VESTEL
BATTERY ENERGY STORAGE SOLUTIONS

ENSURING CONTINUITY

VESTEL
MOBILITY


VESTEL
VOLVO
VOLVO
MAN

ABOUT ZORLU HOLDING

Founded in 1953 and one of Türkiye's leading conglomerates, Zorlu Holding operates in various sectors, including textiles, consumer electronics, home appliances and mobility, energy, real estate, mining-metallurgy, tourism, and factoring. Zorlu Holding contributes significantly to the Turkish economy and holds an important share of the country's exports. Among the top 3 groups in Turkey in terms of employment creation. One of Turkey's 7 biggest exporters. We create value through our group companies by providing smart products, services and solutions for a smart and sustainable life. We export to over 160 countries worldwide and touch the lives of millions of people. With its deep expertise and industry experience of 70+ years, Zorlu Holding is driving innovation and remains a key contributor to Turkey's economy.

ZORLU HOLDING COMPANIES

ZORLU TEXTILES

Zorlu Textiles Group is Europe's Largest Home Textile Producer with exports to 58 countries in 5 continents

ZORLU ENERGY

Globally integrated energy services with 30+ years of experience and extensive knowledge

VESTEL

Turkey's export champion in electronics industry for more than 28 years

NICKEL COBALT MINING

Turkey's first, Europe's unique nickel cobalt concentrate plant

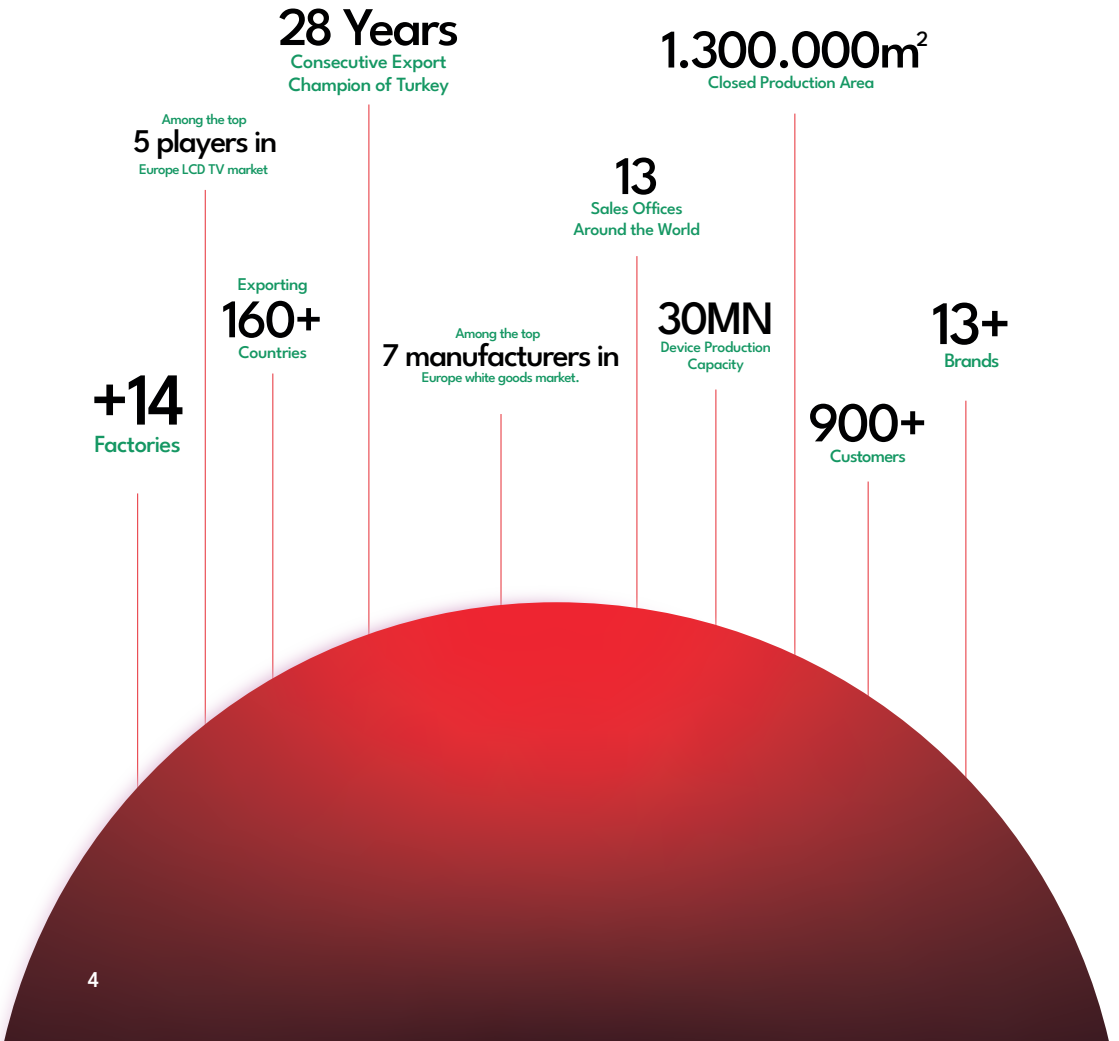
ZORLU PROPERTY

Turkey's first 5 function complex

ABOUT VESTEL GROUP

Vestel Group of Companies is a global technology company that stands out with its expertise in manufacturing, research & development, innovation, design, and brand management in the fields of consumer electronics, digital products, home appliances, and e-mobility. The group consists of 31 companies, 20 of which are located abroad.

Our core values are technology and human-centered transformation, creating accessible and smart solutions that make life easier, and building a net-zero emissions future. We aim to transform our corporate culture by harnessing the power of technology and digitalisation with a focus on people.



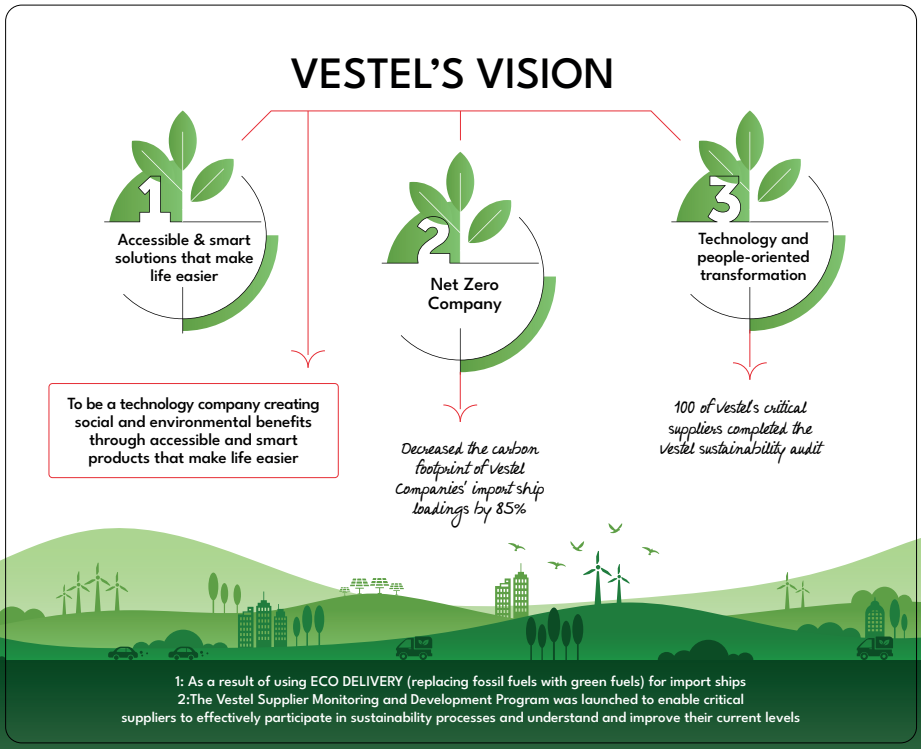
VESTEL SUSTAINABILITY

At Vestel, we strive for sustainability and to improve our ESG (Environmental, Social, Governance) scorecard by being a pioneer in production processes, environmentally friendly products and contributing to the circular economy. This is a long and arduous journey. In this regard, we have Zorlu Holding's sustainability approach, The Smart Life 2030 vision, as a guide to lead us through this journey.

As Zorlu Holding, we are responding to the change in the world with our Smart Life 2030 strategy. With our responsible investment holding approach, which prioritizes opening new horizons, we focus on creating the highest value in environmental, social and governance (ESG) areas when investing for our group, our companies, our stakeholders, the society and the future.

We take an active role in achieving global goals and recognize that the solutions we find to today's problems in ESG areas must be equitable, inclusive and fair to ensure social well-being. With this belief, we invest in human-oriented ecosystems and regenerative business models, and draw strength from our radical collaborations.

Vestel, as part of Zorlu Holding, actively participates in and contributes to the Smart Life 2030 activities included in the sustainability vision of the Holding. Under the main strategies of preparing for the future with an innovative business model approach and developing people-oriented ecosystems, the company set sustainability targets in environmental, social and governance (ESG) areas. Vestel aligns its sustainability goals with the Smart Life 2030 vision, thereby contributing to Zorlu Holding's overall objectives.



91

LSEG DATA & ANALYTICS

67/100

BRONZE | Top 35%
ecovadis
Sustainability Rating
SEP 2025

A

CDP Discloser 2024
Climate Change

B

CDP Discloser 2024
Water Security

73

S&P Global

*Reflects the score as of February 23, 2026.

GLOBAL LOCATIONS

Vestel has offices and sites across multiple countries, forming an extensive global footprint.

OFFICES

United Kingdom · Germany · Spain · France · Romania · Netherlands · Poland · UAE · Kazakhstan · China · Vietnam · USA · Italy

VESTEL MOBILITY

Driving the Future of Sustainable Mobility and Energy Solutions

At Vestel Mobility, we are redefining the future of mobility and energy solutions with cutting-edge technology, regional collaboration, and sustainable practices. Since 2017, Vestel has been investing in the mobility sector, leveraging the industrial strength and expertise of Vestel Group, which boasts a 30-million-unit annual production capacity and exports to 160 countries. By embracing a friendshore approach highlights our commitment to delivering high-quality, regionally sourced solutions that foster reliability, sustainability, and trust in global markets.

With decades of local engineering and in-house design expertise, an unwavering commitment to innovation, and a proven track record as Turkey's leading exporter, we deliver advanced solutions in automotive electronics, EV charging systems, and energy storage technologies.

Building on a foundation of robust R&D capabilities and strong global partnerships including collaborations with TOGG, ZES, Trugo, Migros, Kalyon, Aksa, Aselsan, EDF, Dacia, Etrel, Charge Cloud, Electrip, EON, TOTAL Energies, Mer Group, Webasto, Viessmann, Iberdrola and ZEborne. Vestel Mobility is committed to creating revolutionary, tailor-made solutions for businesses and individuals driving toward a sustainable future.

Innovation and Expertise at Scale

Our journey began in 2013 with the establishment of our Automotive Electronics Division, and we have since achieved key milestones, from EV charger exports to auto electronics nominations and pioneering ESS battery systems.

"Vestel Mobility is proud to be a part of leading global alliances and organizations shaping the future of energy and mobility, including E-Mobility Europe (Avere), CharIN, the Open Charge Alliance (OCA), the European Association for Storage of Energy (EASE), and the SAFE Initiative. These collaborations reflect our commitment to advancing industry standards and driving innovation through global cooperation."

Shaping What's Next

As we look to the future, Vestel Mobility is driven by a purpose: to create solutions that not only meet today's challenges but also anticipate the needs of tomorrow. Our unwavering focus on innovation, sustainability, and seamless integration empowers us to develop technologies that enrich lives and accelerate the transition to a cleaner, smarter world. By fostering collaboration across industries and continually investing in research and development, we remain committed to delivering value for our customers, partners, and communities worldwide.

VESTEL HAS CENTERED ITS MAIN GROWTH STRATEGY AROUND MOBILITY AND
HAS BEEN TAKING STEADY STEPS IN THE PAST 10 YEARS FOR THIS GOAL

2013

Automotive Electronics
Division is formed
EVC focused R&D Team

2016

First nomination
for EVC

2018

Became 24% shareholder of
Turkey's Automobile Enterprise
Group (TOGG)
First EVC export
Battery focused R&D Team

2020

First in vehicle display nomination
IATF-16949 Certification for
Auto Electronics
Expansion into ESS batteries, by
developing low-voltage solutions

2021

IDCC & TCU Auto
Electronics nomination
First DC-EVC sale

2022

First display shipment
+61k units EVC export
First e-mobility battery sales

2023

First BCM Auto Elec. Nomination
First ESS Sales

2024

- Vestel Mobility formed
- New production plant move started
- Utility production line investment made

2025

First Battery-Integrated
EVC System Installation in the EU

R&D KEY TECHNOLOGIES

Vestel Mobility provides top services and processes such as close engineering and R&D collaborations for increased product quality for its clients

Standards, Regulations & Compliance R&D

- Global Compliance & Type Approval Engineering
- Dynamic Thermal Derating & Lifetime Optimization Algorithms

Power, Performance & Efficiency R&D

- High-Efficiency Design
- Thermal Resilience & High-Power Continuous Operation

Advanced Thermal & Fluids Engineering

- Eco-Friendly Thermal Engineering
- Industrial Enclosure Design

Control, Software & Smart Management R&D

- In-House Multi-Tier BMS Development
- Smart Energy Management & Protocol Integration
- Full-Stack Local EMS & Web-UI Development
- Autonomous Grid-Forming & Black-Start Engineering

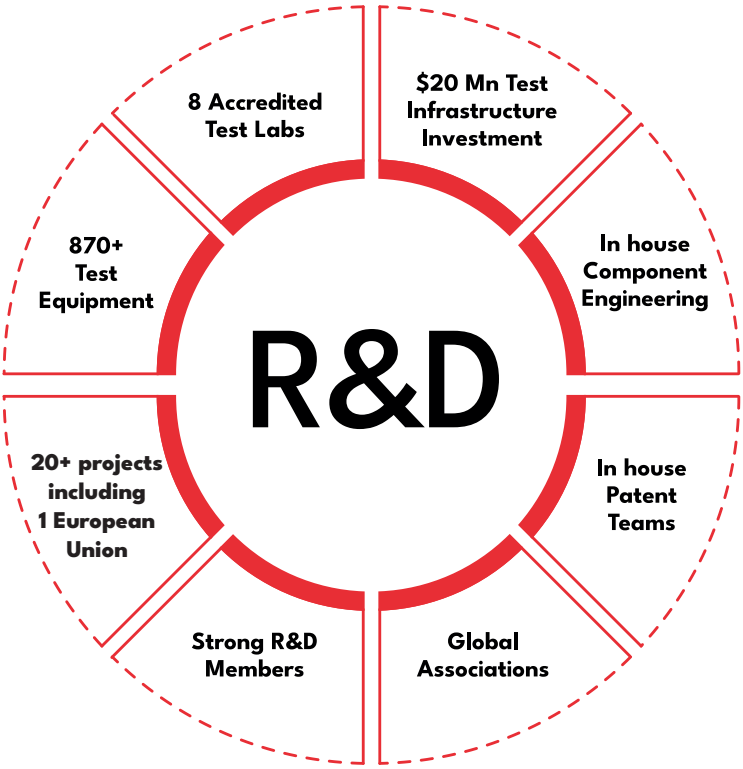
Safety & Protective Engineering

- Multi-Tiered Fail-Safe & Fire Suppression Design
- Proactive Sensor Fusion & Hazard Prevention
- Structural Over-Pressure & Explosion Prevention

Installation, Operation & Serviceability (DFX)

- Design for Manufacturing & Service
- Modular & Scalable Architecture Design

VESTEL MOBILITY IS PROUD TO BE A PART OF LEADING GLOBAL ALLIANCES AND ORGANIZATIONS SHAPING THE FUTURE OF ENERGY AND MOBILITY



ACCREDITED SAFETY AND EMC LABORATORIES

TÜRKAK

3RD PARTY CERTIFICATION LABORATORIES AND APPROVALS

DEKRA TÜVRheinland® intertek Total Quality. Assured.

QUALITY ASSURANCE

APPROVALS

CE

REACH

RoHS

STANDARDS

IEC / EN 62619	IEC 60730	EU Battery Regulation (2023/1542)
IEC / EN 63056	PCS Grid Certificates	ISO9001
IEC 60529 (IP Test)	CE	EN 62477
IEC 61000 (EMC)	MSDS / SDS	EN62109
UN38.3	EN 62281	ISO 13849

SERVICE & SUPPORT

Comprehensive Support & Maintenance

1.REMOTE SUPPORT

Leverage advanced remote diagnostics and expert intervention to ensure seamless operation. Our specialists provide real-time solutions, swiftly resolving technical issues to maximize uptime and operational efficiency.

2.REMOTE DIAGNOSTICS

Continuous system monitoring enables predictive issue detection, mitigating potential failures before they occur. This proactive approach enhances device longevity, ensuring uninterrupted performance and an optimal charging experience.

3.FIELD ENGINEERING SUPPORT

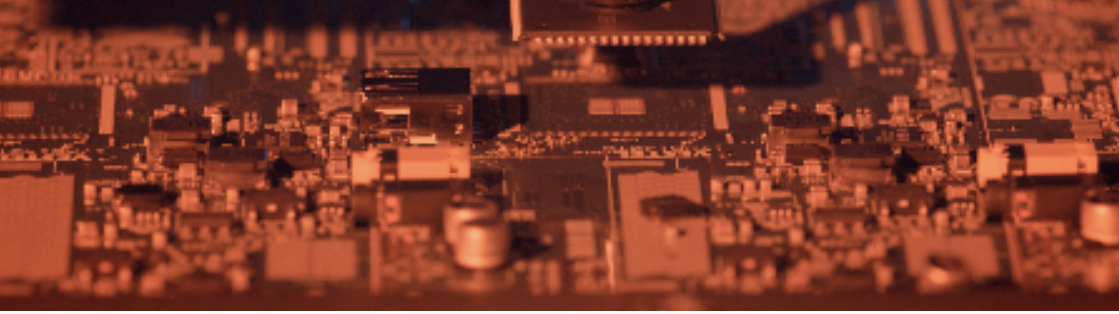
Deploying highly skilled engineers for on-site interventions, we deliver rapid, precise solutions to optimize system performance. Our strategic maintenance approach minimizes disruptions and sustains peak operational efficiency.

4.ON-SITE SUPPORT

With prompt, on-location technical resolutions, our teams ensure swift restoration of full functionality. In critical scenarios, we guarantee reliable emergency interventions to uphold seamless service continuity.

5.CORRECTIVE & PREDICTIVE MAINTENANCE

Through rigorous inspections and proactive maintenance, we mitigate risks and enhance system reliability. Our structured approach ensures optimal long-term performance, safeguarding uninterrupted charging operations.



PRODUCTION

VESTEL, a global leader in electrification and advanced manufacturing, has established state-of-the-art Gigafactory with GWh-scale production capacity dedicated to the assembly of high-performance battery systems. These world-class facilities are designed to meet the growing global demand for both e-mobility and stationary energy storage with high-precision automated assembly technologies. Highlighting our commitment to vertical integration, quality, and scalability, VESTEL controls the entire manufacturing ecosystem—from printed circuit board assembly to complete system integration.

DUAL-LINE CELL ASSEMBLY: CYLINDRICAL & PRISMATIC

To cater to diverse market needs, VESTEL operates two specialized, fully automated production lines:
ESS Battery Line (Prismatic Cells): Optimized for robust, heavy-duty prismatic cells, delivering the high capacity, thermal stability, and long cycle life required for Residential, Commercial & Industrial (C&I) and Utility-Scale Energy Storage Systems.
E-Mobility Battery Line (Cylindrical Cells): High-precision manufacturing of compact, high-density battery packs for e-mobility and micro-mobility.

AUTOMATION & HIGH-PRECISION LASER WELDING

Both production lines utilize advanced robotics and state-of-the-art laser welding technology for cell-to-busbar connections. This automated process ensures exceptionally low contact resistance, superior electrical conductivity, and high mechanical integrity. By precisely controlling heat input and minimizing thermal stress on the cells, our laser welding eliminates micro-damage, guarantees long-term durability, and ensures absolute consistency across GWh-scale outputs.

IN-HOUSE BMS MANUFACTURING (SMT LINES)

To guarantee unmatched reliability and seamless hardware-software integration, VESTEL manufactures its proprietary Battery Management Systems (BMS) and other electronic cards entirely in-house.

COMPREHENSIVE AND AUTOMATED TESTING SYSTEMS

Our quality assurance process is fully integrated into the automated production flow. Battery modules and complete packs undergo multi-stage inspections, including automated 3D optical inspection (AOI) of laser welds, insulation and dielectric strength tests, and comprehensive BMS communication verification. Before shipment, every finished product undergoes rigorous End-of-Line (EOL) testing under simulated real-world conditions—including high-voltage loads and thermal stress cycles—to guarantee 100% operational safety and reliability.

Vestel Energy Storage Solutions with Aplication Areas

Flexible Cabinet Design for C&I and Utility Solutions

USE CASES

Vestel BESS solutions can be adapted to project requirements and usage scenarios.

Peak Shaving

Charge during valley hours and discharge during peak hours to reduce enterprise or park electricity costs and save customers electricity costs.

Demand Response

When the short-term power consumption exceeds the transformers capacity, the energy storage system performs rapid discharge to meet the load energy demand.

Backup Power

Provide uninterrupted short-term power supply for important loads during power interruption and reduce ecomical loses caused by sudden power failure of loads.

Power Trading

On the electricity market trading platform, short-term power trading is conducted by combining load forecasting to maximize profits.

Frequency Regulation

The system can quickly charge or discharge power as needed to balance the supply and demand, helping to maintain the grid's frequency within acceptable limits.

Voltage Regulation

The system helps to adjust voltage levels, ensuring they remain within acceptable limits. This capability helps improve grid stability, reliability, and efficiency, ultimately ensuring consistent and reliable electricity supply to consumers.

EVC Complimentary

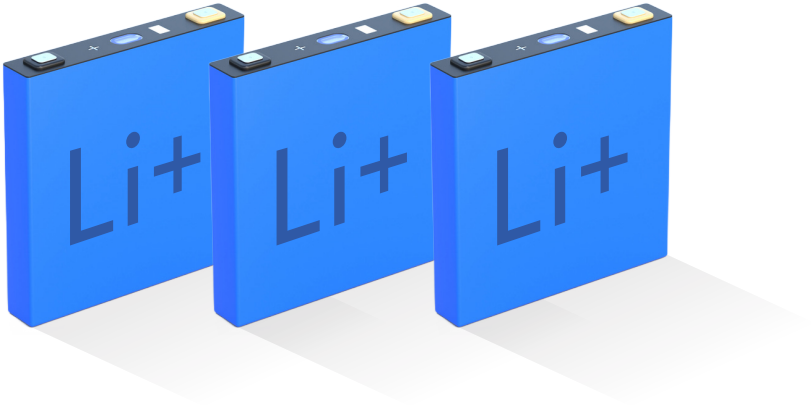
Storing excess renewable or grid energy and using it to charge EVs, reducing reliance on traditional power grids and fossil fuels.

Microgrid Building

A microgrid is a group of interconnected loads and distributed energy resources that acts as a single controllable entity with respect to the grid. It can connect and disconnect from the grid to operate in grid-connected or island mode.

CELL FOR HIGHER CAPACITY

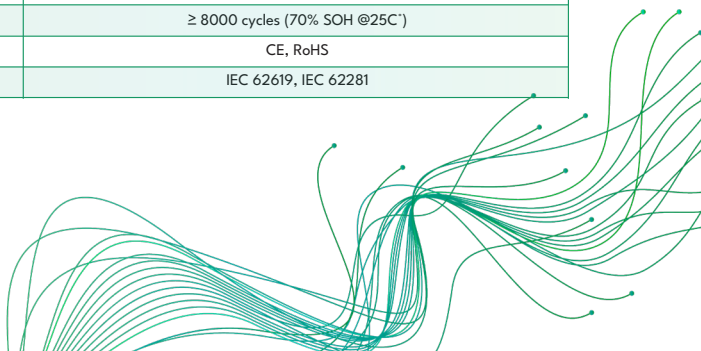
The battery is designed with higher density lithium iron phosphate cell which has 314Ah cell. The total weight is about 5.5 kg.



Product Feature		
Item		**Cell**
Nominal capacity		314 AH
Nominal voltage		3.2 V
Standard charge		1 C
Standard disscharge		1 C
Temperature	Charge	0-60 ˚C
	Discharge	-30-60 ˚C
Dimension		173*71*207 mm (LxWxH)
Weight		5490 g±300 g
Energy density		182,7 Wh/kg
Certification		GB/T 36276-2023, UL1973. UL9540A, IEC62619. UN38.3. ROHS. REACH
Cycle life		8000

52S BATTERY PACK

PARAMETERS		52S PACK (314AH)
Model		52S Battery Pack
Cell Configuration		52S1P
Design Capacity		314Ah
Cell Chemistry		Lithium Iron Phosphate (LFP)
Cell Under Voltage (per cell)		2.8V
Cell Over Voltage (per cell)		3.6V
Voltage Range		DC 145.6 - 187.2V (Nominal 166.4V)
Rated Energy		52.250kWh (166.4V × 314Ah)
Maximum CHARGE/DISCHARGE Current		314A @1C
SAFE Pin Activation Enabled		NO
Communication Protocols		Daisy Chain, UART
Cooling Method		Active liquid cooling
Circuit breaker		630A @250Vdc, 1pcs
Manual Safety Disconnect		350A@1500Vdc, 1pcs
Cell Balancing Enabled		Yes
Internal or External Temperature Sensor		External Enabled
BMU Features		Voltage Monitoring (Max. 52 sampling) Temperature Monitoring (Max. 52 Sampling) Passive Balancinng Overcurrent Self Protection Voltage Drop Monitoring (Optional) Manual Safety Clamp Detection (Optional)
Power Consumption (Active Mode)		min. 60mA ; max. 100mA
Power Consumption (Shut Down Mode)		min. 60uA ; max. 100uA
Display Mode		2-bar LED(Run,Alarm) (Optional)
Applicable System Voltage Level		≤1500V DC
Operating	Charging	0 to 60˚C
Temperature	Discharging	-30 to 60˚C
Storage Temperature		-20˚C to 45˚C
Relative Humidity		0% to 95% RH
IP Rating		IP65
Dimensions		790 x 1140 x 248 mm
Weight		330kg
Cycle Life		≥ 8000 cycles (70% SOH @25C˚)
Compliance		CE, RoHS
Certifications		IEC 62619, IEC 62281



FLEXIBLE CABINET LIQUID COOLING SYSTEM COMPONENTS ESIGN FOR UTILITY SCALE PROJECTS

Vestel liquid cooling battery solution has both only DC cabinet System option which support bigger capacities with parallel connection capability and also all in one cabinet option to provide a compact and ready design. Vestel, can support you for any use cases with utility and C&I solutions.

LIQUID COOLING BATTERY SOLUTIONS

LIQUID COOLING CABINET TECHNICAL PARAMETERS

PARAMETERS	418KWH	261KWH
AC Side		
Rated output power	N/A	125kW
Maximum AC power	N/A	138kW (continuous for 1 minute)
Grid voltage	N/A	400V ac/3P+N+PE
Grid frequency	N/A	50Hz/60Hz
AC voltage harmonics	N/A	≤3% (lineer load)
DC component	N/A	<0.5%Ipn
Power factor range	N/A	0.99
Energy conversion efficiency	N/A	≥89%
DC Side		
Cell type	LFP 314Ah	LFP 314Ah
Grouping method	1P416S	1P260S
Rated energy	418kWh	261.00kWh
Rated capacity	314Ah	314Ah
Rated voltage	1331.2 Vdc	832V
Recommended voltage range	1164.8–1497.6 Vdc	DC 728-936V
Charging/discharging rate	≤1C	≤0.5C
Maximum current	314Ah	157A
Discharge depth	95%DOD	95%DOD
General Parameters		
Cycle life	≥8000 times (25±2˚C)	≥8000 times (25±2˚C)
Protection level	IP65	IP65
Cooling method	Active liquid cooling	Active liquid cooling
Operating temperature	-25 to 55˚C	-25 to 55˚C
Relative humidity	0-95%RH	0-95%RH
Working Altitude	≤2000m	≤2000m
Dimensions (W*D*H)	1,300 × 1,300 × 2,400 mm	1050*1350*2400mm
Total weight	Approximately 3.700kg	Approximately 2,670kg
Fire protection system	PACK-level aerosol (Optional) + RACK-level aerosol fire extinguishing	PACK-level aerosol (Optional) + RACK-level aerosol fire extinguishing
Communication	Ethernet/RS485/CAN	Ethernet/RS485/CAN
Standards complied with	UN38.3, IEC62619, IEC63056, IEC62281, IEC62619,IEC61000	UN38.3, IEC62619, IEC63056, IEC62281, IEC62619,IEC61000

FLEXIBLE CABINET DESIGN FOR UTILITY SCALE PROJECTS

PARAMETERS	418KWH
DC Side	
Cell type	LFP 314Ah
Grouping method	1P416S
Rated energy	418kWh
Rated capacity	314Ah
Rated voltage	1331.2 Vdc
Recommended voltage range	1164.8–1497.6 Vdc
Charging/discharging rate	≤1C
Maximum current	314A
Discharge depth	95%DOD
General Parameters	
Cycle life	≥8000 cycles (25±2C°)
Protection level	IP55
Cooling method	Active liquid cooling
Operating temperature	-30 to 55C°
Relative humidity	0-95%RH
Working Altitude	≤4000m
Dimensions (W*D*H)	1300 × 1300 × 2400 mm
Total weight	Approximately 3.800kg
Fire protection system	PACK-level aerosol (Optional) + RACK-level aerosol fire extinguishing
Communication	Ethernet/RS485/CAN
Standards complied with	UN38.3(IEC62281), IEC62619, IEC63056, IEC61000-6-2/4 IEC62477-1

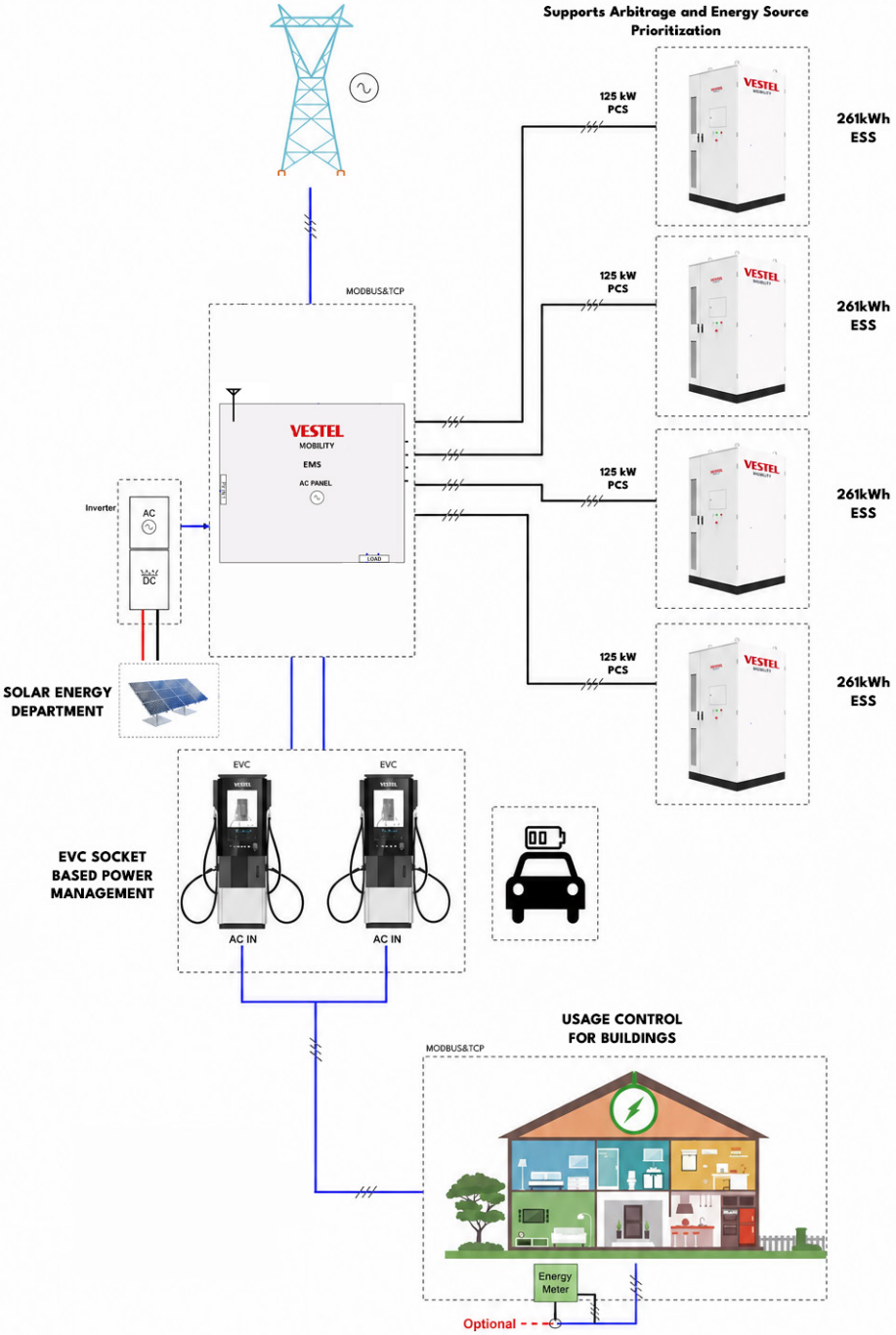
CASE STUDY FROM GERMANY

Project Site
Logistics Hub, Germany

BESS Installation
125kW/261kWh AIO Cabinet
x 4 + 400kW DC Charger x 1

Use Case
Peak Shaving, PV Integration,
Dynamic Response, EV
Charger Complimentary

FIELD APPLICATION - TOPOGOLOGY



RESIDENTIAL BATTERY SOLUTIONS

Energy Independence

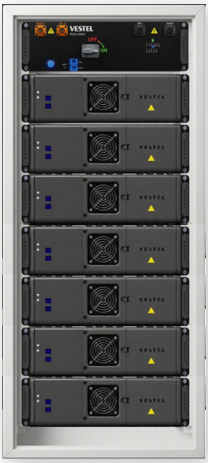
Environmental Benefits

Power Outage Protection

HIGH VOLTAGE RESIDENTIAL BATTERY SOLUTION

Flexible Design

• The stackable, modular design simplifies installation and maintenance, while offering flexible battery capacity expansion up to 40 kWh.



Easy

• Easy pack-to-pack connection via cable
• Automatically assign of BMS address.

Strong

• 5.12kWh for each battery module.

RESS Mechanical Dimensions

LOW VOLTAGE RESIDENTIAL BATTERY SOLUTION

Low Voltage Residential Battery System

High Power
Up to 19.2 kW
continuous output

All Climate
Wide operating
tempature range

Modular
4.8 kWh
per module

Easy Installation
Smart BMS
Auto Adress

Safe & Reliable
LFP technology
>3000 cycles

KEY DESIGN FEATURES

Expandable Capacity

Modular structure of Vestel Residential Battery Solutions allow to expand capacity of battery systems without replacing their infrastructure. With its high energy density and reliability, it's an ideal choice for various applications to adapt and grow with ease while maintaining a high level of performance and reliability.

Renewable Integration

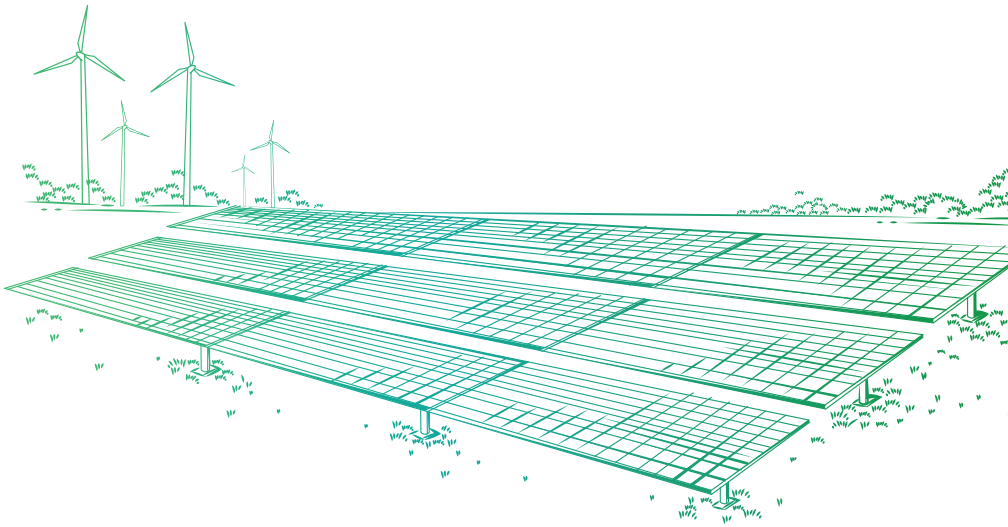
Solar PV integration feature allows storing energy generated from renewable sources for later use, ensuring a more efficient and sustainable energy system.

Durability and Longer Life

With patented innovative on-board charger unit, it prevents unnecessary cycling of the battery, ensuring a longer product life and reducing the need of maintenance.

Safety Protection

Safety is a key priority for Vestel Residential Battery. With our extensive experience in home electronics, we have integrated advanced security features into our product. The system incorporates with intelligent thermal management. over/under voltage&current protection, ensuring the utmost safety for you.



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