



SUMMARY OF TEST REPORT

TEST REPORT NO: HPLI/Test/2008029501/02

DATE: 01/12/2020

(Number of Pages in Test Report: Page no. 1 to 30)

TEST FORMAT AS PER IS 16169: 2014/IEC 62116:2008

1. Name of the Manufacturer: Maitian Energy Co., Ltd. Wuxi Branch
2. Product: PV Grid-tied Inverter
3. Model: F6000 (Representative model)
F5300, F5000, F4600, F3600, F3000 (Series models)
4. Model differences provided (if applicable): Yes
5. Model differences verified as per MNRE Guidelines for series formulation: Yes
6. Test Results:

SL. NO.	TEST REQUIREMENT	CLAUSE	VERDICT
1.	Test for single or multi-phase inverter	6.0	P
2.	Islanding as it applies to PV systems(Informative)	Annex A	P
3.	Test for independent islanding detection device	Annex B	N/A

General Information:

1. The conformity certificates of critical components are verified to ensure complete testing of apparatus under test and details regarding harmonized IEC standards (where IEC standards are not available) are also provided in the list of critical components.

CONCLUSION:

1. Sample meets all relevant requirements of IS 16169: 2014/IEC 62116:2008
2. ~~Sample fails to meet the following test requirements.~~

I, hereby undertake that the verdict stated in the test reports for all the test matches with the test results. The sample meets all relevant requirements of IS 16169: 2014/IEC 62116:2008 ~~does not meet the requirements stated above.~~

Date: 01/12/2020

HI PHYSIX LABORATORY INDIA PVT. LTD.

Ashutosh Pathak
(Signature of Authorized person with Stamp)



TC-5100

TEST REPORT	
IS 16169: 2014/IEC 62116:2008	
Test Procedure of Islanding Prevention Measures for Utility-Interconnected-Photovoltaic Inverters	
Report Reference No.	ULR-TC510020000001654F HPLI/Test/2008029501/02
Date of issue	01/12/2020
Total number of pages	30
Testing Laboratory.....	HI PHYSIX LABORATORY INDIA PRIVATE LIMITED
Address	B-32/1/2, MIDC, RANJANGAON, PUNE MAHARASHTRA
Applicant's name	Maitian Energy Co., Ltd. Wuxi Branch
Address.....	No.11, LiJiang Road, Xinwu District, Wuxi City, Jiangsu Province, China
Test specification	
Standard	IS 16169: 2014/ IEC 62116:2008
Test procedure	BIS Compliance Report
Non-standard test method	N/A
Test Report Form No.	IS 16169/IEC6211:2014_V1.0
Test Report Form Originator	BIS
MASTER TRF.....	Dated: 05.04.2018
Test item description	PV Grid-tied Inverter
Trade Mark	

HI PHYSIX LABORATORY INDIA PVT. LTD.


Ashutosh Pathak
(Chief Technical Manager)



TC-5100

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Report No. HPLI/Test/2008029501/02

Manufacturer	Maitian Energy Co., Ltd. Wuxi Branch
Factory.....	No.11, LiJiang Road, Xinwu District, Wuxi City, Jiangsu Province, China
Model/Type reference.....	F6000 (Representative model) F5300, F5000, F4600, F3600, F3000 (Series models)
Ratings.....	Input side: Nominal Operating voltage: 360Vdc, Max. DC current: 12.5A/12.5A, Isc PV: 15A/15A, MPPT Voltage range: 80-550Vdc, Absolute voltage: 600Vdc, Max. input power: 7800W Output side: Rated apparent power: 6000VA, Max. apparent power: 6000VA, Nominal Frequency: 50Hz, Nominal voltage: 220/230/240Vac, Nominal output current: 26.1A, Max. output current: 26.1A, Power factor: 1(± 0.8 adjustable) (Representative model) (For series models rating see copy of marking plate)

Testing procedure and testing location:

Testing Laboratory.....: HI PHYSIX LABORATORY INDIA PRIVATE LIMITED

Testing location/ address.....: B-32/1/2, MIDC, RANJANGAON, PUNE MAHARASHTRA

Tested by (name + signature): Pravin Zaware 

HI PHYSIX LABORATORY INDIA PVT. LTD.

Approved by (+ signature): Ashutosh pathak 
(Chief Technical Manager)

IS 16169/ IEC 62116_V1.0



Summary of testing:			
Tests performed (name of test and test clause):		Testing location:	
All applicable tests		HI PHYSIX LABORATORY INDIA PRIVATE LIMITED	
Test for single or multi-phase inverter	6.0	B-32/1/2, MIDC, RANJANGAON, PUNE	
Documentation	7.0	MAHARASHTRA	
Unintentional Islanding			

HI PHYSIX LABORATORY INDIA PVT. LTD.

Ashutosh Pathak
(Chief Technical Manager)

Copy of marking plate of the equipment: (Representative model)


F6000

 PV Grid-tied Inverter

www.fox-ess.com

DC	Max. input power	7800W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
AC	Isc PV	15A/15A
	Rated apparent power	6000VA
	Max. apparent power	6000VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	26.1A
	Max. output current	26.1A
	Power factor	1(±0.8 adjustable)
	Ingress protection	IP65
	Operation temperature range	-20...+60°C
	Protective class	Class I
	Inverter topology	Non-Isolated
	Over Voltage Category	III (MAINS) II (PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRMB

☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐



 AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21

 IEC 62109-1/2 IEC 61000-6-2/3

 Maitian Energy Co., Ltd. Wuxi Branch

 No.11, LiJiang Road, Ximou District, Wuxi City,

 Jiangsu Province, China

 Made in china

 V1.00


 SN:

 661F6020063B005


F6000

 PV Grid-tied Inverter

www.fox-ess.com

DC	Max. input power	7800W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
AC	Isc PV	15A/15A
	Rated apparent power	6000VA
	Max. apparent power	6000VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	26.1A
	Max. output current	26.1A
	Power factor	1(±0.8 adjustable)
	Ingress protection	IP65
	Operation temperature range	-20...+60°C
	Protective class	Class I
	Inverter topology	Non-Isolated
	Over Voltage Category	III (MAINS) II (PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRMB

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 AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21

 IEC 62109-1/2 IEC 61000-6-2/3

 Maitian Energy Co., Ltd. Wuxi Branch

 No.11, LiJiang Road, Ximou District, Wuxi City,

 Jiangsu Province, China

 Made in china

 V1.00


 SN:

 661F6020062B010

HI PHYSIX LABORATORY INDIA PVT. LTD.



 Anurag Pathak

 (Chief Technical Manager)

Copy of marking plate of series models :

FoxESS F5300
PV Grid-tied Inverter
www.fox-ess.com

DC	Max. input power	6890W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
	Isc PV	15A/15A
AC	Rated apparent power	5300VA
	Max. apparent power	5830VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	23.0A
	Max. output current	25.3A
	Power factor	1(±0.8 adjustable)

Ingress protection IP65
Operation temperature range -20...+60°C
Protective class Class I
Inverter topology Non-isolated
Over Voltage Category III (MAINS), II (PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8
☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21
IEC 62109-1/2 IEC 61000-6-2/3

Maitan Energy Co., Ltd. Wuxi Branch
No.11, Jiliang Road, Xinxu District, Wuxi City,
Jiangsu Province, China

Made in china
V1.00

SN:



6 6 1 0 2 1 0 1 9 C 1 0 0 4

FoxESS F5000
PV Grid-tied Inverter
www.fox-ess.com

DC	Max. input power	6500W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
	Isc PV	15A/15A
AC	Rated apparent power	5000VA
	Max. apparent power	5500VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	21.7A
	Max. output current	23.9A
	Power factor	1(±0.8 adjustable)

Ingress protection IP65
Operation temperature range -20...+60°C
Protective class Class I
Inverter topology Non-isolated
Over Voltage Category III (MAINS), II (PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8
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AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21
IEC 62109-1/2 IEC 61000-6-2/3

Maitan Energy Co., Ltd. Wuxi Branch
No.11, Jiliang Road, Xinxu District, Wuxi City,
Jiangsu Province, China

Made in china
V1.00

SN:



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Copy of marking plate of series models :

FoxESS F4600
PV Grid-tied Inverter
www.fox-ess.com

DC	Max. input power	5980W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
	Isc PV	15A/15A
AC	Rated apparent power	4600VA
	Max. apparent power	5060VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	20.0A
	Max. output current	22A
	Power factor	1(±0.8 adjustable)

Ingress protection IP65
Operation temperature range -20...+60°C
Protective class Class I
Inverter topology Non-isolated
Over Voltage Category III(MAINS), II(PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8
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AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21
IEC 62109-1/2 IEC 61000-6-2/3

Maitian Energy Co., Ltd. Wuxi Branch
No.11, Liliang Road, Xinwu District, Wuxi City,
Jiangsu Province, China

Made in china
V1.00

SN:



661021819C5091

FoxESS F3600
PV Grid-tied Inverter
www.fox-ess.com

DC	Max. input power	4680W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
	Isc PV	15A/15A
AC	Rated apparent power	3600VA
	Max. apparent power	3960VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	15.7A
	Max. output current	17.2A
	Power factor	1(±0.8 adjustable)

Ingress protection IP65
Operation temperature range -20...+60°C
Protective class Class I
Inverter topology Non-isolated
Over Voltage Category III(MAINS), II(PV)

DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8
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AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21
IEC 62109-1/2 IEC 61000-6-2/3

Maitian Energy Co., Ltd. Wuxi Branch
No.11, Liliang Road, Xinwu District, Wuxi City,
Jiangsu Province, China

Made in china
V1.00

SN:



661021819C5032

HI PHYSIX LABORATORY INDIA PVT. LTD.

Ashutosh Parhak
Ashutosh Parhak
(Chief Technical Manager)



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Copy of marking plate of the equipment: (Series model)

**F3000**
PV Grid-tied Inverter
www.fox-ess.com

DC	Max. input power	3900W
	Absolute max. voltage	600V
	MPPT voltage range	80-550V
	Nominal operating voltage	360V
	Max. DC current	12.5A/12.5A
	Isc PV	15A/15A
AC	Rated apparent power	3000VA
	Max. apparent power	3300VA
	Nominal frequency	50Hz
	Nominal voltage	220/230/240Vac
	Nominal output current	13A
	Max. output current	14.3A
	Power factor	1(±0.8 adjustable)
Ingress protection		IP65
Operation temperature range		-20...+60°C
Protective class		Class I
Inverter topology		Non-isolated
Over Voltage Category		III (MAINS) II (PV)
DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8		
☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
		
AS/NZS 4777.2 VDE-AR-N 4105 G98-1/G99-1 CEI 0-21 IEC 62109-1/2 IEC 61000-6-2/3		
Muldun Energy Co., Ltd. Wuxi Branch No. 11, UJiang Road, Xinwu District, Wuxi City, Jiangsu Province, China		
		
Made in China V1.00		

SN:



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HI PHYSIX LABORATORY INDIA PVT. LTD.

Autosh Pathak
Autosh Pathak
(Chief Technical Manager)

IS 16169/ IEC 62116_V1.0



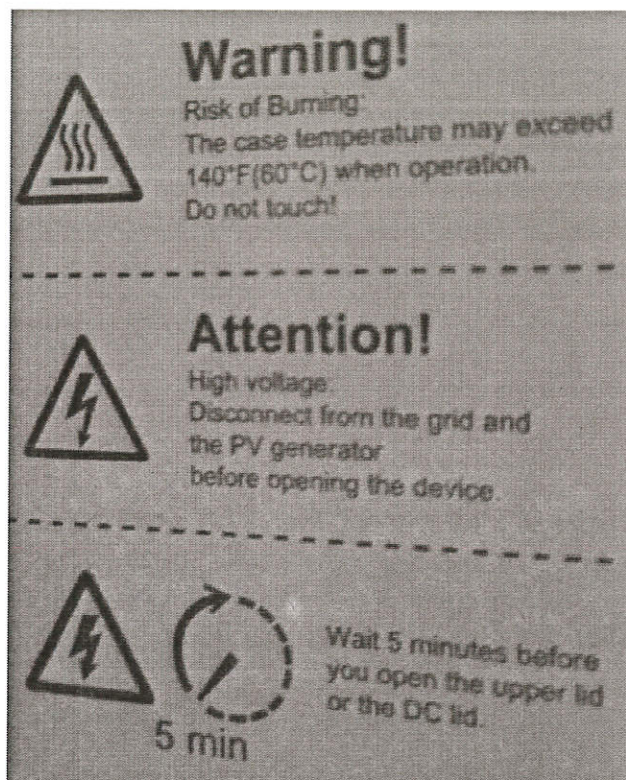
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Warning label equipment:



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Ashutosh Pathak
Ashutosh Pathak
(Chief Technical Manager)

IS 16169/ IEC 62116_V1.0

Test case verdicts

Test case does not apply to the test object: N/A

Test item does meet the requirement.....: P(Pass)

Test item does not meet the requirement.....: F(Fail)

Testing

Date of receipt of test item.....: 20/08/2020

Date(s) of performance of test.....: 07/09/2020-25/11/2020

GENERAL INFORMATION

Test item particulars:	See below
Accessories and detachable parts included in the evaluation	N/A
Options included	N/A
Abbreviations used in the report	See below
EUT – Equipment Under Test	MPPT – Maximum Power Point Tracking
Qf – Quality factor	W - Utility Real Power
Var – Utility Reactive Power	VDC – DC Voltage
VEUT – AC Voltage of EUT	tR – Run on time
IR – Resistive load current	IL – Inductive load current
IC – Capacitive load current	PAC – Utility Real Power
QAC – Utility Reactive Power	IAC – Utility Current
Possible test case verdicts:	N/A
test case does not apply to the test object	
test object does meet the requirement	Pass (P)
test object does not meet the requirement	Fail (F)

HI PHYSIX LABORATORY INDIA PVT. LTD.

Achutosh Pathak
(Chief Technical Manager)



TC-5100

Manufacturer's Declaration per Standard:

Similarities between the models: Representative models and series models have following similarities

- 1) Same rated Input/ Output voltage: Input voltage: 360Vdc/Output voltage: 220V/230V/240Vac
- 2) Same frequency: 50Hz
- 3) Number of Phases at output: Single phase
- 4) Same PCB design and layout : Same
- 5) Same Power Stage topology: Non-isolated
- 6) Same Insulation Class: Transformer less
- 7) Same Control Algorithm/firmware: Master/Slave/ARM: V1.10/V1.02/V1.02, Hardware version : V1.6, DSP maste : U29 DSP slave : U6 ARM : U20
- 8) Same Cabinet Design: IP65
- 9) Class of construction: Class I

Differences between the models: Representative models and series models have following differences
Model description, Electrical rating (as mentioned in marking plate).

General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

The Management System is maintained in accordance with IS/ISO/IEC 17025:2017 and testing Standards/ Instruments are traceable to National/ International Standards.

"(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 point is used as the decimal separator.

HI PHYSIX LABORATORY INDIA PVT. LTD.
Achutash Pathak
(Chief Technical Manager)

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General Product Information:

Product Electrical Ratings

Parameter	Value		Remarks
1) Rating			
a) Maximum output power	W	6000	---
b) DC voltage range	Vdc	80-550	---
c) DC current limits	Idc	12.5A/12.5A	---
d) AC voltage range	Vac	220V/230V/240Vac	---
e) Frequency range	Hz	50	---
f) AC current limits	A	26.1A	---
g) Efficiency	%	99.00	---
h) Voltage trip settings (magnitude and timing)	V	Complies with requirement as specified in standard	---
i) Frequency trip settings (magnitude and timing)	Hz	Complies with requirement as specified in standard	---
j) Other software settings	---	Provided in user manual	---
k) Firmware version	---	Master/Slave/ARM: V1.10/V1.02/V1.02, Hardware version : V1.6, DSP mast : U29 DSP slave : U6 ARM : U20	---
2) Others	---	---	---
a) Displays	---	Information provided in user manual	---
b) Temperature range	°C	-20°C to +60°C	---
c) Humidity	%	0%~100%	---
Sample code by online request is "SC20SPF00526"			

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Achutosh Pathak
(Chief Technical Manager)

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IS 16169:2014 /IEC 62116:2008			
Clause	Requirement + Test	Result – Remark	Verdict
4	Testing circuit		
	The testing circuit shown in Figure 1 is employed.	See below	P
	Similar circuits are used for three-phase output.	Single phase output	N/A
	Parameters to be measured are shown in Table 1 and Figure 1. Parameters to be recorded in the test report are discussed in Clause 7.	Parameters measured according to clause 7 and recorded in the test report	P
5	Testing equipment	See below	P
5.1	Measuring instruments	See below	P
	The waveform measurement/capture device is able to record the waveform from the beginning of the islanding test until the EUT ceases to energize the island.	For waveform measurement digital oscilloscope is used.	P
	For multi-phase EUT, all phases are monitored.	Single phase EUT	N/A
	A waveform monitor designed to detect and calculate the run-on time may be used.	Complies	P
	For multi-phase EUT, the test and measurement equipment is recorded each phase current and each phase-to-neutral or phase-to-phase voltage, as appropriate, to determine fundamental frequency active and reactive power flow over the duration of the test.	Single phase EUT	N/A
	A sampling rate of 10 kHz or higher is recommended. The minimum measurement accuracy is 1 % or less of rated EUT nominal output voltage and 1 % or less of rated EUT output current	Complies	P
	Current, active power, and reactive power measurements through switch S1 used to determine the circuit balance conditions report the fundamental (50 Hz or 60 Hz) component.	Complies	P
5.2	DC power source	See below	P
	A PV array or PV array simulator (preferred) may be used. If the EUT can operate in utility- interconnected mode from a storage battery, a DC power source may be used in lieu of a battery as long as the DC power source is not the limiting device as far as the maximum EUT input current is concerned.	PV array simulator is used	P
	The DC power source provides voltage and current necessary to meet the testing requirements described in Clause 6.	Complies	P

IS 16169/ IEC 62116_V1.0

HI PHYSIX LABORATORY INDIA PVT. LTD.

Ashutosh Pathak
Ashutosh Pathak
(Chief Technical Manager)

IS 16169:2014 /IEC 62116:2008			
Clause	Requirement + Test	Result – Remark	Verdict
5.2.1	PV array simulator	See below	P
	The tests are conducted at the input voltage defined in Table 2 below, and the current is limited to 1.5 times the rated photovoltaic input current, except when specified otherwise by the test requirements.	Complies	P
	A PV array simulator is recommended, however, any type of power source may be used if it does not influence the test results.	PV array simulator is used	P
5.2.2	Current and voltage limited DC power supply with series resistance	Array simulator is used	N/A
	A DC power source used as the EUT input source is capable of EUT maximum input power (so as to achieve EUT maximum output power) at minimum and maximum EUT input operating voltage.	See above	N/A
	The power source provides adjustable current and voltage limit, set to provide the desired short circuit current and open circuit voltage when combined with the series and shunt resistance described below.	See above	N/A
	A series resistance (and, optionally, a shunt resistance) is selected to provide a fill factor within the range: Output power: Sufficient to provide maximum EUT output power and other levels specified by test conditions of table 5. Response speed: The response time of a simulator to a step in output voltage, due to a 5% load change, results in a settling of the output current to within 10% of its final value in less than 1ms. Stability: Excluding the variations caused by the EUT MPPT, simulator output power remains stable within 2 % of specified power level over the duration of the test: from the point where load balance is achieved until the island condition is cleared or the allowable run-on time is exceeded. Power factor: 0.25 to 0.8	See above	N/A
5.2.3	PV array	Array simulator is used	N/A
	A PV array used as the EUT input source is capable of EUT maximum input power at minimum and maximum EUT input operating voltage.	See above	N/A

IS 16169:2014 /IEC 62116:2008																	
Clause	Requirement + Test	Result – Remark	Verdict														
	Testing is limited to times when the irradiance varies by no more than 2 % over the duration of the test as measured by a silicon-type pyranometer or reference device. It may be necessary to adjust the array configuration to achieve the input voltage and power levels prescribed in 6.1.	See above	N/A														
5.3	AC power source	See below	P														
	The utility grid or other AC power source may be used as long as it meets the conditions specified in Table 4. <table><tr><th colspan="2">Table 4 – AC power source requirements</th></tr><tr><th>Items</th><th>Conditions</th></tr><tr><td>Voltage</td><td>Nominal $\pm 2.0\%$</td></tr><tr><td>Voltage THD</td><td>$< 2.5\%$</td></tr><tr><td>Frequency</td><td>Nominal ± 1 Hz</td></tr><tr><td>Phase angle distance¹⁾</td><td></td></tr><tr><td colspan="2">¹⁾ Three-phase case only</td></tr></table>	Table 4 – AC power source requirements		Items	Conditions	Voltage	Nominal $\pm 2.0\%$	Voltage THD	$< 2.5\%$	Frequency	Nominal ± 1 Hz	Phase angle distance ¹⁾		¹⁾ Three-phase case only		Meets the conditions specified in Table 4.	P
Table 4 – AC power source requirements																	
Items	Conditions																
Voltage	Nominal $\pm 2.0\%$																
Voltage THD	$< 2.5\%$																
Frequency	Nominal ± 1 Hz																
Phase angle distance ¹⁾																	
¹⁾ Three-phase case only																	
5.4	AC loads	See below	P														
	On the AC side of the EUT, variable resistance, capacitance, and inductance are connected in parallel as loads between the EUT and the AC power source. Other sources of load, such as electronic loads, may be used if it can be shown that the source does not cause results that are different than would be obtained with passive resistors, inductors, and capacitors.	Variable RLC (AC) load used	P														
	All AC loads are rated for and adjustable to all test conditions. The equations for Qf are based upon an ideal parallel RLC circuit. For this reason, non- inductive resistors, low loss (high Qf) inductors, and capacitors with low effective series resistance and effective series inductance are utilized in the test circuit. Iron core inductors, if used, are not exceed a current THD of 2 % when operated at nominal voltage. Load components are conservatively rated for the voltage and power levels expected. Resistor power ratings are chosen so as to minimize thermally-induced drift in Resistance values during the course of the test.	Meeting the requirement	P														
	Active and reactive power is calculated (using the measurements provided in Table 1) in each of the R, L and C legs of the load so that these parasitic parameters (and parasitics introduced by variacs or autotransformers) are properly accounted for when calculating Qf.	Complies	P														

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IS 16169:2014 /IEC 62116:2008			
Clause	Requirement + Test	Result – Remark	Verdict
6	Test for single or multi-phase inverter	See below	P
6.1	Test procedure	See below	P
	The test uses an RLC load, resonant at the EUT nominal frequency (50 Hz or 60 Hz) and matched to the EUT output power.	Variable RLC (AC) load used	P
	For multi-phase EUT, the load is balanced across all phases and the switch S1 as in Figure 1 opens all phases	Single phase EUT	N/A
	This test is performed with the EUT conditions as in Table 5, where power and voltage values are given as a percent of EUT full output rating.	See below	P
	a) Determine EUT test output power	See appended table 6.1	P
	b) Adjusting the DC input source	See appended table 6.1	P
	c) Turn off the EUT and open S1	See appended table 6.1	P
	d) Adjust the RLC circuit to have $Q_f = 1.0 \pm 0.05$	See appended table 6.1	P
	e) Connect the RLC load configured in step d) to the EUT by closing S2	See appended table 6.1	P
	f) Open the utility-disconnect switch S1 to initiate the test, Run-on time is recorded.	See appended table 6.1	P
	g) For test condition A, adjust the real load and only one of the reactive load components to each of the load imbalance conditions shown in the shaded portion of table 6. If any of the recorded run-on times are longer than the one recorded for the rated balance condition, then the non-shaded parameter combinations also Require testing.	See appended table 6.1	P
	h) For test condition B and C, adjust the only one reactive load components by approximately 1.0% per test, within a total range of 95% to 105% of the operating point. If run-on times are still increasing at the 95% or 105% points, additional 1% increments have to be taken until run-on times begin decreasing.	See appended table 6.1	P
6.2	Pass/fail criteria	See below	P
	An EUT is considered to comply with the requirements for islanding protection when each case of recorded run-on time is less than 2 s or meets the requirements of local codes.	See appended table 6.1	P
7	Documentation	See below	P
	At a minimum, the following information is recorded and maintained in the test report.	See below	P

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(Signature)

Anurag Pathak
(Chief Technical Manager)

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Clause	Requirement + Test	Result – Remark	Verdict
	a) Specifications of EUT. Table 8 provides an example of the type of information that is provided.	See attached data sheet on page no. 27-29	P
	b) Measurement results. Table 9 provides an example of the type of information that is provided. Actual measured values is to be recorded.	See appended table 6.1	P
	c) Block diagram of test circuit.	See page no. 30	P
	d) Specifications of the test and measurement equipment. Table 10 provides an example of the type of information that is provided.	Complies	P
	e) Any test configuration or procedure details such as methods of achieving specified load and EUT output conditions.	Complies	P
	f) Any additional information required by the testing laboratory's accreditation.	Nil	N/A
	g) Specify the evaluation criterion from clause 6.2 that was utilized to determine if the product passed or failed the test.	Comply with the criteria	P
Annex A	Islanding as it applies to PV systems(Informative)	Complies	P
A.1	General	See above Annex A	P
A.2	Impact of distortion on islanding	See above Annex A	P
Annex B	Test for independent islanding detection device (relay)(Informative)	No such application	N/A
B.1	Introduction	See above	N/A
B.2	Testing circuit	See above	N/A
B.3	Testing equipment	See above	N/A
B.4	Testing procedure	See above	N/A
B.5	Documentation	See above	N/A

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Clause	Requirement + Test	Result – Remark	Verdict
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6.1	Table: Tested condition and run-on time											
Sr. No.	P _{EUT} (% of EUT rating)	Reactive load (% of Q _L)	P _{AC} (% of nominal)	Q _{AC} (% of nominal)	Run on time (ms)	P _{EUT} (kW)	Pr (Resistive) (W)	PI (Inductive) (Var)	Pc (Capacitive) (Var)	Actual Q _r	VDC	Remarks
1	100	100	0	0	350.0	6.000	6000	6005	5995	1.000	440	Test A at BL
2	66	66	0	0	315.0	3.960	4045	4050	4000	0.995	280	Test B at BL
3	33	33	0	0	310.0	2.036	2036	2031	2044	1.001	120	Test C at BL
4	100	100	-5	-5	400.0	6.000	6300	6305	5995	0.976	440	Test A at IB
5	100	100	-5	0	375.0	6.000	6255	6005	5995	0.959	440	Test A at IB
6	100	100	-5	5	338.0	6.000	6285	5705	5995	0.930	440	Test A at IB
7	100	100	0	-5	259.0	6.000	6000	6290	5995	1.023	440	Test A at IB
8	100	100	0	5	248.0	6.000	6000	5696	5995	0.974	440	Test A at IB
9	100	100	5	-5	306.0	6.000	5700	6270	5995	1.076	440	Test A at IB
10	100	100	5	0	261.0	6.000	5695	6005	5995	1.054	440	Test A at IB
11	100	100	5	5	355.0	6.000	5710	5711	5995	1.025	440	Test A at IB
12	100	100	-10	10	128.0	6.000	5710	5711	5995	0.913	440	Test A at IB

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(Signature)
Arun K. Pathak
(Chief Technical Manager)

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Clause	Requirement + Test					Result – Remark					Verdict	
13	100	100	-5	10	258.0	6.000	6239	5635	5995	0.932	440	Test A at IB
14	100	100	0	10	155.0	6.000	6011	5626	5995	0.966	440	Test A at IB
15	100	100	10	10	176.0	6.000	5385	5421	5995	1.059	440	Test A at IB
16	100	100	10	5	153.0	6.000	5395	5732	5995	1.087	440	Test A at IB
17	100	100	10	0	150.0	6.000	5376	6005	5995	1.116	440	Test A at IB
18	100	100	10	-5	373.0	6.000	5387	6270	5995	1.138	440	Test A at IB
19	100	100	10	-10	344.0	6.000	5359	6191	5995	1.137	440	Test A at IB
20	100	100	5	-10	396.0	6.000	5795	6206	5995	1.053	440	Test A at IB
21	100	100	0	-10	401.0	6.000	6000	6194	5995	1.016	440	Test A at IB
22	100	100	-5	-10	372.0	6.000	6269	6211	5995	0.973	440	Test A at IB
23	100	100	-10	-10	407.0	6.000	6365	6196	5995	0.957	440	Test A at IB
24	100	100	-10	-5	349.0	6.000	6340	6275	5995	0.967	440	Test A at IB
25	100	100	-10	0	370.0	6.000	6311	6005	5995	0.951	440	Test A at IB
26	100	100	-10	5	255.0	6.000	6299	5767	5995	0.933	440	Test A at IB

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 Anurag Pathak
 (Chief Technical Manager)



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Clause	Requirement + Test					Result – Remark					Verdict	
27	66	66	0	-5	278.0	3.960	4045	4258	4000	1.020	280	Test B at IB
28	66	66	0	-4	288.0	3.960	4045	4212	4000	1.015	280	Test B at IB
29	66	66	0	-3	318.0	3.960	4045	4172	4000	1.010	280	Test B at IB
30	66	66	0	-2	303.0	3.960	4045	4131	4000	1.005	280	Test B at IB
31	66	66	0	-1	333.0	3.960	4045	4091	4000	1.000	280	Test B at IB
32	66	66	0	1	322.0	3.960	4045	4010	4000	0.990	280	Test B at IB
33	66	66	0	2	270.0	3.960	4045	3969	4000	0.985	280	Test B at IB
34	66	66	0	3	239.0	3.960	4045	3929	4000	0.980	280	Test B at IB
35	66	66	0	4	206.0	3.960	4045	3888	4000	0.975	280	Test B at IB
36	66	66	0	5	205.0	3.960	4045	3848	4000	0.970	280	Test B at IB
37	33	33	0	-5	320.0	2.036	2036	2133	2044	1.025	120	Test C at IB
38	33	33	0	-4	331.0	2.036	2036	2112	2044	1.021	120	Test C at IB
39	33	33	0	-3	311.0	2.036	2036	2092	2044	1.016	120	Test C at IB
40	33	33	0	-2	319.0	2.036	2036	2072	2044	1.011	120	Test C at IB

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Clause		Requirement + Test						Result – Remark			Verdict	
41	33	33	0	-1	313.0	2.036	2036	2051	2044	1.006	120	Test C at IB
42	33	33	0	1	324.0	2.036	2036	2011	2044	0.996	120	Test C at IB
43	33	33	0	2	336.0	2.036	2036	1990	2044	0.991	120	Test C at IB
44	33	33	0	3	338.0	2.036	2036	1970	2044	0.986	120	Test C at IB
45	33	33	0	4	335.0	2.036	2036	1950	2044	0.981	120	Test C at IB
46	33	33	0	5	342.0	2.036	2036	1929	2044	0.975	120	Test C at IB
a PEUT: EUT output power. b PAC: Active power flow at S1 in figure 1. Positive means power from EUT to utility. Nominal is the 0% test condition value. C QAC: Reactive power flow at S1 in figure 1. Positive means power from EUT to utility. Nominal is the 0% test condition value. D BL: balance condition, IB: imbalance condition.												

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(Signature)
A. K. Pathak
(Chief Technical Manager)

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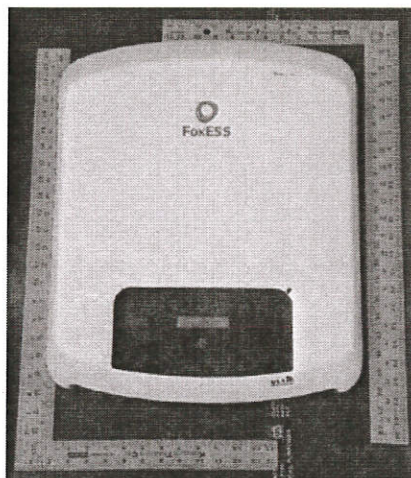
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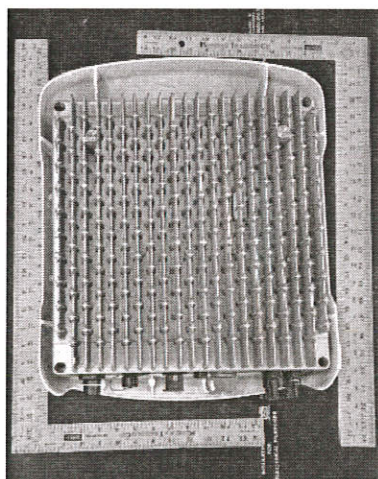
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Appendix A

Photograph



FRONT VIEW



REAR VIEW

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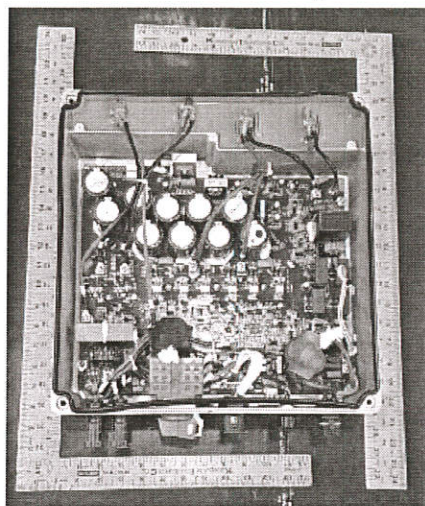
 Ashutosh Pathak
 (Chief Technical Manager)

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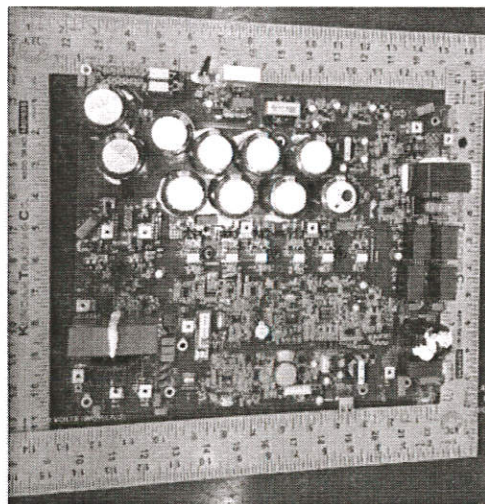
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INTERNAL VIEW



PCB BOARD COMPONENT SIDE VIEW

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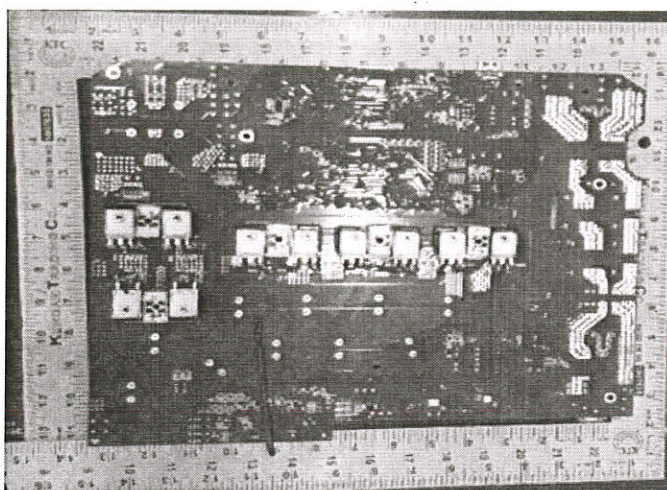
 Ashutosh Pathak
 (Chief Technical Manager)



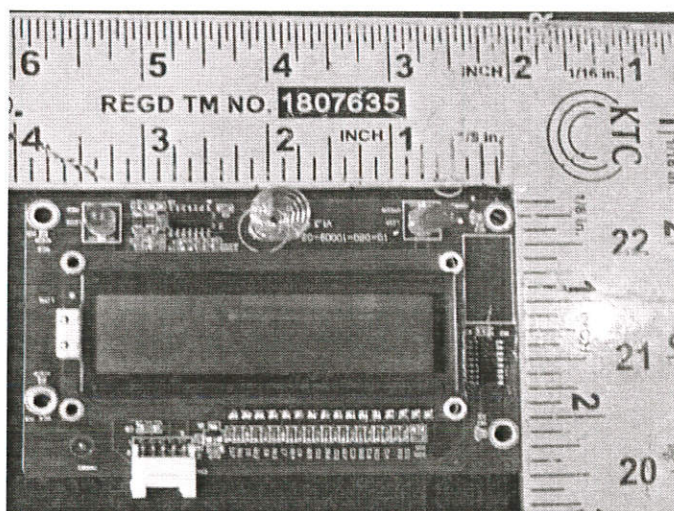
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PCB BOARD SOLDER SIDE VIEW



DISPALY BOARD COMPONENT SIDEVIEW

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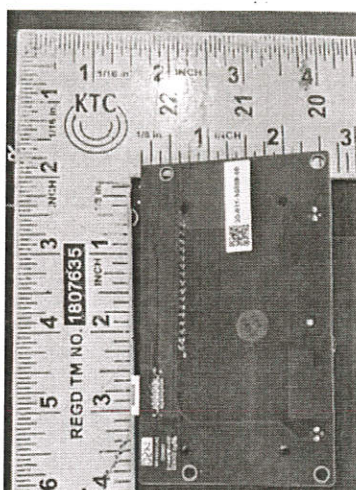
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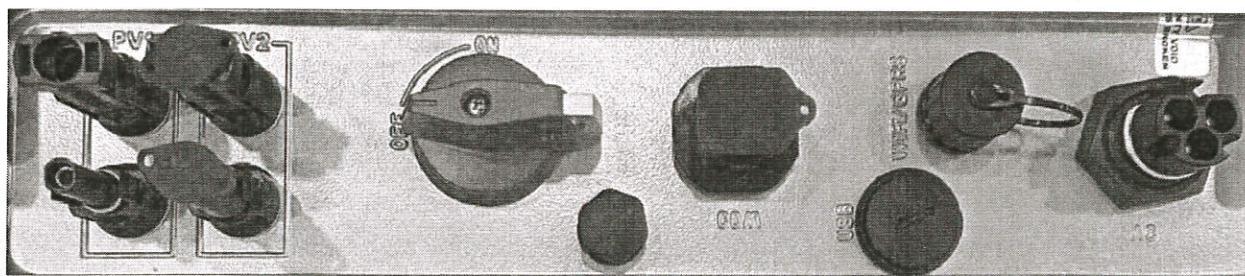
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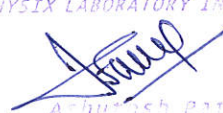
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DISPALY BOARD SOLDER SIDE VIEW



PV CONNECTORS, DC SWITCH, COM,WIFI/GPRS, AC OUTPUT PORT

HI PHYSIX LABORATORY INDIA PVT. LTD.

 Ashutosh Parbhakar
 (Chief Technical Manager)

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TC-5100

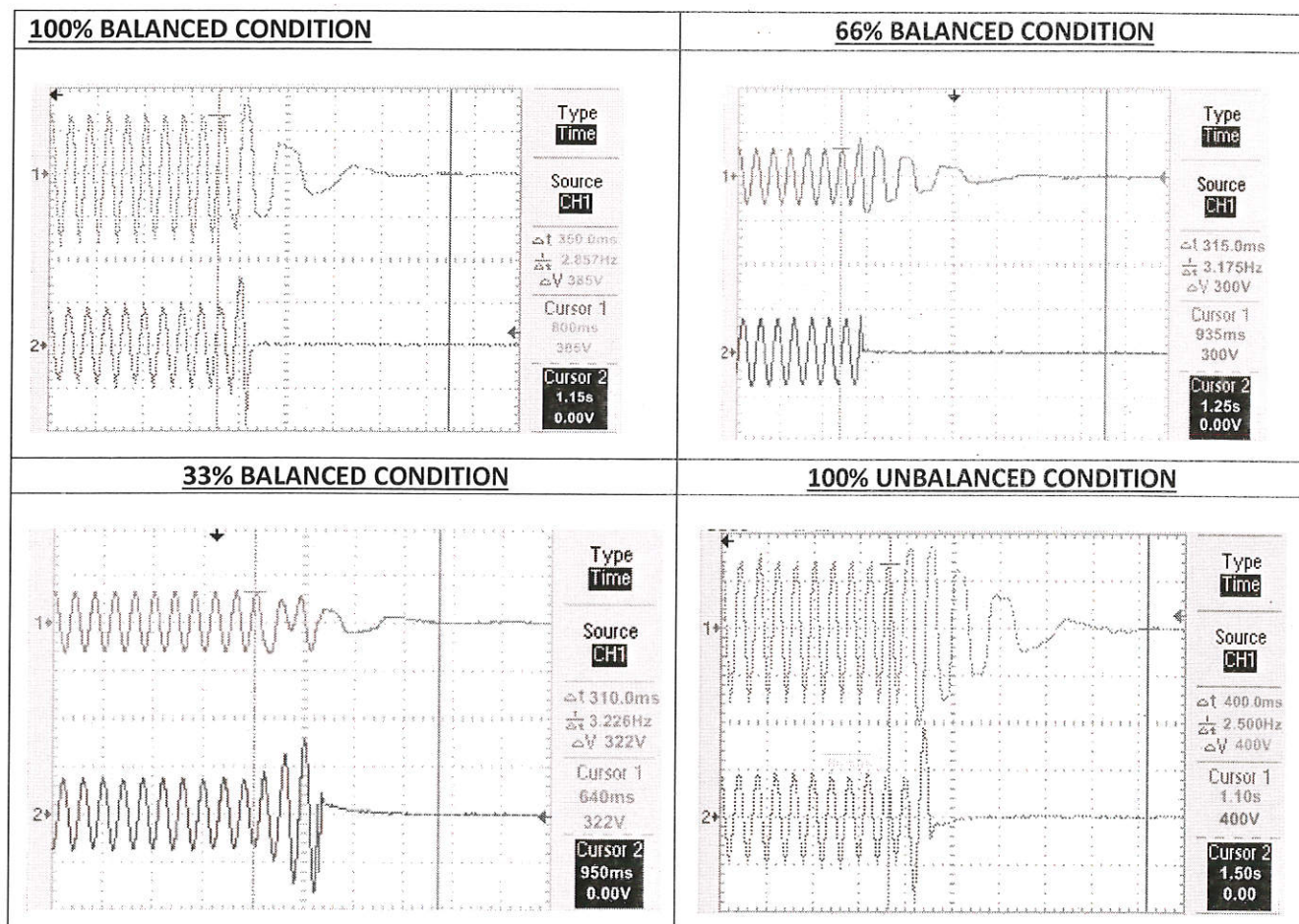
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Waveforms:



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Ashutosh
Ashutosh Pathak
(Chief Technical Manager)

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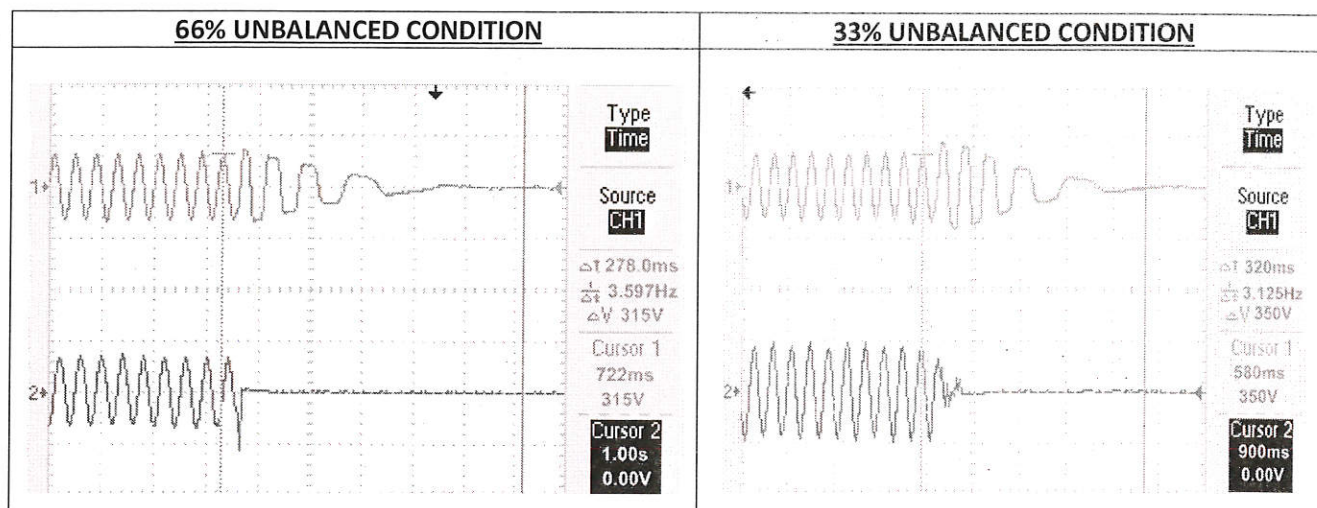
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Ashish Pathak
Chief Technical Manager

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SPECIFICATION OF EUT



FoxESS DATASHEET
Single-Phase F Series

F SERIES
DUAL MPPT INVERTERS

FoxESS offers a range of single and dual MPPT single phase inverters offering unparalleled efficiency and performance. Our dual MPPT F Series range includes 4 to 5.5 and 6.5kW models. The F Series MPPT inverters are used to convert solar energy into AC power for your home or business.

- High Performance**
Low start up voltage, zero voltage drop, 98% efficiency.
- Upgradeable***
Fully equipped for upgrade to the FoxESS range of battery storage systems. Upgrade to 10kW, 15kW or 20kW.
- IP65 Rated**
Engineered to last with maximum flexibility. Suitable for outdoor installation.
- Remote Monitoring**
Monitor your system remotely via smartphone app or web portal.

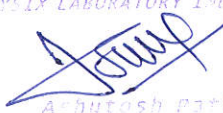
**ANYTIME, ANYWHERE
REMOTE
MONITORING
PLATFORM**
Available on iOS and Android

THE F SERIES

For more about the FoxESS range of single phase inverters, visit:

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 Arunotash Pathak
 (Chief Technical Manager)

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TECHNICAL SPECIFICATIONS

Model	F3000	F3600	F4600	F5000	F5300*	F6000
INPUT						
PV						
Max. Recommended DC Power [W]	3900	4680	5980	6500	6890	7800
Max. DC Voltage [V]	600	600	600	600	600	600
Nominal DC Operating Voltage [V]	360	360	360	360	360	360
Max. Input Current (Input A/Input B) [A]			12.5/12.5			
Max. Short Circuit Current (Input A/Input B) [A]			15/15			
MPPT Voltage Range [Vdc]	80-550	80-550	80-550	80-550	80-550	80-550
Start-up Voltage [V]	120	120	120	120	120	120
No. of MPP Trackers	2	2	2	2	2	2
Strings Per MPP Tracker	1	1	1	1	1	1
OUTPUT						
AC						
Nominal AC Power [W]	3000	3600	4600	5000	5300	6000
Max. Apparent AC Power [VA]	3300	3960	5060	5500	5830	6000
Rated Grid Voltage [Vac]	220/230/240					
Rated Grid Frequency [Hz]	50/60, 45					
Nominal AC Current [A]	13.0	15.7	20.0	21.7	23.0	26.1
Max. AC Current [A]	14.3	17.2	22.0	23.8	25.3	26.1
Displacement Power Factor	1 (Adjustable from 0.8 leading to 0.8 lagging)					
Total Harmonic Distortion (THDi, Nominal output)	<3%	<3%	<3%	<3%	<3%	<3%

HI PHYSIX LABORATORY INDIA PVT. L

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EFFICIENCY

MPPT Efficiency	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%
Euro-efficiency	96.80%	96.80%	96.80%	96.80%	96.80%	96.80%
Max. Efficiency	97.40%	97.40%	97.40%	97.40%	97.40%	97.40%

DC Reverse-polarity Protection	YES
Anti-Islanding Protection	YES
Insulation Monitoring	YES
Residual Current Monitoring	YES
AC Short Circuit Protection	YES
AC Output Over Current Protection	YES
AC Output Over Voltage Protection	YES
Surge Protection	YES
Temperature Protection	YES
Integrated DC Switch	Optional

STANDARD

Safety	IEC 62109-1/2
EMC	IEC 61000-6-1/IEC 61000-6-2/IEC 61000-6-3
Certification	AS4777.2-2015/G98-1/G99-1/EN50549-1/IEC 61727

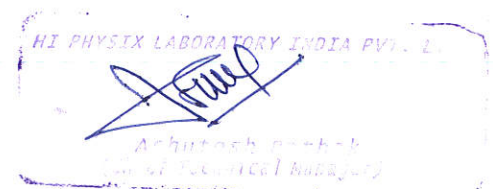
GENERAL DATA

Dimensions (WxHxD) [mm]	402*476.5*148
Net Weight [kg]	15.5
Cooling Concept	Natural
Ingress Protection (according to IEC60529)	IP65
Topology	Transformerless
Over Voltage Category	III (AC side), II (PV side)
Noise Emission (typical) [dB]	<30
Operating Temperature Range	-20..... +60°C (derating at +45°C)
Storage Temperature Range	-40..... +70°C
Humidity	0-100% (no condensation)
Self Consumption (night) [W]	<1W
Monitoring Module (optional)	External WiFi/Lan/GPRS (optional)
Communication	Meter, CT, DMM, USB update, ISO alarm (internal)
Display	LCD screen, Touch Key, App, Web site

*India market only.

VERSION 1.7 | 22/06/2020

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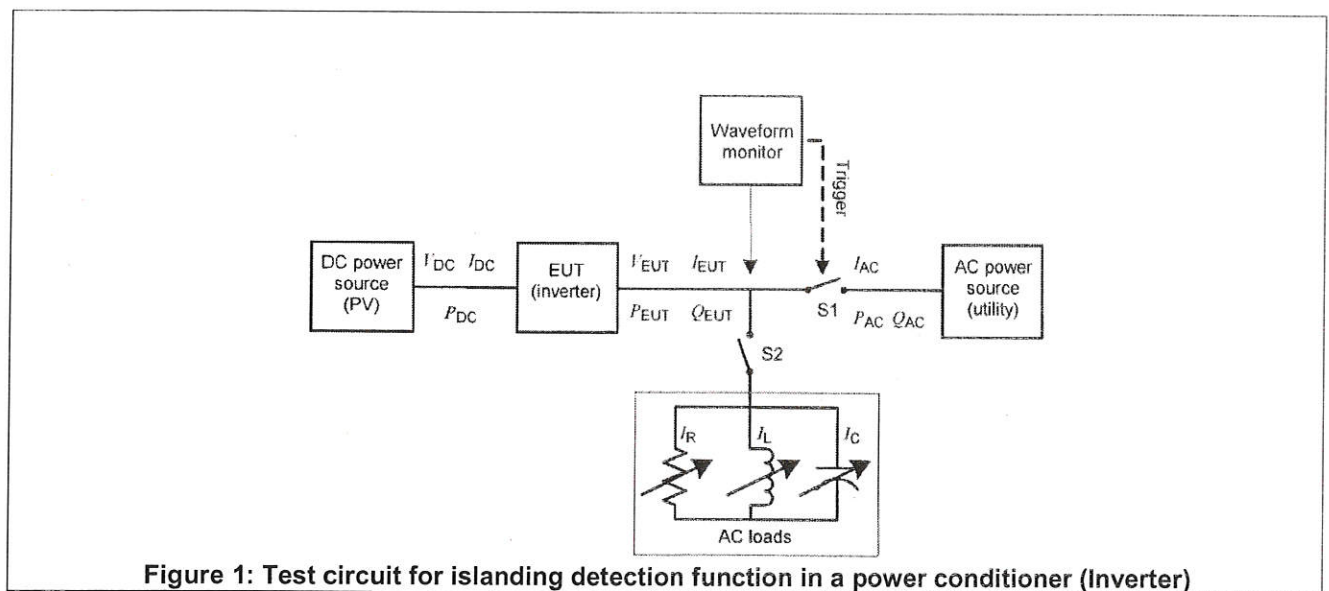
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BLOCK DIAGRAM OF TEST CIRCUIT



-----End of test Report-----

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 (Chief Technical Manager)

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