





Prüfbericht-Nr.: Test Report No.:	CN225FG6 001	Auftrags-Nr.: Order No.:	168375634	Seite 1 von 18 Page 1 of 18
Kunden-Referenz-Nr.: Client Reference No.:	2371431	Auftragsdatum: Order date:	2022.06.02	
Auftraggeber: Client:	OCI power Co.,Ltd 1st-2nd Floor, 5th Factory, 15, Jayumuyeok 2-gil, Gunsan-si, Jeollabuk-do, Rep. of Korea			
Prüfgegenstand: Test item:	Grid-connected PV inverter			
Bezeichnung / Typ-Nr.: Identification / Type No.:	OCIP50-TL3-M3-OD-OL, OCIP50-TL3-M3-OD-FL, OCIP50-TL3-M3-OD-FM, OCIP50-TL3-M3-OD-FH			
Auftrags-Inhalt: Order content:	Test report			
Prüfgrundlage: Test specification:	Clause 4.8 of IEC/EN 62109-2: 2011			
Wareneingangsdatum: Date of receipt:	2022.06.02			
Prüfmuster-Nr.: Test sample No.:	A003281604-001			
Prüfzeitraum: Testing period:	2022.06.02 – 2022.06.14			
Ort der Prüfung: Place of testing:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	 Yin Yue Project Engineer	genehmigt von: authorized by:	 John Dai Reviewer	
Datum: 2022.06.15 Date:		Datum: 2022.06.15 Date:		
Stellung / Position		Stellung / Position		
Sonstiges / Other: This report does not evidence compliance of the provided sample with the relevant standards but only with the referred tests. This test report documents the findings of examination conducted on the delivered product mentioned above only. This report does not entitle the applicant to carry any safety mark on this or similar products. Further for sales or other application purposes of the tested product, any reference to TÜV Rheinland or a test through TÜV Rheinland is only permissible with prior written consent of TÜV Rheinland.				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

TEST REPORT IEC 62109-2 Safety of Power Converter for use in Photovoltaic Power Systems Part 2: Particular requirements for inverters	
Report Number. :	CM225FG6 001
Date of issue	See cover page
Total number of pages.....	See cover page
Name of Testing Laboratory preparing the Report..... : See cover page	
Applicant's name : See cover page	
Address..... : See cover page	
Test specification:	
Standard..... :	Clause 4.8 of IEC/EN 62109-2: 2011
Test procedure..... :	Test report
Non-standard test method..... :	N/A
Test Report Form No..... : IEC62109_2B	
Test Report Form(s) Originator.. : LCIE - Laboratoire Central des Industries Electriques	
Master TRF..... : Dated 2016-11	
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General disclaimer:	
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Test item description.....:	Grid-connected PV inverter	
Trade Mark.....:		
Manufacturer.....:	Shenzhen Kstar New Energy Company Limited	
Model/Type reference	See cover page	
Ratings.....:	See model lists and label for details.	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	Testing Laboratory:	See cover page
Testing location/ address.....:		See cover page
Tested by (name, function, signature).....:		
Approved by (name, function, signature) :		
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature) :		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature)		
Approved by (name, function, signature) :		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature)		
Approved by (name, function, signature) :		
Supervised by (name, function, signature)		

List of Attachments (including a total number of pages in each attachment):

ATTACHMENT 1 – Photo documents (15 pages)

Summary of testing:**Tests performed (name of test and test clause):**

The critical tests were performed for this equipment included clauses 4.8 in scope of this standard.

Test on arbitrary model can represent all models.

Testing location:

TÜV Rheinland (Shanghai) Co., Ltd.

No. 177, Lane 777, West Guangzhong Road,
Jingan District, Shanghai 200072, P.R. China


Summary of compliance with National Differences (List of countries addressed):


N/A


☒ The product fulfils the requirements of Clause 4.8 of IEC/EN 62109-2: 2011.


Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

KSTAR		OCI Power	
OCIP50-TL3-M3-OD-FH OCIP50-TL3-M3-OD-FH(접속함)			
	KS표준번호	KS C 8565, KS C 8567	
	KS표준명	중대형 태양광발전용 인버터, 태양광발전용 접속함	
모델코드 (인버터)		모델코드 (접속함)	
인증일자		인증기관명	한국에너지공단 신재생에너지센터
정격전압(STC)	800V	최대개방전압	1000V
입력전압범위	200-1000V	MPP 전압범위	480-800V
정격입력전류	19.5 A / string	정격 출력	50 kW
정격출력전압	380 V	정격 주파수	60 Hz
정격출력전류	76 A	IP등급/ 무게, 사이즈	IP65 / 62kg 630x1034x280mm
역류방지 다이오드	없음	회로수 /설치환경	6 string / 실외형
제조사	KSTAR	연락처(A/S)	0755-86169858
	사무소	Floor4, Building1, Shenzhen Software Park, Kejizhong No.2road, Hightech North District, Shenzhen, China	
	공장	No.7th Road, Gongming Town, Guangming New District, Shenzhen, 518106, China	
수입자 / 판매자	OCI Power	연락처(A/S)	1544-9633
	사무소	전라북도 군산시 자유무역2길 15, 5동 12층(오식도동)	
제조연월일		Serial No.	
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<div style="border: 1px solid black; width: 150px; height: 30px;"></div>		<div style="border: 1px solid black; width: 150px; height: 30px;"></div>	

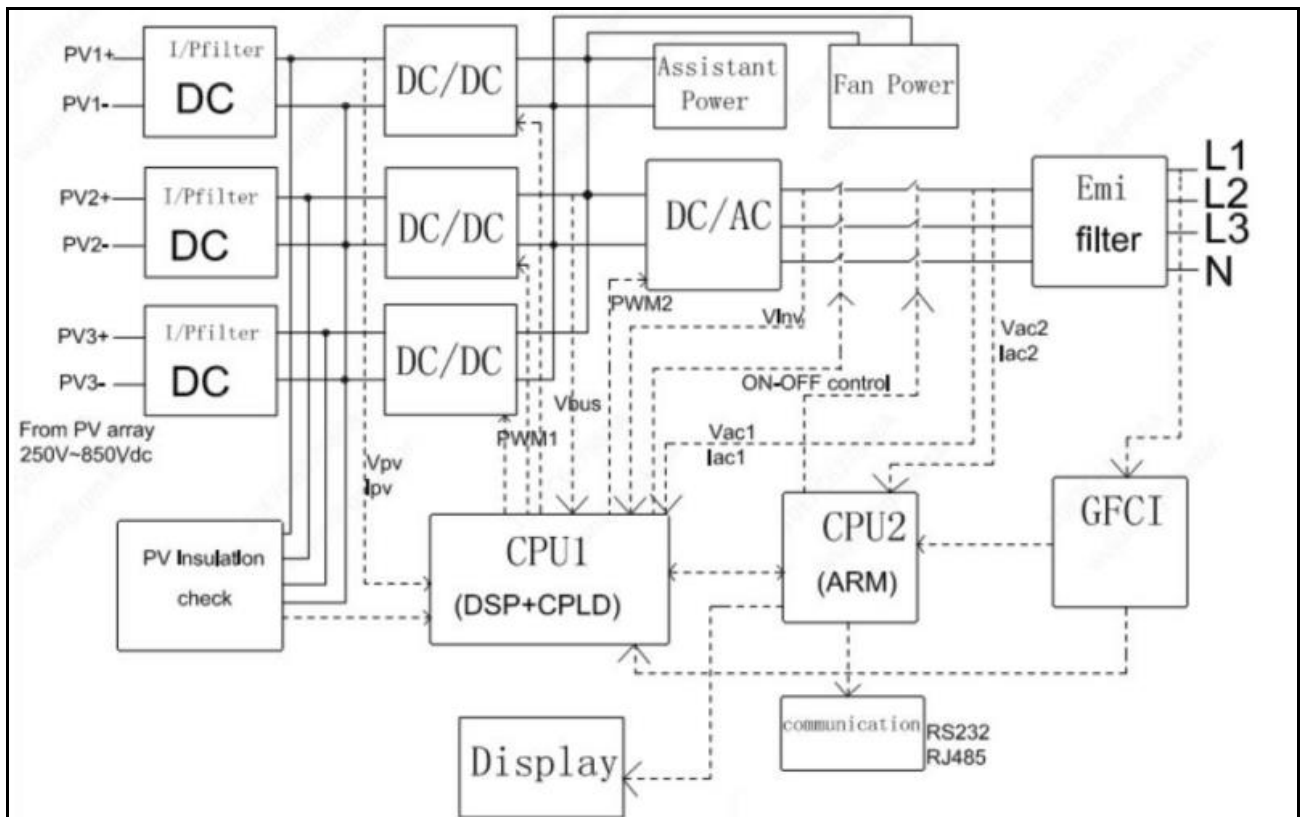
KSTAR		OCI Power	
OCIP50-TL3-M3-OD-FL OCIP50-TL3-M3-OD-FL(접속함)			
	KS표준번호	KS C 8565, KS C 8567	
	KS표준명	중대형 태양광발전용 인버터, 태양광발전용 접속함	
모델코드 (인버터)		모델코드 (접속함)	
인증일자		인증기관명	한국에너지공단 신재생에너지센터
정격전압(STC)	800V	최대개방전압	1000V
입력전압범위	200-1000V	MPP 전압범위	480-800V
정격입력전류	13 A / string	정격 출력	50 kW
정격출력전압	380 V	정격 주파수	60 Hz
정격출력전류	76 A	IP등급/ 무게, 사이즈	IP65 / 62kg 630x1034x280mm
역류방지 다이오드	없음	회로수 /설치환경	9 string / 실외형
제조사	KSTAR	연락처(A/S)	0755-86169858
	사무소	Floor4, Building1, Shenzhen Software Park, Kejizhong No.2road, Hightech North District, Shenzhen, China	
	공장	No.7th Road, Gongming Town, Guangming New District, Shenzhen, 518106, China	
수입자 / 판매자	OCI Power	연락처(A/S)	1544-9633
	사무소	전라북도 군산시 자유무역2길 15, 5동 12층(오식도동)	
제조연월일		Serial No.	
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KSTAR		OCI Power	
OCIP50-TL3-M3-OD-FM OCIP50-TL3-M3-OD-FM(접속함)			
	KS표준 번호	KS C 8565, KS C 8567	
	KS표준명	중대형 태양광발전용 인버터, 태양광발전용 접속함	
모델코드 (인버터)		모델코드 (접속함)	
인증일자		인증기관명	한국에너지공단 신재생에너지센터
정격전압(STC)	800V	최대개방전압	1000V
입력전압범위	200-1000V	MPP 전압범위	480-800V
정격입력전류	16 A / string	정격 출력	50 kW
정격출력전압	380 V	정격 주파수	60 Hz
정격출력전류	76 A	IP등급/ 무게, 사이즈	IP65 / 62kg 630x1034x280mm
역류방지 다이오드	없음	회로수 /설치환경	6 string / 실외형
제조사	KSTAR	연락처(A/S) 0755-86169858	
	사무소	Floor4, Building1, Shenzhen Software Park, Kejizhong No.2road, Hightech North District, Shenzhen, China	
	공장	No.7th Road, Gongming Town, Guangming New District, Shenzhen, 518106, China	
수입자 / 판매자	OCI Power㈜	연락처(A/S)	1544-9633
	사무소	전라북도 군산시 자유무역2길 15, 5동 12층(오식도동)	
제조연월일		[]	
Serial No.		[]	

KSTAR		OCI Power	
OCIP50-TL3-M3-OD-OL OCIP50-TL3-M3-OD-OL(접속함)			
	KS표준 번호	KS C 8565, KS C 8567	
	KS표준명	중대형 태양광발전용 인버터, 태양광발전용 접속함	
모델코드 (인버터)		모델코드 (접속함)	
인증일자		인증기관명	한국에너지공단 신재생에너지센터
정격전압(STC)	800V	최대개방전압	1000V
입력전압범위	200-1000V	MPP 전압범위	480-800V
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제조사	KSTAR	연락처(A/S) 0755-86169858	
	사무소	Floor4, Building1, Shenzhen Software Park, Kejizhong No.2road, Hightech North District, Shenzhen, China	
	공장	No.7th Road, Gongming Town, Guangming New District, Shenzhen, 518106, China	
수입자 / 판매자	OCI Power㈜	연락처(A/S)	1544-9633
	사무소	전라북도 군산시 자유무역2길 15, 5동 12층(오식도동)	
제조연월일		[]	
Serial No.		[]	

Test item particulars	
Equipment mobility..... :	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> stationary <input checked="" type="checkbox"/> fixed <input type="checkbox"/> transportable <input type="checkbox"/> for building-in
Connection to the mains..... :	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> direct plug-in <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> for building-in
Environmental category..... :	<input checked="" type="checkbox"/> outdoor <input type="checkbox"/> indoor unconditional <input type="checkbox"/> indoor conditional
Over voltage category Mains	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
Over voltage category PV	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV
Mains supply tolerance (%)..... :	According to the specified supply range
Tested for power systems..... :	TN
IT testing, phase-phase voltage (V)	---
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Mass of equipment (kg)	See model list.
Pollution degree	<input type="checkbox"/> PD 1 <input type="checkbox"/> PD 2 <input checked="" type="checkbox"/> PD 3 (internal reduced to PD 2)
IP protection class..... :	IP65
Possible test case verdicts:	
- test case does not apply to the test object :	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement ... :	F (Fail)
Testing	
Date of receipt of test item..... :	See cover page
Date (s) of performance of tests..... :	See cover page
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	

Manufacturer's Declaration per sub-clause 4.2.5 of IEC 62109-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... : Shenzhen KSTAR Science And Technology Co.,Ltd. Guangming Branch Kstar High Tech Park, Guangming High Technology Town, Gongming Street, Baoan District, Shenzhen City Guangdong P.R. China	
General product information: <p>The equipment with model names OCIP50-TL3-M3-OD-OL, OCIP50-TL3-M3-OD-FL, OCIP50-TL3-M3-OD-FM, OCIP50-TL3-M3-OD-FH is three-phase un-isolated type grid-connected inverter which will be installed and connected to the grid network after installation and integrates the functions of the combiner box unit and the inverter unit, and provides an external input fuse. In final installation, the equipment shall be fixed to suitable manner as specified in the installation instruction.</p> <p>The EUT contains filters for smoothing the output voltage and for EMC, switching and control circuits. Electronic circuits are mounted on a number of PCBs interconnected by appropriate connectors and wires. Power board including electronics components is mounted on the heat sink to earthing by metal screw and spring washer.</p> <p>AC output direct connected to grid and Protective Earthing are provided by dedicated earthing terminals. Grid is protected combination with a two series of relays as redundant build for ensure the inverter can independent disconnected from grid while a relay was fault.</p> <p>During fault condition defined in this standard, after the DSP receives the abnormal signal from the relevant protective detection circuit, the relays will operate to disconnect the PV inverter line and neutral from grid automatically.</p> <p>The master DSP and slaver DSP has capacity independent disconnected from grid, when any grid fault had happened.</p>	



Block diagram

Models difference:

The models OCIP50-TL3-M3-OD-OL, OCIP50-TL3-M3-OD-FL, OCIP50-TL3-M3-OD-FM, OCIP50-TL3-M3-OD-FH are same as the construction, hardware and software.

Model	OCIP50-TL3-M3-OD-FM	OCIP50-TL3-M3-OD-FH	OCIP50-TL3-M3-OD-OL OCIP50-TL3-M3-OD-FL
Components			
Max. Input Current I _{MAX} [A]	16*2	19.5*2	13*3
Note:			

Table 1

MODELS LIST		OCIP50-TL3-M3-OD-FM	OCIP50-TL3-M3-OD-FH	OCIP50-TL3-M3-OD-OL OCIP50-TL3-M3-OD-FL
PV INPUT	V _{MAX} PV [Vdc]	1000		
	I _{SC} PV [A]	50		

		MPPT Voltage Range V_{MPP} [Vdc]	200-1000		
		Max. Input Current I_{MAX} [A] (A/B) (each MPPT if more than 1)	16*2	19.5*2	13*3
		MPPT Full Power Voltage Range [Vdc]	480-800		
		Number of MPPT	3		
		String per MPPT	2		3
		Overvoltage Category (OVC)	II		
	AC OUTPUT	Rated Output Voltage U_r [Vac]	3W+N+PE, 380		
		Rated Output Frequency F_{NETZ} [Hz]	60		
		Rated Output Power P_E [kW]	50		
		Max. Output Power P_E [KVA]	55		
		Max. Output Current I_{max} [A]	83.6		
		Power Factor $\cos\phi$ [λ]	0.8 leading ~0.8lagging		
		THD [V / I] (100% full power)	<3%		
		Overvoltage Category (OVC)	III		
		Array Insulation Resistance Detection [Ω]	33.3K		
	CONSTRUCTION	Type of inverter	Non-isolated		
		Type of NS Protection	Integrated		
		Separated by	Transformer less		
		Protective Class	Class I		
		Enclosure Protection (IP)	IP65		

	Operating Temperature Range [°C]	-25°C to +60°C
	Pollution degree (PD)	PD3
	Altitude [m]	3000m
	Size [mm]	630*1034*280
	Weight [kg]	62
Note:		

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict
4.8	ADDITIONAL TESTS FOR GRID-INTERACTIVE INVERTERS		P
4.8.1	General requirements regarding inverter isolation and array grounding		N/A
	- Type of Array grounding supported		N/A
	- Inverter isolation		N/A
4.8.2	Array insulation resistance detection for inverters for ungrounded and functionally grounded arrays	(See attached table)	P
4.8.2.1	Array insulation resistance detection for inverters for ungrounded arrays		P
	Inverter shall have means to measure DC insulation resistance from PV input (array) to ground before starting operation		P
	Or Inverter shall be provided with instruction in accordance with 5.3.2.11.		P
	Measured DC insulation resistance:		P
	Inverter measurement circuit shall be capable of detecting insulation resistance below the limit value $R = V_{max}/30mA$ under normal conditions		P
	Inverter measurement circuit shall be capable of detecting insulation resistance below the limit value $R = V_{max}/30mA$ with ground fault in the PV array		P
	Isolated inverters shall indicate a fault if the insulation resistance is less than the limit value		P
	Isolated inverter fault indication maintained until insulation resistance has recovered to a value higher than the limit value		P
	Non-isolated inverters, or inverters with isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30:		P
	- shall indicate a fault in accordance with 13.9		P
	- shall not connect to the mains		P
4.8.2.2	Array insulation resistance detection for inverters for functionally grounded arrays		N/A
	a-1) The value of the total resistance, including the intentional resistance for array functional grounding, the expected insulation resistance of the array to ground, and the resistance of any other networks connected to ground (for example measurement networks) must not be lower than $R = (V_{MAX PV}/30 \text{ mA})$ ohms.		N/A
	a-2) The installation instructions shall include the information required in 5.3.2.12.		N/A
	b-1) As an alternative to a), or if a resistor value lower than in a) is used, the inverter shall incorporate means to detect, during operation, if the total current through		N/A

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict
	the resistor and any networks (for example measurement networks) in parallel with it, exceeds the residual current values and times in Table 31		
	b-2) Inverter shall either disconnect the resistor or limit the current by other means		N/A
	b-3) If the inverter is a non-isolated inverter, or has isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30, it shall also disconnect from the mains.		N/A
	c) The inverter shall have means to measure the DC insulation resistance from the PV input to ground before starting operation, in accordance with 4.8.2.1.		N/A
4.8.3	Array residual current detection		P
4.8.3.1	General		P
4.8.3.2	30 mA touch current type test for isolated inverters	Non-isolated inverters.	N/A
4.8.3.3	Fire hazard residual current type test for isolated inverters	Non-isolated inverters.	N/A
4.8.3.4	Protection by application of RCD's		N/A
	- The requirement for additional protection in 4.8.3.1 can be met by provision of an RCD with a residual current setting of 30 mA, located between the inverter and the mains..		N/A
	- The selection of the RCD type to ensure compatibility with the inverter must be made according to rules for RCD selection in Part 1.		N/A
	- The RCD provided integral to the inverter, or		N/A
	- The RCD provided by the installer if details of the rating, type, and location for the RCD are given in the installation instructions per 5.3.2.9.		N/A
4.8.3.5	Protection by residual current monitoring		P
4.8.3.5.1	General		P
	Where required by Table 30, the inverter shall provide residual current monitoring that functions whenever the inverter is connected to the mains with the automatic disconnection means closed.		P
	The residual current monitoring means shall measure the total (both a.c. and d.c. components) RMS current.		P
	As indicated in Table 30 for different inverter types, array types, and inverter isolation levels, detection may be required for excessive continuous residual current, excessive sudden changes in residual current, or both, according to the following limits:		P
	a) Continuous residual current: The inverter shall disconnect within 0,3 s and indicate a fault in accordance with 13.9 if the continuous residual current exceeds:		P

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- maximum 300 mA for inverters with continuous output power rating ≤ 30 kV;		N/A
	- maximum 10 mA per kVA of rated continuous output power for inverters with continuous output power rating > 30 kVA.		P
	The inverter may attempt to re-connect if the array insulation resistance meets the limit in 4.8.2.		P
	b) Sudden changes in residual current: The inverter shall disconnect from the mains within the time specified in Table 31		P
	The inverter indicates a fault in accordance with 13.9, if a sudden increase in the RMS residual current is detected exceeding the value in the table.		P
	The inverter may attempt to re-connect if the array insulation resistance meets the limit in 4.8.2.		P
4.8.3.5.2	Test for detection of excessive continuous residual current: test repeated 5 times and time to disconnect shall not exceed 0,3 s.	See appended test table 4.8.3.5.2 Test for detection of excessive continuous residual current	P
4.8.3.5.3	Test for detection of sudden changes in residual current repeated 5 times and each of the 5 results shall not exceed the time limit indicated in for each row (30mA, 60mA and 150mA) of Table 31.		P
4.8.3.6	Systems located in closed electrical operating areas		N/A
	The protection against shock hazard is not required if the installation information provided with the inverter indicates the restriction for use in a closed electrical operating area, and		N/A
	Installation information indicates what forms of shock hazard protection are and are not provided integral to the inverter, in accordance with 5.3.2.7.		N/A
	The inverter shall be marked as in 5.2.2.6.		N/A

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.8.2	TABLE: Array insulation resistance detection for inverters for ungrounded and functionally grounded arrays	P
4.8.2.1	Array insulation resistance detection for inverters for ungrounded arrays	P

DC Voltage below minimum operating voltage (V)	DC Voltage for inverter begin operation (V)	Resistance between ground and PV input terminal (Ω)	Required Insulation resistance $R = (V_{MAX PV} / 30mA)$ (Ω)	Result
DC+				
210	350	36.63K	33.3K	N.O.
210	350	36.63K	33.3K	N.O.
210	350	30K	33.3K	I.F.
210	350	30K	33.3K	I.F.
DC-				
210	350	36.63K	33.3K	N.O.
210	350	36.63K	33.3K	N.O.
210	350	30K	33.3K	I.F.
210	350	30K	33.3K	I.F.

Note:

For isolated inverters, shall indicate a fault in accordance with 13.9 (operation is allowed); the fault indication shall be maintained until the array insulation resistance has recovered to a value higher than the limit above

For non-isolated inverters, or inverters with isolation not complying with the leakage current limits in the minimum inverter isolation requirements in Table 30, shall indicate a fault in accordance with 13.9, and shall not connect to the mains; the inverter may continue to make the measurement, may stop indicating a fault and may connect to the mains if the array insulation resistance has recovered to a value higher than the limit above.

It is not required to test all PV input terminals if analysis of the design indicates that one or more terminals can be expected to have the same result, for example where multiple PV string inputs are in parallel.

I.F.: Isolation Fault, N.O.: Normal Operation

Supplementary information:

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict

4.8.3.2	TABLE: 30mA touch current type test for isolated inverters		N/A
Condition		Current (mA)	Limit (30mA)
DC+ to PE			
DC- to PE			

Supplementary information:

The touch current measurement circuit of IEC 60990, Figure 4 is connected from each terminal of the array to ground, one at a time.

4.8.3.3	TABLE: Fire hazard residual current type test for isolated inverters		N/A
Condition		Current (mA)	Limit (300mA or 10mA per kVA)
DC+ to PE			
DC- to PE			

Supplementary information:

4.8.3.5	TABLE: Protection by residual current monitoring		P
Test conditions:		Output power (kVA) : 50 Input voltage (V_{DC}): 800 Frequency (Hz): 60 Output AC Voltage (V_{AC}): 380	

4.8.3.5.2	Test for detection of excessive continuous residual current		P
Fault Current (mA)		Disconnection time (ms)	
Measured Fault Current	Limit 300mA for output power \leq 30 kVA 10mA per kVA for output power $>$ 30 kVA	Measured Disconnection time	Limit
+ PV to N:			
246	500	--	300
230	500	--	300
240	500	--	300
256	500	--	300
222	500	--	300
- PV to N:			
222	500	--	300
240	500	--	300
234	500	--	300
224	500	--	300

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict
224	500	--	300
Note: – maximum 300mA for inverters with continuous output power rating ≤30 kVA; – maximum 10mA per kVA of rated continuous output power for inverters with continuous output power rating > 30 kVA. This test shall be repeated 5 times, and for all 5 tests the time to disconnect shall not exceed 0,3s. The test is repeated for each PV input terminal. It is not required to test all PV input terminals if analysis of the design indicates that one or more terminals can be expected to have the same result, for example where multiple PV string inputs are in parallel.			
Supplementary information:			

4.8.3.5.3	TABLE: Test for detection of sudden changes in residual current		P
+PV to N			
Limit (mA)	U _N		Limit (ms)
	Disconnection time (ms)		
30	147		300
30	134		300
30	145		300
30	152		300
30	130		300
60	138		150
60	146		150
60	128		150
60	137		150
60	143		150
150	21		40
150	30		40
150	22		40
150	24		40
150	19		40
-PV to N			
Limit (mA)	U _N		Limit (ms)
	Disconnection time (ms)		
30	136		300
30	132		300
30	138		300
30	140		300
30	138		300
60	138		150

IEC 62109-2			
Clause	Requirement + Test	Result - Remark	Verdict
60	128		150
60	129		150
60	143		150
60	138		150
150	31		40
150	14		40
150	22		40
150	26		40
150	25		40
Note: The capacitive current is raised until disconnection. Test condition: $I_c + 30/60/150\text{mA} \leq I_{c\text{max}}$. R_1 is set that 30/60/150mA Flow and switch S is closed.			
Supplementary information:			

- End of test report -

PHOTO DOCUMENTATION

CN225FG6 001 attachment 1

for

Grid-connected PV inverter

OCIP50-TL3-M3-OD-OL, OCIP50-TL3-M3-OD-FL,
OCIP50-TL3-M3-OD-FM, OCIP50-TL3-M3-OD-FH

OCI power Co.,Ltd



This documentation consists of 15 pages (excluding this cover page)

Model: as cover



Figure 1. Front view of model



Figure 2. Bottom view of model

Model: as cover



Figure 3. Connection view of model
(OCIP50-TL3-M3-OD-FH, FM)



Figure 4. Connection view of model
(OCIP50-TL3-M3-OD-OL, FL)

Model: as cover

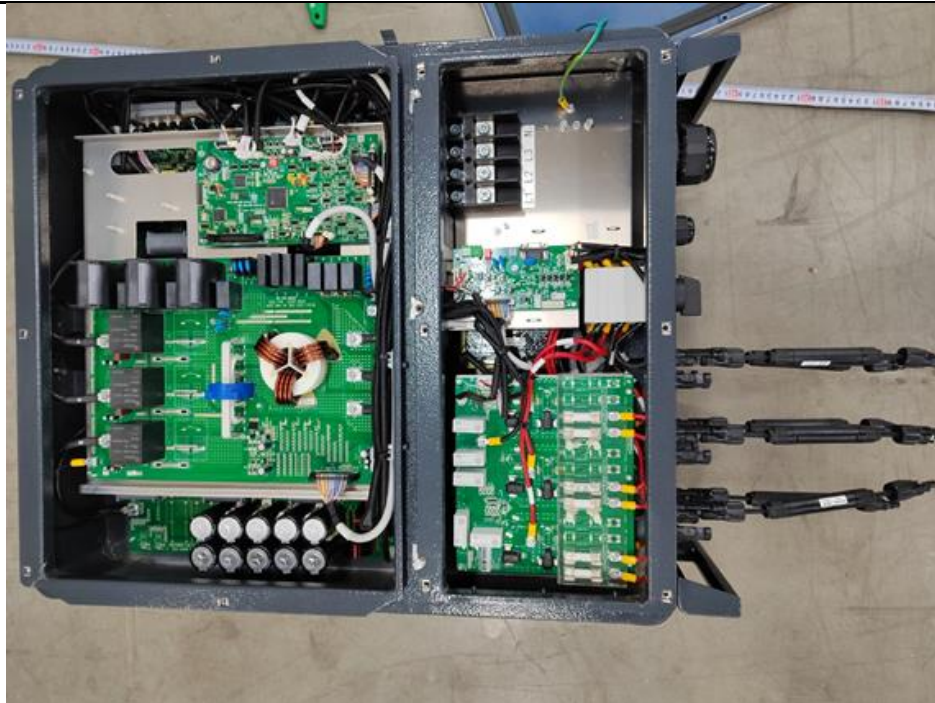


Figure 5. Internal view of model
(OCIP50-TL3-M3-OD-FH, FM)



Figure 6. Internal view of model
(OCIP50-TL3-M3-OD-OL, FL)

Model: as cover

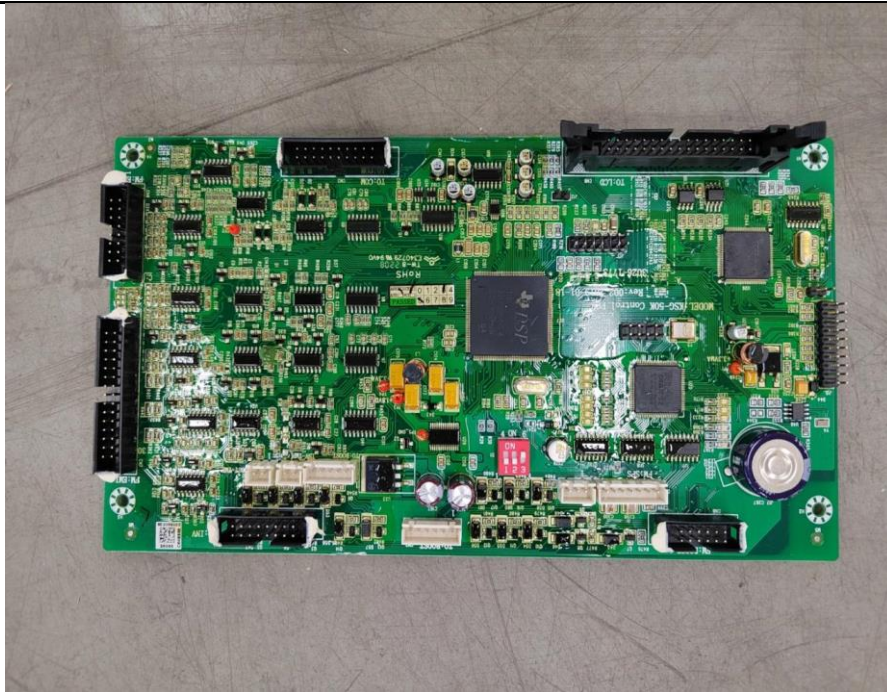


Figure 7. Front view of Control board
(OCIP50-TL3-M3-OD-FH/FM)

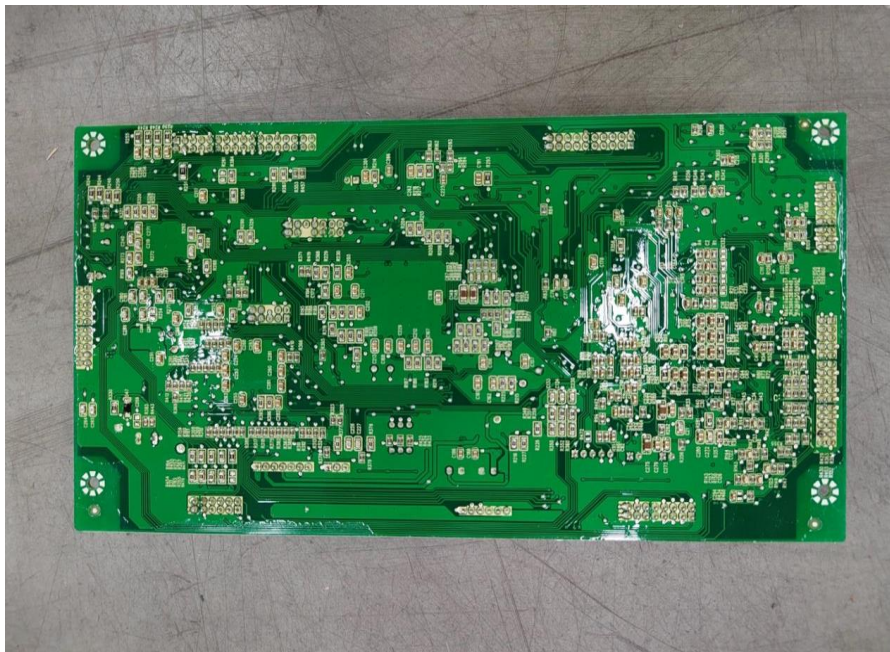


Figure 8. Back view of Control board
(OCIP50-TL3-M3-OD-FH/FM)

Model: as cover



Figure 9. Front view of Control board
(OCIP50-TL3-M3-OD-OL/FL)

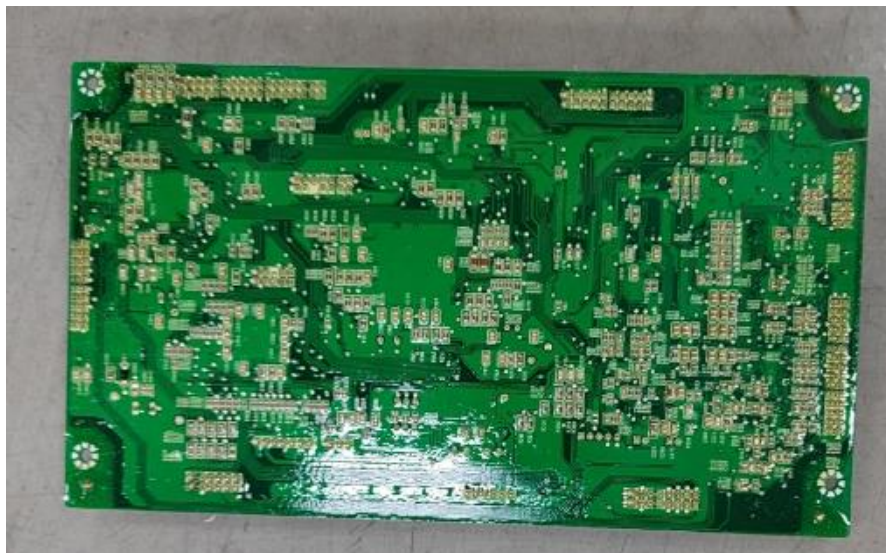


Figure 10. Back view of Control board
(OCIP50-TL3-M3-OD-OL/FL)

Model: as cover

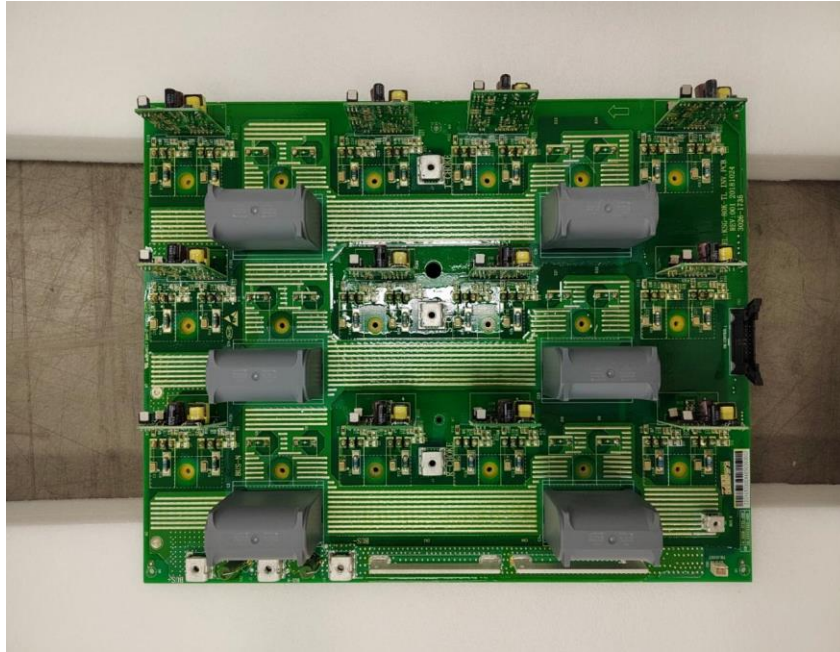


Figure 11. Front view of INV board



Figure 12. Back view of INV board

Model: as cover



Figure 13. Front view of BOOST board

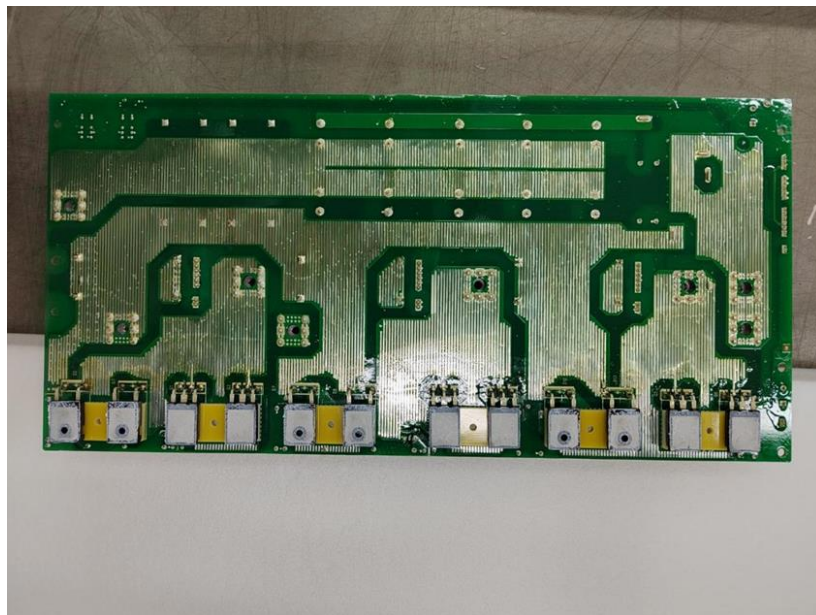


Figure 14. Back view of BOOST board

Model: as cover

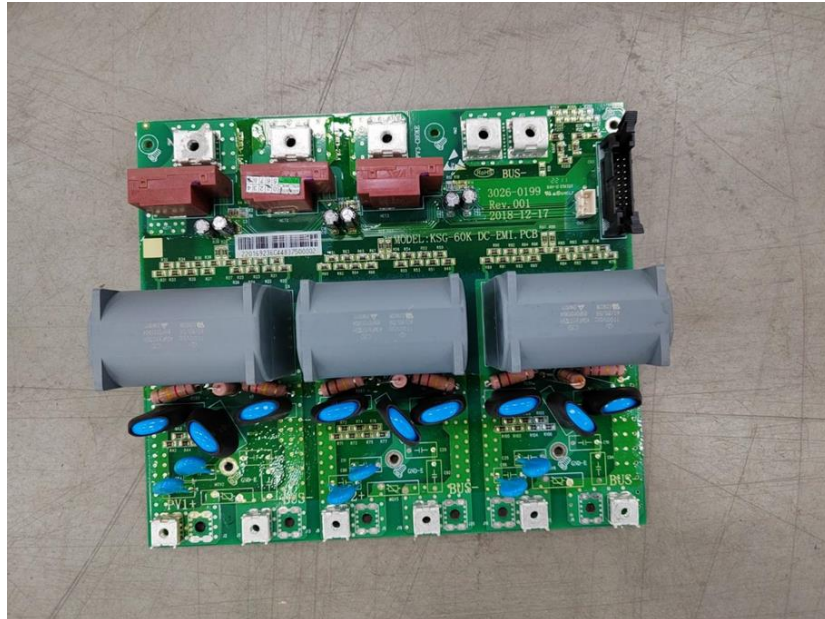


Figure 15. Front view of DC EMI board

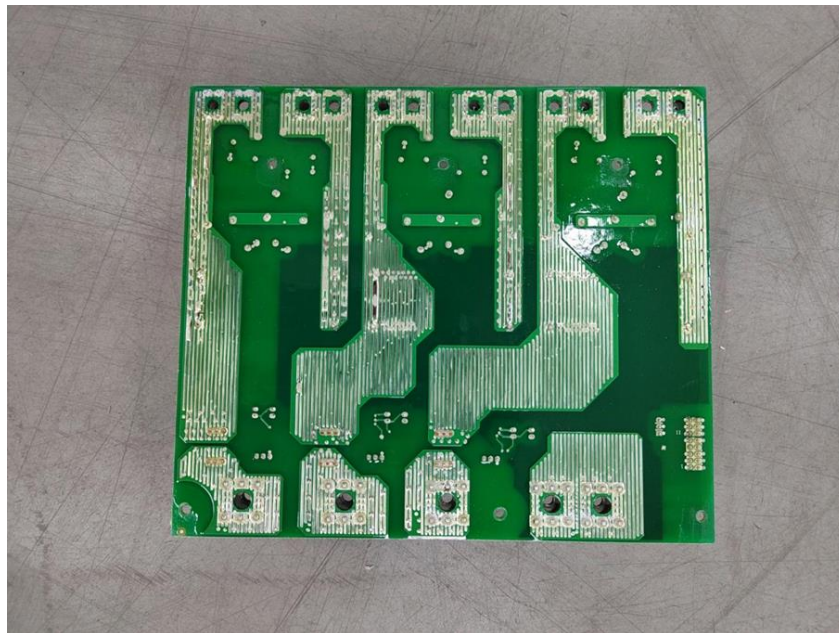


Figure 16. Back view of DC EMI board

Model: as cover

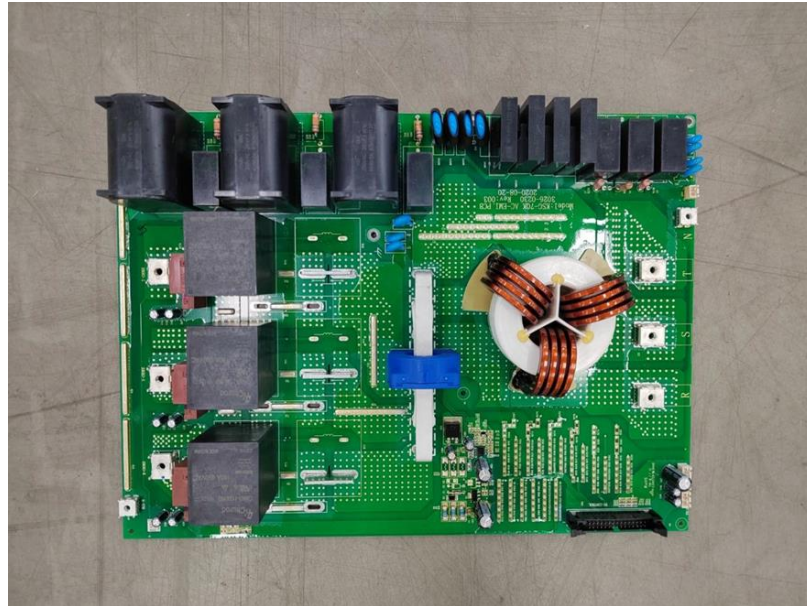


Figure 17. Front view of AC EMI board

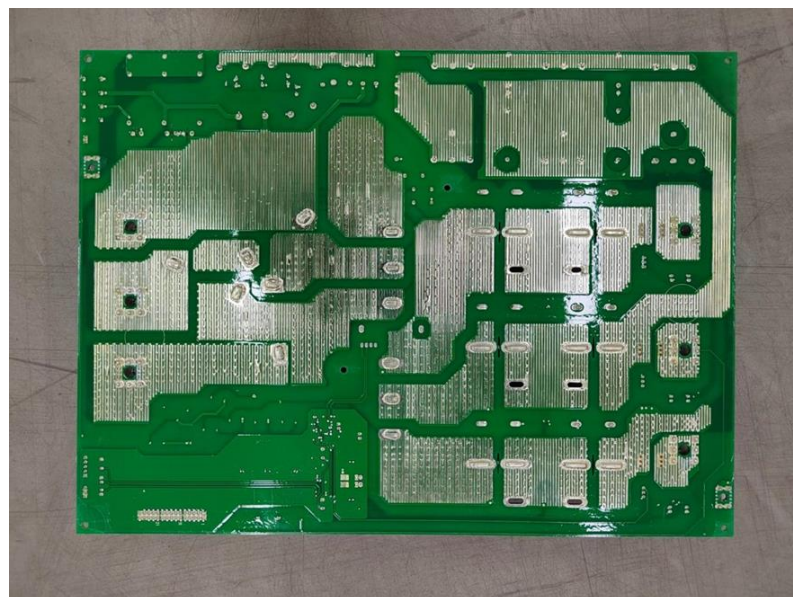


Figure 18. Back view of AC EMI board

Model: as cover

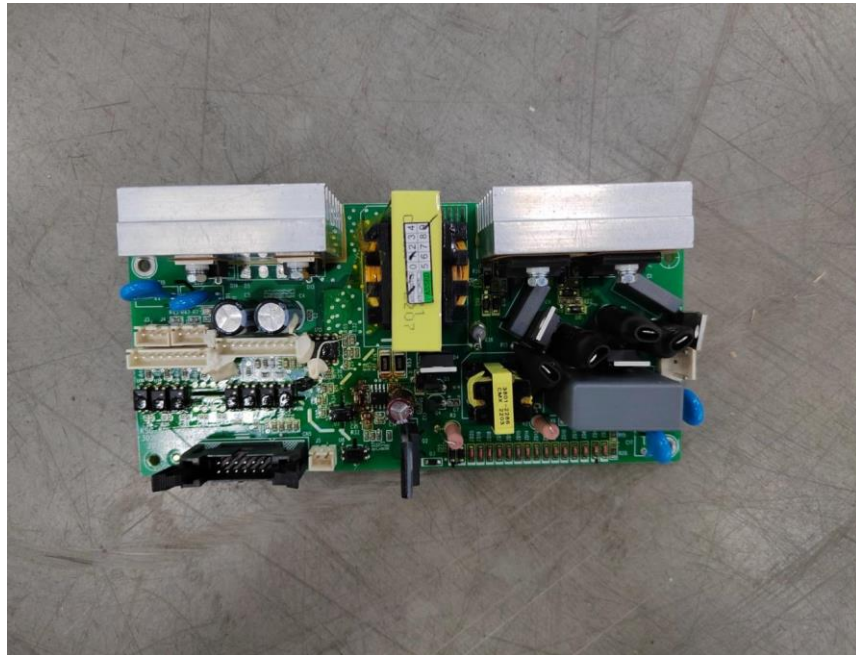


Figure 19. Front view of FAN-SPS board

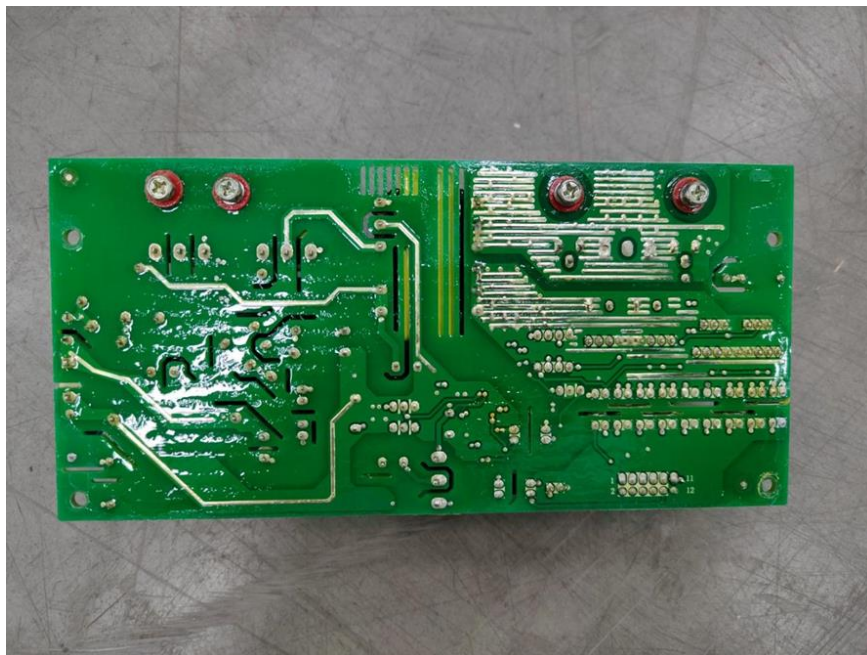


Figure 20. Back view of FAN-SPS board

Model: as cover

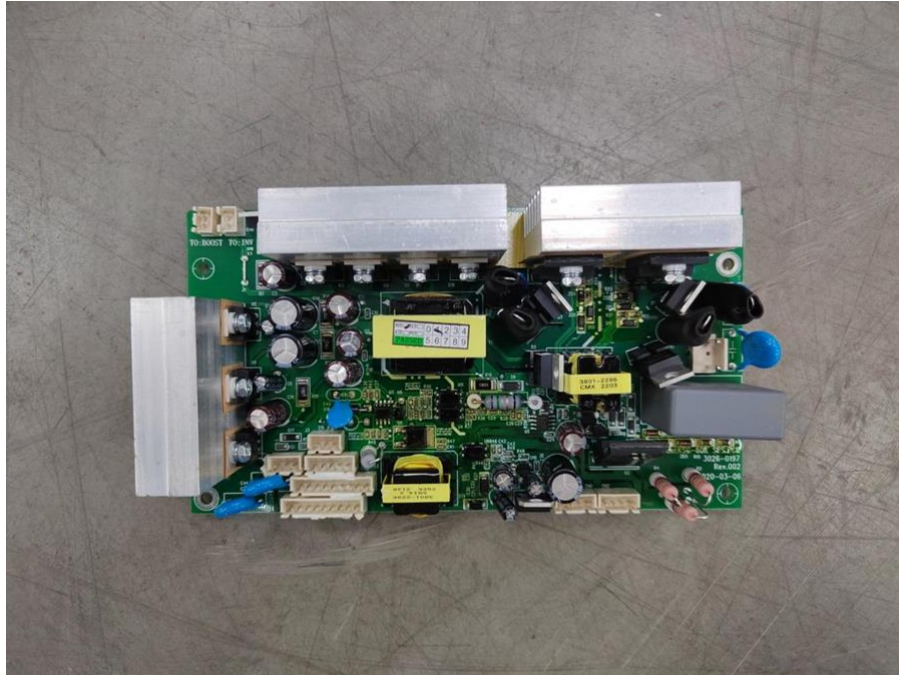


Figure 21.Front view of SPS board

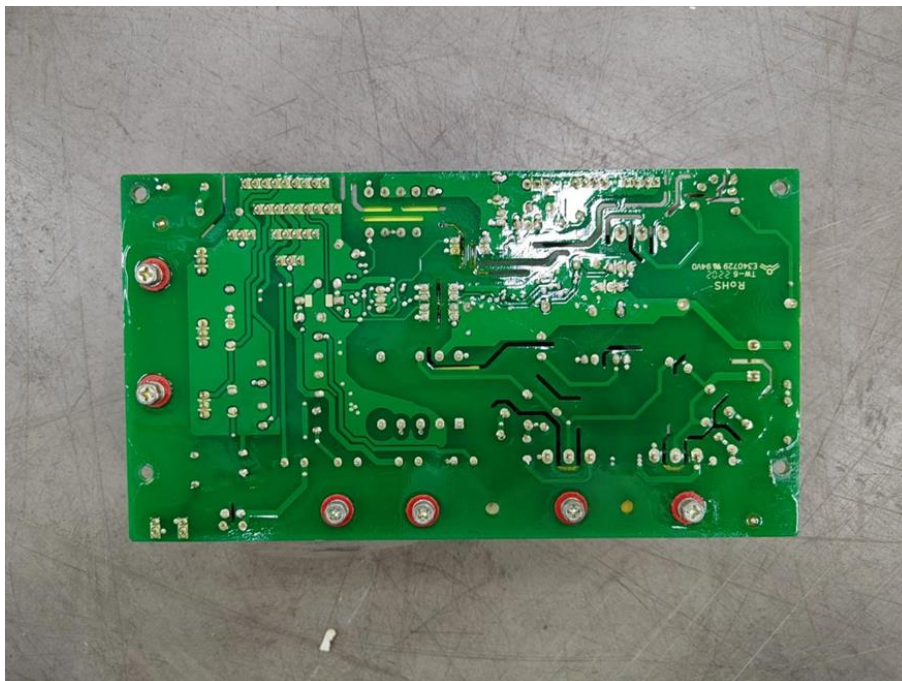


Figure 22.Back view of SPS board

Model: as cover

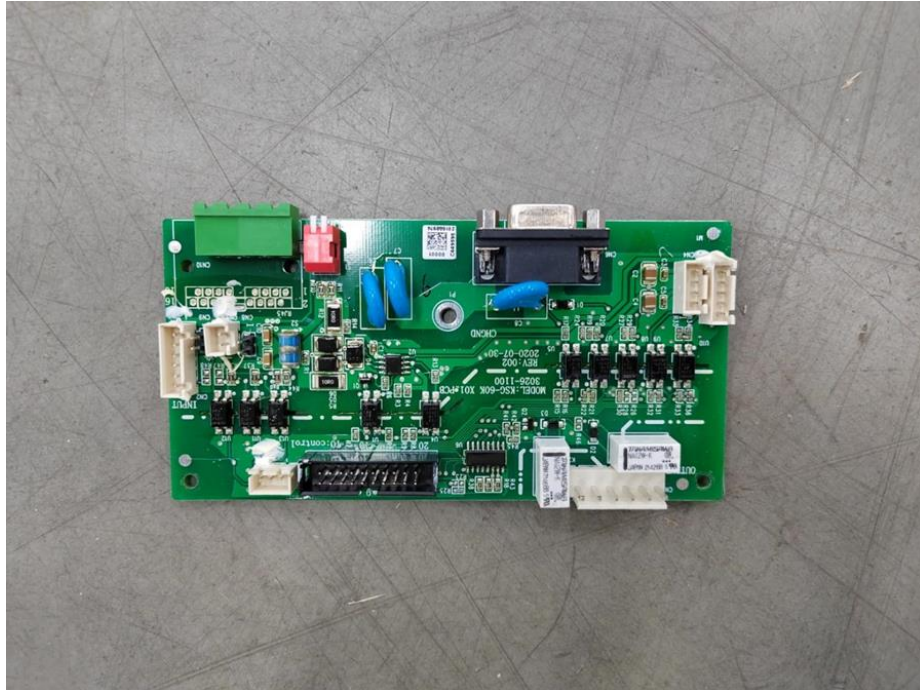


Figure 23. Front view of X01 board

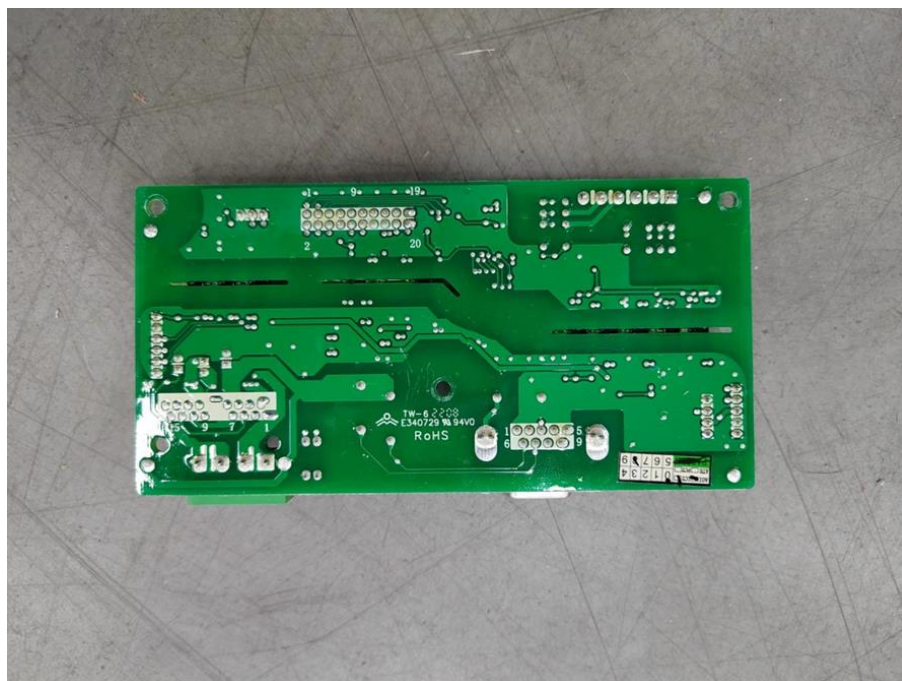


Figure 24. Back view of X01 board

Model: as cover

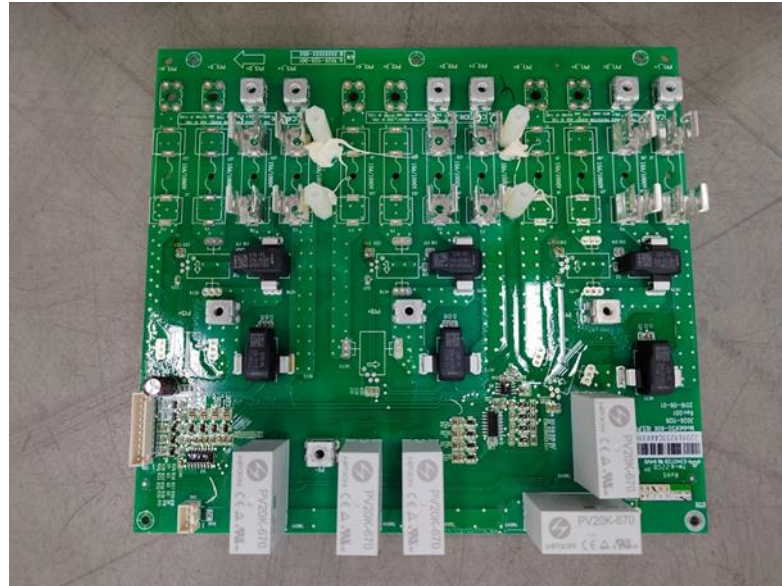


Figure 25. Front view of I03 board
(OCIP50-TL3-M3-OD-FH, FM)

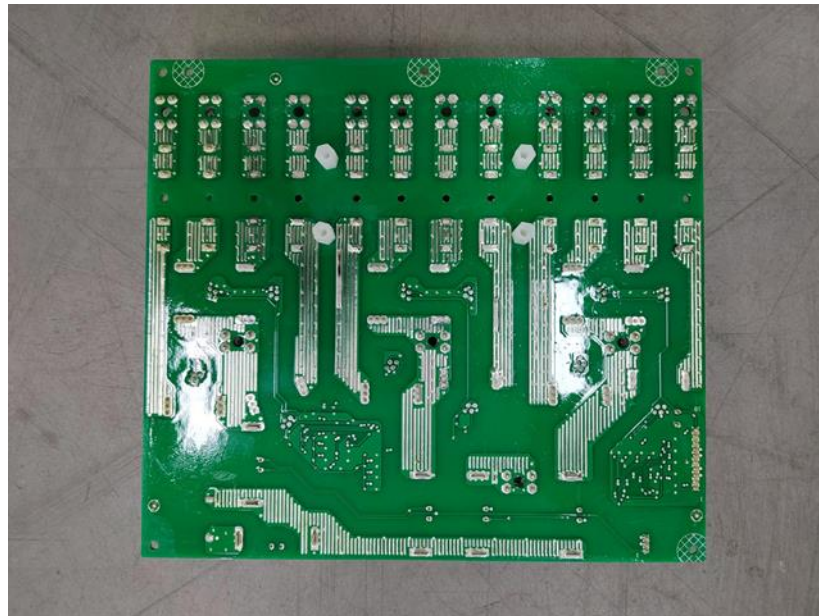


Figure 26. Back view of I03 board
(OCIP50-TL3-M3-OD-FH, FM)

Model: as cover



Figure 27. Front view of I03 board
(OCIP50-TL3-M3-OD-OL,FL)

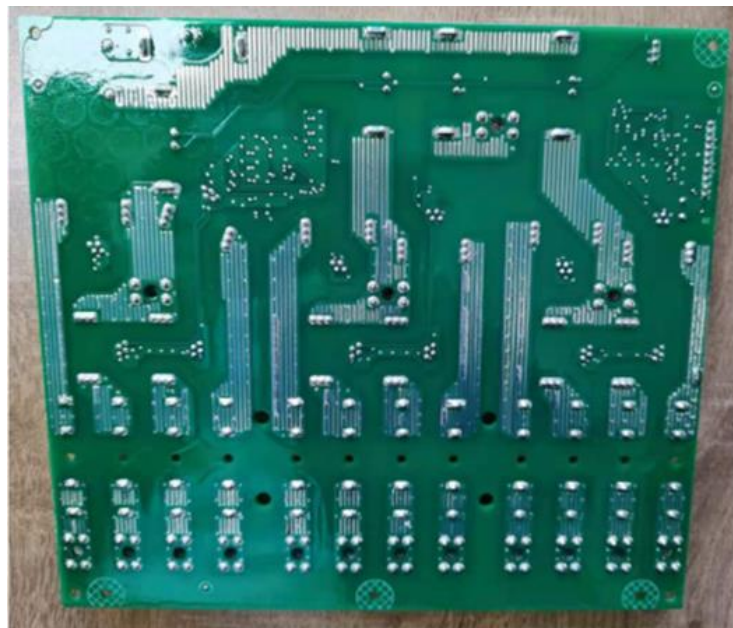


Figure 28. Back view of I03 board
(OCIP50-TL3-M3-OD-OL,FL)

Model: as cover



Figure 29.Front view of LCD board

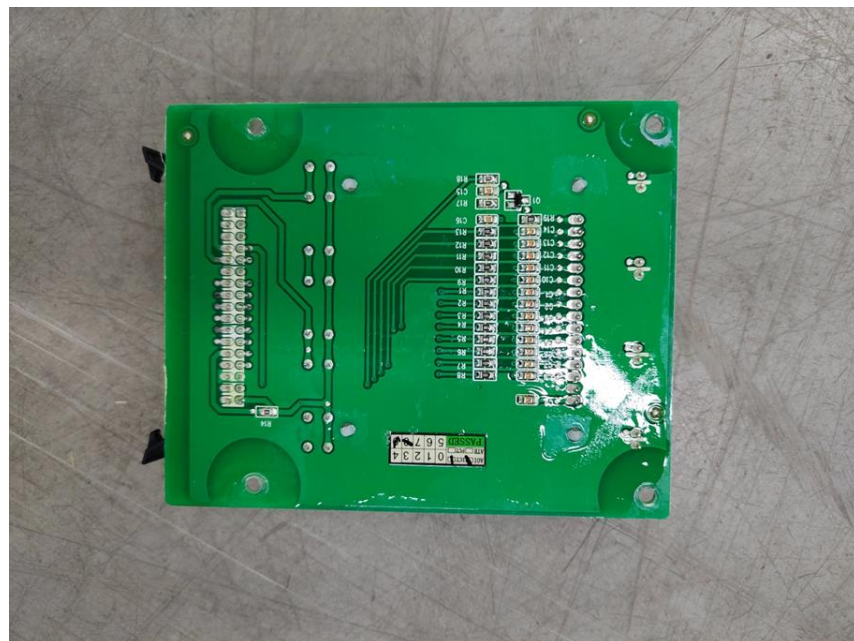


Figure 30.Back view of LCD board