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Photovoltaic panels measures

5th report

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1. Introduction

This report will illustrate the laboratory experience, carried out on 12 May 2023, focused on the study of photovoltaic panels.

In particular we have measured various operating values of three panels (SHARP,PANDA and BENQ) including voltage, current and temperature, in two different load configurations in order to trace the graph of the I/V characteristic.

The collection of data took place inside the courtyard of the ITT Buonarroti (TN), during the afternoon with suitable weather conditions,direct sun exposure, positioning the panels appropriately with an inclination of approximately 37° facing northwest.

We underline how the duration of the collection of the values has slightly compromised the reliability of the measurements, this is mainly due to the variable exposure conditions of the panels to solar radiation over time and the variation of temperature of the panels that reached 44°C starting from around 28°C .

2. Pv panels theory

3. Procedure

4. Tables

4.1 Benq PM245P00

Voltage [V]	Current [A]	Power [W]
33,7	0	0

Table 1: Open circuit

Voltage [V]	Current [A]	Power [W]
33,6	0,007	0,2
33,4	0,009	0,3
33,2	0,11	3,7
33,2	0,15	5,0

Table 2: Series

Voltage [V]	Current [A]	Power [W]
33,2	0,3	10,0
33	0,36	11,9
33	0,41	13,5
33	0,46	15,18
33	0,53	17,5
32,9	0,6	19,7
32,8	0,7	23,0
32,6	0,86	28,0
32,5	1,18	38,4
32,1	1,77	56,8
30,1	4,08	122,8
29	4,26	123,5

Table 3: Parallel

Voltage [V]	Current [A]	Power [W]
0	5,45	0

Table 4: Short circuit

4.2 Panda 60 cells

Voltage [V]	Current [A]	Power [W]
35,5	0	0

Table 5: Open circuit

Voltage [V]	Current [A]	Power [W]
34,9	0,07	0,2
35	0,08	2,8
35,1	0,09	3,2
35,1	0,1	3,5
35,2	0,11	3,9

Table 6: Series

Voltage [V]	Current [A]	Power [W]
34,8	0,3	10,4
34,8	0,34	11,8
34,8	0,36	12,5
34,7	0,41	14,2
34,7	0,45	15,6
34,6	0,54	18,7
34,5	0,7	24,2
34,4	0,94	32,3
34,2	1,18	40,4
33,8	1,74	58,8
33	2,8	92,4
32,5	3,26	106,0
32	3,8	121,6
31,9	3,97	126,6

Table 7: Parallel

Voltage [V]	Current [A]	Power [W]
0	6,68	0

Table 8: Short circuit

4.3 Sharp NA-E135L5 series

Voltage [V]	Current [A]	Power [W]
56,9	0	0

Table 9: Open circuit

Voltage [V]	Current [A]	Power [W]
56,1	0,12	6,7
56	0,14	7,8
55,9	0,17	9,5
55,8	0,22	12,3
55,6	0,29	16,1
55,1	0,48	26,4

Table 10: Series

Voltage [V]	Current [A]	Power [W]
55,3	0,51	28,2
55,2	0,56	31,0
55,2	0,63	34,8
54,9	0,71	39,0
54,5	0,81	44,1
54,2	0,93	50,4
53,3	1,13	60,2
52,2	1,37	71,5
50,2	1,72	86,3
42,8	2,2	94,2
22,8	2,34	53,4

Table 11: Parallel

Voltage [V]	Current [A]	Power [W]
0	2,45	0

Table 12: Short circuit

5. Graphs

5.1 Benq PM245P00

5.2 Panda 60 cells

5.3 Sharp NA-E135L5 series

6. Data analisys

7. Conclusions