GOODWE
Smart Energy Innovator

Demonstration of compliance of the B1 inverters with RfG requirements according to Article 40 of Commission Regulation (EU) 2016/631 and PPDS

We GoodWe Technologies Co., Ltd. hereby confirms the compliance of the inverters listed below with the selected features of the EN50549-1 standard, required by the regulation RfG 2016/631 (EU) and compliance with the requirements of the grid operator listed in the PPDS, Annex No. 4.

Model	GW100K-HT,GW110K-HT,GW120K-HT; GW50KN-MT,GW60KN-MT,GW80K-MT; GW100K-GT, GW110K-GT, GW125K-GT; GW50K-ETC; GW40K-ET-10,GW50K-ET-10; GW100K07-ETC,GW100K06-ETC,GW100K05-ETC; GW100K07-BTC,GW100K06-BTC,GW100K05-BTC; GW50K07-ETC,GW50K06-ETC,GW50K05-ETC; GW50K07-BTC,GW50K06-BTC,GW50K05-BTC
Type	Hybrid Inverter, Grid-Tied PV Inverter, Battery Inverter
Manufacturer	GoodWe Technologies Co., Ltd.
Address	No.90 Zijin Rd., New District, Suzhou, 215011, P.R. China
Tel	+86 512 6239 7998
E-mail address	service@goodwe.com
Reference standard	PPDS 2022 Type A2; (EU) 2016/631; EN 50549-1

Czech Republic settings as described in the table below:

Protection settings	**Protection parameter**	**Unit**
Gird Setting	Un=230V，50Hz	phase
Voltage protection		
Under voltage threshold stage 1	161（0.7Un）	V
Under voltage operate time stage 1	≤2.7	s
Under voltage threshold stage 2	103.5（0.45Un）	V
Under voltage operate time stage 2	≤0.2	s
Over voltage threshold stage 1	264.5（1.15Un）	V
Over voltage operate time stage 1	≤5	s
Over voltage threshold stage 2	276（1.2Un）	V
Over voltage operate time stage 2	≤0.1	s
Over voltage threshold stage 3	NA	V

Over voltage operate time stage 3	NA	s
Over voltage 10min mean threshold	255.3（1.11Un）	V
Over voltage operate time for 10min mean threshold	0	s
Frequency protection		
Under frequency threshold	47.5	Hz
Under frequency operate time	≤0.1	s
Over frequency threshold	51.5	Hz
Over frequency operate time	≤0.1	s
Automatic reconnection (art. 9.5. Appendices No. 4 PPDS; Article. Article 13(7) of the RfG) An inverter disconnected from the grid due to a voltage or frequency deviation will be automatically connected to the distribution network only when the following criteria are met:		
Lower frequency	47.5	Hz
Upper frequency	50.05	Hz
Lower voltage	195.5（0.85Un）	V
Upper voltage	253（1.1Un）	V
Observation time	≥ 300	s
Active power increase gradient	≤ 10 %	Pn/min
Startup		
Lower frequency threshold	49.5	Hz
Upper frequency threshold	50.5	Hz
Lower voltage threshold	207（0.9Un）	V
Upper voltage threshold	253（1.1Un）	V
Island protection	2	s
Operating frequency range **(art. 9.1.1. Appendices No. 4 PPDS; Article. Article 13(1) of the RfG)** The Inverter must remain connected and be able to operate in the frequency range specified below. The inverter must also be able to withstand time variations in grid frequency (RoCoF) up to ± 2 Hz/s.		

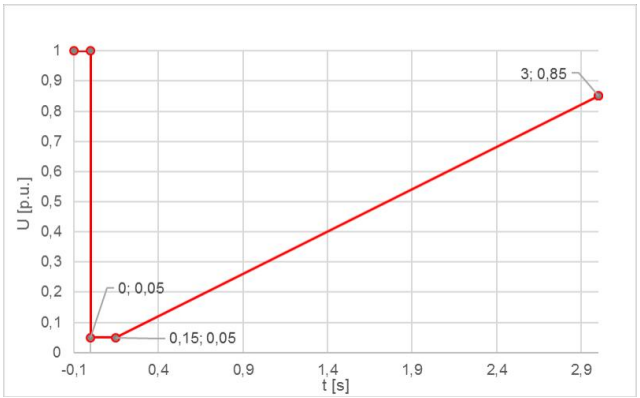
Frequency range	**Duration**
47,5 – 48,5 Hz	30 minutes
48,5 - 49 Hz	90 minutes
49 - 51 Hz	unlimited
51 - 51,5 Hz	30 minutes

Operating voltage range

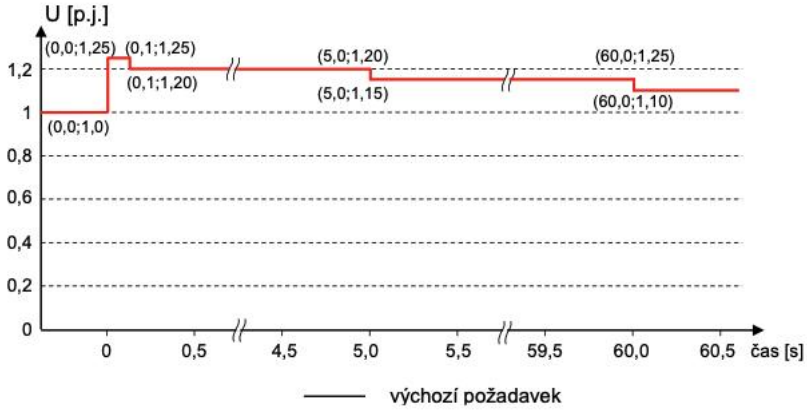
The Inverters must remain connected and be able to operate in the voltage range specified below.

Voltage range	Duration
0.85 Un – 1.1 Un	unlimited

LVRT Voltage-Time-Diagram



OVRT Voltage-Time-Diagram



Reduction of active power at underfrequency

(Article 9.3.2. Annexes No. 4 PPDS; Article 13 paragraphs 4 and 5 RfG)

The Inverters are able to maintain the supply of active power when the frequency drops at the same value as during operation corresponding to the frequency in the 50 Hz system. In case the inverter's technology does not allow to maintain the active power at the inverter's output at P value as at 50 Hz, below 49 Hz a drop of 2% of the maximum capacity at 50 Hz is allowed for every 1 Hz drop in frequency. If the inverter is unable to fulfill this requirement, this must be documented by the distribution system operator with a technical study.

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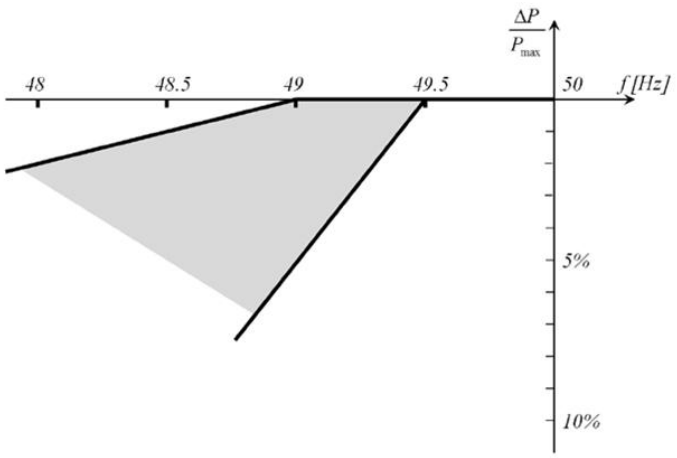


Reduction of active power at overfrequency

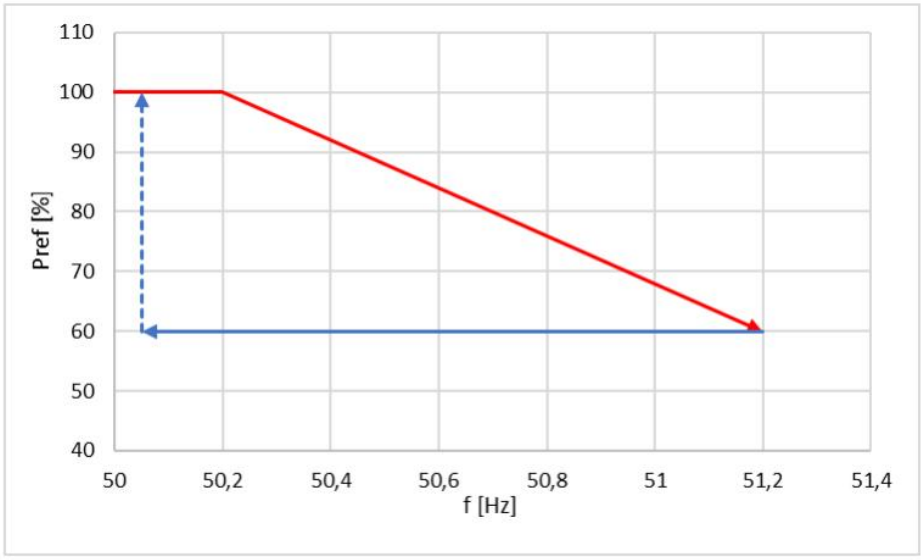
(Article 9.3.1 Annexes No. 4 PPDS; Article 13(2) RfG)

The Inverters is able to activate the provision of frequency response of active power according to Art. 9.3.1. Attachments no. 4 PPDS at frequency threshold range between 50.05 - 50.5 Hz and at static setting between 4% - 10%.

Settings: The active power frequency response threshold for activation is 50.2 Hz, static s2 = 5%. Pref=Pm

The active power frequency response threshold for deactivation is 50.05 Hz

Recover power slope = 10%Pn/min



P(U) function

(Article 9.3.5 Annexes No. 4 PPDS）

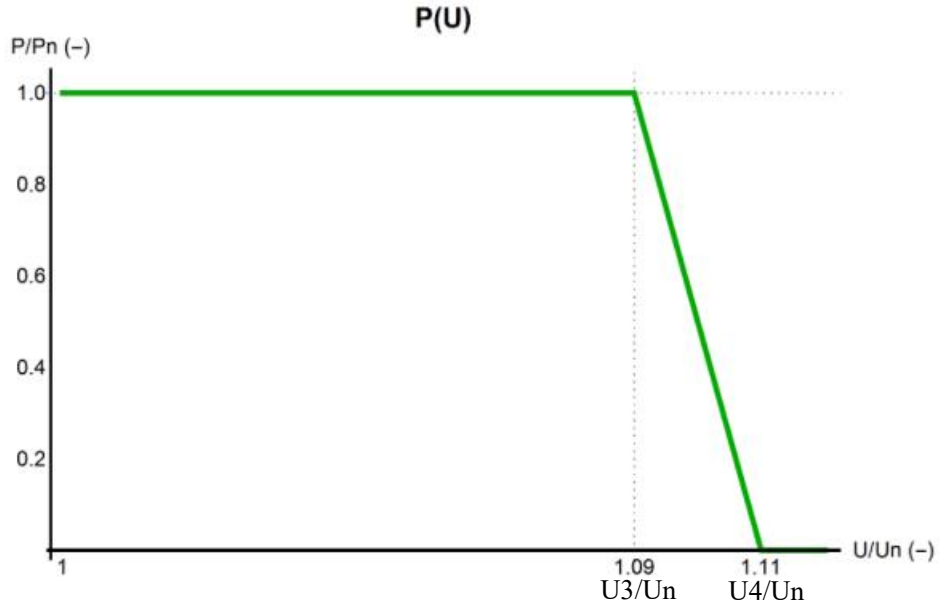
P(U) characteristic set points:

U3/Un = 1,09 = 250,7 V

U4/Un = 1,11 = 255,3 V

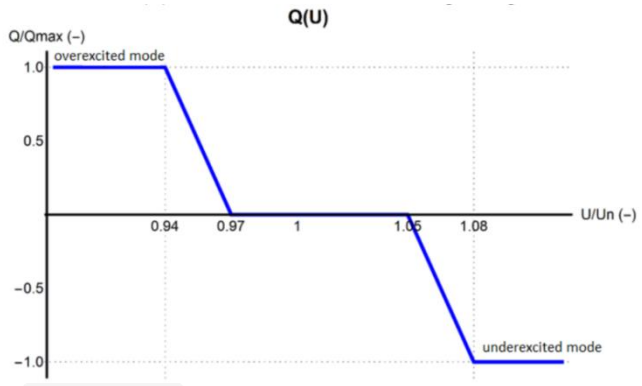
Time constant for P(U) characteristics = 5 s.

Nominal low voltage level = 230 V (phase to neutral = L-N).



Q(U) function

(Article 9.4.2 Annexes No. 4 PPDS）



Voltage related control mode Q(U) set points:

X_1 = 0,94 = 216,2 V

X_2 = 0,97 = 223,1 V

X_3 = 1,05 = 241,5 V

X_4 = 1,08 = 248,4 V

Logical interface **(Art. 5.1. Annex No. 4 PPDS; Art. 13 para. 6 RfG)** The inverters is equipped with a logical interface (input port) for interrupting the supply of active power, which allows to interrupt the supply of active power at the output within five seconds after receiving an instruction to this port.
Communication and information exchange (Art. 5.1. Annex No. 4 PPDS; Art. 14 para. 5 d) RfG) The inverter is equipped with an interface to exchange information in real time or periodically with a time stamp. When the information exchange interface is connected to the PDS control system, the information exchange is verified to the extent specified by the PDS in accordance with with Annex 4 of the PPDS.
Adjustability of active power (Art. 15 para. 2 a) b) RfG; Art. 9.3 Annex No. 4 PPDS) The control system of the production module shall be capable of adjusting the active power setpoint in accordance with the table below. The distributor system operator shall set the time within which the active power setpoint must be reached. The test shall include verification of the local active power input.
Ability to deliver reactive power and fast fault current in non-synchronous PGM (Art. 20 para. 2 a) RfG; Art. 9.2.1.2 and 9.2.2.3 Annex No. 4 PPDS) The inverter shall be capable of supplying reactive power, shall be capable of providing fast fault current at the point of connection in case of symmetrical faults and in case of unsymmetrical faults, unsymmetrical current supply as per the requirement specified by the the distributor system operator in the technical conditions of connection in accordance with Annex 4 of the PPDS.
Voltage/power/power factor control for non-synchronous PGM (Art. 20 para. 2 b) RfG; Art. 9.2.1.2 and 9.4 Annex No. 4 PPDS) The inverter has the ability to regulate voltage/power/power factor. The choice of the voltage/power/power/effect control method, including the range, shall be determined by the distributor system operator in the technical connection conditions in accordance with Annex 4 of the PPDS.
Active power recovery after failure in non-synchronous PGM (Art. 20 para. 3 RfG; Art. 9.2.2.4 Annex No. 4 PPDS) The inverter shall be able to restore the active power after a fault in the system (transient event) that did not lead to disconnection to the pre-failure value (or to the maximum value with respect to the available power source) with a tolerance of ± 5 % within 1 second after reaching 85 % of the voltage at the point of connection. If the production module is supplying reactive power as a priority during the fault, the restoration of active power shall be initiated when the voltage at the point of connection reaches 95 % and shall be completed within 1 s.
This declaration applies to all products from listed product series. This declaration loses its validity if the device is modified or incorrectly connected. This declaration certifies the compliance with the mentioned regulations but does not ensure the properties. The safety instructions in the product documentation provided must be observed!

Signed	Young Wang	Data	2024.4.28