E-Mobility Charging Solutions

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The information contained herein reflects the opinion of the company at the time of writing. It was assembled on the basis of published standards, specialist industry presentations, specialist literature and in-house expertise. The content is for informational purposes only.

List of references
1) http://www.e-tankstellen-finder.com
2) http://www.bmw-i.at/de_at/bmw-i3/
Electric Charging Station - Introduction

The Arrival of Electromobility

The rapid advancement of electrical engine technologies and battery systems has given rise to a new generation of vehicles which are superior to their fossil-fuel powered counterparts both in terms of cost efficiency and road capability. Thanks to the elimination of local emissions combined with the extremely low Austrian carbon footprint in electrical power generation electric vehicles have become an ideal means of transport for inner-city traffic and for medium-distance trips to surrounding areas. With a significant number of charging stations available even a trip across Austria is easily doable now. Currently, in the mid-size car segment the range is around 300 km.

Electricity is the fuel of the future and electric vehicles are convincing in many ways: enhanced driving pleasure, less noise, highly efficient electric motors, which are low on maintenance and show minimal wear and tear. The expansion of renewable energy sources has caused the electricity costs to fall – another welcomed advantage.

This in turn raises the need, both in terms of demand and requirements, for a suitable and nationwide charging infrastructure. Although there are plenty of mains sockets in every household not all of them are suitable for charging the batteries of electric vehicles. Therefore, what we need are easy-to-use electric car charging stations well within range and with a nationwide coverage.

The Austrian regional building regulations already include this requirement. The regional building by-law of one of Austria’s largest federal provinces, Lower Austria, in its latest amendment (11. Novelle zur NÖ Bauordnung § 64 Abs. 3a) regulates that in public car parks with over 50 parking bays at least one in every 10 bays must be suitable for fitting it with electric car/motorcycle charging stations.

The Electric Charging Station

Car charging stations made by Schrack Technik Energie GmbH going by the brand name i-CHARGE (which stands for intelligent charging) pave the way for this climate-friendly mobility. They are the best solution for all electrically powered vehicles currently available (cars, motor scooters, bicycles) and designed to fit all locations:

- Public buildings, such as e.g. underground car parks, shopping centres, and airports
- Outdoors, e.g. at gas stations and service areas or in customer car parks
- Private applications in the garage, carport or for the private carport
- Sports and leisure facilities, such as hotels, public swimming pools, golf courses, and tennis courts

By pairing intuitive ease-of-use with an intelligent charging logic the i-CHARGE charging stations meet all the multiple demands while at the same time being convincingly user friendly.
Electric Charging Station - Introduction

Our car charging stations make charging your car fast, safe and hassle-free. With their remote maintenance capability and the possibility of software updates charging stations are future-proof already today.

In January 2017, there were roughly 2,585 electric car charging stations available in Austria. Their number is continually and deliberately increasing. The Austrian „Life Ministry“ offers consultancy and funding programmes. They support local governments, businesses, associations, and consumers planning to convert their vehicle fleet to electric cars. A new i-CHARGE charging station is your investment in the future and your guarantee for safe charging and optimised battery life.

Charging

To charge the vehicle battery, the alternating current (AC) from the power grid is converted to direct current (DC). The conversion is made by the charger, which is either built into the vehicle (on-board) or into the electric charging station. The control logic in the car (battery management system, BMS) monitors the charging process, checks the temperature of the power cells and adjusts the charging process to optimise charging time and battery life. Power is fed from special power sockets and charging cables, which not only transfer electricity but data as well.

Compared to e-cars, power supply requirements are less demanding in case of single-track vehicles, such as e-bikes or e-scooters. The batteries used there have less charging power due to their lower capacity. Therefore any socket suitable for outdoor installation can be used to charge those.

E-vehicles are chiefly charged while at home or at the office. Charging while you are at work considerably increases your vehicle’s range – roughly 80% of the population could use electric cars, estimating an average distance of 40-some kilometres covered per day. Thanks to DC quick charging stations, where inverter and charger are built into the charging station and can therefore be a lot more powerful, electric vehicles can be used for long-haul journeys: A recharge of up to 80% is possible in less than 20 minutes!

Charging Time

Charging times vary and depend on battery capacity, charger and mains feed. The average charging time of a 24 kWh battery is between 10 hours (Schuko socket in Mode 1 - see below for details on the charging modes) and about 1 hour (in Mode 3) to be fully charged when starting at charging level „empty“. DC rapid charging (Mode 4) can be completed within 20 minutes! The actual charging times are usually shorter, because the battery is hardly ever completely empty.

1 see references on page 2
2 see references on page 2
The Charging Process

The charging station is in stand-by mode if the green LED is on or the display shows that it is ready. The charging station identifies a plugged-in cable by means of an auxiliary contact in the charging socket or through communication with the vehicle. Now it is possible to use a key switch or a contactless card (RFID) to activate charging. If the station does not require activation, charging starts automatically. The battery management system (BMS) of the vehicle controls the charging process and ensures fast charging and optimised battery life. Charging ends when the plug is pulled, which leaves the socket reliably without mains voltage.

Charging Modes

The standard ÖVE/ÖNORM EN 61851 specifies the charging modes to be used for different combinations of socket and charging cable:

- **Schuko/CEE Socket (Mode 1 - 2)**

   Charging stations with a Schuko or CEE socket have an integrated auxiliary contact. This contact recognises a plugged-in plug and ensures safe switching on and off. A combined current breaker with residual current tripping (RCBO) protects the charging point. The electric vehicle is either connected directly (Mode 1) or with a special cable (called „in cable control box“, ICCB) (Mode 2).

- **TYPE 1 und TYPE 2 Sockets (Mode 3)**

   The manufacturers of vehicles and charging stations in the EU have agreed on the TYPE 2 charging plug system. TYPE 1 plugs are only used on the vehicle side, not on the charging station. TYPE 1 vehicles, such as Nissan Leaf or KIA Soul EV can also be charged from a TYPE 2 socket if an adaptor cable is used.
Electric Charging Station - Introduction

Therefore, a TYPE 2 socket is the TYPE of choice, especially if different TYPES of vehicles shall be charged. There may be exceptions where a charging station has to be fitted with a fixed charging cable. In these cases the choice has to be made between TYPE 1 or TYPE 2.

- CHAdeMO and CCS (Mode 4)

As opposed to the AC charging modes 1-3, the CHAdeMO and CCS mode feeds direct current from the charging station into the vehicle's battery. The charger is located inside the charging station. Therefore, the limitations regarding size or weight of a vehicle do not apply. The considerably higher charging power allows fast charging within approx. 20 minutes while preserving battery life as much as possible.

- Activation, Metering and Payment

i-CHARGE electric charging stations for use in public and semi-public areas can be equipped with different activation and payment systems. For activation it is possible to use either a key or an RFID card. Customers can pay using a coin slot, the Quick card or bank card function, or billing can be handled via OCPP (via the power utility company or a payment service provider). The i-CHARGE Grid Master stations can also be integrated into a parking garage system. Metering of the amount of electricity used for charging at the charging point is done by fitting them with an MID approved meter. It has to be noted that billing by electricity used (selling of electrical energy) is only allowed with a valid license for electricity trading. Alternatively, a time-based price may be used.

- Billing via OCPP

The standardised communication protocol, OCPP 1.5, allows to use products from different manufacturers within a shared charging network. The protocol authorises the charging cards of the clients and, after charging has finished, transfers so-called charging data records (CDR), which contain the charging time and electricity amount. The operator of the charging station can then invoice the charging to the customer. It is also possible for several operators to practice clearing, so that their clients can use the stations of other operators (roaming).
Charging Station Server and Payment Systems

The standardised protocol used between charging station and server allows to build a manufacturer independent, expandable and fully compatible charging network. The server solutions of several different manufacturers are compatible with the charging stations from Schrack Technik:

Online Billing via OCPP

- has.to.be GmbH (Salzburger Straße 20, 5550 Radstadt)
- NTT DATA Österreich GmbH (Handelskai 92, 1200 Vienna)
- ENIO GmbH (Geyschlägergasse 14, 1150 Vienna)
- … and several other OCPP compatible back-end providers

The online billing option is especially favourable for large charging networks. Invoicing, administration of the client database, status information and remote operation of charging stations are all managed through a convenient web portal of the software provider.

The web portal allows the definition of different user access rights. For example, the technician is allowed to see the status of charging stations, but not the client database. The back-office staff adds and updates customer data and launches invoicing, but is not allowed to change charging station configurations.

Offline Billing via EBE Charge Server

- EBE Mobility & Green Energy GmbH (Priebnitzgasse 16, 2340 Mödling)

If a transfer of payment data to a server is not desired or not possible, the client database and the entire payment process can be handled locally by the charging station. Still, the charging station can be configured and controlled via web interface that runs on the charging station’s control computer. It is also possible to control several charging stations from a charge server. The prerequisite to do so is a direct connection between the charging stations. Naturally, also the charge server supports the OCPP protocol and can be integrated into an online payment system on request.
Electric Charging Station - Products

**i-CHARGE Public 2**

The new charging unit i-CHARGE Public 2 presents the proven i-CHARGE Public charging unit in a new design. The body features an appealing rounded top, an illuminated RFID reader field and the flush charging sockets as the most readily recognisable modifications. Several other details have been improved and adjusted.

**Technical Data**
- New design with rounded top
- Flush, rain-proof charging points
- Illumination
- Covered door sealing
- Transparent RFID reader field with status display
- Larger cable inlet in the bottom for feed cables up to 5x95 mm²

**Optional Features**
- Colour and logos according to customer specifications
- Free selection of up to 2 or 4 charging points
- Load management to distribute power input
- Floor standing body W = 500, H = 1,700, D = 450 (in mm) with 4 charging points, transformer measurement field and meter board can be mounted inside of body
- Offline operation without billing, impact protection

---

**DESCRIPTION** | **CONNECTON** | **RATED OUTPUT** | **DIM. H x W x D** | **ORDER NO.**
--- | --- | --- | --- | ---
**i-Charge Public 2** | TYPE2, Schuko | 22; 3,7 kW | 1.320 x 250 x 180mm | EMPUB226
Design Offline | TYPE2, Schuko | 22; 3,7 kW | 1.320 x 250 x 180mm | EMPUB226O
Design Offline | 2x TYPE2 | 2x11 kW | 1.320 x 250 x 180mm | EMPUB227
Design Online | 2x TYPE2 | 2x11 kW | 1.320 x 250 x 180mm | EMPUB227O
Design Offline | 2x TYPE2 | 2x22 kW | 1.320 x 250 x 180mm | EMPUB229
Design Online | 2x TYPE2 | 2x22 kW | 1.320 x 250 x 180mm | EMPUB229O
Design Offline with load management | 2x TYPE2 | 2x22 kW | 1.320 x 250 x 180mm | EMPUB229B
Design 4 charging plugs | TYPE2; Schuko | 11; 22; 2x 3,7 kW | 1.320 x 360 x 280mm | EMPUB249
Design Offline | 2x TYPE2; Schuko | 11; 22; 2x 3,7 kW | 1.320 x 360 x 280mm | EMPUB249O
Design Offline | 2x TYPE2; Schuko | 2x 22; 2x 3,7 kW | 1.320 x 360 x 280mm | EMPUB2414
Design Online | 2x TYPE2; Schuko | 2x 22; 2x 3,7 kW | 1.320 x 360 x 280mm | EMPUB2414O
Electric Charging Station - Products

### i-CHARGE Public

i-CHARGE Public charging units are custom designed for public and semi-public areas. Depending on customer requirements, they can be equipped with different activation, authentication and payment systems (RFID, key switch). Billing can also be handled using the charging point server of the power utility company.

#### Technical Data
- Charging points: 1x TYPE 2 11 kW or 22 kW, 1x Schuko
- All-current sensitive RCCB
- Residual current protection per charging point
- Ready/Charging indication with LEDs
- Body: powder-coated stainless steel
- Dimensions: W = 200, H = 1,300, D = 150 (in mm)
- Degree of protection: IP 44, IK 07

#### Technical Data - Online
- MID approved meters
- Identification: RFID/NFC contactless card
- Payment system: OCPP 1.5
- Data transfer: GSM

#### Optional Features
- Colour and logos according to customer specifications
- Free selection of up to 3 charging points
- Load management to distribute power input
- Larger body W = 400, H = 1,300, D = 150 (in mm) and up to 4 charging points max.
- Meter board can be mounted inside of body
- Charging points can be mounted on the side
- Offline operation without billing, impact protection

### Technical Data Table

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
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<tr>
<td>Offline</td>
<td>TYPE2, Schuko</td>
<td>11 kW, 3.7 kW</td>
<td>1,300 x 200 x 150mm</td>
<td>EMPUB023</td>
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<td>Online OCPP</td>
<td>TYPE2, Schuko</td>
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<td>1,300 x 200 x 150mm</td>
<td>EMPUB023O</td>
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<tr>
<td>Offline</td>
<td>TYPE2, Schuko</td>
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<td>1,300 x 200 x 150mm</td>
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<td>2x 11 kW</td>
<td>1,300 x 200 x 150mm</td>
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<td>2x 11 kW</td>
<td>1,300 x 200 x 150mm</td>
<td>EMPUB027O</td>
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<tr>
<td>Offline with load management</td>
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<td>2x 22 kW</td>
<td>1,300 x 200 x 150mm</td>
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<tr>
<td>Offline</td>
<td>2x TYPE2</td>
<td>2x 22 kW</td>
<td>1,300 x 400 x 150mm</td>
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<td>Offline</td>
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<td>1,300 x 400 x 150mm</td>
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<td>2x TYPE2; Schuko</td>
<td>2x 22; 2x 3.7 kW</td>
<td>1,300 x 400 x 150mm</td>
<td>EMPUB1414</td>
</tr>
</tbody>
</table>
Electric Charging Station - Products

**i-CHARGE Public Wall**

The i-CHARGE Public Wall charging station is particularly well suited for use in private garages. Customers have free choice of charging points, ranging from Schuko to TYPE 2, including CEE sockets and others. The charging station can be fitted with authentication and identification systems on request. The cost-efficient option for private use are key switches, whereas RFID card readers and OCPP connection are recommended for public areas to prevent unauthorised use.

**Technical Data**
- 1, 2 or 4 charging points
- Ready/Charging indication with LEDs
- Rugged powder-coated sheet steel body
- Wall mounting
- Dimensions depending on number of charging points -
  - 1 charging point: W = 250, H = 300, D = 210 (in mm)
  - 2 charging points: W = 400, H = 500, D = 210 (in mm)
  - 4 charging points: W = 600, H = 600, D = 210 (in mm)
- Use: outdoor / indoor IP 44

**Optional Features**
- Colour and logos according to customer specifications
- Available charging points, positions freely selectable: Schuko, CEE, TYPE 2, up to 22 kW per charging point
- Fix mounted charging cable TYPE 1, TYPE 2
- Stainless steel body
- Custom dimensions available on request
- Meter (S0 or M BUS interface)
- Timer
- Charging starts/stops via - key switch / key button - RFID (contactless access card) - coin slot
- Billing via OCPP 1.5
- Load management
- Integration of an existing cylinder locking mechanism possible

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
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<tr>
<td>2 points</td>
<td>TYPE 2; Schuko</td>
<td>11 kW; 3,7 kW</td>
<td>500 x 400 x 210mm</td>
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<td>4 points</td>
<td>2x TYPE 2; 2x Schuko</td>
<td>2x 11 kW; 2x 3,7 kW</td>
<td>600 x 600 x 210mm</td>
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</table>
Electric Charging Station - Products

**i-CHARGE Mini Online**

A location with a single charging point should be connected to a payment system, but the available room is insufficient for a floor standing charging unit? i-CHARGE Mini Online offers a TYPE 2 charging point with either 11 kW or 22 kW in a compact body. The charging station needs no special circuit breakers in the feed line, because it features an integrated DC residual-current detection device.

**Technical Data**

- 1 charging point TYPE 2 11 kW or 22 kW
- Integrated residual current monitoring unit (RCMU)
- Integrated modem and OCPP 1.5 billing module
- Ready/Charging indication with LEDs
- Wall-mounted body made of die-cast aluminium
- Dimensions: W = 230, H = 400, D = 110 (in mm)
- Degree of protection: IP 44

**Optional Features**

- Colour and logos according to customer specifications
- Stainless steel body
- MID approved meter
- Charging starts/stops via RFID

### Technical Data

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
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<td>max. 22 kW</td>
<td>400 x 230 x 110 mm</td>
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</table>

### i-CHARGE Charging Cables

Several available adaptor cables and replacement cables allow connecting a TYPE 1 vehicle with a TYPE 2 socket. Refitting and retrofitting of different charging stations and replacements are available if a charging cable is damaged.

<table>
<thead>
<tr>
<th>VEHICLE-SIDE PLUG TYPE</th>
<th>INFRASTRUCTURE TYPE</th>
<th>RATED CURRENT</th>
<th>LENGTH</th>
<th>ORDER NO.</th>
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<td>Charging cable TYPE 1</td>
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<td>20 A 1 phase</td>
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<td>20 A 3 phase</td>
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<td>32 A 3 phase</td>
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<td>EMKHA02</td>
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</table>
Electric Charging Station - Products

i-CHARGE Home Eco

Our Wallbox i-CHARGE Home Eco made of stainless steel is especially remarkable for its size: It is the smallest 22 kW wallbox with TYPE B RCCB on the market. The comfortable operation is further facilitated by three large operating lights which show the current operating state. Optionally, it is possible to include a key switch and there are several ways to integrate the i-CHARGE Home Eco into an existing control system by means of a potential-free switching contact, a network interface or a 0-10 V interface.

Technical Data
- Charging power: 4.6 kW / 11 kW / 22 kW
- Dimensions (L x W x H): 325 x 130 x 150 mm
- Weight: approx. 4 - 5 kg (depends on version)
- Body: powder-coated stainless steel RAL 9016 traffic white
- Charging controller according to EN 61851-1
- Charging current can be set in the steps 6 A, 10 A, 13 A, 16 A, 20 A and 32 A
- Control port for potential-free switching contact
- Degree of protection: IP 44

Optional Features
- All-current sensitive Type B RCD (EMHOM41xB)
- Residual current monitoring unit (RCMU)
- Body colour and printing according to customer specifications (RAL color or stainless steel uncoated)
- Adaptor cable TYPE 1 available
- Available with CEE connection for self-installation
- 0-10 V interface (PV control)
- Ethernet interface on the outside
- Handle made of brushed aluminium

We offer customised branding

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
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<tbody>
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<td>4.6 kW</td>
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<td>TYPE 2</td>
<td>11 kW</td>
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<td>325 x 130 x 150 mm</td>
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</tr>
</tbody>
</table>

We offer customised branding
**i-CHARGE Home**

The i-CHARGE Home charging stations make fast and safe charging at your own private parking space a reality. They are designed for use indoor and outside. Two LEDs display the operating state. Thanks to the compact build mounting takes less space. Another convenient feature is the included charging cable, which saves the effort to dig out the vehicle’s charging cable. Simply park - plug in - charge!

The built-in charging controller of the charging station controls and monitors the charging process in concordance with the EN 61851-1 standard and allows 1- or 3-phase charging of all currently available e-vehicles at up to 32 A.

**Technical Data**
- Rugged plastic housing
- W = 200, H = 200, D = 115 (in mm)
- Use: indoor / outdoor
- Degree of protection: IP 65
- Installation: wall mounting or mobile use
- Charging point: 1 of TYPE 1 or TYPE 2 230 V / up to 20 A
- Charging power 4.6 kW
- Charging time for 20 kWh battery less than 5 h

**Optional Features**
- Higher charging power up to 22 kW
- W = 320, H = 258, D = 142 (in mm)
- Charging point: TYPE 1 230 V up to 32 A / TYPE 2 400 V / up to 32 A
- Charging time for 20 kWh battery approx. 1 h
- RFID card reader

---

**DESCRIPTION** | **CONNECTION** | **RATED OUTPUT** | **DIM. H x W x D** | **ORDER NO.**
--- | --- | --- | --- | ---
**i-CHARGE Home** |  |  |  |
TYPE 1 4.6 kW | TYPE 1 | 4.6 kW | 200 x 200 x 115 mm | EMHOM1211
TYPE 1 7.4 kW | TYPE 1 | 7.4 kW | 200 x 200 x 115 mm | EMHOM1311*
TYPE 2 4.6 kW | TYPE 2 | 4.6 kW | 200 x 200 x 115 mm | EMHOM1212
TYPE 2 7.4 kW | TYPE 2 | 7.4 kW | 200 x 200 x 115 mm | EMHOM1312*
TYPE 2 11 kW | TYPE 2 | 11 kW | 258 x 320 x 142 mm | EMHOM2232P
TYPE 2 22 kW | TYPE 2 | 22 kW | 258 x 320 x 142 mm | EMHOM2363P

* only available on request and after technical feasibility has been confirmed
Electric Charging Station - Products

**i-CHARGE PV**

For those who own electric vehicles and a photovoltaic system Schrack Technik Energie offers an innovative solution to charge the electric vehicle with the power of the sun. Optimise your consumption with i-CHARGE Home PV!

The series i-CHARGE Public and i-CHARGE Home charging stations can be optionally (retro-)fitted with the i-CHARGE PV charging controller. It allows to integrate the charging station with the energy management system (EMS). The EMS determines the current surplus and communicates the surplus power to the i-CHARGE PV charging controller. The electric car receives precisely the charging power that reduces the surplus to zero!

Even while charging is in progress the priority of the charging station can be changed in favour of surplus optimisation. To do so, there are three charging modes available:

- **ECO+:** Charging starts only if no electricity will be drawn from the grid,
- **ECO:** Charging is always done with minimal power, the consumption is reduced to zero,
- **FAST:** The vehicle is charged as quickly as possible, regardless of the available power.

**Technical Data**

- Connection points: S0 bus and 0-10 V interface.
- Switch to select the charging mode.
- Compatible with Schrack Energyguard consumption optimisation module.
- Setting range: 1.4 kW – 3.7 kW one-phase;
  4 kW – 22 kW three-phase

**Description**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE PV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV controller module</td>
<td>0-10 V, S0 bus</td>
<td>up to 22 kW charging power</td>
<td></td>
<td>EMCPV010</td>
</tr>
<tr>
<td>Energy management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EnergyGuard Light</td>
<td>0-10 V</td>
<td>up to 15 kW charging power</td>
<td>110 x 105 x 62mm</td>
<td>PVC00001</td>
</tr>
<tr>
<td>EnergyGuard Pro</td>
<td>0-10 V</td>
<td>up to 50 kW charging power</td>
<td>110 x 105 x 62mm</td>
<td>PVC00002</td>
</tr>
</tbody>
</table>

EMCPV010 Control Curve

EMCPV010 Block Diagram
Electric Charging Station - Products

**i-CHARGE Intelligent Charging**

### i-CHARGE LLEM: Local Load and Energy Management for Multiple Charging Points

Systems with multiple charging points may overwhelm mains power supply if load management is not used. The solution is i-CHARGE LLEM: as soon as more vehicles are connected the charging power will be reduced to a previously set maximum load. The load can be defined dynamically to balance peaks of other loads or the infeed of a PV system. i-CHARGE LLEM is suitable for systems with up to 6 charging points.

### i-CHARGE LLB: Local Load Balancing for 2 Charging Points

If at any one location two charging points are to be installed, but the total power exceeds the mains feed, LLB is the ideal solution. One active charging point will receive the full load, but as soon as both points are used to charge the total power will be reduced. LLB even differentiates between 1-phase and 3-phase charging and optimises the charging feeds. The resulting time savings are up to 50%! Available for i-CHARGE Public and Public Wall.

### i-CHARGE RFID local: User Authorisation without Payment

A local RFID system can be used to restrict the use of the charging station to a limited group of users. The reader recognises the common MIFARE RFID cards and can store up to 75 users. New users are added with the included Master-Teach card. Available for i-CHARGE Public, Public Wall, Home and Home Eco.

---

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE LLEM</td>
<td>0-10 V/50 bus</td>
<td>max. 100 kW</td>
<td>6 charging points</td>
<td>EMCEBELLEM</td>
</tr>
<tr>
<td>i-CHARGE LLB</td>
<td>Offline with load management</td>
<td>2x 22 kW</td>
<td>1.320 x 200 x 150mm</td>
<td>EMPLUB029B</td>
</tr>
<tr>
<td>i-CHARGE RFID local</td>
<td>RFID reader</td>
<td>20 x 110 x 70mm</td>
<td>EMCEBER</td>
<td></td>
</tr>
<tr>
<td>RFID card</td>
<td>RF 85 x 1 55mm</td>
<td>EMCRFIDC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NRGkick Mobile Charger

The NRGkick adaptor cable from CEE to TYPE 2 offers a power of up to 22 kW and includes all required safety components to charge quickly and safely from any existing 3-phase wall socket. The maximum charging current can be set and reduced to the capacity of the socket used.

The free app (iOS and Android) and the Bluetooth LE connection can be used to comfortably monitor and control the charging process. To prevent theft or an unauthorised modification of settings NRGkick includes several security precautions. As soon as charging is initialised all settings are locked and the vehicle lock can only be opened by the owner.

Technical Data
- Charging point: TYPE 2
- Charging mode: Mode 2 according to EN 61851
- Charging power: 400 V 32 A, 22 kW max.
- Integrated AC and DC residual current protection
- Charging current switching at the push of a button
- Bluetooth Low Energy and energy meter (except EMNK532L/S516L)
- Device dimensions (LxWxH): 215 x 90 x 84 mm
- Cable length: 5 m or 7.5 m
- Weight: 4 kg
- Degree of protection: IP 66

Optional Features
- Adaptor cable separate or included in the set
- Maximum charging power 11 kW (16 A)
- Mobile charging solutions for TYPE 1 available on request
i-CHARGE Triberium Fast Charger

Especially for highly frequented locations and alongside major roads; the i-CHARGE Triberium Fast Charger quickly recharges electric vehicles. A charging power of up to 60 kW allows a quick charge up to 80% battery capacity within 20 minutes. Vehicles of all three charging standards – CCS, CHAdeMO and Type 2 – can be charged in the shortest possible time. The charger has a 9” (23 cm) diagonal touch screen which serves as the user interface. A clearly organised menu guides the user through the charging process.

Equipment

The charging station supports all common charging types: Type2 (AC), CHAdeMO (DC) and CCS (DC). It is possible to use DC and AC sockets for charging simultaneously. i-CHARGE Triberium can locally store a list of all authorised users.

Technical Data

- Dimensions (W x H x D): 835 x 1900 x 550 mm
- Connection data: 400 V AC, 3x 32 A – 3x 150 A
- Output voltage: 850 V C max.
- Operating temperature: -30°C to +50°C
- Relative humidity: 5% to 95%
- Body: stainless steel/powder-coated aluminium
- EN 61851 Mode 3 (Type2)
- and Mode 4 (CCS, CHAdeMO)
- Authorisation: RFID card reader
- Network connection: GSM/GPRS/3G/LTE
- Charging unit protocol: OCPP 1.5 (upgradable to OCPP 2.0)

Charging Sockets and Available Capacity Levels

<table>
<thead>
<tr>
<th>DC CHAdeMO</th>
<th>DC CCS/COMBO TYPE 2</th>
<th>AC TYPE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 kW</td>
<td>30 kW</td>
<td>11 kW</td>
</tr>
<tr>
<td>Standard 60 kW</td>
<td>60 kW</td>
<td>22 kW</td>
</tr>
<tr>
<td>120 kW</td>
<td>120 kW</td>
<td>43 kW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE Triberium</td>
<td>CHAdeMO, CCS, TYPE 2</td>
<td>max. 80 kVA</td>
<td>1900 x 835 x 550 mm</td>
<td>EMDCT552</td>
</tr>
<tr>
<td>50 kW DC, 22 kW AC</td>
<td>CHAdeMO, CCS, TYPE 2</td>
<td>max. 100 kVA</td>
<td>1900 x 835 x 550 mm</td>
<td>EMDCT554</td>
</tr>
<tr>
<td>120 kW DC, 43 kW AC</td>
<td>CHAdeMO, CCS, TYPE 2</td>
<td>max. 180 kVA</td>
<td>1900 x 835 x 550 mm</td>
<td>EMDCT120</td>
</tr>
<tr>
<td>DC Wallbox</td>
<td>CHAdeMO</td>
<td>max. 22 kVA</td>
<td>900 x 600 x 300 mm</td>
<td>EMDCM020</td>
</tr>
<tr>
<td>20 kW DC Wallbox CCS</td>
<td>CCS</td>
<td>max. 22 kVA</td>
<td>900 x 600 x 300 mm</td>
<td>EMDCS020</td>
</tr>
</tbody>
</table>
Electric Charging Station - Products

/** i-CHARGE Bike **/

/** i-CHARGE Easy Pack **/

The i-CHARGE Easy Pack safely stores charger and battery during charging. Putting in a 1€ coin locks the box.

/** Technical Data **/

- Aluminium body, IP 22, W = 500, H = 540, D = 200 (in mm)
- Installation: wall mounting
- Charging points: 2 Schuko 230 V / 16 A
- Coin deposit lock
- Optionally 4 charging points
- Optionally with coin collection box. When the case is opened the coin is collected.

/** i-CHARGE Bike Solar **/

Ride your bike with solar power. This all-in-one solution combines electromobility with a renewable energy source. The site must be prepared with a foundation, foundation earth electrodes and/or an integrated lightning protection.

/** Technical Data **/

- Grid infeeding PV system approx. 1 kWp (4 x 255 Wp)
- Power inverter unit SMA Sunnyboy 1200
- 6 charging points (Schuko socket 230 V / 16 A)
- 6 integrated bicycle stands
- Schrack Outdoor information display
- Static load and type tested (snow load zone 3)
- Optional features: wind break, LED illumination, Easy-Pack system

---

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CONNECTION</th>
<th>RATED OUTPUT</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE Bike</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy Pack 2 units</td>
<td>2x Schuko</td>
<td>max. 3,7 kW</td>
<td>540x500x200mm</td>
<td>EMEPS020</td>
</tr>
<tr>
<td>Easy Pack 4 units</td>
<td>4x Schuko</td>
<td>max. 3,7 kW</td>
<td>540x1000x200mm</td>
<td>EMEPS040</td>
</tr>
<tr>
<td>Public 6 units</td>
<td>6x Schuko</td>
<td>max. 6x3,7 kW</td>
<td>1300x200x150mm</td>
<td>EMPPUB066</td>
</tr>
<tr>
<td>Bike Solar</td>
<td>6x Schuko</td>
<td>max. 3,7 kW</td>
<td></td>
<td>On request</td>
</tr>
</tbody>
</table>

---
i-CHARGE Accessories

i-CHARGE Impact Protection

The matching impact protection safeguards your charging station against careless drivers. The bright colouration prevents accidents. The impact protection bars are made of galvanised steel tube of 3 mm or stainless steel tube of 2 mm strength, which prevents corrosion and renders them extremely durable. They are mounted with drive plugs.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
<th>COLOUR</th>
<th>DIM. H x W x D</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE impact protection</td>
<td>Bar for Public 200</td>
<td>Galvanised steel tube</td>
<td>Yellow</td>
<td>350 x 375 x 76mm</td>
</tr>
<tr>
<td></td>
<td>Bar for Public 400</td>
<td>Galvanised steel tube</td>
<td>Yellow/black</td>
<td>350 x 750 x 76mm</td>
</tr>
<tr>
<td></td>
<td>Bollard</td>
<td>Stainless steel</td>
<td>Uncoated</td>
<td>H 900 x 76mm</td>
</tr>
</tbody>
</table>

i-CHARGE Tester TYPE 2

Schrack Technik provides different test plugs for the testing of existing charging infrastructure. They simulate an electric vehicle being connected, which makes it possible to test whether the charging station functions correctly. The first item is a simple test plug to test the functioning (communication according to EN 61851, charging voltage available) and the connection of the test load, the second is an analyser that measures the voltage, includes a rotary field indicator and offers the possibility to simulate the different operating states of the vehicle.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>RATED OUTPUT</th>
<th>ORDER NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-CHARGE Tester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Schuko coupling</td>
<td></td>
<td>EMTEST201</td>
</tr>
<tr>
<td>With Schuko coupling</td>
<td>max. 3,7 kW</td>
<td>EMTEST211</td>
</tr>
<tr>
<td>With voltage measurement and rotary field indicator</td>
<td>-</td>
<td>EMTEST153</td>
</tr>
</tbody>
</table>
Electric Charging Station - References

Hauptbahnhof Wien Main Railway Station

Since October 2014, three public car parks in the vicinity of Vienna’s new infrastructure hub offer to a total of 25 drivers of electric cars the comfortable possibility to park and ride on public transports while their car gets fully charged, ready to drive when they return.

TIWAG and IKB, Tyrol

Driving downhill in the mountainous Tyrol landscape, electric vehicles can recycle energy instead of wasting it in the form of excess heat while braking. We were able to win the power utility companies TIWAG and IKB as customers and installed charging units with integrated transformer measurement of the Type i-CHARGE Public 2 in Tyrol.

Siebenhirten Park and Ride, Vienna

Eco-aware commuters can still enjoy private mobility. Since June 2012 you can charge your electric vehicle at either 2 Type 2, 3 Schuko or 2 CEE charging points in the Siebenhirten Park and Ride car park on the outskirts of Vienna.

Wien Energie, Vienna Airport

On the Schwechat Vienna Airport car park an i-CHARGE Triberium fast charger is installed, ideal for quick charging on your way from Bratislava to Vienna or for E-Taxis. The charging bays were equipped with a roof and well lit. Parking for cars using conventional fuel is prohibited.
**SPAR, Vienna and Surroundings**

Charge your electric car while you shop! Schrack Technik has equipped several Spar markets in Vienna and its surrounding areas with charging stations for two electric vehicles each. They use the proven combination of Type 2 and Schuko. The parking spaces are reserved exclusively for customers with electric vehicles!

**EVN, Grafenegg Castle**

Since autumn 2015 concert visitors or those visiting the Grafenegg Advent Market are welcome to arrive in e-vehicles. The two i-CHARGE Public 2 charging stations, operated by EVN, allow 8 vehicles to simultaneously charge eco-friendly power!

**Energie Burgenland, Eisenstadt**

The head office of the Energie Burgenland power utility company is located in Eisenstadt, the training centre in Oberpullendorf. The electric company cars could not cover the distance to and back – but now there are i-CHARGE Triberium fast chargers installed on both locations. A clean solution!

**Energy Base Giefinggasse, Vienna**

Owners of electric bicycles appreciate the 6 charging points in front of the building of the University of Applied Sciences Vienna as a means to fully charge the battery until they ride off again. Combined with the rugged bicycle racks - a secure solution!
Electric Charging Station - Compatibility

**Compatibility List**

This list shows you which charging station is best suited for the charging plug of your car. Many vehicles are available in different versions. Therefore, please consult the vehicle’s documentation before you choose your charging station:

1. Some vehicles do not support 3-phase charging, which reduces the charging power to one third. The suggestion, however, considers a later purchase of more powerful electric vehicles and the suitable charging station.

2. With an adaptor cable (art. no. EMK121MFF2) it is also possible to charge vehicles with TYPE 1 connection on charging stations with TYPE 2 sockets.

   ← If the power input at the planned installation site is insufficient for the maximum charging power, a station with lower power can be used.

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Vehicle Connection</th>
<th>TYPE 1</th>
<th>TYPE 2</th>
<th>TYPE 2</th>
<th>TYPE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power Input</td>
<td>1ph 3,7 kW</td>
<td>1ph 3,7 kW</td>
<td>3ph 11 kW</td>
<td>3ph 22 kW</td>
</tr>
<tr>
<td>i-Charge Home</td>
<td>3,7 kW 230V/16A</td>
<td>EMHOM1211</td>
<td>EMHOM1212</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>11 kW 400V/16A</td>
<td>-</td>
<td>EMHOM2232P</td>
<td>EMHOM2232P</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>22 kW 400V/32A</td>
<td>←</td>
<td>EMHOM2363P</td>
<td>EMHOM2363P</td>
<td>EMHOM2363P</td>
</tr>
<tr>
<td>i-Charge Home Eco</td>
<td>3,7 kW 230V/16A</td>
<td>EMHOM411</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>11 kW 400V/16A</td>
<td>EMHOM413B</td>
<td>EMHOM413B</td>
<td>EMHOM413B</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>22 kW 400V/32A</td>
<td>EMHOM416B</td>
<td>EMHOM416B</td>
<td>EMHOM416B</td>
<td>EMHOM416B</td>
</tr>
<tr>
<td>i-Charge Public</td>
<td>11 kW 400V/16A</td>
<td>EMPUB023</td>
<td>EMPUB023</td>
<td>EMPUB023</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>22 kW 400V/32A</td>
<td>EMPUB026</td>
<td>EMPUB026</td>
<td>EMPUB026</td>
<td>EMPUB026 EMPUB029B</td>
</tr>
<tr>
<td>Mobile Charging</td>
<td>3,7 kW 230V/16A</td>
<td>CC100A*</td>
<td>EMNK516</td>
<td>EMNK516</td>
<td>EMNK532</td>
</tr>
<tr>
<td>Station</td>
<td>11 kW 400V/16A</td>
<td>-</td>
<td>EMNK516</td>
<td>EMNK516</td>
<td>EMNK532</td>
</tr>
<tr>
<td></td>
<td>22 kW 400V/32A</td>
<td>-</td>
<td>EMNK532</td>
<td>EMNK532</td>
<td>EMNK532</td>
</tr>
</tbody>
</table>

* CC100A replacement emergency charging cable available on request
Request

Company / Name: .......................................................... Contact Person: ..........................................................

Address: ...................................................................... Schrack Customer Number: .............................................

Postcode / City: .......................................................... Phone / Email: ..........................................................

TYPE: □ floor standing □ wallbox □ mobile charging station

Charging sockets - directly at the station:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Schuko 3,7 kW</th>
<th>TYPE 2 1-phase 3,7 kW</th>
<th>TYPE 2 3-phase 11 kW</th>
<th>TYPE 2 3-phase 22 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Charging cables - directly at the station:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TYPE 1 1-phase 3,7 kW</th>
<th>TYPE 2 1-phase 3,7 kW</th>
<th>TYPE 2 3-phase 11 kW</th>
<th>TYPE 2 3-phase 22 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activation: □ always active □ key □ half-cylinder (customer prov.) □ local RFID incl. _____ pcs. RFID cards □ online (OCPP) □ per charging point

Meter: □ without □ central □ per charging point

Protection: □ customer provided □ integrated MCB/RCCB

El. Connection: □ terminals □ Cu / □ Al _____ mm² □ ____________________________

Optional Features: □ emergency unlocking □ cable wall holder □ 0-10 V interface (PV control)

Notes
Contact Details
Schrack Technik Energie GmbH
Seybelgasse 13, 1230 Vienna, Austria
PHONE +43(0)1/866 85-5058
FAX +43(0)1/866 85-98888
E-MAIL energie@schrack.com
www.i-charge.at

Ing. Markus Essbüchl, MSc
Project Coordinator E-Mobility
PHONE +43 1 86685 5737
MOBIL +43 699 181 797 84
m.essbuechl@schrack.at

DI Christian Martin
Project Management E-Mobility
PHONE +43 1 86685 5738
MOBIL +43 699 181 977 94
c.martin@schrack.com

DI Christian Hofstadler
Development & Programming E-Mobility
PHONE +43 1 86685-0
MOBIL +43 699 175 226 22
c.hofstadler@schrack.com

René Mayer
Project Engineer E-Mobility
PHONE +43 1 86685 5727
MOBIL +43 699 107 294 53
r.mayer@schrack.com

Marco Peter
Project Engineer E-Mobility
PHONE +43 1 86685 5840
MOBIL +43 699 18668558
marco.peter@schrack.com