

TWS Technology

POWERING UP YOUR MOBILITY

TWS
Technology with Spirit



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Technology
with
Spirit



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About TWS

Dynamic Leadership in Innovative Rechargeable Lithium-ion Battery Solutions

TWS, a dynamic and global industry leader focused on providing innovative Lithium-based battery technology solutions, was founded in 1998. With over 2 decades of development, we have now grown to over 2,500 global employees to service the worldwide markets. TWS always follows the practice of customer-focused values and we're committed to providing innovative solutions in response to the rapid growth of new lithium-ion battery applications.

Founded in 1998	Patents 100+	Tech Centers 6	Factories 4
Active SKUs 500+	Battery Product Life 10+ Years	Batteries Sold 300,000,000+	



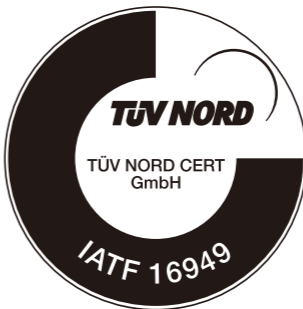
A Better Life through Innovation



Vision
Create a better life for people



Mission
To be the industry leader in rechargeable energy solutions



Our Milestones



Core Values



Winning Culture



Customer Oriented

We always think first about our customers during our decision-making process. We ensure that everyone in the company treats our clients' needs as our first priority. Based on these principles, we build mutually successful long-term partnerships with our clients.

Integrity

We value and hold high ethical standards and will never compromise our business ethics under any circumstances. We always deliver what we promise in our work by being honest, trustworthy, fair, accountable and respectful with our business partners.

Employee Engagement

The success of TWS is built on the contributions and perseverance of our employees. TWS has built an open platform nurturing employees' drive for excellence. United as one, every employee in TWS devotes their passion and effort into whatever work they do, and across all departments.

Teamwork

We work together cohesively and coherently, towards common goals. Creating a positive and productive working atmosphere, we support and depend on each other to blend individual strengths to enhance team performance while uplifting our TWS capabilities.

Pursuit of Excellence

At TWS, we always "Strive for Excellence". We don't just spout empty talk, we walk the talk. We continuously create value for our customers, and abide by the principle of "There is always a better solution" and therefore keep striving to outdo ourselves.

Pursuit of Excellence

For employees in high-performance cultures, good is never good enough. We are always pushing to go farther, better, faster. It's not just about short-term financial performance. It's about building something truly special and lasting.

Customer-oriented

Companies with high-performance cultures focus their energies externally and internally on delighting customers. We don't get caught up in internal politics.

Teamwork

Winning cultures encourage people to be themselves and help individuals develop to their full potential. We also recognize the importance of teamwork, being open to other people's ideas and debating issues collaboratively.

Accountability

A hallmark of a high-performance culture is that employees take personal responsibility for overall business performance. We strive to do the right thing for the business, putting aside issues of personality or territory.

Execution

High performance cultures are impatient to get things done. We are doers, not talkers, keeping an eye on where the value is to ensure their actions will enhance the business.

Passion and Motivation

Everyone in a high-performance culture gives 110%, striving to go beyond adequate to exceptional in the areas that really matter and bringing an infectious enthusiasm to everything they do.

3

Li
Lithium
6.941

Modules



With over 100 patents and over 100 senior experts worldwide, TWS Technology had custom-designed billions of battery packs for customers across various industries.



Modules



ESS



Vacuum Cleaners



eMobility



Material Handling



e-Call



Industrial Handhelds



Smartphones



Medical

TWS provides VDA modules solutions with both standard and customized module design for many years with significant volumes supplied to automotive customers. TWS offers battery modules with or without BMS and option for local assembly, and flexibility in battery pack design with cost advantages.



Electric Passenger Cars



Electric Buses and Trucks



Light Electric Vehicles



Electric Off-highway Vehicles



TWS VDA modules fully conform with the German Association of Automotive Industry Standard. This ready-to-use solution provides multiple cell configuration options with on-demand design flexibility which would allow for condensed project timelines with minimal design development. The TWS VDA modules are widely used in electric vehicles in part because of the superior quality.

Why TWS?

- Cost competitiveness with cell energy options
- Ultra-long cycle life
- Optimal mechanical light weight design against the risk of cell thermal runaway
- Options for local assembly with short lead times

Solutions:

- TWS-1P4S-177-NCM
- TWS-1P6S-102-NCM
- TWS-1P9S-135-NCM
- TWS-1P4S-135-LFP
- TWS-1P8S-50-LFP
- TWS-1P8S-280-LFP
- TWS-1P9S-50-LFP

ESS



Lithium-ion is the best-known storage technology today, TWS has been building integrated battery systems for over 20 years. The same degree of expertise, quality control and technological innovation is used in our process of developing high-performance ESS batteries for the residential and commercial use. State of the art battery system designed for efficiency and long life.

TWS ESS batteries build with cylindrical or prismatic can type cell with the selection of LFP and NMC technology. Our robust BMS technology supports both Master-Slave and Daisy Chain architecture.



Why TWS?

- 20+ years cell chemistry experience and various cell selections ensures the best cost performance solutions
- Mature BMS and software solutions that shorten Time-to-Market
- Fully automated production processes for high reliability and safety
- Local aftersales engineering services globally

Solutions:

- Banding Module
- CTP Pack & Rack
- TITAN ESS Container
- Residential ESS: INFINITE series
- Frame Welding Module
- Air-cooled Module



Vacuum Cleaners



Modern lifestyles created the huge demand in cordless vacuum cleaning and robotic cleaning machines. At TWS, our vision is to Create A Better Life For People and this translates into the design and manufacturing of the power source into the household appliances. TWS' s technology team works to outpace the previous design versions in order to stay on top of new solutions; providing a variety of reference designs for customer adaptation that will reduce design cycle times, but yet still provide high quality.



Upright Vacuum Cleaners



Stick Vacuum Cleaners



Handheld Vacuum Cleaners



Robotic Vacuum Cleaners



TWS technology supports the robotic cleaners with compact and powerful battery solutions, allowing high energy density, extra safety features with communication facilities at an effective cost.

Why TWS?

- Pioneering as supplier of power solutions for global OEMs
- Systematic Value Engineering resulting leadership in best cost performance design solutions
- Full range of battery solutions for hardware protection, AFE and MCU control
- In-house firmware engineering team who understand hardware at the component level created competitive advantages

eMobility



TWS provides best cost performance full battery solutions for eMobility to fulfill numerous applications including electric scooters, electric bicycles, pedelecs and electric motorcycles globally. Experienced in the joint development of BMS, hardware and software solutions.



Electric Scooters



Electric Bicycles



Electric Motorcycles



Electric Wheelchairs



Pedelecs



Backed by increasing government initiatives towards controlling rising air pollution levels, electric two-wheelers are ever-increasing and becoming popular among major urban transport systems in all cities of the globe. These vehicles are easily charged by AC power and often come with removable and replaceable batteries.

Why TWS?

- Ready-made platforms and BMS solutions to fulfill common applications
- TWS' s round the clock design team shortens Time-to-Market
- Specialized End-to-End Integrated IP67 Product Development Capability
- Local aftersales engineering services globally

Material Handling



Environmental sustainability has become the major consideration of logistics vehicles' operation on a global level, thus contributing to the positive impact on cost containment and improvement of human health. TWS provides standard or customized solutions with the merit of easy maintenance, long service hours, lower degradation and quick charge technology.

Why TWS?

- We offer optimized cell energy and modular assembly design, with our BMS options for a variety type of eForklift Continuous roadmap on standard solutions making the universal products compatible with 4x the number of SKUs required for simple plug and play applications.
- Best in class cell chemistry to achieve high energy level and long cycle life
- TWS' s recycling program achieves environmentally friendly standards



e-Call



TWS' s e-Call battery solutions with full range of cell selections. The robust design features and high-performance and high-stability solution is second to none.

Working with all OEMs and Tier 1 automotive customers, TWS provides wide range solutions with highly competitive propositions as well as performance driven.

Why TWS?

- High-performance and high-stability solutions
- Proven track records with global automotive OEMs and Tier 1 customers
- Global FAE engineering teams serve customer needs at their locations
- Built in quality and superior end-to-end quality assurance process achieve zero defects

Industrial Handhelds



TWS has reliable and ruggedly designed battery packs for harsh environment challenges, optional added-value features with Intrinsic Safe, Communications, NFC, e-Ink Display and Wireless Charging capabilities.



Mobile Computers



Portable Scanners



Portable Printers



Walkie Talkie



Point-of-Sale Terminals



Industrial handheld devices are expected to withstand extreme climatic and environmental conditions while being lightweight and having longevity in operation. Due to such advantages, these handheld electronic devices are used in multiple industries such as airline, automotive, retail, agriculture, construction, oil and gas, military and aerospace given performance at harsh environment and design function to communicate without interference. TWS designed battery supports over 10 years product life cycles.

Why TWS?

- 20+ years professional experiences in complex TWS + OEM + JDM multiple parties' multi-locations concurrent engineering development programs
- Outstanding cell application competences supporting best selection for customers
- Beyond Li-ion solutions available with Super Capacitor Technology
- Experiences and knowhow of testing & verification processes for reliable and ruggedized battery designs

Smartphones



Safe, fast charge, compact and high energy density smartphone battery. Superior stable quality level by automated manufacturing process.

With 5G becoming a reality, smartphones become increasingly more indispensable to human life, and smartphones nowadays offer way beyond communication functions. The APPs, data communication, gaming and computing markets are continuously evolving, creating steady demand for safer, more powerful and rapid charging batteries. TWS's knowhow spans throughout the entire array of processes from the inception of a new battery solution, integrated seamlessly with the devices during its design, through careful selection of cell designs and chemistries, robust mechanical design solutions, and knowledgeable software integrations.

Why TWS?

- Pioneer in turnkey 2-cell high voltage fast charge battery solutions
- Experience in mechanical tolerance analysis (cell normal swelling) and knowhow to design compact battery packs
- Integrated SIOP business process (Sales, Inventory, Operations Planning) to meet dynamic demand fluctuations
- Large scale automated production lines for precise and miniature components in battery assembly

Medical



With an ISO 13485 certified manufacturing facility TWS' s rigorous, in-house vertically integrated approach serves as the basis to meet these standards, ensuring that your medical products are reliable and safe.

TWS has a legacy of unrivaled quality and safety for more than 20+ years in designing and manufacturing lithium-ion battery packs. TWS understands the unique and challenging aspects of the medical space and is prepared to meet all of the industry certification standards as well as the demanding qualification and testing criteria. With an ISO 13485 certified manufacturing facility, TWS' s rigorous, in-house vertically integrated approach serves as the basis to meet these standards, ensuring that your medical products are reliable and safe. TWS' s track record, resources, and approach places TWS at the forefront of medical battery integrators and will continue to successfully serve large-scale, top tier medical device manufactures.

Why TWS?

- In-house engineering R&D, NPI, and FAE resources will ensure a streamlined, controlled holistic approach from concept to design through mass production.
- Vertically integrated approach to manufacturing with full traceability of components results in the most rigorous quality control in battery pack industry.
- Proven Six Sigma quality control and improvement methodology
- Strong history of developing and patenting customized, innovative technologies.

Technical Competencies



TWS owns extensive cell and battery expertise, comprehensive design capability, spirit of innovation and fully integrated end-to-end product development capability.

Battery Expertise

With over 20 years professional experiences in battery design and manufacture, and over 200 engineers globally located, TWS has extensive expertise from cells to battery pack systems and knowhow of various applications.

Comprehensive Design Capability

TWS has comprehensive design capability on Li-ion batteries, including well-engineered software and hardware platform powered BMS from simple to complex master-slave systems that cover many applications and communication protocols. The sophisticated simulation capabilities in both mechanics & thermal that ensure our robust design solves power challenges while keeping products safe, but bringing reliability with best performance to cost ratio, Design-to-Quality & Design-to-Cost.

Teamwork

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Pursuit of Excellence

At TWS, we always “Strive for Excellence”. We don’t just spout empty talk, we walk the talk. We continuously create value for our customers, and abide by the principle of “There is always a better solution” and therefore keep striving to outdo ourselves.

Advanced Manufacturing



TWS has multiple manufacturing facilities with operational excellence and agility. They are located strategically in Guangzhou, Xuyi, Huaibei and Jakarta. These manufacturing sites have highly differentiated advanced manufacturing capabilities to deliver the best quality, fastest delivery, and lowest cost to our customers through the adoption of the TWS Operating System to pursue premier performance at the world-class level. Our operational excellence is a simple philosophy rooted in customer-facing priorities: Quality, Delivery, Cost, and Innovation.

TWS’ s Operating System provides a standard framework of how we operate to achieve premier performance by driving continuous improvement culture and building world-class processes to engage employees, give our customers great service and win shareholders’ confidence. The strategic initiatives of Lean Six Sigma are implemented to eradicate wastes in everything we do; ACE (Achieving Cost Excellence) to drive for cost competitiveness in the marketplace; SIOP (Sales, Inventory, and Operations Planning) to improve delivery and cash performance; Lean Product Launch to deliver speed and zero defects of new products to the market; and Winning Cultures to cultivate a highly engaged and performance based team.

Global Footprint

USA

- ▲ Chicago
- ▲ Sacramento
- ▲ Reno
- ▲ Atlanta
- ▲ Los Angeles
- ▲ Boston
- San Diego

UK Germany

- ▲ London
- Frankfurt

China

- Guangzhou
- Shanghai
- ◆ Xuyi
- ◆ Huaibei
- ▲ Hong Kong

Japan

- Tokyo

Korea

- Seoul

Indonesia

- ◆ Jakarta

- Headquarters
- Tech Center
- ◆ Manufacturing Site
- ▲ Sales office

North America

Chicago / USA

Address: 2275 Half Day Road, Bannockburn,
IL 60015, USA

Europe

Frankfurt / Germany

Address: Ohmstraße 11, 63225 Langen, Germany

London / UK

Address: Unit 6, Wyvols Court Farm, Basingstoke Road
Reading, RG7 1WY

Asia

Guangzhou / China

Address: 39 Nan Yun San Road, Science Park,
Guangzhou 510663 PRC

Huaibei / China

Address: 89, Economic Development Zone, Huaibei,
235000, PRC

Hong Kong / China

Address: 11/F, Tung Hip Commercial Building,
244-248 Des Voeux Road Central, Sheung Wan,
Hong Kong

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Xuyi / China

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Zone, Xuyi County, Huaian City, Jiangsu
Province, 211700, PRC

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Address: C-913, H Business park, 26, Beobwon-ro 9-gil,
Songpa-gu, Seoul, Korea

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Jakarta / Indonesia

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