

## ALPAIS BATTERY MONITORING SYSTEM USER MANUAL

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#### **1.INTRODUCTION**

ALPAIS Battery Monitoring System (BMS) measures the voltage, temperature, internal resistance etc. of the battery. These are systems that enable the characteristics to be measured in real-time, to check whether the measured values are within the expected range, to detect faulty/defective batteries before they damage the system, and to send the necessary warnings to the connected systems via dry contact or communication interfaces in case of errors. The Control Module in the center of the BMS system provides a complete solution for monitoring the desired number of batteries with its hardware and software.

#### 1.1. ALPAIS System Structure

Alpais BMS consists of the web server software, a Battery(cell) Module, a String Module, a Control Module, and accessories of modules, each module functions as follows;

Module Name	Remark
Battery Module (BATMOD-XXX)	Determination of the single cell voltage, temperature, resistance, state of health, and alarm indication Balancing feature for series connected batteries Extreme battery voltage and current control
String Module	Determination of the string voltage and current
(STRMOD-XXX)	parameters
Control Module	Realization of the battery data acquisition,
(CONMOD-XXX)	control, alarm, and event logging upload
Accessories	Power Supply, Measuring Cable, Data Cable, Current Sensor, and Current Measuring Cable

Table 1. Modules and Definition Table



#### 1.2. Operating Conditions

- Operating Temperature: 0°C ~ +50°C
- Storage Temperature: -10°C ~ +70°C
- Working Humidity: 5 % ~ 90 % RH, non-condensing
- Atmosphere Pressure: 80 110 kPa

#### 1.3. Measurements

Table 2. Measurement Parameter Table

Measuring Place	Parameter
Battery	Voltage Internal Resistance Temperature
String	Voltage Current Charge/Discharge Cycle Ambient Temperature
Other (Optionally)	Humidity Voltage Balancing State of Health





#### 2.1. System Requirements

• 1 Server (If installation is desired on the local network and there is no embedded server)

Recommended server features are as follows

- ✤ Core speed of 1.3 GHz or faster
- Min 2-core CPU
- ✤ Min 4 GB RAM
- ✤ Min 25 GB of free hard disk space

#### 2.2. Communication

In case of any problems please contact us at the following contact information.

Address: Atakent Mahallesi Vatan Caddesi No:40/1, Postal Code: 41275 Basiskele, Kocaeli, Turkiye

Phone: +90 (216) 561 90 73

Fax: +90 (216) 561 90 74(pbx)

info@alpais.com.tr | www.alpais.com.tr



#### **3.ALPAIS SOFTWARE**

Installation, configuration, adjustment, alarm notification, and monitoring related to the system are performed via web-based ALPAIS Software. ALPAIS Software is run on a Linux-based operating system to maintain system stability. The system supports Modbus RTU, TCP/IP, and SNMP protocols.

The Analyzer (Analyzer) and the server communicate with Ethernet protocol. A server can provide battery data for multiple clients. The analyzer and server are located in the same package.

- Features
- 1. Local Area Network or Cloud Monitoring
- 2. Multiple Location Control from Single Control Center
- 3. Supports SNMP, Modbus-RTU and MODBUS TCP/IP\*
- 4. HDMI Display Compatibility\*
- 5. Real-Time Battery Status and Color Notification
- 6. Detailed Charge / Discharge Record
- 7. Alarm and Event Activities
- 8. E-mail Notifications
- 9. Embedded Web Server
- 10. PDF or CSV Reporting
- 11. Graphics and Analysis Tools
- 12. Alarm History and Service Logs
- 13. Management and Service Based Reporting
- 14.Battery Based Voltage-Current Notifications

\*Only the Control Module with an Embedded Server supports MODBUS-TCP and HDMI display screens.

Modbus Register Map will be shared with the relevant user on request.



#### **4.CONFIGURATION OF SOFTWARE**

#### 4.1. Login

It is possible to access with IP by the manufacturer via any tablet, phone, or computer. Simply enter the e-mail and password to log into the interface.



Figure 1. Login Screen

#### 4.2. Roaming

After logging in to the site, all transactions in the left column are shown.



Figure 2. Roaming



#### 4.3. Summary

In the summary section, all devices under the company appear with their string statuses and general statuses. Clicking on the device accesses the preview screen of the specified device. Thus, more detailed information can be accessed.

alp <mark>aîs</mark>		= •							
Summary		Summary							
Preview									
Alarms		General Devi	ces Status	Ge	eneral Battery Sta	tus		General De	evices Status
Measurements		Critical	2	Critic	al	42			
Batteries		Warning	0	Warni	ng				
Logs	>	Normal		Norm	al				
Reports	>								
Definitions	>								
System	>	Device Status List							
t Settings	>	Devices	Connection	Devices Status	String 1	String 2	String 3	String 4	Total Current
		Alpais-Lab01	×	•	٠				0 A
		Alpais-Lab02	×	•		•			0.04 A

Figure 3. Summary Screen

#### 4.4. Preview

This section includes a system overview. The system is showed the Battery Status Information, General Alarm Status and General Status from see in Figure 4. It also controls the number of batteries, current, voltage, and temperature in each string. Roaming is also available from the 'Device List'.



Figure 4. Preview Screen



#### 4.5. Alarms

Battery and String Alarm Status are given in this part. The alarm details are given as shown in Figure 5 with their string, batteries, and explanations. These are real-time data.

alp <mark>ais</mark>		= •		Ε Θ Ά
Summary		Alarms   Device : Alpois-Lab01		
Preview				
Alarms			1	
@ Measurements		12:15:19 13/08/2024 - String Alarm Status		
🖽 Botteries		String Alarm Status	Alarm Detail	
🗄 Logs	>		Ambient Temperature is in The Normal Values.	
Reports	>		Humidity Is In The Normal Values.	
Definitions	>		String Voltage Is In The Normal Values For Floating Charge.	
System	>			
🏚 Settings	>	12:15:19 13/08/2024 - Battery Alarm Status		
		Battery Alarm Status	Battery State of Health Is Lower Than Minimum Limit Value!	5,9
			Internal Battery Resistance is Higher Than The Maximum Limit Value!	6,9
			Battery Internal Resistance Is In The Normal Values.	12.3.4,6,7,8,10,11
			Battery Temperature Is In The Normal Values.	12.3,45,6,7,8,910,11
			Battery Voltage is in The Normal Values For Floating Charge.	12,3,4,5,6,7,8,9,10,11
			Battery State of Health Is In The Normal Values!	12,3,4,6,7,8,10,11
			No Battery Overvoltage Condition	12.3,45,6,7,8,910,11
			No Battery Overcurrent Condition!	12.3,4,5,8,7,8,9,10,11

Figure 5. General Alarm Screen

#### 4.6. Measurements

This section shows the measurement values of all parameters (voltage, current, temperature, etc.) in each battery and string. Measured values are given in column graphs. Figure 6 shows the selection of the string and others. These are real-time data. Also, if the voltage balancing feature is turned on, it shows the target voltage value and balancing (%) on each string.

alp<mark>ar</mark>s

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Figure 6. Measurement Screen

#### 4.7. Batteries

It's shown the condition of the battery in each string (see Figure 7). Alarm notification is available in case of alert or critical condition. It also shows the number of batteries, voltage, current, and temperature in each string.

Table 3. Battery Measurement Color Definitions

Color	Definitions					
Croon	The battery does not exceed the upper and lower limit values of the					
relevant parameters and is normal state.						
Vollow	The battery is in the warning band of the upper and lower limit values					
renow	of the relevant parameters and is warning state.					
Pod	The battery has exceeded the upper and lower limit values of the					
Reu	relevant parameters and is alarm state.					

alpars



Figure 7. Battery Screen

#### 4.8. Logs

#### 4.8.1. Battery Alarms

In this part, you can select the critical or warning battery status of the limit values according to the specified status (idle, floating, etc.) and battery alarm parameters between the desired dates. The log table can be downloaded in CSV or PDF format.

alpai	<u>s</u>	≡ ■						# <b>8</b> 8
Summary		Battery Alarms	Device : Alp	pais-Lab01 (	String : 1			
Preview								
Alarms		13/08/2024				Between Dates 13/	08/2024	
Measurements		Battery :	1 ×1	×2 ×3	×4 ×5 ×6 ×7 ×	8 × 9 × 10 × 11 E3 String	✓ Charge ✓ Discharge ✓ Floating Charge ✓ Id	le
🖽 Batteries						Status:		
Logs	~	Limits :	×Inte	ernal Resis	tance of Battery	Alarm Statu	s: 🗸 Critical 🗸 Warning	
Alarms	~		*l* ×Ba	ttery Temp ttery State	of Health × Battery	Overvoltage		
📾 Battery Alam	ns		× Ba	ttery Overo	current			
🛦 String Alarms						Show		
🖲 Charge Discha List	rge							Download
		Alarm Status	ID	String	Status	Message Content	Affected Batteries	Date
Reports	>	Critical	6	1	Floating Charge	Battery State of Health Is Lower Than Minimum Lin	nit 5,9	xport all data as csv
Definitions	>	Critical	6	1	Floating Charge	Internal Battery Resistance Is Higher Than The Max	d 5,9	xport all data as pdf
_		Critical	6	1	Floating Charge	Battery State of Health Is Lower Than Minimum Lin	nit 5,9	
System	>	Critical	6	1	Floating Charge	Internal Battery Resistance Is Higher Than The Max	d 5,9	Joiumns:
		Critical	6	1	Floating Charge	Battery State of Health Is Lower Than Minimum Lin	nit 5,9	Alarm Status
🕸 Settings	>	Critical	6	1	Floating Charge	Internal Battery Resistance Is Higher Than The Max	d 5,9	

Figure 8. Battery Alarm Screen

#### 4.8.2. String Alarms

In this part, you can select the critical or warning string status of the limit values according to the specified status (idle, floating, etc.) and string alarm parameters between the desired dates. The log table can be downloaded in CSV or PDF format.

/ Preview		String Alarm IDe	evice : 6   String : 3							
Alarms										
Measurements		02/05/2019				E	etween Dates 02/05/2019			
Batteries		String Status :		🗸 Charge	🗸 Discharge 🗸 Flo	ating Charge 🗌 Idle	Alarm Status :	🗸 Critical 🔍 Warning		
Logs	~									
d Alorma		Limits :		+l• ×Ambi	ient Temperature   ×H	umidity String Voltage	•			
	~									
C Rottoor Alarma										
es outres y Alumns										
A String Alorms										
▲ String Alorms										
String Alarms     Charge Discharge		Alarm Status	ID S	String Name	Status	Message Content			Date	
A String Alarms     Charge Discharge List		Alarm Status Warning	ID 5	String Name	Status Floating Charge	Message Content Humidity Value is in the We	arning Band!		Date 02/05/2019 16:37:32	
String Alarms     String Discharge     List		Alarm Status Warning Warning	1 <b>D</b> 5 6 3 6 3	String Name	Status Floating Charge Floating Charge	Message Content Humidity Value is in the We Humidity Value is in the We	aming Bandi aming Bandi		Date 02/05/2019 16:37:32 02/05/2019 16:37:02	
String Alarms     String Pischarge     String Reports	>	Alarm Status Warning Warning Warning	ID 5 6 3 6 3 6 3	String Name	Status Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the We Humidity Value is in the We Humidity Value is in the We	arning Bandl arning Bandl arning Bandl		Date 02/05/2019 16:37:32 02/05/2019 16:37:02 02/05/2019 16:36:32	
String Alarms     Charge Discharge     Iist     Reports	>	Alarm Status Warning Warning Warning Warning	ID 5	String Name	Status Floating Charge Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the Wi Humidity Value is in the Wi Humidity Value is in the Wi Humidity Value is in the Wi	aming Bandi aming Bandi aming Bandi aming Bandi		Date 02/05/2019 16:37:32 02/05/2019 16:37:02 02/05/2019 16:36:32 02/05/2019 16:36:02	
Bouten y Additions     A String Alarms     Charge Discharge     List     Reports     Definitions	>	Alarm Status Warning Warning Warning Warning Warning	ID \$ 6 3 6 3 6 3 6 3 6 3 6 3	String Name	Status Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the We Humidity Value is in the We Humidity Value is in the We Humidity Value is in the We	aming Bandl aming Bandl aming Bandl aming Bandl aming Bandl		Dete 02/05/2010 16:37:32 02/05/2010 16:37:02 02/05/2010 16:36:32 02/05/2010 16:36:32 02/05/2010 16:36:32	
A String Alorms     Charge Discharge     ist     Reports     Definitions	>	Alarm Status Warning Warning Warning Warning Warning Warning	ID \$ 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3	String Name	Status Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the We Humidity Value is in the We	aming Bandi aming Bandi aming Bandi aming Bandi aming Bandi aming Bandi		Date 02/05/2019 16:37:32 02/05/2019 16:37:02 02/05/2019 16:36:32 02/05/2019 16:36:32 02/05/2019 16:35:32 02/05/2019 16:35:32	
A String Alorms     A String Alorms     Charge Discharge     Discharge     Definitions     System	>	Alarm Status Warning Warning Warning Warning Warning Warning Warning	ID 5	String Name	Status Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the Wr Humidity Value is in the Wr	aming Bandi aming Bandi aming Bandi aming Bandi aming Bandi aming Bandi		Date           02/05/2019 18:37:32           02/05/2019 18:37:32           02/05/2019 18:36:32           02/05/2019 18:36:32           02/05/2019 18:36:32           02/05/2019 18:36:32           02/05/2019 18:36:32           02/05/2019 18:36:32           02/05/2019 18:36:32	
A String Alorms     A String Alorms     Charge Discharge     List     Reports     Definitions     System     Settings	> > >	Alarm Status Waming Waming Waming Waming Waming Waming Waming Waming	ID 5 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3	String Name	Status Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge Floating Charge	Message Content Humidity Value is in the Wr Humidity Value is in the Wr	aming Bondi aming Bondi aming Bondi aming Bondi aming Bondi aming Bondi aming Bondi		Date 02(05)200 103732 02(05)200 103732 02(05)200 103762 02(05)200 103652 02(05)200 103552 02(05)200 103552 02(05)200 103403 02(05)200 103402	

Figure 9. String Alarms Screen

#### 4.8.3. Charge/Discharge List

In this part, the voltage, internal resistance, and temperature of each battery are shown graphically according to charge or discharge conditions. When clicking the 'Show Batteries' button, the page in Figure 11 is opened as a report. Likewise, String presents its own parameters graphically.

Summary	=						A 8 # 0
Preview	с	harae - Discharae	List I Device : 203 kimiki Av	art i Kol-Kol 2			
Alarms							
<ul> <li>Measurements</li> <li>Batteries</li> </ul>				✓ Charge	~1	Discharge	
Logs	~	Start Date/Time	End Date/Time	Status	Passing Time	Show	
Alarms	~	10/01/2019 10:50	10/01/2019 10:50	Charge	0 sec	Show Botteries	Show String
🛱 Battery Alarms		10/01/2019 10:44	10/01/2019 10:44	Chargo	0 soc	Show Botteries	Show String
🛦 String Alarms		10/01/2019 10:42	10/01/2019 10:42	Chargo	0 soc	Show Botteries	ow String
Charge Discharge List		10/01/2019 10:39	10/01/2019 10:41	Chargo	1 min 29 soc	Show Botteries	Show String
Reports	>	10/01/2019 10:30	10/01/2019 10:38	Chargo	7 min 30 soc	Show Batteries	Show String
Definitions	>	10/01/2019 10:28	10/01/2010 10:28	Dischargo	0 sec	Show Batteries	Show String
System	>						
Settings	>						

Figure 10. Charge/Discharge List Screen

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Figure 11. Charge/Discharge Graph Screen

#### 4.9. Report

#### 4.9.1. Report of Batteries

Each battery is displayed optionally the voltage, temperature and internal resistance values as graphical representation in order to at the specified date and at specified time intervals (see Figure 12). In addition, data of selected batteries are downloaded as CSV or PDF files. String selection is made from the right corner.





#### 4.9.2. Report of String

Each string is displayed optionally the voltage, temperature, and current values as a graphical representation in order to at the specified date and at specified

# $\bigcirc$

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time intervals (see Figure 13). In addition, data of selected strings are downloaded as CSV or PDF files. String selection is made from the right corner.



Figure 13. Report of String

### ONLY THE 'ADMIN' USER WILL BE ABLE TO ACCESS THE REST OF THE INTERFACE AFTER THIS SECTION.

#### 4.10. Definitions

#### 4.10.1. Companies

Intracompany system information is recorded and edited. Existing company information can be edited or new companies can be added.

<ul> <li>Summary</li> </ul>	Companies						Definitions > Company	nies
Preview								
의 Alarms	Company List						+ Add Company	
Measurements	Add Company						×	
🖽 Batteries	Company Name	A Company Name		Phone	Phone			
Logs	Address	10 Address		City			Ŧ	
Reports	E-Mail	E-Mail		Password	Password			
Definitions	Mail Server	Mail Server		Port	Port			
nd Companies	TLS							
Lusers	SSL							
Battery Informations				Save				
+ Current Sensors			[				- · · · /= + /= · · · ·	
	Company Name Phone	Address	City E-Mail	Mall Server	Port	Password	Delete / Edit / Test M	
System				u		******	8 0 8	*
🔅 Settings								

Figure 14. Company Screen



#### 4.10.2. Users

Only the admin adds a new user. This part presents user information.

0	Summary	U	sers										Definitions >	Users
0	Preview													
0I	Alarms		Usor List										+ Add User	
C	) Measurements		AddUser										×	
=	Batteries		Name - Surname		<u>&amp;</u> N	ame - Surname								
B	Logs >		E-Mail	E-Mail E-Mail					Passwor	d	Password			
B	Reports >		Company											
B	Definitions v		Phone		0 P	hone			Position 🛱					
	nd Companies		Languago		6									
	LUSERS													
	Battery Informations								Save					
	+ Current Sensors													
			Name-Surname	E-Mail		Phone	Position	Langua	le	Record Date	Company	Password	Doloto / Edit	
Ξ	System >		admin	admin@alaai	comtr	05537512108	Admin	English		15/02/2019	TOVURA	******	80	
	t Settings		damin	dannilaalipai	2001110	03337312100				13/02/2018	1040104			
- ×	, ootango ,													

Figure 15. Users

#### 4.10.3. Battery Information

Battery types and physical properties are regulated.

		*						
Alarms								
Measurements		Battery List					+ Add Batte	
Botteries		Add Battery					:	
Logs	>	Brand	P Brand					
Reports	>							
		Model	1 Model		Capacity	A Capacity		
Definitions	~							
		Voltago	[m] Mathematic		Internal Resistance	Internal Resistance		
d Companies		·	Voltage					
i Companies ≛ Users			Voltage					
int Companies ≛ Users			Voitage		Save			
Companies     Users     Battery Informations	6		rag Voltage		Save			
di Companies     Users     Battery Informations     ÷ Current Sensors			voitage		Save			
E Companies     Users     Bottery Informations     Current Sensors		Brand	Model	Voltage (V)	Save Capacity (Ah)	Internal Resistance (m0hm)	Delete / Edit	
L Componies     Lusers     Bottery Informations     + Current Sensors     System	•	Brand	Model	Voltage (V)	Save Capacity (Ah)	Internal Resistance (m0hm)	Delete / Edit	
Compones Users Bottery Informations Current Sensors System	•	Brand MB F48	Model MB F48	Voltage (V)	Save Capacity (Ah)	Internal Resistance (mOhm)	Delete / Edit	
Companies     Users     Battery Informations     Current Sensors     System     settings	•	Brand MB F48 VIGOR	Model MB F48 NP 72-12	Voltage (V) 12 12	Save Capacity (Ah) 125 12	Internal Resistance (m0hm)	Doloto / Edit	
all Companies  LUsers  Diatory Informations  Current Sensors  System  Settings	•	Brand MB F48 VIGOR RCCKET	Model MB F48 NP 72-12 ES4212	Voitage (v) 12 12 12 12	Save Capacity (Ah) 25 22 42	Internal Resistance (m0hm)	Delete / Edit	

Figure 16. Battery Information Screen

#### 4.10.4. Current Sensors

Reference sensor values are available.

<ul> <li>Summary</li> </ul>	Current Sensors				Definitions > Current Sensors
Preview					
S Alarms	Sensor List				+ Add Sensor
④ Measurements	Add Sensor				×
🖽 Batteries	Brand	📋 Brand			
🖹 Logs >	Model	团 Model	Multiplier Value	Multiplior Value	
Reports >			Save		
Definitions V					
d Companies	Brand	Model	Multiplior	Delete / Edit	
≛ Usors	YHDC	CE HST21 500A/4V		8 •	A
Battery Informations					
+ Current Sensors					
System >					
Settings					÷
	4				+

Figure 17. Sensors Screen

#### 4.11. System

#### 4.11.1. System Editing

This tab consists of 3 steps organizing the battery and string information within the system for the specified device. All information (battery internal resistance initial value, threshold values, limit values, etc.) is arranged here.

alp <mark>ar</mark> s		= •					. e
Summary		System Editing Wiza	rd				
Preview		Please proceed as control	led.				
Alarms					2		3
Measurements			Step 1		Step 2		Step 3
Batteries		Available Systems					-
Logs	>	Available System.					
Reports	>		Device Information	Start Da	Start Date		te
Deficilizes			6 - Alpais-Lab01	17/07/2024 17	17/07/2024 17:05:43		Delete Data
Definitions			7 - Alpais-Lab02	22/07/2024 1	7:42:46	Delete Device	Delete Data
System	Ý			C 20	Scan Devices		
<ul> <li>Edit System</li> </ul>							
System Detail		Detected System	Details - 6 - Alpais-Lab01				-
Memory Check							
Settings	>	String Name	String Voltage	String Current	Ambient Temperature	Num	ber of Batteries
		1	149.68 V	0 A	27 °C	11	
							Next

Figure 18. System Editing Screen

#### 4.11.2. System Detail

It offers information such as system name, version, installation date, software version, device information, etc. In addition, system logs are downloaded from this page. Remote version update is done through this page.

<ul> <li>Summary</li> </ul>	System Detail	
Preview		
© Alarms	System Information Device Information Device	3 Upgrade
Measurements	• Device Name	
Batteries		66.0
Logs		
Reports	Number of String	
Definitions	Number of Batteries	100
System	🗎 Device Setup Date / Time	25j03/2022 NS3.48
✓ Edit System	Controller Module IP	Ping (8824018840)
System Detail		Company Device Logs
Settings		

Figure 19. System Details

#### 4.11.3. Memory Check

It shows the usage rate of the device's memory. It notifies users when the memory is 80% full. With the 'Delete Data' button, data in the desired date ranges or all data can be deleted.



(Stops sending data when memory is 85% full)

alpais	≣ ■	<b>.</b> 0 x
Summary	Memory Check	
Preview		
📮 Alarms	Memory Check Please do not forest to get a report before deleting. This action will permanently delete your data.	
@ Measurements	Memory Occupancy Rate	
🖽 Batteries		
E Logs	> 13/08/2024 Between Dates 13/08/2024	
Reports	> Controller: Ra KB Controller	
Definitions	Operation       6   Delete Data	
System	> 7	
Settings	>	

Figure 20. Memory Check

#### 4.12. Settings

#### 4.12.1. Inputs/Outputs

It is input/output data connection as require to activate the environmental controllers in the system according to certain alarm conditions. Input alarms are opened from this tab. Inputs can be edited or deleted later.

	_						
alp <mark>ais</mark>	=	•					
<ul> <li>Summary</li> </ul>	h	nputs   Device :	UPS 2				
Preview							
Alarms		Inputs It contains the a	criteria for environmental alarms in t	he system.			
③ Measurements		#	Explanation	Port Number	Settings	Alarm	
🛱 Batteries		1	Input 1	Port 1	Jelete		1
E Logs	>						
Reports	>	2	Input 2	Port 2	Delete		1
Definitions	>						
System	>						
Settings	~						
⊞ Inputs							
E Outputs							
Let Threshold Values							
++ Limits							
4 Voltage Balancing							

Figure 21. Input Port

		= •					s 🖪 (
Summary		Outputs   Device : UPS :	2				
Preview							
Alarms		Outputs It contains the criteria f	or environmental alarms in the system.				
Measurements		#	Explanation	Port Num	ber	Set	tings
🖶 Batteries		1		Port1		1	
Logs	>	2		Port 2		1	
Reports	>	3		Port 3		1	
Definitions	>	4		Port 4		1	
System System	>						
Settings	~	Output Port Data					
		The last 100 data are pr	inted in the system.				
E Outputs		#	(Port 1)	(Port 2)	(Port 3)	(Port 4)	Tarih
M Threshold Values							
+I+ Limits							
🐵 Voltage Balancing							

Figure 22. Output Port

#### 4.12.2. Threshold Values

It determines the threshold values according to the current and voltage of operating modes (float-charge-discharge) for each string.

Summary	Т	hreshold Values   Device : 6								
Preview										
<ul><li>Alarms</li><li>Measurements</li></ul>		Threshold Values It contains the oritaria for the domma in the system.								
🖽 Battories		String Name	Floating Charge Voltage (V)	Current (A)			Edit			
🖹 Logs 🔷				Discharge	Charging	Floating Charge $\rightarrow$ Charge				
Reports >		1	13,47	-37	2.0	27	1			
Definitions >		2	13,47	-37	2.0	27	1			
System >		3	13,47	-37	2.0	27	1			
Settings v		4	13,47	-37	2.0	27	1			
E Outputs										
🖬 Threshold Values										
-I+ limits										
++ Limits										

Figure 23. Threshold Value

#### 4.12.3. Limits

It is for setting the lower and upper limits of each battery and string for the following parameters:

- Battery Voltage
- Battery Internal Resistance
- Battery Temperature
- State of Health
- String Voltage



- Ambient Temperature
- Humidity

After the limit values have been set, the 'Save' button is pressed as in Figure 24. After setting the limits, click the icon indicated by the arrow for the parameter to be notified. SMS, notification, and email are sent on request.

<ul> <li>Summary</li> </ul>	Limits   Device : UPS 2
Preview	
🕒 Alarms	Edit Limit You can edit the limit values of the measurement parameters here.
Measurements	
🖽 Batteries	Battery Voltage (V) Battery Internal Resistance (%) Battery Temperature (°C) String Voltage (V) Ambient Temperature (°C) Humidity (%)
🖥 Logs 🔷	Battery Voltage (V)
Reports >	Battery Voltage (V) Battery Internal Resistance (%) Battery Temperature (*C) String Voltage (V) Ambient Temperature (*C) Battery State of Health (%) Humidity (%)
Definitions	
System >	
Settings	Save All
Inputs	
E Outputs	Please select the channels you want to receive notifications x
Ma Threshold Values	Sms √Mail √Notification
+I+ Limits	Time Pariod For Mol Notifications :
m Voltago Polancina	
ar voltage Balancing	Month Weak Day Hour Minute
	Notification Message : Bottery Voltage Is Lower Than The Minimum Limit Volue for Rooting Charget
	Consol Source

Figure 24. Limits

#### 4.12.4. Extreme Alarm Configuration

It sets the upper limits for the overvoltage parameters of the batteries in each string. The changes made are saved with the 'Save' button.

The icon shown with the arrow must be clicked to report the overvoltage and overcurrent parameters. SMS, notification, and e-mail are sent upon request.

alp <mark>ars</mark>		≡	•					1	8
• Summary		Ext	eme Alarm Configurations   Device : Alp	pais-Lab01					
Proview									
Alarms		E	xtreme Alarm Configurations contains the criteria for extreme alarms in the system	ι.					
Measurements			Battery Overvoltage (V)						
🖽 Batteries									
🗈 Logs	>		String Name					Save	
Reports	>		1		1	16.5		0	
Definitions	>								
System	>		Battery Overcurrent						
Settings	×		String Name						
E Outputs									
M Threshold Values									
•I• Limits									
© Extreme Alarm Configurations									

Figure 25. Extreme Alarm Configuration



#### 4.12.5. Voltage Balancing

It is set to take action about the 'voltage balancing' property of each string. If the balancing feature on the handle is desired to be turned on, the battery type should be selected first, and the 'OFF' statement should be made 'ON' and saved with the 'Save' button. If it is suitable for the structure of your batteries, the 'Split Batteries' option should be clicked along with the balancing feature.

From the measurements page, the target voltage and the balancing(%) in each battery can be observed. The voltage balancing feature can be turned off at any alpass

	FASTGROUP		≡ ₽					. 0
0	Summary		Voltage Balancing   Device	e : UPS 2				
0	Preview							
01	Alarms		Voltage Balancing It contains the criteria for environ	nmental voltage balancing in the system	n.			
٢	Measurements		String	Battery Type	Balancing Mode	Split(Center-Tap) Batteries		
•	Batteries		•	(Voltage)				
•	Logs	>	String : 3	12 🗸	off	off 🗆	Save	
B	Reports	>	ottnig.o	1.2				
ы	Definitions	>		2				
=	System	>		12				
۵	Settings	~						
	🗄 inputs							
	E Outputs							
	Ma Threshold Values							
	+I+ Limits							
	n Voltage Balancing							

#### Figure 26. Voltage Balancing

#### 4.13. Notification and Devices

According to the limit values set on the interface, if the notifications are turned on, the notification will be seen on the interface as soon as the alarm occurs. At the same time, if active, e-mail and SMS will be sent.

The device is selected from the right-hand corner. The device list is selected from the upper right corner of the interface (see Figure 27).

nito	oring Syst	em								0	
<b>P</b>										_	⇒.
Notifico	ations Mute									Devie	ce List
Mark Road											
Notification Voltage is in Charge.	rfrom 6 device (String: 2): Battery n the Normal Values for Floating	Status			General Ba	ttery Stat	us			General Status	
			5						Total Ba	attory	120
			9						Inpu	ts	
			20						Outor	ute	_
	>		20						oup	uta	
	0						0			0	
	String : 1			String : 2			String : 3			String : 4	
٥	String Voltage	273.24 V	0	String Voltage	273.24 V	۵	String Voltage	548.52 V	٥	String Voltage	548.48
Ķ^	String Current	0.03 A	Ψ <sup>A</sup>	String Current	0.03 A	Ψ <sup>A</sup>	String Current	0.01 A	₩^	String Current	0.04 /
*C	Ambient Temperature	25 °C	°C	Ambient Temperature	28.2 °C	°C	Ambient Temperature	25.5 °C	°C	Ambient Temperature	26.1 %

Figure 27. Notification and Devices

#### 4.14. Exit

Exit by pressing the icon in the top right corner (see Figure 28).

= •												<b>•</b>
Preview	Device : 6									(	•	admin
											admin	
	Gener	0	General St	ring Status	neral Ba	ttery Stat	tus			General St	admin@lalpais.co TOVURA	mtr
	Critical		5						Total Ba	ittory		
	Warning		9						Inpu	ts	Uogout	-
	Normal		20					Outputs				0
	0			0			0			1	9	
	String : 1 Floating Charge			String: 2 Floating Charge			String : 3 Floating Charge			Strin	ng : 4 Charge	
۵	String Voltage	273.28 V	0	String Voltage	273.24 V	۵	String Voltage	548.52 V	۵	String	Voltage	548.44 V
Ψ <sup>A</sup>	String Current	0.02 A	Ψ^.	String Current	0.02 A	₿^	String Current	0.34 A	₿^	String	Current	0.04 A
*C	Ambient Temperature	25 °C	°C	Ambient Temperature	26.2 °C	°C	Ambient Temperature	25.5 °C	*C	Ambient Te	omporaturo	26 °C
	Number of Batteries	20	8	Number of Batteries	20		Number of Batteries	40	8	Number o	of Batteries	40

Figure 28. Exit



### **5.LIGHT NOTIFICATION and ALARM CASES**

#### 5.1. Control Module

The light notification definitions in the control module are as follows. Does not apply to light notifications on a Control Module with an Embedded Server.

Table 4.	Control	Module	l iaht	Illustration	Table

No	Color	Status	Definition
1	Green	Short flashing light	The program is ready to run
2	Yellow	Short flashing light	Battery Module application on Control Module
3	Red	Continuous Light / Short flashing light	No network connection can be established via Ethernet / Verifying peripheral units

\* Observe the light instructions on the control module when starting the installation. In order to see that the program works in a healthy way, first red, then yellow, and finally green light flashes.

#### 5.2. Battery Module

In normal conditions and when the 'State' button on the control module is pressed, the light notification definitions on the battery module are as follows;

Νο	Color	Status	Definition
1	Green	0.2 sec. led @ 30 sec	Connection is available
2	Yellow	Continuous / 0.2 sec. led@5 sec / 0.7 sec. led @1 sec	IR Test / No message*/ Software update
3	Red	Continuous / 0.2 sec. led @5 sec	No Application (Only Boot Loader) / No Connection

Table 5. Battery Module Normal State Light Notification Table

\*If data is not coming at more than 30 sec.

# 0

#### User Manual

Table 6. Light Notificatior	n Table with Battery Module State Button Active	
-----------------------------	---	--

Νο	Color	Status	Definition
1	Green	0.5 sec. led@1sec	Do not overstep lower or upper limit values
2	Yellow	0.5 sec. led@1 sec	Limit values in the warning band
3	Red	0.5 sec. led@1 sec	Overstep lower or upper limit values

#### 5.3. String Module

In normal conditions and when the 'State' button on the control module is pressed, the light notification definitions on the string module are as follows;

No	Color	Status	Definition
1	Green	0.2 sec. led @ 30 sec	Connection is available

Table 8.	String	Module State	Button	Active	Light	Notification	Table
----------	--------	--------------	--------	--------	-------	--------------	-------

Νο	Color	Status	Definition
1	Green	0.5 sec. led@1sec	Do not overstep lower or upper limit values
2	Yellow	0.5 sec. led@1 sec	Limit values in the warning band
3	Red	0.5 sec. led@1 sec	Overstep lower or upper limit values

#### 5.4. Sounding Notification Device

The sounding notification feature is available on the Alpais Software. Alert alarms can be intercepted by buttons on the software. The sounding notification feature is optional and can be disabled if desired.