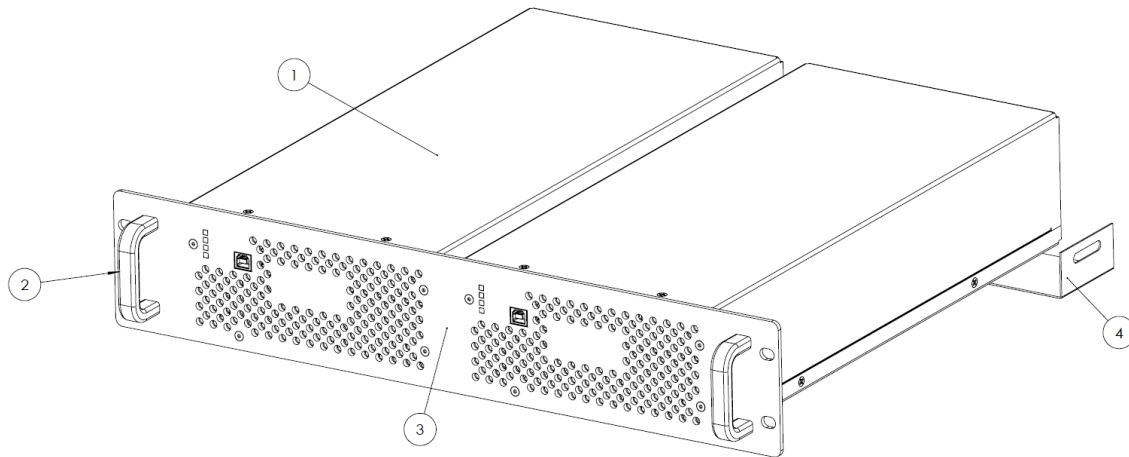# Ferroamp ESO interface

Overview

The Ferroamp ESO ("Energy Storage Optimizer") is a non-isolated bi-directional buck/boost DC/DC-converter. It operates between an energy storage (200-720 VDC) and the Ferroamp DC grid (760 VDC). The ESO has a 19" cabinet format and has all connections on the back side. A debugging/maintenance USB-port is placed on the front side.
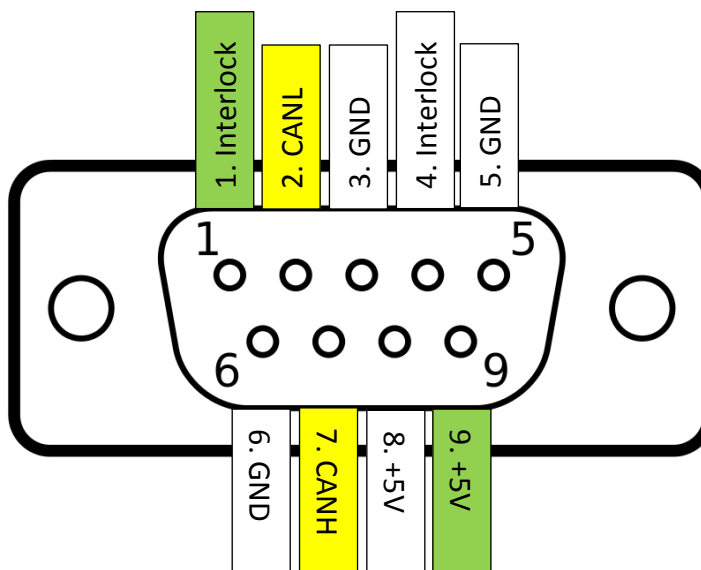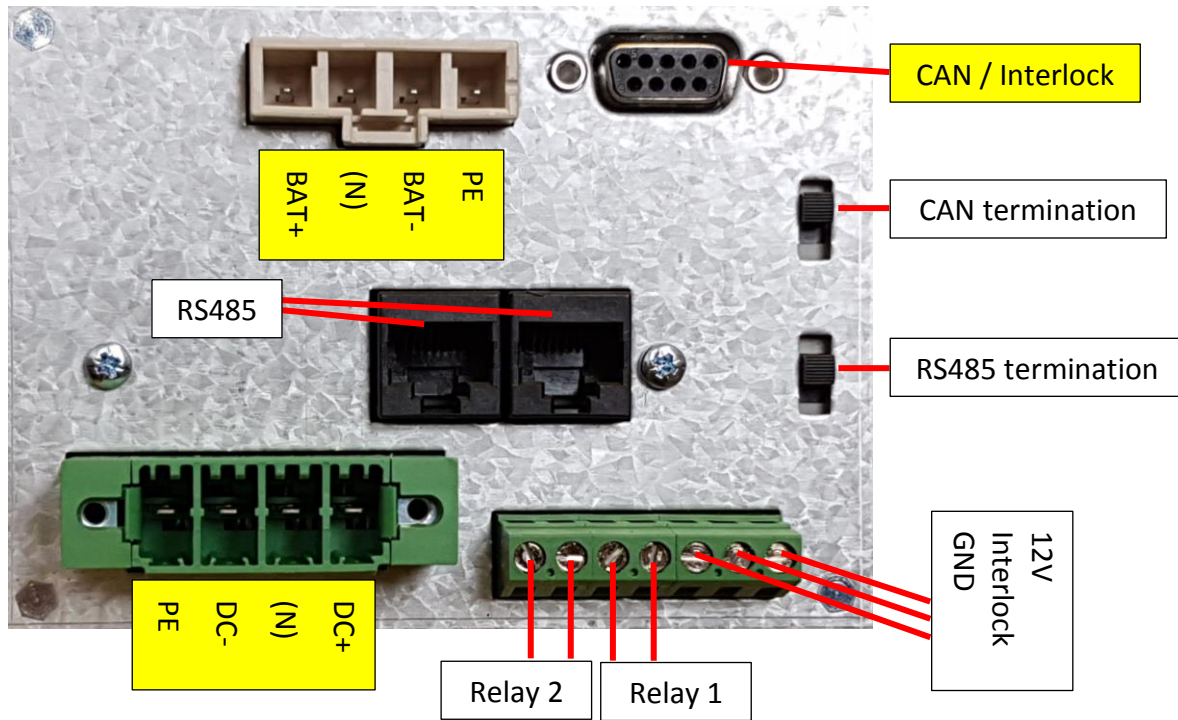

The ESO uses CAN to communicate with the energy storage, RS485 to communicate with paralleled ESO's and power line communication (PLC) to communicate with the EnergyHub.

The ESO is capable of operating in many different modes. The usual mode is that the ESO tries to maintain 760 VDC on the DC-link. The EnergyHub can increase or decrease the DC-link voltage depending on facility load power, solar power, energy prices or any other control scheme. The battery usually informs the ESO of the operational boundary, but the battery is also allowed to request a specific current/voltage from the ESO.

It is recommended to precharge before connecting the battery to the ESO, due to capacitance.

Connectors

CAN / Interlock

CAN termination

RS485

RS485 termination

BAT+
BAT- (N)
PE

DC+ (N)
DC- (N)
PE

Relay 2   Relay 1

12V
Interlock
GND

1. Interlock
2. CANL
3. GND
4. Interlock
5. GND

6. GND
7. CANH
8. +5V
9. +5V

Yellow: Necessary

Green: Optional for disabling the ESO. Alternatively, use the green screw terminal separately. The ESO is disabled as long as "interlock" is disconnected from either +5V or +12V.

Note: Neutral "N" connection to ESO is optional but should not be connected.

Typical installation

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Battery ─ Fuses ─ Energy Storage Optimizer (ESO) ─ Fuses ─ DC grid
Battery ···· CAN ···· Energy Storage Optimizer (ESO)

DC grid ─ Fuses ─ EnergyHub ─ Fuses ─ AC feed / AC load
                              ···· Current measurement ···· AC feed
                  EnergyHub ···· 3G/LAN ···· Internet

Solar cells / PV ─ Solar String Optimizer (SSO) ─ Fuses ─ DC grid
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Legend:

- 🟥 DC-link positive (+380 VDC) / BAT+ / PV+
- 🟦 DC-link negative (-380 VDC) / BAT- / PV-
- 🟩 Protective Earth (PE)

- ⬛ 230 VAC phase 1
- 🟫 230 VAC phase 2
- ⬜ 230 VAC phase 3
- 🟦 Neutral
- 🟩 Protective Earth (PE)