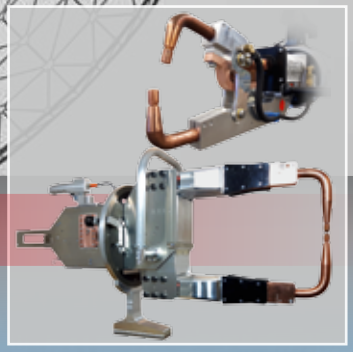
ELMATECH GMBH

electronics machines technologies

Ongoing Leadership in Welding Technology



Welding Technology

Process Control • Welding Power Sources • Welding Guns

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Our mission:
Welding today the materials of tomorrow!

Since 2002, the name ELMA-Tech has been inextricably linked with the most modern welding technologies on machine level as well as in the field of welding process control.

Since the beginning of the 1970s, the concept of a structural arrangement of the welding machine in a power unit (or high-tech high-power current source) and a „virtual machine“ as a fully-digitalized control component has led to the world's leading process technology since the beginning of the 2000s.

In the following years, ELMA-Tech evolves as a plant engineer in the area of welding technologies into the solution provider for the most complex processes in arc, plasma and resistance spot welding.

Problem solving for complex welding and coating tasks

We increase the quality of your welding processes!

Milestones in product development

2002	Foundation of ELMATECH AG Initially „only“ distribution of arc devices
2003	In cooperation with Opel development of the first spot welding system for process capable resistance welding of high-strength steels
2006	Development of a lightweight construction transformer gun
2007	Development of the process control *Virtual Machine* (VM2)
2008	Invention of the „fully automatic“ spot welding process „VISION“
2009	Development of the manually guided industrial welding guns (<40 kg) Implementation Virtual Machine VM2, rotation frequency 20 kHz
2010	Development of the control cabinet with 2 power units
2011	Development of MIDI MIG AC/DC (MIG AC pulse welding process)
2012	Foundation of ELMA-Tech GmbH
2014	Start of a joint venture together with ELMA-Tech Tianjing in China
2015	Further development of spot welding for aluminum thin plates in connection with VM2
2016	Implementation Virtual Machine (VM3), rotation frequency 20 kHz
2017	Market launch of VM3
2019	Market launch of an Aluminum spot welding system
2019	Release of welding power sources and VM3 process control for robot welding guns of other manufacturers

Process control

ELMA-Tech uses a worldwide leading and unique control technology to control the welding process - the „Virtual Machine“. The virtual machine is the core of the ELMA-Tech systems and solves the control of complex joining processes with highest reproducibility with minimum programming effort.

Resistance technology

All over the world, ELMA-Tech supplies advanced multifunction spot welding systems for industrial applications and automotive production (prototyping, pre-production, reworking stations) as well as for bodywork and vehicle construction.

The fully automatic welding process eliminates the need for time-consuming parameterization processes at changing material properties and sheet thicknesses.

Arc technology

ELMA-Tech arc welding systems are convincing in the field of MIG / MAG inert gas welding with fully digital inverter power sources and the latest inverter hybrid technology.

Various models are also designed as DC / AC systems for high quality welding of aluminium thin sheets and aluminium alloys, galvanized and clad sheets, and temperature sensitive alloys.

Thermal coating

ELMA-Tech currently offers efficient know-how in the form of hardware and software components for two thermal spraying processes, namely arc wire spraying (with wire-shaped spraying materials) and plasma coating (with powder-shaped spraying materials).

The ELMA-Tech process control system in combination with the high-performance power sources allows a highly flexible, fully customizable control of spraying processes.

Process control with maximum efficiency for welding and thermal coating

Since 1970, Prof. Dr. Peter Puschner has developed state-of-the-art control and power electronics for welding technology.

The basic techniques associated with this have found their way into the welding technology as a whole and mark the innovation peak in electronic welding equipment. Patents granted worldwide underline the innovative character of ELMA-Tech developments.

In 1997, a novel control system for technological processes was implemented on the basis of these technological developments: the „Virtual Machine“ (VM).

The VM (3rd generation) is used worldwide exclusively by ELMA-Tech as a welding process controller and establishes the technological top position in the control of welding processes that ELMA-Tech occupies today.

Application of virtual measuring technology for the perfect energy control between the electrode caps

Plug & Weld due to fully automatic operation

A particular advantage results from the use of the VM in the resistance spot welding. The fully automatic spot welding process is a clear unique selling point of ELMA-Tech resistance technology:

Start the machine - select automatic mode - perform electrode check - welding!

Sheet thicknesses and material types are automatically recognized by the welding controller.

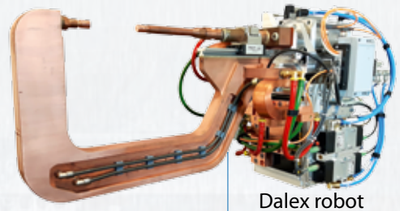
Welding power sources for various applications

LMA-Tech uses IGBT inverters for mobile and stationary applications in arc and resistance spot welding machines. Some of these inverters are designed in quasi-resonance technology.

In cooperation with the market leader on the sector of plasma-coating, parallel switchable DC-generators with a single power-rating of 0,15 MW were produced. These can be interconnected to generators with a power-rating up to 0,5 MW for the application with plasma spraying methods as well as for the tube and pipe manufacturing (submerged arc welding).

Open ELMA VMC VISION control cabinet with 2 VM controls, which allows the parallel operation of 2 ELMA-Tech manual welding guns, e.g. in line production of the automotive industry.

High-performance power source VARIO LDS 800 for use in arc wire spraying



Dalex robot welding gun

Vertical version of an ELMA VMC VISION ROB control cabinet for the connection of robot welding guns from different gun manufacturers (e.g. Dalex).

These control cabinets are generally supplied with only one process control Virtual Machine.

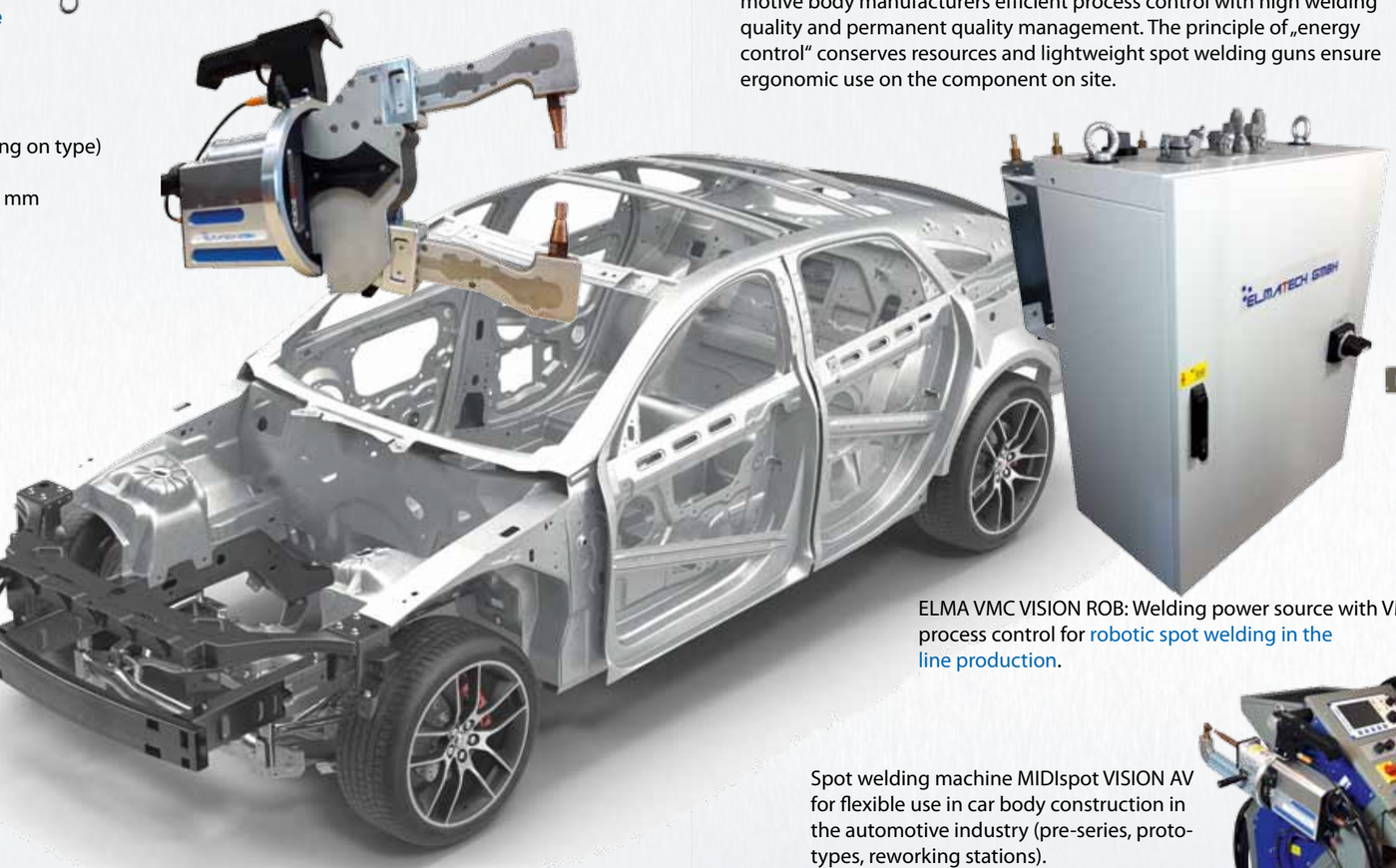
Control cabinet of the ELMA-Tech aluminium spot welding system with strong power section for spotting aluminium alloys with standard electrode caps.

ELMA VISION CM Alu
Manual welding gun for spotting up to 600 welding spots of aluminium alloys.
(5000, 6000, 7000)

Innovative spot welding technology at an unrivaled technology level

Mobile spot welding machines for the bodywork and car body construction

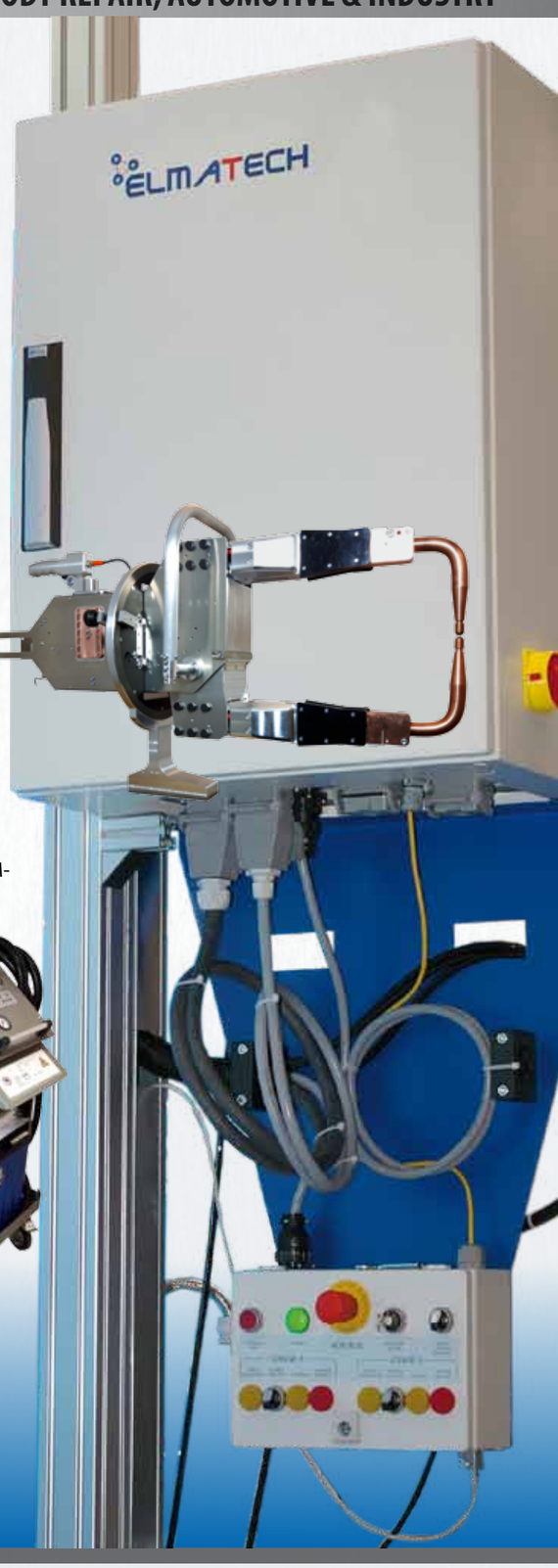
- VM3-process control
- Fully automatic welding process
- Complete software package (depending on type)
- Quality assurance system
- Welding aluminum thin plates up to 3 mm
- Active internal cooling
- Low gun weights



Spot welding machines and systems for car body construction in the automotive industry and for industrial welding applications

The user-friendly and economical spot welding technology offers automotive body manufacturers efficient process control with high welding quality and permanent quality management. The principle of „energy control“ conserves resources and lightweight spot welding guns ensure ergonomic use on the component on site.

ELMA VMC VISION ROB: Welding power source with VM-process control for robotic spot welding in the line production.



Spot welding machine MIDIspot VISION AV for flexible use in car body construction in the automotive industry (pre-series, prototypes, reworking stations).

Aluminium spot welding system

Our efficient answer to your question about an economical solution for resistance spot welding in lightweight aluminium construction.

Body repair easier than ever before! Quality welding without manual settings:

Automatic control of the energy yield
Automatic detection of total sheet thickness
Automatic detection of material type
Automatic parallel resistance detection
Automatic energy tracking

Steel Stainless Steel Aluminum

Process control via Virtual Machine (VM)

- Optimal energy efficiency
- Minimum heat input
- Perfect arc
- Low emissions
- Deep fusion penetration
- Secure root formation

First prototype of a transistorized generator for arc welding processes
60 V, 600 A (Max. power 1.200 A)

Built 1970 at the ISF of RWTH Aachen University
Conception P. Puschner

A comprehensive arc program ...

The characteristic of the current source (current or voltage source) can be selected freely depending on the process state and can be changed with a frequency of 20 kHz. This is made possible by an advanced design of the current source, which has no conventional resistors, but merely simulate them as they correspond to the shape of the current and voltage characteristics.

MIG AC pulse welding
MIG DC pulse welding
MIG / MAG pulsed arc welding
MIG / MAG DUAL pulse welding
MIG / MAG high speed welding
MIG brazing
MIG AC (cold)
Microplasma / Plasma / Plasma WIG
Submerged arc welding
WIG cold and hot wire

Automation

ELMA ARC VISION stands for a whole bundle of arc processes that have been optimized over years by ELMA-Tech and guarantee a perfect and superior welding quality.

When welding aluminum and stainless steels absolutely high-quality seams are the rule.

For this reason, MIG / MAG AC systems are represented in the production lines of renowned automotive manufacturers.

COLD ELMARC

MIG-AC welding / brazing

- Best gap bridging
- High welding speeds
- Extremely spatter-free
- Low-warpage
- Minimum heat input:
  Heat input in AC pulse welding is lower than in other known methods, e.g. CMT, ColdMIG, etc.
  Ideal for welding thin aluminum sheets (<1 mm)

Maximum flexibility

The ELMA-Tech concept for arc coating

Instead of the use of fixed, invariable characteristic curves, ELMA-Tech current sources focus on freely changeable current / voltage curves. This allows very flexible settings of spray parameters for optimized adhesion and extremely fine injection structures, which lead to coatings of high quality and overall high coating thicknesses.

The process control

The ELMA-Tech process control *Virtual Machine* is also used in the wire arc spraying for

- the control of user / machine communication
- the specification of the respective „machine character“
- the provision of processes and process types as purely physical parameters (as synergy tables in the database)
- the reproducibility of the spraying values in combination with the power set in hybrid technology

Perfect arc and spray quality

The VM process control ensures excellent arc and spray quality - both in manual and machine spraying. By means of novel software-supported ignition and spraying methods results have been realised which have hitherto not been achieved, in particular in the case of machine spraying.

In order to avoid too high layer thickness during slow traversing processes, a stable, constant arc is guaranteed even at low power and current in the range of 10 amperes. The outstanding layer quality has also been confirmed to ELMA-Tech by independent institutes (compared to conventional sources).

Characteristic of power source (MAG / Submerged arc welding)

- Significantly higher control frequency of over 5 kHz compared to conventional current sources with max. 300 Hz
- Digital adjustable process parameters with regard to dynamics and throttling during different process phases (ignition, welding)
- Digital selection of the current source characteristic CC or CV (Constant current or constant voltage)
- Unrestricted automation capability with respect to the communication with a PLC
- High efficiency (> 90%) and thus up to 30% lower energy consumption compared to conventional power sources
- Excellent welding properties both in the MAG operation as well as in the range of submerged arc welding

Maximum quality through VM process control

High power current sources for submerged arc welding

Pure efficiency

Photo Submerged Arc Welding, ©2005/Author: NearEMPTiness (on Wikimedia Commons, under Licence CC BY-SA 3.0)

Technology leadership through unique process control
Virtual Machine (VM)

COLD ELMARC
ALU ELMAVISION

Reproducible welding quality
Maximum process reliability
Highest energy efficiency

Cold MIG AC welding with arc welding process COLD ELMARC
Aluminium thin plates <1 mm

Spot welding of aluminium with spot welding process ALU ELMAVISION
Process-safe spot welding of aluminium in industrial applications

Fully flexible adjustment of spray parameters for optimized adhesion and extremely fine injection molding in arc spraying

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