Technical Bulletin No: 48-2025

Title:	Testing and Inspection of Photovoltaic (PV) Arrays and systems in the hire fleet
Priority:	Green – Opportunity to Improve
Legislation:	PUWER, HASWA S2 & S3, E@WR, BS 7671 - 18th Edition IET Wiring Regulations (Section 717)
Brief Description:	Guidance for the regular inspection and test of the DC Side of PV Arrays incorporated into equipment used for rental purposes.
Equipment Affected:	PV Powered Equipment, PV Generators, and Welfare Units.

Overview:
A wide range of equipment is now supplied with PV systems to supply power to site, either as a means of powering the item on hire or as a method to supply power to site.

PV Panels are classed as a voltage generation source and can be hazardous in nature due to the amount of DC Voltage and current generated when placed in direct sunlight, so can pose a hazard to users and general public if in an unsafe state.

As with any other electrical device or system, regular inspection and testing is recommended to ensure electrical safety has not been compromised.

In addition, over time panels may decrease in their output, ether due to wear and tear or damage to the system, regular checks of the output of the system can help to ensure these modules are performing as expected by the end user, where the PV generating voltage may hold a critical requirement, i.e. no access to mains power or to charge critical batteries.

A typical DC PV system may include some or all of the following items that should be inspected for signs of damage at regular intervals:

1. PV Module(s) – One to many depending upon the voltage / current requirements of the system
2. PV Cable – To transmit power to the load
3. PV Connectors – Most commonly MC4 connectors
4. DC Isolator Switch – To disconnect the DC Voltage for maintenance

In addition, regular testing of the system using a dedicated PV Installation tester can identify issues with the electrical safety and operating output of the system, and should be considered as a regular and routine activity within the hire industry

For further resources and information on PV Testing, Seaward has a number of useful guides and webinar content

PV Guide: **https://www.seaward.com/gb/support/guides/solar/**

PV Webinars - **https://www.seaward.com/gb/support/webinars/solar/**

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Examples of PV Powered Hire equipment and key ancillary equipment:

Example 1: Solar Powered Lighting Tower

Example 2: Solar Hybrid Generator

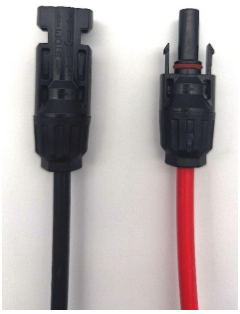
Example 3: Site accommodation unit with Solar Smart Frame

Fig.1: Solar Smart Frame

1 - PV Module

2 - PV Cable

3 - PV Connector (MC4 connection)



4 - DC Isolator Switch

Recommended Actions:

- Risk assess all PV powered equipment in the fleet.
- Pre-Hire inspections should be carried out in relation to all PV systems and equipment.
- Training for staff to inspect and test PV systems and equipment.
- Implement a regime of regular inspection of all cables, connectors and panels for signs of damage.
- Implement a regime of regular dedicated PV system testing to ensure electrical safety has not been compromised and that voltage generation is at expected levels.
- Ensure appropriate PPE is used whenever testing is required.
- Ensure end users are briefed regarding care and maintenance of the equipment including inspection for safety.

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Item Name(s)	Image	Description	Uses in Hire	Maintenance / Care Required	Test/Calibration Method	Suggested Frequency
PV Test Equipment		A multi-function electrical test meter	For performance of electrical safety testing and performance measurement of Photovoltaic modules and systems. Performs continuity and Insulation resistance for safety. Performs Open Circuit Voltage and short Circuit current measurements for performance.	Battery replacement as required. Storage care (dry / protected from damage) and checking lead integrity / condition before use e.g. Regular calibration of device.	Performed by dedicated providers.	Period not exceeding 12 months.
Irradiance Meter		A device to measure the strength of the sunlight during the time performance measures are taken.	To compare performance characteristics against manufacturers specifications of PV systems. Current generation is directly linked to the strength of the sunlight (measured in watts per meter squared)	Battery replacement as required. Storage care (dry / protected from damage) and checking lead integrity / condition before use e.g. Regular calibration of device.	Performed by dedicated providers.	Period not exceeding 12 months.
Clamp Meter		A clamp meter designed to measure currents flowing in the PV cables.	Used to ensure absence of current prior to disconnection / reconnection of connectors.	Battery replacement as required. Storage care (dry / protected from damage) and checking lead integrity / condition before use e.g. Regular calibration of device.	Calibration by suitable competent person to manufacturers standard. Can be completed at branch or by sending item away.	Period not exceeding 12 months.

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