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AN0029
Smart Battery Charging device

Version
V1
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Application Note - AN029

Smart Battery Charging device

1. General description

The “Smart Battery Charging Device” is an add-on device to the EPC series converters that communicates through CAN with them to command the charging operation of a battery.

The “Smart Battery Charging Device” can integrate a battery charging profile inside that regulates the different stages of charge needed in a battery. The device supports the charging of any kind of battery (lead-acid, lithium...) that works within the range of operation of the EPC series converter installed.

Fig. 1: CAN – Smart Battery Charging Device

The “Smart Battery Charging Device” ensures the correct charge of the battery, its safety and reliability as the charging operation is done according to the manufacturer recommendations.

2. External description:

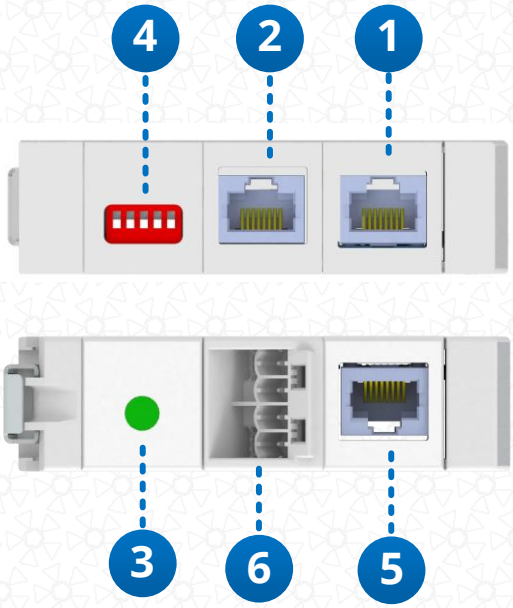


Fig. 2: Connectors available (subject to change)

Element 1: EPC communication cable connector
This connector is used to communicate the DC/DC converter (EPC) and the "Smart Battery Charging device". It is a standard RJ-45 socket

If the installation has more than one EPC external interface module, this cable should be connected to CONNECTOR 2 of the upwards interface.

Element 2: CAN Bypass connector

This is a CAN Bus bypass connector used where multiple interfaces are available at the installation to create a daisy-chain. In this case, the cable should be connected to the CONNECTOR 1 of the downwards interface by a RJ-45 cable, category CAT5e or higher, with maximum length of 100 meters.

In case there are no more interfaces, or this is the last one of the daisy-chain, a termination resistor must be installed. A terminator resistor can be purchased to epic power by contacting with sales@epicpower.es.

Element 3: STATUS LED
An integrated multi-color LED shows the state of the "Smart Battery Charging device" by means of the light status and color.

Element 4: Node ID Configuration Switch

This switch allows to configure the battery charging profile between different available ones.

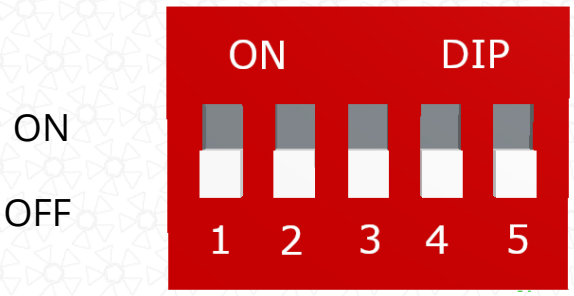


Fig. 3 Node-ID Configuration Switch

Element 5: External CAN communication

This connector is used to communicate an external BMS to the “Smart Battery Charging device”. It is currently not used in the “Smart Battery Charging device”. It is a standard RJ-45 socket

Element 6: Temperature sensor and enable.

4 ways connector that includes temperature (thermocouple) and opto-coupled enable input.

2.1. EPC Dual CAN interface Description

CONNECTOR 7 : CAN Bus #1.

Reserved for custom applications.

Terminal	Description
7A	GND
7B	CAN Low signal
7C	CAN High signal
7D	5V 0.1A Output

CONNECTOR 8 : CAN Bus #2.

Connection with external controller.

Terminal	Description
8A	GND
8B	CAN Low signal
8C	CAN High signal
8D	5V 0.1A Output

CAN 1 and CAN 2 are electrically isolated.

Fig. 4 EPC Dual CAN interface (SKU: F.1003.1002)

2.2. EPC Connection Cable (optional)

Cable used to connect EPC DC/DC Converter with other CAN Interface devices.

Fig. 5 EPC to CAN – Connection cable (SKU: X.2001.0047)

2.3. RJ-45 cable (Optional)

Cable used to connect diverse EPC interfaces together in a daisy-chain mode.

2.4. CAN Bus line terminator (Optional)

The CAN Bus requires to be terminated by a 120 Ohm resistor; this can be achieved in a reliable way by using our terminator (see Fig. 6) in the last CAN Interface.

Fig. 6 RJ-45 CAN Bus terminator (SKU: M.1001.0122)

3. Installation procedure

1. Make sure EPC series converter is OFF (HVDC and LVDC connections are voltage-free).
2. Plug the connection cable in connector 1 of the “Smart Battery Charging Device” and connector 8 of the “EPC Dual CAN Interface” (in the DC/DC converter side).
   If your installation consists on more than one EPC External interface, refer to the following schematic (Fig. 7) for connection.

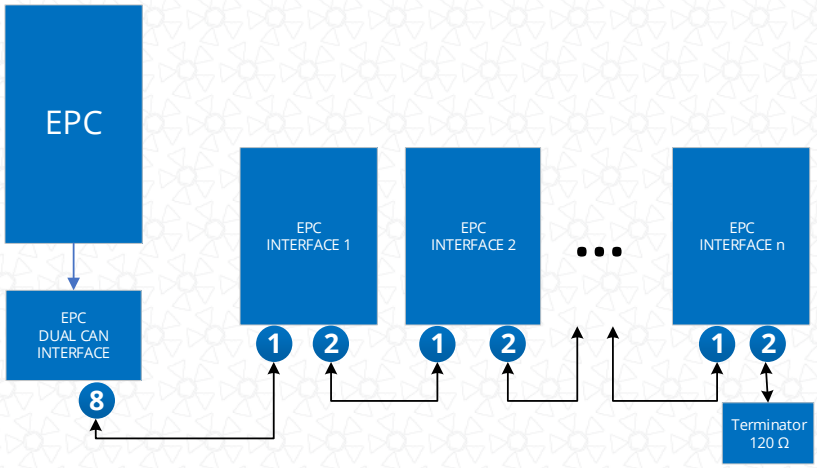
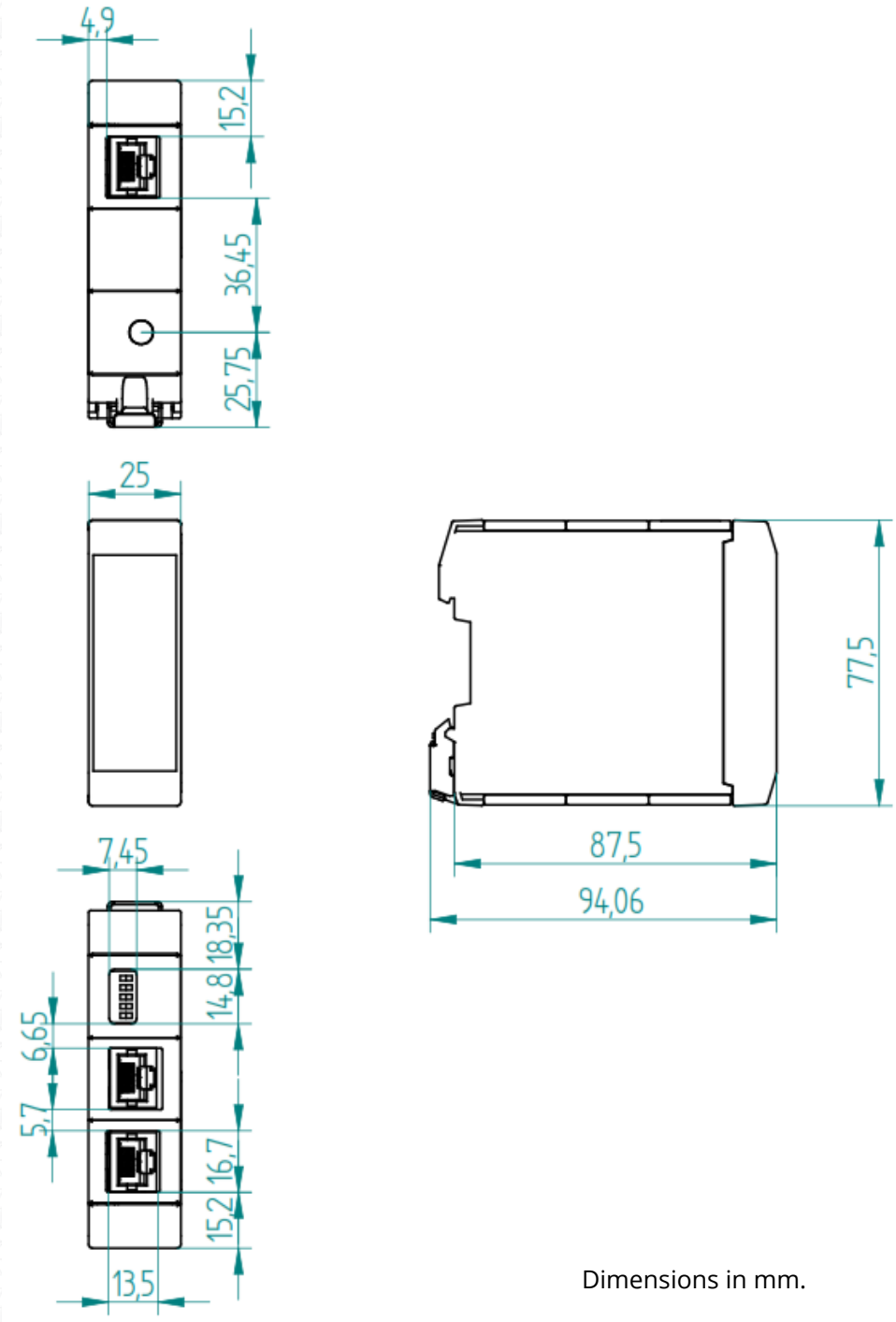


Fig. 7 Connection diagram

3. Use the 5-Way switch (4) configuration to configure the battery charging profile according to the current installation.
4. Cable the temperature sensor and the enable to the 4 ways connector and plug it into connector 6.
5. Switch ON the EPC DC/DC Converter.
6. Enable the “Smart Battery Charging Device” when the EPC converter must charge the batteries

4. Dimensions:



Dimensions in mm.

5. Technical information:

Information required:

To integrate the recommended charging profile for each battery the client must provide the following:

- Battery reference
- Battery datasheet
- Charging charts if they are not included in the datasheet
- Number of batteries in parallel for the application
- If other parallel configurations are possible a list of up to 3 configurations with the same battery (the device can store different number of parallelize units of batteries)

Battery selection:

The "Smart Battery Charging device" includes a 5-way switch, Fig. 8, that allows for configuring up to 32 different charging profiles. Each configuration will have a specific code in the switch that will be defined in Table 1.

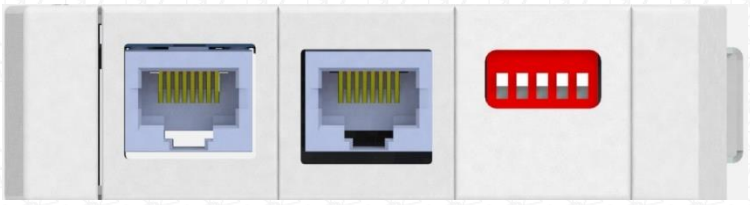


Fig. 8: Smart Battery Charging Device Switch

Table 1: Coding definition for different batteries

Battery configuration description	Chemistry	Switch Code