New BT Levio & Staxio S-series (LSI200, SSI200D, SSI160LN)
新型乗車型電動ローリフト Levio•電動スタッカー Staxioの開発

Magnus Persson *1

*1 Toyota Material Handling Manufacturing Sweden AB

Abstract

The development of the new BT Levio & Staxio S-series started 2018 and the start of production was in April 2023. There were many challenges during the project execution plan due to the pandemic period which led to component shortage situations and remote working for the engineers. The replaced models were unmodern and originally launched in the 1990's and our customers were rejecting these trucks in preference for competitors who had all changed to newer models so there was a strong market need to be able to meet the competition. The new BT Levio & Staxio series is a range of Electric 24V powered pallet truck and stackers developed and manufactured in Europe (Sweden) and are used as compact multi-purpose trucks suitable for a wide range of applications and customers where safety, ergonomics and performance are in focus. The in-built Li-Ion battery solution enables compact dimensions and superior ergonomics.

Keywords: Safety, Ergonomics, Performance, Multi-purpose truck, Li-Ion battery

要　旨

新型乗車型電動ローリフトLevioおよび電動スタッカー Staxioは2018年から2023年にかけてTMHMS(Toyota Material Handling Manufacturing Sweden AB)にて開発された。1990年代に発売された従来車は長年にわたり多くのユーザに支持されてきたが、競合他社が新型車を発売する中で次第にその競争力を失い、市場のニーズに応える新型車の開発が急務となった。新型コロナウイルスによるパンデミック、電子部品の供給不足など多くの困難を乗り越え、2023年に新型電動車Levio、Staxioを発売。更なる安全性向上、高性能化に加え、LIB専用設計によるコンパクトかつ高いエルゴノミクス性により多様な用途、顧客ニーズへの対応を実現した。

キーワード:安全性、エルゴノミクス、高性能、マルチパーパス、リチウムイオン電池

1 Introduction

The new range of BT ride on powered pallet trucks stackers suits a wide range of applications. They are ideal for horizontal transport for medium and long distance, double-load handling, block stacking, stacking at elevated height and levelled-off loading/unloading. The trucks are also suitable for a wide range of customers and needs, as part of a large fleet comprising order pickers and reach trucks and in industries and distribution centers where safety, ergonomics and performance is in focus.

Their size and short turning radius make them fit easily in narrow spaces or narrow aisles. They are also designed for cold store applications.

The Levio & Staxio S-series includes three different basic models to cover the customer needs [Photo1]:

•BT Levio LSI200, 2t Stand-in Powered Pallet Truck
•BT Staxio SSI160LN, 1.6t Stand-in Narrow Stacker Truck with elevated support arms
•BT Staxio SSI200D, 2t Stand-in Double Stacker Truck

Photo1 Levio and Staxio S-series product range

Key points and competition leading performance:

•Safety
•Ergonomics
•Optimized performance
•Built around Li-Ion

2 Features and Benefits

1) Safety

In the operator compartment there are several smart presence sensing features for maximum safety onboard for the driver.

(1) Man-on-platform sensor. [Photo2]
(2) Dead-man's grip sensor in fixed handle. [Photo3]
(3) Left foot photocell sensor. [Photo4]
(4) Steering wheel rotation sensor. The lifting or lowering of the forks will stop if no signal from the steering wheel is detected to prevent crush injuries. [Photo5]

Photo2 Man-on-platform sensor

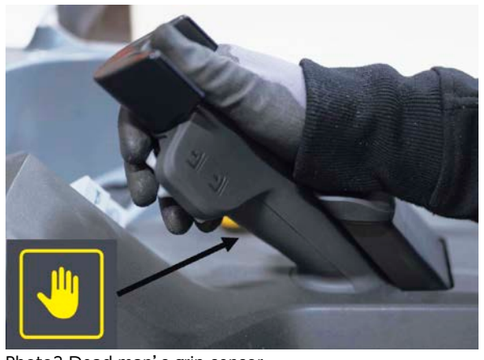

Photo3 Dead-man's grip sensor

Photo4 Left foot photocell sensor

Photo5 Steering wheel rotation sensor

2) Ergonomics

The driver compartment offers a safe and comfortable environment with dampened floor, intuitive colour touch display and easy-to-reach controls with many possibilities to adjust positions of controls and seat. [Photo6]

Photo6 Top view of driver compartment

The new adjustable right-hand module was developed driven from extensive ergonomics studies and customer reference groups involvement to accomplish the best possible driver comfort and optimized ergonomics.
The hand rest part of the controls is adjustable to fit the operator's hand size. The right-hand module is designed so that all buttons are within easy-to-reach. The fixed handle provides good support to hold on to when doing rapid changes of direction or acceleration. [Photo7]

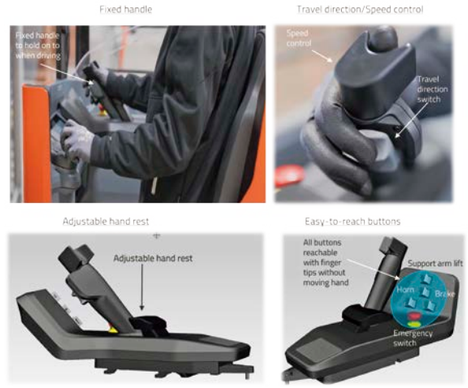

Photo7 Right-hand control module

3) Optimized performance

To optimize the overall performance and productivity and to suit individual customer needs, many programmable parameters are available to set driver profiles depending on driver skill-level and/or the application conditions. Among others the steering sensitivity (in low and high speeds), drive speed in fork/drive wheel direction, acceleration and auto break performance are programmable parameters. [Photo8]

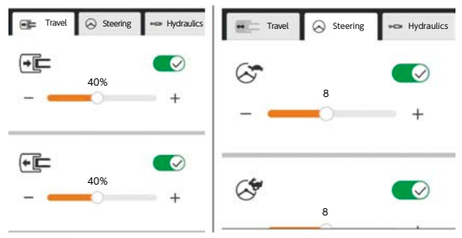

Photo8 Examples of programmable parameters as shown in the touch display.

4) Built around Li-Ion

"Built around You – Built around Li-Ion" This was the vision for the development of the new Levio/Staxio S-series. The in-bult Li-Ion battery gave the prerequisites to optimize the space in the operator compartment, minimize the truck dimensions and offer a sustainable energy solution with more than 3 times greater lifetime energy solution than lead-acid batteries.
Using Toyota material Handling Li-Ion battery solution as energy source also enables quick, easy and safe re-charging and perfect match for usage hours and charging pattern. There are 3 different sizes of battery modules available for the S-series to adapt to the amount of energy needed for the application.
The 3 sizes are 210 Ah, 300 Ah and 420 Ah. [Photo9]
Heated batteries for cold store applications are also available as option.

Photo9 Built around Li-Ion concept and the 3 different energy module sizes.

3 IF Design Awards 2024

Toyota's electric ride-on stacker were among the winners of this year's prestigious iF Design Awards.
The iF Design Awards are recognised as one of the most prestigious and relevant design competitions in the world.
This year's iF Design Awards received 10,800 entries from 72 countries.

An international jury of 132 design experts from 23 countries selected the 75 Gold Award winners, which included Toyota's BT Staxio li-ion-powered ride-on stacker.
iF Gold statements:
"Much smaller and more manoeuvrable than a forklift, this electro-powered stacker is a masterpiece of ergonomic design."
"Well-resolved details and subtle use of curved forms and colours add richness and humanity to this most industrial of products."
The winners of the iF Design Awards were honoured at a ceremony at the Friedrichstadt-Palast in Berlin on 29 April 2024. [Photo 10]

Photo10 iF Design award winners

4 Summary

The new product range is a result of true cross functional teamwork in the different phases of the product development project. Many extraordinary challenges were overcome during the pandemic period, i.e component shortage situations and remote working for the engineers.
The new BT Levio & Staxio S-series have been very well received by the customers and exceeded the sales target expectations by a large margin in the first year of production. The new Levio and Staxio range of products will stand very strong in competition for many years ahead.
The"Built around You – Built around Li-Ion" concept will influence future developments of other types of industrial truck designs driven from sustainable energy solutions, high customer demands of ergonomics and operator safety.

■Author■


Magnus Persson

Magnus Persson
Manager, Project Management Office
R&D Warehouse Trucks
Toyota Material Handling Manufacturing Sweden