



Test Report: CMU3

Multi-Industry General Purpose Smart Controller

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Control Function Test
Communication protocols
Ethernetsupported
Display
Component Stress 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	LED INDICATOR	Dual-color, Red, Dual-color three LED lights (Dual-color: Power status, Red flashing: Fault, Dual-color: Internet Status)	I/P : 24 VDC Ta : 25°C	TEST: PASS
2	DISPLAY	CMU3: HDMI 2.0 external interface CMU3G: HDMI 1.4 external interface	I/P : 24 VDC Ta : 25°C	TEST: PASS
3	RELAY	2 groups, relay contact rating: (30V/1A) (Programmable, configurable according to user requirements)	I/P : 24 VDC Ta : 25°C	TEST: PASS
4	STORAGE SPACE	1. RAM : 2G(DDR4) 2. eMMC : 16G 3. SD Card via USB Interface	I/P : 24 VDC Ta : 25°C	TEST: PASS
5	EXPANSION SLOT	mini PCIe * 1	I/P : 24 VDC Ta : 25°C	TEST: PASS
6	COMMUNICATION	1.RS-485(Modbus)*2 2.CANbus*2 3.PMbus*1 4.Ethernet*2 groups 5.USB2.0: 1*TYPE-C 2*TYPE-A	I/P : 24 VDC Ta : 25°C	TEST: PASS
7	WIRELESS COMMUNICATION	1.Wi-Fi (802.11b/g/n) 2.4 GHz 2.NFC	I/P : 24 VDC Ta : 25°C	TEST: PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	10VDC~ 28VDC	I/P : TESTING Ta : 25°C	6VDC~28VDC
2	INPUT CURRENT(Typ.)	24V/1.5A	I/P : 24 VDC O/P : FULL LOAD (CPU 100%+USB 100%) Ta : 25°C	24V/0.62~0.64A
3	PROGRAM DIGITAL INPUT/OUTPUT	4 Channels, open collector signal	I/P : 24 VDC Ta : 25°C	TEST: PASS
4	BOTTON	1. On/Off button : To enable or disable all connected devices (PSU, CHG, and INV) collectively. 2. Reset button : Press to reboot CMU3 and revert all configurations to factory defaults	I/P : 24 VDC Ta : 25°C	TEST: PASS

FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	MONITORING TELEMETRY	Customizable monitoring dashboard that supports standardized MEAN WELL parameters and user-defined communication registers	I/P : 24 VDC Ta : 25°C	TEST: PASS
2	COMM. INTERFACE	PMBus, CANbus, RS-485	I/P : 24 VDC Ta : 25°C	TEST: PASS
3	LANGUAGE	English, Traditional/Simplified Chinese	I/P : 24 VDC Ta : 25°C	TEST: PASS
4	SPEAKER	Alarm	I/P : 24 VDC Ta : 25°C	TEST: PASS
5	ETHERNET	Web-Built-in web page allows external browsers to display monitoring and system operation status	I/P : 24 VDC Ta : 25°C	TEST: PASS
6	NFC CONNECTIVITY	Proximity Module Plan NFC for near-field communication, allowing internal or external module expansion can read and set data via	I/P : 24 VDC Ta : 25°C	TEST: PASS
7	LOG	1.Data log (device status) 2.Event log (alarm, AC anomalies, etc.) 3.System log (system status, warnings, version information, etc.) 4.Log interval can be set from 1 minutes to 60 minutes 5.Selectable log options (ALL, voltage, current, etc.)	I/P : 24 VDC Ta : 25°C	TEST: PASS
8	MULTILINGUAL SUPPORT	English/Traditional Chinese/Simplified Chinese, designed with a unified structure, allowing flexible replacement	I/P : 24 VDC Ta : 25°C	TEST: PASS
9	OVER-THE-AIR UPDATE	Update firmware via Ethernet (divided into system update and software update)	I/P : 24 VDC Ta : 25°C	TEST: PASS

COMMUNICATION PROTOCOLS

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PMBUS	PMBus v1.1	I/P : 24 VDC Ta : 25°C	TEST: PASS
2	CANBUS	CANbus 2.0B	I/P : 24 VDC Ta : 25°C	TEST: PASS
3	MODBUS	RS-485 RTU	I/P : 24 VDC Ta : 25°C	TEST: PASS
4	NETWORK	Support IEEE802.3, 10/100base network x 2	I/P : 24 VDC Ta : 25°C	TEST: PASS

ETHERNET SUPPORTED

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PROTOCOLS	TCP/IP, NTP, Modbus TCP	I/P : 24 VDC Ta : 25°C	TEST: PASS
2	WEB SERVER	Display system status, parameters, recorded or downloaded data	I/P : 24 VDC 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	Q 407 Rated: 100V 52A@TC=25°C 37A@TC=100°C VGS :± 20V	DC ON/OFF I/P:High-Line +3V =31V VDS: O/P: (1)No Load (2)Full Load Continuous VGS: (1)No Load (2)Full Load Continuous VDS: I/P:Low-Line-0.2V =9.8V O/P: (1)No Load (2) Full Load Continuous(4.3A) Ta:25°C	VDS: (1) 56.6V/10.2A (2) 84.9V/11.8A VGS: (1)10.5V (2)12.3V VDS: (1) 54.9V/8.4A (2) 58.9V/10.6A

■ E.M.C. TEST

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	EN55032 CLASS B	I/P : 24 Vdc O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
2	RADIATION	EN55032 CLASS A	I/P : 24 Vdc O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 24 Vdc O/P : FULL LOAD Ta : 25°C	■CRITERIA A □CRITERIA B
4	E.F.T	EN61000-4-4 INDUSTRY INPUT : 1KV	I/P : 24 Vdc O/P : FULL LOAD Ta : 25°C	■CRITERIA A □CRITERIA B

5	SURGE	IEC61000-4-5 INDUSTRY L-L : 0.5KV L,FG : 1KV	I/P : 24 Vdc O/P : FULL LOAD Ta : 25°C	☒ CRITERIA A ☐ CRITERIA B
6	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 : CMU3G 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 24VDC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 3 HRS I/P : 24VDC O/P : FULL LOAD Ta= 60 °C		

			NO	Position	ROOM AMBIENT Ta= 25°C	HIGH AMBIENT Ta= 60°C
			1	CPU	51.8°C	87.0°C
			2	U1601	46.5°C	81.0°C
			3	U1301	46.0°C	80.5°C
			4	U1302	46.8°C	81.2°C
			5	U701	48.2°C	82.7°C
			6	U601	49.0°C	83.8°C
			7	U802	47.6°C	82.0°C
			8	U901	46.6°C	81.2°C
			9	U1501	45.9°C	80.4°C
			10	U1701	45.2°C	79.5°C
			11	RY2	46.5°C	78.2°C
			12	T1	54.5°C	85.7°C
			13	LF403	44.6°C	77.9°C
			14	L401	52.4°C	83.7°C
			15	L402	51.8°C	83.7°C
			16	U408	49.7°C	82.7°C
			17	U410	52.7°C	84.5°C
			18	U409	53.0°C	84.8°C
			19	U412	52.2°C	83.9°C
			20	C5	51.8°C	83.3°C
			21	C477	51.9°C	83.7°C
			22	C438	50.7°C	83.1°C
			23	C452	57.5°C	88.4°C
			24	C453	51.1°C	82.8°C
			25	C432	39.0°C	72.4°C
			26	Q406	48.6°C	81.6°C
			27	Q407	54.4°C	87.2°C
			28	D409	53.1°C	85.8°C
			29	D411	54.5°C	86.2°C
			30	D413	85.6°C	115.8°C
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 28VDC/10VDC O/P : 100 % LOAD Ta= -25°C		TEST : OK	
4	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 : 31 VDC O/P : FULL LOAD Ta=60 °C HUMIDITY= 95 %R.H		TEST : OK	

6	STORAGE TEMPERATURE TEST	-40~80°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
7	THERMAL SHOCK TEST	-25~60°C	1. Thermal shock Temperature : -30°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 : 24V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle : 24V/ FULL LOAD Burn In Test
8	VIBRATION TEST	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes	(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
9	CAPACITOR LIFE CYCLE	SUPPOSE C452 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC Ta= 25 °C LIFE TIME (2) I/P : 230VAC Ta= 60 °C LIFE TIME Note: 15years(131,400h) is the maximum so that the deterioration of the sealing material	(1) 131400 HRS (2) 131400 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 694.6K hrs min. Telcordia SR-332 (Bellcore) ; 85.45K hrs min. MIL-HDBK-217F (25°C)	
11	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	ERIS WU

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