TC CHARGER- Connection Instruction for Control Interface

I. Charger's Communication Connector

SP1312/S✛

PIN	Description
1	ENABLE：
2	GND：
3	＋12V：＋12V internal power supply 12V (Load≤50mA)
4	LED - Red
5	LED - Green
6	RX： Serial Communication Receiver (for charger)
7	TX： Serial Communication Sender (for charger)

II. Security Tips

1. Do not allow the lead from any PIN to contact the battery positive or negative.

2. Never attempt to connect any two wires from the SP1312 connector that not be connected.

3. Applied power supply or load above 50mA to +12V PIN3 is forbidden.

4. Internal impedance of PIN1 (ENABLE) is 10K with allowable range 0~16V. Please connect a series resistance of 10 K when controlling by an external 24V supply. (Refer to manufacturer first)

III. Charger's Connection Instruction for Control Interface
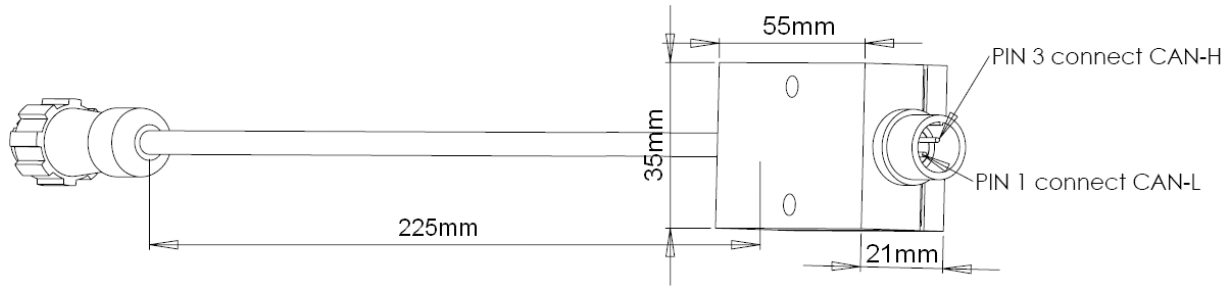
◆ TCcharger chargers can have CAN communication control or ENABLE control modes. TCcharger will configure either before delivery as per customer's requirement. Note that the control interface can not be active at the same time in different modes. The customer should select the appropriate control mode according to the battery management system (BMS) type and the battery requirement.

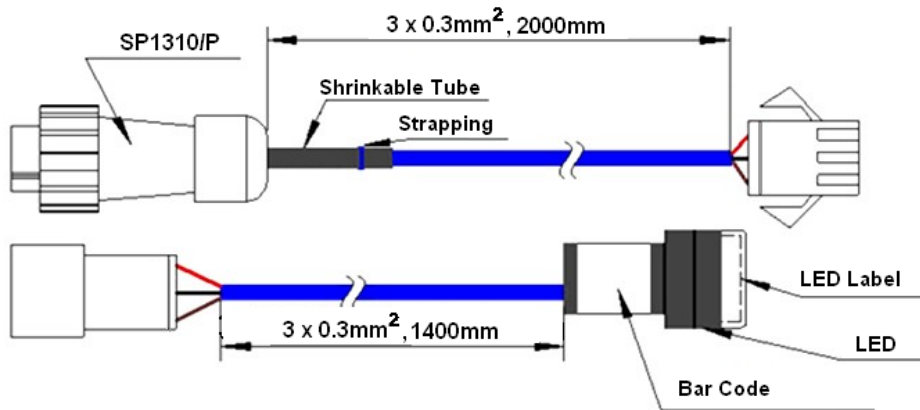| BMS Category	Mode of Connection	Brief Description
BMS with CAN communication function	CAN communication Module (Model: TC-619B)	BMS controls the charging process by the commands sent from CANbus
Battery protector broad or BMS without CAN communication function	Relay control	Use normally open contacts of relay to control the charging enable wires. Closed=Enable, Open=Disable
	Optocoupler device control	Use optoelectronic coupled devices to control the charging enable wires.
	2-5V control	Use 2-5V (dividing by resistance) controlling the charging enable wires and stop charging and be able to set up the output current from 0% to 100% for the charger.

◆ **Control mode No 1# : USING THE CAN COMMUNICATION CONTROL**
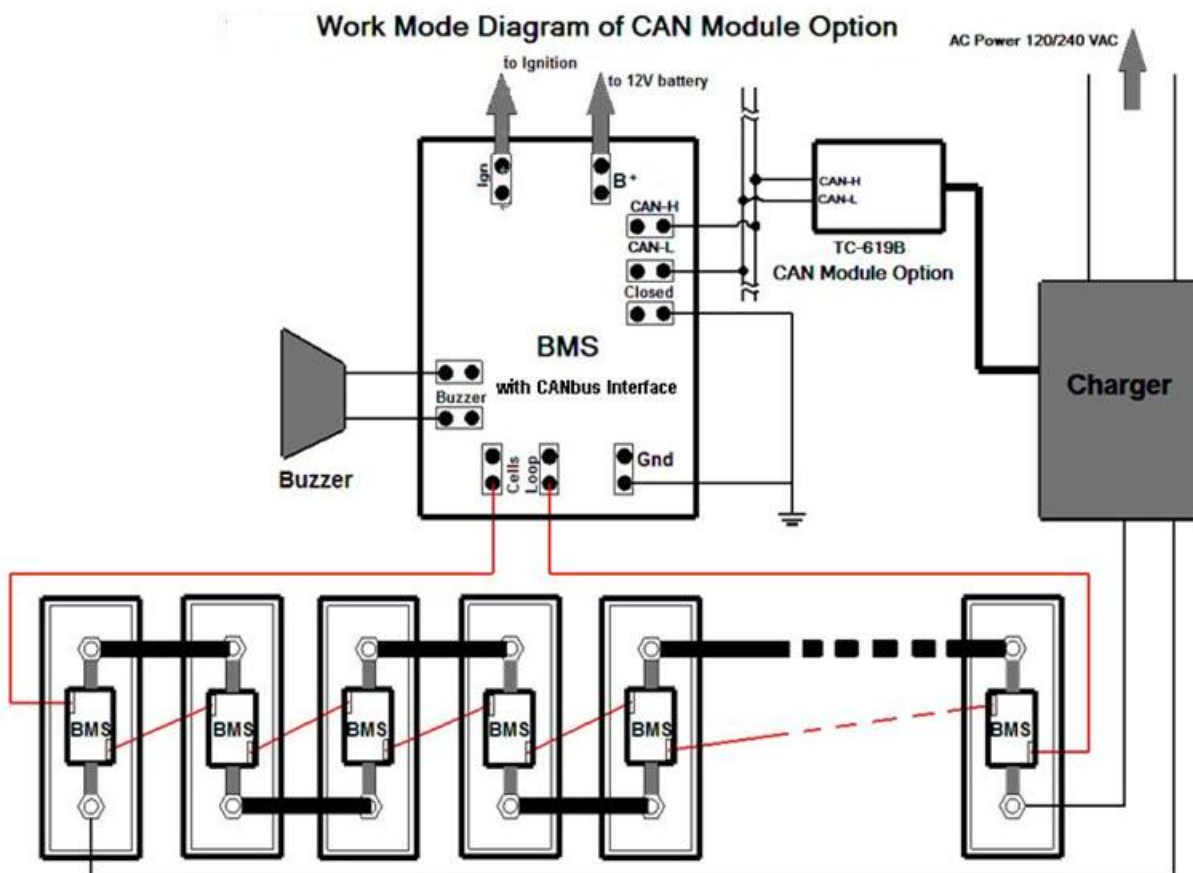
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1. The charger can be controlled by CAN communication when the BMS has functionality. The CAN communication module is required (TC-619B) and can be connected with the BMS CANbus.

2. The customer should specify "CAN communication" protocol when ordering. Specified CAN ID, CAN module type and CAN communication protocol supported are set up before delivery.

3. A Standard CAN module with cable length 225mm and the mating connector can be provided. PIN 1 connects to CAN-H, PIN 3 connects to CAN-L. See below.

TC-619B   CAN communication module's interface Diagram

55mm

35mm

225mm

21mm

PIN 3 connect CAN-H

PIN 1 connect CAN-L

4. An external cable with mating model TC-618E CAN interface is shown.

SP1310/P

3 x 0.3mm², 2000mm

Shrinkable Tube

Strapping

LED Label

LED

3 x 0.3mm², 1400mm

Bar Code

5. SCHEMATIC


Work Mode Diagram of CAN Module Option

◆ **Control mode No 2# : USING THE ENABLE CONTROL**

1. Charging process: Constant current (this current is controllable) charging mode is applied first, then constant voltage charging when the battery reaches the specified voltage point. The voltage does not increases in the constant voltage stage and the charge current will gradually reduce. Charging ceases automatically when the current falls to a preset value (generally one tenth of maximum charging current). If ENABLE signal is removed at any time, charging ceases.

2. The ENABLE/+12V wires can be used to control the charger by an ON/OFF signal from a battery management system.

3. Alternatively the voltage between ENABLE and GND can be used to linearly control the charger output current.

When it is above 2V, charger commences charging. Applying 2~5V can control the maximum output current.

Below 1.5V the charger will cease charging, re-applying above 2V will re-enable charging.

4. SCHEMATIC

Work Mode Diagram of ENABLE Control Option
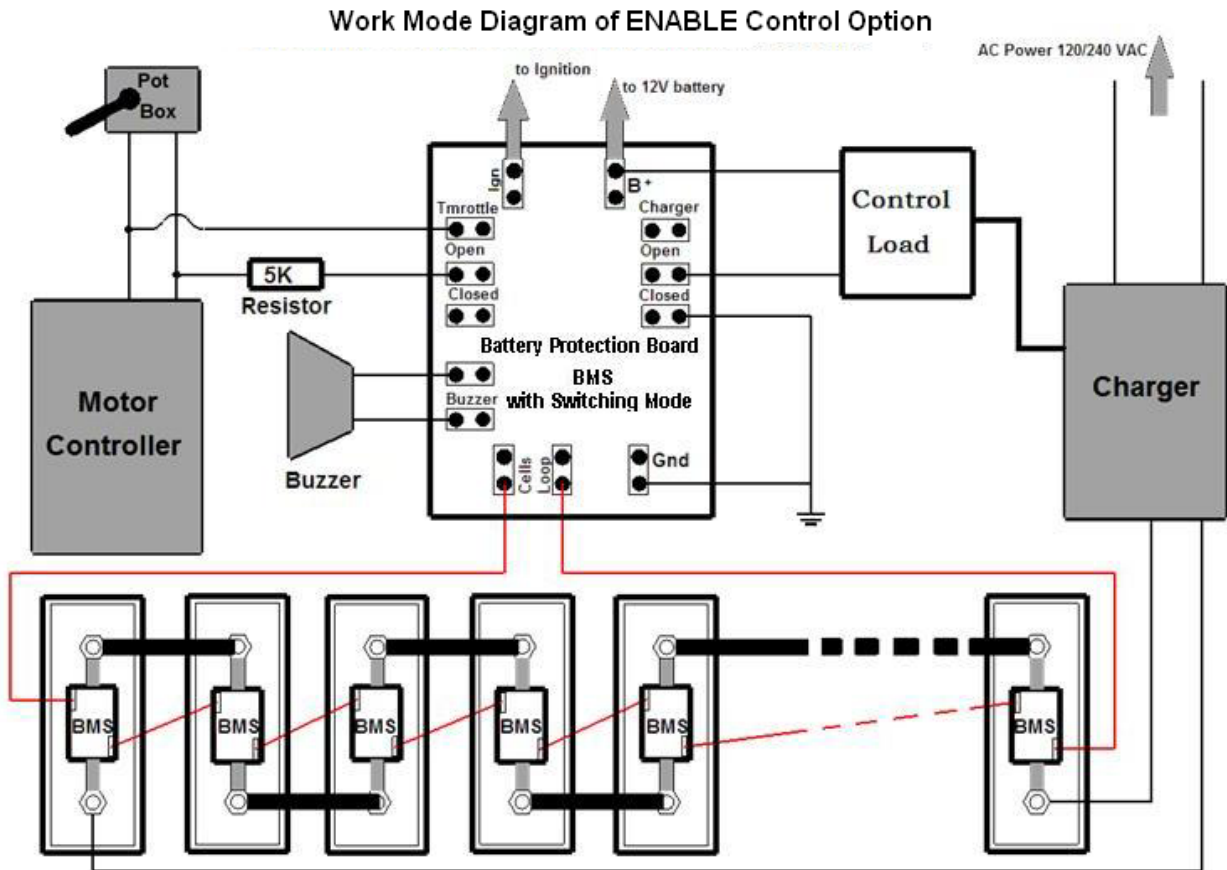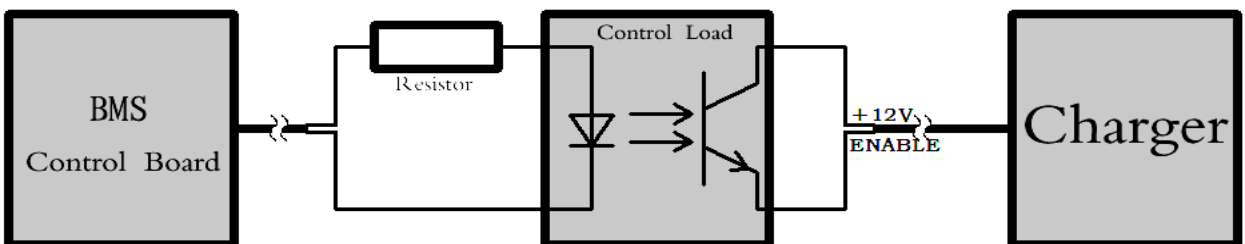

5. ENABLE CONTROL THREE METHODS

▼ **ENABLE CONTROL method 1: USING RELAY CONTROL**

The charger provides +12V (red) and ENABLE(black) from 7-PIN connector. A relay can be connected with BMS according to the Schematic below. Charging is controlled by connecting or disconnecting +12V and ENABLE. If ENABLE is disconnected, charging will cease. Upon re-connection, the charger will recommence charging.
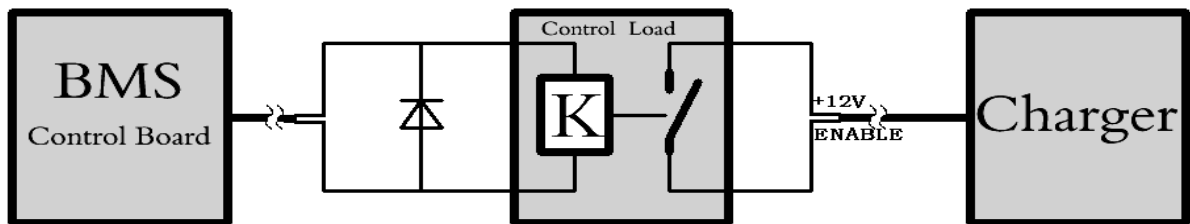
▼ **ENABLE CONTROL method 2:   Optical-couple Control**

Alternatively an Optical-coupling device can be connected with the BMS according to the Schematic below. Charging is controlled by connecting or disconnecting +12V and ENABLE. If ENABLE is disconnected, charging will cease. Upon re-connection, the charger will recommence charging.



▼ **ENABLE CONTROL method 3: USING 2-5V CONTROL**

a. Control of charging current and stop charging can be controlled by altering the DC voltage on ENABLE (PIN 1). It is possible to control the

the maximum output current from 0% to 100% of the charger maximum capability. During the stop mode (<1.5V) if the voltage rises above 2V between ENALBE (PIN 1) and GND(PIN2) charger will enter into working mode. In this working mode, when the control voltage is reduced under 1.5V the charger returns to the stop mode. 2V~5V on ENABLE corresponds linearly to output current from 0% to 100%. For example, When it is 2V between PIN 1 and PIN 2, maximum output current of the charger is 0; When 3V between them, it is 33% of the maximum output current; When 4V between them, it's 66% of it; When above 5V between them, it's 100%.

b. If control only of the maximum charging current is required, use two resistors (R1, R2) to divide voltage and get a fixed DC voltage to ENABLE and the charger operates at the corresponding current. Output current is determined by the voltage that divided by resistors. It's also possible to use the external relay control or Optical-couple control. The output capacity of optical-couple should be more than 10mA and total value of two resistors should not be less than 1500 Ohms.
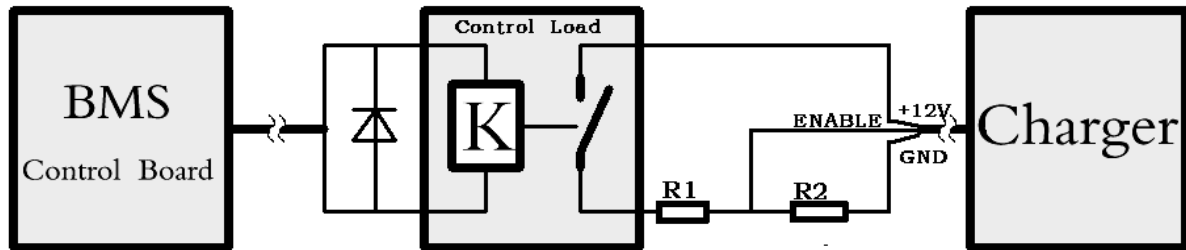
c. If the maximum charging current need to be altered at any time, it can be accomplished by changing the voltage between ENALBE and GND. Generally, use PWM to drive the optical-couple. The output of optical-couple goes through RC filter and then connect to ENABLE. The Schematic below shows another way of altering the voltage between ENABLE and GND using PWM output from the BMS.
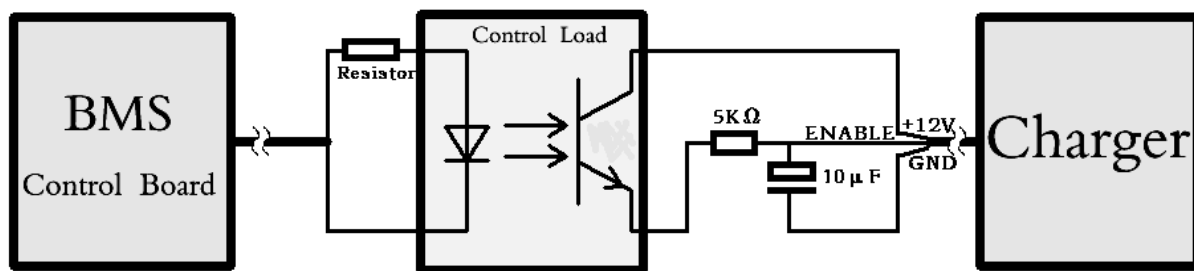
IV. Descriptions

PIN	DEFINITION
1	ENABLE input
2	GND
3	+12V internal power supply
4	
5	
6	
7	

SP1310/P✿

◆ Select PINs (1, 2, 3) , when using 2-5V to control.

PIN 1: Black   PIN 2: Green   PIN 3: Red

◆ Select PINs (1, 3) , when using Relay and optocoupler to control.

PIN 1: Black   PIN 3: Red