

# ANNEX TO THE CERTIFICATE

## 230039RECO06-M1-CER

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### Document Historical Revision:

Document Version	Date	Resume
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**This document is created based on requirements of FGW Technical Guidelines for Power Generating Units, Systems and Storage Systems as well as for their Components. Part 8 (TG8). Certification of the Electrical Characteristics of Power Generating Units, Systems and Storage Systems as well as their Components on the Grid. Revision 09. Dated 01/02/2019.**

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## 1 OVERVIEW OF THE FGW TR8 EVALUATION REPORT

This point of this annex of the certificate no. 230039RECO06-M1-CER contains the information of all items and documentation used for the evaluation of compliance of the certified product according to standards VDE-AR-N 4110: 2018-11, FGW-Richlinie TR 3 Rev. 25 (including supplement 1, dated on 22/01/2019) and FGW-Richlinie TR 4 Rev. 9.

The information contained in this point is extracted from the SGS Evaluation Report Number: 230039RECO06-M1 rev0 with date on 18/07/2023 according of FGW TR8 rev. 9.

The evaluation performed by SGS comprises the checking in compliance with following requirements:

Evaluation:	Remarks	Result		
<b>Keys:</b> P.....Pass. NC.....Not Comply NA.....Not Applicable				
Checking of the PGU tested	<b>See point 1.1 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Checking of the variant models to be included in the certification process	<b>See point 1.2 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Review Test Report according FGW TG3 per VDE-AR-N 4110: 2018 certification	<b>See point 1.3 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Review Test Report according FGW TG3 per VDE-AR-N 4120: 2018 certification	<b>See point 1.2 of this document</b>	<input type="checkbox"/> P	<input type="checkbox"/> NC	<input checked="" type="checkbox"/> NA
Review Test Report according FGW TG4.	<b>See point 1.4 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Quality system certificate according to ISO 9001	<b>See point 1.5 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Compromise letter of maintain ISO 9001 certified during the validity period of VDE certificate.	<b>See point 1.6 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA
Compromise letter of product to certify is the same that the product tested, and transferability acceptance of non-tested PGU.	<b>See point 1.7 of this document</b>	<input checked="" type="checkbox"/> P	<input type="checkbox"/> NC	<input type="checkbox"/> NA

## 1.1 Information about the tested model.

### Information appearing in the application form (CPR1FRM5):

- **Date of the application form:** 26/06/2023
- **Applicant:** Zucchetti Centro Sistemi SpA
- **License holder:** Zucchetti Centro Sistemi SpA <sup>(1)</sup>
- **Factories:** Dongguan SOFAR SOLAR Co., Ltd.
  - 1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, P.R. China.
- **Product:**
  - Type: Solar Grid-Tied Inverter
  - Trademark: ZCS
  - Base model: AZZURRO 3PH 125KTL-V4-A
  - Input: 180-1000 Vdc MPPT(1100 Vdc max.); 10\*40 Adc Max.
  - Output: 3/N/PE, 230 V/400 V; 50/60 Hz; 181.2 Aac; 125 kW.
  - Control software version: V000001
  - Variant models: AZZURRO 3PH 100KTL-V4, AZZURRO 3PH 110KTL-V4 <sup>(1)</sup>

<sup>(1)</sup> Clauses 4.3.2 (Flickers), 4.3.3(Harmonic) and 4.3.4(Unbalances) were performed on these models.

### Certification service applied:

Certification of PV Inverter according to VDE-AR-N 4110: 2018-11.

### Information appearing in the test report according to FGW TG3:

- **Manufacturer:** Shenzhen SOFARSOLAR Co., Ltd.
  - **Product:**
    - Type: Solar Grid-Tied Inverter
    - Trademark: SOFAR SOLAR
    - Base model: SOFAR 125KTLX-G4-A
    - Input: 180-1000 Vdc MPPT(1100 Vdc max.); 10\*40 Adc Max.
    - Output: 3/N/PE, 230 V/400 V; 50/60 Hz; 181.2 Aac; 125 kW.
    - Control software version: V000001
    - Variant models: , SOFAR 110KTLX-G4, SOFAR 125KTLX-G4 <sup>(1)</sup>
- <sup>(1)</sup> Clauses 4.3.2 (Flickers), 4.3.3(Harmonic) and 4.3.4(Unbalances) were performed on these models

<sup>(2)</sup> This is an application for issuance of co-license based on the certificate 230039RECO06-CER.  
As declared by the manufacturer, the model SOFAR 125KTLX-G4-A is totally equivalent to the co-licensed model AZZURRO 3PH 125KTL-V4-A. Technical ratings, Firmware and start-up and display menus are exactly the same and just the model reference name is different.

The holder of the FGW TG3 report above detailed authorizes the company listed as applicant to apply to use this report in order to apply for this certification.

## 1.2 Information about variant models to be included into the scope of the certification process.

Taking as reference the article 2.12.2 of the standard FGW TG8, revision 9, test results can be transferred from test reports to non-tested units taking into account following items:

- a) The design and the control engineering critical to the electrical characteristics including the software used are equivalent in both PGUs from a technical perspective.
- b) The test results for the smallest and the largest power version are available or alternatively the rated power of the power generation unit to be certified is between  $1/\sqrt{10}$  times and twice (for Type 2 systems) of the rated power of the power generation unit to be measured.

- **Information of the base model:**

Brand name base model: AZZURRO 3PH 125KTL-V4-A <sup>(1)</sup>

Rated output power base model [kW]: 125

Firmware version base model: V000001

After the characteristic given for the tested unit (s), test results can be transferred to other non-tested units of complying with the previously mentioned clause a), having output active power comprised between:

- Lower limit: 39.52 kW ( $1/\sqrt{10}$  x Base model's Rated output power), and
- Upper limit: 200 kW (2 x Base model's Rated output power)

- **Information of the variant models:**

- Brand name variant model no. 1: AZZURRO 3PH 100KTL-V4
- Rated output power variant model no. 2 [kW]: 100
- Firmware version variant model no.2: V000001
- Brand name variant model no. 2: AZZURRO 3PH 110KTL-V4
- Rated output power variant model no. 3 [kW]: 110
- Firmware version variant model no.3: V000001

<sup>(1)</sup> As declared by the manufacturer, the model SOFAR 125KTLX-G4-A is totally equivalent to the co-licensed model AZZURRO 3PH 125KTL-V4-A. Technical ratings, Firmware and start-up and display menus are exactly the same and just the model reference name is different.

The test results on the model AZZURRO 3PH 125KTL-V4-A <sup>(1)</sup> are essentially valid for the derived models AZZURRO 3PH 100KTL-V4, AZZURRO 3PH 110KTL-V4 (equivalent to SOFAR 110KTLX-G4, SOFAR 125KTLX-G4 and SOFAR 125KTLX-G4-A).

The models of AZZURRO 3PH 125KTL-V4-A <sup>(1)</sup> are essentially valid for the derived models AZZURRO 3PH 100KTL-V4, AZZURRO 3PH 110KTL-V4 (equivalent to SOFAR 110KTLX-G4, SOFAR 125KTLX-G4 and SOFAR 125KTLX-G4-A). are identical on topological schematic circuit diagram and control solution codes except for the type designation, the input/output rating.

### 1.3 Summary of the evaluation of the test results

The following documentation is used for the evaluation:

- **Information of the test report:**
  - Test report number: 230039RECO06
  - Issuance date: 02/06/2023
  - Testing laboratory: SGS Tecnos, S.A. (Electrical Testing Laboratory).
  - Accreditation number of the laboratory: N° 5/LE011.
  
- **Information of the manufacturer declaration:**
  - Document reference name: 3.Sofar's declaration—125KTLX-G4-A (TG8) (1)
  - Issuance date: 19/04/2023.
  - Issued by: Shenzhen SOFARSOLAR Co., Ltd
  - Signed by: Wanghui, Standard and Certification Engineer

(1) As declared by the manufacturer, the information declared for the model SOFAR 125KTLX-G4-A is exactly the same for co-licensed (ZCS) model AZZURRO 3PH 125KTL-V4-A .

FGW TG8	Title				Result
A.1.2.1 A.2.2.1	Physical part				--
A.1.2.1.1 A.2.2.1.1	Dimensioning of the equipment at the substation				--
	Not applicable to PGU				NA
A.1.2.2 A.2.2.2	Operating range				P
A.1.2.2.1 A.2.2.2.1	Quasi-steady-state operation				--
A.1.2.2.1.1 A.2.2.2.1.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.2.1.2	11.2.3.1 11.2.4 11.2.5.5	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.1.2	11.2.3.1 11.2.4 11.2.5.4	TG3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
Evaluated documentation:					
<p>- <b>Manufacturer declaration:</b>                      "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023                      Compliance is evidenced by the information declared by the manufacturer in                      points 3.1.1 and 3.5.2 of this manufacturer declaration.</p> <p><i>"...in the entire frequency range from 47.5Hz to 51.5Hz and voltages in the range                      of 85%Un to 115%Un at the 125KTLX-G4-A PV inverter AC connection terminal,                      while voltage gradient &lt;5%Un/min and a frequency gradient of &lt;0.5%in/min, for                      quasi-stationary operation, 125KTLX-G4-A PV inverter is able to in parallel operation                      with grid according to the minimum duration time Figure 4"</i></p> <p>Figure for VDE-AR-N 4110:2018-11:</p> <p><i>"When voltage changes at the inverter AC terminal in the amount of <math>\Delta U \leq 10\% U_n</math> with                      voltage gradients of <math>\geq 5\% U_n / \text{min}</math> within the voltage band from 90% <math>U_n</math> to 110% <math>U_n</math>                      occur, inverter has no reduction for active and reactive power and keep connected to                      the grid."</i></p> <p><i>"All adjustments outside of the recommended setting of VDE-AR-N 4110 should be                      approved by the grid provider and also with authorized personnel"</i></p> <p>In addition, the clause 3.5.2 of this manufacturer declaration contains details of                      the capability of the unit as a voltage-time characteristic curve.</p>					
<p>- <b>Test Report:</b>                      Test report no. 230039RECO06. Dated on 02/06/2023.                      Compliance is evidenced by test results provided in points 4.2.1.5 and 4.6 of this                      test report.</p>					

FGW TG8	Title				Result
A.1.2.2 A.2.2.2	Operating range				P
A.1.2.2.2 A.2.2.2.2	Polar wheel and/or grid oscillation				--
A.1.2.2.2.1 A.2.2.2.2.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	NA
	10.2.1.3	11.2.3.2 11.2.3.3	--	<input type="checkbox"/> Manufacturer's declaration	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.1.3	11.2.3.2 11.2.3.3	--	<input type="checkbox"/> Manufacturer's declaration	
	Remarks: For Type 2 PGU no proof of polar wheel oscillations is required.				
A.1.2.3 A.2.2.3	System perturbations				P
A.1.2.3.1 A.2.2.3.1	Rapid voltage variations				--
A.1.2.3.1.1 A.2.2.3.1.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	5.4.2	11.2.2.1	TG3	<input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	5.4.2	11.2.2.1	TG3	<input type="checkbox"/> Test report	
	Evaluated documentation:  - <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in the point 4.3.1 of this test report.				
A.1.2.3.2 A.2.2.3.2.	Flicker				--
A.1.2.3.2.1 A.2.2.3.2.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	5.4.3	11.2.2.2	TG3	<input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	5.4.3	11.2.2.2	TG3	<input type="checkbox"/> Test report	
	Evaluated documentation:  - <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in the point 4.3.2 of this test report.				
A.1.2.3.3 A.2.2.3.3	Harmonics and Interharmonics				--
A.1.2.3.3.1 A.2.2.3.3.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	5.4.4	11.2.2.3	TG3	<input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	5.4.4	11.2.2.3	TG3	<input type="checkbox"/> Test report	
	Evaluated documentation:  - <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in the points 4.3.3.1 to 4.3.3.4 of this test report.				

FGW TG8	Title	Result
A.1.2.3 A.2.2.3	System perturbations	P

FGW TG8	Title				Result
A.1.2.3.4 A.2.2.3.4	<b>Commutation notches</b>				--
A.1.2.3.4.1 A.2.2.3.4.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	NA
	5.4.5	11.2.2.4	TG3	<input type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	5.4.5	11.2.2.4	TG3	<input type="checkbox"/> Test report	
	<b>Remarks:</b>  Evidence only for converters with thyristors which use short-circuit current coming from the grid for commutation of the thyristors. The certified PCS doesn't have thyristors which use short-circuit current coming from the grid for commutation of the thyristors.				
A.1.2.3.5 A.2.2.3.5	<b>Asymmetries</b>				--
A.1.2.3.5.1 A.2.2.3.5.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	5.4.6	11.2.2.5	TG3	<input checked="" type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	5.4.6	11.2.2.5	TG3	<input type="checkbox"/> Test report	
	<b>Evaluated documentation:</b>  - <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023 Compliance is evidenced by test results provided in the point 4.3.4 of this test report.				
A.1.2.3.6 A.2.2.3.6	<b>Audio frequency ripple control</b>				--
	Not applicable to PGU / Storage Systems				NA
A.1.2.3.7 A.2.2.3.7	<b>Carrier frequency use of the customer grid</b>				--
	Not applicable to PGU / Storage Systems				NA

FGW TG8	Title				Result
A.1.2.4 A.2.2.4	Reactive power				P
A.1.2.4.1 A.2.2.4.1	Reactive power provision				--
A.1.2.4.1.1 A.2.2.4.1.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.2.2.1 to 10.2.2.3	11.2.4	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.2.2.1 to 10.2.2.3	11.2.4	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.2.2 of this manufacturer declaration. For further details see the points 4.2 and 4.4 of this document.</li> <li>- <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023 Compliance is evidenced by test results provided in points 4.2.1.1, 4.2.1.5, 4.2.2 and 4.2.4 of this test report.</li> </ul>					
A.1.2.4.2 A.2.2.4.2	Procedure for reactive power provision				--
A.1.2.4.2.1 A.2.2.4.2.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.2.2.4	--	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.2.2.4	--	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.2.2 of this manufacturer declaration. For further details see the points 4.2 and 4.4 of this document.</li> <li>- <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023</li> </ul>					

FGW TG8	Title				Result
A.1.2.5 A.2.2.5	Active power				P
A.1.2.5.1 A.2.2.5.1	General information and grid safety management				--
A.1.2.5.1.1 A.2.2.5.1.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.2.4.1 and 10.2.4.2	11.2.7	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.2.4.1 and 10.2.4.2	11.2.7	TG3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.3.2 of this manufacturer declaration. For further details of control modes and interfaces see the points 4.2 and 4.4 of this document.</li> <li>- <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in points 4.1.1 and 4.1.2.1 of this test report.</li> </ul>					
A.1.2.5.2 A.2.2.5.2	Active power output as a function of grid frequency				--
A.1.2.5.2.1 A.2.2.5.2.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.2.4.3	11.2.8	TG3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.2.4.3	11.2.8	TG3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.3.2 of this manufacturer declaration. Among others, main points detailed by the manufacturer are:  "Normal active power gradients: 0.33%Pn/s~0.66%Pn/s for stationary connection and reconnection after grid fault trip. When frequency returned to rated value (50Hz±0.2Hz) , for the first 10mins, the PGU didn't connect the grid, after 10mins quit from abnormal frequency, the active power gradients will be back to normal active power gradients: 0.15%Pn/s.</li> <li>- <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in the point 4.1.3 of this test report.</li> </ul>					

FGW TG8	Title				Result
A.1.2.6 A.2.2.6	Connection				--
A.1.2.6.1 A.2.2.6.1	Black start capability				--
	Not applicable to PGU				NA
A.1.2.6.2 A.2.2.6.2	Switching-in conditions				--
A.1.2.6.2.1 A.2.2.6.2.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.4	11.2.11	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.4	11.2.11	TG 3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
<p>Evaluated documentation:</p> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.4.1 of this manufacturer declaration. Among others, main points detailed by the manufacturer are: "We verify that connection of 125KTLX-G4-A is possible at 47,5-50.2Hz (<math>\pm 0.1</math> Hz), 90% -110%Un (<math>\pm 2\%</math>Un) for VDE-AR-N 4110." "Normal active power gradients: 0.33%Pn/s~0.66%Pn/s (default is 0.66%Pn/s) for stationary connection and reconnection after grid fault trip." "After the inverter trip for protection, when the voltage recovers to at least 95%Un and frequency is between 49.9~50.1Hz, until the stated stabilization time has passed, 125KTLX-G4 has the setting of the delay time of recovery for both VDE-AR-N 4110, the setting range is from 0 to 60 mins, default setting is 10 mins."  For further details of control modes and interfaces see the point 4.2 of this document.</li> <li>- <b>Test Report:</b> Test report no. 230039RECO06. Dated on 02/06/2023. Compliance is evidenced by test results provided in points 4.1.4, 4.5.1 and 4.5.2 of this test report.</li> </ul>					
A.1.2.7 A.2.2.7	FRT				P
A.1.2.7.1 A.2.2.7.1	Loss of static stability				--
A.1.2.7.1.1 A.2.2.7.1.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	NA
	10.2.1.3 10.5.2	11.2.12	--	--	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.1.3 10.5.2	11.2.12	--	--	
Remarks: No evidence necessary.					

FGW TG8	Title				Result
A.1.2.7 A.2.2.7	FRT				P
A.1.2.7.2 A.2.2.7.2	Island and partial grid operation capability				--
A.1.2.7.2.1 A.2.2.7.2.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	NA
	10.2.1.4	--	--	--	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.1.4	--	--	--	
<p><u>Remarks:</u> No requirements for island operation have been defined.</p> <p>Partial grid operation capability does not constitute a minimum requirement. The distribution grid operator may however require partial grid operation capability and the controller stability in individual cases. Only in this case do the following requirements apply. Here only optional characteristics of the PGU are shown, however not a declaration of conformity.</p> <p><u>Evaluated documentation:</u></p> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.5.1 of this manufacturer declaration. <i>"125KTLX-G4-A detects island by reactive power disturbance. Once island detected, PGU disconnect from the grid."</i></li> </ul>					
A.1.2.7.3 A.2.2.7.3	Dynamic grid support				
A.1.2.7.3.1 A.2.2.7.3.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.2.1.2 10.2.3	11.2.5	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.1.2 10.2.3	11.2.5	TG 3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
<p><u>Evaluated documentation:</u></p> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.5.2 of this manufacturer declaration. <i>"The certified product meets all requirements mentioned above except the paragraph for PGU with double-fed asynchronous machine, A voltage vs time characteristic curve and specifications about the adjustability of the reinforcing factor (k) will be found in TR3 test report."</i></li> </ul> <p>For further details of control modes and interfaces see the point 4.2 of this document.</p> <ul style="list-style-type: none"> <li>- <b>Test Report:</b> Compliance is evidenced by test results offered in the point 4.6 of the test report 230039RECO06 , which refers to the attachment I of the report: 230039RECO06 These reports includes calculations of short-circuit AC currents.</li> </ul>					

FGW TG8	Title				Result
A.1.2.7 A.2.2.7	FRT				P
A.1.2.7.4 A.2.2.7.4	Contribution to short-circuit current				--
A.1.2.7.4.1 A.2.2.7.4.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.2.5.2	11.2.9	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.5.2	11.2.9	TG 3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
<p>Evaluated documentation:</p> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b>                      "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.5.3 of this manufacturer declaration.                      Declared short-circuit currents for certified models are stated below:                     <ul style="list-style-type: none"> <li>• <u>For AZZURRO 3PH 100KTL-V4:</u> <ul style="list-style-type: none"> <li>- Short-circuit surge current <math>i_P</math> (A): 235.7A.</li> <li>- Initial symmetrical short-circuit current <math>I_k''</math> (A): 160.2 A</li> <li>- Uninterrupted short-circuit current <math>I_k</math> (A): 166.7 A..</li> <li>- Maximal current <math>I_{max}</math> (A): 166.7 A.</li> <li>- R.m.s. value of the source current for three-phase fault, <math>I_{skPF}</math> (First 1-2 cycles of the Fault) = 166.7 A</li> <li>- R.m.s. value of the source current for two-phase fault, <math>I(1)sk2PF</math> (First 1-2 cycles of the Fault) = 162.8 A</li> <li>- R.m.s. value of the source current for single-phase fault, <math>I(1)sk1PF</math> (First 1-2 cycles of the Fault)= 162.8 A.</li> </ul> </li> <li>• <u>For AZZURRO 3PH 110KTL-V4:</u> <ul style="list-style-type: none"> <li>- Short-circuit surge current <math>i_P</math> (A): 267.8 A.</li> <li>- Initial symmetrical short-circuit current <math>I_k''</math> (A): 185.4 A</li> <li>- Uninterrupted short-circuit current <math>I_k</math> (A): 189.4 A</li> <li>- Maximal current <math>I_{max}</math> (A): 189.4 A</li> <li>- R.m.s. value of the source current for three-phase fault, <math>I_{skPF}</math> (First 1-2 cycles of the Fault) = 189.4 A</li> <li>- R.m.s. value of the source current for two-phase fault, <math>I(1)sk2PF</math> (First 1-2 cycles of the Fault) = 188.1 A</li> <li>- R.m.s. value of the source current for single-phase fault, <math>I(1)sk1PF</math> (First 1-2 cycles of the Fault)= 188.1 A.</li> </ul> </li> <li>• <u>For AZZURRO 3PH 125KTL-V4-A:</u> <ul style="list-style-type: none"> <li>- Short-circuit surge current <math>i_P</math> (A): 267.8 A.</li> <li>- Initial symmetrical short-circuit current <math>I_k''</math> (A): 185.4 A</li> <li>- Uninterrupted short-circuit current <math>I_k</math> (A): 189.4 A</li> <li>- Maximal current <math>I_{max}</math> (A): 189.4 A</li> <li>- R.m.s. value of the source current for three-phase fault, <math>I_{skPF}</math> (First 1-2 cycles of the Fault) = 189.4 A</li> <li>- R.m.s. value of the source current for two-phase fault, <math>I(1)sk2PF</math> (First 1-2 cycles of the Fault) = 188.1 A</li> <li>- R.m.s. value of the source current for single-phase fault, <math>I(1)sk1PF</math> (First 1-2 cycles of the Fault)= 188.1 A.</li> </ul> </li> </ul> </li> </ul>					

FGW TG8	Title				Result
	<p>- <b>Test Report:</b> Compliance is evidenced by test results offered in the point 4.6 of the test report 230039RECO06, which refers to the attachment I of the report: 230039RECO06</p> <p>These reports includes calculations of short-circuit AC currents.</p>				
FGW TG8	Title				Result
A.1.2.8 A.2.2.8	<b>Protection</b>				<b>P</b>
A.1.2.8.1 A.2.2.8.1	<b>Reserve protection concept</b>				--
	Not applicable to PGU / Storage Systems				<b>NA</b>
A.1.2.8.2 A.2.2.8.2	<b>Readability of protection settings</b>				--
A.1.2.8.2.1 A.2.2.8.2.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	<b>P</b>
	6.3.3	11.2.10	--	<input checked="" type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Or component certificate	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	6.3.3	11.2.10 11.4.17	--	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Or component certificate	
	<u>Evaluated documentation:</u> - <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.1 of this manufacturer declaration. <i>"The protection seting can be easily read by PC monitor"</i>				

FGW TG8	Title				Result
A.1.2.8 A.2.2.8	Protection				P
A.1.2.8.3 A.2.2.8.3	Test terminal				--
A.1.2.8.3.1 A.2.2.8.3.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	6.3.4.5	11.2.10	--	<input checked="" type="checkbox"/> Manufacturer's declaration	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	6.3.3.5	11.2.10	--	<input type="checkbox"/> Manufacturer's declaration	
	<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b>                      "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.2 of this manufacturer declaration.                      "The certified product didn't provide testing terminal for protection test without disconnect the wires."                      The following deviation is stated in the main certificate, as informative:                      "The certified product didn't provide testing terminal for protection test without disconnect the wires, such test terminal would be supplied at the system level on the LV side of MV transformer"</li> </ul>				
A.1.2.8.4 A.2.2.8.4	Operating range				--
A.1.2.8.4.1 A.2.2.8.4.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.3.4.2.2	11.2.10	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.3.4.7	11.2.10	TG 3	<input type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Test report	
	<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Manufacturer declaration:</b>                      "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.3 of this manufacturer declaration.                      "There is no additional protection equipment present in certified 125KTLX-G4-A".</li> <li>- <b>Test Report:</b>                      Test report no. 230039RECO06. Dated on 02/06/2023.                      Compliance is evidenced by test results provided in the point 4.4 of this test report.</li> </ul>				
A.1.2.8.5 A.2.2.8.5	Voltage protection device and Q(U) protection				--
	Not applicable to PGU / Storage Systems				NA
A.1.2.8.6 A.2.2.8.6	Accuracy				--
A.1.2.8.6.1 A.2.2.8.6.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.3.3.2	11.2.10	TG 3	<input checked="" type="checkbox"/> Test report	
	VDE 4120 Requirement Cl.	VDE 4120 Verification Cl.	Associated documents	Requirement needed	
	10.2.4.3 10.3.4.2	11.2.10	TG 3	<input type="checkbox"/> Test report	
	<u>Evaluated documentation:</u> <ul style="list-style-type: none"> <li>- <b>Test Report:</b>                      Test report no. 230039RECO06. Dated on 02/06/2023.                      Compliance is evidenced by test results provided in the point 4.4 of this test report.                      For further details of control modes and interfaces see the point 4.2 of this document.</li> </ul>				
FGW TG8	Title				Result
A.1.2.8	Protection				P

FGW TG8	Title				Result
A.2.2.8					
A.1.2.8.7 A.2.2.8.7	<b>Independence of the protection functions</b>				--
A.1.2.8.7.1 A.2.2.8.7.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.3.3.1	11.2.10	--	<input checked="" type="checkbox"/> Manufacturer's declaration	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.3.3.1	11.2.10	--	<input type="checkbox"/> Manufacturer's declaration	
	<u>Evaluated documentation:</u> - <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.4 of this manufacturer declaration.  <i>"Inverter integrated self-protection function of the certified product is independent                      of any control functions".</i>  For further details of control modes and interfaces see the point 4.3 of this document.				
A.1.2.8.8	<b>Protection monitoring</b>				--
A.2.2.8.8	Not applicable to PGU / Storage Systems				NA
A.1.2.8.9 A.2.2.8.9	<b>Own and auxiliary power supply</b>				--
A.1.2.8.9.1 A.2.2.8.9.1	<b>VDE 4110 Requirement Cl.</b>	<b>VDE 4110 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	P
	10.3.3.6	11.2.10	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Component certificate	
	<b>VDE 4120 Requirement Cl.</b>	<b>VDE 4120 Verification Cl.</b>	<b>Associated documents</b>	<b>Requirement needed</b>	
	10.3.1	11.2.10	TG 3	<input checked="" type="checkbox"/> Manufacturer's declaration <input type="checkbox"/> Component certificate	
	<u>Evaluated documentation:</u> - <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.5 of this manufacturer declaration.				
A.1.2.8.9.4	<b>Fault logger</b>				--
A.2.2.8.9.10	Not applicable to PGU				NA

FGW TG8	Title				Result
A.1.2.8 A.2.2.8	Protection				P
A.1.2.8.10 A.2.2.8.11	Coupling switch				--
A.1.2.8.9.1 A.2.2.8.9.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.3 10.4.5	--	--	<input type="checkbox"/> Manufacturer's declaration	
Evaluated documentation:					
- <b>Manufacturer declaration:</b> "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023 Compliance is evidenced by the information declared by the manufacturer in point 3.6.6 of this manufacturer declaration.					

0 1 2 3 4 5



### 1.4 Summary of the evaluation of the validation results

The following documentation is used for the evaluation:

**Information of the test report:**

- Validation report number: 230039RECO06-TG4
- Issuance date: 14/06/2023
- Issued by: SGS Tecnos, S.A. (Electrical Testing Laboratory)
- Simulation model name: PGU\_125kW.slx
- Version of the simulation model: V1
- MD5 Checksum: 6D21259D292725CD8A2A0F01D13DAD5A
- Simulation platform: Matlab Simulink
- Simulation platform version: Matlab R2021a

**Information of the user manual documentation of the dynamic simulation model:**

- Document reference: User Manual and Model Description of Inverter.
- Version: V1
- Issuance date: 25/08/2022
- Issued by: SOFARSOLAR

FGW TG8	Title				Result
A.1.2.9 A.2.2.9	Simulation models				P
A.1.2.9.1 A.2.2.9.1	Requirements for simulation models				--
A.1.2.9.1.1 A.2.2.9.1.1	VDE 4110 Requirement Cl.	VDE 4110 Verification Cl.	Associated documents	Requirement needed	P
	10.6	11.2.6	TG4	<input checked="" type="checkbox"/> Validated model <input checked="" type="checkbox"/> Validation report <input checked="" type="checkbox"/> Model documentation	
	Evaluated documentation: <ul style="list-style-type: none"> <li>- <b>Model Documentation:</b> "User Manual and Model Description of Inverter". V1 dated on 25/08/2022.</li> <li>- <b>Validation Report:</b> Test report no. 230039RECO06 – TG4. Dated on 14/06/2023</li> </ul>				

### Information about the transferability of validation results to derived models:

The validation process according to FGW TG4 (rev. 9) has been completed over the dynamic simulation model for the PV inverter model AZZURRO 3PH 125KTL-V4-A. However, evaluation requirements detailed in the point 5.8.2 of FGW TG4 (Rev. 9), “*Transfer to other PGUs*”, and the chapter 2.12.2 of FGW TG8 (rev. 9) have been considered for the transferability of this validation process to derived models, AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4 as detailed in the validation report no. 230039RECO06 – TG4, validation results obtained on the simulation model for AZZURRO 3PH 125KTL-V4-A are essentially valid for derived models AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4. This is ensured since all these referred PV models are based on the same architecture and use the same control strategy. The different model types are achieved by modification of the nominal data in the simulation model.

As a basis for this evaluation, they have also been considered simulations of plausibility tests performed according to FGW TG4 (rev. 9) over the validated simulation model with repetitions of tests at reduced power levels which includes rated power levels of derived models. This includes the verification of following simulation cases over the dynamic simulation model of AZZURRO 3PH 125KTL-V4-A adapted to operate with generation capabilities of derived models AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4

- Verification of Voltage-Dependent PQ diagrams.

### 1.5 Evaluation of the ISO 9001 Quality Management System Certificate of manufacturers

Address: 1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, P.R. China



1.6 Compromise letter to maintain ISO 9001 during the validity period of certificate

Compromise letter

We **Shenzhen SOFARSOLAR Co., Ltd.**

Declare the maintenance of the quality system certified by a certification accredited company, according to the requirements of ISO 9001:2015, during the validity period of the certificate, at least 5 years.

We are also committed to require our assemblers to comply with the same standards of quality during that period.

Brand: **SOFAR**

Model: SOFAR 100KTLX-G4 , SOFAR 110KTLX-G4 , SOFAR 125KTLX-G4  
SOFAR 125KTLX-G4-A

Date: 9<sup>th</sup> February, 2023

Name: Wang Hui  
Charge: Standard and Certification Manager  
Signature:

1.7 Compromise letter of the certified product.

**Manufacture Declaration**

We Shenzhen SOFARSOLAR Co., Ltd. declare that the product,

**Tested model:**

- SOFAR 125KTLX-G4-A

In accordance with the standards,

- VDE-ARN 4110 : 2010-11

the variant models to be included in the certification,

**Model Variant 6**


- SOFAR 100KTLX-G4
- SOFAR 110KTLX-G4
- SOFAR 125KTLX-G4


It showed the same hardware typology and the same Software Version: V000001 of the tested model.

Date: 2023/04/29

Name: 王辉 (wanghui)

Chief Engineer  
and Certification Manager

Signature: 

Manufacture Seal: 

## 2 OVERVIEW OF RESULTS OF THE FGW TR3 TEST REPORT

Test Report Number: 230039RECO06 with date 02/06/2023 according of FGW TR3 rev. 25.  
Period of measurement: The necessary testing has been performed between 09<sup>th</sup> of December of 2022 and 21<sup>st</sup> of April of 2023.

Tests in compliance with FGW TR3 rev. 25 have entirely been performed over the PV Inverter model AZZURRO 3PH 125KTL-V4-A. However, test requirements of clauses 4.3.2, 4.3.3 and 4.3.4 of FGW TG3 have been repeated to get corresponding results over variant models AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4.

### 2.1 NENNDATEN / RATED DATA:

For the model AZZURRO 3PH 100KTL-V4:

<b>Nennscheinleistung <math>S_n</math></b>	100 kW	<b>Nennstrom <math>I_n</math></b>	145 A
<b>Nennfrequenz <math>f_n</math> rated frequency <math>f_n</math></b>	50 / 60 Hz	<b>Nennspannung <math>U_n</math> rated Voltage <math>U_n</math></b>	230 V /400 V 3/N/PE

Note: The maximum apparent power of the certified unit AZZURRO 3PH 100KTL-V4 is 110 kVA.

For the model AZZURRO 3PH 110KTL-V4:

<b>Nennscheinleistung <math>S_n</math></b>	110 kW	<b>Nennstrom <math>I_n</math></b>	159.5 A
<b>Nennfrequenz <math>f_n</math> rated frequency <math>f_n</math></b>	50 / 60 Hz	<b>Nennspannung <math>U_n</math> rated Voltage <math>U_n</math></b>	230 V /400 V 3/N/PE

Note: The maximum apparent power of the certified unit AZZURRO 3PH 110KTL-V4 is 125 kVA.

For the model AZZURRO 3PH 125KTL-V4-A:

<b>Nennscheinleistung <math>S_n</math></b>	125 kW	<b>Nennstrom <math>I_n</math></b>	181.2 A
<b>Nennfrequenz <math>f_n</math> rated frequency <math>f_n</math></b>	50 / 60 Hz	<b>Nennspannung <math>U_n</math> rated Voltage <math>U_n</math></b>	230 V /400 V 3/N/PE

Note: The maximum apparent power of the certified unit AZZURRO 3PH 125KTL-V4-A is 125 kVA.

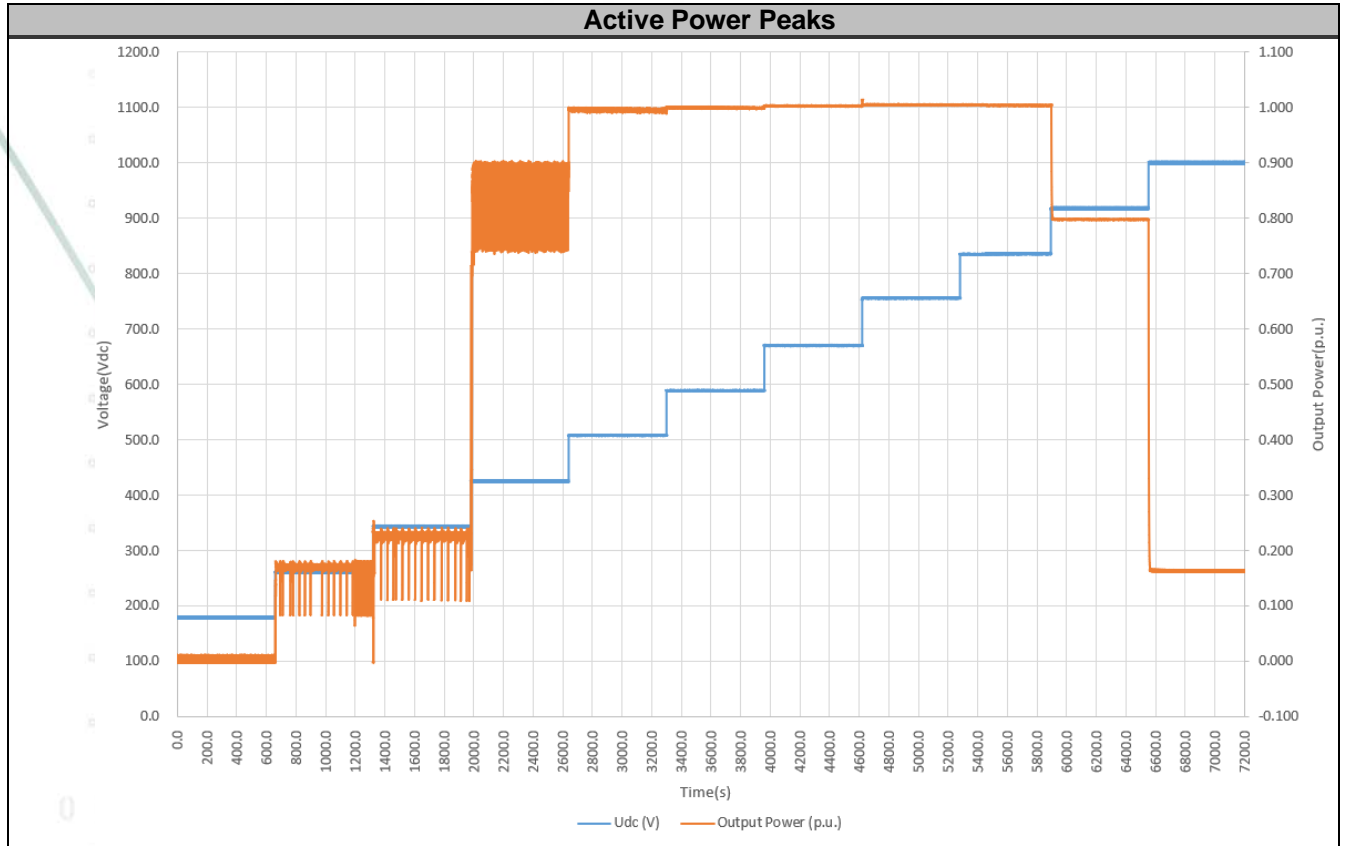
## 2.2 Power quality

### 2.2.1 Wirkleistungsspitzen / Power Peaks

DC Voltage Meas. (V)	Wirkleistungsspitzen in kW / Power peaks in kW			Wirkleistungsspitzen in p.u. / Power peaks in p.u.			Anzahl 600-sekunden. Datensätze in / Number of 600-seconds data set		
	P <sub>0.2</sub>	P <sub>60</sub>	P <sub>600</sub>	p <sub>0.2</sub>	P <sub>60</sub>	P <sub>600</sub>	P <sub>0.2</sub>	P <sub>60</sub>	P <sub>600</sub>
180.0	-0.122	0.018	0.021	-0.001	0.000	0.000	11	11	11
262.0	21.834	20.749	21.362	0.175	0.166	0.171			
344.0	28.981	28.495	28.575	0.232	0.228	0.229			
426.1	111.193	109.495	108.751	0.890	0.876	0.870			
508.0	124.394	124.408	124.498	0.995	0.995	0.996			
589.9	124.895	124.905	124.949	0.999	0.999	1.000			
672.0	125.362	125.325	125.349	1.003	1.003	1.003			
754.0	125.581	125.591	125.626	1.005	1.005	1.005			
836.1	125.495	125.453	125.500	1.004	1.004	1.004			
918.2	99.707	99.713	99.933	0.798	0.798	0.799			
1000.0	20.371	20.376	20.709	0.163	0.163	0.166			

Note: The MPPT range is 180V to 1000V. Full power MPPT voltage range is 550V to 800V

The Reactive Power prior to start the test was set to a setpoint of Q=0, this value was maintained during the whole test.



Note: Results given are obtained after test results performed on the model AZZURRO 3PH 125KTL-V4-A. These test results for the model AZZURRO 3PH 125KTL-V4-A are essentially valid for the derived models , AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4, considering the evaluation offered in the point 1.2 of this document

## 2.2.2 Schalthandlungen / Switching Operation

Schalthandlungen / Case of switching operation	Einschalten bei $P_{\text{verfügbar}} < 10\% P_n$ (Einschaltwindgeschw.) / Start-up at $P_{\text{available}} < 10\% P_n$ (cut-in wind speed)				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{10}$	20				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{120}$	240				
Netzimpedanzwinkel / Grid impedance angle		30°	50°	70°	85°
Flickerformfaktor / Flicker step factor, $k_f (\Psi_k)$	Phase A	0.000	0.000	0.000	0.000
	Phase B	0.000	0.000	0.000	0.000
	Phase C	0.000	0.000	0.000	0.000
Spannungsänderungsfaktor / Voltage change factor, $k_U (\Psi_k)$	Phase A	0.014	0.014	0.014	0.014
	Phase B	0.019	0.019	0.019	0.019
	Phase C	0.024	0.024	0.024	0.024

Schalthandlungen / Case of switching operation	Einschalten bei $P_{\text{verfügbar}} = P_n$ (Nennwindgeschwindigkeit) Start-up at $P_{\text{available}} = 100\%P_n$ (rated wind speed)				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{10}$	20				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{120}$	240				
Netzimpedanzwinkel / Grid impedance angle		30°	50°	70°	85°
Flickerformfaktor / Flicker step factor, $k_f (\Psi_k)$	Phase A	0.000	0.000	0.000	0.000
	Phase B	0.000	0.000	0.000	0.000
	Phase C	0.000	0.000	0.000	0.000
Spannungsänderungsfaktor / Voltage change factor, $k_U (\Psi_k)$	Phase A	0.129	0.129	0.129	0.129
	Phase B	0.130	0.130	0.130	0.130
	Phase C	0.153	0.153	0.153	0.153

Schalthandlungen / Case of switching operation	Seviceabschaltung bei Nennleistung / Cut off at rated power (100%Pn)				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{10}$	20				
Max Anz. Schalthandlungen / Max, number of switching operations, $N_{120}$	240				
Netzimpedanzwinkel / Grid impedance angle		30°	50°	70°	85°
Flickerformfaktor / Flicker step factor, $k_f (\Psi_k)$	Phase A	0.001	0.001	0.001	0.001
	Phase B	0.001	0.001	0.001	0.000
	Phase C	0.001	0.001	0.001	0.001
Spannungsänderungsfaktor / Voltage change factor, $k_U (\Psi_k)$	Phase A	0.194	0.194	0.194	0.194
	Phase B	0.158	0.158	0.158	0.158
	Phase C	0.241	0.241	0.241	0.241

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 125KTL-V4-A. These test results for the model AZZURRO 3PH 125KTL-V4-A are essentially valid for the derived models , AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4, considering the evaluation offered in the point 1.2 of this document

### 2.2.3 Unsymmetrie / Unbalances

Model: AZZURRO 3PH 100KTL-V4						
Pn (%Sn)	V1+ (V)	V1- (V)	I1+ (A)	I1- (A)	Ui (%)	Number of records
10	229.931	0.033	14.524	0.069	0.473	>6000
20	229.993	0.035	29.035	0.060	0.208	>6000
30	230.058	0.038	43.537	0.043	0.098	>6000
40	230.122	0.040	58.016	0.118	0.203	>6000
50	230.186	0.043	72.522	0.059	0.081	>6000
60	230.240	0.045	86.864	0.033	0.038	>6000
70	230.319	0.046	101.386	0.036	0.035	>6000
80	230.348	0.047	107.716	0.034	0.031	>6000
90	230.388	0.049	115.785	0.032	0.028	>6000
100	230.463	0.051	130.312	0.044	0.034	>6000
110	230.514	0.054	144.723	0.038	0.027	>6000

Model: AZZURRO 3PH 110KTL-V4						
Pn (%Sn)	V1+ (V)	V1- (V)	I1+ (A)	I1- (A)	Ui (%)	Number of records
10	229.929	0.032	16.004	0.033	0.209	>6000
20	229.997	0.037	31.943	0.092	0.287	>6000
30	230.068	0.040	47.915	0.076	0.160	>6000
40	230.140	0.043	63.732	0.080	0.125	>6000
50	230.211	0.045	79.682	0.079	0.099	>6000
60	230.285	0.048	95.681	0.120	0.125	>6000
70	230.335	0.049	107.480	0.117	0.109	>6000
80	230.356	0.049	111.459	0.118	0.106	>6000
90	230.420	0.051	127.394	0.163	0.128	>6000
100	230.538	0.054	143.124	0.149	0.104	>6000
110	230.607	0.056	159.047	0.166	0.105	>6000

Model: AZZURRO 3PH 125KTL-V4-A						
Pn (%Sn)	V1+ (V)	V1- (V)	I1+ (A)	I1- (A)	Ui (%)	Number of records
10	229.951	0.034	18.159	0.117	0.643	>6000
20	230.032	0.037	36.372	0.105	0.289	>6000
30	230.114	0.040	54.303	0.100	0.184	>6000
40	230.198	0.043	72.468	0.106	0.146	>6000
50	230.282	0.045	90.597	0.113	0.124	>6000
60	230.374	0.050	108.602	0.137	0.126	>6000
70	230.445	0.052	123.894	0.153	0.123	>6000
80	230.454	0.052	126.599	0.156	0.123	>6000
90	230.545	0.055	144.702	0.180	0.124	>6000
100	230.615	0.055	162.632	0.190	0.117	>6000

According to VDE-AR-N 4110: 2018-11, from the 10%Pn, the generating unit shall not exceed a maximum limit defined at 1.5%.

## 2.2.4 Flicker

Model: AZZURRO 3PH 100KTL-V4					
Network impedance phase angle, $\Psi_k$	Phase	30°	50°	70°	85°
Average active power, P (%Pn)		Flicker coefficient, C ( $\Psi_k, P_{bin}$ )			
0	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
10	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
20	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
30	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
40	A	0.004	0.004	0.004	0.004
	B	0.005	0.005	0.005	0.005
	C	0.004	0.004	0.004	0.004
50	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
60	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
70	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
80	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
90	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 1)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 2)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 3)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
110	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004

Model: AZZURRO 3PH 110KTL-V4					
Network impedance phase angle, $\Psi_k$	Phase	30°	50°	70°	85°
Average active power, P (%Pn)		Flicker coefficient, C ( $\Psi_k, P_{bin}$ )			
0	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
10	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
20	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
30	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
40	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
50	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
60	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
70	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
80	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
90	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 1)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 2)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 3)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
110	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004

Model: AZZURRO 3PH 125KTL-V4-A					
Network impedance phase angle, $\Psi_k$	Phase	30°	50°	70°	85°
Average active power, P (%P <sub>n</sub> )		Flicker coefficient, C ( $\Psi_k$ , P <sub>bin</sub> )			
0	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
10	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
20	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
30	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
40	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
50	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
60	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
70	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
80	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
90	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 1)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 2)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004
100 (test 3)	A	0.004	0.004	0.004	0.004
	B	0.004	0.004	0.004	0.004
	C	0.004	0.004	0.004	0.004

## 2.2.5 Oberschwingungsmessungen / Current Harmonics

Model: AZZURRO 3PH 100KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
2	0.010	0.010	0.019	0.018	0.020	0.021	0.022	0.029	0.038	0.049	0.042	0.040	0.049
3	0.007	0.034	0.066	0.046	0.075	0.071	0.073	0.079	0.077	0.062	0.065	0.074	0.079
4	0.008	0.010	0.019	0.013	0.025	0.028	0.017	0.017	0.019	0.019	0.015	0.015	0.028
5	0.007	0.092	0.174	0.109	0.106	0.123	0.131	0.160	0.198	0.198	0.275	0.285	0.285
6	0.007	0.011	0.020	0.013	0.032	0.021	0.018	0.015	0.015	0.017	0.016	0.014	0.032
7	0.007	0.104	0.198	0.106	0.034	0.032	0.051	0.083	0.115	0.119	0.184	0.219	0.219
8	0.007	0.008	0.016	0.013	0.033	0.045	0.020	0.018	0.019	0.021	0.016	0.015	0.045
9	0.007	0.014	0.027	0.019	0.065	0.032	0.024	0.022	0.030	0.029	0.034	0.036	0.065
10	0.007	0.010	0.019	0.013	0.037	0.027	0.020	0.017	0.018	0.020	0.036	0.020	0.037
11	0.007	0.076	0.145	0.024	0.058	0.046	0.066	0.099	0.134	0.145	0.192	0.210	0.210
12	0.007	0.011	0.020	0.014	0.037	0.028	0.025	0.020	0.019	0.019	0.020	0.020	0.037
13	0.007	0.084	0.161	0.028	0.086	0.094	0.109	0.121	0.108	0.088	0.121	0.124	0.161
14	0.007	0.006	0.011	0.011	0.030	0.033	0.019	0.017	0.017	0.019	0.018	0.018	0.033
15	0.007	0.010	0.018	0.014	0.051	0.027	0.026	0.022	0.029	0.027	0.029	0.034	0.051
16	0.007	0.006	0.012	0.012	0.027	0.029	0.018	0.015	0.016	0.018	0.018	0.020	0.029
17	0.007	0.060	0.121	0.030	0.051	0.056	0.086	0.112	0.093	0.104	0.187	0.164	0.187
18	0.007	0.008	0.016	0.009	0.025	0.020	0.018	0.015	0.017	0.018	0.018	0.017	0.025
19	0.007	0.040	0.077	0.034	0.099	0.134	0.148	0.168	0.137	0.112	0.118	0.109	0.168
20	0.007	0.008	0.017	0.010	0.023	0.020	0.018	0.016	0.016	0.016	0.018	0.016	0.023
21	0.007	0.010	0.019	0.013	0.038	0.024	0.019	0.022	0.024	0.023	0.035	0.034	0.038
22	0.007	0.006	0.012	0.009	0.020	0.025	0.015	0.014	0.015	0.016	0.015	0.015	0.025
23	0.007	0.074	0.147	0.043	0.057	0.099	0.126	0.129	0.078	0.102	0.190	0.212	0.212
24	0.007	0.008	0.015	0.009	0.020	0.016	0.015	0.013	0.015	0.016	0.014	0.015	0.020
25	0.007	0.057	0.113	0.050	0.047	0.075	0.080	0.100	0.070	0.061	0.076	0.097	0.113
26	0.007	0.005	0.011	0.009	0.019	0.016	0.014	0.013	0.014	0.016	0.013	0.013	0.019
27	0.007	0.011	0.022	0.015	0.043	0.021	0.020	0.023	0.016	0.020	0.029	0.032	0.043
28	0.007	0.006	0.012	0.009	0.016	0.017	0.014	0.013	0.014	0.015	0.014	0.014	0.017
29	0.007	0.017	0.034	0.090	0.062	0.068	0.078	0.081	0.084	0.086	0.130	0.173	0.173
30	0.007	0.006	0.012	0.009	0.015	0.014	0.014	0.013	0.014	0.015	0.015	0.015	0.015
31	0.007	0.021	0.038	0.082	0.041	0.049	0.047	0.049	0.060	0.025	0.090	0.106	0.106
32	0.007	0.005	0.010	0.009	0.016	0.017	0.013	0.012	0.013	0.016	0.015	0.014	0.017
33	0.007	0.008	0.017	0.014	0.046	0.018	0.025	0.020	0.024	0.024	0.028	0.027	0.046
34	0.007	0.005	0.010	0.009	0.015	0.013	0.013	0.011	0.013	0.015	0.014	0.013	0.015
35	0.007	0.077	0.150	0.077	0.077	0.031	0.024	0.044	0.049	0.025	0.044	0.052	0.150
36	0.007	0.004	0.009	0.008	0.014	0.012	0.013	0.012	0.012	0.013	0.015	0.015	0.015
37	0.007	0.069	0.138	0.051	0.048	0.085	0.115	0.129	0.113	0.050	0.095	0.094	0.138
38	0.006	0.004	0.009	0.009	0.014	0.016	0.013	0.011	0.014	0.014	0.014	0.015	0.016
39	0.006	0.007	0.014	0.017	0.041	0.016	0.021	0.024	0.029	0.024	0.026	0.026	0.041
40	0.006	0.004	0.009	0.008	0.013	0.013	0.012	0.011	0.011	0.013	0.012	0.013	0.013
41	0.006	0.034	0.069	0.041	0.074	0.044	0.076	0.080	0.080	0.094	0.128	0.132	0.132
42	0.006	0.004	0.009	0.008	0.013	0.011	0.012	0.011	0.012	0.013	0.014	0.014	0.014
43	0.006	0.030	0.060	0.060	0.060	0.070	0.113	0.133	0.111	0.064	0.043	0.061	0.133
44	0.006	0.004	0.009	0.009	0.013	0.011	0.012	0.011	0.012	0.013	0.012	0.014	0.014
45	0.006	0.009	0.018	0.017	0.033	0.018	0.015	0.025	0.025	0.019	0.024	0.031	0.033
46	0.006	0.004	0.009	0.009	0.012	0.012	0.012	0.011	0.012	0.013	0.011	0.013	0.013
47	0.006	0.058	0.114	0.088	0.070	0.037	0.080	0.089	0.098	0.111	0.160	0.167	0.167
48	0.006	0.005	0.011	0.008	0.013	0.011	0.011	0.011	0.013	0.013	0.012	0.013	0.013
49	0.006	0.063	0.125	0.092	0.065	0.028	0.062	0.080	0.072	0.061	0.033	0.039	0.125
50	0.006	0.005	0.011	0.008	0.012	0.010	0.011	0.010	0.011	0.013	0.012	0.012	0.013
TDC(%)	0.046	0.263	0.514	0.287	0.325	0.329	0.391	0.453	0.444	0.420	0.592	0.636	0.636

Model: AZZURRO 3PH 100KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./Order	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2	0.011	0.009	0.018	0.018	0.021	0.026	0.026	0.036	0.048	0.051	0.045	0.045	0.051
3	0.008	0.013	0.026	0.026	0.047	0.043	0.039	0.046	0.040	0.034	0.032	0.034	0.047
4	0.009	0.007	0.013	0.013	0.026	0.027	0.017	0.019	0.024	0.020	0.021	0.023	0.027
5	0.008	0.111	0.212	0.105	0.116	0.134	0.152	0.193	0.225	0.226	0.269	0.290	0.290
6	0.008	0.013	0.027	0.014	0.031	0.022	0.018	0.017	0.022	0.021	0.018	0.021	0.031
7	0.008	0.090	0.170	0.081	0.034	0.031	0.046	0.065	0.091	0.113	0.157	0.190	0.190
8	0.008	0.007	0.014	0.013	0.034	0.046	0.020	0.018	0.021	0.021	0.018	0.017	0.046
9	0.008	0.011	0.021	0.022	0.067	0.037	0.031	0.022	0.023	0.028	0.030	0.033	0.067
10	0.007	0.011	0.021	0.013	0.035	0.028	0.021	0.019	0.021	0.023	0.031	0.019	0.035
11	0.007	0.076	0.146	0.026	0.061	0.049	0.044	0.093	0.129	0.135	0.177	0.214	0.214
12	0.007	0.012	0.019	0.014	0.035	0.028	0.026	0.022	0.022	0.021	0.021	0.021	0.035
13	0.007	0.082	0.157	0.023	0.086	0.095	0.096	0.101	0.092	0.076	0.110	0.115	0.157
14	0.006	0.006	0.011	0.011	0.030	0.034	0.020	0.019	0.021	0.021	0.016	0.017	0.034
15	0.006	0.011	0.019	0.018	0.050	0.029	0.036	0.032	0.030	0.030	0.028	0.042	0.050
16	0.006	0.005	0.011	0.014	0.027	0.028	0.018	0.017	0.020	0.020	0.017	0.017	0.028
17	0.006	0.060	0.120	0.034	0.052	0.050	0.071	0.110	0.088	0.089	0.177	0.159	0.177
18	0.006	0.006	0.013	0.009	0.024	0.019	0.018	0.017	0.018	0.021	0.022	0.021	0.024
19	0.006	0.045	0.088	0.031	0.096	0.137	0.141	0.160	0.142	0.107	0.119	0.104	0.160
20	0.006	0.006	0.012	0.009	0.022	0.018	0.016	0.016	0.017	0.018	0.017	0.015	0.022
21	0.006	0.007	0.015	0.012	0.038	0.022	0.022	0.023	0.022	0.025	0.031	0.036	0.038
22	0.006	0.004	0.009	0.008	0.020	0.024	0.015	0.015	0.016	0.018	0.016	0.016	0.024
23	0.005	0.070	0.141	0.041	0.056	0.094	0.120	0.123	0.091	0.090	0.189	0.223	0.223
24	0.005	0.007	0.014	0.008	0.019	0.015	0.015	0.014	0.017	0.018	0.020	0.018	0.020
25	0.005	0.046	0.093	0.047	0.040	0.077	0.078	0.099	0.077	0.061	0.081	0.101	0.101
26	0.005	0.004	0.008	0.008	0.017	0.016	0.014	0.013	0.015	0.016	0.016	0.017	0.017
27	0.005	0.009	0.019	0.012	0.045	0.020	0.021	0.022	0.019	0.022	0.029	0.031	0.045
28	0.005	0.004	0.009	0.007	0.016	0.016	0.013	0.013	0.016	0.017	0.016	0.018	0.018
29	0.005	0.023	0.046	0.085	0.059	0.073	0.077	0.081	0.092	0.078	0.127	0.179	0.179
30	0.005	0.004	0.007	0.009	0.015	0.012	0.014	0.012	0.014	0.016	0.016	0.016	0.016
31	0.005	0.022	0.041	0.086	0.044	0.044	0.044	0.038	0.046	0.026	0.096	0.117	0.117
32	0.005	0.004	0.008	0.008	0.015	0.018	0.012	0.012	0.014	0.016	0.018	0.018	0.018
33	0.005	0.007	0.014	0.013	0.048	0.020	0.028	0.019	0.022	0.023	0.028	0.029	0.048
34	0.005	0.003	0.007	0.008	0.014	0.012	0.012	0.012	0.015	0.016	0.017	0.017	0.017
35	0.005	0.078	0.155	0.076	0.072	0.026	0.024	0.048	0.045	0.027	0.047	0.063	0.155
36	0.005	0.004	0.008	0.008	0.013	0.011	0.014	0.012	0.015	0.016	0.017	0.016	0.017
37	0.005	0.070	0.141	0.056	0.049	0.089	0.117	0.130	0.114	0.047	0.088	0.088	0.141
38	0.005	0.003	0.007	0.008	0.014	0.016	0.011	0.012	0.014	0.014	0.013	0.015	0.016
39	0.005	0.008	0.016	0.016	0.042	0.016	0.021	0.022	0.022	0.018	0.024	0.028	0.042
40	0.005	0.003	0.007	0.007	0.012	0.013	0.011	0.011	0.013	0.015	0.013	0.015	0.015
41	0.005	0.031	0.063	0.042	0.072	0.042	0.086	0.082	0.081	0.097	0.136	0.136	0.136
42	0.005	0.003	0.008	0.008	0.012	0.011	0.012	0.012	0.017	0.017	0.020	0.020	0.020
43	0.005	0.029	0.057	0.057	0.062	0.073	0.111	0.134	0.111	0.062	0.047	0.066	0.134
44	0.005	0.003	0.007	0.007	0.012	0.011	0.011	0.011	0.013	0.013	0.010	0.012	0.013
45	0.005	0.008	0.016	0.018	0.033	0.015	0.012	0.023	0.021	0.015	0.024	0.031	0.033
46	0.005	0.003	0.008	0.007	0.011	0.012	0.011	0.011	0.013	0.015	0.010	0.014	0.015
47	0.005	0.058	0.113	0.090	0.069	0.038	0.090	0.090	0.100	0.113	0.166	0.167	0.167
48	0.005	0.004	0.008	0.008	0.011	0.010	0.011	0.011	0.015	0.015	0.018	0.018	0.018
49	0.005	0.063	0.124	0.094	0.067	0.030	0.059	0.081	0.073	0.061	0.026	0.039	0.124
50	0.005	0.004	0.008	0.007	0.012	0.010	0.011	0.011	0.013	0.012	0.012	0.014	0.014
TDC(%)	0.043	0.261	0.510	0.275	0.321	0.329	0.384	0.449	0.448	0.416	0.573	0.635	0.635

Model: AZZURRO 3PH 100KTL-V4													
Phase C													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./Order	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
2	0.010	0.007	0.013	0.016	0.023	0.024	0.028	0.035	0.046	0.054	0.043	0.037	0.054
3	0.005	0.022	0.042	0.025	0.044	0.032	0.036	0.044	0.043	0.037	0.035	0.042	0.044
4	0.006	0.009	0.018	0.012	0.026	0.026	0.017	0.014	0.017	0.016	0.020	0.022	0.026
5	0.005	0.103	0.198	0.140	0.090	0.102	0.129	0.162	0.175	0.200	0.242	0.265	0.265
6	0.005	0.007	0.016	0.014	0.032	0.021	0.019	0.018	0.019	0.021	0.016	0.018	0.032
7	0.005	0.079	0.150	0.101	0.035	0.033	0.035	0.068	0.086	0.111	0.177	0.207	0.207
8	0.005	0.011	0.021	0.012	0.035	0.045	0.021	0.016	0.018	0.019	0.017	0.015	0.045
9	0.005	0.009	0.017	0.017	0.067	0.034	0.025	0.025	0.029	0.028	0.030	0.026	0.067
10	0.005	0.006	0.011	0.011	0.039	0.028	0.021	0.016	0.017	0.023	0.047	0.016	0.047
11	0.005	0.076	0.146	0.034	0.061	0.043	0.052	0.105	0.130	0.147	0.176	0.203	0.203
12	0.005	0.013	0.014	0.016	0.040	0.033	0.033	0.025	0.019	0.020	0.017	0.019	0.040
13	0.005	0.086	0.166	0.025	0.084	0.089	0.087	0.111	0.096	0.076	0.111	0.120	0.166
14	0.004	0.007	0.012	0.009	0.030	0.033	0.021	0.017	0.019	0.020	0.017	0.016	0.033
15	0.004	0.012	0.018	0.015	0.052	0.031	0.034	0.037	0.040	0.023	0.024	0.038	0.052
16	0.004	0.005	0.011	0.016	0.027	0.029	0.018	0.016	0.017	0.020	0.018	0.017	0.029
17	0.004	0.056	0.112	0.035	0.051	0.053	0.097	0.120	0.103	0.104	0.183	0.162	0.183
18	0.004	0.007	0.015	0.008	0.024	0.020	0.019	0.015	0.015	0.019	0.018	0.016	0.024
19	0.004	0.045	0.088	0.028	0.097	0.134	0.145	0.170	0.145	0.111	0.116	0.109	0.170
20	0.004	0.007	0.014	0.008	0.023	0.019	0.019	0.016	0.016	0.017	0.020	0.014	0.023
21	0.004	0.008	0.016	0.013	0.036	0.023	0.018	0.028	0.031	0.022	0.033	0.026	0.036
22	0.004	0.004	0.008	0.008	0.019	0.025	0.015	0.013	0.015	0.016	0.015	0.014	0.025
23	0.004	0.067	0.135	0.041	0.055	0.095	0.133	0.134	0.095	0.110	0.189	0.217	0.217
24	0.004	0.004	0.007	0.009	0.019	0.016	0.016	0.013	0.015	0.017	0.018	0.014	0.019
25	0.004	0.056	0.110	0.044	0.045	0.081	0.089	0.107	0.079	0.065	0.079	0.095	0.110
26	0.004	0.004	0.008	0.008	0.017	0.016	0.014	0.013	0.014	0.015	0.016	0.015	0.017
27	0.004	0.007	0.014	0.012	0.043	0.020	0.020	0.022	0.021	0.019	0.026	0.027	0.043
28	0.004	0.004	0.009	0.007	0.015	0.017	0.014	0.013	0.014	0.015	0.014	0.015	0.017
29	0.004	0.021	0.043	0.081	0.057	0.067	0.075	0.087	0.084	0.094	0.125	0.165	0.165
30	0.004	0.005	0.011	0.007	0.015	0.012	0.013	0.012	0.014	0.015	0.018	0.018	0.018
31	0.004	0.025	0.046	0.084	0.045	0.048	0.046	0.040	0.048	0.030	0.098	0.114	0.114
32	0.004	0.003	0.007	0.008	0.014	0.017	0.013	0.013	0.015	0.015	0.017	0.015	0.017
33	0.004	0.007	0.014	0.013	0.047	0.019	0.026	0.019	0.024	0.019	0.027	0.025	0.047
34	0.004	0.004	0.008	0.007	0.013	0.012	0.011	0.012	0.014	0.016	0.017	0.015	0.017
35	0.004	0.079	0.156	0.070	0.075	0.026	0.035	0.049	0.050	0.024	0.043	0.058	0.156
36	0.004	0.004	0.007	0.007	0.012	0.011	0.012	0.011	0.013	0.014	0.018	0.016	0.018
37	0.004	0.069	0.139	0.057	0.048	0.087	0.115	0.126	0.107	0.042	0.089	0.090	0.139
38	0.004	0.003	0.007	0.006	0.013	0.014	0.012	0.012	0.014	0.013	0.011	0.010	0.014
39	0.004	0.007	0.014	0.016	0.042	0.016	0.019	0.026	0.027	0.018	0.026	0.027	0.042
40	0.004	0.003	0.006	0.006	0.012	0.012	0.011	0.011	0.013	0.014	0.015	0.015	0.015
41	0.004	0.031	0.064	0.039	0.075	0.043	0.087	0.077	0.077	0.092	0.129	0.139	0.139
42	0.004	0.003	0.007	0.007	0.011	0.010	0.011	0.011	0.015	0.015	0.018	0.017	0.018
43	0.004	0.028	0.055	0.053	0.059	0.075	0.115	0.136	0.112	0.066	0.046	0.064	0.136
44	0.004	0.003	0.006	0.007	0.012	0.010	0.012	0.011	0.013	0.011	0.011	0.011	0.013
45	0.004	0.009	0.017	0.019	0.033	0.017	0.013	0.027	0.024	0.019	0.025	0.028	0.033
46	0.004	0.003	0.006	0.007	0.011	0.011	0.011	0.010	0.012	0.012	0.010	0.012	0.012
47	0.004	0.058	0.113	0.086	0.071	0.037	0.085	0.088	0.095	0.115	0.161	0.169	0.169
48	0.004	0.004	0.008	0.006	0.011	0.009	0.009	0.009	0.013	0.013	0.015	0.014	0.015
49	0.004	0.059	0.116	0.086	0.064	0.031	0.062	0.082	0.073	0.064	0.028	0.041	0.116
50	0.004	0.004	0.009	0.006	0.011	0.009	0.011	0.011	0.014	0.011	0.014	0.014	0.014
TDC(%)	0.032	0.256	0.499	0.288	0.313	0.314	0.387	0.454	0.427	0.419	0.565	0.619	0.619

Model: AZZURRO 3PH 125KTL-V4-A												
Phase A												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./Order	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2	0.003	0.005	0.007	0.009	0.010	0.014	0.023	0.037	0.029	0.018	0.036	0.037
3	0.003	0.027	0.039	0.055	0.055	0.061	0.066	0.083	0.065	0.049	0.082	0.083
4	0.003	0.006	0.008	0.011	0.014	0.015	0.019	0.024	0.026	0.016	0.014	0.026
5	0.003	0.038	0.066	0.061	0.077	0.112	0.148	0.213	0.379	0.532	0.275	0.532
6	0.003	0.006	0.009	0.015	0.017	0.018	0.020	0.028	0.018	0.017	0.016	0.028
7	0.003	0.053	0.076	0.024	0.036	0.068	0.089	0.123	0.247	0.391	0.296	0.391
8	0.003	0.005	0.009	0.016	0.020	0.018	0.021	0.026	0.026	0.016	0.014	0.026
9	0.003	0.012	0.014	0.020	0.027	0.030	0.023	0.028	0.056	0.048	0.038	0.056
10	0.003	0.005	0.008	0.016	0.019	0.019	0.020	0.017	0.025	0.020	0.016	0.025
11	0.003	0.065	0.082	0.035	0.030	0.065	0.101	0.180	0.412	0.609	0.261	0.609
12	0.003	0.006	0.009	0.018	0.023	0.022	0.024	0.026	0.022	0.020	0.020	0.026
13	0.003	0.058	0.052	0.097	0.110	0.146	0.138	0.169	0.237	0.237	0.159	0.237
14	0.003	0.005	0.008	0.016	0.019	0.019	0.019	0.018	0.022	0.019	0.017	0.022
15	0.003	0.012	0.014	0.023	0.024	0.030	0.027	0.021	0.049	0.045	0.033	0.049
16	0.003	0.005	0.007	0.014	0.017	0.017	0.017	0.017	0.021	0.018	0.018	0.021
17	0.003	0.093	0.133	0.062	0.076	0.120	0.059	0.042	0.042	0.143	0.177	0.177
18	0.003	0.007	0.009	0.014	0.016	0.018	0.019	0.019	0.018	0.017	0.017	0.019
19	0.003	0.066	0.116	0.090	0.087	0.109	0.112	0.171	0.256	0.260	0.100	0.260
20	0.003	0.006	0.009	0.013	0.015	0.017	0.021	0.026	0.028	0.018	0.015	0.028
21	0.003	0.009	0.021	0.019	0.021	0.027	0.026	0.033	0.035	0.041	0.032	0.041
22	0.003	0.005	0.010	0.012	0.014	0.017	0.017	0.016	0.016	0.016	0.014	0.017
23	0.003	0.044	0.042	0.091	0.077	0.113	0.081	0.168	0.261	0.305	0.334	0.334
24	0.003	0.005	0.011	0.012	0.013	0.016	0.017	0.021	0.015	0.013	0.014	0.021
25	0.003	0.032	0.049	0.063	0.072	0.053	0.100	0.107	0.200	0.259	0.154	0.259
26	0.003	0.003	0.008	0.012	0.013	0.015	0.015	0.019	0.017	0.014	0.013	0.019
27	0.003	0.010	0.019	0.019	0.022	0.041	0.026	0.042	0.029	0.030	0.038	0.042
28	0.003	0.004	0.009	0.011	0.011	0.016	0.016	0.018	0.017	0.017	0.013	0.018
29	0.003	0.026	0.077	0.051	0.025	0.034	0.049	0.143	0.162	0.147	0.210	0.210
30	0.003	0.006	0.006	0.010	0.011	0.016	0.017	0.022	0.016	0.018	0.015	0.022
31	0.003	0.027	0.027	0.128	0.146	0.173	0.181	0.106	0.070	0.118	0.157	0.181
32	0.003	0.006	0.008	0.011	0.012	0.015	0.015	0.018	0.016	0.017	0.012	0.018
33	0.003	0.013	0.016	0.029	0.019	0.032	0.034	0.043	0.021	0.027	0.033	0.043
34	0.003	0.006	0.007	0.009	0.009	0.013	0.014	0.016	0.015	0.018	0.016	0.018
35	0.003	0.057	0.051	0.044	0.106	0.127	0.075	0.028	0.111	0.131	0.071	0.131
36	0.003	0.004	0.010	0.011	0.010	0.015	0.018	0.018	0.014	0.017	0.019	0.019
37	0.003	0.076	0.080	0.105	0.122	0.181	0.171	0.147	0.091	0.063	0.166	0.181
38	0.003	0.003	0.009	0.009	0.010	0.015	0.014	0.015	0.013	0.015	0.012	0.015
39	0.003	0.011	0.023	0.026	0.018	0.022	0.035	0.032	0.019	0.023	0.029	0.035
40	0.003	0.006	0.011	0.008	0.008	0.011	0.014	0.014	0.012	0.015	0.012	0.015
41	0.003	0.054	0.110	0.061	0.073	0.110	0.096	0.062	0.128	0.149	0.137	0.149
42	0.003	0.004	0.008	0.009	0.008	0.012	0.016	0.015	0.011	0.012	0.013	0.016
43	0.003	0.040	0.095	0.027	0.053	0.080	0.085	0.117	0.106	0.079	0.082	0.117
44	0.003	0.005	0.007	0.008	0.008	0.011	0.012	0.013	0.010	0.010	0.009	0.013
45	0.003	0.014	0.025	0.016	0.017	0.029	0.028	0.018	0.020	0.024	0.025	0.029
46	0.003	0.004	0.006	0.007	0.007	0.010	0.013	0.013	0.009	0.010	0.010	0.013
47	0.003	0.054	0.055	0.047	0.018	0.029	0.038	0.030	0.069	0.115	0.156	0.156
48	0.003	0.003	0.007	0.006	0.007	0.009	0.012	0.013	0.009	0.008	0.009	0.013
49	0.003	0.052	0.072	0.052	0.071	0.069	0.073	0.057	0.048	0.041	0.066	0.073
50	0.004	0.003	0.005	0.007	0.007	0.008	0.009	0.011	0.008	0.008	0.008	0.011
TDC(%)	0.022	0.225	0.325	0.300	0.342	0.453	0.450	0.540	0.845	1.108	0.780	1.108

Model: AZZURRO 3PH 125KTL-V4-A												
Phase B												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./ Order	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2	0.003	0.007	0.008	0.009	0.010	0.015	0.024	0.034	0.039	0.030	0.045	0.045
3	0.003	0.016	0.024	0.036	0.035	0.040	0.045	0.062	0.038	0.029	0.037	0.062
4	0.003	0.005	0.008	0.010	0.013	0.015	0.016	0.025	0.032	0.019	0.020	0.032
5	0.003	0.064	0.064	0.060	0.087	0.132	0.162	0.240	0.428	0.586	0.296	0.586
6	0.003	0.009	0.008	0.014	0.017	0.018	0.024	0.022	0.028	0.024	0.016	0.028
7	0.003	0.048	0.048	0.019	0.027	0.068	0.094	0.123	0.227	0.384	0.283	0.384
8	0.003	0.005	0.007	0.015	0.020	0.018	0.020	0.023	0.025	0.024	0.016	0.025
9	0.003	0.009	0.014	0.021	0.027	0.029	0.025	0.034	0.055	0.053	0.038	0.055
10	0.003	0.007	0.008	0.015	0.018	0.019	0.020	0.024	0.029	0.023	0.017	0.029
11	0.004	0.065	0.079	0.040	0.031	0.053	0.096	0.185	0.403	0.599	0.271	0.599
12	0.004	0.008	0.008	0.017	0.023	0.022	0.022	0.022	0.022	0.020	0.021	0.023
13	0.004	0.059	0.063	0.095	0.106	0.150	0.139	0.180	0.247	0.257	0.164	0.257
14	0.004	0.006	0.007	0.017	0.018	0.020	0.019	0.023	0.029	0.026	0.017	0.029
15	0.004	0.010	0.015	0.020	0.025	0.028	0.027	0.021	0.049	0.046	0.037	0.049
16	0.004	0.004	0.008	0.014	0.016	0.016	0.017	0.022	0.024	0.022	0.016	0.024
17	0.004	0.084	0.132	0.056	0.075	0.118	0.053	0.032	0.067	0.134	0.165	0.165
18	0.004	0.006	0.006	0.013	0.015	0.017	0.018	0.023	0.023	0.024	0.018	0.024
19	0.004	0.066	0.120	0.085	0.084	0.105	0.112	0.183	0.274	0.284	0.095	0.284
20	0.004	0.004	0.007	0.013	0.015	0.017	0.018	0.021	0.023	0.022	0.015	0.023
21	0.004	0.011	0.015	0.018	0.021	0.031	0.030	0.032	0.034	0.034	0.033	0.034
22	0.004	0.004	0.009	0.012	0.014	0.016	0.017	0.023	0.020	0.019	0.016	0.023
23	0.004	0.043	0.035	0.080	0.067	0.110	0.077	0.147	0.253	0.313	0.328	0.328
24	0.004	0.005	0.011	0.011	0.013	0.014	0.017	0.022	0.021	0.021	0.020	0.022
25	0.004	0.028	0.045	0.062	0.075	0.057	0.091	0.109	0.207	0.272	0.170	0.272
26	0.003	0.004	0.006	0.011	0.013	0.014	0.018	0.022	0.020	0.018	0.016	0.022
27	0.003	0.010	0.020	0.020	0.022	0.044	0.027	0.039	0.028	0.025	0.036	0.044
28	0.003	0.003	0.006	0.011	0.012	0.016	0.017	0.024	0.019	0.018	0.017	0.024
29	0.003	0.032	0.076	0.049	0.022	0.032	0.053	0.123	0.156	0.150	0.197	0.197
30	0.003	0.003	0.007	0.011	0.012	0.015	0.018	0.021	0.017	0.018	0.016	0.021
31	0.003	0.034	0.031	0.117	0.141	0.163	0.163	0.102	0.056	0.118	0.148	0.163
32	0.003	0.004	0.007	0.010	0.011	0.014	0.019	0.023	0.019	0.017	0.020	0.023
33	0.003	0.012	0.018	0.028	0.020	0.030	0.036	0.037	0.033	0.023	0.037	0.037
34	0.003	0.005	0.007	0.009	0.010	0.014	0.017	0.020	0.018	0.017	0.018	0.020
35	0.003	0.063	0.044	0.046	0.105	0.132	0.078	0.026	0.096	0.132	0.070	0.132
36	0.003	0.005	0.009	0.011	0.011	0.014	0.016	0.019	0.018	0.016	0.015	0.019
37	0.003	0.082	0.069	0.103	0.121	0.177	0.169	0.156	0.101	0.063	0.162	0.177
38	0.003	0.005	0.005	0.008	0.009	0.014	0.018	0.018	0.017	0.014	0.018	0.018
39	0.003	0.012	0.023	0.024	0.016	0.027	0.041	0.028	0.025	0.025	0.032	0.041
40	0.003	0.003	0.007	0.008	0.009	0.011	0.014	0.015	0.016	0.013	0.014	0.016
41	0.003	0.048	0.116	0.063	0.071	0.111	0.100	0.059	0.120	0.155	0.131	0.155
42	0.003	0.003	0.006	0.009	0.008	0.010	0.013	0.015	0.015	0.012	0.017	0.017
43	0.003	0.037	0.098	0.023	0.050	0.082	0.088	0.120	0.118	0.082	0.089	0.120
44	0.003	0.003	0.009	0.008	0.008	0.010	0.013	0.015	0.012	0.010	0.010	0.015
45	0.003	0.014	0.025	0.015	0.017	0.033	0.032	0.017	0.020	0.025	0.029	0.033
46	0.003	0.003	0.005	0.007	0.008	0.009	0.012	0.016	0.012	0.010	0.010	0.016
47	0.003	0.048	0.054	0.048	0.018	0.026	0.040	0.022	0.058	0.112	0.151	0.151
48	0.003	0.003	0.006	0.007	0.007	0.009	0.012	0.013	0.012	0.010	0.016	0.016
49	0.003	0.050	0.070	0.048	0.070	0.066	0.071	0.057	0.056	0.049	0.067	0.071
50	0.004	0.004	0.005	0.007	0.007	0.008	0.009	0.013	0.010	0.009	0.010	0.013
TDC(%)	0.024	0.226	0.317	0.284	0.332	0.450	0.445	0.549	0.866	1.144	0.777	1.144

Model: AZZURRO 3PH 125KTL-V4-A												
Phase C												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./ Order	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2	0.014	0.009	0.015	0.016	0.016	0.020	0.028	0.037	0.029	0.030	0.052	0.052
3	0.015	0.018	0.023	0.025	0.027	0.031	0.029	0.041	0.046	0.038	0.060	0.060
4	0.014	0.011	0.015	0.017	0.018	0.020	0.024	0.029	0.031	0.026	0.023	0.031
5	0.015	0.060	0.102	0.051	0.071	0.109	0.146	0.198	0.408	0.571	0.260	0.571
6	0.014	0.010	0.016	0.020	0.022	0.024	0.025	0.025	0.035	0.028	0.022	0.035
7	0.015	0.033	0.068	0.024	0.032	0.053	0.089	0.132	0.248	0.401	0.286	0.401
8	0.014	0.011	0.016	0.020	0.024	0.023	0.027	0.033	0.029	0.025	0.022	0.033
9	0.015	0.011	0.017	0.025	0.030	0.038	0.030	0.035	0.060	0.052	0.037	0.060
10	0.014	0.009	0.015	0.020	0.022	0.023	0.027	0.028	0.034	0.030	0.024	0.034
11	0.015	0.064	0.072	0.032	0.029	0.060	0.104	0.172	0.426	0.609	0.263	0.609
12	0.014	0.012	0.017	0.023	0.030	0.030	0.028	0.027	0.032	0.025	0.032	0.032
13	0.016	0.058	0.065	0.086	0.097	0.136	0.135	0.181	0.246	0.262	0.165	0.262
14	0.015	0.009	0.016	0.022	0.022	0.023	0.025	0.027	0.029	0.027	0.023	0.029
15	0.015	0.015	0.019	0.024	0.029	0.036	0.031	0.029	0.052	0.056	0.041	0.056
16	0.014	0.009	0.014	0.019	0.021	0.022	0.026	0.029	0.028	0.027	0.024	0.029
17	0.016	0.090	0.138	0.065	0.078	0.127	0.058	0.039	0.068	0.157	0.186	0.186
18	0.015	0.009	0.015	0.020	0.021	0.024	0.025	0.025	0.028	0.026	0.023	0.028
19	0.016	0.066	0.110	0.084	0.085	0.108	0.108	0.179	0.258	0.267	0.088	0.267
20	0.014	0.010	0.015	0.018	0.020	0.021	0.027	0.034	0.033	0.024	0.021	0.034
21	0.016	0.012	0.020	0.024	0.024	0.038	0.032	0.037	0.043	0.041	0.033	0.043
22	0.015	0.009	0.014	0.017	0.019	0.021	0.027	0.030	0.024	0.024	0.022	0.030
23	0.016	0.044	0.037	0.097	0.077	0.112	0.094	0.149	0.235	0.312	0.331	0.331
24	0.014	0.008	0.014	0.017	0.019	0.022	0.023	0.026	0.026	0.026	0.024	0.026
25	0.016	0.024	0.044	0.063	0.074	0.063	0.100	0.111	0.200	0.267	0.160	0.267
26	0.015	0.009	0.015	0.017	0.018	0.020	0.024	0.028	0.026	0.024	0.024	0.028
27	0.016	0.011	0.022	0.025	0.026	0.047	0.035	0.042	0.041	0.031	0.041	0.047
28	0.015	0.008	0.014	0.017	0.018	0.021	0.026	0.031	0.025	0.023	0.022	0.031
29	0.015	0.036	0.070	0.059	0.023	0.035	0.065	0.120	0.148	0.149	0.201	0.201
30	0.015	0.010	0.015	0.017	0.018	0.020	0.022	0.024	0.022	0.024	0.027	0.027
31	0.016	0.023	0.033	0.119	0.145	0.180	0.182	0.107	0.067	0.109	0.166	0.182
32	0.014	0.010	0.014	0.016	0.017	0.020	0.026	0.027	0.023	0.024	0.026	0.027
33	0.015	0.015	0.023	0.034	0.025	0.036	0.040	0.045	0.041	0.030	0.040	0.045
34	0.015	0.008	0.013	0.016	0.016	0.019	0.025	0.030	0.024	0.022	0.024	0.030
35	0.017	0.057	0.046	0.047	0.103	0.126	0.077	0.041	0.099	0.129	0.072	0.129
36	0.015	0.009	0.014	0.017	0.017	0.019	0.022	0.021	0.022	0.023	0.026	0.026
37	0.017	0.081	0.072	0.097	0.114	0.179	0.171	0.145	0.103	0.070	0.162	0.179
38	0.015	0.009	0.015	0.016	0.016	0.018	0.025	0.025	0.021	0.022	0.022	0.025
39	0.019	0.015	0.027	0.029	0.021	0.027	0.040	0.035	0.034	0.036	0.037	0.040
40	0.015	0.009	0.015	0.016	0.016	0.017	0.023	0.026	0.022	0.021	0.023	0.026
41	0.018	0.052	0.111	0.063	0.071	0.106	0.099	0.068	0.110	0.150	0.130	0.150
42	0.015	0.008	0.016	0.016	0.016	0.018	0.021	0.021	0.021	0.021	0.023	0.023
43	0.017	0.037	0.099	0.027	0.053	0.083	0.089	0.117	0.121	0.086	0.087	0.121
44	0.015	0.008	0.014	0.015	0.016	0.016	0.021	0.025	0.020	0.020	0.019	0.025
45	0.016	0.015	0.031	0.021	0.023	0.034	0.033	0.025	0.028	0.036	0.032	0.036
46	0.015	0.008	0.014	0.015	0.016	0.017	0.022	0.025	0.019	0.020	0.021	0.025
47	0.015	0.051	0.063	0.049	0.024	0.032	0.045	0.031	0.057	0.113	0.155	0.155
48	0.015	0.008	0.015	0.016	0.016	0.018	0.020	0.022	0.020	0.020	0.022	0.022
49	0.017	0.049	0.065	0.053	0.073	0.067	0.068	0.055	0.047	0.049	0.078	0.078
50	0.017	0.009	0.015	0.016	0.017	0.016	0.019	0.025	0.021	0.020	0.021	0.025
TDC(%)	0.107	0.227	0.336	0.298	0.338	0.455	0.462	0.536	0.865	1.149	0.779	1.149

Model: AZZURRO 3PH 110KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
2	0.003	0.005	0.009	0.009	0.012	0.012	0.018	0.031	0.033	0.021	0.025	0.037	0.037
3	0.003	0.035	0.057	0.065	0.070	0.062	0.079	0.074	0.092	0.073	0.073	0.066	0.092
4	0.003	0.006	0.010	0.012	0.017	0.015	0.015	0.022	0.021	0.015	0.013	0.017	0.022
5	0.003	0.030	0.065	0.062	0.078	0.096	0.144	0.174	0.220	0.256	0.256	0.213	0.256
6	0.003	0.008	0.014	0.015	0.018	0.018	0.021	0.028	0.019	0.017	0.013	0.018	0.028
7	0.003	0.041	0.074	0.026	0.032	0.043	0.078	0.094	0.128	0.183	0.196	0.243	0.243
8	0.003	0.006	0.011	0.017	0.030	0.019	0.021	0.023	0.024	0.020	0.017	0.018	0.030
9	0.004	0.016	0.023	0.024	0.026	0.025	0.039	0.029	0.039	0.033	0.029	0.039	0.039
10	0.003	0.006	0.011	0.017	0.023	0.020	0.023	0.020	0.023	0.017	0.015	0.017	0.023
11	0.004	0.061	0.089	0.032	0.032	0.033	0.088	0.125	0.184	0.299	0.196	0.229	0.299
12	0.004	0.007	0.013	0.018	0.021	0.021	0.022	0.025	0.021	0.017	0.019	0.022	0.025
13	0.004	0.060	0.093	0.104	0.113	0.139	0.164	0.144	0.163	0.185	0.116	0.081	0.185
14	0.004	0.004	0.007	0.016	0.022	0.019	0.021	0.020	0.019	0.018	0.017	0.017	0.022
15	0.004	0.010	0.020	0.022	0.024	0.026	0.033	0.033	0.031	0.032	0.028	0.034	0.034
16	0.004	0.004	0.010	0.015	0.022	0.018	0.019	0.019	0.018	0.017	0.017	0.019	0.022
17	0.004	0.066	0.136	0.085	0.086	0.120	0.139	0.056	0.033	0.050	0.143	0.139	0.143
18	0.004	0.007	0.013	0.015	0.017	0.019	0.020	0.021	0.018	0.015	0.015	0.017	0.021
19	0.004	0.036	0.069	0.103	0.097	0.112	0.130	0.130	0.172	0.224	0.116	0.079	0.224
20	0.004	0.007	0.015	0.014	0.018	0.018	0.019	0.019	0.018	0.017	0.022	0.015	0.022
21	0.004	0.011	0.014	0.027	0.023	0.029	0.040	0.032	0.032	0.028	0.027	0.033	0.040
22	0.004	0.005	0.011	0.013	0.018	0.017	0.018	0.018	0.023	0.015	0.016	0.015	0.023
23	0.004	0.072	0.141	0.103	0.085	0.117	0.135	0.100	0.177	0.221	0.258	0.237	0.258
24	0.004	0.004	0.009	0.013	0.015	0.018	0.018	0.020	0.016	0.013	0.013	0.015	0.020
25	0.004	0.060	0.120	0.099	0.086	0.077	0.065	0.102	0.109	0.177	0.084	0.108	0.177
26	0.004	0.003	0.007	0.014	0.018	0.017	0.017	0.016	0.018	0.017	0.013	0.014	0.018
27	0.004	0.011	0.018	0.025	0.024	0.031	0.053	0.024	0.038	0.032	0.032	0.031	0.053
28	0.004	0.004	0.007	0.011	0.014	0.018	0.019	0.017	0.015	0.014	0.015	0.014	0.019
29	0.004	0.022	0.051	0.043	0.030	0.052	0.034	0.099	0.177	0.191	0.214	0.137	0.214
30	0.004	0.005	0.013	0.010	0.013	0.018	0.020	0.020	0.016	0.017	0.015	0.015	0.020
31	0.004	0.039	0.085	0.176	0.162	0.182	0.197	0.182	0.095	0.063	0.142	0.111	0.197
32	0.004	0.005	0.011	0.013	0.015	0.018	0.018	0.016	0.016	0.017	0.013	0.013	0.018
33	0.004	0.011	0.023	0.018	0.021	0.046	0.049	0.034	0.037	0.034	0.027	0.027	0.049
34	0.004	0.005	0.009	0.011	0.012	0.015	0.016	0.018	0.015	0.014	0.013	0.014	0.018
35	0.004	0.101	0.183	0.094	0.111	0.152	0.129	0.044	0.043	0.096	0.059	0.055	0.183
36	0.004	0.004	0.007	0.012	0.012	0.018	0.019	0.022	0.016	0.016	0.017	0.016	0.022
37	0.004	0.096	0.174	0.139	0.135	0.171	0.233	0.195	0.169	0.116	0.173	0.110	0.233
38	0.004	0.003	0.006	0.010	0.012	0.015	0.016	0.017	0.013	0.015	0.013	0.012	0.017
39	0.004	0.011	0.021	0.027	0.017	0.045	0.029	0.042	0.033	0.029	0.022	0.025	0.045
40	0.004	0.004	0.008	0.009	0.010	0.013	0.013	0.017	0.011	0.013	0.012	0.013	0.017
41	0.004	0.055	0.111	0.090	0.077	0.124	0.136	0.087	0.088	0.136	0.187	0.121	0.187
42	0.004	0.003	0.008	0.010	0.010	0.015	0.016	0.021	0.012	0.012	0.012	0.013	0.021
43	0.004	0.064	0.120	0.072	0.072	0.067	0.120	0.109	0.170	0.178	0.115	0.076	0.178
44	0.004	0.004	0.007	0.008	0.010	0.013	0.012	0.016	0.010	0.013	0.012	0.011	0.016
45	0.004	0.008	0.021	0.018	0.016	0.030	0.026	0.035	0.023	0.023	0.022	0.030	0.035
46	0.004	0.004	0.008	0.007	0.008	0.012	0.012	0.013	0.010	0.011	0.010	0.012	0.013
47	0.004	0.076	0.153	0.039	0.015	0.040	0.050	0.044	0.059	0.082	0.190	0.152	0.190
48	0.004	0.004	0.010	0.008	0.008	0.011	0.011	0.015	0.009	0.010	0.008	0.011	0.015
49	0.004	0.066	0.140	0.091	0.090	0.083	0.067	0.057	0.092	0.116	0.046	0.053	0.140
50	0.004	0.004	0.009	0.008	0.009	0.011	0.009	0.012	0.009	0.010	0.009	0.010	0.012
TDC(%)	0.025	0.256	0.485	0.388	0.379	0.462	0.544	0.496	0.586	0.712	0.682	0.606	0.712

Model: AZZURRO 3PH 110KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./Order	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
2	0.004	0.006	0.013	0.009	0.012	0.014	0.020	0.034	0.036	0.029	0.028	0.046	0.046
3	0.003	0.023	0.033	0.050	0.048	0.045	0.057	0.055	0.065	0.034	0.038	0.026	0.065
4	0.003	0.005	0.010	0.012	0.016	0.014	0.020	0.021	0.027	0.024	0.017	0.022	0.027
5	0.004	0.047	0.070	0.068	0.095	0.106	0.154	0.188	0.238	0.307	0.261	0.225	0.307
6	0.004	0.009	0.018	0.015	0.017	0.019	0.025	0.021	0.023	0.027	0.015	0.024	0.027
7	0.004	0.013	0.030	0.026	0.030	0.046	0.078	0.111	0.122	0.176	0.179	0.222	0.222
8	0.004	0.005	0.011	0.017	0.029	0.018	0.023	0.022	0.023	0.024	0.014	0.020	0.029
9	0.004	0.016	0.016	0.023	0.028	0.025	0.043	0.026	0.041	0.026	0.027	0.041	0.043
10	0.004	0.008	0.014	0.018	0.023	0.020	0.026	0.024	0.023	0.024	0.015	0.017	0.026
11	0.004	0.056	0.091	0.044	0.036	0.033	0.081	0.121	0.190	0.298	0.183	0.238	0.298
12	0.004	0.006	0.012	0.018	0.019	0.021	0.024	0.022	0.022	0.021	0.016	0.026	0.026
13	0.004	0.058	0.096	0.110	0.114	0.132	0.174	0.155	0.164	0.187	0.119	0.079	0.187
14	0.004	0.004	0.009	0.017	0.022	0.019	0.024	0.022	0.023	0.026	0.016	0.019	0.026
15	0.004	0.010	0.017	0.028	0.025	0.024	0.032	0.025	0.028	0.037	0.033	0.036	0.037
16	0.004	0.006	0.014	0.015	0.021	0.017	0.026	0.021	0.022	0.022	0.016	0.017	0.026
17	0.004	0.055	0.119	0.079	0.083	0.104	0.137	0.045	0.046	0.060	0.136	0.132	0.137
18	0.004	0.006	0.012	0.015	0.016	0.019	0.022	0.023	0.022	0.022	0.018	0.018	0.023
19	0.004	0.033	0.071	0.100	0.096	0.101	0.142	0.131	0.183	0.228	0.122	0.067	0.228
20	0.004	0.004	0.009	0.013	0.017	0.017	0.023	0.021	0.021	0.020	0.014	0.016	0.023
21	0.004	0.008	0.014	0.031	0.021	0.028	0.037	0.032	0.035	0.031	0.034	0.033	0.037
22	0.004	0.005	0.009	0.013	0.017	0.017	0.021	0.021	0.020	0.018	0.014	0.016	0.021
23	0.004	0.076	0.143	0.090	0.081	0.103	0.119	0.101	0.147	0.237	0.254	0.245	0.254
24	0.004	0.005	0.010	0.013	0.013	0.017	0.020	0.024	0.020	0.017	0.017	0.018	0.024
25	0.004	0.047	0.113	0.092	0.088	0.071	0.064	0.091	0.114	0.173	0.095	0.109	0.173
26	0.004	0.004	0.008	0.013	0.017	0.015	0.021	0.022	0.021	0.019	0.013	0.016	0.022
27	0.004	0.013	0.017	0.025	0.023	0.031	0.052	0.028	0.038	0.032	0.034	0.033	0.052
28	0.004	0.003	0.006	0.011	0.014	0.016	0.021	0.022	0.020	0.018	0.015	0.015	0.022
29	0.004	0.024	0.040	0.037	0.029	0.051	0.024	0.100	0.148	0.206	0.196	0.138	0.206
30	0.004	0.005	0.010	0.010	0.012	0.016	0.020	0.022	0.020	0.017	0.014	0.015	0.022
31	0.004	0.034	0.068	0.161	0.150	0.173	0.190	0.158	0.085	0.052	0.146	0.114	0.190
32	0.004	0.004	0.009	0.012	0.014	0.014	0.020	0.024	0.021	0.020	0.016	0.018	0.024
33	0.004	0.011	0.016	0.025	0.022	0.050	0.048	0.028	0.032	0.042	0.024	0.027	0.050
34	0.004	0.004	0.009	0.011	0.012	0.013	0.018	0.025	0.020	0.021	0.016	0.016	0.025
35	0.004	0.109	0.195	0.103	0.104	0.158	0.130	0.048	0.027	0.084	0.072	0.048	0.195
36	0.003	0.004	0.009	0.011	0.011	0.018	0.020	0.023	0.021	0.021	0.013	0.014	0.023
37	0.004	0.100	0.190	0.137	0.123	0.172	0.228	0.189	0.175	0.125	0.172	0.108	0.228
38	0.003	0.005	0.009	0.009	0.010	0.014	0.020	0.023	0.017	0.018	0.013	0.014	0.023
39	0.004	0.010	0.020	0.030	0.018	0.046	0.028	0.040	0.031	0.035	0.025	0.024	0.046
40	0.003	0.003	0.006	0.010	0.010	0.012	0.015	0.025	0.017	0.019	0.013	0.016	0.025
41	0.003	0.050	0.106	0.093	0.075	0.129	0.134	0.095	0.076	0.126	0.197	0.113	0.197
42	0.003	0.004	0.008	0.011	0.010	0.015	0.015	0.021	0.016	0.018	0.014	0.017	0.021
43	0.003	0.063	0.117	0.076	0.074	0.076	0.117	0.111	0.173	0.186	0.130	0.084	0.186
44	0.003	0.003	0.005	0.008	0.009	0.013	0.016	0.021	0.014	0.015	0.010	0.011	0.021
45	0.004	0.008	0.018	0.020	0.016	0.031	0.026	0.034	0.023	0.021	0.032	0.027	0.034
46	0.004	0.003	0.006	0.008	0.009	0.010	0.013	0.019	0.013	0.015	0.009	0.013	0.019
47	0.004	0.071	0.140	0.039	0.015	0.039	0.046	0.050	0.043	0.071	0.189	0.147	0.189
48	0.004	0.003	0.007	0.008	0.008	0.010	0.011	0.015	0.012	0.014	0.012	0.018	0.018
49	0.004	0.063	0.136	0.089	0.092	0.082	0.071	0.060	0.094	0.126	0.056	0.054	0.136
50	0.004	0.003	0.006	0.009	0.009	0.010	0.011	0.016	0.012	0.014	0.011	0.012	0.016
TDC(%)	0.027	0.249	0.474	0.380	0.368	0.451	0.541	0.497	0.579	0.741	0.676	0.603	0.741

Model: AZZURRO 3PH 110KTL-V4														
Phase C														
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)	
Nr./ Order	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	
2	0.020	0.013	0.026	0.024	0.026	0.027	0.031	0.042	0.035	0.024	0.031	0.039	0.042	
3	0.021	0.018	0.038	0.034	0.035	0.032	0.041	0.033	0.043	0.049	0.042	0.046	0.049	
4	0.020	0.013	0.026	0.025	0.029	0.028	0.029	0.033	0.030	0.024	0.023	0.025	0.033	
5	0.020	0.046	0.106	0.049	0.073	0.092	0.124	0.160	0.195	0.281	0.236	0.189	0.281	
6	0.020	0.013	0.027	0.028	0.029	0.030	0.031	0.032	0.034	0.028	0.021	0.017	0.034	
7	0.020	0.034	0.066	0.031	0.037	0.041	0.077	0.104	0.142	0.177	0.185	0.237	0.237	
8	0.020	0.014	0.028	0.029	0.037	0.032	0.034	0.034	0.031	0.025	0.023	0.016	0.037	
9	0.020	0.018	0.028	0.035	0.037	0.036	0.042	0.043	0.048	0.036	0.030	0.028	0.048	
10	0.020	0.013	0.026	0.029	0.033	0.032	0.038	0.034	0.033	0.028	0.022	0.018	0.038	
11	0.020	0.054	0.089	0.047	0.045	0.044	0.080	0.112	0.181	0.312	0.188	0.232	0.312	
12	0.020	0.013	0.026	0.031	0.030	0.032	0.034	0.032	0.033	0.026	0.025	0.031	0.034	
13	0.021	0.061	0.098	0.102	0.112	0.123	0.156	0.146	0.172	0.181	0.111	0.078	0.181	
14	0.020	0.013	0.026	0.028	0.032	0.031	0.033	0.033	0.032	0.028	0.023	0.018	0.033	
15	0.020	0.015	0.029	0.036	0.036	0.035	0.039	0.040	0.038	0.046	0.039	0.035	0.046	
16	0.020	0.014	0.029	0.028	0.032	0.031	0.036	0.032	0.030	0.026	0.023	0.017	0.036	
17	0.021	0.063	0.133	0.088	0.086	0.119	0.126	0.062	0.045	0.072	0.153	0.149	0.153	
18	0.020	0.013	0.025	0.028	0.029	0.031	0.033	0.032	0.032	0.025	0.022	0.015	0.033	
19	0.020	0.037	0.072	0.099	0.101	0.100	0.132	0.127	0.180	0.218	0.110	0.076	0.218	
20	0.020	0.014	0.027	0.026	0.029	0.030	0.033	0.034	0.030	0.022	0.027	0.013	0.034	
21	0.021	0.017	0.029	0.035	0.032	0.036	0.043	0.042	0.044	0.041	0.031	0.026	0.044	
22	0.020	0.013	0.025	0.026	0.030	0.031	0.032	0.031	0.033	0.023	0.022	0.015	0.033	
23	0.021	0.076	0.146	0.096	0.084	0.117	0.118	0.117	0.153	0.222	0.261	0.241	0.261	
24	0.020	0.012	0.025	0.027	0.027	0.029	0.031	0.033	0.029	0.022	0.023	0.017	0.033	
25	0.021	0.055	0.107	0.096	0.089	0.079	0.065	0.097	0.113	0.173	0.089	0.100	0.173	
26	0.020	0.012	0.025	0.026	0.029	0.029	0.031	0.034	0.029	0.024	0.021	0.017	0.034	
27	0.021	0.015	0.027	0.035	0.032	0.042	0.053	0.038	0.045	0.040	0.028	0.029	0.053	
28	0.020	0.012	0.024	0.025	0.027	0.030	0.034	0.035	0.029	0.022	0.023	0.015	0.035	
29	0.021	0.032	0.051	0.040	0.039	0.054	0.038	0.110	0.155	0.189	0.203	0.129	0.203	
30	0.020	0.013	0.027	0.026	0.026	0.028	0.031	0.033	0.029	0.024	0.026	0.018	0.033	
31	0.020	0.046	0.070	0.172	0.160	0.189	0.202	0.179	0.093	0.061	0.144	0.119	0.202	
32	0.020	0.014	0.028	0.026	0.027	0.030	0.032	0.035	0.030	0.022	0.022	0.016	0.035	
33	0.020	0.015	0.029	0.034	0.033	0.056	0.053	0.039	0.040	0.050	0.023	0.025	0.056	
34	0.020	0.013	0.024	0.025	0.026	0.029	0.032	0.039	0.030	0.024	0.024	0.016	0.039	
35	0.022	0.097	0.177	0.113	0.120	0.165	0.137	0.057	0.043	0.074	0.065	0.057	0.177	
36	0.020	0.013	0.026	0.026	0.026	0.028	0.031	0.031	0.029	0.025	0.026	0.015	0.031	
37	0.022	0.099	0.193	0.142	0.129	0.175	0.228	0.193	0.166	0.121	0.157	0.109	0.228	
38	0.020	0.013	0.026	0.025	0.025	0.028	0.030	0.034	0.028	0.020	0.020	0.011	0.034	
39	0.022	0.016	0.032	0.042	0.031	0.050	0.040	0.049	0.040	0.041	0.028	0.027	0.050	
40	0.020	0.012	0.025	0.025	0.026	0.030	0.030	0.035	0.027	0.024	0.021	0.017	0.035	
41	0.022	0.060	0.119	0.105	0.084	0.134	0.143	0.096	0.088	0.119	0.197	0.119	0.197	
42	0.020	0.012	0.025	0.025	0.025	0.028	0.029	0.031	0.027	0.024	0.023	0.015	0.031	
43	0.021	0.061	0.116	0.072	0.080	0.074	0.126	0.119	0.174	0.192	0.121	0.084	0.192	
44	0.021	0.013	0.025	0.024	0.025	0.026	0.027	0.031	0.026	0.020	0.020	0.010	0.031	
45	0.021	0.015	0.029	0.034	0.029	0.039	0.038	0.043	0.036	0.027	0.030	0.028	0.043	
46	0.020	0.012	0.026	0.024	0.025	0.028	0.029	0.030	0.025	0.021	0.019	0.014	0.030	
47	0.021	0.072	0.148	0.050	0.029	0.049	0.062	0.057	0.058	0.069	0.194	0.153	0.194	
48	0.021	0.013	0.025	0.025	0.025	0.027	0.027	0.029	0.026	0.022	0.020	0.015	0.029	
49	0.022	0.065	0.134	0.087	0.093	0.083	0.075	0.061	0.093	0.127	0.055	0.060	0.134	
50	0.022	0.014	0.027	0.025	0.026	0.027	0.027	0.029	0.025	0.021	0.021	0.012	0.029	
TDC(%)	0.144	0.263	0.507	0.412	0.404	0.485	0.550	0.519	0.582	0.730	0.675	0.598	0.730	

## 2.2.6 Oberschwingungsmessungen / Voltage Harmonics

Model: AZZURRO 3PH 100KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	
2	0.010	0.010	0.010	0.011	0.010	0.010	0.009	0.008	0.008	0.008	0.008	0.007	0.011
3	0.029	0.030	0.031	0.083	0.130	0.156	0.175	0.188	0.199	0.213	0.217	0.219	0.219
4	0.010	0.003	0.003	0.006	0.007	0.008	0.007	0.007	0.006	0.006	0.005	0.005	0.010
5	0.017	0.024	0.024	0.019	0.072	0.105	0.130	0.150	0.168	0.185	0.198	0.204	0.204
6	0.007	0.008	0.008	0.003	0.003	0.005	0.006	0.006	0.005	0.005	0.005	0.005	0.008
7	0.018	0.031	0.031	0.016	0.023	0.050	0.071	0.087	0.101	0.119	0.126	0.131	0.131
8	0.007	0.008	0.008	0.005	0.004	0.005	0.005	0.006	0.006	0.005	0.006	0.006	0.008
9	0.018	0.012	0.012	0.016	0.008	0.013	0.028	0.045	0.061	0.075	0.087	0.096	0.096
10	0.005	0.008	0.008	0.007	0.006	0.004	0.003	0.002	0.002	0.003	0.004	0.004	0.008
11	0.017	0.024	0.023	0.021	0.022	0.013	0.006	0.018	0.033	0.046	0.059	0.069	0.069
12	0.004	0.008	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.003	0.003	0.004	0.008
13	0.013	0.034	0.033	0.022	0.035	0.034	0.030	0.024	0.013	0.007	0.012	0.021	0.035
14	0.005	0.005	0.005	0.004	0.005	0.005	0.004	0.003	0.003	0.003	0.003	0.003	0.005
15	0.003	0.014	0.015	0.014	0.027	0.031	0.030	0.023	0.015	0.009	0.004	0.010	0.031
16	0.003	0.004	0.004	0.003	0.006	0.006	0.006	0.005	0.004	0.003	0.002	0.004	0.006
17	0.005	0.024	0.024	0.011	0.018	0.025	0.025	0.023	0.017	0.012	0.018	0.015	0.025
18	0.002	0.007	0.007	0.004	0.006	0.006	0.006	0.005	0.004	0.004	0.004	0.004	0.007
19	0.004	0.012	0.012	0.014	0.028	0.040	0.045	0.046	0.039	0.034	0.029	0.024	0.046
20	0.003	0.006	0.006	0.004	0.005	0.005	0.006	0.005	0.005	0.005	0.004	0.004	0.006
21	0.005	0.007	0.008	0.015	0.019	0.025	0.028	0.030	0.030	0.029	0.027	0.022	0.030
22	0.002	0.003	0.003	0.003	0.004	0.006	0.005	0.005	0.004	0.003	0.002	0.003	0.006
23	0.007	0.033	0.033	0.012	0.018	0.032	0.037	0.040	0.037	0.040	0.044	0.044	0.044
24	0.002	0.004	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.002	0.004	0.004
25	0.002	0.035	0.035	0.011	0.023	0.035	0.036	0.037	0.035	0.034	0.028	0.029	0.037
26	0.004	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.006	0.005	0.005	0.006
27	0.011	0.014	0.014	0.014	0.018	0.019	0.020	0.023	0.027	0.030	0.031	0.030	0.031
28	0.004	0.003	0.003	0.003	0.004	0.005	0.004	0.004	0.003	0.002	0.002	0.003	0.005
29	0.012	0.027	0.027	0.019	0.022	0.033	0.035	0.037	0.037	0.040	0.044	0.047	0.047
30	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.004
31	0.012	0.020	0.020	0.023	0.009	0.011	0.010	0.014	0.019	0.016	0.011	0.007	0.023
32	0.002	0.003	0.003	0.003	0.005	0.005	0.003	0.003	0.003	0.003	0.003	0.004	0.005
33	0.014	0.008	0.008	0.007	0.015	0.015	0.019	0.021	0.024	0.029	0.029	0.027	0.029
34	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.002	0.003	0.002	0.003	0.004
35	0.019	0.041	0.040	0.027	0.011	0.018	0.018	0.018	0.020	0.027	0.030	0.027	0.041
36	0.002	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005
37	0.015	0.036	0.036	0.019	0.005	0.024	0.031	0.036	0.034	0.021	0.017	0.013	0.036
38	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.003	0.003	0.004	0.004	0.004
39	0.012	0.010	0.010	0.010	0.011	0.012	0.015	0.016	0.018	0.017	0.016	0.016	0.018
40	0.005	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.005
41	0.008	0.023	0.024	0.013	0.011	0.007	0.014	0.014	0.018	0.021	0.028	0.024	0.028
42	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.005	0.005
43	0.009	0.015	0.015	0.012	0.011	0.025	0.038	0.042	0.037	0.026	0.022	0.022	0.042
44	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004
45	0.008	0.007	0.007	0.005	0.010	0.011	0.015	0.016	0.016	0.013	0.014	0.014	0.016
46	0.004	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.002	0.004	0.004
47	0.002	0.037	0.037	0.023	0.012	0.014	0.026	0.028	0.031	0.029	0.041	0.038	0.041
48	0.005	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.004	0.003	0.002	0.005	0.005
49	0.006	0.034	0.034	0.020	0.011	0.018	0.029	0.032	0.027	0.018	0.010	0.013	0.034
50	0.002	0.002	0.002	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.004
TDD (%)	0.067	0.127	0.127	0.118	0.173	0.224	0.262	0.291	0.312	0.339	0.356	0.365	0.365

Model: AZZURRO 3PH 100KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)
2	0.007	0.008	0.007	0.008	0.008	0.008	0.007	0.008	0.007	0.008	0.008	0.008	0.008
3	0.028	0.036	0.037	0.093	0.138	0.168	0.189	0.203	0.213	0.227	0.231	0.232	0.232
4	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004
5	0.022	0.025	0.025	0.025	0.077	0.114	0.143	0.166	0.185	0.202	0.215	0.220	0.220
6	0.004	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004
7	0.022	0.027	0.027	0.014	0.024	0.051	0.074	0.094	0.110	0.126	0.134	0.139	0.139
8	0.004	0.003	0.003	0.003	0.004	0.005	0.003	0.003	0.004	0.005	0.004	0.005	0.005
9	0.018	0.011	0.012	0.014	0.010	0.021	0.038	0.053	0.067	0.082	0.091	0.100	0.100
10	0.003	0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.005
11	0.019	0.033	0.032	0.031	0.028	0.017	0.007	0.018	0.034	0.048	0.064	0.076	0.076
12	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.004	0.004	0.004	0.005	0.005
13	0.016	0.046	0.046	0.035	0.049	0.047	0.038	0.027	0.014	0.007	0.015	0.022	0.049
14	0.004	0.005	0.005	0.005	0.005	0.006	0.004	0.004	0.004	0.004	0.003	0.004	0.006
15	0.004	0.014	0.014	0.017	0.029	0.034	0.031	0.025	0.016	0.008	0.005	0.012	0.034
16	0.002	0.004	0.005	0.004	0.005	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.005
17	0.009	0.024	0.025	0.027	0.030	0.036	0.036	0.029	0.020	0.012	0.013	0.015	0.036
18	0.002	0.004	0.004	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004
19	0.011	0.019	0.020	0.028	0.039	0.051	0.053	0.052	0.046	0.037	0.032	0.026	0.053
20	0.003	0.005	0.005	0.004	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.005
21	0.007	0.013	0.013	0.017	0.018	0.025	0.029	0.029	0.027	0.026	0.020	0.015	0.029
22	0.002	0.002	0.002	0.002	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.004
23	0.009	0.045	0.045	0.016	0.023	0.035	0.040	0.041	0.040	0.037	0.039	0.040	0.045
24	0.002	0.002	0.002	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004
25	0.010	0.031	0.031	0.005	0.015	0.027	0.030	0.034	0.033	0.033	0.026	0.026	0.034
26	0.004	0.005	0.005	0.006	0.006	0.006	0.006	0.005	0.005	0.006	0.005	0.005	0.006
27	0.017	0.011	0.011	0.009	0.014	0.016	0.021	0.024	0.026	0.028	0.025	0.022	0.028
28	0.002	0.002	0.002	0.003	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.005
29	0.018	0.021	0.022	0.011	0.012	0.024	0.027	0.029	0.030	0.035	0.043	0.048	0.048
30	0.003	0.003	0.003	0.003	0.005	0.005	0.004	0.003	0.003	0.003	0.004	0.005	0.005
31	0.020	0.024	0.024	0.017	0.017	0.035	0.037	0.042	0.046	0.037	0.021	0.017	0.046
32	0.002	0.004	0.004	0.003	0.004	0.004	0.003	0.003	0.004	0.005	0.004	0.004	0.005
33	0.025	0.018	0.018	0.018	0.019	0.015	0.013	0.013	0.013	0.013	0.013	0.014	0.025
34	0.002	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005
35	0.011	0.043	0.043	0.024	0.017	0.007	0.003	0.009	0.010	0.009	0.014	0.018	0.043
36	0.003	0.003	0.003	0.003	0.005	0.004	0.004	0.003	0.003	0.003	0.003	0.005	0.005
37	0.007	0.040	0.041	0.024	0.006	0.025	0.033	0.038	0.037	0.027	0.027	0.025	0.041
38	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.005	0.005
39	0.011	0.008	0.008	0.007	0.012	0.010	0.012	0.010	0.011	0.010	0.011	0.012	0.012
40	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.005	0.005
41	0.014	0.019	0.019	0.015	0.021	0.007	0.015	0.011	0.013	0.016	0.025	0.024	0.025
42	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003	0.003	0.004	0.006	0.006
43	0.005	0.024	0.023	0.019	0.014	0.024	0.035	0.040	0.035	0.023	0.020	0.024	0.040
44	0.004	0.004	0.004	0.003	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.004
45	0.008	0.010	0.010	0.007	0.010	0.007	0.008	0.008	0.009	0.007	0.010	0.012	0.012
46	0.004	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.004
47	0.011	0.040	0.039	0.033	0.024	0.005	0.019	0.020	0.024	0.025	0.036	0.034	0.040
48	0.003	0.002	0.002	0.003	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.006	0.006
49	0.009	0.051	0.051	0.039	0.019	0.018	0.029	0.035	0.032	0.025	0.013	0.017	0.051
50	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.003	0.003	0.004	0.005
TDD (%)	0.076	0.144	0.144	0.141	0.192	0.243	0.283	0.313	0.336	0.359	0.375	0.387	0.387

Model: AZZURRO 3PH 100KTL-V4													
Phase C													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)
2	0.011	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.008	0.011
3	0.029	0.039	0.040	0.096	0.142	0.171	0.190	0.205	0.216	0.231	0.235	0.236	0.236
4	0.008	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.008
5	0.021	0.024	0.023	0.028	0.079	0.112	0.139	0.162	0.179	0.200	0.211	0.220	0.220
6	0.004	0.007	0.007	0.004	0.003	0.003	0.004	0.005	0.006	0.007	0.007	0.008	0.008
7	0.022	0.030	0.029	0.010	0.032	0.061	0.086	0.104	0.121	0.138	0.144	0.149	0.149
8	0.003	0.005	0.005	0.005	0.004	0.005	0.004	0.005	0.006	0.008	0.007	0.008	0.008
9	0.019	0.009	0.010	0.016	0.008	0.022	0.040	0.057	0.072	0.089	0.101	0.107	0.107
10	0.004	0.003	0.004	0.004	0.005	0.004	0.003	0.004	0.004	0.006	0.008	0.007	0.008
11	0.021	0.029	0.028	0.032	0.031	0.020	0.007	0.019	0.034	0.050	0.061	0.073	0.073
12	0.004	0.004	0.003	0.003	0.006	0.005	0.004	0.004	0.004	0.005	0.006	0.007	0.007
13	0.008	0.037	0.036	0.030	0.043	0.039	0.031	0.023	0.010	0.007	0.014	0.022	0.043
14	0.004	0.004	0.004	0.003	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.007	0.007
15	0.006	0.013	0.012	0.017	0.029	0.032	0.030	0.024	0.017	0.009	0.004	0.009	0.032
16	0.004	0.004	0.004	0.004	0.005	0.005	0.003	0.003	0.003	0.004	0.004	0.005	0.005
17	0.008	0.020	0.020	0.019	0.025	0.033	0.035	0.029	0.022	0.016	0.020	0.013	0.035
18	0.003	0.003	0.003	0.004	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.005
19	0.002	0.013	0.013	0.018	0.033	0.046	0.051	0.053	0.047	0.041	0.036	0.031	0.053
20	0.003	0.003	0.003	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005
21	0.005	0.006	0.006	0.012	0.021	0.027	0.029	0.028	0.025	0.024	0.022	0.017	0.029
22	0.004	0.003	0.003	0.003	0.005	0.005	0.003	0.003	0.003	0.004	0.004	0.005	0.005
23	0.007	0.030	0.031	0.011	0.019	0.031	0.038	0.039	0.036	0.039	0.040	0.039	0.040
24	0.002	0.003	0.003	0.003	0.005	0.004	0.004	0.003	0.003	0.003	0.003	0.004	0.005
25	0.004	0.031	0.030	0.006	0.018	0.029	0.032	0.033	0.031	0.032	0.028	0.028	0.033
26	0.006	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
27	0.015	0.017	0.016	0.011	0.014	0.014	0.013	0.014	0.016	0.022	0.023	0.022	0.023
28	0.002	0.004	0.004	0.003	0.004	0.005	0.003	0.003	0.003	0.004	0.004	0.005	0.005
29	0.004	0.022	0.022	0.018	0.012	0.020	0.025	0.031	0.033	0.044	0.048	0.052	0.052
30	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.005
31	0.014	0.020	0.020	0.015	0.005	0.019	0.021	0.025	0.030	0.028	0.018	0.014	0.030
32	0.003	0.003	0.003	0.004	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.005	0.005
33	0.027	0.017	0.017	0.014	0.017	0.021	0.024	0.027	0.030	0.034	0.034	0.031	0.034
34	0.003	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.005
35	0.023	0.045	0.044	0.024	0.011	0.017	0.016	0.020	0.023	0.028	0.029	0.029	0.045
36	0.002	0.003	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005
37	0.021	0.037	0.038	0.022	0.006	0.029	0.037	0.041	0.040	0.027	0.021	0.016	0.041
38	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004
39	0.026	0.005	0.005	0.009	0.013	0.015	0.018	0.018	0.018	0.017	0.019	0.015	0.026
40	0.003	0.003	0.003	0.003	0.005	0.004	0.003	0.003	0.004	0.004	0.004	0.005	0.005
41	0.005	0.018	0.018	0.013	0.014	0.007	0.017	0.014	0.017	0.019	0.028	0.024	0.028
42	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.004	0.004	0.005	0.006	0.006
43	0.004	0.017	0.017	0.015	0.011	0.023	0.034	0.036	0.030	0.018	0.017	0.020	0.036
44	0.005	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.004	0.004	0.004	0.005	0.005
45	0.007	0.006	0.006	0.008	0.010	0.009	0.011	0.009	0.008	0.006	0.012	0.011	0.012
46	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.004	0.004	0.003	0.005	0.005
47	0.005	0.035	0.035	0.024	0.020	0.011	0.024	0.023	0.023	0.026	0.037	0.034	0.037
48	0.003	0.003	0.004	0.003	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.006	0.006
49	0.015	0.040	0.040	0.030	0.021	0.009	0.021	0.027	0.027	0.023	0.010	0.018	0.040
50	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.004	0.004	0.004	0.005	0.005	0.005
TDD (%)	0.080	0.129	0.129	0.134	0.192	0.242	0.283	0.315	0.338	0.370	0.386	0.396	0.396

Model: AZZURRO 3PH 125KTL-V4-A												
Phase A												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./Order	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	
2	0.009	0.010	0.011	0.011	0.010	0.009	0.008	0.007	0.007	0.007	0.006	0.011
3	0.029	0.045	0.058	0.121	0.156	0.178	0.194	0.206	0.215	0.224	0.227	0.227
4	0.010	0.004	0.005	0.007	0.008	0.007	0.006	0.005	0.004	0.004	0.006	0.010
5	0.018	0.013	0.009	0.058	0.100	0.132	0.156	0.177	0.188	0.200	0.217	0.217
6	0.007	0.006	0.005	0.002	0.005	0.006	0.006	0.006	0.005	0.005	0.005	0.007
7	0.019	0.024	0.025	0.016	0.048	0.075	0.093	0.109	0.116	0.123	0.135	0.135
8	0.007	0.007	0.007	0.004	0.004	0.005	0.005	0.004	0.005	0.005	0.005	0.007
9	0.019	0.014	0.016	0.008	0.011	0.031	0.052	0.071	0.088	0.100	0.106	0.106
10	0.005	0.008	0.008	0.006	0.004	0.003	0.003	0.003	0.003	0.003	0.005	0.008
11	0.017	0.015	0.009	0.026	0.017	0.008	0.025	0.047	0.086	0.122	0.091	0.122
12	0.004	0.007	0.007	0.006	0.005	0.004	0.004	0.004	0.003	0.004	0.005	0.007
13	0.012	0.022	0.012	0.039	0.042	0.039	0.026	0.019	0.032	0.050	0.037	0.050
14	0.005	0.003	0.004	0.005	0.005	0.004	0.004	0.003	0.004	0.004	0.004	0.005
15	0.003	0.016	0.012	0.025	0.032	0.029	0.020	0.009	0.013	0.022	0.016	0.032
16	0.002	0.003	0.003	0.005	0.006	0.006	0.005	0.004	0.003	0.003	0.005	0.006
17	0.005	0.042	0.034	0.024	0.034	0.037	0.028	0.020	0.011	0.012	0.021	0.042
18	0.002	0.005	0.004	0.005	0.005	0.006	0.006	0.005	0.004	0.003	0.004	0.006
19	0.004	0.030	0.031	0.030	0.038	0.044	0.042	0.044	0.054	0.051	0.021	0.054
20	0.003	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.004	0.003	0.006
21	0.004	0.010	0.014	0.016	0.024	0.029	0.028	0.025	0.022	0.022	0.019	0.029
22	0.002	0.003	0.004	0.003	0.004	0.005	0.005	0.004	0.004	0.003	0.004	0.005
23	0.006	0.014	0.010	0.031	0.034	0.044	0.041	0.053	0.069	0.072	0.073	0.073
24	0.002	0.004	0.005	0.003	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.005
25	0.003	0.014	0.009	0.032	0.034	0.036	0.046	0.044	0.056	0.063	0.025	0.063
26	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.005	0.005	0.004	0.006
27	0.011	0.012	0.012	0.019	0.019	0.022	0.024	0.027	0.027	0.027	0.026	0.027
28	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.006	0.006
29	0.012	0.026	0.029	0.032	0.022	0.029	0.035	0.051	0.055	0.051	0.063	0.063
30	0.003	0.004	0.002	0.003	0.003	0.004	0.004	0.005	0.003	0.004	0.006	0.006
31	0.015	0.017	0.016	0.036	0.039	0.046	0.050	0.036	0.024	0.021	0.016	0.050
32	0.002	0.003	0.002	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
33	0.014	0.007	0.007	0.020	0.022	0.025	0.027	0.027	0.021	0.014	0.020	0.027
34	0.002	0.003	0.003	0.004	0.003	0.004	0.003	0.004	0.004	0.004	0.005	0.005
35	0.020	0.028	0.005	0.022	0.022	0.028	0.032	0.023	0.011	0.019	0.016	0.032
36	0.002	0.002	0.004	0.003	0.003	0.004	0.004	0.005	0.004	0.005	0.007	0.007
37	0.015	0.041	0.018	0.038	0.042	0.059	0.055	0.045	0.026	0.014	0.038	0.059
38	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.006	0.006
39	0.011	0.011	0.009	0.014	0.014	0.018	0.020	0.017	0.011	0.008	0.015	0.020
40	0.005	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.004	0.007	0.007
41	0.007	0.037	0.038	0.022	0.020	0.029	0.033	0.012	0.023	0.027	0.026	0.038
42	0.003	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.003	0.004	0.007	0.007
43	0.009	0.022	0.032	0.012	0.021	0.036	0.037	0.041	0.035	0.024	0.028	0.041
44	0.002	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.007	0.007
45	0.009	0.011	0.010	0.006	0.007	0.015	0.015	0.012	0.011	0.010	0.012	0.015
46	0.004	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.003	0.004	0.005	0.005
47	0.002	0.032	0.019	0.022	0.014	0.019	0.024	0.011	0.017	0.029	0.039	0.039
48	0.005	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005
49	0.007	0.027	0.019	0.012	0.020	0.025	0.030	0.027	0.024	0.016	0.014	0.030
50	0.002	0.003	0.003	0.004	0.005	0.004	0.003	0.004	0.003	0.003	0.003	0.005
TDD (%)	0.068	0.123	0.113	0.179	0.229	0.280	0.311	0.336	0.363	0.391	0.396	0.396

Model: AZZURRO 3PH 125KTL-V4-A												
Phase B												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./Order	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	
2	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.007	0.007	0.007
3	0.028	0.052	0.067	0.130	0.169	0.192	0.208	0.219	0.228	0.237	0.241	0.241
4	0.003	0.003	0.002	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.005	0.005
5	0.022	0.016	0.012	0.064	0.111	0.146	0.172	0.192	0.205	0.215	0.230	0.230
6	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.005	0.005
7	0.022	0.017	0.020	0.018	0.051	0.079	0.101	0.118	0.126	0.131	0.144	0.144
8	0.005	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.005	0.004	0.005
9	0.018	0.011	0.013	0.004	0.020	0.040	0.059	0.075	0.092	0.105	0.113	0.113
10	0.003	0.003	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.005	0.005
11	0.019	0.018	0.012	0.031	0.019	0.008	0.026	0.050	0.090	0.126	0.099	0.126
12	0.004	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.004	0.004	0.005	0.005
13	0.017	0.035	0.024	0.049	0.049	0.043	0.026	0.018	0.031	0.050	0.036	0.050
14	0.004	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.004	0.005
15	0.005	0.016	0.015	0.025	0.033	0.030	0.021	0.012	0.014	0.022	0.021	0.033
16	0.002	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005
17	0.008	0.044	0.043	0.034	0.044	0.045	0.031	0.021	0.010	0.010	0.020	0.045
18	0.002	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005
19	0.011	0.041	0.045	0.038	0.046	0.051	0.047	0.052	0.061	0.058	0.019	0.061
20	0.003	0.005	0.005	0.004	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.005
21	0.009	0.013	0.019	0.020	0.028	0.032	0.030	0.026	0.024	0.020	0.018	0.032
22	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.005	0.005
23	0.008	0.018	0.015	0.038	0.038	0.048	0.042	0.051	0.069	0.077	0.078	0.078
24	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.005	0.006	0.006
25	0.009	0.013	0.009	0.023	0.026	0.030	0.042	0.045	0.058	0.066	0.029	0.066
26	0.004	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.004	0.006
27	0.015	0.010	0.008	0.012	0.016	0.022	0.024	0.023	0.025	0.025	0.030	0.030
28	0.002	0.002	0.002	0.004	0.004	0.004	0.004	0.005	0.004	0.005	0.008	0.008
29	0.015	0.026	0.021	0.017	0.014	0.023	0.023	0.039	0.048	0.049	0.059	0.059
30	0.003	0.003	0.002	0.003	0.004	0.004	0.004	0.005	0.004	0.005	0.007	0.007
31	0.023	0.033	0.019	0.053	0.061	0.069	0.074	0.060	0.040	0.022	0.016	0.074
32	0.002	0.004	0.003	0.003	0.003	0.004	0.005	0.006	0.005	0.005	0.006	0.006
33	0.024	0.020	0.017	0.025	0.020	0.020	0.021	0.018	0.018	0.015	0.022	0.025
34	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.004	0.005	0.007	0.007
35	0.013	0.039	0.010	0.011	0.021	0.026	0.018	0.013	0.012	0.018	0.021	0.039
36	0.003	0.004	0.005	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.006	0.006
37	0.009	0.047	0.014	0.038	0.043	0.061	0.060	0.053	0.040	0.027	0.041	0.061
38	0.002	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.005	0.004	0.008	0.008
39	0.011	0.010	0.009	0.014	0.012	0.017	0.018	0.012	0.016	0.013	0.021	0.021
40	0.003	0.003	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.007	0.007
41	0.014	0.033	0.046	0.016	0.018	0.028	0.029	0.013	0.022	0.030	0.029	0.046
42	0.004	0.005	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.008	0.008
43	0.005	0.028	0.042	0.008	0.014	0.033	0.037	0.042	0.040	0.028	0.036	0.042
44	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.003	0.007	0.007
45	0.008	0.009	0.011	0.006	0.007	0.012	0.013	0.010	0.012	0.012	0.018	0.018
46	0.003	0.002	0.002	0.003	0.003	0.003	0.004	0.005	0.003	0.004	0.005	0.005
47	0.012	0.038	0.028	0.011	0.005	0.009	0.017	0.006	0.015	0.030	0.040	0.040
48	0.003	0.003	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.006	0.006
49	0.009	0.043	0.032	0.013	0.016	0.017	0.023	0.022	0.021	0.016	0.018	0.043
50	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.003	0.004	0.004
TDD (%)	0.076	0.145	0.135	0.192	0.251	0.303	0.333	0.357	0.388	0.414	0.421	0.421

Model: AZZURRO 3PH 125KTL-V4-A												
Phase C												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./Order	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	U <sub>n</sub> (%)	
2	0.010	0.008	0.008	0.008	0.008	0.007	0.008	0.008	0.008	0.008	0.007	0.010
3	0.029	0.055	0.071	0.133	0.170	0.194	0.210	0.223	0.231	0.240	0.240	0.240
4	0.008	0.005	0.005	0.005	0.006	0.006	0.007	0.006	0.007	0.007	0.008	0.008
5	0.022	0.018	0.014	0.067	0.109	0.142	0.169	0.190	0.204	0.216	0.234	0.234
6	0.004	0.005	0.005	0.003	0.003	0.004	0.005	0.007	0.008	0.010	0.009	0.010
7	0.022	0.020	0.019	0.026	0.060	0.088	0.109	0.125	0.133	0.139	0.153	0.153
8	0.003	0.006	0.006	0.004	0.004	0.005	0.005	0.007	0.008	0.010	0.009	0.010
9	0.019	0.012	0.015	0.006	0.021	0.044	0.065	0.083	0.099	0.115	0.118	0.118
10	0.004	0.004	0.004	0.005	0.004	0.003	0.004	0.006	0.008	0.009	0.009	0.009
11	0.020	0.018	0.015	0.033	0.022	0.007	0.028	0.050	0.091	0.125	0.094	0.125
12	0.004	0.004	0.003	0.005	0.005	0.004	0.004	0.006	0.007	0.008	0.008	0.008
13	0.008	0.025	0.019	0.044	0.044	0.039	0.023	0.016	0.029	0.049	0.036	0.049
14	0.004	0.005	0.004	0.005	0.005	0.004	0.004	0.005	0.007	0.008	0.006	0.008
15	0.005	0.016	0.015	0.026	0.033	0.030	0.020	0.010	0.011	0.022	0.019	0.033
16	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.006	0.006	0.006
17	0.009	0.040	0.037	0.032	0.041	0.044	0.032	0.023	0.011	0.008	0.019	0.044
18	0.003	0.004	0.005	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.006	0.006
19	0.003	0.027	0.031	0.031	0.042	0.050	0.047	0.050	0.057	0.053	0.023	0.057
20	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.004	0.006
21	0.005	0.010	0.015	0.017	0.025	0.031	0.028	0.025	0.023	0.020	0.019	0.031
22	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005
23	0.006	0.015	0.009	0.033	0.033	0.043	0.040	0.046	0.061	0.069	0.069	0.069
24	0.002	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.005	0.005
25	0.005	0.010	0.007	0.025	0.028	0.031	0.040	0.040	0.052	0.059	0.023	0.059
26	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.006
27	0.015	0.013	0.011	0.017	0.013	0.018	0.021	0.021	0.023	0.026	0.027	0.027
28	0.002	0.005	0.004	0.004	0.004	0.004	0.005	0.006	0.004	0.005	0.007	0.007
29	0.004	0.026	0.027	0.022	0.013	0.023	0.031	0.040	0.048	0.048	0.059	0.059
30	0.003	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.006	0.006
31	0.015	0.023	0.015	0.037	0.044	0.055	0.060	0.045	0.034	0.023	0.016	0.060
32	0.003	0.005	0.005	0.005	0.004	0.005	0.005	0.005	0.004	0.005	0.005	0.005
33	0.025	0.019	0.015	0.018	0.021	0.027	0.032	0.030	0.025	0.027	0.027	0.032
34	0.002	0.004	0.004	0.004	0.004	0.005	0.005	0.006	0.004	0.005	0.006	0.006
35	0.022	0.035	0.007	0.018	0.021	0.028	0.035	0.025	0.011	0.017	0.022	0.035
36	0.002	0.005	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.005	0.006	0.006
37	0.020	0.044	0.015	0.034	0.041	0.062	0.061	0.049	0.033	0.018	0.037	0.062
38	0.004	0.005	0.003	0.005	0.004	0.005	0.006	0.005	0.005	0.005	0.007	0.007
39	0.025	0.010	0.009	0.014	0.017	0.020	0.022	0.016	0.009	0.012	0.015	0.025
40	0.003	0.005	0.005	0.004	0.004	0.004	0.005	0.006	0.005	0.005	0.008	0.008
41	0.006	0.032	0.039	0.021	0.021	0.029	0.033	0.015	0.020	0.030	0.033	0.039
42	0.002	0.004	0.006	0.005	0.004	0.005	0.005	0.004	0.005	0.005	0.008	0.008
43	0.004	0.024	0.037	0.007	0.015	0.031	0.032	0.033	0.031	0.022	0.028	0.037
44	0.005	0.003	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.007	0.007
45	0.008	0.008	0.012	0.006	0.009	0.013	0.011	0.010	0.016	0.016	0.015	0.016
46	0.004	0.003	0.004	0.003	0.003	0.004	0.005	0.006	0.004	0.005	0.005	0.006
47	0.005	0.031	0.021	0.013	0.010	0.017	0.019	0.013	0.020	0.030	0.035	0.035
48	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005
49	0.014	0.035	0.026	0.018	0.021	0.017	0.021	0.025	0.023	0.022	0.017	0.035
50	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.004	0.004	0.005
TDD (%)	0.080	0.132	0.125	0.191	0.247	0.302	0.336	0.361	0.389	0.420	0.423	0.423

Model: AZZURRO 3PH 110KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)
2	0.010	0.011	0.011	0.011	0.010	0.009	0.009	0.008	0.007	0.007	0.006	0.006	0.011
3	0.028	0.045	0.048	0.110	0.147	0.171	0.189	0.202	0.216	0.213	0.220	0.223	0.223
4	0.010	0.003	0.004	0.007	0.008	0.007	0.007	0.005	0.005	0.005	0.004	0.007	0.010
5	0.019	0.014	0.013	0.047	0.088	0.119	0.145	0.166	0.186	0.188	0.204	0.211	0.211
6	0.008	0.007	0.006	0.002	0.004	0.005	0.006	0.006	0.004	0.005	0.004	0.007	0.008
7	0.020	0.023	0.025	0.008	0.037	0.064	0.085	0.102	0.117	0.119	0.131	0.135	0.135
8	0.008	0.008	0.008	0.005	0.004	0.004	0.005	0.004	0.004	0.006	0.005	0.007	0.008
9	0.020	0.013	0.014	0.012	0.004	0.020	0.040	0.057	0.077	0.084	0.096	0.103	0.103
10	0.006	0.008	0.008	0.007	0.005	0.003	0.003	0.003	0.003	0.003	0.003	0.007	0.008
11	0.018	0.019	0.015	0.024	0.022	0.011	0.013	0.030	0.049	0.068	0.070	0.083	0.083
12	0.004	0.008	0.008	0.007	0.005	0.004	0.003	0.004	0.003	0.003	0.003	0.007	0.008
13	0.013	0.027	0.022	0.036	0.042	0.041	0.035	0.022	0.015	0.019	0.023	0.035	0.042
14	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.003	0.004	0.003	0.007	0.007
15	0.003	0.016	0.015	0.024	0.033	0.034	0.027	0.019	0.008	0.008	0.008	0.017	0.034
16	0.003	0.003	0.003	0.005	0.006	0.006	0.006	0.005	0.004	0.004	0.002	0.004	0.006
17	0.006	0.030	0.032	0.025	0.033	0.040	0.040	0.026	0.019	0.008	0.017	0.016	0.040
18	0.002	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.004	0.004	0.003	0.006	0.006
19	0.004	0.016	0.017	0.028	0.036	0.044	0.045	0.041	0.042	0.044	0.025	0.017	0.045
20	0.003	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.005	0.004	0.004	0.004	0.006
21	0.005	0.010	0.010	0.017	0.024	0.028	0.031	0.029	0.027	0.024	0.023	0.016	0.031
22	0.002	0.004	0.004	0.003	0.004	0.005	0.005	0.005	0.004	0.004	0.003	0.005	0.005
23	0.007	0.030	0.030	0.034	0.033	0.043	0.050	0.042	0.053	0.057	0.062	0.048	0.062
24	0.002	0.003	0.004	0.004	0.004	0.004	0.005	0.004	0.003	0.003	0.003	0.005	0.005
25	0.003	0.031	0.032	0.037	0.035	0.037	0.039	0.045	0.043	0.045	0.023	0.033	0.045
26	0.005	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.007
27	0.012	0.014	0.014	0.022	0.021	0.021	0.027	0.026	0.031	0.030	0.031	0.028	0.031
28	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.011	0.011
29	0.013	0.010	0.012	0.032	0.024	0.027	0.032	0.039	0.053	0.055	0.063	0.047	0.063
30	0.003	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.008	0.008
31	0.016	0.010	0.013	0.042	0.037	0.043	0.047	0.045	0.032	0.021	0.022	0.011	0.047
32	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.004	0.004	0.003	0.007	0.007
33	0.016	0.007	0.004	0.021	0.022	0.027	0.029	0.028	0.031	0.025	0.028	0.022	0.031
34	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.003	0.006	0.006
35	0.022	0.056	0.050	0.024	0.017	0.028	0.023	0.030	0.025	0.015	0.029	0.012	0.056
36	0.002	0.003	0.002	0.003	0.003	0.004	0.004	0.005	0.004	0.005	0.005	0.006	0.006
37	0.017	0.056	0.051	0.041	0.039	0.052	0.064	0.055	0.048	0.034	0.041	0.023	0.064
38	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.003	0.004	0.004	0.005	0.005
39	0.012	0.016	0.011	0.015	0.014	0.019	0.021	0.021	0.019	0.016	0.019	0.015	0.021
40	0.005	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.007	0.007
41	0.008	0.038	0.041	0.022	0.015	0.028	0.029	0.028	0.015	0.017	0.037	0.020	0.041
42	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.006	0.004	0.005	0.004	0.007	0.007
43	0.010	0.035	0.036	0.019	0.021	0.027	0.044	0.040	0.051	0.050	0.040	0.027	0.051
44	0.002	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.004	0.003	0.008	0.008
45	0.009	0.008	0.012	0.006	0.006	0.011	0.014	0.016	0.014	0.013	0.016	0.014	0.016
46	0.004	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.006	0.006
47	0.002	0.052	0.053	0.014	0.010	0.019	0.020	0.024	0.016	0.016	0.048	0.034	0.053
48	0.005	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.003	0.005	0.003	0.005	0.005
49	0.007	0.040	0.043	0.020	0.020	0.019	0.025	0.026	0.034	0.037	0.017	0.012	0.043
50	0.001	0.003	0.002	0.003	0.004	0.004	0.003	0.004	0.003	0.004	0.003	0.005	0.005
TDD (%)	0.071	0.149	0.148	0.172	0.215	0.262	0.301	0.324	0.353	0.355	0.378	0.379	0.379

Model: AZZURRO 3PH 110KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)
2	0.007	0.008	0.008	0.008	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.008
3	0.028	0.048	0.054	0.116	0.157	0.185	0.203	0.216	0.228	0.227	0.233	0.237	0.237
4	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.006	0.006
5	0.024	0.014	0.012	0.049	0.095	0.130	0.158	0.181	0.199	0.206	0.220	0.220	0.220
6	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.005	0.005
7	0.023	0.018	0.020	0.009	0.037	0.066	0.090	0.108	0.125	0.129	0.140	0.145	0.145
8	0.005	0.003	0.003	0.004	0.004	0.003	0.004	0.004	0.005	0.005	0.004	0.007	0.007
9	0.019	0.009	0.013	0.009	0.010	0.028	0.045	0.063	0.078	0.092	0.101	0.111	0.111
10	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.004	0.007	0.007
11	0.019	0.024	0.023	0.035	0.027	0.013	0.013	0.031	0.051	0.073	0.074	0.089	0.089
12	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.007	0.007
13	0.015	0.039	0.036	0.051	0.055	0.049	0.041	0.023	0.014	0.018	0.023	0.035	0.055
14	0.004	0.005	0.005	0.004	0.005	0.004	0.005	0.005	0.004	0.004	0.003	0.007	0.007
15	0.002	0.015	0.016	0.024	0.035	0.036	0.030	0.019	0.011	0.007	0.010	0.019	0.036
16	0.002	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.005
17	0.009	0.032	0.036	0.037	0.044	0.047	0.042	0.028	0.019	0.011	0.014	0.016	0.047
18	0.002	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.004	0.004	0.003	0.006	0.006
19	0.009	0.023	0.028	0.040	0.045	0.050	0.053	0.045	0.047	0.048	0.029	0.018	0.053
20	0.003	0.005	0.005	0.004	0.005	0.005	0.005	0.005	0.004	0.005	0.004	0.004	0.005
21	0.009	0.013	0.013	0.022	0.025	0.031	0.032	0.029	0.027	0.022	0.018	0.017	0.032
22	0.002	0.002	0.002	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.003	0.006	0.006
23	0.009	0.041	0.040	0.039	0.037	0.043	0.048	0.041	0.049	0.061	0.058	0.056	0.061
24	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.004	0.004	0.005	0.006	0.006
25	0.012	0.026	0.030	0.025	0.026	0.028	0.035	0.040	0.041	0.044	0.020	0.035	0.044
26	0.005	0.006	0.006	0.006	0.007	0.006	0.007	0.006	0.007	0.006	0.005	0.005	0.007
27	0.017	0.009	0.007	0.018	0.019	0.023	0.027	0.026	0.026	0.025	0.025	0.026	0.027
28	0.002	0.002	0.002	0.003	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.012	0.012
29	0.022	0.011	0.006	0.027	0.021	0.025	0.024	0.028	0.042	0.053	0.059	0.047	0.059
30	0.003	0.004	0.004	0.003	0.004	0.005	0.005	0.005	0.004	0.004	0.005	0.008	0.008
31	0.020	0.006	0.005	0.057	0.057	0.063	0.072	0.070	0.055	0.038	0.025	0.012	0.072
32	0.002	0.004	0.004	0.003	0.004	0.003	0.005	0.005	0.006	0.006	0.005	0.007	0.007
33	0.026	0.021	0.018	0.027	0.022	0.020	0.018	0.018	0.015	0.020	0.020	0.021	0.027
34	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.004	0.005	0.005	0.007	0.007
35	0.012	0.065	0.058	0.026	0.022	0.035	0.024	0.014	0.012	0.015	0.021	0.020	0.065
36	0.003	0.002	0.003	0.004	0.003	0.005	0.005	0.005	0.004	0.005	0.004	0.006	0.006
37	0.009	0.063	0.060	0.041	0.038	0.055	0.069	0.060	0.055	0.043	0.053	0.030	0.069
38	0.003	0.004	0.003	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.004	0.006	0.006
39	0.012	0.011	0.014	0.018	0.016	0.019	0.018	0.018	0.013	0.017	0.015	0.018	0.019
40	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.006	0.004	0.005	0.004	0.007	0.007
41	0.016	0.032	0.036	0.026	0.018	0.031	0.029	0.025	0.013	0.015	0.038	0.023	0.038
42	0.003	0.005	0.005	0.004	0.003	0.005	0.004	0.005	0.004	0.006	0.004	0.008	0.008
43	0.006	0.044	0.044	0.013	0.013	0.023	0.041	0.039	0.050	0.051	0.043	0.033	0.051
44	0.004	0.002	0.003	0.003	0.003	0.004	0.004	0.005	0.003	0.004	0.003	0.008	0.008
45	0.008	0.008	0.009	0.007	0.007	0.011	0.013	0.013	0.011	0.014	0.014	0.017	0.017
46	0.004	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.003	0.005	0.003	0.007	0.007
47	0.010	0.049	0.050	0.009	0.005	0.012	0.015	0.019	0.011	0.011	0.044	0.036	0.050
48	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.005	0.004	0.007	0.007
49	0.009	0.053	0.057	0.024	0.020	0.014	0.018	0.022	0.033	0.039	0.020	0.015	0.057
50	0.005	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.003	0.004	0.003	0.006	0.006
TDD (%)	0.080	0.164	0.166	0.188	0.234	0.284	0.323	0.344	0.370	0.383	0.398	0.403	0.403

Model: AZZURRO 3PH 110KTL-V4													
Phase C													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)	U <sub>h</sub> (%)
2	0.012	0.008	0.009	0.009	0.009	0.008	0.009	0.008	0.009	0.007	0.008	0.007	0.012
3	0.028	0.053	0.057	0.122	0.160	0.186	0.205	0.219	0.232	0.231	0.237	0.237	0.237
4	0.008	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007	0.009	0.009
5	0.023	0.012	0.012	0.054	0.095	0.128	0.155	0.178	0.198	0.205	0.222	0.227	0.227
6	0.004	0.006	0.006	0.004	0.003	0.004	0.005	0.007	0.009	0.008	0.008	0.009	0.009
7	0.024	0.021	0.020	0.015	0.046	0.075	0.098	0.116	0.132	0.138	0.150	0.153	0.153
8	0.004	0.006	0.006	0.005	0.005	0.004	0.006	0.006	0.008	0.008	0.007	0.010	0.010
9	0.020	0.014	0.011	0.007	0.011	0.032	0.052	0.072	0.087	0.097	0.108	0.115	0.115
10	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.005	0.007	0.008	0.007	0.010	0.010
11	0.021	0.025	0.021	0.036	0.030	0.015	0.013	0.032	0.053	0.075	0.074	0.085	0.085
12	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.006	0.008	0.006	0.009	0.009
13	0.008	0.032	0.028	0.046	0.049	0.044	0.035	0.020	0.013	0.016	0.024	0.034	0.049
14	0.004	0.005	0.005	0.004	0.005	0.004	0.004	0.005	0.006	0.006	0.006	0.009	0.009
15	0.006	0.016	0.016	0.025	0.034	0.034	0.028	0.018	0.011	0.006	0.008	0.020	0.034
16	0.004	0.005	0.006	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.006	0.006
17	0.009	0.029	0.032	0.032	0.040	0.046	0.041	0.030	0.019	0.012	0.022	0.011	0.046
18	0.004	0.003	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.005	0.004	0.006	0.006
19	0.002	0.013	0.016	0.031	0.041	0.047	0.049	0.045	0.047	0.047	0.029	0.021	0.049
20	0.004	0.004	0.004	0.005	0.005	0.005	0.006	0.005	0.004	0.004	0.005	0.005	0.006
21	0.005	0.012	0.011	0.019	0.025	0.031	0.032	0.027	0.025	0.020	0.020	0.016	0.032
22	0.004	0.003	0.003	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.006	0.006
23	0.008	0.032	0.030	0.035	0.033	0.042	0.044	0.041	0.046	0.055	0.058	0.047	0.058
24	0.002	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.003	0.004	0.003	0.006	0.006
25	0.006	0.029	0.027	0.031	0.029	0.030	0.032	0.038	0.037	0.041	0.020	0.026	0.041
26	0.006	0.007	0.007	0.006	0.007	0.007	0.007	0.007	0.006	0.006	0.005	0.006	0.007
27	0.017	0.011	0.010	0.022	0.015	0.017	0.020	0.022	0.023	0.021	0.025	0.026	0.026
28	0.002	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.004	0.004	0.005	0.012	0.012
29	0.007	0.006	0.008	0.020	0.015	0.022	0.025	0.035	0.044	0.053	0.063	0.043	0.063
30	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.008	0.008
31	0.017	0.009	0.005	0.046	0.043	0.051	0.057	0.057	0.043	0.031	0.023	0.015	0.057
32	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.008	0.008
33	0.028	0.013	0.015	0.021	0.022	0.029	0.032	0.035	0.032	0.027	0.032	0.027	0.035
34	0.002	0.004	0.004	0.005	0.004	0.005	0.005	0.006	0.004	0.005	0.004	0.007	0.007
35	0.024	0.057	0.053	0.023	0.020	0.029	0.024	0.033	0.027	0.021	0.030	0.016	0.057
36	0.002	0.005	0.005	0.005	0.004	0.004	0.005	0.004	0.004	0.004	0.005	0.006	0.006
37	0.021	0.057	0.056	0.037	0.037	0.054	0.068	0.061	0.051	0.039	0.040	0.025	0.068
38	0.004	0.005	0.005	0.005	0.005	0.004	0.005	0.006	0.004	0.005	0.004	0.007	0.007
39	0.026	0.009	0.012	0.015	0.016	0.022	0.022	0.023	0.016	0.013	0.015	0.018	0.026
40	0.003	0.004	0.005	0.004	0.004	0.005	0.005	0.006	0.004	0.005	0.004	0.007	0.007
41	0.006	0.036	0.037	0.026	0.019	0.031	0.031	0.029	0.017	0.013	0.036	0.028	0.037
42	0.002	0.003	0.003	0.005	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.009	0.009
43	0.004	0.037	0.038	0.013	0.016	0.024	0.040	0.035	0.042	0.043	0.035	0.026	0.043
44	0.005	0.003	0.003	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.009	0.009
45	0.008	0.009	0.008	0.007	0.008	0.012	0.011	0.009	0.008	0.011	0.012	0.013	0.013
46	0.004	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.004	0.005	0.004	0.007	0.007
47	0.004	0.046	0.048	0.014	0.009	0.017	0.022	0.018	0.015	0.016	0.045	0.030	0.048
48	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.005	0.005	0.007	0.007
49	0.012	0.046	0.047	0.024	0.024	0.016	0.019	0.023	0.038	0.046	0.025	0.019	0.047
50	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.006	0.006
TDD (%)	0.083	0.152	0.151	0.186	0.232	0.283	0.322	0.350	0.376	0.387	0.407	0.408	0.408

2.2.7 Zwischenharmonische / Interharmonics

Model: AZZURRO 3PH 100KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
75	0.011	0.009	0.017	0.020	0.171	0.060	0.023	0.025	0.026	0.027	0.027	0.028	0.171
125	0.010	0.007	0.013	0.016	0.046	0.038	0.022	0.021	0.020	0.025	0.022	0.021	0.046
175	0.010	0.008	0.015	0.018	0.190	0.073	0.024	0.023	0.023	0.029	0.024	0.022	0.190
225	0.010	0.008	0.015	0.020	0.215	0.127	0.029	0.027	0.030	0.034	0.028	0.027	0.215
275	0.010	0.008	0.016	0.023	0.101	0.050	0.034	0.028	0.030	0.036	0.027	0.026	0.101
325	0.010	0.008	0.016	0.023	0.101	0.054	0.035	0.030	0.032	0.040	0.027	0.026	0.101
375	0.010	0.008	0.016	0.023	0.151	0.096	0.035	0.032	0.032	0.041	0.028	0.026	0.151
425	0.010	0.008	0.015	0.022	0.483	0.237	0.047	0.038	0.038	0.047	0.037	0.032	0.483
475	0.010	0.008	0.016	0.021	0.109	0.086	0.040	0.036	0.039	0.059	0.037	0.032	0.109
525	0.010	0.008	0.018	0.023	0.210	0.077	0.045	0.039	0.040	0.046	0.041	0.032	0.210
575	0.010	0.008	0.021	0.024	0.111	0.061	0.047	0.042	0.045	0.045	0.036	0.042	0.111
625	0.010	0.008	0.018	0.020	0.094	0.058	0.041	0.035	0.037	0.045	0.036	0.035	0.094
675	0.010	0.008	0.016	0.017	0.238	0.120	0.035	0.032	0.037	0.045	0.035	0.034	0.238
725	0.010	0.008	0.016	0.017	0.259	0.126	0.036	0.032	0.035	0.043	0.031	0.029	0.259
775	0.010	0.008	0.016	0.018	0.131	0.068	0.036	0.031	0.037	0.046	0.034	0.030	0.131
825	0.010	0.007	0.015	0.016	0.217	0.129	0.039	0.030	0.030	0.040	0.034	0.027	0.217
875	0.011	0.007	0.014	0.015	0.106	0.050	0.031	0.028	0.030	0.038	0.032	0.028	0.106
925	0.010	0.007	0.013	0.015	0.116	0.043	0.030	0.027	0.028	0.036	0.031	0.027	0.116
975	0.010	0.006	0.013	0.015	0.131	0.062	0.031	0.026	0.028	0.035	0.031	0.030	0.131
1025	0.010	0.006	0.013	0.014	0.074	0.038	0.028	0.025	0.028	0.033	0.030	0.028	0.074
1075	0.010	0.006	0.013	0.014	0.075	0.068	0.027	0.025	0.028	0.035	0.029	0.029	0.075
1125	0.010	0.006	0.013	0.014	0.139	0.114	0.027	0.023	0.024	0.032	0.026	0.026	0.139
1175	0.010	0.008	0.013	0.015	0.082	0.039	0.025	0.023	0.023	0.030	0.025	0.027	0.082
1225	0.010	0.006	0.013	0.013	0.096	0.033	0.023	0.022	0.022	0.029	0.025	0.025	0.096
1275	0.010	0.006	0.013	0.014	0.048	0.033	0.025	0.021	0.022	0.028	0.024	0.023	0.048
1325	0.010	0.006	0.013	0.014	0.050	0.057	0.024	0.022	0.021	0.025	0.024	0.024	0.057
1375	0.010	0.006	0.013	0.013	0.044	0.045	0.022	0.021	0.022	0.025	0.024	0.026	0.045
1425	0.010	0.006	0.013	0.013	0.083	0.062	0.021	0.021	0.022	0.024	0.024	0.025	0.083
1475	0.010	0.006	0.013	0.013	0.046	0.030	0.023	0.020	0.022	0.024	0.023	0.024	0.046
1525	0.010	0.006	0.013	0.013	0.055	0.026	0.021	0.020	0.020	0.025	0.023	0.024	0.055
1575	0.010	0.006	0.013	0.013	0.078	0.056	0.020	0.019	0.021	0.025	0.023	0.023	0.078
1625	0.010	0.006	0.013	0.013	0.063	0.068	0.019	0.019	0.019	0.025	0.022	0.021	0.068
1675	0.010	0.006	0.013	0.013	0.073	0.030	0.019	0.018	0.019	0.024	0.020	0.021	0.073
1725	0.010	0.006	0.013	0.013	0.092	0.028	0.020	0.018	0.019	0.021	0.021	0.021	0.092
1775	0.010	0.006	0.013	0.013	0.031	0.026	0.019	0.018	0.018	0.020	0.021	0.022	0.031
1825	0.010	0.006	0.013	0.013	0.048	0.026	0.019	0.018	0.018	0.020	0.020	0.022	0.048
1875	0.010	0.006	0.013	0.013	0.084	0.057	0.018	0.017	0.019	0.020	0.020	0.022	0.084
1925	0.010	0.006	0.012	0.013	0.039	0.049	0.017	0.017	0.019	0.021	0.019	0.022	0.049
1975	0.010	0.006	0.012	0.013	0.060	0.031	0.018	0.017	0.018	0.021	0.019	0.021	0.060

Model: AZZURRO 3PH 100KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
75	0.013	0.010	0.018	0.020	0.171	0.070	0.024	0.026	0.028	0.030	0.029	0.029	0.171
125	0.012	0.008	0.014	0.016	0.047	0.039	0.023	0.022	0.022	0.026	0.024	0.023	0.047
175	0.012	0.008	0.016	0.019	0.199	0.076	0.026	0.024	0.025	0.030	0.025	0.025	0.199
225	0.012	0.009	0.017	0.021	0.226	0.119	0.032	0.029	0.031	0.036	0.029	0.028	0.226
275	0.012	0.009	0.018	0.024	0.103	0.051	0.035	0.031	0.033	0.037	0.027	0.027	0.103
325	0.012	0.009	0.018	0.025	0.100	0.055	0.038	0.033	0.035	0.041	0.027	0.027	0.100
375	0.012	0.009	0.018	0.024	0.143	0.098	0.039	0.034	0.036	0.043	0.029	0.027	0.143
425	0.012	0.009	0.017	0.024	0.474	0.243	0.050	0.040	0.039	0.048	0.036	0.035	0.474
475	0.012	0.009	0.018	0.023	0.120	0.086	0.042	0.039	0.042	0.061	0.036	0.035	0.120
525	0.011	0.008	0.018	0.022	0.207	0.081	0.048	0.042	0.042	0.047	0.038	0.034	0.207
575	0.011	0.009	0.026	0.028	0.113	0.062	0.049	0.047	0.049	0.045	0.034	0.047	0.113
625	0.011	0.009	0.019	0.020	0.094	0.059	0.043	0.038	0.040	0.044	0.033	0.036	0.094
675	0.010	0.008	0.017	0.018	0.231	0.124	0.037	0.035	0.040	0.046	0.032	0.036	0.231
725	0.010	0.008	0.018	0.018	0.257	0.129	0.042	0.036	0.038	0.044	0.030	0.031	0.257
775	0.010	0.011	0.024	0.026	0.127	0.065	0.037	0.036	0.048	0.046	0.033	0.032	0.127
825	0.009	0.007	0.015	0.017	0.220	0.129	0.039	0.032	0.033	0.047	0.046	0.028	0.220
875	0.009	0.007	0.014	0.015	0.108	0.048	0.032	0.031	0.032	0.039	0.029	0.029	0.108
925	0.009	0.006	0.013	0.015	0.118	0.042	0.030	0.029	0.031	0.035	0.028	0.028	0.118
975	0.009	0.006	0.013	0.014	0.128	0.062	0.031	0.027	0.030	0.036	0.029	0.030	0.128
1025	0.009	0.006	0.012	0.014	0.072	0.036	0.028	0.026	0.029	0.033	0.029	0.029	0.072
1075	0.009	0.006	0.012	0.014	0.076	0.067	0.026	0.027	0.031	0.034	0.027	0.030	0.076
1125	0.009	0.006	0.012	0.013	0.139	0.110	0.027	0.024	0.027	0.032	0.024	0.027	0.139
1175	0.008	0.006	0.012	0.013	0.082	0.038	0.025	0.025	0.026	0.029	0.023	0.028	0.082
1225	0.008	0.006	0.012	0.013	0.099	0.032	0.023	0.022	0.024	0.029	0.023	0.025	0.099
1275	0.008	0.005	0.011	0.013	0.046	0.036	0.025	0.022	0.023	0.028	0.022	0.024	0.046
1325	0.008	0.005	0.011	0.012	0.050	0.061	0.024	0.022	0.021	0.025	0.022	0.023	0.061
1375	0.008	0.005	0.011	0.012	0.043	0.044	0.021	0.021	0.022	0.025	0.022	0.025	0.044
1425	0.008	0.005	0.011	0.012	0.084	0.059	0.020	0.020	0.021	0.025	0.022	0.025	0.084
1475	0.008	0.005	0.011	0.012	0.046	0.030	0.021	0.020	0.021	0.023	0.021	0.024	0.046
1525	0.008	0.005	0.011	0.012	0.056	0.025	0.020	0.019	0.021	0.024	0.022	0.024	0.056
1575	0.008	0.005	0.011	0.012	0.075	0.061	0.019	0.018	0.021	0.025	0.020	0.024	0.075
1625	0.008	0.005	0.011	0.012	0.063	0.070	0.018	0.018	0.019	0.023	0.019	0.021	0.070
1675	0.008	0.005	0.011	0.012	0.071	0.029	0.018	0.017	0.018	0.023	0.018	0.020	0.071
1725	0.008	0.005	0.011	0.012	0.092	0.028	0.019	0.018	0.018	0.021	0.019	0.021	0.092
1775	0.008	0.005	0.011	0.012	0.030	0.026	0.018	0.017	0.018	0.019	0.019	0.022	0.030
1825	0.008	0.005	0.011	0.012	0.047	0.025	0.018	0.017	0.018	0.019	0.018	0.022	0.047
1875	0.008	0.005	0.011	0.011	0.082	0.062	0.017	0.017	0.018	0.020	0.018	0.022	0.082
1925	0.008	0.005	0.010	0.011	0.037	0.051	0.016	0.016	0.018	0.020	0.017	0.021	0.051
1975	0.008	0.005	0.010	0.011	0.059	0.029	0.017	0.016	0.018	0.020	0.017	0.020	0.059

Model: AZZURRO 3PH 100KTL-V4													
Phase C													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
75	0.008	0.008	0.016	0.017	0.165	0.059	0.022	0.023	0.025	0.026	0.026	0.026	0.165
125	0.007	0.006	0.011	0.014	0.046	0.039	0.021	0.019	0.019	0.023	0.021	0.020	0.046
175	0.007	0.007	0.013	0.017	0.183	0.075	0.024	0.021	0.022	0.028	0.023	0.021	0.183
225	0.007	0.007	0.014	0.019	0.216	0.116	0.031	0.026	0.029	0.033	0.026	0.026	0.216
275	0.007	0.008	0.015	0.022	0.099	0.051	0.035	0.028	0.030	0.036	0.025	0.024	0.099
325	0.007	0.008	0.015	0.022	0.100	0.057	0.037	0.029	0.032	0.041	0.027	0.024	0.100
375	0.007	0.007	0.015	0.022	0.144	0.098	0.038	0.032	0.032	0.041	0.027	0.026	0.144
425	0.007	0.007	0.014	0.021	0.472	0.240	0.047	0.038	0.036	0.048	0.035	0.033	0.472
475	0.007	0.007	0.015	0.020	0.117	0.092	0.042	0.035	0.039	0.078	0.036	0.031	0.117
525	0.007	0.007	0.015	0.021	0.208	0.084	0.049	0.040	0.040	0.047	0.046	0.032	0.208
575	0.007	0.009	0.033	0.034	0.111	0.066	0.058	0.058	0.059	0.046	0.033	0.062	0.111
625	0.007	0.009	0.021	0.020	0.099	0.064	0.043	0.036	0.038	0.046	0.033	0.034	0.099
675	0.007	0.007	0.015	0.015	0.234	0.118	0.038	0.032	0.037	0.045	0.032	0.032	0.234
725	0.007	0.007	0.017	0.016	0.257	0.136	0.046	0.037	0.035	0.044	0.029	0.029	0.257
775	0.007	0.011	0.027	0.028	0.129	0.065	0.037	0.035	0.051	0.046	0.032	0.030	0.129
825	0.007	0.007	0.014	0.016	0.220	0.131	0.039	0.030	0.031	0.052	0.056	0.026	0.220
875	0.007	0.006	0.013	0.013	0.105	0.050	0.032	0.029	0.030	0.041	0.029	0.026	0.105
925	0.007	0.006	0.012	0.013	0.118	0.043	0.030	0.027	0.029	0.038	0.028	0.026	0.118
975	0.007	0.005	0.011	0.013	0.129	0.058	0.030	0.026	0.028	0.038	0.028	0.029	0.129
1025	0.007	0.005	0.011	0.012	0.071	0.038	0.028	0.025	0.027	0.033	0.032	0.027	0.071
1075	0.007	0.005	0.011	0.012	0.075	0.065	0.026	0.025	0.028	0.035	0.027	0.028	0.075
1125	0.007	0.005	0.012	0.013	0.140	0.115	0.027	0.023	0.026	0.031	0.023	0.025	0.140
1175	0.007	0.007	0.011	0.014	0.080	0.039	0.027	0.025	0.025	0.030	0.023	0.030	0.080
1225	0.007	0.006	0.011	0.012	0.097	0.034	0.023	0.021	0.022	0.029	0.022	0.022	0.097
1275	0.007	0.005	0.010	0.011	0.046	0.035	0.024	0.020	0.020	0.027	0.021	0.021	0.046
1325	0.007	0.005	0.010	0.011	0.051	0.057	0.022	0.020	0.019	0.025	0.021	0.020	0.057
1375	0.007	0.005	0.010	0.011	0.043	0.043	0.021	0.020	0.019	0.024	0.021	0.023	0.043
1425	0.007	0.005	0.010	0.011	0.082	0.064	0.020	0.019	0.020	0.024	0.020	0.023	0.082
1475	0.007	0.005	0.010	0.010	0.045	0.029	0.023	0.020	0.020	0.023	0.020	0.022	0.045
1525	0.007	0.006	0.010	0.012	0.054	0.025	0.020	0.018	0.020	0.023	0.021	0.022	0.054
1575	0.007	0.005	0.012	0.012	0.079	0.057	0.019	0.017	0.019	0.024	0.020	0.021	0.079
1625	0.007	0.004	0.009	0.011	0.064	0.069	0.017	0.017	0.016	0.023	0.021	0.018	0.069
1675	0.007	0.004	0.009	0.010	0.071	0.029	0.017	0.016	0.016	0.024	0.017	0.017	0.071
1725	0.007	0.004	0.010	0.010	0.091	0.029	0.018	0.016	0.016	0.020	0.017	0.018	0.091
1775	0.007	0.004	0.009	0.010	0.029	0.025	0.018	0.016	0.016	0.019	0.017	0.019	0.029
1825	0.007	0.004	0.009	0.010	0.046	0.024	0.017	0.015	0.016	0.018	0.017	0.019	0.046
1875	0.007	0.004	0.009	0.010	0.084	0.056	0.016	0.015	0.016	0.019	0.017	0.019	0.084
1925	0.007	0.004	0.009	0.010	0.038	0.051	0.015	0.015	0.016	0.019	0.016	0.018	0.051
1975	0.007	0.004	0.009	0.010	0.059	0.030	0.015	0.014	0.016	0.019	0.016	0.017	0.059

Model: AZZURRO 3PH 125KTL-V4-A												
Phase A												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
75	0.005	0.005	0.010	0.017	0.022	0.015	0.016	0.017	0.020	0.021	0.036	0.036
125	0.005	0.005	0.009	0.019	0.021	0.015	0.015	0.012	0.015	0.013	0.018	0.021
175	0.005	0.006	0.010	0.027	0.035	0.019	0.019	0.013	0.018	0.014	0.019	0.035
225	0.005	0.006	0.011	0.027	0.032	0.022	0.022	0.017	0.023	0.020	0.050	0.050
275	0.005	0.006	0.011	0.037	0.045	0.024	0.025	0.018	0.022	0.019	0.043	0.045
325	0.005	0.006	0.011	0.037	0.043	0.025	0.027	0.019	0.022	0.019	0.023	0.043
375	0.005	0.006	0.011	0.045	0.058	0.026	0.027	0.020	0.024	0.019	0.023	0.058
425	0.005	0.006	0.011	0.050	0.068	0.028	0.029	0.021	0.026	0.022	0.025	0.068
475	0.005	0.006	0.011	0.047	0.054	0.030	0.030	0.021	0.029	0.023	0.024	0.054
525	0.005	0.007	0.014	0.045	0.051	0.032	0.031	0.021	0.029	0.029	0.031	0.051
575	0.005	0.007	0.015	0.042	0.052	0.037	0.031	0.030	0.037	0.024	0.033	0.052
625	0.005	0.007	0.013	0.045	0.053	0.031	0.031	0.021	0.027	0.022	0.033	0.053
675	0.005	0.006	0.010	0.036	0.051	0.029	0.030	0.021	0.028	0.022	0.032	0.051
725	0.005	0.006	0.010	0.036	0.044	0.028	0.028	0.021	0.025	0.022	0.026	0.044
775	0.005	0.006	0.012	0.041	0.049	0.025	0.030	0.024	0.029	0.024	0.023	0.049
825	0.005	0.005	0.010	0.037	0.048	0.024	0.026	0.019	0.025	0.021	0.032	0.048
875	0.005	0.005	0.009	0.031	0.036	0.023	0.024	0.018	0.024	0.020	0.026	0.036
925	0.005	0.005	0.009	0.030	0.034	0.022	0.023	0.017	0.023	0.019	0.024	0.034
975	0.005	0.005	0.008	0.032	0.039	0.021	0.022	0.016	0.023	0.019	0.023	0.039
1025	0.005	0.005	0.008	0.033	0.040	0.022	0.023	0.016	0.021	0.019	0.021	0.040
1075	0.005	0.005	0.008	0.025	0.036	0.020	0.021	0.015	0.020	0.018	0.022	0.036
1125	0.005	0.005	0.010	0.022	0.029	0.018	0.019	0.016	0.020	0.017	0.029	0.029
1175	0.005	0.005	0.008	0.024	0.029	0.018	0.018	0.014	0.018	0.016	0.024	0.029
1225	0.005	0.004	0.008	0.022	0.024	0.017	0.018	0.013	0.017	0.015	0.027	0.027
1275	0.005	0.004	0.008	0.032	0.035	0.016	0.016	0.013	0.018	0.015	0.023	0.035
1325	0.005	0.004	0.008	0.029	0.033	0.017	0.016	0.012	0.017	0.015	0.020	0.033
1375	0.005	0.004	0.007	0.020	0.024	0.016	0.016	0.012	0.016	0.015	0.019	0.024
1425	0.005	0.004	0.007	0.020	0.023	0.015	0.017	0.013	0.015	0.016	0.022	0.023
1475	0.005	0.004	0.007	0.020	0.023	0.014	0.015	0.011	0.014	0.016	0.021	0.023
1525	0.005	0.004	0.007	0.018	0.021	0.014	0.015	0.012	0.014	0.014	0.023	0.023
1575	0.005	0.004	0.007	0.022	0.027	0.013	0.014	0.011	0.013	0.013	0.020	0.027
1625	0.005	0.004	0.007	0.020	0.021	0.012	0.013	0.011	0.013	0.012	0.016	0.021
1675	0.005	0.004	0.007	0.019	0.020	0.011	0.013	0.010	0.013	0.012	0.015	0.020
1725	0.005	0.004	0.007	0.019	0.022	0.012	0.012	0.010	0.012	0.012	0.019	0.022
1775	0.005	0.004	0.007	0.017	0.018	0.012	0.012	0.010	0.012	0.012	0.017	0.018
1825	0.005	0.004	0.007	0.017	0.019	0.011	0.012	0.010	0.011	0.011	0.018	0.019
1875	0.005	0.004	0.006	0.013	0.019	0.011	0.011	0.009	0.011	0.011	0.016	0.019
1925	0.005	0.003	0.007	0.015	0.017	0.011	0.011	0.009	0.011	0.011	0.014	0.017
1975	0.005	0.003	0.007	0.015	0.017	0.010	0.011	0.009	0.011	0.010	0.013	0.017

Model: AZZURRO 3PH 125KTL-V4-A												
Phase B												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
75	0.005	0.005	0.010	0.016	0.020	0.015	0.016	0.018	0.020	0.021	0.035	0.035
125	0.005	0.005	0.009	0.018	0.020	0.015	0.015	0.012	0.015	0.014	0.019	0.020
175	0.005	0.005	0.010	0.025	0.034	0.019	0.019	0.014	0.018	0.016	0.019	0.034
225	0.005	0.006	0.011	0.026	0.033	0.022	0.022	0.017	0.023	0.020	0.050	0.050
275	0.005	0.006	0.011	0.037	0.047	0.025	0.025	0.018	0.024	0.021	0.045	0.047
325	0.005	0.006	0.011	0.037	0.045	0.026	0.027	0.019	0.024	0.020	0.022	0.045
375	0.005	0.006	0.011	0.041	0.060	0.027	0.028	0.020	0.024	0.021	0.023	0.060
425	0.005	0.006	0.011	0.045	0.066	0.029	0.029	0.021	0.026	0.023	0.025	0.066
475	0.005	0.006	0.011	0.043	0.053	0.031	0.031	0.021	0.029	0.024	0.026	0.053
525	0.005	0.006	0.011	0.043	0.049	0.033	0.031	0.021	0.028	0.030	0.030	0.049
575	0.006	0.009	0.018	0.044	0.055	0.038	0.031	0.029	0.037	0.025	0.034	0.055
625	0.006	0.006	0.011	0.047	0.055	0.031	0.031	0.021	0.028	0.024	0.035	0.055
675	0.006	0.006	0.010	0.038	0.053	0.029	0.030	0.021	0.028	0.025	0.031	0.053
725	0.006	0.007	0.011	0.040	0.050	0.031	0.029	0.020	0.025	0.024	0.034	0.050
775	0.006	0.008	0.018	0.041	0.049	0.026	0.039	0.033	0.036	0.036	0.025	0.049
825	0.006	0.006	0.010	0.039	0.048	0.024	0.026	0.019	0.025	0.022	0.031	0.048
875	0.006	0.005	0.010	0.032	0.036	0.024	0.024	0.018	0.024	0.022	0.028	0.036
925	0.006	0.005	0.009	0.031	0.034	0.022	0.023	0.017	0.023	0.021	0.025	0.034
975	0.006	0.005	0.009	0.034	0.040	0.022	0.022	0.016	0.022	0.021	0.023	0.040
1025	0.006	0.005	0.009	0.032	0.040	0.022	0.022	0.016	0.021	0.020	0.022	0.040
1075	0.006	0.005	0.009	0.027	0.037	0.020	0.022	0.015	0.020	0.021	0.023	0.037
1125	0.006	0.005	0.009	0.024	0.031	0.019	0.020	0.016	0.021	0.019	0.028	0.031
1175	0.006	0.005	0.009	0.024	0.029	0.018	0.019	0.014	0.018	0.018	0.024	0.029
1225	0.006	0.005	0.009	0.022	0.025	0.017	0.018	0.013	0.018	0.017	0.028	0.028
1275	0.005	0.004	0.008	0.030	0.036	0.016	0.017	0.013	0.017	0.017	0.023	0.036
1325	0.005	0.004	0.008	0.027	0.033	0.016	0.016	0.012	0.017	0.016	0.019	0.033
1375	0.005	0.004	0.008	0.019	0.024	0.016	0.016	0.012	0.016	0.016	0.020	0.024
1425	0.005	0.004	0.008	0.020	0.024	0.015	0.015	0.012	0.015	0.017	0.022	0.024
1475	0.005	0.004	0.008	0.021	0.024	0.015	0.015	0.012	0.014	0.016	0.021	0.024
1525	0.005	0.004	0.008	0.019	0.023	0.014	0.015	0.012	0.014	0.015	0.024	0.024
1575	0.005	0.004	0.008	0.021	0.027	0.013	0.014	0.011	0.013	0.014	0.021	0.027
1625	0.005	0.004	0.007	0.019	0.021	0.012	0.013	0.011	0.013	0.014	0.017	0.021
1675	0.005	0.004	0.007	0.018	0.019	0.012	0.013	0.011	0.013	0.013	0.016	0.019
1725	0.005	0.004	0.007	0.020	0.024	0.013	0.012	0.010	0.012	0.013	0.019	0.024
1775	0.005	0.004	0.007	0.019	0.019	0.012	0.012	0.010	0.012	0.013	0.017	0.019
1825	0.005	0.004	0.007	0.018	0.019	0.012	0.012	0.010	0.011	0.012	0.019	0.019
1875	0.005	0.004	0.007	0.014	0.019	0.011	0.012	0.010	0.011	0.012	0.017	0.019
1925	0.005	0.004	0.007	0.015	0.017	0.011	0.011	0.009	0.011	0.012	0.014	0.017
1975	0.005	0.004	0.007	0.016	0.017	0.010	0.011	0.009	0.011	0.012	0.014	0.017

Model: AZZURRO 3PH 125KTL-V4-A												
Phase C												
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
75	0.022	0.013	0.021	0.027	0.030	0.026	0.028	0.031	0.032	0.032	0.042	0.042
125	0.022	0.013	0.021	0.028	0.029	0.025	0.027	0.028	0.029	0.028	0.031	0.031
175	0.022	0.013	0.021	0.032	0.040	0.027	0.029	0.029	0.032	0.029	0.032	0.040
225	0.022	0.013	0.022	0.033	0.039	0.030	0.032	0.031	0.036	0.032	0.058	0.058
275	0.022	0.013	0.022	0.041	0.049	0.031	0.033	0.031	0.035	0.032	0.052	0.052
325	0.022	0.013	0.022	0.041	0.046	0.033	0.034	0.032	0.035	0.031	0.034	0.046
375	0.022	0.013	0.022	0.045	0.062	0.033	0.036	0.033	0.037	0.031	0.035	0.062
425	0.023	0.013	0.022	0.051	0.071	0.036	0.037	0.034	0.038	0.033	0.036	0.071
475	0.023	0.013	0.022	0.049	0.058	0.037	0.038	0.033	0.041	0.034	0.035	0.058
525	0.022	0.013	0.023	0.047	0.053	0.038	0.040	0.034	0.041	0.047	0.040	0.053
575	0.023	0.017	0.033	0.046	0.056	0.052	0.038	0.047	0.058	0.036	0.051	0.058
625	0.023	0.014	0.024	0.056	0.059	0.037	0.037	0.033	0.040	0.033	0.042	0.059
675	0.023	0.014	0.022	0.042	0.056	0.036	0.040	0.035	0.042	0.037	0.043	0.056
725	0.023	0.014	0.022	0.046	0.057	0.040	0.038	0.034	0.038	0.034	0.048	0.057
775	0.023	0.015	0.028	0.047	0.054	0.034	0.050	0.047	0.049	0.048	0.035	0.054
825	0.024	0.013	0.022	0.044	0.052	0.031	0.035	0.032	0.038	0.034	0.042	0.052
875	0.023	0.013	0.021	0.037	0.042	0.031	0.033	0.032	0.037	0.032	0.038	0.042
925	0.023	0.013	0.021	0.035	0.040	0.030	0.031	0.031	0.036	0.032	0.035	0.040
975	0.023	0.013	0.021	0.041	0.045	0.030	0.032	0.030	0.036	0.032	0.035	0.045
1025	0.023	0.013	0.021	0.039	0.046	0.030	0.032	0.030	0.034	0.032	0.034	0.046
1075	0.023	0.013	0.021	0.034	0.042	0.029	0.032	0.030	0.034	0.033	0.034	0.042
1125	0.023	0.013	0.022	0.032	0.037	0.027	0.030	0.032	0.036	0.031	0.039	0.039
1175	0.023	0.013	0.021	0.031	0.035	0.028	0.029	0.029	0.033	0.030	0.037	0.037
1225	0.023	0.012	0.021	0.029	0.032	0.026	0.028	0.029	0.032	0.030	0.038	0.038
1275	0.023	0.012	0.020	0.038	0.041	0.026	0.028	0.028	0.032	0.030	0.035	0.041
1325	0.023	0.012	0.020	0.035	0.039	0.026	0.027	0.028	0.032	0.029	0.032	0.039
1375	0.023	0.012	0.020	0.028	0.031	0.026	0.027	0.028	0.030	0.030	0.032	0.032
1425	0.023	0.012	0.020	0.028	0.031	0.025	0.027	0.028	0.030	0.030	0.034	0.034
1475	0.023	0.013	0.020	0.029	0.031	0.025	0.026	0.028	0.030	0.030	0.034	0.034
1525	0.023	0.012	0.021	0.027	0.029	0.024	0.026	0.029	0.030	0.029	0.035	0.035
1575	0.023	0.012	0.021	0.029	0.034	0.024	0.026	0.028	0.029	0.029	0.033	0.034
1625	0.023	0.012	0.021	0.028	0.029	0.023	0.026	0.028	0.029	0.028	0.030	0.030
1675	0.023	0.012	0.020	0.028	0.028	0.023	0.025	0.028	0.029	0.028	0.030	0.030
1725	0.023	0.012	0.020	0.028	0.030	0.024	0.025	0.027	0.029	0.028	0.033	0.033
1775	0.024	0.012	0.020	0.027	0.027	0.023	0.025	0.027	0.029	0.028	0.032	0.032
1825	0.024	0.013	0.020	0.026	0.027	0.023	0.025	0.027	0.028	0.028	0.032	0.032
1875	0.024	0.012	0.020	0.025	0.028	0.023	0.025	0.027	0.028	0.027	0.031	0.031
1925	0.024	0.012	0.021	0.026	0.027	0.023	0.025	0.027	0.028	0.027	0.029	0.029
1975	0.024	0.012	0.021	0.026	0.027	0.023	0.025	0.028	0.028	0.027	0.029	0.029

Model: AZZURRO 3PH 110KTL-V4													
Phase A													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)
75	0.005	0.006	0.012	0.019	0.044	0.016	0.018	0.020	0.022	0.021	0.024	0.031	0.044
125	0.005	0.005	0.011	0.023	0.032	0.018	0.016	0.018	0.016	0.015	0.017	0.021	0.032
175	0.006	0.006	0.012	0.031	0.066	0.021	0.021	0.022	0.020	0.017	0.018	0.022	0.066
225	0.005	0.006	0.013	0.030	0.043	0.025	0.025	0.028	0.026	0.023	0.034	0.032	0.043
275	0.005	0.007	0.013	0.035	0.043	0.028	0.028	0.030	0.027	0.022	0.033	0.029	0.043
325	0.005	0.006	0.013	0.037	0.049	0.031	0.030	0.032	0.030	0.023	0.024	0.026	0.049
375	0.005	0.006	0.013	0.052	0.095	0.032	0.030	0.033	0.031	0.024	0.026	0.027	0.095
425	0.005	0.006	0.014	0.053	0.127	0.038	0.033	0.037	0.039	0.027	0.027	0.031	0.127
475	0.005	0.006	0.017	0.049	0.079	0.036	0.035	0.053	0.034	0.027	0.028	0.030	0.079
525	0.005	0.007	0.020	0.049	0.063	0.044	0.043	0.038	0.033	0.028	0.031	0.032	0.063
575	0.005	0.008	0.016	0.047	0.055	0.037	0.035	0.038	0.032	0.039	0.042	0.035	0.055
625	0.005	0.007	0.013	0.038	0.051	0.034	0.034	0.037	0.033	0.028	0.031	0.033	0.051
675	0.006	0.006	0.011	0.041	0.082	0.031	0.032	0.036	0.034	0.028	0.030	0.036	0.082
725	0.006	0.006	0.012	0.040	0.056	0.031	0.030	0.034	0.031	0.025	0.027	0.033	0.056
775	0.006	0.007	0.012	0.042	0.065	0.033	0.029	0.033	0.031	0.025	0.027	0.031	0.065
825	0.006	0.006	0.013	0.038	0.078	0.032	0.029	0.031	0.030	0.024	0.026	0.031	0.078
875	0.006	0.006	0.011	0.036	0.039	0.029	0.026	0.030	0.033	0.023	0.025	0.031	0.039
925	0.006	0.005	0.011	0.033	0.037	0.027	0.025	0.030	0.027	0.023	0.023	0.028	0.037
975	0.006	0.005	0.010	0.029	0.052	0.026	0.024	0.026	0.026	0.023	0.023	0.029	0.052
1025	0.006	0.005	0.010	0.033	0.054	0.025	0.026	0.026	0.024	0.021	0.023	0.028	0.054
1075	0.006	0.005	0.010	0.030	0.054	0.022	0.023	0.027	0.024	0.021	0.022	0.029	0.054
1125	0.006	0.005	0.010	0.024	0.052	0.020	0.020	0.024	0.023	0.020	0.023	0.029	0.052
1175	0.005	0.005	0.009	0.024	0.031	0.020	0.019	0.022	0.021	0.021	0.020	0.029	0.031
1225	0.005	0.006	0.009	0.023	0.029	0.019	0.018	0.021	0.020	0.019	0.020	0.027	0.029
1275	0.006	0.005	0.009	0.032	0.057	0.021	0.017	0.019	0.019	0.019	0.019	0.027	0.057
1325	0.006	0.004	0.009	0.028	0.056	0.020	0.018	0.019	0.018	0.020	0.019	0.025	0.056
1375	0.006	0.004	0.009	0.022	0.030	0.018	0.017	0.019	0.017	0.021	0.020	0.024	0.030
1425	0.006	0.004	0.009	0.021	0.030	0.017	0.016	0.017	0.016	0.017	0.019	0.024	0.030
1475	0.006	0.004	0.009	0.016	0.024	0.016	0.017	0.017	0.016	0.016	0.017	0.025	0.025
1525	0.006	0.004	0.008	0.016	0.025	0.016	0.016	0.017	0.016	0.015	0.018	0.024	0.025
1575	0.006	0.004	0.008	0.023	0.044	0.016	0.014	0.016	0.015	0.015	0.016	0.023	0.044
1625	0.006	0.004	0.009	0.020	0.036	0.015	0.014	0.016	0.016	0.015	0.015	0.021	0.036
1675	0.006	0.004	0.008	0.017	0.021	0.014	0.013	0.016	0.016	0.014	0.014	0.020	0.021
1725	0.006	0.004	0.008	0.018	0.030	0.015	0.013	0.015	0.016	0.014	0.015	0.021	0.030
1775	0.006	0.004	0.008	0.017	0.019	0.014	0.013	0.014	0.013	0.013	0.015	0.021	0.021
1825	0.006	0.004	0.008	0.015	0.020	0.013	0.013	0.014	0.013	0.013	0.014	0.020	0.020
1875	0.006	0.004	0.008	0.013	0.024	0.012	0.012	0.014	0.013	0.013	0.014	0.019	0.024
1925	0.006	0.004	0.008	0.016	0.021	0.012	0.012	0.013	0.012	0.012	0.013	0.020	0.021
1975	0.006	0.004	0.007	0.015	0.021	0.012	0.011	0.013	0.013	0.012	0.013	0.019	0.021

Model: AZZURRO 3PH 110KTL-V4													
Phase B													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	I <sub>n</sub> (%)	
75	0.005	0.006	0.012	0.018	0.043	0.016	0.018	0.020	0.023	0.022	0.025	0.031	0.043
125	0.005	0.005	0.011	0.022	0.032	0.018	0.016	0.019	0.018	0.015	0.017	0.022	0.032
175	0.005	0.006	0.012	0.030	0.067	0.021	0.021	0.023	0.021	0.018	0.018	0.023	0.067
225	0.005	0.006	0.013	0.029	0.043	0.025	0.026	0.029	0.026	0.023	0.034	0.030	0.043
275	0.006	0.007	0.014	0.037	0.041	0.028	0.029	0.032	0.028	0.023	0.032	0.029	0.041
325	0.006	0.007	0.014	0.040	0.046	0.030	0.031	0.034	0.031	0.023	0.022	0.027	0.046
375	0.006	0.006	0.013	0.048	0.094	0.032	0.031	0.035	0.031	0.023	0.024	0.028	0.094
425	0.006	0.006	0.014	0.049	0.125	0.038	0.034	0.038	0.040	0.026	0.026	0.032	0.125
475	0.006	0.007	0.014	0.048	0.080	0.036	0.036	0.051	0.034	0.027	0.028	0.033	0.080
525	0.006	0.007	0.024	0.047	0.064	0.044	0.044	0.039	0.032	0.028	0.029	0.033	0.064
575	0.006	0.010	0.015	0.049	0.053	0.038	0.036	0.039	0.033	0.040	0.041	0.037	0.053
625	0.006	0.007	0.013	0.040	0.048	0.035	0.035	0.038	0.033	0.028	0.030	0.036	0.048
675	0.006	0.006	0.012	0.041	0.089	0.032	0.033	0.037	0.033	0.027	0.029	0.038	0.089
725	0.007	0.007	0.012	0.043	0.059	0.032	0.031	0.035	0.031	0.025	0.027	0.041	0.059
775	0.007	0.012	0.015	0.046	0.066	0.043	0.032	0.033	0.030	0.026	0.030	0.033	0.066
825	0.007	0.006	0.018	0.038	0.076	0.033	0.035	0.031	0.029	0.024	0.024	0.030	0.076
875	0.007	0.006	0.012	0.039	0.038	0.030	0.028	0.031	0.045	0.023	0.024	0.031	0.045
925	0.007	0.006	0.012	0.036	0.037	0.028	0.026	0.031	0.027	0.023	0.022	0.029	0.037
975	0.007	0.006	0.011	0.031	0.057	0.027	0.025	0.027	0.025	0.022	0.022	0.030	0.057
1025	0.007	0.005	0.011	0.034	0.051	0.025	0.026	0.027	0.024	0.021	0.023	0.029	0.051
1075	0.007	0.006	0.011	0.031	0.053	0.023	0.024	0.026	0.023	0.021	0.023	0.030	0.053
1125	0.007	0.005	0.011	0.024	0.049	0.021	0.022	0.024	0.022	0.020	0.022	0.029	0.049
1175	0.007	0.005	0.010	0.025	0.029	0.021	0.020	0.023	0.021	0.020	0.020	0.029	0.029
1225	0.006	0.005	0.010	0.025	0.028	0.020	0.019	0.022	0.020	0.018	0.020	0.028	0.028
1275	0.006	0.005	0.009	0.030	0.059	0.021	0.018	0.021	0.019	0.018	0.018	0.027	0.059
1325	0.006	0.004	0.009	0.027	0.054	0.020	0.018	0.020	0.019	0.019	0.018	0.024	0.054
1375	0.006	0.004	0.009	0.022	0.030	0.018	0.017	0.020	0.018	0.018	0.018	0.024	0.030
1425	0.006	0.004	0.009	0.020	0.030	0.017	0.017	0.019	0.016	0.017	0.018	0.023	0.030
1475	0.006	0.004	0.009	0.016	0.022	0.016	0.017	0.018	0.017	0.015	0.017	0.024	0.024
1525	0.006	0.004	0.008	0.016	0.023	0.016	0.016	0.018	0.016	0.015	0.018	0.024	0.024
1575	0.006	0.004	0.008	0.022	0.048	0.016	0.015	0.018	0.016	0.015	0.016	0.024	0.048
1625	0.006	0.004	0.009	0.020	0.037	0.015	0.014	0.017	0.016	0.015	0.015	0.022	0.037
1675	0.006	0.004	0.008	0.017	0.022	0.015	0.013	0.017	0.016	0.014	0.014	0.021	0.022
1725	0.005	0.004	0.008	0.017	0.031	0.015	0.013	0.016	0.015	0.014	0.015	0.021	0.031
1775	0.005	0.004	0.008	0.017	0.019	0.015	0.013	0.015	0.014	0.013	0.015	0.020	0.020
1825	0.005	0.004	0.008	0.016	0.019	0.014	0.013	0.015	0.014	0.013	0.015	0.020	0.020
1875	0.005	0.004	0.008	0.014	0.028	0.013	0.013	0.015	0.013	0.013	0.014	0.020	0.028
1925	0.005	0.004	0.008	0.017	0.022	0.013	0.012	0.015	0.014	0.013	0.014	0.019	0.022
1975	0.005	0.004	0.008	0.015	0.021	0.012	0.012	0.015	0.013	0.013	0.013	0.019	0.021

Model: AZZURRO 3PH 110KTL-V4													
Phase C													
P <sub>n</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
75	0.032	0.018	0.036	0.039	0.058	0.038	0.038	0.041	0.041	0.029	0.033	0.029	0.058
125	0.032	0.018	0.036	0.041	0.049	0.039	0.038	0.040	0.038	0.025	0.029	0.020	0.049
175	0.031	0.018	0.036	0.045	0.078	0.041	0.041	0.042	0.040	0.026	0.030	0.022	0.078
225	0.031	0.018	0.037	0.045	0.056	0.042	0.042	0.046	0.045	0.031	0.042	0.029	0.056
275	0.031	0.018	0.037	0.050	0.056	0.045	0.044	0.048	0.045	0.031	0.040	0.026	0.056
325	0.031	0.018	0.036	0.052	0.057	0.047	0.045	0.049	0.047	0.031	0.033	0.025	0.057
375	0.031	0.018	0.036	0.059	0.097	0.047	0.045	0.050	0.048	0.032	0.035	0.026	0.097
425	0.032	0.018	0.037	0.061	0.125	0.052	0.049	0.053	0.064	0.034	0.037	0.031	0.125
475	0.031	0.018	0.037	0.058	0.088	0.050	0.052	0.080	0.050	0.034	0.036	0.030	0.088
525	0.031	0.018	0.048	0.061	0.075	0.061	0.066	0.054	0.050	0.036	0.038	0.031	0.075
575	0.031	0.021	0.039	0.068	0.069	0.052	0.050	0.054	0.049	0.063	0.065	0.040	0.069
625	0.031	0.018	0.036	0.052	0.060	0.049	0.049	0.053	0.049	0.035	0.039	0.035	0.060
675	0.031	0.018	0.037	0.052	0.091	0.049	0.049	0.055	0.052	0.038	0.041	0.035	0.091
725	0.032	0.018	0.037	0.055	0.067	0.048	0.048	0.051	0.048	0.034	0.037	0.045	0.067
775	0.032	0.022	0.038	0.061	0.080	0.061	0.048	0.050	0.048	0.034	0.041	0.032	0.080
825	0.032	0.018	0.040	0.053	0.092	0.047	0.051	0.049	0.048	0.032	0.035	0.029	0.092
875	0.031	0.018	0.036	0.052	0.052	0.044	0.044	0.048	0.065	0.032	0.035	0.029	0.065
925	0.032	0.018	0.036	0.050	0.051	0.044	0.043	0.051	0.046	0.031	0.033	0.028	0.051
975	0.032	0.018	0.036	0.047	0.068	0.044	0.042	0.046	0.044	0.031	0.033	0.029	0.068
1025	0.032	0.018	0.037	0.049	0.065	0.043	0.045	0.046	0.043	0.030	0.033	0.028	0.065
1075	0.032	0.018	0.036	0.047	0.066	0.043	0.043	0.045	0.043	0.030	0.033	0.029	0.066
1125	0.032	0.018	0.036	0.043	0.068	0.042	0.041	0.044	0.043	0.029	0.034	0.028	0.068
1175	0.032	0.018	0.036	0.044	0.046	0.041	0.040	0.042	0.042	0.032	0.033	0.030	0.046
1225	0.032	0.018	0.036	0.043	0.045	0.040	0.040	0.042	0.041	0.028	0.031	0.028	0.045
1275	0.031	0.017	0.036	0.048	0.071	0.040	0.038	0.042	0.040	0.028	0.030	0.026	0.071
1325	0.032	0.018	0.035	0.045	0.065	0.039	0.039	0.041	0.040	0.028	0.030	0.023	0.065
1375	0.032	0.018	0.035	0.040	0.047	0.039	0.039	0.041	0.039	0.028	0.031	0.023	0.047
1425	0.032	0.018	0.035	0.040	0.049	0.038	0.039	0.041	0.039	0.027	0.031	0.022	0.049
1475	0.032	0.018	0.036	0.038	0.042	0.038	0.038	0.041	0.039	0.026	0.030	0.026	0.042
1525	0.032	0.018	0.036	0.039	0.043	0.039	0.038	0.040	0.039	0.026	0.031	0.024	0.043
1575	0.032	0.018	0.036	0.042	0.060	0.039	0.038	0.039	0.038	0.025	0.029	0.023	0.060
1625	0.031	0.017	0.036	0.040	0.051	0.038	0.038	0.039	0.038	0.026	0.028	0.020	0.051
1675	0.032	0.018	0.036	0.039	0.042	0.038	0.037	0.039	0.038	0.025	0.028	0.019	0.042
1725	0.032	0.018	0.035	0.039	0.050	0.038	0.037	0.040	0.039	0.025	0.029	0.019	0.050
1775	0.033	0.018	0.035	0.039	0.040	0.037	0.037	0.040	0.039	0.025	0.029	0.019	0.040
1825	0.032	0.018	0.035	0.038	0.041	0.037	0.038	0.039	0.038	0.025	0.029	0.019	0.041
1875	0.032	0.018	0.035	0.037	0.046	0.037	0.037	0.039	0.038	0.025	0.028	0.019	0.046
1925	0.032	0.018	0.036	0.039	0.043	0.038	0.037	0.038	0.037	0.025	0.028	0.018	0.043
1975	0.032	0.018	0.036	0.039	0.042	0.037	0.037	0.038	0.037	0.025	0.027	0.018	0.042

## 2.2.8 Höhere Frequenzen / Higher Frequencies components

Model: AZZURRO 3PH 100KTL-V4													
Phase A													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2.1	0.023	0.047	0.096	0.079	0.153	0.111	0.143	0.160	0.143	0.123	0.142	0.153	0.160
2.3	0.022	0.061	0.119	0.095	0.110	0.078	0.090	0.100	0.109	0.121	0.168	0.177	0.177
2.5	0.022	0.065	0.130	0.097	0.099	0.060	0.075	0.090	0.083	0.077	0.058	0.070	0.130
2.7	0.024	0.058	0.118	0.098	0.113	0.061	0.066	0.081	0.091	0.102	0.152	0.169	0.169
2.9	0.039	0.034	0.070	0.050	0.090	0.058	0.045	0.052	0.059	0.067	0.093	0.112	0.112
3.1	0.026	0.021	0.046	0.051	0.076	0.070	0.072	0.079	0.073	0.049	0.081	0.099	0.099
3.3	0.022	0.014	0.032	0.070	0.088	0.071	0.070	0.075	0.083	0.084	0.058	0.081	0.088
3.5	0.021	0.014	0.032	0.048	0.065	0.065	0.067	0.085	0.095	0.086	0.073	0.078	0.095
3.7	0.021	0.016	0.035	0.047	0.063	0.057	0.065	0.073	0.078	0.081	0.113	0.140	0.140
3.9	0.022	0.025	0.052	0.051	0.063	0.060	0.048	0.068	0.080	0.089	0.122	0.159	0.159
4.1	0.022	0.022	0.046	0.058	0.059	0.057	0.054	0.058	0.060	0.071	0.096	0.115	0.115
4.3	0.023	0.022	0.046	0.058	0.059	0.061	0.045	0.050	0.062	0.070	0.063	0.058	0.070
4.5	0.024	0.025	0.052	0.065	0.056	0.061	0.069	0.063	0.066	0.074	0.099	0.104	0.104
4.7	0.025	0.019	0.039	0.045	0.057	0.058	0.066	0.072	0.072	0.065	0.057	0.064	0.072
4.9	0.026	0.019	0.038	0.044	0.059	0.059	0.057	0.056	0.055	0.064	0.087	0.085	0.087
5.1	0.027	0.022	0.044	0.061	0.056	0.062	0.056	0.074	0.077	0.071	0.078	0.084	0.084
5.3	0.028	0.021	0.040	0.040	0.059	0.060	0.058	0.066	0.067	0.079	0.070	0.063	0.079
5.5	0.029	0.022	0.042	0.035	0.064	0.063	0.054	0.059	0.072	0.064	0.058	0.062	0.072
5.7	0.029	0.023	0.043	0.042	0.068	0.069	0.076	0.066	0.083	0.091	0.078	0.073	0.091
5.9	0.031	0.021	0.040	0.043	0.064	0.071	0.078	0.083	0.082	0.079	0.067	0.073	0.083
6.1	0.029	0.021	0.040	0.039	0.057	0.069	0.070	0.070	0.062	0.083	0.070	0.059	0.083
6.3	0.028	0.021	0.040	0.040	0.054	0.059	0.069	0.094	0.085	0.084	0.085	0.084	0.094
6.5	0.028	0.018	0.033	0.036	0.050	0.049	0.060	0.079	0.084	0.077	0.057	0.064	0.084
6.7	0.027	0.017	0.032	0.034	0.047	0.045	0.050	0.055	0.071	0.071	0.073	0.071	0.073
6.9	0.026	0.017	0.032	0.034	0.043	0.046	0.052	0.048	0.073	0.081	0.058	0.066	0.081
7.1	0.026	0.015	0.029	0.029	0.036	0.042	0.046	0.049	0.059	0.075	0.057	0.053	0.075
7.3	0.025	0.014	0.028	0.028	0.034	0.038	0.041	0.043	0.045	0.064	0.048	0.044	0.064
7.5	0.024	0.014	0.029	0.027	0.031	0.033	0.038	0.047	0.046	0.059	0.052	0.051	0.059
7.7	0.023	0.013	0.027	0.026	0.030	0.030	0.034	0.040	0.043	0.044	0.045	0.046	0.046
7.9	0.022	0.012	0.027	0.026	0.029	0.029	0.032	0.034	0.038	0.042	0.044	0.044	0.044
8.1	0.022	0.012	0.027	0.026	0.028	0.029	0.031	0.032	0.039	0.039	0.042	0.045	0.045
8.3	0.021	0.011	0.026	0.026	0.027	0.027	0.030	0.031	0.036	0.039	0.040	0.040	0.040
8.5	0.020	0.010	0.026	0.025	0.026	0.026	0.028	0.029	0.032	0.037	0.038	0.037	0.038
8.7	0.020	0.010	0.025	0.025	0.025	0.026	0.028	0.030	0.032	0.037	0.038	0.036	0.038
8.9	0.020	0.011	0.026	0.025	0.025	0.026	0.029	0.030	0.033	0.036	0.038	0.035	0.038

Model: AZZURRO 3PH 100KTL-V4													
Phase B													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.019	0.044	0.089	0.076	0.153	0.113	0.146	0.161	0.144	0.123	0.150	0.159	0.161
2.3	0.020	0.059	0.117	0.095	0.108	0.078	0.098	0.100	0.110	0.122	0.172	0.177	0.177
2.5	0.021	0.065	0.129	0.099	0.101	0.058	0.071	0.091	0.084	0.076	0.053	0.068	0.129
2.7	0.025	0.056	0.113	0.097	0.112	0.061	0.069	0.083	0.094	0.106	0.149	0.162	0.162
2.9	0.030	0.031	0.063	0.050	0.089	0.058	0.045	0.051	0.057	0.065	0.088	0.108	0.108
3.1	0.030	0.022	0.047	0.054	0.075	0.074	0.078	0.082	0.072	0.046	0.084	0.102	0.102
3.3	0.022	0.014	0.032	0.071	0.087	0.068	0.068	0.071	0.086	0.085	0.056	0.082	0.087
3.5	0.021	0.014	0.030	0.047	0.064	0.066	0.066	0.083	0.090	0.086	0.068	0.070	0.090
3.7	0.020	0.016	0.034	0.045	0.060	0.054	0.064	0.078	0.085	0.078	0.117	0.147	0.147
3.9	0.020	0.024	0.050	0.054	0.062	0.058	0.048	0.068	0.081	0.087	0.125	0.152	0.152
4.1	0.020	0.021	0.043	0.056	0.057	0.055	0.051	0.053	0.057	0.070	0.097	0.110	0.110
4.3	0.020	0.023	0.047	0.058	0.057	0.059	0.042	0.051	0.066	0.071	0.060	0.060	0.071
4.5	0.021	0.024	0.049	0.065	0.055	0.061	0.063	0.055	0.060	0.075	0.098	0.101	0.101
4.7	0.021	0.019	0.038	0.043	0.056	0.059	0.063	0.069	0.068	0.062	0.055	0.059	0.069
4.9	0.023	0.019	0.037	0.046	0.057	0.058	0.056	0.060	0.057	0.066	0.086	0.088	0.088
5.1	0.026	0.022	0.044	0.061	0.056	0.059	0.058	0.075	0.078	0.070	0.078	0.085	0.085
5.3	0.030	0.021	0.043	0.041	0.060	0.061	0.061	0.064	0.071	0.081	0.074	0.065	0.081
5.5	0.033	0.022	0.043	0.038	0.067	0.066	0.057	0.065	0.082	0.068	0.060	0.068	0.082
5.7	0.033	0.024	0.044	0.040	0.071	0.075	0.076	0.064	0.083	0.092	0.080	0.073	0.092
5.9	0.032	0.022	0.041	0.041	0.064	0.076	0.076	0.078	0.077	0.080	0.075	0.074	0.080
6.1	0.031	0.022	0.042	0.042	0.059	0.073	0.072	0.072	0.069	0.088	0.071	0.064	0.088
6.3	0.029	0.022	0.044	0.042	0.054	0.061	0.073	0.094	0.085	0.082	0.082	0.080	0.094
6.5	0.026	0.017	0.036	0.037	0.051	0.050	0.063	0.072	0.083	0.078	0.055	0.059	0.083
6.7	0.024	0.016	0.033	0.036	0.047	0.045	0.048	0.058	0.076	0.066	0.072	0.075	0.076
6.9	0.022	0.016	0.033	0.034	0.042	0.048	0.052	0.046	0.076	0.084	0.055	0.065	0.084
7.1	0.021	0.013	0.027	0.027	0.034	0.042	0.045	0.049	0.058	0.075	0.055	0.053	0.075
7.3	0.020	0.012	0.026	0.025	0.031	0.037	0.040	0.043	0.046	0.063	0.045	0.048	0.063
7.5	0.020	0.012	0.026	0.025	0.028	0.031	0.037	0.046	0.043	0.059	0.051	0.049	0.059
7.7	0.019	0.012	0.025	0.023	0.027	0.027	0.033	0.039	0.042	0.045	0.044	0.044	0.045
7.9	0.019	0.011	0.024	0.023	0.026	0.026	0.029	0.033	0.037	0.038	0.040	0.042	0.042
8.1	0.019	0.011	0.024	0.023	0.025	0.026	0.030	0.030	0.038	0.038	0.039	0.043	0.043
8.3	0.019	0.010	0.024	0.022	0.024	0.025	0.028	0.030	0.034	0.039	0.036	0.038	0.039
8.5	0.026	0.014	0.030	0.029	0.030	0.031	0.033	0.035	0.036	0.040	0.040	0.040	0.040
8.7	0.019	0.010	0.023	0.022	0.023	0.024	0.026	0.029	0.029	0.035	0.035	0.034	0.035
8.9	0.019	0.010	0.024	0.023	0.023	0.024	0.027	0.029	0.031	0.033	0.035	0.034	0.035

Model: AZZURRO 3PH 100KTL-V4													
Phase C													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2.1	0.016	0.043	0.087	0.070	0.151	0.112	0.149	0.160	0.141	0.120	0.142	0.159	0.160
2.3	0.016	0.060	0.117	0.091	0.110	0.078	0.092	0.098	0.104	0.123	0.167	0.176	0.176
2.5	0.016	0.060	0.120	0.091	0.097	0.058	0.072	0.090	0.083	0.075	0.050	0.064	0.120
2.7	0.017	0.055	0.110	0.096	0.115	0.060	0.057	0.072	0.080	0.107	0.148	0.160	0.160
2.9	0.023	0.028	0.057	0.045	0.086	0.053	0.040	0.048	0.050	0.067	0.085	0.098	0.098
3.1	0.022	0.021	0.044	0.047	0.072	0.070	0.073	0.081	0.070	0.042	0.074	0.092	0.092
3.3	0.017	0.012	0.026	0.068	0.086	0.067	0.066	0.072	0.082	0.084	0.049	0.073	0.086
3.5	0.016	0.012	0.026	0.045	0.063	0.064	0.064	0.082	0.090	0.087	0.063	0.063	0.090
3.7	0.016	0.015	0.030	0.045	0.060	0.054	0.065	0.078	0.084	0.081	0.108	0.132	0.132
3.9	0.016	0.023	0.048	0.050	0.062	0.057	0.045	0.065	0.078	0.084	0.122	0.157	0.157
4.1	0.016	0.021	0.042	0.053	0.057	0.054	0.049	0.053	0.054	0.068	0.095	0.114	0.114
4.3	0.016	0.021	0.043	0.057	0.056	0.057	0.041	0.049	0.060	0.071	0.055	0.052	0.071
4.5	0.016	0.023	0.048	0.062	0.054	0.059	0.061	0.056	0.059	0.072	0.094	0.099	0.099
4.7	0.017	0.017	0.034	0.041	0.055	0.057	0.060	0.068	0.071	0.058	0.049	0.057	0.071
4.9	0.017	0.019	0.037	0.043	0.056	0.059	0.055	0.058	0.057	0.063	0.083	0.081	0.083
5.1	0.018	0.021	0.041	0.057	0.053	0.058	0.056	0.070	0.074	0.061	0.073	0.083	0.083
5.3	0.019	0.017	0.034	0.033	0.055	0.056	0.054	0.061	0.063	0.074	0.067	0.065	0.074
5.5	0.019	0.020	0.039	0.030	0.060	0.059	0.050	0.058	0.074	0.064	0.052	0.060	0.074
5.7	0.019	0.020	0.039	0.036	0.066	0.068	0.069	0.061	0.078	0.086	0.074	0.073	0.086
5.9	0.019	0.017	0.034	0.034	0.061	0.070	0.069	0.075	0.080	0.076	0.067	0.071	0.080
6.1	0.018	0.020	0.039	0.038	0.056	0.070	0.075	0.075	0.067	0.092	0.075	0.060	0.092
6.3	0.018	0.019	0.037	0.035	0.050	0.057	0.068	0.089	0.082	0.075	0.080	0.079	0.089
6.5	0.018	0.014	0.027	0.029	0.046	0.045	0.056	0.069	0.075	0.070	0.052	0.053	0.075
6.7	0.018	0.014	0.028	0.028	0.044	0.042	0.045	0.057	0.077	0.069	0.070	0.071	0.077
6.9	0.018	0.014	0.028	0.027	0.039	0.043	0.047	0.042	0.067	0.078	0.051	0.058	0.078
7.1	0.017	0.012	0.024	0.022	0.031	0.039	0.041	0.045	0.055	0.072	0.053	0.052	0.072
7.3	0.017	0.011	0.022	0.021	0.028	0.034	0.039	0.041	0.043	0.061	0.042	0.043	0.061
7.5	0.016	0.011	0.023	0.021	0.025	0.028	0.033	0.041	0.039	0.054	0.047	0.050	0.054
7.7	0.016	0.010	0.021	0.019	0.023	0.024	0.029	0.034	0.036	0.038	0.039	0.041	0.041
7.9	0.016	0.010	0.020	0.019	0.023	0.022	0.025	0.029	0.034	0.035	0.034	0.039	0.039
8.1	0.016	0.009	0.020	0.019	0.022	0.023	0.026	0.025	0.032	0.032	0.032	0.037	0.037
8.3	0.016	0.009	0.020	0.019	0.021	0.022	0.024	0.025	0.029	0.033	0.030	0.033	0.033
8.5	0.016	0.008	0.019	0.018	0.020	0.020	0.022	0.024	0.026	0.029	0.028	0.029	0.029
8.7	0.015	0.008	0.018	0.018	0.019	0.020	0.021	0.024	0.024	0.030	0.028	0.028	0.030
8.9	0.016	0.009	0.019	0.019	0.020	0.020	0.022	0.024	0.025	0.028	0.027	0.027	0.028

Model: AZZURRO 3PH 125KTL-V4-A												
Phase A												
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.012	0.068	0.147	0.074	0.097	0.140	0.132	0.136	0.169	0.171	0.166	0.171
2.3	0.013	0.057	0.065	0.057	0.040	0.048	0.056	0.046	0.077	0.121	0.162	0.162
2.5	0.014	0.055	0.078	0.062	0.079	0.080	0.080	0.063	0.058	0.051	0.075	0.080
2.7	0.014	0.035	0.074	0.050	0.068	0.077	0.076	0.068	0.079	0.087	0.166	0.166
2.9	0.016	0.023	0.026	0.030	0.030	0.034	0.040	0.036	0.054	0.061	0.081	0.081
3.1	0.018	0.016	0.020	0.039	0.044	0.051	0.058	0.079	0.092	0.055	0.083	0.092
3.3	0.014	0.011	0.021	0.046	0.044	0.054	0.098	0.156	0.159	0.111	0.058	0.159
3.5	0.014	0.012	0.027	0.038	0.047	0.062	0.077	0.126	0.117	0.100	0.051	0.126
3.7	0.013	0.015	0.026	0.037	0.039	0.041	0.049	0.056	0.099	0.149	0.105	0.149
3.9	0.013	0.025	0.034	0.032	0.036	0.046	0.048	0.061	0.083	0.098	0.142	0.142
4.1	0.013	0.020	0.034	0.037	0.038	0.041	0.040	0.048	0.057	0.057	0.117	0.117
4.3	0.012	0.022	0.033	0.031	0.029	0.031	0.037	0.054	0.062	0.074	0.048	0.074
4.5	0.013	0.031	0.042	0.040	0.040	0.038	0.045	0.055	0.066	0.077	0.087	0.087
4.7	0.013	0.020	0.035	0.040	0.041	0.048	0.042	0.043	0.054	0.064	0.054	0.064
4.9	0.013	0.020	0.034	0.031	0.037	0.033	0.048	0.054	0.065	0.047	0.066	0.066
5.1	0.013	0.027	0.040	0.035	0.041	0.049	0.045	0.060	0.078	0.068	0.071	0.078
5.3	0.013	0.019	0.027	0.043	0.038	0.042	0.055	0.060	0.061	0.064	0.052	0.064
5.5	0.012	0.018	0.027	0.046	0.039	0.041	0.036	0.044	0.076	0.081	0.051	0.081
5.7	0.012	0.021	0.034	0.045	0.052	0.045	0.055	0.069	0.075	0.100	0.061	0.100
5.9	0.013	0.015	0.023	0.034	0.048	0.059	0.053	0.067	0.077	0.070	0.054	0.077
6.1	0.011	0.014	0.023	0.033	0.044	0.043	0.049	0.059	0.056	0.072	0.045	0.072
6.3	0.012	0.015	0.027	0.042	0.034	0.053	0.060	0.058	0.095	0.083	0.064	0.095
6.5	0.012	0.012	0.020	0.036	0.038	0.040	0.055	0.063	0.075	0.090	0.045	0.090
6.7	0.012	0.011	0.019	0.029	0.036	0.037	0.043	0.045	0.079	0.091	0.052	0.091
6.9	0.013	0.011	0.021	0.023	0.033	0.037	0.039	0.063	0.070	0.119	0.053	0.119
7.1	0.013	0.010	0.018	0.025	0.023	0.031	0.038	0.050	0.072	0.080	0.042	0.080
7.3	0.015	0.010	0.017	0.021	0.020	0.027	0.028	0.043	0.048	0.070	0.042	0.070
7.5	0.013	0.009	0.016	0.020	0.022	0.023	0.032	0.034	0.066	0.067	0.048	0.067
7.7	0.012	0.008	0.015	0.017	0.020	0.023	0.025	0.037	0.045	0.071	0.043	0.071
7.9	0.012	0.008	0.014	0.017	0.019	0.019	0.024	0.025	0.038	0.055	0.038	0.055
8.1	0.013	0.008	0.014	0.016	0.016	0.019	0.021	0.028	0.032	0.064	0.037	0.064
8.3	0.013	0.008	0.015	0.015	0.015	0.016	0.020	0.022	0.031	0.046	0.029	0.046
8.5	0.015	0.008	0.016	0.014	0.015	0.017	0.018	0.021	0.023	0.032	0.027	0.032
8.7	0.016	0.009	0.015	0.014	0.015	0.017	0.019	0.019	0.028	0.032	0.025	0.032
8.9	0.014	0.008	0.014	0.017	0.018	0.018	0.020	0.022	0.025	0.032	0.024	0.032

Model: AZZURRO 3PH 125KTL-V4-A												
Phase B												
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.012	0.061	0.153	0.075	0.094	0.140	0.137	0.138	0.172	0.179	0.165	0.179
2.3	0.012	0.052	0.065	0.058	0.041	0.049	0.060	0.040	0.068	0.118	0.158	0.158
2.5	0.013	0.053	0.076	0.057	0.079	0.076	0.081	0.065	0.064	0.059	0.079	0.081
2.7	0.013	0.036	0.077	0.044	0.060	0.065	0.068	0.065	0.072	0.090	0.156	0.156
2.9	0.019	0.025	0.028	0.031	0.031	0.033	0.039	0.037	0.053	0.066	0.085	0.085
3.1	0.018	0.018	0.020	0.037	0.043	0.052	0.063	0.086	0.096	0.061	0.080	0.096
3.3	0.015	0.012	0.024	0.044	0.042	0.047	0.093	0.154	0.156	0.112	0.059	0.156
3.5	0.015	0.014	0.028	0.039	0.047	0.063	0.077	0.128	0.120	0.099	0.050	0.128
3.7	0.013	0.015	0.027	0.038	0.039	0.042	0.051	0.058	0.103	0.145	0.103	0.145
3.9	0.012	0.024	0.032	0.035	0.036	0.043	0.047	0.059	0.083	0.111	0.137	0.137
4.1	0.012	0.019	0.033	0.037	0.039	0.041	0.042	0.045	0.055	0.056	0.113	0.113
4.3	0.012	0.021	0.033	0.030	0.029	0.031	0.035	0.056	0.063	0.077	0.053	0.077
4.5	0.012	0.029	0.039	0.040	0.042	0.040	0.044	0.052	0.061	0.072	0.087	0.087
4.7	0.013	0.020	0.037	0.042	0.043	0.049	0.045	0.046	0.053	0.064	0.055	0.064
4.9	0.015	0.020	0.036	0.031	0.039	0.037	0.050	0.058	0.069	0.052	0.069	0.069
5.1	0.016	0.028	0.038	0.034	0.042	0.048	0.046	0.058	0.080	0.070	0.072	0.080
5.3	0.014	0.020	0.030	0.040	0.037	0.044	0.054	0.059	0.061	0.064	0.050	0.064
5.5	0.012	0.017	0.028	0.046	0.038	0.043	0.037	0.049	0.078	0.083	0.051	0.083
5.7	0.012	0.021	0.031	0.045	0.052	0.042	0.052	0.066	0.069	0.096	0.058	0.096
5.9	0.013	0.015	0.023	0.034	0.050	0.060	0.056	0.067	0.076	0.068	0.052	0.076
6.1	0.012	0.014	0.023	0.033	0.043	0.043	0.046	0.063	0.061	0.080	0.047	0.080
6.3	0.013	0.015	0.025	0.042	0.033	0.053	0.060	0.060	0.092	0.077	0.062	0.092
6.5	0.013	0.012	0.020	0.038	0.039	0.040	0.056	0.067	0.069	0.091	0.044	0.091
6.7	0.014	0.011	0.019	0.030	0.037	0.038	0.046	0.049	0.085	0.094	0.053	0.094
6.9	0.014	0.012	0.021	0.023	0.034	0.039	0.041	0.064	0.073	0.117	0.053	0.117
7.1	0.014	0.010	0.019	0.026	0.024	0.033	0.041	0.053	0.074	0.076	0.042	0.076
7.3	0.015	0.010	0.018	0.022	0.021	0.029	0.030	0.047	0.056	0.081	0.043	0.081
7.5	0.013	0.009	0.017	0.021	0.023	0.023	0.034	0.033	0.069	0.066	0.046	0.069
7.7	0.012	0.008	0.016	0.018	0.021	0.023	0.026	0.037	0.052	0.069	0.043	0.069
7.9	0.012	0.008	0.015	0.017	0.019	0.019	0.026	0.028	0.043	0.060	0.039	0.060
8.1	0.012	0.008	0.014	0.017	0.016	0.021	0.021	0.030	0.036	0.063	0.039	0.063
8.3	0.012	0.008	0.014	0.015	0.016	0.017	0.022	0.024	0.035	0.044	0.032	0.044
8.5	0.016	0.009	0.017	0.017	0.017	0.019	0.022	0.026	0.028	0.039	0.029	0.039
8.7	0.014	0.009	0.014	0.015	0.015	0.017	0.021	0.020	0.030	0.032	0.026	0.032
8.9	0.012	0.008	0.015	0.017	0.017	0.019	0.021	0.023	0.027	0.034	0.024	0.034

Model: AZZURRO 3PH 125KTL-V4-A Phase C												
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.059	0.070	0.157	0.090	0.106	0.146	0.146	0.151	0.177	0.185	0.174	0.185
2.3	0.058	0.060	0.087	0.078	0.067	0.073	0.083	0.077	0.091	0.135	0.174	0.174
2.5	0.064	0.060	0.087	0.081	0.096	0.094	0.096	0.091	0.087	0.087	0.109	0.109
2.7	0.060	0.048	0.091	0.071	0.083	0.087	0.086	0.088	0.088	0.100	0.178	0.178
2.9	0.059	0.036	0.053	0.057	0.057	0.059	0.064	0.069	0.076	0.087	0.104	0.104
3.1	0.059	0.033	0.051	0.062	0.064	0.071	0.079	0.101	0.112	0.086	0.104	0.112
3.3	0.057	0.030	0.051	0.067	0.066	0.070	0.102	0.159	0.164	0.128	0.085	0.164
3.5	0.056	0.031	0.053	0.060	0.066	0.079	0.092	0.139	0.131	0.111	0.077	0.139
3.7	0.056	0.032	0.053	0.060	0.061	0.063	0.073	0.085	0.122	0.167	0.122	0.167
3.9	0.056	0.038	0.057	0.060	0.061	0.067	0.071	0.085	0.100	0.116	0.150	0.150
4.1	0.057	0.035	0.057	0.062	0.062	0.064	0.068	0.077	0.083	0.085	0.131	0.131
4.3	0.056	0.035	0.058	0.057	0.056	0.058	0.065	0.081	0.086	0.093	0.079	0.093
4.5	0.055	0.042	0.063	0.063	0.063	0.062	0.070	0.081	0.090	0.097	0.106	0.106
4.7	0.056	0.035	0.059	0.065	0.067	0.071	0.069	0.078	0.085	0.092	0.081	0.092
4.9	0.058	0.035	0.059	0.058	0.062	0.061	0.073	0.085	0.089	0.077	0.091	0.091
5.1	0.057	0.040	0.062	0.061	0.065	0.069	0.072	0.086	0.096	0.093	0.094	0.096
5.3	0.056	0.036	0.055	0.065	0.062	0.068	0.080	0.086	0.087	0.089	0.081	0.089
5.5	0.055	0.034	0.055	0.069	0.062	0.065	0.068	0.079	0.096	0.101	0.081	0.101
5.7	0.056	0.036	0.058	0.067	0.070	0.062	0.075	0.094	0.097	0.115	0.087	0.115
5.9	0.056	0.033	0.053	0.061	0.070	0.079	0.079	0.090	0.100	0.092	0.081	0.100
6.1	0.056	0.032	0.053	0.061	0.068	0.068	0.077	0.092	0.091	0.098	0.079	0.098
6.3	0.056	0.033	0.055	0.066	0.063	0.079	0.087	0.091	0.117	0.112	0.098	0.117
6.5	0.056	0.031	0.050	0.061	0.061	0.061	0.077	0.094	0.096	0.108	0.076	0.108
6.7	0.055	0.031	0.050	0.058	0.061	0.062	0.071	0.079	0.105	0.117	0.083	0.117
6.9	0.055	0.031	0.051	0.054	0.059	0.061	0.067	0.090	0.096	0.130	0.082	0.130
7.1	0.055	0.030	0.050	0.055	0.055	0.060	0.067	0.081	0.099	0.099	0.078	0.099
7.3	0.055	0.030	0.049	0.053	0.053	0.057	0.062	0.078	0.084	0.099	0.078	0.099
7.5	0.055	0.030	0.049	0.052	0.053	0.053	0.062	0.068	0.089	0.092	0.079	0.092
7.7	0.055	0.030	0.049	0.052	0.053	0.055	0.058	0.070	0.077	0.094	0.076	0.094
7.9	0.056	0.029	0.048	0.051	0.051	0.052	0.058	0.066	0.073	0.086	0.073	0.086
8.1	0.056	0.029	0.049	0.051	0.051	0.053	0.057	0.067	0.070	0.087	0.073	0.087
8.3	0.056	0.029	0.049	0.052	0.052	0.053	0.058	0.065	0.069	0.076	0.069	0.076
8.5	0.059	0.030	0.052	0.051	0.051	0.052	0.056	0.065	0.066	0.070	0.068	0.070
8.7	0.060	0.031	0.050	0.051	0.052	0.053	0.057	0.064	0.068	0.068	0.067	0.068
8.9	0.058	0.030	0.049	0.054	0.055	0.054	0.059	0.066	0.067	0.070	0.068	0.070

Model: AZZURRO 3PH 110KTL-V4													
Phase A													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.014	0.084	0.165	0.122	0.116	0.146	0.184	0.145	0.194	0.226	0.223	0.150	0.226
2.3	0.014	0.077	0.156	0.053	0.046	0.060	0.064	0.067	0.071	0.091	0.194	0.161	0.194
2.5	0.014	0.068	0.143	0.095	0.099	0.091	0.079	0.068	0.098	0.121	0.059	0.074	0.143
2.7	0.014	0.052	0.104	0.070	0.084	0.089	0.084	0.071	0.058	0.065	0.176	0.180	0.180
2.9	0.021	0.030	0.059	0.049	0.042	0.039	0.044	0.038	0.035	0.040	0.101	0.090	0.101
3.1	0.017	0.020	0.037	0.050	0.065	0.058	0.067	0.061	0.073	0.048	0.078	0.104	0.104
3.3	0.013	0.009	0.020	0.066	0.063	0.056	0.079	0.127	0.134	0.104	0.060	0.066	0.134
3.5	0.013	0.015	0.030	0.046	0.047	0.066	0.071	0.088	0.092	0.085	0.063	0.065	0.092
3.7	0.013	0.018	0.037	0.045	0.048	0.045	0.051	0.049	0.072	0.093	0.119	0.155	0.155
3.9	0.013	0.025	0.052	0.044	0.048	0.049	0.052	0.052	0.062	0.086	0.127	0.181	0.181
4.1	0.013	0.022	0.044	0.049	0.048	0.048	0.050	0.042	0.052	0.054	0.092	0.124	0.124
4.3	0.013	0.022	0.046	0.032	0.040	0.035	0.039	0.048	0.050	0.069	0.052	0.058	0.069
4.5	0.013	0.028	0.060	0.048	0.045	0.044	0.048	0.056	0.059	0.056	0.093	0.101	0.101
4.7	0.014	0.020	0.039	0.051	0.048	0.051	0.048	0.055	0.058	0.064	0.044	0.064	0.064
4.9	0.014	0.017	0.036	0.039	0.045	0.041	0.049	0.053	0.069	0.049	0.086	0.088	0.088
5.1	0.014	0.017	0.036	0.044	0.049	0.053	0.051	0.048	0.074	0.085	0.077	0.088	0.088
5.3	0.015	0.015	0.030	0.047	0.044	0.056	0.062	0.059	0.058	0.061	0.069	0.069	0.069
5.5	0.015	0.015	0.029	0.049	0.043	0.040	0.043	0.048	0.055	0.090	0.051	0.062	0.090
5.7	0.015	0.016	0.030	0.051	0.054	0.049	0.054	0.073	0.081	0.079	0.074	0.070	0.081
5.9	0.017	0.016	0.032	0.044	0.058	0.064	0.058	0.067	0.089	0.079	0.065	0.069	0.089
6.1	0.016	0.014	0.027	0.037	0.047	0.055	0.049	0.058	0.079	0.054	0.062	0.063	0.079
6.3	0.016	0.013	0.025	0.046	0.035	0.057	0.064	0.056	0.077	0.102	0.081	0.082	0.102
6.5	0.016	0.012	0.023	0.037	0.035	0.041	0.051	0.066	0.059	0.087	0.044	0.065	0.087
6.7	0.015	0.011	0.021	0.032	0.038	0.031	0.044	0.055	0.055	0.097	0.065	0.075	0.097
6.9	0.015	0.011	0.021	0.026	0.034	0.038	0.031	0.061	0.079	0.088	0.051	0.071	0.088
7.1	0.014	0.010	0.020	0.023	0.025	0.036	0.037	0.044	0.078	0.079	0.061	0.061	0.079
7.3	0.015	0.010	0.019	0.024	0.021	0.029	0.027	0.030	0.055	0.055	0.044	0.052	0.055
7.5	0.016	0.010	0.020	0.021	0.022	0.024	0.032	0.033	0.048	0.066	0.056	0.059	0.066
7.7	0.017	0.010	0.020	0.022	0.024	0.024	0.025	0.035	0.036	0.053	0.042	0.054	0.054
7.9	0.015	0.009	0.019	0.020	0.022	0.022	0.023	0.030	0.031	0.046	0.038	0.051	0.051
8.1	0.014	0.009	0.018	0.019	0.019	0.022	0.021	0.026	0.034	0.041	0.033	0.052	0.052
8.3	0.014	0.008	0.016	0.017	0.017	0.019	0.021	0.022	0.032	0.036	0.026	0.044	0.044
8.5	0.014	0.008	0.016	0.017	0.017	0.018	0.019	0.019	0.025	0.028	0.026	0.039	0.039
8.7	0.015	0.008	0.016	0.017	0.018	0.018	0.020	0.022	0.025	0.030	0.025	0.036	0.036
8.9	0.017	0.009	0.019	0.020	0.020	0.020	0.021	0.023	0.025	0.027	0.024	0.033	0.033

Model: AZZURRO 3PH 110KTL-V4													
Phase B													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)
2.1	0.013	0.081	0.159	0.126	0.116	0.155	0.182	0.153	0.193	0.228	0.239	0.147	0.239
2.3	0.014	0.072	0.143	0.054	0.046	0.060	0.061	0.072	0.061	0.081	0.195	0.156	0.195
2.5	0.015	0.064	0.139	0.095	0.101	0.089	0.084	0.075	0.100	0.131	0.070	0.072	0.139
2.7	0.014	0.054	0.102	0.067	0.077	0.080	0.076	0.069	0.059	0.069	0.165	0.169	0.169
2.9	0.030	0.035	0.067	0.053	0.046	0.042	0.047	0.042	0.044	0.039	0.096	0.090	0.096
3.1	0.020	0.021	0.044	0.050	0.062	0.060	0.074	0.069	0.080	0.055	0.085	0.102	0.102
3.3	0.017	0.011	0.022	0.064	0.062	0.053	0.074	0.121	0.133	0.107	0.065	0.067	0.133
3.5	0.018	0.018	0.033	0.045	0.047	0.067	0.072	0.089	0.094	0.083	0.060	0.053	0.094
3.7	0.015	0.020	0.041	0.047	0.049	0.044	0.052	0.053	0.072	0.097	0.117	0.151	0.151
3.9	0.014	0.023	0.051	0.048	0.049	0.046	0.051	0.053	0.061	0.083	0.124	0.169	0.169
4.1	0.013	0.022	0.044	0.049	0.049	0.050	0.051	0.046	0.051	0.053	0.090	0.119	0.119
4.3	0.013	0.025	0.050	0.031	0.039	0.034	0.037	0.048	0.054	0.068	0.055	0.063	0.068
4.5	0.014	0.027	0.058	0.043	0.046	0.047	0.045	0.052	0.057	0.057	0.094	0.100	0.100
4.7	0.015	0.019	0.040	0.051	0.047	0.051	0.049	0.055	0.058	0.069	0.044	0.062	0.069
4.9	0.018	0.019	0.041	0.041	0.049	0.045	0.049	0.055	0.070	0.053	0.087	0.091	0.091
5.1	0.018	0.018	0.036	0.044	0.051	0.056	0.051	0.051	0.073	0.089	0.078	0.088	0.089
5.3	0.016	0.015	0.030	0.042	0.044	0.055	0.058	0.060	0.058	0.062	0.071	0.067	0.071
5.5	0.014	0.014	0.029	0.049	0.041	0.039	0.043	0.052	0.064	0.089	0.048	0.066	0.089
5.7	0.014	0.015	0.027	0.051	0.052	0.046	0.053	0.072	0.079	0.076	0.071	0.069	0.079
5.9	0.016	0.015	0.029	0.043	0.058	0.063	0.057	0.068	0.087	0.080	0.061	0.070	0.087
6.1	0.014	0.013	0.028	0.037	0.048	0.055	0.052	0.060	0.081	0.055	0.066	0.065	0.081
6.3	0.015	0.014	0.026	0.044	0.036	0.055	0.069	0.061	0.087	0.103	0.082	0.081	0.103
6.5	0.015	0.012	0.024	0.040	0.036	0.040	0.058	0.072	0.058	0.083	0.045	0.060	0.083
6.7	0.016	0.012	0.024	0.035	0.039	0.033	0.047	0.061	0.065	0.095	0.072	0.076	0.095
6.9	0.016	0.012	0.024	0.027	0.035	0.041	0.035	0.062	0.081	0.088	0.053	0.068	0.088
7.1	0.016	0.011	0.022	0.025	0.027	0.038	0.040	0.048	0.083	0.079	0.061	0.057	0.083
7.3	0.015	0.010	0.021	0.025	0.023	0.030	0.029	0.036	0.059	0.058	0.048	0.053	0.059
7.5	0.016	0.011	0.021	0.022	0.023	0.023	0.035	0.037	0.050	0.072	0.055	0.056	0.072
7.7	0.016	0.010	0.020	0.021	0.023	0.023	0.026	0.036	0.038	0.058	0.040	0.052	0.058
7.9	0.015	0.009	0.018	0.020	0.021	0.022	0.024	0.035	0.036	0.048	0.041	0.051	0.051
8.1	0.014	0.008	0.018	0.020	0.019	0.022	0.020	0.029	0.040	0.043	0.034	0.050	0.050
8.3	0.013	0.008	0.016	0.018	0.018	0.020	0.021	0.027	0.037	0.039	0.026	0.042	0.042
8.5	0.016	0.009	0.018	0.020	0.020	0.021	0.022	0.026	0.032	0.032	0.028	0.042	0.042
8.7	0.014	0.008	0.016	0.017	0.018	0.018	0.021	0.026	0.028	0.032	0.024	0.034	0.034
8.9	0.016	0.009	0.018	0.019	0.019	0.019	0.020	0.026	0.027	0.029	0.025	0.031	0.031

Model: AZZURRO 3PH 110KTL-V4 Phase C													
P <sub>bin</sub> (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	I <sub>h</sub> (%)	
2.1	0.079	0.095	0.186	0.155	0.151	0.176	0.210	0.180	0.215	0.234	0.240	0.152	0.240
2.3	0.078	0.084	0.172	0.104	0.101	0.108	0.114	0.115	0.110	0.095	0.207	0.161	0.207
2.5	0.084	0.080	0.163	0.126	0.136	0.126	0.124	0.115	0.130	0.144	0.092	0.076	0.163
2.7	0.078	0.068	0.134	0.113	0.122	0.124	0.117	0.112	0.102	0.086	0.184	0.173	0.184
2.9	0.080	0.052	0.103	0.098	0.095	0.094	0.096	0.096	0.097	0.065	0.112	0.082	0.112
3.1	0.077	0.047	0.096	0.099	0.107	0.103	0.109	0.109	0.114	0.074	0.097	0.100	0.114
3.3	0.076	0.043	0.087	0.108	0.107	0.102	0.109	0.147	0.151	0.112	0.085	0.060	0.151
3.5	0.076	0.045	0.089	0.095	0.098	0.109	0.110	0.123	0.122	0.098	0.083	0.056	0.123
3.7	0.076	0.046	0.092	0.095	0.097	0.096	0.097	0.099	0.113	0.099	0.119	0.147	0.147
3.9	0.076	0.049	0.100	0.098	0.099	0.098	0.098	0.102	0.105	0.100	0.144	0.168	0.168
4.1	0.076	0.048	0.095	0.099	0.099	0.098	0.098	0.098	0.099	0.074	0.115	0.126	0.126
4.3	0.076	0.049	0.098	0.090	0.096	0.094	0.093	0.100	0.097	0.087	0.078	0.057	0.100
4.5	0.076	0.050	0.103	0.096	0.098	0.098	0.097	0.103	0.101	0.076	0.110	0.101	0.110
4.7	0.077	0.047	0.095	0.099	0.100	0.103	0.099	0.104	0.103	0.085	0.078	0.058	0.104
4.9	0.079	0.047	0.093	0.094	0.099	0.096	0.098	0.104	0.110	0.071	0.097	0.085	0.110
5.1	0.079	0.046	0.093	0.097	0.100	0.103	0.101	0.103	0.111	0.101	0.094	0.085	0.111
5.3	0.078	0.046	0.090	0.096	0.097	0.106	0.106	0.108	0.104	0.080	0.093	0.067	0.108
5.5	0.078	0.046	0.092	0.098	0.096	0.096	0.098	0.103	0.103	0.105	0.073	0.059	0.105
5.7	0.079	0.046	0.090	0.096	0.101	0.097	0.101	0.117	0.118	0.096	0.099	0.071	0.118
5.9	0.079	0.045	0.092	0.098	0.105	0.110	0.105	0.113	0.121	0.094	0.091	0.069	0.121
6.1	0.079	0.046	0.091	0.093	0.102	0.105	0.104	0.114	0.122	0.079	0.091	0.059	0.122
6.3	0.078	0.045	0.091	0.097	0.097	0.109	0.115	0.115	0.129	0.125	0.108	0.078	0.129
6.5	0.078	0.045	0.088	0.092	0.093	0.095	0.103	0.114	0.108	0.098	0.073	0.053	0.114
6.7	0.078	0.044	0.089	0.092	0.096	0.093	0.099	0.106	0.106	0.116	0.087	0.072	0.116
6.9	0.077	0.043	0.088	0.089	0.093	0.094	0.092	0.107	0.118	0.103	0.078	0.064	0.118
7.1	0.077	0.044	0.089	0.089	0.092	0.096	0.095	0.100	0.120	0.097	0.089	0.058	0.120
7.3	0.076	0.044	0.088	0.088	0.089	0.091	0.090	0.093	0.104	0.080	0.076	0.050	0.104
7.5	0.076	0.044	0.088	0.087	0.089	0.089	0.091	0.092	0.097	0.087	0.085	0.059	0.097
7.7	0.076	0.043	0.087	0.087	0.089	0.089	0.088	0.093	0.090	0.076	0.075	0.051	0.093
7.9	0.077	0.043	0.086	0.086	0.088	0.087	0.087	0.092	0.089	0.071	0.069	0.050	0.092
8.1	0.076	0.043	0.086	0.086	0.088	0.088	0.086	0.090	0.091	0.066	0.067	0.046	0.091
8.3	0.076	0.043	0.087	0.087	0.088	0.088	0.087	0.090	0.091	0.065	0.065	0.037	0.091
8.5	0.077	0.043	0.086	0.086	0.088	0.088	0.087	0.089	0.090	0.062	0.067	0.034	0.090
8.7	0.078	0.043	0.088	0.088	0.089	0.089	0.089	0.090	0.088	0.063	0.068	0.031	0.090
8.9	0.081	0.045	0.090	0.089	0.091	0.090	0.090	0.093	0.091	0.059	0.065	0.028	0.093

## 2.3 Grid Control Capability

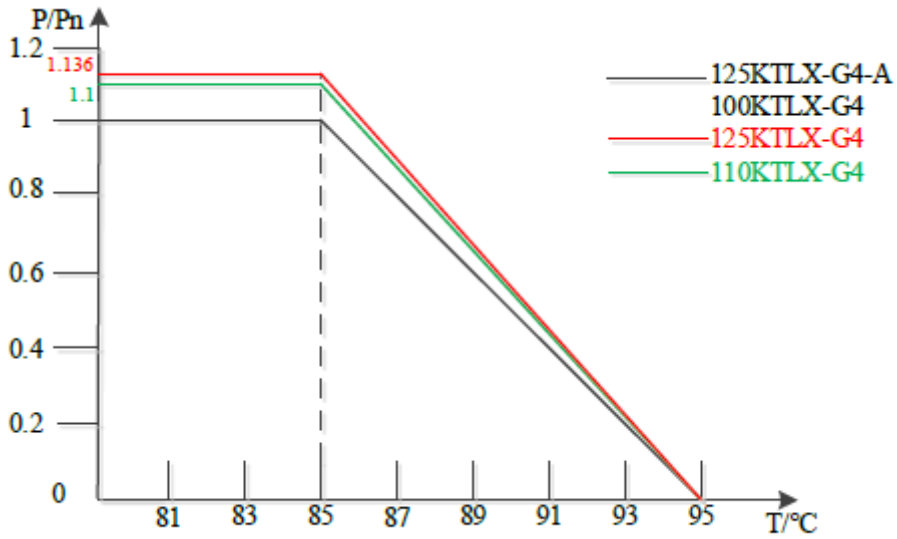
### 2.3.1 Wirkleistungseinspeisung in Abhängigkeit der Netzfrequenz / Active power vs frequency

Überfrequenz / overfrequency	Mittlerer Gradient der Wirkleistung zum Zeitpunkt der Frequenzüberhöhung / Mean power gradient at overfrequency	mittl. Gradient / mean gradient 39.8 % P <sub>M</sub> /Hz	
	Max. Einschwingzeit / Max. Settling time	1.0 s	
	Gradient der Wirkleistung nach Rückkehr aus Überfrequenz / Power gradient after recovery of over frequency	mittl. Gradient / mean gradient 8.0 %P <sub>n</sub> /min max. Gradient / max. gradient 8.1 %P <sub>n</sub> /min	
Unterfrequenz / underfrequency	Mittlerer Gradient der Wirkleistung zum Zeitpunkt der Frequenzunterschreitung / Mean power gradient at underfrequency	mittl. Gradient / mean gradient 40.3 % P <sub>M</sub> /Hz	
	Max. Einschwingzeit / Max. Settling time	4.2 s	
	Gradient der Wirkleistung nach Rückkehr aus Unterfrequenz / Power gradient after recovery of under frequency	mittl. Gradient / mean gradient 8.0 %P <sub>n</sub> /min max. Gradient / max. gradient 8.1 %P <sub>n</sub> /min	
Die EZE kann mit reduzierter Leistung betrieben werden. / The unit is able to run at reduced power		<input checked="" type="checkbox"/> Ja / Yes	<input type="checkbox"/> Nein / No
Maximale Sollwertabweichung der Wirkleistung Max. deviation of power setting		Überschreitung / Exceeding 0.134 kW	Unterschreitung / Undercut -0.347 kW
Trennung vom Netz bei Wirkleistungssollwertvorgabe von: Disconnection from the grid at external active power setpoints at:		-- % P <sub>n</sub> No disconnection is recorded. Operation at 0%P <sub>n</sub> is evidenced.	
Einschwingzeit der Leistung für einen Sollwertsprung mit minimalem Gradienten / Response time of the power output after a change in setpoint with minimal gradient	P <sub>0</sub> -> P <sub>min</sub>	Zeit / time : 59.5 s Gradient: 0.33 % P <sub>n</sub> / s	
	P <sub>min</sub> -> P <sub>0</sub>	Zeit / time : 59.5 s Gradient: 0.33 % P <sub>n</sub> / s	
Einschwingzeit der Leistung für einen Sollwertsprung mit maximalem Gradienten / Response time of the power output after a change in setpoint with maximum gradient	90.0%P <sub>n</sub> -> 10.0%P <sub>n</sub>	Zeit / time : 115.0 s Gradient: 0.65 % P <sub>n</sub> / s	
	10.0%P <sub>n</sub> -> 90.0%P <sub>n</sub>	Zeit / time : 114.4 s Gradient: 0.66 % P <sub>n</sub> / s	

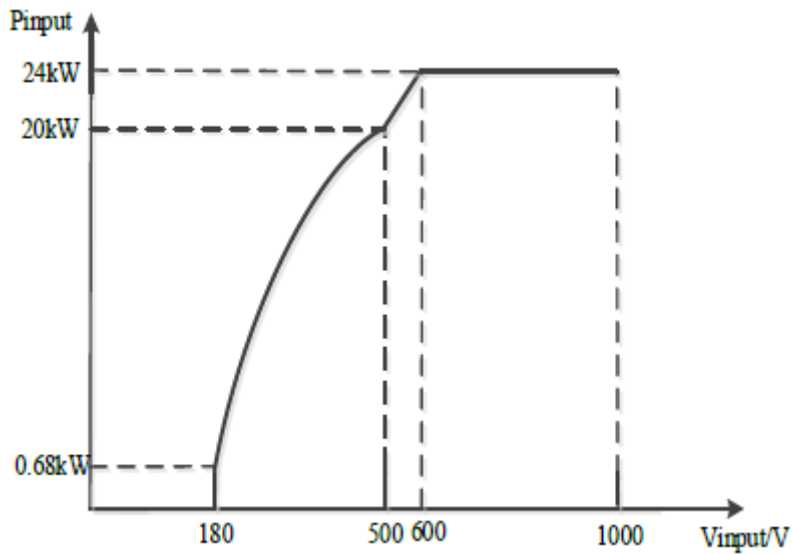
Note: These results are extracted from the test report no. 230039RECO06

As stated in the Manufacturer Declaration “Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023

The output power derating curve ambient temperature over 85° detailed curve shown below.



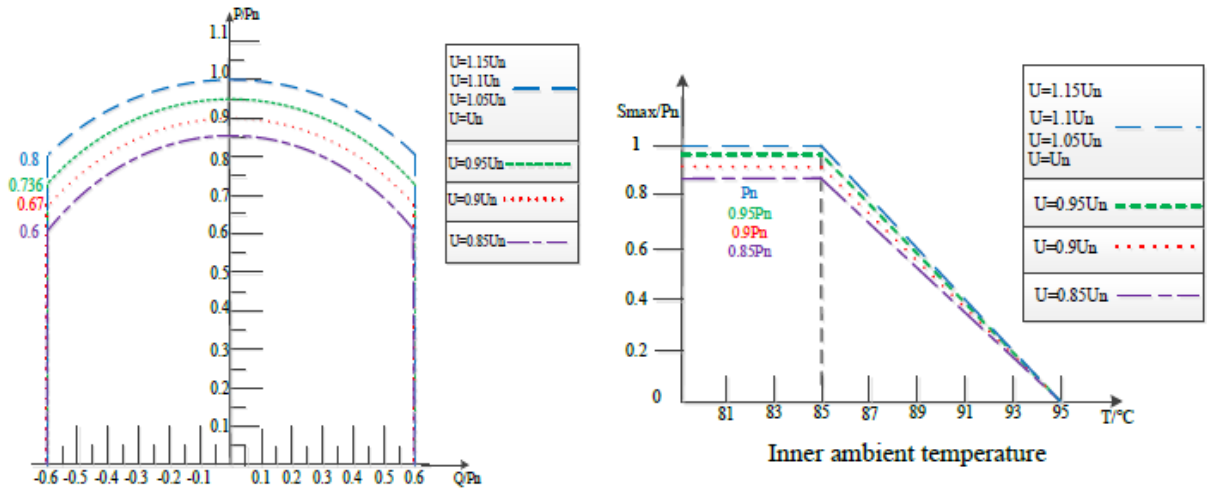
PV voltage and output power curve



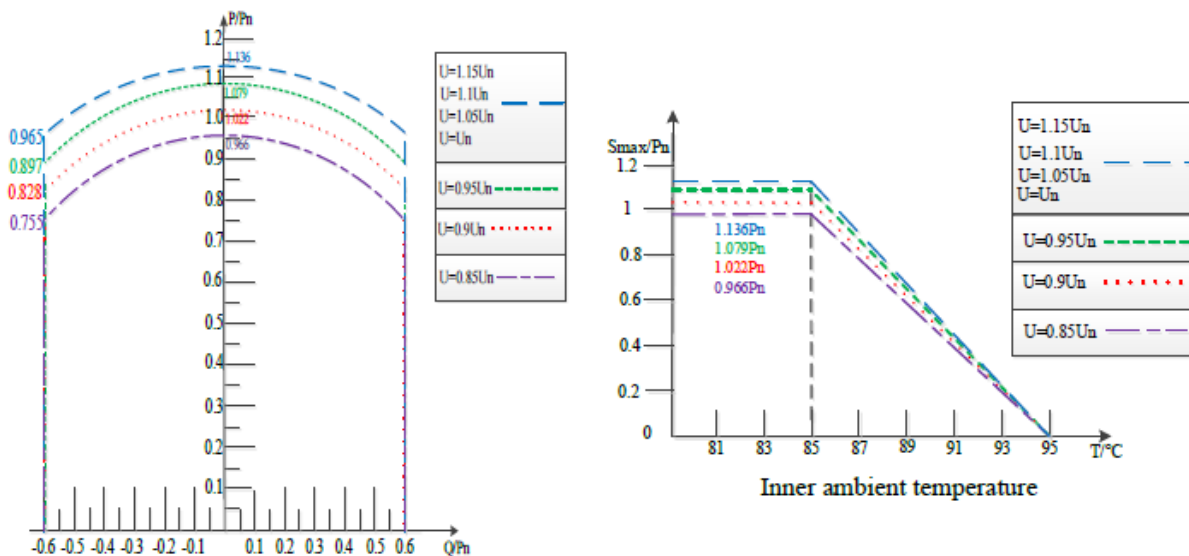
Single Pinput/Input Voltage curve

### 2.3.2 Procedure for reactive power provision

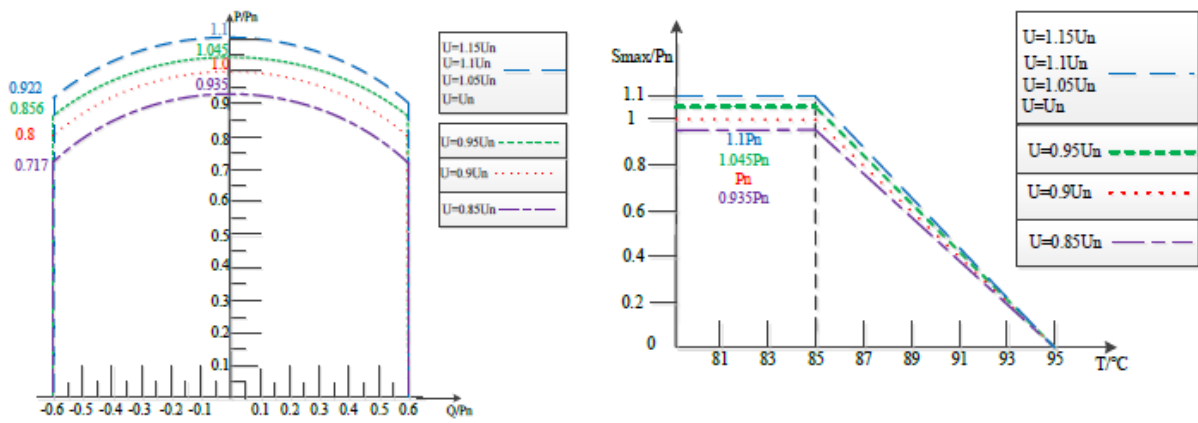
The certified PV inverter fulfils the following P-Q diagram at different voltage levels, as stated in the Manufacturer Declaration "Declaration for AZZURRO 3PH 125KTL-V4-A (TG8). Dated on June 26th. 2023. For VDE-AR-N 4110, the voltage-dependent PQ diagram reactive power capability of SOFAR (25-50)KTLX-G3 series.



Voltage-dependent PQ diagram of 125KTLX-G4-A and 100KTLX-G4(Active power priority)



Voltage-dependent PQ diagram of 125KTLX-G4(Active power priority)



Voltage-dependent PQ diagram of 110KTLX-G4(Active power priority)

0 1 2 3 4 5

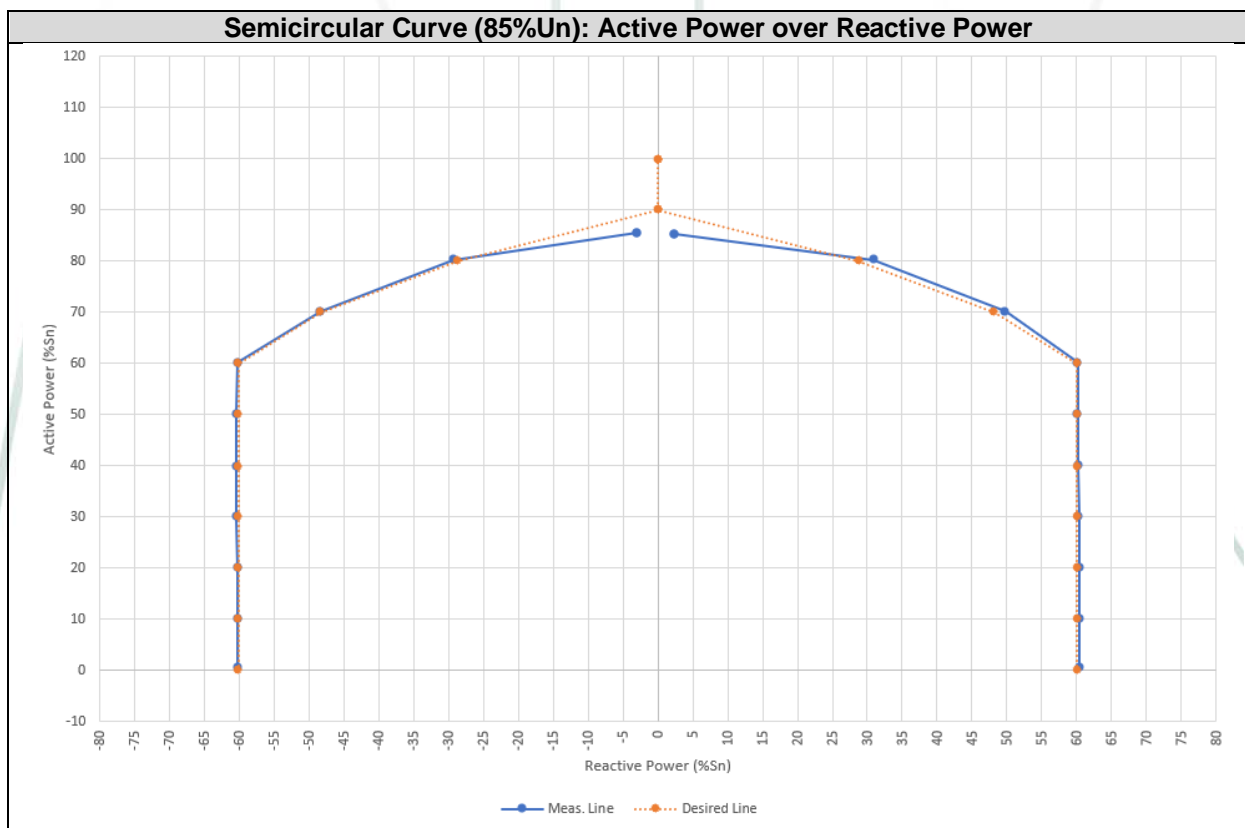
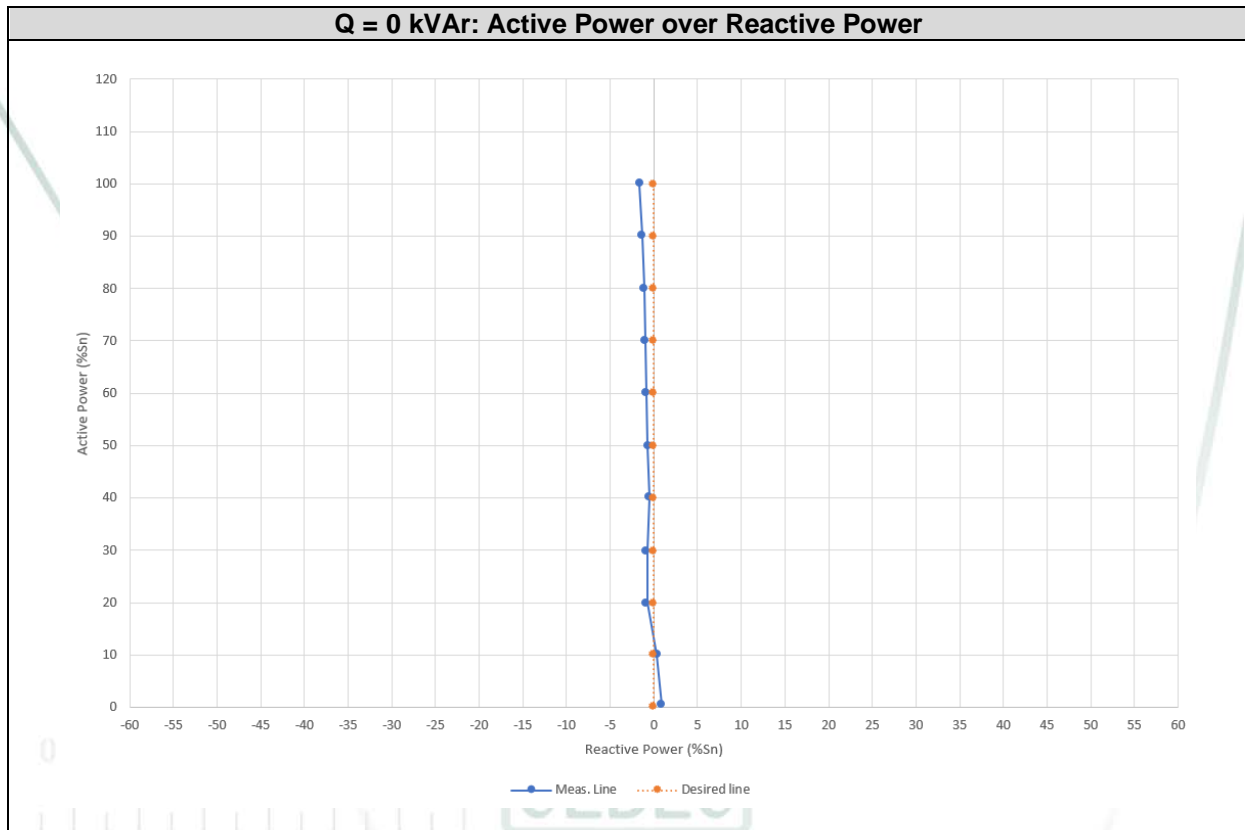


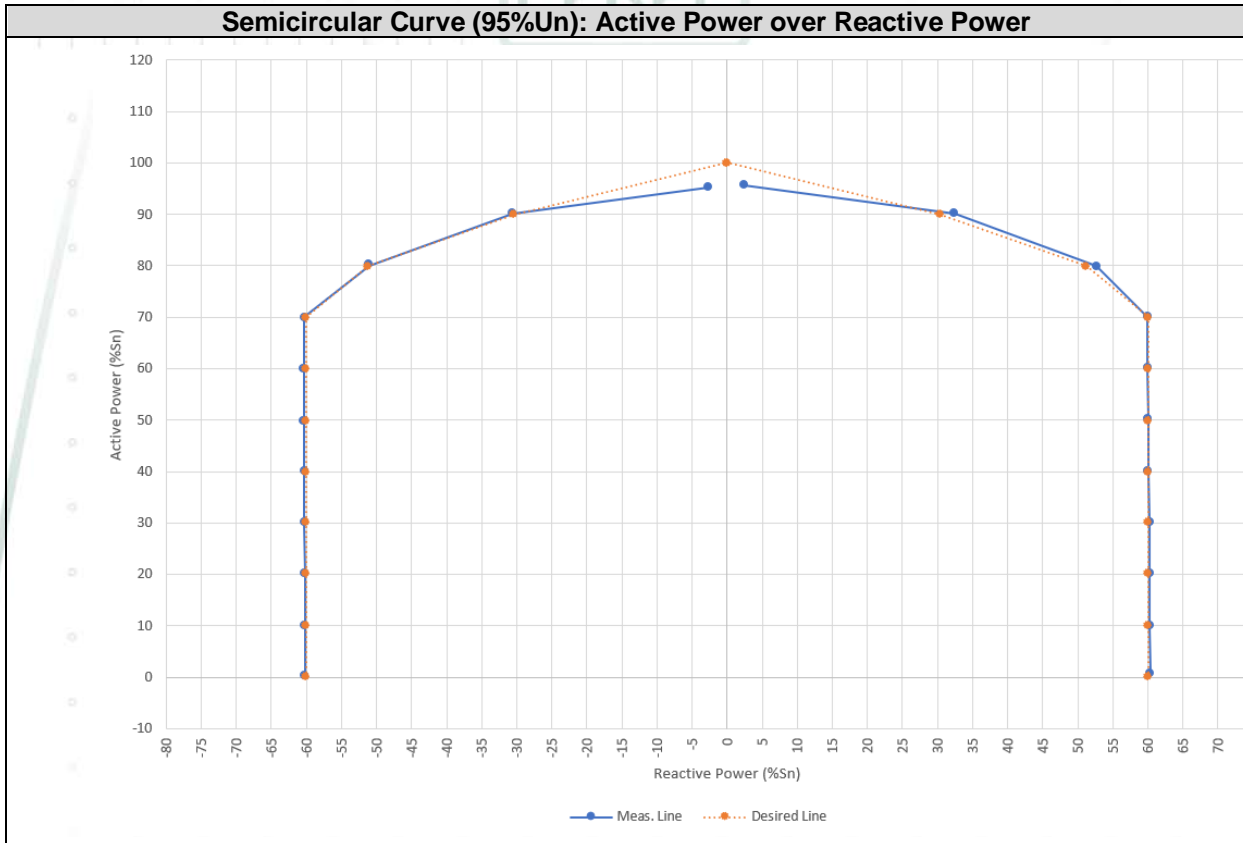
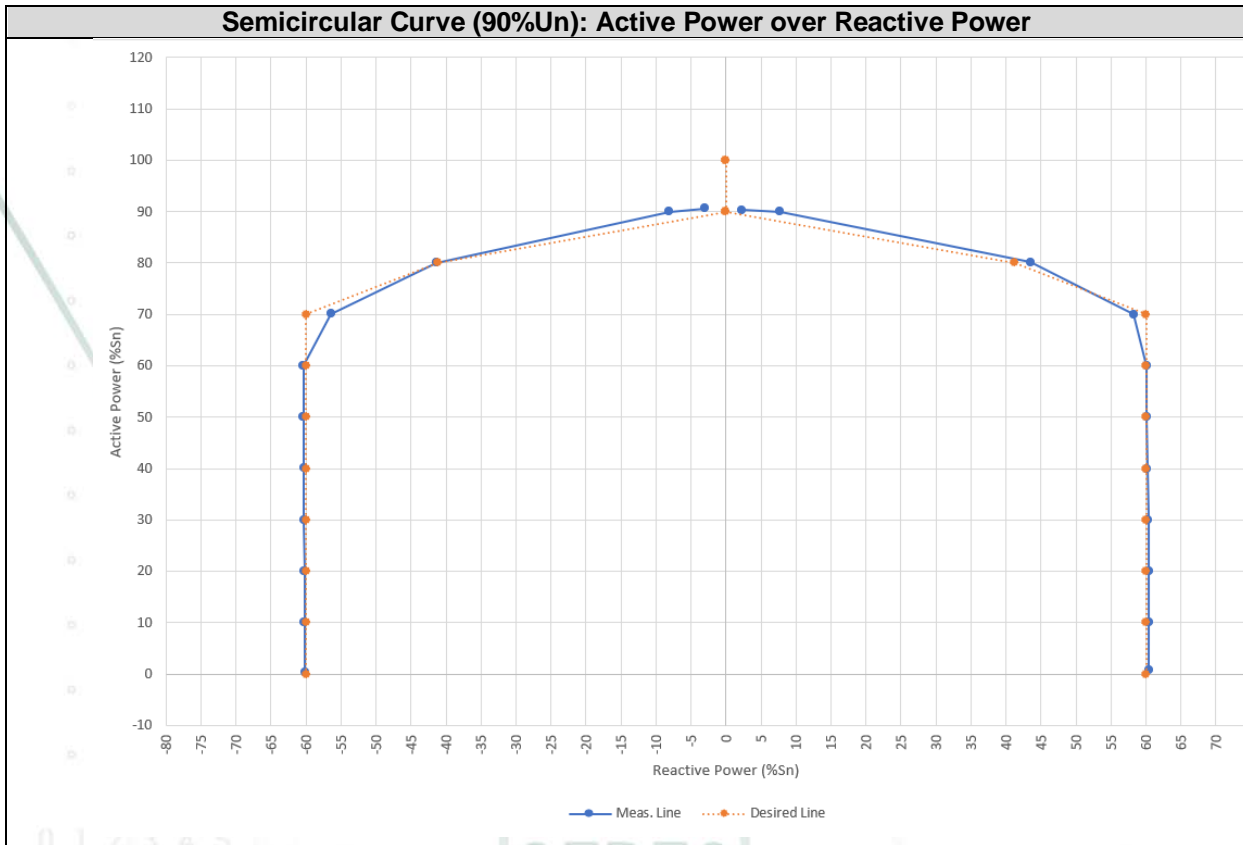
### 2.3.3 Blindleistungsbereitstellung / Provision of reactive power

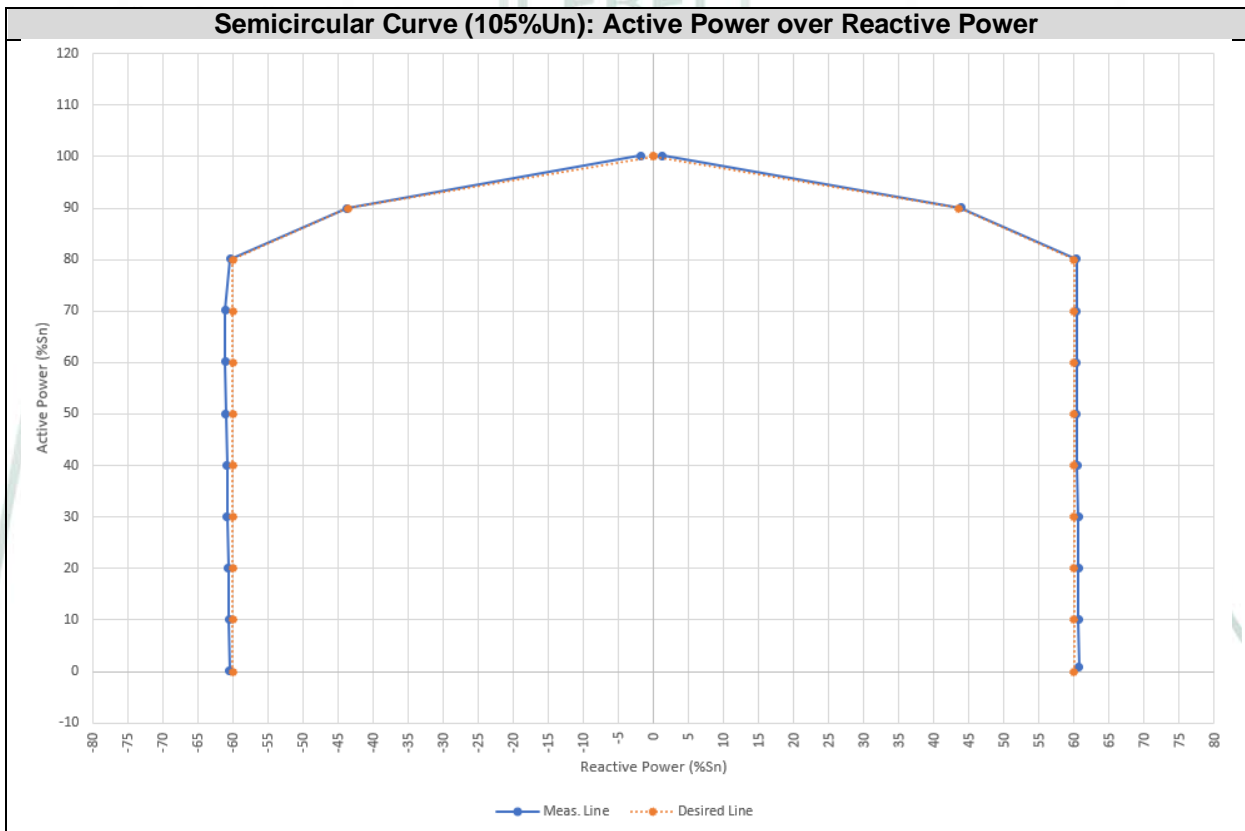
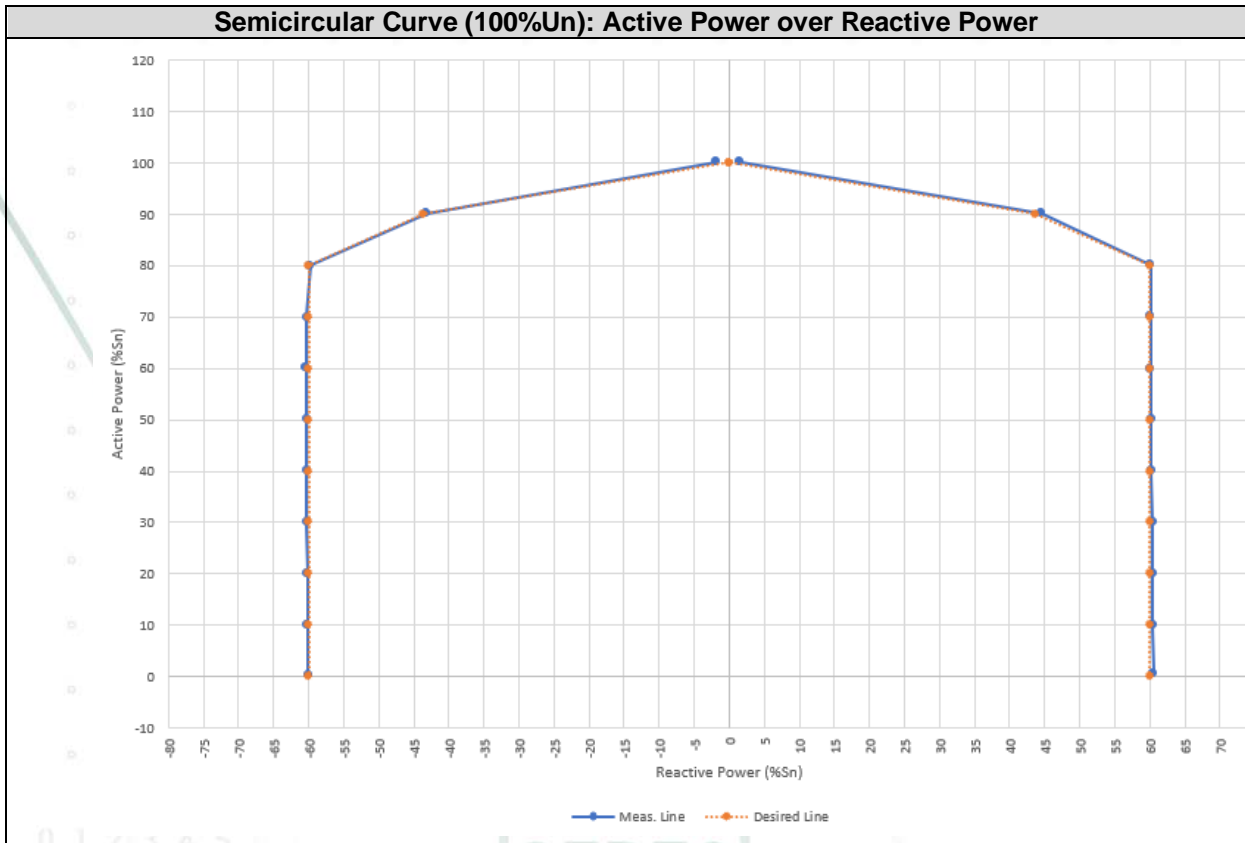
<b>Blindleistungsregelung im Normalbetrieb und maximaler Blindleistungstellbereich / Control of reactive power in normal operation and maximum reactive power range</b>	P/Pn	Qind	Q0	Qkap	P/Pn	Qind	Q0	Qkap
	0%	+75.599	+1.075	-75.114	60%	+75.171	-1.088	-75.485
	10%	+75.552	+0.440	-75.190	70%	+75.156	-1.209	-75.397
	20%	+75.553	-0.993	-75.195	80%	+75.184	-1.392	-74.667
	30%	+75.470	-0.980	-75.339	90%	+55.683	-1.600	-54.019
	40%	+75.246	-0.702	-75.332	100%	+1.939	-2.091	-2.330
	50%	+75.207	-0.938	-75.422				
Q in kVAr (Qind & Qkap measured at ambient)								
<b>Arbeitspunkte des spannungsunabhängigen P-Q Diagramms / Working points of the voltage dependent P-Q diagram</b>	AP / WP		U/Un in %		P/Pn in %		Q in kVAr	
	See measured points and results in the following pages of this annex							
<b>Blindleistungsregelung durch Sollwertvorgabe / Control of reactive power through set point signal</b>	☐ Verschiebungsfaktor / power factor				☒ Blindleistung / reactive power			
	Pbin bei / at Qmax				Q range at 50 %Pn is ± 60 %Pn			
<b>Längste Einsschwingzeit / Longest response time</b>	Parameter				Einsschwingzeit / settling time			
	T < 5 s				2.88 s			
	Standardzeit / standard time				--			
	T < 60 s				37.94 s			
<b>Einstellgenauigkeit des Verschiebungsfaktors bzw. Blindleistung / Positioning accuracy of power factor or reactive power</b>	Sollwert / setpoint				Istwert / measured value			
	+37.500 kVAr				+37.515 kVAr			
	0 kVAr				-0.348 kVAr			
	-37.500 kVAr				-37.568 kVAr			
<b>Anmerkung / remark</b>	Soweit Q(U) und Q(P)- Regelung wurde, sind diese im Prüfbericht hinterlegt / See Q(U) and Q(P) in test report							

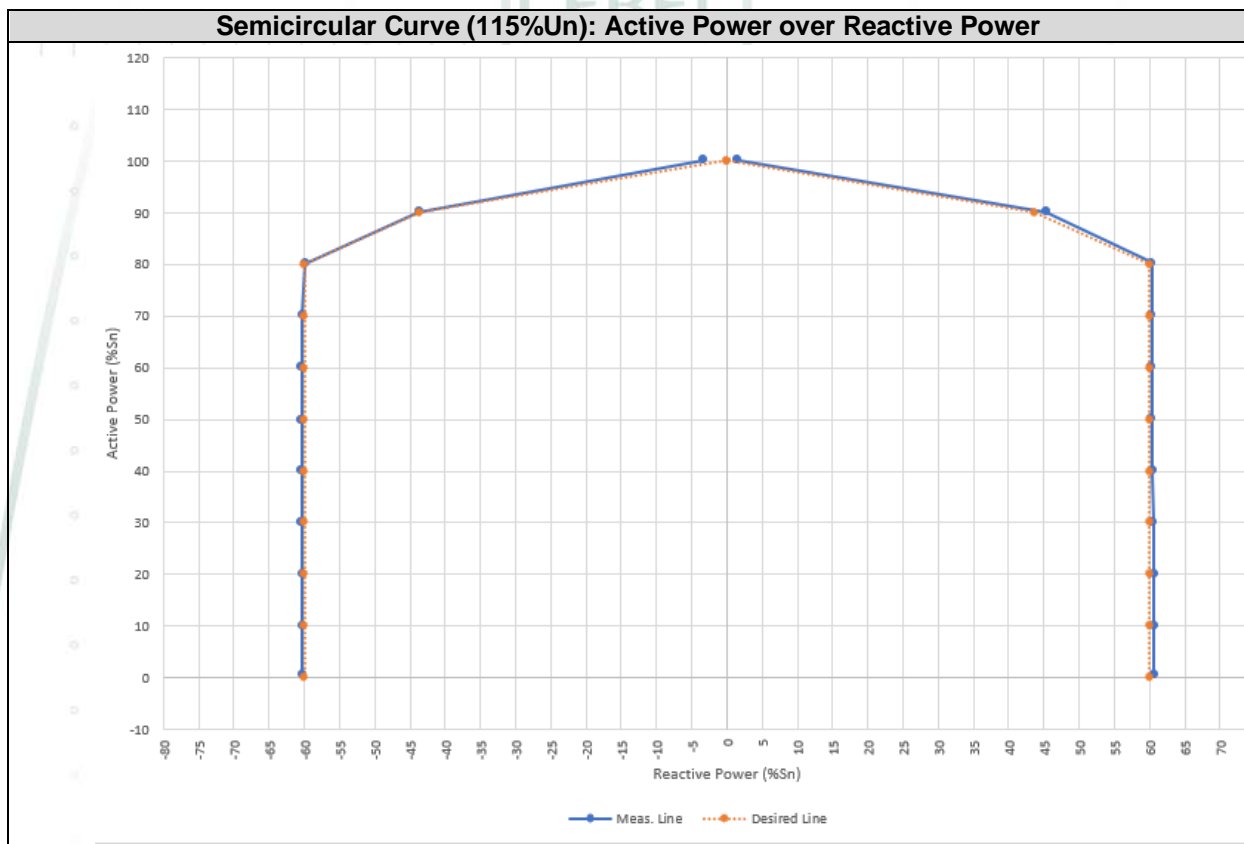
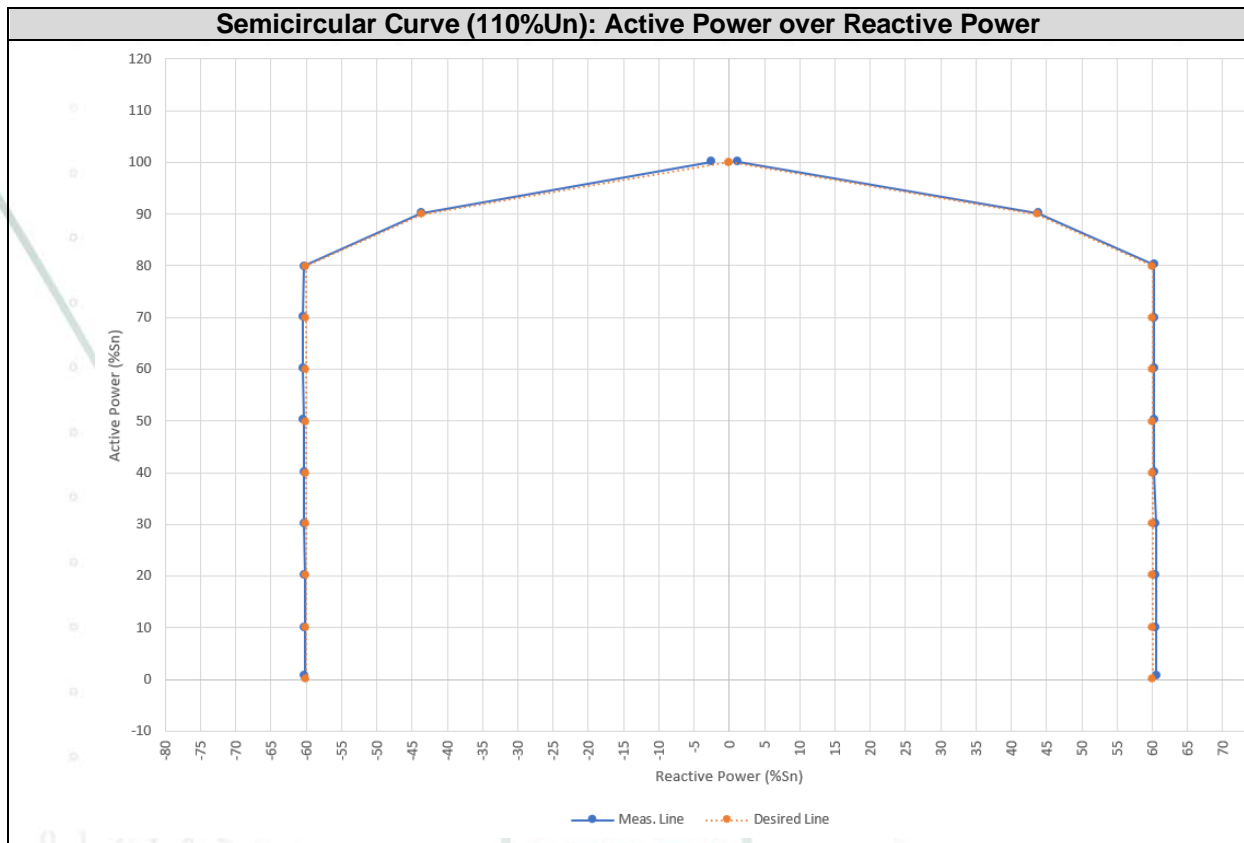
Note: These results are extracted from the test reports no. 230039RECO06

In following charts, they are offered main results after performed tests included in the FGW TG3 test report.









The tables below show measured values for each power step tested to verify the voltage-dependent PQ diagram at different ambient temperature conditions:

Semicircular Curve (U = 85% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.644	+75.538	75.541	+0.541	0.009	195.5	>1800
10	12.528	+75.556	76.588	+0.553	0.164	195.6	>1800
20	25.044	+75.572	79.614	+0.557	0.315	195.7	>1800
30	37.577	+75.494	84.329	+0.477	0.446	195.8	>1800
40	50.146	+75.347	90.509	+0.370	0.554	195.9	>1800
50	62.537	+75.309	97.889	+0.261	0.639	196.0	>1800
60	75.063	+75.187	106.243	+0.177	0.707	196.1	>1800
70	87.633	+62.189	107.457	+1.207	0.816	196.1	>1800
80 <sup>(1)</sup>	100.176	+38.709	107.396	+1.146	0.933	196.2	>1800
90 <sup>(1)</sup>	106.747	+2.975	106.789	+0.539	1.000	196.3	>1800
100 <sup>(1)</sup>	106.731	+3.021	106.774	+0.524	1.000	196.3	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 85.0%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer.

<sup>(1)</sup> The maximum apparent power was not reached below upper power levels due to maximum limitation in the Q capability.

Semicircular Curve (U = 85% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.613	-75.278	75.280	+0.280	0.008	195.4	>1800
10	12.476	-75.334	76.360	+0.325	0.163	195.5	>1800
20	25.024	-75.385	79.430	+0.373	0.315	195.6	>1800
30	37.509	-75.519	84.321	+0.468	0.445	195.7	>1800
40	50.005	-75.534	90.586	+0.447	0.552	195.8	>1800
50	62.554	-75.571	98.102	+0.474	0.638	195.8	>1800
60	75.086	-75.242	106.298	+0.232	0.706	195.9	>1800
70	87.659	-60.379	106.441	+0.191	0.824	196.1	>1800
80 <sup>(1)</sup>	100.229	-36.597	106.702	+0.452	0.939	196.2	>1800
90 <sup>(1)</sup>	106.834	-3.627	106.895	+0.645	0.999	196.3	>1800
100 <sup>(1)</sup>	106.797	-3.728	106.862	+0.612	0.999	196.3	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 85.0%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer.

<sup>(1)</sup> The maximum apparent power were not reached below upper power levels due to maximum limitation in the Q capability.

Semicircular Curve (U = 90% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.934	75.560	75.566	+0.566	0.012	207.1	>1800
10	12.560	75.530	76.568	+0.533	0.164	207.2	>1800
20	25.084	75.509	79.566	+0.509	0.315	207.3	>1800
30	37.523	75.401	84.222	+0.369	0.446	207.4	>1800
40	50.010	75.228	90.334	+0.195	0.554	207.4	>1800
50	62.571	75.191	97.821	+0.192	0.640	207.5	>1800
60	74.971	75.119	106.130	+0.064	0.706	207.6	>1800
70	87.439	72.765	113.756	+1.256	0.769	207.7	>1800
80	100.135	54.423	113.969	+1.469	0.879	207.8	>1800
90 <sup>(1)</sup>	112.539	9.706	112.957	+0.457	0.996	207.8	>1800
100 <sup>(1)</sup>	112.908	2.850	112.944	+0.444	1.000	207.8	>1800

Semicircular Curve (U = 90% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.563	-75.184	75.186	+0.186	0.007	206.9	>1800
10	12.557	-75.244	76.285	+0.250	0.165	207.0	>1800
20	25.114	-75.259	79.338	+0.281	0.317	207.1	>1800
30	37.493	-75.399	84.207	+0.354	0.445	207.1	>1800
40	50.049	-75.399	90.499	+0.360	0.553	207.2	>1800
50	62.516	-75.445	97.980	+0.352	0.638	207.3	>1800
60	75.112	-75.436	106.454	+0.388	0.706	207.4	>1800
70	87.583	-70.536	112.456	-0.044	0.779	207.5	>1800
80	100.085	-51.724	112.661	+0.161	0.888	207.6	>1800
90 <sup>(1)</sup>	112.518	-10.135	112.974	+0.474	0.996	207.8	>1800
100 <sup>(1)</sup>	113.218	-3.727	113.279	+0.779	0.999	207.7	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 90.0%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer .

<sup>(1)</sup>The maximum apparent power were not reached below upper power levels due to maximum limitation in the Q capability.

Semicircular Curve (U = 95% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.961	75.395	75.402	+0.402	0.013	218.4	>1800
10	12.577	75.370	76.412	+0.377	0.165	218.5	>1800
20	25.076	75.348	79.411	+0.354	0.316	218.6	>1800
30	37.609	75.252	84.126	+0.274	0.447	218.6	>1800
40	50.106	75.051	90.240	+0.101	0.555	218.7	>1800
50	62.534	75.025	97.669	+0.041	0.640	218.8	>1800
60	75.164	74.964	106.157	+0.091	0.708	218.9	>1800
70	87.669	74.948	115.338	+0.094	0.760	219.0	>1800
80	100.052	65.794	119.746	+0.996	0.836	219.1	>1800
90(*)	112.612	40.480	119.667	+0.917	0.941	219.1	>1800
100(*)	119.449	3.034	119.487	+0.737	1.000	219.2	>1800

Semicircular Curve (U = 95% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.566	-75.176	75.178	+0.178	0.008	218.2	>1800
10	12.564	-75.250	76.291	+0.257	0.165	218.3	>1800
20	25.128	-75.245	79.330	+0.273	0.317	218.4	>1800
30	37.521	-75.392	84.213	+0.360	0.446	218.5	>1800
40	50.095	-75.387	90.513	+0.375	0.553	218.5	>1800
50	62.504	-75.457	97.982	+0.353	0.638	218.6	>1800
60	75.016	-75.477	106.415	+0.349	0.705	218.7	>1800
70	87.528	-75.337	115.485	+0.241	0.758	218.8	>1800
80	100.098	-63.769	118.685	-0.065	0.843	218.9	>1800
90(*)	112.626	-38.220	118.935	+0.185	0.947	219.0	>1800
100(*)	119.118	-3.294	119.166	+0.416	1.000	219.1	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 95.0%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer .

(<sup>1</sup>)The maximum apparent power were not reached below upper power levels due to maximum limitation in the Q capability.

Semicircular Curve (U = 105% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.950	75.839	75.845	+0.845	0.013	241.4	>1800
10	12.622	75.770	76.814	+0.779	0.164	241.4	>1800
20	25.073	75.777	79.817	+0.760	0.314	241.5	>1800
30	37.533	75.699	84.493	+0.641	0.444	241.6	>1800
40	50.090	75.471	90.580	+0.442	0.553	241.7	>1800
50	62.600	75.425	98.018	+0.390	0.639	241.8	>1800
60	75.039	75.382	106.364	+0.298	0.705	241.8	>1800
70	87.548	75.381	115.529	+0.285	0.758	241.9	>1800
80	100.078	75.411	125.309	+0.309	0.799	242.0	>1800
90	112.566	54.810	125.201	+0.201	0.899	242.1	>1800
100	125.184	1.603	125.195	+0.195	1.000	242.1	>1800

Semicircular Curve (U = 105% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.280	-75.584	75.584	+0.584	0.004	241.2	>1800
10	12.594	-75.717	76.757	+0.722	0.164	241.3	>1800
20	25.108	-75.801	79.851	+0.794	0.314	241.4	>1800
30	37.572	-75.987	84.768	+0.915	0.443	241.4	>1800
40	49.994	-76.043	91.005	+0.867	0.549	241.5	>1800
50	62.569	-76.218	98.610	+0.982	0.635	241.6	>1800
60	75.132	-76.356	107.122	+1.056	0.701	241.7	>1800
70	87.589	-76.394	116.223	+0.979	0.754	241.8	>1800
80	100.120	-75.529	125.414	+0.414	0.798	241.9	>1800
90	112.490	-54.619	125.049	+0.049	0.900	242.0	>1800
100	125.199	-2.352	125.221	+0.221	1.000	242.1	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 100%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer .

Semicircular Curve (U = 110% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.929	75.745	75.750	+0.750	0.012	252.9	>1800
10	12.626	75.698	76.744	+0.709	0.165	252.9	>1800
20	25.052	75.694	79.732	+0.675	0.314	253.0	>1800
30	37.511	75.611	84.404	+0.552	0.444	253.1	>1800
40	50.061	75.388	90.495	+0.357	0.553	253.2	>1800
50	62.562	75.353	97.939	+0.311	0.639	253.3	>1800
60	75.071	75.312	106.337	+0.271	0.706	253.4	>1800
70	87.528	75.292	115.456	+0.212	0.758	253.5	>1800
80	100.160	75.308	125.313	+0.313	0.799	253.6	>1800
90	112.669	54.781	125.281	+0.281	0.899	253.7	>1800
100	125.171	1.679	125.182	+0.182	1.000	253.7	>1800

Semicircular Curve (U = 110% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.760	-75.249	75.253	+0.253	0.010	252.9	>1800
10	12.513	-75.281	76.314	+0.279	0.164	253.0	>1800
20	25.111	-75.312	79.388	+0.331	0.316	253.0	>1800
30	37.520	-75.369	84.192	+0.339	0.446	253.1	>1800
40	50.052	-75.349	90.458	+0.320	0.553	253.2	>1800
50	62.608	-75.442	98.037	+0.409	0.639	253.3	>1800
60	75.093	-75.637	106.583	+0.517	0.705	253.3	>1800
70	87.614	-75.587	115.714	+0.469	0.757	253.4	>1800
80	100.088	-75.379	125.298	+0.298	0.799	253.5	>1800
90	112.667	-54.594	125.197	+0.197	0.900	253.6	>1800
100	125.201	-3.047	125.238	+0.238	1.000	253.7	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 100%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer .

Semicircular Curve (U = 115% Un) – Inductive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.931	75.816	75.822	+0.822	0.012	264.1	>1800
10	12.545	75.770	76.802	+0.767	0.163	264.2	>1800
20	24.990	75.767	79.782	+0.725	0.313	264.3	>1800
30	37.583	75.683	84.501	+0.648	0.445	264.4	>1800
40	50.017	75.459	90.530	+0.392	0.552	264.5	>1800
50	62.658	75.424	98.055	+0.427	0.639	264.6	>1800
60	75.183	75.380	106.464	+0.398	0.706	264.7	>1800
70	87.663	75.363	115.604	+0.360	0.758	264.8	>1800
80	100.307	75.378	125.473	+0.473	0.799	264.9	>1800
90	112.611	56.591	126.031	+1.031	0.894	265.0	>1800
100	125.214	1.981	125.229	+0.229	1.000	265.0	>1800

Semicircular Curve (U = 115% Un) – Capacitive							
P Desired (%Pn)	P measured (kW)	Q measured (kVAr)	S measured (kVA) (*)	S deviation (kVA)	Power Factor (cos φ)	V <sub>AC</sub> + (V)	Number of records
0	0.840	-75.332	75.336	+0.336	0.011	263.9	>1800
10	12.488	-75.380	76.408	+0.373	0.163	264.0	>1800
20	25.093	-75.357	79.425	+0.368	0.316	264.1	>1800
30	37.522	-75.468	84.281	+0.428	0.445	264.2	>1800
40	50.022	-75.432	90.511	+0.372	0.553	264.3	>1800
50	62.514	-75.493	98.017	+0.388	0.638	264.4	>1800
60	75.109	-75.508	106.503	+0.437	0.705	264.5	>1800
70	87.610	-75.355	115.559	+0.315	0.758	264.6	>1800
80	100.158	-74.903	125.068	+0.068	0.801	264.7	>1800
90	112.631	-54.625	125.179	+0.179	0.900	264.8	>1800
100	125.133	-4.140	125.201	+0.201	0.999	265.0	>1800

Note: Test performed in active power priority mode. Maximum apparent power that can be reached corresponds to 100%Pn, approximately. Deviations are calculated in relation to the theoretical P-Q curve provided by the manufacturer .

## 2.4 Protection system

### 2.4.1 Trennung der EZE vom Netz / Cut-off from grid

<input checked="" type="checkbox"/> Die Überprüfung der Gesamtwirkungskette führte zu einer erfolgreichen Abschaltung. The test of the whole trip circuit led to a successful shut down							
	Einstellwert Setting In pu oder/or [Hz]		Auslösewert / Release value In pu oder/or [Hz]		Abschaltzeit / Disconnection time [s]		Rückfallverhältnis Disengaging ratio
	Schwelle / value	Zeit / time	Min.	Max.	Min.	Max.	
Spannungssteigerungsschutz/ Overvoltage protection: U>	1.000	180.00 s	1.001	1.002	179.999	179.980	☒ ≥0.98 ☐ <0.98
	1.300	0.000 s	1.299	1.301	0.083	0.097	
Spannungssteigerungsschutz/ Overvoltage protection: U>>	1.000	0.100 s	1.000	1.000	0.090	0.098	---
	1.300	0.000 s	1.299	1.302	0.026	0.036	
Spannungsrückgangsschutz/ Undervoltage protection: U<	0.100	0.000 s	0.101	0.102	0.019	0.037	☒ ≤1.02 ☐ >1.02
	1.000	2.500 s	1.000	1.000	2.394	2.398	
Spannungsrückgangsschutz/ Undervoltage protection: U<<	0.100	0.000 s	0.100	0.101	0.027	0.029	☒ ≤1.02 ☐ >1.02
	1.000	0.800 s	1.000	1.001	0.782	0.798	
Frequenzsteigerungsschutz/ Overfrequency protection: F>	50.00	5.000 s	50.00		4.998		---
	55.00	0.000 s	55.00		0.037		
Frequenzsteigerungsschutz/ Overfrequency protection: F>>	50.00	0.100 s	50.00		0.081		---
	55.00	0.000 s	54.99		0.041		
Frequenzrückgangsschutz/ Underfrequency protection: F<	45.00	0.000 s	45.00		0.028		---
	49.50	0.100 s	49.50		0.086		
Eigenzeit der Abschaltzeit / Operating time of a circuit breaker:	<input checked="" type="checkbox"/> <b>aus Messung</b> by measurement				<input type="checkbox"/> <b>aus Prüfcertifikat</b> by test certificate		
	According to the point 4.4.1 of the test report no. 230039RECO06, the measured circuit breaker operating time is 5 ms						
	The PGU can either be assembled with following alternatives of the circuit breaker: - Alternative: HF 167F-200 with:  See next pages.						

Note: The time accuracy is +50 ms due to relay delay. The setting time for the trigger has been established equal to the setting value. Therefore, some of the measured times are over the setting value but within the given tolerance.

Note: These results are extracted from the test reports no. 230039RECO06

Supplier: HF 167F-200 Relay

## HF167F-200 太阳能继电器



认证号: E133481



认证号: R 50374273



**特性**

- 200A触点切换能力
- 适用于太阳能光伏发电用逆变器
- 触点间距4mm
- 整机电磁线圈保持电压, 节省电力损耗
- F级绝缘导线

**触点参数**

触点形式	1H
接触电阻 <sup>(1)</sup>	≤1mΩ (VDC 20A)
触点材料	AgNi
触点负载(阻性)	额定55A 额定 200V 额定 55A 800WAC
最大切换电压	830VAC
最大切换电流	200A
最大切换功率	45650VA
机械耐久性	1 x 10 <sup>7</sup> 次
电耐久性	≥3x 10 <sup>7</sup> 次 (额定55A, 额定200A, 额定 55A, 800WAC, 阻性, 85°C, 1s通9s断)

备注: (1) 上述值为初始值。

**线圈参数**

额定线圈功率	约3W
保持电压	40%~100%U <sub>N</sub> (环境温度25°C) 50%~80%U <sub>N</sub> (环境温度65°C)

备注: (1) 线圈保持电压为线圈施加额定电压100ms以上的线圈电压;  
(2) 继电器线圈不允许长时间施加超过额定电压的电压, 防止继电器过热烧毁。

**性能参数**

绝缘电阻	1000MΩ (50VDC)	
介电耐压	断开触点间 2000VAC 1min 线圈与触点间 5000VAC 1min	
浪涌电压(线圈与触点间)	10kV(1.2 / 50μs)	
动作时间(额定电压下)	≤30ms	
释放时间(额定电压下)	≤10ms	
线圈温升	≤70K(触点负载200A, 50%~80% 额定电压激励, 环境温度85°C)	
冲击	稳定性	98m/s <sup>2</sup>
	强度	980m/s <sup>2</sup>
振动	10Hz~55Hz 1.0mm 双振幅	
湿度	5%~85%RH	
温度范围	-40°C~85°C(线圈施加保持电压)	
引出端形式	印刷板式	
重量	约215g	
封装方式	防焊剂型	

备注: (1) 上述值均为初始值。

**线圈规格表** 23°C

额定电压 VDC	动作电压 <sup>(1)</sup> VDC	释放电压 <sup>(1)</sup> VDC	最大电压 <sup>(2)</sup> VDC	线圈电阻 Ω
6	≤4.2	≥0.6	7.2	12 x (±10%)
9	≤6.3	≥0.9	10.8	27 x (±10%)
12	≤8.4	≥1.2	14.4	48 x (±10%)
24	≤16.8	≥2.4	28.8	192 x (±10%)

备注: (1) 上述值为初始值。  
(2) 最大电压是指继电器线圈在额定时间内能够承受的最大电压差。

**安全认证**

<b>UL/CUL</b>	额定55A, 额定200A, 额定 55A, 830WAC, 85°C, 3000次, 阻性负载
<b>TUV</b>	额定55A, 额定200A, 额定 55A, 830WAC, 85°C, 3000次, 阻性负载

备注: (1) 表中未注明温度的负载, 均指环境温度为室温;  
(2) 以上仅列出了该产品认证部分典型负载, 每个负载的详细测试条件不同, 因此电耐久性次数不一样, 如需了解详细情况, 请与我们联系。



宝发继电器  
ISO9001, ISO/TS16949, ISO14001, CHSAS18001, IECQ QC 08000 认证企业 2019 Rev. 1.00

订货标记示例

继电器型号	HF167F-200/	12	-H	3	F	(XXX)
线圈电压	6, 9, 12, 24VDC					
触点形式	H: 一组常开					
触点材料	3: AgNi					
绝缘等级	F: F级					
特性号 <sup>(1)</sup>	XXX: 客户特殊要求 无: 标准型					

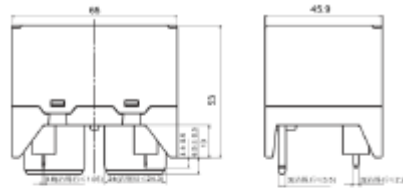
备注: (1) 高耐压继电器不能放入PCB板焊接, 不能进行整体清洗或表面处理;  
(2) 高耐压继电器不能在污染环境(含一定量H<sub>2</sub>S、SO<sub>2</sub>、MDI、粉尘等污染物)下使用;  
(3) 客户特殊要求须经评审后, 按特殊订货形式解决。

外形图、接线图、安装孔尺寸

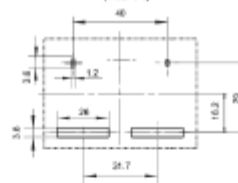
单位: mm

0 1 2 3 4 5  
| | | | |

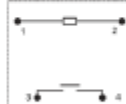
外形图



安装孔尺寸  
(俯视图)



接线图 (俯视图)



备注: (1) 产品部分外形尺寸未注尺寸公差, 当外形尺寸 $\leq 16\text{mm}$ , 公差为 $\pm 0.2\text{mm}$ ; 当外形尺寸在 $17 \sim 50\text{mm}$ 之间时, 公差为 $\pm 0.3\text{mm}$ ; 当外形尺寸 $> 50\text{mm}$ , 公差为 $\pm 0.4\text{mm}$ ;  
(2) 安装孔尺寸中未注尺寸公差为 $\pm 0.1\text{mm}$ 。

声明:

本产品规格书仅对客户使用时参考, 其中未明确规定的要求条件, 请见“继电器术语解释及推广应用指南”。若有变动, 恕不另行通知。对定货而言, 不可能评定继电器在每个具体应用领域的所有性能参数要求, 因而客户应根据具体使用条件选择与之相匹配的产品, 若有疑问, 请与安发联系以便获取更多的技术支持, 对产品选型责任仍由客户负责。

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## 2.4.2 Zuschaltbedingungen / Cut-in conditions

- For VDE-AR-N 4110: 2018-11

	Bereich / range In pu order/ or [Hz]	Zuschaltung erfolgte im angegebenen Bereich / cut in occurred within the given range
Zspannung / Voltage:	0.90 – 1.10	<input type="checkbox"/> nein / no <input checked="" type="checkbox"/> ja / yes
Frequenz / Frequency:	47.5 – 50.2	<input type="checkbox"/> nein / no <input checked="" type="checkbox"/> ja / yes

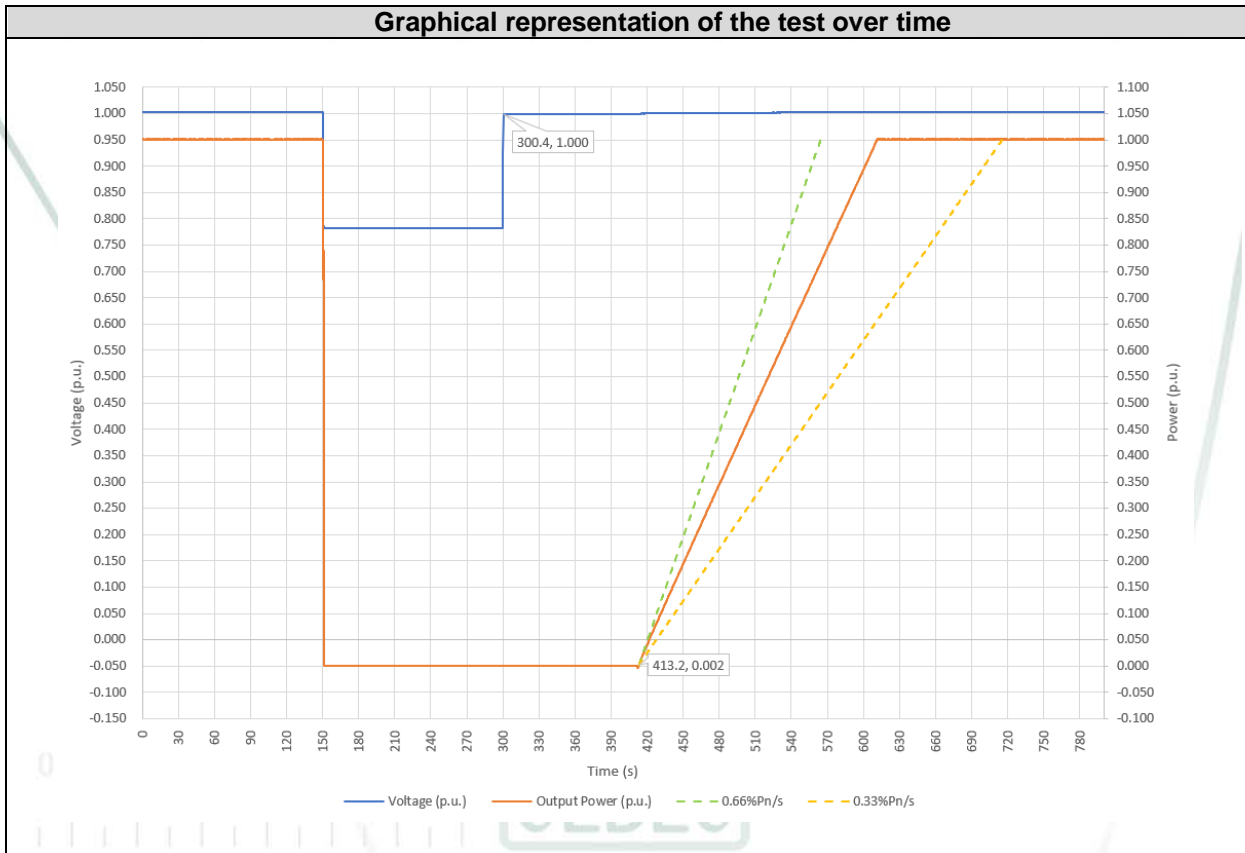
Note: These results are extracted from the test reports no. 230039RECO06

## 2.4.3 Zuschaltbedingungen nach Auslösung des Entkopplungsschutzes / Cut-in conditions after tripping of protection

	Bereich / range In pu order/ or [Hz]	Zuschaltung erfolgte im angegebenen Bereich / cut in occurred within the given range
Unterspannung / Undervoltage:	> 0.95	<input type="checkbox"/> nein / no <input checked="" type="checkbox"/> ja / yes
Unterfrequenz / Underfrequency:	≥ 49.9	<input type="checkbox"/> nein / no <input checked="" type="checkbox"/> ja / yes
Überfrequenz / Overfrequency:	≤ 50.1	<input type="checkbox"/> nein / no <input checked="" type="checkbox"/> ja / yes

Note: These results are extracted from the test reports no. 230039RECO06

As evidenced in the FGW TG3 test report, the certified unit follows a ramp gradient inside of the range 33%Pn/s – 66%Pn/s after the reconnection occurs.



Note: These results are extracted from the test reports no. 230039RECO06

## 2.5 Response during grid faults

The compliance with these requirements including all calculations defined in the FGW TR3 standard is stated in the attachment to the test report:

### - 230039RECO06 (Rev 0) ATTACHMENT I : FGW-TG3: Grid Fault Tests Results

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 125KTL-V4-A. These test results for the model AZZURRO 3PH 125KTL-V4-A are essentially valid for the derived models AZZURRO 3PH 110KTL-V4, AZZURRO 3PH 100KTL-V4, , considering the evaluation offered in the point 1.2 of this document.

The instantaneous values of AC currents and voltages are recorded synchronously with 50kHz (20 $\mu$ s). Positives sequence component are based on measurement of instantaneous voltages and currents are calculated according to IEC 61400-21 (2008).

The following table shows the declared short-circuit values for certified models and can be applied to Annex E.5 of the VDE norm.

- For AZZURRO 3PH 100KTL-V4:
  - Short-circuit surge current  $i_P$  (A): 235.7A.
  - Initial symmetrical short-circuit current  $I_{k''}$  (A): 160.2 A
  - Uninterrupted short-circuit current  $I_k$  (A): 166.7 A..
  - Maximal current  $I_{max}$  (A): 166.7 A.
  - R.m.s. value of the source current for three-phase fault,  $I_{skPF}$  (First 1-2 cycles of the Fault) = 166.7 A
  - R.m.s. value of the source current for two-phase fault,  $I(1)_{sk2PF}$  (First 1-2 cycles of the Fault) = 162.8 A
  - R.m.s. value of the source current for single-phase fault,  $I(1)_{sk1PF}$  (First 1-2 cycles of the Fault)= 162.8 A.

- For AZZURRO 3PH 110KTL-V4:
  - Short-circuit surge current  $i_P$  (A): 267.8 A.
  - Initial symmetrical short-circuit current  $I_k''$  (A): 185.4 A
  - Uninterrupted short-circuit current  $I_k$  (A): 189.4 A
  - Maximal current  $I_{max}$  (A): 189.4 A
  - R.m.s. value of the source current for three-phase fault,  $I_{skPF}$  (First 1-2 cycles of the Fault) = 189.4 A
  - R.m.s. value of the source current for two-phase fault,  $I(1)_{sk2PF}$  (First 1-2 cycles of the Fault) = 188.1 A
  - R.m.s. value of the source current for single-phase fault,  $I(1)_{sk1PF}$  (First 1-2 cycles of the Fault) = 188.1 A.
  
- For AZZURRO 3PH 125KTL-V4-A:
  - Short-circuit surge current  $i_P$  (A): 267.8 A.
  - Initial symmetrical short-circuit current  $I_k''$  (A): 185.4 A
  - Uninterrupted short-circuit current  $I_k$  (A): 189.4 A
  - Maximal current  $I_{max}$  (A): 189.4 A
  - R.m.s. value of the source current for three-phase fault,  $I_{skPF}$  (First 1-2 cycles of the Fault) = 189.4 A
  - R.m.s. value of the source current for two-phase fault,  $I(1)_{sk2PF}$  (First 1-2 cycles of the Fault) = 188.1 A
  - R.m.s. value of the source current for single-phase fault,  $I(1)_{sk1PF}$  (First 1-2 cycles of the Fault) = 188.1 A.

### 3 OVERVIEW OF RESULTS OF THE FGW TR4 VALIDATION REPORT

Report Number: 230039RECO06-TG4 with date 14/06/2023, issue by SGS Tecnos, S.A. (Electrical Testing Laboratory) according FGW TR4 rev. 9.

#### Software Characteristics

- Simulation model name: PGU\_125kW.slx
- Version of the simulation model: V1
- MD5 Checksum: 6D21259D292725CD8A2A0F01D13DAD5A
- Simulation platform: Matlab Simulink
- Simulation platform version: 9.11 Version (R2021b)

The model is in accordance with the requirements of the clause 5 of FGW TR4 rev.9. The validation of the dynamic simulation model has been performed in order to be compliant with evaluations required in the point 2.3.3 of the standard FGW TR8, rev.9.

Requirements of the clause 11.2.6.3 of standards VDE-AR-N 4110: 2018 has been considered for the evaluation process.

Deviations evaluated for MXE, ME and MAE calculations are in accordance with the chapter 5.3 of FGW TR4 rev.9.

The validation plan is according with the chapter 5.1 of FGW TR4 rev.9. where following tests have been used for validation:

- Validation requirements for voltage ride through:  
This involves the validation of symmetrical and asymmetrical test cases defined in the table 4-69 of the chapter 4.6.3 of FGW TR3 rev.25 for Type 2 PGUs.
- Validation of P and Q setpoint control functions  
This involves the validation of the dynamic response of the simulation model in front of P and Q changes commanded by set point. Test requirements offered in the chapter 4.2.4 of FGW TR3 rev.25 are considered.
- Validation requirements for reactive power control processes:  
This involves the validation of accuracy requirements defined in chapters 4.2.5 (Q vs U) and 4.2.6 (Q vs P) of FGW TR3 rev.25.
- Verification of requirements for protective settings:  
This involves the verification of the parameters for protection devices and settings declared by default for the certified product.

The validation overview for VRT cases is compliant with the Annex A.1.1, included in the report and compared with the validation overview in accordance with the table A-1. See FRT validation results in the point 2.1 of this document.

The main validation process detailed in the above referred report has been performed over the dynamic simulation model for AZZURRO 3PH 125KTL-V4-A. In addition, for this model, it has been performed the full list additional plausibility tests in accordance with the chapter 5.5 of FGW TR4 rev.9.

Apart of this, in order to verify the transferability of validation results to derived models, they have also been completed following simulation cases over the dynamic simulation model of SOFAR 80KTLX-G3 adapted to operate with generation capabilities of derived models: AZZURRO 3PH 100KTL-V4 and AZZURRO 3PH 110KTL-V4. See the information given in the point 1.4 of this document for further information.

- Verification of Voltage-Dependent PQ diagrams.

See further information of the dynamic simulation model and the software used in the point 4 of this annex.



### 3.1 Validation results

#### 3.1.1 Validation overview

The following table shows the FRT validation results in terms of deviations as defined by the standard for the positive and negative sequences of currents and powers in symmetrical and asymmetrical fault conditions at nominal and partial power.

All deviations are in accordance to the regular maximum tolerances given by the standard.

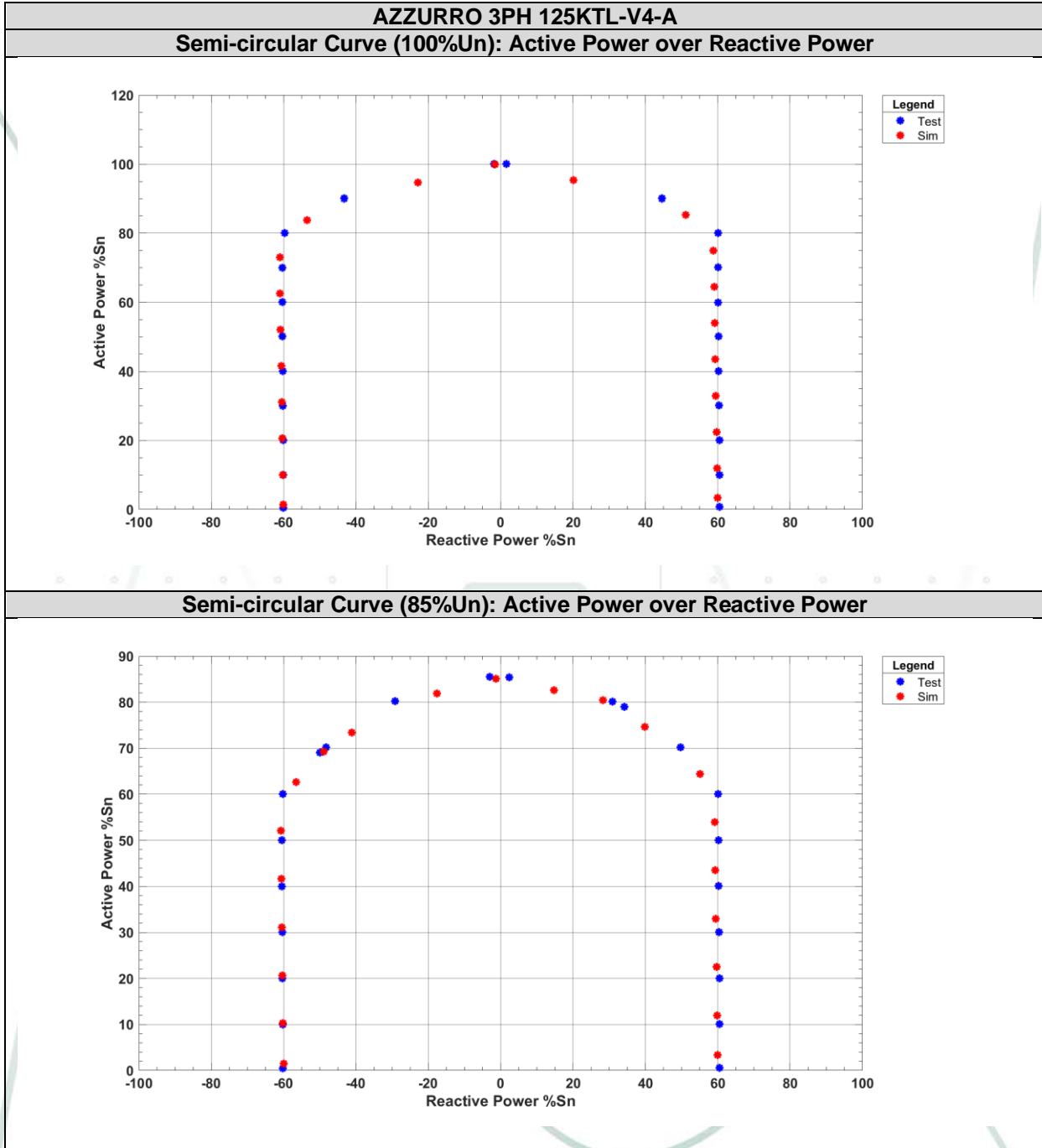
Test designation compliant with <b>TG3</b> Response during grid faults. Table 4-67			Three phase voltage drops in Positive phase sequence system											
			P			Q			Ia			Iq		
			MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE
Ures ≤ 5 % Un 0.1 3ph/100%/2	In accordance with IEC	Pre	0.0016	-0.0009	0.0009	0.0200	-0.0197	0.0197	0.0031	-0.0022	0.0022	0.0043	-0.0040	0.0040
		Fault	0.0034	0.0055	0.0030	0.0287	-0.0263	0.0237	0.1426	-0.1229	0.1327	0.0070	0.0170	0.0049
		Post	0.0020	0.0049	0.0079	0.0201	-0.0195	0.0216	0.0033	0.0054	0.0103	0.0044	-0.0021	0.0061
Ures ≤ 5 % Un 0.2 3ph/20%/2	In accordance with IEC	Pre	0.0012	-0.0009	0.0009	0.0038	-0.0035	0.0035	0.0013	-0.0009	0.0009	0.0007	-0.0003	0.0003
		Fault	0.0028	0.0001	0.0025	0.0295	-0.0285	0.0240	0.1284	-0.1012	0.1194	0.0061	-0.0043	0.0039
		Post	0.0012	-0.0000	0.0021	0.0039	-0.0037	0.0058	0.0013	0.0000	0.0026	0.0008	0.0013	0.0029
Ures 20-30 % Un 25.1 3ph/100%/2	In accordance with IEC	Pre	0.0020	-0.0009	0.0009	0.0191	-0.0187	0.0187	0.0025	-0.0013	0.0013	0.0034	-0.0030	0.0030
		Fault	0.0109	0.0074	0.0017	0.0189	0.0107	0.0157	0.0377	-0.0049	0.0140	0.0048	-0.0062	0.0034
		Post	0.0085	0.0015	0.0108	0.0199	-0.0183	0.0211	0.0087	0.0026	0.0126	0.0043	-0.0019	0.0062
Ures 20-30 % Un 25.2 3ph/20%/2	In accordance with IEC	Pre	0.0012	-0.0009	0.0009	0.0036	-0.0033	0.0033	0.0013	-0.0009	0.0009	0.0005	-0.0002	0.0002
		Fault	0.0102	0.0030	0.0016	0.0186	0.0096	0.0152	0.0374	-0.0087	0.0142	0.0060	-0.0097	0.0042
		Post	0.0016	-0.0004	0.0023	0.0041	-0.0030	0.0057	0.0016	-0.0001	0.0026	0.0009	0.0010	0.0033
Ures 45-60 % Un 50.1 3ph/100%/2	In accordance with IEC	Pre	0.0022	-0.0009	0.0009	0.0193	-0.0188	0.0188	0.0025	-0.0012	0.0012	0.0037	-0.0031	0.0031
		Fault	0.0049	0.0041	0.0026	0.0016	-0.0013	0.0008	0.0152	-0.0133	0.0118	0.0401	-0.0315	0.0366
		Post	0.0063	0.0013	0.0111	0.0200	-0.0176	0.0213	0.0065	0.0024	0.0124	0.0044	-0.0024	0.0059
Ures 45-60 % Un 50.2 3ph/20%/2	In accordance with IEC	Pre	0.0013	-0.0008	0.0008	0.0038	-0.0034	0.0034	0.0014	-0.0009	0.0009	0.0006	-0.0003	0.0003
		Fault	0.0048	0.0033	0.0025	0.0084	-0.0098	0.0077	0.0148	-0.0107	0.0118	0.0530	-0.0476	0.0499
		Post	0.0017	-0.0001	0.0024	0.0042	-0.0022	0.0060	0.0018	0.0001	0.0027	0.0010	0.0006	0.0030
Ures 45-60 % Un 50.5 3ph/100%/2	In accordance with IEC	Pre	0.0018	-0.0006	0.0007	0.0192	-0.0186	0.0186	0.0019	-0.0009	0.0009	0.0035	-0.0029	0.0029
		Fault	0.0044	0.0016	0.0043	0.0044	0.0040	0.0042	0.0089	-0.0040	0.0085	0.0092	0.0086	0.0088
		Post	0.0074	0.0010	0.0099	0.0197	-0.0189	0.0189	0.0077	0.0026	0.0119	0.0040	-0.0034	0.0035
Ures 70-80 % Un 75.1 3ph/100%/2	In accordance with IEC	Pre	0.0012	-0.0004	0.0005	0.0190	-0.0186	0.0186	0.0015	-0.0007	0.0007	0.0034	-0.0029	0.0029
		Fault	0.0043	0.0007	0.0035	0.0094	-0.0099	0.0084	0.0136	-0.0111	0.0127	0.0182	-0.0166	0.0169
		Post	0.0078	0.0026	0.0103	0.0200	-0.0184	0.0200	0.0083	0.0041	0.0123	0.0043	-0.0037	0.0041
Ures 70-80 % Un 75.2 3ph/20%/2	In accordance with IEC	Pre	0.0014	-0.0010	0.0010	0.0037	-0.0034	0.0034	0.0015	-0.0010	0.0011	0.0006	-0.0003	0.0003
		Fault	0.0039	-0.0023	0.0034	0.0148	-0.0159	0.0138	0.0132	-0.0116	0.0125	0.0253	-0.0247	0.0238
		Post	0.0018	-0.0006	0.0023	0.0042	-0.0032	0.0047	0.0018	-0.0003	0.0027	0.0010	-0.0008	0.0012
Ures 70-80 % Un 75.3 3ph/20%/2	In accordance with IEC	Pre	0.0023	0.0008	0.0008	0.0090	-0.0087	0.0087	0.0010	-0.0004	0.0004	0.0060	-0.0057	0.0057
		Fault	0.0030	-0.0013	0.0024	0.0155	-0.0170	0.0148	0.0130	-0.0113	0.0122	0.0279	-0.0277	0.0267
		Post	0.0021	0.0015	0.0019	0.0090	-0.0081	0.0094	0.0009	0.0005	0.0018	0.0060	-0.0058	0.0061
Ures 70-80 % Un 75.4 3ph/20%/2	In accordance with IEC	Pre	0.0017	-0.0013	0.0013	0.0023	0.0020	0.0020	0.0011	-0.0001	0.0002	0.0054	0.0051	0.0051
		Fault	0.0047	-0.0031	0.0044	0.0157	-0.0174	0.0150	0.0131	-0.0116	0.0127	0.0250	-0.0252	0.0239
		Post	0.0018	-0.0000	0.0025	0.0023	0.0023	0.0029	0.0011	0.0013	0.0019	0.0054	0.0047	0.0053
Ures 70-80 % Un	In accordance	Pre	0.0015	-0.0012	0.0012	0.0040	-0.0037	0.0037	0.0015	-0.0012	0.0012	0.0009	-0.0006	0.0006

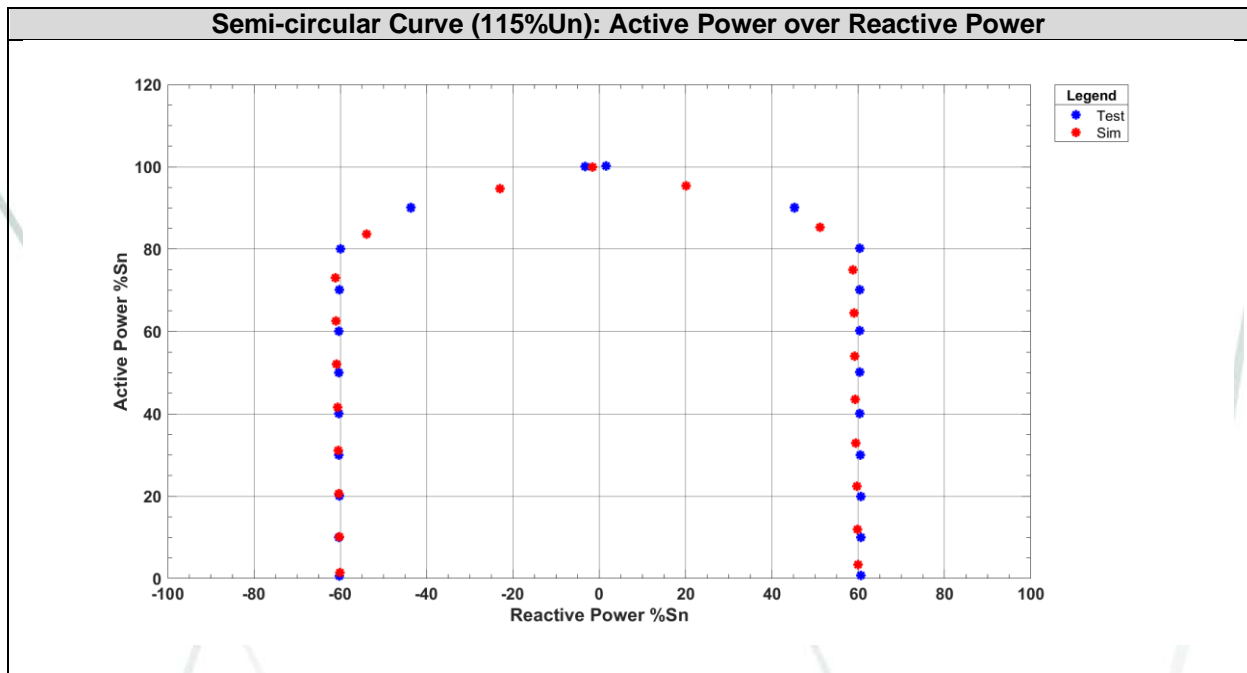
75.5	with IEC	Fault	0.0050	0.0049	0.0046	0.0068	0.0043	0.0060	0.0133	-0.0124	0.0124	0.0822	-0.0789	0.0816
3ph/20%/4		Post	0.0016	-0.0005	0.0022	0.0040	-0.0026	0.0058	0.0016	-0.0004	0.0025	0.0009	-0.0010	0.0020
Ures 75-85 % Un	In accordance with IEC	Pre	0.0016	-0.0005	0.0006	0.0193	-0.0188	0.0188	0.0016	-0.0006	0.0007	0.0036	-0.0031	0.0031
80.1		Fault	0.0075	0.0007	0.0072	0.0053	0.0048	0.0050	0.0096	-0.0030	0.0090	0.0071	0.0066	0.0067
3ph/100%/2		Post	0.0074	0.0019	0.0125	0.0202	-0.0194	0.0194	0.0075	0.0039	0.0146	0.0045	-0.0039	0.0040
Ures 85-90 % Un	In accordance with IEC	Pre	0.0021	-0.0011	0.0011	0.0193	-0.0188	0.0188	0.0022	-0.0012	0.0012	0.0036	-0.0031	0.0031
85.1		Fault	0.0071	-0.0064	0.0067	0.0138	-0.0058	0.0058	0.0133	-0.0126	0.0128	0.0191	-0.0083	0.0084
3ph/100%/2		Post	0.0101	0.0052	0.0157	0.0201	-0.0197	0.0201	0.0083	0.0058	0.0166	0.0045	-0.0047	0.0047
Ures ≥ 110 % Un	In accordance with IEC	Pre	0.0020	-0.0009	0.0009	0.0193	-0.0187	0.0187	0.0021	-0.0011	0.0011	0.0036	-0.0030	0.0030
115.1		Fault	0.0243	-0.0141	0.0191	0.0278	0.0273	0.0268	0.0167	-0.0095	0.0121	0.0234	0.0227	0.0225
3ph/100%/2		Post	0.0062	0.0016	0.0085	0.0193	-0.0193	0.0194	0.0067	0.0032	0.0106	0.0036	-0.0031	0.0033
Ures ≥ 110 % Un	In accordance with IEC	Pre	0.0016	-0.0009	0.0009	0.0037	-0.0034	0.0034	0.0016	-0.0010	0.0010	0.0006	-0.0003	0.0003
115.2		Fault	0.0239	-0.0175	0.0190	0.0200	0.0195	0.0191	0.0163	-0.0109	0.0121	0.0165	0.0157	0.0158
3ph/20%/2		Post	0.0316	-0.0006	0.0029	0.0043	-0.0044	0.0045	0.0316	-0.0002	0.0032	0.0012	-0.0006	0.0008
Ures ≥ 110 % Un	In accordance with IEC	Pre	0.0010	-0.0006	0.0006	0.0037	-0.0034	0.0034	0.0010	-0.0006	0.0006	0.0006	-0.0003	0.0003
110.3		Fault	0.0171	-0.0165	0.0166	0.0160	0.0146	0.0145	0.0125	-0.0120	0.0120	0.0144	0.0131	0.0131
3ph/20%/2		Post	0.0358	0.0000	0.0026	0.0042	-0.0042	0.0042	0.0357	0.0003	0.0030	0.0011	-0.0006	0.0008

Test designation compliant with <b>TG3</b> Response during grid faults. Table 4-67			Two phase voltage drops in Positive phase sequence system											
			P			Q			Ia			Iq		
			MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE
Ures ≤ 5 % Un 0.3 2ph/100%/2	In accordance with IEC	Pre	0.0022	-0.0008	0.0008	0.0191	-0.0186	0.0186	0.0025	-0.0010	0.0011	0.0034	-0.0029	0.0029
		Fault	0.0034	0.0237	0.0023	0.0161	-0.0240	0.0144	0.0126	0.0118	0.0026	0.0223	-0.0229	0.0151
		Post	0.0089	0.0045	0.0099	0.0196	-0.0182	0.0200	0.0087	0.0062	0.0118	0.0039	-0.0027	0.0045
Ures ≤ 5 % Un 0.4 2ph/20%/2	In accordance with IEC	Pre	0.0009	-0.0005	0.0005	0.0037	-0.0034	0.0034	0.0010	-0.0005	0.0005	0.0006	-0.0003	0.0003
		Fault	0.0033	0.0048	0.0025	0.0162	-0.0213	0.0149	0.0064	-0.0003	0.0023	0.0200	-0.0174	0.0159
		Post	0.0013	0.0003	0.0022	0.0041	-0.0029	0.0049	0.0013	0.0005	0.0027	0.0010	0.0003	0.0023
Ures 20-30 % Un 25.4 2ph/100%/2	In accordance with IEC	Pre	0.0022	-0.0009	0.0009	0.0194	-0.0187	0.0187	0.0026	-0.0012	0.0012	0.0037	-0.0030	0.0030
		Fault	0.0017	0.0007	0.0004	0.0082	-0.0082	0.0073	0.0119	-0.0131	0.0088	0.0180	-0.0120	0.0152
		Post	0.0053	0.0011	0.0093	0.0198	-0.0179	0.0205	0.0059	0.0024	0.0113	0.0041	-0.0025	0.0053
Ures 20-30 % Un 25.5 2ph/20%/2	In accordance with IEC	Pre	0.0013	-0.0008	0.0008	0.0036	-0.0034	0.0034	0.0013	-0.0009	0.0009	0.0005	-0.0002	0.0002
		Fault	0.0020	0.0000	0.0002	0.0109	-0.0095	0.0090	0.0111	-0.0086	0.0081	0.0212	-0.0147	0.0178
		Post	0.0018	-0.0003	0.0023	0.0041	-0.0025	0.0052	0.0019	-0.0002	0.0028	0.0010	0.0004	0.0023
Ures 45-60 % Un 50.3 2ph/100%/2	In accordance with IEC	Pre	0.0019	-0.0005	0.0007	0.0191	-0.0186	0.0186	0.0020	-0.0008	0.0009	0.0034	-0.0029	0.0029
		Fault	0.0024	0.0005	0.0017	0.0075	-0.0073	0.0068	0.0121	-0.0112	0.0103	0.0147	-0.0117	0.0135
		Post	0.0056	0.0009	0.0092	0.0197	-0.0181	0.0202	0.0059	0.0023	0.0109	0.0040	-0.0030	0.0046
Ures 45-60 % Un 50.4 2ph/20%/2	In accordance with IEC	Pre	0.0014	-0.0009	0.0009	0.0035	-0.0032	0.0032	0.0015	-0.0010	0.0010	0.0004	-0.0001	0.0001
		Fault	0.0033	-0.0016	0.0022	0.0141	-0.0140	0.0133	0.0124	-0.0106	0.0109	0.0233	-0.0209	0.0220
		Post	0.0017	0.0001	0.0026	0.0039	-0.0026	0.0051	0.0018	0.0002	0.0030	0.0008	0.0002	0.0020
Ures 45-60 % Un 50.6 2ph/100%/2	In accordance with IEC	Pre	0.0025	-0.0012	0.0013	0.0191	-0.0186	0.0186	0.0027	-0.0015	0.0015	0.0034	-0.0030	0.0030
		Fault	0.0083	-0.0052	0.0075	0.0053	0.0075	0.0050	0.0120	-0.0112	0.0100	0.0090	0.0109	0.0072
		Post	0.0086	-0.0011	0.0098	0.0198	-0.0189	0.0190	0.0090	0.0005	0.0115	0.0041	-0.0034	0.0035
Ures 70-80 % Un 75.6 2ph/100%/2	In accordance with IEC	Pre	0.0022	0.0007	0.0007	0.0192	-0.0187	0.0187	0.0019	0.0003	0.0005	0.0035	-0.0030	0.0030
		Fault	0.0061	0.0029	0.0047	0.0050	-0.0064	0.0046	0.0121	-0.0041	0.0094	0.0067	-0.0071	0.0060
		Post	0.0047	0.0032	0.0096	0.0198	-0.0189	0.0196	0.0050	0.0047	0.0116	0.0041	-0.0037	0.0040
Ures 70-80 % Un 75.7 2ph/20%/2	In accordance with IEC	Pre	0.0012	-0.0008	0.0008	0.0038	-0.0035	0.0035	0.0013	-0.0008	0.0008	0.0006	-0.0003	0.0003
		Fault	0.0049	-0.0031	0.0043	0.0130	-0.0106	0.0090	0.0096	-0.0080	0.0089	0.0167	-0.0122	0.0111
		Post	0.0017	0.0000	0.0024	0.0041	-0.0038	0.0042	0.0018	0.0003	0.0029	0.0010	-0.0010	0.0012
Ures 70-80 % Un 75.8 2ph/20%/4	In accordance with IEC	Pre	0.0010	-0.0006	0.0006	0.0037	-0.0034	0.0034	0.0011	-0.0006	0.0006	0.0006	-0.0003	0.0003
		Fault	0.0018	0.0008	0.0004	0.0375	-0.0379	0.0366	0.0105	-0.0071	0.0081	0.0471	-0.0458	0.0458
		Post	0.0015	0.0004	0.0024	0.0042	-0.0031	0.0051	0.0016	0.0006	0.0029	0.0010	-0.0008	0.0016
Ures 75-85 % Un 80.2 2ph/100%/2	In accordance with IEC	Pre	0.0021	-0.0009	0.0009	0.0193	-0.0187	0.0187	0.0023	-0.0011	0.0012	0.0036	-0.0030	0.0030
		Fault	0.0098	-0.0048	0.0088	0.0055	0.0047	0.0051	0.0131	-0.0087	0.0098	0.0075	0.0059	0.0061
		Post	0.0089	0.0025	0.0109	0.0197	-0.0189	0.0190	0.0092	0.0041	0.0130	0.0041	-0.0034	0.0036
Ures ≥ 110 % Un 110.1 2ph/100%/2	In accordance with IEC	Pre	0.0021	-0.0002	0.0005	0.0193	-0.0187	0.0187	0.0019	-0.0004	0.0006	0.0036	-0.0030	0.0030
		Fault	0.0138	-0.0059	0.0104	0.0120	0.0112	0.0112	0.0130	-0.0059	0.0085	0.0151	0.0110	0.0110
		Post	0.0356	0.0071	0.0132	0.0220	-0.0187	0.0188	0.0349	0.0087	0.0154	0.0063	-0.0030	0.0032
Ures ≥ 110 % Un 110.2 2ph/20%/2	In accordance with IEC	Pre	0.0010	-0.0006	0.0006	0.0036	-0.0034	0.0034	0.0010	-0.0007	0.0007	0.0005	-0.0002	0.0002
		Fault	0.0142	-0.0096	0.0105	0.0071	0.0062	0.0058	0.0151	-0.0079	0.0085	0.0126	0.0061	0.0059
		Post	0.0351	0.0006	0.0031	0.0055	-0.0039	0.0039	0.0350	0.0009	0.0035	0.0023	-0.0006	0.0007

TEST DESIGNATION COMPLIANT WITH TG3 RESPONSE DURING GRID FAULTS. TABLE 4-67			TWO PHASE VOLTAGE DROPS IN NEGATIVE PHASE SEQUENCE SYSTEM												
			P			Q			IA			IQ			
			MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE	
URES ≤ 5 % UN 0.3 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	-0.0010	0.0010	0.0021	-0.0015	0.0015
		FAULT	0.0078	0.0058	0.0074	0.0013	0.0110	0.0005	0.0245	0.0208	0.0234	0.0170	0.0241	0.0162	
		POST	0.0000	0.0000	0.0002	0.0000	-0.0010	0.0010	0.0018	-0.0023	0.0024	0.0020	-0.0034	0.0038	
URES ≤ 5 % UN 0.4 2PH/20%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0001	0.0001	0.0007	0.0001	0.0001	
		FAULT	0.0079	0.0061	0.0076	0.0015	0.0072	0.0003	0.0246	0.0213	0.0238	0.0158	0.0187	0.0149	
		POST	0.0000	0.0001	0.0002	0.0000	-0.0011	0.0011	0.0007	-0.0013	0.0014	0.0007	-0.0021	0.0024	
URES 20-30 % UN 25.4 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0002	0.0002	0.0008	0.0004	0.0004	
		FAULT	0.0013	0.0005	0.0002	0.0147	0.0150	0.0132	0.0083	0.0065	0.0072	0.0321	0.0301	0.0291	
		POST	0.0000	0.0001	0.0001	0.0000	0.0008	0.0008	0.0008	0.0008	0.0010	0.0009	-0.0020	0.0027	
URES 20-30 % UN 25.5 2PH/20%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0006	0.0001	0.0002	
		FAULT	0.0015	0.0004	0.0003	0.0102	0.0108	0.0090	0.0084	0.0066	0.0072	0.0302	0.0290	0.0277	
		POST	0.0000	0.0001	0.0001	0.0000	0.0009	0.0009	0.0006	0.0005	0.0008	0.0007	-0.0025	0.0027	
URES 45-60 % UN 50.3 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	-0.0017	0.0017	0.0016	-0.0011	0.0011	
		FAULT	0.0004	0.0001	0.0002	0.0031	0.0001	0.0013	0.0096	0.0080	0.0086	0.0159	-0.0040	0.0072	
		POST	0.0000	0.0000	0.0001	0.0000	0.0004	0.0004	0.0024	-0.0022	0.0025	0.0018	-0.0020	0.0027	
URES 45-60 % UN 50.4 2PH/20%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0002	0.0002	0.0004	0.0000	0.0001	
		FAULT	0.0004	0.0002	0.0002	0.0041	-0.0015	0.0023	0.0097	0.0084	0.0088	0.0190	-0.0100	0.0113	
		POST	0.0000	0.0001	0.0001	0.0000	0.0005	0.0005	0.0009	0.0009	0.0010	0.0007	-0.0012	0.0019	
URES 45-60 % UN 50.6 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0009	0.0009	0.0015	0.0009	0.0009	
		FAULT	0.0028	0.0004	0.0004	0.0032	-0.0020	0.0019	0.0123	0.0019	0.0015	0.0137	-0.0087	0.0076	
		POST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	-0.0013	0.0014	0.0018	0.0002	0.0014	
URES 70-80 % UN 75.6 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	-0.0012	0.0012	0.0014	0.0010	0.0010	
		FAULT	0.0014	-0.0010	0.0010	0.0011	0.0003	0.0005	0.0094	-0.0041	0.0042	0.0083	-0.0028	0.0027	
		POST	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0017	-0.0012	0.0014	0.0016	0.0004	0.0017	
URES 70-80 % UN 75.7 2PH/20%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0002	0.0002	0.0005	0.0001	0.0001	
		FAULT	0.0013	-0.0010	0.0010	0.0008	0.0002	0.0003	0.0081	-0.0046	0.0045	0.0052	-0.0015	0.0014	
		POST	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0008	0.0005	0.0006	0.0008	0.0007	0.0010	
URES 70-80 % UN 75.8 2PH/20%/4	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0001	0.0004	0.0000	0.0001	
		FAULT	0.0027	-0.0023	0.0024	0.0007	0.0006	0.0002	0.0169	-0.0119	0.0117	0.0046	0.0048	0.0033	
		POST	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0006	0.0003	0.0006	0.0006	-0.0011	0.0013	
URES 75-85 % UN 80.2 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	-0.0010	0.0010	0.0016	0.0008	0.0008	
		FAULT	0.0003	0.0000	0.0000	0.0004	0.0002	0.0002	0.0054	0.0003	0.0003	0.0066	-0.0028	0.0023	
		POST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	-0.0011	0.0012	0.0017	0.0007	0.0012	
URES ≥ 110 % UN 110.1 2PH/100%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0005	0.0005	0.0016	-0.0013	0.0013	
		FAULT	0.0060	0.0002	0.0006	0.0121	0.0034	0.0036	0.0098	-0.0060	0.0059	0.0065	0.0021	0.0021	
		POST	0.0028	0.0003	0.0010	0.0006	0.0000	0.0001	0.0012	0.0009	0.0009	0.0017	-0.0012	0.0015	
URES ≥ 110 % UN 110.2 2PH/20%/2	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0001	0.0007	0.0003	0.0003	
		FAULT	0.0008	0.0004	0.0004	0.0002	0.0002	0.0002	0.0121	-0.0060	0.0060	0.0081	0.0039	0.0034	
		POST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0003	0.0008	0.0002	0.0004	

3.1.2 Simulation results of Voltage-Dependent PQ diagrams of certified models



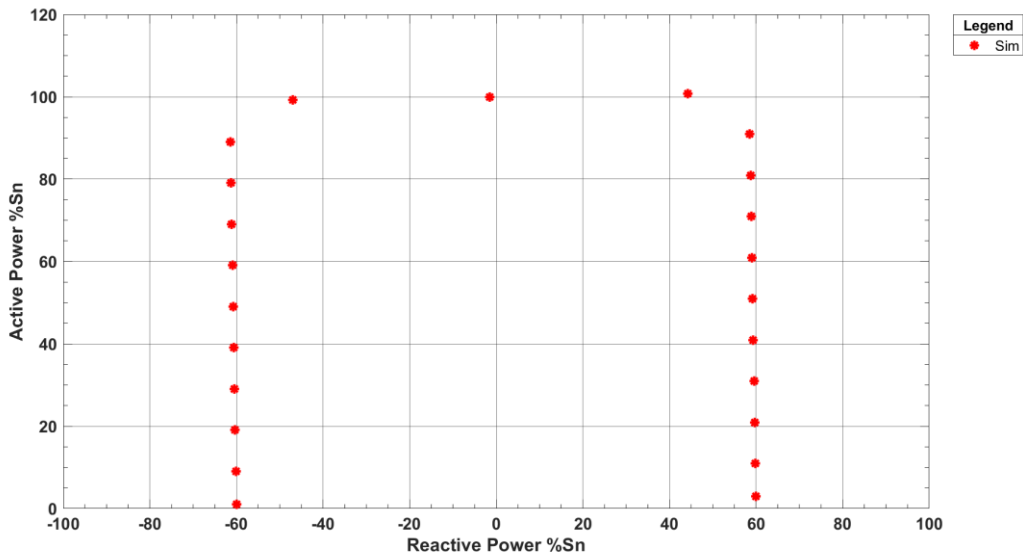


0 1 2 3 4 5

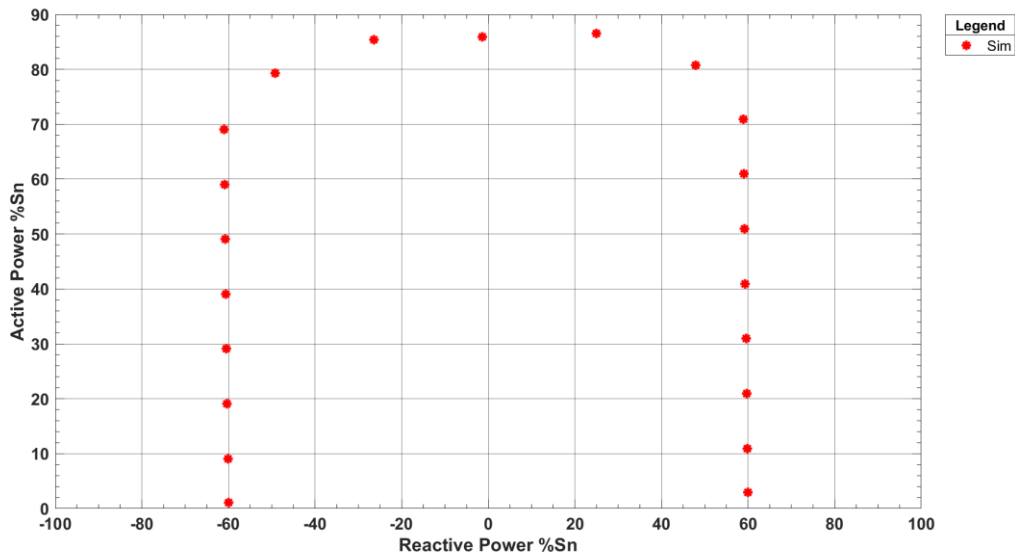


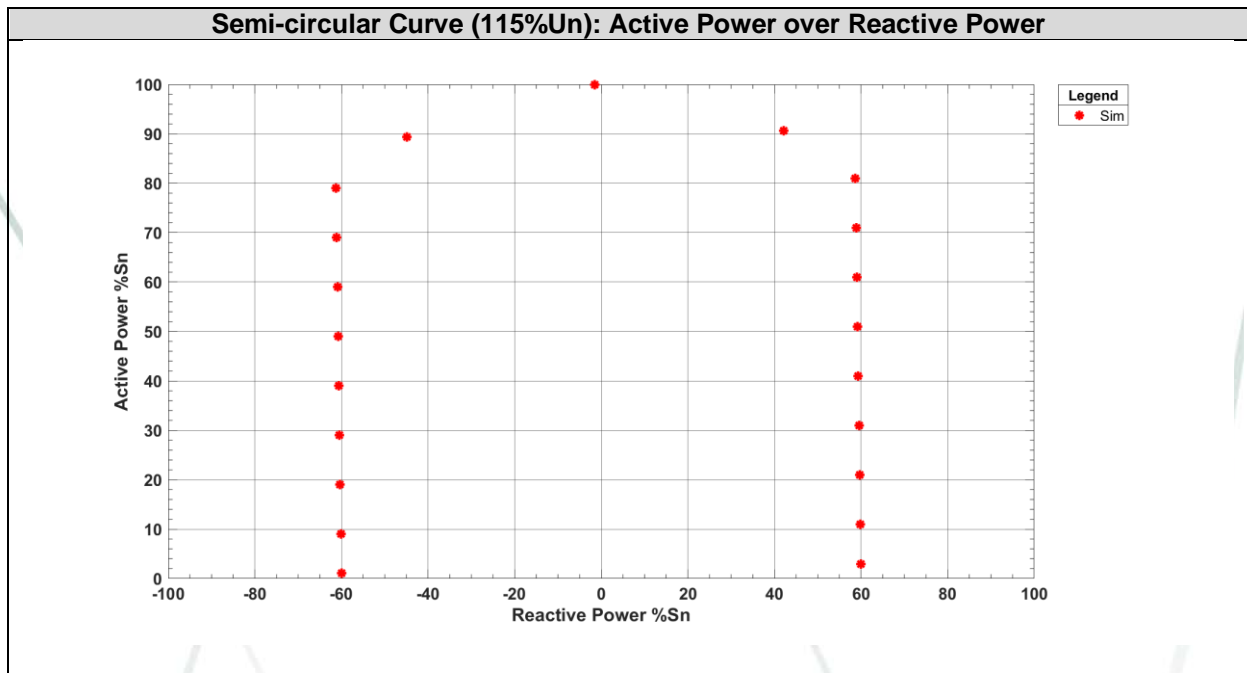
**AZZURRO 3PH 110KTL-V4**

**Semi-circular Curve (100%Un): Active Power over Reactive Power**



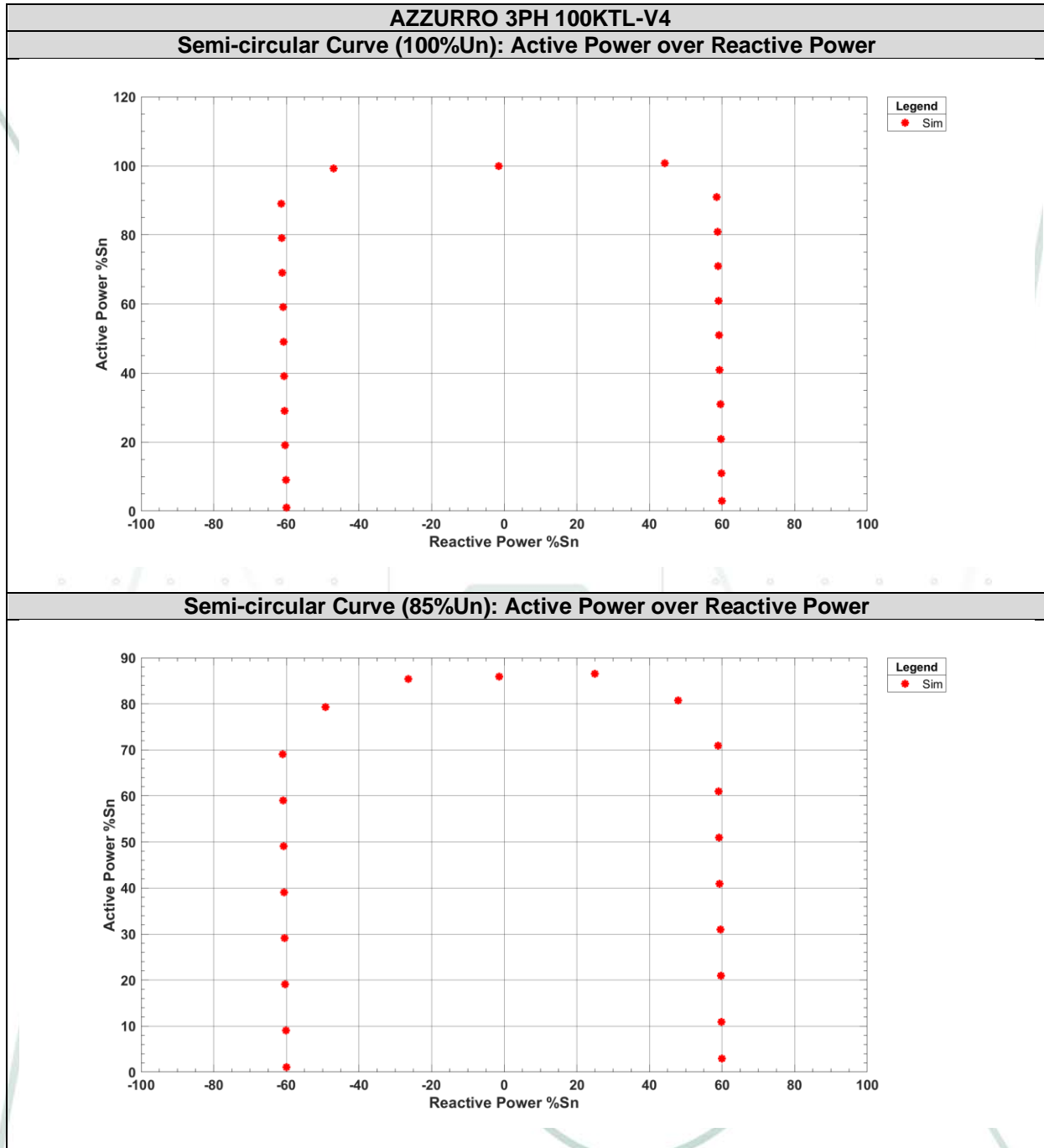
**Semi-circular Curve (85%Un): Active Power over Reactive Power**

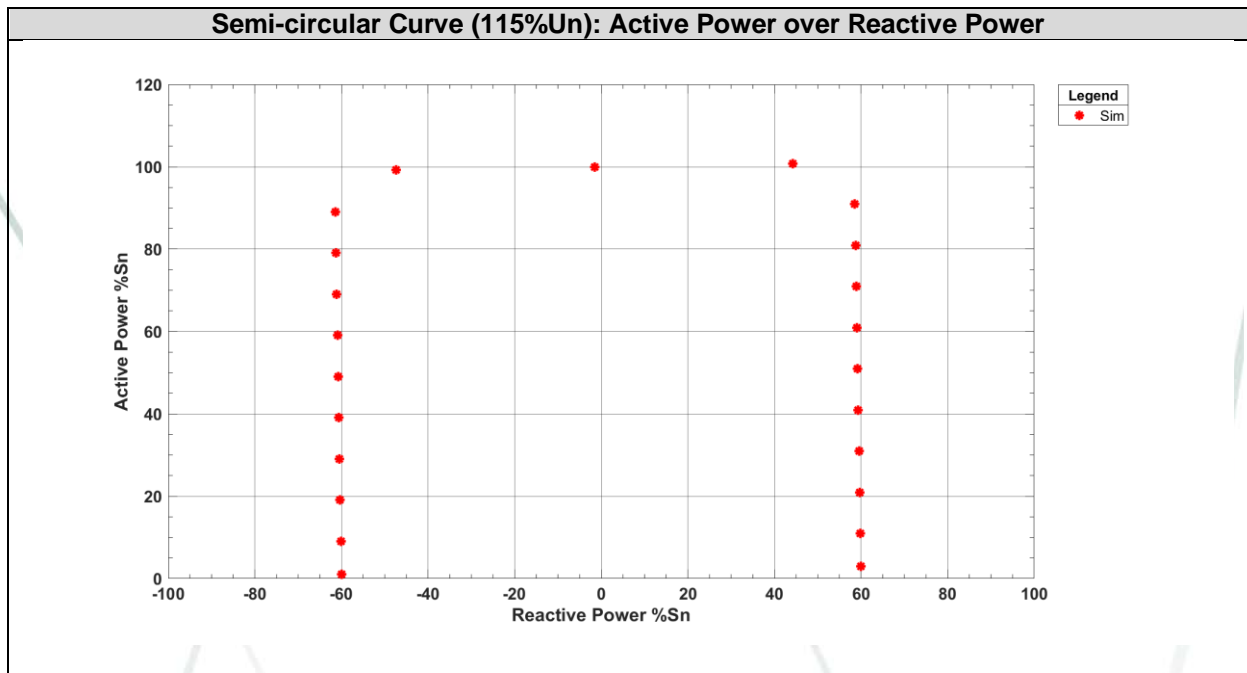




0 1 2 3 4 5







0 1 2 3 4 5



### 3.2 Validation conclusion

Once evaluated the entire tests required to carry out the comparison between simulation and real tests, it is demonstrated that the behaviours of the electronic equipment and its dynamic simulation model **FULLY COMPLIES** with validation requirements according to the specifications of the standard:

- FGW Technical Guidelines for Power Generating Units. Part 4 - Revision 9, dated on 01/02/2019 (FGW TG4 Rev.9): Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems, Storage Systems as well as their Components.

Using as reference following standards:

- VDE-AR-N 4110: 2018-11. Technical requirements for the connection and operation of customer installations to the medium voltage network (TAR medium voltage).

The Dynamic Simulation Model can be considered as validated to simulate with the required accuracy test cases over PV inverter models AZZURRO 3PH 125KTL-V4-A, AZZURRO 3PH 110KTL-V4, AZZURRO 3PH 100KTL-V4.

## 4 TECHNICAL DATA

### 4.1 Technical data

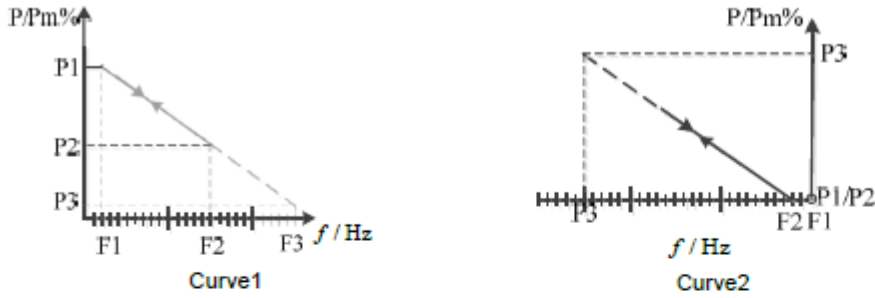
Model	AZZURRO 3PH 100KTL-V4	AZZURRO 3PH 110KTL-V4	AZZURRO 3PH 125KTL-V4-A
<b>DC Input</b>			
Max. input voltage	1100 V		
Start-up operating voltage	200 V		
Rated input voltage	625 V		
MPPT operating voltage range	180 V ~ 1000 V		
Full power MPPT voltage range	500 V ~ 850 V		
Max. input current	10*40 A	10*40 A	10*40 A
Max. short current	10*50 A	10*50 A	10*50 A
<b>AC Output</b>			
Nominal grid voltage	3/N/PE, 230/400 V <sub>ac</sub>		
Nominal grid frequency	50 Hz		
Rated AC power	100 kW	110kW	125 kW
Max. AC power	110 kVA	125kVA	125 kVA
Rated AC current	145 A	159.5 A	181.2 A
Max. AC current	159.5 A	181.2 A	181.2 A
Output power factor	1 default (adjustable+/-0.8)		
<b>General Data</b>			
Operating temperature range	-30 °C ~ +60 °C		
Protection degree	IP66		
Protective class	Class I		
Cooling method	Fan		
Topology	Transformerless		

## 4.2 Overview of important parameters of the generation unit

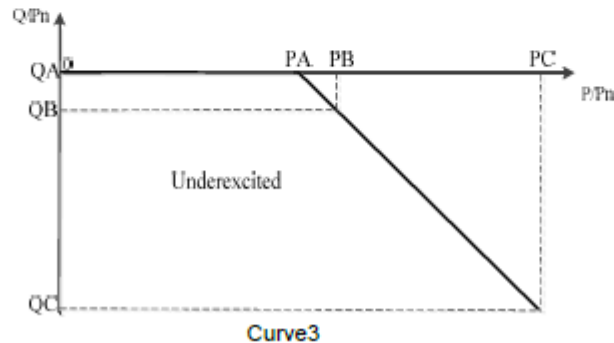
The settings may be specific for each project and need to be checked.

Parameter description	Unit	Default Value	Min.	Max.	Step- wide	Note
<b>Behaviour in the event of disturbances in the network</b>						
LVRT Protection Level		2	1	5		
LVRT Voltage 1	Un%	0	0	130	1	
LVRT Time 1	ms	500	0	85535	1	
LVRT Voltage 2	Un%	20	0	130	1	
LVRT Time 2	ms	1500	0	85535	1	
LVRT Voltage 3	Un%	40	0	130	1	
LVRT Time 3	ms	3000	0	85535	1	
LVRT Voltage 4	Un%	85	0	130	1	
LVRT Time 4	ms	81000	0	85535	1	
LVRT Exit	Un%	91	0	130	1	
LVRT Exit Time	ms	20	0	85535	1	
HVRT Protection Level		2	1	5		
HVRT Voltage 1	Un%	125	0	130	1	
HVRT Time 1	ms	100	0	85535	1	
HVRT Voltage 2	Un%	120	0	130	1	
HVRT Time 2	ms	5000	0	85535	1	
HVRT Voltage 3	Un%	115	0	130	1	
HVRT Time 3	ms	81000	0	85535	1	
Zero Power mode	Un%	70	0	130	1	
HVRT Exit	Un%	109	0	130	1	
HVRT Exit Time	ms	20	0	85535	1	
LVRT K Factor		2.0	0	6	0.1	
HVRT K Factor		2.0	0	6	0.1	
Gradient for active power increase after fault recovery	%Pn/s	200	0	500	1	
<b>Active power by setpoint set</b>						
Power Limiting switch	On/Off	Off				
Pac Limit	%Pn	100	0	100	1	
Active speed control	On/Off	Off				
Active Power Decline Speed	%Pn/min	30	0	3000	1	
Active Power Rising Speed	%Pn/min	30	0	3000	1	
Description of interfaces		RS485				
Behaviour at P=0		No active power output				

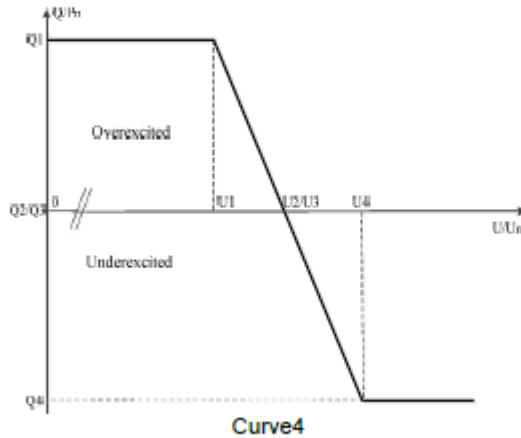
Parameter description	Unit	Default Value	Min.	Max.	Step- wide	Note
<b>Active power reduction at overfrequency</b>						
Over frequency derating	On/Off	On				
Gradient	%Pm/ $\Delta f$	40	0	100	1	
F1	Hz	50.2	50.0	55.0	0.1	
P1	%Pm	100	0	100	1	
F2	Hz	51.5	50.0	55.0	0.1	
P2	%Pm	48	0	100	1	
F3	Hz	52.5	50.0	55.0	0.1	
P3	%Pm	8	0	100	1	
Active power drop rate in overfrequency drop	s	<1				
Active power restoration rate after overfrequency drop	%Pn/min	9	0	3000	1	
Overfrequency drop curve		Curve1				
<b>Underfrequency</b>						
Underfrequency increment	On/Off	On				
Gradient	%Pm/ $\Delta f$	40	0	100	1	
F1	Hz	50.0	45.0	50.0	0.1	
P1	%Pm	0	0	100	1	
F2	Hz	49.8	45.0	50.0	0.1	
P2	%Pm	0	0	100	1	
F3	Hz	47.5	45.0	50.0	0.1	
P3	%Pm	92	0	100	1	
Active power rise rate in underfrequency drop	s	<1				
Active power restoration rate after underfrequency drop	%Pn/min	9	0	3000	1	
Underfrequency drop curve		Curve2				
<b>Others</b>						
Islanding judge criteria (When select 'Frequency change protection')	On/Off	On (Size and direction of frequency change)				
Frequency change	Hz/s	2.5				
Protection time	s	0.5				
Active speed control (When select 'Active power adjustment')	On/Off	On				
Active Power Decline Speed	Pn%/min	30	0	3000	1	
Active Power Rising Speed	Pn%/min	30	0	3000	1	
Limited power switch	On/Off	On				
Pac limit	Pn%	0	0	100	1	



Parameter description	Unit	Default Value	Min.	Max.	Step-wide	Note
<b>Reactive power supply</b>						
Reactive power regulation mode (when select 'Reactive adjusting switch')	Off/Pf/Qt/Q(P)/Q(U)	Off				
<b>Reactive power supply. Mode PF: The reactive power can be regulated by the parameter PF (Power Factor).</b>						
PF (when select Pf).		1.00	0.8(leading or lagging)	1	0.01	
<b>Reactive power supply. Mode Qt: The reactive power can be regulated by the parameter 'Reactive power limit' (in %).</b>						
Reactive power limit (when select Qt).	%Pn	0.00	0.00	60	0.01	
<b>Reactive power supply. Mode Q(P): The reactive ratio or power factor changes with the output power of the inverter.</b>						
Q(P) Curve (when select Q(P))		Curve3				
Active power ratio PA	%Pn	50	0	100	1	
Active power ratio PB	%Pn	60	0	100	1	
Active power ratio PC	%Pn	100	0	100	1	
Corresponding reactive ratio or power factor of active power ratio PA point	%Pn	0	0	1	1	
Corresponding reactive ratio or power factor of active power ratio PB point	%Pn	-5	0	-60	1	
Corresponding reactive ratio or power factor of active power ratio PC point	%Pn	-60	0	60	1	

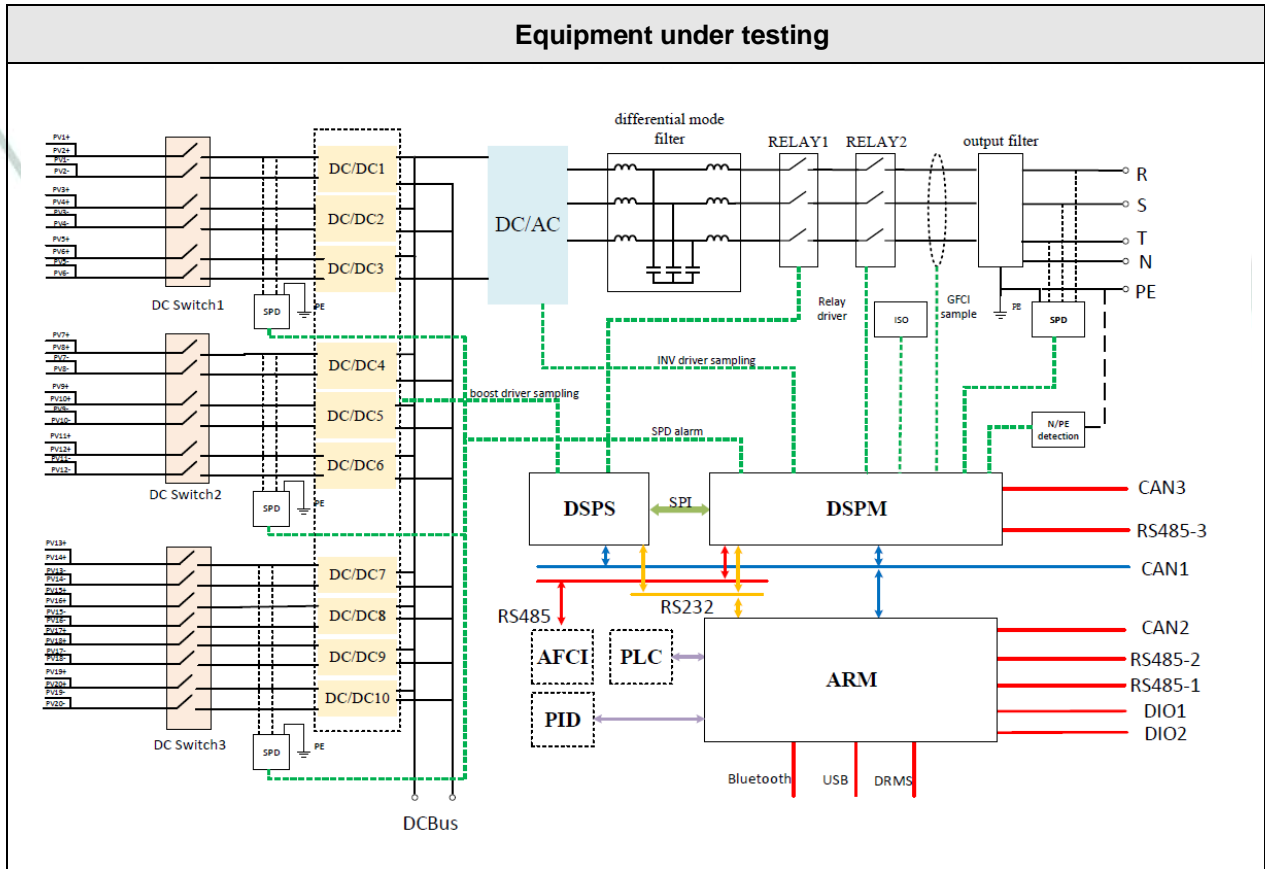


Parameter description	Unit	Default Value	Min.	Max.	Step- wide	Note
<b>Reactive power supply. Mode Q(U): The reactive power changes with the grid voltage.</b>						
Q(U) curve		Curve4				
Hysteretic proportion	%Un	0	0	5	1	
Voltage proportion U1	%Un	96	90	110	1	
Voltage proportion U2	%Un	100	90	110	1	
Voltage proportion U3	%Un	100	90	110	1	
Voltage proportion U4	%Un	104	90	110	1	
Corresponding reactive ratio of voltage proportion U1	%Pn	80	0	80	1	
Corresponding reactive ratio of voltage proportion U2	%Pn	0	0	80	1	
Corresponding reactive ratio of voltage proportion U3	%Pn	0	-60	0	1	
Corresponding reactive ratio of voltage proportion U4	%Pn	-60	-60	0	1	
Reactive response	On/Off	On				
Reactive response time	s	10	0	60	1	



Limits for re-energising (reconnection after fault event)						
Undervoltage Protection Recovery Value	V	218.5	23.0	230.0	0.1	
Overvoltage Protection Recovery Value	V	241.5	230.0	299.0	0.1	
Underfrequency Protection Recovery Value	Hz	49.9	45.0	50.0	0.01	
Overfrequency Protection Recovery Value	Hz	50.1	50.0	55.0	0.01	
Fault Recovery Time	ms	5000	0	200000	20	
Fault Recovery Active Soft Start	On/Off	On				
Fault Recovery Active Soft Start Time	s	600	0	6000	1	
Limits for connection (without previous trip)						
Grid Connection Condition		Grid normal range				
Grid Connection Voltage Minimum	V	207.5	23.0	230.0	0.1	
Max. Grid-connected Voltage	V	253.0	230.0	299.0	0.1	
Grid Connection Frequency Minimum	Hz	47.5	45.0	50.0	0.01	
Max. Grid-connected Frequency	Hz	50.2	50.0	55.0	0.01	
Grid Connection Detection Time	s	80	0	800	1	
Grid-connected Active Power Rising Rate	Pn%/min	30	20	40	1	

### 4.3 Electric scheme



#### 4.4 Interfaces

Following interfaces for setting parameters (include the active power or reactive power) configurations are provided on the PGU level:

- Interface for external active power command: RS485

#### 4.5 Manufacturer's certificates for certified PGUs according to FGW TG3

Manufacturer Certificate according to FGW TG3		
Model AZZURRO 3PH 125KTL-V4-A		
<b>Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type AZZURRO 3PH 125KTL-V4-A</b>		
<b>Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11</b>		
Datum / Date: 02/02/2023		Seite/Page 1/1
<b>1. Allgemeines und Ausgangsgrößen General and Output values</b>		
1	Hersteller	Zucchetti Centro Sistemi SpA Manufacturer
2	Typenbezeichnung	AZZURRO 3PH 125KTL-V4-A type name
3	Einspeisung (einphasig/dreiphasig)	three-phase no. of phases (single-phase/three-phase)
4	Nennscheinleistung	125 kVA rated apparent power
5	Nennwirkleistung	125 kW rated active power
6	AC-Nennspannung	230 V rated AC-voltage
7	AC-Nennfrequenz	50 Hz rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0.256 kA contribution to short circuit current
<b>2 DC Eingangsgrößen DC Input</b>		
1	Min. MPP-Spannung	180 V min. MPP voltage
2	Max. MPP-Spannung	1000 V max. MPP voltage
3	Max. PV-Eingangsspannung	1100 V max. DC Input voltage
4	Max. PV-Eingangsstrom	10*40 A max. DC input current
5	Max. Modulleistung	190 kW <sub>p</sub> max. peak power
<b>3 Wechselrichter-Leistungsteil Converter-Power section</b>		
1	Hersteller	Zucchetti Centro Sistemi SpA manufacturer
2	Typenbezeichnung	AZZURRO 3PH 125KTL-V4-A type name
3	Nennscheinleistung	125 kVA rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without generic type (HV/LV of Trans., without)
5	Taktfrequenz	20 kHz pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation & Observation generic type of power control (MPP-Tracking)
7	Software-Version	V000003 software version
<b>4 Sonstige elektrische Komponenten Other electric installations</b>		
1	Art der Netzkopplung	breaker generic type of interconnection
2	- Hersteller	Zhangzhou Hongfa Electroacoustic Co., Ltd - manufacturer
3	- Typenbezeichnung	HF 167F-200/12-H3F - type
4	Netzschutz integriert (Ja/Nein)	yes Integrated grid protection (yes/no)
5	Netzschutzhersteller	Zhangzhou Hongfa Electroacoustic Co., Ltd grid protection manufacturer
6	- Typenbezeichnung	HF 167F-200/12-H3F - type
7	- Einstellbereiche	Shown in appendix - adjustment ranges
8	Spannungssteigerungsschutz	287.5 V overvoltage protection
9	Spannungsrückgangsschutz	184 V undervoltage protection
10	Frequenzsteigerungsschutz	51.5 Hz overfrequency protection
11	Frequenzrückgangsschutz	47.5 Hz underfrequency protection
12	Typenbezeichnung der Abschalteneinheit	Air switch circuit breaker type
13	Oberschwingungsfilter (Ja/nein)	No harmonic filter (yes / no)
<b>5 Typenprüfung Type test</b>		
1	Prüfbehörde	Societe Generale de Surveillance S.A. testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11 reference
3	Seriennummer des Wechselrichters	SD1036125KE22C060003 serial number of converter
<b>Anschrift des Herstellers Address of manufacturer</b>		
<p>Der Hersteller des PV-Wechselrichters bestätigt, dass der PV-Wechselrichter, dessen elektrischen Eigenschaften in den Prüfberichten abgebildet sind, hinsichtlich seiner technischen Daten mit den o.g. Positionen identisch ist.  <i>The manufacturer of the PV Converter confirms that the PV Converter whose power quality is measured and depicted in the test reports, is identical with the above entries with regard to its technical data</i></p>		



Manufacturer Certificate according to FGW TG3			
Model AZZURRO 3PH 110KTL-V4			
<b>Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type AZZURRO 3PH 110KTL-V4</b>			
<b>Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11</b>			
Datum / Date: 02/0/2023			Seite/Page 1/1
<b>1. Allgemeines und Ausgangsgrößen</b>		<b>General and Output values</b>	
1	Hersteller	Zucchetti Centro Sistemi SpA	Manufacturer
2	Typenbezeichnung	AZZURRO 3PH 110KTL-V4	type name
3	Einspeisung (einphasig/drephasig)	three-phase	no. of phases (single-phase/three-phase)
4	Nennscheinleistung	125 kVA	rated apparent power
5	Nennwirkleistung	100 kW	rated active power
6	AC-Nennspannung	230 V	rated AC-voltage
7	AC-Nennfrequenz	50 Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0.225 kA	contribution to short circuit current
<b>2 DC Eingangsgrößen</b>		<b>DC Input</b>	
1	Min. MPP-Spannung	180 V	min. MPP voltage
2	Max. MPP-Spannung	1000 V	max. MPP voltage
3	Max. PV-Eingangsspannung	1100 V	max. DC Input voltage
4	Max. PV-Eingangsstrom	10*40 A	max. DC Input current
5	Max. Modulleistung	165 kW <sub>p</sub>	max. peak power
<b>3 Wechselrichter-Leistungsteil</b>		<b>Converter-Power section</b>	
1	Hersteller	Zucchetti Centro Sistemi SpA	manufacturer
2	Typenbezeichnung	AZZURRO 3PH 110KTL-V4	type name
3	Nennscheinleistung	110 kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without	generic type (HV/LV of Trans., without)
5	Taktfrequenz	20 kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation & Observation	generic type of power control (MPP-Tracking)
7	Software-Version	V000003	software version
<b>4 Sonstige elektrische Komponenten</b>		<b>Other electric installations</b>	
1	Art der Netzkopplung	breaker	generic type of interconnection
2	- Hersteller	Zhangzhou Hongfa Electroacoustic Co., Ltd	- manufacturer
3	- Typenbezeichnung	HF167F-200/12-H3F	- type
4	Netzschutz integriert (Ja/Nein)	yes	integrated grid protection (yes/no)
5	Netzschutzhersteller	Zhangzhou Hongfa Electroacoustic Co., Ltd	grid protection manufacturer
6	- Typenbezeichnung	HF167F-200/12-H3F	- type
7	- Einstellbereiche	Shown in appendix	- adjustment ranges
8	Spannungssteigerungsschutz	287.5 V	overvoltage protection
9	Spannungsrückgangsschutz	184 V	undervoltage protection
10	Frequenzsteigerungsschutz	51.5 Hz	overfrequency protection
11	Frequenzrückgangsschutz	47.5 Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch	circuit breaker type
13	Oberschwingungsfilter (Ja/nein)	No	harmonic filter (yes / no)
<b>5 Typenprüfung</b>		<b>Type test</b>	
1	Prüfbehörde	Societe Generale de Surveillance S.A.	testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11	reference
3	Seriennummer des Wechselrichters	SD1036110KE22C060001	serial number of converter
<b>Anschrift des Herstellers</b>			
<b>Address of manufacturer</b>			
Der Hersteller des PV-Wechselrichters bestätigt, dass der PV-Wechselrichter, dessen elektrischen Eigenschaften in den Prüfberichten abgebildet sind, hinsichtlich seiner technischen Daten mit den o.g. Positionen identisch ist. The manufacturer of the PV-Converter confirms that the PV-Converter whose power quality is measured and depicted in the test reports, is identical with the above entries with regard to its technical data			

## 5 DYNAMIC SIMUALTION MODEL INFORMATION

### 5.1 Software Characteristics

- Software type: Simulator for Grid Connected Power Conversion System
- Simulation platform: Matlab Simulink
- Used version of the simulation platform: 9.11 Version (R2021b)
- Simulation Software File identification: PGU\_125kW.slx
- Dynamic Simulation Model version: V1
- MD5 Checksum: 6D21259D292725CD8A2A0F01D13DAD5A

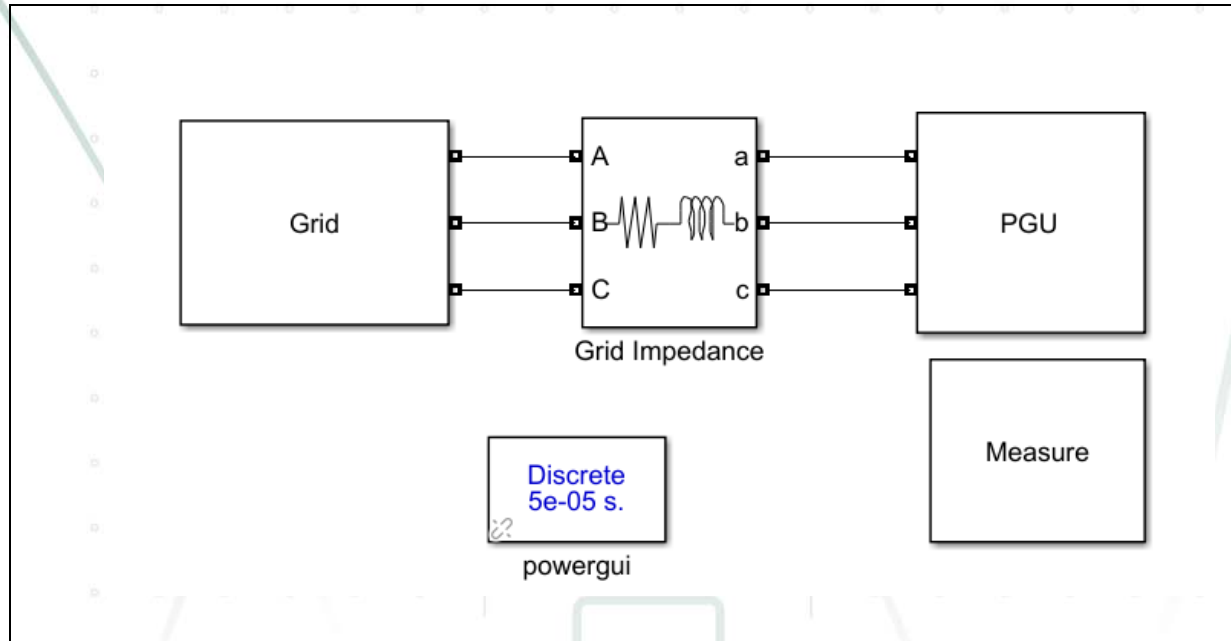
### 5.2 Software Information and Comments

As evidenced in the manufacturer's documentation and the validation report, the dynamic model could be completely able to represent the dynamic behaviours at the PV inverter terminal, and also be suitable for power grid studies. The dynamic model covered by the validation report is valid for fundamental frequency positive and negative sequence response. The dynamic model is developed with the following specifications in mind:

- The model is to be used primarily for power system stability studies and thus should represent all positive and negative sequence dynamics affected and relevant during:
  - Balanced and unbalanced short-circuits on the transmission grid (including voltage recovery)
  - Grid frequency disturbances
  - Reference value changes
- The model is for fundamental frequency positive and negative sequence response.
- The model is valid for typical power system frequency deviations.
- The model is able to handle numerically the simulation of phase jumps.
- The model is valid for steady state voltage deviations within the range from 0.9 p.u. to 1.1 p.u.
- The model could work with integration time step range from 0.001s to 0.01s.
- The model could be initialized to a steady state from load flow solutions at full or partial nominal power.
- External conditions like solar radiation are considered through the available PV array conversion power.
- Over/under frequency and over/under voltage protections are modelled in the control model in order to allow a realistic representation of PV inverter disconnection following grid disturbances. This may be separate modules that connect to the main PV inverter model.
- The model includes the reactive power capability of the PV inverter.

### 5.3 Description of the model

The model has the following design:



The grid information of AZZURRO 3PH 125KTL-V4-Inverter Simulink project is as follows:

	SCR implemented in the simulated grid	Sampling resolution of simulation results
Validation requirements for Voltage Ride Through (LVRT and HVRT)	50	1000 Hz (Step size is 1 ms)
Validation of changes commanded by set point (Active Power)	200	10 Hz (Step size is 100 ms)
Validation of changes commanded by set point. (Reactive Power test 1, 2 and 3)	200	5 Hz (Step size is 200 ms)
Validation requirements for Reactive Power Control processes (QvsU with the shortest settling time)	400	50 Hz (Step size is 20 ms)
Validation requirements for Reactive Power Control processes (QvsP)	200	10 Hz (Step size is 100 ms)
Verification of requirements for Protective Settings	200	10 Hz (Step size is 100 ms)
Plausibility checks	50(*)	100 Hz (Step size is 10 ms)
U-P-Q (SC1200UD model)	200	1 Hz (Step size is 1 s)
U-P-Q (Variant models)	200	1 Hz (Step size is 1 s)
Plausibility Tests for typical PGS configurations. One-off voltage drops	80(*)	100 Hz (Step size is 10 ms)

Plausibility Tests for typical PGS configurations. Unsuccessful AR	80(*)	100 Hz (Step size is 10 ms)
--	-------	--------------------------------

(\*) Based on the clauses **5.5.2 Plausibility test of the individual model in addition to the validation** and **5.5.3 Plausibility tests for typical PGS configurations (suitability for practical application)** of the TG4 standard, the values of SCR for Plausibility checks can be higher than the recommended ones, if the manufacturer gives an explanation about it. It has been given by email and below it is shown that explication:

*Due to a weak network (because of the low SCR value) it is difficult to maintain the same voltage value in PGU terminal as in AC voltage terminal.*

The SCR is calculated by:

$$SCR = M_{Sk}/P_n$$

Where,  $M_{Sk}$  is the short-circuit capacity of interconnected of point,  $P_n$  is the rated capacity of inverter.

And the impedance  $Z_k$  of grid is calculated by:

$$Z_k = U_g^2 / (SCR * P_n)$$

Where,  $U_g$  is the rated voltage of inverter. The resistance is 10% of reactance for impedance.

For further information, see the **“Model Description”** (version 1, issued on 25<sup>th</sup> of August of 2022).

The following pictures shows parameters adjusted by default for the simulations LVRT/HVRT tests offered in this report:

- In ACSourceParameters script:

```
ACSourceParameters.m  MIL_PGU.m  PGS_ACSourceParameters.m  PG
1      %===== AC source module parameters
2      if 0== MIL_enable
3          %===== Rated Voltage and Frequency
4          Un=400;      % Vrms(Phase-Phase)(V)
5          Fn=50;      % Frequency(Hz)
6          InitalAngle=0; % Init Angle of Phase A
7          %===== Rated Voltage and Frequency
8
9
10     %===== Test Type % 0=Disable 1=Enable
11     VRTEnable=1;
12     UprotectionEnable=0;
13     FprotectionEnable=0;
14     PQUTestEnable =0;
15     QUEnableSource=0;
16     PlausibilityEnable=0;
17     %===== Test Type
18
19
20     %===== FRT parameters START
21     PrefaultU=1; % Pre-fault Voltage
22     FaultType=1; % 1=ThreePhase Type  2=TwoPhase Type
23     Tstart=1; % Start time
24     Tend=2; % End time
25     Dip=0.25; % Dip depth
26     %===== FRT parameters END
```

- In the PGUparameters script:

```
PGUparameters.m x +
27
28 %===== VRT Parameters START
29 ZCM=0; %Zero Current Enable
30 U0=0.9; %ThresholdLVRT
31 U1=0; %Upoint1(pu)
32 U2=0.25; %Upoint2(pu)
33 U3=0.5; %Upoint3(pu)
34 U4=0.85; %Upoint4(pu)
35 T0=2; %K factor of LVRT
36 T1=5; %Tpoint1(s)
37 T2=20; %Tpoint2(s)
38 T3=40; %Tpoint3(s)
39 T4=60; %Tpoint4(s)
40
41 ZCM1=0; %Zero Current Enable
42 U00=1.1; %ThresholdOVRT
43 U11=1.25; %Upoint1(pu)
44 U22=1.2; %Upoint2(pu)
45 U33=1.15; %Upoint3(pu)
46 U44=1.1; %Upoint4(pu)
47 T00=2; %K factor of OVRT
48 T11=5; %Tpoint1(s)
49 T22=10; %Tpoint2(s)
50 T33=30; %Tpoint3(s)
51 T44=60; %Tpoint4(s)
52 VRTFilter=1; %VRT Ud Filter time(s)
53 %===== VRT Parameters END
54
```

The zero current enable only has been set for Test 50.5, 80.1, 50.6, 80.2.

The PGU subsystem has been configuring different depending on the simulation executed. Configuration of both LVRT and OVRT parameters are shown below.

The configuration for LVRT is the following:

```
PGUparameters.m x +
1  if 0== MIL_enable
2      %===== PGU module parameters START
3      Pnom=60000; %Rated Power(W)
4      Unom=400; %Rated Urms(phase-phase)(V)
5      Fnom=50; %Frequency(Hz)
6      Smax=100; %Max Apparent Power(%Pn)
7      PercentP=100; %Pre-fault P(%Pn)
8      PercentQ=0; %Pre-fault Q(%Pn)
9      PFEnable=0; %P/f function Enable,Not used
10     %===== PGU module parameters END
11
12     %===== Function Enable part START
13     LVRTEnable=1; %LVRT Enable
14     OVRTEnable=0; %OVRT Enable
15     UPEnable=0; %U protection enable
16     FPEnable=0; %f protection enable
17     QUEnable=0; %QEnable
18     QPEnable=0; %QPEnable
19     PQUTestEnable2=0; %PQU Enable
20     QsettingEnable=0; %Q setting Enable
21     PsettingEnable=0; %P setting Enable
22     %===== Function Enable part END
23
```

The configuration for OVRT is the following:

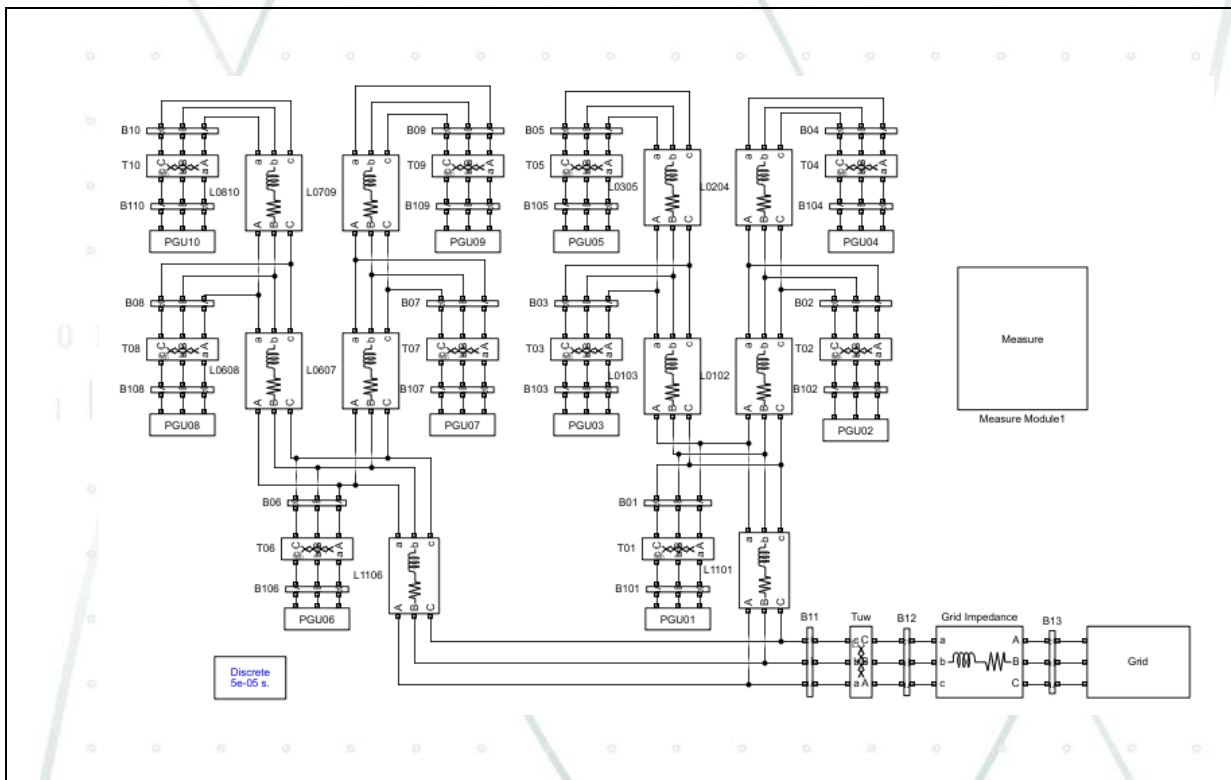
```
PGUparameters.m x +
1  if 0== MIL_enable
2      %===== PGU module parameters START
3      Pnom=60000; %Rated Power(W)
4      Unom=400; %Rated Urms(phase-phase)(V)
5      Fnom=50; %Frequency(Hz)
6      Smax=100; %Max Apparent Power(%Pn)
7      PercentP=100; %Pre-fault P(%Pn)
8      PercentQ=0; %Pre-fault Q(%Pn)
9      PFEnable=0; %P/f function Enable,Not used
10     %===== PGU module parameters END
11
12     %===== Function Enable part START
13     LVRTEnable=0; %LVRT Enable
14     OVRTEnable=1; %OVRT Enable
15     UPEnable=0; %U protection enable
16     FPEnable=0; %f protection enable
17     QUEnable=0; %QEnable
18     QPEnable=0; %QPEnable
19     PQUTestEnable2=0; %PQU Enable
20     QsettingEnable=0; %Q setting Enable
21     PsettingEnable=0; %P setting Enable
22     %===== Function Enable part END
23
```

The slack node can also be configured for plausibility tests.

```

ACSourceParameters.m x +
1  %===== AC source module parameters
2  if 0== MIL_enable
3      %===== Rated Voltage and Frequency
4      Un=400;    % Vrms(Phase-Phase)(V)
5      Fn=50;     % Frequency(Hz)
6      InitialAngle=0; % Init Angle of Phase A
7      %===== Rated Voltage and Frequency
8
    
```

The model for determinate the suitability in PGS simulations has the following design:



The PGU01 has been selected as the nearest PGU, and PGU10 has been selected as the farthest PGU.

Resistance and reactance values have been modelled by adding R-L block with the corresponding values. For this report only the values associated with PGU10 and PGU01 are relevant, and those values has been set as following:

PGU01: Resistance = 0.1  $\Omega$ ; Reactance = 0.0004 L.

PGU10: Resistance = 0.1  $\Omega$ ; Reactance = 0.0024 L.

--- END OF THE ANNEX TO CERTIFICATE ---