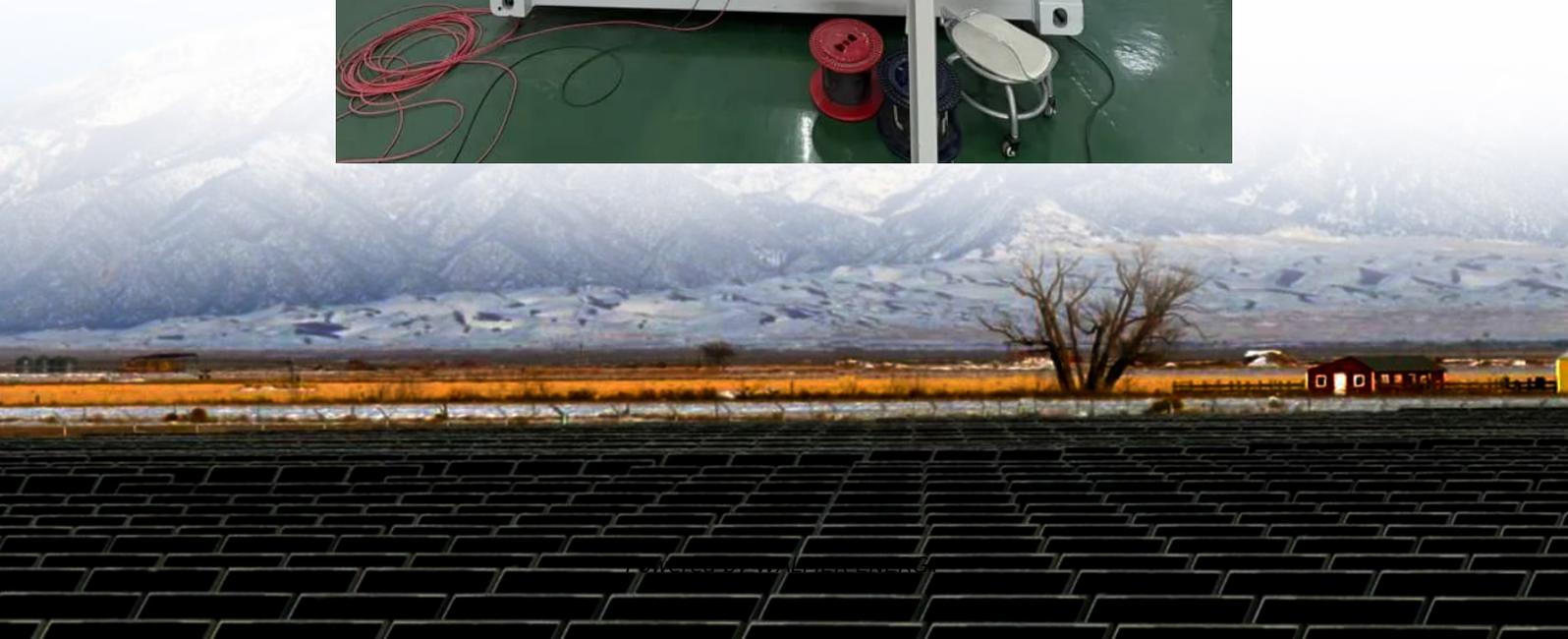


Bamako BMS battery management power system architecture





Overview

What is a BMS master controller?

Data is sent to a BMS Master Controller, which aggregates and analyzes the information. Battery Management Unit (BMU): The Battery Management Unit (BMU) is a key component in a Battery Management System (BMS) responsible for monitoring and measuring critical parameters of the entire battery pack or its individual cells.

What is a battery management system (BMS)?

Algorithms for energy and thermal management SYSTEM MODEL C or HDL Code generated from controller model C or HDL Code generated from plant model Typical Battery Management System Architecture A BMS for a battery pack is typically composed of: 1) Battery Management Unit (BMU) Centralized control of battery pack.

What functionalities can be found in a battery management system (BMU)?

Some other functionalities that can be in the BMU are interlock functionality or the real time clock and vector management system for the software. BMS Software Architecture: The battery management system architecture has different layers that abstract different parts of hardware.

How does a battery management system work?

A BMS can track SoH by assessing factors like cycle count, temperature history, and voltage fluctuations, helping predict the battery's lifespan and identify when it may need replacement. 3. Safety and Fault Protection Safety is a primary concern when designing BMS systems.



Bamako BMS battery management power system architecture

How to Design a Battery Management

Introduction
Improving State-of-Charge (SOC) and State-of-Health (SOH) Accuracy
AFE Direct Fault Control High-Side vs. Low-Side Battery Protections
AFE Safety Functions
Conclusion

Battery-powered applications have become commonplace over the last decade, and such devices require a certain level of protection to ensure safe usage. The battery management system (BMS) monitors the battery and possible fault conditions, preventing the battery from situations in which it can degrade, fade in capacity, or even potentially harm the See more on

media.monolithicpower.cn#b_results .b_vidAns{border-radius:6px;box-shadow:0 0 1px rgba(0,0,0,.05);padding:16px 20px;gap:10px;background:#fff}@charset "UTF-8";#b_results .b_ans.b_vidAns{box-shadow:none!important;padding:var(--smtc-gap-between-content-medium) 0!important;background:var(--bing-smtc-background-ctrl-fade-on-image-stop-0)}#b_results .b_ans.b_vidAns #serpvidans.vsacf .mc_vtvc,#b_results .b_ans.b_vidAns #serpvidans.vsacf .mc_vtvc_th,#b_results .b_ans.b_vidAns #serpvidans.vsacf .cico,#b_results .b_ans.b_vidAns #serpvidans.vsacf .mc_vtvc_htb,#b_results .b_ans.b_vidAns #serpvidans.vsacf .vrhc,#b_results .b_ans.b_vidAns #serpvidans.vsacf .vrhcp,#b_results .b_ans.b_vidAns #serpvidans.vsacf .vrhtc,#b_results .b_ans.b_vidAns #serpvidans.vsacf .vrhtpc{border-radius:var(--mai-smtc-corner-list-card-nested-default)}#b_results .b_ans.b_vidAns #serpvidans.vsacf .mmlist .mc_vtvc,#b_results .b_ans.b_vidAns #serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta{margin:0}#b_results .b_ans.b_vidAns #serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_channel,#b_results .b_ans.b_vidAns #serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_row_channel{color:var(--smtc-foreground-content-neutral-primary)}#serpvidans.vsacf,#serpvidans.vsacf .expctn .expbody,#serpvidans.vsacf .mmlist{display:flex;flex-direction:column;gap:var(--smtc-gap-between-content-medium)}#serpvidans.vsacf .cico{height:auto}#serpvidans.vsacf .mc_vtvc_ban_lo{top:0;right:auto}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta{height:auto;padding:var(--smtc-gap-between-content-xx-small) 0 var(--smtc-gap-between-content-xx-small) var(--smtc-gap-between-content-medium);display:flex;flex-direction:column;justify-content:space-between}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_title,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_title{color:var(--smtc-ctrl-link-foreground-brand-rest);font:var(--bing-smtc-text-global-body2);height:auto;display:-webkit-box;-webkit-line-clamp:2;-webkit-box-orient:vertical}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area,#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta .mc_vtvc_meta_block_area,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block{display:flex;flex-direction:column;gap:var(--smtc-padding-ctrl-text-side)}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_row,#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block .mc_vtvc_meta_row,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_row{color:var(--smtc-foreground-content-neutral-primary);height:var(--mai-smtc-padding-card-default);font:var(--bing-smtc-text-global-caption1)}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_row .mc_vtvc_meta_row_channel::before,#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block .mc_vtvc_meta_row .mc_vtvc_meta_row_channel::before,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_row



```
.mc_vtvc_meta_row_channel::before,#serpvidans.vsacf .mmlist .mc_vtvc .mc_vtvc_meta
.mc_vtvc_meta_block .mc_vtvc_meta_row .mc_vtvc_meta_row_channel::before{content:" .
"}#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area
.mc_vtvc_meta_pubdate,#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta
.mc_vtvc_meta_block .mc_vtvc_meta_pubdate,#serpvidans.vsacf .mmlist .mc_vtvc
.mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_pubdate,#serpvidans.vsacf .mmlist
.mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block .mc_vtvc_meta_pubdate{color:var(--bing-smtc-
foreground-content-neutral-tertiary);padding-bottom:0}.vsacf .mc_cwvc .mc_vtvc_con_rc,.vsacf
.mmlist .mc_vtvc_con_rc{display:flex}.vsacf .mc_cwvc .mc_vtvc_con_rc .mc_vtvc_meta_w,.vsacf
.mmlist .mc_vtvc_con_rc .mc_vtvc_meta_w{height:auto}.vsacf .b_title{padding-left:var(--mai-
smtc-padding-card-default)}.vsacf .b_title .mmtitle{font:var(--bing-smtc-text-global-
subtitle1-strong);margin-bottom:0}.vsacf .b_title .mmtitle a::after{content:"";margin:5px 5px 0
0;border-top:2px solid var(--smtc-foreground-content-neutral-primary);border-right:2px solid
var(--smtc-foreground-content-neutral-primary);background-size:7px 7px;width:7px;height:7px;tr
ansform:rotate(45deg);display:inline-block;margin-left:4px}#serpvidans.vsacf .b_title
.mmtitle{margin-bottom:0}#serpvidans.vsacf .b_title .mmtitle a{color:var(--smtc-foreground-
content-neutral-primary)}#serpvidans.vsacf .cardless.mmlist .mc_vtvc_con_rc,#serpvidans.vsacf
.cardless.mmlist .mc_vtvc_th{height:auto}#serpvidans.vsacf
.vsb_tr_c.va_tt{margin:0}#serpvidans.vsacf .vtbc .mv_vtvc_play,#serpvidans.vsacf .vtbc
.mv_vtvc_play_ext{position:static}#serpvidans.vsacf .va_tt
.mc_vtvc_ban_lo{display:block}#serpvidans.vsacf .mc_bc{width:auto;border-radius:var(--smtc-
ctrl-badge-sm-corner);padding:var(--smtc-padding-ctrl-text-side) var(--smtc-gap-between-
content-xx-small)}#serpvidans.vsacf .rmts .mc_bc ems{display:none}#serpvidans.vsacf
a.vsb_tr_t{color:var(--smtc-foreground-content-neutral-primary)}.vsacf .va_tt .vsb_tr_chd
.mc_vtvc_th_dock.rmoverlay{height:36px}.vsacf .va_tt .vsb_tr_chd .mc_vtvc_th_dock{height:92p
x;background:linear-gradient(180deg,var(--bing-smtc-background-ctrl-fade-on-image-stop-0)
0%,var(--mai-smtc-background-ctrl-on-image-rest) 100%)}.vsacf .va_tt a.vsb_tr_t{padding:0
20px;font:var(--acf-font-title-2-strong)}.vsacf .va_tt .vsb_tr_chd .mc_vtvc .mc_vtvc_meta,.vsacf
.va_tt .vsb_tr_chd .mc_vtvc .mc_vtvc_title{color:var(--mai-smtc-foreground-ctrl-on-image-
rest)}.vsacf span.vcmt_ctt{font:var(--bing-smtc-text-global-caption2);margin:var(--smtc-gap-
between-content-xx-small) 0 0;height:16px}#serpvidans.vsacf .vsb_tr_chd .mc_vtvc_tot
.mc_vtvc_title strong{font-size:14px;line-height:20px;display:unset}#serpvidans.vsacf .va_tt
.b_slidr .slide:not(:first-child){margin-left:var(--smtc-gap-between-content-
small)}#serpvidans.vsacf .va_tt .vsb_tr_chd .mc_vtvc .mc_vtvc_title{white-space:normal;display:
-webkit-box;-webkit-line-clamp:2;-webkit-box-orient:vertical}#serpvidans.vsacf
.b_module_expansion_control .b_btnContainer .b_CompactExpansion{background-color:var(--bin
g-smtc-background-ctrl-neutral-rest);display:flex;justify-content:center;align-
items:center;gap:4px;width:fit-content;height:auto;padding:8px 12px}#serpvidans.vsacf
.b_module_expansion_control .b_btnContainer .b_CompactExpansion .b_CompactExpansionBtnTe
xt{font:var(--bing-smtc-text-global-caption1-strong);color:var(--bing-smtc-foreground-content-
brand-rest)}#serpvidans.vsacf .b_module_expansion_control .b_btnContainer
.b_CompactExpansion .b_arrow{display:flex;margin:0;height:auto}#serpvidans.vsacf
.b_module_expansion_control .b_btnContainer .b_CompactExpansion .b_arrow
path#Shape{fill:var(--bing-smtc-foreground-content-brand-rest)}#serpvidans.vsacf
.b_module_expansion_control .b_btnContainer::after{content:"";position:absolute;width:100%;bo
ttom:20px;left:0;height:1px;border-radius:1px;background:var(--smtc-stroke-ctrl-on-neutral-
rest)}#b_results .b_ans.b_vidAns{box-shadow:none;padding:12px 20px 0}#b_results
.b_ans.b_vidAns .vasac{padding:unset;margin:0}#b_results .b_ans.b_vidAns .vsa
.b_attribution{padding-bottom:0}#b_results .b_ans.b_vidAns .cardless
.salink{margin:0}#b_results .b_ans.b_vidAns .mmlist .mc_vtvc{margin-top:10px}#b_results
.b_ans.b_vidAns .mmlist .mc_vtvc .mc_vtvc_meta{display:flex;flex-direction:column;justify-
content:space-between;margin:0 10px 4px 12px}#b_results .b_ans.b_vidAns .mmlist .mc_vtvc
```



```
.mc_vtvc_meta .mc_vtvc_meta_channel{color:#111}#b_results .b_ans.b_vidAns .mmlist
.mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_row_channel,#b_results .b_ans.b_vidAns .mmlist
.mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area{color:#666}#b_results .b_ans.b_vidAns
.mmlist .mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area{bottom:0;height:unset}.b_dark
.vsa.cardless .mc_vtvc{background-color:unset}.mmlist>a{display:block}.mc_fh{height:100%;
border-radius:6px}.mc_tc_bs{overflow:hidden}.mmlist .mc_vtvc .mc_vtvc_meta { padding: 12px
16px 16px 16px; } .mmlist .mc_vtvc .mc_vtvc_meta_w { height: 112px; margin-top: -0px; }
.mmlist .mc_vtvc .mc_vtvc_title { height: 44px; line-height: 22px; margin-bottom: 0px; margin-
top: 0px; } .mmlist .mc_vtvc .mc_vtvc_meta_block_area { height: 40px; } .mmlist .mc_vtvc
.vtmu, .mmlist .mc_vtvc .vtpl { bottom: 120px; } .mmlist .mc_vtvc_th_dock { height: 112px; }
.mmlist .mc_vtvc_th .cico { height: 131px; } .mc_vtvc{background-color:#fff;box-shadow:0 0 0
1px rgba(0,0,0,.05);line-height:0;margin:0;position:relative;border-radius:6px;overflow:hidden}.
mc_vtvc.noshadow{box-shadow:none}.mc_vtvc_con_rc{border-radius:6px;overflow:hidden;positi
on:relative}.mc_vtvc>a{color:#71777d;display:block;text-
decoration:none;width:100%}.mc_vtvc>a:focus::after{outline:2px solid #00a89d;width:100%;he
ight:100%;content:"";outline-offset:-2px;position:absolute;top:0;left:0}.mc_vtvc_th{background-
color:#d5d5d5;position:relative}.mc_vtvc_th .cico{border-radius:0}.mc_vtvc_ban_lo,.mc_vtvc_ba
n_up{position:absolute;vertical-align:middle}.mc_vtvc_ban_lo{bottom:0}.mc_vtvc_ban_up{top:0
}.mc_vtvc_title{font-weight:normal;margin-
bottom:11px;overflow:hidden;color:#111;height:54px;line-height:18px}.mc_vtvc_title
a{display:inline-block;color:#111}.mc_vtvc_title a:hover{text-decoration:underline}.mc_vtvc_src
_ico{float:left;margin-right:4px}.mc_vtvc_act{height:16px;margin-top:-40px;padding:12px 8px;z-
-index:1}.mc_vtvc_actc{right:16px;bottom:16px;position:absolute;display:inline-block;z-
index:1}.mc_vtvc_act_sep{border-top:1px solid #d5d5d5;height:40px;margin:0 8px}.mc_vtvc_fh
.mc_vtvc_act_sep,.mc_vtvc_fh .mc_vtvc_act{visibility:hidden}#serpvidans .b_topTitle{margin-bo
ttom:8px}.mc_vtvc_htc{width:100%;height:100%;position:absolute;top:0;bottom:0;left:0;right:0
}.mc_vtvc_htb{width:100%;height:100%;background:rgba(0,0,0,.7);position:absolute;top:0;botto
m:0;left:0;right:0}.mc_vtvc_ht{width:100%;padding:0 16px;line-height:16px;color:#fff;text-decor
ation:underline;word-break:break-word;box-sizing:border-box;vertical-align:middle;text-align:cen
ter}.mc-vtvc_th_live_b{background-color:#c80000;color:#fff;display:inline-block;padding:2px
8px;font:11px/14px Arial;border-radius:2px;text-
transform:uppercase;height:15px;width:26px;position:absolute;left:8px;top:110px}.isvctrl .isv
.mc_vtvc_ban_up{left:0;right:initial}.mc_vtvc_ban_lo,.mc_vtvc_ban_up{right:0}.vt_text.b_IRight
.b_ILeft{margin:0 0 0 1px;height:14px;line-height:14px;padding:2px 8px;background:rgba(0,0,0,.
75);border-radius:2px;font-weight:bold}.mc_vthtb{width:100%;height:100%;background:rgba(0,
0,0,.7);position:absolute;top:0;bottom:0;left:0;right:0;display:table}.mc_vtht{width:100%;paddin
g:0 16px;line-height:16px;color:#fff;text-decoration:underline;word-break:break-word;box-
sizing:border-box;vertical-align:middle;text-align:center;display:table-cell}.vt_text.b_IRight
.b_ILeft{margin:0 0 0 1px;height:14px;line-height:14px;padding:2px 8px;background:rgba(0,0,0,.
75);border-radius:2px;font-weight:bold}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleFor
DebuggingPurpose{top:0}.mc_vtvc_center_play{width:32px;height:32px;background-size:contai
n;position:absolute;margin:auto;bottom:0;top:0;left:0;right:0;box-shadow:none;border-radius:0}.
mc_vtvc_center_play.rmvbg{width:32px;height:32px;background-
image:none}.mc_vtvc_htb,.mc_vtvc_ht{display:none}.vt_onhv
.mc_vtvc_htb{display:table}.vt_onhv .mc_vtvc_ht{display:table-
cell}.mc_vtvc_center_play{display:inline-block}.vt_onhv
.mc_vtvc_center_play{display:none}.mc_vtvc .vtmu,.mc_vtvc .vtpl{bottom:163px}.vsarf
.mc_vtvc .vtmu,.vsarf .mc_vtvc .vtpl{bottom:122px}.svarh #mmcar .mc_vtvc .vtmu,.svarh
#mmcar .mc_vtvc .vtpl{bottom:137px}.svarht #mmcar .mc_vtvc .vtmu,.svarht #mmcar
.mc_vtvc .vtpl{top:8px;left:8px}.mc_vtvc_center_play{background-image:url(data:image/svg+x
ml,%3Csvg%20width%3D%2232%22%20height%3D%2232%22%20viewBox%3D%220%200%20
32%2032%22%20fill%3D%22none%22%20xmlns%3D%22http%3A%2F%2F%2F2000%2Fsvg%22
```




```
buggingPurpose{top:0}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleForDebuggingPurpo
se{top:0}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleForDebuggingPurpose{top:0}.vtbc
c .mv_vtvc_play{display:inline-
block;position:absolute;bottom:8px;left:9px;height:8px;width:7px}.vtbc
.mv_vtvc_play_ext{background:url(/rp/Lp38sn_O4jegSK0IHxZVxyp-yKQ.png) -172px
-31px;display:inline-block;height:8px;width:12px;position:absolute;bottom:8px;left:6px}.vtbc
.pivot{height:20px;width:8px;min-width:8px}.vtbc .mv_vtvc_play{background:url(data:image/pn
g;base64,iVBORw0KGgoAAAANSUgAAAcAAAIBAMAAADHKvg1AAAIVBMVEX////////////////////
////////////////////9/gMdvAAACnRSTIMAETNEVWAlmbvuo4D1oAAAAB9JREFUCB1jmMoABKuaQcSqQh
CxKgFGgLhNQIkPQAwaA8zkLyQAI6FOAAAASUVORK5CYII=)}.mc_bc_w{height:18px;padding:8px;
text-align:right}.mc_bc{background-color:rgba(0,0,0,.75);padding:2px 8px;line-height:14px;color
:#fff;display:inline-block;vertical-align:middle;border-radius:2px;font-weight:bold}.mc_bc_w
.pivot{text-align:center;margin-right:1px;height:14px}.vsarr .mmgrid .mc_bc_w .mc_bc{backgro
und-color:rgba(0,0,0,.75);opacity:1}.mmsi{height:16px;width:16px;position:relative;top:5px;pad
ding-right:var(--smtc-gap-between-content-xx-small)}.mmsi-microsoftnews,.mmsi-msn{top:3px}
.vrhdata{display:none}.mmgrid>div{width:197px;display:inline-block;margin-right:8px;margin-
bottom:8px;box-shadow:0 0 0 1px rgba(0,0,0,.05);position:relative;vertical-
align:top;overflow:hidden;white-space:normal;border-radius:6px}.vsarr .mmgrid>div,.vsarr1stbig
.mmggrid>div{margin-right:8px;margin-bottom:8px}#serpvidansrr .mc_vtvc
.mcv_tvc_meta{height:auto}#serpvidansrr .mc_vtvc .mc_vtvc_title{display:-webkit-box;-webkit-
line-clamp:2;-webkit-box-orient:vertical}.mmgrid .mc_tc{border:0}.vsa .mmgrid>div:nth-
child(3n){margin-right:0}.vsa .b_moreLink{padding-top:4px}#serpvidansrr
.mcv_tvc_meta_row{line-height:18px;font-size:100%;height:17px}.vsarr .mmgrid>div:nth-
child(2n){margin-right:0}#serpvidansrr .mc_vtvc .vtmu,#serpvidansrr .mc_vtvc
.vtpl{bottom:128px}.vsarr1stbig .mmgrid>div:nth-child(2){margin-
right:0}#serpvidansrr.uipolish .mc_vtvc_meta_pubdate,#serpvidansrr.uipolish
.mcv_tvc_meta_channel,#serpvidansrr.uipolish #vidans2 .b_videocard .video_metadata
.video_source{color:#767676}#serpvidansrr #vidans2 .b_videocard
.video_metadata_container,#serpvidansrr #vidans2 .b_videocard .video_metadata_container
.video_metadata>h3{width:100%}@media(max-width:1362.9px){#serpvidansrr
.mmggrid>div{width:168px;height:206px}#serpvidansrr .mmgrid>div .cico,#serpvidansrr
.mmggrid>div .cico .rms_img{width:168px;height:100px}#serpvidansrr .mc_vtvc
.mcv_tvc_meta{padding:12px}#serpvidansrr .mc_vtvc .mc_vtvc_title{height:32px;line-
height:16px;margin-bottom:16px}#serpvidansrr .mc_vtvc
.mcv_tvc_meta_block_area{height:34px}#serpvidansrr .mc_vtvc_meta_row{line-
height:15px;font-size:13px;height:15px}#serpvidansrr .mc_vtvc_meta_pubdate{padding-
bottom:4px}#serpvidansrr .mc_vtvc .vtmu,#serpvidansrr .mc_vtvc
.vtpl{bottom:114px}#serpvidansrr #vidans2 .b_videocard .videoPlayer,#serpvidansrr #vidans2
.b_videocard .videoPlayer .cico,#serpvidansrr #vidans2 .b_videocard .videoPlayer .cico .rms_img
{width:343px!important;height:194px!important;margin-right:0}#serpvidansrr
.mmggrid>div .cico,#serpvidansrr .mmgrid>div .cico
.rms_img{width:124px;height:76px}#serpvidansrr .mc_vtvc
.mcv_tvc_meta{padding:8px}#serpvidansrr .mc_vtvc .mc_vtvc_title{height:32px;line-
height:16px;margin-bottom:12px}#serpvidansrr .mc_vtvc
.mcv_tvc_meta_block_area{height:28px}#serpvidansrr .mc_vtvc_meta_row{line-
height:13px;font-size:11px;height:13px}#serpvidansrr .mc_vtvc_meta_pubdate{padding-
bottom:2px}#serpvidansrr .mc_vtvc .vtmu,#serpvidansrr .mc_vtvc
.vtpl{bottom:96px}#serpvidansrr #vidans2 .b_videocard .videoPlayer,#serpvidansrr #vidans2
.b_videocard .videoPlayer .cico,#serpvidansrr #vidans2 .b_videocard .videoPlayer .cico
.rms_img{width:256px!important;height:144px!important;margin-right:0}#serpvidansrr
.maskthumb .mc_bc_w{padding:8px 4px 4px 8px}#serpvidansrr.withsplitline .mmgrid>div:nth-
```



```
last-child(1),#serpvidansrr.withsplitline .mmgrid>div:nth-last-child(2){margin-  
bottom:24px}#serpvidansrr.withsplitline .mmgrid{border-bottom:1px solid #ecec;  
margin-  
bottom:16px}#serpvidansrr #vidans2 .b_videocard .video_metadata{max-  
width:auto;padding:12px 16px}#serpvidansrr #vidans2 .b_videocard{margin-bottom:12px;box-  
shadow:0 0 1px rgba(0,0,0,.05),0 2px 3px rgba(0,0,0,.1);border-radius:6px}#serpvidansrr  
.b_rich{padding-top:0}#serpvidansrr #vidans2 .videoPlayer{border-radius:6px 6px 0  
0;overflow:hidden}#serpvidansrr #vidans2 .b_videocard .video_metadata>h3{white-space:nowr  
ap;overflow:hidden;text-overflow:ellipsis;-webkit-line-clamp:1;line-height:15px;height:15px;font-s  
ize:13px;color:#000;margin-bottom:20px;font-family:Arial,Helvetica,Sans-Serif;font-  
style:normal;display:block}#serpvidansrr.vsarr1stbig #vidans2 .b_videocard .video_metadata  
.actionmenu{display:none}#serpvidansrr #vidans2 .b_videocard .video_summary,#serpvidansrr  
#vidans2 .b_videocard .video_source{line-height:15px}#serpvidansrr #vidans2 .b_videocard  
.videoPlayer .vtbc{right:0}.vrhc line.nhvpv .pffvi,.vrhc line.nhvpv[data-tps="S"] .pffvt,.vrhc  
line.nhvpv[data-tps="M"] .pffvt,.vrhc line.nhvpv[data-tps="L"] .pffvt{display:inline-flex}.vrhc  
line.nhvpv .vrhc.pffv .vrhc{display:none}.vrhc line.nhvpv .vrhc.pffv .player_ol{background:var  
(--mai-smtc-background-ctrl-on-image-hover);transition:background-color .5s;display:flex;align-it  
ems:center;justify-content:center;padding:var(--smtc-gap-between-content-x-  
small);gap:var(--smtc-gap-between-content-x-small);box-sizing:border-box}.mc_vtvc_th  
img{transition:all .3s ease-out}.nhvpv+.mc_vtvc_th img{transform:scale(1.1)}.smtplayerhtml5{  
height:100%;width:100%;overflow:hidden}.smtplayerhtml5 video{min-height:100%;min-  
width:100%}.smtplayerhtml5 .videoplaying{background-color:#000}.smtplayerhtml5.hide{displ  
ay:none}.pffvt{display:none;color:var(--mai-smtc-foreground-ctrl-on-image-rest);font:var(--bing-  
smtc-text-global-subtitle2-strong)}.pffvi{mask:url(/rp/ui07wU6K7FR_inzG7DRbP1i8fGo.svg)  
center no-repeat;mask-size:12px;background:var(--bing-smtc-background-card-on-image-  
default);width:20px;height:20px;flex-shrink:0;align-self:flex-start}[data-tps="L"]  
.pffvt{font:var(--bing-smtc-text-global-subtitle2-strong)}[data-tps="L"]  
.pffvi{width:22px;height:22px;mask-size:16px}[data-tps="S"] .pffvt{font-size:0}[data-tps="S"]  
.pffvi{width:24px;height:24px;mask-size:24px;align-self:center}.hvpv.h5s .pffvt{display:inline-  
flex}.hvpv.h5s .vrhc.pffv .vrhc{display:none}.hvpv.h5s .vrhc.pffv .player_ol{background:var(--  
mai-smtc-background-ctrl-on-image-hover);transition:background-color .5s;display:flex;align-ite  
ms:center;justify-content:center;padding:var(--smtc-gap-between-content-x-small);gap:var(--smt  
c-gap-between-content-x-small);box-sizing:border-box}.pffvt{text-decoration:underline}.vrhcp .v  
rhc{position:absolute;width:100%;height:35px;max-  
height:35px;bottom:0;left:0;padding:0;background:none;display:block;z-index:9}.vrhcp  
.vrhc.hide,.vrhcp .vrhc .hide{display:none}.vrhc{white-space:nowrap;text-overflow:ellipsis;ove  
rflow:hidden;display:inline-block;position:absolute;max-width:240px;height:18px;line-  
height:14px;margin-left:8px;top:10px;left:0;right:0;border-radius:2px;padding-right:8px}.vrhc  
div{display:inline-block}.vrhc nt{color:#fff;font-size:11px;font-weight:bold;background-  
color:rgba(0,0,0,.75);padding:2px 8px;margin-left:0;top:0;box-sizing:border-  
box;position:relative}.vrhc .ricons{position:absolute;right:8px;top:10px;left:auto;bottom:auto;hei  
ght:18px;display:inline-block;cursor:pointer}.vrhc.icons_1 .vrhc{margin-  
right:27px}.vrhc.icons_2 .vrhc{margin-right:49px}.vrhc.icons_3 .vrhc{margin-  
right:79px}.vrhc .vrhc nt,.vsb_tr_chd .vrhc.icons_1 .vrhc{margin-  
right:0}.vpb{position:absolute;display:block;bottom:0;left:0;height:4px}.vpb  
div{position:absolute}.vpb nt{width:0;background:#fff}.vpb  
nt.test{display:none}.vpb.back{background-color:#999}.vrhc .vrhc.npb{height:36px;max-  
height:36px}.vrhc .vadda{width:22px;height:18px;padding:0;margin-right:0;margin-left:2px;bot  
tom:0;position:relative;display:inline-block;z-index:1;background:rgba(0,0,0,.75);border-  
radius:2px;overflow:hidden}.vrhc .vadda.hide{display:none}.vrhc .vadda .mc_vfaa{margin:3px  
5px}.ricons .vol{float:left}.ricons .adultFlag{float:right}.vol{width:22px;height:18px;bottom:0;m  
argin-left:1px;margin-right:1px;position:relative;display:inline-block}.vol.hide,.vol  
.hide{display:none}.vol .bg{background:rgba(0,0,0,.75);border-radius:2px}.vol.bg,.vol
```



```
nt{position:absolute;bottom:0}.vol .vol.bg.volnb{border-radius:0 0 2px 2px}.vol
.volsliderHandle.bg{border-radius:2px 2px 0 0}.vol nt .volsliderHandle{height:70px;display:none
;width:22px;float:left;bottom:18px;position:absolute;display:block}.vol nt
.volsliderHandle.hide{display:none}.volsliderHandle .vsb{height:54px;width:4px;background-
color:#999;margin:9px auto 8px;position:relative;display:block;border-
radius:2px}.volsliderHandle .vsh{height:6px;width:14px;padding:9px 7px 9px 7px;margin:0
-12px;display:block;position:absolute;top:30px}.volsliderHandle
.vsh.hide{display:none}.volsliderHandle .vshi{height:4px;width:14px;background-
color:#fff;border-radius:2px}.volMuteIcon{width:16px;height:14px;margin:2px 4px;float:left}.vol
MuteHandle{width:22px;height:18px}.vo{background:url(/rp/FFZxBXEIP9WYOO0jhTaElyLhEVU.sv
g) no-repeat}.vm{background:url(/rp/fsX-ZVd03wB2TL0vmQjxSp4U9vs.svg) no-
repeat}.vl{background:url(/rp/YXYMPC1Rry_XJGc7Yg8lR4B2eEs.svg) no-
repeat}.vf{background:url(/rp/NosrlR4amKts1zYxWy3laZN3HRk.svg) no-repeat}@media(forced-
colors:active){.vol{forced-color-adjust:none}}.vrhc line .vt_vp,.vrhc.popout
.vt_vp,.vrhc.mousefollow
.vt_vp{position:absolute;bottom:0;border:hidden;padding:0;top:0;left:0;z-index:3}.vrhctc
.hide{display:none}.vrh_clc .vt_vp,.vrh_clc .vrhctc .vrhi,.vrh_clc .player_ol{cursor:pointer}.vrh_clc
.cico{border-radius:0}.vrhctc{border:hidden;top:0;left:0;padding:0}.vrhc.mousefollow
.vrhctc,.vrhc.popout .vrhctc{background-color:#999}.vrhctc.load
.player_ol{background:url(/rp/_o2maogFDeUOsovPJL-ofEuxJ4.gif) center center no-repeat}.vrhc
line .vrhctc .vrhi,.vrhc.popout .vrhctc .vrhi,.vrhc.mousefollow .vrhctc .vrhi{position:absolute!importa
nt;border:hidden;z-index:2;padding:0;left:0;top:0}.player_ol{position:absolute;width:100%;heigh
t:100%;bottom:0;border:hidden;z-index:7}.vrhc.popout,.vrhc line,.vrhc.mousefollow{border-radi
us:6px;overflow:hidden;display:table-row-
group;background:none}.vrhc.popout,.vrhc.mousefollow{z-index:4;box-shadow:0 4px 4px
rgba(0,0,0,.1),0 2px 80px rgba(0,0,0,.2)}.vrhc line{z-index:1;margin:0}.vrhc.popout,.vrhc
line{position:absolute;top:0}.vrhc.popout{border:1px solid #fff}.vrhc.mousefollow{position:fixe
d}.vrhcp{position:relative;top:0;left:0;display:table-row}.vrhcp
.vrhctc{position:relative;overflow:hidden}.vrhc.hide{display:none}@keyframes
vh_fadein{from{opacity:0}to{opacity:1}}.vrhc.not(.hide){animation:vh_fadein 250ms}.vrhc line
img{color:transparent}.vrhc line.fullsize{height:100%}.vrhc,.vrhc: hover,.vrhc: link,.vrhc: active,.v
rhc: visited{color:#000;text-decoration:none}.vrhc.vrh_clc{cursor:pointer}a.hover-anchor{displa
y:block;height:100%;width:100%;text-
decoration:none}.vrhstat{height:0;overflow:hidden}Videos of Bamako BMS Battery Management
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.cico { background: #f5f5f5; } .b_drk .rcimgcol .cico, .b_dark .rcimgcol .cico { background:
unset; } .b_imgSet .b_hList li.square_m,.b_imgSet .b_hList li.tall_m{width:75px}.b_imgSet .b_hList
li.tall_mlb{width:113px}.b_imgSet .b_hList li.tall_mln{width:96px}.b_imgSet .b_hList
li.wide_m{width:128px}.b_imgSet.b_Card .b_hList li{padding-left:1px;padding-
right:9px}.b_imgSet.b_Card .b_hList li.tall_wfn{width:80px;padding-right:6px}.b_imgSet.b_Card
.b_hList li:last-child{padding-right:1px}.b_imgSet.b_Card .b_imgSetData{padding:0 8px
8px;height:40px}.b_imgSet.b_Card .b_imgSetItem{box-shadow:0 0 1px rgba(0,0,0,.05),0 2px
3px 0 rgba(0,0,0,.1);border-radius:6px;overflow:hidden}.b_imgSet .b_imgSetData p
a{color:#444;outline-offset:0}.b_subModule .b_clearfix.b_mhdr .b_floatR
.b_moreLink,.b_subModule .b_clearfix.b_mhdr .b_floatR .b_moreLink:visited,.b_subModule>.b_mo
reLink,.b_subModule>.b_moreLink:visited{color:#767676}.b_imgSet .cico.b_placeholder{display
:flex;justify-content:center;background-color:#f5f5f5;background-clip:content-box}.b_imgSet
.cico.b_placeholder a{display:flex}.b_imgSet .cico.b_placeholder a
```



img {width:48px;height:48px;margin:auto}@media(max-width:1362.9px){#b_context .b_entityTP .b_imgSet li:nth-child(5){display:none}.b_imgSet .b_hList li.wide_m:nth-child(3){display:none}}@media(max-width:1274.9px){#b_context .b_entityTP .b_imgSet li:nth-child(4){display:none}.b_imgSet .b_hList li.wide_m:nth-child(2){display:none}}.rcimgcol .b_imgSet{content-visibility:auto;contain-intrinsic-size:1px 124px}.rcimgcol{height:108px;padding-top:var(--smtc-gap-between-content-x-small);padding-bottom:var(--smtc-gap-between-content-x-small)}.b_algo:has(.b_agh) .rcimgcol{padding-top:var(--smtc-gap-between-content-xx-small)}.rcimgcol .b_imgSet{overflow:hidden}.rcimgcol .b_imgSet ul{overflow-x:auto;overflow-y:hidden;white-space:nowrap;padding-left:var(--mai-smtc-padding-card-default)}.rcimgcol .b_imgSet ul::-webkit-scrollbar{-webkit-appearance:none}.rcimgcol .b_imgSet .b_hList>li{padding-right:var(--smtc-padding-ctrl-text-side)}.rcimgcol .b_imgSet .cico{border-radius:unset}.rcimgcol .b_imgSet .b_hList>li:first-child .cico,.rcimgcol .b_imgSet .b_hList>li:first-child .cico a{border-radius:unset;border-top-left-radius:var(--smtc-corner-card-rest);border-bottom-left-radius:var(--smtc-corner-card-rest);overflow:hidden}.rcimgcol .b_imgSet .b_hList>li:last-child .cico,.rcimgcol .b_imgSet .b_hList>li:last-child .cico a{border-radius:unset;border-top-right-radius:var(--smtc-corner-card-rest);border-bottom-right-radius:var(--smtc-corner-card-rest);overflow:hidden}.rcimgcol .rcimgcol .b_sideBleed{margin-left:unset;margin-right:unset}.rcimgcol .b_imgclgovr{cursor:pointer}.rcimgcol .b_imgclgovr .cico img: hover{transform:scale(1.05);transition:transform .5s ease}#b_content #b_results>.b_algo .b_caption:has(.rcimgcol){padding-right:var(--mai-smtc-padding-card-default);margin-right:calc(-1*var(--mai-smtc-padding-card-default));margin-left:calc(-1*var(--mai-smtc-padding-card-default));padding-left:var(--mai-smtc-padding-card-default)}.rcimgcol .b_imgSet .b_hList .cico a{display:flex;outline-offset:-2px}CS Electrical & Electronics Battery Management Systems (BMS): A Complete GuideMar 6, 2025 · A Battery Management System (BMS) is essential for ensuring the safe and efficient operation of battery-powered systems. From real-time monitoring and cell balancing to thermal ...

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