





| TEST REPORT IEC 61683 Photovoltaic systems – Power conditioners – Procedure for measuring efficiency | |
|--|--|
| Report Number | 64.290.15.01755.01 |
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| Testing location | TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China |
| Applicant's name | Shenzhen INVT Electric Co., Ltd. |
| Address | No.4 Building, Gaofa Industrial Park, Longjing, Nanshan District, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA |
| Test specification: | |
| Standard | IEC 61683:1999 (First Edition) |
| Test procedure | Test report |
| Non-standard test method | N/A |
| Test Report Form No. | IEC61683A |
| Test Report Form(s) Originator | TÜV SÜD Product Service GmbH |
| Master TRF | Dated 2014-10 |
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| | | |
|--|---|--|
| Test item description | PV grid-interactive inverter | |
| Trade Mark | invt | |
| Manufacturer | Shenzhen INVT Electric Co., Ltd. | |
| Model/Type reference | iMars BG20KTR, iMars BG25KTR, iMars BG30KTR | |
| Ratings | See page 3 | |
| Responsible Testing Laboratory (as applicable), testing procedure and testing location: | | |
| <input checked="" type="checkbox"/> | Testing location / address | TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China |
| | Tested by (name + signature) | Richard Li  |
| | Approved by (+ signature) | Billy Qiu  |





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: | | S/N: | | S/N: | |

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.



| | |
|---|--|
| Test item particulars : | |
| Classification of installation and use : Fixed, permanent connection; | |
| Supply Connection : TN or TT system | |
| : | |
| 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 : 9 May 2015 | |
| Date (s) of performance of tests : 9 May 2015 – 14 May 2015 | |
| | |
| 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 checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. | |
| Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1: | |
| 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 |
| 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. | |
| Name and address of factory (ies) | |
| Shenzhen INVT Electric Co., Ltd. Zone A, Juyuan Industrial areas, Tang Wei Fuyong street, Baoan District, 518103 Shenzhen, PEOPLE'S REPUBLIC OF CHINA | |



| IEC 61683 | | | |
|-----------|---|--|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |
| 4 | Efficiency measurement conditions | | P |
| | Efficiency is measured under the conditions in the following clauses. | | P |
| | Specific conditions may be excluded by mutual agreement when those conditions are outside the manufacturer's allowable operating range. | | P |
| 4.1 | DC power source for testing | | P |
| | For power conditioners operating with fixed input voltage, the d.c. power source is a storage battery or constant voltage power source to maintain the input voltage. | | N/A |
| | For power conditioners that employ maximum power point tracking (MPPT) and shunt-type power conditioners, either a photovoltaic array or a photovoltaic array simulator is utilized. | Two photovoltaic array simulators used. | P |
| 4.2 | Temperature | | P |
| | All measurements are to be made at an ambient temperature of $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. | $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ambient temperature as applicant's required | P |
| | Other ambient temperatures may be allowed by mutual agreement. However, the temperature used must be clearly stated in all documentation. | | N/A |
| 4.3 | Output voltage and frequency | | P |
| | The output voltage and frequency are maintained at the manufacturer's stated nominal values. | 3N~, 230/400 V, 50 Hz | P |
| 4.4 | Input voltage | | P |
| | Measurements performed in each of the following tests are repeated at three power conditioner input voltages: a) manufacturer's minimum rated input voltage; b) the inverter's nominal voltage or the average of its rated input range; c) 90 % of the inverter's maximum input voltage. | | P |
| | In the case where a power conditioner is to be connected with a battery at its input terminals, only the nominal or rated input voltage may be applied. | No battery connected | N/A |
| 4.5 | Ripple and distortion | | P |
| | Record input voltage and current ripple for each measurement. Also record output voltage and current distortion (if a.c.) or ripple (if d.c.). Ensure that these measurements remain within the manufacturer's specified values. | | P |
| 4.6 | Resistive loads/utility grid | | P |



| IEC 61683 | | | |
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| Clause | Requirement – Test | Measuring result – Remark | Verdict |
| | At unity power factor, or at the intrinsic power factor of grid-connected inverters without power factor adjustment, measure the efficiency for power levels of 10 %, 25 %, 50 %, 75 %, 100 % and 120 % of the inverter's rating. | The PV grid-interactive inverter can't output 120% of its nominal power | P |
| | Stand-alone inverters are also measured at a power level of 5 % of rated. The power conditioner test is conducted with a specified resistive and reactive grid impedance. | grid-connected inverters | N/A |
| 4.7 | Reactive loads | | N/A |
| | For stand-alone inverters, measure the efficiency with a load which provides a power factor equal to the manufacturer's specified minimum level (or 0,25, whichever is greater) and at power levels of 25 %, 50 % and 100 % of rated VA. | grid-connected inverters | N/A |
| | Repeat for power factors of 0,5 and 0,75 (do not go below the manufacturer's specified minimum PF) and power levels of 25 %, 50 %, and 100 % of rated VA. | | N/A |
| 4.8 | Resistive plus non-linear loads | | N/A |
| | For stand-alone inverters, measure the efficiency with a fixed non-linear load (total harmonic distortion (THD) = $(80 \pm 5) \%$) equal to $(25 \pm 5) \%$ of the inverter's rated VA plus sufficient resistive load in parallel to achieve a total load of 25 %, 50 % and 100 % of rated VA. | | N/A |
| | Repeat the measurements with a fixed non-linear load equivalent to $(50 \pm 5) \%$ of the inverter's rated VA plus sufficient resistive load in parallel to achieve a total load of 50% and 100% of rated VA. | | N/A |
| | The type of non-linear load must be clearly stated in all documentation. | | N/A |
| 4.9 | Complex loads | | N/A |
| | When a non-linear plus a sufficient reactive load condition is specified for stand-alone inverters, measure the efficiency with a fixed non-linear load (THD = $(80 \pm 5) \%$) equal to $(50 \pm 5) \%$ of the inverter's rated VA plus a sufficient reactive load (PF = 0,5) in parallel to achieve a total load of 50 % and 100 % of rated VA. | | N/A |
| | The type of complex load is clearly stated in all documentation. | | N/A |
| 5 | Efficiency calculations | | P |
| 5.1 | Rated output efficiency | | P |
| 5.2 | Partial output efficiency | | P |



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|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|--|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG20KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=563 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 |
| Input current (Adc) | | 2,28 | 4,78 | 9,30 | 11,48 | 13,89 | 22,90 | 34,30 | 45,83 |
| Input power (kW) | | 0,99 | 2,11 | 4,16 | 5,14 | 6,24 | 10,28 | 15,38 | 20,60 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,50 | 3,05 | 5,93 | 7,33 | 8,86 | 14,60 | 21,86 | 29,18 |
| | L2 | 1,36 | 2,76 | 5,60 | 6,99 | 8,51 | 14,23 | 21,50 | 28,80 |
| | L3 | 1,59 | 3,06 | 5,90 | 7,30 | 8,83 | 14,60 | 21,80 | 29,04 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,90 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,83 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,85 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 0,88 | 1,97 | 3,98 | 4,95 | 6,00 | 9,99 | 14,98 | 20,04 |
| Output apparent power (kVA) | | 1,03 | 2,03 | 4,02 | 4,98 | 6,03 | 10,01 | 15,01 | 20,05 |
| Efficiency (η) | | 88,65% | 93,45% | 95,61% | 96,20% | 96,49% | 97,20% | 97,40% | 97,40% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPPT tracking. MPPT range (output full load): 450 – 800 Vdc specified by manufacture. | | | | | | | | | |



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|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG20KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=781 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 |
| Input current (Adc) | | 1,90 | 3,51 | 6,79 | 8,39 | 9,99 | 16,58 | 24,80 | 33,00 |
| Input power (kW) | | 1,15 | 2,16 | 4,23 | 5,23 | 6,23 | 10,35 | 15,48 | 20,60 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,72 | 3,12 | 6,05 | 7,47 | 8,89 | 14,78 | 22,00 | 29.21 |
| | L2 | 1,63 | 2,88 | 5,71 | 7,13 | 8,54 | 14,40 | 21,60 | 28.80 |
| | L3 | 1,83 | 3,16 | 6,03 | 7,45 | 8,87 | 14,70 | 22,00 | 29.20 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,90 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0.99 |
| | L2 | 0,85 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0.99 |
| | L3 | 0,86 | 0,95 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0.99 |
| Output active power (kW) | | 1,04 | 2,02 | 4,05 | 5,04 | 6,03 | 10,07 | 15,10 | 20,10 |
| Output apparent power (kVA) | | 1,19 | 2,11 | 4,10 | 5,08 | 6,06 | 10,10 | 15,12 | 20,11 |
| Efficiency (η) | | 89,74% | 93,61% | 95,80% | 96,35% | 96,70% | 97,37% | 97,60% | 97,60% |
| Supplementary information: | | | | | | | | | |
| () The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 450 – 800 Vdc specified by manufacture. | | | | | | | | | |



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|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|-----------------------------|------|---|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG20KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=1000 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Input current (Adc) | | 0,96 | 2,56 | 5,25 | 6,63 | 7,90 | 12,98 | 19,55 | 25,81 |
| Input power (kW) | | 0,75 | 2,03 | 4,19 | 5,29 | 6,31 | 10,38 | 15,63 | 20,60 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,51 | 2,89 | 5,98 | 7,55 | 9,00 | 14,80 | 22,20 | 29,37 |
| | L2 | 1,48 | 2,81 | 5,67 | 7,22 | 8,67 | 14,40 | 21,81 | 28,92 |
| | L3 | 1,65 | 2,99 | 5,98 | 7,54 | 9,01 | 14,78 | 22,20 | 29,36 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,61 | 0,95 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,49 | 0,93 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,58 | 0,94 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 0,60 | 1,87 | 3,99 | 5,10 | 6,09 | 10,09 | 15,24 | 20,18 |
| Output apparent power (kVA) | | 1,07 | 2,01 | 4,07 | 5,14 | 6,15 | 10,12 | 15,27 | 20,20 |
| Efficiency (η) | | 80,26% | 92,30% | 95,30% | 96,10% | 96,41% | 97,20% | 97,53% | 97,57% |

Supplementary information:

- (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 450 – 800 Vdc specified by manufacture.



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG25KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=600 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 480 | 480 | 480 | 480 | 480 | 480 | 480 | 480 |
| Input current (Adc) | | 2,58 | 5,62 | 10,83 | 13,44 | 16,23 | 27,00 | 40,20 | 53,90 |
| Input power (kW) | | 1,18 | 2,66 | 5,18 | 6,43 | 7,77 | 12,93 | 19,23 | 25,80 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,86 | 3,86 | 7,42 | 9,19 | 11,10 | 18,40 | 27,30 | 36,59 |
| | L2 | 1,72 | 3,57 | 7,08 | 8,85 | 10,71 | 18,01 | 26,98 | 36,28 |
| | L3 | 1,97 | 3,89 | 7,41 | 9,19 | 11,10 | 18,40 | 27,29 | 36,43 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,89 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,84 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,84 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 1,09 | 2,52 | 4,98 | 6,23 | 7,53 | 12,59 | 18,76 | 25,16 |
| Output apparent power (kVA) | | 1,28 | 2,61 | 5,05 | 6,28 | 7,57 | 12,64 | 18,78 | 25,19 |
| Efficiency (η) | | 90,93% | 94,60% | 96,42% | 96,81% | 97,00% | 97,50% | 97,56% | 97,50% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG25KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=800 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 |
| Input current (Adc) | | 1,82 | 4,09 | 8,14 | 10,17 | 12,14 | 20,10 | 30,10 | 40,20 |
| Input power (kW) | | 1,14 | 2,59 | 5,19 | 6,49 | 7,76 | 12,88 | 19,26 | 25,60 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,79 | 3,77 | 7,46 | 9,29 | 11,10 | 18,40 | 27,40 | 36,39 |
| | L2 | 1,71 | 3,50 | 7,12 | 8,95 | 10,72 | 18,00 | 26,99 | 35,90 |
| | L3 | 1,93 | 3,82 | 7,47 | 9,30 | 11,10 | 18,39 | 27,40 | 36,40 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,85 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,79 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,81 | 0,95 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 1,02 | 2,45 | 5,02 | 6,29 | 7,54 | 12,57 | 18,8 | 25,03 |
| Output apparent power (kVA) | | 1,24 | 2,56 | 5,08 | 6,34 | 7,58 | 12,6 | 18,83 | 25,05 |
| Efficiency (η) | | 89,62% | 94,50% | 96,59% | 96,92% | 97,12% | 97,60% | 97,68% | 97,60% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|---|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG25KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=1000 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Input current (Adc) | | 1,38 | 3,30 | 6,68 | 8,07 | 9,87 | 16,25 | 24,20 | 32,20 |
| Input power (kW) | | 1,08 | 2,62 | 5,35 | 6,45 | 7,89 | 12,99 | 19,38 | 25,80 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 1,83 | 3,78 | 7,64 | 9,20 | 11,25 | 18,50 | 27,50 | 36,50 |
| | L2 | 1,77 | 3,61 | 7,32 | 8,87 | 10,90 | 18,10 | 27,10 | 36,03 |
| | L3 | 1,95 | 3,87 | 7,65 | 9,21 | 11,29 | 18,50 | 27,50 | 36,50 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,77 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,69 | 0,94 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,74 | 0,94 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 0,93 | 2,45 | 5,14 | 6,22 | 7,64 | 12,65 | 18,89 | 25,11 |
| Output apparent power (kVA) | | 1,28 | 2,59 | 5,2 | 6,28 | 7,69 | 12,69 | 18,92 | 25,14 |
| Efficiency (η) | | 86,23% | 93,58% | 96,19% | 96,48% | 96,80% | 97,40% | 97,50% | 97,50% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG30KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=600 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 480 | 480 | 480 | 480 | 480 | 480 | 480 | 480 |
| Input current (Adc) | | 3,23 | 6,61 | 13,13 | 16,10 | 19,22 | 32,17 | 48,30 | 64,42 |
| Input power (kW) | | 14,91 | 3,12 | 6,28 | 7,71 | 9,23 | 15,43 | 23,20 | 30,80 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 2,25 | 4,50 | 8,98 | 11,00 | 13,20 | 21,95 | 32,80 | 43,60 |
| | L2 | 2,04 | 4,20 | 8,64 | 10,66 | 12,80 | 21,56 | 32,50 | 43,33 |
| | L3 | 2,35 | 4,54 | 9,00 | 11,00 | 13,20 | 21,97 | 32,70 | 43,46 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,93 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,89 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,88 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 1,38 | 2,97 | 6,08 | 7,48 | 8,97 | 15,04 | 22,56 | 29,99 |
| Output apparent power (kVA) | | 1,53 | 3,05 | 6,13 | 7,52 | 9,01 | 15,09 | 22,6 | 30,1 |
| Efficiency (η) | | 92,13% | 95,02% | 96,80% | 97,00% | 97,20% | 97,52% | 97,50% | 97,40% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|--|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG30KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=800 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 |
| Input current (Adc) | | 2,45 | 4,83 | 9,79 | 12,18 | 14,35 | 23,90 | 36,00 | 48,20 |
| Input power (kW) | | 1,54 | 3,07 | 6,25 | 7,79 | 9,18 | 15,27 | 23,00 | 30,80 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 2,32 | 4,43 | 8,96 | 11,10 | 13,10 | 21,74 | 32,07 | 43,60 |
| | L2 | 2,20 | 4,15 | 8,61 | 10,80 | 12,71 | 21,34 | 32,25 | 43,10 |
| | L3 | 2,44 | 4,48 | 8,98 | 11,16 | 13,10 | 21,80 | 32,71 | 43,62 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,91 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L2 | 0,87 | 0,97 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| | L3 | 0,88 | 0,96 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 |
| Output active power (kW) | | 1,41 | 2,91 | 6,06 | 7,57 | 8,93 | 14,91 | 22,48 | 30,03 |
| Output apparent power (kVA) | | 1,6 | 3,01 | 6,11 | 7,61 | 8,97 | 14,95 | 22,53 | 30,12 |
| Efficiency (η) | | 91,91% | 94,82% | 96,91% | 97,11% | 97,30% | 97,60% | 97,65% | 97,50% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |



| IEC 61683 | | | |
|-----------|--------------------|---------------------------|---------|
| Clause | Requirement – Test | Measuring result – Remark | Verdict |

| TABLE | | Efficiency recording and efficient calculation sheet | | | | | | | |
|---|------|---|--------|--------|--------|--------|--------|--------|--------|
| Model | | iMars BG30KTR | | | | | | | |
| Test ambient temperature | | 26 °C | | | | | | | |
| Test condition | | Two PV simulators used, each settings: Vmax. PV=1000 Vdc; | | | | | | | |
| Total load, % of rated VA | | 5% | 10% | 20% | 25% | 30% | 50% | 75% | 100% |
| Input voltage (Vdc) | | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Input current (Adc) | | 1,79 | 3,86 | 7,86 | 9,65 | 11,64 | 19,28 | 28,90 | 28,70 |
| Input power (kW) | | 1,41 | 3,07 | 6,27 | 7,71 | 9,31 | 15,41 | 23,10 | 30,90 |
| Output voltage (Vac) | L1-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L2-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| | L3-N | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Output current (Aac) | L1 | 2,18 | 4,41 | 8,95 | 11,00 | 13,29 | 21,90 | 32,70 | 43,63 |
| | L2 | 2,14 | 4,19 | 8,63 | 10,66 | 12,90 | 21,50 | 32,22 | 43,20 |
| | L3 | 2,30 | 4,49 | 8,98 | 11,00 | 13,30 | 21,92 | 32,70 | 43,70 |
| Output frequency (Hz) | | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Power factor (PF) | L1 | 0,85 | 0,97 | 0,99 | 0,99 | 1,00 | 1,00 | 1,00 | 1,00 |
| | L2 | 0,81 | 0,96 | 0,99 | 0,99 | 0,99 | 1,00 | 1,00 | 1,00 |
| | L3 | 0,84 | 0,96 | 0,99 | 0,99 | 0,99 | 1,00 | 1,00 | 1,00 |
| Output active power (kW) | | 1,24 | 2,89 | 6,05 | 7,47 | 9,04 | 15,01 | 22,47 | 30,15 |
| Output apparent power (kVA) | | 1,52 | 3,02 | 6,12 | 7,52 | 9,08 | 15,06 | 22,5 | 30,16 |
| Efficiency (η) | | 89,27% | 94,30% | 96,40% | 96,79% | 97,00% | 97,44% | 97,50% | 97,40% |
| Supplementary information: | | | | | | | | | |
| (1) The above parameters are logged about 2 minutes of average values after the stabilization of the MPP tracking. MPPT range (output full load): 480 – 800 Vdc specified by manufacture. | | | | | | | | | |

..... End of test report.....