HERON SINCE 1991

AKHFAS-NER SINCE 1981

HERON

FLUSH SELF-PIERCE RIVETING

Riveting Solutions For Special Materials And Multi-Layer Parts

Make Joining Simple

ABOUT HERON

As a high-tech metal connection equipment manufacturer, Heron Intelligent Equipment has been a name associated with sustainable innovation since 1991. Clients desiring market leading solutions partner with Heron for its proven ability to save valuable resources and improve production processes for hard-to-join metals. Its accumulation of technical know-how, as well as commitment to providing customers with smart, digital machinery helps industry partners "make joining simple".

Based in Guangzhou, a port city in China, Heron's machines have been exported to over 25 countries, and regions including Europe and North America. For decades, Heron has delivered a complete range of products and services to its international customers.

AKH FAS-NER® is our in-house riveting solutions specialist.

FLUSH SELF-PIERCE RIVETING TECHNOLOGY

FSPR® Self-pierce riveting is a mechanical joining technique for identical or dissimilar materials, allowing the joining of two or more layers of varying thicknesses, pre-painted or pre-coated; no pre-drilling required.

Hardened steel FAS-NER

ADVANCED RIVETING SYSTEM

Heron's Flush Self-Pierce Riveting (FSPR) Systems range from standard machines to fully automated turn-key operations. We partner with our customers to manage the design, integration and commissioning of assembly systems from concept to production.

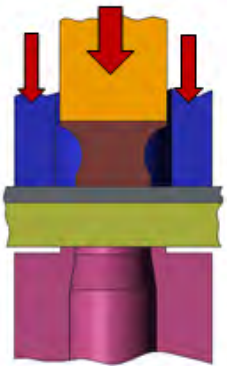
In today's market, companies want to improve efficiencies and product quality as well as decrease manufacturing time and labor. Meeting these demands, our standard and customizable multiple-hit automated systems make up the majority of riveting equipment sales.

FSPR System

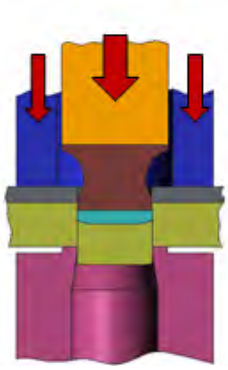
HRC-670 Monitor

Technical principle

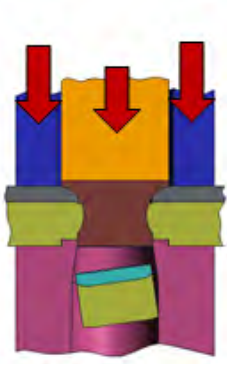
FSPR self-pierce riveting process is realized by a simple punch and die operation which automatically feeds, punches, inserts and locks the self-piercing rivet to produce a solid join in one high-cycle operation.



Stamping



Piercing



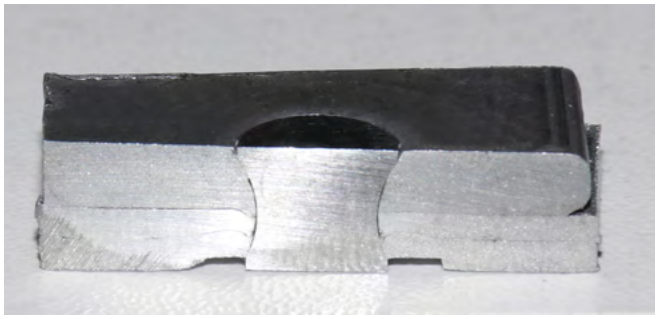
Forming

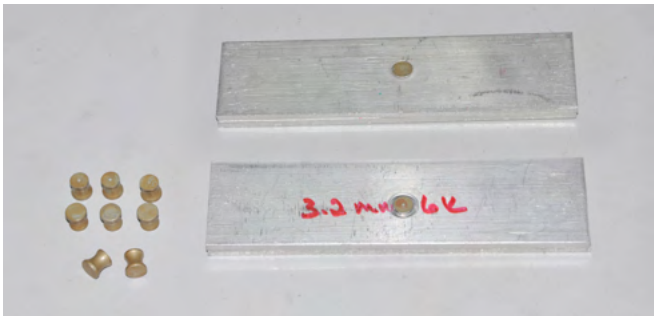
Advantages

- Can join a variety of materials (i.e. high-strength aluminum alloy, hot stamping steel, carbon fiber and magenesium), and achieve multi-layer riveting, the maximum thickness can reach 9.1mm.
- Punching and riveting can be completed in a simple punch and die process, without pre-punching riveting holes.
- Can realize automatic rivet feeding, with high cycle times and productive efficiency.
- Forms joints by extrusion, allows joining of materials with long elongation.
- Stable sheer, tension and riveting appearance.
- Strong anti-rusting ability, longest salt spray test lasts up to 720 hours, special rivets can be extended according to the actual needs of anti-rust ability.

Applicable Riveting Materials

- Aluminium and alloy (pressure cast, extruded, sheet)
- Non-ferrous metals & non-metallic materials (copper, magnesium, and carbon fiber) as a middle layer
- Multi layer-design
- Adhesive as a middle layer
- Deep drawing steels with Rm up to 1000 MPa
- High-strength steels with Rm up to 1600 MPa
- Hot formed steels with Rm up to 1800 MPa





Recommended Material Stack-Up

1. The thickness of the bottom plate should be at least 1/5 of the total thickness of the combined plate.

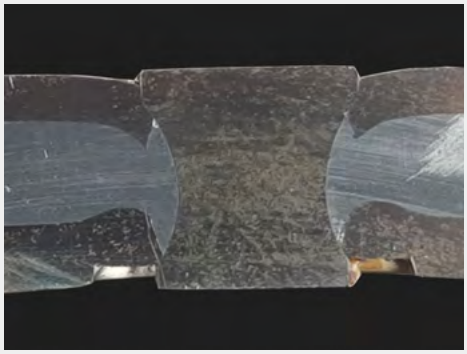
2. Convex side: high-strength metal materials, such as plated steel, hot-formed steel, high-strength steel, etc.
Middle layer: medium and low strength and non-metallic materials, such as carbon fiber, medium and low strength steel, aluminum alloy, etc.
Concave side: medium and low strength metal materials, such as medium and low strength steel, aluminum alloy, etc.

3. When two-layer board materials are riveted together, with the allowable tensile strength of the material on the convex side being within 1800MPa, and that on the concave side within 1000MPa;

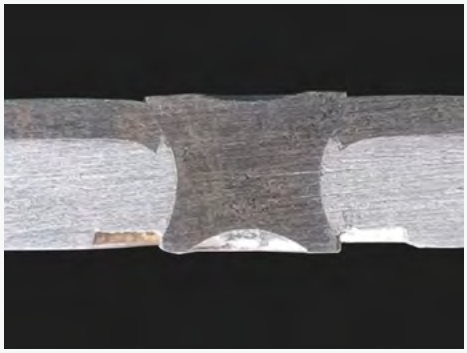
4. When multi-layer board materials are riveted together, the tensile strength of the material on the concave side minus the tensile strength of the middle layer material is ≦ 250Mpa.
-When the difference value is positive, the concave material is harder than the middle layer material.
-When the difference value is negative, the concave material is softer than the middle layer material.

5. When thin plate is on the punch side, and thick plate is on the concave side, the riveting strength is better, but the thick plate is allowed on the punch side;

Joint Quality

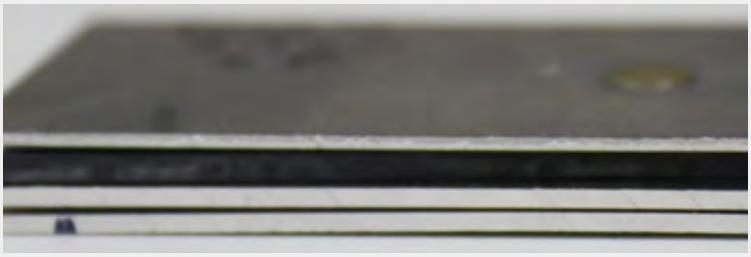


High-strength steel of 1.5mm
Die-cast aluminum is 3.0mm
High-strength steel of 2.0mm



Hot-formed steel of 1.5mm
Die-cast aluminum is 3.0mm

Galvanized sheet: 1.0mm
Carbon fiber is 2.3mm
Aluminum plate 1.5mmX2



Spraying plate is 1.4mm
Aluminum plate is 0.8mm
Galvanized sheet: 1.2mm

Joint Quality

Aluminum sheet: 1.5mm

Aluminum sheet: 1.2mm

Hot-formed steel is 1.3mm

Aluminum plate is 1.6mm

Hot-formed steel is 1.2mm

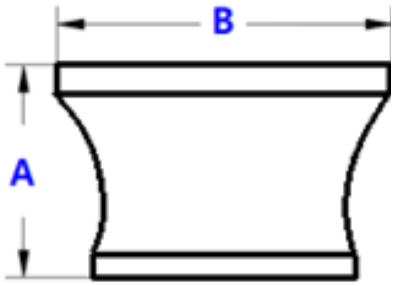
Carbon fiber is 2.3mm

Aluminum sheet: 1.2mm

FSPR Rivet Family

The FSPR rivet is made from hardened steel or aluminum and available in a range of standard sizes.

The typical rivet shape is shown. For accurate selection and customization of rivets, please consult HERON.



size	A		B	
	inch	mm	inch	mm
B09MSD-1	0.075	1.9	0.210	5.3
B09MSD-2	0.084	2.1		
B09MSD-3	0.099	2.5		
B09MSD-4	0.111	2.8		
B09MSD-5	0.125	3.2		
B09MSD-6	0.138	3.5		
B09MSD-7	0.155	3.9		
B09MSD-7-165	0.165	4.2	0.280	7.1
B09MSD-8	0.165	4.2		
B09MSD-9	0.180	4.6		
B09MSD-10	0.195	5.0		
B09MSD-11	0.210	5.3		
B09MSD-11-220	0.220	5.6		
B09MSD-11-235	0.235	6.0		
B09MSD-11-245	0.245	6.2	0.340	8.6
B09MSD-11-260	0.260	6.6		
B09MSD-11-280	0.280	7.1		
B09MSD-12-215	0.215	5.5		
B09MSD-12-235	0.235	6.0		
B09MSD-12-300	0.300	7.6		
B09MSD-12-320	0.320	8.1		

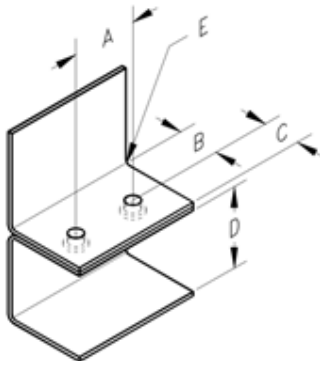
FSPR Minimum Space Design Specification

When the size of "E" increases, the size of B should be increased accordingly.

Unless otherwise specified, the values in the table are the minimum values required.

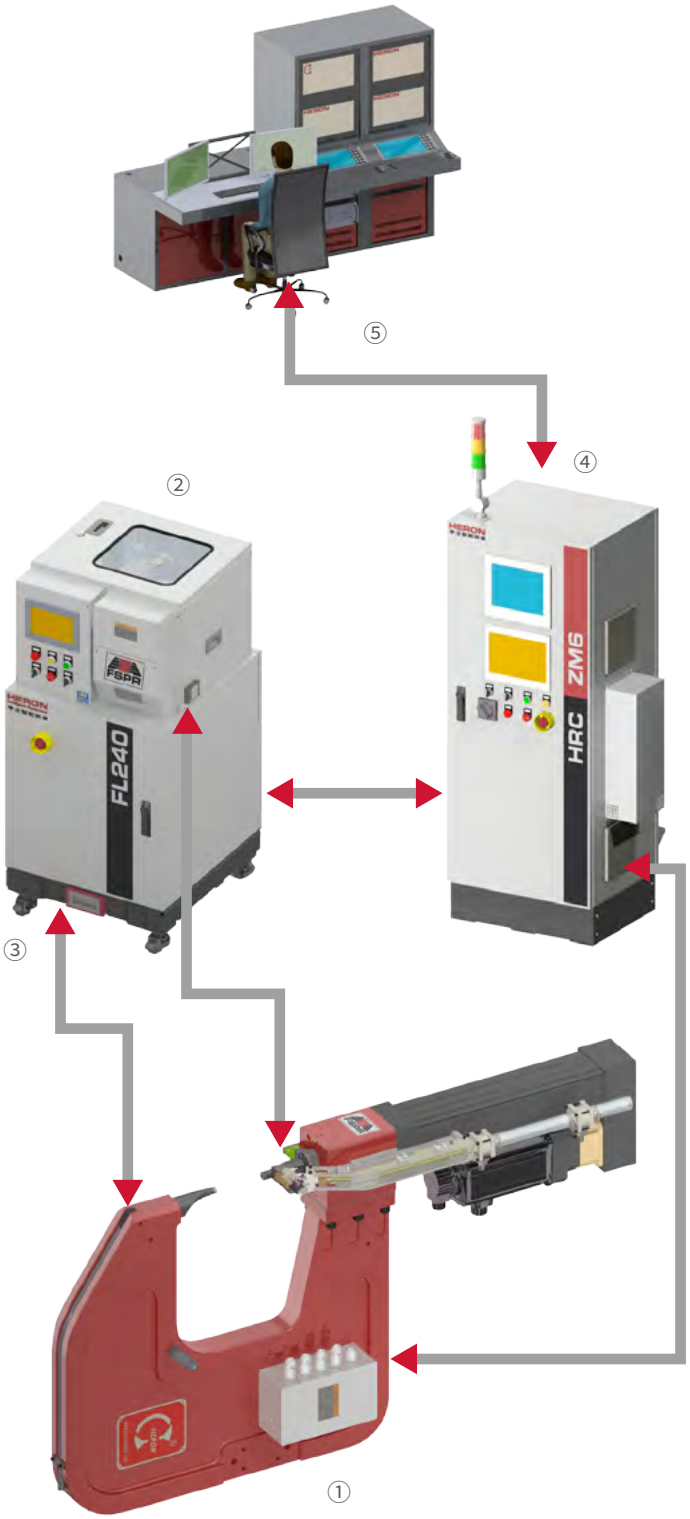
The value of C in the table applies to ordinary mild steel, if riveting low elongation, brittle materials need to appropriately increase the value (* For example, the die side is about 10% elongation of aluminum, C value is greater than 15mm)

If the size of C increases, the size of D needs to be increased accordingly.



Tooling	Dim	SIZE#		
MJ	mm	MSD-1~7	MSD8~11	MSD12~
 	A	13	17	20
	B	7.5	8.8	10.8
	C	6	8	10
	D	30	52	65
	*E	0.8	0.8	0.8

Components of FSPR System



① Servo-riveting system

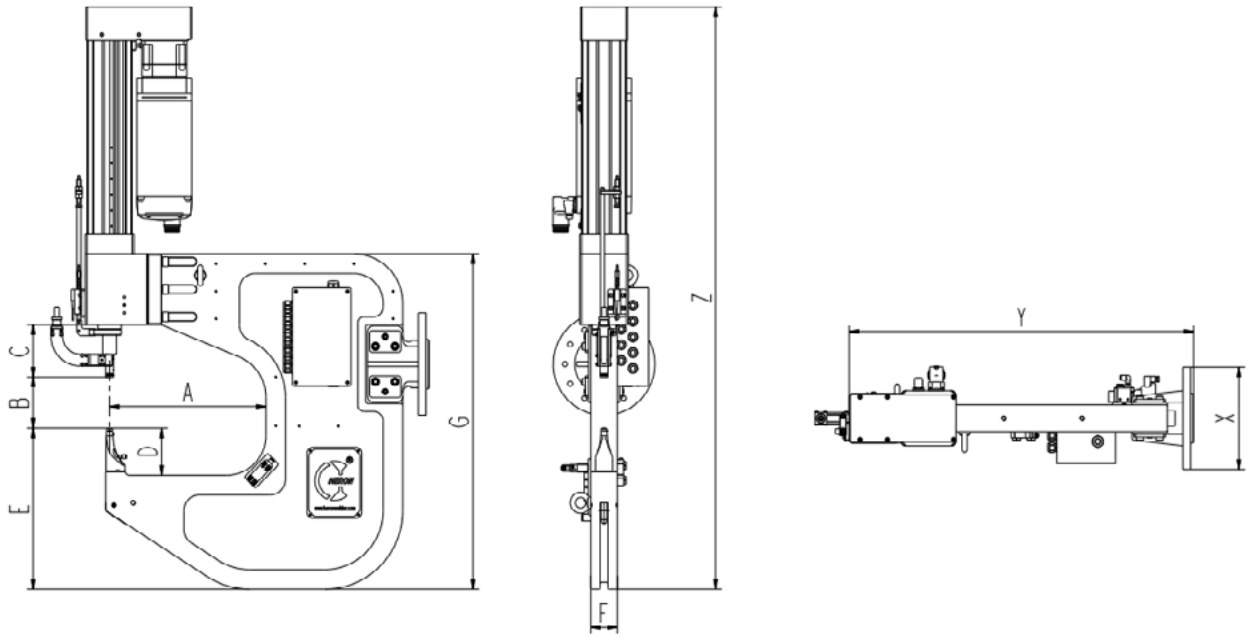
② Rivet feeding system

③ Waste collection system

④ Electrical control system

⑤ Custom system

Standard Size For Riveting Unit



Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	X (mm)	Y (mm)	Z (mm)	Weight (kg)
standard	200	130	133	120	360	50	802.5	260	679.5	1429.5	190.5
	250	130	133	120	385	50	827.5	260	729.5	1454.5	197.5
	300	130	133	120	385	54	827.5	260	779.5	1454.5	214.6
	350	130	133	120	410	58	852.5	260	829.5	1479.5	223.9
	400	130	133	120	410	68	852.5	260	879.5	1479.5	263.8
	450	130	133	120	410	68	852.5	260	929.5	1479.5	275.3
	500	130	133	120	410	68	852.5	260	979.5	1479.5	285.9

1. Basic parameters of standard C-Frame: 200mm Actuator stroke + 150mm open distance.
2. If you need to customize the C-Frame and need more information, please feel free to contact us.

Robot Rivet Unit ZM6

Solutions for Riveting Applications: Lightweight and Compact Design

The ZM6 servo Riveting system with integrated internal strain gauge force sensor (80 KN) is particularly suitable for high precision Riveting processes based on force and displacement monitoring. The weight of the whole machine is significantly optimized and requires little installation space. At the same time, excellent weight-center-of-gravity optimized design can be demonstrated when integrating with robot arms.

- Lightweight and optimized range for robotic applications.
- Compact design .
- Servo motors with single cable technology for the easiest possible mounting process.
- High speeds with ultra-short beats.
- Active compensation of the riveting process to ensure precise positioning.

Applications

The ZM6 servo riveting system is suited for modern, fully automated production riveting lines. Due to its lightweight and compact design, the ZM6 has excellent suitability for assembly applications where the robot arm is used. Examples include clinching, punching and pressing.

Model: ZM6-080

Robot Rivet Unit ZM6

Features

The Actuator housing of the servo riveting system type ZM6 follows a lightweight design and includes a strain gauge force transducer with an integrated amplifier circuit board. Press fitting is carried out by a servo motor driving a threaded screw via a belt and gearbox. The encoder for precise positioning is integrated in the drive motor.

ZM6 servo riveting system adopts HRC-670 riveting quality monitor for riveting quality control. Communication between the monitor and the servo controller is via a real-time fieldbus. The monitor has interfaces to fieldbus types commonly used in the industrial field, such as PROFIBUS, PROFINET, EtherNet/IP, EtherCAT, and the Ethernet port of the monitor enables the transfer of historical data files in a variety of formats. Data backup is also possible.

Electric Cylinder Parameter

Rated power	KW	5
Electric cylinder stroke	mm	200/300 (Optional)
Nominal Pulling Force	KN	20
Nominal Pressing Force	KN	80
Maximum velocity	mm/s	300
Repeated positioning accuracy	mm	±0.01
Overall weight (including servo motor)	kg	73
Protection class IP54		IP54
Operating temperature		The above derating is used.
Operating humidity		⩽75%

Riveting Unit Parameters

Throat depth	mm	200/300/400/450/500
Operating Opening	mm	130
Maximum pressure	KN	80
Weight	Kg	Refer to table on p10
User field installation conditions		
Power supply		380V / 480V
Air source	MPa	⩾0.6

(1) Measurement standards are at the same temperature working conditions.

(2) The specific weight of Riveting unit is subject to the confirmation drawing.

(3) If the user site installation conditions are special, please contact us.

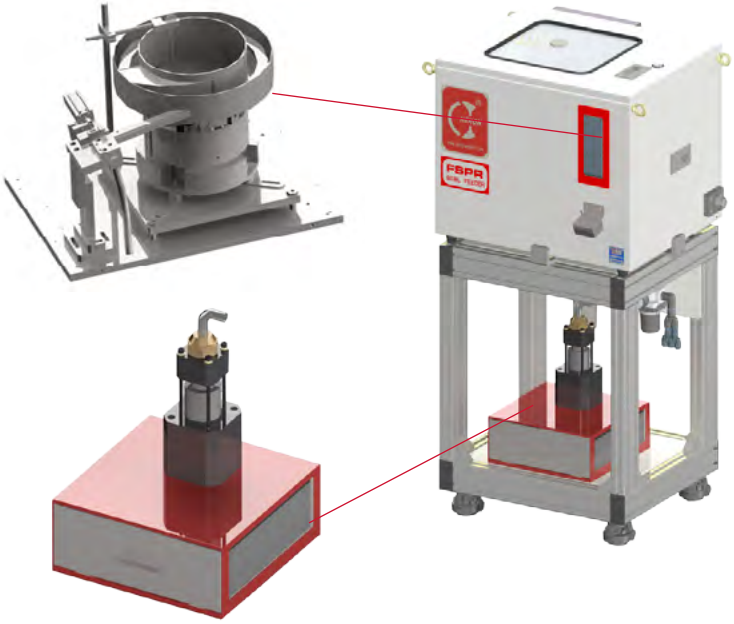
Rivet Feeder / Waste Collection System

Rivet Feeder

The system is an automatic vibrating tray type sorting and feeding system. Its function is to vibrate the disordered rivets to be arranged neatly and accurately in accordance with the set direction to the riveting unit, including full material detection, in place detection and no material alarm and other functions.

Waste Collection System

This system is an automated collection system for FSPR punched and cut scrap. It has functions such as counting and alarming.



Electric Control System

ZM6-080-XXX-D0 Controller

The control system is used for the overall control of the riveter and the communication with the robot.

HRC-670 Monitor

HRC-670 monitor can be used for real-time monitoring of riveting, press-fitting, assembly, spring testing and other processes, and form the correlation curve of force, displacement and time to detect and evaluate the production quality or production steps, which can ensure the quality of assembly and achieve defect-free production and assembly parts process. Widely used in the following production tasks:

- FSPR/SPR
- Clinching
- Press fitting
- Spring testing
- Fatigue testing

Heron: World Class Machines

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