

Certificate

No. ESY 132944 0009 Rev. 00

Certificate of NS Protection

Holder of Certificate: **Heiwit S.p.A**
Via Carlo Robbioni, 2
21100 Varese VA
ITALY

Product: **Converter**
(Hybrid Inverter)

Model(s): **Virgo 6K-S-HW, Virgo 5K-S-HW,**
Virgo 4K6-S-HW, Virgo 4K-S-HW,
Virgo 3K6-S-HW, Virgo 3K-S-HW

Parameters: See page 2

Applicable standards: VDE-AR-N 4105:2018
DIN VDE V 0124-100 (VDE V 0124-100):2020

This Certificate confirms the compliance with the above listed standards on a voluntary basis. It refers only to the sample submitted to TÜV SÜD Product Service GmbH and does not certify the quality or safety of the serial products. It was issued according to TÜV SÜD Product Service certification program Photovoltaics and Grid Integration. For details see: www.tuvsud.com/ps-cert

Test report no.: 64290263148001

Date, 2026-09-14



(Billy Qiu)

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Parameters:

Model	Virgo 3K-S- HW	Virgo 3K6-S- HW	Virgo 4K-S- HW	Virgo 4K6-S- HW	Virgo 5K-S- HW	Virgo 6K-S- HW
PV terminal parameters						
Maximum PV voltage [V _{DC}]	600					
Rated voltage [V _{DC}]	360					
MPPT voltage range [V _{DC}]	100 - 550					
MPPT voltage range (full load) [V _{DC}]	250 - 520					
Maximum input current [A _{DC}]	16/16					
Isc PV [A _{DC}]	20/20					
MPPT tracker number	2					
Maximum input power [W]	8000	8600	9000			
Battery input/output parameters						
Battery type	Lithium-ion/Lead-acid/Sodium-ion					
Maximum voltage [V _{DC}]	60					
Battery rated voltage [V _{DC}]	51.2					
Battery voltage range [V _{DC}]	42 - 60/42 - 60/32 - 60					
Maximum charge power [W]	5000					
Maximum discharge power [W]	5000					
Maximum charge current [A _{DC}]	100					
Maximum discharge current [A _{DC}]	100					
Maximum charge power from grid to battery [W]	3000	3680	4000	4600	5000	5000
Grid terminal input parameters						
Rated input voltage [V _{AC}]	1P+N+PE, 230					
Rated input frequency [Hz]	50					
Maximum continuous input current from grid to battery [A _{AC}]	13.0	16.0	17.4	20.0	21.7	21.7
Maximum continuous input current [A _{AC}]	26.0	32.0	34.8	40.0	43.5	43.5
Maximum continuous input power from grid to battery [W]	3000	3680	4000	4600	5000	5000
Maximum continuous input active power [W]	6000	7360	8000	9200	10000	10000
Maximum continuous input apparent power [VA]	6000	7360	8000	9200	10000	10000
Power factor range	0.8 under-excited to 0.8 over-excited					
Grid terminal output parameters						
Rated output voltage [V _{AC}]	1P+N+PE, 230					
Rated output frequency [Hz]	50					
Rated output current [A _{AC}]	13.0	16.0	17.4	20.0	21.7	26.1
Maximum continuous output current [A _{AC}]	13.0	16.0	17.4	20.0	21.7	26.1
Rated output active power [W]	3000	3680	4000	4600	5000	6000
Maximum output active power P _{E_{max}} [W]	3000	3680	4000	4600	5000	6000
Maximum output apparent power S _{E_{max}} [VA]	3000	3680	4000	4600	5000	6000
Power factor range	0.8 under-excited to 0.8 over-excited					

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E.6 Certificate of the network and system protection

Certificate of NS protection	
Manufacturer	Heiwit S.p.A
Type of NS protection	Integrated NS protection
Central NS protection	☐
Integrated NS protection	☒ Assigned to power generation unit of type: <u>Virgo 6K-S-HW, Virgo 5K-S-HW, Virgo 4K6-S-HW, Virgo 4K-S-</u> <u>HW, Virgo 3K6-S-HW, Virgo 3K-S-HW.</u>
Network connection rule	VDE-AR-N 4105:2018-11 “Generators connected to the low-voltage distribution network” Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100):2020-06 “Network integration of power generation systems – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network
Test report	<u>64.290.26.31480.01</u> from <u>2026-09-03</u>
The network and system protection designated above meets the requirements of VDE-AR-N 4105:2018-11.	

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

Extract from test report for NS protection			
“Determination of electrical properties”			
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	V2.30		
Manufacturer:	Heiwit S.p.A Via Carlo Robbioni, 2, 21100 Varese VA, ITALY		
Measuring period:	From 2024-05-25 to 2024-06-24, 2026-08-01 to 2026-08-02, 2026-09-01 to 2026-09-01		
	Inverter		
Protection function	Setting value	Tripping value	Tripping time NS protection*
Rise-in-voltage protection $U >>$	$1.25 \cdot U_n$	L1-N: 289.4V	L1-N: 128.8ms
Rise-in-voltage protection $U >$	$1.10 \cdot U_n$	$1.10 \cdot U_n$	ms**
Voltage drop protection $U <$	$0.8 \cdot U_n$	L1-N: 183.6V	L1-N: 3000.0ms
Voltage drop protection $U <<$	$0.45 \cdot U_n$	L1-N: 102.5V	L1-N: 311.0ms
Frequency decrease protection $f <$	47.5Hz	47.48Hz	102.0ms
Frequency increase protection $f >$	51.5Hz	51.50Hz	117.0ms
*: The tripping time includes the period from the limit value violation U/f until the tripping signal to the interface switch.			
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.			
The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms.			
**: Verification disconnection time of moving 10-min-average value.			
Disconnecting time as below:			
454.0s (L1-N from 600s@ U_n to 112% U_n)			
Continuous operation (L1-N from 600s@ U_n to 108% U_n)			
296.0s (L1-N from 600s@106% U_n to 114% U_n)			
☒ as integrated NS protection			
Assigned to power generation unit type		Virgo 6K-S-HW, Virgo 5K-S-HW, Virgo 4K6-S-HW, Virgo 4K-S-HW, Virgo 3K6-S-HW, Virgo 3K-S-HW.	
Integrated interface switch type		Series-connected relays for all phase conductors each Relay type: CHFN -V-112HA2F(35A)	
Response time of interface switch for integrated NS protection		Release time: Max. 10 ms	
Verification of the entire functional chain “integrated NS protection – interface switch” has resulted in successful disconnection.		☒	