



# HERON

Digital Resistance  
Welding

## ADVANCED CONNECTION PROCESSES AND EQUIPMENT FOR NEW ENERGY VEHICLES

# CONTENTS

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03 **Customized Products**

04 **Applications**



# HERON

Digital Resistance  
Welding



# ■ PART 1

## Company Overview



- Company Overview

- Innovation Capability

- Resistance Welding Processes

- Manufacturing Capability

# Company Overview

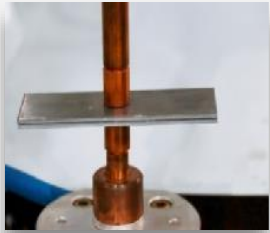
## HERON

- Founded in Guangzhou in **1991, 32 years**
- More than 400 employees
- Factory with **54,000m<sup>2</sup>**
- More than **20 global customers**
- Full range of **resistance welding** products
- **Tog-L-Loc** and **FSPR** equipment
- With **automation production lines** in with appliance, compressor, low-voltage electrical manufacturing industries
- Heron manufacture our own controllers and transformers
- Full range of machine shop

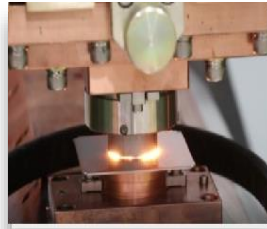




# Resistance Welding and Clinch Technology



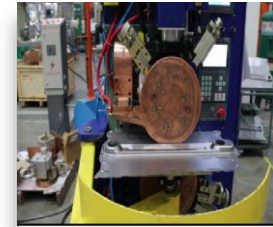
**Spot Welding**



**Press Welding**



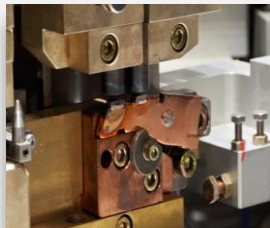
**Butt Welding**



**Seam Welding**



**Resistance  
Diffusion Welding**



**Resistance  
Brazing**



**Energy storage  
explosion welding**



**FSPR**



**Tog-L-Loc  
Lance-L-Loc**

# R&D Capability And Core Technologies

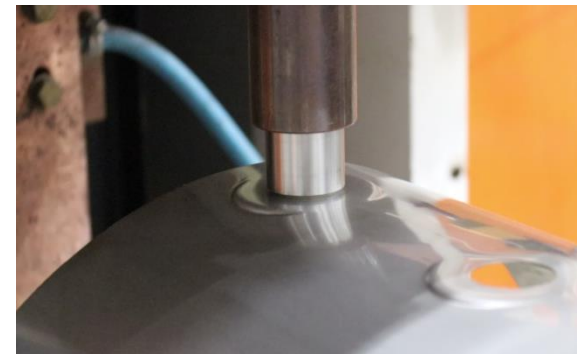
## Keep Innovating New Process Technology

- Resistance welding process for the connection of silver and copper tubes and steel shells
- Resistance welding process for reservoir
- Resistance welding process for brake gas chamber
- Resistance welding process for The connection of silver and copper
- Resistance welding process for air conditioning compressor upper and lower cover
- Resistance welding process for stainless steel bucket inlet and outlet

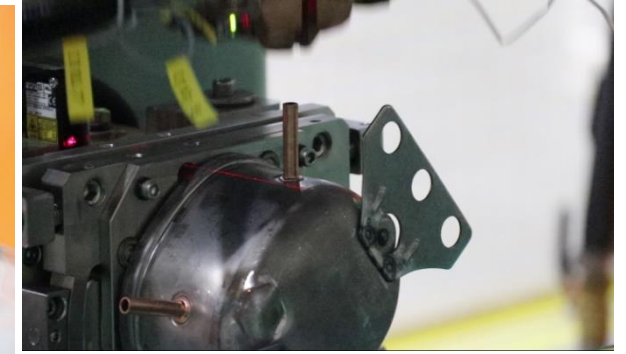
Resistance welding process for  
brake gas chamber



Resistance welding process for The  
connection of silver and copper



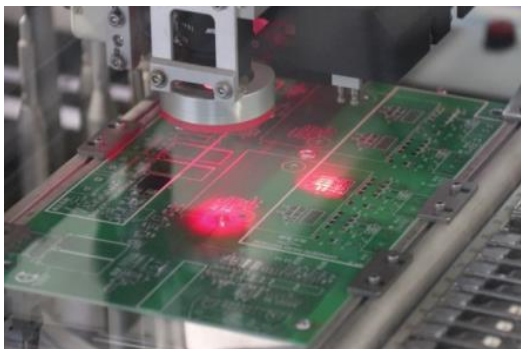
Resistance welding process for stainless  
steel bucket inlet and outlet



Resistance welding process for copper  
tubes and steel shells

# R&D And Manufacturing Capability

## CONTROL MAIN BOARD

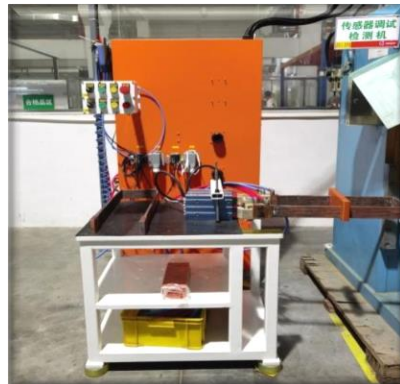


## CONTROLLER

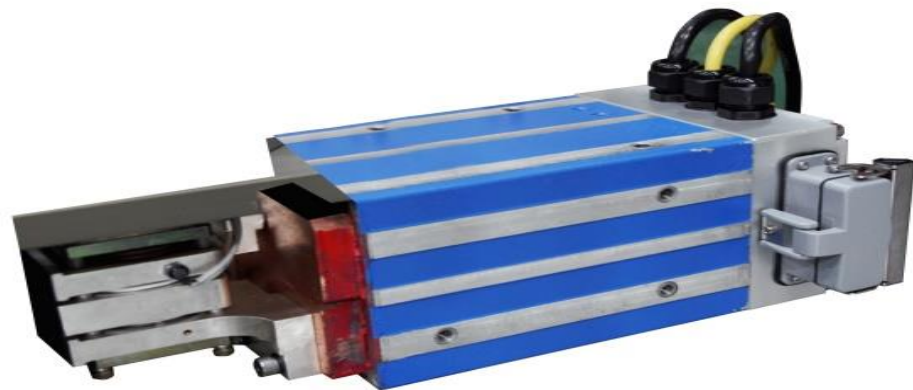


# R&D And Manufacturing Capability

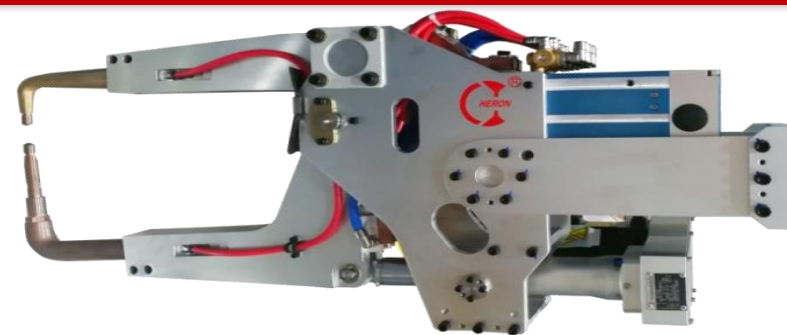
## TRANSFORMER



Robotic Welding Gun



55KVA/75KVA/110KVA/165KVA/220KVA/250KVA



WELDING GUN

# R&D And Manufacturing Capability

## ELECTRIC ACTUATOR

### Inspection Of Screw Rods



### Inspection Of Bearings



### Assembling





## ■ PART 2

# Standard Products



# Capacitor Discharge Welding (CDW)

- Stable welding quality for projection welding.
- Small heat affected zone, lower energy consumption, electrode loss, cost saving.
- When welding galvanized parts, the galvanized layer in the non-welding area can not be damaged, no grinding and post-treatment is required.
- The welding process is not affected by grid fluctuations, especially when the nut convex welding of high-strength and thermoformed steels is very stable.

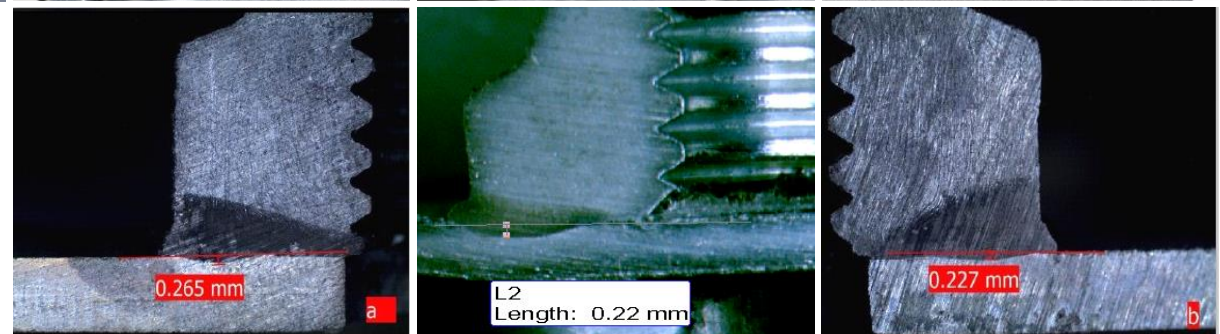


# CDW Of Automotive Body Structure Parts



## High strength steel, thermoformed steel nuts, studs convex

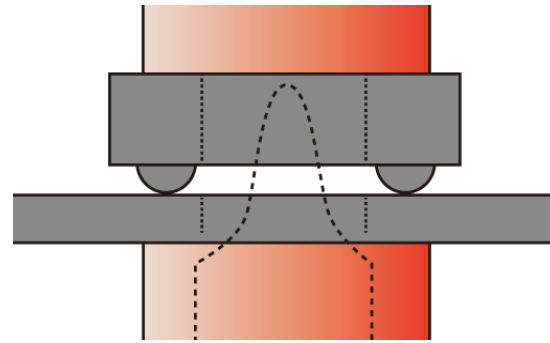
- The heat affected zone of the nut after welding is small, and the thread is not deformed.
- The galvanized layer of the thread and plate can be completely left intact.
- The galvanized layer is not destroyed and no filament is required.
- The molten core has a penetration depth greater than 0.2MM.



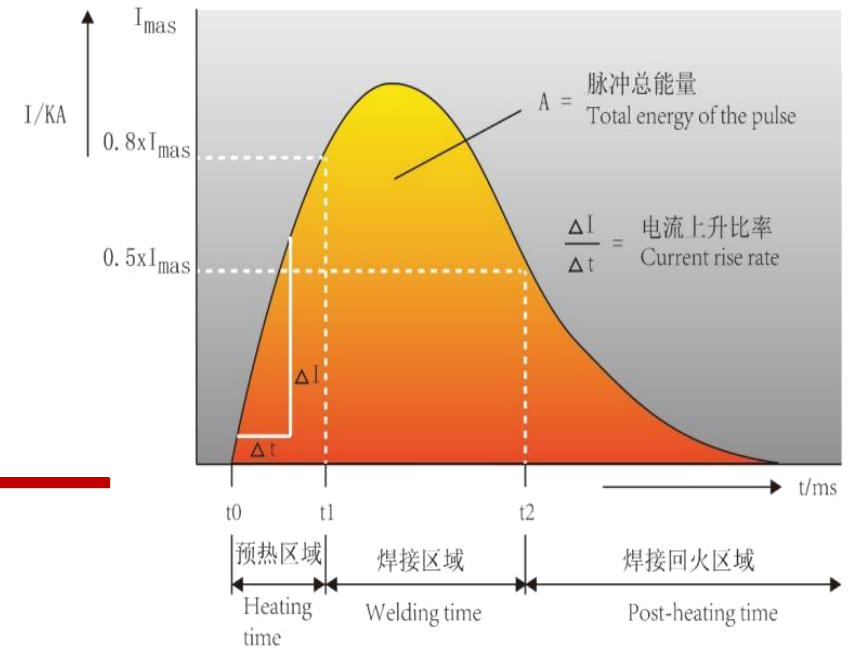
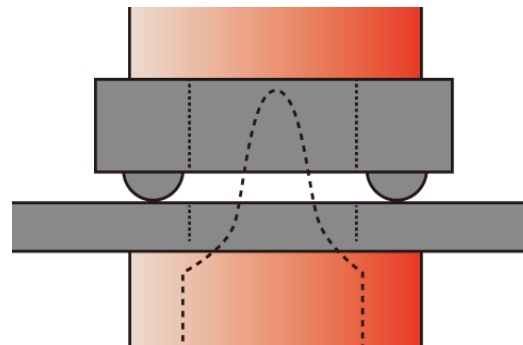
# The Principle Of CDW

**Melt pool: It is the melting of liquid metal in the plastic circle of the two interfaces of the welded metal due to the heat of resistance**

- Conditions for melt pool formation: When the current density reaches a certain value, the bump is not softened but the melt pool is formed
- When the melt pool is already formed: the contact resistance decreases
- How to melt more bumps: According to  $Q=I^2Rt$ , the current should be continuously increased to generate more heat to melt more bumps and ensure the welding quality.



On the contrary, if the current density cannot reach the requirement in a short time, the molten pool cannot be formed between the bump and the plate, then under the action of pressure, the bump in the hot state will be flattened and the contact area will become larger, so that the current density needed to produce the molten pool will not be reached if it goes on, and a false weld will be formed.



**The current profile of CDW determines the advantages of its convex welding process!**



# CDW Equipment Series



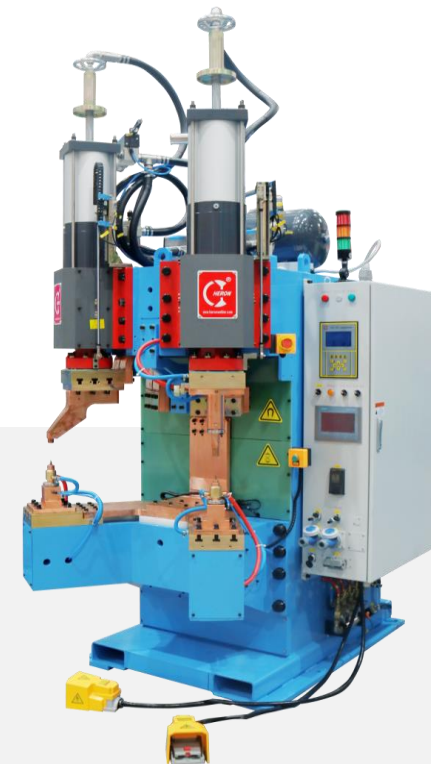
**Type L**  
3-6KJ



**Type H**  
10-40KJ



**Type H**  
10-40KJ



**Double Head  
CDW Equipment**  
10-40KJ



# The Advantages Of Heron's CDW Equipment

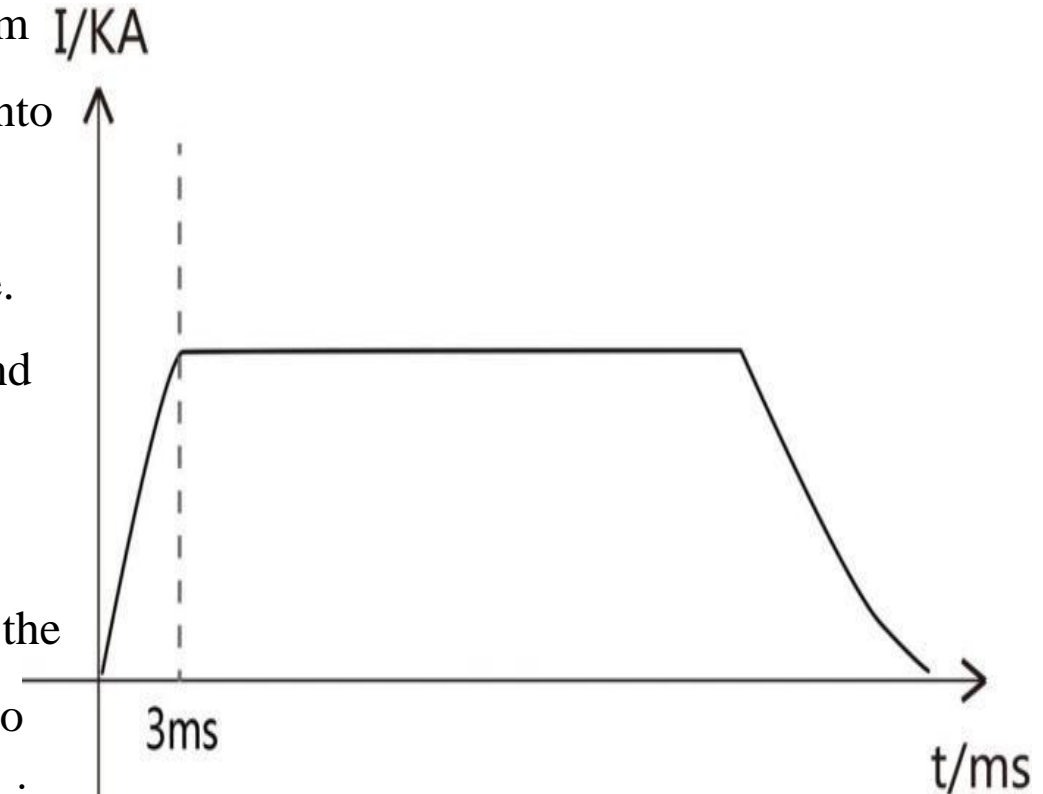
1. The product is mature and stable, , and has been widely used in the press welding process for automobiles, becoming the best process for press welding of hot-formed steel and galvanized steel. There are more than 10,000 devices in use.
2. CDW is a patented product of Heron, with welding current up to one million amperes, and is replacing traditional arc welding, electron beam welding, laser welding, and furnace brazing in some special applications.
3. CDW is an energy-saving and environmentally friendly green welding process with a small heat-affected zone, e.g., 4500J of heat, only 32KA of current, and less than 10KW of power grid.



# Medium Frequency Direct Current (MFDC) Resistance Welding Process

Using Inverter power supply, the three-phase power grid input is inverted into 1KHZ/2KHZ/4KHZ through inverter, and then input to the medium frequency transformer to step down the voltage and then rectify again into low voltage high current.

This inverter power source is applied to the resistance welding machine. Place the welded workpiece between the upper and lower electrodes, and then set the the welding current and welding time through the medium frequency inverter resistance welding controller. Set the pressure and current between the electrodes. when the high current is passed through the welded parts, the high temperature generated by the contact resistance to melt the welded base material and form the welding nucleus process. This power source can greatly reduce the demand of the power grid compared to the AC single-phase welding power source.



The Discharge Current Curve  
**The maximum short-circuit current reaches 250KA!**

# MFDC Equipment Series



**Type H**

110-880KVA



**Type L**

110-440KVA



**Type E**

25-440KVA



**Double-headed**

165-880KVA



# The Advantages Of Heron's MFDC Equipment



1. The MFDC equipment is equipped with diamond-shaped guide rail and follower mechanism, which greatly reduces the splash problem in the process of bump welding;
2. Fast current ramping up to 30KA within 3ms.

# Manual Integrated Welding Gun

## Product Advantages

1. Professionally manufacturing integrated manual welding guns for more than 20 years, Heron has sold out more than 10,000 guns. Three series( H, L2, L3 ), 2 kinds of power supply( medium frequency and AC) , Heron's gun can adapt to a variety of use site;
2. Modular design, high standardization;
3. Stable product performance and strong supply capability;
4. Green manufacturing process, energy saving and emission reduction.





# The Controller Of Manual Integrated Welding Gun

## Product Advantages

1. Developing software and hardware and manufacturing PCB boards independently.;
2. 2 kinds of power controllers: IF and AC.;
3. 2 product series, one towing one and one towing two.;
4. Stable product performance and strong supply capability.



# Robotic Welding Gun

## Product Advantages

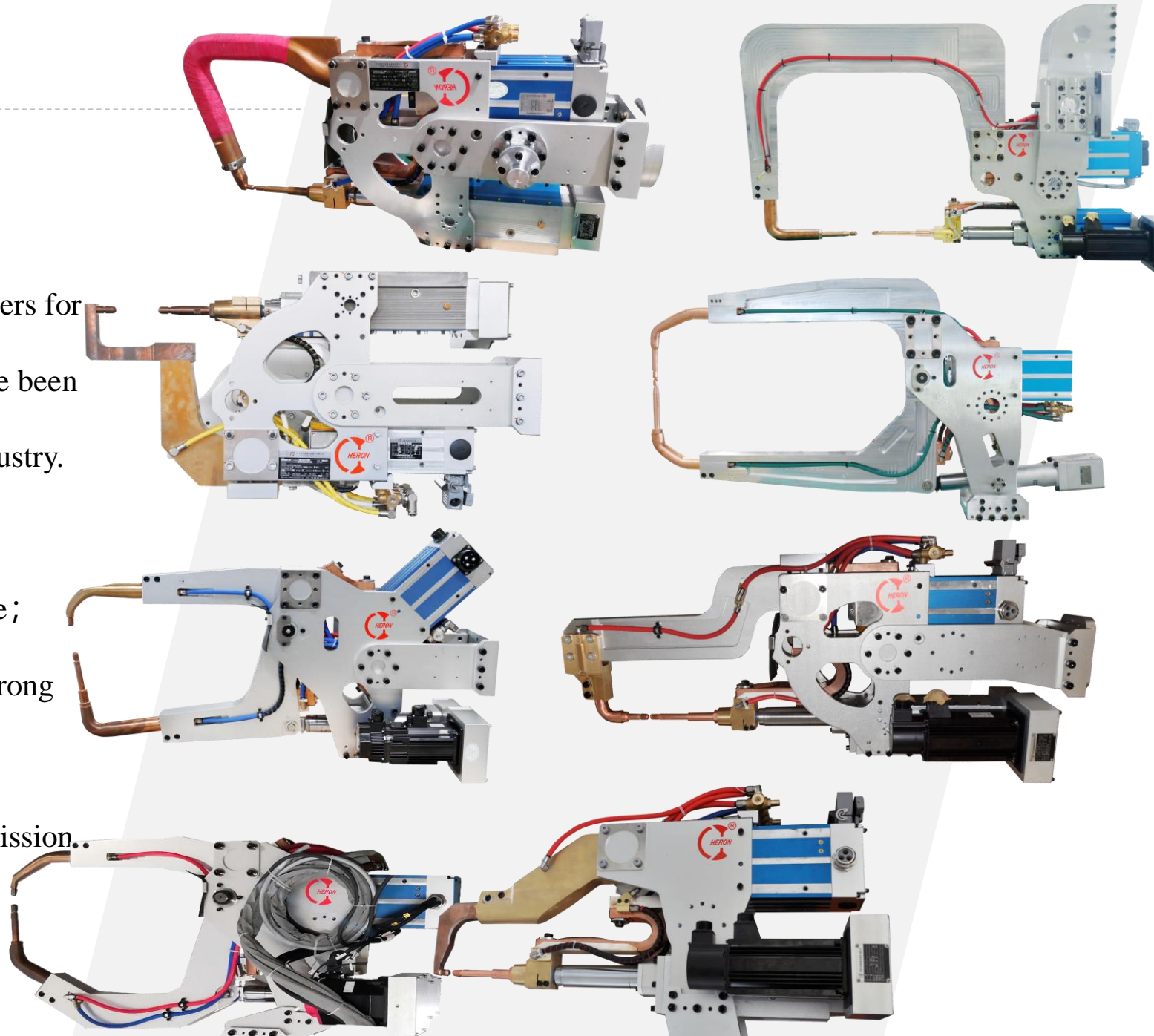
1.Specializing in the production of robotic welding pliers for more than 20 years, Heron's robotic welding guns have been used in large quantities in the body manufacturing industry.

2.Has a full range of clamp;

3.Modular design, universal parts are interchangeable;

4.High self-production rate, stable performance and strong supply capability;

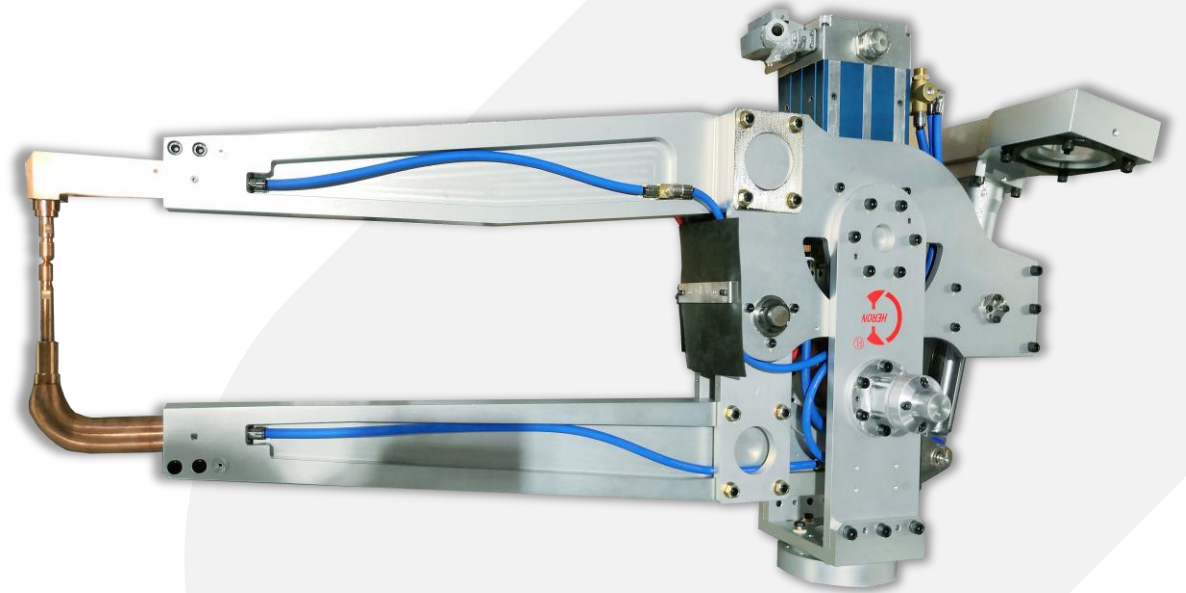
5.Green manufacturing process, energy saving and emission..  
reduction.



# Welding Gun For Aluminum Alloy

## Product Advantages

1. Good rigidity of the welding gun.
2. The maximum output current can reach 55KA.
3. Adopting 250KVA/2KHZ special aluminum welding transformer with 20% load factor.
4. High degree of modularity.



中频/MFDC  
中频/MFDC: 225KVA (1000Hz)-roman  
250KVA (2000Hz)  
Controller  
中频/MFDC: 60KA

# Mid-frequency Servo Robot Controller

## Product Advantages

1. Automatic pressure calibration function;
2. Five sections of current independently adjustable;
3. Step-up function;
4. Welding-spot counting function;
5. Automatic filler function;
6. Electrode resharpening and replacement;
7. Automatic current calibration system.



# Flush Self-Piercing Riveting

- Can clinch **different materials** (such as high-strength aluminum alloy, hot stamping steel, carbon fiber, galvanized sheet).
- Can achieve **multi-layer riveting**, the maximum thickness can reach **9.1mm**.
- The finishing is perfect to maximize outer appearance. The rivet head can be pre-painted or electroplated, and there is no convex coating after riveting.
- The punching and riveting are done in **one go** without the need for pre-punching riveting holes.
- Can feed fastener automatically.
- **Strong shear and tensile force.**
- **Strong anti-rust ability.** It can pass the salt spray test for up to 480 hours, and the special rivets can extend the rust resistance according to the actual needs.





# The Principle Of FSPR

## FSPR Self-piercing Riveting

### —A New Process For Join Aluminium To Hot Stamping Steel

#### Workpiece Pressing

The release machine prepresses the workpiece while the FSPR punch nails are fed into the punch down channel !

#### Punching Nail Embedding

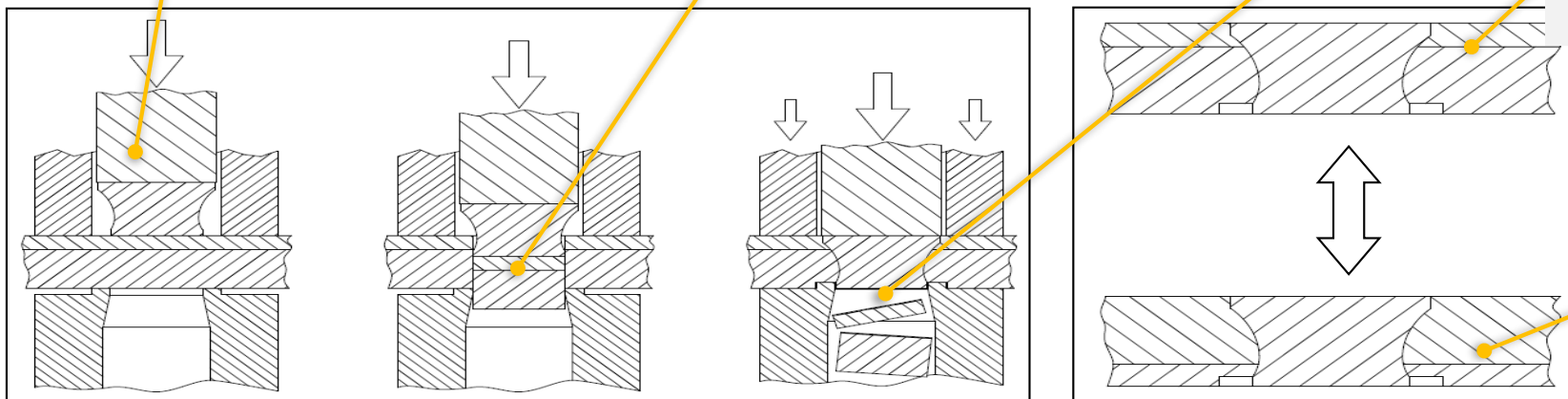
The punch is pressurized downwards, and the FSPR punching nails are simultaneously embedded in the workpiece.

#### Workpiece Material Extrusion

The punch continues to be pressurized, while the demoulder is pressurized and the FSPR punching nails are fully embedded into the workpiece, while the workpiece material is extruded to the "dovetail" area in the middle of the FSPR punching nail.

The thinner layer of workpieces is on the upper layer.

The thicker layer of workpieces is on the punch side.



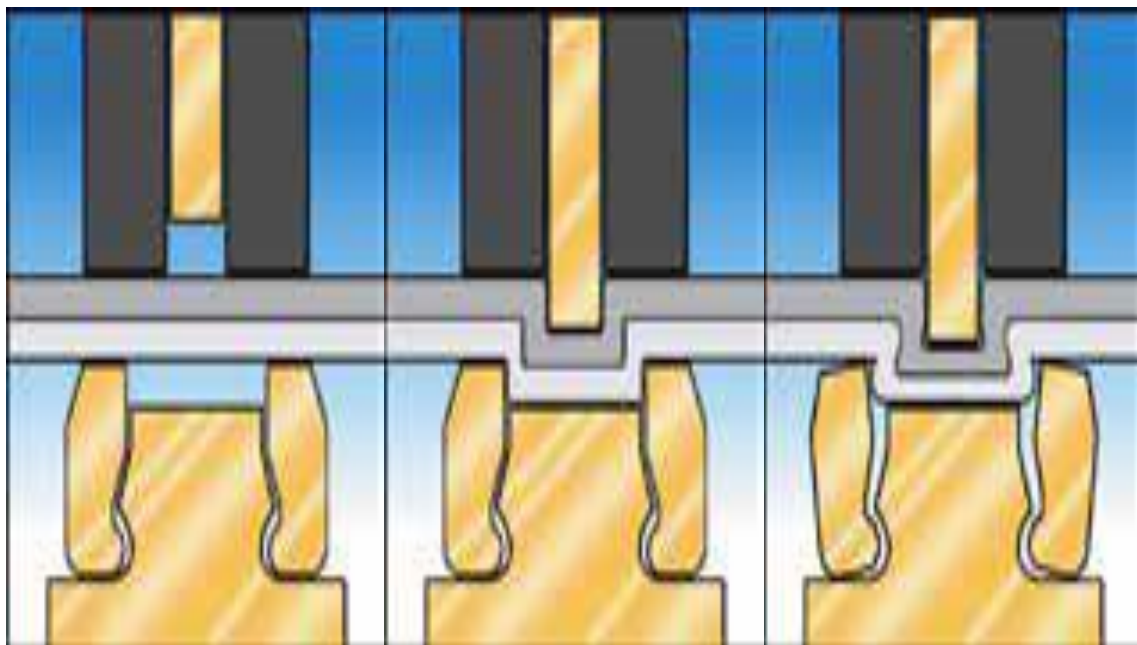
# Tog-L-Loc/Lance-N-Loc/Oval-Loc/V-Loc

- Energy saving and environmental protection: energy saving up to 80% compared to traditional machinery and equipment, no more grinding, plating and painting after joining;
- Economic benefits: the use of this connection production process to shorten production time, reduce waste and reduce costs, and increase profits;
- High corrosion resistance: No tearing damage to the material at the connection point, which greatly improves the corrosion resistance of the product;
- One-time completion: No rivets, screws or buttons are needed to join the panels in one go;
- Simple testing method: The quality of the connection point can be tested in a simple way. No need to pass destructive tensile or peel tests by measuring standard tests.;
- High dynamic fatigue strength: No stress concentration at the joint, long life of the joint under the same dynamic external load;
- No odor, no sparks: No sparks and smoke during connection.

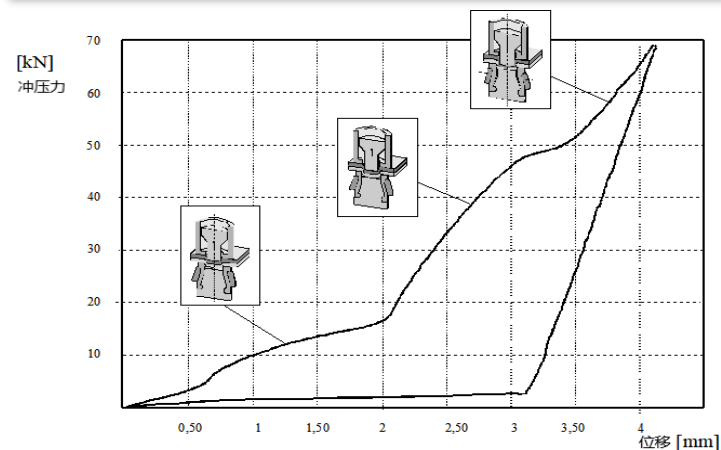


# Top-L-Loc/Lance-N-Loc/Oval-Loc/V-Loc

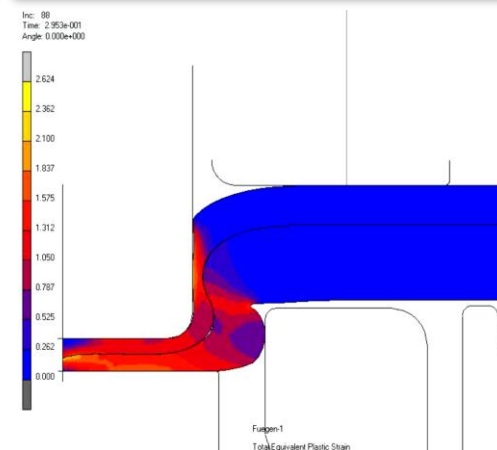
## THE CLINCH PROCESS



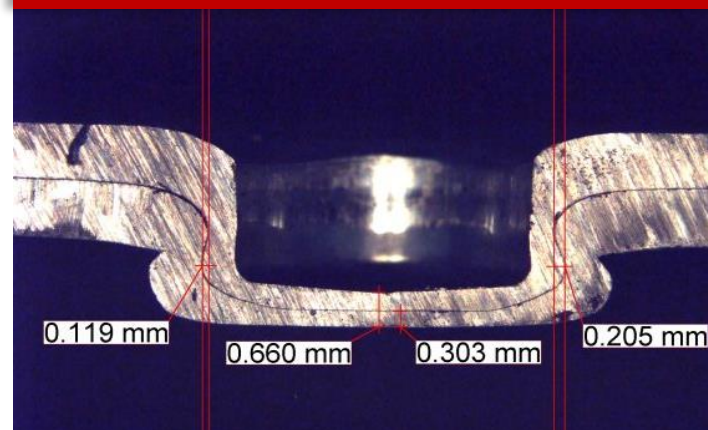
### Forming Process Control



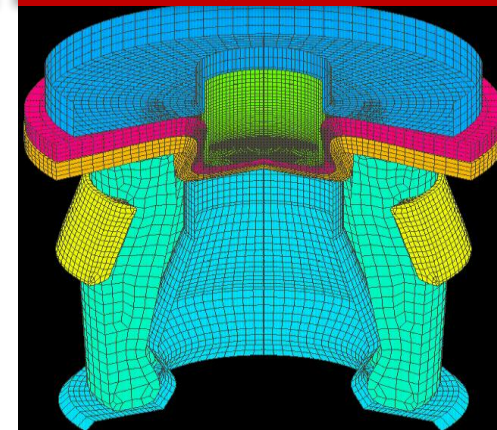
### Forming Process Simulation



### Cross-sectional Metallographic Analysis Of Riveted Points



### Finite Element Analysis (FEA)



## ■ PART 3

# Customized Products

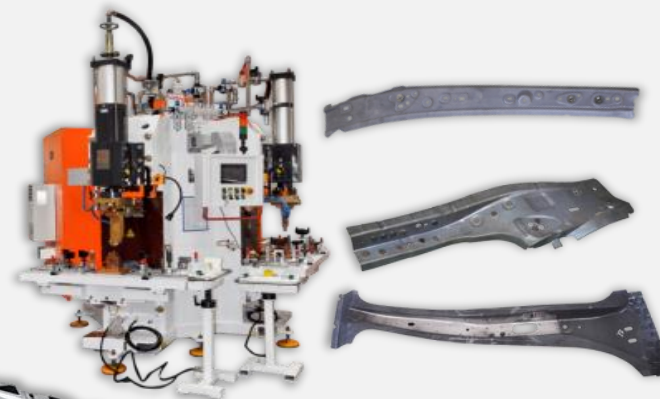




# In The Automotive Industry



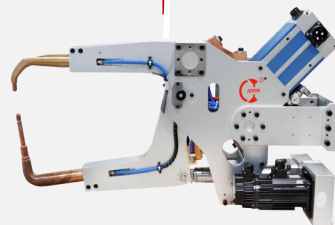
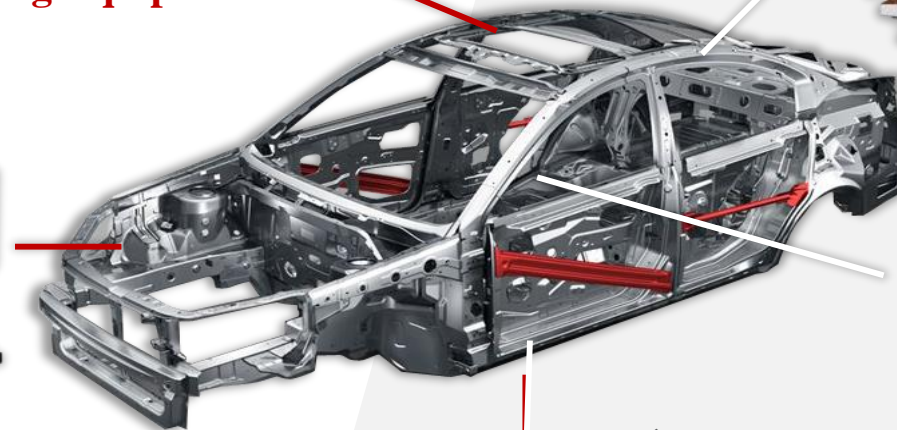
**Sunroof Riveting Equipment**



**ABC Pillar Welding Equipment**



**Anti-collision Bumper Welding Equipment**



**Robot Welding Gun for Car Body**



**Door Frame BC Pillar Welding Equipment**

# Equipments For Door System Series



**Auto Door Frame**



**Auto Body Sill Assembly**



**Auto Door Glass Bracket**

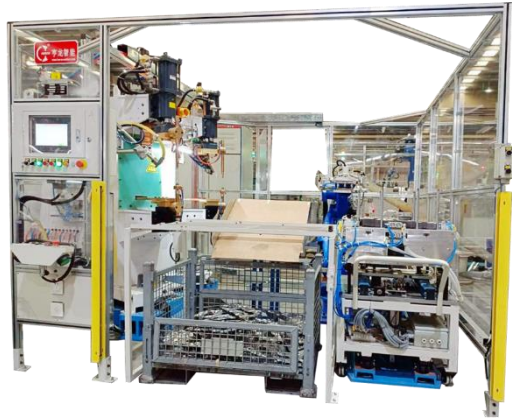


**Auto Door Glass Bracket**

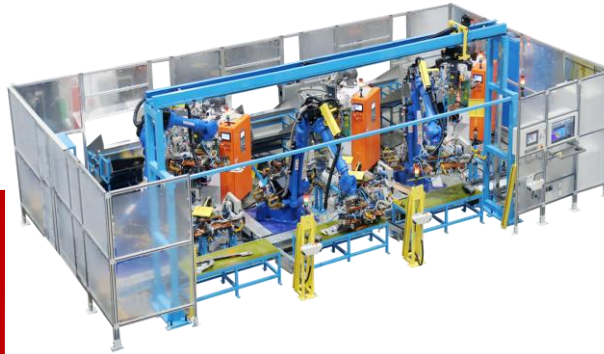
# Equipments For Stamping Part



(Small-sized Stamping Part)  
Projection Welding Station



(Mid-sized Stamping Part)  
Projection Welding Station



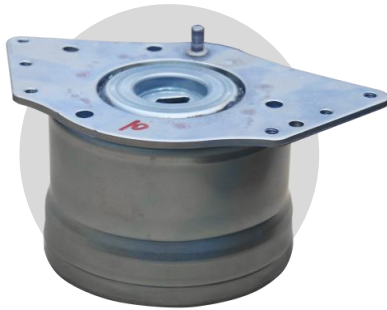
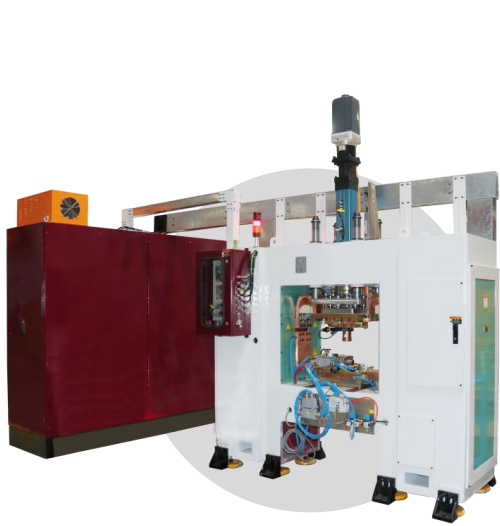
(Large-sized Stamping Part)  
Projection Welding Station



(Large-sized Stamping Part)  
Projection Welding Station



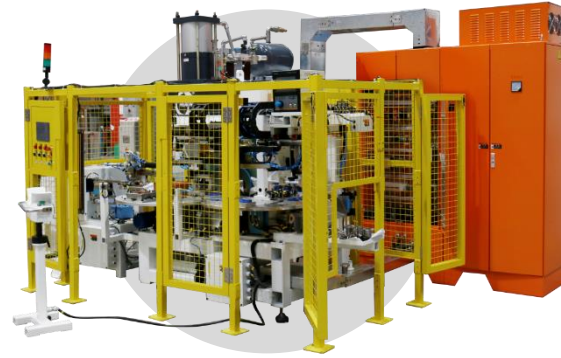
# Equipments For Electric Motor



**Variable Speed Motor  
Housing**



**40000J Motor  
Housing**



**Automotive Transmission  
Bevel Gear**



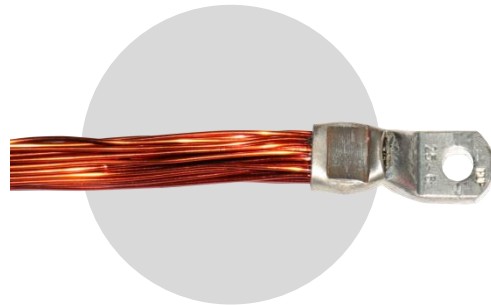
**Stator For Variable  
Speed Motors**



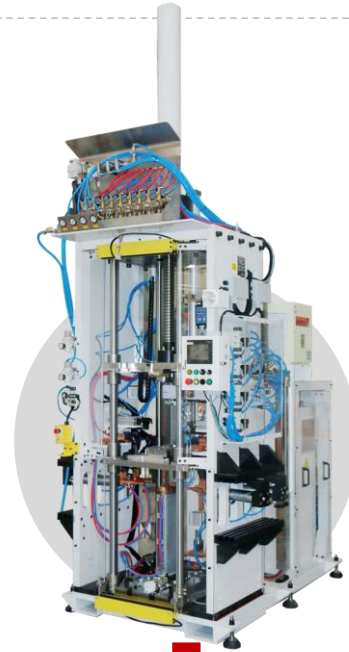
# Equipments For Motor and muffler



**220KVA Electric Motor  
Terminal Welder**



**250KVA Electric Motor  
Terminal Welder**



**100KVA  
Muffler Welder**



**220KVA  
Muffler Welder**

# Equipments For Shock Absorbers



**50KJ CDW Welder For Shock Absorber Clamps**

**200KVA Inverter Seam Welder For Shock Absorbers**



**330KVA Medium Frequency Welder For Shock Absorbers**



# Equipment For Gas Spring



**30KJ CDW Welder For Gas Spring Cylinders**

**220KVA Medium Frequency Convex For Gas Spring**



**220KVA Medium Frequency Convex For Gas Spring**

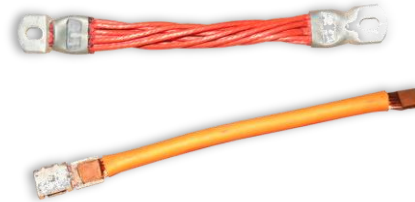


# Equipment For Other Parts



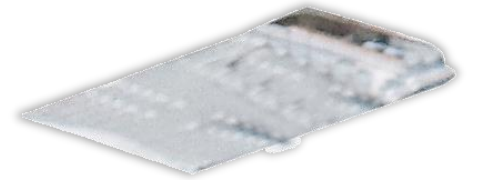
**Welder For Variable-Speed Motors**

**CDW Welder For Braking System**



**Welder For Connection Cables In Battery**

**Automatic Inverter Spot Welder For Battery**





# Equipment For Other Parts

**Welder For Angle Adjuster**



**Welder For Cylinder Gasket**

**Welder For Seat Rail**



**Welder For Gear Hubs**

## ■ PART 4

# Applications





# Robotic Welding Guns Application

OUR  
CUSTOMER



福迪汽车  
FODAYAUTO



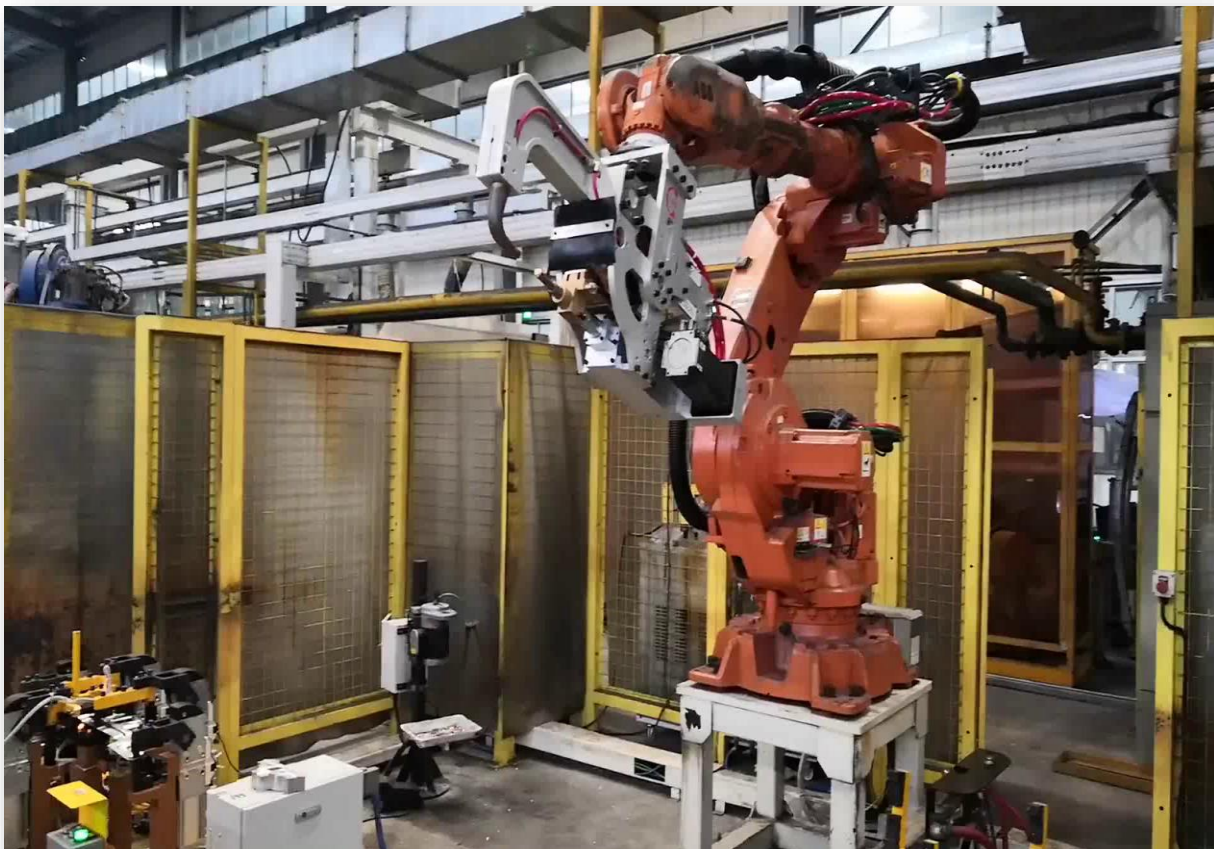
# Robotic Convex Welding Workstation Application

OUR  
CUSTOMER





# Welding Gun For Aluminum Alloy Application





# CDW Equipment Application

OUR  
CUSTOMER



Ogihara  
广汽狭原

豪斯特

Gestamp



华达汽车科技股份有限公司  
HUADA AUTOMOTIVE TECHNOLOGY CO.,LTD.



凌云工业股份有限公司  
LINGYUN INDUSTRIAL CORPORATION LIMITED



Gestamp

# We Are Experienced!



# Our Customers



## COOPERATIVE PARTNER

Heron's products have been widely used in the automotive industry for many years. And we have long-term stable cooperation with the customers in more than ten countries around the world, with mature technology and rich experience.

		 比亚迪汽车	 MAGNA COSMA CHINA		 广汽集团 GAG GROUP	 CHERY		 五菱汽车
		 东风汽车	 Mercedes-Benz	 福迪汽车 FODAY AUTO	 DAEWOO BUS	 江铃汽车 JMC		
		<b>AUTOMOTIVE INDUSTRYN</b>		 一汽解放汽车	 北京汽车 BAK MOTOR	 众泰汽车 ZOTYE AUTO	 广汽日野	 福田汽车 FOTON
		 东风柳汽	 mazda 一汽轿车	 小鹏汽车 XPENG	 长城汽车 WEICHI			
 延锋江森 Yanfeng Johnson Controls	 faurecia	 SUSPA	 LEAR CORPORATION	 Webasto Feel the drive	 交运集团	 Hapm		
 inalfa roof systems	 INTIER Automotive	 豪斯特	 Gestamp	 MINTH				
 Valeo 法雷奥	 华域汽车 HUAYUE AUTOMOTIVE SYSTEMS	 BENTLEER	 MAGNA	<b>AUTO PARTS INDUSTRYN</b>				





**HERON IS ALWAYS HERE FOR YOU !**  
**LET'S TALK MORE!**



**EXPERT IN  
RESISTANCE WELDING · CLINCH**



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