ANNEX TO THE CERTIFICATE

2622-0135-6-M1-CER

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Document Historical Revision:

Document Version	Date	Resume
Revision 0	21/02/2023	First issuance

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.

INDEX

1 OVERVIEW OF THE FGW TR8 EVALUATION REPORT

This point of this annex of the certificate no. 2622/0135-6-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-Richtlinie TR 3 Rev. 25 (including supplement 1, dated on 22/01/2019) and FGW-Richtlinie TR 4 Rev. 9.

The information contained in this point is extracted from the SGS Evaluation Report Number: 2622/0135-6-M1, Rev 0. With date on 21/02/2023 according of FGW TR8 rev. 9.

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

Evaluation:	Remarks	Result		
Keys: P……...Pass. NC……Not Comply NA……Not Applicable				
Checking of the PGU tested	**See point 1.1 of this document**	☒ P	☐ NC	☐ NA
Checking of the variant models to be included in the certification process	**No variant models**	☒ P	☐ NC	☐ NA
Review Test Report according FGW TG3 per VDE-AR-N 4110: 2018 certification	**See point 1.2 of this document**	☒ P	☐ NC	☐ NA
Review Test Report according FGW TG3 per VDE-AR-N 4120: 2018 certification	**See point 1.2 of this document**	☐ P	☐ NC	☒ NA
Review Test Report according FGW TG4.	**See point 1.3 of this document**	☒ P	☐ NC	☐ NA
Quality system certificate according ISO 9001	**See point 1.4 of this document**	☒ P	☐ NC	☐ NA
Compromise letter of maintain ISO 9001 certified during the validity period of VDE certificate.	**See point 1.5 of this document**	☒ P	☐ NC	☐ NA
Compromise letter of product to certify is the same that the product tested, and transferability acceptance of non-tested PGU.	**See point 1.6 of this document**	☒ P	☐ NC	☐ NA

1.1 Information about the tested model.

Information appearing in the application form (CPR1FRM5):

- **Date of the application form:** 05/05/2022
- **Applicant:** Shenzhen SOFARSOLAR Co., Ltd.
- **License holder:** Zucchetti Centro Sistemi SpA ([1])
- **Factories:** Dongguan SOFAR SOLAR Co., Ltd.
- **Product:**
  - Type: Solar Grid-tied Inverter
  - Trademark: ZCS
  - Base model: AZZURRO 3PH 80KTL-V3
  - Input ratings: 180-1000 V_{dc}(1100 V_{dc} max.); 6*60 $A_{dcMax.}$
  - Output ratings: 3/N/PE, 230/400 V_{ac}; 50/60 Hz;80 kW.
  - Software Version: V000001
  - Variant models: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3

([1]) This is an application for issuance of co-license based on the certificate 2622/0135-6-CER.

Information appearing in the test report according to FGW TG3:

- **Manufacturer:** Shenzhen SOFARSOLAR Co., Ltd.
- **Product:**
  - Type: Solar Grid-tied Inverter
  - Trademark: SofarSolar
  - Base model: SOFAR 80KTLX-G3
  - Input ratings: 180-1000 V_{dc}(1100 V_{dc} max.); 6*60 $A_{dcMax.}$
  - Output ratings: 3/N/PE, 230/400 V_{ac}; 50/60 Hz;80 kW.
  - Software Version: V000001
  - Variant models: SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3

1.2 Summary of the evaluation of the test results

The following documentation is used for the evaluation:

Information of the test report:

- Test report number: 2222/0135-6
- Issuance date: 31/01/2023.
- Testing laboratory: SGS Tecnos, S.A. (Electrical Testing Laboratory).
  Accreditation number of the laboratory: Nº 5/LE011.

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/√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 80KTL-V3
  - Rated output power base model [kW]: 80 kW
  - 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: 25.30 kW (1/√10 x Base model's Rated output power), and
- Upper limit: 160 kW (2 x Base model's Rated output power)

- **Information of the variant models:**
  - Brand name base model: AZZURRO 3PH 75KTL-V3
  - Rated output power base model [kW]: 75 kW
  - Firmware version base model: V000001

  - Brand name base model: AZZURRO 3PH 70KTL-V3
  - Rated output power base model [kW]: 70 kW
  - Firmware version base model: V000001

  - Brand name base model: AZZURRO 3PH 60KTL-V3
  - Rated output power base model [kW]: 60 kW
  - Firmware version base model: V000001

  - Brand name base model: AZZURRO 3PH 60KTL-V3 D2
  - Rated output power base model [kW]: 60 kW
  - Firmware version base model: V000001

The test results on the model AZZURRO 3PH 80KTL-V3 (equivalent to SOFAR 80KTLX-G3) are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3).
The models of AZZURRO 3PH 80KTL-V3, AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 are identical on topological schematic circuit diagram and control solution codes except for the type of designation, the input/output rating.

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	☒ Manufacturer's declaration ☒ Test report	

Evaluated documentation:

- **Manufacturer declaration:**
  "3. Declaration—(TG8)". Dated on 13th July 2022
  Compliance is evidenced by the information declared by the manufacturer in points 3.1.1 and 3.5.2 of this manufacturer declaration.

  "For both VDE-AR-N 4110 , in the entire frequency range from 47.5Hz to 51.5Hz and voltages in the range of 85%Un to 115%Un at the 80KTLX-G3 PV inverter AC connection terminal, while voltage gradient <5%Un/min and a frequency gradient of <0.5%fn/min, for quasi-stationary operation, 80KTLX-G3 PV inverter is able to in parallel operation with grid according to the minimum duration time Figure 4"

  Figure 4 for VDE-AR-N 4110:2018-11

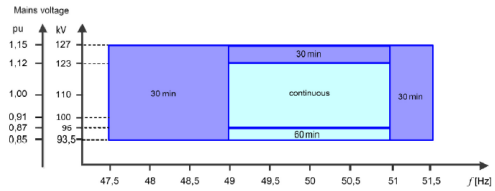


Figure 4 – Minimum requirements for the quasi-static operation of power generating plants

  "When voltage changes at the inverter AC terminal in the amount of ΔU ≤ 10%Un with voltage gradients of ≥ 5%Un/min within the voltage band from 90%Un to 110%Un occur, inverter has no reduction for active and reactive power and keep connected to the grid."

  In addition, the clause 3.5.2 of this manufacturer declaration contains details of the capability of the PGU as a voltage-time characteristic curve.

- **Test Report:**
  Test report no. 2222/0135-6. Dated on 31st January 2023.
  Compliance is evidenced by test results provided in points 4.2.1.5 and 4.6 of this test report.

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	--	☐ 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	☒ Test report	
	Evaluated documentation: - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 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	☒ Test report	
	Evaluated documentation: - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 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	☒ Test report	
	Evaluated documentation: - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 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**
A.1.2.3.4 A.2.2.3.4	**Commutation notches**				--
A.1.2.3.4.1 A.2.2.3.4.1	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**NA**
	5.4.5	11.2.2.4	TG3	☐ Test report	
	Remarks: Evidence only for converters with thyristors which use short-circuit current coming from the grid for commutation of the thyristors. The certified PV inverter 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	**Asymmetries**				--
A.1.2.3.5.1 A.2.2.3.5.1	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	5.4.6	11.2.2.5	TG3	☒ Test report	
	Evaluated documentation: - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in the point 4.3.4 of this test report.				
A.1.2.3.6	**Audio frequency ripple control**				--
A.2.2.3.6	Not applicable to PGU				NA
A.1.2.3.7	**Carrier frequency use of the customer grid**				--
A.2.2.3.7	Not applicable to PGU				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	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	10.2.2.1 to 10.2.2.3	11.2.4	TG3	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.2.2 of this manufacturer declaration. Among others, main points detailed by the manufacturer are: *"In the strategy of reactive power control, priority of active power and reactive power is optional."* *"In the case of lost communication, inverter will response to the latest reactive demand."* For further details see the points 4.2 and 4.4 of the test report no. 2222/0135-6. Dated on 31st January 2023. - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 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 reports.				
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	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	10.2.2.4	--	TG3	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.2.2 of this manufacturer declaration. Among others, main points detailed by the manufacturer are: *The following reactive power control mode functions are implemented on the PGU level:* - *Fixed Reactive Power* - *Fixed Power Factor* - *Q(P) Curve* - *Q(U) Curve* - *Q response time* For further details see the points 4.2 and 4.4 of the test report no. 2222/0135-6. Dated on 31st January 2023. - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023.				

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	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	10.2.4.1 and 10.2.4.2	11.2.7	TG3	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 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. - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in points 4.1.1 and 4.1.2.1 of this test report.				
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	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	10.2.4.3	11.2.8	TG3	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 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: *"When doing for TR3 test, due to the requirement by FGW TR3, inverter take higher priority for active power rising during frequency drop from 49.8Hz to 47.5Hz temporary than dispatching command by grid operator set point only for test purpose, but the final inverter will take higher priority for dispatching command set point."* *"P(f)-diagram: Pref is the active power freeze at that moment when the frequency to 49.8Hz/50.2Hz. The default gradient for over-frequency and under-frequency is 40%Pref/Hz, while it can be adjustable from 1%Pref/Hz to 100%Pref/Hz. 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 back to normal active power gradients: 0.15%Pn/s."* *"In the case of mains frequencies f > 51.5 Hz, inverter can operate continuous if not conflict with other grid protection settings."* *"The ability of RoCoF is more than 2.5Hz/s if not conflict with other grid protection settings."* - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in the point 4.1.3 of this test report.				

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	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 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 80KTLX-G3 is possible at 47,5-50.2 Hz (± 0.1 Hz), 90% -110%Un (± 2%Un) for VDE-AR-N 4110."* *"Normal active power gradients: 0.33%Pn/s~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, 80KTLX-G3 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. - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in points 4.1.4, 4.5.1 and 4.5.2 of this test report.				
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	--	--	
	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**	**P**
	10.2.1.4	--	--	☒ Manufacturer's declaration	
	Remarks: No requirements for island operation have been defined. 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. Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.5.1 of this manufacturer declaration. *"Manufacture: 80KTLX-G3 detects island by reactive power disturbance. Once island detected, PGU disconnect from the grid."*				
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	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.5.2 of this manufacturer declaration. For further details of control modes and interfaces see the point 4.2 of this document. - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in points 4.6 and 4.7 of this test report. The point 4.6 of the test report refers to the attachment I of the report named as 2222/0135-6 Att1 Rev. 1 (which includes calculations of short-circuit AC currents.				

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**	
	10.2.5.2	11.2.9	TG 3	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: • **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 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: • For AZZURRO 3PH 80KTL-V3: • Short-circuit surge current iP (A): 188.5 A. • Initial symmetrical short-circuit current Ik" (A): 127.5 A • Uninterrupted short-circuit current Ik (A): 115.9 A. • Maximal current Imax (A): 133.3 A. • R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 133.3 A • R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 125.4 A • R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 120.1 A. • For AZZURRO 3PH 75KTL-V3: • Short-circuit surge current iP (A): 159.8 A. • Initial symmetrical short-circuit current Ik" (A): 108.6 A • Uninterrupted short-circuit current Ik (A): 108.7 A. • Maximal current Imax (A): 113.0 A. • R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 113.0 A • R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 108.4 A • R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 103.8 A. • For AZZURRO 3PH 70KTL-V3: • Short-circuit surge current iP (A): 152.3 A. • Initial symmetrical short-circuit current Ik" (A): 102.4 A • Uninterrupted short-circuit current Ik (A): 98.4 A. • Maximal current Imax (A): 107.6 A. • R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 107.6 A • R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 105.8 A • R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 98.6 A.				**P**

FGW TG8	Title	Result
	• For AZZURRO 3PH 60KTL-V3: • Short-circuit surge current iP (A): 141.4 A. • Initial symmetrical short-circuit current Ik" (A): 95.6 A • Uninterrupted short-circuit current Ik (A): 86.9 A. • Maximal current Imax (A): 100.0A. • R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 100.0 A • R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 96.6 A • R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 92.5 A. • For AZZURRO 3PH 60KTL-V3 D2: • Short-circuit surge current iP (A): 141.4 A. • Initial symmetrical short-circuit current Ik" (A): 95.6 A • Uninterrupted short-circuit current Ik (A): 86.9 A. • Maximal current Imax (A): 100.0A. • R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 100.0 A • R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 96.6 A • R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 92.5 A. • **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in the point 4.6 of this test report. The point 4.6 of the test report refers to the attachment I of the report named as 2222/0135-6 Att1 Rev. 1, which includes calculations of short-circuit AC currents.	

FGW TG8	Title				Result
A.1.2.8 A.2.2.8	**Protection**				**P**
A.1.2.8.1 A.2.2.8.1	**Reserve protection concept**				**--**
	Not applicable to PGU				**NA**
A.1.2.8.2 A.2.2.8.2	**Readability of protection settings**				**--**
A.1.2.8.2.1 A.2.2.8.2.1	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	6.3.3	11.2.10	--	☒ Manufacturer's declaration ☐ Or component certificate	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.1 of this manufacturer declaration. *"Manufacture: 80KTLX-G3 's protection settings can be easily read and set by PC monitor."*				

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	--	☒ Manufacturer's declaration	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.2 of this manufacturer declaration. *"Manufacture: 80KTLX-G3 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 does not provide test terminal. A connecting terminal plate has to be installed separately, if necessary"*				
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	☒ Manufacturer's declaration ☒ Test report	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.3 of this manufacturer declaration. *"Manufacture: There is no additional protection equipment present in 80KTLX-G3".* - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 2023. Compliance is evidenced by test results provided in the point 4.4 of this test report.				
A.1.2.8.5 A.2.2.8.5	**Voltage protection device and Q(U) protection**				**--**
	Not applicable to PGU				**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	☒ Test report	
	Evaluated documentation: - **Test Report:** Test report no. 2222/0135-6. Dated on 31st January 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.				

FGW TG8	Title				Result
A.1.2.8 **A.2.2.8**	**Protection**				**P**
A.1.2.8.7 **A.2.2.8.7**	**Independence of the protection functions**				**--**
A.1.2.8.7.1 **A.2.2.8.7.1**	**VDE 4110 Requirement Cl.**	**VDE 4110 Verification Cl.**	**Associated documents**	**Requirement needed**	**P**
	10.3.3.1	11.2.10	--	☒ Manufacturer's declaration	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.4 of this manufacturer declaration. *"Manufacture: 80KTLX-G3 inverter integrated self-protection function is independent of any control functions".* For further details of control modes and interfaces see the point 4.3 of this document.				
A.1.2.8.8 **A.2.2.8.8**	**Protection monitoring**				**--**
	Not applicable to PGU				**NA**
A.1.2.8.9 **A.2.2.8.9**	**Own and auxiliary power supply**				**--**
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**
	10.3.3.6	11.2.10	TG 3	☒ Manufacturer's declaration ☐ Component certificate	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.5 of this manufacturer declaration. *"Manufacture: 80KTLX-G3 protection system is power supplied by DC side, it's Network-independent auxiliary power supply to the protection equipment for at least 5 seconds. Failure of the auxiliary power supply of the protection equipment or the equipment control, respectively, causes the power generation to be switched off without delay and triggering of the PGU's main switch. The protection equipment provided for meets the requirements for accuracy and setting ranges. (Voltage and current accuracy are ±1%, frequency accuracy is 0.01Hz) Operability of the protection functions shall be provided before the power generating units start feeding in power. Functionality of protection function in the normal frequency operating ranges(Figure 4) is starting from 45Hz up to 55Hz.".*				
A.1.2.8.9.4 **A.2.2.8.9.10**	**Fault logger**				**--**
	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	--	--	☒ Manufacturer's declaration	
	Evaluated documentation: - **Manufacturer declaration:** "3. Declaration—(TG8)". Dated on 13th July 2022 Compliance is evidenced by the information declared by the manufacturer in point 3.6.6 of this manufacturer declaration.				

1.3 Summary of the evaluation of the validation results

The following documentation is used for the evaluation:

Information of the test report:

- Test report number: 2222/0135-6-TG4
- Issuance date: 20/02/2023
- Issued by: SGS Tecnos, S.A. (Electrical Testing Laboratory)
- Simulation model name: PGU_80kW.slx
- Version of the simulation model: V1
- MD5 Checksum: F4FAC9A7B88A96112F1F53A44EDD17B6
- Simulation platform: Matlab Simulink
- Simulation platform version: 9.1 Version (R2018a)

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

- Document reference name: User Manual and Model Description of Matlab Model of PV Inverter 80KTLX-G3 ([1]).
- Version: V1
- Issuance date: 2022-04-21

([1]) The information given in the user manual for the model AZZURRO 3PH 80KTL-V3 (equivalent to SOFAR 80KTLX-G3) is also the same for models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3). The user manual provides indications to adapt the simulation model to operate with characteristics of different variant models above listed.

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	☒ Validated model ☒ Validation report ☒ Model documentation	
	Evaluated documentation: - **Model Documentation:** "Document reference name: User Manual and Model Description of Matlab Model of PV Inverter " V1 issue on April 21st, 2022. - **Validation Report:** Test report no. 2222/0135-6-TG4. Dated on February 20th, 2023				

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 80KTL-V3 (equivalent to SOFAR 80KTLX-G3). 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 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3).

As detailed in the validation report no. 2222/0135-6-TG4, validation results obtained on the simulation model for AZZURRO 3PH 80KTL-V3 (equivalent to SOFAR 80KTLX-G3) are essentially valid for derived models, AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3).

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 80KTL-V3 (equivalent to SOFAR 80KTLX-G3) adapted to operate with generation capabilities of derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3,SOFAR 70KTLX-G3,SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3)

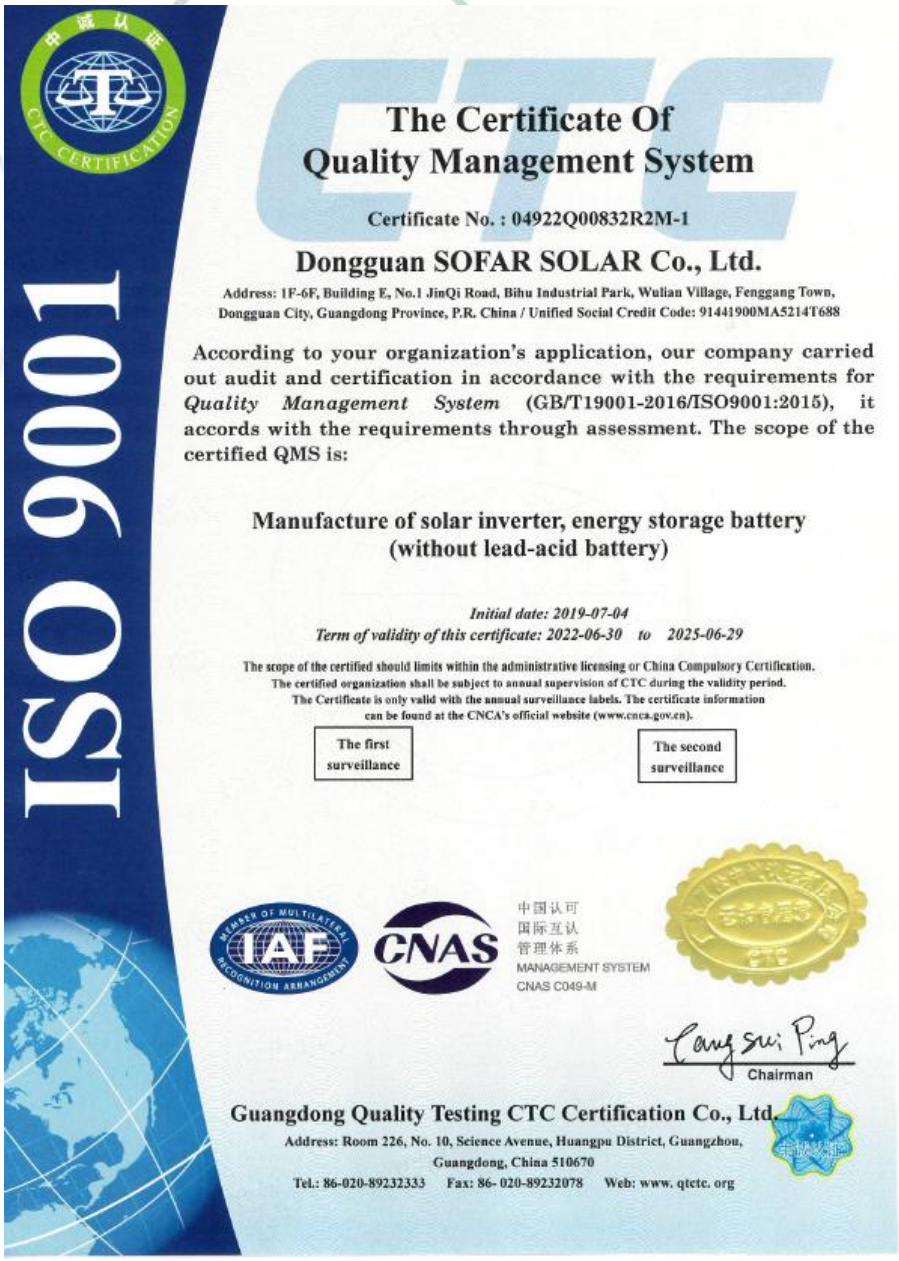
- Verification of Voltage-Dependent PQ diagrams.

1.4 Evaluation of the ISO 9001 Quality Management System Certificate of manufacturers

It is one manufacturer with the following factory address where it is produced the certified PV Inverter:

Factory address: 1F-6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City. P.R. China / Unified Social Credit Code: 91441900MA5214T688.

Evidence: Certificate No. 04919Q01026R2M-1. Issued by CTC CERTIFICATION (CNAS C049-M). Valid until 29th June 2025.



ISO 9001

The Certificate Of Quality Management System

Certificate No. : 04922Q00832R2M-1

Dongguan SOFAR SOLAR Co., Ltd.

Address: 1F-6F, Building E, No.1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, P.R. China / Unified Social Credit Code: 91441900MA5214T688

According to your organization's application, our company carried out audit and certification in accordance with the requirements for *Quality Management System* (GB/T19001-2016/ISO9001:2015), it accords with the requirements through assessment. The scope of the certified QMS is:

Manufacture of solar inverter, energy storage battery (without lead-acid battery)

Initial date: 2019-07-04
Term of validity of this certificate: 2022-06-30 to 2025-06-29

The scope of the certified should limits within the administrative licensing or China Compulsory Certification.
The certified organization shall be subject to annual supervision of CTC during the validity period.
The Certificate is only valid with the annual surveillance labels. The certificate information can be found at the CNCA's official website (www.cnca.gov.cn).

The first surveillance | The second surveillance

中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C049-M

Chairman

Guangdong Quality Testing CTC Certification Co., Ltd.

Address: Room 226, No. 10, Science Avenue, Huangpu District, Guangzhou, Guangdong, China 510670
Tel.: 86-020-89232333 Fax: 86- 020-89232078 Web: www. qtctc. org

1.5 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 accreditedcompany, according to the requirements of ISO 9001:2015, during the validityperiod of the certificate, at least 5 years.

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

Brand: SOFAR

Model: SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3 , SOFAR 70KTLX-G3

SOFAR 75KTLX-G3, SOFAR 80KTLX-G3

Date: 15th February,2022

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

1.6 Compromise letter of the certified product.

Manufacture Declaration

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

Tested model:

- SOFAR 80KTLX-G3

in accordance with the standards,

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

the variant models to be included in the certification,

Model Variant 6

- SOFAR 75KTLX-G3,
- SOFAR 70KTLX-G3,
- SOFAR 60KTLX2-G3 ,
- SOFAR 60KTLX-G3

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

Date: 2022-07-18

Name: 王辉 (wanghui)

Cha

and ification Manag

Signature:

Manufacture Seal

Declaration stating the equivalence and identity among original and co-licensed (ZCS) models.

Compromise letter

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

Hereby to authorize **Zucchetti Centro Sistemi SpA** to use following report and certificate which issued by SGS to apply Co-certificate

- **VDE-AR-N 4110: 2018,**
- **VDE-AR-N 4120: 2018,**
- **FGW TG3 (Rev. 25), FGW TG4 (Rev. 9), FGW TG8 (Rev. 9)**

Following point are also considered with this declaration in relation to the equivalence of models to certify by SGS:

- Sofar Solar will not change the products without prior informing **Zucchetti Centro Sistemi SpA** of proposed changes.

The difference between each model as following:

All the features and technical characteristics of the model:
AZZURRO 3PH 60KTL-V3 is identical with SOFAR 60KTLX-G3 except the model reference name;
AZZURRO 3PH 60KTL-V3 D2 is identical with SOFAR 60KTLX2-G3 except the model reference name;
AZZURRO 3PH 70KTL-V3 is identical with SOFAR 70KTLX-G3 except the model reference name;
AZZURRO 3PH 75KTL-V3 is identical with SOFAR 75KTLX-G3 except the model reference name;
AZZURRO 3PH 80KTL-V3 is identical with SOFAR 80KTLX-G3 except the model reference name;

For the avoidance of doubts, original co-licensed models above referred share the same Hardware and Firmware. They even share the same display and start-up menus for the configuration of the PV Inverter.

Date: 2023/02/21

Shenzhen SOFARSOLAR Co., Ltd.

Signature:
Name: Wanghui
Charger: Certificate Manager

2 OVERVIEW OF RESULTS OF THE FGW TR3 TEST REPORT

Test Report Number: 2222/0135-6 with date 26/09/2022 according of FGW TR3 rev. 25

2.1 Nenndaten / Rated data:

For the model AZZURRO 3PH 80KTL-V3

Nennscheinleistung Sn	80 kW	**Nennstrom In**	115.9 A
Nennfrequenz f_n rated frequency f_n	50/60 Hz	**Nennspannung Un rated Voltage Un**	3/N/PE, 230/400 V

For the model AZZURRO 3PH 75KTL-V3:

Nennscheinleistung Sn	75 kW	**Nennstrom In**	108.7 A
Nennfrequenz f_n rated frequency f_n	50/60 Hz	**Nennspannung Un rated Voltage Un**	3/N/PE, 230/400 V

For the model AZZURRO 3PH 70KTL-V3:

Nennscheinleistung Sn	70 kW	**Nennstrom In**	101.4 A
Nennfrequenz f_n rated frequency f_n	50/60 Hz	**Nennspannung Un rated Voltage Un**	3/N/PE, 230/400 V

For the model AZZURRO 3PH 60KTL-V3:

Nennscheinleistung Sn	60 kW	**Nennstrom In**	86.9 A
Nennfrequenz f_n rated frequency f_n	50/60 Hz	**Nennspannung Un rated Voltage Un**	3/N/PE, 230/400 V

For the model AZZURRO 3PH 60KTL-V3 D2

Nennscheinleistung Sn	60 kW	**Nennstrom In**	86.9 A
Nennfrequenz f_n rated frequency f_n	50 Hz	**Nennspannung Un rated Voltage Un**	3/N/PE, 230/400 V

As declared by the manufacturer, the model SOFAR 80KTLX-G3 is totally equivalent to the co-licensed (ZCS) model AZZURRO 3PH 80KTL-V3. Technical ratings, Firmware and start-up and display menus are exactly the same and just the model reference name is different

The information declared by the manufacturer for the model AZZURRO 3PH 80KTL-V3 is also declared as valid for the variant models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3.

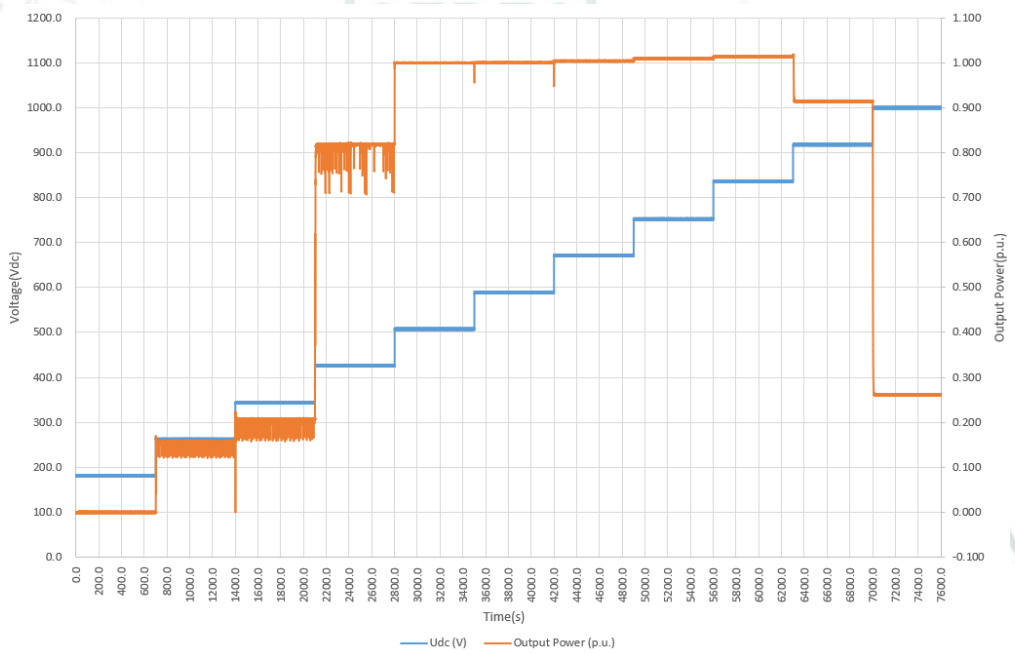
2.2 Power quality

2.2.1 Wirkleistungsspitzen / Power Peaks

DC Voltage Setting. (V)	DC Voltage Meas. (V)	Wirkleistungsspitzen in kW / Power peaks in kW			Wirkleistungsspitzen in p.u. / Power peaks in p.u.			Anzahl 10-Minuten Datensätze in / Number of 10-minute data set		
		$P_{0.2}$	P_{60}	P_{600}	$p_{0.2}$	P_{60}	P_{600}	$P_{0.2}$	P_{60}	P_{600}
180	180.1	-0.055	-0.055	-0.056	-0.001	-0.001	-0.001			
262	262.0	12.545	12.444	12.462	0.157	0.156	0.156			
344	344.0	16.611	16.484	16.452	0.208	0.206	0.206			
426	425.5	65.609	65.520	65.108	0.820	0.819	0.814			
508	507.4	80.069	80.046	80.045	1.001	1.001	1.001			
590	589.3	80.077	80.093	80.091	1.001	1.001	1.001	11	11	11
672	671.7	80.356	80.360	80.358	1.004	1.004	1.004			
754	752.6	80.755	80.752	80.751	1.009	1.009	1.009			
836	836.3	81.091	81.090	81.090	1.014	1.014	1.014			
918	918.0	73.172	73.174	73.262	0.915	0.915	0.916			
1000	1000.3	0.261	0.261	0.263	0.261	0.261	0.263			

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

Active Power Peaks



Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document.

2.2.2 Schalthandlungen / Switching Operation

- Test 1: Switch-on at P<10%Pn.

Schalthandlungen / Case of switching operation	Einschalten bei $P_{verfügbar}$ <10 % P_n (Einschaltwindgeschw.) / Start-up at $P_{available}$ < 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		30º	50º	70º	85º
Flickerformfaktor / Flicker step factor, k_f (Ψ_k)	Phase A	0.005	0.005	0.005	0.005
	Phase B	0.005	0.005	0.005	0.005
	Phase C	0.005	0.005	0.005	0.005
Spannungsänderungsfaktor / Voltage change factor, k_U (Ψ_k)	Phase A	0.022	0.022	0.022	0.022
	Phase B	0.025	0.025	0.025	0.025
	Phase C	0.032	0.032	0.032	0.032

- Test 2: Switch-on at P=100%Pn.

Schalthandlungen / Case of switching operation	Einschalten bei $P_{verfügbar}$ - P_n (Nennwindgeschwindigkeit) Start-up at $P_{available}$ = 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		30º	50º	70º	85º
Flickerformfaktor / Flicker step factor, k_f (Ψ_k)	Phase A	0.005	0.005	0.005	0.005
	Phase B	0.005	0.005	0.005	0.005
	Phase C	0.005	0.005	0.005	0.005
Spannungsänderungsfaktor / Voltage change factor, k_U (Ψ_k)	Phase A	0.117	0.117	0.117	0.117
	Phase B	0.107	0.107	0.107	0.107
	Phase C	0.102	0.102	0.102	0.102

- Test 3: Service shutdown P=100%Pn.

Schalthandlungen / Case of switching operation	**Seviceabschaltung bei Nennleistung / Cut off at rated power**				
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		30º	50º	70º	85º
Flickerformfaktor / Flicker step factor, k_f (Ψ_k)	Phase A	0.001	0.001	0.000	0.000
	Phase B	0.001	0.001	0.000	0.000
	Phase C	0.001	0.001	0.000	0.000
Spannungsänderungsfaktor / Voltage change factor, k_U (Ψ_k)	Phase A	0.122	0.122	0.122	0.122
	Phase B	0.112	0.112	0.112	0.112
	Phase C	0.110	0.110	0.110	0.110

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document.

2.2.3 Unsymmetrie / Unbalances

Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2						
P_n (%Sn)	V_{1+} (V)	V_{1-} (V)	I_{1+} (A)	I_{1-} (A)	U_i (%)	Number of records
110	230.953	0.267	95.988	0.140	0.146	>6000
100	230.847	0.263	86.667	0.129	0.149	>6000
90	230.759	0.257	78.062	0.137	0.175	>6000
80	230.672	0.256	69.402	0.102	0.148	>6000
70	230.587	0.258	60.716	0.078	0.129	>6000
60	230.502	0.259	52.081	0.072	0.138	>6000
50	230.425	0.259	43.442	0.063	0.144	>6000
40	230.352	0.264	34.808	0.050	0.143	>6000
30	230.269	0.259	26.076	0.041	0.158	>6000
20	230.192	0.219	17.401	0.030	0.172	>6000
10	230.114	0.239	8.717	0.029	0.327	>6000

Model: AZZURRO 3PH 70KTL-V3						
P_n (%Sn)	V_{1+} (V)	V_{1-} (V)	I_{1+} (A)	I_{1-} (A)	U_i (%)	Number of records
110	231.138	0.280	111.868	0.150	0.134	>6000
100	231.048	0.291	101.053	0.138	0.136	>6000
90	230.949	0.274	90.955	0.131	0.144	>6000
80	230.865	0.279	80.911	0.132	0.164	>6000
70	230.768	0.280	70.760	0.088	0.125	>6000
60	230.657	0.263	60.728	0.079	0.130	>6000
50	230.559	0.251	50.657	0.071	0.139	>6000
40	230.475	0.249	40.585	0.060	0.148	>6000
30	230.392	0.244	30.400	0.046	0.152	>6000
20	230.246	0.245	20.320	0.033	0.164	>6000
10	230.138	0.231	10.182	0.028	0.271	>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%, for VDE-AR-N 4110: 2018-11

Model: AZZURRO 3PH 75KTL-V3						
P_n (%Sn)	**V_{1+} (V)**	**V_{1-} (V)**	**I_{1+} (A)**	**I_{1-} (A)**	**U_i (%)**	**Number of records**
100	231.095	0.282	108.235	0.151	0.139	>6000
90	230.988	0.274	97.396	0.138	0.142	>6000
80	230.873	0.263	86.700	0.129	0.149	>6000
70	230.762	0.256	75.865	0.063	0.083	>6000
60	230.672	0.247	65.131	0.069	0.105	>6000
50	230.587	0.243	54.270	0.073	0.134	>6000
40	230.498	0.239	43.472	0.061	0.141	>6000
30	230.400	0.240	32.579	0.047	0.145	>6000
20	230.271	0.241	21.773	0.036	0.165	>6000
10	230.149	0.227	10.910	0.030	0.271	>6000

Model: AZZURRO 3PH 80KTL-V3						
P_n (%Sn)	**V_{1+} (V)**	**V_{1-} (V)**	**I_{1+} (A)**	**I_{1-} (A)**	**U_i (%)**	**Number of records**
110	231.279	0.274	127.620	0.174	0.136	>6000
100	231.160	0.277	115.405	0.155	0.134	>6000
90	231.030	0.249	103.981	0.148	0.143	>6000
80	230.926	0.240	92.435	0.138	0.150	>6000
70	230.823	0.242	80.942	0.137	0.169	>6000
60	230.713	0.240	69.433	0.104	0.150	>6000
50	230.609	0.236	57.888	0.077	0.132	>6000
40	230.502	0.239	46.366	0.064	0.139	>6000
30	230.384	0.246	34.746	0.048	0.138	>6000
20	230.263	0.248	23.218	0.038	0.162	>6000
10	230.147	0.231	11.635	0.030	0.259	>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%, for VDE-AR-N 4110: 2018-11

2.2.4 Flicker

Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2					
Network impedance phase angle, Ψk	Phase	30º	50º	70º	85º
Average active power, P (%Pn)		Flicker coefficient, C (Ψk, P_{bin})			
0	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
10	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
20	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
30	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
40	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
50	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
60	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
70	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
80	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
90	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 1)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 2)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 3)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
110	A	0.191	0.191	0.191	0.191
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191

Model: AZZURRO 3PH 70KTL-V3					
Network impedance phase angle, Ψk	Phase	30º	50º	70º	85º
Average active power, P (%Pn)		Flicker coefficient, C (Ψk, P_{bin})			
0	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
10	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
20	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
30	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
40	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
50	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
60	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
70	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
80	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
90	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 1)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 2)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
100 (test 3)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
110	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191

Model: AZZURRO 3PH 75KTL-V3					
Network impedance phase angle, Ψk	Phase	30º	50º	70º	85º
Average active power, P (%Pn)		Flicker coefficient, C (Ψk, P_{bin})			
0	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
10	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
20	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
30	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
40	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
50	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
60	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
70	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
80	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
90	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
100 (test 1)	A	0.205	0.205	0.204	0.204
	B	0.204	0.204	0.205	0.206
	C	0.204	0.204	0.204	0.204
100 (test 2)	A	0.191	0.192	0.192	0.191
	B	0.192	0.192	0.192	0.192
	C	0.192	0.192	0.192	0.192
100 (test 3)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190

Model: AZZURRO 3PH 80KTL-V3					
Network impedance phase angle, Ψk	Phase	30º	50º	70º	85º
Average active power, P (%Pn)		Flicker coefficient, C (Ψk, P_{bin})			
0	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
10	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
20	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
30	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
40	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
50	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.191	0.191	0.191	0.191
60	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
70	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
80	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
90	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
100 (test 1)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
100 (test 2)	A	0.217	0.218	0.218	0.218
	B	0.218	0.218	0.218	0.218
	C	0.216	0.216	0.219	0.219
100 (test 3)	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190
110	A	0.190	0.190	0.190	0.190
	B	0.191	0.191	0.191	0.191
	C	0.190	0.190	0.190	0.190

2.2.5 Oberschwingungsmessungen / Harmonics

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.002	0.038	0.041	0.032	0.036	0.032	0.030	0.017	0.035	0.137	0.057	0.027	0.137
3	0.002	0.194	0.194	0.193	0.194	0.189	0.186	0.182	0.191	0.105	0.169	0.124	0.194
4	0.002	0.035	0.036	0.026	0.030	0.027	0.025	0.015	0.053	0.045	0.048	0.058	0.058
5	0.002	0.048	0.036	0.074	0.110	0.138	0.148	0.161	0.220	0.171	0.103	0.132	0.220
6	0.002	0.014	0.008	0.009	0.009	0.009	0.008	0.008	0.016	0.078	0.014	0.015	0.078
7	0.002	0.022	0.034	0.098	0.098	0.124	0.146	0.166	0.198	0.309	0.173	0.120	0.309
8	0.002	0.009	0.012	0.010	0.008	0.008	0.009	0.009	0.097	0.142	0.049	0.050	0.142
9	0.002	0.091	0.084	0.085	0.087	0.090	0.091	0.092	0.088	0.111	0.083	0.081	0.111
10	0.002	0.013	0.010	0.009	0.008	0.009	0.008	0.008	0.087	0.175	0.086	0.083	0.175
11	0.002	0.013	0.018	0.055	0.042	0.042	0.037	0.037	0.082	0.141	0.070	0.107	0.141
12	0.002	0.014	0.014	0.010	0.010	0.009	0.009	0.008	0.018	0.041	0.017	0.013	0.041
13	0.002	0.017	0.017	0.045	0.042	0.034	0.037	0.040	0.036	0.040	0.021	0.098	0.098
14	0.002	0.010	0.008	0.009	0.008	0.008	0.008	0.008	0.028	0.028	0.021	0.096	0.096
15	0.002	0.027	0.029	0.029	0.030	0.032	0.033	0.035	0.047	0.076	0.032	0.033	0.076
16	0.002	0.009	0.007	0.008	0.007	0.008	0.007	0.008	0.013	0.079	0.114	0.015	0.114
17	0.002	0.108	0.026	0.015	0.024	0.028	0.016	0.026	0.022	0.049	0.046	0.104	0.108
18	0.002	0.011	0.008	0.008	0.007	0.007	0.007	0.008	0.009	0.039	0.022	0.012	0.039
19	0.002	0.089	0.036	0.021	0.018	0.033	0.018	0.025	0.045	0.081	0.042	0.028	0.089
20	0.002	0.010	0.008	0.007	0.008	0.008	0.008	0.009	0.017	0.032	0.033	0.015	0.033
21	0.002	0.014	0.013	0.015	0.013	0.017	0.015	0.021	0.028	0.030	0.024	0.028	0.030
22	0.002	0.009	0.007	0.007	0.007	0.008	0.007	0.007	0.017	0.014	0.097	0.083	0.097
23	0.002	0.110	0.052	0.028	0.011	0.034	0.031	0.025	0.033	0.059	0.054	0.046	0.110
24	0.002	0.009	0.008	0.007	0.007	0.007	0.007	0.007	0.010	0.016	0.020	0.018	0.020
25	0.002	0.118	0.043	0.038	0.009	0.030	0.030	0.033	0.025	0.043	0.039	0.037	0.118
26	0.002	0.008	0.007	0.007	0.007	0.007	0.006	0.008	0.011	0.017	0.044	0.060	0.060
27	0.002	0.013	0.021	0.011	0.016	0.013	0.014	0.023	0.026	0.022	0.022	0.027	0.027
28	0.002	0.007	0.009	0.006	0.006	0.006	0.007	0.008	0.011	0.009	0.054	0.036	0.054
29	0.002	0.060	0.060	0.059	0.034	0.033	0.039	0.039	0.041	0.034	0.036	0.038	0.060
30	0.002	0.008	0.008	0.007	0.006	0.006	0.006	0.006	0.009	0.013	0.013	0.011	0.013
31	0.002	0.058	0.079	0.054	0.044	0.027	0.036	0.038	0.047	0.047	0.030	0.048	0.079
32	0.002	0.008	0.007	0.006	0.006	0.007	0.007	0.006	0.012	0.013	0.024	0.021	0.024
33	0.002	0.012	0.021	0.011	0.014	0.011	0.017	0.025	0.027	0.019	0.028	0.027	0.028
34	0.002	0.009	0.009	0.006	0.006	0.006	0.006	0.007	0.010	0.018	0.022	0.021	0.022
35	0.002	0.065	0.093	0.047	0.068	0.019	0.033	0.043	0.040	0.058	0.045	0.032	0.093
36	0.002	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.007	0.012	0.009	0.009	0.012
37	0.002	0.049	0.064	0.037	0.065	0.015	0.030	0.042	0.048	0.051	0.050	0.049	0.065
38	0.002	0.007	0.007	0.006	0.005	0.005	0.006	0.006	0.007	0.011	0.009	0.011	0.011
39	0.002	0.015	0.026	0.014	0.012	0.013	0.017	0.024	0.028	0.025	0.029	0.031	0.031
40	0.002	0.007	0.007	0.005	0.006	0.006	0.007	0.007	0.008	0.011	0.012	0.011	0.012
41	0.002	0.112	0.028	0.055	0.052	0.039	0.022	0.039	0.045	0.046	0.049	0.051	0.112
42	0.002	0.007	0.005	0.006	0.005	0.005	0.006	0.006	0.006	0.011	0.008	0.008	0.011
43	0.002	0.065	0.035	0.071	0.039	0.064	0.022	0.046	0.059	0.056	0.058	0.067	0.071
44	0.002	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.010	0.009	0.006	0.010
45	0.002	0.026	0.017	0.033	0.021	0.026	0.014	0.021	0.029	0.037	0.038	0.046	0.046
46	0.002	0.008	0.007	0.005	0.005	0.005	0.005	0.006	0.007	0.012	0.011	0.009	0.012
47	0.002	0.053	0.025	0.068	0.053	0.070	0.033	0.041	0.049	0.058	0.056	0.064	0.070
48	0.002	0.006	0.005	0.006	0.005	0.005	0.005	0.005	0.007	0.013	0.008	0.007	0.013
49	0.002	0.060	0.032	0.048	0.052	0.060	0.029	0.026	0.031	0.038	0.037	0.045	0.060
50	0.002	0.005	0.004	0.005	0.005	0.005	0.005	0.005	0.007	0.019	0.007	0.008	0.019
TDC(%)	0.012	0.372	0.296	0.313	0.314	0.327	0.322	0.345	0.437	0.552	0.399	0.392	0.552

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.002	0.011	0.017	0.017	0.023	0.022	0.022	0.027	0.069	0.152	0.049	0.038	0.152
3	0.002	0.061	0.069	0.072	0.056	0.056	0.058	0.065	0.088	0.064	0.080	0.081	0.088
4	0.002	0.026	0.034	0.029	0.029	0.027	0.027	0.024	0.025	0.065	0.047	0.070	0.070
5	0.002	0.076	0.092	0.120	0.152	0.177	0.188	0.202	0.236	0.234	0.102	0.114	0.236
6	0.002	0.008	0.013	0.011	0.011	0.011	0.011	0.011	0.016	0.072	0.014	0.011	0.072
7	0.002	0.044	0.041	0.121	0.120	0.152	0.176	0.192	0.214	0.260	0.163	0.091	0.260
8	0.002	0.008	0.009	0.009	0.009	0.010	0.011	0.011	0.087	0.084	0.072	0.032	0.087
9	0.002	0.024	0.016	0.010	0.020	0.017	0.017	0.014	0.016	0.081	0.024	0.030	0.081
10	0.002	0.009	0.009	0.009	0.008	0.007	0.008	0.009	0.086	0.163	0.057	0.082	0.163
11	0.002	0.015	0.023	0.063	0.052	0.051	0.049	0.054	0.119	0.121	0.089	0.102	0.121
12	0.002	0.010	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.017	0.012	0.012	0.017
13	0.002	0.018	0.016	0.038	0.036	0.031	0.037	0.044	0.025	0.090	0.045	0.089	0.090
14	0.002	0.009	0.008	0.008	0.007	0.008	0.008	0.007	0.044	0.061	0.040	0.098	0.098
15	0.002	0.020	0.012	0.011	0.013	0.014	0.017	0.019	0.031	0.038	0.027	0.023	0.038
16	0.002	0.010	0.008	0.008	0.008	0.008	0.008	0.008	0.018	0.035	0.087	0.018	0.087
17	0.002	0.115	0.023	0.014	0.027	0.033	0.024	0.034	0.029	0.059	0.055	0.095	0.115
18	0.002	0.009	0.007	0.007	0.007	0.007	0.007	0.008	0.016	0.029	0.012	0.012	0.029
19	0.002	0.092	0.038	0.014	0.014	0.025	0.015	0.022	0.039	0.048	0.035	0.025	0.092
20	0.002	0.009	0.007	0.007	0.007	0.007	0.007	0.007	0.014	0.025	0.016	0.030	0.030
21	0.002	0.018	0.014	0.010	0.011	0.012	0.012	0.017	0.021	0.024	0.026	0.022	0.026
22	0.002	0.009	0.007	0.007	0.007	0.008	0.007	0.007	0.019	0.026	0.082	0.080	0.082
23	0.002	0.117	0.057	0.030	0.013	0.034	0.032	0.027	0.039	0.066	0.061	0.046	0.117
24	0.002	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.009	0.017	0.017	0.012	0.017
25	0.002	0.123	0.037	0.029	0.009	0.031	0.024	0.029	0.022	0.036	0.040	0.034	0.123
26	0.002	0.008	0.009	0.007	0.007	0.008	0.007	0.008	0.014	0.019	0.033	0.050	0.050
27	0.002	0.016	0.018	0.010	0.012	0.011	0.014	0.020	0.021	0.027	0.025	0.020	0.027
28	0.002	0.008	0.009	0.007	0.006	0.007	0.007	0.007	0.017	0.021	0.045	0.043	0.045
29	0.002	0.061	0.064	0.063	0.033	0.035	0.041	0.039	0.032	0.037	0.040	0.036	0.064
30	0.002	0.007	0.010	0.006	0.006	0.006	0.006	0.006	0.012	0.020	0.012	0.013	0.020
31	0.002	0.060	0.087	0.053	0.040	0.030	0.036	0.034	0.048	0.042	0.037	0.042	0.087
32	0.002	0.008	0.011	0.007	0.007	0.007	0.008	0.006	0.011	0.019	0.015	0.029	0.029
33	0.002	0.017	0.023	0.012	0.010	0.014	0.018	0.023	0.026	0.023	0.024	0.021	0.026
34	0.002	0.009	0.011	0.006	0.006	0.006	0.007	0.006	0.009	0.017	0.018	0.017	0.018
35	0.002	0.068	0.096	0.041	0.070	0.018	0.037	0.046	0.039	0.049	0.046	0.032	0.096
36	0.002	0.007	0.008	0.005	0.006	0.006	0.006	0.006	0.007	0.010	0.009	0.009	0.010
37	0.002	0.050	0.053	0.041	0.062	0.015	0.031	0.040	0.044	0.045	0.045	0.042	0.062
38	0.002	0.009	0.008	0.006	0.006	0.006	0.006	0.007	0.006	0.013	0.007	0.007	0.013
39	0.002	0.023	0.022	0.011	0.010	0.016	0.020	0.024	0.027	0.026	0.021	0.025	0.027
40	0.002	0.007	0.008	0.006	0.006	0.006	0.006	0.008	0.008	0.014	0.011	0.011	0.014
41	0.002	0.111	0.035	0.063	0.052	0.042	0.025	0.044	0.049	0.044	0.048	0.051	0.111
42	0.002	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.011	0.009	0.009	0.011
43	0.002	0.065	0.037	0.067	0.043	0.060	0.023	0.047	0.059	0.057	0.051	0.056	0.067
44	0.002	0.006	0.008	0.005	0.005	0.005	0.006	0.006	0.007	0.012	0.008	0.008	0.012
45	0.002	0.029	0.016	0.013	0.010	0.013	0.016	0.022	0.032	0.043	0.035	0.044	0.044
46	0.002	0.007	0.005	0.005	0.005	0.005	0.005	0.006	0.007	0.019	0.011	0.007	0.019
47	0.002	0.052	0.019	0.068	0.051	0.075	0.034	0.045	0.051	0.063	0.058	0.063	0.075
48	0.002	0.006	0.007	0.005	0.005	0.005	0.005	0.005	0.006	0.018	0.007	0.007	0.018
49	0.002	0.060	0.023	0.053	0.051	0.061	0.029	0.027	0.032	0.046	0.034	0.043	0.061
50	0.002	0.006	0.008	0.004	0.005	0.005	0.004	0.006	0.007	0.026	0.006	0.006	0.026
TDC(%)	0.012	0.324	0.234	0.266	0.266	0.294	0.297	0.330	0.417	0.520	0.344	0.346	0.520

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.002	0.036	0.033	0.024	0.020	0.017	0.015	0.020	0.040	0.208	0.043	0.033	0.208
3	0.002	0.142	0.135	0.135	0.145	0.143	0.140	0.129	0.118	0.042	0.092	0.057	0.145
4	0.002	0.013	0.010	0.009	0.009	0.008	0.009	0.014	0.032	0.095	0.050	0.071	0.095
5	0.002	0.031	0.069	0.132	0.155	0.183	0.196	0.212	0.260	0.216	0.096	0.133	0.260
6	0.002	0.012	0.014	0.011	0.010	0.010	0.009	0.009	0.009	0.015	0.016	0.015	0.016
7	0.002	0.037	0.053	0.126	0.125	0.153	0.172	0.184	0.219	0.291	0.202	0.128	0.291
8	0.002	0.009	0.009	0.008	0.008	0.008	0.008	0.009	0.099	0.136	0.063	0.046	0.136
9	0.002	0.069	0.076	0.083	0.075	0.078	0.079	0.083	0.089	0.060	0.072	0.062	0.089
10	0.002	0.011	0.013	0.010	0.010	0.009	0.008	0.008	0.093	0.220	0.076	0.082	0.220
11	0.002	0.016	0.026	0.068	0.057	0.057	0.055	0.060	0.110	0.173	0.071	0.136	0.173
12	0.002	0.011	0.012	0.010	0.010	0.010	0.009	0.009	0.011	0.034	0.020	0.011	0.034
13	0.002	0.013	0.022	0.049	0.045	0.041	0.045	0.047	0.023	0.067	0.051	0.111	0.111
14	0.002	0.009	0.008	0.007	0.007	0.007	0.007	0.008	0.032	0.042	0.029	0.093	0.093
15	0.002	0.021	0.022	0.025	0.024	0.026	0.025	0.026	0.033	0.048	0.021	0.023	0.048
16	0.002	0.010	0.008	0.007	0.007	0.007	0.009	0.009	0.020	0.056	0.119	0.016	0.119
17	0.002	0.112	0.025	0.017	0.030	0.035	0.022	0.025	0.021	0.023	0.047	0.104	0.112
18	0.002	0.010	0.008	0.008	0.008	0.008	0.007	0.008	0.015	0.021	0.017	0.012	0.021
19	0.002	0.085	0.039	0.017	0.019	0.029	0.016	0.021	0.051	0.082	0.019	0.030	0.085
20	0.002	0.010	0.007	0.007	0.008	0.007	0.008	0.009	0.021	0.022	0.028	0.023	0.028
21	0.002	0.017	0.012	0.014	0.011	0.017	0.014	0.020	0.025	0.027	0.024	0.023	0.027
22	0.002	0.010	0.007	0.007	0.007	0.007	0.007	0.007	0.022	0.024	0.107	0.082	0.107
23	0.002	0.119	0.048	0.032	0.012	0.036	0.033	0.026	0.033	0.060	0.055	0.055	0.119
24	0.002	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.009	0.019	0.010	0.013	0.019
25	0.002	0.118	0.040	0.036	0.009	0.034	0.027	0.027	0.022	0.021	0.018	0.034	0.118
26	0.002	0.009	0.008	0.007	0.007	0.007	0.007	0.007	0.011	0.015	0.042	0.060	0.060
27	0.002	0.018	0.013	0.015	0.012	0.012	0.013	0.021	0.026	0.031	0.024	0.027	0.031
28	0.002	0.008	0.009	0.007	0.007	0.007	0.007	0.008	0.016	0.023	0.057	0.038	0.057
29	0.002	0.061	0.064	0.058	0.033	0.033	0.042	0.038	0.038	0.040	0.038	0.048	0.064
30	0.002	0.008	0.013	0.008	0.007	0.007	0.007	0.007	0.012	0.018	0.009	0.012	0.018
31	0.002	0.064	0.086	0.049	0.043	0.029	0.036	0.032	0.039	0.051	0.026	0.040	0.086
32	0.002	0.009	0.009	0.007	0.006	0.006	0.007	0.007	0.009	0.024	0.020	0.027	0.027
33	0.002	0.017	0.017	0.015	0.012	0.012	0.014	0.021	0.026	0.021	0.027	0.025	0.027
34	0.002	0.012	0.011	0.007	0.006	0.006	0.007	0.007	0.013	0.019	0.023	0.018	0.023
35	0.002	0.063	0.088	0.044	0.069	0.017	0.038	0.043	0.038	0.052	0.040	0.034	0.088
36	0.002	0.008	0.010	0.007	0.006	0.007	0.006	0.006	0.008	0.013	0.009	0.009	0.013
37	0.002	0.050	0.054	0.045	0.064	0.017	0.028	0.040	0.045	0.047	0.044	0.041	0.064
38	0.002	0.008	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.012	0.009	0.011	0.012
39	0.002	0.026	0.017	0.019	0.014	0.016	0.014	0.021	0.024	0.023	0.026	0.029	0.029
40	0.002	0.007	0.008	0.006	0.006	0.007	0.006	0.007	0.008	0.011	0.014	0.014	0.014
41	0.002	0.112	0.034	0.063	0.050	0.042	0.024	0.042	0.046	0.045	0.044	0.049	0.112
42	0.002	0.009	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.010	0.010	0.010	0.010
43	0.002	0.059	0.046	0.067	0.040	0.063	0.025	0.045	0.060	0.058	0.055	0.061	0.067
44	0.002	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.007	0.011	0.011	0.008	0.011
45	0.002	0.027	0.015	0.041	0.021	0.030	0.016	0.027	0.034	0.040	0.033	0.039	0.041
46	0.002	0.011	0.008	0.005	0.005	0.005	0.006	0.005	0.007	0.016	0.010	0.009	0.016
47	0.002	0.053	0.019	0.065	0.054	0.074	0.031	0.042	0.051	0.062	0.056	0.065	0.074
48	0.002	0.006	0.005	0.006	0.005	0.005	0.005	0.006	0.008	0.018	0.009	0.008	0.018
49	0.002	0.058	0.031	0.050	0.052	0.060	0.032	0.024	0.032	0.047	0.037	0.044	0.060
50	0.002	0.007	0.008	0.005	0.005	0.005	0.005	0.005	0.007	0.021	0.007	0.007	0.021
TDC(%)	0.012	0.344	0.265	0.314	0.313	0.338	0.336	0.358	0.448	0.583	0.381	0.388	0.583

	Model: AZZURRO 3PH 70KTL-V3												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.045	0.046	0.037	0.030	0.028	0.017	0.086	0.100	0.044	0.025	0.042	0.100
3	0.001	0.181	0.178	0.172	0.165	0.158	0.150	0.173	0.126	0.147	0.127	0.044	0.181
4	0.001	0.042	0.041	0.031	0.025	0.023	0.014	0.101	0.018	0.052	0.057	0.046	0.101
5	0.002	0.027	0.080	0.098	0.122	0.136	0.148	0.197	0.091	0.081	0.134	0.232	0.232
6	0.001	0.014	0.008	0.009	0.008	0.007	0.007	0.011	0.017	0.010	0.011	0.014	0.017
7	0.001	0.019	0.048	0.074	0.098	0.117	0.135	0.156	0.260	0.118	0.129	0.186	0.260
8	0.001	0.007	0.009	0.008	0.007	0.008	0.008	0.099	0.124	0.018	0.063	0.052	0.124
9	0.001	0.078	0.074	0.077	0.077	0.079	0.080	0.071	0.063	0.082	0.084	0.071	0.084
10	0.001	0.010	0.010	0.008	0.008	0.007	0.006	0.057	0.051	0.095	0.036	0.034	0.095
11	0.001	0.020	0.031	0.037	0.034	0.031	0.034	0.051	0.039	0.041	0.140	0.155	0.155
12	0.001	0.011	0.013	0.009	0.008	0.008	0.007	0.014	0.038	0.022	0.010	0.019	0.038
13	0.001	0.013	0.026	0.041	0.029	0.034	0.036	0.048	0.111	0.061	0.083	0.119	0.119
14	0.001	0.008	0.007	0.007	0.007	0.007	0.007	0.025	0.110	0.074	0.052	0.037	0.110
15	0.001	0.025	0.025	0.029	0.027	0.028	0.031	0.031	0.036	0.030	0.041	0.039	0.041
16	0.001	0.007	0.008	0.006	0.006	0.006	0.006	0.042	0.067	0.084	0.075	0.043	0.084
17	0.002	0.078	0.013	0.017	0.031	0.014	0.023	0.020	0.024	0.041	0.069	0.038	0.078
18	0.001	0.009	0.009	0.006	0.006	0.006	0.007	0.009	0.041	0.021	0.017	0.010	0.041
19	0.001	0.089	0.022	0.010	0.027	0.017	0.021	0.041	0.027	0.069	0.068	0.074	0.089
20	0.002	0.008	0.007	0.006	0.006	0.006	0.008	0.012	0.070	0.081	0.069	0.023	0.081
21	0.001	0.014	0.014	0.012	0.014	0.013	0.018	0.024	0.036	0.028	0.026	0.025	0.036
22	0.001	0.007	0.008	0.006	0.007	0.006	0.006	0.012	0.051	0.024	0.046	0.065	0.065
23	0.002	0.080	0.053	0.009	0.028	0.026	0.021	0.024	0.038	0.037	0.047	0.019	0.080
24	0.001	0.007	0.007	0.006	0.006	0.006	0.006	0.007	0.019	0.019	0.011	0.012	0.019
25	0.001	0.091	0.042	0.015	0.020	0.025	0.028	0.033	0.052	0.055	0.059	0.054	0.091
26	0.002	0.007	0.006	0.006	0.005	0.006	0.007	0.013	0.022	0.030	0.037	0.044	0.044
27	0.001	0.017	0.012	0.011	0.012	0.011	0.020	0.024	0.032	0.032	0.024	0.022	0.032
28	0.001	0.007	0.006	0.005	0.005	0.006	0.007	0.010	0.023	0.039	0.051	0.018	0.051
29	0.002	0.117	0.037	0.047	0.023	0.034	0.034	0.040	0.039	0.041	0.035	0.062	0.117
30	0.001	0.007	0.006	0.005	0.006	0.005	0.005	0.006	0.014	0.016	0.009	0.013	0.016
31	0.001	0.065	0.035	0.051	0.015	0.030	0.033	0.037	0.046	0.031	0.039	0.045	0.065
32	0.001	0.006	0.007	0.005	0.006	0.005	0.005	0.007	0.010	0.010	0.034	0.021	0.034
33	0.001	0.018	0.017	0.010	0.011	0.013	0.021	0.024	0.024	0.024	0.024	0.025	0.025
34	0.001	0.006	0.005	0.005	0.005	0.005	0.006	0.008	0.013	0.025	0.021	0.017	0.025
35	0.001	0.074	0.085	0.061	0.016	0.027	0.037	0.042	0.041	0.037	0.032	0.032	0.085
36	0.001	0.010	0.006	0.005	0.005	0.005	0.005	0.006	0.012	0.011	0.008	0.007	0.012
37	0.001	0.088	0.090	0.049	0.028	0.023	0.036	0.036	0.052	0.038	0.031	0.046	0.090
38	0.001	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.008	0.010	0.013	0.008	0.013
39	0.001	0.015	0.017	0.009	0.013	0.013	0.020	0.023	0.022	0.025	0.026	0.028	0.028
40	0.002	0.009	0.006	0.005	0.005	0.006	0.006	0.006	0.013	0.012	0.011	0.012	0.013
41	0.002	0.032	0.049	0.028	0.046	0.017	0.033	0.041	0.041	0.040	0.040	0.032	0.049
42	0.002	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.008	0.007	0.007	0.007	0.008
43	0.002	0.015	0.022	0.036	0.065	0.020	0.040	0.050	0.051	0.049	0.056	0.044	0.065
44	0.002	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.008	0.008	0.009	0.010	0.010
45	0.002	0.022	0.014	0.022	0.026	0.013	0.018	0.024	0.032	0.034	0.042	0.032	0.042
46	0.002	0.005	0.006	0.004	0.004	0.004	0.005	0.005	0.008	0.009	0.006	0.006	0.009
47	0.002	0.040	0.013	0.060	0.064	0.034	0.035	0.044	0.053	0.045	0.053	0.049	0.064
48	0.002	0.006	0.005	0.004	0.004	0.004	0.005	0.005	0.009	0.007	0.007	0.008	0.009
49	0.002	0.047	0.027	0.058	0.049	0.031	0.022	0.025	0.030	0.033	0.040	0.057	0.058
50	0.002	0.004	0.005	0.004	0.004	0.004	0.004	0.006	0.009	0.010	0.011	0.012	0.012
TDC(%)	0.011	0.336	0.285	0.281	0.285	0.278	0.295	0.398	0.442	0.349	0.388	0.432	0.442

	Model: AZZURRO 3PH 70KTL-V3												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.015	0.019	0.021	0.020	0.020	0.023	0.019	0.073	0.024	0.014	0.026	0.073
3	0.001	0.048	0.056	0.049	0.048	0.046	0.046	0.089	0.048	0.053	0.072	0.084	0.089
4	0.001	0.026	0.030	0.027	0.024	0.024	0.022	0.065	0.025	0.059	0.067	0.058	0.067
5	0.001	0.050	0.103	0.127	0.151	0.168	0.186	0.213	0.132	0.068	0.101	0.186	0.213
6	0.001	0.008	0.012	0.009	0.009	0.009	0.009	0.019	0.017	0.013	0.009	0.010	0.019
7	0.001	0.035	0.058	0.092	0.119	0.140	0.155	0.182	0.252	0.113	0.096	0.149	0.252
8	0.001	0.007	0.006	0.009	0.009	0.009	0.011	0.091	0.139	0.023	0.054	0.052	0.139
9	0.001	0.021	0.018	0.016	0.016	0.018	0.016	0.016	0.022	0.028	0.044	0.041	0.044
10	0.001	0.007	0.008	0.006	0.006	0.006	0.007	0.061	0.090	0.090	0.040	0.031	0.090
11	0.001	0.018	0.038	0.048	0.043	0.041	0.045	0.077	0.072	0.046	0.129	0.154	0.154
12	0.001	0.007	0.007	0.007	0.007	0.007	0.006	0.010	0.034	0.014	0.013	0.009	0.034
13	0.001	0.014	0.021	0.036	0.026	0.033	0.036	0.050	0.074	0.048	0.084	0.130	0.130
14	0.001	0.007	0.007	0.007	0.006	0.007	0.006	0.014	0.112	0.065	0.060	0.033	0.112
15	0.001	0.015	0.014	0.012	0.011	0.014	0.017	0.017	0.023	0.017	0.022	0.019	0.023
16	0.001	0.007	0.008	0.007	0.006	0.007	0.007	0.031	0.092	0.092	0.073	0.054	0.092
17	0.001	0.082	0.015	0.018	0.032	0.021	0.030	0.031	0.049	0.029	0.080	0.036	0.082
18	0.001	0.007	0.006	0.006	0.006	0.006	0.007	0.007	0.035	0.020	0.011	0.009	0.035
19	0.001	0.094	0.013	0.008	0.021	0.014	0.019	0.044	0.053	0.047	0.070	0.071	0.094
20	0.001	0.008	0.006	0.006	0.006	0.006	0.006	0.016	0.057	0.092	0.062	0.035	0.092
21	0.001	0.011	0.011	0.010	0.010	0.010	0.015	0.017	0.035	0.018	0.017	0.017	0.035
22	0.001	0.007	0.006	0.006	0.006	0.006	0.006	0.010	0.044	0.040	0.051	0.063	0.063
23	0.001	0.084	0.051	0.010	0.028	0.028	0.023	0.021	0.037	0.046	0.037	0.016	0.084
24	0.001	0.007	0.006	0.006	0.006	0.006	0.006	0.011	0.012	0.018	0.015	0.009	0.018
25	0.001	0.093	0.047	0.012	0.022	0.022	0.025	0.029	0.053	0.042	0.058	0.045	0.093
26	0.001	0.008	0.007	0.006	0.006	0.006	0.007	0.013	0.024	0.050	0.046	0.049	0.050
27	0.001	0.015	0.019	0.013	0.009	0.011	0.017	0.018	0.032	0.023	0.015	0.022	0.032
28	0.001	0.007	0.006	0.005	0.007	0.006	0.006	0.010	0.014	0.025	0.041	0.018	0.041
29	0.001	0.118	0.040	0.049	0.023	0.036	0.033	0.040	0.042	0.044	0.035	0.063	0.118
30	0.001	0.007	0.006	0.005	0.005	0.005	0.005	0.007	0.013	0.009	0.010	0.009	0.013
31	0.001	0.064	0.036	0.049	0.018	0.031	0.029	0.030	0.030	0.026	0.034	0.035	0.064
32	0.001	0.008	0.005	0.006	0.006	0.007	0.005	0.008	0.010	0.009	0.026	0.021	0.026
33	0.001	0.022	0.023	0.014	0.013	0.015	0.019	0.020	0.023	0.024	0.019	0.019	0.024
34	0.001	0.007	0.006	0.005	0.005	0.006	0.005	0.006	0.014	0.018	0.022	0.020	0.022
35	0.001	0.078	0.093	0.064	0.017	0.031	0.039	0.037	0.045	0.034	0.035	0.032	0.093
36	0.001	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.011	0.007	0.009	0.006	0.011
37	0.001	0.092	0.089	0.049	0.023	0.025	0.035	0.033	0.038	0.031	0.025	0.039	0.092
38	0.001	0.007	0.006	0.005	0.005	0.005	0.006	0.006	0.009	0.008	0.013	0.009	0.013
39	0.001	0.029	0.025	0.011	0.015	0.017	0.020	0.023	0.024	0.022	0.022	0.022	0.029
40	0.001	0.006	0.008	0.005	0.005	0.005	0.006	0.006	0.012	0.010	0.010	0.012	0.012
41	0.001	0.032	0.049	0.028	0.048	0.019	0.037	0.041	0.042	0.039	0.042	0.033	0.049
42	0.001	0.005	0.006	0.004	0.004	0.004	0.005	0.005	0.008	0.006	0.006	0.008	0.008
43	0.001	0.021	0.025	0.037	0.062	0.020	0.041	0.048	0.045	0.045	0.047	0.035	0.062
44	0.001	0.005	0.006	0.004	0.004	0.005	0.005	0.006	0.008	0.010	0.009	0.008	0.010
45	0.001	0.026	0.009	0.011	0.010	0.013	0.019	0.026	0.033	0.036	0.035	0.033	0.036
46	0.001	0.009	0.005	0.004	0.004	0.005	0.005	0.006	0.008	0.007	0.006	0.006	0.009
47	0.001	0.038	0.013	0.063	0.067	0.035	0.039	0.046	0.052	0.044	0.051	0.054	0.067
48	0.001	0.008	0.006	0.004	0.004	0.004	0.004	0.005	0.007	0.007	0.007	0.006	0.008
49	0.001	0.047	0.023	0.057	0.051	0.030	0.023	0.025	0.029	0.032	0.039	0.047	0.057
50	0.001	0.007	0.005	0.004	0.004	0.004	0.005	0.006	0.009	0.010	0.012	0.011	0.012
TDC(%)	0.010	0.284	0.228	0.235	0.249	0.254	0.284	0.365	0.431	0.296	0.335	0.393	0.431

	Model: AZZURRO 3PH 70KTL-V3												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.031	0.029	0.019	0.016	0.014	0.015	0.067	0.092	0.034	0.014	0.037	0.092
3	0.001	0.137	0.128	0.128	0.125	0.121	0.113	0.106	0.102	0.101	0.067	0.076	0.137
4	0.001	0.017	0.014	0.008	0.007	0.007	0.013	0.073	0.022	0.065	0.072	0.067	0.073
5	0.002	0.031	0.101	0.133	0.156	0.173	0.190	0.236	0.109	0.069	0.107	0.225	0.236
6	0.001	0.011	0.014	0.010	0.008	0.008	0.008	0.012	0.012	0.013	0.011	0.012	0.014
7	0.001	0.027	0.067	0.097	0.123	0.141	0.155	0.186	0.278	0.129	0.124	0.194	0.278
8	0.001	0.007	0.008	0.007	0.007	0.007	0.008	0.101	0.135	0.011	0.066	0.053	0.135
9	0.001	0.059	0.062	0.065	0.066	0.065	0.066	0.072	0.062	0.069	0.052	0.040	0.072
10	0.001	0.009	0.014	0.009	0.009	0.007	0.007	0.066	0.090	0.102	0.039	0.037	0.102
11	0.001	0.014	0.044	0.055	0.048	0.048	0.053	0.078	0.054	0.059	0.151	0.169	0.169
12	0.001	0.009	0.012	0.009	0.009	0.008	0.008	0.010	0.016	0.013	0.014	0.019	0.019
13	0.001	0.013	0.026	0.043	0.034	0.039	0.040	0.061	0.106	0.068	0.093	0.122	0.122
14	0.001	0.007	0.007	0.006	0.006	0.006	0.007	0.025	0.114	0.067	0.053	0.045	0.114
15	0.001	0.020	0.020	0.024	0.024	0.023	0.023	0.023	0.031	0.022	0.028	0.031	0.031
16	0.001	0.007	0.009	0.006	0.007	0.007	0.008	0.045	0.097	0.100	0.082	0.057	0.100
17	0.001	0.081	0.013	0.022	0.034	0.019	0.022	0.032	0.048	0.026	0.082	0.043	0.082
18	0.001	0.008	0.010	0.007	0.006	0.006	0.007	0.010	0.019	0.010	0.014	0.010	0.019
19	0.001	0.087	0.020	0.010	0.023	0.015	0.018	0.040	0.060	0.065	0.069	0.061	0.087
20	0.001	0.007	0.008	0.006	0.006	0.007	0.008	0.017	0.055	0.087	0.069	0.024	0.087
21	0.001	0.013	0.013	0.011	0.015	0.012	0.017	0.020	0.029	0.019	0.025	0.024	0.029
22	0.001	0.007	0.008	0.006	0.006	0.006	0.006	0.008	0.060	0.029	0.052	0.072	0.072
23	0.001	0.081	0.054	0.010	0.027	0.029	0.022	0.018	0.044	0.034	0.045	0.018	0.081
24	0.001	0.009	0.008	0.006	0.006	0.006	0.006	0.010	0.013	0.017	0.011	0.010	0.017
25	0.001	0.092	0.044	0.015	0.023	0.024	0.023	0.031	0.066	0.055	0.049	0.056	0.092
26	0.001	0.007	0.008	0.006	0.006	0.006	0.006	0.017	0.013	0.040	0.041	0.050	0.050
27	0.001	0.013	0.015	0.011	0.011	0.011	0.018	0.022	0.023	0.020	0.022	0.024	0.024
28	0.001	0.009	0.006	0.006	0.006	0.006	0.007	0.011	0.032	0.031	0.053	0.012	0.053
29	0.001	0.118	0.036	0.047	0.020	0.036	0.032	0.040	0.038	0.041	0.034	0.066	0.118
30	0.001	0.008	0.007	0.006	0.007	0.006	0.006	0.007	0.014	0.014	0.010	0.011	0.014
31	0.001	0.059	0.036	0.051	0.018	0.030	0.028	0.031	0.045	0.038	0.031	0.041	0.059
32	0.001	0.007	0.007	0.006	0.005	0.006	0.006	0.008	0.012	0.015	0.030	0.026	0.030
33	0.001	0.017	0.020	0.014	0.014	0.011	0.018	0.022	0.019	0.017	0.025	0.024	0.025
34	0.001	0.007	0.006	0.005	0.006	0.006	0.006	0.008	0.021	0.027	0.025	0.018	0.027
35	0.001	0.081	0.092	0.062	0.017	0.031	0.037	0.042	0.041	0.036	0.033	0.039	0.092
36	0.001	0.012	0.008	0.005	0.006	0.005	0.006	0.006	0.010	0.009	0.009	0.007	0.012
37	0.001	0.088	0.095	0.048	0.027	0.023	0.034	0.031	0.042	0.042	0.029	0.040	0.095
38	0.001	0.007	0.007	0.005	0.005	0.005	0.006	0.008	0.007	0.012	0.011	0.010	0.012
39	0.001	0.021	0.025	0.012	0.017	0.011	0.018	0.022	0.021	0.020	0.027	0.027	0.027
40	0.001	0.007	0.008	0.005	0.006	0.006	0.006	0.006	0.014	0.012	0.012	0.012	0.014
41	0.001	0.030	0.050	0.027	0.050	0.017	0.036	0.040	0.040	0.039	0.040	0.032	0.050
42	0.001	0.007	0.008	0.005	0.005	0.006	0.005	0.005	0.008	0.008	0.008	0.008	0.008
43	0.001	0.022	0.025	0.039	0.063	0.023	0.039	0.049	0.048	0.048	0.056	0.044	0.063
44	0.001	0.006	0.005	0.004	0.005	0.005	0.005	0.005	0.007	0.010	0.008	0.009	0.010
45	0.001	0.019	0.016	0.023	0.031	0.014	0.023	0.027	0.030	0.030	0.038	0.036	0.038
46	0.001	0.009	0.008	0.005	0.005	0.005	0.005	0.006	0.008	0.007	0.006	0.007	0.009
47	0.001	0.037	0.010	0.061	0.065	0.033	0.036	0.045	0.053	0.044	0.051	0.053	0.065
48	0.001	0.010	0.007	0.004	0.005	0.005	0.005	0.006	0.008	0.007	0.008	0.008	0.010
49	0.001	0.047	0.029	0.057	0.048	0.032	0.021	0.025	0.032	0.031	0.038	0.043	0.057
50	0.001	0.007	0.005	0.004	0.004	0.004	0.005	0.006	0.010	0.008	0.010	0.014	0.014
TDC(%)	0.010	0.308	0.269	0.277	0.290	0.289	0.310	0.405	0.465	0.337	0.367	0.442	0.465

	Model: AZZURRO 3PH 75KTL-V3											
	Phase A											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.045	0.041	0.032	0.028	0.025	0.050	0.157	0.055	0.020	0.020	0.157
3	0.001	0.168	0.167	0.158	0.152	0.144	0.135	0.081	0.122	0.108	0.050	0.168
4	0.001	0.040	0.034	0.026	0.023	0.020	0.038	0.136	0.037	0.052	0.040	0.136
5	0.001	0.027	0.079	0.093	0.118	0.129	0.181	0.216	0.073	0.102	0.200	0.216
6	0.001	0.013	0.009	0.008	0.007	0.007	0.006	0.052	0.012	0.011	0.011	0.052
7	0.001	0.015	0.058	0.076	0.099	0.120	0.115	0.176	0.157	0.097	0.162	0.176
8	0.001	0.006	0.007	0.007	0.007	0.007	0.016	0.046	0.041	0.049	0.048	0.049
9	0.001	0.073	0.074	0.072	0.074	0.076	0.076	0.098	0.067	0.074	0.066	0.098
10	0.001	0.009	0.008	0.007	0.007	0.006	0.008	0.086	0.068	0.056	0.016	0.086
11	0.001	0.020	0.035	0.033	0.033	0.031	0.032	0.042	0.051	0.102	0.148	0.148
12	0.001	0.010	0.009	0.008	0.007	0.007	0.007	0.034	0.013	0.010	0.015	0.034
13	0.001	0.011	0.031	0.038	0.029	0.032	0.025	0.023	0.027	0.084	0.100	0.100
14	0.001	0.007	0.007	0.006	0.007	0.006	0.010	0.054	0.017	0.069	0.020	0.069
15	0.001	0.022	0.023	0.026	0.026	0.028	0.029	0.030	0.027	0.031	0.036	0.036
16	0.001	0.006	0.006	0.006	0.006	0.006	0.011	0.027	0.093	0.034	0.056	0.093
17	0.002	0.060	0.016	0.018	0.023	0.014	0.029	0.049	0.034	0.085	0.025	0.085
18	0.001	0.008	0.006	0.006	0.006	0.006	0.008	0.017	0.015	0.012	0.010	0.017
19	0.001	0.076	0.019	0.011	0.027	0.014	0.022	0.032	0.035	0.029	0.082	0.082
20	0.002	0.007	0.006	0.006	0.006	0.006	0.010	0.027	0.027	0.024	0.040	0.040
21	0.001	0.013	0.011	0.010	0.014	0.014	0.019	0.020	0.021	0.022	0.021	0.022
22	0.001	0.006	0.005	0.005	0.006	0.006	0.006	0.026	0.078	0.067	0.048	0.078
23	0.002	0.084	0.040	0.008	0.028	0.024	0.018	0.046	0.042	0.035	0.023	0.084
24	0.001	0.006	0.005	0.006	0.005	0.005	0.006	0.012	0.015	0.015	0.011	0.015
25	0.001	0.082	0.041	0.009	0.024	0.025	0.021	0.018	0.032	0.042	0.055	0.082
26	0.002	0.006	0.005	0.005	0.006	0.005	0.007	0.013	0.034	0.055	0.041	0.055
27	0.001	0.015	0.012	0.012	0.010	0.013	0.020	0.024	0.018	0.020	0.023	0.024
28	0.001	0.006	0.005	0.005	0.005	0.006	0.007	0.010	0.043	0.015	0.020	0.043
29	0.002	0.121	0.036	0.037	0.027	0.030	0.034	0.040	0.029	0.032	0.052	0.121
30	0.001	0.007	0.005	0.005	0.005	0.005	0.005	0.009	0.011	0.008	0.009	0.011
31	0.001	0.082	0.031	0.043	0.022	0.030	0.033	0.030	0.023	0.041	0.030	0.082
32	0.001	0.006	0.006	0.005	0.005	0.005	0.005	0.016	0.019	0.008	0.007	0.019
33	0.001	0.020	0.013	0.010	0.008	0.015	0.021	0.025	0.022	0.021	0.023	0.025
34	0.001	0.005	0.005	0.005	0.005	0.005	0.006	0.012	0.018	0.025	0.024	0.025
35	0.001	0.060	0.065	0.058	0.015	0.029	0.035	0.033	0.036	0.026	0.032	0.065
36	0.001	0.006	0.005	0.005	0.005	0.005	0.005	0.011	0.007	0.007	0.006	0.011
37	0.001	0.081	0.073	0.052	0.012	0.027	0.035	0.035	0.038	0.033	0.039	0.081
38	0.001	0.005	0.005	0.004	0.004	0.005	0.005	0.010	0.007	0.014	0.009	0.014
39	0.001	0.025	0.013	0.010	0.011	0.014	0.021	0.022	0.023	0.024	0.027	0.027
40	0.001	0.008	0.005	0.005	0.005	0.005	0.005	0.010	0.010	0.006	0.008	0.010
41	0.001	0.041	0.050	0.033	0.031	0.022	0.037	0.039	0.039	0.042	0.029	0.050
42	0.001	0.006	0.005	0.004	0.004	0.005	0.004	0.009	0.006	0.008	0.006	0.009
43	0.001	0.016	0.026	0.029	0.051	0.022	0.043	0.047	0.045	0.052	0.043	0.052
44	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.009	0.007	0.005	0.007	0.009
45	0.001	0.021	0.013	0.017	0.021	0.011	0.021	0.027	0.029	0.037	0.034	0.037
46	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.011	0.009	0.006	0.009	0.011
47	0.002	0.054	0.029	0.050	0.056	0.022	0.038	0.047	0.045	0.049	0.053	0.056
48	0.002	0.005	0.004	0.004	0.004	0.004	0.004	0.014	0.007	0.007	0.007	0.014
49	0.002	0.049	0.034	0.050	0.048	0.016	0.024	0.030	0.029	0.037	0.046	0.050
50	0.002	0.005	0.005	0.004	0.004	0.004	0.004	0.016	0.005	0.005	0.008	0.016
TDC(%)	0.010	0.322	0.266	0.260	0.267	0.264	0.303	0.425	0.321	0.327	0.387	0.425

	Model: AZZURRO 3PH 75KTL-V3											
	Phase B											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.017	0.022	0.021	0.021	0.020	0.076	0.172	0.037	0.022	0.015	0.172
3	0.001	0.044	0.047	0.045	0.042	0.041	0.055	0.063	0.034	0.038	0.044	0.063
4	0.001	0.026	0.027	0.025	0.022	0.022	0.055	0.120	0.037	0.064	0.053	0.120
5	0.001	0.049	0.108	0.121	0.148	0.162	0.212	0.255	0.085	0.084	0.159	0.255
6	0.001	0.007	0.009	0.008	0.009	0.008	0.009	0.034	0.011	0.009	0.010	0.034
7	0.001	0.036	0.067	0.090	0.119	0.139	0.129	0.180	0.158	0.079	0.132	0.180
8	0.001	0.007	0.008	0.008	0.008	0.009	0.021	0.075	0.054	0.039	0.048	0.075
9	0.001	0.015	0.015	0.016	0.016	0.016	0.017	0.060	0.017	0.033	0.037	0.060
10	0.001	0.007	0.006	0.006	0.006	0.006	0.007	0.059	0.048	0.058	0.017	0.059
11	0.001	0.020	0.044	0.044	0.041	0.039	0.045	0.035	0.066	0.089	0.145	0.145
12	0.001	0.007	0.006	0.006	0.006	0.006	0.009	0.040	0.009	0.010	0.009	0.040
13	0.001	0.013	0.026	0.033	0.026	0.032	0.033	0.062	0.034	0.082	0.110	0.110
14	0.001	0.006	0.006	0.006	0.007	0.006	0.009	0.033	0.031	0.076	0.012	0.076
15	0.001	0.011	0.011	0.012	0.010	0.013	0.016	0.039	0.020	0.022	0.015	0.039
16	0.001	0.006	0.006	0.007	0.006	0.007	0.010	0.013	0.071	0.032	0.063	0.071
17	0.001	0.062	0.018	0.019	0.027	0.022	0.032	0.053	0.040	0.085	0.024	0.085
18	0.001	0.007	0.005	0.006	0.006	0.006	0.008	0.029	0.010	0.011	0.011	0.029
19	0.001	0.082	0.016	0.009	0.020	0.012	0.020	0.015	0.028	0.026	0.082	0.082
20	0.001	0.007	0.006	0.006	0.006	0.005	0.009	0.016	0.014	0.010	0.055	0.055
21	0.001	0.011	0.009	0.009	0.009	0.010	0.014	0.026	0.022	0.013	0.017	0.026
22	0.001	0.006	0.005	0.006	0.006	0.005	0.006	0.010	0.065	0.069	0.048	0.069
23	0.001	0.085	0.044	0.009	0.027	0.026	0.021	0.037	0.048	0.038	0.028	0.085
24	0.001	0.006	0.005	0.005	0.005	0.005	0.006	0.015	0.014	0.015	0.009	0.015
25	0.001	0.081	0.041	0.008	0.024	0.020	0.021	0.015	0.032	0.040	0.044	0.081
26	0.001	0.006	0.006	0.005	0.006	0.006	0.006	0.015	0.027	0.053	0.039	0.053
27	0.001	0.013	0.017	0.010	0.009	0.012	0.018	0.018	0.020	0.014	0.020	0.020
28	0.001	0.006	0.005	0.005	0.006	0.006	0.005	0.007	0.036	0.015	0.025	0.036
29	0.001	0.118	0.041	0.038	0.028	0.031	0.033	0.032	0.032	0.029	0.049	0.118
30	0.001	0.007	0.006	0.005	0.005	0.005	0.005	0.013	0.011	0.009	0.009	0.013
31	0.001	0.085	0.030	0.042	0.023	0.029	0.030	0.022	0.028	0.039	0.027	0.085
32	0.001	0.007	0.006	0.005	0.006	0.007	0.005	0.010	0.013	0.013	0.010	0.013
33	0.001	0.013	0.016	0.012	0.011	0.015	0.020	0.021	0.019	0.017	0.018	0.021
34	0.001	0.006	0.005	0.005	0.005	0.005	0.005	0.008	0.015	0.022	0.027	0.027
35	0.001	0.064	0.072	0.062	0.014	0.032	0.035	0.043	0.037	0.025	0.037	0.072
36	0.001	0.005	0.005	0.005	0.005	0.005	0.005	0.008	0.008	0.008	0.006	0.008
37	0.001	0.082	0.072	0.050	0.012	0.027	0.035	0.039	0.035	0.029	0.036	0.082
38	0.001	0.006	0.005	0.005	0.004	0.004	0.006	0.011	0.006	0.012	0.012	0.012
39	0.001	0.014	0.023	0.010	0.013	0.017	0.021	0.021	0.017	0.020	0.023	0.023
40	0.001	0.007	0.006	0.005	0.005	0.006	0.005	0.011	0.009	0.008	0.007	0.011
41	0.001	0.039	0.053	0.033	0.034	0.025	0.038	0.034	0.038	0.042	0.032	0.053
42	0.001	0.006	0.005	0.004	0.004	0.004	0.004	0.006	0.007	0.007	0.007	0.007
43	0.001	0.012	0.029	0.030	0.049	0.023	0.042	0.044	0.041	0.045	0.036	0.049
44	0.001	0.006	0.004	0.004	0.004	0.005	0.004	0.008	0.007	0.006	0.007	0.008
45	0.001	0.017	0.013	0.010	0.010	0.014	0.021	0.025	0.028	0.034	0.033	0.034
46	0.001	0.005	0.005	0.004	0.004	0.004	0.005	0.009	0.009	0.006	0.007	0.009
47	0.001	0.049	0.030	0.051	0.060	0.023	0.039	0.043	0.047	0.049	0.057	0.060
48	0.001	0.005	0.005	0.004	0.004	0.004	0.004	0.009	0.005	0.006	0.007	0.009
49	0.001	0.045	0.033	0.050	0.049	0.018	0.026	0.029	0.027	0.035	0.040	0.050
50	0.001	0.006	0.004	0.004	0.004	0.004	0.004	0.011	0.005	0.006	0.008	0.011
TDC(%)	0.009	0.268	0.218	0.218	0.237	0.245	0.304	0.435	0.283	0.285	0.352	0.435

	Model: AZZURRO 3PH 75KTL-V3											
	Phase C											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.029	0.022	0.016	0.014	0.012	0.090	0.221	0.030	0.014	0.030	0.221
3	0.001	0.127	0.123	0.118	0.116	0.112	0.089	0.024	0.099	0.077	0.064	0.127
4	0.001	0.016	0.009	0.007	0.007	0.007	0.066	0.168	0.039	0.063	0.055	0.168
5	0.001	0.031	0.110	0.126	0.152	0.166	0.226	0.283	0.073	0.103	0.198	0.283
6	0.001	0.011	0.010	0.009	0.008	0.007	0.009	0.027	0.011	0.011	0.012	0.027
7	0.001	0.027	0.076	0.096	0.122	0.140	0.127	0.157	0.175	0.101	0.168	0.175
8	0.001	0.006	0.006	0.006	0.007	0.006	0.014	0.064	0.047	0.047	0.049	0.064
9	0.001	0.060	0.062	0.061	0.062	0.063	0.065	0.064	0.060	0.052	0.038	0.065
10	0.001	0.009	0.010	0.008	0.007	0.006	0.007	0.044	0.061	0.056	0.020	0.061
11	0.001	0.014	0.051	0.049	0.047	0.046	0.057	0.072	0.055	0.118	0.159	0.159
12	0.001	0.009	0.009	0.008	0.008	0.008	0.010	0.018	0.015	0.011	0.014	0.018
13	0.001	0.014	0.031	0.040	0.034	0.036	0.030	0.071	0.043	0.090	0.107	0.107
14	0.001	0.006	0.006	0.006	0.006	0.006	0.013	0.057	0.019	0.069	0.025	0.069
15	0.001	0.021	0.019	0.021	0.022	0.022	0.025	0.024	0.017	0.020	0.028	0.028
16	0.001	0.006	0.006	0.006	0.006	0.007	0.014	0.035	0.094	0.035	0.066	0.094
17	0.001	0.062	0.016	0.022	0.028	0.018	0.025	0.061	0.035	0.085	0.032	0.085
18	0.001	0.007	0.006	0.006	0.006	0.006	0.008	0.020	0.012	0.010	0.010	0.020
19	0.001	0.078	0.016	0.013	0.023	0.012	0.019	0.027	0.016	0.031	0.073	0.078
20	0.001	0.007	0.006	0.006	0.006	0.006	0.009	0.015	0.024	0.023	0.044	0.044
21	0.001	0.012	0.011	0.009	0.014	0.011	0.018	0.029	0.018	0.017	0.022	0.029
22	0.001	0.006	0.005	0.005	0.006	0.006	0.007	0.028	0.085	0.072	0.053	0.085
23	0.001	0.086	0.042	0.008	0.029	0.025	0.022	0.034	0.044	0.046	0.024	0.086
24	0.001	0.007	0.006	0.006	0.006	0.005	0.007	0.019	0.008	0.009	0.010	0.019
25	0.001	0.081	0.041	0.008	0.027	0.021	0.017	0.017	0.015	0.037	0.054	0.081
26	0.001	0.006	0.005	0.005	0.006	0.006	0.006	0.014	0.033	0.055	0.044	0.055
27	0.001	0.013	0.013	0.010	0.010	0.011	0.018	0.019	0.019	0.020	0.023	0.023
28	0.001	0.007	0.006	0.005	0.006	0.006	0.007	0.012	0.045	0.009	0.026	0.045
29	0.001	0.124	0.039	0.036	0.027	0.031	0.031	0.032	0.031	0.036	0.049	0.124
30	0.001	0.009	0.007	0.005	0.005	0.006	0.006	0.017	0.007	0.009	0.009	0.017
31	0.001	0.078	0.031	0.043	0.023	0.029	0.029	0.023	0.019	0.034	0.032	0.078
32	0.001	0.006	0.005	0.005	0.005	0.006	0.005	0.020	0.016	0.016	0.010	0.020
33	0.001	0.017	0.013	0.011	0.010	0.012	0.019	0.028	0.021	0.020	0.024	0.028
34	0.001	0.006	0.005	0.005	0.005	0.005	0.006	0.014	0.018	0.026	0.027	0.027
35	0.001	0.065	0.070	0.058	0.014	0.032	0.033	0.037	0.032	0.026	0.039	0.070
36	0.001	0.007	0.006	0.005	0.006	0.005	0.005	0.011	0.007	0.007	0.006	0.011
37	0.001	0.084	0.076	0.051	0.013	0.026	0.034	0.037	0.035	0.029	0.037	0.084
38	0.001	0.007	0.005	0.005	0.005	0.005	0.006	0.012	0.007	0.014	0.010	0.014
39	0.001	0.018	0.017	0.010	0.013	0.012	0.019	0.019	0.020	0.023	0.024	0.024
40	0.001	0.007	0.006	0.005	0.005	0.005	0.006	0.010	0.011	0.008	0.007	0.011
41	0.001	0.040	0.051	0.031	0.034	0.024	0.036	0.034	0.035	0.039	0.030	0.051
42	0.001	0.008	0.006	0.005	0.005	0.005	0.005	0.010	0.008	0.007	0.006	0.010
43	0.001	0.013	0.028	0.030	0.051	0.024	0.041	0.046	0.044	0.051	0.043	0.051
44	0.001	0.005	0.004	0.004	0.004	0.004	0.005	0.007	0.009	0.006	0.006	0.009
45	0.001	0.023	0.015	0.018	0.024	0.014	0.024	0.029	0.027	0.032	0.036	0.036
46	0.001	0.005	0.005	0.004	0.004	0.005	0.004	0.007	0.008	0.007	0.009	0.009
47	0.001	0.055	0.027	0.051	0.059	0.022	0.038	0.043	0.045	0.050	0.055	0.059
48	0.001	0.007	0.006	0.004	0.004	0.005	0.005	0.009	0.008	0.007	0.007	0.009
49	0.001	0.045	0.032	0.050	0.048	0.019	0.023	0.027	0.030	0.036	0.038	0.050
50	0.001	0.005	0.005	0.004	0.004	0.004	0.004	0.011	0.006	0.005	0.008	0.011
TDC(%)	0.009	0.299	0.256	0.256	0.274	0.276	0.332	0.482	0.317	0.323	0.398	0.482

	Model: AZZURRO 3PH 80KTL-V3												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.043	0.036	0.029	0.026	0.020	0.028	0.089	0.031	0.024	0.033	0.038	0.089
3	0.001	0.159	0.156	0.148	0.140	0.132	0.129	0.100	0.112	0.094	0.032	0.041	0.159
4	0.001	0.038	0.030	0.024	0.022	0.016	0.043	0.018	0.043	0.045	0.037	0.052	0.052
5	0.001	0.026	0.077	0.091	0.116	0.128	0.173	0.081	0.070	0.127	0.234	0.239	0.239
6	0.001	0.012	0.008	0.008	0.006	0.006	0.010	0.014	0.009	0.007	0.009	0.014	0.014
7	0.001	0.014	0.058	0.071	0.095	0.115	0.135	0.230	0.088	0.110	0.172	0.191	0.230
8	0.001	0.006	0.007	0.006	0.006	0.007	0.071	0.109	0.021	0.052	0.038	0.059	0.109
9	0.001	0.068	0.067	0.066	0.070	0.072	0.063	0.052	0.072	0.080	0.065	0.069	0.080
10	0.001	0.008	0.007	0.006	0.006	0.006	0.067	0.050	0.075	0.018	0.041	0.059	0.075
11	0.001	0.018	0.037	0.030	0.029	0.030	0.066	0.037	0.045	0.133	0.124	0.151	0.151
12	0.001	0.010	0.008	0.007	0.007	0.006	0.011	0.029	0.013	0.012	0.017	0.022	0.029
13	0.001	0.011	0.032	0.033	0.030	0.032	0.023	0.098	0.057	0.088	0.121	0.147	0.147
14	0.001	0.006	0.006	0.006	0.007	0.006	0.020	0.095	0.069	0.020	0.043	0.062	0.095
15	0.001	0.020	0.022	0.023	0.026	0.027	0.032	0.029	0.034	0.043	0.038	0.041	0.043
16	0.001	0.006	0.006	0.005	0.005	0.005	0.010	0.062	0.047	0.070	0.024	0.024	0.070
17	0.001	0.041	0.016	0.018	0.018	0.018	0.016	0.023	0.055	0.039	0.043	0.061	0.061
18	0.001	0.007	0.006	0.006	0.006	0.005	0.007	0.031	0.012	0.015	0.012	0.013	0.031
19	0.001	0.062	0.019	0.014	0.022	0.015	0.034	0.024	0.051	0.074	0.049	0.056	0.074
20	0.002	0.006	0.006	0.006	0.006	0.006	0.011	0.058	0.053	0.064	0.018	0.025	0.064
21	0.001	0.012	0.010	0.009	0.011	0.015	0.020	0.030	0.029	0.025	0.016	0.016	0.030
22	0.001	0.005	0.005	0.005	0.005	0.005	0.012	0.046	0.032	0.019	0.050	0.068	0.068
23	0.002	0.077	0.036	0.009	0.025	0.021	0.025	0.036	0.039	0.045	0.042	0.050	0.077
24	0.001	0.005	0.005	0.005	0.005	0.005	0.007	0.013	0.015	0.009	0.007	0.010	0.015
25	0.001	0.072	0.036	0.007	0.024	0.025	0.018	0.046	0.036	0.057	0.029	0.039	0.072
26	0.002	0.006	0.005	0.005	0.005	0.005	0.009	0.017	0.007	0.009	0.022	0.032	0.032
27	0.001	0.011	0.012	0.012	0.009	0.016	0.019	0.025	0.024	0.017	0.023	0.028	0.028
28	0.001	0.005	0.005	0.005	0.005	0.006	0.009	0.021	0.046	0.051	0.037	0.052	0.052
29	0.001	0.104	0.033	0.026	0.029	0.028	0.029	0.035	0.034	0.031	0.048	0.058	0.104
30	0.001	0.006	0.005	0.005	0.005	0.005	0.006	0.012	0.011	0.011	0.012	0.015	0.015
31	0.001	0.083	0.024	0.033	0.024	0.028	0.035	0.041	0.024	0.037	0.051	0.065	0.083
32	0.001	0.005	0.005	0.005	0.004	0.005	0.009	0.010	0.020	0.031	0.026	0.034	0.034
33	0.001	0.012	0.010	0.010	0.009	0.017	0.020	0.019	0.019	0.024	0.022	0.024	0.024
34	0.001	0.005	0.004	0.004	0.004	0.005	0.007	0.011	0.018	0.015	0.014	0.017	0.018
35	0.001	0.061	0.052	0.051	0.020	0.031	0.030	0.036	0.027	0.034	0.027	0.029	0.061
36	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.010	0.011	0.007	0.007	0.008	0.011
37	0.001	0.063	0.059	0.049	0.013	0.030	0.036	0.045	0.031	0.027	0.035	0.040	0.063
38	0.001	0.005	0.004	0.004	0.004	0.004	0.005	0.007	0.007	0.006	0.010	0.013	0.013
39	0.001	0.013	0.014	0.009	0.010	0.015	0.021	0.019	0.022	0.023	0.025	0.028	0.028
40	0.001	0.005	0.004	0.004	0.004	0.005	0.006	0.011	0.011	0.011	0.010	0.012	0.012
41	0.001	0.054	0.052	0.039	0.018	0.026	0.035	0.036	0.036	0.032	0.028	0.033	0.054
42	0.001	0.005	0.004	0.004	0.004	0.004	0.005	0.006	0.006	0.006	0.006	0.008	0.008
43	0.001	0.019	0.034	0.030	0.036	0.030	0.044	0.044	0.045	0.046	0.032	0.037	0.046
44	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.007	0.005	0.008	0.009	0.010	0.010
45	0.001	0.016	0.013	0.016	0.017	0.013	0.021	0.027	0.030	0.033	0.028	0.032	0.033
46	0.001	0.004	0.004	0.004	0.004	0.005	0.005	0.007	0.009	0.008	0.007	0.009	0.009
47	0.001	0.040	0.034	0.040	0.046	0.026	0.038	0.047	0.044	0.051	0.037	0.042	0.051
48	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.007	0.005	0.006	0.007	0.009	0.009
49	0.001	0.056	0.039	0.039	0.039	0.015	0.024	0.026	0.030	0.037	0.062	0.066	0.066
50	0.002	0.005	0.004	0.003	0.003	0.003	0.005	0.008	0.007	0.006	0.011	0.014	0.014
TDC(%)	0.009	0.295	0.249	0.240	0.247	0.254	0.320	0.386	0.286	0.343	0.398	0.454	0.454

	Model: AZZURRO 3PH 80KTL-V3												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.018	0.020	0.019	0.018	0.018	0.053	0.077	0.017	0.015	0.016	0.022	0.077
3	0.001	0.046	0.046	0.043	0.041	0.038	0.043	0.031	0.031	0.036	0.044	0.040	0.046
4	0.001	0.025	0.025	0.022	0.021	0.019	0.016	0.026	0.055	0.060	0.052	0.071	0.071
5	0.001	0.051	0.105	0.118	0.144	0.161	0.197	0.118	0.068	0.095	0.191	0.183	0.197
6	0.001	0.006	0.008	0.007	0.008	0.008	0.018	0.016	0.010	0.011	0.012	0.013	0.018
7	0.001	0.028	0.064	0.086	0.114	0.132	0.155	0.231	0.098	0.091	0.151	0.158	0.231
8	0.001	0.006	0.008	0.007	0.008	0.009	0.062	0.123	0.016	0.053	0.043	0.059	0.123
9	0.001	0.018	0.014	0.016	0.016	0.015	0.012	0.018	0.024	0.047	0.038	0.042	0.047
10	0.001	0.006	0.006	0.006	0.006	0.006	0.065	0.080	0.080	0.021	0.040	0.053	0.080
11	0.001	0.016	0.045	0.040	0.039	0.037	0.090	0.063	0.039	0.129	0.131	0.156	0.156
12	0.001	0.006	0.006	0.006	0.006	0.005	0.011	0.032	0.011	0.010	0.012	0.014	0.032
13	0.001	0.012	0.028	0.028	0.028	0.032	0.015	0.065	0.057	0.085	0.125	0.151	0.151
14	0.001	0.006	0.006	0.005	0.006	0.005	0.033	0.093	0.069	0.029	0.043	0.061	0.093
15	0.001	0.014	0.011	0.010	0.011	0.013	0.022	0.020	0.020	0.025	0.022	0.025	0.025
16	0.001	0.006	0.006	0.006	0.006	0.006	0.011	0.078	0.057	0.078	0.034	0.039	0.078
17	0.001	0.045	0.016	0.020	0.021	0.025	0.022	0.041	0.044	0.050	0.044	0.066	0.066
18	0.001	0.006	0.005	0.005	0.005	0.006	0.010	0.028	0.014	0.014	0.010	0.011	0.028
19	0.001	0.067	0.017	0.010	0.018	0.014	0.029	0.047	0.044	0.080	0.042	0.050	0.080
20	0.001	0.006	0.005	0.005	0.005	0.005	0.011	0.046	0.069	0.071	0.009	0.015	0.071
21	0.001	0.009	0.010	0.008	0.010	0.012	0.016	0.031	0.020	0.019	0.015	0.014	0.031
22	0.001	0.006	0.005	0.005	0.006	0.005	0.014	0.035	0.020	0.019	0.056	0.072	0.072
23	0.001	0.081	0.038	0.010	0.025	0.022	0.029	0.031	0.040	0.046	0.035	0.040	0.081
24	0.001	0.005	0.005	0.005	0.005	0.005	0.006	0.009	0.009	0.010	0.009	0.011	0.011
25	0.001	0.075	0.033	0.007	0.023	0.021	0.015	0.048	0.037	0.049	0.031	0.038	0.075
26	0.001	0.005	0.006	0.005	0.005	0.005	0.010	0.019	0.015	0.012	0.032	0.042	0.042
27	0.001	0.012	0.014	0.009	0.008	0.013	0.016	0.027	0.019	0.013	0.023	0.023	0.027
28	0.001	0.005	0.005	0.005	0.005	0.005	0.013	0.013	0.038	0.054	0.033	0.044	0.054
29	0.001	0.108	0.036	0.026	0.030	0.027	0.023	0.036	0.037	0.031	0.049	0.063	0.108
30	0.001	0.006	0.005	0.005	0.005	0.005	0.009	0.012	0.008	0.014	0.010	0.012	0.014
31	0.001	0.092	0.024	0.031	0.025	0.026	0.037	0.027	0.023	0.027	0.044	0.054	0.092
32	0.001	0.006	0.005	0.005	0.004	0.005	0.010	0.008	0.015	0.034	0.032	0.043	0.043
33	0.001	0.021	0.012	0.008	0.011	0.015	0.019	0.019	0.017	0.019	0.021	0.021	0.021
34	0.001	0.005	0.005	0.004	0.005	0.004	0.007	0.012	0.020	0.013	0.009	0.011	0.020
35	0.001	0.065	0.054	0.053	0.020	0.034	0.030	0.040	0.029	0.037	0.026	0.027	0.065
36	0.001	0.005	0.004	0.004	0.004	0.004	0.006	0.009	0.008	0.007	0.007	0.008	0.009
37	0.001	0.063	0.059	0.047	0.014	0.028	0.034	0.034	0.028	0.023	0.032	0.039	0.063
38	0.001	0.005	0.005	0.004	0.005	0.005	0.005	0.007	0.007	0.006	0.010	0.011	0.011
39	0.001	0.022	0.014	0.008	0.013	0.016	0.020	0.022	0.018	0.020	0.020	0.022	0.022
40	0.001	0.006	0.005	0.005	0.005	0.006	0.006	0.010	0.010	0.012	0.012	0.014	0.014
41	0.001	0.054	0.054	0.039	0.021	0.029	0.037	0.037	0.037	0.034	0.028	0.033	0.054
42	0.001	0.006	0.004	0.004	0.004	0.004	0.005	0.007	0.005	0.005	0.007	0.008	0.008
43	0.001	0.022	0.036	0.032	0.034	0.031	0.045	0.039	0.041	0.039	0.030	0.033	0.045
44	0.001	0.006	0.004	0.004	0.004	0.005	0.005	0.006	0.009	0.008	0.006	0.007	0.009
45	0.001	0.021	0.009	0.008	0.010	0.015	0.024	0.029	0.031	0.030	0.029	0.032	0.032
46	0.001	0.004	0.004	0.004	0.004	0.004	0.005	0.006	0.006	0.007	0.008	0.010	0.010
47	0.001	0.038	0.035	0.039	0.047	0.028	0.039	0.046	0.043	0.052	0.043	0.049	0.052
48	0.001	0.004	0.004	0.003	0.003	0.004	0.005	0.006	0.006	0.006	0.005	0.007	0.007
49	0.001	0.058	0.038	0.039	0.040	0.016	0.024	0.026	0.029	0.035	0.055	0.058	0.058
50	0.001	0.004	0.003	0.003	0.003	0.004	0.005	0.008	0.007	0.006	0.010	0.012	0.012
TDC(%)	0.009	0.254	0.203	0.202	0.222	0.241	0.318	0.384	0.256	0.310	0.365	0.411	0.411

	Model: AZZURRO 3PH 80KTL-V3												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	Max (%)
Nr./ Order	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2	0.001	0.027	0.019	0.015	0.013	0.011	0.031	0.080	0.022	0.014	0.026	0.034	0.080
3	0.001	0.117	0.114	0.110	0.106	0.102	0.097	0.092	0.094	0.072	0.077	0.086	0.117
4	0.001	0.015	0.008	0.007	0.006	0.007	0.030	0.023	0.059	0.062	0.057	0.080	0.080
5	0.001	0.034	0.105	0.121	0.149	0.163	0.204	0.094	0.070	0.116	0.225	0.228	0.228
6	0.001	0.011	0.009	0.008	0.008	0.006	0.011	0.012	0.010	0.011	0.010	0.013	0.013
7	0.001	0.022	0.074	0.091	0.116	0.134	0.164	0.248	0.102	0.108	0.188	0.202	0.248
8	0.001	0.006	0.006	0.006	0.006	0.006	0.074	0.120	0.015	0.058	0.043	0.062	0.120
9	0.001	0.054	0.056	0.056	0.058	0.058	0.059	0.053	0.059	0.042	0.035	0.037	0.059
10	0.001	0.008	0.008	0.007	0.007	0.006	0.066	0.080	0.083	0.013	0.051	0.066	0.083
11	0.001	0.013	0.049	0.043	0.044	0.046	0.085	0.047	0.059	0.146	0.138	0.166	0.166
12	0.001	0.008	0.008	0.007	0.008	0.007	0.007	0.014	0.007	0.013	0.016	0.019	0.019
13	0.001	0.012	0.033	0.035	0.034	0.034	0.020	0.092	0.070	0.086	0.125	0.152	0.152
14	0.001	0.006	0.005	0.006	0.005	0.006	0.022	0.097	0.071	0.025	0.054	0.076	0.097
15	0.001	0.018	0.017	0.018	0.021	0.021	0.021	0.025	0.022	0.030	0.032	0.030	0.032
16	0.001	0.006	0.006	0.006	0.006	0.007	0.013	0.085	0.055	0.084	0.026	0.032	0.085
17	0.001	0.045	0.014	0.022	0.022	0.019	0.017	0.041	0.044	0.054	0.050	0.068	0.068
18	0.001	0.007	0.006	0.006	0.006	0.006	0.011	0.015	0.011	0.013	0.013	0.015	0.015
19	0.001	0.063	0.015	0.015	0.020	0.014	0.037	0.055	0.050	0.083	0.038	0.042	0.083
20	0.001	0.006	0.005	0.006	0.006	0.006	0.015	0.047	0.064	0.071	0.015	0.023	0.071
21	0.001	0.011	0.010	0.008	0.012	0.013	0.019	0.025	0.019	0.015	0.021	0.021	0.025
22	0.001	0.006	0.005	0.005	0.006	0.005	0.016	0.053	0.022	0.010	0.063	0.083	0.083
23	0.001	0.080	0.034	0.009	0.027	0.021	0.026	0.036	0.039	0.042	0.038	0.043	0.080
24	0.001	0.005	0.005	0.005	0.005	0.005	0.007	0.010	0.013	0.011	0.010	0.013	0.013
25	0.001	0.073	0.035	0.007	0.025	0.021	0.017	0.059	0.039	0.039	0.037	0.047	0.073
26	0.001	0.005	0.005	0.005	0.005	0.005	0.008	0.013	0.017	0.014	0.030	0.041	0.041
27	0.001	0.012	0.010	0.009	0.008	0.013	0.020	0.020	0.018	0.017	0.022	0.026	0.026
28	0.001	0.006	0.005	0.005	0.005	0.006	0.012	0.029	0.048	0.062	0.040	0.052	0.062
29	0.001	0.112	0.034	0.025	0.030	0.027	0.028	0.032	0.042	0.025	0.054	0.069	0.112
30	0.001	0.009	0.006	0.005	0.005	0.005	0.010	0.012	0.009	0.009	0.008	0.010	0.012
31	0.001	0.084	0.024	0.033	0.024	0.026	0.029	0.040	0.030	0.034	0.047	0.061	0.084
32	0.001	0.005	0.005	0.005	0.005	0.005	0.006	0.011	0.018	0.031	0.033	0.043	0.043
33	0.001	0.018	0.010	0.009	0.009	0.013	0.019	0.016	0.017	0.020	0.025	0.027	0.027
34	0.001	0.005	0.005	0.004	0.004	0.005	0.010	0.018	0.022	0.010	0.013	0.015	0.022
35	0.001	0.065	0.052	0.052	0.020	0.033	0.029	0.036	0.033	0.036	0.030	0.032	0.065
36	0.001	0.005	0.005	0.004	0.005	0.005	0.006	0.009	0.007	0.008	0.006	0.008	0.009
37	0.001	0.065	0.061	0.048	0.014	0.028	0.034	0.037	0.033	0.028	0.033	0.040	0.065
38	0.001	0.006	0.005	0.004	0.004	0.005	0.005	0.006	0.008	0.007	0.011	0.012	0.012
39	0.001	0.023	0.009	0.011	0.010	0.013	0.017	0.018	0.017	0.022	0.024	0.026	0.026
40	0.001	0.006	0.005	0.005	0.005	0.005	0.006	0.012	0.009	0.013	0.011	0.014	0.014
41	0.001	0.053	0.052	0.037	0.020	0.029	0.035	0.035	0.037	0.032	0.027	0.031	0.053
42	0.001	0.007	0.005	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.007	0.010	0.010
43	0.001	0.017	0.034	0.030	0.037	0.031	0.045	0.042	0.043	0.047	0.035	0.040	0.047
44	0.001	0.006	0.004	0.004	0.004	0.004	0.005	0.006	0.009	0.007	0.006	0.008	0.009
45	0.001	0.017	0.016	0.016	0.018	0.016	0.025	0.027	0.026	0.034	0.031	0.033	0.034
46	0.001	0.005	0.004	0.004	0.004	0.004	0.005	0.007	0.007	0.007	0.008	0.012	0.012
47	0.001	0.043	0.034	0.041	0.047	0.026	0.038	0.047	0.044	0.051	0.040	0.045	0.051
48	0.001	0.005	0.004	0.004	0.004	0.005	0.006	0.007	0.006	0.007	0.007	0.009	0.009
49	0.001	0.053	0.038	0.039	0.039	0.015	0.024	0.028	0.029	0.035	0.053	0.057	0.057
50	0.001	0.005	0.004	0.004	0.003	0.004	0.005	0.009	0.007	0.008	0.012	0.015	0.015
TDC(%)	0.009	0.276	0.236	0.236	0.255	0.266	0.341	0.410	0.292	0.339	0.416	0.474	0.474

2.2.6 Zwischenharmonische / Interharmonics

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	(%)
75	0.003	0.015	0.015	0.015	0.014	0.016	0.017	0.019	0.020	0.024	0.026	0.073	0.073
125	0.003	0.016	0.015	0.015	0.012	0.013	0.013	0.014	0.016	0.018	0.016	0.029	0.029
175	0.003	0.017	0.015	0.014	0.013	0.013	0.014	0.014	0.014	0.013	0.013	0.022	0.022
225	0.003	0.014	0.012	0.012	0.012	0.012	0.013	0.013	0.013	0.013	0.013	0.022	0.022
275	0.003	0.014	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.013	0.018	0.018
325	0.003	0.014	0.012	0.013	0.012	0.013	0.013	0.013	0.014	0.014	0.014	0.018	0.018
375	0.003	0.014	0.012	0.013	0.012	0.013	0.013	0.013	0.014	0.014	0.014	0.017	0.017
425	0.003	0.014	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.017	0.017
475	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.017	0.017
525	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.015
575	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.016	0.016
625	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.015	0.016
675	0.003	0.017	0.013	0.014	0.014	0.014	0.014	0.015	0.015	0.016	0.016	0.017	0.017
725	0.003	0.016	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.014	0.014	0.016	0.016
775	0.003	0.016	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.014	0.014	0.015	0.016
825	0.003	0.017	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.014	0.014	0.015	0.017
875	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.016
925	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.016
975	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.016
1025	0.003	0.015	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.015
1075	0.003	0.015	0.012	0.011	0.012	0.012	0.012	0.012	0.013	0.014	0.013	0.014	0.015
1125	0.003	0.015	0.011	0.011	0.012	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.015
1175	0.003	0.014	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.013	0.013	0.015	0.015
1225	0.003	0.014	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.014	0.014
1275	0.003	0.014	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.015	0.015
1325	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.014	0.014
1375	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013
1425	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013
1475	0.003	0.013	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.014	0.014
1525	0.003	0.012	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013
1575	0.003	0.012	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.014	0.014
1625	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.013	0.013
1675	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.011	0.012	0.012
1725	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.013	0.013
1775	0.003	0.012	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012
1825	0.003	0.011	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012
1875	0.003	0.011	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.012	0.012	0.013	0.013
1925	0.003	0.011	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.012	0.011	0.012	0.012
1975	0.003	0.027	0.027	0.028	0.029	0.031	0.029	0.033	0.032	0.032	0.033	0.035	0.035

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.003	0.015	0.016	0.017	0.014	0.016	0.018	0.020	0.022	0.024	0.025	0.065	0.065
125	0.003	0.016	0.014	0.014	0.012	0.013	0.013	0.014	0.015	0.017	0.015	0.023	0.023
175	0.003	0.016	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.012	0.012	0.016	0.016
225	0.003	0.014	0.012	0.012	0.012	0.013	0.013	0.013	0.013	0.013	0.013	0.015	0.015
275	0.003	0.014	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.013	0.018	0.018
325	0.003	0.014	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.017	0.017
375	0.003	0.014	0.012	0.013	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.015
425	0.003	0.014	0.012	0.013	0.013	0.013	0.013	0.014	0.014	0.015	0.014	0.015	0.015
475	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.015
525	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.015
575	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
625	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
675	0.003	0.017	0.014	0.014	0.014	0.014	0.014	0.015	0.016	0.016	0.016	0.017	0.017
725	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
775	0.003	0.016	0.012	0.013	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.014	0.016
825	0.003	0.016	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.015	0.014	0.014	0.016
875	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.016
925	0.003	0.017	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.017
975	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.016
1025	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.016
1075	0.003	0.015	0.012	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.013	0.014	0.015
1125	0.003	0.015	0.011	0.011	0.012	0.012	0.012	0.012	0.013	0.014	0.013	0.014	0.015
1175	0.003	0.015	0.011	0.011	0.012	0.012	0.012	0.012	0.013	0.014	0.013	0.015	0.015
1225	0.003	0.014	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.014	0.013	0.015	0.015
1275	0.003	0.014	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.015	0.015
1325	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.013	0.013
1375	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013
1425	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.013
1475	0.003	0.013	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013
1525	0.003	0.012	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013
1575	0.003	0.012	0.010	0.010	0.010	0.011	0.010	0.011	0.012	0.013	0.012	0.014	0.014
1625	0.003	0.012	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.012
1675	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.012	0.012
1725	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.012	0.012
1775	0.003	0.012	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012
1825	0.003	0.011	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012
1875	0.003	0.011	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.013	0.013	0.014	0.014
1925	0.003	0.011	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012
1975	0.003	0.032	0.032	0.033	0.036	0.037	0.034	0.038	0.039	0.038	0.040	0.041	0.041

	Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.003	0.015	0.016	0.017	0.015	0.016	0.018	0.020	0.021	0.024	0.026	0.065	0.065
125	0.003	0.014	0.014	0.015	0.013	0.013	0.013	0.014	0.015	0.018	0.015	0.024	0.024
175	0.003	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.019	0.019
225	0.003	0.013	0.012	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.013	0.020	0.020
275	0.003	0.013	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.017	0.017
325	0.003	0.014	0.012	0.013	0.013	0.013	0.013	0.014	0.014	0.015	0.015	0.017	0.017
375	0.003	0.014	0.012	0.013	0.013	0.013	0.013	0.014	0.014	0.015	0.014	0.015	0.015
425	0.003	0.014	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.014	0.015	0.015
475	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.014	0.016	0.016
525	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.014	0.015	0.015
575	0.003	0.015	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.015	0.016	0.016
625	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.014	0.016	0.016
675	0.003	0.016	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.015	0.015	0.016
725	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.015	0.014	0.015	0.016
775	0.003	0.016	0.012	0.013	0.013	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
825	0.003	0.016	0.012	0.013	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
875	0.003	0.016	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.015	0.014	0.015	0.016
925	0.003	0.016	0.012	0.012	0.012	0.013	0.013	0.013	0.014	0.014	0.014	0.015	0.016
975	0.003	0.016	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.014	0.014	0.015	0.016
1025	0.003	0.016	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.016
1075	0.003	0.015	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.015
1125	0.003	0.015	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.015	0.015
1175	0.003	0.015	0.012	0.012	0.012	0.012	0.012	0.013	0.013	0.014	0.014	0.014	0.015
1225	0.003	0.014	0.012	0.012	0.012	0.012	0.012	0.013	0.014	0.014	0.014	0.014	0.014
1275	0.003	0.014	0.012	0.011	0.012	0.012	0.012	0.012	0.013	0.014	0.013	0.014	0.014
1325	0.003	0.013	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.014	0.013	0.014	0.014
1375	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.013	0.013
1425	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.014	0.014
1475	0.003	0.013	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.013	0.013	0.014	0.014
1525	0.003	0.012	0.011	0.010	0.011	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013
1575	0.003	0.013	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013
1625	0.003	0.012	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.013
1675	0.003	0.012	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.013
1725	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.013	0.013
1775	0.003	0.012	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.012
1825	0.003	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.012	0.012	0.011	0.012	0.012
1875	0.003	0.011	0.010	0.009	0.010	0.010	0.010	0.011	0.012	0.013	0.013	0.014	0.014
1925	0.003	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012
1975	0.003	0.030	0.030	0.030	0.033	0.033	0.033	0.035	0.036	0.036	0.038	0.038	0.038

	Model: AZZURRO 3PH 70KTL-V3												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.009	0.010	0.011	0.013	0.014	0.016	0.018	0.019	0.022	0.024	0.154	0.154
125	0.002	0.010	0.010	0.010	0.011	0.011	0.011	0.013	0.013	0.014	0.014	0.055	0.055
175	0.002	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.011	0.039	0.039
225	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.036	0.036
275	0.002	0.011	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.025	0.025
325	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.026	0.026
375	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.020	0.020
425	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.020	0.020
475	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.018	0.018
525	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.017	0.017
575	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.019	0.019
625	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.016	0.016
675	0.002	0.013	0.011	0.012	0.012	0.012	0.012	0.013	0.013	0.013	0.013	0.020	0.020
725	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.017	0.017
775	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
825	0.002	0.012	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
875	0.002	0.012	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.016	0.016
925	0.002	0.012	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.015	0.015
975	0.002	0.012	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.015	0.015
1025	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.014	0.014
1075	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.014	0.014
1125	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.013	0.013
1175	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1225	0.002	0.011	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1275	0.002	0.011	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.016	0.016
1325	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1375	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.013	0.013
1425	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.012	0.012
1475	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.014	0.014
1525	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.010	0.011	0.013	0.013
1575	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.015	0.015
1625	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.013	0.013
1675	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.013	0.013
1725	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.012	0.012
1775	0.002	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.013	0.013
1825	0.002	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.012	0.012
1875	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.011	0.014	0.014
1925	0.002	0.009	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.012	0.012
1975	0.002	0.024	0.023	0.024	0.024	0.023	0.023	0.025	0.027	0.028	0.034	0.029	0.034

	Model: AZZURRO 3PH 70KTL-V3												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.003	0.010	0.010	0.011	0.013	0.014	0.017	0.019	0.020	0.021	0.023	0.130	0.130
125	0.002	0.010	0.010	0.010	0.011	0.011	0.012	0.013	0.013	0.013	0.012	0.039	0.039
175	0.002	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.012	0.011	0.011	0.022	0.022
225	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.011	0.011	0.012	0.018	0.018
275	0.002	0.011	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.025	0.025
325	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.022	0.022
375	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.016	0.016
425	0.002	0.011	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.016	0.016
475	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
525	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
575	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
625	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
675	0.002	0.013	0.011	0.012	0.012	0.012	0.012	0.013	0.013	0.013	0.013	0.017	0.017
725	0.002	0.012	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.015	0.015
775	0.002	0.012	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
825	0.002	0.012	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
875	0.002	0.012	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.013	0.013
925	0.002	0.012	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
975	0.002	0.012	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.014	0.014
1025	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.014	0.014
1075	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.012	0.014	0.014
1125	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.013	0.013
1175	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1225	0.002	0.011	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.015	0.015
1275	0.002	0.011	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.015	0.015
1325	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1375	0.002	0.010	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.012
1425	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.013	0.013
1475	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.014	0.014
1525	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.011	0.015	0.015
1575	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.014	0.014
1625	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.012	0.012
1675	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.012	0.012
1725	0.002	0.010	0.009	0.009	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.014	0.014
1775	0.002	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.013	0.013
1825	0.002	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.009	0.010	0.012	0.012
1875	0.002	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.011	0.011	0.012	0.015	0.015
1925	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.009	0.010	0.009	0.010	0.012	0.012
1975	0.002	0.029	0.028	0.030	0.030	0.029	0.029	0.031	0.034	0.034	0.039	0.037	0.039

	Model: AZZURRO 3PH 70KTL-V3												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.003	0.010	0.010	0.011	0.013	0.014	0.017	0.019	0.019	0.022	0.024	0.132	0.132
125	0.002	0.010	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013	0.037	0.037
175	0.002	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.011	0.011	0.011	0.028	0.028
225	0.002	0.011	0.011	0.011	0.011	0.011	0.011	0.012	0.011	0.012	0.012	0.030	0.030
275	0.002	0.011	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.019	0.019
325	0.002	0.011	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.013	0.019	0.019
375	0.002	0.011	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.013	0.016	0.016
425	0.002	0.011	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.012	0.016	0.016
475	0.002	0.012	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.017	0.017
525	0.002	0.012	0.010	0.011	0.011	0.011	0.012	0.013	0.012	0.013	0.013	0.015	0.015
575	0.002	0.012	0.011	0.011	0.011	0.011	0.012	0.012	0.013	0.012	0.013	0.015	0.015
625	0.002	0.012	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.013	0.015	0.015
675	0.002	0.012	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.013	0.016	0.016
725	0.002	0.012	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.013	0.015	0.015
775	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
825	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
875	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.015	0.015
925	0.002	0.012	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
975	0.002	0.012	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.014
1025	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.015	0.015
1075	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.015	0.015
1125	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.014	0.014
1175	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.014	0.014
1225	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.012	0.016	0.016
1275	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.017	0.017
1325	0.002	0.010	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.013	0.013
1375	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.013	0.013
1425	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.014	0.014
1475	0.002	0.010	0.009	0.010	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.013	0.013
1525	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.014	0.014
1575	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.014	0.014
1625	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.014	0.014
1675	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1725	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.014	0.014
1775	0.002	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.013	0.013
1825	0.002	0.009	0.009	0.008	0.009	0.008	0.009	0.010	0.010	0.010	0.010	0.012	0.012
1875	0.002	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.012	0.015	0.015
1925	0.002	0.009	0.009	0.008	0.009	0.008	0.009	0.009	0.010	0.009	0.010	0.012	0.012
1975	0.002	0.026	0.026	0.028	0.028	0.027	0.027	0.029	0.031	0.033	0.036	0.035	0.036

	Model: AZZURRO 3PH 75KTL-V3											
	Phase A											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.009	0.010	0.011	0.012	0.014	0.016	0.019	0.019	0.021	0.024	0.024
125	0.002	0.010	0.009	0.010	0.010	0.010	0.012	0.016	0.012	0.012	0.011	0.016
175	0.002	0.011	0.010	0.010	0.011	0.011	0.012	0.011	0.011	0.010	0.010	0.012
225	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
275	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
325	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
375	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
425	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
475	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
525	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
575	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
625	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
675	0.002	0.011	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.012
725	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
775	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.011	0.012
825	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
875	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
925	0.002	0.011	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
975	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1025	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1075	0.002	0.010	0.009	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1125	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1175	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.011	0.011	0.011
1225	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.011	0.011	0.011
1275	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.011
1325	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.010	0.011	0.011
1375	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010
1425	0.002	0.009	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1475	0.002	0.009	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1525	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1575	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010
1625	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010
1675	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.009	0.009	0.010	0.010
1725	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.009	0.009	0.009	0.010
1775	0.002	0.009	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1825	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.010	0.009	0.009	0.009	0.010
1875	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.010	0.009	0.010	0.011	0.011
1925	0.002	0.008	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1975	0.002	0.021	0.020	0.023	0.024	0.023	0.023	0.024	0.026	0.025	0.027	0.027

	Model: AZZURRO 3PH 75KTL-V3											
	Phase B											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.003	0.009	0.010	0.011	0.012	0.014	0.016	0.019	0.020	0.022	0.024	0.024
125	0.002	0.010	0.010	0.010	0.010	0.010	0.012	0.016	0.012	0.012	0.011	0.016
175	0.002	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.011	0.010	0.010	0.012
225	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
275	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
325	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
375	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
425	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
475	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
525	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
575	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
625	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
675	0.002	0.011	0.011	0.011	0.011	0.011	0.012	0.013	0.012	0.012	0.012	0.013
725	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
775	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.011	0.012
825	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.011	0.012
875	0.002	0.011	0.010	0.010	0.010	0.010	0.010	0.012	0.011	0.011	0.011	0.012
925	0.002	0.011	0.009	0.010	0.010	0.010	0.010	0.012	0.011	0.011	0.011	0.012
975	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1025	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1075	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1125	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1175	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1225	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1275	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.011
1325	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.011
1375	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010
1425	0.002	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1475	0.002	0.009	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1525	0.002	0.009	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1575	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010
1625	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.010	0.010
1675	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.010
1725	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.010
1775	0.002	0.009	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1825	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1875	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.012	0.012
1925	0.002	0.008	0.007	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1975	0.002	0.026	0.026	0.029	0.030	0.027	0.029	0.030	0.032	0.032	0.033	0.033

	Model: AZZURRO 3PH 75KTL-V3											
	Phase C											
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.009	0.010	0.011	0.012	0.014	0.016	0.018	0.020	0.022	0.025	0.025
125	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.017	0.012	0.013	0.012	0.017
175	0.002	0.011	0.010	0.011	0.011	0.011	0.012	0.011	0.011	0.011	0.011	0.012
225	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
275	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
325	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
375	0.002	0.011	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.012	0.012
425	0.002	0.011	0.010	0.010	0.011	0.011	0.011	0.013	0.012	0.012	0.012	0.013
475	0.002	0.011	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.012
525	0.002	0.011	0.010	0.010	0.011	0.011	0.011	0.012	0.011	0.012	0.012	0.012
575	0.002	0.011	0.010	0.010	0.010	0.011	0.011	0.012	0.011	0.012	0.012	0.012
625	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.012
675	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.012
725	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
775	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
825	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.012	0.012	0.012
875	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
925	0.002	0.011	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.012	0.012
975	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.012	0.011	0.011	0.011	0.012
1025	0.002	0.010	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011
1075	0.002	0.010	0.009	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1125	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1175	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1225	0.002	0.010	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
1275	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1325	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011
1375	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.010	0.011	0.011
1425	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.010	0.011	0.011
1475	0.002	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1525	0.002	0.009	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1575	0.002	0.009	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1625	0.002	0.009	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1675	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010
1725	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010
1775	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.009	0.009	0.010	0.010
1825	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009
1875	0.002	0.009	0.008	0.008	0.008	0.008	0.008	0.010	0.010	0.011	0.011	0.011
1925	0.002	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010
1975	0.002	0.024	0.024	0.026	0.028	0.026	0.027	0.028	0.030	0.030	0.031	0.031

	Model: AZZURRO 3PH 80KTL-V3												
	Phase A												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.008	0.009	0.010	0.012	0.013	0.016	0.017	0.018	0.021	0.023	0.039	0.039
125	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.010	0.022	0.022
175	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.010	0.010	0.010	0.066	0.066
225	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.010	0.010	0.011	0.016	0.016
275	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.010	0.010	0.011	0.011	0.019	0.019
325	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.011	0.011	0.011	0.017	0.017
375	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.036	0.036
425	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.017	0.017
475	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.010	0.011	0.011	0.015	0.015
525	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.014	0.014
575	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.014	0.014
625	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011	0.015	0.015
675	0.002	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.012	0.015	0.015
725	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.015	0.015
775	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.010	0.010	0.010	0.011	0.014	0.014
825	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.011	0.010	0.011	0.011	0.014	0.014
875	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.014	0.014
925	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.014	0.014
975	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.013	0.013
1025	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.014	0.014
1075	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.014	0.014
1125	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1175	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.017	0.017
1225	0.002	0.009	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.015	0.015
1275	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.009	0.010	0.010	0.014	0.014
1325	0.002	0.009	0.008	0.008	0.008	0.009	0.010	0.009	0.009	0.010	0.010	0.013	0.013
1375	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.010	0.012	0.012
1425	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.013	0.013
1475	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.012	0.012
1525	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.012	0.012
1575	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.012	0.012
1625	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.011	0.011
1675	0.002	0.008	0.007	0.007	0.007	0.008	0.009	0.008	0.009	0.009	0.009	0.011	0.011
1725	0.002	0.008	0.008	0.007	0.007	0.008	0.009	0.009	0.009	0.009	0.009	0.011	0.011
1775	0.002	0.008	0.007	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.009	0.011	0.011
1825	0.002	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.011	0.011
1875	0.002	0.007	0.007	0.007	0.007	0.007	0.008	0.009	0.009	0.010	0.011	0.012	0.012
1925	0.002	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.008	0.009	0.011	0.011
1975	0.002	0.019	0.019	0.019	0.019	0.021	0.020	0.021	0.023	0.025	0.025	0.027	0.027

	Model: AZZURRO 3PH 80KTL-V3												
	Phase B												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.008	0.009	0.010	0.012	0.013	0.016	0.017	0.019	0.021	0.022	0.037	0.037
125	0.002	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.019	0.019
175	0.002	0.010	0.009	0.010	0.010	0.010	0.011	0.011	0.010	0.010	0.010	0.031	0.031
225	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.010	0.010	0.011	0.015	0.015
275	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.011	0.011	0.011	0.018	0.018
325	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.017	0.017
375	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.018	0.018
425	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.016	0.016
475	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.015	0.015
525	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.014	0.014
575	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.014	0.014
625	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.015	0.015
675	0.002	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.012	0.012	0.014	0.014
725	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.014	0.014
775	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.011	0.010	0.011	0.011	0.013	0.013
825	0.002	0.010	0.009	0.009	0.009	0.009	0.011	0.011	0.010	0.011	0.011	0.013	0.013
875	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.013	0.013
925	0.002	0.010	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.014	0.014
975	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.013	0.013
1025	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.014	0.014
1075	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1125	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1175	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.014	0.014
1225	0.002	0.009	0.009	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1275	0.002	0.009	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010	0.012	0.012
1325	0.002	0.009	0.008	0.008	0.008	0.009	0.010	0.009	0.010	0.010	0.010	0.012	0.012
1375	0.002	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.009	0.010	0.010	0.012	0.012
1425	0.002	0.009	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.012	0.012
1475	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.011	0.011
1525	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.012	0.012
1575	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.012	0.012
1625	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.011	0.011
1675	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.011	0.011
1725	0.002	0.008	0.008	0.007	0.007	0.008	0.009	0.009	0.009	0.009	0.009	0.011	0.011
1775	0.002	0.008	0.008	0.007	0.007	0.008	0.008	0.009	0.009	0.009	0.009	0.011	0.011
1825	0.002	0.008	0.007	0.007	0.007	0.008	0.008	0.008	0.008	0.009	0.009	0.010	0.010
1875	0.002	0.007	0.007	0.007	0.007	0.008	0.008	0.009	0.010	0.010	0.011	0.013	0.013
1925	0.002	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.010	0.010
1975	0.002	0.025	0.026	0.027	0.026	0.028	0.028	0.029	0.031	0.033	0.034	0.035	0.035

	Model: AZZURRO 3PH 80KTL-V3												
	Phase C												
P_n (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [Hz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
75	0.002	0.008	0.009	0.010	0.012	0.013	0.015	0.017	0.018	0.020	0.024	0.033	0.033
125	0.002	0.009	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011	0.027	0.027
175	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.010	0.010	0.010	0.010	0.079	0.079
225	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.010	0.011	0.011	0.011	0.017	0.017
275	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.011	0.011	0.012	0.020	0.020
325	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.010	0.011	0.011	0.012	0.019	0.019
375	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.043	0.043
425	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.019	0.019
475	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.019	0.019
525	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.016	0.016
575	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.016	0.016
625	0.002	0.010	0.010	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.019	0.019
675	0.002	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.017	0.017
725	0.002	0.010	0.009	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.012	0.017	0.017
775	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.010	0.011	0.011	0.011	0.017	0.017
825	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.011	0.011	0.011	0.011	0.016	0.016
875	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.011	0.010	0.011	0.011	0.016	0.016
925	0.002	0.010	0.009	0.009	0.009	0.010	0.011	0.011	0.010	0.011	0.011	0.016	0.016
975	0.002	0.010	0.009	0.009	0.009	0.009	0.011	0.011	0.010	0.010	0.011	0.014	0.014
1025	0.002	0.009	0.009	0.009	0.009	0.009	0.011	0.010	0.010	0.010	0.011	0.018	0.018
1075	0.002	0.009	0.009	0.009	0.009	0.009	0.011	0.010	0.010	0.010	0.011	0.016	0.016
1125	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.015	0.015
1175	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.022	0.022
1225	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.019	0.019
1275	0.002	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.016	0.016
1325	0.002	0.009	0.009	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.015	0.015
1375	0.002	0.009	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1425	0.002	0.009	0.008	0.008	0.008	0.009	0.010	0.010	0.010	0.010	0.010	0.015	0.015
1475	0.002	0.008	0.008	0.008	0.008	0.008	0.010	0.010	0.010	0.010	0.010	0.013	0.013
1525	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.014	0.014
1575	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.014	0.014
1625	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010	0.010	0.013	0.013
1675	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.012	0.012
1725	0.002	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.013	0.013
1775	0.002	0.008	0.008	0.007	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.012	0.012
1825	0.002	0.008	0.008	0.007	0.007	0.008	0.009	0.009	0.009	0.009	0.009	0.012	0.012
1875	0.002	0.008	0.008	0.007	0.007	0.008	0.009	0.010	0.010	0.010	0.011	0.013	0.013
1925	0.002	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.008	0.009	0.009	0.011	0.011
1975	0.002	0.020	0.021	0.021	0.021	0.023	0.023	0.024	0.025	0.027	0.028	0.032	0.032

2.2.7 Höhere Frequenzen / Higher Frequencies components

Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2													
Phase A													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.007	0.133	0.050	0.092	0.069	0.078	0.038	0.065	0.080	0.080	0.081	0.090	0.133
2.3	0.007	0.063	0.036	0.078	0.060	0.077	0.040	0.051	0.062	0.075	0.072	0.083	0.083
2.5	0.008	0.067	0.041	0.053	0.057	0.065	0.035	0.035	0.043	0.055	0.046	0.055	0.067
2.7	0.010	0.060	0.068	0.060	0.095	0.079	0.065	0.032	0.049	0.053	0.050	0.049	0.095
2.9	0.219	0.122	0.123	0.115	0.122	0.118	0.123	0.114	0.118	0.119	0.119	0.115	0.219
3.1	0.045	0.073	0.061	0.051	0.053	0.047	0.062	0.043	0.048	0.063	0.052	0.053	0.073
3.3	0.042	0.071	0.064	0.070	0.067	0.065	0.079	0.064	0.056	0.067	0.066	0.057	0.079
3.5	0.202	0.198	0.188	0.189	0.193	0.192	0.190	0.190	0.188	0.192	0.191	0.192	0.202
3.7	0.009	0.051	0.038	0.033	0.057	0.051	0.037	0.045	0.035	0.040	0.043	0.036	0.057
3.9	0.007	0.117	0.089	0.032	0.061	0.073	0.037	0.053	0.035	0.040	0.033	0.035	0.117
4.1	0.007	0.051	0.065	0.024	0.030	0.049	0.035	0.042	0.038	0.040	0.030	0.034	0.065
4.3	0.007	0.061	0.070	0.025	0.030	0.046	0.037	0.044	0.045	0.041	0.031	0.033	0.070
4.5	0.006	0.031	0.093	0.020	0.049	0.046	0.058	0.045	0.045	0.043	0.029	0.026	0.093
4.7	0.006	0.024	0.057	0.025	0.042	0.034	0.046	0.036	0.042	0.034	0.030	0.028	0.057
4.9	0.006	0.034	0.055	0.021	0.040	0.035	0.047	0.036	0.044	0.042	0.032	0.031	0.055
5.1	0.006	0.053	0.057	0.026	0.030	0.057	0.056	0.039	0.051	0.041	0.029	0.026	0.057
5.3	0.006	0.053	0.042	0.027	0.027	0.046	0.036	0.034	0.040	0.040	0.032	0.030	0.053
5.5	0.006	0.056	0.045	0.027	0.039	0.051	0.037	0.039	0.045	0.046	0.037	0.034	0.056
5.7	0.006	0.056	0.046	0.027	0.036	0.050	0.042	0.049	0.051	0.051	0.036	0.032	0.056
5.9	0.007	0.038	0.035	0.024	0.025	0.027	0.030	0.037	0.035	0.041	0.036	0.034	0.041
6.1	0.006	0.036	0.032	0.030	0.022	0.027	0.040	0.050	0.044	0.051	0.045	0.039	0.051
6.3	0.006	0.026	0.023	0.025	0.020	0.028	0.044	0.047	0.040	0.047	0.039	0.040	0.047
6.5	0.006	0.018	0.019	0.019	0.020	0.021	0.027	0.033	0.034	0.039	0.037	0.039	0.039
6.7	0.006	0.020	0.020	0.023	0.019	0.024	0.032	0.041	0.039	0.046	0.043	0.046	0.046
6.9	0.006	0.025	0.023	0.022	0.013	0.022	0.027	0.034	0.032	0.036	0.038	0.042	0.042
7.1	0.006	0.019	0.019	0.013	0.012	0.015	0.019	0.025	0.030	0.032	0.032	0.031	0.032
7.3	0.006	0.022	0.023	0.013	0.013	0.015	0.019	0.024	0.030	0.029	0.032	0.034	0.034
7.5	0.006	0.014	0.021	0.015	0.011	0.012	0.016	0.021	0.026	0.026	0.026	0.031	0.031
7.7	0.006	0.012	0.015	0.011	0.010	0.010	0.014	0.017	0.022	0.021	0.021	0.025	0.025
7.9	0.006	0.011	0.015	0.012	0.009	0.010	0.014	0.017	0.023	0.019	0.021	0.026	0.026
8.1	0.006	0.012	0.013	0.011	0.010	0.009	0.013	0.016	0.020	0.018	0.019	0.024	0.024
8.3	0.006	0.009	0.011	0.009	0.009	0.009	0.011	0.014	0.016	0.015	0.015	0.018	0.018
8.5	0.006	0.010	0.013	0.010	0.009	0.009	0.011	0.014	0.016	0.015	0.016	0.019	0.019
8.7	0.006	0.011	0.012	0.008	0.008	0.009	0.010	0.013	0.014	0.014	0.014	0.016	0.016
8.9	0.006	0.010	0.010	0.008	0.008	0.009	0.010	0.012	0.012	0.012	0.013	0.014	0.014

Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2													
Phase B													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.006	0.131	0.055	0.094	0.071	0.076	0.041	0.069	0.082	0.080	0.075	0.082	0.131
2.3	0.006	0.064	0.031	0.071	0.055	0.078	0.042	0.055	0.065	0.085	0.073	0.081	0.085
2.5	0.006	0.068	0.032	0.057	0.055	0.064	0.036	0.038	0.044	0.071	0.044	0.055	0.071
2.7	0.006	0.063	0.075	0.057	0.095	0.083	0.065	0.034	0.048	0.065	0.048	0.049	0.095
2.9	0.019	0.064	0.065	0.050	0.060	0.050	0.059	0.035	0.045	0.061	0.054	0.049	0.065
3.1	0.007	0.075	0.051	0.047	0.048	0.043	0.055	0.034	0.043	0.061	0.038	0.049	0.075
3.3	0.021	0.060	0.053	0.056	0.053	0.051	0.071	0.046	0.044	0.066	0.050	0.044	0.071
3.5	0.084	0.112	0.093	0.091	0.102	0.097	0.095	0.095	0.093	0.098	0.098	0.096	0.112
3.7	0.007	0.056	0.039	0.028	0.054	0.048	0.038	0.042	0.033	0.041	0.037	0.038	0.056
3.9	0.006	0.120	0.095	0.033	0.064	0.076	0.038	0.054	0.033	0.036	0.036	0.036	0.120
4.1	0.006	0.061	0.074	0.025	0.032	0.051	0.037	0.044	0.035	0.042	0.033	0.034	0.074
4.3	0.006	0.070	0.079	0.022	0.034	0.048	0.037	0.046	0.040	0.046	0.036	0.033	0.079
4.5	0.006	0.032	0.102	0.022	0.052	0.051	0.060	0.052	0.048	0.043	0.037	0.031	0.102
4.7	0.006	0.029	0.067	0.026	0.048	0.037	0.052	0.043	0.044	0.034	0.029	0.029	0.067
4.9	0.006	0.040	0.063	0.022	0.044	0.038	0.048	0.042	0.048	0.039	0.035	0.029	0.063
5.1	0.006	0.062	0.064	0.030	0.035	0.062	0.063	0.043	0.056	0.044	0.032	0.027	0.064
5.3	0.006	0.065	0.047	0.032	0.034	0.052	0.042	0.041	0.051	0.044	0.032	0.027	0.065
5.5	0.006	0.060	0.050	0.027	0.044	0.054	0.044	0.045	0.055	0.052	0.036	0.031	0.060
5.7	0.006	0.065	0.052	0.030	0.037	0.057	0.047	0.055	0.061	0.055	0.038	0.035	0.065
5.9	0.007	0.038	0.036	0.027	0.029	0.031	0.039	0.045	0.048	0.052	0.040	0.032	0.052
6.1	0.006	0.038	0.032	0.028	0.023	0.027	0.039	0.053	0.051	0.057	0.046	0.042	0.057
6.3	0.006	0.025	0.022	0.026	0.019	0.026	0.043	0.050	0.048	0.054	0.040	0.036	0.054
6.5	0.006	0.017	0.018	0.018	0.019	0.020	0.029	0.039	0.040	0.047	0.039	0.040	0.047
6.7	0.006	0.018	0.017	0.021	0.018	0.019	0.027	0.038	0.039	0.045	0.040	0.040	0.045
6.9	0.007	0.025	0.024	0.022	0.013	0.020	0.025	0.032	0.032	0.037	0.039	0.038	0.039
7.1	0.006	0.018	0.019	0.012	0.011	0.014	0.017	0.023	0.027	0.031	0.032	0.032	0.032
7.3	0.006	0.020	0.021	0.013	0.012	0.013	0.016	0.020	0.023	0.029	0.032	0.033	0.033
7.5	0.006	0.013	0.021	0.013	0.010	0.011	0.014	0.017	0.021	0.026	0.028	0.031	0.031
7.7	0.006	0.011	0.014	0.011	0.009	0.009	0.012	0.014	0.019	0.020	0.021	0.026	0.026
7.9	0.006	0.011	0.014	0.011	0.009	0.009	0.012	0.013	0.020	0.018	0.020	0.026	0.026
8.1	0.006	0.012	0.012	0.010	0.010	0.009	0.011	0.013	0.017	0.017	0.019	0.024	0.024
8.3	0.006	0.009	0.010	0.010	0.008	0.008	0.010	0.011	0.014	0.014	0.015	0.019	0.019
8.5	0.006	0.009	0.013	0.009	0.009	0.009	0.010	0.012	0.013	0.014	0.016	0.019	0.019
8.7	0.006	0.010	0.012	0.008	0.008	0.008	0.009	0.012	0.012	0.013	0.014	0.017	0.017
8.9	0.006	0.009	0.010	0.008	0.008	0.008	0.009	0.012	0.011	0.012	0.013	0.014	0.014

Model: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2													
Phase C													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.006	0.129	0.063	0.094	0.067	0.079	0.041	0.067	0.082	0.081	0.078	0.084	0.129
2.3	0.006	0.065	0.032	0.079	0.061	0.082	0.041	0.055	0.066	0.082	0.071	0.082	0.082
2.5	0.006	0.063	0.044	0.056	0.057	0.065	0.038	0.036	0.044	0.068	0.047	0.053	0.068
2.7	0.007	0.063	0.073	0.066	0.096	0.080	0.065	0.034	0.046	0.050	0.050	0.054	0.096
2.9	0.073	0.077	0.074	0.065	0.073	0.067	0.075	0.057	0.063	0.069	0.070	0.067	0.077
3.1	0.017	0.073	0.057	0.044	0.046	0.044	0.058	0.038	0.044	0.072	0.046	0.054	0.073
3.3	0.035	0.066	0.061	0.064	0.064	0.061	0.076	0.057	0.051	0.071	0.059	0.052	0.076
3.5	0.102	0.126	0.108	0.109	0.118	0.114	0.112	0.114	0.111	0.112	0.111	0.110	0.126
3.7	0.007	0.050	0.042	0.029	0.055	0.051	0.037	0.044	0.038	0.049	0.035	0.037	0.055
3.9	0.006	0.116	0.092	0.032	0.060	0.073	0.038	0.055	0.037	0.043	0.033	0.038	0.116
4.1	0.006	0.061	0.068	0.023	0.029	0.050	0.035	0.044	0.038	0.045	0.032	0.034	0.068
4.3	0.006	0.064	0.074	0.023	0.032	0.044	0.038	0.043	0.041	0.038	0.037	0.034	0.074
4.5	0.006	0.032	0.099	0.022	0.052	0.047	0.059	0.049	0.051	0.043	0.033	0.030	0.099
4.7	0.006	0.026	0.061	0.028	0.044	0.037	0.052	0.039	0.047	0.034	0.036	0.032	0.061
4.9	0.006	0.040	0.056	0.020	0.036	0.037	0.046	0.039	0.048	0.039	0.038	0.032	0.056
5.1	0.006	0.057	0.062	0.029	0.031	0.056	0.057	0.041	0.052	0.044	0.034	0.029	0.062
5.3	0.006	0.065	0.043	0.029	0.030	0.050	0.040	0.040	0.048	0.045	0.035	0.031	0.065
5.5	0.006	0.053	0.047	0.023	0.036	0.044	0.039	0.042	0.048	0.047	0.038	0.034	0.053
5.7	0.006	0.062	0.050	0.029	0.036	0.049	0.042	0.050	0.053	0.051	0.044	0.033	0.062
5.9	0.006	0.040	0.037	0.029	0.025	0.030	0.036	0.042	0.038	0.045	0.037	0.032	0.045
6.1	0.006	0.038	0.032	0.027	0.025	0.026	0.035	0.040	0.041	0.043	0.040	0.040	0.043
6.3	0.006	0.027	0.023	0.025	0.020	0.028	0.042	0.048	0.038	0.045	0.037	0.043	0.048
6.5	0.006	0.018	0.018	0.021	0.019	0.023	0.032	0.037	0.035	0.040	0.036	0.042	0.042
6.7	0.006	0.019	0.017	0.022	0.020	0.020	0.027	0.036	0.038	0.041	0.036	0.044	0.044
6.9	0.007	0.027	0.024	0.023	0.014	0.022	0.028	0.037	0.035	0.038	0.038	0.041	0.041
7.1	0.006	0.022	0.021	0.013	0.012	0.016	0.020	0.027	0.028	0.030	0.031	0.033	0.033
7.3	0.006	0.021	0.022	0.012	0.012	0.013	0.019	0.024	0.030	0.028	0.029	0.034	0.034
7.5	0.006	0.015	0.022	0.015	0.011	0.012	0.017	0.021	0.026	0.026	0.028	0.030	0.030
7.7	0.006	0.012	0.016	0.012	0.010	0.010	0.014	0.017	0.022	0.021	0.021	0.026	0.026
7.9	0.006	0.011	0.014	0.011	0.010	0.010	0.014	0.017	0.022	0.019	0.021	0.026	0.026
8.1	0.006	0.012	0.013	0.011	0.010	0.009	0.013	0.016	0.020	0.017	0.019	0.023	0.023
8.3	0.006	0.009	0.012	0.010	0.009	0.009	0.011	0.014	0.016	0.015	0.015	0.019	0.019
8.5	0.006	0.010	0.013	0.010	0.009	0.009	0.011	0.014	0.015	0.015	0.016	0.018	0.018
8.7	0.006	0.012	0.012	0.008	0.009	0.009	0.010	0.013	0.014	0.013	0.014	0.017	0.017
8.9	0.006	0.010	0.011	0.008	0.008	0.009	0.009	0.012	0.011	0.012	0.013	0.014	0.014

Model: AZZURRO 3PH 70KTL-V3													
Phase A													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.006	0.041	0.057	0.049	0.082	0.032	0.056	0.069	0.070	0.068	0.073	0.064	0.082
2.3	0.006	0.049	0.025	0.066	0.071	0.040	0.044	0.054	0.066	0.060	0.071	0.065	0.071
2.5	0.007	0.053	0.037	0.061	0.053	0.036	0.030	0.036	0.042	0.042	0.052	0.071	0.071
2.7	0.008	0.062	0.080	0.071	0.052	0.061	0.027	0.039	0.042	0.038	0.032	0.046	0.080
2.9	0.189	0.117	0.102	0.096	0.097	0.105	0.097	0.100	0.103	0.103	0.106	0.107	0.189
3.1	0.039	0.062	0.051	0.036	0.043	0.053	0.037	0.040	0.046	0.044	0.045	0.041	0.062
3.3	0.036	0.052	0.053	0.071	0.068	0.065	0.054	0.048	0.055	0.052	0.058	0.057	0.071
3.5	0.173	0.162	0.161	0.165	0.165	0.162	0.162	0.161	0.163	0.165	0.164	0.165	0.173
3.7	0.008	0.042	0.030	0.036	0.047	0.028	0.039	0.031	0.036	0.039	0.032	0.029	0.047
3.9	0.006	0.072	0.047	0.026	0.051	0.036	0.045	0.027	0.030	0.034	0.031	0.033	0.072
4.1	0.006	0.070	0.049	0.027	0.033	0.033	0.036	0.028	0.031	0.029	0.026	0.029	0.070
4.3	0.006	0.063	0.049	0.030	0.033	0.036	0.038	0.033	0.033	0.028	0.029	0.029	0.063
4.5	0.006	0.085	0.055	0.033	0.043	0.054	0.039	0.035	0.029	0.025	0.024	0.026	0.085
4.7	0.005	0.033	0.041	0.021	0.037	0.038	0.031	0.036	0.033	0.025	0.023	0.024	0.041
4.9	0.005	0.031	0.042	0.016	0.040	0.038	0.031	0.038	0.034	0.030	0.026	0.028	0.042
5.1	0.005	0.022	0.051	0.024	0.046	0.043	0.034	0.043	0.034	0.022	0.021	0.022	0.051
5.3	0.005	0.023	0.047	0.021	0.032	0.027	0.029	0.035	0.033	0.026	0.023	0.023	0.047
5.5	0.005	0.027	0.057	0.021	0.034	0.028	0.033	0.038	0.040	0.029	0.025	0.028	0.057
5.7	0.005	0.038	0.052	0.022	0.032	0.039	0.042	0.045	0.040	0.026	0.024	0.026	0.052
5.9	0.006	0.026	0.034	0.019	0.024	0.028	0.031	0.030	0.033	0.028	0.027	0.027	0.034
6.1	0.005	0.035	0.037	0.021	0.028	0.038	0.042	0.039	0.043	0.034	0.033	0.031	0.043
6.3	0.005	0.039	0.026	0.017	0.026	0.038	0.039	0.035	0.041	0.034	0.029	0.032	0.041
6.5	0.005	0.029	0.021	0.017	0.017	0.022	0.028	0.031	0.031	0.032	0.032	0.032	0.032
6.7	0.005	0.031	0.022	0.020	0.014	0.024	0.035	0.035	0.039	0.036	0.040	0.038	0.040
6.9	0.005	0.021	0.017	0.015	0.013	0.019	0.029	0.029	0.032	0.035	0.036	0.033	0.036
7.1	0.005	0.014	0.015	0.012	0.011	0.014	0.021	0.026	0.025	0.026	0.029	0.027	0.029
7.3	0.005	0.011	0.015	0.013	0.010	0.014	0.021	0.026	0.024	0.029	0.032	0.032	0.032
7.5	0.005	0.010	0.012	0.012	0.009	0.014	0.018	0.023	0.021	0.025	0.028	0.028	0.028
7.7	0.005	0.011	0.011	0.010	0.008	0.012	0.014	0.019	0.019	0.020	0.023	0.022	0.023
7.9	0.005	0.014	0.011	0.010	0.008	0.013	0.014	0.019	0.018	0.021	0.024	0.022	0.024
8.1	0.005	0.013	0.011	0.009	0.008	0.011	0.013	0.017	0.016	0.018	0.022	0.020	0.022
8.3	0.005	0.009	0.009	0.008	0.007	0.009	0.011	0.014	0.014	0.014	0.016	0.016	0.016
8.5	0.005	0.009	0.009	0.008	0.007	0.009	0.012	0.013	0.014	0.015	0.017	0.016	0.017
8.7	0.005	0.007	0.009	0.008	0.007	0.008	0.011	0.012	0.012	0.013	0.014	0.015	0.015
8.9	0.005	0.007	0.008	0.007	0.007	0.008	0.010	0.010	0.011	0.012	0.012	0.013	0.013

Model: AZZURRO 3PH 70KTL-V3													
Phase B													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.042	0.059	0.050	0.081	0.034	0.059	0.068	0.066	0.064	0.067	0.057	0.081
2.3	0.005	0.051	0.023	0.066	0.069	0.041	0.047	0.056	0.066	0.060	0.065	0.069	0.069
2.5	0.005	0.052	0.032	0.059	0.053	0.035	0.032	0.038	0.040	0.044	0.051	0.063	0.063
2.7	0.005	0.063	0.085	0.074	0.056	0.062	0.030	0.044	0.039	0.039	0.029	0.048	0.085
2.9	0.016	0.076	0.046	0.032	0.035	0.054	0.030	0.037	0.041	0.042	0.054	0.052	0.076
3.1	0.006	0.060	0.045	0.031	0.036	0.049	0.029	0.038	0.040	0.038	0.035	0.033	0.060
3.3	0.018	0.039	0.042	0.062	0.057	0.059	0.039	0.036	0.044	0.040	0.046	0.047	0.062
3.5	0.072	0.082	0.079	0.087	0.088	0.081	0.082	0.081	0.084	0.084	0.081	0.081	0.088
3.7	0.006	0.046	0.028	0.036	0.046	0.030	0.036	0.030	0.039	0.035	0.034	0.030	0.046
3.9	0.005	0.075	0.049	0.025	0.055	0.035	0.046	0.028	0.036	0.034	0.030	0.035	0.075
4.1	0.005	0.081	0.053	0.029	0.033	0.035	0.038	0.027	0.028	0.030	0.027	0.029	0.081
4.3	0.005	0.072	0.051	0.030	0.034	0.036	0.040	0.030	0.035	0.028	0.032	0.032	0.072
4.5	0.005	0.091	0.061	0.036	0.045	0.057	0.045	0.036	0.034	0.031	0.028	0.027	0.091
4.7	0.005	0.041	0.048	0.023	0.040	0.044	0.037	0.035	0.035	0.025	0.023	0.030	0.048
4.9	0.005	0.035	0.045	0.019	0.041	0.040	0.036	0.040	0.034	0.027	0.025	0.028	0.045
5.1	0.005	0.023	0.058	0.027	0.053	0.050	0.037	0.047	0.037	0.025	0.024	0.025	0.058
5.3	0.005	0.024	0.059	0.026	0.034	0.032	0.035	0.043	0.037	0.026	0.022	0.022	0.059
5.5	0.005	0.031	0.058	0.026	0.038	0.035	0.039	0.049	0.045	0.030	0.026	0.029	0.058
5.7	0.005	0.043	0.062	0.023	0.033	0.042	0.047	0.054	0.046	0.030	0.028	0.029	0.062
5.9	0.006	0.030	0.038	0.020	0.027	0.036	0.039	0.043	0.043	0.031	0.027	0.027	0.043
6.1	0.005	0.037	0.037	0.021	0.026	0.036	0.045	0.045	0.047	0.036	0.036	0.032	0.047
6.3	0.005	0.041	0.028	0.016	0.025	0.040	0.043	0.044	0.043	0.035	0.029	0.030	0.044
6.5	0.005	0.029	0.019	0.018	0.016	0.024	0.033	0.036	0.038	0.032	0.033	0.032	0.038
6.7	0.005	0.028	0.023	0.018	0.013	0.021	0.032	0.035	0.038	0.034	0.037	0.034	0.038
6.9	0.006	0.020	0.018	0.016	0.012	0.019	0.027	0.029	0.034	0.032	0.031	0.028	0.034
7.1	0.005	0.011	0.014	0.011	0.010	0.013	0.020	0.024	0.025	0.026	0.028	0.026	0.028
7.3	0.005	0.010	0.015	0.012	0.009	0.013	0.017	0.021	0.022	0.025	0.029	0.029	0.029
7.5	0.005	0.010	0.012	0.011	0.008	0.011	0.015	0.020	0.020	0.023	0.025	0.025	0.025
7.7	0.005	0.012	0.011	0.009	0.008	0.010	0.012	0.017	0.017	0.019	0.023	0.023	0.023
7.9	0.005	0.013	0.011	0.010	0.007	0.010	0.011	0.015	0.016	0.019	0.024	0.022	0.024
8.1	0.005	0.012	0.010	0.009	0.007	0.009	0.011	0.014	0.015	0.017	0.022	0.021	0.022
8.3	0.005	0.009	0.009	0.008	0.007	0.008	0.010	0.012	0.013	0.014	0.017	0.017	0.017
8.5	0.005	0.008	0.009	0.008	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.016	0.016
8.7	0.005	0.007	0.009	0.008	0.006	0.007	0.010	0.011	0.011	0.013	0.015	0.015	0.015
8.9	0.005	0.007	0.008	0.007	0.006	0.007	0.009	0.009	0.011	0.011	0.012	0.013	0.013

Model: AZZURRO 3PH 70KTL-V3													
Phase C													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.044	0.060	0.051	0.083	0.035	0.057	0.069	0.069	0.067	0.073	0.064	0.083
2.3	0.005	0.048	0.026	0.068	0.074	0.039	0.047	0.056	0.066	0.058	0.067	0.070	0.074
2.5	0.006	0.052	0.037	0.060	0.051	0.037	0.031	0.035	0.043	0.041	0.051	0.065	0.065
2.7	0.006	0.058	0.085	0.071	0.056	0.062	0.029	0.041	0.042	0.035	0.030	0.046	0.085
2.9	0.064	0.086	0.062	0.049	0.052	0.066	0.049	0.055	0.054	0.056	0.064	0.061	0.086
3.1	0.014	0.058	0.050	0.033	0.041	0.049	0.032	0.037	0.039	0.039	0.040	0.036	0.058
3.3	0.030	0.049	0.049	0.069	0.064	0.063	0.049	0.043	0.047	0.047	0.055	0.056	0.069
3.5	0.087	0.096	0.096	0.099	0.101	0.095	0.098	0.095	0.095	0.096	0.093	0.097	0.101
3.7	0.006	0.041	0.027	0.034	0.045	0.030	0.038	0.033	0.038	0.033	0.034	0.029	0.045
3.9	0.005	0.072	0.052	0.025	0.052	0.036	0.047	0.030	0.026	0.034	0.031	0.037	0.072
4.1	0.005	0.073	0.055	0.030	0.031	0.035	0.038	0.031	0.031	0.030	0.030	0.027	0.073
4.3	0.005	0.062	0.052	0.030	0.032	0.036	0.037	0.035	0.030	0.030	0.031	0.029	0.062
4.5	0.005	0.088	0.060	0.033	0.044	0.056	0.042	0.039	0.033	0.028	0.025	0.025	0.088
4.7	0.005	0.039	0.050	0.024	0.039	0.044	0.034	0.037	0.032	0.028	0.028	0.031	0.050
4.9	0.005	0.031	0.042	0.020	0.036	0.037	0.034	0.036	0.036	0.029	0.028	0.029	0.042
5.1	0.005	0.023	0.053	0.024	0.046	0.045	0.036	0.044	0.034	0.026	0.023	0.021	0.053
5.3	0.005	0.023	0.058	0.022	0.030	0.029	0.034	0.039	0.039	0.026	0.025	0.025	0.058
5.5	0.005	0.026	0.053	0.023	0.031	0.031	0.036	0.043	0.040	0.029	0.025	0.030	0.053
5.7	0.005	0.041	0.059	0.023	0.032	0.039	0.043	0.048	0.045	0.030	0.029	0.026	0.059
5.9	0.005	0.030	0.041	0.021	0.025	0.036	0.035	0.037	0.036	0.031	0.028	0.027	0.041
6.1	0.005	0.035	0.036	0.019	0.023	0.032	0.034	0.036	0.037	0.033	0.034	0.035	0.037
6.3	0.005	0.041	0.029	0.018	0.026	0.038	0.040	0.034	0.039	0.034	0.032	0.034	0.041
6.5	0.005	0.031	0.020	0.019	0.018	0.026	0.031	0.029	0.032	0.029	0.034	0.034	0.034
6.7	0.005	0.028	0.023	0.019	0.014	0.021	0.031	0.033	0.033	0.034	0.041	0.040	0.041
6.9	0.006	0.022	0.017	0.016	0.013	0.020	0.031	0.030	0.033	0.033	0.037	0.032	0.037
7.1	0.005	0.014	0.015	0.011	0.011	0.014	0.023	0.025	0.026	0.027	0.031	0.031	0.031
7.3	0.005	0.010	0.015	0.013	0.010	0.014	0.021	0.026	0.023	0.027	0.032	0.034	0.034
7.5	0.005	0.011	0.013	0.012	0.009	0.014	0.018	0.023	0.021	0.025	0.028	0.028	0.028
7.7	0.005	0.012	0.011	0.010	0.008	0.012	0.015	0.018	0.018	0.020	0.025	0.024	0.025
7.9	0.005	0.014	0.011	0.009	0.008	0.012	0.014	0.018	0.016	0.021	0.023	0.024	0.024
8.1	0.005	0.013	0.011	0.009	0.007	0.011	0.013	0.016	0.015	0.019	0.021	0.021	0.021
8.3	0.005	0.009	0.009	0.009	0.007	0.009	0.011	0.013	0.013	0.015	0.017	0.016	0.017
8.5	0.005	0.008	0.009	0.008	0.007	0.009	0.011	0.013	0.013	0.015	0.016	0.016	0.016
8.7	0.005	0.007	0.009	0.008	0.007	0.008	0.011	0.012	0.012	0.013	0.014	0.015	0.015
8.9	0.005	0.007	0.008	0.007	0.007	0.008	0.010	0.010	0.011	0.012	0.012	0.013	0.013

Model: AZZURRO 3PH 75KTL-V3												
Phase A												
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.047	0.059	0.047	0.063	0.035	0.060	0.067	0.064	0.071	0.057	0.071
2.3	0.006	0.060	0.035	0.055	0.062	0.029	0.046	0.061	0.057	0.064	0.066	0.066
2.5	0.006	0.053	0.040	0.053	0.051	0.023	0.032	0.048	0.037	0.045	0.059	0.059
2.7	0.008	0.065	0.064	0.075	0.063	0.044	0.032	0.050	0.041	0.034	0.042	0.075
2.9	0.179	0.108	0.091	0.095	0.095	0.096	0.092	0.105	0.096	0.094	0.096	0.179
3.1	0.037	0.060	0.038	0.036	0.038	0.046	0.033	0.043	0.041	0.040	0.037	0.060
3.3	0.033	0.063	0.055	0.061	0.051	0.064	0.044	0.049	0.053	0.048	0.057	0.064
3.5	0.161	0.151	0.150	0.155	0.152	0.152	0.150	0.150	0.152	0.154	0.153	0.161
3.7	0.008	0.031	0.022	0.042	0.041	0.033	0.029	0.030	0.034	0.033	0.033	0.042
3.9	0.006	0.039	0.023	0.035	0.058	0.033	0.035	0.026	0.027	0.035	0.026	0.058
4.1	0.005	0.059	0.035	0.023	0.039	0.025	0.032	0.026	0.023	0.022	0.025	0.059
4.3	0.005	0.052	0.039	0.027	0.036	0.025	0.035	0.031	0.025	0.028	0.029	0.052
4.5	0.005	0.079	0.032	0.040	0.036	0.038	0.040	0.028	0.023	0.021	0.026	0.079
4.7	0.005	0.041	0.032	0.024	0.026	0.033	0.033	0.031	0.024	0.023	0.022	0.041
4.9	0.005	0.035	0.035	0.022	0.028	0.036	0.034	0.035	0.026	0.025	0.023	0.036
5.1	0.005	0.044	0.047	0.023	0.045	0.047	0.038	0.034	0.023	0.020	0.026	0.047
5.3	0.005	0.026	0.036	0.023	0.037	0.032	0.029	0.034	0.025	0.021	0.022	0.037
5.5	0.005	0.034	0.047	0.024	0.041	0.035	0.032	0.036	0.030	0.026	0.025	0.047
5.7	0.005	0.027	0.053	0.019	0.040	0.036	0.035	0.041	0.028	0.025	0.023	0.053
5.9	0.006	0.021	0.027	0.019	0.021	0.022	0.027	0.033	0.029	0.025	0.025	0.033
6.1	0.005	0.020	0.030	0.024	0.021	0.029	0.035	0.042	0.036	0.030	0.032	0.042
6.3	0.005	0.025	0.030	0.015	0.022	0.030	0.031	0.038	0.032	0.028	0.028	0.038
6.5	0.005	0.021	0.018	0.012	0.017	0.022	0.027	0.029	0.029	0.030	0.030	0.030
6.7	0.005	0.026	0.019	0.016	0.019	0.028	0.034	0.036	0.034	0.035	0.039	0.039
6.9	0.005	0.024	0.018	0.015	0.018	0.025	0.028	0.031	0.031	0.032	0.031	0.032
7.1	0.005	0.015	0.014	0.012	0.013	0.017	0.022	0.025	0.025	0.027	0.027	0.027
7.3	0.005	0.016	0.012	0.010	0.012	0.018	0.022	0.023	0.024	0.029	0.029	0.029
7.5	0.005	0.011	0.008	0.008	0.010	0.014	0.020	0.019	0.020	0.026	0.026	0.026
7.7	0.005	0.011	0.007	0.009	0.008	0.011	0.015	0.017	0.017	0.020	0.021	0.021
7.9	0.005	0.011	0.008	0.010	0.008	0.011	0.016	0.016	0.017	0.021	0.022	0.022
8.1	0.005	0.010	0.008	0.009	0.008	0.010	0.015	0.015	0.016	0.019	0.019	0.019
8.3	0.005	0.008	0.007	0.007	0.008	0.009	0.012	0.013	0.013	0.014	0.014	0.014
8.5	0.005	0.009	0.007	0.007	0.008	0.010	0.012	0.013	0.013	0.016	0.015	0.016
8.7	0.005	0.008	0.008	0.008	0.007	0.009	0.011	0.011	0.012	0.013	0.014	0.014
8.9	0.005	0.008	0.007	0.007	0.007	0.008	0.009	0.010	0.011	0.011	0.012	0.012

Model: AZZURRO 3PH 75KTL-V3												
Phase B												
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.045	0.063	0.048	0.062	0.039	0.061	0.060	0.061	0.065	0.054	0.065
2.3	0.005	0.055	0.036	0.054	0.063	0.031	0.048	0.055	0.058	0.063	0.069	0.069
2.5	0.005	0.049	0.037	0.052	0.051	0.025	0.034	0.044	0.036	0.045	0.054	0.054
2.7	0.005	0.068	0.068	0.077	0.066	0.043	0.035	0.043	0.038	0.036	0.043	0.077
2.9	0.016	0.068	0.033	0.039	0.040	0.041	0.030	0.046	0.043	0.039	0.041	0.068
3.1	0.006	0.055	0.032	0.031	0.034	0.041	0.027	0.033	0.030	0.037	0.032	0.055
3.3	0.017	0.054	0.046	0.052	0.041	0.057	0.030	0.035	0.040	0.036	0.045	0.057
3.5	0.067	0.073	0.074	0.083	0.078	0.077	0.073	0.076	0.078	0.078	0.077	0.083
3.7	0.006	0.029	0.025	0.043	0.039	0.034	0.028	0.030	0.030	0.031	0.035	0.043
3.9	0.005	0.044	0.023	0.036	0.060	0.035	0.034	0.026	0.029	0.034	0.026	0.060
4.1	0.005	0.060	0.041	0.026	0.040	0.027	0.030	0.025	0.027	0.025	0.029	0.060
4.3	0.005	0.053	0.044	0.028	0.037	0.028	0.036	0.027	0.028	0.028	0.031	0.053
4.5	0.005	0.085	0.036	0.043	0.039	0.039	0.045	0.031	0.029	0.023	0.028	0.085
4.7	0.005	0.043	0.037	0.028	0.029	0.038	0.038	0.030	0.023	0.023	0.022	0.043
4.9	0.005	0.039	0.041	0.030	0.030	0.037	0.040	0.033	0.028	0.021	0.022	0.041
5.1	0.005	0.048	0.053	0.024	0.050	0.052	0.045	0.040	0.026	0.024	0.027	0.053
5.3	0.005	0.025	0.046	0.029	0.042	0.039	0.039	0.039	0.026	0.020	0.021	0.046
5.5	0.005	0.035	0.050	0.026	0.043	0.040	0.040	0.046	0.030	0.026	0.027	0.050
5.7	0.005	0.029	0.062	0.021	0.044	0.043	0.042	0.047	0.031	0.026	0.025	0.062
5.9	0.006	0.023	0.031	0.023	0.024	0.029	0.035	0.043	0.033	0.029	0.027	0.043
6.1	0.005	0.020	0.031	0.024	0.021	0.031	0.037	0.048	0.038	0.034	0.034	0.048
6.3	0.005	0.029	0.033	0.015	0.021	0.029	0.033	0.043	0.033	0.032	0.028	0.043
6.5	0.005	0.020	0.018	0.011	0.016	0.023	0.029	0.038	0.032	0.030	0.029	0.038
6.7	0.005	0.025	0.019	0.015	0.015	0.023	0.030	0.036	0.033	0.036	0.034	0.036
6.9	0.006	0.024	0.018	0.015	0.016	0.021	0.025	0.030	0.031	0.030	0.028	0.031
7.1	0.005	0.014	0.013	0.011	0.011	0.015	0.020	0.024	0.025	0.029	0.026	0.029
7.3	0.005	0.015	0.013	0.009	0.010	0.015	0.019	0.019	0.021	0.028	0.028	0.028
7.5	0.005	0.010	0.008	0.008	0.008	0.013	0.017	0.017	0.020	0.025	0.024	0.025
7.7	0.005	0.009	0.008	0.008	0.008	0.010	0.014	0.014	0.016	0.021	0.022	0.022
7.9	0.005	0.011	0.008	0.009	0.008	0.010	0.014	0.014	0.016	0.021	0.021	0.021
8.1	0.005	0.010	0.008	0.008	0.008	0.010	0.013	0.013	0.015	0.019	0.020	0.020
8.3	0.005	0.008	0.007	0.006	0.008	0.009	0.011	0.011	0.012	0.015	0.016	0.016
8.5	0.005	0.008	0.007	0.007	0.007	0.009	0.011	0.011	0.013	0.015	0.015	0.015
8.7	0.005	0.008	0.007	0.007	0.007	0.008	0.009	0.010	0.012	0.014	0.015	0.015
8.9	0.005	0.007	0.007	0.007	0.007	0.007	0.008	0.010	0.011	0.012	0.012	0.012

Model: AZZURRO 3PH 75KTL-V3												
Phase C												
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.046	0.061	0.046	0.063	0.039	0.059	0.064	0.062	0.068	0.058	0.068
2.3	0.005	0.063	0.035	0.057	0.066	0.031	0.049	0.056	0.057	0.063	0.070	0.070
2.5	0.005	0.050	0.038	0.053	0.052	0.026	0.032	0.038	0.037	0.045	0.053	0.053
2.7	0.005	0.067	0.068	0.076	0.064	0.043	0.032	0.048	0.041	0.036	0.042	0.076
2.9	0.060	0.075	0.049	0.052	0.054	0.056	0.048	0.065	0.056	0.052	0.053	0.075
3.1	0.014	0.059	0.036	0.031	0.035	0.042	0.029	0.039	0.037	0.036	0.034	0.059
3.3	0.028	0.057	0.050	0.058	0.049	0.061	0.038	0.043	0.048	0.044	0.052	0.061
3.5	0.082	0.091	0.088	0.095	0.092	0.091	0.088	0.090	0.089	0.090	0.090	0.095
3.7	0.006	0.027	0.024	0.041	0.041	0.033	0.031	0.029	0.029	0.028	0.036	0.041
3.9	0.005	0.042	0.024	0.035	0.058	0.034	0.036	0.027	0.026	0.032	0.026	0.058
4.1	0.005	0.058	0.039	0.024	0.040	0.024	0.033	0.027	0.025	0.022	0.030	0.058
4.3	0.005	0.050	0.044	0.027	0.035	0.028	0.034	0.032	0.030	0.030	0.030	0.050
4.5	0.005	0.080	0.037	0.041	0.037	0.038	0.045	0.031	0.025	0.025	0.026	0.080
4.7	0.005	0.044	0.039	0.027	0.030	0.039	0.037	0.034	0.029	0.028	0.025	0.044
4.9	0.005	0.039	0.037	0.024	0.030	0.036	0.035	0.036	0.030	0.028	0.024	0.039
5.1	0.005	0.044	0.050	0.024	0.045	0.048	0.043	0.037	0.027	0.023	0.026	0.050
5.3	0.005	0.027	0.046	0.026	0.039	0.038	0.034	0.036	0.028	0.023	0.023	0.046
5.5	0.005	0.030	0.047	0.023	0.035	0.035	0.036	0.039	0.030	0.029	0.027	0.047
5.7	0.005	0.028	0.059	0.020	0.039	0.038	0.037	0.042	0.035	0.029	0.025	0.059
5.9	0.005	0.020	0.034	0.020	0.024	0.025	0.030	0.039	0.030	0.029	0.026	0.039
6.1	0.005	0.018	0.031	0.025	0.020	0.027	0.032	0.036	0.032	0.032	0.033	0.036
6.3	0.005	0.028	0.034	0.017	0.022	0.029	0.030	0.036	0.030	0.034	0.029	0.036
6.5	0.005	0.025	0.019	0.012	0.018	0.024	0.028	0.032	0.029	0.030	0.030	0.032
6.7	0.005	0.023	0.019	0.015	0.016	0.024	0.029	0.030	0.029	0.036	0.039	0.039
6.9	0.005	0.027	0.018	0.016	0.017	0.026	0.030	0.031	0.031	0.032	0.031	0.032
7.1	0.005	0.017	0.014	0.012	0.013	0.019	0.023	0.025	0.025	0.029	0.028	0.029
7.3	0.005	0.014	0.013	0.010	0.011	0.016	0.021	0.023	0.022	0.028	0.032	0.032
7.5	0.005	0.011	0.008	0.008	0.010	0.015	0.021	0.019	0.021	0.026	0.026	0.026
7.7	0.005	0.010	0.008	0.009	0.008	0.011	0.016	0.017	0.017	0.021	0.023	0.023
7.9	0.005	0.011	0.008	0.010	0.008	0.011	0.016	0.015	0.017	0.021	0.021	0.021
8.1	0.005	0.010	0.008	0.009	0.008	0.010	0.014	0.014	0.016	0.018	0.019	0.019
8.3	0.005	0.009	0.007	0.007	0.008	0.009	0.012	0.012	0.013	0.015	0.015	0.015
8.5	0.005	0.008	0.007	0.007	0.007	0.010	0.012	0.012	0.013	0.015	0.015	0.015
8.7	0.005	0.009	0.008	0.008	0.007	0.009	0.010	0.011	0.012	0.013	0.014	0.014
8.9	0.005	0.008	0.007	0.007	0.007	0.008	0.010	0.010	0.012	0.012	0.012	0.012

Model: AZZURRO 3PH 80KTL-V3												
Phase A												
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.060	0.064	0.052	0.043	0.043	0.060	0.061	0.061	0.060	0.049	0.056
2.3	0.005	0.046	0.039	0.045	0.051	0.033	0.047	0.058	0.056	0.064	0.051	0.059
2.5	0.006	0.059	0.043	0.043	0.042	0.022	0.033	0.037	0.038	0.048	0.074	0.080
2.7	0.007	0.057	0.058	0.071	0.063	0.028	0.037	0.038	0.034	0.035	0.057	0.057
2.9	0.164	0.109	0.081	0.091	0.091	0.086	0.087	0.089	0.090	0.089	0.090	0.101
3.1	0.034	0.065	0.029	0.039	0.042	0.036	0.036	0.040	0.037	0.043	0.041	0.049
3.3	0.034	0.065	0.054	0.052	0.052	0.057	0.045	0.051	0.052	0.046	0.044	0.046
3.5	0.156	0.146	0.145	0.149	0.147	0.148	0.146	0.147	0.148	0.150	0.152	0.161
3.7	0.007	0.021	0.018	0.042	0.029	0.035	0.027	0.032	0.035	0.027	0.029	0.032
3.9	0.005	0.019	0.017	0.045	0.047	0.039	0.026	0.027	0.027	0.034	0.030	0.034
4.1	0.005	0.040	0.022	0.022	0.038	0.027	0.028	0.028	0.022	0.021	0.024	0.028
4.3	0.005	0.042	0.027	0.022	0.039	0.026	0.033	0.030	0.024	0.026	0.021	0.025
4.5	0.005	0.051	0.024	0.037	0.044	0.029	0.034	0.025	0.020	0.021	0.029	0.032
4.7	0.005	0.041	0.022	0.031	0.028	0.025	0.031	0.029	0.023	0.020	0.023	0.027
4.9	0.005	0.038	0.030	0.029	0.025	0.025	0.033	0.029	0.023	0.025	0.023	0.026
5.1	0.005	0.052	0.042	0.022	0.032	0.037	0.038	0.029	0.019	0.018	0.023	0.025
5.3	0.005	0.030	0.025	0.020	0.029	0.031	0.030	0.029	0.022	0.022	0.019	0.021
5.5	0.005	0.029	0.032	0.029	0.034	0.036	0.034	0.035	0.025	0.026	0.029	0.032
5.7	0.005	0.039	0.045	0.026	0.045	0.043	0.038	0.035	0.023	0.021	0.022	0.025
5.9	0.005	0.017	0.022	0.018	0.025	0.027	0.026	0.029	0.026	0.026	0.024	0.026
6.1	0.005	0.015	0.023	0.016	0.027	0.035	0.033	0.037	0.026	0.029	0.031	0.034
6.3	0.005	0.014	0.028	0.015	0.023	0.029	0.030	0.036	0.028	0.029	0.026	0.030
6.5	0.005	0.016	0.017	0.015	0.015	0.020	0.025	0.028	0.026	0.028	0.030	0.032
6.7	0.005	0.020	0.016	0.014	0.017	0.024	0.029	0.034	0.032	0.035	0.033	0.036
6.9	0.005	0.024	0.016	0.010	0.017	0.020	0.024	0.028	0.029	0.032	0.029	0.031
7.1	0.005	0.014	0.011	0.009	0.012	0.016	0.022	0.022	0.025	0.027	0.026	0.028
7.3	0.005	0.015	0.010	0.010	0.013	0.016	0.023	0.021	0.024	0.029	0.026	0.028
7.5	0.005	0.012	0.007	0.009	0.011	0.016	0.020	0.019	0.023	0.025	0.023	0.026
7.7	0.005	0.009	0.007	0.008	0.008	0.013	0.016	0.017	0.018	0.021	0.019	0.021
7.9	0.005	0.008	0.007	0.007	0.008	0.014	0.017	0.016	0.019	0.023	0.021	0.022
8.1	0.005	0.007	0.006	0.008	0.007	0.012	0.015	0.014	0.016	0.020	0.019	0.020
8.3	0.005	0.007	0.006	0.007	0.007	0.010	0.012	0.012	0.013	0.015	0.014	0.015
8.5	0.005	0.009	0.006	0.007	0.008	0.010	0.012	0.012	0.014	0.015	0.015	0.016
8.7	0.005	0.008	0.007	0.006	0.007	0.009	0.011	0.011	0.012	0.013	0.013	0.014
8.9	0.005	0.008	0.007	0.006	0.007	0.008	0.009	0.010	0.010	0.011	0.011	0.012

Model: AZZURRO 3PH 80KTL-V3													
Phase B													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.060	0.067	0.053	0.043	0.046	0.062	0.058	0.059	0.057	0.047	0.054	0.067
2.3	0.005	0.046	0.038	0.042	0.050	0.035	0.049	0.058	0.056	0.063	0.056	0.064	0.064
2.5	0.005	0.060	0.041	0.042	0.042	0.025	0.033	0.036	0.037	0.047	0.066	0.071	0.071
2.7	0.005	0.063	0.060	0.072	0.065	0.027	0.037	0.036	0.034	0.034	0.054	0.053	0.072
2.9	0.010	0.074	0.023	0.044	0.044	0.030	0.033	0.035	0.041	0.040	0.043	0.049	0.074
3.1	0.005	0.060	0.024	0.036	0.039	0.030	0.032	0.035	0.031	0.040	0.038	0.043	0.060
3.3	0.019	0.057	0.045	0.042	0.042	0.046	0.034	0.041	0.040	0.033	0.033	0.034	0.057
3.5	0.072	0.081	0.076	0.083	0.077	0.081	0.078	0.082	0.082	0.080	0.082	0.082	0.083
3.7	0.005	0.021	0.020	0.041	0.029	0.034	0.026	0.034	0.032	0.027	0.029	0.034	0.041
3.9	0.005	0.020	0.017	0.047	0.049	0.041	0.025	0.032	0.030	0.034	0.031	0.035	0.049
4.1	0.005	0.046	0.027	0.023	0.041	0.029	0.026	0.024	0.024	0.026	0.026	0.030	0.046
4.3	0.005	0.051	0.031	0.025	0.038	0.030	0.030	0.031	0.026	0.026	0.023	0.029	0.051
4.5	0.005	0.056	0.026	0.039	0.049	0.032	0.037	0.030	0.022	0.022	0.032	0.036	0.056
4.7	0.005	0.052	0.027	0.036	0.029	0.030	0.034	0.031	0.021	0.026	0.024	0.026	0.052
4.9	0.005	0.046	0.036	0.032	0.028	0.029	0.036	0.029	0.022	0.024	0.024	0.028	0.046
5.1	0.005	0.056	0.048	0.025	0.035	0.040	0.043	0.032	0.021	0.022	0.026	0.029	0.056
5.3	0.005	0.035	0.031	0.025	0.036	0.038	0.038	0.033	0.022	0.018	0.022	0.026	0.038
5.5	0.005	0.032	0.038	0.033	0.038	0.040	0.042	0.040	0.022	0.024	0.028	0.030	0.042
5.7	0.005	0.041	0.052	0.027	0.052	0.050	0.046	0.041	0.024	0.024	0.024	0.026	0.052
5.9	0.005	0.016	0.027	0.022	0.033	0.035	0.035	0.039	0.026	0.025	0.025	0.027	0.039
6.1	0.005	0.018	0.024	0.017	0.027	0.037	0.038	0.042	0.031	0.031	0.030	0.033	0.042
6.3	0.005	0.015	0.030	0.015	0.024	0.032	0.035	0.038	0.029	0.027	0.025	0.028	0.038
6.5	0.005	0.018	0.019	0.014	0.015	0.022	0.029	0.034	0.030	0.027	0.030	0.032	0.034
6.7	0.005	0.020	0.015	0.014	0.015	0.022	0.029	0.033	0.032	0.033	0.029	0.032	0.033
6.9	0.005	0.024	0.015	0.009	0.015	0.018	0.024	0.030	0.028	0.028	0.025	0.027	0.030
7.1	0.005	0.014	0.012	0.008	0.012	0.014	0.020	0.023	0.026	0.027	0.024	0.028	0.028
7.3	0.005	0.014	0.009	0.009	0.011	0.014	0.018	0.020	0.024	0.027	0.024	0.026	0.027
7.5	0.005	0.012	0.007	0.009	0.010	0.013	0.016	0.018	0.024	0.023	0.022	0.024	0.024
7.7	0.005	0.008	0.007	0.008	0.007	0.011	0.014	0.015	0.019	0.022	0.021	0.023	0.023
7.9	0.005	0.007	0.007	0.007	0.007	0.011	0.014	0.015	0.018	0.023	0.021	0.022	0.023
8.1	0.005	0.007	0.006	0.007	0.007	0.010	0.012	0.013	0.017	0.021	0.020	0.021	0.021
8.3	0.005	0.006	0.006	0.006	0.007	0.008	0.010	0.011	0.014	0.017	0.017	0.017	0.017
8.5	0.005	0.008	0.006	0.006	0.007	0.009	0.010	0.011	0.014	0.015	0.016	0.016	0.016
8.7	0.005	0.008	0.006	0.006	0.006	0.008	0.009	0.010	0.013	0.014	0.014	0.014	0.014
8.9	0.005	0.007	0.006	0.006	0.006	0.007	0.008	0.009	0.011	0.012	0.012	0.013	0.013

Model: AZZURRO 3PH 80KTL-V3													
Phase C													
P_{bin} (%)	0	10	20	30	40	50	60	70	80	90	100	110	MAX (%)
F [kHz]	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	I_h(%)	
2.1	0.005	0.059	0.064	0.050	0.045	0.045	0.062	0.060	0.062	0.062	0.050	0.058	0.064
2.3	0.005	0.049	0.040	0.046	0.052	0.035	0.049	0.058	0.055	0.065	0.055	0.063	0.065
2.5	0.005	0.055	0.042	0.043	0.043	0.024	0.033	0.037	0.037	0.048	0.066	0.072	0.072
2.7	0.005	0.061	0.059	0.072	0.064	0.028	0.035	0.037	0.034	0.035	0.053	0.055	0.072
2.9	0.045	0.079	0.039	0.054	0.055	0.045	0.046	0.046	0.053	0.049	0.049	0.058	0.079
3.1	0.011	0.057	0.027	0.034	0.039	0.032	0.034	0.034	0.035	0.045	0.042	0.050	0.057
3.3	0.055	0.077	0.070	0.069	0.067	0.071	0.063	0.065	0.069	0.063	0.061	0.042	0.077
3.5	0.108	0.113	0.110	0.116	0.112	0.114	0.112	0.112	0.113	0.113	0.118	0.099	0.118
3.7	0.006	0.024	0.019	0.041	0.031	0.034	0.028	0.034	0.034	0.026	0.027	0.032	0.041
3.9	0.005	0.021	0.018	0.044	0.049	0.041	0.027	0.023	0.030	0.032	0.032	0.035	0.049
4.1	0.005	0.043	0.025	0.021	0.041	0.027	0.028	0.026	0.023	0.024	0.026	0.030	0.043
4.3	0.005	0.043	0.028	0.023	0.038	0.027	0.031	0.025	0.030	0.027	0.022	0.028	0.043
4.5	0.005	0.053	0.025	0.039	0.044	0.032	0.038	0.027	0.023	0.022	0.033	0.038	0.053
4.7	0.005	0.049	0.028	0.032	0.029	0.028	0.035	0.028	0.027	0.029	0.025	0.028	0.049
4.9	0.005	0.039	0.031	0.027	0.026	0.028	0.035	0.031	0.025	0.026	0.025	0.028	0.039
5.1	0.005	0.053	0.045	0.022	0.033	0.038	0.039	0.030	0.021	0.019	0.023	0.027	0.053
5.3	0.005	0.035	0.031	0.022	0.035	0.036	0.036	0.034	0.022	0.020	0.021	0.027	0.036
5.5	0.005	0.032	0.034	0.027	0.033	0.034	0.036	0.036	0.026	0.025	0.028	0.031	0.036
5.7	0.005	0.039	0.050	0.027	0.046	0.044	0.040	0.040	0.024	0.025	0.023	0.026	0.050
5.9	0.005	0.017	0.028	0.018	0.031	0.033	0.029	0.031	0.027	0.028	0.025	0.027	0.033
6.1	0.005	0.017	0.023	0.019	0.023	0.029	0.031	0.034	0.027	0.030	0.033	0.036	0.036
6.3	0.005	0.016	0.031	0.015	0.023	0.030	0.028	0.034	0.032	0.028	0.026	0.030	0.034
6.5	0.005	0.018	0.019	0.014	0.015	0.022	0.026	0.029	0.028	0.030	0.032	0.036	0.036
6.7	0.005	0.021	0.015	0.015	0.015	0.022	0.028	0.030	0.031	0.034	0.034	0.037	0.037
6.9	0.005	0.025	0.017	0.011	0.017	0.021	0.027	0.029	0.030	0.033	0.030	0.032	0.033
7.1	0.005	0.015	0.012	0.009	0.013	0.017	0.021	0.023	0.026	0.028	0.028	0.031	0.031
7.3	0.005	0.015	0.009	0.009	0.012	0.016	0.022	0.021	0.024	0.030	0.028	0.030	0.030
7.5	0.005	0.013	0.007	0.009	0.011	0.016	0.020	0.019	0.024	0.024	0.024	0.027	0.027
7.7	0.005	0.009	0.007	0.008	0.008	0.013	0.016	0.016	0.018	0.022	0.021	0.023	0.023
7.9	0.005	0.008	0.007	0.007	0.008	0.013	0.016	0.015	0.018	0.022	0.022	0.024	0.024
8.1	0.005	0.007	0.006	0.008	0.007	0.012	0.014	0.013	0.016	0.020	0.020	0.021	0.021
8.3	0.005	0.007	0.006	0.006	0.007	0.010	0.011	0.012	0.013	0.016	0.015	0.016	0.016
8.5	0.005	0.009	0.006	0.006	0.008	0.010	0.011	0.011	0.014	0.015	0.015	0.016	0.016
8.7	0.005	0.008	0.007	0.006	0.007	0.009	0.010	0.011	0.012	0.014	0.013	0.014	0.014
8.9	0.005	0.008	0.007	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.012	0.013	0.013

2.3 Grid Control Capability

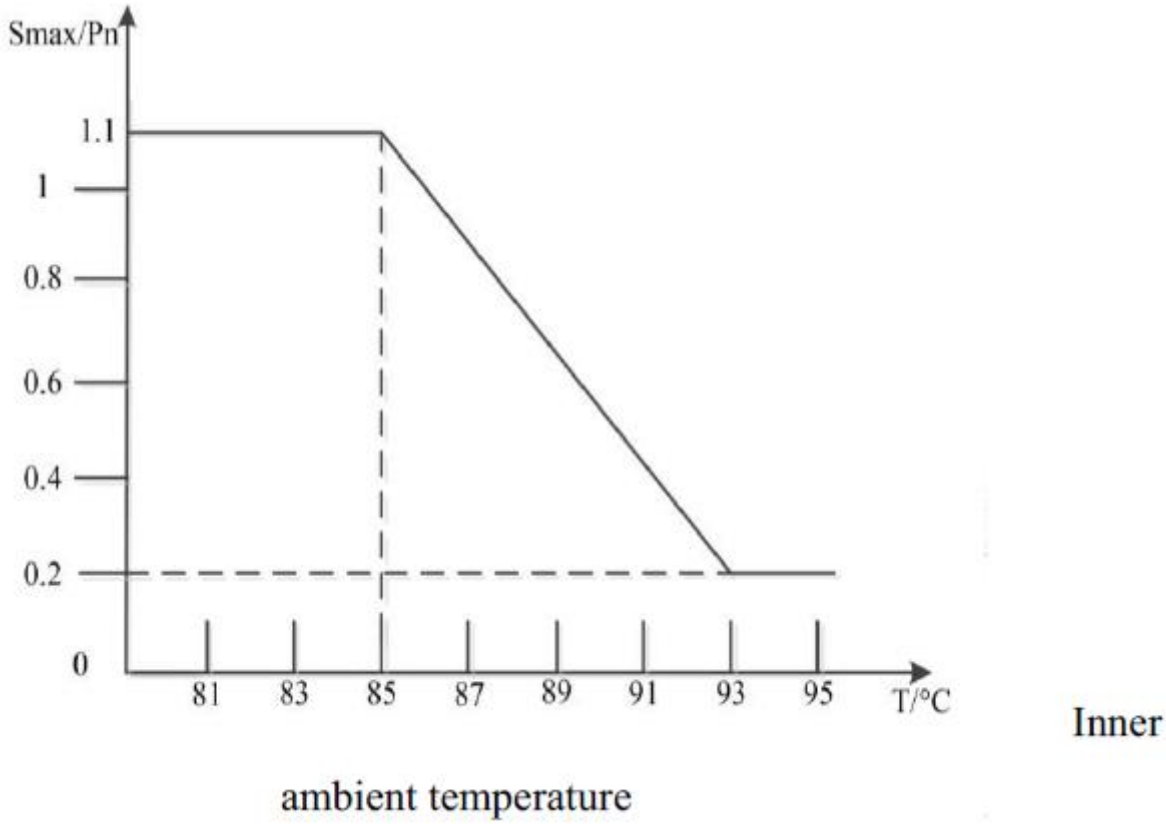
2.3.1 Wirkleistungs einspeisung in Abhängigkeit der Netfrequenz / Active power vs frequency

Überfrequenz / overfrequency	**Mittlerer Gradient der Wirkleistung sum Zeitpunkt der Frequenzüberhöhung / Mean power gradient at overfrequency**	mittl. Gradient / mean gradient 39.9 % P_M/Hz	
	Max. Einschwingzeit / Max. Settling time	0.2 s	
	Gradient der Wirkleistung nach Rückkehr aus Überfrequenz / Power gradient after recovery of over frequency	mittl. Gradient / mean gradient 8.1 %Pn/Hz max. Gradient / max. gradient 8.3 %Pn/Hz	
Unterfrequenz / underfrequency	**Mittlerer Gradient der Wirkleistung sum Zeitpunkt der Frequenzunterschreitung / Mean power gradient at underfrequency**	mittl. Gradient / mean gradient 40.4 % P_M/Hz	
	Max. Einschwingzeit / Max. Settling time	1.1 s	
	Gradient der Wirkleistung nach Rückkehr aus Unterfrequenz / Power gradient after recovery of under frequency	mittl. Gradient / mean gradient 8.1 %Pn/Hz max. Gradient / max. gradient 8.1 %Pn/Hz	
Die EZE kann mit reduzierter Leistung betrieben werden. / The unit is able to run at reduced power		☒ Ja / Yes	☐ Nein / No
Maximale Sollwertabweichung der Wirkleistung Max. deviation of power setting		Überschreitung / Exceeding 0.107 kW	Unterschreitung / Undercut 0.006 kW
Trennung vom Nets bei Wirkleistungssollwertvorgabe von: Disconnection from the grid at external active power setpoints at:		-- % Pn No disconnection is recorded. Operation at 0%Pn 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		P0 -> Pmin	Zeit / time : 58.30 s Gradient: 0.34 % Pn / s
		Pmin -> P0	Zeit / time : 58.40 s Gradient: 0.35 % Pn / s
Einschwingzeit der Leistung für einen Sollwertsprung mit maximalem Gradienten / Response time of the power output after a change in setpoint with maximum gradient		P0 -> Pmin	Zeit / time : 118.0 s Gradient: 0.65 % Pn / s
		Pmin -> P0	Zeit / time : 117.5 s Gradient: 0.65 % Pn / s

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document.

As stated in the Manufacturer Declaration TR8 (issued the 13th July 2022):

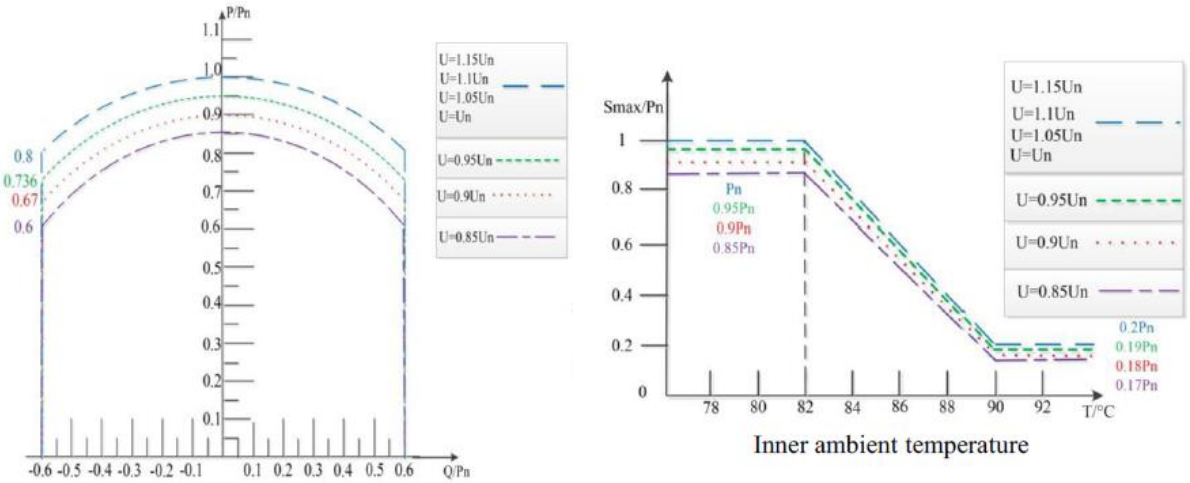
"Active power output is dependent on the temperature according to the following curve."



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 TR8 (issued the 13th July 2022):

For both VDE-AR-N 4110 , the voltage-dependent PQ diagram reactive power capability of 80KTLX-G3 inverter is shown below.



Voltage-dependent PQ diagram of 75KTLX-G3
(active power priority)

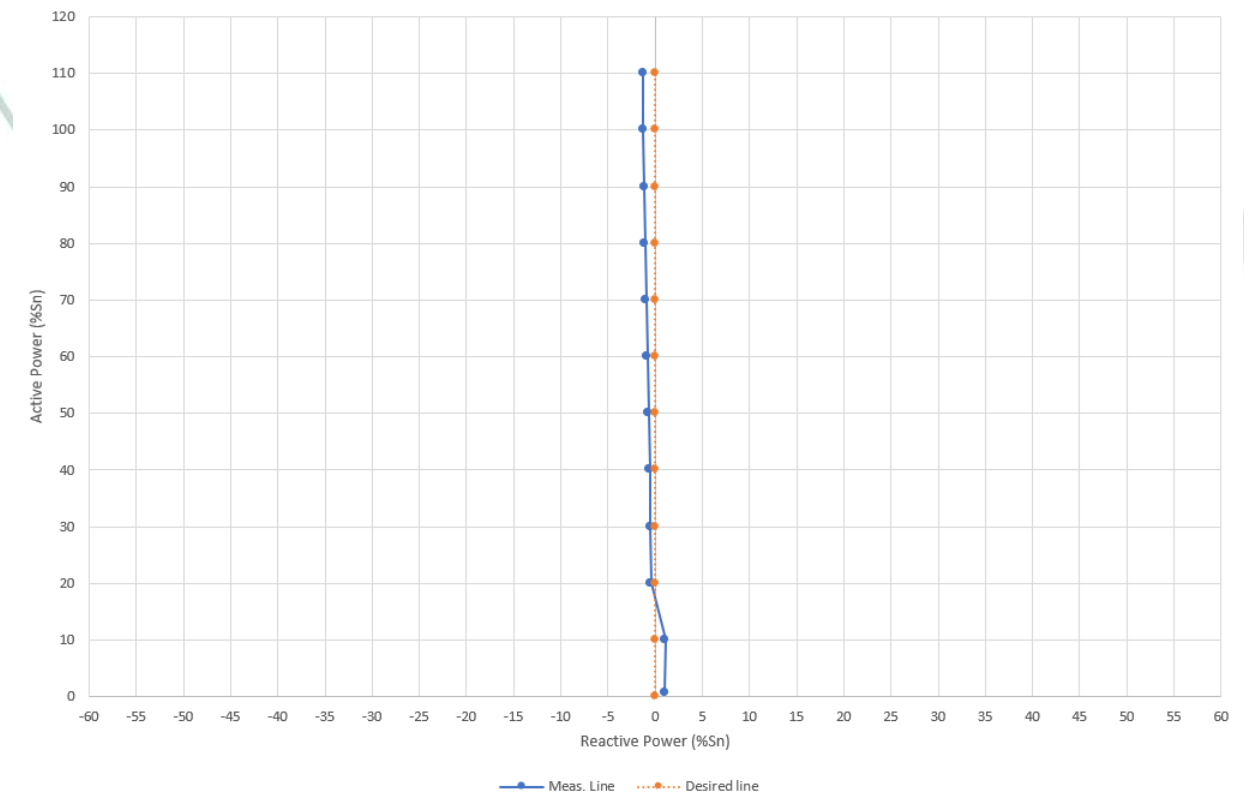
2.3.3 Blindleistungbereitstellung / Provision of reactive power

Blindleistungsregelung im Normalbetrieb und maximaler Blindleistungstellbreich / Control of reactive power in normal operation and maximum reactive power range	P/Pn	Qind	Q0	Qkap	P/Pn	Qind	Q0	Qkap
	0%	48.909	0.838	-47.426	60%	48.466	-0.644	-48.056
	10%	48.948	0.866	-47.629	70%	48.353	-0.737	-48.159
	20%	48.922	-0.360	-47.884	80%	48.223	-0.836	-48.292
	30%	49.039	-0.403	-48.121	90%	48.107	-0.932	-48.307
	40%	48.855	-0.466	-47.933	100%	37.470	-1.030	-33.022
	50%	48.632	-0.543	-47.984	110%	-2.615	-1.022	2.559
	Q in kVAr.							
Arbitspunkte des spannungsanhängigen P-Q Diagramms / Working points of the voltage dependent P-Q diagram	AP / WP		U/Un in %		P/Pn in %		Q in kVAr	
	See measured points and results in the following pages of this annex							
Blindleistungsregelung durch Sollwertvorgabe / Control of reactive power through set point signal	☐Verschiebungsfaktor / power factor				☒Blindleistung / reactive power			
	Pbin bei / at Qmax				Q range at 50 %Pn is ± 60 %Pn			
Längste Einsschwingzeit / Longest response time	Parameter				Einsschwingzeit / settling time			
	T < 6 s				3.8 s			
	Standardzeit / standard time				--			
	T < 60 s				46.86 s			
Einstellgenauigkeit des Verschiebungsfaktors bzw. Blindleistung / Positioning accuracy of power factor or reactive power	Sollwert / setpoint				Istwert / measured value			
	24.000 kVAr				24.046 kVAr			
	0 kVA				-0.857 kVAr			
	-24.000 kVAr				-24.082 kVAr			
Anmerkung / remark	Soweit Q(U) und Q(P)- Regelung wurde, sind diese im Prüfbericht hinterlegt / See Q(U) and Q(P) in test report							

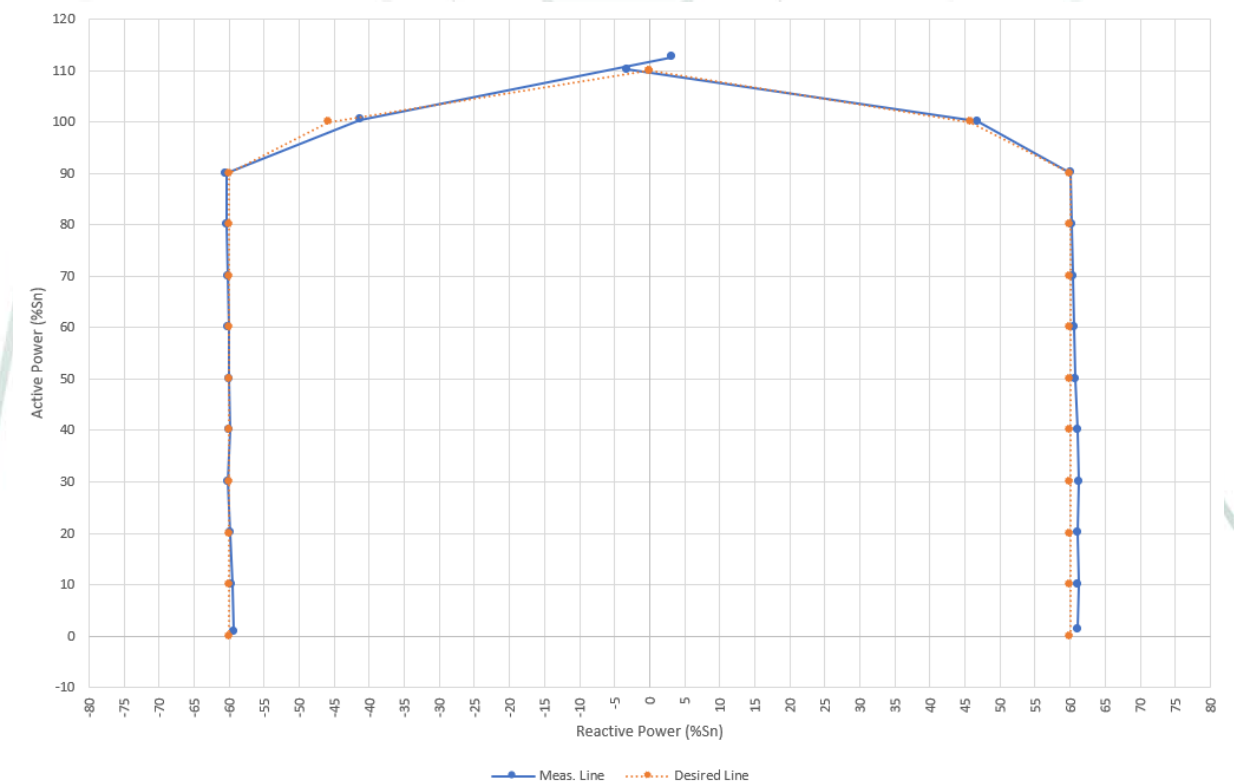
Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document.

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

Q = 0 kVAr: Active Power over Reactive Power

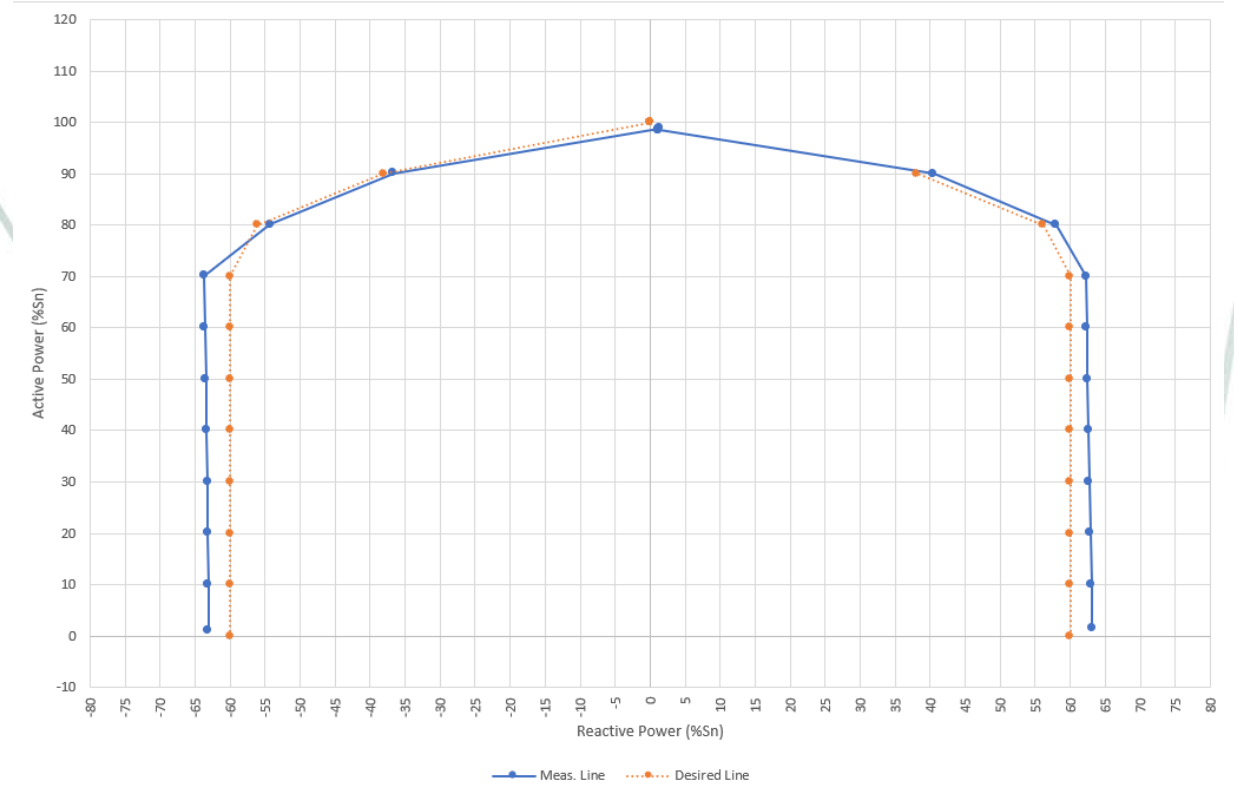


Semicircular Curve (100%Un): Active Power over Reactive Power

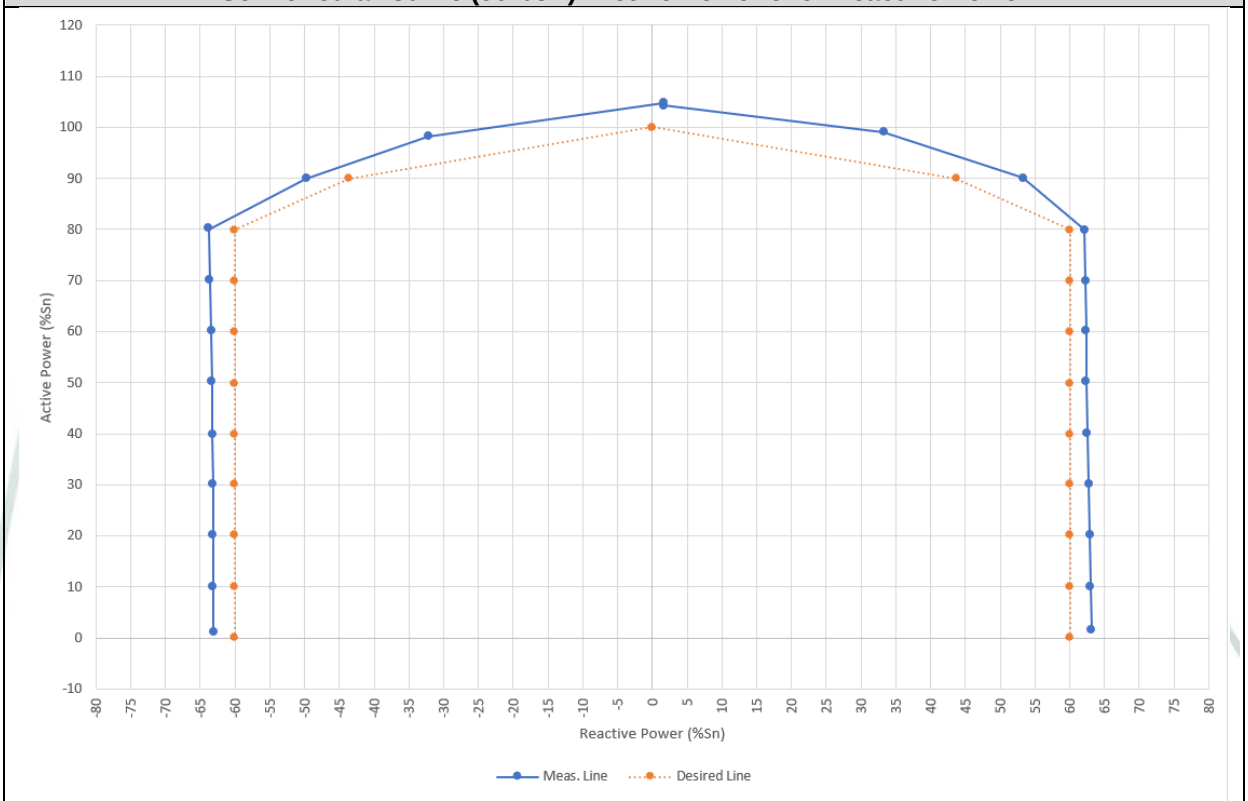


SGS Belgium NV – Division SGS CEBEC
Riverside Business Park
Bld. Internationalelaan, 55 Build. K
BE-1070 Brussels
Tel. +32 2 556 00 20
Fax +32 2 556 00 36

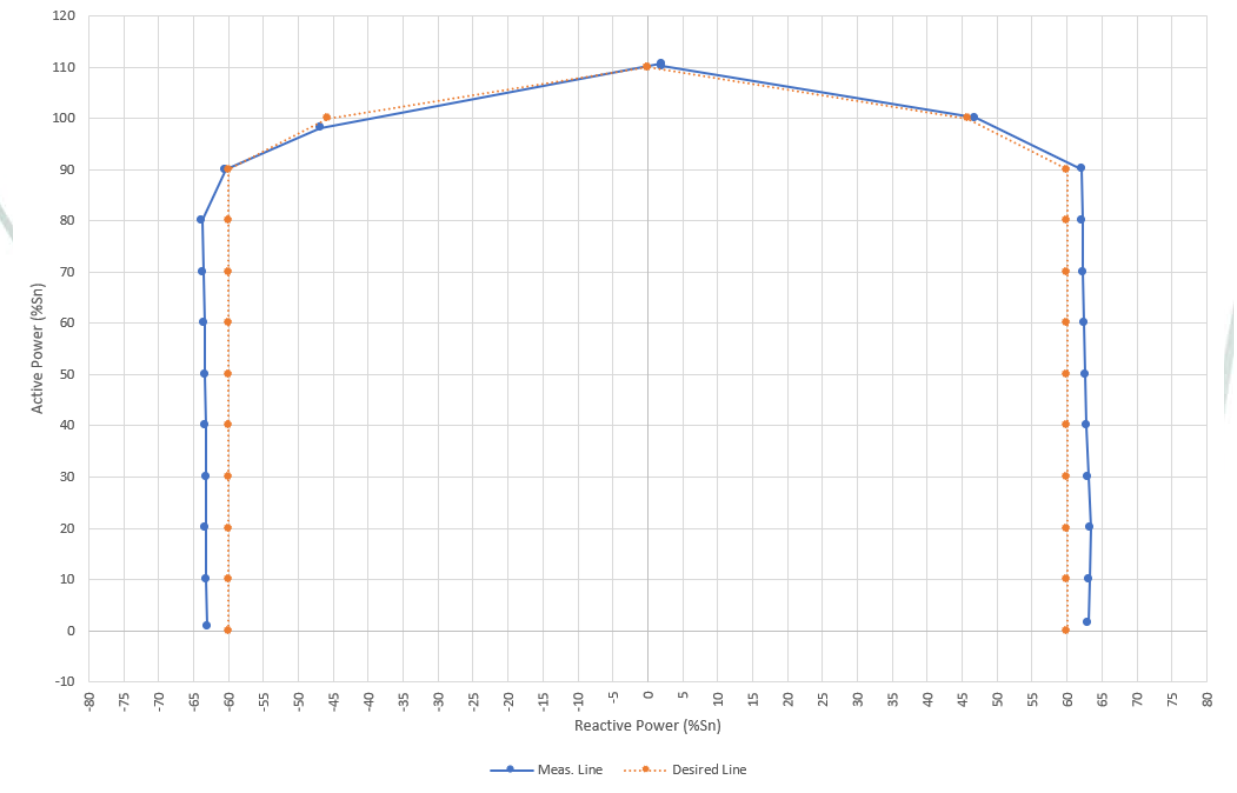
Semicircular Curve (85%Un): Active Power over Reactive Power



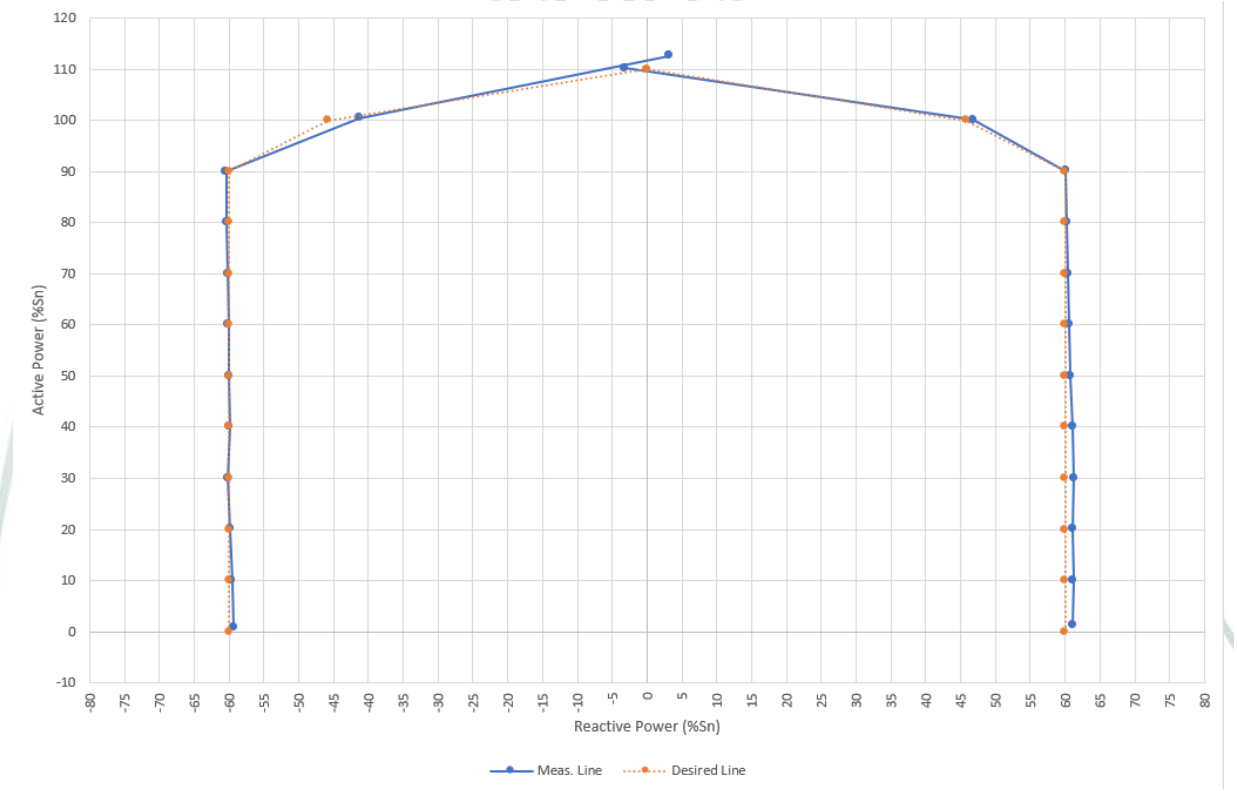
Semicircular Curve (90%Un): Active Power over Reactive Power



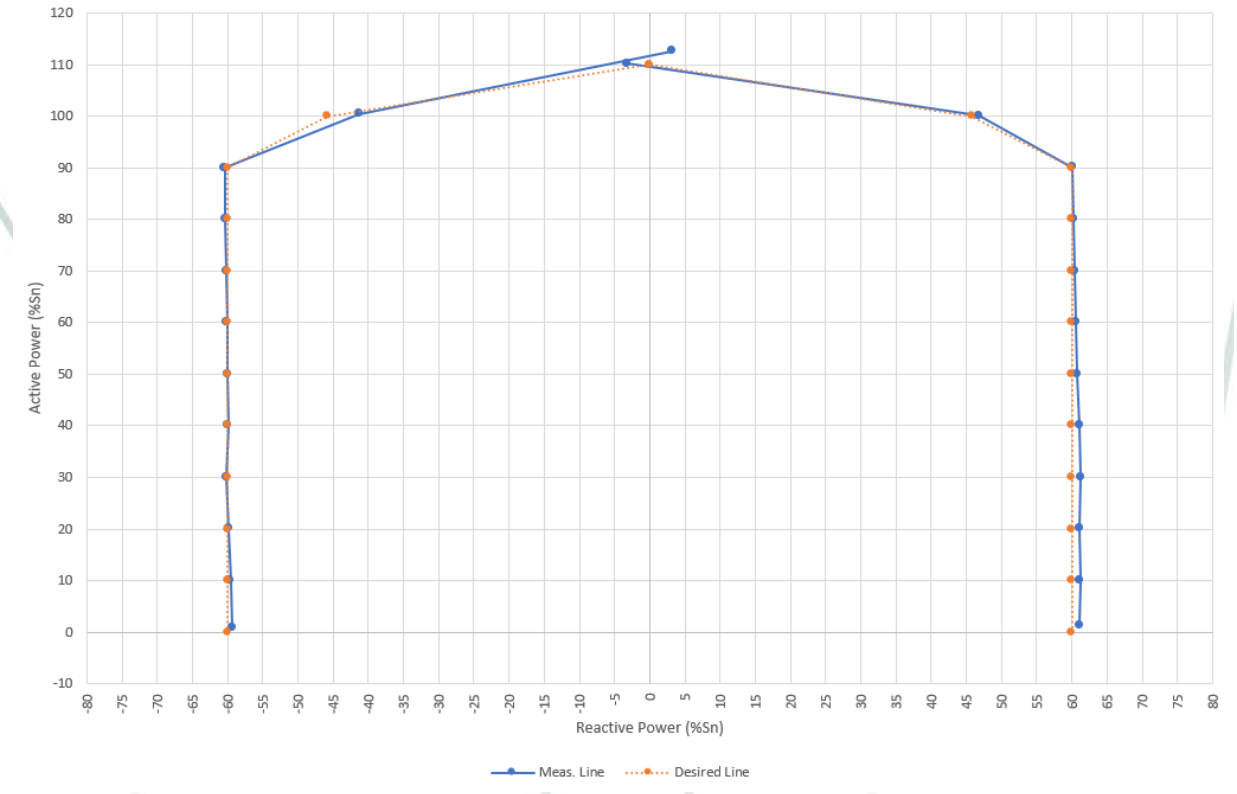
Semicircular Curve (95%Un): Active Power over Reactive Power



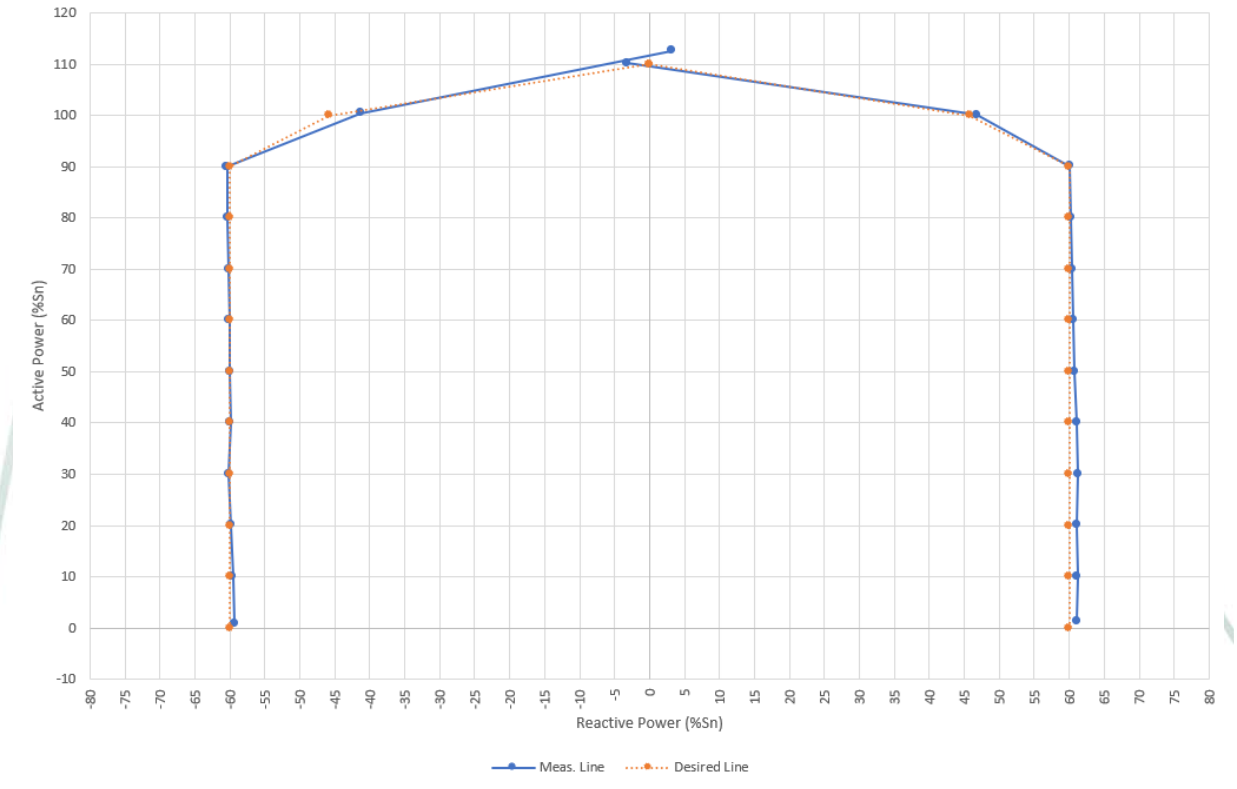
Semicircular Curve (105%Un): Active Power over Reactive Power



Semicircular Curve (110%Un): Active Power over Reactive Power



Semicircular Curve (115%Un): Active Power over Reactive Power



Tables below show measured values for each power step tested, at both the inductive and the capacitive sides:

Semicircular Curve (U = 100% Un) – Inductive							
P Desired (%Pn)	**P measured (kW)**	**Q measured (kVAr)**	**S measured (kVA)**	**S deviation (kVA)**	**Power Factor (cos φ)**	**V_{AC} + (V)**	**Number of records**
0	1.110	48.909	48.922	+0.922	0.023	230.8	>900
10	8.053	48.948	49.607	+0.945	0.162	230.9	>900
20	16.088	48.922	51.500	+0.903	0.312	231.0	>900
30	24.024	49.039	54.607	+0.942	0.440	231.1	>900
40	32.041	48.855	58.426	+0.737	0.548	231.2	>900
50	40.058	48.632	63.006	+0.524	0.636	231.3	>900
60	48.043	48.466	68.243	+0.361	0.704	231.4	>900
70	56.053	48.353	74.027	+0.271	0.757	231.6	>900
80	64.022	48.223	80.152	+0.152	0.799	231.7	>900
90	72.054	48.107	86.638	+0.105	0.832	231.8	>900
100	80.075	37.470	88.409	+0.409	0.906	231.8	>900
110	88.192	-2.615	88.231	+0.231	1.000	231.4	>900

Semicircular Curve (U = 100% Un) – Capacitive							
P Desired (%Pn)	**P measured (kW)**	**Q measured (kVAr)**	**S measured (kVA)**	**S deviation (kVA)**	**Power Factor (cos φ)**	**V_{AC} + (V)**	**Number of records**
0	0.674	-47.426	47.431	-0.569	0.014	229.6	>900
10	8.039	-47.629	48.302	-0.360	0.166	229.7	>900
20	16.018	-47.884	50.492	-0.105	0.317	229.8	>900
30	24.045	-48.121	53.794	+0.129	0.447	229.9	>900
40	31.995	-47.933	57.630	-0.059	0.555	230.0	>900
50	40.060	-47.984	62.508	+0.026	0.641	230.1	>900
60	48.063	-48.056	67.967	+0.084	0.707	230.2	>900
70	56.008	-48.159	73.867	+0.110	0.758	230.3	>900
80	64.066	-48.292	80.229	+0.229	0.799	230.5	>900
90	72.006	-48.307	86.709	+0.176	0.830	230.6	>900
100	80.378	-33.022	87.167	-0.833	0.922	230.9	>900
110	90.118	2.559	90.158	+2.158	1.000	231.5	>900

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_{AC+} (V)**	**Number of records**
0	1.196	50.528	50.543	+2.543	0.024	195.4	>1800
10	8.072	50.410	51.053	+2.391	0.158	195.6	>1800
20	16.048	50.287	52.786	+2.189	0.304	195.7	>1800
30	24.053	50.168	55.636	+1.971	0.432	195.8	>1800
40	32.070	50.073	59.463	+1.775	0.539	196.0	>1800
50	40.005	49.998	64.033	+1.551	0.625	196.1	>1800
60	48.030	49.925	69.278	+1.396	0.693	196.2	>1800
70	55.975	49.857	74.960	+1.204	0.747	196.4	>1800
80([1])	63.996	46.389	79.041	+4.241	0.810	196.5	>1800
90([1])	72.020	32.379	78.964	+4.164	0.912	196.4	>1800
100([1])	78.835	0.999	78.902	+4.102	0.999	196.1	>1800
110([1])	78.834	1.000	78.901	+4.101	0.999	196.1	>1800

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_{AC+} (V)**	**Number of records**
0	0.860	-50.462	50.469	+2.469	0.017	194.4	>1800
10	8.012	-50.509	51.140	+2.478	0.157	194.6	>1800
20	16.069	-50.535	53.028	+2.432	0.303	194.7	>1800
30	24.025	-50.577	55.993	+2.328	0.429	194.8	>1800
40	32.068	-50.659	59.955	+2.267	0.535	195.0	>1800
50	40.074	-50.748	64.663	+2.181	0.620	195.1	>1800
60	48.114	-50.868	70.018	+2.136	0.687	195.3	>1800
70	56.067	-50.959	75.765	+2.009	0.740	195.4	>1800
80([1])	64.129	-43.431	77.452	+2.652	0.828	195.7	>1800
90([1])	72.058	-29.363	77.811	+3.011	0.926	196.0	>1800
100([1])	78.961	0.991	79.028	+4.228	0.999	196.6	>1800
110([1])	79.040	1.055	79.106	+4.306	0.999	196.6	>1800

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_{AC+} (V)**	**Number of records**
0	1.221	50.487	50.503	+2.503	0.024	206.9	>1800
10	8.015	50.456	51.089	+2.427	0.157	207.0	>1800
20	16.079	50.318	52.825	+2.229	0.304	207.1	>1800
30	24.041	50.165	55.628	+1.963	0.432	207.2	>1800
40	32.069	50.060	59.451	+1.762	0.539	207.4	>1800
50	40.057	49.971	64.045	+1.563	0.625	207.5	>1800
60	48.068	49.873	69.267	+1.385	0.694	207.6	>1800
70	56.004	49.804	74.946	+1.190	0.747	207.8	>1800
80	64.017	49.725	81.061	+1.861	0.790	207.9	>1800
90([1])	72.061	42.634	83.729	+4.529	0.861	208.0	>1800
100([1])	79.176	26.642	83.538	+4.338	0.948	207.8	>1800
110([1])	83.440	1.322	83.497	+4.297	0.999	207.5	>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_{AC+} (V)**	**Number of records**
0	0.962	-50.444	50.453	+2.453	0.019	206.5	>1800
10	8.010	-50.501	51.132	+2.470	0.157	206.6	>1800
20	16.054	-50.504	52.994	+2.398	0.303	206.7	>1800
30	24.032	-50.516	55.941	+2.275	0.430	206.8	>1800
40	32.004	-50.577	59.852	+2.164	0.535	206.9	>1800
50	40.025	-50.675	64.575	+2.093	0.620	207.1	>1800
60	48.058	-50.772	69.910	+2.027	0.687	207.2	>1800
70	56.045	-50.875	75.692	+1.936	0.740	207.4	>1800
80	64.065	-50.974	81.869	+2.669	0.783	207.5	>1800
90([1])	72.014	-39.780	82.271	+3.071	0.875	207.8	>1800
100([1])	78.496	-25.758	82.614	+3.414	0.950	208.1	>1800
110([1])	83.807	1.313	83.863	+4.663	0.999	208.5	>1800

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_{AC+} (V)**	**Number of records**
0	1.222	50.438	50.454	+2.454	0.024	218.4	>1800
10	8.039	50.550	51.185	+2.523	0.157	218.5	>1800
20	16.073	50.674	53.162	+2.566	0.302	218.6	>1800
30	24.046	50.437	55.877	+2.211	0.430	218.7	>1800
40	32.026	50.215	59.559	+1.870	0.538	218.8	>1800
50	40.054	50.074	64.123	+1.641	0.625	218.9	>1800
60	48.023	49.971	69.306	+1.424	0.693	219.1	>1800
70	56.058	49.855	75.021	+1.264	0.747	219.2	>1800
80	63.979	49.771	81.059	+1.059	0.789	219.3	>1800
90(*)	72.047	49.679	87.515	+0.982	0.823	219.5	>1800
100(*)	80.039	37.477	88.379	+0.379	0.906	219.4	>1800
110(*)	88.131	1.620	88.175	+0.175	0.999	219.0	>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_{AC+} (V)**	**Number of records**
0	0.744	-50.392	50.398	+2.398	0.015	218.0	>1800
10	8.047	-50.543	51.180	+2.517	0.157	218.1	>1800
20	16.032	-50.633	53.111	+2.514	0.302	218.3	>1800
30	24.037	-50.566	55.988	+2.323	0.429	218.4	>1800
40	31.995	-50.614	59.879	+2.190	0.534	218.5	>1800
50	40.021	-50.692	64.586	+2.104	0.620	218.6	>1800
60	48.028	-50.778	69.894	+2.011	0.687	218.7	>1800
70	56.053	-50.885	75.705	+1.949	0.740	218.9	>1800
80	64.052	-50.996	81.874	+1.874	0.782	219.0	>1800
90(*)	72.011	-48.342	86.733	+0.200	0.830	219.1	>1800
100(*)	78.525	-37.482	87.012	-0.988	0.902	219.4	>1800
110(*)	88.512	1.619	88.555	+0.555	1.000	220.0	>1800

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_{AC+} (V)**	**Number of records**
0	1.063	48.498	48.510	+0.510	0.022	241.3	>1800
10	8.025	48.525	49.184	+0.522	0.163	241.4	>1800
20	16.015	48.567	51.140	+0.543	0.313	241.5	>1800
30	24.043	48.499	54.132	+0.466	0.444	241.6	>1800
40	32.142	48.582	58.253	+0.564	0.552	241.7	>1800
50	40.014	48.305	62.726	+0.244	0.638	241.8	>1800
60	48.044	48.155	68.023	+0.141	0.706	241.9	>1800
70	56.069	47.983	73.799	+0.042	0.760	242.0	>1800
80	64.120	47.870	80.019	+0.019	0.801	242.1	>1800
90	72.156	47.763	86.533	-0.001	0.834	242.2	>1800
100	79.563	38.317	88.309	+0.309	0.901	242.2	>1800
110	88.294	6.030	88.501	+0.501	0.998	241.9	>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_{AC+} (V)**	**Number of records**
0	0.539	-47.985	47.988	-0.012	0.011	240.6	>1800
10	8.089	-48.252	48.925	+0.263	0.165	240.7	>1800
20	16.074	-48.536	51.129	+0.532	0.314	240.8	>1800
30	24.052	-48.874	54.471	+0.806	0.442	240.9	>1800
40	32.058	-48.846	58.427	+0.738	0.549	241.0	>1800
50	40.090	-48.678	63.062	+0.580	0.636	241.1	>1800
60	48.079	-48.706	68.439	+0.557	0.703	241.2	>1800
70	56.104	-48.799	74.357	+0.601	0.755	241.4	>1800
80	64.062	-48.909	80.598	+0.598	0.795	241.5	>1800
90	72.096	-49.013	87.178	+0.645	0.827	241.6	>1800
100	79.303	-37.740	87.825	-0.175	0.903	241.8	>1800
110	88.067	-1.621	88.082	+0.082	1.000	241.7	>1800

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_{AC+} (V)**	**Number of records**
0	1.049	48.495	48.507	+0.507	0.022	252.7	>1800
10	8.023	48.470	49.130	+0.468	0.163	252.8	>1800
20	16.004	48.468	51.042	+0.446	0.314	252.9	>1800
30	24.022	48.473	54.099	+0.434	0.444	253.0	>1800
40	32.043	48.467	58.102	+0.413	0.551	253.1	>1800
50	40.003	48.334	62.741	+0.259	0.638	253.2	>1800
60	47.967	48.138	67.957	+0.074	0.706	253.3	>1800
70	56.008	48.001	73.764	+0.007	0.759	253.4	>1800
80	63.999	47.887	79.932	-0.068	0.801	253.6	>1800
90	72.091	47.762	86.478	-0.055	0.834	253.7	>1800
100	79.594	38.264	88.315	+0.315	0.901	253.7	>1800
110	88.029	2.109	88.054	+0.054	1.000	253.6	>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_{AC+} (V)**	**Number of records**
0	0.678	-47.858	47.863	-0.137	0.014	252.6	>1800
10	8.056	-48.230	48.898	+0.236	0.165	252.7	>1800
20	16.185	-48.504	51.133	+0.537	0.317	252.8	>1800
30	24.105	-48.684	54.325	+0.659	0.444	252.9	>1800
40	32.127	-49.074	58.655	+0.966	0.548	253.0	>1800
50	40.086	-48.824	63.172	+0.690	0.635	253.1	>1800
60	48.091	-48.742	68.473	+0.590	0.702	253.2	>1800
70	56.041	-48.765	74.287	+0.531	0.754	253.3	>1800
80	64.057	-48.854	80.560	+0.560	0.795	253.4	>1800
90	71.983	-48.945	87.047	+0.514	0.827	253.5	>1800
100	79.909	-36.049	87.664	-0.336	0.912	253.8	>1800
110	88.056	-1.621	88.071	+0.071	1.000	253.8	>1800

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_{AC+} (V)**	**Number of records**
0	1.046	48.480	48.492	+0.492	0.022	264.2	>1800
10	8.076	48.401	49.071	+0.409	0.165	264.3	>1800
20	16.068	48.326	50.928	+0.331	0.315	264.4	>1800
30	24.046	48.329	53.981	+0.315	0.445	264.5	>1800
40	32.098	48.303	57.995	+0.307	0.553	264.6	>1800
50	40.121	48.305	62.795	+0.313	0.639	264.7	>1800
60	48.105	48.111	68.035	+0.153	0.707	264.8	>1800
70	56.043	48.002	73.790	+0.034	0.759	264.9	>1800
80	64.005	47.862	79.922	-0.078	0.801	265.0	>1800
90	72.086	47.781	86.484	-0.049	0.834	265.1	>1800
100	79.538	38.213	88.242	+0.242	0.901	265.1	>1800
110	88.020	2.112	88.046	+0.046	1.000	264.9	>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_{AC+} (V)**	**Number of records**
0	0.990	-47.954	47.965	-0.035	0.021	263.7	>1800
10	8.068	-48.164	48.836	+0.173	0.165	263.8	>1800
20	16.028	-48.440	51.023	+0.426	0.314	263.8	>1800
30	24.116	-48.666	54.314	+0.648	0.444	263.9	>1800
40	32.040	-48.884	58.448	+0.759	0.548	264.0	>1800
50	40.080	-48.990	63.297	+0.815	0.633	264.1	>1800
60	48.083	-48.873	68.560	+0.678	0.701	264.2	>1800
70	56.073	-48.826	74.351	+0.595	0.754	264.3	>1800
80	64.034	-48.879	80.557	+0.557	0.795	264.4	>1800
90	72.018	-48.952	87.080	+0.547	0.827	264.5	>1800
100	79.121	-37.537	87.574	-0.426	0.903	264.8	>1800
110	88.045	-1.796	88.063	+0.063	1.000	264.9	>1800

2.4 Protection system

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

☒ 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 [ms]		Rückfallverhältnis Disengaging ratio
	Schwelle / value	Zelt / time	Min.	Max.	Min.	Max.	
Spannungssteigerungsschutz/ Overvoltage protection: U>	1.000	180.00 s	1.007	1.014	179.980 s	179.997 s	☒≥0.98 ☐<0.98
	1.300	0.000 s	1.036	1.309	0.026 s	0.051 s	
Spannungssteigerungsschutz/ Overvoltage protection: U>>	1.000	0.100 s	1.007	1.009	0.103 s	0.108 s	---
	1.300	0.000 s	1.306	1.310	0.029 s	0.045 s	
Spannungsrückgangsschutz/ Undervoltage protection: U<	0.100	0.000 s	0.101	0.103	0.035 s	0.058 s	☒≤1.02 ☐>1.02
	1.000	2.500 s	0.998	1.001	2.395 s	2.400 s	
Spannungsrückgangsschutz/ Undervoltage protection: U<<	0.100	0.000 s	0.100	0.102	0.037 s	0.055 s	☒≤1.02 ☐>1.02
	1.000	0.800 s	1.000	1.003	0.886 s	0.897 s	
Frequenzsteigerungsschutz/ Overfrequency protection: F>	50.00	5.000 s	49.997		4.990 s		---
	55.00	0.000 s	54.997		0.032 s		
Frequenzsteigerungsschutz/ Overfrequency protection: F>>	50.00	0.100 s	49.994		0.093 s		---
	55.00	0.000 s	54.994		0.036 s		
Frequenzrückgangsschutz/ Underfrequency protection: F<	45.00	0.050 s	49.997		0.058 s		---
	49.50	0.100 s	49.996		0.088 s		

Eigenzeit der Abschalteinheit / Operating time of a circuit breaker:	☒ **aus Messung** by measurement	☒ **aus Prüfzertifikat** by test certificate
	According to the point 4.4.1 of the test report no. 2222/0135-6, the measured circuit breaker operating time is 46.6 ms The PGU can either be assembled with following alternatives of the circuit breaker: - Alternative 1: Solar Relay HF167F-200 with: – Declared operate time given by the supplier: 30 ms as maximum. – Declared release time given by the supplier: 10 ms as maximum. See next pages.	

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document.

HF172F-100 SOLAR RELAY

File No.: E133481

File No.: R50393829

Features

- 100A switching capability
- Applicable to solar photovoltaic inverter
- 4.0 mm contact gap
- Low coil holding voltage contributes to saving energy of equipment
- UL insulation system: Class F

CONTACT DATA

Contact arrangement	1A
Contact resistance(initial)	6mΩ max.(6VDC 20A)
Contact material	AgNi
Contact rating (Res. load)	Making 30A,carrying 100A breaking 30A, 690VAC at 85°C
Max. switching voltage	800VAC
Max. switching current	100A
Max. switching power	24000VA
Mechanical endurance	1 x 10^6OPS
Electrical endurance	3 x10^4OPS (Making 30A, carrying 100A breaking 30A, at 85°C 1s on 9s off)

COIL

Coil power	Approx. 2.5W
Holding voltage	40% to 100% U_N (at 25°C) 50% to 60%U_N (at 85°C)

Notes: 1) The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.
2) To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

SAFETY APPROVAL RATINGS

UL/CL	Making 60A, carrying 100A breaking 60A, 277VAC at 85°C Making 30A, carrying 100A breaking 30A, 800VAC at 85°C
TÜV (pending)	Making 60A, carrying 100A breaking 60A, 277VAC at 85°C Making 30A, carrying 100A breaking 30A, 800VAC at 85°C

Notes: 1) All values unspecified are at room temperature.
2) Only typical loads are listed above. Other load specifications can be available upon request.

CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	5000VAC 1min
Surge Voltage		10kV(1.2 / 50μs)
Operate time (at rated. volt.)		30ms max.
Release time (at rated. volt.)		10ms max.
Temperature rise		70K max. (Contact load current 100A, 50% to 60% rated voltage excitation, at 85°C)
Shock resistance	Functional	98m/s²
	Destructive	980m/s²
Vibration resistance		10Hz to 55Hz 1.5mm DA
Humidity		5% to 85% RH
Ambient temperature		-40°C to 85°C (Apply holding voltage to coil)
Termination		PCB
Unit weight		Approx. 125g
Construction		Flux proofed

Notes: The data shown above are initial values.

COIL DATA at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
6	4.5	0.3	6.6	14.4 x (1±10%)
9	6.75	0.45	9.9	32.4 x (1±10%)
12	9	0.6	13.2	57.6 x (1±10%)
24	18	1.2	26.4	230.4 x (1±10%)

Notes: *Maximun voltage refers to the maximun voltage which relay coil could endure in a short period of time.

HONGFA RELAY
ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED 2019 Rev. 1.00

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ORDERING INFORMATION

HF172F-100/	12	-H	F	(XXX)

Type

Coil voltage 6, 9, 12, 24VDC

Contact arrangement H:1 Form A

Insulation standard F: Class F

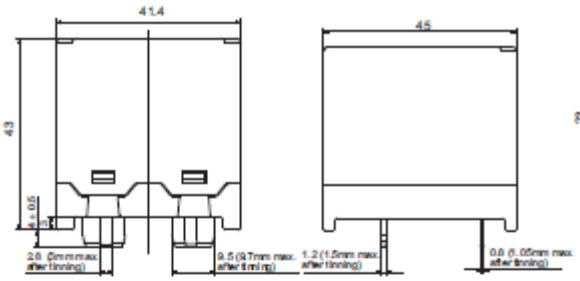
Special code 3) XXX: Customer special requirement Nil: Standard

Notes: 1) Flux-proofed relays can not be used inthe environment with pollutants like H_2S, SO_2, NO_2, dust, etc.
2) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.
3) The customer special requirement express as special code after evaluating by Hongfa.

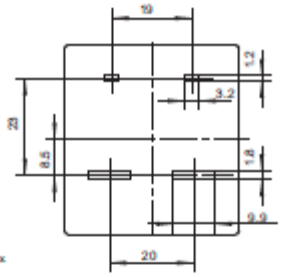
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

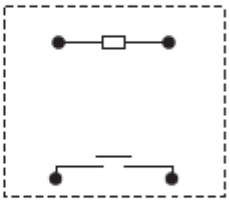
Outline Dimensions



PCB Layout
(Bottom view)



Wiring Diagram
(Bottom view)



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.

Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. We could not evaluate all the performance and all the parameters for every possible application. Thus the user should be in a right position to choose the suitable product for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the user's responsibility to determine which product should be used only.

SGS Belgium NV – Division SGS CEBEC
Riverside Business Park
Bld. Internationalelaan, 55 Build. K
BE-1070 Brussels
Tel. +32 2 556 00 20
Fax +32 2 556 00 36

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	
Zpannung / Voltage:	0.90 – 1.10	☐ nein / no	☒ ja / yes
Frequenz / Frequency:	47.5 – 50.2	☐ nein / no	☒ ja / yes

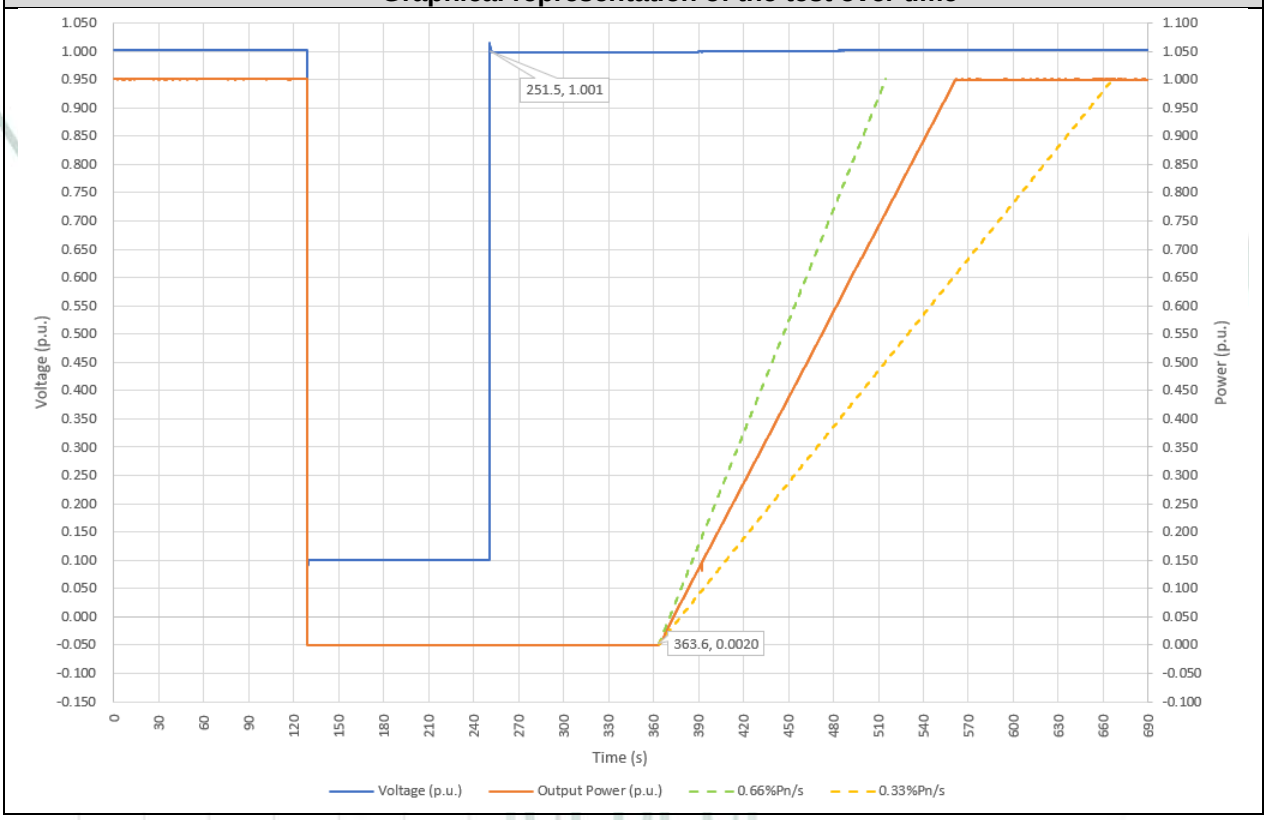
Note: Results given are obtained after test results performed on the model SOFAR 80KTLX-G3. These test results for the model SOFAR 80KTLX-G3 are essentially valid for the derived models SOFAR 75KTLX-G3, SOFAR 70KTLX-G3, SOFAR 60KTLX-G3, SOFAR 60KTLX2-G3 considering the evaluation offered in the point 1.2 of this document

2.4.3 Zuschaltbedingungen nach Auslösung des Entkupplungsschutzes / 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	☐ nein / no	☒ ja / yes
Unterfrequenz / Underfrequency:	≥ 49.9	☐ nein / no	☒ ja / yes
Überfrequenz / Overfrequency:	≤ 50.1	☐ nein / no	☒ ja / yes

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.

Graphical representation of the test over time



Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 considering the evaluation offered in the point 1.2 of this document

2.5 Response during grid faults

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

- **2222 / 0135-6 - Att1 Rev. 1 : FGW-TG3: Grid Fault Tests Results**

Note: Results given are obtained after test results performed on the model AZZURRO 3PH 80KTL-V3. These test results for the model AZZURRO 3PH 80KTL-V3 are essentially valid for the derived models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3 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 (20µs). 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 80KTL-V3:

- Short-circuit surge current iP (A): 188.5 A.
- Initial symmetrical short-circuit current Ik“ (A): 127.5 A
- Uninterrupted short-circuit current Ik (A): 115.9 A.
- Maximal current Imax (A): 133.3 A.
- R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 133.3 A
- R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 125.4 A
- R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 120.1 A.

For AZZURRO 3PH 75KTL-V3:

- Short-circuit surge current iP (A): 159.8 A.
- Initial symmetrical short-circuit current Ik“ (A): 108.6 A
- Uninterrupted short-circuit current Ik (A): 108.7 A.
- Maximal current Imax (A): 113.0 A.
- R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 113.0 A
- R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 108.4 A
- R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 103.8 A.

For AZZURRO 3PH 70KTL-V3:

- Short-circuit surge current iP (A): 152.3 A.
- Initial symmetrical short-circuit current Ik“ (A): 102.4 A
- Uninterrupted short-circuit current Ik (A): 98.4 A.
- Maximal current Imax (A): 107.6 A.
- R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 107.6 A
- R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 105.8 A
- R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 98.6 A.

For SOFAR 60KTLX-G3:

- Short-circuit surge current iP (A): 141.4 A.
- Initial symmetrical short-circuit current Ik“ (A): 95.6 A
- Uninterrupted short-circuit current Ik (A): 86.9 A.
- Maximal current Imax (A): 100.0A.
- R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 100.0 A
- R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 96.6 A
- R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 92.5 A.

For SOFAR 60KTLX2-G3:

- Short-circuit surge current iP (A): 141.4 A.
- Initial symmetrical short-circuit current Ik“ (A): 95.6 A
- Uninterrupted short-circuit current Ik (A): 86.9 A.
- Maximal current Imax (A): 100.0A.
- R.m.s. value of the source current for three-phase fault, IskPF (First 1-2 cycles of the Fault) = 100.0 A
- R.m.s. value of the source current for two-phase fault, I(1)sk2PF (First 1-2 cycles of the Fault) = 96.6 A
- R.m.s. value of the source current for single-phase fault, I(1)sk1PF (First 1-2 cycles of the Fault)= 92.5 A.

Negative sequence short circuit impedance for all integer K factors is 1.618~9999 p.u.@stable status.

3 OVERVIEW OF RESULTS OF THE FGW TR4 VALIDATION REPORT

Report Number: 2222/0135-6-TG4 with date 20/02/2022, issue by SGS Tecnos, S.A. (Electrical Testing Laboratory) according FGW TR4 rev. 9.

Software Characteristics

- Simulation model name: PGU_80kW.slx
- Version of the simulation model: V1
- MD5 Checksum: F4FAC9A7B88A96112F1F53A44EDD17B6
- Simulation platform: Matlab Simulink
- Simulation platform version: 9.1 Version (R2018a)

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, rev9.
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.

As declared by the manufacturer, the model SOFAR 80KTLX-G3 is totally equivalent to the co-licensed (ZCS) model AZZURRO 3PH 80KTL-V3. Technical ratings, Firmware and start-up and display menus are exactly the same and just the model reference name is different

The information declared by the manufacturer for the model AZZURRO 3PH 80KTL-V3 is also declared as valid for the variant models AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3.

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 SOFAR 80KTLX-G3 . 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 AZZURRO 3PH 80KTL-V3 adapted to operate with generation capabilities of derived models: AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3. 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 TG3 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	IN ACCORDANCE WITH IEC	PRE	0.0010	0.0004	0.0004	0.0371	-0.0366	0.0366	0.0031	0.0025	0.0025	0.0213	-0.0208	0.0208
0.1		FAULT	0.0053	-0.0013	0.0052	0.0363	-0.0343	0.0362	0.1244	-0.1239	0.1217	0.0035	0.0184	0.0012
3PH/100%/2		POST	0.0020	-0.0024	0.0027	0.0372	-0.0362	0.0384	0.0048	0.0023	0.0045	0.0215	-0.0185	0.0232
URES ≤ 5 % UN	IN ACCORDANCE WITH IEC	PRE	0.0006	0.0002	0.0002	0.0077	-0.0073	0.0073	0.0006	0.0002	0.0002	0.0046	-0.0042	0.0042
0.2		FAULT	0.0053	-0.0034	0.0052	0.0363	-0.0348	0.0362	0.1246	-0.1092	0.1212	0.0036	0.0029	0.0023
3PH/20%/2		POST	0.0007	-0.0013	0.0014	0.0079	-0.0076	0.0095	0.0007	-0.0010	0.0013	0.0047	-0.0025	0.0066
URES 20-30 % UN	IN ACCORDANCE WITH IEC	PRE	0.0010	0.0005	0.0005	0.0125	-0.0121	0.0121	0.0027	0.0024	0.0024	0.0041	0.0036	0.0036
25.1		FAULT	0.0097	0.0029	0.0007	0.0055	0.0045	0.0053	0.0423	-0.0155	0.0174	0.0040	0.0083	0.0026
3PH/100%/2		POST	0.0011	0.0011	0.0072	0.0126	-0.0109	0.0137	0.0037	0.0058	0.0089	0.0041	0.0055	0.0059
URES 20-30 % UN	IN ACCORDANCE WITH IEC	PRE	0.0008	0.0004	0.0004	0.0030	-0.0026	0.0026	0.0009	0.0005	0.0005	0.0009	0.0005	0.0005
25.2		FAULT	0.0101	0.0009	0.0012	0.0206	0.0203	0.0204	0.0412	-0.0142	0.0172	0.0028	0.0099	0.0016
3PH/20%/2		POST	0.0009	-0.0012	0.0013	0.0032	-0.0018	0.0043	0.0010	0.0009	0.0011	0.0010	0.0023	0.0028
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0018	-0.0012	0.0012	0.0126	-0.0120	0.0120	0.0023	0.0016	0.0016	0.0042	0.0037	0.0037
50.1		FAULT	0.0055	0.0057	0.0010	0.0089	-0.0102	0.0084	0.0185	-0.0098	0.0140	0.0269	-0.0249	0.0257
3PH/100%/2		POST	0.0251	0.0000	0.0035	0.0126	-0.0097	0.0142	0.0277	0.0046	0.0054	0.0042	0.0057	0.0060
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0014	-0.0011	0.0011	0.0032	-0.0026	0.0026	0.0014	-0.0011	0.0011	0.0009	0.0005	0.0005
50.2		FAULT	0.0052	0.0018	0.0010	0.0093	-0.0103	0.0087	0.0182	-0.0128	0.0138	0.0276	-0.0249	0.0262
3PH/20%/2		POST	0.0016	-0.0017	0.0018	0.0032	0.0003	0.0050	0.0016	-0.0014	0.0015	0.0010	0.0027	0.0029
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0013	0.0007	0.0007	0.0112	-0.0106	0.0106	0.0034	0.0029	0.0029	0.0055	0.0050	0.0050
50.5		FAULT	0.0013	0.0022	0.0007	0.0108	-0.0105	0.0105	0.0020	0.0009	0.0014	0.0212	-0.0203	0.0207
3PH/100%/2		POST	0.0017	0.0076	0.0100	0.0111	-0.0106	0.0106	0.0071	0.0140	0.0145	0.0056	0.0048	0.0051
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0009	0.0003	0.0003	0.0124	-0.0120	0.0120	0.0031	0.0026	0.0026	0.0041	0.0036	0.0036
75.1		FAULT	0.0007	0.0043	0.0002	0.0163	-0.0166	0.0150	0.0083	-0.0060	0.0077	0.0230	-0.0216	0.0213
3PH/100%/2		POST	0.0010	-0.0018	0.0020	0.0128	-0.0110	0.0128	0.0031	0.0029	0.0042	0.0043	0.0037	0.0040
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0007	0.0003	0.0003	0.0031	-0.0026	0.0026	0.0007	0.0002	0.0002	0.0009	0.0005	0.0005
75.2		FAULT	0.0007	0.0011	0.0003	0.0172	-0.0180	0.0165	0.0084	-0.0070	0.0075	0.0242	-0.0236	0.0232
3PH/20%/2		POST	0.0006	0.0008	0.0008	0.0030	-0.0018	0.0034	0.0006	0.0004	0.0006	0.0011	0.0006	0.0009
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0005	0.0001	0.0001	0.0102	-0.0097	0.0097	0.0015	-0.0011	0.0011	0.0070	-0.0066	0.0066
75.3		FAULT	0.0014	0.0016	0.0007	0.0034	-0.0041	0.0025	0.0084	-0.0072	0.0079	0.0062	-0.0055	0.0051
3PH/20%/2		POST	0.0008	0.0004	0.0005	0.0110	-0.0035	0.0119	0.0016	-0.0011	0.0013	0.0141	-0.0011	0.0093
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0016	-0.0010	0.0010	0.0033	0.0029	0.0029	0.0006	0.0000	0.0002	0.0064	0.0060	0.0060
75.4		FAULT	0.0007	0.0012	0.0002	0.0052	0.0028	0.0048	0.0071	-0.0059	0.0066	0.0060	0.0045	0.0055
3PH/20%/2		POST	0.0017	-0.0015	0.0015	0.0179	-0.0019	0.0073	0.0007	0.0002	0.0005	0.0148	0.0005	0.0090

TEST DESIGNATION COMPLIANT WITH TG3 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 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0015	-0.0011	0.0011	0.0031	-0.0027	0.0027	0.0015	-0.0011	0.0011	0.0009	0.0005	0.0005
75.5		FAULT	0.0037	0.0041	0.0033	0.0237	-0.0249	0.0231	0.0120	-0.0107	0.0113	0.0375	-0.0357	0.0366
3PH/20%/4		POST	0.0018	-0.0017	0.0017	0.0032	0.0009	0.0046	0.0017	-0.0014	0.0015	0.0009	0.0009	0.0013
URES 75-85 % UN	IN ACCORDANCE WITH IEC	PRE	0.0017	-0.0010	0.0010	0.0113	-0.0108	0.0108	0.0033	0.0027	0.0027	0.0052	0.0048	0.0048
80.1		FAULT	0.0010	0.0047	0.0002	0.0196	-0.0191	0.0192	0.0009	0.0019	0.0003	0.0241	-0.0233	0.0235
3PH/100%/2		POST	0.0019	0.0100	0.0124	0.0114	-0.0109	0.0109	0.0060	0.0161	0.0163	0.0053	0.0045	0.0049
URES 85-90 % UN	IN ACCORDANCE WITH IEC	PRE	0.0014	0.0007	0.0007	0.0111	-0.0106	0.0106	0.0037	0.0030	0.0030	0.0055	0.0050	0.0050
85.1		FAULT	0.0010	0.0008	0.0004	0.0413	-0.0284	0.0283	0.0049	-0.0040	0.0042	0.0516	-0.0328	0.0328
3PH/100%/2		POST	0.0017	0.0120	0.0140	0.0112	-0.0105	0.0109	0.0059	0.0180	0.0181	0.0057	0.0044	0.0054
URES ≥ 110 % UN	IN ACCORDANCE WITH IEC	PRE	0.0018	-0.0011	0.0011	0.0113	-0.0106	0.0106	0.0008	0.0000	0.0002	0.0056	0.0050	0.0050
115.1		FAULT	0.0071	-0.0025	0.0051	0.0245	-0.0065	0.0067	0.0018	0.0006	0.0002	0.0205	-0.0065	0.0063
3PH/100%/2		POST	0.0025	0.0113	0.0135	0.0116	-0.0117	0.0117	0.0017	0.0147	0.0148	0.0057	0.0045	0.0052
URES ≥ 110 % UN	IN ACCORDANCE WITH IEC	PRE	0.0010	0.0004	0.0004	0.0028	-0.0024	0.0024	0.0009	0.0003	0.0003	0.0012	0.0008	0.0008
115.2		FAULT	0.0061	-0.0048	0.0052	0.0379	-0.0231	0.0235	0.0008	0.0002	0.0002	0.0305	-0.0201	0.0200
3PH/20%/2		POST	0.0011	0.0007	0.0007	0.0031	-0.0045	0.0045	0.0009	0.0001	0.0006	0.0012	0.0005	0.0019
URES ≥ 110 % UN	IN ACCORDANCE WITH IEC	PRE	0.0018	-0.0012	0.0012	0.0029	-0.0025	0.0025	0.0018	-0.0012	0.0012	0.0011	0.0007	0.0007
110.3		FAULT	0.0058	-0.0050	0.0051	0.0119	0.0113	0.0112	0.0022	-0.0015	0.0015	0.0113	0.0106	0.0106
3PH/20%/2		POST	0.0018	-0.0012	0.0012	0.0030	-0.0029	0.0030	0.0018	0.0009	0.0015	0.0011	0.0006	0.0008

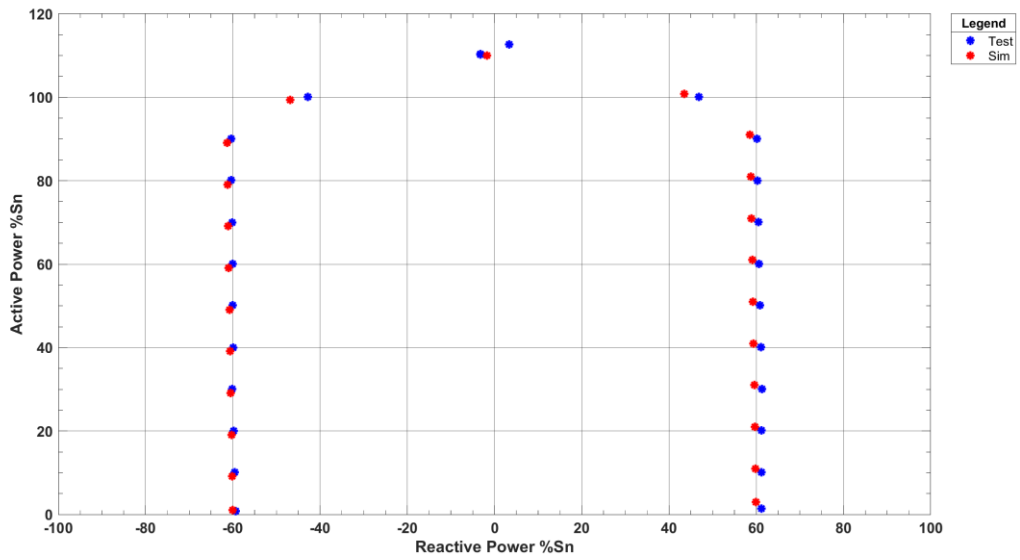
TEST DESIGNATION COMPLIANT WITH TG3 RESPONSE DURING GRID FAULTS. TABLE 4-67			TWO PHASE VOLTAGE DROPS IN POSITIVE PHASE SEQUENCE SYSTEM											
			P			Q			IA			IQ		
			MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE	MXE	ME	MAE
URES ≤ 5 % UN	IN ACCORDANCE WITH IEC	PRE	0.0010	0.0004	0.0004	0.0126	-0.0121	0.0121	0.0028	0.0025	0.0025	0.0041	0.0036	0.0036
0.3		FAULT	0.0028	0.0065	0.0023	0.0326	-0.0339	0.0317	0.0125	-0.0162	0.0113	0.0514	-0.0395	0.0478
2PH/100%/2		POST	0.0012	-0.0026	0.0033	0.0126	-0.0111	0.0132	0.0040	0.0021	0.0047	0.0042	0.0045	0.0049
URES ≤ 5 % UN	IN ACCORDANCE WITH IEC	PRE	0.0006	0.0002	0.0002	0.0031	-0.0026	0.0026	0.0006	0.0002	0.0002	0.0011	0.0005	0.0005
0.4		FAULT	0.0028	-0.0019	0.0024	0.0324	-0.0303	0.0321	0.0126	-0.0114	0.0115	0.0505	-0.0359	0.0486
2PH/20%/2		POST	0.0007	0.0006	0.0011	0.0032	-0.0015	0.0041	0.0007	0.0004	0.0011	0.0010	0.0017	0.0022
URES 20-30 % UN	IN ACCORDANCE WITH IEC	PRE	0.0015	0.0009	0.0009	0.0110	-0.0105	0.0105	0.0007	0.0002	0.0003	0.0056	0.0052	0.0052
25.4		FAULT	0.0021	0.0071	0.0017	0.0389	-0.0369	0.0372	0.0086	-0.0043	0.0058	0.0773	-0.0631	0.0669
2PH/100%/2		POST	0.0015	0.0096	0.0113	0.0110	-0.0091	0.0121	0.0035	0.0131	0.0135	0.0057	0.0062	0.0068
URES 20-30 % UN	IN ACCORDANCE WITH IEC	PRE	0.0008	0.0003	0.0003	0.0029	-0.0025	0.0025	0.0006	0.0002	0.0002	0.0010	0.0006	0.0006
25.5		FAULT	0.0022	0.0025	0.0016	0.0433	-0.0418	0.0423	0.0082	-0.0049	0.0055	0.0771	-0.0652	0.0688
2PH/20%/2		POST	0.0009	0.0004	0.0011	0.0030	-0.0010	0.0042	0.0008	0.0009	0.0014	0.0011	0.0020	0.0025
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0017	-0.0011	0.0011	0.0128	-0.0120	0.0120	0.0022	0.0016	0.0016	0.0043	0.0037	0.0037
50.3		FAULT	0.0008	0.0044	0.0001	0.0205	-0.0207	0.0193	0.0093	-0.0059	0.0078	0.0301	-0.0267	0.0269
2PH/100%/2		POST	0.0104	0.0007	0.0030	0.0127	-0.0107	0.0133	0.0131	0.0051	0.0054	0.0044	0.0044	0.0047
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0011	0.0006	0.0006	0.0032	-0.0027	0.0027	0.0011	0.0007	0.0007	0.0009	0.0004	0.0004
50.4		FAULT	0.0010	0.0008	0.0006	0.0178	-0.0174	0.0174	0.0088	-0.0074	0.0072	0.0254	-0.0225	0.0243
2PH/20%/2		POST	0.0012	0.0006	0.0012	0.0032	-0.0014	0.0041	0.0012	0.0003	0.0013	0.0009	0.0013	0.0018
URES 45-60 % UN	IN ACCORDANCE WITH IEC	PRE	0.0012	0.0004	0.0004	0.0113	-0.0107	0.0107	0.0040	0.0032	0.0032	0.0054	0.0049	0.0049
50.6		FAULT	0.0008	0.0014	0.0002	0.0189	-0.0154	0.0184	0.0017	-0.0022	0.0002	0.0247	-0.0197	0.0241
2PH/100%/2		POST	0.0015	0.0115	0.0127	0.0115	-0.0108	0.0108	0.0067	0.0175	0.0177	0.0058	0.0046	0.0050
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0019	-0.0014	0.0014	0.0113	-0.0108	0.0108	0.0029	0.0022	0.0022	0.0053	0.0049	0.0049
75.6		FAULT	0.0032	0.0065	0.0028	0.0364	-0.0242	0.0237	0.0027	0.0002	0.0008	0.0451	-0.0266	0.0269
2PH/100%/2		POST	0.0017	0.0127	0.0147	0.0113	-0.0106	0.0110	0.0058	0.0185	0.0185	0.0054	0.0046	0.0052
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0017	-0.0011	0.0011	0.0030	-0.0026	0.0026	0.0016	-0.0010	0.0010	0.0009	0.0006	0.0006
75.7		FAULT	0.0027	0.0029	0.0023	0.0367	-0.0254	0.0250	0.0031	-0.0011	0.0013	0.0444	-0.0281	0.0283
2PH/20%/2		POST	0.0017	0.0008	0.0015	0.0031	-0.0022	0.0031	0.0015	0.0003	0.0017	0.0012	0.0005	0.0009
URES 70-80 % UN	IN ACCORDANCE WITH IEC	PRE	0.0017	-0.0012	0.0012	0.0030	-0.0025	0.0025	0.0015	-0.0011	0.0011	0.0011	0.0006	0.0006
75.8		FAULT	0.0045	0.0044	0.0039	0.0528	-0.0328	0.0321	0.0042	-0.0031	0.0033	0.0652	-0.0361	0.0366
2PH/20%/4		POST	0.0019	0.0006	0.0019	0.0031	-0.0019	0.0034	0.0017	0.0001	0.0020	0.0013	0.0006	0.0013
URES 75-85 % UN	IN ACCORDANCE WITH IEC	PRE	0.0014	0.0006	0.0006	0.0114	-0.0108	0.0108	0.0039	0.0030	0.0030	0.0056	0.0049	0.0049
80.2		FAULT	0.0011	0.0057	0.0001	0.0228	-0.0222	0.0223	0.0030	0.0030	0.0002	0.0257	-0.0240	0.0243
2PH/100%/2		POST	0.0014	0.0178	0.0188	0.0117	-0.0110	0.0110	0.0066	0.0237	0.0237	0.0057	0.0045	0.0049
URES ≥ 110 % UN	IN ACCORDANCE WITH IEC	PRE	0.0013	0.0008	0.0008	0.0370	-0.0365	0.0365	0.0026	0.0019	0.0019	0.0212	-0.0208	0.0208
110.1		FAULT	0.0081	-0.0031	0.0068	0.0043	0.0031	0.0030	0.0081	-0.0031	0.0049	0.0096	0.0034	0.0034
2PH/100%/2		POST	0.0015	0.0034	0.0052	0.0372	-0.0363	0.0363	0.0028	0.0080	0.0081	0.0214	-0.0205	0.0207
URES ≥ 110 % UN	IN ACCORDANCE WITH IEC	PRE	0.0015	0.0009	0.0009	0.0080	-0.0074	0.0074	0.0015	0.0009	0.0009	0.0048	-0.0043	0.0043
110.2		FAULT	0.0074	-0.0052	0.0066	0.0044	0.0036	0.0030	0.0106	-0.0038	0.0047	0.0101	0.0038	0.0033
2PH/20%/2		POST	0.0014	0.0007	0.0010	0.0078	-0.0075	0.0075	0.0014	0.0004	0.0013	0.0047	-0.0042	0.0043

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	IN ACCORDANCE WITH IEC	PRE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	-0.0010	0.0010	0.0021	-0.0015	0.0015
0.3		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
2PH/100%/2		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	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
0.4		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
2PH/20%/2		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	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
25.4		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
2PH/100%/2		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	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
25.5		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
2PH/20%/2		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	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
50.3		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
2PH/100%/2		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	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
50.4		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
2PH/20%/2		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	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
50.6		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
2PH/100%/2		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	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
75.6		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
2PH/100%/2		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	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
75.7		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
2PH/20%/2		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	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
75.8		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
2PH/20%/4		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	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
80.2		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
2PH/100%/2		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	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
110.1		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
2PH/100%/2		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	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
110.2		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
2PH/20%/2		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

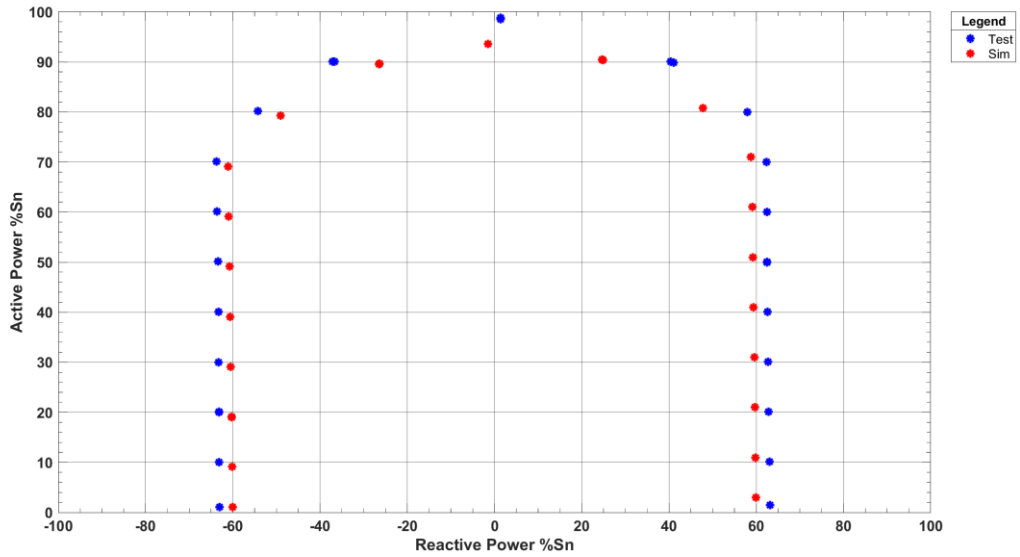
3.1.2 Simulation results of Voltage-Dependent PQ diagrams of certified models

AZZURRO 3PH 80KTL-V3

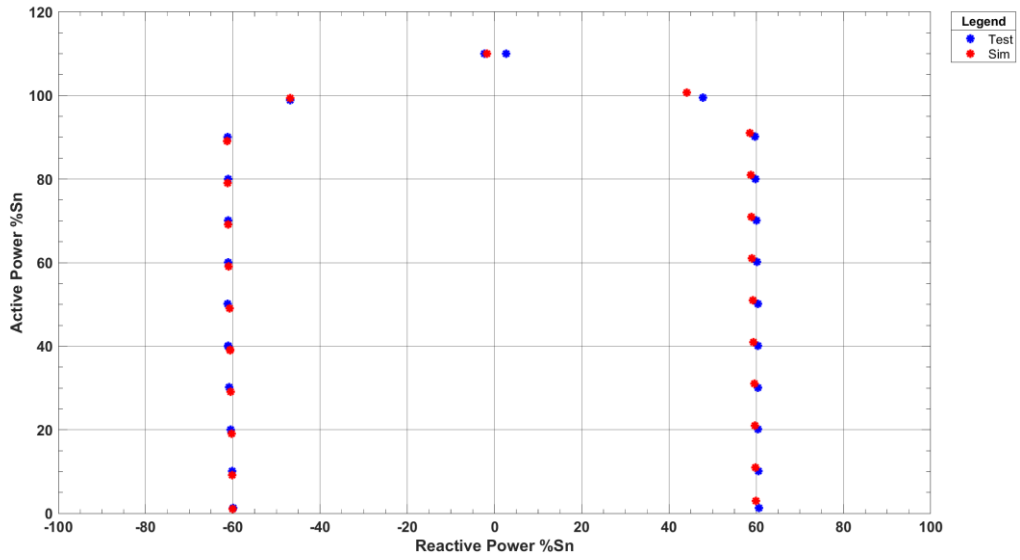
Semi-circular Curve (100%Un): Active Power over Reactive Power



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

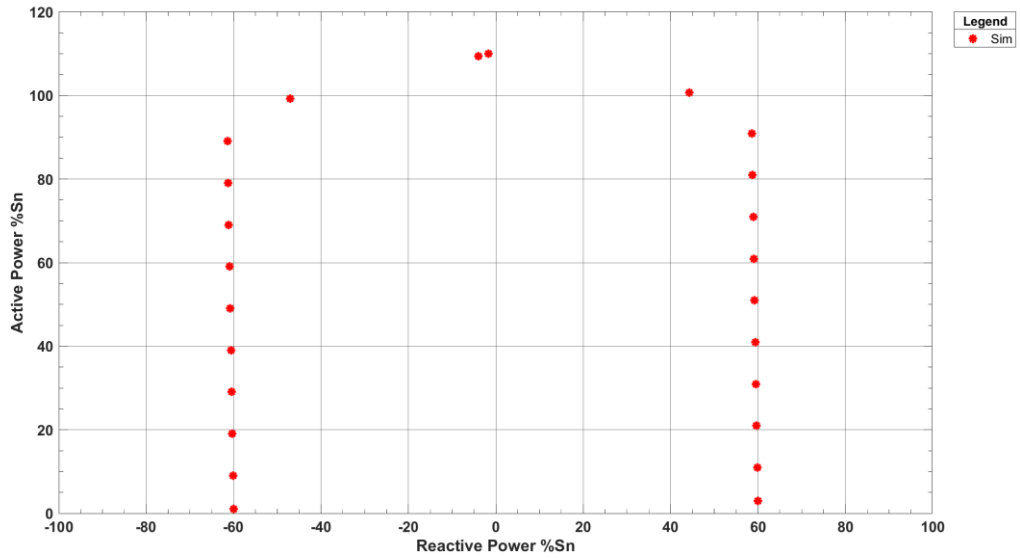


Semi-circular Curve (115%Un): Active Power over Reactive Power

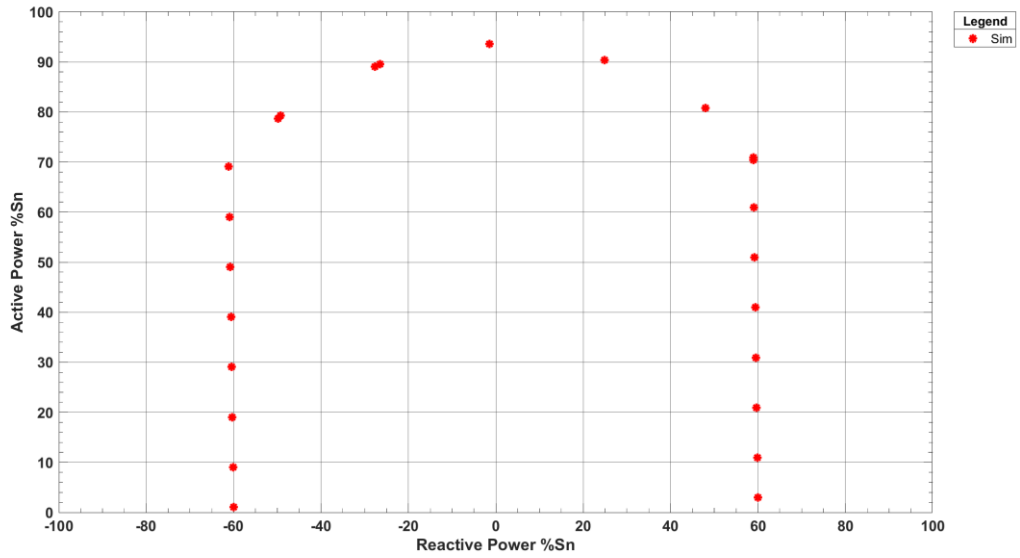


SGS Belgium NV – Division SGS CEBEC
Riverside Business Park
Bld. Internationalelaan, 55 Build. K
BE-1070 Brussels
Tel. +32 2 556 00 20
Fax +32 2 556 00 36

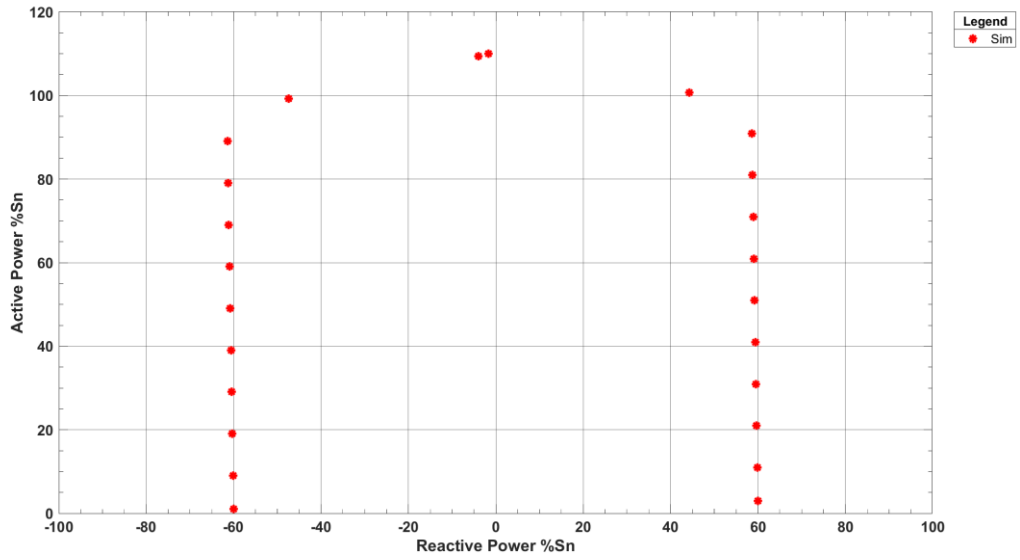
AZZURRO 3PH 60KTL-V3
Semi-circular Curve (100%Un): Active Power over Reactive Power



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

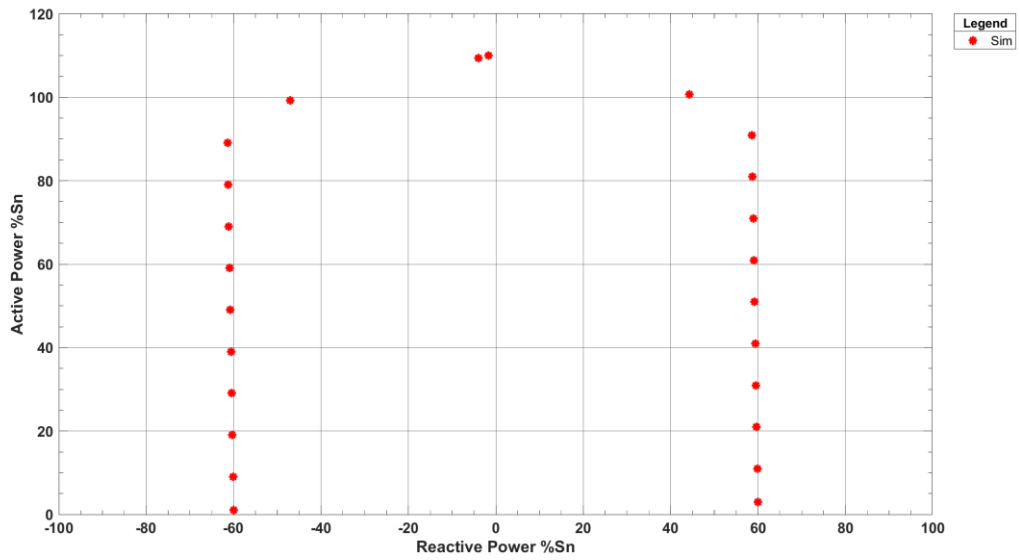


Semi-circular Curve (115%Un): Active Power over Reactive Power

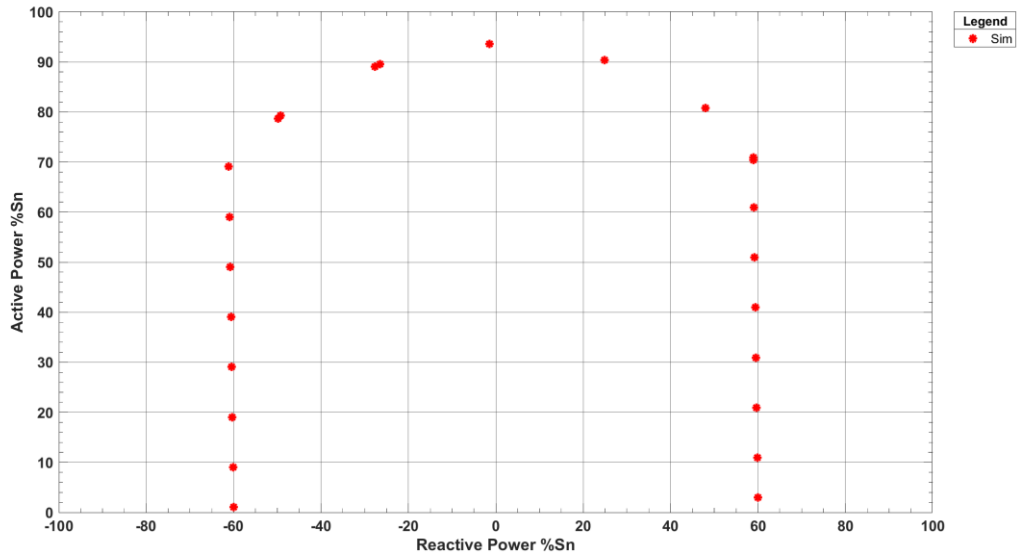


SGS Belgium NV – Division SGS CEBEC
Riverside Business Park
Bld. Internationalelaan, 55 Build. K
BE-1070 Brussels
Tel. +32 2 556 00 20
Fax +32 2 556 00 36

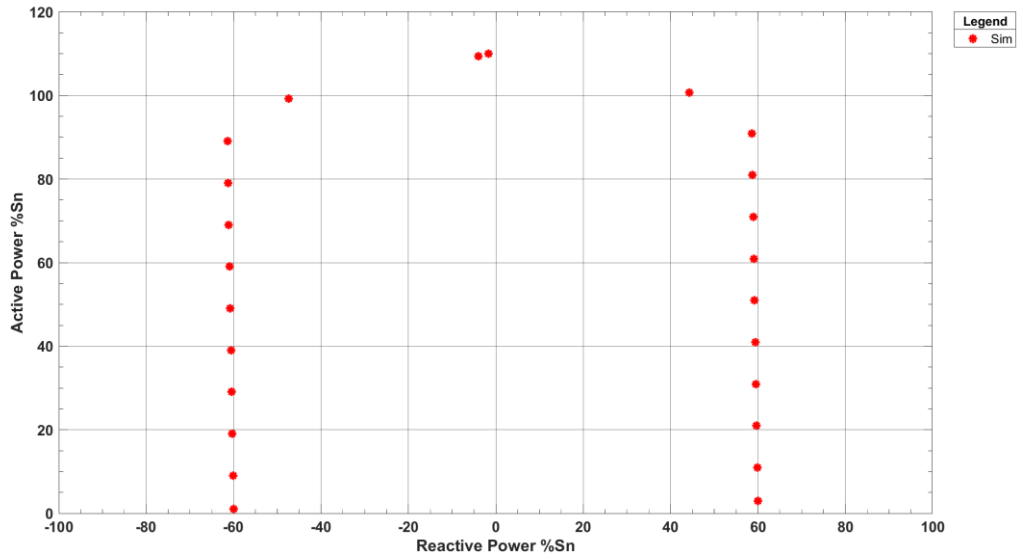
AZZURRO 3PH 70KTL-V3
Semi-circular Curve (100%Un): Active Power over Reactive Power



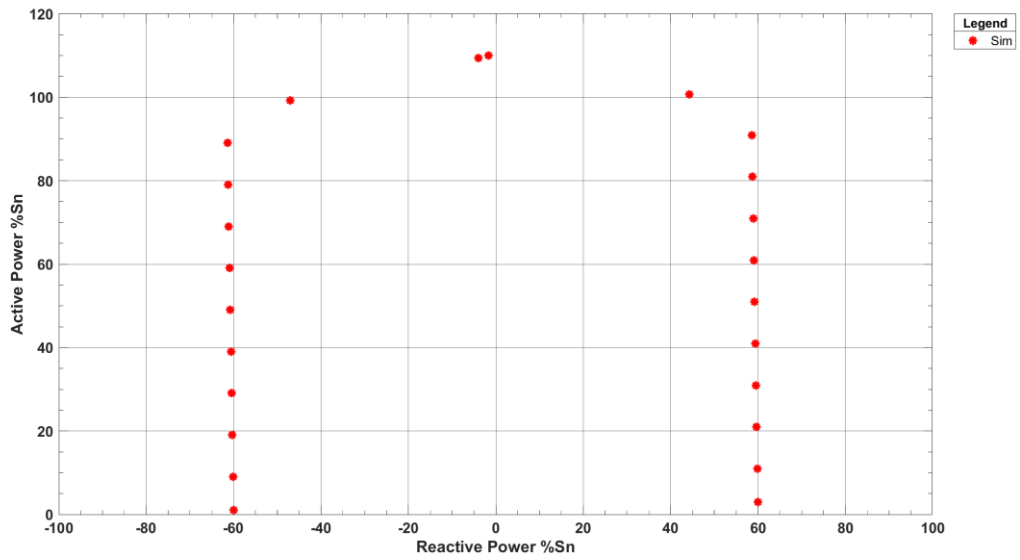
Semi-circular Curve (85%Un): Active Power over Reactive Power



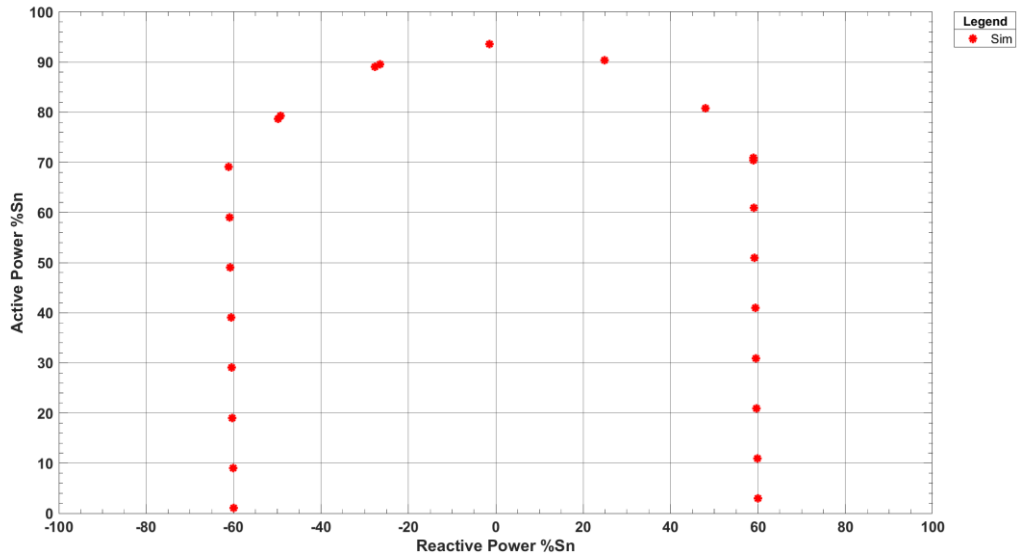
Semi-circular Curve (115%Un): Active Power over Reactive Power



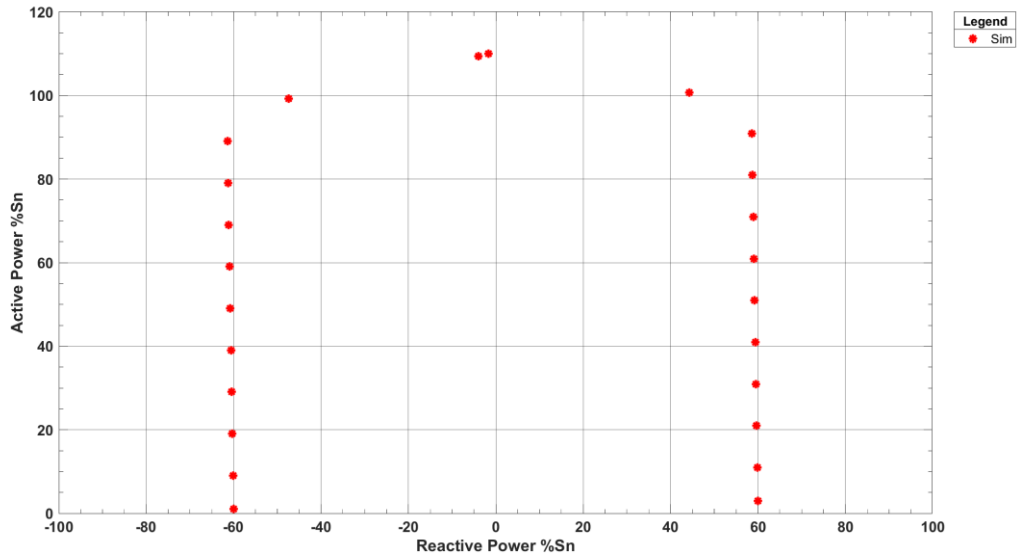
AZZURRO 3PH 75KTL-V3
Semi-circular Curve (100%Un): Active Power over Reactive Power



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



Semi-circular Curve (115%Un): Active Power over Reactive Power



SGS Belgium NV – Division SGS CEBEC
Riverside Business Park
Bld. Internationalelaan, 55 Build. K
BE-1070 Brussels
Tel. +32 2 556 00 20
Fax +32 2 556 00 36

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 80KTL-V3 and AZZURRO 3PH 60KTL-V3, AZZURRO 3PH 60KTL-V3 D2, AZZURRO 3PH 70KTL-V3, AZZURRO 3PH 75KTL-V3

4 TECHNICAL DATA

4.1 Technical data

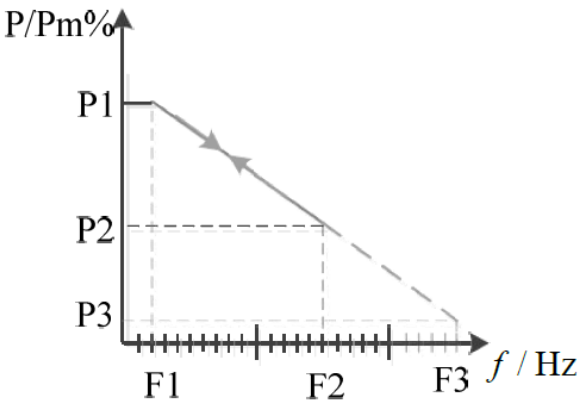
Model	AZZURRO 3PH 60KTL-V3	AZZURRO 3PH 60KTL-V3 D2	AZZURRO 3PH 70KTL-V3	AZZURRO 3PH 75KTL-V3	**AZZURRO 3PH 80KTL-V3**
DC Input					
Max. input voltage	1100 V				
Start-up operating voltage	200 V				
Rated input voltage	620 V				
MPPT operating voltage range	180 V ~1000 V				
Full power MPPT voltage range	550 V ~ 800 V				
Max. input current	6*32 A	6*32 A	6*40 A	6*40A	6*40 A
Max. short current	6*50 A	6*50 A	6*60 A	6*60A	6*60 A
AC Output					
Nominal grid voltage	3/N/PE, 230/400 V_{ac}				
Nominal grid frequency	50/60 Hz				
Rated AC power	60 kW	60 kW	70 kW	75 kW	80 kW
Max. AC power	66 kVA	66 kVA	77 kVA	75 kVA	88 kVA
Rated AC current	86.9 A	86.9 A	101.4 A	108.7 A	115.9 A
Max. AC current	100 A	100 A	116.7 A	113 A	133.3 A
Output power factor	1 default (adjustable+/-0.8)				
General Data					
Operating temperature range	-30 ºC ~ +60 ºC				
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 needed to be checked.

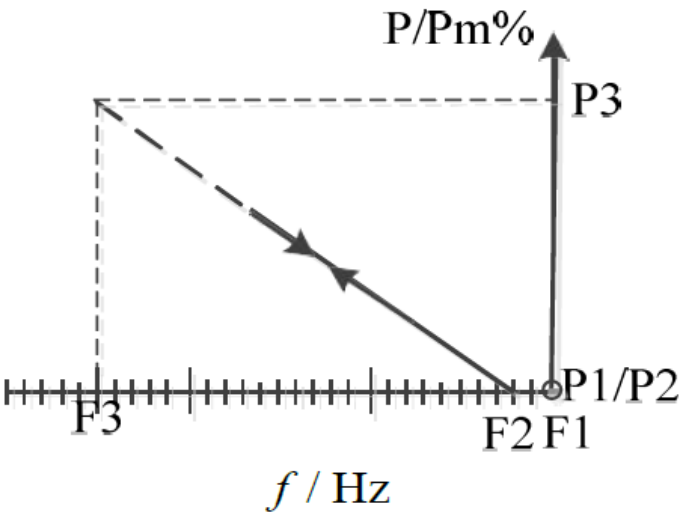
Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Behaviour in the event of disturbances in the network					
LVRT Protection Level		2	1	5	
LVRT Voltage 1	Un%	0	0	130	1
LVRT Time 1	ms	500	0	65535	1
LVRT Voltage 2	Un%	20	0	130	1
LVRT Time 2	ms	1500	0	65535	1
LVRT Voltage 3	Un%	40	0	130	1
LVRT Time 3	ms	3000	0	65535	1
LVRT Voltage 4	Un%	85	0	130	1
LVRT Time 4	ms	61000	0	65535	1
LVRT Exit	Un%	91	0	130	1
LVRT Exit Time	ms	20	0	65535	1
LVRT K Factor		2.0	0	6	1
HVRT Protection Level		2	1	5	
HVRT Voltage 1	Un%	125	0	130	1
HVRT Time 1	ms	100	0	65535	1
HVRT Voltage 2	Un%	120	0	130	1
HVRT Time 2	ms	5000	0	65535	1
HVRT Voltage 3	Un%	115	0	130	1
HVRT Time 3	ms	61000	0	65535	1
Zero Power mode	Un%	70	0	130	1
HVRT Exit	Un%	109	0	500	1
HVRT Exit Time	ms	20	0	65535	1
HVRT K Factor		2.0	0	6	0.1
Gradient for active power increase after fault recovery	%Pn/s	200	0	500	1
Others					
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 'Activepower 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
Active power by setpoint					
Power Limitingswitch	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 RisingSpeed	%Pn/min	30	0	3000	1
Description ofinterfaces		RS485			
Behaviour at P=0		No active power output			
Active power reduction at overfrequency					
Over frequency derating	On/Off	On			
Gradient	%Pm/△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 dropcurve		Curve1			



Curve1

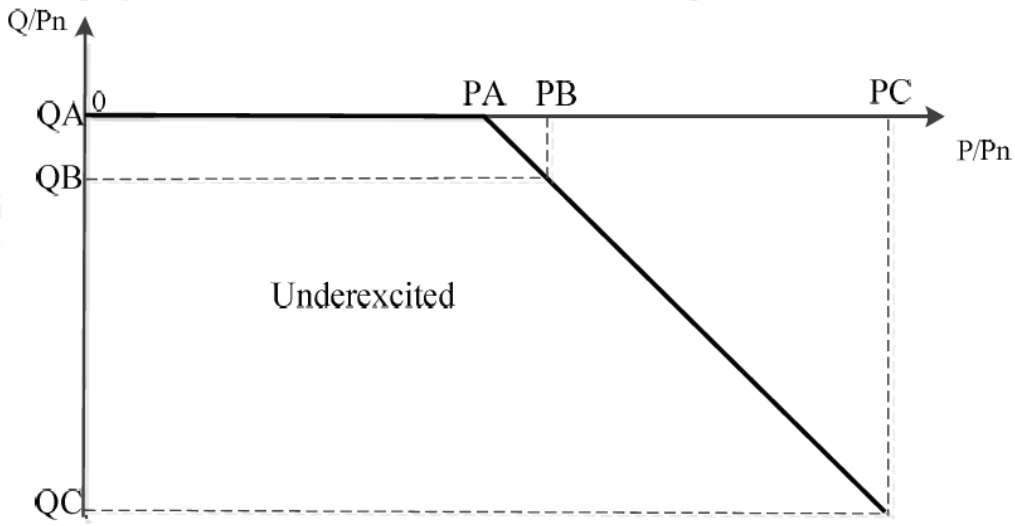
Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Active power injection at underfrequency					
Underfrequencyincrement	On/Off	On			
Gradient	%Pm/△f	40	0	100	1
F1	Hz	50.0	45.0	50.0	0.1
P1	%Pm	0	0	100	1
F2	Hz	49.8	45.0	50.0	0.1
P2	%Pm	0	0	100	1
F3	Hz	47.5	45.0	50.0	0.1
P3	%Pm	92	0	100	1
Active power riserate in underfrequency drop	s	<1			
Active power restoration rate after underfrequency drop	%Pn/min	9	0	3000	1
Underfrequency drop curve		Curve2			



Curve2

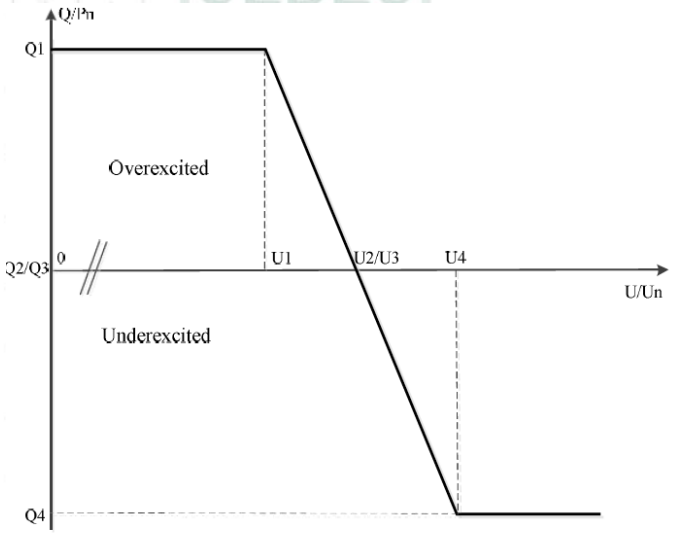
Parameter description	Unit	Default Value	Min.	Max.	Step- wide	Note
Reactive power supply (PF)						
Reactive powerregulationmode(whenselect'Reactiveadjusting switch')	Off/Pf/Qt/Q(P)/Q(U)	Off	--	--	--	--
Reactive power supply. Mode PF: The reactive power can be regulated by the parameter PF (Power Factor).						
PF (when select Pf).	--	1.00	0.8(leadingor lagging)	1	0.01	--
Reactive power supply. Mode Qt: The reactive power can be regulated by the parameter 'Reactive power limit' (in %).						
Reactive power limit (when select Qt).	%Pn	0.00	0.00	60	0.01	--

Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Reactive power supply. Mode Q(P): The reactive ratio or power factor changes with the output power of the inverter.					
Q(P) Curve (when select Q(P))		Curve3			
Active power ratio PA	%Pn	50	0	100	1
Active power ratioPB	%Pn	60	0	100	1
Active power ratioPC	%Pn	100	0	100	1
Corresponding reactive ratio or power factor of active power ratioPA point	%Pn	0	0	1	1
Corresponding reactive ratio or power factor of active power ratioPB point	%Pn	-5	0	-60	1
Corresponding reactive ratio or power factor of active power ratioPC point	%Pn	-60	0	60	1



Curve3

Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Reactive power supply. Mode Q(U): The reactive power changes with the grid voltage.					
Q(U) curve		Curve4			
Hysteretic proportion	%Un	0	0	5	1
Voltage proportionU1	%Un	96	90	110	1
Voltage proportionU2	%Un	100	90	110	1
Voltage proportionU3	%Un	100	90	110	1
Voltage proportionU4	%Un	104	90	110	1
Corresponding reactive ratio of voltage proportionU1	%Pn	60	0	60	1
Corresponding reactive ratio of voltage proportionU2	%Pn	0	0	60	1
Corresponding reactive ratio of voltage proportionU3	%Pn	0	-60	0	1
Corresponding reactive ratio of voltage proportionU4	%Pn	-60	-60	0	1
Reactive response	On/Off	On			
Reactive responsetime	s	10	0	60	1



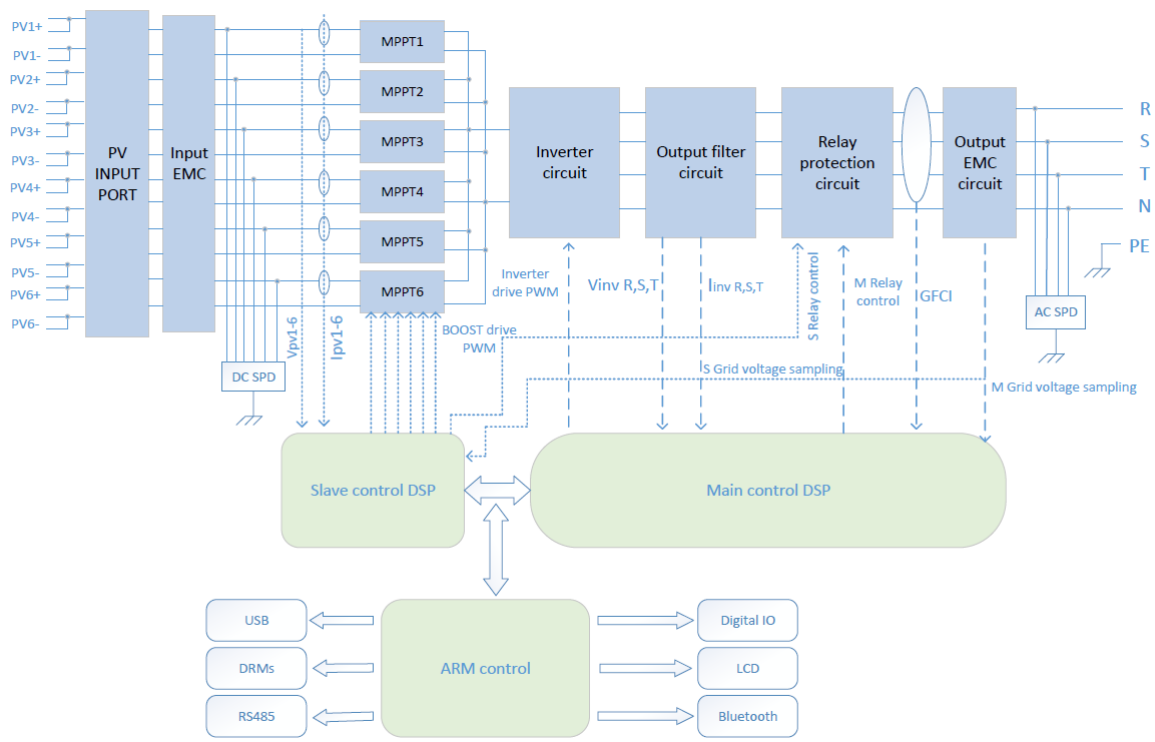
Curve4

Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Limits for re-energizing (reconnection after fault event)					
Undervoltage Protection RecoveryValue	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 ActiveSoft Start	On/Off	On			
Fault Recovery ActiveSoft Start Time	s	600	0	6000	1
Limits for connection (without previous trip)					
Grid ConnectionCondition		Grid normalrange			
Grid Connection Voltage Minimum	V	207.5	23.0	230.0	0.1
Max. Grid-connectedVoltage	V	253.0	230.	299.0	0.1
Grid Connection Frequency Minimum	Hz	47.5	45.0	50.0	0.01
Max. Grid-connectedFrequency	Hz	50.2	50.0	55.0	0.01
Grid Connection Detection Time	s	60	0	600	1
Grid-connected ActivePower Rising Rate	Pn%/min	30	20	40	1

Parameter description	Unit	Default Value	Min.	Max.	Step- wide
Protective functions					
AC Over-voltage Level 1 Protection Value	V	287.5	230	299.0	0.1
AC Over-voltage Level 1 Protection Time	ms	100	100	180000	1
AC Over-voltage Level 2 Protection Value	V	287.5	230	299.0	0.1
AC Over-voltage Level 2 Protection Time	ms	100	0	100	1
AC Under-voltage Level 1 ProtectionValue	V	184.0	23.0	230.0	0.1
AC Under-voltage Level 1 ProtectionTime	ms	1000	0	2500	1
AC Under-voltage Level 2 Protection Value	V	103.5	46.0	461.0	0.1
AC Under-voltage Level 2 Protection Time	ms	300	0	800	1
Grid Overfrequency Level 1 ProtectionValue	Hz	51.5	50.0	55.0	0.01
Grid OverfrequencyLevel 1 Protection Time	ms	200	0	5000	1
Grid Overfrequency Level 2 ProtectionValue	Hz	52.5	50.0	55.0	0.01
Grid OverfrequencyLevel 2 Protection Time	ms	100	0	100	1
AC Under-frequency Level 1 ProtectionValue	Hz	47.5	45.0	49.5	0.01
AC Under-frequency Level 1 ProtectionTime	ms	100	0	100	1
Evaluation of conductor-conductor or conductor-earth voltage		Conductor -earth voltage			
Logical AND or OR link		OR			
Self-protection overvoltage (transient)	V	450			

4.3 Electric scheme

Equipment under testing



4.4 Interfaces

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

- <u>Interface for external active power command:</u> RS485.

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

Manufacturer Certificate according to FGW TG3

AZZURRO 3PH 60KTL-V3 D2 (equivalent to SOFAR 60KTLX2-G3)

Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type SOFAR 60KTLX2-G3

Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11

Datum / Date: 13/7/2022 **Seite/Page 1/1**

1.	**Allgemeines und Ausgangsgrößen**			**General and Output values**
1	Hersteller	Shenzhen SOFARSOLAR Co.,Ltd.		Manufacturer
2	Typenbezeichnung	SOFAR 60KTLX2-G3		type name
3	Einspeisung (einphasig/dreiphasig)	three-phase		no. of phases (single-phase/three-phase)
4	Nennscheinleistung	66	kVA	rated apparent power
5	Nennwirkleistung	60	kW	rated active power
6	AC-Nennspannung	230	V	rated AC-voltage
7	AC-Nennfrequenz	50	Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0. 136	kA	contribution to short circuit current
2	**DC Eingangsgrößen**			**DC Input**
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	6*40	A	max. DC input current
5	Max. Modulleistung	90	kW_p	max. peak power
3	**Wechselrichter-Leistungsteil**			**Converter-Power section**
1	Hersteller	Shenzhen SOFARSOLAR Co., Ltd.		manufacturer
2	Typenbezeichnung	SOFAR 60KTLX2-G3		type name
3	Nennscheinleistung	66	kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without		generic type (HV/LV of Trans., without)
5	Taktfrequenz	16	kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation& Observation		generic type of power control (MPP-Tracking)
7	Software-Version	V000015		software version
4	**Sonstige elektrische Komponenten**			**Other electric installations**
1	Art der Netzkopplung	breaker		generic type of interconnection
2	- Hersteller	Dongguan Churod Electronic Co., Ltd		- manufacturer
3	- Typenbezeichnung	CHAR-112A150T		- type
4	Netzschutz integriert (Ja/Nein)	yes		integrated grid protection (yes/no)
5	Netzschutzhersteller	Dongguan Churod Electronic Co., Ltd		grid protection manufacturer
6	- Typenbezeichnung	CHAR-112A150T		- 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	Frequenzrückgangschutz	47.5	Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch		circuit breaker type
13	Oberschwingungsfilter (ja/nein)	No		harmonic filter (yes / no)
5	**Typenprüfung**			**Type test**
1	Prüfbehörde	Societe Generale de Surveillance S.A.		testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11		reference
3	Seriennummer des Wechselrichters	SD1021060KE225190051		serial number of converter

Anschrift des Herstellers
Address of manufacturer

Stempel, Unterschrift
Stamp, signature

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

Manufacturer Certificate according to FGW TG3

AZZURRO 3PH 70KTL-V3 (equivalent to SOFAR 70KTLX-G3)

Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type SOFAR 70KTLX-G3

Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11

Datum / Date: 13/7/2022 **Seite/Page 1/1**

1.	**Allgemeines und Ausgangsgrößen**			**General and Output values**
1	Hersteller	Shenzhen SOFARSOLAR Co.,Ltd.		Manufacturer
2	Typenbezeichnung	SOFAR 70KTLX-G3		type name
3	Einspeisung (einphasig/dreiphasig)	three-phase		no. of phases (single-phase/three-phase)
4	Nennscheinleistung	77	kVA	rated apparent power
5	Nennwirkleistung	70	kW	rated active power
6	AC-Nennspannung	230	V	rated AC-voltage
7	AC-Nennfrequenz	50	Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0.159	kA	contribution to short circuit current
2	**DC Eingangsgrößen**			**DC Input**
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	6*40	A	max. DC input current
5	Max. Modulleistung	105	kW_p	max. peak power
3	**Wechselrichter-Leistungsteil**			**Converter-Power section**
1	Hersteller	Shenzhen SOFARSOLAR Co., Ltd.		manufacturer
2	Typenbezeichnung	SOFAR 70KTLX-G3		type name
3	Nennscheinleistung	77	kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without		generic type (HV/LV of Trans., without)
5	Taktfrequenz	16	kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation& Observation		generic type of power control (MPP-Tracking)
7	Software-Version	V000015		software version
4	**Sonstige elektrische Komponenten**			**Other electric installations**
1	Art der Netzkopplung	breaker		generic type of interconnection
2	- Hersteller	Dongguan Churod Electronic Co., Ltd		- manufacturer
3	- Typenbezeichnung	CHAR-112A150T		- type
4	Netzschutz integriert (Ja/Nein)	yes		integrated grid protection (yes/no)
5	Netzschutzhersteller	Dongguan Churod Electronic Co., Ltd		grid protection manufacturer
6	- Typenbezeichnung	CHAR-112A150T		- type
7	- Einstellbereiche	Shown in appendix		- adjustment ranges
8	Spannungssteigerungsschutz	287.5	V	overvoltage protection
9	Spannungsrückgangschutz	184	V	undervoltage protection
10	Frequenzsteigerungsschutz	51.5	Hz	overfrequency protection
11	Frequenzrückgangschutz	47.5	Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch		circuit breaker type
13	Oberschwingungsfilter (ja/nein)	No		harmonic filter (yes / no)
5	**Typenprüfung**			**Type test**
1	Prüfbehörde	Societe Generale de Surveillance S.A.		testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11		reference
3	Seriennummer des Wechselrichters	SD1021070KE225200034		serial number of converter

Anschrift des Herstellers
Address of manufacturer

Stempel, Unterschrift
stamp, signature

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

Manufacturer Certificate according to FGW TG3

AZZURRO 3PH 80KTL-V3 (equivalent to SOFAR 80KTLX-G3)

Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type SOFAR 80KTLX-G3

Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11

Datum / Date: 13/7/2022 **Seite/Page 1/1**

1.	**Allgemeines und Ausgangsgrößen**			**General and Output values**
1	Hersteller	Shenzhen SOFARSOLAR Co.,Ltd.		Manufacturer
2	Typenbezeichnung	SOFAR 80KTLX-G3		type name
3	Einspeisung (einphasig/dreiphasig)	three-phase		no. of phases (single-phase/three-phase)
4	Nennscheinleistung	88	kVA	rated apparent power
5	Nennwirkleistung	80	kW	rated active power
6	AC-Nennspannung	230	V	rated AC-voltage
7	AC-Nennfrequenz	50	Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0.188	kA	contribution to short circuit current
2	**DC Eingangsgrößen**			**DC Input**
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	6*40	A	max. DC input current
5	Max. Modulleistung	120	kW_p	max. peak power
3	**Wechselrichter-Leistungsteil**			**Converter-Power section**
1	Hersteller	Shenzhen SOFARSOLAR Co., Ltd.		manufacturer
2	Typenbezeichnung	SOFAR 80KTLX-G3		type name
3	Nennscheinleistung	88	kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without		generic type (HV/LV of Trans., without)
5	Taktfrequenz	16	kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation& Observation		generic type of power control (MPP-Tracking)
7	Software-Version	V000015		software version
4	**Sonstige elektrische Komponenten**			**Other electric installations**
1	Art der Netzkopplung	breaker		generic type of interconnection
2	- Hersteller	Dongguan Churod Electronic Co., Ltd		- manufacturer
3	- Typenbezeichnung	CHAR-112A150T		- type
4	Netzschutz integriert (Ja/Nein)	yes		integrated grid protection (yes/no)
5	Netzschutzhersteller	Dongguan Churod Electronic Co., Ltd		grid protection manufacturer
6	- Typenbezeichnung	CHAR-112A150T		- type
7	- Einstellbereiche	Shown in appendix		- adjustment ranges
8	Spannungssteigerungsschutz	287.5	V	overvoltage protection
9	Spannungsrückgangschutz	184	V	undervoltage protection
10	Frequenzsteigerungsschutz	51.5	Hz	overfrequency protection
11	Frequenzrückgangschutz	47.5	Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch		circuit breaker type
13	Oberschwingungsfilter (ja/nein)	No		harmonic filter (yes / no)
5	**Typenprüfung**			**Type test**
1	Prüfbehörde	Société Générale de Surveillance S.A.		testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11		reference
3	Seriennummer des Wechselrichters	SD1021080KE226030058		serial number of converter

Anschrift des Herstellers
Address of manufacturer

Stempel, Unterschrift
Stamp, signature

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

Manufacturer Certificate according to FGW TG3

AZZURRO 3PH 75KTL-V3 (equivalent to SOFAR 75KTLX-G3)

Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type SOFAR 75KTLX-G3

Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11

Datum / Date: 13/7/2022 **Seite/Page 1/1**

1.	**Allgemeines und Ausgangsgrößen**			**General and Output values**
1	Hersteller	Shenzhen SOFARSOLAR Co.,Ltd.		Manufacturer
2	Typenbezeichnung	SOFAR 75KTLX-G3		type name
3	Einspeisung (einphasig/dreiphasig)	three-phase		no. of phases (single-phase/three-phase)
4	Nennscheinleistung	75	kVA	rated apparent power
5	Nennwirkleistung	75	kW	rated active power
6	AC-Nennspannung	230	V	rated AC-voltage
7	AC-Nennfrequenz	50	Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0.156	kA	contribution to short circuit current
2	**DC Eingangsgrößen**			**DC Input**
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	5*40	A	max. DC input current
5	Max. Modulleistung	105	kW_p	max. peak power
3	**Wechselrichter-Leistungsteil**			**Converter-Power section**
1	Hersteller	Shenzhen SOFARSOLAR Co., Ltd.		manufacturer
2	Typenbezeichnung	SOFAR 75KTLX-G3		type name
3	Nennscheinleistung	75	kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without		generic type (HV/LV of Trans., without)
5	Taktfrequenz	16	kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation& Observation		generic type of power control (MPP-Tracking)
7	Software-Version	V000015		software version
4	**Sonstige elektrische Komponenten**			**Other electric installations**
1	Art der Netzkopplung	breaker		generic type of interconnection
2	- Hersteller	Dongguan Churod Electronic Co., Ltd		- manufacturer
3	- Typenbezeichnung	CHAR-112A150T		- type
4	Netzschutz integriert (Ja/Nein)	yes		integrated grid protection (yes/no)
5	Netzschutzhersteller	Dongguan Churod Electronic Co., Ltd		grid protection manufacturer
6	- Typenbezeichnung	CHAR-112A150T		- type
7	- Einstellbereiche	Shown in appendix		- adjustment ranges
8	Spannungssteigerungsschutz	287.5	V	overvoltage protection
9	Spannungsrückgangschutz	184	V	undervoltage protection
10	Frequenzsteigerungsschutz	51.5	Hz	overfrequency protection
11	Frequenzrückgangschutz	47.5	Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch		circuit breaker type
13	Oberschwingungsfilter (ja/nein)	No		harmonic filter (yes / no)
5	**Typenprüfung**			**Type test**
1	Prüfbehörde	Société Générale de Surveillance S.A.		testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11		reference
3	Seriennummer des Wechselrichters	SD1021075KE226030067		serial number of converter

Anschrift des Herstellers
Address of manufacturer

Stempel, Unterschrift
Stamp, signature

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

Manufacturer Certificate according to FGW TG3

AZZURRO 3PH 60KTL-V3 (equivalent to SOFAR 60KTLX-G3)

Herstellerbescheinigung zu spezifischen Daten eines Photovoltaik-Wechselrichters vom Type SOFAR 60KTLX-G3

Manufacturer's certificate on specific data of a Photovoltaic Converter of the type VDE-AR-N 4110:2018-11

Datum / Date: 13/7/2022 **Seite/Page 1/1**

1.	**Allgemeines und Ausgangsgrößen**			**General and Output values**
1	Hersteller	Shenzhen SOFARSOLAR Co.,Ltd.		Manufacturer
2	Typenbezeichnung	SOFAR 60KTLX-G3		type name
3	Einspeisung (einphasig/dreiphasig)	three-phase		no. of phases (single-phase/three-phase)
4	Nennscheinleistung	66	kVA	rated apparent power
5	Nennwirkleistung	60	kW	rated active power
6	AC-Nennspannung	230	V	rated AC-voltage
7	AC-Nennfrequenz	50	Hz	rated frequency
8	Beitrag zum Stoßkurzschlussstrom	0. 136	kA	contribution to short circuit current
2	**DC Eingangsgrößen**			**DC Input**
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	6*32	A	max. DC input current
5	Max. Modulleistung	90	kW_p	max. peak power
3	**Wechselrichter-Leistungsteil**			**Converter-Power section**
1	Hersteller	Shenzhen SOFARSOLAR Co., Ltd.		manufacturer
2	Typenbezeichnung	SOFAR 60KTLX-G3		type name
3	Nennscheinleistung	66	kVA	rated apparent power
4	Art (HF/NF-Trafo, trafolos)	Without		generic type (HV/LV of Trans., without)
5	Taktfrequenz	16	kHz	pulse rate of inverter
6	Art der Leistungsregelung (MPP-Tracking)	Perturbation& Observation		generic type of power control (MPP-Tracking)
7	Software-Version	V000015		software version
4	**Sonstige elektrische Komponenten**			**Other electric installations**
1	Art der Netzkopplung	breaker		generic type of interconnection
2	- Hersteller	Dongguan Churod Electronic Co., Ltd		- manufacturer
3	- Typenbezeichnung	CHAR-112A150T		- type
4	Netzschutz integriert (Ja/Nein)	yes		integrated grid protection (yes/no)
5	Netzschutzhersteller	Dongguan Churod Electronic Co., Ltd		grid protection manufacturer
6	- Typenbezeichnung	CHAR-112A150T		- 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	Frequenzrückgangschutz	47.5	Hz	underfrequency protection
12	Typenbezeichnung der Abschalteinheit	Air switch		circuit breaker type
13	Oberschwingungsfilter (ja/nein)	No		harmonic filter (yes / no)
5	**Typenprüfung**			**Type test**
1	Prüfbehörde	Société Générale de Surveillance S.A.		testing authority
2	Aktenzeichen	VDE-AR-N 4110:2018-11		reference
3	Seriennummer des Wechselrichters	SD1021060KE225190051		serial number of converter

Anschrift des Herstellers
Address of manufacturer

Stempel, Unterschrift
stamp, signature

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: 9.1 Version (R2018a)
- Simulation Software File identification: PGU_80kW.slx
- Dynamic Simulation Model version: V1
- MD5 Checksum: F4FAC9A7B88A96112F1F53A44EDD17B6

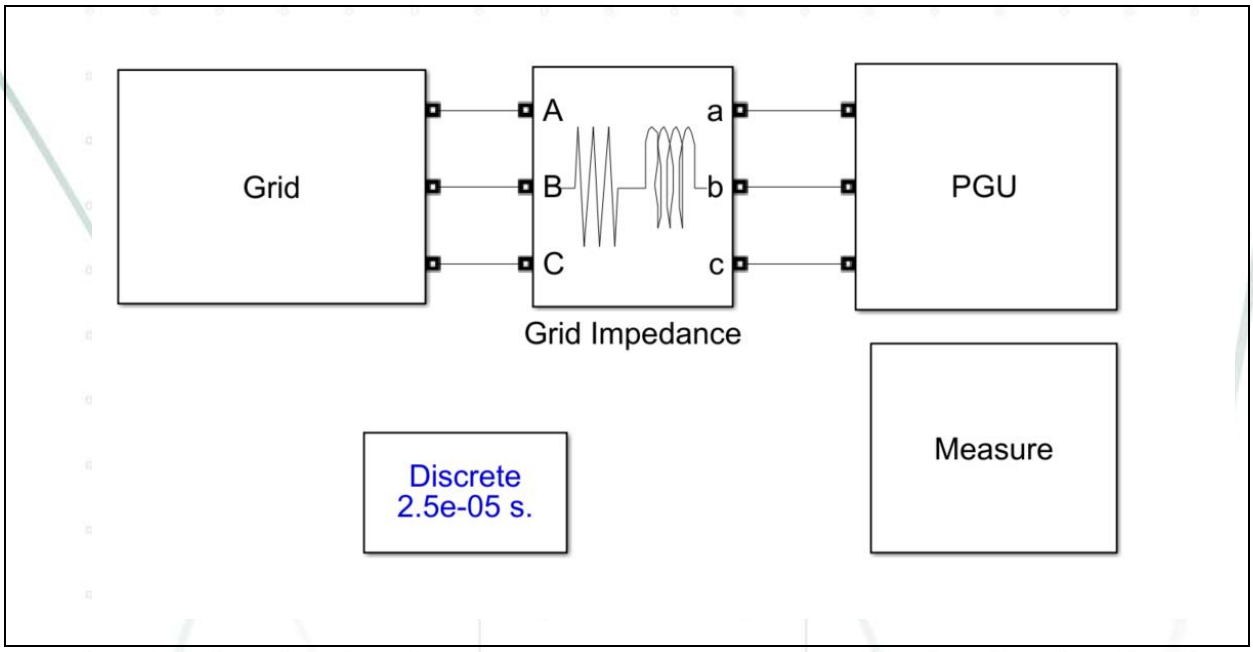
5.2 Software Information and Comments

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 SOFAR 80KTLX-G3 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 Plausability 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:

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

Where, MSk is the short-circuit capacity of interconnected of point, Pn is the rated capacity of inverter.

And the impedance Zk of grid is calculated by:

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

Where, Ug 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 21st of April 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

```
%===================  AC source module parameters


%============ Rated Voltage and Frequency
Un=800;       % Vrms(Phase-Phase)(V)
Fn=50;        % Frequency(Hz)
InitalAngle=0; % Init Angle of Phase A
%==========   Rated Voltage and Frequency


%============== Test Type % 0=Disable 1=Enable
VRTEnable=1;
UprotectionEnable=0;
FprotectionEnable=0;
PQUTestEnable =0;
QUEnableSource=0;
PlausibilityEnable=0;
%================ Test Type


%============= FRT parameters START
PreFaultU=1;  % Pre-fault Voltage
FaultType=1;  % 1=ThreePhase Type  2=TwoPhase Type
Tstart=1.942;     % Start time
Tend=3.582;       % End time
Dip=0.8;      % Dip depth
%============= FRT parameters END
```

- In the PGUparameters script:

PGUparameters.m

```
%===========  Grid Impedance
SCR=50;
%===========  Grid Impedance

%===========  VRT Parameters START
ZCM=0;        %Zero Current Enable
U0=0.9;       %ThresholdLVRT
U1=0;         %Upoint1(pu)
U2=0.25;      %Upoint2(pu)
U3=0.5;       %Upoint3(pu)
U4=0.85;      %Upoint4(pu)
T0=10;         %K factor of LVRT
T1=5;         %Tpoint1(s)
T2=20;         %Tpoint2(s)
T3=40;         %Tpoint3(s)
T4=60;        %Tpoint4(s)

ZCM1=0;       %Zero Current Enable
U00=1.1;      %ThresholdOVRT
U11=1.25;     %Upoint1(pu)
U22=1.2;      %Upoint2(pu)
U33=1.15;     %Upoint3(pu)
U44=1.1;      %Upoint4(pu)
T00=2;        %K factor of OVRT
T11=5;       %Tpoint1(s)
T22=10;        %Tpoint2(s)
T33=30;       %Tpoint3(s)
T44=60;       %Tpoint4(s)
VRTFilter=1;  %VRT Ud Filter time(s)
%===========  VRT Parameters END
```

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

The PGU subsystem has been configurating 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

```
if 0== MIL_enable
    %============ PGU module parameters  START
    Pnom=80000;  %Rated Power(W)
    Unom=400;     %Rated Urms(phase-phase)(V)
    Fnom=50;      %Frequency(Hz)
    Smax=110;     %Max Apparent Power(%Pn)
    PercentP=100;  %Pre-fault P(%Pn)
    PercentQ=-48;   %Pre-fault Q(%Pn)
    PFEnable=0;   %P/f function Enable,Not used
    %============ PGU module parameters END

    %===========  Function Enable part START
    LVRTEnable=1;     %LVRT Enable
    OVRTEnable=0;     %OVRT Enable
    UPEnable=0;       %U protection enable
    FPEnable=0;       %f protection enable
    QUEnable=0;       %QUEnable
    QPEnable=0;       %QPEnable
    PQUTestEnable2=0;  %PQU Enable
    QsettingEnable=0; %Q setting Enable
    PsettingEnable=0; %P setting Enable
    %============  Function Enable part END
```

The configuration for OVRT is the following:

PGUparameters.m

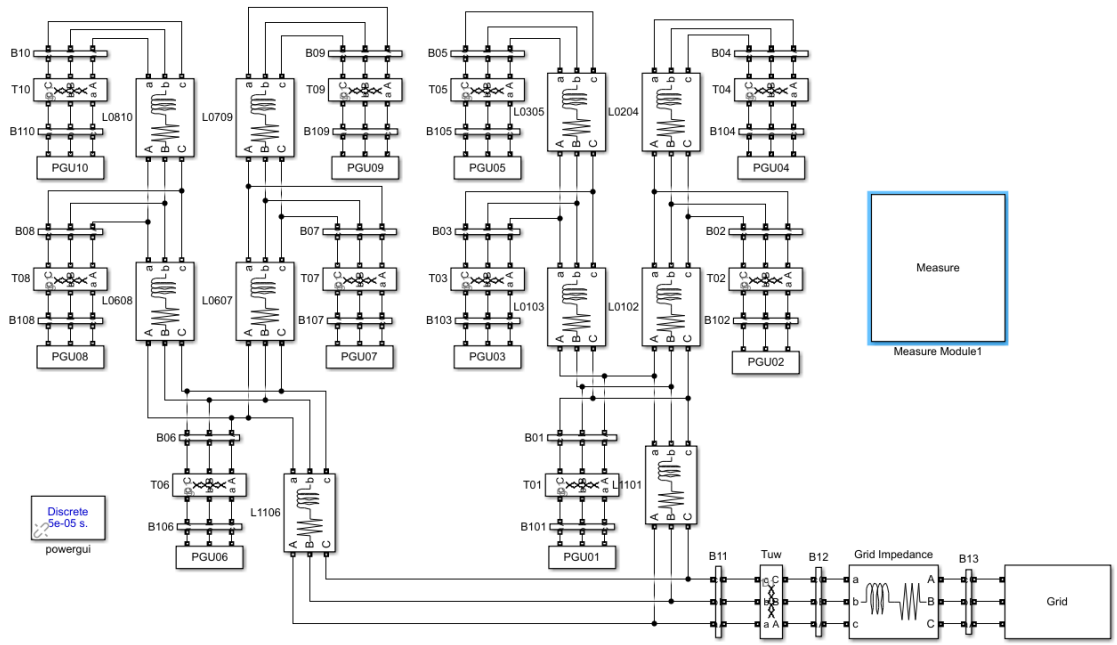
```
if 0== MIL_enable
    %============ PGU module parameters  START
    Pnom=80000;  %Rated Power(W)
    Unom=400;     %Rated Urms(phase-phase)(V)
    Fnom=50;      %Frequency(Hz)
    Smax=110;     %Max Apparent Power(%Pn)
    PercentP=100;  %Pre-fault P(%Pn)
    PercentQ=0;   %Pre-fault Q(%Pn)
    PFEnable=0;   %P/f function Enable,Not used
    %============ PGU module parameters END

    %===========  Function Enable part START
    LVRTEnable=0;     %LVRT Enable
    OVRTEnable=1;     %OVRT Enable
    UPEnable=0;       %U protection enable
    FPEnable=0;       %f protection enable
    QUEnable=0;       %QUEnable
    QPEnable=0;       %QPEnable
    PQUTestEnable2=0;  %PQU Enable
    QsettingEnable=0; %Q setting Enable
    PsettingEnable=0; %P setting Enable
    %============  Function Enable part END
```

The slack node can also be configured for plausibility tests.

```
ACSourceParameters.m
%=================== AC source module parameters
if 0== MIL_enable
    %============ Rated Voltage and Frequency
    Un=400;        % Vrms(Phase-Phase)(V)
    Fn=50;         % Frequency(Hz)
    InitalAngle=0; % Init Angle of Phase A
    %==========   Rated Voltage and Frequency
```

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 = 0.04 Ω; Reactance = 0.00024 L.
PGU10: Resistance = 0.04 Ω; Reactance = 0.0004 L.

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