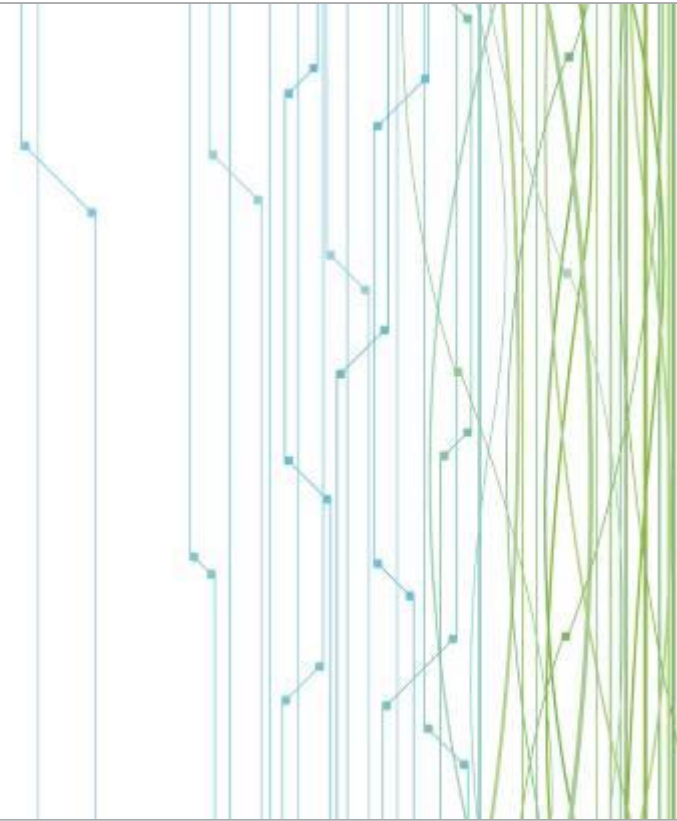


Electric Vehicles

Servicing the Future

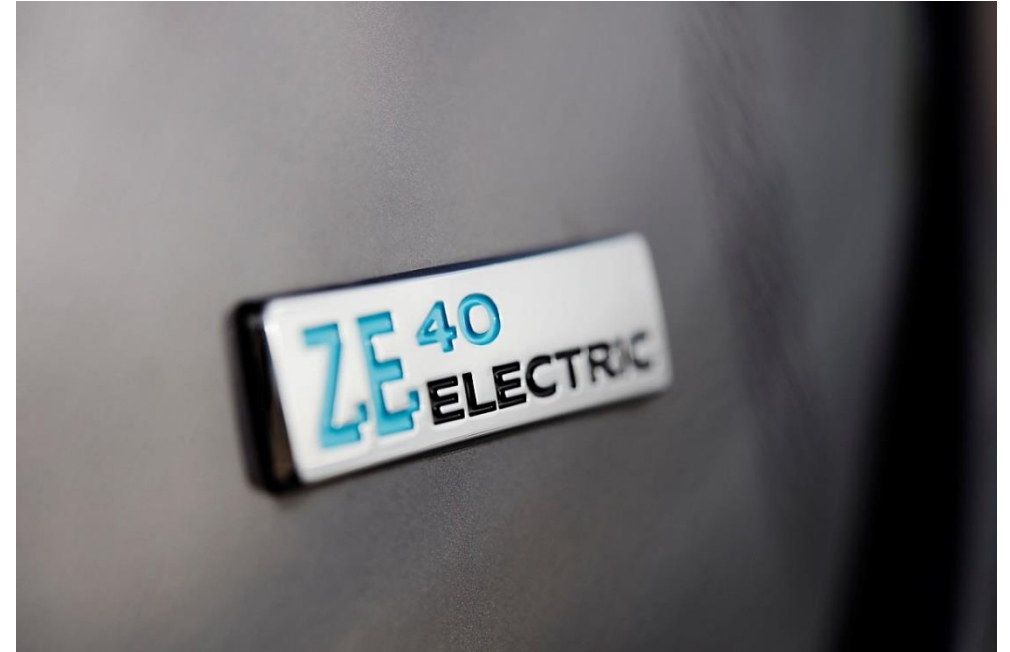
RENAULT
Z.E.



TODAY'S PRESENTER

➤ **Mathew Kiziuk**

- Regional Development Manager E.V -North
- Mathew.kiziuk@renault.co.uk
- 07811 996920



ELECTRIC VEHICLES ARE NOT A “NEW” THING...



FIRST EVS WITH
AUTONOMY OF 18 – 40 MILES



HENNEY KILOWATT DAUPHINE
WITH 60 MILES AUTONOMY



1830s 1900s 1920s 1960/70 2008 2012/13 2015 2016/2017

Invention

Success

Decline

Return

Growth and development

Breakthrough

54 YEARS TO GO FROM
60 MILES TO 130 MILES
(EXCLUDING TESLA)

3 YEARS TO GO FROM
130 MILES TO 250 MILES



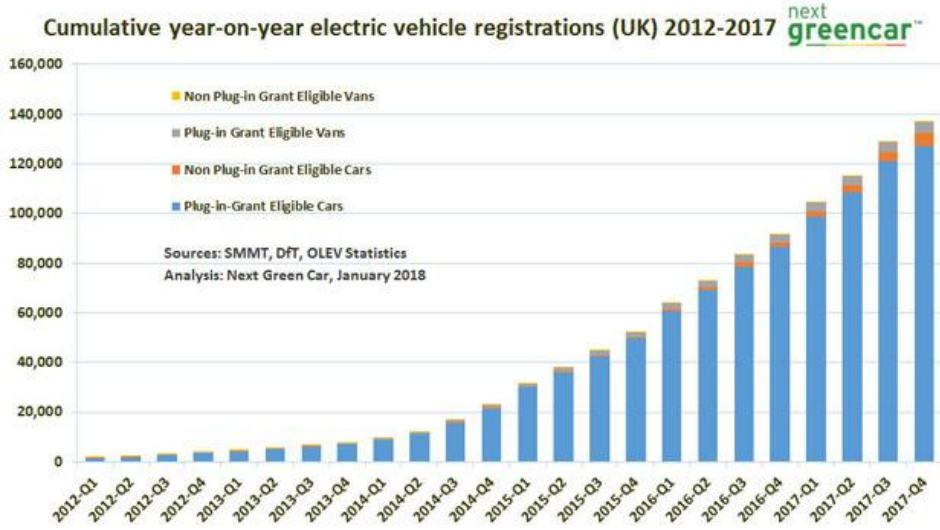
Electric Vehicle Uptake.

1800% increase in 5 years

132,000 EV's on UK Roads

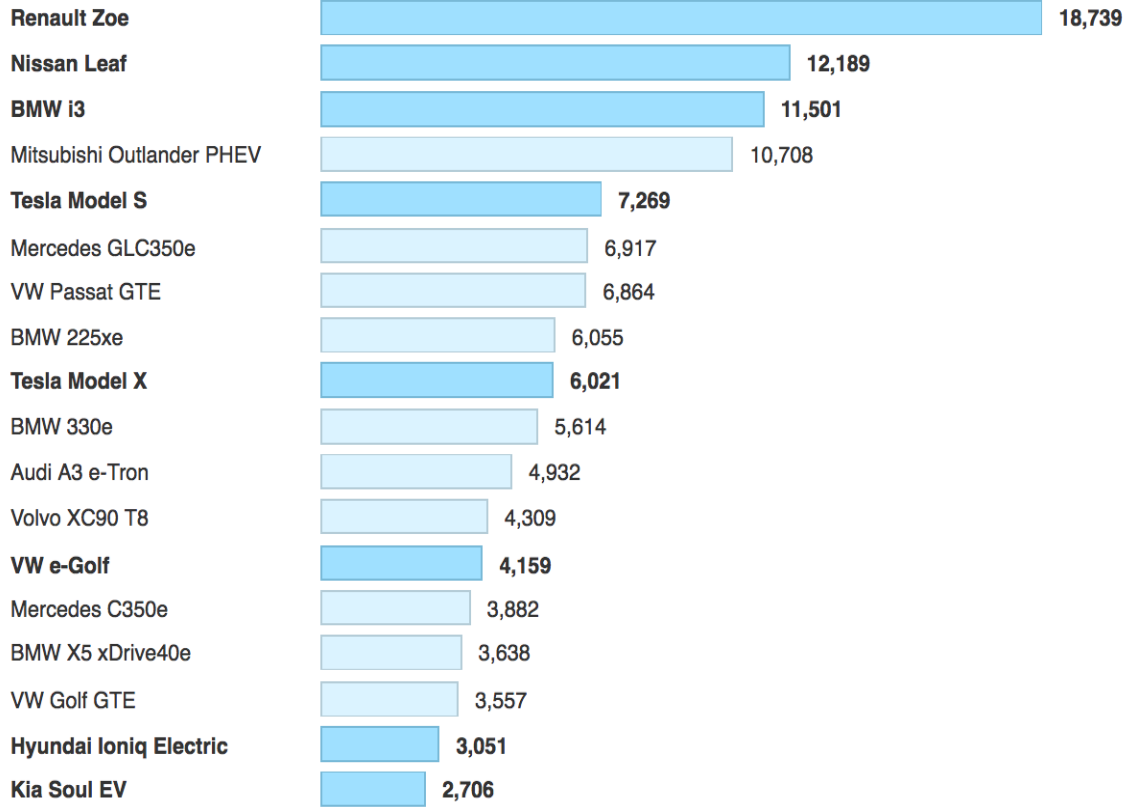
85,000 ZOE's sold in Europe

Renault 19.1% market share



EV sales up 27% YOY

Diesel Sales down 17% YOY



What vehicles are available to assist my business today ?



Renault Twizy

- Real world range of up to 46 miles per charge
- Great as a fun hire vehicle
- Mobile advert for your business



Renault Zoe – Electric Car

- Real world range of up to 186 miles per charge
- Affordable / mainstream electric transportation
- Easy to use



Renault Kangoo – Electric Van

- Real world range of 125 miles per charge
- 625 KG payload
- Price is not vastly higher than diesel equivalents

Now Available.....

MASTER Z.E.

The new Master Z.E. has been created to primarily satisfy last-mile urban distribution and municipal needs

Driving Range	Master Z.E.
NEDC ⁽⁹⁾	114
Summer Real life estimate	74
Winter Real life estimate	49





Charging Times	Master Z.E.
Domestic 16 Amp	17 hours
3.7kW	11 hours
7kW	6 hours
43kW Quick Charger	6 hours



(9) Homologated range according to NEDC test cycle, for comparison purposes, 114 miles, and may not reflect real life driving results. Range will vary on various factors including driving conditions, driving style, temperature and topography but is likely to be between 49 miles in winter conditions and 74 miles in temperate conditions with the Z.E. 33 battery.

Conversions

The Master Z.E. is available in four versions- three lengths and two heights. This new Master Z.E. has been made in partnership PVI. The body produced in Batilly is combined with the Z.E. 33 battery from LG.

	VAN			PLATFORM CAB
				
	L1H1	L2H2	L3H2	L3H1
Master Version	FWD 3.5T LHD/RHD	FWD 3.5T LHD/RHD	FWD 3.5T LHD/RHD	3.5T LHD/RHD
Payload	~1075kg	~1000kg	~925kg	~600kg (box body) TBC
Load Volume(m3)	8	10,8	13	15 - 22

The Z.E. Designated Operating Zones



The Blue zone

The Blue zone:

- The entire vehicle **except** access to all components powered by the traction battery (electric power unit, traction battery, air-conditioning compressor, electric heating, etc.).



- **Authorisation level 0 accreditation, / technicians and staff that have been briefed on the safety risks** (informed person)

It is prohibited to carry out work on an electric vehicle with the power on



The Orange zone

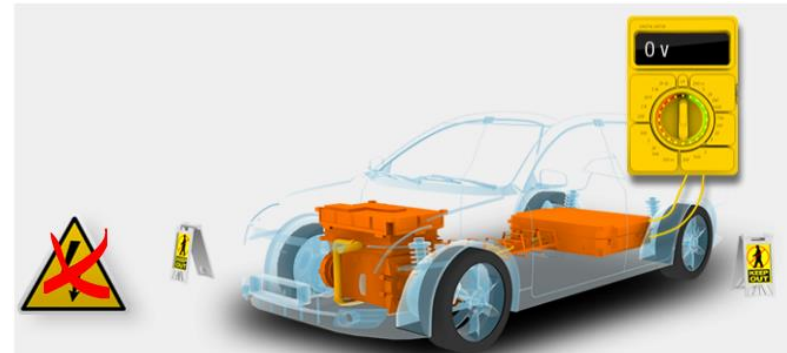
The Orange zone:

Authorisation level 1, EVS accreditation

- The entire traction chain including the traction battery, the power unit, the heating resistance units, the air-conditioning compressor, etc. which are powered by energy from the traction battery.

Authorisation Level 1, Lockout Technician accreditation

- The lockout and removal of lockout from the traction battery,



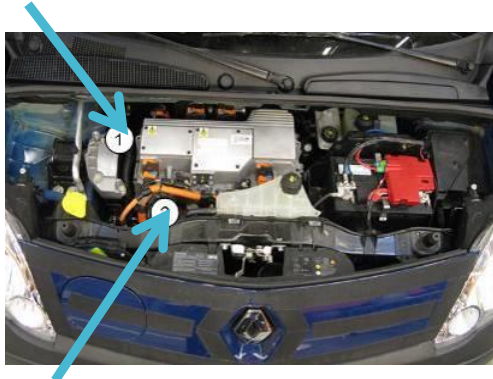
It is prohibited to carry out work on an electric vehicle with the power on



Orange Zone Example (Kangoo Z.E).

The Orange area's are where the 400v cables are located

Specific stickers on the accessible 400V components



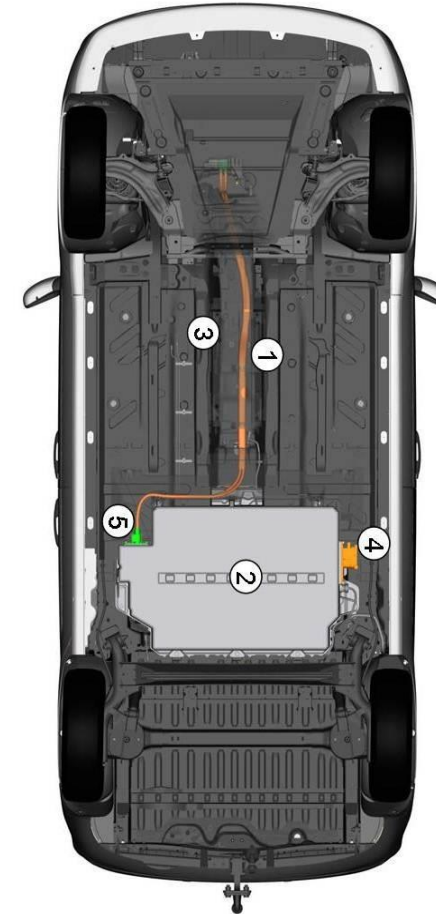
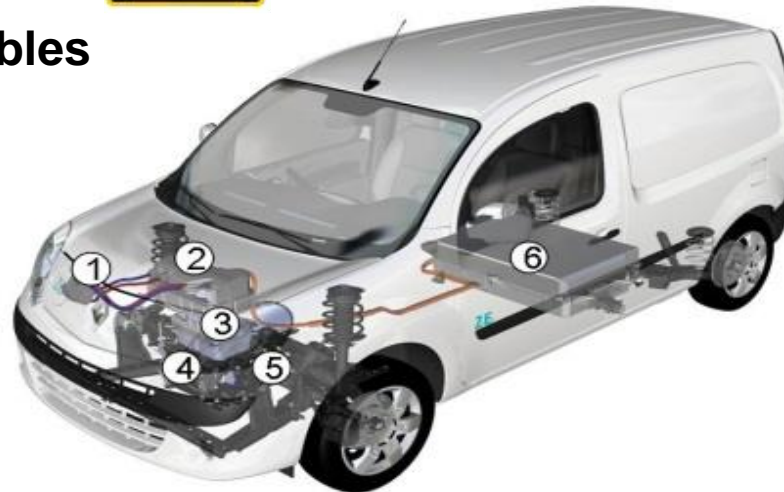
Orange 400V cables

Orange Zone for Z.E. is
Level 1 specialist Only

High voltage cables that are



DANGEROUS

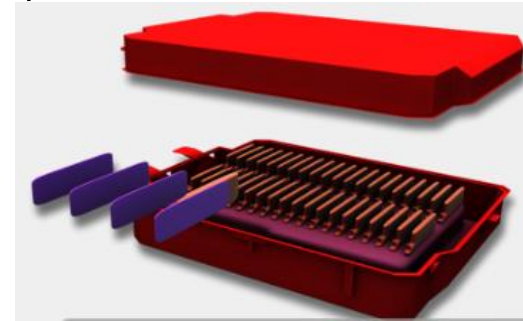


Vehicle under body

The Red zone

The Red zone:

- The entire zone inside the traction battery. The components inside the traction battery are charged (60/400 volts). The work is carried out with the power on.



- **Authorisation level 2, Electric Vehicle Specialist level 2**
(battery repair operative not in the dealer network, factory only)

It is prohibited to carry out work on an electric vehicle with the power on



Accreditation Training and NT6037A

THE SAFETY PROCEDURE IS BASED ON:

- **The European standard on the operation of electrical installations: EN 50110-1.**
- **The general electric safety instructions, publication UTE C 18-510.**

NT6037A

- **The employer is duty bound to train their employees in the prevention of electrical risk for professional activities where the risk is present.**
- **The purpose of this training is for dealership staff to acquire a level of professional competency in the area of electrical safety**
- **At the end of this training, the employer must issue each person under their authority with competency clearance when carrying out electrical or non-electrical operations requiring accreditation**
- **This competency is not directly linked to a professional qualification. It must be represented by document NT6037-v1 and signed by the employer and the competent person.**
- **This accreditation is represented by a personal competency certificate which the holder must always carry with them when carrying out his professional activities.**

ELECTRIC VEHICLE ACCREDITATION LEVELS

Level 0 accreditation — Blue training — "experienced, non-electrical operative"

This training is applicable to those using an electric vehicle in the company and working near to or on components with no voltage passing through them. This training is delivered by the employer.

Level 1 accreditation — Orange training — "EVS and/or lockout technician"

This training is intended for staff that perform maintenance work on components supplied by the traction battery. This training is delivered by Renault in conjunction with Lloyds register, each employee is then certified by the employer.

Two types of employee:

The Lockout Technician, who is accredited to make an electric vehicle safe.
The Electric Vehicle Specialist, who is capable of running fault finding and repairing components supplied by the traction battery.

The Electric Vehicle Specialist is also a Lockout Technician.

Level 2 accreditation — Red training — "BATTERY REPAIRER, qualified electrical operative"

Level 2 accreditation is not available in the Renault network

After completing this BLUE training, you will be authorised to perform the following operations:**

- **Charging an electric vehicle.**
- **Performing a repair (mechanical, bodywork, new and used vehicle preparation etc.) outside the electrical circuit supplied by the traction battery.**
- **Using a CLIP electronic diagnostic tool.**
- **Operations on the accessory circuit**
- **** in addition to the standard dealership Health & Safety training**

Kangoo ZE33 – 4 year / 48,000 mile service schedule

Manufacturers recommended servicing 4 years / 48,000 miles

Service - Analysis

Renault Kangoo Diesel
ML20 ENERGY dCi 90
Business Van [Euro 6]
15

Renault Kangoo ZE
Electric 60 ML20 44kW
33kWh Business i-Van
Auto 17

	Renault Kangoo Diesel ML20 ENERGY dCi 90 Business Van [Euro 6] 15	Renault Kangoo ZE Electric 60 ML20 44kW 33kWh Business i-Van Auto 17
Service 1	24 Month	24 Month
Service 1 Labour Hours	1.30	1.30
Service 1 Labour Cost	73.30	73.30
Service 1 Parts Cost	65.13	17.99
Service 1 Oil Cost	34.29	0.00
Service 1 Total	172.73	91.29
Service 2	48 Month	48 Month
Service 2 Labour Hours	1.80	1.70
Service 2 Labour Cost	106.58	100.66
Service 2 Parts Cost	85.43	18.89
Service 2 Oil Cost	36.01	0.00
Service 2 Total	228.02	119.55
Brake Fluid Parts Cost	159.20	45.52
Brake Fluid Oil Cost	70.30	0.00
Brake Fluid Total	409.39	219.48
Total Labour Hours	3.10	3.00
Total Labour Cost	179.89	173.97
Total Parts Cost	159.20	45.52
Total Oil Cost	70.30	0.00
Total	409.39	219.48

Tyres and Brakes

Tyres - Parts	Renault Kangoo Diesel ML20 ENERGY dCi 90 Business Van [Euro 6] 15	Renault Kangoo ZE Electric 60 ML20 44kW 33kWh Business i-Van Auto 17	Brakes - Parts	Renault Kangoo Diesel ML20 ENERGY dCi 90 Business Van [Euro 6] 15	Renault Kangoo ZE Electric 60 ML20 44kW 33kWh Business i-Van Auto 17
Front Tyre Size	195/65R15T	195/65R15T (Van)	Front Brake Discs Cost	133.36	133.40
Front Tyre Cost	49.32	49.15	Front Brake Discs Labour Hours	0.20	0.20
Front Tyre Freq	31000 miles	31000 miles	Front Brake Discs Freq	80000 miles	80000 miles
Front Tyre Count	3.00	3.00	Front Brake Discs Count	0.40	0.40
Front Tyre Spread	24,000	24,000	Front Brake Discs Spread	54,000	54,000
Rear Tyre Size	195/65R15T	195/65R15T (Van)	Front Brake Pads Cost	50.91	50.91
Rear Tyre Cost	49.32	49.15	Front Brake Pads Labour Hours	0.70	0.70
Rear Tyre Freq	52000 miles	52000 miles	Front Brake Pads Freq	40000 miles	40000 miles
Rear Tyre Count	1.90	1.90	Front Brake Pads Count	1.00	1.00
Rear Tyre Spread	44,000	44,000	Front Brake Pads Spread	25,000	25,000
Spare Tyre Size	Sealant	195/65R15T (Van)	Rear Brake Discs Cost	158.56	152.10
Spare Tyre Cost	0.00	0.00	Rear Brake Discs Labour Hours	0.80	1.20
Spare Tyre Freq			Rear Brake Discs Freq	104000 miles	104000 miles
Spare Tyre Count	0.00	0.00	Rear Brake Discs Count	0.30	0.30
Spare Tyre Spread	0	0	Rear Brake Discs Spread	75,000	75,000
Balance Cost Cost	6.00	6.00	Rear Brake Pads Cost	45.36	45.36
Balance Cost Count	4.90	4.90	Rear Brake Pads Labour Hours	0.60	1.00
Valve Cost Cost	3.80	3.80	Rear Brake Pads Freq	52000 miles	52000 miles
Valve Cost Count	4.90	4.90	Rear Brake Pads Count	0.90	0.90
			Rear Brake Pads Spread	35,000	35,000

Safety Standards



SAFETY PROTECTION

It is compulsory to wear individual protection equipment during any operation in the orange zone (battery removal, lockout, etc.)



SAFETY STANDARDS

The procedures described in the repair manuals must be performed by a qualified operative authorised to perform an operation on a high-voltage on-board network.

- Non-compliance with these instructions may cause a risk of fire, serious injury or electric shocks leading to death.



- Lockout

- The lockout or Z.E. electric vehicle safety operation involves switching off the power and securing the operating zone in order to make it safe and protect the technicians working on the electric system for the entire duration of the operation (avoiding all risks of accidental electrocution)
- To identify and apply the Z.E. electric vehicle lockout process, please consult => MR (repair manual) and/or NT (technical note) 6037A / Authorisation-lockout, available => Renault Net => Dialogys => Doc-Online.



It is prohibited to carry out work on an electric vehicle with the power on



SAFETY STANDARDS

- Working alone in the workshop is prohibited.
- **Why?**



To ensure that, in the event of a problem, another person nearby can come to the aid of the person in danger.

- It is prohibited for non-qualified personnel and personnel not authorised for LOCKOUT operations to work on the high-voltage on-board network / orange zones “including disconnecting the 400 volt traction battery”.
- **Why?**

Operations on the high-voltage network of the vehicle are subject to a risk of electrification or electrocution.

It is prohibited to carry out work on an electric vehicle with the power on



Staff training requirements within the dealership

- 1 manager trained to Renault EV Managers status
- EV 1 Course – 1 day training @ £350

- 2 Technicians trained to Renault Technician status
- Renault Technical induction – 5 Days @ £350 per day
- Electrical systems EL1 – 3 days @ £350 per day
- Electrical Vehicle Specialist EV2 – 5 days @ £350 per day

- Total staff training cost for compliant workshop £9,450

Specialist Tooling



Specialist tooling list

- Traction Battery Cradle
- Traction Battery lifting frame
- Lifting Table
- Crane for lifting Traction battery
- Insulating Cover
- Traction Battery Lockout Padlocks
- Voltage Absence Test Meter
- Traction Battery Lock out tool
- PPE as previously described
- EV Barrier Kit
- Rescue Rod

As Volumes increase



As Volumes increase

- RUK already at 87% UK coverage – constantly working to increase this with dealers.
- With our vehicles and the manner in which we classify working on them, minor service work can be carried out by a multitude of technicians it does not require an EV specialist to perform a service
- The only time specialist trained staff are required is when working on the 400v system
- EV motors have minimal moving parts and far less to go wrong than a diesel or petrol engine
- We offer training and tooling should a fleet wish to carry out its own servicing

THANK YOU