

KOSTAL

KOSTAL INDUSTRIE ELEKTRIK
GmbH & Co. KG
58099
HAGEN

Technical notice

Inverter compliance with article 12 of guide UTE 15-712-1

KOSTALINDUSTRIE ELEKTRIK
GmbH&Co.KG 58099 HAGEN

Mission completed on 04/07/2025
Avis Technique :
(Details of examinations are given in the report)

CASE NO.: 2403STC00000012
REPORT DATE: 04/07/2024

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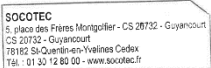



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PURPOSE OF THE SERVICE

The purpose of this report is to document the results of our detailed technical assessment, with a view to issuing an opinion on the conformity of KOSTAL's PIKO CI 30/50 G2 inverter with the requirements specified in paragraph §12 of standard UTE C15-712-1. Furthermore, in the context of the installation of this inverter in France, our mission includes the validation of its system and DC operation, in accordance with the applicable standards.

NATURE OF THE ASSIGNMENT

The current mission aims to analyze the documents provided by the client, with the purpose of confirming the compatibility of the PIKO CI 30/50 G2 inverter with the specifications required for its deployment within an electrical installation in France. This analysis falls within the scope of intervention established by our contractual agreement, following the acceptance of our technical and financial proposal.

BENEFIT LIMIT

The scope of this report includes a thorough review of the documentation provided by the customer. It is important to note that this document does not represent a certificate of conformity for the equipment. Furthermore, our technical opinion is not intended to guide the design of the final installation where the inverter will be integrated. A verification in compliance with current standards, in particular with Consuel, must be carried out to ensure full compliance of the installation.

REFERENCE STANDARDS

- UTE C 15-712-1: "Photovoltaic installations connected to the public distribution network" July 2013.
- NF EN 62109-1: "Safety of power converters used in photovoltaic systems - Part 1: general requirements" July 2010
- NF EN 62109-2: "Safety of power converters used in photovoltaic systems - Part 2: Particular requirements for inverters" October 2011
- DIN VDE 0126-1-1 "Automatic disconnecting device between a generator and the public low-voltage network" August 2013
- NF C 15-100: "Low-voltage electrical installations" December 2002

REFERENCE DOCUMENTS

- Certificate of conformity IEC/EN 62109-1 and -2 and IEC/EN 62109-1 and -2 :2011 by TUV Rheinland. Date of issue: 12.08.2024.
- EU Declaration of Conformity - PIKO CI 30/50 G2 - Date : 12.05.2025
- Technical data : Solar Inverter PIKO CI 100kW. - Ref: EN - DOC03594654 - Date: april 2024
- Product test report - IEC/EN 62109-1 and -2 :2010 et IEC/EN 62109-1 and -2 :2011. TUV Rheinland. Date 10 mai 2024
- Instruction manual - PIKO CI 30/50 G2

VERIFIED ELEMENTS

- **Document review:** In-depth analysis of user manuals, certificates, test reports and declarations of conformity.
- **DC switch inspection:** Rigorous inspection of the DC switch to ensure correct operation.
- **CE Marking check:** Verification of the presence and conformity of the CE marking, attesting to compliance with European standards.
- **Evaluation of decoupling protection devices:** Confirmation of the existence and effectiveness of decoupling protection mechanisms.

TECHNICAL ADVICE

After a thorough examination of the technical specifications of the PIKO CI 30/50 G2 inverter, both on the AC and DC sides, and taking into account the previously mentioned standards, the equipment meets the required conditions for use in France.

This validation is contingent upon the entire electrical installation's compliance with current standards. It is imperative that the suitability of the entire installation be subject to detailed studies to ensure proper implementation, in accordance with the manufacturer's recommendations and the requirements of the electrical network operator.

This specifically includes the verification of compatibility of voltages, currents, frequencies, and load capacities, to ensure the optimal and safe operation of the overall electrical system, in conformity with current European standards.

In accordance with Article 12 of the UTE C15-712-1 (2013) guide, it is required to provide a disconnection device and an emergency shutdown mechanism, on both the AC and DC sides. For high-power inverters, these devices can be integrated within the same enclosure. In the case of inverters with multiple DC inputs, it is acceptable to perform the emergency shutdown via separate direct control devices. These devices can be switches, circuit breakers, or contactors. To meet these requirements, the concerned inverters are equipped with disconnect switches compliant with the IEC 60947-3 standard (see appendix F). However, although the DC circuit breaker is presented as an option in Appendix F (extract from the CDF), it is important to note that this option must be activated to ensure that the inverter complies with French standards. The inverters with multiple DC inputs also meet the criteria for high power, allowing these devices to be integrated within their enclosure. Moreover, the presence of integrated connectors, accessible without opening the inverter, facilitates the connection of DC cables without exposure to direct contact with internal components. Consequently, the integrated DC switches meet the requirements for disconnection and emergency shutdown on the DC side, as defined by Article 12 of the UTE C15-712-1 (2013) guide. Additional measures must be considered to comply with the AC disconnection needs near the inverter, and other provisions may be required to adhere to the directives of Article 12.4, concerning Public Access Buildings (ERP) or Classified Installations for Environmental Protection (ICPE).

APPENDIX

APPENDIX A: INVERTER CHARACTERISTICS

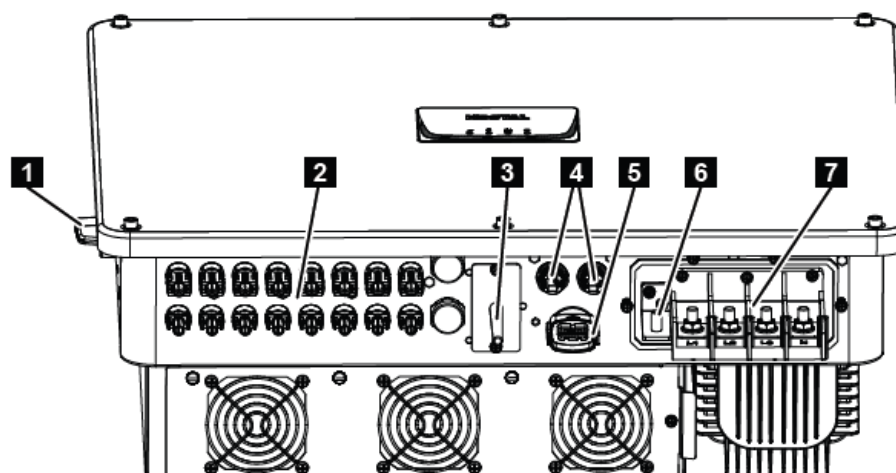
PIKO CI

Solar Inverter 30/50 G2



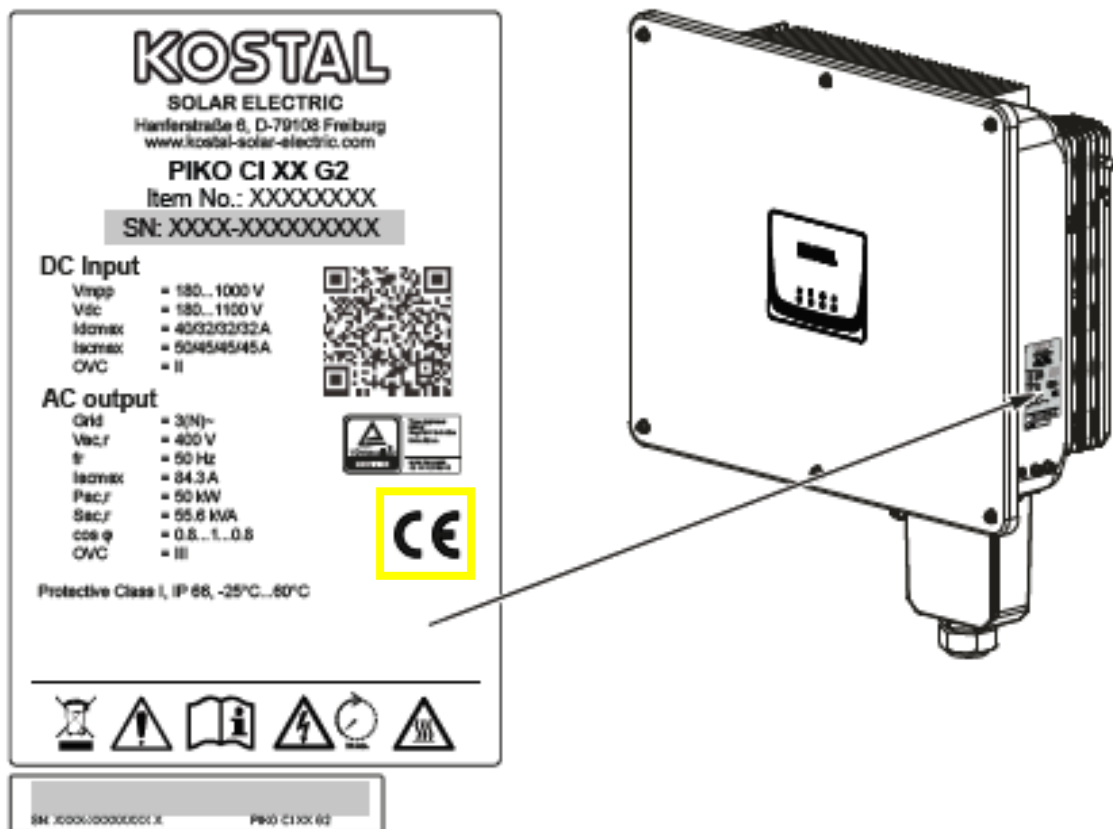
PIKO CI G2		30	50	
Input side (DC)	Max. PV power (cos φ = 1)	kWp	45	75
	Nominal DC power	kW	30	50
	Rated Input voltage (U _{DC,r})	V	620	620
	Start-up Input voltage (U _{DC,start})	V	200	200
	Max system voltage (U _{DC,max})	V	1100	1100
	MPP range at rated output (U _{MPP,min})	V	420	500
	MPP range at rated output (U _{MPP,max})	V	850	850
	Working voltage range (U _{DC,workmin})	V	180	180
	Working voltage range (U _{DC,workmax}) ⁴⁾	V	1000	1000
	Max. Input current (I _{DC,max}) per MPPT ³⁾	A	104 MPPT 1: 40 MPPT 2: 32 MPPT 3: 32	136 MPPT 1: 40 MPPT 2: 32 MPPT 3: 32 MPPT 4: 32
	Max. DC short-circuit current (I _{SC,PV})	A	140 MPPT 1: 50 MPPT 2: 45 MPPT 3: 45	185 MPPT 1: 50 MPPT 2: 45 MPPT 3: 45 MPPT 4: 45
	Max. DC current per DC terminal (I _{string,max})	A	20	20
Internal DC string fuses	A	--	--	
Number of DC Inputs		6	8	
Number of Independent MPP trackers		3	4	
Output side (AC)	Rated power, cos φ = 1 (P _{AC,r})	kW	30	50
	Apparent output power (S _{AC,nom} / S _{AC,max})	kVA	33,4 / 33,4	55,6 / 55,6
	Min. output voltage (U _{AC,min})	V	322	322
	Max. output voltage (U _{AC,max})	V	520	520
	Rated AC current (I _{AC,r})	A	43,5	72,5
	Max. output current (I _{AC,max})	A	51	84,3
	Short-circuit current (RMS)	A	43,5	72,5
	Grid connection		3N~, 230/400V, 50 Hz	
	Rated frequency (f _r)	Hz	50	
	Grid frequency (f _{min} /f _{max})	Hz	45/55	
	Setting range of the power factor (cos φ _{AC,r})		0,8...1...0,8	
	Power factor for rated power (cos φ _{AC,r})		1	
Max. THD	%	<3		
Standby (night-time consumption)	W	<10		

APPENDIX B: DC-SIDE SWITCH IDENTIFICATION



- 1 Sectionneur DC
- 2 Connexions DC pour générateurs PV (6 pour PIKO CI 30 G2 et 8 pour PIKO CI 50 G2)
- 3 Antenne Wifi
- 4 Connexion LAN
- 5 Raccordement de communication (RS485, récepteur centralisé, connexion NAS)
- 6 Raccordement PE
- 7 Bornes de raccordement AC

APPENDIX C: CE MARKING IDENTIFICATION



Appendix D: Details of Technical Specifications and Decoupling Protective Devices in accordance with DIN VDE 0126-1

Côté entrée (DC)

PIKO CI		PIKO CI 30 G2		PIKO CI 50 G2	
Puissance PV max. ($\cos(\phi) = 1$)	kWc	45		75	
Puissance DC nominale	kW	30		50	
Tension d'entrée assignée ($U_{dc,r}$)	V	620			
Tension d'entrée de démarrage ($U_{dc,start}$)	V	200			
Tension système max. ($U_{dc,max}$)	V	1100			
Plage MPP à puissance nominale ($U_{mpp,min}$)	V	420		500	
Plage MPP à puissance nominale ($U_{mpp,max}$)	V	850			
Plage de tension de fonctionnement ($U_{dc,workmin}$)	V	180			
Plage de tension de travail ($U_{dc,workmax}$)	V	1000			
Courant d'entrée max. ($I_{dc,max}$) par MPPT	A	104 (MPPT 1 : 40 MPPT 2-3 : 32)		136 (MPPT 1 : 40 MPPT 2-4 : 32)	
Courant de court-circuit DC max. ($I_{sc,pv}$)		140 (MPPT 1: 50 MPPT 2-3: 45)		185 (MPPT 1: 50 MPPT 2-4: 45)	
Courant DC max. par entrée DC ($I_{stringmax}$)	A	20			
Fusibles string DC internes	A	--			
Nombre d'entrées DC		6		8	
Nombre de trackers MPP Indépendants		3		4	

Côté sortie (AC)

PIKO CI		PIKO CI 30 G2		PIKO CI 50 G2	
Puissance nominale, $\cos \phi = 1$ ($P_{ac,r}$)	kW	30		50	
Puissance apparente de sortie ($S_{ac,nom}$, $S_{ac,max}$)	kVA	33,4 / 33,4		55,6 / 55,6	
Tension de sortie min. ($U_{ac,min}$)	V	322			
Tension de sortie max. ($U_{ac,max}$)	V	520			
Courant alternatif assigné ($I_{ac,r}$)	A	43,5		72,5	
Courant de sortie max. ($I_{ac,max}$)	A	51		84,3	
Courant de court-circuit (crête/RMS)	A	43,5		72,5	
Raccordement au réseau		3N~, 230/400 V, 50 Hz			
Fréquence assignée (fr)	Hz	50			
Fréquence du réseau ($f_{min} - f_{max}$)	Hz	45/65			
Plage de réglage du facteur de puissance ($\cos \phi_{AC,r}$)		0,8...1...0,8			

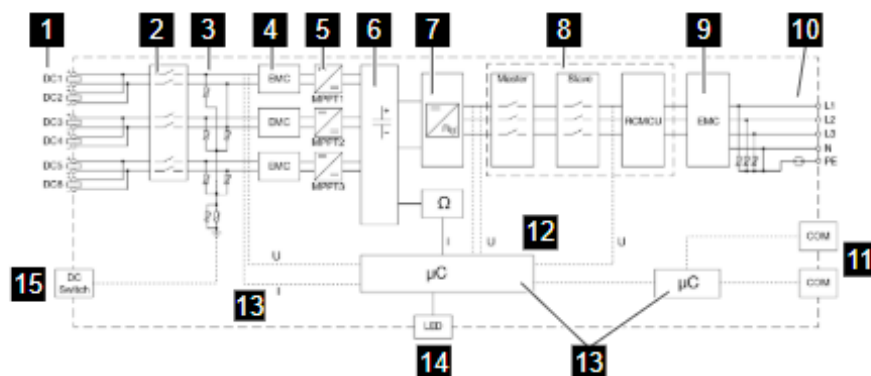
Données du système

PIKO CI		PIKO CI 30 G2		PIKO CI 50 G2
Topologie : sans séparation galvanique - sans transformateur				oui
Type de protection selon CEI 60529				IP66
Classe de protection selon la norme EN 62109-1				I
Catégorie de surtension selon CEI 60664-1 côté entrée (générateur PV)				II
Catégorie de surtension selon CEI 60664-1 côté sortie (raccordement au réseau)				III
Protection contre les surtensions DC/AC				Type 2 (Interchangeable)
Degré d'encrassement				4
Catégorie environnementale (Installation en extérieur)				oui
Catégorie environnementale (Installation en Intérieur)				oui
Résistance aux UV				oui
Diamètre du câble AC (min-max)	mm	25...31		32...38
Section du câble AC (min-max)	mm ²	16...35		35...50
Section du câble photovoltaïque (min-max)	mm ²		4...6	
Protection max. par fusible côté sortie (AC) CEI 60898-1	A	B63, C63		B125/C125
Protection des personnes Interne selon la norme EN 62109-2				RCMU/RCCM type B
Point de coupure automatique selon la norme VDE V 0126-1-1				oui
Hauteur/largeur/profondeur	mm	530 (707) /635/224		530 (707)/635/224
Poids	kg	33,1		44,3
Principe de refroidissement – ventilateurs régulés		---		oui
Débit d'air max.	m ³ /h	---		152
Émissions sonores (typique)	dB(A)	<35		<50

APPENDIX E: FUNCTIONAL DIAGRAM

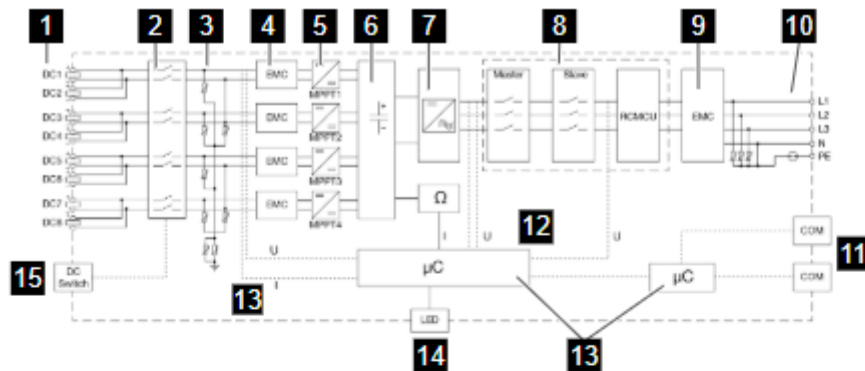
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PIKO CI 30 G2



- | | |
|----|--|
| 1 | DC-Eingänge für PV-Module |
| 2 | Elektronische DC-Freischnittstelle |
| 3 | Überspannungsschutz (DC-Seite) |
| 4 | EMV-Filter (DC-Seite) |
| 5 | DC-Steller |
| 6 | Zwischenkreis |
| 7 | Wechselrichterbrückenschaltung |
| 8 | Netzüberwachung und -abschaltung |
| 9 | EMV-Filter (AC-Seite) |
| 10 | AC-Anschluss |
| 11 | Anschlussfelder für Kommunikationsschnittstellen |
| 12 | Spannungs- und Strommessung |
| 13 | Steuerung System und Kommunikation |
| 14 | Status-LED |
| 15 | DC-Schalter |

PIKO CI 50 G2



- | | |
|----|--|
| 1 | DC-Eingänge für PV-Module |
| 2 | Elektronische DC-Freischaltstelle |
| 3 | Überspannungsschutz (DC-Seite) |
| 4 | EMV-Filter (DC-Seite) |
| 5 | DC-Steller |
| 6 | Zwischenkreis |
| 7 | Wechselrichterbrückenschaltung |
| 8 | Netzüberwachung und -abschaltung |
| 9 | EMV-Filter (AC-Seite) |
| 10 | AC-Anschluss |
| 11 | Anschlussfelder für Kommunikationsschnittstellen |
| 12 | Spannungs- und Strommessung |
| 13 | Steuerung System und Kommunikation |
| 14 | Status-LED |
| 15 | DC-Schalter |

APPENDIX F: STANDARD 60947-3

DC Switch (optional)	Zhejiang Benyi Electrical Co., Ltd	BYSS.1-50	16A, 1500Vdc, IP66, 85°C	EN 60947-3:2009+A1+A2	TUV R 50425301
(Alternative)	Zhejiang Benyi Electrical Co., Ltd	BYSS-63M	63A, 1500V	EN IEC 60947-3:2021	TUV R 50527027
(Alternative)	SANTON International B.V.	XB	Min : 1000V, 50A, IP20, 70°C	AS/NZS IEC 60947.1:2015 AS 60947.3:2018	TUV AZ 69025129
(Alternative)	Shanghai Liangxin Electrical Co., Ltd.	NDG3V	Min : 1000VDC, 35A, IP20, 75°C	EN IEC 60947-1:2021 EN IEC 60947-3:2021	TUV SUD B 083574 0365
(Alternative)	ProJoy Electric	PEDS-HM	Min : 1000V, 32A, IP20, 70°C	EN IEC 60947-3:2021	TUV R50566013
(Alternative)	Beijing people's electric plant Co., Ltd.	GHX5	Min : 1000V, 32A, IP20, 70°C	AS/NZS IEC 60947.1:2015 AS 60947.3:2018	TUV AZ69025800