

automotive

electronics

solar

**A Global Leader in Ultrasonic Metal Welding**



**Schunk Sonosystems**



**Stapla Ultrasonics**

# The bond across industries worldwide

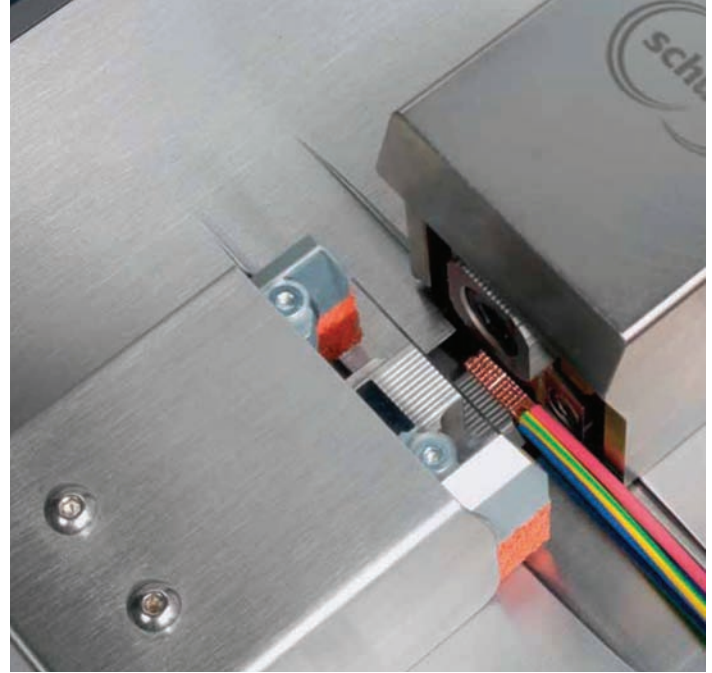
## About Stapla and Schunk

Founded in the US in 1986, Stapla Ultrasonics Corporation is a subsidiary of Schunk Sonosystems, a member of the Schunk Group headquartered in Frankfurt, Germany. Today, the combination of Stapla Ultrasonics and Schunk Sonosystems is the largest manufacturer of ultrasonic metal welding products worldwide.

Strong technical expertise and progressive leadership have been combined to make Stapla and Schunk a global partner with the largest manufacturers of automobiles, electrical appliances, electronic components/subsystems, and environmental technology.

By delivering a consistent weld quality and rigorous quality control practices, Stapla and Schunk welders can be effectively integrated into a wide spectrum of manual or automated production lines.

Looking forward, Stapla and Schunk's innovative ideas will continue to set industrial standards and meet new challenges in advanced ultrasonic metal welding.



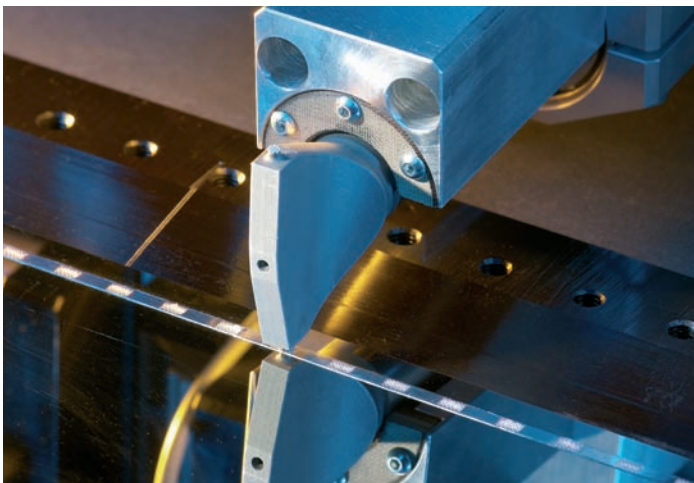
## Benefits of ultrasonic metal welding

Ultrasonic metal welding bonds non-ferrous metals in a solid state without melting or adding materials to the parts being joined. This is accomplished by overlapping the materials and vibrating them together using a high frequency mechanical oscillation.

Although copper and aluminum are the best suited materials for this process, other non-ferrous metals and alloys can be used, and dissimilar materials can be joined together.

### Advanced ultrasonic metal welding ensures:

- High quality metallic bonds
- High weld strength
- Excellent electrical properties
- Low thermal load
- Low operating costs
- Comprehensive process control
- Short welding times



# Service as solid as Ultrasonic welds

## Dedicated to your success

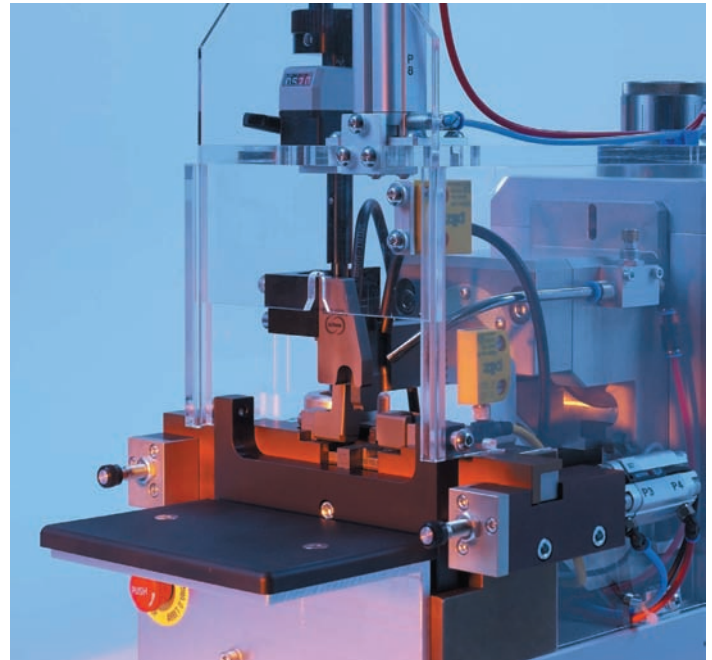
Stapla Ultrasonics' staff has a wide range of metal welding applications and industries experience. We'll guide you through the process, from product design to production.

In our applications laboratory, we test the feasibility of ultrasonic welding for your products. Our advanced engineering capabilities allow us to apply custom fixtures, tooling, and integration for special applications to meet your specific needs.

We then offer equipment recommendations and a detailed analysis of the practicality of your project.

Stapla also familiarizes your personnel with the welding process, machine operation, quality assurance, and maintenance.

Additionally, we have an enviable reputation throughout the industry for providing after sales support services that are responsive and thoroughly professional.



## Your end-to-end system provider

### Ultrasonic Welding Systems

- Global products with continuous innovation
- 36 patents; 60% of sales w/products < 5 years

### Applications Engineering

- Apply products to customer product specifications
- Apply products for customer product requirements
- Tool and fixture design, lab samples and prototypes

### Training and Service

- Hands-on product training of personnel
- Product support and service
- Tooling replacement and spare parts

## Stapla and Schunk

### Software and Network Engineering

- Design interface to customer production system
- Apply welding parameters and quality criteria

### Process Development and System Integration

- Special systems integration and testing
- Product startup and testing

# Comparison of joining technologies

	Ultrasonic Welding	Resistance Welding	Crimping
<b>Weld Characteristics</b>	relatively flexible, stable, low impact from heat or vibration	inconsistent results, high impact from heat	relatively stiff and inflexible, high impact from vibrations
<b>Weldable Materials</b>	Cu – Cu or Cu-alloy, Al – Cu or Cu-alloy, Al – Al		
<b>Welds w/o tool change</b>	end compaction, end & in-line splice Cu, Al, brass, different alloys, dissimilar metals		Limited to terminal/splice wire range within crimp die
<b>Energy Consumption</b>	low electrical energy required since materials are not fused (10% compared to resistance welding) Energy per 1,000 welded connections: 10mm <sup>2</sup> requires 0.26kWh, 20mm <sup>2</sup> requires 0.51kWh	(100%) high electrical energy required materials being joined must be fused/melted	Low: direct drive/on demand usage
<b>Consumable Materials</b>	None	fluxing agent	crimps
<b>Self-cleaning Properties</b>	yes	no	no
<b>Welding Times</b>	Short: 0.1 - 1.0 seconds		Very Short: 400 milliseconds
<b>Cooling System</b>	none required	water cooling is required	none required
<b>Installation Requirements</b>	compact, light weight, standard power supply, standard shop air	large, heavy high cost power supply	Bench top, quick set up
<b>Setup Time</b>	quick programming quick tool change	long setup long tool change time	short setup
<b>Tool Durability</b>	horn life application dependent; superior to resistance welding and crimping	electrode life relatively short, frequent electrode dressing required	crimp tools must be manually monitored and replaced more frequently than ultrasonic welding
<b>Thermal Dynamics</b>	“cold friction” process no change of base materials no melting of wire insulation crimping immediately after weld	melting of materials process change of base materials structure melting of wire insulation likely crimping only after cooling of weld	crimp generated by force
<b>Electrical Conductivity</b>	very high	high	fair: resistance due to possible corrosion
<b>Electro-magnetic Load</b>	low	high	low
<b>Process Control</b>	comprehensive, with auto-correct, wide process window, quick and easy optimization	limited control, tolerances critical narrow process window, long and difficult optimization	in process crimp verification. real time monitoring of accurate defect detection at 10%
<b>Reproducible Joint QC</b>	No warm-up required consistent pull/peel values stable in time	Warm-up required inconsistent pull/peel values	not stable in time
<b>Maintenance Requirements</b>	low service interval display	high	

# Stapla and Schunk products and services

Stapla and Schunk carry a full line of standard and special welding systems for manual and fully automatic operation, including:

■ = Stapla      ▲ = Available in North America  
● = Schunk      ◆ = Available Globally

## Standard Splicers

■ Stapla Alpha	Wire splicer / cross sections up to 0.70-24mm <sup>2</sup>	▲
■ Stapla Raptor II	Wire splicer / cross sections up to 0.35-35mm <sup>2</sup>	▲
■ Stapla Raptor XL	Wire splicer / cross sections up to 0.35-42 mm <sup>2</sup> +	▲
● Schunk Minic-IV	Wire splicer, wire cross sections 0.26-15mm <sup>2</sup>	◆
● Schunk Minic-IV-CS	Wire splicer, wire cross sections 0.26-15mm <sup>3</sup> , with cutting system	◆
● Schunk Minic-II	Wire splicer, wires cross sections to 0.5-30mm <sup>2</sup>	◆
● Schunk Minic-II-CS	Wire splicer, wires cross sections to 0.5-30mm <sup>2</sup> , with cutting system	◆
● Schunk Global-Splicer-40	Wire splicer, wires cross sections to 40mm <sup>2</sup>	◆
● Schunk Global-Splicer-40-CS	Wire splicer, wires cross sections to 40mm <sup>2</sup> , with cutting system	◆
● Schunk Global-Splicer-50	Wire splicer, wires cross sections to 50mm <sup>2</sup>	◆
● Schunk LS-60 Splicer	Table welder, wire cross sections to 60mm <sup>2</sup> (potential to 80mm <sup>2</sup> )	◆

## Standard Splicer Accessories

■ Stapla System Tables	Workbenches for Splicers	▲
■ Stapla Ant-Side Splice Kit	Optimum wire alignment for splicers	▲
■ Stapla Bar Code Scanner	Bar code scanner	▲
● Schunk System Tables	Workbenches for splicers (3 types)	◆
● Schunk Ant-Side Splice Kit	Optimum wire alignment for splicers	◆
● Schunk Splice-Checker	Non-destructive testing system to 20mm <sup>2</sup>	◆
● Schunk Sequencer	Software solution for networked production	◆
● Schunk Interface System	Raychem interface for heat shrink system	◆
● Schunk Access System	Fingerprint sensor for safe access	◆
● Schunk Bar Code Scanner	Bar code scanner (1D and 2D scanner)	◆

## Standard Termination

■ Stapla UTA-3000	Wire terminator / wire to reel-fed terminals & insulation crimping	▲
■ Stapla Condor II (MAK)	Standard terminal welder, wire cross sections up to 35mm <sup>2</sup>	▲
■ Stapla GL	Wire terminator / multiple wires to terminals & insulation crimping	▲
● Schunk Minic-II-GT	Schunk Minic-II with ground terminal function	◆
● Schunk DS-20-GT	Standard terminal welder, wire cross sections up to 35mm <sup>2</sup> , reel feeder	◆
● Schunk DS-20-GT (MAK, HFK, etc.)	Special terminal welder, with multiple options	◆

## Special Applications

■ Stapla Mini Condor ST30	35kHz universal welder	▲
■ Stapla Condor ST30	20kHz universal welder	▲
■ Stapla AutoShunt	Fully automated braid wire processing system	▲
● Schunk DS-35	35kHz universal welder	◆
● Schunk DS-20	20kHz universal welder	◆
● Schunk LS-C	20kHz universal welder, larger cross sections	◆

## Tube Sealing

■ Stapla Tube Sealer II	Portable welder for sealing and cutting tubes up to 1/2"	▲
■ Stapla Kobra	Explosion proof portable welder for sealing and cutting tubes up to 1/2"	◆

## Seam Welding (Solar)

■ Stapla RM-20	20kHz seam / continuous welder for custom applications / nodal point	◆
■ Stapla RM-35	35kHz seam / continuous welder for custom applications / nodal point	◆
■ Stapla Solstar-3	Fin welder for production volumes of up to 40,000 m <sup>2</sup> per year	◆
■ Stapla RSK-20	Fin welder for production volumes of over 40,000 m <sup>2</sup> per year	◆
■ Stapla RSK-PL	Fully automated, high volume fin welder	◆
■ Stapla SWR-20	Semi automated, medium volume absorber plate welder	◆
■ Stapla SWR-20-AFC	Fully automated, high volume absorber plate welder	◆
■ Stapla SWR-20-AFC-S	Fully automated, high volume absorber plate welder w sound enclosure	◆
● Schunk DS-35-TF	Al conductor strips to PV (thin-film) panels, high volume	◆

## Stapla and Schunk Services

■ ● Applications engineering and lab testing	▲ ◆
■ ● Prototyping	▲ ◆
■ ● Special welding systems and tool design	▲ ◆
■ ● Product startup	▲ ◆
■ ● Training and seminars	▲ ◆
■ ● Product service and spare parts	▲ ◆



For more information on our technology and product line, or for help with meeting your unique metal welding needs, please do not hesitate to call or email us.

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