

TEST REPORT CEI 0-21:2022 Reference technical rules for connection of active and passive users to the LV electrical Utilities	
Report Reference No.....	220916017GZU-001
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Testing Laboratory.....	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
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Tested by (name + signature).....	Gaison Li Engineer <i>Gaison Li</i>
Approved by (+ signature).....	Jason Fu Supervisor <i>Jason Fu</i>
Applicant's name.....	INVT Solar Technology (Shenzhen) Co., Ltd.
Address.....	6th Floor, Block A, INVT Guangming Technology Building, Kejie Fourth Road, Shutianpu Community, Matian Guangming District, 518000 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Test specification:	
Standard.....	CEI 0-21: 2022
Test procedure.....	Type approval for Type B
Non-standard test method.....	N/A
Test Report Form No.....	CEI 0-21 B
Test Report Form(s) Originator.....	Intertek Guangzhou
Master TRF.....	Dated 2019-04
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Test item description.....	Grid-tied Solar inverter
Trade Mark.....	invt
Manufacturer.....	Same as applicant
Model/Type reference.....	iMars XG100KTR, iMars XG100KTR-F, iMars XG110KTR, iMars XG110KTR-F, iMars XG136KTR-L, iMars XG136KTR-LF, iMars XG136KTR-X, iMars XG136KTR-XF

Ratings	Model	iMars XG100KTR	iMars XG100KTR-F
	Max.PV voltage	1100Vdc	
	MPPT voltage range	180V – 1000Vdc	
	Max.input current	26A*9	30A*9
	PV Isc	40A*9	
	Nominal output voltage	3/N/PE, 230/400Vac	
	Nominal output Frequency	50Hz	
	Max.output current	158.8A	
	Rated output power	100KW	
	Max.apparent power	110KVA	
	Power factor range	0.8Leading – 0.8 lagging	
	Safety level	Class I	
	Ingress Protection	IP 66	
	Operation Ambient Temperature	-30°C - +60°C	
	Software version	V1.1	
	Model	iMars XG110KTR	iMars XG110KTR-F
	Max.PV voltage	1100Vdc	
	MPPT voltage range	180V – 1000Vdc	
	Max.input current	26A*10	30A*10
	PV Isc	40A*10	
	Nominal output voltage	3/N/PE, 230/400Vac	
	Nominal output Frequency	50Hz	
	Max.output current	174.6A	
	Rated output power	110KW	
	Max.apparent power	121KVA	
	Power factor range	0.8Leading – 0.8 lagging	
	Safety level	Class I	
	Ingress Protection	IP 66	
	Operation Ambient Temperature	-30°C - +60°C	
	Software version	V1.1	
	Model	iMars XG136KTR-L	iMars XG136KTR-LF
	Max.PV voltage	1100Vdc	
	MPPT voltage range	180V – 1000Vdc	

	Max.input current	26A*12	30A*12
	PV Isc	40A*12	
	Nominal output voltage	3/N/PE, 277/480Vac	
	Nominal output Frequency	50Hz	
	Max.output current	174.6A	
	Rated output power	136KW	
	Max.apparent power	150KVA	
	Power factor range	0.8Leading – 0.8 lagging	
	Safety level	Class I	
	Ingress Protection	IP 66	
	Operation Ambient Temperature	-30℃ - +60℃	
	Software version	V1.1	
	Model	iMars XG136KTR-X	iMars XG136KTR-XF
	Max.PV voltage	1100Vdc	
	MPPT voltage range	180V – 1000Vdc	
	Max.input current	26A*12	30A*12
	PV Isc	40A*12	
	Nominal output voltage	3/N/PE, 311/540Vac	
	Nominal output Frequency	50Hz	
	Max.output current	160.4A	
	Rated output power	136KW	
	Max.apparent power	150KVA	
	Power factor range	0.8Leading – 0.8 lagging	
	Safety level	Class I	
	Ingress Protection	IP 66	
	Operation Ambient Temperature	-30℃ - +60℃	
	Software version	V1.1	

Summary of testing:

Tests performed (name of test and test clause):

See following page 9 -15 for details

Testing location:

Intertek Testing Services Shenzhen Ltd.
Guangzhou Branch

Room 02, &
101/E201/E301/E401/E501/E601/E701/E801 of
Room 01 1-8/F., No. 7-2. Caipin Road, Science
City, CETDD, Guangzhou, Guangdong, China

Marking plate

invt	Grid-tied Solar Inverter
iMars XG100KTR	
DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	26AX9
I _{sc} PV	40AX9
AC Output	
Nominal Voltage	3/N/PE230/400V
Max. Current	158.8A
Rated Power	120000W
Max. Output Power	110000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov
Environment	
Temperature	-30°C - +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66
	
Made in China	
INVT Solar Technology (Shenzhen) Co., Ltd.	

invt	Grid-tied Solar Inverter
iMars XG100KTR-F	
DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	30AX9
I _{sc} PV	48AX9
AC Output	
Nominal Voltage	3/N/PE230/400V
Max. Current	158.8A
Rated Power	100000W
Max. Output Power	110000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov
Environment	
Temperature	-30°C - +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66
	
Made in China	
INVT Solar Technology (Shenzhen) Co., Ltd.	

invt	Grid-tied Solar Inverter
iMars XG110KTR	
DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	26AX10
I _{sc} PV	40AX10
AC Output	
Nominal Voltage	3/N/PE230/400V
Max. Current	174.6A
Rated Power	110000W
Max. Output Power	121000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov
Environment	
Temperature	-30°C - +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66
	
Made in China	
INVT Solar Technology (Shenzhen) Co., Ltd.	

invt	Grid-tied Solar Inverter
iMars XG110KTR-F	
DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	30AX10
I _{sc} PV	48AX10
AC Output	
Nominal Voltage	3/N/PE230/400V
Max. Current	174.6A
Rated Power	110000W
Max. Output Power	121000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov
Environment	
Temperature	-30°C - +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66
	
Made in China	
INVT Solar Technology (Shenzhen) Co., Ltd.	

invt

Grid-tied
Solar Inverter

iMars XG136KTR-L

DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	26AX12
I _{sc} PV	40AX12

AC Output	
Nominal Voltage	3/N/PE,277/480V
Max. Current	174.6A
Rated Power	136000W
Max. Output Power	150000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov

Environment	
Temperature	-30°C ~ +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66

Made in China

INVT Solar Technology (Shenzhen) Co., Ltd.

invt

Grid-tied
Solar Inverter

iMars XG136KTR-LF

DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	30AX12
I _{sc} PV	40AX12

AC Output	
Nominal Voltage	3/N/PE,277/480V
Max. Current	174.6A
Rated Power	136000W
Max. Output Power	150000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov

Environment	
Temperature	-30°C ~ +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66

Made in China

INVT Solar Technology (Shenzhen) Co., Ltd.

invt

Grid-tied
Solar Inverter

iMars XG136KTR-X

DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	26AX12
I _{sc} PV	40AX12

AC Output	
Nominal Voltage	3/N/PE,311/540V
Max. Current	160.4A
Rated Power	136000W
Max. Output Power	150000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov

Environment	
Temperature	-30°C ~ +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66

Made in China

INVT Solar Technology (Shenzhen) Co., Ltd.

invt

Grid-tied
Solar Inverter

iMars XG136KTR-XF

DC Input	
V _{max} PV	1100V
MPPT Range	180V-1000V
Max. Current	30AX12
I _{sc} PV	40AX12

AC Output	
Nominal Voltage	3/N/PE,311/540V
Max. Current	160.4A
Rated Power	136000W
Max. Output Power	150000VA
Frequency	50Hz/60Hz
Power factor range	0.80un - 0.80ov

Environment	
Temperature	-30°C ~ +60°C
Protective Class	I
Inverter topology	Non-isolated
Ingress protection	IP66

Made in China

INVT Solar Technology (Shenzhen) Co., Ltd.

Test item particulars	
Temperature range	-30°C - 60 °C
AC Overvoltage category	☐ OVC I ☐ OVC II ☒ OVC III ☐ OVC IV
DC Overvoltage category	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV
IP protection class	IP 66
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A (Not applicable)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	08 Oct 2022
Date (s) of performance of tests	08 Oct 2022 – 23 Nov 2022
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a point is used as the decimal separator. <i>This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.</i>	

General product information:

The control system is divided into DC and AC control. AC-DSP and CPLD on the AC side mainly monitors the voltage, current, frequency and GFCI on the grid side, and participates in the inverter control.

The DC-DSP monitors the voltage, current, and ISO on the PV input side, and participates in the BOOST booster circuit and maximum power MPPT point tracking.

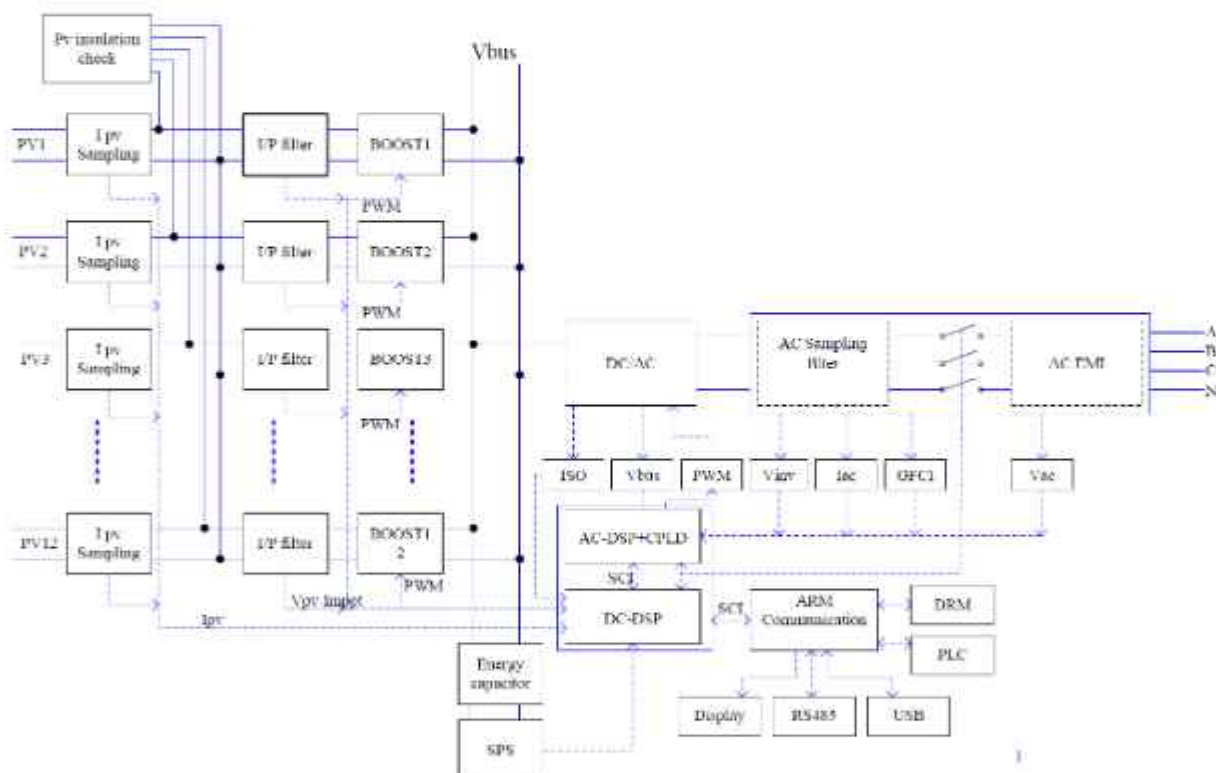
There is an internal communication circuit between the two DSP to coordinate with each other to complete the software function of the whole machine.

The ARM monitoring board does not participate in the control of the whole system. It communicates with the DC-SPS to collect the data of the whole system.

The relays (K3, K4, K5, K6) are designed on redundant structure where K4, K6 are controlled by DC-DSP and K5, K6 are controlled by AC-DSP.

The AC-DSP and DC-DSP are used together to control relay open or close, if the single fault on one controller, the other controller can be capable of opening the relay, so that still providing safety means.

Block diagram:



Model difference:

All models are identical, except the output power derating in software.

The detailed difference as following:

Model	iMars XG100KTR, iMars XG100KTR-F	iMars XG110KTR, iMars XG110KTR-F	iMars XG136KTR-L, iMars XG136KTR-LF	iMars XG136KTR-X, iMars XG136KTR-XF
PV input	9 strings MPPT Each MPPT: two string input	10 strings MPPT Each MPPT: two string input	12 strings MPPT Each MPPT: two string input	
AC output voltage	230/400Vac		277/480Vac	311/540Vac

Factory:

Shenzhen INVT Electric Co., Ltd. (Baoan Factory)

4th to 1st floors of Emerson Industrial Park, No. 3, Fengtang Avenue, Tangwei Community, Fuhai Street, Baoan District, Shenzhen, CHINA.

Topology of the device, which this certificate is based on

(The static converters in systems with capacity more than 11.08 kW)

Disconnection Device	Interface Protection Device	Device for Static Conversion	Rotating Generator Device
		☒	

Tests performed (name of test and test clause):

Annex A: Requirements and test for Interface Protection System (SPI)

Interface protection System (SPI) can be integrated to inverter with output power up to 11.08KW.

A.4 Verifiche e prove sul SPI /test and inspection on SPI

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Prove funzionali sull'SPI <i>/Functional test on SPI</i>	A.4.3 A.4.3.1 A.4.3.2 A.4.7 (limit conditions)	Condizioni di riferimento / Reference conditions (20 °C) – Tab.9	N/A	--
		Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B) - Tab.12	N/A	--
		Umidità / Humidity test CEI EN 60068-2-78 (Test Cab) - Tab.12	N/A	--
		Freddo / Cold test CEI EN 60068-2-1 (Test A) - Tab.12	N/A	--

A.4.3.3 Prescrizioni aggiuntive per le prove funzionali
/Additional requirements of the functional test

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Insensibilità delle armoniche del relè di frequenza <i>Insensitivity to harmonics of the frequency relay</i>	A.4.3.3.1	CEI 0-21:2022	N/A	--
Segnale di telesecatto <i>Remote trip signal</i>	A.4.3.3.2	CEI 0-21:2022	N/A	--
Segnale di telecomunicazione <i>Communication signal</i>	A.4.3.3.3	CEI 0-21:2022	N/A	--
Verifica di insensibilità alla derivata di frequenza <i>Verification of insensitivity to the derivative of frequency</i>	A.4.3.4	CEI 0-21:2022	N/A	--
Autotest	A.4.4	CEI 0-21:2022	N/A	--
Single Fault tolerance	A.4.5	CEI 0-21:2022	N/A	--

A.4.6: Prove di compatibilità EMC				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Compatibilità elettromagnetica /Electromagnetic compatibility	A.4.6	CEI EN 60255-26 CEI EN 60263 (Severità classe 2 – Livello industriale) – Tab.11	N/A	--
Note:				

A.4.7 Compatibilità Climatica / Climatic compatibility				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Compatibilità Climatica /Climatic compatibility Storage conditions	A.4.7 (limit conditions)	Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B) - Tab.12	N/A	--
		Umidità / Humidity test CEI EN 60068-2-78 (Test Cab) - Tab.12	N/A	--
		Freddo / Cold test CEI EN 60068-2-1 (Test A) - Tab.12	N/A	--
		Ciclo termico /changing temperature CEI EN 60068-2-14 - Tab.12	N/A	--
Compatibilità Climatica /Climatic compatibility Inverter in working conditions	A.4.7 (limit conditions)	Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B) - Tab.12	N/A	--
		Umidità / Humidity test CEI EN 60068-2-78 (Test Cab) - Tab.12	N/A	--
		Freddo / Cold test CEI EN 60068-2-1 (Test A) - Tab.12	N/A	--
		Ciclo termico /changing temperature CEI EN 60068-2-14 - Tab.12	N/A	--

A.4.8 Prove di isolamento /Insulating test				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Tenuta ad impulso /Pulse test	A.4.8	CEI EN 60146-1-1	N/A	--
Rigidità Dielettrica /Dielectric Strength		CEI EN 60255-5	N/A	--
Resistenza di Isolamento /insulation resistance		CEI EN 60255-5	N/A	--

A.4.9 Prove di sovraccaricabilità dei circuiti di misura / <i>Measurement circuits Overload</i>				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Prove di sovraccaricabilità dei circuiti di misura <i>/ Measurement circuits Overload</i>	A.4.9	CEI 0-21:2022	N/A	—

Annex B: Tests on inverters for indirectly connected systems

B.1 Prove sull'inverter / inverter tests

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Armoniche di corrente /Harmonics measurement (full power, 66% and 33% of max. power) ☐ CEI EN 61000-3-2 ☒ CEI EN 61000-3-12	B.1 Tab. 14 Tab. 15	Condizioni di riferimento / Reference conditions (20 °C) – Tab.14	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
		Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B) - Tab.15	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
		Freddo / Cold test CEI EN 60068-2-1 (Test A) - Tab.15	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
Fluttuazioni di tensione /Flicker measurement (full power, 66% and 33% of max. power) ☐ CEI EN 61000-3-3 ☒ CEI EN 61000-3-11	B.1 Tab. 14 Tab. 15	Condizioni di riferimento / Reference conditions (20 °C) – Tab.14	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
		Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B) - Tab.15	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
		Freddo / Cold test CEI EN 60068-2-1 (Test A) - Tab.15	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X

B.1.1 Condizioni di connessione, riconnessione ed erogazione graduale della potenza

Connection, re-connection conditions, and gradual increase of the power production

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Verifica delle condizioni di connessione e riconnessione /Check of the connection and re-connection conditions	8.4.1.3 B.1.1.1	CEI 0-21:2022	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
Verifica della erogazione graduale della potenza attiva /Check of the gradual increase of the power production	8.4.1.3 B.1.1.2	CEI 0-21:2022	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X

B.1.2 Erogazione della potenza reattiva / Reactive power production (or adsorption)				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Verifica dei requisiti costruttivi: capability erogazione della potenza reattiva / Check of the constructive requirements: reactive power production capability	B.1.2.2	CEI 0-21:2022	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
Erogazione di potenza reattiva secondo un livello assegnato / Reactive power production according to an assigned level Applicable for plant with power >11.08KW.	B.1.2.3	CEI 0-21:2022	PASS	iMars XG110KTR
Tempo di risposta ad una variazione a gradino del livello assegnato / Reaction time after a step variation of the assigned level. Applicable for plant with power >11.08KW.	B.1.2.4	CEI 0-21:2022	PASS	iMars XG110KTR
Erogazione automatica di potenza reattiva secondo una curva caratteristica $\cos\phi = f(P)$ / Automatic reactive power production according to a characteristic curve $\cos(\phi)$	B.1.2.5 Annex E E.2	CEI 0-21:2022	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X
Erogazione automatica di potenza reattiva secondo una curva caratteristica $Q = f(V)$ / Automatic reactive power production according to a characteristic curve $Q = f(V)$ Applicable for plant with power >11.08KW.	B.1.2.6 Annex E E.2.1	CEI 0-21:2022	PASS	iMars XG110KTR

B.1.3 Limitazione della potenza attiva / Active power limitation				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Limitazione automatica della potenza attiva per valori di tensioni prossimi al 110% della tensione nominale / <i>Automatic limitation of active power for voltage values close to 110% of the rated voltage</i>	8.5.3.1 B.1.3.1	CEI 0-21:2022	PASS	iMars XG110KTR
Regolazione della potenza attiva in presenza di transitori di sovralfrequenza sulla rete di trasmissione / <i>Regulation of active power in the presence of over-frequency transients on the transmission network</i>	8.5.3.2 B.1.3.2	CEI 0-21:2022	PASS	iMars XG110KTR
Verifica del campo di funzionamento in tensione e frequenza / <i>Verification of the operating range in voltage and frequency</i>	8.4.4 B.1.3.3	CEI 0-21:2022	PASS	iMars XG110KTR
Limitazione della potenza attiva su comando esterno roveniente dal Distributore / <i>Restriction of active power on the external command by the Distributor</i>	8.5.3.3 B.1.3.4 Annex F	CEI 0-21:2022	PASS	iMars XG110KTR iMars XG136KTR-L iMars XG136KTR-X

B.1.4 Emissione di componente continua nella corrente di uscita / DC current injection on the output				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Verifica della emissione di componente continua / <i>Check of DC current injection</i>	B.1.4.1	Condizioni di riferimento / Reference conditions (20 °C)	PASS	iMars XG110KTR
		Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B)	PASS	iMars XG110KTR
		Freddo / Cold test CEI EN 60068-2-1 (Test A)	PASS	iMars XG110KTR
Verifica delle protezioni contro l'immissione di componente continua / <i>Check of protections against the DC current injection.</i>	B.1.4.2	Condizioni di riferimento / Reference conditions (20 °C)	PASS	iMars XG110KTR
		Caldo secco / Dry heat test CEI EN 60068-2-2 (Test B)	PASS	iMars XG110KTR
		Freddo / Cold test CEI EN 60068-2-1 (Test A)	PASS	iMars XG110KTR

B.1.5 Verifica della insensibilità agli abbassamenti di tensione (LVFRT capability) / Check of the LVFRT capability				
Test	Ref. CEI 0-21	Ref. standard	Result	Sample

LVFRT Capability <i>Applicable for plant with power >11.08KV.</i>	8.5.1 B.1.5	CEI 0-21:2022	PASS	iMars XG110KTR
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B.1.6 Verifica della insensibilità alle richiuse automatiche in discordanza di fase
/ Check of the insensibility to the re-closures when phases are in discordance

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Verifica della insensibilità alle richiuse automatiche in discordanza di fase <i>/ Check of the insensibility to the re-closures when phases are in discordance</i>	8.4.4.3 8.6.2.1 B.1.6 B.1.6.1 or B.1.6.2 (or B.1.6.3)	CEI 0-21:2022	PASS	iMars XG110KTR

Allegato B: Prove di compatibilità EMC

Test	Ref. CEI 0-21	Ref. standard	Result	Sample
Compatibilità elettromagnetica / Electromagnetic compatibility	Annex B	CEI EN 61000-6-1 CEI EN 61000-6-3	PASS	Note

Note: Refer to EMC report No. 210623184GZU-001, which is issued by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

CEI 0-21			
Clause	Requirement - Test	Result - Remark	Verdict
A.3	Adjustment ranges for the interface protection system (SPI)		N/A
A.3.1	Under voltage protection 27.S1		N/A
A.3.1	Under voltage protection 27.S2		N/A
A.3.2	Over voltage protection 59.S1		N/A
A.3.2	Over voltage protection 59.S2		N/A
A.3.3	Under frequency protection 81<S1		N/A
A.3.3	Under frequency protection 81<S2		N/A
A.3.4	Over frequency protection 81>S1		N/A
A.3.4	Over frequency protection 81>S2		N/A
A.4	Checks and tests on the interface protection system SPI		N/A
A.4.3	Functional tests on the interface protection system (SPI)		N/A
A.4.3.3.1	Frequency relay insensitivity to harmonics		N/A
A.4.3.3.2	Remote trip signal		N/A
A.4.3.3.3	Communication Signal		N/A
A.4.3.4	Verification of insensitivity to the derivative of frequency		N/A
A.4.4	Autotest		N/A
A.4.5	Single fault tolerance		N/A
A.4.6	EMC compatibility tests		N/A
A.4.7	Climatic compatibility tests		N/A
A.4.8	Insulation tests		N/A
A.4.9	Tests for the overload capacity of measuring circuits		N/A
A.4.10	Compliance of equipment		N/A
A.4.11	Automatic mechanism to prevent current imbalance during production		N/A
B.1	Test on the inverter		P
B.1.1	Conditions of connection, reconnection and gradual power supply		P
B.1.1.1	Checking the connection and reconnection conditions		P
B.1.1.2	Checking gradual supply of active power		P
B.1.2	Reactive power exchange		P
B.1.2.2	Test performance and recording mode		P

CEI 0-21			
Clause	Requirement - Test	Result - Remark	Verdict
B.1.2.2.1	Inverters in systems with total capacity up to 11.08 kW		N/A
B.1.2.2.2	Inverters in systems with total capacity greater than 11.08 kW		P
B.1.2.3	Reactive power exchange at a given level		P
B.1.2.4	Response time to an assigned step level change		P
B.1.2.5	Automatic supply of reactive power according to a characteristic curve $\cos\phi = f(P)$		P
B1.2.6	Automatic exchange of reactive power according to a characteristic curve $Q=f(V)$		P
B.1.3	Limitation of active power		P
B.1.3.1	Automatic limitation of active power for voltage values close to 110% of the rated voltage		P
B.1.3.2	Regulation of active power in the presence of over-frequency transients on the transmission network		P
B1.3.3	Verification of the operating range in voltage and frequency		P
B.1.3.4	Limitation of active power to external command from the Distributor		P
B.1.4	Output of DC component in the output current		P
B.1.4.1	Checking the DC component output		P
B.1.4.2	Checking the protection against DC input		P
B.1.5	Checking insensitivity to voltage dips (LVRT capability)		P
B.1.6	Checking the insensitivity to automatic reclosing during phase accordance		P
B.1.6.1	Tests on the simulated network		P
B.1.6.2	Tests on the distribution network using a coupling transformer		N/A
B.1.6.3	Tests on the distribution network, simulation of frequency drift		N/A

Appended Table - Testing Result

B.1	TABLE: Test on the inverter	P
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Current harmonics emission test for class A limit (According to CEI EN 61000-3-12)

Test was performed under the condition of table 14 and table 15

Tabella 14 – Condizioni di riferimento

Grandezza di influenza	Valore di riferimento
Temperatura ambiente	20 °C ± 2 °C
Pressione atmosferica	98 ± 10 kPa
Umidità relativa	65 %
Posizione apparecchiatura	Secondo quanto dichiarato dal costruttore
Frequenza	50 Hz
Forma d'onda della tensione di riferimento	Conforme alla CEI EN 50160

Tabella 15 – Condizioni di riferimento

Grandezza di influenza	Valore di riferimento
Temperatura ambiente	-10 °C e +55 °C
Pressione atmosferica	98 ± 10 kPa
Umidità relativa	65 % (per temperature maggiori di 0°C)
Posizione apparecchiatura	Secondo quanto dichiarato dal costruttore
Frequenza	50 Hz
Forma d'onda della tensione di riferimento	Conforme alla CEI EN 50160

Harmonics measurement under ambient condition 55°C

33% Pn

Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.365	0.394	0.320	0.370	0.402	0.321	0.193	0.225	0.145	8.00
3rd	0.071	0.065	0.027	0.076	0.068	0.027	0.072	0.064	0.027	21.60
4th	0.264	0.232	0.240	0.267	0.234	0.244	0.150	0.114	0.120	4.00
5th	1.199	1.205	1.188	1.239	1.246	1.230	1.210	1.215	1.195	10.70
6th	0.021	0.018	0.015	0.020	0.018	0.016	0.022	0.015	0.019	2.67
7th	0.230	0.237	0.234	0.238	0.245	0.243	0.232	0.237	0.234	7.20
8th	0.024	0.018	0.022	0.025	0.018	0.022	0.015	0.011	0.013	2.00
9th	0.009	0.008	0.009	0.009	0.008	0.009	0.009	0.008	0.008	3.80
10th	0.009	0.010	0.007	0.009	0.009	0.007	0.008	0.008	0.006	1.60
11th	0.037	0.039	0.041	0.038	0.041	0.041	0.038	0.040	0.041	3.10
12th	0.011	0.007	0.010	0.011	0.007	0.011	0.011	0.007	0.010	1.33
13th	0.028	0.030	0.031	0.028	0.031	0.031	0.029	0.031	0.031	2.00
PWHD	5.026	4.954	5.002	4.835	4.927	4.905	4.818	4.894	5.037	23
THD	3.960	3.988	3.867	3.973	4.003	3.879	3.824	3.844	3.735	23

Harmonics measurement under ambient condition 55°C										
66% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.665	0.714	0.601	0.671	0.725	0.612	0.321	0.366	0.259	8.00
3rd	0.070	0.058	0.033	0.079	0.062	0.034	0.066	0.062	0.024	21.60
4th	0.484	0.445	0.446	0.490	0.448	0.450	0.249	0.200	0.203	4.00
5th	1.237	1.249	1.243	1.278	1.292	1.289	1.250	1.254	1.250	10.70
6th	0.026	0.016	0.023	0.025	0.016	0.025	0.023	0.017	0.022	2.67
7th	0.223	0.231	0.226	0.233	0.240	0.233	0.225	0.233	0.231	7.20
8th	0.047	0.041	0.042	0.047	0.042	0.043	0.024	0.019	0.021	2.00
9th	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.011	0.009	3.80
10th	0.009	0.012	0.008	0.009	0.012	0.009	0.009	0.010	0.008	1.60
11th	0.059	0.059	0.059	0.060	0.061	0.059	0.061	0.064	0.061	3.10
12th	0.012	0.008	0.010	0.011	0.008	0.011	0.011	0.007	0.011	1.33
13th	0.041	0.043	0.043	0.041	0.044	0.044	0.042	0.045	0.042	2.00
PWHD	3.847	3.739	3.641	3.589	3.627	3.716	3.278	3.186	3.125	23
THD	2.285	2.313	2.229	2.287	2.317	2.238	2.028	2.037	1.990	23

Harmonics measurement under ambient condition 55°C										
100% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.962	1.004	0.854	0.962	1.028	0.874	0.357	0.424	0.307	8.00
3rd	0.082	0.073	0.035	0.093	0.080	0.042	0.081	0.070	0.042	21.60
4th	0.686	0.622	0.640	0.691	0.625	0.644	0.294	0.218	0.233	4.00
5th	1.283	1.301	1.295	1.327	1.345	1.341	1.303	1.311	1.297	10.70
6th	0.033	0.022	0.031	0.034	0.021	0.033	0.033	0.020	0.031	2.67
7th	0.200	0.202	0.202	0.207	0.210	0.209	0.200	0.207	0.205	7.20
8th	0.066	0.061	0.060	0.067	0.064	0.061	0.027	0.026	0.021	2.00
9th	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.011	3.80
10th	0.010	0.013	0.010	0.010	0.012	0.010	0.009	0.011	0.009	1.60
11th	0.077	0.079	0.077	0.078	0.080	0.078	0.079	0.083	0.078	3.10
12th	0.012	0.009	0.010	0.012	0.009	0.011	0.011	0.008	0.010	1.33
13th	0.045	0.048	0.049	0.046	0.049	0.049	0.048	0.050	0.049	2.00
PWHD	3.268	2.964	3.167	2.846	2.918	2.897	2.943	2.903	2.870	23
THD	1.755	1.764	1.685	1.750	1.770	1.692	1.403	1.413	1.369	23

Harmonics measurement under ambient condition -10°C										
33% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.365	0.394	0.318	0.369	0.403	0.322	0.196	0.226	0.144	8.00
3rd	0.071	0.065	0.026	0.076	0.067	0.028	0.070	0.067	0.025	21.60
4th	0.264	0.232	0.240	0.267	0.233	0.243	0.150	0.113	0.120	4.00
5th	1.199	1.206	1.189	1.240	1.246	1.230	1.210	1.215	1.195	10.70
6th	0.020	0.018	0.015	0.021	0.018	0.016	0.022	0.016	0.019	2.67
7th	0.230	0.238	0.234	0.238	0.245	0.243	0.232	0.237	0.234	7.20
8th	0.024	0.016	0.022	0.024	0.018	0.022	0.016	0.011	0.013	2.00
9th	0.009	0.008	0.008	0.009	0.009	0.009	0.010	0.008	0.008	3.80
10th	0.008	0.010	0.007	0.009	0.010	0.007	0.008	0.008	0.006	1.60
11th	0.037	0.039	0.041	0.038	0.039	0.042	0.038	0.040	0.041	3.10
12th	0.011	0.007	0.010	0.011	0.007	0.011	0.012	0.007	0.010	1.33
13th	0.028	0.030	0.031	0.028	0.031	0.031	0.029	0.031	0.031	2.00
PWHD	5.324	5.128	4.982	5.176	5.035	5.086	4.982	4.845	4.938	23
THD	3.962	3.989	3.867	3.974	4.005	3.881	3.822	3.844	3.734	23

Harmonics measurement under ambient condition -10°C										
66% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.668	0.712	0.596	0.668	0.725	0.611	0.319	0.364	0.260	8.00
3rd	0.070	0.061	0.030	0.073	0.059	0.034	0.064	0.061	0.023	21.60
4th	0.483	0.442	0.446	0.491	0.449	0.452	0.248	0.199	0.204	4.00
5th	1.235	1.249	1.244	1.277	1.292	1.287	1.251	1.253	1.250	10.70
6th	0.025	0.016	0.024	0.026	0.018	0.025	0.023	0.017	0.022	2.67
7th	0.225	0.231	0.226	0.232	0.240	0.234	0.225	0.233	0.231	7.20
8th	0.047	0.041	0.043	0.047	0.042	0.042	0.024	0.019	0.021	2.00
9th	0.009	0.010	0.010	0.009	0.010	0.010	0.010	0.010	0.009	3.80
10th	0.010	0.012	0.008	0.009	0.012	0.008	0.009	0.010	0.008	1.60
11th	0.060	0.060	0.059	0.061	0.061	0.060	0.061	0.064	0.062	3.10
12th	0.012	0.008	0.011	0.011	0.008	0.011	0.012	0.007	0.011	1.33
13th	0.041	0.044	0.043	0.042	0.045	0.044	0.044	0.045	0.044	2.00
PWHD	3.525	3.476	3.376	3.476	3.564	3.518	3.174	3.057	2.856	23
THD	2.285	2.311	2.226	2.283	2.318	2.235	2.028	2.035	1.990	23

Harmonics measurement under ambient condition -10°C										
100% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.959	1.004	0.853	0.954	1.032	0.876	0.360	0.432	0.320	8.00
3rd	0.080	0.071	0.034	0.088	0.080	0.038	0.073	0.072	0.034	21.60
4th	0.687	0.623	0.640	0.691	0.624	0.644	0.300	0.224	0.238	4.00
5th	1.281	1.300	1.290	1.325	1.344	1.337	1.300	1.309	1.294	10.70
6th	0.034	0.023	0.030	0.034	0.021	0.033	0.033	0.021	0.031	2.67
7th	0.200	0.203	0.202	0.208	0.209	0.209	0.201	0.207	0.204	7.20
8th	0.066	0.061	0.060	0.067	0.062	0.061	0.027	0.026	0.021	2.00
9th	0.011	0.013	0.012	0.012	0.012	0.012	0.011	0.012	0.011	3.80
10th	0.010	0.013	0.010	0.010	0.012	0.011	0.009	0.011	0.009	1.60
11th	0.077	0.079	0.078	0.079	0.081	0.079	0.080	0.084	0.079	3.10
12th	0.012	0.009	0.011	0.012	0.009	0.010	0.011	0.008	0.010	1.33
13th	0.046	0.049	0.050	0.046	0.050	0.050	0.049	0.051	0.050	2.00
PWHD	2.845	2.935	2.836	2.734	2.567	2.589	2.318	2.453	2.275	23
THD	1.754	1.764	1.682	1.744	1.771	1.691	1.402	1.415	1.371	23

Harmonics measurement under ambient condition 22°C										
33% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.365	0.394	0.318	0.368	0.402	0.321	0.192	0.226	0.146	8.00
3rd	0.070	0.062	0.028	0.076	0.068	0.027	0.072	0.066	0.025	21.60
4th	0.264	0.232	0.240	0.267	0.234	0.244	0.150	0.114	0.121	4.00
5th	1.199	1.206	1.188	1.240	1.246	1.230	1.210	1.215	1.195	10.70
6th	0.021	0.018	0.015	0.020	0.018	0.016	0.022	0.015	0.019	2.67
7th	0.231	0.238	0.234	0.238	0.245	0.242	0.232	0.237	0.234	7.20
8th	0.024	0.016	0.022	0.024	0.018	0.022	0.015	0.011	0.013	2.00
9th	0.009	0.008	0.009	0.009	0.008	0.009	0.009	0.008	0.008	3.80
10th	0.009	0.009	0.007	0.008	0.009	0.007	0.008	0.008	0.006	1.60
11th	0.038	0.039	0.041	0.037	0.039	0.041	0.039	0.040	0.041	3.10
12th	0.012	0.007	0.011	0.011	0.007	0.011	0.012	0.007	0.010	1.33
13th	0.028	0.031	0.031	0.028	0.031	0.031	0.029	0.031	0.031	2.00
PWHD	5.034	4.843	4.739	4.893	4.936	4.736	4.681	4.752	4.728	23
THD	3.963	3.990	3.866	3.972	4.004	3.879	3.822	3.846	3.736	23

Harmonics measurement under ambient condition 22°C										
66% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.669	0.713	0.598	0.669	0.727	0.612	0.320	0.368	0.260	8.00
3rd	0.069	0.059	0.031	0.074	0.064	0.032	0.067	0.063	0.023	21.60
4th	0.483	0.441	0.446	0.488	0.448	0.451	0.248	0.200	0.203	4.00
5th	1.235	1.249	1.243	1.278	1.292	1.288	1.252	1.254	1.250	10.70
6th	0.025	0.016	0.024	0.025	0.016	0.024	0.023	0.017	0.022	2.67
7th	0.226	0.232	0.226	0.232	0.240	0.233	0.224	0.233	0.231	7.20
8th	0.047	0.039	0.043	0.047	0.041	0.043	0.024	0.019	0.021	2.00
9th	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.011	0.009	3.80
10th	0.009	0.012	0.008	0.009	0.012	0.009	0.009	0.010	0.008	1.60
11th	0.059	0.060	0.059	0.060	0.061	0.060	0.061	0.064	0.061	3.10
12th	0.012	0.008	0.010	0.012	0.008	0.010	0.011	0.007	0.011	1.33
13th	0.041	0.044	0.043	0.041	0.045	0.044	0.043	0.045	0.043	2.00
PWHD	3.187	3.286	3.110	3.169	3.250	3.311	2.935	2.849	2.752	23
THD	2.286	2.310	2.227	2.283	2.318	2.236	2.029	2.038	1.990	23

Harmonics measurement under ambient condition 22°C										
100% Pn										
Harmonic	iMars XG110KTR			iMars XG136KTR-L			iMars XG136KTR-X			Limit (%)
	L1	L2	L3	L1	L2	L3	L1	L2	L3	
2nd	0.954	1.003	0.858	0.954	1.030	0.875	0.355	0.424	0.309	8.00
3rd	0.079	0.070	0.033	0.091	0.080	0.038	0.074	0.068	0.037	21.60
4th	0.686	0.622	0.640	0.691	0.625	0.644	0.293	0.217	0.232	4.00
5th	1.283	1.300	1.292	1.326	1.344	1.338	1.302	1.309	1.295	10.70
6th	0.034	0.022	0.031	0.034	0.021	0.033	0.033	0.020	0.031	2.67
7th	0.199	0.202	0.202	0.208	0.210	0.209	0.201	0.208	0.205	7.20
8th	0.066	0.061	0.060	0.067	0.062	0.060	0.026	0.026	0.021	2.00
9th	0.011	0.012	0.012	0.011	0.012	0.012	0.011	0.012	0.011	3.80
10th	0.010	0.012	0.010	0.010	0.012	0.011	0.009	0.011	0.009	1.60
11th	0.077	0.079	0.077	0.079	0.081	0.079	0.080	0.083	0.078	3.10
12th	0.012	0.009	0.011	0.012	0.008	0.010	0.011	0.008	0.010	1.33
13th	0.046	0.049	0.049	0.046	0.049	0.049	0.048	0.050	0.049	2.00
PWHD	2.632	2.715	2.639	2.597	2.618	2.649	2.286	2.317	2.302	23
THD	1.751	1.763	1.686	1.745	1.770	1.692	1.402	1.411	1.368	23

B.1

TABLE: Test on the inverter

P

Flicker measurement

CEI EN 61000-3-3

Test was performed under the condition of table 14 and table 15

TABELLA 14 – Condizioni di riferimento

Grandezza di influenza	Valore di riferimento
Temperatura ambiente	20 °C ± 2 °C
Pressione atmosferica	98 ± 10 kPa
Umidità relativa	95 %
Posizione apparecchiatura	Secondo quanto dichiarato dal costruttore
Frequenza	50 Hz
Forma d'onda della tensione di riferimento	Conforme alla CEI EN 60169

TABELLA 15 – Condizioni di riferimento

Grandezza di influenza	Valore di riferimento
Temperatura ambiente	-15 °C e +55 °C
Pressione atmosferica	98 ± 10 kPa
Umidità relativa	65 % (per temperature maggiori di 0°C)
Posizione apparecchiatura	Secondo quanto dichiarato dal costruttore
Frequenza	50 Hz
Forma d'onda della tensione di riferimento	Conforme alla CEI EN 60169

Flicker measurement under ambient condition 20° C

Model: iMars XG110KTR

100% rating power condition:

P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.348	0.359	0.346
PLT	≤ 0.65	0.339	0.350	0.332
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.563%	0.553%	0.555%

66% rating power condition:

P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.347	0.370	0.359
PLT	≤ 0.65	0.339	0.357	0.340
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.407	0.396%	0.397%

33% rating power condition:

P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.353	0.377	0.362
PLT	≤ 0.65	0.344	0.360	0.350
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.208%	0.197%	0.201%

Flicker measurement under ambient condition 20° C

100% rating power condition:

L1 Phase

Element	1	Element	1	Judgement	Pass
Volt Range	900V/50Hz	Element	(1, 2, 3)	Judgement	Pass
Wd(50V)	200.00V				
Freq(50)	50.00Hz				

Line	0.00%		0.0000m		0.0000m		0.0000m		0.0000m	
	3.30000	4.00000	500.000	0.30000	1.00000	0.00000	N.12			
1	0.00000	Pass	580.728 m	Pass	0.00000	Pass	337.806 m	Pass		
2	0.00000	Pass	583.174 m	Pass	0.00000	Pass	342.928 m	Pass		
3	0.00000	Pass	583.347 m	Pass	0.00000	Pass	335.031 m	Pass		
4	0.00000	Pass	582.048 m	Pass	0.00000	Pass	342.846 m	Pass		
5	0.00000	Pass	558.890 m	Pass	0.00000	Pass	333.236 m	Pass		
6	0.00000	Pass	582.948 m	Pass	0.00000	Pass	325.802 m	Pass		
7	0.00000	Pass	584.378 m	Pass	0.00000	Pass	332.518 m	Pass		
8	0.00000	Pass	559.830 m	Pass	0.00000	Pass	343.704 m	Pass		
9	0.00000	Pass	555.705 m	Pass	0.00000	Pass	348.718 m	Pass		
10	0.00000	Pass	582.504 m	Pass	0.00000	Pass	348.341 m	Pass		
11	0.00000	Pass	582.510 m	Pass	0.00000	Pass	343.452 m	Pass		
12	0.00000	Pass	582.816 m	Pass	0.00000	Pass	337.719 m	Pass		
Result	Pass	Pass	Pass	Pass	Pass	Pass	338.327 m	Pass		

L2 Phase

Element	2	Element	2	Judgment	Pass
Volt Range	500V/50Hz	Element	(1, 2, 3)	Judgment	Pass
Wd(50V)	200.00V				
Freq(50)	50.00Hz				

	0.0000	0.0000	0.0000	0.0000	0.0000
Limit	3.30000	4.00000	500.000	1.00000	0.00000
			0.30000		N 12
1	0.00000	Pass	548.887 m	Pass	350.041 m
2	0.00000	Pass	545.559 m	Pass	355.423 m
3	0.00000	Pass	547.883 m	Pass	356.411 m
4	0.00000	Pass	551.288 m	Pass	354.430 m
5	0.00000	Pass	551.327 m	Pass	352.026 m
6	0.00000	Pass	548.017 m	Pass	347.001 m
7	0.00000	Pass	550.310 m	Pass	336.340 m
8	0.00000	Pass	545.703 m	Pass	337.075 m
9	0.00000	Pass	548.221 m	Pass	348.134 m
10	0.00000	Pass	547.053 m	Pass	345.743 m
11	0.00000	Pass	548.537 m	Pass	342.310 m
12	0.00000	Pass	548.136 m	Pass	354.542 m
Result	Pass	Pass	Pass	Pass	350.390 m

L3 Phase

Element	3	Element	3	Judgement	Pass
Volt Range	900V/50Hz	Element	(1, 2, 3)	Judgement	Pass
Wd(50V)	200.00V	Test		Judgement	Pass
Freq(50)	50.00Hz				

	0.0000	0.0000	0.0000	0.0000	0.0000
Unit	330000	400000	500000	100000	0.00000
			0.30000		M 12
1	0.00000 Pass	548.316 m Pass	0.00000 Pass	350.041 m Pass	
2	0.00000 Pass	550.216 m Pass	0.00000 Pass	329.979 m Pass	
3	0.00000 Pass	551.801 m Pass	0.00000 Pass	354.245 m Pass	
4	0.00000 Pass	554.174 m Pass	0.00000 Pass	331.985 m Pass	
5	0.00000 Pass	550.550 m Pass	0.00000 Pass	354.148 m Pass	
6	0.00000 Pass	548.806 m Pass	0.00000 Pass	338.371 m Pass	
7	0.00000 Pass	550.350 m Pass	0.00000 Pass	346.250 m Pass	
8	0.00000 Pass	554.825 m Pass	0.00000 Pass	329.260 m Pass	
9	0.00000 Pass	551.116 m Pass	0.00000 Pass	332.990 m Pass	
10	0.00000 Pass	552.779 m Pass	0.00000 Pass	326.378 m Pass	
11	0.00000 Pass	554.246 m Pass	0.00000 Pass	325.878 m Pass	
12	0.00000 Pass	551.085 m Pass	0.00000 Pass	333.187 m Pass	
Result	Pass	Pass	Pass	Pass	332.875 m Pass

Flicker measurement under ambient condition -10° C				
Model: iMars XG110KTR				
100% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.343	0.360	0.343
PLT	≤ 0.65	0.338	0.351	0.333
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.562%	0.549%	0.553%
66% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.348	0.363	0.343
PLT	≤ 0.65	0.335	0.351	0.335
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.406%	0.396%	0.401%
33% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.343	0.354	0.365
PLT	≤ 0.65	0.334	0.337	0.344
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.208%	0.197%	0.202%

Flicker measurement under ambient condition -10° C

100% rating power condition:

L1 Phase

Element	1	Element	1	Judgment	Pass
Volt Range	600V/500V	Total	(1 2 3)	Judgment	Pass
Volts	230.00V				
Freq(Hz)	50.00Hz				
Limit	3.30000	4.00000	500.000	1.00000	0.05000
			3.30000		N 12
1	0.00000	Pass	563.954 m	Pass	330.954 m
2	0.00000	Pass	561.327 m	Pass	341.806 m
3	0.00000	Pass	562.477 m	Pass	334.701 m
4	0.00000	Pass	558.249 m	Pass	341.040 m
5	0.00000	Pass	559.270 m	Pass	341.136 m
6	0.00000	Pass	558.376 m	Pass	338.422 m
7	0.00000	Pass	558.029 m	Pass	335.800 m
8	0.00000	Pass	558.974 m	Pass	343.489 m
9	0.00000	Pass	560.939 m	Pass	343.628 m
10	0.00000	Pass	567.238 m	Pass	336.636 m
11	0.00000	Pass	558.446 m	Pass	337.843 m
12	0.00000	Pass	561.833 m	Pass	330.446 m
Result					338.685 m

L2 Phase

Element	2	Element	2	Judgment	Pass
Volt Range	600V/500V	Total	(1 2 3)	Judgment	Pass
Volts	230.00V				
Freq(Hz)	50.00Hz				
Limit	3.30000	4.00000	500.000	1.00000	0.05000
			3.30000		N 12
1	0.00000	Pass	544.056 m	Pass	340.304 m
2	0.00000	Pass	546.545 m	Pass	358.930 m
3	0.00000	Pass	548.225 m	Pass	353.713 m
4	0.00000	Pass	545.041 m	Pass	350.415 m
5	0.00000	Pass	548.202 m	Pass	355.802 m
6	0.00000	Pass	546.712 m	Pass	356.970 m
7	0.00000	Pass	547.058 m	Pass	344.763 m
8	0.00000	Pass	545.011 m	Pass	351.301 m
9	0.00000	Pass	548.997 m	Pass	352.900 m
10	0.00000	Pass	547.093 m	Pass	341.877 m
11	0.00000	Pass	549.647 m	Pass	345.610 m
12	0.00000	Pass	548.965 m	Pass	362.568 m
Result					351.004 m

L3 Phase

Element	3	Element	3	Judgment	Pass
Volt Range	600V/500V	Total	(1 2 3)	Judgment	Pass
Volts	230.00V				
Freq(Hz)	50.00Hz				
Limit	3.30000	4.00000	500.000	1.00000	0.05000
			3.30000		N 12
1	0.00000	Pass	549.340 m	Pass	333.838 m
2	0.00000	Pass	552.237 m	Pass	333.820 m
3	0.00000	Pass	553.342 m	Pass	335.459 m
4	0.00000	Pass	549.168 m	Pass	323.019 m
5	0.00000	Pass	551.373 m	Pass	321.727 m
6	0.00000	Pass	552.410 m	Pass	332.674 m
7	0.00000	Pass	551.331 m	Pass	333.702 m
8	0.00000	Pass	552.703 m	Pass	343.660 m
9	0.00000	Pass	551.287 m	Pass	340.933 m
10	0.00000	Pass	551.981 m	Pass	337.632 m
11	0.00000	Pass	551.558 m	Pass	327.319 m
12	0.00000	Pass	552.803 m	Pass	333.159 m
Result					333.207 m

Flicker measurement under ambient condition 55° C				
Model: iMars XG110KTR				
100% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.352	0.359	0.341
PLT	≤ 0.65	0.339	0.348	0.331
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.563%	0.551%	0.554%
66% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.349	0.359	0.344
PLT	≤ 0.65	0.337	0.353	0.336
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.406%	0.398%	0.400%
33% rating power condition:				
$P_{bin}(\%)$	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.349	0.364	0.362
PLT	≤ 0.65	0.334	0.353	0.346
dc	$\leq 3.30\%$	0%	0%	0%
dmax	4%	0.207%	0.199%	0.200%

Flicker measurement under ambient condition 55° C

100% rating power condition:

L1 Phase

Element	1		Element	1		Judgment	Pass
Volt Range	500V/500A		Total	(1.2.3)		Judgment	Pass
Volts(V)	230.00V						
Freq(Hz)	50.00Hz						
Limit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.85000	N:12	
1	0.00000	Pass	551.555 m	Pass	349.063 m	Pass	
2	0.00000	Pass	556.843 m	Pass	341.885 m	Pass	
3	0.00000	Pass	558.239 m	Pass	338.175 m	Pass	
4	0.00000	Pass	551.541 m	Pass	332.895 m	Pass	
5	0.00000	Pass	553.455 m	Pass	352.127 m	Pass	
6	0.00000	Pass	551.893 m	Pass	340.070 m	Pass	
7	0.00000	Pass	552.538 m	Pass	327.061 m	Pass	
8	0.00000	Pass	551.893 m	Pass	336.487 m	Pass	
9	0.00000	Pass	556.175 m	Pass	335.387 m	Pass	
10	0.00000	Pass	551.482 m	Pass	344.515 m	Pass	
11	0.00000	Pass	559.455 m	Pass	335.679 m	Pass	
12	0.00000	Pass	553.570 m	Pass	336.047 m	Pass	
Result	Pass	Pass	Pass	Pass	Pass	339.211 m	Pass

L2 Phase

Element	2		Element	2		Judgment	Pass
Volt Range	500V/500A		Total	(1.2.3)		Judgment	Pass
Volts(V)	230.00V						
Freq(Hz)	50.00Hz						
Limit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.85000	N:12	
1	0.00000	Pass	549.197 m	Pass	341.177 m	Pass	
2	0.00000	Pass	546.229 m	Pass	345.656 m	Pass	
3	0.00000	Pass	549.006 m	Pass	349.150 m	Pass	
4	0.00000	Pass	549.358 m	Pass	348.238 m	Pass	
5	0.00000	Pass	546.545 m	Pass	355.636 m	Pass	
6	0.00000	Pass	548.804 m	Pass	345.227 m	Pass	
7	0.00000	Pass	549.203 m	Pass	354.825 m	Pass	
8	0.00000	Pass	551.175 m	Pass	353.527 m	Pass	
9	0.00000	Pass	548.178 m	Pass	345.255 m	Pass	
10	0.00000	Pass	549.768 m	Pass	345.322 m	Pass	
11	0.00000	Pass	546.795 m	Pass	337.753 m	Pass	
12	0.00000	Pass	546.885 m	Pass	353.840 m	Pass	
Result	Pass	Pass	Pass	Pass	Pass	348.983 m	Pass

L3 Phase

Element	3		Element	3		Judgment	Pass
Volt Range	500V/500A		Total	(1.2.3)		Judgment	Pass
Volts(V)	230.00V						
Freq(Hz)	50.00Hz						
Limit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.85000	N:12	
1	0.00000	Pass	551.373 m	Pass	338.085 m	Pass	
2	0.00000	Pass	552.672 m	Pass	331.155 m	Pass	
3	0.00000	Pass	552.736 m	Pass	333.662 m	Pass	
4	0.00000	Pass	551.038 m	Pass	334.036 m	Pass	
5	0.00000	Pass	550.907 m	Pass	341.823 m	Pass	
6	0.00000	Pass	554.254 m	Pass	326.201 m	Pass	
7	0.00000	Pass	553.006 m	Pass	327.053 m	Pass	
8	0.00000	Pass	552.742 m	Pass	334.886 m	Pass	
9	0.00000	Pass	552.386 m	Pass	324.722 m	Pass	
10	0.00000	Pass	553.370 m	Pass	331.775 m	Pass	
11	0.00000	Pass	552.070 m	Pass	333.718 m	Pass	
12	0.00000	Pass	551.414 m	Pass	329.275 m	Pass	
Result	Pass	Pass	Pass	Pass	Pass	331.555 m	Pass

Flicker measurement under ambient condition 20° C				
Model: iMars XG136KTR-L				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.347	0.349	0.338
PLT	≤ 0.65	0.338	0.341	0.327
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.595%	0.579%	0.580%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.355	0.392	0.356
PLT	≤ 0.65	0.345	0.379	0.349
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.417%	0.408%	0.405%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.349	0.367	0.356
PLT	≤ 0.65	0.342	0.353	0.348
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.219%	0.209%	0.211%

Flicker measurement under ambient condition 20° C

100% rating power condition:

L1 Phase

Element	1	Element	1	Judgment	Pass
Vol: Range	0.00V/0.0Hz	Total	(1, 2, 3)	Judgment	Pass
Vol: Set	277.00V				
Freq (Hz)	50.00Hz				
Limit	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.50000	500.000	1.00000	0.65000
			3.30000		N 12
1	0.00000	Pass	589.176 m	Pass	345.027 m
2	0.00000	Pass	588.236 m	Pass	333.508 m
3	0.00000	Pass	582.291 m	Pass	340.028 m
4	0.00000	Pass	580.309 m	Pass	338.108 m
5	0.00000	Pass	584.121 m	Pass	338.531 m
6	0.00000	Pass	581.224 m	Pass	343.130 m
7	0.00000	Pass	580.559 m	Pass	335.128 m
8	0.00000	Pass	580.131 m	Pass	337.038 m
9	0.00000	Pass	581.284 m	Pass	338.575 m
10	0.00000	Pass	585.194 m	Pass	341.787 m
11	0.00000	Pass	581.785 m	Pass	338.506 m
12	0.00000	Pass	581.524 m	Pass	347.033 m
Result	Pass	Pass	Pass	Pass	338.204 m

L2 Phase

Element	2	Element	2	Judgment	Pass
Vol: Range	0.00V/50Hz	Total	(1, 2, 3)	Judgment	Pass
Vol: Set	277.00V				
Freq (Hz)	50.00Hz				
Limit	0.0000	0.0000	0.0000	0.0000	0.65000
	3.30000	4.50000	500.000	1.00000	0.65000
			3.30000		N 12
1	0.00000	Pass	577.872 m	Pass	349.015 m
2	0.00000	Pass	574.720 m	Pass	325.027 m
3	0.00000	Pass	575.137 m	Pass	343.218 m
4	0.00000	Pass	577.408 m	Pass	341.734 m
5	0.00000	Pass	578.338 m	Pass	347.556 m
6	0.00000	Pass	577.255 m	Pass	345.108 m
7	0.00000	Pass	578.347 m	Pass	346.506 m
8	0.00000	Pass	574.422 m	Pass	340.593 m
9	0.00000	Pass	575.455 m	Pass	346.121 m
10	0.00000	Pass	577.980 m	Pass	326.386 m
11	0.00000	Pass	577.277 m	Pass	347.027 m
12	0.00000	Pass	579.184 m	Pass	325.561 m
Result	Pass	Pass	Pass	Pass	341.377 m

L3 Phase

Element	3	Element	3	Judgment	Pass
Vol: Range	0.00V/50Hz	Total	(1, 2, 3)	Judgment	Pass
Vol: Set	277.00V				
Freq (Hz)	50.00Hz				
Limit	0.0000	0.0000	0.0000	0.0000	0.65000
	3.30000	4.50000	500.000	1.00000	0.65000
			3.30000		N 12
1	0.00000	Pass	575.328 m	Pass	322.544 m
2	0.00000	Pass	575.825 m	Pass	333.609 m
3	0.00000	Pass	575.921 m	Pass	321.709 m
4	0.00000	Pass	580.734 m	Pass	318.398 m
5	0.00000	Pass	578.052 m	Pass	338.061 m
6	0.00000	Pass	577.851 m	Pass	326.882 m
7	0.00000	Pass	575.851 m	Pass	326.542 m
8	0.00000	Pass	575.455 m	Pass	326.093 m
9	0.00000	Pass	575.721 m	Pass	326.601 m
10	0.00000	Pass	577.432 m	Pass	338.134 m
11	0.00000	Pass	575.623 m	Pass	326.777 m
12	0.00000	Pass	577.754 m	Pass	322.719 m
Result	Pass	Pass	Pass	Pass	327.924 m

Flicker measurement under ambient condition -10° C				
Model: iMars XG136KTR-L				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.376	0.367	0.343
PLT	≤ 0.65	0.345	0.352	0.333
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.590%	0.578%	0.579%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.336	0.351	0.329
PLT	≤ 0.65	0.326	0.341	0.325
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.421%	0.408%	0.411%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.350	0.371	0.361
PLT	≤ 0.65	0.340	0.356	0.350
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.219%	0.210%	0.210%

Flicker measurement under ambient condition -10° C

100% rating power condition:

L1 Phase

Element	1		Element	1		Judgement	Pass
Test Range	600V/50Hz		Element	1		Judgement	Pass
MeasPt	277.00V		Total	(1 of 3)		Judgement	Pass
Freq(Hz)	60.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.00000	N:12	
1	0.00000	Pass	589.561 m	Pass	0.00000	Pass	588.516 m
2	0.00000	Pass	589.873 m	Pass	0.00000	Pass	589.460 m
3	0.00000	Pass	588.860 m	Pass	0.00000	Pass	587.798 m
4	0.00000	Pass	588.644 m	Pass	0.00000	Pass	588.515 m
5	0.00000	Pass	589.715 m	Pass	0.00000	Pass	589.267 m
6	0.00000	Pass	589.077 m	Pass	0.00000	Pass	589.265 m
7	0.00000	Pass	588.565 m	Pass	0.00000	Pass	588.489 m
8	0.00000	Pass	589.295 m	Pass	0.00000	Pass	587.691 m
9	0.00000	Pass	590.205 m	Pass	0.00000	Pass	589.515 m
10	0.00000	Pass	589.391 m	Pass	0.00000	Pass	588.124 m
11	0.00000	Pass	588.134 m	Pass	0.00000	Pass	587.724 m
12	0.00000	Pass	585.138 m	Pass	0.00000	Pass	576.857 m
Result	Pass	Pass	Pass	Pass	Pass	345.398 m	Pass

L2 Phase

Element	2		Element	2		Judgement	Pass
Test Range	600V/50Hz		Element	2		Judgement	Pass
MeasPt	277.00V		Total	(1 of 3)		Judgement	Pass
Freq(Hz)	60.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.00000	N:12	
1	0.00000	Pass	574.911 m	Pass	0.00000	Pass	566.750 m
2	0.00000	Pass	577.325 m	Pass	0.00000	Pass	562.858 m
3	0.00000	Pass	575.328 m	Pass	0.00000	Pass	563.741 m
4	0.00000	Pass	574.428 m	Pass	0.00000	Pass	565.257 m
5	0.00000	Pass	576.526 m	Pass	0.00000	Pass	568.736 m
6	0.00000	Pass	576.773 m	Pass	0.00000	Pass	569.548 m
7	0.00000	Pass	575.823 m	Pass	0.00000	Pass	563.916 m
8	0.00000	Pass	576.741 m	Pass	0.00000	Pass	567.319 m
9	0.00000	Pass	575.566 m	Pass	0.00000	Pass	566.960 m
10	0.00000	Pass	576.532 m	Pass	0.00000	Pass	564.575 m
11	0.00000	Pass	575.567 m	Pass	0.00000	Pass	563.355 m
12	0.00000	Pass	577.120 m	Pass	0.00000	Pass	562.202 m
Result	Pass	Pass	Pass	Pass	Pass	562.343 m	Pass

L3 Phase

Element	3		Element	3		Judgement	Pass
Test Range	600V/50Hz		Element	3		Judgement	Pass
MeasPt	277.00V		Total	(1 of 3)		Judgement	Pass
Freq(Hz)	60.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.00000	N:12	
1	0.00000	Pass	574.511 m	Pass	0.00000	Pass	563.186 m
2	0.00000	Pass	573.224 m	Pass	0.00000	Pass	564.003 m
3	0.00000	Pass	576.347 m	Pass	0.00000	Pass	565.426 m
4	0.00000	Pass	574.481 m	Pass	0.00000	Pass	563.667 m
5	0.00000	Pass	574.100 m	Pass	0.00000	Pass	561.362 m
6	0.00000	Pass	576.169 m	Pass	0.00000	Pass	565.380 m
7	0.00000	Pass	579.703 m	Pass	0.00000	Pass	563.711 m
8	0.00000	Pass	577.125 m	Pass	0.00000	Pass	567.266 m
9	0.00000	Pass	579.935 m	Pass	0.00000	Pass	563.785 m
10	0.00000	Pass	575.209 m	Pass	0.00000	Pass	567.448 m
11	0.00000	Pass	575.209 m	Pass	0.00000	Pass	560.345 m
12	0.00000	Pass	578.205 m	Pass	0.00000	Pass	562.972 m
Result	Pass	Pass	Pass	Pass	Pass	563.563 m	Pass

Flicker measurement under ambient condition 55° C				
Model: iMars XG136KTR-L				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.358	0.351	0.357
PLT	≤ 0.65	0.334	0.336	0.333
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.596%	0.580%	0.580%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.360	0.398	0.369
PLT	≤ 0.65	0.351	0.388	0.355
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.417%	0.403%	0.407%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.349	0.358	0.359
PLT	≤ 0.65	0.338	0.350	0.348
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.220%	0.211%	0.212%

Flicker measurement under ambient condition 55° C

100% rating power condition:

L1 Phase

Element	1		Element	1		Judgment	Pass
Volt Range	600V/500s		Total	11.2.30		Judgment	Pass
In/Out	275.00V						
Freq(Hz)	50.00Hz						
Limit	3.30000	4.00000	500.000	1.00000	0.05000		
	3.30000	4.00000	500.000	1.00000	0.05000		
1	0.00000	Pass	580.801 m	Pass	0.00000	Pass	330.029 m
2	0.00000	Pass	592.381 m	Pass	0.00000	Pass	331.416 m
3	0.00000	Pass	598.744 m	Pass	0.00000	Pass	335.536 m
4	0.00000	Pass	593.847 m	Pass	0.00000	Pass	329.016 m
5	0.00000	Pass	592.476 m	Pass	0.00000	Pass	320.753 m
6	0.00000	Pass	593.328 m	Pass	0.00000	Pass	341.347 m
7	0.00000	Pass	580.888 m	Pass	0.00000	Pass	341.578 m
8	0.00000	Pass	595.130 m	Pass	0.00000	Pass	338.009 m
9	0.00000	Pass	584.835 m	Pass	0.00000	Pass	329.383 m
10	0.00000	Pass	588.794 m	Pass	0.00000	Pass	332.584 m
11	0.00000	Pass	595.158 m	Pass	0.00000	Pass	338.731 m
12	0.00000	Pass	594.330 m	Pass	0.00000	Pass	339.865 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	334.458 m

L2 Phase

Element	2		Element	2		Judgment	Pass
Volt Range	600V/500s		Total	11.2.30		Judgment	Pass
In/Out	275.00V						
Freq(Hz)	50.00Hz						
Limit	3.30000	4.00000	500.000	1.00000	0.05000		
	3.30000	4.00000	500.000	1.00000	0.05000		
1	0.00000	Pass	578.815 m	Pass	0.00000	Pass	327.885 m
2	0.00000	Pass	577.873 m	Pass	0.00000	Pass	338.466 m
3	0.00000	Pass	589.821 m	Pass	0.00000	Pass	322.488 m
4	0.00000	Pass	580.952 m	Pass	0.00000	Pass	325.233 m
5	0.00000	Pass	577.535 m	Pass	0.00000	Pass	324.524 m
6	0.00000	Pass	577.583 m	Pass	0.00000	Pass	330.207 m
7	0.00000	Pass	578.120 m	Pass	0.00000	Pass	340.415 m
8	0.00000	Pass	580.311 m	Pass	0.00000	Pass	328.287 m
9	0.00000	Pass	578.488 m	Pass	0.00000	Pass	324.371 m
10	0.00000	Pass	580.829 m	Pass	0.00000	Pass	320.282 m
11	0.00000	Pass	579.005 m	Pass	0.00000	Pass	348.158 m
12	0.00000	Pass	580.182 m	Pass	0.00000	Pass	336.131 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	330.184 m

L3 Phase

Element	3		Element	3		Judgment	Pass
Volt Range	600V/500s		Total	11.2.30		Judgment	Pass
In/Out	275.00V						
Freq(Hz)	50.00Hz						
Limit	3.30000	4.00000	500.000	1.00000	0.05000		
	3.30000	4.00000	500.000	1.00000	0.05000		
1	0.00000	Pass	577.538 m	Pass	0.00000	Pass	332.913 m
2	0.00000	Pass	578.506 m	Pass	0.00000	Pass	337.510 m
3	0.00000	Pass	579.119 m	Pass	0.00000	Pass	325.800 m
4	0.00000	Pass	579.958 m	Pass	0.00000	Pass	325.928 m
5	0.00000	Pass	579.510 m	Pass	0.00000	Pass	318.129 m
6	0.00000	Pass	578.389 m	Pass	0.00000	Pass	315.808 m
7	0.00000	Pass	575.113 m	Pass	0.00000	Pass	333.244 m
8	0.00000	Pass	578.552 m	Pass	0.00000	Pass	363.782 m
9	0.00000	Pass	579.387 m	Pass	0.00000	Pass	357.057 m
10	0.00000	Pass	580.424 m	Pass	0.00000	Pass	330.842 m
11	0.00000	Pass	578.988 m	Pass	0.00000	Pass	332.242 m
12	0.00000	Pass	580.838 m	Pass	0.00000	Pass	325.928 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	333.015 m

Flicker measurement under ambient condition 20° C				
Model: iMars XG136KTR-X				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.363	0.378	0.352
PLT	≤ 0.65	0.351	0.362	0.338
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.611%	0.593%	0.594%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.347	0.452	0.346
PLT	≤ 0.65	0.334	0.342	0.332
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.443%	0.432%	0.434%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.349	0.367	0.367
PLT	≤ 0.65	0.340	0.358	0.351
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.234%	0.228%	0.226%

Flicker measurement under ambient condition 20° C

100% rating power condition:

L1 Phase

Element	1		Element	1		Judgment	Pass
Volt Range	600V/50Hz		Total	(1 of 3)		Judgment	Pass
Wt(Spt)	011.00V						
Freq(Hz)	50.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.05000	N12	
1	0.00000	Pass	603.138 m	Pass	0.00000	Pass	348.295 m
2	0.00000	Pass	597.554 m	Pass	0.00000	Pass	341.115 m
3	0.00000	Pass	604.577 m	Pass	0.00000	Pass	351.105 m
4	0.00000	Pass	601.000 m	Pass	0.00000	Pass	340.025 m
5	0.00000	Pass	598.194 m	Pass	0.00000	Pass	340.920 m
6	0.00000	Pass	601.900 m	Pass	0.00000	Pass	349.630 m
7	0.00000	Pass	604.475 m	Pass	0.00000	Pass	347.983 m
8	0.00000	Pass	608.397 m	Pass	0.00000	Pass	357.303 m
9	0.00000	Pass	599.462 m	Pass	0.00000	Pass	357.568 m
10	0.00000	Pass	611.807 m	Pass	0.00000	Pass	357.100 m
11	0.00000	Pass	604.427 m	Pass	0.00000	Pass	353.020 m
12	0.00000	Pass	607.473 m	Pass	0.00000	Pass	358.871 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	351.585 m

L2 Phase

Element	2		Element	2		Judgment	Pass
Volt Range	600V/50Hz		Total	(1 of 3)		Judgment	Pass
Wt(Spt)	011.00V						
Freq(Hz)	50.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.05000	N12	
1	0.00000	Pass	597.087 m	Pass	0.00000	Pass	348.210 m
2	0.00000	Pass	597.033 m	Pass	0.00000	Pass	351.821 m
3	0.00000	Pass	599.478 m	Pass	0.00000	Pass	350.280 m
4	0.00000	Pass	593.095 m	Pass	0.00000	Pass	363.455 m
5	0.00000	Pass	592.389 m	Pass	0.00000	Pass	360.575 m
6	0.00000	Pass	597.584 m	Pass	0.00000	Pass	368.057 m
7	0.00000	Pass	599.765 m	Pass	0.00000	Pass	339.058 m
8	0.00000	Pass	591.111 m	Pass	0.00000	Pass	378.260 m
9	0.00000	Pass	599.879 m	Pass	0.00000	Pass	367.880 m
10	0.00000	Pass	599.050 m	Pass	0.00000	Pass	369.623 m
11	0.00000	Pass	597.136 m	Pass	0.00000	Pass	371.408 m
12	0.00000	Pass	597.445 m	Pass	0.00000	Pass	378.345 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	362.751 m

L3 Phase

Element	3		Element	3		Judgment	Pass
Volt Range	600V/50Hz		Total	(1 of 3)		Judgment	Pass
Wt(Spt)	011.00V						
Freq(Hz)	50.00Hz						
Limit	0.0%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.30000	4.00000	500.000	1.00000	0.05000	N12	
1	0.00000	Pass	592.877 m	Pass	0.00000	Pass	329.270 m
2	0.00000	Pass	595.677 m	Pass	0.00000	Pass	343.238 m
3	0.00000	Pass	598.538 m	Pass	0.00000	Pass	334.661 m
4	0.00000	Pass	597.440 m	Pass	0.00000	Pass	338.345 m
5	0.00000	Pass	597.170 m	Pass	0.00000	Pass	324.541 m
6	0.00000	Pass	595.840 m	Pass	0.00000	Pass	338.170 m
7	0.00000	Pass	598.733 m	Pass	0.00000	Pass	338.032 m
8	0.00000	Pass	595.852 m	Pass	0.00000	Pass	338.201 m
9	0.00000	Pass	597.821 m	Pass	0.00000	Pass	335.932 m
10	0.00000	Pass	595.874 m	Pass	0.00000	Pass	330.031 m
11	0.00000	Pass	594.139 m	Pass	0.00000	Pass	352.528 m
12	0.00000	Pass	595.258 m	Pass	0.00000	Pass	348.743 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	338.595 m

Flicker measurement under ambient condition -10° C				
Model: iMars XG136KTR-X				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.341	0.353	0.339
PLT	≤ 0.65	0.333	0.338	0.329
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.607%	0.594%	0.595%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.337	0.353	0.339
PLT	≤ 0.65	0.330	0.342	0.329
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.444%	0.432%	0.431%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.346	0.360	0.352
PLT	≤ 0.65	0.339	0.349	0.345
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.238%	0.227%	0.225%

Flicker measurement under ambient condition -10° C

100% rating power condition:

L1 Phase

Element	1		Element	1		Judgment	Pass
V _{LL} Range	0.07V/0.0Hz		V _{LL} Set	0.1, 0.0V		Judgment	Pass
Freq (Hz)	50.00Hz						
Unit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Limit	3.30000	4.00000	500.000	1.00000	0.65000	N/A	N/A
1	0.00000	Pass	803.085 m	Pass	0.00000	Pass	328.352 m
2	0.00000	Pass	604.993 m	Pass	0.00000	Pass	339.505 m
3	0.00000	Pass	803.741 m	Pass	0.00000	Pass	332.448 m
4	0.00000	Pass	609.171 m	Pass	0.00000	Pass	341.308 m
5	0.00000	Pass	801.214 m	Pass	0.00000	Pass	338.438 m
6	0.00000	Pass	605.605 m	Pass	0.00000	Pass	338.983 m
7	0.00000	Pass	607.920 m	Pass	0.00000	Pass	333.780 m
8	0.00000	Pass	803.783 m	Pass	0.00000	Pass	330.438 m
9	0.00000	Pass	604.340 m	Pass	0.00000	Pass	333.685 m
10	0.00000	Pass	803.990 m	Pass	0.00000	Pass	339.148 m
11	0.00000	Pass	604.534 m	Pass	0.00000	Pass	329.681 m
12	0.00000	Pass	604.403 m	Pass	0.00000	Pass	332.002 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	333.719 m

L2 Phase

Element	2		Element	2		Judgment	Pass
V _{LL} Range	0.07V/0.0Hz		V _{LL} Set	0.1, 0.0V		Judgment	Pass
Freq (Hz)	50.00Hz						
Unit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Limit	3.30000	4.00000	500.000	1.00000	0.65000	N/A	N/A
1	0.00000	Pass	557.816 m	Pass	0.00000	Pass	345.551 m
2	0.00000	Pass	553.561 m	Pass	0.00000	Pass	329.642 m
3	0.00000	Pass	551.158 m	Pass	0.00000	Pass	328.511 m
4	0.00000	Pass	552.484 m	Pass	0.00000	Pass	335.171 m
5	0.00000	Pass	551.587 m	Pass	0.00000	Pass	339.941 m
6	0.00000	Pass	551.075 m	Pass	0.00000	Pass	353.840 m
7	0.00000	Pass	551.880 m	Pass	0.00000	Pass	341.900 m
8	0.00000	Pass	550.044 m	Pass	0.00000	Pass	332.743 m
9	0.00000	Pass	551.272 m	Pass	0.00000	Pass	341.081 m
10	0.00000	Pass	550.889 m	Pass	0.00000	Pass	348.145 m
11	0.00000	Pass	553.740 m	Pass	0.00000	Pass	340.214 m
12	0.00000	Pass	554.014 m	Pass	0.00000	Pass	319.750 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	338.434 m

L3 Phase

Element	3		Element	3		Judgment	Pass
V _{LL} Range	0.07V/0.0Hz		V _{LL} Set	0.1, 0.0V		Judgment	Pass
Freq (Hz)	50.00Hz						
Unit	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Limit	3.30000	4.00000	500.000	1.00000	0.65000	N/A	N/A
1	0.00000	Pass	580.532 m	Pass	0.00000	Pass	326.310 m
2	0.00000	Pass	593.913 m	Pass	0.00000	Pass	325.586 m
3	0.00000	Pass	583.001 m	Pass	0.00000	Pass	330.943 m
4	0.00000	Pass	595.485 m	Pass	0.00000	Pass	327.228 m
5	0.00000	Pass	591.987 m	Pass	0.00000	Pass	320.144 m
6	0.00000	Pass	588.091 m	Pass	0.00000	Pass	323.125 m
7	0.00000	Pass	585.452 m	Pass	0.00000	Pass	334.570 m
8	0.00000	Pass	589.514 m	Pass	0.00000	Pass	330.568 m
9	0.00000	Pass	588.177 m	Pass	0.00000	Pass	329.878 m
10	0.00000	Pass	580.760 m	Pass	0.00000	Pass	338.454 m
11	0.00000	Pass	593.259 m	Pass	0.00000	Pass	319.240 m
12	0.00000	Pass	589.067 m	Pass	0.00000	Pass	326.214 m
Result	Pass	Pass	Pass	Pass	Pass	Pass	325.875 m

Flicker measurement under ambient condition 55° C				
Model: iMars XG136KTR-X				
100% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.367	0.389	0.357
PLT	≤ 0.65	0.351	0.373	0.345
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.607%	0.594%	0.592%
66% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.345	0.347	0.338
PLT	≤ 0.65	0.335	0.341	0.330
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.445%	0.433%	0.433%
33% rating power condition:				
P _{bin} (%)	Limit	L1 Phase	L2 Phase	L3 Phase
PST	≤ 1	0.346	0.368	0.356
PLT	≤ 0.65	0.342	0.359	0.347
dc	≤ 3.30%	0%	0%	0%
dmax	4%	0.235%	0.228%	0.229%

Flicker measurement under ambient condition 55° C

100% rating power condition:

L1 Phase

Element	1	Element	1	Judgment	Pass
Volt Range	0.0V/50Hz	Total	1 (2/3)	Judgment	Pass
Volts	311.00V				
Freq(Hz)	50.00Hz				
Limit	330000	400000	500000	100000	0.00000
	330000	400000	500000	100000	0.00000
1	0.00000 Pass	602.466 m Pass	0.00000 Pass	342.999 m Pass	
2	0.00000 Pass	602.570 m Pass	0.00000 Pass	352.167 m Pass	
3	0.00000 Pass	603.592 m Pass	0.00000 Pass	353.710 m Pass	
4	0.00000 Pass	603.467 m Pass	0.00000 Pass	367.013 m Pass	
5	0.00000 Pass	607.467 m Pass	0.00000 Pass	355.454 m Pass	
6	0.00000 Pass	602.531 m Pass	0.00000 Pass	349.109 m Pass	
7	0.00000 Pass	604.134 m Pass	0.00000 Pass	361.499 m Pass	
8	0.00000 Pass	607.569 m Pass	0.00000 Pass	355.321 m Pass	
9	0.00000 Pass	602.517 m Pass	0.00000 Pass	347.817 m Pass	
10	0.00000 Pass	602.186 m Pass	0.00000 Pass	338.815 m Pass	
11	0.00000 Pass	607.385 m Pass	0.00000 Pass	347.303 m Pass	
12	0.00000 Pass	603.324 m Pass	0.00000 Pass	355.545 m Pass	
Result	Pass	Pass	Pass	Pass	351.929 m Pass

L2 Phase

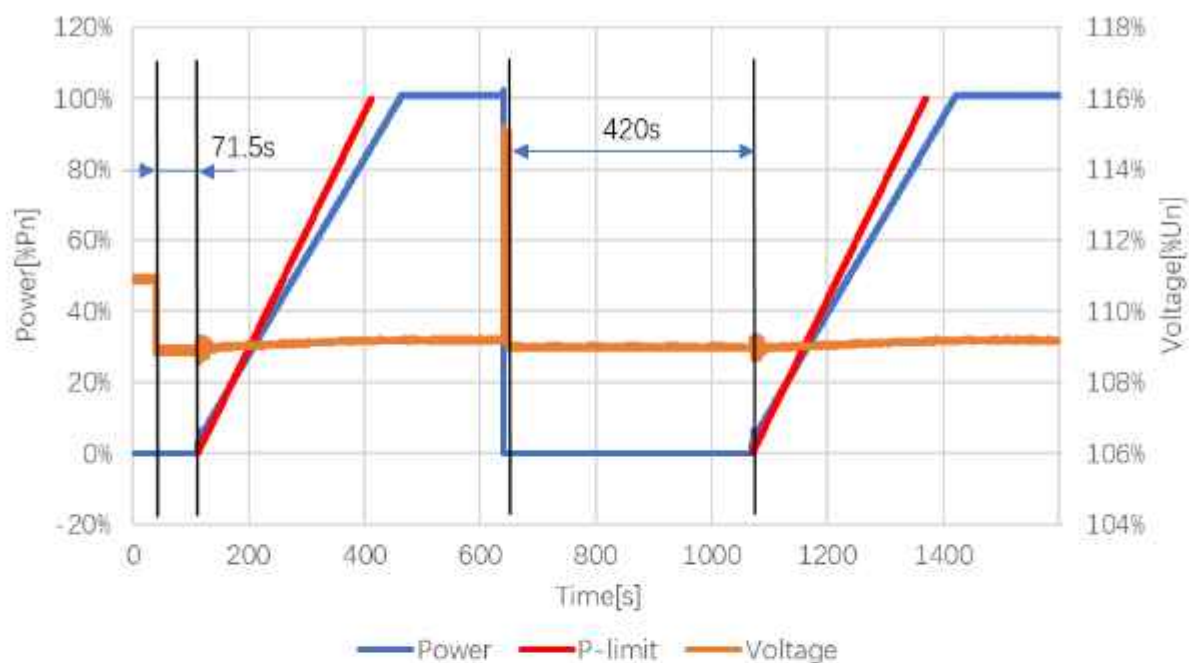
Element	2	Element	2	Judgment	Pass
Volt Range	0.0V/50Hz	Total	1 (2/3)	Judgment	Pass
Volts	311.00V				
Freq(Hz)	50.00Hz				
Limit	330000	400000	500000	100000	0.00000
	330000	400000	500000	100000	0.00000
1	0.00000 Pass	593.895 m Pass	0.00000 Pass	326.874 m Pass	
2	0.00000 Pass	590.295 m Pass	0.00000 Pass	326.120 m Pass	
3	0.00000 Pass	590.360 m Pass	0.00000 Pass	322.354 m Pass	
4	0.00000 Pass	591.545 m Pass	0.00000 Pass	329.862 m Pass	
5	0.00000 Pass	591.425 m Pass	0.00000 Pass	324.839 m Pass	
6	0.00000 Pass	591.589 m Pass	0.00000 Pass	325.053 m Pass	
7	0.00000 Pass	594.503 m Pass	0.00000 Pass	339.547 m Pass	
8	0.00000 Pass	591.554 m Pass	0.00000 Pass	327.657 m Pass	
9	0.00000 Pass	592.755 m Pass	0.00000 Pass	329.515 m Pass	
10	0.00000 Pass	591.117 m Pass	0.00000 Pass	323.873 m Pass	
11	0.00000 Pass	598.180 m Pass	0.00000 Pass	323.984 m Pass	
12	0.00000 Pass	591.767 m Pass	0.00000 Pass	340.475 m Pass	
Result	Pass	Pass	Pass	Pass	323.708 m Pass

L3 Phase

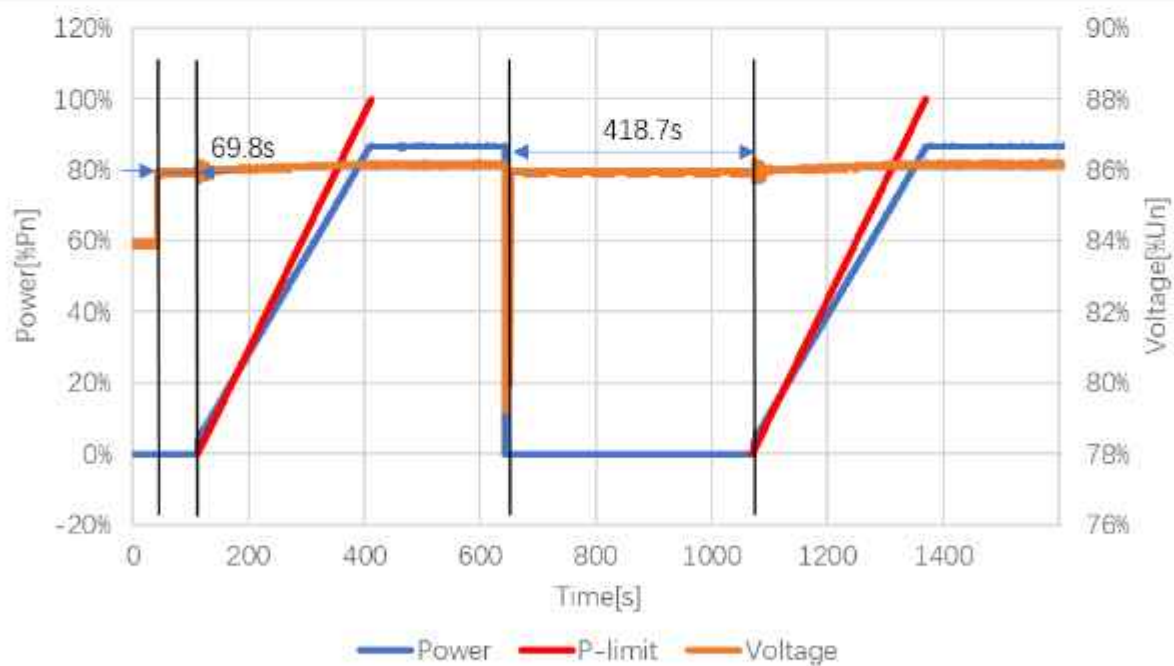
Element	3	Element	3	Judgment	Pass
Volt Range	0.0V/50Hz	Total	1 (2/3)	Judgment	Pass
Volts	311.00V				
Freq(Hz)	50.00Hz				
Limit	330000	400000	500000	100000	0.00000
	330000	400000	500000	100000	0.00000
1	0.00000 Pass	590.748 m Pass	0.00000 Pass	337.994 m Pass	
2	0.00000 Pass	591.621 m Pass	0.00000 Pass	353.514 m Pass	
3	0.00000 Pass	591.409 m Pass	0.00000 Pass	341.147 m Pass	
4	0.00000 Pass	591.338 m Pass	0.00000 Pass	307.225 m Pass	
5	0.00000 Pass	598.220 m Pass	0.00000 Pass	342.012 m Pass	
6	0.00000 Pass	592.675 m Pass	0.00000 Pass	339.952 m Pass	
7	0.00000 Pass	592.625 m Pass	0.00000 Pass	348.414 m Pass	
8	0.00000 Pass	598.016 m Pass	0.00000 Pass	340.536 m Pass	
9	0.00000 Pass	591.177 m Pass	0.00000 Pass	357.022 m Pass	
10	0.00000 Pass	599.675 m Pass	0.00000 Pass	339.192 m Pass	
11	0.00000 Pass	599.752 m Pass	0.00000 Pass	346.214 m Pass	
12	0.00000 Pass	599.724 m Pass	0.00000 Pass	345.342 m Pass	
Result	Pass	Pass	Pass	Pass	345.915 m Pass

B.1.1.1 and B.1.1.2	TABLE: Checking the connection and reconnection conditions Checking gradual supply of active power				P
Model: iMars XG110KTR					
No connection in less than 30 sec		Connection after 30 sec		Rising curve of 20%P _n /min	
U > 110% U _n	Yes	85% < U < 110 % U _n	Yes (71.5s)	17.14%P _n /min	
U < 85% U _n	Yes	85% < U < 110 % U _n	Yes (69.8s)	17.03%P _n /min	
f > 50.10 Hz	Yes	49,90 < f < 50.10 Hz	Yes (70.1s)	17.11%P _n /min	
f < 49.90 Hz	Yes	49,90 < f < 50.10 Hz	Yes (68.7s)	17.04%P _n /min	
Disconnection		Connection after 300 sec		Rising curve of 20%P _n /min	
U > 110% U _n	Yes	85% < U < 110 % U _n	Yes (420.0s)	17.19%P _n /min	
U < 85% U _n	Yes	85% < U < 110 % U _n	Yes (418.7s)	17.06%P _n /min	
f > 51.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (381.3s)	17.12%P _n /min	
f < 47.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (372.6s)	17.01%P _n /min	

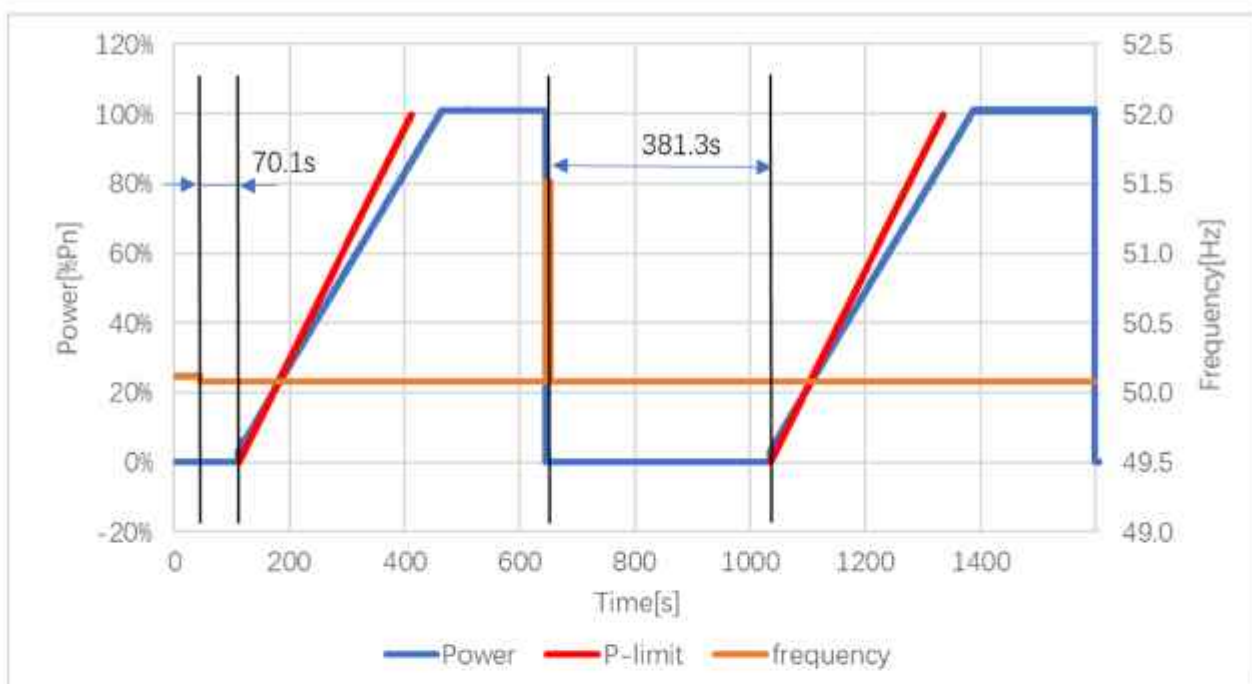
Overvoltage conditions



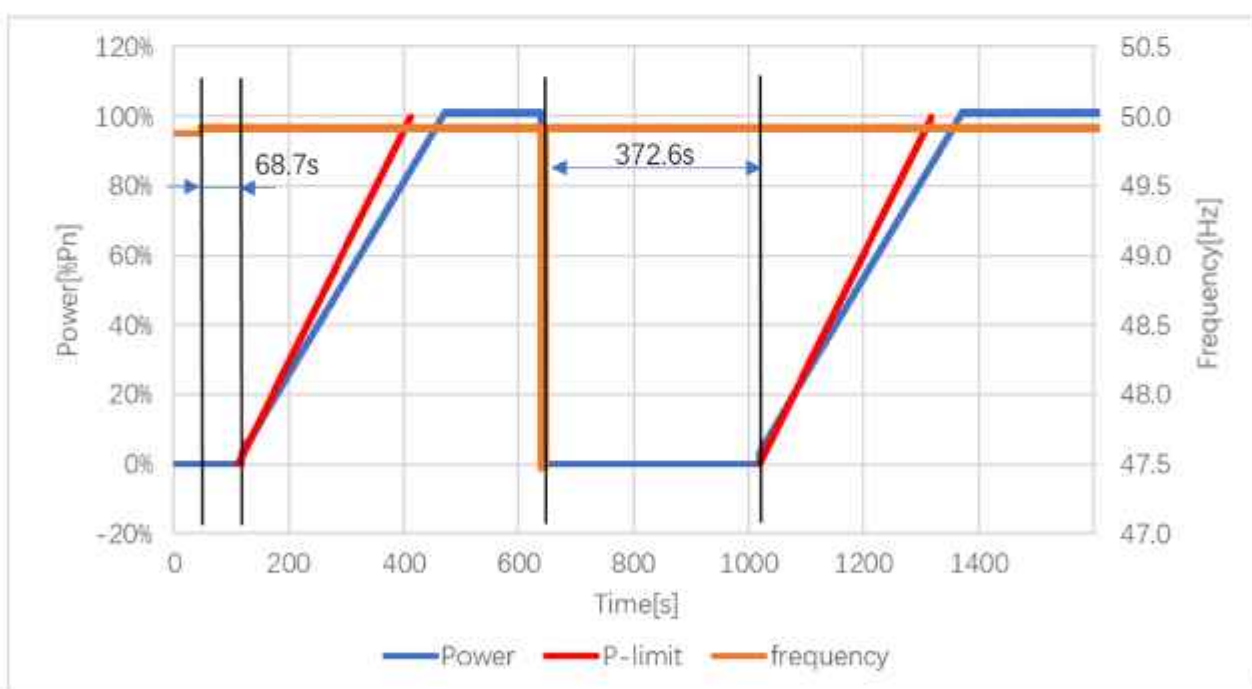
Undervoltage conditions



Overfrequency conditions

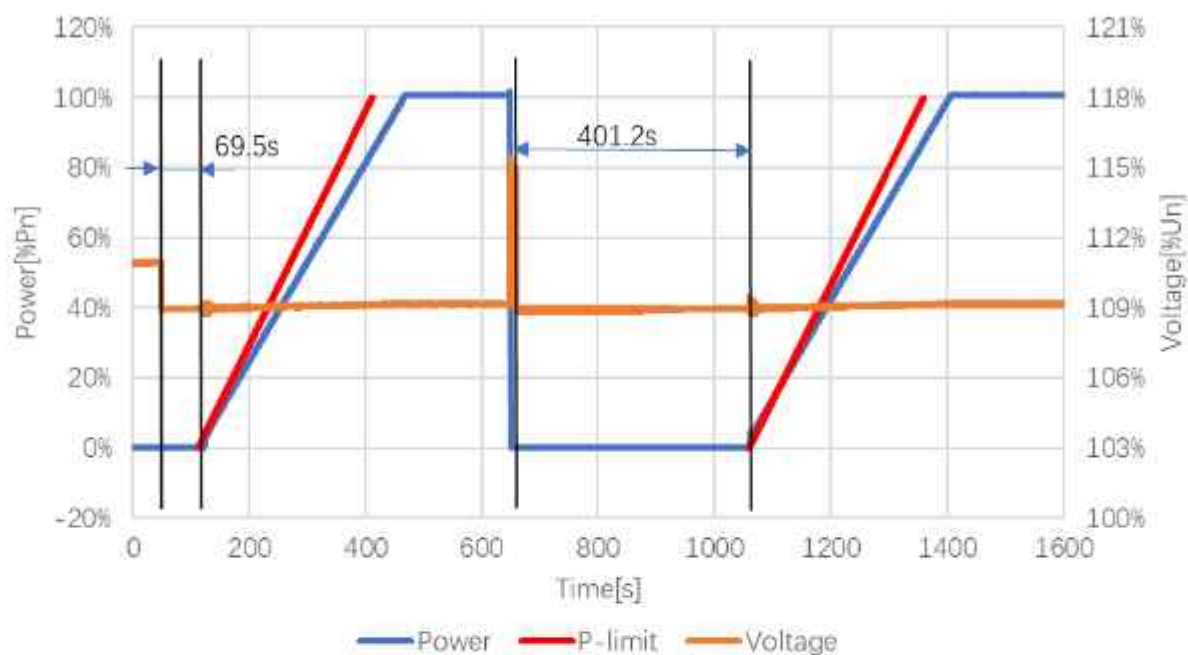


Underfrequency conditions

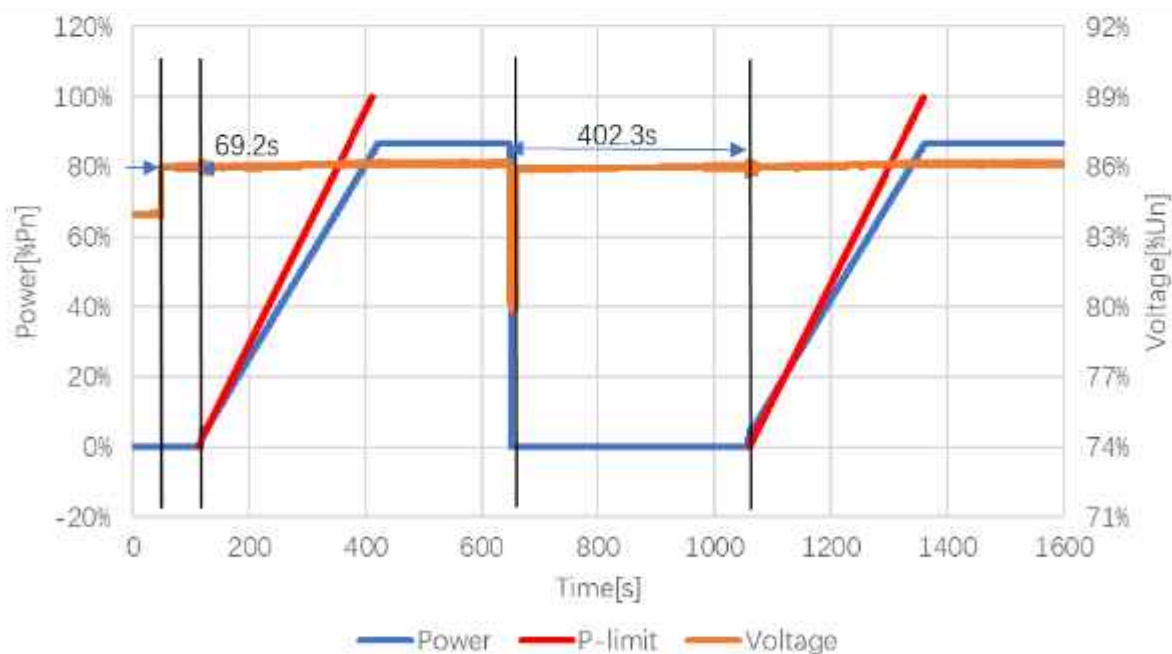


B.1.1.1 and B.1.1.2	TABLE: Checking the connection and reconnection conditions Checking gradual supply of active power				P
Model: iMars XG136KTR-L					
No connection in less than 30 sec		Connection after 30 sec		Rising curve of 20%Pn/min	
U > 110% Un	Yes	85% < U < 110 % Un	Yes (69.5s)	16.93%Pn/min	
U < 85% Un	Yes	85% < U < 110 % Un	Yes (69.2s)	17.11%Pn/min	
f > 50.10 Hz	Yes	49,90 < f < 50.10 Hz	Yes (70.3s)	17.01%Pn/min	
f < 49.90 Hz	Yes	49,90 < f < 50.10 Hz	Yes (70.1s)	16.95%Pn/min	
Disconnection		Connection after 300 sec		Rising curve of 20%Pn/min	
U > 110% Un	Yes	85% < U < 110 % Un	Yes (401.2s)	17.02%Pn/min	
U < 85% Un	Yes	85% < U < 110 % Un	Yes (402.3s)	17.08%Pn/min	
f > 51.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (399.7s)	17.08%Pn/min	
f < 47.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (416.3s)	16.97%Pn/min	

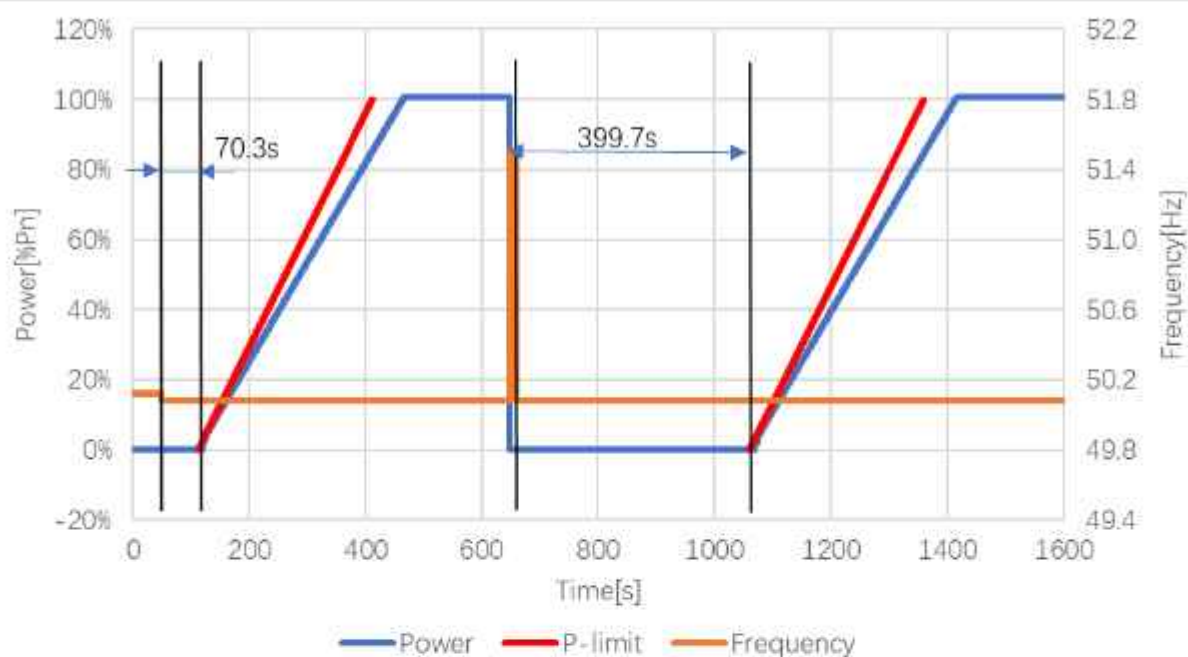
Overvoltage conditions



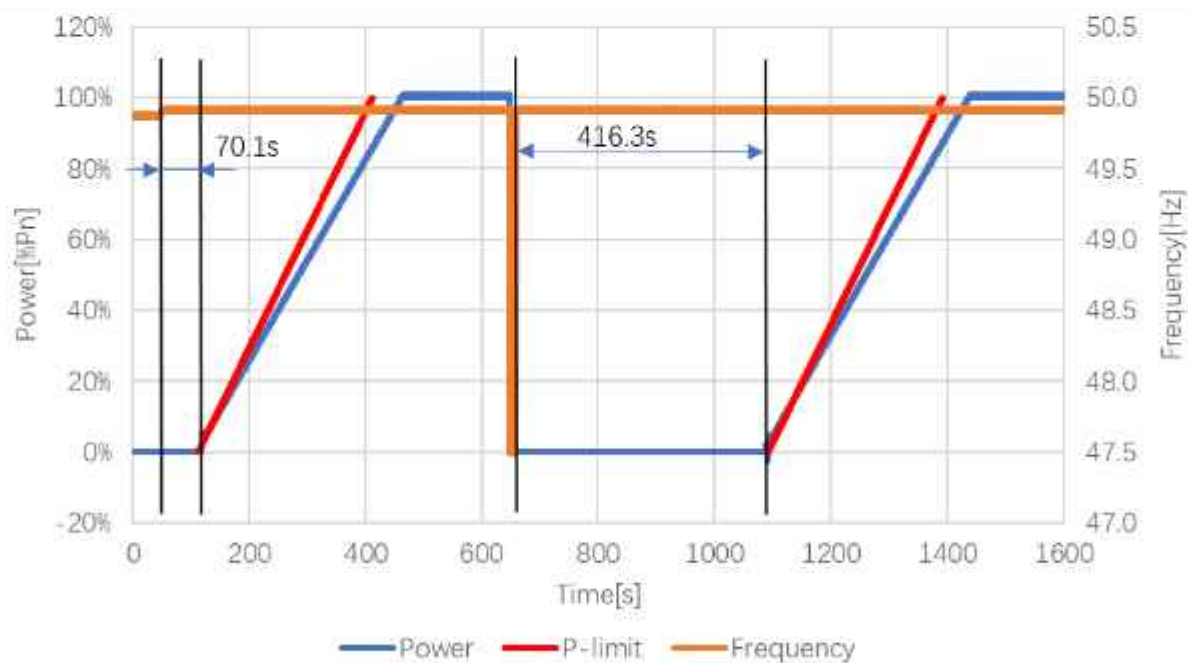
Undervoltage conditions



Overfrequency conditions

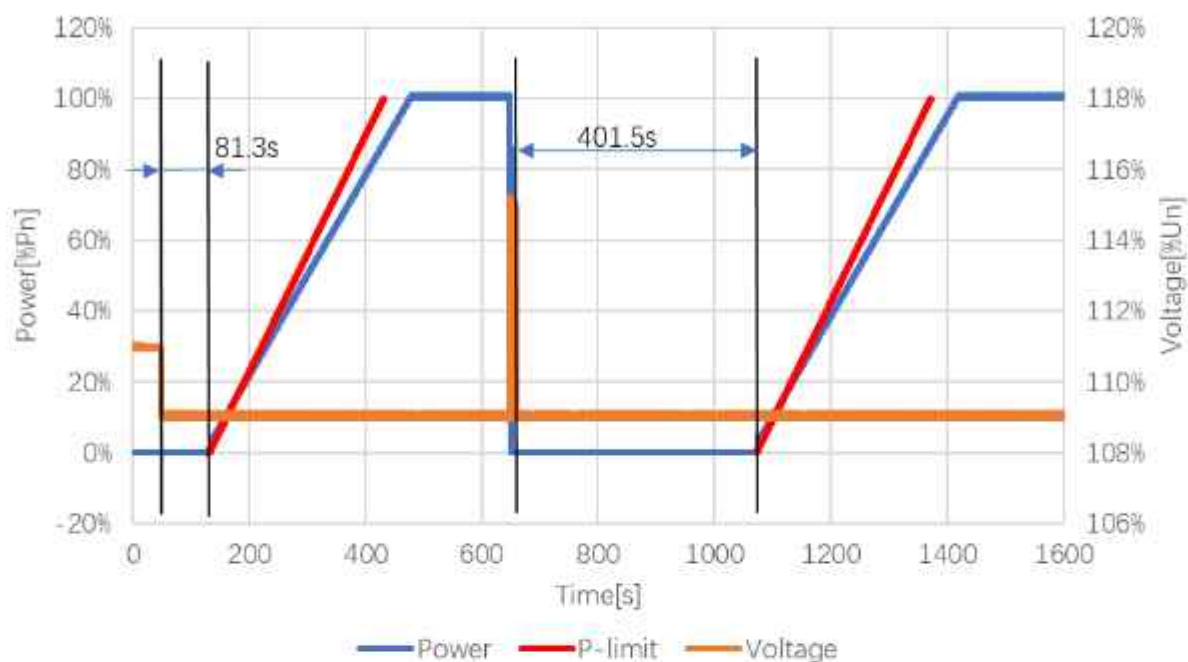


Underfrequency conditions

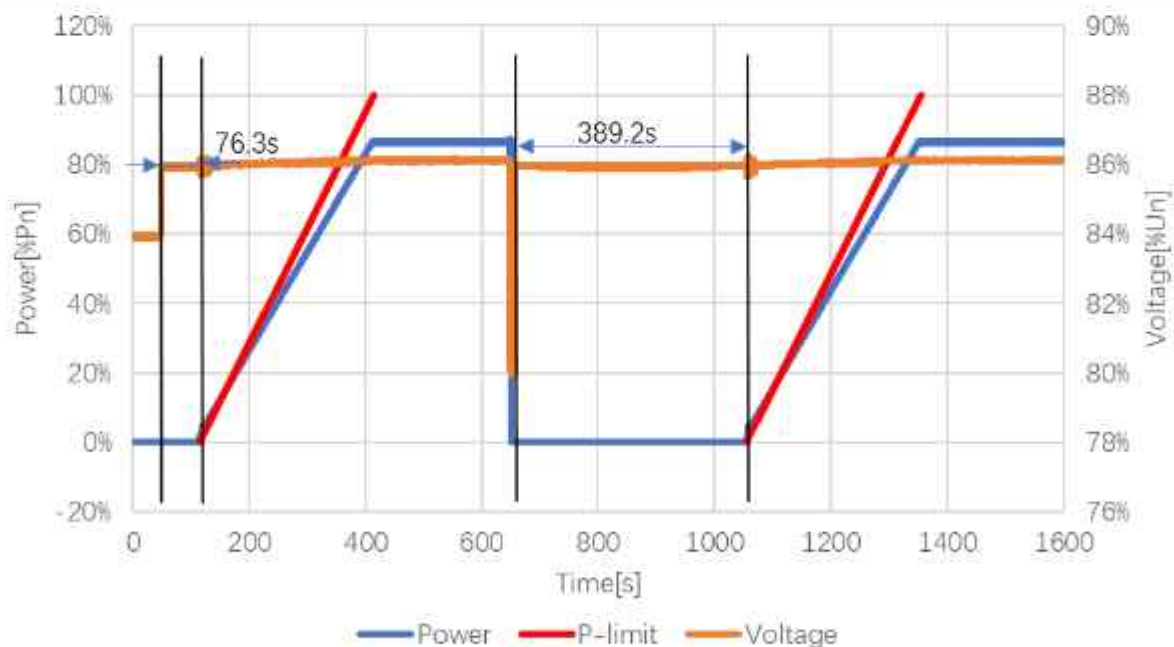


B.1.1.1 and B.1.1.2	TABLE: Checking the connection and reconnection conditions Checking gradual supply of active power				P
Model: iMars XG136KTR-X					
No connection in less than 30 sec		Connection after 30 sec		Rising curve of 20%Pn/min	
U > 110% Un	Yes	85% < U < 110 % Un	Yes (81.3s)	16.81 %Pn/min	
U < 85% Un	Yes	85% < U < 110 % Un	Yes (76.3s)	17.04%Pn/min	
f > 50.10 Hz	Yes	49,90 < f < 50.10 Hz	Yes (75.8s)	17.14%Pn/min	
f < 49.90 Hz	Yes	49,90 < f < 50.10 Hz	Yes (88.3s)	16.89%Pn/min	
Disconnection		Connection after 300 sec		Rising curve of 20%Pn/min	
U > 110% Un	Yes	85% < U < 110 % Un	Yes (401.5s)	16.87 %Pn/min	
U < 85% Un	Yes	85% < U < 110 % Un	Yes (389.2s)	16.93%Pn/min	
f > 51.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (405.0s)	16.78%Pn/min	
f < 47.50 Hz	Yes	49,90 < f < 50.10 Hz	Yes (400.7s)	16.83%Pn/min	

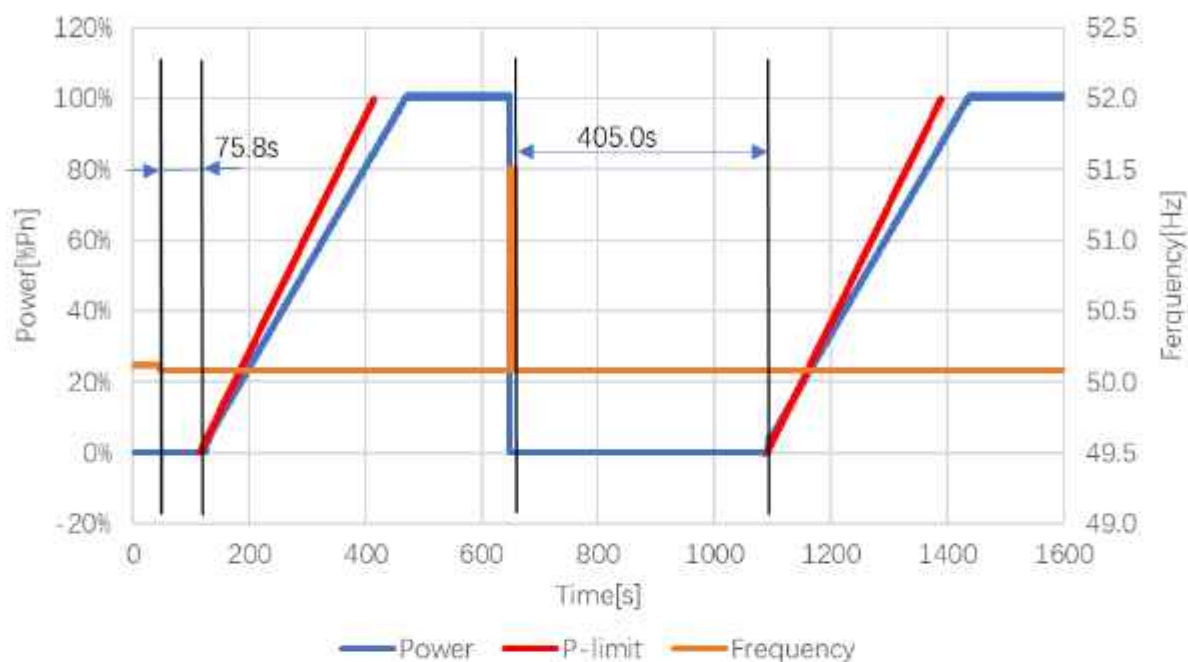
Overvoltage conditions



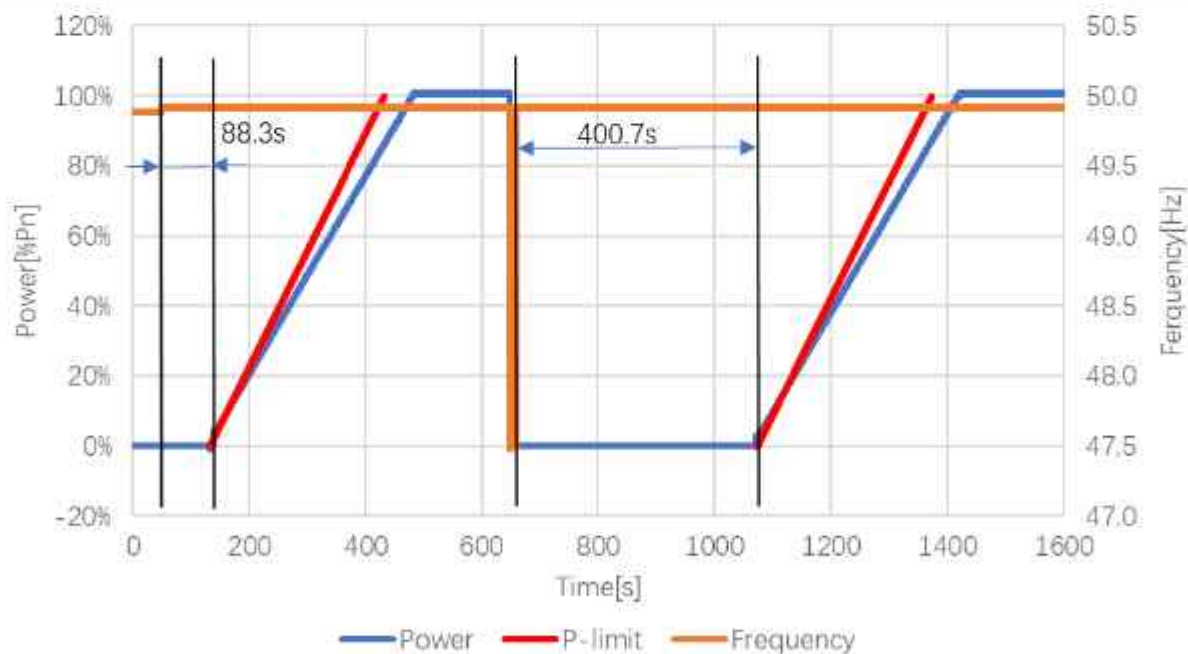
Undervoltage conditions



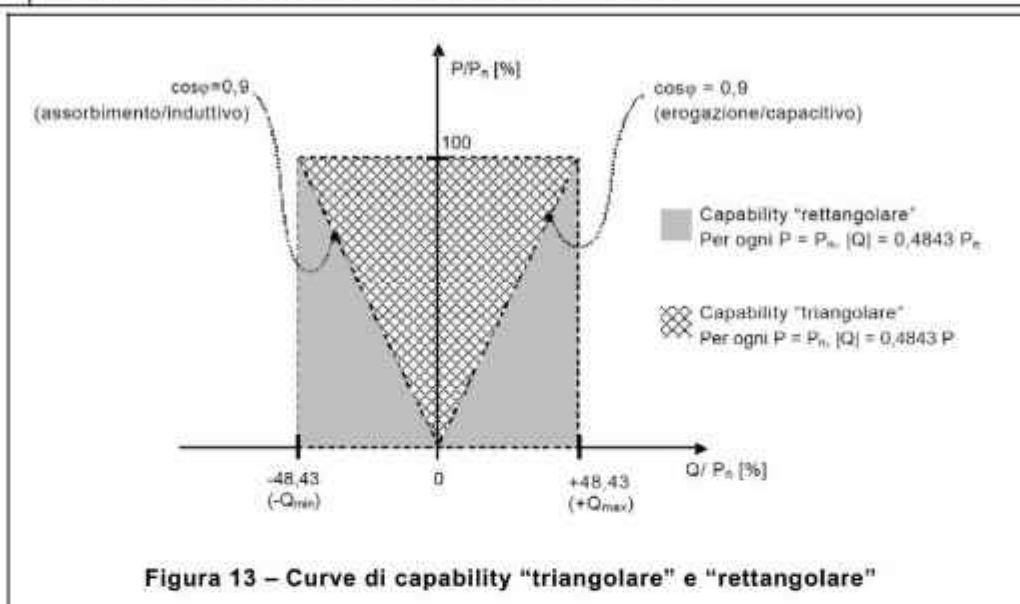
Overfrequency conditions



Underfrequency conditions



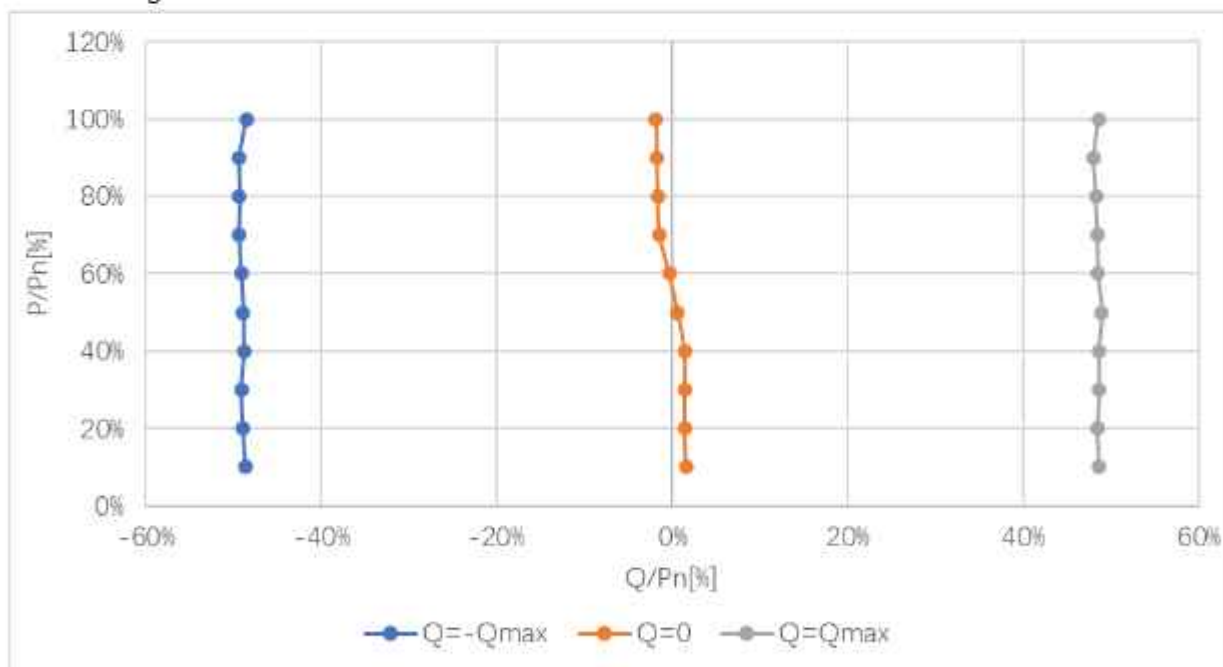
B.1.2.2 Table: Verification of reactive power supply capability P



For each of the 10 levels of active power, 3 values of inductive reactive power and 3 values of capacitive reactive power must be registered as average values in 1 min, based on the measurements at the fundamental in a window of 200ms.

P/Q_r Graph

Maximum reactive power adsorbed (Qmin) and produced (Qmax) as a function of the active power fed into the grid.



Model: iMars XG110KTR

TABLE_ Reactive power production with set point Q = 0

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	5821.6	5.29	1756.6	1.60	6201.6	5.64	0.9584
	5793.7	5.27	1683.7	1.53	6196.4	5.63	0.9546
	5831.9	5.30	1703.9	1.55	6207.4	5.64	0.9593
10% - 20%	16710.6	15.19	1587.4	1.44	17272.0	15.70	0.9872
	16853.7	15.32	1563.8	1.42	17328.6	15.75	0.9923
	16893.5	15.81	1486.8	1.35	17184.8	15.62	0.9936
20% - 30%	27667.6	25.15	1584.4	1.44	28493.4	25.90	0.9958
	27589.4	25.08	1572.7	1.43	28511.8	25.92	0.9972
	27599.0	25.09	1582.5	1.44	28637.9	26.03	0.9937
30% - 40%	38604.8	35.10	1591.9	1.45	39682.7	36.08	0.9933
	38578.7	35.07	1469.2	1.34	39672.6	36.07	0.9923
	38461.8	34.97	1537.9	1.40	39574.3	35.98	0.9928
40% - 50%	49788.6	45.26	735.9	0.67	51160.9	46.51	0.9994
	49842.1	45.31	863.5	0.79	51263.8	46.60	0.9988
	48953.8	44.50	803.0	0.73	50974.3	46.34	0.9989
50% - 60%	60884.0	55.35	-350.4	-0.32	62590.9	56.90	0.9996
	60482.6	54.98	-350.8	-0.32	62518.5	56.84	0.9994
	60782.5	55.26	-307.8	-0.28	62318.9	56.65	0.9993
60% - 70%	72027.0	65.48	-1588.4	-1.44	74171.9	67.43	0.9991
	72518.7	65.93	-1478.3	-1.34	74832.8	68.03	0.9995
	72482.7	65.89	-1504.1	-1.37	74528.6	67.75	0.9996
70% - 80%	83155.7	75.60	-1805.8	-1.64	85696.9	77.91	0.9993
	83279.5	75.71	-1794.3	-1.63	85538.3	77.76	0.9997
	83317.3	75.74	-1802.8	-1.64	85387.0	77.62	0.9994
80% - 90%	94285.9	85.71	-1900.7	-1.73	97266.5	88.42	0.9995
	94386.4	85.81	-1867.3	-1.70	97472.8	88.61	0.9995
	94418.2	85.83	-1879.5	-1.71	97402.5	88.55	0.9993
90%-100%	105420.3	95.84	-2011.7	-1.83	108966.8	99.06	0.9992
	105296.7	95.72	-2008.4	-1.83	108684.3	98.80	0.9994
	105189.5	95.63	-1996.2	-1.81	108583.5	98.71	0.9994

TABLE_ Reactive power production with set point Q = -Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6139.6	5.58	-53400.7	-48.55	7908.3	7.19	0.1142
	6173.6	5.61	-53709.3	-48.83	7983.5	7.26	0.1139
	6181.8	5.62	-53687.8	-48.81	7972.8	7.25	0.1141
10% - 20%	16677.6	15.16	-53819.2	-48.93	18668.7	16.97	0.2960
	16583.5	15.08	-53884.2	-48.99	18417.4	16.74	0.2952
	16724.1	15.20	-53902.3	-49.00	18376.3	16.71	0.2963
20% - 30%	27812.1	25.28	-54024.1	-49.11	30044.2	27.31	0.4577
	27548.7	25.04	-53863.7	-48.97	29767.1	27.06	0.4604
	27618.3	25.11	-53839.7	-48.95	29732.0	27.03	0.4602
30% - 40%	38937.6	35.40	-53655.1	-48.78	41475.6	37.71	0.5873
	38608.1	35.10	-53230.4	-48.39	40905.2	37.19	0.5783
	38582.5	35.08	-54045.2	-49.13	41783.7	37.99	0.5824
40% - 50%	50071.8	45.52	-53714.5	-48.83	53053.6	48.23	0.6818
	49884.2	45.35	-53571.5	-48.70	52574.7	47.80	0.6805
	49853.7	45.32	-53486.9	-48.62	52863.7	48.06	0.6806
50% - 60%	61225.8	55.66	-54011.1	-49.10	64539.9	58.67	0.7499
	61371.5	55.79	-54528.4	-49.57	63945.1	58.13	0.7502
	60526.4	55.02	-53731.8	-48.85	63169.4	57.43	0.7503
60% - 70%	71912.7	65.38	-54313.5	-49.38	75590.3	68.72	0.7979
	72095.2	65.54	-54138.4	-49.22	75285.8	68.44	0.8000
	72162.7	65.60	-54185.2	-49.26	74827.4	68.02	0.8001
70% - 80%	83224.1	75.66	-54209.3	-49.28	87325.7	79.39	0.8379
	83374.6	75.80	-54825.1	-49.84	87011.0	79.10	0.8413
	83592.0	75.99	-54027.5	-49.12	86897.3	79.00	0.8393
80% - 90%	94047.7	85.50	-54263.7	-49.33	98793.3	89.81	0.8662
	94185.3	85.62	-54002.6	-49.09	98268.3	89.33	0.8673
	94093.2	85.54	-53869.2	-48.97	98174.8	89.25	0.8662
90%-100%	104644.9	95.13	-53364.0	-48.51	108561.7	98.69	0.8908
	104644.9	95.13	-53336.9	-48.49	108561.7	98.69	0.8904
	104587.3	95.08	-53231.2	-48.39	108825.0	98.93	0.8901

TABLE_ Reactive power production with set point Q = +Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	5738.2	5.22	53509.7	48.65	6603.3	6.00	0.1035
	5782.6	5.26	53574.5	48.70	6575.7	5.98	0.1027
	5780.3	5.25	53353.5	48.50	6586.0	5.99	0.1033
10% - 20%	16815.8	15.29	53344.2	48.49	17810.6	16.19	0.2988
	16847.9	15.32	53466.8	48.61	17880.0	16.25	0.2982
	16864.9	15.33	53378.1	48.53	17925.9	16.30	0.2984
20% - 30%	27933.5	25.39	53570.9	48.70	29246.9	26.59	0.4574
	27985.7	25.44	54063.1	49.15	29149.1	26.50	0.4587
	27865.2	25.33	53825.9	48.93	29250.7	26.59	0.4604
30% - 40%	38947.5	35.41	53522.2	48.66	40678.8	36.98	0.5868
	38939.5	35.40	53409.3	48.55	40606.7	36.92	0.5870
	39027.1	35.48	53521.3	48.66	40794.6	37.09	0.5863
40% - 50%	50202.9	45.64	53847.2	48.95	52406.9	47.64	0.6824
	50066.5	45.52	53631.1	48.76	52313.9	47.56	0.6799
	49952.9	45.41	53647.3	48.77	52095.8	47.36	0.6763
50% - 60%	61253.4	55.68	53418.2	48.56	63537.3	57.76	0.7501
	61366.2	55.79	53296.6	48.45	63523.3	57.75	0.7522
	61542.6	55.95	53743.8	48.86	63436.3	57.67	0.7543
60% - 70%	72627.0	66.02	53331.8	48.48	75363.3	68.51	0.8016
	72268.9	65.70	53168.5	48.34	75290.7	68.45	0.7976
	72739.0	66.13	53568.2	48.70	75243.5	68.40	0.8010
70% - 80%	84218.5	76.56	53131.9	48.30	86979.6	79.07	0.8365
	84127.0	76.48	53104.8	48.28	87423.8	79.48	0.8382
	83713.1	76.10	53036.9	48.22	87592.8	79.63	0.8438
80% - 90%	95620.9	86.93	52902.3	48.09	99215.9	90.20	0.8721
	95217.5	86.56	53263.7	48.42	99282.8	90.26	0.8650
	95105.4	86.46	53412.7	48.56	99346.8	90.32	0.8682
90%-100%	105192.9	95.63	53440.9	48.58	109178.3	99.25	0.8946
	105065.9	95.51	53381.1	48.53	108652.5	98.78	0.8937
	104794.7	95.27	53616.1	48.74	108805.2	98.91	0.8901

Model: iMars XG136KTR-L							
TABLE_ Reactive power production with set point Q = 0							
Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6901.6	5.07	3811.3	2.80	7421.7	5.46	0.8754
	6937.2	5.10	3647.2	2.68	7523.8	5.53	0.8824
	7003.7	5.15	3728.5	2.74	7472.8	5.49	0.8793
10% - 20%	20450.6	15.04	2233.2	1.64	21175.2	15.57	0.9942
	20372.4	14.98	2201.5	1.62	21258.9	15.63	0.9951
	20417.5	15.01	2159.4	1.59	21186.7	15.58	0.9937
20% - 30%	34191.4	25.14	3551.2	2.61	35115.7	25.82	0.9945
	34073.5	25.05	4002.5	2.94	35074.1	25.79	0.9952
	33874.6	24.91	3851.5	2.83	35082.4	25.80	0.9947
30% - 40%	47609.4	35.01	3431.7	2.52	48820.1	35.90	0.9973
	47397.9	34.85	3627.6	2.67	48728.4	35.83	0.9974
	47476.1	34.91	3728.4	2.74	48629.4	35.76	0.9981
40% - 50%	61427.1	45.17	3404.0	2.50	62961.7	46.30	0.9984
	61286.8	45.06	3528.4	2.59	62738.2	46.13	0.9986
	61538.4	45.25	3275.9	2.41	62848.1	46.21	0.9988
50% - 60%	75148.5	55.26	3404.8	2.50	77126.4	56.71	0.9993
	75385.2	55.43	3328.9	2.45	77275.9	56.82	0.9994
	75184.5	55.28	3275.0	2.41	77375.8	56.89	0.9993
60% - 70%	88945.2	65.40	3351.3	2.46	91318.1	67.15	0.9992
	88846.3	65.33	3127.4	2.30	91275.8	67.11	0.9995
	89042.8	65.47	3265.9	2.40	91473.6	67.26	0.9991
70% - 80%	101648.3	74.74	1175.8	0.86	104376.3	76.75	0.9996
	102740.5	75.54	1281.2	0.94	105646.4	77.68	0.9994
	102396.5	75.29	1264.9	0.93	105275.5	77.41	0.9993
80% - 90%	116583.5	85.72	-274.9	-0.20	119911.9	88.17	0.9995
	115835.7	85.17	-186.4	-0.14	118967.6	87.48	0.9996
	116286.6	85.50	-247.9	-0.18	119566.6	87.92	0.9993
90%-100%	130307.2	95.81	-3195.6	-2.35	134185.4	98.67	0.9996
	130084.0	95.65	-3072.1	-2.26	134728.4	99.07	0.9992
	130428.9	95.90	-3085.3	-2.27	133987.6	98.52	0.9995

TABLE_ Reactive power production with set point Q = -Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6843.6	5.03	-66135.4	-48.63	8751.3	6.43	0.1032
	6845.3	5.03	-65637.1	-48.26	8690.3	6.39	0.1031
	6847.3	5.03	-66150.9	-48.64	8696.8	6.39	0.1034
10% - 20%	20738.8	15.25	-66080.2	-48.59	22915.7	16.85	0.2989
	20647.4	15.18	-66034.9	-48.56	22907.6	16.84	0.2971
	20631.2	15.17	-66479.7	-48.88	22749.2	16.73	0.2995
20% - 30%	34209.3	25.15	-65896.1	-48.45	36456.0	26.81	0.4559
	34194.6	25.14	-65932.8	-48.48	36438.4	26.79	0.4586
	34388.7	25.29	-66008.0	-48.54	36775.2	27.04	0.4614
30% - 40%	48067.9	35.34	-66349.7	-48.79	50728.5	37.30	0.5844
	47934.3	35.25	-66165.4	-48.65	50767.2	37.33	0.5870
	47931.2	35.24	-66337.3	-48.78	50664.0	37.25	0.5873
40% - 50%	61535.6	45.25	-66630.8	-48.99	64262.7	47.25	0.6826
	61485.5	45.21	-66519.5	-48.91	64413.8	47.36	0.6770
	61253.1	45.04	-66505.5	-48.90	64668.8	47.55	0.6794
50% - 60%	74874.2	55.05	-65969.6	-48.51	78570.3	57.77	0.7512
	75196.2	55.29	-65969.6	-48.51	78978.0	58.07	0.7500
	75260.7	55.34	-66059.5	-48.57	78480.0	57.71	0.7562
60% - 70%	88804.1	65.30	-66644.2	-49.00	92532.7	68.04	0.8054
	89204.8	65.59	-66302.3	-48.75	92811.6	68.24	0.7982
	88836.1	65.32	-66422.4	-48.84	92786.5	68.23	0.8036
70% - 80%	102574.1	75.42	-66117.6	-48.62	107732.3	79.21	0.8341
	102757.0	75.56	-66095.8	-48.60	107242.3	78.85	0.8385
	102623.1	75.46	-66429.3	-48.85	107516.7	79.06	0.8476
80% - 90%	116846.5	85.92	-66424.5	-48.84	120739.4	88.78	0.8720
	116130.2	85.39	-65969.5	-48.51	121445.3	89.30	0.8683
	116568.0	85.71	-66033.8	-48.55	121144.7	89.08	0.8674
90%-100%	129076.4	94.91	-65922.6	-48.47	133447.5	98.12	0.8979
	128644.7	94.59	-66157.7	-48.65	133513.0	98.17	0.8904
	128805.1	94.71	-66150.3	-48.64	134200.9	98.68	0.8917

TABLE_ Reactive power production with set point Q = +Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6979.5	5.13	66325.4	48.77	7958.8	5.85	0.1060
	7018.9	5.16	65701.5	48.31	7987.9	5.87	0.1058
	6998.3	5.15	66130.5	48.63	8007.4	5.89	0.1055
10% - 20%	20585.3	15.14	65795.5	48.38	21898.1	16.10	0.2970
	20455.4	15.04	65941.4	48.49	21815.1	16.04	0.2984
	20528.5	15.09	65745.6	48.34	21850.1	16.07	0.2986
20% - 30%	34278.4	25.20	66498.9	48.90	35739.1	26.28	0.4581
	34100.5	25.07	66484.3	48.89	35476.4	26.09	0.4562
	34168.0	25.12	66583.2	48.96	35587.9	26.17	0.4594
30% - 40%	47679.7	35.06	66183.0	48.66	49458.8	36.37	0.5852
	47846.8	35.18	66202.6	48.68	49610.3	36.48	0.5849
	47653.9	35.04	66147.3	48.64	49303.2	36.25	0.5864
40% - 50%	61107.1	44.93	66127.0	48.62	63511.5	46.70	0.6783
	61126.3	44.95	66100.3	48.60	63551.1	46.73	0.6820
	61325.3	45.09	66033.3	48.55	63571.9	46.74	0.6779
50% - 60%	75019.0	55.16	66035.1	48.56	77635.8	57.09	0.7485
	74954.5	55.11	65922.0	48.47	77935.2	57.31	0.7524
	75193.0	55.29	65595.6	48.23	77759.5	57.18	0.7537
60% - 70%	91723.0	67.44	65496.0	48.16	92009.6	67.65	0.8030
	91704.0	67.43	65853.0	48.42	91356.2	67.17	0.8017
	91715.9	67.44	65677.1	48.29	91886.0	67.56	0.8031
70% - 80%	102682.1	75.50	65853.9	48.42	106298.4	78.16	0.8394
	102376.2	75.28	65957.6	48.50	105559.9	77.62	0.8454
	102246.7	75.18	65900.9	48.46	105714.7	77.73	0.8443
80% - 90%	116538.8	85.69	65704.2	48.31	120366.5	88.50	0.8741
	116768.4	85.86	65924.2	48.47	120610.9	88.68	0.8682
	115950.6	85.26	65929.5	48.48	120870.6	88.88	0.8741
90%-100%	129846.4	95.48	66634.7	49.00	134537.6	98.92	0.8908
	129899.0	95.51	66445.6	48.86	133524.4	98.18	0.8929
	129893.0	95.51	66553.9	48.94	134273.8	98.73	0.8869

Model: iMars XG136KTR-X							
TABLE_ Reactive power production with set point Q = 0							
Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6919.4	5.09	4430.5	3.26	7392.1	5.44	0.8418
	6936.2	5.10	4275.8	3.14	7462.5	5.49	0.8462
	6942.7	5.10	4386.2	3.23	7507.3	5.52	0.8448
10% - 20%	20445.1	15.03	2642.1	1.94	21147.5	15.55	0.9915
	20475.8	15.06	2584.7	1.90	21004.7	15.44	0.9921
	20399.5	15.00	2486.7	1.83	21264.0	15.64	0.9918
20% - 30%	34110.9	25.08	2618.6	1.93	35075.7	25.79	0.9969
	34275.8	25.20	2549.7	1.87	35134.2	25.83	0.9973
	34371.4	25.27	2641.8	1.94	34976.5	25.72	0.9974
30% - 40%	47624.4	35.02	2621.6	1.93	48899.6	35.96	0.9984
	47372.8	34.83	2583.4	1.90	49675.3	36.53	0.9982
	47428.5	34.87	2681.8	1.97	49075.1	36.08	0.9984
40% - 50%	61270.3	45.05	2593.1	1.91	62851.6	46.21	0.9991
	61027.5	44.87	2599.0	1.91	63186.3	46.46	0.9992
	61149.6	44.96	2639.3	1.94	62947.8	46.29	0.9990
50% - 60%	74957.1	55.12	2671.2	1.96	76980.3	56.60	0.9994
	74853.8	55.04	2743.8	2.02	76285.7	56.09	0.9991
	74903.5	55.08	2618.5	1.93	76373.6	56.16	0.9992
60% - 70%	88721.8	65.24	2689.2	1.98	91117.5	67.00	0.9995
	88638.5	65.18	2731.8	2.01	90738.6	66.72	0.9994
	88583.9	65.14	2684.9	1.97	91027.8	66.93	0.9992
70% - 80%	102487.1	75.36	2751.8	2.02	105404.2	77.50	0.9996
	102178.4	75.13	2694.3	1.98	105042.7	77.24	0.9994
	102347.8	75.26	2749.6	2.02	105247.3	77.39	0.9995
80% - 90%	116190.8	85.43	2835.9	2.09	119599.0	87.94	0.9997
	115684.3	85.06	2785.4	2.05	119647.3	87.98	0.9996
	116238.4	85.47	2894.3	2.13	118994.2	87.50	0.9994
90%-100%	129924.9	95.53	2460.8	1.81	133844.8	98.42	0.9997
	129368.5	95.12	2375.7	1.75	134175.8	98.66	0.9996
	130037.8	95.62	2471.5	1.82	134026.0	98.55	0.9995

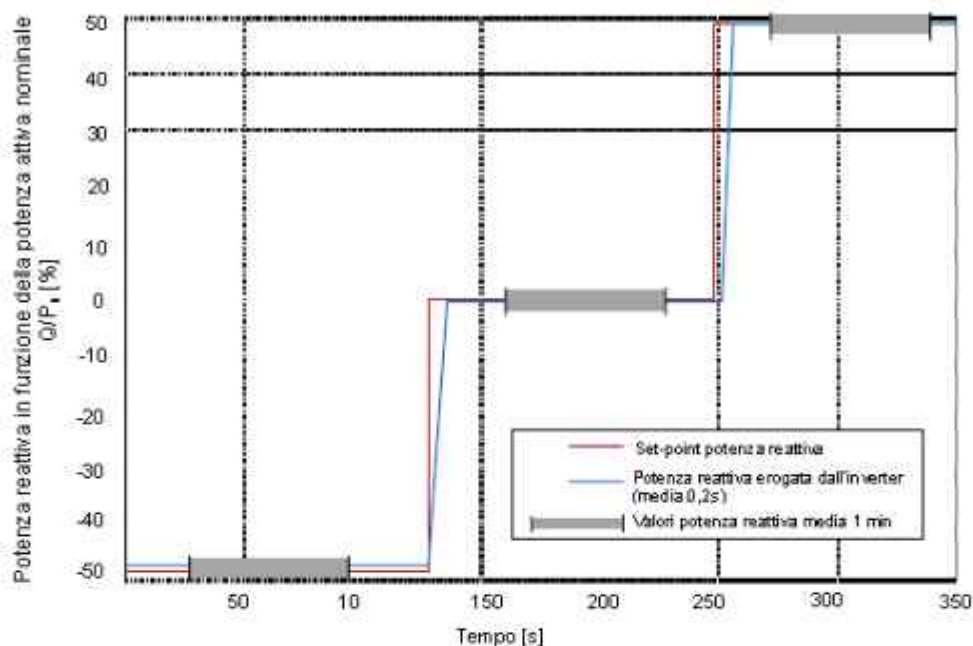
TABLE_ Reactive power production with set point Q = -Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	6830.8	5.02	-65633.0	-48.26	8699.1	6.40	0.1033
	6822.7	5.02	-65594.6	-48.23	8677.8	6.38	0.1027
	6814.0	5.01	-66167.0	-48.65	8690.1	6.39	0.1035
10% - 20%	20401.0	15.00	-65877.6	-48.44	22586.4	16.61	0.2968
	20481.8	15.06	-66119.6	-48.62	22637.4	16.65	0.2949
	20474.3	15.05	-66143.5	-48.63	22580.7	16.60	0.2952
20% - 30%	33872.4	24.91	-66088.6	-48.59	36372.1	26.74	0.4551
	34185.2	25.14	-66459.2	-48.87	36405.7	26.77	0.4583
	34014.0	25.01	-66043.2	-48.56	36437.4	26.79	0.4557
30% - 40%	47553.7	34.97	-66547.0	-48.93	50538.3	37.16	0.5824
	47499.6	34.93	-66344.0	-48.78	50366.3	37.03	0.5859
	47442.4	34.88	-66104.2	-48.61	50579.3	37.19	0.5857
40% - 50%	61034.6	44.88	-66007.4	-48.53	64494.4	47.42	0.6794
	61008.8	44.86	-65853.7	-48.42	64364.9	47.33	0.6811
	61509.3	45.23	-66215.2	-48.69	64642.4	47.53	0.6811
50% - 60%	75019.9	55.16	-66283.0	-48.74	78601.2	57.80	0.7498
	74649.0	54.89	-65826.9	-48.40	78396.0	57.64	0.7507
	74677.2	54.91	-65891.3	-48.45	78217.4	57.51	0.7470
60% - 70%	88915.9	65.38	-66463.7	-48.87	92066.0	67.70	0.8037
	88991.3	65.43	-66182.4	-48.66	92546.6	68.05	0.7993
	88935.4	65.39	-65993.3	-48.52	92495.1	68.01	0.8023
70% - 80%	102651.8	75.48	-66286.7	-48.74	106820.3	78.54	0.8390
	102142.7	75.10	-66085.3	-48.59	107142.0	78.78	0.8367
	102658.0	75.48	-65919.7	-48.47	106518.3	78.32	0.8416
80% - 90%	116434.5	85.61	-66497.9	-48.90	121688.9	89.48	0.8716
	117009.9	86.04	-66015.5	-48.54	121572.4	89.39	0.8723
	116572.9	85.72	-66098.2	-48.60	122016.8	89.72	0.8650
90%-100%	128715.5	94.64	-65675.2	-48.29	133328.3	98.04	0.8891
	128671.1	94.61	-65865.7	-48.43	133947.4	98.49	0.8936
	128821.0	94.72	-65715.7	-48.32	133802.7	98.38	0.8934

TABLE_ Reactive power production with set point Q = +Qmax

Power	Active Power		Reactive Power		DC Power		Power Factor
	W	%Pn	VAr	%Pn	W	%Pn	cosφ
0% - 10%	7049.5	5.18	65721.4	48.32	7858.5	5.78	0.1057
	7023.0	5.16	66239.3	48.71	7923.4	5.83	0.1055
	7022.9	5.16	65668.8	48.29	7902.0	5.81	0.1059
10% - 20%	20659.4	15.19	65977.0	48.51	21766.9	16.01	0.2966
	20496.2	15.07	65879.6	48.44	21796.6	16.03	0.2956
	20564.9	15.12	66416.6	48.84	21754.5	16.00	0.2968
20% - 30%	34177.4	25.13	66051.4	48.57	35483.3	26.09	0.4599
	34329.4	25.24	65967.4	48.51	35559.4	26.15	0.4602
	34346.4	25.25	66081.0	48.59	35714.3	26.26	0.4592
30% - 40%	47718.7	35.09	65840.7	48.41	49663.2	36.52	0.5881
	47725.1	35.09	65946.6	48.49	49333.9	36.27	0.5873
	47595.4	35.00	65717.1	48.32	49342.2	36.28	0.5849
40% - 50%	61682.0	45.35	65477.4	48.15	63742.1	46.87	0.6822
	61518.2	45.23	65915.3	48.47	63553.4	46.73	0.6811
	61726.8	45.39	65897.3	48.45	63344.0	46.58	0.6819
50% - 60%	74792.3	54.99	65804.3	48.39	77397.6	56.91	0.7554
	74815.0	55.01	65844.4	48.42	77597.4	57.06	0.7533
	75243.8	55.33	65397.1	48.09	77750.1	57.17	0.7562
60% - 70%	88739.5	65.25	65390.4	48.08	91956.1	67.61	0.8052
	89246.1	65.62	65438.7	48.12	91575.9	67.34	0.8051
	89266.8	65.64	65468.5	48.14	91783.8	67.49	0.8019
70% - 80%	103194.1	75.88	65713.9	48.32	106642.0	78.41	0.8396
	102900.0	75.66	65291.3	48.01	106472.9	78.29	0.8425
	102227.1	75.17	65489.8	48.15	106018.4	77.95	0.8452
80% - 90%	116918.6	85.97	65412.8	48.10	120663.2	88.72	0.8750
	117070.0	86.08	65488.7	48.15	121223.7	89.14	0.8695
	117030.9	86.05	65457.1	48.13	120306.2	88.46	0.8673
90%-100%	129597.1	95.29	66636.0	49.00	134350.5	98.79	0.8918
	130096.8	95.66	66596.2	48.97	133789.7	98.37	0.8940
	129405.8	95.15	66107.9	48.61	133449.7	98.12	0.8869

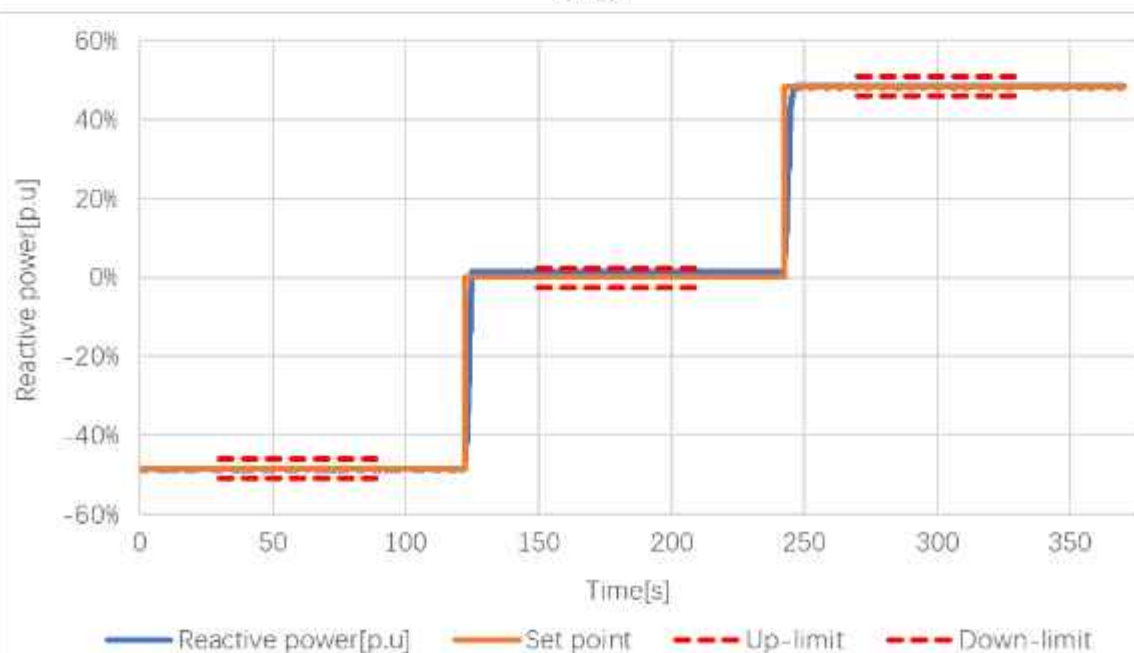
B.1.2.3 Table: Reactive power exchange at a given level **P**



Model: iMars XG110KTR

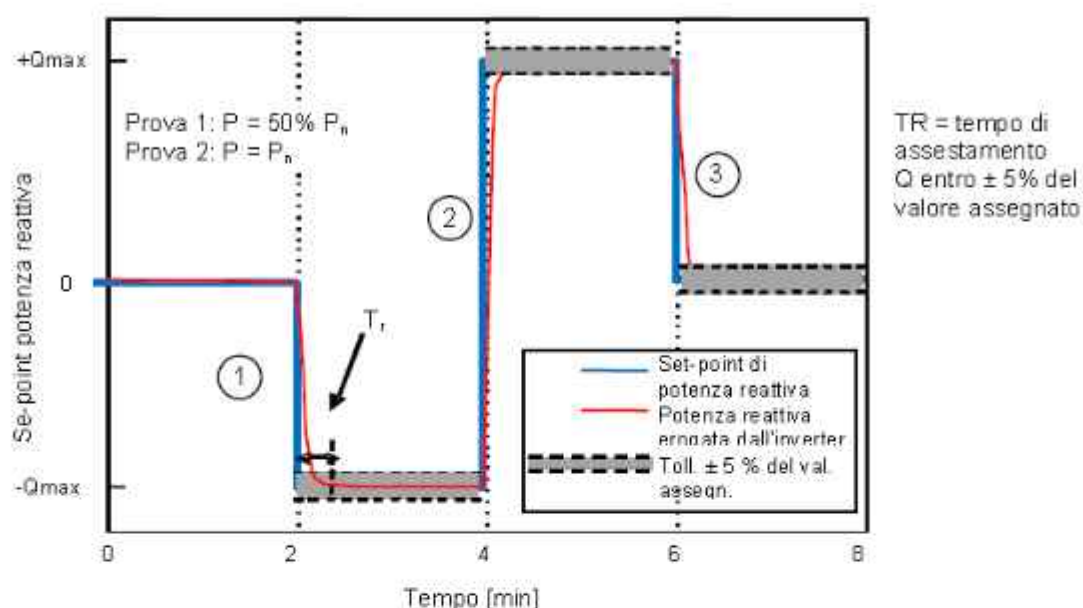
50% P_n	Set point Reactive power Q/P_n [%]	Reactive power measured Q/P_n [%]	Deviation from set point $\Delta Q/P_n$ [%]	Limit [%]
-Qmin	-48.43	-48.76	-0.33	$\Delta Q \leq \pm 2.5\% P_n$
0	0	1.99	1.99	$\Delta Q \leq \pm 2.5\% P_n$
+Qmax	+ 48.43	48.95	0.52	$\Delta Q \leq \pm 2.5\% P_n$

Graph



B.1.2.4 Table: Response time to an assigned step level change

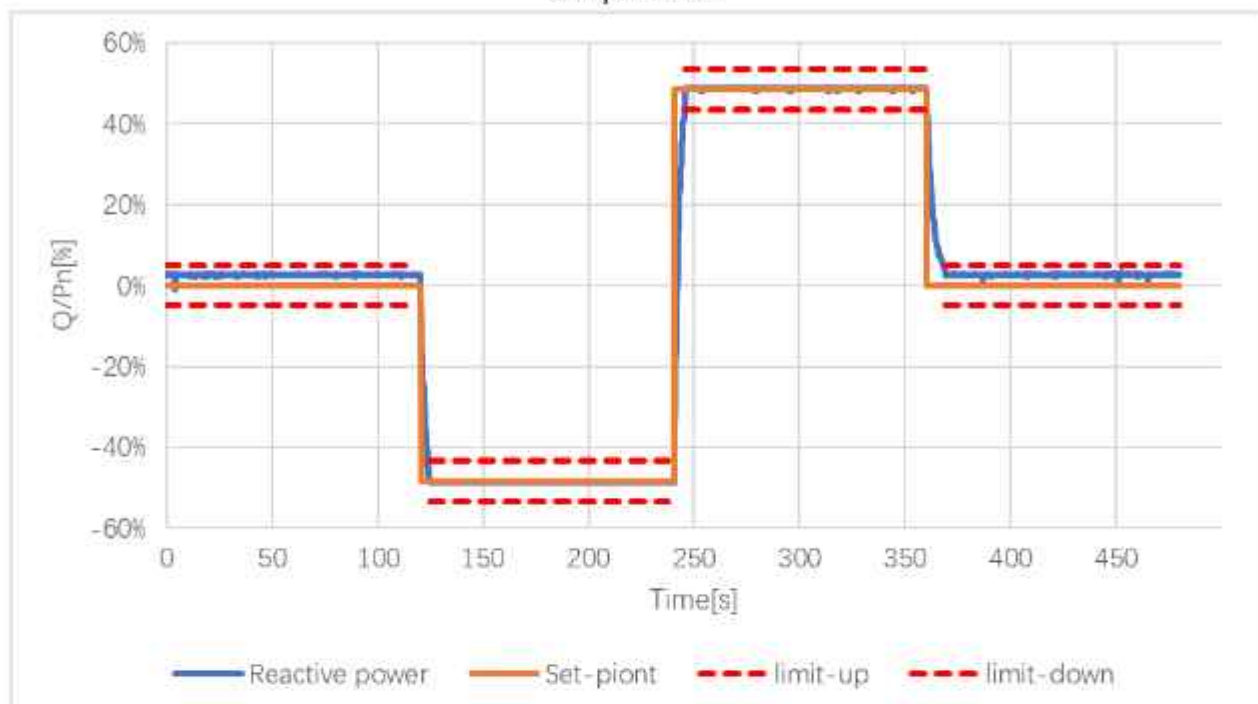
P



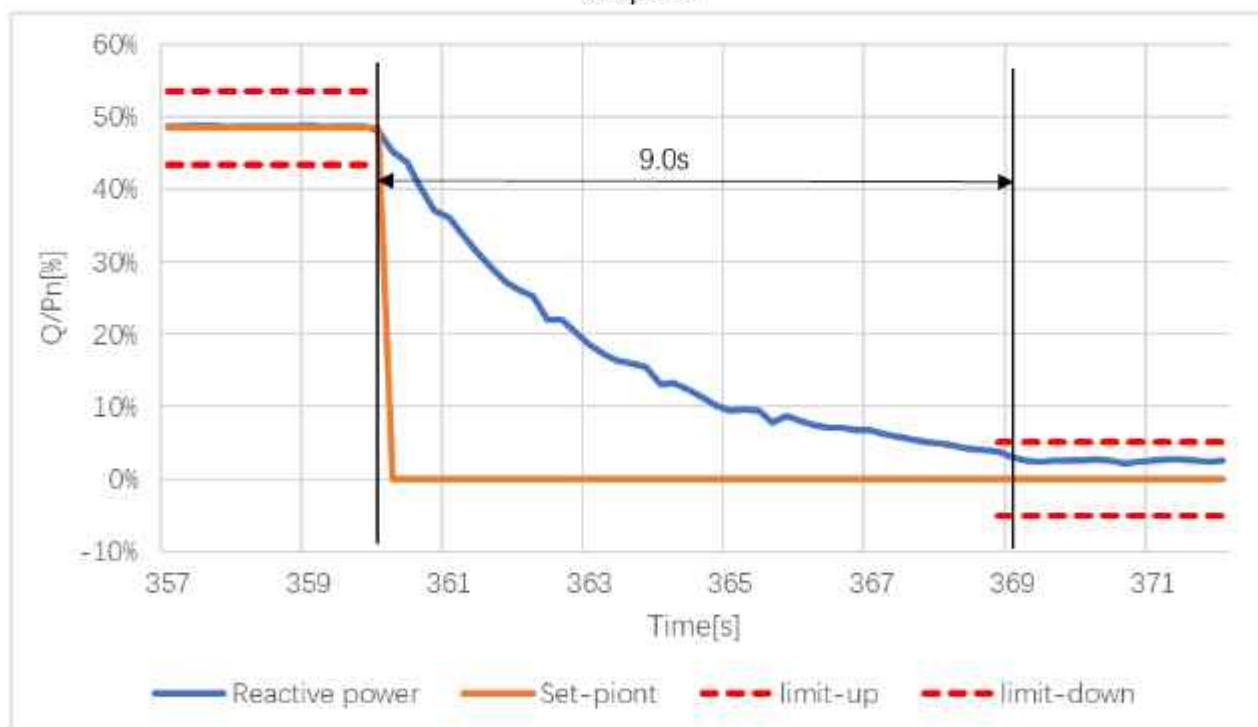
Model: iMars XG110KTR

Test 1			Test 2			
Output power [%]	Qmax ind [VA]	Qmax cap [VA]	Output power [%]	Qmax ind [VA]	Qmax cap [VA]	
100% Pn	-53365.0	53551.1	50% Pn	-53362.0	53546.2	
Test 1 (see Graph 1): 100%Pn						
Point	Output power	transient	Vac	QE60 [VA]	Tr [s]	limit [s]
1	110230.7	0 → Qmax ind	230.7	-53365.0	4.8	10
2	109040.5	Qmax ind → Qmax cap	230.7	53551.1	5.4	10
3	110408.3	Qmax cap → 0	230.7	2836.8	9.0	10
Test 2 (see Graph 2): 50% Pn						
Point	Output power	transient	Vac	QE60 [VA]	Tr [s]	limit [s]
1	55947.3	0 → Qmax ind	230.2	-53362.0	4.8	10
2	56093.4	Qmax ind → Qmax cap	230.1	53546.2	6.4	10
3	56082.6	Qmax cap → 0	230.2	2217.2	7.6	10

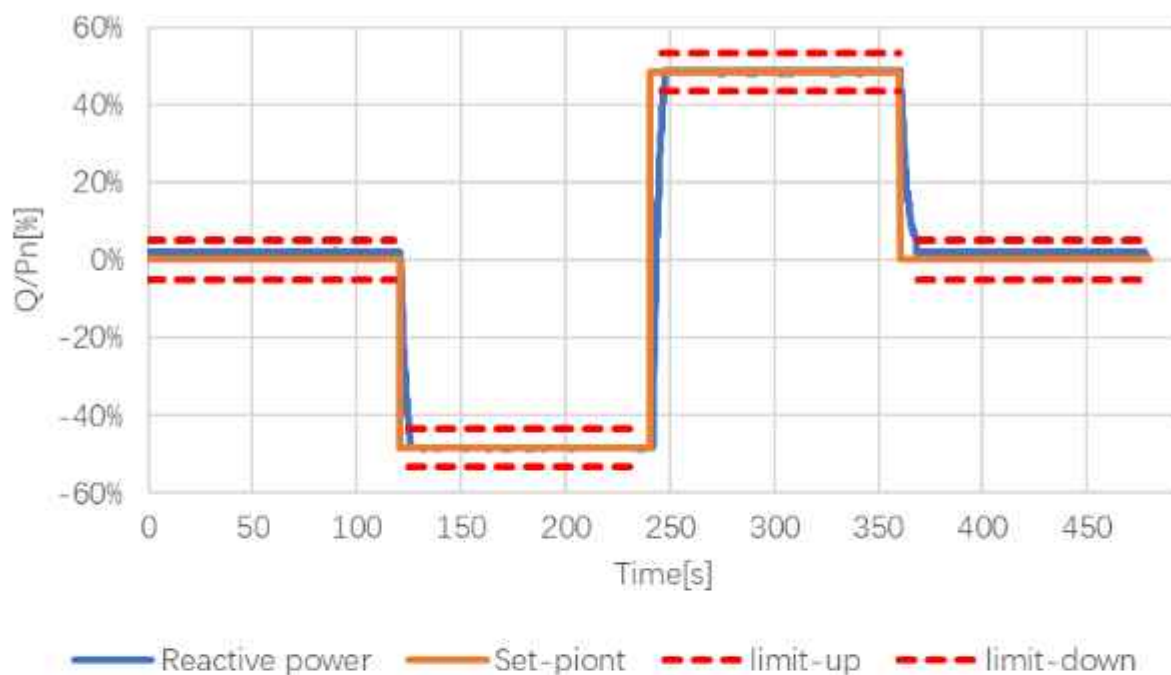
Graph-Test 1



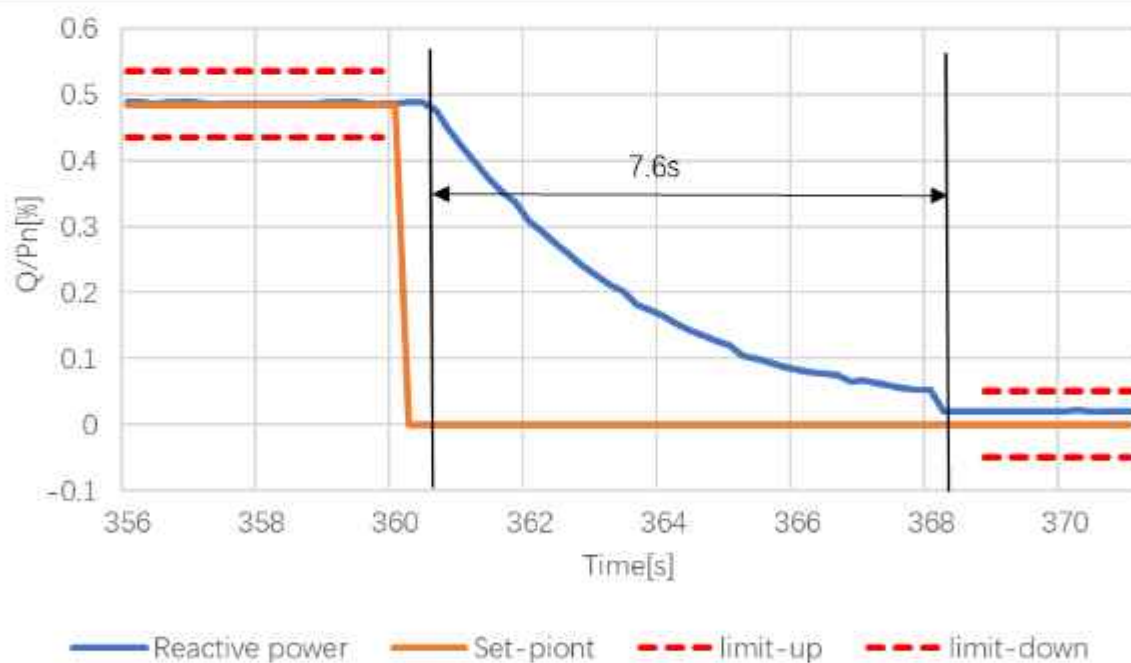
Graph-Tr



Graph -Test 2



Graph-Tr



B.1.2.5	Table: Automatic supply of reactive power according to a characteristic curve $\cos\phi = f(P)$	P
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Model: iMars XG110KTR

Max. cos declared..... : cos : 0.9

Set value..... :
Lock-in: 1.05 Vn
(Vn and 1.1 Vn with steps of 0.01)
Lock-out: 230 V
(0.9 Vn and Vn with steps of 0.01)

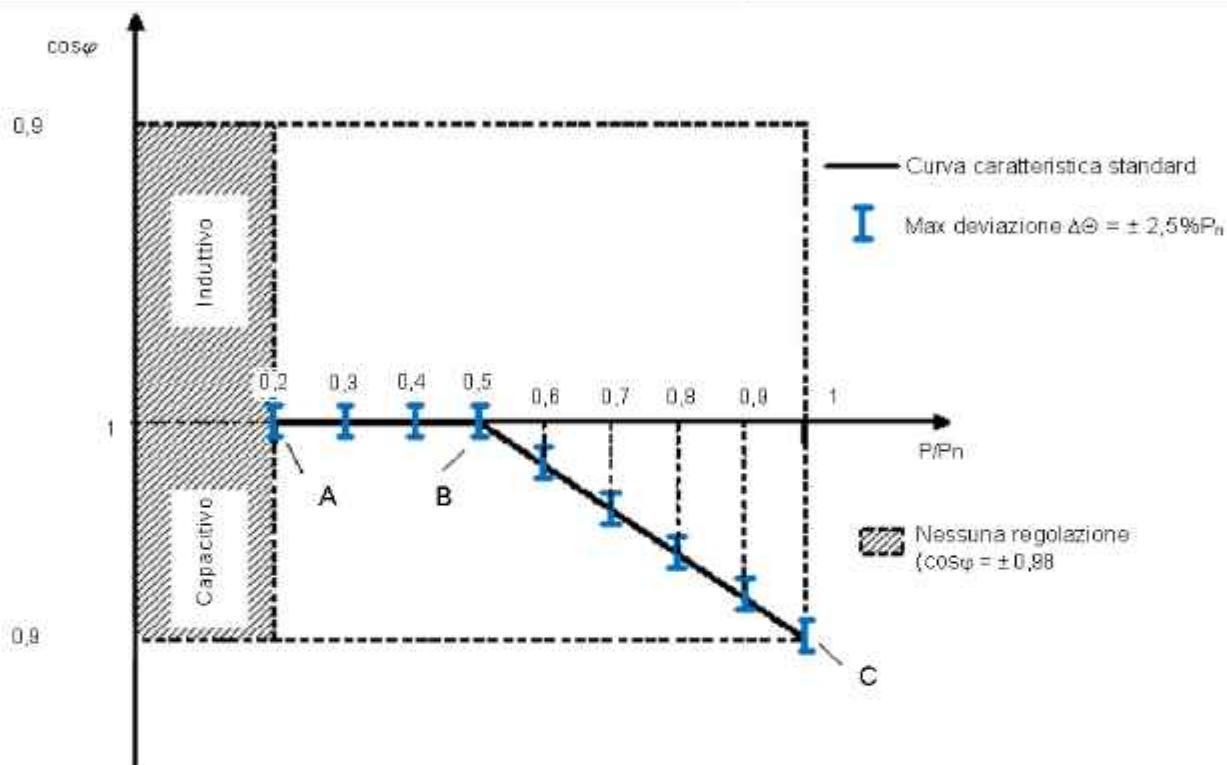
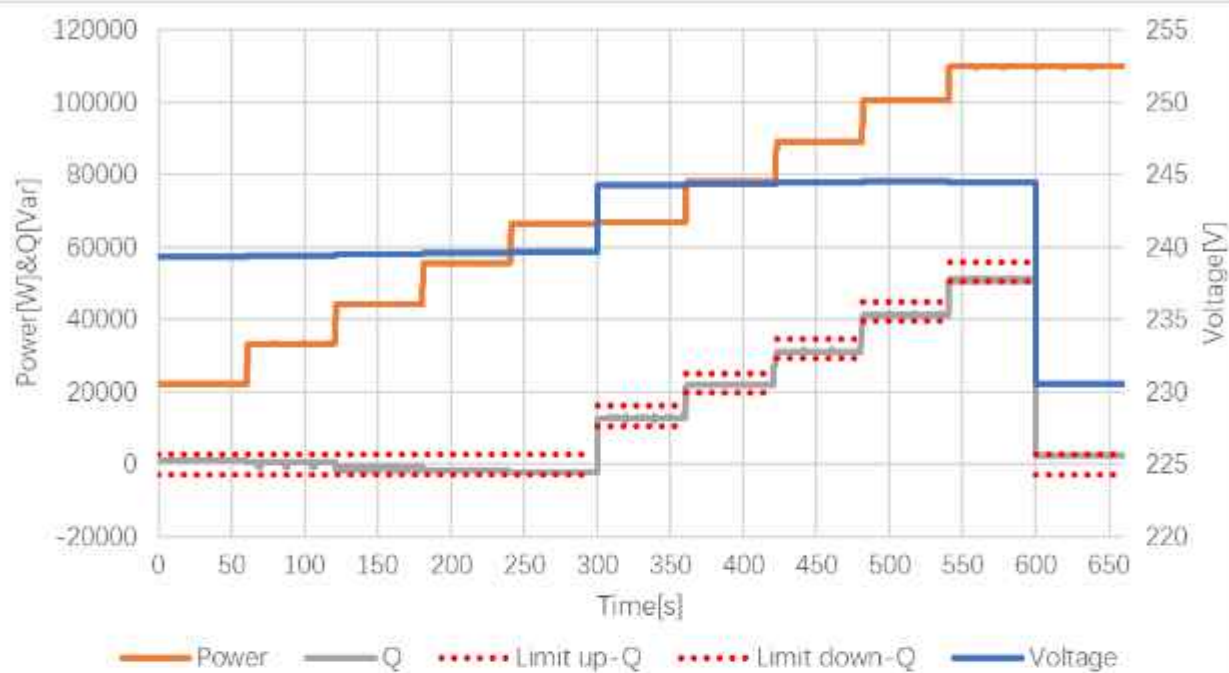


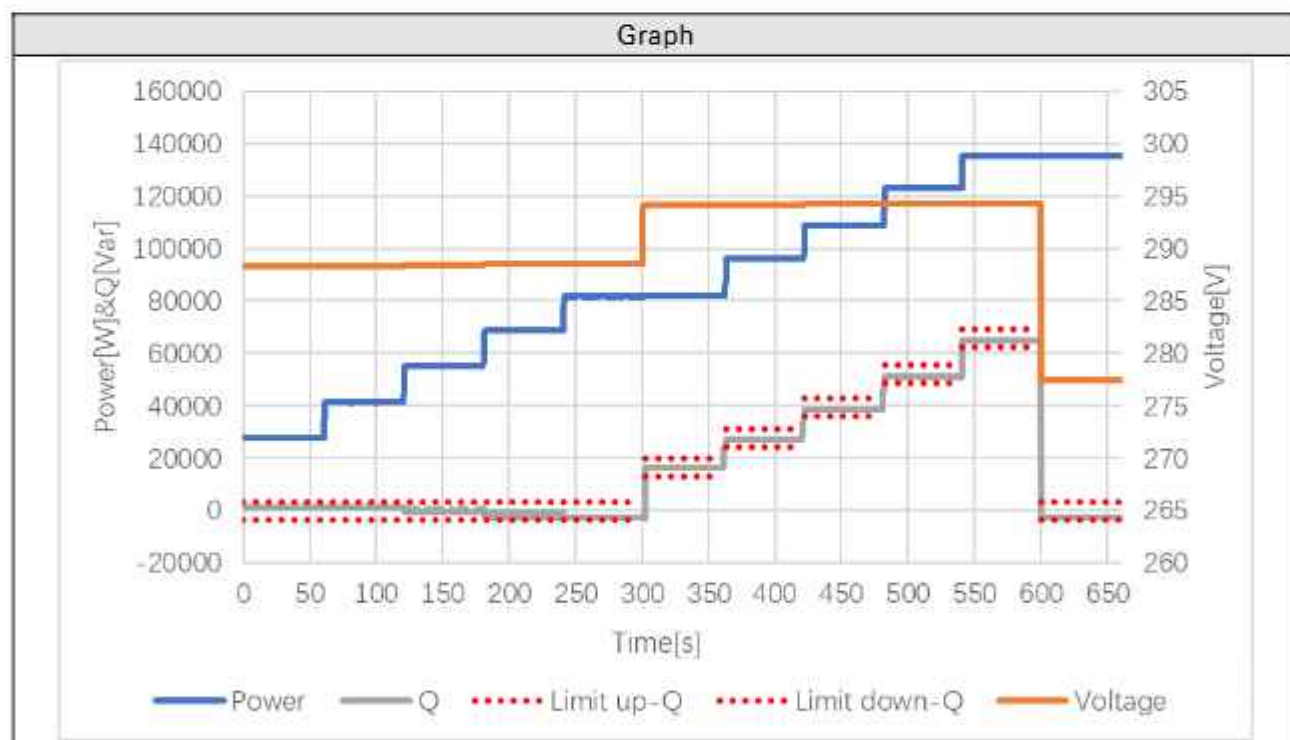
Figura 27 – Curva caratteristica standard $\cos\phi = f(P)$

P/Pn (%)	P (W)	Voltage(V)	Q (Var)	Measured cos φ	Desired cos φ	Δ Q	Limit
20%	22102.41	239.35	887.01	0.9939	1	887.01	±2.5%Pn
30%	33314.03	239.43	622.19	0.9983	1	622.19	±2.5%Pn
40%	44138.72	239.50	-994.90	0.9991	1	-994.90	±2.5%Pn
50%	55345.48	239.57	-1928.85	0.9994	1	-1928.85	±2.5%Pn
60%	66541.74	239.66	-2070.29	0.9995	1	-2070.29	±2.5%Pn
60%	66800.04	244.28	12875.05	0.9818	0.98	-526.95	±2.5%Pn
70%	77994.06	244.35	21916.88	0.9626	0.96	-541.12	±2.5%Pn
80%	89140.46	244.43	31177.26	0.9439	0.94	-761.74	±2.5%Pn
90%	100369.70	244.50	41195.71	0.9251	0.92	-977.29	±2.5%Pn
100%	109937.10	244.42	51061.09	0.9069	0.9	-2213.91	±2.5%Pn
100%	109920.70	230.53	2293.99	0.9987	1	2293.99	±2.5%Pn

Graph



Model: iMars XG136KTR-L							
Max. cos declared.....:					cos : 0.9		
Set value.....:					Lock-in: 1.05 Vn (Vn and 1.1 Vn with steps of 0.01)		
					Lock-out: 277 V (0.9 Vn and Vn with steps of 0.01)		
P/Pn (%)	P (W)	Voltage(V)	Q (Var)	Measured cos ϕ	Desired cos ϕ	ΔQ	Limit
20%	27438.5	288.2	1240.9	0.9928	1	1240.9	$\pm 2.5\%P_n$
30%	41121.6	288.3	1029.4	0.9978	1	1029.4	$\pm 2.5\%P_n$
40%	54891.1	288.4	-619.5	0.9989	1	-619.5	$\pm 2.5\%P_n$
50%	68680.6	288.4	-1960.4	0.9993	1	-1960.4	$\pm 2.5\%P_n$
60%	81682.3	288.5	-2608.2	0.9995	1	-2608.2	$\pm 2.5\%P_n$
60%	81984.1	294.1	16388.5	0.9805	0.98	-181.5	$\pm 2.5\%P_n$
70%	95914.7	294.2	27311.3	0.9617	0.96	-454.7	$\pm 2.5\%P_n$
80%	108858.7	294.2	38602.2	0.9424	0.94	-885.8	$\pm 2.5\%P_n$
90%	123044.1	294.3	50937.3	0.9239	0.92	-1203.7	$\pm 2.5\%P_n$
100%	135275.4	294.3	64895.5	0.9016	0.9	-971.5	$\pm 2.5\%P_n$
100%	135753.7	277.2	-2845.3	0.9994	1	-2845.3	$\pm 2.5\%P_n$



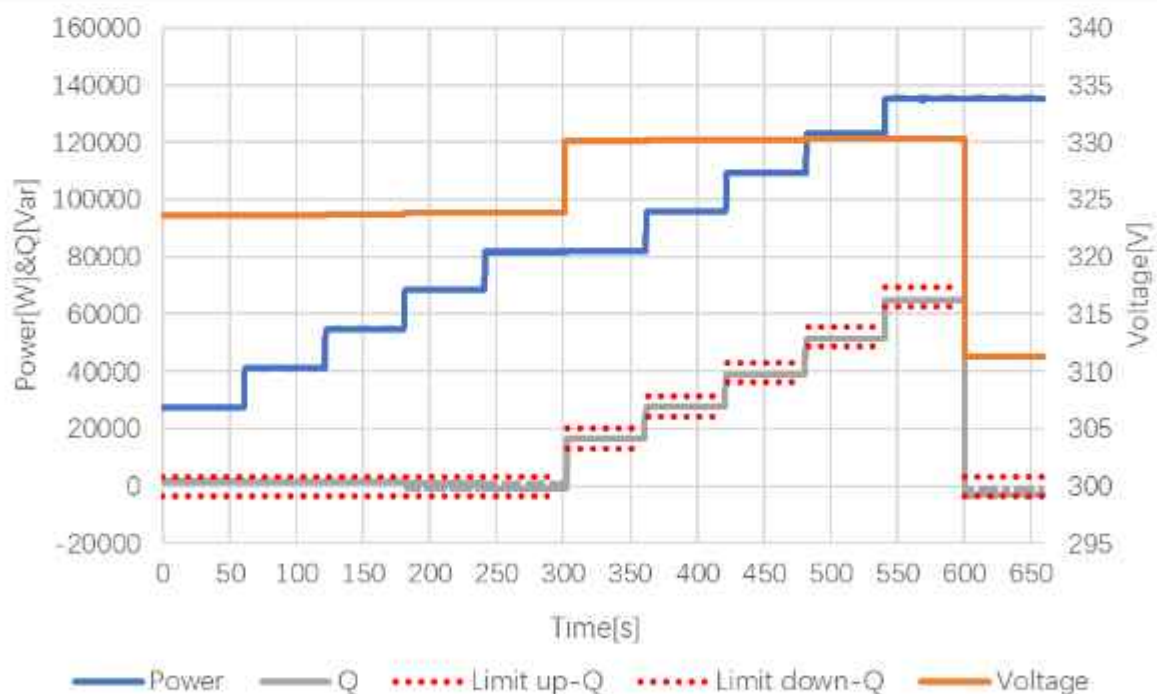
Model: iMars XG136KTR-X

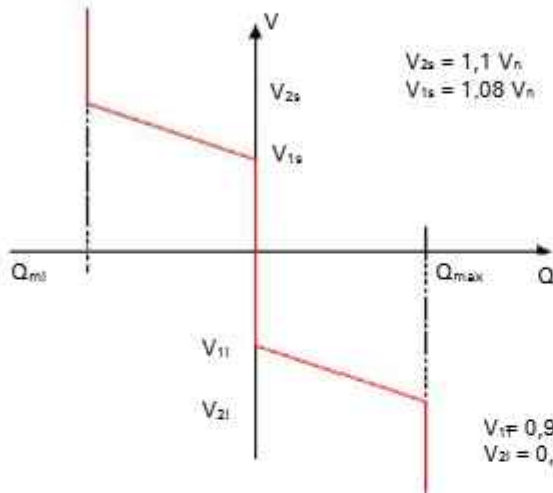
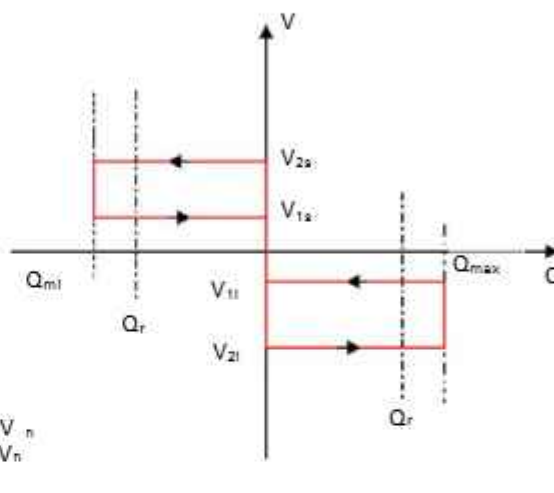
Max. cos declared..... : cos : 0.9

Set value..... : Lock-in: 1.05 Vn
(Vn and 1.1 Vn with steps of 0.01)
Lock-out: 311 V
(0.9 Vn and Vn with steps of 0.01)

P/Pn (%)	P (W)	Voltage(V)	Q (Var)	Measured cos ϕ	Desired cos ϕ	ΔQ	Limit
20%	27245.9	323.6	1681.2	0.9898	1	1681.2	$\pm 2.5\%P_n$
30%	40988.2	323.6	1368.6	0.9963	1	1368.6	$\pm 2.5\%P_n$
40%	54795.2	323.7	1216.9	0.9983	1	1216.9	$\pm 2.5\%P_n$
50%	68576.4	323.8	923.9	0.9990	1	923.9	$\pm 2.5\%P_n$
60%	81660.6	323.8	-701.6	0.9993	1	-701.6	$\pm 2.5\%P_n$
60%	81942.5	330.0	16292.2	0.9801	0.98	-277.8	$\pm 2.5\%P_n$
70%	95819.1	330.2	27740.6	0.9605	0.96	-25.4	$\pm 2.5\%P_n$
80%	109169.9	330.2	39166.5	0.9412	0.94	-321.5	$\pm 2.5\%P_n$
90%	122883.6	330.3	51360.4	0.9226	0.92	-780.6	$\pm 2.5\%P_n$
100%	135275.7	330.3	64894.9	0.9016	0.9	-972.1	$\pm 2.5\%P_n$
100%	135737.5	311.3	-2875.2	0.9996	1	-2875.2	$\pm 2.5\%P_n$

Graph



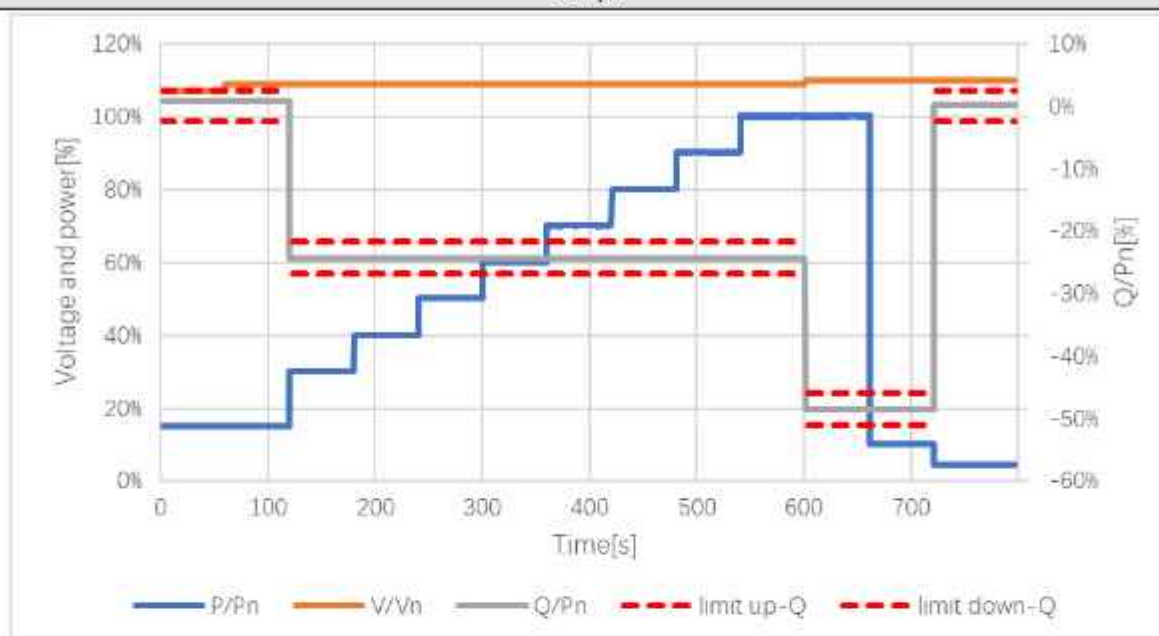
B.1.2.6	Table: Automatic exchange of reactive power according to a characteristic curve $Q=f(V)$	P
Sampling:	Measure the active and reactive power as a 0.2 s average	
Set value:	Lock in: 0.2Pn (default value: 0.2Pn) (0.1Pn and Pn with steps of 0.1 Pn) Lock-out: 0.05Pn	
 $V_{2s} = 1,1 V_n$ $V_{1s} = 1,08 V_n$ $V_{1i} = 0,92 V_n$ $V_{2i} = 0,9 V_n$  $V_{2s} = 1,1 V_n$ $V_{1s} = 1,08 V_n$ $V_{1i} = 0,92 V_n$ $V_{2i} = 0,9 V_n$		
Curve settings: $V_{1s} = 1,08V_n$; $V_{2s} = 1,1V_n$; $V_{1i} = 0,92V_n$; $V_{2i} = 0,9V_n$ (V_{1i} , V_{2i} , V_{1s} and V_{2s} must be programmable in a range 0,9-1,1 Vn with steps 0,01Vn,)		
V1i, V2i, V1s and V2s programmable value:		Range: 0,9 to 1,1Vn Step: 0,01Vn V1i, V2i: 0- Q_{max} adjustable V1s, V2s: 0- Q_{min} adjustable

Model: iMars XG110KTR

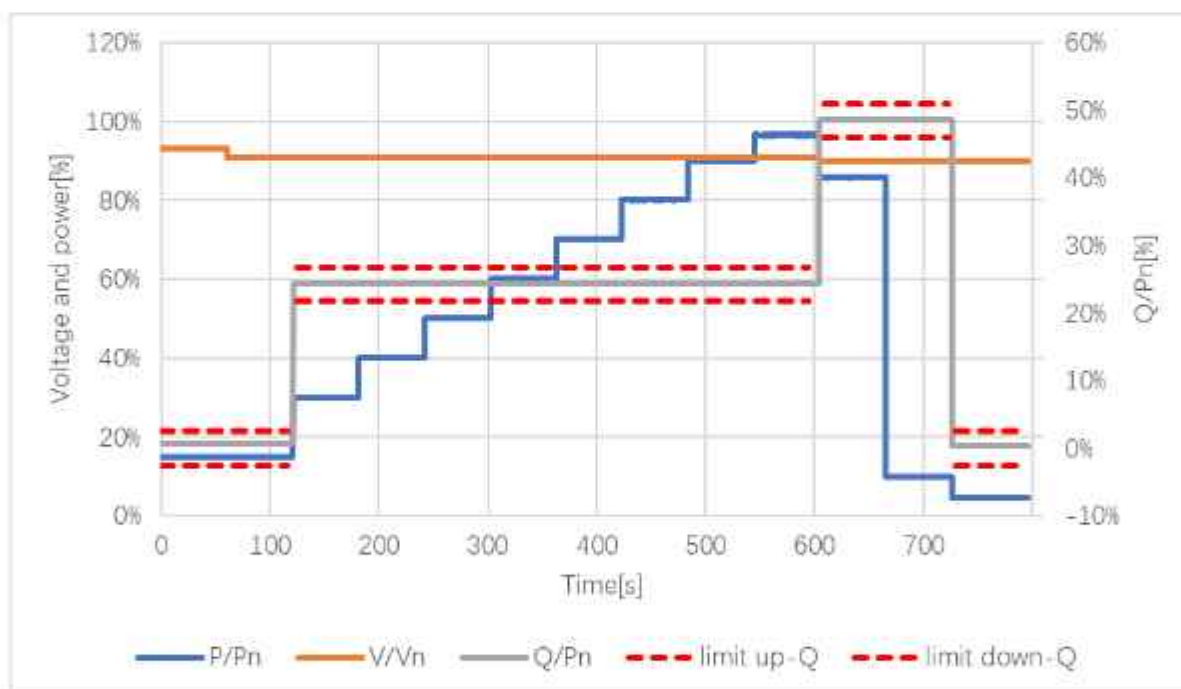
P/P _n [%] Set-point	Vac [V] Set-point	P/P _n [%] Measured	Vac [V] Measured	Q/P _n [%]	Q [Var] expected	ΔQ ($\leq \pm 2,5 \% P_n$)
< 20 %	1.07V _n	15.02	246.1	0.77	≈ 0 (< $\pm 2,5 \% P_n$)	0.77
< 20 %	1.09V _n	15.02	250.7	0.77	≈ 0 (< $\pm 2,5 \% P_n$)	0.77
<20 % → 30 %	1.09V _n	30.04	250.7	-24.30	-0,5 Q _{min} (within 10sec)	-0.085
40 %	1.09V _n	40.06	250.7	-24.30	-0,5 Q _{min}	-0.085
50 %	1.09V _n	50.06	250.7	-24.30	-0,5 Q _{min}	-0.085
60 %	1.09V _n	60.11	250.7	-24.30	-0,5 Q _{min}	-0.085
70 %	1.09V _n	70.09	250.7	-24.30	-0,5 Q _{min}	-0.085
80 %	1.09V _n	80.10	250.7	-24.30	-0,5 Q _{min}	-0.085
90 %	1.09V _n	90.12	250.7	-24.30	-0,5 Q _{min}	-0.085
100 %	1.09V _n	100.28	250.7	-24.30	-0,5 Q _{min}	-0.085
100 %	1.1V _n	100.28	253.0	-48.59	-Q _{min}	-0.16
100 % → 10 %	1.1V _n	10.02	253.0	-48.59	-Q _{min}	-0.16
10 % → $\leq 5 \%$	1.1V _n	4.51	253.0	0.31	≈ 0 (< $\pm 2,5 \% P_n$)	0.31

P/P _n [%] Set-point	Vac [V] Set-point	P/P _n [%] measured	Vac [V] Measured	Q/P _n [%]	Q [Var] expected	ΔQ ($\leq \pm 2,5 \% P_n$)
< 20 %	0.93V _n	15.02	213.9	0.77	≈ 0 (< $\pm 2,5 \% P_n$)	0.77
< 20 %	0.91V _n	15.02	209.3	0.77	≈ 0 (< $\pm 2,5 \% P_n$)	0.77
<20 % → 30 %	0.91V _n	30.04	209.3	24.30	0,5 Q _{max} (within 10sec)	0.085
40 %	0.91V _n	40.06	209.3	24.30	0,5 Q _{max}	0.085
50 %	0.91V _n	50.06	209.3	24.30	0,5 Q _{max}	0.085
60 %	0.91V _n	60.11	209.3	24.30	0,5 Q _{max}	0.085
70 %	0.91V _n	70.09	209.3	24.30	0,5 Q _{max}	0.085
80 %	0.91V _n	80.10	209.3	24.30	0,5 Q _{max}	0.085
90 %	0.91V _n	90.12	209.3	24.30	0,5 Q _{max}	0.085
100 %	0.91V _n	96.70	209.3	24.30	0,5 Q _{max}	0.085
100 %	0.90V _n	85.80	207.0	48.59	Q _{max}	0.16
100 % → 10 %	0.90V _n	10.02	207.0	48.59	Q _{max}	0.16
10 % → $\leq 5 \%$	0.90V _n	4.51	207.0	0.31	≈ 0 (< $\pm 2,5 \% P_n$)	0.31

Graph



$V1s = 1,08Vn$; $V2s = 1,1Vn$

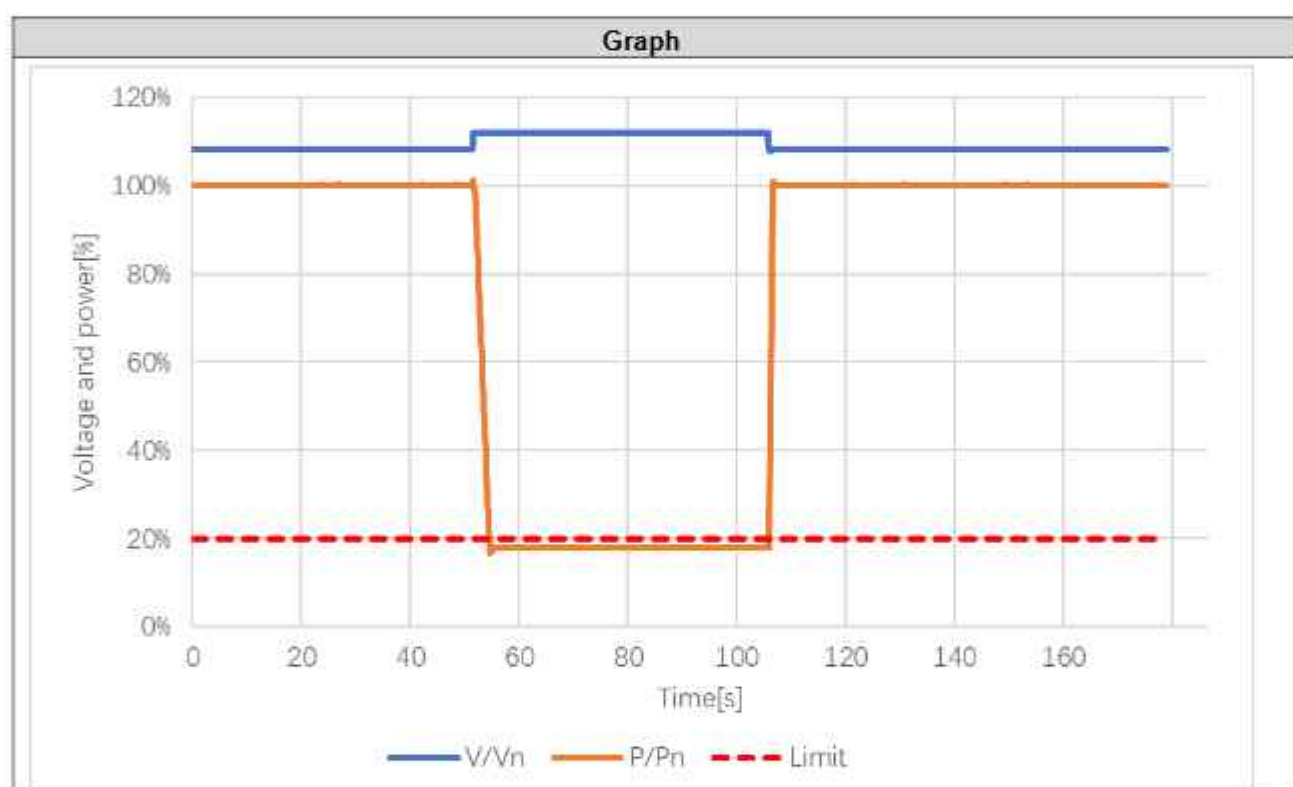


$V1i = 0,92Vn$; $V2i = 0,9Vn$

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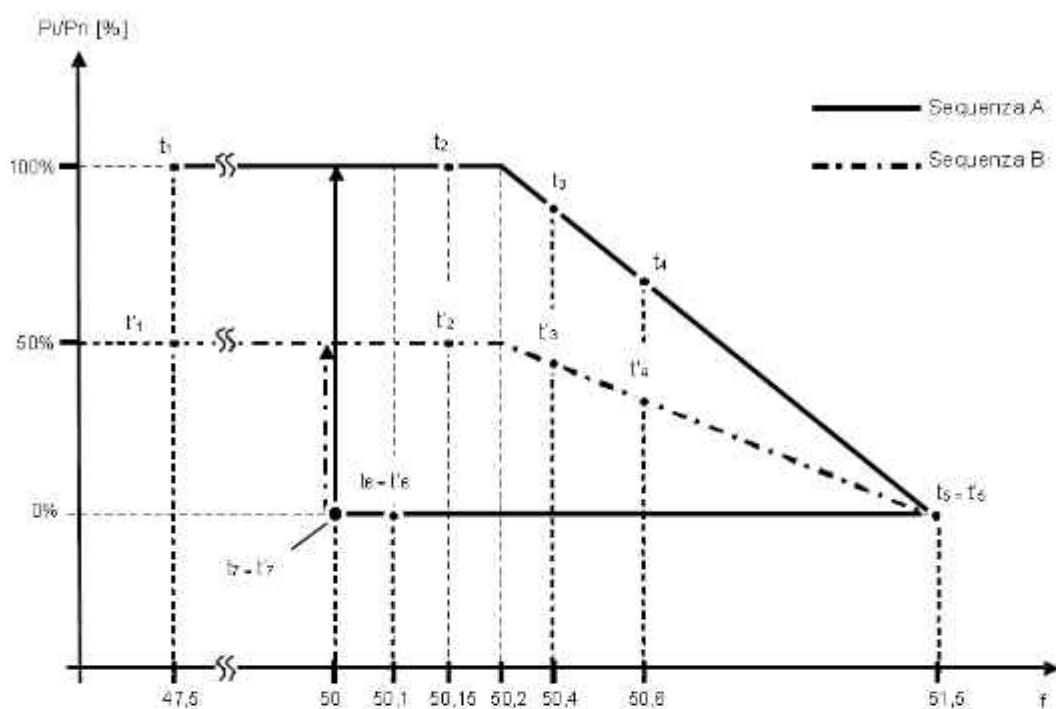
Report No.: 220510017020-001

B.1.3.1	Table: Automatic limitation of active power for voltage values close to 110% of the rated voltage					P
Model: iMars XG110KTR						
Step #	Set voltage value [V/Vn]	Voltage [V/Vn]	Measured power values [W]	Measured power [%]	Limit	RESULT
1	1,08	1.08	110072.3	100.06	--	PASS
2	1,12	1.12	19577.2	17.80	$P < 20\%P_n$	PASS
3	1,08	1.08	110095.5	100.08	--	PASS



B.1.3.2	Table: Adjustment of the active power in the presence of overfrequency transients on the transmission network	P
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Activation settings.....	Settable delay from 0s to 1s with step of 50ms (default value: no intentional delay)
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Model: iMars XG110KTR

EUT working at 100% of nominal power, over frequency

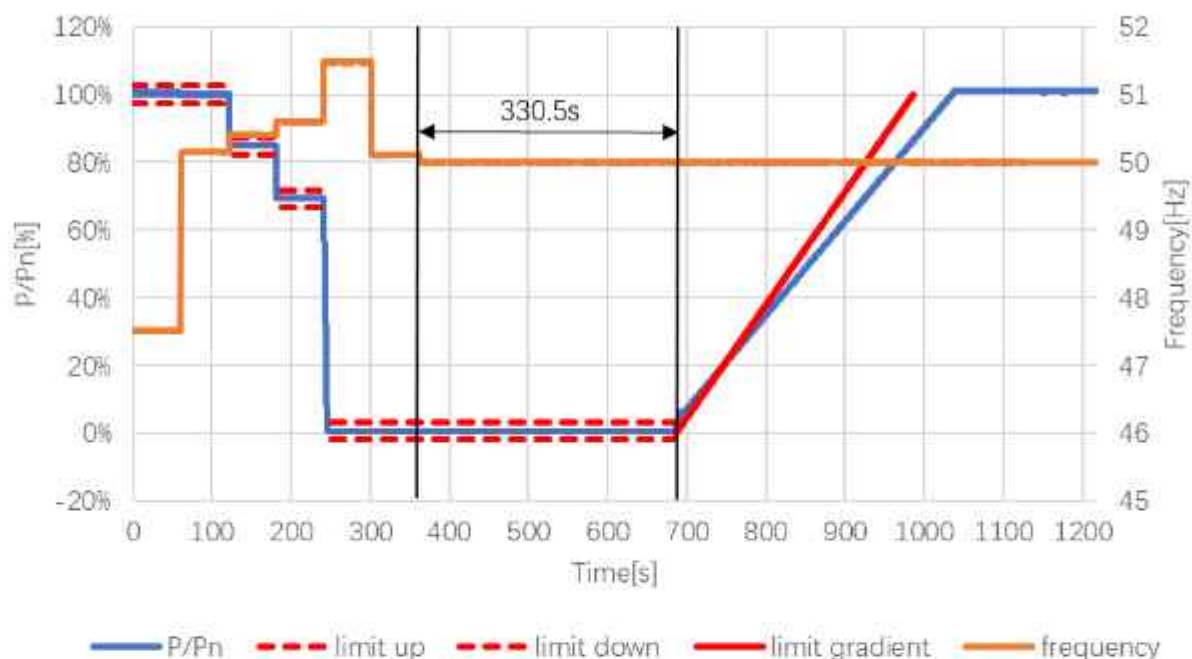
Set Frequency (Hz)	Measured Frequency (Hz)	Active Power desired (%P _n)	Active Power measured (%P _n)	Deviation (%P _n)	Limit (%P _n)
47.51Hz±0.01Hz	47.51	100	100.58	0.58	± 2.5
50.15Hz±0.01Hz	50.15	100	100.19	0.19	± 2.5
50.40Hz±0.01Hz	50.40	84.62	84.92	0.30	± 2.5
50.60Hz±0.01Hz	50.60	69.23	69.43	0.20	± 2.5
51.49Hz±0.01Hz	51.49	0.77	0.63	-0.14	± 2.5
50.11Hz±0.01Hz	50.11	0.77	0.63	-0.14	± 2.5
50.00Hz±0.01Hz	50.00	100	101.15	1.15	± 2.5

Delay to reconnection Desired (s)	Delay to reconnection Measured (s)	Decrease of Active Power Desired %*Pref/min	Increase of Active Power Measured %*Pref/min
≥300	330.5	≤20%	17.24

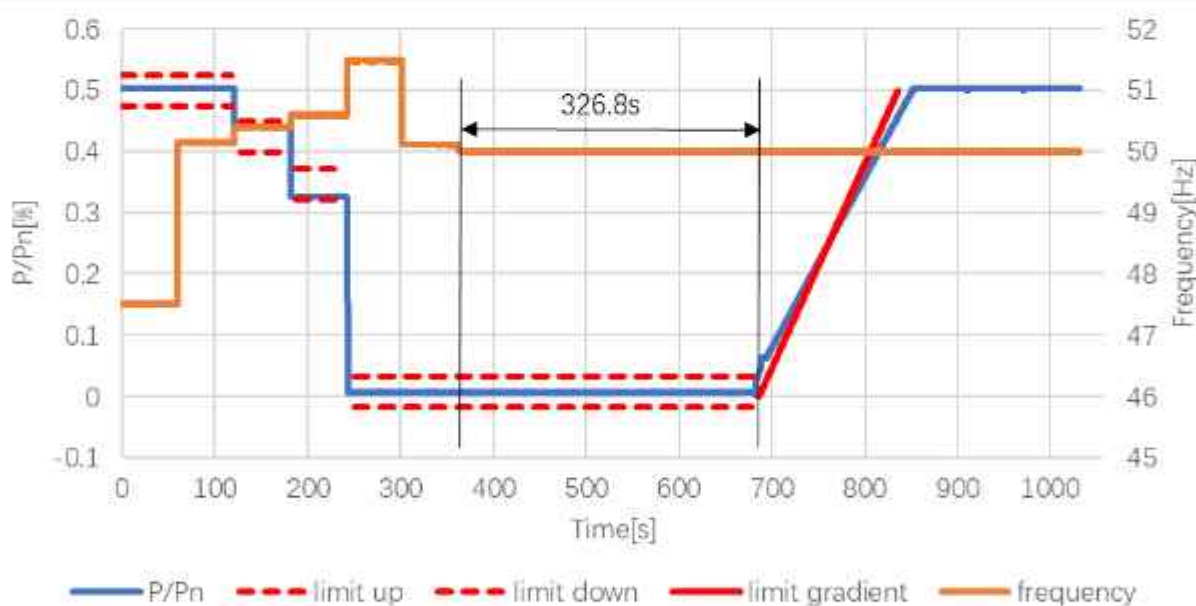
EUT working at 50% of nominal power, over frequency					
Set Frequency (Hz)	Measured Frequency (Hz)	Active Power desired (%P _n)	Active Power measured (%P _n)	Deviation (%P _n)	Limit (%P _n)
47.51Hz±0.01Hz	47.51	50	50.31	0.31	± 2.5
50.15Hz±0.01Hz	50.15	50	50.31	0.31	± 2.5
50.40Hz±0.01Hz	50.40	42.31	44.02	1.71	± 2.5
50.60Hz±0.01Hz	50.60	34.61	32.60	-2.01	± 2.5
51.49Hz±0.01Hz	51.49	0.39	0.63	0.24	± 2.5
50.11Hz±0.01Hz	50.12	0.39	0.63	0.24	± 2.5
50.00Hz±0.01Hz	50.00	50	50.30	0.30	± 2.5

Delay to reconnection Desired (s)	Delay to reconnection Measured (s)	Decrease of Active Power Desired %*Pref/min	Increase of Active Power Measured %*Pref/min
≥300	326.8	≤20%	18.05

EUT working at $\approx 100\%$ of nominal power, over frequency



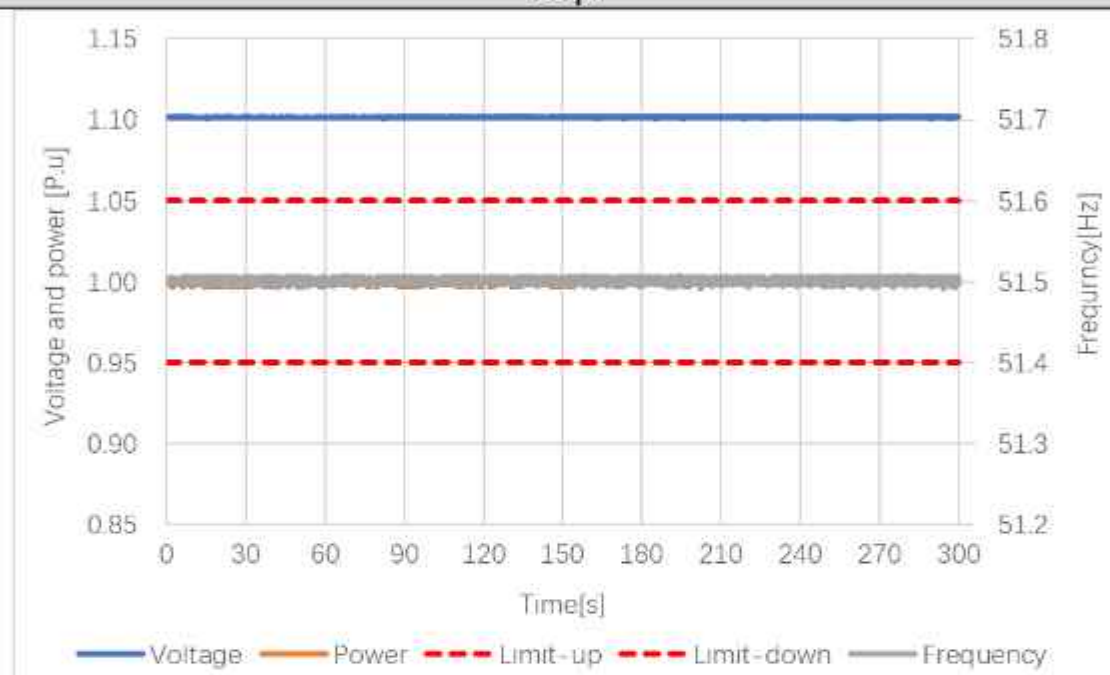
UT working at 50% of nominal power, overfrequency



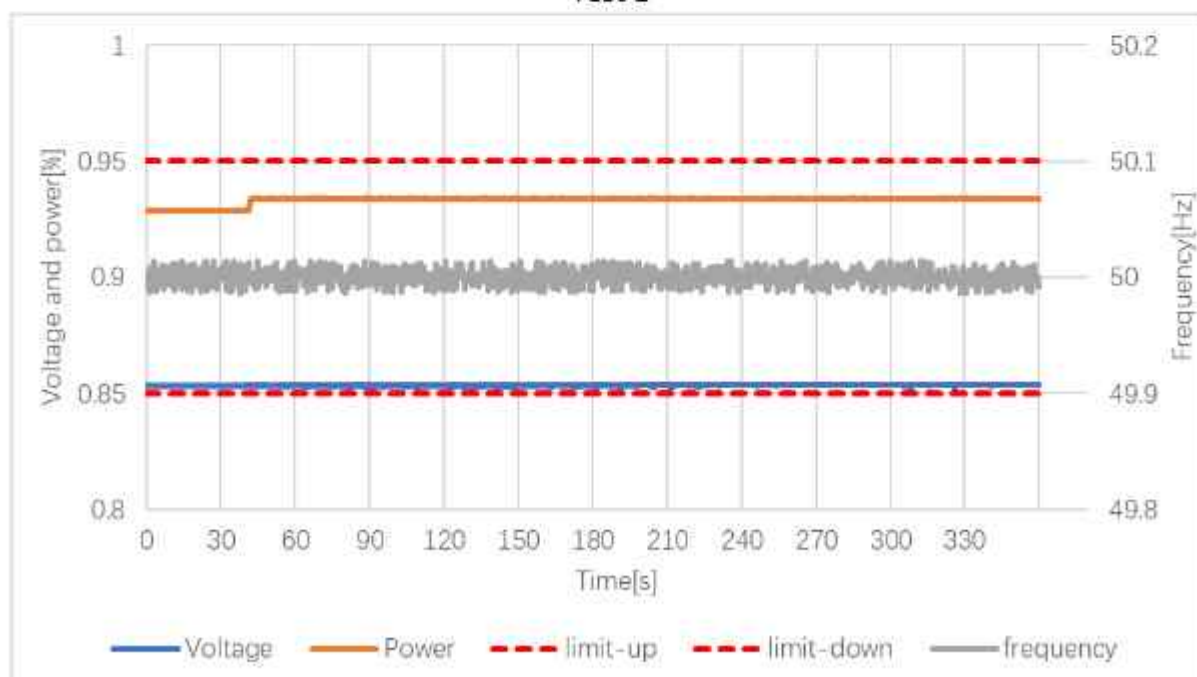
B.1.3.3		Table: Verification of the operating range in voltage and frequency					P
#	Voltage (%)	Frequency (Hz)	P (%)	P meas. (%)	Time (s)	Limit (%Pn)	
Test 1	110	51.5	100	100.28	≥ 5min	± 5	
Test 2	85	50.0	90	93.32	≥ 5min	± 5	

* it is possible to operate at reduced power, equal to the maximum power that can be supplied for the maximum output current Limit ($P \geq 85\% \cdot P_n$).

Graph



Test 1

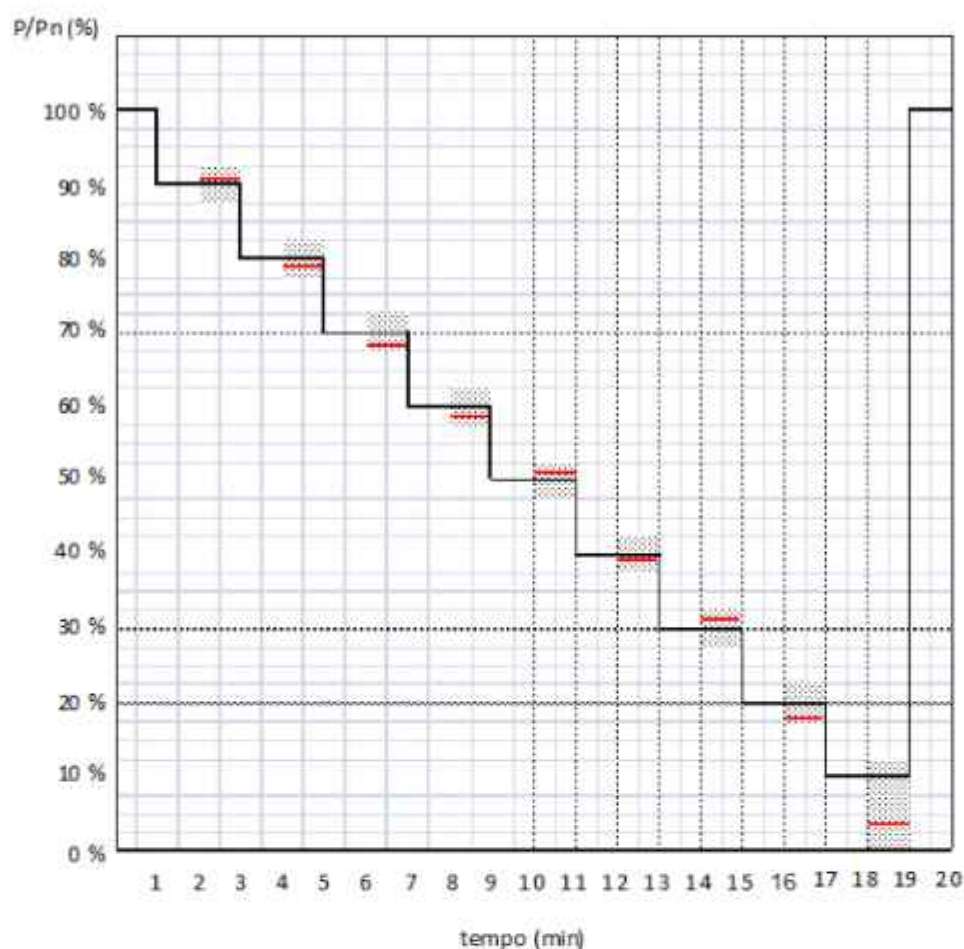


Test 2

B.1.3.4

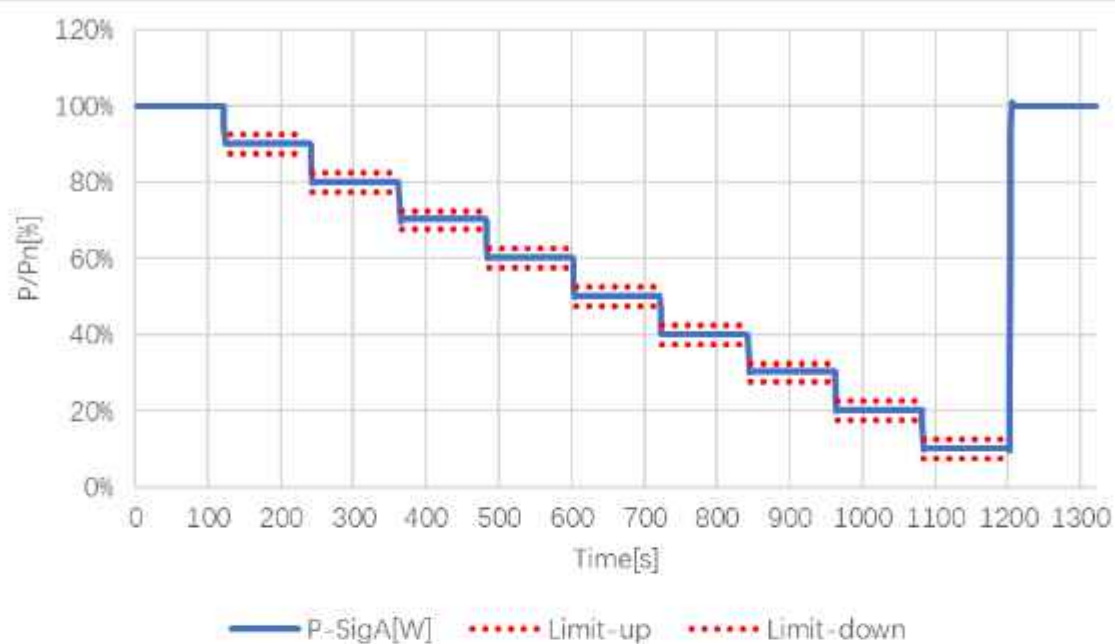
Table: Verification of active power limitation on external command from the Distributor

p

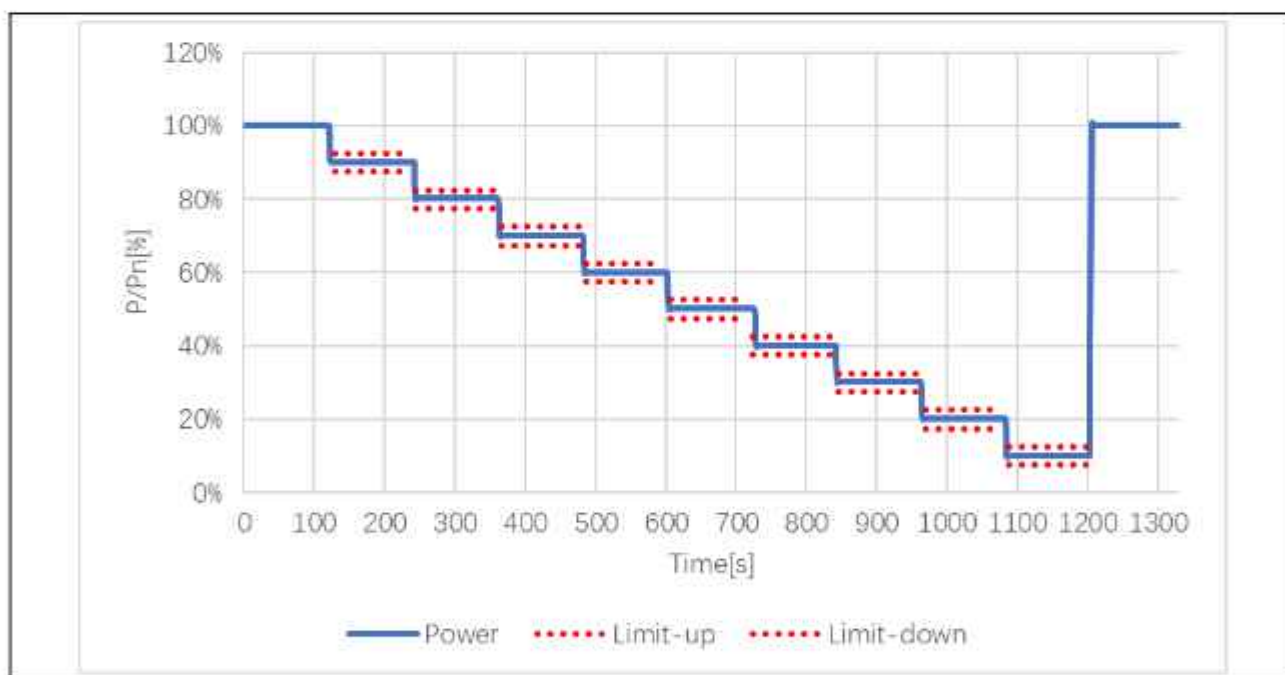


Model: iMars XG110KTR

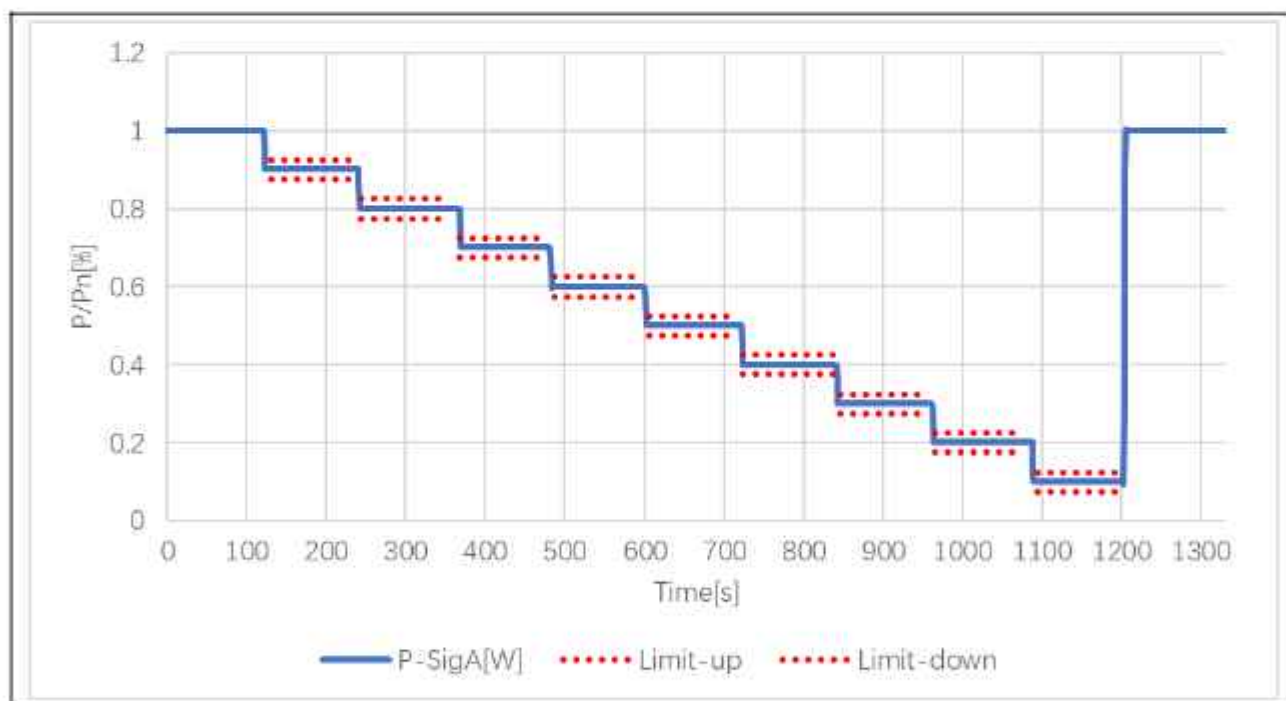
Output Power %	P measured (%)	P set point (%)	Deviation (%)	Limit(%Pn)
100	99.95	100	-0.05	--
90	90.15	90	0.15	±2.5
80	80.21	80	0.21	±2.5
70	70.04	70	0.04	±2.5
60	60.23	60	0.23	±2.5
50	50.11	50	0.11	±2.5
40	39.99	40	-0.01	±2.5
30	30.20	30	0.20	±2.5
20	20.04	20	0.04	±2.5
10	10.25	10	0.25	±2.5
100	100.22	100	0.22	--



Model: iMars XG136KTR-L				
Output Power %	P measured (%)	P set point (%)	Deviation (%)	Limit(%Pn)
100	100.18	100	0.18	--
90	90.17	90	0.17	±2.5
80	80.14	80	0.14	±2.5
70	70.11	70	0.11	±2.5
60	60.09	60	0.09	±2.5
50	50.18	50	0.18	±2.5
40	40.04	40	0.04	±2.5
30	30.13	30	0.13	±2.5
20	20.19	20	0.19	±2.5
10	10.04	10	0.04	±2.5
100	100.16	100	0.16	--



Model: iMars XG136KTR-X				
Output Power %	P measured (%)	P set point (%)	Deviation (%)	Limit(%Pn)
100	100.19	100	0.19	--
90	90.15	90	0.15	±2.5
80	80.21	80	0.21	±2.5
70	70.04	70	0.04	±2.5
60	60.25	60	0.25	±2.5
50	50.11	50	0.11	±2.5
40	39.96	40	-0.04	±2.5
30	30.20	30	0.20	±2.5
20	20.04	20	0.04	±2.5
10	10.25	10	0.25	±2.5
100	100.25	100	0.25	--

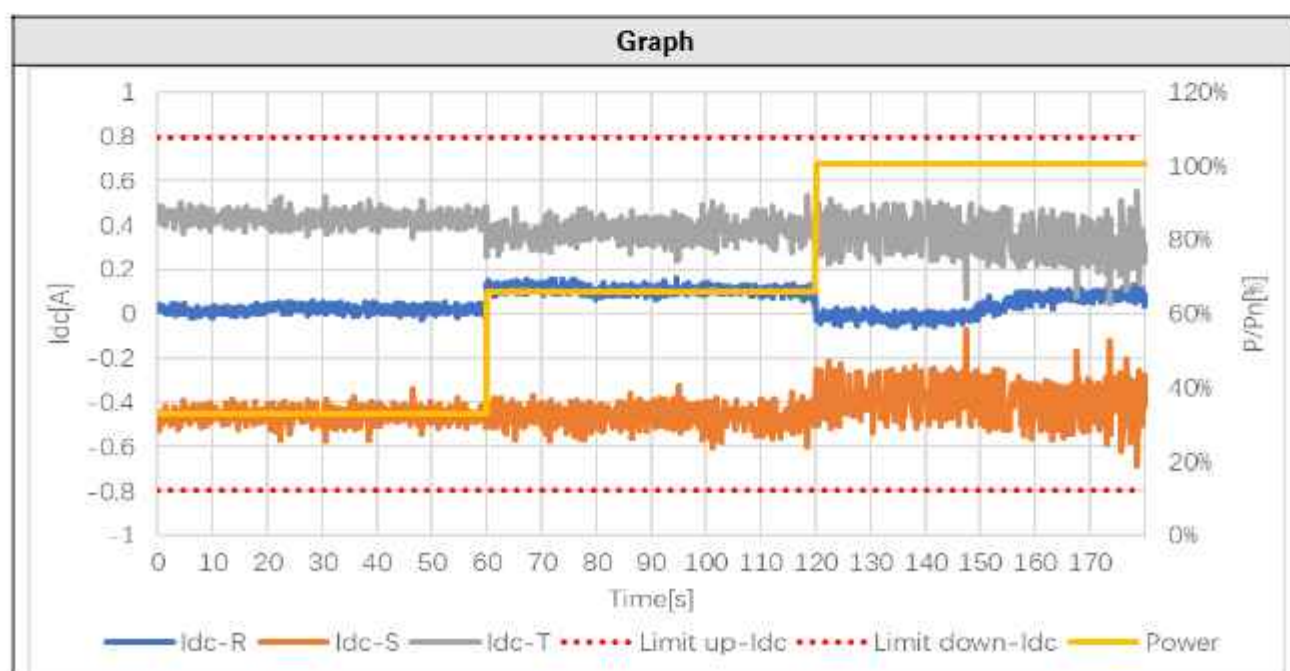


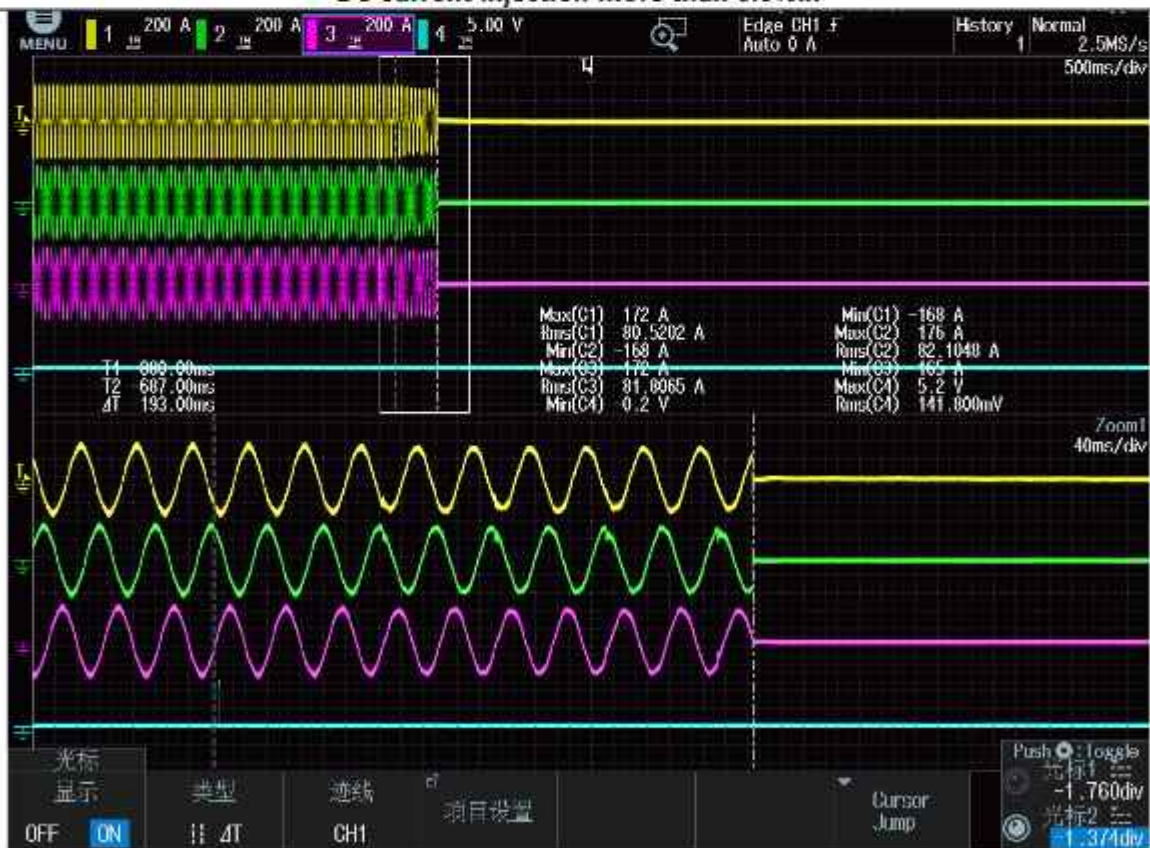
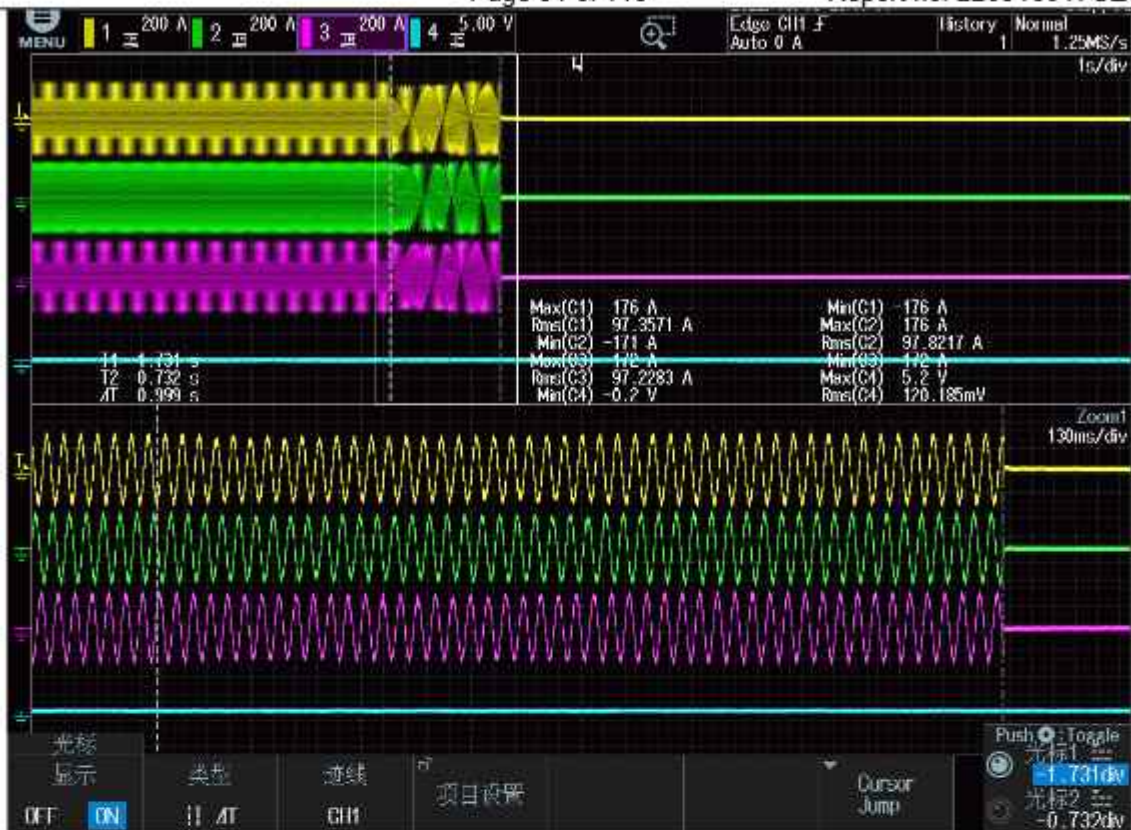
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Report No.: 220510017026-001

B.1.4.1	Table: Checking the DC component output									P
Model: iMars XG110KTR										
Temperature: 20°C										
Power [%Nominal VA]	Rated Current [Arms]			D.C component. Value [A]			D.C component. Value [%In]			Limit [%In]
	R	S	T	R	S	T	R	S	T	
33±5	159.4	159.4	159.4	0.05	0.57	0.52	0.03	0.36	0.33	0.5%
66±5	159.4	159.4	159.4	0.16	0.60	0.53	0.10	0.38	0.33	0.5%
100 ±5	159.4	159.4	159.4	0.13	0.68	0.55	0.08	0.43	0.35	0.5%

B.1.4.2		TABLE: Check of protections against the DC current injection.									P
Power [%nominal VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	Idc >		
33±5	36300	230	1.00	159.4	159.4	159.4	0.867	0.54	0.5% In	996	1
66±5	72600	230	1.00	159.4	159.4	159.4	0.836	0.52	0.5% In	999	1
100 ±5	110000	230	1.00	159.4	159.4	159.4	0.854	0.54	0.5% In	993	1
Power [%nominal VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	Idc >>		
33±5	36300	230	1.00	159.4	159.4	159.4	1.35	0.85	1A	193	0.2
66±5	72600	230	1.00	159.4	159.4	159.4	1.39	0.87	1A	193	0.2
100 ±5	110000	230	1.00	159.4	159.4	159.4	1.52	0.95	1A	192	0.2



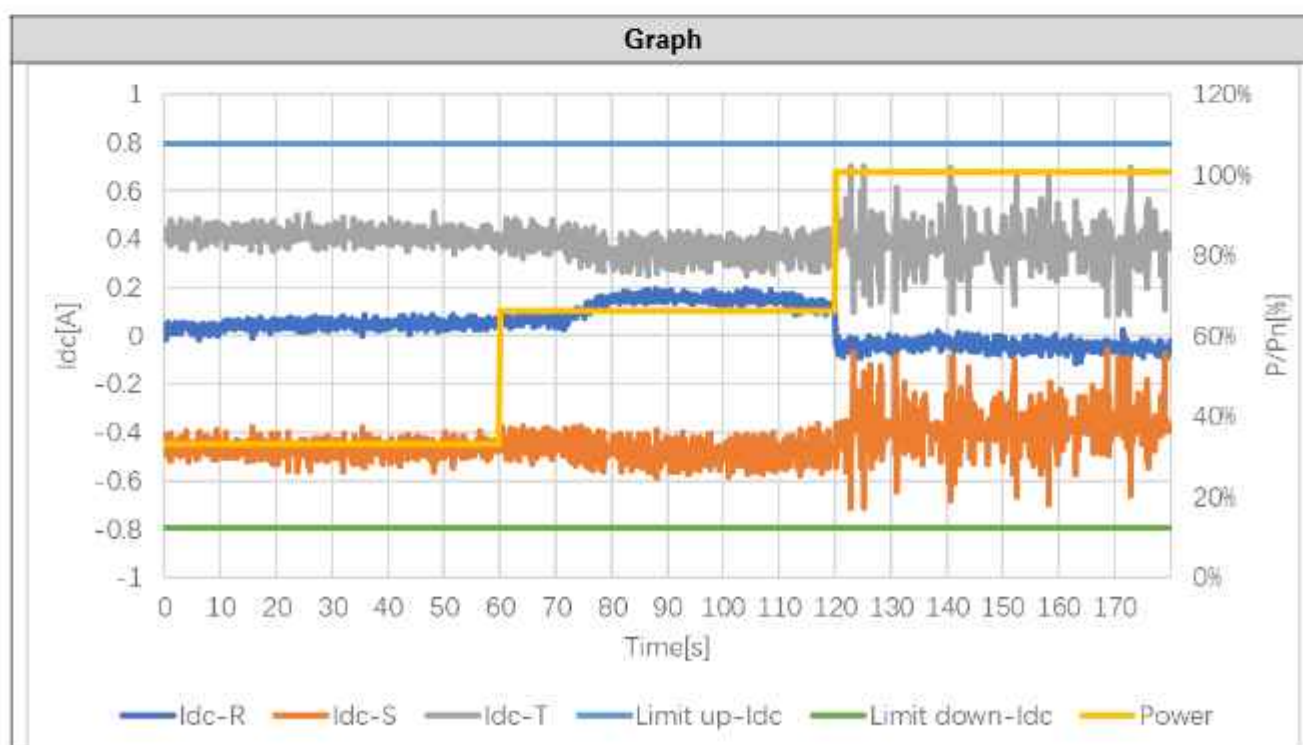


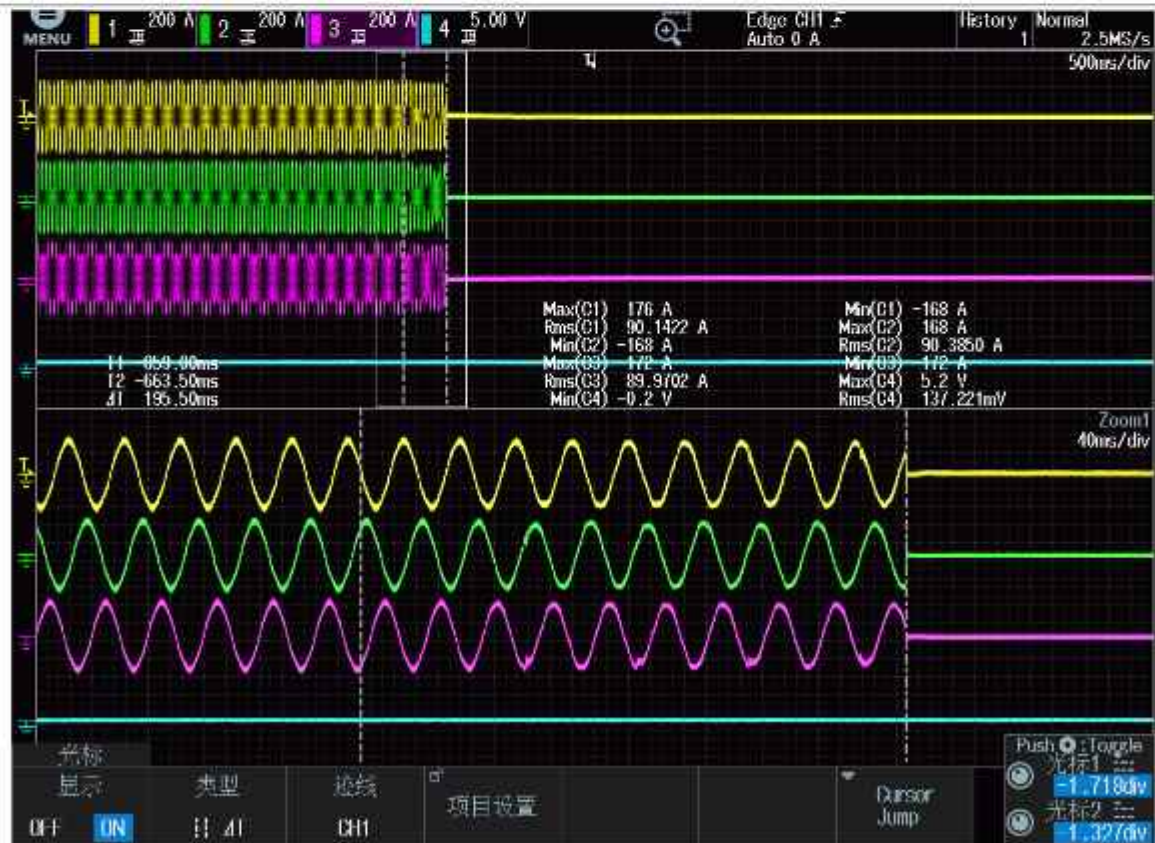
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Report No.: 220910017-020-001

B.1.4.1	Table: Checking the DC component output									P
Temperature: 60°C										
Power [%Nominal I VA]	Rated Current [Arms]			D.C component. Value [A]			D.C component. Value [%In]			Limit [%In]
	R	S	T	R	S	T	R	S	T	
33±5	159.4	159.4	159.4	0.09	0.56	0.51	0.06	0.35	0.32	0.5%
66±5	159.4	159.4	159.4	0.19	0.59	0.48	0.12	0.37	0.30	0.5%
100 ±5	159.4	159.4	159.4	0.11	0.71	0.70	0.07	0.45	0.44	0.5%

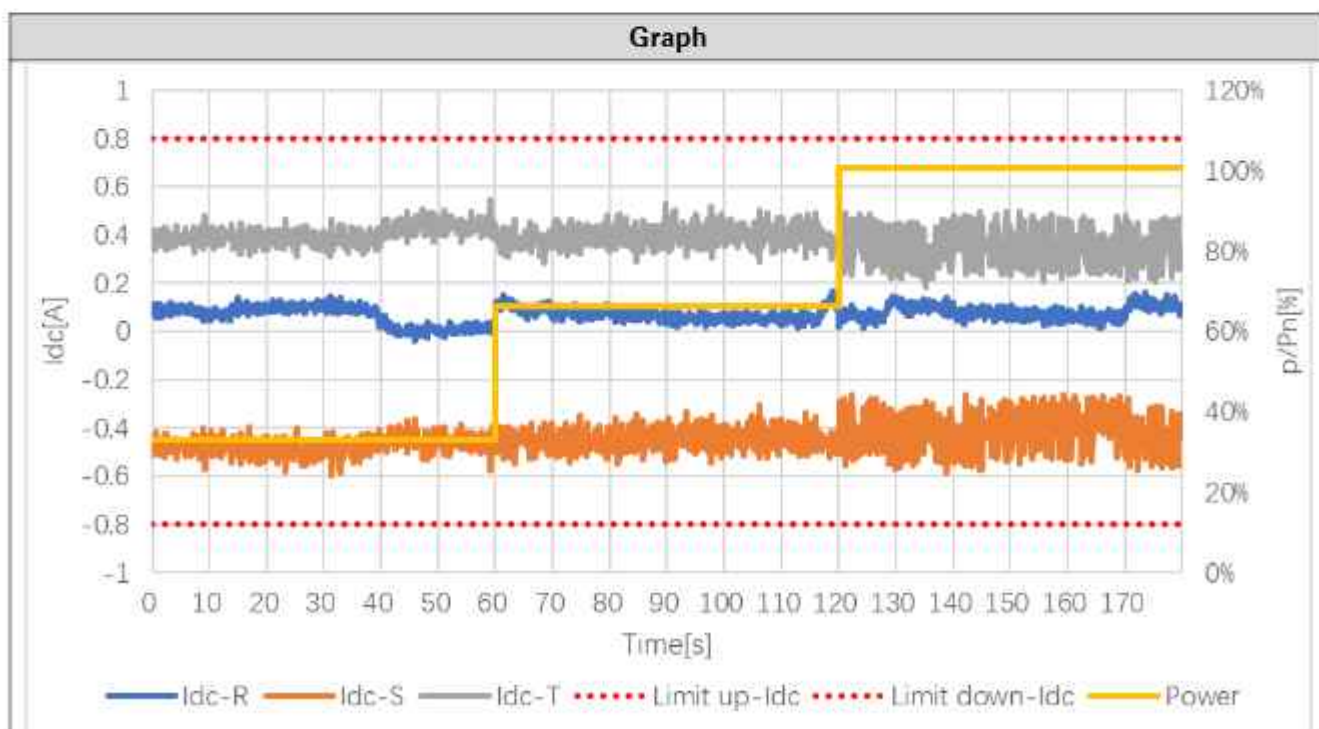
B.1.4.2		TABLE: Check of protections against the DC current injection.									P
Power [%nominal VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	$I_{dc} >$		
33±5	36300	230	1.00	159.4	159.4	159.4	0.867	0.54	0.5% In	982	1
66±5	72600	230	1.00	159.4	159.4	159.4	0.836	0.52	0.5% In	976	1
100 ±5	110000	230	1.00	159.4	159.4	159.4	0.854	0.54	0.5% In	991	1
Power [%nominal VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	$I_{dc} >>$		
33±5	36300	230	1.00	159.4	159.4	159.4	1.35	0.85	1A	188	0.2
66±5	72600	230	1.00	159.4	159.4	159.4	1.39	0.87	1A	195	0.2
100 ±5	110000	230	1.00	159.4	159.4	159.4	1.52	0.95	1A	194	0.2

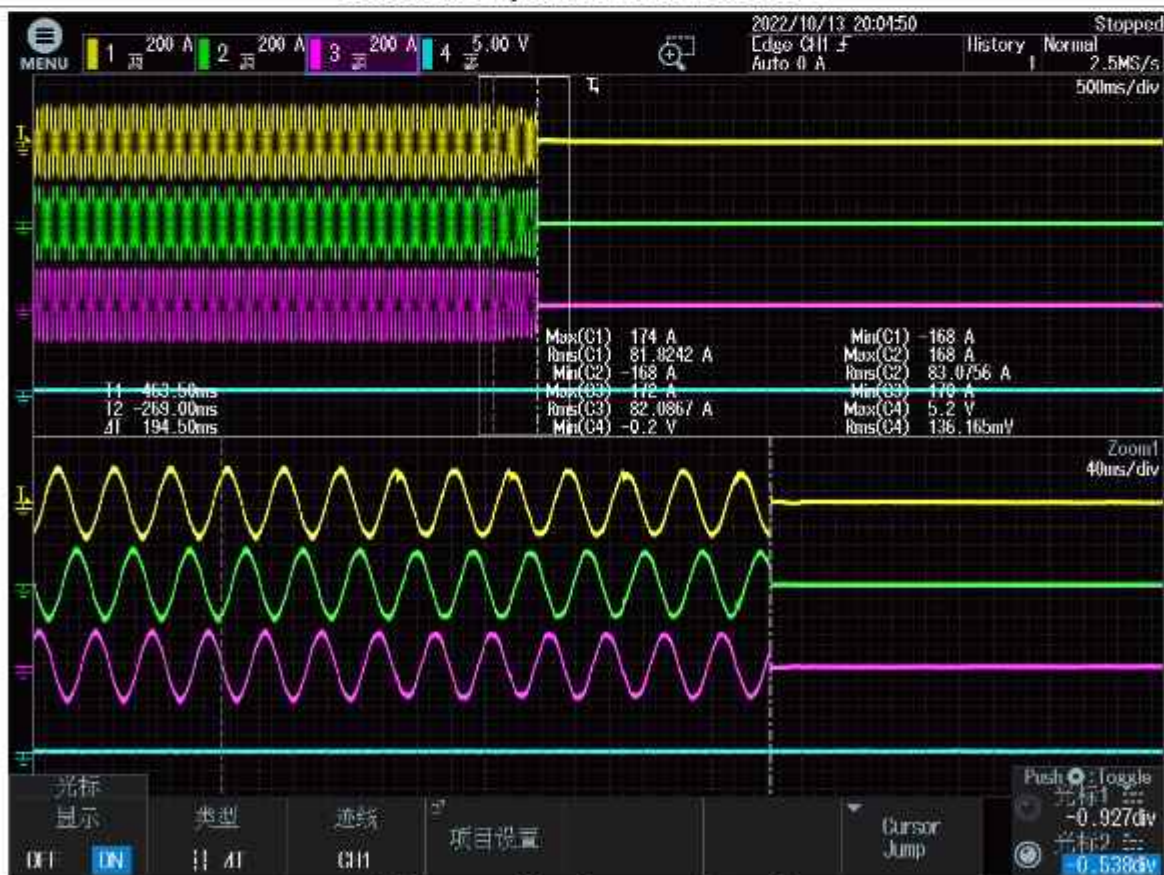




B.1.4.1 Table: Checking the DC component output										P
Temperature: -30°C										
Power [%Nominal I VA]	Rated Current [Arms]			D.C component. Value [A]			D.C component. Value [%In]			Limit [%In]
	R	S	T	R	S	T	R	S	T	
33±5	159.4	159.4	159.4	0.14	0.60	0.54	0.09	0.38	0.34	0.5%
66±5	159.4	159.4	159.4	0.17	0.55	0.52	0.11	0.35	0.33	0.5%
100 ±5	159.4	159.4	159.4	0,16	0.59	0.49	0.10	0.37	0.31	0.5%

B.1.4.2		TABLE: Check of protections against the DC current injection.									P
Power [%nominal I VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	I _{dc} >		
33±5	36300	230	1.00	159.4	159.4	159.4	0.867	0.54	0.5% In	973	1
66±5	72600	230	1.00	159.4	159.4	159.4	0.836	0.52	0.5% In	983	1
100 ±5	110000	230	1.00	159.4	159.4	159.4	0.854	0.54	0.5% In	986	1
Power [%nominal I VA]	Power [W]	Rated Voltage [Vrms]	cos	Rated Current [Arms]			Intervention value D.C.			Trip Time [ms]	Limit [s]
				R	S	T	[A]	[%In]	I _{dc} >>		
33±5	36300	230	1.00	159.4	159.4	159.4	1.35	0.85	1A	184	0.2
66±5	72600	230	1.00	159.4	159.4	159.4	1.39	0.87	1A	194	0.2
100 ±5	110000	230	1.00	159.4	159.4	159.4	1.52	0.95	1A	189	0.2





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Report No.: 220910017-020-001

B.1.5	Table: Checking insensitivity to voltage dips (LVFRT capability)								P
Model: iMars XG110KTR									
Output power: 110KW		Limits: >90% Pnom,							
	R	S	T	R	S	T	Duration	Recovery time	Limits of recovery time
	U/U _{nom}	U/U _{nom}	U/U _{nom}	φ1	φ2	φ3	[ms]	[ms]	[ms]
1s - three-phase symmetrical fault	0.100	0.100	0.100	0 °	-120 °	120 °	200±20	285	<400
1a - two-phase asymmetric failure	0.866	0.866	0.100	27 °	-147 °	120 °	200±20	274	<400
2s - three-phase symmetrical failure	0.250	0.250	0.250	0 °	-120 °	120 °	400±20	269	<400
2nd - two-phase asymmetric failure	0.880	0.880	0.250	22 °	-142 °	120 °	400±20	256	<400
3s - three-phase symmetrical failure	0.500	0.500	0.500	0 °	-120 °	120 °	850±20	259	<400
3a - two-phase asymmetric failure	0.900	0.900	0.500	14 °	-134 °	120 °	850±20	241	<400
4s - three-phase symmetrical failure	0.747	0.747	0.747	0 °	-120 °	120 °	1300±20	238	<400
4th - two-phase asymmetric failure	0.940	0.940	0.747	7 °	-127 °	120 °	1300±20	247	<400
5 – asymmetric two-phase fault in LV	0.100	0.100	1.000	0 °	-120 °	120 °	200 ± 20	257	<400
5 – asymmetric two-phase fault in LV	0.100	1.000	0.100	0 °	-120 °	120 °	200 ± 20	260	<400
5 – asymmetric two-phase fault in LV	1.000	0.100	0.100	0 °	-120 °	120 °	200 ± 20	242	<400
6 – asymmetric two-phase fault in LV	0.500	0.500	1.000	0 °	-120 °	120 °	400 ± 20	259	<400
6 – asymmetric two-phase fault in LV	0.500	1.000	0.500	0 °	-120 °	120 °	400 ± 20	250	<400
6 – asymmetric two-phase fault in LV	1.000	0.500	0.500	0 °	-120 °	120 °	400 ± 20	242	<400

1s - three-phase symmetrical fault



During dip



After dip

1a - two-phase asymmetric failure



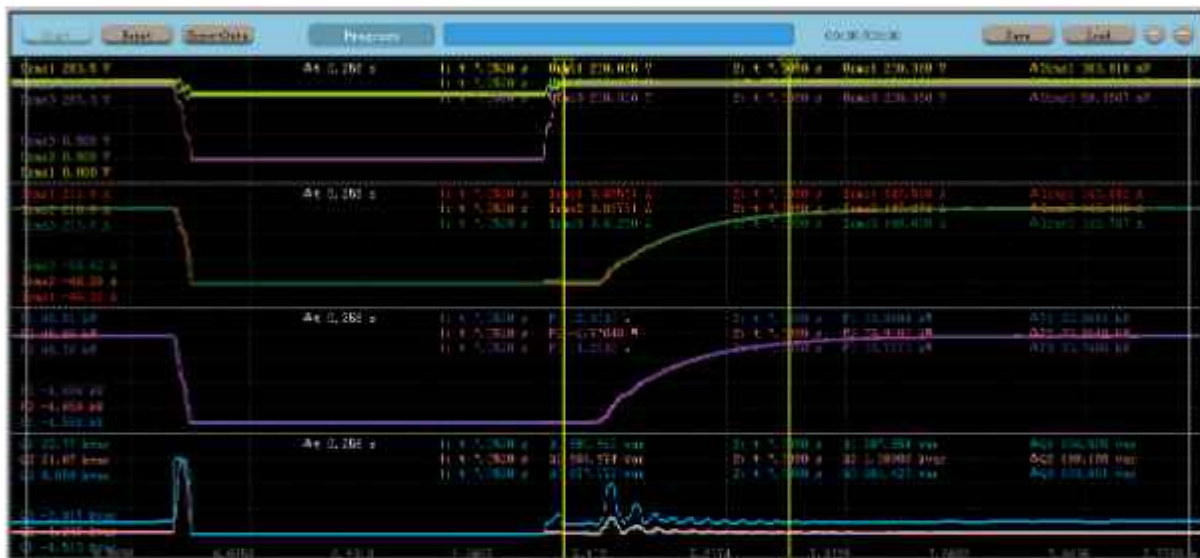
2s - three-phase symmetrical failure



2nd - two-phase asymmetric failure



During dip



After dip

3s - three-phase symmetrical failure



During dip

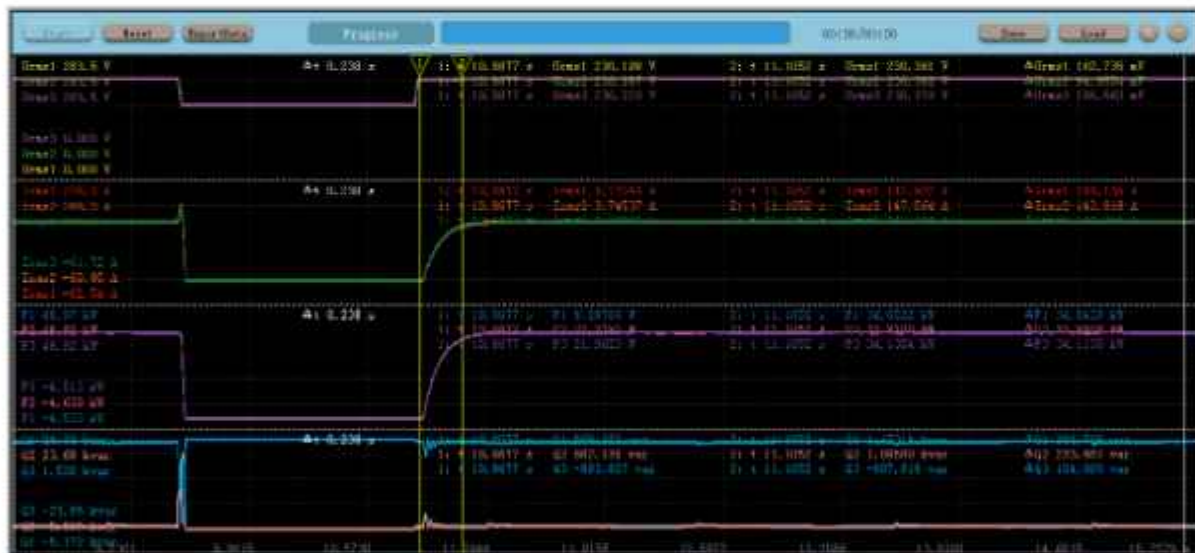


After dip

4s - three-phase symmetrical failure



During dip



After dip

4th - two-phase asymmetric failure



During dip



After dip

5 – asymmetric two-phase fault in LV



During dip



After dip

6 – asymmetric two-phase fault in LV



During dip



After dip

Model: iMars XG110KTR									
Output power: 22KW	Limits: 10%-30% P _{nom}								
	R	S	T	R	S	T	Duration	Recovery time	Limits of recovery time
	U/U _{nom}	U/U _{nom}	U/U _{nom}	φ1	φ2	φ3	[ms]	[ms]	[ms]
1s - three-phase symmetrical fault	0.100	0.100	0.100	0°	-120°	120°	200±20	240	<400
1a - two-phase asymmetric failure	0.870	0.870	0.100	27°	-147°	120°	200±20	223	<400
2s - three-phase symmetrical failure	0.250	0.250	0.250	0°	-120°	120°	400±20	223	<400
2nd - two-phase asymmetric failure	0.880	0.880	0.250	22°	-142°	120°	400±20	232	<400
3s - three-phase symmetrical failure	0.500	0.500	0.500	0°	-120°	120°	850±20	220	<400
3a - two-phase asymmetric failure	0.900	0.900	0.500	14°	-134°	120°	850±20	236	<400
4s - three-phase symmetrical failure	0.750	0.750	0.750	0°	-120°	120°	1300±20	219	<400
4th - two-phase asymmetric failure	0.94	0.94	0.750	7°	-127°	120°	1300±20	232	<400

1s - three-phase symmetrical fault



1a - two-phase asymmetric failure



2s - three-phase symmetrical failure



During dip



After dip

2nd - two-phase asymmetric failure



During dip



After dip

3s - three-phase symmetrical failure



3a - two-phase asymmetric failure



During dip

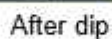
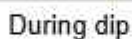


After dip

4s - three-phase symmetrical failure

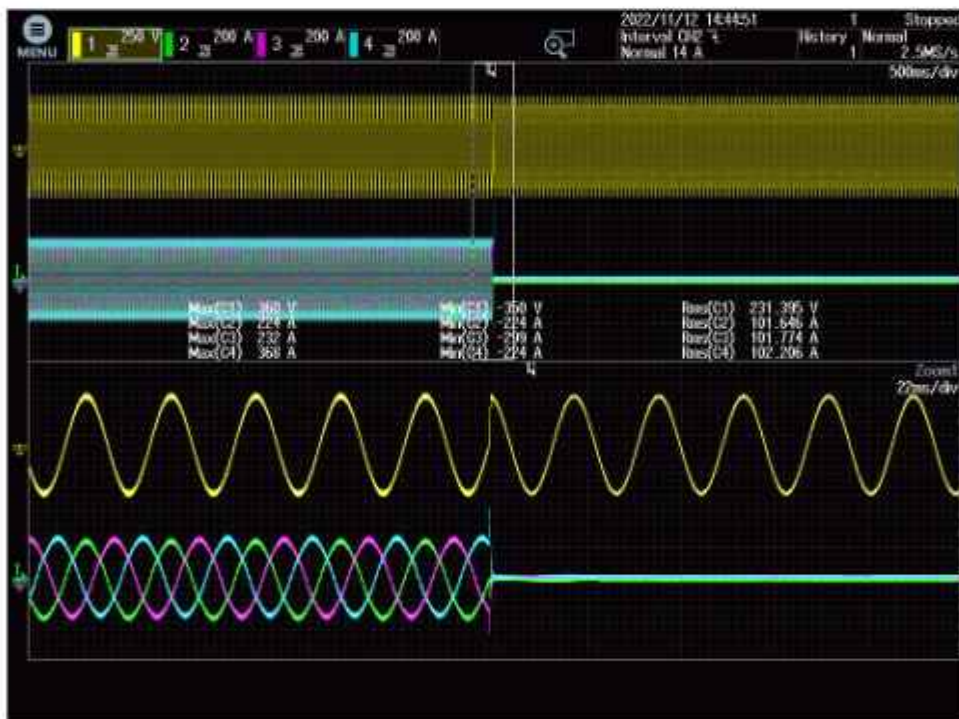
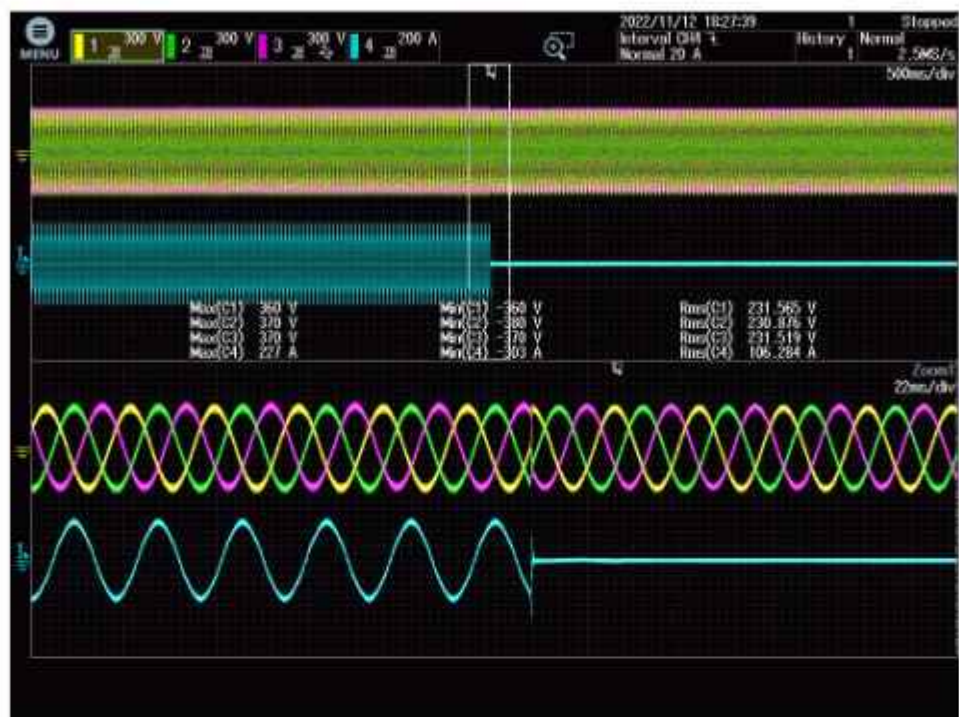


4th - two-phase asymmetric failure

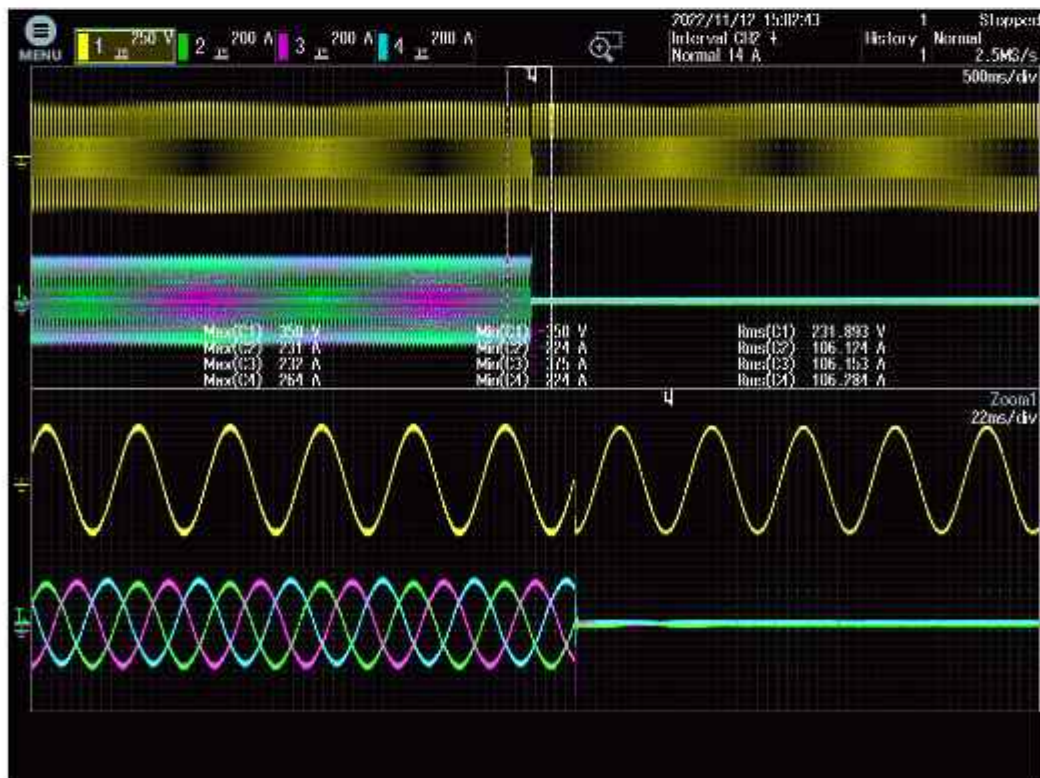
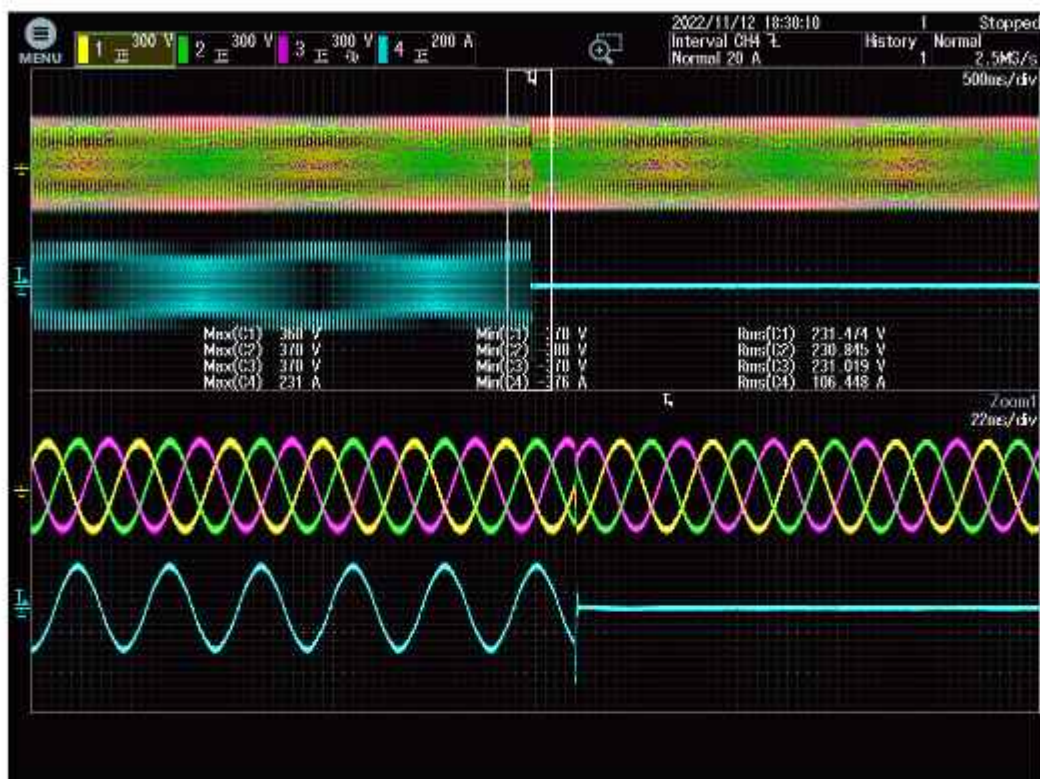


B.1.6	Table: Checking the insensitivity to automatic reclosing during phase accordance			P
Model: iMars XG110KTR				
Setoff	Angle before the setoff	Angle after the setoff	Current at 20 ms before to at least 200 ms after the setoff	Result
+90°	0°	90°	L1: 101.64A L2: 101.77A L3: 102.21A	No damage, Inverter disconnected
-90°	0°	-90°	L1: 106.12A L2: 106.15A L3: 106.28A	No damage, Inverter disconnected
180°	0°	180°	L1: 105.09A L2: 104.51A L3: 106.30A	No damage, Inverter disconnected
-180°	0°	-180°	L1: 106.37A L2: 106.89A L3: 106.59A	No damage, Inverter disconnected

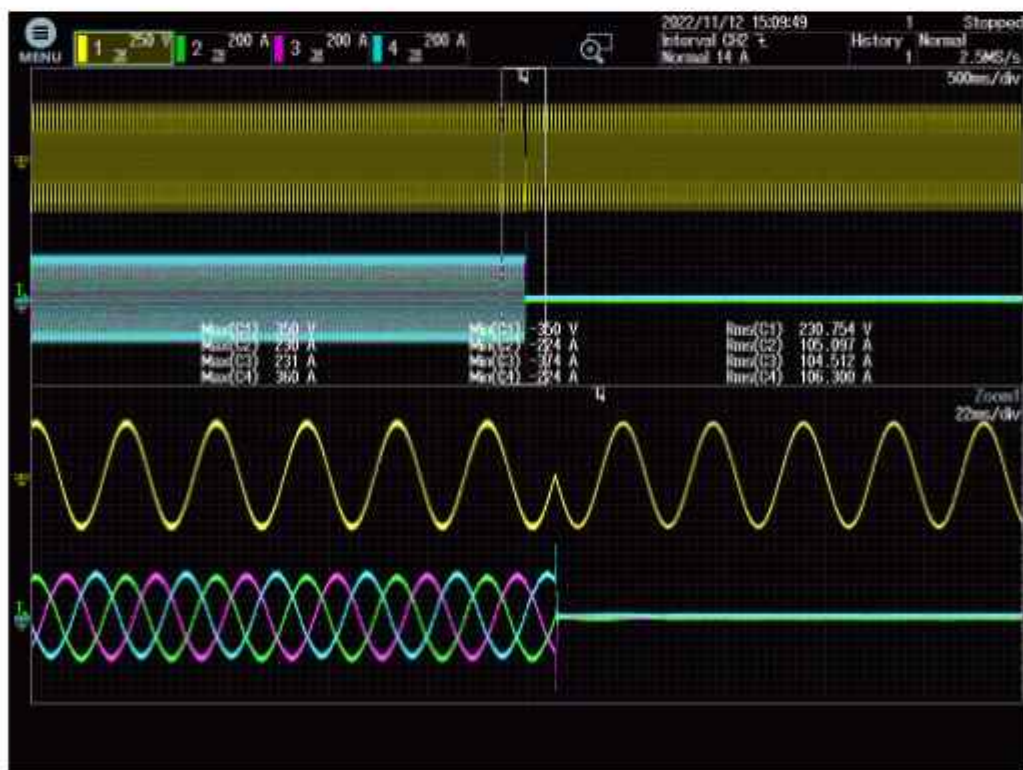
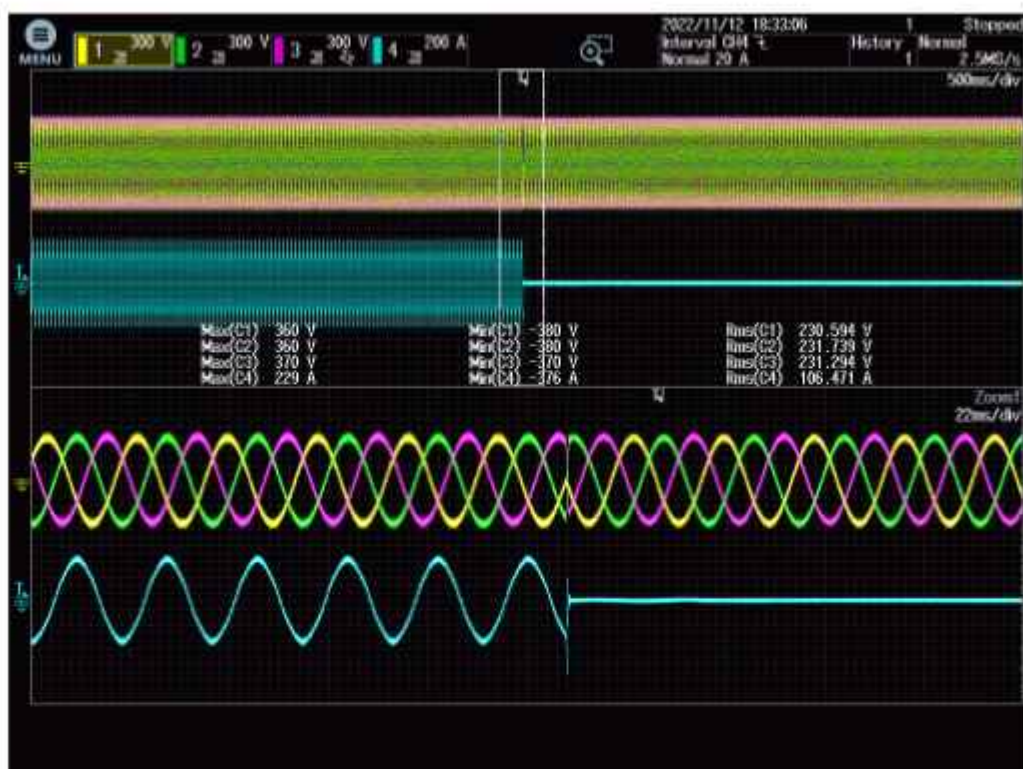
EUT with a setoff of 90°



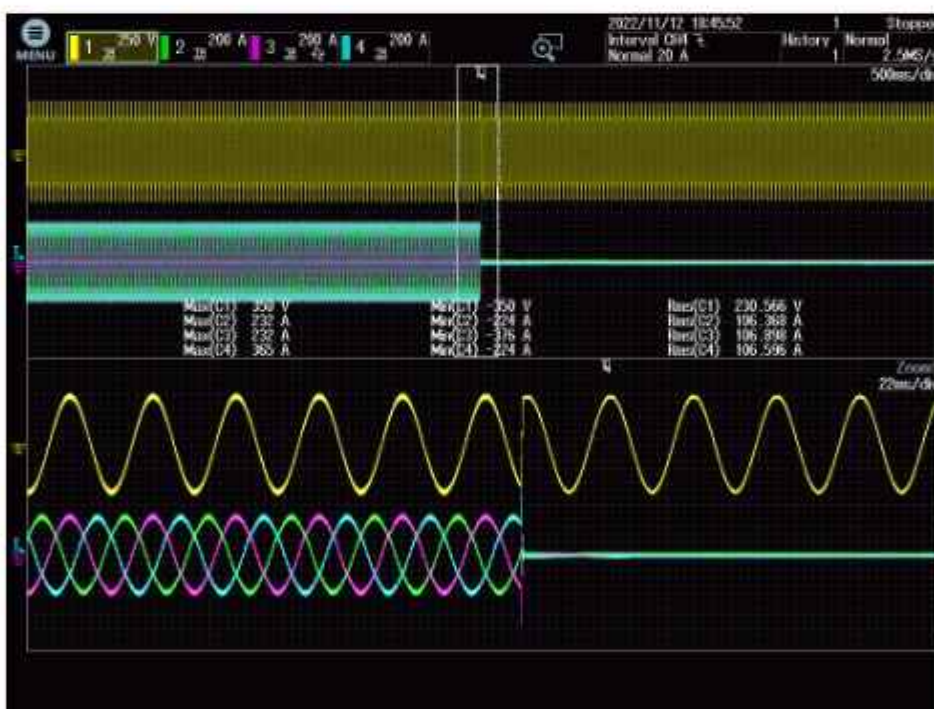
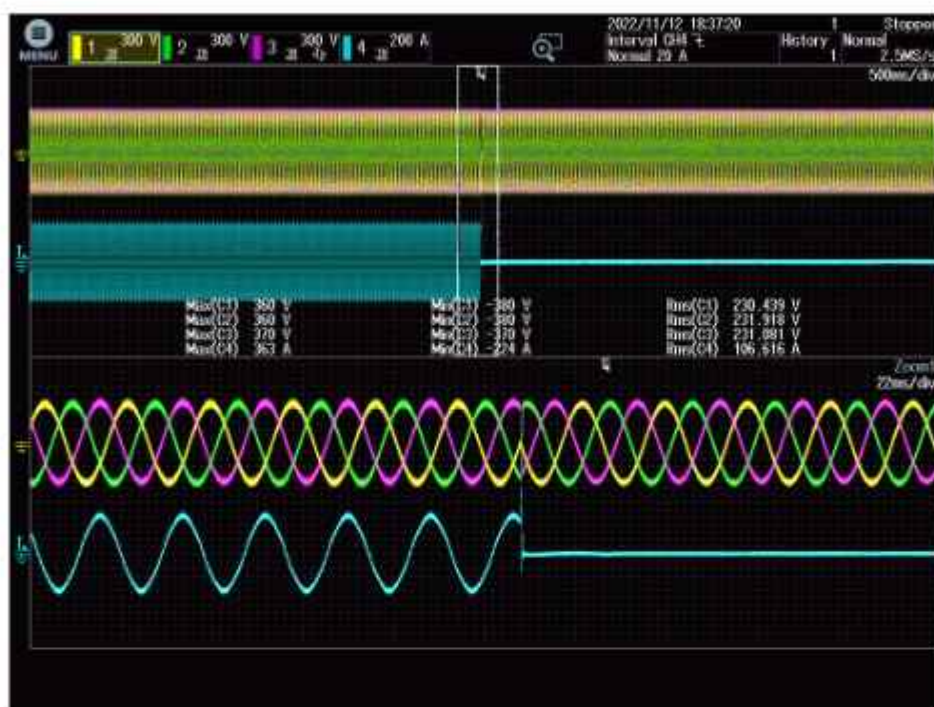
EUT with a setoff of -90°



EUT with a setoff of 180°



EUT with a setoff of -180°



Appendix 1: ISO 9001 certificate



Certificate of Registration

质量管理体系 - ISO 9001:2015

证明人： 深圳市英威腾电气股份有限公司光明分公司 91440300MA5F9H760L 中国 广东省 深圳市 光明区马田街道 薯田埔社区科杰西路 英威腾光明科技大厦A座 邮编：518106	Shenzhen INVT Electric Co., Ltd. Guangming Branch Building A INVT Guangming Technology Building Kejie Fourth Road, Shutianpu Community, Matian Street Guangming District Shenzhen Guangdong 518106 China
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持有证书: FM 741214

并运行符合 ISO 9001:2015 要求的质量管理体系。认证范围如下:

The design, sales and services of inverter, The manufacture of uninterruptible power supply, PV (photovoltaic) inverter, electric control products for electric automobile and power converters for automobile.

PSI代表,

Chris Cheung, 亞太地區 合規風險主管

首次发证日期: 2009-01-25
最新发证日期: 2021-01-15

生效日期: 2021-01-25
有效期至: 2024-01-24

Page: 1 of 3

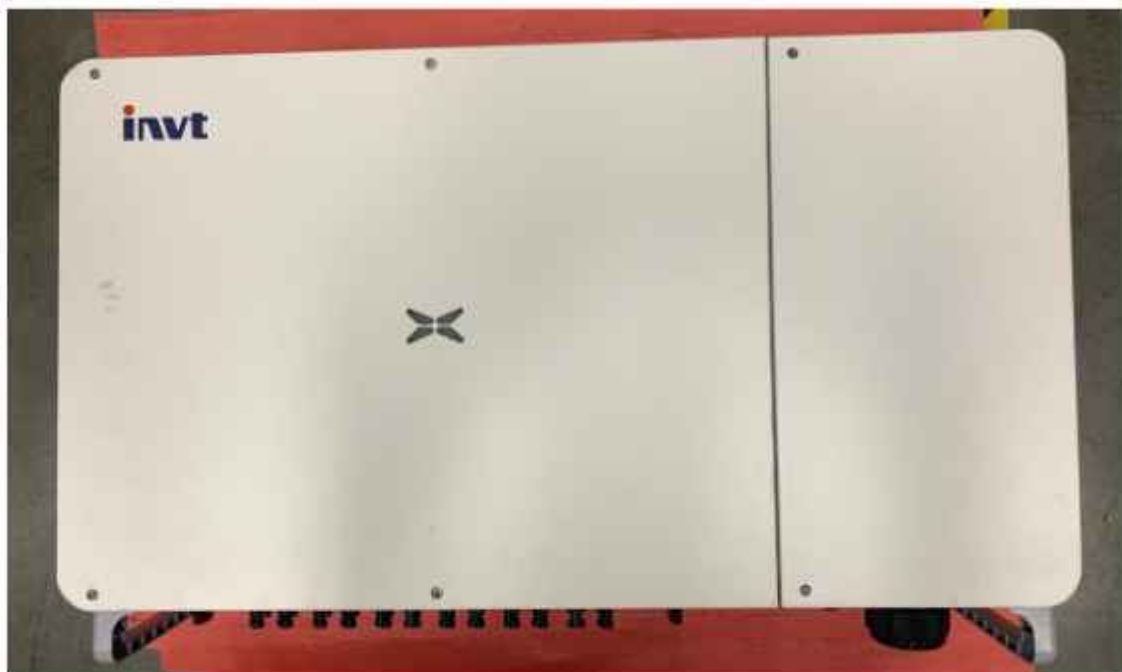


...making excellence a habit.

[illegible]

香港總行及辦事處：852, Watermark Court, Dove Avenue, Kowloon, Milton Keynes MK9 6PF, 電話：++ 345 030 3000
 新加坡分公司地址：拉佛士廣場，管理層信箱7005321。網址：SBN Cybernet High Road, London W4 4AL, UK
 馬尼拉聯絡辦公室：三藩市（美國加州）太平洋大道門牌V24街第40-41號。電話：+66 10 88873000
 852 312 312 312

Appendix 2: Photos



Overview 1



Overview 2



Overview 3



Side view



Connection view(for 9 strings)



Connection view (for 10 strings)



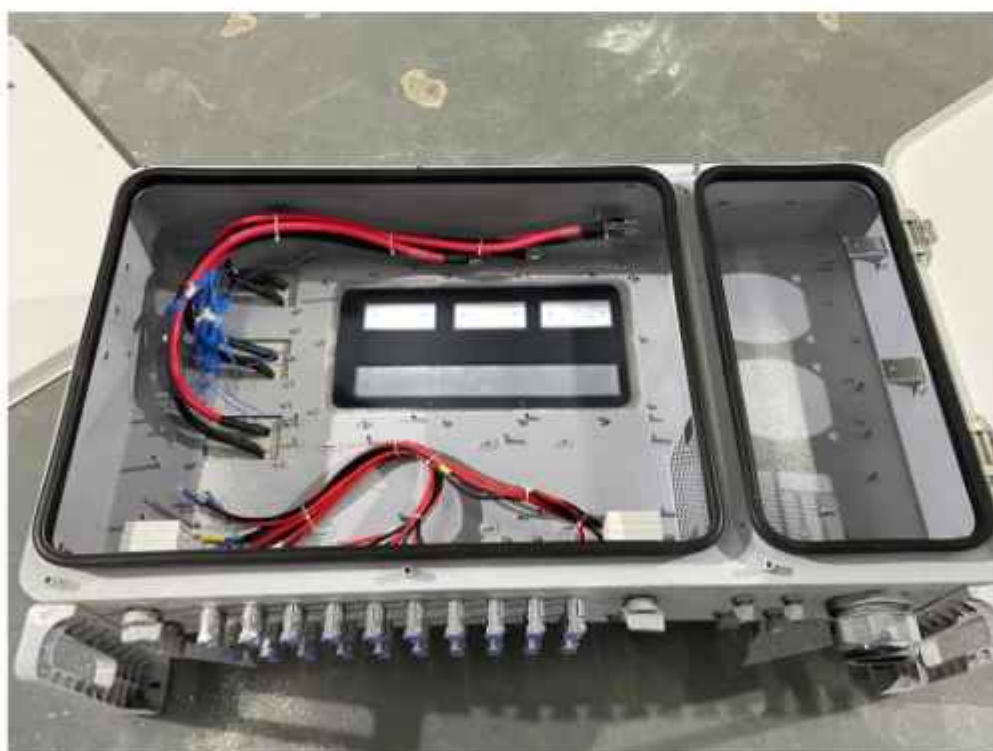
Connection view (for 12 strings)



Grounded view



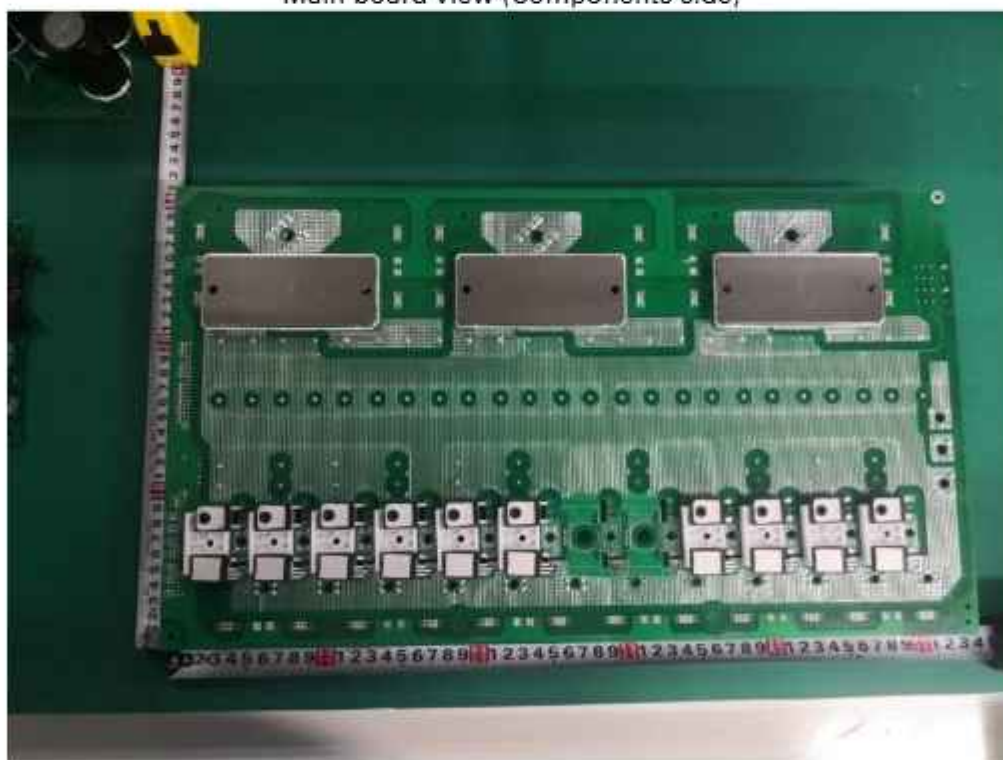
Internal view



Internal view (removed PCB board)



Main board view (Components side)



Main board view (Soldered side)

Appendix 3: Equipment

Asset	Description	Manufacturer	Model	Cal Date	Cal Due
SA200-16	Precision Power Analyzer	YOKOGAWA	WT3000	17 Aug 2022	16 Aug 2023
SA200-02	RLC load	Qunling	ACLT-4830H	/	/
SA200-52	AC power source	Chroma	61860	/	/
SA016-38	Programmable Temperature & Humidity Test Chambe	ESPEC	GPL-5	07 Mar 2022	06 Mar 2023
SA002-16	Impulse tester	Anwei	MegaPulse 10*700-7	09 Dec 2021	08 Dec 2022
SA002-35	Withstanding Voltage Tester	EEC	7480	16 May 2022	15 May 2023
SA050-33	Scope Corder	YOKOGAWA	DL 850E	06 Jan 2022	05 Jan 2023
SA200-22	Digital Insulation Tester	Fluke	Fluke1587C	02 Jun 2022	01 Jun 2023

(End of Report)