



Centralized CAN Cell Group Module

Product Code: CCGM024B

Introduction

Centralized Cell Group Module (CCGM) is a battery cells communication adapter (or "Slave unit") equipped with two CAN connectors for easy BMS system assembly and integrated proprietary EMUS software that allows data transfer within 100ms frequency. The CCGM performs all cell data measuring by itself, so the product allows saving space by reducing the need of having cell modules and three-way connectors. The CCGM increases the speed of the cell data broadcasting and provides for each connected battery cell balancing functionality.



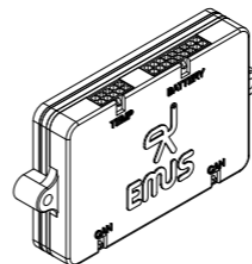
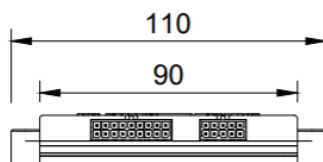
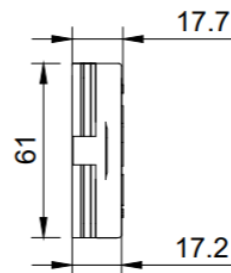
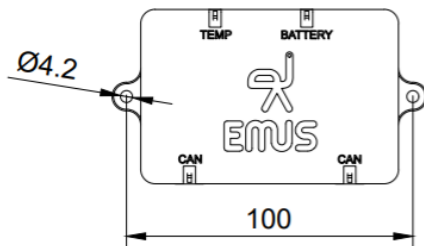
Applications

- Scalable system up to 24 CCGMs per Control Unit
- Ideal for battery modules up to ~200Ah. Higher capacity could require longer balancing periods
- Suitable for prismatic, cylindrical and pouch cells
- Electric vehicles and autonomous vehicles
- Storage systems
- Photovoltaic battery systems

Features

- 2x CAN connectors to easy daisy chain the CCGMs to the CAN bus
- Each CCGM can monitor from 6 up to 16 series cells
- 400mA passive balancing current per cell
- 5x External temperature sensors can be connected to each CCGM (10kΩ NTC)
- In combination with the Temperature Breakout (TBB011A) each CCGM can be complemented with up to 30 temperature sensors (15 NTCS per TBB011A)
- Adjustable CAN speed to 50, 125, 250, 500kbps or 1Mbitps
- Any lithium chemistry, series-connected battery pack, or a pack of multiple parallel strings

Mechanical Information



CAN Connection Layout:

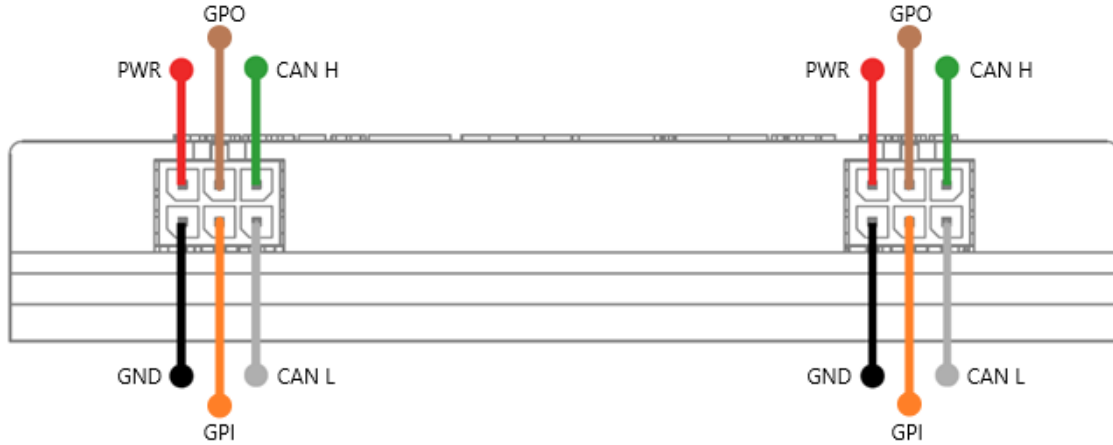


Figure 2. CCGM024B CAN Connection Layout

Table 2. CCGM024B CAN side pin assignment

Assignment	Mating Housing	Terminal
PWR	2x microfit 43025-0600	43030-0003 (recommended crimp tool Molex Hand Crimp Tool P/N: 638190000)
GND*		
GPO**		
GPI**		
CAN_H		
CAN_L		

*GND & GND1 are independent Grounds

**GPO & GPI are not energized. They require to be powered from the same power source as the CCGM (consult Table 3)

Electrical Characteristics

Table 3. CCGM024B electrical characteristics

Item	Value	
Supply voltage	8-72V	
Supply voltage battery	12.0 VDC to 79.2 VDC	
Power supply reverse protection	Yes	
Current consumption	From battery	Active mode 5mA @ 57.6V Sleep mode 35uA @ 57.6V
	From CU	2.2mA @ 68V – 8.7mA @ 12V
Maximum Balancing Current	400mA*	
Isolation voltage	850V**	
Transient/overvoltage protection between CAN H/CAN L and GND (and vice versa)	24V	

Item	Value
Cell voltage limits	0-4.95V
General purpose output max sinking current (resettable fuse trip current)	0.75A
General purpose output (GPO) max. voltage	32VDC
General purpose input (GPI) ON voltage	5 to 72 VDC

*Depending on thermal conditions

**According to standard IEC 60664-1:2020. Direct contact between CCGM024B's heatsink and conductive surface without potential might decrease isolation endurance under environmental conditions classified as Pollution level 2 or superior. In the case of mounting on conductive surfaces with potential, isolation endurance is reduced to 400VDC. Additional Insulation Gasket is needed to reach declared isolation voltage. For further information refer to Insulation Gasket chapter

Other Specifications

Table. 4 CCGM024B other specifications

Item	Conditions	Value
Cell Count	Other Li chemistries	6-16
	LTO cell chemistry	8-16
CAN Speed	-	50kbps, 125kbps, 250kbps, 500kbps, 800kbps, 1Mbps (by default 250kbps)
Reserved CAN IDs	-	0x1FFFFFFE5, 0x1FFFFFFE6, 0x1FFFE5E5, and 0x1FFFE5E6
Operating Temperature	-	-40 to +85 °C
IP rating	-	IP50
Weight	Without Quick Start Kit	120g
	With Quick Start Kit	160g
Cell communication wire length	In our Quick Start Kit	45cm
Temperature sensors wire length	In our Quick Start Kit	45cm
Cell Voltage	General Firmware	2.01 - 4.54V
	LTO Firmware	1.01 - 3.54V

Installation

To set up the 16 cells and 5 external temperature sensors please refer to figure below.

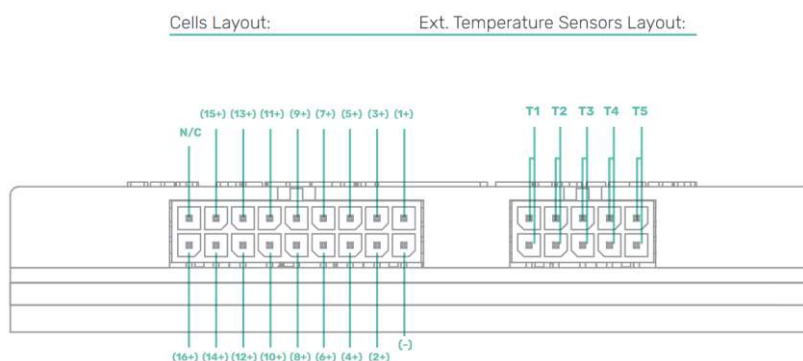


Figure 3. CCGM024B wiring to 16 cells battery

To set up less than 16 cells please refer to figure below. Example picture for 8 cells:

Cells Layout: (using other amount of cells)

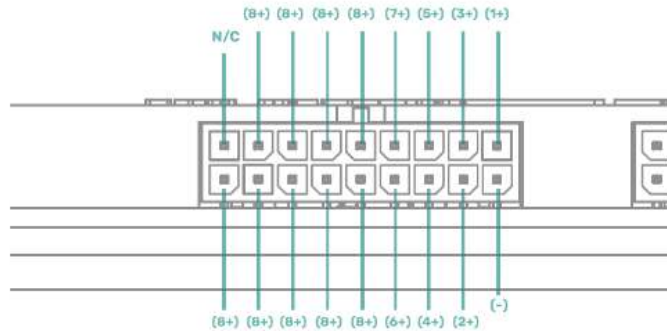


Figure 4. CCGM024B wiring to 8 cells battery



Minimum cell count depends on the cell chemistry used. The lowest supported battery pack voltage by internal CCGM parts is 12V, therefore if LTO cells are used then the minimum cell count should be calculated accordingly. E.g., if LTO cell's expected lowest voltage is 1.5V then the minimum number of cells required would be 8 [12V / 1.5V = 8 cells].

$$V_{BatTotal} \div V_{CellMin} = MinimumNumOfCells$$

NOTE: the absolute minimum total battery pack voltage is 9V, however it is not guaranteed that the device will sense cell voltages correctly.



NOTE: Connection must start from the most negative cell to the most positive. In cases when cells number is less than 16, e.g., 8 cells, then free cells connection wires (dedicated for 9th-16th cells) must ALL be connected to the last 8th (most positive cell).

Insulation Gasket

Centralized Cell Group Module (CCGM) provides isolation protection between CAN bus and Battery cells. In those cases where it is necessary to install the CCGM024B on a conductive surface, it is recommended to isolate the CCGM024B with an Insulation Gasket (refer to Table 3 footnotes). The Insulation Gasket must be also designed to provide high heat transfer. The Insulation Gasket is recommended to meet at least the following technical specifications:

1. Breakdown voltage = 1500 VDC
2. Thermal resistance = 0.250 K/W

To correctly install the Insulation Gasket, follow the following step. In the pictures below it is shown an example of proper Insulation Gasket kit.

1. Visually inspect the Insulation Gasket to ensure no damages are present. In case of punctures, cuts, abrasions, or any other harm is detected, discard the Insulation Gasket
2. Thoroughly clean all surfaces that will be in direct contact with the Insulation Gasket. Fine particles can damage or reduce the isolation effectivity
3. Mount the CCGM with the plastic screws, washers, and nuts. Once again, ensure that no dirt, fine particles, or liquids are present on the contact surfaces. Overtightening the screws can reduce the Insulation Gasket effectivity (recommended torque 0.25Nm for M4 plastics screws). Ensure the heatsink is completely surrounded by the Insulation Gasket.



Centralized CAN Cell Group Module

Battery Management Systems

battery made simple

Remote Monitoring ready

Reviewed by I.R.R on 2024-October-02

Product Code: CCGM024B

Insulation Gasket Example



Figure 5. Insulation Gasket Kit example

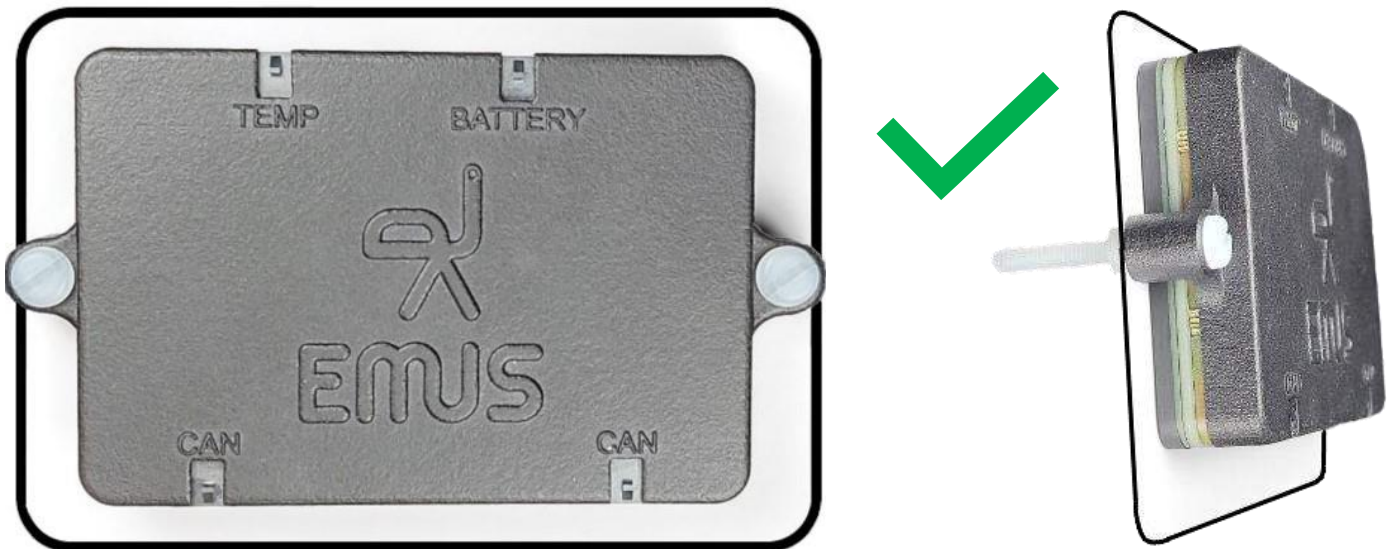


Figure 6. Correct Insulation Gasket installation

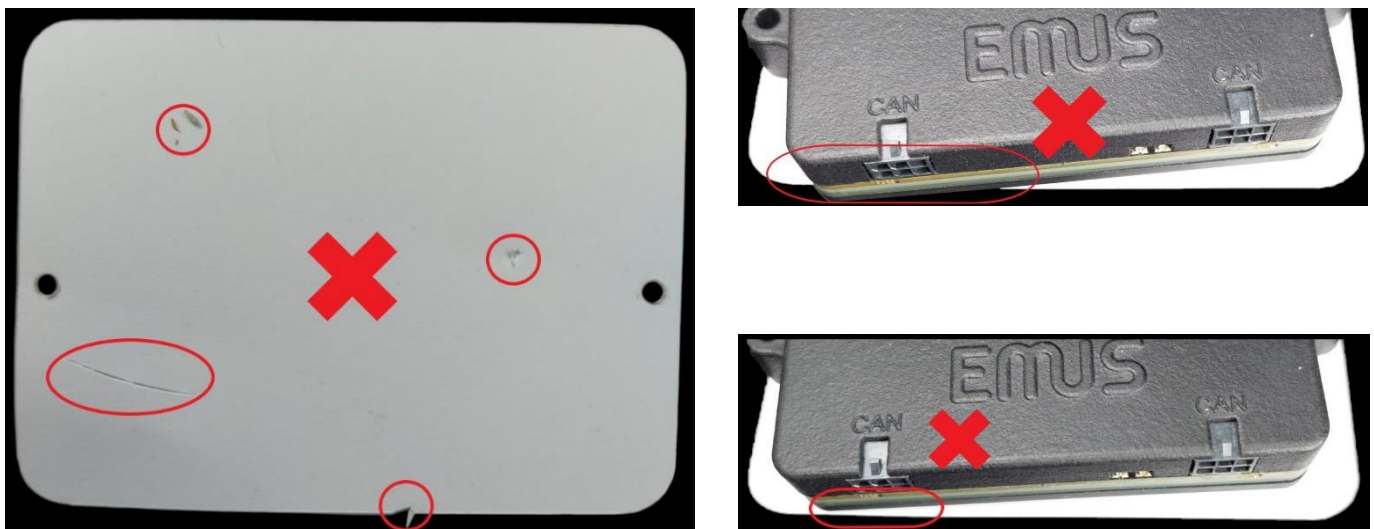


Figure 7. Damaged Insulation Gasket and insufficient Insulation Gasket coverage respectively