



Technical Report No.: 64.290.15.04847.01

Rev. 00

Dated: 29 February 2016

Client: Name: INVT Solar Technology (ShenZhen) Co., Ltd.
Address: No.7 Building Gaofa Industrial Park, Longjing, Nanshan District,
518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Manufacturing place: Manufacturer's Name: INVT Solar Technology (ShenZhen) Co., Ltd.
Address: No.7 Building Gaofa Industrial Park, Longjing, Nanshan District,
518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Factory's name: Shenzhen INVT Electric Co., Ltd.
Address: Zone A, Juyuan Industrial areas, Tang Wei Fuyong street, Baoan
District, 518103 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Test subject: Product: PV grid-interactive inverter
Type: iMars BG40KTR

Test specification: IEC 60068-2-1:2007;
IEC 60068-2-2:2007;
IEC 60068-2-14:2009;
IEC 60068-2-30:2005;

Purpose of examination: Test according to the test specification

Test result: The test results show that the presented product is in compliance with the
specified requirements.

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1 Description of the test subject

1.1 Function




- (1) The unit is non-isolated (transformerless) PV grid-interactive DC-AC inverter for connection with public low voltage grid, for outdoor or indoor use.
- (2) The unit shall be used at specified ambient range. Temperature: -25 °C ~ +60 °C, Auto-derating after 45 °C; Altitude: < 2000 m; Overvoltage category: II(DC side), III(AC side); Relative humidity range: 4 % ~ 100 %.
- (3) There are two independent MPP trackers. Each tracker have four independent strings.
- (4) DC Switch disconnecter is optional and there are two alternative methods of AC output construction: Connector and cable glands.
- (5) The PGU provides two relays in series on each phase (integrated NS protection function). The internal control is redundant built. It consist one main DSP (U2) and slave MCU (U4). Both DSP can open relays independently and communicate with each other.
- (6) The unit can control the active power and reactive power via RS 485 communication port.
- (7) In order to protect the PCE, user and installer, external DC and AC circuit breakers shall be equipped at the end-use application.
- (8) Low voltage electrical installations shall comply with national and local regulation.

1.2 Consideration of the foreseeable misuse

- Not applicable
- Covered through the applied standard
- Covered by the following comment
- Covered by attached risk analysis

1.3 Technical Data

Model	iMars BG40KTR
V _{max} PV	1000 Vd.c.
I _{sc} PV	36 Ad.c.
Max. continuous PV input current	2x33 Ad.c.
MPPT Range	280 ~ 800 Vd.c.
MPPT Range (full load)	620 ~ 800 Vd.c.
Max. continuous output current	48 Aa.c.
Max. continuous output power	40 kVA
Nominal Frequency	50 Hz
Nominal AC voltage	3/N/PE, 277V/480V
Power factor (Cos phi), adjustable	0,80 _{under-excited} to 0,80 _{over-excited}

invt		GRID-TIED SOLAR INVERTER
Model:		iMars BG40KTR
DC Input		
V _{max} PV:	1000V	
MPPT Range:	280V - 800V	
Max. Continuous Current:	33Ax2	
I _{sc} PV:	36Ax2	
AC Output		
Max. Continuous Current:	48A	
Max. Continuous Power:	40kVA	
Frequency:	50Hz	
Nominal Voltage:	3/N/PE, 277V/480V	
Power Factor:	+0.8~0.8	
Temperature:	-25°C...+60°C	
Protective Class:	I	
Overvoltage Category:	II(DC),III(AC)	
Ingress Protection:	IP65	
  		
S/N:		



Temperature	-25 °C ~ +60 °C
Protective class	I
Ingress protection	IP65

Note: The above artwork nameplate may be only a draft. For the final production, the additional markings or other words which do not conflict with this standard, may be added.

2 Order

2.1 Date of Purchase Order, Customer's Reference

14 October 2015

2.2 Receipt of Test Sample, Location

29 October 2015

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China

2.3 Date of Testing

2 November 2015 ~ 5 November 2015

2.4 Location of Testing

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China

2.5 Points of Non-compliance or Exceptions of the Test Procedure

N/A

3 Test Results

3.1 Positive Test Results

IEC 60068-2-1:2007, Test Ad: Clause 5.3 + Test Ae: Clause 5.4

IEC 60068-2-2:2007, Test Bd: Clause 5.3 + Test Be: Clause 5.4

IEC 60068-2-14:2009, Test Na: Clause 7 + Test Nb: Clause 8

IEC 60068-2-30:2005, Test Db: Damp heat, cyclic (12 h + 12 h cycle)

4 Remark

4.1 Remarks to Factory

When the product is placed on the market, it must be accompanied with safety instructions written in



official language of the country. The instructions shall give information regarding safe operation, installation and maintenance.

- 4.2 The manufacturer/ Importer has to ensure the appliance placing on the EU market conforms to the applicable EU directives which provide the affixing of the CE marking, such as LVD, EMC, RoHS, ErP, and so on.

5 Documentation

N/A

6 Summary

The test specifications are met.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
TÜV SÜD Group

Engineer:

Richard Li
Project Handler

Technical Report checked:

Billy Qiu
Designated Reviewer

IEC 60068-2-1:2007, Tests – Test A: Cold

6.8	Initial measurements	Functional tests is satisfactory and no visual defects observed before conduct cold test.
5.3	Test Ad: Cold for heat-dissipating specimens with gradual change of temperature that are powered after initial temperature stabilization	
	Temperature	-25 °C as applicant's required.
	Duration	4 h, 1 cycle as applicant's required.
	State of specimen	Energizing the specimen.
5.4	Test Ae: Cold for heat-dissipating specimens with gradual change of temperature that are required to be powered throughout the test	
	Temperature	-25 °C as applicant's required.
	Duration	4 h, 1 cycle as applicant's required.
	State of specimen during conditioning	Energizing the specimen.
6.10	Intermediate measurements	Functional tests is satisfactory and no visual defects observed during the cold test.
6.13	Final measurements	Functional tests is satisfactory and no visual defects observed after the cold test.
	The specimen [did not] exhibit broken, cracked, bent, misaligned or torn external surface.	
	The specimen [did not] exhibit visible corrosion of output connections.	
	The specimen [did not] exhibit cracked or damaged wire or cable.	
	The specimen [did not] exhibit exposed live electrical parts.	
	The specimen [did not] exhibit any other conditions which may affect functioning, performance or safety.	
	The specimen [did not] exhibit any shorting of live terminals / live parts or cables.	
	The specimen [did not] exhibit any sparking of live terminals / live parts or cables.	
	The specimen [did not] stopped functioning.	



IEC 60068-2-2:2007, Tests – Test B: Dry heat

6.7	Initial measurements	Functional tests is satisfactory and no visual defects observed before conduct dry heat test.
5.3	Test Bd: Dry heat for heat-dissipating specimens with gradual change of temperature that are not powered during the conditioning period	
	Temperature	+60 °C as applicant's required.
	Duration	3 h, 1 cycle as applicant's required.
	State of specimen	Energizing the specimen.
5.4	Test Be: Dry heat for heat-dissipating specimens with gradual change of temperature that are required to be powered throughout the test	
	Temperature	+60 °C as applicant's required.
	Duration	6 h, 1 cycle as applicant's required.
	State of specimen during conditioning	Energizing the specimen.
6.9	Intermediate measurements	Functional tests is satisfactory and no visual defects observed during the dry heat test.
6.13	Final measurements	Functional tests is satisfactory and no visual defects observed after the dry heat test.
	The specimen [did not] exhibit broken, cracked, bent, misaligned or torn external surface.	
	The specimen [did not] exhibit visible corrosion of any parts of active circuit visible externally.	
	The specimen [did not] exhibit visible corrosion of output connections.	
	The specimen [did not] exhibit cracked or damaged wire or cable.	
	The specimen [did not] exhibit corrosion of enclosure surface.	
	The specimen [did not] exhibit exposed live electrical parts.	
	The specimen [did not] exhibit any other conditions which may affect functioning, performance or safety.	
	The specimen [did not] exhibit any shorting of live terminals / live parts or cables.	
	The specimen [did not] exhibit any sparking of live terminals / live parts or cables.	
	The specimen [did not] exhibit any smoking.	
	The specimen [did not] stopped functioning.	

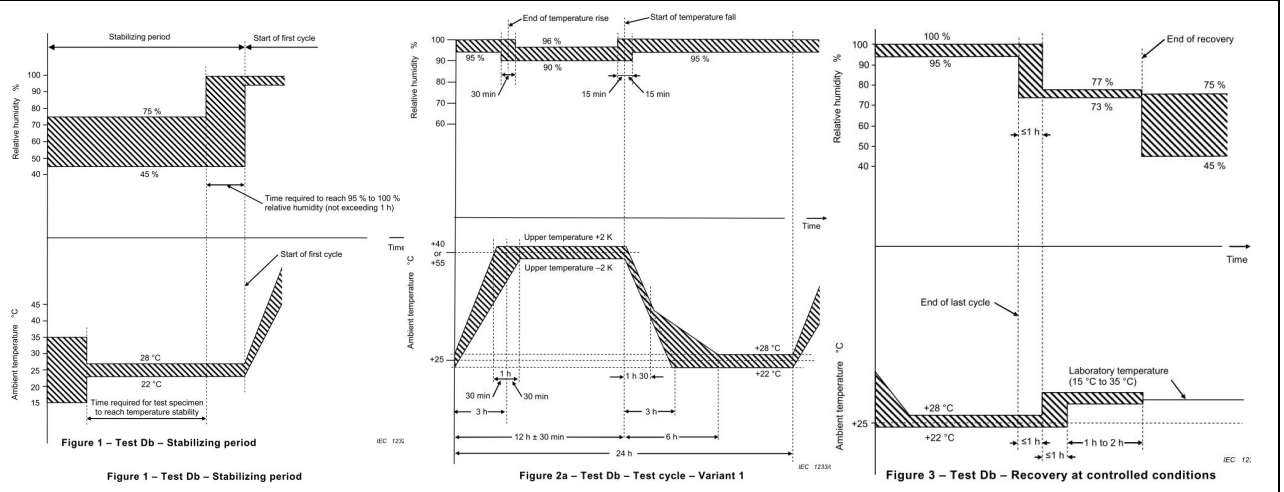
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IEC 60068-2-14:2009, Tests – Test N: Change of temperature

6.1	Initial measurements	Functional tests is satisfactory. No electrically and mechanically defects observed before conduct change of temperature test.
7	Test Na: Rapid change of temperature with prescribed time of transfer	
	lower temperature, T_A ,	-25 °C as applicant's required.
	higher temperature, T_B ,	+60 °C as applicant's required.
	exposure time, t_1 ,	3 h as applicant's required.
	Test cycles	2 cycles as applicant's required.
	Transformer time, t_2	$t_2 < 1,5$ minutes. Automatic transfer methods used.
	Choice of the duration of the transfer time	two-chamber method
	State of specimen during conditioning	De-energizing the specimen.
8	Test Nb: Change of temperature with specified rate of change	
	lower temperature, T_A ,	-25 °C as applicant's required.
	higher temperature, T_B ,	+60 °C as applicant's required.
	exposure time, t_1 ,	3 h as applicant's required.
	Test cycles	1 cycles as applicant's required.
	Rate of change of temperature	About 0,85 K/min.
	State of specimen during conditioning	De-energizing the specimen.
6.2	Final measurements	Functional tests is satisfactory. No electrically and mechanically defects observed after conduct change of temperature test.
	The specimen [did not] exhibit broken, cracked, bent, misaligned or torn external surface.	
	The specimen [did not] exhibit visible corrosion of any parts of active circuit visible externally.	
	The specimen [did not] exhibit visible corrosion of output connections and enclosure surface	
	The specimen [did not] exhibit cracked or damaged wire or cable or smoking.	
	The specimen [did not] exhibit any other conditions which may affect functioning, performance or safety.	
	The specimen [did not] exhibit any shorting of live terminals / live parts or cables.	
	The specimen [did not] exhibit any sparking of live terminals / live parts or cables.	
	The specimen [did not] stopped functioning.	

IEC 60068-2-30:2005, Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)

6.1	Initial measurements	Functional tests is satisfactory and no visual defects observed before conduct Damp heat.
5.2	b) upper temperature: 55 °C	55 °C
	number of cycles: 1, 2, 6.	1 cycles as applicant's required.



	State of specimen during conditioning	De-energizing the specimen.
8	Intermediate measurements	Functional tests is satisfactory and no visual defects observed during conduct Damp heat.
6.2	Final measurements	Functional tests is satisfactory and no visual defects observed after conduct Damp heat.
	The specimen [did not] exhibit broken, cracked, bent, misaligned or torn external surface.	
	The specimen [did not] exhibit visible corrosion of any parts of active circuit visible externally.	
	The specimen [did not] exhibit visible corrosion of output connections and enclosure surface	
	The specimen [did not] exhibit cracked or damaged wire or cable or smoking or sparking.	
	The specimen [did not] exhibit any other conditions which may affect functioning, performance or safety.	
	The specimen [did not] exhibit any shorting of live terminals / live parts or cables.	
	The specimen [did] withstand dielectric strength test. 2121 Vdc / 60 s (PV and Metal enclosure), 4242 Vdc / 60 s (PV and communication port)	
	Impulse voltage test The specimen [did] withstand Impulse voltage test. 4464 V _{1,2/50 μs} (PV and Metal enclosure), 6464 V _{1,2/50 μs} (PV and communication port)	

..... End of Technical Report