POST eVolve Series
AC Charging solutions for EV’s

CirCarLife
Intelligent charging solutions for electric vehicles

May ‘18
Post eVolve; SMART vs BASIC

Simplest solution: no communication, no metering, no user management
Post eVolve; Parts description

1 — Hat
2 — LED Beacons
3 — Display & RFID Reader*
4 — Plugs
5 — Key lock access
6 — Base

What's included:
- Charge Point
- Installation Manual
- CirCarLife RFID MiFare Card
- eVolve Post Key
- Foundation Kit

(*) Only Smart Series
## Post eVolve SMART; Available models

<table>
<thead>
<tr>
<th>Model</th>
<th>S</th>
<th>T</th>
<th>C63</th>
<th>TM4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC power supply</td>
<td>1P + N + PE</td>
<td>3P + N + PE</td>
<td>3P + N + PE</td>
<td>3P + N + PE</td>
</tr>
<tr>
<td>AC input voltage</td>
<td>230 VAC +/-10%</td>
<td>400 VAC +/-10%</td>
<td>400 VAC +/-10%</td>
<td>400 VAC +/-10%</td>
</tr>
<tr>
<td>Maximum input current</td>
<td>64 A</td>
<td>64 A</td>
<td>63 A</td>
<td>64 A</td>
</tr>
<tr>
<td>Maximum input power</td>
<td>14.7 kW</td>
<td>44 kW</td>
<td>43 kW</td>
<td>44 kW</td>
</tr>
<tr>
<td>Number of plugs</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Outlet A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output current</td>
<td>32 A</td>
<td>32 A</td>
<td>63 A</td>
<td>32 A</td>
</tr>
<tr>
<td>Maximum output power</td>
<td>7.4 kW</td>
<td>22 kW</td>
<td>43 kW</td>
<td>22 kW</td>
</tr>
<tr>
<td>AC output voltage</td>
<td>230 VAC (1P + N + PE)</td>
<td>400 VAC (3P + N + PE)</td>
<td>400 VAC (3P + N + PE)</td>
<td>400 VAC (3P + N + PE)</td>
</tr>
<tr>
<td>Outlet B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output current</td>
<td>32 A</td>
<td>32 A</td>
<td>32 A</td>
<td>16 A</td>
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<td>Maximum output power</td>
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<td>230 VAC (1P + N + PE)</td>
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<tr>
<td>Socket type</td>
<td>2x Type 2 Socket (lock system)</td>
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<td>Type 2 Cable</td>
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</tr>
</tbody>
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![Socket Type Diagram](image-url)
### Post eVolve BASIC; Available models

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<tr>
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<th>S-one</th>
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<tr>
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<td>32 A</td>
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<td>Maximum input power</td>
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<td>22 kW</td>
</tr>
<tr>
<td>Number of plugs</td>
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<td>1</td>
</tr>
<tr>
<td>Maximum output current per outlet</td>
<td>32 A</td>
<td>32 A</td>
</tr>
<tr>
<td>Maximum output power per outlet</td>
<td>7.4 kW</td>
<td>22 kW</td>
</tr>
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<td>64 A</td>
</tr>
<tr>
<td>Maximum input power</td>
<td>14.8 kW</td>
<td>44 kW</td>
<td>25.7 kW</td>
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<td>2</td>
<td>2</td>
<td>4</td>
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Post eVolve; Features

- Its **frontal key-locked door** provides an easy access to the inside of the charger which results in a lower OpEx (Operating Expenditure) due to a quicker installation and service (preventive/corrective). Moreover, it allows the charger to be installed next to a wall, optimising the available space.
About the charger’s **housing, aluminium and ABS plastic** have been combined in a robust structural design that provides protection to both mechanical stress and severe environmental conditions, increasing the charger lifespan and avoiding its replacement in just a few years.
Post eVolve; Features

- **Accessibility for the disabled** has also been considered, complying with international standards regarding the height of connectors/display that facilitates its operation.

Measures in mm

Plug & display at 1200mm approx.
Post eVolve; Features

- The **LED beacons** not only inform the user about the status of the plug but help to locate the charger when dark.
Post eVolve; Features

- eVolve series includes the necessary **electrical protections** not only to minimize the human safety risk of electrical shock but also to ensure the maximum uptime due to independent protections per connector.

Example TM4:

- RCD for plug A and plug B
- MCB for plug A and plug B (type 2 sockets)
- MCB & RCD for control circuit
- MCB for plug A and plug B (schuko sockets)

(internal components layout change from model to model)
Post eVolve; Features

- Wide frontal customisation are, increasing brand recognition
Post eVolve; Features

- Optional including *tethered cables*, specially interesting for fleets and workplace
Optional **pre-fabricated foundation**, (1) which helps to reduce installation cost, (2) is a future proof solution (changing the adapter, the post can be easily replaced) and (3) protects foundation against bumps.
Post eVolve; Features

On February 7th 2017 the new edition of International Standard IEC 61851-1:2017 (Electric vehicle conductive charging system - Part 1: General requirements) was published\(^1\).

According to CENELEC (European Committee for Electrotechnical Standardization), the DOP (Date Of Publication) and DOW (Date Of Withdrawal) for IEC 61851-1:2017 is July 10th 2017\(^2\).

\(^1\) [https://webstore.iec.ch/publication/33644](https://webstore.iec.ch/publication/33644)


IEC 61851-1:2017, in its section 8.5 (Residual current protective devices) states the following:

\textit{EV supply equipment can have one or more connecting points to supply energy to EVs.}

\textit{Where connecting points can be used simultaneously and are connected to a common input terminal of the EV supply equipment, they shall have individual protection incorporated in the EV supply equipment.}

\textit{If the EV supply equipment has more than one connecting point that cannot be used simultaneously then such connecting points can have common protection devices.}
Post eVolve; Features

EV supply equipment that includes an RCD and that does not use the protective measure of electrical separation shall comply with the following:

- The connecting point of the EV supply equipment shall be protected by an RCD having a rated residual operating current not exceeding 30 mA;
- RCD(s) protecting connecting points shall be at least type A;
- RCDs shall comply with one of the following standards: IEC 61008-1, IEC 61009-1, IEC 60947-2 and IEC 62423;
- RCDs shall disconnect all live conductors.

NOTE 1 This applies to single-phase or three-phase connecting points.

Where the EV supply equipment is equipped with a socket-outlet or vehicle connector for AC use in accordance with IEC 62196 (all parts), protective measures against DC fault current shall be taken. The appropriate measures shall be:

- RCD type B or
- RCD Type A and appropriate equipment that ensures the disconnection of the supply in case of DC fault current above 6 mA.

[...]

[...]
Post eVolve; Features

In order to comply with the above bold text, the current “by default” version of some product series (e.g. Post eVolve Smart which by default includes only RCD type A) is no longer valid.

After evaluating this situation and considering that either RCD type B or 6mA DC fault current detection increases the cost of the product, Circontrol decided to work on a solution that provides both value to the market (lower OpEx) and helps to differentiate from the competition: **RCD type B with automatic**\(^{(3)}\)/**remote reclosing**\(^{(4)}\)

This solution (RCD type B with automatic/remote reclosing) is significantly better than RCD type A with 6mA DC fault current detection due to the following reasons:

1. Since RCD type B tripping is ensured in many more scenarios than RCD type A (regardless 6mA DC fault current detection), this residual current protective device is future-proof against new coming battery / charging developments, ensuring human safety against electrical shocks
2. Its automatic/remote reclosing capability significantly reduces the OpEX (Operational Expenditure) in those occasions where the EVs trips the RCD (no technician has to go to the unit to reclose the RCD)

\(^{(3)}\) IEC 61851-1:2017, in its section 15 (Automatic reclosing of protective devices) indicates: *In the following countries automatic reclosing of protection means is not allowed: DK, UK, FR, CH.*

\(^{(4)}\) Only valid for AC chargers. For DC chargers including AC connector as per IEC 62196, due to technical limitations, the solution adopted is RCD type B
Post eVolve SMART; Features

- Optional **self-reclosing RCD**, lower OpEx (Operational Expenses) since a technician is not to be sent when RCD trips due to an EV or faulty cable.

IEC 61851-1:2017, in its section 15 (Automatic reclosing of protective devices) indicates:

*In the following countries automatic reclosing of protection means is not allowed: DK, UK, FR, CH*
Post eVolve SMART; Features

• To comply with the most demanding requirements regarding billing, eVolve series includes **MID certified meters**

**CEM-C20**

Three-phase electrical energy meter with direct measurement, assembly on DIN rail

**Description**

Three-phase electrical energy meter for direct measurements of up to 65 A. Built-in LCD display (7 digits) with rotating screen system. Features an optical communication port (OSC system) on the side of the unit for installing the communication module (CEM-M). Also features 2 buttons (1 sealable button) for viewing all the measured information.

Other features include:

— MID certification, module B-D (depending on the type)
— Class 1 active energy (Class B, in accordance with MID), Class 2 reactive energy
— Complies with the EN 50470 (MID European standards) or IEC 62052-11 standards (international standards), depending on the type.
— Compact size (4 modules, 72 mm)
— Resettable partial meter
— 1 programmable impulse output, in accordance with DIN 43864
— Indicates bad connections on the screen
— Energy storage, even in the case of bad connections

(internal components may change from model to model)
Post eVolve SMART; Features

- Optional **anti-vandal doors & key-locking**; lower OpEx (Operational Expenses) since protects the connectors against vandalism

(key also available in BASIC models)
The Embedded Load Management allows a lower TCO (Total Cost of Ownership) by charging two EVs simultaneously even when the charger is not supplied with its maximum output power.

Example:
Post eVolve Smart T (2x22kW) supplied with 30kW (Pa) instead of 44kW (Pt)

<table>
<thead>
<tr>
<th>Case 1 (only 1 car plugged in to the charger)</th>
<th>Case 2 (2 cars plugged in to the charger)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /> 22kW (max)</td>
<td><img src="image2.png" alt="Image" /> 15kW* (max)</td>
</tr>
</tbody>
</table>

*50% of Pa
Post eVolve SMART; Features

- In terms of communication, either by its Ethernet port (by default) or 3G/GPRS modem (optional) the charger can be connected to a back-office system (by means of OCPP) obtaining benefits such as user management, billing, remote error diagnostic, etc.

**OCPP**
Open Charge Point Protocol

v1.6 during Q4/2017
(inc. Smart Charging capabilities)

- For the user:
  - Registration (permanent/one-time usage)
  - Payment
  - Portal (e.g. statistics)
  - Reservation of charging points
  - Etc.

- For the car park operator:
  - Public visibility
  - Reporting & statistics
  - Pricing parameters
  - Billing
  - Roaming
  - Etc.
Post eVolve SMART; Features

• Clear charging instructions and plug status are shown using a **backlight display**, increasing user satisfaction, especially useful when the charger has been previously reserved by another user.

![Diagram showing charging status and energy consumption](image-url)
Post eVolve SMART; Features

- Charge Point status can be **remotely monitored** using the software provided by Circontrol
Compatible with EV Report tool; user friendly software to centralize all the charge transactions that contains each charge point for a selected time interval. It allows quickly exported to CSV file format all the desired charge transactions. CSV files are an open source document file that easily can be opened by the most common spreadsheet software like MS Excel, Calc (LibreOffice)...
Post eVolve SMART; Features

- Compatible with DLM (Dynamic Load Management) System;
  See video next: [https://www.youtube.com/watch?v=bHmmzHXqeAM](https://www.youtube.com/watch?v=bHmmzHXqeAM)
Post eVolve; MASTER – SLAVE (concept idea)
Features; touch-screen & RFID (only in master)

- Multi-language (increased user experience)
- Charge point selection (reduced CapEx)
Post eVolve; MASTER – SLAVE (coming soon)

Features; **modem (only in master)**

- Slaves do not need modem (reduced CapEx & OpEx)
Post eVolve; MASTER – SLAVE (coming soon)

Features; **DLM Standard**

- Power distribution (reduced initial investment & OpEx)

- No extra hardware needed

- Power distribution amongst used charging points
Post eVolve; MASTER – SLAVE (coming soon)

Other considerations:

- 9 slaves for each master (TBC)
- Easy configuration via web
- Slaves offline mode when communication is lost with master

(estimated Q3/2018)
Post eVolve; MASTER – SLAVE (coming soon)

(master-slave system at Circontrol laboratory)