SIPLUS ECC

Charging controllers for Electric Vehicle
AC-charging infrastructure
SIPLUS ECC

- **Motivation**
- Overview
- Portfolio
- Positioning
- Application examples
- Customer benefits
- Support/Sales Tools

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Electromobility
Incentives and challenges

"Clean, quiet and efficient – tomorrow's mobility"

Why electric?
- No (local) emissions (CO₂, pollution, noise)
- Fossil-based fuels are limited
- Lower operating/maintenance costs
- Better energy efficiency (efficiency range of 20%→50%)
- Optimum use of renewable energy sources

What are the challenges?
- Legal framework (incentives for changeover)
- Costs (battery)
- Charging infrastructure (standardization)

Charging infrastructure is an important factor for electric mobility
SIPLUS ECC

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### Charging systems and application areas

#### Overview

<table>
<thead>
<tr>
<th>Location</th>
<th>At home / private</th>
<th>Semi-public</th>
<th>Public</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electric vehicle owners charge vehicles at home</td>
<td>Restricted access; operated by private companies</td>
<td>Electric vehicle owners charge in public areas</td>
</tr>
<tr>
<td></td>
<td>Charge mainly from wall boxes</td>
<td>Charge mainly from wall boxes and charging stations</td>
<td>Charge mainly from charging stations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario</th>
<th></th>
<th>Larger restricted user group (e.g. employees)</th>
<th>In general, anyone can use the charging station (national or international)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An extremely restricted group of persons has access to the system</td>
<td>Identification/payment using ID card, batch or tags</td>
<td>Identification/payment using cash, credit card, mobile phone, roaming</td>
</tr>
<tr>
<td></td>
<td>No identification / payment required, or using a key/code</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customers</th>
<th>Private users</th>
<th>Gas stations</th>
<th>Municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real Estates</td>
<td>Companies</td>
<td>Service providers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hotels</td>
<td>Energy providers/ electricity suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fleet operators</td>
<td></td>
</tr>
</tbody>
</table>
Charging systems and application areas
Overview of charging systems

AC charging

Onboard charger

Li ion battery

DC charging

DC
Charging systems and application areas
Plug types for AC charging (IEC worldwide)

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>COMBO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="American standard" /></td>
<td><img src="image2" alt="European standard" /></td>
<td><img src="image3" alt="European standard" /></td>
</tr>
<tr>
<td>AC charging (single-phase)</td>
<td>AC charging (single/thREE-phase)</td>
<td>AC charging (single-phase)</td>
</tr>
<tr>
<td>SAE-J1772 / IEC 62196-2</td>
<td>IEC 62196-2</td>
<td>IEC 62196-3</td>
</tr>
<tr>
<td>The first electric vehicles (EV) have these charging sockets</td>
<td>&quot;Mennekes plug&quot; with locking</td>
<td>Only one connection type required for both AC and DC charging</td>
</tr>
</tbody>
</table>
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Components and charging systems for electric vehicles: SIPLUS ECC

EV-specific components
SIPLUS ECC for AC charging systems
EV = Electric Vehicle

Standard components of
SIRIUS
SENTRON
SITOP
SIMATIC
SIPLUS extreme

SIPLUS ECC charging controllers supplement Siemens standard products

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Industry Sector
SIPLUS ECC charging controllers are used for

- Controlling and monitoring switching and protection components
- Communication with the electric vehicle in accordance with IEC 61851, charging mode 3
- Communication with a higher-level control system
  - Ethernet (CM-230)
SIPLUS ECC
Product portfolio

SIPLUS ECC CM-100
Compact
- Simple applications
- Stand-alone operation
- Low-cost

SIPLUS ECC CM-230
Modular
- More complex applications
- Communication functions
- Stand-alone / managed operation

SIPLUS ECC
Functional units
Pre-assembled
- Customer-specific applications
- Tested and ready-to-use

Home charging

Public charging

Integration in OEM solution

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Industry Sector
**SIPLUS ECC CM-230**
Parameterization/Diagnostics/Visualization

### SIPLUS ECC CM-230
Parameterization/diagnostics/visualization via the Web browser

### SIMATIC STEP 7 / PC
Data from charging controller
Settings for individual charging controllers and charging outlets
Management of “n” charging outlets by a higher-level control system

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**Customer benefits:**

- Easy local and remote operation via Web browser
- Variable charging current limit (Load management)
- Remote firmware updates possible
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Charging systems and application areas
Where are SIPLUS ECC components used?

SIPLUS ECC is suitable for various AC charging systems

AC wall boxes
AC charging stations/satellite systems
Control system/operation center

Private charging
Fleet/(semi-)public charging

SIPLUS ECC CM-100
SIPLUS ECC CM-230

(Load management 6 … 80 A)
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## Application examples

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<table>
<thead>
<tr>
<th>Home charging</th>
<th>Fleet/(semi-)public charging</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Home charging" /></td>
<td><img src="image2" alt="Fleet/(semi-)public charging" /></td>
</tr>
</tbody>
</table>

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Home charging application with 1 charging outlet: SIPLUS ECC CM-100
Home charging application with 1 charging outlet: SIPLUS ECC CM-230 with diagnostics and load management
(Semi-)public charging application with 2… n charging outlets: SIPLUS ECC CM-230 with load management, GSM and HMI
Public charging application with 2 ... n charging outlets
SIPLUS ECC CM-230 with load management, HMI, energy metering and overvoltage protection
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# SIPLUS ECC CM-100 Customer benefits

<table>
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<tr>
<th>SIPLUS ECC CM-100</th>
<th>Customer benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging according to IEC 61851, charging mode 3</td>
<td>Safe, standard-compliant charging - worldwide</td>
</tr>
<tr>
<td>Also available as 230 V variant</td>
<td>Costs for an additional 24 V DC power supply can be avoided</td>
</tr>
<tr>
<td>Available as variant with automatic switchover between</td>
<td>High degree of flexibility, because different cars can be</td>
</tr>
<tr>
<td>charging currents 13 A and 32 A</td>
<td>charged with same infrastructure</td>
</tr>
<tr>
<td>Design: removable screw-type terminals, ambient</td>
<td>Quick and reliable wiring / easy maintenance, use in</td>
</tr>
<tr>
<td>temperature: -25º to +60º C</td>
<td>harsh ambient conditions</td>
</tr>
<tr>
<td>Optimum interaction with Siemens low-voltage switchgear and controlgear</td>
<td>Reliable operation over the entire system lifetime</td>
</tr>
<tr>
<td>Worldwide service and support (&gt; 190 countries)</td>
<td>Ideal product for international projects</td>
</tr>
</tbody>
</table>
## SIPLUS ECC CM-230 Customer benefits

<table>
<thead>
<tr>
<th>SIPLUS ECC CM-230</th>
<th>Customer benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging according to IEC 61851, charging mode 3</td>
<td>Safe, standard-compliant charging - worldwide</td>
</tr>
<tr>
<td>Connection to control systems via TCP/IP</td>
<td>Standard protocol supports easy connection to SIMATIC S7 / PC / higher level control systems</td>
</tr>
<tr>
<td>Dynamic load management (6 ... 80 A), i.e. charging current control during operation</td>
<td>Management of connected loads, internal consumption with photovoltaic systems, etc.</td>
</tr>
<tr>
<td>Configuration, visualization via Web interface</td>
<td>Easy handling in local and remote mode, e.g. for firmware updates</td>
</tr>
<tr>
<td>RS232 interface and freely assignable digital I/Os</td>
<td>Customized functionality without the need for add-on modules, e.g. direct connection of a display</td>
</tr>
<tr>
<td>Remote counter reading over Ethernet, integrated temperature/humidity sensors</td>
<td>Minimal system costs, no further components required</td>
</tr>
<tr>
<td>Design: removable screw-type terminals</td>
<td>Quick and reliable wiring, easy maintenance</td>
</tr>
</tbody>
</table>
Your investment in SIPLUS ECC ...

- Standard-compliant AC charging of electric cars (IEC 61851, Mode 3)
- Ideal for applications with load management
- Investment security due to communication interface
- Remote firmware update reduces maintenance costs
- Flexibility thanks to freely-parameterizable I/Os
- Optimum interaction with Siemens low-voltage switchgear and controlgear
- Worldwide service and support
- Customer-specific variations possible (e.g. functional units)

... pays off
SIPLUS ECC

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More information, such as

- Product-related presentation slides
- Brochures
- Manuals
- Data sheets
- FAQs

Available at

- Internet: [www.siemens.com/siplus-ecc](http://www.siemens.com/siplus-ecc)
SIPLUS ECC
Support and training

Support

Online:  www.siemens.com/automation/service&support
Phone:  +49 (0) 911/895-5900 (8°° - 17°° CET)
Email:  siplus-ecc.industry@siemens.com

Sales tools

Demo cases:  www.siemens.com/modellis
Thank you for your attention!

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