

## LVRT TESTING FOR THE VERIFICATION OF COMPLIANCE OF PV INVERTER WITH: NTS V2.1 SEPE + CORRECTION REV. 1.0 8/10/2021

Procedure: PE.T-LE-62

Test Report Number.....: **2221 / 0269-7**  
Type.....: Grid Connected PV Inverter  
Tested Model.....: **SIRIO-ES-50**  
Variant Models.....: SIRIO-ES-60

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**Data Provided By The Client:**

The following data has been provided by the applicant:

1. Any Information regarding Technical characteristics of the equipment, (Ratings, operation modes, software and hardware versions, dimensions & weight).
2. Equipment operation & construction information (Manuals, Electrical diagrams, information about components, Operation procedures).
3. Documental Information (Brand and models names, address or other information about applicant, company or manufacturer information).
4. Other information remarked within this report.


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**Test Report Historical Revision:**

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## 1 SCOPE

SGS Tecnos, S.A. (Electrical Testing Laboratory) has been contracted by SGS Tecnos, S.A. (Certification Body) in order to perform the testing for UGE according to:

### NTS SEPE

- “Norma Técnica de Supervisión (NTS) de la conformidad de los Módulos de Generación de Electricidad según el Reglamento UE 2016/631”. Revisión 2.1 (09/07/2021).
- “Corrección de errores de la versión 2.1 (del 9/7/2021) de la Norma Técnica de Supervisión de la Conformidad de los Módulos de Generación de Electricidad según el Reglamento UE 2016/631”. Revision 1.0 del (08/10/2021).

The Equipment Under Testing (EUT) is an UGE, without inertia, nonsynchronous. For the purpose of evaluation, the EUT is considered to be a **Type A**, and **Type B** UGE, as defined in the standard:

- Type A: At the point of connection,  $V < 110 \text{ kV}$ ,  $0.8 \text{ kW} \leq P \leq 100 \text{ kW}$ .
- Type B: At the point of connection,  $V < 110 \text{ kV}$ ,  $100 \text{ kW} < P \leq 5 \text{ MW}$ .
- Type C: At the point of connection,  $V < 110 \text{ kV}$ ,  $5 \text{ MW} < P \leq 50 \text{ MW}$ .
- Type D: At the point of connection,  $V \geq 110 \text{ kV}$ ,  $P > 50 \text{ MW}$ .

This is an attachment to test report **2221 / 0269 – 7**. This attachment has been prepared to show detail of the results for RESPONSE DURING GRID FAULTS test (clause 5.11 of the standards).



**2 GENERAL INFORMATION**

**2.1 TESTING PERIOD AND CLIMATIC CONDITIONS**

Testing has been performed between two periods:

- From May 6<sup>th</sup> to November 3<sup>rd</sup>, 2022
- From July 19<sup>th</sup>, to July 24<sup>th</sup>, 2023.

All the tests and checks have been performed at climatic conditions:


Temperature	25 ± 10 °C
Relative Humidity	50 ± 20 %
Pressure	90 ± 10 kPa

**SITE TEST**

Name.....: **SGS Tecnos, S.A. (Electrical Testing Laboratory)**  
Address .....: C/ Trespaderne, 29 - Edificio Barajas 1  
28042 Madrid (Spain)

**2.2 EQUIPMENT UNDER TESTING**

The following information has been provided by the manufacturer:

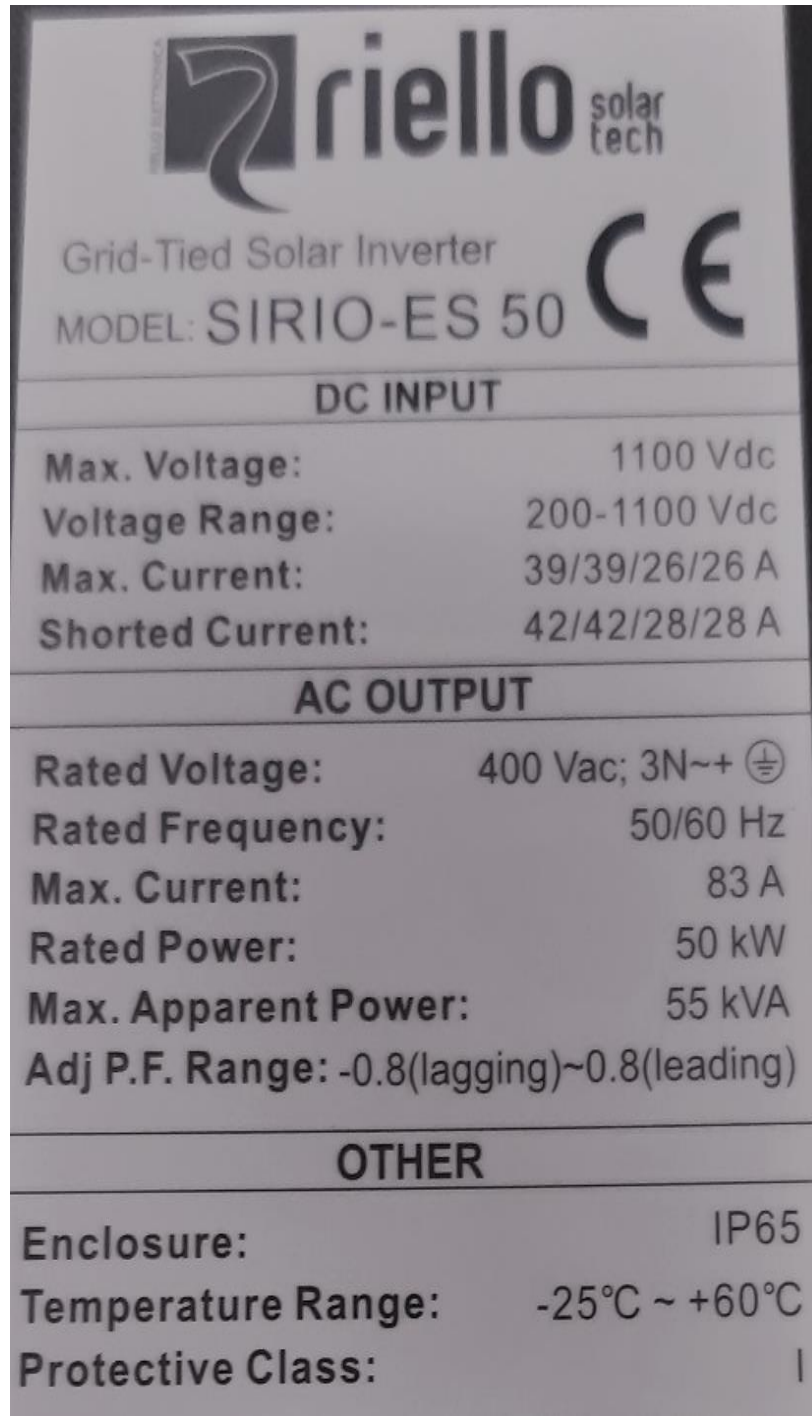
Apparatus type.....: Three Phase Photovoltaic Inverter  
Installation.....: Wall mounted Installation  
Manufacturer.....: RIELLO SOLARTECH  
Trademark.....:   
Model / Type reference.....: **SIRIO-ES-50**  
Serial Number.....: AM42SPSE0000139  
Software Version.....: V013133  
Rated Characteristics.....: Input: MPPT 200 – 960 V<sub>dc</sub>; V<sub>max</sub>: 1100 V<sub>dc</sub>; V<sub>n</sub>: 620 V<sub>dc</sub>;  
I<sub>dc\_max</sub> = 33/33/22/22 A<sub>dc</sub>; I<sub>sc</sub> = 42/42/28/28 A<sub>dc</sub>  
Output: 400 V<sub>ac</sub>; 50/60 Hz; I<sub>n</sub>: 3x76 A<sub>ac</sub>; I<sub>max</sub>: 3x83 A<sub>ac</sub>;  
I<sub>n</sub>: 3x76A; S<sub>max</sub>: 55 kW, P<sub>n</sub>: 50kW

Date of manufacturing: 2021

Test item particulars


Input.....: DC  
Output.....: 3/N/PE  
Class of protection against electric shock...: Class I  
Degree of protection against moisture.....: IP 65  
Type of connection to the main supply.....: Three phase – Fixed installation  
Cooling group.....: Forced ventilation (Fan)  
Modular.....: No  
Internal Transformer.....: No

**Copy of marking plate (representative):**



**Note:**

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation.

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**Equipment under testing:**

- SIRIO-ES-50

**Variant models:**

- SIRIO-ES-60

The variant models can be included in this test report without tests because the following features don't change in comparison with the tested model:

- Same topology of power stages. That is, the same arrangement of conversion stages, the same location of filters, the same location of relays, etc.
- Same isolation class (low-frequency transformer, high-frequency transformer or no transformer).
- Same AC connection state (1-phase or 3-phase).
- Nominal alternating current  $\pm 50\%$  with respect to the type tested.
- Same control algorithm for all technical requirements.
- Groupings of several power stages (modular systems) shall be considered valid without the need for repeating tests.

The results obtained apply only to the particular sample tested that is the subject of the present test report.

The most unfavourable result values of the verifications and tests performed are contained herein. Throughout this report a point (~~eomma~~) is used as the decimal separator.

The following table shows the full ratings of the all the models referenced in this report:

MODELO	SIRIO ES 50	SIRIO ES 60	SIRIO ES 100	SIRIO ES 110
<b>ENTRADA</b>				
Voltaje máximo de entrada [V]	1100			
Corriente máxima de entrada [A]	2x39 + 2x26	4x39	3x40 + 5x32	3x40 + 6x32
Corriente máxima de cortocircuito [A]	2x42 + 2x28	4x42	3x50 + 5x45	3x50 + 6x45
Realimentación máxima	0A			-
Voltaje nominal [V]	620		600	
Rango del voltaje de operación del MPPT [V]	200 + 1100			
Grado de sobretensión	II			
Número máximo de entradas	10 (3/3/2/2)	12 (3/3/3/3)	16 (8x2)	18 (9x2)
Número de rutas del MPPT	4		8	9
Protección de sobrecarga [V]	Fuse, 16A/1100			
<b>SALIDA</b>				
Potencia nominal de salida [W]	50000	60000	100000	110000
Potencia aparente máxima [VA]	55000	66000	110000	123000
Potencia active máxima [W]	55000	66000	110000	121000
Corriente de salida nominal [A]	3x83	3x92	3x168.8	3x187
Voltaje nominal de la red eléctrica [V]	380 / 400, 3W+N+PE		380 / 400 / 415, 3W+N+PE	
Voltaje de la red eléctrica [V]	277 + 520 (configurable)			
Frecuencia nominal de la red eléctrica [Hz]	50 / 60			
Rango de frecuencia de la red eléctrica [Hz]	45-55 / 55-65		45-55 / 55-65 (configurable)	
THDi [%]	< 3 % (potencia nominal)			
CC off-sets [%]	< 0.5 in			
Factor de potencia	> 0.99 potencia nominal (regulable 0.8 inductivo - 0.8 capacitivo)			
Grado de sobrecarga según IEC 62109-1	III			
<b>PROTECCIÓN</b>				
Protección del sistema	Interruptor de entrada de CC, entrada para protección para sobrecargas, entrada para protección de conexión inversa, detección de fallos en el string fotovoltaico, detección de resistencia térmica, paso de bajo tensión, salida para protección de sobrecargas, protección DDR, protección de CC off sets, protección para sobrecalentamiento, protección anti-islanding, protección de sobretensión o baja tensión de CA/CC, protección de alta o baja frecuencia de CA			-
Pararrayos CA/CC	Soportado: II tipo, Máximo 40KA			-
<b>SISTEMA</b>				
Maximum efficiency [%]	98.3		98.4	
European Efficiency [%]	98			
Topología	Sin transformador			
Nivel de protección	IP65		IP66	
Grado de contaminación	PD3		-	
Refrigeración	Forzado con ventiladores de velocidad controlada			
<b>MONITOR Y COMUNICACIONES</b>				
Monitor	Wireless por APP + LED/LCD			
Comunicaciones	Bluetooth, RS485, Wi-Fi (opcional), Ethernet (opcional)		Bluetooth, 2xRS485, Wi-Fi (opcional), Ethernet (opcional)	
<b>PARÁMETROS MEDIOAMBIENTALES</b>				
Temperatura del rango operativo [°C]	-25 + 60			
Humedad relativa	0 + 100			
Altitud máxima operativa [m]	4000			
Ruido [dB] (@ 1 m)	<62		≤65 (típico)	
<b>INSTALACIÓN FÍSICA</b>				
Dimensiones (WxDxH) [mm]	855x275x500		936x365x678	
Peso [kg]	73	74	92	
Modelo de instalación	Soporte para montar el inversor			
Conector de entrada	Amphenol H4			
Conector de salida	Conector resistente al agua + Terminal OT			
<b>CUMPLIMIENTO DE LA NORMATIVA</b>				
Estándar de la corriente eléctrica	NB / T32004			
Certificado de seguridad	IEC62109-1, IEC62109-2, N B / T32004			
EMC	EN 61000-6-2/4			
Reglamento	CEI 0.21 & CEI 0.16 - RD1699, RD 661, RD 413, UNE 206006, UNE 206007-1, UNE 217002, UNE 217001/RD244/RD647, NTS			
Garantía	5 años			

**2.3 REFERENCE VALUES**

The values presented in the following table have been used for calculation of referenced values (p.u.; %) through the report if not otherwise indicated.

Reference Values	
Rated power, <b>Pn</b> in kW	50
Max. Active power, <b>Pmax</b> in kW	55
Rated apparent power, <b>Sn</b> in kVA	55
Max. apparent power, <b>Smax</b> in kVA	55
Rated wind speed (only WT), vn in m/s	Not applicable
Rated current (determined), <b>In</b> in A	79.7
Rated output voltage, (phase to phase) <b>Un</b> in Vac	400
<p>Note: In this report p.u. values are calculated as follows:</p> <ul style="list-style-type: none"> <li>-For Active &amp; Reactive Power p.u values are reference to <b>Pn</b></li> <li>-For Currents p.u values, the reference is always <b>In</b></li> <li>-For Voltages p.u values, the reference is always <b>Un</b></li> </ul> <p>Rated current has been determined as follows: <math>In = Smax / (Un \cdot \sqrt{3})</math></p>	

## 2.4 TEST EQUIPMENT LIST

The following table shows measurement equipment used in tests:

From May 6<sup>th</sup> to November 3<sup>rd</sup>, 2022

No	EQUIPMENT	MARK/MODEL	SGS CODE(DIE)	CALIBRATION DATE
1	Power Analyzer	YOKOGAWA / WT3000	DIE.510014	12/08/2021 to 12/08/2022
2	Data Acquisition Equipment	DEWESsoft / SIRIUSi-4xHV-4xLV	DIE.630044	15/12/2021 to 15/12/2022
3	Digital Thermohygrometer	TESTO / 622	DIE.840050	19/10/2021 to 19/01/2023
4	Current Clamp	HIOKI / 9660	DIE.510012-1	05/02/2021 to 05/02/2023
5	Current Clamp	HIOKI / 9660	DIE.510012-2	05/02/2021 to 05/02/2023
6	Current Clamp	HIOKI / 9660	DIE.510012-3	05/02/2021 to 05/02/2023
7	Current Clamp	HIOKI / 9660	DIE.510012-4	05/02/2021 to 05/02/2023
8	Digital Multimeter Current Clamp	HIOKI / 3285	DIE.510051	15/05/2021 to 15/05/2022 30/05/2022 to 30/05/2023
9	True Multimeter	FLUKE / 289	DIE.560040	20/12/2021 to 20/12/2022
10	MATLAB Function	SGS / RMS+Power	DIE.001461-1	15/02/2019 to --
11	MATLAB Function	SGS / VoltageChangeMeasures	DIE.001461-2	15/02/2019 to --
12	MATLAB Function	SGS / Sequences	DIE.001461-3	07/03/2019 to --
13	MATLAB Function	SGS / Static+MobileWindow	DIE.001461-4	10/06/2019 to --
14	MATLAB Function	SGS / Parameter	DIE.001461-5	14/02/2019 to --

Note:

1. All measurement equipment was used inside their corresponding calibration period. Copy of all calibration certificates are available at the laboratory for reference.
2. Since those are mathematical functions there is no need to establish a final calibration date.

From July 19<sup>th</sup> to July 24<sup>th</sup>, 2023.

No	EQUIPMENT	MARK/MODEL	SGS CODE(DIE)	CALIBRATION DATE
1	Power Analyzer	YOKOGAWA / WT3000	DIE.510014	12/08/2022 to 12/08/2023
2	Digital Thermohygrometer	TESTO / 622	DIE.840050	31/01/2023 to 01/05/2024
3	Current Clamp	HIOKI / 9660	DIE.510012-1	15/02/2023 to 15/02/2025
4	Current Clamp	HIOKI / 9660	DIE.510012-2	15/02/2023 to 15/02/2025
5	Current Clamp	HIOKI / 9660	DIE.510012-3	15/02/2023 to 15/02/2025
6	Current Clamp	HIOKI / 9660	DIE.510012-4	15/02/2023 to 15/02/2025
7	Digital Multimeter Current Clamp	HIOKI / 3285	DIE.510051	29/06/2023 to 29/06/2024
8	True Multimeter	FLUKE / 289	DIE.560040	19/12/2022 to 19/12/2023
9	MATLAB Function	SGS / RMS+Power	DIE.001461-1	15/02/2019 to --
10	MATLAB Function	SGS / VoltageChangeMeasures	DIE.001461-2	15/02/2019 to --
11	MATLAB Function	SGS / Sequences	DIE.001461-3	07/03/2019 to --
12	MATLAB Function	SGS / Static+MobileWindow	DIE.001461-4	10/06/2019 to --
13	MATLAB Function	SGS / Parameter	DIE.001461-5	14/02/2019 to --

Note:

3. All measurement equipment was used inside their corresponding calibration period. Copy of all calibration certificates are available at the laboratory for reference.
4. Since those are mathematical functions there is no need to establish a final calibration date.

## 2.5 MEASUREMENT UNCERTAINTY AND DATA SAMPLING RATES

Associated uncertainties through measurements showed in this this report are the maximum allowable uncertainties.

Magnitude	Uncertainty
Voltage measurement	±1.5 %
Current measurement	±2.0 %
Frequency measurement	±0.2 %
Time measurement	±0.2 %
Power measurement	±2.5 %
Phase Angle	±1°
Temperature	±3° C
<p>Note1: Measurements uncertainties showed in this table are maximum allowable uncertainties. The measurement uncertainties associated with other parameters measured during the tests are in the laboratory at disposal of the petitioner.</p> <p>Note2: Where the standard requires lower uncertainties that those in this table. Most restrictive uncertainty has been considered and would be reported in this report.</p>	

Magnitude	Measurement uncertainty requirement	Maximum uncertainty Test equipment used
Voltage (Fundamental frequency)	≤ 0.5 % of Un	± 0.06 %
Current (Fundamental frequency)	≤ 0.5 % of In	± 0.4 %
Frequency	±10mHz (±0.02%)	± 6.6 mHz

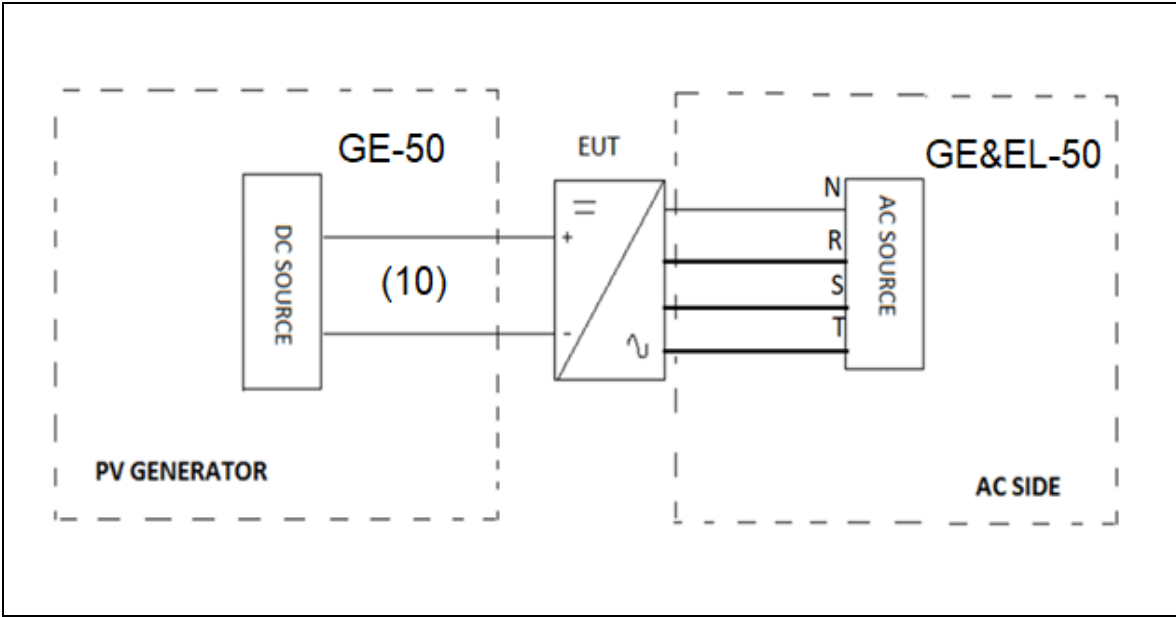
Data sampling rates have been applied as follows:

Magnitude	Data sampling <i>(Requested by standard)</i>	Data sampling <i>(Used for testing)</i>
Voltage measurements	≥ 3 kHz	> 10 kHz
Current measurements	≥ 3 kHz	> 10 kHz
Robustness Requirements	≥ 10 kHz	≥ 20 kHz



**2.6 TEST SET UP**

Below is the simplified construction of the test set up.



Different equipment has been used to take measures as it shows in chapter 2.4. Current and voltage clamps have been connected to the inverter input / output for all the tests.

All the tests described in the following pages have used this specified test setup.

**The test bench used includes:**

EQUIPMENT	MARK / MODEL	RATED CHARACTERISTICS	OWNER / ID. CODE
AC Power Source	CINERGIA / GE&EL+50 vAC/DC	0-400 V 50/60Hz 3x73A	DIE.501051
DC Power Source	CINERGIA / GE+50 vAC/DC	0-800 V <sub>dc</sub> 3x50A	DIE.501053

**2.6.1 AC Voltage source verification**

According to point 5 of the standard, the accuracy of the equipment used as a source of voltage and frequency shall comply with the following requirements:

- Unbalance of the AC voltage  $\mu < 0.5\%$
- Harmonics of Voltage source THD  $< 1\%$

Variable	Required	Measured	Result
Unbalance ( $\mu$ )	$< 0.5\%$	0.02%	Pass
THD	$< 1.0\%$	0.18%	Pass

### 3 RESPONSE DURING GRID FAULTS

The aim of this test is to determinate whether the PGU is able to detect a voltage dip and to ride through undamaged. This test has been done according to point 5.11 of the NTS V2.1 SEPE standard.

All the tests of this report have been performed with a deadband of  $Un \pm 15\% Un$ . There is no command for negative sequence reactive current injection in any case.

The test has been carried out using a short circuit simulator which automatically adjusted the value of the series impedances and shot circuit impedances in order to obtain the type of fault configured for each test.

The signals definitions for all the diagrams shown in the report are provided below.

- R Voltage: Instantaneous phase-to-neutral voltages (phase 1)
- S Voltage: Instantaneous phase-to-neutral voltages (phase 2)
- T Voltage: Instantaneous phase-to-neutral voltages (phase 3)
- R Current: Instantaneous phase current (phase 1)
- S Current: Instantaneous phase current (phase 2)
- T Current: Instantaneous phase current (phase 3)
- RS RMS Voltage: RMS phase-to-phase voltage as moving averages over 20 ms (phases 1-2)
- ST RMS Voltage: RMS phase-to-phase voltage as moving averages over 20 ms (phases 2-3)
- TR RMS Voltage: RMS phase-to-phase voltage as moving averages over 20 ms (phases 3-1)
- RS RMS Current: RMS phase current as moving averages over 20 ms (phase 1-2)
- ST RMS Current: RMS phase current as moving averages over 20 ms (phase 2-3)
- TR RMS Current: RMS phase current as moving averages over 20 ms (phase 3-1)
- U+: Positive sequence voltage in per unit values.
- IQ+: Positive sequence reactive current
- IP+: Positive sequence active current
- P+: Positive sequence active power as moving averages over 20 ms
- Q+: Positive sequence reactive power as moving averages over 20 ms
- U-: Negative sequence voltage in per unit values.
- IQ-: Negative sequence reactive current
- IP-: Negative sequence active current
- P-: Negative sequence active power as moving averages over 20 ms
- Q-: Negative sequence reactive power as moving averages over 20 ms

Results are exposed in tables below, inside each table results are divided in different groups of information: General Information, Pre-fault, Fault and Post-Fault.

For voltage results it is necessary to point out that. Total values are referred to real RMS measured values; in case of asymmetrical faults, Total refers to the average value of the 2 phases where the voltage dip has been applied.

For calculating the K factors of the rise and settling times, the voltage dip depth for two-phase faults and three-phase faults are determined from the voltages in the positive and negative phase sequence systems over a period of time from 100 ms after fault occurrence until 20 ms before fault clearance.

The following table corresponds to the tests performed by SGS to prove compliance with the robustness requirements, based on tables 49 and 50 of NTS V2.1 SEPE standard.

Test	$U_{res}(p.u.)$	$T_i(ms)$	Fault Type	Load	$Q/P_{max}$	K
U5TP <sub>max</sub>	5%Un ( $\pm 5\%$ )	$\geq 200$	3-Phase	Full	$0 \pm 10\%$	K=3.5
U5TP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U5BP <sub>max</sub>			2-Phase	Full	$0 \pm 10\%$	K=3.5
U5BP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U40TP <sub>max</sub>	40%Un ( $\pm 5\%$ )	$\geq 850$	3-Phase	Full	$0 \pm 10\%$	K=3.5
U40TP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U40BP <sub>max</sub>			2-Phase	Full	$0 \pm 10\%$	K=3.5
U40BP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U75TP <sub>max</sub>	75%Un ( $\pm 5\%$ )	$\geq 1340$	3-Phase	Full	$0 \pm 10\%$	K=3.5
U75TP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U75TP <sub>med</sub> Q <sub>max</sub>					$Q_{max}/P_{max}$	K=3.5
U75TP <sub>med</sub> Q <sub>min</sub>				$Q_{min}/P_{max}$	K=3.5	
U75TP <sub>min</sub>			P <sub>min</sub>	$0 \pm 10\%$	K=6	
U75BP <sub>max</sub>			2-Phase	Full	$0 \pm 10\%$	K=3.5
U75BP <sub>med</sub>				Partial	$0 \pm 10\%$	K=3.5
U75BP <sub>min</sub>				P <sub>min</sub>	$0 \pm 10\%$	K=6

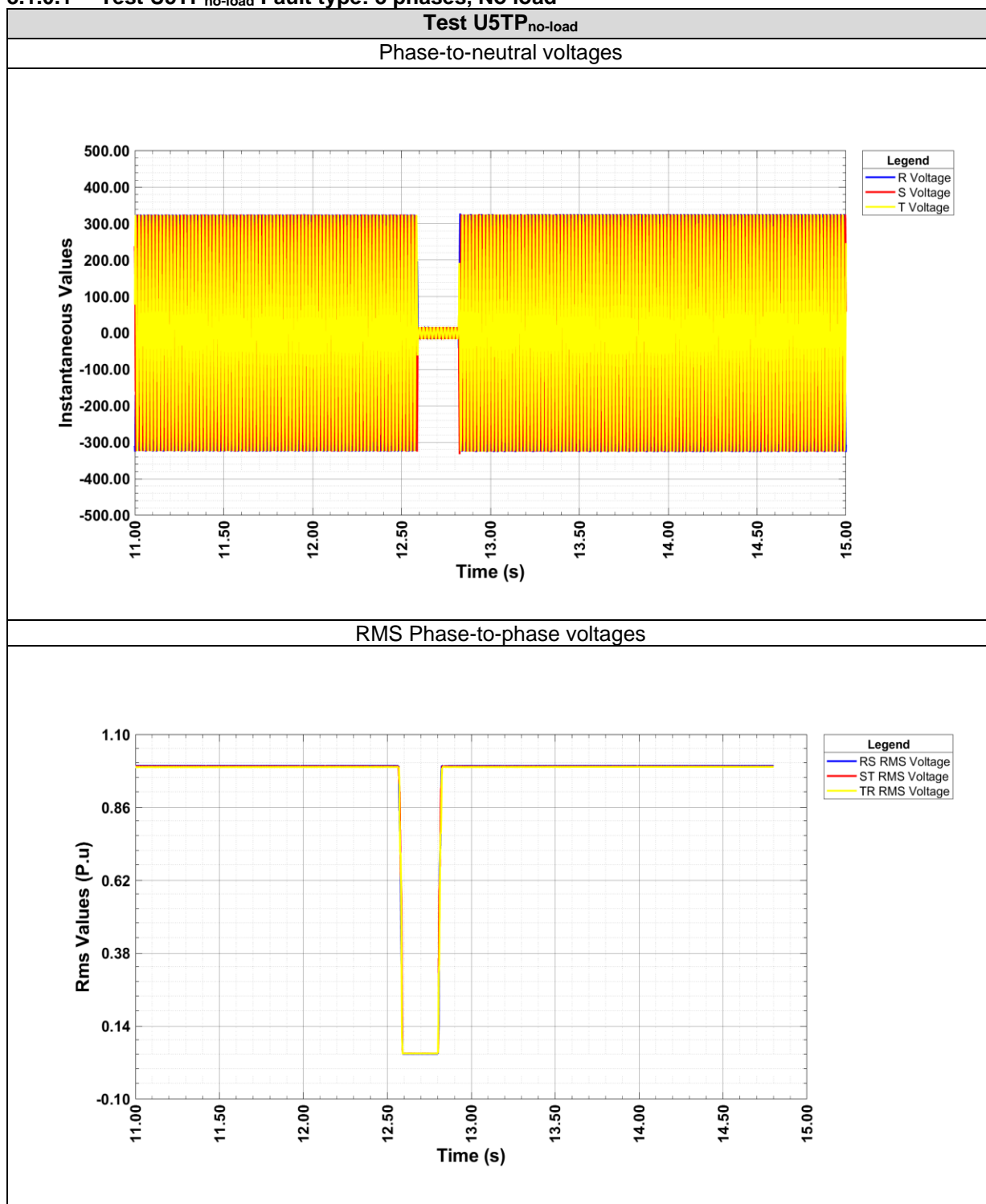
Note: according to table 48 of the standard full load test should be performed at a power level greater than 90% P<sub>max</sub>, in this case it has been used a level greater than 90%P<sub>n</sub>. Nevertheless, all the evaluations have been performed taking as reference S<sub>n</sub> and I<sub>n</sub>.

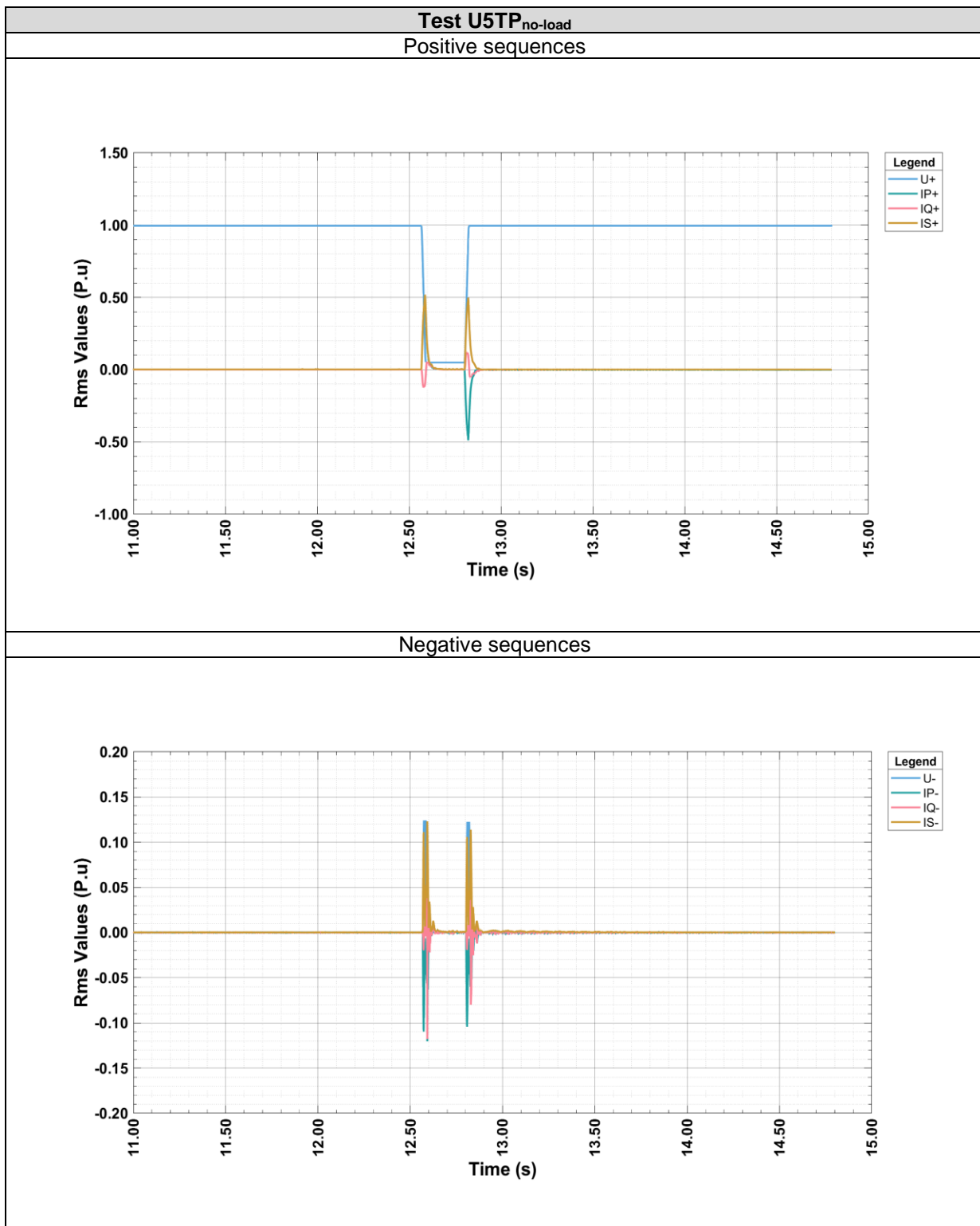
### 3.1 LVRT

#### 3.1.0 No Load tests

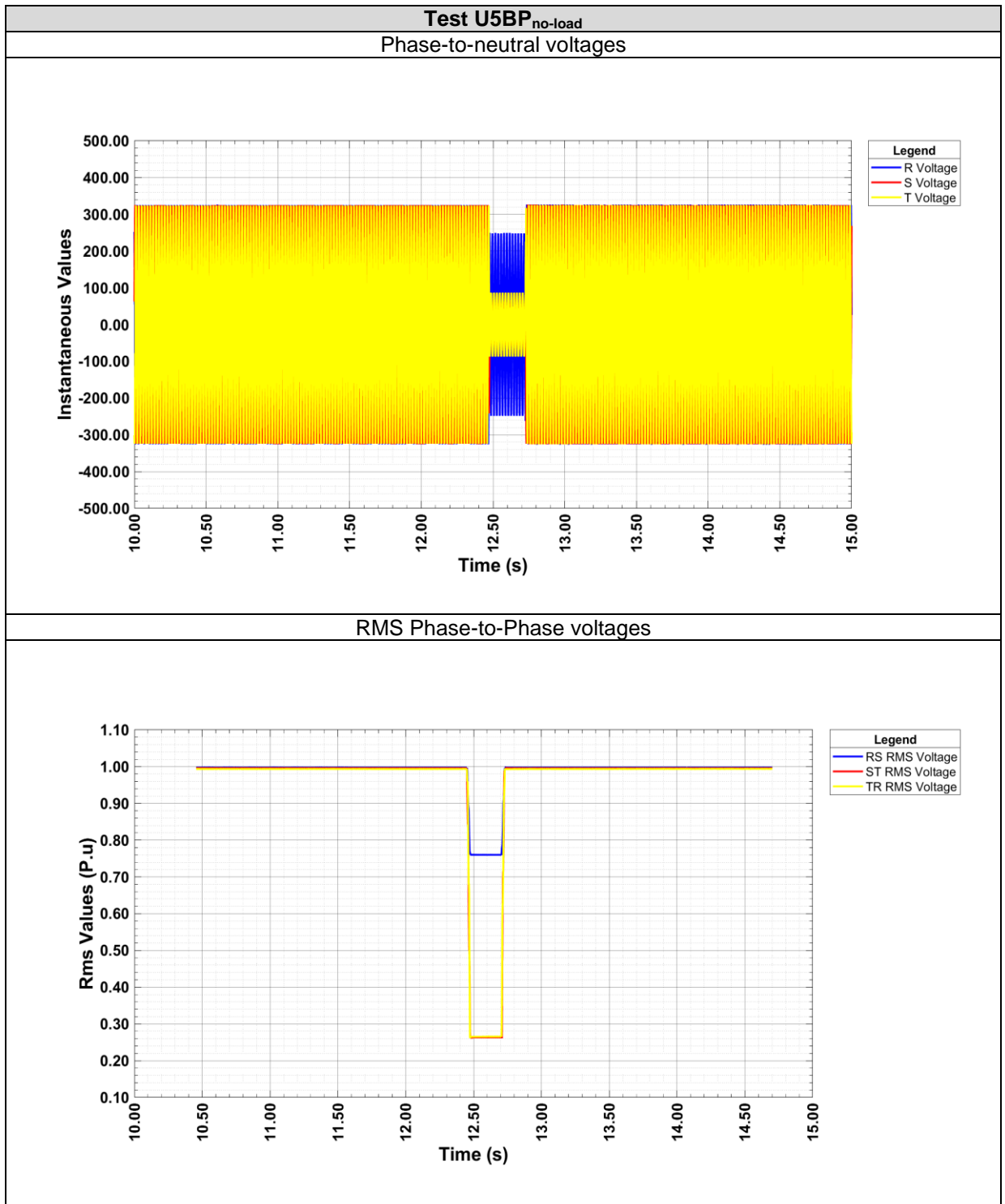
No load tests have been performed to check that the settings for each test are correctly set in accordance with the standard requirements.

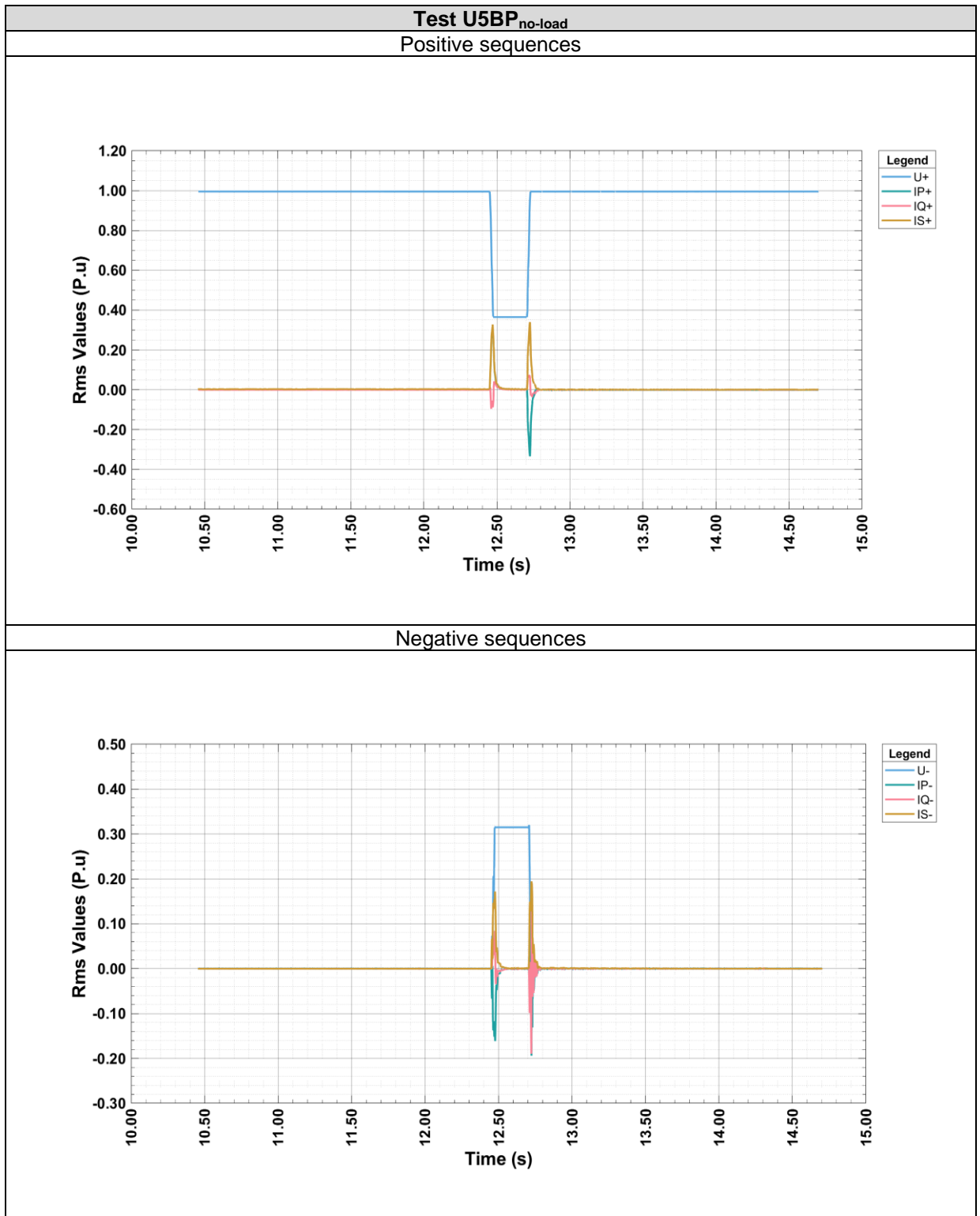
##### 3.1.0.1 Test U5TP<sub>no-load</sub> Fault type: 3 phases, No load



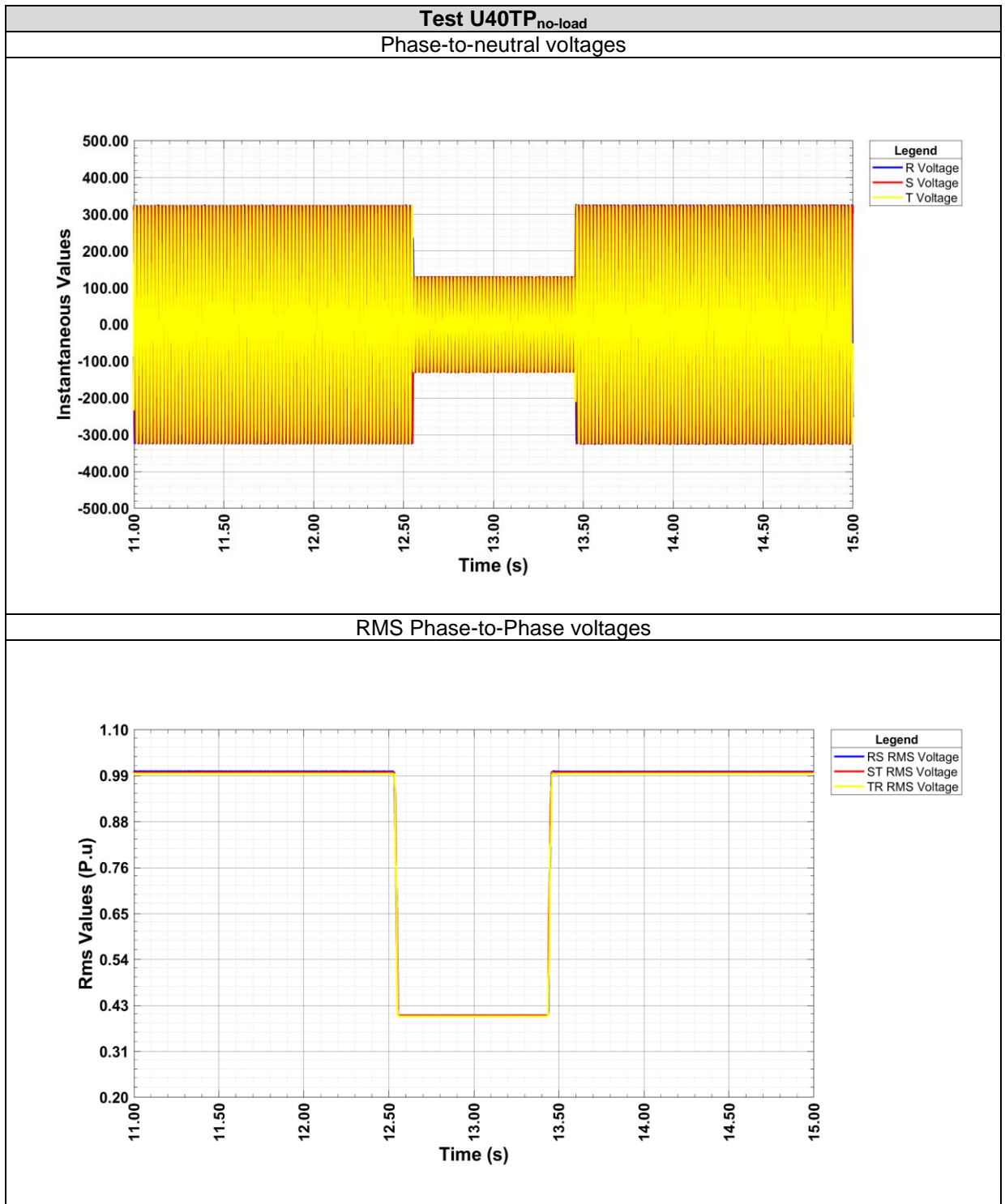


**3.1.0.2 Test U5BP<sub>no-load</sub> Fault type: 2 phases, No load**

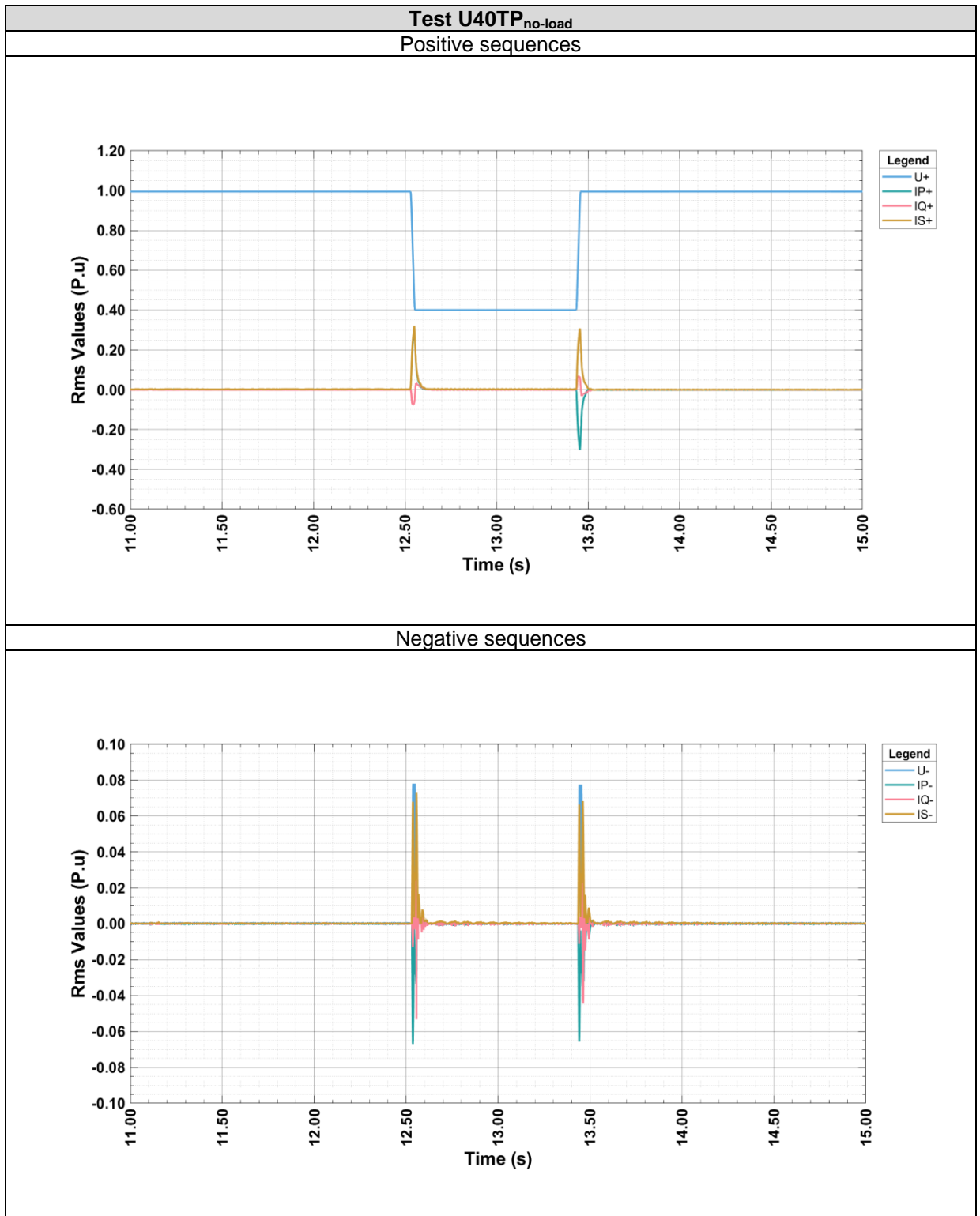




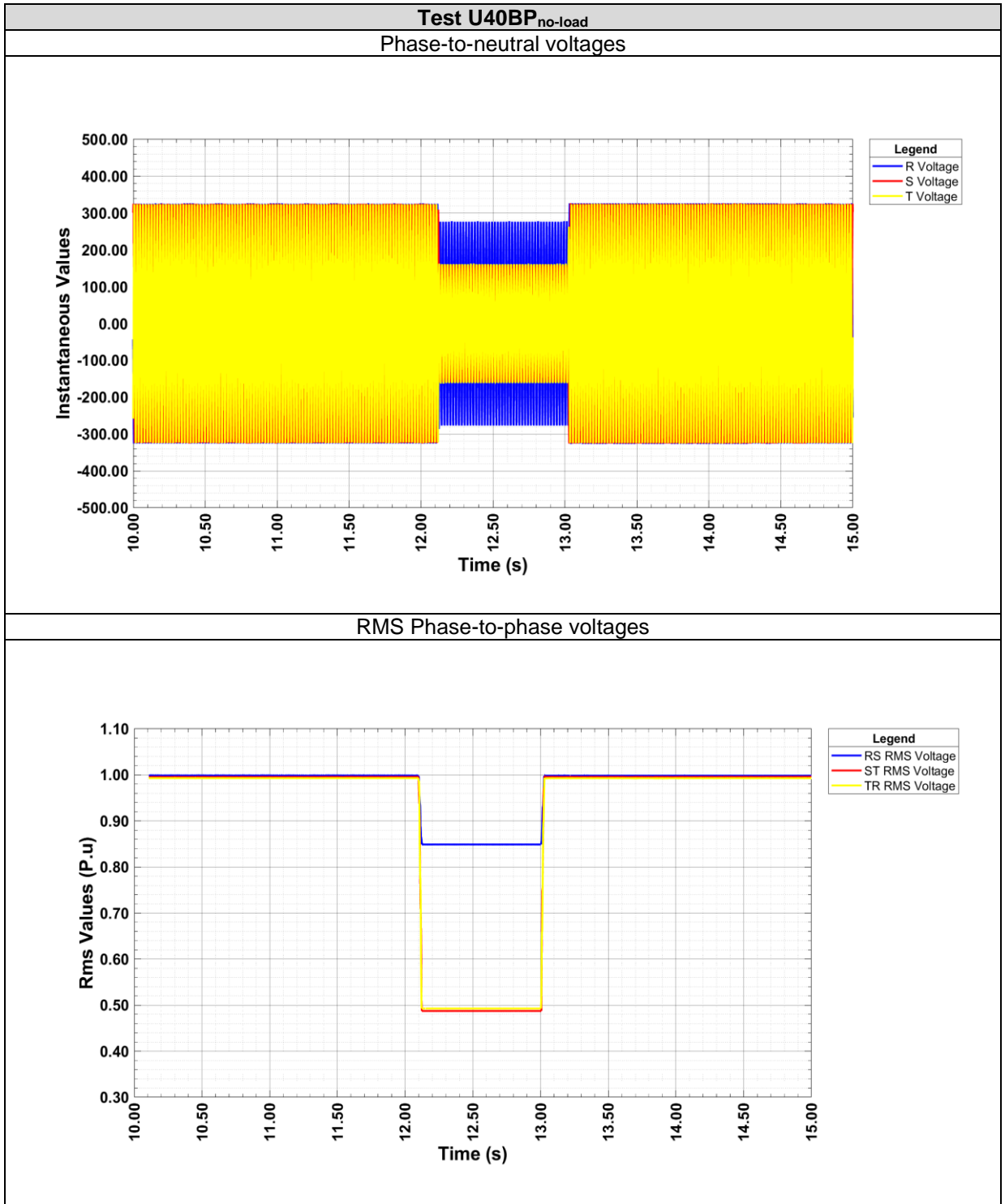
**3.1.0.3 Test U40TP<sub>no-load</sub> Fault type: 3 phases, No load**

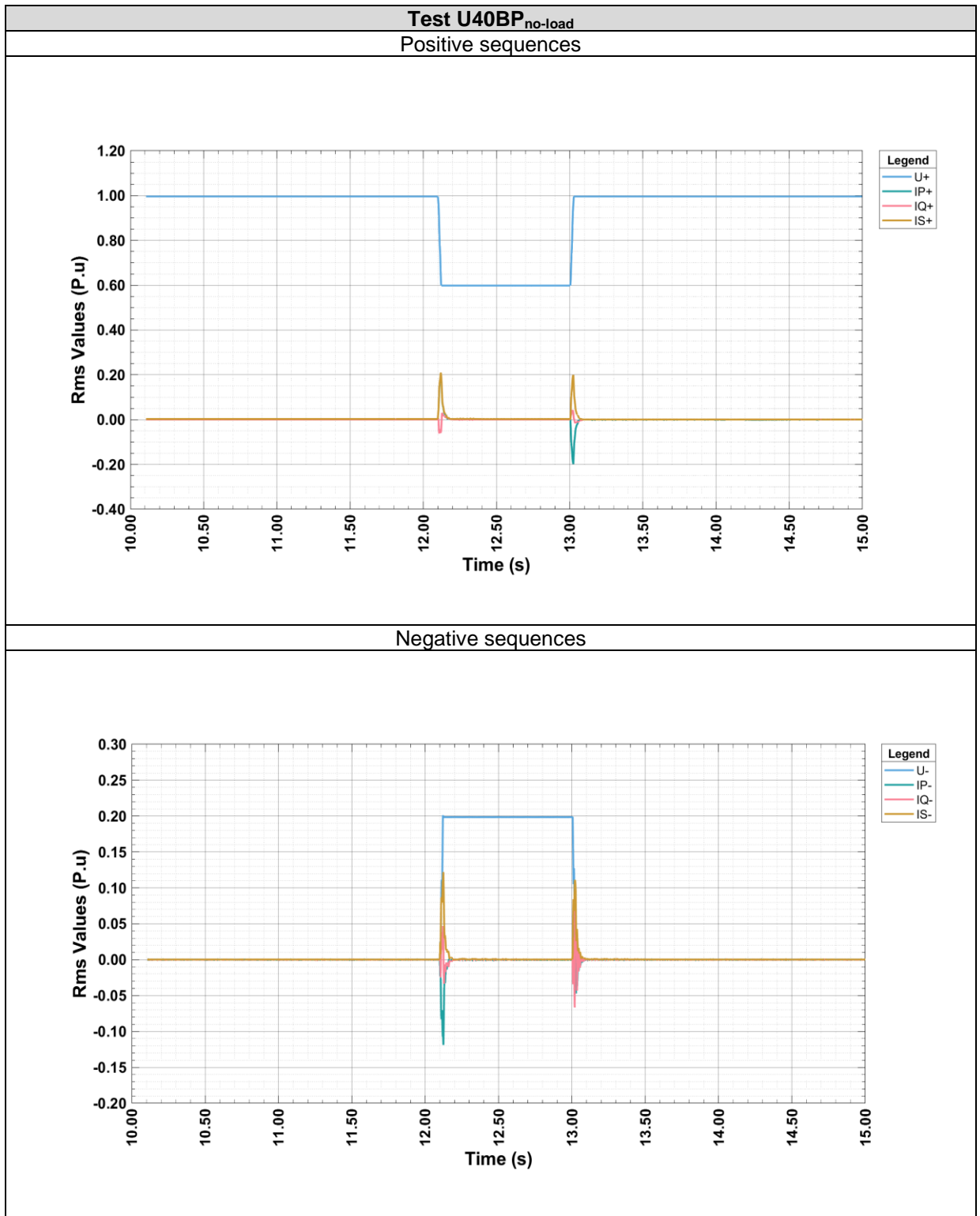




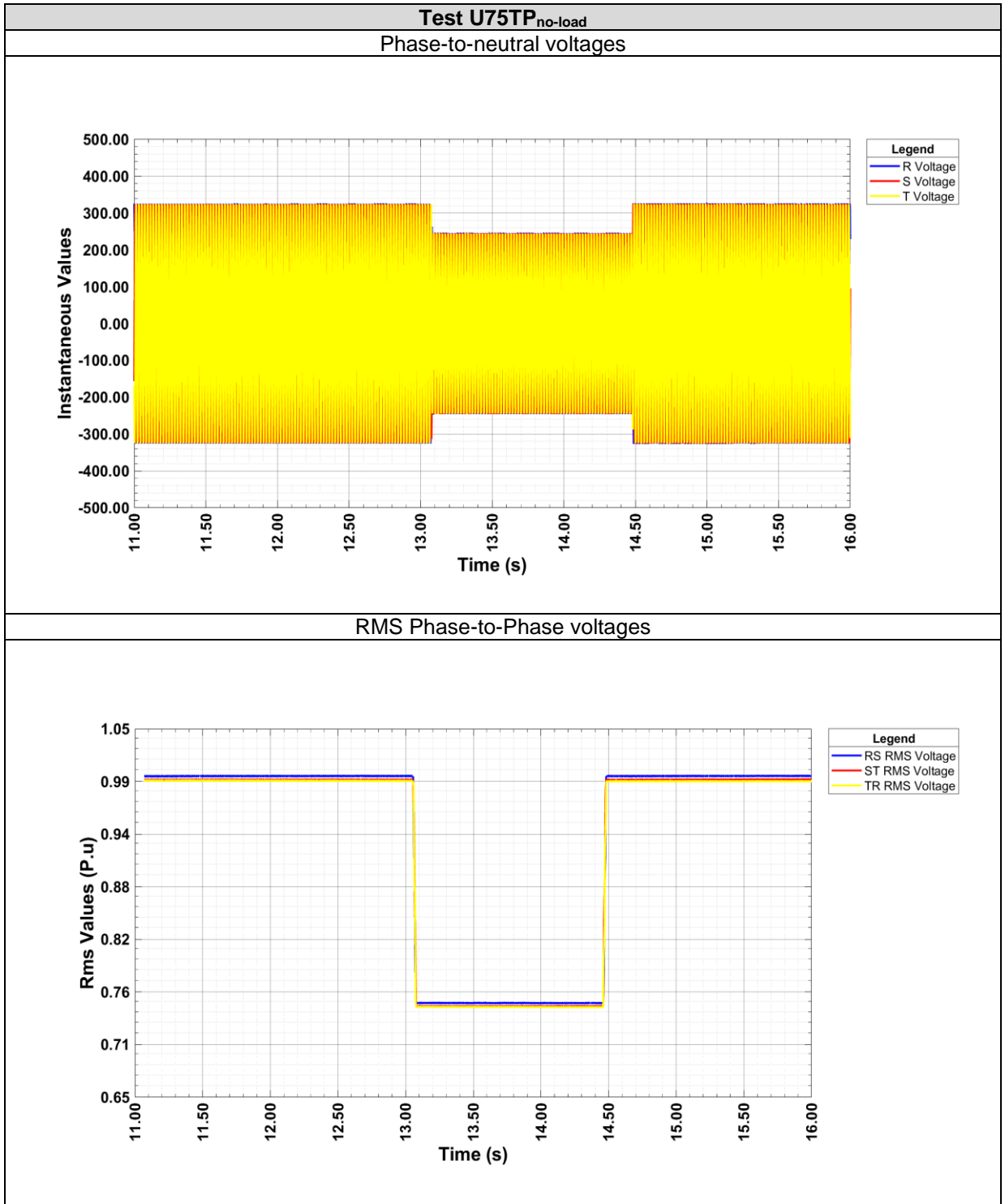


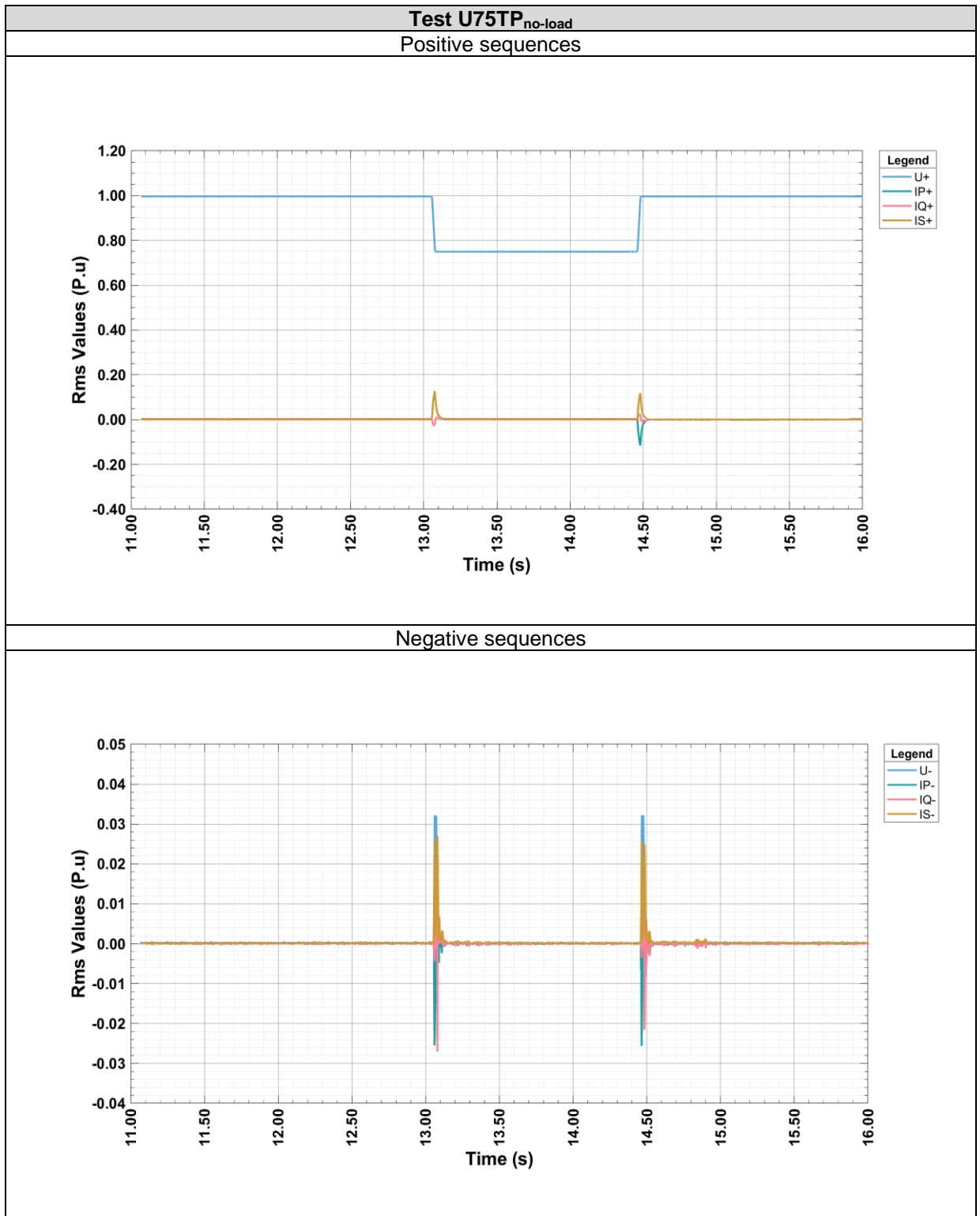
3.1.0.4 Test U40BP<sub>no-load</sub> Fault type: 2 phases, No load



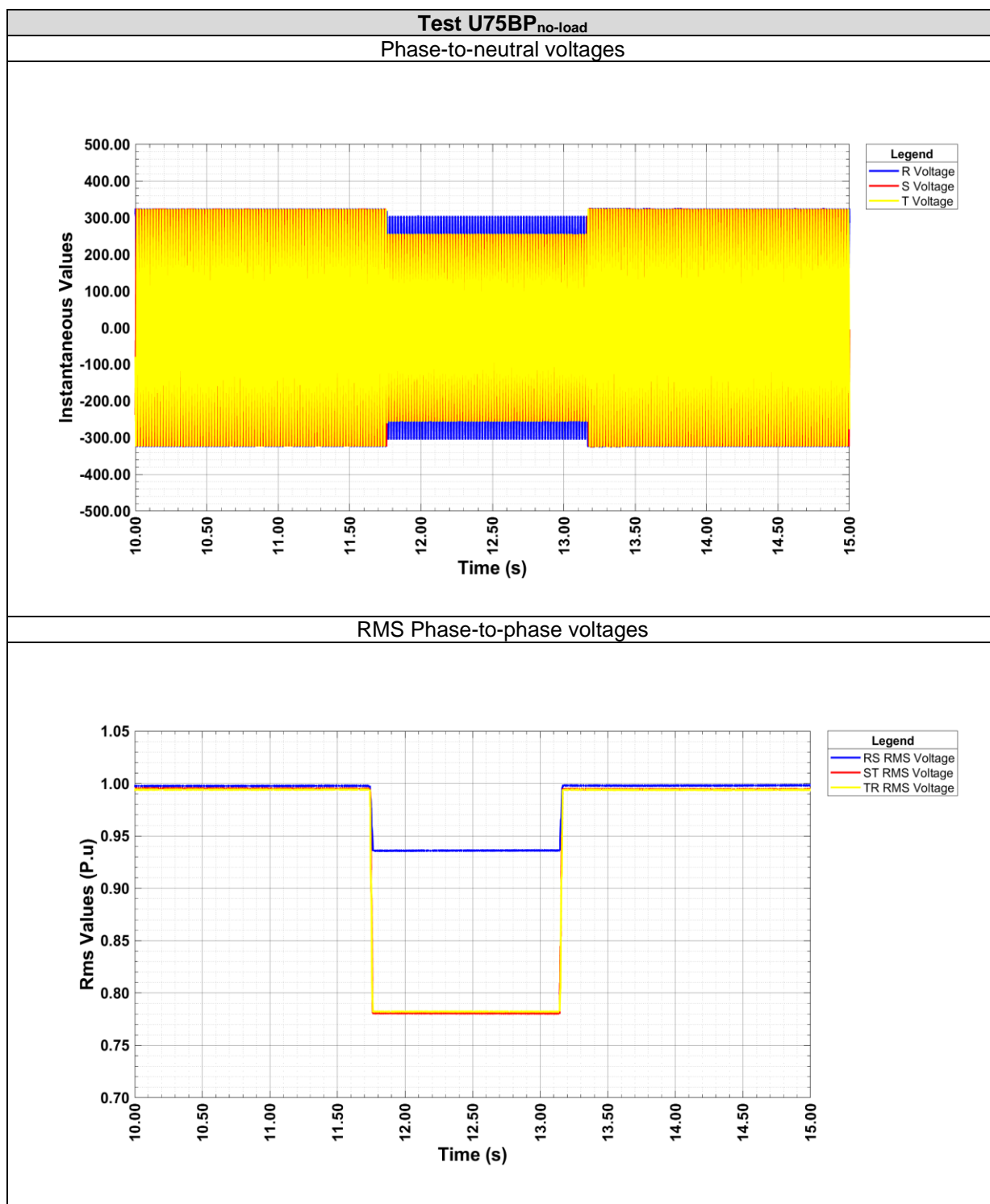


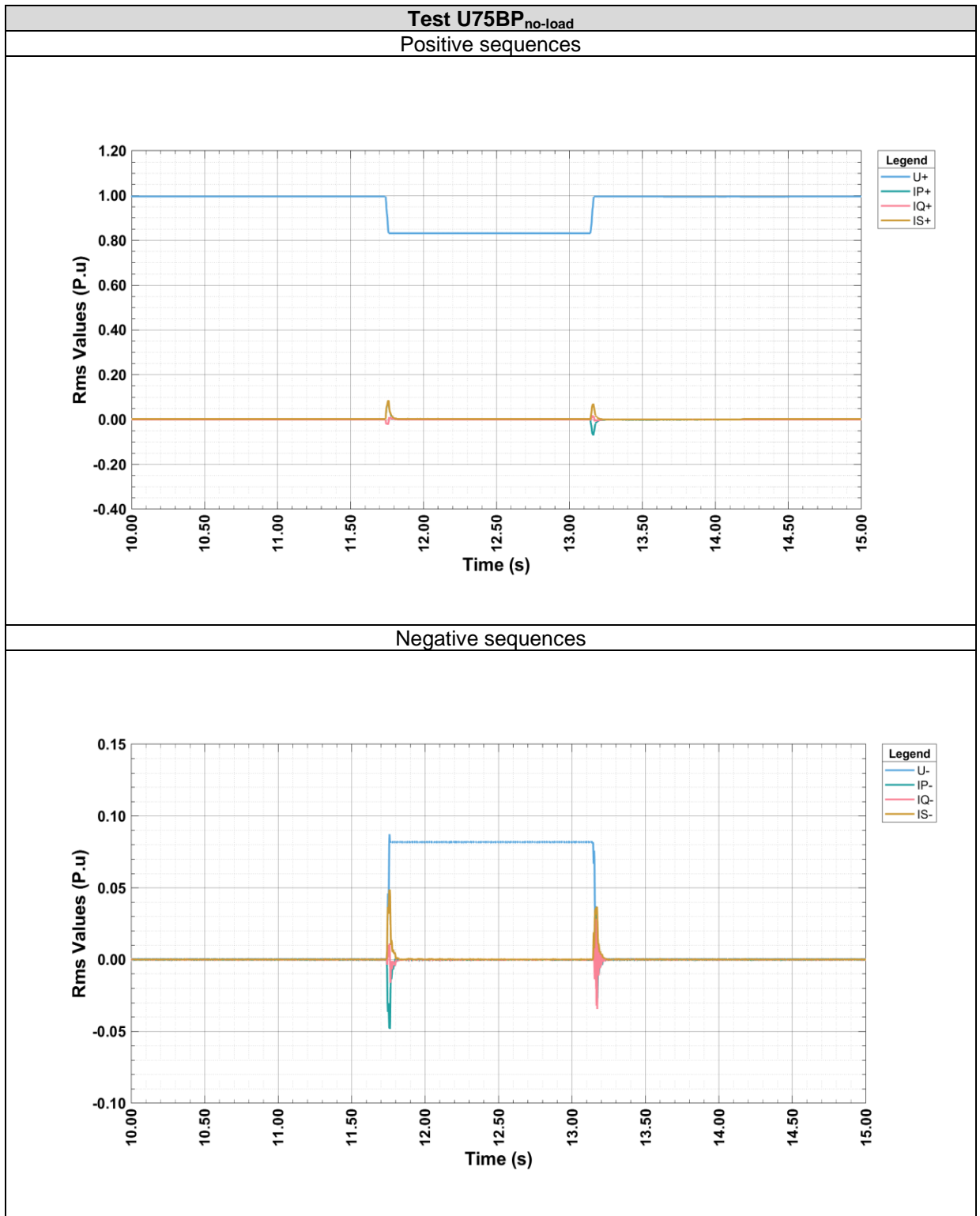
**3.1.0.5 Test U75TP<sub>no-load</sub> Fault type: 3 phases, No load**





**3.1.0.6 Test U75BP<sub>no-load</sub> Fault type: 2 phases, No load**





### 3.1.1 Load tests: Dip depth 5% Un

In this chapter of the test report are shown the test results and diagrams for the tests done with a dip depth of 5% Un. There are included at this point the tests U5TPmax, U5TPmed, U5BPmax and U5BPmed according to both table 49 and 50 of NTS 2.1 SEPE. For the voltages and currents in the below picture tables, the unit is V and A.

#### 3.1.1.1 Test U5TPmax Fault type: 3 phases, Full load

General Information	Test type			U5TPmax
	Fault type			Three Phase
	Fault occurrence ti (sec)			60.299
	Fault clearance td (sec)			60.584
	Fault time (sec)			0.285
	Measured time (s)			70.520
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.997
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.845
	Reactive Current (p.u)	Pos.	ti-60 s to ti	-0.040
			ti-1 s to ti	-0.043
		Neg.	ti-1 s to ti	0.003
	Active Current (p.u)	Pos.	ti-1 s to ti	0.843
	Active Power (p.u)	Total	ti-10 s to ti	0.841
			ti-2 s to ti	0.841
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.841	
	Pos.	ti-500 ms to ti-100 ms	-0.067	
FAULT	Factor k	Pos. (K1)		-1.2
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.010
		Neg.		0.010
	Settling time in sec (te)	Pos.		0.028
		Neg.		0.026
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.054
		Neg.	ti+100 ms to td-20 ms	0.001
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.096
		Neg.	ti+100 ms to td-20 ms	0.001
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.133
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.104
		Neg.	ti+100 ms to td-20 ms	0.008
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.007
		Pos.	ti+100 ms to td-20 ms	0.007
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.059
Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	81.0	
	Phase 2	ti+20	82.6	
	Phase 3	ti+20	83.9	
Short-circuit currents in A	Phase 1	ti+20	81.0	
	Phase 2	ti+20	78.8	
	Phase 3	ti+20	87.1	

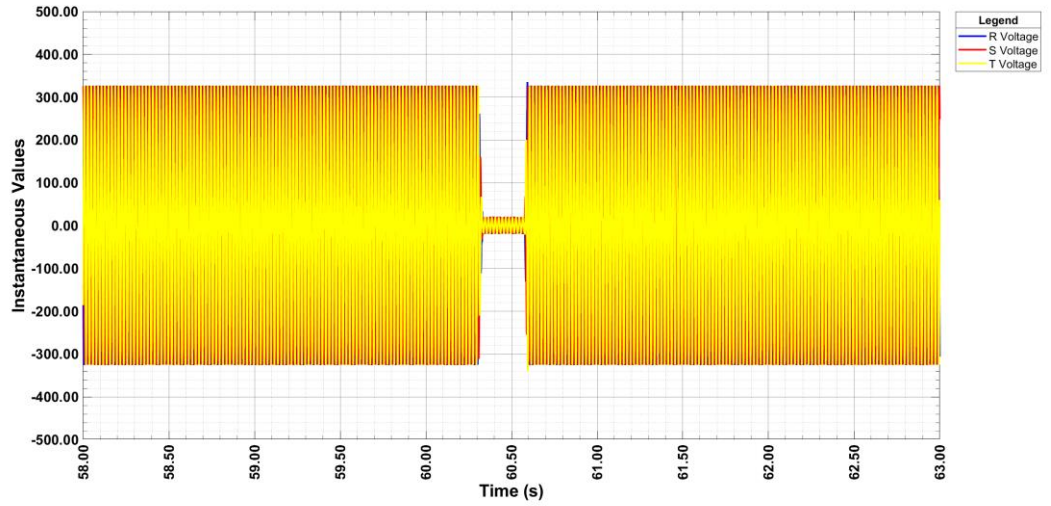


	Short-circuit currents in A	Phase 1	ti+100	87.1
		Phase 2	ti+100	88.7
		Phase 3	ti+100	87.1
	Short-circuit currents in A	Phase 1	ti+150	87.1
		Phase 2	ti+150	88.8
		Phase 3	ti+150	87.0
	Short-circuit currents in A	Phase 1	ti+300	62.3
		Phase 2	ti+300	62.6
		Phase 3	ti+300	62.2
	Short-circuit currents in A	Phase 1	ti+500	67.6
		Phase 2	ti+500	67.4
		Phase 3	ti+500	66.0
	Short-circuit currents in A	Phase 1	ti+1000	69.0
	Phase 2	ti+1000	69.1	
	Phase 3	ti+1000	67.9	
	Capacity to withstand the voltage dip	Connected		YES
POST-FAUTL	Reactive Current (piu)	Pos.	td+1 s to td+10 s	-0.041
		Neg	td+1 s to td+10 s	0.003
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.846
	Active Power	Total	td+1 s to td+10 s	0.844
	Reactive Power (put)	Pos.	td+1 s to td+10 s	-0.041
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.848
		Neg	td+1 s to td+10 s	0.011
	the of the Active Power in sec	Pos		0.019
Transient overvoltage capacity	Connected		YES	

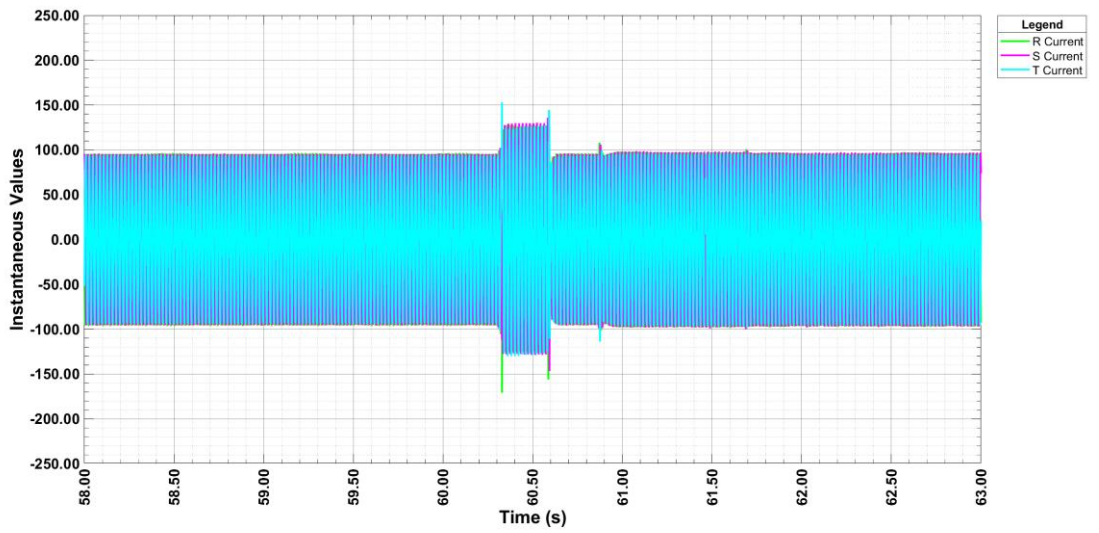
Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.

### Test U5TPmax

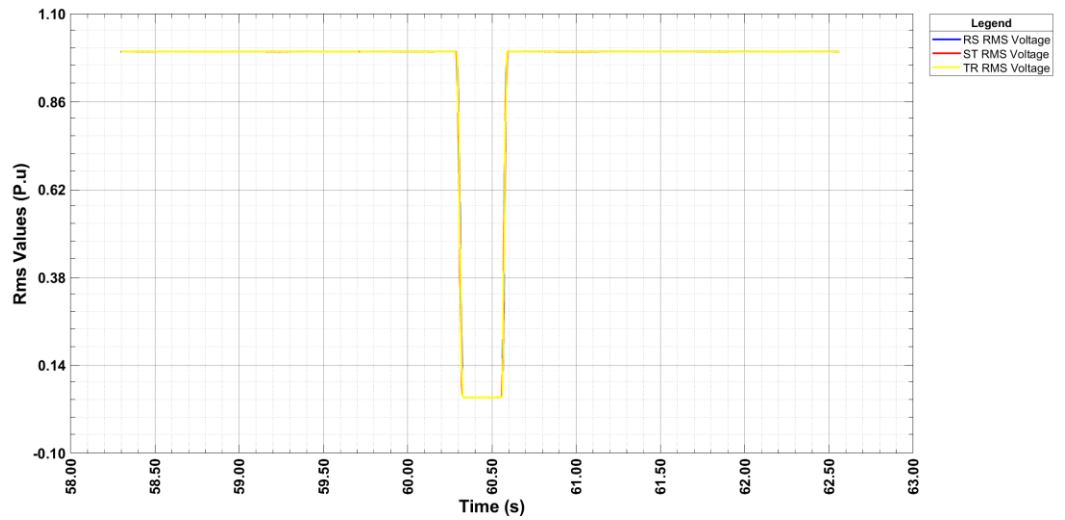
#### Phase-to-neutral voltages



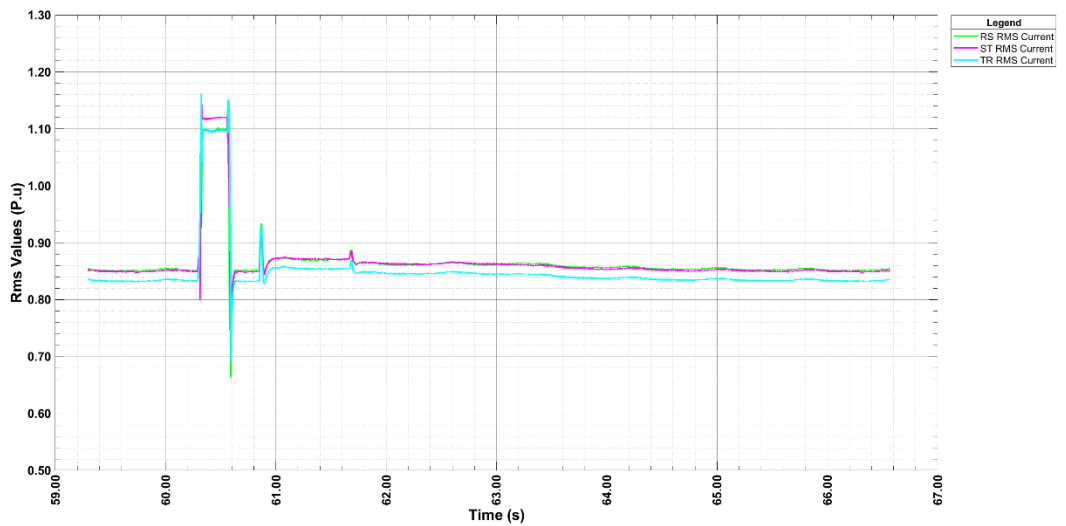
#### Phase currents



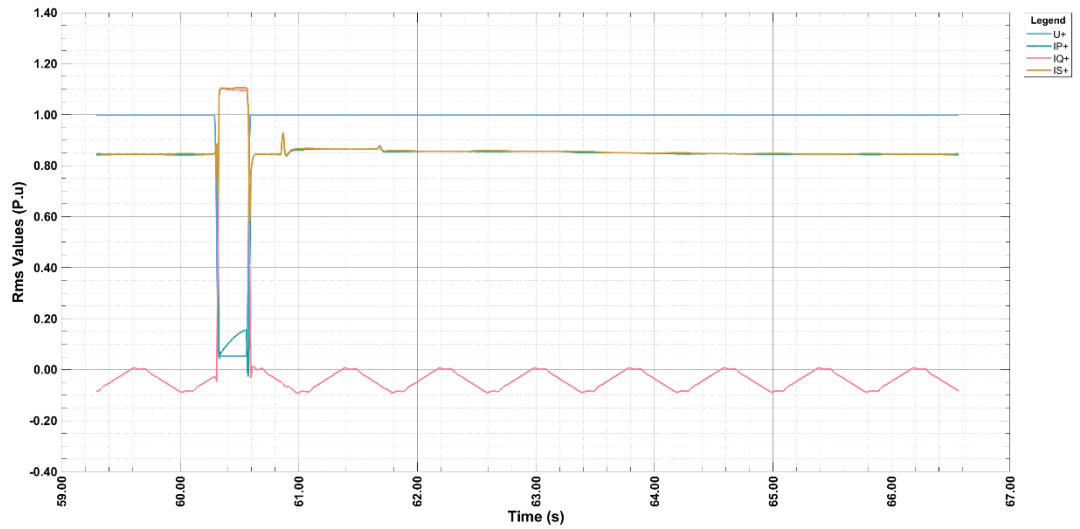
**Test U5TPmax**  
RMS phase to phase voltages



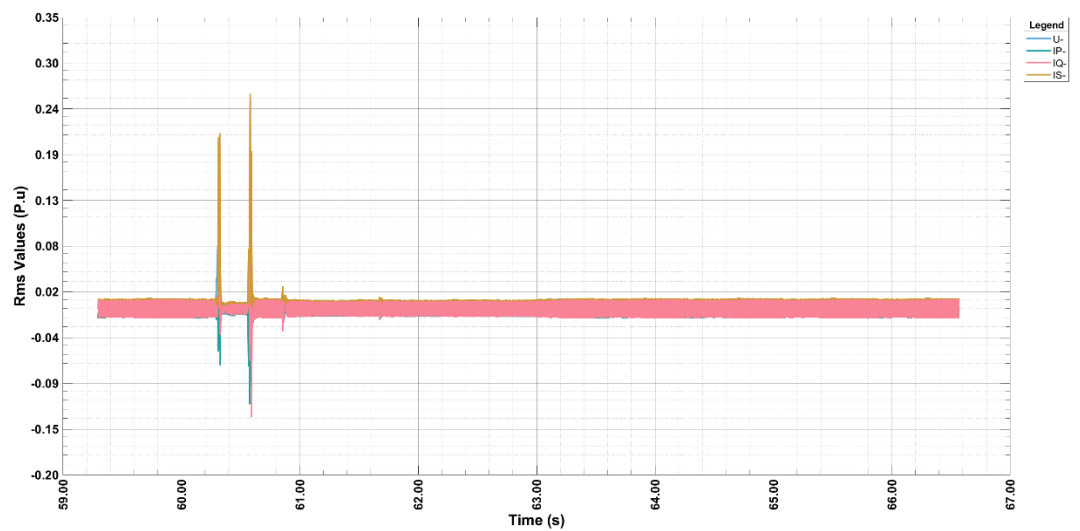
RMS phase currents



**Test U5TPmax**  
Positive sequences

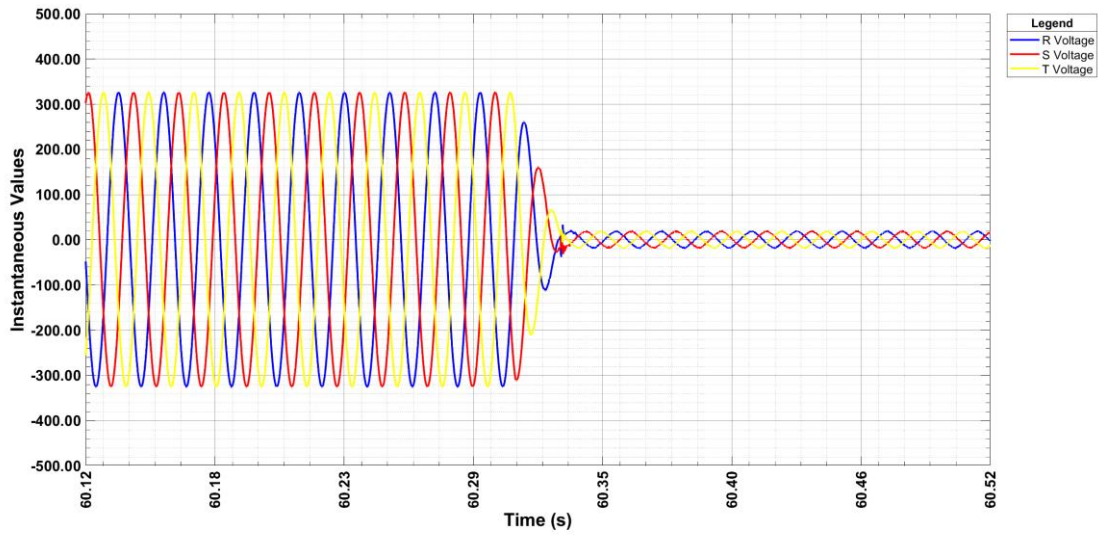


Negative sequences

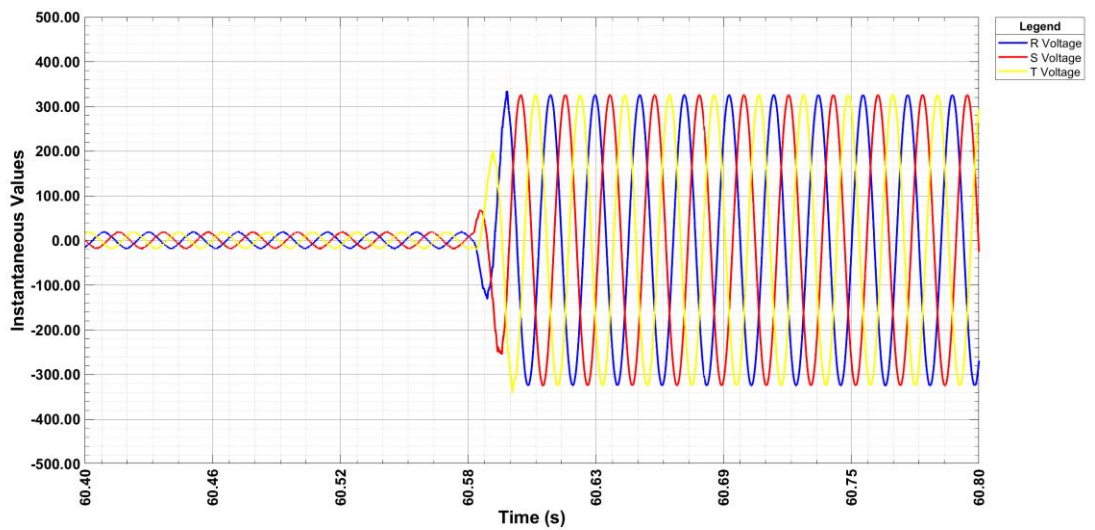


**Test U5TPmax**

Transient voltage: Fault beginning

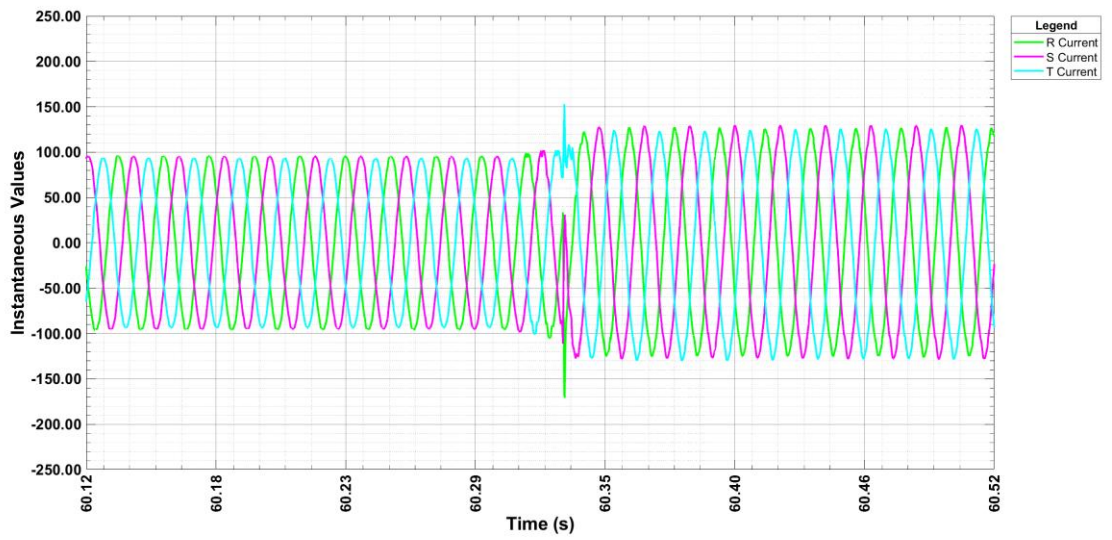


Transient voltage: Fault end

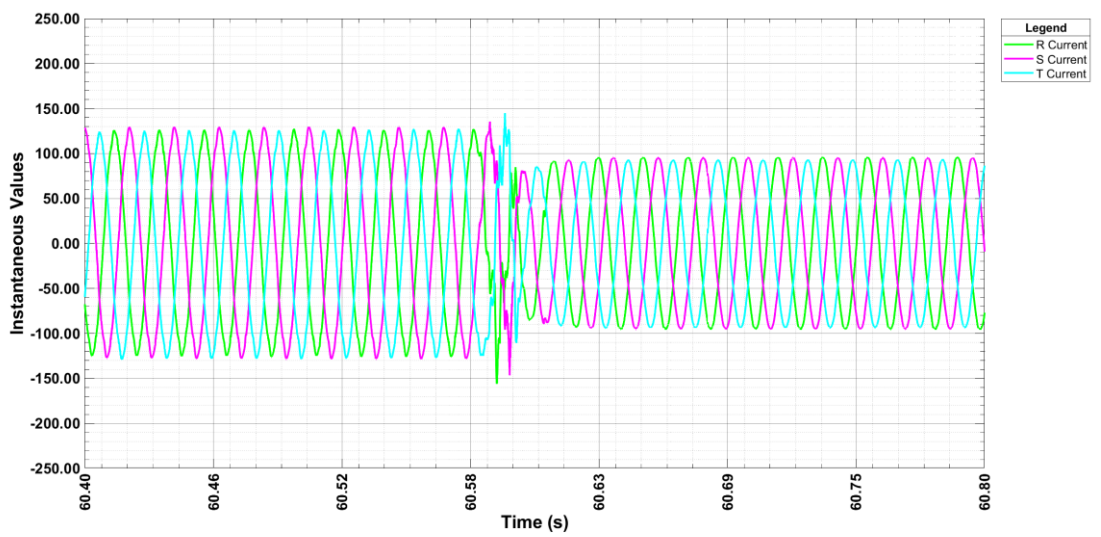


### Test U5TPmax

Transient current: Fault beginning



Transient current: Fault end





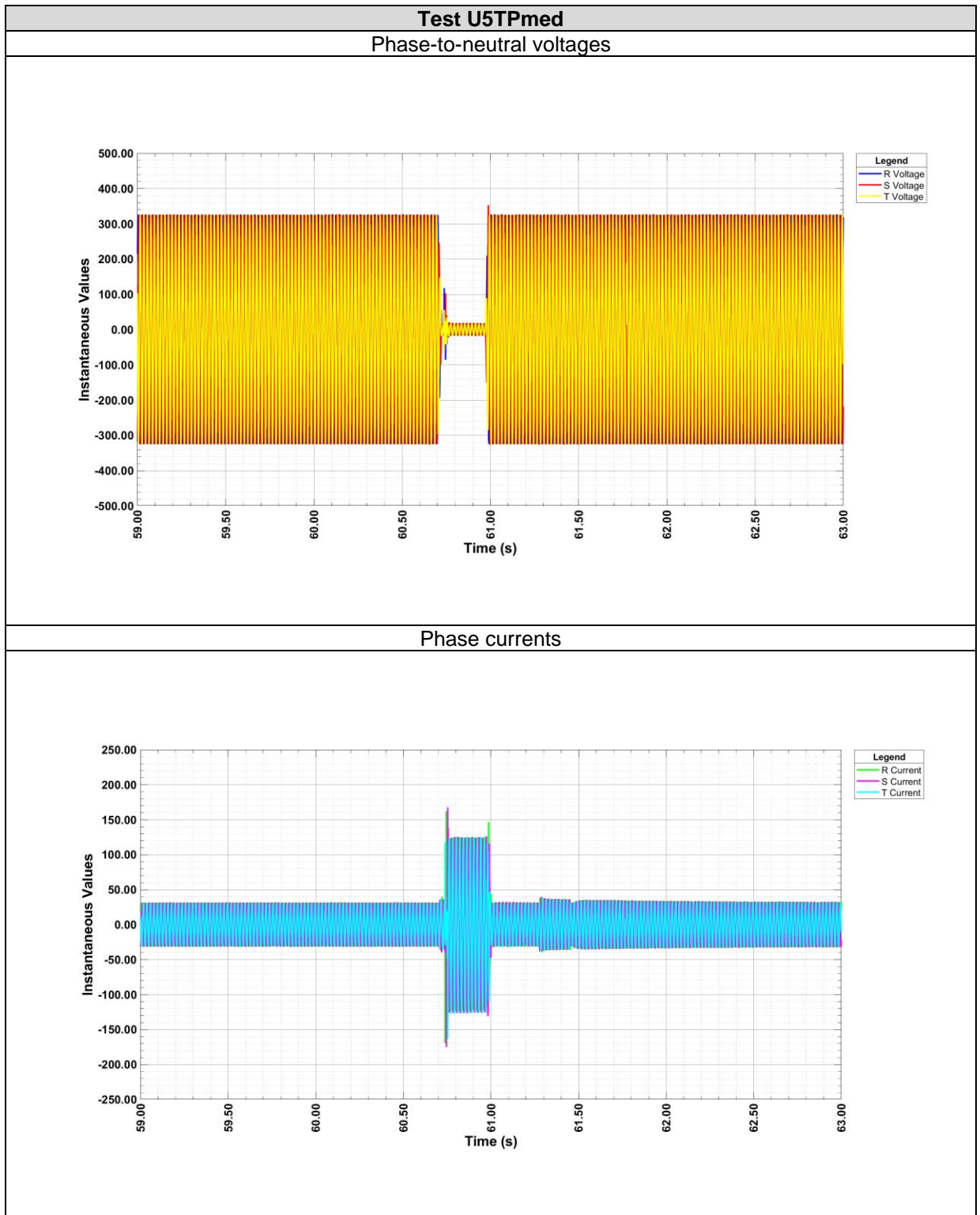
### 3.1.1.2 Test U5TPmed Fault type: 3 phases, Partial load

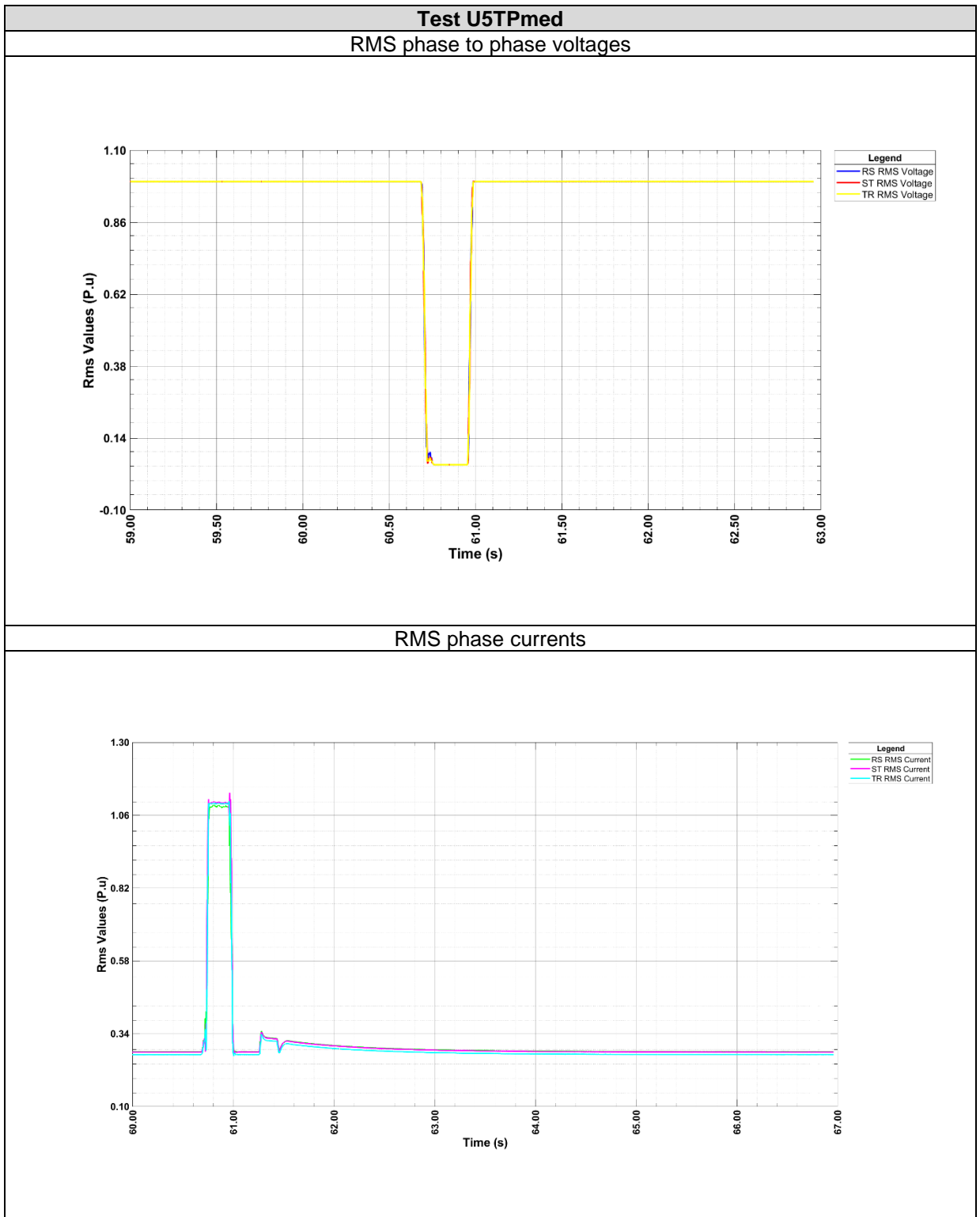
General Information	Test type			U5TPmed
	Fault type			Three Phase
	Fault occurrence ti (sec)			60.694
	Fault clearance td (sec)			60.979
	Fault time (sec)			0.285
	Measured time (s)			70.876
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.277
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.010
			ti-1 s to ti	0.010
		Neg.	ti-1 s to ti	0.002
	Active Current (p.u)	Pos.	ti-1 s to ti	0.276
	Active Power (p.u)	Total	ti-10 s to ti	0.275
			ti-2 s to ti	0.275
		Pos.	ti-500 ms to ti-100 ms	0.276
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.010	
FAULT	Factor k	Pos. (K1)		-1.1
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.031
		Neg.		0.027
	Settling time in sec (te)	Pos.		0.056
		Neg.		0.045
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.052
		Neg.	ti+100 ms to td-20 ms	0.001
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.023
		Neg.	ti+100 ms to td-20 ms	0.004
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	-0.392
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.095
		Neg.	ti+100 ms to td-20 ms	0.006
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	-0.020
		Pos.	ti+100 ms to td-20 ms	-0.021
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.054
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	25.2
		Phase 2	ti+20	25.9
		Phase 3	ti+20	25.2
	Short-circuit currents in A	Phase 1	ti+20	24.8
Phase 2		ti+20	25.9	
Phase 3		ti+20	87.2	
Short-circuit currents in A	Phase 1	ti+100	86.6	
	Phase 2	ti+100	87.6	
	Phase 3	ti+100	87.2	
Short-circuit currents in A	Phase 1	ti+150	86.6	
	Phase 2	ti+150	87.5	
	Phase 3	ti+150	87.3	

	Short-circuit currents in A	Phase 1	ti+300	25.2
		Phase 2	ti+300	27.1
		Phase 3	ti+300	23.8
	Short-circuit currents in A	Phase 1	ti+500	22.3
		Phase 2	ti+500	22.2
		Phase 3	ti+500	21.5
	Short-circuit currents in A	Phase 1	ti+1000	24.6
		Phase 2	ti+1000	24.5
		Phase 3	ti+1000	23.9
	Capacity to withstand the voltage dip	Connected		YES
POST- FAUTL	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.010
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.279
	Active Power	Total	td+1 s to td+10 s	0.278
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.010
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.279
		Neg	td+1 s to td+10 s	0.005
	the of the Active Power in sec	Pos		0.004
	Transient overvoltage capacity	Connected		YES

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.

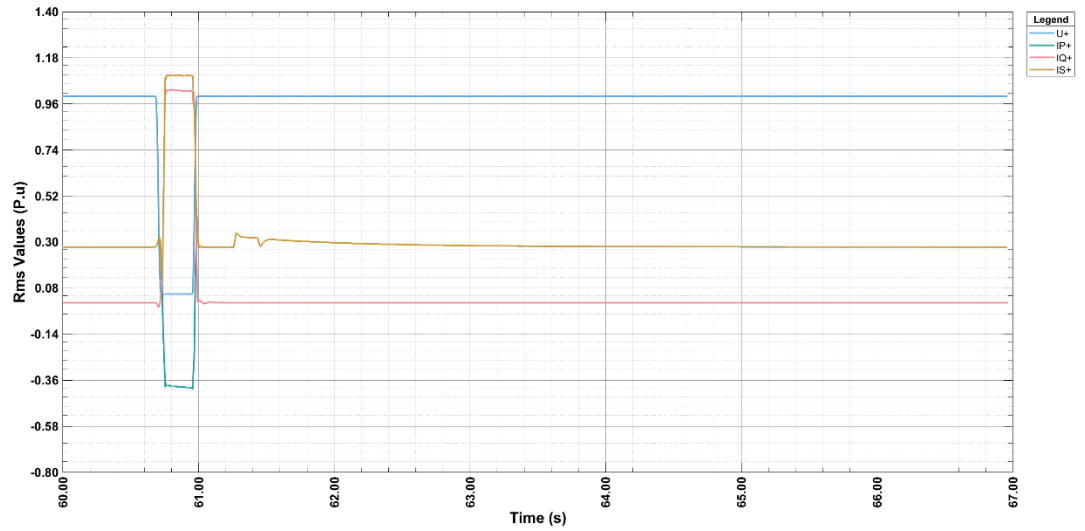




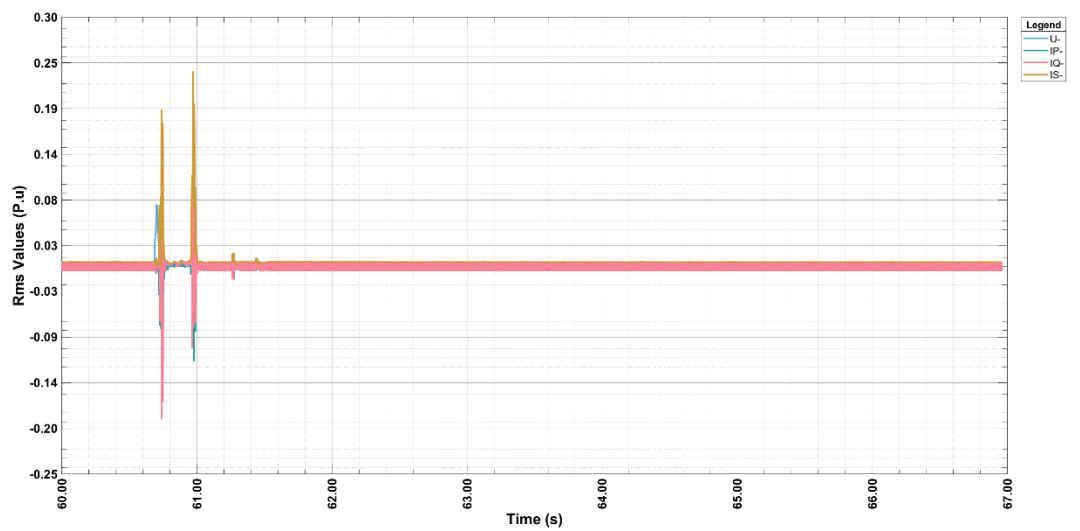


**Test U5TPmed**

Positive sequences

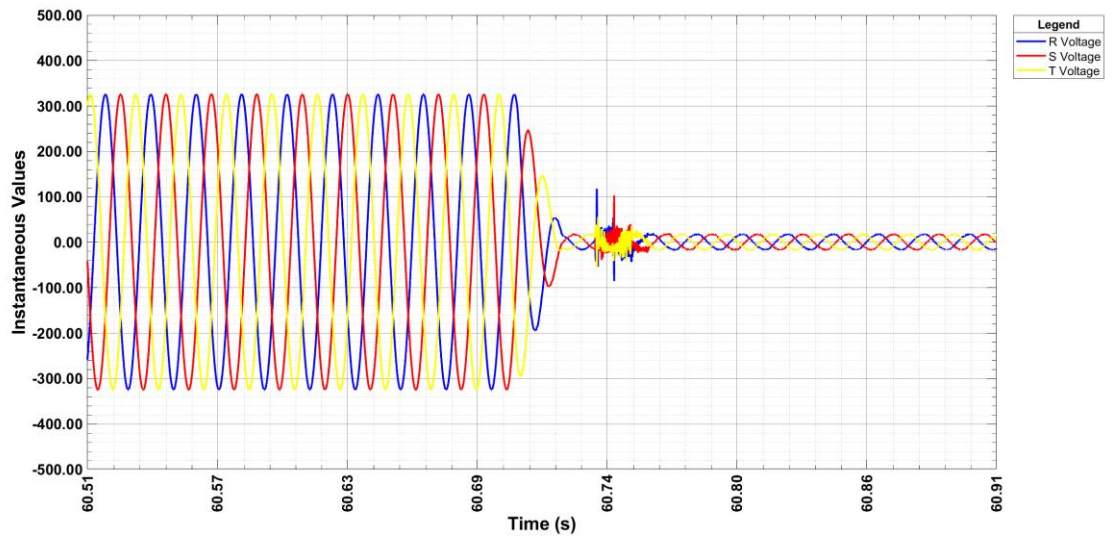


Negative sequences

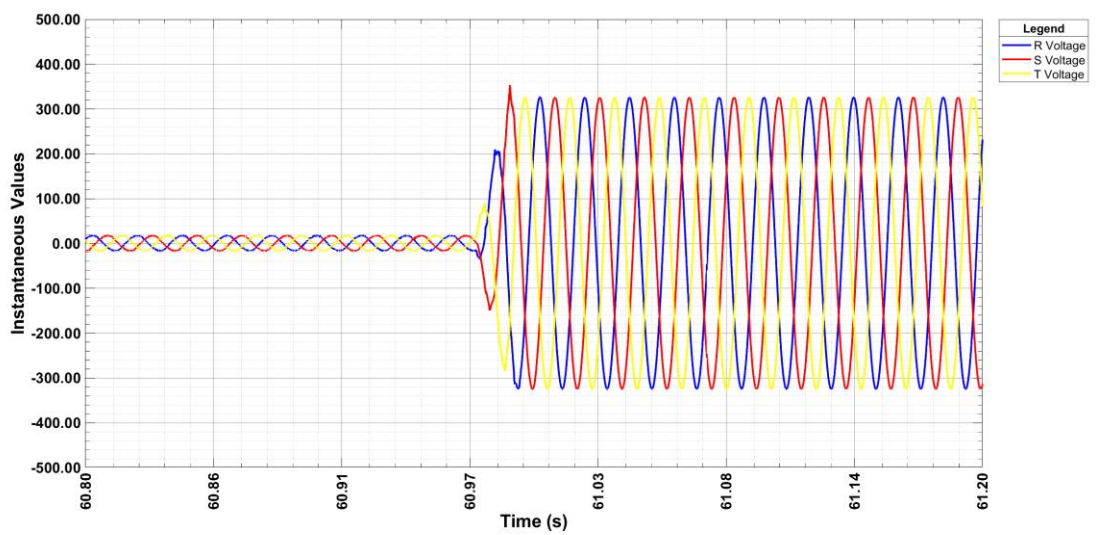


**Test U5TPmed**

Transient voltage: Fault beginning

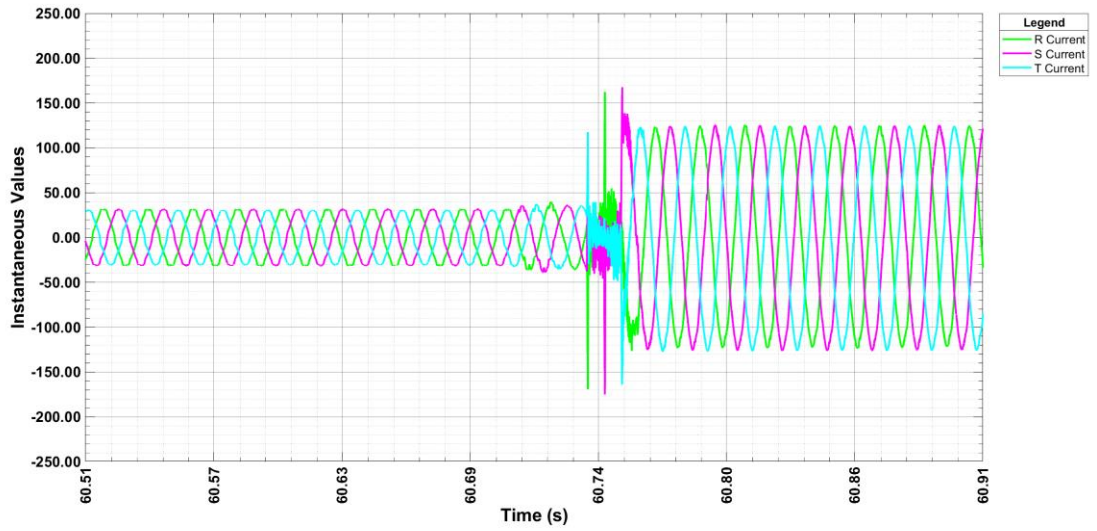


Transient voltage: Fault end

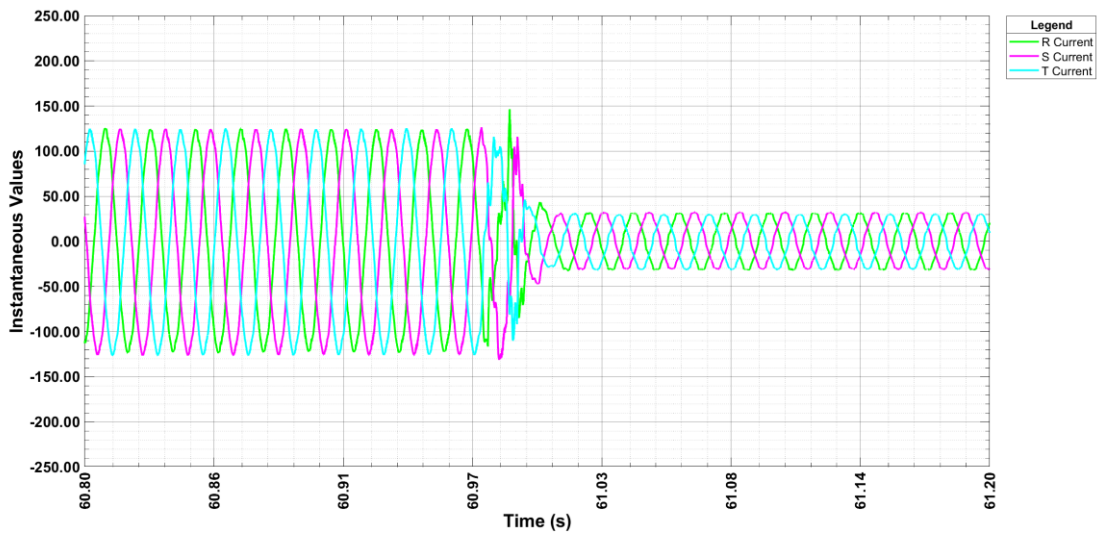


### Test U5TPmed

#### Transient current: Fault beginning



#### Transient current: Fault end



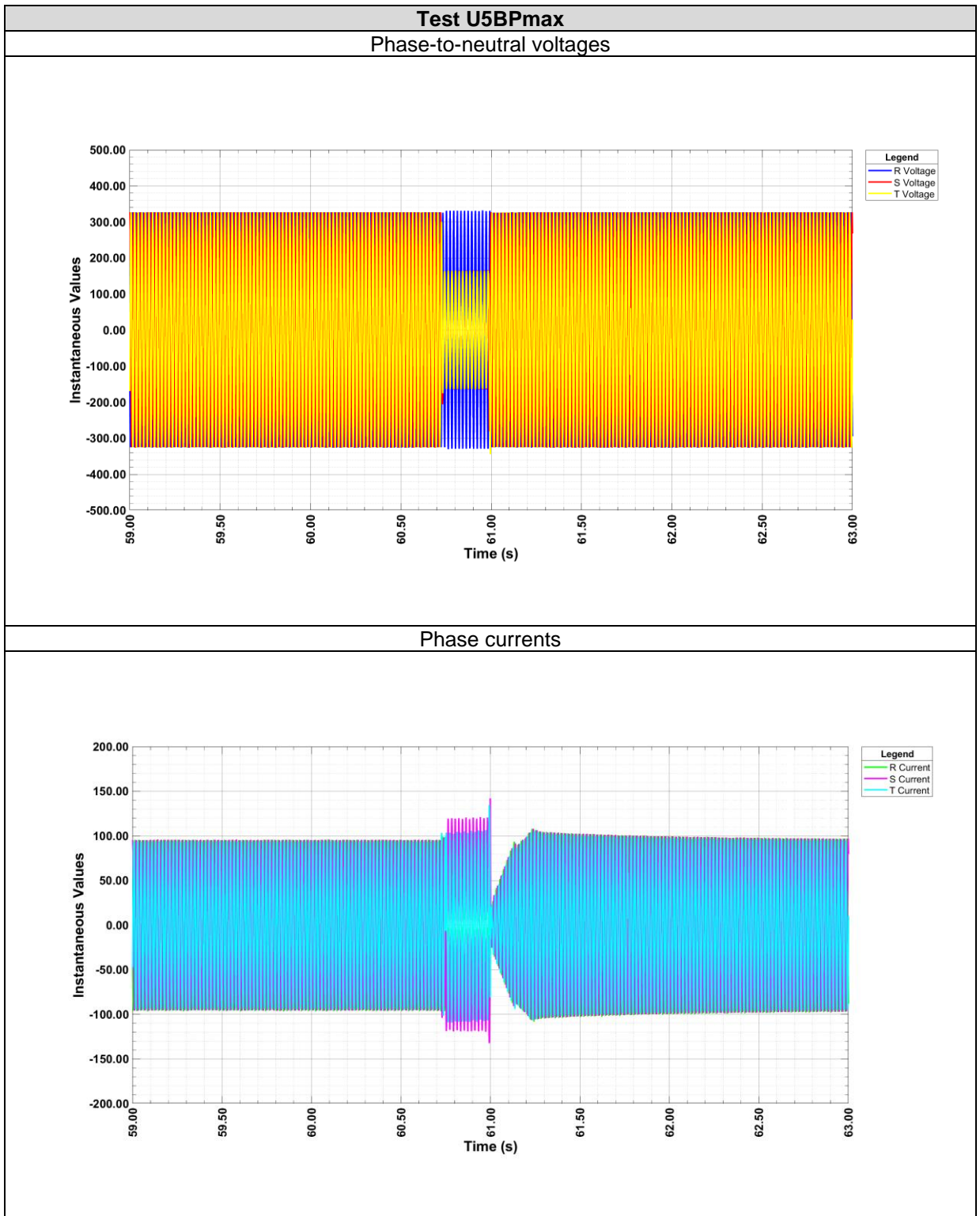
### 3.1.1.3 Test U5BPmax Fault type: 2 phases, Full load

General Information	Test type			U5BPmax
	Fault type			Two Phase
	Fault occurrence ti (sec)			60.709
	Fault clearance td (sec)			60.988
	Fault time (sec)			0.279
	Measured time (s)			70.965
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.997
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.000
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.841
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.003
			ti-1 s to ti	0.003
		Neg.	ti-1 s to ti	0.004
	Active Current (p.u)	Pos.	ti-1 s to ti	0.841
	Active Power (p.u)	Total	ti-10 s to ti	0.842
			ti-2 s to ti	0.842
		Pos.	ti-500 ms to ti-100 ms	0.842
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.003	
FAULT	Factor k	Pos. (K1)		-1.2
		Neg. (K2)		1.1
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.023
		Neg.		0.020
	Settling time in sec (te)	Pos.		0.035
		Neg.		0.036
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.524
		Neg.	ti+100 ms to td-20 ms	0.472
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.571
		Neg.	ti+100 ms to td-20 ms	-0.532
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.015
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.571
		Neg.	ti+100 ms to td-20 ms	0.548
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.070
		Pos.	ti+100 ms to td-20 ms	0.008
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.300
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
Short-circuit currents in A	Phase 1	ti+20	--	
	Phase 2	ti+20	--	
	Phase 3	ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	
	Phase 3	ti+150	--	

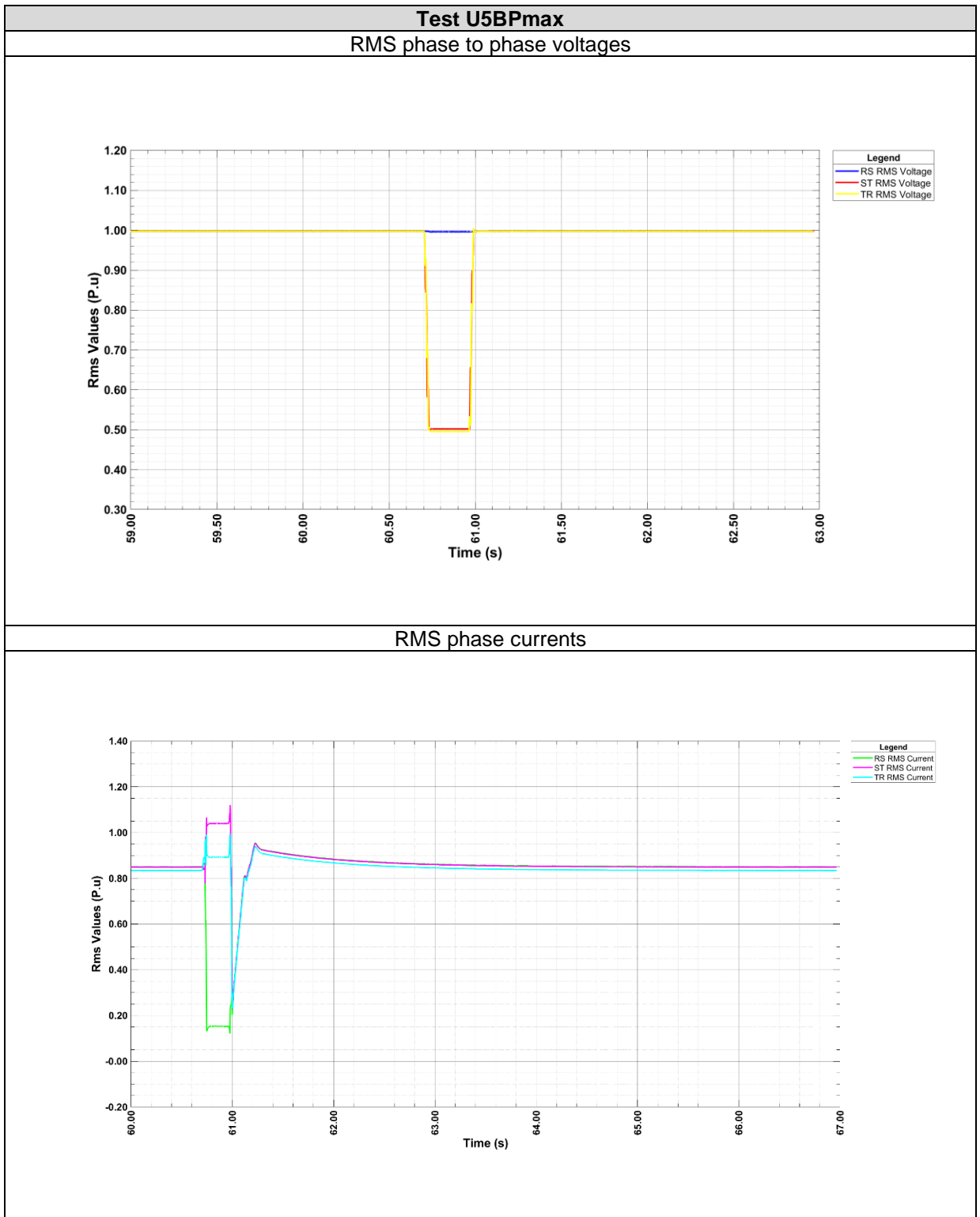
	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
<b>POST- FAULTL</b>	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.004
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.844
	Active Power	Total	td+1 s to td+10 s	0.845
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.003
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.844
		Neg	td+1 s to td+10 s	0.010
	the of the Active Power in sec	Pos		0.131
	Transient overvoltage capacity	Connected		YES

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.



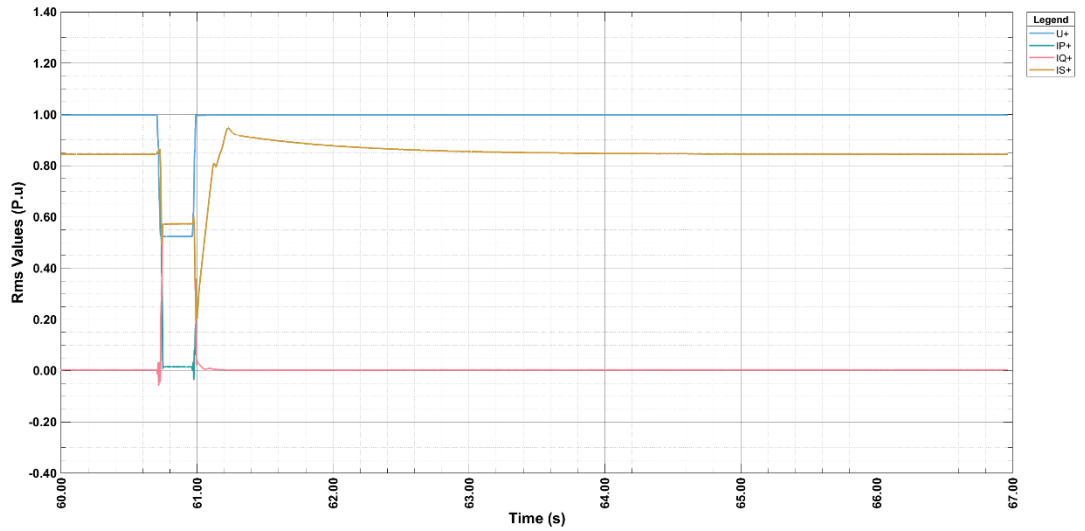




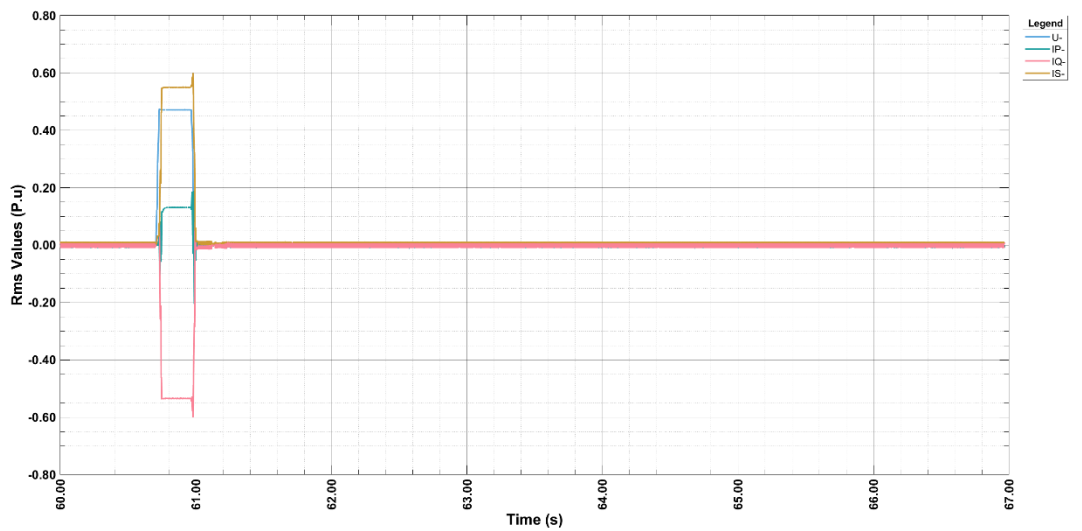


**Test U5BPmax**

Positive sequences

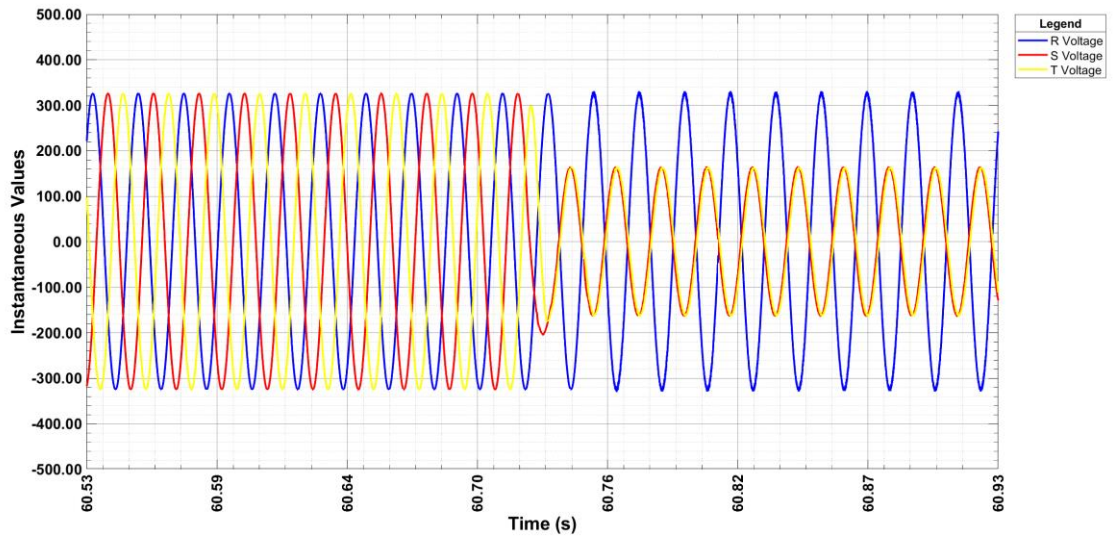


Negative sequences

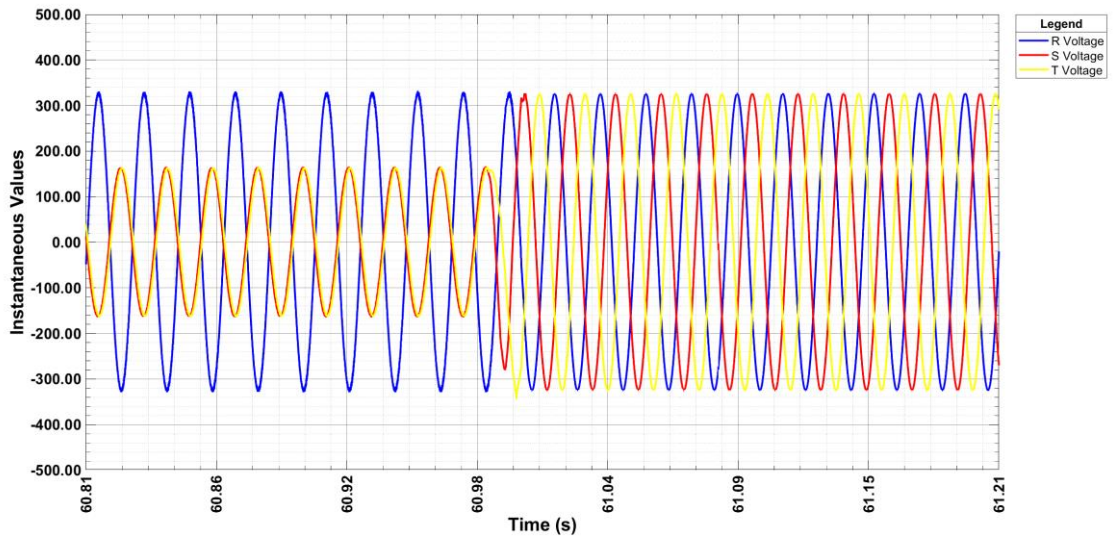


**Test U5BPmax**

Transient voltage: Fault beginning

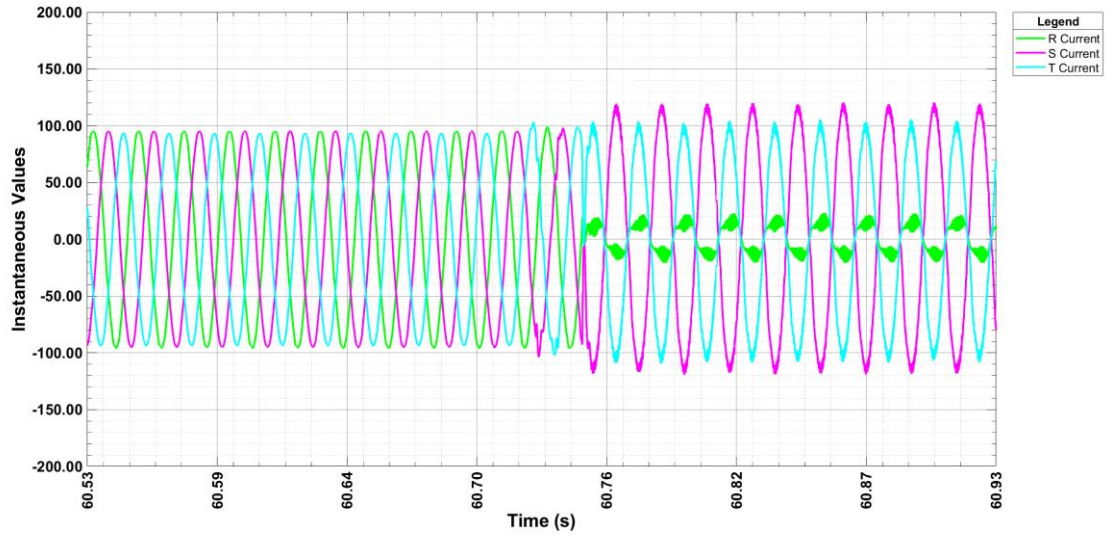


Transient voltage: Fault end

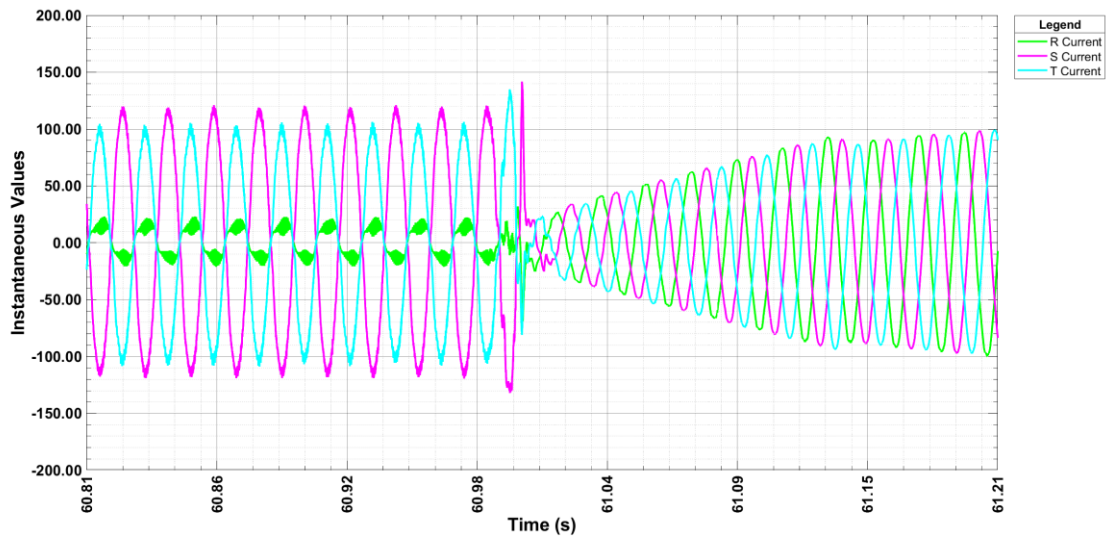


### Test U5BPmax

#### Transient current: Fault beginning



#### Transient current: Fault end



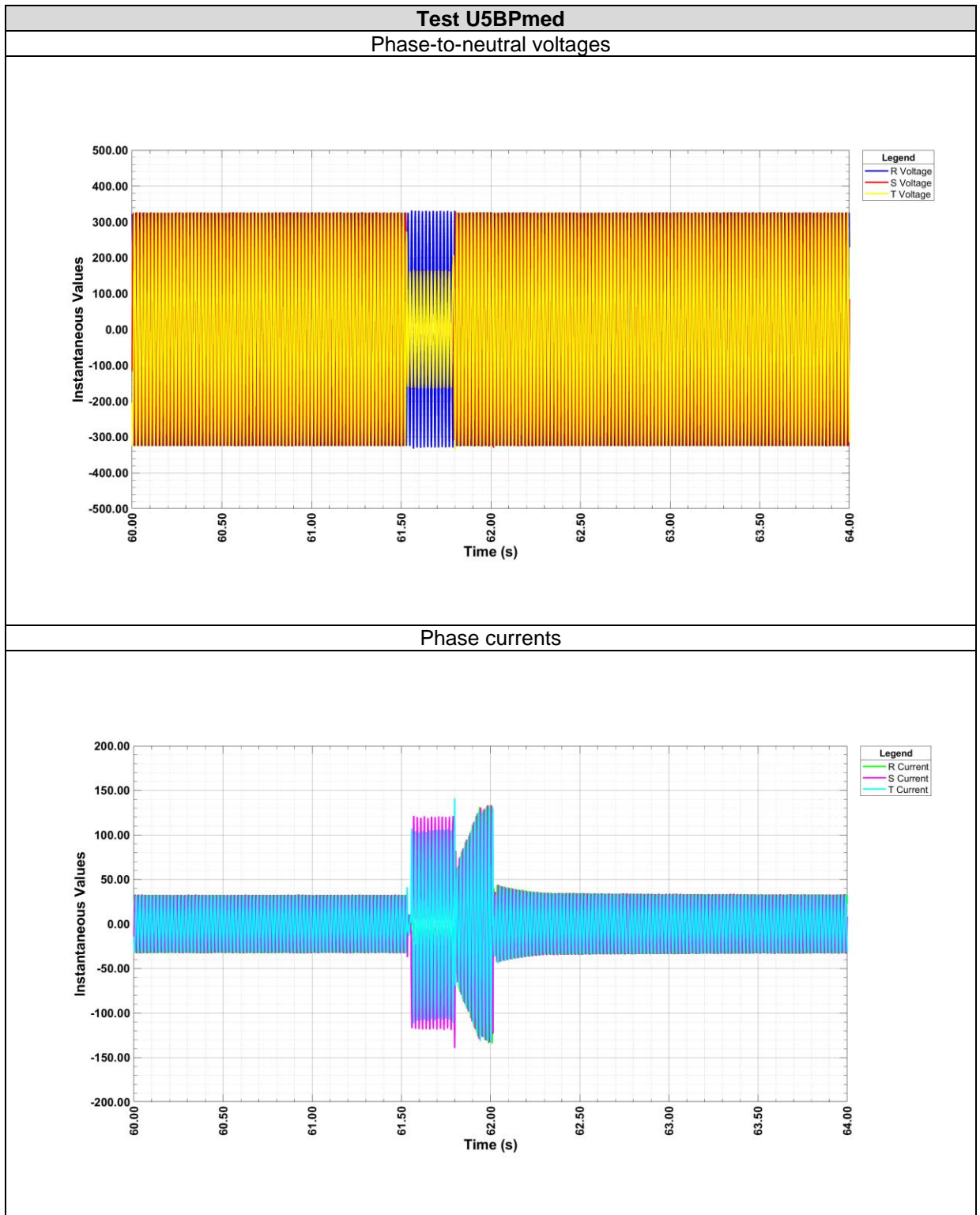
### 3.1.1.4 Test U5BPmed Fault type: 2 phases, Partial load

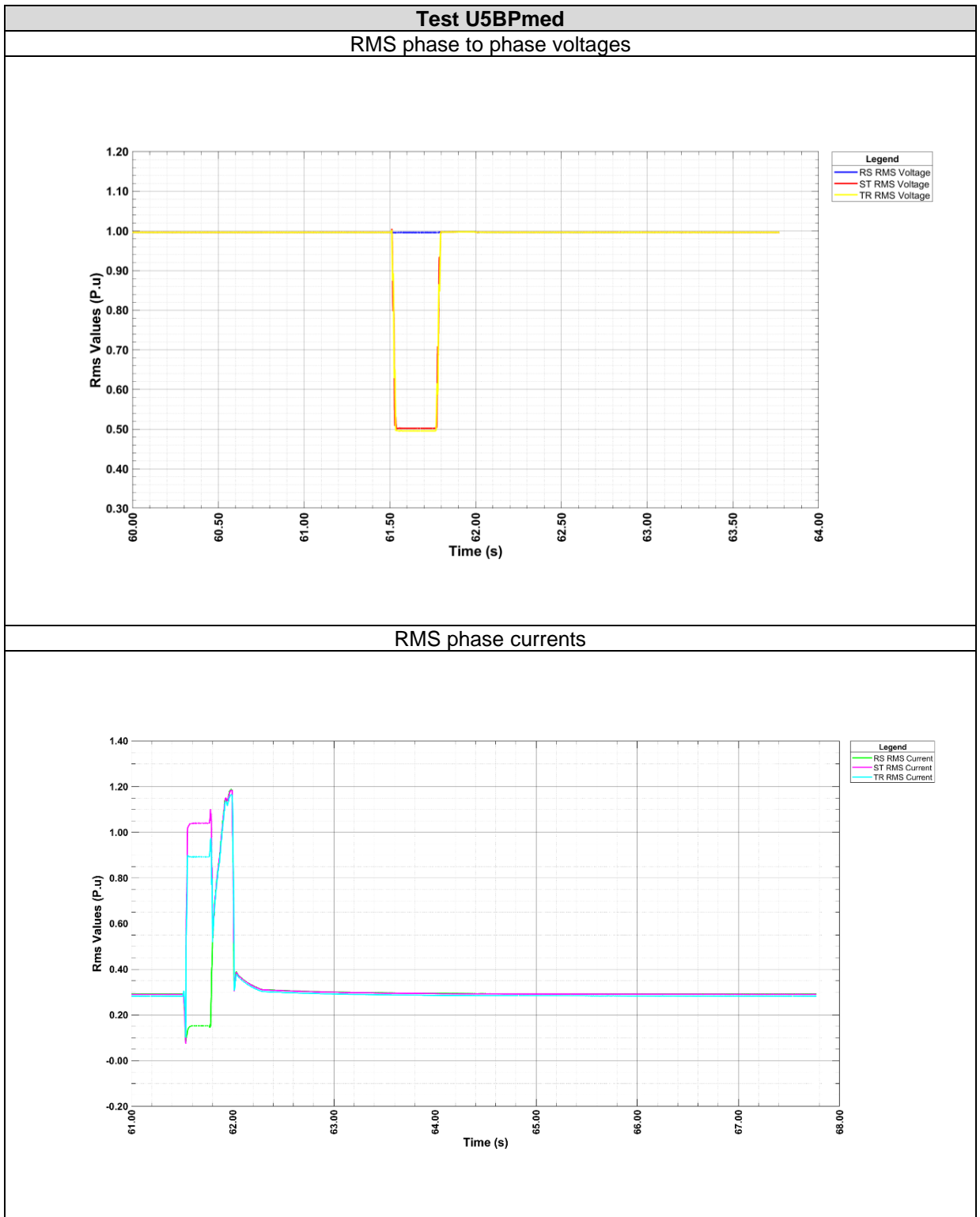
General Information	Test type			U5BPmed
	Fault type			Two Phase
	Fault occurrence ti (sec)			61.514
	Fault clearance td (sec)			61.793
	Fault time (sec)			0.279
	Measured time (s)			71.780
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.000
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.287
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.011
			ti-1 s to ti	0.011
		Neg.	ti-1 s to ti	0.002
	Active Current (p.u)	Pos.	ti-1 s to ti	0.287
	Active Power (p.u)	Total	ti-10 s to ti	0.287
			ti-2 s to ti	0.287
	Pos.	ti-500 ms to ti-100 ms	0.287	
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.011	
FAULT	Factor k	Pos. (K1)		-1.2
		Neg. (K2)		1.1
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.024
		Neg.		0.014
	Settling time in sec (te)	Pos.		0.036
		Neg.		0.036
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.524
		Neg.	ti+100 ms to td-20 ms	0.472
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.571
		Neg.	ti+100 ms to td-20 ms	-0.533
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.015
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.571
		Neg.	ti+100 ms to td-20 ms	0.548
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.070
		Pos.	ti+100 ms to td-20 ms	0.008
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.300
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
Short-circuit currents in A	Phase 1	ti+20	--	
	Phase 2	ti+20	--	
	Phase 3	ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	
	Phase 3	ti+150	--	

	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
POST- FAUTL	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.011
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.288
	Active Power	Total	td+1 s to td+10 s	0.288
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.011
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.288
		Neg	td+1 s to td+10 s	0.005
	the of the Active Power in sec	Pos		0.000
Transient overvoltage capacity	Connected		YES	

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.



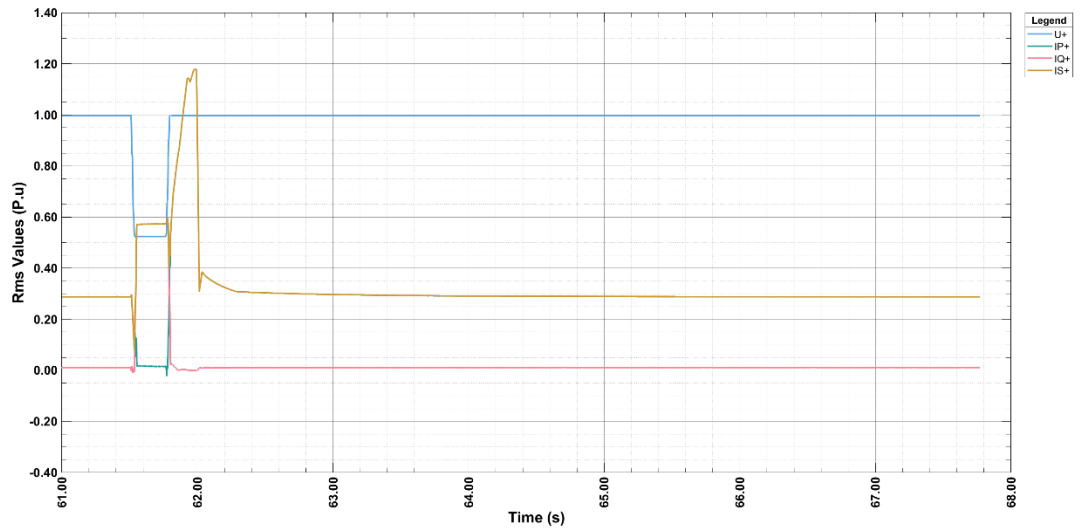




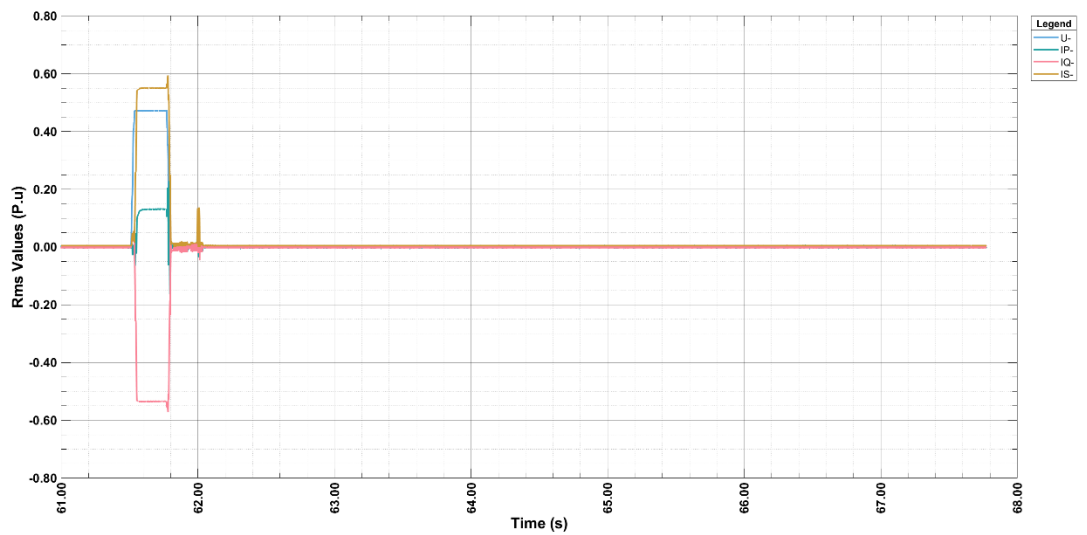


**Test U5BPmed**

Positive sequences

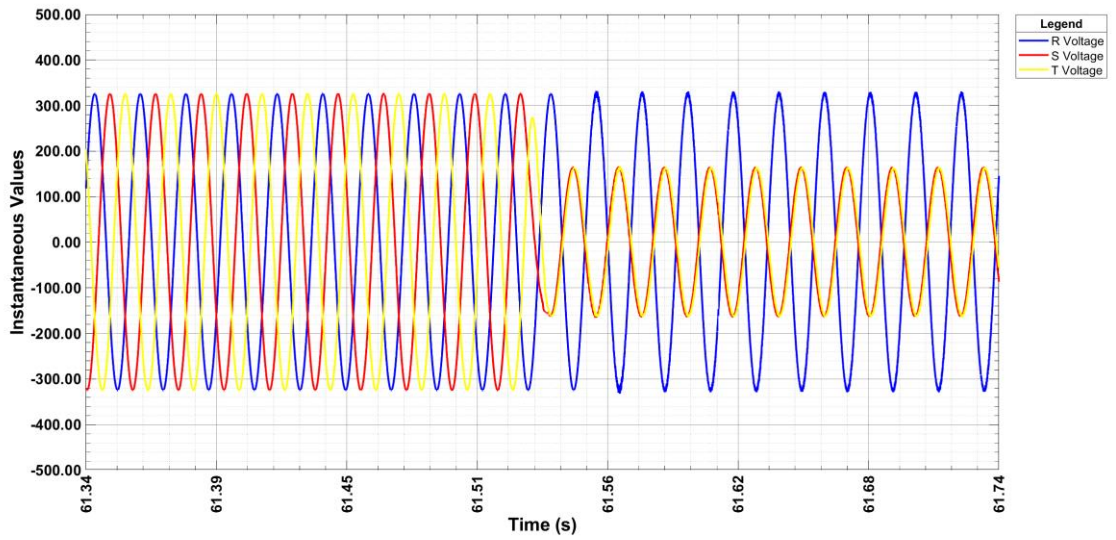


Negative sequences

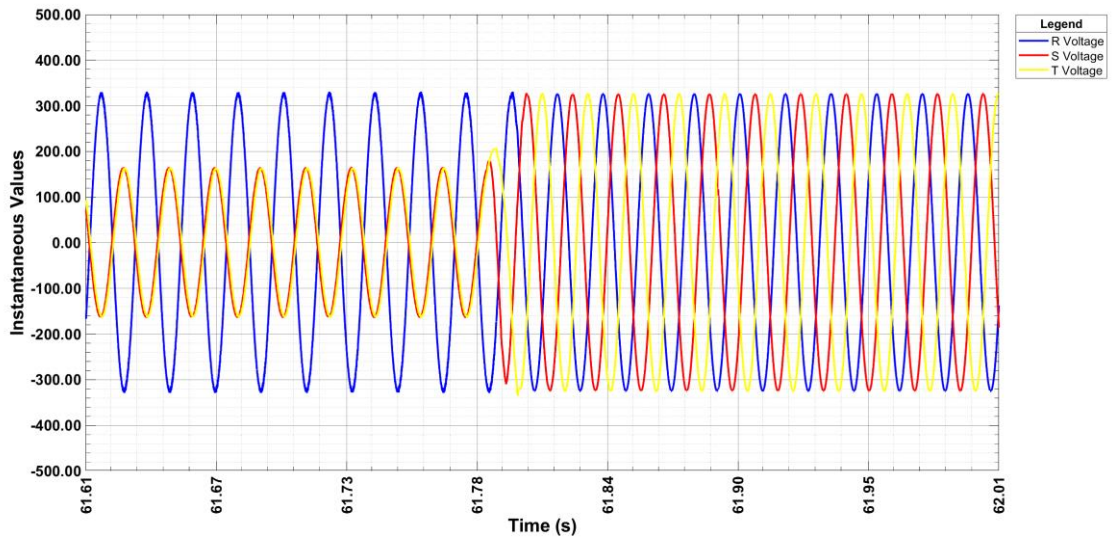


**Test U5BPmed**

Transient voltage: Fault beginning

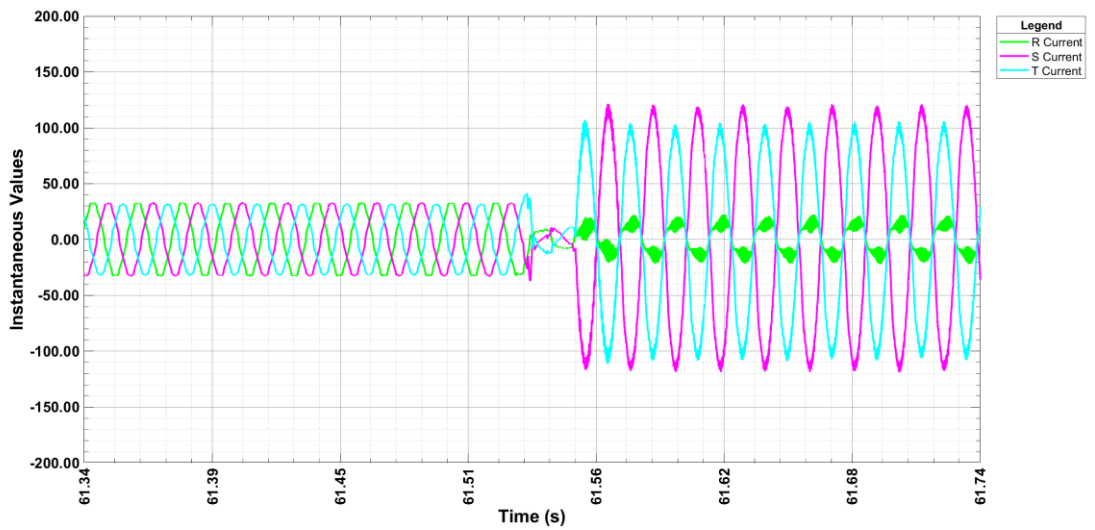


Transient voltage: Fault end

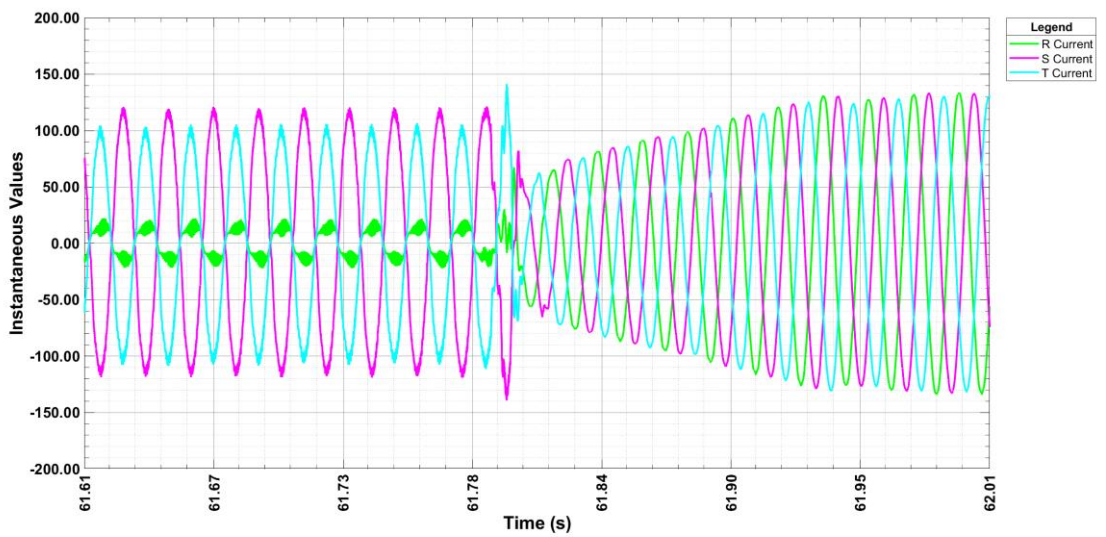


### Test U5BPmed

#### Transient current: Fault beginning



#### Transient current: Fault end



### 3.1.2 Load tests: Dip depth 40% Un

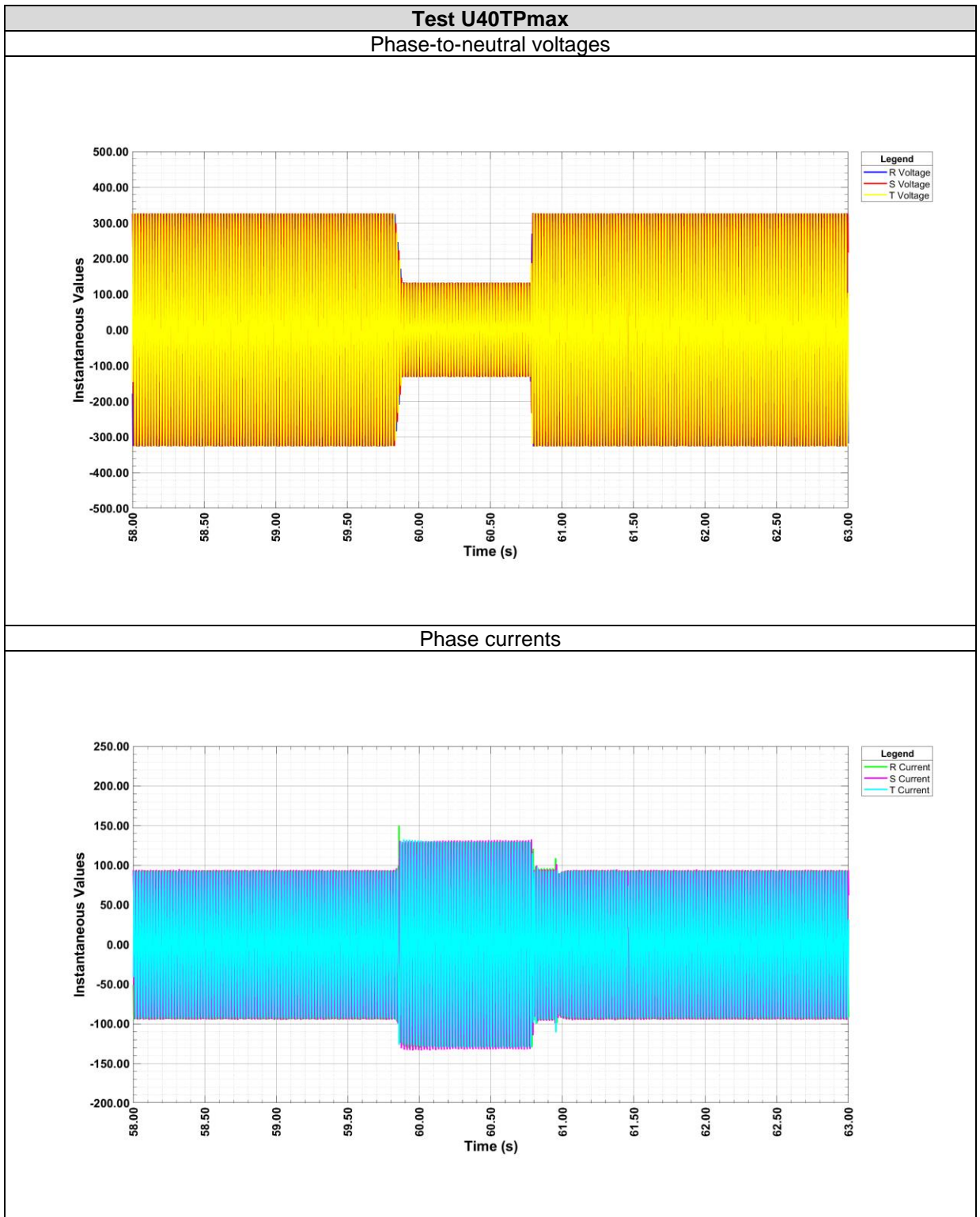
In this chapter of the test report are shown the test results and diagrams for the load tests configured with a dip depth of 40% Un. There are included in this point the tests U40TPmax, U40TPmed, U40BPmax, and U40BPmed, according to both table 49 and 50 of NTS V2.1 SEPE. For the voltages and currents in the below picture tables, the unit is V and A.

#### 3.1.2.1 Test U40TPmax Fault type: 3 phases, Full load

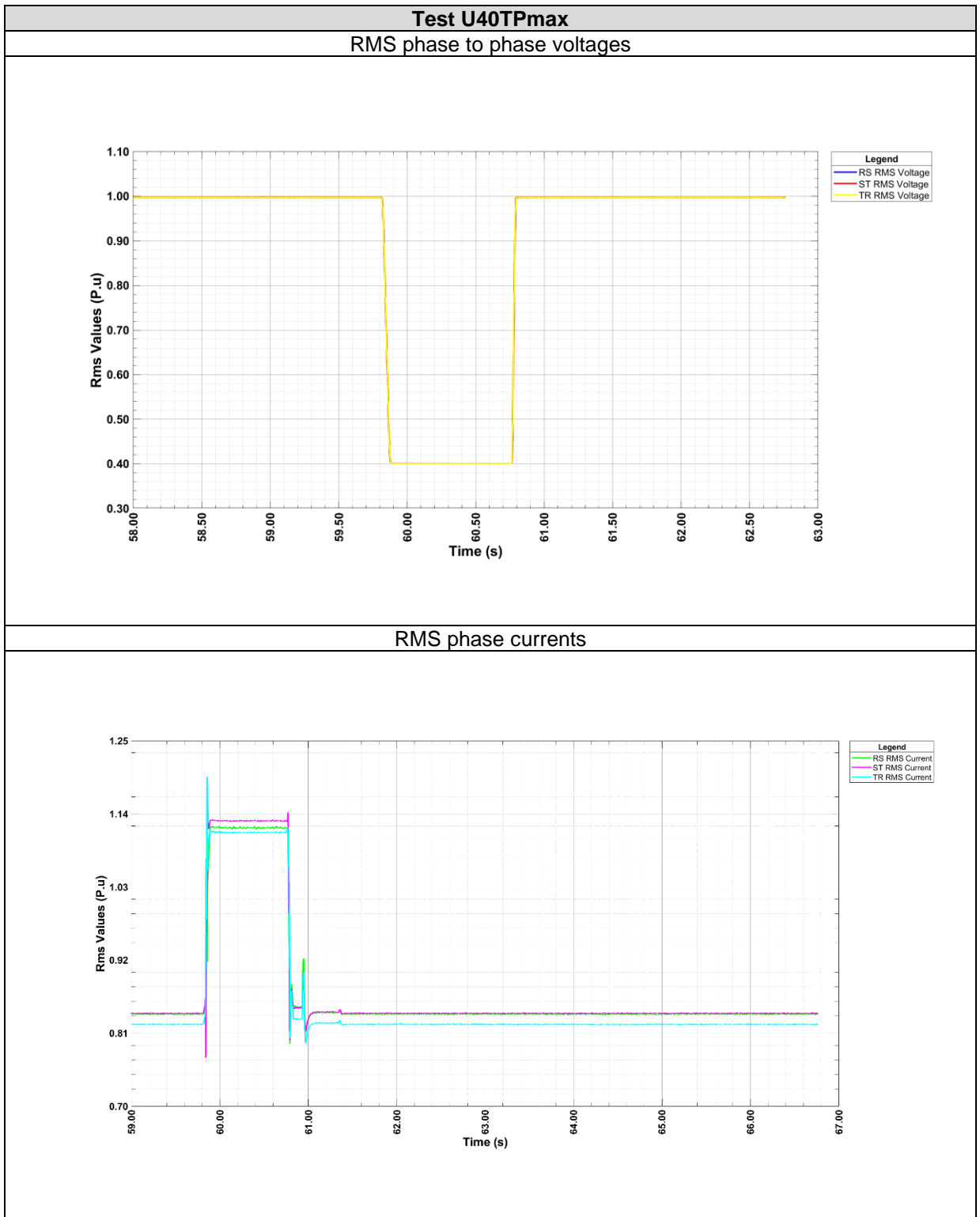
General Information	Test type			U40TPmax
	Fault type			Three Phase
	Fault occurrence ti (sec)			59.833
	Fault clearance td (sec)			60.785
	Fault time (sec)			0.952
	Measured time (s)			70.609
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.834
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.003
			ti-1 s to ti	0.003
		Neg.	ti-1 s to ti	0.004
	Active Current (p.u)	Pos.	ti-1 s to ti	0.834
	Active Power (p.u)	Total	ti-10 s to ti	0.832
			ti-2 s to ti	0.831
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.832	
	Pos.	ti-500 ms to ti-100 ms	0.003	
FAULT	Factor k	Pos. (K1)		-1.9
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.005
		Neg.		0.005
	Settling time in sec (te)	Pos.		0.024
		Neg.		0.022
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.401
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.118
		Neg.	ti+100 ms to td-20 ms	0.000
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.037
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.119
		Neg.	ti+100 ms to td-20 ms	0.005
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.015
		Pos.	ti+100 ms to td-20 ms	0.015
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.449
Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	82.1	
	Phase 2	ti+20	84.1	
	Phase 3	ti+20	94.2	
Short-circuit currents in A	Phase 1	ti+20	76.1	
	Phase 2	ti+20	80.2	
	Phase 3	ti+20	88.3	
Short-circuit currents in A	Phase 1	ti+100	88.9	

		Phase 2	ti+100	89.8
		Phase 3	ti+100	88.3
Short-circuit currents in A		Phase 1	ti+150	88.9
		Phase 2	ti+150	89.7
		Phase 3	ti+150	88.4
Short-circuit currents in A		Phase 1	ti+300	88.7
		Phase 2	ti+300	89.7
		Phase 3	ti+300	88.3
Short-circuit currents in A		Phase 1	ti+500	88.8
		Phase 2	ti+500	89.7
		Phase 3	ti+500	88.3
Short-circuit currents in A		Phase 1	ti+1000	67.7
		Phase 2	ti+1000	67.2
		Phase 3	ti+1000	66.1
Capacity to withstand the voltage dip		Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.004
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.834
	Active Power	Total	td+1 s to td+10 s	0.832
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.000
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.834
		Neg	td+1 s to td+10 s	0.010
the of the Active Power in sec	Pos		0.009	
Transient overvoltage capacity		Connected		YES

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.

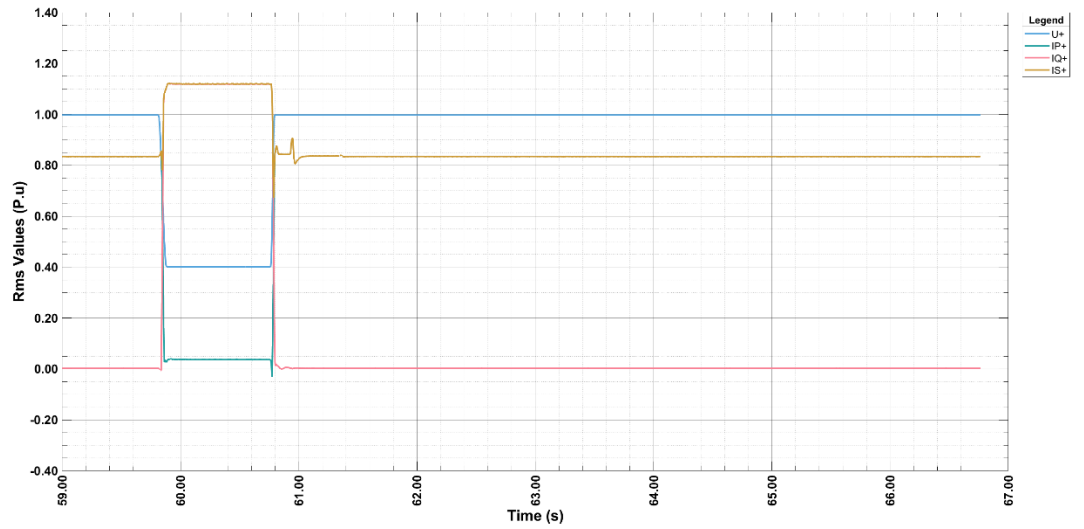




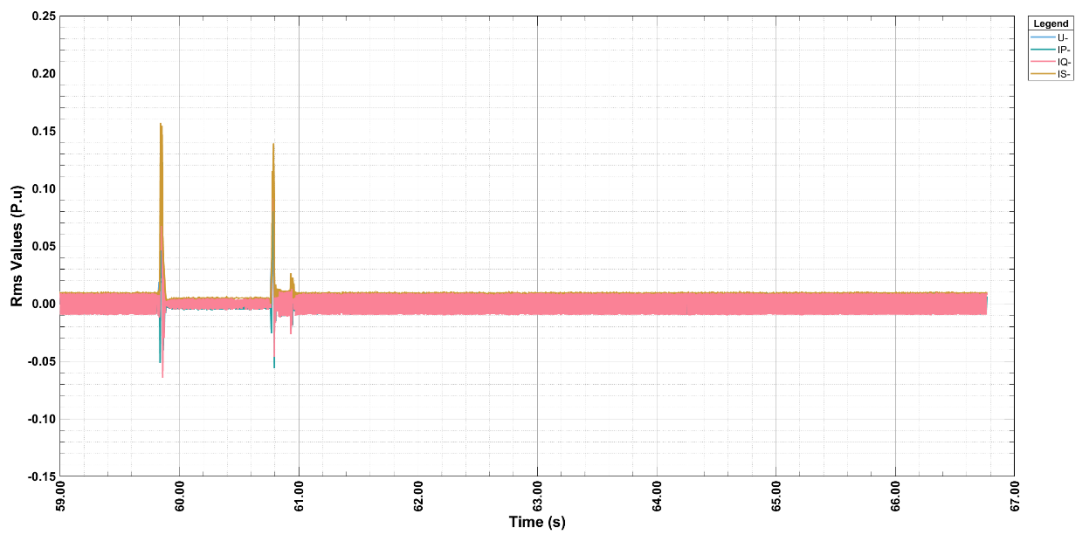


**Test U40TPmax**

Positive sequences



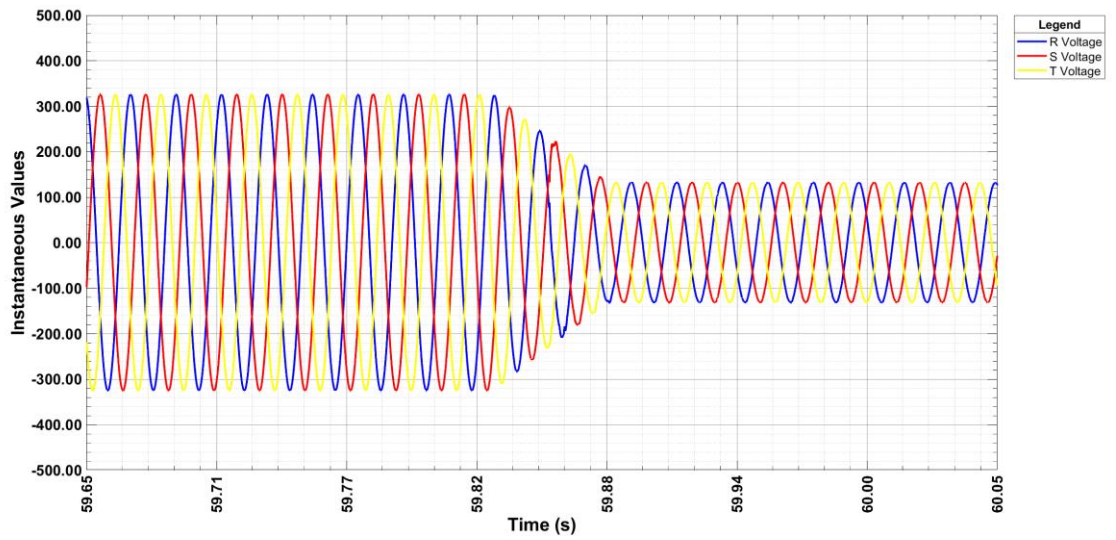
Negative sequences



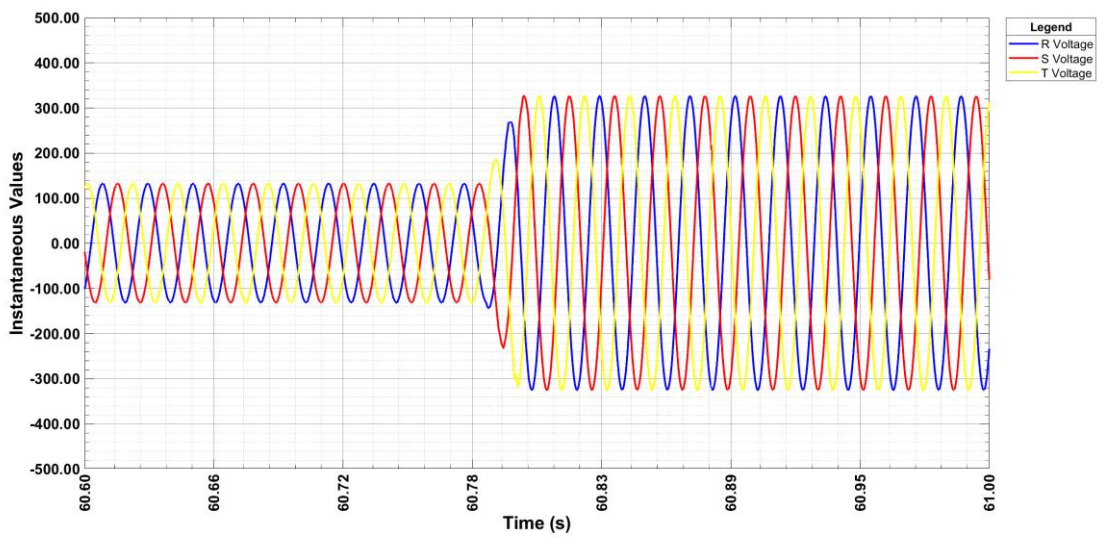


**Test U40TPmax**

Transient voltage: Fault beginning

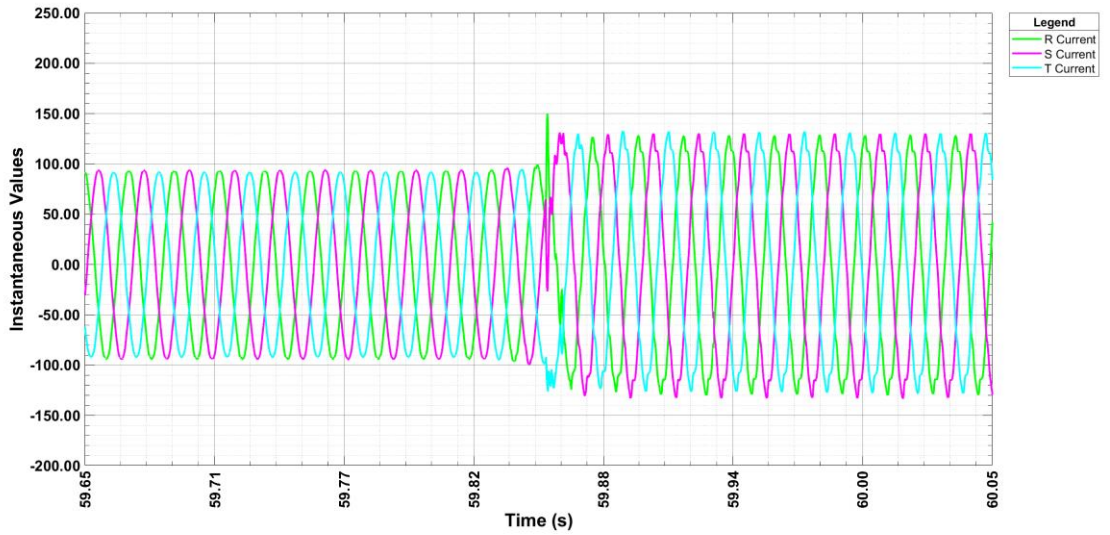


Transient voltage: Fault end

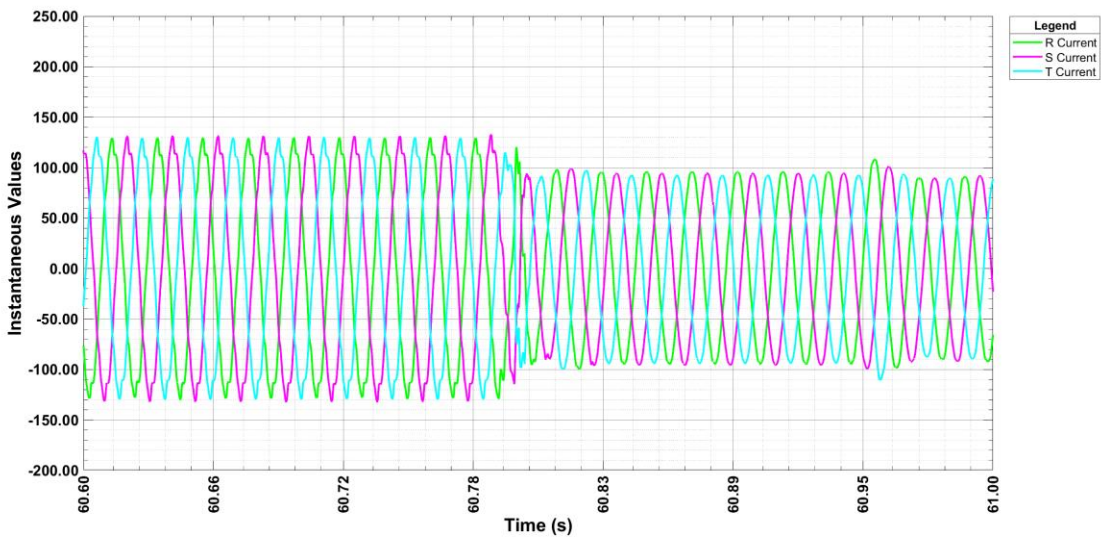


**Test U40TPmax**

Transient current: Fault beginning



Transient current: Fault end

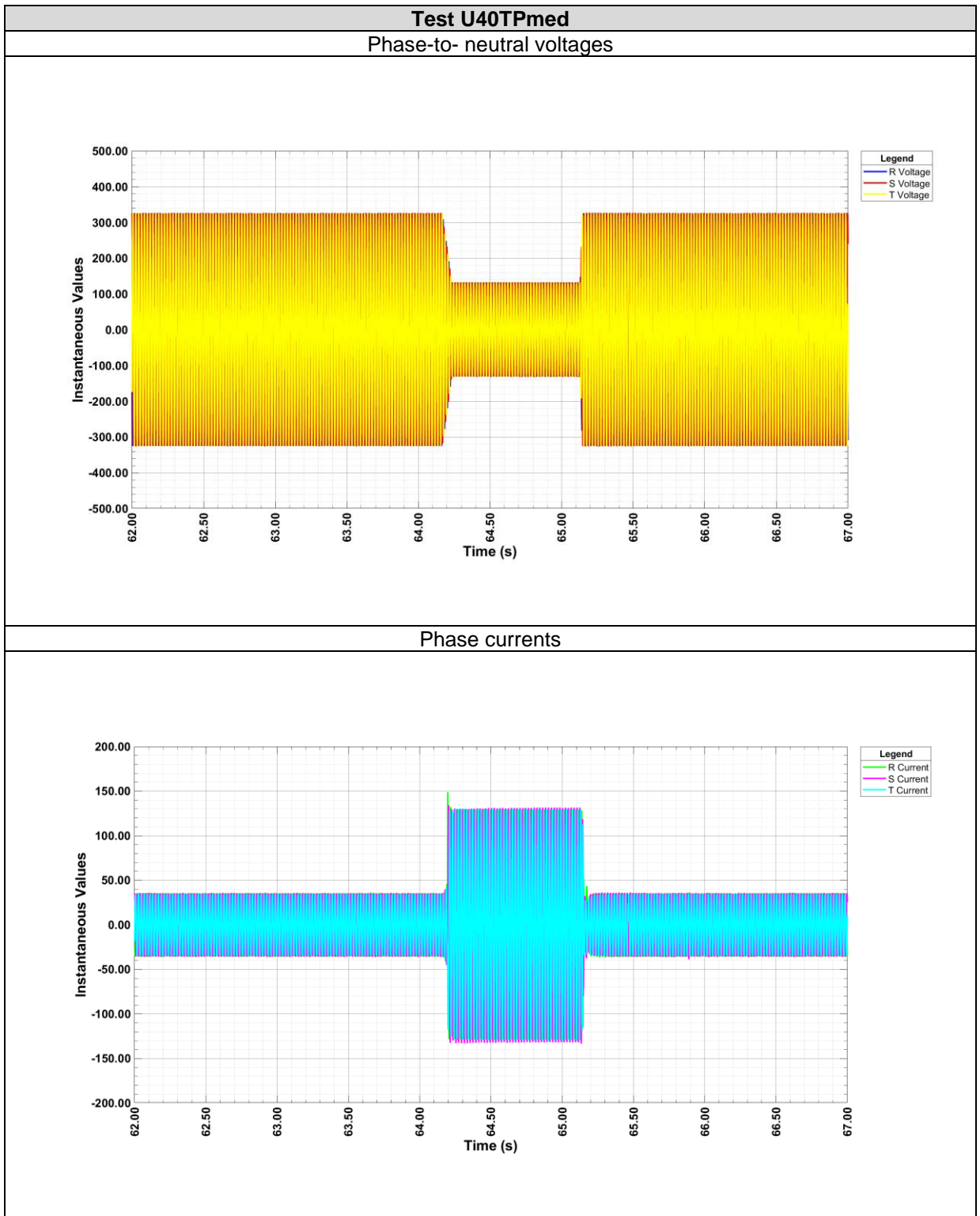


### 3.1.2.2 Test U40TPmed Fault type: 3 phases, Partial load

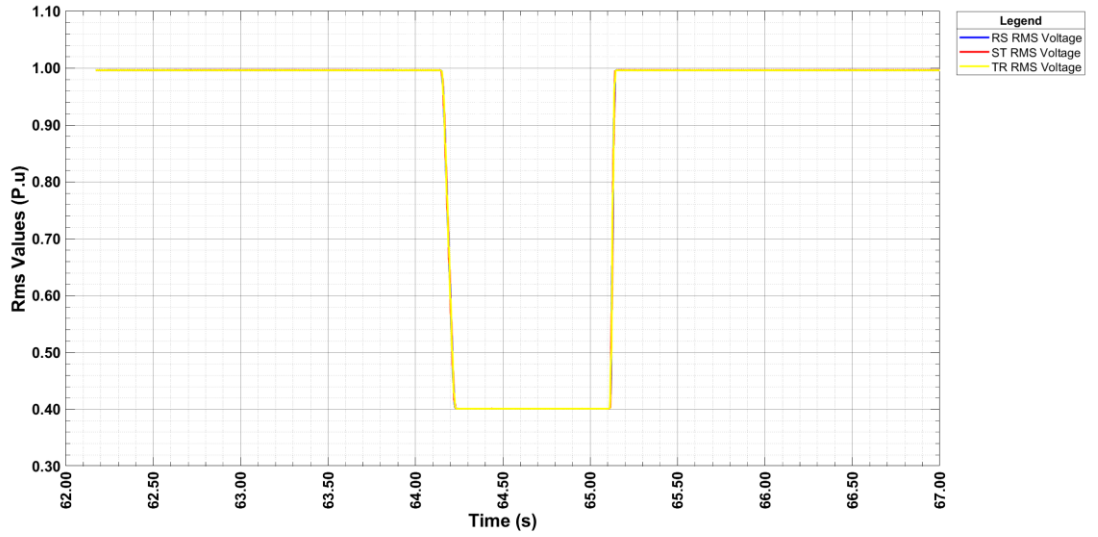
General Information	Test type			U40TPmed
	Fault type			Three Phase
	Fault occurrence ti (sec)			64.172
	Fault clearance td (sec)			65.135
	Fault time (sec)			0.963
	Measured time (s)			75.072
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.995
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.314
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.010
			ti-1 s to ti	0.010
		Neg.	ti-1 s to ti	0.002
	Active Current (p.u)	Pos.	ti-1 s to ti	0.314
	Active Power (p.u)	Total	ti-10 s to ti	0.312
			ti-2 s to ti	0.312
		Pos.	ti-500 ms to ti-100 ms	0.312
	Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.010
FAULT	Factor k	Pos. (K1)		-1.9
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.006
		Neg.		0.007
	Settling time in sec (te)	Pos.		0.025
		Neg.		0.022
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.401
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.119
		Neg.	ti+100 ms to td-20 ms	0.000
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.037
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.120
		Neg.	ti+100 ms to td-20 ms	0.005
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.015
		Pos.	ti+100 ms to td-20 ms	0.015
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.449
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	76.0
		Phase 2	ti+20	69.6
		Phase 3	ti+20	77.1
Short-circuit currents in A	Phase 1	ti+20	75.7	
	Phase 2	ti+20	69.6	
	Phase 3	ti+20	88.4	
Short-circuit currents in A	Phase 1	ti+100	88.9	
	Phase 2	ti+100	89.7	
	Phase 3	ti+100	88.4	
Short-circuit currents in A	Phase 1	ti+150	88.8	
	Phase 2	ti+150	89.7	
	Phase 3	ti+150	88.4	

	Short-circuit currents in A	Phase 1	ti+300	88.9
		Phase 2	ti+300	89.7
		Phase 3	ti+300	88.4
	Short-circuit currents in A	Phase 1	ti+500	88.8
		Phase 2	ti+500	89.7
		Phase 3	ti+500	88.4
	Short-circuit currents in A	Phase 1	ti+1000	22.7
		Phase 2	ti+1000	20.7
		Phase 3	ti+1000	21.6
	Capacity to withstand the voltage dip	Connected		YES
POST- FAUTL	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.010
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.313
	Active Power	Total	td+1 s to td+10 s	0.312
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.010
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.314
		Neg	td+1 s to td+10 s	0.005
the of the Active Power in sec	Pos		0.003	
Transient overvoltage capacity	Connected		YES	

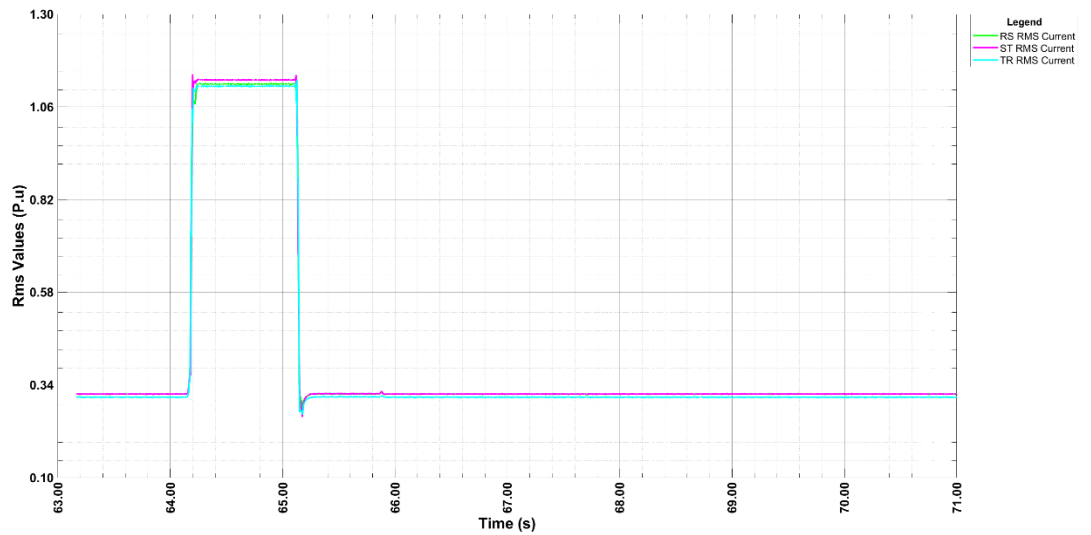
Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.



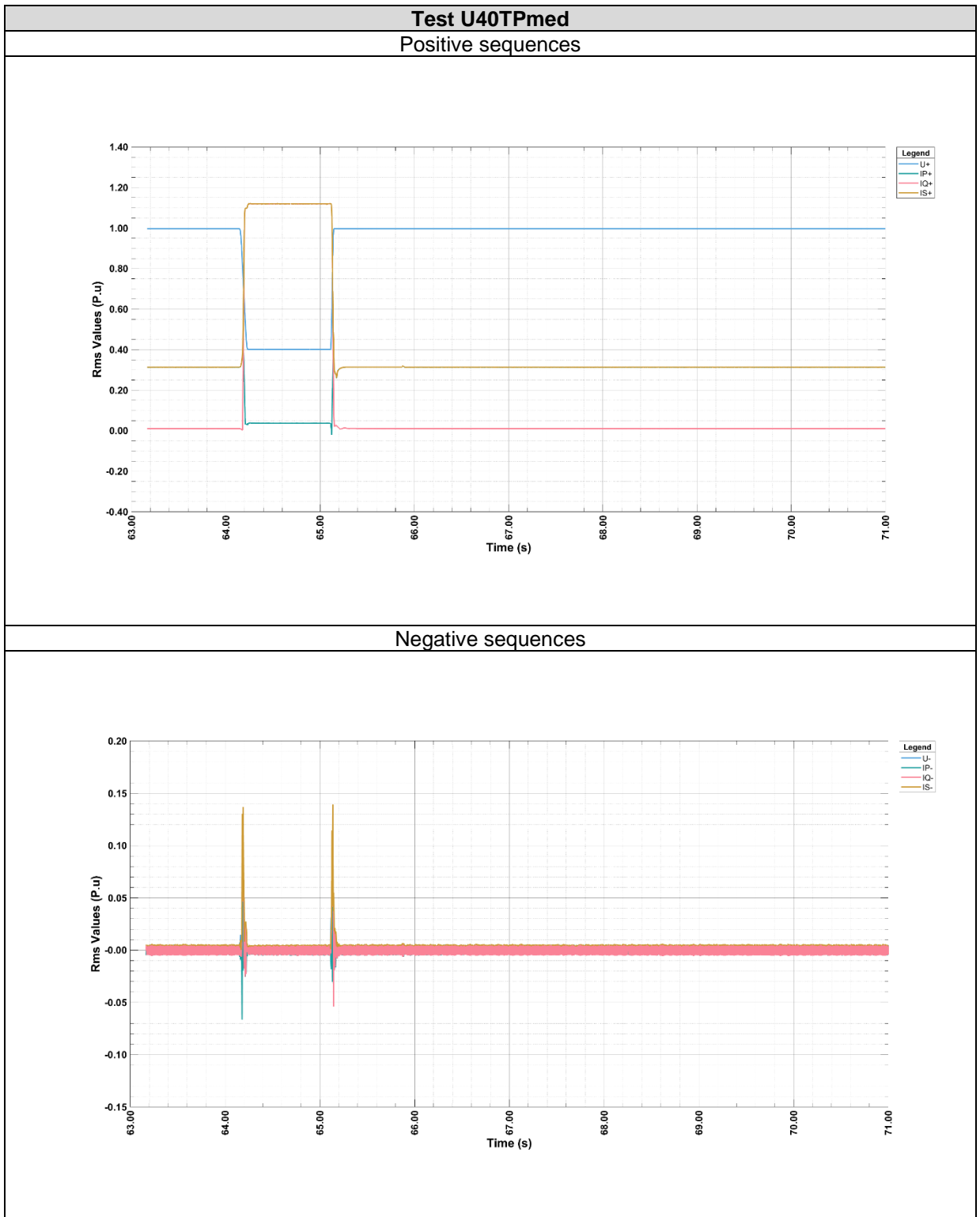
**Test U40TPmed**  
RMS phase to phase voltages



RMS phase currents

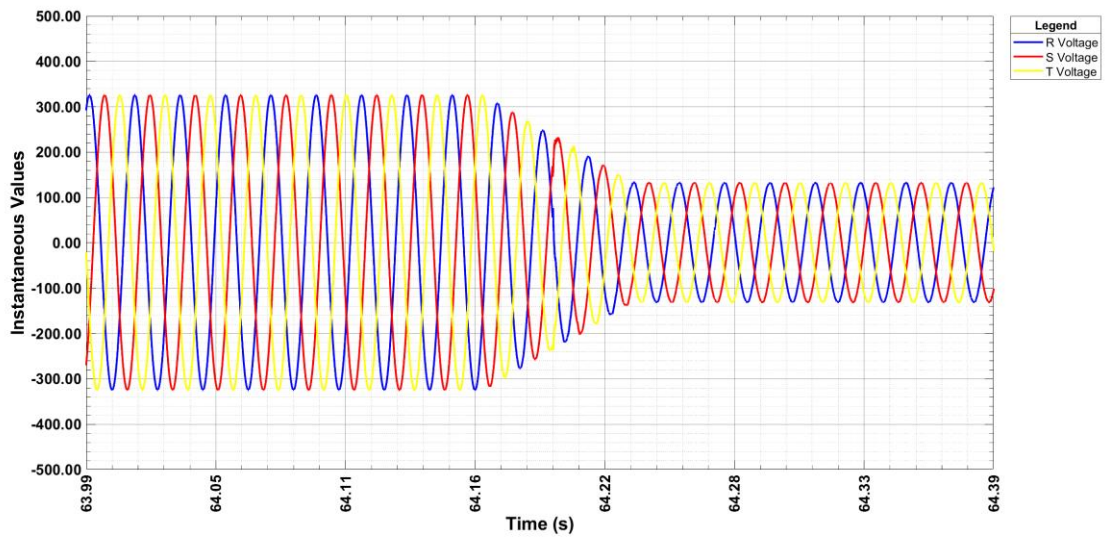




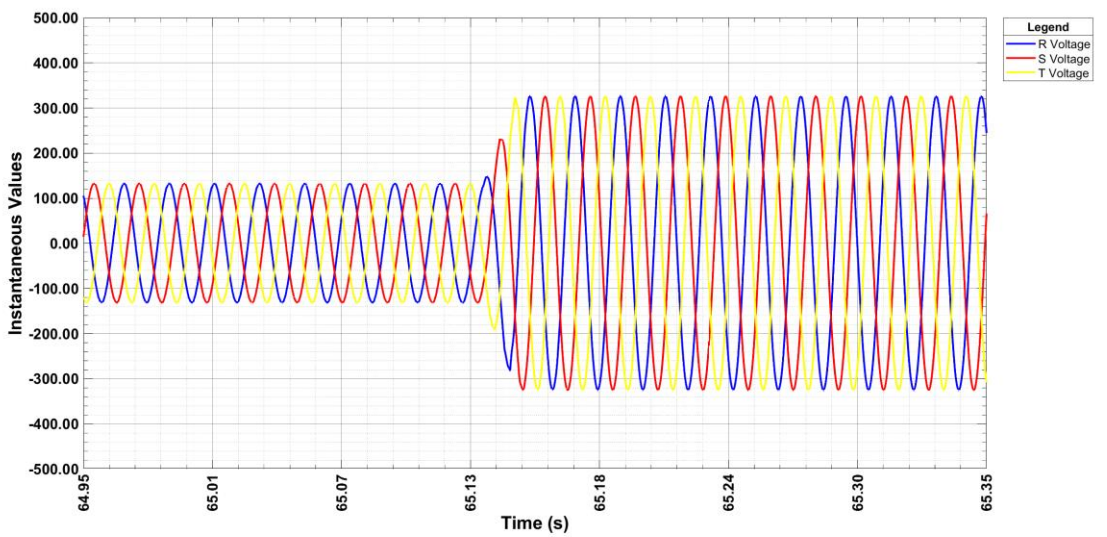


**Test U40TPmed**

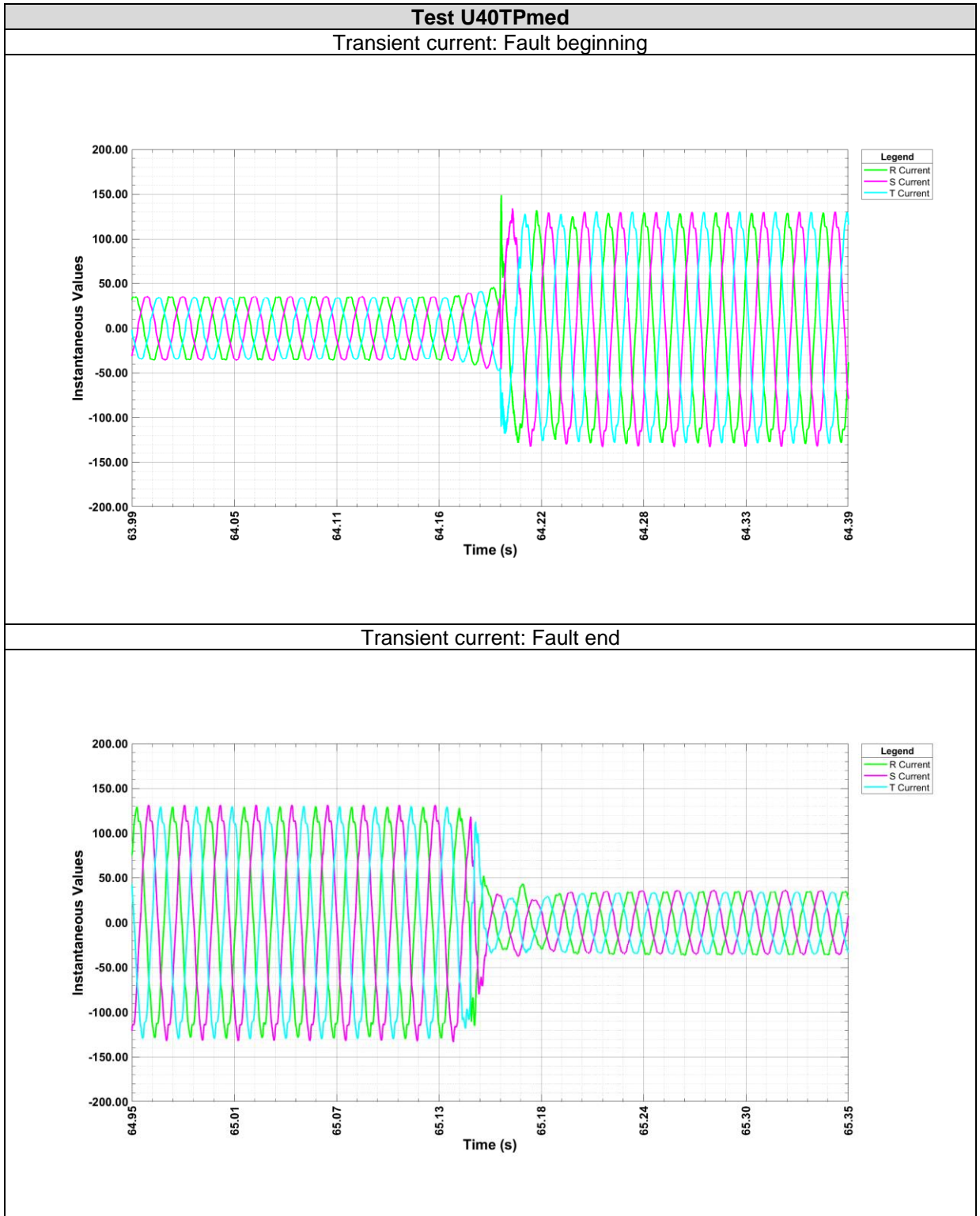
Transient voltage: Fault beginning



Transient voltage: Fault end





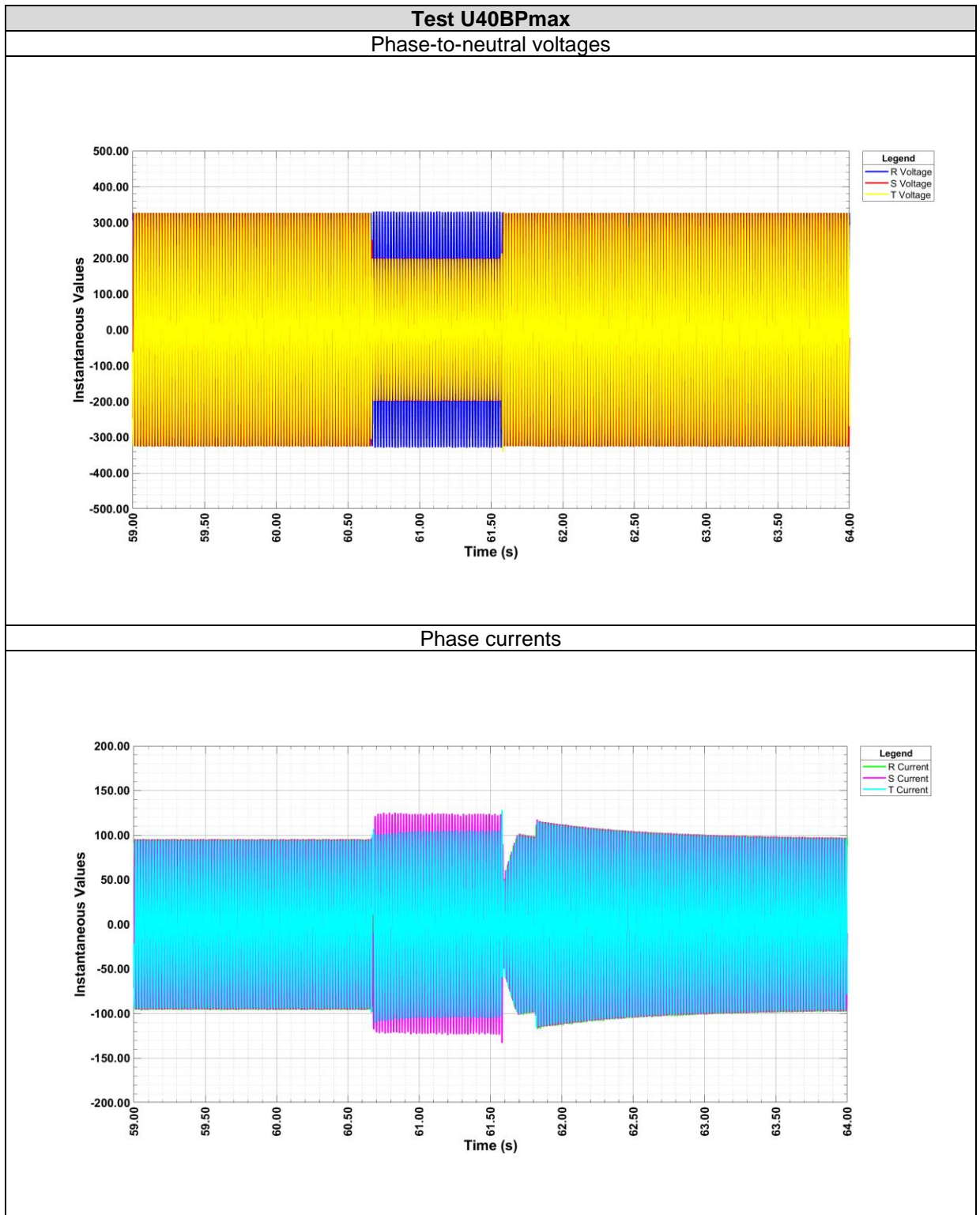


### 3.1.2.3 Test U40BPmax Fault type: 2 phases, Full load

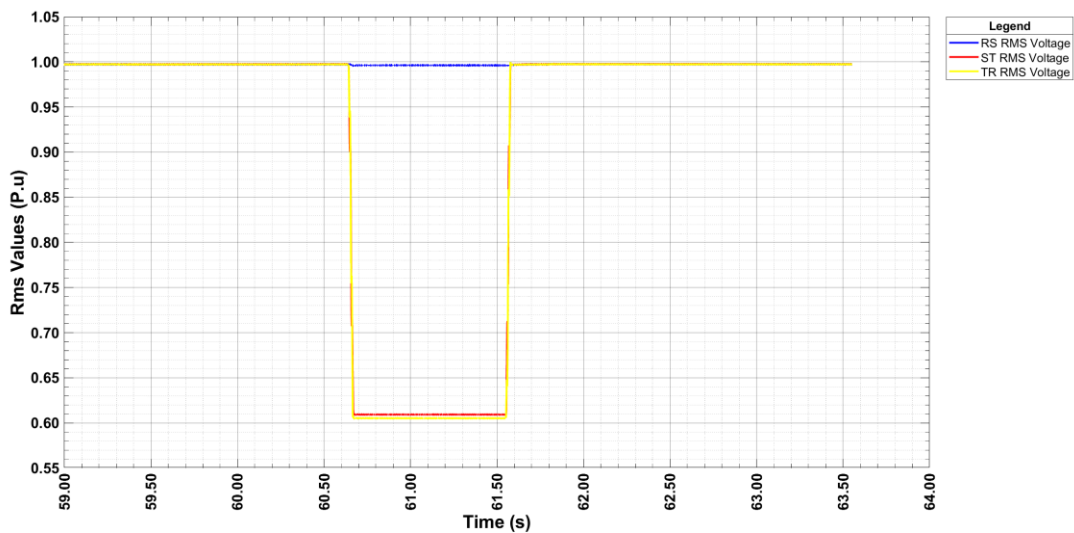
General Information	Test type			U40BPmax
	Fault type			Two Phase
	Fault occurrence ti (sec)			60.648
	Fault clearance td (sec)			61.574
	Fault time (sec)			0.926
	Measured time (s)			71.556
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.997
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.000
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.841
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.003
			ti-1 s to ti	0.003
		Neg.	ti-1 s to ti	0.004
	Active Current (p.u)	Pos.	ti-1 s to ti	0.841
	Active Power (p.u)	Total	ti-10 s to ti	0.842
			ti-2 s to ti	0.842
		Pos.	ti-500 ms to ti-100 ms	0.842
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.003	
FAULT	Factor k	Pos. (K1)		-1.9
		Neg. (K2)		1.8
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.010
		Neg.		0.009
	Settling time in sec (te)	Pos.		0.023
		Neg.		0.024
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.699
		Neg.	ti+100 ms to td-20 ms	0.298
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.577
		Neg.	ti+100 ms to td-20 ms	-0.528
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.013
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.577
		Neg.	ti+100 ms to td-20 ms	0.544
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.048
		Pos.	ti+100 ms to td-20 ms	0.009
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.405
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
	Short-circuit currents in A	Phase 1	ti+20	--
Phase 2		ti+20	--	
Phase 3		ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	
	Phase 3	ti+150	--	

	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
<b>POST-FAULT</b>	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.004
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.848
	Active Power	Total	td+1 s to td+10 s	0.849
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.003
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.848
		Neg	td+1 s to td+10 s	0.010
	the of the Active Power in sec	Pos		0.081
	Transient overvoltage capacity	Connected		YES

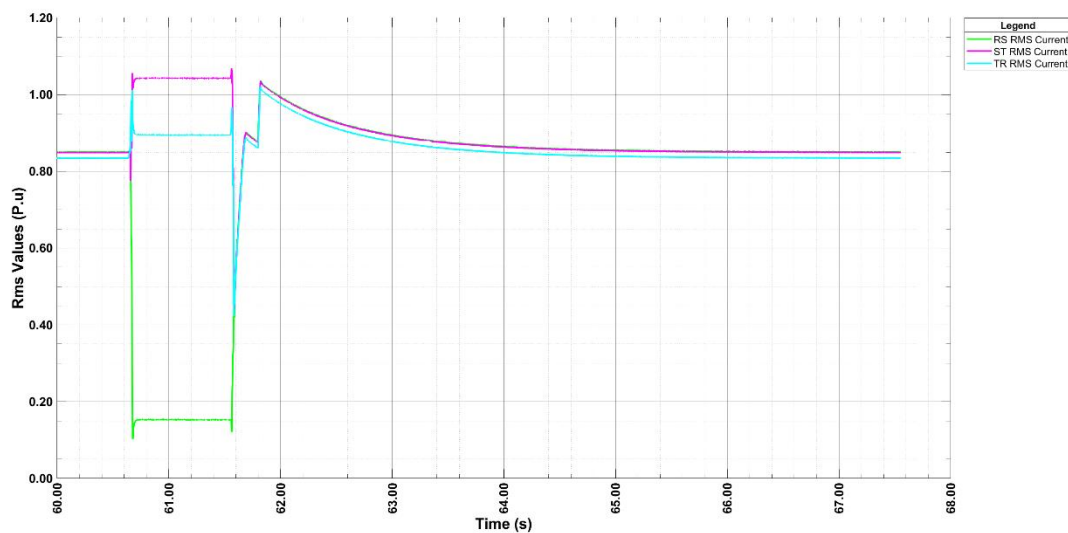
Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.



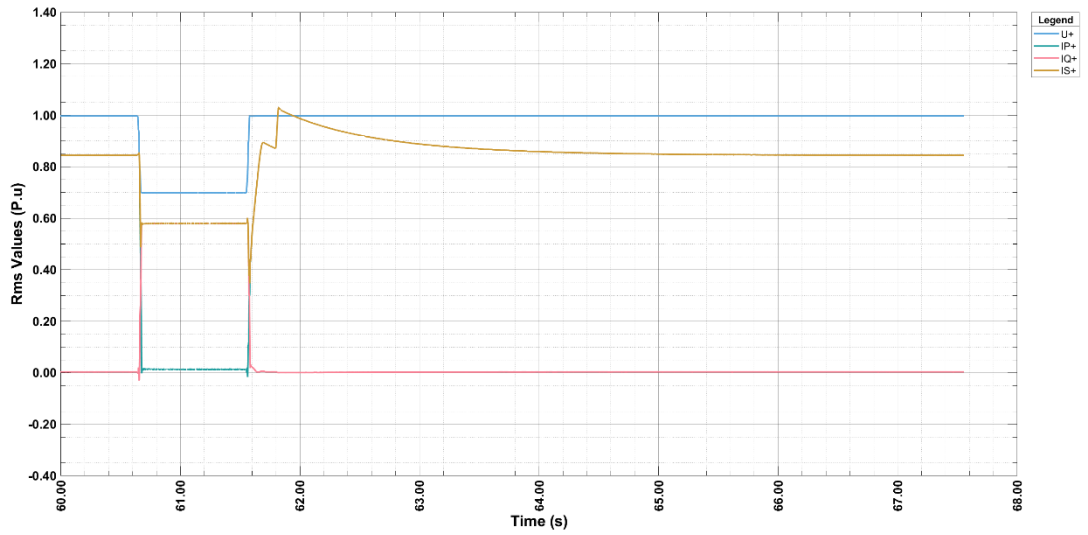
**Test U40BPmax**  
RMS phase to phase voltages



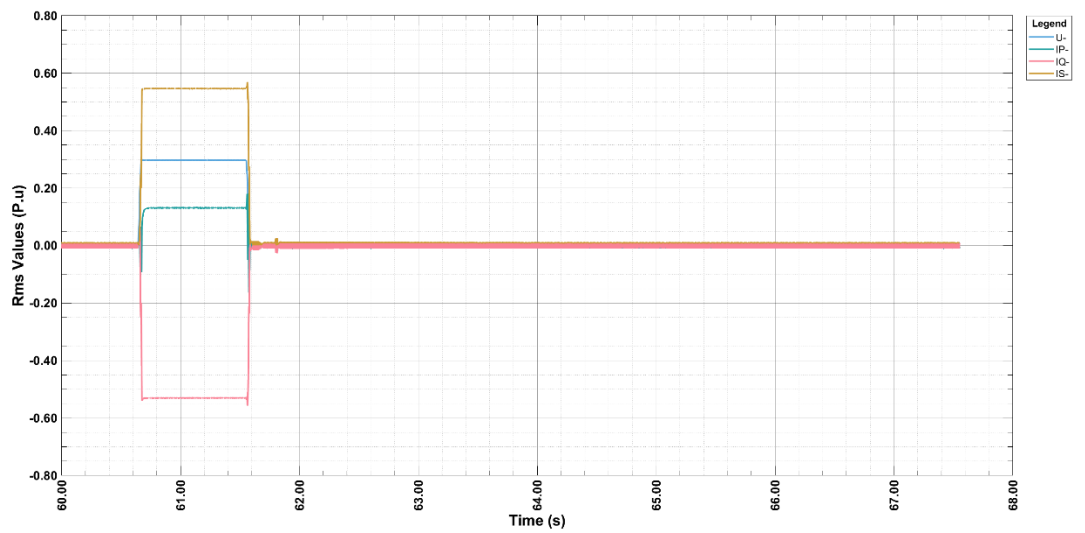
RMS phase currents



**Test U40BPmax**  
Positive sequence voltage



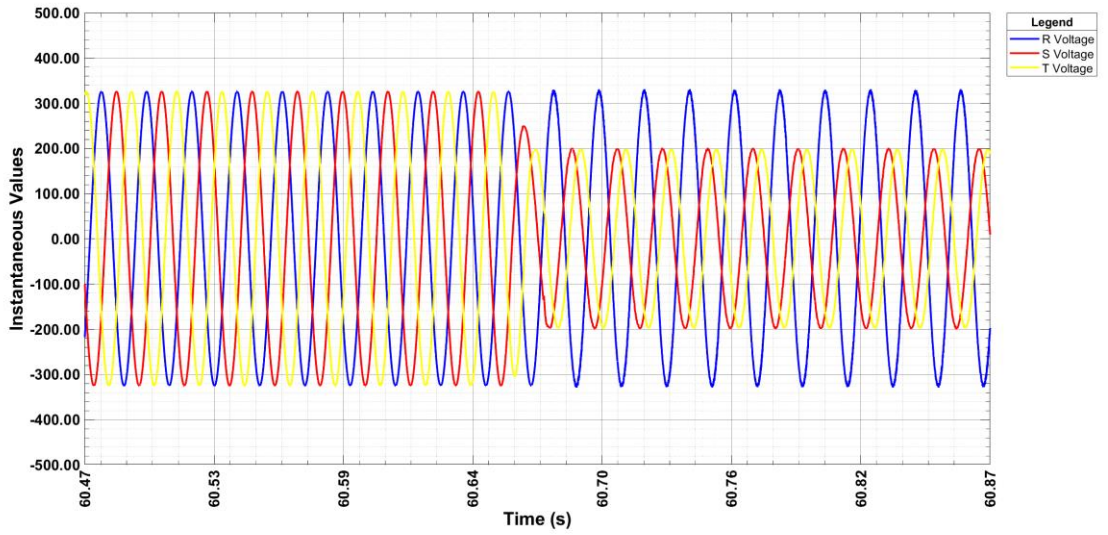
Negative sequence voltage



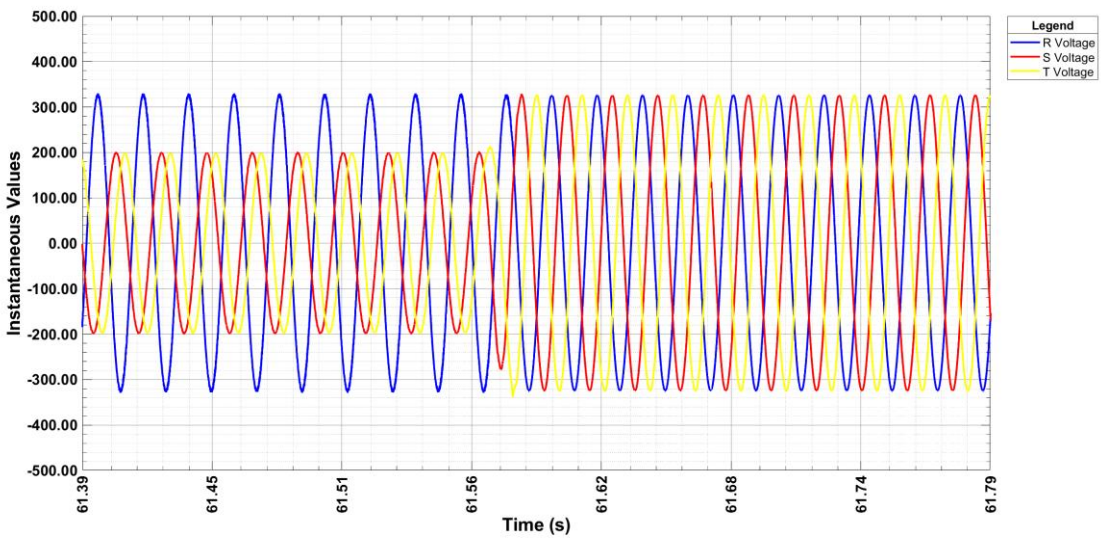


**Test U40BPmax**

Transient voltage: Fault beginning



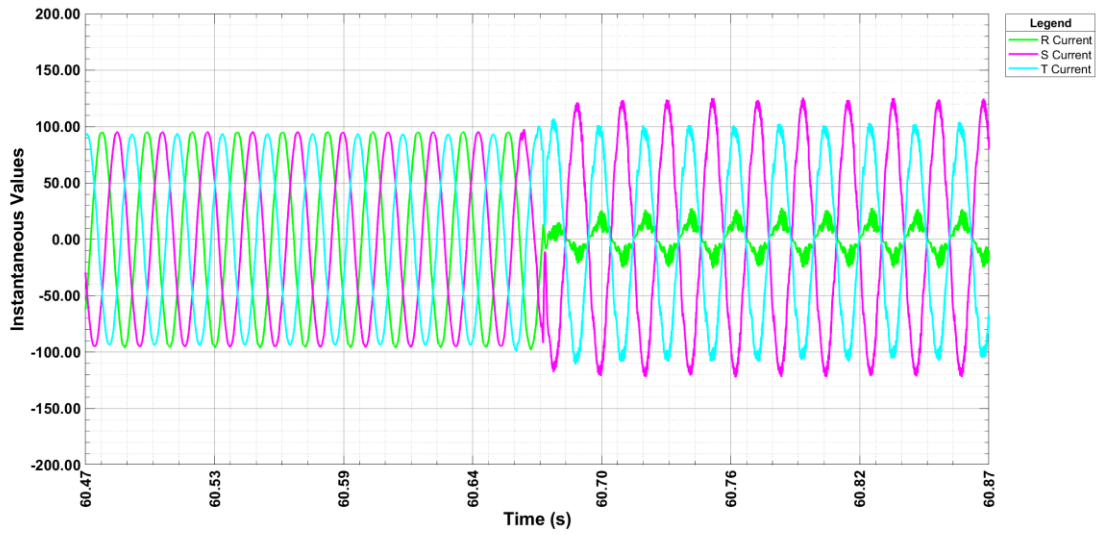
Transient voltage: Fault end



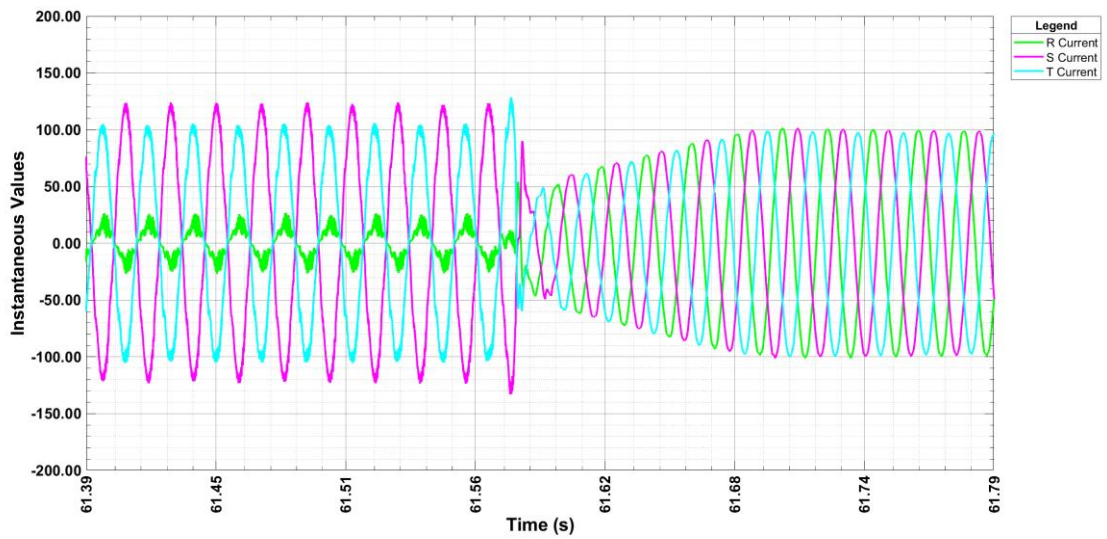


### Test U40BPmax

#### Transient current: Fault beginning



#### Transient current: Fault end

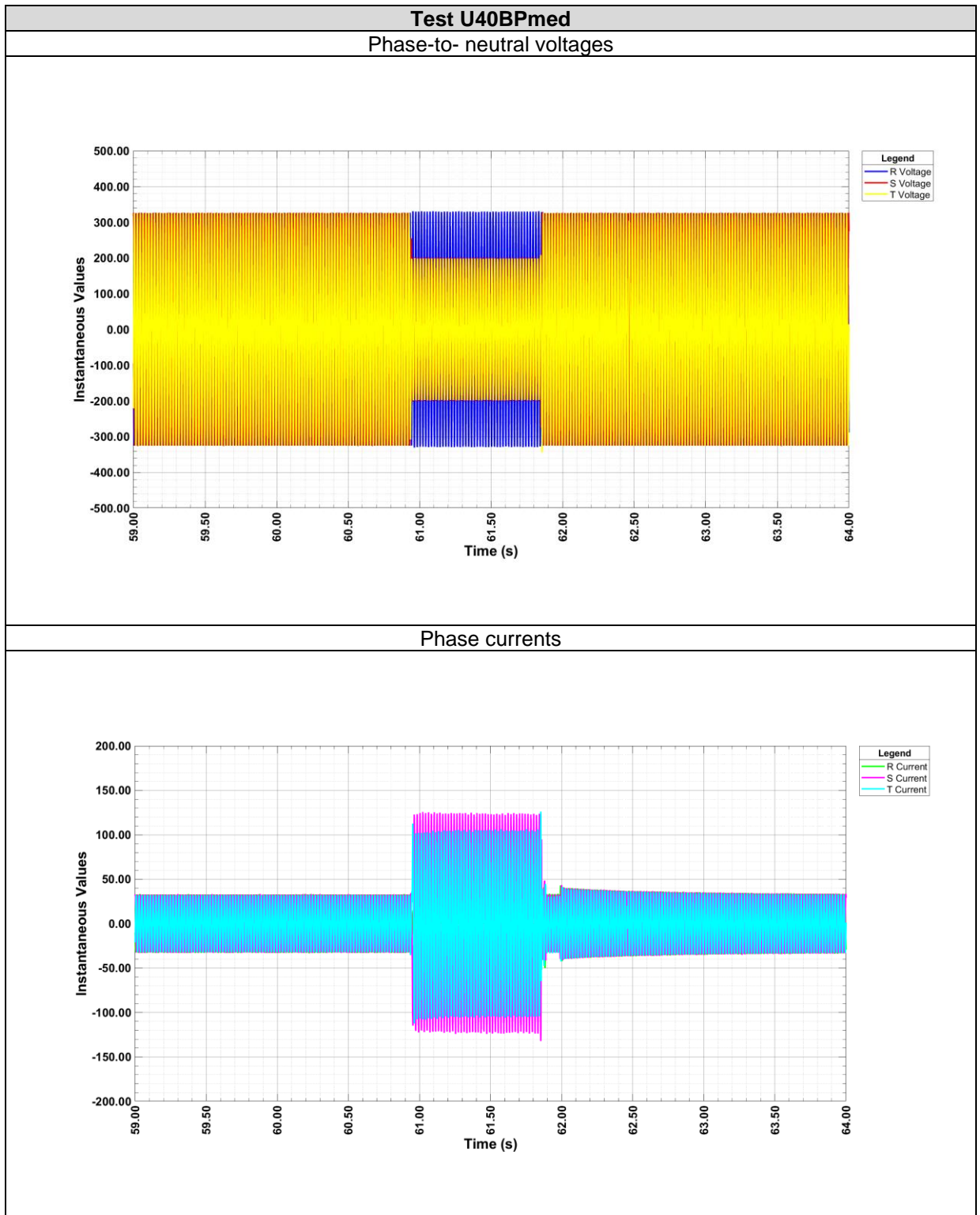


### 3.1.2.4 Test U40BPmed Fault type: 2 phases, Partial load

General Information	Test type			U40BPmed
	Fault type			Two Phase
	Fault occurrence ti (sec)			60.922
	Fault clearance td (sec)			61.847
	Fault time (sec)			0.925
	Measured time (s)			71.833
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.000
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.287
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.011
			ti-1 s to ti	0.011
		Neg.	ti-1 s to ti	0.002
	Active Current (p.u)	Pos.	ti-1 s to ti	0.287
	Active Power (p.u)	Total	ti-10 s to ti	0.287
			ti-2 s to ti	0.287
	Pos.	ti-500 ms to ti-100 ms	0.287	
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.011	
FAULT	Factor k	Pos. (K1)		-1.9
		Neg. (K2)		1.8
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.010
		Neg.		0.000
	Settling time in sec (te)	Pos.		0.023
		Neg.		0.023
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.699
		Neg.	ti+100 ms to td-20 ms	0.298
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.577
		Neg.	ti+100 ms to td-20 ms	-0.528
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.013
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.577
		Neg.	ti+100 ms to td-20 ms	0.544
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.048
		Pos.	ti+100 ms to td-20 ms	0.009
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.405
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
Short-circuit currents in A	Phase 1	ti+20	--	
	Phase 2	ti+20	--	
	Phase 3	ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	
	Phase 3	ti+150	--	
Short-circuit currents in A	Phase 1	ti+300	--	

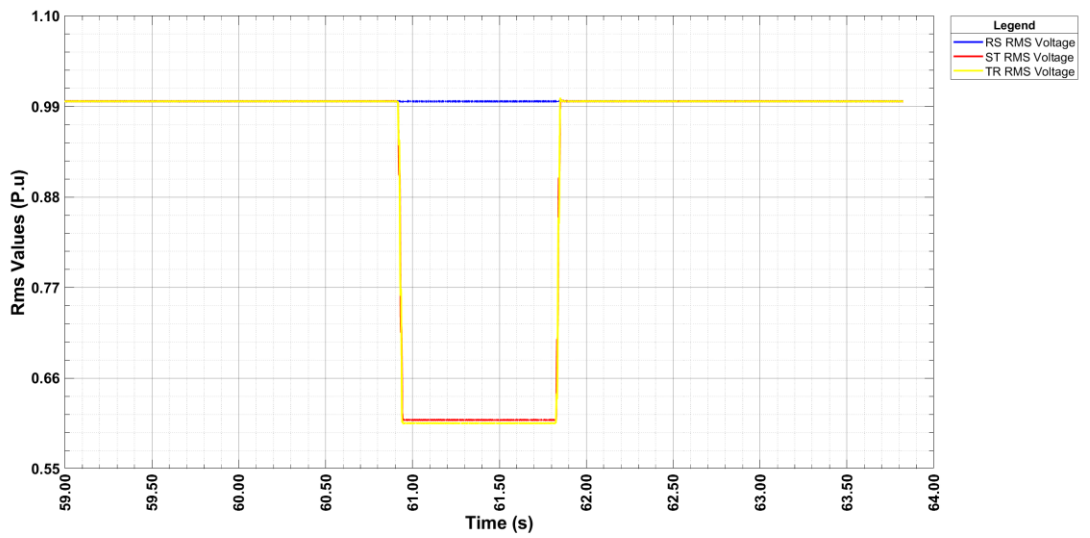
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.011
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.289
	Active Power	Total	td+1 s to td+10 s	0.289
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.011
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.289
		Neg	td+1 s to td+10 s	0.005
	the of the Active Power in sec	Pos		0.007
Transient overvoltage capacity	Connected		YES	

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the current is limited.

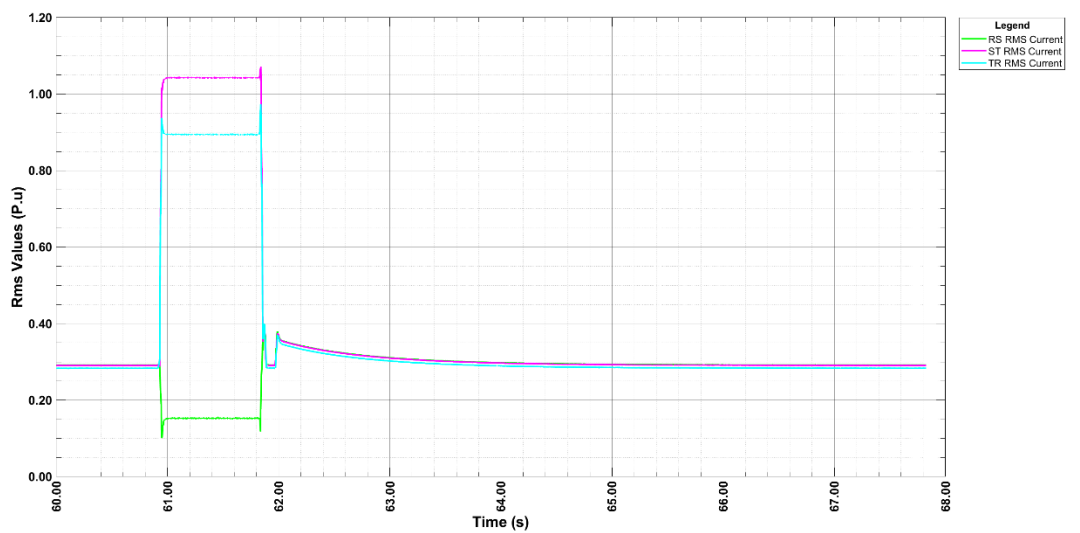


**Test U40BPmed**

RMS phase to phase voltages

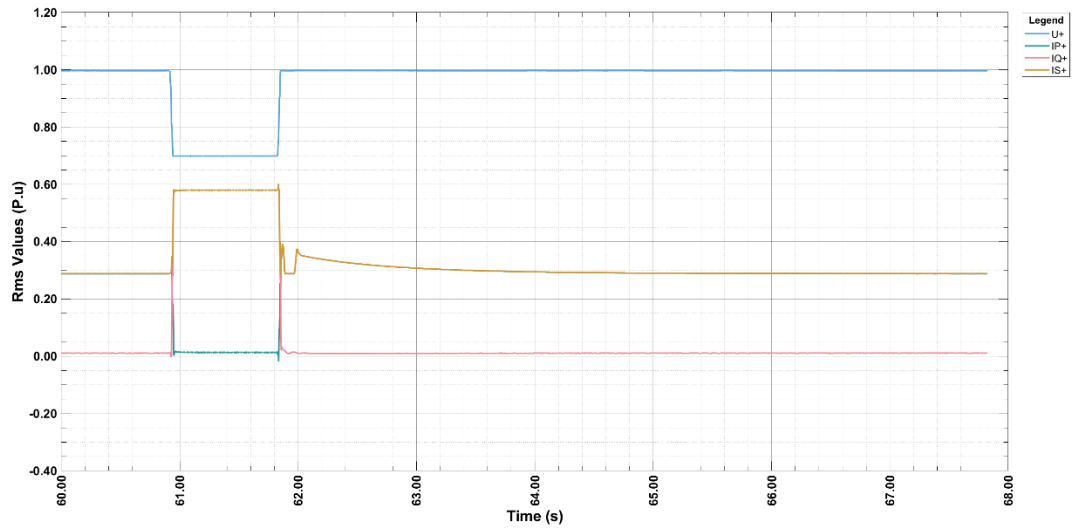


RMS phase to phase currents

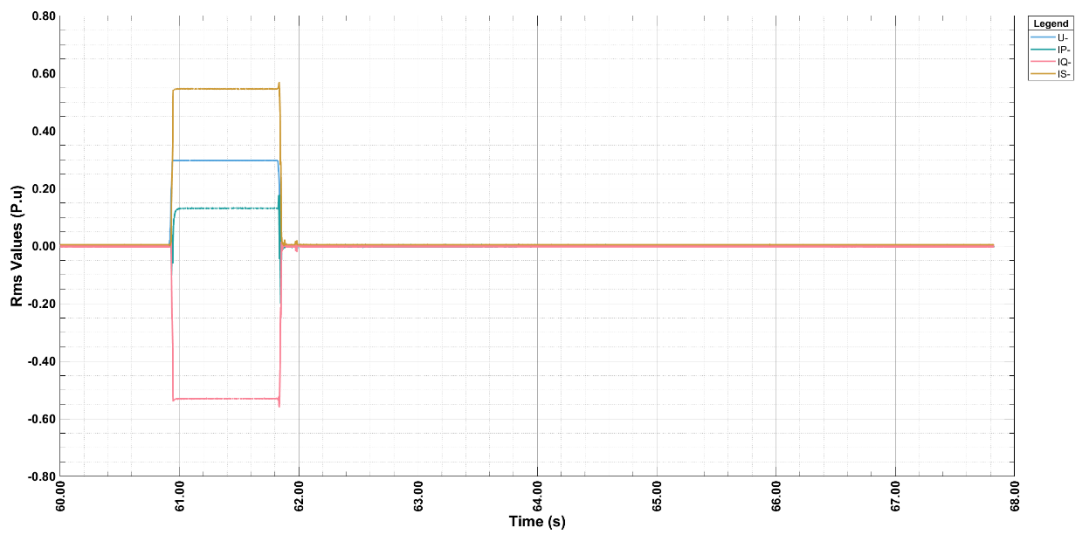


**Test U40BPmed**

Positive sequences



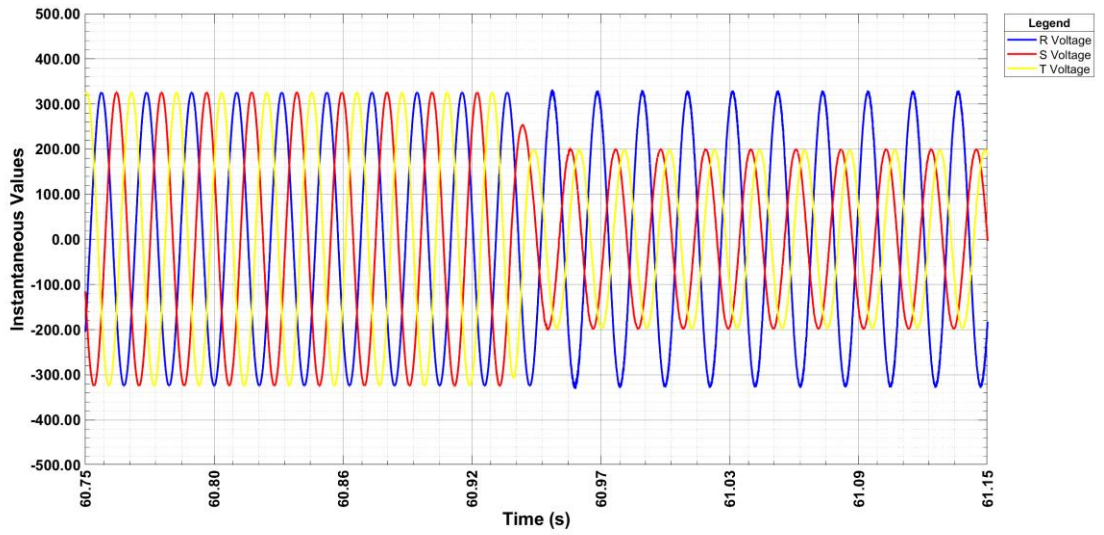
Negative sequences



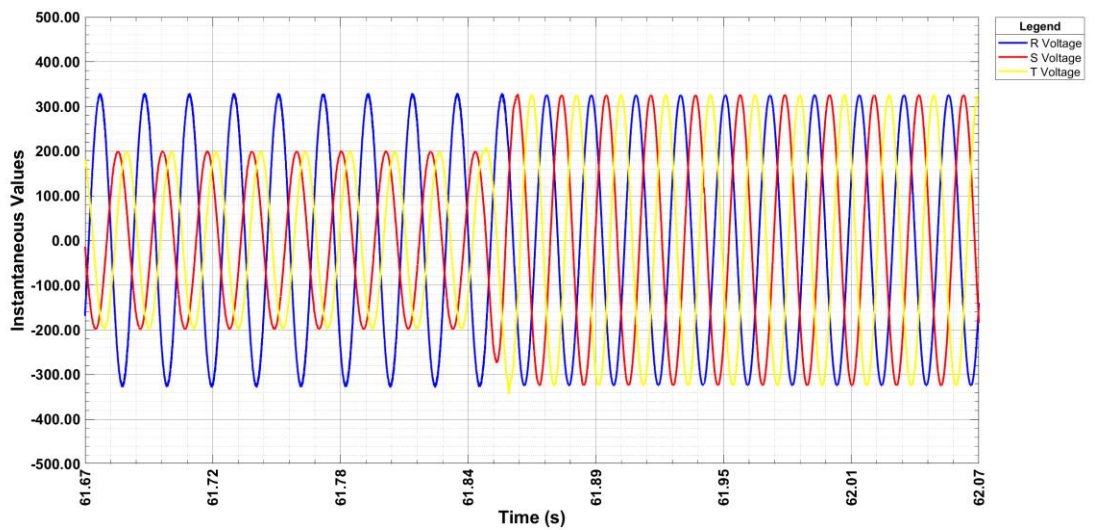


### Test U40BPmed

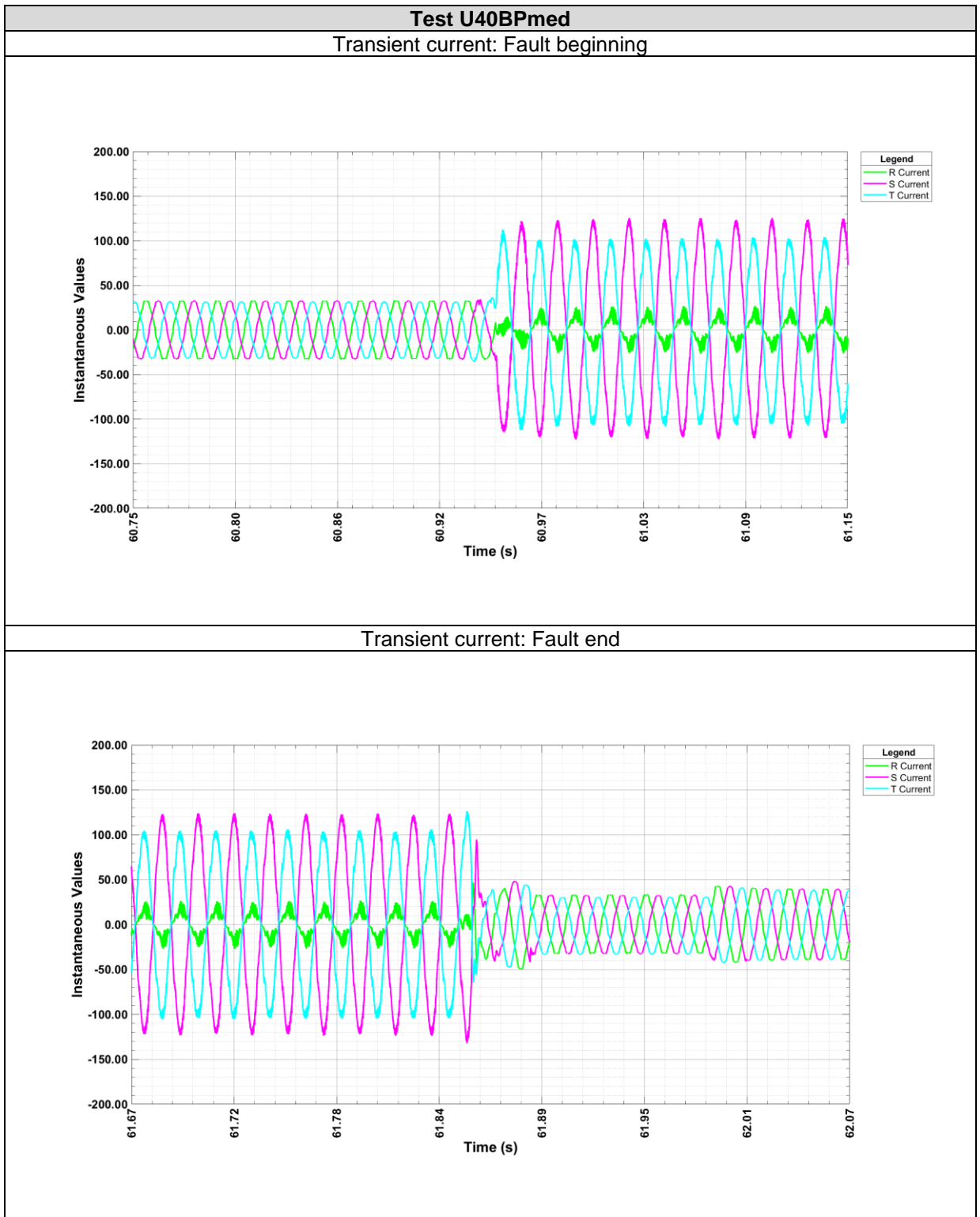
Transient voltage: Fault beginning



Transient voltage: Fault end







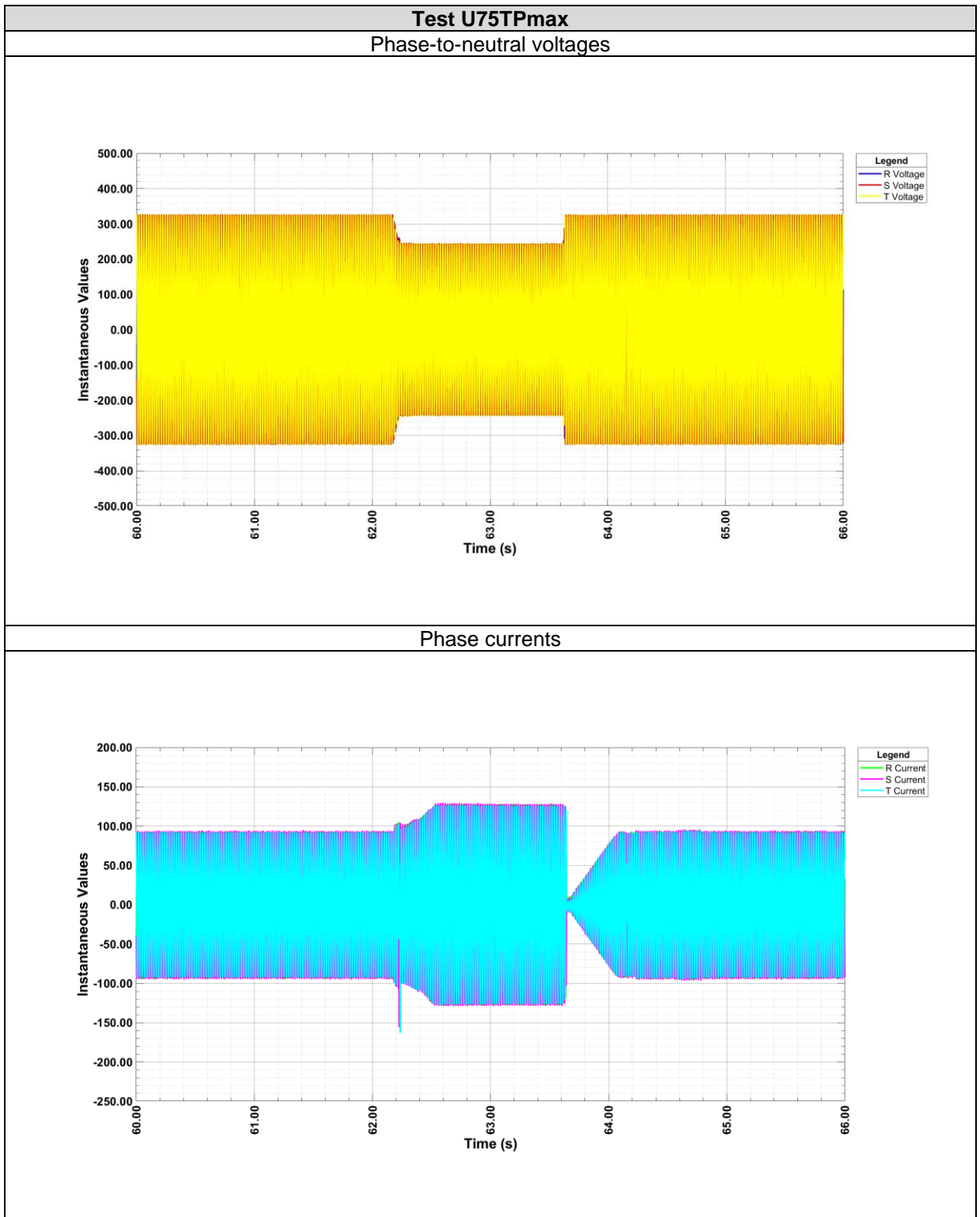
### 3.1.3 Load tests: Dip depth 75% Un

In this chapter of the test report are shown the test results and diagrams for the load tests configured with a dip depth of 75% Un. There are included in this point the tests Test U75TPmax, Test U75TPmed, Test U75TPmedQmax, Test U75TPmedQmin, Test U75TPmin, Test U75BPmax, Test U75BPmed and Test U75BPmin according to both table 49 and 50 of NTS V2.1 SEPE. For the voltages and currents in the below picture tables, the unit is V and A.

#### 3.1.3.1 Test U75TPmax Fault type: 3 phases, Full load

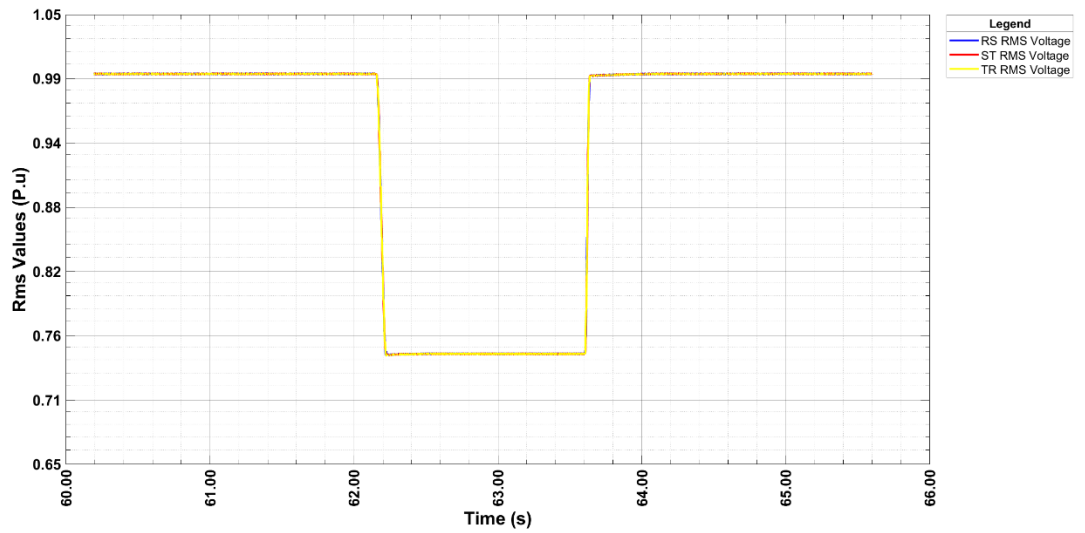
General Information	Test type			U75TPmax
	Fault type			Three Phase
	Fault occurrence ti (sec)			62.193
	Fault clearance td (sec)			63.621
	Fault time (sec)			1.429
	Measured time (s)			92.650
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.995
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.823
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.003
			ti-1 s to ti	0.003
		Neg.	ti-1 s to ti	0.003
	Active Current (p.u)	Pos.	ti-1 s to ti	0.824
	Active Power (p.u)	Total	ti-10 s to ti	0.821
			ti-2 s to ti	0.821
	Pos.	ti-500 ms to ti-100 ms	0.821	
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.003	
FAULT	Factor k	Pos. (K1)		-3.3
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.017
		Neg.		0.015
	Settling time in sec (te)	Pos.		0.038
		Neg.		0.037
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.748
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.825
		Neg.	ti+100 ms to td-20 ms	0.002
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.708
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.092
		Neg.	ti+100 ms to td-20 ms	0.011
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.530
		Pos.	ti+100 ms to td-20 ms	0.530
Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.618	
Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	73.3	
		ti+20	77.0	
		ti+20	71.8	
	Phase 2	ti+20	65.4	
		ti+20	68.8	
		ti+20	68.6	

	Short-circuit currents in A	Phase 1	ti+100	68.5
		Phase 2	ti+100	69.0
		Phase 3	ti+100	68.6
	Short-circuit currents in A	Phase 1	ti+150	72.2
		Phase 2	ti+150	73.0
		Phase 3	ti+150	72.1
	Short-circuit currents in A	Phase 1	ti+300	84.7
		Phase 2	ti+300	85.8
		Phase 3	ti+300	84.6
	Short-circuit currents in A	Phase 1	ti+500	89.5
		Phase 2	ti+500	90.1
		Phase 3	ti+500	88.2
	POST-FAULT	Short-circuit currents in A	Phase 1	ti+1000
		Phase 2	ti+1000	89.7
		Phase 3	ti+1000	87.6
Capacity to withstand the voltage dip		Connected		YES
Reactive Current (piu)		Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.003
Active Current (pp.)		Pos.	td+1 s to td+10 s	0.823
Active Power		Total	td+1 s to td+10 s	0.821
Reactive Power (put)		Pos.	td+1 s to td+10 s	0.003
Voltage(piu.)		Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
Current (put)		Pos.	td+1 s to td+10 s	0.823
		Neg	td+1 s to td+10 s	0.008
the of the Active Power in sec	Pos		0.426	
Transient overvoltage capacity	Connected		YES	

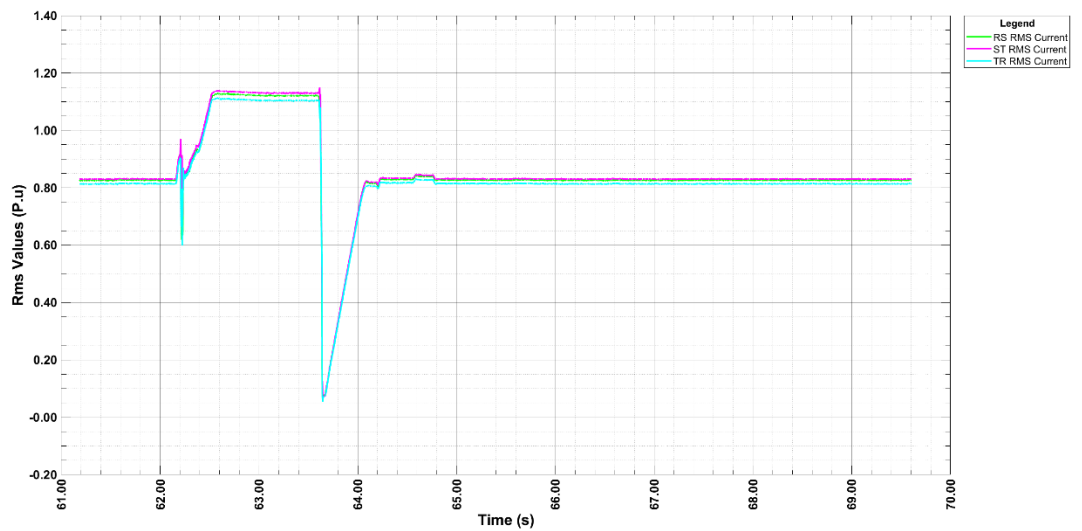


**Test U75TPmax**

RMS phase to phase voltages

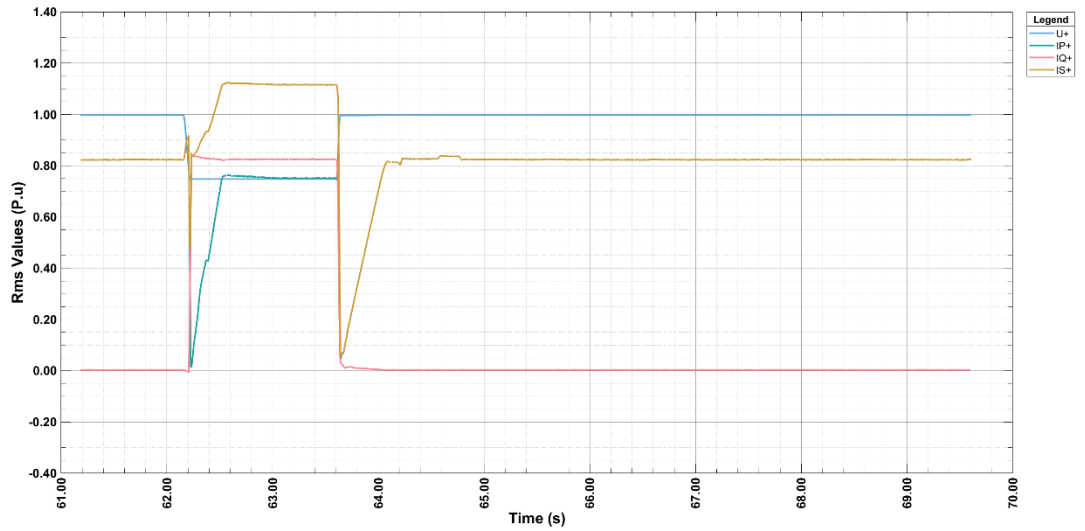


RMS phase currents

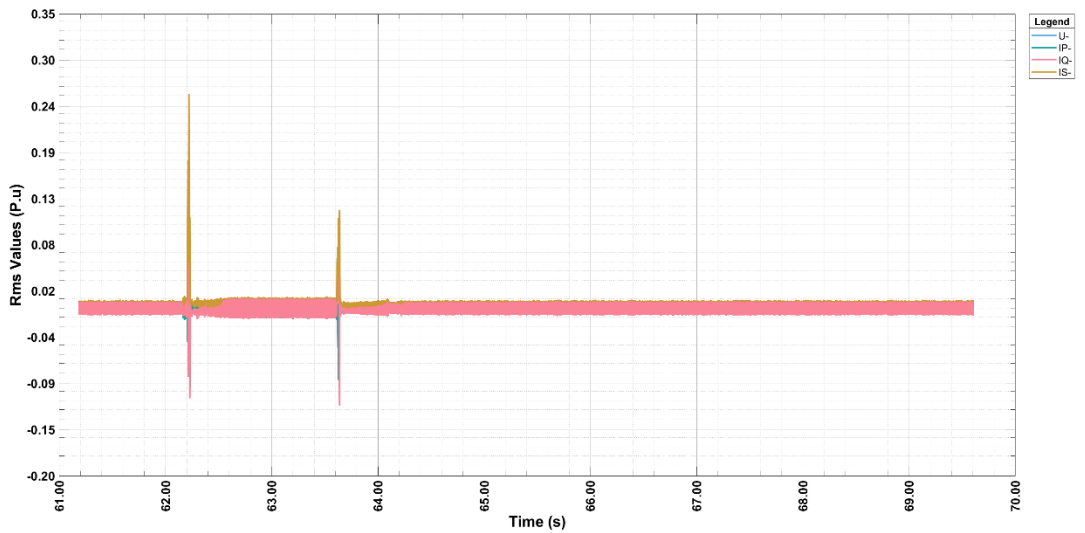


**Test U75TPmax**

Positive sequences

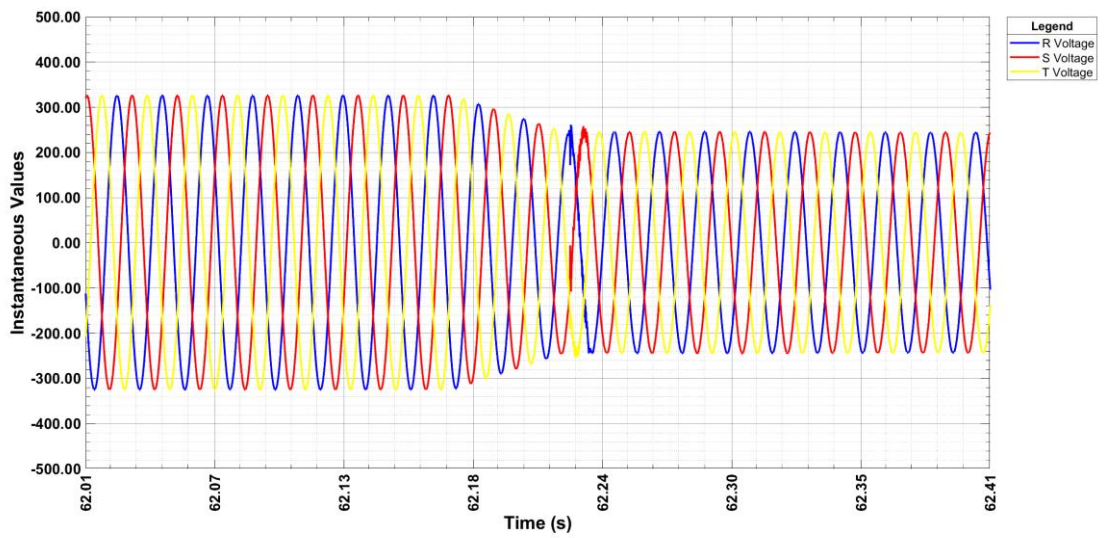


Negative sequences

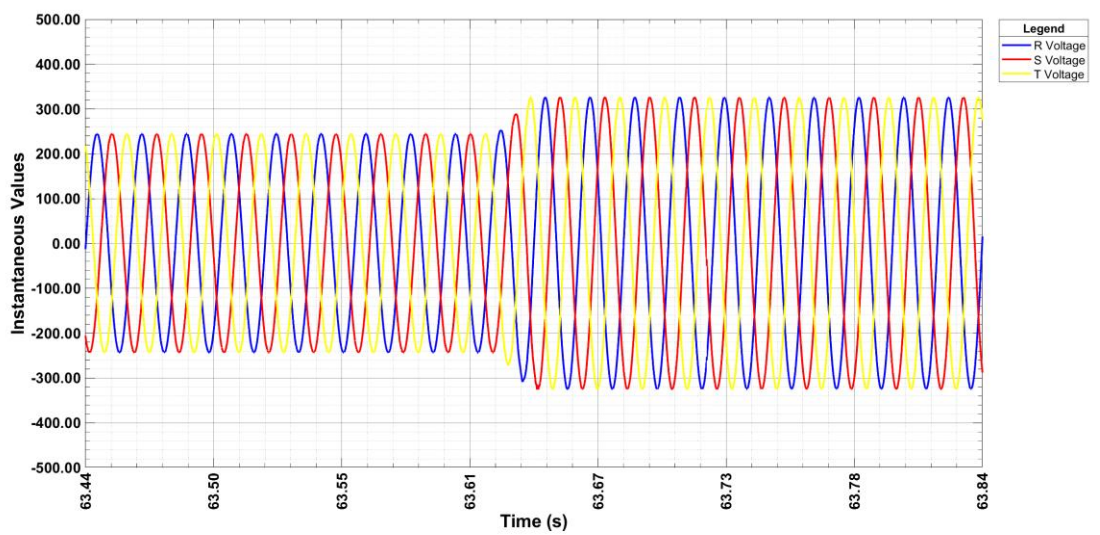


**Test U75TPmax**

Transient voltage: Fault beginning



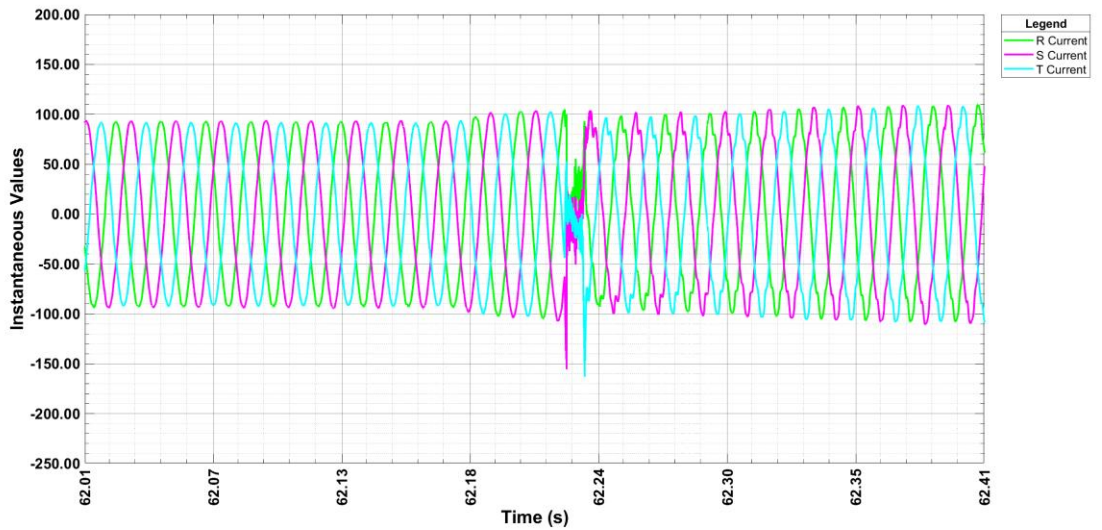
Transient voltage: Fault end



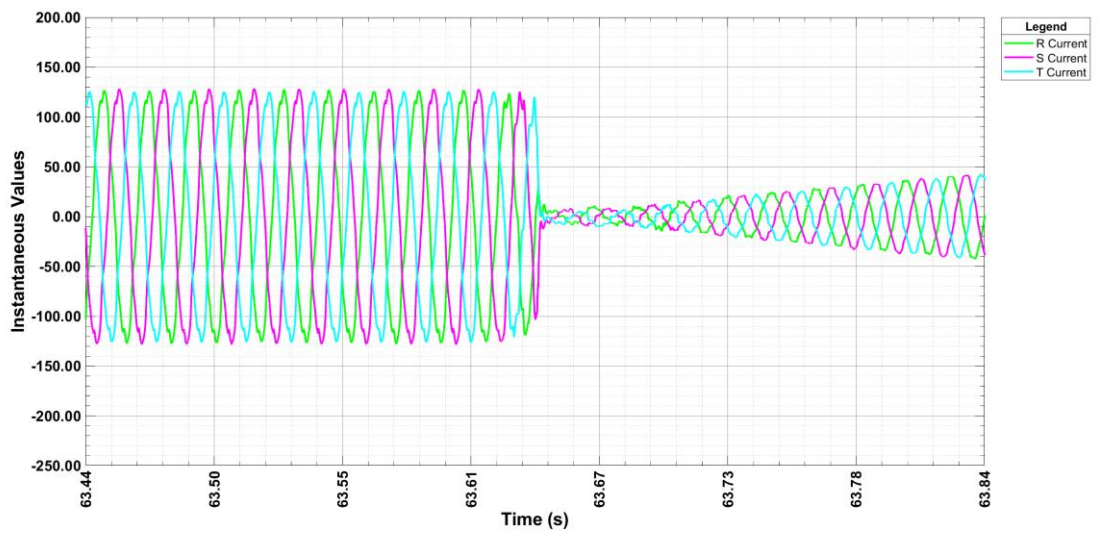


### Test U75TPmax

#### Transient current: Fault beginning



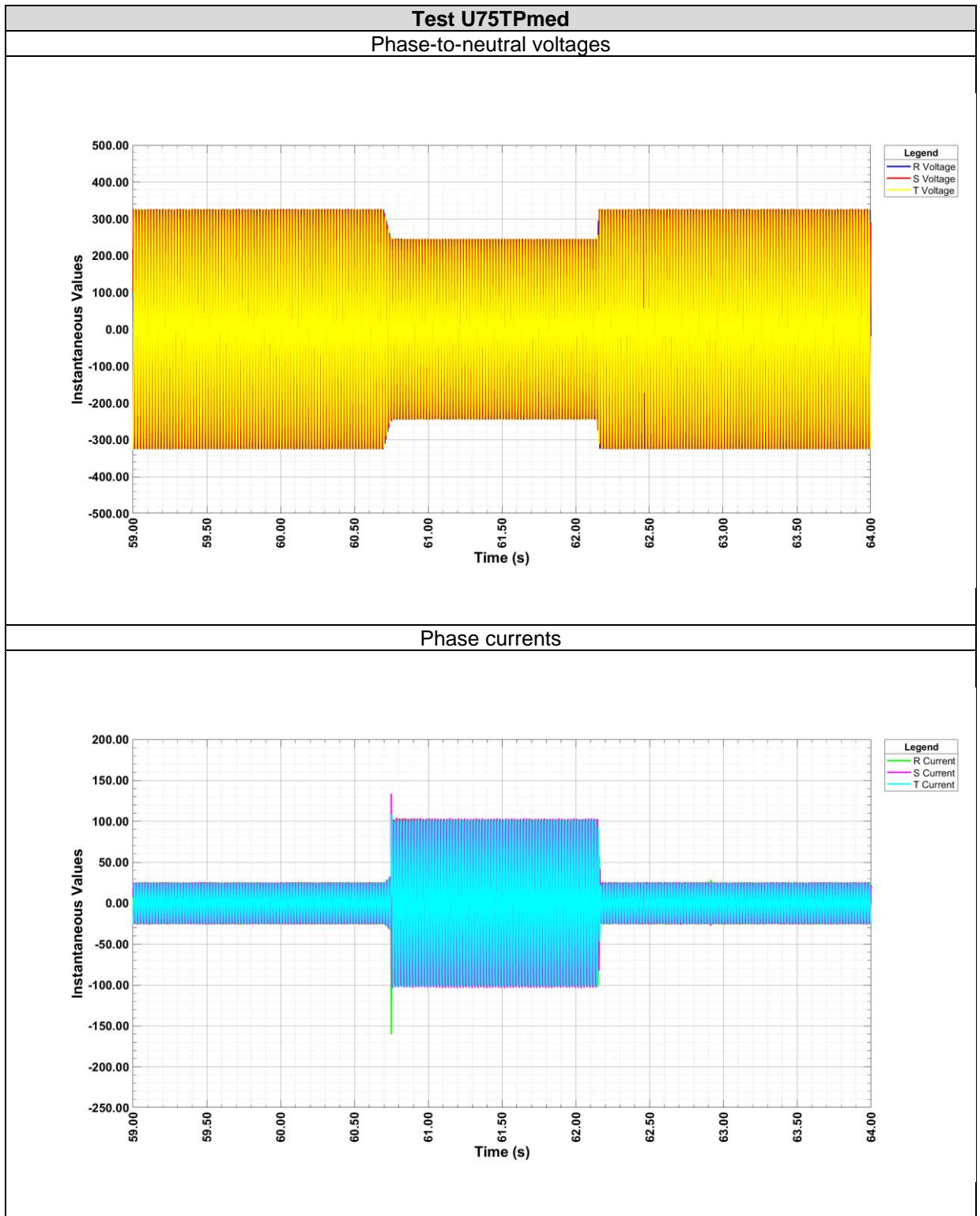
#### Transient current: Fault end



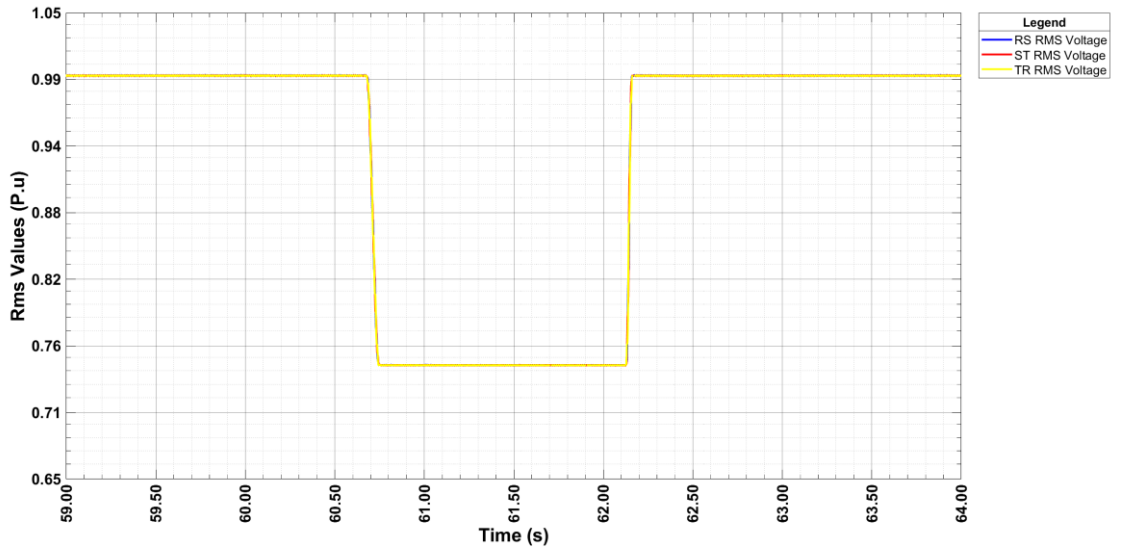
### 3.1.3.2 Test U75TPmed Fault type: 3 phases, Partial load

General Information	Test type			U75TPmed
	Fault type			Three Phase
	Fault occurrence ti (sec)			60.716
	Fault clearance td (sec)			62.144
	Fault time (sec)			1.428
	Measured time (s)			72.093
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.994
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.221
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.011
			ti-1 s to ti	0.011
		Neg.	ti-1 s to ti	0.001
	Active Current (p.u)	Pos.	ti-1 s to ti	0.222
	Active Power (p.u)	Total	ti-10 s to ti	0.220
			ti-2 s to ti	0.220
		Pos.	ti-500 ms to ti-100 ms	0.220
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.011	
FAULT	Factor k	Pos. (K1)		-3.3
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.015
		Neg.		0.015
	Settling time in sec (te)	Pos.		0.031
		Neg.		0.000
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.748
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.825
		Neg.	ti+100 ms to td-20 ms	0.001
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.289
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.874
		Neg.	ti+100 ms to td-20 ms	0.006
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.216
		Pos.	ti+100 ms to td-20 ms	0.216
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.617
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	47.8
		Phase 2	ti+20	37.3
		Phase 3	ti+20	48.1
Short-circuit currents in A	Phase 1	ti+20	47.4	
	Phase 2	ti+20	37.3	
	Phase 3	ti+20	68.8	
Short-circuit currents in A	Phase 1	ti+100	69.1	
	Phase 2	ti+100	70.2	
	Phase 3	ti+100	68.8	
Short-circuit currents in A	Phase 1	ti+150	69.3	
	Phase 2	ti+150	70.3	
	Phase 3	ti+150	68.9	

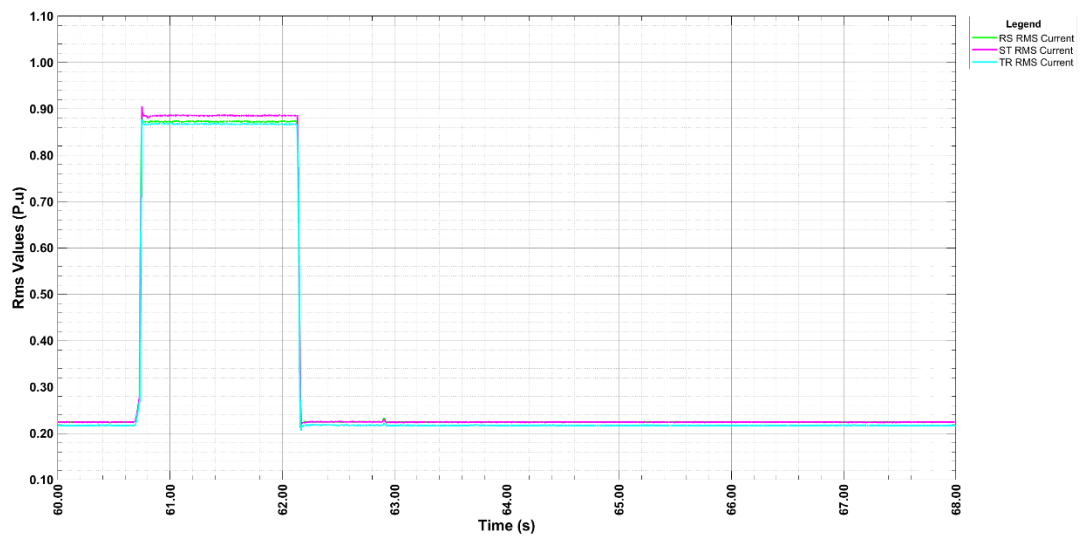
	Short-circuit currents in A	Phase 1	ti+300	69.2
		Phase 2	ti+300	70.4
		Phase 3	ti+300	68.9
	Short-circuit currents in A	Phase 1	ti+500	69.2
		Phase 2	ti+500	70.3
		Phase 3	ti+500	68.8
	Short-circuit currents in A	Phase 1	ti+1000	69.2
		Phase 2	ti+1000	70.3
		Phase 3	ti+1000	68.8
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.011
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.221
	Active Power	Total	td+1 s to td+10 s	0.220
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.011
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.221
		Neg	td+1 s to td+10 s	0.004
	the of the Active Power in sec	Pos		0.000
Transient overvoltage capacity	Connected		YES	



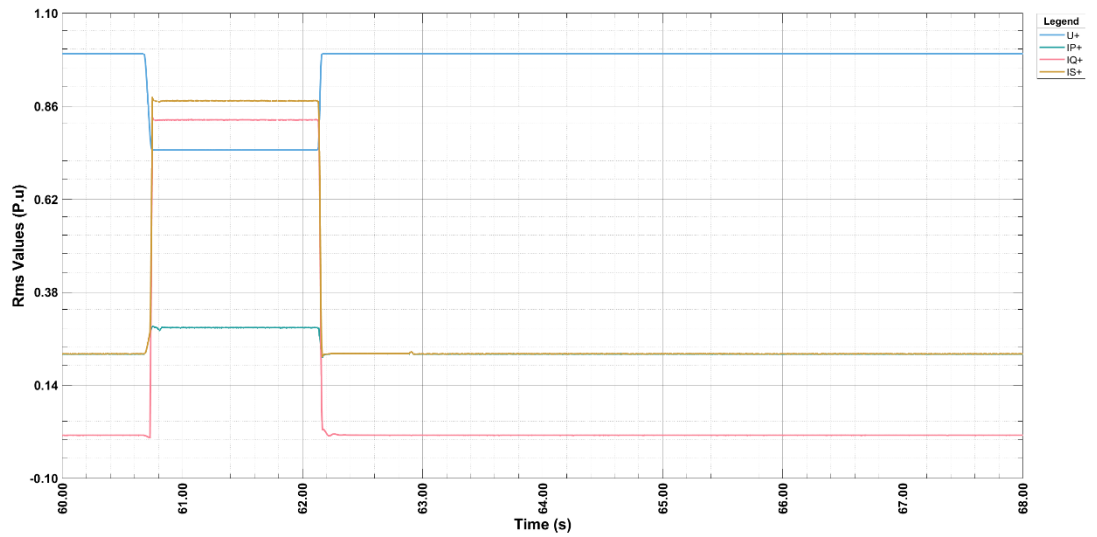
**Test U75TPmed**  
RMS phase to phase voltages



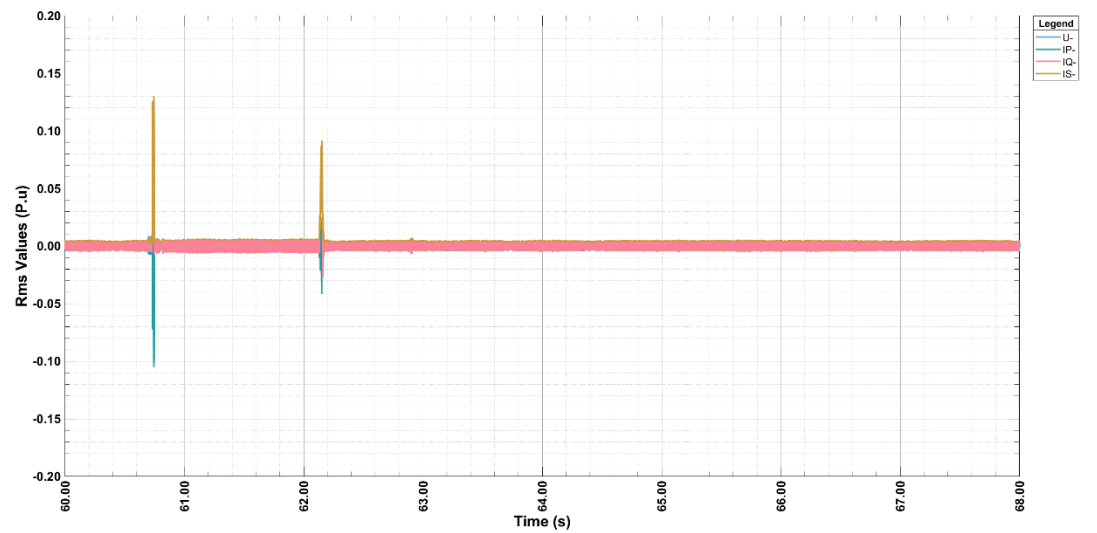
RMS phase currents



**Test U75TPmed**  
Positive sequence voltage



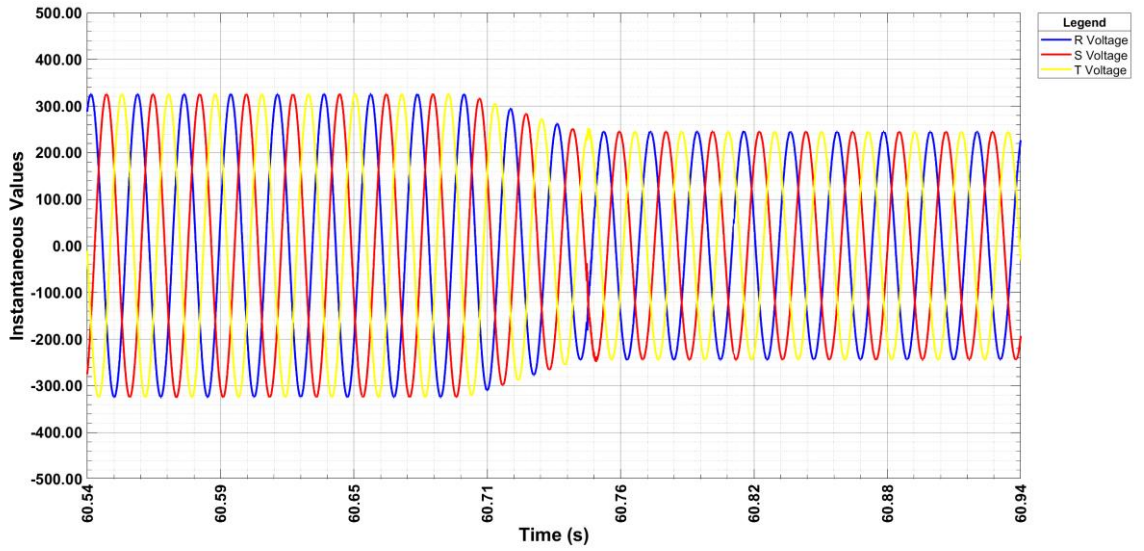
Negative sequences



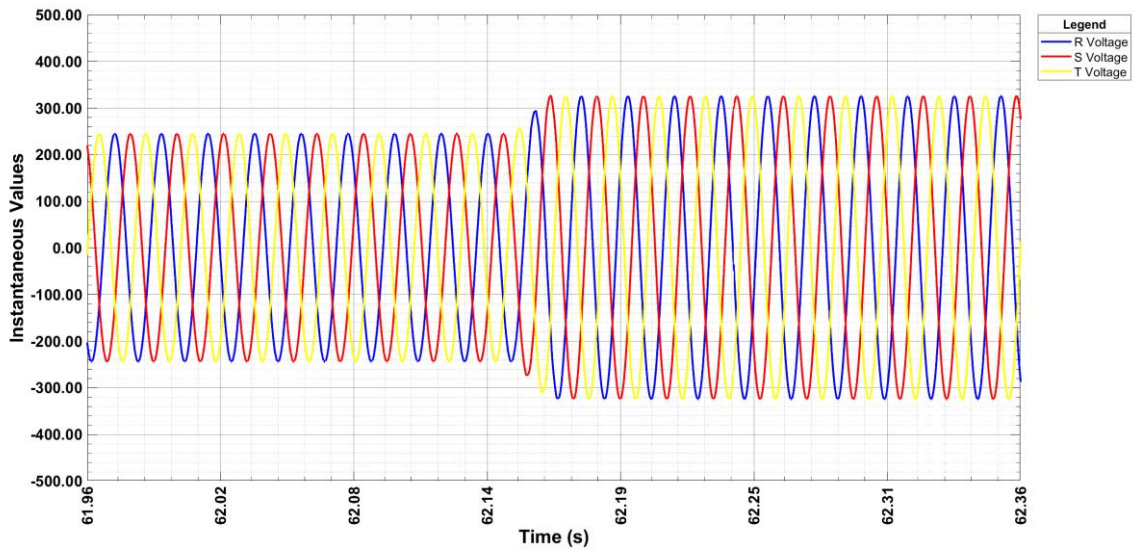


**Test U75TPmed**

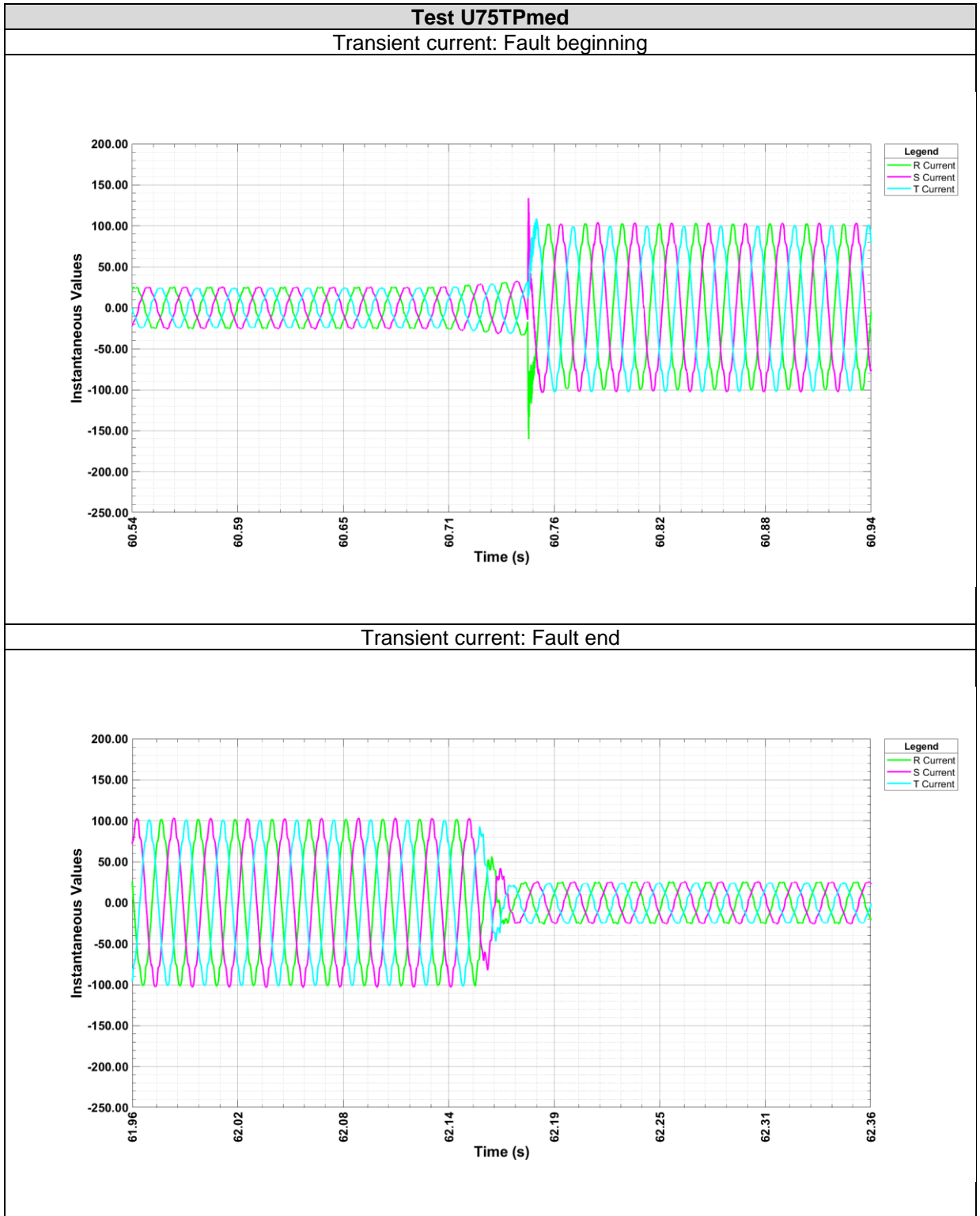
Transient voltage: Fault beginning



Transient voltage: Fault end





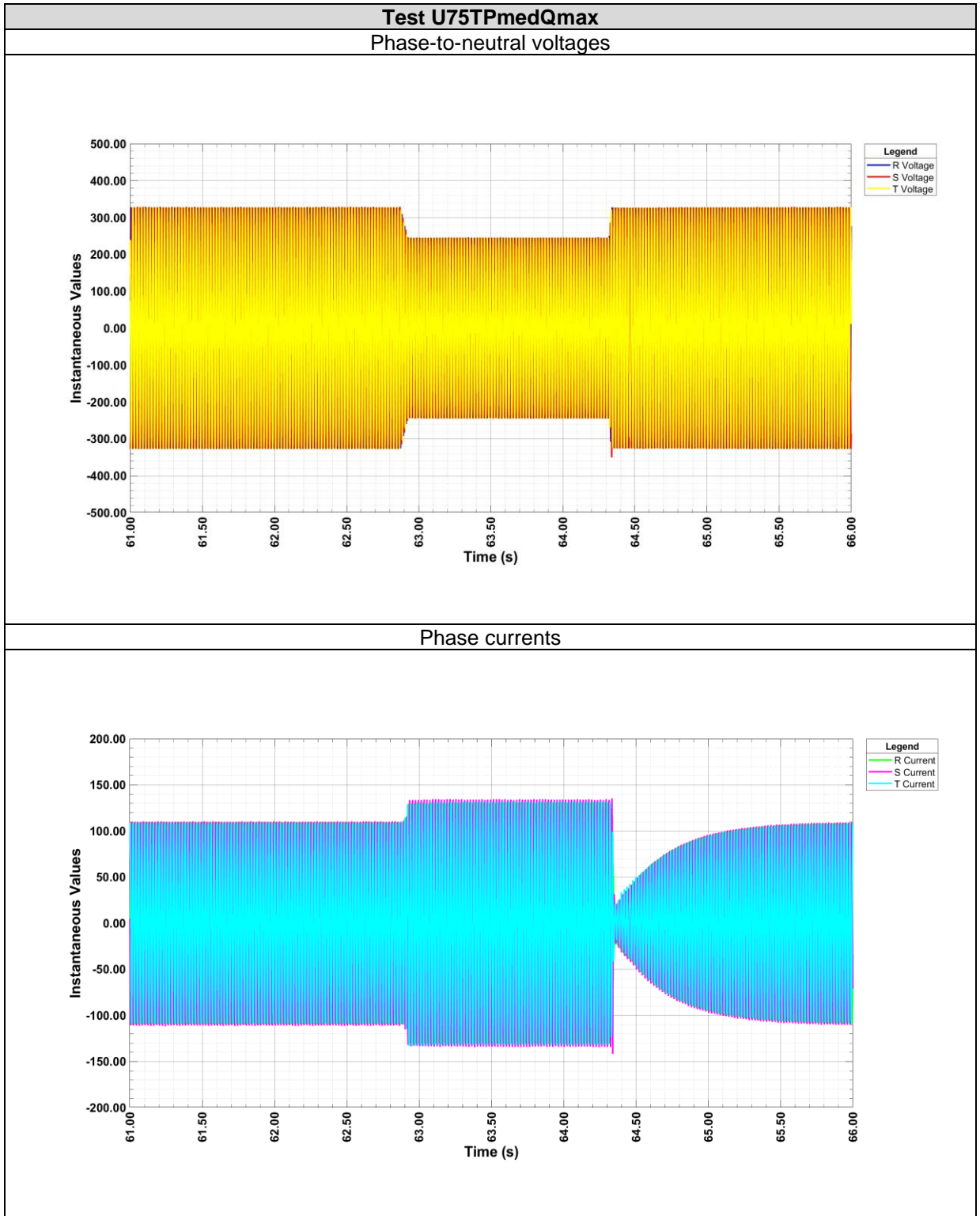


### 3.1.3.3 Test U75TPmedQmax Fault type: 3 phases, Partial load, Qmax

General Information	Test type			U75TPmed Qmax
	Fault type			Three Phase
	Fault occurrence ti (sec)			62.891
	Fault clearance td (sec)			64.319
	Fault time (sec)			1.428
	Measured time (s)			74.095
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.999
			2) ti-500 ms to ti-100 ms	0.999
			3) ti-1 s to ti	0.997
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.939
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.914
			ti-1 s to ti	0.914
		Neg.	ti-1 s to ti	0.001
	Active Current (p.u)	Pos.	ti-1 s to ti	0.219
	Active Power (p.u)	Total	ti-10 s to ti	0.218
			ti-2 s to ti	0.218
		Pos.	ti-500 ms to ti-100 ms	0.218
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.913	
FAULT	Factor k	Pos. (K1)		-0.9
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.010
	Rise Time in sec from ti(tr)	Pos.		0.010
		Neg.		0.025
	Settling time in sec (te)	Pos.		0.020
		Neg.		0.000
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.748
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.132
		Neg.	ti+100 ms to td-20 ms	0.001
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.014
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	1.132
		Neg.	ti+100 ms to td-20 ms	0.007
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.010
		Pos.	ti+100 ms to td-20 ms	0.010
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.847
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	83.2
		Phase 2	ti+20	87.7
		Phase 3	ti+20	84.2
Short-circuit currents in A	Phase 1	ti+20	83.2	
	Phase 2	ti+20	87.3	
	Phase 3	ti+20	89.2	
Short-circuit currents in A	Phase 1	ti+100	89.9	
	Phase 2	ti+100	91.0	
	Phase 3	ti+100	89.2	
Short-circuit currents in A	Phase 1	ti+150	90.0	
	Phase 2	ti+150	91.0	

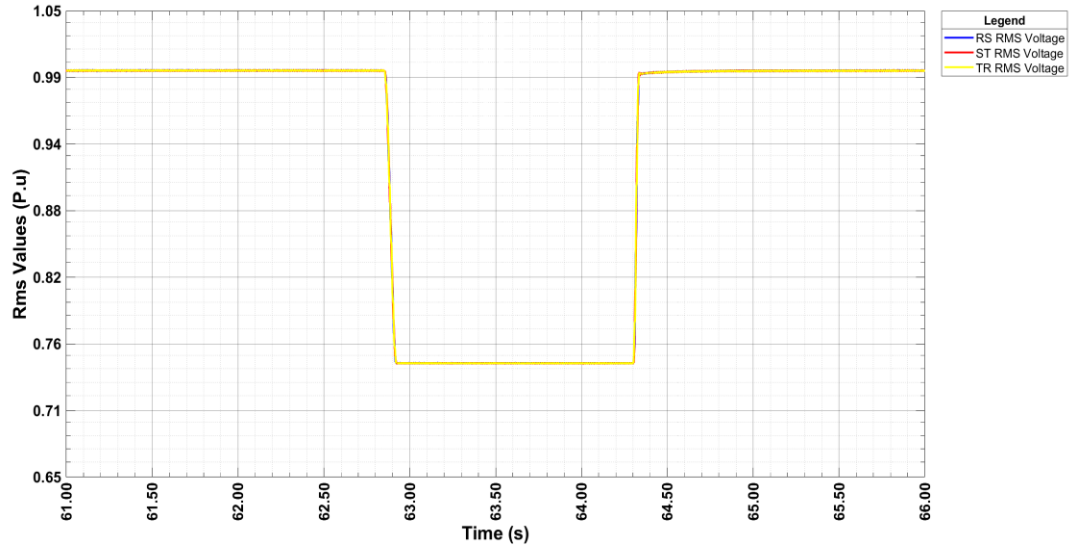
		Phase 3	ti+150	89.3
	Short-circuit currents in A	Phase 1	ti+300	90.0
		Phase 2	ti+300	91.0
		Phase 3	ti+300	89.3
	Short-circuit currents in A	Phase 1	ti+500	89.9
		Phase 2	ti+500	91.0
		Phase 3	ti+500	89.3
	Short-circuit currents in A	Phase 1	ti+1000	89.9
		Phase 2	ti+1000	91.0
	Phase 3	ti+1000	89.3	
	Capacity to withstand the voltage dip	Connected		YES
<b>POST- FAULTL</b>	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.912
		Neg	td+1 s to td+10 s	0.000
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.219
	Active Power	Total	td+1 s to td+10 s	0.218
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.911
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.999
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.938
		Neg	td+1 s to td+10 s	0.006
the of the Active Power in sec	Pos		0.008	
	Transient overvoltage capacity	Connected		YES

Note: The determined K-factor is lower than the configured in the EUT (K=3.5) because the reactive current is already at its maximum under pre-fault conditions.

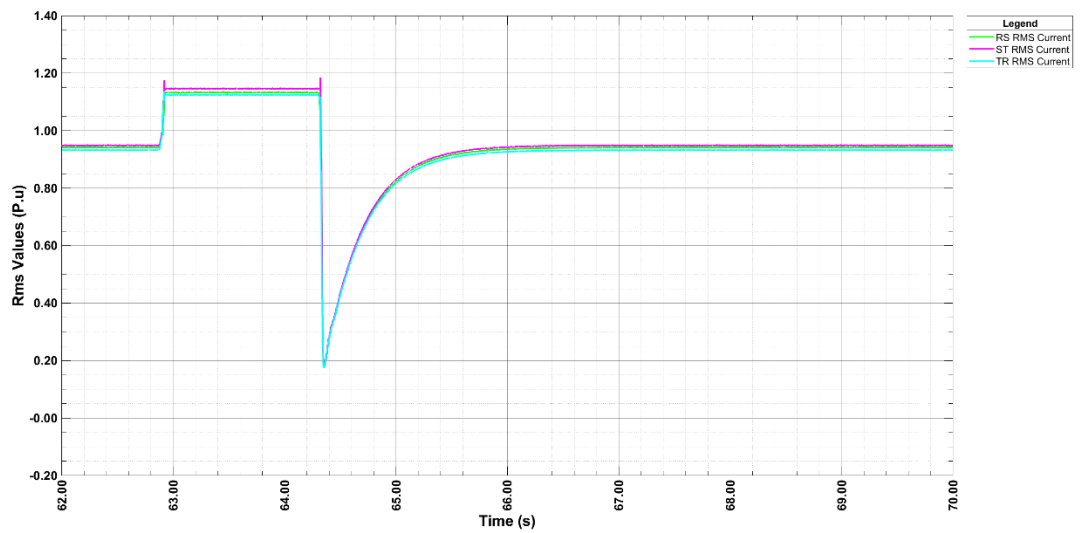


**Test U75TPmedQmax**

RMS phase to phase voltages

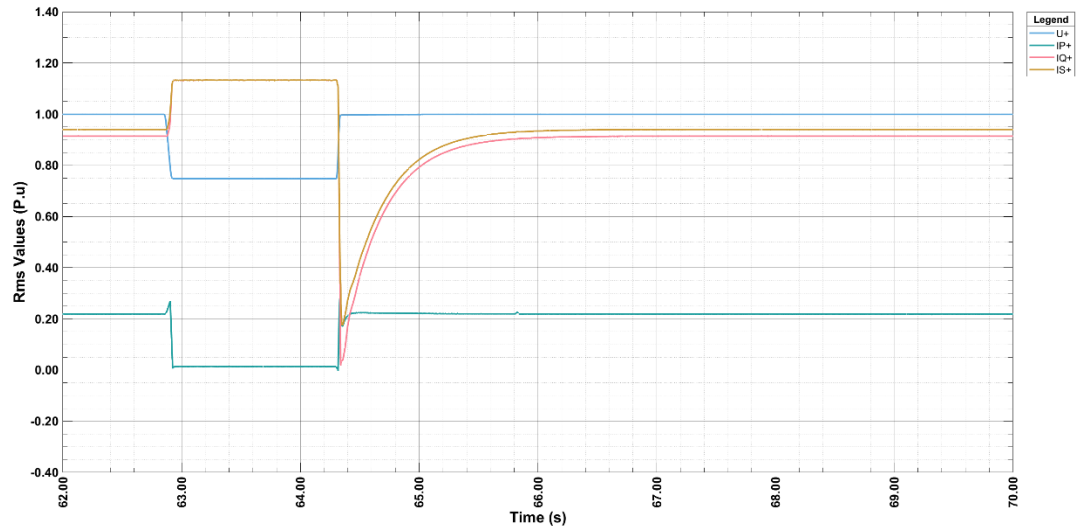


RMS phase currents

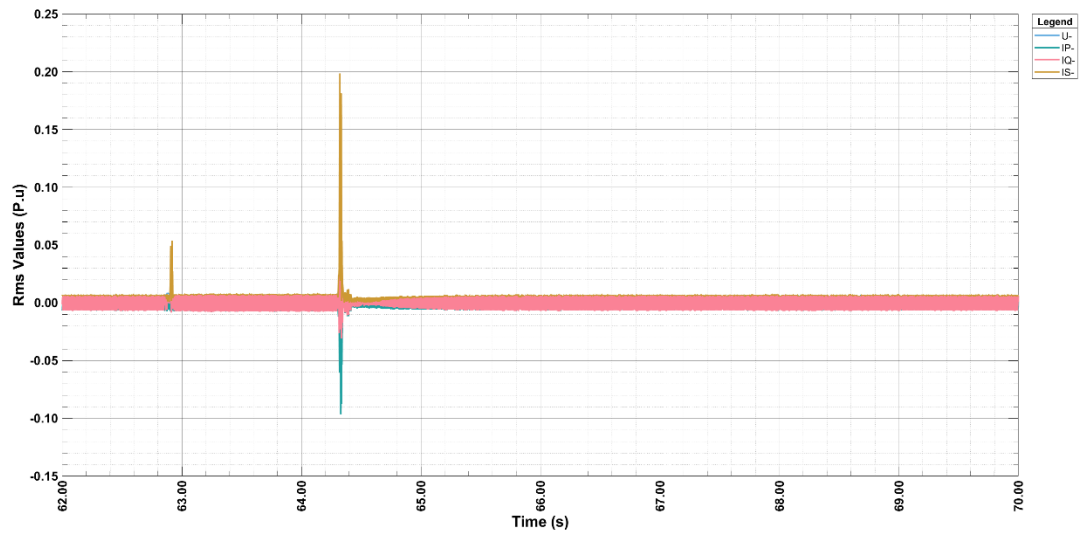


**Test U75TPmedQmax**

Positive sequences

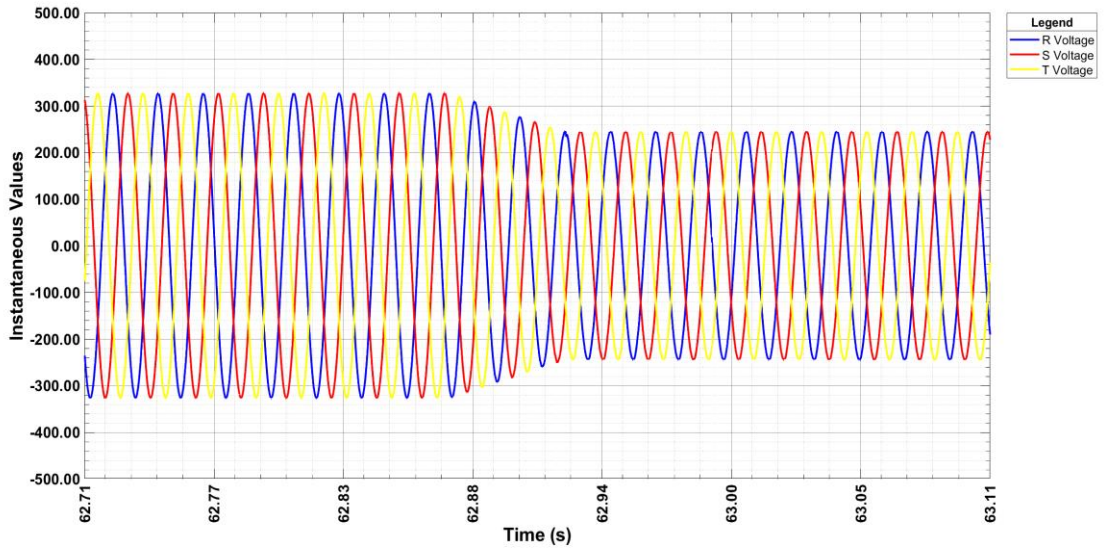


Negative sequences

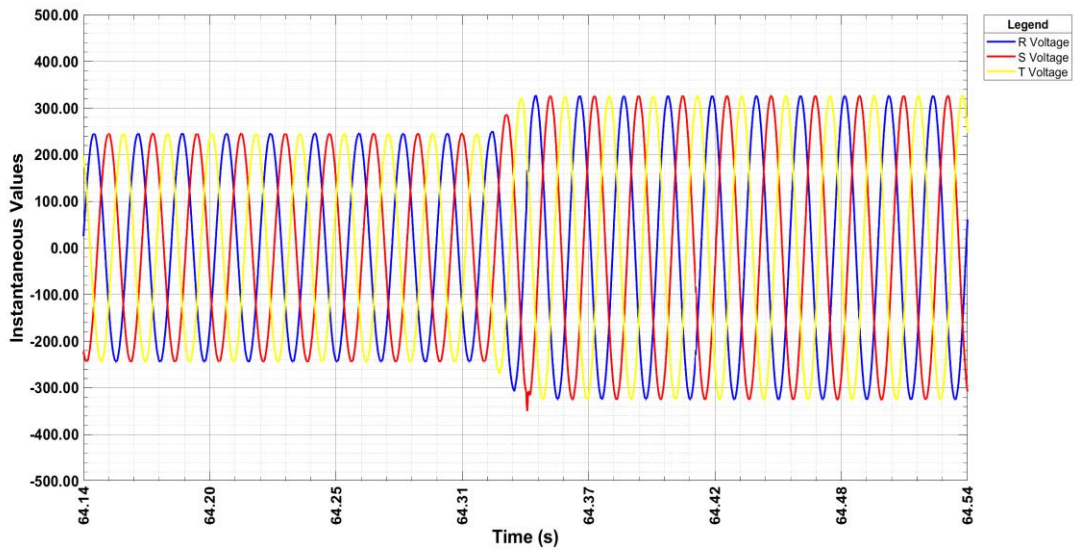


**Test U75TPmedQmax**

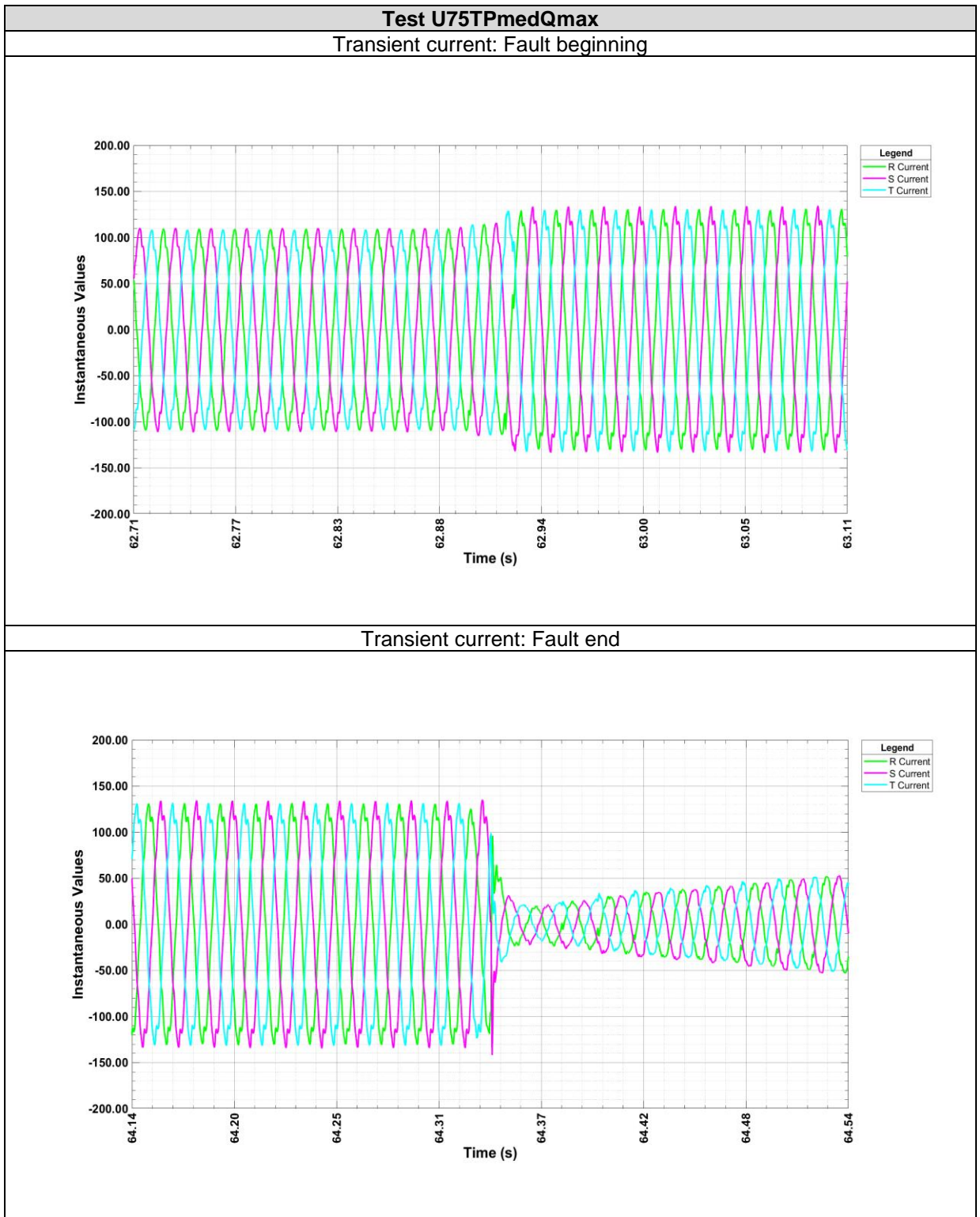
Transient voltage: Fault beginning



Transient voltage: Fault end



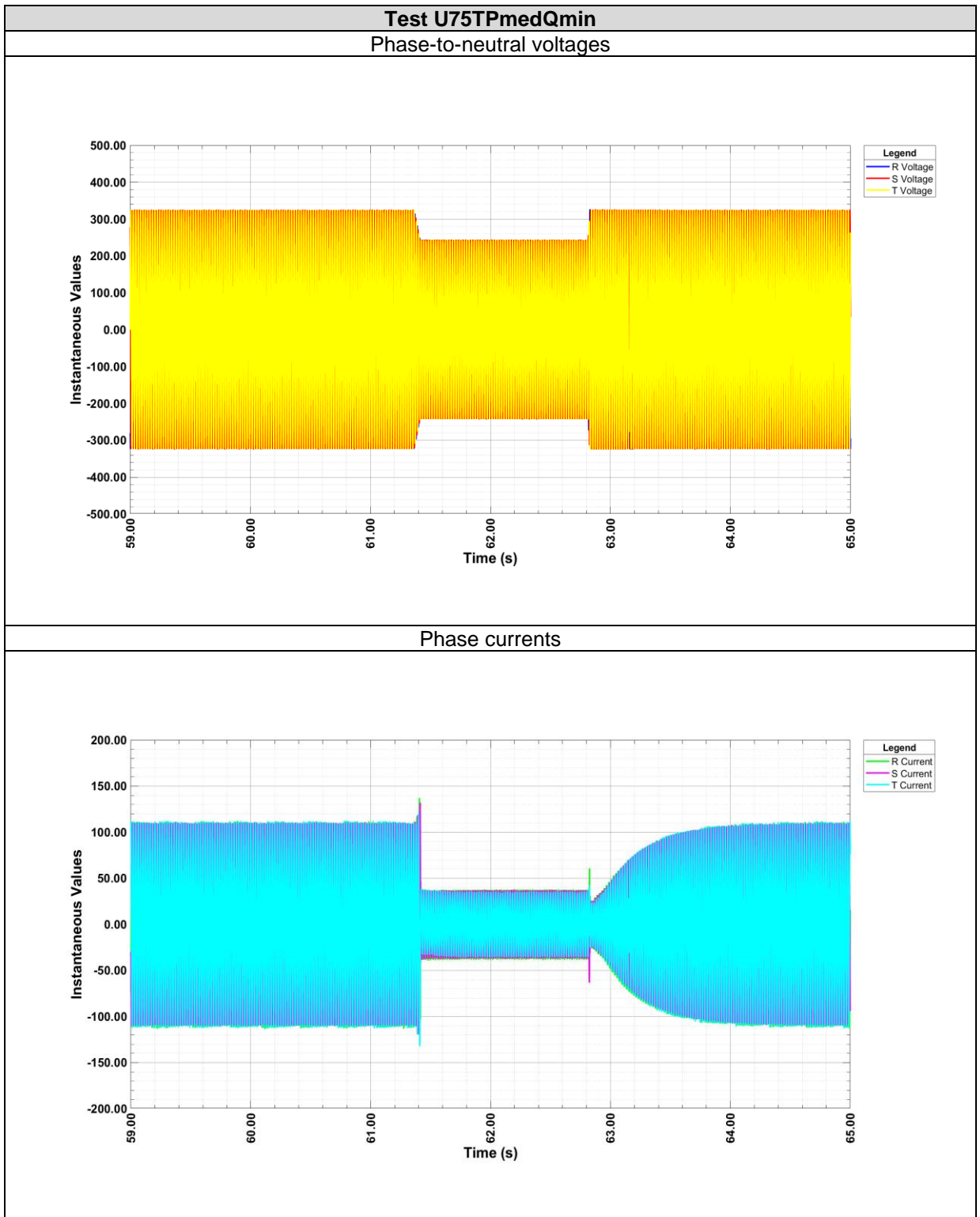




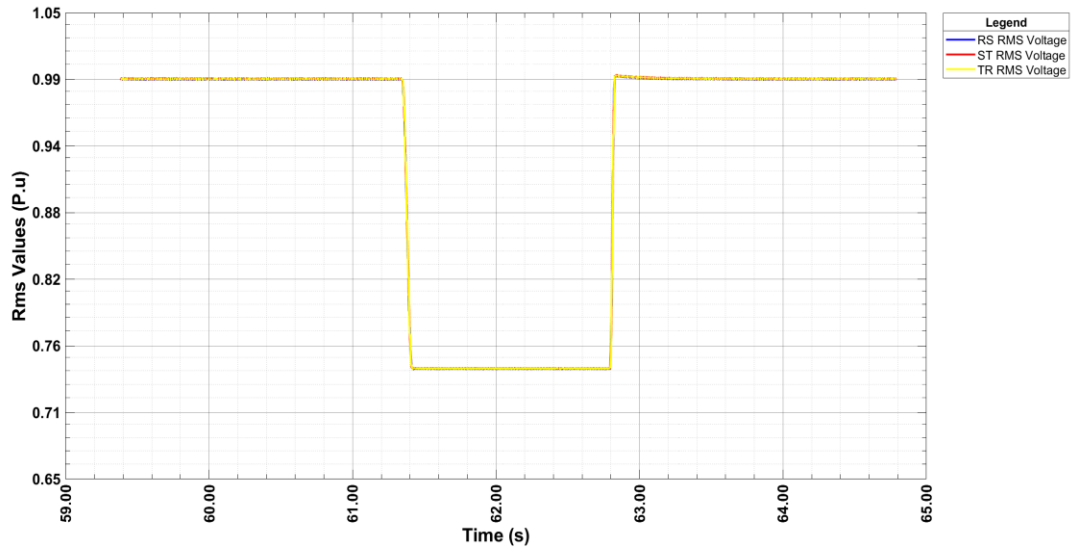
### 3.1.3.4 Test U75TPmedQmin Fault type: 3 phases, Partial load, Qmin

General Information	Test type			U75TPmed Qmin
	Fault type			Three Phase
	Fault occurrence ti (sec)			61.382
	Fault clearance td (sec)			62.812
	Fault time (sec)			1.430
	Measured time (s)			92.362
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.993
			2) ti-500 ms to ti-100 ms	0.993
			3) ti-1 s to ti	0.991
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.940
	Reactive Current (p.u)	Pos.	ti-60 s to ti	-0.920
			ti-1 s to ti	-0.921
		Neg.	ti-1 s to ti	0.003
	Active Current (p.u)	Pos.	ti-1 s to ti	0.194
	Active Power (p.u)	Total	ti-10 s to ti	0.192
			ti-2 s to ti	0.192
		Pos.	ti-500 ms to ti-100 ms	0.192
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	-0.914	
FAULT	Factor k	Pos. (K1)		-3.3
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.016
		Neg.		0.014
	Settling time in sec (te)	Pos.		0.029
		Neg.		0.000
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.745
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	-0.112
		Neg.	ti+100 ms to td-20 ms	0.003
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.292
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.313
		Neg.	ti+100 ms to td-20 ms	0.006
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.217
		Pos.	ti+100 ms to td-20 ms	0.217
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	-0.084
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	84.5
		Phase 2	ti+20	84.8
		Phase 3	ti+20	84.7
	Short-circuit currents in A	Phase 1	ti+20	68.6
Phase 2		ti+20	75.5	
Phase 3		ti+20	24.5	
Short-circuit currents in A	Phase 1	ti+100	25.2	
	Phase 2	ti+100	25.1	
	Phase 3	ti+100	24.5	
Short-circuit currents in A	Phase 1	ti+150	25.3	

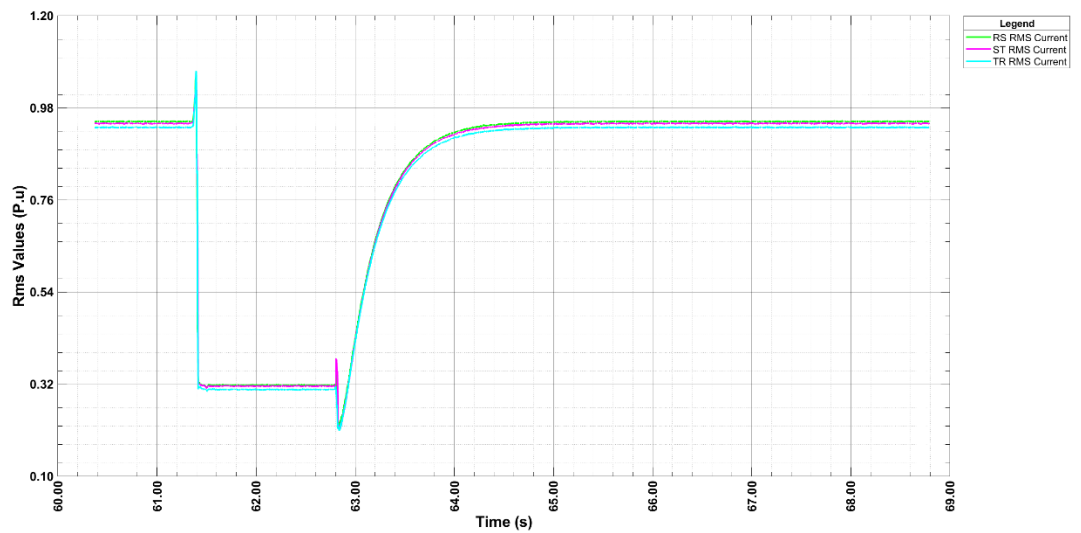
		Phase 2	ti+150	25.1
		Phase 3	ti+150	24.4
	Short-circuit currents in A	Phase 1	ti+300	25.2
		Phase 2	ti+300	25.1
		Phase 3	ti+300	24.4
	Short-circuit currents in A	Phase 1	ti+500	25.2
		Phase 2	ti+500	25.0
		Phase 3	ti+500	24.4
	Short-circuit currents in A	Phase 1	ti+1000	25.2
		Phase 2	ti+1000	25.1
		Phase 3	ti+1000	24.4
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	-0.919
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.194
	Active Power	Total	td+1 s to td+10 s	0.193
	Reactive Power (put)	Pos.	td+1 s to td+10 s	-0.913
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.993
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.939
		Neg	td+1 s to td+10 s	0.010
	the of the Active Power in sec	Pos		0.000
Transient overvoltage capacity	Connected		YES	



**Test U75TPmedQmin**  
RMS phase to phase voltages

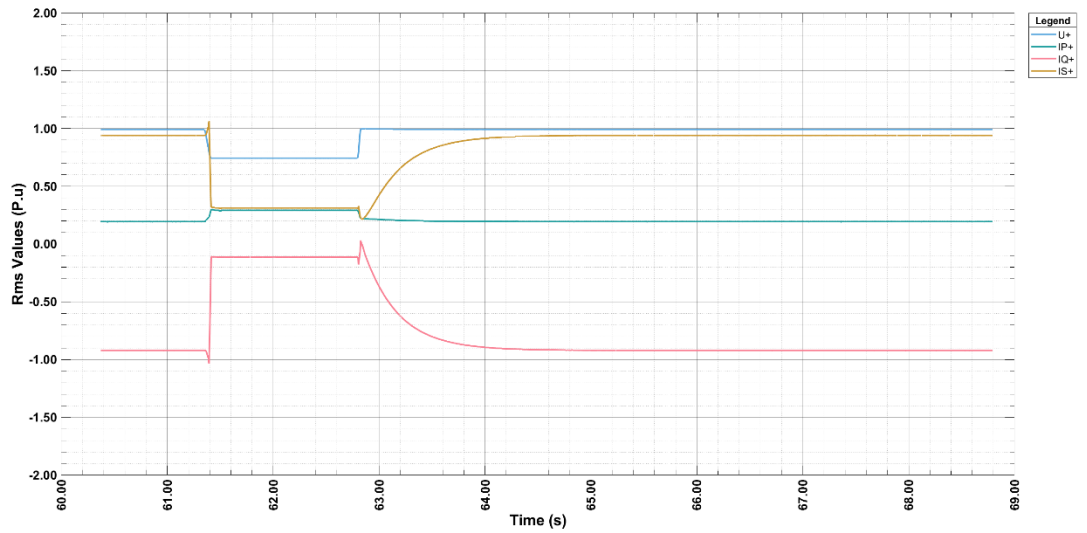


RMS phase currents

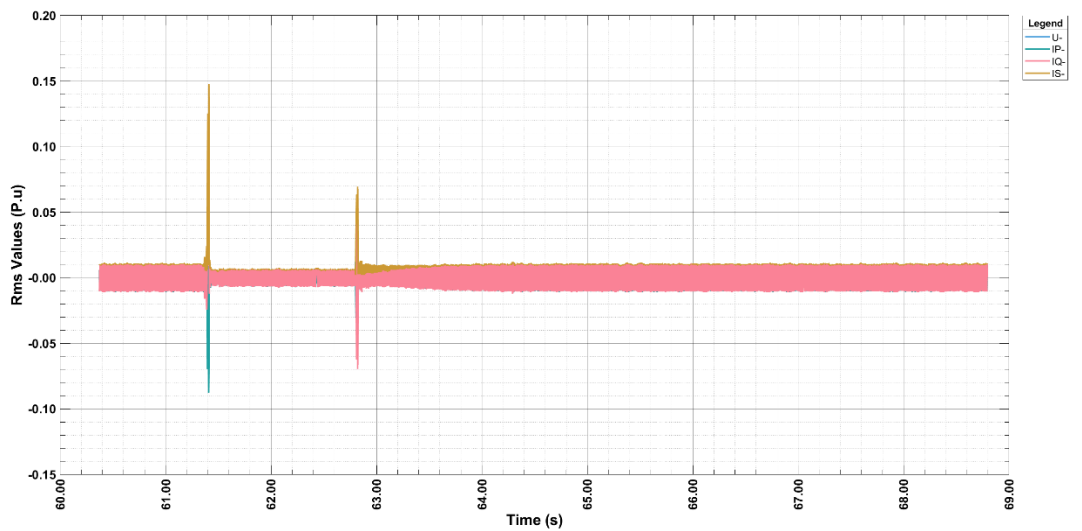


**Test U75TPmedQmin**

Positive sequences



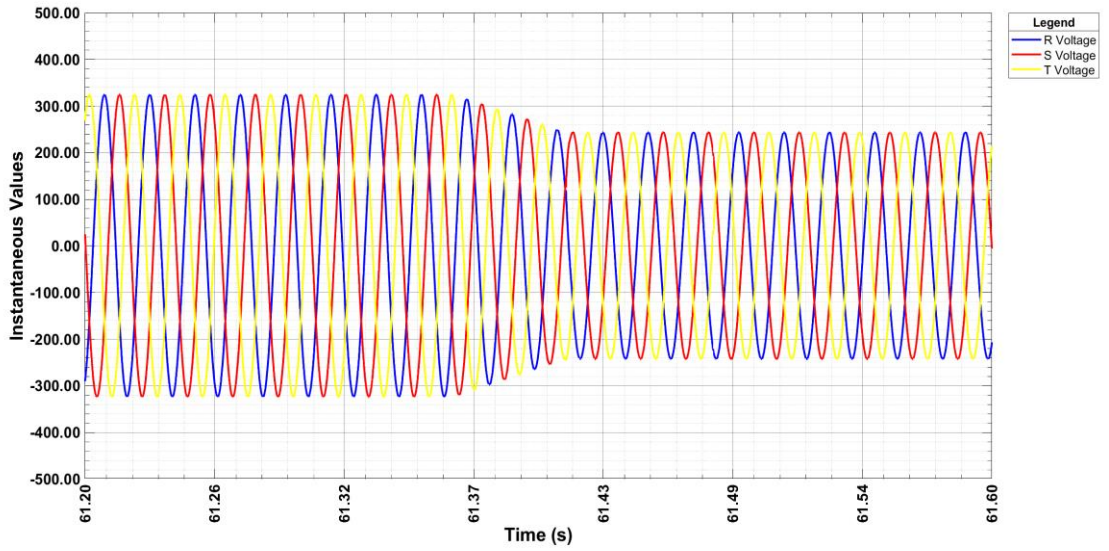
Negative sequences



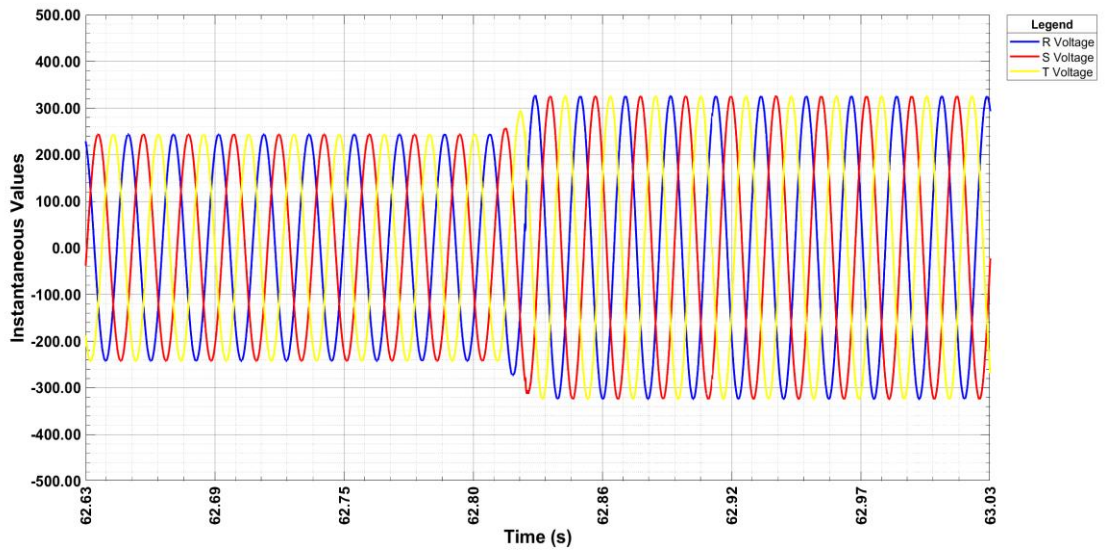


### Test U75TPmedQmin

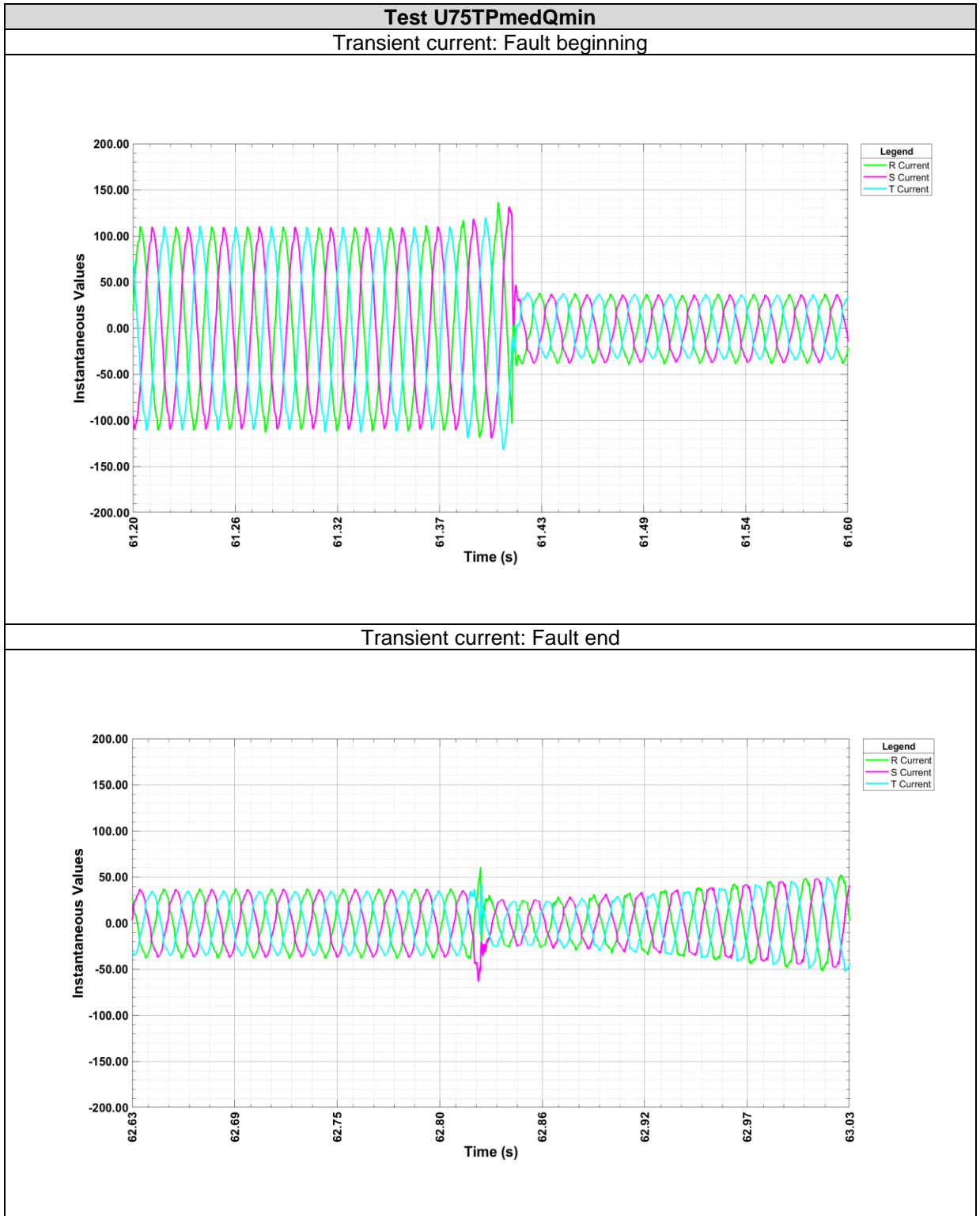
Transient voltage: Fault beginning



Transient voltage: Fault end





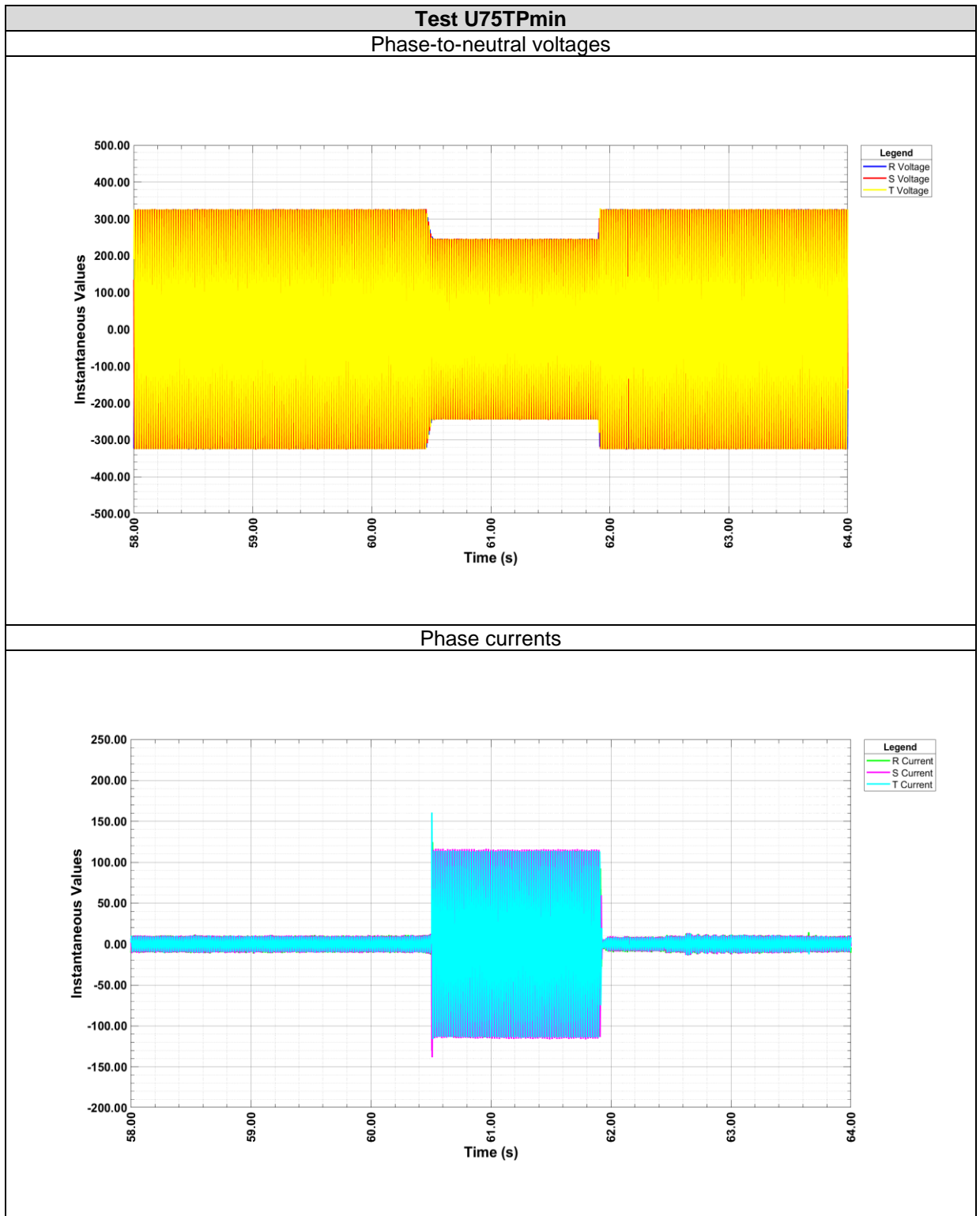


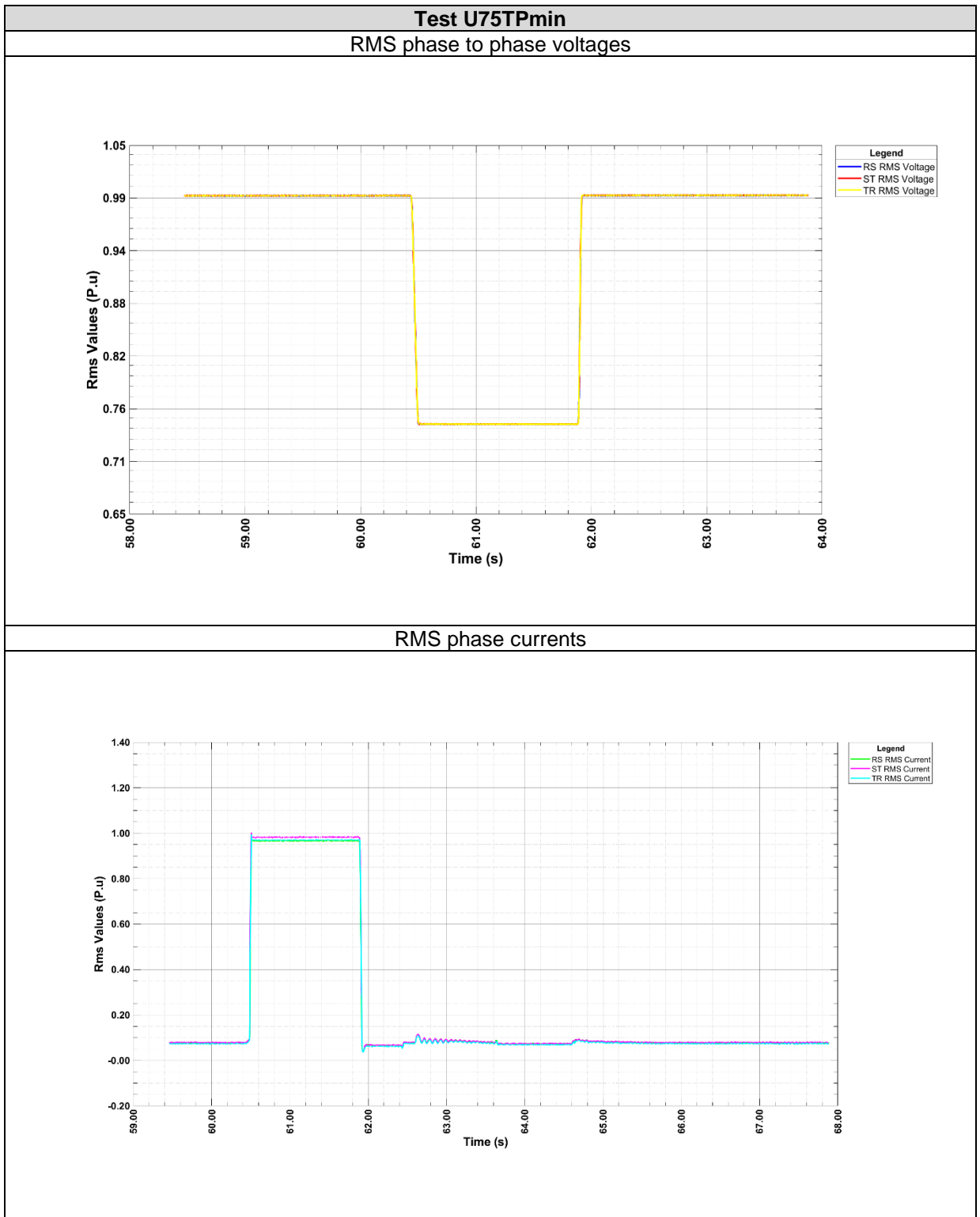
### 3.1.3.5 Test U75TPmin Fault type: 3 phases, Partial load, k=6

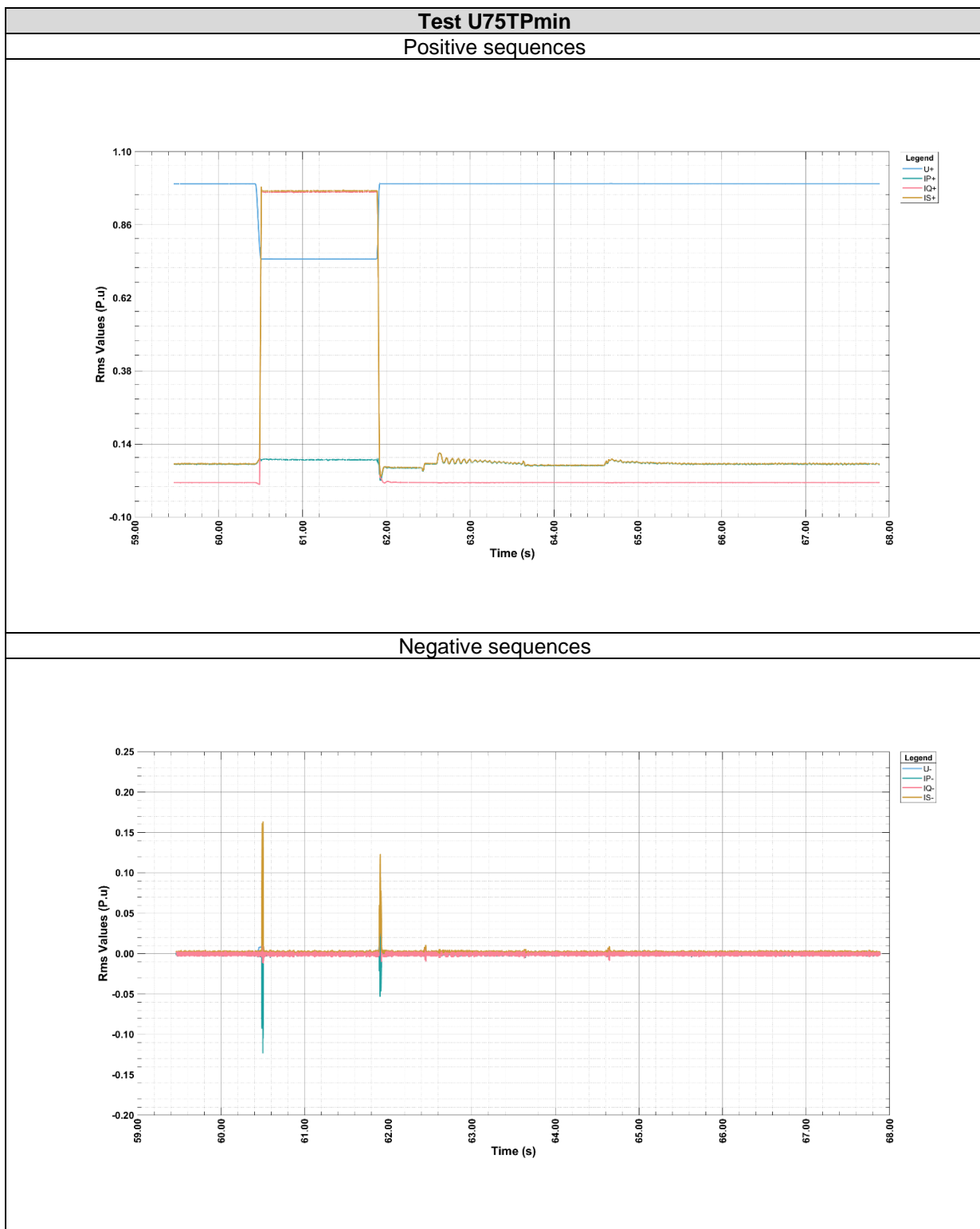
General Information	Test type			U75TPmin
	Fault type			Three Phase
	Fault occurrence ti (sec)			60.473
	Fault clearance td (sec)			61.902
	Fault time (sec)			1.429
	Measured time (s)			96.625
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.995
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.994
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.075
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.014
			ti-1 s to ti	0.013
		Neg.	ti-1 s to ti	0.001
	Active Current (p.u)	Pos.	ti-1 s to ti	0.074
	Active Power (p.u)	Total	ti-10 s to ti	0.074
			ti-2 s to ti	0.074
		Pos.	ti-500 ms to ti-100 ms	0.074
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.013	
FAULT	Factor k	Pos. (K1)		-3.9
		Neg. (K2)		--
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.015
		Neg.		0.016
	Settling time in sec (te)	Pos.		0.032
		Neg.		0.000
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.748
		Neg.	ti+100 ms to td-20 ms	0.000
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.967
		Neg.	ti+100 ms to td-20 ms	0.001
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.088
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.971
		Neg.	ti+100 ms to td-20 ms	0.003
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.066
		Pos.	ti+100 ms to td-20 ms	0.066
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.723
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	36.3
		Phase 2	ti+20	54.4
		Phase 3	ti+20	38.9
	Short-circuit currents in A	Phase 1	ti+20	36.3
Phase 2		ti+20	54.4	
Phase 3		ti+20	77.0	
Short-circuit currents in A	Phase 1	ti+100	76.8	
	Phase 2	ti+100	77.9	
	Phase 3	ti+100	77.0	
Short-circuit currents in A	Phase 1	ti+150	76.6	

		Phase 2	ti+150	77.9
		Phase 3	ti+150	77.0
	Short-circuit currents in A	Phase 1	ti+300	76.8
		Phase 2	ti+300	77.9
		Phase 3	ti+300	77.0
	Short-circuit currents in A	Phase 1	ti+500	76.7
		Phase 2	ti+500	77.9
		Phase 3	ti+500	77.0
	Short-circuit currents in A	Phase 1	ti+1000	76.8
		Phase 2	ti+1000	78.0
	Phase 3	ti+1000	77.1	
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.014
		Neg	td+1 s to td+10 s	0.001
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.075
	Active Power	Total	td+1 s to td+10 s	0.074
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.013
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.076
		Neg	td+1 s to td+10 s	0.003
	the of the Active Power in sec	Pos		0.002
Transient overvoltage capacity	Connected		YES	

Note: The determined K-factor is lower than the configured in the EUT (K=6) because the current is limited.

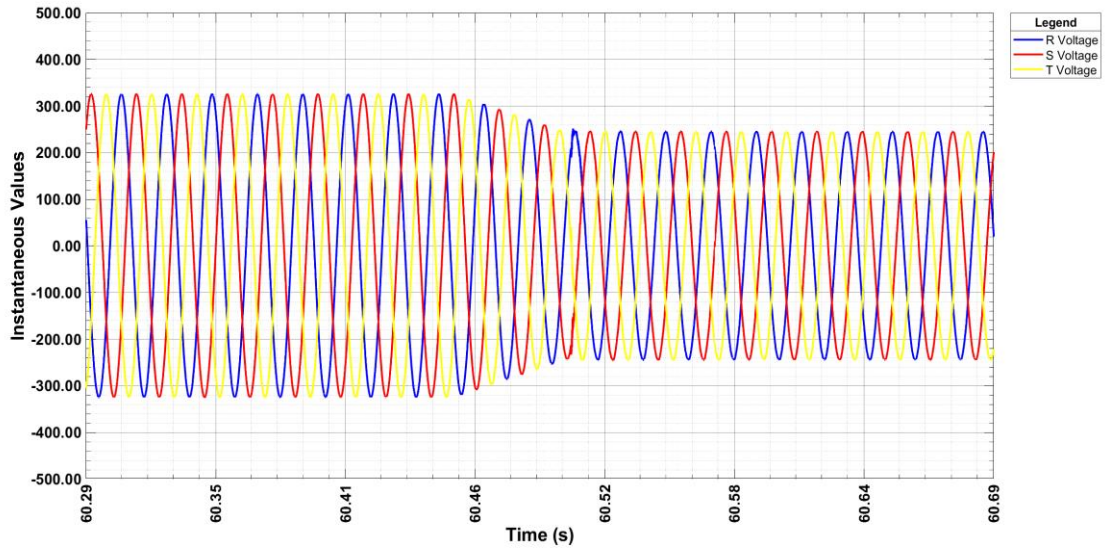




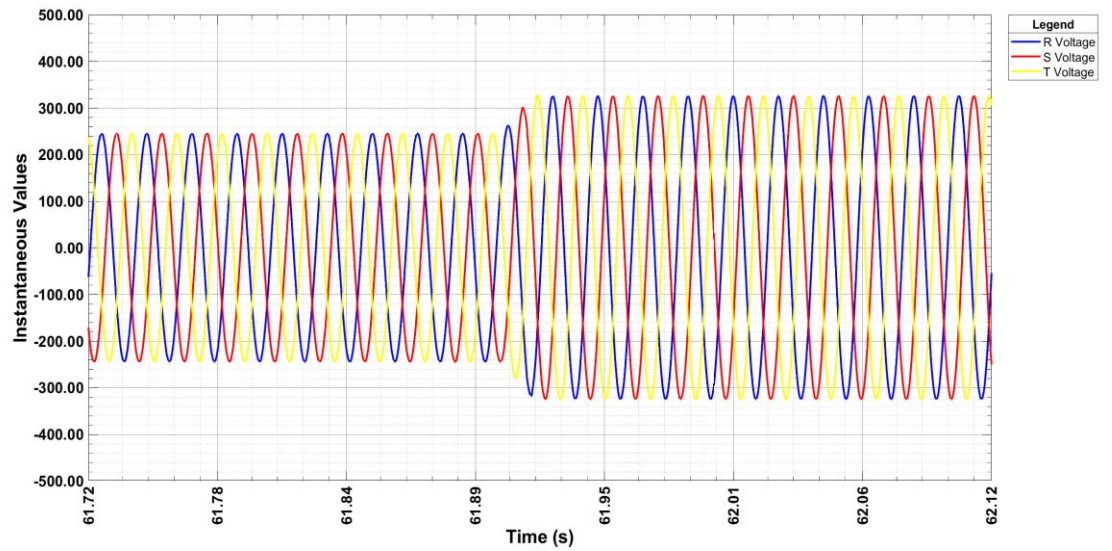


**Test U75TPmin**

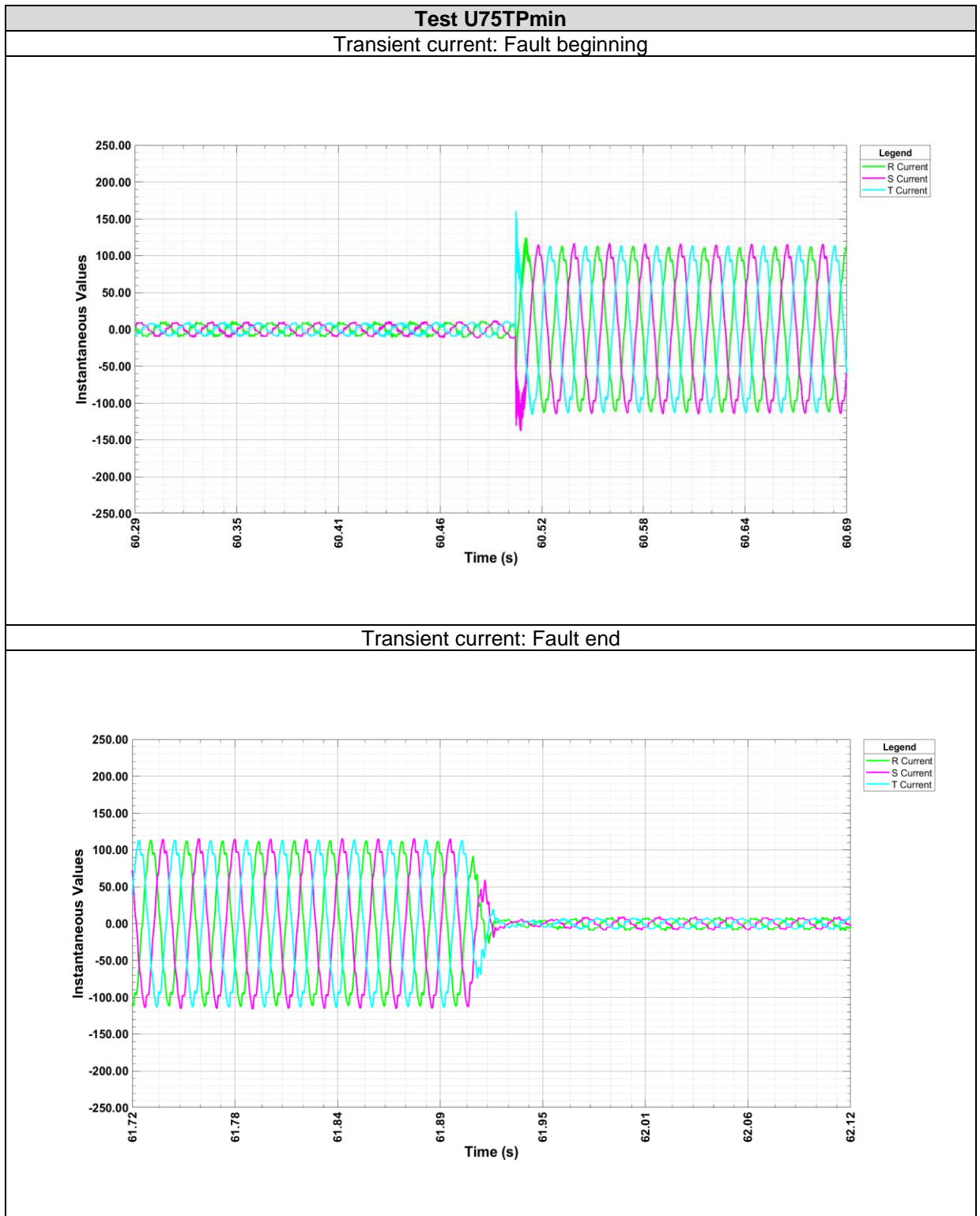
Transient voltage: Fault beginning



Transient voltage: Fault end



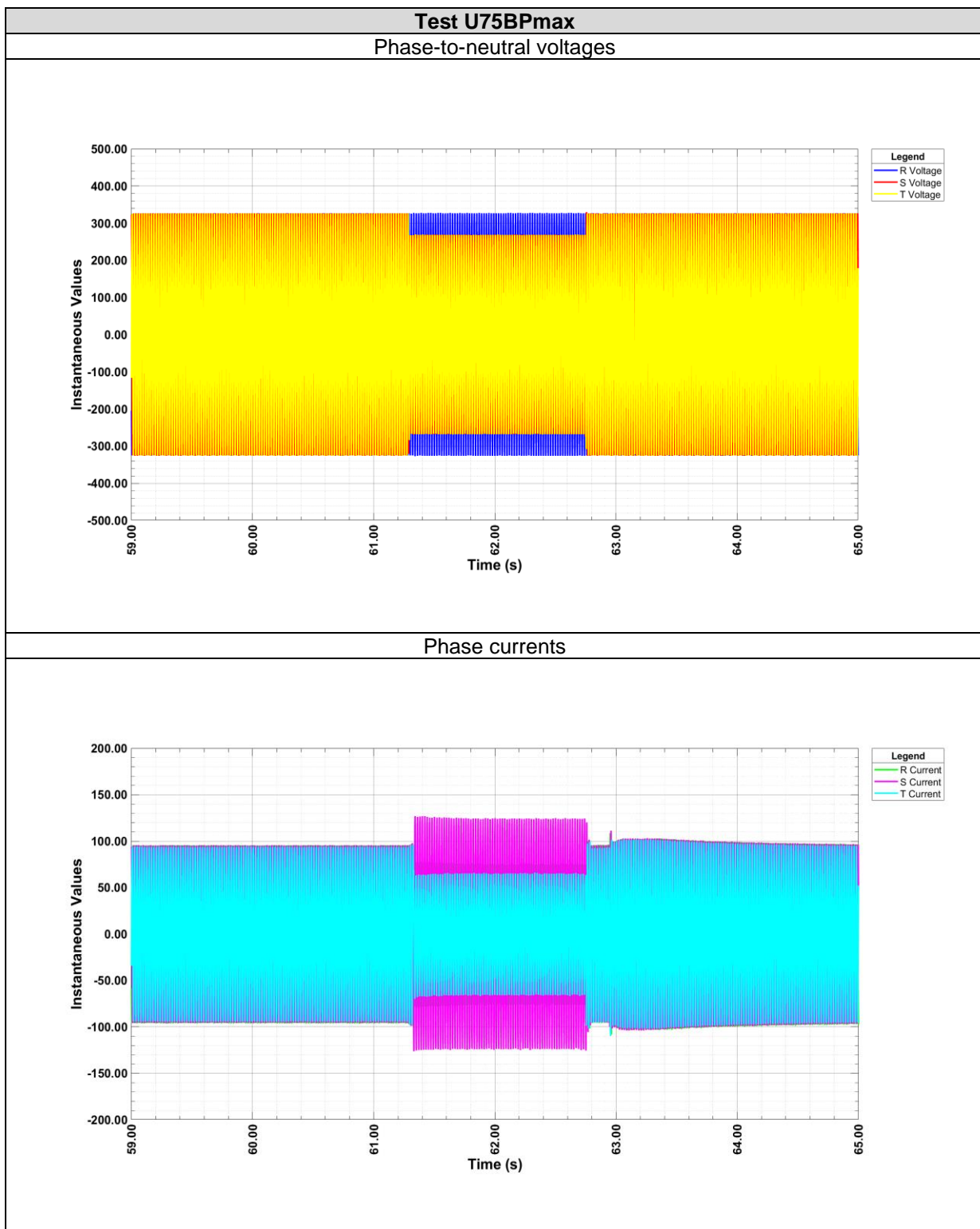




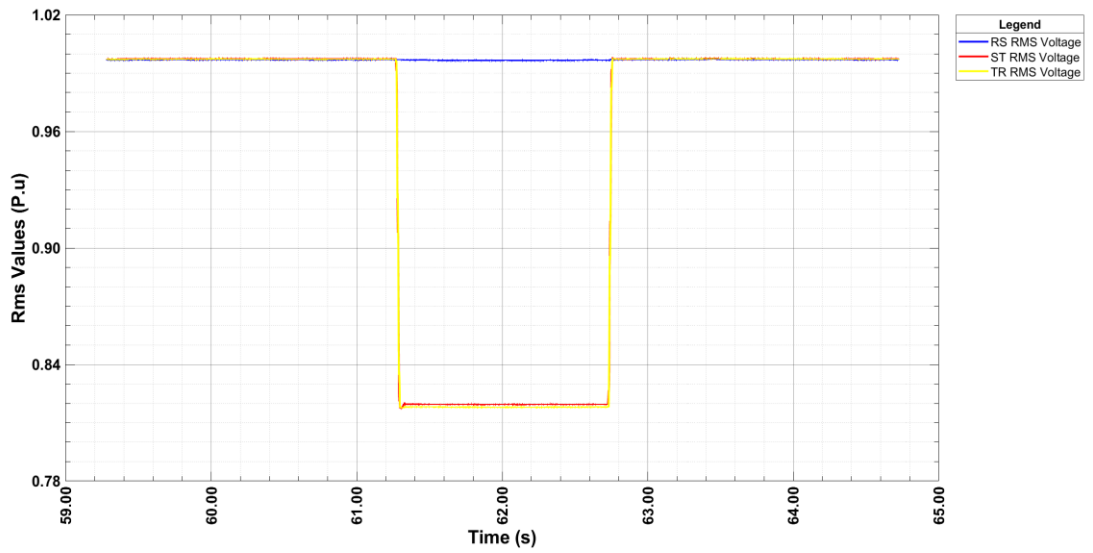
### 3.1.3.6 Test U75BPmax Fault type: 2 phases, Full load

General Information	Test type			U75BPmax
	Fault type			Two Phase
	Fault occurrence ti (sec)			61.279
	Fault clearance td (sec)			62.745
	Fault time (sec)			1.466
	Measured time (s)			72.740
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.997
			2) ti-500 ms to ti-100 ms	0.997
			3) ti-1 s to ti	0.997
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.841
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.003
			ti-1 s to ti	0.003
		Neg.	ti-1 s to ti	0.004
			Active Current (p.u)	Pos.
	Active Power (p.u)	Total	ti-10 s to ti	0.842
			ti-2 s to ti	0.842
		Pos.	ti-500 ms to ti-100 ms	0.842
			Reactive Power (p.u)	Pos.
FAULT	Factor k	Pos. (K1)		-3.4
		Neg. (K2)		3.3
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.032
		Neg.		0.000
	Settling time in sec (te)	Pos.		0.043
		Neg.		0.044
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.873
		Neg.	ti+100 ms to td-20 ms	0.124
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.418
		Neg.	ti+100 ms to td-20 ms	-0.396
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.554
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.694
		Neg.	ti+100 ms to td-20 ms	0.411
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.499
		Pos.	ti+100 ms to td-20 ms	0.486
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.367
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
Short-circuit currents in A	Phase 1	ti+20	--	
	Phase 2	ti+20	--	
	Phase 3	ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	

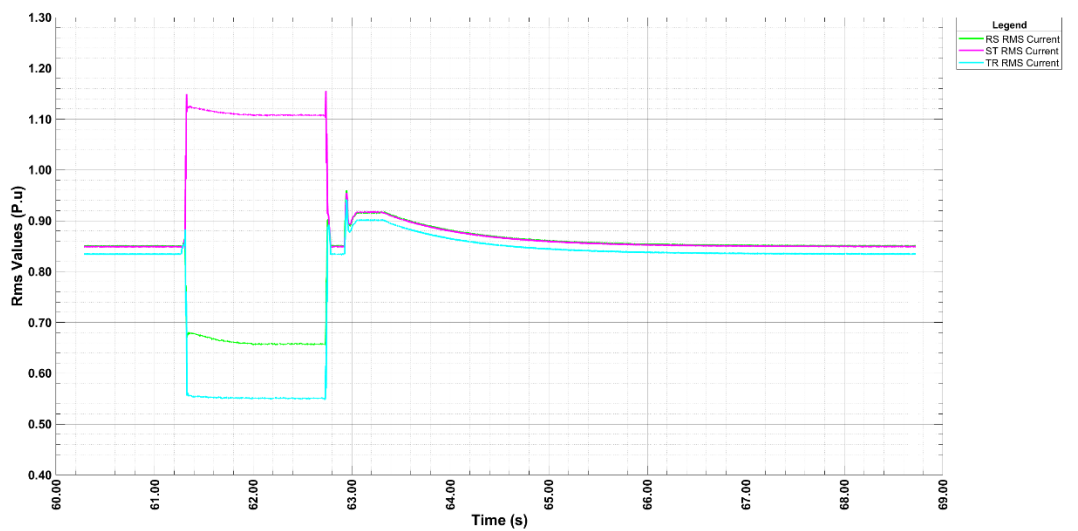
		Phase 3	ti+150	--
	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.003
		Neg	td+1 s to td+10 s	0.004
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.845
	Active Power	Total	td+1 s to td+10 s	0.846
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.003
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.997
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.845
		Neg	td+1 s to td+10 s	0.010
	the of the Active Power in sec	Pos		0.007
Transient overvoltage capacity	Connected		YES	

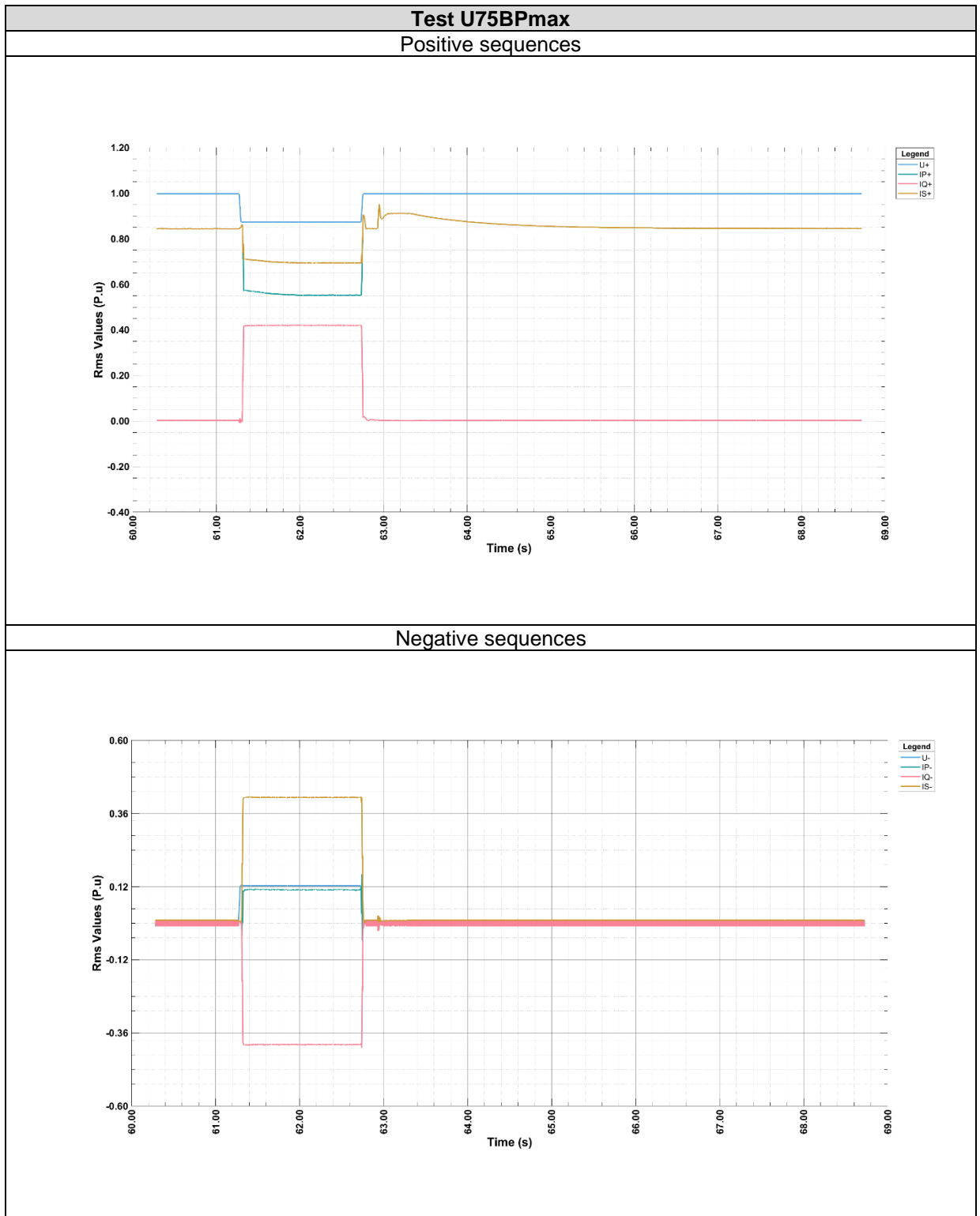


**Test U75BPmax**  
RMS phase to neutral voltages



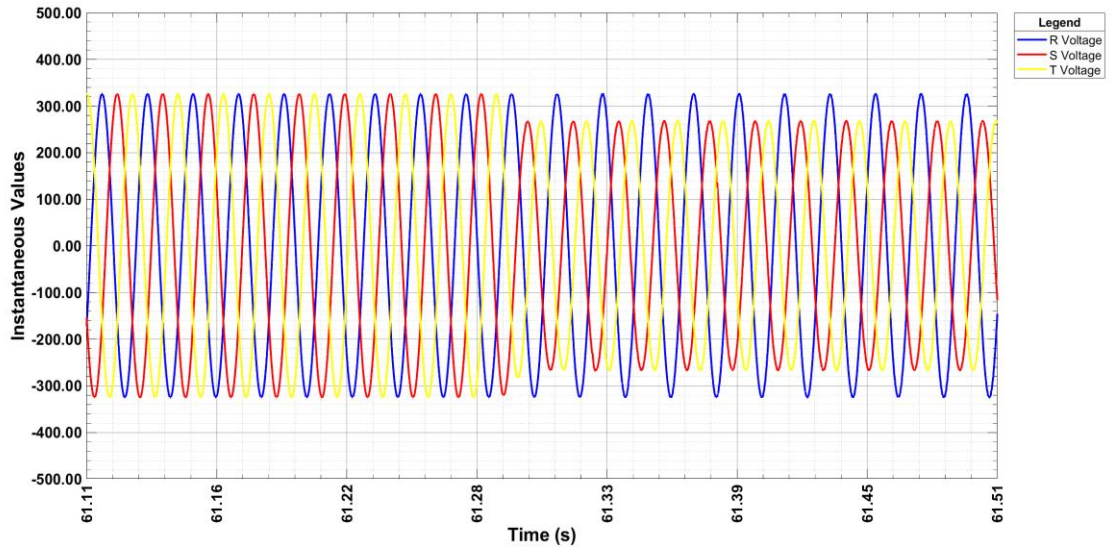
RMS phase currents



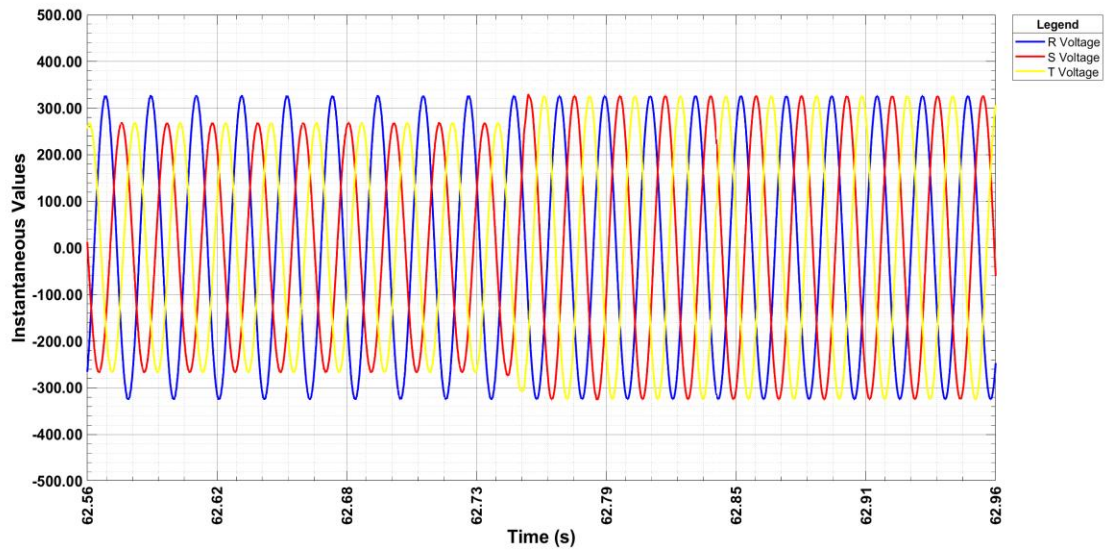


**Test U75BPmax**

Transient voltage: Fault beginning



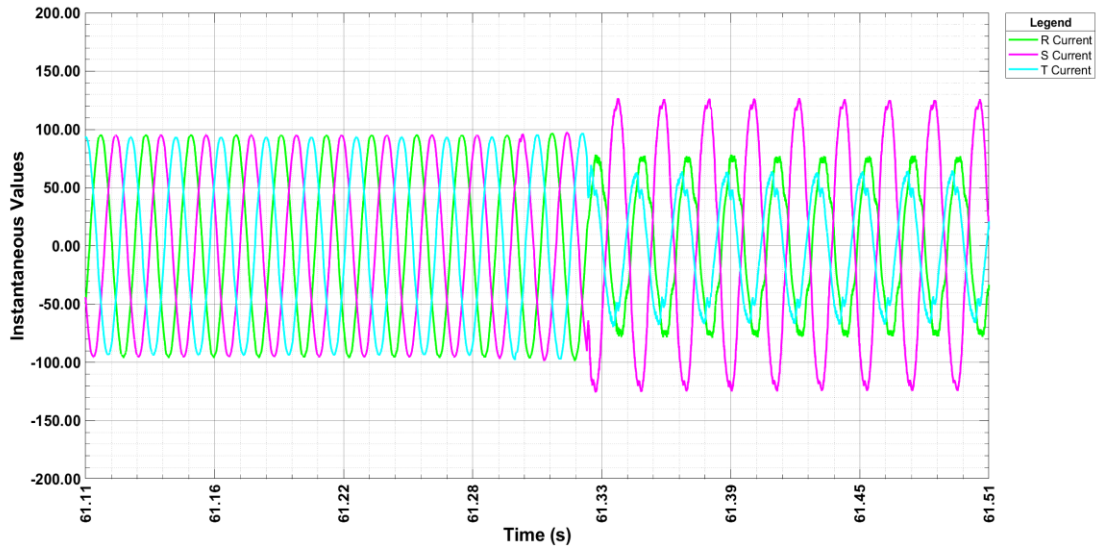
Transient voltage: Fault end



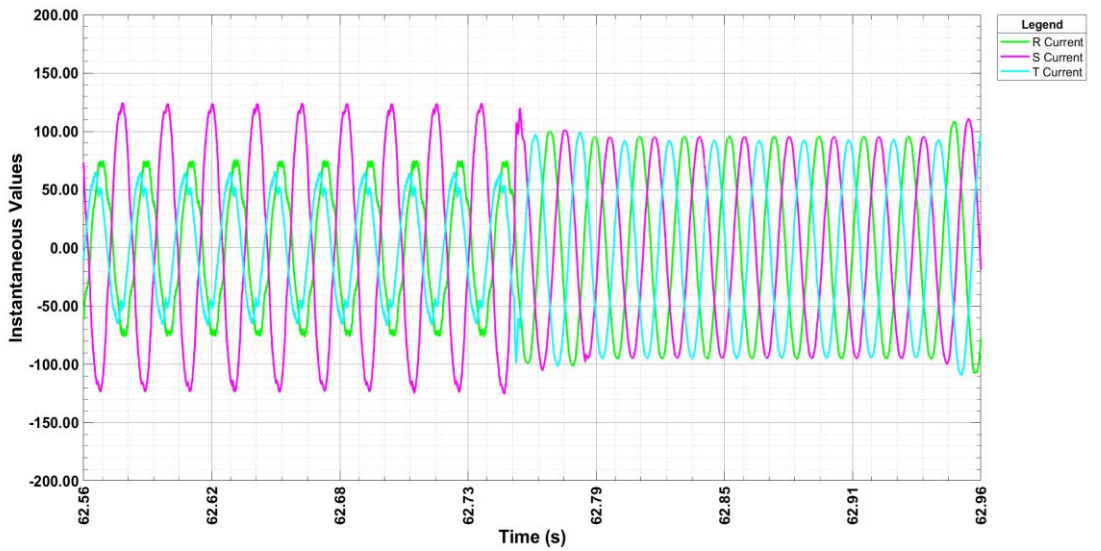


**Test U75BPmax**

Transient current: Fault beginning



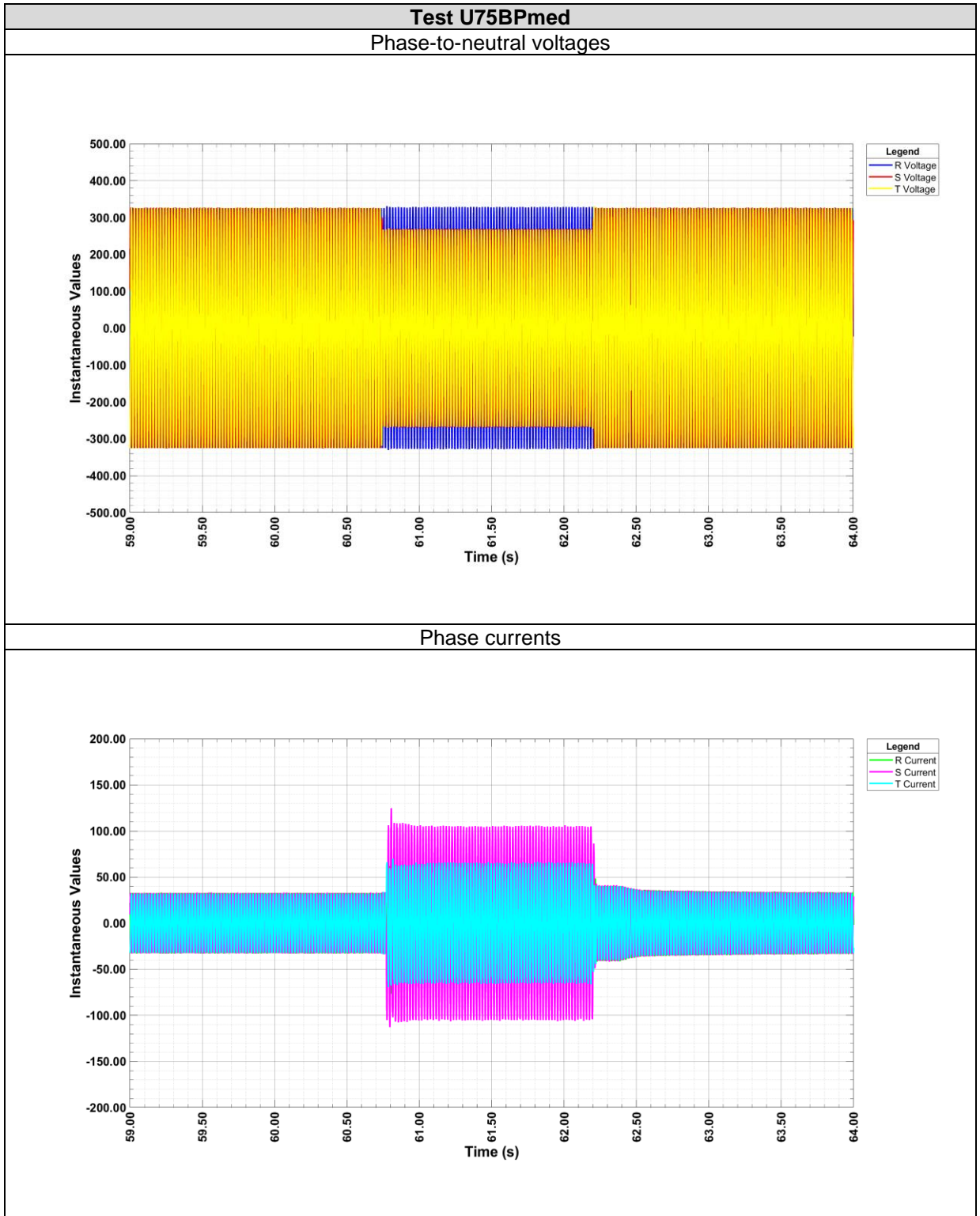
Transient current: Fault end



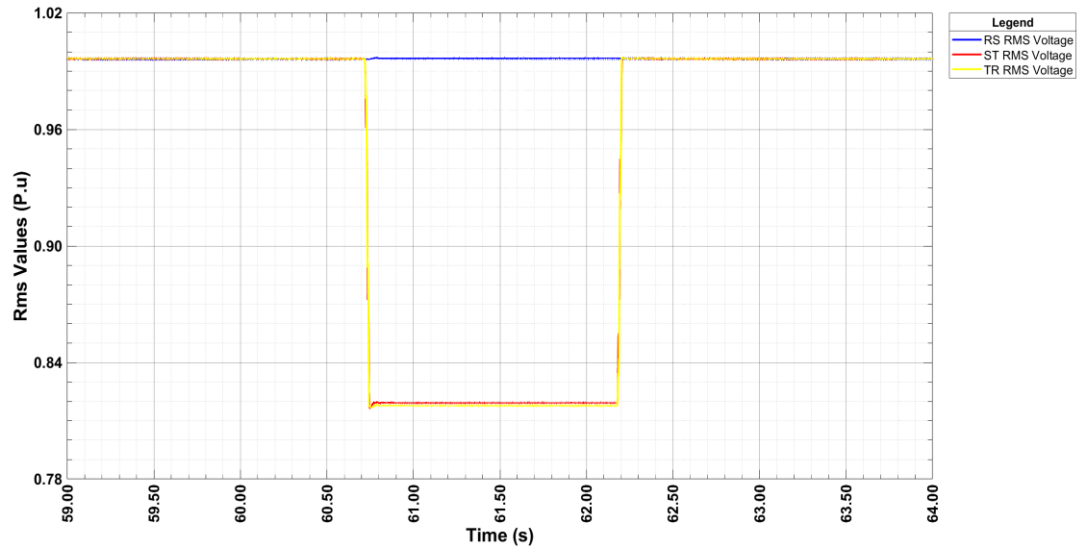
### 3.1.3.7 Test U75BPmed Fault type: 2 phases, Partial load

General Information	Test type			U75BPmed
	Fault type			Two Phase
	Fault occurrence ti (sec)			60.732
	Fault clearance td (sec)			62.193
	Fault time (sec)			1.462
	Measured time (s)			72.190
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.287
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.011
			ti-1 s to ti	0.011
		Neg.	ti-1 s to ti	0.002
			ti-1 s to ti	0.287
	Active Current (p.u)	Pos.	ti-1 s to ti	0.287
	Active Power (p.u)	Total	ti-10 s to ti	0.287
			ti-2 s to ti	0.287
	Pos.	ti-500 ms to ti-100 ms	0.287	
		ti-500 ms to ti-100 ms	0.011	
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.011	
FAULT	Factor k	Pos. (K1)		-3.3
		Neg. (K2)		3.3
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.024
		Neg.		0.000
	Settling time in sec (te)	Pos.		0.036
		Neg.		0.035
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.873
		Neg.	ti+100 ms to td-20 ms	0.123
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.416
		Neg.	ti+100 ms to td-20 ms	-0.398
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.351
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.544
		Neg.	ti+100 ms to td-20 ms	0.407
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.318
		Pos.	ti+100 ms to td-20 ms	0.308
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.365
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
	Short-circuit currents in A	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
	Short-circuit currents in A	Phase 1	ti+100	--
		Phase 2	ti+100	--
Phase 3		ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	
	Phase 3	ti+150	--	

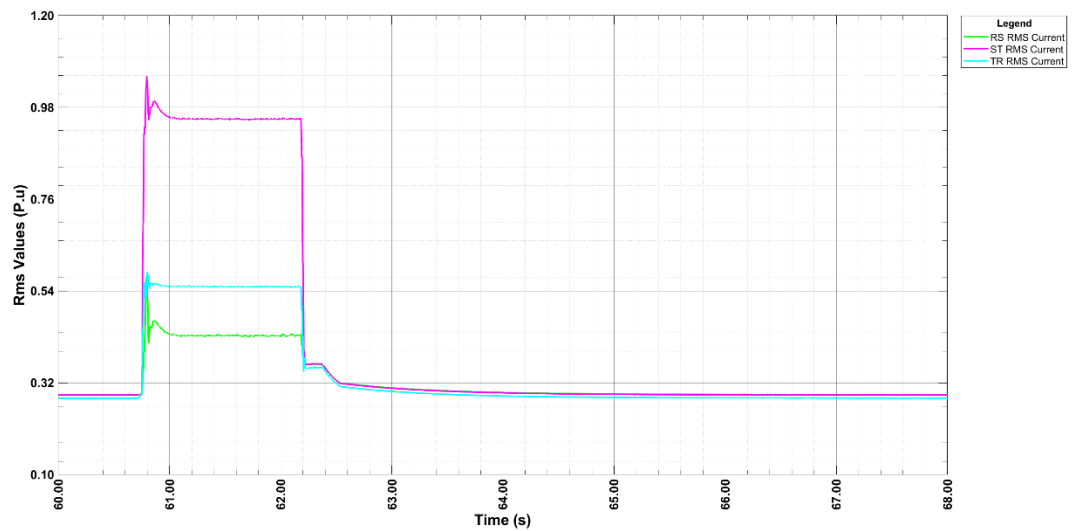
		Phase 3	ti+150	--
	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
		Phase 3	ti+1000	--
	Capacity to withstand the voltage dip	Connected		YES
POST-FAULT	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.011
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.288
	Active Power	Total	td+1 s to td+10 s	0.288
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.011
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.288
		Neg	td+1 s to td+10 s	0.005
	the of the Active Power in sec	Pos		0.000
Transient overvoltage capacity	Connected		YES	



**Test U75BPmed**  
RMS phase to phase voltages

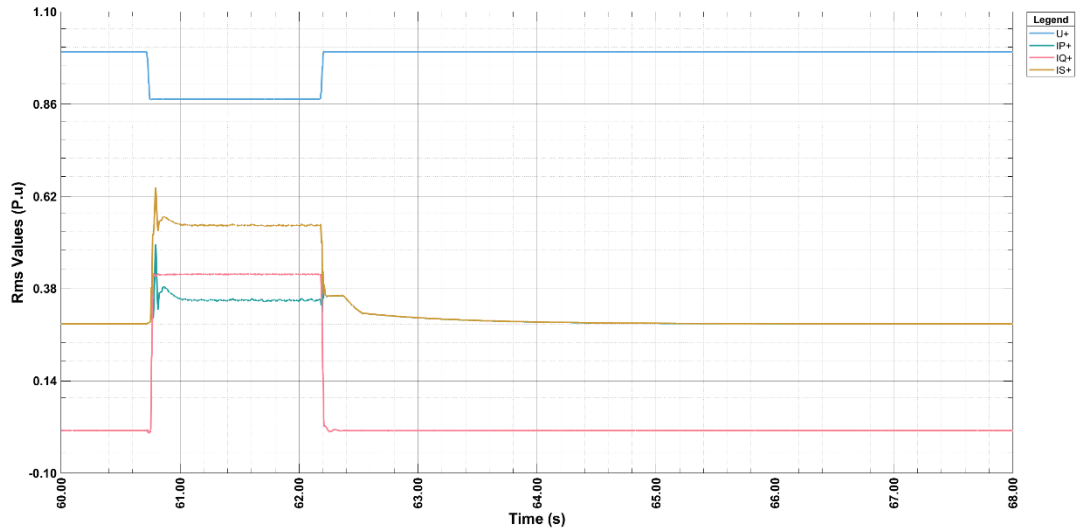


RMS phase currents

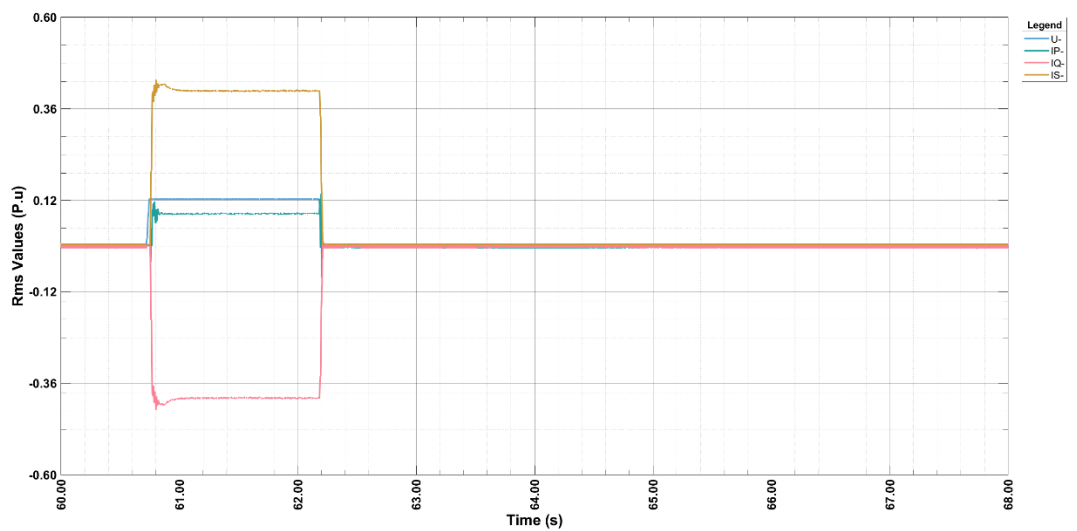


**Test U75BPmed**

Positive sequences



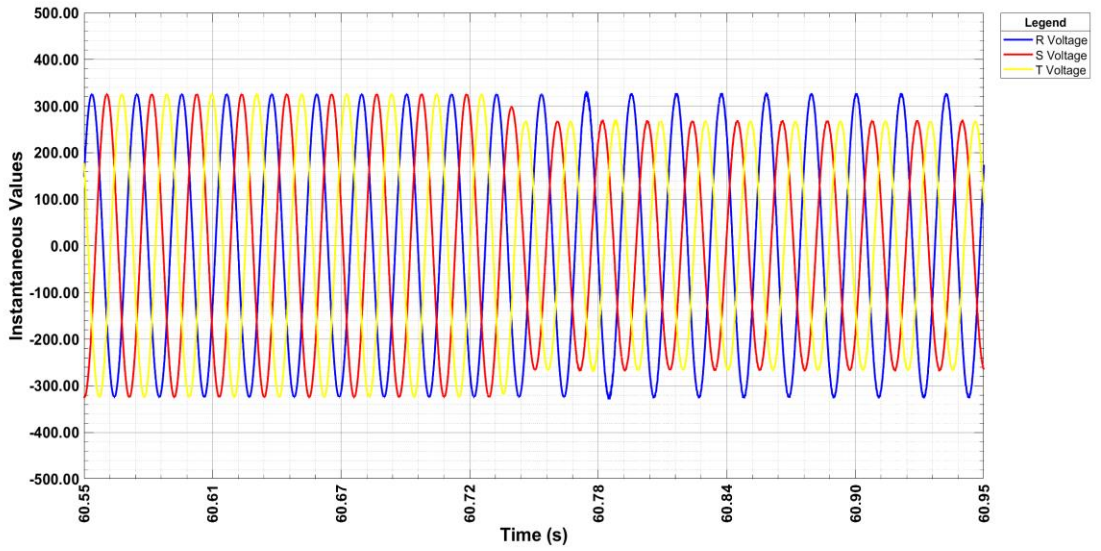
Negative sequences



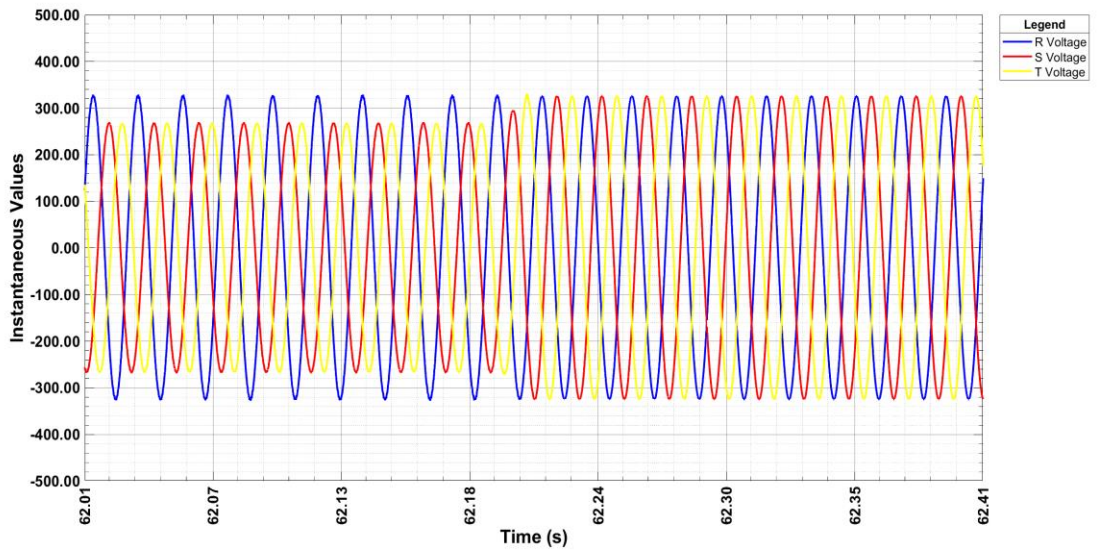


**Test U75BPmed**

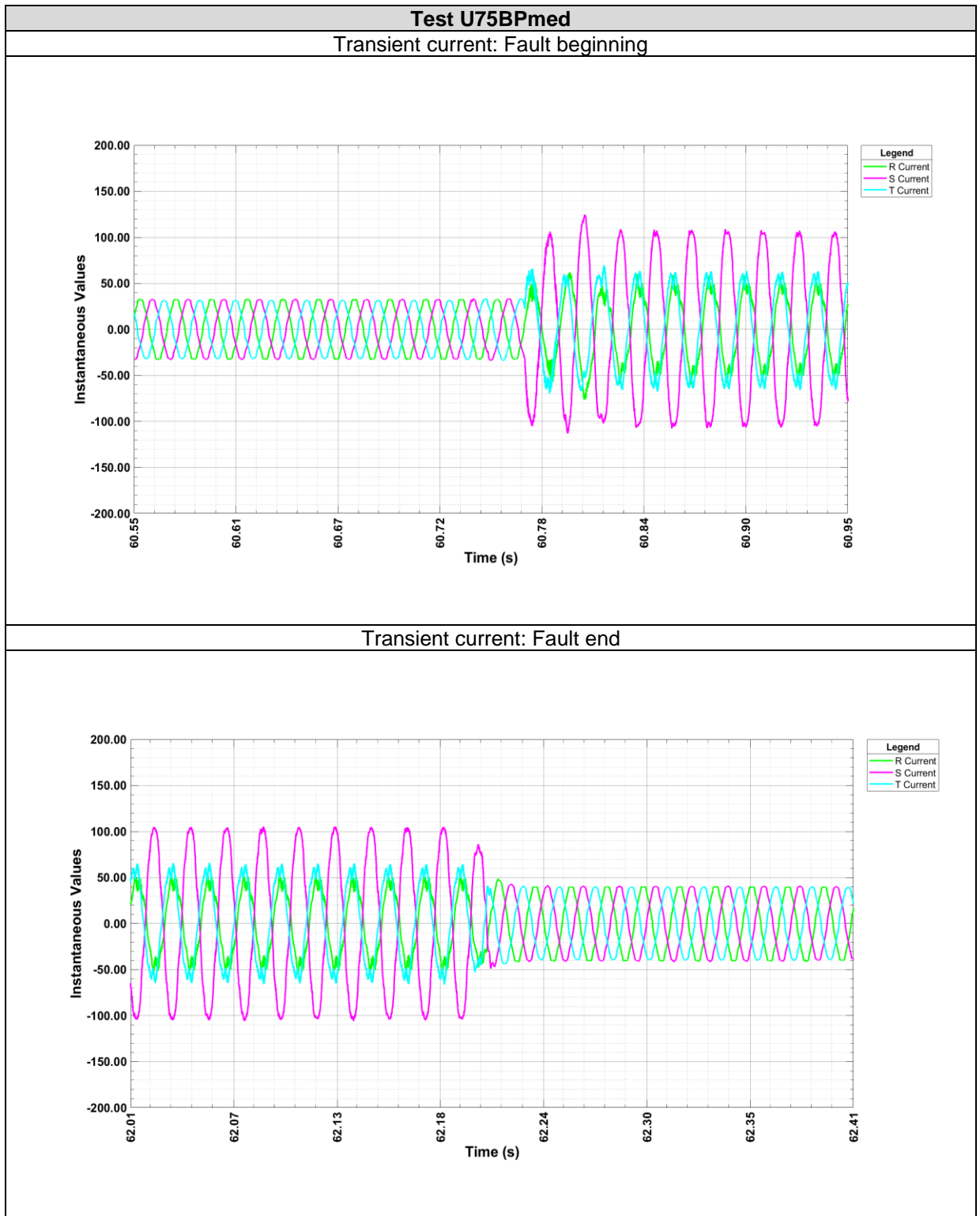
Transient voltage: Fault beginning



Transient voltage: Fault end





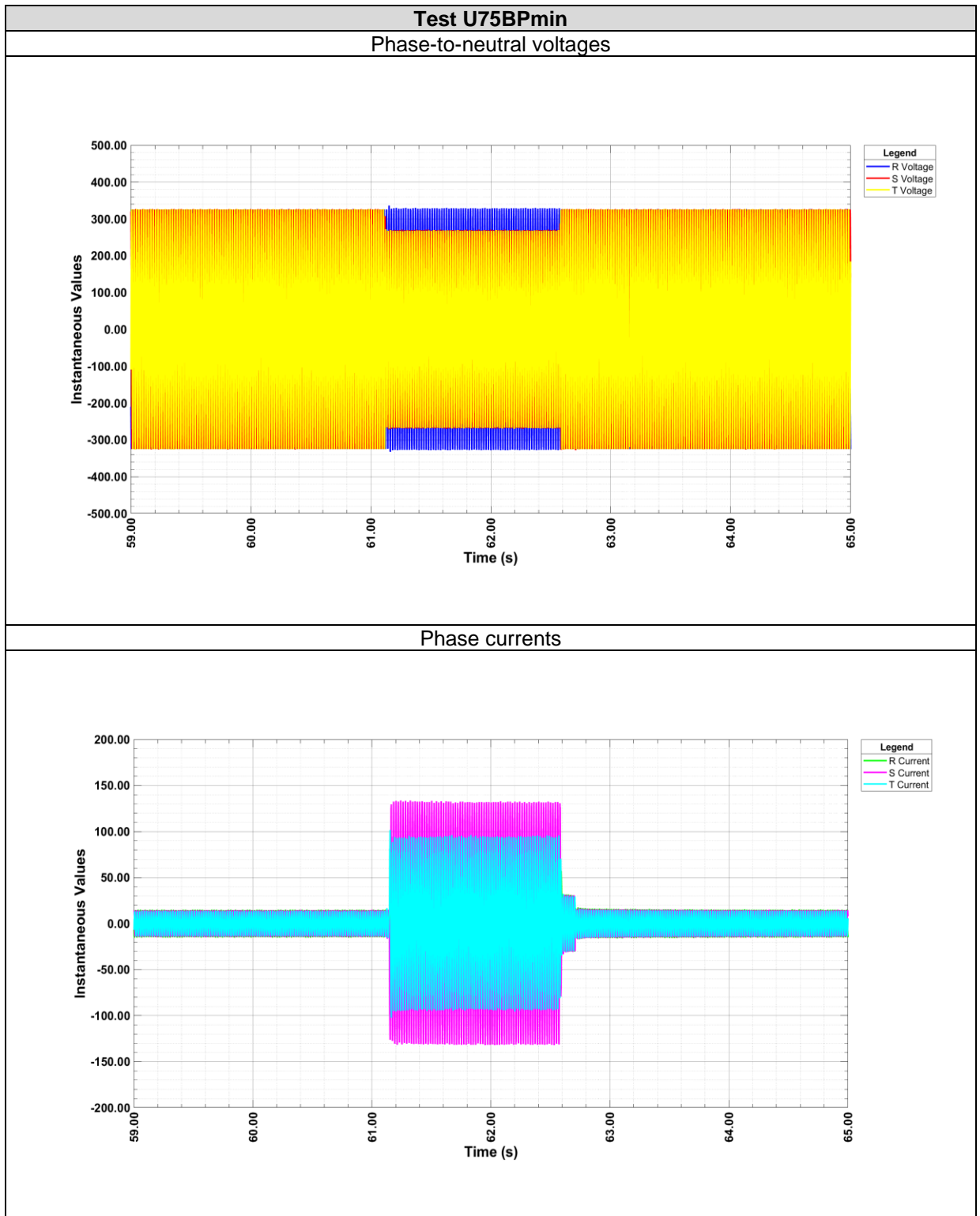


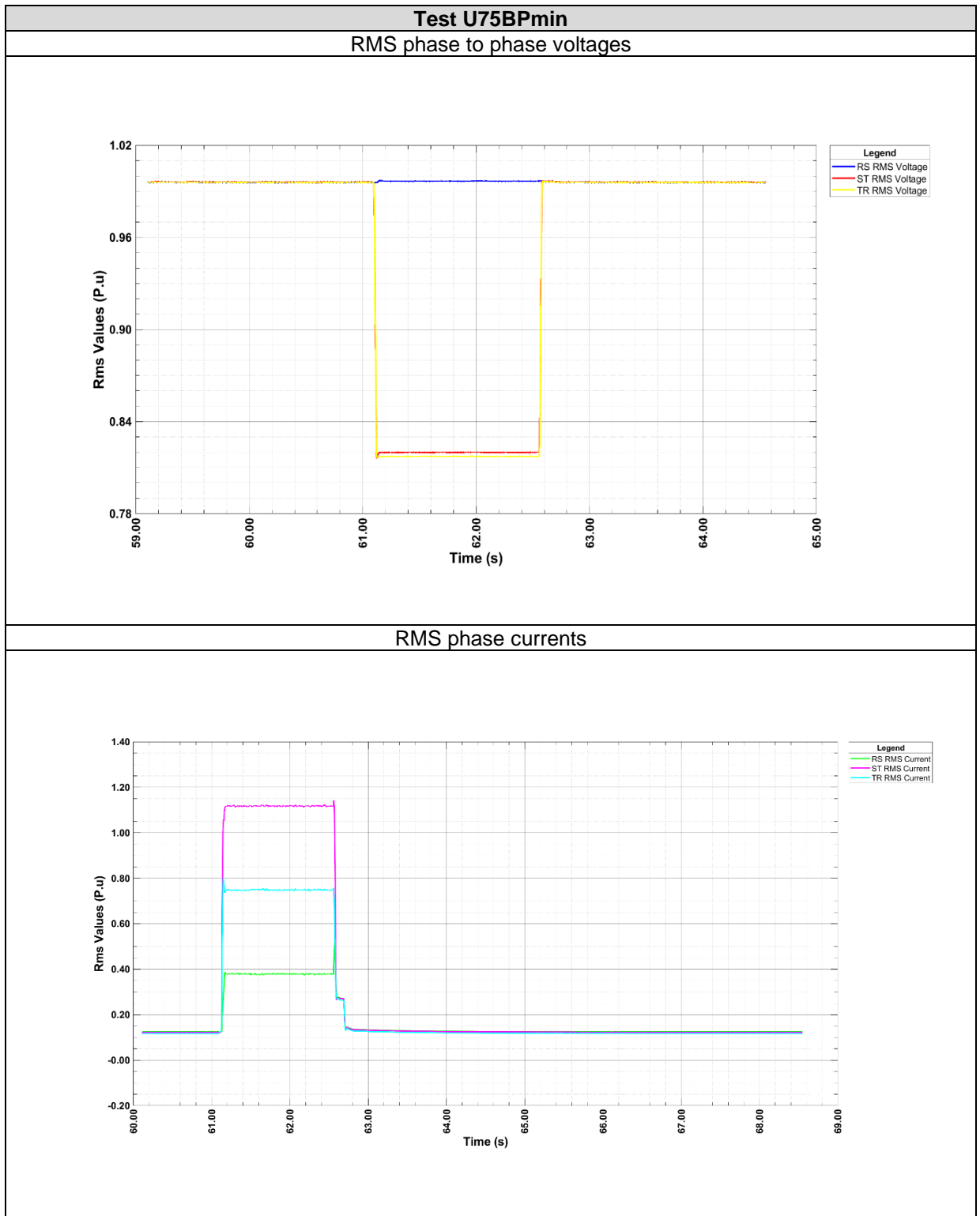
### 3.1.3.8 Test U75BPmin Fault type: 2 phases, Partial load, k=6

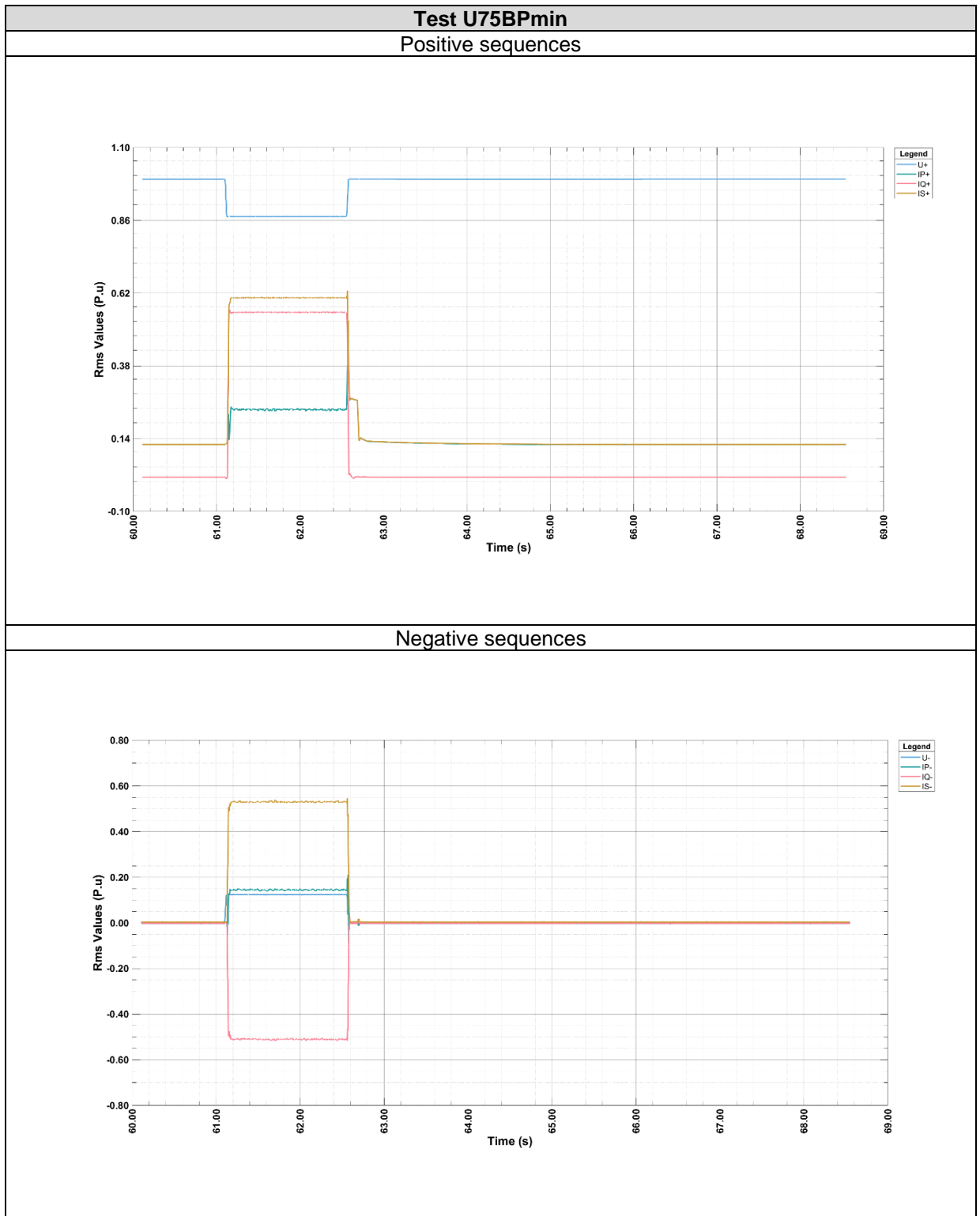
General Information	Test type			U75BPmin
	Fault type			Two Phase
	Fault occurrence ti (sec)			61.108
	Fault clearance td (sec)			62.573
	Fault time (sec)			1.465
	Measured time (s)			72.567
PRE-FAULT	Parameter	Phase Reference	Reference Time	Measured
	Voltage(p.u.)	Pos.	1) ti-60 s to t1	0.996
			2) ti-500 ms to ti-100 ms	0.996
			3) ti-1 s to ti	0.996
		Neg.	1) ti-60 s to t1	0.000
			2) ti-500 ms to ti-100 ms	0.000
			3) ti-1 s to ti	0.001
	Current (p.u)	Pos.	ti-500 ms to ti-100 ms	0.120
	Reactive Current (p.u)	Pos.	ti-60 s to ti	0.013
			ti-1 s to ti	0.013
		Neg.	ti-1 s to ti	0.002
	Active Current (p.u)	Pos.	ti-1 s to ti	0.120
	Active Power (p.u)	Total	ti-10 s to ti	0.120
			ti-2 s to ti	0.120
		Pos.	ti-500 ms to ti-100 ms	0.120
Reactive Power (p.u)	Pos.	ti-500 ms to ti-100 ms	0.013	
FAULT	Factor k	Pos. (K1)		-4.4
		Neg. (K2)		4.1
	Activation time in sec (ta)	Pos.		0.000
	Rise Time in sec from ti(tr)	Pos.		0.023
		Neg.		0.000
	Settling time in sec (te)	Pos.		0.035
		Neg.		0.035
	Voltage (p.u)	Pos.	ti+100 ms to td-20 ms	0.873
		Neg.	ti+100 ms to td-20 ms	0.123
	Reactive Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.554
		Neg.	ti+100 ms to td-20 ms	-0.508
	Active Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.235
	Apparent Current (p.u)	Pos.	ti+100 ms to td-20 ms	0.602
		Neg.	ti+100 ms to td-20 ms	0.528
	Active Power (p.u)	Total	ti+100 ms to td-20 ms	0.224
		Pos.	ti+100 ms to td-20 ms	0.206
	Reactive Power (p.u)	Pos.	ti+100 ms to td-20 ms	0.486
	Short-circuit currents (Max Instant, value in A)	Phase 1	ti+20	--
		Phase 2	ti+20	--
		Phase 3	ti+20	--
Short-circuit currents in A	Phase 1	ti+20	--	
	Phase 2	ti+20	--	
	Phase 3	ti+20	--	
Short-circuit currents in A	Phase 1	ti+100	--	
	Phase 2	ti+100	--	
	Phase 3	ti+100	--	
Short-circuit currents in A	Phase 1	ti+150	--	
	Phase 2	ti+150	--	

		Phase 3	ti+150	--
	Short-circuit currents in A	Phase 1	ti+300	--
		Phase 2	ti+300	--
		Phase 3	ti+300	--
	Short-circuit currents in A	Phase 1	ti+500	--
		Phase 2	ti+500	--
		Phase 3	ti+500	--
	Short-circuit currents in A	Phase 1	ti+1000	--
		Phase 2	ti+1000	--
	Phase 3	ti+1000	--	
	Capacity to withstand the voltage dip	Connected		YES
POST- FAUTL	Reactive Current (piu)	Pos.	td+1 s to td+10 s	0.013
		Neg	td+1 s to td+10 s	0.002
	Active Current (pp.)	Pos.	td+1 s to td+10 s	0.120
	Active Power	Total	td+1 s to td+10 s	0.120
	Reactive Power (put)	Pos.	td+1 s to td+10 s	0.013
	Voltage(piu.)	Pos.	td+1 s to td+10 s	0.996
		Neg	td+1 s to td+10 s	0.000
	Current (put)	Pos.	td+1 s to td+10 s	0.121
		Neg	td+1 s to td+10 s	0.004
the of the Active Power in sec	Pos		0.000	
Transient overvoltage capacity	Connected		YES	

Note: The determined K-factor is lower than the configured in the EUT (K=6) because the current is limited.

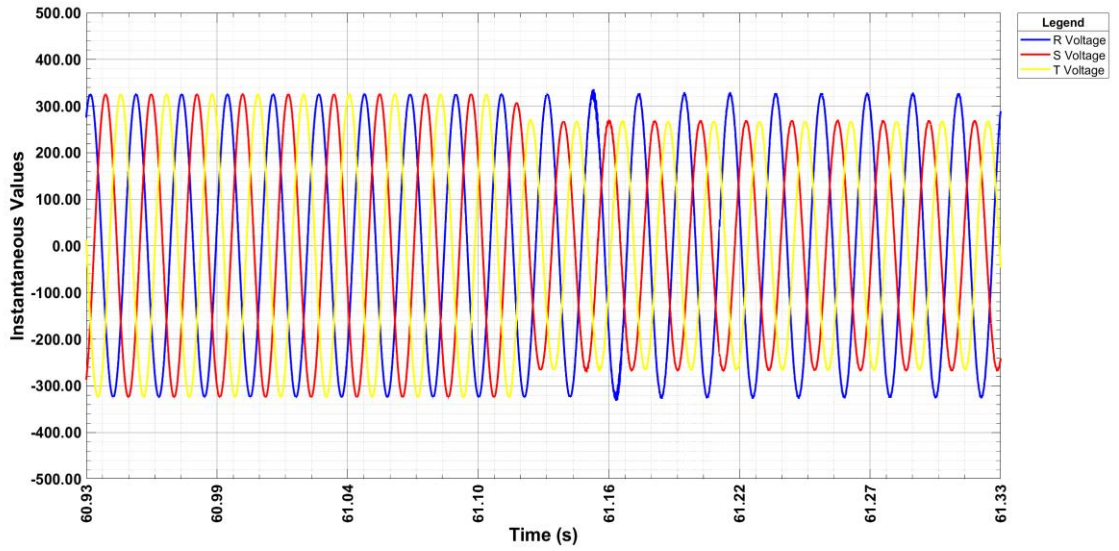




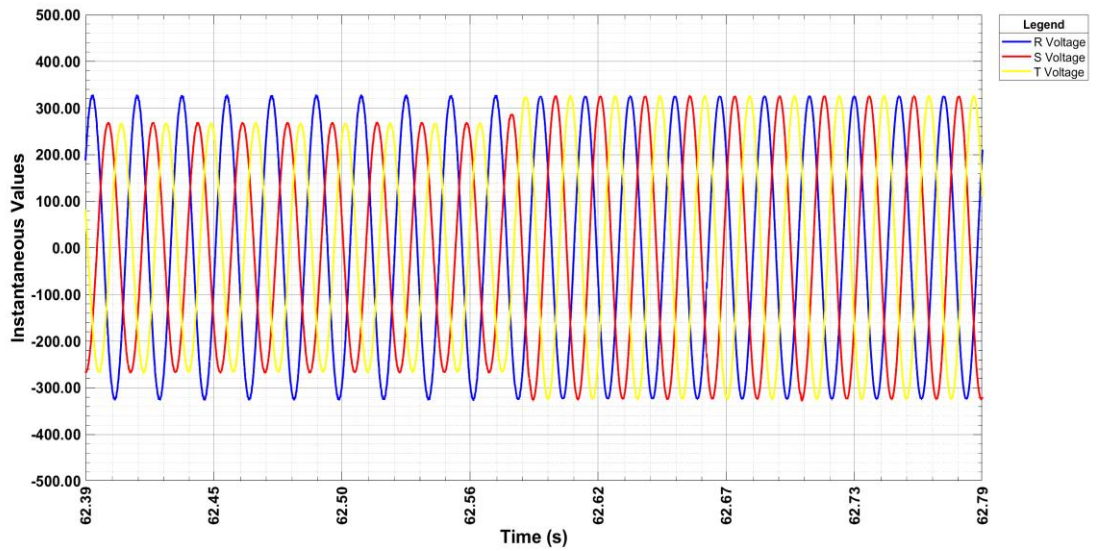


**Test U75BPmin**

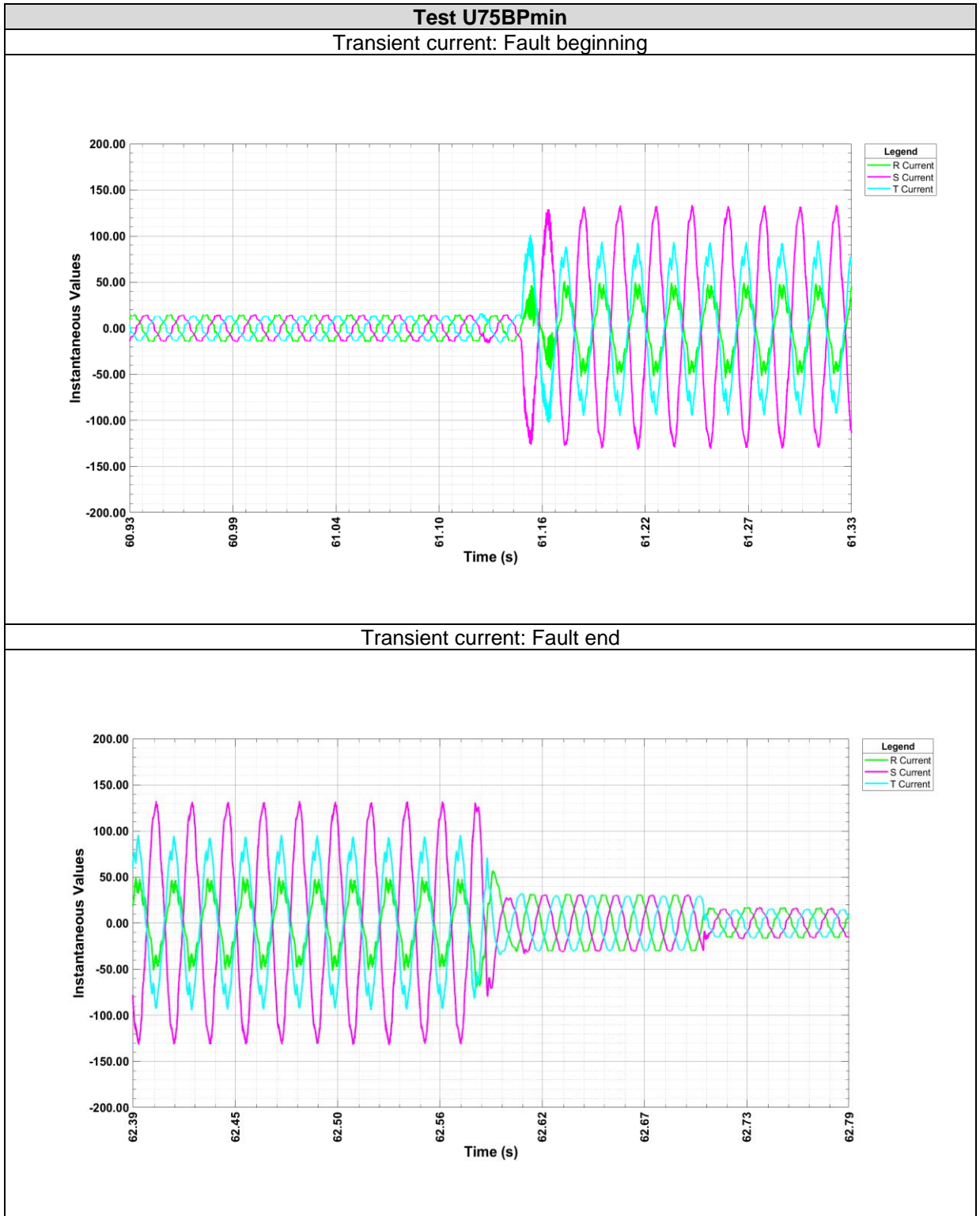
Transient voltage: Fault beginning



Transient voltage: Fault end







----- END OF THE ATTACHMENT -----