Certificate — Сертификат — 證明書 — 설명서 — شهادة

CERTIFICATE OF COMPLIANCE

According to the council GPSR Directive (EU) 2023/988

CERTIFICATE NO.: CTG2508220922E-SC380AR

Applicant:	Shenzhen hr-tun Technology Co. , Ltd.
Applicant address:	Room 305, 3rd Floor, Building G, Zhichuang Green Valley, No. 62, Puxia Road, Henggang Street, Longgang District, Shenzhen , Guangdong P.R, China
Manufacturer:	Dongguan hr-tun Technology Co. , Ltd.
Manufacturer address:	Room 701, Building 1, No. 80, Tangxia Section of Qingzhang Road, Tangxia Town, Dongguan , Guangdong P.R, China
Type of product:	Combined Gas & Carbon Monoxide Alarm
Trade mark:	/
Model(s):	GC03 C03 G03

List of directives:	the council GPSR Directive (EU) 2023/988
Test standards:	EN 50291-1:2018
Verdict:	Conform
Test report No.:	CTG2508220922E-SR380AR

The EUT described above has been tested by us with the listed standards and found in compliance with the council GPSR Directive (EU) 2023/988. Technical file of the applicant mentioned has been inspected and audit has been completed successfully. The certificate applies to the tested sample above mentioned only and shall not imply an assessment of the whole production. It is only valid in connection with the test report number:CTG2508220922E-SR380AR.This one is responsible to start the CE marking and certification procedure as required by the legislation in force.

Caution about CE marking (instruction for the applicant who puts the product on the EU market):The label of the CE marking on the right side should be not less than 5mm height.

CE marking and EC Declaration of Conformity are duties for the manufacturer or its applicant who puts the product on the market.

CE

Aaron Zhai

CERTIFICATION MANAGER

Aug. 22, 2025

SHENZHEN CTG TESTING CO., LTD.
ADD:3F, Yongxing Plastic Plant, No. 11 Waihuan Road,Shiyan street, Bao'an District, Shenzhen,China
EMAIL: SERVICES@CTG-CERT.COM WEBSITE: WWW.CTG-CERT.COM

TEST REPORT
UL 2034
Standard for safety
Single and Multiple station Carbon Monoxide Alarms

Report Number.....:	CTG2508150922E-SR249AB
Tested by (name + signature).....:	Iverson Chen
Reviewed by (name + signature)..:	Alan Li
Approved by (name + signature)..:	Aaron Zhai
Date of issue.....:	2025.08.15
Testing Laboratory.....:	Shenzhen CTG Testing Co., LTD
Address.....:	3/F, Yongxing Plastic Plant, No.11. Waihuan Road, Shiyan Street, Bao'an District Shenzhen, Guangdong, China
Applicant's name.....:	Shenzhen hr-tun Technology Co. , Ltd.
Address.....:	Room 305, 3rd Floor, Building G, Zhichuang Green Valley, No. 62, Puxia Road, Henggang Street, Longgang District, Shenzhen , Guangdong P.R, China
Test specification:	
Standard.....:	UL 2034-2024
Test procedure.....:	Test report
Non-standard test method.....:	N/A
Test Report Form No.....:	UL 2034-2024
Master TRF.....:	Dated 2025-08-15
Test item description.....:	Combined Gas & Carbon Monoxide Alarm
Trade Mark.....:	E-TUN
Manufacturer.....:	Dongguan hr-tun Technology Co. , Ltd.
Address.....:	Room 701, Building 1, No. 80, Tangxia Section of Qingzhang Road, Tangxia Town, Dongguan , Guangdong P.R, China
Model/Type reference.....:	GC03
Additional model.....:	C03，G03
Rating.....:	AC 100-240V 50/60Hz、200mA、≤3W

Standard: UL 2034-2024			
Report No.:	CTG2508150922E-SR249AB	Client:	Shenzhen hr-tun Technology Co. , Ltd.
Product:	Combined Gas & Carbon Monoxide Alarm	Rated input	AC 100-240V
Project Engineer:	Iverson Chen	Rated output	--
Test Engineer:	Iverson Chen	Protection class	Class II
Application Date	2025.08.08	Protection against moisture:	IPX0
Requested Date	2025.08.08	Construction:	Power by battery
Re-test	☐	Operation mode	Continous
Full-test	☒	Weight:	<1kg
Model/ type reference:	GC03	Sample No.	1#, 2#, 3#
Should the heating test be done in heating oven?	☐ Yes °C ☒ No		
Altitude during operation (m)	☐ Up to 2000 ☒ No		
Altitude of test laboratory (m)	☒ below 2000 ☐ No		
Other information:.....			

Lab Use Only			
Lab Start Date	2025.08.08	Lab Finish Date	2025.08.15
Ambient Temperature, °C	24.9	Relative Humidity, %	44

Remarks:

UL 2034

Test Item:

No.	Clause(s)	Test(s)	Remark	Comment
1	6	Alarm Reliability Prediction		Pass
2	7	Battery Removal Indicator	Battery, with indicator	Pass
3	8	Alarm Reset/Silence Feature	Operation (on the alarm) by physically depressing the alarm reset/silence feature	Pass
4	9	Voltage Classification	DC 12V	Pass
5	10	Lifetime		Pass
6	12	Service and Maintenance Protection		Pass
7	13	Enclosure	V-1, Thickness: 1.4mm Opening <1.0mm	Pass
8	14	Corrosion Protection	Inside	Pass
9	15	Primary Power Supply	AC 100-240V	N/A
10	16	Secondary Power Supply		N/A
11	17	Batteries		Pass
12	18	Supplementary Signaling Circuits		N/A
13	19	Permanent Connection		N/A
14	20	Power Supply Cord	No power cord	N/A
15	21	Equipment Grounding	AC 100-240V	N/A
16	22	Remote Power Supply Leads		N/A
17	23	INTERNAL WIRING		Pass
18	24	Wireways	Cannot touch sharp edges, burrs, fins, and moving parts	Pass
19	25	Splices		Pass
20	26	Barriers	No Barriers	N/A
21	27	Grounding and Bonding		N/A
22	28	Mounting of components Operating components Current-carrying parts Electrical insulating material		Pass

No.	Clause(s)	Test(s)	Remark	Comment
23	29	Bushings	thickness>1.0mm	Pass
24	30	Lampholders and Lamps	LED	Pass
25	31	Protective Device		Pass
26	32	Printed-Wiring Boards	UL 796 V-0	Pass
27	33	Switches	No such switch	N/A
28	34	Transformers and Coils	Without transformers	N/A
29	35	Dropping Resistors		N/A
30	36	Spacings		Pass
31	38	Normal Operation Test	600ppm, 12h	Pass
32	39	Circuit Measurement Test	Battery: AC 100-240V	Pass
33	39.2	Battery trouble voltage determination	Battery: AC 100-240V	Pass
34	39.3	Battery trouble silence	Battery: AC 100-240V	N/A
35	40.1	Electrical Supervision Test	produced every 30–60 seconds ±10 percent for a minimum of seven consecutive days	Pass
36	40.2	AC powered units	DC powered	N/A
37	40.4	Component failure		Pass
38	40.5	External wiring		N/A
39	41	Sensitivity Test	See below table	Pass
40	42	Selectivity Test	See below table	Pass
41	43	Sensitivity Test Feature		N/A
42	44	Stability Tests	See below table	Pass
43	45	One Year(minimum)Sensor Stability Test for CO Sensors		N/A
44	46	Velocity-Sensitivity Test		Pass
45	47	Temperature Test	See below table	Pass
46	48	Overload Test	See below table	Pass

No.	Clause(s)	Test(s)	Remark	Comment
47	49	Endurance Test	See below table	Pass

48	50	Variable Ambient Temperature Test	See below table	Pass
49	51	Humidity Test	See below table	Pass
50	52	Leakage Current Test		N/A
51	53	Transient Tests		N/A
52	54	Surge Immunity Test		N/A
53	55	Surge Current Test		N/A
54	56	Dielectric Voltage-Withstand Test	See below table	Pass
55	57	Abnormal Operation Test	See below table	Pass
56	58	Overvoltage Test	See below table	Pass
57	59	Undervoltage Test	See below table	Pass
58	60	Dust Test	See below table	Pass
59	61	Static Discharge Test		N/A
60	62	Vibration Test	See below table	Pass
61	63	Replacement Test, Head and Cover		N/A
62	64	Jarring Test	See below table	Pass
63	65	Corrosion Test	See below table	Pass
64	66	Battery Tests		N/A
65	67	Audibility Test		N/A
66	68	Tests of Thermoplastic Materials	See below table	Pass
67	69	Paint Loading Test		N/A
68	70	Battery Replacement Test		N/A
69	71	Polarity Reversal Test		N/A
70	72	Electric Shock Current Test		N/A
71	73	Strain Relief Test	See below table	Pass
72	74	Power Supply Tests		N/A
73	75	Drop Test	See below table	Pass
74	76	Marking	See below table	Pass
75	77	Variable Ambient Temperature and Humidity Test		Pass
76	78	Corrosion(Salt Spray)Test		Pass
77	79	Vibration Test		Pass
78	80	Contamination Test (Cooking By-Products)		Pass

79	81	Carbon Monoxide Alarms for Use on Recreational Boats		Pass
--		MANUFACTURING AND PRODUCTION TESTS		N/A
80	83	Sensitivity Calibration Tests		N/A
81	84	Measurement of In-Service Reliability		N/A
82	85	Production Line Dielectric Voltage-Withstand Tests		N/A
83	86	Production Line Grounding Continuity Tests		N/A
84	87	Audibility Test		N/A
85	88	Alarm Shipment		N/A
86	89	MARKING		N/A
87	90	Marking Permanence		N/A
88	91	INSTRUCTIONS		N/A
89	ANNEX A	RELIABILITYAND FAILURE RATE DETERMINATION INFORMATION		N/A

Openings in enclosures (7.4)

7.4	Test pin (During the test)			Pass
Bare parts of ELV or hazardous parts accessible?	ELV circuits or hazardous parts protected by lacquer, cotton... accessible?	Functional or basic insulation of parts or wiring in ELV or hazardous voltage accessible?	Unearthed conductive parts separated from ELV or hazardous parts by functional insulation or basic insulation accessible?	Bare parts of TNV circuits accessible?
~~Yes~~ / No	~~Yes~~ / No	~~Yes~~ / No	~~Yes~~ / No	~~Yes~~ / No
Test pin				

7.4	Articulate probe with web stop (During the test)	Pass
Are bare live parts at hazardous voltages accessible?		
~~Yes~~ / No		
Test Finger		

7.4	Accessibility probe	Pass
Finger used:	Parts for testing	Result
test probe	Contacts of connectors accessible?	~~Yes~~ / No

Splices (25)

Pull Location	Test method	Force	Observations	Pass	
				Pass	Fail
Soldering for Wire	--	2lbs (2N)	No damaged, no breakage, without displacement	--	

Spacings (36)

36	Spacings					Pass
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Between + and – for	--	AC 100-240V	1.6	>2.0mm	1.6	>2.0mm
Live part to enclosure	--	--	--	--	--	--
Between + and – for Ultracapacitor	--	--	--	--	--	--
Primary winding to secondary winding of transformer (T1) (RI)	--	--	--	--	--	--
Supplementary information						
Note(s): --						

Current input (39)

Method:

EUT is operating at: U=Un, F=Fn.
Load of the EUT is under maximum normal load.
The input current and wattage to the EUT shall be measured.
Multiple rated voltages or rated voltage range, each rated voltage shall be measured.
The current and power shall be taken under steady state conditions.

Result:

39.1	TABLE: Electrical data (in normal conditions)					Pass
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
AC 100-240V	0.2	0.2A	/	--	--	Normal work
Supplementary information:						

Sensitivity Test (41)

41	TABLE: Sensitivity Test Voltage: DC 12V		Pass
Model	concentrations	Alarm time	Results
Detector	70ppm	102min	P
Detector	150ppm	36min	P
Detector	400ppm	9min	P

41	TABLE: Sensitivity Test Voltage: AC 100-240V		Pass
Model	concentrations	Alarm time	Results
Detector	70ppm	104min	P
Detector	150ppm	35min	P
Detector	400ppm	9min	P

Selectivity Test (42)

42	Overload Protection Devices	Pass

Test part:	Time	Result
Methane 500ppm n-Butane 300ppm n-Heptane 500ppm Ethyl acetate 200ppm Isopropyl alcohol 200ppm Carbon dioxide 5000ppm Ammonia 100ppm Ethanol 200ppm Toulene 200ppm Trichloroethane 200ppm Acetone 200ppm	16h	--
--		

42	TABLE: Sensitivity Test Voltage: 12V	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	113min	P
Detector	150ppm	41min	P
Detector	400ppm	9min	P

Stability Tests (44)

44	TABLE: Sensitivity Test Voltage: AC 100-240V	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm,	>60min	P
Detector	30ppm	NO actuation	P

Temperature Test (47)

Method:

EUT primary is U=Un, F=Fn, operated under normal max. load.
Temperatures of parts are measured by thermal couplers, windings are measured by resistance change method.
Measuring place shall be a point close to the heat source.
The test is continued until thermal stable.
Voltage is changed lower or higher tolerance without rest of time.

Result:

47	**TABLE: Thermal requirements,**						Pass
	Supply voltage (V) .....:	AC 100-240V	--	--	--		—
	Ambient Tmin (°C) .....:	40.0	--	--	--		—
	Ambient Tmax (°C) ..... :	40.0	--	--	--		—
	load	Standby	--	--	--		
	Model	--	--	--	--	--	
Maximum measured temperature T of part/at::		T (°C)					Allowed Tmax (°C)
Capacitor		1.1	--	--	--	--	25
Enclosure		1.3	--	--	--	--	25
Internal wire		1.7	--	--	--	--	25
U1		2.5	--	--	--	--	25
Q1		2.7	--	--	--	--	25
Battery		--	--	--	--	--	25
Screen		1.1	--	--	--	--	25
--							
Supplementary information:							

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
Supplementary information:							

47	TABLE: Thermal requirements,						Pass
	Supply voltage (V) .....:	AC 100-240V	--	--	--	--	—
	Ambient Tmin (°C) .....:	40.0	--	--	--	--	—
	Ambient Tmax (°C) ..... :	40.0	--	--	--	--	—
	Load	Alarm condition,	--	--	--	--	
	Model	--	--	--	--	--	
Maximum measured temperature T of part/at::		T (°C)					Allowed Tmax (°C)
Capacitor		9.6	--	--	--	--	40
Enclosure		7.6	--	--	--	--	65
Internal wire		12.3	--	--	--	--	50
U1		13.5	--	--	--	--	65
Q1		11.6	--	--	--	--	45
Battery		--	--	--	--	--	20
Screen		4.8	--	--	--	--	65
--							

Supplementary information:

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--

Supplementary information:

Overload Tests (48)

48	Overload Tests	Pass

Test part:	Voltage	Result
Alarm	DC13.8V	Still can work

Endurance Test (49)

Test part:	Test method	Test method	Observations	Pass	
				Pass	Fail
Alarm	6000cycles	1s of alarm	Still can work	--	

Variable Ambient Temperature Test (50)

50	TABLE: Variable Ambient Temperature Voltage: AC 100-240V		Pass
Model	Ambient	time	Results
Detector	49℃ 50% R.H. 20.9%O_2	3h	P
Detector	0℃ 20.9%O_2	3h	P
Still can work, no change.			

50	TABLE: Variable Ambient Temperature Voltage: AC 100-240V		Pass
Model	Ambient	time	Results
Detector	70℃ 50% R.H.	1h	P
Detector	40℃	3h	P
Detector	60℃	20 days	P
Still can work, no change.			

Humidity Test (51)

51	TABLE: Variable Ambient Temperature Voltage: 12V	Pass

Model	Ambient	time	Results
Detector	50℃ 95% R.H.	168h	P
Detector	25℃ 10% R.H.	168h	P
Still can work, no change.			

51	TABLE: Sensitivity Test Voltage: AC 100-240V	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	114min	P
Detector	150ppm	43min	P
Detector	400ppm	10min	P

Leakage Current Test (52)

52	Leakage Current Test	N/A

Test voltage: AC 100-240V

Measured point:	U_2 (mV)	(mA)	Limit (mA)
Line and output accessible terminal	--	--	0.5
Neutral and output accessible terminal	--	--	0.5
Line and accessible enclosure surface	--	--	0.5
Neutral and accessible enclosure surface	--	--	0.5
Oscilloscope, Measuring circuit for touch current according to Annex D, Leakage Current Tester			

Transient Tests (53)

53	TABLE: Voltage: AC 100-240V	N/A

Model	Test method	time	Results
Detector	100 kHz Ring Wave transient 100-2400V	500 oscillatory transient pulses	N/A
Still can work, no change.			

Surge Immunity Test (Combination Wave) (54)

54	TABLE: Surge test	N/A

Location	Discharge condition	Pass insulation resistance? Yes / ~~No~~
AC input	2kV, 1.2/50 μs, 50 times	--
AC input	4kV, 1.2/50 μs, 50 times	--
AC input	6kV, 1.2/50 μs, 50 times	--
AC input	1kA, 8/20 μs, 50 times	--
AC input	2kA, 8/20 μs, 50 times	--
AC input	3kA, 8/20 μs, 50 times	--
--		
Still can normal work, No Emission of flame, molten metal, glowing or flaming particles		

Surge Immunity Test (Combination Wave) (54)

54	TABLE: Surge test	N/A

Location	Discharge condition	Pass insulation resistance? Yes / ~~No~~
AC input	20kV, 1.2/50 μs 10kA, 8/20 μs,	--
AC input	20kV, 1.2/50 μs 10kA, 8/20 μs,	--
AC input	20kV, 1.2/50 μs 10kA, 8/20 μs,	--
--		
Still can normal work, No Emission of flame, molten metal, glowing or flaming particles		

Dielectric Voltage-Withstand Test (56)

Method:

The test is made while the EUT is still in well-heated condition
Make sure the power switch of the EUT is in ON position.
Thin material can be tested in room temperature.
The test voltage is a.c. of 50 or 60 Hz or d.c. voltage equal to peak value of the a.c. voltage.
Test voltage is applied gradually raised from zero to the specified voltage and held at that value for 60s.
Insulation breakdown is: Current flows through the insulation rapidly increases in an uncontrolled manner; that is the insulation does not restrict the flow of the current.
Corona discharge or a single momentary flashover is not regarded as insulation breakdown.
A test incorporating reinforced insulation and lower grades insulation (BI, SI), care is taken not to overstress BI or SI.
Where capacitors (X or Y capacitors) are across the insulation, d.c. voltage is recommended for the test.
Discharge resistors shall be disconnected before testing.

Result:

56	**Electric strength test**		Pass
Test voltage applied between:		Test voltage (V)	Breakdown
Input and plastic enclosure		1000V	No
--			
--			

Abnormal Operation Tests (57)

Method:

EUT is operating under normal load, U=Un, F=Fn. A fault is then introduced. One fault only at one time. Ventilation openings shall be blocked; Semiconductors shall be short-circuited or open-circuited one at a time; Transformer secondary windings are short-circuited one at a time (other windings are normal loaded); Transformer secondary windings are overloaded one at a time (other windings are normal loaded), Fan is locked; Operational insulation which clearances or creepage distances are less than requirement, is short-circuited; Motors are locked.
The input current, fuse rating current, test duration and observation shall be recorded.
The test is continued until a protection device opened the circuit (fuse) or steady state conditions.
Overload test and fault condition which the current is more than normal current, shall wait until thermal stable, coil temperature of transformer shall be recorded.

Result:

57	**Fault condition tests (Continued)**		Pass
Requirement	Result	Remarks	
During the test:			
Fire propagates beyond the EUT?	No		
Molten metal emitted?	No		
Enclosures deform to cause non-compliance with the standard?	No		

57	**TABLE: Fault condition tests**		Pass
	Ambient temperature (°C) .....:	25.3 °C	—

Component No.	Fault	Supply voltage (V)	Test time	Fuse #	current (A)	Observation
U1 Pin1-2	S	AC 100-240V(unit powered by power supply, normal operation)	7h	--	--	Still Normal work, no damage, no hazards.
U1 Pin1-8	S	AC 100-240V (unit powered by power supply, normal operation)	7h	--	--	Still Normal work no damage, no hazards.
Q1	S	AC 100-240V(unit powered by power supply, normal operation)	10mins	--	0	Still Normal work, no damage, no hazards.
Speaker	O	DC23V	7h			Still Normal work, no damage, no hazards,

Supplementary information:

S: Short-circuited; **O**: Open-circuited; **O/L**: Overloaded
Equipment used: CTT15S, CTT48

57	**Electric strength test**	Pass

Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

Overvoltage Test (58)

58	Overcurrent protection	Pass

Test part:	Voltage	Result
Alarm Standby	DC13.2V, 16h	Still can work
58	TABLE: Sensitivity Test Voltage: AC 100-240V	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	116min	P
Detector	150ppm	43min	P
Detector	400ppm	11min	P

Undervoltage Test (59)

59	Overcurrent protection	Pass

Test part:	Voltage	Result
Alarm Standby	DC10.2V, 16h	Still can work
59	TABLE: Sensitivity Test	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	129min	P
Detector	150ppm	52min	P
Detector	400ppm	11min	P

Dust Test (60)

60	Overcurrent protection	Pass

Test part:	Test method	Result
Alarm Standby	2 ounces (0.06 kg) of cement dust, 15min	Still can work
60	TABLE: Sensitivity Test	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	143min	P
Detector	150ppm	50min	P
Detector	400ppm	11min	P

Vibration Test (62)

62	TABLE: Vibration tests	Pass

Model	amplitude	Test frequency (Hz)	Vibration time (h)	Results
Detector	0.25 mm	10-35-10, 1s	0.25h	P
Detector	0.25 mm	10-35-10, 1s	4h	P

62	TABLE: Sensitivity Test	Pass

Model	concentrations	Alarm time	Results
Detector	70ppm	147min	P
Detector	150ppm	44min	P
Detector	400ppm	9min	P
Detector	700ppm	<50s	P

Jarring Test (64)

64	TABLE: Impact test Vertically			Pass
Model	weighing	Test temperature (°C)	Impact energy (J)	Results
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
No damage.				

64	**Electric strength test**	Pass
Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

64	TABLE: Impact test Horizontally			Pass
Model	weighing	Test temperature (°C)	Impact energy (J)	Results
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
No damage.				

64	**Electric strength test**	Pass
Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

Corrosion Test (65)

65	TABLE: Corrosion Voltage: AC 100-240V	Pass

Model	Test method	time	Results
Detector	30℃, 70%R.H.	21days	P
No rust.			

Impact test (68.5)

68.5	TABLE: Impact test	Pass

Model	weighing	Test temperature (°C)	Impact energy	Results
Enclosure	0.535kg	25	6.8N.m	P
Enclosure	0.535kg	25	6.8N.m	P
Enclosure	0.535kg	25	6.8N.m	P

68.5	**Electric strength test**	Pass

Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

Battery Replacement Test (70)

70	TABLE: Corrosion Voltage:	N/A

Model	Test method	Observations	Results
Battery	6cycles/min Total 50 cycles.	Still can work the alarm device not sound for more than 1 second	--

Polarity Reversal Test (71)

71	TABLE: Polarity Reversal Voltage: --	N/A

Model	Test method	Observations	Results
Battery	Polarity Reversal	Can't charge the battery the alarm device sound for more than 1 second Other function still normally.	--

Strain Relief Test (73)

Pull Location	Test method	Force	Observations	Pass	
				Pass	Fail
Connector	--	22.2N	No damaged, no breakage	P	

Drop test (75)

75	TABLE: Drop Test			Pass
Model	Test method	Test temperature (°C)	High (m)	Results
Detector	--	25	2.1m	P
Detector	--	25	2.1m	P
Detector	--	25	2.1m	P
Detector	--	25	2.1m	P
Detector	--	25	2.1m	P
No damaged, no breakage				

75	**Electric strength test**		Pass
Test voltage applied between:		Test voltage (V)	Breakdown
Input and plastic enclosure		1000V	No
--			
--			

Marking (76)

76	Permanency of Wrapped Hang Tag Marking		N/A
Location	Temperature, humidity, time	Observations	result
Label	66°C, 3days 40°C 72h 61°C 93% R.H 10days	--	--

UL 1484

Test Item:

No.	Clause(s)	Test(s)	Remark	Comment
1	10	Product Assembly		Pass
2	11	Detection-Threshold Adjustment		N/A
3	12	Supplementary Signaling Feature		N/A
4	13	Sharp Edges	No Sharp Edges	Pass
5	14	Enclosures	Nonmetallic enclosures V-1, Thickness: 1.4mm Opening <1.2mm	Pass
6	15	Protection Against Corrosion	Inside	Pass
7	17	Cord-Connected Products	No power cord	N/A
8	18	Permanently Connected Products	No Permanently Connected Products	N/A
9	19	Supplementary Signaling Circuits		N/A
10	20	Grounding	No earth connector	N/A
11	22	Wiring Methods, Splices, Bushings, Barriers	Cannot touch sharp edges, burrs, fins, and moving parts	Pass
12	23	Separation of Circuits	No Transformer	N/A
13	24	Bonding for Grounding		N/A
14	25	Mounting of components, Insulating materials, Uninsulated live parts Current-carrying parts		Pass
15	26	Lamp holders and Lamps	LED	N/A

No.	Clause(s)	Test(s)	Remark	Comment
16	27	Printed-Wiring Boards	UL 796C V-0	Pass
17	28	Protective Devices		Pass
18	29	Switches	No such siwtch	Pass
19	30	Transformers		N/A
20	31	SPACINGS		N/A
21	34	Normal Operation Test		Pass
22	35	Input Measurement Test		Pass
23	36	Electrical Supervision Test		Pass
24	37	Temperature Test		Pass
25	38	Dielectric Voltage-Withstand Test		Pass
26	39	Abnormal-Operation Test		Pass
27	40	Overload Test		Pass
28	41	Endurance Test		Pass
29	42	Audibility Test		Pass
30	43	Leakage Current Test		N/A
31	44	Tests of Thermoplastic Materials		Pass
32	45	Power Supply Tests		N/A
33	46	Polarity Reversal Test		N/A
34	47	Electric Shock Current Test		N/A
35	48	Ignition Test		Pass
36	49	Detection Threshold Tests		Pass
37	50	Permanence of Marking Tests		Pass
38	51	Strain-Relief Test		N/A
--		MANUFACTURING ANDPRODUCTION TESTS		N/A
39	53	Production-Line Detection-Threshold Calibration Tests		N/A
40	54	Production-Line Dielectric Voltage-Withstand Test		N/A
41	55	Production-Line Grounding Continuity Tests		N/A
42	56	MARKING		Pass
43	57	INSTRUCTIONS		Pass

Openings in enclosures (14)

14	***Test pin (During the test)***			**Pass**
Bare parts of ELV or hazardous parts accessible?	ELV circuits or hazardous parts protected by lacquer, cotton... accessible?	Functional or basic insulation of parts or wiring in ELV or hazardous voltage accessible?	Unearthed conductive parts separated from ELV or hazardous parts by functional insulation or basic insulation accessible?	Bare parts of TNV circuits accessible?
~~Yes /~~ No	~~Yes /~~ No	~~Yes /~~ No	~~Yes /~~ No	~~Yes /~~ No
Test pin				

14	***Articulate probe with web stop (During the test)***	**Pass**
Are bare live parts at hazardous voltages accessible?		
~~Yes~~ / No		
Test Finger		

14	***Accessibility probe***	**Pass**
Finger used:	Parts for testing	Result
test probe	Contacts of connectors accessible?	~~Yes /~~ No

Spacings *(36)*

36	**Spacings**					N/A
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Live Part and Enclosure	--	--	--	--	--	--
Live part to enclosure	--	--	--	--	--	--
Between + and – for Ultracapacitor	--	--	--	--	--	--
Primary winding to secondary winding of transformer (T1) (RI)	--	--	--	--	--	--
Supplementary information						
Note(s): --						

Input Measurement Test (35)

Method:

EUT is operating at: U=Un, F=Fn.
Load of the EUT is under maximum normal load.
The input current and wattage to the EUT shall be measured.
Multiple rated voltages or rated voltage range, each rated voltage shall be measured.
The current and power shall be taken under steady state conditions.

Result:

35	TABLE: Electrical data (in normal conditions)					Pass
U (V)	I (A)	I rated (A)	I (A)	Fuse #	Ifuse (A)	Condition/status
AC 100-240V	120mA	200mA	--	--	--	Normal work
Supplementary information:						

Temperature Test (37)

Method:

EUT primary is U=Un, F=Fn, operated under normal max. load.
Temperatures of parts are measured by thermal couplers, windings are measured by resistance change method.
Measuring place shall be a point close to the heat source.
The test is continued until thermal stable.
Voltage is changed lower or higher tolerance without rest of time.

Result:

37	**TABLE: Thermal requirements,**						Pass
	Supply voltage (V) .....:	AC 100-240V	--	--	--	--	—
	Ambient Tmin (°C) .....:	23.9	--	--	--	--	—
	Ambient Tmax (°C) ..... :	24.1	--	--	--	--	—
	load	Alarm	--	--	--	--	
	Model	--	--	--	--	--	
Maximum measured temperature T of part/at::		T (°C)					Allowed Tmax (°C)
Internal wire		6.4					25
Enclosure		4.9					25
Supplementary information:							

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--

Supplementary information:

37	**TABLE: Thermal requirements,**						Pass
	Supply voltage (V) .....:	AC 100-240V	--	--	--		—
	Ambient Tmin (°C) .....:	23.3	--	--	--		—
	Ambient Tmax (°C) ..... :	23.7	--	--	--		—
	load	Standby	--	--	--		
	Model	--	--	--	--		
Maximum measured temperature T of part/at::		T (°C)					Allowed Tmax (°C)
Internal wire		1.7					25
Enclosure		1.1					25
Supplementary information:							

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
Supplementary information:							

Dielectric Voltage-Withstand Test (38)

Method:

The test is made while the EUT is still in well-heated condition
Make sure the power switch of the EUT is in ON position.
Thin material can be tested in room temperature.
The test voltage is a.c. of 50 or 60 Hz or d.c. voltage equal to peak value of the a.c. voltage.
Test voltage is applied gradually raised from zero to the specified voltage and held at that value for 60s.
Insulation breakdown is: Current flows through the insulation rapidly increases in an uncontrolled manner; that is the insulation does not restrict the flow of the current.
Corona discharge or a single momentary flashover is not regarded as insulation breakdown.
A test incorporating reinforced insulation and lower grades insulation (BI, SI), care is taken not to overstress BI or SI.
Where capacitors (X or Y capacitors) are across the insulation, d.c. voltage is recommended for the test.
Discharge resistors shall be disconnected before testing.

Result:

38	**Electric strength test**		Pass
Test voltage applied between:		Test voltage (V)	Breakdown
Input and plastic enclosure		1000V	No
--			
--			

Abnormal-Operation Test (39)

5.3	Abnormal Operations and Fault Conditions Test	Pass

Requirement	Result	Remarks
During the test:		
Fire propagates beyond the EUT?	~~Yes~~ / No	--
Molten metal emitted?	~~Yes~~ / No	--
Enclosures deform to cause non-compliance with the standard?	~~Yes~~ / No	--
After the test:		
Electric strength test on reinforced insulation breakdown?	~~Yes~~ / No	--
Electric strength test on Basic insulation breakdown?	~~Yes~~ / No	--
SC: Short-circuited; **OC:** Open-circuited; **OL:** Over-load; **BK:** Block; **RP:** Reverse-polarity; **LK:** Lock; **DC:** Disconnect; **OVC:** Overcharging under Max. available charging voltage or 106% rated voltage; **ED:** Excessive discharging		
Voltage regulator, power meter, Data Acquisition/Switch Unit , Oscilloscope, Oscilloscope Probe, Digital Micro-ohmmeter, Withstanding Voltage Tester, DC Electrical load;		

39 Abnormal Operations and Fault Conditions Test	**Pass**
Ambient temperature (°C) ……:	25.1°C

Comp./ fault		Result / Observation	
Speaker	Test voltage: _12V_ Duration: _10mins_ Fuse or Fuse resistor No: _ _ I/P current (A): _0_ I/P power (W): _0_	☐ Become steady, output power / current _____ ☐ Shut down immediately, and _____ damaged, can't be recovered, repeated ____ times. ☐ Protected, can be recovered.	☐ Fuse opened immediately ☐ Fuse opened after __ ☐ T.F opened after __ ☐ see raw data __ ☒ No hazards Remark: --
U1	Test voltage: _12V_ Duration: _10mins_ Fuse or Fuse resistor No: _ _ I/P current (A): _0_ I/P power (W): _0_	☐ Become steady, output power / current _____ ☐ Shut down immediately, and _____ damaged, can't be recovered, repeated ____ times. ☐ Protected, can be recovered.	☐ Fuse opened immediately ☐ Fuse opened after __ ☐ T.F opened after __ ☐ see raw data __ ☒ No hazards Remark: --

Overload Tests *(40)*

46	Overload Tests	Pass

Test part:	Voltage	Result
Alarm	13.8V	Still can work
Test part:	Current	Result
Alarm	150% Rated current	Still can work

Endurance Test (41)

Test part:	Test method	Test method	Observations	Pass	
				Pass	Fail
Alarm	6000cycles	5s of alarm	Still can work	--	

Audibility Test (42)

42	TABLE: Audibility Voltage: 12V		Pass
Model	Test method	sound-pressure	Results
Detector	3m.	88 decibels	P
No rust.			

Leakage Current Test (43)

43	Leakage Current Test		N/A
Test voltage:			
Measured point:	U_2 (mV)	(mA)	Limit (mA)
Line and output accessible terminal	--	--	0.5
Neutral and output accessible terminal	--	--	0.5
Line and accessible enclosure surface	--	--	0.5
Neutral and accessible enclosure surface	--	--	0.5
Oscilloscope, Measuring circuit for touch current according to Annex D, Leakage Current Tester			

Tests of Thermoplastic Materials (44)

44	TABLE: Tests of Thermoplastic Materials Voltage: 12V		Pass
Model	Ambient	time	Results
Detector 1#	90	168h	P
Detector 2#	90	168h	P
Detector 3#	90	168h	P
Still can work, no change.			

Ignition Test (48)

48	Ignition	Pass
Test part:	Test method	Result
Alarm Standby	8.3 ±0.3 percent by volume mixture of methane and air.	No ignition
48	TABLE: Sensitivity Test	Pass

Model	concentrations	Alarm time	Results
Detector	8.4%	10mins	P
No ignition			

Detection Threshold Tests (49)

49.2, 49.3	Detection Threshold Tests	Pass
Test part:	Voltage	Result
Alarm	12V	Still can work
Alarm	12V	Still can work
Alarm	12V	Still can work
Alarm	12V	Still can work

49.4	Detection Threshold Tests	Pass
Test part:	Voltage	Result
Alarm 30℃ 85%	12V	Still can work
Alarm 30℃ 85%	12V	Still can work
Alarm	12V	Still can work
Alarm	12V	Still can work

Humidity Test (49.6)

49	TABLE: Variable Ambient Temperature Voltage: 12V	Pass

Model	Ambient	time	Results
Detector	40℃ 93% R.H.	168h	P
Detector	40℃ 93% R.H.	168h	P
Still can work, no change.			

49.6	Leakage Current Test	N/A

Test voltage--

Measured point:	U_2 (mV)	(mA)	Limit (mA)
Line and output accessible terminal	--	--	0.5
Neutral and output accessible terminal	--	--	0.5
Line and accessible enclosure surface	--	--	0.5
Neutral and accessible enclosure surface	--	--	0.5

Oscilloscope, Measuring circuit for touch current according to Annex D, Leakage Current Tester

Effect of shipping and storage (49.7)

49.7	TABLE: Variable Ambient Temperature Voltage12V	Pass

Model	Ambient	time	Results
Detector	70℃	24h	P
Detector	70℃	24h	P
Still can work, no change.			

Transient tests (49.8)

52	TABLE: Surge test	N/A

Location	Discharge condition	Pass insulation resistance? Yes / ~~No~~
AC input	2kV, 1.2/50 μs, 50 times	--
AC input	4kV, 1.2/50 μs, 50 times	--
AC input	6kV, 1.2/50 μs, 50 times	--
AC input	1kA, 8/20 μs, 50 times	--

AC input	2kA, 8/20 μs, 50 times	--
AC input	3kA, 8/20 μs, 50 times	--
--		
Still can normal work, No Emission of flame, molten metal, glowing or flaming particles		

Jarring Test (49.10)

49.10	TABLE: Impact test Vertically			Pass
Model	weighing	Test temperature (° C)	Impact energy (J)	Results
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
No damage.				

49.10	**Electric strength test**	Pass
Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

49.10	TABLE: Impact test Horizontally			Pass
Model	weighing	Test temperature (° C)	Impact energy (J)	Results
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
Enclosure	0.540kg, D:50mm	25	4.08J	P
No damage.				

49.10	**Electric strength test**	Pass
Test voltage applied between:	Test voltage (V)	Breakdown
Input and plastic enclosure	1000V	No
--		
--		

Vibration Test (49.13)

49.13	TABLE: Vibration tests			Pass
Model	amplitude	Test frequency (Hz)	Vibration time (h)	Results
Detector	0.25 mm	10-35-10, 1s	0.25h	P
Detector	0.25 mm	10-35-10, 1s	4h	P

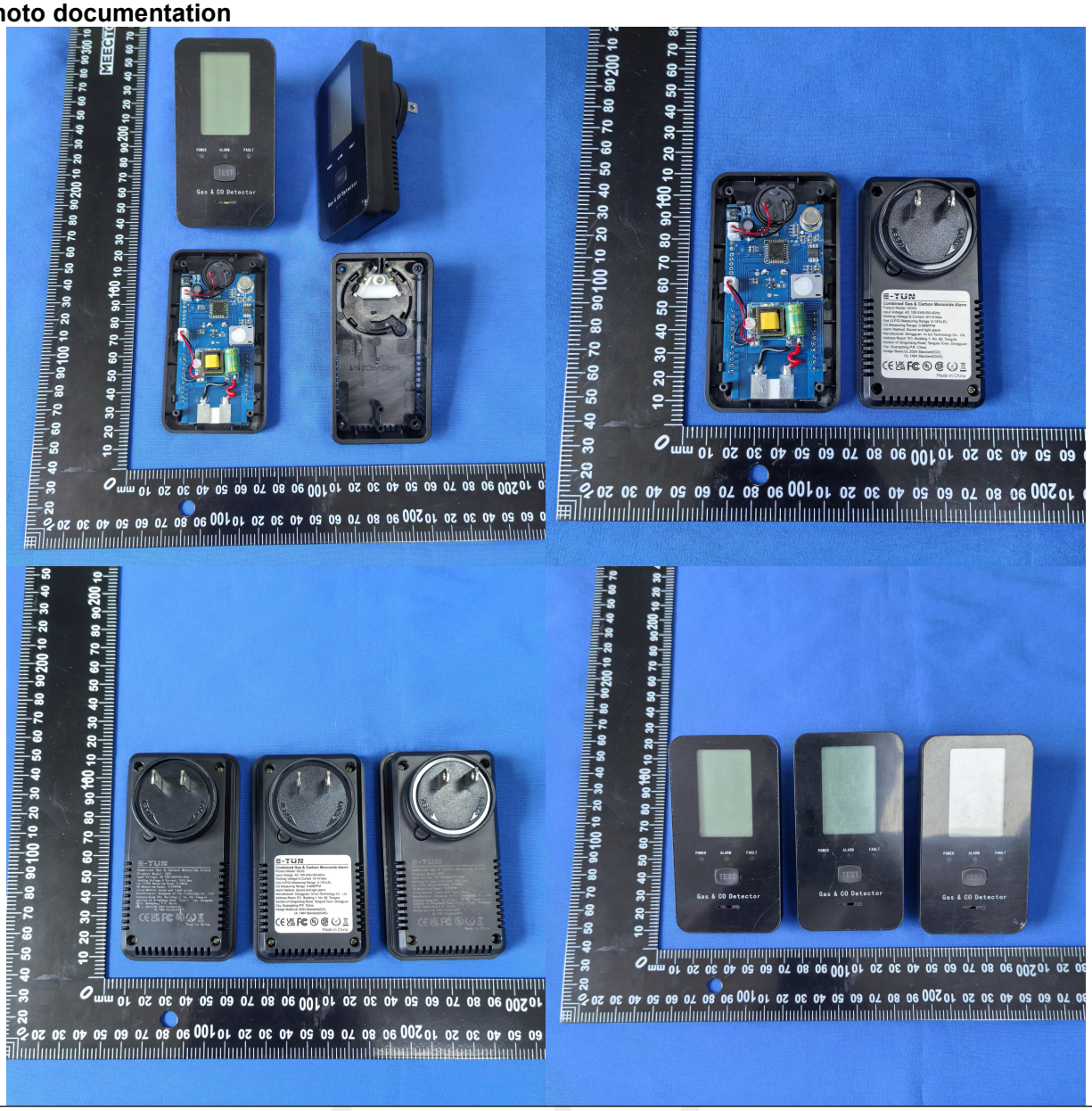
Marking (50)

50	Permanency of Wrapped Hang Tag Marking		N/A
Location	Temperature, humidity, time	Observations	result
Label	66°C, 3days 40°C 72h 61°C 93% R.H 10days	--	--

Strain Relief Test (51)

Pull Location	Test method	Force	Observations	N/A	
				Pass	Fail
Connector	--	44.5N	No damaged, no breakage	--	

Photo documentation



END OF THE REPORT

HZgytDD jrw5HTG