



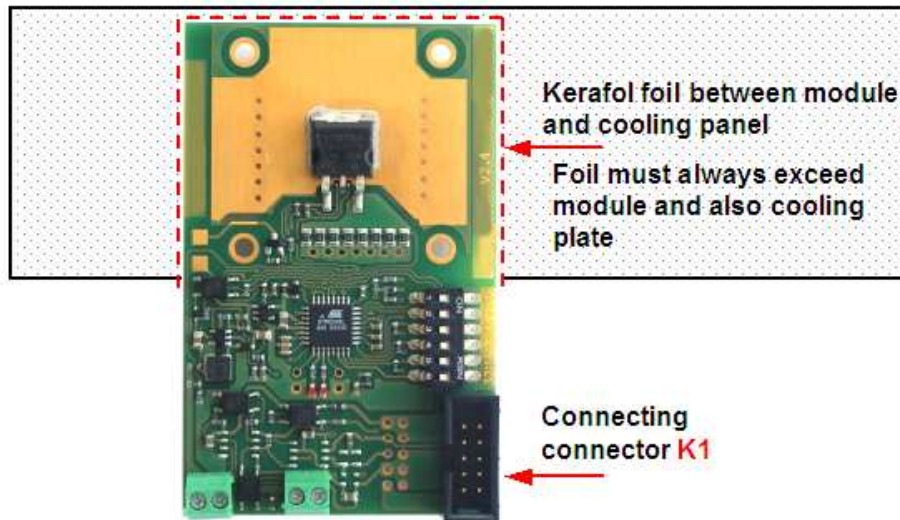
### Real Time Battery Management System (RT-BMS)

The Real Time Battery Management System (RT-BMS) is an advanced battery management solution for any type of lithium-based cells. The **RT-BMS** is designed according to the concept of single real-time balancers managing and balancing **up to 192 individual cells**. The individual cell-balancing units are controlled by the central **Master RT-BMS Control Unit**.

### The RT-BMS System Components Setup

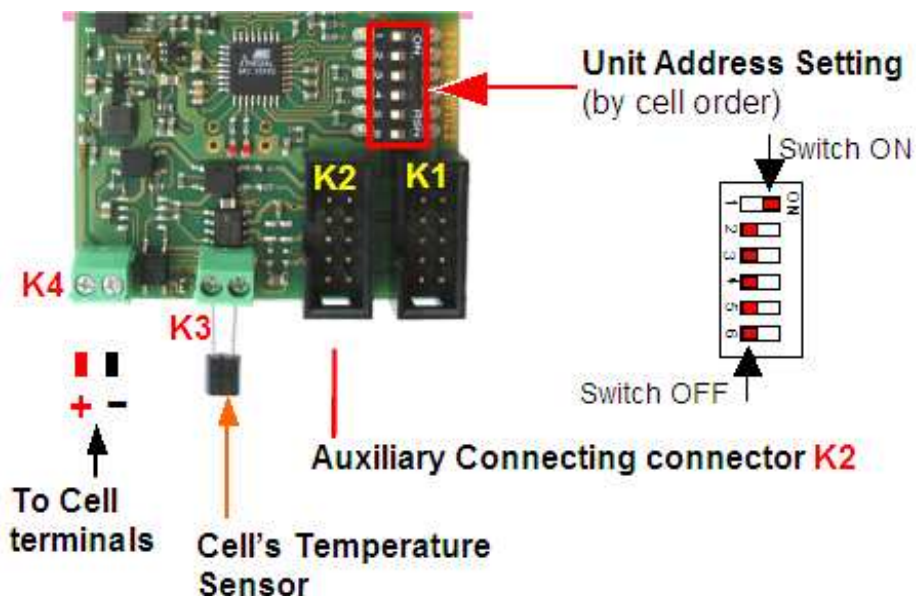
#### Cell Balancing Unit (Module)

**Cell Balancing Unit (Module)**  
(balancing current of up to 5A)

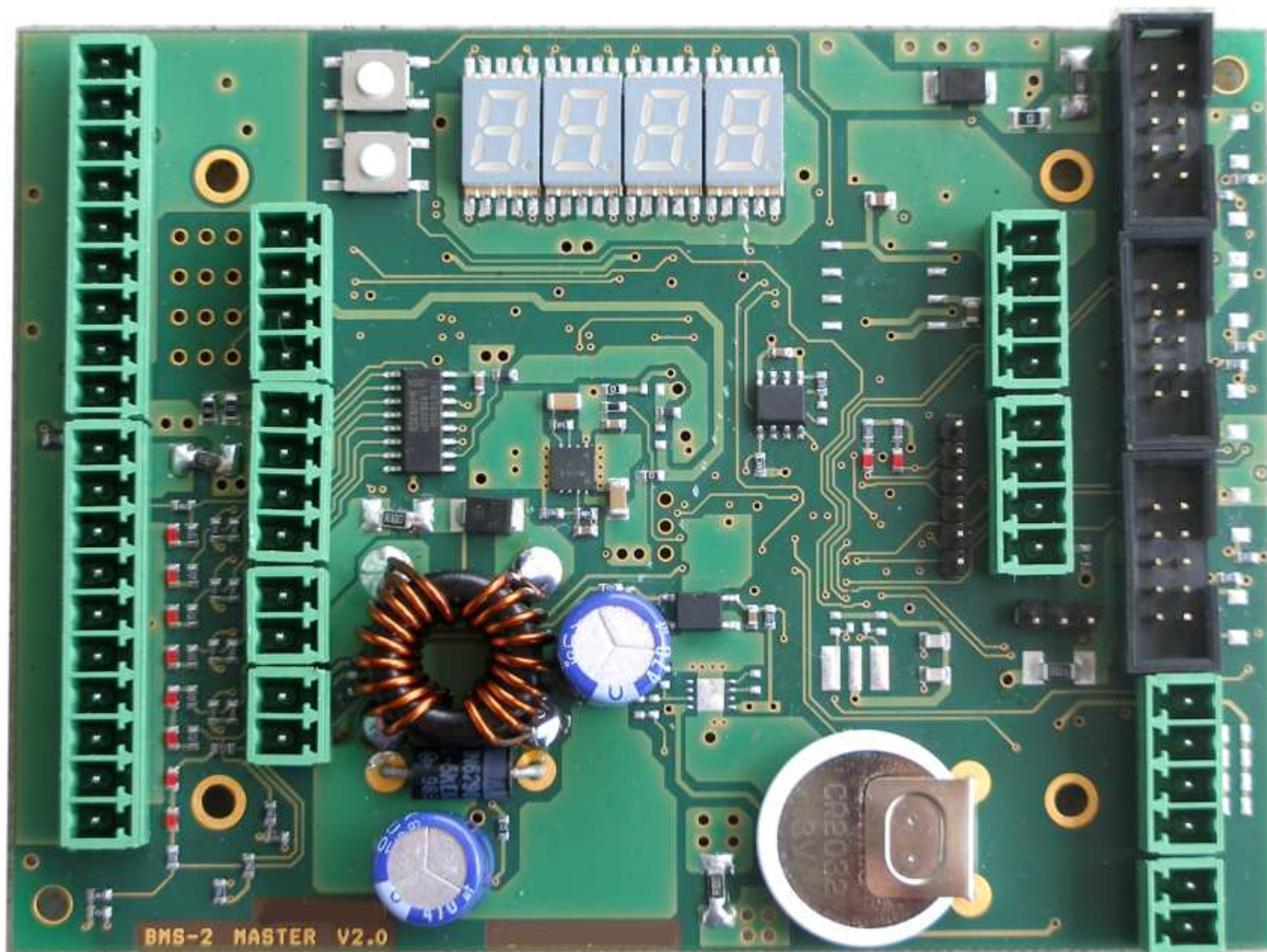


**Connectors:** Battery Cell +, Battery Cell -, Temperature sensor, 10-pin Communication data lines to the Master Control Unit

**Switch:** Module address setting (binary)



## Master RT-BMS Control Unit (removed from the plastic box)



Dimension (plastic box)	130 × 95 × 25 mm
Weight (incl. box)	140 gram
Supply voltage	+12 V
Number of supported cells	max. 192 64 + 64 (+ 64)
Power control outputs	8 × 12 V/8 A
Signal Indication outputs	4 × 12 V/1 A
Auxiliary digital outputs	3 × 3.3V / 10V
Auxiliary frequency output	1 × 3.3V / 10V

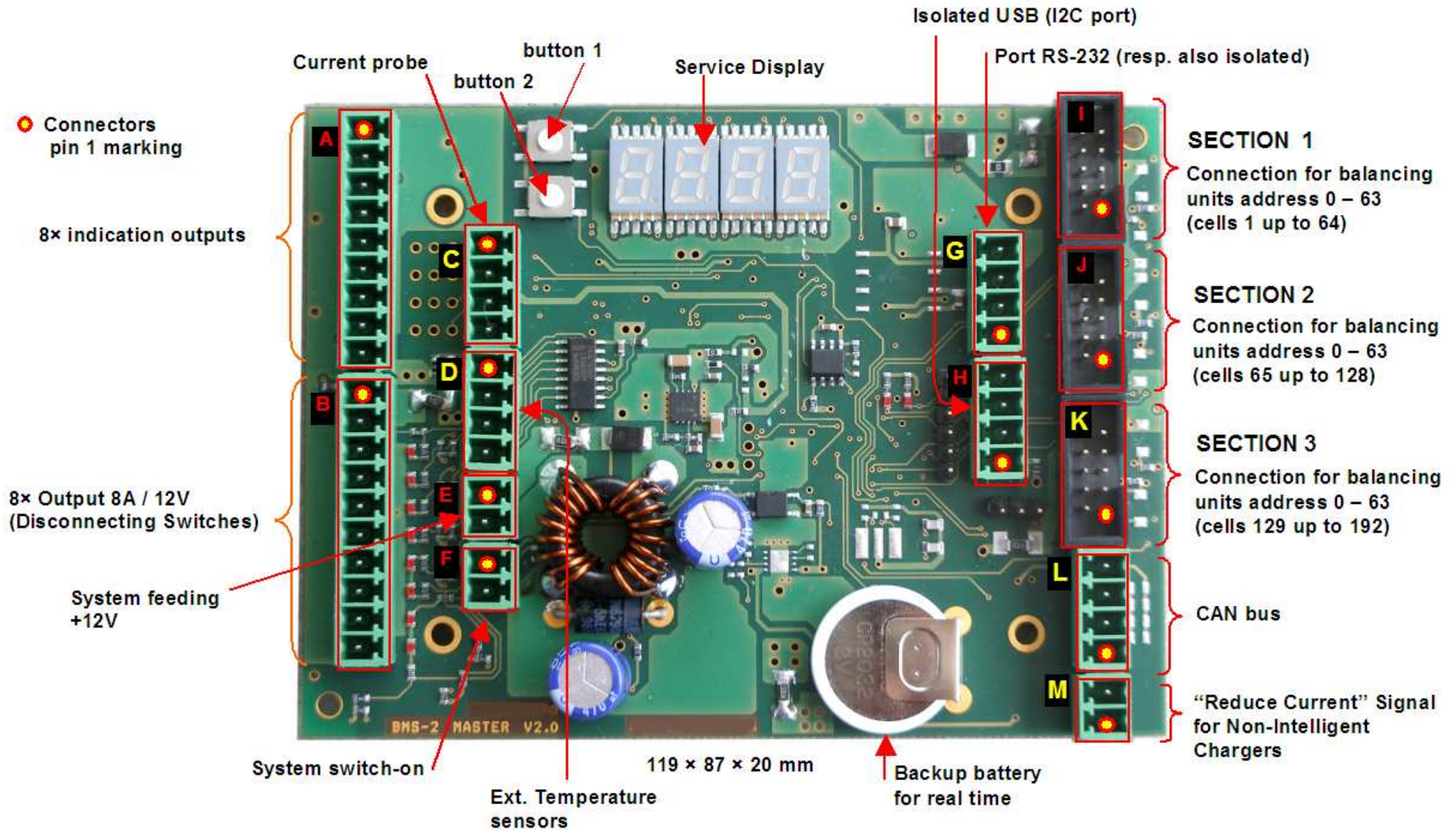
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# Master RT-BMS Control Unit - the description of connectors, inputs and outputs



## Master RT-BMS Control Unit - the description of connectors, inputs and outputs (cont.)

### Connector A (indication):

- **Pin 1:** Digital output open collector 4 (1A / 12V) – free
- **Pin 2:** Digital output open collector 3 (1A / 12V) – free
- **Pin 3:** Digital output open collector 2 (1A / 12V) – Error
- **Pin 4:** Digital output open collector 1 (1A / 12V) – Fuel reserve
- **Pin 5:** GND
- **Pin 6:** Analog. / digital. output 4 (range 0 / +3.3V / 10V) – min. U of cell [V]
- **Pin 7:** Analog. / digital. output 3 (range 0 / +3.3V / 10V) – max. U of cell [V]
- **Pin 8:** Analog. / digital. output 2 (range 0 / +3.3V / 10V) – Current [A]
- **Pin 9:** A / D / frequency output 1 (range 0 / +3.3V / 10V) – Battery charge [%]

### Connector B (power disconnecting switches, O.C.):

- **Pin 1:** minus pole of battery 12V (power GND) – separate cable!
- **Pin 2:** minus pole of battery 12V (power GND) – separate cable!
- **Pin 3:** Main Current (for motor controller)
- **Pin 4:** Antispark Current (for motor controller)
- **Pin 5:** Charging Current 1 (main or small power – finishing)
- **Pin 6:** Charging Current 2 (not or full power)
- **Pin 7:** Battery Warming
- **Pin 8:** Battery Cooling
- **Pin 9:** AUX 1 (reserve)
- **Pin 10:** AUX 2 (reserve)

### Connector H (I2C bus, connection of USBCOM3):

- **Pin 1:** +5V / +12V output
- **Pin 2:** SCL
- **Pin 3:** SDA
- **Pin 4:** GND

### Connector C (current sensor):

- **Pin 1:** current sensor supply (+5V or +12V)
- **Pin 2:** Sense +
- **Pin 3:** Sense – (not used for HALL 400)
- **Pin 4:** GND

### Connector D (Ext. Temperature sensors):

- **Pin 1:** sensor 1: KTY 81-210
- **Pin 2:** GND of sensor 1
- **Pin 3:** sensor 2: KTY 81-210
- **Pin 4:** GND of sensor 2

### Connector E (System supply):

- **Pin 1:** supply (+12V)
- **Pin 2:** minus pole of battery 12V (system GND)

### Connector F (BMS switch-on):

- **Pin 1:** (system GND) minus pole of battery 12V
- **Pin 2:** internal switch-on supply (+12V)

### Connector L (CAN BUS):

- **Pin 1:** GND
- **Pin 2:** CAN L
- **Pin 3:** GND
- **Pin 4:** CAN H

### Connector G (port RS-232):

- **Pin 1:** feeding (internal or external)
- **Pin 2:** RxD
- **Pin 3:** TXD
- **Pin 4:** GND

### Connector M (auxiliary charger controlling):

- **Pin 1:** OPT +
- **Pin 2:** OPT –