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.
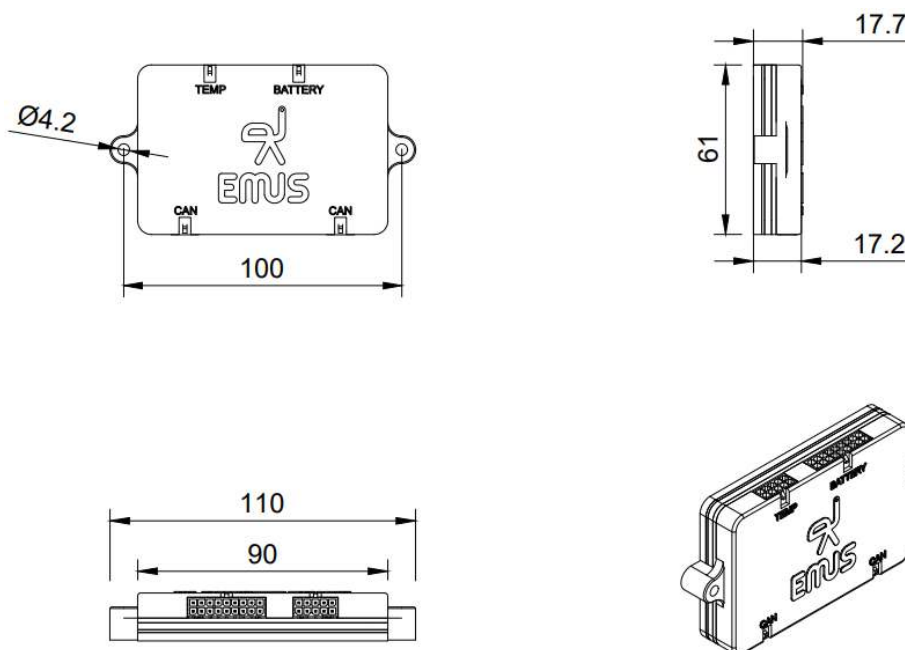
Applications

- 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

Mechanical Information

Product Code: CCGM024B

Connection Layout

Cells Layout: Ext. Temperature Sensors Layout:
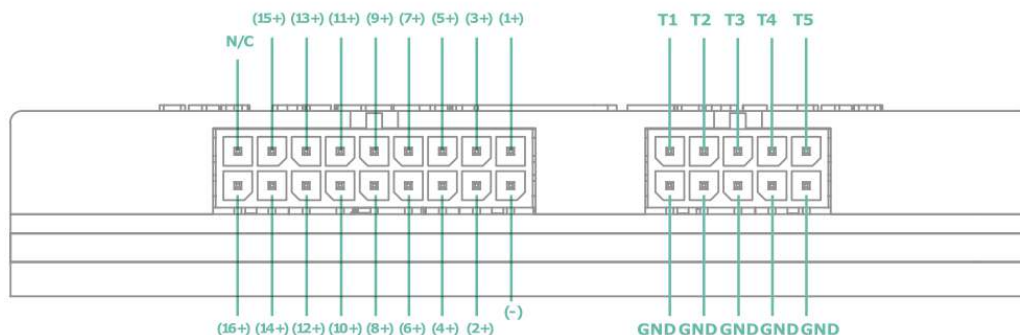
Table 1. CCGM024B pin assignment

Assignment	Mating Housing	Terminal
(-)*	Microfit 43025-1800 cell connector	43030-0003Molex Micro-latch crimps (recommended crimp tool Molex Hand Crimp Tool P/N: 638190000)
1+		
2+		
3+		
4+		
5+		
6+		
7+		
8+		
9+		
10+		
11+		
12+		
13+		
14+		
15+		
16+		
N/C		
5XGND1*	Microfit 43025-1000 Temp connector	43030-0003 (recommended crimp tool Molex Hand Crimp Tool P/N: 638190000)
T1		
T2		
T3		
T4		
T5		

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High Voltage Centralized CAN Cell Group Module

Battery Management Systems

battery made simple

Remote Monitoring ready

Reviewed by *I.R.R* on *2024-April-16*

Product Code: 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)
GND2*		
GPO**		
GPI**		
CAN_H		
CAN_L		

*GND1 & GND2 are independent Grounds / GND1 and (-) are the same electrical point
**GPO & GPI are not energized. They require to be powered from the same power source as the CCGM (consult Table 3 voltage ranges)

▣ Electrical Characteristics

Table 3. CCGM024B electrical characteristics

Item	Conditions	Value
Supply voltage	–	8–72V
Supply voltage battery	–	12.0 VDC to 79.2 VDC
Power supply reverse protection	–	Yes
Current consumption	–	2.2 mA @ 68V – 8.7 mA @ 12V
Current consumption battery side	Sleep	35uA @ 57.6V
	Active	5mA @ 57.6V
Maximum Balancing Current	Per Cell	400mA*
Maximum Withstand Isolation Voltage	V_{ISO} (duration = 60s)	5000V
Transient/overvoltage protection between CAN H/CAN L and GND (and vice versa)	–	24V
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

Product Code: CCGM024B

Item	Conditions	Value
General purpose input (GPI) ON voltage	**-**	5 to 72 VDC

*Depending on thermal conditions

◻️▪️ 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	**-**	0x1FFFFEE5, 0x1FFFFEE6, 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

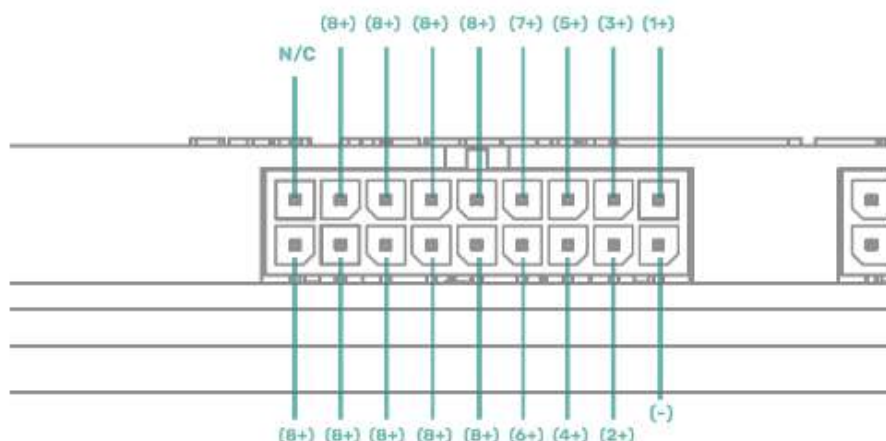To set up the 16 cells and 5 external temperature sensors please refer to figure below.

Cells Layout: Ext. Temperature Sensors Layout:

Product Code: CCGM024B
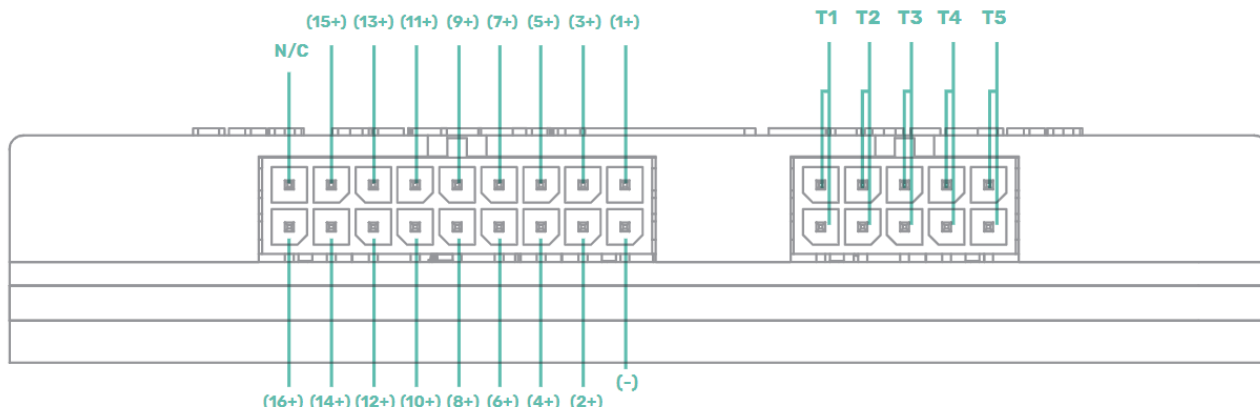
To set up less than 16 cells please refer to figure below. Example picture for 8 cells:

Cells Layout: (using other amount of cells)

⚠️ 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).

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