HDClinch
HARDY Clinching System

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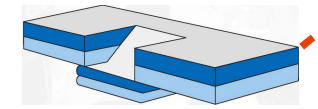
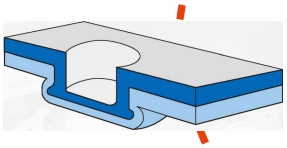
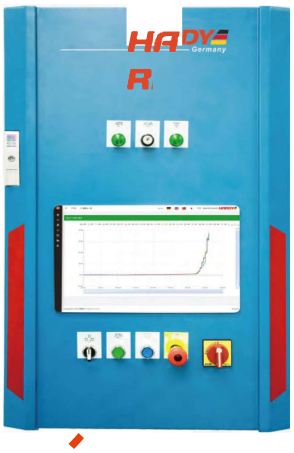




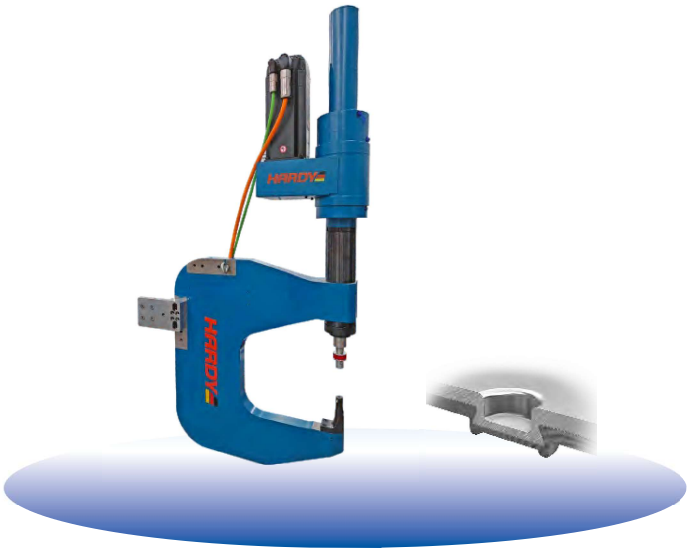
Geometry of clinching points

Actuating unit



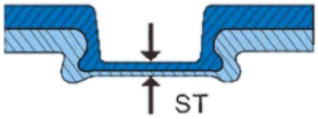
Control system

Clinching technology



Methods of work

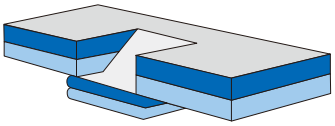
Under the action of external force, the special Clinching mold forces the combination of joined materials to produce material flow at the joining point, forming a plastic deformation process of mutual inlay, which is called Clinching.

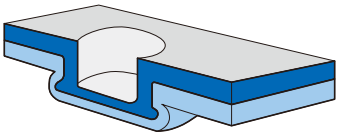


This joining point has a certain tensile strength and shear strength, which is called the Joining point .

The geometry of Joining point

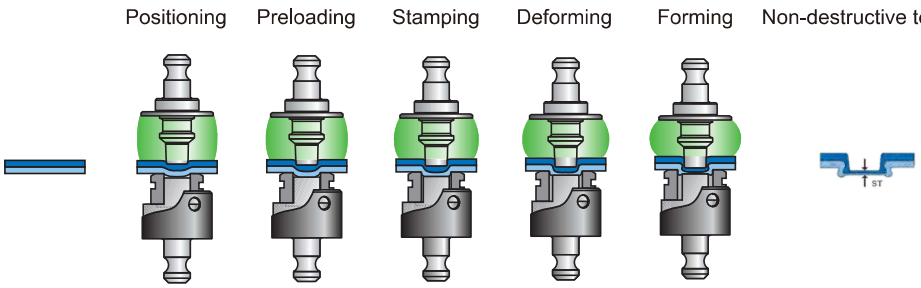
- Clinching points can be either round or rectangular.
- Under the action of the round point mold, the joining metal plate undergoes internal deformation to form a round clinching point, which is good in appearance and evenly distributed in internal stress.
- It is mainly suitable for the joining of soft materials and thin materials.
- Rectangular point.
- The rectangular point clinching is a composite cutting and deformation process, which is mainly suitable for the joining of hard materials and stainless steel plates.





Clinching technology

Process of Clinching



Factors influencing the quality of clinching:

Joining device

- The structure of the joined equipment
- Power of the joined equipment
- Static deforming characteristic
- Control of the clinching process

Joining process

- Space positioning
- Duty cycles
- The influence of the surrounding environment

Combination of materials

- Material
- Thickness of the material
- Material strength
- Surface condition
- Accessibility of geometry for joining point

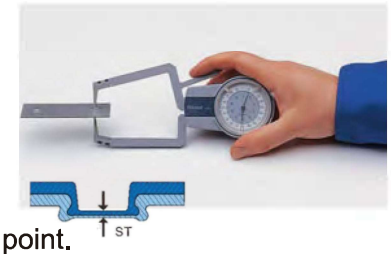
Joining mold

- The structure of the upper punch
- The structure of the lower die
- Stripper/pre-clamping mechanism
- Joining force
- Stripping force

Clinching technology

Joining point quality inspection and control

The joining quality of the joining point is directly related to the shape and geometry of the forming.
Therefore, the quality of the joining point can be judged by measuring the bottom thickness value ST of the joining point.
By adjusting the magnitude of the stamping force, the base thickness value ST can be changed, so as to improve the balance between tensile strength and shear strength of the joining point.
That is, the quality of the joining points can be detected and controlled without damage.



Technical advantages of Clinching (compared to spot welding)

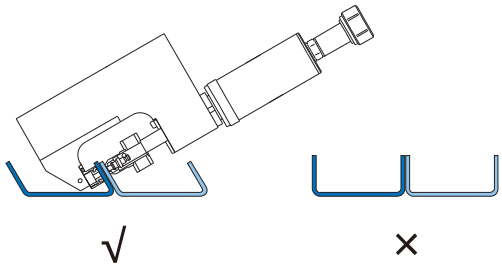
- The dynamic fatigue strength of the joining points is high
- The quality of the joining points can be inspected without damage
- Sandwich or multi-layer material joinings are allowed
- No thermal stress in the joining point area, and no stress concentration
- There is no consumption of raw materials and no auxiliary materials are required
- There is no need to deal with it beforehand or after
- The protective layer on the surface of the workpiece will not be damaged
- The working environment is good, no smoke and dust emission, no noise
- Low energy consumption and low cost of use

Comparison of joining ability of Materials (Clinching vs. Spot Welding)

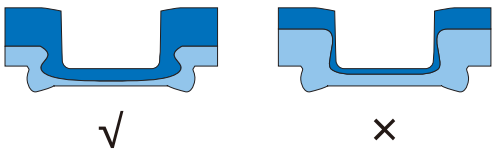
Project	Clinching	Spot welding
Mild steel	Very good	Very good
Stainless steel	Very good	Good, necessary to prevent shrinkage porosity and cracks
Aluminum (and its alloys)	Very good	Difficult to clean the oxide layer in the welding area and the electrode is easy to adhere to the workpiece
Magnesium (and its alloys)	Very good	Very difficult and requires a special material electrode
Titanium (and its alloys)	Very good	Very difficult and requires a special material electrode
Steel (and its alloys)	Very good	Difficult, Electrodes made of special materials are required
Lacquered sheet metal	Very good	Impossible
Steel plate with plated surface	Does not destroy the plating	The plating in the heat-affected zone is destroyed
Metal workpieces with non-metallic interlayers	Possible	Impossible
Use in combination with adhesives	Very good	Impossible
Three-layer sheet metal	Good	Difficult
Four-layer sheet metal	Good	Impossible

Design specification for product being clinched

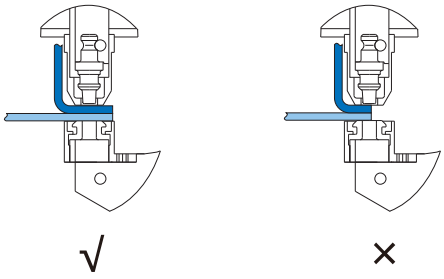
1 Make sure that the C-frame can enter the joining point and avoid joining in a closed cavity



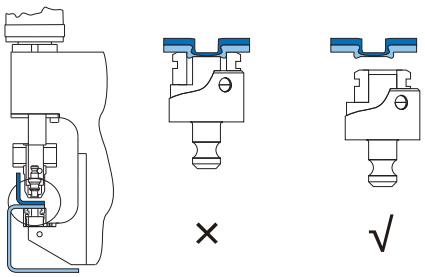
2 Clinching direction
General Recommendations:
Press-in from thick plate to thin plate



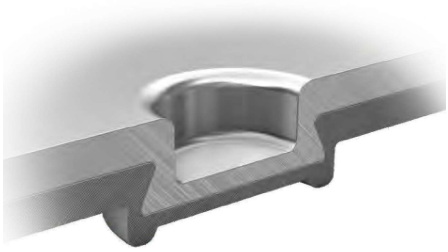
3 Make sure to provide sufficient flange width

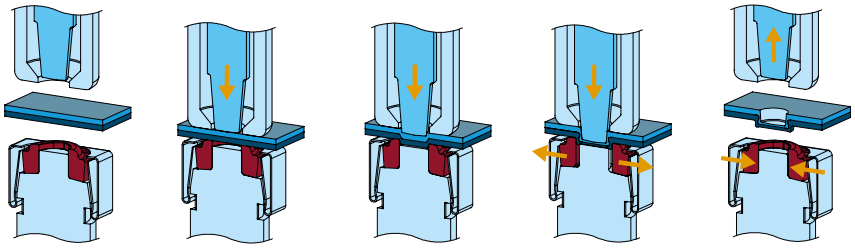


4 Leave plenty of room for extension of die.



Technical parameters





Project	Specification	Technical parameters	Unit
CNC drives :Power Unit	Max drive	50/80	KN
	Max Stroke	100/200(Optional)	mm
	Max free stroke	250	mm/s
	Max working stroke	35	mm/s
	Open height	50/100/150	mm
	Depth S/M/L	200/250/300	mm
	Extra-large depth XL	350/450/600	mm
C Frame	Die supporting height	30/50/80(Customizable)	mm
Die Type	Round die	Φ3.Φ4.Φ5.	mm
		Φ6.Φ8.Φ10	mm
	Rectangular die	St 4.3、5、6	mm

Actuating unit

Features

- Various structural forms (mobile, handheld)
- High Precision positioning
- Servo drive to ensure data to be collected and analyzed
- Suitable for joining of the same or different materials, workpieces are not deforming

Molds

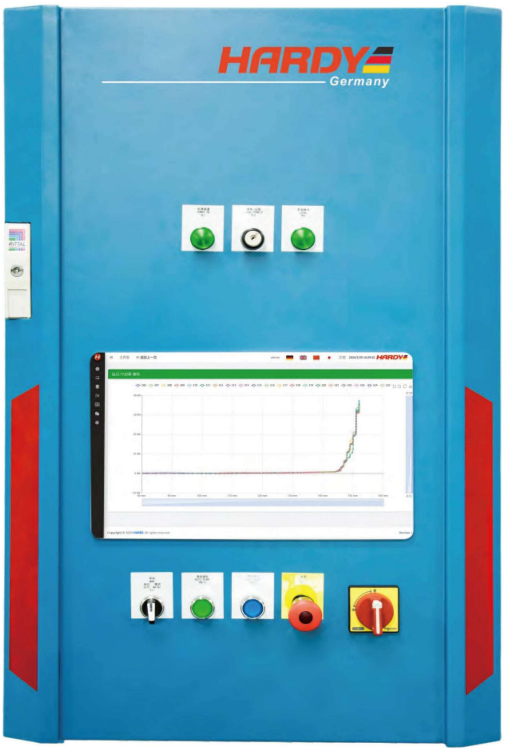
Features

- No external fasteners or welding machinery are required for fastening
- The interlock of materials is formed by the metal pressed into and stamped on the bottom layer
- It is suitable for joining materials with high hardness, and multi-layer materials are fastened and joined

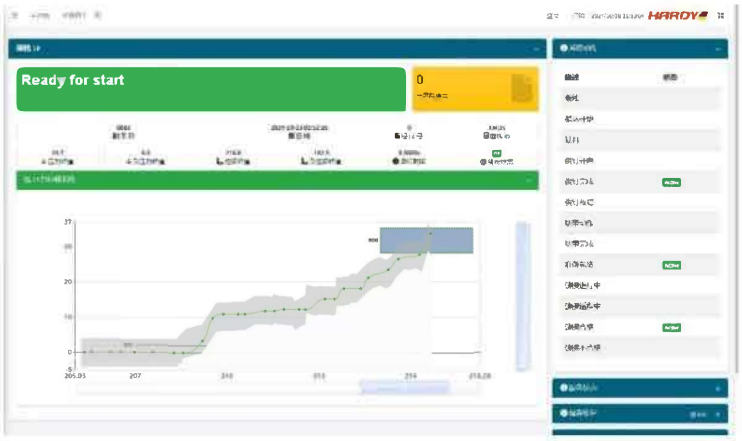
Independent control system

Features:

- Standardize "embedded PC" control
- The standard HMI for parameter setting,data curve viewing,and Error alarm reminde
- Simple and intuitive interface,password protected access levels
- The riveting process is automatically monitored to ensure the quality of riveting
- Data acquisition allows important data to be uploaded to the factory MES to ensure product quality
- Multiple communication protocols such as EtherNet/ IP, ProfiNet, equipmentNet,CC-Link etc.

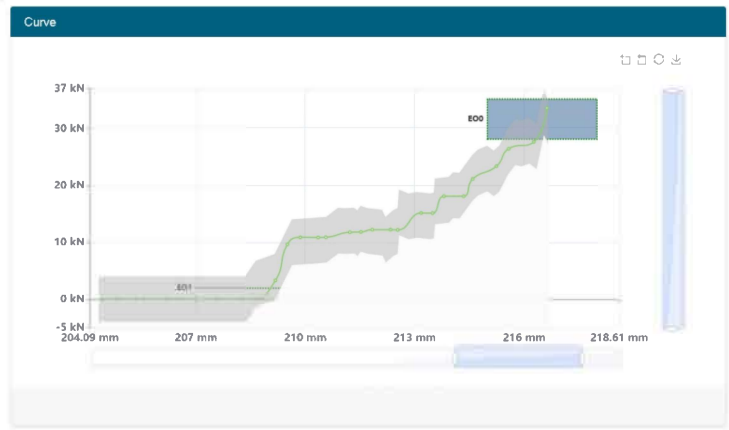


Software



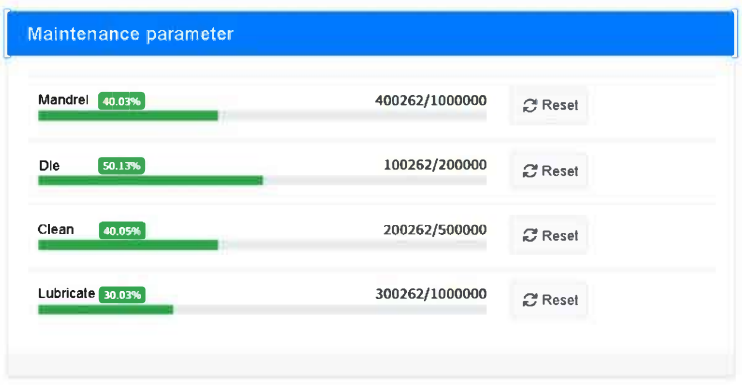
Main interface:

- Functional, concise and straightforward
- Alert of the status of each posture during device operation
- Real-time feedback on the operation of the device
- It can be operated by touch or keyboard and mouse



Data Acquisition and Analysis:

- Process data acquisition and graphical analysis



Maintenance:

- Preset maintenance prompts and record usage data