MONITORING OF THE ELECTRIC BATTERY SWAPPING

INTRO

Electric two-wheelers (E2W) have gained popularity due to their environmental friendliness, affordability and ease of use. These vehicles offer an excellent solution to the challenges of urban mobility, reducing emissions and noise pollution while providing a cost-effective alternative to traditional petrol vehicles. However, a major challenge to the widespread adoption of E2Ws is the availability of convenient and fast-charging infrastructure.

CHALLENGE

Traffic congestion, road conditions, accidents, traffic lights, stop signs - they all eat up our precious time. When it comes to E2Ws, there is one more item to add to the list - battery drain. Unlike electric cars, electric two-wheelers tend to have smaller battery capacities, making frequent charging necessary, but also time-consuming and inconvenient. The solution soon arrived - battery swapping, which allows electric E2W users to quickly replace a discharged battery pack with a fully charged one. It is designed to help users avoid downtime, eliminate restrictions and prevent battery degradation.

The concept of the battery swap stations is to be fully automated. This means that there are no operators on site, unless there are some technical problems indicated with the particular battery. In this case, the technical service engineer is sent to the docking station to take the battery for further inspection and repair. So, the question is: how can fleet managers and business owners be aware of battery health, location and potential failures or breakdowns without physically removing all the batteries for inspection? At the very least, it would take a lot of time and effort, not to mention disruption to operations and service.

It's also important to take precautions and safety measures - check the temperature, current and other key parameters when the battery is being rented out. This will give business owners peace of mind and additional proof in the event of a warranty claim between both parties. Finally, it's important to know and inform the user about the return or replacement of the battery to ensure a smooth service. For all these challenges, Teltonika Telematics has an effective solution. Let's find out more.

TFT100

PREDICT AND PREVENT POTENTIAL BATTERY FAILURES WITH REAL-TIME MONITORING, EXTENDING BATTERY LIFE AND REDUCING REPLACEMENT COSTS

SOLUTION

Firstly, each battery in the swap station is equipped with a GPS tracker of the e-mobility category - TFT100. For this case to work, our customers need to choose the TFT100 CAN interface version to be able to read all CAN-related parameters from the battery, such as voltage, current, state of charge, fault codes, charging status, etc. This helps managers and business owners to always be aware of the condition of the batteries and know exactly when this or that battery needs to be taken to the service point for repair. It helps them avoid wasting time, effort and money on manual battery health checks.
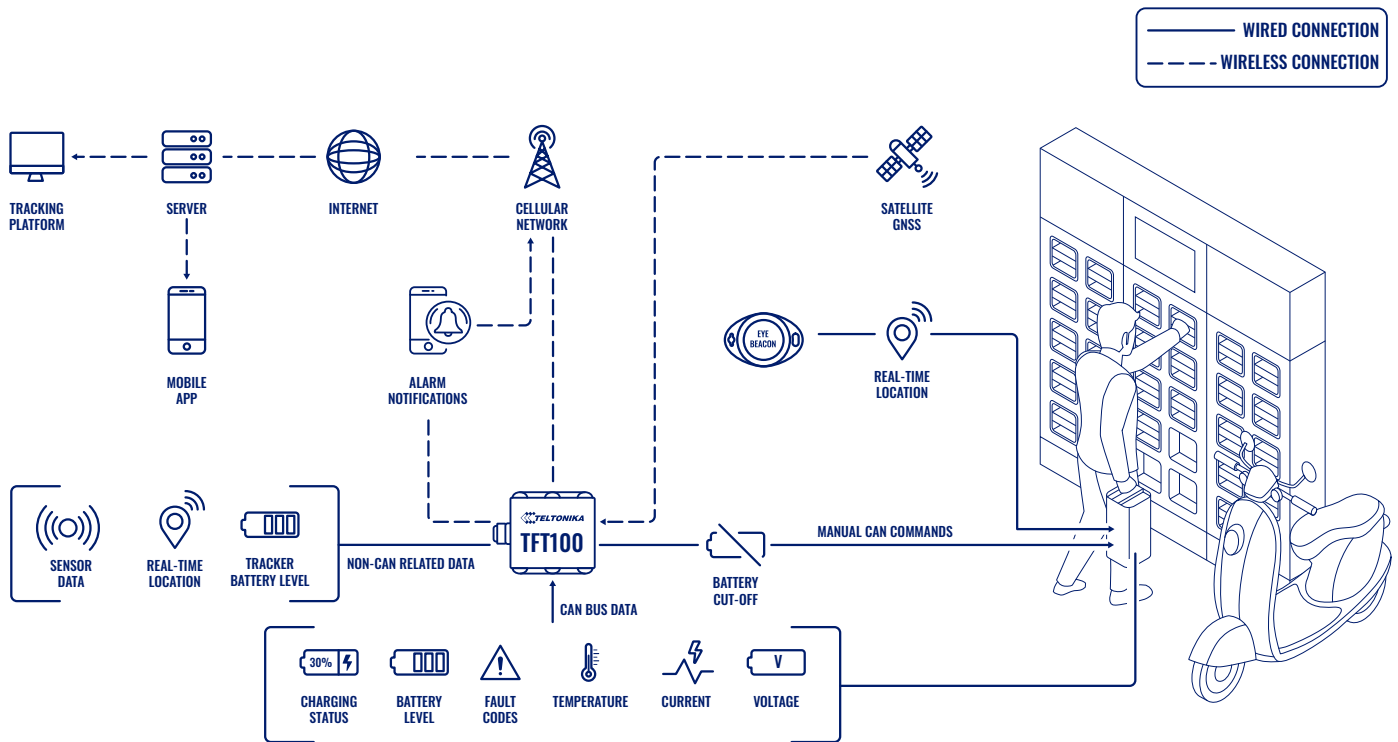
How it works – the TFT100 CAN version supports Manual CAN Commands functionality, meaning that customers can configure up to 10 CAN Commands based on the protocol and initiate configured commands to be executed remotely after device power-up, repeatedly or periodically.

For example, if the battery is overheating, the command can be sent to disconnect the battery remotely (battery cut-off). The user can receive a warning SMS message or mobile app alert notification to take appropriate action. Such precautionary measures contribute to user and battery safety to prevent incidents.

Another important point is that during the lease period, the battery must be used following the manufacturer's guidelines to meet warranty standards in the event of a dispute. For example, misuse of a battery can cause its crash and rupture, resulting in a fire or even an explosion. Fortunately, regular battery monitoring and data logging can help OEMs detect cases of battery misuse and provide evidence in the event of a warranty claim.

Finally, to prevent EV battery theft, it's necessary to equip the batteries with Bluetooth beacons alongside TFT100 beforehand. If the battery is discharged and the TFT100's internal battery is also drained, it's still possible to locate it and take appropriate action. It also allows the business owner to know how many batteries are currently at the charging station and how many are temporarily unavailable.

TOPOLOGY

WIRED CONNECTION
- - - WIRELESS CONNECTION

TRACKING PLATFORM · SERVER · INTERNET · CELLULAR NETWORK · SATELLITE GNSS

MOBILE APP · ALARM NOTIFICATIONS

EYE BEACON · REAL-TIME LOCATION

SENSOR DATA · REAL-TIME LOCATION · TRACKER BATTERY LEVEL · NON-CAN RELATED DATA · TFT100 · BATTERY CUT-OFF · MANUAL CAN COMMANDS

CAN BUS DATA

CHARGING STATUS · BATTERY LEVEL · FAULT CODES · TEMPERATURE · CURRENT · VOLTAGE

BENEFITS

- **Improve safety -** continuously monitor vital battery parameters, protect against potential hazards and minimise the likelihood of accidents.

- Optimise operational efficiency - monitoring battery levels and swapping in real-time reduces downtime and ensures smoother operations.

- **Improve user experience** - provide customers with timely battery swapping, reducing wait times and improving satisfaction.

- **Cost savings** - minimise manual checks and interventions, resulting in labour cost savings and efficient use of resources.

- **Proactive maintenance** - predict and prevent potential battery failures with real-time monitoring, extending battery life and reducing replacement costs. Use the battery as recommended by an OEM, and ensure warranty standards are met.

- **Data-driven decision-making** - gain insight from collected data to make informed decisions about battery inventory, placement and swapping frequency.

- **Environmental impact** - encourage the use of electric vehicles by ensuring consistent battery availability, helping to reduce carbon emissions.

- **Safety and compliance** - ensure batteries are swapped and maintained according to safety standards, reducing risk, and ensuring compliance.

SUCCESS CASE

A few years ago, the Indian startup was researching Teltonika Telematics' GPS tracking devices to offer as a turnkey solution alongside its in-house developed software platform. A few years later, the company started manufacturing its own BMS and custom batteries on the SMT line in India. As a result, the customer decided to enter the battery-swapping business, which is becoming increasingly popular in Asia. That's when they first bought and tested some e-mobility trackers – model TFT100.

The TFT100 (CAN version) helped the customer to obtain the necessary CAN-related data, such as battery level, voltage, temperature, charge status, fault codes and much more - to ensure the battery swap business ran smoothly and safely. Within 1.5 years, the customer has successfully installed around 500 TFT100 trackers in their batteries and the business is thriving. Now the plan is to double the volume next year and to consider collecting data not only from the battery itself but also from the swap stations.

WHY TELTONIKA?

Teltonika Telematics has a long-standing reputation for manufacturing high-quality products and solutions that consistently meet and exceed industry standards. Our GPS trackers undergo rigorous testing and quality control processes to ensure they perform flawlessly in a wide range of conditions. Teltonika products deliver reliable performance day in and day out, helping customers avoid costly disruption and downtime.

In an increasingly data-driven world, the loss of critical information can be devastating. Our devices and services are renowned for their reliability and are built to ensure that data cannot be lost, providing peace of mind to customers who rely on their connectivity and data management solutions for mission-critical operations. With Teltonika Telematics, customers can be confident that their data is safe and secure no matter what the circumstances, making it a smart choice for businesses and organisations seeking reliable connectivity and data management solutions.

FEATURED PRODUCT

TFT100

RELATED ACCESSORIES

Eye Beacon