Application Note

Implementing the isoCHA425HV-D4-4+AGH420-1 (or +AGH421-1) in DC Fast Charging (DCFC) Stations

Introduction

The isoCHA425HV-D4-4+AGH420-1 is an advanced insulation monitoring interrupter (IMI) specifically designed for DC fast charging (DCFC) stations. Its primary function is to ensure electrical safety by monitoring the insulation between the high-voltage DC system and ground, including the system frame. The IMI achieves this by superimposing a measuring pulse onto the high-voltage system, which attempts to break through to the ground. If there is a leakage path due to compromised insulation, the IMI detects it and responds according to its pre-set internal alarm thresholds.

For the IMI to operate correctly, several parameters must be configured in advance, and certain conditions must be met. This guide outlines the steps required for the self-check of the IMI and the subsequent cable test, both of which must be completed before initiating the charging process.

Sequence of Events

1. **IMI in STOP Mode:**
   - The IMI is initially in STOP mode, activated via a ModBus command.
2. **Client Vehicle Connection:**
   - A client vehicle arrives and plugs into the charging station.
3. **Deactivating STOP Mode:**
   - The IMI is taken out of STOP mode through a ModBus command.
4. **External IMI Test Resistor Placement:**
   - Before lifting the STOP mode, an external IMI test resistor, with an ohmic value below the IMI's alarm threshold, is placed on the DC bus.
5. **Test Voltage Application:**
   - Simultaneously, the DC bus is excited with a test voltage of 100VDC or higher.
6. **IMI Response to Test Resistor:**
   - Upon exiting STOP mode, the insulation monitoring device (IMD) measures the high-voltage DC bus, detects the test resistor's value within seconds, and triggers an alarm.
7. **IMI Trip Confirmation:**
   - The IMI trips within the required time frame, confirming a successful self-test.
8. **Test Resistor Removal:**
   - The test resistor is then removed.
9. **Reacquisition of Bus Values:**
   - The test voltage remains applied, allowing the IMD to reassess the bus. It should now detect higher ohmic values, indicating a healthy high-voltage DC bus, and reset out of alarm mode.
   - Note: Sending a RESET command via Modbus after removal of the test resistor will speed up the recovery
10. **Cable Check Confirmation:**
    - A successful reset indicates that the cable check is complete. If there were a fault on the cable, the IMI would remain in alarm mode rather than resetting.
11. **Commencement of Charging Operation:**
    - Once the IMI has reset, the charging operation can safely begin.

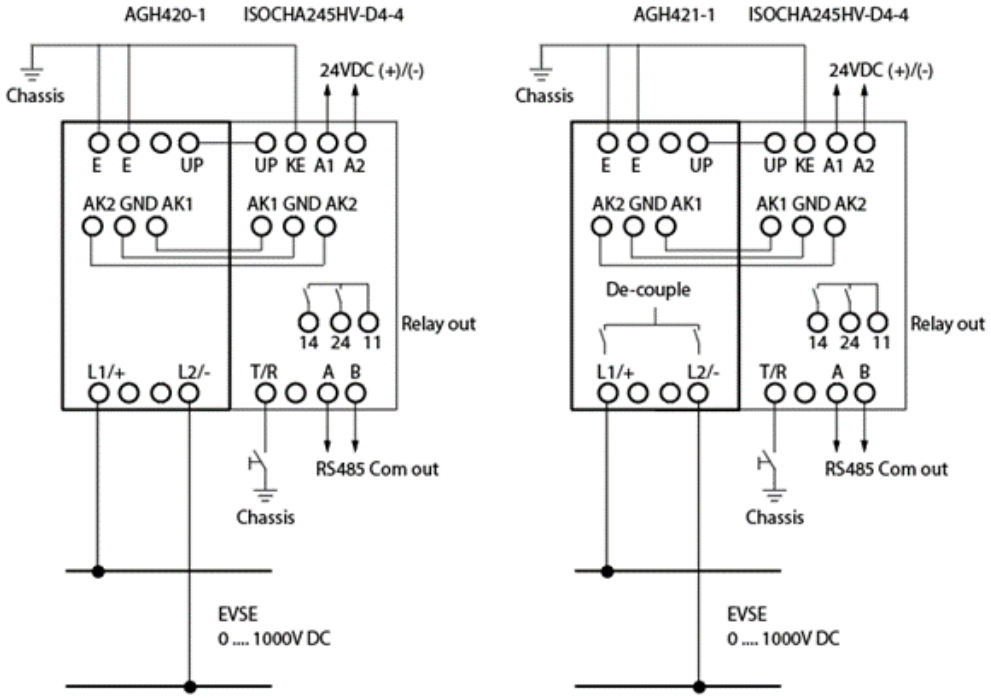
This process ensures that the DCFC station is electrically safe and that any potential insulation faults are identified and addressed before initiating a charging session.

Note:

There are two isoCHA variants. In some cases it might be of benefit to be able to physically disconnect an IsoC device from the system. This could be an installation with dynamic load distribution to two or more charge points, or in cases where multiple IMI connected to the same power network may interfere.

The isoCHA425HV-D4-4+AGH420-1 is permanently connected to the DC bus.

The isoCHA425HV-D4-4+AGH421-1 can be physically disconnected via Modbus command (STOP mode) from the DC bus via internal switches placed within the AGH421-1.



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