

INSTALLATION SHEET

# HVC 150C E-Bus charger UL

This document briefly indicates the main relevant elements for the installation of the HVC bus charger. It can be used as a basic to determine the requirements for a site. The first page explains the installation for 1 depot charge box. The second page explains the installation for two (2) or three (3) depot charge boxes.

**General:**

- The electrical installation should be designed and constructed according to local laws, safety and electrical regulations.
- A ground electrode should be installed in the earth close to the first charge box or cabinet, based on local regulations and site design. The ground-resistance must be  $\leq 10 \Omega$  (subject to local regulations).
- More detailed information is available in the installation manual.

**Main AC Power supply:**

- AC Supply: 480 VAC 3-phase, 60 Hz
- Circuit Breaker: Depends on local Rules, commonly 1x250A 3P (no neutral required)
- Option: 1 X Surge Protected Device type 1



**Input power cable:**

- 1 X AC power cable 3P+PE: 4 X 500 MCM maximum

**Specification:**

- Nominal input voltage:  $480 V_{AC} \pm 10\%$
- Nominal frequency:  $60 \text{ Hz} \pm 1\%$
- Nominal input current: 198 A
- Input power: 170 kVA
- Power Factor ( $\cos \Phi$ ):  $\geq 0.95$
- Cellular: 4G/3G connection integrated



**Fast Charge Station**

- 1 X HVC-150C
- Dimensions (H x W x D): 2030 x 1170 x 770 mm 79.9" x 46.1" x 30.3" inches
- Weight: 1340 kg (2954 lbs)

**Placement (two options):**

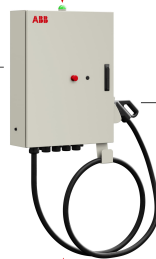
- Concrete foundation block
- Support frame for an existing floor

**Cables between cabinet and charge box:**

- DC power cable: 2x350 MCM (maximum)
- Interlock cable: 2xSTP 14-18 AWG
- PE wire: 1 X 6 AWG
- Communication: 8 X glass fiber OM3 or greater

**Depot charge box:**

- Output voltage range: 150 – 850 V<sub>DC</sub>
- Maximum output current: 200 A<sub>DC</sub>
- Maximum output power: 150 kW
- CCS Output charging protocol
- CCS Cable length 3.5 m (optional: 7 m)



- Maximum distance between Fast Charge Station and depot charge box: 150 m (492 ft)

**Depot Charge Box**

- Dimensions (H X W X D): 800 X 600 X 210 mm 31.5" X 23.6" X 8.3" in
- Weight: 65 kg

**Auxiliary input power cable:**

- 1 X AC auxiliary power 1P+N+PE: 3 X 14 AWG

**Auxiliary AC power supply (mandatory) per depot charge box:**

- Typically combined with Main AC power supply. Can be located in separate place
- 1 X 1P GFCI Class B (30 mA) circuit breaker: 15 A
  - Continuous power consumption: 500 W
  - Inrush current: 48 A < 5 ms
  - Option: 1 X surge protected device type 1



Aux distribution board

**Placement:**

- Wall-mount support
- Optional: Support frame for an existing floor
- Optional: External emergency and start/stop button and external beacon light

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Installation of two or three depot charge boxes:

**General:**

- The electrical installation should be designed and constructed according to local laws, safety and electrical regulations.
- A ground electrode should be installed in the earth close to the first charge box or cabinet, based on local regulations and site design. The ground-resistance must be  $\leq 10 \Omega$  (subject to local regulations).
- More detailed information is available in the installation manual.

**Main AC Power supply:**

- AC Supply: 480 VAC 3-phase, 60 Hz
- Circuit Breaker: Depends on local Rules, commonly 1x250A 3P (no neutral required)
- Option: 1 X Surge Protected Device type 1



**Input power cable:**

- AC power cable 3P+PE: 4 X 500 MCM maximum

**Specification:**

- Nominal input voltage:  $480 V_{AC} \pm 10\%$
- Nominal frequency:  $60 \text{ Hz} \pm 1\%$
- Nominal input current: 198 A
- Input power: 170 kVA
- Power Factor ( $\cos \Phi$ ):  $\geq 0.95$
- Cellular: 4G/3G connection integrated



- Maximum distance between Fast Charge Station and depot charge box: 150 m (492 ft)
- Maximum distance between depot charge boxes: 30 m (100 ft)

**Cables between cabinet and charge box:**

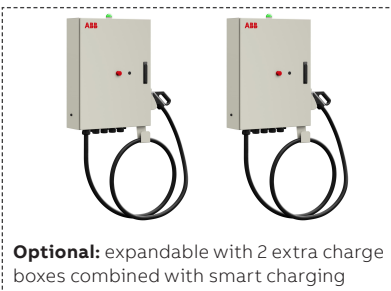
- DC power cable: 2x350 MCM (maximum)
- Interlock cable: 2xSTP 14-18 AWG
- PE wire: 1 X 6 AWG
- Communication: 8 X glass fiber OM3 or greater

**Cables between charge boxes:**

- Daisy chained (Box 1  $\rightarrow$  2, Box 2  $\rightarrow$  3)  
Placed in conduit
- DC power cable: 2x350 MCM (maximum) Placed in conduit separate from DC cable conduit
  - AC auxiliary power 1P+N+PE: 3 x 14 AWG\*
  - Interlock cable: 2xSTP 14-18 AWG
  - Ethernet: 1 x FTP Cat6 / Cat5e
  - Communication: 4 x glass fiber OM3 of greater
  - PE wire: 2 x 6 AWG \*\*
- \* this cable is only if you are daisy chaining the Auxiliary power  
\*\* refer to grounding scheme

**Depot charge box:**

- Output voltage range: 150 – 850  $V_{DC}$
- Maximum output current: 200  $A_{DC}$
- Maximum output power: 150 kW
- CCS Output charging protocol
- CCS Cable length 3.5 m (optional: 7 m)



**Auxiliary input power cable:**

- Placed in conduit #2 (cabinet - depot) or in conduit #3 (aux. - depot):
- 1 X AC auxiliary power 1P+N+PE: 3 X 14 AWG

**Auxiliary AC power supply (mandatory) per depot charge box<sup>1</sup>:**

- Typically combined with Main AC power supply. Can be located in separate place
- 1 X 1P GFCI Class B (30 mA) circuit breaker: 15 A
  - Continuous power consumption: 500 W
  - Inrush current: 48 A < 5 ms
  - Option: 1 X surge protected device type 1



Aux distribution board

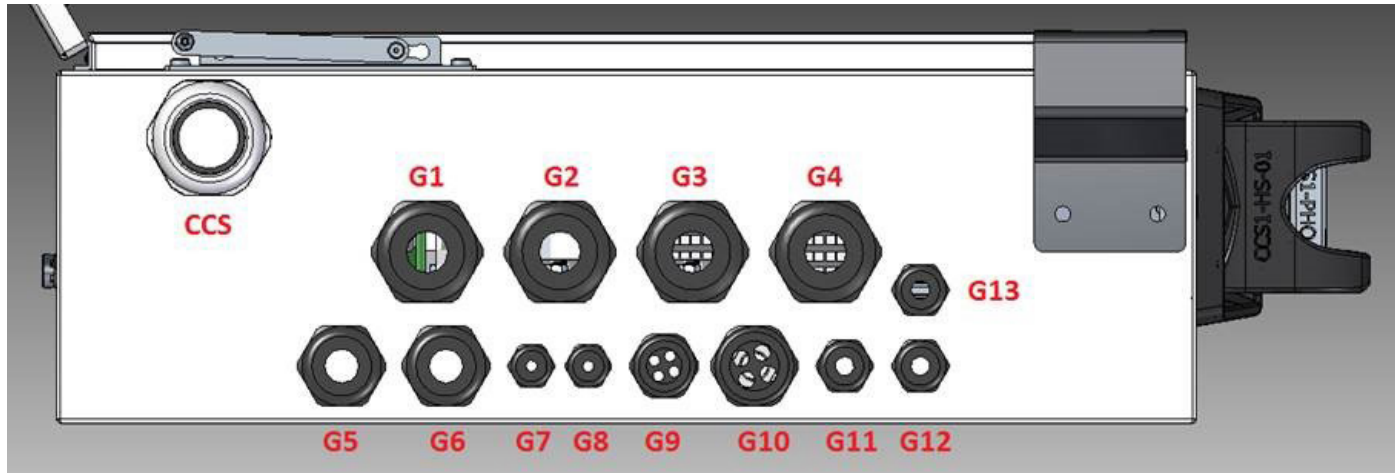
**Smart Charging:** Smart charging allows for a maximum of 3 depot charge boxes to be connected to one fast charge station. The depot charge boxes are daisy chained and vehicles can be charged sequentially and on a first come first served basis. The maximum distance between 2 depot boxes can be up to 30 m.

<sup>1</sup> refer to configuration options

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Overview of cables coming to depot charge box



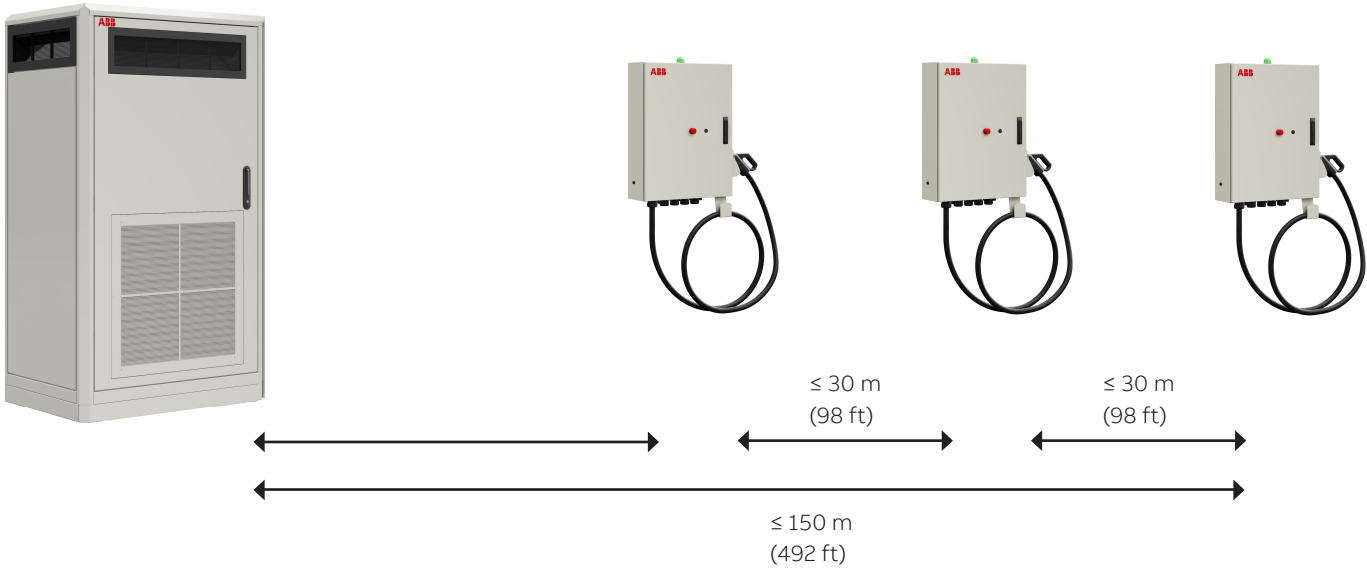
| No | Signal                | Wire                                      | Gland dimensions  | Cable specs   | Gland nr |
|----|-----------------------|---|-------------------|---|----------|
| 1  | Charging cable        | CCS1/2                                    | CCS fi 33 - 38 mm | Provided with chargebox   | CCS      |
| 2  | DC+ In                | 1 X 350 MCM                               | 22 - 32 mm        | TF-Kable W-RHH-RHW-2-2000V, W350-1XT, 350 MCM<br>note: 350 MCM with reinforced isolation > 5400 VDC | G3       |
| 3  | DC- In                | 1 X 350 MCM                               | 22 - 32 mm        | As above  | G1       |
| 4  | DC+ Out               | 1 X 350 MCM                               | 22 - 32 mm        | As above  | G4       |
| 5  | DC- Out               | 1 X 350 MCM                               | 22 - 32 mm        | As above  | G2       |
| 6  | PE                    | 1 X 6 AWG                                 | fi 8-9 mm         | OLFLEX 4160900 (Fi-OD: 8.9 mm)  | G10      |
| 7  | PE                    | 1 X 6 AWG                                 | fi 8-9 mm         | OLFLEX 4160900 (Fi-OD: 8.9 mm)  | G10      |
| 8  | PE                    | 1 X 2-8 AWG                               | fi 6-12 mm        | OLFLEX 4161100 (2 AWG) (Fi-OD: 11.4 mm)   | G11      |
| 9  | AC input              | 3 X 14 AWG                                | fi 6-12 mm        | OLFLEX 10019945<br>Fi-OD: 8.3 mm  | G12      |
| 10 | AC output             | 3 X 14 AWG                                | fi 6-12 mm        | As above  | G13      |
| 11 | Interlock/Monitor In  | 2 X 2 X 19 AWG<br>(Shielded Twisted Pair) | fi 8-9 mm         | Lapp UniTronic LiYCY(TP) 0066262<br>Fi-OD = 8.7 mm  | G10      |
| 12 | Interlock/Monitor Out | 2 X 2 X 19 AWG<br>(Shielded Twisted Pair) | fi 8-9 mm         | As above  | G10      |
| 13 | Ethernet In           | Cat6 / Cat5e<br>(Shielded Twisted Pair)   | fi 5-10 mm        |   | G7       |
| 14 | Ethernet Out          | Cat6 / Cat5e<br>(Shielded Twisted Pair)   | fi 5-10 mm        |   | G8       |
| 15 | Ext. EMO switch       | 4 X 20 AWG                                | fi 5-6 mm         | OLFLEX classic 110 H, 4 X 20 AWG/ 10019904<br>Fi-OD: 5.8 mm   | G9       |
| 16 | Ext. Beacon           | 4 X 20 AWG                                | fi 5-6 mm         | As above  | G9       |
| 17 | Ext. Start button     | 2 X 20 AWG                                | fi 5-6 mm         | As above  | G9       |
| 18 | Spare                 |   | fi 5-6 mm         |   | G9       |
| 19 | Fiber-optic In        | 2 fibers (recommended 4 for spare)*       | M32               | OM3, pre-fabricated optical fiber   | G5       |
| 20 | Fiber-optic Out       | 2 fibers (recommended 4 for spare)        | M32               | OM3, pre-fabricated optical fiber   | G6       |

\* 4 fibers (recommended 8 for spare) for connection from HVC to first depot charge

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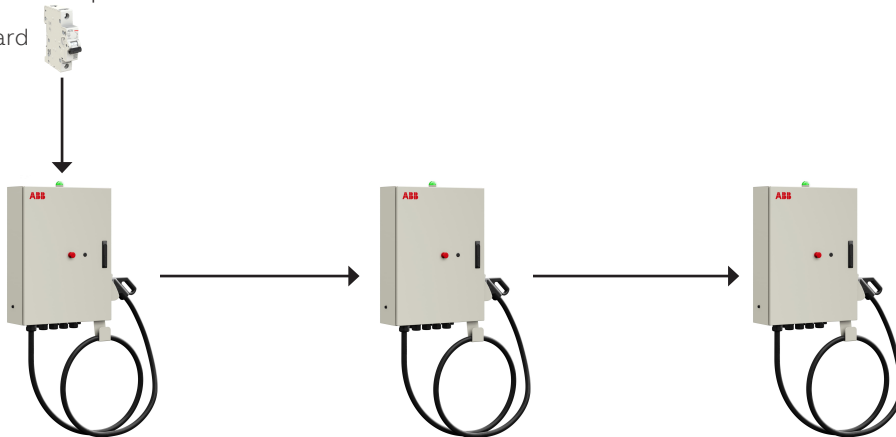
## Distance limitation



## Auxiliary AC power supply configurations

### 1 - Daisy-chained connection option

Auxiliary distribution board

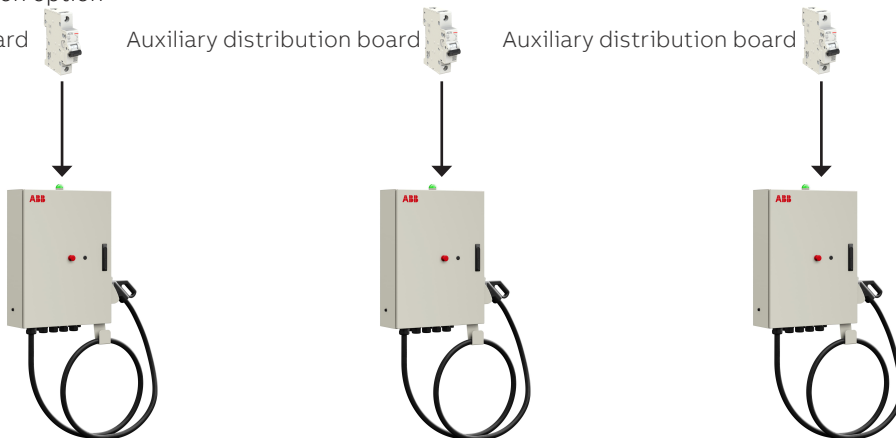


### 2 - Individual connection option

Auxiliary distribution board

Auxiliary distribution board

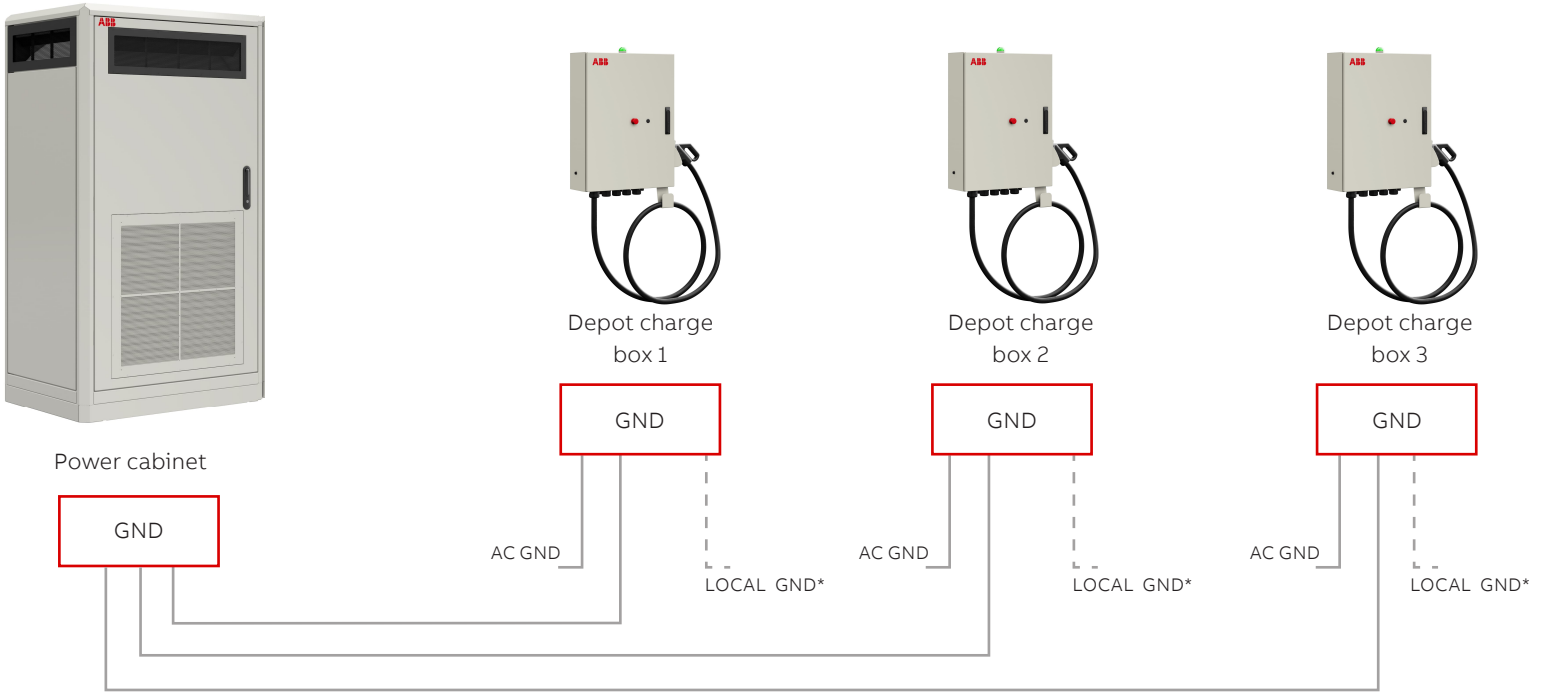
Auxiliary distribution board



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## Proposed grounding scheme



\* if available LOCAL GND can be used instead of CABINET GND