



**Technical Report No.: 64.290.15.01943.01**

**Rev. 00**

**Dated: 30 June 2015**

**Client:** Name: Shenzhen INVT Electric Co., Ltd.  
Address: No.4 Building, Gaofa Industrial Park, Longjing, Nanshan District, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

**Manufacturing place:** Manufacturer's Name: Shenzhen INVT Electric Co., Ltd.  
Address: No.4 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 BG20KTR, iMars BG25KTR, iMars BG30KTR

**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 PGU units are non-isolated (transformerless) PV grid-interactive DC-AC inverters for connection with public low voltage grid, for outdoor or indoor use.
- (2) There are two independent MPP trackers. Each tracker have four independent strings.
- (3) DC Switch disconnecter is optional and there are two alternative methods of AC output construction: Connector and cable glands.
- (4) 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 BG20KTR	iMars BG25KTR	iMars BG30KTR
Vmax. PV	1000 Vd.c.	1000 Vd.c.	1000 Vd.c.
MPPT Range	280 – 800 Vd.c.	280 – 800 Vd.c.	280 – 800 Vd.c.
Max. continuous PV input current	25x2 A	30x2 A	33x2 A
Isc PV	27x2 A	33x2 A	36x2 A
Max. continuous output current	32 A	40 A	48 A
Max. continuous output power	20 kVA	25 kVA	30 kVA
Nominal Frequency	50 Hz	50 Hz	50 Hz
Nominal AC voltage	3/N/PE, 230V/400V	3/N/PE, 230V/400V	3/N/PE, 230V/400V
Power factor (Cos phi), adjustable	0,80 <sub>under-excited</sub> to 0,80 <sub>over-excited</sub>	0,80 <sub>under-excited</sub> to 0,80 <sub>over-excited</sub>	0,80 <sub>under-excited</sub> to 0,80 <sub>over-excited</sub>
Temperature	-25 °C - +60 °C	-25 °C - +60 °C	-25 °C - +60 °C
Protective class	I	I	I
Overvoltage Category	II(DC), III(AC)	II(DC), III(AC)	II(DC), III(AC)
Ingress protection	IP65	IP65	IP65

**Copy of marking plate:**

invt GRID-TIED SOLAR INVERTER		invt GRID-TIED SOLAR INVERTER		invt GRID-TIED SOLAR INVERTER	
Model:	iMars BG20KTR	Model:	iMars BG25KTR	Model:	iMars BG30KTR
DC Input		DC Input		DC Input	
Vmax. PV:	1000V	Vmax. PV:	1000V	Vmax. PV:	1000V
MPPT Range:	280V - 800V	MPPT Range:	280V - 800V	MPPT Range:	280V - 800V
Max. Continuous Current:	25Ax2	Max. Continuous Current:	30Ax2	Max. Continuous Current:	33Ax2
Isc PV:	27Ax2	Isc PV:	33Ax2	Isc PV:	36Ax2
AC Output		AC Output		AC Output	
Max. Continuous Current:	32A	Max. Continuous Current:	40A	Max. Continuous Current:	48A
Max. Continuous Power:	20kVA	Max. Continuous Power:	25kVA	Max. Continuous Power:	30kVA
Frequency:	50Hz	Frequency:	50Hz	Frequency:	50Hz
Nominal Voltage:	3/N/PE, 230V/400V	Nominal Voltage:	3/N/PE, 230V/400V	Nominal Voltage:	3/N/PE, 230V/400V
Power Factor (Cos phi), adjustable:	0.8 under-excited to 0.8 over-excited	Power Factor (Cos phi), adjustable:	0.8 under-excited to 0.8 over-excited	Power Factor (Cos phi), adjustable:	0.8 under-excited to 0.8 over-excited
Temperature:	-25°C...+60°C	Temperature:	-25°C...+60°C	Temperature:	-25°C...+60°C
Protective Class:	I	Protective Class:	I	Protective Class:	I
Overvoltage Category:	II(DC), III(AC)	Overvoltage Category:	II(DC), III(AC)	Overvoltage Category:	II(DC), III(AC)
IP:	IP65	IP:	IP65	IP:	IP65
Grid Monitoring:	DIN VDE 0126-1-1 VDE-AR-N 4105	Grid Monitoring:	DIN VDE 0126-1-1 VDE-AR-N 4105	Grid Monitoring:	DIN VDE 0126-1-1 VDE-AR-N 4105
					
S/N: <input type="text"/>		S/N: <input type="text"/>		S/N: <input type="text"/>	

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.

**Models different:**

The three models have same PCB layout, communication port, electric circuits, electronic control circuits, and have similar software protection designed, with difference as below:

- (1) Have different amounts of bus capacitors.
- (2) Have different parameters of AC disconnect relays.
- (3) Have different parameters of boost and inverting inductor.

**2 Order**

**2.1 Date of Purchase Order, Customer's Reference**

11 May 2015

**2.2 Receipt of Test Sample, Location**

12 May 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**

13 May 2015 – 24 May 2015

**2.4 Location of Testing**

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch  
TÜV SÜD Group  
5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China



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 to factory

- 4.1 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 market conforms to the applicable local regulation, such as LVD, EMC, RoHS, ErP, and so on.

## 5 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 external faulty interconnections or koints.	
	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 enectrical 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 60068-2-2:2007, 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 external faulty interconnections or koints.	
	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 enectrical 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**

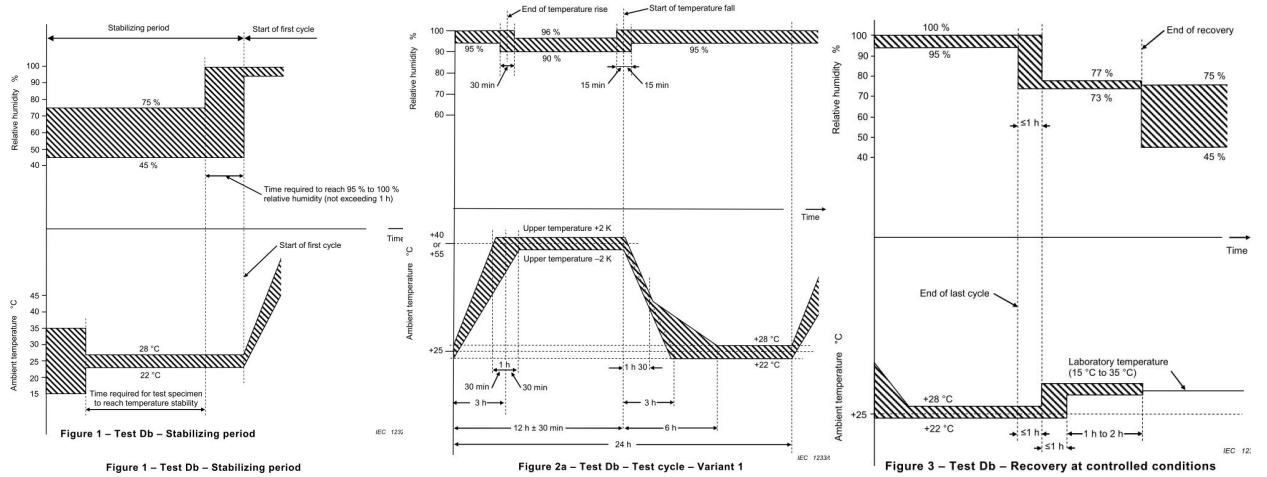
6.1	Initial measurements	Functional tests is satisfactory. No electrically and mechanically defects observed before conduct change of temperature test.
7	Test Na: Rapid change of temperature with prescribed time of transfer	
	lower temperature, $T_A$ ,	-25 °C as applicant's required.
	higher temperature, $T_B$ ,	+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.	

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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 <sub>1,2/50 μs</sub> (PV and Metal enclosure), 6464 V <sub>1,2/50 μs</sub> (PV and communication port)	

..... End of Technical Report .....

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