

Review of System Maintenance and Troubleshooting of Solar Photovoltaic Grid Connected System

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Abstract:-In a solar system, like any other equipment installation, the life time of the system is dependent is shortened if the system is not well maintained. Considering the cost of such a large system, it is more than essential for the system to be maintained. In addition, like any other electrical equipment or system, troubles do occur and trouble chapter seeks to outline the major maintenance activities and also create a fault finding tree that makes it easier to identify faults and solve them in the shortest possible time.

Keywords:-solar system,fault finding tree,maintenance

I. INTRODUCTION

As with any mechanical or electrical appliance, PV systems require routine, periodic maintenance. System components may also need repair or replacement from time to time. An efficient and long-lasting system will depend on a periodic check of system components and completion of any preventive maintenance as necessary. In the event of a system malfunction, effective troubleshooting and repair is necessary. You may be able to carry out many routine inspections and maintenance tasks yourself.

1.1 Maintenance schedule for each component

For each major component in the grid connected PV system, the major maintenance schedule is outlined as follows:

Table 1.1 Maintenance schedule for Solar Array[2]

Maintenance activity	Period recommended
Clean modules	Every three months
Check all cabling for loose connections and mechanical damage	Every three months
Check mechanical security of the array Structure	Every three months
Check output voltage and current of each parallel string of the array and compare to the expected output under the same conditions	Every three months
Check for shading by trees and houses around modules	Every three months

Table 1.2 Maintenance schedule for Inverter, AC disconnect and Service panel[3]

Maintenance activity	Period recommended
Check if the all the units have not been invaded by spiders, rodents or insects.	Every months
Cleaning all units to minimize dust build Up	Every months
Check that all electrical connections are clean and tight	Every months

1.2 Maintenance logbooks

To have historical information about each of the equipment which can help show abnormal variations, future problems and changes in performance over time, all maintenance activities and their records must be kept. A book usually called a log book made up of loose sheets is used to keep these records.

The following are the individual log books prepared for this system. These sheets are ticked to show that that particular activity has been undertaken [3].

Table 1.3 Solar array log sheet [2]

Date	Module cleaned	Cabling in good condition	Array structure OK	Output voltage	Output Current	No shading	Comments

Table 1.4 Inverter, AC disconnect and service panel log sheets [3]

Applian	Activity	Date	Date	Date	Date
Inverter	No insect				
	All connection				
	The appliance				
AC Disconnect	No insect				
	All connection				
	The appliance				
AC main junction (service)	No insect				
	All connection				
	The appliance				

1.2 SYSTEM FAULT FINDING

The fault finding process for a system as large as this can be both tedious and time consuming (remember time is money!).

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In this section major fault occurrences likely to be encountered by operating each of the components is stated and the logical process to ascertain the fault cause is listed.

1.2.1 Solar Array Faults

Most likely fault occurrence – Solar array does not give similar current output under similar irradiation conditions in the past. Logical process for identifying fault cause[3]

1. Check for shading of the modules
2. Check for dirt on modules
3. Check for any loose wires
4. Check current output for each string and check if any of the strings give an unrealistic low figure.
5. If an underperforming string is identified, identify the particular module by shading each module successively and checking the relative changes in the ammeter reading. The module that when shaded does not result in any change in ammeter reading is faulty.

1.2.2 Inverter faults

Most likely fault occurrence – Inverter does not give required voltage output. Logical process for identifying fault cause[2]

1. Check for loose connections at input of Inverter
2. Then the fault is in the circuit board of the inverter and since the Trace sun-tied inverter comes with a 10 year warranty, the manufacturers are contacted for further instructions.

1.3 Grid Connected PV System Troubleshooting Tree

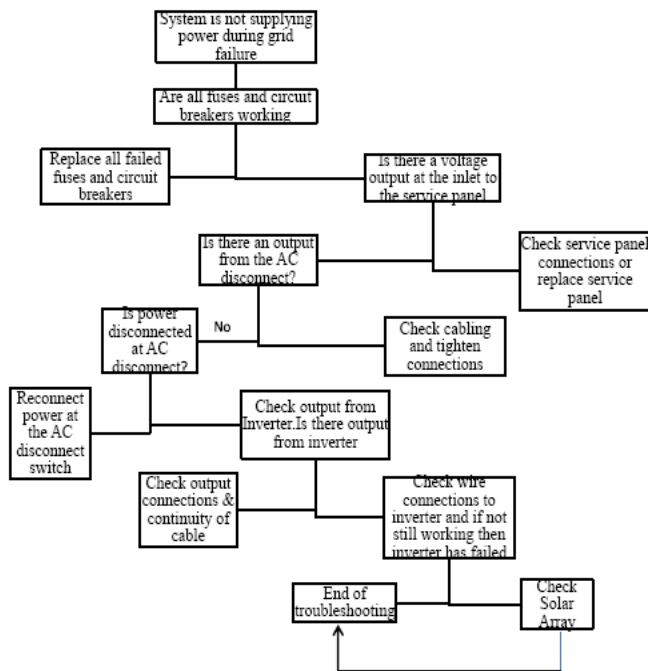


Figure 1.1 Troubleshooting tree[1],[4]

II. CONCLUSION

Introducing troubleshooting tree gives better periodic maintenance & preventive maintenance. Minor faults are repaired at the time of periodic maintenance & better solar array output is obtained.

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