Vorläufige Prototypenbestätigung / *Preliminary prototype confirmation*

Nr. / *No.*:

968/GI 2356.00.26

Netzintegration von Erzeugungseinheiten und -anlagen

Grid integration of power generating units and systems

Antragsteller / *Applicant*	Wuxi Solinteg Power Co., Ltd. Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China
Zertifizierstelle / *Certification Body*	TÜV Rheinland Industrie Service GmbH Am Grauen Stein 51105 Köln, Deutschland / *Germany*
Produkttyp / *Product type*	Hybrid-Inverter Series
Modell / *Model*	**M2HT-75K-300, M2HT-80K-300, M2HT-99K-300, M2HT-100K-300, M2HT-110K-300, M2HT-125K-300**
Beschreibung / *Description*	Die EZE kann innerhalb ihrer Betriebsbereiche Leistung und Blindleistung bereitstellen / beziehen. Darüber hinaus bietet sie eine dynamische Blindstromeinspeisung bei Netzfehlern mit eingebauter Schutzfunktion. / *The PGU can supply/receive power and reactive power within its operating ranges. It also provides dynamic reactive current feed-in during grid fault with equipped protective function.*
Normen / *Standards*	VDE-AR-N 4110:2023-09, FGW TR 8 / *TG8*, Rev.10
Erklärung / *Declaration*	Die TÜV Rheinland Industrie Service GmbH bestätigt, dass es sich bei der genannten Energieerzeugungseinheit (EZE) Typ-2 nach VDE-AR-N 4110, sowie gemäß FGW TR 8, um einen Prototypen handelt, der in der Lage ist die technischen Anforderungen der Normen zu erfüllen. Es wird davon ausgegangen, dass die Anforderungen der FGW TR8 im Rahmen einer Zertifizierung erfüllt werden. / *TÜV Rheinland Industrie Service GmbH confirms that the mentioned Power Generating Unit (PGU Type-2) is a prototype according to VDE-AR-N 4110, as well as according to FGW TG 8, which is able to meet the technical requirements of the standards. It is assumed that the requirements of FGW TG8 are fulfilled within the scope of a certification.*
Inbetriebnahme der ersten EZE / *Commissioning of the first PGU*	--
Datum / *Date*	2026-06-22
Gültig bis / *Valid until*	2028-06-22 Die Details zur Gültigkeit im Kapitel 1.3 sind entsprechend zu beachten. / *The details on validity in chapter 1.3 must be observed accordingly.*

Diese Prototypenbestätigung darf nicht auszugsweise verwendet werden.

This prototype confirmation may not be used in extracts.

Köln, 2026-06-22
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein, D-51105 Köln

M.Sc. Stefan Bekic
Certifier

M.Sc. Sandipkumar Prajapati
Assessor

1. Aufgabenstellung / *Task*

Im Rahmen dieser Prototypenbestätigung wird auf Grundlage herstellerspezifischer Dokumente überprüft, ob die genannte Energieerzeugungseinheit (EZE) die Anforderungen gemäß [N1] bis [N2] erfüllen kann.

As part of this prototype confirmation, it is checked on the basis of manufacturer-specific documents whether the named power generating unit (EZE Type-2) can meet the requirements according to [N1] to [N2].

1.1. Normen und Technische Richtlinien / *Standards and technical guidelines*

[N1] Technical Guideline for the connection of customer systems to the medium-voltage network and their operation (TAR medium voltage / VDE-AR-N 4110)

[N2] Technical guideline for generating units and systems part 8 revision 10 of the Fördergesellschaft Windenergie und andere Erneuerbare Energien e.V. (FGW TG8 Rev. 10)

1.2. Für die Bestätigung verwendete Dokumente / *Documents supplied for confirmation*

Für die Bewertung der EZE wurden u. a. Informationen aus den folgenden herstellerspezifischen Dokumenten entnommen.

For the evaluation of the PGU, e.g. Information taken from the following manufacturer-specific documents.

[D1] Wuxi Solinteg Power Co., Ltd.,
Declaration of VDE-AR-N 4110
Revision: V1.0
Datum / *Date*: 2026-06-01

[D2] Wuxi Solinteg Power Co., Ltd.,
Application for Certification
Datum / *Date:* 2026-05-06

[D3] Wuxi Solinteg Power Co., Ltd.,
User Manual for Hybrid Inverter Series Solinteg M2HT-75~125K-300
Datum / *Date:* N/A

[D4] BCC Inc. (Beijing Certification Center Inc.)
Quality Management System Certificate ISO 9001:2015
Certificate Number: 016ZB25Q30850R0M
Unified Social Credit Code: 91320214MA7JNNRL98
Dated: 2026-05-15 / Valid until: 2028-05-14

1.3. Gültigkeit der Prototypenbestätigung / *Validity of prototype confirmation*

Die Gültigkeit der ausgestellten Prototypenbestätigung beschränkt sich gemäß VDE-AR-N 4110 auf zwei Jahre nach Inbetriebsetzung des ersten Prototypen. Da zurzeit noch keine EZE von diesem Typ in Betrieb genommen worden ist, handelt es sich um eine vorläufige Prototypenbestätigung. Diese Prototypenbestätigung ist nach Inbetriebnahme des ersten Prototypen entsprechend zu revidieren und die Gültigkeit ist auf zwei Jahre nach Inbetriebsetzung der der ersten EZE dieses Prototypen zu beschränken.

The validity of the prototype confirmation issued is limited to two years after commissioning of the first prototype in accordance with VDE-AR-N 4110. Since no PGU of this type has currently been commissioned, this is a provisional prototype confirmation. This prototype confirmation must be revised accordingly after commissioning of the first prototype and the validity must be limited to two years after commissioning of the first PGU of this prototype.

2. Prototypenregelung nach FGW TR 8 / *Prototype regulation according to FGW TG 8*

In diesem Abschnitt wird überprüft, ob es sich bei der EZE gemäß FGW TR 8 [N2] um einen Prototyp handelt. Nach [N2] ist ein Prototyp das erste Betriebsmittel eines Typs, welches wesentliche technische Weiterentwicklungen oder Neuerungen aufweist, sowie alle weiteren Betriebsmittel dieses Typs, die innerhalb von zwei Jahren nach Inbetriebsetzung des ersten Betriebsmittels dieses Typs in Betrieb gesetzt wurden. Die Regelung und Fristen von Betriebsmittelprototypen in einer EZE können den Netzanschlussregeln (NAR) entnommen werden.

In this section, it is checked whether the mentioned PGU is a prototype according to FGW TG 8 [N2]. According to [N2], the definition of the prototype is the first item of equipment of this type that has significant technical developments or innovations, as well as all other items of equipment of this type that were put into operation within two years after the first item of equipment of this type was in service. The rules and deadlines for equipment prototypes of PGU can be found in the grid connection guideline (NAR).

Gemäß [N1] gilt: Für Erzeugungsanlagen (EZA) mit EZE gleichen Prototyps müssen das Anlagenzertifikat und die Konformitätserklärung binnen eines Jahres, nachdem für den ersten Prototyp ein Einheitenzertifikat vorliegt, nachgereicht werden. Für Komponenten innerhalb der Erzeugungsanlage, für die ein Komponentenzertifikat erforderlich ist, kann die Prototypenregelung entsprechend angewendet werden.

According to [N1], the following applies: for power generating systems (PGS) with PGU of the same prototype, the plant certificate and the declaration of conformity must be submitted within one year after a unit certificate is available for the first prototype. The prototype regulation can be applied accordingly for components within the generating plant for which a component certificate is required.

Bewertung / *Assessment:*

FGW TR8 / TG8 (Revision 9)	**Bewertung/Assessment**
2.11 Betriebsmittel Prototypen / *Prototype*	
Herstellererklärung zur teilweisen oder vollständigen Konformität zu einer oder mehreren NAR. */ Manufacturer's declaration of partial or full conformity to one or more NAR.*	☒ Berücksichtigt */ Included* (Anhang 1 / *Annex 1*)
Herstellererklärung, dass es sich um eine wesentliche technische Weiterentwicklung bzw. Neuerung handelt. / *Manufacturer's declaration that it is a major technical development or innovation.*	☒ Berücksichtigt */ Included* (Anhang 1 / *Annex 1*)
Aufzeigen von Unterschieden zu ggf. vorhandenen und bereits zertifizierten Betriebsmitteln. / *Identification of differences to any existing and already certified equipment.*	☒ Berücksichtigt */ Included* (Anhang 1 / *Annex 1*)
Herstellererklärung, dass weitere technische Daten den Anforderungen der jeweiligen NAR entsprechen. / *Manufacturer's declaration that further technical data meet the requirements of the respective NAR.*	☒ Berücksichtigt */ Included* (Anhang 1 / *Annex 1*)

3. Prototypenregelung gemäß VDE-AR-N 4110/ *Prototype regulation according to VDE-AR-N 4110*

Nach [N2] muss die Zertifizierungsstelle in der Prototypenbestätigung nachvollziehbar ausweisen, dass der Prototyp grundsätzlich in der Lage ist, die Anforderungen der jeweiligen NAR an die elektrischen Eigenschaften und Funktionen der Betriebsmittel zu erfüllen.

According to [N2], the certification body must clearly state in the prototype confirmation that the prototype is basically able to meet the requirements of the respective NAR for the electrical properties and functions of the equipment.

Die Vorgaben der NAR an den Prüfumfang für die Prototypenbestätigung sind zu berücksichtigen (sofern vorhanden). Im Folgenden wird dazu die Übereinstimmung der elektrischen Eigenschaften des EZE- mit den Anforderungen nach [N1] überprüft.

The specifications of the NAR for the scope of testing for the prototype confirmation must be taken into account (if available). In the following, the compliance of the electrical properties of the PGU with the requirements of [N1] is checked.

Bewertung / Assessment:

Art der Betriebsmittel ***Type***	EZE / *PGU*		Komponenten / *Components*		
	PV	Speicher / *Storage System*	EZA-Regler / *PGU Controller*	Kompensations-einrichtung / *Compensation equipment*	Schutzein-richtungen / *Protective devices*
	☒	☐	☐	☐	☐
Anmerkung ***Annotation***	Die folgenden Punkte 1), 2) und 4) sind anzuwenden. *The following items 1), 2) and 4) are applied.*		Die folgenden Punkte 1), 2), 3) und 4) sind anzuwenden. *The following items 1), 2), 3) and 4) are applied.*		

Anforderungen an Prototypen gemäß VDE-AR-N 4110 Requirements for Prototypes according to VDE-AR-N 4110		
Nr.	Anforderungen / *Requirements*	Bewertung / *Evaluation*
1)	Der Prototyp weist wesentliche technische Weiterentwicklungen oder Neuerungen auf. / *The prototype shows significant technical developments or innovations.*	☒ Zutreffend/ *Applied*
2)	Der Prototyp ist grundsätzlich in der Lage die Anforderungen dieser VDE-Richtlinie an die elektrischen Eigenschaften zu erfüllen. / *The prototype is basically able to meet the requirements of this VDE guideline for the electrical properties.*	☒ Zutreffend/ *Applied*
3)	Für Komponenten innerhalb der Erzeugungsanlage, für die ein Komponentenzertifikat erforderlich ist, kann die Prototypenregelung entsprechend angewandt werden. *For components within the power generating plant, for which a component certificate is required, the prototype regulation can be applied in analogy.*	☐ Zutreffend/ *Not applicable*
4)	Anforderungen an die Angaben der Datenblätter und darauf basierende Plausibilitätsprüfung (PP) / *Requirements for the information in the data sheets and the plausibility check (PP) based on them*	

	a) Herstellererklärung, dass die Erzeugungseinheit so konstruiert wurde, dass die Anforderungen der VDE erfüllt werden können. / *Manufacturer's declaration that the generating unit was constructed in such a way that the requirements of the VDE can be met.*	☒ Enthalten/ *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt / *Not applicable*	
	b) Schematisches Übersichtsbild der Erzeugungseinheit mit allen wesentlichen Komponenten / *Schematic overview of the generating unit with all essential components*	☒ Enthalten/ *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt / *Not applicable*	
	c) Elektrische Daten (Nenn- und Bemessungsgrößen) / *Electrical data (nominal and rated values)*	☒ Enthalten/ *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt (keine Anforderungen an EZA-Regler)/ *Not applicable for PGU controllers*	
	d) Schutzfunktionen mit Einstellbereichen / *Protection functions with setting ranges* Entkupplungsschutz / *Decoupling protection* Eigenschutz / *Self-protection*	☒ Enthalten/ *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt (keine Anforderungen an EZA-Regler) / *Not applicable for PGU controllers*	
	e) Betriebsbereich der Erzeugungseinheit: / *Operating range of the generating unit* Grenzen im quasistationären Betrieb / *Limits in quasi-steady state operation* Blindleistungsstellbereich / *Reactive power adjustment range* FRT-Grenzkurve (U/t-Diagramm) / *FRT limit curve (U/t diagram)*	☒ Enthalten/ *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt (keine Anforderungen an EZA-Regler) *Not applicable for PGU controllers*	
	f) Wirkleistungsregelung: / *Active power control* Leistungs-Frequenz-Verhalten; / *Power frequency regulation* Wirkleistungsgradient / *Active power ramping*	☒ Enthalten *Included*
	PP: ☒ *fulfilled: the active power can be regulated by following methods (Annex-1):* *- Power/frequency behavior P = f(f, Pref)* *- Power/Voltage behavior P = f(v)* *- Active power ramping* ☐ Entfällt / *Not applicable*	
	g) Blindleistungsregelung / *Reactive power control regulated by* *- Fixed Q* *- Fixed cos φ* *- Voltage-dependent reactive power Q(U)* *- Active power Dependent reactive power Q(P)*	☒ Enthalten *Included* ☐ Entfällt für EZA-Regler / *Not applicable*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)*: ☐ Entfällt (keine Anforderung an EZA-Regler) / *Not applicable*	
	h) Spannungsstützung bei Netzfehlern durch Blindstromeinspeisung bei dynamischer Netzstützung / *Dynamic reactive current feed-in functionality*	☒ Enthalten *Included*
	PP: ☒ Erfüllt (Anhang 1) / *Fulfilled (Annex 1)* ☐ Entfällt / *Not applicable*	

Votum des Fachauditors / Conclusion

Die TÜV Rheinland Industrie Service GmbH bestätigt, dass es sich bei der genannten EZE nach [N1], sowie gemäß [N2], um einen Prototypen handelt, der in der Lage ist die technischen Anforderungen der Normen zu erfüllen. Es wird davon ausgegangen, dass die Anforderungen von [N3] im Rahmen einer Zertifizierung erfüllt werden.

TÜV Rheinland Industrie Service GmbH confirms that the mentioned PGU according to [N1], as well as according to [N2], is a prototype that is able to meet the technical requirements of the standards. It is assumed that the requirements of [N2] are met within the framework of a certification.

Die Bewertung ergab keine Beanstandungen.
The evaluation did not result in any objections.

Anhang / Annex
Anhang 1 / Annex 1:
Manufacturer's Declaration

SOLINTEG

Declaration of VDE-AR-N 4110

Wuxi Solinteg Power Co., Ltd.

M2HT-75K-300, M2HT-80K-300, M2HT-99K-300, M2HT-100K-300, M2HT-110K-300, M2HT-125K-300

Version: V1.0

We confirm that all parameters information in the parameter list corresponds to the actual parameters in the control system and can be adjusted on the generating units.

Signature: Lin zhi

Date: 2026.06.01

Declaration of VDE-AR-N 4110&4120

1. Company Information

License Holder:	Wuxi Solinteg Power Co., Ltd.
Address:	Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China
Product Type:	M2HT-75K-300, M2HT-80K-300, M2HT-99K-300 , M2HT-100K-300, M2HT-110K-300, M2HT-125K-300

2. Product Datasheet:

Product Model:	M2HT-75K-300	M2HT-80K-300	M2HT-99K-300	M2HT-100K-300	M2HT-110K-300	M2HT-125K-300
DC Input:						
Max. PV Input Voltage(V)	1000					
MPPT Voltage Range(V)	160-950					
Max. Input Current(A)	48*6					
Short Circuit Current(A)	60*6					
BATTERY DATA:						
Battery type	Li-ion					
Battery voltage range [Vd.c.]	300-950					
Max. Charging/Discharging Current[Ad.c.]	300					
AC Output:						
Output Voltage(V)	3L/N/PE, 220/380V; 230/400V; 240/415V(180-280V)					
Rated Frequency(Hz)	50/60					
Rated Output Power (kW)	75	80	99	100	110	125
Max. Output Power(kW)	75	80	99	100	110	125
Max. Apparent Power(kVA)	75	80	99	100	110	125
Rated Output Current(A)	108.7	115.9	143.5	144.9	159.4	181.2
Max. Output Current(A)	113.6	121.2	150.0	151.5	166.7	189.4
Power Factor Range	0.8 leading …0.8 lagging					
Others:						
Enclosure Protect Class	IP66					
Working Temperature (℃)	-30~60					
Protective class	I					
Over voltage category	II(PV+Battery), III(Mains)					
Voltage measure accuracy	±1% of Un					
frequency measure accuracy	±0.05 Hz					
Size (W*H*D) (mm)	1232*932*356					
Weight	164					
Firmware	V1.00					

3. Rating Label:

SOLINTEG

Model : M2HT-75K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	270-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	75kW
On-grid Output Rated Apparent Power:	75kVA
On-grid Output Max. Apparent Power:	75kVA
On-grid Output Rated Current:	108.7Aa.c.
On-grid Output Max. Current:	113.6Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	75kW
Off-grid Output Rated Apparent Power:	75kVA
Off-grid Output Max. Apparent Power:	75kVA
Off-grid Output Rated Current:	108.7Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

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Check Code 190640

Scan to Add

Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

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SOLINTEG

Model : M2HT-80K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	290-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	80kW
On-grid Output Rated Apparent Power:	80kVA
On-grid Output Max. Apparent Power:	80kVA
On-grid Output Rated Current:	115.9Aa.c.
On-grid Output Max. Current:	121.2Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	80kW
Off-grid Output Rated Apparent Power:	80kVA
Off-grid Output Max. Apparent Power:	80kVA
Off-grid Output Rated Current:	115.9Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

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Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

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SOLINTEG

Model : M2HT-99K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	355-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	99kW
On-grid Output Rated Apparent Power:	99kVA
On-grid Output Max. Apparent Power:	99kVA
On-grid Output Rated Current:	143.5Aa.c.
On-grid Output Max. Current:	150Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	99kW
Off-grid Output Rated Apparent Power:	99kVA
Off-grid Output Max. Apparent Power:	99kVA
Off-grid Output Rated Current:	143.5Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

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Check Code 190640

Scan to Add

Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

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SOLINTEG

Model : M2HT-100K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	360-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	100kW
On-grid Output Rated Apparent Power:	100kVA
On-grid Output Max. Apparent Power:	100kVA
On-grid Output Rated Current:	144.9Aa.c.
On-grid Output Max. Current:	151.5Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	100kW
Off-grid Output Rated Apparent Power:	100kVA
Off-grid Output Max. Apparent Power:	100kVA
Off-grid Output Rated Current:	144.9Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

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Check Code 190640

Scan to Add

Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

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SOLINTEG

Model : M2HT-110K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	395-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	110kW
On-grid Output Rated Apparent Power:	110kVA
On-grid Output Max. Apparent Power:	110kVA
On-grid Output Rated Current:	159.4Aa.c.
On-grid Output Max. Current:	166.7Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	110kW
Off-grid Output Rated Apparent Power:	110kVA
Off-grid Output Max. Apparent Power:	110kVA
Off-grid Output Rated Current:	159.4Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

10 min

234502918383948A

Check Code 190640

AI识图

Scan to Add

Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

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SOLINTEG

Model : M2HT-125K-300 **Name :** Hybrid Inverter

DC (PV/BAT)

PV Max. Input Voltage:	1000Vd.c.
PV Operating Voltage Range:	160-950Vd.c.
PV Rated Power MPP Voltage Range:	450-850Vd.c.
PV Max. Input Current:	48/48/48/48/48/48Ad.c.
PV Isc:	60/60/60/60/60/60Ad.c.
Battery Voltage Range:	300-950Vd.c.
Battery Max. Charge/Discharge Current:	300Ad.c.
Battery Type:	Li-ion

AC (On-grid/Off-grid)

On-grid Output Rated Power:	125kW
On-grid Output Rated Apparent Power:	125kVA
On-grid Output Max. Apparent Power:	125kVA
On-grid Output Rated Current:	181.2Aa.c.
On-grid Output Max. Current:	189.4Aa.c.
On-grid Input Max. Apparent Power:	207kVA
On-grid Input Max. Current:	300Aa.c.
On-grid Power Factor:	0.8 leading...0.8 lagging
Off-grid Output Rated Power:	125kW
Off-grid Output Rated Apparent Power:	125kVA
Off-grid Output Max. Apparent Power:	125kVA
Off-grid Output Rated Current:	181.2Aa.c.
Rated Voltage:	3L/N/PE; 220/380V;230/400V;240/415V
Rated Frequency:	50/60Hz

General

Operating Temperature Range:	-30...+60℃
Protective Class:	I
Ingress Protection:	IP66
Operating Altitude:	3000m
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV+Battery), III(Mains)

10 min

234502918383948A

Check Code 190640

Scan to Add

Manufacturer: Wuxi Solinteg Power Co., Ltd.
Address: Building H1-1001, No. 6 Jingxian Road, Xinwu District, 214135 Wuxi, Jiangsu Province, China

Declaration of VDE-AR-N 4110

4. Product description:

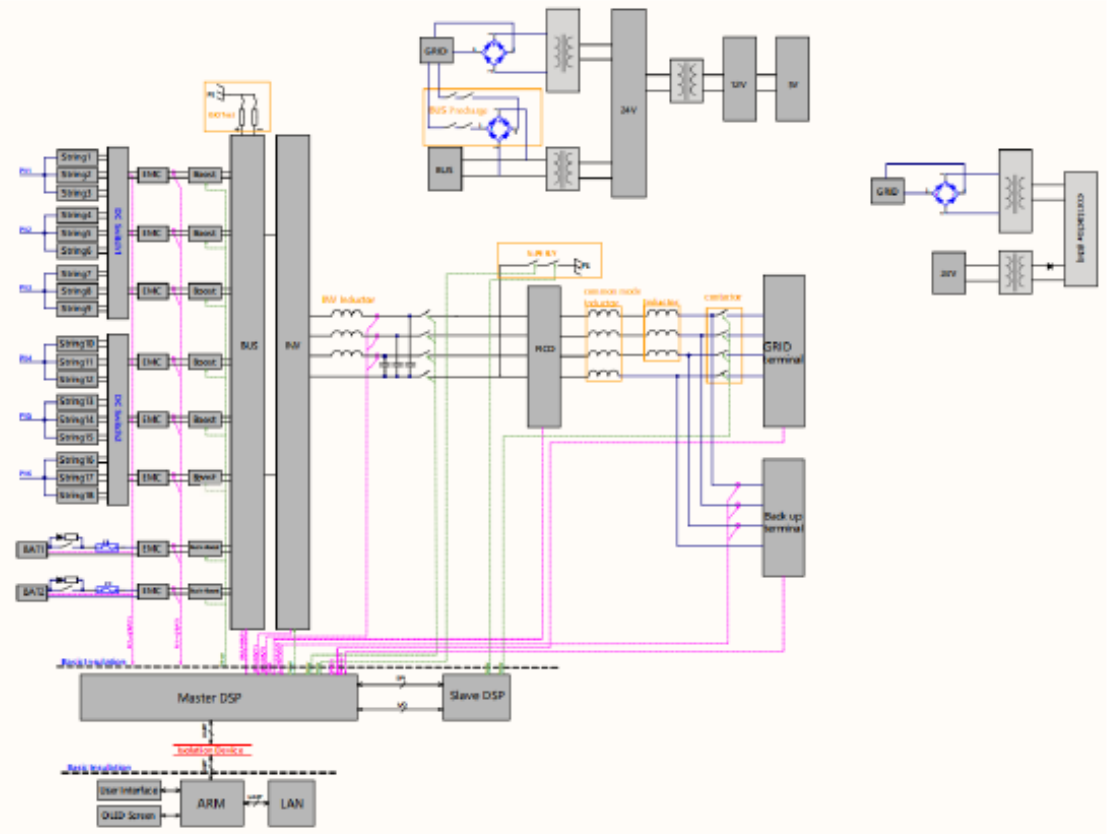
The models M2HT-75K-300, M2HT-80K-300, M2HT-99K-300, M2HT-100K-300, M2HT-110K-300 and M2HT-125K-300 are three-phase Hybrid Inverter, which are mainly used to combine the PV array, lithium battery, loads and power grid to realize intelligent power management and dispatching.

There are relays on grid and back-up ports circuits. There is a Contactor in the Grid port, referring to notes under diagram for Contactor Operating Logic. The Contactor will be disconnected when the inverters are in off-grid mode, while the inverters are in grid-tied mode, the Contactor will be connected.

NPE relays exist between N phase and PE conductor for load port.

External overcurrent devices are required for PV input in each string, battery port and grid port, which have been mentioned in manual.

The PGU have been designed so that the requirements of VDE-AR-N 4110 for the power generating unit can be complied with. This series product is new generation developed by new topology and firmware.



Primary energy supply:PV source+Battery source

Type of modulation in Hybrid inverter: SVPWM(Space Vector Pulse Width Modulation)

Pulse frequency: 16KHz

Phase to neutral voltage is used for protection detetion.

P.u. value is related to rated current =181.2A

Declaration of VDE-AR-N 4110

This protective device consists of an AC relay and an AC contactor connected in series, with the relay and contactor communicating with each other. This ensures that the equipment can be effectively isolated from the power supply in the event of a short circuit or abnormal operation of the relay or contactor.

The controlling section is also redundant built, one master DSP, and one slave DSP. The master DSP carries out the main calculation and driving instructions. Slave DSP is responsible for the redundant contactor independently. In case any one of two chips breaks down or runs a wrong program, which result to the loss of protection function, the another chip could indicate the fault and disconnect the equipment immediately.

Declaration of VDE-AR-N 4110

5. PQ diagram:

Model: M2HT-125K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Model: M2HT-110K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Declaration of VDE-AR-N 4110

Model: M2HT-100K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

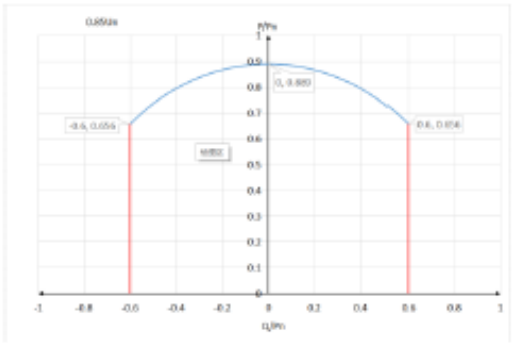
Model: M2HT-99K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

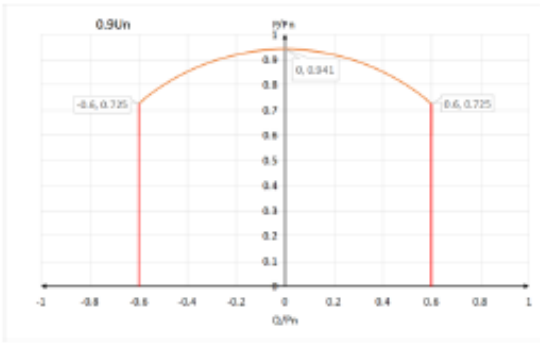
Declaration of VDE-AR-N 4110

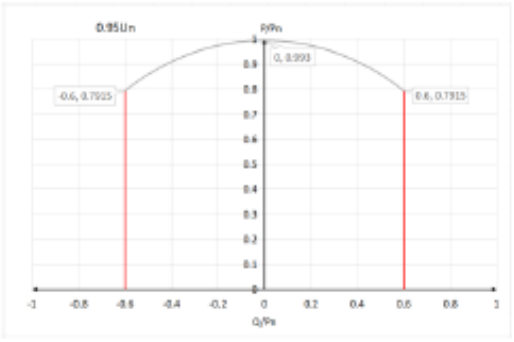
Model: M2HT-80K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

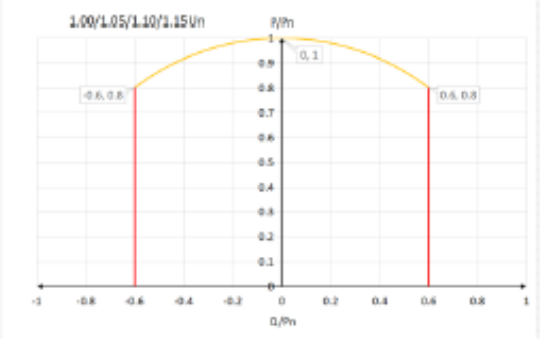
Model: M2HT-75K-300 Discharging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Declaration of VDE-AR-N 4110









Model: M2HT-125K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Declaration of VDE-AR-N 4110

Model: M2HT-110K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Model: M2HT-100K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

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Model: M2HT-99K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

Model: M2HT-80K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--

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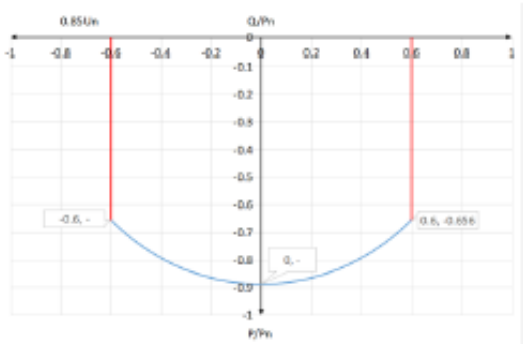
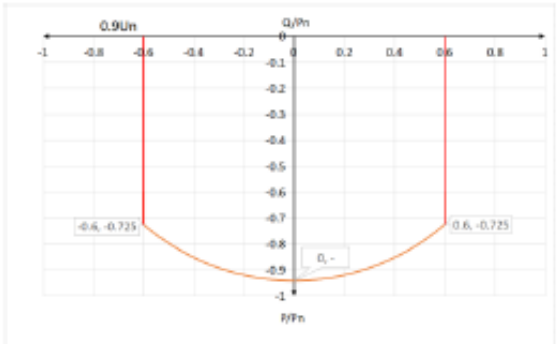
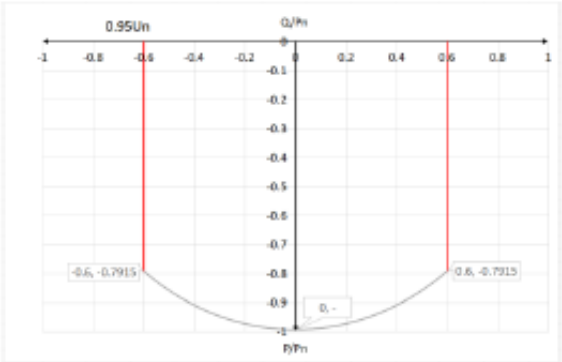
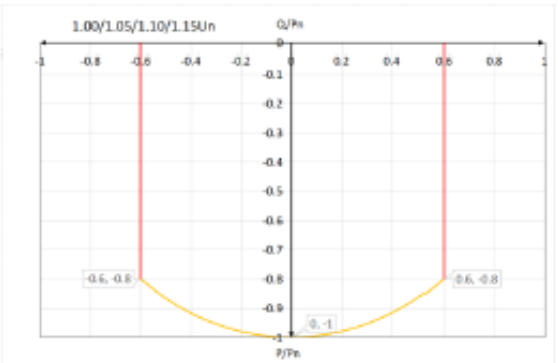
Model: M2HT-75K-300 Charging mode:								
P [p.u.]	Direction	Qmax [p.u.]						
		85 % U_N	90 % U_N	95 % U_N	100 % U_N	105 % U_N	110 % U_N	115 % U_N
0	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.1	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.2	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.3	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.4	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.5	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.6	Underexcited	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.60	0.60	0.60	0.60	0.60	0.60	0.60
-0.7	Underexcited	-0.55	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.55	0.60	0.60	0.60	0.60	0.60	0.60
-0.8	Underexcited	-0.39	-0.50	-0.59	-0.60	-0.60	-0.60	-0.60
	Overexcited	0.39	0.50	0.59	0.60	0.60	0.60	0.60
-0.9	Underexcited	--	-0.27	-0.42	-0.44	-0.44	-0.44	-0.44
	Overexcited	--	0.27	0.42	0.44	0.44	0.44	0.44
-1.0	Underexcited	--	--	--	0.00	0.00	0.00	0.00
	Overexcited	--	--	--	0.00	0.00	0.00	0.00
-1.1	Underexcited	--	--	--	--	--	--	--
	Overexcited	--	--	--	--	--	--	--









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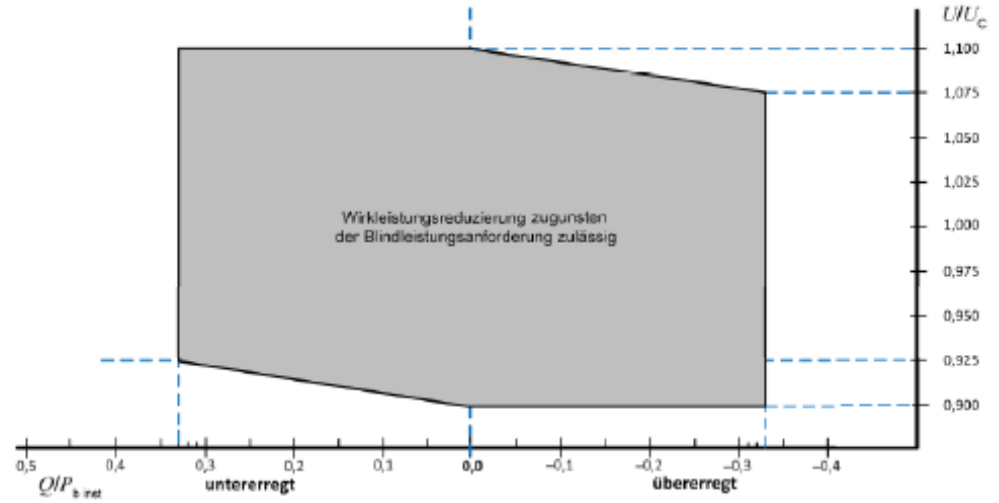
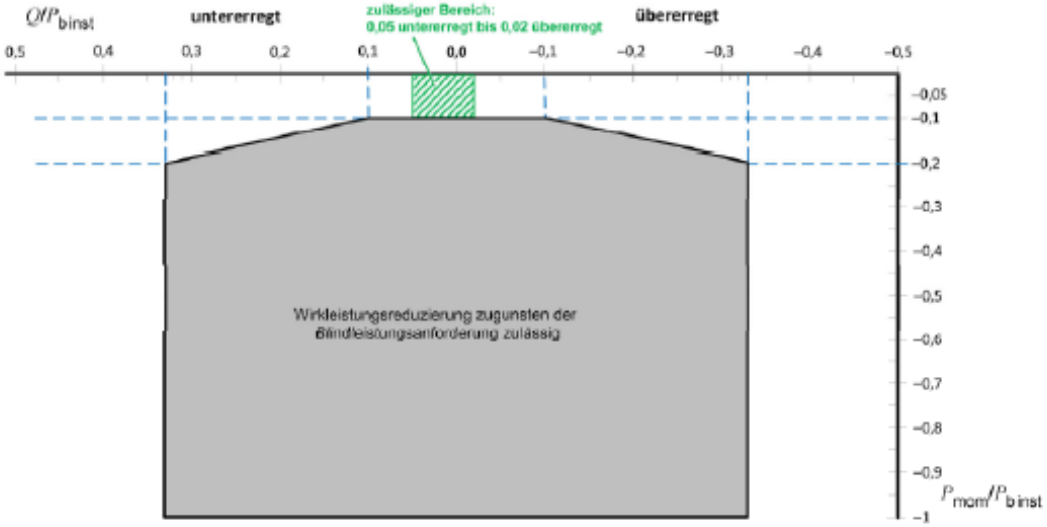
Every set point value specified by the grid operator can be achieved within the required reactive power range from VDE-AR-N 4110.





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6. Methods for reactive power control

The reactive power is always prioritised over active power.

The P-Q relation in normal operation always follow the equation:

S=min(U*I, min(Smax, U*Imax))

P=sqrt(S^2-Q^2)

Reactive power control			
Parameter	Setting range	Setting step	Default value
Reactive power regulation mode *(Reactive power mode in case of active power output)*	**Mode choose:** - Off - cos φ, manual setting (Manual cos φ specification) - cos φ(P) charac. Curve (QP Curve1) - Q(P) characteristic curve (Q(P) curve2) - Q(V) characteristic curve - Q, manual setting in %	--	- Off Setting range: -0.6Pn…0.6Pn, Default value: 0.00%Pn
Remark: The parameters can be set on the PGS controller to meet the requirements of reactive power control			

a. Reactive power-voltage character curve Q(U)

Reactive power-voltage character curve Q(U):			
Parameter	Setting range	Setting step	Default value
Q(U) _1mode			
Point 1 voltage	184.0···276.0V	0.1V	211.6V
Point 1 reactive power	-60.0···60.0%	0.1%	33.0%
Point 2 voltage	184.0···276.0V	0.1V	216.2V
Point 2 reactive power	-60.0···60.0%	0.1%	33.0%
Point 3 voltage	184.0···276.0V	0.1V	218.5V
Point 3 reactive power	-60.0···60.0%	0.1%	33.0%
Point 4 voltage	184.0···276.0V	0.1V	220.8V
Point 4 reactive power	-60.0···60.0%	0.1%	33.0%
Point 5 voltage	184.0···276.0V	0.1V	225.4V
Point 5 reactive power	-60.0···60.0%	0.1%	16.5%
Point 6 voltage	184.0···276.0V	0.1V	230.0V
Point 6 reactive power	-60.0···60.0%	0.1%	0%
Point 7 voltage	184.0···276.0V	0.1V	234.6V
Point 7 reactive power	-60.0···60.0%	0.1%	-16.5%
Point 8 voltage	184.0···276.0V	0.1V	239.2V
Point 8 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 9 voltage	184.0···276.0V	0.1V	241.5V

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Point 9 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 10 voltage	184.0···276.0V	0.1V	243.8V
Point 10 reactive power	-60.0···60.0%	0.1%	-33.0%
Q(U) curve reactive power reference value	Parameter not adjustable		Sn
Q(U)_1Time constant(τ)	0.0···60.0s	0.1s	3.3s
Q(U) Enter/exit mode	Mode 0···Mode 1	NA	Mode1
Lock in power	0.0···100.0%	0.1%	20.0%
Lock out power	0.0···100.0%	0.1%	5.0%
Minimum PF(cosφ)	0.1···0.8	0.1	0.4
Voltage displacement	-15.0···15.0%Un	0.1%Un	0.0%Un
Voltage dead band	-5.0···5.0%Un	0.1%Un	0.0%Un
Q(U) _ 2mode			
Point 1 voltage	184.0···276.0V	0.1V	211.6V
Point 1 reactive power	-60.0···60.0%	0.1%	33.0%
Point 2 voltage	184.0···276.0V	0.1V	216.2V
Point 2 reactive power	-60.0···60.0%	0.1%	33.0%
Point 3 voltage	184.0···276.0V	0.1V	218.5V
Point 3 reactive power	-60.0···60.0%	0.1%	33.0%
Point 4 voltage	184.0···276.0V	0.1V	220.8V
Point 4 reactive power	-60.0···60.0%	0.1%	33.0%
Point 5 voltage	184.0···276.0V	0.1V	225.4V
Point 5 reactive power	-60.0···60.0%	0.1%	16.5%
Point 6 voltage	184.0···276.0V	0.1V	230.0V
Point 6 reactive power	-60.0···60.0%	0.1%	0%
Point 7 voltage	184.0···276.0V	0.1V	234.6V
Point 7 reactive power	-60.0···60.0%	0.1%	-16.5%
Point 8 voltage	184.0···276.0V	0.1V	239.2V
Point 8 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 9 voltage	184.0···276.0V	0.1V	241.5V
Point 9 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 10 voltage	184.0···276.0V	0.1V	243.8V
Point 10 reactive power	-60.0···60.0%	0.1%	-33.0%

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Q(U)_2 curve reactive power reference value	Parameter not adjustable		Sn
Q(U)_2 Time constant(τ)	0.0···60.0s	0.1s	3.3s
Q(U)_2 Enter/exit mode	Mode 0···Mode 1	NA	Mode1
Lock in power	0.0···100.0%	0.1%	20.0%
Lock out power	0.0···100.0%	0.1%	5.0%
Minimum PF(cosφ)	0.1···0.8	0.1	0.4
reactive power displacement	-60.0···60.0%	0.1%	0.0%
Voltage dead band	-5.0···5.0%Un	0.1%Un	0.0%Un
Remark: For this function, the PT1 curve can be turned off directly under external control.			

		Data Item	Data Value	Unit	Range
63	TITLE2	**Q(U)_1 mode**			
64	28025	Point 1 voltage	211.6	V	[184.0,276.0]
65	28026	Point 1 reactive power	33.0	%	[-60.0,60.0]
66	28027	Point 2 voltage	216.2	V	[184.0,276.0]
67	28028	Point 2 reactive power	33.0	%	[-60.0,60.0]
68	28029	Point 3 voltage	218.5	V	[184.0,276.0]
69	28030	Point 3 reactive power	33.0	%	[-60.0,60.0]
70	28031	Point 4 voltage	220.8	V	[184.0,276.0]
71	28032	Point 4 reactive power	33.0	%	[-60.0,0.0]
72	28175	Point 5 voltage	225.4	V	[184.0,276.0]
73	28176	Point 5 reactive power	16.5	%	[-60.0,60.0]
74	28177	Point 6 voltage	230.0	V	[184.0,276.0]
75	28178	Point 6 reactive power	0.0	%	[-60.0,60.0]
76	28179	Point 7 voltage	234.6	V	[184.0,276.0]
77	28180	Point 7 reactive power	-16.5	%	[-60.0,60.0]
78	28181	Point 8 voltage	239.2	V	[184.0,276.0]
79	28182	Point 8 reactive power	-33.0	%	[-60.0,60.0]
80	28183	Point 9 voltage	241.5	V	[184.0,276.0]

		Data Item	Data Value	Unit	Range
81	28184	Point 9 reactive power	-33.0	%	[-60.0,60.0]
82	28185	Point 10 voltage	243.8	V	[184.0,276.0]
83	28186	Point 10 reactive power	-33.0	%	[-60.0,60.0]
84	28024	Q(U) curve reactive power reference value	Sr		
85	28111	Q(U)_1 Time constant(τ)	3.3	s	[0.0,60.0]
86	28021	Q(U) Enter/exit mode	Mode1		
87	28022	Lock in power	20.0	%	[0.0,100.0]
88	28023	Lock out power	5.0	%	[0.0,100.0]
89	28110	Minimum PF(cosφ)	0.40		[0.1,0.8]
90	28187	Voltage displacement	0.0	%Un	[-15.0,15.0]
91	28188	Voltage dead band	0.0	%Un	[-5.0,5.0]
92	TITLE2	**Q(P) Mode**			
93	28155	Point 1 active power	0.0	%Pn	[-100,100]
94	28156	Point 1 reactive power	0.0	%Sr	[-100,100]
95	28157	Point 2 active power	20.0	%Pn	[-100,100]
96	28158	Point 2 reactive power	0.0	%Sr	[-100,100]
97	28159	Point 3 active power	40.0	%Pn	[-100,100]
98	28160	Point 3 reactive power	0.0	%Sr	[-100,100]

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		Data Item	Data Value	Unit	Range
99	28161	Point 4 active power	50.0	%Pn	[-100,100]
100	28162	Point 4 reactive power	0.0	%Sr	[-100,100]
101	28163	Point 5 active power	55.0	%Pn	[-100,100]
102	28164	Point 5 reactive power	-2.5	%Sr	[-100,100]
103	28165	Point 6 active power	60.0	%Pn	[-100,100]
104	28166	Point 6 reactive power	-5.0	%Sr	[-100,100]
105	28167	Point 7 active power	75.0	%Pn	[-100,100]
106	28168	Point 7 reactive power	-19.0	%Sr	[-100,100]
107	28169	Point 8 active power	90.0	%Pn	[-100,100]
108	28170	Point 8 reactive power	-33.0	%Sr	[-100,100]
109	28171	Point 9 active power	95.0	%Pn	[-100,100]
110	28172	Point 9 reactive power	-33.0	%Sr	[-100,100]
111	28173	Point 10 active power	100.0	%Pn	[-100,100]
112	28174	Point 10 reactive power	-33.0	%Sr	[-100,100]
113	28219	Q(P) time constant (τ)	3.3	s	[0.0,60.0]
114	TITLE2	**Q(U)_2 mode**			
115	28189	Point 1 voltage	211.6	V	[184.0,276.0]
116	28190	Point 1 reactive power	33.0	%	[-60.0,60.0]

		Data Item	Data Value	Unit	Range
117	28191	Point 2 voltage	213.9	V	[184.0,276.0]
118	28192	Point 2 reactive power	33.0	%	[-60.0,60.0]
119	28193	Point 3 voltage	216.2	V	[184.0,276.0]
120	28194	Point 3 reactive power	33.0	%	[-60.0,60.0]
121	28195	Point 4 voltage	220.8	V	[184.0,276.0]
122	28196	Point 4 reactive power	0.0	%	[-60.0,0.0]
123	28197	Point 5 voltage	225.4	V	[184.0,276.0]
124	28198	Point 5 reactive power	0.0	%	[-60.0,60.0]
125	28199	Point 6 voltage	230.0	V	[184.0,276.0]
126	28200	Point 6 reactive power	0.0	%	[-60.0,60.0]
127	28201	Point 7 voltage	234.6	V	[184.0,276.0]
128	28202	Point 7 reactive power	0.0	%	[-60.0,60.0]
129	28203	Point 8 voltage	239.2	V	[184.0,276.0]
130	28204	Point 8 reactive power	0.0	%	[-60.0,60.0]
131	28205	Point 9 voltage	243.8	V	[184.0,276.0]
132	28206	Point 9 reactive power	-33.0	%	[-60.0,60.0]
133	28207	Point 10 voltage	246.1	V	[184.0,276.0]
134	28208	Point 10 reactive power	-33.0	%	[-60.0,60.0]

		Data Item	Data Value	Unit	Range
135	28209	Q(U)_2 curve reactive power reference value	Sr		
136	28215	Q(U)_2 Time constant(τ)	3.3	s	[0.0,60.0]
137	28210	Q(U)_2Enter/exit mode	Mode1		
138	28211	Lock in power	20.0	%	[0.0,100.0]
139	28212	Lock out power	5.0	%	[0.0,100.0]
140	28213	Reactive power displacement	0.0	%	[-60.0,60.0]
141	28214	Voltage dead band	0.0	%Un	[-5.0,5.0]

Curve setting in test:

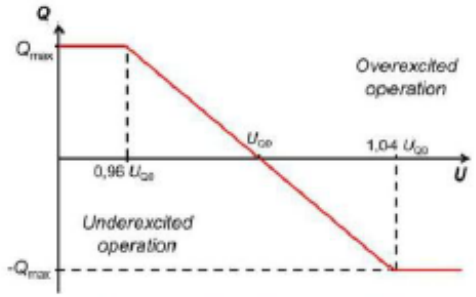

Fig. 4–166: Q(U) characteristic for use in the test

b. Character curve Q(P)

Character curve Q(P)			
Parameter	Setting range	Setting step	Default value
Q(P) Mode			
Point 1 active power	-100…100%	0.1%	0.0%
Point 1 reactive power	-100…100%	0.1%	0.0%
Point 2 active power	-100…100%	0.1%	20.0%
Point 2 reactive power	-100…100%	0.1%	0.0%
Point 3 active power	-100…100%	0.1%	40.0%
Point 3 reactive power	-100…100%	0.1%	0.0%
Point 4 active power	-100…100%	0.1%	50.0%
Point 4 reactive power	-100…100%	0.1%	0.0%
Point 5 active power	-100…100%	0.1%	55.0%
Point 5 reactive power	-100…100%	0.1%	-2.5%
Point 6 active power	-100…100%	0.1%	60.0%
Point 6 reactive power	-100…100%	0.1%	-5.0%
Point 7 active power	-100…100%	0.1%	75.0%
Point 7 reactive power	-100…100%	0.1%	-19.0%
Point 8 active power	-100…100%	0.1%	90.0%
Point 8 reactive power	-100…100%	0.1%	-33.0%
Point 9 active power	-100…100%	0.1%	95.0%
Point 9 reactive power	-100…100%	0.1%	-33.0%
Point 10 active power	-100…100%	0.1%	100.0%
Point 10 reactive power	-100…100%	0.1%	-33.0%
Q(P) time constant(τ)	0.0…60.0s	0.1s	3.3s

Curve setting in test:

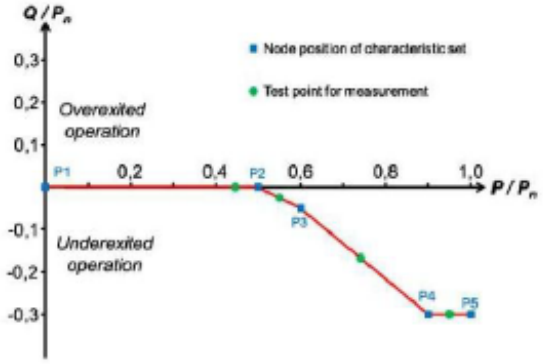

Fig. 4–177: Q(P) characteristic for test

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c. Fixed Q

Fixed Q			
Parameter	Setting range	Setting step	Default value
Qt mode (Fixed Q)			
Fixed Q	-60…60%	0.1%	0.0%
Fixed Q time constant(τ)	0.0…60.0s	0.1s	3.3s

If communication with plant controller or network operator interrupted over 1min, the reactive power maintain the last set-point received.

d. Fixed cosφ

Fixed cosφ			
Parameter	Setting range	Setting step	Default value
PF	0.800ue…0.800oe	0.001	1.000
Fixed cosφ time constant(τ)	0.0…60.0s	0.1s	3.3s

If communication with plant controller or network operator interrupted over 1min, the reactive power maintain the last set-point received.

Reactive power strategy:

The reactive power is prioritized over active power. Active power can be reduced in favor of reactive power provision. In favor of reactive power provision, the active power can be reduced when limitation of apparent power(Smax) or current(Imax) reached. The reduction of power is automatically, and can not be parameterized manually.

		Data Item	Data Value	Unit	Range
42	TITLE1	**Reactive Power Mode**			
43	28107	Reactive Power Mode	OFF		
44	TITLE2	**PF mode (Fixed cosφ)**			
45	28108	PF	1.000		(-1.000,-0.800][U[...
46	28216	Fixed cosφ time constant (τ)	3.3	s	[0.0,60.0]
47	TITLE2	**Qt mode (Fixed Q)**			
48	28109	Fixed Q	0.0	Sr%	[-60.0,60.0]
49	28217	Fixed Q time constant (τ)	3.3	s	[0.0,60.0]

7. Network security management

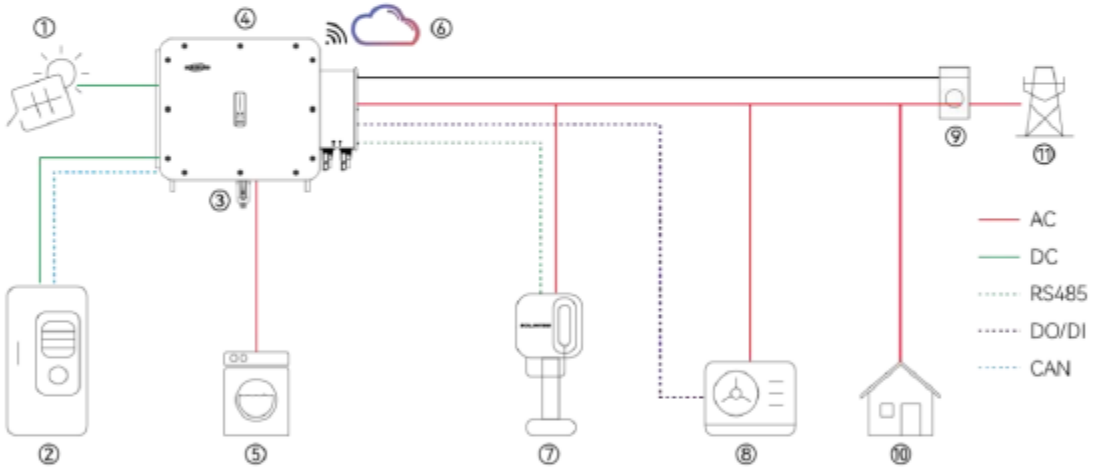
Rated active power			
Parameter	Setting range	Setting step	Default value
Max Active power mode	Parameter not adjustable		Rated
Active power output limit	0 %...100 %	0.1 %	100.0%
Slow change switch	OFF/ON	--	On
Slow change rate	0.00 ...100.00%Pn/s	0.01 %	0.50%

		Data Item	Data Value	Unit	Range
142	TITLE1	**Active power output limit**			
143	25114	Active power output limit	100.0	%Pn	[0.0,100.0]
215	TITLE1	**AC output power slow change**			
216	28099	Slow change switch	OFF		
217	28100	Slow change rate	0.50	%Pn/s	[0.00,100.00]

Interface: RJ45/USB

The way of External controller are WEB UI、DATA MANAGER

There is one kind of interface for network security management integrated in each unit and only one command from network or third party can be responded a time.



Item	Name	Description
1	PV Strings	
2	Battery	Ensure use of high-voltage Lithium-ion batteries that have been per-matched. For details on the compatibility list, please contact Solinteg service team.
3	Communication module	The communication module is shipped with the device.
4	Inverter	M2HT-75~125K-300 series inverter.
5	Back-up Loads	Loads required to operate under Off-grid conditions.
6	Solinteg Cloud	Solinteg monitoring platform (www.solinteg-cloud.com).
7	EV Charger	The EV charger should be the Solinteg ECA series if control is required. For details on specific models, please contact Solinteg service team.
8	Smart Load	Smart loads (e.g., heat pumps compliant with the SG READY function), refer to Section 7.6 Smart Load.
9	Current Transformer (CT)	The CTs is shipped with the inverter. If the CTs do not meet site requirements, order the RMM-5A meter from Solinteg and purchase separate 5A CTs (with an accuracy class of 0.5 or higher).

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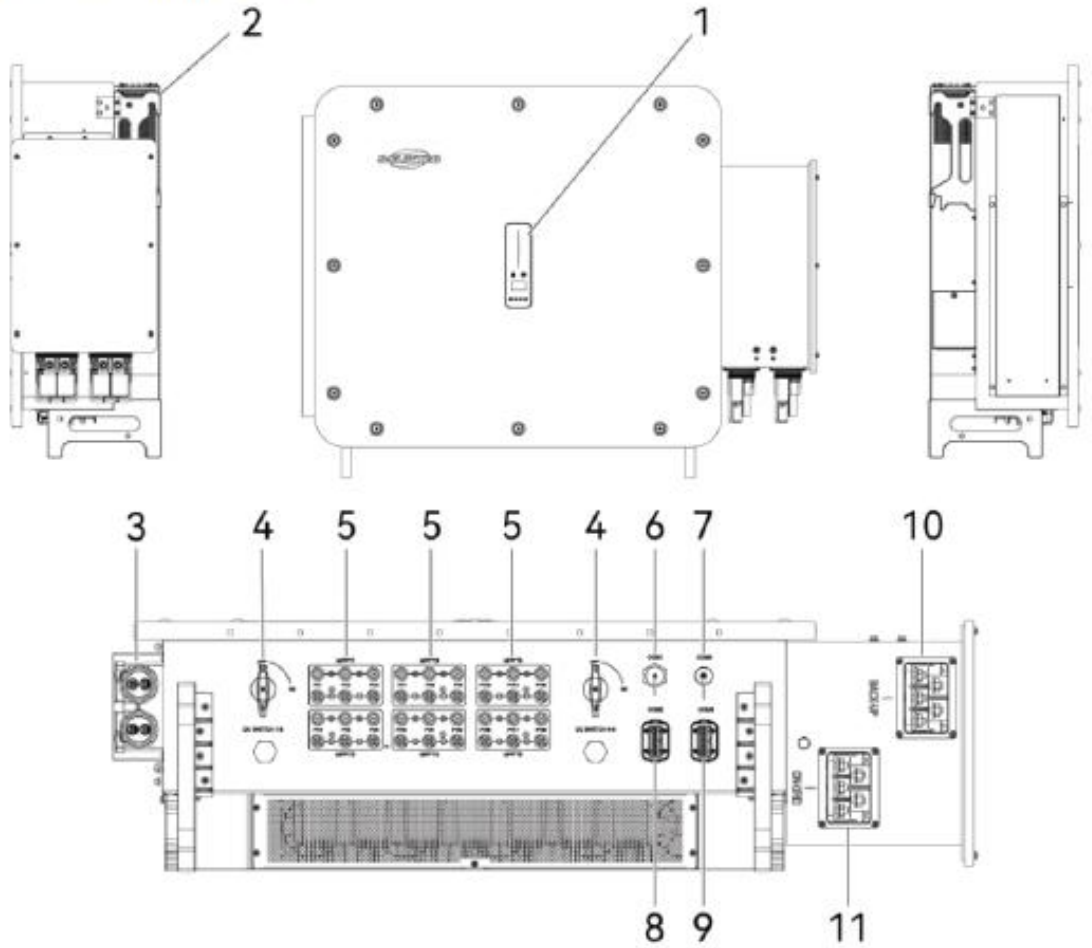
Appearance of Hybrid inverter



Item	Name	Description
1	Indicator, display and button	Display the operation information and working status of the inverter.
2	Hanger	Used to hang the inverter on the wall-mounting bracket.
3	BAT	Battery connection.
4	DC SWITCH	Used to disconnect/ connect PV input.
5	MPPT	PV string input.
6	COM1	Communication module connection port.
7	COM4	Reserved
8	COM2	For connecting the multifunctional connector, refer to Section 7.2 Multifunction Port for port definitions.
9	COM3	
10	BACK-UP	Used for load cable connection.
11	ON-GRID	Used for On-grid or generator cable connection.

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8. Active power output dependent on grid frequency

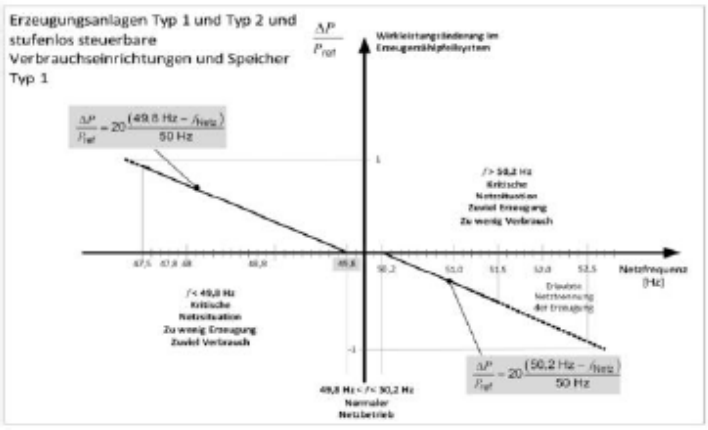
RoCoF complied with:

±2.0Hz/s for a moving average window 0.5s or

±1.5Hz/s for a moving average window 1s or

±1.25Hz/s for a moving average window 2s

P(f) curve:



Over frequency curve start point: 50.2Hz – 50.5Hz adjustable Over frequency curve droop: 2% - 12% adjustable.
Under frequency curve start point: 49.5Hz – 49.8Hz adjustable Under frequency curve droop: 2% - 12% adjustable
While frequency step or shift exceeded the dead-band of P(f) curve, the unit output decrease or increase according to the droop of curve. There is no power change when frequency located within the dead-band (50±200mHz default). In the case of frequency above 51.5Hz the unit is able to remain connected to grid for another 5s without any power increase.

Even if the mains frequency has regained the tolerance band of 50,0 Hz ± 200 mHz after the frequency deviation, a critical network condition shall still be assumed. The transition from "critical network condition" to "normal operation" is time-limited by a maximum change of the set-point active power, starting from Pmom. This set-point active power change (except for the supply of control energy) shall be limited to a maximum gradient of 10 % Pb inst/min. Only when the mains frequency has been within the tolerance band of 50,0 Hz ± 200 mHz for an uninterrupted period of 10 min, the normal network operation is considered to be restored and this requirement is no longer valid.

The following requirements complied:

1) Initial time delay Tv < 2 s
2) Accuracy of frequency measurement < 10 mHz
3) Accuracy of fast frequency measurement < 50 mHz
4) Sample time < 200 ms

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Active power output dependent on grid frequency			
Parameter	Setting range	Setting step	Default value
Power response to overfrequency (OFP)			
Overfrequency FP curve switch	ON/OFF	---	ON
Overfrequency enter reference power (Pref)	Pm | Pn | Pmax	---	Pm
Overfrequency threshold frequency [Hz]	50.00 Hz ... 65.00 Hz	0.01 Hz	50.20Hz
Overfrequency threshold power [%Pref]	0 % ... 100,0 %	0.1 %	100.0%
Overfrequency end point frequency[Hz]	50.00 Hz ... 65.00 Hz	0.01 Hz	51.50Hz
Overfrequency end point power [%Pref]	0 % ... 100,0 %	0.1 %	48.0%
Overfrequency slope[%Pref/Hz]	-100.0 ··· -10.0%Pref/Hz	0.1%Pref/Hz	-40%Pref/Hz
Overfrequency droop	2.0···20.0	0.1	5.0
Response delay time	0···5s	1s	0s
Overfrequency recovery mode	Mode 0 | Mode 1	---	Mode1
Overfrequency recovery point frequency	50.00 Hz ··· 65.00 Hz	0.01 Hz	50.10Hz
Overfrequency recovery waiting time	0···600s	1s	0s
Overfrequency slow recovery reference power (Pref)	Pm | Pn | Pmax	---	Pn
Overfrequency power recovery rate[%Pn/min]	0 % ··· 100,0 %	0.1 %	8.0%
Power response to underfrequency (UFP)			
LFSM-U curve switch	ON/OFF	---	ON
Underfrequency enter reference power (Pref)	Pm | Pn | Pmax	---	Pn
Underfrequency threshold frequency [Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	49.80Hz
Underfrequency threshold power [%Pref]	-100.0 ··· 100,0 %	0.1 %	-100.0%
Underfrequency midpoint frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	48.80Hz
Underfrequency midpoint power [%Pref]	-100.0 ··· 100,0 %	0.1 %	0 %
Underfrequency end point frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	47.80Hz
Underfrequency end point power[%Pref]	-100.0 ··· 100,0 %	0.1 %	100.0%
Underfrequency slope 1[%Pref/Hz]	-100.0 ··· -10.0	0.1%Pref/Hz	-100.0%Pref/Hz
Underfrequency droop 1[%]	2.0 ··· 20.0	0.1	2.0
Underfrequency slope 2[%Pref/Hz]	-100.0 ··· -10.0	0.1%Pref/Hz	-100.0%Pref/Hz
Underfrequency droop 2[%]	2.0 ··· 20.0	0.1	2.0
Underfrequency slow recovery switch	ON/OFF	---	ON
Underfrequency recovery mode	Mode 0 | Mode 1	---	Mode1

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Underfrequency recovery point frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	49.90Hz
Underfrequency power recovery rate[%Pn/min]	0 % ··· 100,0 %	0.1 %	8.0%
Underfrequency recovery waiting time	0···600s	1s	0s
Underfrequency slow recovery reference power	Pm | Pn | Pmax	---	Pn
Underfrequency power recovery rate	0 %/min ··· 100,0 %Pn/min	0.1 %Pn/min	8,0 %/min
Response delay time	0···5s	1s	0s

		Data Item	Data Value	Unit	Range
151	TITLE1	**Active response to frequency deviation (FP)**			
152	TITLE2	**Power response to overfrequency (OFP)**			
153	28061	Overfrequency FP curve switch	ON		
154	28062_12	Overfrequency enter reference power (Pref)	Pm		
155	28063	Overfrequency threshold frequency	50.20	Hz	[50.00,65.00]
156	28064	Overfrequency threshold power	100.0	%	[-100.0,100.0]
157	28065	Overfrequency end point frequency	51.50	Hz	[50.00,65.00]
158	28066	Overfrequency end point power	48.0	%	[-100.0,100.0]
159	00000	Overfrequency slope	-40	%/Hz	[-100.0,-10.0]
160	28113	Overfrequency droop	5.0	%	[2,20]
161	28114	Response delay time	0	s	[0,5]
162	28062_0	Overfrequency recovery mode	Mode1		
163	28067	Overfrequency recovery point frequency	50.10	Hz	[50.00,65.00]
164	28068	Overfrequency recovery waiting time	0	s	[0,600]
165	28069	Overfrequency slow recovery reference power (Pref)	Pn		
166	28070	Overfrequency power recovery rate	8.0	%min	[0.0,100.0]
167	TITLE2	**Power response to underfrequency (UFP)**			
168	28137	LFSM-U curve switch	ON		

		Data Item	Data Value	Unit	Range
169	28138_12	Underfrequency enter reference power (Pref)	Pn		
170	28139	Underfrequency threshold frequency	49.80	Hz	[45.00,60.00]
171	28140	Underfrequency threshold power	-100.0	%	[-100.0,100.0]
172	28141	Underfrequency midpoint frequency	48.80	Hz	[45.00,60.00]
173	28142	Underfrequency midpoint power	0.0	%	[-100.0,100.0]
174	28143	Underfrequency end point frequency	47.80	Hz	[45.00,60.00]
175	28144	Underfrequency end point power	100.0	%	[-100.0,100.0]
176	00002	Underfrequency slope 1	-100.0	%	[-100.0,-10.0]
177	28145	Underfrequency droop 1	2.0	%	[2,20]
178	00003	Underfrequency slope 2	-100.0	%	[-100.0,-10.0]
179	28146	Underfrequency droop 2	2.0	%	[2,20]
180	28147	Underfrequency slow recovery switch	ON		
181	28148_0	Underfrequency recovery mode	Mode1		
182	28149	Underfrequency recovery point frequency	49.90	Hz	[45.00,60.00]
183	28150	Underfrequency recovery waiting time	0	s	[0,600]
184	28151	Underfrequency slow recovery reference power	Pn		
185	28152	Underfrequency power recovery rate	8.0	%/min	[0.0,100.0]
186	28153	Response delay time	0	s	[0,5]

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9. Quasi-steady-state operation

During quasi-steady-state operation, the power generating plants shall be able to operate linked to the distribution network in compliance with the minimum time requirements given in following figure over the full frequency range of 47,5 Hz to 51,5 Hz and for voltages in the range of 85 % Uc to 115 % Uc (r.m.s. values of the phase-to-phase voltage) at the network connection point.

Minimum time requirements given in standard:

Following P-f diagram per VDE-AR-N 4110: 2023 complied:

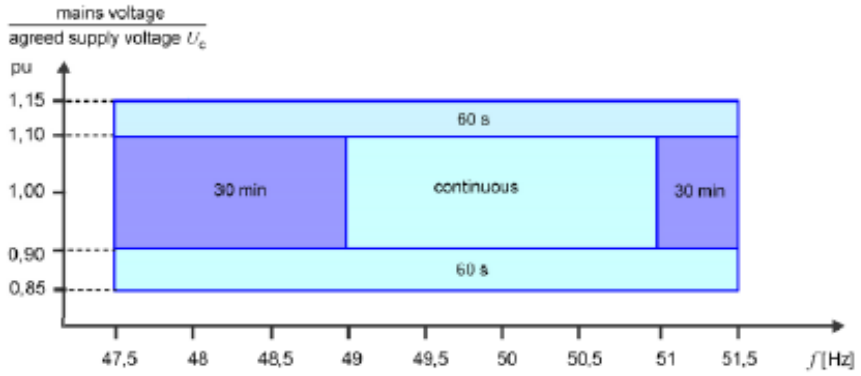
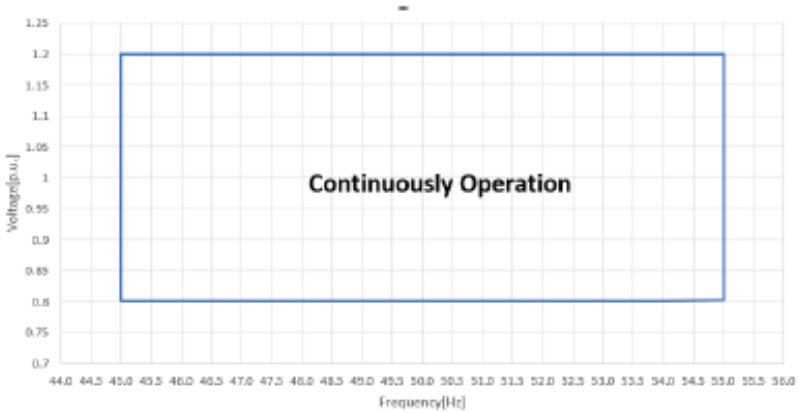


Figure 4 – Requirements for the quasi-steady-state operation of power generating plants

4110 Actual capability of inverter:



Continuously operation area: 0.8-1.2Un, 45.0-55.0Hz
Other areas: operation at least 120 mins

Remark:When the internal protection and FVRT functions are disabled, the machine cannot be operated outside the range.

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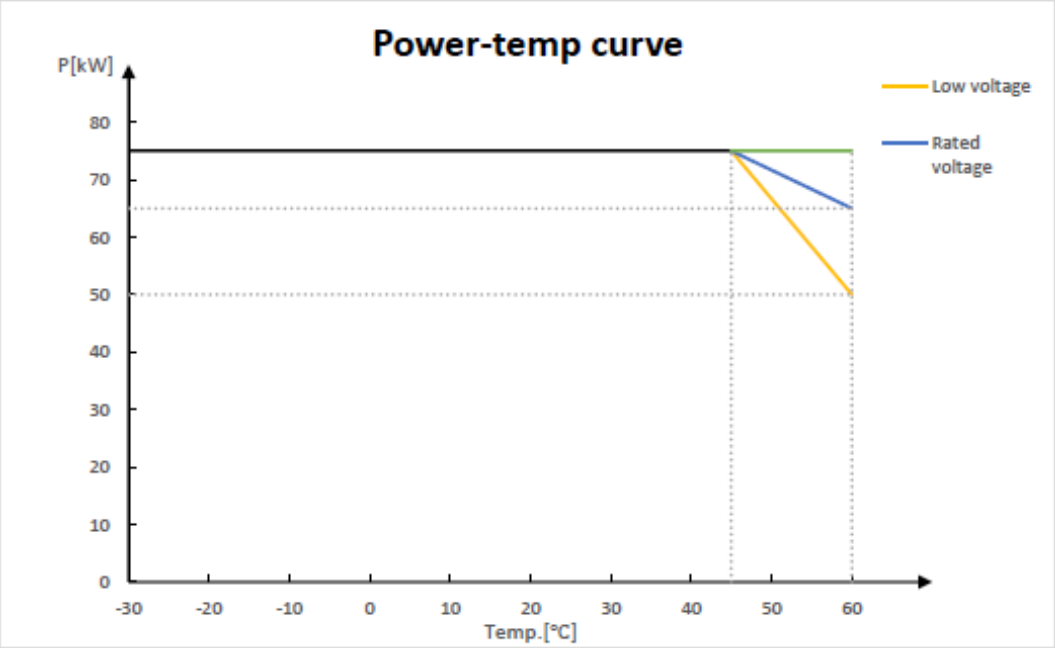
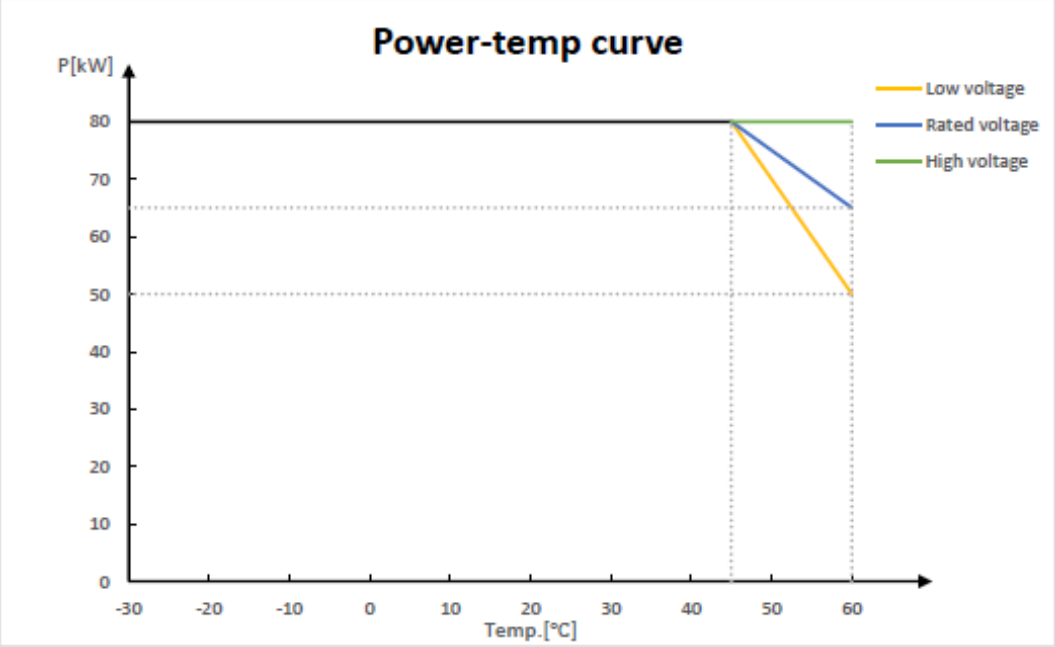
10. Active power dependent on ambient temperature

Following Power-temp curve applies on models:

M2HT-75K-300



M2HT-80K-300



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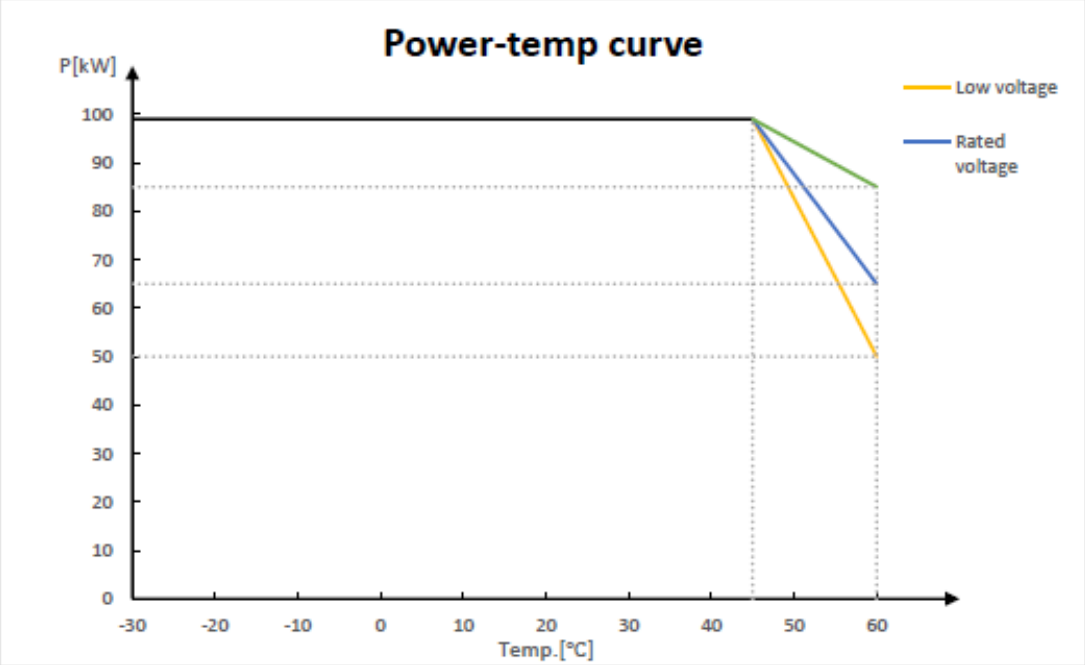
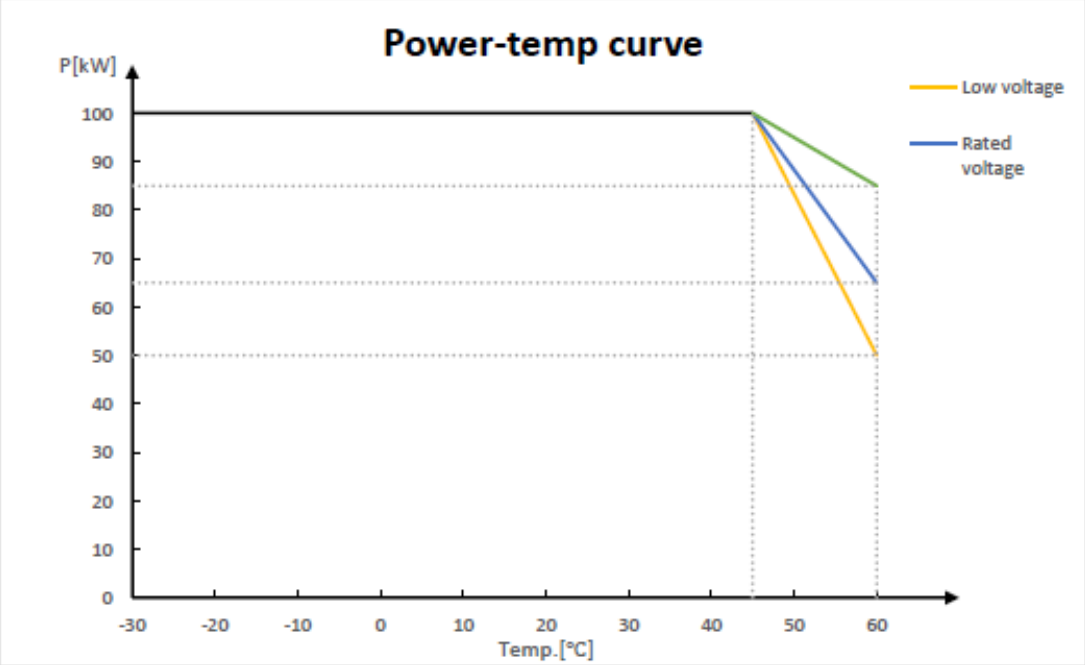
M2HT-99K-300

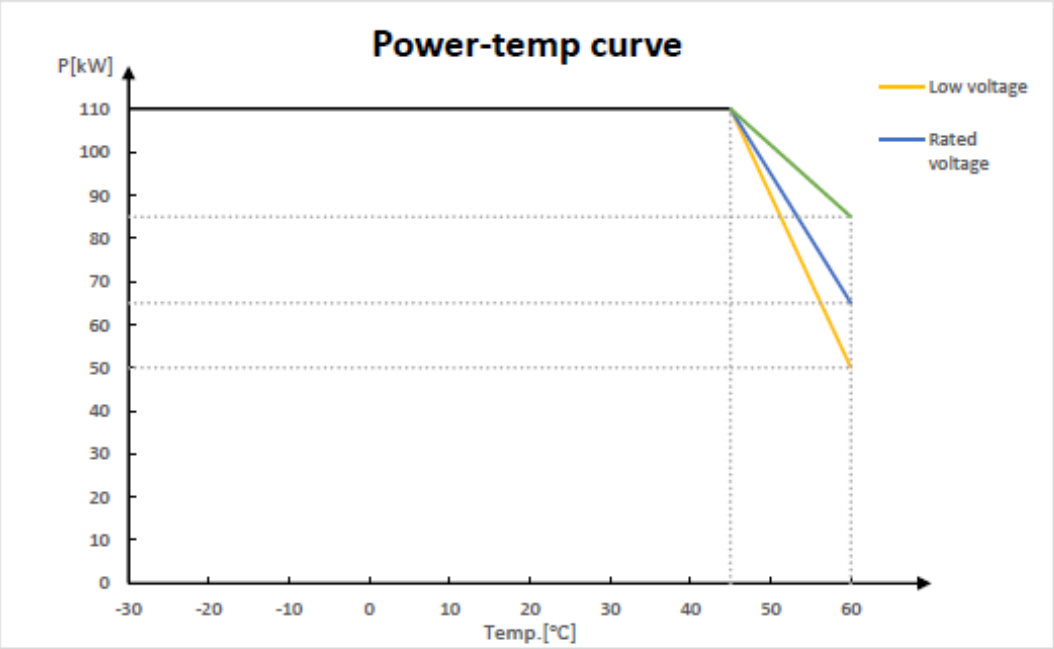


M2HT-100K-300

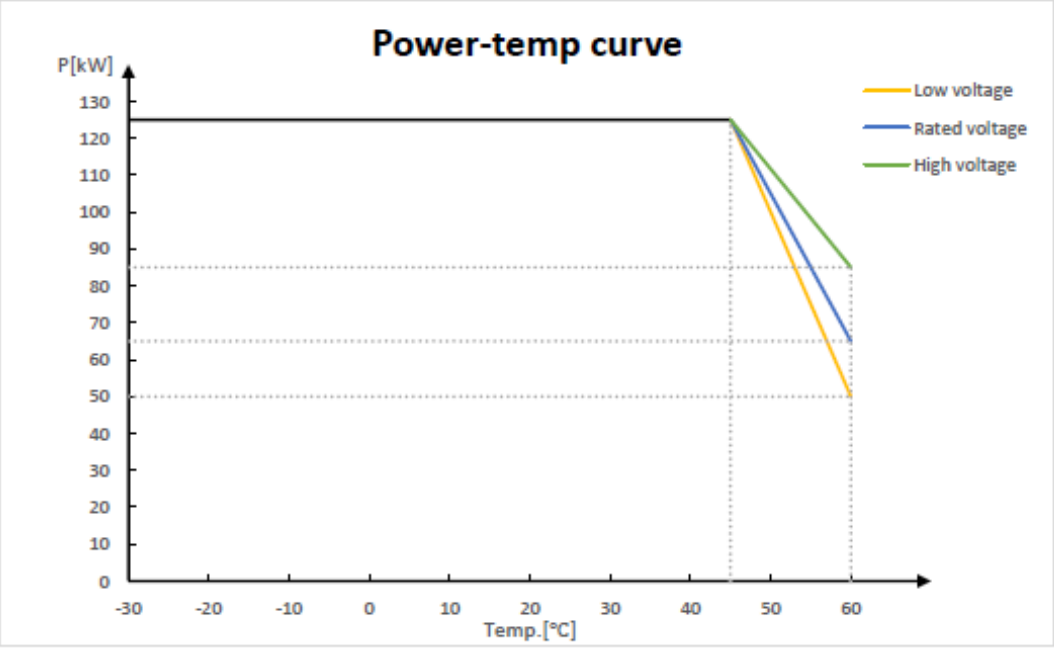


Declaration of VDE-AR-N 4110

M2HT-110K-300



M2HT-125K-300



11. Interface protection function

Interface protection settings:			
Parameter	Setting range	Setting step	Default value
Voltage Protection			
Level-1 UV protection threshold	0.0...300.0V	0.1V	184.0V
Level-1 UV protection time	0...600000ms	1 ms	2400ms
Level-1 OV protection threshold	0.0...300.0V	0.1V	253.0V
Level-1 OV protection time	0...600000ms	1 ms	180000ms
Level-2 UV protection threshold	0.0...300.0V	0.1V	69.0V
Level-2 UV protection time	0...600000ms	1 ms	800ms
Level-2 OV protection threshold	0.0...300.0V	0.1V	287.5V
Level-2 OV protection time	0...600000ms	1 ms	100ms
10Min OV protection switch	ON/OFF	---	OFF
10Min OV protection threshold	0.0...300.0V	0.1V	253.0V
Frequency Protection			
Level-1 UF protection threshold	45.00...65.00 Hz	0.01 Hz	47.50Hz
Level-1 UF protection time	0...600000ms	1 ms	100ms
Level-1 OF protection threshold	45.00...65.00 Hz	0.01 Hz	51.50Hz
Level-1 OF protection time	0...600000ms	1 ms	5000ms
Level-2 UF protection threshold	45.00...65.00 Hz	0.01 Hz	47.50Hz
Level-2 UF protection time	0...600000ms	1 ms	100ms
Level-2 OF protection threshold	45.00...65.00 Hz	0.01 Hz	52.50Hz
Level-2 OF protection time	0...600000ms	1 ms	100ms

		Data Item	Data Value	Unit	Range
5	TITLE1	**Grid and System Protection**			
6	TITLE2	**Voltage Protection**			
7	28004	Level-1 UV protection threshold	184.0	V	[0.0,300.0]
8	28005	Level-1 UV protection time	2400	ms	[0,600000]
9	28006	Level-1 OV protection threshold	253.0	V	[0.0,300.0]
10	28007	Level-1 OV protection time	180000	ms	[0,600000]
11	28008	Level-2 UV protection threshold	69.0	V	[0.0,300.0]
12	28009	Level-2 UV protection time	800	ms	[0,600000]
13	28010	Level-2 OV protection threshold	287.5	V	[0.0,300.0]
14	28011	Level-2 OV protection time	100	ms	[0,600000]
15	28101	10Min OV protection switch	OFF		
16	28102	10Min OV protection threshold	253.0	V	[0.0,300.0]

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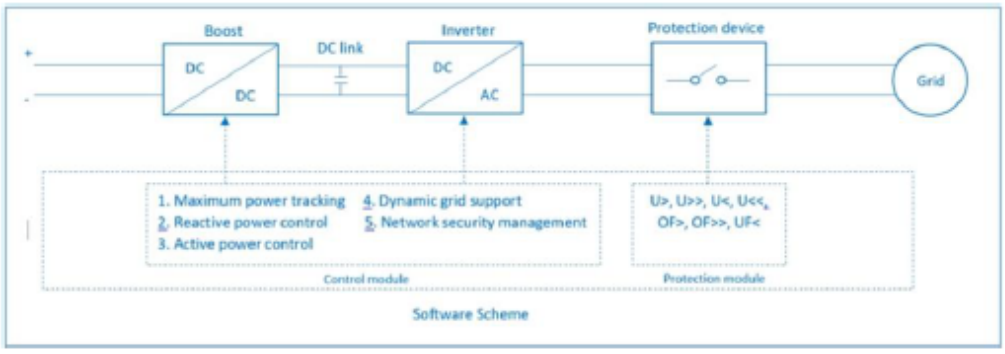
		Data item	Data Value	Unit	Range
17	TITLE2	**Frequency Protection**			
18	28012	Level-1 UF protection threshold	47.50	Hz	[45.00,65.00]
19	28013	Level-1 UF protection time	100	ms	[0,600000]
20	28014	Level-1 OF protection threshold	51.50	Hz	[45.00,65.00]
21	28015	Level-1 OF protection time	5000	ms	[0,600000]
22	28016	Level-2 UF protection threshold	47.50	Hz	[45.00,65.00]
23	28017	Level-2 UF protection time	100	ms	[0,600000]
24	28018	Level-2 OF protection threshold	52.50	Hz	[45.00,65.00]
25	28019	Level-2 OF protection time	100	ms	[0,600000]

All the settings values are readable through PC.

The self-check function of protection device is integrated in unit and could be started by PC without any wiring change. When self-check function started, the program would change the voltage sampling value to trip the protection settings. It's detected by unit if the protection relay works normally.

The integrated protection functions are implemented in separate software modules and they operate independent from control functions as the software block diagram below:



The auxiliary power supply of protection device be supply from dc side, as a network independent auxiliary power can supply to the protection device over 5s. The protection device would be tripped immediately as long as the auxiliary power supply failed.

Declaration of VDE-AR-N 4110

12. Connection conditions and Reconnection conditions

The Hybrid Inverter could be connected for 47,5 Hz ± 0,1 Hz and 50,2Hz ± 0,1 Hz as well as at 90 % Un and 110 % Un ± 2 % Un. The verification of connection can be carried out at simulated mains frequency and mains voltage. The connection power gradient could be set from 0%Pn/min to 100%Pn/min. The default value is 20%Pn/min.

After a power generating unit was disconnected from the network by opening the coupler circuit-breaker(galvanic isolation) at the power generating unit due to the tripping of decoupling protection equipment(overfrequency, underfrequency, voltage reduction, voltage rise), automatic connection or reconnection of the power generating units is permitted only if the voltage at the network connection point is at least 95 % Uc and if the frequency is between 49,9 Hz and 50,1 Hz.

The gradient of power recovery could be set between 0%Pn/min to 100%Pn/min.

Automatic reconnection of the power generating units may only be made after the mains voltage and frequency have been stable within the aforementioned voltage and frequency limits for a settable period of time. This time period shall be adjustable from 10s operation up to 600s. Unless otherwise specified by the network operator, a default value of 300s shall be set.

The conditions for product connection are shown in the table below for setting conditions.

Simultaneous sampling accuracy:

Voltage ±1%

Frequency ±0.05Hz

Time ±20ms

Connection condition settings:			
Parameter	Setting range	Setting step	Default value
Connection and starting to generate power			
Grid connection switch	ON/OFF	---	OFF
Connection slow loading mode	Mode1 | Mode2 | Mode3	---	Mode2
Active power increase gradient	0.0···100.0Pn%/min	0.1Pn%/min	20.0Pn%/min
Starting to generate power			
Lower voltage	0.0···300.0 V	0.1 V	207.0V
Upper voltage	0.0···300.0 V	0.1 V	253.0V
Lower frequency	45.00···65.00 Hz	0.01 Hz	47.50Hz
Upper frequency	45.00···65.00 Hz	0.01 Hz	50.20Hz
Observation time	10···600 s	1 s	300 s
Reconnection after tripping			
Lower voltage	0.0···300.0 V	0.1 V	218.5V
Upper voltage	0.0···300.0 V	0.1 V	253.0V
Lower frequency	45.00···65.00 Hz	0.01 Hz	49.90Hz
Upper frequency	45.00···65.00 Hz	0.01 Hz	50.10Hz
Observation time	10···600 s	1 s	300 s

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		Data Item	Data Value	Unit	Range
26	TITLE1	**Connection and starting to generate power**			
27	28044	Grid connection switch	ON		
28	28071	Connection slow loading mode	Mode2		
29	28072	Active power increase gradient	20.0	%Pn/min	[0.0,100.0]
30	TITLE2	**Starting to generate power**			
31	28047	Lower voltage	207.0	V	[0.0,300.0]
32	28048	Upper voltage	253.0	V	[0.0,300.0]
33	28049	Lower frequency	47.50	Hz	[45.00,65.00]
34	28050	Upper frequency	50.20	Hz	[45.00,65.00]
35	28045	Observation time	300	s	[10,600]
36	TITLE2	**Reconnection after tripping**			
37	28051	Lower voltage	218.5	V	[0.0,300.0]
38	28052	Upper voltage	253.0	V	[0.0,300.0]
39	28053	Lower frequency	49.90	Hz	[45.00,65.00]
40	28054	Upper frequency	50.10	Hz	[45.00,65.00]
41	28046	Observation time	300	s	[10,600]

13. Interface Switch Information

Mfg.	Type	Parameter
Shanghai Liangxin Electrical Co., Ltd	NDC1-3304	330A/AC380V， -40℃ ~ +70℃
Shanghai Liangxin Electrical Co., Ltd	NDC1-4004(alternative)	400A/AC380V， -40℃ ~ +70℃
Shanghai KingSi Power Co., Ltd.	KSiC1-630(alternative)	630A/AC380V， -30℃ ~ +75℃
Hong Fa	HF167F-270/12-HPTFL(978)	270A/1000VAC/12VDC, -40℃ ~ 85℃
Hong Fa	HF167F-200/12-HTF(alternative)	200A/830VAC/12VDC, -40℃ ~ 85℃
Hong Fa	HF172F-200/12-HTF(alternative)	200A/830VAC/12VDC,-40℃ ~ 85℃

the interface switch complied with:

- Three-pole galvanic separation.

- The switch is designed as specified by the manufacturer. The switching capacity of the coupling switch may sustain the max. output current of inverter

- The coupling switch is designed to be triggered without delay.

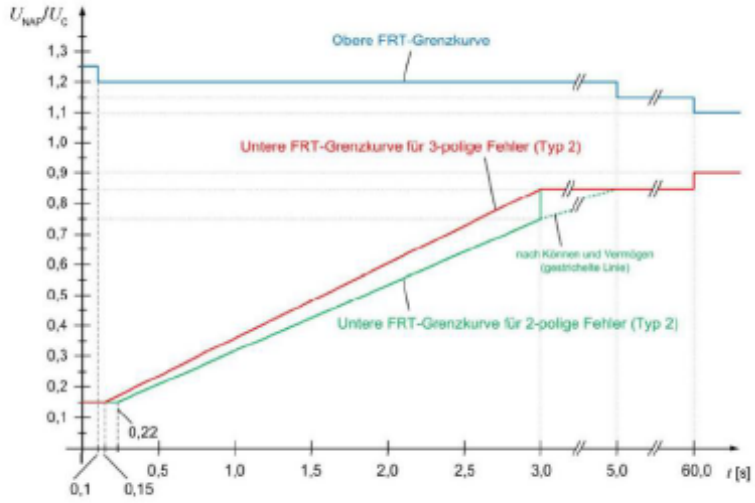
- The sum of time elements of the protection and switching equipment does not exceed 100 ms.

Declaration of VDE-AR-N 4110

14. Dynamic Grid Support

The inverter is able to keep connecting on the grid in case grid voltage change within the limit curve below, even the step change of voltage exceeded 15%Un. The inverter is able to ride through several consecutive voltage dips.

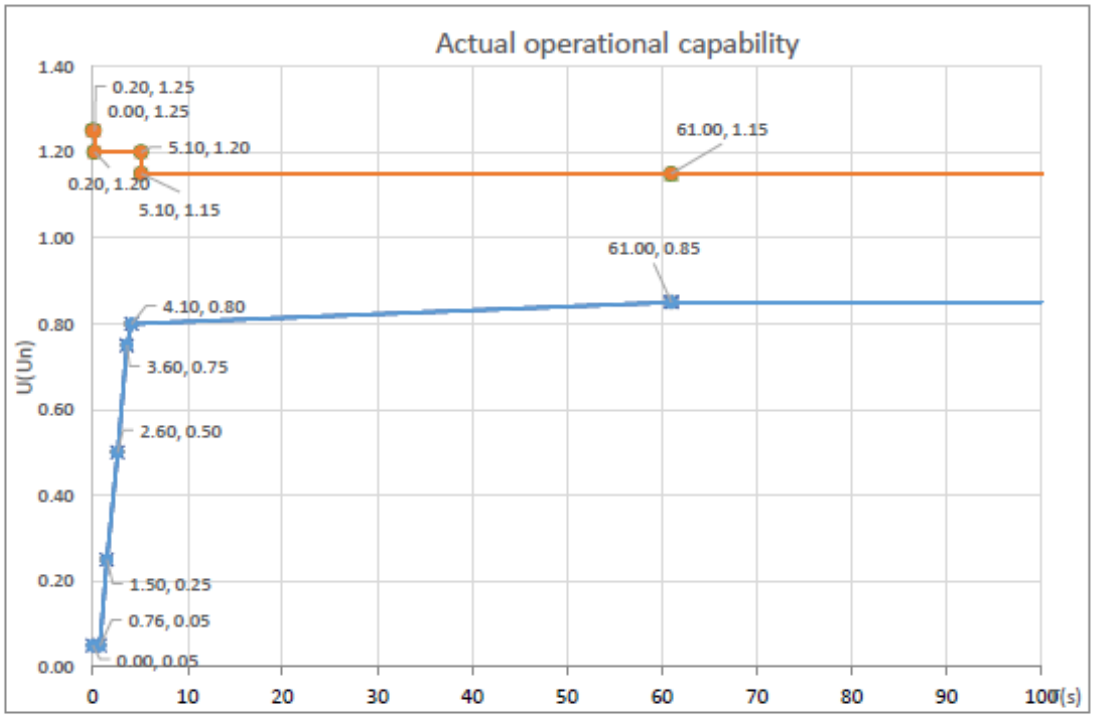
Following FVRT curve per VDE-AR-N 4110:2023 complied:



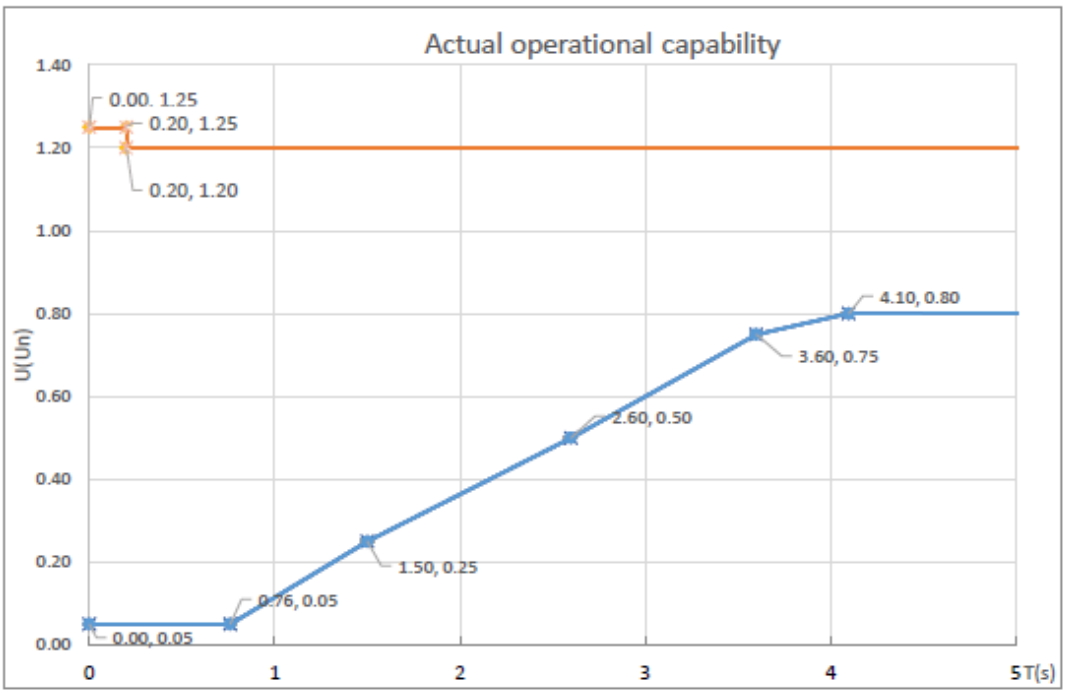
Legende

U_{NAP} Effektivwert der aktuellen Spannung am Netzanschlusspunkt

Actual capability:



Declaration of VDE-AR-N 4110



During the voltage fault, the inverter may:

a) cease feeding any current to grid or
b) feed the reactive current of both positive and negative sequence components according to the ΔU-ΔI relationship below:

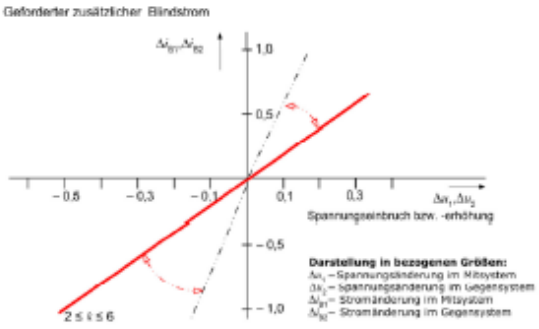


Bild 15 – Prinzip der Spannungsstützung bei Netzfehlern

Response the reactive current fulfill:
a) Anschwingzeit: $T_{an_90\,\%} \leq 30$ ms;
b) Einschwingzeit: $T_{ein_\Delta x} \leq 60$ ms.

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Dynamic network support			
Parameter	Setting range	Setting step	Default value
LVRT			
LVRT switch	ON/OFF	---	ON
Zero current voltage	0···230.0V	0.1V	161.0V
Lock in voltage	0···230.0V	0.1V	207.0V
Lock out voltage	0···230.0V	0.1V	211.6V
Point 1 voltage	0···207.0V	0.1V	11.5V
Point 1 protection time	0···62000ms	1ms	760ms
Point 2 voltage	0···207.0V	0.1V	57.5V
Point 2 protection time	0···62000ms	1ms	1500ms
Point 3 voltage	0···207.0V	0.1V	115.0V
Point 3 protection time	0···62000ms	1ms	2600ms
Point 4 voltage	0···207.0V	0.1V	172.5V
Point 4 protection time	0···62000ms	1ms	3600ms
Point 5 voltage	0···207.0V	0.1V	184.0V
Point 5 protection time	0···62000ms	1ms	4100ms
K factor	0···10	0.1	2.00
Voltage abrupt change LVRT switch	ON/OFF	---	ON
Voltage abrupt change threshold(LVRT)	0···30.0V	0.1V	5.0V

Dynamic network support			
Parameter	Setting range	Setting step	Default value
HVRT			
HVRT switch	ON/OFF	---	ON
Reactive power switch	ON/OFF	---	OFF
Lock in voltage	230···287.5V	0.1V	253.0V
Lock out voltage	230···287.5V	0.1V	250.7V
Point 1 voltage	230···287.5V	0.1V	264.5V
Point 1 protection time	0···62000ms	1ms	61000ms
Point 2 voltage	230···287.5V	0.1V	276.0V
Point 2 protection time	0···62000ms	1ms	5100ms
Point 3 voltage	230···287.5V	0.1V	287.5V
Point 3 protection time	0···62000ms	1ms	200ms
K factor	0···10	0.1	2.00
Voltage abrupt change OVRT switch	ON/OFF	---	ON
Voltage abrupt change threshold(OVRT)	0···30.0V	0.1V	5.0V

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		Data Item	Data Value	Unit	Range
187	TITLE1	**LVRT**			
188	28085	LVRT switch	ON		
189	28086	Zero current voltage	161.0	V	[0,230]
190	28073	Lock in voltage	207.0	V	[0,230]
191	28074	Lock out voltage	211.6	V	[0,230]
192	28075	Point 1 voltage	11.5	V	[0,207]
193	28080	Point 1 protection time	760	ms	[0,62000]
194	28076	Point 2 voltage	57.5	V	[0,207]
195	28081	Point 2 protection time	1500	ms	[0,62000]
196	28077	Point 3 voltage	115.0	V	[0,207]
197	28082	Point 3 protection time	2600	ms	[0,62000]
198	28078	Point 4 voltage	172.5	V	[0,207]
199	28083	Point 4 protection time	3600	ms	[0,62000]
200	28079	Point 5 voltage	184.0	V	[0,207]
201	28084	Point 5 protection time	4100	ms	[0,62000]
202	28103	K factor	2.00		[0,10]
203	28105	Voltage abrupt change LVRT switch	OFF		
204	28221	Voltage abrupt change threshold(LVRT)	5.0	%Un	[0.0,30.0]

		Data Item	Data Value	Unit	Range
205	TITLE1	**HVRT**			
206	28096	HVRT switch	ON		
207	28097	Reactive power switch	OFF		
208	28088	Lock in voltage	253.0	V	[230,287.5]
209	28089	Lock out voltage	250.7	V	[230,287.5]
210	28090	Point 1 voltage	264.5	V	[230,287.5]
211	28093	Point 1 protection time	61000	ms	[0,62000]
212	28091	Point 2 voltage	276.0	V	[230,287.5]
213	28094	Point 2 protection time	5100	ms	[0,62000]
214	28092	Point 3 voltage	287.5	V	[230,287.5]
215	28095	Point 3 protection time	200	ms	[0,62000]
216	28104	K factor	2.00		[0,10]
217	28106	Voltage abrupt change OVRT switch	OFF		
218	28220	Voltage abrupt change threshold(OVRT)	5.0	%Un	[0.0,30.0]

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15.Multiple faults

Per control strategy of inverter, the PV input power reduced meanwhile in case the power output is blocked during voltage dips. Thus, the primary available energy is able to completely dissipate during the fault.

For instance, in multiple faults test procedure below under PEmax power condition, the dissipated energy can be estimated by PEmax*(0.16s+0.6s+1.05s+0.16s+1.05s)= PEmax*3.02s

Event	Times according to VDE-AR-N 4110 [4]/ VDE-AR-N 4120 [3] in s	Alternative sequence times in s
Drop	0.14 – 0.16	0.14 – 0.16
Break	0.30 – 2	0.30 – 2
Drop	0.55 – 0.6	0.95 – 1.05
Break	20 – 30	20 – 30
Drop	0.95 – 1.05	0.14 – 0.16
Break	20 – 30	0.30 – 2
Drop	0.14 – 0.16	0.95 – 1.05
Break	0.30 – 2	20 – 30
Drop	0.95 – 1.05	0.14 – 0.16
Break	-	0.30 – 2
Drop	-	0.95 – 1.05

Table 4-81: Multiple faults

After multiple faults, the product can continue to enter multiple faults even after 30 minutes.

Declaration of VDE-AR-N 4110

16. Configuration summary

Interface protection settings:			
Parameter	Setting range	Setting step	Default value
Level-1 UV protection threshold	0.0…300.0V	0.1V	184.0V
Level-1 UV protection time	0…600000ms	1 ms	2400ms
Level-1 OV protection threshold	0.0…300.0V	0.1V	253.0V
Level-1 OV protection time	0…600000ms	1 ms	180000ms
Level-2 UV protection threshold	0.0…300.0V	0.1V	69.0V
Level-2 UV protection time	0…600000ms	1 ms	800ms
Level-2 OV protection threshold	0.0…300.0V	0.1V	287.5V
Level-2 OV protection time	0…600000ms	1 ms	100ms
Level-1 UF protection threshold	45.00…65.00 Hz	0.01 Hz	47.50Hz
Level-1 UF protection time	0…600000ms	1 ms	100ms
Level-1 OF protection threshold	45.00…65.00 Hz	0.01 Hz	51.50Hz
Level-1 OF protection time	0…600000ms	1 ms	5000ms
Level-2 UF protection threshold	45.00…65.00 Hz	0.01 Hz	47.50Hz
Level-2 UF protection time	0…600000ms	1 ms	100ms
Level-2 OF protection threshold	45.00…65.00 Hz	0.01 Hz	52.50Hz
Level-2 OF protection time	0…600000ms	1 ms	100ms
Self-protection settings:			
Parameter	Setting range	Setting step	Default value
OV protection value	--	--1.30Un	1.30Un
OV protection time	--	--	50ms
Connection condition settings:			
Parameter	Setting range	Setting step	Default value
Lower voltage	0.0···300.0 V	0.1 V	207.0V
Upper voltage	0.0···300.0 V	0.1 V	253.0V
Lower frequency	45.00···65.00 Hz	0.01 Hz	47.50Hz
Upper frequency	45.00···65.00 Hz	0.01 Hz	50.20Hz
Observation time	10···600 s	1 s	300 s
Active power increase gradient	0.0···100.0Pn%/min	0.1Pn%/min	20.0Pn%/min
Reonnection condition settings:			
Parameter	Setting range	Setting step	Default value
Lower voltage	0.0···300.0 V	0.1 V	218.5V
Upper voltage	0.0···300.0 V	0.1 V	253.0V
Lower frequency	45.00···65.00 Hz	0.01 Hz	49.90Hz
Upper frequency	45.00···65.00 Hz	0.01 Hz	50.10Hz
Observation time	10···600 s	1 s	300 s
Active power increase gradient	0.0···100.0Pn%/min	0.1Pn%/min	20.0Pn%/min
Reactive power-voltage character curve Q(U):			
Parameter	Setting range	Setting step	Default value
Q(U)_1mode			
Point 1 voltage	184.0···276.0V	0.1V	211.6V
Point 1 reactive power	-60.0···60.0%	0.1%	33.0%
Point 2 voltage	184.0···276.0V	0.1V	216.2V
Point 2 reactive power	-60.0···60.0%	0.1%	33.0%
Point 3 voltage	184.0···276.0V	0.1V	218.5V

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Point 3 reactive power	-60.0···60.0%	0.1%	33.0%
Point 4 voltage	184.0···276.0V	0.1V	220.8V
Point 4 reactive power	-60.0···60.0%	0.1%	33.0%
Point 5 voltage	184.0···276.0V	0.1V	225.4V
Point 5 reactive power	-60.0···60.0%	0.1%	16.5%
Point 6 voltage	184.0···276.0V	0.1V	230.0V
Point 6 reactive power	-60.0···60.0%	0.1%	0%
Point 7 voltage	184.0···276.0V	0.1V	234.6V
Point 7 reactive power	-60.0···60.0%	0.1%	-16.5%
Point 8 voltage	184.0···276.0V	0.1V	239.2V
Point 8 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 9 voltage	184.0···276.0V	0.1V	241.5V
Point 9 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 10 voltage	184.0···276.0V	0.1V	243.8V
Point 10 reactive power	-60.0···60.0%	0.1%	-33.0%
Q(U) curve reactive power reference value	Parameter not adjustable		Sn
Q(U)_1Time constant(τ)	0.0···60.0s	0.1s	3.3s
Q(U) Enter/exit mode	Mode 0···Mode 1	NA	Mode1
Lock in power	0.0···100.0%	0.1%	20.0%
Lock out power	0.0···100.0%	0.1%	5.0%
Minimum PF(cosφ)	0.1···0.8	0.1	0.4
Voltage displacement	-15.0···15.0%Un	0.1%Un	0.0%Un
Voltage dead band	-5.0···5.0%Un	0.1%Un	0.0%Un
Q(U) _ 2mode			
Point 1 voltage	184.0···276.0V	0.1V	211.6V
Point 1 reactive power	-60.0···60.0%	0.1%	33.0%
Point 2 voltage	184.0···276.0V	0.1V	216.2V
Point 2 reactive power	-60.0···60.0%	0.1%	33.0%
Point 3 voltage	184.0···276.0V	0.1V	218.5V
Point 3 reactive power	-60.0···60.0%	0.1%	33.0%
Point 4 voltage	184.0···276.0V	0.1V	220.8V
Point 4 reactive power	-60.0···60.0%	0.1%	33.0%
Point 5 voltage	184.0···276.0V	0.1V	225.4V
Point 5 reactive power	-60.0···60.0%	0.1%	16.5%
Point 6 voltage	184.0···276.0V	0.1V	230.0V
Point 6 reactive power	-60.0···60.0%	0.1%	0%
Point 7 voltage	184.0···276.0V	0.1V	234.6V
Point 7 reactive power	-60.0···60.0%	0.1%	-16.5%
Point 8 voltage	184.0···276.0V	0.1V	239.2V
Point 8 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 9 voltage	184.0···276.0V	0.1V	241.5V
Point 9 reactive power	-60.0···60.0%	0.1%	-33.0%
Point 10 voltage	184.0···276.0V	0.1V	243.8V
Point 10 reactive power	-60.0···60.0%	0.1%	-33.0%
Q(U)_2 curve reactive power reference value	Parameter not adjustable		Sn
Q(U)_2 Time constant(τ)	0.0···60.0s	0.1s	3.3s
Q(U)_2 Enter/exit mode	Mode 0···Mode 1	NA	Mode1
Lock in power	0.0···100.0%	0.1%	20.0%
Lock out power	0.0···100.0%	0.1%	5.0%

Declaration of VDE-AR-N 4110

Minimum PF(cosφ)	0.1···0.8	0.1	0.4
reactive power displacement	-60.0···60.0%	0.1%	0.0%
Voltage dead band	-5.0···5.0%Un	0.1%Un	0.0%Un
Character curve Q(P)			
Parameter	Setting range	Setting step	Default value
Point 1 active power	-100···100%	0.1%	0.0%
Point 1 reactive power	-100···100%	0.1%	0.0%
Point 2 active power	-100···100%	0.1%	20.0%
Point 2 reactive power	-100···100%	0.1%	0.0%
Point 3 active power	-100···100%	0.1%	40.0%
Point 3 reactive power	-100···100%	0.1%	0.0%
Point 4 active power	-100···100%	0.1%	50.0%
Point 4 reactive power	-100···100%	0.1%	0.0%
Point 5 active power	-100···100%	0.1%	55.0%
Point 5 reactive power	-100···100%	0.1%	-2.5%
Point 6 active power	-100···100%	0.1%	60.0%
Point 6 reactive power	-100···100%	0.1%	-5.0%
Point 7 active power	-100···100%	0.1%	75.0%
Point 7 reactive power	-100···100%	0.1%	-19.0%
Point 8 active power	-100···100%	0.1%	90.0%
Point 8 reactive power	-100···100%	0.1%	-33.0%
Point 9 active power	-100···100%	0.1%	95.0%
Point 9 reactive power	-100···100%	0.1%	-33.0%
Point 10 active power	-100···100%	0.1%	100.0%
Point 10 reactive power	-100···100%	0.1%	-33.0%
Q(P) time constant(τ)	0.0···60.0s	0.1s	3.3s
Fixed Q			
Parameter	Setting range	Setting step	Default value
Fixed Q	-60···60%	0.1%	0.0%
Fixed Q time constant(τ)	0.0···60.0s	0.1s	3.3s
Fixed cosφ			
Parameter	Setting range	Setting step	Default value
PF	0.800ue…0.800oe	0.001	1.000
Fixed cosφ time constant(τ)	0.0···60.0s	0.1s	3.3s
Network security management			
Parameter	Setting range	Setting step	Default value
Max Active power mode	Parameter not adjustable		Rated
Active power output limit	0 %...100 %	0.1 %	100.0%
Slow change switch	OFF/ON	--	On
Slow change rate	0.00 ...100.00%Pn/s	0.01 %	0.50%
Active power output dependent on grid frequency			
Parameter	Setting range	Setting step	Default value
Power response to overfrequency (OFP)			
Overfrequency FP curve switch	ON/OFF	---	ON
Overfrequency enter reference power (Pref)	Pm | Pn | Pmax	---	Pm
Overfrequency threshold frequency [Hz]	50.00 Hz … 65.00 Hz	0.01 Hz	50.20Hz
Overfrequency threshold power [%Pref]	0 % … 100,0 %	0.1 %	100.0%

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Overfrequency end point frequency[Hz]	50.00 Hz … 65.00 Hz	0.01 Hz	51.50Hz
Overfrequency end point power [%Pref]	0 % … 100,0 %	0.1 %	48.0%
Overfrequency slope[%Pref/Hz]	-100.0 ··· -10.0	0.1%Pref/Hz	-40%Pref/Hz
Overfrequency droop	2.0···20.0	0.1	5.0
Response delay time	0···5s	1s	0s
Overfrequency recovery mode	Mode 0 | Mode 1	---	Mode1
Overfrequency recovery point frequency	50.00 Hz ··· 65.00 Hz	0.01 Hz	50.10Hz
Overfrequency recovery waiting time	0···600s	1s	0s
Overfrequency slow recovery reference power (Pref)	Pm | Pn | Pmax	---	Pn
Overfrequency power recovery rate[%Pn/min]	0 % ··· 100,0 %Pn/min	0.1 %Pn/min	8.0%Pn/min
Power response to underfrequency (UFP)			
LFSM-U curve switch	ON/OFF	---	ON
Underfrequency enter reference power (Pref)	Pm | Pn | Pmax	---	Pn
Underfrequency threshold frequency [Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	49.80Hz
Underfrequency threshold power [%Pref]	-100.0 ··· 100,0 %	0.1 %	-100.0%
Underfrequency midpoint frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	48.80Hz
Underfrequency midpoint power [%Pref]	-100.0 ··· 100,0 %	0.1 %	0%
Underfrequency end point frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	47.80Hz
Underfrequency end point power[%Pref]	-100.0 ··· 100,0 %	0.1 %	100.0%
Underfrequency slope 1[%Pref/Hz]	-100.0 ··· -10.0	0.1%Pref/Hz	-100.0%Pref/Hz
Underfrequency droop 1[%]	2.0 ··· 20.0	0.1	2.0
Underfrequency slope 2[%Pref/Hz]	-100.0 ··· -10.0	0.1%Pref/Hz	-100.0%Pref/Hz
Underfrequency droop 2[%]	2.0 ··· 20.0	0.1	2.0
Underfrequency slow recovery switch	ON/OFF	---	ON
Underfrequency recovery mode	Mode 0 | Mode 1	---	Mode1
Underfrequency recovery point frequency[Hz]	45.00 Hz ··· 60.00 Hz	0.01 Hz	49.90Hz
Underfrequency power recovery rate[%Pn/min]	0 % ··· 100,0 %Pn/min	0.1 %Pn/min	8.0%Pn/min
Underfrequency recovery waiting time	0···600s	1s	0s
Underfrequency slow recovery reference power	Pm | Pn | Pmax	---	Pn
Underfrequency power recovery rate[%Pn/min]	0 %/min ··· 100,0 %Pn/min	0.1 %Pn/min	8,0 %Pn/min
Response delay time	0···5s	1s	0s

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Dynamic network support			
Parameter	Setting range	Setting step	Default value
LVRT			
LVRT switch	ON/OFF	---	ON
Zero current voltage	0···230.0V	0.1V	161.0V
Lock in voltage	0···230.0V	0.1V	207.0V
Lock out voltage	0···230.0V	0.1V	211.6V
Point 1 voltage	0···207.0V	0.1V	11.5V
Point 1 protection time	0···62000ms	1ms	760ms
Point 2 voltage	0···207.0V	0.1V	57.5V
Point 2 protection time	0···62000ms	1ms	1500ms
Point 3 voltage	0···207.0V	0.1V	115.0V
Point 3 protection time	0···62000ms	1ms	2600ms
Point 4 voltage	0···207.0V	0.1V	172.5V
Point 4 protection time	0···62000ms	1ms	3600ms
Point 5 voltage	0···207.0V	0.1V	184.0V
Point 5 protection time	0···62000ms	1ms	4100ms
K factor	0···10	0.1	2.00
Voltage abrupt change LVRT switch	ON/OFF	---	ON
Voltage abrupt change threshold(LVRT)	0···30.0V	0.1V	5.0V
HVRT			
HVRT switch	ON/OFF	---	ON
Reactive power switch	ON/OFF	---	OFF
Lock in voltage	230···287.5V	0.1V	253.0V
Lock out voltage	230···287.5V	0.1V	250.7V
Point 1 voltage	230···287.5V	0.1V	264.5V
Point 1 protection time	0···62000ms	1ms	61000ms
Point 2 voltage	230···287.5V	0.1V	276.0V
Point 2 protection time	0···62000ms	1ms	5100ms
Point 3 voltage	230···287.5V	0.1V	287.5V
Point 3 protection time	0···62000ms	1ms	200ms
K factor	0···10	0.1	2.00
Voltage abrupt change OVRT switch	ON/OFF	---	ON
Voltage abrupt change threshold(OVRT)	0···30.0V	0.1V	5.0V
Automatic shutdown			
Parameter	Setting range	Setting step	Default value
Communication Interruption Configuration	- On/Off	--	Communication Interruption Configuration: Off (VDE-AR-N 4110)
Note(s): The default is off.If communication with plant controller or network operator interrupted over 1min, the reactive power will maintain the last set-point received. If the setting is On.When communication is interrupted, the machine will be shut down immediately, the time is not set , after the communication is restored in accordance with the connection condition to start the machine.			

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17. Short-circuited current of PGU

Type of power generating Unit	Information	Symbol	Value [p.u.]
PGU with full-scale converters	RMS value of the source current for three-phase fault	I_{skPF}	1.0Imax
	RMS value of the source current for two-phase fault	$I_{(1)sk2PF}$	1.0Imax
	RMS value of the source current for single-phase fault	$I_{(1)sk1PF}$	1.0Imax
	Negative-sequence short-circuit impedance for integer k-factors	$Z_{(2)PF}$	0.50Ohm

The Power Generation Unit has been designed so that the requirements of VDE-AR-N 4110 for the controller can be complied with.

The prototype is an essential technical advancement or innovation. This product has not been certified and has not been commissioned in Germany.

This product is different to already existing or certified products.

- End -

Anhang 2 / Annex 2:
Quality Management
QUALITY MANAGEMENT SYSTEM CERTIFICATION

CERTIFICATE

Certificate No: 016ZB25Q30850R0M

CERTIFICATE OF QUALITY MANAGEMENT SYSTEM CERTIFICATION

Date of Initial Issuance: May. 15, 2025
Date of Expiration: May. 14, 2028

This is to Certify that the Quality Management System of

WUXI SOLINTEG POWER CO., LTD.

is in conformity with
GB/T19001-2016/ISO9001:2015 Standard, applies to
RESEARCH AND DEVELOPMENT, PRODUCTION, SALES, AND TECHNICAL SERVICES (LOAD MONITORING, OPERATION AND MAINTENANCE, AFTER-SALES) FOR HYBRID INVERTERS ACROSS VARIOUS POWER SEGMENTS,AS WELL AS RELATED PRODUCTS (COMMUNICATION MODULES, SMART METERS, BACKUP POWER CONTROL BOXES)

BCC Inc.

President:

Unified social credit code:91320214MA7JNNRL98

REGISTERED ADDRESS:BUILDING H1-1001, NO. 6 JINGXIAN ROAD, XINWU DISTRICT, WUXI, JIANGSU PROVINCE, CHINA

OPERATION ADDRESS:BUILDING 10, NO. 52 CHANGJIANG SOUTH ROAD, XINWU DISTRICT, WUXI, JIANGSU PROVINCE, CHINA

MANAGEMENT SYSTEM
CNAS C016-M

BCC Address:Room 45-(05)-02, Floor 5, No.45 Guangyuannei Street, Dongcheng District, Beijing, CHINA. This certificate is valid within state - specified validities of administrative and qualification licensing.The effectiveness of this certificate shall be maintained by regular surveillance audit, the validity of the certificate can be inquired through www.bcc.com.cn or by QR code.The information of this certificate available for inquiry on CNCA's website: www.cnca.gov.cn.