Certificate of compliance

Applicant:	**KOSTAL Solar Electric GmbH** Hanferstraße 6 79108 Freiburg **Germany**
Product:	**Storage System consisting of**
Inverter:	**PLENTICORE BI 5.5/26 G2** **PLENTICORE BI 10/26 G2**
Additional components:	**B-Box Premium HVS / HVM / HVC series, Nilar Home Box series, BMZ FORCE H1 series, Pylon FORCE H1 series, LG RESU Flex series, Axitec AXIstorage Li SH series or AXIstorage SV1/SV2 series*** *Note: Details see Annes below

Storage System for three-phase parallel connection to the public grid. The network monitoring and disconnection device is an integral part of the above-mentioned models.

Applied rules and standards:

Technical Regulation 3.3.1 for Electrical Storage Installations:2023-01

Plant category A Energy storage facilities up to 125kW

3. Energy Storage system and storage medium, category A
4. Voltage and frequency
5. Power quality
6. Control and regulation
7. Protection and safety
8. Exchange of signals and data communication

DIN VDE V 0124-100:2020 (5.5.2.1 Functional safety of network and system protection)
Grid integration of generator plants - Low-voltage - Test requirements for generator units to be connected to and operated in parallel with low-voltage distribution networks

At the time of issue of this certificate, the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number:	**19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**	**Certification Program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U23-1024**	**Date of issue:**	**2023-11-10**

Certification body

Georg Loritz
Lab Supervisor Energy Systems

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

Certification body Bureau Veritas Consumer Products Services Germany GmbH accreditation to DIN EN ISO/IEC 17065

Testing laboratory accredited according to DIN EN ISO/IEC 17025

A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH

Type Verification Test Report	
Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations	**Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

Type Approval and declaration of compliance with the requirements of Technical Regulation 3.3.1 for Electrical Storage Installations				
Manufacturer / applicant	KOSTAL Industrie Elektrik GmbH Lange Eck 11 58099 Hagen Germany			
Micro-generator Type	Storage System			
	PLENTICORE BI 5.5/26 G2	PLENTICORE BI 10/26 G2	--	--
Battery (DC)				
Battery DC voltage range [V]	120 – 650	120 – 650	--	--
Battery charge current [A]	26	26	--	--
Battery discharge current [A]	26	26	--	--
Connection (AC)				
Output AC voltage [V]	3N~, 400V, 50Hz	3N~, 400V, 50Hz	--	--
Rated AC current [A]	7,94	14,43	--	--
Max AC current [A]	8,82	16,04	--	--
Active Power [W]	5500	10000	--	--
Apparent power [VA]	5500	10000	--	--
Type	Bidirectional	Bidirectional	--	--
Firmware version	02.08			

Type Verification Test Report

Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations — **Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

Batteries are used in the above stated storage system				
Brand	BYD Company Limited	BYD Company Limited	BYD Company Limited	BYD Company Limited
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	B-Box Premium HVS 5.1	B-Box Premium HVS 7.7	B-Box Premium HVS 10.2	B-Box Premium HVS 12.8
CUS module (kWh)	4,86	7,30	9,73	12,16
Number of modules	2	3	4	5
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	BYD Company Limited	BYD Company Limited	BYD Company Limited	BYD Company Limited
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	B-Box Premium HVS 5.1	B-Box Premium HVS 7.7	B-Box Premium HVS 10.2	B-Box Premium HVS 12.8
CUS module (kWh)	4,86	7,30	9,73	12,16
Number of modules	2	3	4	5
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	BYD Company Limited	BYD Company Limited	BYD Company Limited	BYD Company Limited
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	B-Box Premium HVM 11.0	B-Box Premium HVM 13.8	B-Box Premium HVM 16.6	B-Box Premium HVM 19.3
CUS module (kWh)	10,49	13,11	15,73	18,35
Number of modules	4	5	6	7
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	BYD Company Limited	BYD Company Limited	BYD Company Limited	BYD Company Limited
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	B-Box Premium HVC 15.7	B-Box Premium HVC 18.3	B-Box Premium HVC 20.9	B-Box Premium HVC 23.5
CUS module (kWh)	14,88	17,36	19,84	22,32
Number of modules	6	7	8	9
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				

Type Verification Test Report

Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations **Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

Batteries are used in the above stated storage system				
Brand	Nilar AB	Nilar AB	--	--
Technology	Nickel Metal Hydride (NiMH)	Nickel Metal Hydride (NiMH)	--	--
Model	Nilar Home Box E-288V-5,76kWh-K	Nilar Home Box E-288V-6,91kWh-K	--	--
CUS module (kWh)	5,76	6,91	--	--
Number of modules	4	4	--	--
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	BMZ Germany GmbH	BMZ Germany GmbH	BMZ Germany GmbH	BMZ Germany GmbH
Technology	Li-Ion NCA/NMC	Li-Ion NCA/NMC	Li-Ion NCA/NMC	Li-Ion NCA/NMC
Model	FORCE H1 10.65	FORCE H1 14.2	FORCE H1 17.75	FORCE H1 21.3
CUS module (kWh)	10,12	13,49	16,87	20,24
Number of modules	3	4	5	6
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	FORCE H1 10.65	FORCE H1 14.2	FORCE H1 17.75	FORCE H1 21.3
CUS module (kWh)	10,12	13,49	16,87	20,24
Number of modules	3	4	5	6
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.	Pylon Technologies Co., Ltd.
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	FORCE H1 24.85	FORCE H2 7.1	FORCE H2 10.66	FORCE H2 14.2
CUS module (kWh)	23,62	6,75	10,12	13,49
Number of modules	7	2	3	4
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				

Type Verification Test Report

Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations — **Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

Batteries are used in the above stated storage system				
Brand	LG Energy Solution, Ltd.	LG Energy Solution, Ltd.	LG Energy Solution, Ltd.	--
Technology	Lithium nickel manganese cobalt oxides (Li-NMC)	Lithium nickel manganese cobalt oxides (NMC)	Lithium nickel manganese cobalt oxides (NMC)	--
Model	RESU Flex 8.6	RESU Flex 12.9	RESU Flex 17.2	--
CUS module (kWh)	8,17	12,26	16,34	--
Number of modules	2	3	4	--
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG
Technology	Lithium nickel manganese cobalt oxides (Li-NMC)	Lithium nickel manganese cobalt oxides (NMC)	Lithium nickel manganese cobalt oxides (NMC)	Lithium nickel manganese cobalt oxides (Li-NMC)
Model	AXIstorage Li SH 3 Energypacks	AXIstorage Li SH 4 Energypacks	AXIstorage Li SH 5 Energypacks	AXIstorage Li SH 6 Energypacks
CUS module (kWh)	9,70	12,90	16,10	19,30
Number of modules	3	4	5	6
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	AXIstorage SV1 3 Energy-packs	AXIstorage SV1 4 Energy-packs	AXIstorage SV1 5 Energy-packs	AXIstorage SV1 6 Energy-packs
CUS module (kWh)	10,12	13,49	16,87	20,24
Number of modules	3	4	5	6
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Brand	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG	AXITEC Energy GmbH & Co. KG
Technology	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)	Lithium Iron Phosphate (LFP)
Model	AXIstorage SV1 7 Energy-packs	AXIstorage SV2 2 Energy-packs	AXIstorage SV2 3 Energy-packs	AXIstorage SV2 4 Energy-packs
CUS module (kWh)	23,62	6,75	10,12	13,49
Number of modules	7	2	3	4
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				

Type Verification Test Report

Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations — **Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

Description of the structure of the power generation unit:

The power generation unit is equipped with a DC and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in each line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

Setting of the parameter values for DK1 and DK2

	Settings for DK1	Setting for DK2
	LFSM-O	
Threshold frequency [Hz]	50,2	50,5
Droop [% of Pn]	5% (40% Pn/Hz)	4% (50% Pn/Hz)
Intentional Delay	500ms	500ms
	Reactive Power	
	Q fix	Q fix
Active/disabled [On/Off]	On	On
Q setpoint [VAr]	0	0
	cos φ fix	
Active/disabled [On/Off]	Off	Off
PF setpoint [PF]	1	1
	cos φ (P)	
Active/disabled [On/Off]	Off	Off
Cos φ (P) P1 [% of P_n]	0	0
Cos φ (P) PF1 [PF]	1	1
Cos φ (P) P2 [% of P_n]	50	50
Cos φ (P) PF2 [PF]	1	1
Cos φ (P) P3 [% of P_n]	100	100
Cos φ (P) PF3 [PF]	0,9 inductive	0,9 inductive
Cos φ (P) Lockin [% of U_n]	105	105
Cos φ (P) Lockout [% of U_n]	100	100
	Connection and Reconnection	
Gradient [% of P_n/min]	20	20
Observation time [seconds]	180	180
U_{min} [% of U_n]	85	85
U_{max} [% of U_n]	110	110
f_{min} [Hz]	47,5	47,5
f_{max} [Hz]	50,2	50,5

Type Verification Test Report

Extract from test report according to Technical Regulation 3.3.1 for Electrical Storage Installations — **Nr. 19TH0374_BI-G2_EN_TR.3.3.1-LV-DK1-DK2_0**

	Settings for DK1	Setting for DK2
	System Protection	
f> [s]	0,2	0,2
f> [Hz]	51,5	51,5
f< [s]	0,2	0,2
f< [Hz]	47,5	47,5
U> [s]	60	60
U> [% of U_n]	110	110
U>> [s]	0,2	0,2
U>> [% of U_n]	115	115
U< [s]	50	50
U< [% of U_n]	85	85
	Loss of Mains Detection	
U<< [s]	0,2	0,2
U<< [% of U_n]	80	80

Note

The settings of the interface protection are password protected adjustable.

In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.