

Engineer's Guide

BZL MCV DD EV

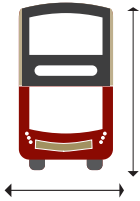


Vehicle information



Maximum capacity

64 (seated)	63 (seated)	62 (seated)
16 (standing)	15 (standing)	13 (standing)
0 wheelchair	1 wheelchair	2 wheelchairs



Dimensions

length 10.9m (35'9") | width 2.55m (8'4")
height 4.3m (14'1") | unladen Weight 13,680kgs

Heavy Vehicle Brake code (DTP number): 192202



Fully electric

Zero emission double deck bus
Helps improve air quality



Battery (SOC) - state of charge

The driver should contact control when the battery SOC is at 20% prior to the vehicle battery warning activating (an audible alarm will sound at 15%). This will allow the required response from Control.



Energy Storage System

Battery chemistry type: Lithium-ion, NCA
Available battery capacity: 94 kWh (5 Batteries)
Total battery capacity: 470 kWh
Maximum charge power: 150 kW

Startup procedure

1. Master switch

Ensure cab main isolator switch (24v) is enabled.
This can be found under the driver's seat (left side).



2. Power switch

Ensure cab main isolator switch (24v) is enabled.



3. Ignition switch

Turn ignition key to first position.



4. Warning systems

Wait for warning lights to turn off and for the Volvo logo to stop spinning. Listen for the fire suppression system "OK" message. If the warning shows "Low", contact your supervisor.

5. Start the vehicle (Ready to Drive)

Turn ignition switch (key) fully to end and then release. The ignition switch will return to the previous position and the vehicle will be in Ready to Drive mode.

During the time you are waiting for the warning lights to turn off, the vehicle is conducting checks.

NOTE: If you turn the electric motor on too soon, it could lead to faults occurring.

Once the *Ready to Drive Symbol* appears, the vehicle is ready to select gear and drive as normal.

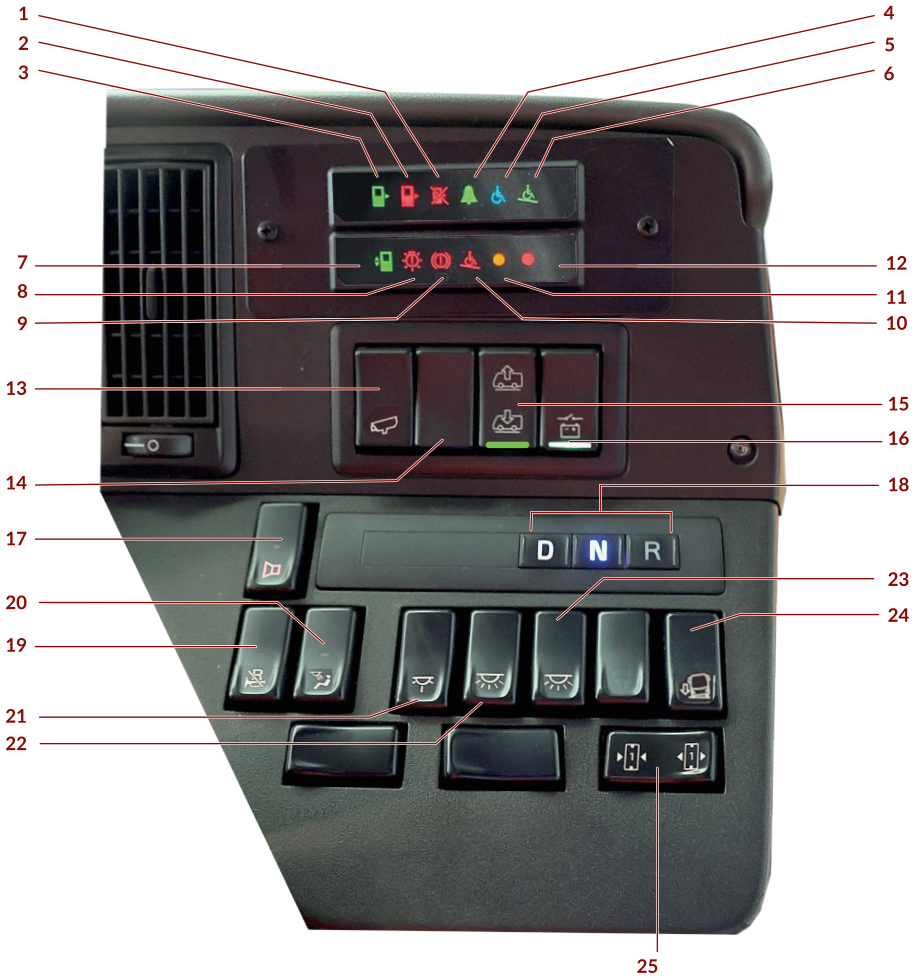


Ready to Drive
Symbol

Please note - The air compressor is electric and you will have no air supply if the traction voltage system is not on and the green bus icon (Ready to Drive) is not displayed.

Driver controls

Dash Controls—right hand side



Driver controls

Driver's dash controls - right hand side

- 1 Any door open warning** Illuminates when any door is opened.
- 2 Emergency door open warning** Illuminates when offside emergency door is opened.
- 3 Doors low air pressure** Illuminates when air pressure is too low to operate the doors.
- 4 Bus stop request** Illuminates when stop request button is pressed. The light cancels once the entrance doors are opened.
- 5 Disabled request** Illuminates when requested in the wheelchair area.
- 6 Ramp unstowed** Illuminates if the ramp is in any position other than correctly stowed. The light will cancel once the ramp is finished with and correctly stowed.
- 7 Sensitive edge active** Shows the sensitive edge is working on entrance doors.
- 8 Exterior light fault**
- 9 Not used**
- 10 Ramp fault**
- 11 Not used**
- 12 Not used**
- 13 Flank switch** Press to change the view on the driver's monitor to the flank camera for manoeuvring.
- 14 Not used**
- 15 Suspension** Press up for full ferry lift, select centre position for normal ride height. Selecting the down position has no effect (full kneel is not fitted to this bus). Ensure that the switch is in the centre position when used in service.
- 16 Power switch** Turn on before operating the bus.
- 17 PA system**
- 18 Gear selection - D - Drive, N - Neutral, R - Reverse.** Push button selection. To select a gear, the handbrake and footbrake must be applied. When selecting D to R or R to D you must select N prior to selecting the Drive or Reverse gears.
- 19 Reversing horn cut off switch** Will silence the reversing horn for a single reversing manoeuvre (ie: at night). However, as soon as the bus is moved out of reverse gear, the mute function will deactivate. A warning will sound the next time reverse gear is selected.
- 20 Cab light switch** When in the on position, the cab lighting will be illuminated. When in the off position, the cab lighting, first saloon light and entrance light will illuminate when the entrance doors open and the sidelights are on.
- 21 Indirect light switch** Turns on / off green saloon lighting.
- 22 Nearside saloon light switch** Turns on / off near side direct white saloon lighting.
- 23 Offside saloon light switch** Turns on /off offside saloon direct white lighting.
- 24 Side kneel** Activates the side kneeling facility, only lowering the airbags on one side only. The bus will kneel only when the handbrake is applied. The kneeling function is available with the front entrance doors open.
- 25 Entrance door controls**

Driver controls

Dash controls display

The dash layout is largely familiar to other Volvo buses in our fleet. Please note that on the left gauge (1) there is a +/- to show when the battery is being drained (-) and when the battery is in a regenerative state (+).

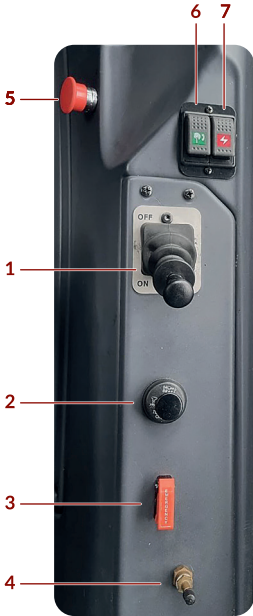


- | | | |
|------------------------|-------------------------|--------------------------------|
| 1 Power Gauge | 4 Parking Brake Applied | 7 Door/Ramp Halt Brake Warning |
| 2 Charge Level | 5 Information Screen | 8 Air Gauge |
| 3 Ready To Drive Light | 6 Speed | |

If the battery state of charge shows 20% or under, you MUST contact Control.

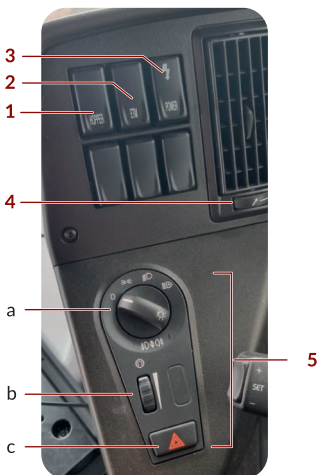
Driver controls

Side binnacle controls



- 1 Handbrake** Handbrake is engaged in the on position and released when moved to the off position.
- 2 Broms brake** The Broms Brake activates when the air pressure in the brake circuit is too low and you try to release the parking brake, for example if the bus has been parked for longer periods. To release the Broms brake:
 - a. Ensure the handbrake is applied.
 - b. Power up the vehicle.
 - c. Wait until sufficient brake pressure has built up (5.6 Bar) and the stop lamp in the instrument panel has gone out.
 - d. Push down on the Broms brake to deactivate and release the handbrake as normal to move the vehicle.
- 3 Emergency cut off switch** Only to be used in an extreme emergency to shut all systems down. **Do not use as a method of recycling the bus if instructed to do so by Control.**
- 4 Air release valve**
- 5 Driver assault alarm** Strike with knee to activate, after 10 seconds, twist to deactivate.
- 6 Lothian radio / comms switches**
- 7 Emergency call switch to Control**

Dash controls - left hand side



- 1 Cash hopper switch**
- 2 ETM switch**
- 3 Power switch**
- 4 Drivers heater vent**
- 5 Lighting controls**
 - a. Side & headlight switch
 - b. Instrument lighting
 - c. Hazard lights

- 6 Ignition switch** Located under the steering column.

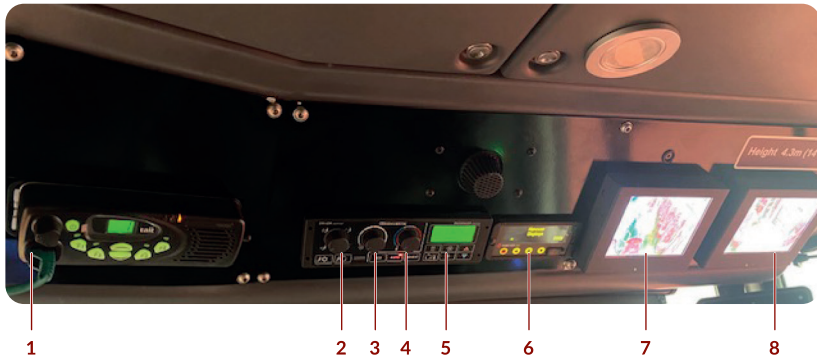


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Driver controls

Overhead control console

Located in the upper driver console, the heater controls are divided for passenger saloon and drivers cab area.



- 1 Driver radio unit
- 2 Airflow control
- 3 Airflow speed control
- 4 Airflow temperature control
- 5 Passenger saloon area
- 6 Destination control – Hanover screens used in all other buses in the fleet.
- 7 Internal and flank CCTV
- 8 Internal CCTV monitor

Instruments and controls

Dashboard information



Main beam activated



Battery charging fault



Fault in ABS system



Rear fog light activated



Window/mirror heater activated



ESP (Electronic Stability Program) enabled



Stop message in the display



Differential lock is engaged



Fault in braking system



Warning message in the display



Bogie lifted



Air pressure for primary braking system is lower than 6 bar



Next stop



Door brake activated



Air pressure for secondary braking system is lower than 6 bar



Seat belt reminder



Kneeling activated (for easier access)



Limp home



Parking brake applied



Check the tachograph



Electric driveline ready



If stop lamp illuminates, then the vehicle must be brought to a safe stop, handbrake applied and powered down. Please contact Control on the normal call button. If the stop lamp comes on and the vehicle is in Ready to Drive mode an acoustic alarm will also sound.

Instruments and controls

Driver information display



Message active



Hydraulic fluid for cooling fan, low level



Gearbox, low oil pressure



Fire alarm



Anti-lock brake system (ABS) activated,



Transmission fluid, low level



Alarm clock activated



Traction control system (TCS) temporarily deactivated



Clutch, high temperature



Door brake activated



Accelerator pedal disconnected



Brake system, failure



Steering fluid, low level



Gear selector, not in neutral,



Brake linings, wear warning



Steering servo, failure



Gear selector, reverse gear selected



Brakes, high temperature



Steering servo bogie, low pressure



Gearbox, low air pressure



Brakes, no data from first brake circuit



Brakes, no data from second brake circuit



Compressor, failure



Wet tank, low pressure



Brakes, no data from third brake circuit



Compressor/air drier, failure



Electronic Stability Program (ESP) activated



Brakes, no data from fourth brake circuit



Kneeling



ESP, failure



Brakes, no data from F brake circuit



Pinch guard active




















ESP, requires calibrating



Disconnected accelerator pedal: If the driver depresses the brake pedal (or applies the parking brake) and the accelerator pedal at the same time, the accelerator pedal will not function.

Instruments and controls

Driver information display (continued)

 Brakes, no data from R brake circuit	 Bus fully lowered	 Hill start aid activated
 Brakes, no data from parking brake	 Air suspension system, failure	 Door, open
 Brakes, no data from auxiliary brake	 Air suspension system, low pressure	 Door, failure
 Engine cover, open	AC Climate system activated	 Stop at next bus stop
 Luggage or wheel chair hatch, open	 Climate system, failure	 Emergency hammer removed
 Instrument, overheating	 Ice warning	 Boarding or alighting with pram
 One or more lights, failure	 Washer fluid, low level	 Ready to be charged
 Headlamp, failure	 Battery, low voltage	 Charging, failure
 Brake light, failure	 Battery, high voltage	 External air hose or charger connected
 Direction indicator, failure	 Battery, too high voltage	 Incorrect wheel alignment
 Coolant, high temperature	 Fire suppression system, low pressure	 Speeding beyond permitted limits set for bus
 Coolant, low level		

Charging Procedure - plugging in

1. Position the bus correctly next to charger (use a banksman if reversing is required). Ensure handbrake is applied and power off bus (EV)

2. Open the bus (EV) charging port and remove the covers



3. Ensure the charging station is showing GREEN (indicates Ready to Charge)

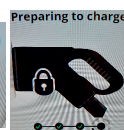
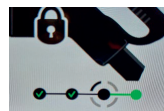


4. Select the charging adaptor (gun) from the side nearest your bus (EV) (where applicable). Charging plugs and sockets on BEV must be visually inspected and any defects immediately reported to your line manager

5. Plug charger gun into port on bus (EV).



6. Charging session will start automatically once 4-step safety handshake ('donut' indicator) between bus (EV) and charger has completed.



7. Lights on charger and screen will turn BLUE indicating charging has commenced.

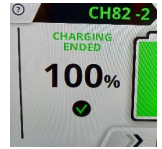


8. If charging session is interrupted, charging stops into fault status. Indicator lights and display will turn RED. For a new charging session to be started, charging gun must be disconnected and returned to holder. If lights go back to Green (Ready to Charge), repeat process. If lights stay RED inform chargehand or night supervisor immediately

Charging Procedure - unplugging

Unplugging procedure (Fully Charged Bus (EV))

1. Charger indicates bus (EV) is fully charged and lights have returned to green.



2. Press charger gun release button at charger port on bus and return charger gun to holder. Bus should be checked to ensure it is 100% charged (if not 100%, inform supervisor)



3. Replace covers and close charger port on bus.

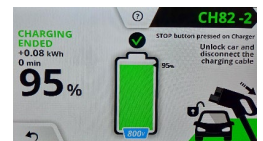


Unplugging procedure (NOT Fully Charged Bus (EV))

1. Press STOP on touchscreen display or button below screen to halt charging



2. Screen will revert to green. Follow on-screen message and press charger gun release button at charger port on bus and return charger gun to holder.



3. Replace covers and close charger port cover on bus.



BZL Main Switch

The main switch on BZL buses is located behind the seat in the driver's cab (see image below).



This switch should ONLY be turned off in the event of an emergency or when undergoing maintenance.

Charger(s) fault/loss of site power procedures

Loss of Power Or Faults to Charger(s)

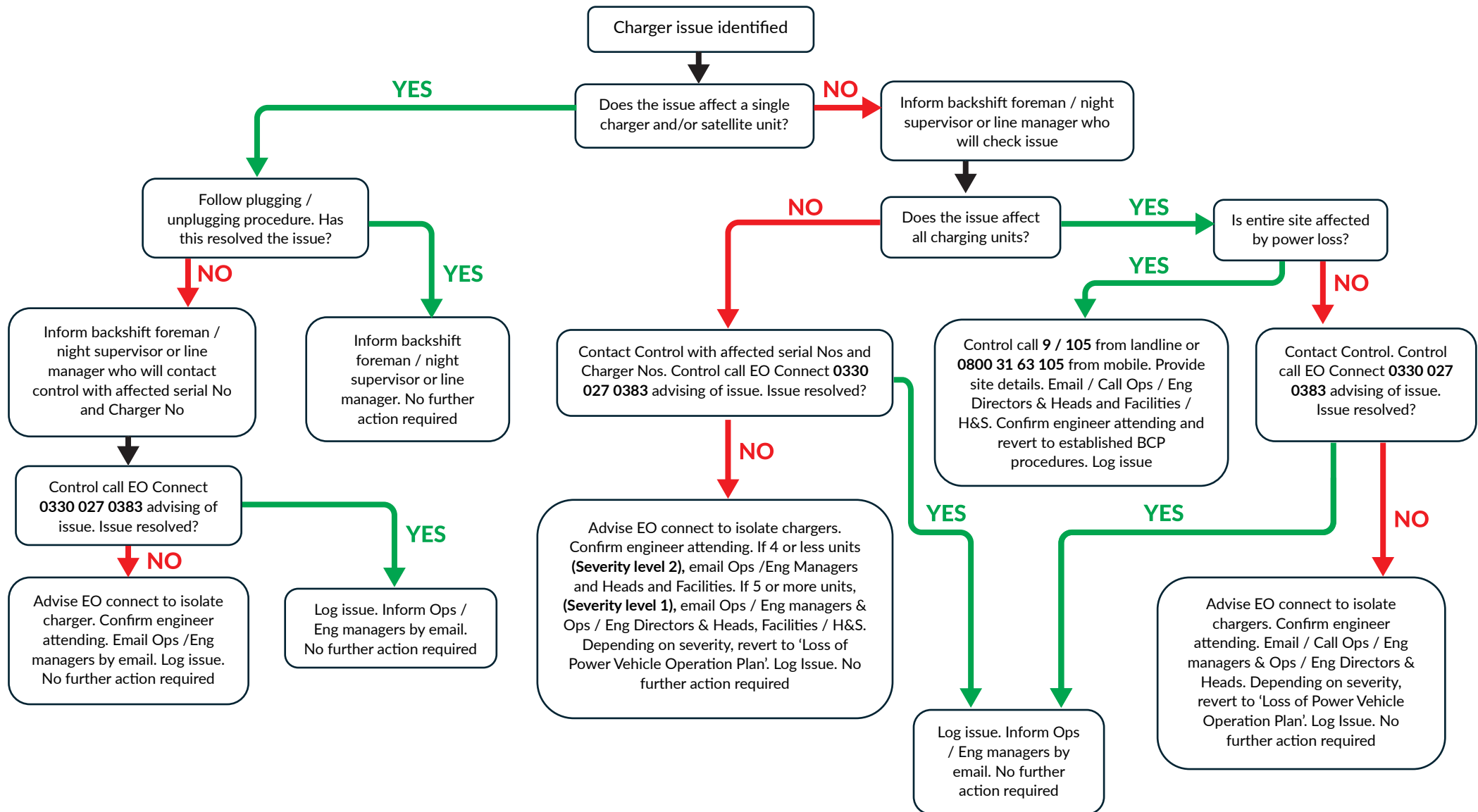
In the event of the loss of electricity to vehicle charger(s) or any faults or charger gun will not release from the vehicle, please follow the below process:

1. Fault identifier or site supervisor to contact the Control Room with full details of fault issue. (preferred method is via email including pictures so this can be relayed correctly to EO).
2. Control Room will then contact **EO** on **0330 027 0383** and report issue.
- 2.1 Control to confirm via email the description of the fault and that the fault(s) has been reported. Email to be sent to General Manager, Depot Engineer, Assistant Depot Engineer, Facilities Manager, Service Delivery Manager. Email to include Job card/reference given, and what actions are going to be taken to rectify.
- 2.2 Control to log in EPM
- 2.3 Control to update via same email chain if any updates received.
3. If 5 or more chargers are off, then an email needs to be sent to the Depot Manager and Depot Engineer, Assistant Depot Engineer, Facilities Manager, Chief Engineer & Engineering Director, Engineering Manager, H&S Manager, Depot Manager, Head of Operations and Operations Director.
4. Regular communication must be maintained between all involved to allow correct decision making.
5. Depending on Severity, Operations and Commercial may implement a loss of power vehicle operation plan and a SMIP may be generated By Head of Op Risk.

Service Level Agreement With EO

- 24 hour and 365 days remote monitoring with fault resolution and diagnostics using EO Cloud, they can reboot the charger, disable charger, carry out communication tests, unlock cable, start, stop and pause charging.
- If unable to fix remotely, EO will send out an engineer.

The flow chart overleaf gives a detailed approach to the outcome of each escalation point and departmental workflows that may be required.



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