



LYNS-TCI

TEST REPORT

IEC 61683

Photovoltaic systems –

Power conditioners –

Procedure for measuring efficiency

Report Number.....: **LS2A26011503EGIC01**

Total pages.....: 49

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Date of issue: 2026-01-24



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Testing Location: As above

Address: As above

Test specification:

Standard.....: IEC 61683:1999

Test Report Form No.....: IEC 61683_V1.1

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Product name	MicroInverter
Trademark	ATMOCE
Factory's name	Salcomp (Shenzhen) Co., Ltd
Factory address	No.69, Salcomp Road, Furong Industrial Area, Xinqiao, Baoan District, Shenzhen City, Guangdong Province, P.R. China

Model/Type reference	MI-1000-2M	MI-1200-2M	MI-1250-2M
Ratings:			
Input parameters			
PV Max. Input Voltage [V]	60		
PV MPPT Range [V]	16-60		
Max. Input Continuous Current [A]	2*20		
Max. Input Short-circuit Current [A]	2*25		
Output parameters			
Output Nominal Voltage [V]	220/230V/240 (L + N, 50/60Hz) *		
Nominal output current [A]	4,55/4,35/4,17	5,45/5,22/5,00	5,68/5,43/5,21
Max. Output Continuous Current [A]	4,77/4,57/4,38	5,73/5,48/5,25	5,97/5,71/5,47
Nominal output power P _n [W]	1000	1200	1250
Max. apparent power S _{max} [VA]	1000	1200	1250
Software version	01.02.00		
Note:			
* All tests are performed at 230Vac, 50Hz.			
Protection Device			
Type of product	(Central NS protection relay + Interface switch)		
Model.....	(Central NS protection relay) MA-NSP-Ctrl “Tested”		
Operating Voltage	3L-N 380/400/415Vac		
Operating current	0.3A max		
Hardware Version.....	01.01.00		
Software Version	01.01.00		

Type of product	Central NS protection relay
Model	MR100-S
Operating Voltage	L-N 220/230/240Vac
Nominal current	40A
Hardware Version	01.01.00
Software Version	01.01.00

Type of product	Central NS protection relay
Model	MR100-T

Operating Voltage	3L-N 220/230/240Vac
Nominal current	40A
Hardware Version	01.01.00
Software Version	01.01.00

Type of product	Central NS protection relay
Model	MC100L
Operating Voltage	L-N 220/230/240Vac
Nominal current	63A
Hardware Version	01.01.00
Software Version	01.01.00

Type of product	Contactator
Model.....	(Interface switch) NDC1-9540 "Tested"
Rated operating voltage ...	380/415Vac
Rated operating current ..	95A

Type of product	Contactator
Model.....	(Interface switch) NDC1-225
Rated operating voltage ...	380/415Vac
Rated operating current ..	225A

Contents

Revision history of test report	5
Copy of marking plate.....	6
General remarks - documentation	8
General remarks for testing	9
General product information	10
Test overview	13
Assessment	14
Annex 1 – Test Results	19
Efficiency recording and efficient calculation sheet for utility-interactive	20
Efficiency recording and efficient calculation sheet for utility-interactive	22
No load loss condition	25
Standby loss condition.....	26
Annex 2 – Pictures of the unit	27
Annex 3 – Test equipment list	48

Revision history of test report

Issued Date	Description	Report Number
2026-01-24	Initial issue.	LS2A26011503EGIC01

Copy of marking plate

ATMOCE
Model:MI-1000-2M
Name: Microinverter

PV Max. Input Voltage: 60 Vd.c.
 PV MPPT Range: 16-60 Vd.c.
 Max. Input Continuous Current: 2*20 Ad.c.
 Max. Input Short-circuit Current: 2*25 Ad.c.
 Output Nominal Voltage: 220 Va.c., 230 Va.c., 240 Va.c.,
 1/N AC
 Output Nominal Frequency: 50/60 Hz
 Max. Output Continuous Power: 1000 W
 Max. Output Continuous Current: 4.77 A
 Power Factor: 0.8(leading)-0.8(lagging)
 Overvoltage Category: II(DC)/III(AC)
 Operating Temperature Range: - 40 - +65°C
 Relative Humidity: 4 -100%
 Protective Class: II
 Ingress Protection: IP67


CE

RoHS


User Manual


 Certificate
QC PASS

 ATMOCE HOLDING B.V.
MADE IN CHINA

ATMOCE
Model:MI-1200-2M
Name: Microinverter

PV Max. Input Voltage: 60 Vd.c.
 PV MPPT Range: 16-60 Vd.c.
 Max. Input Continuous Current: 2*20 Ad.c.
 Max. Input Short-circuit Current: 2*25 Ad.c.
 Output Nominal Voltage: 220 Va.c., 230 Va.c., 240 Va.c.,
 1/N AC
 Output Nominal Frequency: 50/60 Hz
 Max. Output Continuous Power: 1200 W
 Max. Output Continuous Current: 5.73 A
 Power Factor: 0.8(leading)-0.8(lagging)
 Overvoltage Category: II(DC)/III(AC)
 Operating Temperature Range: - 40 - +65°C
 Relative Humidity: 4 -100%
 Protective Class: II
 Ingress Protection: IP67


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 ATMOCE HOLDING B.V.
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ATMOCE

Model:MI-1250-2M

Name:Microinverter

PV Max. Input Voltage:	60 Vd.c.
PV MPPT Range:	16-60 Vd.c.
Max. Input Continuous Current:	2*20 Ad.c.
Max. Input Short-circuit Current:	2*25 Ad.c.
Output Nominal Voltage: 220 Va.c., 230 Va.c., 240 Va.c.,	1/N AC
Output Nominal Frequency:	50/60 Hz
Max. Output Continuous Power:	1250 W
Max. Output Continuous Current:	5.97 A
Power Factor:	0.8(leading)-0.8(lagging)
Overvoltage Category:	II(DC)/III(AC)
Operating Temperature Range:	- 40 - +65°C
Relative Humidity:	4 -100%
Protective Class:	II
Ingress Protection:	IP67

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MADE IN CHINA

Note:

The marking plates shown above may be only a draft. The use of certification marks on products must be approved by the respective NCBs to which these marks belong.

The marking plate is attached to the side surface or the back of the enclosure and is visible after installation.

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General remarks - documentation

Possible test case verdicts

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

Test case is not rated: N/R

Test item does meet the requirement: P (Pass)

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

Testing

Date of receipt of test items: 2026-01-15

Date(s) of performance of tests: 2026-01-15 to 2026-01-23

General remarks:

The test result presented in this report relate only to the object(s) tested. This report shall not be reproduced in part or in full without the written approval of the issuing testing laboratory.

"(see Annex #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Conformity statements are decided in accordance with ILAC-G8:09/2019 Binary Statement for Simple Acceptance Rule, unless otherwise normatively specified or contractually agreed.

EUT type



Hybrid inverter



Solar inverter



Stand-alone inverter

General remarks for testing

Test setup:

For the test setups were used:

a) Test setup 1: The test configures used for Utility-interactive type testing.

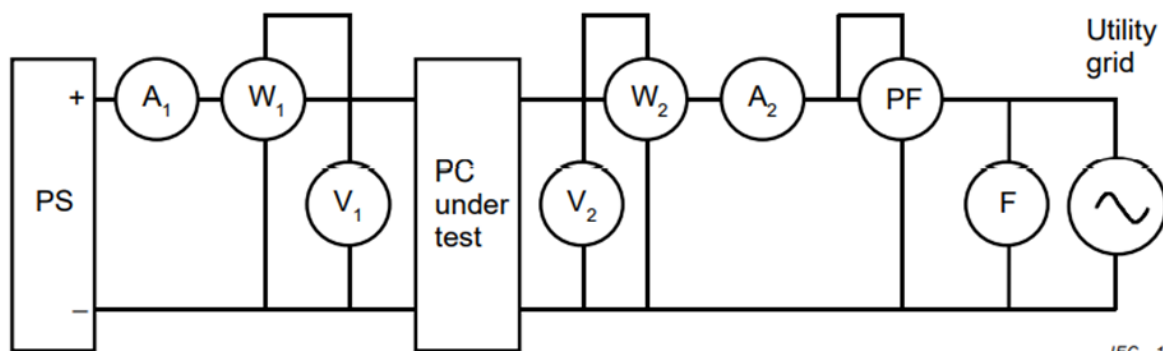


Figure 1 – Test circuit for Utility-interactive type

IEC 15

General product information

Equipment mobility : Permanent connection
 Operating condition : Continuous
 Class of equipment..... : Class II
 Protection against ingress of water : IP67
 Mass of equipment [kg] : 2,1kg

The products under test are single-phase Solar Grid-tied Inverter that convert DC voltage into AC voltage and feed it into the low-voltage public grid. (See Figure 2)

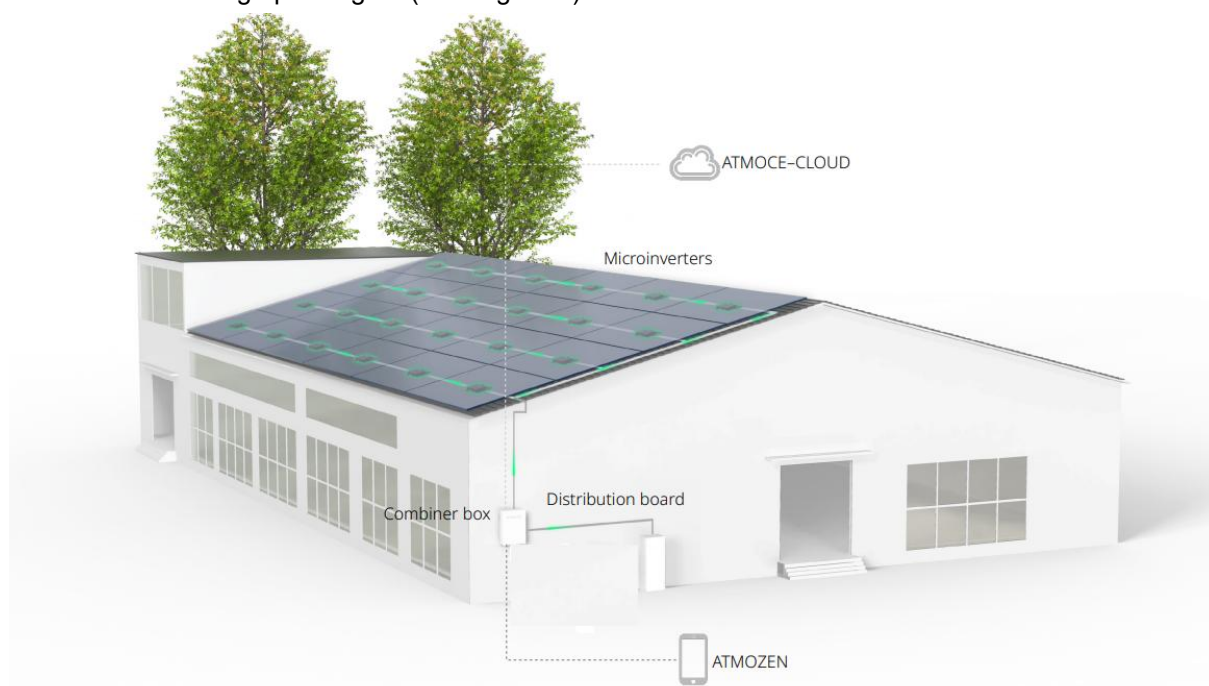


Figure 2 –Scheme of an installation

The product was tested on following revisions:

Hardware revisions: 01.02.00

Software version: 01.02.00

General product information

Description of the power circuit (See Figure 3):**1. System Overview**

This photovoltaic (PV) system is designed for connection of generating units to the low-voltage distribution network, in compliance with the applicable grid-connection requirements. The system architecture integrates high-efficiency microinverters, a central communication gateway, and a dedicated external protection unit to provide robust, single-phase power generation with centralized Network and System Protection (NS Protection).

The system comprises the following core components:

- **Microinverters:** Series MI-{1000~1250}-2M.
- **Gateway:** Model MG100.

Microinverters can choose either of the following two protection devices for protection:

- **Protection Device:** A dedicated external unit (MA-NSP-Ctrl) featuring an NS protection relay and an interface switch (NDC1-9540 / NDC1-225).
- **Protection Device:** A dedicated external unit (MR100 - S / MR100 - T / MC100L) featuring an NS protection relay and an integrated interface switch.

2. Microinverter Specifications and Power Circuit

The microinverter portfolio includes the MI-{1000~1250}-2M series are identical in hardware as well as software except for electrical ratings.

- **Safety and Isolation:** As illustrated in the power circuit diagram **Figure 3**, the microinverter topology utilizes an isolated DC/AC design. The PV-side DC input voltage is strictly maintained below 60V, ensuring galvanic isolation from the AC grid for enhanced safety.

3. Network and System Protection (External Relay Kit)

The external / dedicated relay kit (Model: MA-NSP-Ctrl / MR100 - S / MR100 - T / MC100L) functions as the central NS protection device. It operates independently to continuously monitor grid stability parameters.

- **Functionality:** If the grid voltage or frequency deviates from the defined permissible ranges, the device automatically triggers the integrated interface switch to disconnect the system from the grid.
- **Reconnection:** The device is designed with an automatic reconnection mechanism that restores grid connection only after grid conditions have returned to the allowable operating range for the required observation period.

4. Communication and Control Architecture

The system utilizes a hybrid communication architecture managed by the MG100 Gateway, ensuring seamless data flow between components:

- **Microinverter ↔ Gateway:** Data transmission is handled via **Power Line Communication (PLC)**.
- **Protection Device ↔ Gateway:** The external relay kit communicates with the Gateway via a dedicated **RS485** connection.

5. Safety Warning

Before installing or operating this system, all personnel must thoroughly read the instructions and cautionary markings found in the technical documentation, on the microinverter chassis, and on the solar array. To ensure operational safety and warranty compliance, the installation and replacement of microinverters must be performed exclusively by qualified professionals.

General product information

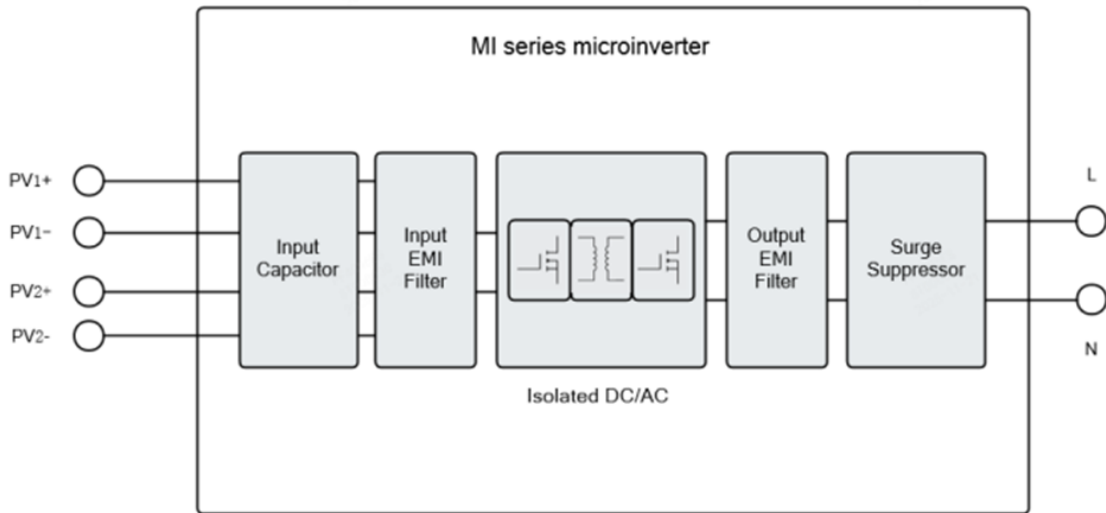


Figure 3 – Block diagram of the power circuit

Differences of the model:

The units in the product series:

- sharing the same control electronics,
- with the same firmware,
- with the same construction solutions including the power part,
- with the same number of phases,
- with the same power electronics, filters and transducers designed for different sizes of current ratings.

The units in the series are identical hardware platform.

The implemented control and firmware are identical in all units. There is no difference regarding AC behavior between the PGU-types apart from the power rating deviation and current limitation of each unit.

The models MI-{1000~1250}-2M series are identical in hardware as well as software except for electrical ratings.

Test overview

Requirements on Grid Connection of IEC 61683:1999	
Clause	Verdict
Efficiency recording and efficient calculation sheet for utility-interactive	P
Efficiency recording and efficient calculation sheet for Stand-alone	N/A
No load loss condition	P
Standby loss condition	P

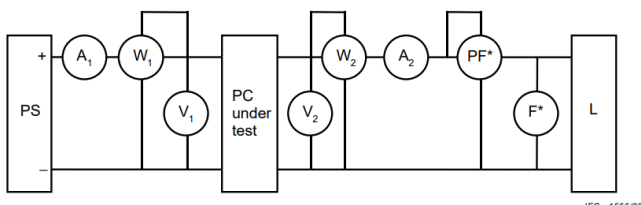
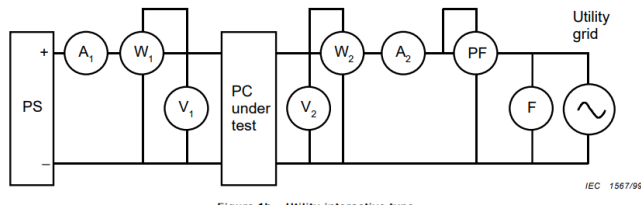
Assessment

Requirements on Grid Connection of IEC 61683:1999			
Clause/§	Requirement	Remark	Verdict
4	Efficiency measurement conditions		P
	Efficiency shall be measured under the matrix of conditions as described in the following clauses and table 1. Specific conditions may be excluded by mutual agreement when those conditions are outside the manufacturer's allowable operating range. The resulting data shall be presented in tabular form and may also be presented graphically.	See below.	P
4.1	DC power source for testing		P
	For power conditioners operating with fixed input voltage, the d.c. power source shall be a storage battery or constant voltage power source to maintain the input voltage.	Considered.	P
	For power conditioners that employ maximum power point tracking (MPPT) and shunt-type power conditioners, either a photovoltaic array or a photovoltaic array simulator shall be utilized.	Photovoltaic array simulator used.	P
4.2	Temperature		P
	All measurements are to be made at an ambient temperature of $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Other ambient temperatures may be allowed by mutual agreement. However, the temperature used must be clearly stated in all documentation.	25°C	P
4.3	Output voltage and frequency		P
	The output voltage and frequency shall be maintained at the manufacturer's stated nominal values.	230V, L/N, 50Hz	P
4.4	Input voltage		P
	Measurements performed in each of the following tests shall be 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) the inverter's full load input voltage.	Input voltages: a). MI-1000-2M: 33Vd.c. a). MI-1200-2M: 39Vd.c. a). MI-1250-2M: 41Vd.c. b). 42Vd.c. c). 54Vd.c.	P
	In the case where a power conditioner is to relate to a battery at its input terminals, only the nominal or rated input voltage may be applied.		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. Note that ripple and distortion may not be specified at low power levels, but readings shall be recorded.	The ripple of the input voltage had no influence on the measurements. (See appended table)	P

Assessment

Requirements on Grid Connection of IEC 61683:1999			
Clause/§	Requirement	Remark	Verdict
4.6	Resistive loads/utility grid		P
	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. Stand-alone inverters shall also be measured at a power level of 5 % of rated. The power conditioner test should be conducted with a specified resistive and reactive grid impedance.	MicroInverter	P
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. 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.	Not considered.	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. 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. The type of non-linear load must be clearly stated in all documentation.	Not considered.	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. The type of complex load shall be clearly stated in all documentation.	Not considered.	N/A
5	Efficiency calculations		P
5.1	Rated output efficiency		P
	Rated output efficiency shall be calculated from measured data as follows: $\eta_R = (P_o / P_i) \times 100$	Considered.	P
5.2	Partial output efficiency		N/A

Assessment

Requirements on Grid Connection of IEC 61683:1999								
Clause/§	Requirement	Remark	Verdict					
	Partial output efficiency shall be calculated from measured data as follows: $\eta_{\text{par}} = (P_{\text{op}} / P_{\text{ip}}) \times 100$	---	N/A					
5.3	Energy efficiency		P					
	Energy efficiency shall be calculated from measured data as follows: $\eta_{\text{E}} = (W_{\text{o}} / W_{\text{i}}) \times 100$	Considered.	P					
5.4	Efficiency tolerances		P					
	When an efficiency value has been guaranteed, the tolerance of this value shall be within the value at rated conditions indicated in table 2. Table 2 – Efficiency tolerances <table><tr><th>Item</th><th>Tolerance</th><th>Remarks</th></tr><tr><td>Efficiency of power conditioner</td><td>$-0.2(1 - \eta)\%$</td><td>η: guaranteed efficiency</td></tr></table> NOTE The efficiency tolerance is derived in annex D. See 4.3 of IEC 60146-1-1. The tolerance corresponds to +0.2 per unit of the losses with a minimum efficiency tolerance of -0.002 per unit.	Item	Tolerance	Remarks	Efficiency of power conditioner	$-0.2(1 - \eta)\%$	η : guaranteed efficiency	Considered.
Item	Tolerance	Remarks						
Efficiency of power conditioner	$-0.2(1 - \eta)\%$	η : guaranteed efficiency						
6	Efficiency test circuits		P					
6.1	Test circuits		P					
	Figures 1a shall be applied to stand-alone power conditioners respectively. 	Considered.	N/A					
	Figures 1b shall be applied to utility-interactive power conditioners respectively. 	Considered.	P					
	The type of power source shall be indicated on all tests and shall adhere to the requirements of 4.1.	Considered.	P					
6.2	Measurement procedure		P					
	a) Efficiency is calculated with equation (1) or (2) using measured P_i , P_o or P_{ip} , P_{op} . DC input power P_i , P_{ip} can be measured by wattmeter W_1 , or determined by multiplying the d.c. voltmeter V_1 and d.c. ammeter A_1 readings. Output power P_o , P_{op} is measured with wattmeter W_2 .	Considered.	P					

Assessment

Requirements on Grid Connection of IEC 61683:1999			
Clause/§	Requirement	Remark	Verdict
	b) DC input voltage, which is measured by d.c. voltmeter V_1 , shall be varied in the defined range where the output current, which is measured with a.c. ammeter A_2 , is varied from low output to the rated output.	Considered.	P
	c) An average indicating instrument shall be used for the d.c. voltmeter and d.c. ammeter. A true r.m.s. type of indicating instrument shall be used for the a.c. voltmeter and a.c. ammeter. The d.c. wattmeter W_1 shall be a d.c. measuring type. The wattmeter W_2 shall be an a.c. or d.c. measuring type according to the output.	Considered.	P
	d) Power factor (PF in per cent) can be measured by a power factor meter PF, or calculated from the readings of V_2 , A_2 , W_2 and as follows: $PF = (W_2 / (V_2 \times A_2)) \times 100$	Considered.	P
	e) Each meter may be an analogue type or a digital type. The measurement accuracy shall be better than $\pm 0,5\%$ of the full-scale value for each power measured. Digital power instruments for W_1 and W_2 are also recommended.	Digital measurement devices were used for testing. The accuracy of the measurement devices fulfills the requirements.	P
	f) An MPPT dynamically adjusts the input voltage to maximize the output power. In principle, the monitoring equipment shall sample all of the electrical parameters, such as input voltage and current, output power and current, within the update period of the MPPT. If the MPPT and input source (PV array or PV array simulator) interact in such a way that the input voltage varies by less than 5 %, then averaging of readings is acceptable. The averaging period shall be 30 s or longer.	The dynamic MPPT was deactivated, the 60s average was used anyway.	P
7	Loss measurement		P
7.1	No-load loss		P
	Stand-alone inverters: reading of d.c. input voltage, output voltage and frequency is given with meters V_1 , V_2 and F respectively in figure 1a, and shall be adjusted to the rated values.	Not considered.	N/A
	Utility-interactive inverters: reading of d.c. input voltmeter V_1 , a.c. output voltmeter V_2 and frequency meter F in figure 1b shall be adjusted to meet the specified voltages and frequency.	See appended table.	P
7.2	Standby loss		P
	Stand-alone inverters: Consumption of utility power when the power conditioner is not operating but is under standby condition.	Not considered.	N/A

Assessment

Requirements on Grid Connection of IEC 61683:1999			
Clause/§	Requirement	Remark	Verdict
	Utility-interactive inverters: consumption from the d.c. source when the power conditioner is not operating but is under standby condition.	See appended table.	P
Annex A	Power conditioner description (informative)	See below.	P
	A power conditioner is defined in IEC 61277	---	P
Annex B	Power efficiency and conversion factor (informative)	See below.	P
	There are two types of efficiencies shown in IEC 60146-2; one is a power efficiency; the other is a conversion factor. Power efficiency is defined as the ratio of active output power and active input power. Conversion factor is the ratio between output and input fundamental power levels.	Power efficiency used.	P
Annex C	Weighted-average energy efficiency (informative)	See below.	P
	The energy of a power conditioner depends on both the irradiance profile and the load profile. The energy efficiency of a power conditioner shall be calculated by the ratio of the output to the input energy measured over a certain period.	Considered.	P
C.1	η_{WT} of power conditioner for utility-interactive PV systems	Considered.	P
	Utility-interactive PV systems, which have no storage and for which reverse-power flow is accepted, are described. In this case, d.c. power generated by the PV array is supplied direct into the power conditioner (PC). Almost all of the input power to the PC is converted to a.c. power. A part of it is dissipated as the PC loss.	Considered.	P
C.2	η_{WT} of power conditioner for stand-alone PV systems	---	N/A
	In stand-alone PV systems with a storage subsystem, power generated from the PV array is stored and stabilized by the batteries. DC power is converted into regulated d.c. power or constant-voltage and constant-frequency a.c. power by a power conditioner (PC) and supplied to the load. In this case, some fraction of the generated power is dissipated as a loss in the batteries and power conditioner.	---	N/A
Annex D	Derivation of efficiency tolerance in table 2 (informative)	Considered.	P

Annex 1 – Test Results

Efficiency recording and efficient calculation sheet for utility-interactive							
Power conditioner type	Grid-connected						
Model:	MI-1000-2M						
Parameters of power conditioner	Minimum rated input voltage: 33Vd.c. Nominal voltage.....: 42Vd.c. Maximum full load voltage.: 54Vd.c. Rated output voltage: 230Va.c. Rated output frequency: 50Hz Rated output power: 1000W						
PV input voltage	a) Manufacturer's minimum rated input voltage (33Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V).....:	32,94	33,04	33,01	33,01	33,07	33,02	--
Input voltage ripple (V).....:	1,65	0,01	0,01	0,01	0,00	0,01	--
Input current (A).....:	3,028	7,793	12,485	15,550	23,464	31,764	--
Input current ripple (A).....:	0,160	0,026	0,050	0,033	0,049	0,079	--
Input power (Pi) (W).....:	99	257	411	511	771	1041	--
Output power (Po) (W).....:	96	251	402	500	751	1008	--
Output efficiency (%).....:	96,87	97,74	97,96	97,88	97,42	96,83	--
Input energy (Wi) (kWh)....:	0,002	0,004	0,007	0,009	0,013	0,017	--
Output energy (Wo) (kWh) :	0,002	0,004	0,007	0,008	0,013	0,017	--
Energy efficiency (%).....:	96,87	97,74	97,96	97,88	97,42	96,83	--
PV input voltage	b) The inverter's nominal voltage (42Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V).....:	41,75	42,09	42,07	42,13	42,02	42,02	--
Input voltage ripple (V).....:	1,32	0,01	0,01	0,02	0,01	0,00	--
Input current (A).....:	2,384	6,122	9,754	12,183	18,309	24,560	--
Input current ripple (A).....:	0,086	0,023	0,096	0,024	0,038	0,082	--
Input power (Pi) (W).....:	99	257	409	512	766	1026	--
Output power (Po) (W).....:	97	251	402	502	750	1001	--
Output efficiency (%).....:	97,31	97,55	98,08	98,17	97,97	97,61	--
Input energy (Wi) (kWh)....:	0,002	0,004	0,007	0,009	0,013	0,017	--

Output energy (Wo) (kWh) :	0,002	0,004	0,007	0,008	0,013	0,017	--
Energy efficiency (%) :	97,31	97,55	98,08	98,17	97,97	97,61	--
PV input voltage	c) The inverter's full load voltage (54Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V) :	54,24	54,05	54,01	53,98	53,91	53,98	--
Input voltage ripple (V) :	1,02	0,00	0,02	0,01	0,02	0,02	--
Input current (A) :	1,833	4,858	7,610	9,598	14,297	19,084	--
Input current ripple (A) :	0,047	0,020	0,056	0,018	0,026	0,034	--
Input power (Pi) (W) :	99	262	410	517	769	1027	--
Output power (Po) (W) :	96	254	401	506	753	1002	--
Output efficiency (%) :	96,34	97,07	97,77	97,94	97,87	97,56	--
Input energy (Wi) (kWh) :	0,002	0,004	0,007	0,009	0,013	0,017	--
Output energy (Wo) (kWh) :	0,002	0,004	0,007	0,008	0,013	0,017	--
Energy efficiency (%) :	96,34	97,07	97,77	97,94	97,87	97,56	--

Efficiency recording and efficient calculation sheet for utility-interactive

Power conditioner type	Grid-connected						
Model:	MI-1200-2M						
Parameters of power conditioner	Minimum rated input voltage: 39Vd.c. Nominal voltage.....: 42Vd.c. Maximum full load voltage.: 54Vd.c. Rated output voltage: 230Va.c. Rated output frequency: 50Hz Rated output power: 1200W						
PV input voltage	a) Manufacturer's minimum rated input voltage (39Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V) :	39,11	39,07	39,01	39,03	38,99	39,03	--
Input voltage ripple (V) :	1,65	0,01	0,00	0,01	0,00	0,01	--
Input current (A) :	3,160	7,842	13,139	15,707	23,857	32,125	--
Input current ripple (A) :	0,138	0,025	0,035	0,045	0,060	0,156	--
Input power (Pi) (W) :	123	306	511	611	924	1245	--
Output power (Po) (W) :	120	299	501	599	903	1208	--

Output efficiency (%)..... :	97,58	97,91	98,13	98,07	97,65	97,01	--
Input energy (Wi) (kWh).... :	0,002	0,005	0,009	0,010	0,015	0,021	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,015	0,020	--
Energy efficiency (%) :	97,58	97,91	98,13	98,07	97,65	97,01	--
PV input voltage	b) The inverter's nominal voltage (42Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V)..... :	42,53	42,07	42,06	42,04	42,06	41,96	--
Input voltage ripple (V)..... :	1,58	0,01	0,01	0,01	0,00	0,21	--
Input current (A) :	2,920	7,288	12,177	15,198	22,087	29,770	--
Input current ripple (A) :	0,117	0,018	0,024	0,032	0,052	0,385	--
Input power (Pi) (W) :	124	306	511	637	924	1239	--
Output power (Po) (W) :	121	299	501	624	903	1204	--
Output efficiency (%)..... :	97,42	97,82	98,16	98,07	97,72	97,19	--
Input energy (Wi) (kWh).... :	0,002	0,005	0,009	0,011	0,015	0,021	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,015	0,020	--
Energy efficiency (%) :	97,42	97,82	98,16	98,07	97,72	97,19	--
PV input voltage	c) The inverter's full load voltage (54Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V)..... :	54,03	54,01	53,93	54,01	54,01	54,09	--
Input voltage ripple (V)..... :	1,26	0,01	0,02	0,01	0,01	0,14	--
Input current (A) :	2,294	5,696	9,482	11,346	17,166	23,043	--
Input current ripple (A) :	0,067	0,023	0,269	0,024	0,029	0,106	--
Input power (Pi) (W) :	124	307	510	611	924	1240	--
Output power (Po) (W) :	120	299	500	599	903	1206	--
Output efficiency (%)..... :	96,73	97,37	97,91	97,92	97,69	97,27	--
Input energy (Wi) (kWh).... :	0,002	0,005	0,009	0,010	0,015	0,021	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,015	0,020	--
Energy efficiency (%) :	96,73	97,37	97,91	97,92	97,69	97,27	--
Efficiency recording and efficient calculation sheet for utility-interactive							
Power conditioner type	Grid-connected						

Model:	MI-1250-2M						
Parameters of power conditioner	Minimum rated input voltage: 41Vd.c. Nominal voltage.....: 42Vd.c. Maximum full load voltage.: 54Vd.c. Rated output voltage: 230Va.c. Rated output frequency: 50Hz Rated output power: 1250W						
PV input voltage	a) Manufacturer's minimum rated input voltage (41Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V).....:	40,78	41,10	41,06	40,96	41,03	41,03	--
Input voltage ripple (V).....:	1,68	0,01	0,00	0,01	0,01	0,01	--
Input current (A).....:	3,070	7,748	12,475	15,636	23,510	31,640	--
Input current ripple (A).....:	0,138	0,022	0,026	0,034	0,061	0,317	--
Input power (Pi) (W).....:	125	318	511	638	959	1290	--
Output power (Po) (W).....:	122	311	501	626	937	1252	--
Output efficiency (%).....:	97,59	97,92	98,16	98,11	97,70	97,04	--
Input energy (Wi) (kWh)....:	0,002	0,005	0,009	0,011	0,016	0,022	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,016	0,021	--
Energy efficiency (%).....:	97,59	97,92	98,16	98,11	97,70	97,04	--
PV input voltage	b) The inverter's nominal voltage (42Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V).....:	42,53	42,05	42,07	41,91	41,78	42,12	--
Input voltage ripple (V).....:	1,58	0,01	0,02	0,01	0,00	0,23	--
Input current (A).....:	2,920	7,723	12,172	15,321	23,100	30,719	--
Input current ripple (A).....:	0,117	0,018	0,026	0,032	0,063	0,355	--
Input power (Pi) (W).....:	124	324	511	640	960	1283	--
Output power (Po) (W).....:	121	317	501	628	938	1247	--
Output efficiency (%).....:	97,42	97,88	98,16	98,10	97,72	97,14	--
Input energy (Wi) (kWh)....:	0,002	0,005	0,009	0,011	0,016	0,021	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,016	0,021	--
Energy efficiency (%).....:	97,42	97,88	98,16	98,10	97,72	97,14	--

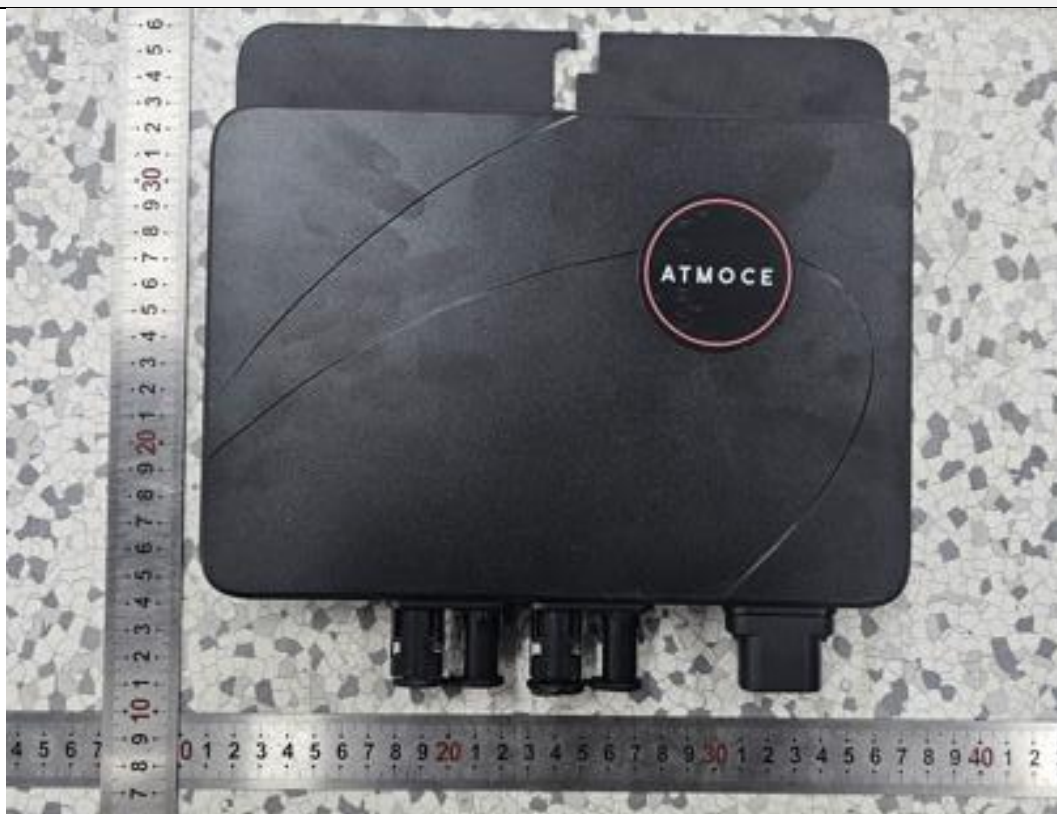
PV input voltage	c) The inverter's full load voltage (54Vd.c.)						
Temperature (°C)	25,0						
Operating period for energy measurement (min)	1,0						
Percentage of rated output VA:	10%	25%	40%*	50%	75%	100%	120%
Input voltage (V)..... :	54,03	54,05	53,93	54,04	54,04	54,14	--
Input voltage ripple (V)..... :	1,25	0,01	0,02	0,01	0,00	0,16	--
Input current (A)..... :	2,294	5,929	9,484	11,886	17,829	23,856	--
Input current ripple (A)..... :	0,068	0,015	0,067	0,021	0,031	0,103	--
Input power (Pi) (W)..... :	124	320	510	641	960	1285	--
Output power (Po) (W)..... :	120	312	500	628	938	1247	--
Output efficiency (%)..... :	96,91	97,45	97,92	97,92	97,66	97,11	--
Input energy (Wi) (kWh).... :	0,002	0,005	0,009	0,011	0,016	0,021	--
Output energy (Wo) (kWh) :	0,002	0,005	0,008	0,010	0,016	0,021	--
Energy efficiency (%)..... :	96,91	97,45	97,92	97,92	97,66	97,11	--
Note:							
*Non-standard requirement test conditions.							

No load loss condition			
Power conditioner type	Utility-interactive		
PV Input voltage	42V		
Model	MI-1000-2M	MI-1200-2M	MI-1250-2M
Measure input voltage (V)	42,1	42,1	42,1
Measured input power (W)	1,0	1,0	1,0

Standby loss condition			
Power conditioner type	Utility-interactive		
PV Input voltage	42V		
Model	MI-1000-2M	MI-1200-2M	MI-1250-2M
Measure input voltage (V)	42,1	42,1	42,1
Measured input power (W)	6,5	6,5	6,6

Annex 2 – Pictures of the unit

Enclosure front view



Enclosure left side view



Enclosure right view



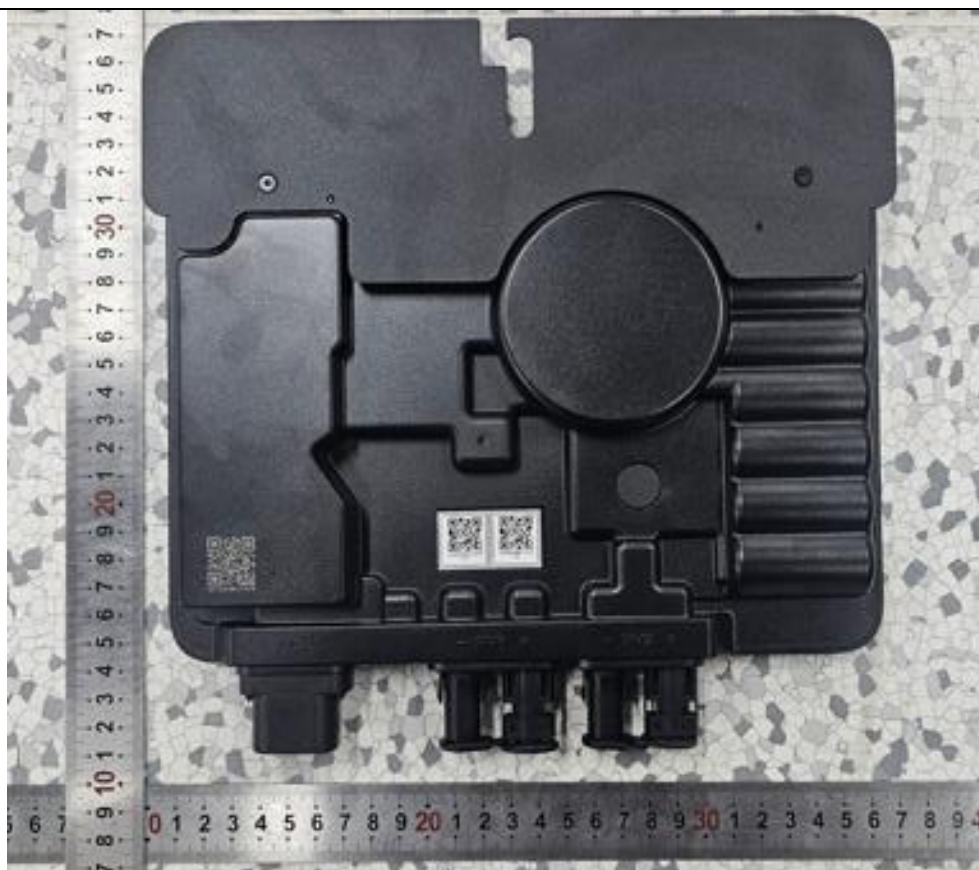
Enclosure top view



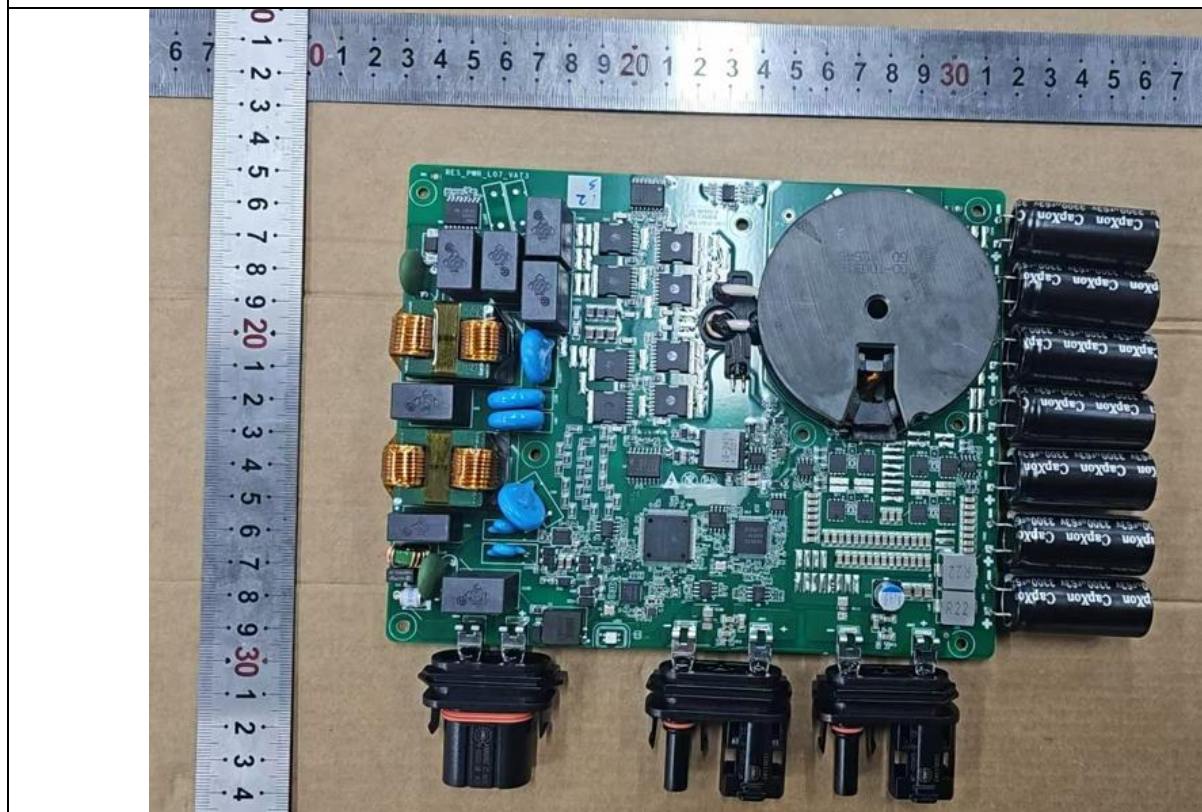
Enclosure bottom view



Enclosure rear view



Enclosure Internal view



Protection Device: MA-NSP-Ctrl

Protection Device Enclosure front view



Protection Device Enclosure left side view



Protection Device Enclosure right view



Protection Device Enclosure top view



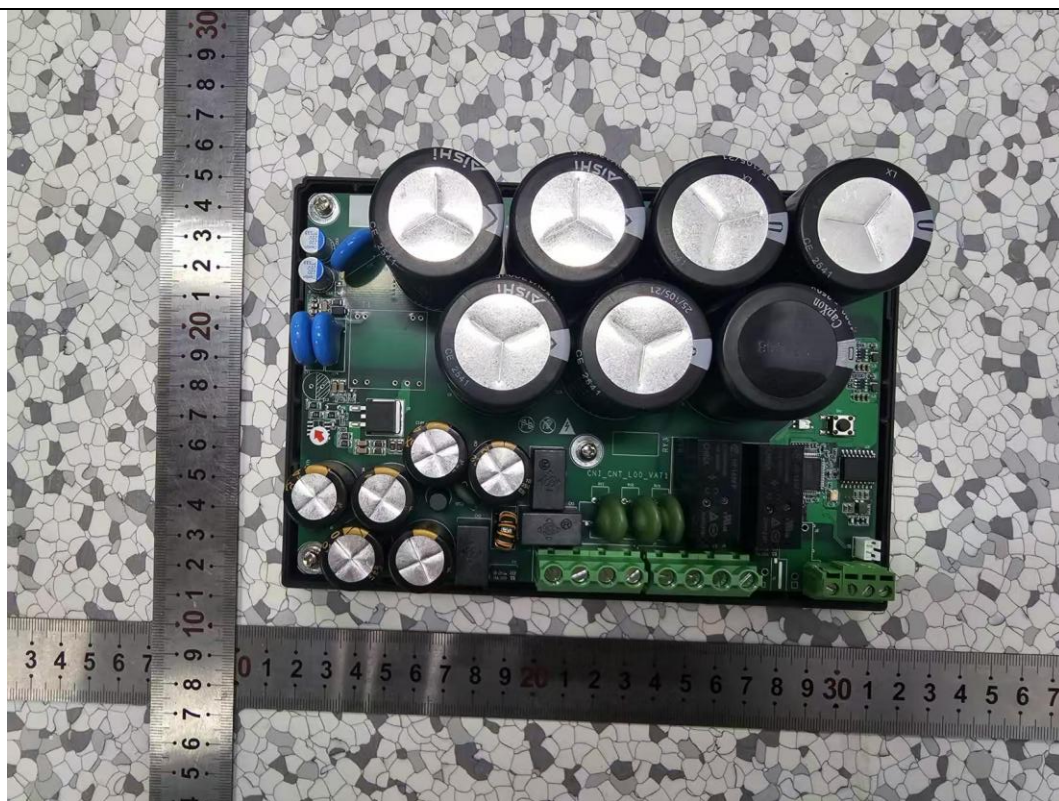
Protection Device Enclosure bottom view



Protection Device Enclosure rear view



Protection Device Enclosure Internal view



Protection Device: MR100-S

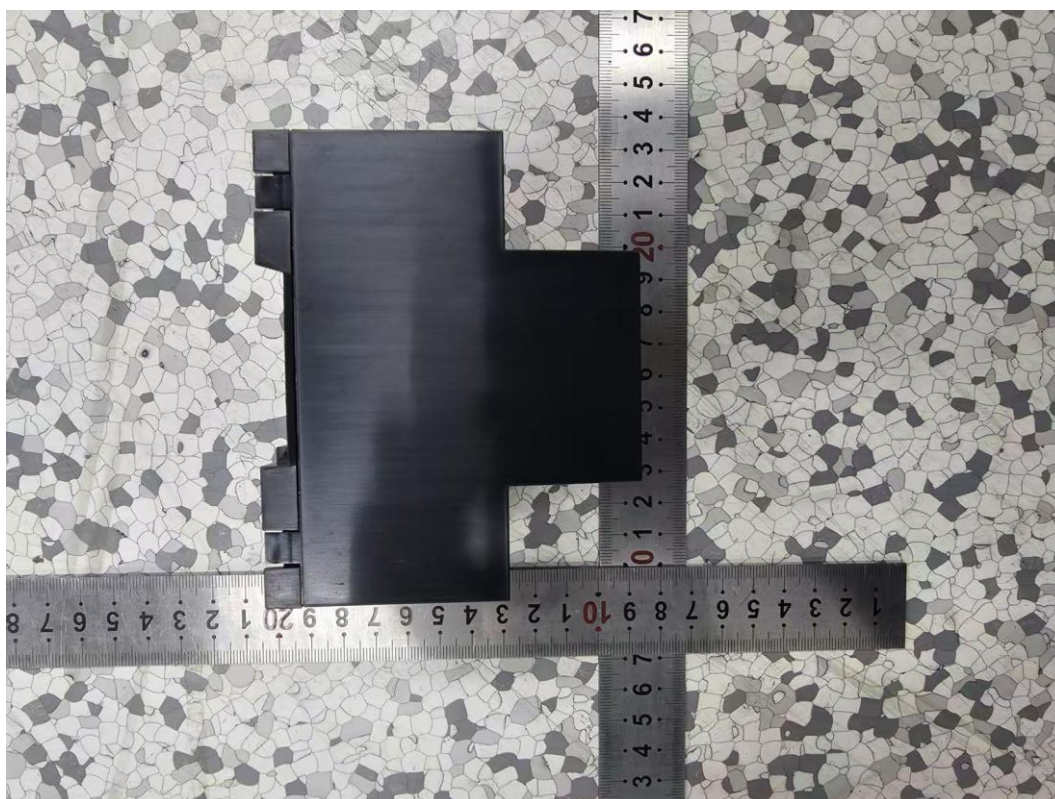
Protection Device Enclosure front view



Protection Device Enclosure left side view



Protection Device Enclosure right view



Protection Device Enclosure top view



Protection Device Enclosure bottom view



Protection Device Enclosure rear view



Protection Device: MR100-T

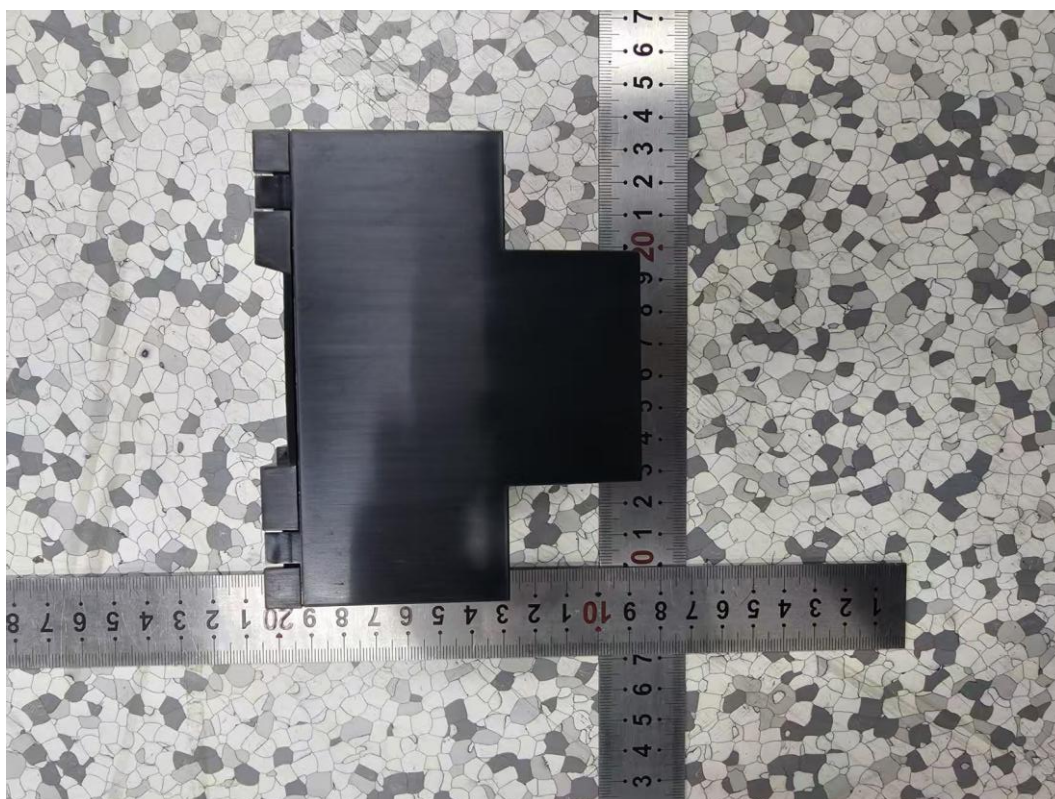
Protection Device Enclosure front view



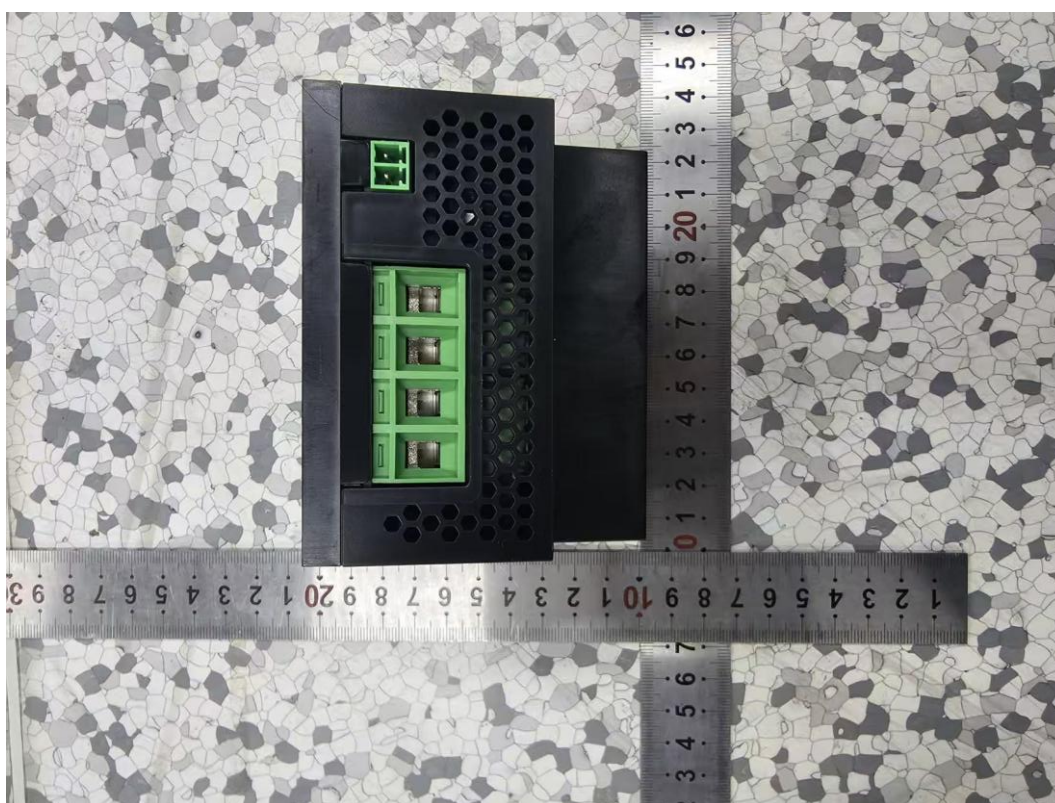
Protection Device Enclosure left side view



Protection Device Enclosure right view



Protection Device Enclosure top view



Protection Device Enclosure bottom view



Protection Device Enclosure rear view



Protection Device: MC100L

Protection Device Enclosure front view



Protection Device Enclosure left side view



Protection Device Enclosure right view



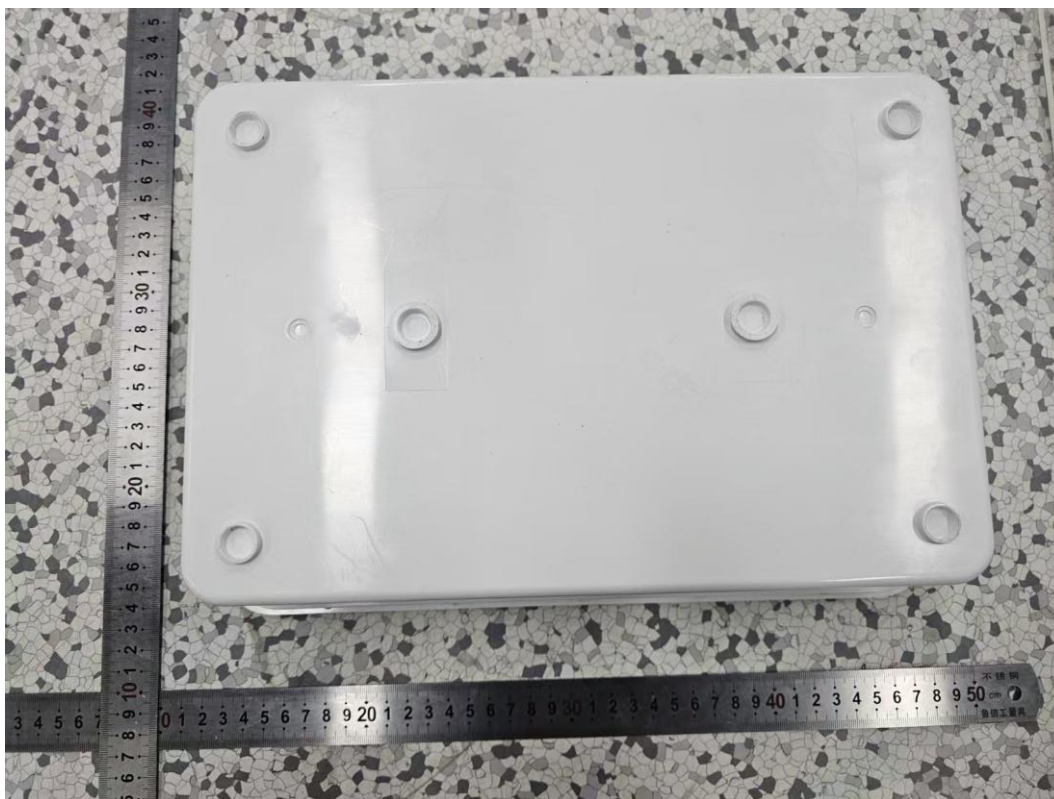
Protection Device Enclosure top view



Protection Device Enclosure bottom view



Protection Device Enclosure rear view



Photos of Gateway – MG100

Enclosure front view



Enclosure side view-1



Enclosure side view-2



Enclosure side view-3



Enclosure side view-4



Enclosure rear view



Annex 3 – Test equipment list

Date(s) of performance of tests: 2026-01-15 to 2026-01-23

Equipment	Internal No.	Manufacturer	Type	Serial No.	Next Calibration
AC source	HC-ENG-049	KEWELL	S7000-21K-2000-0040	6018888221201709	Monitored by Power Analyzer
	HC-ENG-050	KEWELL	S7000-21K-2000-0040	6018888221201708	
	HC-ENG-030	KEWELL	KAC-45-345-33	6018888220300485	
	HC-ENG-038	KEWELL	KAC-45-345-33	6018888220903208	
Data acquisition instrument	HC-ENG-047	DEWETRON	TRION-1820-POWER	A1222045/C5220854	2026-03-20
Current sensor	HC-ENG-047-001	SIGNALTEC	CT 400	1222140764	
	HC-ENG-047-002	SIGNALTEC	CT 400	1222140765	
	HC-ENG-047-003	SIGNALTEC	CT 400	1222140766	
	HC-ENG-047-004	SIGNALTEC	CT 400	1222140767	
Digital hygrometer	HC-ENG-002	Jiangsu Jingchuang Electric Co., Ltd,	GSP-8A	CMA215000031	2026-03-23

End of Test Report