



Test Report: CMU2

Multi-Industry General Purpose Smart Controller

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Control Function Test

Communication protocols

Ethernet supported

Extension cards

Display

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	LCD DISPLAY	Display the DC output voltage, current, and status of each PSU	I/P : 230 VAC Ta : 25°C	TEST: PASS
2	LED INDICATOR	Green: Power on/ Normal Red: Fault/ Abnormal	I/P : 230 VAC Ta : 25°C	Power on: Green Fault: RED
3	RELAY CONTACT	4 user programmable channels, 30V/1A	I/P : 230 VAC Ta : 25°C	TEST: PASS
4	DIGITAL OUTPUT	5 user programmable channels, open collector signal	I/P : 230 VAC Ta : 25°C	TEST: PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85 ~ 264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	51V~264VAC
			I/P: LOW-LINE-3V=82 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63HZ NO DAMAGE	I/P:90 VAC ~264 VAC Ta:25°C	TEST: PASS
3	INPUT CURRENT (Typ.)	230V/ 0.4 A 115V/ 0.6 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =0.08A/ 230VAC I =0.1A/ 115VAC
4	DIGITAL INPUT	5 Channels, open collector signal	I/P : 230 VAC Ta : 25°C	TEST: PASS

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	MONITORED	I/P & O/P Voltage, O/P current, temperature, fan rpm	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
2	COMM. INTERFACE	PMBus, CANbus,	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
3	SD CARD SLOT	SDHC 32GB Max.	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
4	FIRMWARE UPDATE	Update can be done via SD card or Ethernet access	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

5	UI LANGUAGE	English, Traditional /Simplified Chinese	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
6	LOG	Record data and events	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
7	BUZZER	Alarms, mute / CMU2□ Button click & alarms, mute/ CMU2□-R	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

COMMUNICATION PROTOCOLS

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PMBUS	PMBus v1.1	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
2	CANBUS	CANbus 2.0B	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
3	NETWORK	Support IEEE802.3, 10/100base network	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
4	EXTENSION CARDS	Extension Cards	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

ETHERNET SUPPORTED

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PROTOCOLS	TCP/IP, NTP, SMTP, Modbus TCP(under develop)	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
2	WEB SERVER	Display status of system, parameters, data being logged or download	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

EXTENSION CARDS

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PMBUS	2 PMBus ports, PMBus V1.1	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS
2	CANBUS	2 CANBus ports, CANBus 2.0B	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

DISPLAY

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	LCD PANEL	7" TFT LCD, resolution 800x480, capacitive touch panel Details of settings please refer to user's manual	I/P:230VAC O/P:FULL LOAD Ta:25°C	TEST : PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q20 Rated 100V/60A	AC ON/OFF I/P:High-Line +3V =267V VDS: O/P: (1) Full Load (2) Full load continue I/P:Low-Line -3V = 82V VDS: O/P: (1) Full Load (2) Full load continue Ta:25°C	VDS: (1) 82.1V/6.54A (2) 67.4V/3.86A VDS: (1) 82.7V/6.54A (2) 67.4V/3.87A
2	Diode Peak Voltage	D70 Rated 5A/120V	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1) Full Load (2) Full load continue Ta:25°C	VDS: (1) 56.2V (2) 45.9V
3	Control IC Voltage Test	PWM IC U2 Rated VCC: 30V	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1) Full Load (2)Full load continue Ta:25°C	(1) 12.9V (2) 12.9V
4	U72 Buck PWM Transistor Peak Voltage	U72 low side MOS Rated Pin3(PH) voltage: 20v Pin3(PH) current: 775mA	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1) Full Load (2)Full load continue Ta:25°C	(1) 13.5V/574mA (2) 13.5V/574mA
5	U3 Buck PWM Transistor Peak Voltage	U3 low side MOS Rated Pin8(PH) voltage: 30v Pin8(PH) current: 3.5A	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1) Full Load (2)Full load continue Ta:25°C	(1) 16.1V/1.48A (2) 16.1V/1.47A

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG : 2KVAC/min O/P-FG:0.7KVDC/min	I/P-O/P: 3.6KVAC/min I/P-FG: 2.4KVAC/min O/P-FG:0.84 KVDC/min Ta:25°C	I/P-O/P:2.06mA I/P-FG:1.42mA O/P-FG:0.0002mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 30GΩ I/P-FG: 30GΩ O/P-FG: 2.32GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	29 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	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 : CMU2 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 60 °C		

			NO	Position	ROOM AMBIENT Ta=25°C	HIGH AMBIENT Ta=60°C
			1	U101	51.8°C	81.0°C
2	U501	51.2°C	79.6°C			
3	U2	66.9°C	93.3°C			
4	D303	53.9°C	81.4°C			
5	Q20	56.7°C	83.2°C			
6	T1 wire	52.1°C	78.9°C			
7	U6	63.3°C	90.8°C			
8	L50	65.0°C	91.8°C			
9	U3	62.6°C	89.7°C			
10	C28	52.9°C	80.5°C			
11	C6	55.3°C	82.2°C			
12	INSIDE TA	36.8°C	67.0°C			
13	U1	60.5°C	87.0°C			
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/85VAC O/P : 100 %LOAD Ta= -25 °C	TEST : OK		
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60°C/95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 60°C HUMIDITY= 95 %R.H	TEST : OK		
4	STORAGE TEMPERATURE TEST	-40~60°C	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC			
5	THERMAL SHOCK TEST	-25~60°C	1. Thermal shock Temperature : -25°C~ +65°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test			
6	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°C			
7	CAPACITOR LIFE CYCLE	SUPPOSE C6 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 60 °C LIFE TIME		(1) 3054921HRS (2) 436516HRS		
8	MTBF	Conducted by Parts Stress Analysis Prediction 680.0K hrs min. Telcordia TR/SR-332 (Bellcore) ; 75.9K hrs min. MIL-HDBK-217F (25°C)				
9	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 50,000 hours				



TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

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