# EV PowerCharger GEN 1: Parallel Connection

## Contents

# 1 Introduction

This procedure describes how to connect EV PowerChargers in parallel in order to increase total available power, and how to enable CAN communication with multiple parallel chargers. Eltek does not take any responsibility for the integration of the chargers into a specific system (with battery, BMS etc).

The document is valid for parallel connections of 2 to 16 equal (same part number) EV PowerChargers.

# 2 Connection diagram

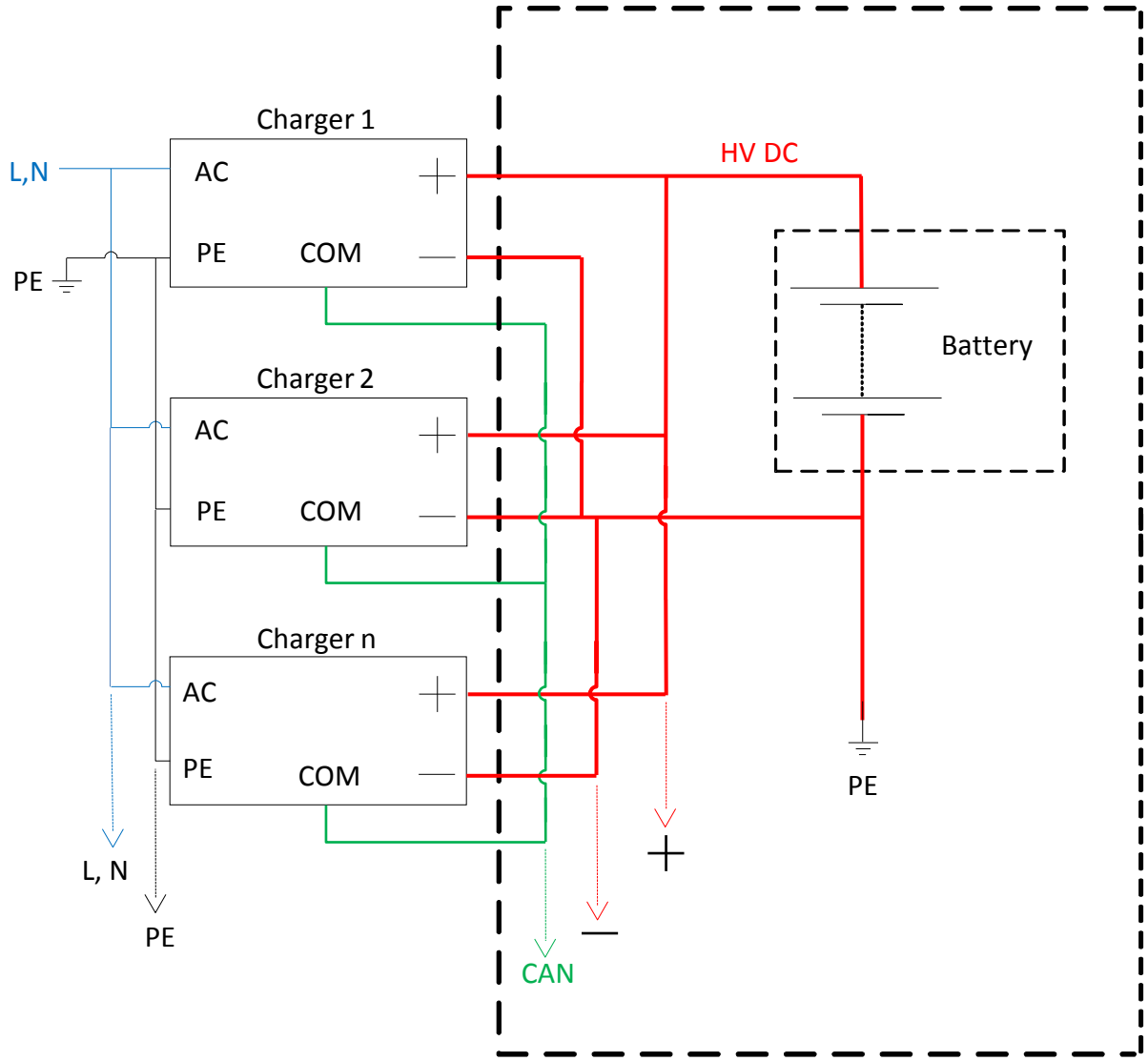


**Figure 1: Connection diagram**

# 3 Software settings

To communicate with more than one charger connected to the same CAN bus network each charger must have a unique logical address. The logical address in combination with a setting called the 'base CAN identifier' determines the CAN identifiers the charger uses for communication. The reason for configuring unique logical addresses is to prevent the chargers from using the same CAN identifiers for communication, as this would cause collisions on the CAN bus.

The factory default CAN communication setup for an EV Powercharger is:
Base CAN identifier: 0x2FF
Logical address: 1

A charger configured with the default base CAN identifier and logical address uses the CAN identifiers in the column labeled "Address = 1". A charger configured with a logical address of 2 uses the CAN identifiers in the column labeled "Address = 2", and so on. For each increment in the logical address the applied CAN identifier range is moved up by 16 (0x10h).

| Offset | CAN message | Address = 1 | Address = 2 | Address = 15 | Address = 16 |
|---|---|---|---|---|---|
| 0 | Charger control (broadcast) | 0x2FF | 0x2FF | 0x2FF | 0x2FF |
| 1 | Individual charger control | 0x300 | 0x310 | 0x3E0 | 0x3F0 |
| 2 | Software update | 0x301 | 0x311 | 0x3E1 | 0x3F1 |
| 3 | Software update response | 0x302 | 0x312 | 0x3E2 | 0x3F2 |
| 4 | Configuration | 0x303 | 0x313 | 0x3E3 | 0x3F3 |
| 5 | Configuration response | 0x304 | 0x314 | 0x3E4 | 0x3F4 |
| 6 | Status #1 | 0x305 | 0x315 | 0x3E5 | 0x3F5 |
| 7 | Status #2 | 0x306 | 0x316 | 0x3E6 | 0x3F6 |
| 8 | Errors / Warnings | 0x307 | 0x317 | 0x3E7 | 0x3F7 |
| 9 | Serial number | 0x308 | 0x318 | 0x3E8 | 0x3F8 |

The base CAN identifier is used to move all CAN identifiers used by the EV Powerchargers in the 11-bit CAN identifier range. In combination with the logical address and the offset (see first column in above table) the CAN identifier for each message is identified by:

Message CAN identifier = Offset + base CAN identifier + ((logical address – 1) * 16)

For example, the CAN ID for the configuration message used by a charger configured with base CAN identifier 0x3FF and logical address 2 is:

Message CAN identifier = 4 + 0x3FF + ((2 – 1) * 16) = 0x413

The above example correlates with the values in the column labeled "Address = 2", with the only difference being the 0x100 CAN identifier shift caused by the 0x3FF base CAN identifier.

**Things to consider before changing address**

- You need to know the base CAN identifier and logical address of the charger you intend to change the address on. Note that the factory default base CAN identifier is 0x2FF and the logical address is 1.
- You should only have the charger you intend to configure connected to the CAN bus.
- The base CAN identifier should be configured to the same value on all the chargers you intend to run and communicate with in parallel. This is required for controlling all chargers in parallel with a single broadcast charger control message.

**Procedure**

1. Unlock write protection
2. Modify charger address
3. Power cycle the charger (disconnect mains, wait 40 seconds and reconnect mains)

**Unlock write protection**

This example assumes a factory default CAN communication setup:
Base CAN identifier: 0x2FF
Logical address: 1

The following CAN command unlocks the write protection for **1 second**:

CAN ID: 0x303 (Configuration)
Data length: 8
Data (in hex): 01 16 F1 E2 D3 C4 B5 A6

If the command succeeds the charger responds with:

CAN ID: 0x304 (Configuration response)
Data length: 8
Data (in hex): 01 16 F1 E2 D3 C4 B5 A6

**Modify charger address**

This example assumes a factory default CAN communication setup:
Base CAN identifier: 0x2FF
Logical address: 1

Note that the write protection must be unlocked prior to modifying the charger address. Make sure that this command is executed within 1 second from unlocking the write protection.

The following CAN command changes the logical address from 1 to 2:

CANID: 0x303 (Configuration)
Data length: 3
Data (in hex): 01 04 02

The byte marked in yellow is the desired address. The allowed range is 1 – 16.

If the command succeeds the charger responds with:

CAN ID: 0x304 (Configuration response)
Data length: 3
Data (in hex): 01 04 02

# 4 NOTE!

- The proposed connection will affect the isolation resistance on the DC output.
- The CAN bus must be connected as a daisy chain. The CAN bus branch for each EV PowerCharger must be kept as short as possible.
- An end resistor of 120 Ω must be connected between CAN+ and CAN- at both ends of the CAN bus.
- In order to obtain the same output current/load for each charger the maximum total current must be divided on the total number of PowerChargers connected in parallel. The result must be entered and set as maximum output current for each individual PowerCharger.
- Eltek take no responsibility for the integration of chargers into the customer system.