

Compliance Document

No. D 091849 0031 Rev. 01

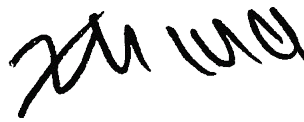
Holder of Certificate: **CSI Solar Co., Ltd.**
199 Lushan Road, SND
215129 Suzhou, Jiangsu
PEOPLE'S REPUBLIC OF CHINA

Product: **PV inverter**
Grid-connected PV inverter

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. For details see: www.tuvsud.com/ps-cert

Test report no.: 704092320207-01

Date, 2023-09-22


(Zhengdong Ma)

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Model(s):

CSI-100K-T4001A-E, CSI-100K-T4001B-E, CSI-110K-T4001A-E,
CSI-110K-T4001B-E, CSI-120K-T4001A-E, CSI-120K-T4001B-E.

Parameters:

Please see pages 3 to 7.

**Tested
according to:**

EN 50549-2:2019

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Model	CSI-100K-T4001A-E	CSI-110K-T4001A-E	CSI-120K-T4001A-E
PV input parameters:			
Vmax PV (absolute max.)	1100 Vd.c.		
MPPT voltage range	200-1000 Vd.c.		
Max. input current	6*40 Ad.c.		
Isc PV (absolute max.)	6*50 Ad.c.		
AC output parameters:			
Rated output power	100 kW	110 kW	120 kW
Max. output apparent power	100 kVA	110 kVA	120 kVA
AC nominal voltage	3/N/PE~ 230/400 Va.c.		
AC nominal frequency	50 Hz		
Max. output current	152 Aa.c.	167.1 Aa.c.	182.3 Aa.c.
Power factor	0.8 leading...0.8 lagging		

Model	CSI-100K-T4001B-E	CSI-110K-T4001B-E	CSI-120K-T4001B-E
PV input parameters:			
Vmax PV (absolute max.)	1100 Vd.c.		
MPPT voltage range	200-1000 Vd.c.		
Max. input current	9*32 Ad.c.		
Isc PV (absolute max.)	9*40 Ad.c.		
AC output parameters:			
Rated output power	100 kW	110 kW	120 kW
Max. output apparent power	100 kVA	110 kVA	120 kVA
AC nominal voltage	3/N/PE~ 230/400 Va.c.		
AC nominal frequency	50 Hz		
Max. output current	152 Aa.c.	167.1 Aa.c.	182.3 Aa.c.
Power factor	0.8 leading...0.8 lagging		

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Interface protection system default settings and power controls in inverter (based on EN 50549-2:2019)				
Clause(s) / subclause(s) of this EN	Ref	Parameter	Typical value range	Value default
4.4.2 Operating frequency range	A,B	47.0 – 47.5 Hz Duration	0 – 20 s	20 s
	A,B	47.5 – 48.5 Hz Duration	30 – 90 min	90 min
	A,B	48.5 – 49.0 Hz Duration	30 – 90 min	90 min
	A,B	49.0 – 51.0 Hz Duration	not configurable	unlimited
	A,B	51.0 – 51.5 Hz Duration	30 – 90 min	90 min
	A,B	51.5 – 52 Hz Duration	0 – 15 min	15 min
4.4.3 Minimal requirement for active power delivery at underfrequency	A,B	Reduction threshold	49 Hz – 49.5 Hz	No Reduction
	A,B	Maximum reduction rate	2 – 10 % PM/Hz	N/A
4.4.4 Continuous operating voltage range	n.a.	Upper limit	not configurable	110% U _c
	n.a.	Lower limit	not configurable	90% U _c
4.5.2 Rate of change of frequency (ROCOF) immunity	A,B	ROCOF withstand capability (defined with a sliding measurement window of 500 ms)	not defined	2 Hz/s
		non-synchronous generating technology:		
		synchronous generating technology:		N/A
4.5.3.2 Generating plant with non-synchronous generating technology	B	Maximum power resumption time	not defined	1 s
	B	Voltage-Time-Diagram	see Figure 6	Time [s] U [p.u.]
				0.0 0.2
				0.15 0.2
				1.5 0.85
				180 0.85
4.5.3.3 Generating plant with synchronous generating technology	B	Maximum power resumption time	not defined	N/A
	B	Voltage-Time-Diagram	see Figure 7 (N/A)	Time [s] U [p.u.]
				-- --
				-- --
				-- --
				-- --
4.5.4 Over-voltage ride through (OVRT)	n.a.	Voltage-Time-Diagram	not configurable	Time [s] U [p.u.]
				0.0 1.25
				0.1 1.25
				0.1 1.20
				5.0 1.20
				5.0 1.15
				60 1.15
4.6.1 Power response to overfrequency	A,B	Threshold frequency f ₁	50.2 Hz – 52 Hz	50.2Hz
	A,B	Droop	2 % – 12 %	5%
	A,B	Power reference	PM P _{max}	P _M for other non-synchronous

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				generating technology.
	n.a.	Intentional delay	0 – 2 s	0 s
	n.a.	Deactivation threshold fstop	50.0 Hz – f1	Deactivation
	n.a.	Deactivation time tstop	0 – 600 s	-
	A	Acceptance of staged disconnection	yes no	yes
4.6.2 Power response to underfrequency	n.a.	Threshold frequency f1	49.8 Hz – 46 Hz	49.8 Hz
	n.a.	Droop	2 – 12 %	5%
	n.a.	Power reference	PM Pmax	Pmax
	n.a.	Intentional delay	0 – 2 s	0 s
4.7.2.2 Capabilities	B	Reactive power range overexcited	0 – 0.6	0
	B	Reactive power range underexcited	0 – 0.6	0
4.7.2.3 Control modes	n.a.	Enabled control mode	Q setp. Q(U) Q(P) cos φ setp. cos φ (P)	Q setpoint
4.7.2.3.2 Setpoint control modes	n.a.	Q setpoint and excitation	0-60%Smax	0
	n.a.	cos φ setpoint and excitation	1-0.9	1
4.7.2.3.3 Voltage related control modes	n.a.	Characteristic curve	-	-
	n.a.	Time constant	3 s – 60 s	3.33 s
	n.a.	Min cos φ	0 – 1	disable
	n.a.	Lock in power	0 % – 20 %	20%
	n.a.	Lock out power	0 % – 20 %	5%
4.7.2.3.4 Power related control mode	n.a.	Characteristic curve	-	disable
4.7.4.2.1 Voltage support during faults and voltage steps - General	B.	Enabling	enable disable	disable
	B.	Static voltage range overvoltage	100 % Un – 120 % Un	110%
	B.	Static voltage range undervoltage	20 % Un – 100 % Un	90%
	B.	Insensitivity range of ΔU50per	0 % – 15 %	5%
	B.	Gradient k1	0 – 6	2
	B.	Gradient k2	0 – 6	2
4.7.4.2.1.2 Optional Modes	n.a.	Active power priority	enable disable	disable
	n.a.	Reactive current limitation [% rated current]	0 %–100 %	50%
	n.a.	Zero current threshold	20 % Un – 100 % Un	50% Un
4.7.4.2.2 Zero current mode for converter connected generating technology	n.a.	Enabling	enable disable	disable
	n.a.	Static voltage range undervoltage	20 % Uc – 100 % Uc	50% Uc
4.9.3 Requirements on voltage and frequency protection – inverter self-protection	B	Undervoltage threshold stage 1	0.2 Un – 1 Un	0.85 Un
	B	Undervoltage operate time stage 1	0.1 s – 100 s	1.4 s
	B	Undervoltage threshold stage 2	0.2 Un – 1 Un	0.5 Un
	B	Undervoltage operate time stage 2	0.1 s – 5 s	0.3 s
	B	Overvoltage threshold stage 1	1.0 Un – 1.2 Un	1.15 Un
	B	Overvoltage operate time stage 1	0.1 s – 100 s	0.3 s
	B	Overvoltage threshold stage 2	1.0 Un – 1.3 Un	1.25 Un
	B	Overvoltage operate time stage 2	0.1 s – 5 s	0.1 s
	B	Overvoltage threshold 10 min	1.0 Un – 1.15 Un	1.10 Un

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		mean protection		
	B	Underfrequency threshold stage 1	47.0 Hz – 50.0 Hz	47.5 Hz
	B	Underfrequency operate time stage 1	0.1 s – 100 s	0.4 s
	B	Underfrequency threshold stage 2	47.0 Hz – 50.0 Hz	47 Hz
	B	Underfrequency operate time stage 2	0.1 s – 5 s	0.2 s
	B	Overfrequency threshold stage 1	50.0 Hz – 52.0 Hz	51.5 Hz
	B	Overfrequency operate time stage 1	0.1 s – 100 s	0.4 s
	B	Overfrequency threshold stage 2	50.0 Hz – 52.0 Hz	52.0 Hz
	B	Overfrequency operate time stage 2	0.1 s – 5 s	0.4 s
	B	Positive sequence under-voltage protection threshold	20 % – 100 %	Deactivated
	B	Positive sequence under-voltage protection operate time	0.2 s – 100 s	Deactivated
	B	Negative sequence over-voltage protection threshold	1 % – 100 %	Deactivated
	B	Negative sequence over-voltage protection operate time	0.2 s – 100 s	Deactivated
	B	Zero sequence over-voltage protection threshold	0 % – 100 %	Deactivated
	B	Zero sequence over-voltage protection operate time	0.2 s – 100 s	Deactivated
4.10.2 Automatic reconnection after tripping	B	Lower frequency	47.0 Hz – 50.0 Hz	49.5 Hz
	B	Upper frequency	50.0 Hz – 52.0 Hz	50.2 Hz
	B	Lower voltage	50 % Un – 100 % Un	90%Un
	B	Upper voltage	100 % Un – 120 % Un	110%Un
	B	Observation time	10 s – 600 s	60s
	B	Active power increase gradient	6 % – 3000 %/min	10%Pn/min
4.10.3 Starting to generate electrical power	A,B	Lower frequency	47.0 Hz – 50.0 Hz	49.5 Hz
	A,B	Upper frequency	50.0 Hz – 52.0 Hz	50.1 Hz
	A,B	Lower voltage	50 % – 100 % Un	90%Un
	A,B	Upper voltage	100 % – 120 % Un	110%Un
	A,B	Observation time	10 s – 600 s	60s
	A,B	Active power increase gradient	6 % – 3000 %/min	10%Pn/min
4.11.1 Ceasing active power	A,B	Remote operation of the logic interface	yes no	Digital input
4.11.2 Reduction of active power on set point	B	Remote operation NOTE: If yes further definition is provided by the DSO	yes no	Digital input
4.12 Remote information exchange	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes no	no

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The Column Ref specifies if a parameter is relevant for COMMISSION REGULATION 2016/631 and for what type of generating module the parameter is relevant. If n.a. is set, this parameter is: not applicable for 2016/631, but is introduced into EN 50549-2 for local DSO network management reasons and is not considered as cross border issues.

Based on manufacturer's request, below national deviation of protection settings and automatic reconnection according to type B for Netherlands deviation is considered and tested in addition.

Protection Settings	Undervoltage threshold stage 1(Netherlands deviation)	85%
	Undervoltage operate time stage 1(Netherlands deviation)	3 s
	Undervoltage threshold stage 2(Netherlands deviation)	5%
	Undervoltage operate time stage 2(Netherlands deviation)	0.25 s
	Overvoltage threshold stage 1 (Netherlands deviation)	115%
	Overvoltage operate time stage 1 (Netherlands deviation)	2 s
	Underfrequency threshold stage 1 (Netherlands deviation)	47.5 Hz
	Underfrequency operate time stage 1(Netherlands deviation)	2 s
	Overfrequency threshold stage 1 (Netherlands deviation)	51.5 Hz
	Overfrequency operate time stage 1 (Netherlands deviation)	2 s
Fault-Ride-Through and Fast fault-current injection	Gradient k	2
	Static voltage range overvoltage	U _{max} =120%
	Deactivation/activation	activation
	Insensitivity range	+/-10%
Automatic reconnection	Lower frequency	49.9 Hz
	Upper frequency	50.1 Hz
	Lower voltage	90%
	Upper voltage	110%
	Observation time	60 s
	Active power increase gradient	10%/min