



SPLICE CRIMPING



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SM Crimp 2000 - splice crimping of various components

SCS (Splice Crimping Station) – automatic straightening, cutting, stripping, twisting and splicing

HSCS (High-Speed Splice Crimping Station) – high-speed automatic connection of wires and connectors





SPLICE CRIMPING

SPLICE CRIMPING TECHNOLOGY

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SPLICE CONNECTION - FROM WIRES AND PCB TO DIODES AND COILS

Splice is a solderless crimp connection formed by crimping a metal clip onto ends of components.

Unlike standard terminals, splice connection is applicable to any electrical and mechanical components of various dimensions and materials: wire, PCB, coil, capacitor, sensor, diode, lead frame, textile, rubber, etc. In contrast to welding and soldering, it is vibration resistant and its quality can be evaluated both within and after production.

Customization and reliability of splice solution is further enhanced, since SM Contact R&D department defines optimal connection, tooling and splice band parameters at the beginning of the project.

Splice connections are widely used by automotive components suppliers of VW, BMW, PSA, Renault, etc.

Splice advantages



Reproducible quality

Splicing as a mechanical process allows getting high reproducible quality. With the precise tooling and splice band, the quality of a product stays the same from cycle to cycle.



Gastight

Deformation of components and the splice during splicing process guarantees gastight connection.



Deformation and vibrations resistance

Splice crimping doesn't involve heating unlike soldering, thus it keeps components out of burning or melting risks and guarantees good behavior under deformation and vibrations.



Universal

Splice connection can be performed with various types of components (PCBs, wires, coils, sensors, plastic connectors, filament, etc.), materials (fiber, Teflon, chrome, steel, etc.) and size.



Easy to go

Thanks to automation, it's possible to make up to 2 000 splices per hour without any experience in splicing.



Adaptable to product

Tooling is designed individually for each product so that the splice fits perfectly the components and forms reliable connection.



Low electrical resistance

Connection and tooling engineering guarantees stable low electrical resistance preventing loose strands, misaligned connection and other defects.



Compact

Splice allows making compact and constant size connection with minimum dimensions such as 0.46*0.24 mm cross-section for an artificial cardiac pacemaker. Space saving feature is ideal for sensors, bulbs, heating elements, etc.



Quality control

Unlike soldering, splice quality is easy to be controlled with the help of inline systems (Crimp Force Monitor, camera position and color control, Poka Yoke, etc.) or standalone laboratory equipment (cross section, pull force, crimp height measurement, etc.).


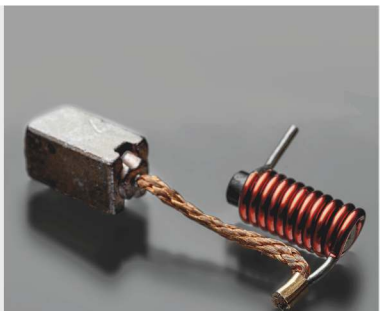





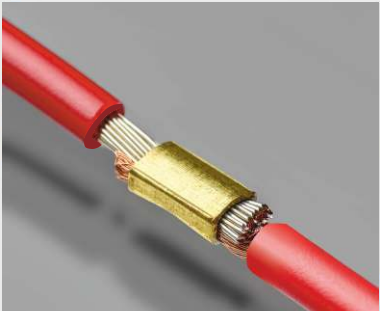





Cost-efficient







Splice spare parts are cheaper than ones for welding and soldering and they need to be changed rarely, each 300 000 – 3 000 000 assemblies depending on components type.



Component types

 <p>DIODE & CAPACITOR</p>	 <p>WIRE & COIL</p>	 <p>WIRE & LEADFRAME</p>	  
 <p>WIRE & PCB</p>	 <p>WIRE & WIRE</p>	 <p>WIRE & PLASTIC BODY SWITCH</p>	  

Application fields

 <p>AUTOMOTIVE</p>	 <p>ALTERNATIVE ENERGY</p>	 <p>ELECTRONICS</p>	  
 <p>LIGHT INDUSTRY</p>	 <p>MASS MARKET</p>	 <p>MEDICAL INDUSTRY</p>	  



SPLICE CRIMPING

SPLICE CRIMPING TECHNOLOGY

Splice connection expertise

SM Contact designs and produces splice crimping machines for a wide range of electrical components.

We start each project with profound connection and tooling qualification to define its optimal parameters, to adapt machine specification, and to match industry norms.



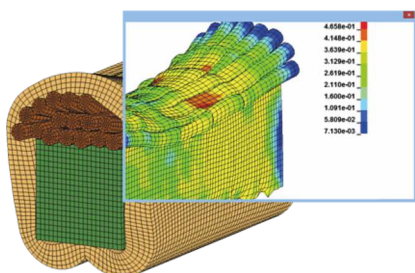
TOOLING DEFINITION

We do:

Perform computer simulation of strains and stresses during splice crimping using FEA software and connections database.

You get:

Equipment type, clincher type (standard, CI-type or special) and size, punch tip shape (standard or double trumpet), special tool necessity definition.



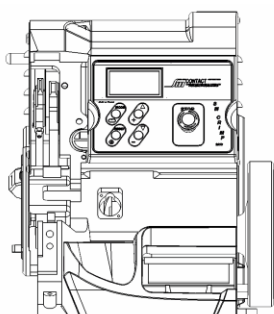
LABORATORY TESTS

We do:

Make samples and perform laboratory study of pull-force, electrical resistance, galvanic corrosion, thermal stress test and cross-view.

You get:

Connection datasheet validated for different splice heights and compression according to components tolerances (reference connection cross-view shape and dimensions for machine adjustment, tooling requirements, etc.).



01
STEP

SPLICE BAND DEFINITION

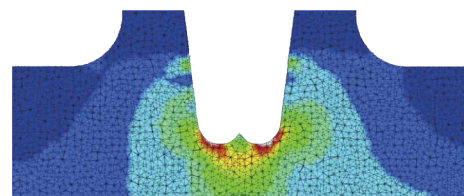
We do:

Define splice band features depending on type of application, component materials, working environment and temperature range.

You get:

Splice band material (LA, LE, CN, CE, IN), type (standard serrated, M-type), thickness (0.2 – 0.53 mm), length (1,5, 2, 3, 4, 6, 7 mm or upon demand), and height.

02
STEP



03
STEP

SPLICE CONNECTION SIMULATION

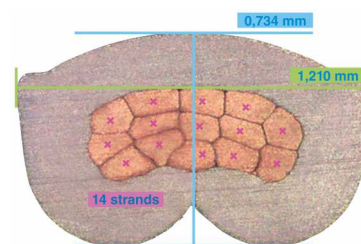
We do:

Using FEA software, we construct components computer model of defined type and materials and simulate strains and stresses during splice crimping.

You get:

Optimal connection parameters and its improvement options to match industry norms and Customer's demand (dimensions and components positioning, compression rate, internal stress levels, contact resistance, and interconnection surface).

04
STEP



05
STEP

EQUIPMENT MANUFACTURING

We do:

Engineering department adapts automation level, speed, special options and quality control devices.

You get:

Splice crimping equipment customized for Customer's application, as well as for quality, automation, cost and production volume requirements.



SPLICE CRIMPING EQUIPMENT

Depending on configuration, equipment performs insulation stripping, single or multiple splice crimping, inline quality control, and defective products removal.

Choose one of SM Contact equipment configuration to manufacture gastight, vibration resistant, compact connection with low electrical resistance.

Advantages of splice crimping equipment



Quality control equipment

Laboratory equipment allows to control industry norms or any other special requirements compliance: micrograph laboratories, pull force and crimp height measurement tools, specialized software, etc.



Crimping tooling set

Each part is customized for the product, its materials, working environment and temperature range to guarantee reliable connection.

Integrated memory keeps application parameters, recommended settings and spare parts list.



Built-in quality control

Laser and camera devices control presence, position and color of components, components and tooling defects, stripping length, etc. Real-time video of a work-area simplifies components positioning.

Crimp Force Monitor detects any deviation from quality tolerances and provides automatic rejection of defective items.



Splice band

Splice band is defined according to the type of application and environment temperatures: its type and material (brass, brass with tin coating, chrome-nickel, chrome-nickel with tin coating, stainless steel), thickness (0.2 – 0.53 mm), length (1.5, 2, 3, 4, 6, 7 mm or upon demand), and height.



Usability

HMI provides intuitive process control and readjustment to another product in flowchart or product visualization. It shows complete work algorithm, indicating the current step and step when the failure occurred.



Universal

Equipment can be configured depending on the required additional operations (stripping, straightening, cutting, twisting) and on the type of components feeding (manually one-by-one, automatically in bulk or in embossed carrier tape).



Motorized feeding system

Splice band feeding system controls the length of each splice precisely with a sensor and prevents damages of splice ribbon surface due to rubber feeding wheel.



Quick switch to another product

Splicing parameters are defined by a tooling cassette which can be easily changed within 1 minute. Built-in circuit board contains key connection parameters and transfers it to splice equipment automatically.



Operator's safety

Safety of operation is assured by safety beams, lighting and safety covers depending on the equipment configuration. Safety beams detect any foreign object presence and stop the cycle.



Automation

Depending on the machine configuration, various parameters can be controlled automatically: zero position of a punch guide, splice height, components position.



Qualification

Certification conformity: CE, Apave, TÜV



SPLICE CRIMPING

SPLICE CRIMPING EQUIPMENT

SM Crimp 2000 Standard

SPLICE CRIMPING WITH MANUAL COMPONENTS POSITIONING

Technical characteristics

Power supply	240 V AC / 500 W / 2A*
Cycle time	300 ms
Noise level	< 75 dB
Weight	56 kg
Dimensions including hand wheel (WxDxH)	291 x 490 x 340 mm**
CE	✓
TÜV, Apave	✓

* Adaptable to 110 V

** May vary depending on configuration



Operation area
with fingerguard

SM Crimp 2000 Standard operation includes components manual positioning, when operator holds components within splice area, and splice crimping by pressing the foot pedal.

Cast iron frame provides stability during splice crimping.

Upgrade 2018

- Control panel with buttons - changed to touch screen.
- Hand wheel for machine adjustment - replaced by motor control via touch screen.
- 2 encoders - added for automatic control of a splice height and machine initial position.
- Fast upgrade to Advanced version thanks to plug-and-play fixture installation.

SM Crimp 2000 Advanced

SPLICE CRIMPING WITH SEMI-AUTOMATIC COMPONENTS POSITIONING

Technical characteristics

Power supply	240 V AC / 2400 W / 10 A*
Cycle time	300 ms
Noise level	< 75 dB
Weight	56 kg
Dimensions including hand wheel (WxDxH)	291 x 490 x 340 mm**
CE	✓
TÜV, Apave	✓

* Adaptable to 110 V

** May vary depending on configuration



Automatic table with exchangeable jig for splice crimping of 2 sensors with wires

SM Crimp 2000 Advanced differs from its Standard version with two aspects:

1. Components are located to the special movable worktable – fixture;
2. Splice crimping can be performed not only by pressing the pedal, but also automatically.

Fixture can be customized to match the shape of corresponding components or it can be equipped with a removable customized jig. In both cases, accurate and secure positioning of components is assured. It also prevents double crimps in the same position. Two jigs can be useful in case of high volumes: while one is being processed, second is reloaded.

Fixture is moved between loading and operation stages manually by operator or automatically with servomotor.



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SPLICE CRIMPING EQUIPMENT

SCS (Splice Crimping Station)

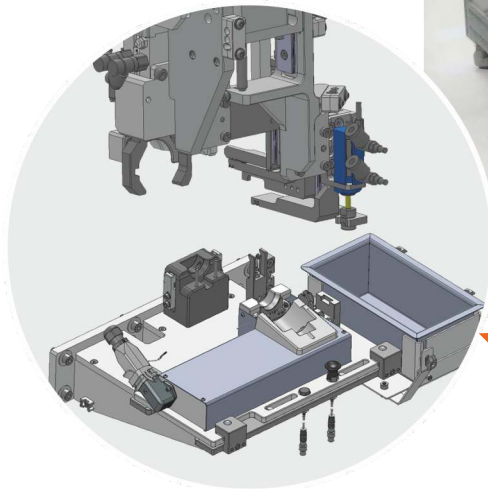
AUTOMATIC STRIPPING AND SPLICE CRIMPING



Technical characteristics

Power supply	240 V AC / 2400 W / 10 A*
Max. power	2 kW
Pneumatic pressure	6 bar
Cycle time	3 - 5 sec.
Noise level	< 75 dB
Weight	550 kg
Dimensions (WxDxH)	900 x 1600 x 1500 mm
CE	✓
TÜV, Apave	✓

* Adaptable to 110 V



Fixture and clamps specific design for customer components

SCS provides all required manipulations for customized splice connection: straightening, cutting, stripping, twisting and splicing.

Components are manually loaded to the fixture, customized in accordance to their quantity, shape and size. Fixture is moved between loading and work area automatically with servomotor. 3-axis automatic manipulators transfer components from one unit to another. Each manipulator is customized to fit application. It prevents damage and guarantees precise and safe operation.

All steps can be controlled by camera, laser and sensors. Electrical setting of machine height allows comfortable sitting and standing position of operator.



HSCS (High-Speed Splice Crimping Station)

SEMI-AUTOMATIC STRIPPING AND SPLICE CRIMPING FOR INTERFACE AND WIRES

Technical characteristics

Power supply	240 V AC / 2400 W / 10 A*
Cycle time (manual wires loading and connector unloading)	6 - 7 sec.
Cycle time (automatic wires loading and connector unloading)	5 sec.
Noise level	< 75 dB
Weight	approx. 600 kg
Dimensions (WxDxH)	1640 x 780 x 1970 mm
CE	✓
TÜV, Apave	✓

* Adaptable to 110 V



Components operation area

HSCS is designed for high-speed automatic connection of wires and connectors. Feeding of all components is synchronously performed by motorized wire and connector manipulators.

Various additional options are available on demand: straightening, cutting, stripping, twisting, etc. Such quality features as components presence, stripping length and crimp force can be assured by camera and laser control, CFM and other systems.

Machine and all its components can be integrated into floor-mounted frame with PLC and HMI units for operation control.

CNC stripper is equipped with two brushless servomotors, one is for blade motion and another is for transfer of wire manipulator to splice clincher. Stripper can be adjusted by HMI for precise jog mode. Stripping length is managed by mechanical stopper equipped by micrometer screw from Mitutoyo.



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SPLICE CRIMPING EQUIPMENT

Specification summary

Features	SM Crimp 2000	SM Crimp 2000 Advanced	SCS	HSCS
Cast iron frame	+	+	+	-
Crimp height adjustment	+	+	+	+
Touch screen interface	+	+	-	-
Crimping tooling set	+	+	+	+
Manual fixture	-	+	-	-
Automatic fixture with jig	-	+	+	-
Automatic manipulators	-	-	+	+
Splice band	+	+	+	+
Motorized splice band feeding system	+	+	+	+
Hand wheel	+	+	-	-
CE conformity and Apave (TÜV) certification	+	+	+	+
Safety cover	-	-	+	+
CNC stripper	-	-	-	+

Options

Crimp Force Monitor (CFM)	+	+	+	Standard feature
Cutting unit	+	+	+	+
Components camera control	-	+	+	+
Component position video verification	+	+	-	-
Laser control	-	-	+	+
HMI	-	+	+	+
POKA YOKE	-	+	+	+
Lighting and safety beams	-	+	-	+
Bimanual cycle start	-	+	-	-
Frame and cabinet	-	+	-	Standard feature
Double crimping	-	+	-	-
Straightening, twisting and stripping station	-	-	+	+
Vibrating feeder	-	-	-	+



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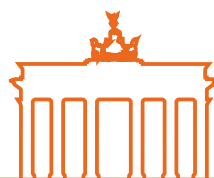
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