## 1.3 Contactor Control (CC)

**1.3.1 Feature Objective:**

Contactor control is a BMS feature that directly controls the main charger contactor and charger contactor based on the commands from Battery State Control (BSC). The contactor control also controls the pre-charger contactor during the main contactor closing state to prevent current surge situation. Besides, the contactor control will also check the vehicle side voltage before closing the main charger contactor and a fault will be raised if any circuit fault is detected.

**1.3.2 Functional Description:**

1. If the main or charger contactor control command turns from 0 to 1, set pre-charger contactor relay and negative contactor relay to 1 and monitor the vehicle side load voltage. When the vehicle side voltage is within a threshold of the battery voltage, set the main or charger contactor relay to 1 depending upon which contactor command was received and then set the pre-charger contactor relay to 0 after a calibratable amount of time.
2. If the main or charger contactor control command turns from 1 to 0, set main or charger contactor relay to 0 depending upon which contactor command was received. Also set the negative contactor relay to 0.
3. If the vehicle voltage does not reach battery voltage within a specific time, then a pre-charger fault is raised. This fault is classified as a medium fault. Once the fault is received by battery state control it commands contactor control to open the contactors.

**1.3.3 I/O description:**

The BCC feature requires the dynamic I/O shown in the following table

|  |  |  |  |
| --- | --- | --- | --- |
| **Signal(s)** | **I/O** | **Description** | **Units/comments** |
| bsc\_main\_cc\_cmd | Input | Main contactor command from BSC | state |
| bsc\_chg\_cc\_cmd | Input | Charger contactor command from BSC | state |
| vitm\_pack\_voltage | Input | Battery Pack voltage from VITM | state |
| vitm\_veh\_voltage | Input | Vehicle Side voltage from VITM | percentage |
| pre\_chg\_fault\_reset | Input | Signal to reset precharge fault | State |
| cc\_neg\_cmd | Output | Negative Contactor command to the negative contactor relay | State |
| cc\_main\_cmd | Output | Main Contactor command to the main contactor relay | state |
| cc\_chg\_cmd | Output | Charger Contactor command to the charger contactor relay | State |
| cc\_pre\_cmd | Output | Pre-charge Contactor command to the pre-charge contactor relay | State |
| cc\_precharge\_fault | Output | Pre-charge fault flag when vehicle side voltage does not reach pack voltage within a set time | State |

**1.3.4 Fault Management:**

When a pre-contactor fault occurs, it is sent to BSC which then commands contactor control to open the contactors.