

## Demonstration of compliance of the A1 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.

<b>Model</b>	GW6000-ET-G2,GW8000-ET-G2,GW10K-ET-G2; GW6000-BT-G2,GW8000-BT-G2,GW10K-BT-G2; GW5048D-ES,GW3648D-ES; GW5048-EM,GW3648-EM,GW3048-EM; GW3600-EH,GW5000-EH,GW6000-EH; GW3600N-EH,GW5000N-EH,GW6000N-EH; GW3k-BH,GW3600-BH,GW5000-BH,GW6000-BH; GW10K-ET,GW8K-ET,GW6.5K-ET,GW5K-ET; GW10KN-ET,GW8KN-ET,GW6.5KN-ET,GW5KN-ET; GW700-XS-11,GW1000-XS-11,GW1500-XS-11,GW2000-XS-11,GW2500-XS-11,GW3000-XS-11; GW700-XS-30,GW1000-XS-30,GW1500-XS-30,GW2000-XS-30,GW2500-XS-30,GW3000-XS-30; GW3000-DNS-30,GW3600-DSN-30,GW4200-DNS-30, GW5000-DNS-30, GW6000-DNS-30; GW4000-SDT-20, GW5000-SDT-20, GW6000-SDT-20, GW8000-SDT-20, GW10K-SDT-20	
<b>Type</b>	Hybrid Inverter, Grid-Tied PV Inverter, Battery Inverter	
<b>Manufacturer</b>	GoodWe Technologies Co., Ltd.	
<b>Address</b>	No.90 Zijin Rd., New District, Suzhou, 215011, P.R. China	
<b>Tel</b>	+86 512 6239 7998	
<b>E-mail address</b>	service@goodwe.com	
<b>Reference standard</b>	PPDS 2022 Type A1; (EU) 2016/631; EN 50549-1	
<b>Czech Republic settings as described in the table below:</b>		
<b>Protection settings</b>	<b>Protection parameter</b>	<b>Unit</b>
Gird Setting	Un=230V, 50Hz	phase
<b>Voltage protection</b>		
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
<b>Frequency protection</b>		
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
<b>Automatic reconnection (art. 9.5. Appendices No. 4 PPDS; Article. Article 13(7) of the RfG)</b>		
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
<b>Startup</b>		
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
<b>Island protection</b>		
2		
<b>Operating frequency range</b>		
<b>(art. 9.1.1. Appendices No. 4 PPDS; Article. Article 13(1) of the RfG)</b>		
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.		

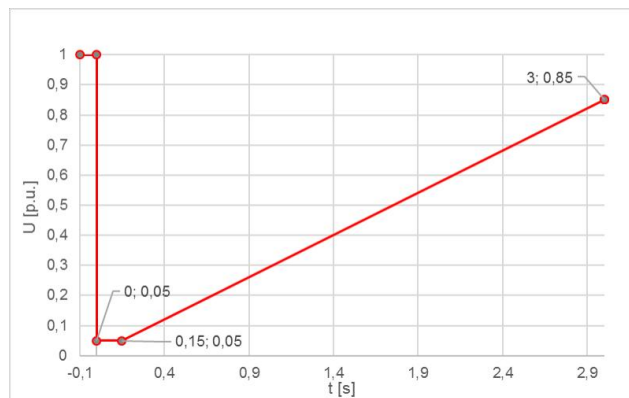
Frequency range	Duration
47,5 – 48,5 Hz	30 minutes
48,5 - 49 Hz	90 minutes
49 - 51 Hz	unlimited
51 - 51,5 Hz	30 minutes

**Operating voltage range**

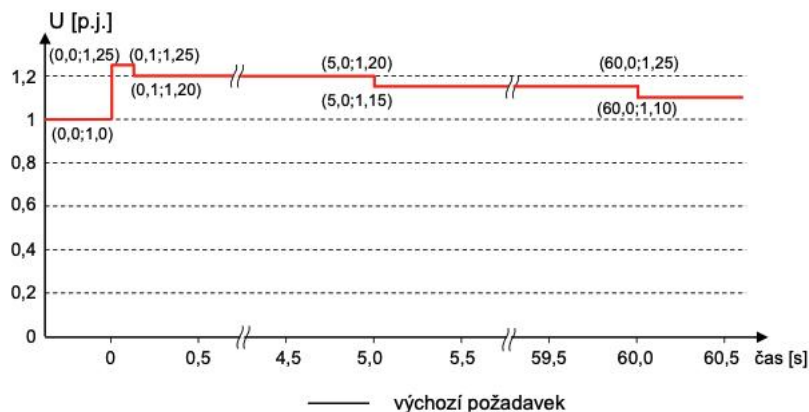
The Inverters must remain connected and be able to operate in the voltage range specified below.

Voltage range	Duration
0.85 Un – 1.1 Un	unlimited

**LVRT Voltage-Time-Diagram**



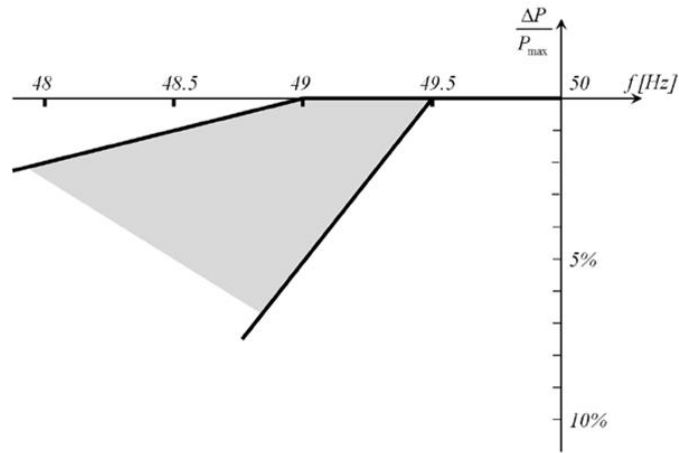
**OVRT Voltage-Time-Diagram**



**Reduction of active power at underfrequency**

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

The Inverters is 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.



**Reduction of active power at overfrequency**

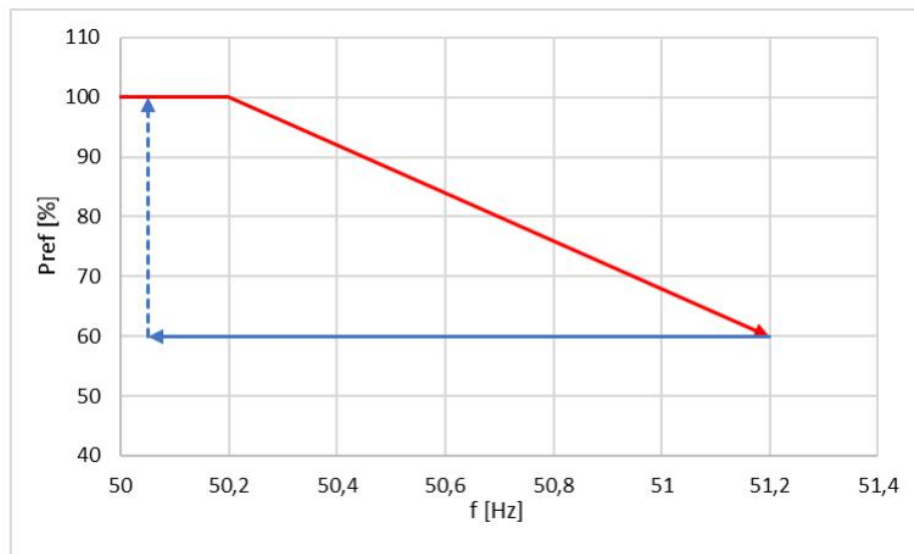
**(Article 1.5 Annexes No. 4 PPDS; Article 13(2) RfG)**

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  $s_2 = 5\%$ .  $P_{ref} = P_m$

The active power frequency response threshold for deactivation is 50.05 Hz

Recover power slope =  $10\%P_n/\text{min}$



**P(U) function**

(Article 9.3.5 Annexes No. 4 PPDS)

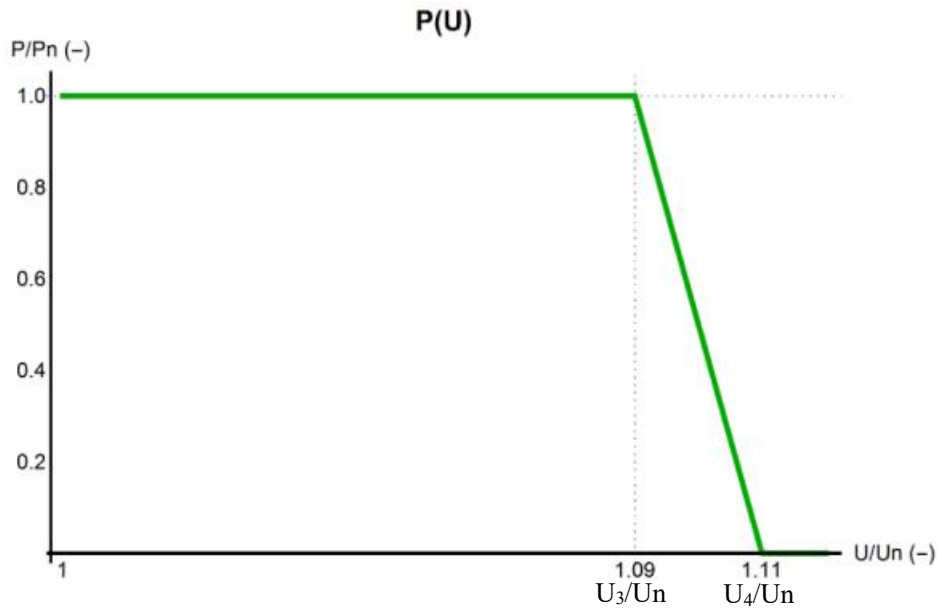
P(U) characteristic set points:

$$U_3/U_n = 1,09 = 250,7 \text{ V}$$

$$U_4/U_n = 1,11 = 255,3 \text{ V}$$

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

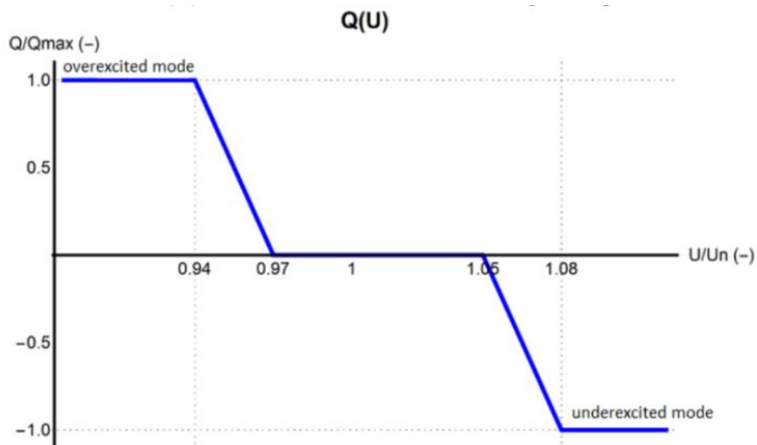
Nominal low voltage level = 230 V (phase to neutral = L-N).



**Q(U) function**

(Article 9.4.2 Annexes No. 4 PPDS)

Voltage related control mode Q(U) set points:



$$X_1 = 0,94 = 216,2 \text{ V}$$

$$X_2 = 0,97 = 223,1 \text{ V}$$

$$X_3 = 1,05 = 241,5 \text{ V}$$

$$X_4 = 1,08 = 248,4 \text{ V}$$

**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.

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!

<b>Signed</b>	<i>Young Wang</i>	<b>Data</b>	<i>2024.4.28</i>
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