

# Control Unit – G1 Control Unit (CU021A)

## INTRODUCTION

EMUS G1 Control Unit (or simply Control Unit) is the main controller that autonomously executes all core and utility functions of battery management. It interacts with all other first party and third-party components in the system using various inputs, outputs, and interfaces that are populated on its main 22 pin and secondary 8 pin connectors. The device also is flexible and allows by using EMUS Control Panel, to monitor and configure more than 300 battery management system parameters



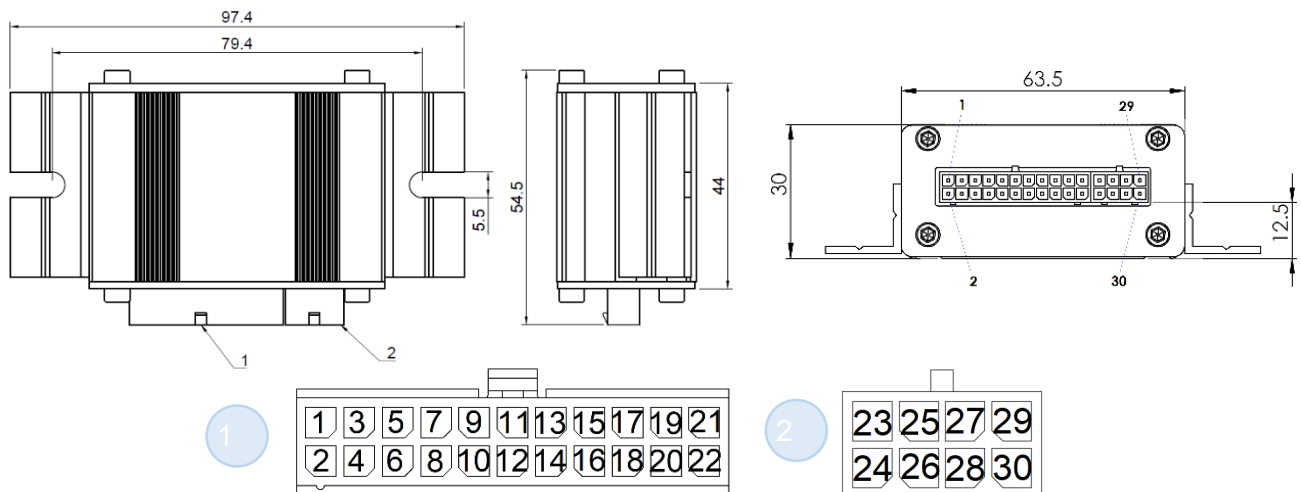
## APPLICATIONS

- Any lithium chemistry, series connected battery pack of up to 100 cells if using serial cell communication. (distributed regular)
- Any lithium chemistry, series connected battery pack, or pack of multiple parallel strings, of up to 3200 cells total, if using EMUS CAN Cell Group Modules. (distributed grouped)
- Any lithium chemistry, series connected battery pack, or multiple parallel string, of up to 512 cells total, if using EMUS Centralized CAN Cell Group Modules. (centralized CCGM)

## FEATURES

- USB data interface for quick connection to a host device when configuration, diagnostics, or maintenance is needed.
- RS232 data interface for continuous BMS activity monitoring by using third party or first party EMUS G1 BMS devices.
- Serial interface for cell communication.
- Non isolated CAN 2.0 A/B data interface. Enables to communicate with CAN equipped EMUS G1 BMS components, control third party charging devices
- State of Charge (SOC), State of Health (SOH) calculations.

## MECHANICAL INFORMATION





Pin No.	Assignment	Mating Housing	Terminal
1	PWR	43025-2200 Microfit 22 Pin Header or equivalent	43030-0003 (recommended crimp tool Molex Hand Crimp Tool P/N: 638190000)
2	GROUND		
3	CELL RX+		
4	CELL RX-		
5	CELL TX+		
6	CELL TX-		
7	USB PWR		
8	GROUND		
9	USB D+		
10	USB D-		
11	DISP.TX		
12	DISP.RX		
13	HEATER		
14	BAT.LOW		
15	BUZZER		
16	CHG.IND.		
17	CHARGER		
18	FAST CHG.		
19	IGN.IN		
20	AC SENSE		
21	CAN+		
22	CAN-		
23	SPEED IN	43025-0800 Microfit 8pin Connector or equivalent	
24	SOC OUT		
25	+5V OUT		
26	GROUND		
27	INPUT 4		
28	INPUT 3		
29	INPUT 2		
30	INPUT 1		

**ELECTRICAL CHARACTERISTICS**

Item	Conditions	Value	
Operating voltage		9 to 32 VDC	
Power supply reverse polarity protection		Yes	
Current consumption	At typical supply voltage, with nothing else connected	12 VDC typical 54 mA	24 VDC typical 20 mA
	At typical supply voltage, with Current Sensor connected	12 VDC typical 72 mA	24 VDC typical 25.5 mA



General purpose output max sinking current (resettable fuse trip current)		0.5 A
General purpose output max voltage		32 VDC
General purpose input ON voltage		5 to 32 VDC
General purpose input OFF voltage		0 VDC
Current sensor input ON voltage	Applies when pin is mapped with function other than PF14 Current	5 VDC
Current sensor input OFF voltage		0 VDC
SOC OUT output voltage range	Sensor Input	0 to 5 VDC
SOC OUT output resistance		1 kOhm
SOC OUT output PWM signal frequency	Applies when pin is mapped with function PF11 State of Charge Output or function PF18 Analog Charger Control Output	7.8125 kHz
SPEED IN input signal frequency range	Applies when SPEED IN input is mapped with function PF1 Speed Sensor Input	7kHz
SPEED IN input ON voltage		5 to 32 VDC
SPEED IN input OFF voltage		0 VDC
USB interface controller		FT232R
USB power supply data line transient/overvoltage protection		5 VDC
USB/RS232 interface galvanic isolation		None
USB interface duplexity		Full duplex (send and receive)
RS232 interface duplexity	USB not connected	Full duplex (send and receive)
	USB connected	Half duplex (send only)
USB/RS232 interface baud rate		57.6kbps
USB/RS232 interface data bits		8 bits
USB/RS232 interface parity		None
USB/RS232 interface stop bits		1 bit

**OTHER SPECIFICATIONS**

Item	Condition	Value
Max number of Cell Modules in cell communication daisy chain when using Top and Bottom Isolators		100
Max number of CAN Cell Group Modules on CAN bus		32
Max number of Centralized CAN Cell Group Modules on CAN bus		32
Operating temperature		-40 to +85°C
IP rating		IP54
Weight	With quick start kit	114 g
	Without quick start kit	92 g



## COMPATIBLE CHARGERS AND INVERTERS

Charger Name	Communication Protocol
TC	CAN J1939
Elcon	CAN J1939
HF/PFC	CAN J1939
IEB	CAN J1939
Eltek Valere EV Power	CAN
Zivan NG and SG series	CAN
Powerfinn Robust and PAP3200	CAN
Delta-Q	CANOpen
EDN	CAN
G-Power EV33	CAN
Sunny Island inverter	CAN
TSM	CAN
Shinry	CAN
Micropower Group Lion	CAN
Brusa NLG644	CAN
ZVU	I/O Controlled
Victron Inverter	CAN
ATIB Electronica HTC	CAN
Analog Controlled Charger	I/O Controlled
Non-CAN	I/O Controlled



**NOTE:** For all chargers recently supported please refer to <https://emusbms.com>.



**NOTE:** For more information on each charger communication protocol, contact the charger manufacturer.