



# TEST REPORT

樣品規格  
Specification

主驗 Main Test  
UPS 12360 7 F2

輔驗 Additional Test  
UPS 12240 6 F2 UPS 12360 6 F2  
UPS 12460 F2 UPS 12580 F2  
RUM 6290 F2

報告彙整日期  
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UPS-M01-2403

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### TEST REPORT

樣品描述 Sample Description	Valve Regulated Lead Acid Battery	主驗型號 Main Model	UPS 12360 7 F2
批號 Lot no.	220216V21	規格 Specification	See the Table 1
樣品數量 Sample Quantity	30 pcs	樣品狀況 Sample Status	undamaged
收件日期 Sample Received Date	2022/4/6	測試日期 Test Date	Start date : 2022/4/7 End date : 2024/3/22
製造商Manufacturer	CSB Energy Technology Co., Ltd.		
地址Address	11F, No. 150, Sec. 4, Chengde Rd., Shilin Dist., Taipei City 111052, Taiwan (R.O.C.)		
委託單位Applicant	CSB Energy Technology Co., Ltd.		
實驗室地址 Test address	No. 16, Gongye W. Rd., EII Jenn Vil., Guantian Dist., Tainan City 72048, Taiwan(R.O.C.)		
測試項目 Test Items	See the Table 2		
測試依據 Test standard	The testing methods of the report are based on IEC 60896-21: 2004 (1), and the testing results are based on IEC 60896-22: 2004 (1).		
測試結果 Test Conclusion	The results conform to the requirements of standards with respect to the test items. (Stamp of Test Unit)		
備註 Remarks	There are 6 models (See the Table 1) for application, shown in this report, with the difference being the outer sizes and capacity. All of the tests were performed on UPS 12360 7 F2. Other models were test by 6.11 Discharge capacity C <sub>10</sub> to confirm status.		

Tested by : 黃亮諭

Sign :



Date : 2024/3/22

Reviewed by : 王冠堯

Sign :



Date : 2024/3/22

Approved by : 王冠堯

Sign :



Date : 2024/3/22

<b>Table 1: Models for application</b>		
No.	Models	Specification
1	UPS 12240 6 F2	12V/240W
2	UPS 12360 6 F2	12V/360W
3	UPS 12360 7 F2	12V/360W
5	UPS 12460 F2	12V/460W
6	UPS 12580 F2	12V/580W
7	RUM 6290 F2	6V/290W

**Table 2: Test items**

Test Clause	Measures	Purpose
6.1	Gas emission	To determine the emitted gas volume
6.2	High current tolerance	To verify the adequacy of current conduction cross-sections
6.3	Short circuit current and dc. Internal resistance	To provide data for the sizing of fuses in the exterior circuit
6.4	Protection against internal ignition from external spark sources	To evaluate the adequacy of protective features
6.5	Protection propensity against ground short	To evaluate the adequacy of design features
6.6	Content markings and durability of required	To evaluate the quality of the markings and the content of the information
6.8	Valve operation	To ensure the correct opening of safety valves
6.9	Flammability rating of materials	To verify the fire hazard class of battery materials
6.10	Intercell connector performance	To verify the maximum surface temperatures of the connectors during high rate discharges
6.11	Discharge capacity	To verify the available capacities at discharge rates or discharge durations. selected
6.12	Charge retention during storage	To provide storage duration data
6.13	Float service with daily discharge	To determine cyclic performance under float charge conditions
6.14	Recharge behavior	To determine the recovery of capacity or autonomy time after a power outage
6.15	Service life at an operating temperature of 40 °C	To determine the operational life at temperatures elevated
6.16	Impact of a stress temperature of 55 °C or 60 °C	To determine the influence of high stress temperatures on cell or monobloc battery life
6.17	Abusive over-discharge	To determine the expected behavior when excessive capacity is discharged
6.18	Thermal runaway sensitivity	To determine the expected times to establish a condition of escalating current and temperature
6.19	Low temperature sensitivity	To determine the sensitivity toward induced by electrolyte freezing damage
6.20	Dimensional stability at elevated internal pressure and temperature	To determine the propensity of the monobloc battery to be deformed by pressure and at elevated temperature cell or internal
6.21	Stability against mechanical abuse of units during installation	Determine the propensity of the cell or monobloc battery to fracture or leak when dropped.

## TEST RESULT

IEC 60896-21:2004, IEC 60896-22:2004			
Items	Requirement – Test	Result - Remark	Verdict
6.2	<p><b>High current tolerance:</b></p> <p>The test methods are according to clause 6.2.1 to 6.2.6 which are stated in the standard IEC 60896-21</p>	<p style="text-align: center;">UPS 12360 7 F2: It has no any damage after 30s of high current flow.</p> <p style="text-align: center;">Voltage after the test: No.13: 13.03 V/20.71 mΩ No.14: 13.01 V/20.65 mΩ No.15: 13.02 V/20.89 mΩ</p>	Pass
	<p>Requirement and application: Measure unit voltage, inspect and document the status of the top-lead and terminals of each unit after 30 s current flow. Pass for all applications: Voltage of unit &gt;2,0 Vpc; Show evidence of no incipient melting or of no loss of electrical continuity after 30 s of high current flow (value to be stated).</p>		
6.3	<p><b>Short circuit current and d.c. internal resistance:</b></p> <p>The test methods are according to clause 6.3.1 to 6.3.6 which are stated in the standard IEC 60896-21</p>	<p style="text-align: center;">UPS 12360 7 F2:</p> <p style="text-align: center;">No.16: Isc=264 A Ri=0.048 Ω</p> <p style="text-align: center;">No.17: Isc=264 A Ri=0.048 Ω</p> <p style="text-align: center;">No.18: Isc=258 A Ri=0.049 Ω</p>	State the value
	<p>Requirement and application: Define prospective short-circuit value Isc and internal resistance Ri of all units of a type range. State data for all applications: Short-circuit current (Isc) in A; Internal resistance (Ri) in ohms.</p>		
	<p>Requirement and application: see table 8 in the standard IEC 60896-22</p>		
	<p>The test methods are according to clause 6.5.1 to 6.5.9 which are stated in the standard IEC 60896-21</p>		
6.6	<p><b>Content and durability of required markings:</b></p> <p>The durability of the marking shall be tested according to clause 1.7.13 of IEC 60950-1 and the content of marking shall meet the requirement of IEC 60896-22</p>	Information remain readable after test and content meet requirement.	Pass
	<p>Requirement and application: Expose information to chemicals. Pass all substances for all applications: Information shall remain readable after exposure to chemicals and remain in place</p>		
	<p>Requested information to be present for all applications.</p>		

**IEC 60896-21:2004, IEC 60896-22:2004**

Items	Requirement – Test	Result - Remark	Verdict					
6.11	<b>Discharge capacity:</b>	<b>UPS 12360 7 F2:</b>	Pass					
	The test methods are according to clause 6.11.1 to 6.11.12 which are stated in the standard IEC 60896-21	See Report No. RL22050301-01						
	Requirement and application: Determine actual capacity $C_a$ . $C_a$ to be at least X % of $C_{rt}$ with all units at all rates shown below: 10h\ 8h\ 3h\ 1h\ 0.25h 1.80Vpc\1.75Vpc\1.70Vpc\1.60Vpc\1.60Vpc Comply for all applications: $C_a \geq 95 \% C_{rt}$	Capacity		$C_{rt}=6.70Ah$	Capacity	$C_{rt}=6.66Ah$		
		No.		$C_{10}(Ah)$	%of $C_{rt}$	No.	$C_8(Ah)$	%of $C_{rt}$
		1		7.05	105.2	7	6.97	104.7
		2		7.03	104.9	8	6.94	104.2
		3		6.91	103.1	9	7.20	108.1
		4		7.11	106.1	10	7.24	108.7
		5		7.10	106.0	11	7.15	107.4
		6		7.04	105.1	12	7.15	107.4
		Capacity		$C_{rt}=6.06Ah$	Capacity	$C_{rt}=5.04Ah$		
		No.		$C_3(Ah)$	%of $C_{rt}$	No.	$C_1(Ah)$	%of $C_{rt}$
13	6.51	107.4	19	5.24	104.0			
14	6.13	101.2	20	5.25	104.2			
15	6.31	104.1	21	5.34	106.0			
16	6.44	106.3	22	5.40	107.1			
17	6.48	106.9	23	5.31	105.4			
18	6.43	106.1	24	5.35	106.2			
Capacity	$C_{rt}=3.73Ah$							
No.	$C_{0.25}(Ah)$	%of $C_{rt}$						
25	3.90	104.6						
26	3.79	101.6						
27	3.89	104.3						
28	3.83	102.7						
29	3.89	104.3						
30	3.88	104.0						
6.12	<b>Charge retention during storage</b>	<b>UPS 12360 7 F2:</b>	Pass					
	The test methods are according to clause 6.11.1 to 6.11.12 which are stated in the standard IEC 60896-21	Charge retention factor						
6.12	Requirement and application: see table 16 in the standard IEC 60896-22	UPS 12360 7 F2:	Pass					
		No.7: $C_{rf} = 86.5 \%$ No.8: $C_{rf} = 87.0 \%$ No.9: $C_{rf} = 88.3 \%$ No.10: $C_{rf} = 87.8 \%$ No.11: $C_{rf} = 85.8 \%$ No.12: $C_{rf} = 91.0 \%$						
6.14	<b>Recharge behavior:</b>	<b>UPS 12360 7 F2:</b>	Pass					
	The test methods are according to clause 6.14.1 to 6.14.12 which are stated in the standard IEC 60896-21	Rbf24h=96.9 %						
	Requirement and application: Determine capacity after recharge; Rbf24h (24 h Recharge behaviour factor), Rbf168h (168 h Recharge behaviour factor). Comply for all applications: $\geq 90 \%$ , $\geq 98 \%$ (NOTE The requirement applies not to the average but to each of the individual tested units.)	Rbf168h =101.0 %						

IEC 60896-21:2004, IEC 60896-22:2004			
Items	Requirement – Test	Result - Remark	Verdict
6.17	<b>Abusive over-discharge:</b>	UPS 12360 7 F2: Unbalanced string over-discharge capacity Caod: Caod = 0.88 Crt(3h rate)  Cyclic over-discharge capacity Caoc: Caoc=0.90 Crt(3h rate)	Pass
	The test methods are according to clause 6.17.1 to 6.17.15 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 21 in the standard IEC 60896-22		
6.19	<b>Impact of low temperature service on capacity</b>	No mechanical damages UPS 12360 7 F2: No.11: Cals = 0.96 Crt No.12: Cals = 0.97 Crt No.13: Cals = 0.99 Crt	Pass
	The test methods are according to clause 6.19.1 to 6.19.13 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 23 in the standard IEC 60896-22		
6.21	<b>Stability against mechanical abuse of units during installation</b>	No leakage, No broken	Pass
	The test methods are according to clause 6.21.1 to 6.21.6 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 25 in the standard IEC 60896-22		

<b>ANNEX B : Additional Test 6.11 Discharge capacity C10</b>		
<b>Models</b>	<b>No.</b>	<b>% of Crt</b>
UPS 12240 6 F2	1	103.4
	2	103.9
	3	104.1
	4	102.6
	5	103.2
	6	103.7
UPS 12360 6 F2	1	104.3
	2	103.4
	3	101.8
	4	104.8
	5	105.1
	6	104.9
UPS 12460 F2	1	102.6
	2	103.1
	3	102.0
	4	101.2
	5	101.8
	6	102.1
UPS 12580 F2	1	105.7
	2	104.2
	3	104.3
	4	104.5
	5	105.4
	6	104.4
RUM 6290 F2	1	105.7
	2	103.8
	3	104.2
	4	105.8
	5	105.4
	6	105.2



<b>Table 3: Mian Test Report Number (UPS 12360 7 F2)</b>		
Test Clause	Measures	Report No.
6.2	High current tolerance	RL22051102-01
6.3	Short circuit current and dc. Internal resistance	RL22050202-01
6.6	Content markings and durability of required	RL22051101-01
6.11	Discharge capacity	RL22050301-01
6.12	Charge retention during storage	RL21120802-01
6.14	Recharge behavior	RL22051901-01
6.17	Abusive over-discharge	RL24032101-01
6.19	Low temperature sensitivity	RL24032201-01
6.21	Stability against mechanical abuse of units during installation	RL22051902-01

<b>Table 4: Additional Test Report Number</b>		
Test Clause	Measures	Report No.
6.11	Discharge capacity (UPS 12240 6 F2)	RL24030701-01
	Discharge capacity (UPS 12360 6 F2)	RL24030801-01
	Discharge capacity (UPS 12460 F2)	RL24010201-01
	Discharge capacity (UPS 12580 F2)	RL24010801-01
	Discharge capacity (RUM 6290 F2)	RL24020501-01