	33.374E-3	0.039		PASS
27	29.320E-3	0.034		PASS
28	33.502E-3	0.039		PASS
29	58.984E-3	0.069		PASS
30	38.064E-3	0.045		PASS
31	50.863E-3	0.060		PASS
32	30.115E-3	0.035		PASS
33	23.785E-3	0.028		PASS
34	33.120E-3	0.039		PASS
35	46.480E-3	0.055		PASS
36	33.063E-3	0.039		PASS
37	44.123E-3	0.052		PASS
38	21.929E-3	0.026		PASS
39	21.425E-3	0.025		PASS
40	21.103E-3	0.025		PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	57.280	99.809		
2	936.457E-3	1.632	8.00	PASS
3	305.167E-3	0.532		PASS
4	163.370E-3	0.285	4.00	PASS
5	967.867E-3	1.686	10.70	PASS
6	102.446E-3	0.179	2.67	PASS
7	283.513E-3	0.494	7.20	PASS
8	72.461E-3	0.126	2.00	PASS
9	54.320E-3	0.095		PASS
10	48.073E-3	0.084	1.60	PASS
11	46.625E-3	0.081	3.10	PASS
12	41.804E-3	0.073	1.33	PASS
13	100.022E-3	0.174	2.00	PASS
14	36.667E-3	0.064		PASS
15	33.988E-3	0.059		PASS
16	42.031E-3	0.073		PASS
17	118.132E-3	0.206		PASS
18	31.655E-3	0.055		PASS
19	124.568E-3	0.217		PASS
20	34.780E-3	0.061		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	27.267E-3	0.048		PASS
22	25.565E-3	0.045		PASS
23	80.260E-3	0.140		PASS
24	23.051E-3	0.040		PASS
25	58.920E-3	0.103		PASS
26	25.724E-3	0.045		PASS
27	21.944E-3	0.038		PASS
28	20.639E-3	0.036		PASS
29	20.899E-3	0.036		PASS
30	19.813E-3	0.035		PASS
31	23.808E-3	0.041		PASS
32	21.417E-3	0.037		PASS
33	18.586E-3	0.032		PASS
34	26.691E-3	0.047		PASS
35	51.102E-3	0.089		PASS
36	18.029E-3	0.031		PASS
37	52.727E-3	0.092		PASS
38	27.209E-3	0.047		PASS
39	18.010E-3	0.031		PASS
40	26.193E-3	0.046		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	56.565	99.918		
2	348.220E-3	0.615	8.00	PASS
3	159.375E-3	0.282		PASS
4	252.014E-3	0.445	4.00	PASS
5	932.523E-3	1.647	10.70	PASS
6	109.520E-3	0.193	2.67	PASS
7	337.659E-3	0.596	7.20	PASS
8	69.769E-3	0.123	2.00	PASS
9	51.678E-3	0.091		PASS
10	47.811E-3	0.084	1.60	PASS
11	50.693E-3	0.090	3.10	PASS
12	38.025E-3	0.067	1.33	PASS
13	87.627E-3	0.155	2.00	PASS
14	39.575E-3	0.070		PASS
15	30.730E-3	0.054		PASS
16	48.202E-3	0.085		PASS
17	99.739E-3	0.176		PASS
18	46.915E-3	0.083		PASS
19	113.933E-3	0.201		PASS
20	39.258E-3	0.069		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	24.456E-3	0.043		PASS
22	39.106E-3	0.069		PASS
23	65.757E-3	0.116		PASS
24	37.798E-3	0.067		PASS
25	56.167E-3	0.099		PASS
26	30.041E-3	0.053		PASS
27	19.312E-3	0.034		PASS
28	18.363E-3	0.032		PASS
29	18.814E-3	0.033		PASS
30	19.683E-3	0.035		PASS
31	20.511E-3	0.036		PASS
32	23.930E-3	0.042		PASS
33	22.430E-3	0.040		PASS
34	29.465E-3	0.052		PASS
35	30.981E-3	0.055		PASS
36	42.740E-3	0.075		PASS
37	43.110E-3	0.076		PASS
38	33.134E-3	0.059		PASS
39	23.828E-3	0.042		PASS
40	33.217E-3	0.059		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	56.253	99.634		
2	904.583E-3	1.602	8.00	PASS
3	433.782E-3	0.768		PASS
4	378.857E-3	0.671	4.00	PASS
5	976.862E-3	1.730	10.70	PASS
6	155.133E-3	0.275	2.67	PASS
7	352.623E-3	0.625	7.20	PASS
8	82.172E-3	0.146	2.00	PASS
9	71.715E-3	0.127		PASS
10	61.587E-3	0.109	1.60	PASS
11	58.624E-3	0.104	3.10	PASS
12	61.947E-3	0.110	1.33	PASS
13	81.335E-3	0.144	2.00	PASS
14	55.862E-3	0.099		PASS
15	45.065E-3	0.080		PASS
16	49.724E-3	0.088		PASS
17	101.039E-3	0.179		PASS
18	71.244E-3	0.126		PASS
19	112.954E-3	0.200		PASS
20	54.546E-3	0.097		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	33.063E-3	0.059		PASS
22	50.110E-3	0.089		PASS
23	72.212E-3	0.128		PASS
24	51.842E-3	0.092		PASS
25	58.158E-3	0.103		PASS
26	32.344E-3	0.057		PASS
27	25.933E-3	0.046		PASS
28	25.737E-3	0.046		PASS
29	24.179E-3	0.043		PASS
30	24.986E-3	0.044		PASS
31	26.049E-3	0.046		PASS
32	25.178E-3	0.045		PASS
33	24.368E-3	0.043		PASS
34	25.203E-3	0.045		PASS
35	32.363E-3	0.057		PASS
36	44.942E-3	0.080		PASS
37	44.332E-3	0.079		PASS
38	39.504E-3	0.070		PASS
39	27.964E-3	0.050		PASS
40	34.222E-3	0.061		PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.762	98.927		
2	797.292E-3	2.742	8.00	PASS
3	152.628E-3	0.525		PASS
4	285.844E-3	0.983	4.00	PASS
5	133.578E-3	0.459	10.70	PASS
6	98.020E-3	0.337	2.67	PASS
7	152.108E-3	0.523	7.20	PASS
8	63.816E-3	0.219	2.00	PASS
9	54.451E-3	0.187		PASS
10	53.841E-3	0.185	1.60	PASS
11	170.813E-3	0.588	3.10	PASS
12	37.307E-3	0.128	1.33	PASS
13	125.827E-3	0.433	2.00	PASS
14	33.235E-3	0.114		PASS
15	34.235E-3	0.118		PASS
16	30.972E-3	0.107		PASS
17	31.949E-3	0.110		PASS
18	29.538E-3	0.102		PASS
19	41.832E-3	0.144		PASS
20	27.963E-3	0.096		PASS

Average harmonic current results - Phase 1				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	24.282E-3	0.084		PASS
22	22.873E-3	0.079		PASS
23	65.891E-3	0.227		PASS
24	23.144E-3	0.080		PASS
25	55.171E-3	0.190		PASS
26	23.946E-3	0.082		PASS
27	23.894E-3	0.082		PASS
28	24.727E-3	0.085		PASS
29	25.440E-3	0.087		PASS
30	20.651E-3	0.071		PASS
31	36.978E-3	0.127		PASS
32	24.251E-3	0.083		PASS
33	19.867E-3	0.068		PASS
34	25.343E-3	0.087		PASS
35	44.366E-3	0.153		PASS
36	17.840E-3	0.061		PASS
37	21.947E-3	0.075		PASS
38	24.008E-3	0.083		PASS
39	21.150E-3	0.073		PASS
40	19.932E-3	0.069		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.385	99.308		
2	610.600E-3	2.136	8.00	PASS
3	157.297E-3	0.550		PASS
4	188.486E-3	0.659	4.00	PASS
5	153.475E-3	0.537	10.70	PASS
6	69.702E-3	0.244	2.67	PASS
7	133.939E-3	0.469	7.20	PASS
8	61.679E-3	0.216	2.00	PASS
9	52.898E-3	0.185		PASS
10	66.064E-3	0.231	1.60	PASS
11	170.995E-3	0.598	3.10	PASS
12	41.976E-3	0.147	1.33	PASS
13	117.142E-3	0.410	2.00	PASS
14	43.016E-3	0.150		PASS
15	30.768E-3	0.108		PASS
16	30.557E-3	0.107		PASS
17	31.530E-3	0.110		PASS
18	24.526E-3	0.086		PASS
19	42.476E-3	0.149		PASS
20	32.170E-3	0.113		PASS

Average harmonic current results - Phase 2				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	28.882E-3	0.101		PASS
22	36.552E-3	0.128		PASS
23	46.813E-3	0.164		PASS
24	32.553E-3	0.114		PASS
25	55.183E-3	0.193		PASS
26	32.642E-3	0.114		PASS
27	20.858E-3	0.073		PASS
28	32.504E-3	0.114		PASS
29	19.061E-3	0.067		PASS
30	20.366E-3	0.071		PASS
31	34.210E-3	0.120		PASS
32	20.676E-3	0.072		PASS
33	26.288E-3	0.092		PASS
34	40.272E-3	0.141		PASS
35	30.311E-3	0.106		PASS
36	27.102E-3	0.095		PASS
37	23.666E-3	0.083		PASS
38	26.979E-3	0.094		PASS
39	16.404E-3	0.057		PASS
40	16.799E-3	0.059		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
1	28.342	98.241		
2	757.712E-3	2.626	8.00	PASS
3	330.316E-3	1.145		PASS
4	344.743E-3	1.195	4.00	PASS
5	213.631E-3	0.741	10.70	PASS
6	123.984E-3	0.430	2.67	PASS
7	121.939E-3	0.423	7.20	PASS
8	99.473E-3	0.345	2.00	PASS
9	74.947E-3	0.260		PASS
10	99.316E-3	0.344	1.60	PASS
11	165.395E-3	0.573	3.10	PASS
12	62.358E-3	0.216	1.33	PASS
13	125.119E-3	0.434	2.00	PASS
14	64.713E-3	0.224		PASS
15	43.199E-3	0.150		PASS
16	41.832E-3	0.145		PASS
17	48.154E-3	0.167		PASS
18	38.047E-3	0.132		PASS
19	41.565E-3	0.144		PASS
20	34.116E-3	0.118		PASS

Average harmonic current results - Phase 3				
Hn	Ieff [A]	Ieff [%]	Limit [%]	Result
21	33.503E-3	0.116		PASS
22	37.932E-3	0.131		PASS
23	48.722E-3	0.169		PASS
24	36.893E-3	0.128		PASS
25	58.368E-3	0.202		PASS
26	42.259E-3	0.146		PASS
27	28.303E-3	0.098		PASS
28	34.453E-3	0.119		PASS
29	27.013E-3	0.094		PASS
30	23.943E-3	0.083		PASS
31	25.454E-3	0.088		PASS
32	28.063E-3	0.097		PASS
33	27.744E-3	0.096		PASS
34	45.523E-3	0.158		PASS
35	31.813E-3	0.110		PASS
36	37.141E-3	0.129		PASS
37	28.240E-3	0.098		PASS
38	24.495E-3	0.085		PASS
39	24.783E-3	0.086		PASS
40	21.413E-3	0.074		PASS

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
Prova a temperatura ambiente: 14/06/2013 */test at ambient temperature*	Alberto Crocco
Prova a -10°C: 18/06/2013 */test at -10°C*	Alberto Crocco
Prova a 55°C: 20/06/2013 */test at 55°C*	Alberto Crocco
Prova a 40°C: 20/06/2013 */test at 40°C*	Alberto Crocco

Fluttuazioni di tensione e di flicker

/Voltage fluctuation and flicker

Norme di riferimento */Reference standards*
CEI EN 61000-3-11:2001-08
EN 61000-3-11:2000-11
IEC 61000-3-11:2000-08

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di flicker */Flickermeter*	EM Test DPA503	HRMFLK01
Generatore in corrente alternata variabile in tensione e frequenza */Variable test power supply*	☐ Elettrotest TPS 22kW	TPS22K01
	☒ Elettrotest TPS 90kW	TPS90K01
Impedenza di rete di riferimento */Network reference impedance*	Eurotest	IMPR0005
Camera climatica */Climatic chamber*	☐ VC 4033	CLTCHR02
	☐ Fitoclima 8000	CLTCHCT4
	☒ Polithermo	CLTCHR10

Incertezza di misura */Measure uncertainty*	6%
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLFLK00
Procedura e allestimento della prova conformi alla normativa CEI EN 61000-3-11 */Procedure and setup comply with CEI EN 61000-3-11*	

Luogo di prova */Test site*		Camera climatica */Climatic chamber*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.1°C	Umidità relativa */Relative humidity*	65.3%

Risultati – Fluttuazioni di tensione e flicker

/Results – Voltage fluctuation and flicker

Tabelle delle misure – Fluttuazioni di tensione e flicker in condizioni di riferimento

/Table of measures – Voltage fluctuation and flicker at reference conditions

Potenza di uscita: 100%Pn

/output power: 100%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.154	0.144	0.151	1.00	PASS
Plt	0.145	0.137	0.145	0.65	PASS
dc [%]	0.051	0.053	0.054	3.30	PASS
dmax [%]	0.182	0.157	0.188	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.149	0.141	0.148	1.00	PASS
dc [%]	0.051	0.053	0.054	3.30	PASS
dmax [%]	0.168	0.135	0.179	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.149	0.141	0.148	1.00	PASS
dc [%]	0.050	0.051	0.051	3.30	PASS
dmax [%]	0.163	0.144	0.186	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.154	0.144	0.151	1.00	PASS
dc [%]	0.042	0.044	0.044	3.30	PASS
dmax [%]	0.173	0.130	0.172	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.151	0.142	0.148	1.00	PASS
dc [%]	0.038	0.044	0.044	3.30	PASS
dmax [%]	0.164	0.138	0.160	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.149	0.140	0.147	1.00	PASS
dc [%]	0.039	0.038	0.036	3.30	PASS
dmax [%]	0.150	0.154	0.164	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.148	0.138	0.148	1.00	PASS
dc [%]	0.047	0.051	0.049	3.30	PASS
dmax [%]	0.170	0.122	0.168	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.148	0.141	0.148	1.00	PASS
dc [%]	0.049	0.052	0.052	3.30	PASS
dmax [%]	0.181	0.134	0.188	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.142	0.134	0.142	1.00	PASS
dc [%]	0.042	0.045	0.043	3.30	PASS
dmax [%]	0.151	0.126	0.172	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.136	0.129	0.137	1.00	PASS
dc [%]	0.046	0.047	0.048	3.30	PASS
dmax [%]	0.153	0.135	0.165	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.140	0.133	0.141	1.00	PASS
dc [%]	0.049	0.053	0.051	3.30	PASS
dmax [%]	0.182	0.134	0.185	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.138	0.131	0.139	1.00	PASS
dc [%]	0.047	0.047	0.051	3.30	PASS
dmax [%]	0.137	0.128	0.151	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.137	0.129	0.137	1.00	PASS
dc [%]	0.048	0.048	0.049	3.30	PASS
dmax [%]	0.170	0.157	0.175	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.167	0.160	0.167	1.00	PASS
Plt	0.161	0.153	0.159	0.65	PASS
dc [%]	0.056	0.043	0.045	3.30	PASS
dmax [%]	0.183	0.193	0.185	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.160	0.154	0.159	1.00	PASS
dc [%]	0.052	0.041	0.042	3.30	PASS
dmax [%]	0.171	0.153	0.150	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.166	0.160	0.167	1.00	PASS
dc [%]	0.041	0.035	0.040	3.30	PASS
dmax [%]	0.182	0.164	0.160	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.167	0.159	0.167	1.00	PASS
dc [%]	0.040	0.035	0.038	3.30	PASS
dmax [%]	0.175	0.147	0.155	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.167	0.159	0.166	1.00	PASS
dc [%]	0.048	0.037	0.036	3.30	PASS
dmax [%]	0.169	0.193	0.185	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.167	0.159	0.167	1.00	PASS
dc [%]	0.056	0.043	0.036	3.30	PASS
dmax [%]	0.173	0.157	0.159	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.158	0.149	0.155	1.00	PASS
dc [%]	0.039	0.036	0.037	3.30	PASS
dmax [%]	0.172	0.152	0.143	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.158	0.150	0.155	1.00	PASS
dc [%]	0.053	0.037	0.036	3.30	PASS
dmax [%]	0.175	0.141	0.139	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.157	0.149	0.154	1.00	PASS
dc [%]	0.046	0.043	0.045	3.30	PASS
dmax [%]	0.167	0.153	0.142	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.157	0.149	0.155	1.00	PASS
dc [%]	0.037	0.027	0.029	3.30	PASS
dmax [%]	0.156	0.135	0.139	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.157	0.149	0.154	1.00	PASS
dc [%]	0.036	0.033	0.033	3.30	PASS
dmax [%]	0.153	0.136	0.138	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.157	0.149	0.155	1.00	PASS
dc [%]	0.045	0.033	0.034	3.30	PASS
dmax [%]	0.183	0.147	0.145	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.157	0.149	0.155	1.00	PASS
dc [%]	0.036	0.032	0.033	3.30	PASS
dmax [%]	0.168	0.143	0.137	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.182	0.163	0.181	1.00	PASS
Plt	0.179	0.160	0.179	0.65	PASS
dc [%]	0.054	0.041	0.035	3.30	PASS
dmax [%]	0.242	0.210	0.213	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.178	0.158	0.176	1.00	PASS
dc [%]	0.030	0.028	0.028	3.30	PASS
dmax [%]	0.224	0.195	0.198	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.180	0.159	0.180	1.00	PASS
dc [%]	0.033	0.037	0.035	3.30	PASS
dmax [%]	0.217	0.198	0.187	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.180	0.159	0.179	1.00	PASS
dc [%]	0.044	0.038	0.034	3.30	PASS
dmax [%]	0.205	0.196	0.201	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.181	0.161	0.180	1.00	PASS
dc [%]	0.054	0.041	0.028	3.30	PASS
dmax [%]	0.206	0.190	0.191	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.182	0.163	0.181	1.00	PASS
dc [%]	0.036	0.033	0.032	3.30	PASS
dmax [%]	0.205	0.200	0.213	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.179	0.161	0.179	1.00	PASS
dc [%]	0.047	0.034	0.028	3.30	PASS
dmax [%]	0.213	0.205	0.200	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.179	0.161	0.179	1.00	PASS
dc [%]	0.046	0.038	0.030	3.30	PASS
dmax [%]	0.206	0.191	0.211	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.178	0.159	0.178	1.00	PASS
dc [%]	0.044	0.032	0.029	3.30	PASS
dmax [%]	0.205	0.186	0.204	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.178	0.159	0.178	1.00	PASS
dc [%]	0.044	0.038	0.027	3.30	PASS
dmax [%]	0.242	0.205	0.202	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.177	0.158	0.176	1.00	PASS
dc [%]	0.030	0.031	0.030	3.30	PASS
dmax [%]	0.196	0.210	0.197	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.178	0.159	0.179	1.00	PASS
dc [%]	0.045	0.037	0.031	3.30	PASS
dmax [%]	0.204	0.196	0.205	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.178	0.159	0.179	1.00	PASS
dc [%]	0.044	0.031	0.031	3.30	PASS
dmax [%]	0.204	0.194	0.196	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Prova B: Caldo secco 40°C */Test B: Dry heat 40°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.148	0.142	0.146	1.00	PASS
Plt	0.137	0.131	0.136	0.65	PASS
dc [%]	0.052	0.055	0.049	3.30	PASS
dmax [%]	0.220	0.291	0.266	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.145	0.138	0.141	1.00	PASS
dc [%]	0.040	0.053	0.046	3.30	PASS
dmax [%]	0.216	0.191	0.228	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.134	0.128	0.133	1.00	PASS
dc [%]	0.042	0.049	0.044	3.30	PASS
dmax [%]	0.161	0.160	0.158	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.135	0.129	0.134	1.00	PASS
dc [%]	0.048	0.049	0.049	3.30	PASS
dmax [%]	0.220	0.157	0.207	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.148	0.142	0.146	1.00	PASS
dc [%]	0.052	0.055	0.049	3.30	PASS
dmax [%]	0.193	0.291	0.266	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.143	0.138	0.141	1.00	PASS
dc [%]	0.048	0.048	0.045	3.30	PASS
dmax [%]	0.192	0.215	0.196	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.140	0.134	0.138	1.00	PASS
dc [%]	0.047	0.051	0.045	3.30	PASS
dmax [%]	0.169	0.191	0.177	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.136	0.129	0.134	1.00	PASS
dc [%]	0.050	0.051	0.045	3.30	PASS
dmax [%]	0.162	0.166	0.170	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.134	0.127	0.132	1.00	PASS
dc [%]	0.043	0.047	0.039	3.30	PASS
dmax [%]	0.171	0.174	0.165	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.128	0.123	0.128	1.00	PASS
dc [%]	0.041	0.043	0.041	3.30	PASS
dmax [%]	0.150	0.146	0.151	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.139	0.138	0.145	1.00	PASS
dc [%]	0.005	0.006	0.008	3.30	PASS
dmax [%]	0.120	0.138	0.123	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.127	0.121	0.127	1.00	PASS
dc [%]	0.043	0.048	0.040	3.30	PASS
dmax [%]	0.148	0.194	0.164	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.126	0.121	0.125	1.00	PASS
dc [%]	0.046	0.048	0.042	3.30	PASS
dmax [%]	0.152	0.144	0.139	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.158	0.148	0.150	1.00	PASS
Plt	0.148	0.137	0.141	0.65	PASS
dc [%]	0.043	0.042	0.046	3.30	PASS
dmax [%]	0.358	0.234	0.280	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.142	0.131	0.134	1.00	PASS
dc [%]	0.040	0.037	0.041	3.30	PASS
dmax [%]	0.168	0.150	0.150	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.151	0.138	0.146	1.00	PASS
dc [%]	0.032	0.032	0.034	3.30	PASS
dmax [%]	0.171	0.159	0.164	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.149	0.135	0.144	1.00	PASS
dc [%]	0.039	0.039	0.041	3.30	PASS
dmax [%]	0.182	0.162	0.173	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.148	0.134	0.143	1.00	PASS
dc [%]	0.033	0.031	0.035	3.30	PASS
dmax [%]	0.173	0.155	0.173	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.145	0.133	0.140	1.00	PASS
dc [%]	0.036	0.041	0.046	3.30	PASS
dmax [%]	0.358	0.234	0.280	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.137	0.127	0.130	1.00	PASS
dc [%]	0.043	0.042	0.046	3.30	PASS
dmax [%]	0.176	0.166	0.198	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.139	0.130	0.133	1.00	PASS
dc [%]	0.040	0.040	0.040	3.30	PASS
dmax [%]	0.187	0.154	0.184	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.157	0.146	0.149	1.00	PASS
dc [%]	0.043	0.040	0.043	3.30	PASS
dmax [%]	0.187	0.160	0.182	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.141	0.132	0.133	1.00	PASS
dc [%]	0.038	0.034	0.040	3.30	PASS
dmax [%]	0.192	0.230	0.187	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.158	0.148	0.150	1.00	PASS
dc [%]	0.041	0.039	0.039	3.30	PASS
dmax [%]	0.238	0.210	0.230	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.146	0.137	0.138	1.00	PASS
dc [%]	0.038	0.040	0.038	3.30	PASS
dmax [%]	0.202	0.211	0.165	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.155	0.144	0.146	1.00	PASS
dc [%]	0.038	0.037	0.038	3.30	PASS
dmax [%]	0.185	0.156	0.166	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.133	0.127	0.129	1.00	PASS
Plt	0.124	0.117	0.120	0.65	PASS
dc [%]	0.031	0.033	0.033	3.30	PASS
dmax [%]	0.170	0.175	0.166	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.128	0.126	0.127	1.00	PASS
dc [%]	0.025	0.029	0.030	3.30	PASS
dmax [%]	0.155	0.152	0.161	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.133	0.127	0.129	1.00	PASS
dc [%]	0.025	0.026	0.025	3.30	PASS
dmax [%]	0.155	0.143	0.131	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.131	0.125	0.128	1.00	PASS
dc [%]	0.025	0.027	0.025	3.30	PASS
dmax [%]	0.148	0.140	0.141	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.132	0.125	0.127	1.00	PASS
dc [%]	0.028	0.030	0.033	3.30	PASS
dmax [%]	0.170	0.149	0.156	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.123	0.114	0.119	1.00	PASS
dc [%]	0.031	0.033	0.033	3.30	PASS
dmax [%]	0.150	0.139	0.137	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.118	0.111	0.114	1.00	PASS
dc [%]	0.026	0.030	0.029	3.30	PASS
dmax [%]	0.150	0.134	0.127	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.118	0.109	0.113	1.00	PASS
dc [%]	0.021	0.024	0.024	3.30	PASS
dmax [%]	0.143	0.132	0.166	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.124	0.116	0.121	1.00	PASS
dc [%]	0.027	0.029	0.030	3.30	PASS
dmax [%]	0.155	0.175	0.128	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.115	0.107	0.110	1.00	PASS
dc [%]	0.023	0.026	0.027	3.30	PASS
dmax [%]	0.146	0.112	0.111	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.116	0.111	0.112	1.00	PASS
dc [%]	0.029	0.031	0.032	3.30	PASS
dmax [%]	0.144	0.134	0.120	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.122	0.116	0.117	1.00	PASS
dc [%]	0.027	0.030	0.031	3.30	PASS
dmax [%]	0.147	0.121	0.119	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.122	0.115	0.117	1.00	PASS
dc [%]	0.024	0.026	0.026	3.30	PASS
dmax [%]	0.146	0.126	0.119	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Prova B: Caldo secco 55°C */Test B: Dry heat 55°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.148	0.138	0.143	1.00	PASS
Plt	0.143	0.132	0.138	0.65	PASS
dc [%]	0.039	0.044	0.044	3.30	PASS
dmax [%]	0.275	0.302	0.270	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.141	0.130	0.138	1.00	PASS
dc [%]	0.034	0.039	0.037	3.30	PASS
dmax [%]	0.149	0.154	0.162	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.144	0.133	0.140	1.00	PASS
dc [%]	0.033	0.037	0.037	3.30	PASS
dmax [%]	0.185	0.172	0.197	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.143	0.133	0.139	1.00	PASS
dc [%]	0.033	0.036	0.036	3.30	PASS
dmax [%]	0.153	0.144	0.160	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.140	0.129	0.137	1.00	PASS
dc [%]	0.039	0.037	0.044	3.30	PASS
dmax [%]	0.275	0.229	0.270	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.138	0.127	0.134	1.00	PASS
dc [%]	0.031	0.036	0.035	3.30	PASS
dmax [%]	0.137	0.131	0.151	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.140	0.129	0.136	1.00	PASS
dc [%]	0.035	0.042	0.039	3.30	PASS
dmax [%]	0.193	0.302	0.254	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.137	0.124	0.132	1.00	PASS
dc [%]	0.039	0.044	0.042	3.30	PASS
dmax [%]	0.132	0.138	0.160	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.142	0.131	0.137	1.00	PASS
dc [%]	0.032	0.038	0.037	3.30	PASS
dmax [%]	0.174	0.208	0.231	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.148	0.137	0.143	1.00	PASS
dc [%]	0.039	0.043	0.041	3.30	PASS
dmax [%]	0.149	0.168	0.179	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.144	0.133	0.139	1.00	PASS
dc [%]	0.034	0.040	0.038	3.30	PASS
dmax [%]	0.146	0.163	0.188	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.146	0.136	0.141	1.00	PASS
dc [%]	0.034	0.040	0.039	3.30	PASS
dmax [%]	0.156	0.170	0.183	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.148	0.138	0.143	1.00	PASS
dc [%]	0.033	0.037	0.036	3.30	PASS
dmax [%]	0.253	0.207	0.240	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Note */Remarks*
La prova è stata eseguita alla massima potenza erogabile a 55°C (pari a 30kW) in accordo alle specifiche del cliente. */test has been performed maximum allowable power at 55°C (equal to 30kW) according to manufacturer specifications*

Potenza di uscita: 66%Pn

/output power: 66%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.213	0.215	0.215	1.00	PASS
Plt	0.147	0.147	0.149	0.65	PASS
dc [%]	0.035	0.037	0.037	3.30	PASS
dmax [%]	0.216	0.230	0.212	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.140	0.141	0.143	1.00	PASS
dc [%]	0.026	0.028	0.028	3.30	PASS
dmax [%]	0.143	0.196	0.164	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.213	0.215	0.215	1.00	PASS
dc [%]	0.034	0.037	0.037	3.30	PASS
dmax [%]	0.216	0.230	0.212	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.146	0.147	0.148	1.00	PASS
dc [%]	0.030	0.030	0.033	3.30	PASS
dmax [%]	0.183	0.204	0.171	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.146	0.147	0.149	1.00	PASS
dc [%]	0.030	0.032	0.033	3.30	PASS
dmax [%]	0.155	0.148	0.177	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.142	0.142	0.144	1.00	PASS
dc [%]	0.031	0.032	0.033	3.30	PASS
dmax [%]	0.182	0.173	0.196	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.138	0.138	0.140	1.00	PASS
dc [%]	0.035	0.036	0.037	3.30	PASS
dmax [%]	0.143	0.176	0.180	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.137	0.138	0.139	1.00	PASS
dc [%]	0.032	0.032	0.033	3.30	PASS
dmax [%]	0.145	0.180	0.180	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.137	0.139	0.140	1.00	PASS
dc [%]	0.029	0.030	0.029	3.30	PASS
dmax [%]	0.149	0.152	0.169	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.129	0.128	0.131	1.00	PASS
dc [%]	0.031	0.031	0.031	3.30	PASS
dmax [%]	0.135	0.132	0.155	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.129	0.129	0.132	1.00	PASS
dc [%]	0.033	0.032	0.034	3.30	PASS
dmax [%]	0.151	0.136	0.163	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.129	0.128	0.131	1.00	PASS
dc [%]	0.032	0.031	0.031	3.30	PASS
dmax [%]	0.163	0.147	0.165	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.127	0.126	0.129	1.00	PASS
dc [%]	0.030	0.031	0.031	3.30	PASS
dmax [%]	0.145	0.144	0.163	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Note */Remarks*
La prova è stata eseguita al 66% della massima potenza erogabile a 55°C in accordo alle specifiche del cliente. */test has been performed at 66% of maximum allowable power at 55°C according to manufacturer specifications.*

Potenza di uscita: 33%Pn

/output power: 33%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.157	0.146	0.158	1.00	PASS
Plt	0.118	0.104	0.116	0.65	PASS
dc [%]	0.024	0.023	0.023	3.30	PASS
dmax [%]	0.192	0.183	0.216	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.107	0.091	0.100	1.00	PASS
dc [%]	0.021	0.021	0.021	3.30	PASS
dmax [%]	0.133	0.111	0.124	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.110	0.092	0.105	1.00	PASS
dc [%]	0.024	0.023	0.023	3.30	PASS
dmax [%]	0.150	0.127	0.148	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.114	0.095	0.110	1.00	PASS
dc [%]	0.019	0.020	0.019	3.30	PASS
dmax [%]	0.138	0.131	0.144	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.112	0.095	0.112	1.00	PASS
dc [%]	0.021	0.021	0.021	3.30	PASS
dmax [%]	0.140	0.134	0.142	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.109	0.093	0.107	1.00	PASS
dc [%]	0.019	0.018	0.018	3.30	PASS
dmax [%]	0.131	0.126	0.160	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.101	0.084	0.097	1.00	PASS
dc [%]	0.015	0.015	0.015	3.30	PASS
dmax [%]	0.104	0.100	0.116	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.101	0.087	0.099	1.00	PASS
dc [%]	0.018	0.018	0.019	3.30	PASS
dmax [%]	0.116	0.106	0.114	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.101	0.087	0.099	1.00	PASS
dc [%]	0.020	0.020	0.021	3.30	PASS
dmax [%]	0.123	0.102	0.114	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.113	0.101	0.112	1.00	PASS
dc [%]	0.022	0.021	0.022	3.30	PASS
dmax [%]	0.126	0.122	0.127	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.108	0.093	0.107	1.00	PASS
dc [%]	0.018	0.020	0.021	3.30	PASS
dmax [%]	0.120	0.132	0.157	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.157	0.146	0.158	1.00	PASS
dc [%]	0.020	0.023	0.023	3.30	PASS
dmax [%]	0.192	0.183	0.216	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.146	0.134	0.145	1.00	PASS
dc [%]	0.019	0.021	0.020	3.30	PASS
dmax [%]	0.176	0.179	0.204	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Note */Remarks*
La prova è stata eseguita al 33% della massima potenza erogabile a 55°C in accordo alle specifiche del cliente. */test has been performed at 33% of maximum allowable power at 55°C according to manufacturer specifications.*

Prova A: Freddo -10°C */Results – Test A: Cold -10°C*

Potenza di uscita: 100%Pn

/output power: 100%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.159	0.146	0.154	1.00	PASS
Plt	0.149	0.137	0.144	0.65	PASS
dc [%]	0.062	0.062	0.063	3.30	PASS
dmax [%]	0.368	0.313	0.363	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.159	0.146	0.154	1.00	PASS
dc [%]	0.058	0.056	0.063	3.30	PASS
dmax [%]	0.256	0.148	0.193	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.155	0.143	0.151	1.00	PASS
dc [%]	0.058	0.061	0.059	3.30	PASS
dmax [%]	0.228	0.144	0.168	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.150	0.138	0.145	1.00	PASS
dc [%]	0.052	0.053	0.055	3.30	PASS
dmax [%]	0.368	0.227	0.319	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.148	0.136	0.144	1.00	PASS
dc [%]	0.053	0.054	0.054	3.30	PASS
dmax [%]	0.206	0.143	0.161	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.149	0.137	0.145	1.00	PASS
dc [%]	0.052	0.053	0.059	3.30	PASS
dmax [%]	0.267	0.162	0.216	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.146	0.134	0.141	1.00	PASS
dc [%]	0.049	0.048	0.054	3.30	PASS
dmax [%]	0.363	0.313	0.211	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.143	0.131	0.137	1.00	PASS
dc [%]	0.049	0.052	0.050	3.30	PASS
dmax [%]	0.204	0.190	0.144	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.145	0.132	0.139	1.00	PASS
dc [%]	0.060	0.059	0.060	3.30	PASS
dmax [%]	0.212	0.144	0.148	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.145	0.132	0.140	1.00	PASS
dc [%]	0.062	0.061	0.056	3.30	PASS
dmax [%]	0.288	0.278	0.363	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.149	0.136	0.143	1.00	PASS
dc [%]	0.062	0.061	0.063	3.30	PASS
dmax [%]	0.222	0.163	0.173	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.151	0.139	0.146	1.00	PASS
dc [%]	0.061	0.062	0.057	3.30	PASS
dmax [%]	0.239	0.210	0.166	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.151	0.138	0.145	1.00	PASS
dc [%]	0.058	0.058	0.058	3.30	PASS
dmax [%]	0.286	0.181	0.216	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 66%Pn

/output power: 66%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.151	0.144	0.147	1.00	PASS
Plt	0.147	0.139	0.143	0.65	PASS
dc [%]	0.048	0.041	0.046	3.30	PASS
dmax [%]	0.407	0.277	0.304	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.142	0.133	0.137	1.00	PASS
dc [%]	0.041	0.033	0.040	3.30	PASS
dmax [%]	0.200	0.219	0.176	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.141	0.132	0.136	1.00	PASS
dc [%]	0.043	0.039	0.046	3.30	PASS
dmax [%]	0.209	0.140	0.140	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.144	0.136	0.141	1.00	PASS
dc [%]	0.042	0.039	0.041	3.30	PASS
dmax [%]	0.240	0.153	0.166	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.148	0.139	0.144	1.00	PASS
dc [%]	0.047	0.041	0.043	3.30	PASS
dmax [%]	0.219	0.161	0.173	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.151	0.144	0.147	1.00	PASS
dc [%]	0.045	0.038	0.045	3.30	PASS
dmax [%]	0.212	0.144	0.170	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.147	0.139	0.144	1.00	PASS
dc [%]	0.041	0.034	0.040	3.30	PASS
dmax [%]	0.202	0.152	0.161	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.151	0.143	0.147	1.00	PASS
dc [%]	0.042	0.037	0.039	3.30	PASS
dmax [%]	0.204	0.155	0.171	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.149	0.141	0.145	1.00	PASS
dc [%]	0.040	0.041	0.046	3.30	PASS
dmax [%]	0.211	0.145	0.175	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.148	0.141	0.145	1.00	PASS
dc [%]	0.039	0.033	0.041	3.30	PASS
dmax [%]	0.204	0.141	0.153	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.150	0.142	0.145	1.00	PASS
dc [%]	0.046	0.039	0.045	3.30	PASS
dmax [%]	0.227	0.168	0.198	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.147	0.140	0.144	1.00	PASS
dc [%]	0.042	0.035	0.040	3.30	PASS
dmax [%]	0.202	0.144	0.169	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.148	0.141	0.145	1.00	PASS
dc [%]	0.048	0.039	0.045	3.30	PASS
dmax [%]	0.407	0.277	0.304	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Potenza di uscita: 33%Pn

/output power: 33%Pn

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.146	0.147	0.145	1.00	PASS
Plt	0.135	0.129	0.134	0.65	PASS
dc [%]	0.184	0.161	0.160	3.30	PASS
dmax [%]	0.374	0.318	0.326	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	L1	L2	L3	Limit	Result
Pst	0.146	0.147	0.145	1.00	PASS
dc [%]	0.184	0.161	0.160	3.30	PASS
dmax [%]	0.374	0.318	0.326	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 2	L1	L2	L3	Limit	Result
Pst	0.139	0.132	0.135	1.00	PASS
dc [%]	0.027	0.030	0.032	3.30	PASS
dmax [%]	0.234	0.194	0.172	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 3	L1	L2	L3	Limit	Result
Pst	0.137	0.127	0.133	1.00	PASS
dc [%]	0.026	0.027	0.030	3.30	PASS
dmax [%]	0.173	0.128	0.136	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 4	L1	L2	L3	Limit	Result
Pst	0.135	0.126	0.132	1.00	PASS
dc [%]	0.026	0.029	0.029	3.30	PASS
dmax [%]	0.164	0.139	0.150	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 5	L1	L2	L3	Limit	Result
Pst	0.131	0.123	0.130	1.00	PASS
dc [%]	0.029	0.029	0.031	3.30	PASS
dmax [%]	0.165	0.115	0.125	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 6	L1	L2	L3	Limit	Result
Pst	0.133	0.125	0.131	1.00	PASS
dc [%]	0.027	0.028	0.030	3.30	PASS
dmax [%]	0.249	0.217	0.181	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 7	L1	L2	L3	Limit	Result
Pst	0.131	0.124	0.130	1.00	PASS
dc [%]	0.028	0.029	0.030	3.30	PASS
dmax [%]	0.180	0.133	0.135	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 8	L1	L2	L3	Limit	Result
Pst	0.132	0.124	0.132	1.00	PASS
dc [%]	0.026	0.027	0.027	3.30	PASS
dmax [%]	0.185	0.140	0.125	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 9	L1	L2	L3	Limit	Result
Pst	0.129	0.122	0.129	1.00	PASS
dc [%]	0.027	0.031	0.028	3.30	PASS
dmax [%]	0.172	0.148	0.156	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 10	L1	L2	L3	Limit	Result
Pst	0.136	0.133	0.133	1.00	PASS
dc [%]	0.028	0.030	0.031	3.30	PASS
dmax [%]	0.174	0.134	0.137	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 11	L1	L2	L3	Limit	Result
Pst	0.139	0.130	0.136	1.00	PASS
dc [%]	0.026	0.027	0.030	3.30	PASS
dmax [%]	0.181	0.193	0.227	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Flicker measurement 12	L1	L2	L3	Limit	Result
Pst	0.135	0.125	0.134	1.00	PASS
dc [%]	0.026	0.026	0.028	3.30	PASS
dmax [%]	0.185	0.126	0.168	4.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
Prova a temperatura ambiente: 17/06/2013 */test at ambient temperature*	Alberto Crocco
Prova a -10°C: 19/06/2013 */test at -10°C*	Alberto Crocco
Prova a 55°C: 21/06/2013 */test at 55°C*	Alberto Crocco
Prova a 40°C: 20/06/2013 */test at 40°C*	Alberto Crocco

Verifica delle condizioni di connessione, riconnessione ed erogazione graduale della potenza

/Verification of the connection and re-connection condition

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.1.1
Annex B. Point B.1.1.2

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Potenza */ Power* [W] P<1.5KW	1.2%
Potenza */ Power* [W] P>1.5KW	1.5%
Tempo */ Time* [s]	0.5 s
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1110
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

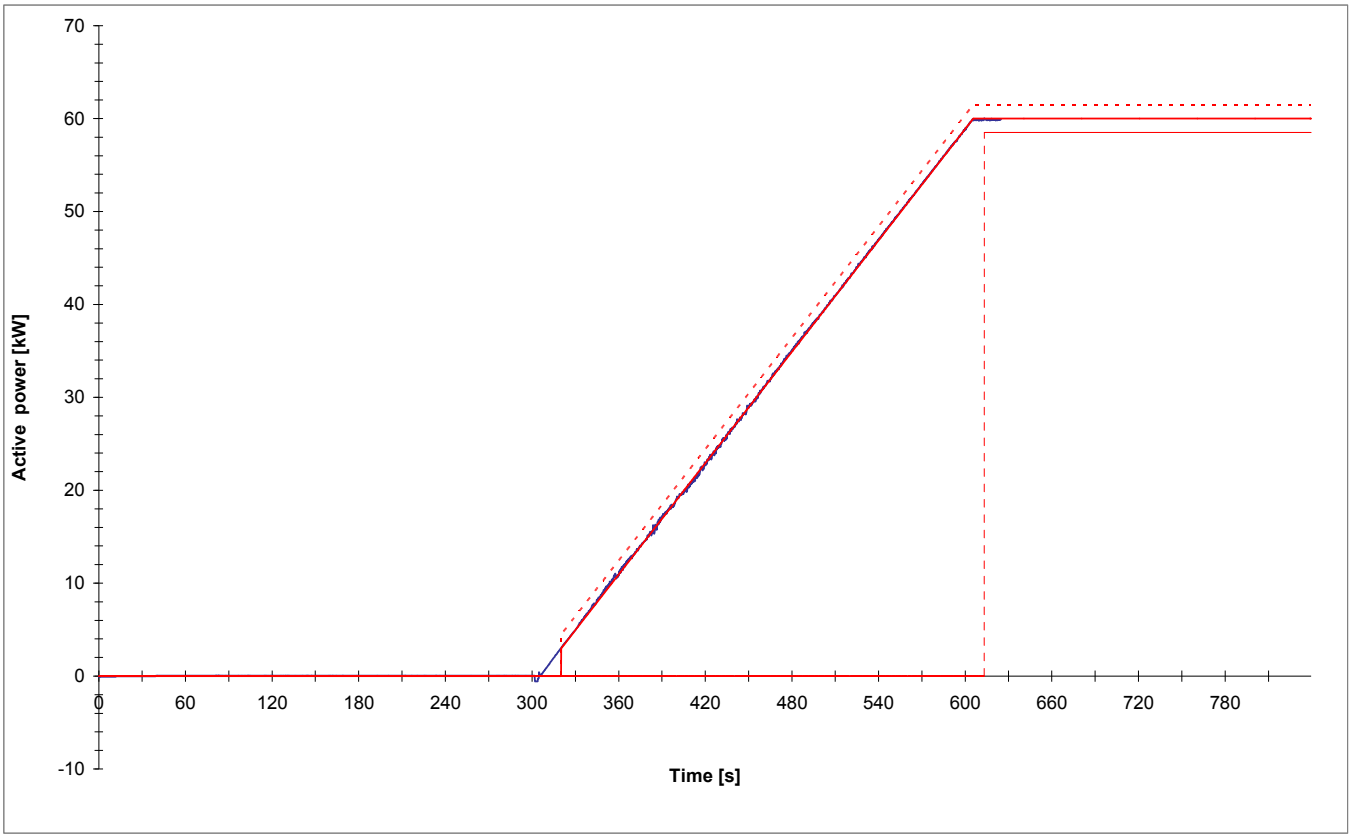
Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.3°C	Umidità relativa */Relative humidity*	54%

Risultati di prova

/Test results

Soglia di sovratensione – riconnessione dopo fault di rete

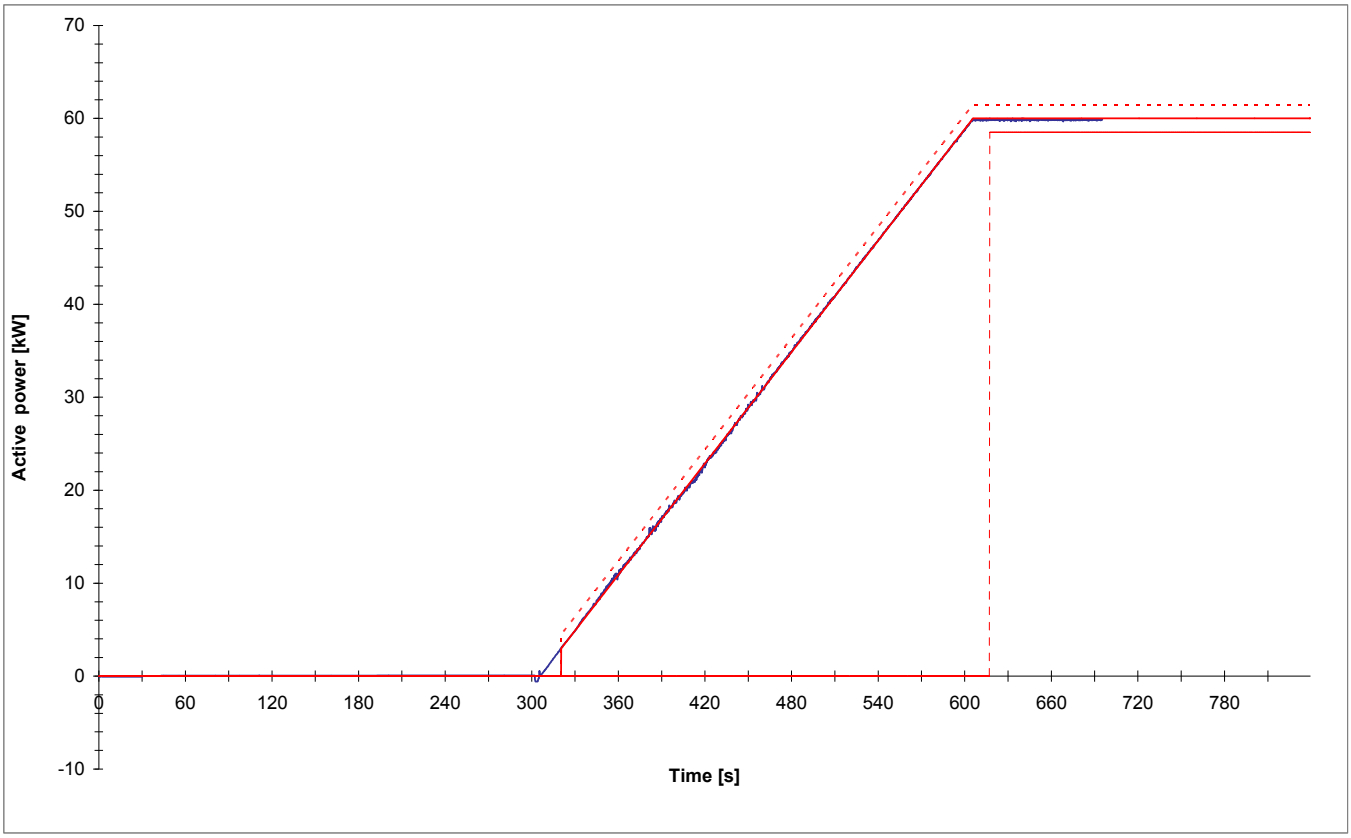
/overvolatge threshold – re connection after grid fault



Descrizione del test */Description of test*	**Esito** */Result*
Tempo di riconnessione */Reconnection time*	312.6 s
Tempo per arrivare alla massima potenza dopo la riconnessione */Time to full power after reconnection*	300.4 s
Aumento di potenza */Power increase*	Sotto al limite */Under the limit*

Soglia di sottotensione – riconnessione dopo fault di rete

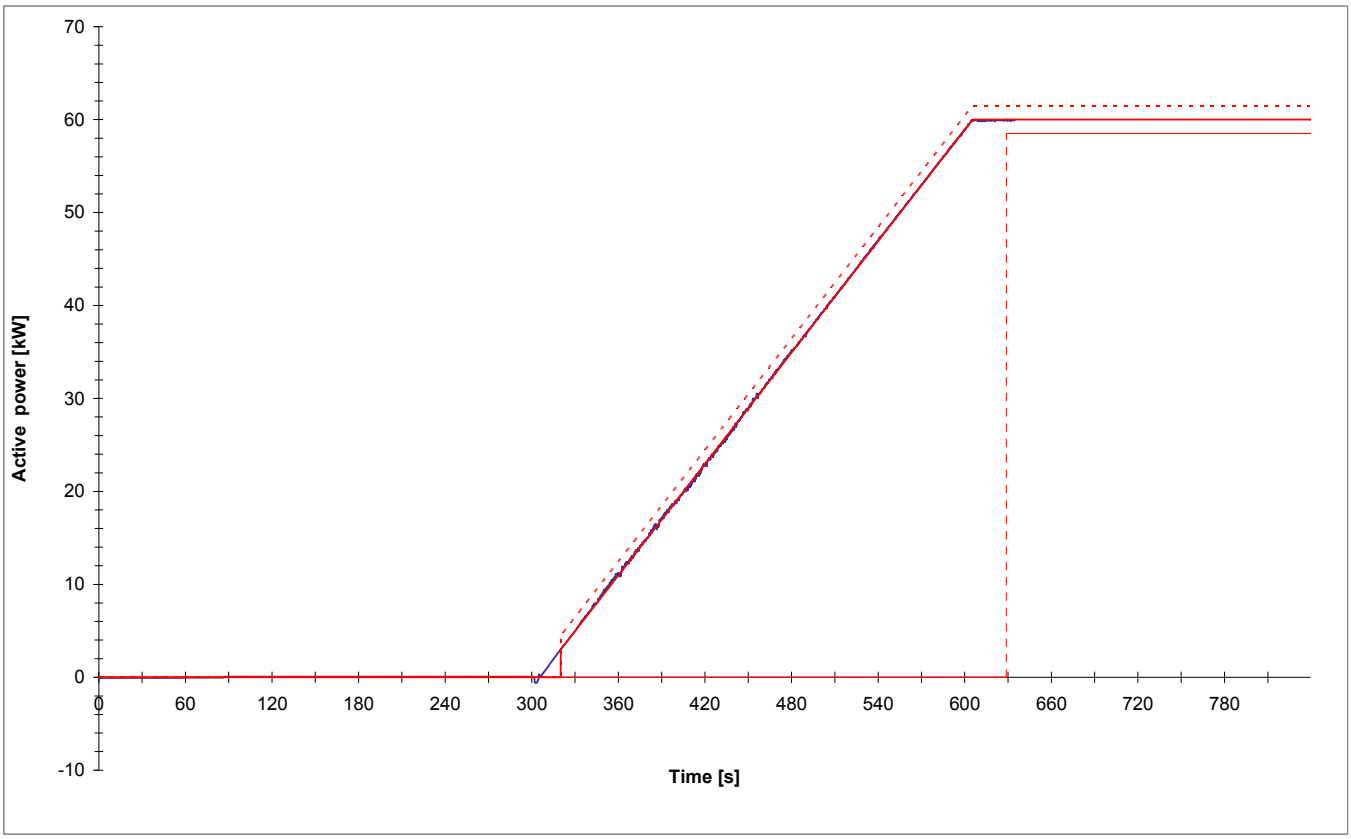
/undervolatge threshold – re connection after grid fault



Descrizione del test */Description of test*	**Esito** */Result*
Tempo di riconnessione */Reconnection time*	313.0 s
Tempo per arrivare alla massima potenza dopo la riconnessione */Time to full power after reconnection*	304.0 s
Aumento di potenza */Power increase*	Sotto al limite */Under the limit*

Soglia di sovrafrequenza – riconnessione dopo fault di rete

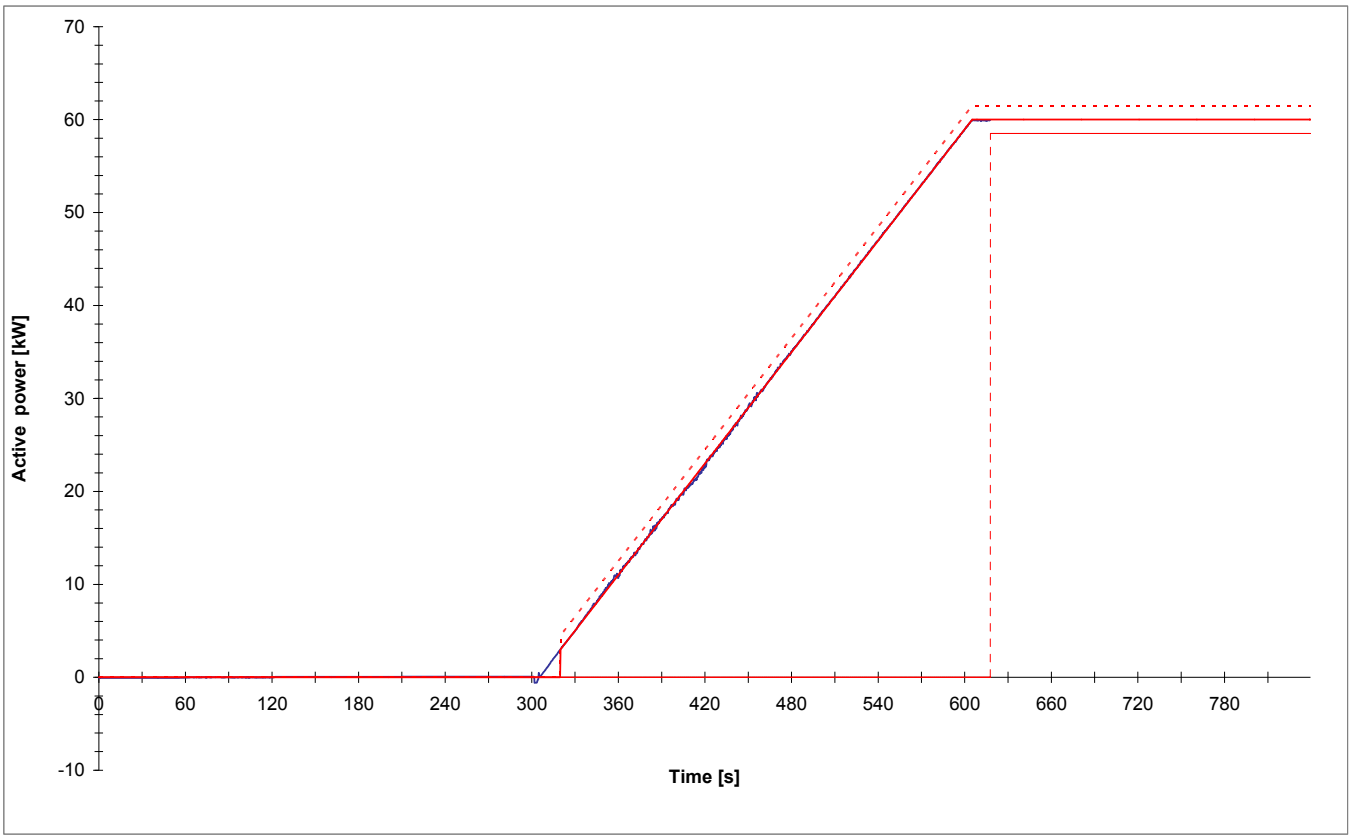
/overfrequency threshold – re connection after grid fault



Descrizione del test */Description of test*	**Esito** */Result*
Tempo di riconnessione */Reconnection time*	312.6 s
Tempo per arrivare alla massima potenza dopo la riconnessione */Time to full power after reconnection*	316.0 s
Aumento di potenza */Power increase*	Sotto al limite */Under the limit*

Soglia di sottofrequenza – riconnessione dopo fault di rete

/underfrequency threshold – re connection after grid fault



Descrizione del test */Description of test*	**Esito** */Result*
Tempo di riconnessione */Reconnection time*	312.4 s
Tempo per arrivare alla massima potenza dopo la riconnessione */Time to full power after reconnection*	305.2 s
Aumento di potenza */Power increase*	Sotto al limite */Under the limit*

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
16/05/2013	Alberto Crocco

Verifica dei requisiti costruttivi: capability erogazione della potenza reattiva – modalità di esecuzione e registrazione della prova

/Verification of the construction requirements: capability to supply reactive power – testing and recording methods

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.2.1

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Tensione */Volt* [V]	0.26%
Corrente */Current* [A]	1.0%
Potenza attiva */Active Power* [W] <1.5kW	1.2%
Potenza attiva */Active Power* [W] >1.5kW	1.5%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.2%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.5%
Tempo */Time* [s]	0.5 s
Fattore di potenza */Power Factor*	1.0
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1220
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20,2°C	Umidità relativa */Relative humidity*	54,2%

Tabella di misura – comportamento induttivo (Q/P = -48,43%)

/Table of measures - Inductive behaviour (Q/P = -48,43%)

Power-Bin	Active power [W]	Reactive power [VAr]	Power factor (cosφ)
0 % - 10 %	5894,275	-29998,605	-0,193
	5874,799	-30012,587	-0,192
	5933,012	-29987,699	-0,194
10 % - 20 %	11849,581	-30010,883	-0,367
	11863,320	-29972,745	-0,368
	11866,320	-29954,077	-0,368
20 % - 30 %	17804,429	-29997,890	-0,510
	17800,926	-29994,238	-0,510
	17821,480	-29983,674	-0,509
30 % - 40 %	23892,831	-29983,710	-0,623
	23879,836	-29999,051	-0,623
	23874,325	-29996,388	-0,623
40 % - 50 %	29957,118	-29996,542	-0,707
	29950,904	-29996,071	-0,707
	29942,939	-30000,610	-0,704
50 % - 60 %	36028,883	-30015,064	-0,768
	36019,969	-30016,803	-0,768
	36025,706	-30011,858	-0,768
60 % - 70 %	42023,005	-30057,989	-0,813
	42009,896	-30058,935	-0,813
	42015,726	-30056,125	-0,813
70 % - 80 %	48001,987	-30139,120	-0,847
	48014,402	-30133,790	-0,847
	48022,724	-30142,874	-0,844
80 % - 90 %	54031,847	-30209,206	-0,873
	53997,973	-30237,450	-0,873
	54001,919	-30216,875	-0,873
90 % - 100 %	59385,095	-30278,072	-0,891
	59394,318	-30289,324	-0,891
	59404,091	-30282,779	-0,891

Tabella di misura – comportamento capacitivo (Q/P = 48,43%)

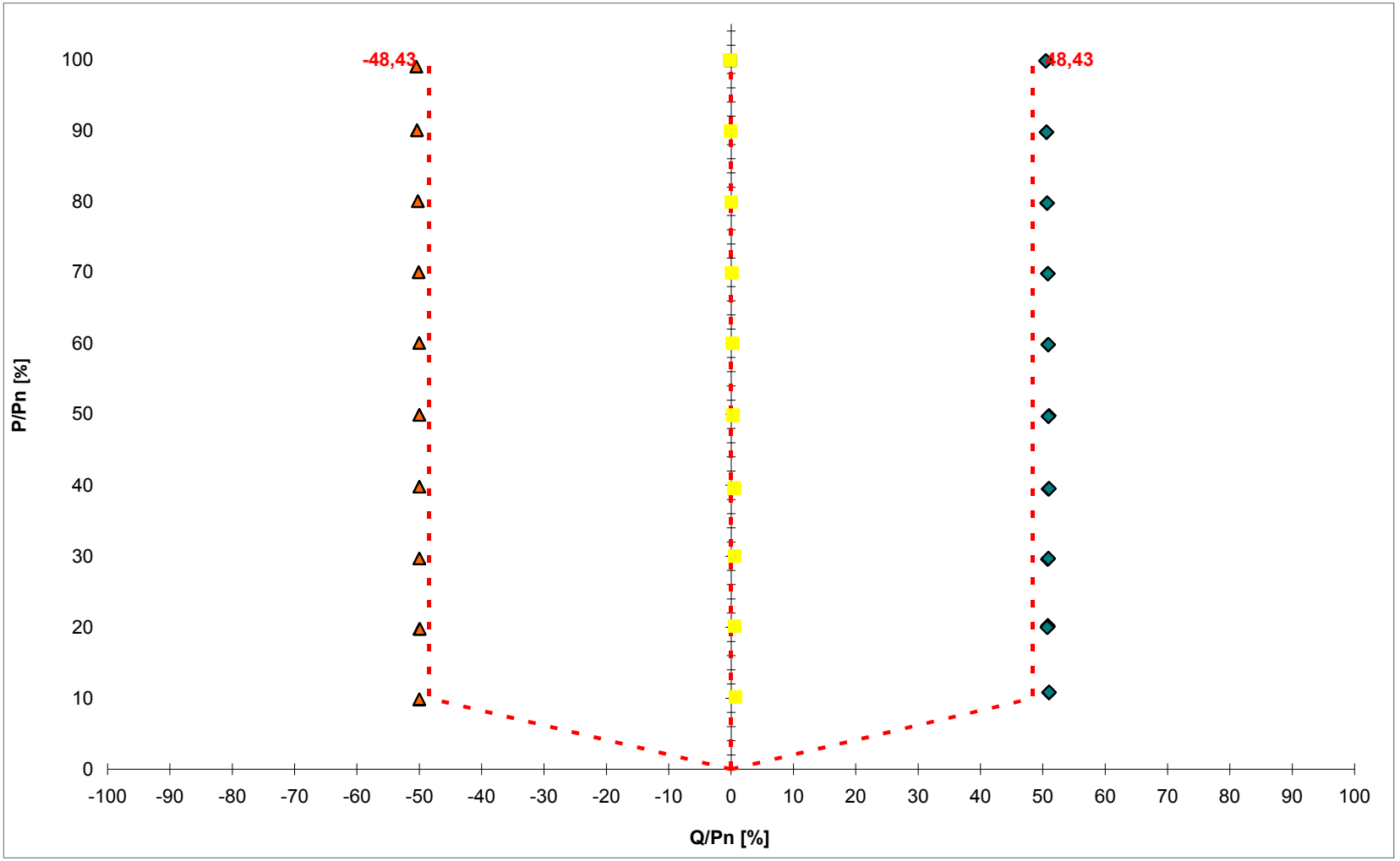
/Table of measures - capacitive behaviour (Q/P = 48,43%)

Power-Bin	Active power [W]	Reactive power [VAr]	Power factor (cosφ)
0 % - 10 %	6478,513	30576,703	0,207
	6473,364	30599,226	0,207
	6510,213	30591,781	0,208
10 % - 20 %	12138,576	30492,342	0,370
	12045,217	30505,294	0,367
	11985,285	30430,048	0,366
20 % - 30 %	17803,426	30525,533	0,504
	17738,285	30463,710	0,503
	17811,951	30534,131	0,504
30 % - 40 %	23677,068	30539,578	0,613
	23715,883	30574,088	0,613
	23718,244	30605,855	0,613
40 % - 50 %	29878,248	30588,662	0,699
	29833,986	30530,377	0,699
	29824,149	30530,995	0,699
50 % - 60 %	35888,463	30511,077	0,762
	35875,172	30512,055	0,762
	35896,599	30524,907	0,762
60 % - 70 %	41909,800	30478,572	0,809
	41883,632	30476,403	0,809
	41884,382	30487,639	0,808
70 % - 80 %	47847,869	30404,183	0,844
	47851,927	30413,115	0,844
	47866,413	30418,282	0,844
80 % - 90 %	53839,390	30345,463	0,871
	53853,779	30351,666	0,871
	53857,635	30348,817	0,871
90 % - 100 %	59867,001	30290,333	0,892
	59872,225	30301,671	0,892
	59881,190	30296,021	0,892

Tabella di misura – comportamento nominale (cosφ = 1)

/Table of measures - Rated behaviour (cosφ = 1)

Power-Bin	Active power [W]	Reactive power [VAr]	Power factor (cosφ)
0 % - 10 %	6116,834	433,963	0,997
	6105,121	431,882	0,997
	6108,467	429,426	0,997
10 % - 20 %	12087,531	370,932	1,000
	12087,419	374,530	0,999
	12079,659	371,116	1,000
20 % - 30 %	18024,016	355,059	1,000
	18024,890	354,951	1,000
	18001,780	357,481	1,000
30 % - 40 %	23756,423	325,000	1,000
	23771,634	324,531	1,000
	23708,056	269,202	1,000
40 % - 50 %	29920,264	176,535	1,000
	29891,246	196,795	1,000
	29927,125	244,214	1,000
50 % - 60 %	35994,472	142,153	1,000
	35985,413	140,791	1,000
	35990,044	140,199	1,000
60 % - 70 %	41948,840	78,540	1,000
	41940,939	80,629	1,000
	41941,328	76,195	1,000
70 % - 80 %	47936,136	25,282	1,000
	47933,993	23,351	1,000
	47932,596	24,255	1,000
80 % - 90 %	53908,599	-33,642	1,000
	53912,748	-30,377	1,000
	53914,414	-32,343	1,000
90 % - 100 %	59911,648	-85,006	1,000
	59916,774	-86,179	1,000
	59922,783	-86,734	1,000


-48,43
48,43
P/Pn [%]
Q/Pn [%]
100
90
80
70
60
50
40
30
20
10
0
-100
-90
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
16/05/2013	Alberto Crocco

Erogazione di potenza reattiva secondo un livello assegnato

/Supply reactive power according to a predefined level

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.2.3

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

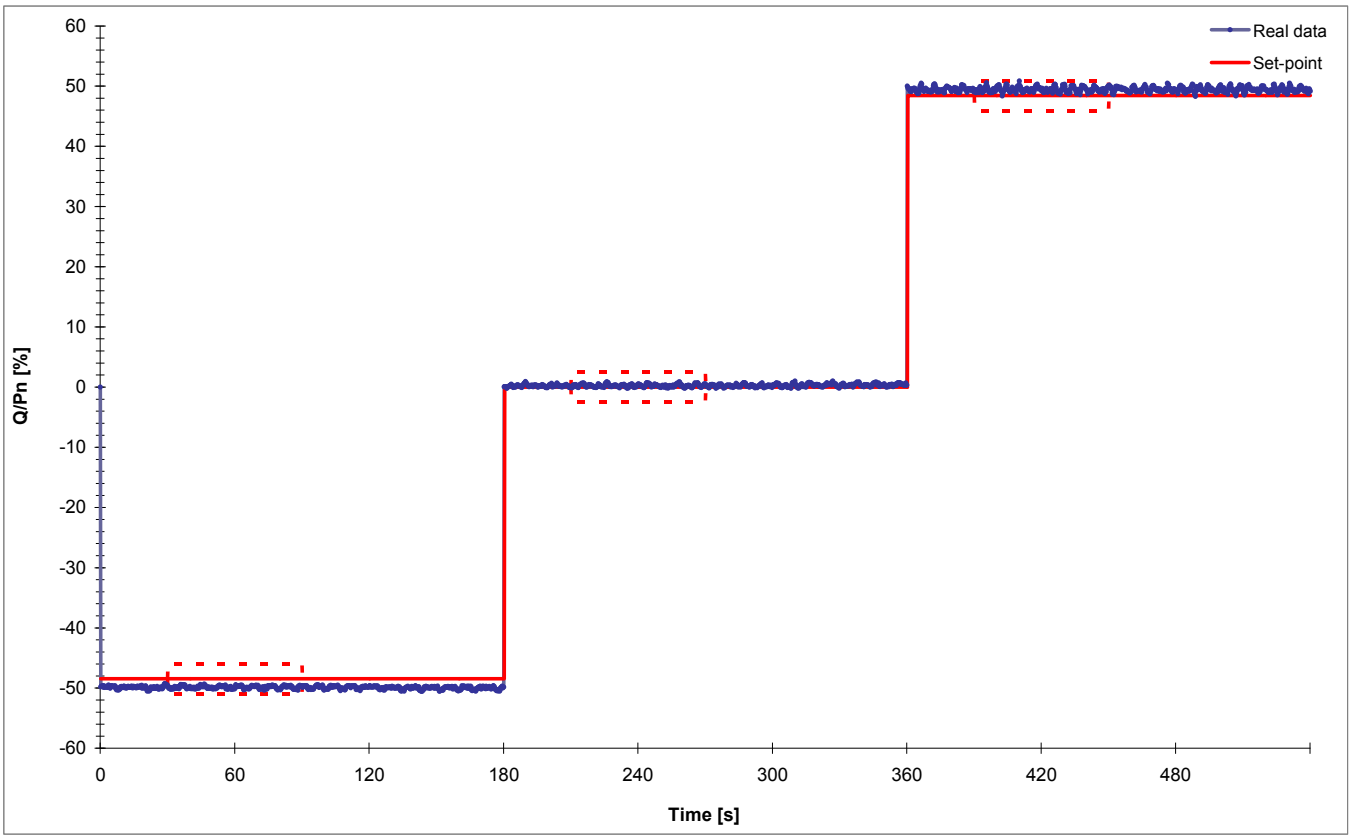
Incertezza di misura */Measure uncertainty*	
Tensione */Volt* [V]	0.26%
Corrente */Current* [A]	1.0%
Potenza attiva */Active Power* [W] <1.5kW	1.2%
Potenza attiva */Active Power* [W] >1.5kW	1.5%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.2%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.5%
Tempo */Time* [s]	0.5 s
Fattore di potenza */Power factor*	1.0
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1230
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20,4°C	Umidità relativa */Relative humidity*	46%

Risultati di prova

/Test results



	Q/Pn set point [%]	Q/Pn measured [%]	Δ Q/Pn [%]
-Qmin	-48,43	-49,871	1,441
Q_0	0	0,239	-0,239
+Qmax	48,43	49,448	-1,018

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
21/05/2013	Alberto Crocco

Tempo di risposta ad una variazione a gradino del livello assegnato

/Response time to a step variation in the set level

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.2.4

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Tensione */Volt* [V]	0.26%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.2%
Potenza reattiva */Reactive Power* [VAR] >1.5kW	1.5%
Tempo */Time* [s]	0.5 s
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

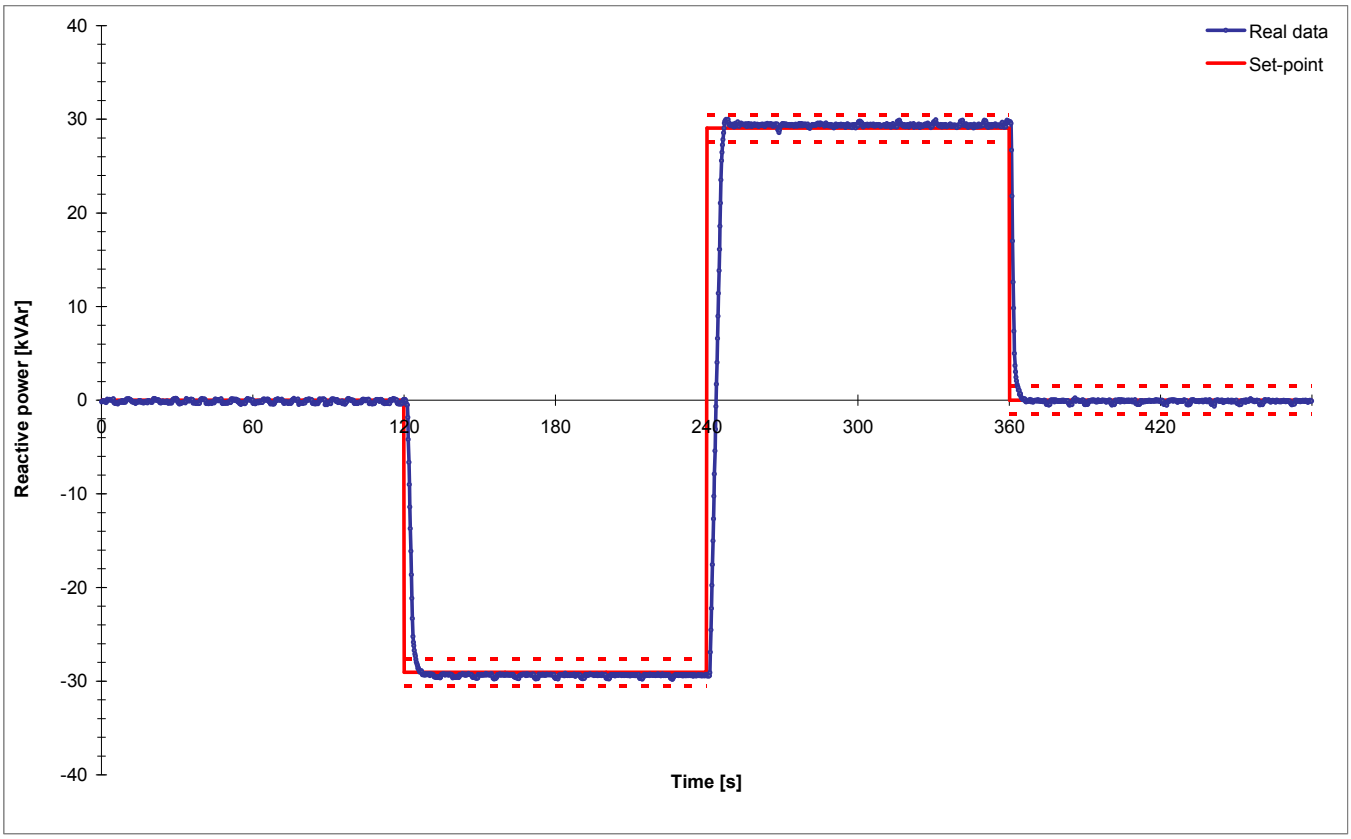
Procedura di test */Test procedure*	LPLB1240
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.4°C	Umidità relativa */Relative humidity*	46%

Risultati di prova

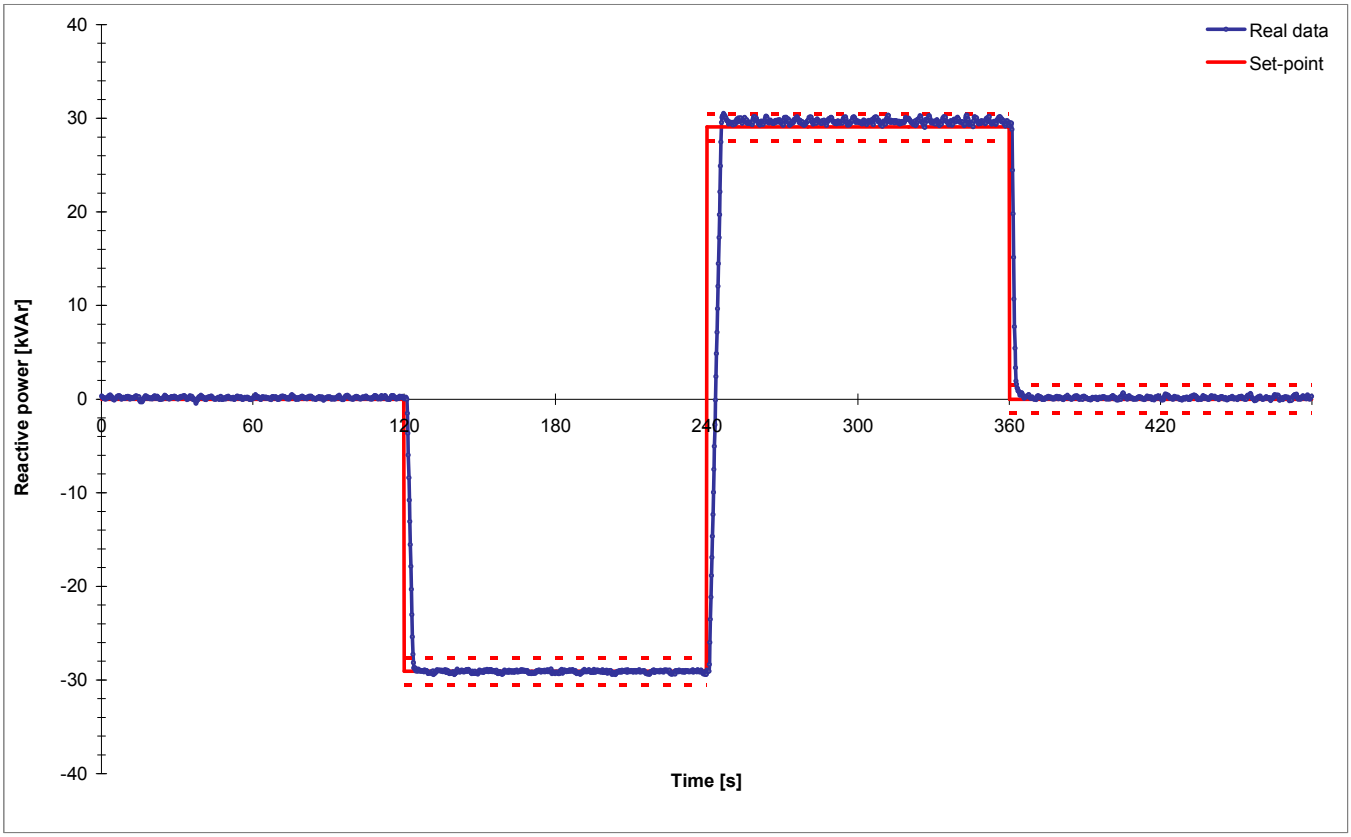
/Test results

Prova a 100%Pn */test at 100%Pn*



Reactive power set-point	Time [s]	Reactive power [VAR]	Voltage L1 [V]	Voltage L2 [V]	Voltage L3 [V]
Step 1 = Q_0 to $-Q_{min}$	4,40	-28728,95	230,93	230,97	230,68
Step 2 = $-Q_{min}$ to $+Q_{max}$	6,20	27536,84	231,17	231,22	230,90
Step 3 = $+Q_{max}$ to Q_0	3,00	274,60	231,01	231,06	230,76

Prova a 50%Pn */test at 50%Pn*



Reactive power set-point	Time [s]	Reactive power [VAR]	Voltage L1 [V]	Voltage L2 [V]	Voltage L3 [V]
Step 1 = Q_0 to $-Q_{min}$	3,40	-28519,26	230,59	230,61	230,34
Step 2 = $-Q_{min}$ to $+Q_{max}$	5,60	27960,19	230,78	230,82	230,52
Step 3 = $+Q_{max}$ to Q_0	2,80	591,09	230,64	230,67	230,39

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
21/05/2013	Alberto Crocco

Erogazione automatica di potenza reattiva secondo una curva caratteristica cos(φ)=ƒ(P)

/Automatic reactive power supply according to a cos(φ)=ƒ(P) characteristic curve

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.2.5

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

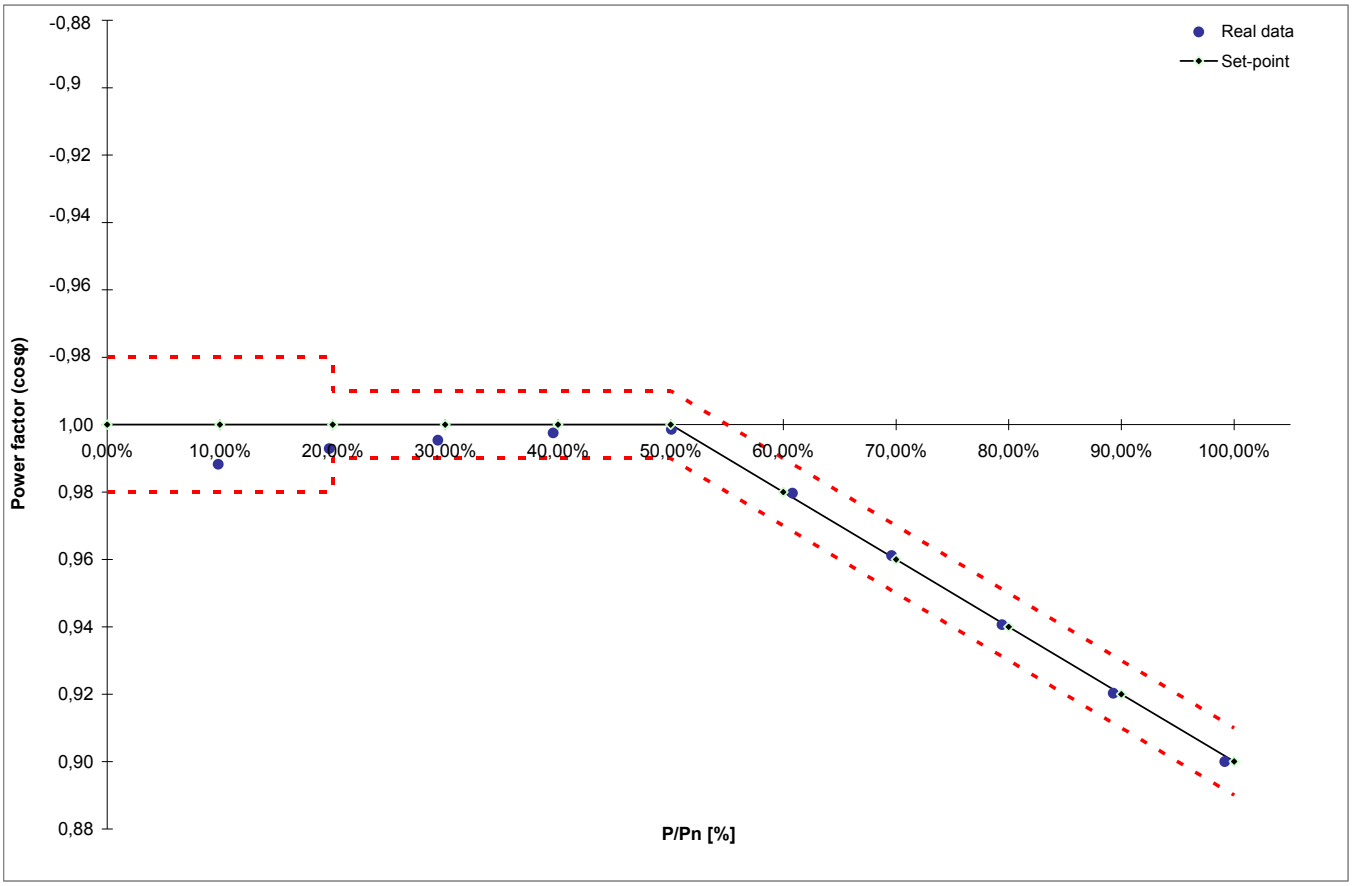
Incertezza di misura */Measure uncertainty*	
Potenza attiva */Active Power* [W] <1.5kW	1.2%
Potenza attiva */Active Power* [W] >1.5kW	1.5%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.2%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.5%
Fattore di potenza */Power Factor*	1.0
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1250
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.1°C	Umidità relativa */Relative humidity*	46%

Risultati di prova

/Test results



Power set-point [%]	Output voltage [V]	Active power [W]	Measured PF (cosφ)	Reactive power [VAr]	Expected PF (cosφ)	PF shifting (|Δ cosφ|)	Measured P/P_n [%]
<20	Vn	5908	0,9882	914,1260	1,000	0,012	9,85%
20,00%	Vn	11832	0,9929	1626,9297	1,000	0,007	19,72%
30,00%	Vn	17615	0,9953	-1705,1643	1,000	0,005	29,36%
40,00%	Vn	23745	0,9975	-1208,4316	1,000	0,003	39,57%
50,00%	Vn	30046	0,9986	-1198,9434	1,000	0,001	50,08%
60,00%	Vn	36172	0,9991	-1329,8016	1,000	0,001	60,29%
60,00%	1,06 Vn	36491	0,9796	-7478,6745	0,980	0,000	60,82%
70,00%	1,06 Vn	41773	0,9611	-12000,5767	0,960	0,001	69,62%
80,00%	1,06 Vn	47644	0,9406	-17197,8232	0,940	0,001	79,41%
90,00%	1,06 Vn	53570	0,9203	-22773,7751	0,920	0,000	89,28%
100,00%	1,06 Vn	59504	0,9000	-28824,5730	0,900	0,000	99,17%

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
21/05/2013	Alberto Crocco

Erogazione automatica di potenza reattiva secondo una curva caratteristica Q=ƒ(V)

/Automatic reactive power supply according to the characteristic curve Q=ƒ(V)

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.2.6

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Tensione */Volt* [V]	0.26%
Potenza attiva */Active Power* [W] <1.5kW	1.2%
Potenza attiva */Active Power* [W] >1.5kW	1.5%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.2%
Potenza reattiva */Reactive Power* [VAR] <1.5kW	1.5%
Fattore di potenza */Power factor*	1.0
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

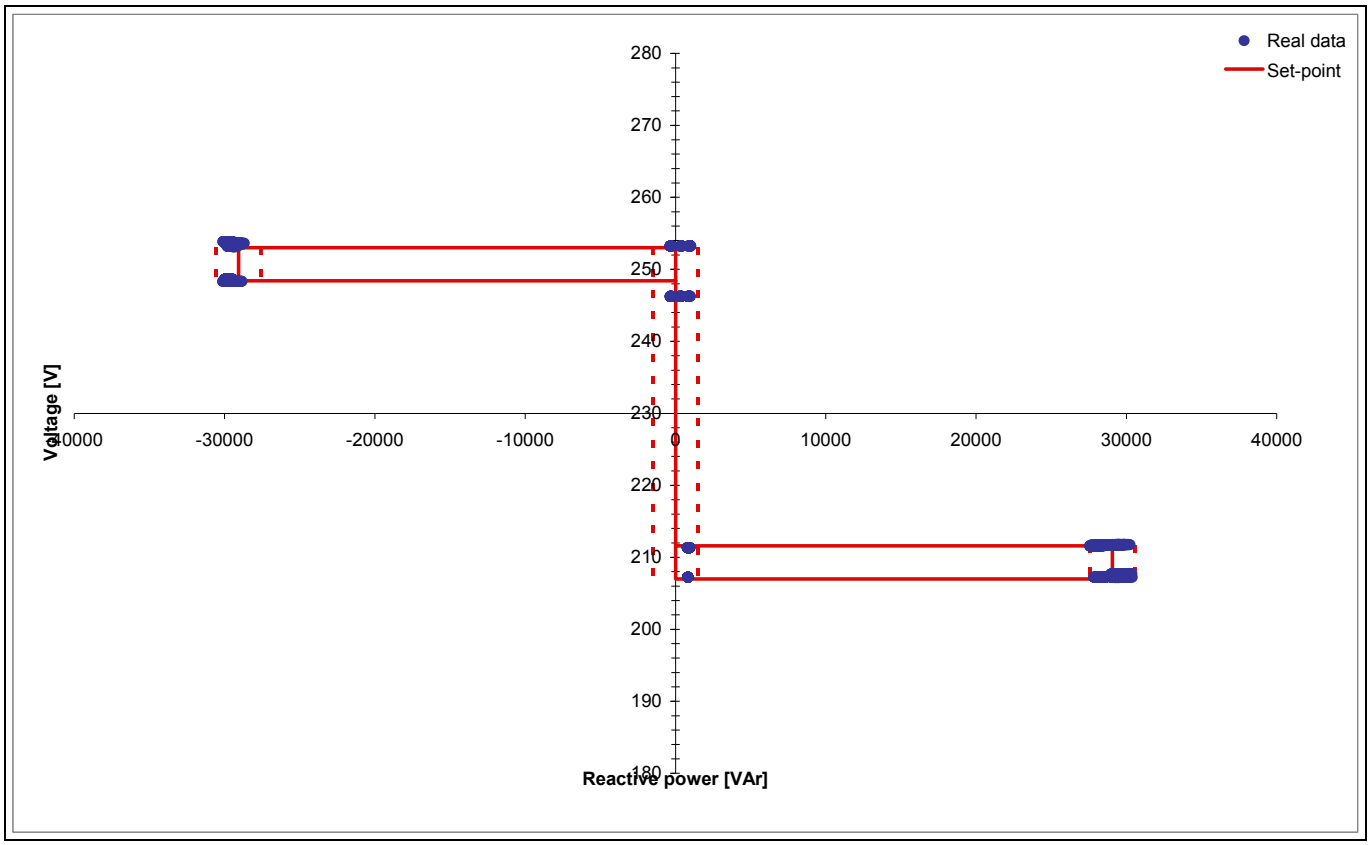
Procedura di test */Test procedure*	LPLB1260
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.3°C	Umidità relativa */Relative humidity*	46%

Risultati di prova

/Test results

Power set-point [%]	Voltage set-point [V_{AC}]	Active power [W]	Voltage L1 [V_{AC}]	Voltage L2 [V_{AC}]	Voltage L3 [V_{AC}]	Reactive power [VAr]	Expected Q [VAr]	Q shifting (Δ Q)
Upper limits								
<20	1.07 Vn	6128	246,36	246,33	246,06	890	0	889,80
<20	1.10 Vn	6053	253,37	253,31	253,04	-278	0	278,23
20 → 30	1.10 Vn	17420	253,60	253,52	253,25	-29400	-29058 (-Qmin)	342,26
40	1.07 Vn	24011	253,74	253,65	253,40	-29620	-29058 (-Qmin)	561,78
50	1.10 Vn	30055	253,88	253,78	253,53	-29409	-29058 (-Qmin)	351,40
60	1.10 Vn	36248	253,46	253,41	253,14	-29762	-29058 (-Qmin)	703,66
70	1.07 Vn	42083	253,60	253,55	253,27	-29633	-29058 (-Qmin)	574,99
80	1.10 Vn	48161	253,73	253,68	253,40	-29506	-29058 (-Qmin)	448,29
90	1.10 Vn	53675	253,74	253,69	253,41	-29393	-29058 (-Qmin)	334,86
100	1.07 Vn	59523	253,97	253,92	253,64	-29980	-29058 (-Qmin)	921,71
100	1.08Vn	59427	248,73	248,70	248,42	-29855	-29058 (-Qmin)	796,51
100 → 10	1.08Vn	5372	248,45	248,41	248,12	-29191	-29058 (-Qmin)	133,14
10 → < 5	1.08Vn	2384	248,39	248,34	248,04	-1249	0	1248,91
Lower limits								
<20	0.91 Vn	6033	211,35	211,48	211,16	876	0	876,23
<20	0.90 Vn	6013	207,24	207,40	207,06	816	0	816,50
20 → 30	0.90 Vn	18034	207,70	207,86	207,51	29389	29058 (+Qmax)	330,62
40	0.90 Vn	24166	207,72	207,88	207,52	29818	29058 (+Qmax)	759,85
50	0.90 Vn	30043	207,21	207,38	207,02	29474	29058 (+Qmax)	416,05
60	0.90 Vn	36048	207,24	207,41	207,05	29823	29058 (+Qmax)	764,72
70	0.90 Vn	41969	207,27	207,43	207,08	29527	29058 (+Qmax)	469,47
80	0.90 Vn	47896	207,29	207,45	207,10	29402	29058 (+Qmax)	343,58
90	0.90 Vn	53866	207,45	207,60	207,26	29687	29058 (+Qmax)	628,72
95 **Nota 3** */Remark 3*	0.90 Vn	55729	207,26	207,41	207,07	28018	29058 (+Qmax)	1040,19
95 **Nota 3** */Remark 3*	0.92 Vn	55740	211,59	211,72	211,39	27843	29058 (+Qmax)	1214,78
100 → 10	0.92 Vn	6830	211,78	211,92	211,58	29770	29058 (+Qmax)	711,81
10 → < 5	0.92 Vn	2402	211,32	211,43	211,11	867	0	866,55



Note */Remarks*
Nota 3: la piena capability di erogazione di potenza reattiva con erogazione anche della massima potenza attiva nominale è richiesta solamente alla tensione nominale. Essendoci un limite di corrente sulla massima erogazione di potenza, in caso di sottotensione viene data priorità alla generazione di potenza reattiva. */Remark 3: the full reactive power capability with even the highest rated active power is required only at the rated voltage.* *Since there is a current limit on the maximum power output, in case of undervoltage, priority is given to the generation of reactive power.*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
22/05/2013	Alberto Crocco

Regolazione della potenza attiva in presenza di transitori sulla rete di trasmissione

/Regulation of active power in the presence of transients on the distribution grid

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.3.1

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Potenza attiva */Active Power* [W] P<1.5KW	1.2%
Potenza attiva */Active Power* [W] P>1.5KW	1.5%
Frequenza */Frequency* [Hz]	0.006%
Tempo */Time* [s]	0.5 s
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1310
Procedura e allestimento della prova conformi alla normativa CEI 0-21 */Procedure and setup comply with CEI 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.3°C	Umidità relativa */Relative humidity*	47%

Risultati di prova

/Test results

Potenza: 100%Pn (sequenza A)

/power: 100%Pn (sequence A)

Frequenza limite: 50,3Hz

/frequency limit: 50,3Hz

Statismo: 2,4%

/statism: 2,4%

Frequency setpoint [Hz]	Power setpoint [W]	Measured power [W]	Reduction time [s]	Limited P time [s]
47,51	60000,00	59750	---	---
50,20	60000,00	59743	---	---
50,40	55000,00	54353	1,6	---
50,60	45000,00	44381	1,8	---
51,49	500,00	-90	0,8	---
50,11	500,00	-110	---	---
50,00	500,00	-100	---	316,20
50,00	60000,00	59564	---	305,20
Power ramp rate:	Within the range			

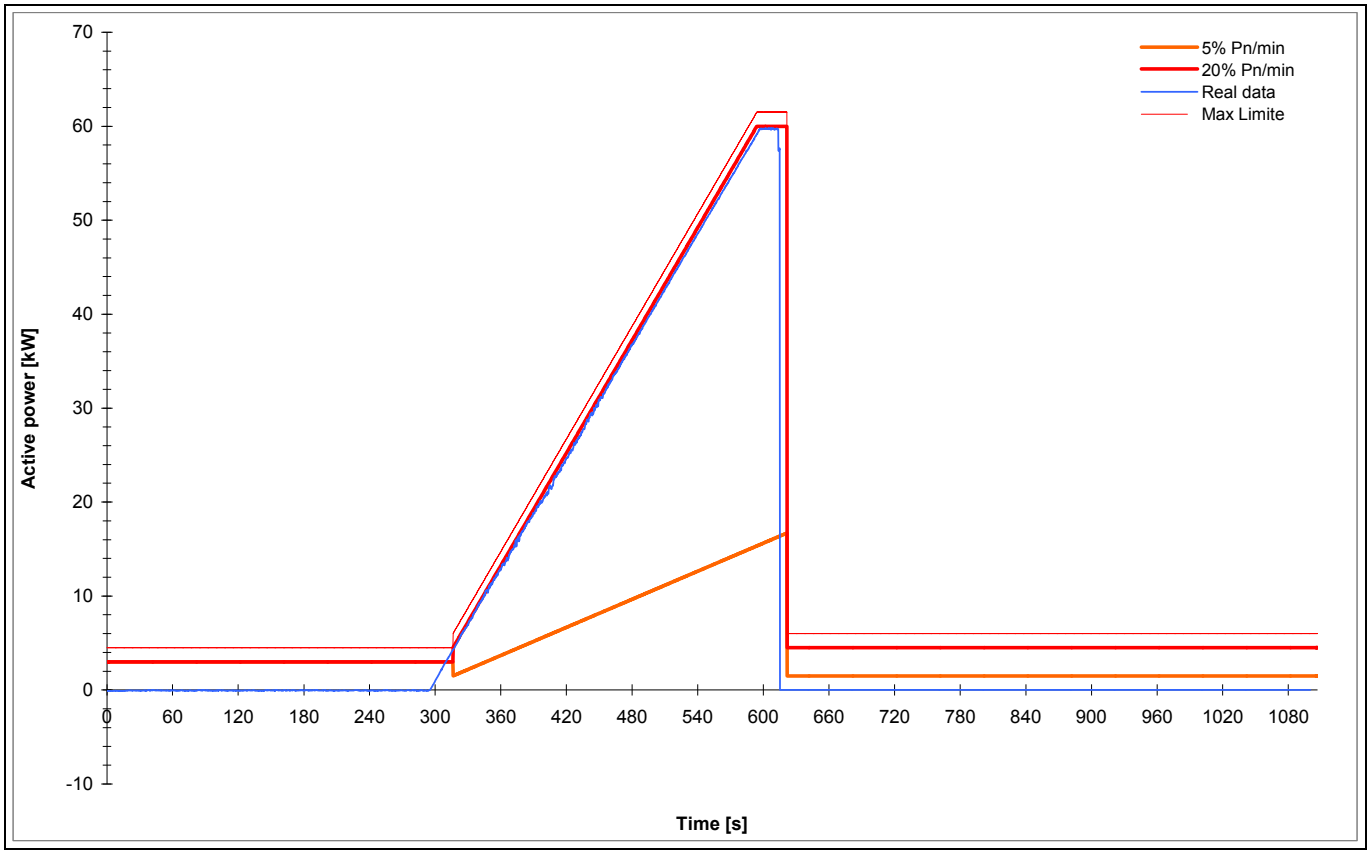


Fig. 1 – rampa di riconnessione (sequenza A)
/re connection ramp (sequence A)

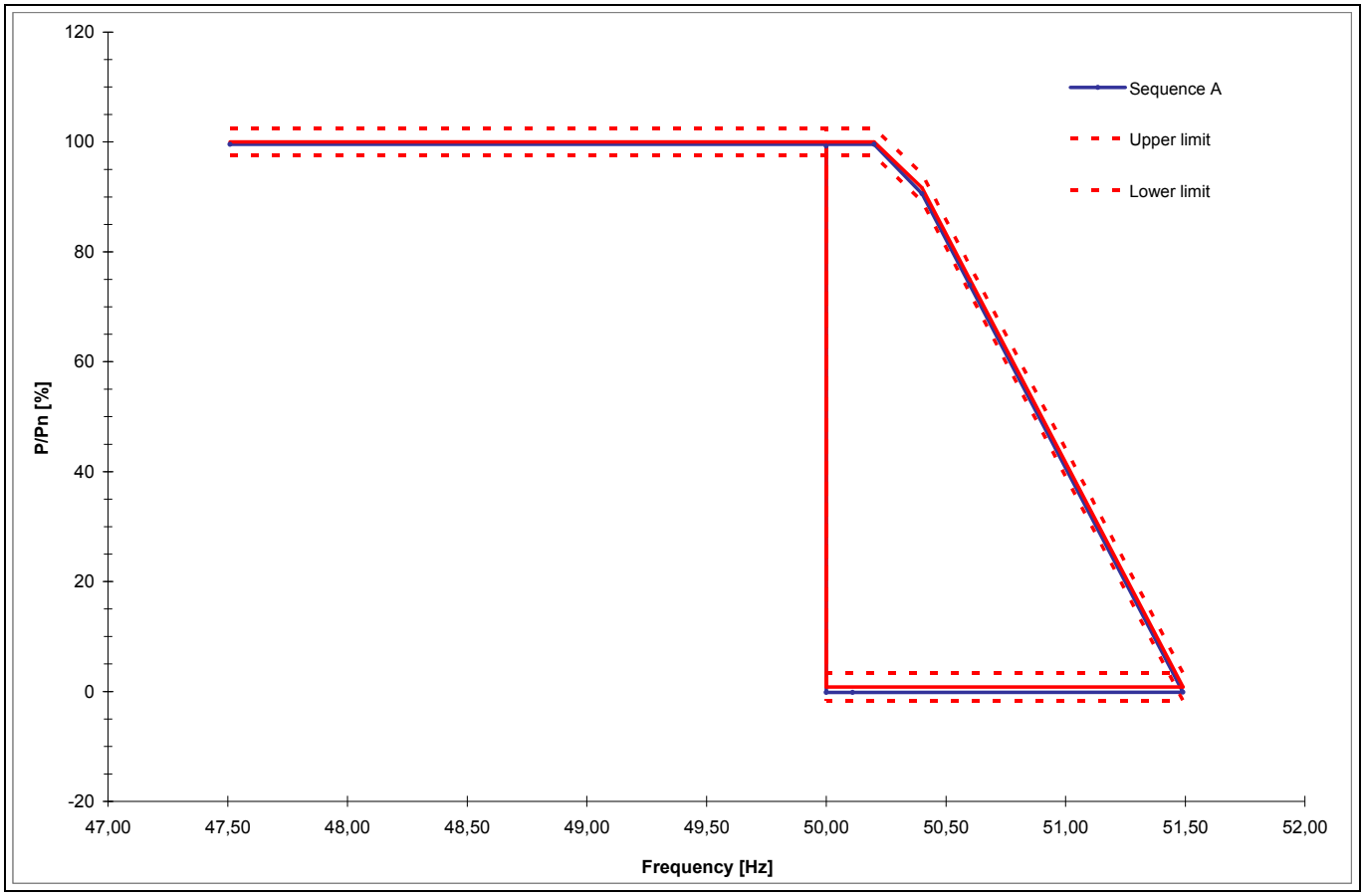


Fig. 2 – Curve di limitazione della potenza attiva rispetto alla frequenza (sequenza A)
/curves of limitation of active power in accordance with frequency (sequence A)

Potenza: 50%Pn (sequenza B)

/power: 50%Pn (sequence B)

Frequenza limite: 50,3Hz

/frequency limit: 50,3Hz

Statismo: 2,4%

/statism: 2,4%

Frequency setpoint [Hz]	Power setpoint [W]	Measured power [W]	Reduction time [s]	Limited P time [s]
47,51	30000,00	29965	---	---
50,20	30000,00	29861	---	---
50,40	27500,00	26875	0,8	---
50,60	22500,00	21765	0,8	---
51,49	250,00	43	0,6	---
50,11	250,00	26	---	---
50,00	250,00	31	---	303,20
50,00	30000,00	30081	---	306,80
Power ramp rate:	Within the range			

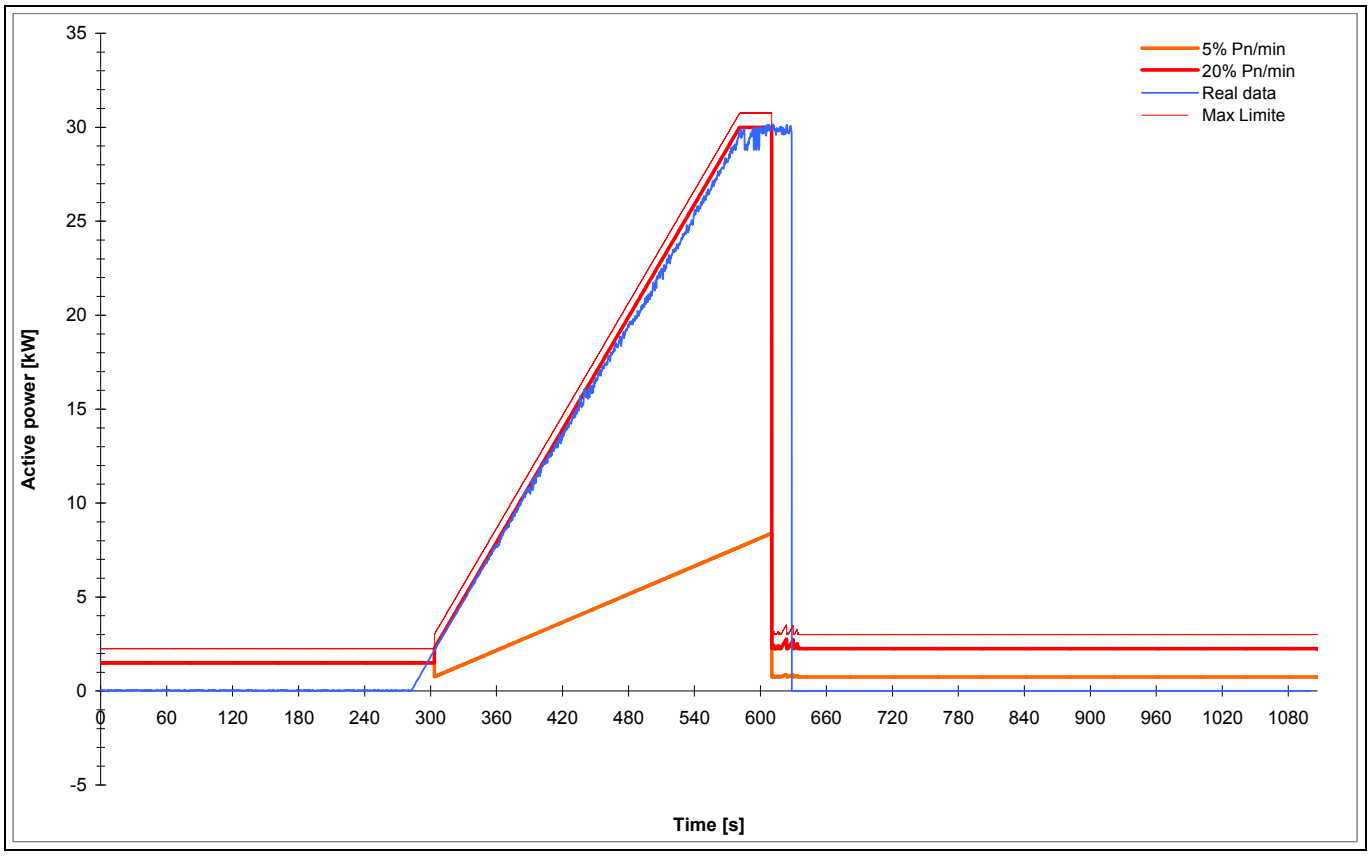


Fig. 3 – rampa di riconnessione (sequenza B)
/re connection ramp (sequence B)

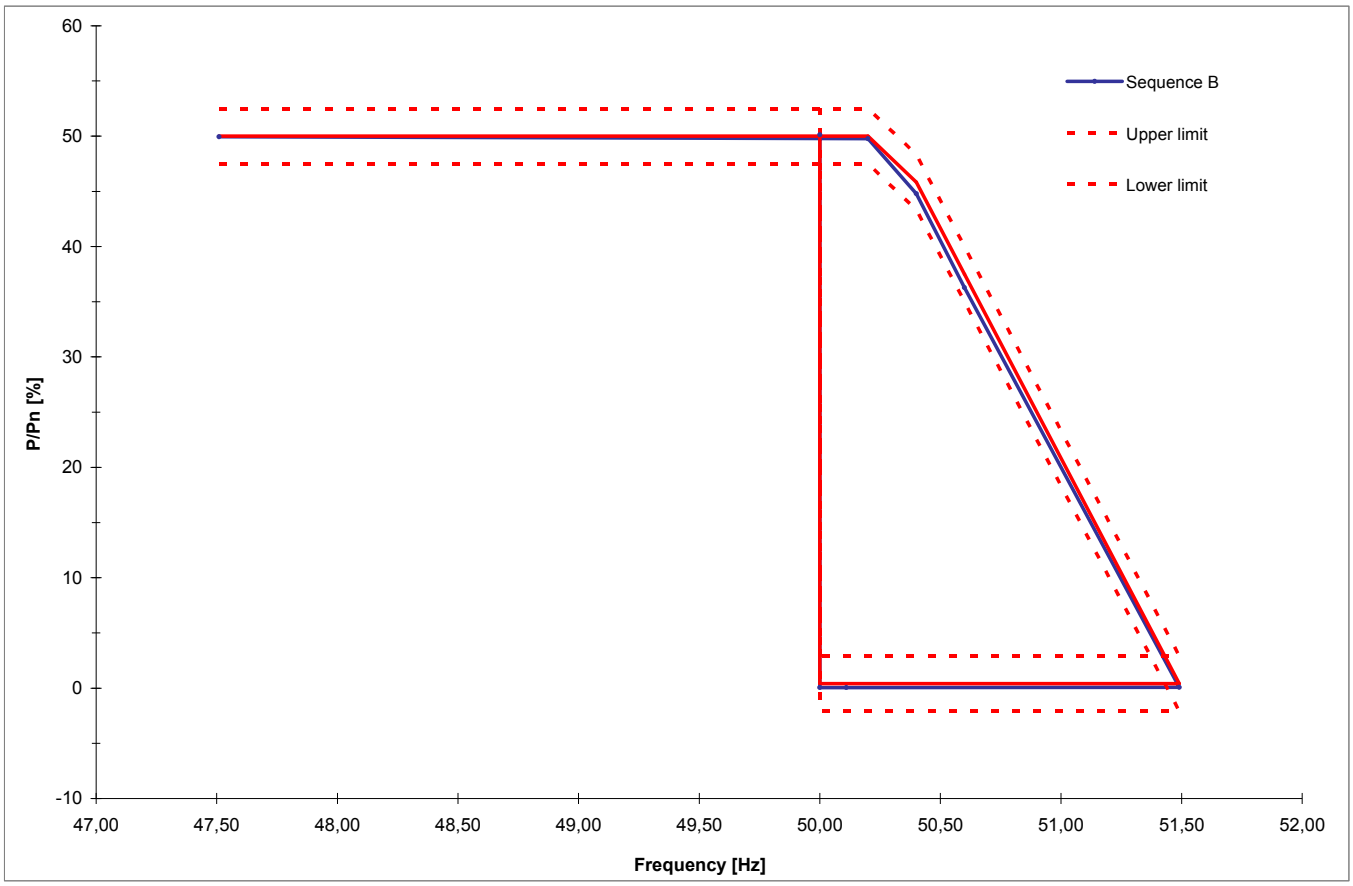


Fig. 4 – Curve di limitazione della potenza attiva rispetto alla frequenza (sequenza B)
/curves of limitation of active power in accordance with frequency (sequence B)

Potenza: 100%Pn

/power: 100%Pn

Frequenza limite: 50,5Hz

/frequency limit: 50,5Hz

Statismo: 2%

/statism: 2%

Frequency setpoint [Hz]	Power setpoint [W]	Measured power [W]	Reduction time [s]	Limited P time [s]
47,51	60000,00	59774	---	---
50,40	60000,00	59777	---	---
50,60	54000,00	52777	1,4	---
50,80	42000,00	40914	1,2	---
51,49	600,00	-59	1,2	---
50,11	600,00	-106	---	---
50,00	600,00	-123	---	310,20
50,00	60000,00	59781	---	796,20
Power ramp rate:	Within the range			

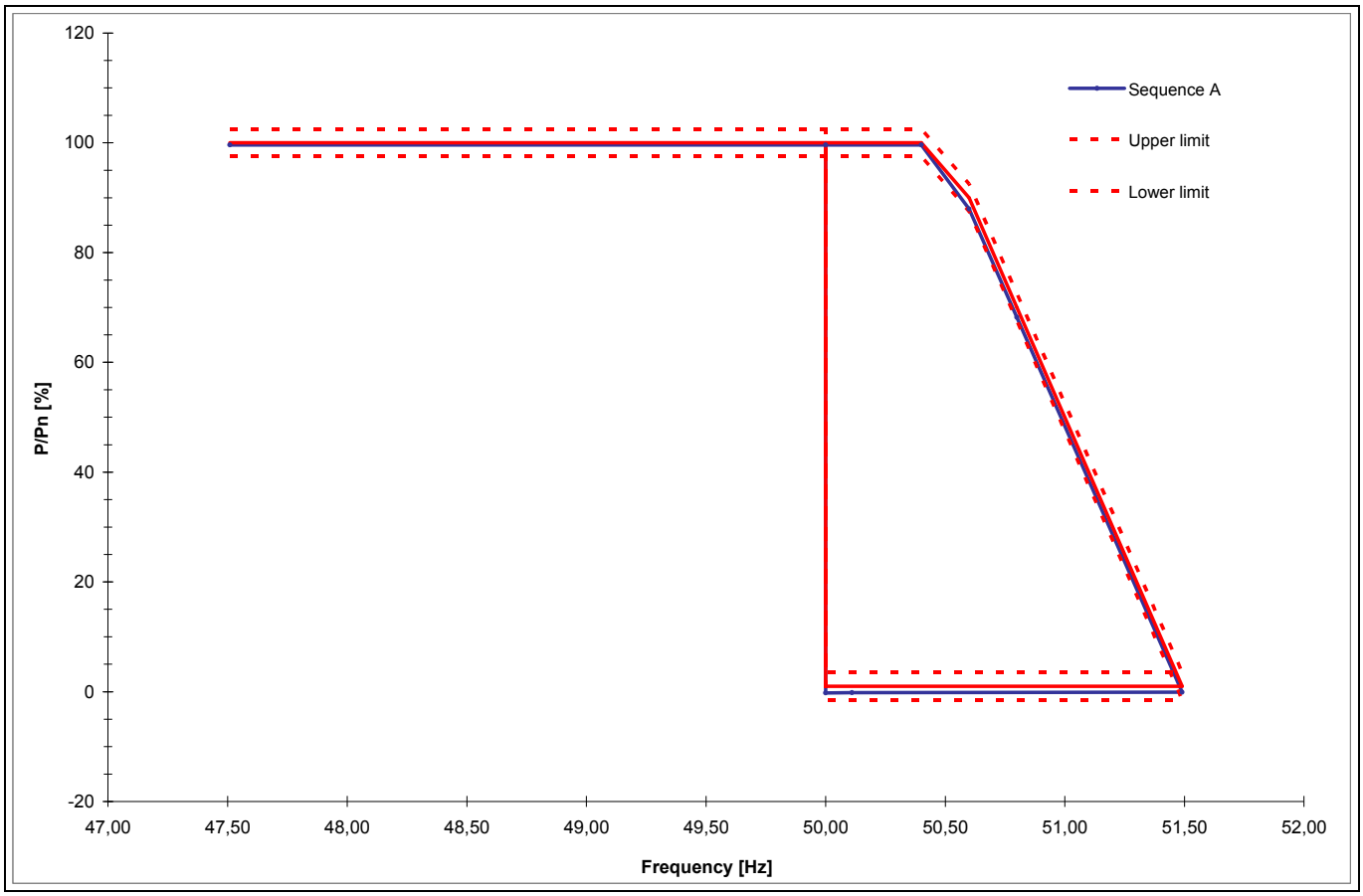


Fig. 5 – Curva di limitazione della potenza attiva rispetto alla frequenza
/curve of limitation of active power in accordance with frequency

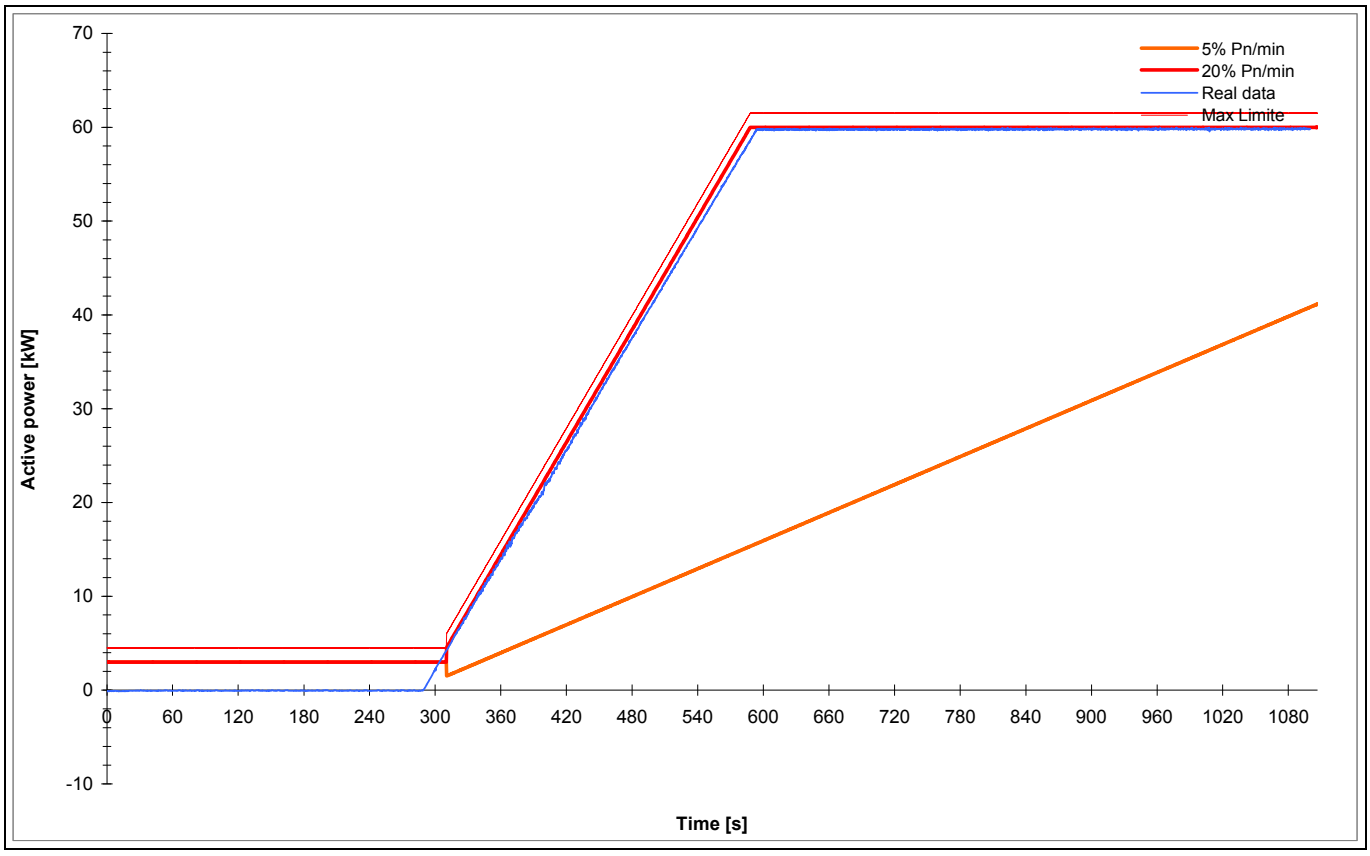


Fig. 6 – rampa di riconnessione
/re connection ramp

Potenza: 100%Pn

/power: 100%Pn

Frequenza limite: 50,2Hz

/frequency limit: 50,2Hz

Statismo: 2,4%

/statism: 2,4%

Frequency setpoint [Hz]	Power setpoint [W]	Measured power [W]	Reduction time [s]	Limited P time [s]
47,51	60000,00	59834	---	---
50,10	60000,00	59832	---	---
50,30	55000,00	54701	1	---
50,50	45000,00	44273	1,2	---
51,39	500,00	-12	2	---
50,11	500,00	-107	---	---
50,00	500,00	-29	---	321,80
50,00	60000,00	59636	---	311,40
Power ramp rate:	Within the range			

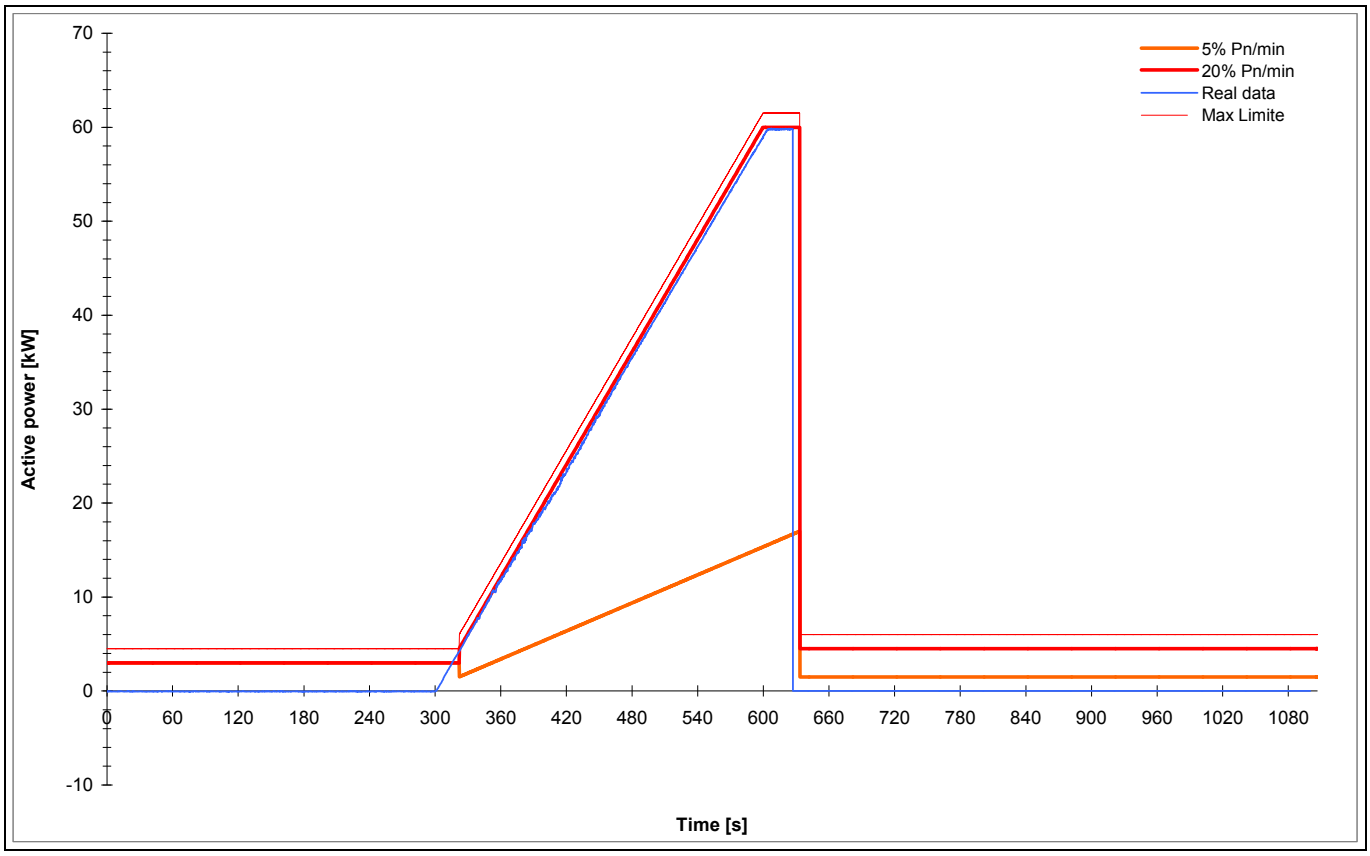


Fig. 7 – rampa di riconnessione
/re connection ramp

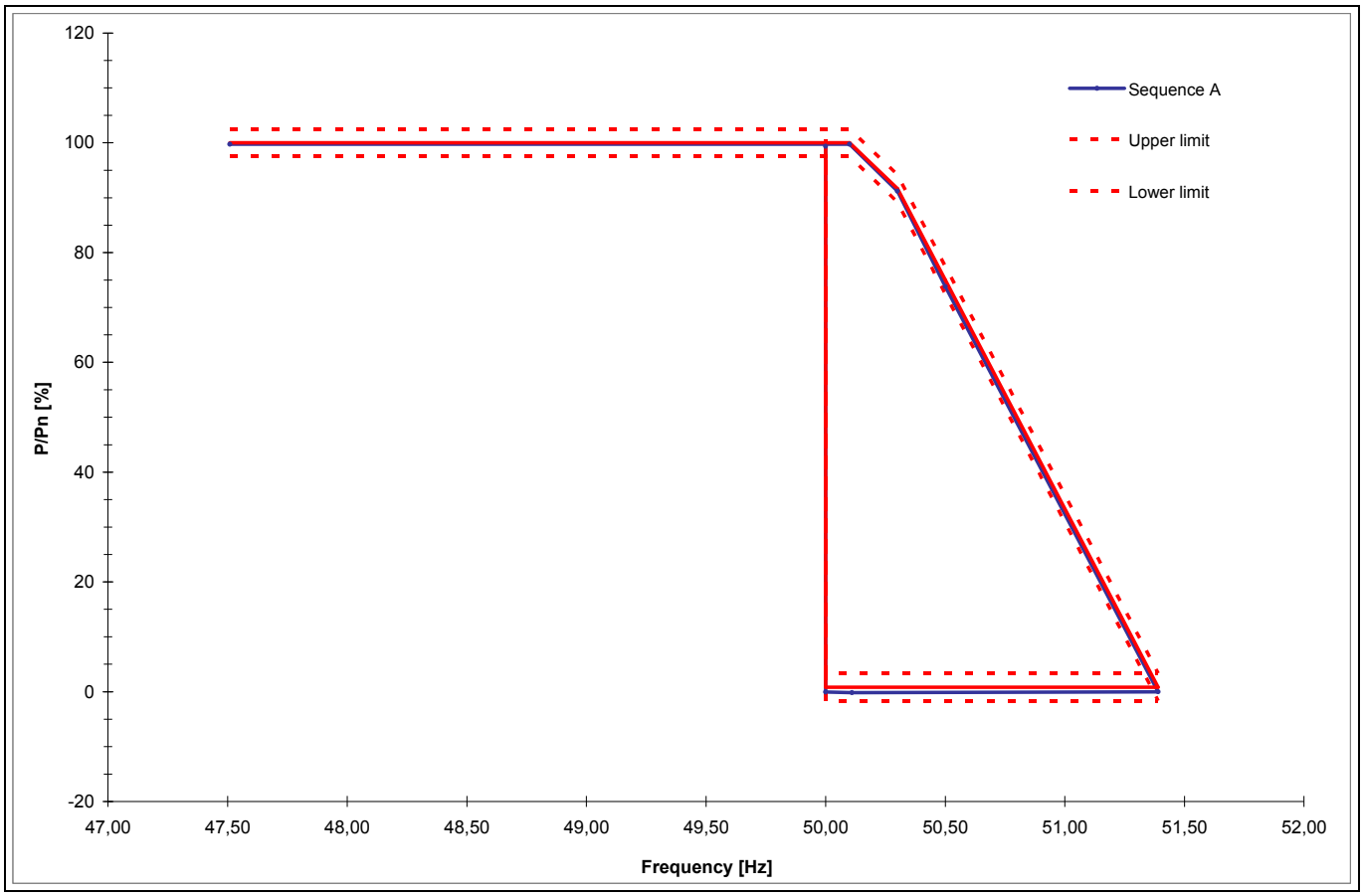


Fig. 8 – Curva di limitazione della potenza attiva rispetto alla frequenza
/curve of limitation of active power in accordance with frequency

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
22/05/2013	Alberto Crocco

Limitazione della potenza attiva su comando esterno proveniente dal distributore

/Active power limit as a result of an external command sent by the distributor

Norme di riferimento */Reference standards*

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12
Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica
/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.
Annex B. Point B.1.3.2

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

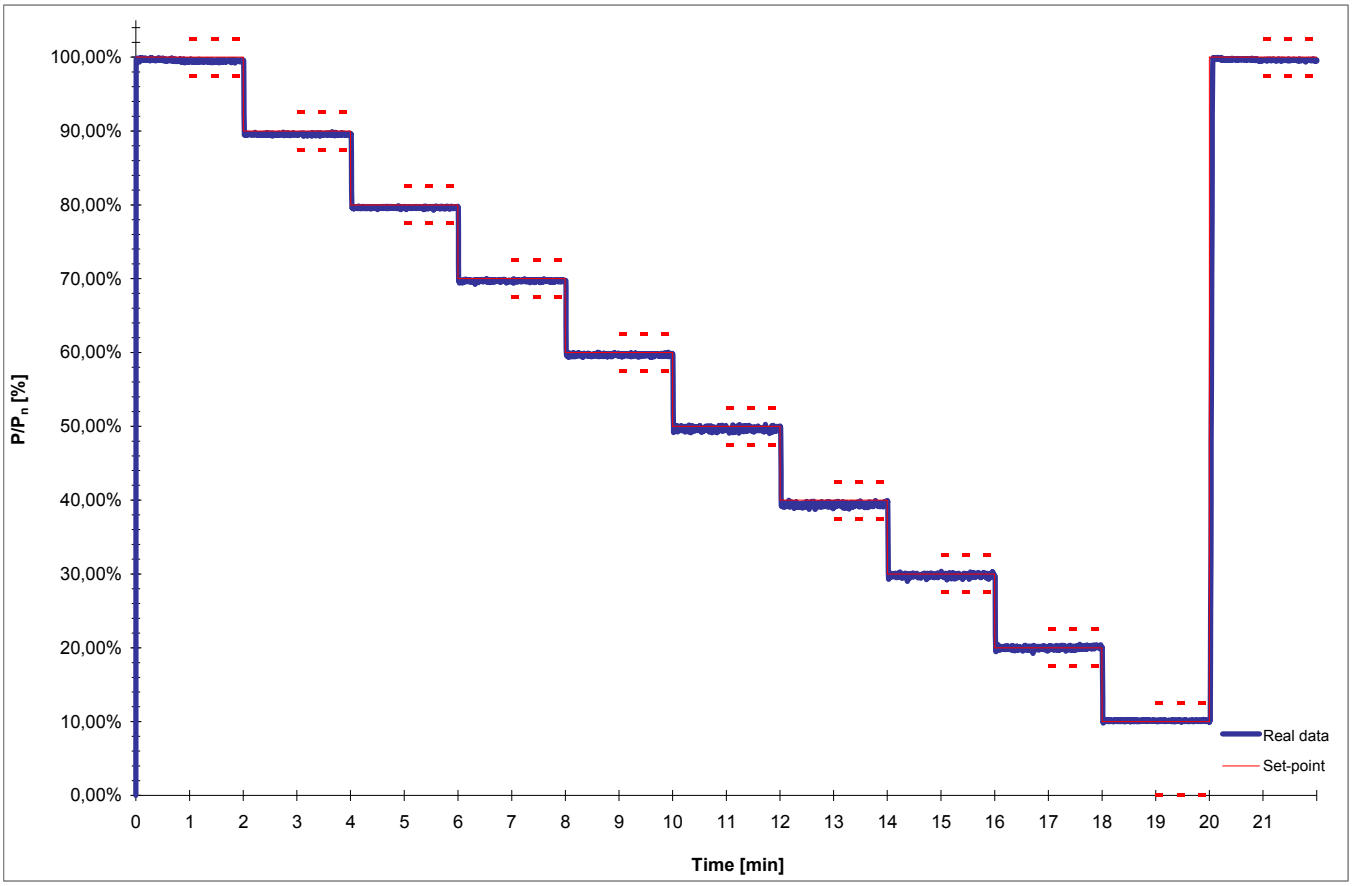
Incertezza di misura */Measure uncertainty*	
Potenza attiva */Active Power* [W] P<1.5KW	1.2%
Potenza attiva */Active Power* [W] P>1.5KW	1.5%
Tempo / *Time* [s]	0.5 s
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1320
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.1°C	Umidità relativa */Relative humidity*	46%

Risultati di prova

/Test results



Description of test	Power set point [VA]	Power measured [VA]
100% P_n	60000	59698,46
90% Pn	54000	53743,45
80% Pn	48000	47779,42
70% Pn	42000	41821,40
60% Pn	36000	35815,72
50% Pn	30000	29777,88
40% Pn	24000	23646,90
30% Pn	18000	17883,22
20% Pn	12000	12024,91
10% Pn	6000	6073,50
100% Pn	60000	59772,17

Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
21/05/2013	Alberto Crocco

Verifica della insensibilità agli abbassamenti di tensione (LVFRT capability)

/Verification of insensitivity to voltage dips (LVFRT capability)

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12

Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica

/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.

Annex B. Point B.1.5

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Analizzatore di potenza */Power analyzer*	DEWE-800	DEWE-800
Shunt di misura */Shunt*	☐ MKB-200-100	MKB01200 MKB02200 MKB03200
	☐ MKA-100-100	MKA01100 MKA02100 MKA03100
	☐ MKA-50-100	MKA01050 MKA02050 MKA03050
	☐ MKA-30-100	MKA01030 MKA02030 MKA03030
	☐ MKA-10-100	MKA01010 MKA02010 MKA03010
	☒ MKA-2-100	MKA01002 MKA02002 MKA03002

Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01

Incertezza di misura */Measure uncertainty*	
Tensione */Volt* [V]	0.26%
Corrente */Current* [A]	1.0%
Potenza attiva */Active Power* [W] P<1.5KW	1.2%
Potenza attiva */Active Power* [W] P>1.5KW	1.5%
Tempo */Time* [ms]	0,1%
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Procedura di test */Test procedure*	LPLB1500
Procedura e allestimento della prova conformi alla normativa CEI EN 0-21 */Procedure and setup comply with CEI EN 0-21*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20,4°C	Umidità relativa */Relative humidity*	46,7%

Criteri di accettazione */Performance criteria*:

Riferendosi alla Fig. 14 (CEI 0-21):

- nella zona tratteggiata il generatore non deve sconnettersi dalla rete. In questa zona è consentito interrompere temporaneamente l'erogazione della potenza attiva e reattiva erogata prima della insorgenza del guasto;
- nella sono sottostante (grigio) il generatore può scollegarsi dalla rete;
- entro 200ms dal ripristino di un livello di tensione di rete conpreso tra +10% e -15% della tensione nominale, il generatore deve riprendere l'erogazione della potenza attiva e reattiva immessa in rete prima dell'insorgenza del guasto con una tolleranza massima del 10% della potenza nominale. Nella fascia tra 85% e 90% della tensione nominale è ammessa una riduzione dela potenza erogata in base ai limiti della corrente massima di uscita dal generatore.

/referring to picture 14 (CEI0-21):

- *In the hatched area the generator must not be disconnected from the grid. In this area it is permitted to temporarily interrupt the supply of active and reactive power supplied before the onset of fault*
- *In the area below (grey) the generator can be disconnected from the grid*
- *Within 200ms of the restoration of a grid voltage level between +10% and -15% of the rated voltage, the generator must resume the supply of active and reactive power interrupted into the grid before the onset of the fault with a maximum tolerance of ±10% of the rated power. In the range between 85% and 90% of the rated voltage it is admissible a power reduction according to the maximum output current of the generator.*

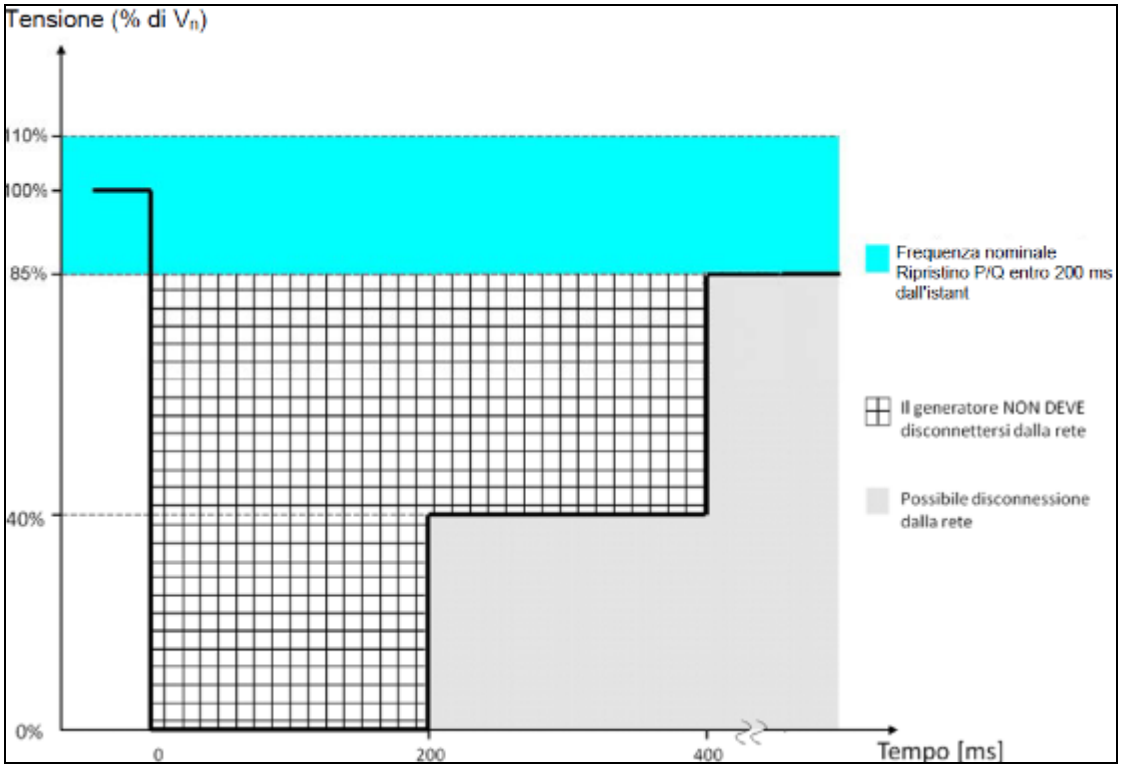


Figura 14 norma CEI 0-21 */Figure 14 standard CEI 0-21*

Risultati – Test di LVFRT

/Results – LVRFT test

Test eseguito a: 20 %Pn

/Test performed with appliance at: 20 %Pn

Elenco prove */Test list*	**Ampiezza residua della tensione V/Vn** */Residual amplitude of the voltage V/Vn*	**Tempo di permanenza** */Duration time*	**Commenti** */Remarks*	**Esito** */result*
Guasto simmetrico trifase */three-phase symm. fault*	0,05 ± 0,05 V/Vn	200±20ms	---	PASS
Guasto simmetrico trifase */three-phase symm. Fault*	0,45 ± 0,05 V/Vn	400±20ms	---	PASS
Guasto asimm. bifase */bi-phase asymm. fault*	0,05 ± 0,05 V/Vn	200±20ms	---	PASS
Guasto asimm. bifase */bi-phase asymm. fault*	0,45 ± 0,05 V/Vn	400±20ms	---	PASS
Guasto simm. bifase LV */bi-phase LV asymm. fault*	0,05 ± 0,05 V/Vn	200±20ms	---	PASS
Guasto simm. bifase LV */bi-phase LV asymm. fault*	0,45 ± 0,05 V/Vn	400±20ms	---	PASS

Type of LVF	Active power 100ms before LVF [W]	Active power after 200ms LVF [W]	Reactive power 100ms before LVF [VAR]	Reactive power after 200ms LVF [VAR]	RESULT	Remarks
1 Guasto simmetrico trifase */three-phase symm. fault*	12657,00	10282,00	1533,00	1866,00	Pass	---
2 Guasto simmetrico trifase */three-phase symm. Fault*	11845,00	11230,00	1291,00	1455,00	Pass	---
3 Guasto asimmetrico bifase */bi-phase asymm. fault*	11963,00	8724,00	984,00	3577,00	Pass	L1
3 Guasto asimmetrico bifase */bi-phase asymm. fault*	12174,00	11999,00	1118,00	2267,00	Pass	L2
3 Guasto asimmetrico bifase */bi-phase asymm. fault*	11879,00	11029,00	821,00	5891,00	Pass	L3

Type of LVF	Active power 100ms before LVF [W]	Active power after 200ms LVF [W]	Reactive power 100ms before LVF [VAR]	Reactive power after 200ms LVF [VAR]	RESULT	Remarks
4 Guasto asimmetrico bifase */bi-phase asymm. fault*	11161,00	11534,00	891,00	3279,00	Pass	L1
4 Guasto asimmetrico bifase */bi-phase asymm. fault*	11992,00	11875,00	917,00	2976,00	Pass	L3
4 Guasto asimmetrico bifase */bi-phase asymm. fault*	12553,00	11882,00	1242,00	3095,00	Pass	L2
5 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	11290,00	11479,00	840,00	3673,00	Pass	L1-L2
5 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	12547,00	11103,00	1326,00	3247,00	Pass	L1-L3
5 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	12542,00	11275,00	1430,00	2350,00	Pass	L2-L3

Type of LVF	Active power 100ms before LVF [W]	Active power after 200ms LVF [W]	Reactive power 100ms before LVF [VAR]	Reactive power after 200ms LVF [VAR]	RESULT	Remarks
6 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	12671,00	12323,00	1236,00	2428,00	Pass	L1-L2
6 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	11876,00	11890,00	1254,00	2278,00	Pass	L1-L3
6 Guasto asimmetrico bifase in BT */bi-phase LV asymm. fault*	11371,00	12328,00	781,00	2201,00	Pass	L2-L3

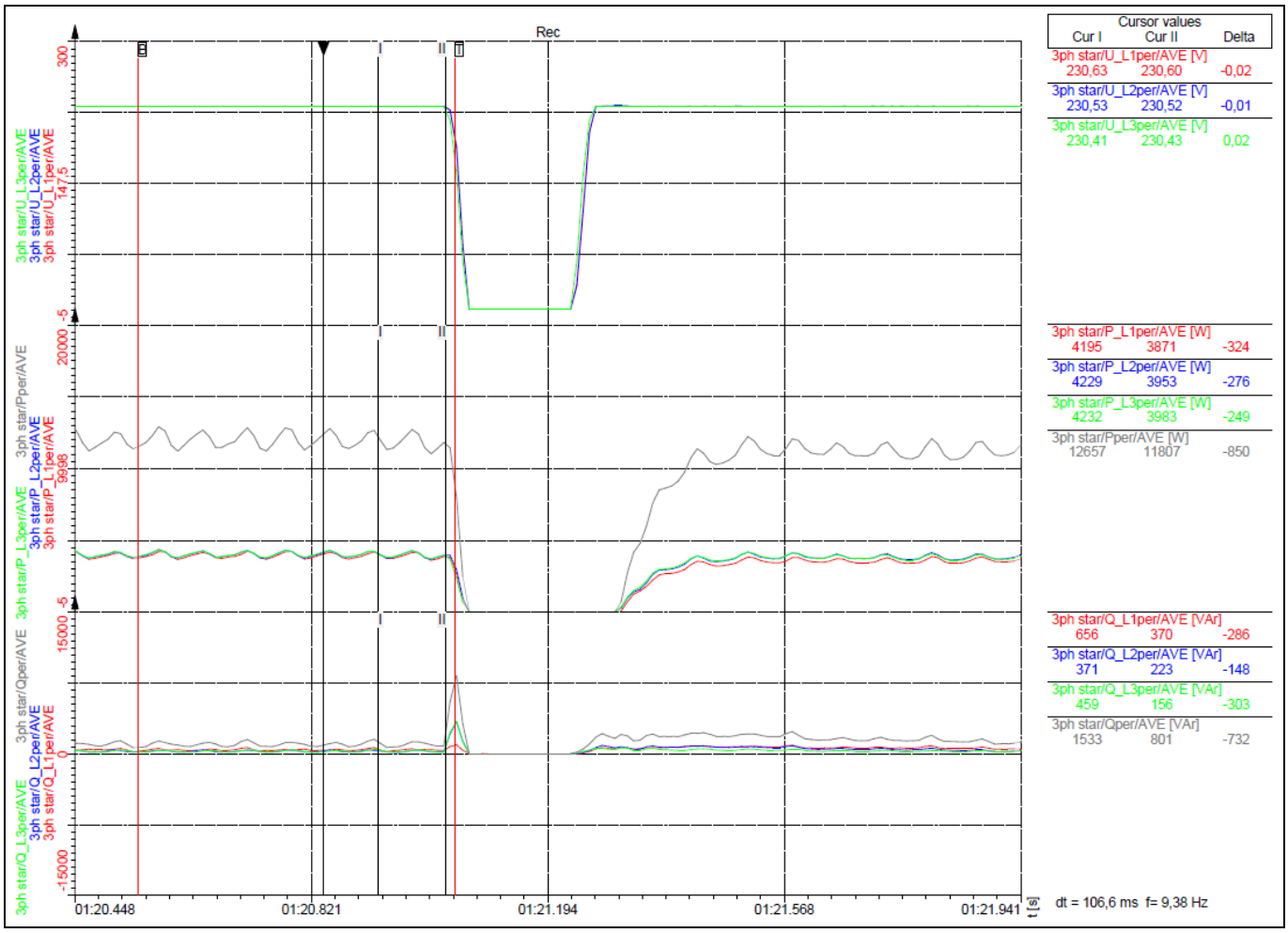


Fig. 9 – 1 Guasto simmetrico trifase – potenza attiva e reattiva prima del guasto

/1 three-phase symm. Fault – active and reactive power before fault

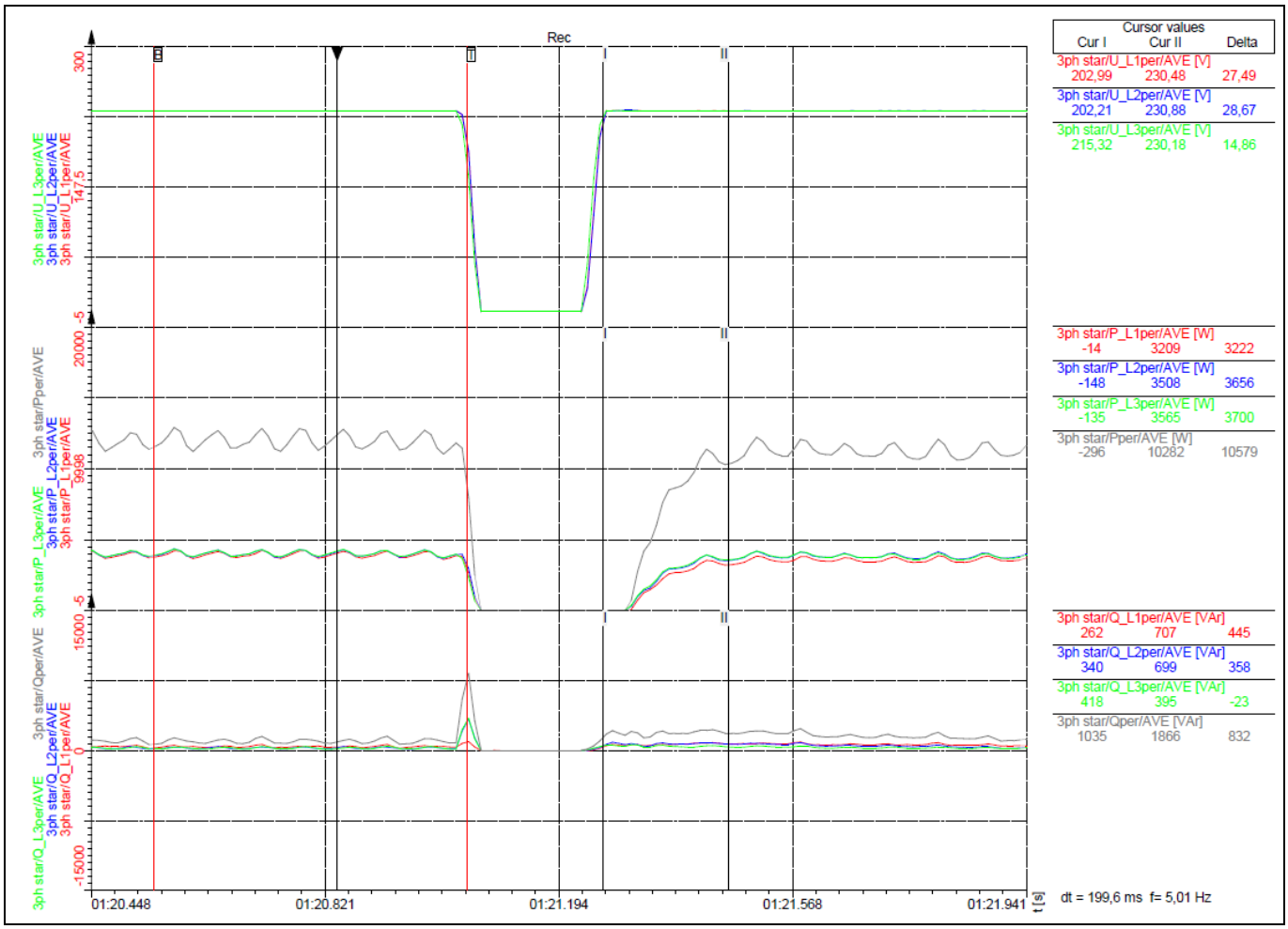


Fig. 10 – 1 Guasto simmetrico trifase – potenza attiva e reattiva dopo il guasto

/1 three-phase symm. Fault – active and reactive power after fault

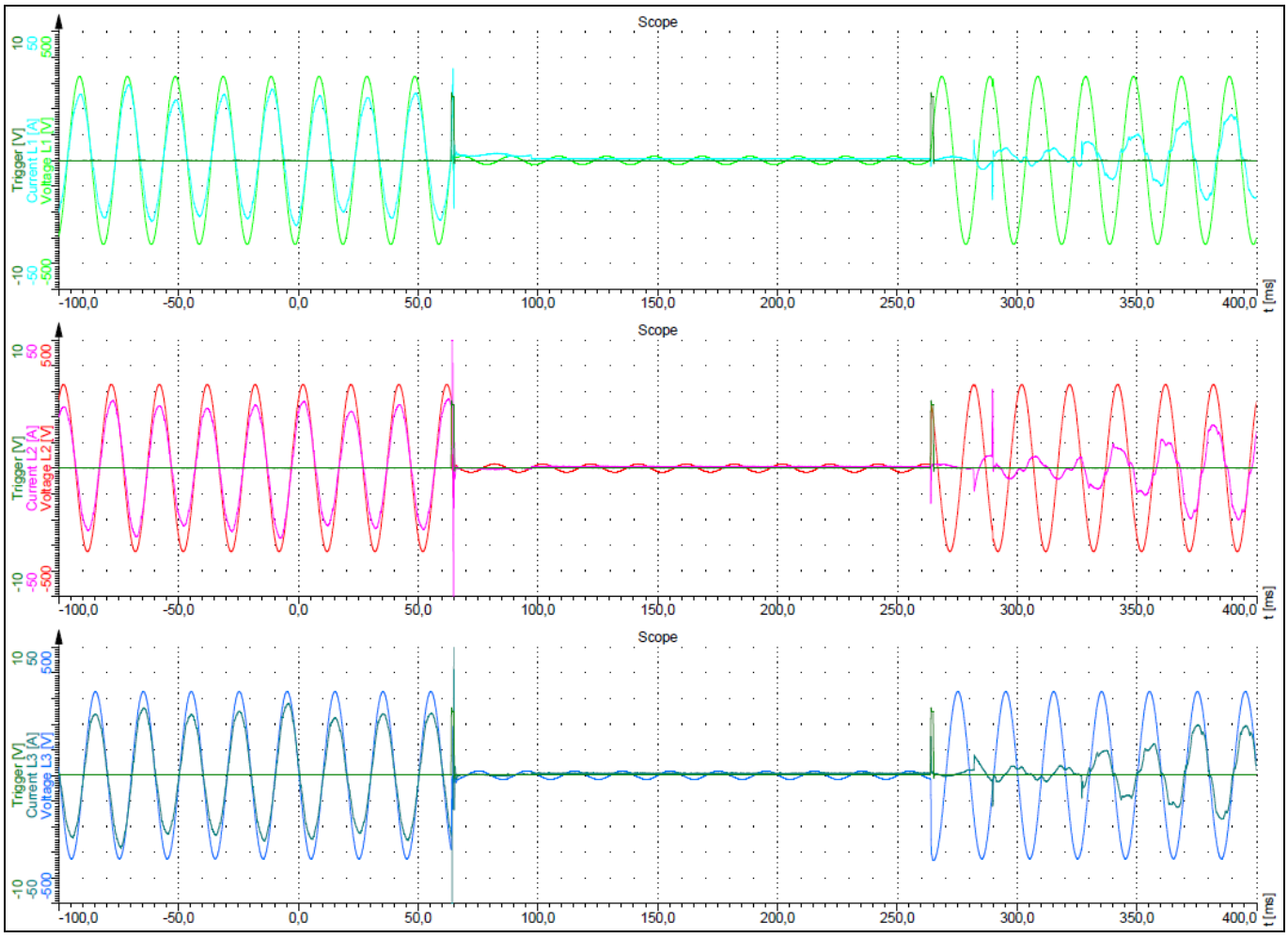


Fig. 11 – 1 Guasto simmetrico trifase – durata del guasto

/1 three-phase symm. Fault – duration of fault

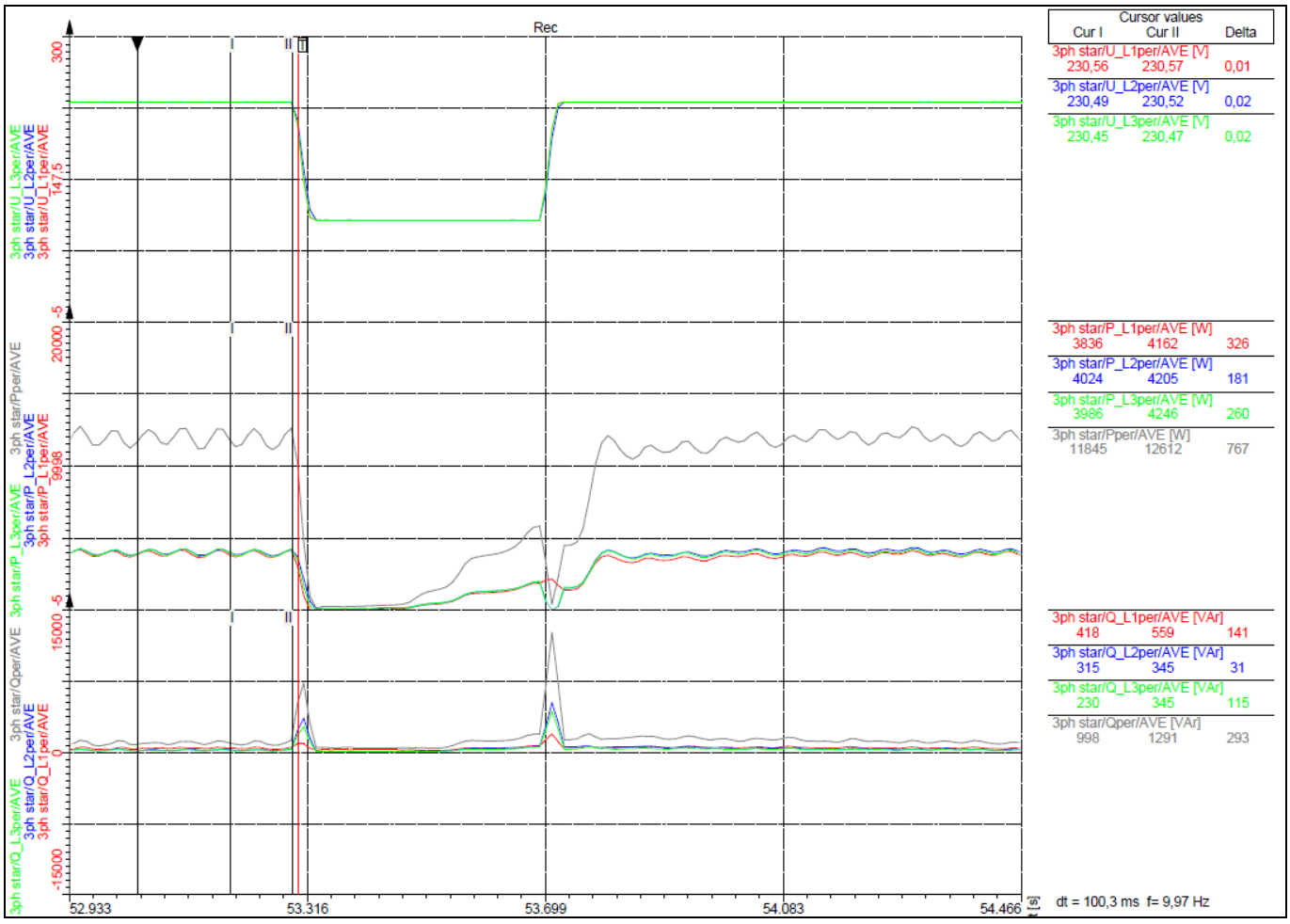


Fig. 12 – 2 Guasto simmetrico trifase – potenza attiva e reattiva prima del guasto

/2 three-phase symm. Fault – active and reactive power before fault

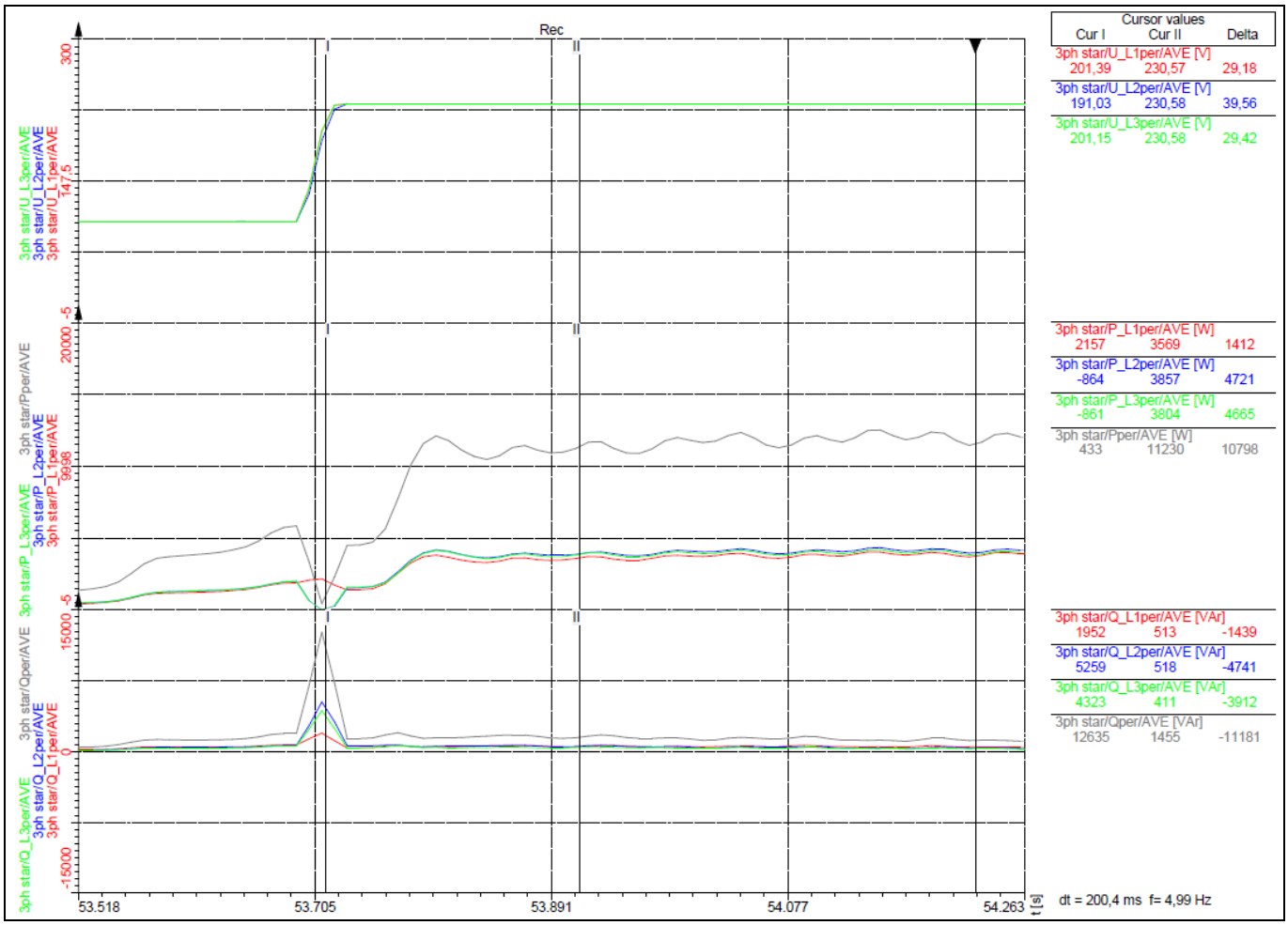


Fig. 13 – 2 Guasto simmetrico trifase – potenza attiva e reattiva dopo il guasto

/2 three-phase symm. Fault – active and reactive power after fault

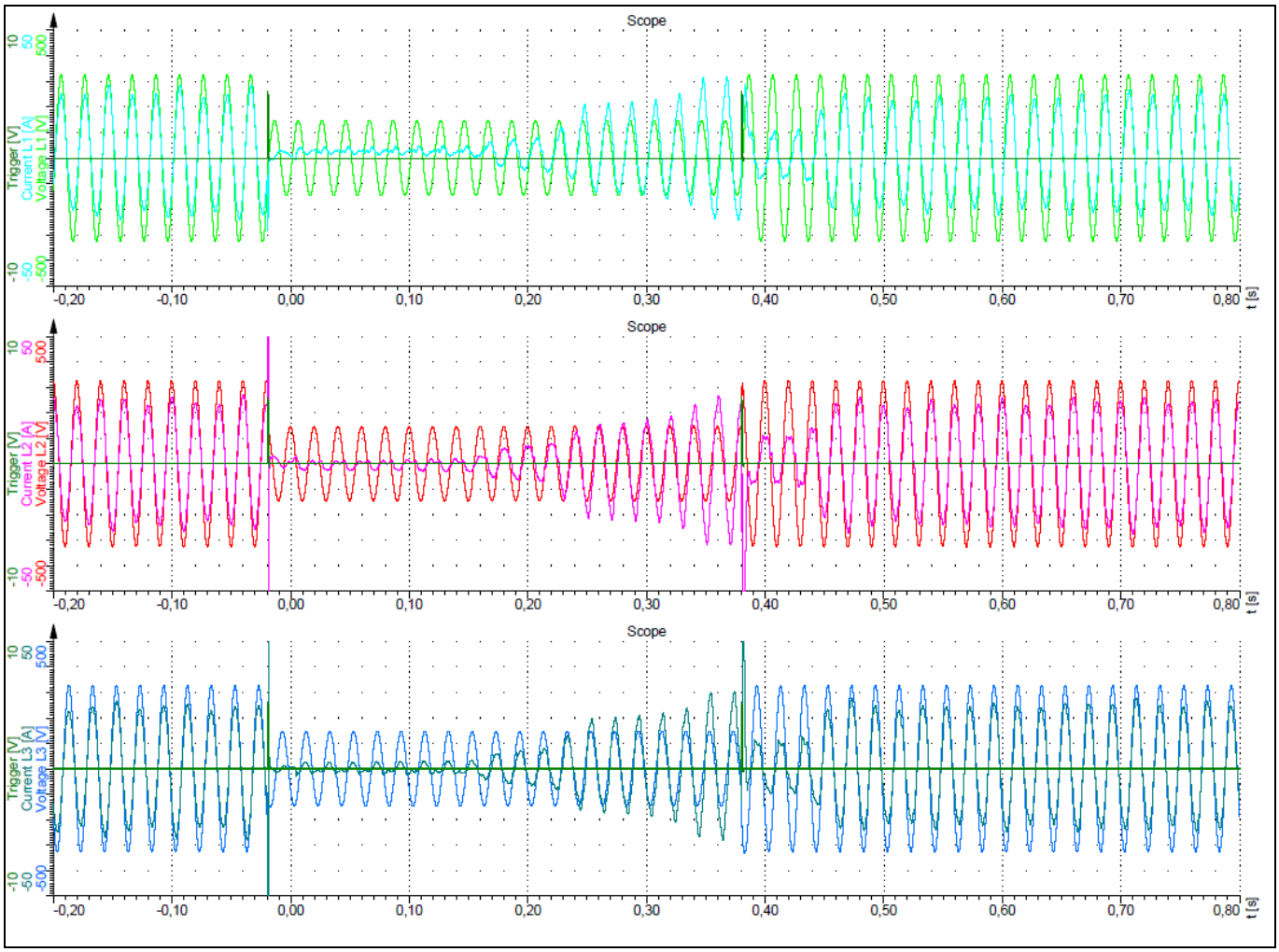


Fig. 14 – 2 Guasto simmetrico trifase – durata del guasto

/2 three-phase symm. Fault – duration of fault

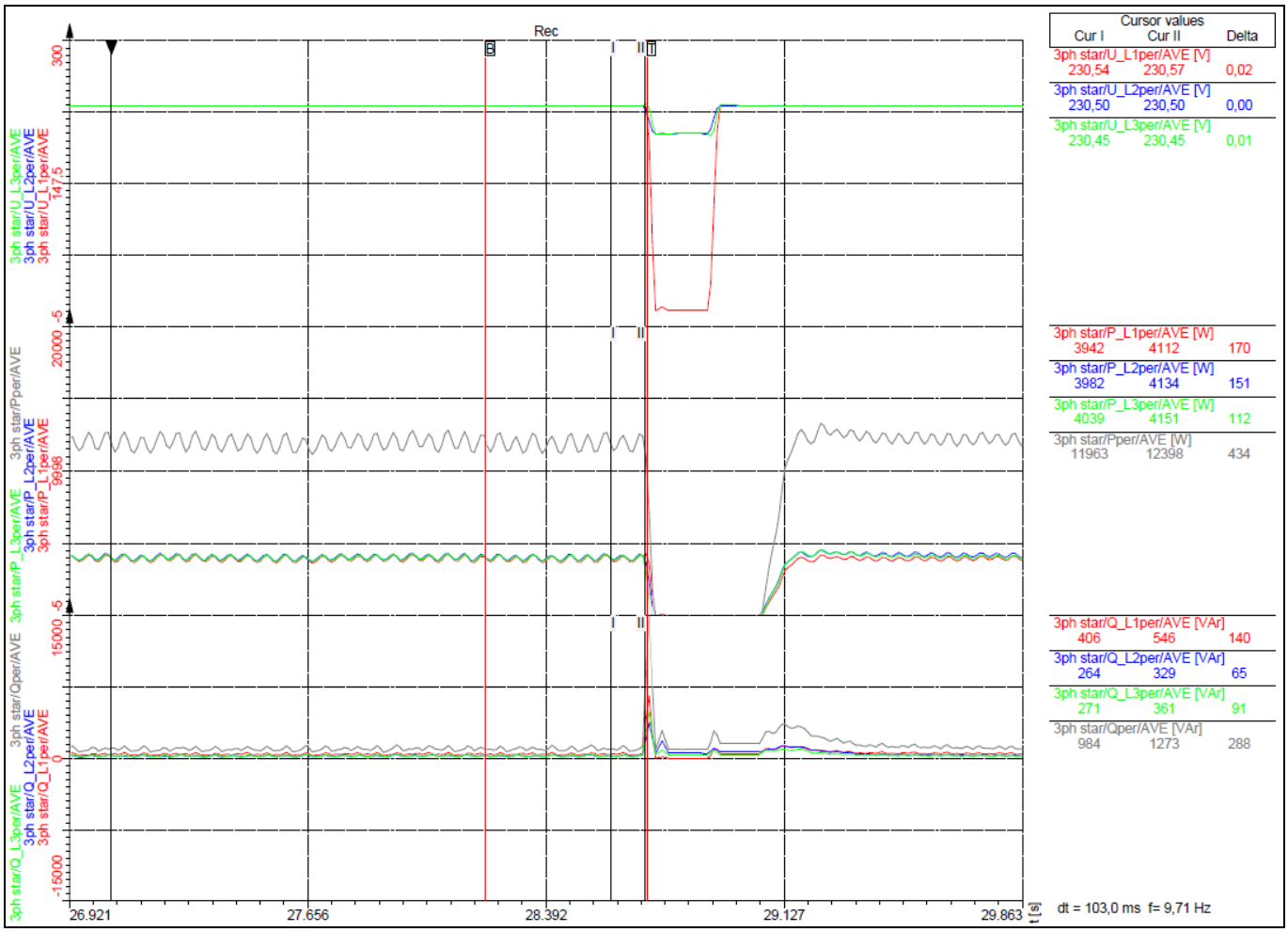


Fig. 15 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L1

/3 bi-phase asymm. fault – active and reactive power before fault – test on L1

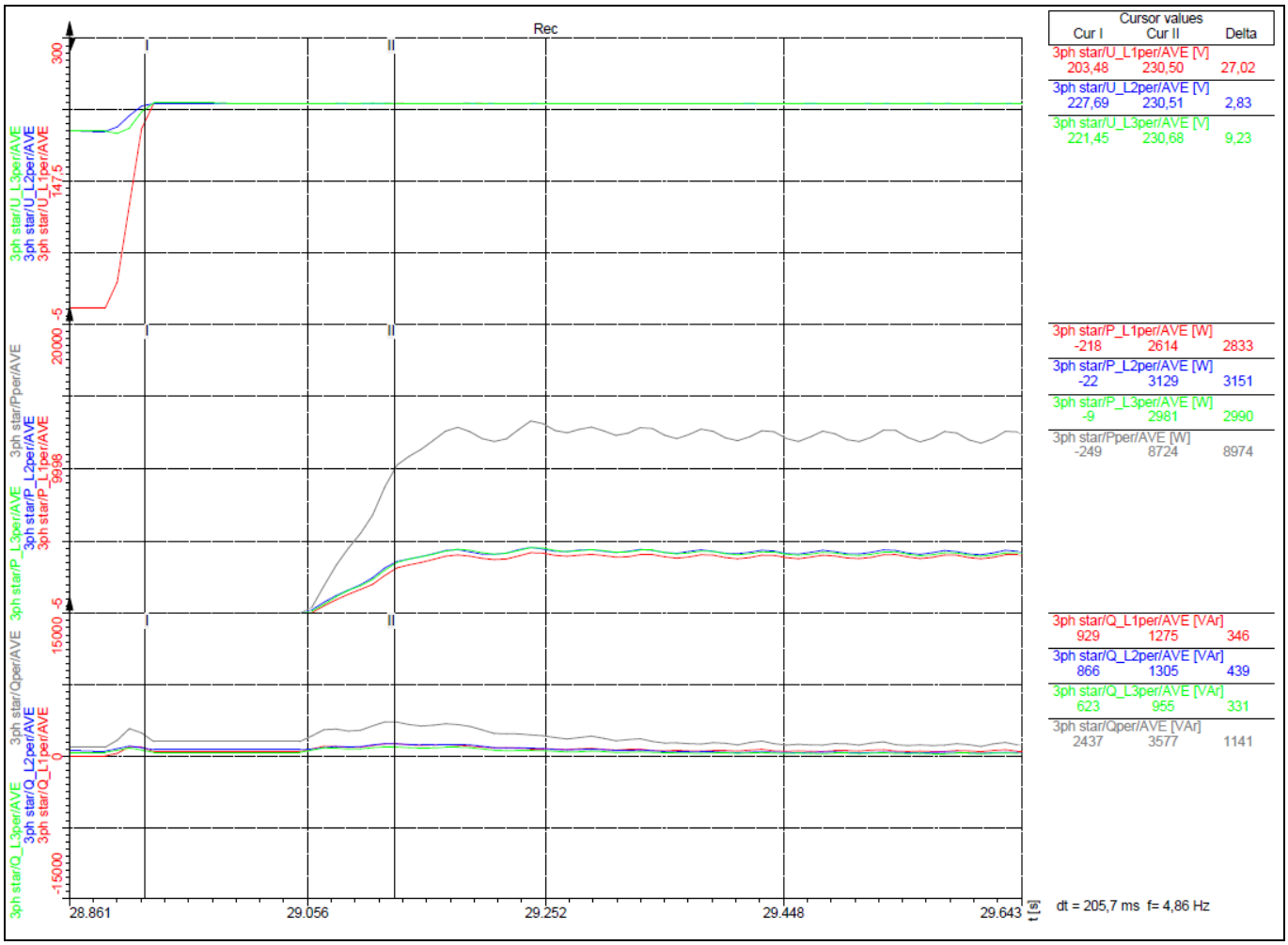


Fig. 16 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L1

/3 bi-phase asymm. fault – active and reactive power after fault – test on L1

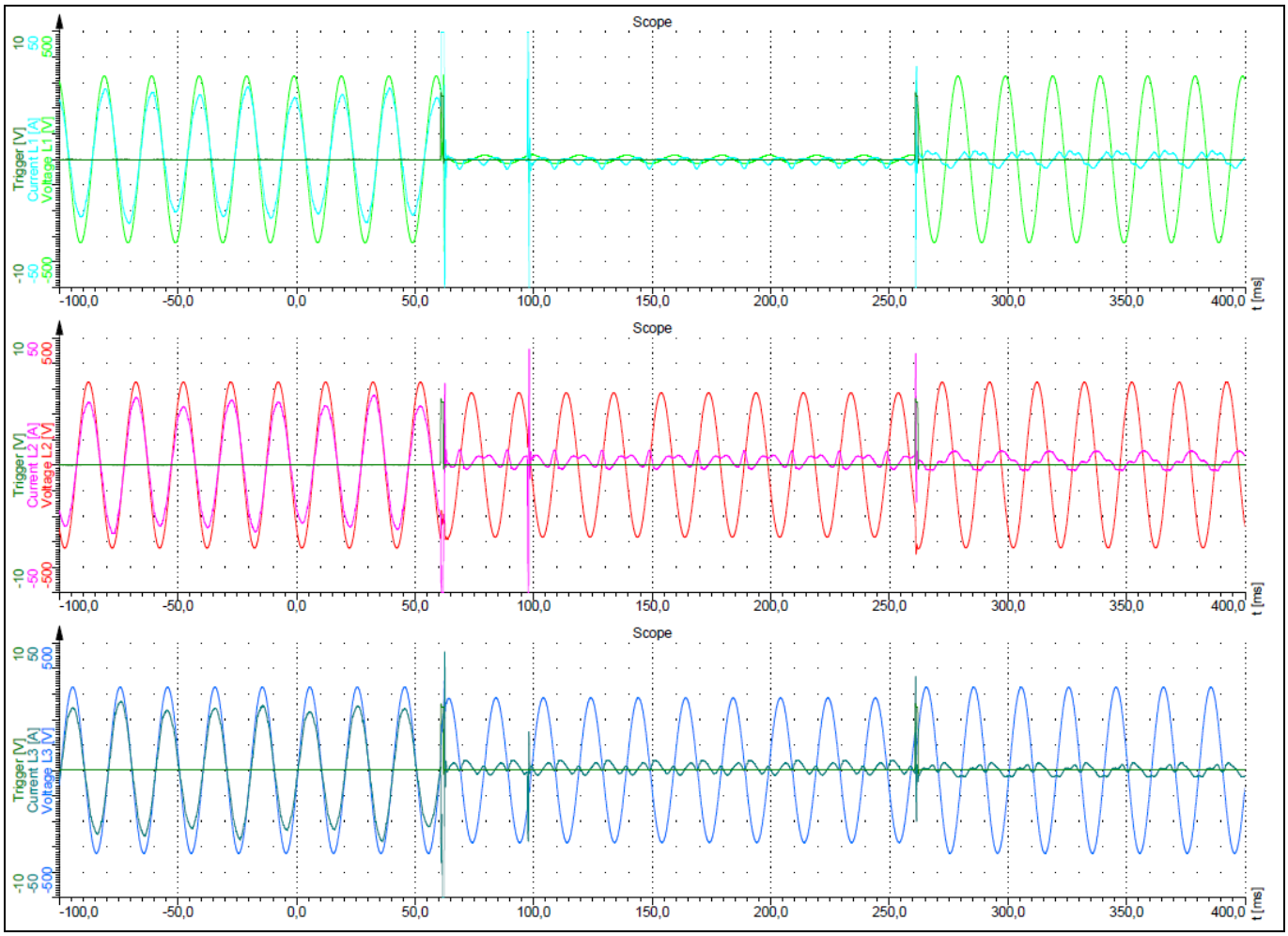


Fig. 17 – 3 Guasto simmetrico trifase – durata del guasto – prova su L1

/3 three-phase symm. Fault – duration of fault – test on L1

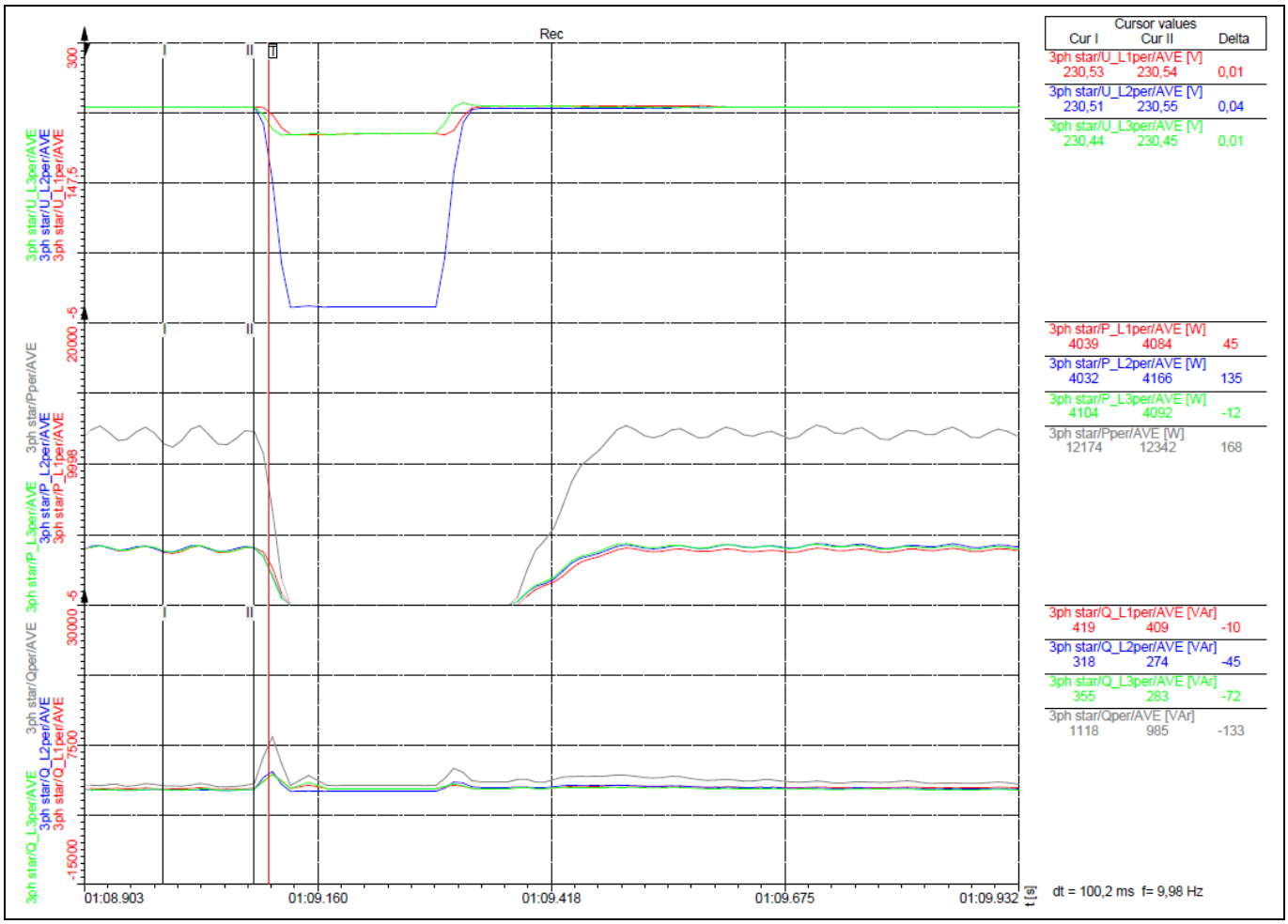


Fig. 18 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L2

/3 bi-phase asymm. fault – active and reactive power before fault – test on L2

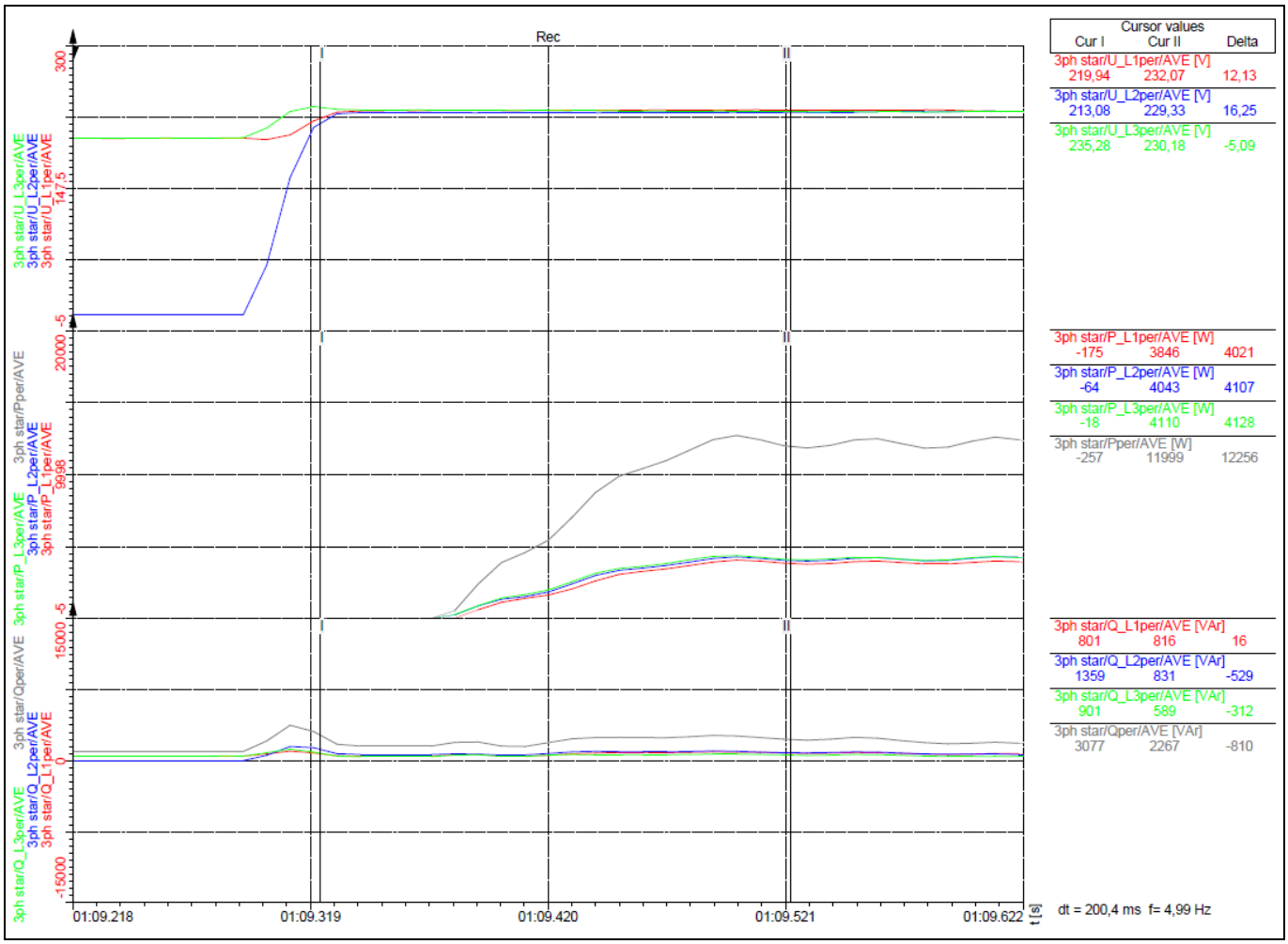


Fig. 19 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L2

/3 bi-phase asymm. fault – active and reactive power after fault – test on L2

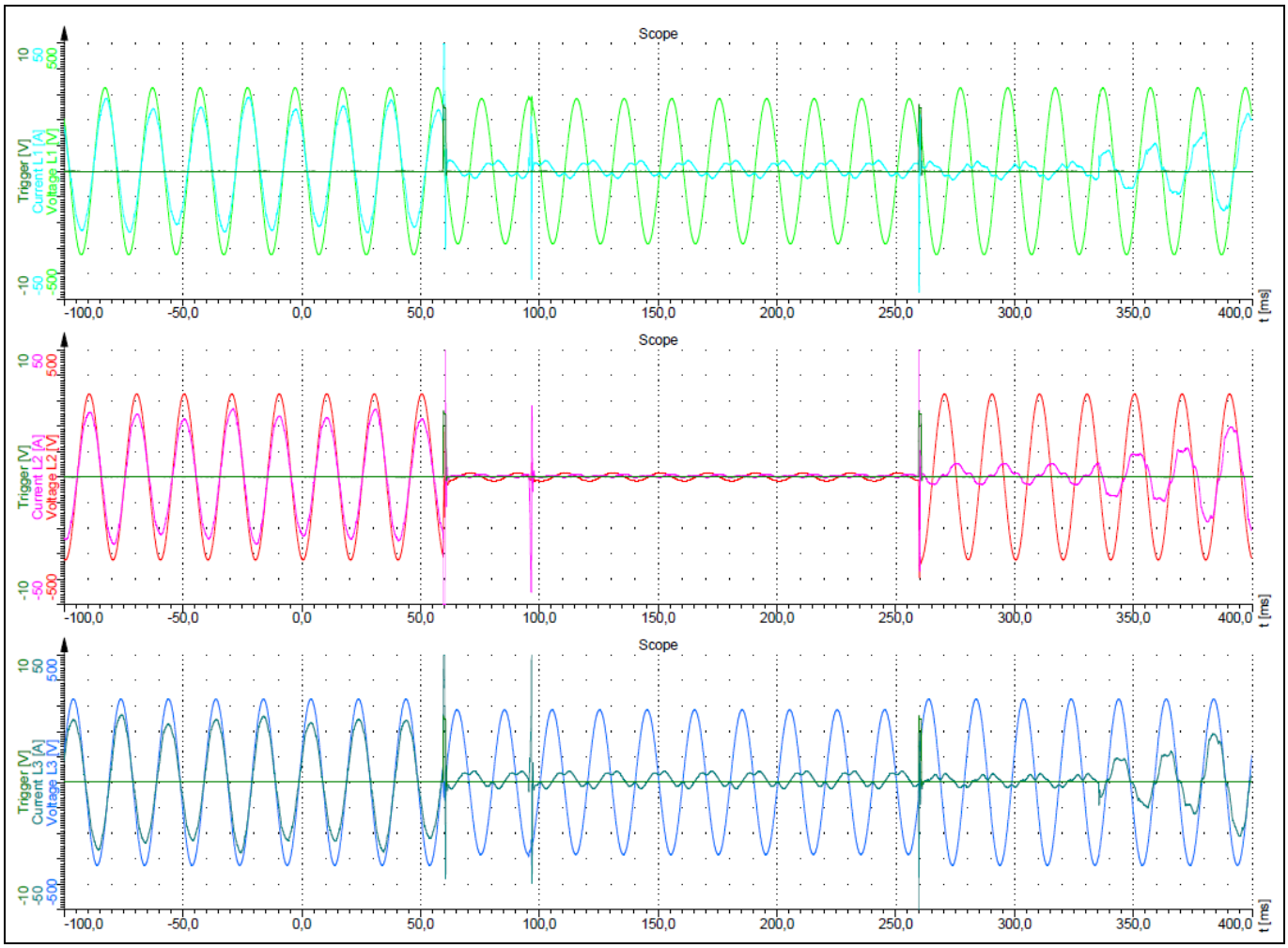


Fig. 20 – 3 Guasto simmetrico trifase – durata del guasto – prova su L2

/3 three-phase symm. Fault – duration of fault – test on L2

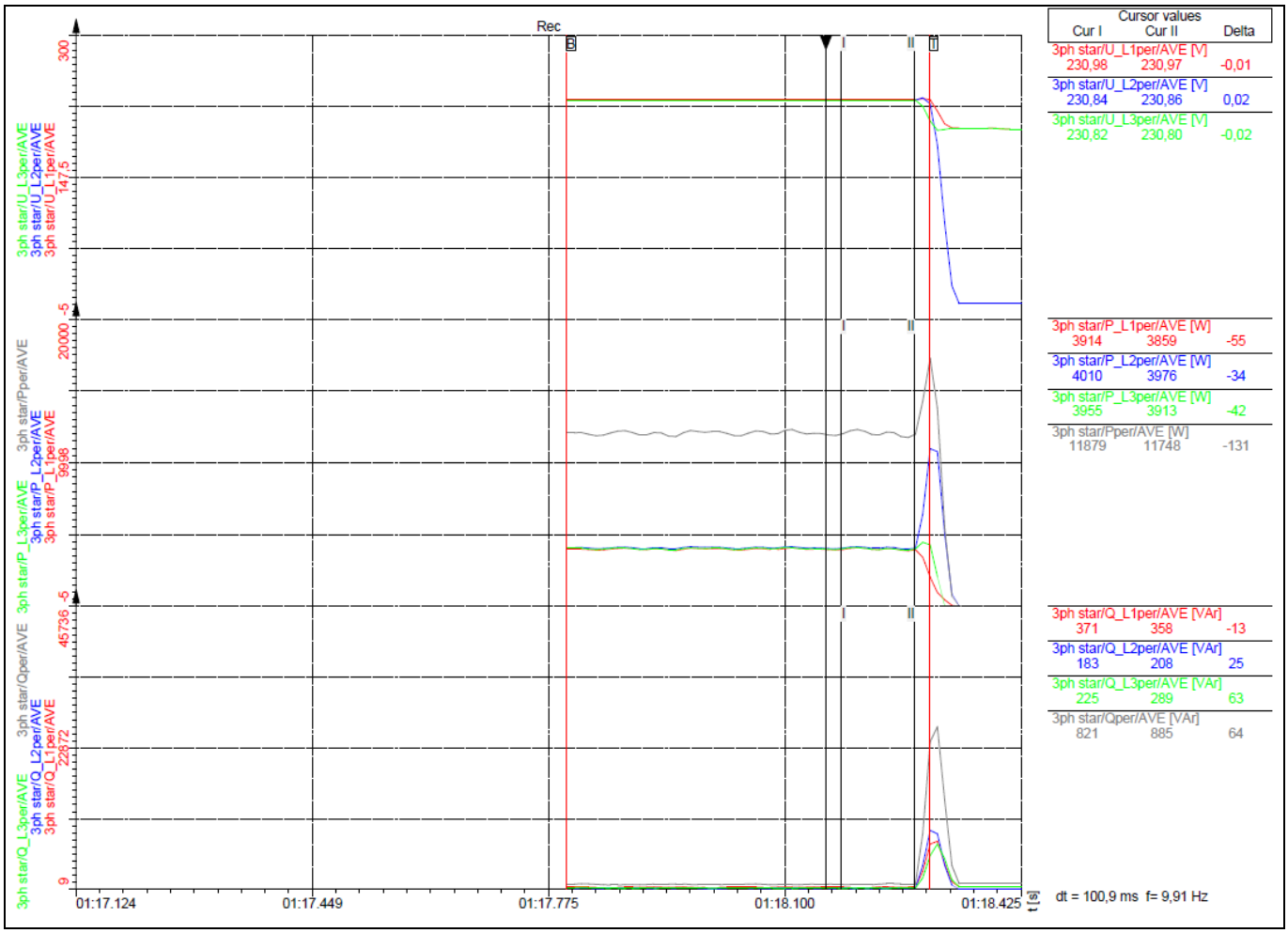


Fig. 21 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L3

/3 bi-phase asymm. fault – active and reactive power before fault – test on L3

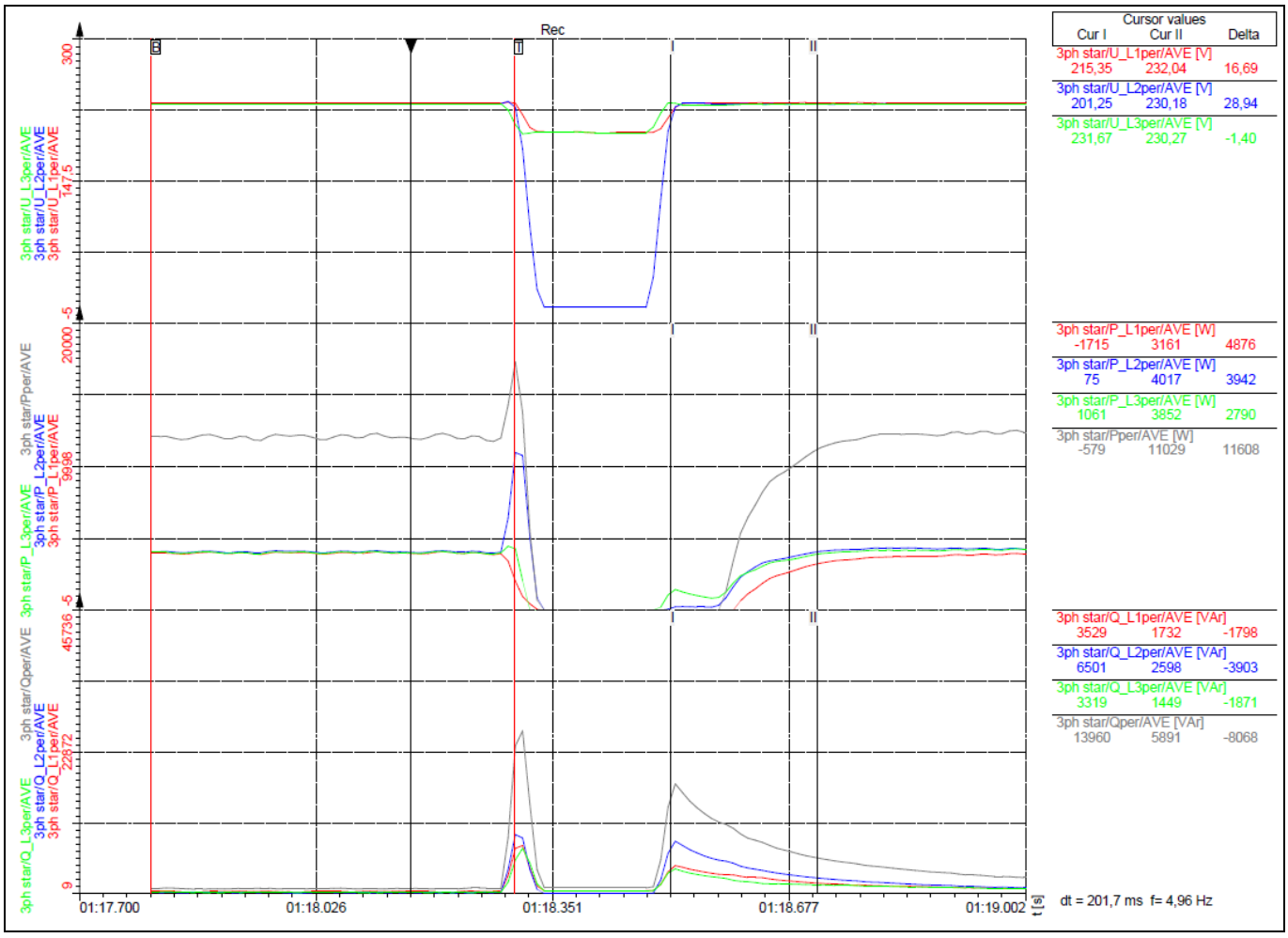


Fig. 22 – 3 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L3

/3 bi-phase asymm. fault – active and reactive power after fault – test on L3

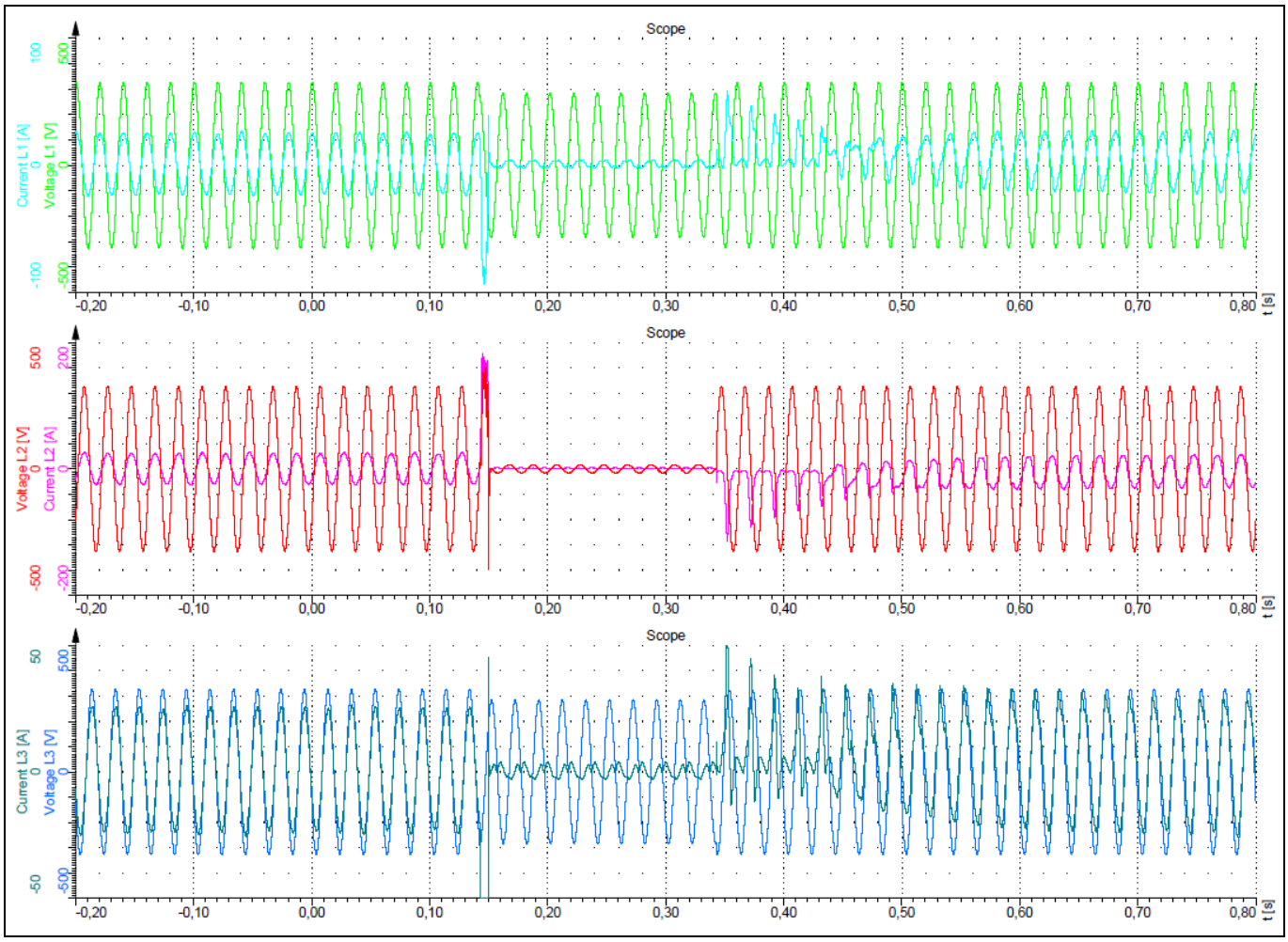


Fig. 23 – 3 Guasto simmetrico trifase – durata del guasto – prova su L3

/3 three-phase symm. Fault – duration of fault – test on L3

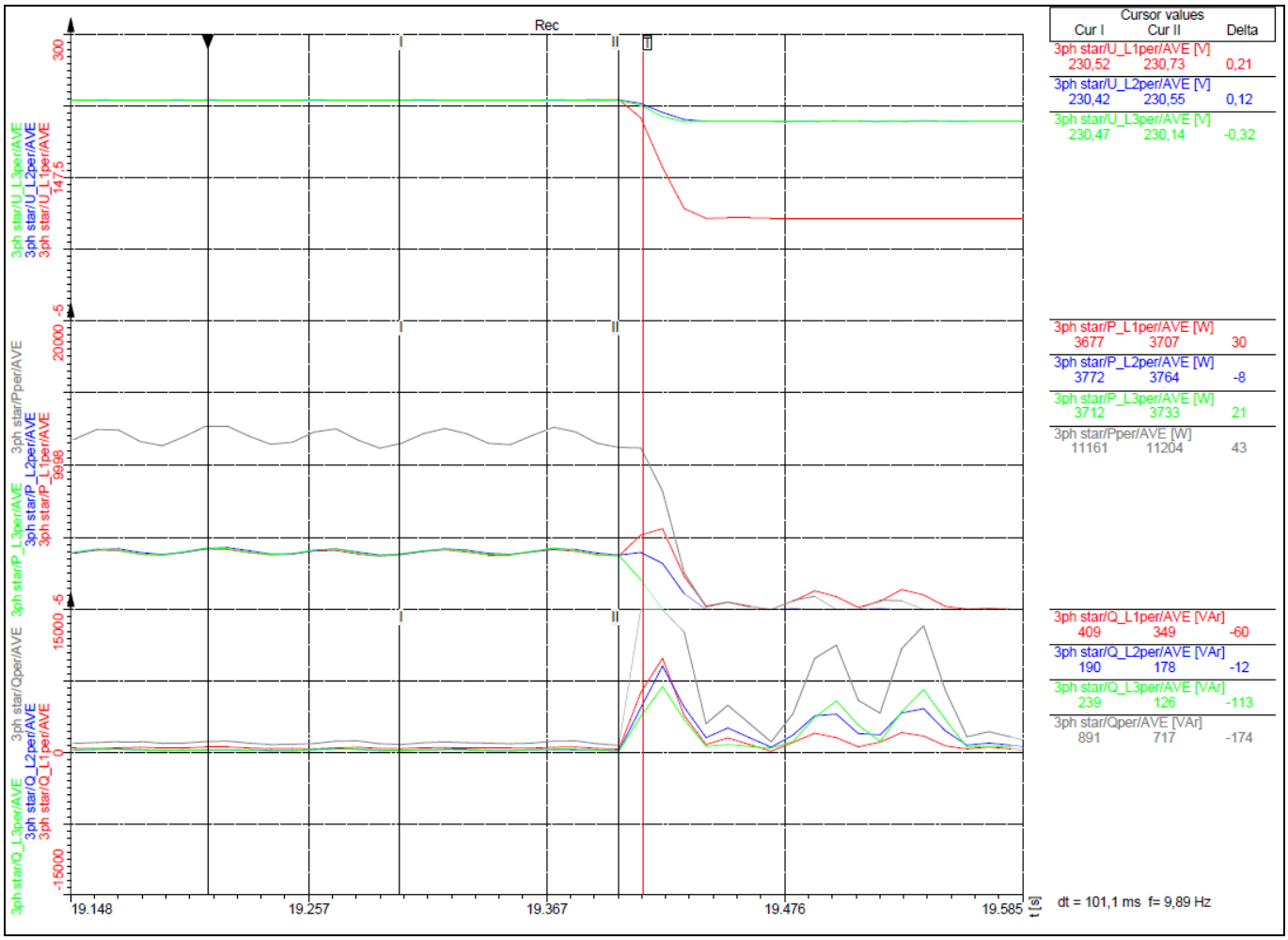


Fig. 24 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L1

/4 bi-phase asymm. fault – active and reactive power before fault – test on L1

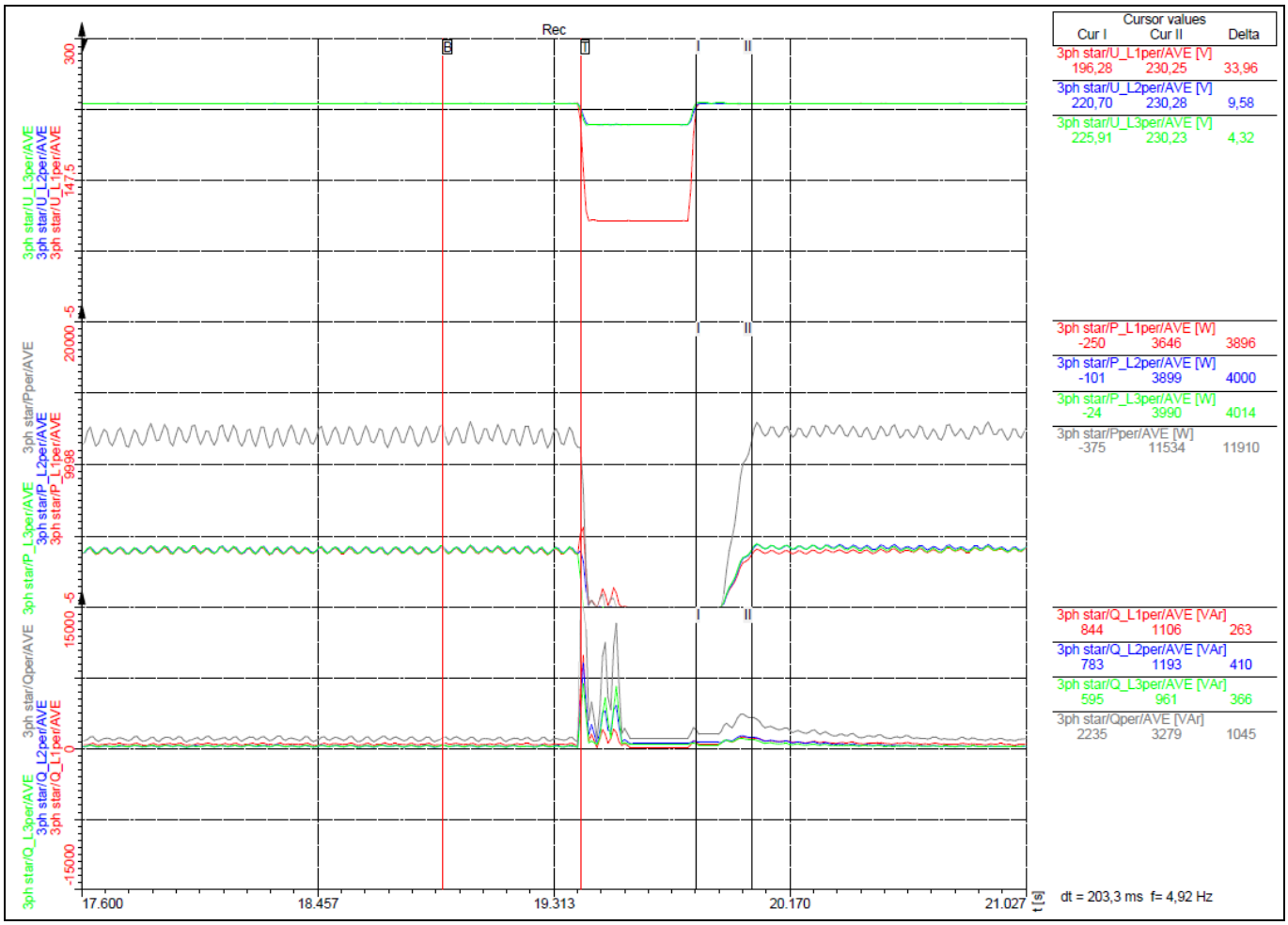


Fig. 25 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L1

/4 bi-phase asymm. fault – active and reactive power after fault – test on L1

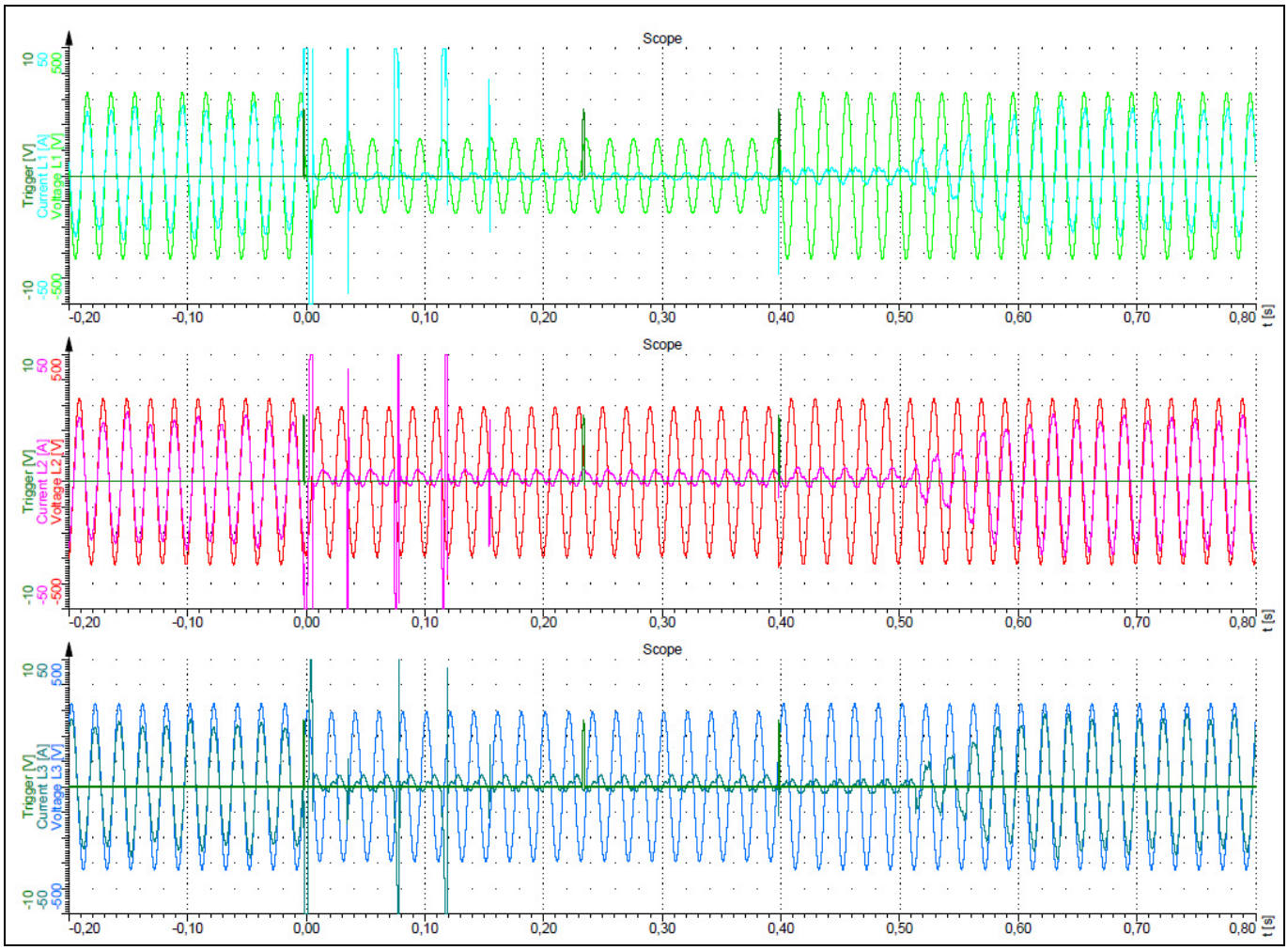


Fig. 26 – 4 Guasto simmetrico trifase – durata del guasto – prova su L1

/4 three-phase symm. Fault – duration of fault – test on L1

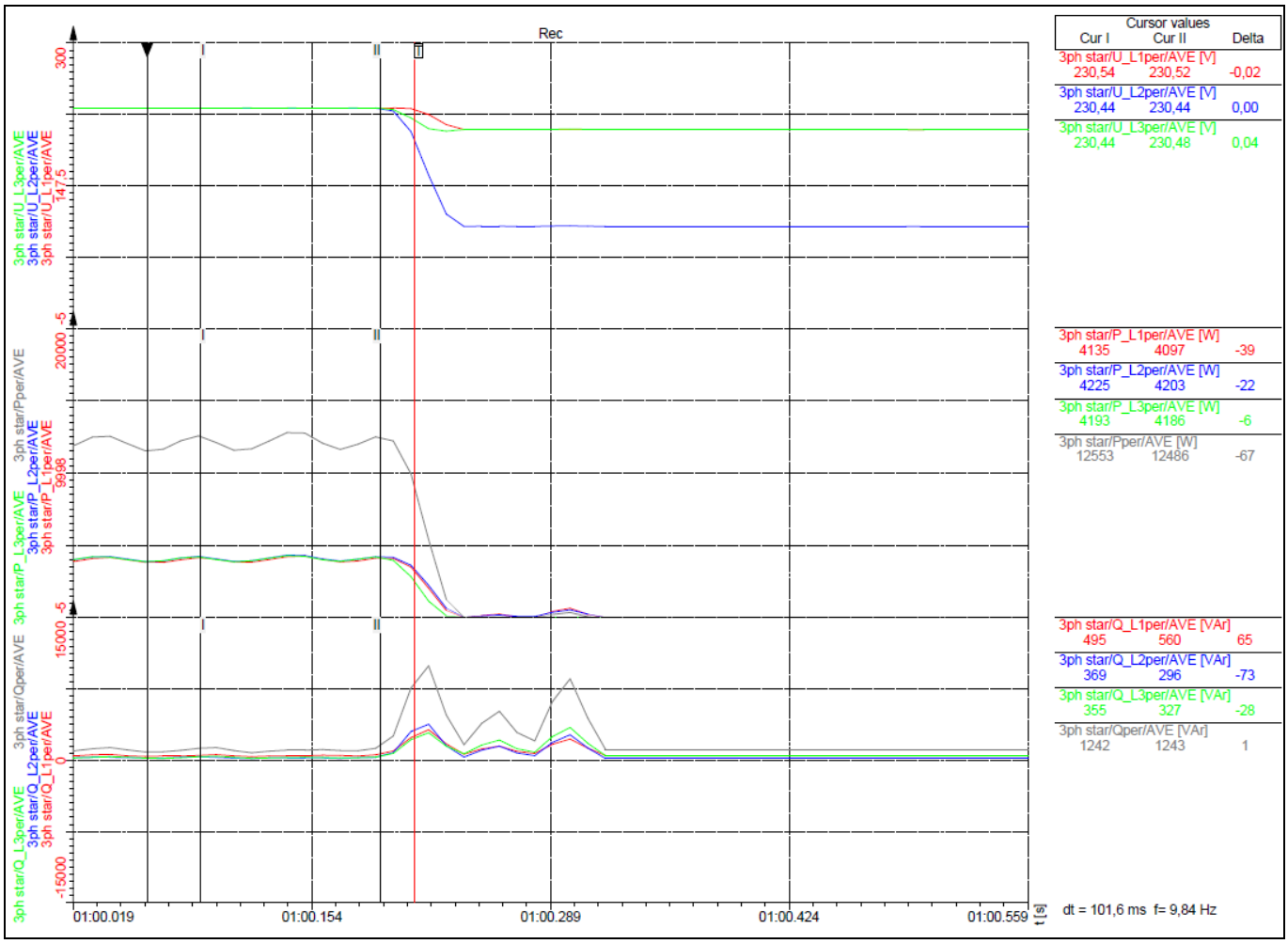


Fig. 27 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L2

/4 bi-phase asymm. fault – active and reactive power before fault – test on L2

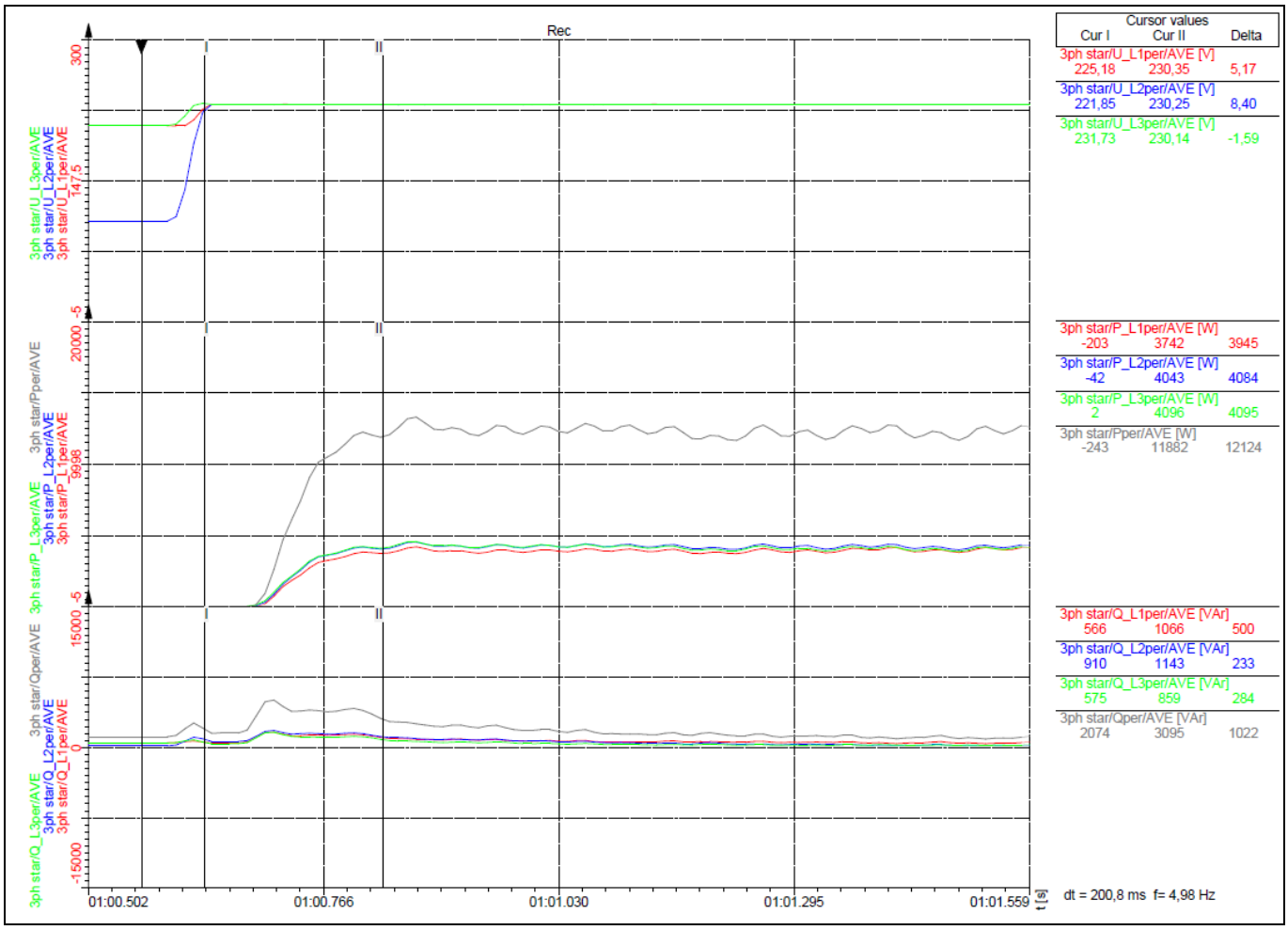


Fig. 28 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L2

/4 bi-phase asymm. fault – active and reactive power after fault – test on L2

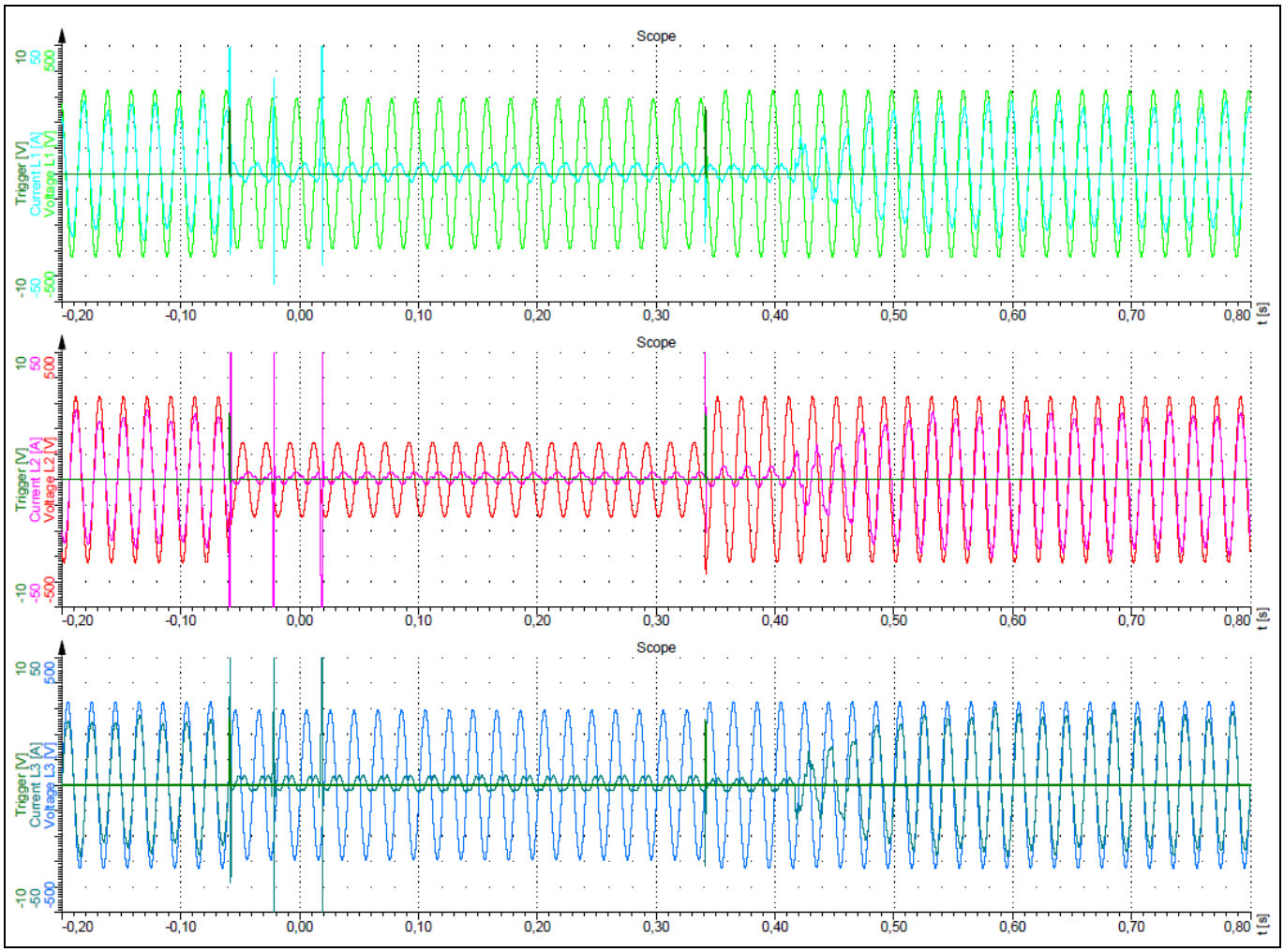


Fig. 29 – 4 Guasto simmetrico trifase – durata del guasto – prova su L2

/4 three-phase symm. Fault – duration of fault – test on L2

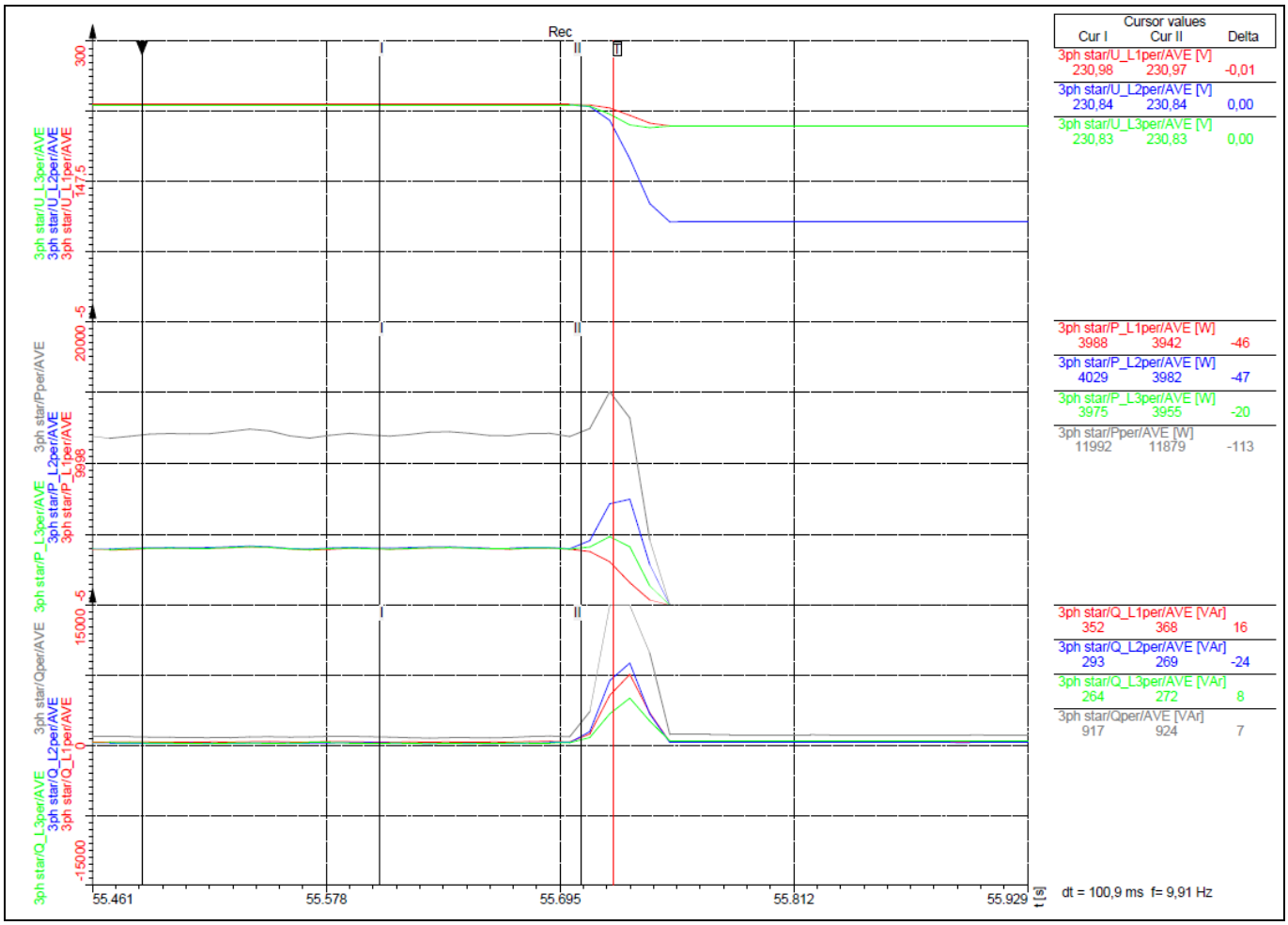


Fig. 30 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva prima del guasto – prova su L3

/4 bi-phase asymm. fault – active and reactive power before fault – test on L3

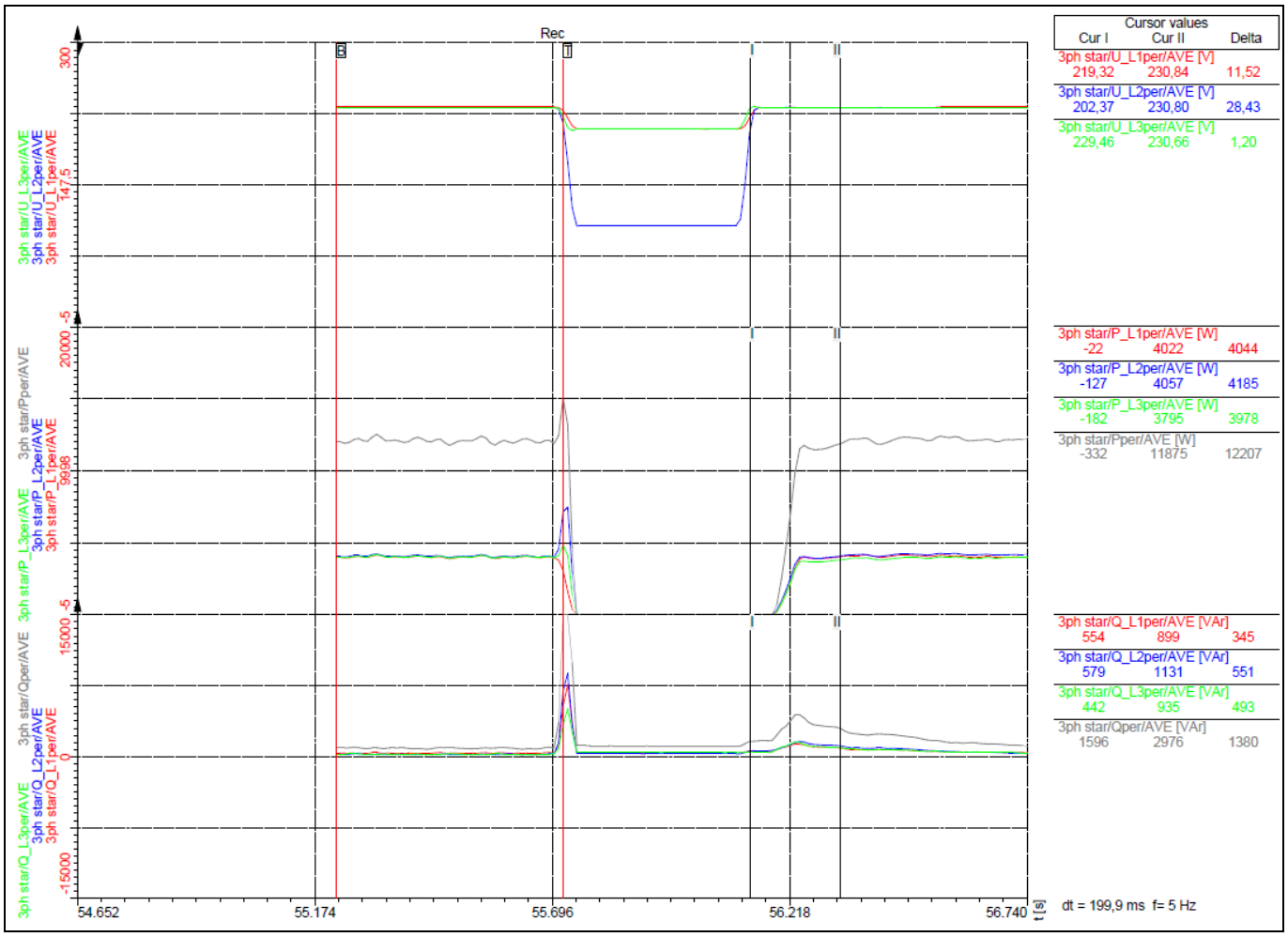


Fig. 31 – 4 Guasto asimmetrico bifase – potenza attiva e reattiva dopo il guasto – prova su L3

/4 bi-phase asymm. fault – active and reactive power after fault – test on L3

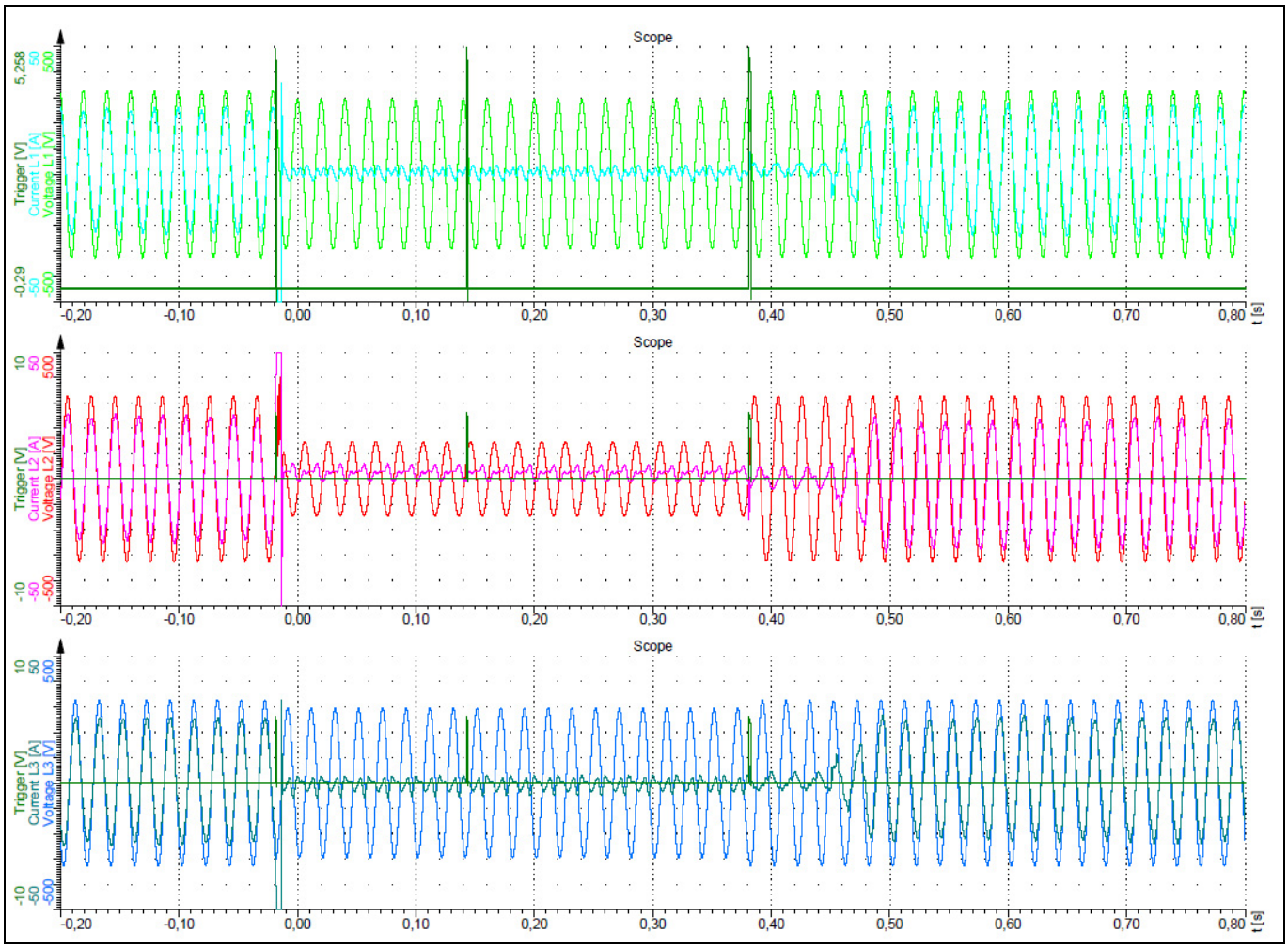


Fig. 32 – 4 Guasto simmetrico trifase – durata del guasto – prova su L3

/4 three-phase symm. Fault – duration of fault – test on L3

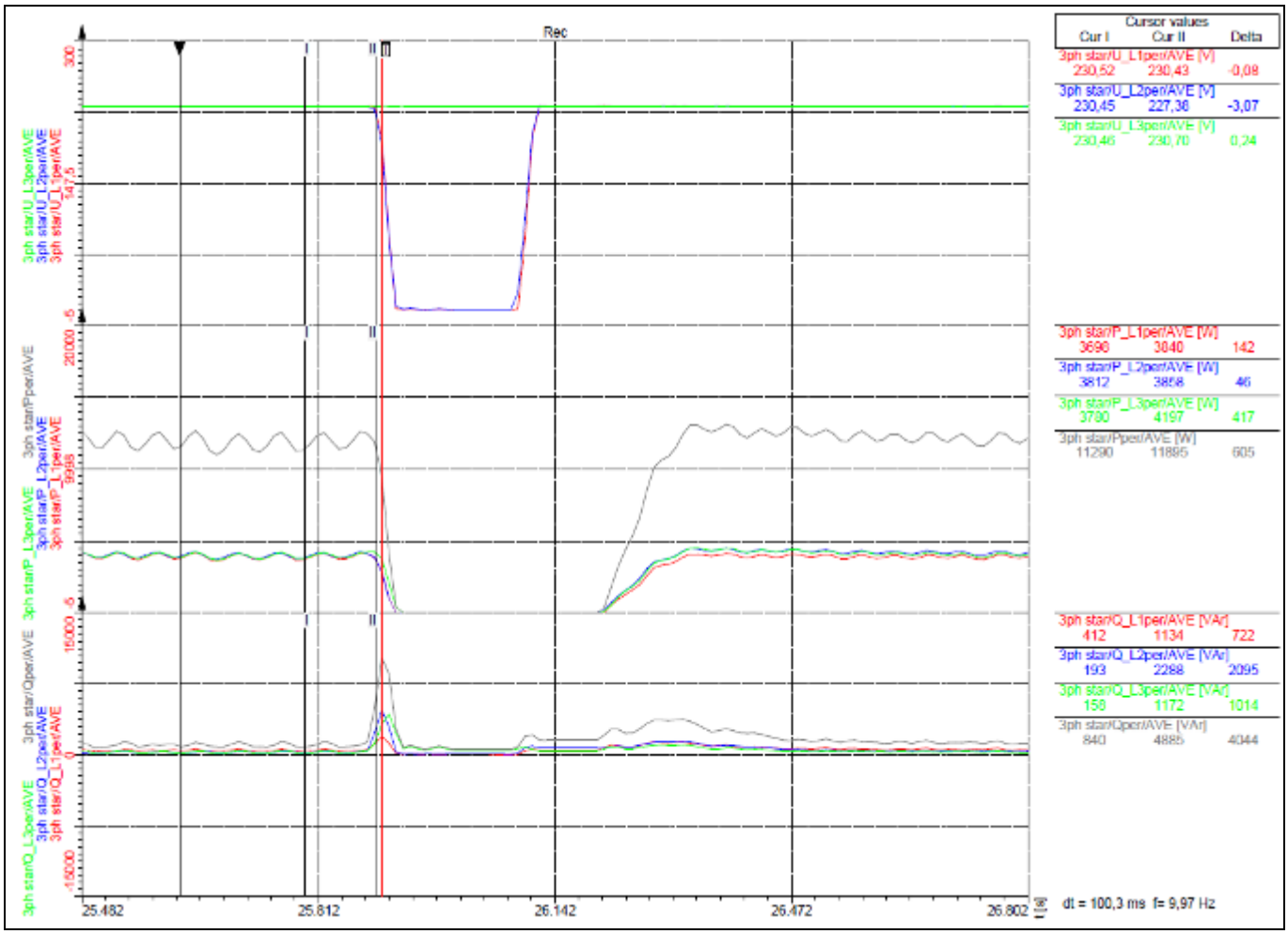


Fig. 33 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L1-L2

/5 bi-phase LV asymm. fault - active and reactive power before fault – test on L1-L2

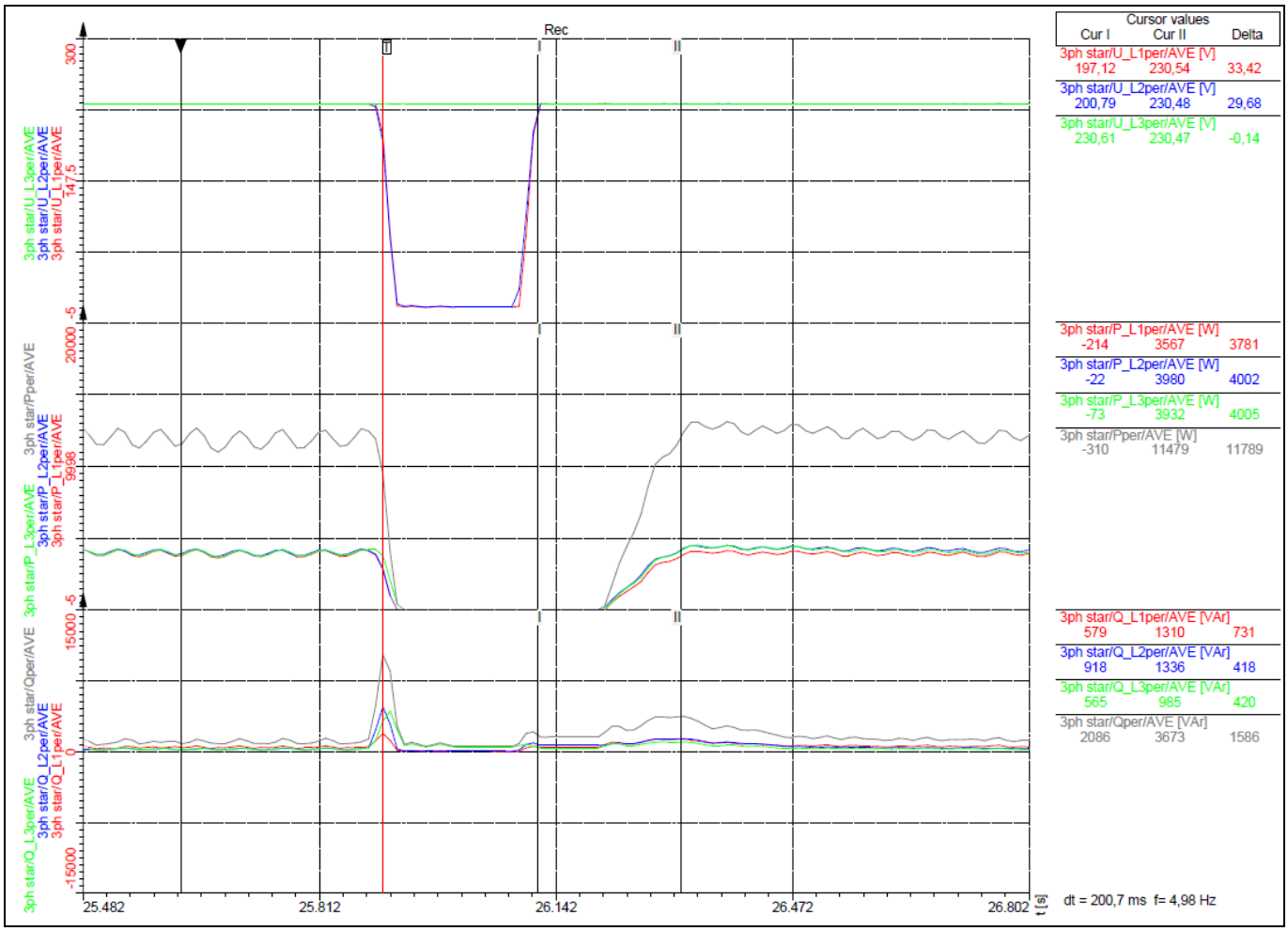


Fig. 34 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L1-L2

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L1-L2

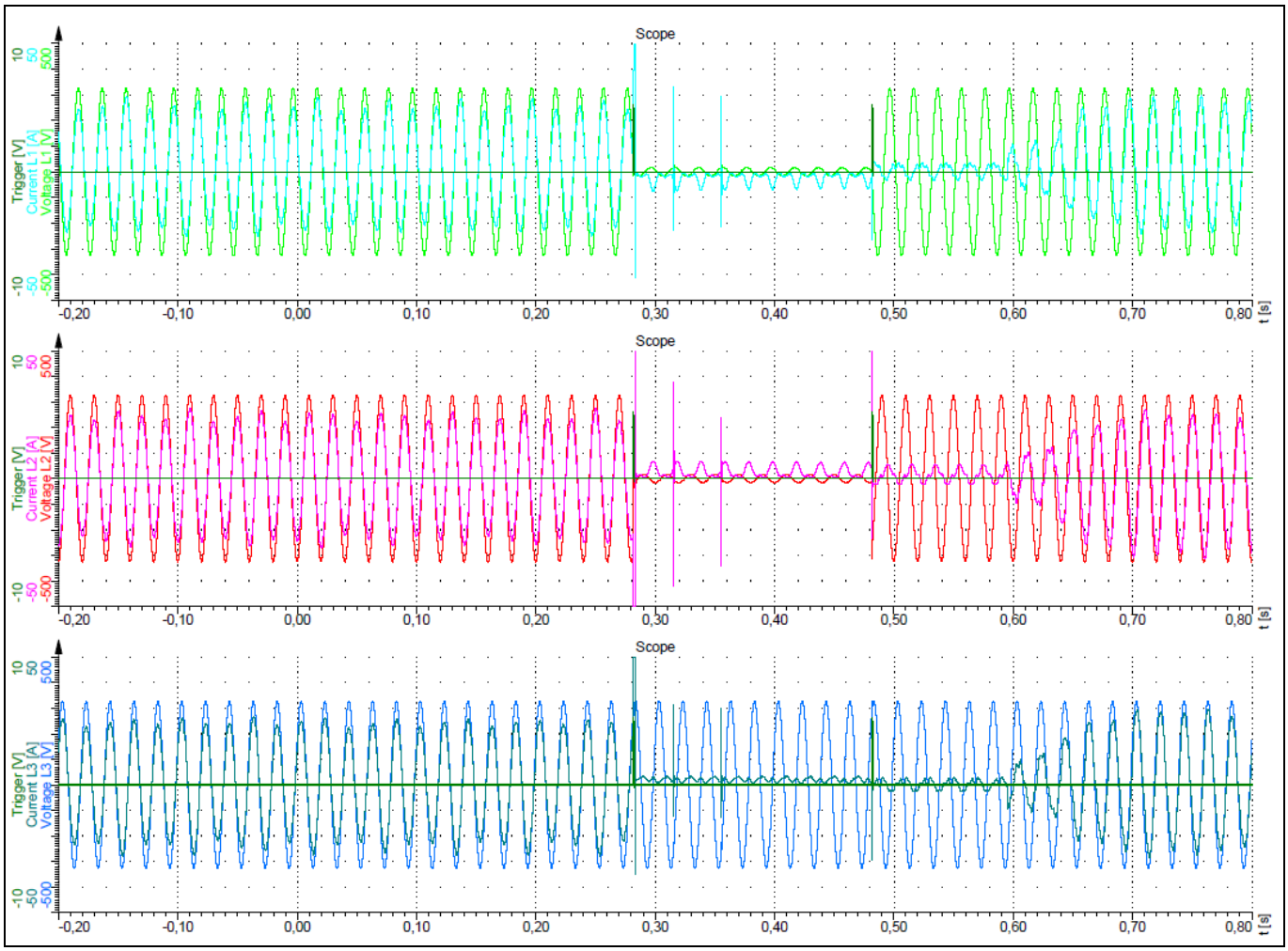


Fig. 35 – 5 Guasto asimmetrico bifase in BT – durata del guasto – prova su L1-L2

/5 bi-phase LV asymm. fault - duration of fault – test on L1-L2

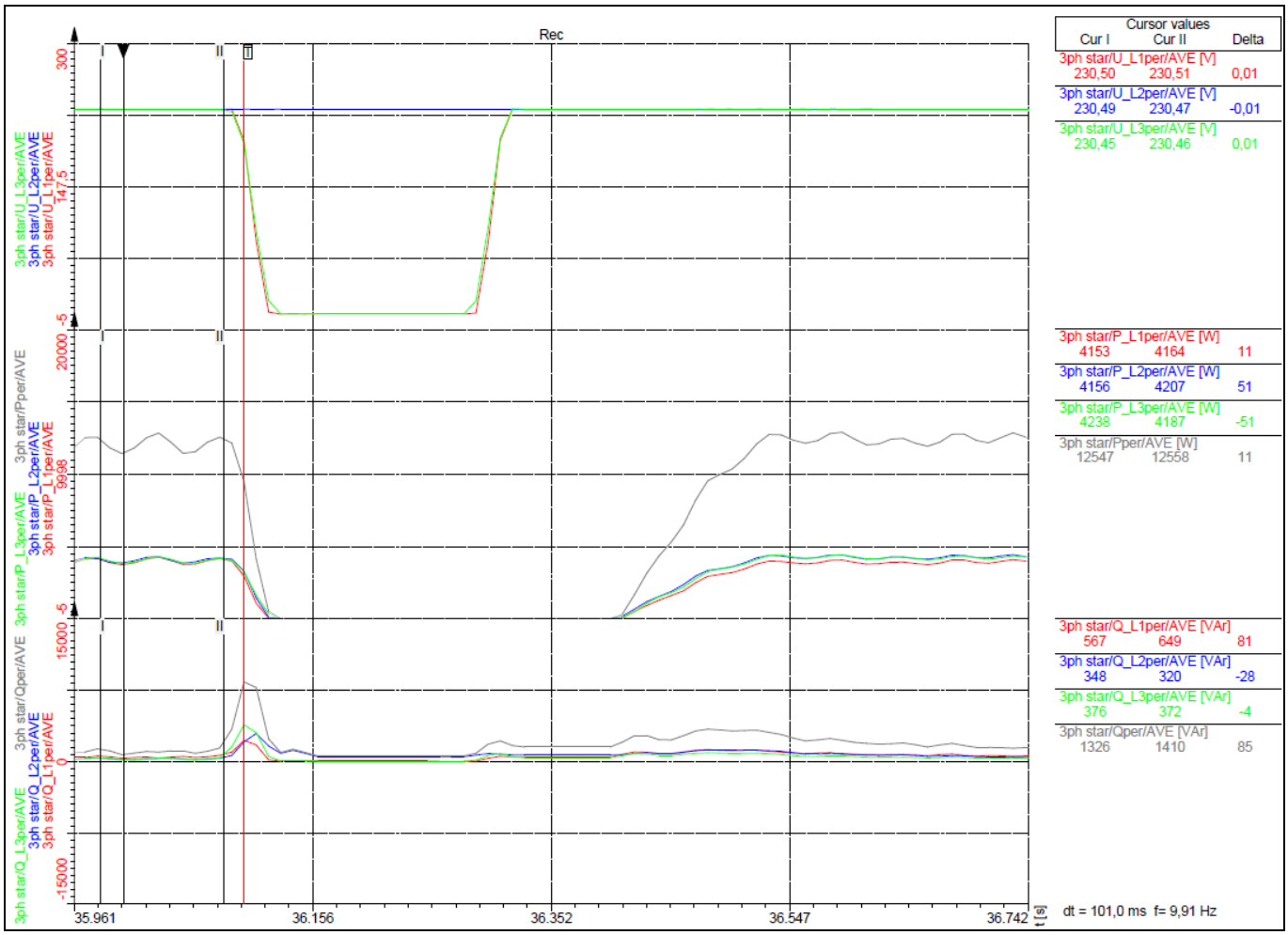


Fig. 36 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L1-L3

/5 bi-phase LV asymm. fault - active and reactive power before fault – test on L1-L3

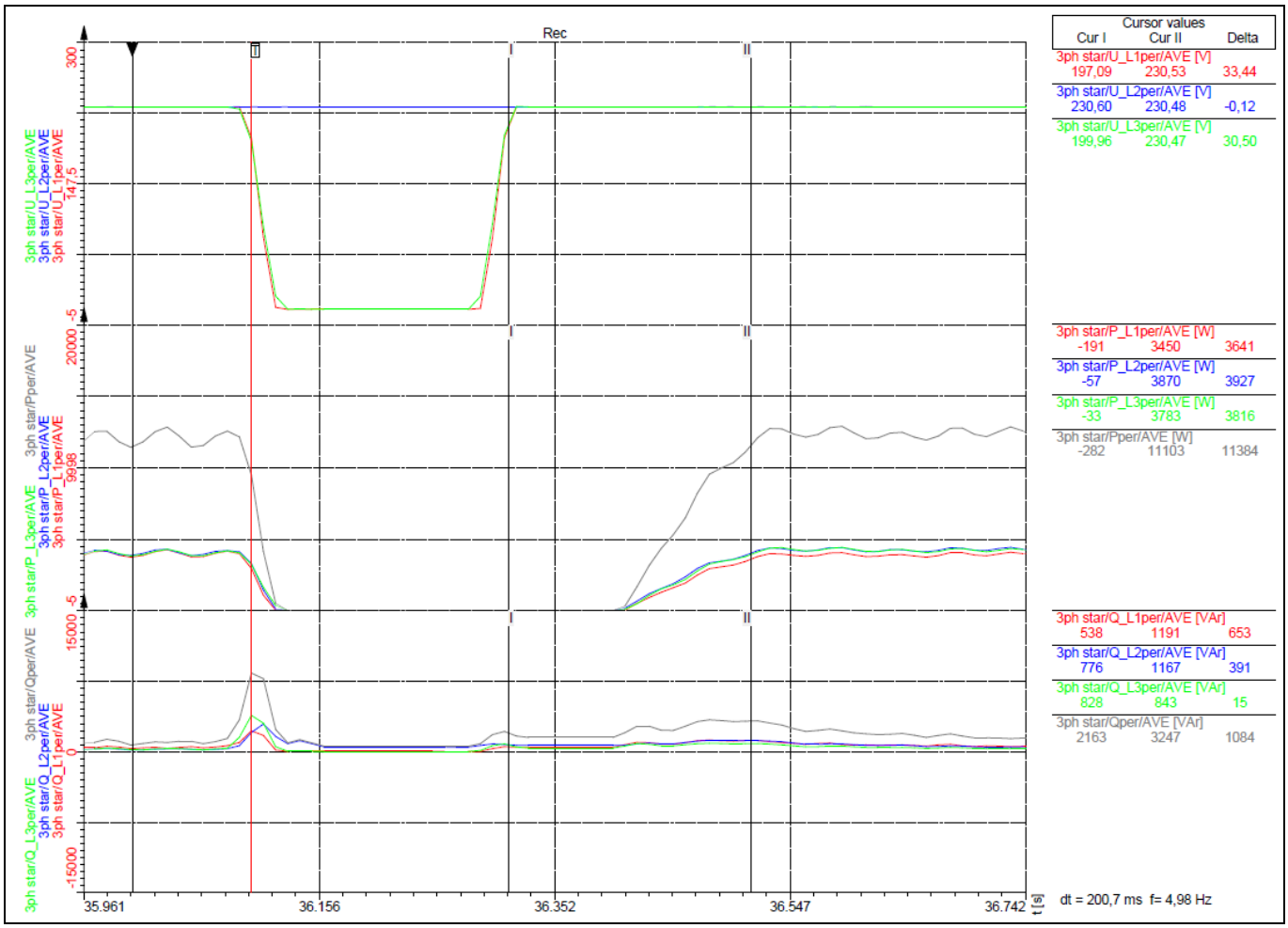


Fig. 37 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L1-L3

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L1-L3

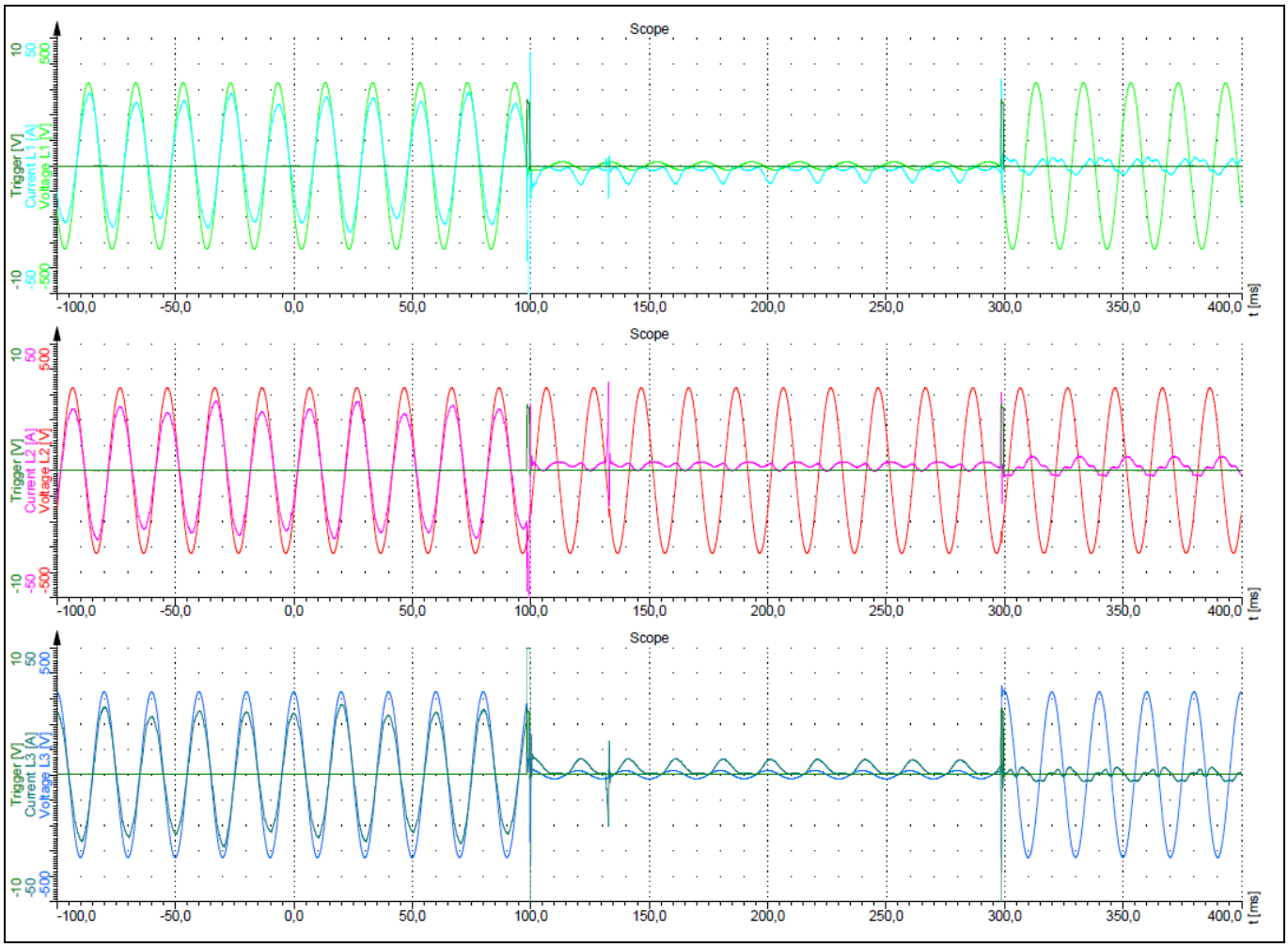


Fig. 38 – 5 Guasto asimmetrico bifase in BT – durata del guasto – prova su L1-L3

/5 bi-phase LV asymm. fault - duration of fault – test on L1-L3

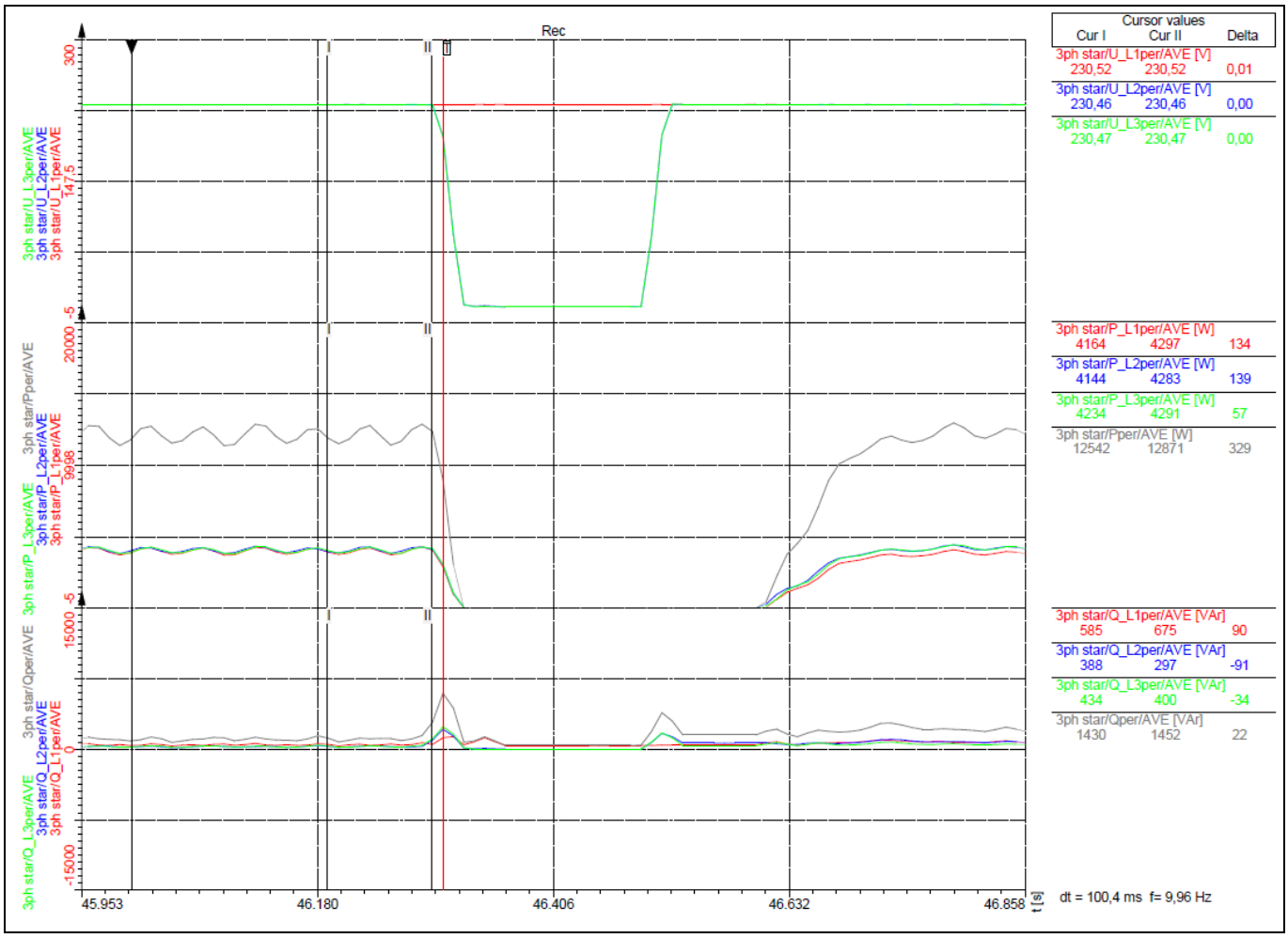


Fig. 39 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L2-L3

/5 bi-phase LV asymm. fault - active and reactive power before fault – test on L2-L3

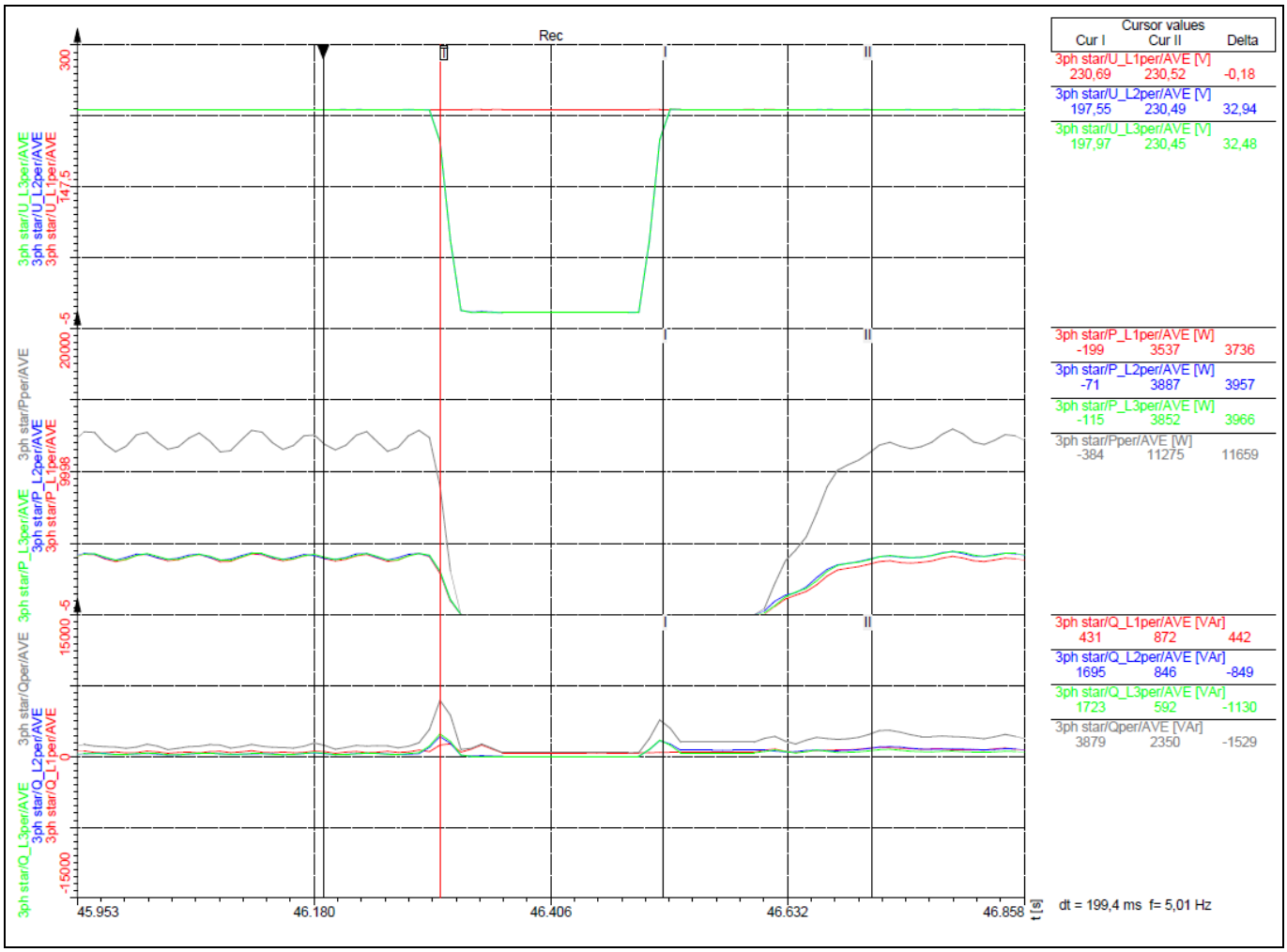


Fig. 40 – 5 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L2-L3

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L2-L3

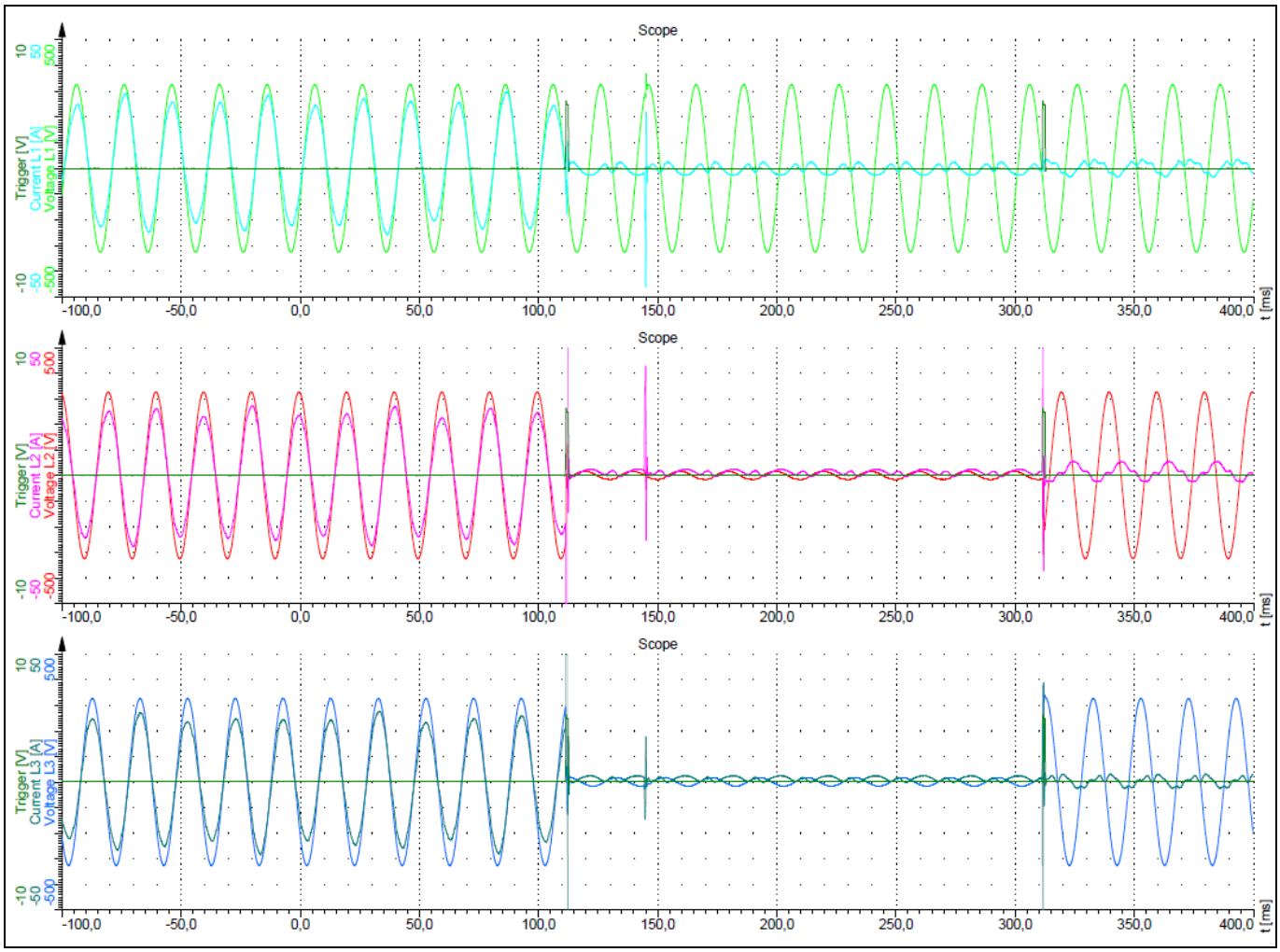


Fig. 41 – 5 Guasto asimmetrico bifase in BT – durata del guasto – prova su L2-L3

/5 bi-phase LV asymm. fault - duration of fault – test on L2-L3

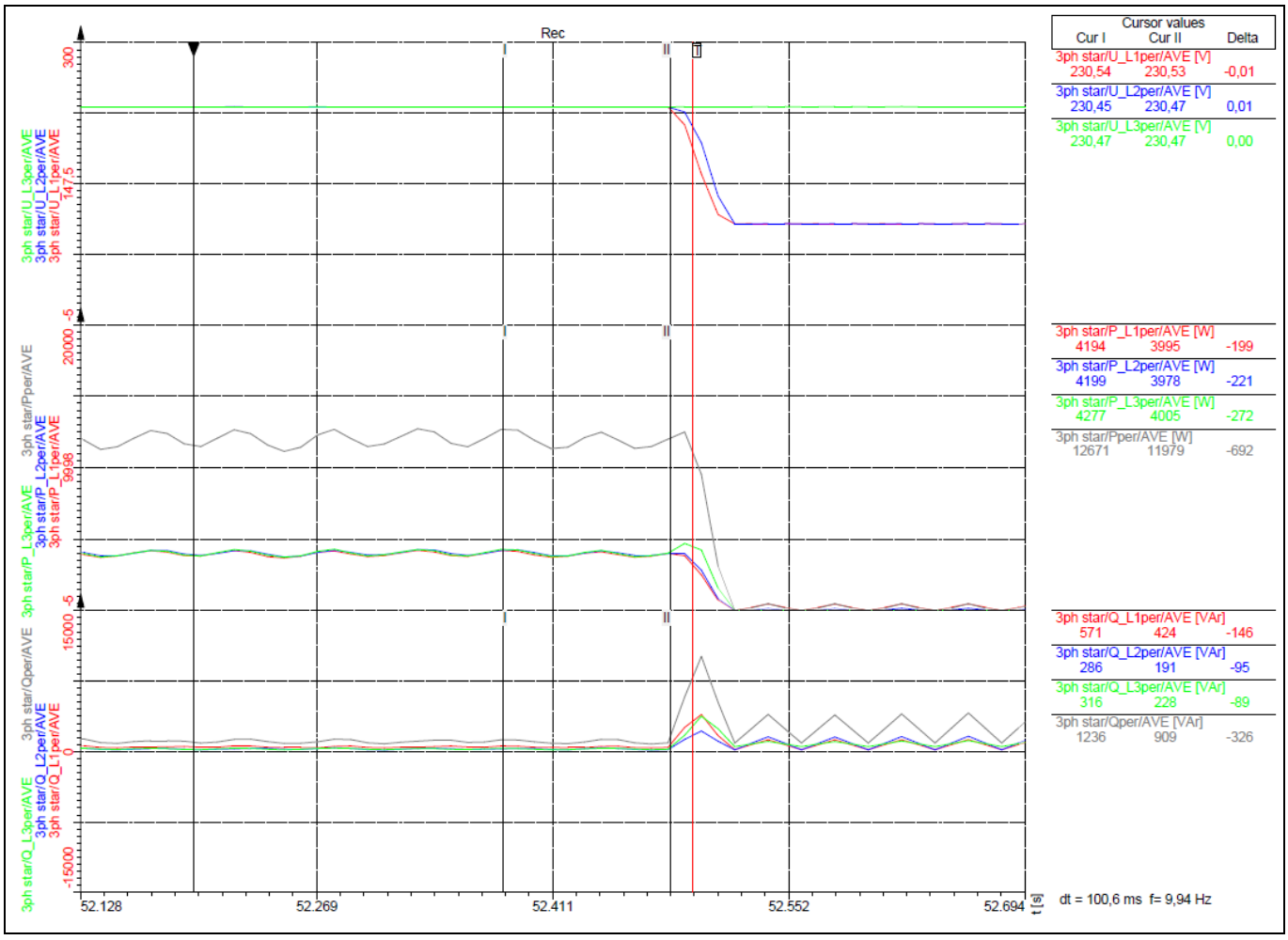


Fig. 42 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L1-L2

/6 bi-phase LV asymm. fault - active and reactive power before fault – test on L1-L2

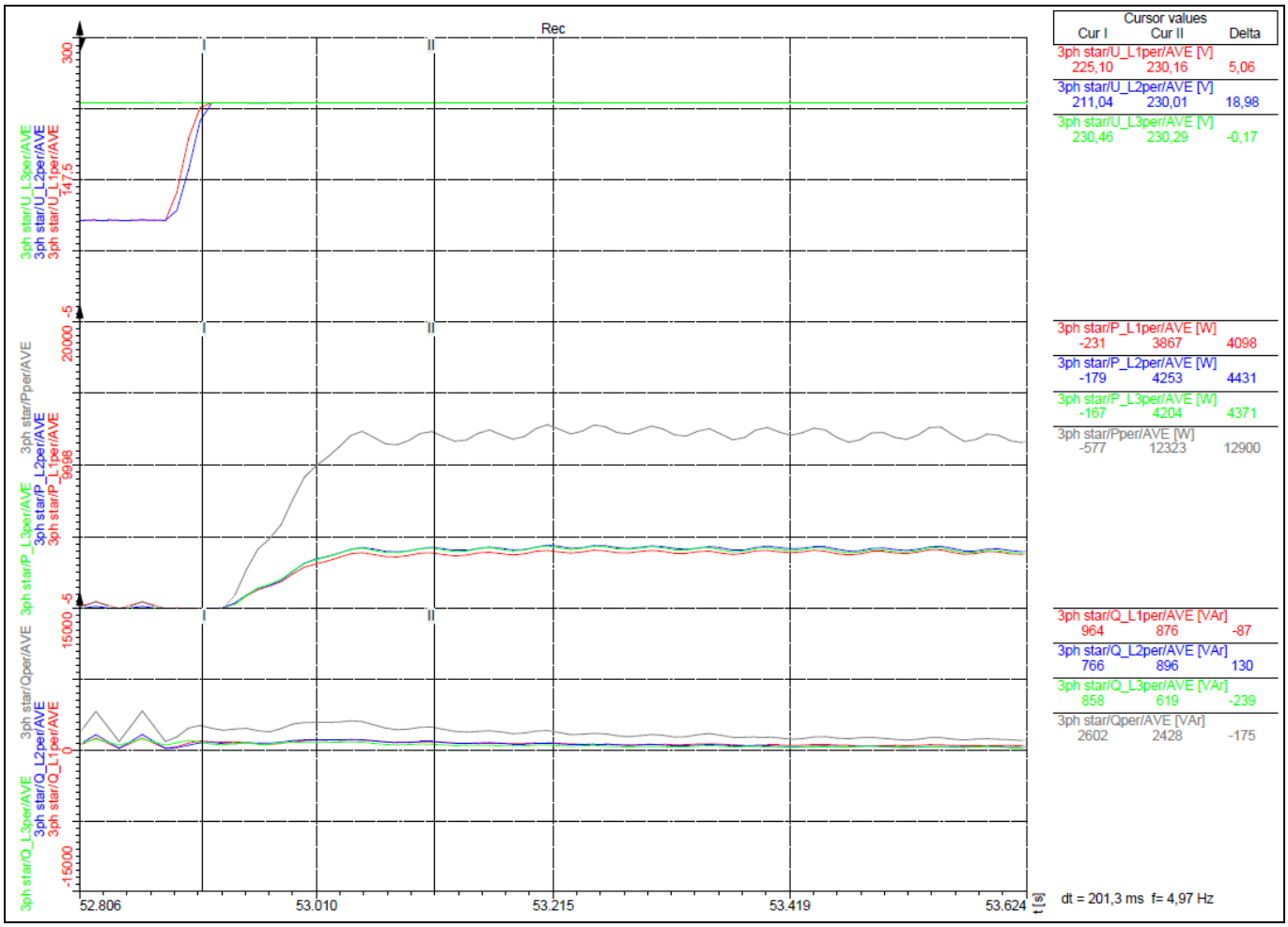


Fig. 43 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L1-L2

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L1-L2

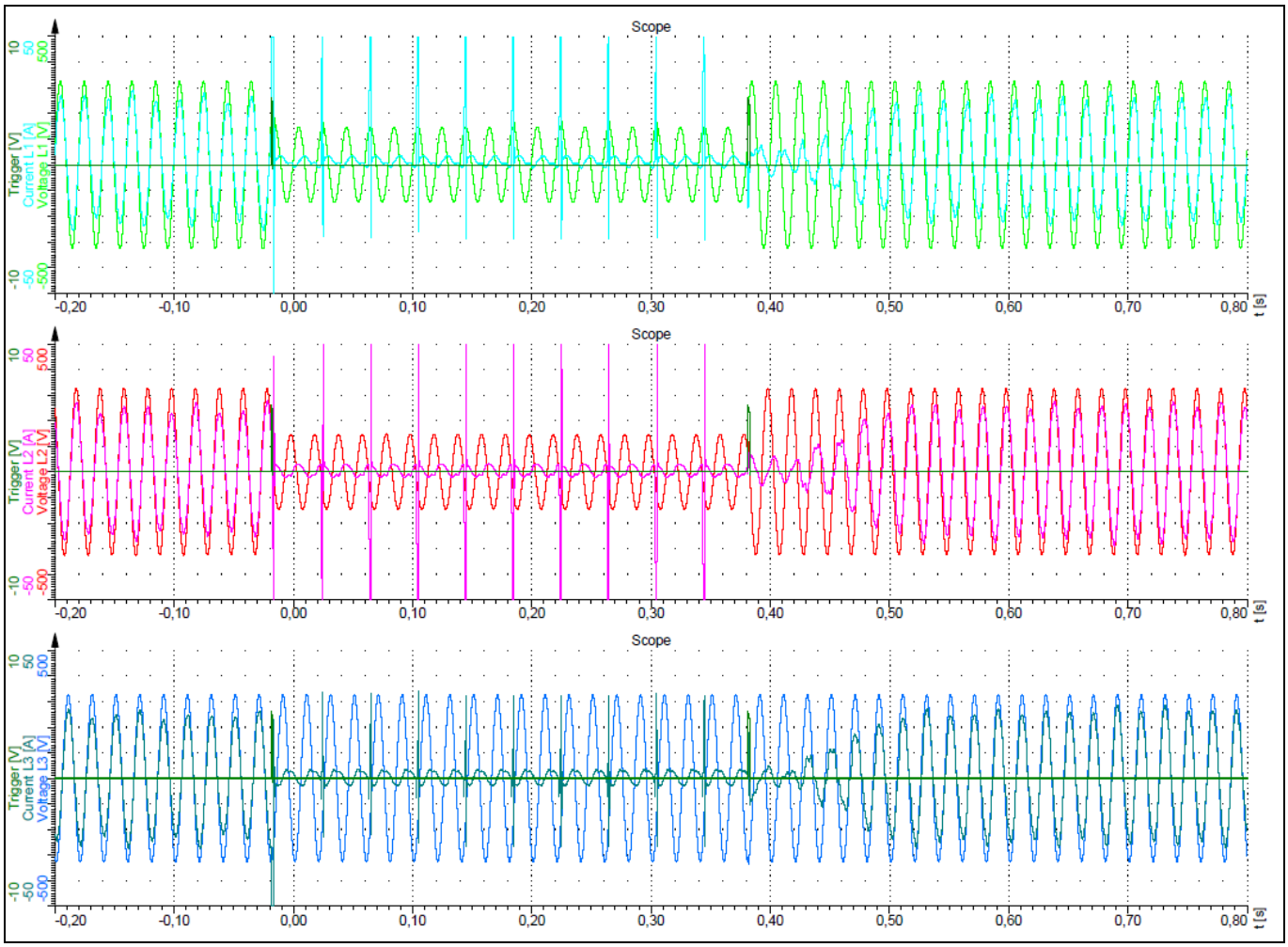


Fig. 44 – 6 Guasto asimmetrico bifase in BT – durata del guasto – prova su L1-L2

/6 bi-phase LV asymm. fault - duration of fault – test on L1-L2

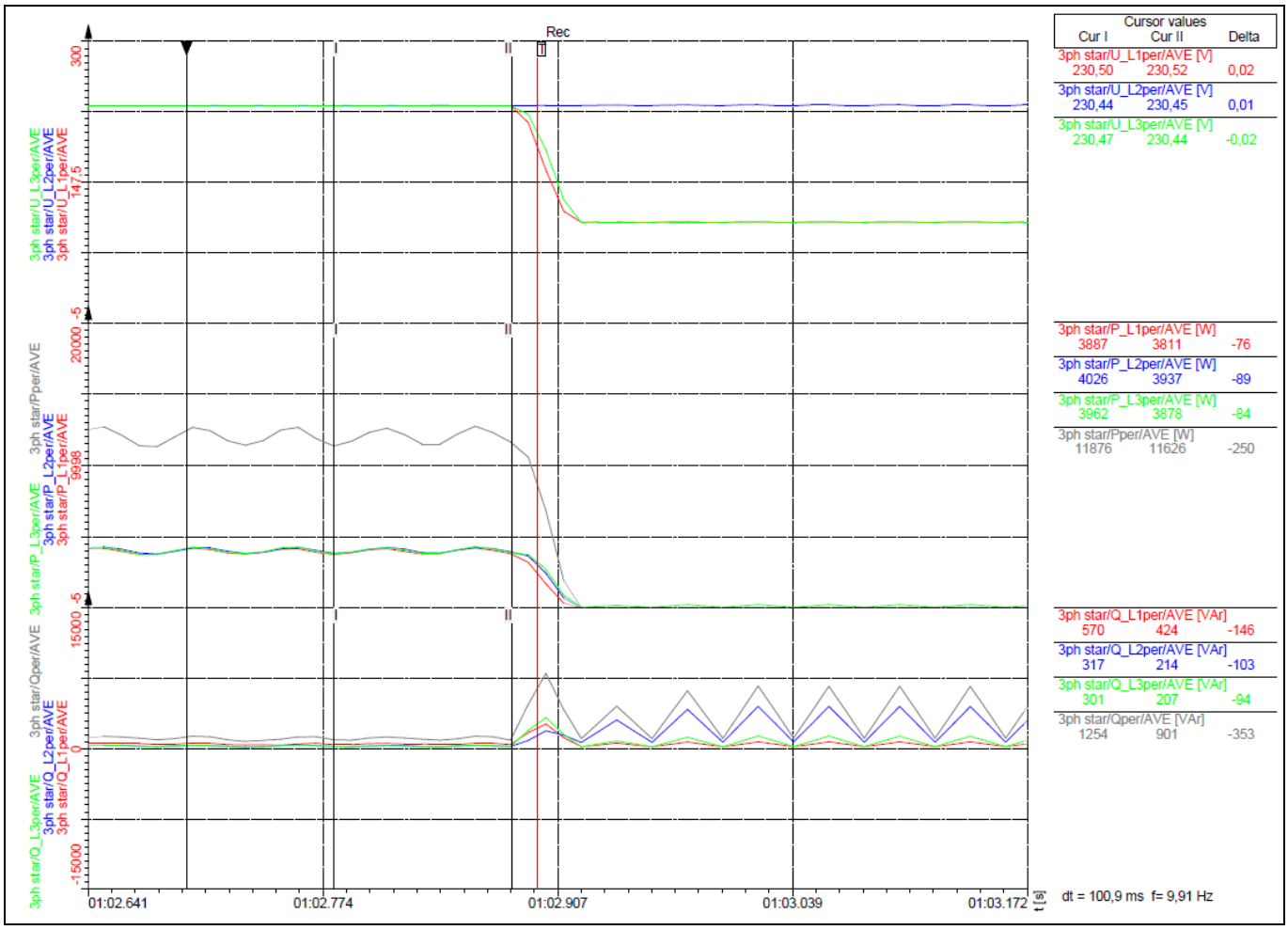


Fig. 45 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L1-L3

/6 bi-phase LV asymm. fault - active and reactive power before fault – test on L1-L3

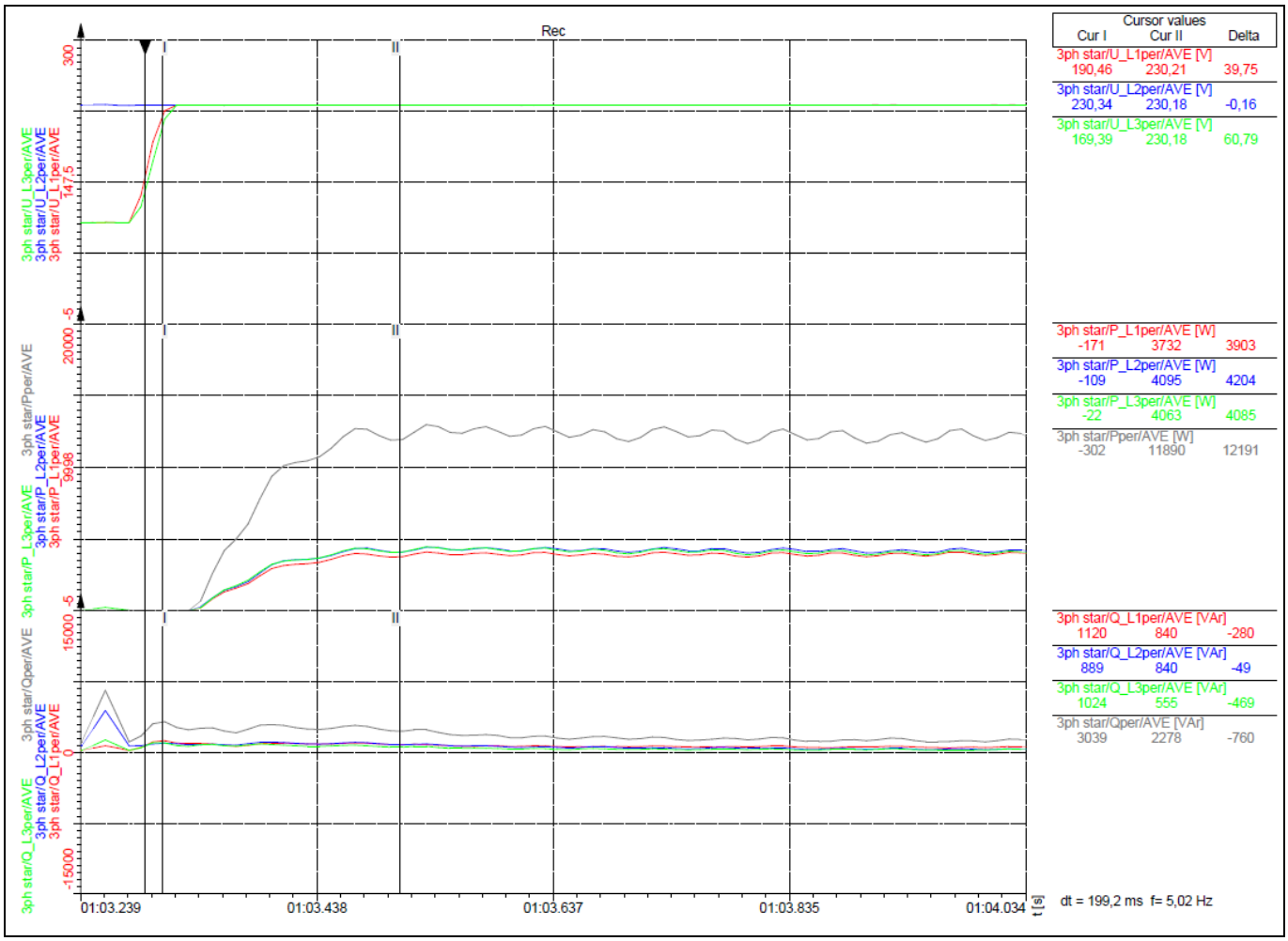


Fig. 46 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L1-L3

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L1-L3

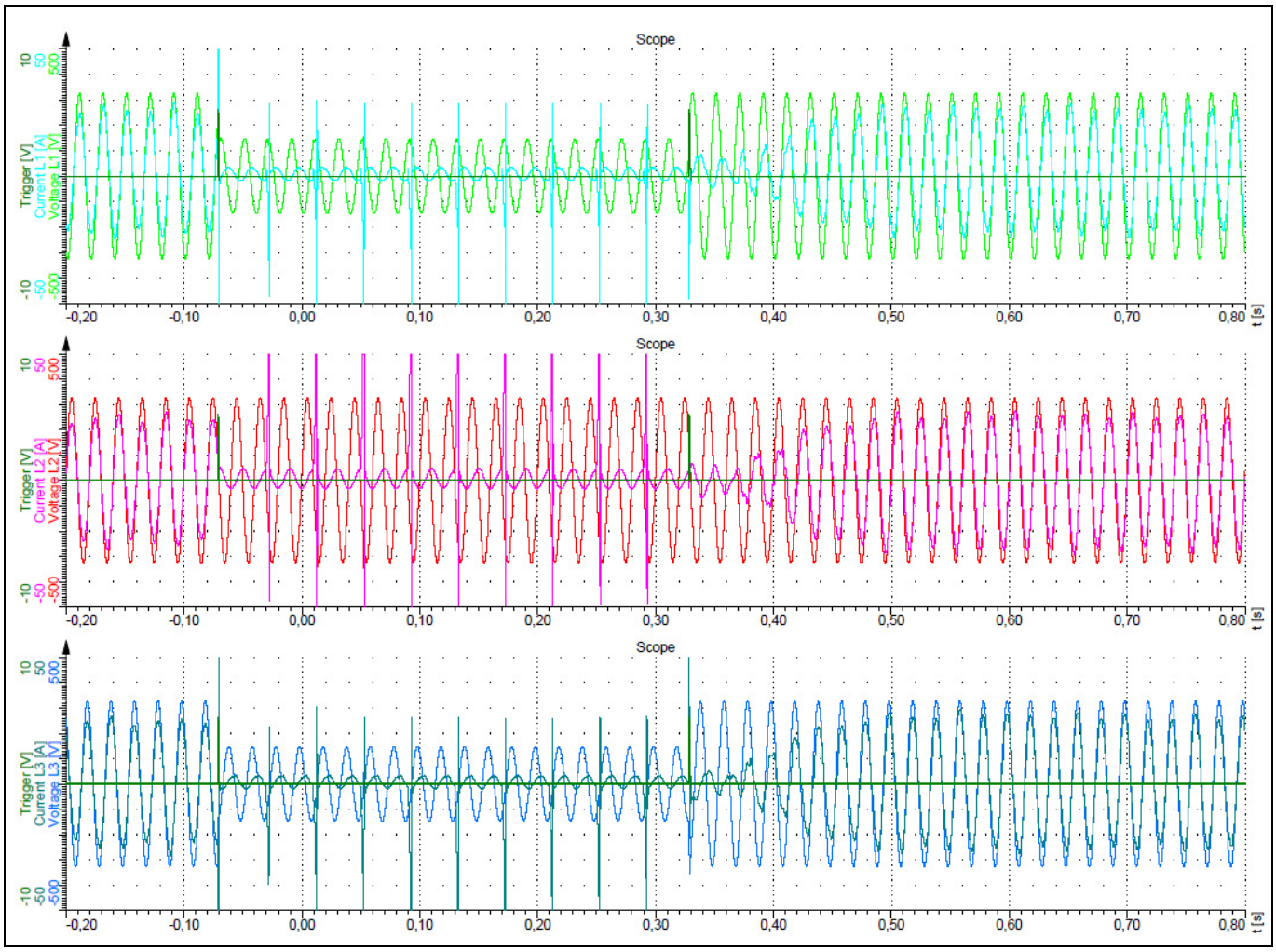


Fig. 47 – 6 Guasto asimmetrico bifase in BT – durata del guasto – prova su L1-L3

/6 bi-phase LV asymm. fault - duration of fault – test on L1-L3

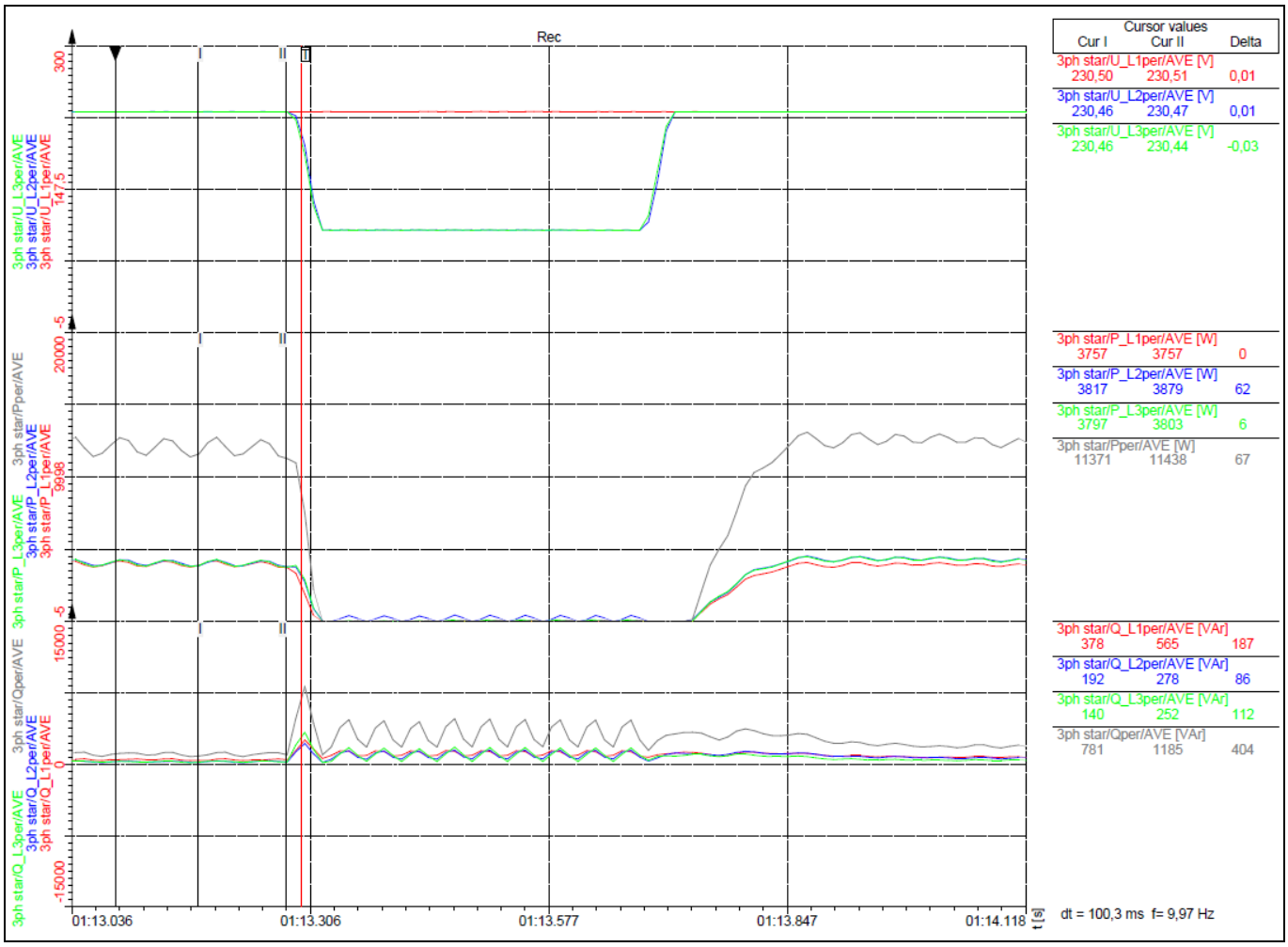


Fig. 48 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva prima del guasto – prova su L2-L3

/6 bi-phase LV asymm. fault - active and reactive power before fault – test on L2-L3

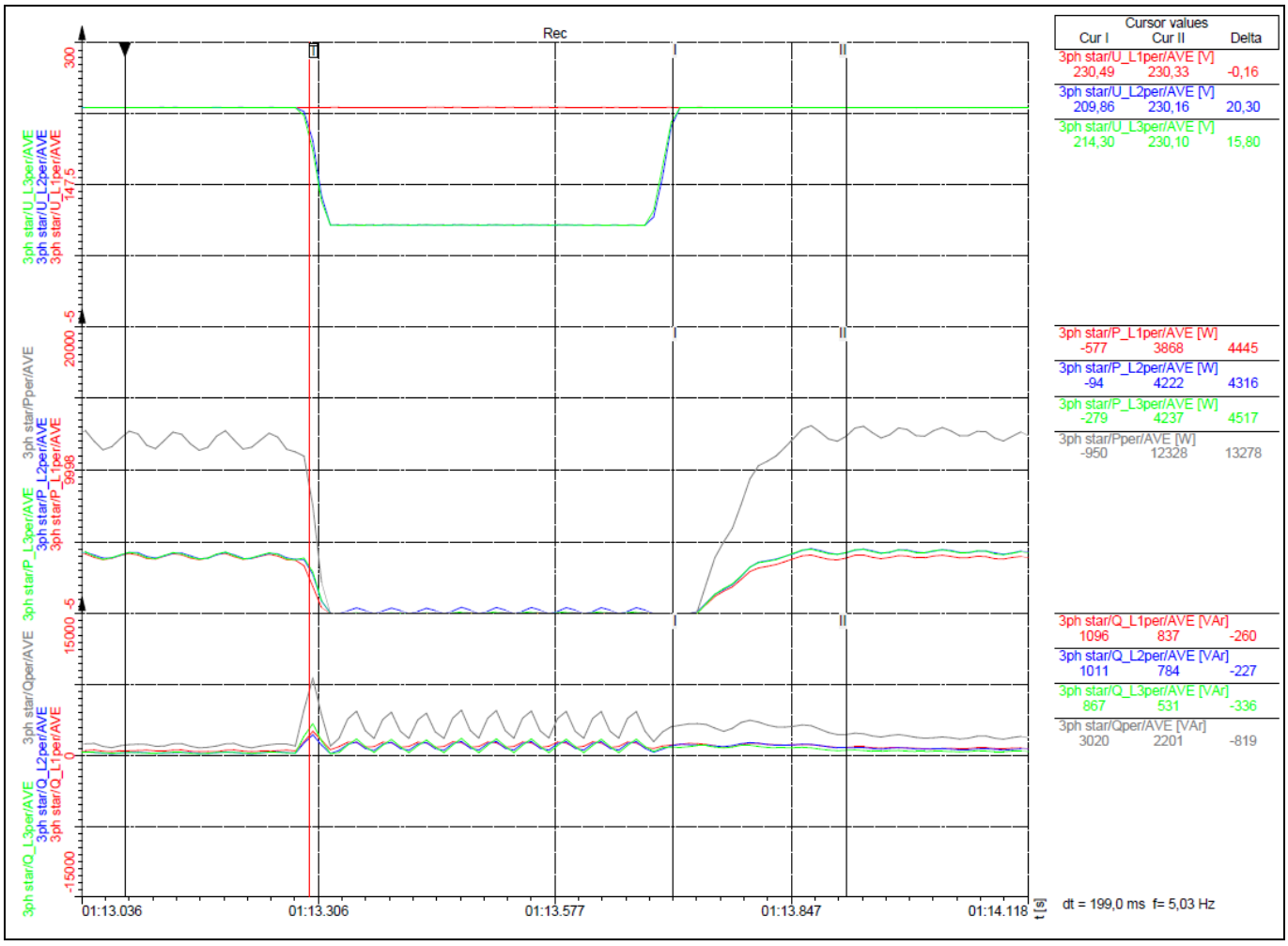


Fig. 49 – 6 Guasto asimmetrico bifase in BT – potenza attiva e reattiva dopo il guasto – prova su L2-L3

/5 bi-phase LV asymm. fault - active and reactive power after fault – test on L2-L3

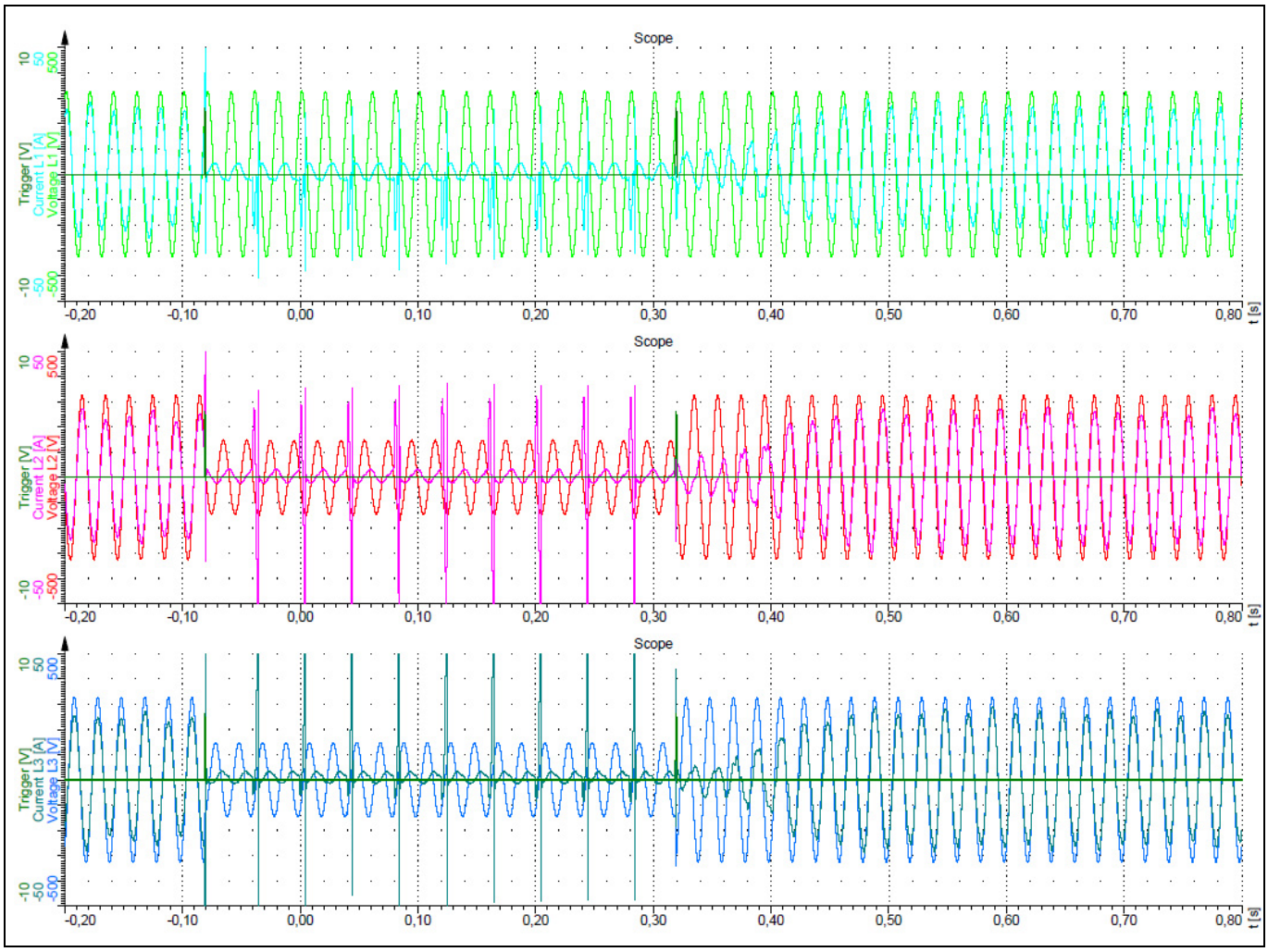


Fig. 50 – 6 Guasto asimmetrico bifase in BT – durata del guasto – prova su L2-L3

/6 bi-phase LV asymm. fault - duration of fault – test on L2-L3

Note */Remarks*
Per la prova a 100%Pn, si veda il test report n. 131906LP rilasciato da CreiVen S.c.a.r.l. numero Accredia: 0259 */Remark 2: for test at 10%Pn, see test report n.131906LP released by CreiVen S.c.a.r.l. numero Accredia: 0259*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
22/05/2013	Alberto Crocco

Verifica della insensibilità alle richiusure automatiche in discordanza di fase

/Verification of insensitivity to automatic re-closing in phase discordance

CEI 0-21:2012-06 + CEI 0-21;V1:2012-12

Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica

/Reference technical rules for the connection of active and passive users to the LV electrical Utilities.

Annex B. Point B.1.6

STRUMENTAZIONE UTILIZZATA */MEASUREMENT EQUIPMENT*		
Strumenti ed attrezzature */Instrumentation and tools*	Modello */Model*	Codice Interno */Internal Code*
Simulatore di campo fotovoltaico */PV field simulator*	TOPCON Regatron	☒ TOPCON01 ☒ TOPCON02 ☒ TOPCON03 ☐ TOPCON04
Generatore di forma d'onda arbitrario */Arbitrary waveform generator*	California Instruments Model MX45	GENARB01
Oscilloscopio digitale */Digital oscilloscope*	☒ LECROY- WAVE RUN NER 64XI LCRY0612N51181	DGTSCP05
Sonde differenziali */Differential probe*	Probe master	DIFPRB01 / 02
Sonde di corrente */Current probe*	☒ Fluke 335 ☐ Fluke 336 ☐ Fluke 355	PINZAMP2 PINZAMP3 PINZAMP4
Rete di scambio di fase */Change of phase network*	Eurotest	CHANGE123

Incertezza di misura */Measure uncertainty*	
Corrente */Current* [A]	2.0%
Tempo */Time* [ms]	0,5%
Angolo [°] */Angle*	1°
L'incertezza di misura dichiarata è espressa come due volte lo scarto tipo, corrispondente ad un livello di confidenza di circa il 95% */Expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%*	

Luogo di prova */Test site*		Laboratorio Power converter */Power Converter laboratory*	
CONDIZIONI AMBIENTALI */ENVIRONMENTAL CONDITIONS*			
Temperatura */Temperature*	20.4°C	Umidità relativa */Relative humidity*	48l%

Criteri di accettazione */Performance criteria*:

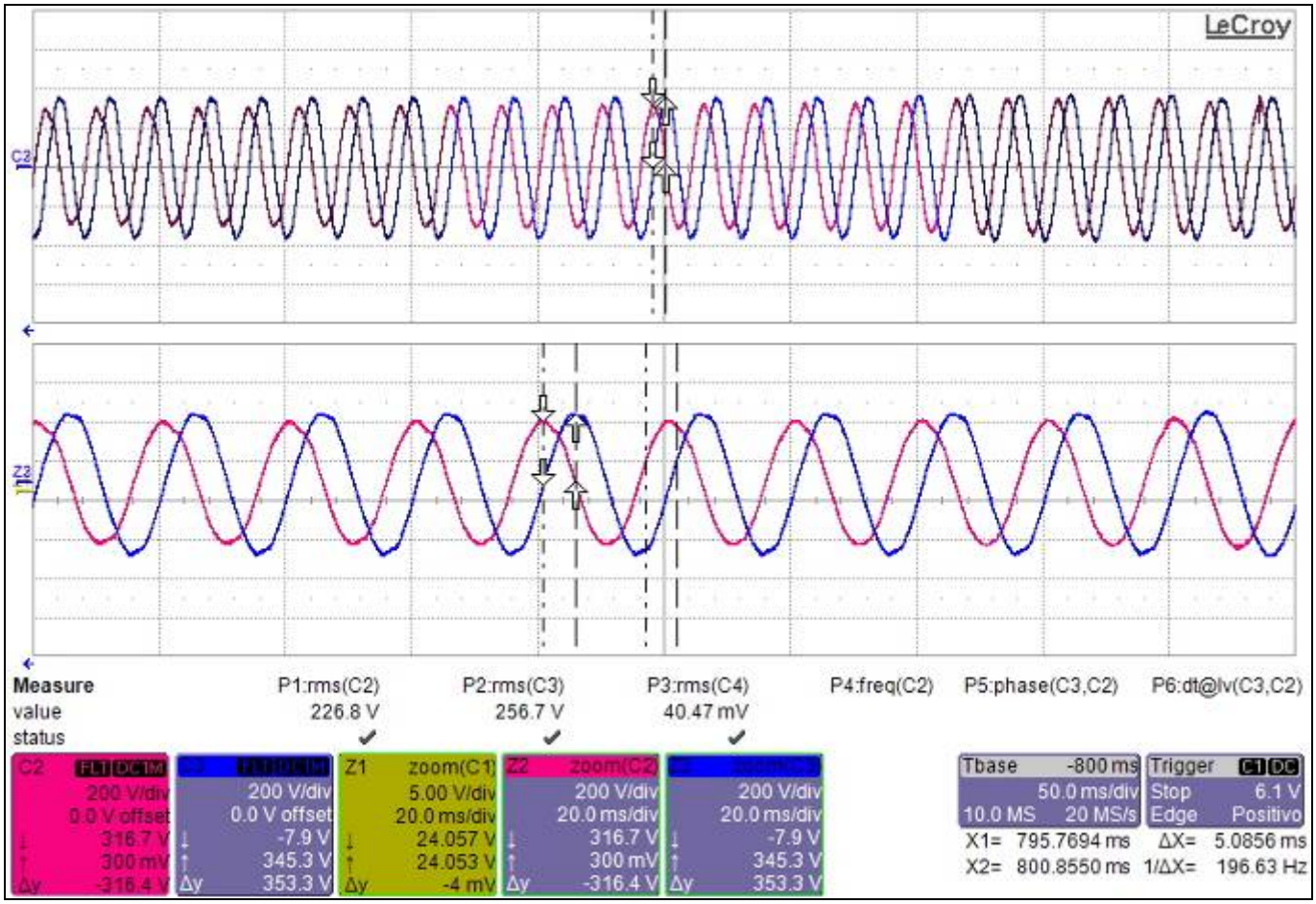
A seguito dell'esecuzione del test, il dispositivo in esame non deve guastarsi.
/Appliance has to work properly, without breaks, after the test.

Risultati di prova

/Test results

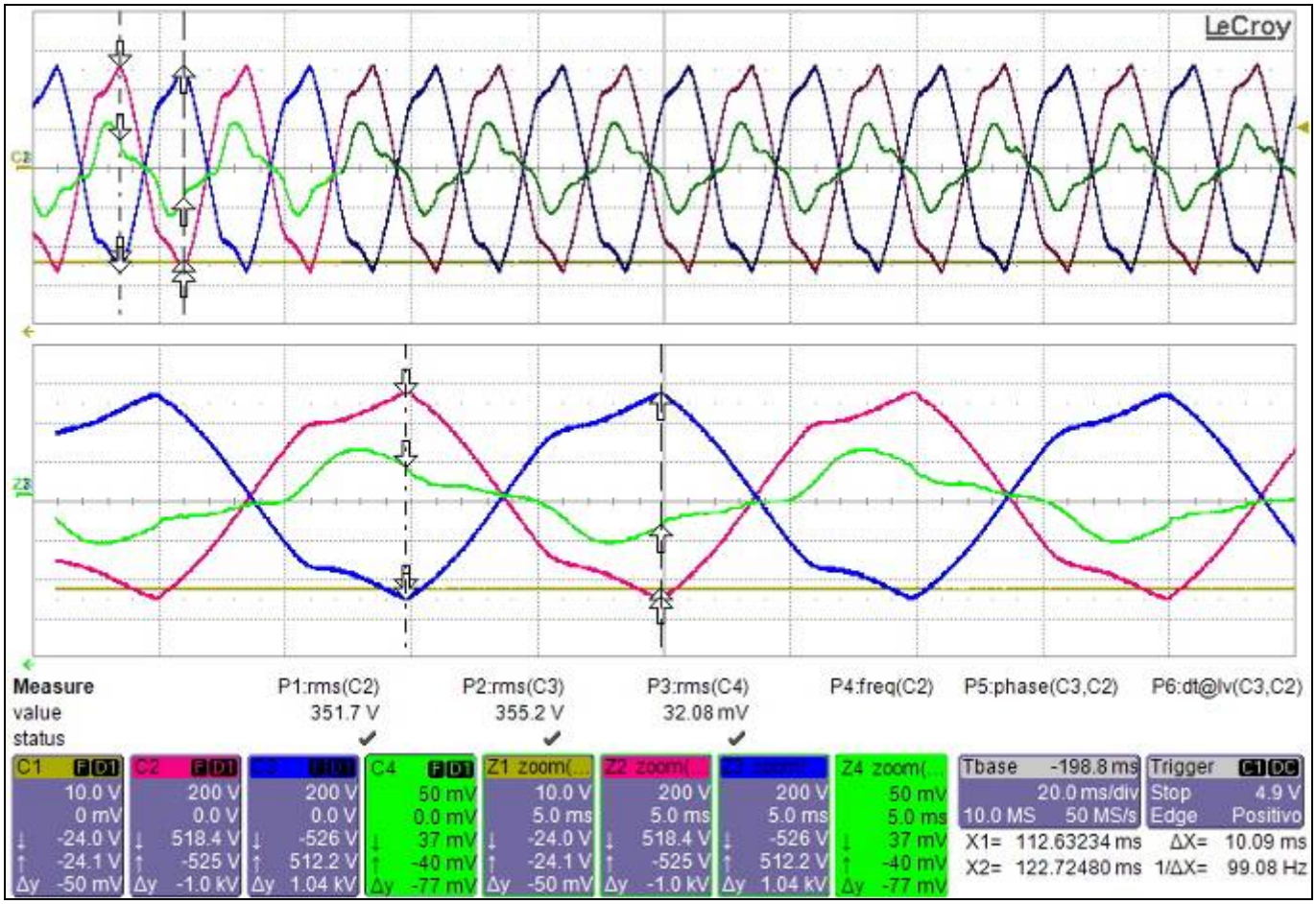
Angolo di sfasamento: 90°

/phase shift angle: 90°



Angolo di sfasamento: 180°

/phase shift angle: 180°



Note */Remarks*

Esito finale della prova **SUPERATA**

/Final result */PASS*

Data */Date [d/m/y]*	Operatore */Technician*
23/05/2013	Alberto Crocco