



Electric Vehicles: Enabling Infrastructure

engineering intelligent solutions

Lucy Electric provides innovative products and solutions that support electric vehicle charging networks

The increase in electric vehicles is already having a major impact on energy network management. This will only increase as numbers of EVs grow rapidly.

Providing the infrastructure, knowledge and expertise, both Lucy Electric and its sister company Lucy Zodion are ideally equipped to provide end-to-end e-mobility ecosystems.

From monitoring and managing network infrastructure to connected, adaptive onstreet EV solutions, together, we have a wealth of experience ensuring our capability to future-proof smart city and home solutions.

From home to street to forecourt, from slow to ultra-fast charging, we provide next generation intelligent devices to make smart solutions which are connectable across the electrical infrastructure.

Our knowledgeable and experienced teams can design, specify and deliver the right solution to meet your EV infrastructure needs.

To find out more about us, visit: www.lucyelectric.com



Electrification of transport

Overview

The electrification of transport is gathering momentum as demonstrated in a few recent publications, including "Committee for Climate Change", "London Delivery Plan" and "UK Net Zero 2050 Targets" papers.

To meet this demand, several electric vehicle (EV) infrastructure solutions can be deployed, with differing impacts to the network. These infrastructures serve users from residential, business premises, motorway services, to delivery vehicle hubs.

Network Connections and Monitoring

Residential and commercial EV charging points are being connected to existing installations, which means that Distribution Network Operators (DNO's) have limited to no visibility of the changing load parameters on their network. When mixed with roof top solar PV, this adds further complexity to the network load profile.

New ultra-fast charger clusters also require a dedicated feed from the DNO. This is referred to as a Secondary Substation (or Package Substation), and typically comprises of:

- 11 kV Ring Main Unit (RMU)
- Medium voltage/low voltage (MV/LV) Transformer
- Low Voltage Distribution Panel
- Remote Terminal Unit (RTU).

Network monitoring

The last mile of the distribution network has previously been all but invisible, but companies can no longer afford to have the low-voltage network as a data blind-spot. The rapid growth in disruptive technologies such as energy storage and electric vehicles, alongside the increased use of renewables and distributed energy resources is having a major impact on energy network management.

How we can help

The mix of new infrastructure requires upgrades to existing networks, monitoring and control of the network to deliver the flexibility customers demand. This has to be managed in conjunction with the increasing flexibility from renewable generation sources.

With over 200 years of history and considerable experience in electrical networks, Lucy Electric and Lucy Zodion are ideally placed to deliver a range of solutions for EV charging infrastructure.

This ranges from Package Substations for new high speed (150 kW and above) EV chargers and a new EV pre-wired Feeder Pillar for multi-user locations, to EV charging connections in street lights and a range of Cut Outs for residential applications.

Our Gemini 3 RTU range enables local control to ensure flexibility of the network is maintained, and our GridKey LV monitoring solution provides an understanding of the available capacity on the local networks allowing for improved planning.





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Package substation

Integrated medium and low voltage power distribution cabinet and a fluid filled distribution transformer

- Offer a full end-to-end solution from initial specification, engineering, build, contract / project management, delivery to site
- Extensive sales and tendering support providing expert guidance, working in collaboration with the end client to ensure specification is met and prompt tender return
- Offering a competitive / selective solution with a wide range
 of product options
- Not tied to any specific transformer manufacturer providing full flexibility, choice and the ability to comply with all DNO / IDNO and general industrial specification requirements

Benefits

- One point of contact
- UK stock reducing lead-times
- Pre-assembled improving installation times
- Technical expertise and support, end-to-end
 Competitive market-leading products in one 'Lucy Electric' solution
- Approved by DNO / IDNO (G81 recommendations)
- Fully ENA (Energy Networks Association) assessed
- Fully Lucy Electric warranted solution

Transformers

We can provide a wide range of transformers to suit various application needs (typically 315, 500, 800, 1000, 1250, 1500 A (higher ratings can be provided on request)

- All Transformers provided will be to the very latest EU (Eco loss) standards and recommendations
- Extremely low noise making design to comply with the local requirements
- Highly energy efficient with very low eddy current and hysteresis losses
- Free breathing and hermetically sealed variants available. (Cast resin variants can be supplied on request)
- Mineral oil (standard) or high fire point fluid options (Midel, Silicone)
- ESI unit type (HV and LV connections on the same side), or BEBS style (HV and LV connections) on opposite side Transformers are available







Package substation equipment

Sabre RMU

SF₆ insulated with vacuum circuit breaker protection

- Up to 24 kV and 630 A ratings
- Non-extensible, extensible, and modular range
- IP54 for outdoor installation without requiring a kiosk
- Seamless integration with SCADA network for remote operation and control
- Maintenance free with 30 years life expectancy

Technical Data					
Rated voltage	kV	12	15.5	17.5	24
Rated current: ring switch	А	630	630	630/400	630
Rated current: vacuum circuit breaker	А	250 / 630	250 / 630	400/630	250 / 630
Impulse withstand voltage	kV	75	95	95	125 / 145
Short circuit making current	kA	50	50	54.6	40
Short circuit breaking current	kA	20	20	21	16
Internal arc rating	kA/1 sec	20	20	21	16



Trident RMU

Oil insulated with fuse protection

- Up to 15.5 kV and 630 A ratings
- Non-extensible, extensible, and modular range
- Fuse switch fitted with shunt trips for remote tripping
- IP54 for outdoor installation without requiring a kiosk
- Seamless integration with SCADA network for remote operation and control
- Maintenance free with 30 years life expectancy

Technical Data kV 15.5 kV Rated voltage Ring switch rated current: А 630 A Fuse switch rated current: 200 A А Mode of fault current interruption HV fuses Impulse withstand voltage kVp 95 / 110 kVp Short circuit making current 50 kA kΑ Short circuit breaking current 20 kA kA





Metering Units

Designed for Sabre and Trident ring main units

- Freestanding and RMU mounted version
- Voltage transformer (VT) isolation for HV testing
- Bus bar metering and tee off metering options
- Trip lock out relay for RMU / AMU combinations for emergency tripping
- IP54 for outdoor installation without requiring a kiosk

Technical Data		
Rated voltage	kV	up to 17.5
Rated current	A	250 / 400 / 630
Short time withstand current	kA/3 sec	20
Bushings		Din 400 type C
Impulse withstand voltage	kVp	75 / 95
Short circuit making current	kA	50
Cable connection		3 single core cables / single 3 core cable





Sabre - Air metering unit

Trident - Oil metering unit

AcuLok

Transformer mounted LV distribution cabinet

- Innovative, safe and operator friendly fuse handle technology
- Up to 8 outgoing fuse ways with 630 A rating
- Independent load make load break disconnector switches for all three phases

400 V

• IP34D protection for indoor and outdoor installation

Technical Data Rated voltage Rated current outgoing fuse way

Rated current outgoing fuse ways	630 A
Rated current load break disconnector	1000 / 2000 A
Mode of fault current interruption	Fuse
Number of outgoing fuse ways	4, 5, 6 or 8
Fuse types	BS88 J type, 92 mm
Mounting options	Transformer mounted with 'F' type flange
Cable connection	3C / 4C, 300 mm ²







EV Charger Power Supply

Empowering EVs with pre-wired EV feeder pillars

As one of the UK's leading suppliers of pre-wired power distribution enclosures, we understand the importance of electrical safety and flexibility to meet the growing demands of power infrastructure. Electric vehicles (EV) are becoming commonplace throughout the UK and further afield, with a number of initiatives in place to drive up use of low carbon electric vehicles in a bid to reduce emissions and increase efficiencies.

As the demand for EV increases, there becomes a growing need for the implementation of accessible charge points, meaning a stepchange in urban infrastructure is required, therefore the demand for power distribution solutions are on the up.



- Lucy Group companies have distribution network operator (DNO) approval throughout England, Wales and Scotland, which means our fused products are compatible and compliant with most existing street-light infrastructure.
- Lucy Zodion's fused street lighting solutions undergo rigorous in-house and third party testing (KEMA) to ensure they meet industry and safety standards
- The on-street EV connection solutions we develop are in line with the IET Code of Practice for Electrical Vehicle Charging Equipment Installation (BS7671)



Pre-wired EV feeder Pillar

As EV charge points fall into the four main categories of slow, fast, rapid and super, there are a number of electrical components required, depending on the charge speed specified.

Our standard range of pre-wired supply pillars for EV charging, come in four sizes and can supply power for up to 54 fast charge points, 12 rapid charge points and 2 super.

Additional components can be integrated as optional extras, which need to be specified upon enquiry.



Fast

Fast EV charging points usually provide power from 7.4 kW to 22 kW and typically fully charge an Electric Vehicle in 3-4 hours. They are often found in retail car parking facilities or on-street, where people have more time to spare.

On-street

We have a number of solutions to match a range of fast charging requirements, from supplying the appropriate amount of power to a charging point, to ensuring street lighting infrastructure is capable of supporting EV charging

Fast charging				
Pillar Type	FORTRESS SIZE 14	FORTRESS SIZE 24	FORTRESS SIZE 30	FORTRESS SIZE 30
7.4 kW (32 A SPN)	~	~	~	~
Max no. of charge points per pillar	9	18	36	54
22 kW (32 A TPN)	~	~	~	~
Max no. of charge points per pillar	4	6	12	18
On-street charging				
Cutautture	Trojan Midi			
Cut out type				
5.8 kW (32 A SPN)	2 x RCBO's (25 A/30 mA and 6 A/30 mA)			
Max no. of charge points	1 (per lamppost)			

Rapid

Current Rapid AC chargers are rated at 43 kW, while most Rapid DC units are at least 50 kW. Our EV supply pillars support both AC and DC charge points and have the capacity to enable charging for the majority of EV's to 80% in around 30-60 minutes (depending on battery capacity).

Rapid charging				
Pillar Type	FORTRESS SIZE 14	FORTRESS SIZE 24	FORTRESS SIZE 30	FORTRESS SIZE 30
43 kW (63 A TPN)	~	~	~	~
Max no. of charge points per pillar	2	4	8	12
50 kW (80 A TPN)	~	~	~	~
Max no. of charge points per pillar	1	3	5	8

Super fast

Super or ultra-fast EV charging points are able to provide up to 120 kW of power. Our Super EV charging supply solutions, feed power to EV charge points at a maximum rated speed. This gives electric vehicles that have the battery capacity, 80% of charge in approximately 30 minutes.

Super fast charging			
Diller Ture	FORTRESS SIZE 30	FORTRESS SIZE 30	
Ршагтуре	400 A 3ph supply	600 A 3ph supply	
120 kW (250 A TPN)	~	~	
Max no. of charge points per pillar	1	2	



Heavy Duty Cut Outs

CT Metering Chamber

Heavy Duty Cut Out with metering

Wall mounting fused service heads with ratings up to 630 A for indoor applications.

Available also with an integral CT metering chamber which accepts latest generation smart meters.

Technical Data	
Busbar rated current	200, 400 or 630 A
Rated voltage	400 V
Rated insulation voltage	690 V
Fuse handle maximum rating	As above
Max incoming cable size (630 A)	300 mm ²
Max incoming cable size (200 A)	185 mm ²
Cable connection	Via mechanical shear off connec- tors, lugs (optional leader clamps on outgoing)



Indoor Cut Out

Single and three phase cut outs

Catered for single and triple pole installations with reversible mounting in Combined Neutral and Earth (CNE) or Separate Neutral and Earth (SNE) configurations.

A choice of cable protection or sealing chamber accessories provide the required levels of security, whether it is for existing or new installations.

Designed and tested to BS 7657:2010, the HSCOs are manufactured from tough, impact resistant glass fibre polyester material with heavy duty brass terminals.

Variants are offered for 60/80 A applications with 22 mm diameter fuse clips or 100 A applications with 30 mm diameter clips. Close coupled HSCOs which mate directly to the meter housing are also available to counter instances of theft of supply.







Remote Terminal Unit

Gemini 3

The Gemini 3 is a flexible Remote Terminal Unit (RTU) platform for advanced feeder automation on electrical distribution networks. It incorporates a range of features allowing customers to build in flexibility and scalability to their network automation.

The Gemini 3 modular design provides a secure operation with built-in diagnostics, continuous status monitoring and indication. The individual modules are rugged, making the device field serviceable, ensuring future proofing of the installation. The modules currently available in Gemini 3 are:

- Low power consumption saving costs in power supplies
- Dedicated motor power enable relay output providing safe and secure operation of switchgear
- Optional HMI via CAN bus port
- I/O expansion and analogue inputs via CAN bus expansion port
- I/O have associated LED indicators
- Digital inputs capable of using volt-free contacts avoiding need for providing a wetting voltage
- I/O expansion and analogue inputs via Modbus port
- Capabilities for battery back-up supported
- Flexible communication options
- Enhanced cyber security features for use in Critical National Infrastructure
- Supports multiple masters
- Simple DIN rail mounting, saving time and simplifying maintenance
- Optimised form factor providing efficient assembly into control cabinets and switchgear panels
- Easy to configure, customisable product adapting to different solutions
- Pluggable terminal blocks improving installation times
- Secure firmware and configuration
- IEC 61499 programmable logic
- Event driven
- Hierarchical
- Distributed processing
- Standard library functions available
- Pre-assigned I/O allocation available for fast and easy solutions
- Simple parameter changes in configuration tool allowing customisation









Low Voltage Monitoring

GridKey - MCU 318

- Easy to fit and compact custom designed for monitoring LV substations
- Robust and durable
- No calibration or maintenance
- Class 2 metering accuracy
- Weather resistant to IP54
- · Comprehensive reporting of substation feeders
- 2 year, extendable, warranty
- 2.5G, GSM/GPRS mobile data transfer between unit and datacentre

Metrology	
Measurement Standards	Class 2 in accordance with EN 62053-
	21 when used with Slimsensor current
	sensors
Electrical safety standards	EN 61010-1: 2010, with corrigendum May 2011 EN 61010-2-030: 2010
Over voltage	300 V rms Category IV. pollution degree 3
Current measurement range	Accurate up to 720 A AC per feeder phase
	No damage at any over-current condition
Operating voltage and measure- ment range	230 V AC + 15%20% rms phase to neutral
Line frequency	50 Hz (nominal)
Protection, Environmental 8	& Compatibility
IP Rating	IP54
Electromagnetic compatibility	EN 61000-6-2 immunity EN 61000-6-4 Emissions
Surge protection	IEC61000 6kV
Operating temperature range	- 20°C to 55°C (<93% RH, non-con- densing)
Storage temperature range	- 25°C to 70°C
Altitude	Up to 2000 m
Mechanical	
Size (h x w x d)	300mm x 245mm x 80mm
Weight	1.35 kg
IP category	IP54 IEC 60529
Impact	EN 62262 IK06
Power	Power from single phase only, 6W typical, 11W maximum (GPRS enabled)
Communications interfaces	GSM/GPRS quad band 850/900/1800/1900 MHz
	Any network SIM can be provided by customer











Energy Services

Complete product life cycle

Our aim at Lucy Electric is to ensure that you consistently get the very best from our technology – and your budgets.

With our integrated set of product lifecycle services, ranging from after sales support to training and consultancy, we provide incisive expertise and timely assistance throughout the lifecycle of your high performance Lucy Electric products.

Whether you are managing extensive distribution networks, expanding, updating or automating your operation, Lucy Electric has the products and services to give you peace of mind that your assets are being effectively managed and maintained.

1. Installation

- A. Offloading and site erection
- B. Full turnkey projects

2. Commissioning

- A. Pre-commissioning services
- B. Final commissioning and energisations
- C. Specialist commissioning services (G59 testing or similar)

3. Maintenance and support

A. Non-intrusive (thermal, partial discharge and other services)

B. Intrusive

C. Full maintenance contracts which also include options such as extended warranties

D. Supply a range of spares

4. Consultancy

A. Consultancy for extension, upgrades and retrofitting of switchgear to maximise asset performance and avoid unexpected failures and production losses

5. Training

- A. Product familiarisation courses
- B. Full knowledge transfer programmes
- C. Bespoke courses

6. Emergency responce

A. Emergency response services for contracted customers

B. 24/7 support line



7. Modifications

A. Upgrades to installed assets which could include automating an RMU for example

8. De-commissioning

A. Full end of life services including de-commissioning and disposal of assets

B. Asset replacement services

9. Technical support

A. Pre-installation design and support services

- B. Post installation support services, for a range of scenarios
- C. Technical support for our complete range of products





For more information please contact us:

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