

ELECTRIC CRUISER



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The Electric Cruiser is a Toyota Land Cruiser converted into a 100% electric vehicle. The diesel engine and gearbox are replaced with an electric motor fitted with a newly designed 4x4 1:3 reduction gearbox. The rest of the vehicle is kept original.



INTRODUCTION

The Toyota Land Cruiser 70 Series is the most commonly used light vehicle in mining worldwide. The heavy-duty frame and powertrain have proven to survive in these rough environments. Furthermore, the basic design makes the Land Cruiser the ideal base for special build conversions, needed for the different trades inside the mines. However, the standard Land Cruisers with diesel engines cannot meet future emission standards.

It is the first zero emissions LV that withstands challenging mining operations, helps improve working conditions and reduces the need for ventilation. The Electric Cruiser uses high-quality components from the automotive industry. All parameters of the engine such as maximum speed and torque can be customised to a setting suitable for your requirements. Precise fleet management gives clients complete control over the vehicle, its usage and maintenance status.

The engine and gearbox of an Electric Cruiser have been replaced with the electric unit, which is powered by batteries mounted under the hood and where the fuel tank would normally be. The smoothness of the electric engine reduces strain on the vehicle, also enhancing the driving experience.

The Electric Cruiser conversion brings up-to-date comfort and zero emissions to the light mining vehicle while retaining reliability.

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IMPROVED WORKING CONDITIONS

Zero emissions

Health & safety and clean air are a big part of the challenges faced in underground mining and especially the diesel particulate matter, exposes the underground miners to serious health risks. For this it is obvious that the days are just about over for the diesel-powered Land Cruiser.

Less noise generation

Everyone who has been underground knows how difficult it is to talk to each other. The noise from the vehicle itself and from ventilation can be decreased drastically when there are no emissions.

Less vehicle heat

Combustion engines have an approximate 40% efficiency of energy use and generate a lot of heat instead, where the e-motor has an efficiency over 90%.

Employer branding

Working with modern technology in a clean and innovative environment makes working in the mining industry a lot more appealing for potential new employees.

Governmental preference

Regulatory bodies are gradually starting to favour mines that commit to an all-electric underground environment, resulting in approvals for permits that would otherwise be denied, along with a faster permitting process, both of which are potentially game-changing for mining companies around the world.



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COST SAVINGS

Low maintenance cost

Because of the regenerative braking using the e-motor, the brakes can be used for a much longer time. No servicing on air-, oil- or fuel filters and gearboxes or oil changes. By replacing the clutch and engine the maintenance is minimized.

Less downtime

The higher reliability of the electrical components and the reduced number of components guarantee that less maintenance is required and therefore less downtime will occur.

Low operational cost

The biggest cost savings can be made on energy, while the energy needed to provide clean and fresh air into the mine and to ventilate the exhaust gasses and heat out of the mine will be considerably lower when only electrical powered equipment is used. On average the cost of ventilation of an underground mine is 20-40% of all overhead cost.

For calculating the ventilation requirements of an underground mine usually the amount of BHP/kW of diesel-powered equipment is used, so less diesel vehicles means less ventilation needed. An additional advantage is that because electricity is a lot cheaper than diesel this results in an immediate decrease of fuel cost.

No need of expensive and hazardous fuel infrastructure

The transport and infrastructure for fossil fuels to and in a mine is very costly and potentially dangerous. With electric vehicles you can use the electric infrastructure which is already in place for light and ventilation and the risk is close to none. The deeper the mine, the more savings can be made.

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COMFORTABLE DRIVING EXPERIENCE

Smooth acceleration

There is no gearbox, so no gear changing and therefore there is no jerking of the vehicle when accelerating. The EVCU is set to gradually increase the power to the drivetrain to provide a smooth ride. This gives less stress on the driveline.

Better weight distribution

By dividing the battery capacity over the front and the rear of the vehicle, the weight distribution improves and prevents bouncing of the rear of the vehicle which is a common issue when driving an empty pick-up vehicle.

No engine noise

An electric engine makes almost no sound, making this a huge benefit compared to big diesel engines, not only for miners but also less noise-pollution for the surrounding areas of mine sites.



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SAFETY

Certified batteries

The battery system is designed with the highest level of safety in mind and meets the electrical safety regulation ECE R100.

Heavy duty and water- and dustproof battery housing

Operational environment temperatures of battery and e-motor may vary from -20 up to +70 degrees Celsius with water cooling and heating for subzero areas.

Speed limiter

The speed limit of the vehicle can be set by the use of the software that is accessible via the instrument panel in the dashboard (password protected).

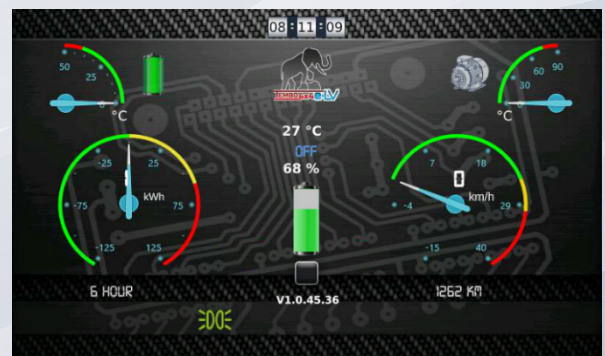
Onboard diagnostics

The instrument panel offers several fleet management options to keep the (electric) fleet in optimal condition.

Instrument panel

Custom designed instrument panel contains the following extra features:

- Time in operation
- Distance driven
- Service indicator set to workhours
- kWh used or regenerating
- Temperature of battery & E-motor
- Multiple main screens (km/h and/or kWh)
- Charging status/current in kW
- Customised logo's & background



Fire suppression system (optional)

This system uses water in combination with high pressure and a small amount of foam additive. All three components of the chain reaction that causes a fire – heat, oxygen and fuel – are attacked simultaneously.

Emergency failsafe brake system (optional)

Wet brake systems available as emergency brakes which can become active when a door is opened while driving, the E-stop button is pressed or when the engine key is turned off. This system ensures that the vehicle cannot roll away unexpectedly (uncontrolled vehicle movement) – a feature that provides an unprecedented level of safety for vehicle operators and site personnel. These brakes reduce vehicle operating costs, improve brake reliability and significantly enhance vehicle safety.

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