


# Certificate of Conformity

No. ESY 106812 0022 Rev. 00

<b>Holder of Certificate:</b>	<b>Qingdao Greenmeadow Trade Co.,Ltd</b> Bld.No.35, Airport International Center No.6 Changcheng South Road Chengyang District 266109 Qingdao PEOPLE'S REPUBLIC OF CHINA
<b>Product:</b>	<b>Converter</b> <b>(PV inverter and Integrated NS protection unit)</b>
<b>Model(s):</b>	<b>PV inverter: BDM-800-U, BDM-600-U</b> <b>Integrated NS protection unit: BDM-BR-10A</b>
<b>Parameters:</b>	See page 2
<b>Applicable standards:</b>	VDE-AR-N 4105:2018 DIN VDE V 0124-100 (VDE V 0124-100):2020
<b>Test report no.:</b>	64290203026602

**Date,** 2023-09-07



( Billy Qiu )

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## Parameters:

PV inverter model:	BDM-800-U	BDM-600-U
PV input parameters:		
Maximum input power	1200 W	1200 W
Maximum input voltage	60 Vd.c.	60 Vd.c.
Rated input voltage	20 - 60 Vd.c.	20 - 60 Vd.c.
MPPT voltage range	22 - 55 Vd.c.	22 - 55 Vd.c.
Maximum input current	17 Ad.c. x 2	14 Ad.c. x 2
Isc PV	20 Ad.c. x 2	20 Ad.c. x 2
AC output rating		
Rated output voltage	230 Va.c.	230 Va.c.
Rated output frequency	50 Hz	50 Hz
Maximum continuous output current	3.26 Aa.c.	2.61 Aa.c.
Maximum output active power	750 W	600 W
Maximum output apparent power	750 VA	600 VA
Power factor range	0.95 under-excited - 0.95 over-excited	0.95 under-excited - 0.95 over-excited
General		
Protection class	Class I	Class I

Integrated NS protection unit model:	BDM-BR-10A
Inverter side input rating	
Rated input voltage	230 Va.c.
Rated input frequency	50 Hz
Maximum continuous input current	10 Aa.c.
Maximum continuous input current during work with BDM-800-U and BDM-600-U	3.26 Aa.c / 2.61 Aa.c.
Grid side output rating	
Rated output voltage	230 Va.c.
Rated output frequency	50 Hz
Maximum continuous output current	10 Aa.c.
Maximum continuous input current during work with BDM-800-U and BDM-600-U	3.26 Aa.c / 2.61 Aa.c.
General	
Protection class	Class II

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## E.4 Unit certificate

Unit Certificate											
<b>Manufacturer</b>	Qingdao Greenmeadow Trade Co.,Ltd Bld.No.35 Airport International Center, No.6 Changcheng South Road, Chengyang District, 266109 Qingdao, PEOPLE'S REPUBLIC OF CHINA										
<b>Power generation unit type</b>	[PV inverter]: BDM-800-U, BDM-600-U Remark: certified on representative model BDM-800-U of family design products, results of the measurement of BDM-800-U can be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.										
<b>Technical data</b>	<table border="1"> <tr> <td>Max. active power <math>P_{E_{max}}</math></td> <td>750 W (BDM-800-U)</td> </tr> <tr> <td>Max. apparent power <math>S_{E_{max}}</math></td> <td>759 VA (BDM-800-U)</td> </tr> <tr> <td>Rated voltage</td> <td>230 Va.c.</td> </tr> <tr> <td>Rated current (AC) <math>I_r</math></td> <td>3.26 A (BDM-800-U)</td> </tr> <tr> <td>Initial short-circuit AC current</td> <td>9.6 A (BDM-800-U)</td> </tr> </table>	Max. active power $P_{E_{max}}$	750 W (BDM-800-U)	Max. apparent power $S_{E_{max}}$	759 VA (BDM-800-U)	Rated voltage	230 Va.c.	Rated current (AC) $I_r$	3.26 A (BDM-800-U)	Initial short-circuit AC current	9.6 A (BDM-800-U)
	Max. active power $P_{E_{max}}$	750 W (BDM-800-U)									
	Max. apparent power $S_{E_{max}}$	759 VA (BDM-800-U)									
	Rated voltage	230 Va.c.									
	Rated current (AC) $I_r$	3.26 A (BDM-800-U)									
Initial short-circuit AC current	9.6 A (BDM-800-U)										
<b>Network connection rule</b>	<b>VDE-AR-N 4105 "Generators connected to the low-voltage distribution network"</b> Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network										
<b>Test requirement</b>	<b>DIN VDE V 0124-100 (VDE V 0124-100) "Network integration of power generation systems – Low voltage"</b> Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network										
<b>Test report</b>	64.290.20.30266.02 from 2023-08-22										
The above designated power generation unit meets the requirements of VDE-AR-N 4105											

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## E.5 Test report "Network interactions" for power generation units with an input current > 75 A

Extract of the test report for power generation units "Determination of electrical properties"		
System manufacturer:	Qingdao Greenmeadow Trade Co.,Ltd Bld.No.35 Airport International Center, No.6 Changcheng South Road, Chengyang District, 266109 Qingdao, PEOPLE'S REPUBLIC OF CHINA	
Manufacturer indications:	Type of system	Grid-connected type PV inverter for PV systems
	Max. active power $P_{E_{max}}$	750 W (BDM-800-U) 598 W (BDM-600-U)
	Rated voltage	230 Va.c., single phase
Measurement period:	<u>From 2023-08-06 to 2023-08-20</u>	

Rapid voltage change						
Connection without provisions (regarding the primary energy carrier)			ki = <u>0.37</u>			
Most adverse case when switching between generator levels			ki = <u>0.64</u>			
Connection at nominal conditions (of the primary energy carrier)			ki = <u>0.43</u>			
Disconnection at rated power			ki = <u>1.15</u>			
Worst value of all switching operations			kimax = <u>1.15</u>			
Flicker	Network impedance angle $\Psi_k$	32° <sup>a)</sup>	30°	50°	70°	85°
	Initial flicker factor $c_\psi$	2.15	--	--	--	--
Remark: a) According to VDE V 0124-100, the worst case is measured at 32° network impedance angle and the other angles are waived.						

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Harmonics and inter-harmonics & Feed-in of direct currents												
Harmon Nr.	P/P <sub>E<sub>max</sub></sub>											Limit (A)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.002	-0.010	-0.007	-0.015	-0.011	-0.009	-0.016	-0.007	-0.006	0.003	-0.012	0.5% I <sub>R</sub>
1	0.001	0.383	0.597	1.017	1.387	1.584	2.064	2.249	2.742	3.039	3.217	-
2	0.000	0.018	0.010	0.012	0.021	0.018	0.010	0.026	0.034	0.011	0.028	1.08
3	0.000	0.073	0.069	0.054	0.048	0.040	0.033	0.037	0.029	0.026	0.026	2.30
4	0.001	0.006	0.004	0.003	0.005	0.012	0.007	0.018	0.016	0.011	0.012	0.43
5	0.000	0.046	0.046	0.036	0.033	0.034	0.023	0.018	0.021	0.014	0.009	1.14
6	0.002	0.005	0.003	0.006	0.006	0.003	0.006	0.010	0.010	0.007	0.007	0.30
7	0.000	0.031	0.036	0.028	0.031	0.030	0.023	0.009	0.015	0.016	0.010	0.77
8	0.001	0.003	0.002	0.002	0.004	0.005	0.009	0.010	0.012	0.008	0.009	0.23
9	0.001	0.026	0.028	0.025	0.024	0.021	0.018	0.013	0.011	0.011	0.011	0.40
10	0.002	0.004	0.002	0.007	0.001	0.004	0.004	0.004	0.008	0.007	0.009	0.18
11	0.001	0.024	0.024	0.027	0.027	0.022	0.019	0.023	0.012	0.012	0.014	0.33
12	0.001	0.001	0.005	0.004	0.002	0.003	0.003	0.003	0.008	0.009	0.008	0.15
13	0.000	0.025	0.026	0.028	0.027	0.027	0.020	0.027	0.017	0.015	0.014	0.21
14	0.000	0.003	0.003	0.006	0.010	0.005	0.002	0.003	0.010	0.003	0.012	0.13
15	0.001	0.021	0.025	0.029	0.024	0.025	0.021	0.031	0.017	0.016	0.019	0.15
16	0.001	0.004	0.003	0.008	0.011	0.008	0.007	0.001	0.006	0.002	0.011	0.12
17	0.001	0.014	0.020	0.024	0.028	0.025	0.026	0.031	0.016	0.023	0.022	0.13
18	0.002	0.006	0.006	0.010	0.010	0.007	0.006	0.001	0.007	0.009	0.006	0.10
19	0.001	0.009	0.020	0.015	0.026	0.029	0.026	0.031	0.030	0.023	0.027	0.12
20	0.001	0.011	0.005	0.004	0.015	0.001	0.010	0.009	0.011	0.007	0.008	0.09
21	0.000	0.008	0.010	0.024	0.017	0.036	0.021	0.025	0.024	0.027	0.027	0.11
22	0.000	0.013	0.015	0.006	0.007	0.012	0.014	0.007	0.006	0.017	0.013	0.08
23	0.001	0.030	0.037	0.037	0.043	0.048	0.039	0.038	0.006	0.020	0.011	0.10
24	0.001	0.036	0.035	0.036	0.037	0.027	0.046	0.030	0.026	0.035	0.024	0.08
25	0.000	0.024	0.009	0.013	0.020	0.033	0.020	0.031	0.023	0.021	0.020	0.09
26	0.000	0.009	0.002	0.002	0.003	0.010	0.007	0.007	0.004	0.013	0.008	0.07
27	0.001	0.021	0.017	0.008	0.006	0.024	0.028	0.023	0.029	0.032	0.035	0.08
28	0.002	0.004	0.006	0.008	0.007	0.007	0.011	0.007	0.010	0.004	0.008	0.07
29	0.001	0.021	0.017	0.016	0.015	0.012	0.025	0.028	0.034	0.042	0.030	0.08
30	0.001	0.003	0.003	0.012	0.004	0.003	0.008	0.004	0.011	0.004	0.015	0.06
31	0.001	0.023	0.021	0.019	0.014	0.007	0.016	0.021	0.035	0.037	0.036	0.07
32	0.000	0.000	0.004	0.008	0.010	0.004	0.005	0.009	0.010	0.009	0.009	0.06
33	0.000	0.020	0.025	0.027	0.024	0.002	0.011	0.018	0.036	0.030	0.033	0.07
34	0.001	0.001	0.003	0.014	0.015	0.006	0.011	0.007	0.012	0.010	0.015	0.05
35	0.001	0.016	0.017	0.017	0.027	0.005	0.012	0.011	0.028	0.035	0.029	0.06
36	0.001	0.005	0.003	0.013	0.009	0.008	0.008	0.007	0.008	0.005	0.015	0.05
37	0.001	0.011	0.018	0.026	0.026	0.018	0.003	0.007	0.021	0.025	0.030	0.06
38	0.002	0.004	0.005	0.008	0.012	0.010	0.009	0.004	0.011	0.013	0.010	0.05
39	0.002	0.006	0.011	0.019	0.029	0.020	0.012	0.014	0.023	0.020	0.017	0.06
40	0.001	0.007	0.002	0.007	0.008	0.011	0.011	0.012	0.013	0.006	0.012	0.05
THD	0.206%	4.002%	4.042%	3.903%	4.048%	3.837%	3.485%	3.665%	3.701%	3.702%	3.701%	5%

Supplementary information: test according to DIN EN 61000-3-2(VDE 0838-2):2019.

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## E.6 Certificate of the network and system protection

<b>Certificate of NS protection</b>	
<b>Manufacturer</b>	Qingdao Greenmeadow Trade Co.,Ltd Bld.No.35 Airport International Center, No.6 Changcheng South Road, Chengyang District, 266109 Qingdao, PEOPLE'S REPUBLIC OF CHINA
<b>Type of NS protection</b>	Integrated NS protection
<b>Central NS protection</b>	<input type="checkbox"/>
<b>Integrated NS protection</b>	<input checked="" type="checkbox"/> Assigned to power generation unit of type: [PV inverter]: BDM-800-U, BDM-600-U [Integrated NS protection unit]: BDM-BR-10A Remark: The BDM-800-U, BDM-600-U not included the Integrated NS protection and disconnection device (relay) inside, the Integrated NS protection unit BDM-BR-10A need to connected in series between the BDM-800-U, BDM-600-U AC output and low voltage grid.
<b>Network connection rule</b>	<b>VDE-AR-N 4105 “Generators connected to the low-voltage                      distribution network”</b> Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network
<b>Test requirement</b>	<b>DIN VDE V 0124-100 (VDE V 0124-100) “Network integration of                      power generation systems – Low voltage”</b> Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network
<b>Test report</b>	64.290.20.30266.02 from 2023-08-22
The network and system protection designated above meets the requirements of VDE-AR-N 4105.	

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## E.7 Requirements for the test report for the NS protection

<b>Extract from test report for NS protection</b>			
"Determination of electrical properties"			
<b>NS protection test report</b>			
<b>Type of NS system:</b>	Integrated NS protection The BDM-800-U, BDM-600-U not included the Integrated NS protection and disconnection device (relay) inside, the Integrated NS protection unit BDM-BR-10A need to be connected in series between the BDM-800-U, BDM-600-U AC output and low voltage grid.		<b>Other Manufacturer indications</b>
<b>Software version:</b>	9200-D for BDM-800-U, BDM-600-U V81 for BDM-BR-10A		
<b>Manufacturer:</b>	Qingdao Greenmeadow Trade Co.,Ltd Bld.No.35, Airport International Center, No.6 Changcheng South Road, Chengyang District, 266109 Qingdao, PEOPLE'S REPUBLIC OF CHINA		
<b>Measuring period:</b>	From 2023-08-06 to 2023-08-20		
<b>Model</b>	<b>BDM-800-U+BDM-BR-10A</b>		
	<b>Inverter</b>		
<b>Protection function</b>	<b>Setting value</b>	<b>Tripping value</b>	<b>Tripping time NS protection*</b>
Rise-in-voltage protection $U >>$	$1.25 * U_n$	286.75 V	151.74 ms
Rise-in-voltage protection $U >$	$1.10 * U_n$	$1.10 * U_n$	ms**
Voltage drop protection $U <$	$0.8 * U_n$	183.86 V	3.077 s
Voltage drop protection $U <<$	$0.45 * U_n$	104.07 V	375.09 ms
Frequency decrease protection $f <$	47.5 Hz	47.50 Hz	171.19 ms
Frequency increase protection $f >$	51.5 Hz	51.49 Hz	168.17 ms
<p>*: The tripping time includes the period from the limit value violation <math>U/f</math> until the tripping signal to the interface switch.</p> <p>When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicated above.</p> <p>The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms.</p> <p>** : Verification disconnection time of moving 10-min-average value.</p> <p>Disconnecting time as below:</p> <p>For BDM-800-U with Integrated NS protection unit BDM-BR-10A</p> <p>495.4 s (L-N from 600s@<math>U_n</math> to 112%<math>U_n</math>)</p> <p>Continuous operation (L-N from 600s@<math>U_n</math> to 108%<math>U_n</math>)</p> <p>298.2 s (L-N from 600s@106%<math>U_n</math> to 114%<math>U_n</math>)</p>			
<input checked="" type="checkbox"/> <b>as integrated NS protection</b>			

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Assigned to power generation unit type	PV inverter: BDM-800-U, BDM-600-U Integrated NS protection unit: BDM-BR-10A
Integrated interface switch type	Series-connected relays for all phase conductors each Relay type for BDM-800-U or BDM-600-U+BDM-BR-10A Manufacture: XIAMEN HONGFA ELECTROACOUSTIC Co Ltd. Model: HF140FF/005-2HSW Rated current: 10 A, Operating time: 5ms
Response time of interface switch for integrated NS protection	Release time: Max. 5 ms for HF140FF/005-2HSW
Verification of the entire functional chain “integrated NS protection – interface switch” has resulted in successful disconnection.	<input checked="" type="checkbox"/>