VERIFICATION OF COMPLIANCE OF MICROINVERTER WITH:

UTE C 15-712-1 (JUILET 2013)

GUIDE PRATIQUE: INSTALLATIONS PHOTOVOLTAÏQUES SANS STOCKAGE ET RACCORDÉES AU RÉSEAU PUBLIC DE DISTRIBUTION

Test Report Number	:	GZES240300433302
Equipment	:	Microinverter
Trademark	:	ADAYO
Tested Model	:	ID800D
Variant Models	:	ID400A, ID400D, ID400M, ID600A, ID600D, ID600M, ID800A, ID800M

APPLICANT

Name	:	Huizhou Foryou Optoelectronics Technology Co., Ltd
Address	:	Building 6, B Area, No.1 North Shangxia Road, Dongjiang High-Tech Industry Park, Huizhou, Guangdong, China

TESTING LABORATORY

Name	:	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Address	:	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Conducted (tested) by	:	Doris Tao (Project Engineer)
Approved by	:	Colin Chen (Technical Reviewer)
Date of issue	:	2024/04/22
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Test Report Historical Revision:

Test Report Version	Date	Resume
GZES240300433302	2024/04/22	First issuance **Remarks:** According to the declaration from the applicant, the only difference between the EUT (test samples in this report) and testing sample of report GZES240100061702, which was issued by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch as below: -Update applicant, manufacturer, trademark, models name, label, appearance and equipment type ect. After evaluation, no clause needs to retest. All test data originate from the report GZES240100061702, which was issued by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch.

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1 SCOPE

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch has been contracted by Huizhou Foryou Optoelectronics Technology Co., Ltd**,** in order to evaluate the compliance of a PV Inverter according to UTE C 15-712-1 (Juilet 2013) Guide Pratique: Installations photovoltaïques sans stockage et raccordées au réseau public de distribution.

2 GENERAL INFORMATION

2.1 TESTING PERIOD AND CLIMATIC CONDITIONS

The necessary checking has been performed on the 26th March of 2024.No additional tests have been done.

SITE TEST

Name ..... : Dongguan BALUN Testing Technology Co., Ltd.

Address ..... : Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong, China.

2.2 EQUIPMENT UNDER TESTING

Apparatus type ..... : Microinverter (Sinlge phase)

Installation ..... : Fixed(permanent connection)

Manufacturer ..... : Huizhou Foryou Optoelectronics Technology Co., Ltd

Address ..... : Building 6, B Area, No.1 North Shangxia Road, Dongjiang High-Tech Industry Park, Huizhou, Guangdong, China

Trade mark ..... : ADAYO

Model / Type reference ..... : ID800D

Serial Number ..... : WWA2344068

Software Version ..... : DH01.001-000-000

Rated Characteristics ..... : DC Input: MPPT 33~55 Vdc (60 Vdc max.), 14 A*2 Maximum.
AC Output: 230 Vac, 50 Hz, 3.48 A, 800 W.

Date of manufacturing: 2023

Test item particulars

Input ..... : DC

Output ..... AC

Class of protection against electric shock... : Class I

Degree of protection against moisture..... : IP 67

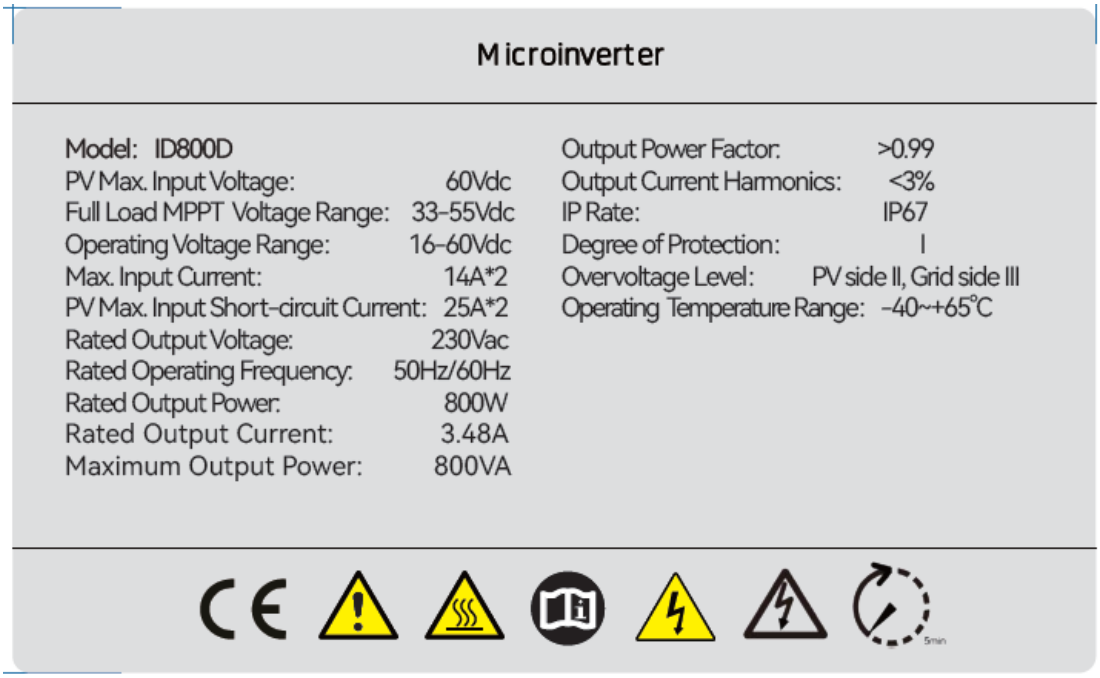
Type of connection to the main supply ..... : TN

Cooling group ..... : Natural Cooling

Modular ..... : No

Internal Transformer ..... : Yes

Copy of marking plate (representative):



Note:

1. The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.
2. Label is attached on the side surface of enclosure and visible after installation.
3. Labels of other models are as the same with **ID800D**'s except the parameters of rating.

Equipment under testing:

- ID800D

The variants models are:

- ID800A
- ID800M
- ID600A
- ID600D
- ID600M
- ID400A
- ID400D
- ID400M

The variant models have been included in this test report without tests because the following features don´t change regarding to the tested model:

- Same connection system and hardware topology.
- Same control algorithm.
- Output power within 1/√10 and 2 times of the rated output power of the EUT or Modular inverters.
- Same Firmware Version.

The models of ID400A, ID400D, ID400M, ID600A, ID600D, ID600M, ID800A, ID800D and ID800M are identical on topological schematic circuit diagram and control solution codes.

The results obtained apply only to the particular sample tested that is the subject of the present test report.

The most unfavorable result values of the verifications and tests performed are contained herein.

Throughout this report a point (~~comma~~) is used as the decimal separator.

Following table shows the full ratings of all the models referenced in this report, marked in **bold letters** is the one subjected to testing:

Model	ID400A ID400M ID400D	ID600A ID600M ID600D	ID800A ID800M ID800D
PV Input			
Number of MPPT Trackers	2		
Max. Input Voltage	60 Vdc		
Start-up Operating Voltage	30 Vdc		
Operating Voltage Range	16V-60 Vdc		
MPPT Voltage Range	33V-55 Vdc		
Max. Input Current	7 A * 2	12 A * 2	14 A * 2
Max. Short Current	15 A * 2	20 A * 2	25 A * 2
AC Output			
Nominal Grid Voltage	L/N/PE, 230Vac		
Nominal Grid Frequency	50 Hz		
Rated AC Power	400 W	600 W	800 W
Max. AC Power	400 VA	600 VA	800 VA
Rated AC Current	1.74 A	2.60 A	3.48 A
Output Power Factor	>0.99		
General Data			
Operating temperature range	-40 ºC ~ +65 ºC		
Protection degree	IP67		
Protective class	Class I		
Altitude	Max. 2000m		
Cooling method	Natural Cooling		
Topology	Transformer		

2.3 Manufacturer and Factory information

Manufacturer Name..... : Huizhou Foryou Optoelectronics Technology Co., Ltd

Manufacturer Address ..... : Building 6, B Area, No.1 North Shangxia Road, Dongjiang High-Tech Industry Park, Huizhou, Guangdong, China

Factory Name..... : Shenzhen Donnergy Technology Co., Ltd

Factory Address ..... : 6F Building 8, Xianan Third Industrial Zone, Shangcun Community, Gongming Street, Guangming District, Shenzhen, China

2.4 MEASUREMENT UNCERTAINTY AND DATA SAMPLING RATES

Associated uncertainties through measurements showed in this this report are the maximum allowable uncertainties.

Magnitude	Uncertainty
Voltage measurement	±1.5 %
Current measurement	±2.0 %
Frequency measurement	±0.2 %
Time measurement	±0.2 %
Power measurement	±2.5 %
Phase Angle	±1 º
Temperature	±3 ºC
Note1: Measurements uncertainties showed in this table are maximum allowable uncertainties. The measurement uncertainties associated with other parameters measured during the tests are in the laboratory at disposal of the petitioner. Note2: Where the standard requires lower uncertainties that those in this table. Most restrictive uncertainty has been considered.	

2.5 DEFINITIONS

EUT	Equipment Under Testing	PGU	Power Genaration Unit
A	Ampere	Hz	Hertz
VAr	Volt-Ampere reactive	V	Volt
Un	Nominal Voltage	W	Watt
In	Nominal Current	p.u.	Per unit
MV	Medium Voltage	Pn	Nominal Active Power
LV	Low Voltage	Qn	Nominal Reactive Power
LVRT	Low Voltage Ride Through	Sn	Nominal Apparent Power
I_{scmax}	Maximum PV curret in short circuit	I+	Current Positive Sequence
		I1-	Current Negative Sequence
U_{ocmax}	Maximum PV voltage in open circuit		

3 RESUME OF TEST RESULTS

INTERPRETATION KEYS

Test object does meet the requirement ..... **P** Pass

Test object does not meet the requirement ..... **F** Fails

Test case does not apply to the test object..... **N/A** Not applicable

To make a reference to a table or an annex. ..... See additional sheet

To indicate that the test has not been performed..... **N/P** Not performed

STANDARD SECTION	CHAPTER OF THE STANDARD UTE C15-712: 2013	RESULT
5	**Description of PV installation**	**P**
6	**Earthing of the installation**	**P**
6.1	Diagrams showing bonding of alternatingcurrent part with earth	P
6.2	Earthing of one polarity in the d.c. part	N/A
6.3	Earthing of conductive masses and elements	P
7	**Protection against electric shock**	**P**
7.1	General Points	P
7.2	Protection measure by TBTS or TBTP on D.C part	P
7.3	Protection against direct contact	P
7.4	Protection against indirect contact	P
8	**Overcurrent protection**	**P**
8.1	Direct Current part	P
8.2	Alternating Current part	P
8.3	Protection of auxiliary circuits	P
9	**Tripping device**	**P**
10	**Prevention of degradation of photovoltaic installations**	**N/A**
11	**Voltage drop**	**N/A**
12	**Disconnection and circuit-breakers**	**N/A**
13	**Protection from surges emanating from the atmosphere or caused by operations**	**N/A**
13.1	General points	P
13.1.1	Types of protection	P
13.2	Installation conditions for lightning arresters	N/A
13.3	Overvoltage protection for installations without lightning conductor	N/A
13.4	Additional regulations for surge protection for installations with a lightning conductor	N/A
14	**Choice and installation of equipment**	**N/A**
14.4	Inverters	N/A
15	**Markings**	**P**
16	**Technical file (in French)**	**P**
17	**Maintenance of photovoltaic installations**	**N/A**
Annex A	Agreements between the administrator of the public distribution network and the user/producer	**N/A**
Annex B	Cables for photovoltaic installations – values for permissible currents (informative)	**N/A**
Annex C	Keraunic levels in France and in the overseas departments (informative)	**N/A**
Annex D	Calculation of U_{ocmax} and I_{scmax}	**N/A**

4 REQUIREMENTS REVIEW

The following clauses have been extracted from the UTE C15-712 regulation.

Clause	Requirement	Comments	Result
5	**Description of PV installations**	Installation manuals ID800D series Single-phase Microinverter user manual" provide general instructions of the installation procedures	P
6	**Earthing of the installation**		P
6.1	**Diagrams showing bonding of alternating current part with earth** The earthing system has been produced in accordance with the requirements of NF C 15-100	The inverter is earthed through the protective bonding connector, as shown in the user manuals "ID800D series Single-phase Microinverter user manual"	P
6.2	**Earthing of one polarity in the d.c. part** In a PV installation, the protection devices against indirect contact are independent of the principle of the earthing systems. The direct current part is created in accordance with the rules for class II or equivalent isolation.	The DC side of the inverter must not be earthed according to the user manuals "ID800D series Single-phase Microinverter user manual"	P
	Galvanic isolation between the part d.c. and the a.c. part is required, it can be either internal to the inverters, or external to the inverters. When external to the inverters, it must be performed by means of an inverter transformer or by means of a single multi-winding transformer with a separate inverter winding. It must then be ensured that the inverters used are compatible with this type of Implementation	The inverter is isolated internally through a transformer.	P
6.3	**Earthing of conductive masses and elements**		P
6.3.1	**Direct current part** To minimise the effects of induced overvoltages, the metal structures of the modules and the metal support structures (including the metal cable runs) must be connected to equipotential bonding, which in turn is connected to the earth.	Enclosure and metal estructures connected to the protective equipotencial bonding and connected to earth.	P
6.3.2	**Alternating current part** All chassis on the a.c. side must be connected to the earth via a protective conductor that meets the requirements of paragraph 411.3.1.2 and section 5-54 of N F C 15-100. If a transformer is installed outside the inverter (low voltage/low voltage or high voltage/low voltage transformer), equipotential bonding is required between these items of equipment.	Enclosure and metal estructures connected to the protective equipotencial bonding and connected to earth. See picture of the equpotential bonding.	P

Clause	Requirement	Comments	Result
6.3.3	**Inverter** The inverter body must be connected to the equipotential bonding via a conductor with a minimum cross-section of 6 mm^2 Cu or equivalent and to the protective conductor of the a.c. part.	Protective conductors are 6AWG cupper wire (>6mm2 Cu).	P
7	**Protection against electric shock**		P
7.1	**General points** The PV equipment of the direct current part must be treated as being under voltage, even if it is disconnected from the alternating current part.		P
7.2	**Protection measure by TBTS or TBTP on D.C part** The requirements of TBTS or TBTP are described in article 414 of NF C 15-100.	Inverter compliant with requirement. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
7.3	**Protection against direct contact**		P
7.3.1	**General points** All connection points necessary for the realization of a PV chain whose U_{ocmax} voltage is greater than 60 V, must be provided by connectors including at its ends. These connectors must comply with standard NF EN 50521.		N/A
7.3.2	**BT installation case** Electrical equipment must be fitted with a form of protection either by insulation of the live parts or through a casing. The eqiuipment must be at least IP2X or IPXXB	Inverter compliant with requirement. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023. Accreditation：IP67	P
7.3.3	**Case of installation in TBTS and TBTP** If the nominal voltage of the safety extra-low voltage circuit is less than or equal to 25 V rms a.c. or 60 V d.c. without ripple, protection against direct contact through insulation of the live parts or a casing is not necessary.	Inverter compliant with requirement. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
7.4	**Protection against indirect contact**		P

Clause	Requirement	Comments	Result
7.4.1	**General points** The regulations for protection against indirect contact is set out in section 4-41 of NF C 15-100. The circuits covered by 411.3.3 of standard NF C15-100 and, in particular, circuits in residential buildings must be protected with a differential device with a sensitivity of 30 mA or less.	RCD equipped. See user manuals “ID800D series Single-phase Microinverter user manual”	P
7.4.2	**Direct current part**		N/A
7.4.2.1	**General points** For the direct current part (PV modules, junction boxes, chain cables, group cables, marshalling boxes or cabinets, etc.), protection against indirect contact must be ensured		N/A
7.4.2.2	**Protection with double or reinforced insulation** The requirements of article 412 of standard NF C15-100 must be applied.	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
7.4.3	**Alternating current part** Protection against indirect contact is ensured through double or reinforced insulation or by an automatic cut-out of the supply, according to one of the following measures: ● In a TT system: cut-out on the first fault; ● In a TN system: cut-out on the first fault; ● In an IT system: cut-out on the second fault.	TN system	P
8	**Overcurrent protection**	Refer to installation manual for details	P
8.1	**Direct current part**		P
8.1.1	**General points** See figure 7 of this standard		P
8.1.2	**Protection of PV modules** In an installation with several PV module chains in parallel, the modules must be protected against the effect of reverse currents that may be generated in the chains in the event of a fault.		N/A
8.1.3	**Protection of PV chain cables** The sizing of the PV chain cables takes into account the choice of protection device for the PV modules adopted in 8.1.2.		N/A

Clause	Requirement	Comments	Result
8.1.4	**Protection of PV group cables** In an installation with several PV groups in parallel, the cables for the groups must be protected against the effect of reverse currents caused by a short circuit in a group.		N/A
8.1.5	**Protection of main PV cable** The main cable of a PV generator must be dimensioned with a permissible current Is greater than or equal to 1.25 Isc STC_gen.		N/A
8.1.6	**Characteristics of overcurrent protection devices** The overcurrent protection devices must be either fuses compliant with standard NF EN 60269-1 or circuit-breakers compliant with standard NF EN 60947-2. These devices must be implemented for both polarities, regardless of the configuration of the installation.		P
8.2	**Alternating current part**		P
8.2.1	**General points** In the case of an installation connected to the network via a branch line with limited power, the minimum cross-section of the conductors connected to the terminals downstream of the general isolating and protection device is 10 mm^2 Cu.	See user manuals “ID800D series Single-phase Microinverter user manual”	P
8.2.2	**Overload protection** Alternating current circuits are protected against surges in accordance with the requirements of article 433 of standard NF C 15-100.	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
8.2.3	**Short-circuit protection** In the case of a short circuit in an inverter or its line, the inverter is regarded as the load and the public network as the source.	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
8.3	**Protection of auxiliary circuits**	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P

Clause	Requirement	Comments	Result
9	**Tripping device** This protection device is designed to disconnect generators in the event of: ● a fault on the public distribution network; ● a failure in the supply from the public distribution network; ● fluctuations in the voltage or frequency greater than those specified by the distributor.	Tripping device requirement covered in VDE 0126. Inverter certified by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch based on test report number GZES240300433301 issued on April 22, 2024.	P
10	**Prevention of degradation of photovoltaic installations** In order to prevent the degradation of PV installations due to specific external influences and the presence of direct current, and despite the implementation of measures such as the installation of double insulation and monoconductor cables, additional measures must be implemented for the direct current part**.**	This requirement shall be covered by final PV installation.	N/A
11	**Voltage drop**	This requirement shall be covered by final PV installation.	N/A
11.1	**General points** The objective of technical and commercial optimisations is to minimise voltage drops.		N/A
11.2	**Direct current installation** The authorised maximum drop in voltage in the direct current part of the installation is between 3% and Impp STC (STC: standard test conditions).		N/A
11.3	**Alternating current installation** For PV installations connected directly to the LV public distribution network, the maximum authorised drop in voltage between the a.c. terminals of the inverter and the point of delivery (NF C 14-100) isl 3% at the nominal power of the inverter(s). It is recommended to limit this drop in voltage to 1 % in order to be able to limit energy losses on the one hand and momentary disconnection of the inverter on the other, maintaining a margin between the average operating voltage of the inverter and the setting of its protection at maximum voltage.		N/A
12	**Disconnectors and circuit-breakers**	This requirement shall be covered by final PV installation.	N/A
12.1	**General points** When choosing and installing circuit-breakers and disconnectors between the PV installation and the public distribution network, the network must be regarded as the source and the PV installation as the load.		N/A

Clause	Requirement	Comments	Result
12.2	**Disconnectors** To facilitate maintenance of the PV inverters, disconnection mechanisms must be installed close to the inverter, on both direct current and alternating current sides.		N/A
12.3	**Emergency circuit-breakers**		N/A
12.3.1	**General points** To allow maintenance work on junction boxes fitted with protection devices, a circuit-breaker must be installed inside or immediately downstream of these protection devices		N/A
12.3.2	**Emergency shutdown of the DC portion** The emergency disconnection can be ensured by manual control of the circuit-breaker or via a remote control action.		N/A
12.3.3	**Alternating current part**		N/A
12.3.4	**Measures specific to residential buildings** In conformity with the regulations set down in article 771.463 of standard NF C 15-100, the emergency circuit-breakers must be tripped by a direct manual action.		N/A
12.4	**Breakdown for emergency services intervention**		N/A
12.4.1	**General points**		N/A
12.4.2	**Additional provisions**		N/A
13	**Protection from surges emanating from the atmosphere or caused by operations1**	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
13.1	**General points** The information contained in this chapter refers to overvoltage protection for photovoltaic installations connected to the network and complements standard NF C 15-100 and guide UTE C 61-740-52.	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
13.1.1	**Types of protection**	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P

Clause	Requirement	Comments	Result
13.1.1.1	**Protection through equipotential bonding** As described in section 6.3, an equipotential bonding conductor must connect all the metal structures of the modules and the metal structures of the supports of the PV installation (including the metal cable runs) whether or not lightning conductors are present. This conductor must be connected to the earth.	Safety requirement covered in IEC 62109-1. Inverter report number GZES231202137901 which was issued SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch on Dec. 18, 2023.	P
13.1.1.2	**Protection by lightning arresters** The installation conditions are described in 13.2		N/A
13.2	**Installation conditions for lightning arresters**	Protection given by final installation	N/A
13.2.1	**Installation conditions for lightning arresterson a.c. side** Based on guide UTE C 61-740-52, protection by a lightning arrester is obligatory if there is a lightning conductor or if the lightning density (Ng) is greater than 2.5.		N/A
13.2.2	**Installation conditions for lightning arresters on d.c. side**	Protection given by final installation	N/A
13.2.2.1	**Installation without lightning conductor** The length L is the accumulated distance between the inverter(s) and the furthest points of the photovoltaic modules comprising the chain, as a sum of the lengths of the routes in accordance with the principles shown in Figure 8.		N/A
13.2.2.2	**Installation with lightning conductor** The installatiori of type 2 lightning conductor(s) is obligatory on the d.c. side.		N/A
13.3	**Overvoltage protection for installations without lightning conductor**		N/A
13.3.1	**Choice and installation of lightning arresters on a.c. side** If a lightning arrester is prescribed for the a.c. part of a PV installation connected to the public low-voltage distribution network, it is always installed in the panel nearest to the installation origin of the installation. If this lightning arrester is located more than 10 metres away from the inverter, a second lightning arrester must be installed near the latter.		N/A
13.3.2	**Choice and installation of lightning arresters on d.c. side** If a lightning arrester is prescribed for the d.c. part of a PV installation, it is always installed in the panel nearest to the inverter. If one of the chains is located more than 10 metres away from the inverter, the installation of a second lightning arrester near the chains is recommended.	Protection given by final installation.	N/A

Clause	Requirement	Comments	Result
13.3.2.1	**Choice of I_n** The lightning arresters are type 2 with a minimum value for the nominal discharge current In of 5 kA. A higher nominal discharge current than the required value will prolong the service life of the lightning arrester.		N/A
13.3.2.2	**Choice of I_{max}** This parameter is used to coordinate the energy of the lightning arresters: please refer to information from the manufacturer.		N/A
13.3.2.3	**Choice of I_{imp}** The shock current Iimp of the type 1 surge arresters is chosen according to the UTE C guide 61-740-52 or by default with a minimum value of 12.5 kA.		N/A
13.3.2.4	**Choice of Up** The value of Up must be less than 80% of the surge withstand voltage of the equipment to be protected.		N/A
13.3.2.5	**Choice of Ucpv** The value of the maximum permissible voltage from the lightning arrester UCPV must be selected according to the maximum open-circuit voltage of the PV generator corresponding to the voltage UocSTC specified by the manufacturers of the PV modules. The voltage UCPV must be greater than or equal to the maximum voltage U_{ocMAX} of the photovoltaic generator. Whatever the protection methods of the lightning arrester, it must also withstand the maximum voltage UocMAX between these live terminals (+ and - terminals) and the earth.		N/A
13.3.7	**Choice of I_{scwpv} and protection device associated with the lightning arrester** The lightning arrester must be fitted with an external disconnection device, if specified by the manufacturer; this assembly must be sized to function regardless of the current produced by the PV modules.		N/A
13.4	**Additional regulations for surge protection for installations with a lightning conductor** The regulations are set out in guide UTE C 61-740-52.		N/A
14	**Choice and installation of equipment**		N/A

Clause	Requirement	Comments	Result
14.1	**General points** The rated operating voltage of all the equipment of the d.c. part must be equal to or greater than the voltage U_{OCMAX}. In the case of buildings with multiple occupation (for tertiary or residential use) with photovoltaic production in communal parts, the lines coming from the PV modules must be routed round the outside of private areas to the junction boxes for the chain/group located in the communal areas or in the buildings or the electrical service site dedicated to this purpose. The equipment installed outside must have a minimum degree of protection of IP44. The degree of protection against mechanical impacts must be at least IK07 in compliance with standard NF EN 62262 (C 20-015). It must be possible to carry out work on the removable equipment, devices and connections in the utmost safety. If a transformer is installed, the inverters and any general low-voltage panel must be installed close to the transformer in the same room or in adjoining rooms. The location of equipment (junction box(es), inverter(s), cabinets with protection devices and meter cabinets etc.) must comply with article 513.1 of standard NF C 15-100. Special regulations for residential buildings are given in article 771. The equipment, including the ducts etc., must be arranged so that they can be operated, inspected and serviced easily and their connections can be accessed.	Final compliance given by end installation.	N/A
14.2	**Ducts etc.**		N/A
14.2.1	**Choice for the d.c. part** The ducts are sized in accordance with the regulations in standard NF C 15-100 on the basis of cables with reticulated polyethylene insulation.		N/A
14.2.2	**Installation** The connections and the cables must be installed in a manner that will prevent any deterioration due to external influences. See the requirements set out in guide UTE C 15-520.		N/A
14.3	**PV modules** The PV modules must comply with the standards in series NF EN 61730.		N/A
14.4	**Injection Inverters** The level of the current for the inverter must be based on ImppSTC	Compliance given by final installation characteristics.	N/A

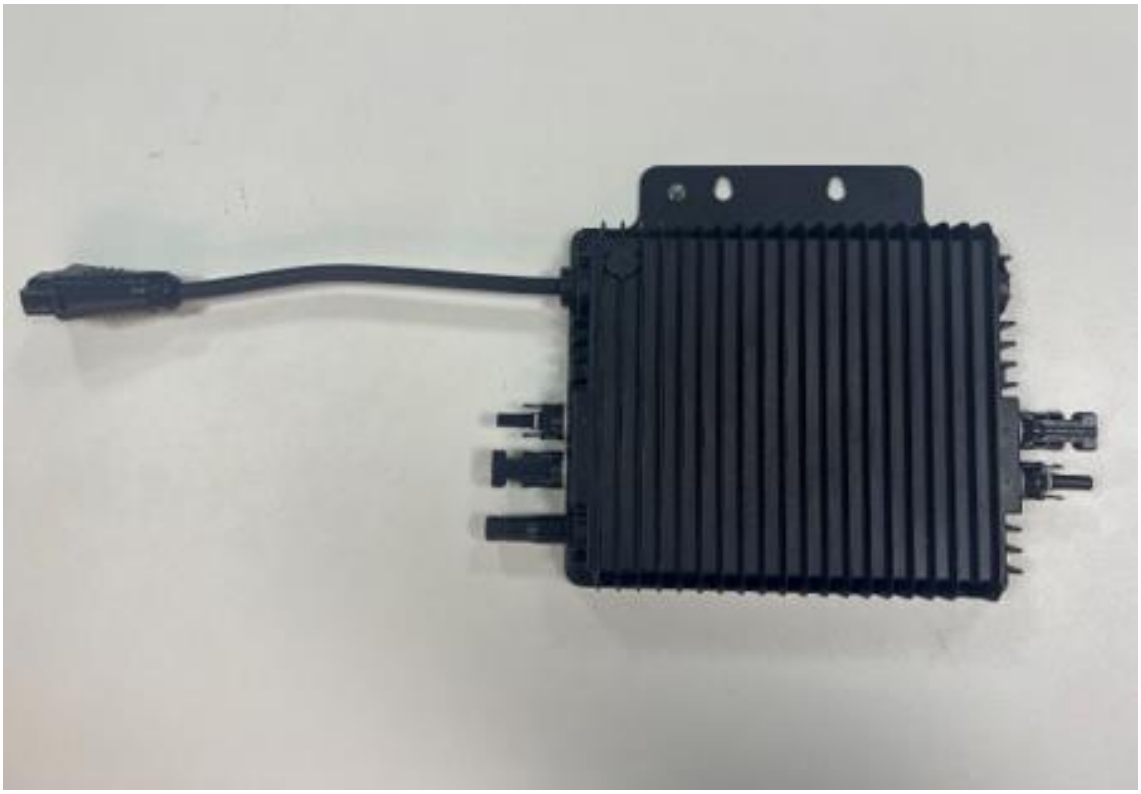
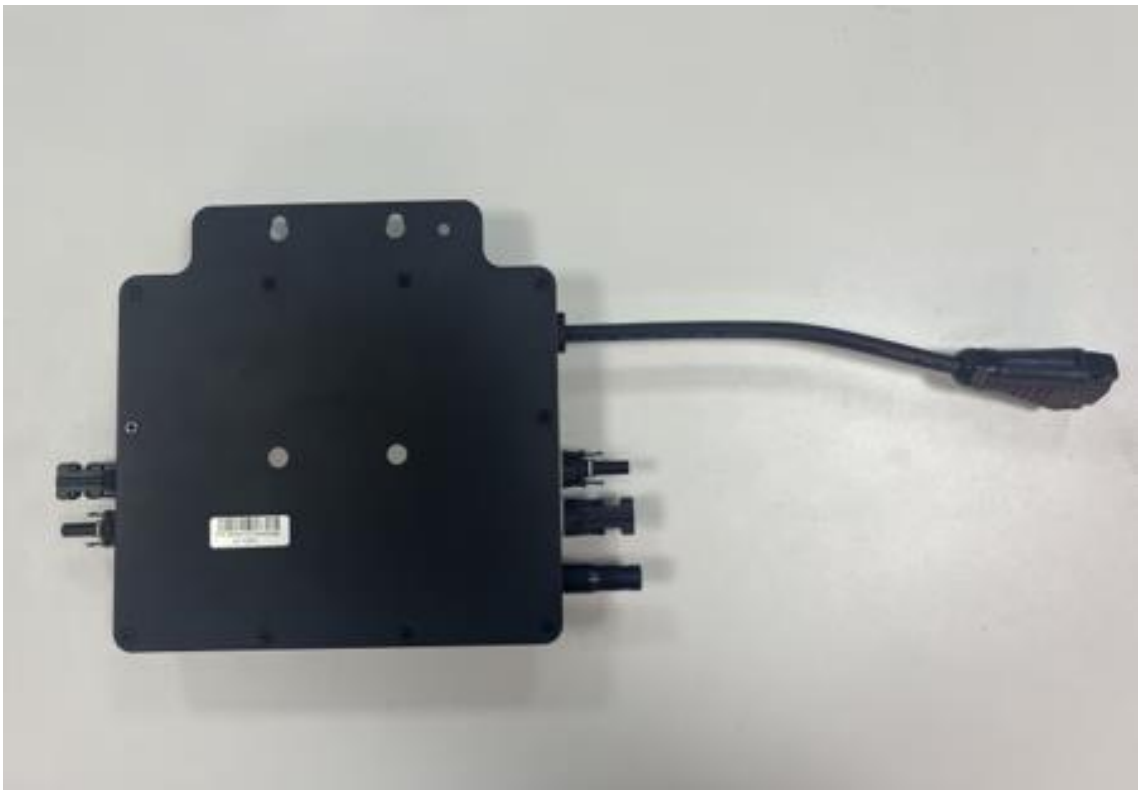
Clause	Requirement	Comments	Result
14.5	**Equipment** All equipment installed in the d.c. part must be adapted for operation in direct current and be selected and installed in accordance with the manufacturer's instructions. Equipment installed in the d.c. part must be of the industrial type, in other words compliant with the NF EN 60947 series of standards. ● The characteristics of switches, switch-disconnectors and fuse-combination units must conform to the operating category DC21 B. ● The characteristics of disconnectors must conform to the operating category DC20. ● The characteristics of contactors must conform to the operating category DC1.		N/A
14.6	**Equipment assemblies** The direct current and alternating parts of the installation can be accommodated in the same panel if there is a physical separation of these two parts. For the d.c. part, it is imperative to protect all the connections or disconnection devices against accidental or unauthorised opening when live in accordance with 536.2.3 of standard NF C 15-100. To this end, a notice "Do not operate when live" must be placed inside the boxes or cabinets near these disconnection devices. Furthermore, in premises accessible to persons other than those with the requisite authorisation or qualification (BA4 or BA5): ● The design or installation must be such that it is only possible to disassemble the connection devices with the aid of a tool; ● Equipment that does not have an under load circuit-breaking feature must require the either the use of a key or tool or the direct operation of a device with an under load circuit-breaking feature.		N/A
14.7	**Connectors** In the d.c. part, the connectors used must comply with the standard NF EN 50521.To guarantee the quality of the connection and limit the risks of an electric arc that could spark a fire, each pair of male and female connectors to be assembled, must be of the same type and the same brand.	Compliance given by the end installation	N/A
14.8	**Lighting arresters**		N/A

Clause	Requirement	Comments	Result
14.8.1	**Choice of lightning arresters** The lightning arresters installed in the a.c. part of the PV installation must comply with standard NF EN 61643-11. The lightning arresters installed in the d.c. part of the PV installation must meet the requirements of guide UTE C 61-740-51.		N/A
14.8.2	**Installation of lightning arresters** Alternating current and direct current lightning arresters are installed in accordance with the regulations set out in guide UTE C 61-740-52.		N/A
15	**Markings**		P
15.1	**Identification of components** The main components comprising the photovoltaic installations must be identified and marked with clearly visible labels fixed permanently in accordance with the installation plans and diagrams:		P
15.2	**Labelling** For safety reasons and to alert the different people carrying out work in and around the building (staff tasked with maintenance work, inspectors, public distribution network operators, emergency services, etc.), it is imperative that the presence of a photovoltaic installation on a building is indicated.		P
15.2.1	**Labelling on the a.c.part**		
15.2.2	**Labelling on the d.c. part** All the junction boxes (PV generator and PV groups) and d.c. ducts must carry a visible and permanent marking indicating that live parts within these boxes may remalin under voltage even after the inverter has been disconnected on the direct current side.		P
15.2.3	**Labelling on the inverter** All inverters must bear a marking indicating that before any work is carried out, the two sources of voltage must be isolated.		P
15.3	**Specific Labels for Emergency Services Intervention**		P

Clause	Requirement	Comments	Result
16	**Technical file** The technical file must include the following items drawn up in French: ● A circuit diagram of the photovoltaic system; ● The list of installed equipment mentioning the characteristics and references to the replacement parts (fuses, lightning arrester cartridges etc.); ● An installation diagram for the various photovoltaic components and modules as well as the corresponding connections (ducts); ● A description of the procedure for working on the photovoltaic system and safety instructions.		P
17	**Maintenance of photovoltaic installations**		N/A
17.1	**General points** The minimal technical maintenance work must be provided for during the life cycle of a photovoltaic installation to maintain or restore the installation to a state in which it can fulfil the function for which it was designed.		N/A
17.2	**Levels and frequency of maintenance** A distinction is made between the following three levels of maintenance comprising: ● Conditional maintenance based on monitoring of the key parameters of the installation; ● Precautionary maintenance carried out according to the prognoses extrapolated from the analysis and evaluation of the key parameters concerning the degradation of the asset (e.g. corrosion); ● Systematic maintenance carried out at predetermined intervals and without a prior check of the state of the product or its constituent components.		N/A
17.3	**Technical areas covered during maintenance** A distinction is made between operations relating to the safety of persons and property, and actions relating to functional reliability.		N/A
17.3.1	**General points** Maintenance only covers the easily accessible electrical parts of the installation, described in 17.3.2 and 17.3.3.		N/A
17.3.2	**Points relating to the safety of persons and property**		N/A

Clause	Requirement	Comments	Result
17.3.3	**Points relating to the proper functioning**		N/A
Annex A	**Agreements between the administrator of the public distribution network and the user/produce**		N/A
A1	**Provisions for limiting effects adversely affecting supply quality** The study of the connection by the administrator of the public distribution network requires the communication of the characteristic data for the project, the generators and the provisions for connection to the network. The administrator of the public distribution network may disclose date sheets summarising the minimum list of data required to study the request.		N/A
A2	**Choice of tripping device and approval** The installation or modification of a tripping device must be subject to an agreement with the administrator of the public distribution network. This process knust take account of the situation and the features at the point of delivery and must therefore, where necessary, be coordinated with the connection study for the site.		N/A
A3	**Start-up by the administrator of the public distribution network** For installations with a power of less than 250 WA, this step is subject to prior submission of proof of conformity stamped by CONSUEL (Comite National pour la Securite des Usagers de l'Electricite, the National Committee for the Safety of Users of Electricity).		N/A
Annex B	**Cables for photovoltaic installations - values for permissible currents (informative)**		-
	Specific cables for photovoltaic installations have been refined in order to meet the needs of these installations. The tables below, taken from document UTE C 32-502, give the values for the permissible currents for cables compliant with this guide.		N/A
Annex C	**Keraunic levels in France and in the overseas departments (informative)**		-
Annex D	**Calculation of U_{ocmax} and I_{scmax}**		N/A

5 PICTURES

Front view for model ID800D, ID600D, ID400D

Back view for model ID800D, ID600D, ID400D


Front view for model ID800M, ID600M, ID400M

Back view for model ID800M, ID600M, ID400M

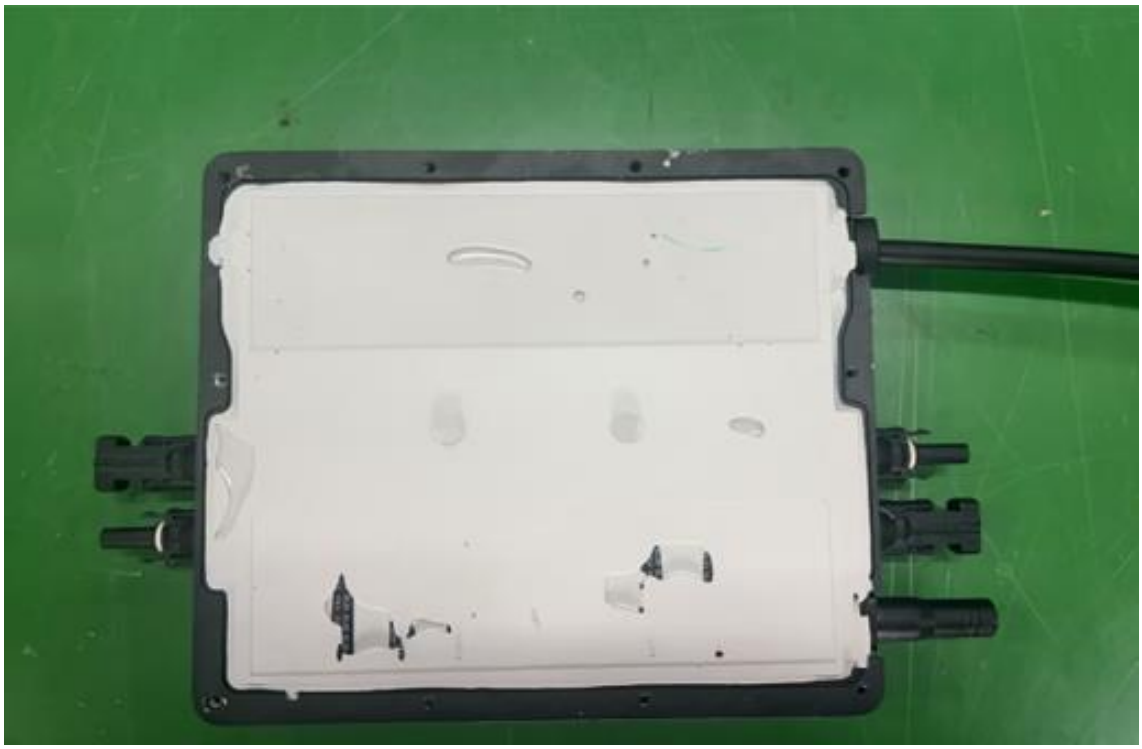
Front view for model ID800A, ID600A, ID400A

Back view for model ID800A, ID600A, ID400A


Internal view of appearance

Front view of main board

Back view of main board

After gluing


Serial Number

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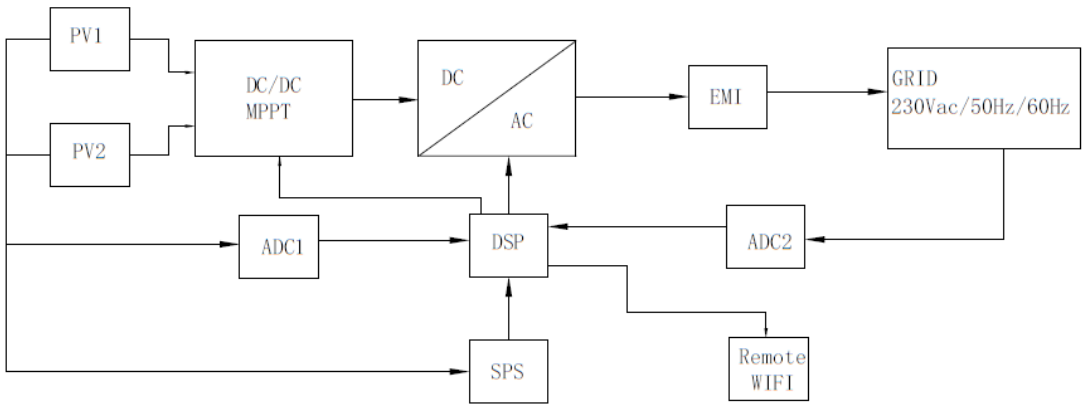

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