

WELCOME TO ISABELLENHÜTTE



COMPANY PRESENTATION



ISABELLENHÜTTE HEUSLER GMBH & CO. KG

The company is one of the world's leading manufacturers of electrical resistance and thermoelectric alloys for temperature measurement and a well known manufacturer of passive components for the automotive, electrical and electronics industry.

Our precision measurement systems set the industry benchmark for current, voltage and temperature measurement in cars and trucks, hybrid and electric vehicles, as well as in renewable energy generating systems.

The crucial factor for our success as technology leader is the concentration of a wide range of production steps and proprietary technologies in-house.

Our unique value chain and the continuous improvement of processes are the basis of our outstanding technical and innovative capability.

Innovation by tradition

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THE COMPANY

THE COMPANY

Innovation by tradition //

Facts //

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

“Isabellenhütte is not only one of the oldest but also one of the most modern companies in the state of Hesse.”

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

INNOVATION BY TRADITION

History //

Vision & mission //

Internationality //

Technology leadership //

Research and development //

Quality leadership //

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

HISTORY

Emblem as company logo

In 1728, the “**Kupferhütte**“ (copper smelter) was donated by Prince Christian to his wife Isabella Charlotte Princess of Nassau-Dillenburg. The name was changed into “Isabelle Kupferhütte“.

The gate decoration dated **1734** includes the crowned initials of **Isabella Charlotte Fürstin zu Nassau (I. C. F. z. N.)**.

Today, it is the logo of Isabellenhütte.



Isabella Charlotte
Princess of Nassau



HISTORY

Our history

- 1482** First recorded reference to the “Kupferhütte auf der Nanzenbach“
- 1728** Name changed into “Isabelle Kupferhütte“
- 1827** Ownership of Isabellenhütte passes to the Heusler family
- 1889** MANGANIN[®] alloy developed
- 1952** Establishment of thermoelectric and resistance alloy division
- 1978** Establishment of components division
- 1987** Production of world’s first SMD mOhm precision current-sensing shunt
- 2004** Series production deployment of ISA-ASIC in battery management systems

HISTORY

- 2006** Launch of the complete “Precision Measurement“ range
- 2007** Introduction of the SMD resistor family “VMx”; the 3-tonne vacuum induction furnace enters service
- 2009** New production site in Chemnitz
- 2010** Acquisition of our long-term US agency ISOTEK: Isabellenhütte’s first subsidiary
- 2011** Joint Venture China
- 2012** Establishment of a subsidiary in Tokyo, Japan: Isabellenhütte KK
- 2013** Establishment of a subsidiary in Shanghai, China: Isabellenhütte (Shanghai) Electronic Technology Trading Co., Ltd.

HISTORY

Isabellenhütte today

Completely family-run since 1827, Isabellenhütte Heusler today is a modern, internationally active company of the metal and electronics industry with a high vertical integration of all value added levels.

Facts (status: 02/2014)

Employees	683
Turnover	102 mn euros
Export ratio	67 %
Local agents	45
Countries	24
Legal form	GmbH & Co. KG

“For us, innovation by tradition means that we are and will be a reliable and competent partner.”

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

VISION / MISSION

Our vision – Isabellenhütte in the year 2020

For us, “innovation by tradition” means that we have been, are and will be a reliable and competent partner.

We are an independent, family-run company of international renown with sustainable, profitable growth. Highly qualified, committed employees are passionate about taking the company forward. Our success and our culture, which is based on mutual respect, make us proud of each other.

Driven by our pioneering spirit, we make a significant worldwide contribution to the efficient generation and use of electrical energy.

VISION / MISSION

Our mission – consistently into the future

We team with our customers to develop new materials, compelling products and innovative solutions, setting global standards in current, voltage and temperature measurement.

Isabellenhütte's comprehensive technology portfolio makes us unique. We are a preferred partner thanks to our international, process-oriented positioning, supported by our expertise, products and services.

Sustainability and reliability are our hallmarks.

We have been delivering on our promises for over 500 years.

TECHNOLOGY LEADERSHIP

We are ahead of our time – and our competitors

Our headquarters are home to possibly one of the most unique value chains anywhere in the world.

Every stage of production is concentrated here, from the foundry, rolling mill and wire-drawing shop to the complete manufacturing of components and measurement modules.

With development, quality management and assurance, as well as technical expertise, all entirely in our own hands, we can ensure the highest quality standards.

RESEARCH & DEVELOPMENT

We look for deep-seated solutions to each new challenge we face

We concentrate on what we have excelled at for decades – uncompromising quality.

The goal of maintaining these high standards in future and thus staying ahead of competition – this is what drives us.

This is why research and development has always been crucial to our business.

The results: continuous development, a number of important innovations and products of the highest quality for our customers.

This continuous improvement takes place in all divisions of our company.

RESEARCH & DEVELOPMENT

Milestones

- 1889** MANGANIN®
- 1967** ZERANIN®
- 1987** World's first low-ohmic SMD resistor using ISA-PLAN® technology
- 1990** Resistor for total current measurement in cars
- 1992** ISA-WELD® technology
- 1993** First 20-Watt SMD resistor for power hybrids
- 1994** SMx premium resistor series for sizes 1206, 2010, 2512 and 2817
- 1996** Manufacturing of the first electric kWh metering module with integrated shunt
- 1998** Battery current sensor, consisting of an 100- μ Ohm shunt, with integrated electronics

RESEARCH & DEVELOPMENT

Milestones

- 2002** The first fully integrated 16-bit measured value acquisition system for electronic battery management systems in cars and trucks
- 2004** 2- μ Ohm coaxial resistor for measuring extremely high currents
- 2005** USB precision measurement system for temperature and resistance (μ Ohm meter), based on ISA-ASIC
- 2007** VMx family – cost-optimised premium resistors in the sizes 0805, 1206, 2010 and 2512
- 2008** ISAscale[®] family – measurement systems for current, voltage and temperature
- 2010** VLx family and embedded shunts
- 2011** IVT family and IPC phase current sensor
- 2012** IUH shunt sensor for 30,000 A

“We would like to become better every day — we do not only owe this to ourselves but also to our customers.”

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

QUALITY LEADERSHIP

Continuous improvement is our goal

To achieve that goal, we've developed a simple formula: traditional values combined with state-of-the-art production methods and a commitment to improvement.

As part of the associated philosophy, we keep a high percentage of manufacturing processes in house, thus making production more flexible and independent.

This enables us to guarantee the best possible product quality.

QUALITY LEADERSHIP

Continuous improvement is our goal

Our products are developed and manufactured in compliance with mandatory quality objectives and value standards that are documented internally and externally.

With our philosophy, we have successfully established and consolidated our position as a technological pioneer.

Our quality management system is certified according to DIN EN ISO 9001:2008 and ISO TS 16949:2009 quality standards.

Isabellenhütte has been certified according to the ESCC system of the European Space Agency (ESA) and is therefore approved as “qualified supplier“ for space applications of resistors.

Quality standards

.....
[DIN EN ISO 9001:2008](#)

.....
[DIN EN ISO TS 16949:2009](#)

.....
[DIN EN ISO 14001 / DIN EN ISO 50001](#)

.....
[IECQ-CECC](#)

(IEC Quality Assessment System for Electronic Components)

.....
[RoHS 2011/65/EU](#)

.....
[Authorised Economic Operator \(AEO\)](#)

.....
[AEO-F certificate](#)

(customs simplifications/security and safety)

.....
[European Space Agency \(ESA\)](#)



.....
[Deutscher Kalibrierdienst \(DKD\)](#)



LOCATION DILLENBURG

Made in Germany

Despite being a global technology leader, we have remained loyal to our roots in Dillenburg.

Not just for traditional but also for entrepreneurial reasons.

For a company such as ours, with enormous expertise in both design and manufacturing, Germany remains a highly attractive location.



FACTS

Overview //

Turnover development //

Management //

Organisation //

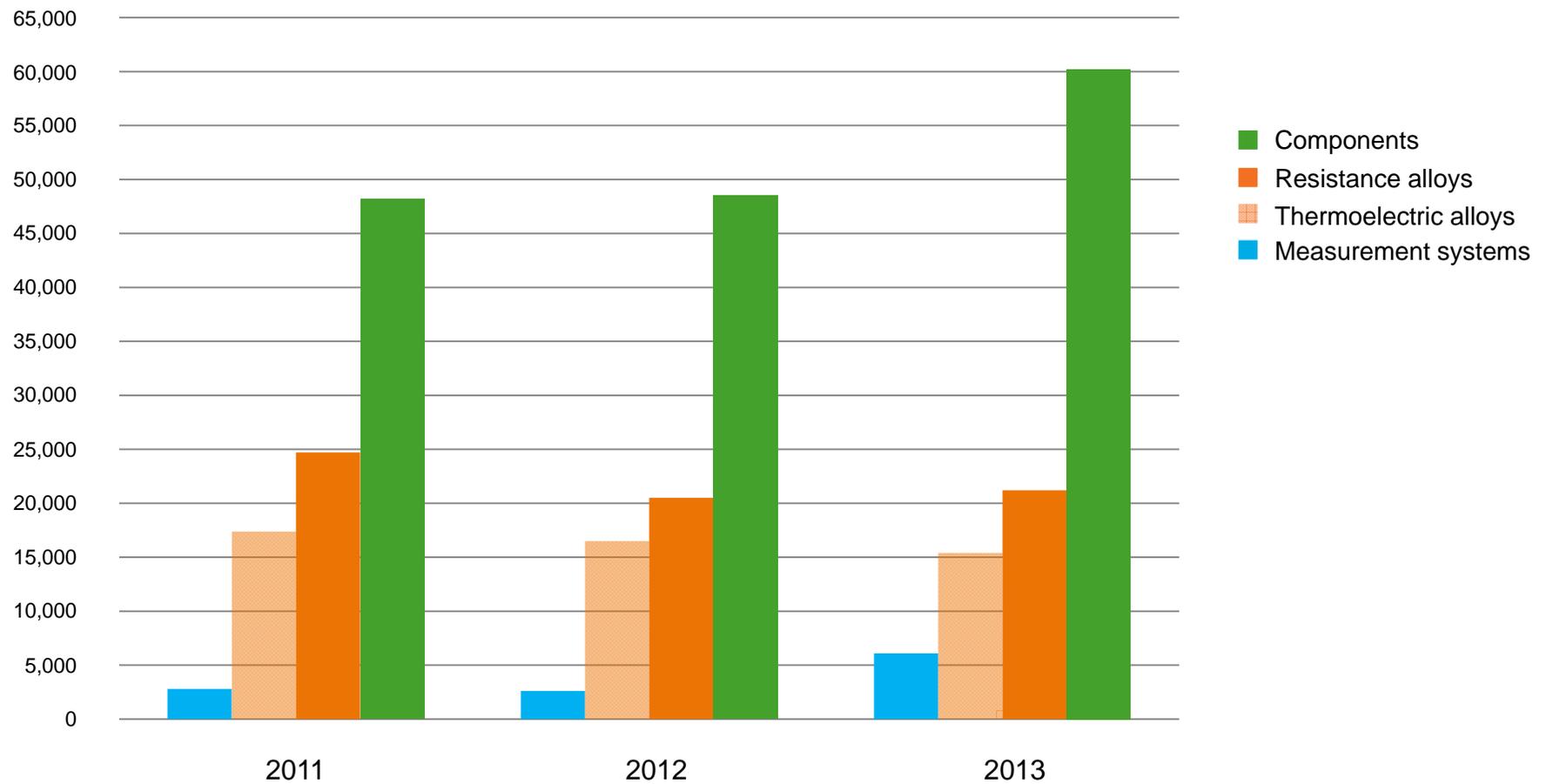
Product lines //

Backup //

OVERVIEW

	2011	2012	2013
Employees	659	680	680
Investments (€)	6.0 mn	6.8 mn	7.6 mn
Turnover (€)	98.6 mn	94.1 mn	102 mn
Alloy sales (t)	1,673	1,508	1,402
Component sales (mn units)	234	247	332.6

TURNOVER DEVELOPMENT (1,000 €)



MANAGEMENT



Jürgen Brust (speaker)



Dr. Felix Heusler

COUNTRIES / LOCAL AGENTS

EuropeLocal agents **15**Countries **15**

COUNTRIES / LOCAL AGENTS / SUBSIDIARIES

**Worldwide**

Subsidiaries	●	3
Local agents ROW	○	20
Countries		9

PRODUCT LINES

ISAscale® measurement systems

Precision and power resistors

Resistance and thermo alloys



Johann Jacob Heusler



1727 - 1799

Carl Ludwig Heusler



1827 - 1851

Friedrich W.O. Heusler



1851 - 1873

Conrad Heusler



1873 - 1907

Dr. Fritz Heusler



1907 - 1937

Otto Heusler



1937 - 1939
1946 - 1966

Ernst Heusler



1937 - 1976

Fritz Heusler



1975 - 2000

Dr. Felix Heusler



2007 - heute

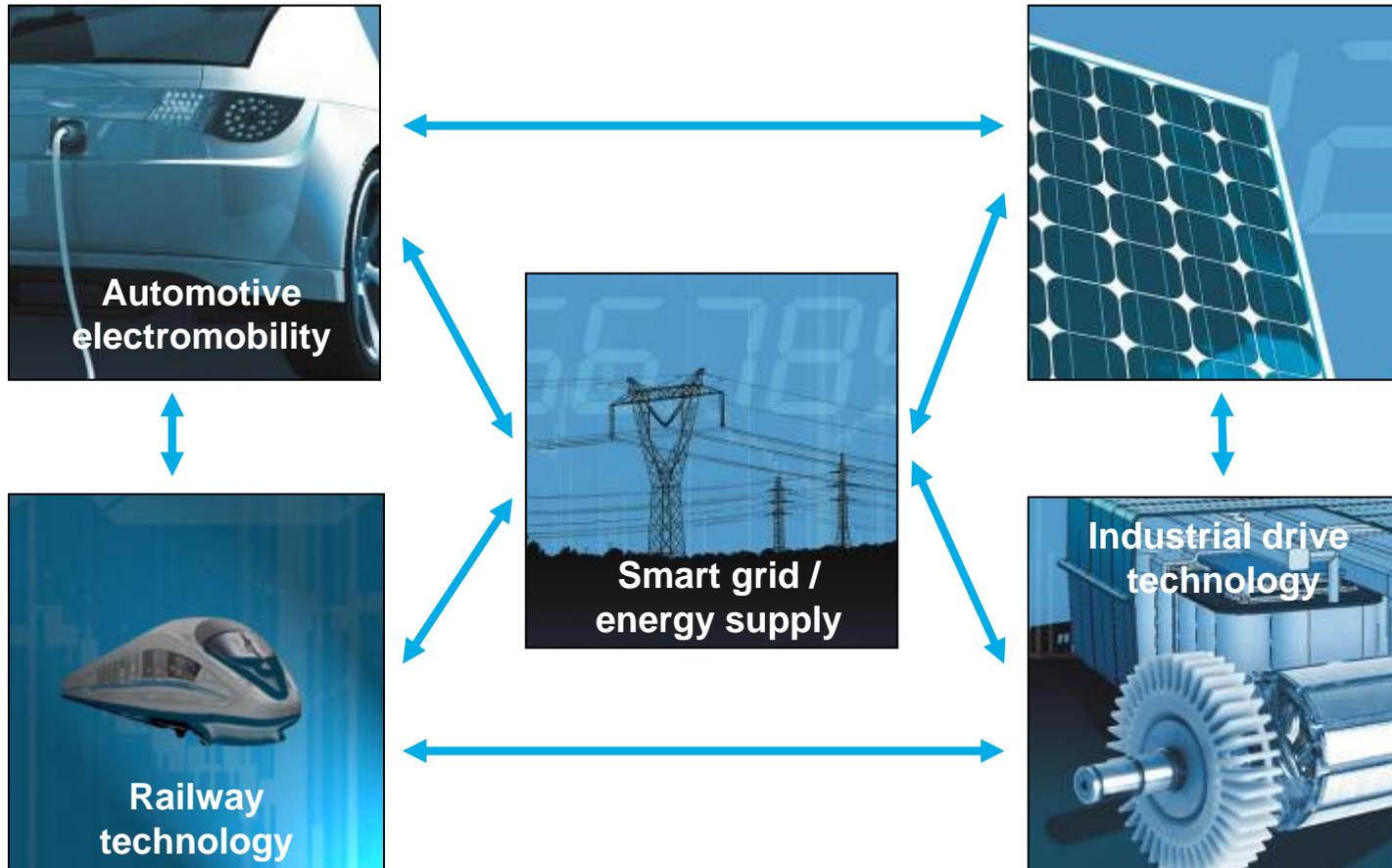
“500 years ago, it started with a simple copper smelter – today, we are one of the world’s leading manufacturers of measurement systems, resistance and thermo alloys as well as precision and power resistors: this is innovation by tradition.”

ISABELLENHÜTTE HEUSLER GMBH & CO. KG

MEASUREMENT SYSTEMS



OVERVIEW



PRODUCT FAMILIES

Currently, there are 3 major product families:

IVT family

ISAscale® / Current Voltage Temperature



IPC family

ISAscale® Phase Current



IHI family

ISAscale® High Isolated



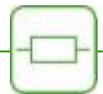
OVERVIEW

Product groups

Business field	Examples of application	Module family
Automotive	HV battery current/voltage sensor technology HV converter current sensor technology Mobile energy meters for electromobility 4-cell li-ion battery management system	IVT IPC
Renewable energies	Wind converters/generators Storage technology HV battery current/voltage sensor technology Solar converters	IPC and IHI IVT ISD/ISM
Railway technology	LV and MV current sensor technology in power trains	IPC and IHI
Energy supply and smart grid	LV and MV application in the range from 1,000 A to 30,000 A; modules based on battery und converter sensor technology Voltage range 1 - 20 kV	IHI and IUH
Drive technology	Converter sensor technology for electric drives in the range from 10 A to 30,000 A	IHI and IUH



LOW-OHMIC PRECISION AND POWER RESISTORS



OVERVIEW

Ultimate performance where it's least expected – in every detail

With our combination of specialist expertise and many decades of experience, we can offer our customers solutions with the highest quality standards.

All our product serieses meet even the toughest requirements with regard to thermoelectric voltage, long-term stability, inductance and power rating.

These characteristics are influenced not only by the choice of resistance material, but also by the resistor design.

For this reason, we have created two different manufacturing technologies: ISA-PLAN[®] and ISA-WELD[®].



OVERVIEW

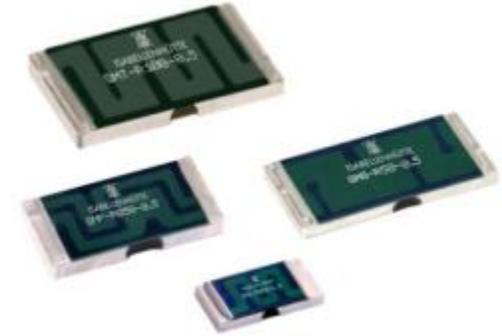
ISA-PLAN®

ISA-PLAN® resistors are manufactured from etched, homogenous precision resistor alloys such as MANGANIN® or ZERANIN®.

They are electrically insulated and mounted on a metal substrate with good thermal conductivity.

The resistance materials have low temperature coefficients of less than 10 ppm/K and are thermoelectrically matched to the copper, thereby reducing the thermoelectric voltage to almost zero.

In addition, the heat conduction into the substrate, together with its high thermal capacity, provides excellent pulse power rating.



OVERVIEW

ISA-WELD®

ISA-WELD® resistors made of composite material, copper and one of our resistor alloys, e. g. MANGANIN®, ZERANIN® or Isaohm® and Aluchrom.

This enables highest flexibility.

Thickness and width of the strips are as variable as the resistor materials used.

An optimised heat distribution in the components avoids hot spots.

There are a number of further advantages, such as the comparatively low leading resistance of the copper connections and a uniform current density and heat distribution in the resistor.



OVERVIEW

Product families / ways of assembly

SMD assembly

Hybrid assembly

Circuit board assembly

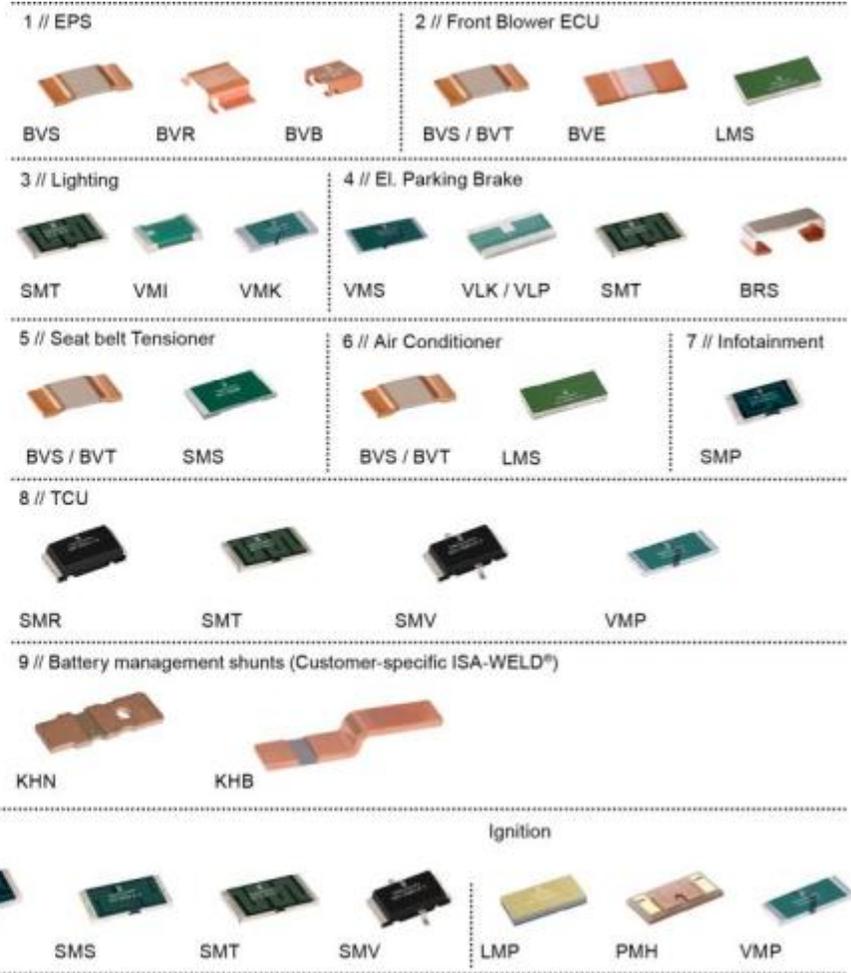
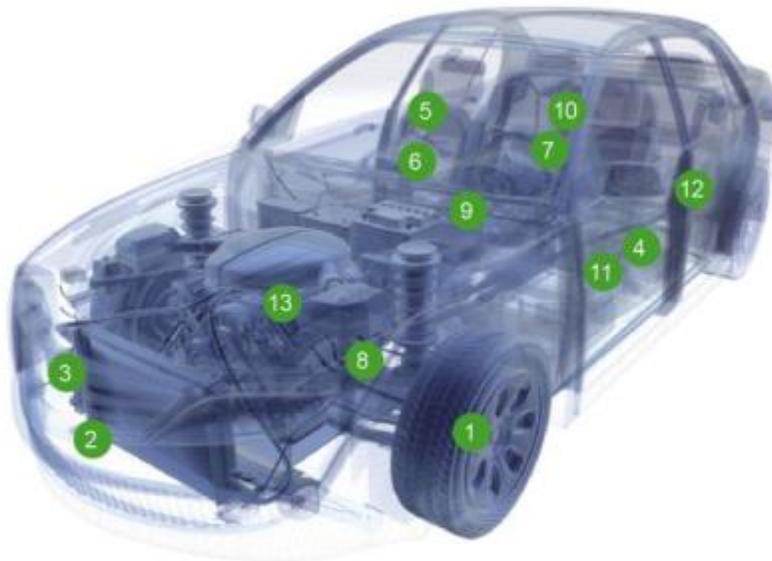
Heat sink assembly

Bus bar assembly

Customer-specific resistors made of composite material



APPLICATION FIELDS



APPLICATION FIELDS

Automotive applications

ABS	Antilock Braking System
ACC	Automatic Cruise Control
ASR	Anti-Slip Control
BMS	Battery Management System
EHPS	Electronic Hydraulic Power Steering
EPAS	Electronic Power Advanced Steering
ESP	Electronic Stability Program
GDI	Gasoil Direct Injection
TCS	Traction Control System



APPLICATION FIELDS

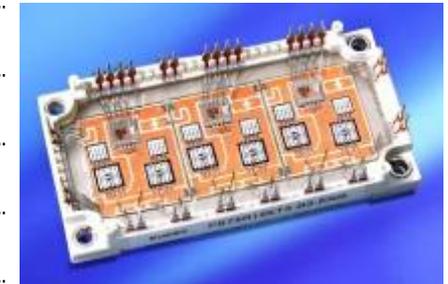
Further application fields

.....
Shunts for IGBT power modules
.....

Power supply
.....

DC/DC converters
.....

Shunts for energy meters
.....



APPLICATION FIELDS

Battery management

.....
Cars

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Trucks

.....
Hybrid and electronic vehicles

.....
USVs

.....
Camper vans

.....
Boats

.....
Measuring and monitoring current, voltage and temperature of the battery, with high accuracy, in an extremely wide range from a few mA (stand-by current) to 1,500 A (starter current).



INDUSTRIAL BRANCHES

Further industrial branches

.....
Automotive

.....
Industrial electronics

.....
Drive technology

.....
Digital energy meters

.....
Telecommunication

.....
“White goods“
.....



RESISTANCE AND THERMOELECTRIC ALLOYS



OVERVIEW

From hidden depths comes unexpected power

Our alloys rank among the finest in the world and are used in many areas of both electronics and electrical engineering.

We are happy to cater to individual customer requirements and can supply our alloys in the form of regular wires, enameled wires, sheets, stranded wires, bands, flat wires, tubes, rods and foils.



OVERVIEW

Resistance alloys

- Our resistance alloys are made to the most exacting tolerances and in compliance with all national and international standards.
- The result is exceptionally high quality.
- The delivery form is determined by our customers.
- Possible forms are soft annealed wires (bare or insulated), enameled wires, wires with silk, rayon or glass fibre insulation, soft annealed flat wires and bands.



OVERVIEW

Thermoelectric alloys

- Thermoelectric alloys are the most used sensors for temperature measurement.
- They are easy to handle and relatively tolerant against harsh industrial use.
- We produce these thermocouple materials in semi-finished form and in compliance with international standards.
- For our customers, we provide a decisive advantage: the ultimate precision and reliability.



APPLICATION FIELDS

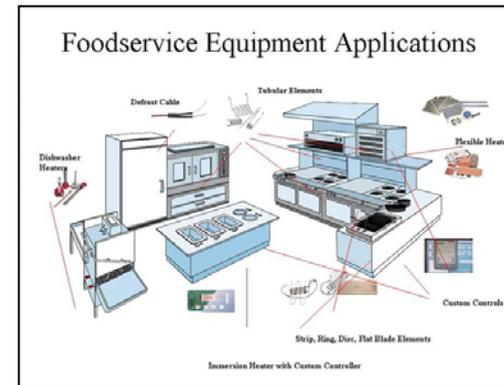
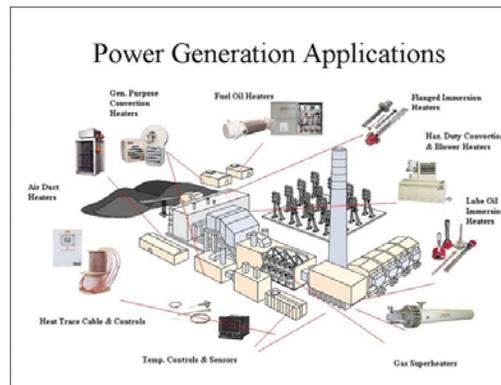
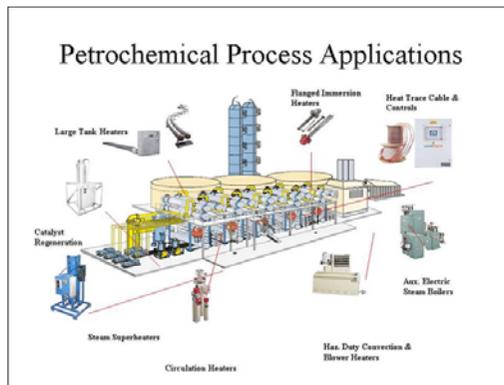
Resistance and thermoelectric alloys are used in:

Anti-freeze protection

Heat supply

Temperature measurement / control

Current measurement / limitation



Thank you for your attention.

Speaker // month year

ISABELLENHÜTTE HEUSLER GMBH & CO. KG