Test Report: PV-ML24-40

20A MPPT controller

■ **DESIGN VERIFY TEST**

Output Function Test
Input Function Test
Protection Function Test
Control Function Test

■ **SAFETY & E.M.C. TEST**

Safety Test
E.M.C. Test

■ **RELIABILITY TEST**

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	BOOST CHARGE VOLTAGE (default)	14.4V(12V BAT) 28.8V(24V BAT)	I/P : NONE O/P : BAT LOAD Ta : 25℃	14.317V 28.74V
2	FLOAT CHARGE VOLTAGE (default)	13.8V 27.6V	I/P : NONE O/P : BAT LOAD Ta : 25℃	13.78V 27.52V
2	CHARGING CURRENT	40A	I/P: BAT O/P:BAT LOAD Ta:25℃	39.52A

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	~100V	I/P: Testing O/P: :NO LOAD Ta:25℃	3.85V~121V
2	EFFICIENCY (TYP)	98%	I/P: Testing O/P:NO LOAD Ta:25℃	98.22%
3	MPPT EFFICIENCY (TYP)	**99%**	I/P : PV O/P : BAT LOAD Ta : 25℃	99.96%
4	NO LOAD POWER CONSUMPTION	**<1.2W**	I/P : 24V O/P : NO LOAD Ta : 25℃	0.1673W

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT OVER VOLTAGE	＞150V	I/P: Testing O/P: Battery Ta:25℃	121.2V
2	OUTPUT OVER VOLTAGE	Shut off o/p voltage, clamping by zener diode	O/P: Testing Ta:25℃	42.7V
3	OVER-DISCHARGE VOLTAGE	11.1V	I/P: Testing O/P: Battery Ta:25℃	11.1V
4	OVER-DISCHAR GE RECOVERY VOLTAGE	12.6V	I/P: NC O/P: Testing Ta:25℃	12.62V

5	OLP	>110%	I/P: Testing O/P: Testing Ta:25℃	23.5A
6	SHORT	Shut down	I/P: PV O/P: Testing Ta:25℃	TEST：OK
7	BATTERY REVERSE CONNECTION	Shut down，Auto recovery	I/P: NC O/P: Battery Ta:25℃	TEST：OK
8	PHOTOVOLTAIC INPUT REVERSE-CONNECTION	Shut down,，Auto recovery	I/P: PV O/P: NC Ta:25℃	TEST：OK

CONTROL FUNCTION TEST

NO	TEST ITEM		SPECIFICATION	RESULT
1	BUTTON	UP	Page up; increase the parameter value in setting	TEST：OK
		DOWN	Page down; decrease the parameter value in setting	TEST：OK
		RETURN	Return to previous menu	TEST：OK
		CONFIRM	Enter into sub-menu; set/ saveTurn on/off loads	TEST：OK
2	SETTING	LOAD MODEL SETTING	Sole light control	TEST：OK
			Light control + time control mode	TEST：OK
			Manual mode	TEST：OK
			Debugging mode	TEST：OK
			Normal on mode	TEST：OK
		BATTERY TYPE	Sealed System voltage12/24 Auto 1. Equalizing charging voltage 2. Boost charging voltage 3. Floating charging voltage 4. Over-discharge recovery voltage 5. Over-discharge voltage	TEST：OK 1.14.6V 2.14.4V 3.13.8V 4.12.6V 5..11.1V
			Gel System voltage12/24 Auto 1. Boost charging voltage 2. Floating charging voltage 3. Over-discharge recovery voltage 4. Over-discharge voltage	TEST：OK 1.14.2V 2.13.8V 3.12.6V 4.11.1V
			Li System voltage12/24 Auto	TEST：OK

		1. Boost charging voltage 2. Over-discharge recovery voltage 3. Over-discharge voltage	1.14.4V 2.12.6V 3.11.1V
		Flooded System voltage12/24 Auto 1. Equalizing charging voltage 2. Boost charging voltage 3. Floating charging voltage 4. Over-discharge recovery voltage 5. Over-discharge voltage	TEST : OK 1.14.8V 2.14.6V 3.13.8V 4.12.6V 5..11.1V
		User System voltage12/24 Auto 1. Equalizing charging voltage 2. Boost charging voltage 3. Floating charging voltage 4. Over-discharge recovery voltage 5. Over-discharge voltage	TEST : OK Can set the voltage range：9-17V

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	DC-FG: 1.5KVAC/min PV-FG :1.5KVAC/min	DC-FG: 1.5KVAC/min PV-FG :1.5KVAC/min	NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTED	BS EN/EN61000-6-3 Class A	I/P : PV O/P : FULL LOAD Ta : 25℃	TEST : OK
2.	RADIATION	BS EN/EN61000-6-4 Class B	I/P : PV O/P : FULL LOAD Ta : 25℃	TEST : OK
3	E.S.D	BS EN/EN61000-4-2 ■ MEDICAL AIR : 8KV / Contact : 4KV	I/P : PV O/P : FULL LOAD Ta : 25℃	TEST : OK
4	RF	BS EN/EN61000-4-3	I/P : PV O/P : FULL LOAD Ta : 25℃	TEST : OK

5	EFT	BS EN/EN61000-4-4	I/P：PV O/P：FULL LOAD Ta：25℃	TEST：OK
6	SURGE	BS EN/EN61000-4-5	I/P：PV O/P：FULL LOAD Ta：25℃	TEST：OK
7	CONDUCTED	BS EN/EN61000-4-6	I/P：PV O/P：FULL LOAD Ta：25℃	TEST：OK
8	Magnetic field immunity	BS EN/EN61000-4-8	I/P：PV O/P：FULL LOAD Ta：25℃	TEST：OK
	Test by certified Lab ＆ Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL：PV-ML48-60 1. ROOM AMBIENT BURN-IN：2 HRS I/P：150VDC O/P：FULL LOAD Ta= 23.8 ℃ 2. HIGH AMBIENT BURN-IN：2 HRS I/P：150VDC O/P：FULL LOAD Ta= 45.2 ℃		

NO	Position	ROOM AMBIENT Ta= 23.8 ℃	HIGH AMBIENT Ta=45.2℃
1	Varistor	50.1	71.1
2	Capacitor C24	24.8	46
3	Capacitor C28	24.6	45.4
4	Capacitor C33	24.1	44
5	Capacitor C34	26.5	47.3
6	MOSFET Q12	60.2	80.6
7	MOSFET Q15	56.9	78.2
8	Switch button	33.1	54.5
9	Inductor L1	81.2	101.7
10	Winding of the inductor L1	67.1	87.7
11	E-Cap.	64.8	86.3
12	DIODE Module	54.4	75.7
13	PCB	49.4	70.4
14	Input connector	41.5	62.9
15	Input wire	40.1	61.9
16	output connector	32.6	54
17	output wire	33.7	54.4
18	LED screen	36.4	57.4
19	Plastic buttons	23.1	44.2
20	Plastic enclosure	23	43.6

2	HIGH TEMPERATURE	NO DAMAGE 1 HOUR	I/P : BAT O/P : FULL LOAD Ta : 50℃	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : BAT O/P : 100%LOAD Ta= -10℃	TEST : OK
4	VIBRATION TEST	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25℃	TEST : OK

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	Jinkj		Chenhm

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