

Document version: 1		Date: Month / Year
TEAM: XXX – YYY TEAM – HOUSE NAME		GENERAL COMMENTS: ▪
<p>Important:</p> <ul style="list-style-type: none"> ▪ In what follows, “C” means “Compliant”; “NC” means “Not Compliant”; “PC” means “Partially Compliant”; “MI” means “More information needed”; and “NA” means “Not Applicable”. Answers must be provided to the “NC”, “PC” and “MI” issues listed in this document. ▪ Teams are kindly requested to include their answers/comments in this document and create a new version that will be sent back to the SDE Organization together with updated versions of the Project Manual (Contest Support Document) and Drawings specific sections of the Photovoltaic installation. ▪ This process will be repeated until the electrical safety of the photovoltaic installation is guaranteed, leading to the documentation approval by the SDE Organization. ▪ Approval of the Photovoltaic installation (Project manual and Drawings— and <i>in situ</i> in the Solar Village) is a necessary condition for participating in contest 4 (Electrical Energy Balance) during the Contest week. Non-approved Photovoltaic installations will remain safely disconnected during that period. 		
General		
Rule 7.3.d	Photovoltaic installation size (nominal power of all power conditioning connected to PV generation (units: kW))	
	Brand(s), model(s) and nominal power (units: kW) of DC/AC power conditioning equipment (inverters)	
	Brand(s) and model(s) and nominal power (units: kW) of DC/DC power conditioning equipment	
Rule 7.4.d	<i>Only applicable to PV systems with hard-wired battery bank:</i>	
	Brand, model and nominal power of battery inverter (units: kW)	
	Battery inverter manufacturer certificate: compatibility with TT distribution grid	
	Nominal operation voltage of the battery bank (units: V)	
	Nominal capacity of the battery bank (units: Ah)	
Photovoltaic system design – Compliance with standard IEC 60364-7-712		
712.312	Types of distribution system	
712.312.2	Types of system earthing <i>Indicate the type selected, from the following options:</i> <ul style="list-style-type: none"> ▪ <i>None of the live conductors on the DC side is earthed.</i> ▪ <i>One of the live conductors on the DC side is earthed, if there is at least simple separation between the DC side and the AC side.</i> 	SDE comment: Team’s comment:
712.4	Protection for safety	
712.41	Protection against electric shock	
712.411	Protection against direct and indirect contact <ul style="list-style-type: none"> ▪ <i>Measures adopted to guarantee protection against direct and indirect contact.</i> 	SDE comment: Team’s comment:
712.413	Fault protection <ul style="list-style-type: none"> ▪ <i>Measures adopted (and protective devices used) to guarantee fault protection on DC and AC sides.</i> 	SDE comment:

		Team's comment:
712.433	Protection against overload on the DC side <ul style="list-style-type: none"> Measures adopted to guarantee protection against overload on the PV modules and DC cables (PV string cables, PV array cables, PV DC main cable). 	SDE comment: Team's comment:
712.434	Protection against short-circuit currents <ul style="list-style-type: none"> Measures adopted to guarantee protection against short-circuit currents on the PV supply cable. 	SDE comment: Team's comment:
712.444	Protection against electromagnetic interference in buildings <ul style="list-style-type: none"> Measures adopted to minimize voltages induced by lightning. 	SDE comment: Team's comment:
712.5 712.511	Selection and erection of electrical equipment Compliance with standards <ul style="list-style-type: none"> Compliance with standards of the PV modules and junction boxes used. 	SDE comment: Team's comment:
712.512	Operational conditions and external influences <ul style="list-style-type: none"> Voltage compatibility between the PV strings/PV array/PV generator and inverter. If blocking diodes are used, reverse voltage compatibility with the corresponding PV strings. 	SDE comment: Team's comment: SDE comment: Team's comment:
712.513	Accessibility <ul style="list-style-type: none"> Location of electrical equipment (PV modules, junction boxes, inverter, protection devices, etc.) must guarantee proper operation and maintenance, according to good design & installation practices and manufacturers' indications. 	SDE comment: Team's comment:
712.52 712.522	Wiring systems Selection and erection in relation to external influences <ul style="list-style-type: none"> Selection criteria of DC cables (PV string cables, PV array cables and PV DC main cables) to minimize the risks of earth faults and short-circuits. Selection criteria of wiring systems in order to withstand the expected external influences. 	SDE comment: Team's comment: SDE comment:

		Team's comment:
712.53	Isolation, switching and control	
712.536	Isolation and switching	SDE comment:
	<ul style="list-style-type: none"> ▪ Means of isolating the PV inverter from the DC side and AC side. 	Team's comment:
	<ul style="list-style-type: none"> ▪ Warning labels to be placed on all junction boxes. 	SDE comment:
		Team's comment:
712.54	Earthing arrangements, protective conductors and protective bonding conductors	
	<ul style="list-style-type: none"> ▪ Location of protective equipotential bonding conductors, if applicable. 	SDE comment:
		Team's comment:
Photovoltaic system design – Compliance with standard IEC 61727 and Royal Decree 1663/2000		
4	Utility compatibility	
4.1	Nominal voltage and frequency	
4.2	Voltage operating range (230V+10% = 253V, 230V-15% = 195.5 V)	
4.5	Frequency operating range (50Hz + 1 Hz, 50Hz – 1Hz)	
5.2	Over/under voltage and frequency	
	Automatic switch integrated in the inverter, if the following conditions are met (specify compliance):	SDE comment:
	a) Connection/disconnection tasks are performed by a contactor that rearms automatically once the voltage and frequency have recovered to within the expected ranges.	
	b) The contactor shall be normally governed by the inverter, manual activation is also possible.	
	c) The state of the contactor ("on/off") will be clearly shown in the front part of the inverter.	
	d) Sealing of the protections against over/under voltage and frequency will be possible, or the inverter manufacturer shall certify:	
	1. The limiting values of the over/under voltage and frequency protections.	
	2. The type and characteristics of the device used to detect over/under voltage and frequency (model, brand, calibration, etc.).	
	3. That the inverter has passed specific tests related to the voltage and frequency limits.	Team's comment:
	e) If the over/under voltage and frequency protections are performed by software, certificate of the inverter manufacturer, where it is mentioned explicitly that the software is not accessible to the PV system user.	
5.5	Earthing	
	<ul style="list-style-type: none"> ▪ Earthing of PV system compatible with TT systems 	SDE comment:

		Team's comment:
	<ul style="list-style-type: none"> Galvanic separation between the LV distribution network and the PV system, by means of an isolation transformer (included in or external to the inverters) or any other means fulfilling the same function, based on state-of-the-art technological development (specify which). <p>Note: inverters with high-frequency transformers or transformerless inverters are permitted, provided that the manufacturer provides a certificate guaranteeing that the maximum DC current to be fed into the grid is smaller or equal than 0.5% of the nominal output current of the device.</p>	SDE comment:
		Team's comment:
Photovoltaic system design – Maintenance		
	Maintenance plan, with specific recommendations for: Photovoltaic modules/generator(s), supporting structure, inverter(s), cables and wiring methods, protections and earthing system.	SDE comment:
		Team's comment:
Photovoltaic system drawings		
<p>Note: Drawings reference numbers shown below indicate the minimum drawings required for approval. Additional drawings can be included, provided that they respect the corresponding section, for example: for particular details of DC circuits, new drawings with reference numbers PV-012, PV-013,... up to PV-019 can be added. The same applies to particular details of the PV system as a whole (new drawings: PV-002 to PV-009), AC circuits (PV-022 to PV-029) and Grounding system (PV-031 to PV-039)</p>		
		General comment: Please adapt your drawings reference numbers to the specifications indicated below.
PV-001	Photovoltaic system: General This drawing shall be electrical and include the interfaces with the electrical installation of the house and the electricity distribution network	SDE comment:
		Team's comment:
PV-011	Photovoltaic system: DC circuits This drawing shall be electrical and include information about wiring (section, type), protections (current characteristics) and wiring methods of DC circuits	SDE comment:
PV-021	Photovoltaic system: AC circuits This drawing shall be electrical include information about wiring (section, type), protections (current characteristics) and wiring methods of AC circuits	SDE comment:
		Team's comment:
PV-031	Photovoltaic system: Grounding system This drawing shall include information about wiring (section, type) and wiring methods of the grounding system, including DC and AC circuits	SDE comment:
		Team's comment: