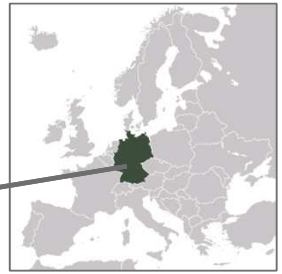
Jauch Battery

Company Presentation

JAUCH – HEADQUARTERS

The Jauch Headquarters are located in Villingen-Schwenningen, Germany, at the edge of the Black Forest, 100 km south of Stuttgart and 40 km north-west of Lake Constance.



OUR VALUE PROPOSITIONS

Technical and project support

- Frequency Control Products
- Battery Technology

Quality "Made in Germany"

- Frequency Control Products
- Battery Technology

International and reliable logistics services

- Frequency Control Products
- Battery Technology

Qualified specialists

- Frequency Control Products
- Battery Technology

MILESTONES

1954
Foundation of Jauch and start of selling mechanical components to the German watch industry

1974
Jauch is responsible for the sales of Motorola Inc.'s quartz crystals and starts selling frequency components for the first time.

1976
Jauch becomes a representative of Renata AG - the beginning of battery sales at Jauch.

1986
First cooperations with production partners in Asia

1993
Opening of a technology center for high-precision quartz crystals in Villingen-Schwenningen, Germany

Opening of Jauch Quartz Indonesia (P.T. Great)

2002
Foundation of the subsidiary Jauch Quartz America, Inc.

2003
Intensive development of the battery division. Business relations and partnerships in Asia are established.

2004
Foundation of the subsidiary Jauch Quartz France SASU

Establishment of a test center for cells and batteries in Villingen-Schwenningen

MILESTONES

2007
Foundation of the subsidiary Jauch Quartz UK, Ltd.

Sales of the first, customer specific, Lithium ion and Lithium polymer battery packs

2010
Partnership with Siward for the production of frequency components on reserved production lines

2012
Establishment of an assembly line for batteries in Villingen-Schwenningen

2015
Opening of a competence center for battery management systems in Villingen-Schwenningen.

2016
Opening of a configuration center for MEMS oscillators in Villingen-Schwenningen

2017
Expansion of our own test laboratory in Villingen-Schwenningen to authorize UN certifications for batteries.

2018
Acquisition of company “Batteries and Power Solutions GmbH“ and foundation of “Jauch Battery Solutions GmbH“

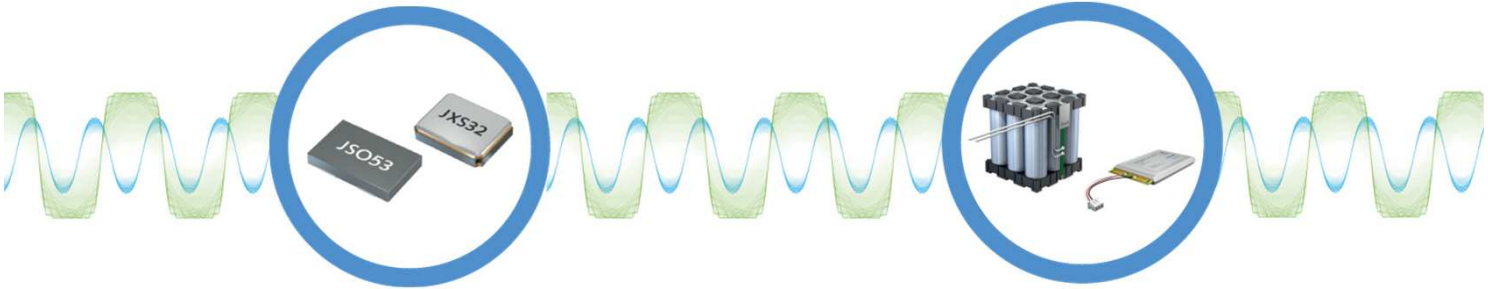
Cooperation with Siward for joint development, qualification and production of frequency control products

2019
Opening of the Jauch Battery Academy in Villingen-Schwenningen

Launch of battery brand “Jauch”.

2020
Expansion of the seminar offer in the field of FCP technology. Re-naming to “Jauch Academy“.

PRODUCT RANGES



Frequency Control Products

Quartz Crystals

Crystal Oscillators

Battery Technology

Battery Packs

Lithium Ion and Lithium Polymer Batteries

Battery Management Systems (BMS)

Certifications

Battery Academy

CONSULTATION

Jauch specialists will advise and assist you before and during the development phase in detail.

- **Selection of suitable components**

  Avoid incorrect decisions, minimize development problems, optimize lead times, optimize costs
- **Help with specifications:**

  Joint creation of custom specifications for your project, selection of products according to your requirements, individual precalculation
- **Technical support along with distribution:**

  Precalculation for special applications, optimized specification with regards to all project-specific parameters, cost-optimized preselection

DESIGN-IN-SUPPORT

Jauch has a modern electronic laboratory, so we can optimally support you in developing your circuits.

- **Sizing assistance for quartz circuits:**

  Product selection based on electrical aspects, sizing recommendations based on your IC datasheets, consultancy for special applications, checking your prototypes in our laboratory
- **Modification recommendations for quartz circuits:**

  Qualified modification proposals based on our circuit analysis, correction of the component selection, correction after layout change

PRODUCT PORTFOLIO BATTERIES

Lithium Ion Batteries

Lithium Polymer Batteries

Lithium Thionyl Chloride Batteries

Lithium Button Cells

Cylindrical Lithium Batteries

Lithium Iron Phosphate Batteries

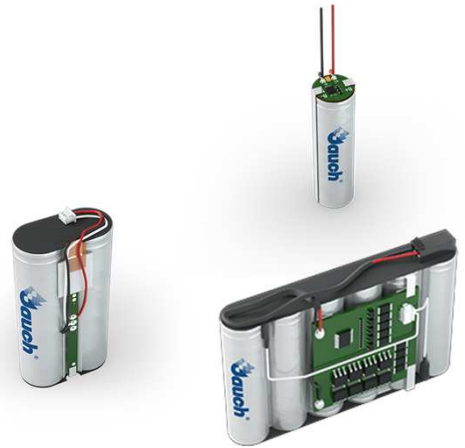
NiMH Batteries

Battery Holders

Individual Solutions

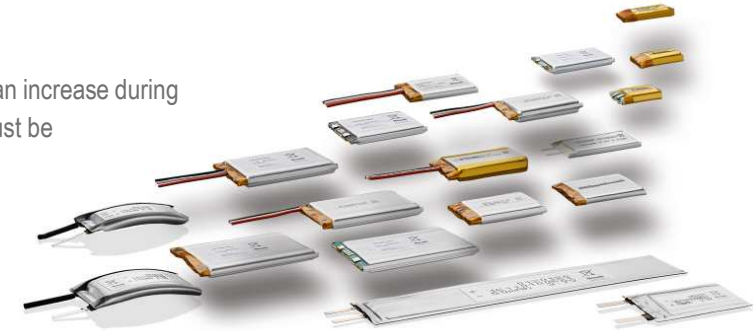
LITHIUM ION BATTERIES

- Wide range of cylindrical and prismatic cells
- Graphite electrode (negative) and lithium metal oxide electrode (positive)
- Lithium metal oxide can be manganese, nickel or cobalt.
- Nominal voltage depends on the electrode material and is 3.6 or 3.7 volts.
- Charge voltage is usually 4.2 volts.
- Cell voltage, temperature sensitivity, maximum allowable charge or discharge current vary greatly depending on electrode material and electrolyte.
- High energy density



LITHIUM POLYMER BATTERIES

- Wide range of different sizes, mostly pouch cells
- Plastic-coated aluminum foil is used instead of a steel housing.
- Cells can be very thin and are lighter than other battery types.
- Nominal voltage depends on the electrode material and is normally 3.7 volts.
- Charge voltage is usually 4.2 volts.
- Because of the soft housing, the thickness of the cell can increase during the charging process („swelling“). This phenomenon must be considered in the planning of the housing.



LITHIUM BUTTON CELLS

- Large selection of sizes
- Different pin configurations available
- Main application areas: car keys, watches, medical equipment, LED flashlights, and any form of memory backup
- Nominal voltage is 3 volts.
- Fast delivery times (stock article)
- Wide temperature range from -30 to +70°C

CYLINDRICAL LITHIUM BATTERIES

- Low self-discharge, long shelf life
- Non-rechargeable

- Lithium manganese dioxide batteries (LiMnO2) with a voltage of 3 volts are widely used.
- Mainly used in electronic devices and as a backup battery for motherboards
- Low passivation of the anode helps avoid voltage drops at the beginning of the load (voltage delay).

- Lithium carbon fluoride mono cells (Li(CF)n) are also widely used.
- Further increased durability and extended temperature range with a lower self-discharge
- Mainly used in the field of memory backup

LITHIUM THIONYL CHLORIDE BATTERIES

- Non-rechargeable lithium battery with lithium as an anode and a graphite electrode as a cathode
- Thionyl chloride serves as both a solvent and an electrolyte.
- Nominal voltage is about 3.6 volts, which remains nearly constant during the discharge time.
- Highest energy density of all primary batteries, up to 650 Wh/kg
- Maximum reliability even at high power consumption and in extreme temperature conditions (-55 to +85°C)
- Wide range of sizes, round cells and prismatic cells
- Different tab configurations available
- Typical applications: off-grid power supply of electronics in military and industrial applications, security technology, and utility meters

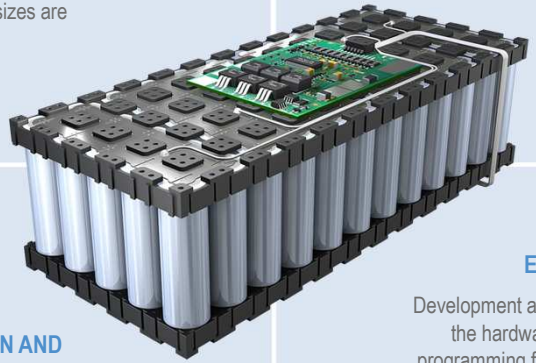
PACK DESIGN

CELL SELECTION

Large selection of standard cell sizes and chemistries. Individual cell sizes are possible.

DEVELOPMENT

Development of a battery pack that is ideal for your application.



PRODUCTION AND ASSEMBLY

Prototypes, small and large volumes.

ELECTRONICS

Development and production of the hardware and software programming for the protection circuits and battery management systems.

BATTERY PACKS DEVELOPMENT AND KNOW-HOW

Even with complex battery pack configurations for your customers, you can rely on the competent support of Jauch. Our own research and development team includes doctors of chemistry, production technicians, electronics engineers as well as certification and transportation specialists.

The large number of battery tests required on the market can be carried out at Jauch's own test laboratory in Villingen-Schwenningen.

Battery Development Process:

DEFINITION PHASE

- Customer inquiry
- Feasibility study
- Design of battery pack
- Preliminary battery description, if necessary, preparation of specification
- Quotation

PRODUCT DEVELOPMENT

- Development / design-engineering
- Datasheet preparation
- Prototype build and test
- Send approval prototype to customer
- Testing at customer – approval / design freeze
- Start of product approvals / certifications
- Conversion from prototype to final design suitable for mass production

PRODUCTION PHASE

- Pilot-Run / Ramp-Up
- Mass production

PROJECT COMPLETION

- Lessons-Learned
- Customer feedback
- Refinement if necessary

INDIVIDUAL SOLUTIONS & CUSTOMIZED DEVELOPMENTS

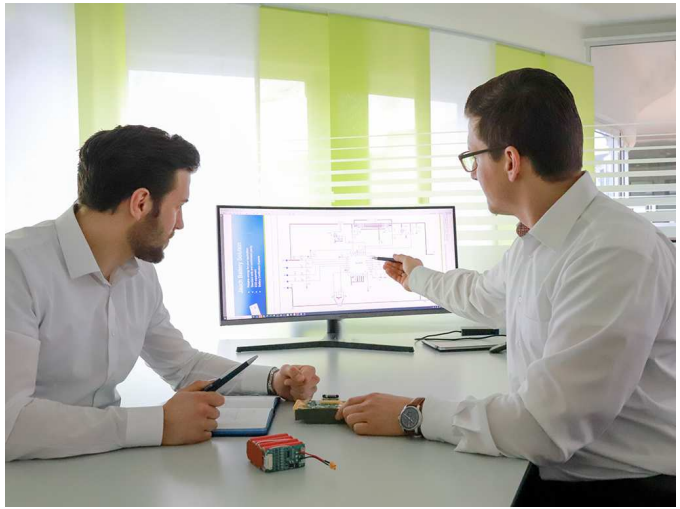
We develop individual battery packs for our customers.

- Taking care of special requests for design-in as well as all relevant safety aspects
- Individual package design with all the technical specifications will be accompanied by extensive testing and studies.
- Development of the software for the battery management system which ensures that the battery pack operates safely even under extreme loads.

CONSULTATION & DESIGN-IN

In-depth support by our battery experts.

- We support our customers right from the design-in phase.
- Together with the customer we develop an optimized solution for every application and every device.
- Customized cell sizes are developed and produced in order to realize the best solution.
- The housing of the battery is configured in accordance with individual requirements of the customer.
- Customer-specific develpments are accompanied by extensive tests and a feasibility analysis.
- Consultation on handling, transport, storage and certification of batteries



CELL SELECTION

We select the ideal cell for the customer's application.

- Wide range of cell sizes
- Wide range of cell chemistries

ELECTRONICS (PCM & BMS)

Protection Circuit Module and Battery Management System

- Development and production of the hardware as well as programming of the software for the protection circuits and battery management systems
- From simple electronic protection circuits to intelligent batteries with programmable battery management systems
- Battery management system will be tailored to the characteristics of each battery pack and matches the requirements of the application.

CERTIFICATION

We support in certification questions.

- Own Jauch test and certification laboratory
  → flexible in conducting battery tests
- UN38.3 certifications can be authorized in Villingen-Schwenningen
- All international certifications with accredited partner laboratories (UL, IEC, PSE, KC, EMV, …)
- All certification criteria must be observed from the outset

TEST CENTER

Our test center for batteries and cells in Villingen-Schwenningen was established in 2004 and expanded in 2017.

- CTF für IEC IEC62133-2:2017
- UN38.3 Transport Test
- Customer-specific tests: simulation of extreme environmental or temperature conditions
- Benchmark tests
- Functional tests
- Vibration, shock and drop tests
- Determination of the required current profile
- Charging and discharging tests
- Safety tests

TRANSPORTATION

We are experts for the transport of batteries.

- Jauch employees are trained for the shipment of dangerous goods and IATA certified: consignor (PK 1) and packer (PK 2)
- Expertise in the packaging and labelling of lithium batteries
- Support in transportation of lithium batteries by road, sea, and air, in compliance with transport regulations
- Required accompanying documents for the transport of batteries

INDUSTRIES

- Industrial Electronics
- Medical Technology
- Measurement and Control Technology
- Safety Engineering
- Automotive
- Tooling Equipment
- Military and Defense
- E-Mobility
- Smart Metering
- Communication Technology

FACTS & FIGURES – BATTERY

Production locations	Germany:	Battery packs
	Bulgaria:	Battery packs
	China:	cells
Production capacity – cells	CR:	64,000,000 per month
	ER:	11,000,000 per month
	LP:	4,000,000 per month
	LI:	20,000,000 per month
Production capacity – packs	Germany:	3,000 per month
	Bulgaria:	20,000 per month
	China:	300,000 per month
Warehouse	Capacity:	10 million pcs
	Products in stock:	6 million pcs

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