Unit-3

sec-1-1

1A → Introduction to BMS

Battery management system voltage, current & ambient temperature monitoring

→ Types of BMS

- Hardware BMS: It performs basic protection functions to keep the battery pack functioning as healthy as possible
  - over voltage cut-off
  - under voltage cut off
  - continuous current
  - Over current detection
  - Over temperature cut-off
- Software BMS: It has all the features of hardware BMS but additionally can collect data, can have memory and can transmit data via CAN, bluetooth etc.

2A Basic functionalities of BMS

- Over voltage cut off: LFP cells = 3.6V } Limits
  NMC cells = 4.2V }
- Under voltage cut off: LFP cell = 2.5V
  NMC cell = 2.75V

  multiple cycle of deep discharge causes battery swelling
- Continuous current: It is the parameter setting in a BMS that makes sure the BMS is functioning smoothly in all aspects when operated at a particular charge and discharge current. Ex: a 14S, 40A CC BMS

can allow 40A continuous current during discha
and allow 20A continuous current during charg

Overcurrent detection (OCD): Max current BMS can allow for short period

ex: a 14S, 50A CC BMS can allow 100A OCD for 1s. The battery will cut-off after one second

Over temperature cut-off: A BMS enforces the maximum temparature the battery can achieve during charging and during discharge.

The temperature cutoff during charging is generally lower than the temperature cutoff during discharging.

Most cell manufacturers don't recommend charging batteries beyond 45°C and don't recommend discharging beyond 55°C. BMS has a thermistor to sense the battery temperature.

3A Types of BMS communication in EV

- CAN (Controlled area network).

Robust vehicle bus standard designed to allow micro controller and its devices to communica-te with eachother applications without a host computer. It can also be implemented for communication between the battery charger and Battery management system (BMS)

- UART with bluetooth

  universal asynchronous receiver and transmitter and it works with bluetooth interface which sends the data to the end users on their cell phone application.

- IoT cloud connectivity

  It requires wireless internet and can transmit data to the cloud and it can be viewed remotely by any body with an access.