KEBA KeContact

Intelligent management of charging infrastructures

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KEBA eMobility

Consistent. Convenient . And climate neutral.

Leading manufacturer for charging infrastructure

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Management of charging infrastructures

Management of charging infrastructures

Why?

- The trend towards eMobility continues and the **number of electric vehicles** (BEV) on our roads is constantly **increasing**.
- Especially when vehicles are **parked for extended periods** (at work during the day, at home at night), they can be charged at low power. This is not only **economical**, but also protects the batteries of the vehicles and reduces the load on the power grid.
- To make this possible the charging infrastructure must grow considerably or the **number of charging stations** at these locations must **increase** considerably.
- The **expansion of the distribution network infrastructure** by the energy suppliers is costly and cannot keep up with this development.
- In order not to overload existing connections and to be able to provide the necessary infrastructure, **intelligent management of the charging infrastructure** is essential.

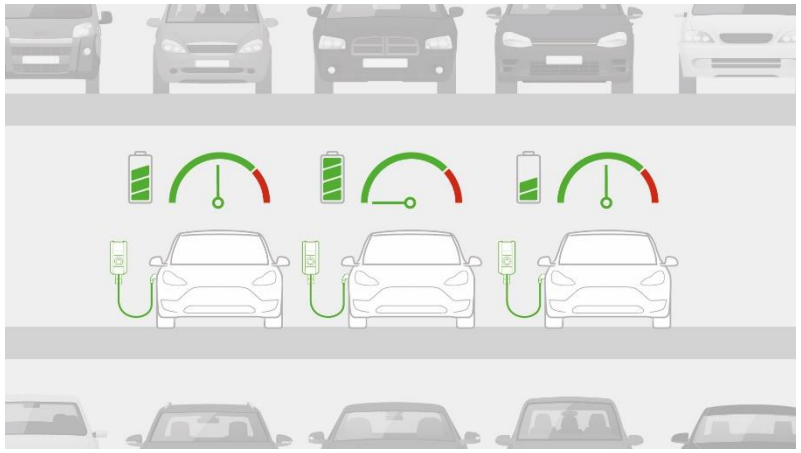
Management of charging infrastructures

Options: Master/client setup or central controller

Intelligent load management is easy to implement with the KeContact charging infrastructure:

- **Load management in a master/client network**
  KeContact P30 x-series as master:
  up to **15x** KeContact P30 c-series
  (= charging network with up to 16 wallboxes)

- **Load management with a central controller**
  KeContact M20 Charging Management Controller as master:
  - Small version: up to **20x** KeContact P30 c-series
  - Medium version: up to **40x** KeContact P30 c-series
  - Large version: up to **200x** KeContact P30 c-series



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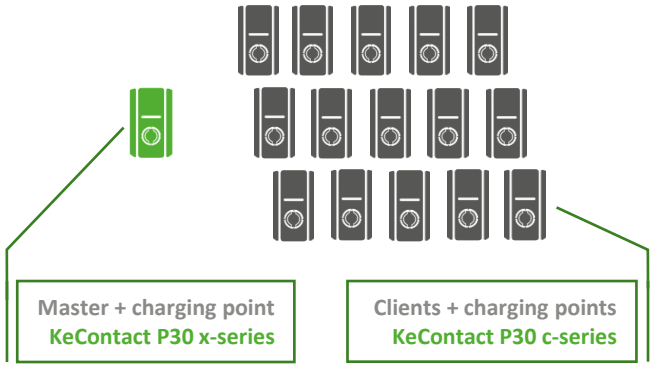
Management of charging infrastructures

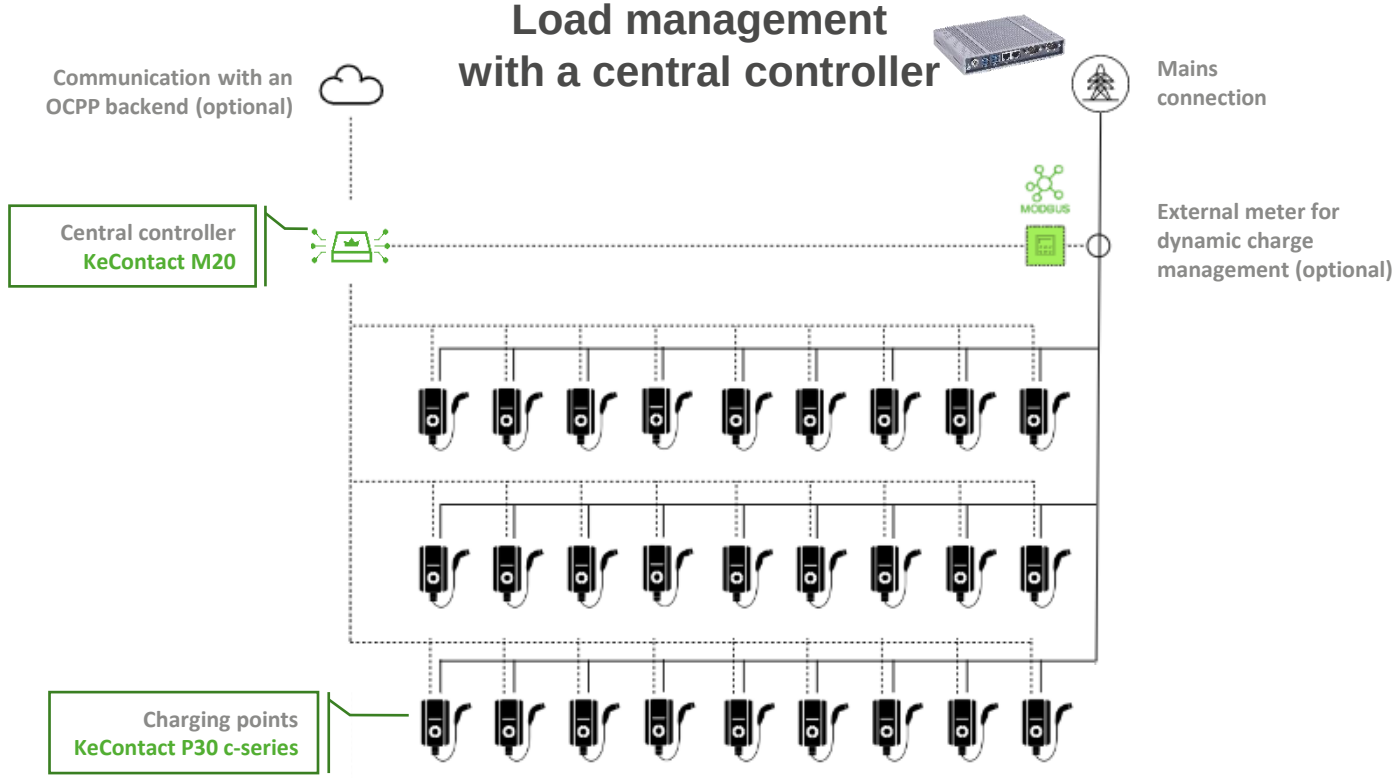
Options: Master/client setup or central controller

Load management in a master/client network



- Easy installation
- No additional hardware necessary (except LAN switch)
- Connection to OCPP backend possible
- Dynamic load management with external meter possible (e.g. for house connection monitoring)
- **Max. 15 + 1 charging points in a network**

Load management with a central controller



- Convenient configuration of all charging points via the central webinterface of the KeContact M20
- **Up to 200 charging points in one network, arbitrarily grouped in up to 15 clusters**

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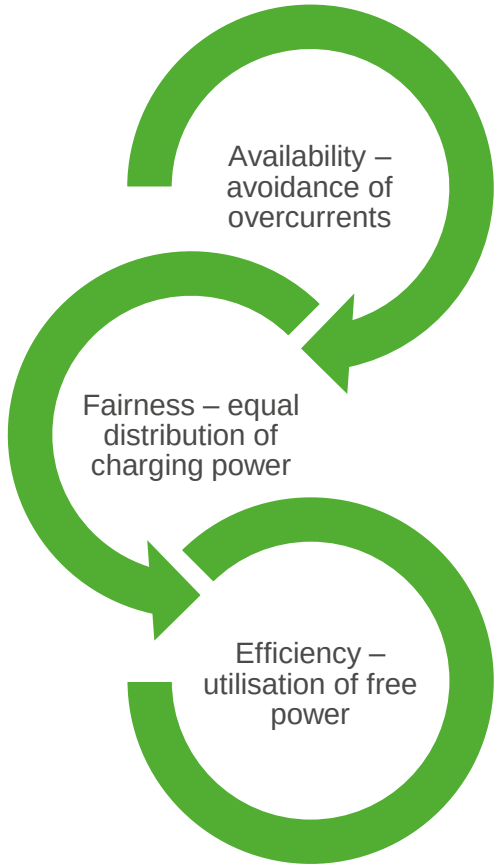
Management of charging infrastructures

Basics: Principles of load management



The overriding principle in load management is, of course, the **avoidance of overcurrents** and therefore the availability of the charging infrastructure.

Rapid lowering of the charging currents ensured by **local communication** prevents the line protection from being triggered.

The available power is distributed **evenly** across all active charging points. In order to prevent all charging processes from being switched off by falling below the minimum charging current, the charging of individual vehicles is **paused for a maximum of 15 minutes** each.

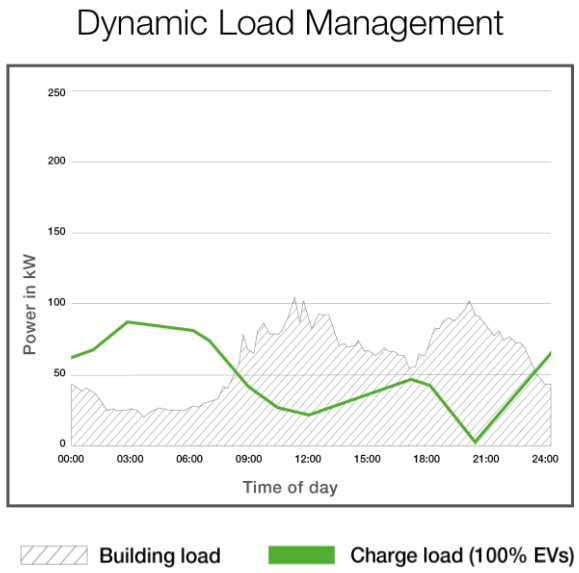
The larger the network of charging stations in a load management system, **the more efficiently** the available connected load can be used.

Management of charging infrastructures

Basics: Static and dynamic load management

- **Static load management** means that the **maximum charging current** set for the charging network **is not exceeded**.
- For this purpose, each vehicle connected in the charging network is only provided with a corresponding **static component of the current** and, if necessary, the charging of a vehicle is also paused.

- With **dynamic load management**, the **actual power consumption both of the charging stations and of all other consumers** behind this metering point is measured by means of an external meter.
- This allows a **maximization of the charging power** available for the vehicles without the risk of overloading the house connection, e.g. due to increasing loads in another area.
- In the configuration menu of the webinterface, **TCP house connection monitoring** can be activated and the meter used can be selected.

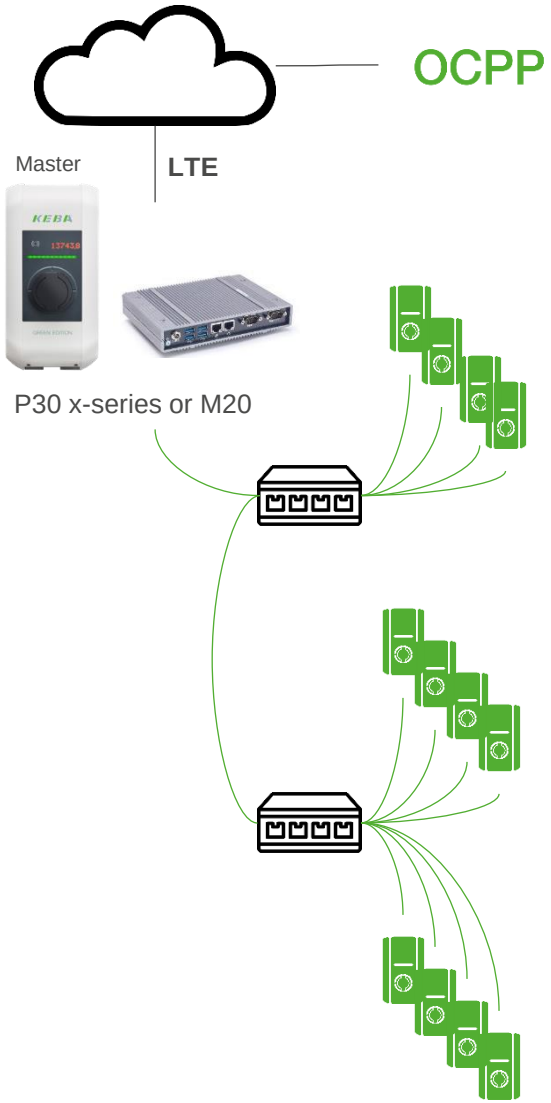


Management of charging infrastructures

Basics: Communication

- Both the connection of the charging stations in the master/client network (KeContact P30 x- or c-series) and the connection to the central controller (KeContact M20) are established via **LAN**.
- Both the master (P30 x-series) and the controller (M20) can function as **DHCP servers** if required.
- Alternatively, the charging stations can also be integrated into an existing “managed” LAN. In this case, the necessary **port and protocol activations** must be observed.
- The **integrated LTE modem** (optional for P30 x-series) can also be used for the connection to an OCPP backend.
  A SIM card must be inserted according to the instructions.

- You can find further information on installation and commissioning in the product manuals on our Downloads page.



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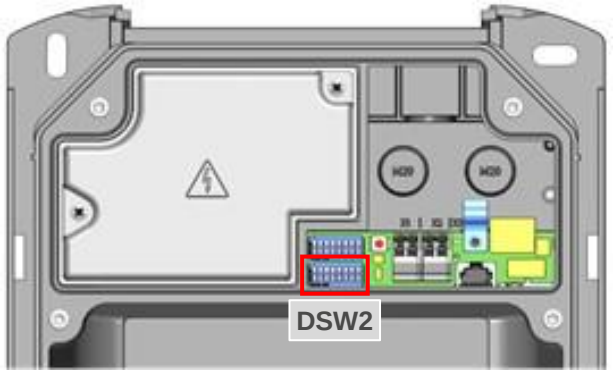
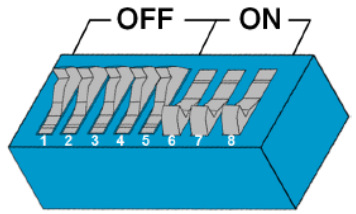
Management of charging infrastructures

Basics: Configuration

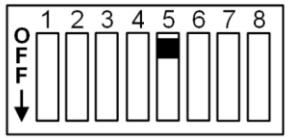
- To activate communication in the charging network, **DIP switch 2.5** must be switched to **ON** in all charging stations (regardless of whether master/client or in a network with the central controller). The DIP switches are located under the connector panel cover.





- All other **settings** for the charging stations in the network can then be made **centrally via the webinterface** of the P30 x-series acting as master or the M20 controller.

Activation of communication - DSW2.5

DIP switch	Function	Illustration
DSW2.5	Activation of communication in the charging network. This DIP switch setting must be made for each master and client charging station to enable charging station communication.	

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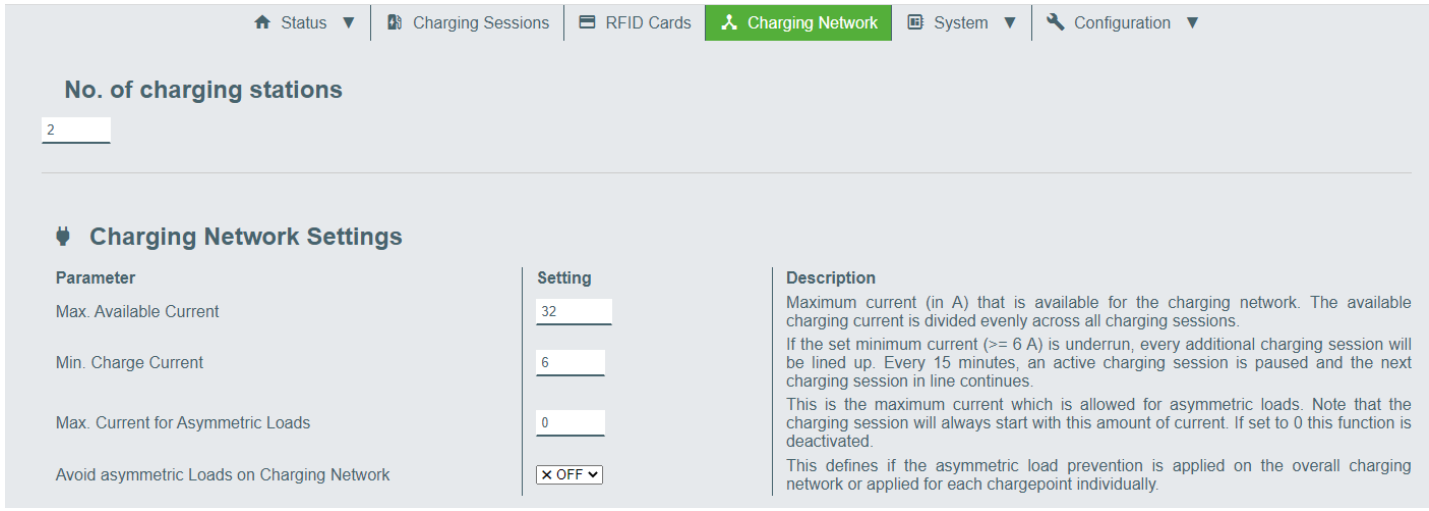
Management of charging infrastructures

Basics: Configuration in the webinterface

- The first configuration step is to set the **number of charging stations** in the “Charging network” menu.
- The connected **charging stations are listed automatically**. Then the settings for the charging network (e.g. maximum available and minimum charging current) or for the individual charging stations (e.g. phase rotation) can be made.
- You can find further information on the webinterface and configuration in the product manuals on our Downloads page.



Management of charging infrastructures

Basics: Authorisation

- The optional function for **authorisation via RFID** can be activated via the webinterface in the configuration menu.
- Depending on the operating mode (online: with an OCPP backend or offline: without connection to a backend), **different authorisation modes** can be selected.
- The offline authorisation mode also represents the **fallback scenario** in case the connection is interrupted during operation with OCPP backend.

- The **locally stored whitelist** can be viewed and, of course, edited in the “RFID Cards” menu of the webinterface.
- Furthermore, it is possible to **download or upload the list as a .csv file**.
- In a charging network, this **whitelist is applied to all charging stations** that are connected to the master or central controller.

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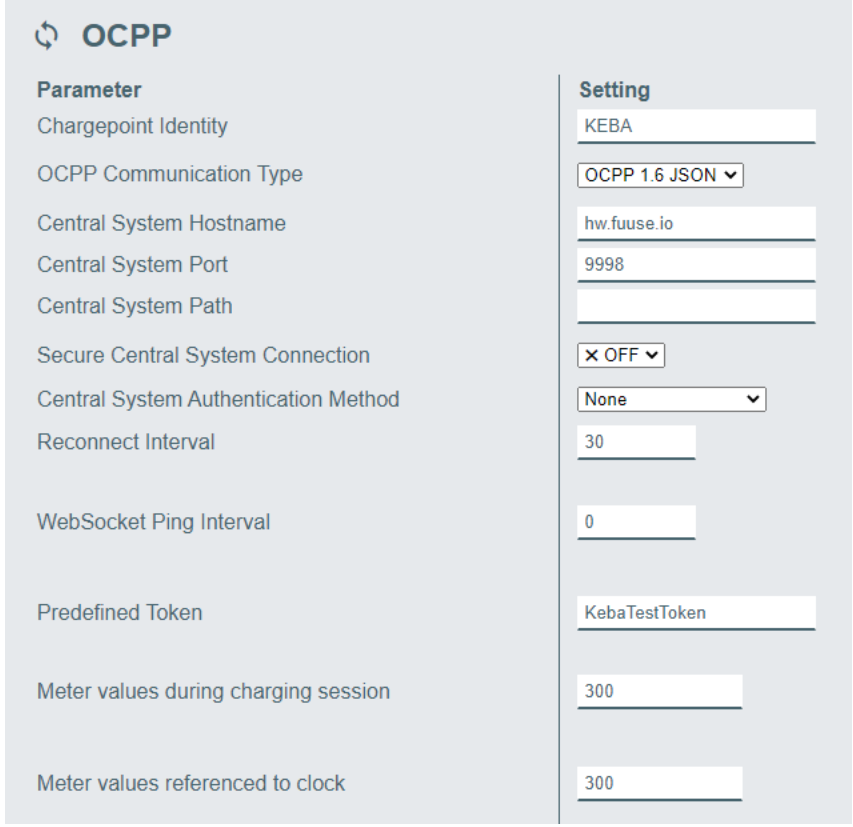
Management of charging infrastructures

Basics: Load management and OCPP backends

- The **connection to an OCPP backend** can be activated and configured in the configuration menu of the webinterface.
- When doing this, the settings (protocol, port, path, etc.) must **match the settings of the backend**. In addition, it may be necessary to install a corresponding certificate.
- In a charging network, the master or central controller with a **charging point ID** acts as the communication interface to the backend. The charging stations below are each identified with a **connector ID**.
- When load management is applied, i.e. when it is necessary to reduce the charging current, it is ensured that **the maximum current is not exceeded**, even if the connection to the backend is interrupted for a short time.
- If the connection to the backend is interrupted, the data of the charge sessions can be **saved locally and later synchronised**.



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Master/client installations – KeContact P30

Load management in a master/client network

KeContact P30 x- & c-series at a glance

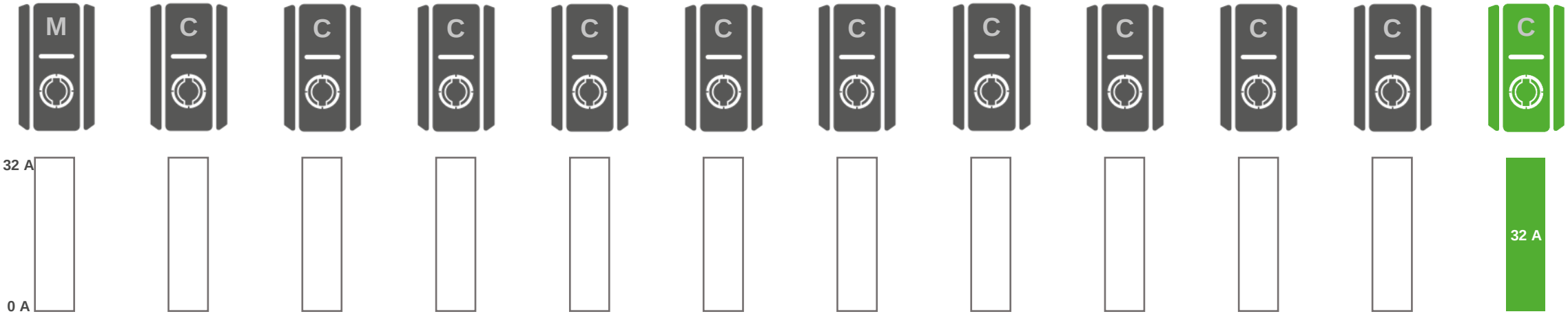
	KEBA eMobility App
	Mobile communication 4G/LTE for wireless communication
	WLAN communication for the wireless integration of wall boxes in an existing network
	Web interface for configuration settings
	Offline logging of charging sessions (up to 3 months) as master or stand-alone
KEBA eMobility App	Dynamic home connection monitoring with an external power meter via Modbus TCP (active)
Charge control by external systems (Smart Home & Energy Management Systems) via UDP and Modbus TCP (passive)	Charge control by external systems (Smart Home & Energy Management Systems) via UDP and Modbus TCP (passive)
Local, static/dynamic load management as a client	Local, static/dynamic load management as a master
OCPP communication as client	OCPP communication as master or stand-alone
Ethernet interface for permanent installation (LSA+)	Ethernet interface for permanent installation (LSA+)
Freely programmable display	Freely programmable display
For the billing of energy consumption - MID certified*	For the billing of energy consumption - MID certified*
Energy meter	Energy meter
Power monitoring***	Power monitoring***
RFID user authorization*	RFID user authorization*
LED strip for status information	LED strip for status information
DC-leakage detection	DC-leakage detection
Enable input / switch output	Enable input / switch output
Ethernet interface (RJ45) - debug	Ethernet interface (RJ45) - debug
USB interface	USB interface
Z.E. Ready / EV Ready	Z.E. Ready / EV Ready
c-series	**x-series**
Single-phase & three-phase operation**	Single-phase & three-phase operation**
Max. charging power: 11 / 22 kW**	Max. charging power: 11 / 22 kW**
Max. charging current per phase: 16 A / 32A**	Max. charging current per phase: 16 A / 32A**
Controlled charging	Intelligent charging

- **Master:** KeContact P30 x-series
  client: KeContact P30 c-series
- In a master/client network, **charge management** can be realised **for up to 16 charging stations**.
- A KeContact P30 **x-series acts here as the master** and controls up to 15 c-series devices.
- The formation of subgroups (clusters) in the load management network is not possible in this setup, i.e. a **static or dynamically monitored limit for the charging current** is set for the entire network.
- The **charging points communicate via LAN** and the P30 x-series acts as a central communication interface, e.g. to a backend.

Load management in a master/client network

Examples of load management scenarios – 1/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (static), minimum charging current: 6 A



- 1 active charging station.
- Charging starts with the connected vehicle with the maximum charging current of the station (in this example 32 A, i.e. 22 kW).
- Load management is not yet active, since the maximum current in the overall system has not yet been reached.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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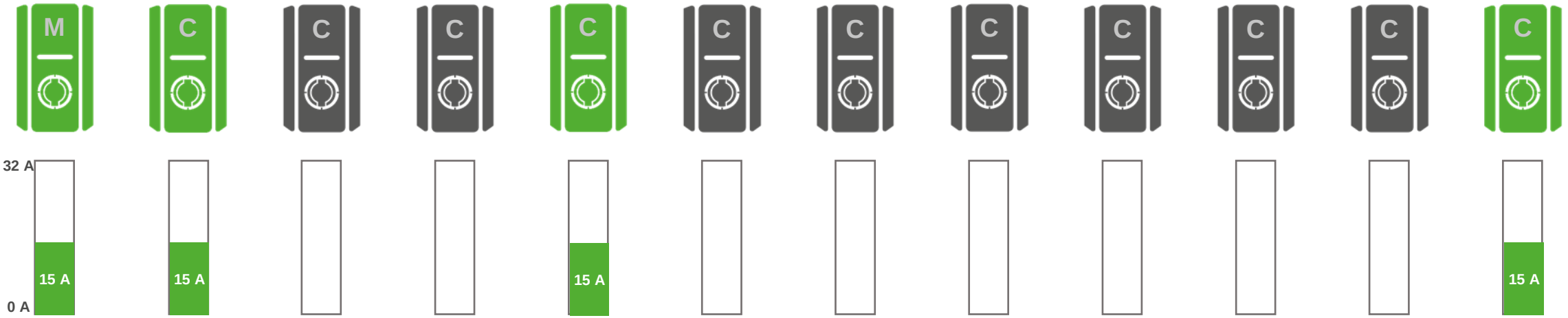
Load management in a master/client network

Examples of load management scenarios – 2/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (static), minimum charging current: 6 A



- 4 active charging stations.
- Load management is activated, otherwise the maximum current of the system will be exceeded (4 x 32 A = 128 A).
- The available power is distributed evenly across all active charging stations (60 A / 4 = 15 A).

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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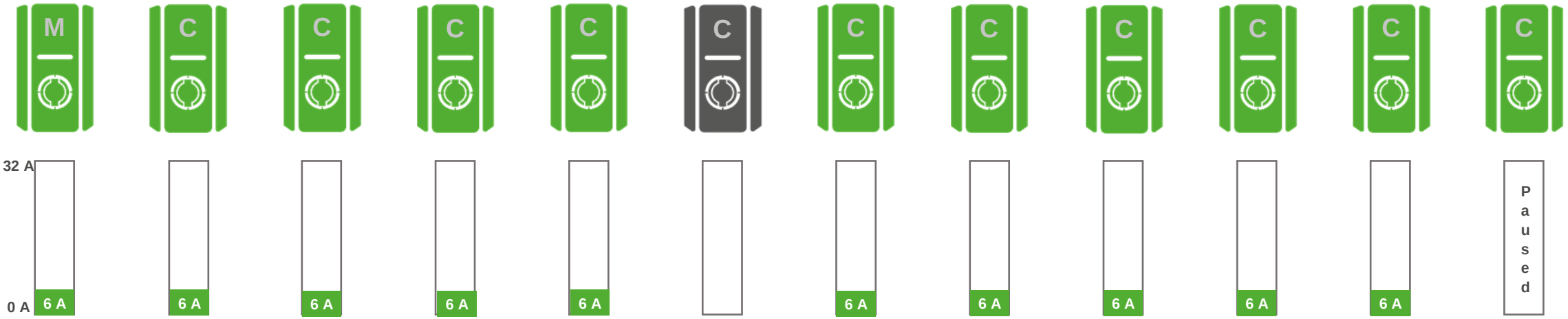
Load management in a master/client network

Examples of load management scenarios – 3/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (static), minimum charging current: 6 A



- 11 active charging stations, load management is active.
- The available power is distributed evenly across all active charging stations, but since the charging current falls below the minimum of 6 A (60 A / 11 = 5.45 A), a vehicle must be paused.
- The vehicle that has been charging the longest is paused for a maximum of 15 minutes.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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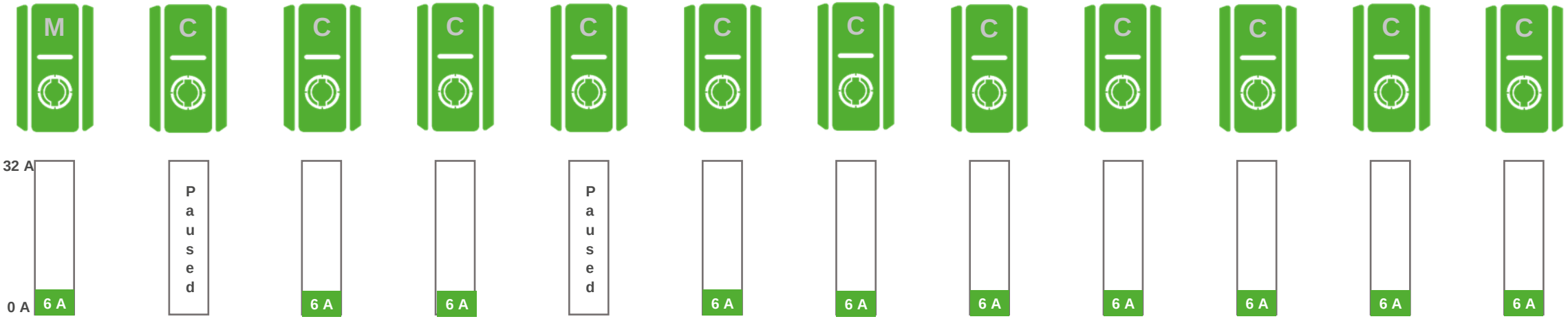
Load management in a master/client network

Examples of load management scenarios – 4/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (static), minimum charging current: 6 A



- 12 active charging stations, load management is active.
- Now 2 charge sessions must be paused to prevent falling below the minimum charging current.
- The last paused session is continued and the vehicles that have been charging the longest are paused for a maximum of 15 minutes.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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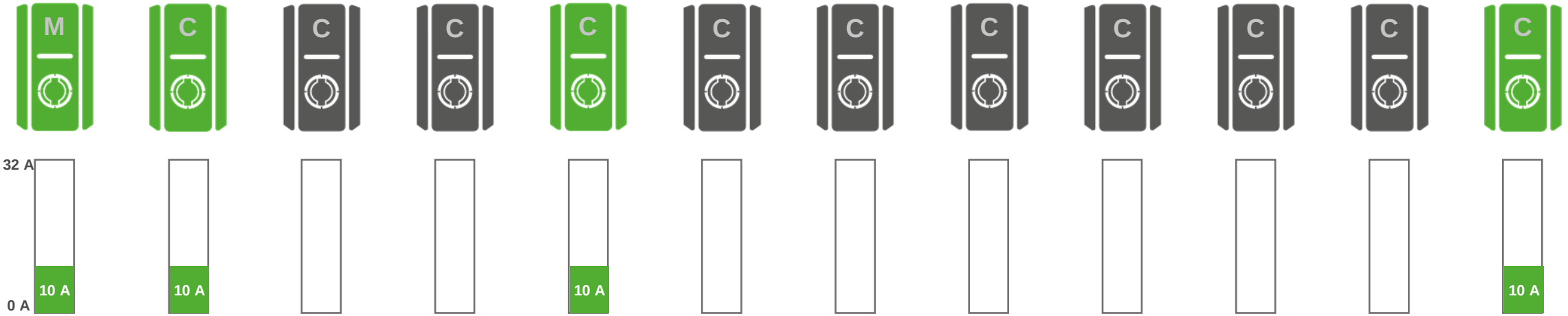
Load management in a master/client network

Examples of load management scenarios – 5/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (incl. dynamic control), minimum charging current: 6 A



- 4 active charging stations, load management is activated.
- Dynamic load management detects that only 40 A are available for the charging infrastructure due to higher loads from other consumers.
- The available power is distributed evenly across all active charging stations (40 A / 4 = 10 A).

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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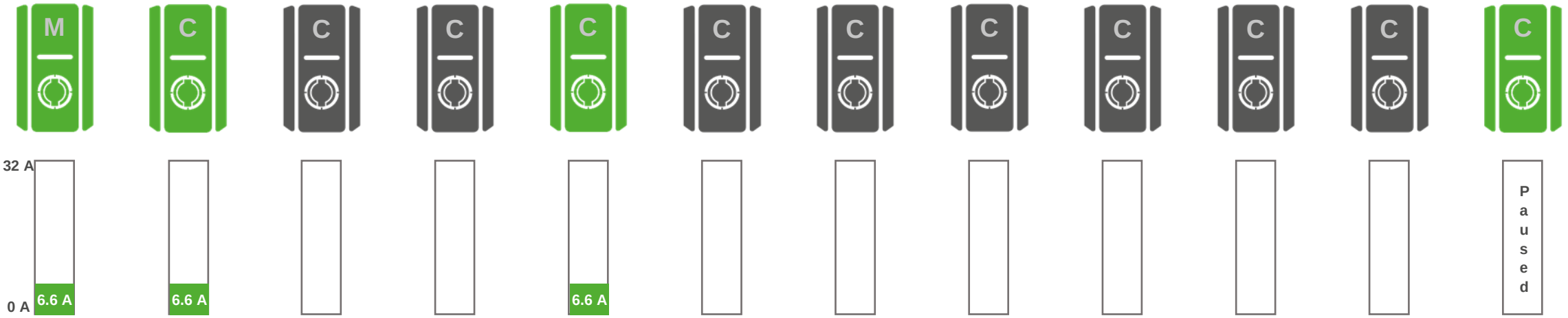
Load management in a master/client network

Examples of load management scenarios – 6/6

Master/client network with 12 charging stations, max. current for the entire system: 60 A (incl. dynamic control), minimum charging current: 6 A



- 4 active charging stations, load management is activated.
- Dynamic load management detects that only 20 A are available.
- The available power is distributed evenly across all active charging stations, but since the charging current falls below the minimum of 6 A (20 A / 4 = 5 A), a vehicle must be paused.
- The vehicle that has been charging the longest is paused for a maximum of 15 minutes.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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Installations with a central controller – KeContact M20

Load management with a central controller

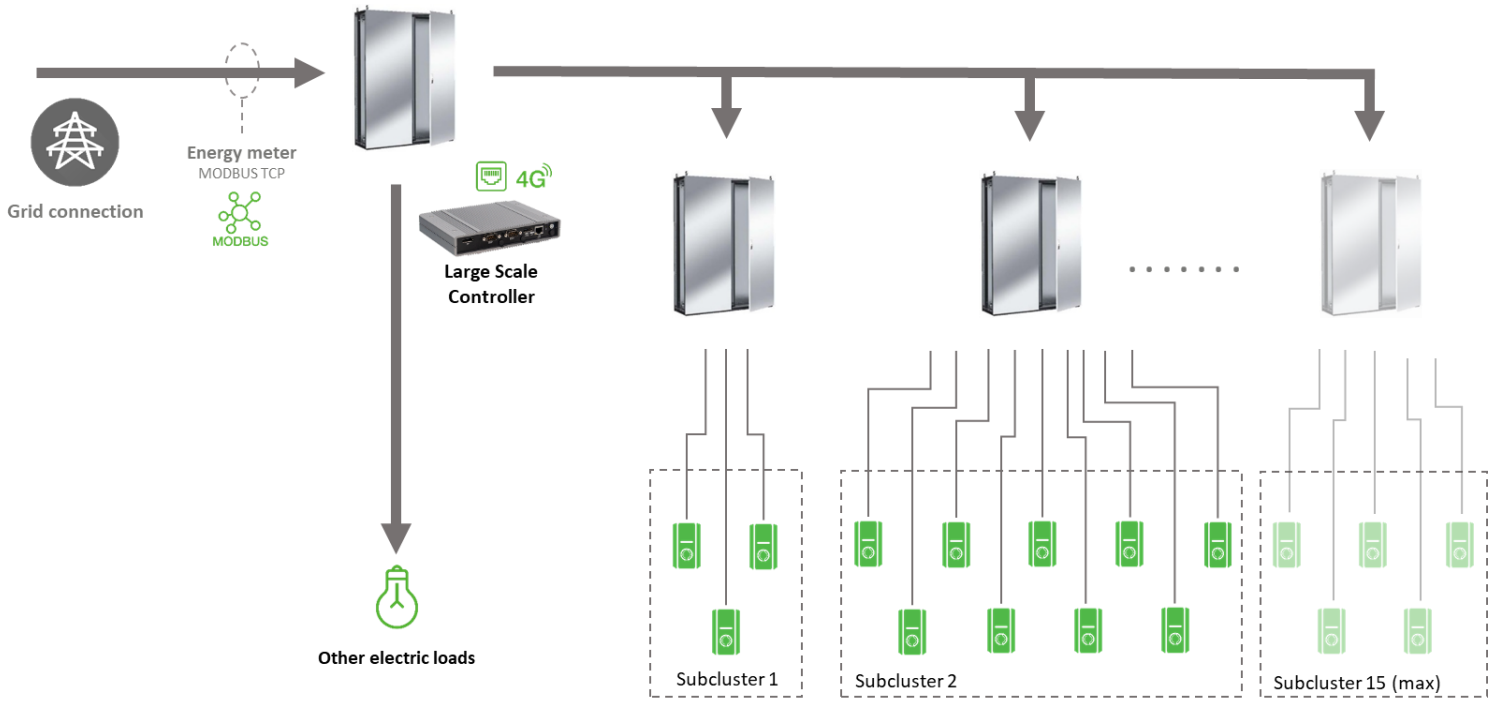
KeContact M20 Charging Management Controller at a glance

- KeContact M20 is an **external charge controller** for controlling up to **200 KeContact P30 c-series** charging stations.
- The M20 features **local, dynamic load management** and enables the **flexible distribution of free connected load** among the charging points at a single location.
- Due to its **compact dimensions**, the device fits in a control cabinet where it can be **protected** against damage and unauthorised access.
- The charging stations are **set up and managed** via a **local webinterface** to which a connection is established via Ethernet or mobile network.
- The standardised **OCPP communication protocol** allows **integration** into external ecosystems.

Load management with a central controller

KeContact M20 – dynamic load management and clusters

- Creation of up to 15 charging station **clusters**, which are taken into account in load management.
- A separate **current limit** can be defined for each cluster.
- **Dynamic load management** can be realised with an external Modbus TCP meter.



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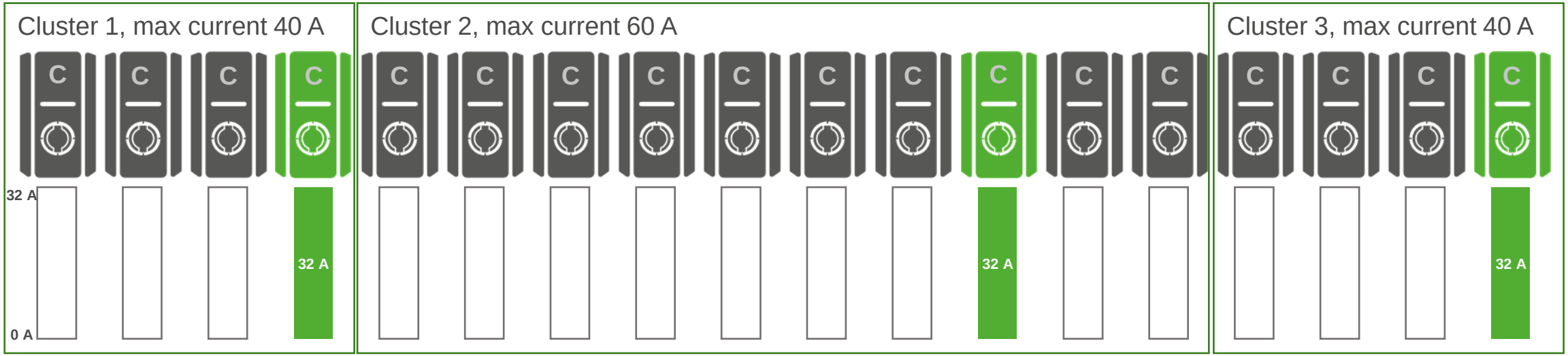
Load management with a central controller

Examples of load management scenarios – 1/4

Load management network with 18 charging stations in 3 clusters, max. current for the entire system: 100 A (static), minimum charging current: 6 A



- 3 active charging stations (one per cluster).
- Charging starts with the connected vehicle with the maximum charging current of the station (in this example 32 A, i.e. 22 kW).
- Load management is not yet active, since none of the limits for the maximum current (overall system, cluster 1/2/3) has been reached.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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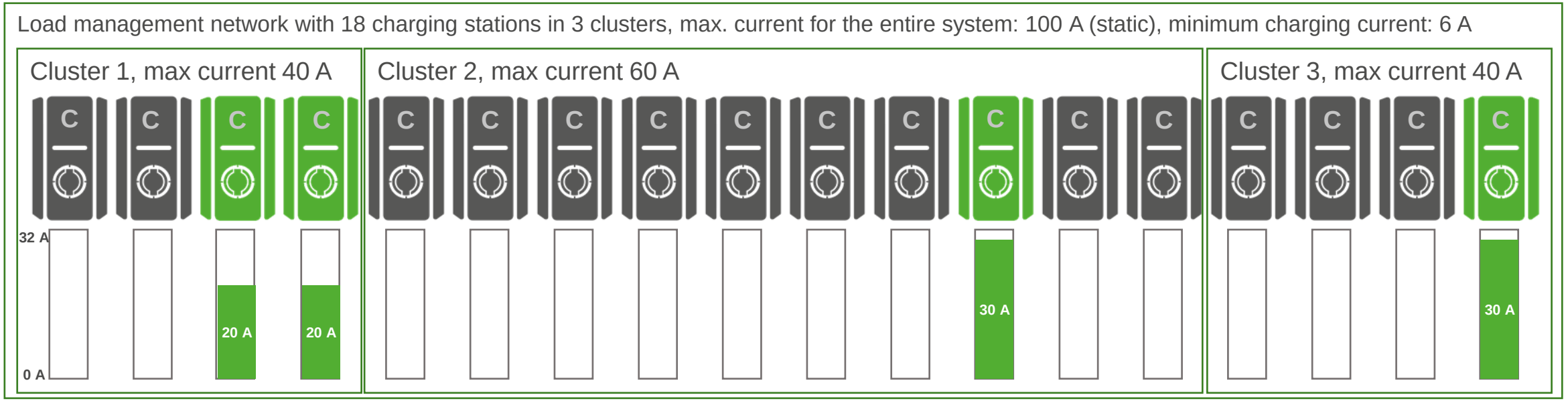
Load management with a central controller

Examples of load management scenarios – 2/4



- 4 active charging stations (2 in cluster 1, 1 each in clusters 2 & 3).
- Load management is activated, otherwise the maximum current of the system (4 x 32 A > 100 A) and the maximum current in cluster 1 (2 x 32 A > 40 A) will be exceeded.
- Equal distribution of the available current (100 A / 4 = 25 A), but cannot be utilised in cluster 1.
- Reduction of the current in cluster 1 (40 A / 2 = 20 A) and redistribution of the remaining current to other clusters.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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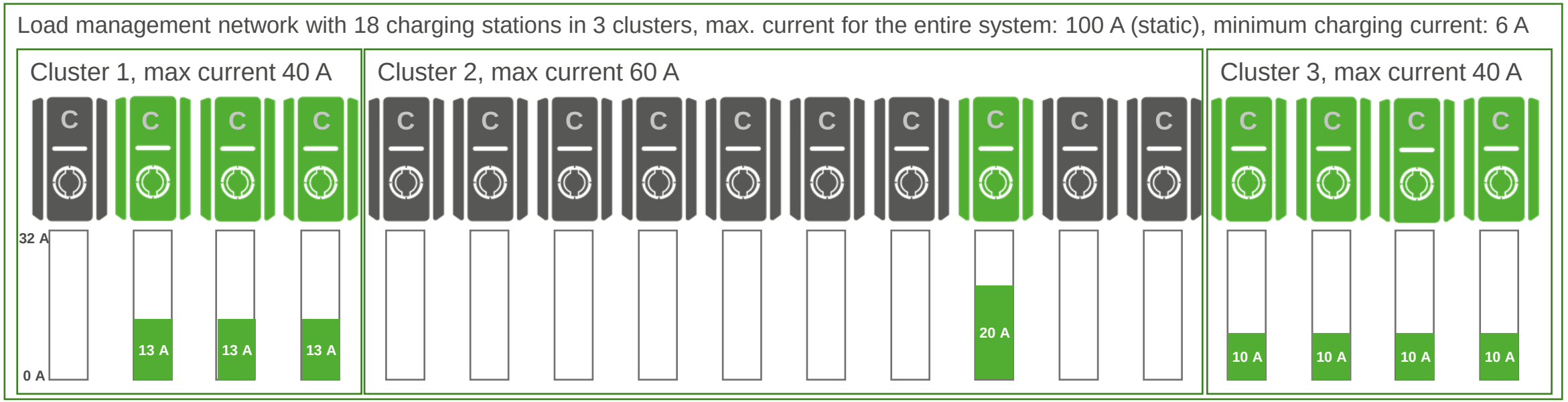
Load management with a central controller

Examples of load management scenarios – 3/4



- 8 active charging stations (3 in cluster 1, 1 in cluster 2, and 4 in cluster 3).
- Load management is activated, otherwise the maximum current of the system (8 x 32 A > 100 A) and the maximum current in cluster 1 (3 x 32 A > 40 A) and cluster 3 (4 x 32 A > 40 A) will be exceeded.
- For each charging station, it is calculated how much the charging current must be reduced in order not to exceed one of the limits and still provide the greatest possible charging power.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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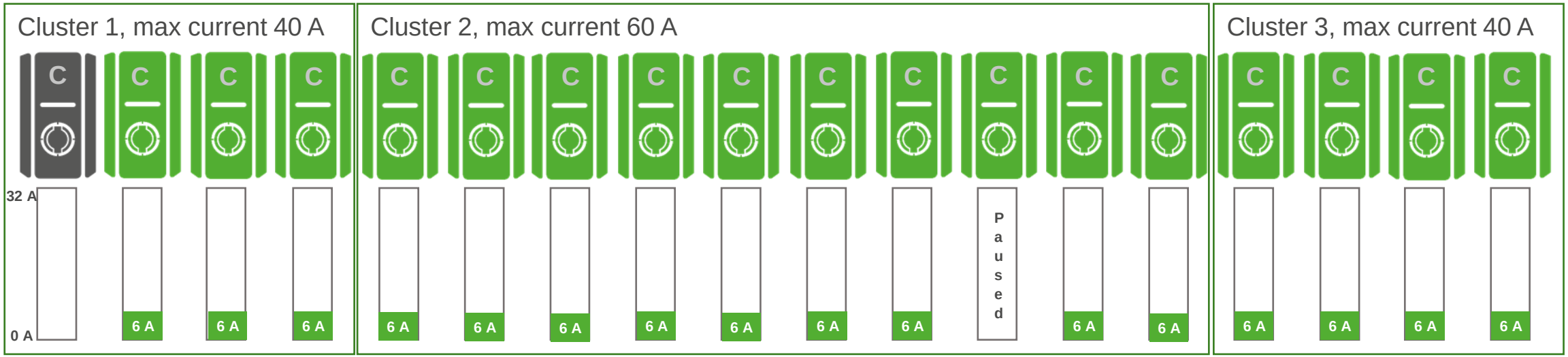
Load management with a central controller

Examples of load management scenarios – 4/4

Load management network with 18 charging stations in 3 clusters, max. current for the entire system: 100 A (static), minimum charging current: 6 A



- 17 active charging stations (3 in cluster 1, 10 in cluster 2, and 4 in cluster 3).
- Load management is activated, otherwise the maximum current of the system (8 x 32 A > 100 A) and the maximum current in cluster 1 (3 x 32 A > 40 A), cluster 2 (10 x 32 A > 60 A) and Cluster 3 (4 x 32 A > 40 A) is exceeded.
- The available power is distributed evenly across all active charging stations, but since the charging current falls below the minimum of 6 A (100 A / 17 = 5.88 A), a vehicle must be paused.
- The vehicle that has been charging the longest is paused for a maximum of 15 minutes.

Charging station WITHOUT connected vehicle

Charging station WITH connected vehicle

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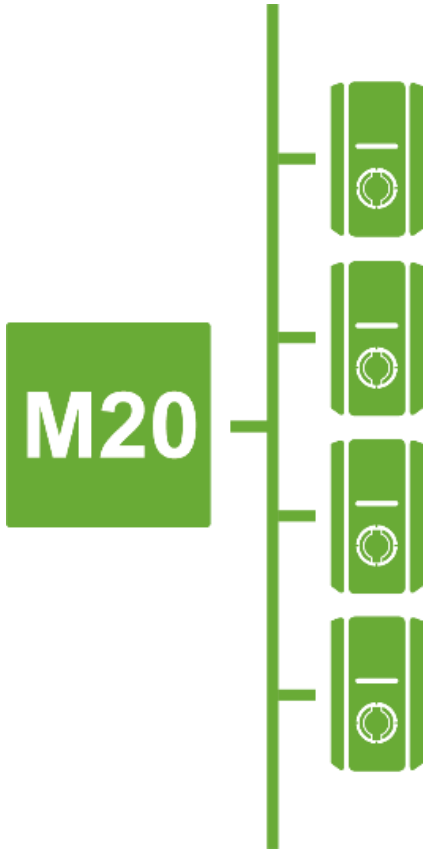
Load management with KEBA KeContact products

Recap of the advantages



Optimal use and distribution of available power

- Optimal and flexible use of available power
- Dynamic load management with external energy meter or with an OCPP backend

Central control and monitoring

- Convenient management of up to 200 KeContact c-series wallboxes
- Simple, central management of RFID cards & rights
- A single central communication point for integration into external ecosystems (OCPP) incl. integrated LTE modem and external antenna

Secure and cost-efficient

- On request, all captured data is stored only locally (on M20 or P30 x-series)
- Offline mode: Even if the internet connection is interrupted, load management is possible without restrictions and billing data is stored temporarily
- Cost savings in electrical installation through the targeted allocation of charging station clusters to existing fuses and power distribution systems
- One-off, transparent acquisition costs

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