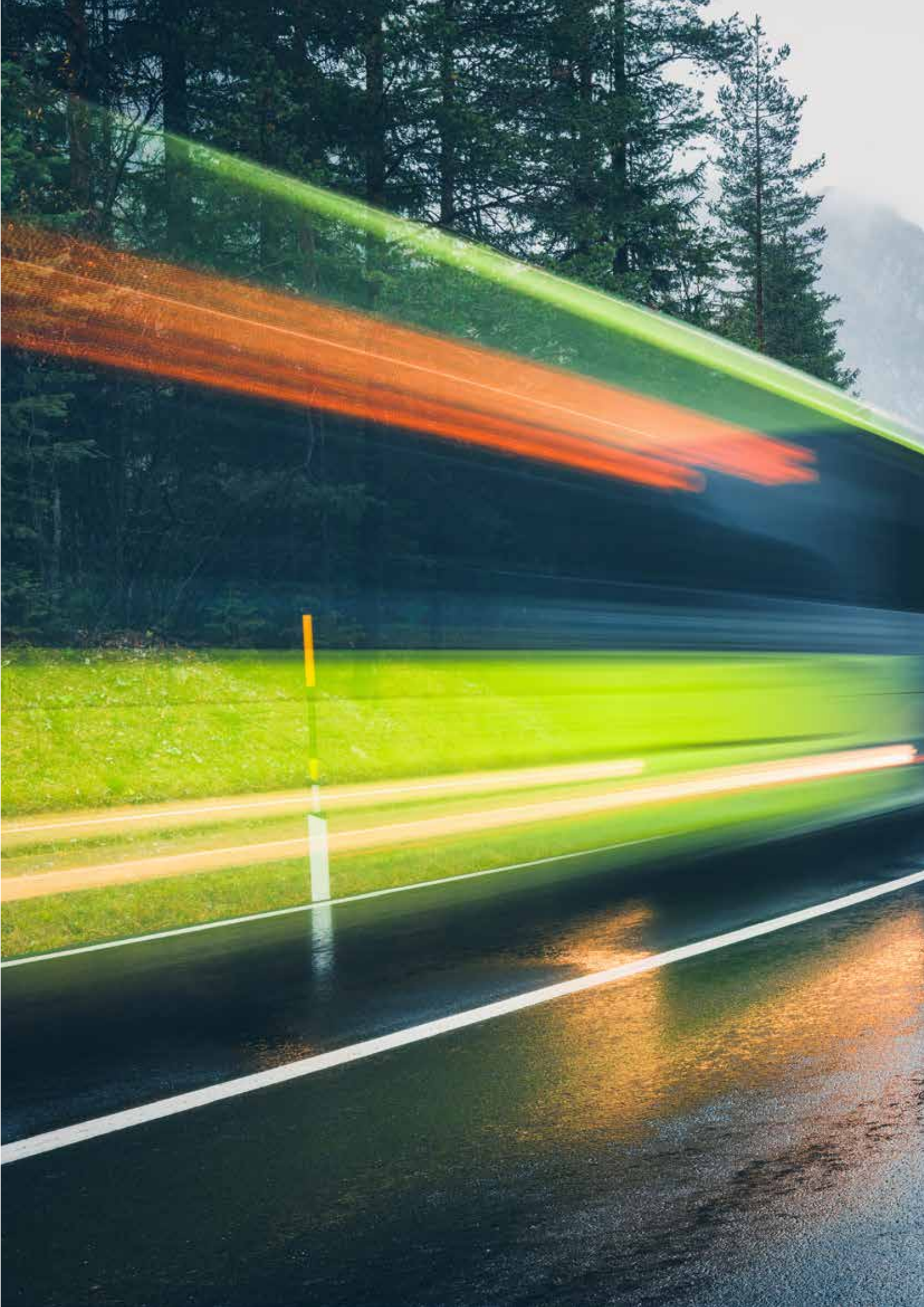


Solutions for **e-mobility**







> Content

> Jema Energy 05

> Business sectors 06

> Solutions for E-mobility 08

Engineering and support

Interoperability

Product range

ECI series

SIGMA series

Pantograph connection

Wall-box & Tilt-box

MECI 30

ASSURED Project

> Jema Services 20

> Data sheets 24



> Jema Energy

Jema Energy is specialised in the design and manufacture of electronic solutions.

The company was founded in 1953 and has supplied customised power supplies to a wide variety of clients in various sectors.

Jema's product ranges contain UPS systems for the energy, gas and oil sectors, solar inverters and quality energy solutions for the energy sector as well as customised power supplies for the research sector, including particle accelerators, nuclear fusion and high power magnetism laboratories.

Jema has developed electric bus and truck chargers and accessories and has always incorporated new functions arising from activities in railways, UPS and network integration.

Jema's knowledge and wide experience have allowed the combination of key elements such as control cards, communications, change of algorithms, HVAC and test them in various media to offer clients the latest technological innovations.

We are present in more than 90 countries and we have a technical service available for any plant. Our objective is to reduce your operating costs with on-demand maintenance services and the high reliability of our equipment.

Jema belongs to the Irizar Group, and industrial group in continuous growth with more than 130 years's history, a solid international presence and its own research and development centre. The Group is wholly committed to the brand, to technology and to sustainability.

> Business sectors



E-mobility

Solutions for electric heavy-duty vehicles, charging infrastructures and traction systems.

Electronic solutions

Design and manufacture of electronic solutions for cabin and passenger comfort.

Total product flexibility and customization.





Renewables, BESS, Grid quality and Hydrogen

Wind and photovoltaic power energy conversion equipment, intelligent networks and energy storage solutions.

Jema offers a complete turnkey systems to adapt energy installations and major consumers to the new requirements of electricity grid operators.

Big Science

Ad hoc solutions for atomic particle and nuclear fusion research laboratories, network quality and testbed solutions.



> Solutions for E-mobility

Charging infrastructures

The chargers developed by Jema Energy and high quality products designed to maximise the output of the installation and minimise operating and maintenance costs.





> Engineering and support

To solve the most basic questions about depot or line electrifying, Jema has a fleet simulation for working together and individually with each client.

The Engineering department works mainly on the following points:

- > Analysis and simulation for different scenarios
- > Charging study and implementation in depots
- > Smart charging system
- > Study of the best solution for the opportunity chargers

> Interoperability

Jema chargers are interoperable as per the DIN70121, ISO15118 and IEC61851 standards, allowing their use with any type of heavy-duty vehicles. Our chargers offer greater flexibility in the depot or line distributions.



> Product range

SIGMA series



MECI



ECL series



WALL-BOX & TILT-BOX



ECI SERIES

> *DEPOT CHARGERS*

ECI SERIES chargers has a wide range of indoor and outdoor for depot and/or line installations. With a range from 50 kW to 600 kW chargers give you the opportunity to charge your vehicle slowly or fastly.

Main features:

- > Remote communication modules via MODBUS TCP/IP u OCPP 1.6 according to VDV 261
- > Interoperable according to IEC61851-1-23-24, DIN70121 & ISO15118 standards
- > Network analyser included
- > Bidirectional: G2V and V2G
- > Central integrated charging function
- > Cable, pantograph or both connection



ECI SERIES

> *OPPORTUNITY CHARGERS*

Recommended when the vehicle has insufficient range to complete the working day and must be charged during the service. The charging stations are placed at strategic points in cities, but there is also the possibility of the complete automation of slow charging in depots with a structure of contacts gantries installed over the parking space.

ECI SERIES opportunity chargers have powers of between 300 kW and 600 kW allowing a vehicle to be charged to up to 85% of SOC in under five minutes. All the chargers are bidirectionals for G2V and V2G.

As with depot chargers, opportunity chargers are interoperable according to ISO15118 and IEC61851 standards. They also have communications for remote control by MODBUS TCP/IP or OCPP 1.6.

Main features:

- > Bidirectional chargers: G2V and V2G
- > Possibility of integrate the charger in buildings or supply of a fully-equipped container for low or medium voltage connection.
- > Opportunity chargings are via pantograph with 4-5 poles
- > Inverted or vehicle roof pantograph
- > The tunkey solution connects the opportunity charger to the medium voltage system with the certificate required by the operators.



SIGMA SERIES

> *DEPOT & OPPORTUNITY CHARGERS*



The SIGMA SERIES chargers come to the emobility market as the most versatile and modular range of heavy-duty chargers in Jema's history.

The SIGMA is designed and manufactured so that a single charger can solve the multiple needs that customers may encounter.

SIGMA: modularity and multiple DC output possibility (from 60 kW to 360 kW)

Main features:

- > Interoperable according to IEC61851-1-23-24, DIN70121 e ISO15118 standards
- > Cable, pantograph or both connection
- > MODBUS TCP or OCPP 1.6 VAS according to VDV 261
- > Low harmonic distorsions
- > Compact with a modular design, reducing maintenance time and space

PANTOGRAPH CONNECTION

> *UP/DOWN*



PANTOGRAPH UP

Pantograph connection is recommended when the vehicle has insufficient autonomy to complete the journey and needs charging along the way.

The Opportunity chargers are designed and developed to offer successful charge via up/down pantograph.

The system comprises automatic pantograph contact, wireless communication, contact pates and infrastructure equipment that automatically connects the vehicle with a pantograph.

PANTOGRAPH DOWN



WALL-BOX & TILT-BOX



Main features:

- > Connects with the electric vehicle to the same charger via CCS2 or pantograph
- > Different configurations depending on the selected energy output and power
- > Two CCS2 and two pantograph
- > Installation in depot chargers up to 600 kW
- > Compact with a modular design, reducing maintenance time, noise and space

Jema Energy's R&D department has developed new solutions with different output technologies for the charger-vehicle connection.

The Tilt-box allows a charger to be connected to either via CCS2 cable or pantograph up/down.

The most versatile Wall-Box is adapted for connection to 100 meters cable and inverted pantographs.



MECI 30 kW

> *DC FAST CHARGING STATION*



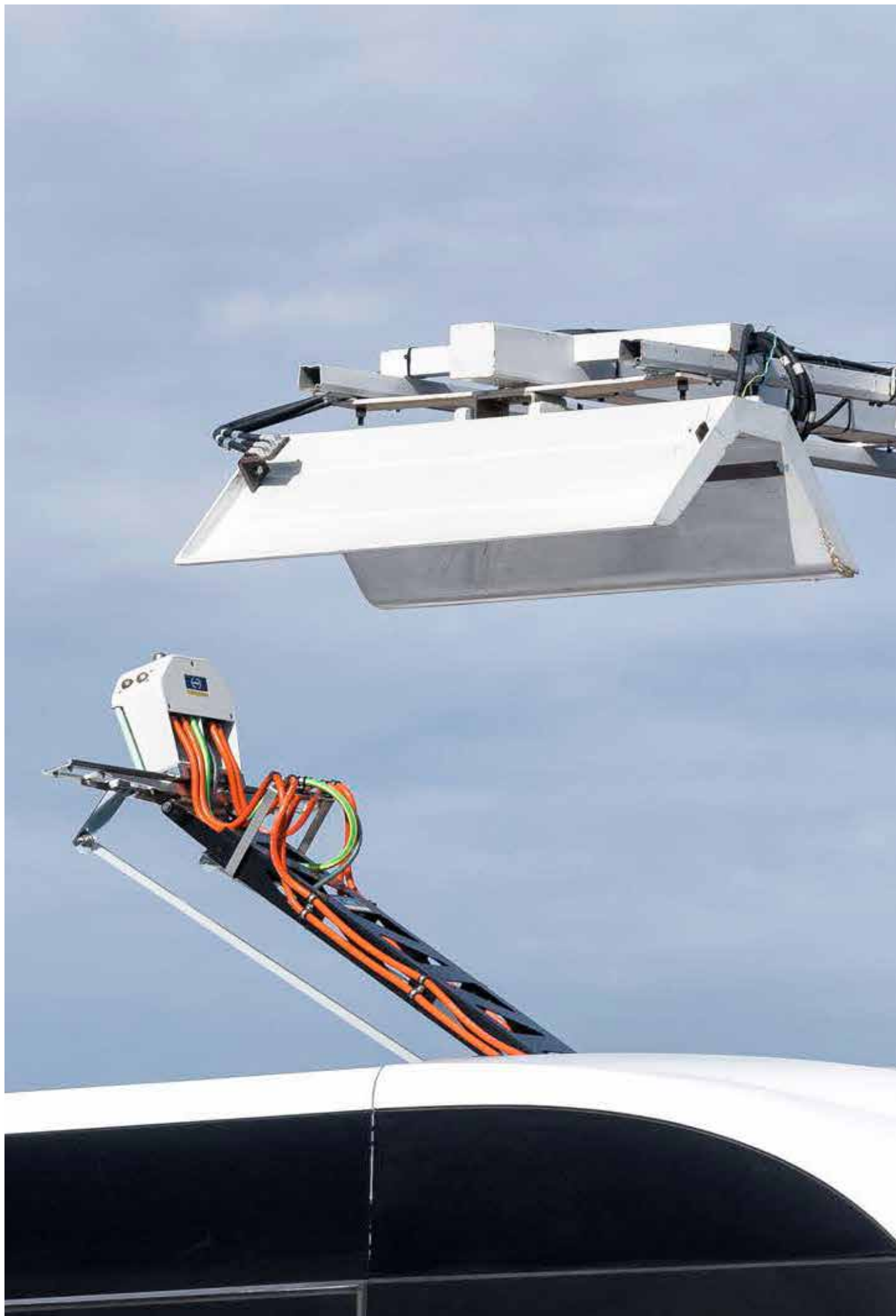
Main features:

- > Indoor and Outdoor
- > Suitable as a backup charger
- > CCS2 connection
- > Three-phase connector 150-1000 Vdc
- > Easy carrying by wheels

ADDITIONAL SOLUTIONS

In order to provide the complete equipment for the projects, we offer a series of additional ones that helps to adapt the facilities to the needs of the clients:

- > Electrical reed
- > RFID card
- > Wall-Box extensible pole of 100m and additional pole of 2m



> ASSURED PROJECT

The ASSURED involves the electrification of urban commercial vehicles and their integration with fast charging infrastructures in various European cities.


To do this, the project will test innovative solutions for heavy and medium service vehicles with various concepts for interoperable charging infrastructures to be developed in business cases taking into account the commercial and social costs and benefits.

The consortium comprises 39 partners in 12 European countries that cover the entire value chain of heavy and light urban transport vehicles and includes authorities and public transport operators, bus makers, truck makers, light vehicle makers, charging solutions suppliers, energy suppliers, national and international associations, cities, consultancies and research centres.

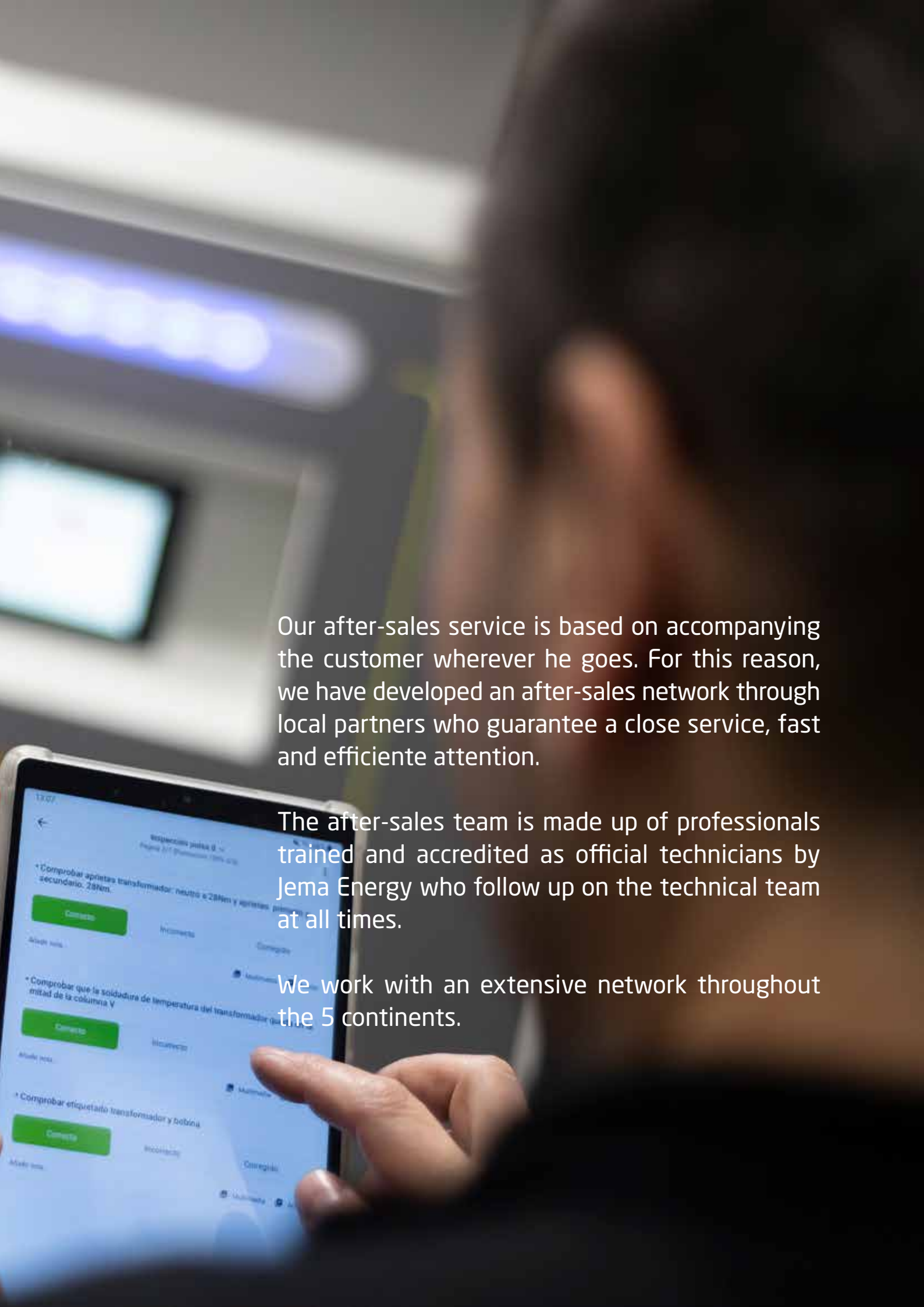
Within the project, Jema participates in the definition of the open points in the current standard:

- Requirements for charging stations
- Adapting of the quick charging protocol, implementing test cases and testing interoperability and compliance.
- Demonstration of a real usage case in which various charging strategies are implemented to increase efficiency and, therefore, the operating frequency with the same number of vehicles



A hand holding a stylus is pointing at a large digital screen. The screen displays a yellow star graphic. The background is a blurred office environment with a desk and a computer monitor.

> Jema Service
adapted to your needs



Our after-sales service is based on accompanying the customer wherever he goes. For this reason, we have developed an after-sales network through local partners who guarantee a close service, fast and efficient attention.

The after-sales team is made up of professionals trained and accredited as official technicians by Jema Energy who follow up on the technical team at all times.

We work with an extensive network throughout the 5 continents.

> Warranty

We provide the highest quality and best reliability. Our systems are designed and manufactured in accordance with international standards and comply with safety regulations.

Furthermore, we provide integral guarantee services to ensure your investment.

- > Equipment designed to have a long useful life
- > Easy maintenance of the equipment
- > Optional warranties: basic extended or availability warranty extension

In addition, during the service life of the equipment, Jema offers system updates (software), adjustments to new regulations and the sending of spare parts.

	Basic Warranty	Basic Warranty Extension	Availability Warranty Extension
Duration (years)	2	2-15	1-15
Material	●	●	●
Corrective level	●	●	●
Preventive	●	●	●
Spare Parts Availability	●	●	●
Remote Support	●	●	●
Response time	●	●	●
Availability	●	●	●

● Included

● Optional

> Technicians training

As part of the basic warranty Jema provides a first training course to O&M team in order to reach the knowledge to carry out level A in preventive and corrective maintenance.

SUPPORT DOCUMENTATION

- > As built documents
- > User manual
- > Maintenance plan
- > Diagnostic tools

HEALTH, SAFETY AND ENVIRONMENTAL

- > Risks prevention, Health and Safety instructions
- > Use of personal protection equipment
- > Management of hazardous materials and substances

HOMOLOGATION OF TECHNICIANS

After the training process, Jema certifies that the technicians have the necessary skills and capabilities to perform predictive maintenance and make the diagnosis in corrective maintenance.

> Asset management

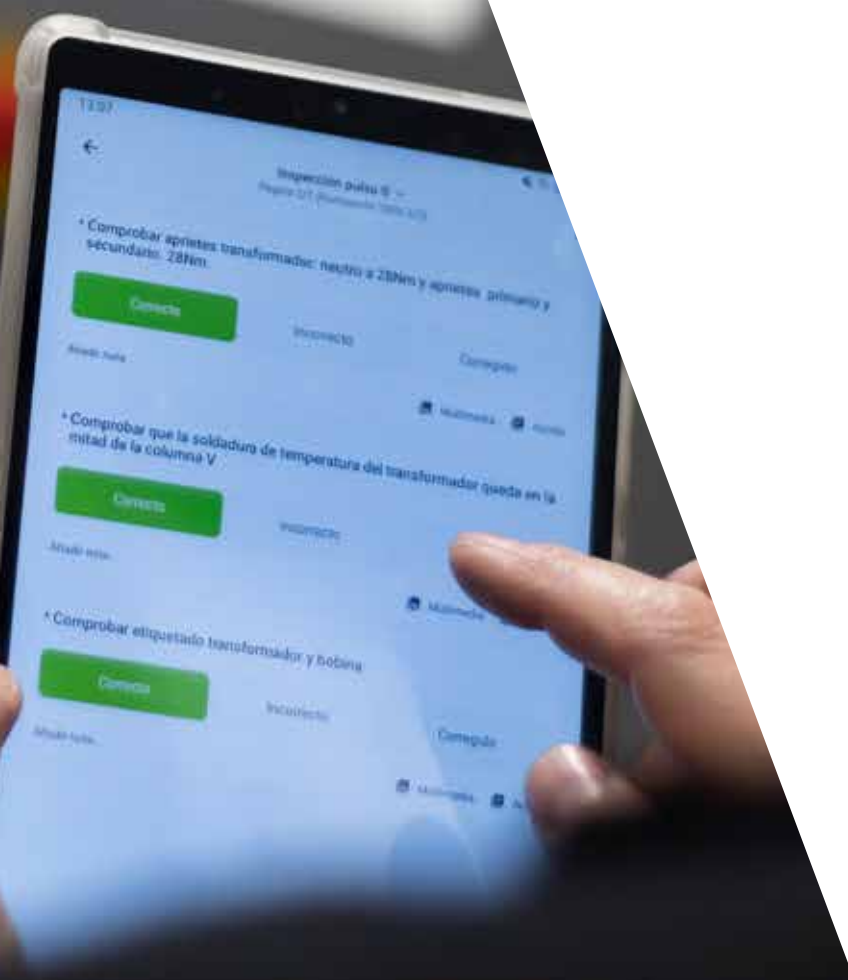
Asset management is based on principles such as knowledge, planning, organization and integrated management. It aims to optimize the performance of the equipment and minimize its cost, as well as improve the service offered.

It includes:

- > Digital maintenance Management through our iSERVICE
- > Manage monitor of the equipment through monitoring systems
- > Create work orders and maintenance plannings
- > Generate periodic reports for the client
- > Alarm and incidence analysis of every plant and system
- > Blg Data analysis, Benchmark and alarm log management



> Data sheets



> ECI series

50 · 150

	ECI 50M 8 / ECI 50P	ECID 50M 8 / ECID 50P
> INPUT DATA		
Input voltage	400 V AC 3L + N PE	
Max. input power	50 kVA	102 kVA
Max. input current	82 A	163 A
Frecuency	50/60 Hz	
Galvanic isolation	Yes	

> OUTPUT DATA		
Output power (Pnom)	50 kW	2x50 kW
Output voltage range	480-800 VDC	
Max. current	105 A	
Control Structure	Logic control and DSP technology, SVM	
Soft start	Yes	

> PROTECTIONS		
Over-voltage/ Over-current	Inputs and outputs	
Inverse polarity	Yes	
Insulation leak detection system	Yes	
Over-temperature	Yes (includes power limitation)	
Frequency & Voltage max/min	Yes	

> GENERAL DATA		
Connection to electric vehicle	CCS: 8 m long or pantograph	
Communications	Ethernet communications port (to order)	
OCPP 1.6	Yes	
Standards	CE MARKING, IEC 61851, DIN70121, ISO 15118	
Operating temperature	-20°C to +50°C @ nominal power	
Relative humidity	10%-95% without condensation	
Dimensions	2043 x 812 x 934	
Color	White (RAL9002) and customizable sides (<i>Consult us</i>)	
Weight	450 kg	950 kg
Access protection (IP)	IP 54	
Mechanical protection (IK)	IK10	
Ventilation	Forced	
Consumption at max. power	540 VA	480 VA
Heating consumption (disconnected)	<840 W	<850 W
Disconnected consumption	<100 W	

ECI 100M 8 / ECI 100P

ECI 150M / 150P

400 V AC 3L + N PE	
102 kVA	155 kVA
163 A	228 A
50/60 Hz	
Yes	
100 kW	
150 kW	
480-800 VDC	
200 A	200 A (CCS2)/375 A
Logic control and DSP technology, SVM	
Yes	
Inputs and outputs	
Yes	
Yes	
Yes (Includes power regulation)	
Yes	
CCS: 8 m long or pantograph	
Ethernet communications port (to order)	
Optional	
CE MARKING, IEC 61851, DIN70121, ISO 15118	
-20°C to +50°C @ nominal power	
10%-95% without condensation	
2043 x 812 x 934	1800 x 1200 x 900
White (RAL9002) and customizable sides (<i>Consult us</i>)	
950 kg	1400 kg
IP54	
IK10	
Forced	
540 VA	
<850 W	
<100 W	

> OPORTUNITY CHARGERS

300 · 500 · 600

	ECI 300 kW	ECI 500 kW
> INPUT DATA		
Input voltage	400 VAC 3F + N+ T	260 V AC + 3F + N + T
Max. input power	310 kVA	515 kVA
Max. input current	600 A	1200 A
Frecuency	50/60 Hz	
Galvanic isolation	Yes	

> OUTPUT DATA		
Output power (Pnom)	300 kW	500 kW
Output voltage range	480-850 VDC	
Max. current	1000 A	
Control Structure	Logic control and DSP technology, SVM	
Soft start	Yes	

> PROTECTIONS		
Over-voltage/Over-current	Inputs and outputs	
Inverse polarity	Yes	
Insulation leak detection system	Yes	
Over-temperature	Yes (includes power regulation)	
Frequency & Voltage max/min	Yes	

> GENERAL DATA		
Connection to electric vehicle	Pantograph up/down	
Communications	PRS-485 Communications port (Option: Ethernet, GPRS...)	
OCPP 1.6	Yes	
Standards	CE MARKING, IEC 61851, DIN70121, ISO 15118	
Operating temperature	-20°C to +50°C @ nominal power	
Relative humidity	10%-95% without condensation	
Dimensions	2000 x 2800 x 750	
Color	White (RAL9002)	
Weight	2225 kg	
Access protection (IP)	IP 20	
Mechanical protection (IK)	IK10	
Ventilation	Forced/5000m ³ /h	
Consumption at max. power	2000 VA	
Heating consumption (disconnected)	<350 W	
Disconnected consumption	<100 W	

ECI 600 kW

315 V AC 3F + N +T

620 kVA

1200 A

50/60 Hz

Yes

600 kW

480-850 VDC

1000 A

Logic control and DSP technology, SVM

Yes

Inputs and outputs

Yes

Yes

Yes (Includes power regulation)

Yes

Pantograph up/down

PRS-485 Communications port (Option: Ethernet, GPRS...)

Yes

CE MARKING, IEC 61851, DIN70121, ISO 15118

-20°C to +50°C @ nominal power

10%-95% without condensation

2000 x 2800 x 750

White (RAL9002)

2225 kg

IP20

IK10

Forced/5000m³/h

2000 VA

<350 W

<100 W

> SIGMA series

60 · 90 · 120 · 150 · 180

	60	90	120	150
> INPUT DATA				
Input voltage	400 VAC 3Ph + N+ T / 480 VAC 3Ph + N + PE			
Max. input power	64 kVA	95 kVA	125 kVA	155 kVA
Max. input current	116 A	174 A	232 A	290 A
Equipment harmonic distortion	<5% 0.99			
Efficiency	> 95%			
Frequency	50/60 Hz			
Galvanic isolation	Yes			

> OUTPUT DATA				
Output power (P _{nom})	60 kW	90 kW	120 kW	150 kW
Output voltage range	150-1000 VDC			
Max. current	200 A	250 A	250 A	250 A
Control Structure	Logic control and DSP technology, SVM			
Soft start	Yes			

> PROTECTIONS				
Over-voltage/Overcurrent	Inputs and outputs			
Inverse polarity	Yes			
Insulation leak detection system	Yes			
Over-temperature	Yes (includes power regulation)			
Frequency & voltage max/min	Yes			

> GENERAL DATA				
Connection to electric vehicle	CCS: 5 m (200 A)		CCS: 5m (250 A) or Pantograph	
Communications/ OCPP	Communications port Ethernet/1.6			
Standards	EC, IEC 61000, IEC 61851, DIN70121, ISO 15118			
Operating temperature	-20°C to +40°C @ nominal power			
Relative humidity	10%-95% without condensation			
Dimensions	2150 x 800 x 800			
Color	White (RAL7035)			
Weight	425 kg	430 kg	450 kg	450 kg
Access protection (IP)	IP 54/ IK10			
Pollution degree	P3			
Corrosion	C4M			
Ventilation	Forced Air			
Consumption disconnected	Without heating <180 W / with heating < 850 W			

180	60D	90D	60T
400 VAC 3Ph + N+ T / 480 VAC 3Ph + N + PE			
186 kVA	125 kVA	186 kVA	186 kVA
348 A	232 A	348 A	348 A
<5% 0.99			
> 95%			
50/60 Hz			
Yes			

180 kW	2*60 kW / 120 kW	2*90 kW / 180 kW	3*60 kW / 1*60 kW + 1*120 KW 180 kW
150-1000 VDC			
CCS 250 A/ Panto 375 A	CCS 250 A / Panto 375 A		
Logic control and DSP technology, SVM			
Yes			

Inputs and outputs			
Yes			
Yes			
Yes (Includes power regulation)			
Yes			

CCS: 5m (250 A) or Pantograph	2 outlets CCS: 5 m (250 A) / Pantograph	3 outlets CCS: 5 m (250 A) with remote box / Pantograph
Communications port Ethernet/1.6		
EC, IEC 61000, IEC 61851, DIN70121, ISO 15118		
-20°C to +40°C @ nominal power		
10%-95% without condensation		
2150 x 800 x 800		
White (RAL7035)		
480 kg	450 kg	480 kg
IP 54/ IK10		
P3		
C4M		
Forced Air		
Without heating <180 W / with heating < 850 W		

> SIGMA series

300 · 360 · 120D · 180D · 120T

	300	360
> INPUT DATA		
Input voltage	400 VAC 3Ph + N+ T / 480 VAC 3Ph + N + PE	
Max. input power	310 kVA	375 kVA
Max. input current	580 A	696 A
Equipment harmonic distortion	<5% 0.99	
Efficiency	> 95%	
Frequency	50/60 Hz	
Galvanic isolation	Yes	

> OUTPUT DATA		
Output power (P _{nom})	300 kW	360 kW
Output voltage range	150-1000 VDC	
Max. current	700 A per pantograph	700 A per pantograph
Control Structure	Logic control and DSP technology, SVM	
Soft start	Yes	

> PROTECTIONS		
Over-voltage/Overcurrent	Inputs and outputs	
Polarity reversal	Yes	
Insulation leak detection system	Yes	
Over-temperature	Yes (includes power regulation)	
Frequency & voltage max/min	Yes	

> GENERAL DATA		
Connection to electric vehicle	Output 1 pantograph	Output 1 pantograph
Communications/ OCPP	Communications port Ethernet/1.6	
Standards	EC, IEC 61000, IEC 61851, DIN70121, ISO 15118	
Operating temperature	-20°C to +40°C @ nominal power	
Relative humidity	10%-95% without condensation	
Dimensions	2 x (2150 x 800 x 800) + 1x (1810 x 400 x 800)	
Color	White (RAL7035)	
Weight	960 kg	
Access protection (IP)	IP 54/ IK10	
Pollution degree	P3	
Corrosion	C4M	
Ventilation	Forced Air	
Consumption disconnected	Without heating <3600 W / with heating < 1650 W	

120D	180D	120T
400 VAC 3Ph + N+ T / 480 VAC 3Ph + N + PE		
248 kVA	375 kVA	375 kVA
464 A	696 A	696 A
<5% 0.99		
> 95%		
50/60 Hz		
Yes		
2*120 kW / 240 kW	2*150 kW / 300 kW	3*120 kW / 1*120 kW + 1/240 kW / 360 kW
150-1000 VDC		
700 A per pantograph (non-simultaneous)		
Logic control and DSP technology, SVM		
Yes		
Inputs and outputs		
Yes		
Yes		
Yes (Includes power regulation)		
Yes		
Output to 2 pantographs		Output to 3 pantographs
Communications port Ethernet/1.6		
EC, IEC 61000, IEC 61851, DIN70121, ISO 15118		
-20°C to +40°C @ nominal power		
10%-95% without condensation		
2 x (2150 x 800 x 800) + 1x (1810 x 400 x 800)		
White (RAL7035)		
960 kg		
IP 54/ IK10		
P3		
C4M		
Forced Air		
Without heating <360 W / with heating < 1650 W		

> WALL-BOX

> INPUT DATA	
Feeding	230 VDC

> COMMUNICATIONS WITH CHARGER	
Ethernet	<100 mm
Optical fibre	> 100 mm

> GENERAL DATA	
Dimensions	800*400*250 mm
Weight	400 kg

> TILT-BOX 500 & 1000

	ECI	SIGMA
> INPUT DATA		
Input voltage	550 Vdc to 800 Vdc	150 Vdc to 1000 Vdc
Input current range	1000 A	

> OUTPUT DATA		
Output voltage	550 Vdc to 800 Vdc	150 Vdc to 1000 Vdc
Output current range	1000 A	

> GENERAL DATA	
Type of wiring	Copper / aluminium
Max. input power section	4 x 240 mm ²
Max. output power section	4 x 240 mm ²
Max. output power ground section	2 x 240 mm ²
Max. power section	2.5 mm ²
Dimensions	800 * 400 * 250
Weight	-

**JEMA Energy S.A.**

Paseo del Circuito 10
20160 Lasarte-Oria, Gipuzkoa, Spain
Tel. +34 943 376 400
Fax. +34 943 371 279
Email: jema@jemaenergy.com

JEMA Energy México

Av. Las Misiones, 13 3ª Etapa
Parque Industrial Bernardo Quintana
Municipio El Marqués 76249 Querétaro, Mexico
Tel. +55 442 238 25 00
Email: jema.mexico@jemaenergy.com

JEMA Energy USA LLC

7545 Irvine Center Dr Suite 200
Irvine, CA 92618, USA
Tel. +1 (402) 208 7494
Email: jema.usa@jemaenergy.com

JEMA Energy Brasil

Rodovia Marechal Rondon Km 252,5
CEP: 18607-810 Botucatu SP, Brazil
Tel. +55 14 38118000 2371
Email: jema.brasil@jemaenergy.com