

CERTIFICATE G83/2

Product Model: Growatt 1000/Growatt1500/Growatt2000/Growatt3000/Growatt4000

Nominal AC Power: 1000W/1600W/2000W/2850W/3680W

MAX. AC Power: 1100W/1650W/2200W/2850W/4000W

Manufacturer: Growatt New Energy Technology Co., Ltd.

Address: 1st East & 3rd Floor, Jiayu Industrial Zone, Xibianling, Shangwu Village, Shiyan, Baoan District, Shenzhen, P.R. China

Test Lab: Growatt R&D Test Lab

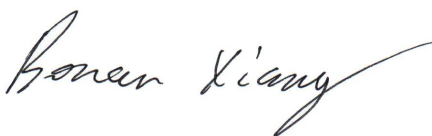
The results of the G83/2 tests are summarized in this certificate. Growatt declares hereby that all units shipped to the UK are within the specification and parameter set by the G83/2 engineering recommendation.

Test Details:

- Under / Over voltage switch off
- Under / Over frequency switch off
- Loss of mains test
- Power quality: Harmonic current emissions as per BS EN 61000-3-2
- Power quality: Power factor
- Power quality: Voltage fluctuations and flicker as per BS EN 61000-3-3
- Power quality: DC injection
- Reconnection times

Growatt New Energy Technology CO., LTD

The General Engineer



TEST I: UNDER/OVER AC VOLTAGE TEST						
	G83/2 Limit		Setting		Test results	
Parameter	Voltage	Time	Voltage	Time	Voltage	Time
Under Voltage Stage 1	200.1 V	2.5 s	201.1 V	2.55 s	201.4 V	2.53 s
Under Voltage Stage 2	184 V	0.5 s	185 V	0.55 s	185.2 V	0.532 s
Ovder Voltage Stage 1	262.2 V	1.0 s	261.2 V	1.05 s	260.9 V	1.03 s
Ovder Voltage Stage 2	273.7 V	0.5 s	272.7 V	0.55 s	271.9 V	0.526 s

TEST II: UNDER/OVER FREQUENCY TEST						
	G83/2 Limit		Setting		Test results	
Parameter	Frequency	Time	Frequency	Time	Frequency	Time
Under Frequency Stage 1	47.5Hz	20 s	47.52Hz	20.1 s	47.52Hz	20.12 s
Under Frequency Stage 2	47 Hz	0.5 s	47.02 Hz	0.55 s	47.02 Hz	0.520 s
Ovder Frequency Stage 1	51.5 Hz	90 s	51.48 Hz	90.2 s	51.48 Hz	90.3 s
Ovder Frequency Stage 2	52 Hz	0.5 s	51.98 Hz	0.55 s	51.99 Hz	0.523 s

TEST III: LOSS OF MAINS PROTECTION				
Parameter	10% of power	55% of power	100% of power	Note
G83/2 Limit,sec	0.5	0.5	0.5	
Trip setting,sec	0.4	0.4	0.4	
Trip value,sec	0.357	0.313	0.301	

TEST IV: POWER QUALITY TEST-HARMONICS								
Parameter	2nd	3rd	5th	7th	9th	11th	13th	15th....39th
G83/2Limit(A)	1.08	2.3	1.14	0.77	0.4	0.33	0.21	0.15x(15/n)
Test value	Growatt1000	0.501	1.017	0.579	0.295	0.213	0.171	<limit BS EN 61000-3-2
	Growatt1500	0.516	1.029	0.563	0.282	0.207	0.169	
	Growatt2000	0.591	1.112	0.899	0.489	0.273	0.211	
	Growatt3000	0.573	1.127	0.897	0.492	0.267	0.201	
	Growatt4000	0.591	1.112	0.899	0.489	0.273	0.211	

TEST V: POWER QUALITY TEST-POWER FACTOR				
Parameter	212V	230V	250V	Note
G83/2 Limit	0.95lag-0.95lead	0.95lag-0.95lead	0.95lag-0.95lead	
Measured	>0.99	>0.99	>0.99	@full load

TEST VI: POWER QUALITY TEST- VOLTAGE FLICKER					
Parameter	Starting	Stopping	Running		Note
Limit	4%	4%	$P_{st} = 1.0$	$P_{it} = 0.65$	
Test Value	<1.08%	<1.08	0.27	0.17	

TEST VII: POWER QUALITY TEST- DC INJECTION				
Test level	10% power	55% power	100% power	Note
Test value	<<20mA	<<20mA	<<20mA	

TEST VIII: RECONNECTION TIMES				
Test level (% of rated power)	Under/Over Voltage	Under/Over Frequency	Loss of mains	Note
G83/2 Limit	20 s	20 s	20 s	
Actual setting	60 s	60 s	60 s	
Recorded values	65 s	65 s	65 s	