

## Short-Course

# Solar PV System Installation and Maintenance

## NTQF Level III

### Learning Guide -18

|                           |  |
|---------------------------|--|
| <b>Unit of Competence</b> | <b>Install off-grid solar PV system</b>    |
| <b>Module Title</b>       | <b>Installing off-grid solar PV system</b> |
| <b>LG Code</b>            | <b>EIS PIM3 M10 120 LO6 LG-18</b>          |
| <b>TTLM Code</b>          | <b>EIS PIM3 TTLM 0120 v1</b>               |

**LO 6:- Notify completion of installation work -**

**18**

This learning guide is developed to provide you the necessary information, knowledge, skills and attitude regarding the following content coverage and topics:

- Completing forms related to the conducted job
- Completing installation activities report
- Documenting as-installed apparatus and associated equipment
- Notifying completion of work by appropriate person
- Using appropriate medium to transfer information
- Informing system operation, routine maintenance and limitations to customer

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:-

- Complete forms related to the conducted job
- Complete installation activities report
- Document as-installed apparatus and associated equipment
- Notify completion of work by appropriate person
- Use appropriate medium to transfer information
- Inform system operation, routine maintenance and limitations to customer

### Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below:
3. Read the information written in the information Sheet 1 (page: 171), Sheet 2 (page: 173), Sheet 3 (page: 176), Sheet 4 (page: 179), Sheet 5 (page: 182), Sheet 6 (page: 184)
4. Accomplish the Self-Check 1 (page: 172), Self-Check 2 (page: 175), Self-Check 3 (page: 178), Self-Check 4 (page: 181), Self-Check 5 (page: 183), Self-Check 6 (page: 191)

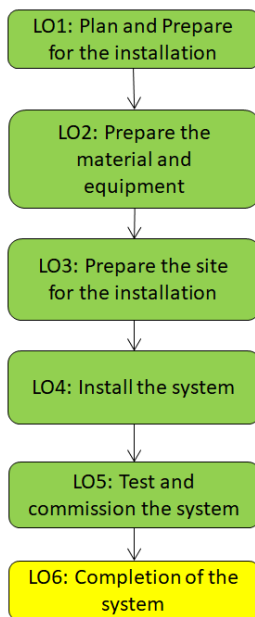
## LO 6:- Notify Completion of installation work

|                     |   |
|---------------------|---|
| Information Sheet 1 | Completing forms related to the conducted job |
|---------------------|---|

### 1 Completing forms related to the conducted job

#### 1.1 Introduction

The last step is notifying the completion of the installation and to finalise the paperwork. See Figure 110 for a high level overview of the process that will be followed in Module 10. LO6 (in Yellow) deals with the completion of the installation work including notification and finalising all the paperwork.



**Figure 110: Installation Process**

#### 1.2 Forms

At the end of the job, there is some paperwork that needs to be done. This includes:

- Completion of the installation activity report; (Information Sheet 2)
- Updating all the drawings and documents to reflect the as-built system. (Information Sheet 3);
- Complete the work completion report for the customer (Information Sheet 4).

|                        |                     |
|------------------------|---------------------|
| <b>Self-Check - 11</b> | <b>Written Test</b> |
|------------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

| N°       | Questions and answers                    |
|----------|--|
| <b>1</b> | <b>What should the job card include?</b> |
|          |  |

|                |                |
|----------------|----------------|
| Satisfactory   | 4 points       |
| Unsatisfactory | Below 2 points |

**Answer Sheet**

|               |
|---------------|
| Score = _____ |
| Rating: _____ |

Name

Date

## 2 Completing installation activity report

### 2.1 Work Completion Report

A spread sheet or other reporting format is used for collecting data, calculating results and reporting purposes. Inputs for such a system may be downloaded from a data collection and monitoring system or combination of systems, or they may be input manually. Regardless of the method, the inputs should be standardized for consistent results.

Reports should include the following elements, at a minimum:

- System name, address/location
- System size, type (fixed, tracking), module, inverter, pitch and azimuth
- Name of person(s) performing the tests and reporting the results
- Test equipment used (monitoring/model, irradiance sensor, temperature sensor, etc.)
- Period of time for measurements
- Number of measurements taken and used
- Irradiance measured
- Temperature measured (and conversion of ambient to module/cell if appropriate)
- Uncertainty of the test results and acceptable tolerance
- Notes on any significant findings or observances
- Summary and narrative of the outcome (lab report).

|  |  |                       |  |
|--|--|-----------------------|--|
| <b>installation of solar electric system</b>   |  | <b>Job nr.:</b>       |  |
| company name:  |  | client name:          |  |
| company adress:  |  | client adress:        |  |
| installer name:  |  | installation site:    |  |
| installation date:   |  |                       |  |
| <b>technical details</b>   |  |                       |  |
| the solar electric system is designed to:  |  |                       |  |
| solar module specifications:   |  | qty:                  |  |
| charge controller specifications:  |  | qty:                  |  |
| battery specifications:  |  | qty:                  |  |
| inverter specifications:   |  | qty:                  |  |
| combiner box:  |  | qty:                  |  |
| battery fuse:  |  | qty:                  |  |
| surge protective devices:  |  | qty:                  |  |
| other equipment:   |  | qty:                  |  |
| other equipment:   |  | qty:                  |  |
| other equipment:   |  | qty:                  |  |
| other equipment:   |  | qty:                  |  |
| <b>documentation handed over</b>   |  |                       |  |
| manual for charge controller   |  | system logbook        |  |
| manual for inverter  |  | maintenance guide     |  |
| manual for batteries   |  | troubleshooting guide |  |
| The installer assures that the system is fully functional according to its intended design and in accordance with the regulations of the Nigerian electricity regulatory comission : |  | date:                 |  |
|  |  | sign:                 |  |
| the client confirms that the system is fully functional according to its intended design and to have received all relevant documentation and instructions to operate the system      |  | date:                 |  |
|  |  | sign:                 |  |
| if technical assistance is required contact:   |  |                       |  |

Figure 111: Work Completion Report sample

•

|                       |                     |
|-----------------------|---------------------|
| <b>Self-Check - 2</b> | <b>Written Test</b> |
|-----------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

| N° | Questions and answers                         |
|----|---|
| 1  | What are the work completion report contents? |
|    |   |

|                |                |
|----------------|----------------|
| Satisfactory   | 10 points      |
| Unsatisfactory | Below 6 points |

**Answer Sheet**

|               |
|---------------|
| Score = _____ |
| Rating: _____ |

Name

Date

|                            |  |
|----------------------------|--|
| <b>Information Sheet 3</b> | <b>Documenting as-installed apparatus and associated equipment</b> |
|----------------------------|--|

### 3 Documenting as-installed apparatus and associated equipment

#### 3.1 Introduction

It is very important to update all documentation to reflect the as-built system. There are often changes that have to be made to the system while installing and it should be reflected in the final documentation.

#### 3.2 Documentation to update

- System Data
- Name plate data –Rated Power, Manufacturers, Models and quantities of PV modules, charge controllers and inverters
- Cover page data- Contact information for the customer, system designer and system installer, Relevant project date
- Wiring diagrams
- Site drawings
- Data sheets
- O & M information
  - Procedure for verifying correct system operation
  - A checklist of what to in case of system failure
  - Emergency shut down and isolation procedures
  - Maintaining and cleaning recommendations
- Test results and commission data
- PV system documentation is a permanent record associated with a PV installation, including maintenance and testing records. This information is critical for the effective maintenance and evaluation of the system over time. Key components of a PV system documentation package should include the following:
  - The system DC and AC power ratings; the manufacturer, model and quantity of PV modules, inverters, batteries, controllers and all other major components, as applicable. The dates of the system installation, commissioning and inspection should also be noted.
  - The names, postal addresses, phone numbers and email addresses for the customer/owner, system designer, installation contractor and any other responsible parties or subcontractors.
  - A site layout identifying equipment locations on buildings or relative to property lines or easements. In some cases, a shading analysis and performance estimates may be provided with project proposals, and should also be including with the final system documents.



- A single line diagram depicting the overall system design, including the types of modules, total number of modules, modules per string and total number of strings; the types and number of inverters; and any other major components. For larger projects, complete as-built electrical and mechanical drawings are usually required at project close out.
- The types, sizes and ratings for all balance of- system components annotated on the single line diagram, or noted and provided in a separate table, including specifications for all conductors, raceways, junction boxes, source circuit combiner boxes, disconnects, overcurrent protection devices, and grounding equipment, as applicable.
- Data sheets and specifications for PV modules, inverters and other major components, including module mounting systems. For most inverters, installation and user/operator manuals are available and provide important information regarding the safe operation and maintenance of the equipment.
- Operation and maintenance information including procedures for verifying proper system operation and performance, and how to determine if there is a problem and what to do. Procedures for isolating/disconnecting
- Equipment and emergency shutdown procedures should also be provided. A maintenance plan and intervals should be provided for all routine (scheduled) system maintenance, such as array cleaning as required. Operating and maintenance guidelines should differentiate what tasks can be performed by the owner or caretakers, from those that require professional service due to the complexity of the tasks, special equipment needs, or safety concerns. Maintenance agreements, plans and recordkeeping forms or sheets should also be provided to document maintenance activities over time.
- Warranty details on major components indicating the terms and conditions, and how the warranty process is handled and by whom. System warranties should also be addressed, including quality of workmanship, roof weather sealing or performance warranties as applicable.
- Copies of all commissioning test reports and verification data.
- Contracting and financial details are also an important part of system documentation, and may be included with the technical items discussed above or under a separate file. These documents would include construction contracts, invoices and payments for materials and labour, building permits, inspection certificates, interconnection agreements, and applications and approvals from incentive programs, such as rebates and tax forms.

|                       |                     |
|-----------------------|---------------------|
| <b>Self-Check - 3</b> | <b>Written Test</b> |
|-----------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

| N°       | Questions and answers                                     |
|----------|---|
| <b>1</b> | <b>Point out some of the documentation to update. (8)</b> |
|          |   |

|                |                |
|----------------|----------------|
| Satisfactory   | 6 points       |
| Unsatisfactory | Below 5 points |

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name

Date

## Information Sheet 4

## Notifying completing of work by appropriate person

## 4 Notifying completing of work by appropriate person

### 4.1 Work Completion Report

At the end of the work, the customer should be presented with a record of what was done. See Module 13 LO1 for a sample RAL Acceptance Record document. This should include important information pertaining to the following:

- General Information
  - Client Contact details.
  - Location of the installation.
  - Installer contact details.
- Technical Specifications of the installation
  - Type of plant e.g. Grid-connected, Off-grid etc.
  - Nominal power of PV plant.
  - Details of modules, Charge Controller, Inverter, batteries.
  - Protective devices.
  - Critical measurements.
- Visual Checklist (verification against quotation)
  - General mounting – check for damages to property e.g. roof etc.
  - Mounting system
  - Cabling and cable path
  - Charge Controller
  - Protective devices
  - Batteries
  - AC Inverter
  - Monitoring system (if installed)
  - Cleanness
  - Installation according to contract/quotation
- Reasonability Check
  - Plant is fully operational?
  - Environmental conditions e.g. temperature, irradiation
  - DC output Power
  - AC output power
- Measurements
  - Open circuit voltages
  - Short circuit currents
  - Battery voltages
- Deficiencies, Rework requirements
- List of documentation provided

- Technical drawings
  - For all components operation manuals, installation manuals, data sheets, warranty certificates.
  - List of serial numbers.
  - Measurement protocols.
  - Service contact information.
  - Documented customer dialogue.
  - Proof of client's instruction (RAL document).
  - Any other protocol prepared during planning and installation phase.
  - Ensure that the installation strictly adheres to relevant electrical installation codes
- Client Approval
  - Client and Installer signatures

### 4.2 Reporting Performance Results

Ultimately, an owner or O&M provider should be able to generate EPI reports within the data collection and monitoring system, without the need to download monitoring data to another reporting system. This requires incorporating a standard PV energy production model into the monitoring system. This system should also use standardized methods of collecting weather and irradiance data. The data collection and monitoring system will then be capable of producing Predicted Energy from the design model, Expected Energy from real operating conditions, and Measured Energy. If a standardized method of incorporating the model and actual weather and irradiance data is used in any monitoring system, then monitoring results will be consistent across all platforms

|                       |                     |
|-----------------------|---------------------|
| <b>Self-Check - 4</b> | <b>Written Test</b> |
|-----------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

|           |  |
|-----------|--|
| <b>N°</b> | <b>Questions and answers</b>                                     |
| <b>1</b>  | <b>What should be included in a Completion work notification</b> |
|           |  |

|                |                |
|----------------|----------------|
| Satisfactory   | 4 points       |
| Unsatisfactory | Below 2 points |

**Answer Sheet**

|                                    |
|------------------------------------|
| Score = _____<br><br>Rating: _____ |
|------------------------------------|

Name

Date

## 5 Using appropriate medium to transfer information

The appropriate medium for transferring information could be done in different ways. This should be explained at the time of project agreement. Mostly the main medium to transfer information used in project activities is writing.

An owner or O&M provider should be able to generate EPI reports within the data collection and monitoring system, without the need to download monitoring data to another reporting system.

The customer should get copies of all documentation relevant to the system either in hard copy format or electronic format.

The installation company should keep a full set of documentation.

|                     |                     |
|---------------------|---------------------|
| <b>Self-Check 5</b> | <b>Written Test</b> |
|---------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

|           |   |
|-----------|---|
| <b>N°</b> | <b>Questions and answers</b>  |
| <b>1</b>  | <b>What is the mostly used medium for transferring information?</b> |
|           |   |

|                |                |
|----------------|----------------|
| Satisfactory   | 2 points       |
| Unsatisfactory | Below 2 points |

**Answer Sheet**

|               |
|---------------|
| Score = _____ |
| Rating: _____ |

Name \_\_\_\_\_

Date \_\_\_\_\_

|                            |  |
|----------------------------|--|
| <b>Information Sheet 6</b> | <b>Informing system operation, routine maintenance and limitations to customer</b> |
|----------------------------|--|

## **6 Informing system operation, routine maintenance and limitations to customer**

### **6.1 Introduction**

Installers should train the end-user after the solar PV installation in the proper using and maintaining of the system. Because users are interacting with the system every day, they have to have awareness about the installed system. What equipment can be used or plugged to the systems, for how long and dos and don'ts.

Most system owners are paying a lot of money to have PV systems installed, and they have the right to expect the systems to perform for them. An annual site inspection should be considered in the initial sale. If you've installed batteries in a client's system, you need to plan on more than the annual maintenance check for optimal performance.

As long as someone is monitoring the system output on a regular basis, any problems can be detected and dealt with rather quickly. It's when the system isn't being monitored that problems arise. The question then becomes: How long has there been a problem, and who's at fault for not catching it?

Modern systems have monitoring options with the capacity to send an alert via e-mail or text message when a problem occurs. Depending on the monitoring sophistication and options the system owner signs up for, this alert can be a notification of low power production, or it can be an actual error code indicating a problem with the array. Very often, these more advanced features can notify multiple people (including you) when an error occurs. If you can call your client to notify her that you're aware of a system issue before she is, you'll look like a hero (Mayfield, 2010).

In general, clients should be informed about:

- Procedures for verifying correct system operation.
- A check list of what to do in case of system failure.
- Emergency shutdown and isolation procedures.
- Maintenance and cleaning recommendations.
- Using energy sensibly.

### **6.2 Train the user**

The user should be trained on the following aspects of the system:

- Understanding the installed system and components and their function.
  - Solar Module, Charge controller, Battery, inverter, etc.
- How to clean the modules when they are dirty and the advantage of cleaning it.

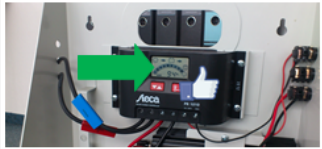
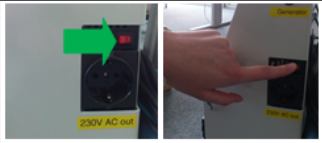




- Saving energy.
  - Switching off the lights when not in use.
  - Which appliances to use and which ones use too much energy,
  - How to monitor energy usage.
- Proper maintenance of the batteries. (See Module 13 LO3);
- Whom to communicate with when problems arise.
  - Contact details of the installer or technician.

SHS for Bolivia

### 3 How to use the SHS

When the system is ready installed you can start to connect your consumers such as lamps, a TV or a radio. Below you find a description how to use the SHS.

|   |   |
|---|---|
| <p><b>1</b></p> <p>Check the Charge Controller if the State of Charge (SOC) of the battery is over 30%. If not you should wait until it is charged again in order not to destroy the battery.<br/><b>Check this every time you want to use the SHS.</b></p> |    |
| <p><b>2</b></p> <p>Switch on the inverter. You find the button.</p>   |    |
| <p><b>3</b></p> <p>Check if the small lamp shines green. If yes your system is ready.</p>   |   |
| <p><b>4</b></p> <p>Connect your consumers to the inverter.</p>  |  |

SHS for Bolivia



|   |   |
|---|---|
| <p><b>5</b></p> <p>You can use a multi socket if you want.</p>  |    |
| <p><b>6</b></p> <p><b>CAUTION!</b> The capacity of the system is limited. The inverter can only handle connections up to 600 W. So make sure that you do not connect more than 600W. Check the given W-amount on the consumers and add up the number to see if you can connect them at the same time.</p> | <p><b>Example 1:</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p><b>OmniBlend V</b></p> <p>MODEL : TM-800A</p> <p>VOLTAGE : AC 110-130V~</p> <p>FREQUENCY : 50-60Hz</p> <p>POWER : 950W</p> <p>HOUSEHOLD USE ONLY</p> <p>FILE NO. E248336</p> <p>DATE OF MANUFACTURE: Mar. 2018</p> </div> <p>950W! This blender will destroy the inverter.<br/><b>Do not connect.</b></p> |
| <p><b>Example 2:</b></p> <p>Please see below the labels of a TV and speakers: 149 W + 20 W = 169 W ✓</p> <p>These two consumers could be connected to the SHS at the same time.</p>   | <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;"> <p><b>SONY</b></p> <p>LED DIGITAL COLOR TV / TELEVISION COULEUR NUMÉRIQUE</p> <p>110 V ~ 240 V ~ 50/60 Hz 149 W</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p><b>FC</b></p> <p>12V 2700 DC 20W</p> </div> </div> <p>149 W + 20 W = 169 W ✓</p>                            |
| <p><b>5</b></p> <p>Switch off!:</p> <p>At night and when the system is not in use, you have to switch off the inverter to save electricity.</p>   |    |

Figure 112: Example system usage instructions

Inspection Protocol

|                   |                                 |                                |   |      |      |      |
|-------------------|---------------------------------|--------------------------------|---|------|------|------|
| Name of inspector | Room temperature                | Charge mode (float, boost,...) | PV Generator voltage in V (at combiner box) | 1-1: | 2.1: | 3.1: |
| Date, time        | Total voltage battery bank in V | State of charge in %           |   | 1.2: | 2.2: | 3.2: |
|                   |                                 |                                |   | 1.3: | 2.3: | 3.3: |

| Cell number | Cell voltage in V | Electrolyte density in kg/l | Electrolyte temperature in °C | Electrolyte level (okay/n.okay) |
|-------------|-------------------|-----------------------------|-------------------------------|---------------------------------|
| 1           |                   |                             |                               |                                 |
| 2           |                   |                             |                               |                                 |
| 3           |                   |                             |                               |                                 |
| 4           |                   |                             |                               |                                 |
| 5           |                   |                             |                               |                                 |
| 6           |                   |                             |                               |                                 |
| 7           |                   |                             |                               |                                 |
| 8           |                   |                             |                               |                                 |
| 9           |                   |                             |                               |                                 |
| 10          |                   |                             |                               |                                 |
| 11          |                   |                             |                               |                                 |
| 12          |                   |                             |                               |                                 |
| 13          |                   |                             |                               |                                 |
| 14          |                   |                             |                               |                                 |
| 15          |                   |                             |                               |                                 |
| 16          |                   |                             |                               |                                 |
| 17          |                   |                             |                               |                                 |
| 18          |                   |                             |                               |                                 |
| 19          |                   |                             |                               |                                 |
| 20          |                   |                             |                               |                                 |
| 21          |                   |                             |                               |                                 |
| 22          |                   |                             |                               |                                 |
| 23          |                   |                             |                               |                                 |
| 24          |                   |                             |                               |                                 |

Notes:

Figure 113: Battery inspection Sheet

6.3 Maintenance

A maintenance program should be developed and followed for every photovoltaic power system. The maintenance program should include considerations for structural, Electrical and mechanical components of the system.

Table 11: Sample maintenance schedule

|  |
|--|
| Weekly Maintenance   |
| <ul style="list-style-type: none"> <li>Observe Battery state of charge</li> </ul>  |
| Monthly Maintenance  |
| <ul style="list-style-type: none"> <li>Check and add water to battery electrolyte</li> <li>Wipe electrolyte residue from the top of the battery</li> <li>Inspect the charge controller for proper indicator light sequence</li> <li>Equalize batteries if specific gravity difference between any adjacent cell is greater than 15 points( e.g. 1.250 vs. 1.265)</li> <li>Inspect array for broken panels</li> <li>Wash array</li> </ul> |
| Annual maintenance   |
| <ul style="list-style-type: none"> <li>Check array wiring for physical damage and wind chafing</li> <li>Check array mounting hardware for tightness</li> </ul>   |

- Inspect inverter. Remove dust or dirt
- Inspect system wiring for poor connections. Look for signs of excessive heating
- Inspect battery terminals for corrosion. Clean and apply anti-oxidant petroleum jelly as necessary
- Inspect controller for proper operation
- Verify output from the array (Isc and Voc and if possible Imp and Vmp)

|                       |                     |
|-----------------------|---------------------|
| <b>Self-Check - 6</b> | <b>Written Test</b> |
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Answer all the questions listed below. Use the Answer sheet provided in the next page:

| N°       | Questions and answers                               |
|----------|---|
| <b>1</b> | What do you check on Annual check?                  |
|          |   |
| <b>2</b> | When do you Inspect battery terminals for corrosion |
|          |   |

|                |                |
|----------------|----------------|
| Satisfactory   | 10 points      |
| Unsatisfactory | Below 6 points |

**Answer Sheet**

|                                    |
|------------------------------------|
| Score = _____<br><br>Rating: _____ |
|------------------------------------|

Name

Date

#### 6.4 Completing appropriate documentation

A system description with circuit diagrams, an operation and maintenance plan, should be presented to the user. The designer or installer should read through the operation / maintenance plan with the client, and perhaps have them sign a copy asserting that they have read the instructions. A copy of the operation and maintenance plan should be left with the client. All major components and switch gear should be labelled and be easily accessible for service.



Acceptance Record in accordance with the Requirements of the RAL-P3 GZ 966 for Photovoltaic Installations  
English Version October 2012

## Customer Briefing

Minimum requirements for a Customer Instruction according to the RAL Quality Label  
"Photovoltaic Installations" RAL GZ 966, Adapted by DGS Thuringia for South Africa

### The following was discussed with the customer

- Functionality and operation of the entire system have been explained to the customer.
- The customer has been informed about the basic functionality of the main components (modules, inverter, cabling, main DC insulator/switch, protection equipment, meters etc.).
- The customer has been informed about the location of the main components of the installation (modules, inverter, cabling, main DC switch, protection equipment, meters etc.).
- User manuals have been delivered to the customer (especially for inverter and modules).

If applicable:

- The customer has been informed about the location of the monitoring systems and informed about its function.

### Service contact details

- Service contact details at visible locations on critical components, e.g. inverter, data recorder, battery bank, etc.

### Relevant operations and necessary actions were explained

- Normal operation: The plant is working (producing energy and feeding in) with sufficient radiation, respective display on the inverter.
- Sufficient radiation, but the inverter does not work, showing malfunction reports or switching on and off for indicating errors etc.
- In case of malfunction the customer should:
  - Switch off the PV plant (DC insulator/switch, fuses).
  - Inspect for obvious faults such as loose connections, brittle cables or physical damage to any component.
  - Contact the installer (see service phone number).

### System tests and inspections

The installation contractor shall be responsible for annual inspection of the installation. All maintenance activities listed in the user's manual shall be adhered to.

- It is recommended to check plant yield and report at least on a monthly basis (if not constantly monitored).
- Where possible, dirt (leaves, bird droppings etc.) shall be removed from PV-modules by washing.
- The following annual inspections should be performed:
  - Changes to the configuration or set-up of plant / PV array / roof (e.g. after thunderstorms etc.)
  - Functional testing for the integrity of all protective equipment (eg. earthing, lightning protectors, etc.)
  - Visual inspection of all components for physical damage, including panels, cables, connectors, mounting brackets, etc.

### Monitoring system (if applicable)

- The monitoring system is installed and working.
- The customer was informed how to use the monitoring system.
- The operating manual was handed to the customer.
- The customer was duly trained to perform plausibility check of the yields.
- The customer was trained to assess essential values that may indicate malfunctions.

| Signed by customer |  |
|--------------------|--|
| Location:          |  |
| Date:              |  |
| Name:              |  |
| Capacity:          |  |
| Signature:         |  |

| Signed by installer |  |
|---------------------|--|
| Location:           |  |
| Date:               |  |
| Name:               |  |
| Capacity:           |  |
| Signature:          |  |

Figure 114: RAL Customer Briefing

|                       |                     |
|-----------------------|---------------------|
| <b>Self-Check - 7</b> | <b>Written Test</b> |
|-----------------------|---------------------|

Answer all the questions listed below. Use the Answer sheet provided in the next page:

|           |  |
|-----------|--|
| <b>N°</b> | <b>Questions and answers</b>   |
| <b>1</b>  | <b>What should the installer present at the time of work completion?</b> |
|           |  |

|                |                |
|----------------|----------------|
| Satisfactory   | 5 points       |
| Unsatisfactory | Below 3 points |

**Answer Sheet**

|               |
|---------------|
| Score = _____ |
| Rating: _____ |

Name

Date

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