



**BUREAU
VERITAS**

Certificate of compliance

Applicant: TommaTech GmbH
Zeppelinstr. 14
85748 Garching b.München,
Germany

Product: Grid-connected PV Inverter

Model: Trio Castor 18K,
Trio Castor 20K,
Trio Castor 22K,
Trio Castor 23K,
Trio Castor 25K

The device is designed to work as a generation unit of the type: A

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

Applied rules and standards:

EN 50549-1:2019/A1:2023

Requirements for parallel connection of installations with distribution networks - Part 1: Connection to an LV distribution network - Production of installations up to and including Type B

- 4.4 Normal operating range
- 4.5 Immunity to disturbances
- 4.6 Active response to frequency deviation
- 4.7 Power response to voltage variations and voltage changes
- 4.8 EMC and power quality
- 4.9 Interface protection
- 4.10 Connection and starting to generate electrical power
- 4.11 Ceasing and reduction of active power on set point
- 4.13 Requirements regarding single fault tolerance of interface protection system and interface switch

EN 50549-10:2022

Requirements for generating plants to be connected in parallel with distribution networks - Part 10: Tests for conformity assessment of generating units

Compliance with the parameters in Annex C of the standard

(see appendix parameter table)

Commission Regulation (EU) 2016/631 of 14 April 2016

Establishing a network code on requirements for grid connection of generators (NC RFG).
Type approval for generation units to use in Type A plants.

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: CWXK-ESH-P26020667

Certification Program: NSOP-0032-DEU-ZE-ES-V11

Certificate number: U26-0462

Date of issue: 2026-06-19

Certification body

Accreditation



Domenik Koll
Head of Energy Systems Germany



Accredited certification body by Deutsche Akkreditierungsstelle GmbH (DAkkS) according to ISO/IEC 17065. The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-ZE-12024-01-00. The Deutsche Akkreditierungsstelle GmbH (DAkkS) is signatory of the multilateral arrangements of EA, ILAC and IAF for mutual recognition.

Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this certificate of conformity shall not be reproduced.

Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016

Manufacturer	TommaTech GmbH Zeppelinstr. 14 85748 Garching b.München, Germany			
Product type	Grid-connected PV Inverter			
Static converter model	Trio Castor 18K	Trio Castor 20K	Trio Castor 22K	--
Input DC (photovoltaic)				
MPP voltage range [V]	200-1000	200-1000	200-1000	--
Max. input voltage [V]	1100	1100	1100	--
Max. input current per MPPT [A]	26+26	26+26	26+26	--
Output AC				
Rated AC voltage [V]	3L/N/PE, 230/400V, 50Hz	3L/N/PE, 230/400V, 50Hz	3L/N/PE, 230/400V, 50Hz	--
Max. output current [A]	28,7	31,9	35,1	--
Nom. converter output (P _{NINV}) [kW]	18,0	20,0	22,0	--
Max. apparent power [kVA]	19,8	22,0	24,2	--
Static converter model	Trio Castor 23K	Trio Castor 25K	--	--
Input DC (photovoltaic)				
MPP voltage range [V]	200-1000	200-1000	--	--
Max. input voltage [V]	1100	1100	--	--
Max. input current per MPPT [A]	26+26	26+26	--	--
Output AC				
Rated AC voltage [V]	3L/N/PE, 230/400V, 50Hz	3L/N/PE, 230/400V, 50Hz	--	--
Max. output current [A]	36,7	39,8	--	--
Nom. converter output (P _{NINV}) [kW]	23,0	25,0	--	--
Max. apparent power [kVA]	25,3	27,5	--	--



BUREAU
VERITAS

Annex certificate of conformity No. U26-0462

Extract from test report CWXK-ESH-P26020667 issued by a testing laboratory accredited by "Deutsche Akkreditierungsstelle GmbH (DAkkS)" according to ISO/IEC 17025. The accreditation is only valid for the scope listed in the annex of the accreditation certificate "D-PL-12024-03-04".

Interface protection system and interface switch (Network and system protection "NS-protection")	
Type of protection	integrated NS-protection
Assigned to generation unit type	Trio Castor 18K, Trio Castor 20K, Trio Castor 22K, Trio Castor 23K, Trio Castor 25K
Integrated interface switch	Type of switching equipment 1: Relay (Model AZSR143) Type of switching equipment 2: Relay (Model AZSR143)
	Note: The output is switched off by the inverter bridge and two relay in series in each line and neutral.
Software	
Firmware version	5512-0326
Note	
<p>The settings of the product are password protected adjustable.</p> <p>In case the generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.</p> <p>The above stated generators are tested according to the requirements in the EN 50549-1 and the Commission Regulation (EU) 2016/631 of 14 April 2016. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements.</p>	

Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016

Parameter Table					
Name of parameter set		EN50549-1&EN50549-10			
Specific technical requirement		EN50549-10			
Clause of EN 50549-1	Parameter	Remarks / additional information ^b	setting range	default settings used	
4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes	
4.4.2 Operating frequency range	47,0 – 47,5 Hz Duration		0 s – 20 s	0s	
	47,5 – 48,5 Hz Duration		30 – 90 min	30 min	
	48,5 – 49,0 Hz Duration		30 – 90 min	30 min	
	49,0 – 51,0 Hz Duration		not configurable	unlimited	
	51,0 – 51,5 Hz Duration		30 – 90 min	30 min	
	51, 5 – 52 Hz Duration		0 – 15 min	0 s	
4.4.3 Minimal requirement for active power delivery at under frequency	Reduction threshold		not configurable 49,0 Hz – 49,5 Hz	Electronic inverter, no power reduction take place 49,5 Hz	
	Maximum reduction rate		not configurable 2 – 10% P _M /Hz	≤ 2 % 10% P _M /Hz	
4.4.4 Continuous operating voltage range	Upper limit		not configurable 1,0 U _n – 2,0 U _n	1,15 U _n 1,10 U _n	
	Lower limit		not configurable 0,9 U _n – 1,0 U _n	0,85 U _n , 0,90 U _c	
4.5.2 Rate of change of frequency (ROCOF) immunity	ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology (inverter): synchronous generating technology:		not configurable 0 – 10 Hz/s		
		yes		2 Hz/s	
4.5.3.2 Generating plant with non-synchronous generating technology (FRT)	Fault recovery of active power (times calculated from the removal of the short circuit)		configurable	≤ 5 s	
		Voltage-Time-Diagram	see Figure 6 of EN 50549-1:2019	Time [s]	U [p.u.]
		0,0		0,2	
		0,15		0,2	
		1,5		0,85	
		180		0,85	
		180	0,9		
4.5.4 Over-voltage ride through (OVRT)	Voltage-Time-Diagram		not configurable see Figure 8 of EN 50549-1:2019	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
				60	1,10
4.5.5 Phase jump immunity	Phase jump immunity		not configurable	20°	
4.6.1 Power response to over frequency (LFSM-O)	Threshold frequency f_1		50,2 Hz – 52,0 Hz	50,2 Hz	
	Droop		2% – 12%	5%	
	Power reference		P_M P_{max}	P_M for other nonsynchronous Generating technology	
	Intentional delay		0 s – 2 s	0 s	
	Deactivation threshold f_{stop}		50,0 Hz – f_1	deactivated	
	Deactivation time t_{stop}		0 s – 600 s	-	
	Acceptance of staged disconnection		yes no	yes	
4.6.2 Power response to under frequency (LFSM-U)	Threshold frequency f_1		49,8 Hz – 46,0 Hz	49,8 Hz	
	Droop		2 % – 12%	5%	
	Power reference		P_M P_{max}	P_{max}	
	Intentional delay		0 s – 2 s	0 s	
4.7.2.2 Capabilities	Active factor range overexcited		0,90 – 1 / 48% P_d - 0 0,95 – 1 / 33% P_d - 0	0,95 – 1 / 33% P_d - 0	
	Active factor range underexcited		0,90 – 1 / 48% P_d - 0 0,95 – 1 / 33% P_d - 0	0,95 – 1 / 33% P_d - 0	
4.7.2.3 Control modes	Enabled control mode		Q setp. Q(U) Q(P) cos φ setp. cos φ (P)	activated deactivated deactivated deactivated deactivated	
4.7.2.3.2 Set point control modes	Q setpoint and excitation		0% – 48% P_D , 0% – 33% P_D	0	
	cos φ setpoint and excitation		1,0 – 0,9	1	
4.7.2.3.3 Voltage related control modes	Characteristic curve		cos φ (P) Q(P)	indicate default characteristic	
	Time constant		3 s – 60 s	10 s	
	Min cos φ		0,0 – 1	0,9	
	Lock in power		0% – 20%	deactivated	
	Lock out power		0% – 20%	deactivated	
4.7.2.3.4 Power related control mode	Characteristic curve		Q(U) P(U)	Q(U) (three-phase inverter) 0,00...-0,436 0,92...-0,436 0,94...0,0	



BUREAU
VERITAS

Annex certificate of conformity No. U26-0462

Extract from test report CWXK-ESH-P26020667 issued by a testing laboratory accredited by "Deutsche Akkreditierungsstelle GmbH (DAKKS)" according to ISO/IEC 17025. The accreditation is only valid for the scope listed in the annex of the accreditation certificate "D-PL-12024-03-04".

				1,06...0,0 1,08...0,436 1,20...0,436 P(U) deactivated
4.7.4.2.2 Zero current mode for converter connected generating technology	Enabling		enable disable	disable
	Static voltage range overvoltage		100% U_n – 120% U_n	120% U_n
	Static voltage range undervoltage		20% U_n – 100% U_n	50% U_n
4.9.3 Requirements on voltage and frequency protection	Threshold for protection as dedicated device [in A or kW, kVA]		43 A Note: Rated current of internal safety device!	Internal safety device
	Undervoltage threshold stage 1		0,2 U_n – 1 U_n	0,85 U_n
	Undervoltage operate time stage 1		0,1 s – 100 s	1,2 – 1,5 s
	Undervoltage threshold stage 2		0,2 U_n – 1 U_n	N/A
	Undervoltage operate time stage 2		0,1 s – 5 s	N/A
	Overvoltage threshold stage 1		1,0 U_n – 1,2 U_n	1,15 U_n
	Overvoltage operate time stage 1		0,1 s – 100 s	0,1 – 0,2 s
	Overvoltage threshold stage 2		1,0 U_n – 1,3 U_n	1,25 U_n (N/A)
	Overvoltage operate time stage 2		0,1 s – 5 s	0,1 s (N/A)
	Overvoltage threshold 10 min mean protection ^a		1,0 U_n – 1,15 U_n	1,10 U_n
	Overvoltage operate time 10 min mean protection ^a		0,04 s – 10,00 s	10 min (update every 3s)
	Underfrequency threshold stage 1		47,0 Hz – 50,0 Hz	47,5 Hz
	Underfrequency operate time stage 1		0,1 s – 100 s	0,3 s – 0,5 s
	Underfrequency threshold stage 2		47,0 Hz – 50,0 Hz	N/A
	Underfrequency operate time stage 2		0,1 s – 5 s	N/A
	Overfrequency threshold stage 1		50,0 Hz – 52,0 Hz	52,0 Hz
	Overfrequency operate time stage 1		0,1 s – 100 s	0,3 s – 0,5 s
Overfrequency threshold stage 2		50,0 Hz – 52,0 Hz	N/A	
Overfrequency operate time stage 2		0,1 s – 5,0 s	N/A	



BUREAU
VERITAS

Annex certificate of conformity No. U26-0462

Extract from test report CWXK-ESH-P26020667 issued by a testing laboratory accredited by "Deutsche Akkreditierungsstelle GmbH (DAkkS)" according to ISO/IEC 17025. The accreditation is only valid for the scope listed in the annex of the accreditation certificate "D-PL-12024-03-04".

	Loss of mains according EN 62116 (LoM)		0 s – 6000 s	ROCOF 2,5 Hz/s (0,5 s) active 2 s (5 s)
4.10.2 Automatic reconnection after tripping	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 52,0 Hz	50,2 Hz
	Lower voltage		50% Un – 100 % Un	85% Un, 90% Uc
	Upper voltage		100% Un – 120% Un	110% Un
	Observation time		10 s – 600 s	60 s
	Active power increase gradient		6% – 3000% / min	10% / min
4.10.3 Starting to generate electrical power	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 52,0 Hz	50,1 Hz
	Lower voltage		50% – 100% Un	85% Un, 90% Uc
	Upper voltage		100% – 120% Un	110% Un
	Observation time		10 s – 600 s	60 s
	Active power increase gradient		6% – 3000% / min	disabled
4.11.1 Ceasing active power	Remote operation of the logic interface		yes no	RS485, WiFi, local
4.11.2 Reduction of active power on set point	Remote operation NOTE: If yes further definition is provided by the DSO		yes no	RS485, WiFi, local