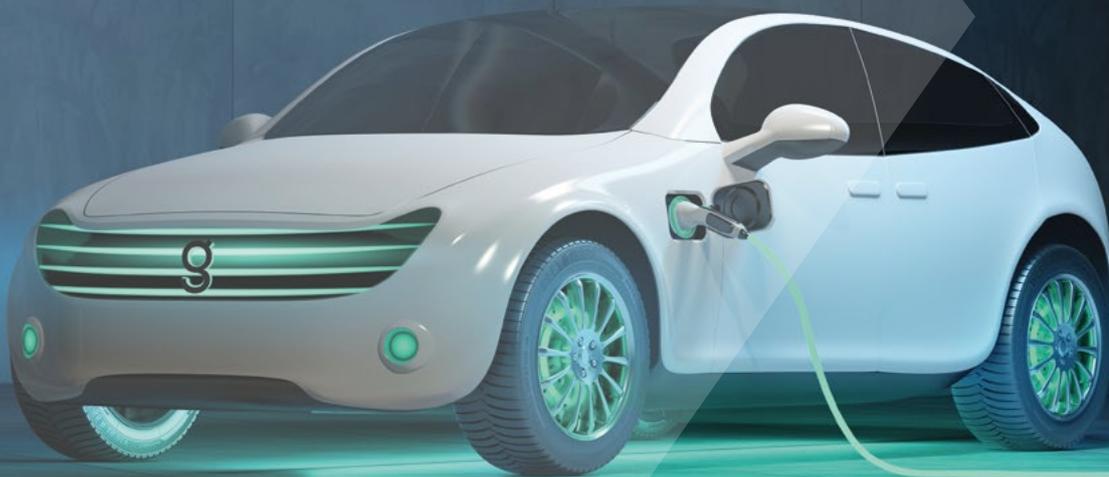


ghost ONE
A Brand of Kontron

The OEM wallbox – developed for your brand



eSYSTEMS
A Company of Kontron



Smart Charging. Next Level.

Developed for your brand – according to your requirements

As a leading provider of IoT-enabled AC wallboxes for OEM customers in the automotive and energy sectors, we create synergies between electric vehicles, charging infrastructure and intelligent energy management. We deliver custom solutions that work effectively with your products and business models. Talk to us. Our in-depth expertise is ready to provide your customers with the best possible service.

Our technologies make the difference

By combining state-of-the-art technologies with innovative features for future-proof AC charging, we are leading the way into the eFuture. Our solutions offer a unique feature set for AC charging, coupled with the highest cyber security standards. Another advantage is an impressive range of integrated communication standards, which ensure comprehensive connectivity and IoT capability.

Thanks to our open system approach, we are always ready to integrate the latest standards, which means that our customers are guaranteed to be up to date. Our “features on demand” option makes it possible to add new functions at any time via over-the-air updates. Our well-established platform delivers optimum product maturity and has proven itself in a number of application areas.

Ongoing development of this platform enables us to secure your position as a technology leader – today and tomorrow.



GLOBAL PRESENCE AND PRODUCT APPROVAL

Our specialised certification expertise allows you to get products approved worldwide. With the support of the globally positioned KONTRON Group, we manufacture and deliver local for local worldwide and guarantee constant availability.



AUTOMOTIVE QUALITY AND SYSTEM INTEGRATION

As a reputable tier 1 supplier, we ensure excellent automotive quality and process understanding. In addition, our expertise in sector coupling guarantees comprehensive and efficient system integration.



QUICK LAUNCHES AND CUTTING-EDGE TECHNOLOGY

With us at your side, you can significantly shorten your product line's time to market and save your own development resources. We are always at the cutting edge of technology and have future products and functions in our sights.



EXCELLENT VALUE FOR MONEY

As well as high-quality products, we offer unbeatable value for money. With us, quality and cost-effectiveness go hand in hand.



DIGITALISATION AND CONNECTIVITY

We are here to help you develop new digital business models in an increasingly connected world. Our in-depth connectivity, IoT and cyber security expertise are at your service.



MODULAR AND CUSTOM PRODUCT SOLUTIONS

Our modular platform makes high-level product customisation possible. Together, we create solutions that are specifically tailored to your needs.



Each brand is unique – ghostONE is too

In order to meet the specific needs and requirements of your brand, we offer our wallbox as a modular system.

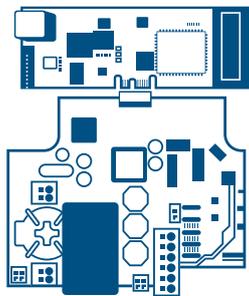
ghost ONE



White label solution

- › A complete solution with our wallbox design.
- › Customer-specific adjustments can be applied to design elements, e.g. logo and web interface.

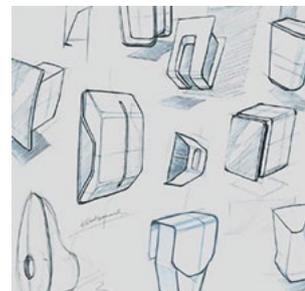
ghost CORE



Electronics only (hardware/software)

- › Our electronics, incl. software, in your own housing.
- › We provide support for product development and certification.

ghost EXCLUSIVE



Customer-specific charging solutions

- › A complete solution developed on the basis of your individual requirements, right through to series production (design, markets, electronics, software).

Pure innovation in every version.

The right ghostONE for every application

From private wallboxes to public charging stations – ghostONE is equipped for every application and offers you the solution for your individual requirements.

ghostONE



- › Optional: Socket outlet with shutter
- › Ethernet & Wi-Fi
- › Over-the-air update
- › Optional: LTE functionality
- › Local load management
- › 11 kW / 22 kW
- › Charging cable 4.5 m / 7 m

ghostONE MID

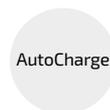


- › Optional: Socket outlet with shutter
- › Ethernet & Wi-Fi
- › Over-the-air update
- › LTE functionality
- › Local load management
- › MID conformity
- › 11 kW / 22 kW
- › Charging cable 4.5 m / 7 m

ghostONE ERK



- › Socket outlet with shutter
- › Ethernet & Wi-Fi
- › Over-the-air update
- › LTE functionality
- › Local load management
- › Eichrecht conformity
- › 22 kW



The eFuture starts with networked technologies, and its extensive customisability paves the way for every conceivable application scenario.

Over-the-air update

Web App
OCPP 1.6, OCPP 2.0.1

Integrated safety feature

Direct current RCD 6 mA

Human-machine interface (HMI)

Via LED status indicator

Optional

MID compliance
German calibration law
(Eichrecht) compliance

Intelligent charging functions

Full implementation as per ISO 15118
PV self-consumption charging
Charging by tariff plans
Grid-stabilising charging via SMGW / cloud

Remote management

Web App
OCPP 1.6, OCPP 2.0.1
EEBUS

Authorisation

Plug & Charge as per ISO 15118
AutoCharge
RFID

Connectivity

Ethernet, Wi-Fi, LTE (optional)

Integrated HEMS functionality

Electricity meter readout
MODBUS/TCP
Local load management

The advantages at a glance: smart features of the ghostONE

ghostONE is much more than a conventional AC wallbox. The platform's smart features and design in line with automotive standards offer your customers a wide range of benefits.



Simple installation and networking

Page 8



Secure and simple authorisation with RFID, AutoCharge or plug & charge

Page 9



Option for billing company cars or fleet charging (ERK, MID & OCPP)

Page 10



Optimum utilisation of the photovoltaic system thanks to PV surplus charging, 3/1 phase switching and implementation of the ISO 15118 standard

Page 12



Connected and cost-saving charging through smart home integration

Page 14



Cost savings through reduced grid charges (§14a EnWG) and grid-friendly charging

Page 16



Stabilisation of the grids (blackout protection) through integrated mini HEMS (load management)

Page 18



Reduction in electricity costs and contribution to the energy transition

Page 20



Web App for easy configuration and operation of the ghostONE

Page 21



Intelligent use such as authorisation, PV charging and over-the-air updates (OTA), etc. are also possible in offline mode (no cloud required)

Page 21



Protection from hackers thanks to optimised cyber security

Page 22



Stable, sustainable and durable design – validated according to automotive standards & certified according to the respective country standards

Page 23



INSTALLATION & NETWORKING

ghostONE offers your customer secure, simple and cost-effective installation and initial configuration

Initial installation – quick & easy

No access, passwords or software configurations are required for the initial installation by the electrician. The installer can carry out the electrical acceptance test, including the charging test, without having to log into apps, websites or similar. This saves an enormous amount of time during installation, and therefore money, and avoids queries about passwords, settings, etc. Sensitive data such as home network passwords do not have to be disclosed.

Initial configuration & networking

In order to fully utilise the smart features of the ghostONE wallbox, the wallbox needs to be networked. This can be done via an Ethernet cable, Wi-Fi or LTE. The initial configuration can be carried out via the local hotspot and does not require any further networking such as a connection to the home network (Wi-Fi) – laying an Ethernet cable is therefore possible but not a must.





AUTHORISATION

Secure and simple authorisation

The ghostONE offers your customer several ways to protect the charging function of their wallbox from unauthorised access:

RFID

- › ghostONE enables a large number of RFID chips to be taught in to the box. This means that other family members or neighbours can charge at the wallbox with their own RFID chip – but not everyone who wants to.

AutoCharge

- › Your customer can charge their electric car by simply plugging it in – the electric car and the wallbox will recognise each other automatically. This is enabled by the full implementation of the ISO15118 standard in the ghostONE.

Plug & Charge

- › Plug and charge goes beyond the functionality of AutoCharge and offers maximum security and convenience thanks to encrypted communication in accordance with the ISO15118 standard. In addition, Plug and charge enables billing at public charging parks. This is made possible by the full implementation of the ISO 15118 standard in the ghostONE.



AutoCharge



ISO
15118
— full —
implementation



BILLING

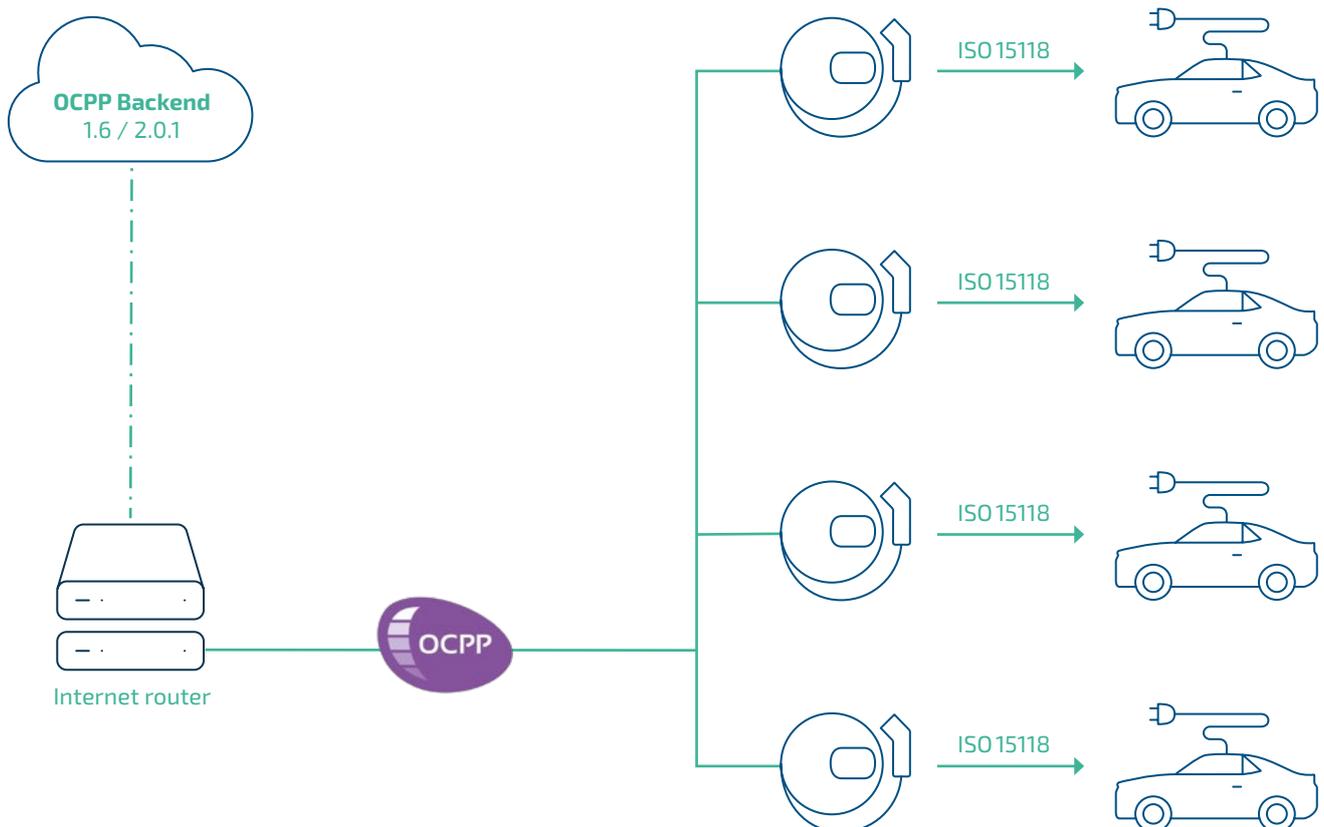
Straightforward billing for private individuals, company cars and fleet shops

The ghostONE is available as a MID and calibration law-compliant version and is compatible with many backends for billing thanks to OCPP. This makes charging in semi-public and public spaces possible for your customers. In addition, charging is also possible in private spaces to separate company cars and private electric vehicles.

Use Case | Connectivity & Remote Control

Management of charging points with OCPP

- › The wallbox enables remote control for the charge point operator, making wallbox management possible (authentication, authorisation, billing etc.).
- › Integration of OCPP connection to the CPO-Backend.
- › Implementation of "Eichrecht"-conformity of the wallbox for billing according to German "Eichrecht".





**PV SURPLUS
CHARGING**





**SMART HOME
INTEGRATION**



Connected and cost-saving charging through smart home integration

In order to be able to integrate PV systems and heat pumps into the communication, ghostONE has integrated another standard in addition to ISO 15118: the EEBUS protocol for smart home applications. This protocol is widely recognised in the energy, automotive and electrical industries. The PV system can use EEBUS to tell a Home Energy Management System (HEMS) how much solar power is currently available. On this basis, the HEMS decides whether electricity needs to be added from the grid, and if so how much. Further integration of the wallbox into smart home applications is also possible via Modbus/TCP and REST.

Use Case | EEBUS Smart Home Integration

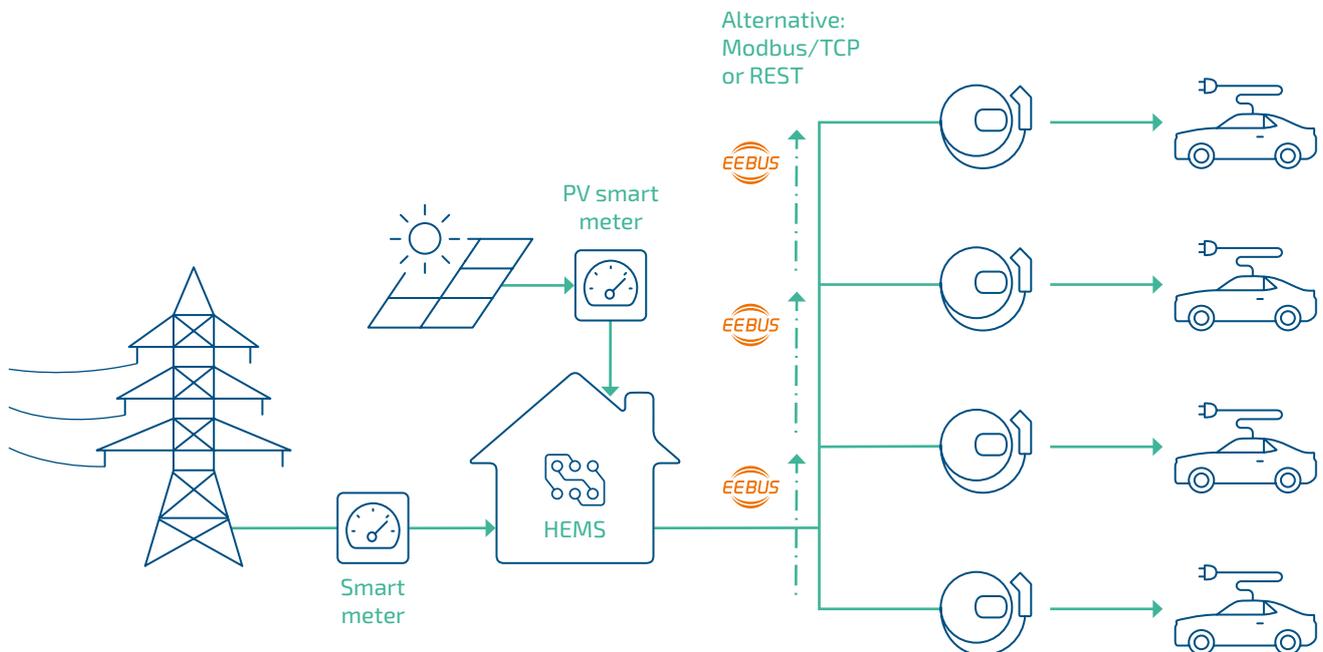
Intelligent charging features with EEBUS and HEMS

Example of optimised PV charging

- › The PV system can use EEBUS to tell a HEMS how much solar power is currently available. The charging plan decides on this basis whether electricity needs to be added from the grid, and if so how much.

EEBUS Smart Home Integration

- › Private installations with EEBUS-HEMS and other EEBUS-connected devices.
- › Further integration also possible via Modbus/TCP and REST.





**SECURING THE
POWER GRID**

Securing the electricity grid and reducing grid fees in accordance with §14a EnWG

Since 1 January 2024, German distribution grid operators have been obliged to reduce controllable consumption devices (SteuVE) down to 4.2 kW when necessary to benefit the grid. Together with an FNN control box, the ghostONE enables stepless dimming. The power output of the wallbox is reduced to as little as 4.2 kW – as required by §14 EnWG (German Energy Industry Act). Digital communication takes place via the EEBUS standard, allowing control commands to be transmitted continuously and bidirectionally.

This smart feature offers your customer a further opportunity to reduce their electricity costs: by participating in §14a EnWG, it is possible to reduce the cost component of grid charges, as the grid operator currently pays up to 110 to 190 euros per year for participation. In addition to the cost factor, your customer contributes to securing the grids and thus to the energy transition.

Use Case | Grid Convenience

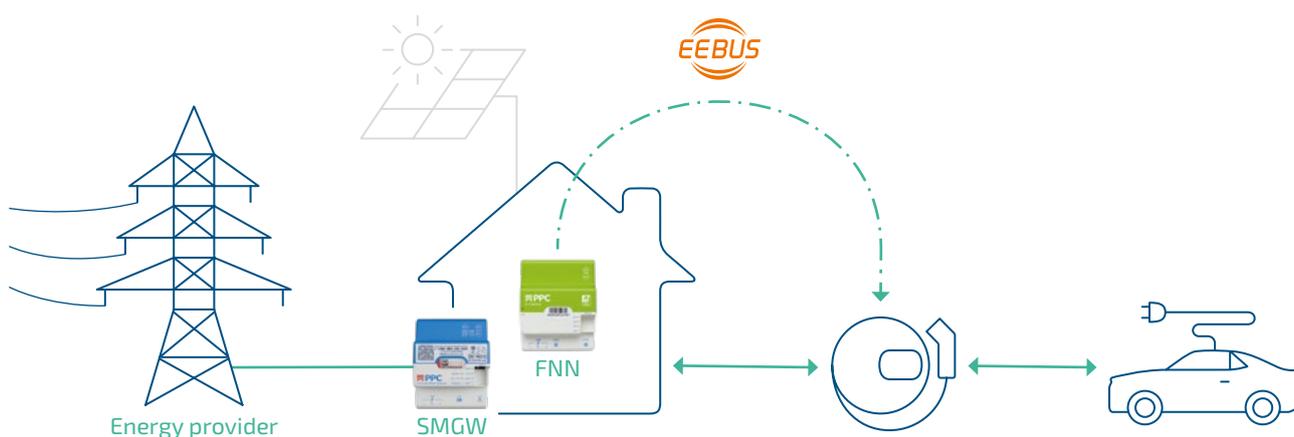
Charging in accordance with of §14a EnWG with EEBUS

Grid Convenience

- › Dynamic adjustment of charging power by limitations of the grid provider.
- › EEBUS as communication standard.
- › Dimming via FNN control box and Smart Meter Gateway (SMGW).

Added value for the customer

- › Private installations with EEBUS-HEMS and other devices networked via EEBUS.
- › Grid convenience as essential feature for comprehensive charging infrastructure.
- › Preparation for upcoming regulations.





LOAD MANAGEMENT

Securing the electricity grids through static or dynamic load management

If your customer is charging their electric car and using various household appliances at the same time, it can happen that all these processes draw more power from the grid than the main fuse allows. The same happens if several electric cars are charging at the same time using electricity from the same grid.

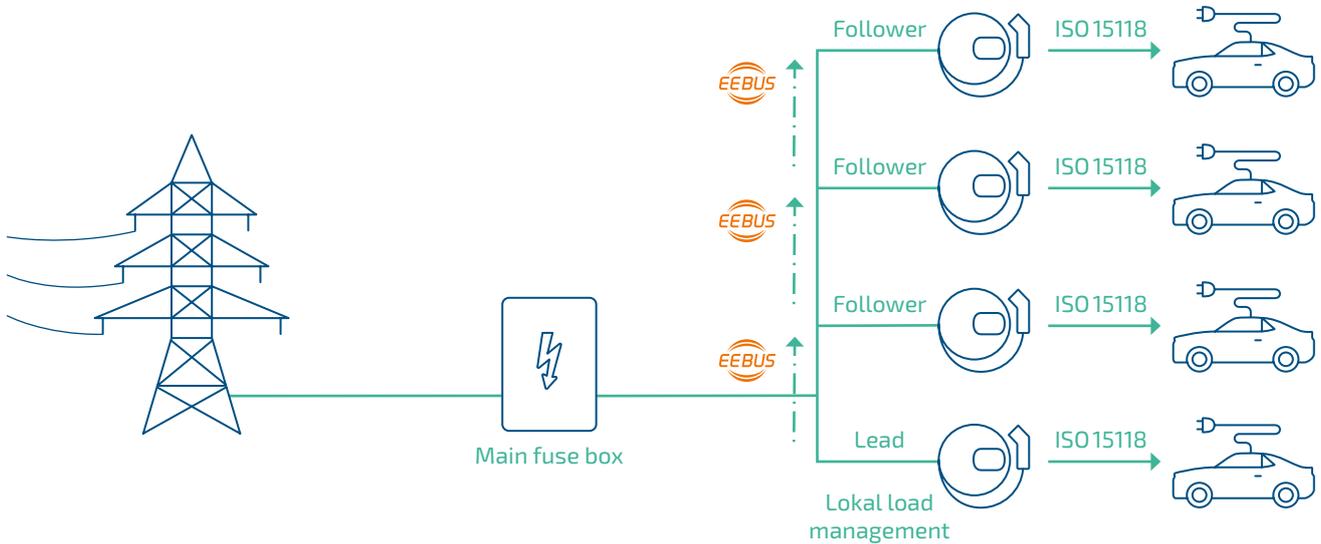
This is where load management comes to the rescue so as not to overload the house's main fuse, which would lead to a power cut. For load management, a household consists of non-controllable loads such as the washing machine, cooker, iron and TV and controllable loads such as the wallbox and heat pump. If load management only covers the controllable loads, this is referred to as static load management. The maximum available power is distributed among the controllable loads. If, for example,

we consider an underground car park with four wallboxes and an available power of 64 kW – then each wallbox would have 16 kW available for charging the electric car. However, this does not take into account the washing machine, which is also located in the basement. If a load management system also covers the non-controllable consumers by analysing a central electricity meter, this is referred to as dynamic load management. This ensures that the house connection is not interrupted by the unforeseeable use of uncontrollable consumers. This usually requires a HEMS (Home Energy Management System), which can incur additional costs. The ghostONE has already solved this function, however, with an integrated mini HEMS and thus saves your customer additional costs and secures the house connection.

Use Case | Local static load management (Mini HEMS)

A maximum charging capacity is distributed across several wallboxes (controllable consumers)

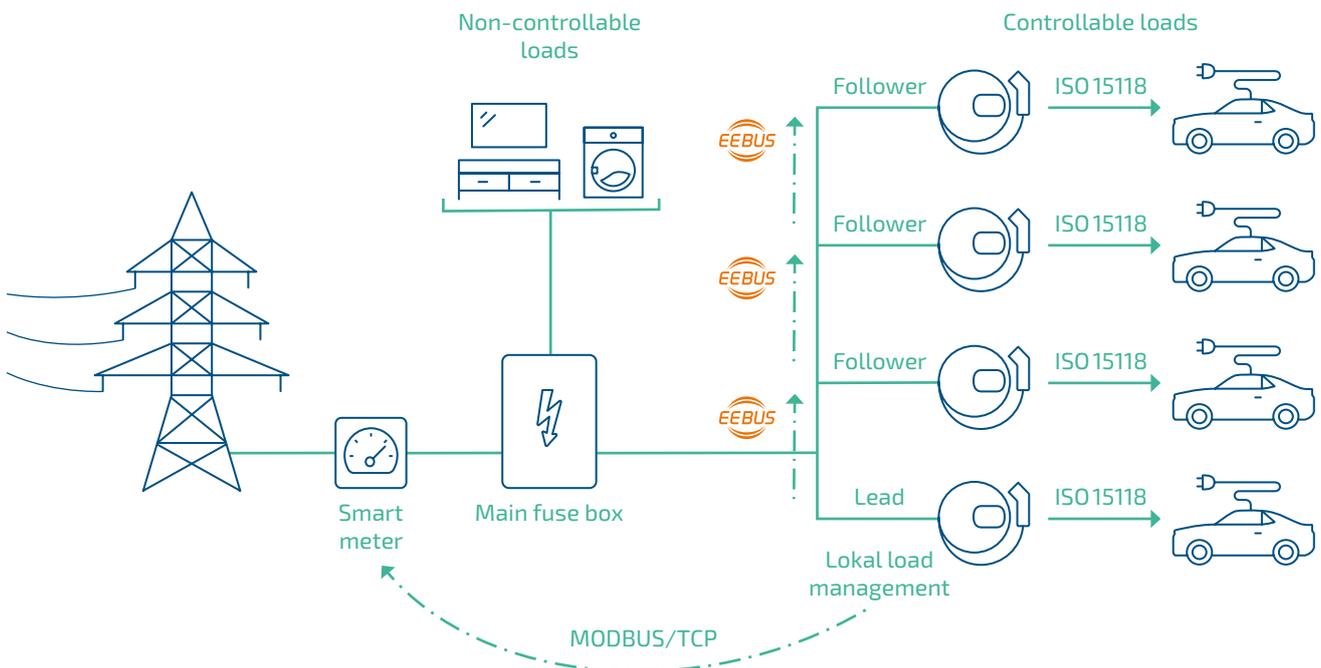
- ▶ One wallbox acts as a local load management system (lead).
- ▶ It distributes the power according to grid limits.
- ▶ Remaining wallboxes receive the limits using EEBUS.

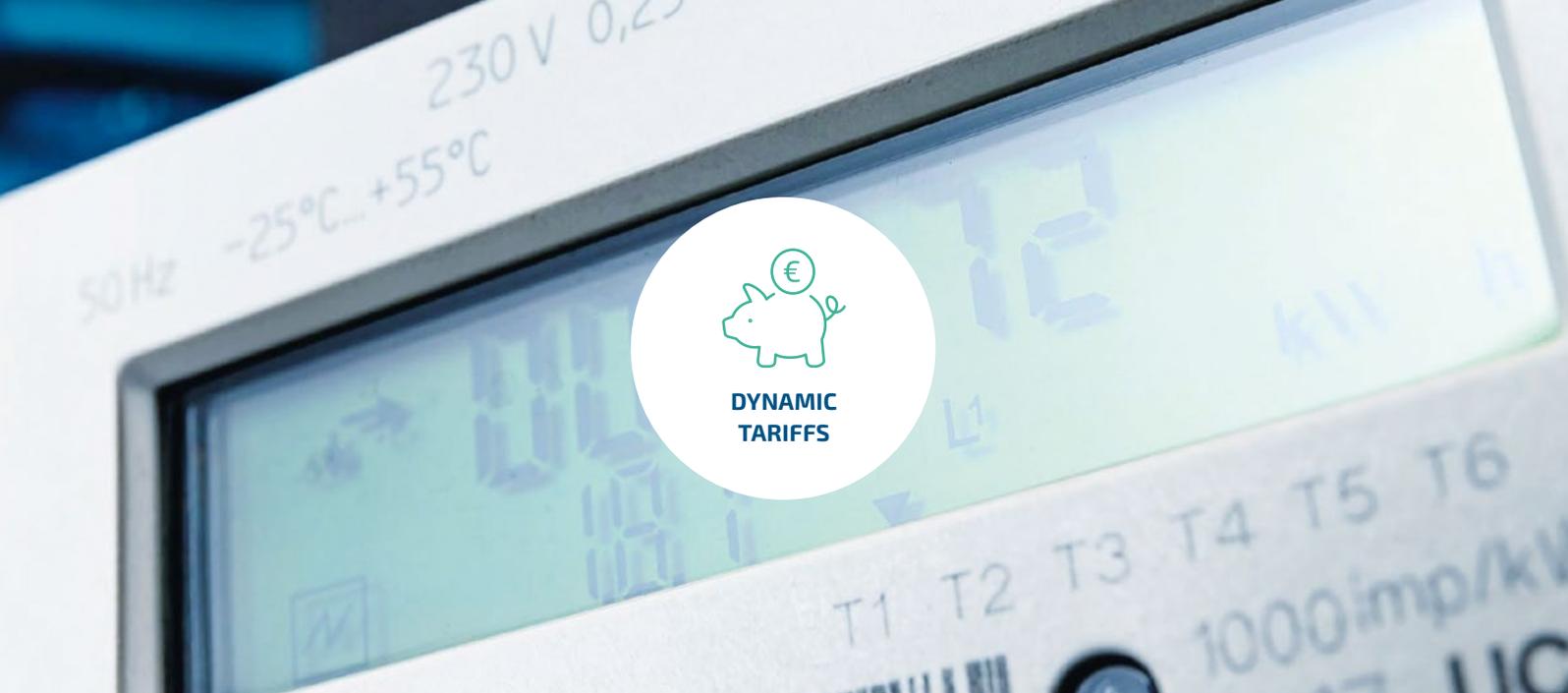


Use Case | Local dynamic load management (Mini HEMS)

The maximum available power at the house connection is intelligently divided between non-controllable and controllable consumers

- ▶ The power of non-controllable loads such as washing machines and TVs is recorded by the smart meter. The remaining available power is then distributed among the controllable loads such as the wallbox.
- ▶ If several wallboxes are installed, one wallbox acts as a local load management system (lead).
- ▶ The controllable loads receive the limits using EEBUS.





Reduce electricity costs and promote the energy transition at the same time

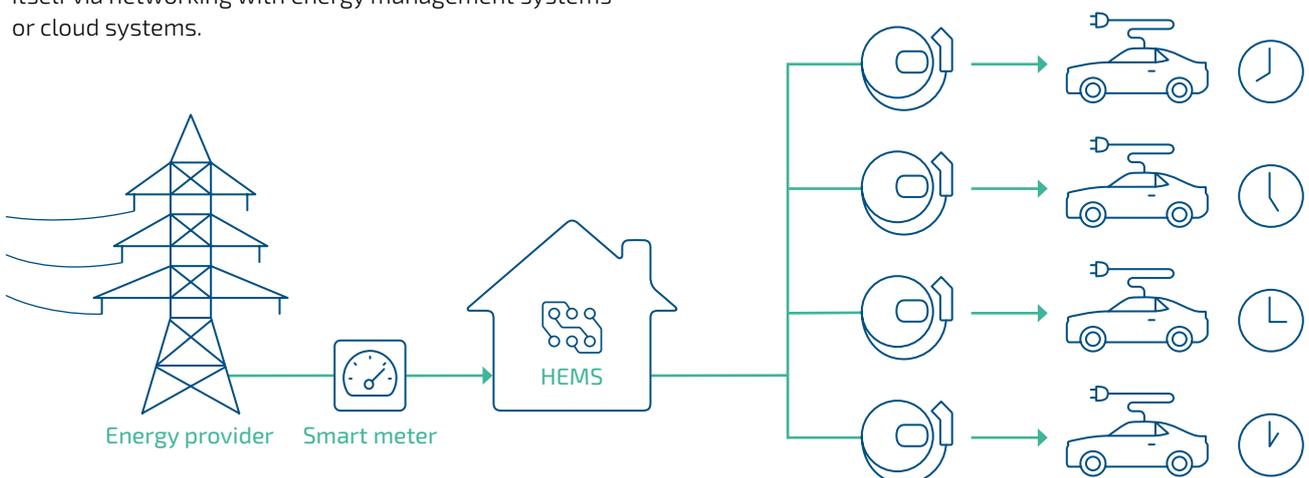
Charging with photovoltaics, integration into the smart home and participation in § 14a EnWG have already been mentioned as three of the ways in which ghostONE can help your customers to reduce their electricity costs and drive forward the energy transition. Another point is the topic of dynamic tariffs: in addition to your own photovoltaic power, you can also rely on green electricity from wind power, for example. However, this is not always available in sufficient quantities, for example when there is not enough wind to operate the wind turbines sufficiently. This means that electricity is more expensive at different times. If this is reflected in your electricity tariff, this is referred to as a dynamic tariff. To use the cheapest electricity, you need an intelligent charging system like the ghostONE to charge when the electricity is cheapest. And no, your customer doesn't have to set an alarm clock to switch on the wallbox at the most favourable time. Our ghostONE does this all by itself via networking with energy management systems or cloud systems.

Use Case | Dynamic tariffs

Time-shifted charging according to dynamic tariffs

Charging low-cost green electricity with dynamic tariffs

- ▶ Green electricity costs different amounts at different times – this is called a dynamic tariff. To use the cheapest electricity, you need an intelligent charging system like the ghostONE to charge when the electricity is cheapest.
- ▶ ghostONE switches on the charging process at the most favourable time via networking to the HEMS or cloud system.





Simple operation via the WebApp and over-the-air updates (OTA) in offline mode

The ghostONE has its own web app. It allows users to operate all smart functions intuitively and to monitor the charging status. The integrated system functions, such as the authorisation function or optimisation processes for PV surplus charging, can also be called up in offline mode via the web app. Internet or a cloud are not required.

The situation is different for updates. Internet access is required here. Underground car parks, for example, can have a poor mobile phone connection, or none at all, making it difficult to retrieve updates for the wallbox or the car. The ghostONE solves this problem quite simply, as the networked wallbox offers a Wi-Fi access point that can be used to install OTA updates for the vehicle even in underground car parks.

Use Case | Internet Access

Wi-Fi access point for the electric vehicle

Internet access for the electric vehicle

- ▶ Underground car parks often interfere with cellular network access.
- ▶ Internet access is essential for updates.
- ▶ The wallbox acts as a Wi-Fi access point.





Protection from hackers through optimised Cyber security

Private charging stations are an easy target for cyber attacks. This is because most wallboxes are connected to the internet, including the ghostONE. In accordance with the European Radio Equipment Directive (RED), the ghostONE is protected from cyber attacks. The new RED measures cover the following targets:

- ▶ Increasing the resilience of networks: Wireless devices and products must include features that prevent interference with communication networks and prevent the devices from being used to disrupt the functionality of websites or other services.
- ▶ Better protection of consumer privacy: Wireless devices and products must have functions that guarantee the protection of personal data.
- ▶ Reducing the risk of money fraud: Wireless devices and products must include features that minimise the risk of fraud in electronic payments. For example, they must ensure better authentication control of the user in order to prevent fraudulent payments.

The extension directive published at the end of 2022 must be implemented from August 2025. In the coming years, basic security precautions that have long been standard in corporate networks or online banking will also be required in the consumer electronics world – and this includes wallboxes. ghostONE has already fully implemented the previously defined RED requirements and offers your customers optimum security.



VALIDATION & CERTIFICATION

eSYSTEMS
A Company of Kontron

Stable, sustainable and durable design – validated according to automotive standards & certified according to the respective country standards

Thanks to validation according to automotive standards, the ghostONE wallbox is equipped for all adversities, guaranteeing the user a stable design across the entire service life.



The ghostONE is tested for the following:

- › Water protection (IPX5) – even in pouring rain or snow, the ghostONE charges reliably for your customer.
- › Dust protection (IP5KX) – even in desert areas, dust cannot harm it.
- › Packaging test (ISTA) – the wallbox arrives safely at your customer's premises.
- › Salt spray test – charging with a view of the sea? No problem with ghostONE.

- › Sun exposure – ghostONE is available in various colours that do not fade even in direct sunlight.
- › Vandalism – we would like to have a peaceful world for our ghostONE – but it is also safe from troublemakers.
- › Warm and humid climate – the ghostONE is tested up to a humidity of 95 per cent.
- › Lifetime tests (HTOE/TWDL) in fast motion – the ghostONE will provide your customers with many years of loyal service.
- › Chemical resistance – almost like Teflon – chemicals such as oil, acid, cleaning agents and bird droppings – our ghostONE is unaffected (testing of 28 chemicals for chemical resistance).
- › Low temperature resistance (-30 °C) – after a long cold night, the ghostONE doesn't need any warm-up time or coffee – it's ready to use straight away.

Certification

We take care of the certification for your desired target countries and thus save you time and reduce stress – so ghostONE is available to your customers even faster.

eSYSTEMS

A Company of Kontron

eSystems MTG GmbH

Bahnhofstraße 100
73240 Wendlingen
Deutschland

Tel.: +49 7024 40598-0

E-Mail: info@esystems-mtg.de
www.esystems.de

Kontron AG

Kontron AG is a leading
IoT technology company.
You can find more information
about the Kontron Group here:
www.kontron.com

Further information about our OEM charging solutions
can be found here: ghostONE.esystems.de/oem-charging-solutions



ghostONE downloads - here you will find all important
documents, data sheets, certificates and other materials:
ghostONE.esystems.de/oem-charging-solutions/downloads

