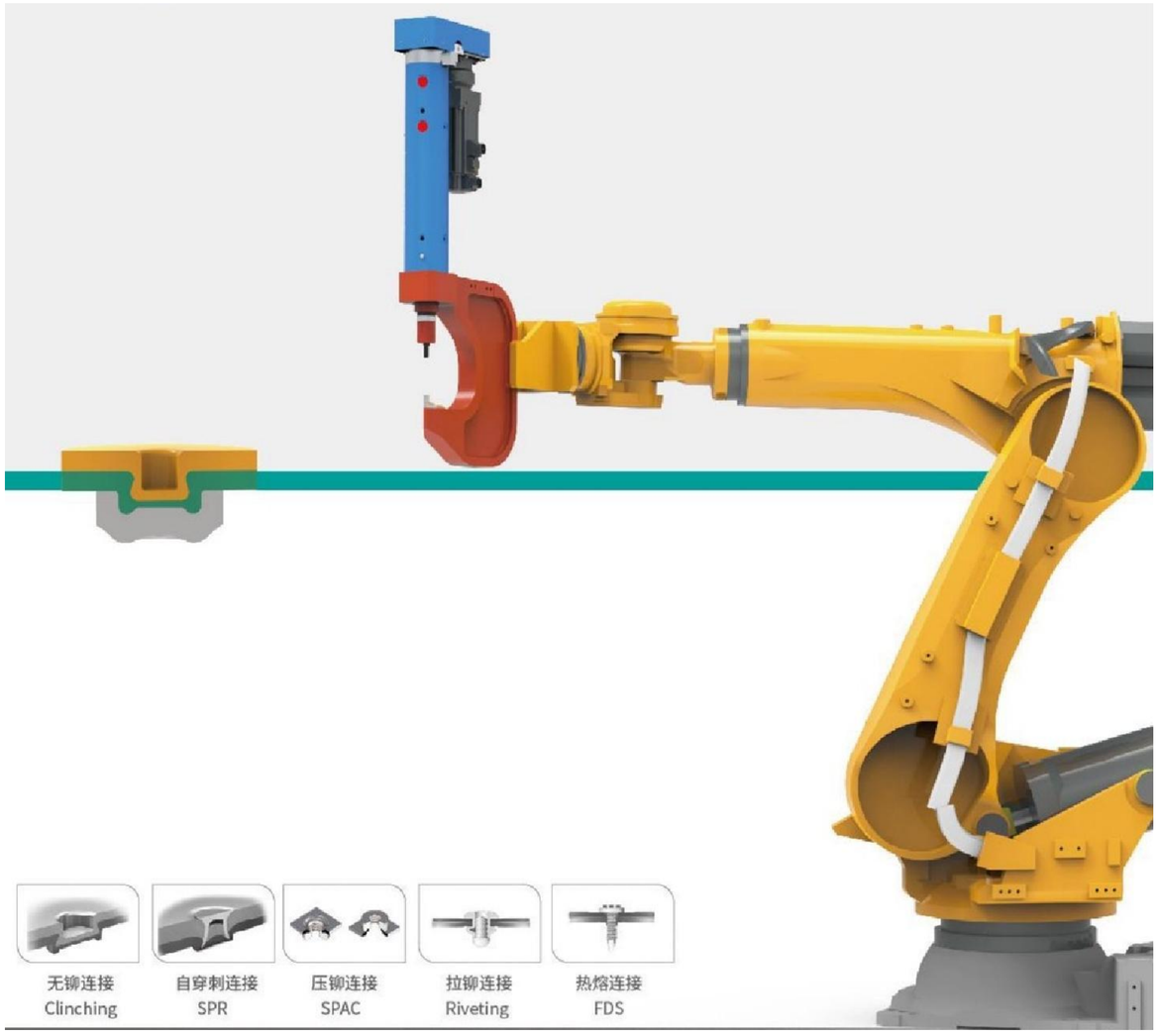
SIMITCH

Clinching Technologies



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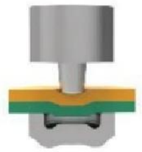
What is Clinching?

Clinching is a mechanical connection technology that uses the plastic deformation of the plate itself to embed the upper and lower layers of material into each other, forming a "mechanical lock" to achieve the connection of the plate. The cross section of the joint is shown in the figure. Compared with traditional connection technology, clinching machine has low cost and high energy utilization rate. It does not produce chemical pollutants during the connection process and is easy to integrate into automated production lines. The clinching connection process does not require high surface quality of the plate. It is suitable for the connection of plate surfaces with coatings or coverings. It is one of the important technologies for connecting lightweight plates.

Clinching Process

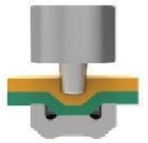
1



Positioning& Press-in

At this step, first make sure the punch is reset to the top dead center, put the lower sheet in flatly, then stack the upper sheet on the lower sheet, also pay attention to aligning the riveted area with the center of the mold.

2



Forming

Early forming stage: Press-in elastic stage, stretch forming stage.

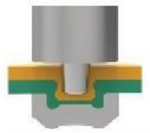
Initial press-in elastic stage: from the moment the punch contacts the upper sheet to the moment the upper and lower sheets begin to bend plastically.

3

Plastic deformation

During the clinching filling stage, the punch continues to move downward, squeezing upper and lower sheets until the punch reaches a near dead point.

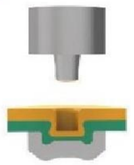
4



Holding pressure

During the holding pressure stage of forging, the die should continue to maintain pressure for a certain period of time to prevent the sheet from rebounding, so that the upper and lower sheets can fully fill the annular groove and ensure that the rivet-free riveted joints are completely formed.

5



Back pressure

In this stage,the punch moves upward.There is an inverted cone on the punch, it’s easy to demoulding.Move the punch upward,then take down the riveted sheet. If it is an automated riveting with multiple points connected, the entire mold must be separated from the riveted sheet first, and then the sheet or mold is automatically moved before a new riveting is performed.

Clinching Technology
Advantage

Compared with the traditional connection methods,clinching technology has obviously advantage:Low energy consumption and low costs,easy maintenance,eco-friendly.Long life time and precious technology,high connection strength,connection flexibility and process controllability.

Features

■ Low energy consumption and low costs.

Clinching does not require the consumption of raw materials and auxiliary materials, and its cost is only about 50% of spot welding, making it the preferred solution for reducing costs and improving economic benefits.。

■ Low costs & easy maintenance

Clinching machine is cheap and durable, with a simple structure and easy maintenance. In contrast, traditional equipment is prone to aging and has high maintenance costs.

■ Eco-friendly

The clinching points are beautiful in appearance and do not require additional surface treatment. And clinching do not cause noise or smoke pollution during operation,making them more environmentally friendly.

■ Long life time and precious technology

The service life of the clinching mold is long, the average lifetime can reach 100,000 to 300,000 times. The connection process is simple and does not require pre- or post-processing (such as punching, surface treatment), which improves work efficiency.

■Material compatibility

Clinching can solve the problem that traditional processes cannot connect metal materials such as aluminum, magnesium, and titanium. This makes clinching have unique advantages when connecting different materials or sandwich panels.

■Automation and connection quality

Clinching has a high degree of automation and can be connected at a single point or multiple points at the same time. It is the preferred connection method for mass production. There is no stress concentration at the connection point, and the fatigue resistance is higher than spot welding. The connection strength can be tested without damage and the whole process can be automatically monitored.

■ High connection strength

Although the connection strength of clinching is lower than that of self-piercing riveting, in general applications, its connection strength is sufficient to meet the needs. At the same time, clinching is more suitable for connecting thin plates.

■Connection flexibility

Clinching technology allows connections between panels of different thicknesses, different materials, and even different shapes. This flexibility enables it to meet a variety of complex design requirements.

■ Process controllability.

The clinching process can precisely control the position and shape of the connection points, thus ensuring product consistency and reliability.

Multi functional and diverse choices

Household appliances industry

- Washing Machine
- Tumble dryer
- Refrigerator
- Oven/stove
- Air conditioning ,dishwasher

Construction Engineering

- Garage door
- Elevator
- Lighting
- Exterior door/ interior door
- Busway

Ventilation duct industry

- Air duct
- Air filter
- Boiler
- Radiator
- Pocket filter

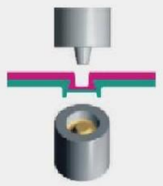
Automotive industry

- Roof frame
- Airbag
- Battery box
- Body area
- Top compartment
- Switch contacts

Process Competence

Dot connection

Using a simple round punch,on the SIMITCH pneumatic hydraulic clinching machine,through a stamping process,the connected plate can be squeezed into the corresponding die,so that it "flows" and deforms in the die,then producing a connection point without edges or burrs.

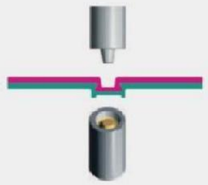


Double point connection

This new connection method is a two in one solution.Using one set mold (punch and die) to make two connections in one press stroke. This aims to increase production efficiency and prevent the connection point from turning. Compared with a single round point, its shear strength is up to twice and the tensile strength is up to 1.5 times.

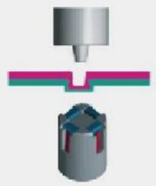
Micro point connection

Micro circular connectors with a tip diameter of 1.5 to 2 mm are the solution for miniaturization of components. They are ideal for metal sheets with a thickness of 0.1-0.5 mm and narrow flanges, where conductivity between the connecting layers is outstanding.



SKB Dot connection

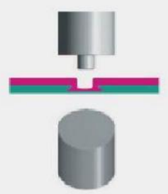
This clinching uses a special SKB die, which consists of a fixed part and a moving part with 4-6 movable die pieces. The fixed part ensures accurate centering to form the connection point, the sheet material and the punch are centered relative to this fixed part, and the movable parts between the fixed parts guide and constrain the "flow" of the sheet material at the connection point.



Process Competence

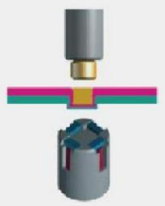
SKB flat point connection

For some plates, the raised dots produced by SIMITCH dot connection may be a hindrance. Therefore, after processing the SKB dots, the raised part can be pressed back to form a flat point (+0.1mm) using a flat point mold.



Riveting dot point connection

This connection is accomplished with a simple cylindrical rivet in a joining process using the drawing/pressing method. Similar to the circular joint, the materials to be joined are not cut but guided through a die form, resulting in a very durable joint - even in the case of thin materials.



Rectangular point connection ST

Rectangular point connection combines the process of cutting and deformation, and is mainly suitable for the connection of hard materials and stainless steel plates.

Three-flap mold connection

It has wider adaptability and better compatibility to sheet materials.

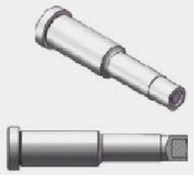
Clinching Tools

Besides riveting technology, SIMITCH also provides complete riveting mould for automated manufacturing.

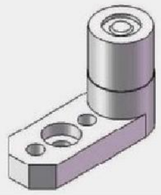
For your use of sheet metal stamping connection technology,we will provide you with unique and reliable quality assurance and service guarantee.

Types of Mould

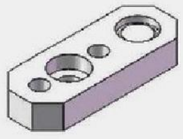
Flanged Punch



Round Joint flanged die

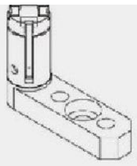


Round Joint Die,offset



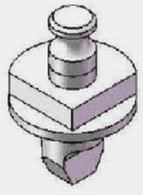
Round Joint Die,flat

SPFB flanged die

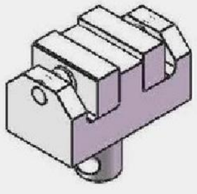


SFZG die offset

EPTS Segment die



EPAA Square point punch



EPBB Square DIE

SIMITCH Test Report

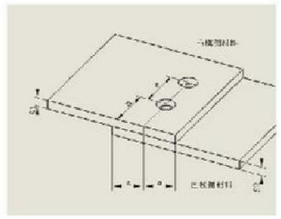
It is our quality guarantee to you. Under same condition, the SIMITCH point connection strength of your workpiece is guaranteed to reach or exceed the corresponding technical indicators in the test report.

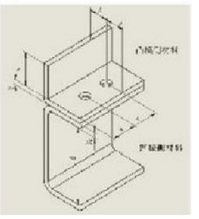
SIMITCH Mould Certificate

Each time we provide mould, the mould manufacturing and maintenance related matters also will be provided.
SIMITCH technical file computer management system can dynamically provide you with SIMITCH technology at any time, including comprehensive technical information and technical changes. This ensures that our company's technical engineers can quickly provide you with technical support.

Mould Installation Guidelines

The following parameters are the limiting parameters of the SIMITCH stamping connection process and should be noted by users when using this technology. It will assist designers in correctly designing the SIMITCH connection process. If your specific application does not meet the requirements of the following parameters, please contact us directly.





Possible connection point diameter	3					10	12
Possible plate thickness combination Punch side plate thickness S1	About 2.5÷3.0×S2						
Possible plate thickness combination Die side plate thickness S2	About 2÷2.5×S1						
Total combined plate thickness S1+S2	0.5-1.5	0.8-2.0	1.0-2.0	1.0-3.0	1.5-5.0	2.0-6.0	
Edge distance almin	5	5	6			8	
Edge distance blmin			6				
Edge distance b2min	5	5	6		7	8	
Minimum distance b3 from connection point to bend edge Pay attention to the bending radius	10	10	10	10	14	16	
Minimum distance e between two adjacent connection points	12	12	12	12	15	17	
Free space d when using standard mold	52	52	52	52	52	52	
Free space d when using flat plate	20	20	20	20	20	20	
Maximum wing length X	No limit						

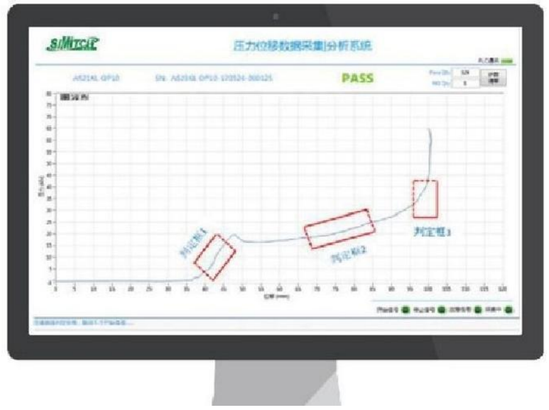
System Competence

One system – many possibilities!

Our multi-technology control system operates and monitors all functions, is drive-independent and can be used for any technology. When the robot changes grippers, the system recognizes the parameters and continues working, which creates the highest degree of flexibility.

Process Monitoring Equipment

The system supports simultaneous acquisition of multiple sets of pressure-displacement data, forming curves for display respectively, independent criteria for judgment, curves can be combined and displayed in one chart, closed-loop control, monitoring riveting quality



Riveting Machine

During the riveting process,high forces are required to press the punch into the material,and these forces are generated by a servo press or a pneumatic hydraulic cylinder.

Servo Press

SIMITCH--BP bending series servo press is suitable for precision press fitting with a force range of 10-200kN.

Servo press is the machine that integrates assembly and measurement. Both semi-automatic workstations and fully automatic equipment lines can be integrated.

It can effectively monitor the relationship between force and displacement in high-precision assembly processes such as pressing, riveting, forming and elasticity testing.

Pneumatic Hydraulic Cylinder

SIMITCH pneumatic hydraulic cylinder is a complete drive system. Its different structural forms and specially designed accessories make it suitable for different situations.

Punching force 5-2000kN, short action pressure stroke.

Clinching Machine -Standard Type

CEC Universal Clinching Machine

- Feature:Big throat depth
- Drive:SIMITCH pneumatic hydraulic BS series cylinder
- Main part:

1.Pneumatic hydraulic cylinder
2.CEC machine frame
3.STE safety control system

Part Number	Max. Capacity		Throat depth	Opening distance
	KN	T	mm	mm
CEC 8	78	7.8	500	45

CEU Universal Clinching Machine

- Feature:Big throat depth
- Drive:SIMITCH pneumatic hydraulic BS series cylinder
- Main part:

1.Pneumatic hydraulic cylinder
2.CEU machine frame
3.STE safety control system

Part Number	Max. Capacity		A	B	C	D	H
	KN	T					
CEU 08	78	7.8	935	700	1100	500	60
CEU 15	134	13.4	1045	800	1100	500	60

Clinching Machine

TCEU Air Duct Clinching Machine

- Feature: Big throat depth
- Drive: SIMITCH pneumatic hydraulic BS series cylinder
- Main part:

1.Pneumatic hydraulic cylinder
2.CEU machine frame
3.STE safety control system

Part Number	Max. Capacity		Throat depth	Opening distance
	KN	T	mm	mm
TCEU 8	78	7.8	400	45

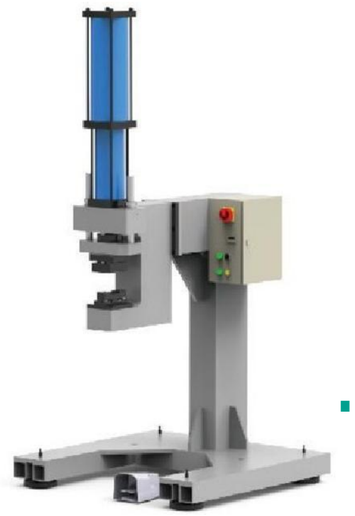
CEB Benchtop Clinching Machine

- Feature: It can be used as a benchtop or clamp-type machine, and can also be installed in a production line as an independent dedicated unit.
- Drive: SIMITCH pneumatic hydraulic BS/BT series cylinder
- Main part:

1.Pneumatic hydraulic cylinder
2.CEB machine frame
3.STE safety control system

Part Number	Max. Capacity		A	B	C	D	E	H	T Groove
	KN	T							
CEB 02	18.4	1.84	400	400	220	160	100	300	10
CEB 04	38.2	3.82	450	450	220	160	100	300	12
CEB 08	78	7.8	450	480	250	160	120	320	12
CEB 15	134	13.4	500	600	314	200	150	350	14
CEB 20	184	18.4	550	660	450	300	200	350	18
CEB 30	283.6	28.36	550	660	450	300	200	350	18

Clinching Machine



CEJ Universal Clinching Machine

Feature:Tooling fixture can be specially designed according to the product.

D and H dimensions can be changed according to tooling.

■Drive: SIMITCH pneumatic hydraulic BS series cylinder

■Main part:

1.Pneumatic hydraulic cylinder

2. CEJ machine frame

3. STE safety control system

Part Number	Max. Capacity KN	T	A	B	C	D	H
CEJ 15	134	13.4	1100	1050	890	130	260

PC floor type Clinching Machine Series

■Feature:The dimension of the machine can be customized according to the customer's product requirements.

Simitch pneumatic hydraulic cylinder BS/BT series

■Main part:

1.Pneumatic hydraulic cylinder

2. PC machine frame

3. STE safety control system

Part Number	Max. Capacity KN	T	A	B	C	D	H	T Groove
PC 8	78	7.8	900	600	750	205	280	12
PC 15	134	13.4	900	660	750	225	350	14
PC 20	184	18.4	1200	750	750	255	400	18
PC 30	283.6	28.36	1300	800	750	255	450	18
PC 50	477.6	47.76	1400	1000	750	255	550	18
PC 75	735.7	73.57	1500	1200	750	255	550	18
PC 100	990	99	1600	1200	750	255	550	18

MA 4-column clinching machine

■Feature:The dimension of the machine can be specially designed according to the customer's product requirements.

Simitch pneumatic hydraulic cylinder BS/BT series

■Main part:

1.Pneumatic hydraulic cylinder

2. MA machine frame

3. STE safety control system

Part Number	Max. Capacity KN	T	A	B	C	D	E	H	T Groove
MA 4	38.2	3.82	790	810	775	200	160	280	10
MA 8	78	7.8	790	810	775	310	200	350	12
MA 15	134	13.4	790	810	775	350	250	380	14
MA 20	184	18.4	790	810	775	360	260	400	18
MA 30	283.6	28.36	790	810	775	360	260	400	18
MA 50	477.6	47.76	1000	810	775	400	260	550	18
MA 75	735.7	73.57	1000	810	775	500	280	350	18

MB 4-column clinching machine

■Feature:The dimension of the machine can be specially designed according to the customer's product requirements.

Simitch pneumatic hydraulic cylinder BS/BT series

■Main part:

1.Pneumatic hydraulic cylinder

2. PC machine frame

3. STE safety control system

Part Number	Max. Capacity KN	T	A	B	C	D	E	H	T Groove
MB 4	38.2	3.82	790	810	775	270	300	280	10
MB 8	78	7.8	790	810	775	290	350	350	12
MB 15	134	13.4	790	810	775	300	350	380	14
MB 20	184	18.4	790	810	775	360	350	400	18
MB 30	283.6	28.36	790	810	775	360	350	400	18
MB 50	477.6	47.76	1000	810	775	400	450	550	18
MB 75	735.7	73.57	1000	810	775	500	500	350	18

Clinching Machine

Portable clinching tong

■Feature:Handheld & portable

■ Drive:Pneumatic hydraulic cylinder

■ Main part:

1.Split type pneumatic hydraulic cylinder

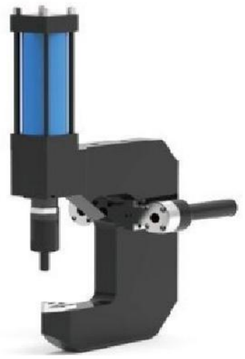
2.Clamp body

3.Supercharger

4.Suspension arm

5. Balancer

Part Number	Max. Capacity	A	D	H
	KN T			
CRH03 45	45 4.5	28.5	40	27
CRH03 45	45 4.5	35	60	27
CRH03 75	75 7.5	118	110	45
CRH03 75	75 7.5	118	160	45



C type tong

X type tong

Application examples

SIMITCH-CLINCHING

Safety Airbag clinching machine

■Power source:Pneumatic hydraulic cylinder,servo cylinder

■Machine type:CEC,CEU,CEJ,TPC

■ Pressure switch: displacement control return

■ Equipment function: manual placement of workpieces

SIMITCH-CLINCHING

Electronic component clinching machine

■Power source:Pneumatic hydraulic cylinder,servo cylinder

■Machine type:PC,MA,MB,CEB,CEC

■ XYZ Servo Platform:Automatic translation of parts

■ Quality management: Pressure displacement data management system

■Function:Place the workpieces manually

Application examples

SIMITCH-CLINCHING

Washing machine clinching machine

- Power source:Pneumatic hydraulic cylinder,servo cylinder
- Machine type:PC,MA,MB,CEB,CEC
- Servo Platform:Automatic translation of parts
- Quality management:

Pressure displacement data management system

- Function:Place the workpieces manually

SIMITCH-CLINCHING

Washing machine clinching machine

- Power source:Pneumatic hydraulic cylinder,servo cylinder
- Machine type:PC,MA,MB,CEB,CEC
- Servo Platform:Automatic translation of parts
- Quality management:

Pressure displacement data management system

- Function:Place the workpieces manually

Application examples

SIMITCH-CLINCHING

Integrated stove clinching machine

- Power source:Pneumatic hydraulic cylinder,servo cylinder
- Machine type:PC,MA,MB,CEB,CEC
- Servo Platform:Automatic translation of parts
- Quality management:

Pressure displacement data management system

- Function:Place the workpieces manually

Application examples

SIMITCH-CLINCHING

Dishwasher liner automatic riveting production line

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

SIMITCH-CLINCHING

Air conditioner chassis automatic riveting production line

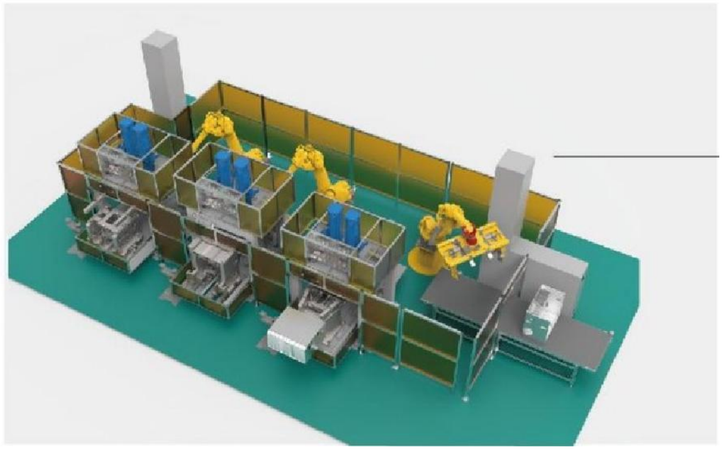
- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

Application examples

SIMITCH-CLINCHING

Automatic riveting production line for drum washing machine cover

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement



SIMITCH-CLINCHING

Integrated stove box automatic riveting production line

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

Application examples

SIMITCH-CLINCHING

Air valve hinge plateclinching platform

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

SIMITCH-CLINCHING

Air valve corner clinching platform

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

Application examples

SIMITCH-CLINCHING

Air valve shaft bracket clinching platform

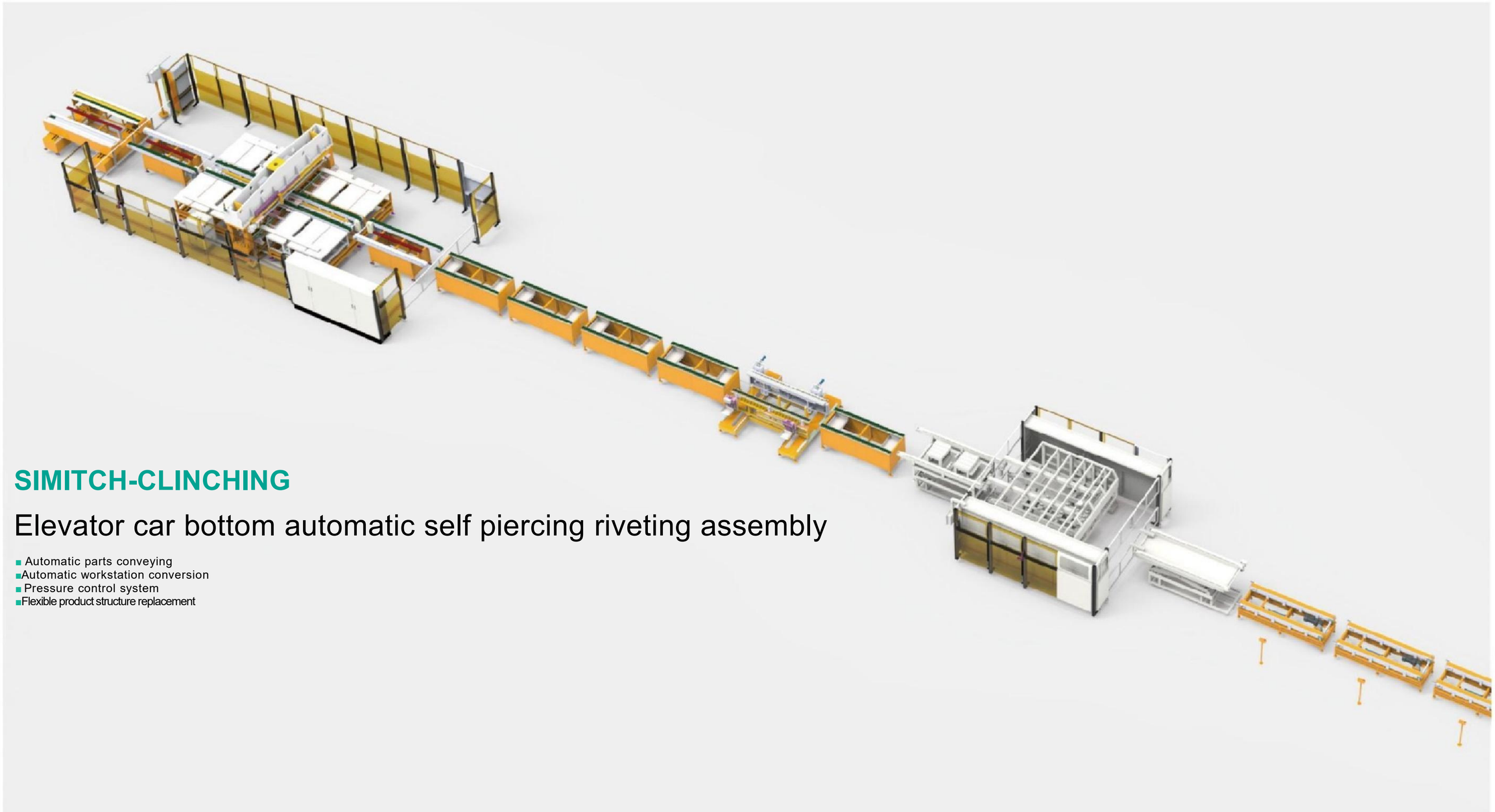
- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

SIMITCH-CLINCHING

Air valve frame clinching platform

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

Application examples



SIMITCH-CLINCHING

Elevator car bottom automatic self piercing riveting assembly

- Automatic parts conveying
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement

Application examples

SIMITCH-CLINCHING

电梯轿顶手动铆接线

Elevator car roof manual riveting production line

- Power source:Pneumatic hydraulic cylinder
- Automatic workstation conversion
- Pressure control system
- Flexible product structure replacement